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<td>For City review.</td>
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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. American Society for Testing Materials (ASTM)
   - ASTM D1587  Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes
   - ASTM D2113  Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation
   - ASTM D5093  Standard Test Method for Field Measurement of Infiltration Rate Using Double-Ring Infiltrometer with Sealed-Inner Ring

2. City of Miami Beach Code of Ordinances

3. City of Miami Beach Environment and Sustainability Department
   - Environmental Permitting Handbook

4. Environmental Protection Agency (EPA) Regulations

5. Florida Administrative Code (FAC)

6. Florida Building Code

7. Florida Department of Environmental Protection (FDEP) Regulations

8. Florida Department of Transportation (FDOT)
   - Design Standards
   - Standard Plans for Road and Bridge Construction

9. Florida Statutes (F.S.)

10. Miami-Dade County
    - Code of Ordinances
    - Miami-Dade County Department of Public Works Manual
11. Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM) Regulations

12. Occupational Safety and Health (OSHA) Regulations

13. South Florida Water Management District (SFWMD) Regulations

B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

   Section 3. Right-of-Way Construction Requirements
   Section 8. Surveying, Drawing, and Drafting Requirements
   Section 9. Erosion and Sediment Control
   Section 10. Earthwork and Roadwork

1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the
Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

PART 2 – GEOTECHNICAL CONSIDERATIONS

2.01 GENERAL

A. Geotechnical, soil testing, and/or laboratory testing services are required steps in the proper planning of construction projects for the City. Many of the City’s Capital Improvement Projects and Public Works projects will require a geotechnical, soils, or laboratory testing report to validate either the City of Miami Beach or any Architect’s or Engineer’s recommendations as to any site, building, or any other project’s unknown characteristics.

B. The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the nature and location of the work, the confirmation of the ground, the character and quality of the substrata, the types and quantity of materials to be encountered, the nature of the ground water conditions, the character of equipment and facilities needed preliminary to and during the execution of the work, the general and local conditions, and all other matters which can in any way affect the work under the Contract. The prices established for the work to be done will reflect all costs pertaining to the Work. Any claims for extras based on substrata or ground water table conditions will not be allowed.

C. Information on subsoil conditions consisting of soil borings and environmental issues shall be included in the Contract Documents. The Contractor shall perform any additional soil investigations he deems necessary at his own expense.

D. The City and/or the Engineer will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the geotechnical investigation was made. The Contractor shall examine the site and review the available geotechnical boring logs or undertake its own subsurface investigation prior to submitting its bid, taking into consideration all conditions that may affect its work.

2.02 SCOPE OF SERVICES

A. The Consultant shall provide all labor, materials, equipment, transportation, and other appurtenant work for performing subsurface explorations, obtaining representative samples, and performing all other geotechnical services.
B. The Consultant shall comply with all Local, State, and Federal rules and regulations with regard to permits, bonds, drilling, plugging, and all other applicable aspects of drilling.

C. The Consultant shall research and review all pertinent existing geologic and geotechnical data and information available from United States Geological Survey (USGS), area development, and the company’s own files.

D. The Consultant shall review the proposed project information and requested scope of work indicated as a minimum level of services desired relative to the anticipated subsurface conditions present. If localized subsurface conditions are expected to vary significantly, Consultant shall advise City or designee of additional recommended services prior to commencing work.

E. The Consultant shall be responsible for contacting the appropriate agencies (state/city utility check) for determining locations of utilities in the vicinity of the actual boring locations, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

F. Borings shall be backfilled to the original ground surface in accordance with all applicable Local, State, and Federal guidelines.

G. Consultant shall perform the standard penetration test (SPT) in accordance with ASTM D1956.

H. In soil that is predominantly cohesive (silty clays, sandy clays, and material with adhesive binder), Consultant shall use the thin-walled tube method for sampling in accordance with ASTM D1587.

I. Rock coring shall be performed in accordance with ASTM D2113.

J. Double-ring infiltration test shall be conducted in accordance with ASTM D5093.

K. Laboratory tests shall be performed by the Consultant to classify soils and obtain geotechnical physical characteristics such as strength, compressibility, swell potential, compaction characteristics, and chemical characteristics such as corrosiveness. Perform laboratory testing consistent in quantity and quality with local geotechnical engineering practice to provide the required design parameters and recommendations. The quantity of tests to be performed will be dependent upon the type of soil and/or rock encountered during drilling and sampling with additional consideration of the foundation types that may be required to support the proposed structures.

L. The Consultant shall prepare a geotechnical engineering report containing a discussion of the proposed construction, final boring logs, boring location plan, a description of the drilling and sampling program, a description of the geology and subsurface conditions encountered, groundwater conditions, laboratory test results, and foundation and earthwork recommendations and design parameters.
2.03 GEOTECHNICAL ENGINEERING REPORT

A. The following is a list of major items that shall appear in the Geotechnical Engineering Report.

1. Previous Construction Activity and Existing Fill (if present): A discussion of previous construction activity shall address any existing fills or subsurface openings, if encountered. Outline the engineering properties of any existing fills with regard to foundation design.

2. Subsurface Conditions: Subsurface conditions encountered at the site shall be discussed, based upon stratigraphic sequence observed and local geology. Figures shall be provided displaying soil borings and generalized cross sections. A general description of the engineering properties or parameters determined from the investigation and applied to design recommendations shall be provided. Prevailing groundwater elevations observed and those recommended for design shall be noted.

3. Site Preparation Recommendations: Provide grading and site preparation recommendations taking into consideration the conceptual grading plan for the site.

4. Compaction Requirements: The report shall contain detailed and specific criteria for acceptable embankment, fill, or backfill materials and address whether the available borrow material on site is suitable for select backfill, suitable backfill, or structural backfill. The report shall contain recommendations for material usage at the site with regard to placement and compaction requirements as well as any recommended treatment. Compaction criteria, including acceptable gradations, moisture control, compactive effort, and need for proofrolling shall be discussed, including criteria for both granular and cohesive fill, if applicable. Preparation of subgrades for fill and backfill placement shall be discussed.

5. Foundation Design: The Geotechnical Engineering Report prepared by the Consultant will be used to size and structurally design stable foundations for the structures. To accomplish this task, the report shall contain recommendations in regard to the recommended foundation type for each structure, as loading and site conditions may require.

B. The report shall provide net allowable bearing pressures for shallow spread footings and mats, at recommended bearing depths, considering the types of materials supporting the mats, and note whether any over stressing is allowed under short-term loading such as dynamic, wind, or seismic loading conditions. If over-excavation of unsuitable materials and backfill with structural backfill are required to improve the foundation soils to allow the use of shallow foundations, provide estimated vertical and horizontal extent of the over-excavation and structural backfill. Provide estimated total and differential settlement for foundations using the recommended bearing pressures. Provide an estimate of the time of settlement. Note factors of safety included or recommended.
recommendations for resistance to lateral loads, such as passive earth pressures and sliding friction for the base of foundations. Provide recommended groundwater level for determination of buoyancy and means to resist buoyant forces, if needed.

C. Recommendations for deep foundations shall include diameter, depth, and any recommended installation requirements. Provide allowable design loading capacities for vertical downward loading, vertical upward loading, and horizontal loading, as appropriate to the site conditions.

D. Provide design parameters for analysis of laterally loaded drilled piers and required input into lateral pile capacity software. All factors of safety utilized in developing the allowable load capacities shall be outlined in detail.

1. Slope Stability and Excavations: The report shall address the recommended inclination of both temporary excavation and permanent slopes.

2. Excavation Requirements: If necessary, a section of the report shall address the excavatability of the soils and rock which may be exposed during foundation excavation and site grading. The effort and type of equipment utilized to perform excavations is dependent upon the size and depth of the excavation. Thus, the discussion shall be in regard to area-type excavations and confined excavations, such as utility trenches.

3. Dewatering: Conditions present at the site requiring groundwater control, dewatering, or surface drainage during excavation for mats, footings, and other construction shall be discussed. Anticipated types of dewatering shall be described. Special consideration to exposed sub-soils within the bottom of excavations during construction shall be addressed.

4. Corrosion Potential and Chemical Attack to Concrete: An evaluation of representative subsurface materials shall be performed to provide laboratory test results for chemical constituents, specifically parts hydrogen (pH), chloride ion, soluble sulfates, and sulfides, as well as electrical resistivity. These parameters are required to evaluate the potential for corrosion to underground piping and grounding and selection of cement type to resist potential sulfate attack.

5. Pavement and Roadway: Provide typical pavement thickness suggestions.

E. Any other items of consideration as deemed necessary by the Consultant.

F. The Geotechnical Engineering Report shall be signed and sealed by a Professional Engineer registered under the regulatory laws of the State of Florida.
PART 3 – TRAFFIC ENGINEERING

3.01 ROADWAY FUNCTIONAL CLASSIFICATION

A. Functional classification establishes the hierarchy of the roads as well as the authorities responsible for them: State, County, or Local.

B. The State Roads are aligned near the East and West edges of the City limits, primarily traveling North and South, as well as making connections to the MacArthur Causeway (I-395), Julia Tuttle Causeway (I-195), and John F. Kennedy Causeway.

C. Within the interior of this State Road loop reside the majority of the local roads.

D. Arterials are major streets expected to carry large volumes of traffic. Arterials are often divided into major and minor arterials, and provide regional as well as local connections. All state roadways mentioned above are classified as arterial.

E. Collectors, as the name implies, collect traffic from local roads and distribute it to arterials. Traffic on collectors is usually going to or coming from somewhere nearby. Collectors are typically in jurisdiction of the county or the local government, in this case, the City of Miami Beach.

F. Local roads are at the “bottom” of the hierarchy. These roads have the lowest posted speed limits, and carry low volumes of traffic. Typically they will be the primary roads within residential neighborhoods for circulation.

3.02 TRAFFIC STUDY

A. A traffic study will be required for proposed projects consisting of new developments.

B. The traffic study shall include the following topics:

1. Introduction of the project/development
2. Data collection
3. Prevailing road and traffic conditions
4. Existing traffic conditions
5. Committed development traffic
6. Project traffic
7. Future traffic conditions
8. General site operations and impacts
9. Findings and conclusions

C. A parking study should be performed for residential areas for before, during, and after construction of the project.

3.03 TRAFFIC CALMING

A. The installation of traffic calming devices is regulated by the City of Miami Beach Traffic Calming Manual, which was reviewed and approved by Miami-Dade County Department of transportation and Public Works on July 22, 2010. This manual provides the methodology which includes policies, techniques, processes, and procedures to study a problematic street and/or area and install traffic calming devices as required. The City of Miami Beach Traffic Calming Manual is included as Appendix 1-B for reference.

PART 4 – MAINTENANCE OF TRAFFIC DURING CONSTRUCTION

4.01 GENERAL

A. The Contractor shall be fully responsible for the maintenance of public streets, detour of traffic (including furnishing and maintaining regulatory and informative signs along the detour route), traffic control, and other provisions throughout the Project as required by the City of Miami Beach, Miami-Dade County Department of Transportation and Public Works (MCDTPW) Traffic Division, Florida Department of Transportation (FDOT), or other governing agency. Traffic shall be maintained according to corresponding typical traffic control details as outlined in the MCDTPW Manual. No street shall be completely blocked, nor blocked more than one-half at any time, keeping the other one-half open for traffic, without specific approval. Hard closures require approval from the City of Miami Beach Transportation Department.

B. An off-duty City of Miami Beach police officer is required. Off-Duty Office phone number is 305-673-7823.

C. The Contractor shall provide all barricades with warning lights, necessary arrow boards and signs to warn motorists of the work throughout the Project. Adequate approved devices shall be erected and maintained by the Contractor to detour traffic.

D. Excavated or other material stored adjacent to or partially upon a roadway pavement shall be adequately marked for traffic safety at all times.

E. The Contractor shall provide necessary access to all adjacent property during construction.

F. The Contractor shall be responsible for the provision, installation and maintenance of all traffic control and safety devices, in accordance with specifications outlined in the
MDCDTPW Manual. In addition, the Contractor shall be responsible for the resetting of all traffic control and information signing removed during the construction period.

G. Where excavations are to be made in the vicinity of signalized intersections, the Contractor is alerted that vehicle loop detectors may have been embedded in the pavement. The Contractor shall verify the locations of vehicle loop detectors shown on the Plans by inspecting the site of the work and by contacting the City or designee. Any loop detector which is damaged by the Contractor, whether shown on the Plans or not, shall be repaired or replaced by the Contractor, at his expense, and to the satisfaction of the City or designee.

H. Temporary pavement will be required over all cuts in pavement areas, and also where traffic is to be routed over swale or median areas. When the temporary pavement for routing traffic is no longer necessary, it shall be removed and the swale or median areas restored to their previous condition.

I. Pavement markings damaged during construction shall be remarked, as required by the City or designee.

4.02 MAINTENANCE OF TRAFFIC PLANS

A. For construction within the City public right-of-way, the Contractor shall submit two sets of maintenance of traffic (MOT) plans for review to the City of Miami Beach Public Works Department and the agency having jurisdiction.

B. MOT plans should be designed and developed by a certified MOT Specialist when normal traffic flow will be impacted causing unexpected or confusing situations in unclear travel path for motorist/pedestrians when entering non advanced warning work zones. MOT work zone traffic controls separate and protect workers, pedestrians and motorists delineating areas closed to traffic.

C. MOT plans must be designed in accordance with the requirements of the agency having jurisdiction.

D. MOT plans must be site-specific.

E. MOT plans will be reviewed and approved by the agency having jurisdiction.

F. MOT plans shall be in color.

PART 5 – CONSTRUCTION BEST MANAGEMENT PRACTICES

5.01 PRE-CONSTRUCTION PHOTOGRAPHS

A. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing,
landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

5.02 EROSION AND SEDIMENT CONTROL

A. Refer to City of Miami Beach Public Works Manual Section 9.

5.03 SETTLEMENT MONITORING, VIBRATION MONITORING, AND MITIGATION

A. The work required under this section does not modify the requirements or responsibilities for the preservation of existing property from damage. The Contractor shall evaluate the need for, design of and provide any necessary precautionary features to protect existing structures from damage. Employ construction methods that will not produce damaging vibrations, soil movement, soil loss, or instability of existing structures.

B. The Engineer of Record will choose and retain the services of a vibration monitoring and inspection consultant (VMC).

C. The Contractor shall, at his own expense and no cost to the City, implement settlement and vibration mitigation measures to prevent any damage to existing property.

D. Before starting work, the Contractor shall check and verify governing dimensions and elevations of the work to be performed. The VMC will provide a list adjacent structures to be inspected prior to the work at the project. Inspections will be conducted within 100 feet of the piles being driven. Inspections will consist of interior and exterior written documentation and digital photographs of visible existing defects. A summary report will be prepared and retained by the Engineer, the City, and copies provided to the Contractor. Individual copies of inspections will be provided to the property owners.

E. The Contractor shall survey adjacent structures and improvements, establishing exact elevations at fixed points to act as reference benchmarks. The Contractor shall clearly identify benchmarks and record existing elevations. Datum level used to establish benchmark elevations shall be located at a sufficient distance so as not to be affected by movement resulting from sheet piling, excavation activities, dewatering, or other construction operations.

F. During pile driving or excavation, the Contractor shall resurvey benchmarks weekly, employing a licensed State of Florida Professional Surveyor and Mapper (PSM) or registered Professional Engineer. The Contractor shall maintain an accurate log of surveyed elevations for comparison with original elevations. The Contractor shall
promptly notify the VMC if benchmark changes occur or if cracks, sags, or other damage becomes evident nearby.

G. Vibration monitoring will be performed by the VMC at nearby structures when vibratory construction work is being performed close to existing structures. The Contractor shall facilitate full access to the site, as is required by the VMC, for them to perform monitoring. Vibration monitoring points will include structures within a radius deemed appropriate by the VMC from the locations of installation. If at any time the Contractor or VMC detects damage to any structure, the sheet piling shall be stopped immediately. If at any time settlement, heave, or vibration exceeds the following values, sheet piling shall be stopped immediately, and a corrective mitigation plan shall be implemented in order to meet threshold values.

1. Maximum allowable settlement of structures = 0.00833-feet (i.e., 0.10 inches)

2. Maximum allowable peak particle vibration (PPV) level for public infrastructure = 0.75 inch/second, unless determined that the structure requires additional protection.

3. Maximum allowable vibration level for residential structures = 0.50 inch/second, unless determined that structure requires additional protection.

H. Written complaints or claims (Claims) by property owners for damage to property shall be responded to by the Contractor in writing within 10 calendar days of receiving the Claim. The response shall include acknowledgement of the Claim and a plan to work towards resolution. The Contractor shall submit a copy of the response to the VMC, for informational purposes only, within 5 calendar days of receiving the Claim and prior to submitting the response to the property owner. The property shall be inspected by the Contractor and a follow-up response with proposed resolution shall occur within 30 days of receiving the Claim. The follow-up response shall be submitted to the VMC within 15 days of receiving the Claim, for informational purposes only.

5.04 PROTECTION OF PROPERTY REMAINING IN PLACE

A. Property obstructions which are to remain in place, such as buildings, poles, walls, posts, bridges, etc., are to be carefully protected from damage and are not to be displaced. Any damage to such obstructions noted to remain in place shall be repaired by the Contractor at no additional cost to the City or Owner.

B. Should structures be encountered which interfere with the work, the City or designee shall be consulted immediately in order for a decision to be made on the relocation of the work so it will clear the obstruction, if the obstruction cannot be relocated.
5.05 PROTECTION OF UTILITIES TO REMAIN IN PLACE

A. The work area may have existing utilities, such as, but not limited to irrigation, phone, electrical, water, sewer, storm sewer, and gas lines. It shall be the responsibility of the Contractor to verify the location of all such utilities, structures, etc. by hand excavation or other appropriate measures before performing any work that could result in damage or injury to persons, utilities, structures, or property. The Contractor shall make a thorough search of the site for utilities before work is commenced in any particular location.

B. The Contractor shall take immediate steps to repair, replace, or restore all services to any utilities or other facilities which are disrupted at the fault of the Contractor. Further, the Contractor shall engage any additional outside repairs on a continuous “around the clock” basis until services are restored. The Contractor shall also provide and operate any supplemental temporary services to maintain uninterrupted use of the facilities. All costs involved in the repairs and restoring of disrupted service resulting from negligence on the part of the Contractor shall be borne by the Contractor and shall be fully responsible for any and all claims resulting from the damage.

C. Should utilities be encountered which interfere with the work, the City or designee shall be consulted immediately in order for a decision to be made on the relocation of the work so it will clear the obstruction, if the obstruction cannot be relocated.

D. Prior to the start of construction, the contractor shall comply with F.S. 553.851 for the protection of underground gas lines.

E. When power poles are adjacent to any proposed utility, the Contractor shall provide proper shoring or other suitable support during construction. The shoring and support methods shall be approved by the utility company engineering department. The cost of shoring will be included in the overall project cost.

F. The Contractor shall not purposefully disrupt or disconnect any type of utility whatsoever without first obtaining the written permission of the City. Requests for disconnection must be in writing and received by the City at least 72 hours prior to the time of the requested interruption.

5.06 PROTECTION OF TREES REMAINING IN PLACE

A. Construction can potentially damage the existing trees confined within the construction zone. Besides their aesthetic value, some trees are valuable and may be environmentally protected. Mangroves and mangrove associated species (as defined by Miami-Dade County Code of Ordinances) are the jurisdiction of Miami-Dade County and would fall under the Miami-Dade County Code of Ordinances, Chapter 24, Division II. All other trees fall under the City of Miami Beach Code of Ordinances Chapter 46, Article II, Division 2, Section 46-62.
B. Trees can be an important part of the ecological environment of the surrounding area. Measures should be in place to protect trees whenever necessary, including conservation of the canopy.

C. Where directed by the City, desirable trees within the roadway area shall be trimmed, protected, and left standing. Branches of trees extending over the area occupied by the roadway shall be trimmed as directed, to give a clear height of 14 feet over vehicular areas and 8 feet over pedestrian areas. Pruning shall be in accordance with City of Miami Beach Code of Ordinances Chapter 46, Article II, Division 2, Section 46-62.

D. When pruning cuts or root pruning to existing trees is shown in the Plans, work is to be supervised on site by an International Society of Arboriculture (ISA) or American Society of Consulting Arborists (ASCA) Certified Arborist and performed in accordance with American National Standards Institute (ANSI) A300 and the City of Miami Beach Code of Ordinances Chapter 46, Article II, Division 2, Section 46-62.

E. All trees found within a FDOT designated road shall comply with the appropriate FDOT index for tree protection barriers. All other tree protection shall be in accordance with the Miami Beach Code of Ordinances Chapter 46, Article II, Division 2, Section 46-62 and the City of Miami Beach Public Works Manual Standard Details.

F. For all areas both inside and outside the earthwork area, the Contractor shall not deface, injury, or destroy trees, nor remove or cut them without prior approval via a tree removal permit from the City of Miami Beach. Any accidental damage to a tree shall immediately be reported to the City of Miami Beach for evaluation for public safety and possible new and additional permit requirements/work. An after-the-fact tree removal permit may be required.

G. The Contractor shall understand all ANSI tree care standards prior to the start of earthwork. All necessary permitted above and below ground tree work shall follow the appropriate ANSI standards for tree care.

H. Tree relocation, when required, shall be in accordance with Miami Beach Code of Ordinances Chapter 46, Article II, Division 2, Section 46-62.

5.07 CLEARING AND GRUBBING

A. If trees are present on site, a tree removal permit from the City of Miami Beach and/or tree protection standards must be obtained or in place prior to proceed with any clearing and grubbing.

B. The Contractor shall follow all ANSI guidelines for tree care for remaining trees for both above and below ground work.
Section 1. Design Standards and Guidelines

C. Standard clearing and grubbing shall consist of the complete removal and disposal of, including but not limited to, all buildings, pavements, foundations, sidewalks, curbing, timber, brush, stumps, roots, rubbish and debris and all other obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas, and of all other structures and obstructions necessary to be removed as provided in FDOT Specifications, Section 110.

D. Remove and dispose of all product and debris not required to be salvaged or not required to complete the construction. All work to be executed that may affect existing vegetation shall be performed in accordance with the City of Miami Beach Code of Ordinances.

E. Unless otherwise shown in the plans, clearing and grubbing shall be done within the following areas:

1. All areas where excavation is to be done, including borrow pits, lateral ditches, right-of-way ditches, etc.
2. All areas where roadway embankments will be constructed.
3. All areas where structures will be constructed, including pipe culverts and other pipelines.
4. Any other areas specifically called for on the plans to be cleared and grubbed.

F. In all areas where excavation is to be done and where the excavated material is to be used in the construction of roadway embankment or roadway base or pavement; also in all areas where roadway embankment will be constructed; roots and other debris shall be removed to a depth of at least one foot below the ground surface. The surface shall then be plowed to a depth of at least six inches and all roots thereby exposed shall be removed to a depth of at least 1 foot. All stumps within the roadway right of way shall be completely removed and disposed of by the Contractor. The top six inches of soil in vegetated areas to be removed and stockpiled in a separate location from other soils for use as topsoil. Stockpiled topsoil shall be free of grass, weeds, stones, and other deleterious material. Stockpile shall be stabilized in accordance with Section 10 of the City of Miami Beach Public Works Manual.

G. Where excavation is done within the roadway area and where excavation for structures is done, all roots, etc., protruding through or appearing on the surface of the completed excavation shall be removed to a depth of at least 1 foot below the excavation surface.

H. In borrow pits, material pits and lateral ditches, all stumps, roots, etc., protruding through or appearing on the surface of the completed excavation shall be removed or cut off below the finished excavation surface.
I. In borrow and material pits no clearing or grubbing shall be done to within three feet inside the right-of-way line.

J. Within all other areas where standard clearing and grubbing is to be done, roots and other debris, projecting through or appearing on the surface of the original ground, shall be removed to a depth of one foot below the surface, but no plowing and harrowing will be required in these areas.

K. Selective clearing and grubbing shall consist of removing and disposing of all vegetation, obstructions, etc., as provided above except that, where the Contractor so elects roots, etc., may be cut off flush with the ground surface. Stumps shall be completely removed and disposed of by the Contractor. Undergrowth shall be entirely removed except in specific areas designated by the City or designee to remain for aesthetic purposes. Desirable trees shall be trimmed, protected, and left standing in accordance with Section 5.06, except for such trees as the City or designee may designate to be removed in order to facilitate right-of-way maintenance. Undesirable or damaged trees as designated by the City or designee shall be removed. Selective clearing and grubbing shall be done only in areas designated in the plans. Perform all selective clearing and grubbing in accordance with ANSI A300 and the City of Miami Beach Code of Ordinances.

5.08 DEMOLITION

A. Demolition describes those activities that involve the wrecking or taking out of any load supporting structural member of a facility together with any related handling operations or the intentional burning of any facility. Methods of destruction employed at demolition sites include the use of heavy machines, explosions/implosions, and hand methods. Demolition work involves many of the hazards associated with construction. In addition, breaking up buildings or structures is an inherently noisy and sometimes dusty operation.

B. A demolition plan describing proposed sequence, methods, and equipment for demolition and disposal should be submitted to the City or designee for review prior to start of work to ensure that demolition activities do not adversely impact the natural environmental and general surrounding areas.

C. The objective of demolition best management practices (BMPs) is to ensure that demolition activities do not adversely impact the natural environment and general surrounding areas.

D. Demolition BMPs include but are not limited to the following.

1. Demolish and remove existing construction, utilities, equipment, and appurtenances without damaging integrity of existing structures, equipment, and appurtenances that are to remain.
2. Exercise all necessary precautions for fire prevention. Do not burn demolition debris on or near the site.

3. Protect persons and property throughout progress of work. Proceed in such a manner as to minimize spread of dust and flying particles and to provide safe working conditions for personnel.

4. Wet down work area during demolition operations to prevent dust from arising. Provide maximum practicable protection from inclement weather for materials, equipment, and personnel located in partially dismantled structures. Provide shoring or bracing where necessary to prevent settlement or displacement of existing or new structures. Do not overload floors. Complete demolition work on upper levels before disturbing supporting members on lower levels.

5. Confine apparatus, storage of materials, demolition work, new construction, and operations of workmen to areas that will not interfere with continued use and operation of entire facility. Provide and maintain lights, barriers, and temporary passageways for free and safe access.

6. Make necessary arrangements with and perform work required by utility companies and municipal departments for discontinuance or interruption of utility services due to demolition work.

E. The Work specifically covered under this Section consists of the removal and disposal of existing structure, appurtenances, concrete pavement, concrete sidewalk, slope pavement, ditch pavement, curb and curb and gutter. The items to be removed shall be: (1) those items shown in the Plans to be removed; (2) those found within the limits of the area to be cleared and grubbed and directed by the City or designee to be removed; (3) those items which it is necessary to remove in order to construct new structures, utilities, and other appurtenances or obstructions which may be designated in the plans.

F. Demolition shall be constructed in such a way as to leave no obstructions to any proposed new structures or to any waterways. Pilings shall be pulled or shall be cut off or broken off at least 2 feet below the finish grade line. (In the event that the Plans indicate channel excavation to be done by others, the finish ground line shall be considered as the limits of such excavation.) For material which are to remain the property of the City or are to be salvaged for utilization in temporary structures, the removal shall be in such way as to avoid damage to such materials, and all bolts, nails, etc., shall be entirely removed from timbers to be so salvaged; also such salvaged structural steel members shall be marked for identification, as directed. Retaining walls and drainage structures are specifically not included in the Work covered under this Section.

G. All materials resulting from the removal of pavements shall be disposed of at properly permitted disposal facility.
5.09 ASBESTOS

A. All demolition and renovation projects for commercial facilities require review for asbestos and approval from RER-DERM.

B. An asbestos survey must be completed for all demolition projects and all renovation projects over 160 square feet.

C. A laboratory must be retained to perform an asbestos survey. A copy of the asbestos survey report should be included as an attachment to the specifications.

D. The Contractor shall prepare and submit an “STATEMENT OF RESPONSIBILITIES REGARDING ASBESTOS” if it is required.

E. The Contractor shall obtain all necessary permits.

F. The Contractor shall retain a Florida Licensed Asbestos Contractor for removal and disposal of all regulated asbestos-containing material (ACM) per all Local, State, and Federal regulations.

G. It is the responsibility of the Contractor to quantify the amount of asbestos-containing material during bidding and the Contractor’s review of the Asbestos Survey.

H. The Contractor shall furnish all labor, equipment, and materials, and perform all operations necessary for the removal, containment, cleanup, and disposal of all asbestos-containing elements in the structures. Obtain any required permits and payment of any fees relating to this work. The Contractor shall perform his own quality control, administer, and supervise his work force as specified herein.

I. The Contractor shall comply with all laws, ordinances, rules, and regulations of Local, State, and Federal authorities regarding worker protection during removal, handling, storing, transporting, and disposing of asbestos-containing waste materials. The Contractor shall submit matters requiring interpretation of standards to the appropriate administrative agency for resolution before starting removal work. The Contractor shall assume responsibility for all costs related to compliance with regulatory requirements.

5.10 DEWATERING

A. All necessary Local, State, and Federal permits shall be obtained prior to dewatering.

B. Refer to City of Miami Beach Public Works Manual Section 3 for right-of-way dewatering permit requirements.

C. Refer to City of Miami Beach Public Works Manual Section 10 for dewatering system requirements.
5.11 AIR QUALITY

A. There are three potential sources of air pollution on construction sites. They are exhaust gases from vehicles and machinery, exhaust material from chippers, and dust.

B. Contractors shall comply with all air quality rules and regulations in the Miami-Dade County Code of Ordinances.

C. The purpose of construction BMPs is to ensure there is no health risk or loss of amenity due to emission of exhaust gases to the environment.

D. Air quality BMPs include but are not limited to the following.
   1. Ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently, and serviced to the manufacturers’ specifications.
   2. Smoke from internal combustion engines should not be visible for more than ten (10) seconds.

5.12 DUST CONTROL

A. All permittees, contractors, owners, operators, or other persons involved in construction activities shall refer to applicable sections of Local, State, and Federal regulations on dust control for additional guidance, including but not limited to the Miami-Dade County Code of Ordinances.

B. All persons involved in construction activities shall take measures to control dust from operations and prevent spillage of excavated materials on public roads.

C. All persons involved in construction activities shall remove spillage of excavated materials, debris, and dust from public roads by methods approved by the City or designee.

D. All persons involved in construction activities shall provide temporary dust-proof partitions where required to protect unaltered portions of existing structures and facilities and as directed by the City or designee. Temporary partitions shall be provided where demolition work is required to protect equipment and material and shall consist of plastic sheeting (6 mil).

E. All persons involved in construction activities shall apply water at locations, quantities, and frequencies required by the City or designee to control dust for nuisance prevention to the City and properties in the vicinity of the site. The frequency of watering will be determined by weather conditions and the erodibility of the soil. If additives in the water are used to increase its dust suppression properties, the chemical should have no adverse environmental impact on adjacent water bodies.

F. Additional dust control BMPs include but are not limited to the following.
1. Prevention of dust generation is preferable to applying dust suppression measures. Ensure in the project schedule that the area of cleared land is minimized during the drier months of the year, when dust generation is at its greatest.

2. The soil shall be maintained in a sufficiently damp condition to prevent loose grains of soil from becoming dislodged. The soil shall be completely crusted over by application of water or completely covered with clean gravel or treated with an approved dust suppressant.

3. Ensure that smooth surfaces are deep ripped and left rough and cloddy to reduce the wind velocity at the soil surface.

4. Construct wind fences if appropriate for the site. As a contingency measure, in areas that do not have access to a water supply, water stored on-site should never be less than fifty percent of disturbed land surface. Wherever watering is used to suppress dust, ensure it does not create contaminated runoff that will contaminate surface waters.

5. Use barriers where required to prevent the migration of sawdust or particulates from sanding or surface preparation activities during construction.

5.13 WORKING IN WATERWAYS AND AREAS PRONE TO FLOODING

A. Generally, an Environmental Resource Permit (ERP) must be obtained before beginning any activity that could affect wetlands or areas prone to flooding, alter surface water flows, or contribute to water pollution. SFWMD and FDEP have an operating agreement about which agency will process ERP permits for particular projects, based on the type of land use. Refer to FAC Division 40E and Division 62 for SFWMD and FDEP rules, respectively. A permit to control water pollution, reduce flooding impacts, or install culverts or bridges at a specific site may also need to be obtained from RER-DERM depending on the nature of the project. The Contractor should refer to Miami-Dade County Code of Ordinances and FDEP rules. Work in some waterways may also require approval from the United States Army Corps of Engineers.

B. Some activities are exempt from ERP permits. The responsible drainage authority must be consulted if there are any works that will impact a waterway. Any changes to the physical nature of a waterway require prior approval from the responsible drainage authority. At the design stage, consider all options to avoid working in a natural waterway.

C. The Contractor should avoid all activities where possible that affect both the short- and long-term survivability of shoreline vegetation regardless sediment movement, pruning of above ground vegetation, removal of root systems, or any other applicable activity. A permit from Miami-Dade County may be required if construction affects mangrove and
mangrove associated vegetation. A tree removal permit from the City of Miami Beach shall be required to remove or effectively destroy all other tree species.

D. Where it is not possible to avoid working in an intracoastal waterway or canal, additional precautions should be taken. These include but are not limited to the following.

1. Minimize the time during which work in a waterway is required and the extent of the work.

2. Schedule work for the driest months of the year.

3. Avoid times of the year when aquatic populations may be under stress, such as during spawning or when food may be scarce.

4. Maintain minimum flows to ensure the viability of aquatic communities and ensure that there are no barriers to the passage of fish upstream and downstream.

5. Establish protocols to minimize downstream damage.

6. Stabilize any disturbance to a levee or any other bank so that erosion is avoided.

7. Measure turbidity continuously immediately downstream from the areas in which work is occurring and modify work practices where continuous monitoring shows degraded water quality.

8. If working in a concrete channel, use appropriate machinery to avoid damage to structures.

E. Water Crossings

1. If activities require construction of a crossing, it should be installed during low tide, if feasible, with downstream weirs in place to trap any released sediment. Two types of access crossings may be considered.

   a. Culvert: This type of crossing may be effective in controlling erosion while in use but will cause erosion during installation and removal.

   b. Bridge: This type of crossing must be used for major waterways and for other waterways with high flows.

2. The crossing should be protected against erosion, both to prevent excessive sedimentation in the waterway and to prevent washout of the crossing. The crossing should be positioned perpendicular to the flow and located at the narrowest part of the canal or waterway. Damage to the bed and banks should be avoided. The crossing should be engineered to be stable under the expected vehicle loads. Drainage over the surface of the crossing and access road should have adequate controls to ensure that sediment runoff to the stream is minimized. If a cofferdam is
used, minimum downstream flows should be maintained that will sustain the aquatic ecology. Waterway crossings also act as sediment traps. Cleaning sediment out behind a crossing should follow the same procedure as for weirs.

F. Contingency plans should be in place for more intense storm events, particularly where works are planned to occur within an area prone to flooding. The Contingency Plan should consider the consequences to the environment for 5, 10, 20, and 100-year frequency floods. At a minimum, the Contingency Plan should address the following:

1. Methods to limit stormwater entering excavation areas.
2. Enhancement of existing measures and installation of additional controls when an intense storm event is forecasted.
4. Clean-up procedures, including disposal of excess water.
5. A flood warning system.
6. Procedures for preventing the loss of soil, fuel, chemicals, or other materials that could adversely affect the environment.
7. Notification of relevant authorities if unplanned incidents occur that could pose a risk to the environment.

G. Prior to works being undertaken on, near, or within a waterway, a Reinstatement Plan should be prepared and submitted for approval to the responsible drainage authority. At a minimum, the Reinstatement Plan should include the following:

1. Proposed changes to the waterway.
2. Impact on adjacent vegetation.
3. Type and form of flood protection works.
4. Erosion and sediment runoff controls.
5. Proposed methods for reinstatement of the waterway bed and banks.
6. Revegetation plan addressing a period of no less than twelve (12) months and including proposed species and locations, methods for weed control, and ongoing maintenance until a satisfactory level of established plants is achieved.
5.14 HURRICANE PREPAREDNESS PLAN

A. During the hurricane season, which runs from June 1\textsuperscript{st} to November 30\textsuperscript{th}, it may become necessary to suspend work due to an impending storm until the proper working conditions prevail. In the event of a tropical storm or hurricane, it is the Contractor’s responsibility to secure the jobsite in anticipation of the storm.

B. Fifteen (15) days prior to beginning of construction, the Contractor shall submit to the City or designee a Hurricane Preparedness Plan. The plan shall outline the necessary measures that the Contractor proposes to perform in the event of a tropical storm or hurricane in order to protect all work, materials, and equipment from exposure and properly safeguard all components of the project.

5.15 ENVIRONMENTAL EMERGENCY PROCEDURES

A. Procedures should be in place and staff trained to deal with any emergency, which could cause major environmental damage. Adequate equipment, such as spill kits, should be kept on-site to deal with emergency spills.

5.16 SITE MAINTENANCE AND CLEANLINESS

A. It is important to maintain the construction site in a neat and satisfactory condition during the construction and after construction has been completed.

B. During construction, the Contractor shall regularly clean up all rubbish, surplus materials, and the adjacent areas affected. Unneeded construction equipment should be removed and all damages repaired so that the public and property owners will be inconvenienced as little as possible.

C. Any material or debris that has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes structures, or elsewhere during the course of the Contractor’s operations must be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, pipes, structures, and work, etc., should, upon completion of the Work, be left in a clean and neat condition.

D. The Contractor shall perform the cleanup work on a regular basis and as frequently as ordered by the City or designee. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore, such work shall also be accomplished, when ordered by the City or designee, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.

E. Upon failure of the Contractor to perform periodic clean up and basic restoration of the site to the City or designee’s satisfaction, the City or designee may, upon five (5) days prior written notice to the Contractor, employ such labor and equipment as it deems
necessary for the purpose, and all costs resulting there from shall be charged to the Contractor and deducted from amounts of money that it may be due.

F. On or before the completion of the Work, the Contractor shall tear down and remove all temporary buildings and structures; remove all temporary works, tools, and machinery or other construction equipment; remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around houses and other buildings; remove all rubbish from any grounds which has been occupied; and leave roads and all parts of the premises and adjacent property affected by work operations in a neat and satisfactory condition.

G. Upon completion of the Work, the Contractor shall remove from the sites of the subsurface explorations all plant, machinery, tools, equipment, temporary work, and surplus materials; remove all rubbish from any grounds which has been occupied; and leave the roads and all parts of the premises and adjacent property affected by work operations in a neat and satisfactory condition.

H. The Contractor shall thoroughly clean all materials and equipment installed, and, upon completion of the Work, deliver it undamaged and in fresh and new-appearing condition. All mechanical equipment should be left fully charged with lubricant and ready for operation.

I. The Contractor shall restore or replace, when and as directed by the City or designee, any public or private property damaged by work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end, perform as required all necessary highway or driveway, walkway, and landscaping work. Suitable materials, equipment, and methods should be used for such restoration. The restoration of existing property or structures should be done as promptly as practicable as work progresses and should not be left until the end of the contract period.

5.17 LITTER

A. There are two main sources of litter on construction sites: building material washed away during a storm and deposited into waterways and rubbish thrown away by construction workers. Litter is often caused by thoughtlessness of staff and the unavailability of suitable litter bins on the construction site. Refer to the City of Miami Beach Code of Ordinances for the City’s rules and regulations governing litter.

B. The purpose of construction BMPs is to ensure that all litter is disposed of in a responsible manner and is not released into the environment. Litter BMPs include but are not limited to the following.

1. Maintain a high quality of housekeeping and ensure that materials are not left where they can be washed or blown away to become litter.
2. Provide bins for construction workers and staff at locations where they consume food.

3. Conduct ongoing awareness with staff of the need to avoid littering.

5.18 RODENT AND PEST CONTROL

A. The Contractor shall provide rodent and pest control as required to prevent infestation of the site and storage areas.

B. The Contractor shall employ methods and use materials that do not adversely affect conditions at the site or on adjoining properties.

C. In accordance with all Local, State, and Federal laws and regulations, the Contractor shall promptly and properly dispose of pests and rodents trapped or otherwise controlled.

5.19 ROAD CLEANING

A. Some sites require vehicles to move on and off the site. It is possible that these vehicles will transport soil off the site and deposit it on the adjacent roads. Prevention of soil being deposited on roads is preferable to cleaning them afterwards.

B. All points on the site where vehicles regularly leave should have rumble grids and wheel washes installed. In wet weather it may be necessary to hose mud off vehicle wheels as they traverse the grid.

C. All exits leading to the above mentioned controls should be paved with gravel. Refer to City of Miami Beach Public Works Manual Section 9 for requirements for temporary gravel construction entrances/exits.

D. Where there is only occasional use of road crossings (twice a day or less), or where there is insufficient space on the site to install a rumble grid and wheel wash daily road sweeping should be instituted, at a minimum. Care should be taken to ensure that road sweeping does not give rise to dust problems.

E. The number of times a day that road cleaning occurs should be determined by the frequency of road usage and the state of the roads, which should be inspected often.

F. Installation of litter traps lined with filter cloth in side-entry pits will trap soil in stormwater spilt on roads during rain. Where soil is being transported for offsite disposal, all loads should be covered.
5.20 STORAGE OF CHEMICALS AND FUELS

A. Although it may be necessary to store fuels and chemicals on project sites, this inevitably creates an environmental risk. Spills can severely pollute waterways and land. Reducing the quantities of chemicals and fuel stored on-site to minimum practicable levels is desirable. Infrequently used chemicals should be ordered just before they are needed. It may be possible to use a mini-tanker to refuel vehicles instead of relying on a central fueling point.

B. There are several approaches that can be taken to reduce the risk of fuel spills. Steps could include designing storage units to prevent vehicles or fork-lifts puncturing tanks, fitting automatic cut-offs to fuel dispensers, and making units vandal resistant. Containment areas will prevent spilled fuel from escaping and causing environmental damage. Containment area should be designed and installed in accordance with FDEP and EPA standards and guidelines. Key design issues addressed in the guidelines are volume of containment area, construction material, vehicular access, and stormwater management. Roofed containment areas are strongly preferred.

C. It is necessary to have a contingency plan for cleanup should a spill occur. It should consider issues such as cleaning up spilled material on the site, containing and cleaning up spills which have entered waterways, disposal, or reuse of recovered residues, and contacting key company and government agency personnel to advise them of the emergency.

5.21 NOISE CONTROL

A. Noise levels shall comply with laws and regulations, including OSHA requirements and Miami-Dade County and City of Miami Beach Code of Ordinances.

B. Noise emissions shall not interfere with the work of Owner or others.

C. Depending on the location of the facility, suitable noise suppression or abatement measures may be required, such as the provision of hay bales or other noise screens.

D. Work Hours

1. One of the most effective means of reducing noise nuisance from construction activities, where there are residents nearby, is to limit the times of operation of noisy equipment, vehicles, and operations.

2. There are occasions when it is necessary to work beyond these times, and exceptions can be made in cases where an activity that has commenced cannot be stopped, such as a concrete pour, and deliveries may need to be made outside normal working hours to avoid a major traffic hazard. Documentation justifying out-of-hours work should be maintained and authorized by site management as well as the City of Miami Beach Building Department. Local residents who are affected by such
activities should be notified beforehand. Even with such restricted hours, every effort should be made to reduce the noise of all site activities.

3. Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm on weekdays and 7 am to 1 pm on Saturday, except where, for practical reasons, the activity is unavoidable.

4. Noise should not be above background levels inside any adjacent residence between 10 pm and 7 am.

5. Advise local residents when unavoidable out-of-hours work will occur.

E. Vehicles and Equipment

1. Noise from vehicles and powered machinery and equipment on-site should not exceed the manufacturer’s specifications based on the installation of a silencer.

2. Fit and maintain appropriate mufflers on earth-moving equipment and other vehicles on-site.

3. Enclose noisy equipment.

4. Equipment should be regularly serviced.

F. Traffic

1. There is a conflict between operational efficiency and local amenity with regard to traffic flows in and out of a construction site. During normal business hours when traffic densities are high, deliveries of materials and large equipment can cause severe traffic snarls and even pose a danger to other vehicles. Out-of-hours deliveries will cause noise pollution from trucks moving past nearby houses.

2. The Contractor shall comply with all traffic ordinances in the City of Miami Beach Code of Ordinances.

3. If for some reason, the normal flow of traffic has to be diverted or interrupted to accommodate construction activities within the City of Miami Beach, prior authorization from the City must be given. It may also be necessary to fulfill the permit requirements of Miami-Dade County or FDOT depending on whether the street is a County or State-managed road.

4. Schedule deliveries to the site so that disruption to local amenity and traffic are minimized.
5.22 WASTE MINIMIZATION AND RECYCLING

A. When choosing between waste minimization options, the following hierarchy for waste management is preferred:

1. Waste avoidance and/or reduction
2. Reuse
3. Recycling

B. Diverting the waste stream in these ways means that waste treatment and waste disposal options can be reduced.

C. Construction sites should pursue the hierarchy (item A) and seek out waste reduction opportunities. To identify opportunities, it is necessary to consider all aspects of the project and the wastes it generates. Waste can be minimized by using improved technologies, recycling, or reusing materials on-site, or by making purchasing decisions that favor recycled products.

D. Wherever possible, the environmental management plan should include performance measures and targets for reduction, reuse, and recycling.

E. Waste minimization opportunities include but are not limited to the following.

1. Obtaining construction materials, paints, lubricants, and other liquids in reusable packaging or containers.
2. Using noise barriers made from recycled materials.
4. Using contaminated water out of sediment dams for dust suppression and irrigating adjacent vegetated land.
5. Sending waste concrete from demolition activities to a concrete recycler instead of landfill.
6. Segregating and recycling solid wastes generated by construction activities, offices, and eating areas.
7. Collecting lubricating oil from the construction vehicle fleet and sending it to a recycler.

F. The Contractor’s plan shall identify the elements of their waste stream during the project and outline plans for recycling and waste minimization.
5.23 CONTAMINATED MATERIAL AND WASTES

A. On large construction sites, it is possible that old landfills will be uncovered or the land found to be contaminated. In cases where this occurs, contaminated material or soil may need to be disposed of. Disposal methods adopted depend on the nature of the material.

B. To properly characterize the material, a comprehensive sampling and analysis program is required so that the correct route for disposal can be determined. For an old landfill, sampling should also ascertain the odor levels, presence of methane, groundwater levels, and leachate quality.

C. Solid Inert Wastes

1. Solid inert waste found on construction sites usually consists of building rubble, but may also include such items as demolition material, concrete, bricks, timber, plastic, glass, metals, bitumen, trees, and shredded tires.

2. Such wastes should be reused, recycled, or disposed of to a landfill site licensed to take such wastes.

3. RER-DERM and FDEP regulate construction and demolition debris disposal operations.

D. Putrescible Wastes

1. Putrescible wastes are defined as waste able to be decomposed by bacterial action. They usually consist of discarded food, domestic garbage, commercial wastes, grass and garden clippings, and prunings.

2. As many old landfills were not licensed it is possible that other wastes were buried, and the inspection and analytical program should be designed to detect other materials if they are present.

3. Old landfills may also contain contaminated leachate and gases, such as methane and odorous sulfur gases. The biological and chemical condition of the landfill will depend on its age and contents.

4. Excavating putrescible wastes could give rise to the following problems.
   a. Escape of methane and odorous landfill gases
   b. Release of contaminated leachate
   c. Production of litter
   d. Prevalence of seagulls and vermin

   RER-DERM should be contacted immediately in these instances.
5. Precautions will need to be taken during excavation to ensure that these problems are adequately controlled. The controls for the excavation, disposal, and rehabilitation of the remainder of the landfill are outlined below.

a. Contain, extract, and treat or dispose of contaminated water to the sewer system, provided approvals from the appropriate regulatory agencies have been obtained.

b. Extract and flare landfill gases if sufficient quantities are present.

c. Control odors during excavation by minimizing the working surface area and immediately covering with a clean fill. A deodorizer might also be needed to minimize emissions of odorous gases to the atmosphere.

d. Limit leachate generation by minimizing infiltration or ingress of water into the landfill through installation of cut-off drains and banks around the excavation areas.

e. Cap excavated areas with an impermeable material. Transportation of the excavated putrescible waste to a licensed landfill may also cause problems. Old putrescible wastes can be highly odorous, and additional measures may need to be taken, such as using sealed and covered containers.

E. Contaminated Soil

1. Old landfills may contain soil contaminated with chemicals such as heavy metals and hydrocarbons. Construction sites may also intersect contaminated sites, with elevated levels of heavy metals, hydrocarbons, or other toxic chemicals. The classification of contaminated soil depends on the concentrations of the contaminants and their leachability, as described in the Miami-Dade County Code of Ordinances.

2. Below is a list of BMPs to ensure that all contaminated material uncovered on a construction site is excavated and disposed of in an environmentally responsible manner.

a. Examine material uncovered on-site prior to disposal. If the wastes include putrescible wastes, analyze leachate and landfill gases.

b. Excavate material in a manner that avoids offsite environmental problems.

c. Seal remaining contaminated material or wastes where only part of the landfill has been excavated to ensure that there is no offsite effect now or in the future.

d. Transport odorous wastes in covered vehicles.
e. Dispose of contaminated material in a landfill licensed to take the type of contaminated material or wastes uncovered.

F. Regulated/Hazardous Materials and Wastes: The contractor’s plan shall specify, with respect to each regulated or hazardous material or waste expected to be used or generated during the project, how compliance with applicable Local, State, and Federal requirements will be achieved. Examples of such materials include diesel fuel skid tanks, cleaning solvents, paints, and other related materials or wastes. The placement, storage, containment, management, and disposal of such materials shall be specified and shall be in accordance with the City of Miami Beach Code of Ordinances, FDEP, FAC, and EPA guidelines and regulations.

G. Petroleum Soil Contamination

1. Classification of affected soil for disposal purposes will be made using an Organic Vapor Analyzer (OVA) with flame ionization detector. Soils with vapor readings higher than 10 parts per million (ppm) for diesel as defined in FAC Section 62-, are excessively contaminated and shall be identified for treatment and disposal. Affected soil must be placed on an impermeable barrier when temporarily stockpiled. All stockpile leachate or runoff shall be collected for disposal in accordance with applicable Local, State, and Federal regulations.

2. Affected soils shall be processed by incineration at a state licensed facility. These soils shall be transported and disposed of in accordance with all Local, State, and Federal regulations.

3. The incinerated soil shall be tested to certify the treated soil meets applicable Local, State, and Federal regulations for final disposal.

H. Free Petroleum Product

1. Some free petroleum products which may be partly or entirely diesel fuel or gasoline may be encountered during excavation or removal of affected soil. The Contractor shall remove free petroleum product, if necessary, when a separate floating phase greater than 0.10 inch thick is present as required by health and safety considerations. The free petroleum product shall be removed by skimming, pumping to an oil/water separator, or other approved methods. The Contractor shall take reasonable precautions to ensure that solids are not entrained in the pumping process.

2. Free petroleum products shall be transported and disposed of in accordance with all Local, State, and Federal regulations. All laboratory analyses required for disposal of the free petroleum products shall be performed.

I. All waste material shall be loaded, labeled, placarded, marked, weighed, and transported in accordance with the FDOT Regulations and U.S. Department of
Transportation Regulations. Use only transporters that are licensed and competent to haul these wastes.

5.24 ENVIRONMENTAL MANAGEMENT PLAN

A. Pre-Construction Planning

1. Assess all possible impacts that the project will have on the environment. Determine whether construction activities will intersect a contaminated site or old landfill. Assess impact of the development on the amenity of adjacent residents. Commence monitoring all segments of the environment to determine background conditions. Collect all relevant information on the site and adjacent areas that may be affected by the construction.

2. Collect relevant weather and climate information. Obtain design plans, work schedules, and work programs that may contribute to environmental risk. Obtain a map of site topography and generate maps of changes in topography as a result of the development. Calculate stormwater flows in each micro-catchment for each phase of the development. Map changes of vegetative cover and the position of stockpiles and batters, as a function of time. Collect information on flows of any natural waterways that will be affected by the development.

3. Identify all hazards to the environment. Quantify hazards whenever possible. Determine consequences of each hazard. Calculate total risk level for each hazard. Rank risks. Identify all significant risks. Develop an action plan to address all significant risks. Wherever possible seek to avoid risks or minimize them by modifying the project design or planned work program and schedule.


B. Environmental Management Plan

1. Construction companies must have an environmental management system in place before preparing the Environmental Management Plan for the project. Ensure that all staff is adequately trained.

2. Ensure that all procedures are written down. Ensure that quality control and quality assurance systems are in place to ensure effectiveness of the environmental management system. Prepare an Environmental Management Plan based on the risk management action plan. List special work procedures to avoid or reduce environmental harm.

3. Map cleared areas, as a function of time. Map changes of landform as a function of time, and identify control measures on the map and position of soil stockpiles and batters. Include any special operational procedures required to protect the
environment in the work site manual. Ensure that written contingency plans have been prepared and adequately resourced.

4. Ensure that best practice documents for the site are prepared and implemented. Document maintenance, inspection, and surveillance schedule. Prepare a rehabilitation plan. Update plan, as required.

5.25 INSPECTIONS, MONITORING, AND AUDITS

A. Implement an adequate program of inspections, monitoring, and audits.

PART 6 – PERMITS

6.01 GENERAL

A. The Consultant/Contractor is responsible for obtaining all required Local, State, and Federal permits, including but not limited to City of Miami Beach right-of-way, MDCDTPW permits, MOT permits, excavations, dewatering, etc.

B. If required, the Consultant/Consultant shall be responsible for all special events permits from the City of Miami Beach Public Works Department and City of Miami Beach Police Department.

C. Below is summary of environmental permits from the City of Miami Beach Environmental Permitting Handbook. Refer to the City of Miami Beach Environmental Permitting Handbook for more information.

<table>
<thead>
<tr>
<th>Type of Permit</th>
<th>Environmental Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami-Dade County Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM)</td>
<td></td>
</tr>
</tbody>
</table>
| Class I | • Work in/on/over/upon tidal waters or coastal wetlands  
| | • Mangrove trimming |
| Class II | • Stormwater discharge to County surface waters (ponds, lakes, and canals)  
| | • Not required if all stormwater is retained on site with no overflow structures to new or existing systems that eventually discharge to surface waters |
| Class III | • Structural impacts or work within a Miami-Dade County Canal or waterway |
| Class IV | • Work within freshwater wetlands |
| Class V | • Temporary short-term dewatering |
| Class VI | • Drainage systems for nonresidential projects |
| Demolition/Asbestos Review | • Demolition/renovation of asbestos |
| Tree Removal | • Removal or relocation of any tree not specifically exempt under Section 24-49(4) |
| Plans Review (no permit required) | • Drainage projects greater than 2 acres impervious, and total project less than 10 acres, and no wetlands |
We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.

<table>
<thead>
<tr>
<th>Type of Permit</th>
<th>Environmental Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida Department of Environmental Protection (FDEP)</td>
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</tr>
<tr>
<td>Class V</td>
<td>Construction and operation of injection wells (deep wells)</td>
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<tr>
<td>NPDES (by contractor)</td>
<td>Soil disturbance greater than 1 acre during construction</td>
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<tr>
<td>Submerged Lands Easement / TIITF</td>
<td>Work in/on/over/upon Lands of the State (tidally influenced waters)</td>
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<tr>
<td>Coastal Construction Control Line (CCCL)</td>
<td>Excavation or construction seaward of the CCCL</td>
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<tr>
<td>United States Coast Guard</td>
<td></td>
</tr>
<tr>
<td>Bridge</td>
<td>Bridge replacements and projects affecting navigation</td>
</tr>
<tr>
<td>Nationwide (Check for appropriated type)</td>
<td>Dredge and fill work where wetland impacts are less than 0.5 acre</td>
</tr>
<tr>
<td>Individual</td>
<td>Dredge and fill work where wetland impacts are greater than 0.5 acre</td>
</tr>
<tr>
<td>South Florida Water Management District (SFWMD)</td>
<td></td>
</tr>
<tr>
<td>General Environmental Resource Permit</td>
<td>Stormwater quality, where the total project area is less than 10 acres and is located entirely in uplands</td>
</tr>
<tr>
<td>Individual Environmental Resource Permit</td>
<td>Stormwater quality, activities in/on/over wetlands or surface waters, coastal issues, surface water flow alteration, and other natural resource issues.</td>
</tr>
<tr>
<td>Conceptual Environmental Resource Permit</td>
<td>Stormwater quality, activities in/on/over wetlands or surface waters, coastal issues, surface water flow alteration, and other natural resource issues. Wetland impacts are less than 10 acres and the total project area is less than 100 acres</td>
</tr>
<tr>
<td>Consumptive Use (CUP)</td>
<td>When installation of pipes/trenches/drainage structures requires dewatering When dewatering is required, an Environmental Resource Permit must be secured first; a water use permit is not typically issued by SFWMD in the absence of an Environmental Resource Permit.</td>
</tr>
</tbody>
</table>

Note:
TIITF = Board of Trustees of the Internal Improvement Trust Fund of the State of Florida

PART 7 – PROJECT CLOSEOUT REQUIREMENTS

7.01 REQUIREMENTS

A. The Contractor shall submit all closeout documents required by the Contract Documents, including but not limited to the following.

1. Warranties and guarantees

2. Test reports, including but not limited to:

   a. Pipeline pressure/leak testing results

   b. Bacteriological sampling results

   c. Concrete test results certified by a licensed testing laboratory
3. Inspection and acceptance records 

4. Operating and maintenance manuals 

5. Project record documents (refer to Section 8 of the City of Miami Beach Public Works Manual) 

6. Permit closeout documentation 

B. The Contractor must participate in a Final Completion walk-through with the City of Miami Beach. 

C. Final payment application must include: 

   1. Final releases of liens from all subcontractors and suppliers 
   2. Final release from Contractor 
   3. Final consent of surety bond 

D. The Contractor must obtain final Greenspace Management approval for installed landscaping. 

E. Upon receipt of Final Payment, the Contractor shall execute the Form of Final Receipt, if applicable. (Appendix 1-C)
APPENDIX 1-A:
STREET FUNCTIONAL CLASSIFICATION

The following table presents the functional classification for the streets in the City of Miami Beach. This is Table 2 in the City of Miami Beach Transportation Master Plan Final Report.
### Street Functional Classification

*City of Miami Beach Transportation Master Plan, Table 2*

<table>
<thead>
<tr>
<th>Segment Number</th>
<th>Segment Name</th>
<th>Segment Limits</th>
<th>Segment Length (miles)</th>
<th>Existence of a Median</th>
<th>Median</th>
<th>Road Jurisdiction</th>
<th>Functional Classification</th>
<th>Number of Traffic Signals</th>
<th>Signals per Mile</th>
<th>Speed Limit</th>
</tr>
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<tbody>
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<tr>
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<tr>
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<tr>
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<td>9</td>
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</table>
### Street Functional Classification

*City of Miami Beach Transportation Master Plan, Table 2*

<table>
<thead>
<tr>
<th>Segment Number</th>
<th>Segment Name</th>
<th>Segment Limits</th>
<th>Segment Length (miles)</th>
<th>Existence of a Median</th>
<th>Median</th>
<th>Road Jurisdiction</th>
<th>Functional Classification</th>
<th>Number of Traffic Signals</th>
<th>Signals per Mile</th>
<th>Speed Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>North Bay Road</td>
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<td>3.465</td>
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<tr>
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<td>45</td>
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<td>Dade Boulevard – 47th Street</td>
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<td>Curbed</td>
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<tr>
<td>46</td>
<td>Pine Tree Drive</td>
<td>47th Street – 51st Street</td>
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<td>Curbed</td>
<td>County</td>
<td>Collector</td>
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<tr>
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<td>73rd Street</td>
<td>Collins Avenue – Dickens Avenue</td>
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<tr>
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<td>Hawthorne Avenue – Collins Avenue</td>
<td>0.551</td>
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</tr>
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<td>77th Street – 85th Street</td>
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<tr>
<td>54</td>
<td>Biarritz Drive</td>
<td>Shore Lane – Normandy Drive</td>
<td>0.224</td>
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<td>N/A</td>
<td>City of Miami Beach</td>
<td>Local</td>
<td>1</td>
<td>4</td>
<td>25</td>
</tr>
</tbody>
</table>
### Street Functional Classification

*City of Miami Beach Transportation Master Plan, Table 2*

<table>
<thead>
<tr>
<th>Segment Number</th>
<th>Segment Name</th>
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<th>Existence of a Median</th>
<th>Road Jurisdiction</th>
<th>Functional Classification</th>
<th>Number of Traffic Signals</th>
<th>Signals per Mile</th>
<th>Speed Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>North Shore Drive</td>
<td>Fairway Drive to 71st Street</td>
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<td>56</td>
<td>Dickens Avenue</td>
<td>71st Street to Tatum Waterway Drive</td>
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<td>10</td>
</tr>
<tr>
<td>57</td>
<td>Tatum Waterway Drive</td>
<td>Dickens Avenue to Byron Avenue</td>
<td>0.224</td>
<td>Undivided</td>
<td>N/A</td>
<td>City of Miami Beach</td>
<td>Collector</td>
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<td>9</td>
</tr>
<tr>
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<td>Byron Avenue</td>
<td>Tatum Waterway Drive to 88th Street</td>
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<td>City of Miami Beach</td>
<td>Collector</td>
<td>3</td>
<td>7</td>
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</tbody>
</table>
APPENDIX 1-B:
CITY OF MIAMI BEACH TRAFFIC CALMING MANUAL
City of Miami Beach
Traffic Calming Manual

MIAMI BEACH

FINAL REVISION
REVIEWED AND APPROVED BY
MIAMI-DADE COUNTY PUBLIC WORKS
ON JULY 22, 2010

EXHIBIT
"A"
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INTRODUCTION .................................................................................................................. 3
GOALS AND OBJECTIVES ................................................................................................. 4
METHODOLOGY .................................................................................................................. 5
TRAFFIC CALMING PROCESS AND PROCEDURE ............................................................. 8
SUMMARY .......................................................................................................................... 13

Appendix A – Project Application
Appendix B – Summary of Traffic Calming Devices’ Characteristics
Appendix C – References
Appendix D – City of Miami Beach Functional Classification Map
INTRODUCTION

"Traffic calming involves changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes, in the interest of street safety, livability, and other public purposes". ¹

The City of Miami Beach (City) through the Department of Public Works, Transportation Division has developed the City of Miami Beach Traffic Calming Manual (the Manual) to address traffic concerns in the local and residential streets in order to preserve and maintain the particular characteristics of its neighborhoods.

The growth of Miami Beach has increased the traffic using the local network, thus impacting the local and residential streets. Speeding and cut-through traffic often occur through residential neighborhoods affecting livability and safety. The Traffic Calming Manual has been conceived as a tool to address these issues.

As a guideline to implement traffic calming measures, the Manual provides the process and procedures to study a problematic local street and/or area within the City’s boundaries. State and County roads are not eligible for City consideration of traffic calming measures.

Based on the research of different traffic calming practices within the United States (see Appendix C), the Street Closure/Traffic Flow Modification Study², and the results of traffic counts performed on several streets in Miami Beach, specific thresholds were developed to implement traffic calming measures according to the City’s unique characteristics.

The Manual also provides guidelines for the installation of different traffic calming measures that may be used in a traffic calming project, analyzing the effects on speed and volume each would have, as well as their preliminary costs.

City staff and residents will identify traffic problems in their neighborhoods and will create a traffic calming project with solutions that are acceptable and appropriate.

The methodology and procedure documented in this manual is implemented and revised as to fit in the City of Miami Beach.

¹ Institute of Transportation Engineers.
² Dade County Public Works Department and Metropolitan Planning Organization
GOALS AND OBJECTIVES

Traffic calming is the application of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for pedestrians and bicyclists. Traffic calming may be a component of a neighborhood traffic plan.

GOAL:
Ensure the development of a safe, efficient and integrated transportation system in the City of Miami Beach that promotes neighborhood livability using adequate technical planning and traffic engineering practices.

OBJECTIVES:
The main objectives of traffic calming include:

- Restoration of communities affected by speeding traffic
- Discouragement of the use of local residential streets by heavy vehicles and cut-through traffic
- Improvement of the quality of life a street may afford in a neighborhood
- Improvement of roadway safety and reduction of accidents
- Improvement in safety and convenience specifically for vulnerable road users, such as bicyclists and pedestrians
- Changes to the attitude of many drivers towards speed and a tangible demonstration that streets are for people as well as for traffic
- Reduction in noise and disturbance
METHODOLOGY

TRAFFIC CALMING POLICIES

Specific points to consider in the design of traffic calming measures include:

- Streets that are classified as arterial or higher shall not be considered under these traffic calming guidelines. A map showing the streets classified as arterials in the City is included in Appendix D of this document. These road classifications are intended to be the primary means by which traffic travels in our community. However, a properly sized roundabout, where appropriate as a capacity treatment and where physical space is available, may be usable in lieu of a traffic signal and they provide calming as a corollary effect. In the case of Alton Road and in coordination with FDOT, the City has installed speed radar boards with the purpose of alerting drivers on how fast they are driving above the speed limit. The devices are effective in that they catch the drivers’ attention, prompting them to reduce the speed of the vehicle they would be driving.

- For collector streets, pedestrian refuge islands, roundabouts and entrance treatments (specially an entrance to a neighborhood) are some options to try as traffic calming measures for these types of streets.

- For local streets, speed cushions would be the preferred traffic calming treatment. Speed cushions provide a vertical hump for passenger vehicles but leave beveled gaps for wide-tracked vehicles such as fire trucks and school buses. Chicanes, traffic circles and speed tables are additional techniques available for local streets.

- If the request affects local streets within the City, then the City will coordinate the review with agencies potentially affected by the traffic flow modification(s)/street closure(s), which may include, but not be limited to the following entities:
  - City of Miami Beach Fire Department.
  - Miami-Dade County Fire & Rescue (MDFR).
  - City of Miami Beach Police Department.
  - Miami-Dade County Police Department (MDPD).
  - Miami-Dade County Planning and Zoning Department (MDP&Z).
  - Miami-Dade County Public Schools (MDCPS).
  - Miami-Dade Transit (MDT).
  - Florida Department of Transportation (FDOT).
  - Miami-Dade County PWD.

These reviews shall be relevant to the agency reviewing the proposed traffic flow modification(s)/street closures(s). The scope of the traffic review shall be determined on a case-by-case basis by Miami-Dade County PWD.
The City representative shall review all comments brought forth by the aforementioned entities. The City under the following conditions shall deny the application for traffic flow modification(s)/street closure(s):

- Comments made by any entity revealed concerns that cannot be resolved.
- The proposed locations for extenuating circumstances do not meet all criteria outlined under this process or applicable State laws.

- Emergency vehicles access must be preserved. Fire and Police Departments are involved from the beginning.
- The cut-through traffic should be routed back to collector and arterial roadways.
- The City's Public Works Department shall look at the redistribution of traffic in adjacent streets. The impacts on adjacent streets and arterials shall be measured, so that unintended or adverse shifts in traffic do not occur.
- Buses need to be able to negotiate traffic calming features safely, without undue discomfort to passengers and at a reasonable operating speed.
- Bicyclist and pedestrian access must be accommodated. Provision for pedestrians and bicyclists should be of a high quality to promote the shift from the private car to more sustainable modes of transport. Adequate widths and carefully considered routes and priorities coupled with arrangements to make access for disabled people as easy as possible are required.
- The City Public Works Department may recommend employing different traffic calming devices according to neighborhood's characteristics. Final decision will depend on consensus with the community and the County Public Works Department.

**TRAFFIC CALMING TECHNIQUES**

**PHYSICAL:** In general, wider roads encourage higher automobile speeds. Many traffic-calming techniques are therefore designed to physically change the width of the street. If motorists can see far into the distance, their speed may increase. The interruptions of sight lines through changes in the road's direction, or breaking the road into smaller visual units using techniques such as chicanes and roundabouts, cause the drivers to slow down.

**PSYCHOLOGICAL:** Traffic calming may also be achieved by changing the psychological feel of the street. Streets using different surface types, vertical landscaping or narrowed lanes create the appropriate space for a relaxed, pedestrian-friendly atmosphere. These psychological changes give motorist cues that they are no longer on a major roadway, but are in a different environment that is shared with people.
There is an extensive menu of treatments that may be part of a traffic calming strategy. Such treatments include:

- **DEFLECTING PATHS:** Deflecting the vehicle path causes the driver to reduce speed and be more attentive to the task of driving. Deflection is done through changing the route of the automobile. Some measures apply at mid-block locations, while others are most appropriate for intersections.

- **DIVERTING TRAVEL ROUTES:** Diverting the driver’s route increases travel time and encourages the driver to use another route. Traffic diverters, street closures, one-way streets, median closures and turning movement restrictions are examples of a diversion. Another example is to install signage to ensure that Heavy Goods Vehicles (HGVs) and other ‘through’ traffic choose suitable routes that reduce the environmental impact of their journeys.

- **CHANGES TO PAVEMENT SURFACE:** Changing the pavement surface demands attention from drivers, and reduces the speed for comfortable driving (the “design” speed). Speed humps, brick pavers and special pavement materials are among the most frequent approaches to changing the pavement surface.

- **TRAFFIC CONTROL DEVICES:** Traffic control devices, where warranted, can be used to regulate traffic patterns.

**ENFORCEMENT:** Intensified enforcement of traffic regulations can calm traffic, generally, by reminding drivers of posted speed limits and by enforcing the observance of STOP signs. Police officers are the usual source of intensified enforcement, but neighborhood volunteers can also be very effective in assisting in an enforcement effort.

**EDUCATION:** The City of Miami Beach will make a conscious effort to initiate and maintain an educational program on traffic calming and safety within the city.
TRAFFIC CALMING PROCESS AND PROCEDURE

The following flow-chart documents the traffic calming evaluation and installation process from application to post installation. In order to avoid duplication, County and City will coordinate from the beginning as requests are received. Throughout the process, the County’s Public Works Department will be kept informed.

1. Application submitted by property owners

2. City Public Works Department (PWD) review and initial public meeting
   - Speed/volume study conducted
   - Consistency checks (with local plans/programs/policies)

3. Warranted?
   - YES
   - NO
     - Report back to Community

4. Submit study results to County PWD for review

5. Preliminary traffic calming plan prepared by City PWD

6. Plan submitted to Fire, Police, and County PWD as well as other agencies if needed for review and comments
   - YES
   - NO

7. Public meeting conducted
   - YES
   - NO

8. Ballots sent to residents

9. Ballots received & submitted by residents

10. Plan prioritized and implemented
1. **COMPLETE AND SUBMIT PROJECT APPLICATION:** A preliminary traffic calming study can be initiated by a resident complaint, the request of a neighborhood association, or a Commissioner’s request. A resident or neighborhood association requesting traffic calming must complete and submit an Application and Petition for Traffic Calming to the City’s Public Works Department. The Petition for Traffic Calming must have signatures from a minimum of 50% of residents for the section of the street affected. The application and petition are included in Appendix A of this document. An initial meeting with the residents that submitted the request and surrounding area may be conducted to explain the process the City follows to evaluate applications and to collect their input.

2. **EVALUATE APPLICATION:** City staff shall identify the study area, collect preliminary data (the City’s Public Works Department will perform speed and volume studies and collect accident reports), and complete the evaluation of the traffic calming request.

Speed and traffic volumes are the first criteria used to gauge whether a traffic calming study area warrants further research for possible development and implementation of a traffic calming plan. The tables below show the thresholds established for Miami Beach regarding speed and volume:

<table>
<thead>
<tr>
<th>Points</th>
<th>85th speed is... above posted speed limit</th>
<th>Points</th>
<th>volume 24 hr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>less than 4.6 mph</td>
<td>0.5</td>
<td>500 - 750 veh.</td>
</tr>
<tr>
<td>1.0</td>
<td>4.6 to 7.5 mph</td>
<td>1.0</td>
<td>751 - 1,100 veh.</td>
</tr>
<tr>
<td>1.5</td>
<td>7.6 to 10.5 mph</td>
<td>1.5</td>
<td>1,101 - 1,700 veh.</td>
</tr>
<tr>
<td>2.0</td>
<td>10.6 to 13.5 mph</td>
<td>2.0</td>
<td>1,701 - 2300 veh.</td>
</tr>
<tr>
<td>2.5</td>
<td>13.6 to 16.5 mph</td>
<td>2.5</td>
<td>More than 2,300 veh.</td>
</tr>
<tr>
<td>3.0</td>
<td>more than 16.5 mph</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The 85th percentile speed is defined as “the speed that is exceeded by 15% of the motorists surveyed”

The second criterion establishes the number of accidents per year during the last three years along the street as a warrant for traffic calming study.

<table>
<thead>
<tr>
<th>Points</th>
<th>No. of accidents</th>
</tr>
</thead>
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<td>0.5</td>
<td>1-2</td>
</tr>
<tr>
<td>1.0</td>
<td>3</td>
</tr>
<tr>
<td>1.5</td>
<td>4 or more</td>
</tr>
</tbody>
</table>

9
i. Any street that ranks 2.5 or higher is eligible for traffic calming. The neighborhood street would require 2/3 voter approval from residents and is subject to final roadway design. The County has 100% required approval from property owners adjacent to the proposed site where speed humps as well as other calming devices will be installed. Due to the curvature of the roadway, and other unique design characteristics, some streets may not be suitable for any or all of the traffic calming tools available.

ii. Any street that ranks 2.0 will be studied by the City's Transportation Division to determine if other measures may be helpful in addressing concerns.

The following items may be considered, but not limited, as part of the study:
1. Location of school, pedestrian oriented facility (i.e. elderly housing) or community facility (i.e. park) located on the subject street or within an established walking area.
2. Driveway density.

After review of the above study, the City's Transportation Division would be able to recommend various alternate solutions if the street does not fully qualify for the installation of traffic calming devices.

iii. Any street that scores less than a 2.0 and is determined to not be an appropriate location based on the study completed will not be eligible for re-evaluation for twelve (12) months after the speed/volume study is conducted. After two (2) years of testing, if the street does not qualify for traffic calming, the project is ineligible for re-testing for twenty-four (24) months.

3. CHECK FOR CONSISTENCY WITH CITY AND MPO PLANS AND PROGRAMS:
Every effort will be made to ensure that any proposed physical traffic modifications will be consistent with City and County short and long range transportation plans and programs. However, this may require recommendations to change the priority of previously adopted plans and programs in order to more rapidly improve the efficiency of the arterial network near the affected neighborhood. In addition, every effort will be made to ensure that any physical traffic modifications are consistent with land use/zoning.

4. SUBMIT TRAFFIC ENGINEERING STUDY AND DATA COLLECTED TO COUNTY PUBLIC WORKS DEPARTMENT: The results of the traffic engineering study together with the data collected will be submitted to the County Public Works Department for their review in anticipation to the preparation and submittal of the traffic calming plan.
5. PREPARE THE DRAFT TRAFFIC CALMING PLAN: The City Public Works Department will develop a preliminary traffic calming plan for the warranted street. The plan will include the locations for the following existing conditions: driveways, bike lanes, inlets, manholes, light poles, stop signs, and any other traffic calming proposed for the subject street. The plan will also specify the area that is affected.

6. SUBMIT PLAN FOR APPROVAL: The plan will be submitted to the Fire Department, Police Department and County Public Works Department for review and comments. The plan may be revised to address any concern expressed by these agencies, as well as other agencies if needed. The County will submit a response to the City within ten (10) working days from submittal to the County’s Public Works Department.

7. CONDUCT NEIGHBORHOOD WORKSHOP: If the area of concern meets the minimum criteria outlined in this document, City staff will schedule a neighborhood workshop meeting with residents to review the results of preliminary studies and to receive comments on the preliminary design of the traffic calming plan.

Citizen participation is an essential ingredient in the development and implementation of a successful neighborhood traffic plan. Neighborhood residents offer insight into the nature and extent of traffic and safety problems. Residents must also live day to day with any devices constructed. These residents are most directly affected by the problems and potential mitigating measures, and they are frequently the source of innovative solutions. The following are two levels of community involvement:

A. Participatory programs involving interested citizens.
B. Outreach programs attempting to communicate with the silent citizens, normally the vast majority of residents.

Implementation of an effective traffic calming program, which incorporates resident participation, will provide many benefits to the community. Benefits include effective transportation management, community safety, and an enhanced quality of life.

8 & 9. RESIDENTS APPROVAL: Once the study is complete and a neighborhood meeting has been held, a ballot will be sent to each affected property owner. Approval of at least two-thirds (2/3) of the received ballots from the affected property owners is needed to proceed with the traffic calming plan. The County requires 100% approval from property owners adjacent to the proposed site where speed humps, as well as other calming devices, will be installed.

10. PRIORITIZE AND IMPLEMENT PROJECT: Projects are prioritized Citywide based on the point score determined in Step 2, Request Evaluation. Projects will be listed and assigned resources quarterly. Once assigned, the project will remain listed
even if subsequent projects become listed with higher scores. The highest-ranking projects are undertaken first. The number of projects initiated each year depends on City resources. The City notifies all project requesters of the status of their request after project approval. The City also notifies the appropriate neighborhood associations or homeowner associations of the status of the neighborhood projects within their neighborhood and asks for their comments.

City staff will finalize the design and implementation process for the proposed traffic calming devices. Specific techniques may be installed as a “test site”, while others will be installed permanently. “Test sites” will be monitored and evaluated for effectiveness. After a period of evaluation, measurable objectives and performance measures will be established on a case by case basis. It is noted that the City’s and County’s Traffic Engineering Standards will be consulted for adherence in relation to any proposed traffic calming measures.

CRITERIA FOR PILOT TRAFFIC CALMING PROJECTS

1. Street must be local.
2. Street may not be a locally designated arterial or collector.
3. Street may not have any commercial land uses.
4. The affected area must comply with the petition requirements for support of projects as contained within the City Traffic Calming Manual.
5. The project must be found by the City Public Works Department not to present any risk or hazard similar to the findings that must be made for a City or County approved traffic calming project or installation.
6. The affected area has agreed to pay for one half of the device(s) purchase costs.
7. Speed cushions, of a design approved by the County and City Public Works Departments, will be the primary traffic calming device approved for use in these projects. The City will follow the traffic calming process outlined in the Miami Beach Traffic Calming Manual for evaluation and prior to installation of speed cushions. Other traffic calming measures shall be considered upon review by the City and subsequent approval by the County.
8. Immediately following the installation of the project, City staff will begin an evaluation of the project’s effectiveness. This evaluation includes, but is not limited to, field observations, traffic counts, speed studies and other data collection (as needed). If the project has not met the objectives during the evaluation period, staff will notify the community’s representatives. City staff and community representatives may then decide to make modifications to the current plan. These modifications may include the implementation of additional or different techniques, or the removal of the traffic calming devices.
9. In the event the devices are found to be ineffective after the evaluation process (minimum of three months after installation), the City’s Public Works Director will send a letter to the affected property owners to let them know of this recommendation and collect the resident’s input prior to removal. Removal
may also be initiated by a petition request from 50% of the residents in the affected area.

SPEED CUSHIONS

If speed cushions are warranted, they can be constructed of either rubber, concrete, or asphalt material. In general, rubber speed cushions offer the following advantages:

- Easy to install.
- Preformed shapes ensure uniform design at every location.
- The unique shape of a speed cushion is difficult, if not impossible, to mold with asphalt.
- Easy to remove if the device does not prove to be effective.
- Easy to remove and re-install in case the road need to be resurfaced.
- Relatively easy to maintain. If a piece gets damaged, it gets replaced very easily.
- Rubber speed cushions also include embedded striping that aids in alerting drivers of the presence of the speed cushion.
- Relatively low cost.
- Made of recycled rubber, which is environmentally friendly.

Rubber speed cushions are highly durable, can last for a long time and offer high resistance to weather and other environmental effects, especially in the climate of South Florida. Asphalt speed cushions, on the contrary, have not been developed within the United States on a basis to fully understand their performance.

Asphalt speed cushions would not offer the same design features of the rubber speed cushions. The typical cross section of the rubber speed cushion has design characteristics that would be very difficult to mimic on an asphalt cushion. This would be the clearest disadvantage in trying to construct an asphalt cushion and still expect it to perform as well as the rubber speed cushion. It is therefore recommended to utilize rubber instead of asphalt speed cushions as the preferred installation for these types of devices in the City of Miami Beach.

SUMMARY

The City of Miami Beach Traffic Calming Manual is a guide to assist the residents and City staff in addressing their concerns about undesirable traffic issues in our neighborhoods. Traffic calming is by no means the answer to all situations. However it has proven in numerous cities around the country to improve safety and livability in a neighborhood.
The Traffic Calming Manual provides a methodology for members of our community to request a traffic management study. The City Public Works Department will conduct the study and will make recommendations to mitigate the traffic impact in that particular location. Cooperative work between residents, business, other interested parties and City staff will allow finding acceptable and appropriate solutions to every problem. As traffic calming measures must respond to traffic patterns changes, traffic management studies have to be done periodically to evaluate the effectiveness of the adopted measure.

The Traffic Calming Manual will be updated as needed after initial approval by the County and as the City implements the criteria established as part of this Manual. Nothing contained herein should be construed to alter or supersede applicable rules, codes, or regulations of Miami-Dade County.
APPENDIX A

PROJECT APPLICATION

TODAY's DATE: ________________

ASSOCIATION: ___________________ CONTACT NAME: ___________________

LOCAL ADDRESS: ______________________________________________________

HOME PHONE: ________________ WORK PHONE: ___________________

WHICH NEIGHBORHOOD STREET(S) ARE OF CONCERN?

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

WHAT TRAFFIC OR SAFETY CONCERNS HAVE BEEN OBSERVED? (Check all that apply)

□ Speeding                □ Reckless driving
□ Cut-through vehicles    □ Noise
□ Vehicles not obey traffic control devices (stop sign, signal...)
□ Other: ____________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
PETITION FOR TRAFFIC CALMING

The petition for traffic calming must have signatures from a minimum of 50% of property owners for the section of the street affected.

Location: ____________________________________________________________

<table>
<thead>
<tr>
<th>Name (print)</th>
<th>Address</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

RETURN COMPLETED APPLICATION AND PETITION TO:

PUBLIC WORKS DEPARTMENT
1700 Convention Center Drive
Miami Beach, FL 33139
ATTENTION: Xavier Falconi
APPENDIX B

Summary of Traffic Calming Devices' Characteristics

Traffic calming measures can be separated into two groups based on the main impact intended:

- **Volume control measures** are primarily used to address cut-through traffic problems by blocking certain movements, thereby diverting traffic to streets better able to handle it.

- **Speed control measures** are primarily used to address speeding problems by changing vertical alignment, changing horizontal alignment, or narrowing the roadway. The distinction between the two types of measures is not as clear as their names suggest, since speed control measures frequently divert traffic to alternate routes, and volume control measures usually slow traffic.

<table>
<thead>
<tr>
<th>Speed Humps/Speed Cushions</th>
<th>Volume Reductions</th>
<th>Speed Reductions</th>
<th>Noise</th>
<th>Emergency &amp; Service Access</th>
<th>Cost Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possible</td>
<td>Possible</td>
<td>Increase</td>
<td>Some problems</td>
<td>Moderate ($2-$5K)</td>
<td></td>
</tr>
<tr>
<td>Raised Crosswalks</td>
<td>No effect</td>
<td>No</td>
<td>No effect</td>
<td>Moderate ($4K)</td>
<td></td>
</tr>
<tr>
<td>Textured Pavements</td>
<td>Unlikely</td>
<td>Yes</td>
<td>Minor change</td>
<td>Moderate to High (varies)</td>
<td></td>
</tr>
<tr>
<td>Traffic Circles</td>
<td>Unclear</td>
<td>Minor</td>
<td>Minor change</td>
<td>Some constraints           Moderate to High ($10-$30K w/o ROW cost)</td>
<td></td>
</tr>
<tr>
<td>Chokers/Bump-outs</td>
<td>Rare</td>
<td>Minor</td>
<td>Minor change</td>
<td>No effect                 Moderate ($10-$20 per approach)</td>
<td></td>
</tr>
<tr>
<td>Short Medians</td>
<td>No</td>
<td>Yes</td>
<td>No effect</td>
<td>No effect                 Moderate ($5-$15K)</td>
<td></td>
</tr>
<tr>
<td>Bike Lanes</td>
<td>No</td>
<td>Yes</td>
<td>No effect</td>
<td>No effect                 Moderate to High (varies)</td>
<td></td>
</tr>
<tr>
<td>Chicanes/Lateral Shifts</td>
<td>No</td>
<td>Possible</td>
<td>No effect</td>
<td>Some constraints          Moderate ($5-$10K)</td>
<td></td>
</tr>
<tr>
<td>Closures</td>
<td>Yes</td>
<td>Yes</td>
<td>No effect</td>
<td>Some constraints          Moderate to High ($10-$30K)</td>
<td></td>
</tr>
<tr>
<td>Diverters</td>
<td>Possible</td>
<td>Possible</td>
<td>No effect</td>
<td>Some constraints          Moderate ($5-$15K)</td>
<td></td>
</tr>
<tr>
<td>Realigned Intersections</td>
<td>Unlikely</td>
<td>Possible</td>
<td>No effect</td>
<td>Some constraints          High (varies) with possible ROW costs</td>
<td></td>
</tr>
</tbody>
</table>

3 "TrafficCalming.org" website
<table>
<thead>
<tr>
<th>Measure</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed Hump</td>
<td>• relatively inexpensive&lt;br&gt;• relatively easy for bicycles to cross if designed appropriately&lt;br&gt;• very effective in slowing travel speeds.</td>
<td>• cause a &quot;rough ride&quot; for all drivers, and can cause severe pain for people with certain skeletal disabilities&lt;br&gt;• force large vehicles, such as emergency vehicles and those with rigid suspensions, to travel at slower speeds&lt;br&gt;• may increase noise and air pollution</td>
<td>• For a 12-foot hump:&lt;br&gt;  Average of 22% decrease in the 85th percentile travel speeds, or from an average of 35.0 to 27.4 miles per hour; (from a sample of 179 sites).&lt;br&gt;  Average of 11% decrease in accidents, or from an average of 2.7 to 2.4 accidents per year (from a sample of 49 sites).&lt;br&gt;• For a 14-foot hump:&lt;br&gt;  Average of 23% decrease in the 85th percentile travel speeds, or from an average of 33.3 to 25.6 miles per hour (from a sample of 15 sites).&lt;br&gt;  Average of 41% decrease in accidents, or from an average of 4.4 to 2.6 accidents per year (from a sample of 5 sites).</td>
</tr>
<tr>
<td>Raised Crosswalks</td>
<td>• improve safety for both pedestrians and vehicles&lt;br&gt;• If designed well, they can have positive aesthetic value&lt;br&gt;• They are effective in reducing speeds, though not to the extent of Speed Humps</td>
<td>• can be expensive&lt;br&gt;• Their impacts on drainage needs to be considered&lt;br&gt;• They may increase noise and air pollution</td>
<td>• For a 22-foot Speed Table (the most similar device for which data is available):&lt;br&gt;  Average of 18% decrease in the 85th percentile travel speeds, or from an average of 36.7 to 30.1 miles per hour; (from a sample of 58 sites).&lt;br&gt;• Average of 45% decrease in accidents, or from an average of 6.7 to 3.7 accidents per year (from a sample of 8 sites).</td>
</tr>
<tr>
<td>Textured Pavements</td>
<td>Traffic Circles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| • can reduce vehicle speeds over an extended length  
• If designed well, they can have positive aesthetic value  
• Placed at an intersection, they can calm two streets at once | • generally expensive, varying by materials used  
• If used on a crosswalk, they can make crossings more difficult for wheelchair users and the visually impaired  
• No data has been compiled on the effects of textured pavements |
| • very effective in moderating speeds and improving safety  
• If designed well, they can have positive aesthetic value  
• Placed at an intersection, they can calm two streets at once | • difficult for large vehicles (such as fire trucks) to circumnavigate  
• must be designed so that the circulating lane does not encroach on the crosswalks  
• may require the elimination of some on-street parking  
• Landscaping must be maintained, either by the residents or by the municipality |
| • Average of 11% decrease in the 85th percentile travel speeds, or from an average of 34.1 to 30.2 miles per hour (from a sample of 45 sites)  
• Including a large sample from Seattle, an average of 73% decrease in accidents, or from an average of 2.2 to 0.6 accidents per year (from a sample of 130 sites)  
• Excluding the large sample from Seattle, an average of 29% decrease in accidents, or from an average of 5.9 to 4.2 accidents per year (from a sample of 17 sites) |
<table>
<thead>
<tr>
<th>Chicanes</th>
<th>Bike Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Easily negotiable by large vehicles such as fire trucks, late curve realignment is sometimes needed.</td>
<td>• Discourage high speeds by forcing drivers to deviate out of the appropriate lane and merging back in slowly.</td>
</tr>
<tr>
<td>• Must be designed carefully to avoid speed deviation.</td>
<td>• Increase pedestrian safety by reducing speeds, especially by the absence of curbs.</td>
</tr>
<tr>
<td>• No data has been compiled on the effects of chicanes.</td>
<td>• Their speed reduction effect is somewhat limited by the absence of any on-street parking.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Short Median Narrowings (Center Island Narrowings)</th>
<th>Chokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• If designed well, they can have some positive aesthetic value.</td>
<td>• If designed well, they can have some positive aesthetic value.</td>
</tr>
<tr>
<td>• Reduce both speeds and volumes.</td>
<td>• Must be designed carefully to avoid speed deviation.</td>
</tr>
<tr>
<td>• May require the elimination of some on-street parking.</td>
<td>• Their effect on large vehicles is limited by the absence of any on-street parking.</td>
</tr>
<tr>
<td>• Their effect on the speed of the 55th percentile travel is 34.9 to 32.3 miles per hour.</td>
<td>• Their effect on the 55th percentile travel is 34.9 to 32.3 miles per hour.</td>
</tr>
</tbody>
</table>

<p>| Average of % decrease in traffic volumes with various narrowing measures, taken from a sample of 7 sites | Average of % decrease in traffic volumes with various narrowing measures, taken from a sample of 7 sites |</p>
<table>
<thead>
<tr>
<th></th>
<th>Closures</th>
<th>Diverters</th>
<th>Realigned Intersections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Full closures are able to maintain pedestrian and bicycle access</td>
<td>• Do not require a closure, only a redirection of existing streets</td>
<td>• May reduce speeds and improve safety at a T-intersection that is commonly ignored by</td>
</tr>
<tr>
<td></td>
<td>• Very effective in reducing traffic volume</td>
<td>• Able to maintain full pedestrian and bicycle access</td>
<td>motorists</td>
</tr>
<tr>
<td></td>
<td>• Require legal procedures for street closures</td>
<td>• Able to maintain full pedestrian and bicycle access</td>
<td>• The curb realignment can be costly</td>
</tr>
<tr>
<td></td>
<td>• Cause circuitous routes for local residents and emergency services</td>
<td>• May be expensive</td>
<td>• They may require some additional ROW to cut the corner</td>
</tr>
<tr>
<td></td>
<td>• May be expensive</td>
<td>• May limit access to businesses</td>
<td>• No data has been compiled on the effects of realigned intersections</td>
</tr>
<tr>
<td></td>
<td>• May require reconstruction of corner curbs</td>
<td></td>
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<tr>
<td></td>
<td>• Average of 44% decrease in traffic volume, or a decrease of 671 vehicles per day (from a sample of 19 sites)</td>
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<tr>
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<td></td>
<td>• Average of 35% decrease in traffic volume, or a decrease of 501 vehicles per day (from a sample of 27 sites)</td>
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</tbody>
</table>
APPENDIX C

References


City of Fort Lauderdale Speed Hump Installation Policy, December 30, 2002.


APPENDIX 1-C:
FORM OF FINAL RECEIPT
FORM OF FINAL RECEIPT:

[The following form will be used to show receipt of final payment for this Contract.]

FINAL RECEIPT FOR CONTRACT NO. _____________________________

Received this __________ day of ________________________, 20__, from City of Miami Beach, Florida, the sum of _________________________________ Dollars ($__________________) as full and final payment to CONTRACTOR for all work and materials for the Project described as:

This sum includes full and final payment for all extra work and material and all incidentals.

CONTRACTOR hereby indemnifies and releases CITY from all liens and claims whatsoever arising out of the Contract and Project.

CONTRACTOR hereby certifies that all persons doing work upon or furnishing materials or supplies for the Project have been paid in full. In lieu of this certification regarding payment for work, materials and supplies, CONTRACTOR may submit a consent of surety to final payment in a form satisfactory to CITY.

CONTRACTOR further certifies that all taxes imposed by chapter 212, Florida Statutes (Sales and Use Tax Act), as amended, have been paid and discharged.

[If incorporated sign below.]

CONTRACTOR

ATTEST:

__________________________  ____________________________
(Name of Corporation) (Signature)

__________________________  ____________________________
(Secretary) (Signature)

(Corporate Seal)

[If not incorporated sign below.]

WITNESSES:

__________________________  ____________________________

__________________________  ____________________________

CONTRACTOR

__________________________
(Name of Firm)

__________________________
(Signature)

__________________________
(Print Name and Title)

____ day of ____________, 20__.  

____ day of ____________, 20__.  

____ day of ____________, 20__.  

STANDARD DETAILS

Standard Details are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself with all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 1-1  4-FT CHAIN LINK TREE PROTECTION FENCE
SECTION VIEW
N.T.S.

NOTES:

1. TREE PROTECTION FENCE (TPF) SHALL BE INSTALLED PRIOR TO ANY SITE WORK, CLEARING OR DEMOLITION.

2. TPF SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.

3. REMOVE TPF ONLY WITH WRITTEN APPROVAL FROM CITY URBAN FORESTER AFTER ALL SITE WORK HAS BEEN COMPLETED.

4. NO CONSTRUCTION ACTIVITIES PERMITTED WITHIN TPF WITHOUT URBAN FORESTER APPROVAL.
RIGHT-OF-WAY CONSTRUCTION REQUIREMENTS
SECTION 3. RIGHT-OF-WAY CONSTRUCTION REQUIREMENTS

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  1.07 Street Designations

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3.12 Guardrails
3.13 Landscape – Tree Planting/Right-of-Way Improvements Permit
3.14 Pedestrian Scaffolding Placement
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3.16 Revocable Permits
3.17 Roofing Equipment Placement
3.18 Sanitary Sewer Lateral Connection or Increased Sanitary Volume Service
3.19 Search Light
3.20 Sewer Capacity Certification Allocation Letter
3.21 Sidewalk Café
3.22 Sidewalk Closure
3.23 Sidewalk Curb and Gutter Construction/Repair
3.24 Pool Bond Permit
3.25 Soil Boring
3.26 Street Closure
3.27 Utility Manhole Maintenance
3.28 Underground Utilities
3.29 Water Meter Service
3.30 Water and Sewer Donation Program
PART 1 – GENERAL

1.01 GENERAL

A. Right-of-way (ROW) permits and procedures assure compliance with all applicable Local, State, and Federal laws, codes, and regulations and with utility accommodation policies and practices.

B. A copy of the ROW permit and plans are required to be on the jobsite at all times during construction.

C. All driveways shall be maintained open at all times.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. City of Miami Beach Code of Ordinances
   Transportation Master Plan Final Report

2. Florida Building Code

3. Florida Statutes (F.S.)

4. Miami-Dade County Code of Ordinances

B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

   Section 1. Design Standards and Guidelines

   Section 8. Surveying, Drawing, and Drafting Requirements

   Section 9. Erosion and Sediment Control

   Section 10. Earthwork and Roadwork

   Section 14. Water Distribution System

   Section 15. Sanitary Sewer Gravity Collection System

   Section 16. Sanitary Sewer Force Mains and Pump Stations
1.03 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.04 WORKING HOURS

A. Working hours on major corridors within the City ROW are 10 am to 3:30 pm in accordance with Resolution 2016-29583.

B. Work outside of these hours requires approval and a noise waiver.
1.05 NOISE

A. City of Miami Beach Noise Ordinance (Code of Ordinances, Chapter 46, Article IV) shall be followed all times during construction.

1.06 UTILITY COORDINATION

A. F.S. 556 requires that all utility franchise owners in the State of Florida be members of the Sunshine One Call of Florida. The City of Miami Beach as owner and operator of potable water, sanitary sewer, storm, and street lighting utilities is a participating member of the Sunshine 811 One Call of Florida. Contractors and designers are required to request dig or design tickets through Sunshine 811 One Call.

B. Sunshine dig tickets are required when any excavation or design projects are proposed or performed within the public ROW, public property, or easement by the utility companies/contractors, engineers, owners, etc. Dig ticket requests for marking of underground utility locations requires two (2) full business days notification prior to any excavation work being done within the public ROW, public property, or easement area.

C. For design location purposes, the City will provide utility location information fourteen (14) business days from receipt of a design ticket request from the Sunshine 811 system. Utility location information for design tickets will only be provided through paper copies or by electronic means, and the utility information will be based upon record drawings, atlases, as-builts, Geographic Information System (GIS) maps, etc.

D. The following is the procedure for requesting tickets through Sunshine 811 One Call for underground utility locations.

1. Requests shall be submitted through Sunshine 811 One Call by the utility companies, contractor, engineer, owner, etc. via phone or e-mail. The dig or design ticket will be assigned an identification number. Information shall include but not limited to the City ROW permit number, contact person(s), project location, description of work, and any other pertinent information.

2. Receipt of the dig or design ticket by the City’s Utility location technician will be received through the Sunshine 811 system. The technician researches the applicable City utility records for water, sanitary sewer, street lighting, storm drainage, as well as their service connections within the public ROW, property, or easement at the dig site location or designated area.

3. The contactor shall mark with a “white line” the proposed location and limits of the excavation area.

4. The locate technician responds to field mark the utility location and enter a positive response code in the Sunshine 811 system per the time frame as required and outline in F.S. 556, (48 hours/two (2) full business days for a standard dig ticket)
unless otherwise mutually agreed with the customer or by effected by other special circumstances.

5. The locate technician will provide field markings identifying City owned underground utilities by using A.P.W.A uniform color-coded paint and utility markings guidelines.

6. The locate technician shall document and digitally photograph the location(s) marked and upload and enter a positive response code into the Sunshine 811 system to close the ticket, and the system will notify the contactor, caller/requester.

7. Utility field markings, as per F.S. 556, will be valid for thirty (30) calendar days.

1.07 STREET DESIGNATIONS

A. Street designations per the City of Miami Beach Transportation Master Plan Final Report are as follows.

1. Arterials: Arterials are major streets expected to carry large volumes of traffic. Arterials are often divided into major and minor arterials and provide regional as well as local connections.

2. Collectors: Collectors, as the name implies, collect traffic from local roads and distribute it to arterials. Traffic on collectors is usually going to or coming from somewhere nearby. Collectors are typically in jurisdiction of the county or the local government, in this case, the City of Miami Beach.

3. Local: Local roads are at the “bottom” of the hierarchy. These roads have the lowest posted speed limits and carry low volumes of traffic. Typically they will be the primary roads within residential neighborhoods for circulation.

B. Refer to Table 2 of the Transportation Master Plan Final Report (latest version) for street designations.

PART 2 – DOCUMENTATION REQUIREMENTS

2.01 CERTIFIED PROPERTY SURVEY

A. One (1) signed and sealed hard copy or electronic copy of the survey.

B. The certified property survey shall be completed in accordance with Section 8 of the City of Miami Beach Public Works Manual.

C. The certified property survey shall be less than six (6) months old at time of permit application.
2.02 PLANS

A. Two (2) sets of plans if submitting hard copies or electronic submission of plans in accordance with Section 8 of the City of Miami Beach Public Works Manual.

B. Plans shall be signed and sealed by an Engineer registered in the State of Florida.

C. Minimum size for plans is 11-inches by 17-inches. Plans shall be drawn to scale.

D. Plans shall be prepared in accordance with Section 8 of the City of Miami Beach Public Works Manual.

E. Plans shall include right-of-way dimensions identifying property lines.

F. Plans shall include plan and profile sections and details, as applicable.

G. Plans shall show existing and proposed conditions and elevations, as applicable.

2.03 PROOF OF PROPERTY OWNERSHIP

A. When proof of property ownership is required, one of the following shall be provided:

1. Copy of property warranty deed

2. Copy of Miami-Dade County property tax assessment document (i.e., tax card)

3. Copy of Miami-Dade County property appraisal document

2.04 CONTRACTOR LICENSE

A. When required, copies of all licenses held by the Contractor and Subcontractors that pertain to the type of work to be performed under the project shall be provided. A current valid certificate, as listed below, shall be provided.

1. The State of Florida Construction Industry Licensing Board, pursuant to the provisions of Section 489.115 of the Florida Statutes; or

2. Miami-Dade County Construction Trades Qualifying Board, pursuant to the provisions of Section 10-3 (a) of the Miami-Dade County Code. Holders of Miami-Dade County Certificates of Competency must also hold Certificates of Registration issued by the State of Florida Construction Industry Licensing Board, pursuant to the provisions of Section 489.117, Florida Statutes.

B. A copy of the Contractor’s occupational/business license and State registration (Florida State Registration can be located at printed at www.Sunbiz.org).
C. For underground utility work, the Contractor must be licensed as a Certified General Contractor with an Underground Utility License issued by the State of Florida Department of Business and Professional Regulations (http://www.myfloridalicense.com/dpr).

2.05 INSURANCE REQUIREMENTS

A. Provide current copy of the Certificate of Liability Insurance to be approved by the City of Miami Beach’s Risk Management Division.

B. Minimum insurance limits are as follows:
   1. Auto liability limit: $1,000,000
   2. Commercial general liability limit: $1,000,000
   3. Workmen’s Compensation, if required by the State

C. All policies must be issued by companies authorized to do business in Florida with a Best Key rating of B+VI or better.

D. The City of Miami Beach must be a CERTIFICATE HOLDER with 30 day notice of cancellation of change.

E. The City of Miami Beach must be named as an additional insured for both general liability and automobile insurance.

F. Provide project address, description, and duration of construction activity to be performed in the description operation section of the Certificate of Insurance document. (Refer to Appendix 3-A.)

2.06 BOND

A. Minimum bond amount varies by permit type. Refer to Part 3. Bond amount to be determined by the City of Miami Beach Public Works Department.

B. Upon final inspection and satisfaction of the ROW permit (special provision) the bond will be refunded less interest in full.

2.07 FLORIDA DEPARTMENT OF TRANSPORTATION PERMIT

A. A FDOT permit is required for work on state roadways and ROWs.

B. State roads within the City of Miami Beach are listed below.

   1. Alton Road, from 5th Street to 63rd Street
2. 5th Street/MacArthur Causeway
3. 41st Street/Arthur Godfrey Road
4. Collins Avenue, north of 5th Street
5. 63rd Street
6. 71st Street/Normandy Drive
7. Indian Creek Drive
8. Harding Avenue, from 87th Street to 71st Street
9. Abbott Avenue, from 71st Street to 67th Street

C. The FDOT District 6 Permit Office is located at:
   1000 NW 111th Avenue
   Miami, FL 33172

D. The FDOT District 6 Permit Office phone number is 305-470-5367.

2.08 MIAMI-DADE COUNTY PERMIT

A. A Miami-Dade County (MDC) permit is required for all work on MDC roadways and ROWs.

B. MDC roads within the City of Miami Beach are listed below.
   1. 23rd Street, from Dade Boulevard to Collins Avenue
   2. Dade Boulevard
   3. Pine Tree Drive
   4. La Gorce Drive
   5. Venetian Causeway

C. The Miami-Dade County Department of Transportation and Public Works is located at:
   111 NW 1st Street
   Miami, FL 33132

D. The Miami-Dade County Department of Transportation and Public Works phone number is 305-375-2142.
2.09 Pre-Construction Photographs

A. The permittee shall photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All photographs shall be date and time stamped. A minimum of five (5) date and time stamped photographs shall be submitted with any ROW permit application.

2.10 Parking Meter Space Purchase

A. Parking space rental fee is based on the latest version of City of Miami Beach Code of Ordinances Appendix A – Fee Schedule.

B. Provide proof (receipt) of parking meter space purchase from the City of Miami Beach Parking Enforcement Division. The phone number is: 305-673-7000, extension 6729.

2.11 Right-of-Way Rental

A. The fee for blocking the right-of-way is based on the latest version of City of Miami Beach Code of Ordinances Appendix A – Fee Schedule.

PART 3 – Permit Requirements

3.01 Asphalt or Concrete Driveway Approach

A. When applying for an Asphalt or Concrete Driveway Approach Construction in Right-of-Way Permit, the following documents are required.

1. Certified property survey in accordance with 2.01 of this Section.

2. Plans in accordance with 2.02 of this Section.

3. Proof of property ownership for Owner/Builder construction permit in accordance with 2.03 of this Section.

4. Proof of Contractor’s license in accordance with 2.04 of this Section.

5. Proof of insurance in accordance with 2.05 of this Section.

6. $2,500 minimum bond per drive approach for Owner/Builder permit in accordance with 2.06 of this Section.

7. Maintenance of traffic (MOT) plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.
8. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

9. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

10. Pre-construction photographs in accordance with 2.09 of this Section.

B. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.02 BUS SHELTER INSTALLATION

A. When applying for a Bus Shelter Installation Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section. Plans must be reviewed and approved by the City of Miami Beach Transportation Department before applying for ROW permit.

2. Proof of Contractor’s license in accordance with 2.04 of this Section.

3. Proof of insurance in accordance with 2.05 of this Section.

4. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

5. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

6. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

7. Pre-construction photographs in accordance with 2.09 of this Section.

8. Copy of notification letter to owners of adjacent properties that may be affected. Copy the City of Miami Beach Public Works Department, Permitting.

B. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.
3.03 CONSTRUCTION DUMPSTER/ROLL-OFF TEMPORARY PLACEMENT IN RIGHT-OF-WAY

A. This permit is for temporary placement only. Construction dumpsters/roll-off containers shall not remain the right-of-way more than four (4) weeks.

B. When applying for a Construction Dumpster/Roll-Off Placement in Right-of-Way Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.
2. Proof of insurance in accordance with 2.05 of this Section.
3. $2,500 minimum bond in accordance with 2.06 of this Section.
4. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.
5. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.
6. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.
7. Pre-construction photographs in accordance with 2.09 of this Section.
8. Proof of parking meter space purchase/loading zone approval in accordance with 2.10 of this Section.

C. Per City of Miami Beach Code of Ordinances Section 90-297, the City has the right to restrict the location of any roll-off, portable containers, or dumpsters in order to ensure the public's safety and to prevent traffic hazards. It is prohibited to place roll-offs and portable containers in the following locations and areas:

1. Alleys, lanes, bridges
2. Ocean Drive, from Biscayne Street to 15th Street
3. Collins Avenue, from Biscayne Street to 87th Terrace
4. Washington Avenue, from Biscayne Street to 17th Street
5. 41st Street, from Collins Avenue to Alton Road
6. 71st Street, from Collins Avenue to Bay Drive
D. Construction dumpster/roll-off containers shall only be placed in parking spaces or loading zones; they shall not be placed on swales or green spaces. Construction dumpster/roll-off containers shall not block the sidewalk. Construction dumpster/roll-off containers shall occupy the approved placement zone only.

E. Construction dumpster/roll-off container placement requires location approval by the Public Works Department Sanitation Division prior to ROW permit issuance.

3.04 IRRIGATION AND POOL SUBMETERS

A. When applying for an irrigation or pool water submeter service for a sanitary sewer credit, the following documents are required.

1. Proof of property ownership in accordance with 2.03 of this Section.

2. Proof of Contractor’s license in accordance with 2.04 of this Section. Cooling tower water meter (sub-meter) shall be installed by a State of Florida licensed Plumbing Contractor; City of Miami Beach Building Department approval is required.

3. Pre-construction photographs in accordance with 2.09 of this Section.

4. Signed and notarized letter from the property owner authorizing installation of a new water submeter service at a determined location within private property.

5. Completed water meter service (sub-meter) application.

B. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.05 CRANE SET-UP IN THE RIGHT-OF-WAY

A. When applying for Crane Set-Up in Right-of-Way Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.

2. Proof of Contractor’s license in accordance with 2.04 of this Section.

3. Proof of insurance in accordance with 2.05 of this Section.

4. $10,000 minimum sidewalk/asphalt roadway bond in accordance with 2.06 of this Section.

5. $10,000 performance bond indemnifying the City as additional insured. Must be approved by the City of Miami Beach Risk Manager.
6. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

7. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

8. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

9. Pre-construction photographs in accordance with 2.09 of this Section.

10. Copy of notification letter to property owners with a 375-foot radius of the work/lift zone. Copy the City of Miami Beach Public Works Department Permitting and Engineering in letter distribution. Notification letters shall be provided 48 hours prior to lift. The notification letter shall include the following.
   a. Crane operator’s name
   b. On-site supervisor’s contact number
   c. Brief description of lift being performed
   d. Date of lift
   e. Time of lift

11. Crane specifications including but not limited to the following.
   a. Stabilizers
   b. Outriggers
   c. Deployment width

12. Proof of parking space purchase/loading zone approval in accordance with 2.10 of this Section, if applicable.

13. Proof of right-of-way rental in accordance with 2.11 of this Section, if applicable. Public Works Department to determine.


15. Three (3) references.
B. ROW permit will be issued to crane operator only.

C. Crane set-up shall occupy approved lift zone only.

3.06 DECORATIVE PAVER OR CONCRETE DECORATIVE DRIVEWAY CONNECTION

A. When applying for a Decorative Paver or Concrete Decorative Driveway Connection in Right-of-Way Permit, the following documents are required.

1. Certified property survey in accordance with 2.01 of this Section.

2. Plans in accordance with 2.02 of this Section.

3. Proof of property ownership for Owner/Builder construction permit in accordance with 2.03 of this Section.

4. Proof of Contractor’s license in accordance with 2.04 of this Section.

5. Proof of insurance in accordance with 2.05 of this Section.

6. $2,500 minimum bond per drive approach for Owner/Builder permit in accordance with 2.06 of this Section.

7. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

8. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

9. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

10. Pre-construction photographs in accordance with 2.09 of this Section.

11. Restrictive covenant to be signed, notarized, and recorded at the Miami-Dade County Clerk of Courts for decorative drive installations.

B. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

C. No decorative driveway approaches are allowed on FDOT roadways.
3.07 DEMOLITION

A. When applying for a Demolition Permit, the following documents are required.

1. Certified property survey in accordance with 2.01 of this Section.
2. Plans in accordance with 2.02 of this Section.
3. Proof of ownership in accordance with 2.03 of this Section.
4. Proof of Contractor’s license in accordance with 2.04 of this Section.
5. Proof of insurance in accordance with 2.05 of this Section.
6. Public Works Department to calculate restoration bond referencing the subject property.
7. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.
8. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.
9. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.
10. Pre-construction photographs in accordance with 2.09 of this Section.
11. Lien search report from the City of Miami Beach Finance Department. A lien search report can be requested online at https://secure.miamibeachfl.gov/lienresearch.
12. Copy of the City of Miami Beach’s Finance Department receipt stamped paid in full for all outstanding City bills including special assessment liens.
13. Signed and notarized letter from applicant/owner requesting that the existing water meter service remain in place during demolition to mitigate dust.

B. The fee schedule for sanitary sewer lateral sealing and water service disconnection is as follows.

1. Sanitary sewer lateral sealing: $704.00, per connection
2. Water service disconnection: $184.00, per connection
C. In accordance with the provision of Miami-Dade Ordinance 89-95 as currently in effect and as may be amended or revised in the future, the City of Miami Beach shall require all new retail users, as defined in the Ordinance, to pay the Miami-Dade County Water and Sewer connection charges. The City of Miami Beach shall not render water service, sewer service, or both to any new retail user until a written receipt from the Miami-Dade Department of Water and Sewer is provided showing that the Miami-Dade County connection charges have been paid.

1. “New retail user” is defined as any user who applies to a volume customer of the Miami-Dade Water and Sewer Department for water service, sewer service, or both, or an existing user who applies for increased water service, sewer service, or both.

2. Ordinance 89-95 County fee must be paid prior to City of Miami Beach service connection.

3. Water and sewer impact fees are due prior to building permit issuance.

D. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.08 DEWATERING

A. When applying for a Dewatering Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section. The area to be dewatered must be identified in the plans. Plans shall also include groundwater discharge location into designated well or sanitary sewer system.

2. Two (2) sets of the dewatering plan signed and sealed by a State of Florida Engineer.

3. Copy of the stamped Miami-Dade Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM) approved dewatering permit package.

4. Proof of Contractor’s license in accordance with 2.04 of this Section.

5. Proof of insurance in accordance with 2.05 of this Section.

6. $2,500 minimum bond in accordance with 2.06 of this Section.

7. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.
8. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

9. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

10. Pre-construction photographs in accordance with 2.09 of this Section.

B. For dewatering into a City of Miami Beach stormwater injection well, the following additional documents are required.

RESERVED

C. For dewatering into the City of Miami Beach’s sanitary sewer system, the following additional documents are required.

1. List of the City of Miami Beach pump stations and collection systems that will be affected by the dewatering process.

2. Complete sections 1a, 1b, and 1c of Miami-Dade County Sewer Capacity Certification Letter Application.

3. Make and model of equipment used in dewatering process. Notify City of Miami Beach Public Works Department Operations if any equipment malfunctions or needs to be replaced for any reason during the process.

4. A pump curve may be requested.

5. The groundwater extraction/pumping rates, operating schedule including exact days and times and overall duration of dewatering at each location.

6. A flow meter must be used on all pumps to monitor the process and readings will be provided daily to City of Miami Beach Public Works Operations.

7. Sewer allocation fees will be determined during the review process.

D. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

E. Pedestrian ramp constructed over dewatering discharge pipe in right-of-way requires meeting American Disabilities Act (ADA) approval for compliance to maintain pedestrian movement through the construction zone. Provide notification signage to read “Caution: pedestrian ramp ahead” when utilizing sidewalk through the construction zone.
3.09 FIRE HYDRANT ASSEMBLY INSTALLATION/RELOCATION

A. When applying for a Fire Hydrant Assembly Installation/Relocation permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section. Plans must be reviewed and approved by the City of Miami Beach Building Department before applying for ROW permit.

2. Proof of Contractor’s license in accordance with 2.04 of this Section. Contractor must have an underground license.

3. Proof of insurance in accordance with 2.05 of this Section.

4. $2,500 minimum bond in accordance with 2.06 of this Section.

5. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

6. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

7. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

8. Pre-construction photographs in accordance with 2.09 of this Section.

B. The applicant must install City of Miami Beach approved “American Darling” type fire hydrant assembly model number B-84B-5 with threaded pattern. The nozzle sizes shall meet the Miami Beach Fire Department Requirements. (Refer to City of Miami Beach Public Works Manual Section 14 for more information.)

C. The schedule of fees is as follows. Minimum size provided is 6-inch diameter. All pipe material is ductile iron.

1. Fire hydrant assembly: $2,500.00

2. Additional cost for fire assembly supply line great than 20 feet: $1,500.00

D. FDOT/MDC roadway construction for fire hydrant installation/relocation requires additional feeds to be calculated by City of Miami Beach Public Works Department Engineering Division.

E. All fire main taps must be witnessed by City Inspector.
F. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.10 FIRE LINE SERVICE CONNECTION

A. When applying for a Fire Line Service Connection permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section. All existing underground facilities must be identified on the plans. Plans must be reviewed and approved by the City of Miami Beach Building Department before applying for ROW permit.

2. Proof of Contractor’s license in accordance with 2.04 of this Section. Contractor must have an underground license.

3. Proof of insurance in accordance with 2.05 of this Section.

4. $2,500 minimum bond in accordance with 2.06 of this Section.

5. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

6. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

7. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

8. Pre-construction photographs in accordance with 2.09 of this Section.

9. Signed and notarized Fire Line Service Agreement with water account number.

10. One (1) copy of City of Miami Beach Fire Department fire flow calculations.

11. Hydraulic water flow calculations may be required.

12. Copy of City of Miami Beach water bill.

B. The schedule of fees is as follows. Minimum size provided is 4-inch diameter. All pipe material is ductile iron.

1. 4-inch fire line service connection: $3,100.00

2. 6-inch fire line service connection: $5,900.00
3. 8-inch fire line service connection: $7,900.00

4. Additional cost for fire line service connection great than 20 feet: $1,500.00

C. FDOT/MDC roadway construction for fire hydrant installation/relocation requires additional feeds to be calculated by City of Miami Beach Public Works Department Engineering Division.

D. All fire main taps must be witnessed by City Inspector.

E. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.11 GENERATOR PLACEMENT IN RIGHT-OF-WAY

A. This permit is for temporary generator placement only. Generators shall not remain the ROW more than four (4) weeks. City of Miami Beach projects may be exempt from this requirement.

B. When applying for a Generator Placement in Right-of-Way Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.

2. Proof of insurance in accordance with 2.05 of this Section.

3. $2,500 minimum bond in accordance with 2.06 of this Section.

4. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

5. Pre-construction photographs in accordance with 2.09 of this Section.

6. Copy of notification letter to other ROW users. Copy the City of Miami Beach Public Works Department, Permitting.

7. Proof of parking space purchase/loading zone approval in accordance with 2.10 of this Section.

8. Generator specifications, including the length, width, and height of the trailer mounted unit with rubber tires. Photographs of the trailer-mounted generator shall be included.

9. Copy of approved RER-DERM permit(s), if required.
Section 3. Right-of-Way Construction Requirements

We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.

C. Generators shall only be placed in parking spaces or loading zones; they shall not be placed in swales or green spaces. Generators shall not block the sidewalk.

D. Generator placement requires location approval by City of Miami Beach Code Compliance Department and Fire Department and prior to ROW permit issuance. City of Miami Beach Environment Division approval is required when generator is to be placed on or near the beach.

E. Generator shall occupy approved placement zone only.

F. Hospital silencer shall be provided for sound attenuation for standalone generators.

G. UL approved cable ramps required when crossing right-of-way roadway or sidewalk.

H. Generator shall have environmental protective padding placed directly on ground surfaces such as asphalt brick pavers, concrete, beach sand, etc.

3.12 GUARDRAILS

A. When applying for a Guardrails Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section. Guardrail elevations shall be shown on the plans.

2. Proof of Contractor’s license in accordance with 2.04 of this Section.

3. Proof of insurance in accordance with 2.05 of this Section.

4. $2,500 minimum bond in accordance with 2.06 of this Section.

5. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

6. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

7. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

8. Pre-construction photographs in accordance with 2.09 of this Section.

9. Copy of notification letter to property owners in the construction zone(s). Copy the City of Miami Beach Public Works Department, Permitting.
10. Two (2) sets of the dewatering plan signed and sealed by a State of Florida Engineer, if applicable. Copy of the stamped RER-DERM approved dewatering permit package, if applicable.

B. The City of Miami Beach Transportation Department must review and approve all guardrail plans.

C. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.13 LANDSCAPE – TREE PLANTING/RIGHT-OF-WAY IMPROVEMENTS PERMIT

A. When applying for Landscape – Tree Planting/Right-of-Way Improvements Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section. Plans must be signed and sealed by a State of Florida Licensed Landscape Architect. Plans must show the existing and proposed right-of-way swale area condition. Plans must be reviewed and approved by the City of Miami Beach Greenspace Division, City’s certified Arborist/Landscape Coordinator before applying for a ROW permit.

2. Copy of City of Miami Beach Urban Forestry Tree Permit.

3. Proof of Contractor’s license in accordance with 2.04 of this Section.

4. Proof of insurance in accordance with 2.05 of this Section.

5. $2,500 minimum bond in accordance with 2.06 of this Section.

6. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

7. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

8. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

9. Pre-construction photographs in accordance with 2.09 of this Section.

10. Approved and executed Landscape Maintenance Agreement between the City of Miami Beach and the property owner.
11. Copy of notification letter to other ROW users. Copy the City of Miami Beach Public Works Department, Permitting.

B. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.03 of this Section.

3.14 PEDESTRIAN SCAFFOLDING PLACEMENT

A. When applying for a Pedestrian Scaffolding Placement in Right-of-Way Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section. Two (2) sets of the scaffolding component plan, signed and sealed by a State of Florida Engineer. Structural plans must be reviewed and approved by the City of Miami Beach Building Department prior to applying for a ROW permit.

2. Signed and sealed copy of the Special Inspector Form as required by Florida Building Code.

3. Proof of Contractor's license in accordance with 2.04 of this Section.

4. Proof of insurance in accordance with 2.05 of this Section.

5. $2,500 minimum bond in accordance with 2.06 of this Section.

6. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

7. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

8. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

9. Pre-construction photographs in accordance with 2.09 of this Section.

3.15 PUBLIC STORAGE CONTAINER

A. This permit is for temporary placement only. Storage container shall be permitted for seven (7) days maximum within the ROW. Subsequent day(s) subject to Code Compliance Enforcement issuance of violation(s).

B. When applying for a Public Storage Container Placement in Right-of-Way Permit, the following documents are required.
1. Plans in accordance with 2.02 of this Section. Plans shall show container placement in designated area. Load off and pick-up date(s) shall be noted on the plans.

2. Proof of insurance in accordance with 2.05 of this Section.

3. $2,500 minimum bond in accordance with 2.06 of this Section.

4. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

5. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

6. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

7. Pre-construction photographs in accordance with 2.09 of this Section.

8. Proof of parking space purchase/loading zone approval in accordance with 2.10 of this Section.

C. Public storage containers shall only be placed in parking spaces or loading zones; they shall not be placed in swales or green spaces. Public storage containers shall not block the sidewalk.

D. Public storage container placement requires location approval by City of Miami Beach Code Compliance Department prior to ROW permit issuance.

3.16 REVOCABLE PERMITS

A. The Revocable Permit requirements are defined in City of Miami Beach Code of Ordinances Chapter 82, Article III, Division 2.

B. For installation of swales with permeable surfaces the property owner must apply for a Revocable Permit with proper justification and provide benefits to the City.

C. All surveys shall be performed and prepared under the supervision and direction of a Professional Surveyor and Mapper (PSM) licensed in the State of Florida pursuant to FAC Chapter 5J-17 and shall meet the Standards of Practice for Professional Surveying and Mapping as identified in the following FAC rules.

1. Rule 5J-17.050: Definitions

3. Rule 5J-17.052: Standards of Practice – Boundary Survey Requirements


D. All surveys shall be submitted in accordance with submittal procedures as defined in FAC Rule 5J-17.062 and shall state on their prepared survey, map, and/or report that the prepared document is certified to the City of Miami Beach.

E. All surveys shall be in accordance with Section 8 of the City of Miami Beach Public Works Manual.

3.17 ROOFING EQUIPMENT PLACEMENT

A. This permit is for temporary placement only. Roofing equipment shall not remain the ROW more than four (4) weeks.

B. This permit is for placement of roofing equipment crossing the sidewalk.

C. When applying for a Roofing Equipment Placement in Right-of-Way Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.

2. Proof of insurance in accordance with 2.05 of this Section.

3. $2,500 minimum bond in accordance with 2.06 of this Section.

4. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

5. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

6. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

7. Pre-construction photographs in accordance with 2.09 of this Section.

8. Proof of parking space purchase/loading zone approval in accordance with 2.10 of this Section.
3.18 SANITARY SEWER LATERAL CONNECTION OR INCREASED SANITARY VOLUME SERVICE

A. When applying for a Sanitary Sewer Lateral Connection or Increased Sanitary Volume Service, the following documents are required.

1. Plans in accordance with 2.02 of this Section. The location of the proposed sanitary sewer lateral shall be identified on plan and profile drawings. Plans must be reviewed and approved by the City of Miami Beach Building Department before applying for ROW permit.

2. Proof of property ownership in accordance with 2.03 of this Section.

3. Proof of Contractor’s license in accordance with 2.04 of this Section. Contractor must have an underground license.

4. Proof of insurance in accordance with 2.05 of this Section.

5. $2,500 minimum bond in accordance with 2.06 of this Section.

6. Pre-construction photographs in accordance with 2.09 of this Section.

7. Copy of RER-DERM permit, if required.

B. The schedule of fees is as follows. Minimum size provided is 6-inch diameter. All pipe material is PVC. Precast sewer manhole minimum diameter is 4 feet.

1. 6-inch sanitary sewer lateral connection: $2,500.00

2. 8-inch sanitary sewer lateral connection: $4,600.00

3. 10-inch sanitary sewer lateral connection: $6,500.00

4. Additional cost for fire line service connection great than 20 feet: $1,500.00

5. 4-foot-deep precast sanitary sewer manhole: Market value plus 10 percent

6. 5-foot-deep precast sanitary sewer manhole: Market value plus 10 percent

7. 6-foot-deep precast sanitary sewer manhole: Market value plus 10 percent

8. FDOT/MDC roadway restoration requires additional cost to be determined by the City of Miami Beach Public Works Department.

C. In accordance with the provision of Miami-Dade Ordinance 89-95 as currently in effect and as may be amended or revised in the future, the City of Miami Beach shall require all new retail users, as defined in the Ordinance, to pay the Miami-Dade County Water and Sewer connection charges. The City of Miami Beach shall not render water service, sewer service, or both to any new retail user until a written receipt from the Miami-Dade
Department of Water and Sewer is provided showing that the Miami-Dade County connection charges have been paid.

1. “New retail user” is defined as any user who applies to a volume customer of the Miami-Dade Water and Sewer Department for water service, sewer service, or both, or an existing user who applies for increased water service, sewer service, or both.

2. Ordinance 89-95 County fee must be paid prior to City of Miami Beach service connection.

3. Water and Sewer Impact Fees are due prior to building permit issuance.

D. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.19 SEARCH LIGHT

A. This permit is for temporary search light placement only. Search lights shall not remain the ROW more than seven (7) days.

B. When applying for a Search Light Placement in Right-of-Way Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.

2. Proof of insurance in accordance with 2.05 of this Section.

3. $2,500 minimum bond in accordance with 2.06 of this Section.

4. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

5. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

6. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

7. Pre-construction photographs in accordance with 2.09 of this Section.

8. Proof of parking space purchase in accordance with 2.10 of this Section.

C. Search light shall occupy approved placement zone only.
D. Search light placement requires location approval by City of Miami Beach Code Compliance Department prior to ROW permit issuance. City of Miami Beach Environmental Division approval is required when search light is to be placed on or near the beach. City of Miami Beach Parking Department approval is required when search light is placed in a parking area.

E. Search light shall have environmental protective padding placed directly on ground surfaces such as asphalt brick pavers, concrete, beach sand, etc.

3.20 SEWER CAPACITY CERTIFICATION ALLOCATION LETTER

A. When applying for a Sewer Capacity Certification Allocation Letter, the following documents are required.

1. Project name, and name and phone number of contact person submitting the application.

2. Plans in accordance with 2.02 of this Section. Provide stamped and signed plans approved by the City of Miami Beach Building Department for Public Works review OR verify that the approved plans are available online.

3. Copy of the property building history card including vacant lots serviced by City water/sewer connections. If no property records exist, provide document signed by the Building Department Record Manager or copy of Miami-Dade County Appraiser summary form.

4. Complete Sections 1a, 1b, and 1c of the Sewer Capacity Certification Letter application. (The City of Miami Beach Public Works Department will certify the pump station information in Section 2 of the application.)

5. Payment (cash, check, or credit card) for processing fee payable to City of Miami Beach. Processing fee is $161.00.

B. Applicant will provide RER-DERM with the Certified Sewer Application for further processing by the RER-DERM Wastewater Section.

C. In accordance with the provision of Miami-Dade Ordinance 89-95 as currently in effect and as may be amended or revised in the future, the City of Miami Beach shall require all new retail users, as defined in the Ordinance, to pay the Miami-Dade County Water and Sewer connection charges. The City of Miami Beach shall not render water service, sewer service, or both to any new retail user until a written receipt from the Miami-Dade Department of Water and Sewer is provided showing that the Miami-Dade County connection charges have been paid.
1. “New retail user” is defined as any user who applies to a volume customer of the Miami-Dade Water and Sewer Department for water service, sewer service, or both, or an existing user who applies for increased water service, sewer service, or both.

2. Ordinance 89-95 County fee must be paid prior to City of Miami Beach service connection.

3. Water and Sewer Impact Fees are due prior to building permit issuance.

3.21 SIDEWALK CAFÉ

A. In the event of a conflict between the City of Miami Beach Public Works Manual and the City of Miami Beach Code of Ordinances, the latest version of the City of Miami Beach Code of Ordinances supersedes the Public Works Manual.

B. It is recommended that applicant visit the City of Miami Beach Planning and Zoning Department prior to applying for a Sidewalk Café Permit in order to determine the cost per seat. This will help the applicant to adjust costs prior to submitting plans. This cost per seat will re-appear during the plumbing inspection, which will require a visit to Miami-Dade Water and Sewer Department with the Sewer Capacity Certification Allocation Letter (refer to Section 3.20).

C. When applying for a Sidewalk Café Permit, the following documents are required.

1. 24-inch by 36-inch signed and sealed detailed plans of the sidewalk café area. Plans must be in color. Plans shall include the following items.

   a. Pedestrian clearance.

   b. Detailed measurements of tables, seats, umbrellas, planters, hostess stands, and menu boards. Must show exact placement location of menu boards on plan.

   c. Photograph, drawings, or manufacturer’s brochures of tables, chairs, umbrellas (with flame retardant certificate).

   d. Legend that shows the total number of tables and seats (inside and outside, separately), umbrellas, hostess stand, menu boards, and total square footage.

   e. Internal floor plan of restaurant that shows restroom location (including fixtures), number of seats, and total square footage.

   f. Location of doorways, steps, trees, landscaping areas, fountains, parking meters, fire hydrants, bus shelters, directory/kiosks, public benches, trash receptacles, and other public fixtures, furnishing, and obstructions.

2. Current fiscal year business tax receipt (BTR) that specifies restaurant with at least one seat inside.
3. Certificate of Insurance (see Attachment 3-B), which includes the following. The Certificate of Insurance shall be signed by the City of Miami Beach Risk Management Department.
   a. General liability
   b. Liquor liability
   c. Workers’ compensation - If the business has less than four (4) employees, submit a notarized letter that states that workers compensation is not needed.

4. Umbrella certification if sidewalk café will include umbrellas.

5. Fats, oils, and grease discharge control annual operating permit (GDO permit).

D. Refer to the latest version of City of Miami Beach Code of Ordinances Appendix A – Fee Schedule for permit fees.

E. Pedestrian clearance is 12 linear feet on Lincoln Road and 5 linear feet on other City streets.

F. Sidewalk cafes are only allowed to have one (1) menu board and one (1) specials menu board.

G. All seats must face north and south away from pedestrian path if operating on Washington Avenue, Ocean Drive, Collins Avenue, Alton Road, etc. For Sidewalk Cafes operating on Lincoln Road, seats must face east and west away from pedestrian path.

H. Umbrella minimum clearance is 6’-8”. Restaurant name on umbrella shall not exceed 6 inches in height.

I. The permittee shall comply with all applicable accessibility codes include the ADA and state code provisions addressing accessibility for building construction.

3.22 SIDEWALK CLOSURE

A. Sidewalk closures are allowed 9 am to 4 pm unless a permit has been issued for a 24-hour closure. 24-hour closures require approval by the City Manager and Transportation Department.

B. When applying for Sidewalk Closure Permit, the following documents are required.
   1. Plans in accordance with 2.02 of this Section.
   2. Proof of insurance in accordance with 2.05 of this Section.
3. $2,500.00 minimum bond when closing the sidewalk with heavy machines/equipment in accordance with 2.06 of this Section.

4. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

5. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

6. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

7. Pre-construction photographs in accordance with 2.09 of this Section.

8. Proof of parking space purchase in accordance with 2.10 of this Section, if applicable.

3.23 SIDEWALK CURB AND GUTTER CONSTRUCTION/REPAIR

A. When applying for a Sidewalk Curb and Gutter Construction/Repair Permit, the following documents are required.

1. Certified property survey in accordance with 2.01 of this Section.

2. Plans in accordance with 2.02 of this Section.

3. Proof of Contractor's license in accordance with 2.04 of this Section.

4. Proof of insurance in accordance with 2.05 of this Section.

5. $2,500.00 minimum bond required for owner/builder permit in accordance with 2.06 of this Section.

6. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

7. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

8. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

9. Pre-construction photographs in accordance with 2.09 of this Section.
B. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

### 3.24 POOL BOND PERMIT

A. When applying for a Pool Bond Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.

2. Proof of Contractor’s license in accordance with 2.04 of this Section.

3. Proof of insurance in accordance with 2.05 of this Section.

4. $2,500.00 minimum bond when closing the sidewalk with heavy machines/equipment in accordance with 2.06 of this Section.

5. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

6. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

7. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

8. Pre-construction photographs in accordance with 2.09 of this Section.

9. Proof of parking space purchase in accordance with 2.10 of this Section, if applicable.

B. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

### 3.25 SOIL BORING

A. When applying for Soil Boring Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section. Plans shall identify the soil boring location(s) and bore number.

2. Proof of Contractor’s license in accordance with 2.04 of this Section.

3. Proof of insurance in accordance with 2.05 of this Section.
4. $2,500.00 minimum bond in accordance with 2.06 of this Section.

5. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

6. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

7. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

8. Pre-construction photographs in accordance with 2.09 of this Section.

9. Proof of parking space purchase in accordance with 2.10 of this Section, if applicable.

B. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.26 STREET CLOSURE

A. Daytime street closures are allowed from 10:30 am to 3:30 pm. Nighttime street closures are from 10 pm to 5 am. 24-hour street closures require approval by the City Manager and Transportation Department.

B. When applying for a Street Closure Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.

2. $2,500.00 minimum bond in accordance with 2.06 of this Section.

3. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

4. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

5. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

6. Pre-construction photographs in accordance with 2.09 of this Section.
7. Proof of parking space purchase in accordance with 2.10 of this Section, if applicable.

8. Copy of notification letter to property owners in designated street closure area(s). Copy the City of Miami Beach Public Works Department, Permitting.

9. Copy of approved street closure request application with signatures of acceptance by the City of Miami Beach Chief of Police, Public Works Director, and City Manager.

C. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.27 UTILITY MANHOLE MAINTENANCE

A. The Utility Manhole Maintenance Permit is required for utilities other than the City of Miami Beach.

B. When applying for Utility Manhole Maintenance Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.

2. Two (2) sets of the dewatering plan signed and sealed by a State of Florida Engineer, if dewatering is required. Copy of the stamped RER-DERM approved dewatering permit package if dewatering is required.

3. Proof of Contractor's license in accordance with 2.04 of this Section.

4. Proof of insurance in accordance with 2.05 of this Section.

5. $2,500.00 minimum bond in accordance with 2.06 of this Section.

6. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

7. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

8. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

9. Pre-construction photographs in accordance with 2.09 of this Section.
C. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.28 UNDERGROUND UTILITIES

A. The Underground Utilities Permit is required for utilities other than the City of Miami Beach.

B. When applying for Underground Utilities Permit, the following documents are required.

1. Plans in accordance with 2.02 of this Section.

2. Two (2) sets of the dewatering plan signed and sealed by a State of Florida Engineer, if dewatering is required. Copy of the RER-DERM approved dewatering permit package if dewatering is required.

3. Proof of Contractor’s license in accordance with 2.04 of this Section. Contractor must have an underground license.

4. Proof of insurance in accordance with 2.05 of this Section.

5. $2,500.00 minimum bond in accordance with 2.06 of this Section.

6. MOT plans in accordance with Section 1 of the City of Miami Beach Public Works Manual.

7. If construction is occurring along a state road or state ROW, a FDOT permit is required in accordance with 2.07 of this Section. A copy of the stamped permit approved by FDOT must be submitted.

8. If construction is occurring along a MDC road or ROW, a MDC permit is required in accordance with 2.08 of this Section. A copy of the stamped permit approved by MDC must be submitted.

9. Pre-construction photographs in accordance with 2.09 of this Section.

10. Copy of notification letter to owners of adjacent properties that may be affected. Copy the City of Miami Beach Public Works Department, Permitting.

C. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.29 WATER METER SERVICE

A. When applying for a Water Meter Service Permit, the following documents are required.
1. Plans in accordance with 2.02 of this Section.

2. Proof of property ownership in accordance with 2.03 of this Section.

3. Proof of Contractor’s license in accordance with 2.04 of this Section. Contractor must have an underground license.

4. Proof of insurance in accordance with 2.05 of this Section.

5. $2,500 minimum bond in accordance with 2.06 of this Section.

6. Pre-construction photographs in accordance with 2.09 of this Section.

7. Signed and notarized letter from the property owner authorizing placement of new water meter service.

8. Completed Water Meter Service Application.

9. Copy of City of Miami Beach water bill.

B. All water main taps must be witnessed by City Inspector.

C. In accordance with the provision of Miami-Dade Ordinance 89-95 as currently in effect and as may be amended or revised in the future, the City of Miami Beach shall require all new retail users, as defined in the Ordinance, to pay the Miami-Dade County Water and Sewer connection charges. The City of Miami Beach shall not render water service, sewer service, or both to any new retail user until a written receipt from the Miami-Dade Department of Water and Sewer is provided showing that the Miami-Dade County connection charges have been paid.

1. “New retail user” is defined as any user who applies to a volume customer of the Miami-Dade Water and Sewer Department for water service, sewer service, or both, or an existing user who applies for increased water service, sewer service, or both.

2. Ordinance 89-95 County fee must be paid prior to City of Miami Beach service connection.

3. Water and Sewer Impact Fees are due prior to building permit issuance.

D. The applicant must contact Sunshine One Call of Florida and the City of Miami Beach Public Works Department to mark underground utilities located in the construction zone in accordance with 1.06 of this Section.

3.30 WATER AND SEWER DONATION PROGRAM

RESERVED
SPECIAL PROJECTS AND DEVELOPMENTS
SECTION 4. SPECIAL PROJECTS AND DEVELOPMENTS

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PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. City of Miami Beach Code of Ordinances
2. Florida Building Code
3. Florida Statutes (F.S.)
4. Miami-Dade County Code of Ordinances

B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

Section 1. Design Standards and Guidelines
Section 8. Surveying, Drawing, and Drafting Requirements

PART 2 – DEVELOPMENT AGREEMENT REQUIREMENTS

2.01 GENERAL

A. Consistent with the City’s comprehensive plan and to ensure that all developments which increase the demand for public facilities in the City will be served in accordance with the levels of service which are established in the capital improvements element of the comprehensive plan and the City’s Municipal Mobility Plan, a Development Agreement may be required by the City for an authorized development.

B. Such Development Agreement shall mean any agreement, covenant, or declaration of restrictions conforming to the Florida Local Government Development Agreement Act, Sections 163.3220-163.3243 of the Florida Statutes, accepted or entered into by the City.

C. The specific requirements of the Development Agreement by the City may be addressed as part of the Design Review Board or Historic Preservation Board recorded Final Order for the Development and/or as a result of the preliminary plan reviews or the approved mitigation plan as described in Section 122-8(d) of the City of Miami Beach Code of Ordinances for the proposed development.
D. The Development Agreement shall be a legal document prepared by the developer, reviewed by the City’s Planning, Building, Public Works, Parks, Parking, and Fire Departments and approved by the City Attorney’s office.

E. Depending on the impact to the public facilities, the Development Agreement may be approved administratively by the City Manager or designee or by the City Commission.

F. Within fourteen (14) days of executing the Development Agreement, it shall be recorded with the clerk of the Miami-Dade County Circuit Court. A copy of the recorded Development Agreement shall be submitted to the State Land Planning agency within fourteen (14) days after the agreement is recorded. A Development Agreement shall not be effective until it is properly recorded in the public records of the County and until thirty (30) days after having been received by the State Land Planning agency. The burdens of the Development Agreement shall be binding upon, and the benefits of the Agreement shall inure to, all successors in interest to the parties to the Agreement.

2.02 REQUIREMENTS OF THE DEVELOPMENT AGREEMENT

A. The development agreement shall include, but not be limited to, the following.

1. A legal description of the land subject to the agreement and the names of its legal and equitable owners.

2. The duration of the agreement.

3. The development uses permitted and planned, including population/unit densities and intended uses with a breakdown of areas for the different uses.

4. A description of public facilities with a description of the required improvements that will service the development, including who shall provide such facilities; the date any new facilities, if needed, will be constructed; and a schedule to assure public facilities are available concurrent with the impacts of the development.

5. The funding or contribution towards such funds by the developer for the construction of the facilities.

6. A description of any reservation or dedication of land for public purposes or easements.

7. A description of all local development permits approved or needed to be approved for the development of the land (such as environmental, Florida Department of Environmental Protection [FDEP], Florida Department of Transportation [FDOT], etc.).
8. A finding that the development permitted or proposed is consistent with the local government's comprehensive plan and land development regulations and/or a description of the required improvements by such development to meet this plan.

9. A description of the conditions, terms, restrictions, or other requirements determined by the City to be in the welfare of the public (such as street end improvements, etc.).

10. A statement indicating that the failure of the agreement to address a particular permit, condition, term, or restriction shall not relieve the developer of the necessity of complying with the law governing said permitting requirements, conditions, term, or restriction.

11. A schedule or phases of the development in stages so that the public facilities and services needed for each stage or phase will be available in accordance with the City’s criteria.

PART 3 – PERMIT, SUBMITTALS, AND COMPLETION CERTIFICATES

3.01 GENERAL

A. Permits are required for all construction activities performed within the public right-of-way (ROW) prior to start of all proposed installations, modifications, relocations, and repairs to include roadways, underground utility infrastructure, aerial/subaqueous crossings ensuring that all work is performed in accordance with all applicable Federal, State, County, and Local municipal agencies standard requirements prior to start of project.

B. Submittal of Local and State agency applications for water/wastewater (Department of Health, Miami-Dade Division of Environmental Resources Management, Department of Regulatory and Economic Resources [RER-DERM]), stormwater (RER-DERM / South Florida Water Management District), street lighting/furniture (City of Miami Beach Public Works Department), traffic concurrency (City of Miami Beach Public Works Department) must be stamped approved by the respective agency prior to issuance of the right-of-way permit.

C. Completion certificates shall be certified, signed, and sealed by a licensed laboratory and/or licensed State of Florida Engineer documenting test results by identifying the person that witnessed all field-related test results to include density/proctor, bacteriological, water main/fire line service connections pressure/leak test results, sanitary sewer lateral pressure test, stormwater injection well intake capacity, and street lighting photometric grid with foot candle calculations shall be submitted in hard copy and certified digital format for final acceptance and approval by the City of Miami Beach Public Works Department.
PART 4 – COMPLETION

4.01 INSPECTIONS

A. Project closure requires final inspections of all roadway/infrastructure improvements within the City of Miami Beach ROW by the Public Works Department Field Inspector that shall confirm that all design criteria is achieved and approved material used during construction is acceptable including meeting the City’s standard restoration specification.

4.02 PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.

4.03 AS-BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.
RIGHT-OF-WAY, EASEMENTS, AND LAND USE SPECIAL PROVISIONS
SECTION 5. RIGHT-OF-WAY, EASEMENTS, AND LAND USE SPECIAL PROVISIONS

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PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. City of Miami Beach Code of Ordinances
2. Florida Administrative Code (FAC)
3. Florida Statutes (F.S.)
4. Miami-Dade County Code of Ordinances

B. Related standard specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

Section 1. Design Standards and Guidelines
Section 8. Surveying, Drawing, and Drafting Requirements

1.02 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.

1.03 SURVEY REQUIREMENTS

A. All surveys shall be performed and prepared under the supervision and direction of a Professional Surveyor and Mapper (PSM) licensed in the State of Florida pursuant to FAC Chapter 5J-17 and shall meet the Standards of Practice for Professional Surveying and Mapping as identified in the following FAC rules.

1. Rule 5J-17.050: Definitions
3. Rule 5J-17.052: Standards of Practice – Boundary Survey Requirements

B. All surveys shall be submitted in accordance with submittal procedures as defined in FAC Rule 5J-17.062 and shall state on their prepared survey, map, and/or report that the prepared document is certified to the City of Miami Beach.

C. All surveys shall be in accordance with Section 8 of the City of Miami Beach Public Works Manual.

PART 2 – PLATTING PROCEDURES

2.01 PLATTING REQUIREMENTS

A. The Surveyor shall contact Miami-Dade County for filling and recording procedures for the Plats.

B. The City of Miami Beach is responsible for approval by a Governing body and is required to review, approve, and adopt plats within the City limits by its City Commission.

C. Platting shall be in accordance with F.S. Section 117, Part I.

D. Lots split shall be in accordance with City of Miami Beach Code of Ordinances Section 142-190.

2.02 DRAWING REQUIREMENTS

A. Refer to of Section 8 of the City of Miami Beach Public Works Manual for drawing Requirements.

2.03 PRELIMINARY CONFERENCE

A. The subdivider or his engineer and/or land surveyor, prior to the preparation of the tentative plat, may seek the advice of the City of Miami Beach Building and Zoning Department in order to become more familiar with the subdivision requirements and the provisions of the master plan affecting the area in which the proposed subdivision is located.

PART 3 – RIGHT-OF-WAY AND EASEMENT MODIFICATIONS

3.01 DEFINITIONS

A. Right-of-way and easement modifications usually consist of the following:
1. Vacation of a street, alley, or a portion of ROW by the City. These ROWs may be platted or dedicated and may have reversionary rights to adjacent property owners.

2. Abandonment of a utility easement or exchange of an existing utility easement with an equivalent easement elsewhere (relocation of easements). These also may be platted or dedicated/recorded easements either for utilities or for access.

3.02 VACATION OF A STREET, ALLEY, OR A PORTION OF RIGHT-OF-WAY

A. Pursuant to a review by the Land Use Committee of criteria/standards for considering the abandonment/vacation of streets or other ROWs, the City of Miami Beach Mayor and City Commission, on July 26 1989, recommended a case-by-case consideration of these vacations.

B. As set forth in these criteria/standards, precedent cases of vacation and by Ordinance 92-2783 incorporated as Article II of the City Code, the following are the requirements and procedures for soliciting the vacation of streets or other ROWs within the City.

1. An applicant requesting vacation of a street, alley or portion of ROW must submit:
   a. A non-refundable $5,000.00 application fee which will be applied to the assessed land value of the right-of-way being vacated.
   b. A title binder or title commitment or attorney's opinion of title to the land subject to the request.
   c. Provide a legal description and sketch of the subject area certified to the City of Miami Beach with electronic/digital signature and seal as outlined in Section 8 of the City of Miami Beach Public Works Manual.
   d. A statement by the applicant as to how the purchase and vacation of said ROW is in the best interest of the general public's welfare.
   e. A recent topographic survey by a registered surveyor of the applicant's property and the subject City property.
   f. A plan showing the exact location and description of the subject City ROW, with the proposed improvements and use.
   g. A map showing subject property and properties within 375-foot radius highlighted.
   h. A list of the property owners within the 375-foot radius and their mailing addresses.
   i. A certified letter stating the source and completeness of the above mentioned real property ownership list.
2. Upon receipt of these items, the City’s Public Works Department and City Attorney’s Office shall review the application and the applicant’s commitment shall be obtained for the following:

a. The City's and other utilities' rights and needs for a utility easement should be reviewed and considered. Any relocation costs should be assumed by the applicant.

b. Implement the requirements of Article II, sections 82-36 to 82-40 of the City of Miami Beach Code of Ordinances as applicable.

3. Following completion of the above mentioned requirements, a public hearing shall be scheduled during a Commission meeting, public announcements published in the local newspapers, and notices mailed to property owners for the provided mailing list.

4. The City Commission will evaluate the Administration’s recommendations and analysis based on criteria similar to granting or denying a revocable permit as stated in Section 82-94 of the City of Miami Beach Code of Ordinances during the public hearing and shall either approve, deny, or refer to further consideration to the Land Use Committee.

3.03 ABANDONMENT OF A UTILITY EASEMENT OR EXCHANGE OF AN EXISTING UTILITY EASEMENT WITH AN EQUIVALENT EASEMENT ELSEWHERE (RELOCATION OF EASEMENTS)

A. Pursuant to precedent cases for easement vacations/abandonment or relocations, following are the requirements and procedures to abandon or exchange a utility easement.

1. Applicant must submit a Certified Property Survey less than six (6) months old of the property where easement lies in accordance with Section 8 of the City of Miami Beach Public Works Manual.

2. Applicant must submit a title binder or proof of ownership to the property where easement is located and/or shall be relocated to.

3. Applicant must provide a legal description and sketch of the subject area certified to the City of Miami Beach with electronic/digital signature and seal as outlined in Section 8 of the City of Miami Beach Public Works Manual.

4. A letter explaining the reason for the request for abandonment/relocation of the easement, accompanied by Design Review Board or Historic Preservation Board Final Orders showing conflicts of proposed construction with easement shall be submitted.
5. Applicant must obtain and submit Letters of No Objection or Agreements for relocation from all the utility companies servicing the City. All relocation or removal costs of existing utilities shall be borne by the applicant.

6. Applicant shall prepare and submit survey and legal description of the new or proposed easement together with an easement document to be reviewed by the City.

7. Following the review by the City’s Public Works Department and City Attorney’s Office and form approval of the granted easement documents, applicant executes and submits to the City two (2) originals of the granted easement documents.

8. The Public Works Department shall present the documents to the City Commission for considering approval of abandonment or exchange of the easement usually contingent upon applicant completing the relocation of existing City utilities or posting a bond for the cost of such relocation.

9. Applicant records and submits to the City proof of the recorded documents at the Miami-Dade County Clerk.

PART 4 – RESTRICTIVE COVENANTS AND MAINTENANCE AGREEMENTS

A. In order to enhance public property with landscaping and other architectural features, the City requires developers to design, construct, and/or install such enhancements within public ROW adjacent to their proposed developments.

B. These required enhancements are usually described in the Design Review Board or Historic Preservation Board’s Final Order. Pursuant to the execution of these requirements, the developers present plans of the proposed improvements within the ROW to the City for review and approval. The plans are reviewed for compliance with City standards and specifications by the Planning, Building, Parks, Parking, Fire, and Public Works Departments.

C. The final approved plans are then approved for construction when presented by the Contractor to the Public Works Department for a ROW permit.

D. As a requirement to permit the construction of such improvements within the ROW and because of the limited City resources to maintain such enhancements in a well maintained condition, the Public Works Department will require the Developer to submit a Maintenance Agreement or a Restrictive Covenant running with the property for the maintenance of such enhancements. This Maintenance Agreement or Restrictive Covenant shall be prepared by the Developer or his designee and reviewed and approved prior to execution and recordation, by the Public Works Department and the City Attorney’s Office. The following are the minimum guidelines for preparing such Agreement or Covenant.
1. The document shall provide a legal description of the property and its owner(s) who will be responsible for maintaining the improvements within the ROW.

2. A description with attached sketches and plans if necessary, describing the proposed enhancements within the ROW which are subject to the maintenance agreement.

3. Minimum known standards or a description of the acceptable state of the installed enhancements/improvements in which such items in the ROW shall be maintained at.

4. Provide a legal description and sketch of the subject area certified to the City of Miami Beach with electronic/digital signature and seal as outlined in Section 8 of the City of Miami Beach Public Works Manual.

5. A liability insurance clause provided and maintained by the developer and holding the City harmless in the event of accidents due to these improvements.

6. A restoration cost clause for the developer’s responsibility to restore the subject enhancements following a necessary and permitted utility cut for replacement, construction, or maintenance work of utilities or a major natural disaster affecting such installed improvements. This may also include a condition for the City to take action to perform such repairs within timely manner to safeguard public interests at a cost which will become reimbursable to the City by the Developer or its successors.

E. Upon execution of the Maintenance Agreement or Restrictive Covenant by the Developer or the legal representative of the property owner(s), the document shall be recorded, and a copy of the recorded document submitted to the City’s Public Works Department.

F. The Public Works Department shall conduct a final inspection of all the constructed improvements together with representatives of all the concerned Departments such as Parks, Planning, Americans with Disabilities Act (ADA), etc. and an acceptance and close-out of the ROW permit shall constitute acceptability of the conditions for the Maintenance Agreement or Covenant.
7
BLUE/GREEN INFRASTRUCTURE POLICIES AND GUIDELINES
SURVEYING, DRAWING, AND DRAFTING REQUIREMENTS
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REQUIREMENTS

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PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. Florida Administrative Code (FAC)

2. Florida Statutes (F.S.)

3. National CAD Standards

1.02 QUALITY ASSURANCE

A. It is the City of Miami Beach’s (City’s) intent that all electronic drawing files, regardless of what consultant produces them, be similar in style and content. To this end, all consultants must conform to the City’s electronic media standards and guidelines as outlined in this document and in conjunction with the City’s template file. These guidelines shall be utilized by all consultants contracted by the City of Miami Beach. Any deviation from these guidelines will require prior approval from the City.

B. An Acknowledgement of Compliance with CAD Standards shall be submitted along with all CAD file submittals. A copy of this form is included as Appendix 8-A.

C. All electronic submittals are subject to random electronic drawings reviews by the City to ensure that these guidelines are being followed.

1.03 COMPUTER-AIDED DESIGN TOOLS

A. All electronic drawing files submitted to the City shall be designed using one of the Autodesk software platforms as outlined below. The use of any other software will not be accepted. Unless otherwise specified by the City Engineer, any AutoCAD, Civil3D, or Revit files shall be created with the latest version of the program.

<table>
<thead>
<tr>
<th>Software</th>
<th>Acceptable Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>AutoCAD</td>
<td>General 2D AutoCAD linework</td>
</tr>
<tr>
<td>Civil 3D</td>
<td>3D civil designs including pipelines, roadways, grading &amp; drainage</td>
</tr>
<tr>
<td>Revit</td>
<td>3D building/facility designs (no civil work shall be done in Revit)</td>
</tr>
</tbody>
</table>

B. Standards for Civil 3D and Revit are under development.

C. Consultants are expected to be able to setup the current City’s template on their computers, including but not limited to line types, plat styles, and plotters.
1.04 PROJECT RESOURCES

A. Refer to the City’s online Public Works Manual at https://www.miamibeachfl.gov/city-hall/public-works/engineering-division/right-of-way-permitting-procedure-engineering-manual/ for the latest available AutoCAD template, title block, and plot files. A PDF of the template is included as Appendix 8-B.

PART 2 – SURVEYS

2.01 GENERAL SURVEY REQUIREMENTS

A. All surveys shall be performed and prepared under the supervision and direction of a Professional Surveyor and Mapper (PSM) licensed in the State of Florida pursuant to FAC Chapter 5J-17 and shall meet the Standards of Practice for Professional Surveying and Mapping as identified in the following FAC rules.

1. Rule 5J-17.050: Definitions
3. Requirements
4. Rule 5J-17.052: Standards of Practice – Boundary Survey Requirements
5. Rule 5J-17.053: Standards of Practice – Professional Matters in Surveying and Mapping

B. All surveys shall be submitted in accordance with submittal procedures as defined in FAC Rule 5J-17.062 and shall state on their prepared survey, map, and/or report that the prepared document is certified to the City of Miami Beach.

C. In addition to all the previously mentioned rules, the survey, map, and/or report shall meet the most recent Florida specific rules and requirements.

D. Surveyor shall coordinate with City of Miami Beach Public Works Department for access to site being surveyed and any private properties that need to be surveyed along the right-of-way.

E. As a minimum and in addition to all referenced applicable Florida Rules, all surveys for engineering design purposes shall address and meet the following requirements:

1. All horizontal and vertical control shall be tied to the Florida State Plane Coordinate System, East Zone, (NAD 83/2011).

3. The Surveyor shall be responsible for acquiring the position (X, Y, Z coordinates NAD 83/2011) of existing Vertical and Horizontal Survey Control Points.

4. Calculate a centerline Survey Baseline with 100-foot stations along the baseline. The baseline of the survey shall be tied to right-of-way and monuments. Each surveyor will be responsible for obtaining right-of-way information from the most recent records. When a Lot, Parcel or Tract is being Surveyed a Boundary and Topographic Survey must be performed. When a Lot, Parcel or Tract is being Surveyed a Boundary and Topographic Survey must be performed and Prepared.

5. The Surveyor will set Vertical Control Points (Benchmarks) and Survey Horizontal Control Points at convenient locations and/or along the corridor to be used during the design, construction, and completion of the project. Benchmarks shall be found or set at maximum of 1,100 feet between each Benchmark. The Surveyor shall tie-in at least two existing Government published benchmarks to the vertical circuit and take cross sections at 50-foot intervals along the entire project corridor. Site benchmarks and elevations shall be derived from existing government benchmarks and carried into the proposed site using Second Order, Class II procedures. A full listing of benchmark locations shall accompany the survey data.

6. Cross section elevations shall define all grade breaks such as intersections, swale, edge of pavement, pavement centerline, curb and gutter, edges of sidewalk, driveway connections, right-of-way line, edge of the 25-foot right-of-way offset, encroachments (both natural and built-in) etc. The Surveyor shall develop a Digital Terrain Model (DTM) for the entire project area.

7. The Surveyor shall obtain elevations of the lowest finished floor of all buildings adjacent to project corridor.

8. The Surveyor shall locate and identify all visible surface improvements and topographic features that exist along the width of the corridor, including but not limited to the following.

   a. Existing valve boxes, water/electrical meter boxes, electrical pull boxes, telephone/cable risers, fences, hydrants, etc.

   b. Above ground and underground utilities, invert elevations of accessible underground utilities, wood/concrete utility poles, culverts, guardrails, pavement limits, headwalls, end-walls, manholes, vaults, mailboxes, driveways, side streets, trees, landscaping, traffic signage, and any other noted improvements.

   c. The Survey should identify fence material/height, landscaping plant material limits, and driveway construction materials, as well as private property encroachments (i.e., landscaping, overhangs, improvements, etc.).
9. The Surveyor shall coordinate with each utility agency and/or by other means to identify the location of all existing underground utilities and the interconnectivity of the underground utilities.

10. Survey limits shall include the entire right-of-way. Survey limits may extend at a minimum 25-feet past the right-of-way into private property for neighborhood projects or as requested by the City.

11. Survey data will indicate geometry of perimeter private property plats (inclusive of fences, landscaping, and driveways).

2.02 CONSTRUCTION LAYOUT SURVEY

A. When the surveyor and mapper provides construction staking, these stakes must be based on controls established using the survey standards set out in FAC Rules 5J-17.051 and 5J-17.052 and Section 8 of the City of Miami Beach Public Works Manual. The stakes provided should be adequate in number and position so that the physical items can be constructed from the plans as designed.

B. Section 472.003(3), F.S., provides an exemption from licensing for certain classes of individuals performing construction layout from boundary, horizontal and vertical controls that have been established by a licensed professional surveyor and mapper. This rule is designed to set out what constitutes horizontal and vertical controls.

C. Horizontal control monumentation for the purpose of this rule includes:

1. Points of Curve, Points of Tangency, Points of Tangent Intersections, Points on Line and Points on Curve.

2. Points of Intersection of other streets or roads.

3. Angle points or changes in direction.

D. Horizontal control monumentation for road centerlines, right-of-way lines, reference lines or base lines shall be at least a minimum of two (2) points placed so that no point on the line being monumented is more than 700 feet from a control monument.

E. Horizontal control monumentation for main utility lines (such as water, sewer, storm drainage, electric, telephone, television, gas, etc.) when not constructed within or along a road right-of-way control in accordance with sub-subparagraph 5J-17.052(3)(b)1.b., F.A.C., shall be at least a minimum of two (2) points placed so that no point on the line being monumented is more than 700 feet from a control monument.

F. Horizontal control monumentation for buildings and/or primary constructions shall be at least:

1. Boundaries, or
2. Control or base lines (minimum of 2 points), or

3. A minimum of a four-corner envelope for non-residential construction improvement layout.

G. Horizontal control monumentation required by plans as a control for horizontal location not included in sub-sub-subparagraphs 5J-17.052(3)(b)1.b., c., or d., F.A.C., shall meet the requirements of subparagraph 5J-17.052(3)(b)2., F.A.C.

H. All construction requiring benchmarks shall have a minimum of two (2) existent or established benchmarks for vertical control.

I. Vertical control for linear type construction sites such as roads and sewer lines shall have a maximum of 1,100 feet between existent or established benchmarks.

J. Vertical control for acreage construction sites shall have two (2) existent or established benchmarks on the first ten (10) acres plus an additional benchmark for each additional ten (10) acres.

K. The only required documentation for this type of survey product shall be field notes.

2.03 SPECIFIC PURPOSE SURVEY

A. Surveys which are performed for a purpose other than the purposes encompassed by the definitions in paragraphs 5J-17.050(10)(a)-(i) or (k), F.A.C., shall be permitted only where unusual conditions make impracticable or impossible the performance of one of the types of surveys defined in paragraphs 5J-17.050(10)(a)-(i) or (k), F.A.C.

B. Such purpose and conditions shall be clearly shown upon the survey map or in the survey report.

C. Surveys performed for purposes of monumenting, referencing, describing, and mapping centerline or baseline may be performed as Specific Purpose Surveys. Additionally, surveys performed for the purpose of monumenting official right-of-way lines may be performed as Specific Purpose Surveys.

2.04 DESCRIPTIONS/SKETCH FOR EASEMENTS, REVOCABLE PERMITS, ENCROACHMENTS, EASEMENTS, VACATIONS, OR OTHER SPECIFIC PURPOSE

A. At a minimum, descriptions/sketch for easements, revocable permits, encroachments, easements, vacations, or other specific purposes shall include the following.

1. The Point of Commencement (POC) and the Point of Beginning (POB) must be referenced to State Plane Coordinates, Florida East Zone, North American Datum of 83/2011. The method used to determine the Coordinates must be noted on the drawing.
2. The Miami-Dade Property Appraiser Folio of the property should be shown and the recording information of the subject property and its adjoiners.

3. Sketch and Legal Description with dimensioned encroachment, permit, vacation, or easement area etc. complete with the total square footage of the encumbered area.

4. State on the prepared sketch, map, and/or report that the prepared document is Certified to the City of Miami Beach and its purpose.

2.05 TOPOGRAPHIC SURVEY

A. Topographic surveying and mapping by field methods shall meet general provisions applicable to all surveys and maps as set out in Rule 5J-17.051, F.A.C. A minimum of two site benchmarks on or near the survey shall be indicated upon the survey map.

B. Topographic Features:

1. Intended Features. The surveyor and mapper shall devise a method of reporting which topographic features were intended to be surveyed and mapped, the style of cartographic representation employed for each, and the degree of intended completeness in the surveying and mapping of each feature. As with abbreviations, any symbols, line types, etc. shown on the survey map shall be explained and/or defined in a legend.

2. Obscured Areas. Features in obscured areas where the desired points or surfaces being mapped are not clearly visible on source images shall be clearly labeled on the map as “interpolated” or “estimated” through the use of notes and shall be depicted graphically clearly different from other surveyed features.

3. Scale of Map. The scale of the map that is selected when provided in hard copy shall be sufficient to accurately and clearly show the results of the survey.

4. Property Lines. Any depiction of property lines on a topographic map shall be accompanied with a statement as to the source of the property lines shown.

2.06 GIS COMPATIBILITY

RESERVED

PART 3 – PLAN AND PRODUCTION CRITERIA

3.01 SCALE

A. All drawings are to be set at a scale that can easily be measured with an engineering or architectural scale. If a drawing is not to scale it should be clearly defined with a “NOT TO SCALE” note.
B. Plan and Profiles: The preferred scale for plan and profile sheets is Plan View 1" = 20', Horizontal Profile 1" = 20', Vertical Profile 1" = 2'. If deviation from these standard scales is needed to accommodate the project needs, the Horizontal Profile scale should always match the Plan view scale, and the Vertical Profile Scale should always be a division of 10 of what the Horizontal Profile Scale is set to.

C. Section Views: Section views represented on contract drawings shall follow the same guidelines as plan views. Sections shall never be at a coarser scale than the plan view it is referenced from.

D. Engineering Plans: Site plan views presented on Contract Drawings shall be at a preferred scale of 1" = 20', or 1" = 40' if necessary. Larger areas may need to be displayed at larger scales to fit on standard ANSI D sheets. In this case, enlarged plans should be used in conjunction with overall plans. Overall plans may be displayed at the minimum scale necessary for them to fit on sheets.

E. Architectural Plans: Architectural (building) views presented on contract drawings shall be at a preferred scale of 1/4" = 1', or 1/8" = 1' if necessary. Larger areas may need to be displayed at larger scales to fit on standard ANSI D sheets. In this case, enlarged plans should be used in conjunction with overall plans. Overall plans may be displayed at the minimum scale necessary for them to fit on sheets.

3.02 DELIVERABLE REQUIREMENTS

A. The City of Miami Beach will require paper “hard copies”, electronic PDFs, and all related CAD files during different phases of the project, as listed in the table below. Different requirements can be set at the sole discretion of the City Project Manager.

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<tr>
<th>Milestone</th>
<th>.dwg/.rvt</th>
<th>PDF</th>
<th>22x34 Print</th>
<th>11x17 Print</th>
</tr>
</thead>
<tbody>
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<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>30% Design</td>
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<td>X</td>
<td>S/S</td>
<td>S/S</td>
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</tbody>
</table>

Note: S/S = signed and sealed

B. Complete as-built drawings package are to be submitted for review in electronic format both in PDF and AutoCAD format.
3.03 HARD COPIES

A. Hard copy (paper) submittals shall be on 22-inch by 34-inch paper. When Miami-Dade Water and Sewer Department (WASD) permitting is required, drawings shall be plotted on 24-inch by 36-inch paper in accordance with WASD requirements.

B. If half-size drawings are submitted, they shall be 11-inch by 17-inch paper. Half-size drawings shall be true half-size to scale.

C. Hard copy submittals shall have the original signature and seal.

3.04 ELECTRONIC SUBMITTALS

A. Final submittals shall meet the Procedures for Signing and Sealing Electronically Transmitted Surveys or Other Documents as outlined in FAC Rule 5J-17.062 and follow the Seal provision of Chapter 472 FS. All Survey Documents submitted without a proper seal will be rejected without review.

B. It is the City’s preference to have all electronic drawing (.dwg) files submitted utilizing the eTransmit function of AutoCAD. A ReadMe.txt document briefly explaining how the files are organized and the folders are structured is required.

C. A *.dst sheet set manager file shall be included with all electronic submittals. The *dst file shall be configured in such a way that the sheets can be easily opened and plotted. All Text *.txt files and/or point files shall also be submitted.

D. If Revit is being utilized for design work, all sheets shall be exported to AutoCAD, year/version as listed in Part 1. The *.rvt file shall also be included in the final submittal package.

3.05 GENERAL DRAFTING GUIDELINES

A. Always draw from left (West) to right (East) and down (South) to up (North).

B. North arrows should never point down.

C. All topography items shall be outside of the right-of-way and shall be orientated to read.

D. Profiles and alignment guidelines
   1. Profiles prepared in AutoCAD shall utilize the standard profile grid provided in the CMB STANDARD .dwt.
   2. Baseline station numbers and tick marks shall be 1/8-inch minimum high in paper space.
3. Baseline stationing shall increase from West to East and from South to North. Beginning stations at project site should be labeled and referenced to the nearest intersection.

4. Major tick marks and station values shall be placed at every 100 feet. Intermediate tick marks shall be placed every 20 feet between major tick marks.

5. If elevation information is not available or drawings are being prepared in only 2-dimensions, right-of-way lines, baselines, lot lines and other geometry related entities shall be set at a Z elevation of 0.00.

PART 4 – DRAWING CONTENT REQUIREMENTS

4.01 ALL DRAWINGS

A. All drawings submitted to the City of Miami Beach Public Works Department shall include at a minimum the following, where applicable.

1. Centerlines, right-of-way lines, right-of-way dimensions, street widths and names, with matching plat, if applicable, subdivision name, phaseline, and number. (Phasing to be nearest valve and manhole in limits of phase area).

2. Baselines, monuments, monument lines, lot lines, parcel lines.

3. All involved lots and blocks shown and correctly designated (to match plat).

4. All control lines identified (i.e., centerline, section line, etc.). Identify all streets by name or number and show stationing at all intersecting streets.

5. Baseline shall be tied to centerlines, boundary lines, section corners, or to monument lines or to right-of-way lines. Baselines must show bearings or deflection angles, or delta, radius, chord, and arc length for curves.

6. Pipeline shall be tied to a baseline that easily identified on the existing or proposed right-of-way. Baseline shall not be on top of the main except for gravity sewers installed on centerlines.

7. Show all existing water and/or sewer mains as a broken line (i.e., dashed). Show proposed water and/or sewer mains as dark solid line. Also, identify respective utility pipe, size, and material type. Existing or proposed mains 20-inches in diameter and greater, shall be shown as two lines (i.e., double line) of the line type as stated.

8. Show all horizontal and vertical curve data, including point of curvature (PC) and point of tangency (PT) stations or radial bearing.

9. Easements:
a. Easements type and size shall be clearly shown with size and tied to centerline. The easements shall be separate for water, sewer, force main, and pump stations.

b. Existing Official Record Book (ORB) or other record information must be shown.

c. Easement lines shall be tied to the centerline of the main.

10. Separate profile for each segment and utility type (water, sanitary sewer, stormwater, etc.).

11. Every utility (water, sewer, sewer laterals, water services, gas, electric, stormwater, telecommunication, duct banks, etc.) encountered and/or crossing drainage, water, or sanitary sewer facilities (whether it is a conflict or has sufficient clearances) shall be located, both horizontally and vertically. The clearance between the facilities horizontal and vertical, shall be noted. For instance, if a 2-inch gas main crosses over the top of a 6-inch potable water main, the bottom elevation of the gas main shall be noted and the top of the water main shall be noted. The difference between the two facilities will be the clearance between the two facilities. Parallel mains shall note the clearance between the outside of the mains. It shall be the Contractor’s responsibility to note these crossings on a daily basis and ensure that this information is reflected on the As-Built Drawing plan set. Crossings will not require state plane coordinates.

12. All mains shall be stationed and all facilities labeled. Drawings shall show stations for all services. Lengths and distances for service runs shall also be given.

13. Label and station all valves, fittings, services, outlets, manholes, deflection points, and other components in the line. The labels and stations shall coincide, plan and profile.

14. Clearly show and label what is new and what is existing at the tie-in points.

15. Show all outlets, stub-outs, sewer lateral, water service and any other relevant information. Identify the size, material, length, direction, and elevation (top of pipe for water, sewer, and stormwater and force mains, invert gravity sewer and stormwater mains).

16. On all pipe fittings of 36-inch diameter or over, including tees, bends, crosses, wyes and bevels, station and elevations shall be taken at the ends and center points to reflect the true elevation and orientation of the fitting.

17. Elevations of natural ground or pavement over pipelines shall be shown at each position where the pipe elevation is shown at least every 100 feet.

18. Manhole rim and valve box manhole rim elevations shall be shown.
19. Show all invert and bottom elevations in manholes and valve vaults or boxes. Show all invert and bottom elevations together with pipe size, and where it can be determined, pipe material, for existing structures having pipes which cross the pipeline being constructed.

20. Locations, elevations, and size of all casings shall be shown.

21. Locations and top and bottom elevation of all sheeting, including sheeting left in-place, shall be shown.

22. Where service is not at a right angle (90 degrees) to main line, tie service with length of offset to nearest property line.

23. Provide State Plane Coordinate values for all visible features such as valves, manholes, maintenance access structures, fire hydrants, water meters, cleanouts, and backflow preventers. Also provide State Plane Coordinate values for existing valves and manholes at points of connection or closest to the point of connection and the point of connection itself.

24. Lines that are abandoned in place shall be located during construction and clearly identified (dashed and bold line type) on the drawings to include cut and plug locations and pipe material.

25. For large diameter pipelines 30-inch and above, the restraint system used shall be identified (gland restrained, joint restrained, or gasket restrained).

26. Large diameter transmission mains 42-inches and larger shall show each pipe joint, pipe length, and station.

4.02  UTILITY DRAWINGS

A. Utility drawings shall include at a minimum the following, where applicable.

1. Separate profile for each proposed segment and utility type (water, sanitary sewer, storm sewer, etc.)

2. Plans showing:
   a. Size of main
   b. Material of main
   c. Offset of main
   d. Deflections
   e. Station
f. Services

g. Hydrants

h. Laterals

i. Manholes

j. Fittings

k. Type, length, size, and elevation in conflict structures

3. The size of the piping shall be verified by the survey crew during the as-built survey.

B. Water main, sanitary sewer force main, and stormwater force main drawings shall include at a minimum the following, where applicable.

1. Profile drawings showing high and low elevation of the piping and finish grade. Top of pipe location (horizontal and vertical) location every 100 linear feet. Show size and material of pipe and all fittings with stations. Stationing system shall be the same as that used in the plan view.

2. Location (horizontal and vertical) of all structures, fittings (including bends and tees) valves, double detector check valves, fire hydrants, and appurtenances. Every valve, tee, bend, fire hydrant, beginning and ending of deflections, maintenance access structure, manholes, inlets, catch basins, etc., shall be located, both horizontally (plan view) station and offset from the baseline (right-of-way center) and vertically (on profile drawings).

3. Tie-ins to existing lines.

4. The ends of all services at the buildings or homes shall be as-built or where the service terminates.

5. Water services with meter boxes at the property line shall be located with a dimension to the nearest landmark. For example, a water service meter box is located from a maintenance access structure at the intersection of a street. The next four (4) meter boxes can be dimensioned from each other, provided they are all in the same horizontal alignment.

6. If there are water services that do not have meter boxes at the property line (or are not readily visible/accessible), they shall be located by the State Plane Coordinate System. These services shall be located, both horizontally – plan view – station and offset from the baseline (right-of-way center) and vertically – on profile drawings.

7. Coordinates shall be indicated to the nearest 0.1 foot. The coordinate northings/eastings and elevations shall be presented in a table format that clearly
identifies what each coordinate refers to. Every tee, valve, maintenance access structure, etc. may be “numbered” in the plan view and provide a separate plan sheet for the coordinate table.

8. Distances from main to all valves, fire hydrants, and meter boxes shall be shown.

9. Label water service as either double, single, irrigation, and so on, based on type of service, including the diameter size.

10. Location of all air release valves and top of pipe elevation.

C. Sanitary sewer gravity main and stormwater gravity main drawings shall include at a minimum the following, where applicable.

1. Rims, inverts, and length of piping between structures as well as slopes.

2. Weir elevations.

3. The stub ends of all laterals shall be located and if there are any cleanouts installed on the sewer laterals then the invert elevation of these cleanouts needs to be obtained.

4. Plan showing manhole numbers and stations, size and material of pipe, manhole to manhole length and slope. The size, material type, station locations and lengths of laterals shall also be shown.

5. Profile showing manhole numbers (as per plan), rim elevations, invert elevations in and out of each manhole with directions, length, and slope of line.

6. Stations of all wyes and tees for laterals and location of cleanouts with distance to property line.

7. Connections to existing sewer collection systems with flow direction shown.

8. Sewer laterals crossing utilities shall show a profile with invert elevation, ground elevations, slope and clearance and elevation at cleanout.

9. Sanitary sewer laterals with cleanouts at the property line shall be located with a dimension to the nearest landmark. Services/laterals may also be located from each other provided a minimum of five (5) services/laterals are tied together. For example, a sanitary sewer cleanout is located from a maintenance access structure at the intersection of a street. The next four (4) sanitary sewer cleanouts can be dimensioned from each other, provided they are all in the same horizontal alignment.

10. If there are sanitary sewer laterals that do not have cleanouts at the property line (or are not readily visible/accessible), they shall be located by the State Plane Coordinate System. These services shall be located, both horizontally – plan view –
station and offset from the baseline (right-of-way center) and vertically – on profile drawings.

D. All pipeline profile views shall include at a minimum the following, where applicable.

1. Every valve, tee, bend, fire hydrant, beginning and ending of deflections, maintenance access structure, wet well, etc. shall be located, both horizontally - plan view – station and offset from the baseline (ROW center) and vertically - on profile drawings.

2. In addition to dimensioning for appurtenances, and the elevation along the top of pipe every 200 feet will also be required.

4.03 SANITARY SEWER PUMP STATION AND STORMWATER PUMP STATION DRAWINGS

A. Sanitary sewer pump station and stormwater pump station drawings shall include at a minimum the following, where applicable.

1. Show horizontal and vertical locations of all fittings, deflections, or at any significant change of direction, and at a maximum 25-foot intervals for on-site (e.g., pump station) work.

2. Plan and vertical cross-section of the station showing and identifying the piping and mechanical layout. Show elevations for top of wet and dry wells, bottom of wet well, pipe inverts, etc.

3. Electrical schematic.

4.04 PAVING, GRADING, AND DRAINAGE DRAWINGS

A. Paving, grading, and drainage drawings shall include at a minimum the following, where applicable.

1. All existing and proposed utilities in the public right-of-way shall be shown on the paving, grading, and drainage plans. All utilities shall be identified and located by dimension, horizontally and by elevation, and their materials of construction shall be noted to the extent determinable without excavation.

2. Cross-section(s) and/or typical section(s) of proposed road and drainage construction, shall show dimensions, materials, and purposes of all existing (to remain) facilities as well as all proposed facilities within the right-of-way.

3. Pavement marking and signing drawings shall include sign locations.

B. All rock elevations for parking lot, roadways, and swale areas shall include at a minimum the following.
1. Rock elevations at all high and low points, and at enough intermediate points to confirm slope consistency and every 50 feet for roadways.

2. Rock elevations shall be taken at all locations where there is a finish grade elevation shown on the design plans.

3. All catch basin and manhole rim elevations shall be shown.

4. Elevations around medians will also be required.

5. Elevations shall be taken on all paved and unpaved swales prior to placement of asphalt and/or topsoil/sod, at enough intermediate points to confirm slope consistency and conformance to the plan details.

C. Retention area elevations shall be taken at the bottom of the retention area and at the top of bank. If there are contours indicated on the design plans, then they shall be as-built as well.

4.05 LAKE AND CANAL BANK DRAWINGS

A. Lake and canal bank drawings shall include a key sheet of the lake for the location of cross sections. Lake and canal bank cross sections shall be plotted at a minimum of every 100 linear feet, unless otherwise specified. Drawings shall consist of the location and elevation of the top of bank, edge of water and the deep cut line, with the distance between each shown on the drawing.

B. Pipelines that are "dead" or have been abandoned shall be located during construction and shall be annotated on the As-Built Drawings.

4.06 SEAWALL DRAWINGS

A. At a minimum, surveys and plans made for the improvement of seawalls, docks, and/or water-related structures shall include the following.

1. A Boundary Survey prepared by a Florida Licensed Professional Surveyor and Mapper for the upland owner dated within six months of the Building Permit application must be provided.

2. The location, size, and dimensions of proposed and/or existing improvements of the project area adjacent to abutting City Owned Submerged Lands or State-Owned Submerged Lands (sovereign lands) with improvements dimensionally tied into to the side and rear line(s) of the upland owner. Include the following.

   a. Tie in dimensions of the Mean High-Water Line (MHWL) Plat Line

   b. Deed Line of the upland owner
c. The dimensioned width of the canal (waterway) from the upland owner’s MHWL line to opposite MHWL line of the canal

d. Surveyor’s note with qualifying statement.

3. Existing and proposed elevations of the top of the seawall.

PART 5 – AS-BUILT DRAWINGS

5.01 QUALITY OF AS-BUILT DRAWINGS

A. To ensure that as-built drawings may serve their intended purposes now and in the future, they should be prepared with consideration for quality. The City of Miami Beach Public Works Department will consider the following elements during as-built during review to ensure the quality of the as-built drawings.

B. The Contractor is required to have a survey crew record the field information on as necessary when there is underground pipe installation. The Florida Licensed Professional Surveyor and Mapper shall be responsible for providing measurements accurate to the standard of practice established in Chapter 5J-17.050 to 5J-17.052 of the Florida Administrative Code, pursuant to Section 427.027, Florida Statutes. The approved final record as-built shall be used as part of the City of Miami Beach’s GIS and Record System.

C. The Contractor’s PSM shall maintain exact and extensive records of any deviations from the design plan set.

D. As-built drawings shall be prepared in a professional manner consistent with common engineering standards for layout, lettering, and line-work.

E. As-built information shall be portrayed in a manner that is readily understandable by someone not familiar with the specific job.

F. Preparer shall endeavor to present as-built information clearly without "cluttering" the drawing.

G. As-built drawings shall include all disciplines in the Bid Set drawings.

5.02 REDLINE DRAWINGS

A. The Contractor shall maintain full size (22-inches by 34-inches) redline drawings to reflect the "record" items of work as the work progresses.

B. At a minimum, the redline drawings shall be reviewed on the 20th working day of every third month, or more often, as deemed necessary by Consultant, after the month in which the final Notice-to Proceed is given as well as on completion of Work. Failure to
maintain the redline drawings up-to-date shall be grounds for withholding monthly progress payments until such time as the redline drawings are brought up-to-date.

C. Redline drawings shall be accessible to the City or designee at all times during construction period.

D. The cost of maintaining record changes, and preparation of the as-built record drawings shall be included in the unit prices bid for the affected items.

5.03 AS-BUILT SURVEY

A. An as-built survey will be required upon completion of all construction projects that lay within City-owned properties, including, but not limited to, City rights-of-way, easements, parcels, and submerged lands, etc. All improvements, including but not limited to, landscaping will be required.

B. As-built surveys shall be prepared in accordance with FAC Chapter 5J-17.051 and all applicable Standards of Practice.

C. When performing as-built surveys, the surveyor and mapper shall obtain field measurements of vertical or horizontal dimensions of constructed improvements so that the constructed facility can be delineated in such a way that the location of the construction may be compared with the construction plans.

D. As-built survey maps shall clearly show by symbols, notations, or delineations, those constructed improvements located by the survey.

E. The vertical and horizontal accuracy of the measurements made shall be such that it may be determined whether the improvements were constructed consistent with planned locations.

F. The Surveyor shall be responsible for the location, establishing or replacement of Vertical and Horizontal Survey Control Points.

G. Complete topographic and boundary survey for the project shall be signed and sealed by the Florida Licensed Professional Surveyor and Mapper as part of the as-built plans. All information required of a boundary survey shall be contained on the as-built plans to include the legal description of the site, easements and rights-of-way abutting the site and location of all surface facilities recorded by a PSM. All utilities within the property shall be properly shown, along with their associated elevation and clearance.

5.04 UPDATE OF CONSTRUCTION DOCUMENTS

A. Representative items of work that should be shown on the record drawings as verified, changed, or added are shown below.
B. All "proposed" information shall be removed from as-builts, leaving only "as-built" information reflected in drawing.

C. Upon completion of the Work, the Contractor shall furnish the Consultant the as-built record drawings. Pay request quantities must match as-builts record drawings. The completed as-built record drawings shall be delivered to the Consultant at least 48 hours prior to final inspection of the work. The final inspection will not be conducted unless the as-built record drawings are in the possession of the Consultant.

D. The City reserves the right to have a Registered PSM perform spot checks of as-built information provided by the Contractor. The City shall pay the costs of such survey work when the work is performed by a City of Miami Beach Contractor. Should any spot checks indicate that any portion of the installation does not comply with the Contract Documents, a recheck shall be performed by another (or third) Registered PSM or agreed to by both the City and Contractor at the Contractor's expense. If the recheck confirms the first check, that portion of the work shall be removed and replaced or modified at no additional cost to the City until satisfactory compliance is attained.

E. As-built survey drawings shall meet the Florida Standards of Practice for Surveying and Mapping as outlined in Rule 5J-17.050-053.

5.05 CERTIFICATION

A. All as-built drawings are to be certified to the City of Miami Beach Public Works Department and all sheets are to be signed and sealed as previously outlined.

B. As-builts shall include a signed, sealed, and dated certification statement by the responsible Florida Licensed Professional Surveyor and Mapper that all measurements were recorded under his direction and are accurate.

C. Any civil drawings that are not surveyed shall also be included in the set and shall be signed and sealed by the Engineer of Record.

D. As-builts that contain electrical, mechanical, or structural work shall also be signed and sealed by the Engineer of Record to indicate that the work was constructed as designed.

E. It is the responsibility of the Contractor to check the as-builts for errors and omissions prior to submittal to the City and certify in writing that the as-builts are correct and accurate, including the actual location of all piping including building exposed and internal piping, electrical/signal conduits in or below the concrete floor, indicate the size, depth, and voltage in each conduit.
PART 6 – AUTOCAD STANDARDS

6.01 TEMPLATES

A. The CMB STANDARD.dwt file shall be used to start all AutoCAD design projects.

B. No standards or styles set within the City’s template file shall be modified without City approval.

C. If additional standards or styles need to be created to accommodate a project need, City approval is required.

D. The CMB STANDARD.dwt template file shall be used in conjunction with the CMB STANDARD.ctb file.

E. The transparency must be on when plotting CAD drawings.

6.02 SHEET SIZES

A. All sheets shall utilize the standard ANSI D (22-inch by 34-inch) sheet size.

B. When half size sheets are requested the standard ANSI B (11-inch by 17-inch) sheet size shall be used.

C. Any other sheet sizes will require prior approval from the City before being included in any deliverable.

6.03 TITLE BLOCK

A. Each contract sheet should include a North Arrow and Bar Scale in Paper Space if required for that layout. Refer to Appendix 8-C for an example.

B. Refer to Appendix 8-C for an example Title Block layout and its features.

C. All projects submitted to the City shall utilize the City of Miami Beach standard 22-inch by 34-inch Title Block CMB_ANSI-D_BORDER.dwg inserted into “Paper Space” at 0,0 as an external reference.

D. All sheets shall utilize the CMB_ANSI-D_ATTRIBUTES.dwg file inserted into “Paper Space” at 0,0 as a block for the border annotation.

E. When using the CMB STANDARD.dwt Template file, the Border and Attributes file will be preloaded.

F. All drawings shall have the file location, plot date, and plotted by information directly below the title block, as indicated on the template file.
6.04 REVISIONS TRACKING

A. Once the design phase is complete (after 100% submittal), project revisions shall be tracked in the revisions box to track the bidding phase of the project, i.e., Issued for Bidding, Addendum No. 1, Addendum No. 2, etc.

B. At the completion of the bidding phase once again the revision box shall be cleared to track the construction phase of the project, i.e., Conformed Drawing, RFI (request for information) No. 1, Record Drawing, etc.

6.05 DRAWING TEMPLATE

A. All projects submitted to the City shall utilize the City of Miami Beach standard Cover Sheet, Sheet Index, General Notes, Legend and Abbreviations Sheets.

B. These sheets are included with the file CMB-GENERAL.dwg located on the City’s website.

C. Additional notes or abbreviations require City approval prior to editing these sheets.

D. The Legend Sheet contains various symbols that shall be used on all projects. These symbols include, but are not limited to, section bubbles, detail callouts, north arrows, etc.

6.06 KEY MAPS

A. Each Plan Sheet shall have a Key Map located in the bottom right corner of the sheet (above the designated Seal location), as indicated on Appendix 8-C.

B. The Drawings Key Map shall be “keyed” to the Site Key Map for the project.

C. The Drawing Key Map shall clearly identify the limits of the proposed improvements depicted on the Sheet File in relation to the Overall Site Key map.

6.07 EXTERNAL REFERENCING

A. External references (xrefs) shall be used on all City of Miami Beach projects. Xrefs shall contain all graphic design information for plan, elevations, sections, profiles, etc. Xref settings requirements include:

1. The Overlay and Relative Path options shall be utilized.

2. Nested references are not acceptable (i.e., insert a reference file within reference file).

3. All Xrefs shall be referenced in Model Space of the sheet file, except the Title Block which shall be referenced in Paper Space.
6.08 DESIGNATORS

A. The codes listed in the following table are for the number and naming conventions discussed in the subsequent sections. Discipline specific sheets shall be ordered within the drawing set as listed in the table.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
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<td>Plans (Horizontal views and combination plan and profile)</td>
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<tr>
<td>2</td>
<td>Elevations and profiles (Vertical views)</td>
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<tr>
<td>3</td>
<td>Sections (Sectional views, wall sections)</td>
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<tr>
<td>4</td>
<td>Large-Scale Views (Scaled up reproductions of plans, elevations, or sections that are not details)</td>
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<tr>
<td>5</td>
<td>Details</td>
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<tr>
<td>6</td>
<td>Schedules and Diagrams</td>
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<td>7</td>
<td>User Defined (For types that do not fall in other categories, including typical detail sheets)</td>
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<td>8</td>
<td>User Defined (For types that do not fall in other categories)</td>
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<tr>
<td>9</td>
<td>3D Representations (Isometrics, perspectives, photographs)</td>
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**X-Ref Naming – RF**

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<th>Code</th>
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<tr>
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<tr>
<td>DS</td>
<td>Data shortcut</td>
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<tr>
<td>VS</td>
<td>Survey site</td>
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**Facility Codes – FC**

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<tr>
<td>PS</td>
<td>Pump station</td>
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<tr>
<td>LS</td>
<td>Lift station</td>
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<tr>
<td>WW</td>
<td>Wet well</td>
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**Facility View Type – FV**

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<td>UP</td>
<td>Upper plan</td>
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<tr>
<td>RP</td>
<td>Roof plan</td>
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**X-Ref Civil Discipline – XDIS**

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<tr>
<td>STRU</td>
<td>All new structures (buildings, pads sidewalks)</td>
</tr>
<tr>
<td>STRM</td>
<td>All new stormwater/drainage piping</td>
</tr>
<tr>
<td>SSWR</td>
<td>All new sanitary sewer piping</td>
</tr>
<tr>
<td>UTIL</td>
<td>All new utility piping (gas, water, air, etc.)</td>
</tr>
<tr>
<td>ROAD</td>
<td>All new paving and roadwork</td>
</tr>
<tr>
<td>ELEC</td>
<td>All new electrical site work</td>
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<tr>
<td>TOTO</td>
<td>All survey line work</td>
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**Phase – P**

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<td>Existing (features)</td>
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<tr>
<td>D</td>
<td>Demolition (to be demolished features)</td>
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<tr>
<td>F</td>
<td>Future (features to be completed in a future phase)</td>
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<tr>
<td>N</td>
<td>New (proposed design)</td>
</tr>
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</table>
6.09 SHEET NUMBERING AND NAMING

A. All electronic design files submitted to the City of Miami Beach shall use the sheet numbering and file naming format described in this section.

B. Sheet Numbering: Sheets shall be numbered following the structure below.

\[ D S – XX \]

Where:
- \( D \) = Discipline Code
- \( S \) = Sheet Type Code
- \( XX \) = Sequential Number

Example:
- C1-01 refer to Civil Plan Sheet #1.
- C1-02 refers to Civil Plan Sheet #2.

C. Sheet File Naming: Sheet files shall be numbered following the structure below.

\[ ZZ YYYYY – D S – XX.dwg \]

Where:
- \( ZZ \) = City’s Discipline Code (Internal)
- \( YYYYY \) = Year of Construction
- \( D \) = Discipline Code
- \( S \) = Sheet Type Code
- \( XX \) = Sequential Number

D. X-Ref Facility Naming: Typical naming for x-ref facility files

\[ ZZ YYYYY – D – FC – FV.dwg \]

Where:
- \( ZZ \) = City’s Discipline Code (Internal)
- \( YYYYY \) = Year of Construction
- \( D \) = Discipline Code
- \( FC \) = Facility Code
- \( FV \) = Facility View Type

6.10 LAYERS

A. Layers and layer management is one of the most important parts to producing quality CAD drawings.

B. The City of Miami Beach has included most necessary layers within the template files.
C. If additional Layers are needed, the National CAD Standards (NCS) Layering system shall be used as outlined below.

D – MAJR – MINA – MINB – P

Where:

D = Discipline Code  
MAJR = Major Designator  
MINA = Minor Designator A  
MINB = Minor Designator B  
P = Phase

D. Major Designator: Major Designators define a major part of the file (i.e., WALL, TOPO, ROAD, etc.) and should always be 4 characters long. Major designators should be considered a feature of the design and not a description of a feature. NCS major designators are listed in Appendix 8-D.

E. Minor Designators: These fields should be used as descriptions of the Major Designator for that layer. For instance, if you have a V-WALL layer you can add the minor descriptors of FULL, HALF, STON, RETN, etc. to describe what type of wall it is. Minor designators should always be 4 characters long, which is why there is a need to have additional Minor Designators to adequately describe the layer. NCS major designators are listed in Appendix 8-D.

F. Phase: The phase will signify the source of information of objects on that layer. The Phase area does not have to be used; it is optional but highly recommended. The most common examples of phase codes are listed in the table in Section 5.08.

6.11 LINE WEIGHTS

A. The City’s drawing templates were built around a line weight by layer system. That means the thickness of the lines when printed is controlled by the line weight setting in the Layer Manager and not the plot style (.ctb file). By using these settings, the color of the object has no impact on how the object prints; therefore, if a layer color is changed it will not alter the intended final appearance. Refer to Appendix 8-E for more information on line weights.

6.12 ANNOTATION STYLES

A. General Guidelines

1. The City utilizes the Annotation option for all text, dimensions, and leader callouts.

2. All text shall be Arial true type font and shall utilize the styles listed below.
3. These styles can be found in the City template file and shall not be modified in any way.

4. Annotative mode shall always be used.

5. Existing features text shall be drawn in a lighter tone than proposed features.

B. Text annotation styles shall conform to the following.

<table>
<thead>
<tr>
<th>Text Style</th>
<th>Text Height</th>
<th>Use</th>
<th>Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMB_07</td>
<td>0.07&quot;</td>
<td>Existing callouts/Notes</td>
<td>C-ANNO-TX-E</td>
</tr>
<tr>
<td>CMB_10</td>
<td>0.10&quot;</td>
<td>Proposed callouts/Notes</td>
<td>C-ANNO-TX-N</td>
</tr>
<tr>
<td>CMB_12</td>
<td>0.12&quot;</td>
<td>Street Names, Plat/property info, etc.</td>
<td>Varies (See Template)</td>
</tr>
<tr>
<td>CMB_16</td>
<td>0.165&quot;</td>
<td>View Titles, Detail Titles, Match lines</td>
<td>Varies (See Template)</td>
</tr>
<tr>
<td>CMB_18</td>
<td>0.18&quot;</td>
<td>Sheet Titles/Schedule Headers</td>
<td>Varies (See Template)</td>
</tr>
</tbody>
</table>

C. Dimension annotation styles shall conform to the following.

<table>
<thead>
<tr>
<th>Dim Styles</th>
<th>Text Style</th>
<th>Use</th>
<th>Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMB ARCH_07</td>
<td>CMB_07</td>
<td>Existing Dimensions for sheets with Architectural Scales</td>
<td>G-ANNO-DIM-E</td>
</tr>
<tr>
<td>CMB ARCH_10</td>
<td>CMB_10</td>
<td>Proposed Dimensions for sheets with Architectural Scales</td>
<td>G-ANNO-DIM-N</td>
</tr>
<tr>
<td>CMB ENG_07</td>
<td>CMB_07</td>
<td>Existing Dimensions for sheets with Engineering Scales</td>
<td>G-ANNO-DIM-E</td>
</tr>
<tr>
<td>CMB ENG_10</td>
<td>CMB_10</td>
<td>Proposed Dimensions for sheets with Engineering Scales</td>
<td>G-ANNO-DIM-N</td>
</tr>
</tbody>
</table>

D. Multileader annotation styles shall conform to the following.

<table>
<thead>
<tr>
<th>Multileader Styles</th>
<th>Text Style</th>
<th>Use</th>
<th>Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMB ML_07</td>
<td>CMB_07</td>
<td>Standard Existing Callout</td>
<td>G-ANNO-LDR-E</td>
</tr>
<tr>
<td>CMB ML_07U</td>
<td>CMB_07</td>
<td>Standard Existing Callout w/ Top Underline and secondary text below</td>
<td>G-ANNO-LDR-E</td>
</tr>
<tr>
<td>CMB ML_10</td>
<td>CMB_10</td>
<td>Standard Proposed Callout</td>
<td>G-ANNO-LDR-N</td>
</tr>
<tr>
<td>CMB ML_10U</td>
<td>CMB_10</td>
<td>Standard Proposed Callout w/ Top Underline and secondary text below</td>
<td>G-ANNO-LDR-N</td>
</tr>
</tbody>
</table>

1. The left edge of the multileader text should line up vertically (left justification) and the leader(s) should always extend to the text.
2. Leaders on the left side of the text should be aligned with the middle of the top line of the text.

3. Leaders on the right side should be aligned with the middle of the bottom line of text.

4. If the information below the first line is secondary information (such as rim, inverts, etc.) the leader should underline the first line of text.

E. Miscellaneous Annotations/Symbols

1. The City utilizes various symbols for calling out specific features like Grading Labels, Key Notes, Detail Items, Sections, etc.

2. These blocks are included on the Legend sheet in the file CMB-GENERAL.dwg template.

6.13 TABLE STYLES

A. The CMB Template contains a CMB Standard Table style that shall be used when creating Tables in AutoCAD.

B. If the Consultant is utilizing Civil 3D for design and needs to develop additional Tables not found in the template the guidelines below shall be used.

C. Table cell style shall conform to the following.

1. Alignment – Middle Center
2. Text Style – CMB_25
3. Text Height – 0.25
4. Text Color – Green
5. No border above, to the left, and to the right

D. Header cell style shall conform to the following.

1. Alignment – Middle Left
2. Text Style – CMB_18
3. Text Height – 0.1875
4. Text Color – Blue
5. All Borders
E. Data cell style shall conform to the following.

1. Alignment – Middle Left
2. Text Style – CMB_12
3. Text Height – 0.125
4. Text Color – Black/White (Color 7)
5. All Borders

6.14 BLOCKS, HATCHES, AND IMAGES

A. Blocks

1. Blocks should be created at full scale.
2. Define blocks on layer “0”.
3. Set Color to Bylayer and Lineweight to Bylayer.
4. Set insertion points relative to normal field construction installation.
5. Block names shall consist of logical easy to understand name (Manhole, Catch Basin, etc.).
6. The use of nested blocks shall NOT be used, making sure that all blocks are transportable in their host file, without loss of information.

6.15 HATCH PATTERNS

A. All patterns used in the DWG files must be produced by the core AutoCAD software and not specific T Plot Styles.

B. Plot Style CMB Standard.ctb is configured such that colors 1-249 will print black and colors 250-255 will print as they are seen on screen. No additional screening or line weight settings are configured at this time.

C. Background Images: When a project includes an aerial photo in the background of a drawing use the methods below to ensure a clear and easily read drawing.

1. Utilize a mask or whiteout behind all relevant information.
2. Fade the Image by 50%-60%. 
6.16 STANDARDS

RESERVED

PART 7 – CIVIL 3D STANDARDS

RESERVED
APPENDIX 8-A:
ACKNOWLEDGEMENT OF COMPLIANCE WITH CAD STANDARDS
ACKNOWLEDGEMENT OF COMPLIANCE WITH CAD STANDARDS

Today's Date: ______________________

Completion Stage Submittal: ______________________

This checklist is intended to verify Consultant adherence to the City of Miami Beach AutoCAD standards. A signed copy of this form shall be provided with all CAD file submittals.

Total Number of Drawings in the Submittal Set: ______________________

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have all drawing files been named in accordance with City standards?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>2. Have all cross references (xrefs) been named and layered in accordance with City standards?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>3. Do the Cover Sheet and Title Block match City standards?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>4. Is a Key Map provided?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>5. Are individual Discipline Drawings referenced to the Key Map?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>6. Has the topographic survey been x-ref’d into each drawing?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>7. Have all design-related items been placed in “Model Space”?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>8. Have the proper discipline layering/naming criteria been adhered to?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>9. Have all hatch patterns and shading guidelines been followed?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>10. Are all dimensions and leaders associated with an item?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>11. Are graphical scales provided on each drawing in “Paper Space”?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>12. Are north arrows provided on each drawing as applicable, in “Paper Space”?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>13. Is the Consultant’s logo properly inserted in “Paper Space”?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>14. Are the DWGs correctly referenced in a *.dst file?</td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

Comments: __________________________________________________________________________

_________________________________________________________________________________

___________________________________________
Signature

___________________________________________
Date

_____________________________________
Printed Name and Title

_____________________________________
Company

We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.
APPENDIX 8-B:
DRAWING TEMPLATE

1. **GENERAL NOTES:**

   INFORMATION SHOWN ON THE DRAWINGS AS TO THEIR LOCATION AND CHARACTER HAS BEEN UTILIZED AS SHOWN ON THE APPROVED PLANS SHALL BE FIELD VERIFIED BY THE CONTRACTOR. THE ENGINEER OF RECORD, OR HIS DESIGNEE TO MAKE INSPECTIONS AS NECESSARY DURING CONSTRUCTION.

   MATERIALS RESULTING FROM DEMOLITION WORK SHALL BECOME THE PROPERTY OF THE CONTRACTOR. REMOVE FROM SITE AND DISPOSE OF THESE MATERIALS IN A MANNER AND LOCATION CONSIDERED ACCEPTABLE BY THE ENGINEER OF RECORD AND THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT, INFRASTRUCTURE DIVISION.

   SODDED COMPLETELY TO RESTORE TO PRE-EXISTING CONDITIONS OR BETTER AND SHALL BE MAINTAINED UNDER THE RESPONSIBILITY OF THE CONTRACTOR.

   ALL EXISTING UTILITIES, MANHOLE COVERS, ELECTRICAL BOXES, VALVE BOXES, METER BOXES, AND SPECIFICATIONS. ALL PERMITTING REQUIREMENTS SHALL BE IN STRICT ACCORDANCE WITH THE LOCAL, STATE AND FEDERAL CODES, STANDARDS AND CRITERIA.

   AN ONSITE INSPECTION TO VERIFY: 1) SIZE OF PIPE AND 2) MATERIALS ON-SITE. IF THIS INSPECTION DOES NOT OCCUR OR IS INCOMPLETE, CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ADDITIONAL MATERIALS OR WORK REQUIRED TO COMPLY WITH THE SPECIFICATIONS AND CONTRACT.

   ALL TAPS MUST BE WITNESSED BY THE CITY. SIZE-ON-SIZE TAPS ARE NOT ALLOWED UNLESS APPROVED BY THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT. THE REUSE OF CONTAMINATED SOILS THAT ARE NOT RETURNED TO THE ORIGINAL EXCAVATION REQUIRED PRIOR TO COMPLETION OF THE PROJECT.

   THE SEWER PIPES ARE DESIGNED AND CONSTRUCTED EQUAL TO THE WATER PIPE AND PRESSURE TESTED AT 150 PSIG. THE ALLOWABLE LEAKAGE RATE SPECIFIED IN AMERICAN WATER WORKS ASSOCIATION STANDARDS CANADA IS A TEST PRESSURE OF 100 PSI FOR A DURATION OF NOT LESS THAN TWO (2) HOURS. THE SEWER IS ENCASED IN A WATERTIGHT CARRIER PIPE OR CONCRETE. THE SEWER IS DESIGNED TO MINIMIZE THE POTENTIAL OF LEAKAGE INTO THE ENVIRONMENT. THE SEWER ROCKS ARE DESIGNED TO MINIMIZE THE POTENTIAL OF LEAKAGE INTO THE ENVIRONMENT. THE SEWER ROCKS ARE DESIGNED TO MINIMIZE THE POTENTIAL OF LEAKAGE INTO THE ENVIRONMENT. THE SEWER ROCKS ARE DESIGNED TO MINIMIZE THE POTENTIAL OF LEAKAGE INTO THE ENVIRONMENT. THE SEWER ROCKS ARE DESIGNED TO MINIMIZE THE POTENTIAL OF LEAKAGE INTO THE ENVIRONMENT. THE SEWER ROCKS ARE DESIGNED TO MINIMIZE THE POTENTIAL OF LEAKAGE INTO THE ENVIRONMENT.


APPENDIX 8-C: EXAMPLE SHEET LAYOUT

1. This space is reserved for north arrow and bar scale where applicable. Bar scale should always be located beneath the north arrow. North arrow should always be oriented to true north.

2. This space is reserved general notes and/or keyed notes when applicable. If the note's section is not needed the layer "G_BORDER_NOTES" can be turned off from the border XREF file.

3. This space reserved for key plan when applicable. If a key plan is not needed on a particular sheet the layer "G_BORDER_KEY" can be turned off from the border XREF file.

4. This space is reserved for PE seal and signature and should never be removed or covered on any sheet in the contract set.

When signing and sealing electronically, use PE seal area for digital.

5. This space reserved for the current milestone submittal (i.e. 30% submittal - not for construction).

6. This space reserved consultants name & logo.

7. Project revisions should be noted and tracked here. Refer to the City of Miami Beach Public Works Manual Section 8 for additional guidelines on tracking revisions.
### APPENDIX 8-D: MAJOR AND MINOR DESIGNATORS

The United States National CAD Standards® - Version 6 Major and Minor Designators are listed in the following table.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>025Y</td>
<td>25-year mark</td>
</tr>
<tr>
<td>04FT</td>
<td>Four feet high</td>
</tr>
<tr>
<td>050Y</td>
<td>50-year mark</td>
</tr>
<tr>
<td>06FT</td>
<td>Six feet high</td>
</tr>
<tr>
<td>100Y</td>
<td>100-year mark</td>
</tr>
<tr>
<td>200Y</td>
<td>200-year mark</td>
</tr>
<tr>
<td>AA~~</td>
<td>Agitation air-system</td>
</tr>
<tr>
<td>ABLT</td>
<td>Anchor bolts</td>
</tr>
<tr>
<td>ABOV</td>
<td>Above</td>
</tr>
<tr>
<td>ABUT</td>
<td>Abutment</td>
</tr>
<tr>
<td>ACCS</td>
<td>Access</td>
</tr>
<tr>
<td>ACFU</td>
<td>Fused ac</td>
</tr>
<tr>
<td>ACTL</td>
<td>Aerial horizontal and vertical control points</td>
</tr>
<tr>
<td>ACNF</td>
<td>Unfused ac</td>
</tr>
<tr>
<td>AGGR</td>
<td>Exposed aggregate</td>
</tr>
<tr>
<td>AIR~</td>
<td>Air</td>
</tr>
<tr>
<td>ALOC</td>
<td>Allocation</td>
</tr>
<tr>
<td>ALRM</td>
<td>Alarm</td>
</tr>
<tr>
<td>ALUM</td>
<td>Aluminum</td>
</tr>
<tr>
<td>AMEX</td>
<td>Ammonia exhaust-system</td>
</tr>
<tr>
<td>AMW~</td>
<td>Ammonia waste-system</td>
</tr>
<tr>
<td>ANNN</td>
<td>Optional number (A = letter, NNN = number between 001 and 999)</td>
</tr>
<tr>
<td>ANNO</td>
<td>Annotation</td>
</tr>
<tr>
<td>ANOD</td>
<td>Sacrificial anode</td>
</tr>
<tr>
<td>AR~~</td>
<td>Argon-system</td>
</tr>
<tr>
<td>ARB~</td>
<td>Argon bulk-system</td>
</tr>
<tr>
<td>ARC~</td>
<td>Regenerative caustic-system</td>
</tr>
<tr>
<td>AREX</td>
<td>Arsenic exhaust-system</td>
</tr>
<tr>
<td>ASPH</td>
<td>Asphalt</td>
</tr>
<tr>
<td>BA~~</td>
<td>Breathable air-system</td>
</tr>
<tr>
<td>BACK</td>
<td>Back</td>
</tr>
<tr>
<td>BAFL</td>
<td>Baffle block and splash pad</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>BARR</td>
<td>Barrier</td>
</tr>
<tr>
<td>BASN</td>
<td>Stilling and settling basin</td>
</tr>
<tr>
<td>BBAC</td>
<td>Battery backup</td>
</tr>
<tr>
<td>BEDS</td>
<td>Perennial and annual beds</td>
</tr>
<tr>
<td>BENT</td>
<td>Top of bent</td>
</tr>
<tr>
<td>BFW~</td>
<td>Boiler feed water-system</td>
</tr>
<tr>
<td>BKRS</td>
<td>Breakers</td>
</tr>
<tr>
<td>BLBD</td>
<td>Boiler blow down piping</td>
</tr>
<tr>
<td>BLDG</td>
<td>Building points</td>
</tr>
<tr>
<td>BLIN</td>
<td>Baseline</td>
</tr>
<tr>
<td>BMRK</td>
<td>Benchmarks</td>
</tr>
<tr>
<td>BNDY</td>
<td>Boundary</td>
</tr>
<tr>
<td>BOLD</td>
<td>Bold lines</td>
</tr>
<tr>
<td>BORO</td>
<td>Borough</td>
</tr>
<tr>
<td>BOT1</td>
<td>Bottom group 1</td>
</tr>
<tr>
<td>BOT2</td>
<td>Bottom group 2</td>
</tr>
<tr>
<td>BOTB</td>
<td>Bottom of bank</td>
</tr>
<tr>
<td>BOTM</td>
<td>Bottom</td>
</tr>
<tr>
<td>BOXD</td>
<td>Mixing box, dual duct</td>
</tr>
<tr>
<td>BOXS</td>
<td>Mixing box, single duct</td>
</tr>
<tr>
<td>BRCK</td>
<td>Brick</td>
</tr>
<tr>
<td>BRDG</td>
<td>Bridge</td>
</tr>
<tr>
<td>BRGX</td>
<td>Bridging</td>
</tr>
<tr>
<td>BRKL</td>
<td>Break lines</td>
</tr>
<tr>
<td>BRNG</td>
<td>Bearings and distance labels</td>
</tr>
<tr>
<td>BROW</td>
<td>Brush row points</td>
</tr>
<tr>
<td>BRSH</td>
<td>Brush points</td>
</tr>
<tr>
<td>BUOY</td>
<td>Buoy</td>
</tr>
<tr>
<td>BUSH</td>
<td>Bushes and shrubs</td>
</tr>
<tr>
<td>BUSS</td>
<td>Bus duct</td>
</tr>
<tr>
<td>BUSW</td>
<td>Busways</td>
</tr>
<tr>
<td>BUT~</td>
<td>Butane-system</td>
</tr>
<tr>
<td>BWTR</td>
<td>Breakwater</td>
</tr>
<tr>
<td>C~~~</td>
<td>Caustic-system</td>
</tr>
<tr>
<td>CA~~~</td>
<td>Compressed air-system</td>
</tr>
<tr>
<td>CABL</td>
<td>Cable</td>
</tr>
<tr>
<td>CAIR</td>
<td>Compressed air</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>CARS</td>
<td>Cars and other vehicles</td>
</tr>
<tr>
<td>CATV</td>
<td>Cable television</td>
</tr>
<tr>
<td>CAVI</td>
<td>Cavity</td>
</tr>
<tr>
<td>CBOX</td>
<td>Combiner box</td>
</tr>
<tr>
<td>CD~</td>
<td>Condensate drain-system</td>
</tr>
<tr>
<td>CDA~</td>
<td>Clean dry air-system</td>
</tr>
<tr>
<td>CDFF</td>
<td>Ceiling diffusers</td>
</tr>
<tr>
<td>CHIM</td>
<td>Chimney</td>
</tr>
<tr>
<td>CIPR</td>
<td>Culvert inlet protection</td>
</tr>
<tr>
<td>CIRC</td>
<td>Circuits</td>
</tr>
<tr>
<td>CITY</td>
<td>City</td>
</tr>
<tr>
<td>CLAS</td>
<td>Classifications</td>
</tr>
<tr>
<td>CLDA</td>
<td>Cold air</td>
</tr>
<tr>
<td>CLG~</td>
<td>Chlorine gas-system</td>
</tr>
<tr>
<td>CLHD</td>
<td>Ceiling heads</td>
</tr>
<tr>
<td>CLNG</td>
<td>Ceiling</td>
</tr>
<tr>
<td>CLV~</td>
<td>Chlorine vacuum-system</td>
</tr>
<tr>
<td>CLW~</td>
<td>Concentrated lead waste-system</td>
</tr>
<tr>
<td>CMTL</td>
<td>Corrugated metal</td>
</tr>
<tr>
<td>CMUW</td>
<td>Concrete masonry unit</td>
</tr>
<tr>
<td>CMW~</td>
<td>Concentrated metals waste-system</td>
</tr>
<tr>
<td>CNDS</td>
<td>Condensate piping</td>
</tr>
<tr>
<td>CNDT</td>
<td>Diversionary/bypass conduit/culvert</td>
</tr>
<tr>
<td>CNMB</td>
<td>Circuit numbers</td>
</tr>
<tr>
<td>CNTE</td>
<td>Construction entrance</td>
</tr>
<tr>
<td>CNTJ</td>
<td>Construction joint</td>
</tr>
<tr>
<td>CNTR</td>
<td>Center</td>
</tr>
<tr>
<td>CNTY</td>
<td>County</td>
</tr>
<tr>
<td>COAX</td>
<td>Coax cable</td>
</tr>
<tr>
<td>COFF</td>
<td>Coffer dam</td>
</tr>
<tr>
<td>CONC</td>
<td>Concrete</td>
</tr>
<tr>
<td>CONI</td>
<td>Coniferous trees</td>
</tr>
<tr>
<td>CONS</td>
<td>Conservation</td>
</tr>
<tr>
<td>CORP</td>
<td>Corporation</td>
</tr>
<tr>
<td>COVR</td>
<td>Coverage</td>
</tr>
<tr>
<td>CPIP</td>
<td>Cold water piping</td>
</tr>
<tr>
<td>CRIT</td>
<td>Critical</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>CRKT</td>
<td>Crickets</td>
</tr>
<tr>
<td>CSTG</td>
<td>Construction/Grading</td>
</tr>
<tr>
<td>CSWK</td>
<td>Casework</td>
</tr>
<tr>
<td>CTLA</td>
<td>Controlled access</td>
</tr>
<tr>
<td>CTLJ</td>
<td>Control joint</td>
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City of Miami Beach Public Works Department
Public Works Manual
We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.
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## APPENDIX 8-E: LAYER LINE WEIGHTS

The following table presents the layer line weights used in the City’s AutoCAD template.

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City of Miami Beach Public Works Department
Public Works Manual
We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.
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<td>Communications: annotation (text, dimensions)</td>
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<td>Flood Hazard Area: 500 year limit</td>
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</table>
### Section 8. Surveying, Drawing, and Drafting Requirements

**City of Miami Beach Public Works Department**
**Public Works Manual**
*We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.*

<table>
<thead>
<tr>
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### Section 8. Surveying, Drawing, and Drafting Requirements

**City of Miami Beach Public Works Department**

**Public Works Manual**

We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.

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EROSION AND SEDIMENT CONTROL
SECTION 9. EROSION AND SEDIMENT CONTROL

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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to
the applicable requirements of the following documents. All referenced specifications,
codes, and standards refer to the most current issue available.

1. American Association of State Highway Transportation Officials (AASHTO)
   AASHTO M288 Geotextiles

2. American Society for Testing Materials (ASTM)
   ASTM D3776 Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
   ASTM D3786 Standard Test Method for Bursting Strength of Textile Fabrics—
   Diaphragm Bursting Strength Tester Method
   ASTM D4355 Standard Test Method for Deterioration of Geotextiles by
   Exposure to Light, Moisture and Heat in a Xenon Arc-Type
   Apparatus
   ASTM D4491 Standard Test Methods for Water Permeability of Geotextiles by
   Permittivity
   ASTM D4632 Standard Test Method for Grab Breaking Load and Elongation of
   Geotextiles
   ASTM D4751 Standard Test Methods for Determining Apparent Opening Size of
   a Geotextile
   ASTM D4833 Standard Test Method for Index Puncture Resistance of
   Geomembranes and Related Products

3. Florida Administrative Code (FAC)

4. Florida Building Code

5. Florida Department of Environmental Regulation
   Management, Chapter 6

6. Florida Department of Environmental Protection (FDEP)
   Florida Storm Water Erosion and Sedimentation Control Inspector’s Manual

7. Florida Department of Transportation (FDOT)
Design Standards

Standard Plans for Road and Bridge Construction

8. Florida Department of Transportation (FDOT) and FDEP

Erosion and Sediment Control Designer and Reviewer Manual

9. Miami-Dade Division of Environmental Resources Management, Department of

Regulatory and Economic Resources (RER-DERM) Regulations

10. Occupational Safety and Health (OSHA) Regulations

1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to
avoid property damage. Adequate barricades, construction signs, torches, red lanterns,
and guards as required shall be placed and maintained during the progress of the
construction work for the protection of the public in compliance with all Local, State,
Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own
expense, all damage to property or adjacent properties caused in the execution of the
Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on
the job and shall comply with all applicable provisions of Local, State, and Federal safety
laws and regulations to prevent accidents or injury to persons on, about, or adjacent to
the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all
materials and equipment from damage and/ or theft. In the event that the Contractor’s
tools or materials delivered to or stored on-site are stolen or damaged, the Contractor
shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed
by the City or designee or the local authorities having jurisdiction and shall, when so
directed, properly correct any unsafe conditions created by or unsafe practices on the
part of its employees. In the event of the Contractor’s failure to comply, the City or
designee may take the necessary measures to correct the conditions or practices
complained of, and all costs thereof will be deducted from any monies due the
Contractor. Failure of the City or designee to direct the correction of unsafe conditions or
practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida
Building Code and OSHA Regulations in general and specifically the provisions
concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.03 REQUIREMENTS

A. All work, including work less than one (1) acre in size, that has the potential to impact the City’s Municipal Separate Stormwater System (MS4), and/or adjacent properties, is required to employ sediment and erosion control measures that are in accordance with the FDEP *Florida Storm Water Erosion and Sedimentation Control Inspector’s Manual*, latest revision, and in accordance with RER-DERM requirements.

B. All construction activity that results in the disturbance of equal to or greater than one (1) acre is required to obtain coverage under the FDEP Generic Permit for Storm Water Discharge from Large and Small Construction Activities (Construction Generic Permit [CGP]).

C. If required by law, the Contractor shall obtain permits required by the National Pollutant Discharge Elimination System (NPDES) Stormwater Permitting program for construction activity, as required by Florida Administrative Code (FAC) Chapter 62-621 and administered by FDEP.

D. NPDES best management practices for sediment and erosion work must be strictly followed during and after construction.

E. The Contractor is responsible for following the best erosion and sediment control practices as outlined in the plans, specification, applicable permit(s), and the prevention, correction, control, and abatement of erosion and water pollution in accordance with FAC Chapter 62-302.

F. The Contractor shall design, provide, maintain, and remove temporary erosion and sediment controls as necessary.

G. Temporary erosion controls may include, but are not limited to, mulching, netting, and watering on site surfaces and spoil and borrow area surfaces, providing interceptor ditches at ends of berms and at those locations which will ensure erosion during construction will be either eliminated or maintained within acceptable limits as established by the City and all regulatory agencies having jurisdiction.

H. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the City and all regulatory agencies having jurisdiction.

I. The Contractor shall provide effective temporary erosion and sediment control measures during construction or until final controls become effective.
J. All excavations and earthwork shall be done in a manner to minimize water turbidity and pollution. Discharge shall be controlled and rerouted through hay filters, siltation bags, sumps, or other approved sediment filtering devices. The Contractor shall be responsible for the prevention, correction, control, and abatement of erosion and water pollution in accordance with FAC, Chapter 62-302.

K. The Contractor is responsible for the removal of any sediment that leaves the site and changes any downstream conditions by raising channel bottoms and/or clogging outfall culvers.

L. This Section indicates the minimum erosion and sediment control measures required. The Contractor is responsible for meeting all applicable rules, regulations, and water quality guidelines and may need to install additional controls.

M. The Contractor shall pay for any water quality control violations from any agency that results in fines being assessed to the City because of the Contractor’s failure to eliminate turbid runoff from leaving the site and raising background levels of turbidity above existing background levels.

1.04 SUBMITTALS

A. The Contractor shall prepare and submit to permitting agencies with jurisdiction a Stormwater Pollution Prevention Plan (SWPPP) when required by FDEP.

B. The Contractor shall submit a copy of the approved SWPPP for temporary erosion and sediment control to the City or designee.

C. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

1.05 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.
PART 2 – PRODUCTS

2.01 SILT FENCE

A. Correctly installed silt fences shall be used along the limits of construction to minimize off-site siltation migration.

B. Silt fences shall be installed below small disturbed areas that are less than ¼ acre disturbed per 100-feet of fence when slopes are less than 2%. Silt fence shall be located no closer than 6 feet from toe of slope to allow for ponding, maintenance, and access. Silt fence shall not be installed across streams, ditches, or waterways or other areas of concentrated flows.

C. Filter fabric shall be FDEP Type D-3 fabric with permittivity $24\geq 0.2$ and elongation $\geq 50\%$, or equivalent.

D. Silt fence shall be stable for the 10-year peak storm runoff.

E. The posts for silt fences shall be 48-inch minimum metal or wooden fence posts driven into the ground a minimum of two (2) feet.

F. Maximum post spacing shall be ten (10) feet on center.

G. Reinforcement of filter fabric shall be woven wire fence (minimum 14 gauge; 6-inch maximum mesh spacing).

2.02 STONE FOR EROSION CONTROL

A. The stone for erosion control shall consist of field stone or rough un-hewn quarry stone, approximately 6-inches to 9-inches in size. The stone shall be sound, tough, dense, and resistant to the action of air and water.

2.03 RIPRAP

A. The stone for riprap shall consist of field stone or rough un-hewn quarry stone, approximately 12-inches to 18-inches in size. The riprap shall be sound, tough, dense, and resistant to the action of air and water. Neither the width nor thickness of individual stones shall be less than one third their length.

2.04 ROLLED EROSION CONTROL MATTING (RECMS)

A. RECMs should be utilized to aid stabilization of slopes greater than 2:1 and with more than 10 feet of vertical relief. RECMs should also be used when mulch cannot be adequately tacked and where immediate ground cover is required to prevent erosion damage. Examples of RECMs are blankets, nets, and matting.
B. RECM materials and properties shall be in accordance with the FDEP *Erosion and Sediment Control Designer and Reviewer Manual*.

C. RECMs shall be used to aid in permanent stabilization of vegetated channels where runoff velocity will exceed 2 feet/second on bare earth during the 2-year rainfall event that produces peak runoff.

D. RECMs shall be chosen based on applicable design standards. Typically, nets shall be used in conjunction with mulch; the use of mulch is typically not required with excelsior, woven straw blankets, and coir blankets.

E. The recommended anchoring devices are 12-inch minimum length wooden stakes, 11-gauge staples that are at least 6-inches long by 1-inch wide, or rigid, biodegradable stakes of a minimum of 6 inches in length. If Manufacturer’s recommendations are more stringent, they shall supersede.

### 2.05 TEMPORARY AND PERMANENT DIVERSIONS

A. Temporary diversions shall be constructed adjacent to disturbed areas to collect surface runoff from disturbed areas and direct the runoff to sediment basins or to divert non-sediment laden runoff away from undisturbed areas and/or sediment basins. All temporary diversions transporting sediment-laden runoff shall terminate in a sediment trapping device.

B. Permanent diversions should be planned as a part of initial site development and should be coordinated with temporary diversions. Permanent diversions shall be used to divert water to locations where it can be used or released without erosion or flood damage.

C. All temporary and permanent diversions shall be stabilized with vegetation or other means within 7 days of installation.

### 2.06 TEMPORARY SLOPE DRAINS

A. Temporary slope drains are used to convey concentrated runoff down the face of a slope without causing erosion and are generally used in conjunction with temporary diversions.

B. The pipe shall be heavy-duty flexible material such as non-perforated, corrugated high-density polyethylene (HDPE) pipe or specially designed flexible tubing.

### 2.07 TEMPORARY GRAVEL CONSTRUCTION ENTRANCES/EXITS

A. Temporary gravel construction entrances/exits shall be located at points where vehicles enter and leave a construction site.

B. Temporary gravel construction entrances/exits shall be constructed with a minimum 6-inch layer of FDOT No. 1 Coarse Aggregate, 1-1/2" to 3-1/2" and must extend the full
width of the vehicular ingress and egress area. The entrance shall be at least 50 feet in length. The exit shall widen at its connection to the roadway to accommodate the turning radius of large trucks.

2.08 TEMPORARY AND PERMANENT STABILIZATION OF DISTURBED AREAS

A. Unless specifically outlined in the approved Plans, sod shall be only vegetative method used for soil stabilization.

B. Sod shall be placed in areas which may require immediate erosion protection to ensure water quality standards are maintained and where no active construction is occurring.

C. All fill slopes 3:1 or steeper to receive staked solid sod.

D. Ground cover adequate to restrain erosion shall be provided on disturbed areas that will be left un-worked for periods exceeding 7 to 14 days.

2.09 CHECK DAMS AND CHECK DAMS WITH WEIRS

A. Check dams and check dams with weirs shall not be constructed in an intermittent or perennial stream. The drainage area for any one check dam or check dam with weir shall be limited to half (1/2) acre.

B. Check dams shall be constructed of stone for erosion control or riprap with filter fabric, fiber filtration tubes, or sediment logs. Check dams with weirs shall be constructed of stone for erosion control or riprap with filter fabric. Material specifications for stone for erosion control, riprap, fiber filtration tubes, and sediment logs appear herein. If Manufacturer’s recommendations are more stringent, they shall supersede.

2.10 INLET EROSION CONTROL MEASURES

A. The Contractor shall use a minimum of one of the inlet erosion control measures for all drop inlets within or immediately downstream of the limits of disturbance and potentially receiving sediment-laden flow from construction areas.

B. Inlet erosion control measures shall be used to prevent or limit the introduction of sediment to storm drain systems and allow early use of the of the storm drainage system. Maximum drainage areas for inlet erosion control measures vary from one (1) acre for excavated drop inlet protection, hardware and cloth gravel inlet protection, and block and gravel inlet protection to more than five (5) acres for rock pipe inlet protection.

C. Materials for inlet erosion control measures consist of silt fence, riprap, stone (gravel), hardware wire, sod, concrete blocks, and sediment logs. Riprap and stone for erosion control shall be as specified herein. If Manufacturer’s recommendations are more stringent, they shall supersede.
2.11 FIBER FILTRATION TUBES (FFTS) AND SEDIMENT LOGS

A. FFTs shall consist of composite wood fibers and man-made fibers, with or without performance-enhancing polymers, encased with cylindrical tubes composed of a heavy-duty, knitted, high density polyethylene mesh. The photodegradable mesh shall be oriented in a diamond or hexagonal pattern and shall move freely at all knitted yarn intersections.

B. Sediment logs shall consist of natural fibers (wood, coconut, etc.) inside heavy duty knitted cylindrical tubing.

2.12 TEMPORARY AND PERMANENT CHANNELS

A. Temporary and permanent channels shall be used to convey concentrated runoff without damage from erosion, deposition, or flooding.

2.13 TEMPORARY SEDIMENT TRAPS, SEDIMENT BASINS, AND SKIMMER SEDIMENT BASINS

A. Sizing for sediment traps and basins shall comply with all Local, State, and Federal regulations. For reference, FDEP criteria for a NPDES Generic Permit are listed below.

1. For construction sites with ten (10) or more disturbed acres, the following design requirements shall be met.

   a. For drainage basins with ten (10) or more disturbed acres at one time, a temporary (or permanent) sediment or wet detention basin providing 3,600 cubic feet of storage per acre drained must be provided until final stabilization of the site. The 3,600 cubic feet of storage area per acre drained does not apply to flows from off-site areas and flows from on-site areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin.

   b. For drainage basins with ten (10) or more disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained is not attainable, a combination of smaller sediment basins, sediment traps, wet detention systems, or other best management practices must be used.

2. For drainage basins of less than ten (10) disturbed acres, sediment basins and sediment traps are recommended but not required.

B. These temporary measures shall not be constructed within an intermittent or perennial stream and shall be installed prior to any land disturbance activities within the drainage area. Temporary sediment traps shall be constructed by excavating the appropriate size rectangular basin and constructing a rock-fill dam on the discharge end.
C. Sediment basins and skimmer sediment basins shall be used where drainage areas are too large for temporary sediment traps. Outlet structures must withdraw from basin surface unless drainage area is less than one (1) acre. They shall retain sediment on the site and prevent off site sediment in waterways, and they shall not be located in intermittent or perennial streams. Sediment basins and skimmer sediment basins shall be installed prior to any land disturbance activities within the drainage area.

D. Porous baffles are used to reduce the velocity and turbulence of the water flowing through the structure and to facilitate the settling of sediment in the water before discharge. They effectively spread the flow across the entire width of a structure.

E. Typical materials for porous baffles include silt fence, coir erosion blanket, coir mesh, and tree protection fence.

F. The structure life for temporary sediment traps shall be limited to two (2) years. Temporary sediment traps shall be spaced to limit the maximum tributary drainage area to five (5) acres. The basin life of sediment basins and skimmer sediment basins shall be limited to three (3) years unless they are designed as permanent structures. The drainage area for sediment basins and skimmer sediment basins shall be limited to 100 acres.

G. The principal spillway for sediment basins shall consist of a riser and barrel. Ensure that the pipe is capable of withstanding the maximum expected load without yielding, buckling, or cracking. The basin should be provided with a skimmer or flashboard riser to dewater the basin from the water surface. The emergency spillway shall be constructed in undisturbed soil.

H. The principal spillway for skimmer sediment basins shall consist of a skimmer which dewater the basin from the top of the water surface at a controlled rate. A dewatering rate of 24 to 72 hours is required. The skimmer outlet pipe shall be capable of withstanding the maximum expected load without yielding, buckling, or cracking. The emergency spillway shall be constructed in undisturbed soil whenever possible and shall be lined with impermeable geotextile fabric. The principal spillway outlet and emergency spillway shall be stabilized.

2.14 OUTLET STABILIZATION STRUCTURE

A. Outlet stabilization structures shall be used where the discharge velocity of the upstream water conveyance structure exceeds the permissible velocity of the receiving channel or disposal area.

B. Structures shall be sized for a capacity equivalent to a 10-year, peak runoff or design discharge of the water conveyance structure, whichever is greater.
2.15 TURBIDITY CURTAIN

A. Type I or Type II turbidity curtains may be used, depending on the requirements for the conditions encountered.

B. Curtains shall be linked together per Manufacturer’s specifications.

C. Type I curtains and appurtenances to meet the tenants of the following table.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabric</td>
<td>18 oz. nylon reinforced PVC fabric (300 psi test) with lacing grommets</td>
</tr>
<tr>
<td>Flotation</td>
<td>Closed cell solid plastic foam flotation (6-inch equivalent diameter) (12 lb/ft buoyancy)</td>
</tr>
<tr>
<td>Bottom Tension and Ballast</td>
<td>5/4-inch galvanized steel chain</td>
</tr>
<tr>
<td>End Connectors</td>
<td>5/8-inch polypro rope (600 lb. breaking strength)</td>
</tr>
<tr>
<td>Skirt Depth</td>
<td>10’</td>
</tr>
</tbody>
</table>

D. Type II curtains and appurtenances to meet the tenants of the following table.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabric</td>
<td>18 oz. nylon reinforced PVC fabric (300 psi test)</td>
</tr>
<tr>
<td>Flotation</td>
<td>Closed cell solid plastic foam flotation (8-inch equivalent diameter) (17 lb/ft buoyancy)</td>
</tr>
<tr>
<td>Top Tension</td>
<td>5/16-inch vinyl sheathed EAW steel cable (9800 lb. breaking strength) with galvanized connections (tool free disconnect)</td>
</tr>
<tr>
<td>Bottom Tension and Ballast</td>
<td>5/16-in galvanized steel chain</td>
</tr>
<tr>
<td>End Connectors</td>
<td>Slotted PVC connector pipe (metal collar reinforced).</td>
</tr>
<tr>
<td>Skirt Depth</td>
<td>10’</td>
</tr>
</tbody>
</table>

2.16 FILTER BAGS

A. Temporary filter bag sediment control bags for use in dewatering and retaining sediment pumped out of active ‘dirty’ project areas, such as stream restoration projects, where water is pumped from work area, sent through the bag, and flow is then released from the bag to discharge on a stable flood plain or other secure area.

B. The filter bag shall be a non-woven bag which is sewn with a double needle matching using a high strength thread. The dewatering bag must be made of non-woven geotextile
with a minimum surface area of 225 square feet per side. Each sack is required to have a fill spout large enough to accommodate a 4-inch discharge hose. Straps are to be attached such that the hose is secure, and the hose prevents pumped water from escaping without being filtered.

C. The geotextile fabric shall be non-woven and shall meet the following properties.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test Method</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>ASTM D3776</td>
<td>Oz/yd</td>
<td>12</td>
</tr>
<tr>
<td>Grab Tensile</td>
<td>ASTM D4632</td>
<td>lbs</td>
<td>300</td>
</tr>
<tr>
<td>Puncture</td>
<td>ASTM D4833</td>
<td>lbs</td>
<td>180</td>
</tr>
<tr>
<td>Flow Rate</td>
<td>ASTM D4491</td>
<td>gal/min/ft²</td>
<td>75</td>
</tr>
<tr>
<td>Permittivity</td>
<td>ASTM D4491</td>
<td>sec⁻¹</td>
<td>1.1</td>
</tr>
<tr>
<td>Mullen Burst</td>
<td>ASTM D3786</td>
<td>psi</td>
<td>550</td>
</tr>
<tr>
<td>UV Resistant</td>
<td>ASTM D4355</td>
<td>%</td>
<td>70</td>
</tr>
<tr>
<td>AOS% Retained</td>
<td>ASTM D4751</td>
<td>%</td>
<td>100</td>
</tr>
</tbody>
</table>

2.17 DEWATERING SUMPS

A. This section includes installation of temporary sump pits from which pumping is conducted to remove excess water while minimizing sedimentation. The sump pit filters water being pumped to reduce sedimentation. Further sedimentation may be reduced when flow is pumped to a filter bag (if required).

B. Filter geotextile shall be a minimum 6-ounce per square yard (nominal) non-woven needle punched synthetic fabric consisting of staple or continuous filament polyester or polypropylene manufactured in a manner accepted by the City or designee. The geotextiles shall be inert and unaffected by long-term exposure to chemicals or liquids with a pH range from 3 to 10. The geotextiles shall have a minimum threshold water head of 0.25-inches in the "as received" condition. Filter geotextile shall have a Survivability Class of Class 1 or 2 in accordance with AASHTO M288, unless otherwise specified herein.

C. Stone: Shall be #57 clean gravel stone (3/4 to 1.5 inch max diameter).

D. Hardware Cloth: Shall be one-quarter (1/4) inch metal hardware cloth.

E. Standpipe to be twelve (12) to thirty-six (36) inch diameter perforated HDPE, polyvinyl chloride (PVC), or corrugated metal pipe (CMP) as per site conditions, with half (1/2) inch by six (6) inch slits or one (1) inch diameter holes, six (6) inches on center. Bottom of pipe to have a watertight cap or plate attached.
2.18 FLOCCULANT LOGS/BLOCKS

A. Log or block forms of polyacrylamides (PAM) shall be used to aid in the removal of suspended particulates from runoff. PAMs shall only be used after all appropriate physical best management practices (BMPs) have been implemented on site. Only PAMs approved for use by the Local, State, and Federal permitting agencies shall be allowed. PAMs shall not be applied directly to surface waters of the state.

B. A sediment basin or similar structure between the PAM application point and surface waters is required. Choose the appropriate PAM for the soil type. Flocculant (floc) logs/blocks shall be Applied Polymer Systems APS 700 Series or approved equal.

C. Product supplier or other qualified professional should be consulted to determine the best PAM or PAM blend for the project site soil types and application methods. Only PAMs which have been demonstrated to pass the chronic toxicity testing requirements may be used. Check for Local, State, and Federal guidance and regulations before use of these products.

D. Particle collection systems (wattles, check dams, jute matting, or particle curtains) shall be used in conjunction with floc logs/blocks wherever possible.

PART 3 – EXECUTION

3.01 INSTALLATION AND MAINTENANCE

A. The Contractor is responsible for maintenance of BMPs to make sure they are functioning as designed at all times.

B. The BMP structures shall be inspected after each rain and repairs made as needed. Sediment deposits should be removed after each rainfall. Sediment must be removed when the level of deposition reaches approximately one-half the height, or one-half the storage volume, of the barrier.

C. All installation and maintenance shall be conducted in accordance with this Specification and all Local, State, and Federal regulations. In the event of a discrepancy between this specification, Manufacturer’s recommendations, and Local, State, and Federal regulations, the more stringent requirements shall take precedence.

D. If applicable, all requirements of the NPDES Permit shall be followed. In the event of a discrepancy between this specification and the NPDES Permit requirements, the more stringent requirements shall take precedence.

E. If possible, erosion and sedimentation control devices shall be established prior to clearing operations in a given area. Where such practice is not feasible, the erosion and sedimentation control device(s) shall be established concurrent with the clearing operations or immediately following completion of the clearing operations.
F. At a minimum, maintenance shall be scheduled as required for a particular device to maintain the removal efficiency and intent of the device. Maintenance shall include but not be limited to 1) the removal and satisfactory, legal disposal of accumulated sediment from traps or silt barriers and 2) replacement of filter fabrics used for silt fences and stone impaired by sediment in stone filters, gravel construction entrances, etc. Maintenance as noted in items 1) and 2) above shall be performed as required, and at least once every three (3) months for the duration of construction activities. Sediment removed from erosion and sedimentation control devices shall be disposed of in locations that will not result in off-site sedimentation.

3.02 SILT FENCE

A. Silt fence shall be erected and maintained until a vegetative ground cover has been established.

B. Silt fence shall not be installed across streams, ditches, waterways, or other areas of concentrated flow. Silt fence shall be placed at least 6 feet beyond the toe of slope of any embankment or stockpile area to allow space for ponding and maintenance access.

C. Dig a trench approximately 8 inches deep and 10 inches wide and place the fabric in the bottom of the excavated ditch or use the slicing method to insert the fabric into a cut sliced in the ground with a disc. Ensure that the height of the sediment fence does not exceed 24 inches above the ground surface.

D. Install posts a maximum of 10 feet apart on center. Install posts 2 feet deep on the downstream side of the silt fence, as close as possible to the fabric.

E. Joints should be avoided along the fencing. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.

F. Compaction is vitally important for effective results. Compact the soil immediately next to the silt fence fabric with the front wheel of the tractor, skid steer or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four (4) trips.

G. Stabilized outlets for silt fence shall be provided. The outlet section shall have a maximum width of 4 feet. The height of silt fence at the outlet shall be a maximum of 1 foot. A 5 foot by 5 foot (minimum) apron of #57 washed stone with filter fabric beneath shall be provided on the downstream side of the silt fence outlet.

H. Silt fence shall be erected around all catch basins which are located downstream from any construction work unless other inlet protection is specified. Should any catch basins be indicated to be relocated or modified, silt fence shall be utilized until work is completed on the catch basins.
I. Inspect silt fence at least once a week and after each rainfall event. Make any required repairs immediately.

J. Should the fabric of any silt fence collapse, tear, decompose or become ineffective, replace it promptly. All fabric shall be replaced after the first six (6) months of construction activity and every six (6) months thereafter until construction activities are complete, unless otherwise directed by the City or designee.

K. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid undermining the fence during cleanout.

L. Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

3.03 STONE FOR EROSION CONTROL

A. Stone for erosion control shall be dumped and placed in such manner that the larger rock fragments are uniformly distributed throughout the rock mass and the smaller fragments fill the voids between the larger fragments. Rearranging of individual stones by equipment or by hand shall only be required to the extent necessary to secure the results specified above, to protect structures from damage when rock material is placed against the structures, or to protect the underlying separator geotextile from damage during installation.

B. Inspect at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Remove accumulated sediment and replace stone impaired by sediment, as necessary.

3.04 RIPRAP

A. Riprap shall be graded so that the smaller stones are uniformly distributed through the mass. Stone may be placed by mechanical methods, augmented by hand placing where necessary. The placed riprap shall form a properly graded, dense, neat layer of stone. The placed riprap shall have a minimum depth of 24 inches. FDOT Type D-2 geotextile filter fabric as specified in FDOT Index No. 199 shall be used under all riprap.

B. Inspect periodically for scour or dislodged stones. Control of weed and brush growth may be needed.

3.05 ROLLED EROSION CONTROL MATTING (RECM)

A. RECMs shall be placed immediately after the channel or slope has been properly graded and, if applicable, prepared, fertilized, and seeded.
B. Grade the surface of the installation area so that the ground is smooth and loose. Remove all large rocks, debris, etc. so as to ensure that good contact between the RECM and the ground is maintained so that no erosion occurs beneath the RECM. Terminal anchor trenches are required at RECM ends and intermittent trenches must be constructed across channels at 25-foot intervals. Terminal anchor trenches should be a minimum of 12 inches in depth and 6 inches in width, while intermittent trenches should be a minimum of 6 inches deep and 6 inches wide. Take care to maintain direct contact between the soil and the RECM.

C. For slope installation, place RECM 2-3 feet over top of slope and into an approximately 12-inch deep by 6-inch wide excavated end trench. Using staples, stakes, or pins, anchor the RECM at 1-foot intervals along the bottom of the trench, backfill, and compact. Along the slope, pin the RECM in a 3 foot center-to-center pattern; provide a minimum 3-inch overlap for adjacent rolls.

D. For channel installations, excavate 12-inch deep by 6-inch wide terminal trenches across the upper and lower end of the lined channel. Anchor the RECM at a minimum of 25 foot intervals utilizing either two rows of anchors or 6-inch by 6-inch cross trenches. Bury outside RECM edges in longitudinal trenches 6 inches deep and wide along the channel edges. Pin the RECM in at 1-foot intervals along the bottom of terminal trenches, backfill, and compact. Overlap adjacent rolls a minimum of 3 inches and pin at 1-foot intervals. Place the first RECM at the downstream end of the channel and unroll upstream. When starting installation of a new roll, begin in a trench or shingle-lap ends of rolls a minimum of 1 foot with upstream RECM on top to prevent uplifting.

E. Staples, stakes, and pins shall be driven so that the top is flush with the ground.

F. During the establishment period, check RECMs at least weekly and within 24 hours after any storm event of greater than 1/2 inch of rain per 24-hour period. Immediately make repairs. Good contact with the ground must be maintained. Monitor and repair the RECM as necessary until ground cover is established.

3.06 TEMPORARY AND PERMANENT DIVERSIONS

A. Remove and properly dispose of all trees, debris, etc. Fill and compact all ditches, swales, etc. that will be crossed to natural ground level or above.

B. Excavate, shape, and stabilize diversions. Unless otherwise noted, provide vegetative stabilization immediately after installation of permanent diversions. Temporary diversions that are to serve longer than seven (7) working days shall be seeded and mulched as soon as they are constructed to preserve dike height and reduce maintenance. Seed and mulch disturbed areas draining into the diversions within fourteen (14) calendar days of completing any phase of grading.
C. For temporary diversions, ensure that the top of the dike is not lower at any point than the design elevation plus the specified settlement. Provide sufficient room around temporary diversions to permit machine re-grading and cleanout. Vegetate the ridge of temporary diversions immediately after construction unless they will remain in place less than seven (7) working days.

D. Provide outlet protection adequate to accept flow from diversion plus any other contributing runoff. Sediment-laden runoff shall be routed through a sediment-trapping device.

E. Inspect temporary diversions once a week and after every rainfall event. Immediately remove sediment from the flow area and repair the diversion ridge. Carefully check outlets and make timely repairs as needed. When the area protected is permanently stabilized, remove the ridge and the channel to blend with the natural ground level and appropriately stabilize it. Inspect permanent diversions weekly and after every rainfall event during construction operations until permanent vegetation is established. After vegetation is established, inspect after major storms. Immediately remove any debris and make repairs as needed in a timely manner. Maintain healthy vegetation at all times.

3.07 TEMPORARY SLOPE DRAINS

A. Place slope drains on undisturbed soil or well compacted fill. Slightly slope the section of pipe under the dike toward its outlet. Hand-tamp the soil under and around the entrance section in lifts not to exceed 6 inches.

B. Ensure that all slope drain connections are watertight. Ensure that all fill material is well-compacted. Securely fasten the exposed section of the drain with grommets or stakes spaced no more than 10 feet apart. Extend the drain beyond the toe of the slope and provide outlet protection.

C. Immediately stabilize all disturbed areas following construction.

D. Inspect the temporary slope drain, inlet and outlet protection, and supporting diversions weekly and after every rainfall event and promptly make any necessary repairs. When the protected area has been permanently stabilized, temporary measures may be removed, materials disposed of properly, and all disturbed areas stabilized appropriately.

3.08 TEMPORARY CONSTRUCTION GRAVEL ENTRANCES/EXITS

A. Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with FDOT No. 1 Coarse Aggregate, 1-1/2" to 3-1/2". Inspect each construction entrance at least weekly and after each rainfall event and replace stone impaired by sediment, as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways.
B. If, despite the use of a gravel construction entrance/exit, most of the mud and sediment are not removed from vehicle tires, tire washing may be necessary.

3.09 TEMPORARY AND PERMANENT STABILIZATION OF DISTURBED AREAS

A. Southern turfgrass installations are not propagated by seed but through proper sod installation (Saint Augustinegrass or Bahiagrass), and sod installation shall be the only method used for soil stabilization after the final grade is established. The Contractor shall be responsible for keeping the sod in healthy condition through watering and maintenance at no additional cost to the City until the project’s Final Acceptance or the sod’s temporary use is eliminated.

B. The Contractor is responsible for keeping the sod in place on slopes at all times and not allowing it to slide down the slope. Sod staples may be necessary on steep slopes.

C. The Contractor shall replace any poorly performing vegetative section with healthy material before Final Acceptance.

3.10 CHECK DAMS AND CHECK DAMS WITH WEIRS

A. Stone shall be placed on a filter fabric foundation. Center stone shall be at least 9 inches below natural ground level and stone shall extend 1.5 feet beyond ditch bank.

B. For check dams with weirs, provide an apron with a length 3 times the height of the dam and a width a minimum of 4 feet. A 12-inch layer (minimum) of sediment control stone shall be placed on the upstream side of the dam.

C. Fiber filtration tubes and sediment logs may be specified for use as check dams. These measures shall be installed according to instructions included herein. If Manufacturer’s recommendations are more stringent, they shall supersede.

D. Spacing shall be such that the elevation of the top of the lower dam is the same as the toe elevation of the upper dam.

E. Check dams and check dams with weirs shall be inspected at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Sediment, limbs, and other debris shall be cleared from the channel. Repairs shall be made immediately.

3.11 INLET EROSION CONTROL MEASURES

A. Excavated Drop Inlet Protection: Drainage area is limited to one (1) acre. The minimum volume of excavated area around the drop inlet is 1800 cubic feet/acre disturbed. Minimum depth of the excavated area shall be 1 foot and maximum depth shall be 2 feet, as measured from the crest of the inlet structure. Weep holes shall be protected by gravel. Inspect the excavated basin at least weekly and after every storm event until the
contributing drainage area has been permanently stabilized. Remove sediment when the storage volume has been reduced by one-half.

B. Block and Gravel Inlet Protection: Drainage area shall be limited to one (1) acre unless site conditions allow for frequent removal of accumulated sediment. The height of the block barrier shall be no less than 12 inches and no more than 24 inches. On the bottom row, place some of the blocks on their side to allow for dewatering. Place wire mesh over all block openings to hold gravel in place. Lateral support may be provided by placement of 2 x 4 wood studs through block openings. Place gravel 2 inches below the top of the block barrier. Block and gravel inlet protection shall not be used near the edge of fill material and shall not divert water away from the storm drain. Inspect at least weekly and after every storm event until the contributing drainage area has been permanently stabilized. Remove sediment as necessary to provide adequate storage volume for subsequent rains. Replace stone as needed.

C. Rock Pipe Inlet Protection: Rock pipe inlet protection may be used at pipes with a maximum diameter of 36 inches. It shall not be installed in intermittent or perennial streams. The minimum crest width of the riprap berm shall be 3 feet, with a minimum bottom width of 11 feet and minimum height of 2 feet. The top of the riprap shall be 1 foot lower than the shoulder of the embankment or diversions. The outside face of the riprap should be covered with a 12-inch thick layer of #5 or #57 washed stone. The sediment storage area should be excavated upstream of the rock pipe inlet protection, with a minimum depth of 18 inches below grade. The rock pipe inlet protection shall be inspected at least weekly and after any storm event of greater than ½ inch of rain per 24-hour period. Repairs shall be made immediately. Remove sediment when the volume of the sediment storage area has been decreased by one-half and replace the contaminated part of the gravel facing.

3.12 FIBER FILTRATION TUBES (FFTs) AND SEDIMENT LOGS

A. FFTs and sediment logs shall be placed along slopes to function as slope breaks and to minimize sediment transport and in diversions/channels to serve as check dams.

B. FFTs and sediment logs shall be installed to maintain contact with the soil surface. Install prior to seeding. May be installed before or after installation of RECMs.

C. Anchor the upstream/upslope side of the FFTs using wire staples or approved devices at 1-foot intervals. Drive wooden stakes through downstream/downslope side of the FFTs at 2-foot intervals. Take care not to compress the FFTs. Backfill and compact loose soil against the upstream/upslope side. Overlap adjacent FFT ends by a minimum of 1 foot.

D. For channel installation, construct anchor trench 3-inches deep by FFT diameter and place loose soil against upstream side of FFT. For channel gradients of 2%, install trenches on 25-foot intervals. Decrease interval distance with steeper channel gradients or more highly erosive soils.
E. Any sediment accumulation at the base of the FFT must be removed when it reaches one-third of the height of the tube. FFT may need to be removed if fully loaded with captured sediment for maximum product performance. FFTs are to be left in place or removed from the site as directed by the City or designee.

F. Sediment logs may be installed in a shallow trench, if necessary. Place and secure filter fabric 2 feet downstream and the full width of the sediment log to resist scour from water flowing over log. Wood stakes shall be placed at least every 2 feet along the length of the sediment log. Stakes shall only penetrate the netting around the log. They shall not be driven through the center of the log. Sediment logs are to be left in place or removed from the site as directed by the City or designee.

G. The FFTs and sediment logs shall be inspected at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Look for signs of flow undercutting the logs. Re-anchor and replace as necessary.

3.13 TEMPORARY AND PERMANENT CHANNELS

A. Remove all trees, brush, stumps, etc. from the channel area and dispose of properly.

B. Excavate the channel to the dimensions shown on the plans, over-excavating to allow for liner thickness. Remove and properly dispose of all excess soil so that surface water may enter the channel freely.

C. Armor the channel. If the channel lining requires an establishment period, protect the channel with mulch or a temporary liner sufficient to withstand anticipated velocities during this period.

D. During the establishment period, inspect channels weekly and after every rainfall. After lining has been fully established, inspect channels after any storm event of greater than ½ inch of rain per 24-hour period. Immediately make repairs.

E. Perform all channel construction to keep erosion and water pollution to a minimum. Immediately upon completion of the channel, vegetate all disturbed areas or otherwise protect them against soil erosion. Where channel construction will take longer than 7 days, stabilize channels by reaches.

F. Inspect the channel outlet and all road crossings for bank stability and evidence of piping or scour holes. Give special attention to outlets and points where concentrated flow enters the channel.

G. Maintain all vegetation adjacent to and in the channel in a healthy, vigorous condition to protect the area from erosion.

H. Remove all significant sediment accumulations to maintain the designed carrying capacity.
3.14 TEMPORARY SEDIMENT TRAPS, SEDIMENT BASINS, AND SIMMER SEDIMENT BASINS

A. Care shall be taken to ensure that proper site preparation operations are conducted prior to trap or basin construction. Clear, grub, and strip embankment location.

B. A cut-off trench 1-foot in depth shall be excavated along the center line of the earth fill embankment for sediment basins and skimmer sediment basins. Keep the trench dry during backfilling and compaction operations.

C. Fill material shall be free of roots, woody vegetation, rocks, and other objectionable materials. Fill shall be placed in 6 to 8 inch layers and compacted. Construct the embankment to an elevation 10 percent (minimum of 6 inches) higher than the design height to allow for settling.

D. Inlets to the sediment traps and basins shall be constructed so as to prevent erosion. Use diversions to divert sediment-laden water to the upper end of the basin.

E. Shape the sediment trap or basin to the specified dimensions.

F. Following construction of the embankment, clear the sediment trap or basin area below the crest elevation of the spillway to facilitate sediment cleanout. Provide access for cleanout of accumulated sediment.

G. Temporary Sediment Trap

1. Construct riprap outlet in embankment. Use filter fabric or a keyway cutoff trench between the riprap and the soil to protect it from piping. The outlet weir must be level and constructed to grade to ensure design capacity. Ensure that the stone spillway outlet extends downstream past the toe of the embankment until the outlet velocity is acceptable for the receiving stream.

2. Provide emergency bypass in natural, stable areas, located so that flow will not damage the embankment.

H. Sediment Basin

1. Securely attach the riser to the barrel or barrel stub to make a watertight structural connection. Secure all barrel connections with approved watertight assemblies. Install anti-seep collar(s) as required. Ensure that the pipe stays in firm contact with its foundation when compacting fill around the pipe. Do not use pervious material as backfill around the pipe. Anchor the riser to prevent floatation. Install trash guard to prevent the riser and barrel from becoming clogged.

2. Install basin dewatering mechanism.

3. Install outlet protection at principal spillway outlet. Install the emergency spillway in undisturbed soil and provide stabilization as specified.
I. Skimmer Sediment Basin

1. Excavate a shallow pit under the skimmer or provide a low support of stone or timber under the skimmer to prevent the skimming device from settling into the mud.

2. Place the barrel on a firm, smooth foundation of impervious soil. Do not use pervious material to backfill around the pipe. Ensure that the barrel stays in firm contact with its foundation when compacting fill around the pipe.

3. Assemble the skimmer following the Manufacturer’s instructions.

4. Lay the assembled skimmer on the bottom of the basin with the flexible joint at the inlet of the barrel pipe. Attach the flexible joint to the barrel pipe and position the skimmer over the excavated pit or support. Attach a rope to the skimmer and anchor it to the side of the basin so that the skimmer may be pulled to the side for maintenance. Provide gravel pad at bottom of basin where skimmer can rest when pond is empty to guard against skimmer being stuck in mud at bottom of basin.

5. Install the spillway in undisturbed soil to the greatest extent possible and line with laminated plastic or impermeable geotextile fabric. Anchor the edges of the fabric in a trench with staples or pins. Install outlet protection at the principal spillway outlet.

J. Install porous baffles in temporary sediment traps, sediment basins, and skimmer sediment basins.

1. Care shall be taken when installing porous baffles so they perform as designed. Baffle material shall be secured at the bottom and sides of sediment trap or basin. Fabric shall not be spliced but a continuous piece shall be used across the trap or basin.

2. Install at least three rows of baffles between the inlet and outlet discharge point. Sediment traps and basins less than 20 feet in length may use 2 baffles.

3. Posts or sawhorses shall be installed across the width of the sediment trap or basin. Steel posts shall be driven to a depth of 24 inches, spaced a maximum of 4 feet apart. Except in locations of baffle weirs, the top of the fabric shall be 6 inches higher than the invert of the spillway and 2 inches lower than the top of the berms.

K. Sediment traps and basins shall be constructed so that the area disturbed and resulting erosion is minimized. The emergency spillway, embankment, and all other disturbed areas above the crest of the principal spillway are to be stabilized immediately after construction.

L. Sediment traps and basins may attract children and should be considered dangerous. Steep side slopes should be avoided and fences with warning signs may be necessary if trespassing is likely.
M. Inspect temporary sediment traps, sediment basins, and skimmer sediment basins once a week and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Repairs shall be made immediately.

1. Sediment, limbs, and other debris shall be cleared and the trap or basin shall be restored to its original dimensions when it accumulates to one-half the design depth. Sediment material removed from traps and basins shall be disposed of in locations that will not result in off-site sedimentation. If no suitable on site locations are available, all such sediment will be legally disposed of off-site.

2. The embankment, spillways, and outlet shall be checked for erosion damage and the embankment shall be checked for piping and settlement. Immediately fill any settlement of the embankment to slightly above design grade. Any riprap displaced from the spillway must be replaced immediately. Replace contaminated gravel facing of riprap outlets as necessary. Inspect vegetation. Reseed and re-mulch as necessary.

3. Baffles, fabric, and skimmer shall be inspected for damage. Repairs shall be made immediately. Re-anchor baffles if water is flowing under or around them.

4. Debris shall be removed from the skimmer to prevent clogging.

3.15 OUTLET STABILIZATION STRUCTURE

A. Riprap shall be installed in accordance with the Specifications contained herein, with FDOT Type D-2 geotextile filter fabric as specified in FDOT Index No. 199 placed under the riprap.

B. The apron shall be constructed on zero grade with no overfill. Ensure the apron is properly aligned with the receiving stream.

C. All disturbed areas shall be stabilized with vegetation immediately after construction.

D. Outlet stabilization structures shall be inspected at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period to see if any erosion around or below the riprap has taken place or if stones have been dislodged. Repairs shall be made immediately.

3.16 TURBIDITY CURTAIN

A. Install curtains per manufacturer's specifications.

B. Inspect curtains daily. Re-locate, repair, or replace as needed.
3.17 FILTER BAG

A. Install filter bag on a slope so incoming water flows downhill through the filter bag without creating more erosion. Strap the neck of the filter bag tightly to the discharge hose. To increase the efficiency of filtration, place the bag on an aggregate or hay bale or gravel bed to maximize water flow through the surface area of the bag.

B. The filter bag is full when it no longer can efficiently filter sediment or pass water at a reasonable rate. Flow rates will vary depending on the size of the filter bag, the type and amount of sediment discharged into the filter bag, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies. Under most circumstances filter bags will accommodate flow rates of 1,500 gallons per minute. Use of excessive flow rates or overfilling filter bag with sediment will cause ruptures of the bags or failure of the hose attachment straps.

C. Full or partially full silt bags cannot be left in place and must be removed from site and legally disposed. If allowed, the filter bag may be cut open and the contents seeded after removing visible fabric. Filter bag is strong enough to be lifted with added straps. Off-site disposal may be facilitated by placing the filter bag in the back of a dump truck or flatbed prior to use and allowing the water to drain from the bag in place, thereby dismissing the need to lift the filter bag.

3.18 DEWATERING SUMP

A. Excavate for pit installation. Pit dimensions are variable, with the minimum diameter being trice the diameter of the standpipe.

B. A base of filter material consisting of clean gravel or #57 stone (1.5-inch max diameter) is to be placed in the pit to a depth of six (6) inches.

C. The standpipe shall be wrapped with hardware cloth and approved non-woven geotextile fabric and placed in pit on clean gravel.

D. After installing the standpipe, the pit surrounding the standpipe should then be backfilled with #57 stone to an elevation that is six (6) inches minimum above the anticipated highwater level.

E. The standpipe shall extend twelve (12) inches minimum above the anticipated standing water level.

F. Insert pumping mechanism. Connect to separate filter bag if required.

3.19 FLOCCULANT LOGS/BLOCKS

A. Install flocculant logs and blocks per Manufacturer’s specifications.
B. Inspect logs/blocks daily. Re-locate, repair, or replace as needed.

**3.20 ADDITIONAL REQUIREMENTS**

A. All storm sewer piping shall be blocked at the end of every working day until the inlet is constructed above grade.

B. All streets around the construction area shall be scraped as necessary to prevent accumulation of dirt and debris.

C. Adequate means shall be provided to prevent any sediment from entering any storm drains, curb inlets (curb inlet filter box), ditches, streams, or bodies of water downstream of any area disturbed by construction. Excavation materials shall be placed upstream of any trench or other excavation to prevent sedimentation of off-site areas. Silt fence may be required around excavation materials. In areas where a natural buffer area exists between the work area and the closest stream or water course, this area shall not be disturbed.

D. Erosion and sediment control barriers shall be placed where there is potential for downstream water quality degradation.

E. On-site protection must be provided to prohibit silt from leaving the project confines due to unforeseen conditions or accidents.

**3.21 INSPECTIONS**

A. Inspections and record keeping shall be in accordance with all permit requirements.

B. The site must be inspected at least once every seven (7) calendar days and within 24 hours of the end of a storm event that is 1/2 inch or greater (even if it rains on the weekend or a holiday). The site must be inspected by a qualified inspector provided by the Contractor.

C. The qualified inspector must do the following during all inspections.

1. **Inspect all stormwater discharges from the site to ensure BMPs are not causing or contributing to violations of water quality standards or resulting in off-site sedimentation.**

2. **Inspect the BMPs identified in the SWPPP to ensure that they are installed, maintained, and operating correctly and effectively.**

3. **Inspect all areas used for storage of materials that are exposed to rainfall and runoff to ensure all BMPs are being used and maintained properly.**

4. **Inspect all locations where vehicles enter or exit the site for evidence of off-site sediment tracking and inform operator of all actions needing to be taken to remove**
5. Inspect all distributed areas and discharge points for signs of visible erosion and sedimentation.

D. The inspection report must contain at a minimum the following.

1. Scope of the inspection
2. Name(s) and qualifications of personnel making the inspection
3. Date(s) of the inspection
4. Rainfall data
5. Major observations relating to the implementation of the SWPPP
6. Corrective actions taken since last inspection
7. Any incidents of non-compliance. (Where an inspection does not identify any incidents of non-compliance, the report must certify that the facility is in compliance with the SWPPP and the CGP.)
8. Signature of the qualified inspector who prepared the report
9. Signature of a responsible authority

E. Immediate action shall be taken to repair/maintain erosion and sediment control measures that are not performing as designed. The City or designee reserves the right to stop all construction activities not related to these measures until such deficiencies are repaired.

F. In areas that have undergone final stabilization, inspections and, if necessary, maintenance will occur at least once per month for the duration of the contract or project, whichever is longer.

3.22 REMOVAL OF TEMPORARY SEDIMENT CONTROL STRUCTURES

A. The Contractor is responsible for removing the temporary erosion and sediment control devices after completion of construction and only when areas have been stabilized. All areas disturbed by removing controls shall be returned to original or better condition at no additional cost to the City.

3.23 COMPLETION

A. The Contractor is responsible for removing silt from site if not reusable on-site and assuring plan alignment and grade in all ditches and swales at completion of
construction. Silt shall be disposed of in a location which will not cause additional sediment transport or it shall be removed from site to a properly permitted location.

B. The Contractor shall ensure that all drainage structures, pipes, etc. are cleaned out and working properly at time of acceptance.

C. The Contractor shall ensure all disturbed areas within the project site have been fully stabilized with permanent vegetation or hard surface landscaping as per the Contract Documents.

3.24 PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.
STANDARD DETAILS

Standard Details for erosion and sediment control are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself with all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 9-1  FLOATING TURBIDITY BARRIER PLAN VIEW AT OUTFALL
DETAIL 9-2  FLOATING TURBIDITY BARRIER
DETAIL 9-3  HAYBALE BARRIER
DETAIL 9-4  BURLAP DROP INLET SEDIMENT FILTER
DETAIL 9-5  HAYBALE DROP SEDIMENT FILTER
DETAIL 9-6  GRAVEL FILTERS FOR AREA INLETS
DETAIL 9-7  SILT FENCE
NOTES:

1. TURBIDITY BARRIERS ARE TO BE USED IN ALL PERMANENT BODIES OF WATER REGARDLESS OF WATER DEPTH.
2. DEPLOYMENT OF BARRIER AROUND LOCATIONS MAY VARY TO ACCOMMODATE CONSTRUCTION OPERATIONS.
3. NAVIGATION MAY REQUIRE SEGMENTING BARRIER DURING CONSTRUCTION OPERATIONS.
4. TURBIDITY CURTAINS SHOULD EXTEND THE ENTIRE DEPTH OF THE WATERCOURSE WHENEVER IT IS NOT SUBJECT TO TIDAL ACTION AND/OR SIGNIFICANT WIND AND WAVE FORCES, BUT NOT LESS THAN 10 FEET.
5. TURBIDITY CURTAINS SHOULD BE LOCATED PARALLEL TO THE DIRECTION OF FLOW OF A MOVING BODY OF WATER. THEY SHOULD NOT BE PLACED ACROSS THE MAIN FLOW OF A SIGNIFICANT BODY OF MOVING WATER.
6. AN ATTEMPT SHOULD BE MADE TO AVOID AN EXCESSIVE NUMBER OF JOINTS IN THE CURTAIN.
7. THE ENDS OF THE CURTAIN, BOTH FLOATING UPPER AND WEIGHTED LOWER, SHOULD EXTEND WELL UP INTO THE SHORELINE. THE ENDS SHOULD BE SECURED FIRMLY TO THE SHORELINE TO FULLY ENCLOSE THE AREA WHERE SEDIMENT MAY ENTER THE WATER.
8. TURBIDITY BARRIERS TO FOLLOW ALL FEDERAL, STATE, AND LOCAL REGULATIONS.
9. FLOATING TURBIDITY BARRIERS WILL BE PLACED AT ALL OUTFALL LOCATIONS CONNECTED TO THE WORK AREA DURING ACTIVE CONSTRUCTION. IF SEAGRASSES ARE PRESENT BARRIERS WILL NOT BE PLACED OVER THEM. THE FLOATING TURBIDITY BARRIERS SHALL BE INSTALLED IN A MANNER TO PREVENT MANATEE ENTANGLEMENT.
10. TURBIDITY BARRIERS TO BE MARKED WITH SITE CONTRACTOR’S COMPANY NAME USING PERMANENT MARKINGS NO SMALLER THAN 3-INCHES IN HEIGHT ON TOP OF THE BARRIER.
11. TURBIDITY BARRIER SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
NOTES:

1. D1 = 5' STD. (SINGLE PANEL FOR DEPTHS 5' OR LESS).
2. D2 = 5' STD. (ADDITIONAL PANEL FOR DEPTHS > 5').
3. CURTAIN TO REACH BOTTOM UP TO DEPTHS OF 10 FEET.
4. TWO (2) PANELS TO BE USED FOR DEPTHS GREATER THAN 10 FEET UNLESS SPECIAL DEPTH CURTAINS SPECIFICALLY CALLED FOR IN THE PLANS OR AS DETERMINED BY THE CITY OR DESIGNEE.
5. COMPONENTS OF TYPE I AND II MAY BE SIMILAR OR IDENTICAL TO PROPRIETARY DESIGNS. ANY INFRINGEMENT ON THE PROPRIETARY RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF THE USER. SUBSTITUTIONS FOR TYPES I AND II SHALL BE AS APPROVED BY THE CITY OR DESIGNEE.
CROSS-SECTION OF A PROPERLY INSTALLED HAYBALE

NOTES:

1. THE FILTER BARRIER SHALL BE ENTRENCHED AND BACKFILLED. A TRENCH SHALL BE EXCAVATED AROUND THE INLET AND WIDTH OF A BALE TO A MINIMUM DEPTH OF 4-INCHES. AFTER THE BALES ARE STACKED, THE EXCAVATED SOIL SHALL BE BACKFILLED AND COMPACTED AGAINST THE FILTER BARRIER.

2. BALE SHALL BE EITHER WIRE-BOUND OR STRING-TIED WITH THE BINDINGS ORIENTED AROUND THE SIDES RATHER THAN OVER AND UNDER THE BALES.

3. BALES SHALL BE PLACED LENGTHWISE IN SINGLE ROW SURROUNDING THE INLET WITH THE ENDS OF ADJACENT BALES PRESS TOGETHER.

4. EACH BALE SHALL BE SECURELY ANCHORED AND HELD IN PLACE BY AT LEAST TWO STAKES OR REBARS DRIVEN THROUGH THE BALE.

5. LOOSE STRAW SHOULD BE WEDGED BETWEEN BALES TO PREVENT WATER FROM ENTERING BETWEEN BALES.

6. HAYBALES BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

7. CLOSE ATTENTION SHALL BE PAID TO THE REPAIR OF DAMAGED BALES, END RUNS, AND UNDERSHOT BALES.

8. NECESSARY REPAIRS TO BARRIERS OR REPLACEMENT IF BALES SHALL BE ACCOMPLISHED PROMPTLY.

9. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH RAINFALL. THEY MUST BE REMOVED WHEN THE LEVEL OF DEPOSITION REACHES APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.

10. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE HAYBALES BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO EXISTING GRADE, PREPARED, AND SEENED.
BURIED STAKES AT A MIN. OF 12-INCH WITHIN A TRENCH OF 8-INCH x 12-INCH WITH COMPACTED BACKFILL

NOTES:

1. THIS METHOD INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPES NO GREATER THAN 5%) WHERE SHEET OR OVERLAND FLOWS (NOT EXCEEDING 0.50 CFS) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.

2. SILT FENCES AND FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

3. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER IS STILL NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.

4. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
NOTES:

1. THIS METHOD INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPES NO GREATER THAN 5%) WHERE SHEET OR OVERLAND FLOWS (NOT EXCEEDING 0.50 CFS) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.

2. THE FILTER BARRIER SHALL BE ENTRANCED AND BACKFILLED. A TRENCH SHALL BE EXCAVATED AROUND THE INLET AND WIDTH OF A BALE TO A MINIMUM DEPTH OF FOUR INCHES. AFTER THE BALES ARE STACKED, THE EXCAVATED SOIL SHALL BE BACKFILLED AND COMPACTED AGAINST THE FILTER BARRIER.

3. BALE SHALL BE EITHER WIRE-BOUND OR STRING-TIED WITH THE BINDINGS ORIENTED AROUND THE SIDES RATHER THAN OVER AND UNDER THE BALES.

4. BALES SHALL BE PLACED LENGTHWISE IN SINGLE ROW SURROUNDING THE INLET WITH THE ENDS OF ADJACENT BALES PRESS TOGETHER.

5. EACH BALE SHALL BE SECURELY ANCHORED AND HELD IN PLACE BY AT LEAST TWO STAKES OR REBARS DRiven THROUGH THE BALE.

6. LOOSE STRAW SHOULD BE WEDGED BETWEEN BALES TO PREVENT WATER FROM ENTERING BETWEEN BALES.

7. Silt fences and filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

8. Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.
3/4-INCH GRAVEL CONTAINED BURLAP BAGS OR SYNTHETIC NET BAGS, (1/8-INCH) MESH APPROXIMATELY 24 INCHES LONG, 12 INCHES WIDE AND 6 INCHES HIGH

WIRE SCREEN PLACED AROUND CONCRETE BLOCK PERIMETER

CONCRETE BLOCKS PLACED AROUND DROP INLET PERIMETER

GRAVEL FILTER APPROXIMATELY 3/4-INCH DIA. PLACED TO TOP OF CONCRETE BLOCKS

AREA INLET WITH GRADE

CONCRETE BLOCKS STACKED 2 HIGH

WIRE SCREEN TO PREVENT MOVEMENT OF GRAVEL

OVERFLOW

RUNOFF WATER WITH SEDIMENT

DROP INLET WITH GRADE

GRAVEL FILTER APPROXIMATELY 3/4-INCH DIA. PLACED TO TOP OF CONCRETE BLOCKS

AREA INLET WITH GRADE

CONCRETE BLOCKS STACKED 2 HIGH

WIRE SCREEN TO PREVENT MOVEMENT OF GRAVEL

OVERFLOW

RUNOFF WATER WITH SEDIMENT

DROP INLET WITH GRADE

PLACE GRAVEL FILTER BAGS SUCH THAT NO GAPS ARE EVIDENT

IF A DOUBLE LAYER FILTER BAGS ARE USED, THE TOP BAGS MUST BE PLACED SUCH THAT NO GAPS ARE EVIDENT WITH LOWER LAYER OF BAGS.

GRAVEL FILTER BAGS CAN BE A SINGLE OR DOUBLE LAYER

PLACE GRAVEL FILTER BAGS SUCH THAT NO GAPS ARE EVIDENT

NOTES:

1. THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE OVERFLOW CAPACITY IS NECESSARY TO PREVENT EXCESSIVE POUNDING AROUND THE STRUCTURE.

2. WIRE MESH SHALL BE LAID OVER THE TOP DROP INLET SO THAT THE WIRE EXTENDS A MINIMUM OF 1 FOOT BEYOND EACH SIDE OF THE INLET STRUCTURE. HARDWARE CLOTH AND COMPARABLE WIRE MESH WITH 1/2-INCH OPENING SHALL BE USED. IF MORE THAN ONE STRIP OF MESH IS NECESSARY THE STRIP SHALL BE OVERLAPPED.

3. FDOT NO.1 COARSE AGGREGATE SHALL BE PLACED OVER THE WIRE MESH AS INDICATED. DEPTH OF THE STONE BE AT LEAST 12 INCHES OVER THE ENTIRE INLET OPENING.

4. STRUCTURE SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
WOVEN WIRE FENCE (MIN. 14 GAUGE; 6" MAX. MESH SPACING)

FILTER CLOTH TRENCH

48' MIN. METAL OR WOODEN FENCE POSTS DRIVEN INTO GROUND A MINIMUM OF 2'-0"

10' O.C. (MAX.)

FDOT TYPE D-3 FABRIC WITH PERMITTIVITY 24 ± 0.2 AND ELONGATION ≥ 50% OR EQUIVALENT

FILTER FABRIC W/WIRE FENCE ATTACH SECURELY TO UPSTREAM SIDE OF POST

STANDARD DETAIL
TRENCH WITH NATIVE BACKFILL
N.T.S.

ALTERNATE DETAIL
TRENCH WITH GRAVEL
N.T.S.

NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS BY USE OF WIRE TIES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE ON THE UPSTREAM SIDE OF FENCE BY USE OF WIRE TIES SPACED EVERY 24" X 24".
3. SILT FENCES TO BE INSTALLED IN LOCATIONS AS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN PRIOR TO BEGINNING OF CONSTRUCTION TO CONTROL SEDIMENT. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
4. SILT FENCES SHALL BE REPAIRED TO THEIR ORIGINAL CONDITIONS IF DAMAGED. SEDIMENT SHALL BE REMOVED FROM THE SILT FENCES WHEN IT REACHES ONE-HALF THE HEIGHT OF THE SILT FENCE.
5. SILT FENCES TO BE REMOVED AND THE AREA TO BE RESTORED TO ITS NATURAL CONDITION WHEN PERMANENT EROSION AND SEDIMENT CONTROL PROCEDURES ARE EFFECTIVE.
6. STRUCTURE SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY
EARTHWORK AND ROADWORK
SECTION 10. EARTHWORK AND ROADWORK

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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. American Association of State Highway Transportation Officials (AASHTO)
   AASHTO T-180 Standard Method of Test for Moisture–Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
   AASHTO M 81 Standard Specification for Cut-Back Asphalt, Rapid-Curing Type
   AASHTO M 140 Standard Specification for Emulsified Asphalt

2. Americans with Disabilities Act (ADA)
   ADA Standards for Accessible Design

3. American Society for Testing and Materials (ASTM)
   ASTM A36 Standard Specification for Carbon Structural Steel
   ASTM A572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
   ASTM C33 Standard Specification for Concrete Aggregates
   ASTM C140 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
   ASTM C936 Standard Specification for Solid Concrete Interlocking Paving Units
   ASTM E303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester

4. City of Miami Beach
   Code of Ordinances
   Street Design Guidelines (2016)
Transportation Master Plan (2016)

Bicycle-Pedestrian Master Plan (2016)

5. Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM) Regulations

6. Federal Highway Administration (FHWA)

   Manual on Uniform Traffic Control Devices (MUTCD)

7. Florida Accessibility Code for Building Construction

   Chapter 3 - Geometric Design

8. Florida Building Code

9. Florida Department of Environmental Protection (FDEP)

10. Florida Department of Transportation (FDOT)

    Design Standards

    Greenbook

    Manual of Uniform Minimum Standards for Design, Construction and Maintenance (Florida Greenbook)

    Standard Plans for Road and Bridge Construction

11. Florida Statutes

12. Miami-Dade County

    Code of Ordinances

    Public Works Manual

13. National Association of City Transportation Officials (NACTO)

    Urban Bikeway Design Guide

    Urban Street Design Guide

14. Occupational Safety and Health (OSHA) Regulations

15. South Florida Water Management District (SFWMD) Requirements

16. United States Access Board

    Public Right-of-Way Accessibility Guidelines (PROWAG)
B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

- Section 1. Design Standards and Guidelines
- Section 3. Right-of-Way Construction Requirements
- Section 8. Surveying, Drawing, and Drafting Requirements
- Section 9. Erosion and Sediment Control
- Section 13. Concrete
- Section 14. Water Distribution System
- Section 15. Sanitary Sewer Gravity Collection System
- Section 16. Sanitary Sewer Force Mains and Pump Stations
- Section 17. Stormwater Drainage and Gravity Collection System
- Section 18. Stormwater Force Mains and Pump Stations

1.02 DEFINITIONS

A. Refer to the City of Miami Beach Street Design Guidelines for street definitions and treatment type.

B. Pedestrian Priority Zones are areas where the combined pedestrian and transit mode share is higher than 40%. Pedestrian Priority Zones have more stringent requirements to facilitate safe pedestrian street and intersection design as per the City of Miami Beach Street Design Guidelines.

1.03 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety
laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.04 SCOPE OF WORK

A. Work under these Specifications shall conform to the dimensions, lines, grades, and cross sections shown on associated Drawings. The Work included under these Specifications covers the furnishing of material, equipment, and labor necessary for:

1. Clearing and grubbing within the areas of the road right-of-way, borrow pits, sand-clay base material pits, lateral ditches, and any other areas shown in the Plans to be cleared and grubbed. Included in the Work is the removal and disposal of all trees, stumps, roots, and other such protruding objects; buildings, structures, appurtenances, existing pavement, and other facilities necessary to prepare the area for the proposed construction; and the removal and disposal of all products and debris which are not required to be salvaged or not required to complete the construction.

2. Excavating, backfilling, filling, and compaction of areas to be occupied by facilities or utility systems to be constructed.

3. Cutting, removing, protecting, constructing, replacing, or stabilizing all existing roadways, driveways, and pavements.

4. Constructing or repairing features of the road right-of-way including but not limited to asphalt pavement, utility installation, curbs, sidewalks and driveways, ADA accessible paths, etc. as described herein.
5. Certain miscellaneous Work considered as necessary for the complete preparation of the overall project site, as follows:

a. The work of plugging any water wells which are encountered within the right-of-way and which are to be abandoned. The Contractor shall follow SFWMD, RER-DERM, State, and FDEP regulations for abandonment of wells.

b. The leveling of the terrain outside the limits of construction, for purpose of facilitating maintenance and other post-construction operations.

c. The protection of all existing trees and vegetation in accordance with Section 1 of the City of Miami Beach Public Works Manual.

d. The trimming of certain trees and shrubs within the project right-of-way, for utilization in subsequent landscaping of the project. Trimming of trees and shrubs shall be in accordance with Section 1 of the City of Miami Beach Public Works Manual.

1.05 RESTORATION LIMITS

A. At a minimum, sidewalk, curb, gutter, and roadway restoration shall be in accordance with the requirements of the agencies having jurisdiction including but not limited to City of Miami Beach, Miami-Dade County, and FDOT.

B. The Contractor is responsible to restore the full lane width of two-lane roads when a trench is longitudinally cut within a lane. If the cut is in between two lanes, the Contractor is responsible to restore both lanes. If the cut impacts multiple lanes, all lanes impacted shall be restored. When a perpendicular cut is made crossing the pavement, a minimum of 25 feet width on each side of the cut, or to the intersection, must be restored by milling and resurfacing. For new developments, the Contractor shall restore the pavement from property line to property line.

C. At a minimum, the width of all asphalt repairs within the Work area shall extend at least 12 inches beyond the limit of the damage. Where the line for repaving for trenches extends 12-inches into the edge of the existing paving, repaving shall be to this edge only. Damage by the Contractor to the pavement beyond 12-inches into the edge of the existing paving will require the full lane be repaved.

D. The edge of the pavement shall be cut to a true edge with a saw or other acceptable method so as to provide a clean edge to abut the repair. The line of the repair shall be uniform with no irregularities. Repair of damage by the Contractor beyond the Work area shall be approved by the City or designee prior to commencing the Work.
E. Any base course or surface course beyond the restoration limits, damaged as a result of the Contractor’s operation, shall be restored in accordance with the applicable requirements of these Specifications, to the satisfaction of the City or designee.

F. Permanent pavement repair shall be with edges straight and parallel and patches rectangular in plan. Replace any paving, beyond the limits shown in the details and as called for in the Specifications, as required. Where trenches are located out of the existing pavement and damage occurs to the pavement, that pavement shall also be replaced by the Contractor.

G. Five Year Moratorium Directive from City: If the road is under Moratorium, the Contractor is to restore the entire roadway width.

H. Final asphalt application requires milling and resurfacing full travel lanes or as directed by City of Miami Beach Public Works Department Field Inspector.

I. Restoration of Miami-Dade County Roads

1. On April 7, 2020 the Miami-Dade County Board of County Commissioners heard the first reading ordinance entitled: Ordinance relating to restoration of right of way after public work or construction; Amending Section 2-103.1 of the Code of Miami Dade County, Florida; Requiring that certain roads, sidewalks, curbs and gutters removed, damaged or destroyed during construction be replaced with same material; Directing that Public Works Manual include specifications that infrastructure removed, damaged or destroyed in right-of-way be replaced with same material; Providing severability, inclusion in the Code, and an effective date [See original item under file No. 200526]. All restoration of Miami-Dade County roads shall be in accordance with this ordinance.

2. Restoration of Miami-Dade County roads shall be in accordance with the Miami-Dade County Public Works Manual.

1.06 DESIGN CRITERIA

A. Asphalt or Concrete Driveway Approaches

1. Driveway approach shall have 4-foot clearance from property lines, trees, streetlight poles, fire hydrants, signposts, etc.

2. 6-inch minimum thickness of grade 57 crushed lime rock base, mechanically compacted to 98% of maximum dry density per AASHTO T-180 must be laid, prior to placing 1½-inch minimum asphalt.

B. Decorative Paver Driveway Approaches

1. Decorative driveway approaches are NOT allowed on FDOT roadways.
2. Driveway approach shall have 4-foot clearance from property lines, trees, streetlight poles, fire hydrants, signposts, etc.

3. Sidewalk section in driveway approach to be minimum 6-inches thick 3,000 pounds per square inch (psi) concrete. Miami Beach Red integral colored concrete (where applicable) will be required adjacent to existing red colored sidewalks. Curb/gutters to be replaced in standard concrete grey.

4. 6-inch minimum thick sidewalk for driveway approach section.

5. The driveway approach shall have #10/10 6x6 minimum welded wire reinforcement mesh in approach section (sidewalk section excluded).

6. The entire length of the gutter section shall have two (2) #5 reinforcing bars.

7. The entire length of the curb section shall have two (2) #5 reinforcing bars.

8. Minimum 3,000 psi concrete strength shall be used in the driveway approach section.

9. The sub-base shall be compacted with a with mechanical tamper to achieve 98% of maximum dry density per AASHTO T-180 prior to pouring concrete.

10. The Contractor shall provide a copy of batch ticket for 3,000 psi concrete batch samples.

11. A minimum 1½ -inch thick leveling course shall be used for brick paver application.

12. Provide 4-inch PVC sleeves in center of swale area extended one foot on both sides of approach slab capped and placed at approximately 18 inches to 24 inches in depth for decorative approaches only.

C. Sidewalk Curb and Gutter Construction/Repair

1. Sidewalk section minimum depth shall be 4 inches.

2. 3,000 psi concrete shall be used for sidewalk section.

3. The sub-base shall be compacted with a with mechanical tamper to achieve 98% of maximum dry density per AASHTO T-180 prior to pouring concrete.

4. The Contractor shall provide a copy of batch ticket for 3,000 psi concrete batch samples.

5. The entire length of the gutter section shall have two (2) #5 reinforcing bars.

6. The entire length of the curb section shall have two (2) #5 reinforcing bars.
D. Underground Utilities Installation in the Right-of-Way

1. Maintain a minimum cover of 36 inches under pavement and in the swale area.

2. Utility restoration shall be in accordance with City of Miami Beach Public Works Manual Standard Details.

E. Soil Borings

1. Restore asphalt/concrete bore holes with suitable backfill materials up to approximately 8 inches from existing surface grade. Backfill and pack the remaining depth with cold-patch asphalt fill with 3,000 psi concrete (Miami Beach Red in sidewalk) achieving a matching textured surface.

2. Swale area open bore restoration to be backed filled with clean suitable material in 8-inch lifts to existing surface grade, achieving and matching surface (sod).

F. Bicycle Design Criteria – General

1. This section consists of design standards for the development of bicycle facilities, including bicycle roadway conditions, bicycle routes (shared use roadways), and shared use paths. Standards include minimum widths, roadway conditions, and traffic control signals such as pavement markings, signage, and signalizations.

2. Bicyclists shall be considered in all phases of transportation planning, design, construction and capacity improvement projects and transit projects. All projects shall be designed to accommodate bicyclists. Florida Statues require that all needs of bicyclists and pedestrians be addressed in all local and state transportation plans and programs.

3. Florida Statutes Section 316.065(1)(a) states, “Bicycle and pedestrian ways shall be given full consideration in the planning and development of transportation facilities, including the incorporation of such ways into state, regional, and local transportation plans and programs. Bicycle and pedestrian ways shall be established in conjunction with the construction, reconstruction, or other change of any state transportation facility, and special emphasis shall be given to projects in or within 1 mile of an urban area.”

4. The planning and implementation of bicycle lanes shall follow the City of Miami Beach Transportation Master Plan and the City of Miami Beach Miami Beach Bicycle-Pedestrian Master Plan. Roadways not specifically outlined in the aforementioned documents shall be planned in accordance with the City of Miami Beach Street Design Guidelines.

5. All bicycle lanes in the City shall be colored pavement green bicycle lanes. bicycle lane markings shall be installed in accordance with MUTCD Chapter 9C, NACTO.
Urban Bikeway Design Guide, and the City of Miami Beach Street Design Guidelines.

6. All bicycle signage including wayfinding signage shall be installed in accordance with MUTCD Chapter 9B, NACTO Urban Bikeway Design Guide and the City of Miami Beach Street Design Guidelines.

7. Bicycle lane signalization shall be installed in accordance with MUTCD Chapter 9D, NACTO Urban Bikeway Design Guide (Signal Section), and the City of Miami Beach Street Design Guidelines.

G. Bicycle Roadway Conditions

1. Pavement Surface Quality: Pavement surfaces shall be smooth, and the pavement shall be uniform in width. Wide cracks, joints, holes, bumps, or drop-offs at the edge of the traveled way shall be repaired. Other obstacles, barriers, and specific hazards to bicyclists shall be eliminated as well. Roadways shall be provided with adequate drainage to prevent ponding and washouts.

2. Drainage Inlet Grates: Bicycle-safe grates shall be used, and grates shall be located in a manner which will minimize severe and/or frequent maneuvering by the bicyclist. Drainage inlet grates shall be placed or adjusted to be flush with the adjacent pavement surface.

3. Utility Covers: Bicycle-safe utility covers shall be used, and utility covers shall be located in a manner which will minimize severe and/or frequent maneuvering by the bicyclist. Utility covers shall be placed or adjusted to be flush with the adjacent pavement surface.

4. Railroad Crossings: Railroad-highway grade crossings shall be at a right angle to the rails. If the crossing angle is less than approximately 45 degrees, an additional paved shoulder of sufficient width shall be provided to permit the bicyclist to cross the track at a safer angle, preferably perpendicularly. Where this is not possible, and where train speeds are low, commercially available compressible flangeway fillers may enhance bicyclist operation. Roadway approaches shall be at the same elevation as the rails. Rubber or concrete crossing materials are longer lasting than wood or asphalt and requires less maintenance. Warning signs and pavement markings shall be installed in accordance with MUTCD.

H. Bicycle Lanes

1. Bicycle lanes shall be one-way facilities and carry bicycle traffic in the same direction as the adjacent motor vehicle lane. In most cases, bicycle lanes shall be through lanes and shall be located to the right of the right most through lane.

2. Width: The desired bicycle lane width adjacent to a curb is 6 feet. The desirable
ridable surface adjacent to a street edge or longitudinal joints is 4 feet. Wherever possible, the design shall consider the implementation of a buffered bicycle lane, the buffered bicycle lane shall be a minimum of 5.5 feet if not adjacent to parking (refer to NACTO *Urban Bikeway Design Guide* and the *City of Miami Beach Street Design Guidelines*).

3. If parking is permitted, the bicycle lane shall be placed between the parking area and the travel lane and have a minimum width of 5 feet unless identified as a parking protected bicycle lane in the *City of Miami Beach Transportation Master Plan* and 2016 Bicycle-Pedestrian Master Plan. For parking protected bicycle lane standards refer to the NACTO *Urban Bikeway Design Guideway* (Cycle Track Section) and the *City of Miami Beach Street Design Guidelines*. Where parking is permitted but a parking stripe or stalls are not utilized, the shared area shall be a minimum of 11 feet without a curb face and 12 feet adjacent to a curb face. If the parking volume is substantial or turnover is high, an additional 1 to 2 feet of width is desirable.

4. Select active warning beacon shall be used for bicycle route at locations where bicycle facilities crossroads at mid-block locations or at intersections where signals are not warranted or desired, and at locations where driver compliance at bicycle crossing is low.

   a. Use select bicycle signal heads where a standalone bicycle path or multi-use path crosses a street, at complex intersections, at intersections with high number of bicycle and motor crashes, at intersections near schools, etc.

   b. Use select hybrid beacon for bicycle where the bicycle route intersects a major street, where off-street bicycle facilities intersect major streets without existing signalized crossings, and at midblock crossings of major roadways with high bicycle or pedestrian volumes.

   c. Use of signal detection and actuation may require improving efficiency, convenience, and safety and to reduce delay for bicycle travel.

I. Bicycle Routes

1. Bicycle routes are signed shared roadways and responsible agencies shall ensure these routes are suitable as shared routes and will also ensure that they be maintained. All intersections along bicycle boulevards should minimize delay and improve safety for bicyclists on the bicycle route according to NACTO *Urban Bikeway Design Guide* (Bicycle Boulevards Section) and the *City of Miami Beach Street Design Guidelines*. Bicycle routes shall meet the following conditions:

   a. The route provides continuity to other bicycle facilities such as bicycle lanes or bicycle paths.

   b. The road is a common route for bicyclists through a high demand corridor.
c. The route extends along local neighborhood streets and collectors that lead to an internal neighborhood destination such as a park, school, or commercial district.

d. An effort has been made to adjust traffic control devices to give greater priority to bicyclists on the route, as opposed to alternative streets.

2. Bicycle route should have a maximum posted speed of 25 mph. Speed management and street design techniques shall be employed to reduce speeds. Reduced speed limits may require authorizing legislation. The MUTCD designates that speed limits shall be in increments of 5 mph and requires an Engineering study to reduce the speed below the statutory speed for the type of roadway.

3. Volume Management measures shall be employed to reduce or discourage thru traffic on designated bicycle route corridors by physically or operationally reconfiguring select corridors and intersections along the route.

4. Street parking has been removed or restricted in areas of critical width to provide improved safety. All bicycle routes shall be stripped with shared lane markings (sharrow). All shared lane markings shall have a green background.

5. Wider curb lanes are provided compared to parallel roads.

J. Share Use Paths

1. Shared use paths are facilities that are usually on exclusive right-of-way, with minimal cross flow by motor vehicles. Users are non-motorized and may include, but are not limited to, bicyclists, in-line skaters, roller skaters, skateboarders, wheelchair users, and pedestrians. Shared use paths shall be separated from the roadway.

2. Width: The minimum recommended width for a paved 2-way path is 10 feet. In very rare circumstances, a reduced width of 8 feet may be used where the following conditions prevail per FDOT Greenbook:

   a. Bicycle traffic is expected to be low, even on peak days or during peak hours.

   b. Pedestrian use of the facility is not expected to be more than occasional.

   c. Horizontal and vertical alignments provide frequent, well-designed passing and resting opportunities.

   d. The path will not be regularly subjected to maintenance vehicle loading conditions that would cause pavement edge damage.

   e. In addition, a path width of 8 feet may be used for a short distance due to a physical constraint such as an environmental feature, bridge abutment, utility structure, or fence.
3. Horizontal Clearance: A minimum 2 feet wide graded area with a maximum 1:6 slope shall be maintained adjacent to both sides of the path; however, 3 feet or more is desirable to provide clearance from trees, poles, walls, fences, guardrails, or other lateral obstructions. Where the path is adjacent to canals, ditches, or slopes steeper than 1:3, a wider separation should be considered. A minimum 5 feet separation from the edge of the paths pavement to the top of the slope is desirable. Depending on the height of embankment and condition at the bottom, a physical barrier, such as dense shrubbery, railing or chain link fence, may need to be provided.

4. Vertical Clearance: Vertical clearance to obstructions shall be a minimum of 8 feet. However, vertical clearance may need to be greater to permit passage of maintenance and emergency vehicles. In under-crossings and tunnels, 10 feet is desirable.

5. Design Speed: A design speed of 20 mph shall be used for shared use paths.

6. Structures: The minimum clear width on structures should be the same as the approach shared use path, plus the minimum 2 feet wide clear areas. Grades on structures to be used by pedestrians shall comply with the requirements of the ADA Accessibility Guidelines (as described in the Federal Register) and the Florida Accessibility Code for Building Construction, Chapter 3 - Geometric Design.

7. Ramp Widths: Ramps for curbs at intersections shall be at least the same width as the shared use path. Curb cuts and ramps should provide a smooth transition between the shared use path and the roadway. A 5 feet radius or flare may be considered to facilitate right turns for bicyclists.

1.07 SUBMITTALS

A. Minimum criteria are presented in this Section and the following Standard Details. Earthwork and roadwork related designs drawings shall be designed by a State of Florida Engineer and have signed and sealed calculations when appropriate.

B. Plans shall be in accordance with Section 8 of the City of Miami Beach Public Works Manual.

C. Properly identified product data for review, including but not limited to asphaltic concrete mixes, fill materials, bedding materials, geotextiles, pavers, guardrails, bicycle facilities, and all other materials and finishes used, shall be submitted to the City or designee for review and approval prior to fabrication and/or delivery.

D. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami.
Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

E. Roadway Report

1. The Draft Roadway Report shall be submitted to the FDOT District Geotechnical Engineer and the City of Miami Beach Public Works Department for review prior to incorporation of the Consultant’s recommendations in the project design.

2. The Roadway Report shall include, but not be limited to:
   a. Copies of Soil Conservation Services (SCS) and United States Geological Survey (USGS) maps with project limits.
   b. A report of tests sheet that summarizes the laboratory test results, the soil stratification (i.e., soils grouped into layers of similar material), and construction recommendations relative to the current Standard indices.
   c. Estimated seasonal high and/or low groundwater levels and review with respect to proposed pavement grades.
   d. Recommended type of geosynthetic for various applications.
   e. The design load bearing ratio (LBR) results from 90% and mean methods.
   f. Permeability/infiltration parameters for water retention areas/exfiltration trenches/swales.
   g. A description of the site and subsoil conditions, design recommendations, and a discussion of any special considerations (i.e., removal of unsuitable material, recompression of weak soils, estimated settlement time/amount, groundwater control etc.).
   h. An appendix which contains stratified soil boring profiles, laboratory test data sheets, design LBR calculations/graphs, and any other pertinent information.

F. In addition to the Roadway Report, the Consultant will also provide stratified boring profiles to the Designer and review the entire set of plans for completeness before each submittal as requested by the City. The Consultant shall assist the Designer with detailing limits on the cross-sections of subsoil excavation.

G. If there will be dewatering work, all necessary Local, State, and Federal permits shall be obtained prior to dewatering, including a RER-DERM Class V permit. For right-of-way permit requirements refer to Section 3 of the City of Miami Beach Public Works Manual. In addition, for dewatering work, the following shall be submitted to the City or designee.
1. Name of dewatering subcontractor, if applicable

2. Shop Drawings indicating the following:
   a. Plans showing the methods and location of dewatering and discharge including a sufficient number of detailed sections to clearly illustrate the scope of work.
   b. Relationship of the dewatering system, observation wells, and discharge line to existing buildings, other structures, utilities, streets, and new construction.
   c. Utility locations.
   d. Drawings shall bear the seal and signature of the qualified Registered Professional Engineer licensed in the State of Florida in charge of preparing the drawings.
   e. List of materials and equipment to be used.
   f. A sample of all well record forms to be maintained during construction.

3. Detailed description of the sequence of dewatering operations.

4. Dewatering well installation records indicating an identification number, location, dimensions, and installation procedures and materials.

5. Observation well installation records indicating an identification number, location, dimensions, and installation procedures and materials.

6. Emergency observation plan to be put into operation during failure of the dewatering system.

7. Monthly Dewatering System Monitoring Reports containing the following data on approved forms:
   a. For observation wells, daily piezometric levels shall be identified by date, time, well number and system (subsystem if multiple pumps are used) pumping rate. Piezometric levels shall be noted in feet of drawdown and groundwater elevation.
   b. For dewatering wells, suspended material test results shall be identified by date, time, well number, well pumping rate (if monitored) and system (subsystem if multiple pumps are used) pumping rate.
   c. Installation records for new wells.

8. Schedule and records of all maintenance tests for primary and standby dewatering systems including the following:
   a. Maintenance tests and water quality tests for suspended matter at the discharge
point including date, time of day, elapsed times of tests procedures, components
tested, suspended particles, resultant observations, and well readings.

b. Daily discharge rates.

c. Installation and removal of wells.

d. General observations of the system such as equipment running times and
failures.

9. Dewatering well removal records

10. Observation well removal records

1.08 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City
of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and
accurate manner. It is the intent of the City to obtain a complete and working installation
according to these Specifications, and any items of labor, equipment, or materials which
may reasonably be assumed as necessary to accomplish this end shall be supplied
whether or not they are specifically shown on the project plans or stated herein.

B. Asphalt Acceptance Standards: The following minimum defects identified by the City or
designee must be covered by warranty (but not limited to):

1. Sunken pavement patches greater than or equal to one-quarter (¼) inch (measured
by a twelve (12) foot straight edge).

2. Surface raveling or oxidation due to deficiencies with the asphalt material.

3. Poor workmanship.

4. Inadequate compaction per Standards and Specifications.

PART 2 – PRODUCTS

2.01 BACKFILL MATERIAL

A. Except where a 1:10 cement/sand or flowable fill concrete mix is required, granular soil
backfill materials shall be utilized. Suitable backfill material shall be clean, shall not be
expansive nor have high organic content, shall be free of clay, marl, unstable materials,
debris, lumps and clods, and shall meet the following requirements.

1. Maximum Liquid Limit shall not exceed 12 as determined by ASTM D4318.
2. Maximum Plasticity Index shall not exceed 35 as determined by ASTM D4318.

3. Not more than 10 percent of weight shall be finer than 74-micron (No. 200) U.S. Standard Sieve.

B. Backfill material containing limerock shall have sufficient sand to fill the voids in the limerock. No stones or rocks larger than 6-inches in diameter will be permitted in any backfill.

C. Debris, broken paving, or broken concrete shall not be used.

D. Material for backfill may be material resulting from excavation, only if it meets the above-mentioned requirements, or if suitable in the opinion of the City or designee. If sufficient suitable backfill material, including select backfill material, is not available from the site, additional material shall be furnished.

2.02 SELECT BACKFILL

A. Select backfill material specified herein shall meet all the general requirements for backfill material set forth in 2.01, and in addition, shall be free of any rocks or stones larger than 2 inches in diameter. Select backfill material may be material resulting from trench excavation, if suitable in the opinion of the City or designee, carefully selected to comply with these requirements.

2.03 SUITABLE BACKFILL

A. Suitable backfill material shall be clean and free from all organic material, clay, marl or unstable materials, debris, lumps, broken paving, or other deleterious material. No rocks or stones larger than 3½ inches in diameter shall be allowed in any suitable backfill. Material for backfill may be material resulting from excavation, if suitable in the opinion of the City or designee.

2.04 STRUCTURAL FILL

A. Structural fill shall consist of an inorganic, non-plastic, granular soil containing less than 10% material passing the No. 200 mesh sieve (relatively clean sand or crushed limerock with a 2 inches max. particle size) with a Unified Soil Classification of GP, GW, SP, SPGM, SW-SM or SP-SM.

2.05 UNSUITABLE FILL AND BACKFILL MATERIAL

A. Unsuitable fill and unsuitable backfill material shall be all material not meeting the definition of Structural Fill, Suitable Backfill, or Select Fill and cannot be amended or blended in the field to meet the standard of one of these fills. Unsuitable Fill material may contain deleterious material including but are not limited to: cherty or other
extremely hard pieces, lumps, balls or pockets of sand or clay size material, organic matter, muck, loose sand, loose free shells, corals or skeletal remain of other marine invertebrates retained on the No. 4 sieve, or water sensitive clay minerals.

2.06 BEDDING MATERIAL

A. Pipe bedding material shall be accordance with the City of Miami Beach Public Works Manual Standard Details.

B. Bedding may be select backfill material, as specified above, if approved by the City or designee.

C. No. 57 stone may be used for bedding of piping (except for copper pipe) and/or manholes as shown on the Standard Details.

D. Sand for bedding shall be dry screened. Sand shall be graded sand with 100% passing a ⅜ inch sieve and not more than 5% passing a No. 200 sieve.

E. Limerock screenings, sand or other fine material shall not be used for bedding.

F. All pipe bedding material shall be new, unless otherwise approved by the City or designee. Existing pipe bedding material may not be used.

2.07 NO. 57 STONE

A. No 57 stone shall be crushed stone (or drain field limerock). Crushed stone shall consist of hard, durable, sub-angular particles of proper size and gradation, and shall be free from organic material, wood, trash, sand, loam, clay, excess fines, and other deleterious materials. The stone shall conform to the requirements of ASTM C 33, Size No. 57 (3/4-inch rock) and be graded within the following limits:

<table>
<thead>
<tr>
<th>SIEVE SIZE</th>
<th>PERCENT FINER BY WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½ inch</td>
<td>100</td>
</tr>
<tr>
<td>1 inch</td>
<td>95 to 100</td>
</tr>
<tr>
<td>½ inch</td>
<td>25 to 60</td>
</tr>
<tr>
<td>No. 4</td>
<td>0 to 10</td>
</tr>
<tr>
<td>No. 8</td>
<td>0 to 5</td>
</tr>
</tbody>
</table>
2.08 BALLAST ROCK

A. Ballast rock shall be composed of hard, durable, sound pieces having a specific gravity of not less than 2.65. It shall be crushed rock conforming to the following gradation:

<table>
<thead>
<tr>
<th>SIEVE SIZE</th>
<th>PERCENT FINER BY WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½ inch</td>
<td>100</td>
</tr>
<tr>
<td>¾ inch</td>
<td>30 to 75</td>
</tr>
<tr>
<td>½ inch</td>
<td>15 to 55</td>
</tr>
<tr>
<td>¼ inch</td>
<td>0 to 5</td>
</tr>
<tr>
<td>No. 8</td>
<td>0 to 5</td>
</tr>
</tbody>
</table>

2.09 SEPARATOR GEOTEXTILE

A. If required by Geotechnical Report, roadways shall be demucked or stabilized with a separator geotextile in accordance with the Geotechnical Report.

B. Laboratory analysis shall be completed, and all material to be used in the construction of the road shall be approved by the City or designee prior to placement.

C. Separator geotextile shall be made from woven fabric, meeting the physical requirements of FDOT Specifications Section 985 and placed as per manufacturer’s Specifications or as directed by the City or designee. At a minimum, separator geotextile shall have 1 foot overlap, and upslope segments must overlap on top of down slope segments.

D. Follow the manufacturer’s recommendations regarding protection from direct sunlight. At the time of installation, the City or designee will reject the material if it has defects, tears, punctures, flaws, deterioration, or other damage. However, if approved by the City or designee, the Contractor may repair torn or punctured sections by placing a patch over the damaged area following manufacturer’s recommendation. The Contractor shall replace or repair any rejected geosynthetic at no additional expense to the City.

E. Repair existing or newly installed separator geotextile by a patch consisting of the same material as the reinforcement separator geotextile over the damaged area. Overlap the undamaged reinforcement separator geosynthetic with the patch a minimum of 5 feet in all directions. Replacement of existing separator geotextile material shall be of similar or better quality and shall meet the requirements as provided in FDOT Specifications, Section 985.
2.10 ASPHALT

A. Subbase: Limit gradation of the material within the limits of the area being stabilized to 97% passing 3½-inch sieve. Soil shall be clean, non-deleterious material. Subbase material supporting the roadway and shoulders shall have a minimum LBR of 40. The stabilized subbase shall be 12 inches, placed in maximum compacted lift thickness of 8-inches, and compacted to 98% of maximum dry density as per AASHTO T-180.

B. Limerock Base Course

1. The material used in limerock base courses shall be material classified as either Miami Oolite Formation or Ocala Formation at the Contractor’s option having a minimum of 70% calcium carbonate or magnesium carbonate; however, only one formation may be used on any contract.

2. Limerock base course shall have a minimum LBR of 100. Limerock base shall be twice the thickness of the existing adjacent base and shall be minimum of 12-inches thick and a maximum of 18-inch thick, placed in 6-inch lifts. Base material shall be compacted to a density of not less than 98% of maximum dry density as per AASHTO T-180 under all paved areas.

3. The limerock material shall contain no more than 0.5% of organic material or objectionable matter and shall show no significant tendency to air slake or undergo any chemical under exposure to weather.

4. The maximum percentage of water sensitive clay material shall be three percent (3%).

5. At least 97% (by weight) of the material shall pass a 3½-inch sieve, and the material shall be graded uniformly down to dust. The fine material shall consist entirely of dust of fracture. All crushing or breaking up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.

6. The limerock material shall be uniform in quality and shall not contain cherty or other extremely hard pieces, lumps, balls or pockets of sand or clay size material in sufficient quantity as to be detrimental to prevent proper bonding, finishing, or strength of the limerock base.

7. Limerock material shall be non-plastic, and the liquid limit shall not exceed 35.

C. Asphaltic Concrete

1. Bituminous Material: Asphalt cement, Viscosity Grade AC-20 or AC-30, shall conform with the requirements of FDOT Specifications, Section 916-1.

2. Coarse Aggregate: Coarse aggregate, stone or slag shall conform to the
requirements of the FDOT Specifications, Section 901.

3. Fine aggregate: Fine aggregate shall conform to the requirements of FDOT Specifications, Section 902.3.

4. Mineral Filler: Mineral filler shall conform to the requirements of FDOT Specifications, Section 917-1 and 917-2.

5. Prime Coat: Unless otherwise indicated, the material used for the prime coat shall be cutback asphalt, Grade RC-70 or RC-250, and shall conform with the requirements specified in AASHTO Designation M 81. Unless otherwise indicated, the use of wither RC-70 or RC-250 shall be at the Contractor’s option.

6. Tack Coat: The material used for the tack coat shall be Emulsified Asphalt, Grade RS-2 and shall conform with the requirements specified in AASHTO Designation M 140.

7. Where Type S Asphalt Concrete is specified in the Contract Documents, if approved by the City or designee, the equivalent fine Type SP Asphalt Concrete mixture (Traffic Level C) meeting the requirements of FDOT Specifications Section 334 may be selected as an alternate at no additional cost to the City or Owner. The equivalent mixes are as follows:

   Type S-I ...............................................Type SP-12.5
   Type S-II...............................................Type SP-19.0
   Type S-III..............................................Type SP-9.5

2.11 CONCRETE PAVERS

A. Concrete pavers shall be Miami Beach red approved equal. Use of other colors to complement project design theme and/or match existing pavers’ configuration require shall only be used with written approval from the City of Miami Beach Public Works Department.

B. All concrete pavers shall have a skid resistant finish.

C. Provide products supplied by a member of the Interlocking Concrete Pavement Institute (ICPI) as called for in the Drawings and/or as specified herein.

D. Concrete pavers shall conform to the requirements of ASTM C936.

E. Concrete pavers shall have an average compressive strength of 8,000 psi with no individual unit under 7,200 psi.
F. Average absorption of 5% with no unit greater than 7% when tested in accordance with ASTM C140.

2.12 TEXTURED PAVEMENT

A. “StreetBond SP150E Coating Material” refers to a high-performance premium coating material consisting of epoxy modified acrylic polymers blended with sand and aggregate, and specially formulated by GAF, Inc. (Tel. 1-800-766-3411), for application on asphalt surfaces to provide a durable, long lasting color and texture to the asphalt surface.

B. “StreetBond Colorant” is a highly concentrated, high quality, UV stable pigment blend designated to be added to StreetBond SP150E coating system to provide color to the coating. The colors to be used shall be shown on the Drawings. The same StreetBond Colorant shall be used in each SP150E coating layer to the asphalt surface. One pint of colorant shall be used with one pail of StreetBond coating material.

C. Use only patterned/textures pavement products listed on the Qualified Products List (QPL). Meet manufacturer’s Specifications for all pattern/texture templates, coating, and coloring material. Use only material that is delivered to the job site in sealed containers bearing the manufacture’s original labels. Material coating used to achieve the pattern/texture and/or color shall produce an adherent, weather resistant, skid resistant surface capable of resisting deformation to traffic. Paint and thermoplastic material must meet the requirements of this Specifications and FDOT Specifications Section 971, except that the requirements for Color and Retroreflectivity do not apply.

D. Manufacturers seeking approval for inclusion on the QPL must submit application and certifications in accordance with FDOT Specifications Section 6 along with the following documentation:

1. Manufacturer's Specifications and procedures for materials and installation.

2. Manufacturer's certification with supporting test data and results that the patterned/textured pavement installed in accordance with the manufacturer’s Specifications and procedures has been tested in accordance with the ASTM E274, Skid Resistance of Paved Surfaces using a standard ribbed full-scale tire at a speed of 40 mph (FN40R) and has a minimum FN40R value of 35.

2.13 SIDEWALKS

A. The replacement of gray concrete sidewalks throughout the City shall be with the "Miami Beach Red" sidewalk color standard, unless otherwise specified by any applicable City land use board, in accordance with Resolution 2019-30800.

B. The Public Works Director has the authority to determine on a street-by-street basis if replacement of sidewalks to a "Miami Beach Red" color standard is appropriate.
C. The replacement of gray sidewalks shall be completed gradually over time as new neighborhood projects are implemented and the sidewalks within an entire block are replaced.

2.14 GUARDRAILS

A. All guardrail materials including but not limited to timber posts, steel posts, anchor bolts, offset blocks, and reflective elements require manufacturer’s certification confirming that all materials meet the requirements of the FDOT Standard Specifications for Road and Bridge Construction, Section 536 and must be in accordance with the Standard Details.

2.15 BICYCLE FACILITIES

A. Bicycle Racks

1. Bicycle racks shall be in accordance with the Standard Details.

B. Railings

1. Bicycle railings, pedestrian railings, guardrails, and handrails shall be per FDOT Specifications Section 515 except in Historic Districts. Bicycle railings, pedestrian railings, guardrails, and handrails located in Historic Districts require approval by the Historic Preservation Design Board.

2. Railing components shall be obtained from producers currently on the FDOT Production Facility Listing.

PART 3 – EXECUTION

3.01 EXCAVATION

A. Excavation shall be conducted in accordance with FDOT Specifications, Section 120.

B. Where rock, clay, or other material within the limits of the roadway is unsuitable in its original position, the Contractor shall excavate such material to the cross sections shown in the Plans or indicated by the City or designee, and shall backfill with suitable material, which shall be shaped to conform to the required cross sections. Where the removal of plastic soils below the finished earthwork grade is required, a construction tolerance from the lines shown in the Plans as the removal limits as defined by the Geotechnical Engineer of plus or minus 0.2 feet in depth and plus or minus six (6) inches each side in width will be allowed.

C. The Contractor shall perform all excavation of every description and of whatever substance encountered, to the dimensions, grades, and depths shown on the Drawings, or as directed by the City or designee. All excavations shall be made by open cut. All
existing utilities such as pipes, poles, and structures shall be carefully located, supported, and protected from injury; in case of damage, they shall be restored at the Contractor’s expense.

D. Pipe trench excavation shall be in accordance with the appropriate Standard Detail in the City of Miami Beach Public Works Manual.

E. Excavation for appurtenances shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation or sheeting, if used, of not less than 12 inches.

F. In areas where trench widths are not limited by site constraints the trench sides may be sloped to a stable angle of repose of the excavated material but only from a point one foot above the crown of the pipe. A substantially and safely constructed movable shield, "box" or "mule" may be used in place of sheeting when the trench is opened immediately ahead of the shield and closed immediately behind the shield as pipe laying proceeds inside the shield.

G. Ladders or steps shall be provided for and used by workmen to enter and leave trenches.

H. Contractor shall be solely responsible for the design, installation, and maintenance of shoring, sheeting, and bracing as necessary to support the sides of excavations and to prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work. Design of shoring or other excavation support shall be provided by a Professional Engineer licensed in the State of Florida. Prior to trench excavation, a Trench Excavation Plan shall be prepared and shall address the following topics.

1. Details of shoring, sloping, or other provisions for worker protection from hazards of caving ground.

2. Design assumptions and calculations.

3. Methods and sequencing of installing excavation support.

4. Proposed locations of stockpiled excavated material.

5. Minimum lateral distance from the crest of slopes for vehicles and stockpiled excavated materials.

6. Anticipated difficulties and proposed resolutions.

I. For trench exceeding 5 feet in depth, provide adequate safety system meeting requirements of applicable Local, State, and Federal requirements.
J. Provide excavation support as necessary to support sides of excavations and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

K. Remove excavation support in a manner that will maintain support as excavation is backfilled or leave voids of backfill. Do not begin to remove excavation support until support can be removed without damage to existing facilities, completed Work, or adjacent property.

L. Excavated material that is suitable for use as backfill shall be used in areas where sufficient material is not available from the excavation. Suitable material in excess of backfill requirements shall be used on the site as directed by the City or designee, or removed at the Contractor’s expense.

3.02 STOCKPILING EXCAVATED MATERIAL

A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.

B. Material suitable for backfill and not needed for backfill at the structure shall be stockpiled and later moved where needed.

C. Materials shall be stored and in such a manner that will not interfere unduly with City operations, traffic at the site, traffic on public roadways, or sidewalks and shall not be placed on private property. In congested areas, such materials that cannot be stored adjacent to the trench or used immediately as backfill shall be removed to other convenient places of storage acceptable to the City or designee at the Contractor’s expense.

D. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.

E. Confine stockpiles to within easements, right-of-way, and approved Work areas. Do not obstruct road or streets.

F. Do not stockpile excavated material adjacent to trenches and other excavations unless excavation side-slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.

G. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work if weight of stockpiled material could induce excessive settlement.

H. Do not place stockpiles within 50 feet of inlets, streams, wetlands, bodies of water, etc. unless permitted by the City or designee.
I. Stockpile side slopes shall be no steeper than 3 horizontal : 1 vertical unless approved by the City or designee. Top of stockpile shall have a minimum slope of no less than 5% to promote positive drainage.

J. Provide perimeter erosion control measures around stockpiles, located no closer than 5-feet from toe of slope, and stabilized stockpile surface with temporary seeding or other measures if stockpile will remain inactive for more than seven (7) days.

3.03 DEWATERING

A. All necessary Local, State, and Federal permits shall be obtained prior to dewatering, including a RER-DERM Class V permit. For right-of-way permit requirements refer to Section 3 of the City of Miami Beach Public Works Manual.

B. Contractor shall be solely responsible for the arrangement, location, and depths of the dewatering system necessary to accomplish the Work.

C. Dewatering shall prevent the loss of fines, seepage, boils, quick conditions, or softening of the foundation strata while maintaining stability of the sides and bottom of the excavation and providing dry conditions for construction operations.

D. When dewatering is required, provide, operate, and maintain dewatering system in accordance with FDOT Specifications Section 455-29 of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level a minimum of 5 feet below the lowest point of excavation. Continuously maintain excavation free of water regardless of source, and until backfilled to final grade.

E. The dewatering system shall be designed to:

1. Prevent loss of soil as water is removed.

2. Avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.

3. Relieve artesian pressure and resultant uplift of excavation bottom.

4. Provide pipe and pumps of sufficient size and quantity to be able to flood the excavation within 12 hours in an emergency situation. Restoration of the working area shall be carried out by the Contractor at no additional cost to the Owner.

F. Any water which accumulates in the excavations for structures shall be removed promptly by means satisfactory to the City or designee in such a manner as to not create a nuisance to adjacent property or public thoroughfare. Pumps and engines for dewatering systems shall be operated at a minimum noise level suitable to a residential
area. The Contractor shall be responsible for any nuisance created due to the disposal of the water from his drainage system.

G. Provide supplemental ditches and sump only as necessary to collect water from local seeps. Do not use ditches and sumps as primary means of dewatering.

H. When dewatering is required, dewatering pumps shall be powered by electric driven motors only, unless otherwise approved by the City or designee. The Contractor shall make arrangements with Florida Power & Light (FPL) to provide the temporary electric service points for the dewatering operation.

I. In addition, the Contractor shall provide a standby dewatering system that meets the following requirements:

1. Provide 100 percent standby power.

2. Provide a 15 percent minimum increase in the number of wells and related equipment required to operate the dewatering system installed and ready to operate.

3. Provide a minimum of three separate power units for the standby power system and one installed auxiliary unit for each individually powered pump.

4. Provide separate discharge lines from each well or common lines with valves such that any well or wells that malfunction or are damaged can be isolated from the others.

5. The systems shall be laid out and designed in such a way that portions of the system may be isolated for routine maintenance or repair in case of accidental damage without affecting the normal operation of the system.

6. The Contractor shall provide sufficient fuel to maintain a five (5) day supply on site for fuel power systems.

J. Conduct settlement monitoring and mitigation during dewatering activities in accordance with Section 1 of the City of Miami Beach Public Works Manual and as specified in the Dewatering Plan.

K. Disposal of Water

1. The Contractor shall be required to obtain all necessary permits from authorities having jurisdiction, including but not limited to RER-DERM Class V permit, approving the location and proposed method of disposal before discharging water from any excavation into any portion of the public right-of-way or into any existing drainage structure or facility.

2. Treat water collected by dewatering operations as required by regulatory agencies.
prior to discharge.

3. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.

4. Remove sediments from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

L. Protection of Property

1. Make assessment of potential for dewatering-induced settlement. Provide and operate devices or systems, including but not limited to re-injection wells, infiltration trenches, and cutoff walls, necessary to prevent damage to existing facilities, completed Work, and adjacent property.

2. Securely support existing facilities, completed Work, and adjacent properties vulnerable to settlement due to dewatering operations. Support shall include, but not be limited to, bracing, underpinning, or compacting grouting. Support shall be designed by a Professional Engineer licensed in the State of Florida.

M. When shown in the Contract Documents, install piezometers at the locations shown in the Plans. Monitor the piezometer and record the groundwater elevation level daily. Notify the City or designee of any groundwater lowering near the structure of 12 inches or more.

3.04 BACKFILLING

A. Backfill in the dry whenever normal dewatering equipment and methods can accomplish the needed dewatering. Place and compact granular bedding and fill over pipelines and conduits. Density tests for determination of the specified compaction shall be made by a testing laboratory approved by the City or designee. Testing of compacted fill materials is required in accordance with these Specifications. If results of tests taken during the progress of the Work indicate compacted materials do not meet specified requirements, such defective Work will be removed, replaced, and re-tested as directed by the City or designee and at the Contractor’s sole expense. Compacted fill is to be tested before proceeding with the placement of surface materials.

B. Backfilling of pipe trenches will not be allowed until the Work has been approved by the City or designee, pressure tested if required, and the City or designee indicates that backfilling may proceed. Any Work which is covered or concealed without the knowledge and consent of the City or designee shall be uncovered or exposed for inspection. Partial backfill may be made to help restrain the pipe during pressure testing, if previously authorized by the City or designee.
C. The Contractor shall backfill all trenches and other excavations made in the process of installing the pipe. The Contractor shall maintain the surface of the backfill free from major irregularities and potholes.

D. The Contractor shall maintain trenches free of debris, wood, rocks over 2 inches in diameter, and water.

E. Backfill shall be kept up with the rate of pipe laying. The backfill up to the springline of the pipe shall be placed as soon as practical after laying the pipe. On parts of the line where the groundwater level may be high enough to float the pipe, the placing of the backfill and the rate of pumping the trench shall be so controlled as to prevent the pipe from floating or moving from the line and grade shown on the Plans.

F. Pipe bedding and backfill shall be in accordance with the applicable City of Miami Beach Public Works Manual Standard Detail. Material shall be placed in maximum 6-inch layers. Each layer shall be thoroughly compacted to at least 98% of maximum density as defined by AASHTO Specifications T-180. The material in the ditch may be compacted by either hand tamper or a mechanized power tamper, provided the results meet the requirements and are approved by the City or designee. Particular attention and care shall be exercised in obtaining thorough support for the branch of all service connection fittings. Care shall be taken to preserve the alignment and gradient of the installed pipe.

G. A testing laboratory will make periodic field tests to determine the density being obtained in each lift of backfill. Testing shall be performed at a minimum frequency of one test every 100 feet. When compacted backfill fails to meet the specified percentage of maximum density as shown by test results, it shall be reworked and recompacted, and then retested. The reworking, recompacting, and retesting of the backfill shall be repeated as many times as may be necessary to obtain compacted backfill with density meeting or exceeding the specified percentage as indicated by test results.

H. The Contractor shall exercise proper care to ensure no pipe will be broken or displaced by use of mechanical compacting equipment. Water shall be added as required to obtain optimum moisture content to facilitate compaction but ponding or inundation of backfill will not be permitted.

I. In the event sufficient suitable material is not available at any point to properly backfill the trench, the Contractor shall transport suitable material from points of the line where such material is available or shall otherwise furnish suitable material.

3.05 DISPOSAL OF SURPLUS AND UNSUITABLE MATERIAL

A. Ownership of Excavated Materials

1. The City shall be deemed owner of all excavated material deemed suitable for fill and
backfill and shall remain so until the final job requirements for fill or backfill materials have been fulfilled. Unless otherwise provided by the Plans or Special Provisions, any surplus materials then remaining and not needed for job requirements shall become the property of the Contractor and are to be disposed of by him, outside the right-of-way, in a properly permitted location to the satisfaction of the City or designee.

2. In urban or other areas where temporary storage of apparent excess suitable materials within the right-of-way may be impracticable, the Contractor may stockpile the materials outside the right-of-way in areas provided by the Contractor. If temporary storage is not feasible in the right-of-way, Contractor shall not dispose of such material until the City or designee has declared it surplus in writing. The Contractor may dispose of excess material with the written understanding that any portion of the disposed material required to fulfill the actual job requirements shall be replaced with equally suitable material at his own expenses.

3. No extra compensation will be allowed for any re-handling involved under the provisions of this Sub-article.

B. Contractor shall take ownership and dispose of all excavated material deemed Unsuitable Fill, such material may be temporarily stored within the right-of-way with location and length of time approved by the City or designee. Prior to removal of Unsuitable Fill material to a disposal site, the City or designee shall be notified, providing a location map including access route, the name of the property owner, and a person to contact to arrange a site inspection. The Contractor shall submit this notification at least two weeks in advance of planned commencement of disposal activity, to allow for the City or designee to conduct an investigation without delaying job progress.

C. General Requirements for Disposal: Excavated muck or other materials unsuitable for the roadway construction backfilling shall be disposed of as shown in the Plans or, if the Plans do not indicate the disposal, the materials shall become the property of the Contractor and shall be disposed of by him outside the right-of-way, at a properly permitted location.

D. Disposal of Muck on Side Slopes: As an exception to the provisions of FDOT Specifications, Section 120-5.1 when approved by the City or designee, in rural undeveloped areas muck (A-8 material) may be placed on the slopes, or may be stored alongside the roadway, provided there shall be a clear distance of at least six (6) feet between the roadway grading limits and the muck, and the muck shall be so dressed as to present a reasonably neat appearance. In addition, disposal of this material by placing on the slopes may also be permitted in developed areas where, in the opinion of the City or designee, this will result in an esthetically pleasing appearance and will have no detrimental effect on the adjacent developments. Where muck or other unsuitable material is permitted to be disposed of inside the right-of-way limits, such material shall
not be placed such as to impede the inflow or outfall of any channel or of side ditches. The City or designee shall determine the limits adjacent to channels within which such materials shall not be placed.

E. Disposal of Paving Materials: Unless otherwise indicated in the plans, paving materials excavated in the removal of existing pavements, such as paving brick, asphalt block, concrete slab, limerock, sidewalk, curb, and gutter, etc., shall become the property of the Contractor and shall be disposed of by him outside the right-of-way, at a properly permitted location. If the materials are to remain the property of the City, they shall be placed in neat piles as directed.

F. Disposal Areas: Where the plans or Specifications require the Contractor to dispose of excavated materials outside the right-of-way and the disposal area is not indicated in the contract documents, the Contractor shall furnish the disposal area and any necessary permits without additional compensation.

G. Areas provided by the Contractor for disposal of removed paving materials shall be out of sight of the project and at least 300 feet from the nearest roadway right-of-way line of any State maintained road.

3.06 TRENCH RESTORATION

A. Trench restoration shall be per the applicable City of Miami Beach Public Works Manual Standard Detail.

B. Mill and resurface minimum 1 inch in accordance with the restoration limits in Part 1 or as directed by the City of Miami Beach Public Works Department. Prior to placing pavement, City Public Works inspection is required. If milled section crosses a pedestrian path or temporary pedestrian path/detour, an asphalt apron as shown in City of Miami Beach Public Works Manual Standard Detail 10-4 must be provided at transitions with all adjacent surfaces within the pedestrian crossing.

C. Where cuts have been made through unpaved, stabilized rock roadways, driveways and parkways, surface restoration shall consist of 3 inches of compacted limerock overlaid by 3 inches of gravel or graded and washed rock with a maximum diameter of ½ inch, except as otherwise directed by the City or designee. The rock shall be installed over the entire width of the disturbed area and shall closely match the existing rock at each location. Several grades of rock may be required to attain this end, but it is not anticipated that more than one grade will have to be used at any one location.

3.07 TEMPORARY PAVEMENT

A. Temporary paving will be required along the entire route where the original paved surface is removed. Unless otherwise approved by the City or designee, temporary
paving shall be placed the same day the trench is backfilled. The trench shall be backfilled up to a level 1 inch below the existing pavement surface and a temporary, cold mixed sand/asphalt pavement shall be constructed up to the level of the existing pavement surface. The liquid asphalt shall be Grade RC-70, conforming to the requirements of FDOT Specifications, Section 916-2. The sand shall conform to the requirements of FDOT Specifications, Section 902 for fine aggregate.

B. The cold mix is to be installed one block at a time, not crossing any intersection, or a maximum of 1,200 feet shall be completed before the Contractor may move forward with his excavation Work. Backfill, compaction and temporary paving is to keep pace with the pipe installation. Written permission must be obtained from the City of Miami Beach Public Works Department to allow lengths greater than 1,200 feet. At the sole discretion of the City of Miami Beach Public Works Department, the allowable limits in the permit may be reduced due to unforeseen right-of-way conditions.

C. The temporary pavement shall be maintained by the Contractor in a condition satisfactory to the City or designee until its removal. Removal shall include any surplus backfill material. Replacement of the temporary pavement with permanent pavement shall be made within 30 days. In replacing the temporary paving with permanent pavement, all Work shall be completed in sections compatible with specified traffic maintenance procedures.

D. The Contractor may elect to install a suitable temporary hot mix asphaltic pavement to be left in-place, in lieu of cold mix, when the hot mix asphalt is left in-place and installed over properly compacted limerock base course. This temporary pavement shall be incorporated into the specified permanent pavement restoration as part of paving restoration.

E. Sand seal on the limerock base course will not be permitted in lieu of temporary paving.

F. Unless otherwise approved by the City or designee, temporary paving shall be placed within twenty-four (24) hours following the completion of backfilling.

G. If temporary asphalt is utilized, it shall be removed prior to placement of final asphalt surface.

H. Temporary restoration requires field approval by City of Miami Beach Public Works Department Field Inspector.

3.08 TRENCH PLATES

A. When backfilling operations of an excavation in the traveled way either transverse or longitudinal cannot be properly completed within a workday, steel plate bridging may be required to preserve unobstructed traffic flow. When approved in writing by the City of
Miami Beach Public Works Department the Contractor may use steel plates to bridge excavated trenches in areas where the roadway surface is to be opened to traffic. In such cases, the following conditions shall apply.

1. The plate(s) must extend beyond the edge of the trench wall to adequately support the traffic loads. Plate(s) shall be large enough to allow minimum of 2 feet of bearing on each side of the excavation. Plates shall be placed perpendicular or parallel to the direction of travel. In all situations the longitudinal edges of the steel plates shall not be in the wheel path.

2. For trench widths less than or equal to 4 feet as determined in the direction of travel, steel plates shall have a minimum thickness of 1 inch.

3. For trenches and excavations with spans greater than 4 feet as measured in the direction of travel, a structural design, to include plate dimensions, thickness, ASTM A36 or ASTM A572 steel grade, and minimum shoring or bracing requirements, shall be prepared by a structural professional engineer registered in the State of Florida and approved by the City or designee.

4. Plates shall be designed for HS20-44 loading only and shall not be accessed by construction equipment exceeding HS20-44 loading limits.

5. Trenches and excavations shall be adequately shored and braced to withstand highway traffic loads.

6. Each plate must be fully supported around the perimeter to prevent wobbling or rocking with non-asphaltic shims and installed to operate with minimum noise.

7. Plates shall be secured with a trench plate locking device, and cold patch of asphalt shall be used along all edges of steel plate to ensure smooth transition for traffic from the road surface to the top of the plate surface and back to the road surface. Cold patch on the edges of trench plate shall not be approved unless plate is otherwise secured against movement.

8. If the trench steel plates are going to be in place more than 48 hours, a “STEEL PLATE” sign with black lettering on an orange background will be used in advance of steel plate bridging. This sign is to be used along with any other required construction signing.

9. The Contractor is responsible for maintenance of the steel plates, shoring, and trench plate securing systems, and ensuring that they meet manufacturer Specifications. If the City must correct an emergency condition due to excavation and plate placement and or movement, the Contractor will be charged for the cost of corrective measures required.

10. Trench plates may be removed and replaced as necessary to complete utility work in
the street without removal of the perimeter restraint. Upon completion of construction and permanent removal of trench plates and frames, the anchor screw holes shall be filled with liquid asphalt during the trench patching operation or with high strength grout or other material approved by the City or designee. Patch material shall be struck smooth with the street surface.

B. No direct payment will be made for furnishing, placing, maintaining, and removal of plate(s) and/or any incidental items necessary to complete the work unless specifically provided as a pay item in the contract.

3.09 INSTALLATION OF ASPHALT

A. General

1. Pavement markings removed or obliterated by the Contractor’s operations shall be promptly replaced, in kind, to the satisfaction of the City of Miami Beach Department of Public Works, Traffic Engineering Division or designee.

2. At least three density determinations shall be made on each day’s final compaction operations on each course, and the density determinations shall be made at more frequent intervals if deemed necessary by the City or designee.

B. Subbase: Roadway subbase shall be stabilized to the minimum depth shown on the Drawings to a LBR not less than 40. Stabilizing shall be type C as defined in Section 160 of the FDOT specifications. Stabilization may require the addition and thorough mixing in of crushed limerock, coarse limerock screenings, or any other stabilizing material acceptable to the City or designee. The stabilizing material shall be applied in such quantity that, after mixing and blending, the subbase will have a LBR not less than 40. Stabilizing material shall be mixed or blended in the subbase material by plowing, scarifying, diskng, harrowing, blading, and mixing with rotary tillers until the mixed materials are of uniform bearing ratio throughout the width and depth of the layer being processed. The minimum acceptable density at any location will be 98% of maximum dry density as determined by AASHTO T-180.

C. Limerock Base: The limerock base shall be constructed in accordance with Section 200 of the FDOT Specifications, to the thickness and width indicated on the Drawings. Pavement base shall be constructed in maximum 6-inch lifts.

D. After spreading of the base material is completed, the entire surface shall be scarified and shaped so as to produce the exact grade and cross section after compaction. For double course base, this scarifying shall extend a depth sufficient to penetrate slightly the surface of the first course. The maximum depth of each lift shall be 6-inches.

E. When the material does not have the proper moisture content to ensure the required density, wetting or drying shall be required. If the material is deficient in moisture, water
will be added and uniformly mixed in by disk ing the base course to its full depth. If the material contains an excess of moisture, it shall be allowed to dry before being compacted. Wetting and drying operations shall involve manipulation of the entire width and depth of the base as a unit. As soon as proper conditions of moisture are attained, the material shall be compacted to an average density not less than 98% of maximum dry density as determined by AASHTO T-180. Where the base is being constructed in more than one course, the density shall be obtained in each lift of the base.

F. During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density determination on the finished base.

G. Unless otherwise directed by the City or designee, the surface shall be "hard-planed" with a blade grader immediately prior to the application of the prime coat to remove the thin glaze or cemented surface and to allow free penetration of the prime material. The materials planed from the base shall be removed from the base area.

H. If cracks or checks appear in the base, either before or after priming, which in the opinion of the City or designee, would impair the structural efficiency of the base course, the Contractor shall remove such cracks or checks by re-clarifying, reshaping, adding base material where necessary and re-compacting, at no additional cost to the City or Owner.

I. Mixing Base and Subbase: If at any time the subbase material shall become mixed with the base course material, the Contractor shall, without additional compensation, dig out and remove the mixture, reshape and compact the subbase and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.

J. Prime Coat: The prime coat shall be applied at a rate of 0.15 gallons per square yard and the work performed in accordance with Section 300 of the FDOT Specifications.

K. Asphaltic Concrete: The spreading, compacting, and jointing the wearing surface shall be in accordance with Sections 330 and 333 of the FDOT Specifications to the thickness indicated on the Drawings.

L. Tack Coat: Apply tack coat at a rate between 0.02 and 0.10 gallons per square yard and perform the Work in accordance with Section 300 of the FDOT Specifications.

M. Connections with Existing Facilities

1. Where the bituminous pavement is to be connected with an existing roadway surface or other facility, the Contractor shall modify the existing roadway profile in such a manner as to produce a smooth riding connection to the existing facility.
2. Where it is necessary to remove existing asphalt surfaces to provide proper meet lines and riding surfaces, the Contractor shall saw cut the existing surface so that there will be sufficient depth to provide a minimum of 1-inch of asphalt concrete, and the waste material shall be disposed of to the satisfaction of the City or designee. Prior to placing the asphalt concrete, these areas shall be tacked. Meet lines shall be straight and the edges vertical. The edges of meet line cuts shall be painted with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, the meet line shall be sealed by painting with a liquid asphalt or emulsified asphalt and immediately covered with clean, dry sand.

N. Surface Tolerance

1. Tests for conformity with the specified grade shall be made immediately after initial compression. Any variation shall be immediately corrected by the removal or addition of materials and by continuous rolling.

2. The completed surface of the pavement shall be of uniform texture, smooth, uniform as to grade, and free from defects of all kinds. The completed surface shall not vary more than 1/8 inch from the lower edge of a 12-foot straightedge placed on the surface along the centerline or across the trench.

3. After completion of the final rolling, the smoothness and grade of the surface shall again be tested by the Contractor.

4. When deviations in excess of the above tolerances are found, the pavement surface shall be corrected as stated in Section 330-12.4 of the FDOT Specifications.

5. All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the City or designee.

O. Weather Conditions: Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall or any imminent storms that might adversely affect the construction. The Engineer will determine when surfaces and materials are dry enough to proceed with construction. Asphalt concrete shall not be placed during heavy rainfall or when the surface upon which it is to be placed is wet.

P. Protection of Structures and Adjustment of Appurtenances

1. Provide whatever protective coverings may be necessary to protect the exposed portions of bridges, culverts, curbs, gutters, posts, guard fences, road signs, and any other structures from splashing oil and asphalt from the paving operations. Remove any oil, asphalt, dirt, or any other undesirable matter that may come upon these structures by reason of the paving operations.

2. Where water valve boxes, manholes, catch basins, or other underground utility
appurtenances are within the area to be surfaced, the Contractor shall adjust the
covers of these improvements to conform to the proposed surface elevations.

3. In this effort, the Contractor shall be responsible for ensuring that appurtenances are
brought to proper grade to conform to the finished surface elevations and any delays
experienced from such obstructions will be considered as incidental to the paving
operation. No additional payment will be made. Protect all covers during asphalt
application.

Q. Pavement Warranty: Settlement of replaced pavement over trenches within the warranty
period shall be considered the result of improper or inadequate compaction of the sub-
base or base materials. The Contractor shall promptly repair all pavement deficiencies
noted during the warranty period at the Contractor's sole expense.

3.10 INSTALLATION OF CONCRETE PAVERS

A. Install paver blocks as manufactured by licensee of Paver Systems, Inc., in accordance
with the Drawings, manufacturer’s recommendations, and Standard Details. Paver block
construction shall conform to the requirements of Interlocking Concrete Pavers Institute
(ICPI).

B. Where necessary to cut blocks, cutting shall be done so as leave tight joint along all
adjacent edges and surfaces. Smoothly split or sawn blocks only will be accepted.

C. After final vibrating/compaction there shall be no more than ¼ inch deviation from
proposed grades.

D. Installation of concrete pavers in non-roadway areas shall be in accordance with the
following.

1. Replacement of all underground utilities that are in conflict with paver installation.

2. The finished subbase shall be approved before placement of limerock base.

3. The limerock base course shall be compacted to 98% of maximum dry density as per
AASHTO T-180

4. The finished limerock base course shall be approved by the City or designee prior to
placement of the sand leveling course.

5. The uncompacted sand leveling base shall be screened over the compacted
limerock base to an uncompacted thickness of 1½ inches. The bedding course shall
be treated with soil sterilizers to prohibit growth of grass and weeds.

6. The paver blocks shall be laid in the pattern approved by the City of Miami Beach
Public Works Department in accordance with the Standard Details.
7. Construct concrete header curb in accordance with the Standard Details.

E. Installation of concrete pavers in on roadways shall be in accordance with the following.

1. Replacement of all underground utilities that are in conflict with paver installation.

2. The finished subbase shall be approved before placement of the concrete slab.

3. The concrete pavers on the roadway shall be installed over a 6-inch-thick concrete base reinforced with galvanized steel wire mesh 6X6-W1.4xW1.4 with 1½ inches bedding between the concrete base and the concrete pavers.

4. The uncompacted sand leveling base shall be screened over the concrete base to an uncompacted thickness of 1½ inches. The bedding course shall be treated with soil sterilizers to prohibit growth of grass and weeds.

5. Construct concrete header curb in accordance with the Standard Details.

3.11 INSTALLATION OF TEXTURED PAVEMENT

A. Applications of textured pavement include the following.

1. Imprinting patterns into existing or new pavement and covering with a surface coating(s) of paint or thermoplastic.

2. Imprinting patterns into existing or new pavement and inlaying the imprint with performed thermoplastic material.

3. Colored, preprinted, preformed texturized thermoplastic material that is applied over existing pavement.

4. Colored thermoplastic material that can be imprinted and texturized during or after application to existing pavement.

B. Patterns are defined as visible surface markings. Imprinted textures are defined as palpable surface markings.

C. Use the location, pattern/texture type (brick, stone, etc.) and coating color as specified in the Plans. Joint openings shall not exceed ½ inch in width.

D. Apply a patterned and/or textured treatment to asphalt or concrete in accordance with manufacturer’s recommendations.

E. For application requiring removal and replacement of existing pavement, meet the requirements of FDOT Specifications Section 350 for cement concrete pavement; the requirements of Section 334 for Superpave asphalt or Section 337 for FC 9.5 and FC 12.5 asphalt.
F. Protect treated surfaces from traffic and environmental effect until the area is completely coated/imprinted and any coating have dried or cured according to the manufacturer’s instructions. Complete all utility, traffic loop detector, and other items requiring a cut and installation under the finished surface, prior to pattern installation. For asphalt roadways, apply patterned/textured pavement a minimum of 14 days after placement of the adjacent pavement. Upon completion of the installation, the City or designee will check the area at random location(s) for geometric accuracy, as specified in the plans. If any of the chosen areas have an imprint width and depth that is less than the manufacturer’s specifications, correct the entire textured area, at no additional cost to the City. Supply the specified pattern and color sample for the Engineer’s use to visually determine that the material matches the color specified in the plans. For any continuous or abutting areas, i.e., all treated areas of an intersection, color material must be from the same lot/batch. Provide certification that the textured pavement was installed in accordance with the manufacturer’s requirements.

G. Textured pavement on crosswalks and travel lanes are to be tested for skid resistance in accordance with ASTM E303.

3.12 INSTALLATION OF SIDEWALKS

A. Sidewalks at intersections and driveways shall be six (6) inches thick. Driveways shall include a 4-foot section at 2% maximum cross slope as per Standard Details and FDOT Index 522-03.

B. Sidewalks not at intersections or driveways shall be four (4) inches thick.

C. The concrete for sidewalk shall be 3,000 psi, with Integral Miami Beach Red color, and shall be City of Miami Beach approved design mix.

D. The concrete shall be reinforced with 6X6-W1.4xW1.4 welded steel wire mesh.

E. Wherever possible, sidewalks shall be designed with a minimum effective width of 6 feet on residential streets and 8 feet on collectors and arterials. Effective sidewalk widths shall be determined in accordance with the City of Miami Beach Street Design Guidelines and Standard Details.

F. All wayfinding signage shall be installed in the back of the sidewalk wherever permitted by sight visibility, otherwise 4 feet minimum clear pedestrian path around sign shall be provided.

3.13 INSTALLATION OF CURB RAMPS

A. It is the policy of the City of Miami Beach Public Works Department to install truncated dome detectable warnings on the curb ramps, in compliance with the ADA Standards and PROWAG requirements for detectable warnings on walking surfaces and with
FDOT standards. Curb ramps shall be directional and aligned with the crosswalk. Refer to the City of Miami Beach Street Design Guidelines.

B. The installation of truncated domes on curb ramp shall be in compliance with the FDOT Index 522-002 and FDOT Specifications Section 527 and associated QPL. This Specification excludes stamped concrete detectable warnings due to poor performance.

C. The detectable warnings are required to have a dark-on-light or light-on-dark contrast with the surrounding concrete. Dark gray shall be the color used on the detectable warning portion of the curb ramp when applied to a curb ramp that is Miami Beach Red in color. The color of the detectable warnings shall be integral with the device material. On curb ramps constructed of material other than “standards” concrete or from colors other than Miami Beach Red, coordinate with the Public Works Department for appropriate color and contrast.

D. Provide certification from an independent testing laboratory that the applied detectable warning device meets the above minimum requirements. Submit this certification for review and approval by the City or designee at least 10 days before the planned installation of any applied detectable warning device.

E. At least ten (10) days before the first installation of any applied detectable warning device, submit manufacture’s installation recommendations and instructions for review and approval by the City or designee.

F. Special Considerations: 2 curb ramps per corner should always be used unless technically infeasible. US Access Board Public Rights-of-Way Access Advisory Committee strongly discourages single installations where possible because single ramps can:

1. Misdirect blind pedestrians who use the slope of curb ramps as a cue.

2. Increase crossing times for persons who use wheeled mobility aids and can place users into oncoming traffic at small radius corners where it is difficult to provide landing space at the bottom that is wholly within marked crossings.

3. Drivers may not be as alert to persons crossing at the apex of a corner.

G. If a single diagonal curb ramp is installed because of technical infeasibility, a 48 inches clear space wholly contained within the crosswalk must be provided at the bottom of the curb ramp to allow wheelchair users enough room to maneuver off of the ramp and into the crosswalk.

3.14 INSTALLATION OF BICYCLE FACILITIES

A. Bicycle Racks
1. The bicycle rack shall be a minimum of 24 inches from the curb when oriented in a parallel direction or a minimum of 54 inches to the centerline of the rack when oriented perpendicular to the curb.

2. The bicycle rack should be located to preserve at least 36 inches to 48 inches of pedestrian walkway clearance to meet ADA requirements.

3. All bicycle racks shall be at least 4 feet clearance from any street utility vaults or utility poles.

4. All bicycle racks shall be at least 30 inches from any street encroachments, i.e.: ground level planters, garbage cans.

5. All bicycle racks shall be at least 8 feet from any fire hydrant.

6. All bicycle racks shall be at least 10 feet from the point of curvature of the curb adjacent to any intersection.

7. Do not block building entrances, driveways, handicap parking spaces, or stairs.

8. An area 2.2 feet wide by 7 feet long is required for a single rack.

9. Spacing between multiple bicycle racks mounted adjacent to each other should be a minimum of 30 inches on center.

B. Railings

1. Railings shall be placed at locations shown of Plans or as directed by the City or designee.

3.15 PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.

3.16 AS-BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built requirements.
STANDARD DETAILS

Standard Details for earthwork and roadwork are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself will all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 10-1  TYPICAL PAVEMENT RESTORATION
DETAIL 10-2  TYPICAL PAVEMENT RESTORATION FOR TRENCHES 6 INCHES OR LESS
DETAIL 10-3  TYPICAL GREEN AREA RESTORATION
DETAIL 10-4  TEMPORARY ASPHALT APRON FOR MANHOLES, CROSSWALKS, JOINTS
DETAIL 10-5  CORAL ROCK WALL
DETAIL 10-6  CONCRETE CURB AND GUTTER CITY OF MIAMI BEACH MODIFIED TYPE "F"
DETAIL 10-7  CONCRETE CURB
DETAIL 10-8  24" CONCRETE VALLEY GUTTER
DETAIL 10-9  24" CONCRETE DROP CURB (DRIVEWAY)
DETAIL 10-10 PUBLIC SIDEWALK CURB RAMPS NOTES
DETAIL 10-11 TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS
DETAIL 10-12 TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS WITH SIDEWALK/UTILITY STRIP TRANSITION
DETAIL 10-13 TYPICAL PLACEMENT OF SIDEWALK CURB RAMPS AT CURBED RETURNS
DETAIL 10-14 TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS
DETAIL 10-15 LINEAR SIDEWALK RAMPS
DETAIL 10-16 SIDEWALK CURB RAMP DETECTABLE WARNING
DETAIL 10-17 SIDEWALK JOINTS
DETAIL 10-18 TYPICAL 4" THICK CONCRETE SIDEWALK
DETAIL 10-19 CURB & GUTTER/TRENCH DRAIN TRANSITION DETAIL
DETAIL 10-20 TRENCH DRAIN DETAIL FOR BULB-OUT
DETAIL 10-21 RESIDENTIAL DRIVEWAY SPACING
DETAIL 10-22 COMMERCIAL AND INDUSTRIAL DRIVEWAY SPACING
DETAIL 10-23 DRIVEWAY SAFE SIGHT TRIANGLE
DETAIL 10-24   CONCRETE DRIVEWAY WITH CONCRETE SIDEWALKS
DETAIL 10-25   CONCRETE DRIVEWAY DETAIL WITH CONCRETE SIDEWALKS
DETAIL 10-26   SIGHT RESTRICTIONS AT INTERSECTIONS WITH NO DEDICATED RADII
DETAIL 10-27   SIGHT RESTRICTIONS AT INTERSECTIONS WITH DEDICATED RADII
DETAIL 10-28   STANDARD ROAD DETAIL FOR 50' RIGHT-OF-WAY 2 LANES SWALE
DETAIL 10-29   STANDARD ROAD DETAIL FOR 50' RIGHT-OF-WAY 2 LANES CURB & GUTTER
DETAIL 10-30   STANDARD ROAD DETAIL FOR 60' RIGHT-OF-WAY 2 LANES SWALE
DETAIL 10-31   STANDARD ROAD DETAIL FOR 60' RIGHT-OF-WAY 2 LANES CURB & GUTTER, LOCAL STREET
DETAIL 10-32   STANDARD ROAD DETAIL FOR 60' RIGHT-OF-WAY 3 LANES CURB & GUTTER, COLLECTOR STREET
DETAIL 10-33   STANDARD ROAD DETAIL FOR 70' RIGHT-OF-WAY 4 LANES CURB & GUTTER, WITH STRIPPED MEDIAN
DETAIL 10-34   SCHOOL ZONE PAVEMENT MARKINGS
DETAIL 10-35   ZEBRA STRIPING DETAIL
DETAIL 10-36   GUARDRAIL
DETAIL 10-37   STREET SIGN POST ASSEMBLY
DETAIL 10-38   STREET SIGN POST, TYPICAL INSTALLATION
DETAIL 10-39   STREET/STOP NAME SIGN ASSEMBLY AND FABRICATION
DETAIL 10-40   TYPICAL PAVER WALKWAY IN AREAS OUT OF ROADWAY
DETAIL 10-41   SPECIAL CONCRETE PAVER CROSSWALK SECTION
DETAIL 10-42   SPECIAL CONCRETE PAVER DROPOFF LANE
DETAIL 10-43   MINIMUM WIDTHS FOR BICYCLE LANES - CURBED STREET WITHOUT PARKING
DETAIL 10-44   MINIMUM WIDTHS FOR BICYCLE LANES ON CURBED STREET WITH PARKING
DETAIL 10-45   MINIMUM WIDTHS FOR BICYCLE LANES ON ROADWAY WITHOUT CURB & GUTTER
DETAIL 10-46   BICYCLE PAVEMENT MARKER
DETAIL 10-47  BICYCLE LANE PAVEMENT MARKING DETAILS
DETAIL 10-48  BICYCLE RACK
DETAIL 10-49  BICYCLE GUIDE SIGNS
DETAIL 10-50  BICYCLE GUIDE SIGNS
DETAIL 10-51  BICYCLE LANE SIGN ASSEMBLY & FABRICATION
DETAIL 10-51  BICYCLE LANE SIGN ASSEMBLY ON EXISTING POLE
SECOND CUT:
EXISTING PAVEMENT SHALL BE
SAW CUT ALONG A NEAT STRAIGHT
LINE TO THE FARthest POINT OF
BROKEN OR DISTURBED ASPHALT.

ASPHALTIC CONCRETE MINIMUM
2 INCHES THICK OR SAME AS
ADJACENT ROADWAY. APPLY
TACK COAT TO BASE AND
ALONG EXISTING ASPHALT EDGES

EXISTING BASE (TYP)

COMPACTED LIMEROCK BASE COURSE
WITH LBR OF 100 TWICE THE
THICKNESS OF ADJACENT EXISTING
BASE, 12" MIN., 18" MAX. IN 6' LIFTS
COMPACTED TO 98% OF MAX. DENSITY
PER AASHTO T-180.

CLEAN BACKFILL WITH LBR 40 AND
MAX. ROCK SIZE OF 3½' COMPACTED
TO 98% OF MAX. DRY DENSITY PER
AASHTO T-180 TO THE BOTTOM OF
THE BASE COURSE.

TRENCH WIDTH (W)+4’-0" MIN.
REFER TO CITY OF MIAMI BEACH
PUBLIC WORKS MANUAL
SECTION 10 FOR
RESTORATION LIMITS

INITIAL CUT

1" MIN.

EXISTING ASPHALT
PAVEMENT

FOR TRENCH RESTORATION,
REFER TO CITY OF MIAMI
BEACH PUBLIC WORKS
MANUAL PIPE INSTALLATION
STANDARD DETAILS

SECTION VIEW
N.T.S.

NOTES:

1. IF TEMPORARY ASPHALT IS UTILIZED, IT SHALL BE REMOVED PRIOR TO PLACEMENT OF FINAL
ASPHALT SURFACE.

2. WHEN TRENCH NEEDS TO BE COVERED FOR PEDESTRIAN OR VEHICULAR USE, STEEL TRENCH
PLATE OR OTHER APPROVED SYSTEM SHALL BE UTILIZED. A TRENCH PLATE LOCKING SYSTEM
MUST BE UTILIZED TO PREVENT THE MOVEMENT OF THE TRENCH PLATE. TRENCH COVER SYSTEM
MUST BE APPROVED BY THE CITY OR DESIGNEE.

3. COLD PATCH ON THE EDGES OF TRENCH PLATES SHALL NOT BE APPROVED UNLESS PLATES
ARE OTHERWISE SECURED AGAINST MOVEMENT. SEE STANDARD DETAIL 10-4 FOR ADDITIONAL
INFORMATION.

4. CONTRACTOR MUST PROVIDE DENSITY TEST RESULTS PRIOR TO PAVING.
NOTES:

1. FLOWABLE FILL SHALL BE USED AS BACKFILL ONLY WHEN INDICATED PER FDOT PERMIT REQUIREMENT OR AS DIRECTED BY THE CITY OR DESIGNEE.

2. CONTRACTOR MUST PROVIDE DENSITY TEST RESULTS PRIOR TO PAVING.
6" TOP SOIL

18" MIN.  

18" MIN. 

FOR TRENCH RESTORATION, REFER TO CITY OF MIAMI BEACH PUBLIC WORKS MANUAL PIPE INSTALLATION STANDARD DETAILS

VARIES

SECTION VIEW

NTS.

TYPICAL GREEN AREA RESTORATION
MANHOLES/CROSSWALKS/JOINTS

MANHOLES PROJECTING 1' OR MORE ABOVE THE TRAVEL LANE AND CROSSWALKS HAVING AN UNEVEN SURFACE GREATER THAN 1/4" AS A RESULT OF CONSTRUCTION ACTIVITIES SHALL HAVE A TEMPORARY ASPHALT APRON CONSTRUCTED AS SHOWN IN THE DETAIL BELOW. THIS DOES NOT APPLY TO TRENCH PLATES OR TRENCH COVER SYSTEMS.

ALL TRANSVERSE JOINTS THAT HAVE A DIFFERENCE IN ELEVATION OF 1' OR MORE SHALL HAVE A TEMPORARY ASPHALT APRON CONSTRUCTED AS SHOWN IN THE DETAIL BELOW.

MANHOLE OR OTHER ABOVE GROUND OBSTRUCTION

COLD PATCH ASPHALT APRON
BITUMINOUS TACK COAT

5 TEMPORARY SURFACE

THE APRON IS TO BE REMOVED PRIOR TO CONSTRUCTING THE NEXT LIFT OF ASPHALT.
1. NEW CORAL ROCK SHALL MATCH EXISTING CORAL ROCK SIZE AND APPEARANCE.
2. CONTRACTOR SHALL REPAIR BROKEN AND/OR CHIPPED AREAS OF EXISTING CORAL ROCK WALLS MATCHING MATERIALS AND CONSTRUCTION.
3. MORTAR COLOR SHALL MATCH EXISTING MORTAR COLOR.
LIMEROCK BASE
CURB PAD
COMPACTED 98%
PER AASHTO T-180

3 #5 REINFORCING STEEL
RODS CONTINUOUS BETWEEN
EXPOSED JOINTS

SECTION VIEW
N.T.S.

NOTES:

1. CURB MUST MATCH EXISTING CURB FOR RESTORATION PROJECTS.

2. WHEN USED ON HIGH SIDE OF ROADWAYS, THE CROSS SLOPE OF THE
GUTTER SHALL MATCH THE CROSS SLOPE OF THE ADJACENT PAVEMENT.
THE THICKNESS OF THE LIP SHALL BE 6", UNLESS OTHERWISE SHOWN
ON PLANS.

3. COLOR: STANDARD GRAY UNLESS OTHERWISE NOTED.

4. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL
REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE
THE MANUFACTURER'S MILL MARKING ROLLED INTO THE BAR WHICH
SHALL INDICATE THE PRODUCER, SIZE, AND GRADE.
1. FOR USE ADJACENT TO CONCRETE OR FLEXIBLE PAVEMENT, ASPHALT SHOWN. EXPANSION JOINT, PREFORMED JOINT FILLER AND JOINT SEAL ARE REQUIRED BETWEEN CURBS AND CONCRETE PAVEMENT ONLY.

2. COLOR: STANDARD GRAY UNLESS OTHERWISE NOTED.

3. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, AND GRADE.
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NOTES:


2. COLOR: STANDARD GRAY UNLESS OTHERWISE NOTED.

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NOTES:

1. PUBLIC SIDEWALK CURB RAMPS SHALL BE CONSTRUCTED IN THE PUBLIC RIGHT-OF-WAY AT LOCATIONS THAT WILL PROVIDE CONTINUOUS UNOBSERVED PEDESTRIAN CIRCULATION PATHS TO PEDESTRIAN AREAS, ELEMENTS AND FACILITIES IN THE PUBLIC RIGHT-OF-WAY, AND TO ACCESSIBLE PEDESTRIANS ROUTES ON ADJACENT SITES. CURBED FACILITIES WITH SIDEWALKS AND THOSE WITHOUT SIDEWALKS ARE TO HAVE CURB RAMPS CONSTRUCTED AT ALL STREET INTERSECTIONS AND AT TURNOUTS THAT HAVE CURBED RETURNS. PARTIAL CURB RETURNS SHALL EXTEND TO THE LIMIT PRESCRIBED BY FDOT INDEX 515 TO ACCOMMODATE CURB RAMPS. RAMPS CONSTRUCTED AT LOCATIONS WITHOUT SIDEWALKS SHALL HAVE A LANDING CONSTRUCTED AT THE TOP OF EACH RAMP.

2. CURB RAMP RUNNING SLOPES AT UNRESTRAINED SITES SHALL NOT BE STEEPER THAN 1:12 AND CROSS SLOPE SHALL BE 0.02 OR FLATTER. TRANSITION SLOPES SHALL NOT BE STEEPER THAN 1:12. WHEN ALTERING EXISTING PEDESTRIAN FACILITIES WHERE EXISTING SITE DEVELOPMENT PRECLUDES THE ACCOMMODATION OF A RAMP SLOPE OF 1:12, A RUNNING SLOPE BETWEEN 1:12 AND 1:10 IS PERMITTED FOR A RISE OF 6' MAXIMUM AND RUNNING SLOPE OF BETWEEN 1:10 AND 1:8 IS PERMITTED FOR A RISE OF 3' MAXIMUM. WHERE COMPLIANCE WITH THE REQUIREMENTS FOR CROSS SLOPE CANNOT BE FULLY MET, THE MINIMUM FEASIBLE CROSS SLOPE SHALL BE PROVIDED. RAMP RUNNING SLOPE IS NOT REQUIRED TO EXCEED 8' IN LENGTH, EXCEPT AS SITED WHERE THE PLANS SPECIFY A GREATER LENGTH.

3. IF A CURB RAMP IS LOCATED WHERE PEDESTRIANS MUST WALK ACROSS THE RAMP, THE WALK SHALL HAVE TRANSITION SLOPES TO THE RAMP; THE MAXIMUM SLOPE OF THE TRANSITIONS SHALL BE 1:12. RAMPS WITH CURB RETURNS MAY BE USED AT LOCATIONS WHERE OTHER IMPROVEMENTS PROVIDE GUIDANCE AWAY FROM THAT PORTION OF THE CURB PERPENDICULAR TO THE SIDEWALK; IMPROVEMENTS FOR GUIDANCE ARE NOT REQUIRED AT CURB RAMPS FOR LINEAR PEDESTRIAN TRAFFIC.

4. CURB RAMP DETECTABLE WARNING SURFACES SHALL EXTEND THE FULL WIDTH OF THE RAMP AND IN THE DIRECTION OF TRAVEL 24' FROM THE BACK OF CURB. DETECTABLE WARNING SURFACES SHALL BE CONSTRUCTED BY TEXTURING A TRUNCATED DOME PATTERN IN CONFORMANCE WITH ADA STANDARDS FOR ACCESSIBLE DESIGN, PUBLIC RIGHT-OF-WAY GUIDELINES SECTION 305. TRANSITION SLOPES ARE NOT HAVE DETECTABLE WARNINGS.

5. WHERE A CURB RAMP IS CONSTRUCTED WITHIN EXISTING CURB, CURB AND GUTTER AND/OR SIDEWALK THE EXISTING CURB OR CURB AND GUTTER SHALL BE REMOVED TO THE NEAREST JOINT BEYOND THE CURB TRANSITIONS OR TO THE EXTENT THAT NO REMAINING SECTION OF THE CURB OR CURB AND GUTTER IS LESS THAN 5' LONG. THE EXISTING SIDEWALK SHALL BE REMOVED TO THE NEAREST JOINT BEYOND THE TRANSITION SLOPE OR WALK AROUND OR TO THE EXTENT THAT NO REMAINING SECTION OF SIDEWALK IS LESS THAN 5' LONG.

6. THE RAMP DETECTABLE WARNING SURFACE COLOR REQUIREMENT SHALL BE PROVIDE A DARK-ON-LIGHT VISUAL CONTRAST BETWEEN THE DETECTABLE WARNING SURFACE AND THE ADJACENT WALKING SURFACE. WHERE ADJACENT WALKING SURFACES ARE COLORED OR ARE CONSTRUCTED WITH MATERIALS OTHER THAN STANDARD CLASS I PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH SECTION 522 OF FDOT STANDARD SPECIFICATIONS, THE PLANS MUST PROVIDE FOR DETECTABLE WARNING SURFACE COLORS OR MATERIALS THAT PROVIDE THE NECESSARY CONTRAST, EITHER DARK-ON-LIGHT OR LIGHT-ON-DARK.
TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS

CROSSWALK WIDTHS & CONFIGURATION VARY; MUST CONFORM TO FDOT INDEX NO. 522
NOTE:

1. WHERE CURB RAMPS ARE CONSTRUCTED IN EXISTING SIDEWALKS OR UTILITY STRIP SLOPES GREATER THAN 0.02, THE SIDEWALK SHALL BE RECONSTRUCTED TO REDUCE THE SLOPES TO 0.02 AT THE FLARE POINT.
CROSSWALK WIDTHS & CONFIGURATION VARY; MUST CONFORM TO FDOT INDEX NO. 522.

BACK OF SIDEWALK ALIGNMENT VARIATIONS

4' MIN. FULL HEIGHT CURB

WHEN CROSSWALK MARKINGS ARE REQUIRED, RAMP RUNS MUST FALL WITHIN CROSSWALK LIMITS & PARALLEL WITH THE PROJECTED CROSSWALK ALIGNMENT

PLAN VIEW
N.T.S.
CROSSWALK WIDTHS & CONFIGURATION VARY; MUST CONFORM TO FDOT INDEX NO. 522.

FOR BACK OF SIDEWALK CURB OR BUFFER TRANSITIONS AND FOR RAMP & SIDEWALK CURB OPTIONS SEE 10-12, 10-13 AND 10-15.

PLAN VIEW
N.T.S.

NOTE:

1. A PORTION OF ONE OR BOTH RAMPs MAY EXTEND OUTSIDE THE RETURN.
Omit joints on curb ramps for turnout or side street layout. Crosswalk widths & configuration vary; must conform to FDOT index No. 522.

Plan view
N.T.S.
NOTES:

1. ALL SIDEWALK CURB RAMPS SHALL HAVE DETECTABLE WARNING SURFACES THAT EXTEND THE FULL WIDTH OF THE RAMP AND IN THE DIRECTION OF TRAVEL, 24" (610 MM) FROM THE BACK OF CURB.

2. STAMPED CONCRETE DETECTABLE WARNINGS ARE NOT ALLOWED DUE TO POOR PERFORMANCE.
TABLE OF SIDEWALK JOINTS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>'A'</td>
<td>P.C. AND P.T. OF CURVES, JUNCTION OF EXISTING &amp; NEW SIDEWALKS, CURBS, AND DRIVEWAYS.</td>
</tr>
<tr>
<td>'B'</td>
<td>5'-0&quot; CENTER TO CENTER ON SIDEWALKS.</td>
</tr>
<tr>
<td>'C'</td>
<td>EXISTING STRUCTURES</td>
</tr>
</tbody>
</table>

SIDEWALK JOINTS

NOTES:

1. ALL CONCRETE SHALL BE 3000 PSI AND REINFORCED WITH 6X6-W1.4XW1.4 WELDED WIRE MESH.

2. SIDEWALKS AT DRIVEWAYS AND INTERSECTIONS ARE OF 6" THICK, AND 4" THICK IN OTHER AREAS.

3. TEMPORARY REPAIR OF SIDEWALK USING COLD ASPHALT PATCH SHALL MEET THE SLOPE REQUIREMENT OF NEW SIDEWALK.

4. COLD PATCH MUST BE SMOOTH AND FLUSH WITH ADJOINING FLAGS OF SIDEWALK.

5. REPAIR OF SIDEWALK MUST BE IN FULL, PARTIAL FLAGS WILL NOT BE ACCEPTED.
NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH FDOT SPECIFICATIONS SECTIONS 346 & 350.

2. ALL TESTING SHALL BE IN ACCORDANCE WITH FDOT SPECIFICATIONS SECTION 346-5/346-8 FOR 28 DAY COMpressive STRENGTH 3000 PSI CONCRETE.

3. PROVIDE EXPANSION JOINTS 20' CENTER TO CENTER, AT PC & PT OF CURVES, JUNCTIONS OF EXISTING & NEW SIDEWALKS, AND WHERE SIDEWALK ABUTS CURBS, DRIVEWAYS & SIMILAR STRUCTURES. PROVIDE CONTRACTION JOINTS 5' CENTER TO CENTER.

4. SOD SHALL BE PLACED BELOW EDGE OF SIDEWALK TO ALLOW DRAINAGE.

5. TEMPORARY REPAIR OF SIDEWALK USING COLD ASPHALT PATCH SHALL MEET THE SLOPE REQUIREMENT OF NEW SIDEWALK.

6. COLD PATCH MUST BE SMOOTH AND FLUSH WITH ADJOINING FLAGS OF SIDEWALK.

7. REPAIR OF SIDEWALK MUST BE IN FULL FLAGS, PARTIAL FLAGS WILL NOT BE ACCEPTED.
CITY OF MIAMI BEACH MODIFIED TYPE F CURB & GUTTER

PREFORMED TRENCH DRAIN GRATE

CONCRETE AROUND PREFORMED TRENCH DRAIN

END CURB AT POINT WHERE BACK OF CURB INTERSECT BACK OF CONCRETE AROUND PREFORMED TRENCH DRAIN

EXISTING SIDEWALK (TO REMAIN)

EXISTING CURB & GUTTER (TO REMAIN)

SHAPE GUTTER AS REQUIRED TO MAINTAIN DESIRED DIRECTION OF FLOW
TRENCH DRAIN DETAIL FOR BULB-OUT

CONSTRUCT CITY OF MIAMI BEACH MODIFY CURB TYPE "F" AROUND BULB-OUTS

PEDESTRIAN (ADA) GRATE (CAST IRON) PART Z-882 HDP GRATE OR EQUIVALENT (ZURN)

VARIABLES (SEE PLANS)
4" THICK SIDEWALK ANCHOR (TYP.)

VARIABLES (0'-2') (SEE PLANS)
12" SOD 2% 1.5'

MILLING & RESURFACING 2'

SEE TYPICAL SECTIONS FOR CROSS SLOPE

SAW CUT
4" THICK CURB PAD

4" (TYP.)

EXISTING PAVEMENT
EXISTING BASE & PAVEMENT (REMOVE)

TOP OF GRATE TO MATCH EXISTING CURB HEIGHT

EXISTING CURB & GUTTER (TO BE REMOVED)

6" 6' 6'

PUBLIC WORKS DEPARTMENT 1700 CONVENTION CENTER DRIVE, MIAMI BEACH, FL 33139
NOTES:

1. THE LIMITS WITHIN WHICH DRIVEWAYS MAY NOT BE CONSTRUCTED ARE DETERMINED BY MEASURING FROM THE PI OF R/W LINES A DISTANCE OF 15' ALONG THE R/W LINE CURVE TANGENTS.

2. ALL DRIVEWAYS MUST BE CONSTRUCTED SO THAT NO PART OF THE DRIVEWAY (EXCLUDING THE TRANSITION) BETWEEN THE EDGE OF ROADWAY PAVEMENT AND THE R/W LINE IS CLOSER THAN 5' FROM A SIDE LOT LINE EXTENDED.
1. WHERE THE INTERSECTION ANGLE $\phi$ IS 90° OR LESS, DIMENSION "A" CONTROLS.

2. WHERE THE INTERSECTION ANGLE $\phi$ IS OVER 90°, DIMENSION "D" CONTROLS.

3. WHEN THIS DISTANCE IS LESS THAN 50', THE AREA SHALL BE PAVED AND A 6" CONCRETE CURB CONSTRUCTED AT THE BACK OF SIDEWALK.

4. WIDTHS BETWEEN 40' & 60' WILL BE PERMITTED ON FRONTAGES 130' OR GREATER, PROVIDED DIMENSIONS REMAIN AS SHOWN ON TABLE BELOW.

5. DRAINAGE IS REQUIRED IN DRIVEWAY AREA.
NOTES:

1. THE HEIGHT OF FENCES, WALLS, BUS SHELTERS AND HEDGES SHALL NOT EXCEED 2 FEET IN HEIGHT WITHIN FIFTEEN (15) FEET OF THE EDGE OF DRIVEWAY LEADING TO A PUBLIC RIGHT-OF-WAY.

2. THE SAFE SIGHT DISTANCE TRIANGLE AREA SHALL NOT CONTAIN OBSTRUCTIONS TO CROSS-VISIBILITY AT A HEIGHT BETWEEN 2 FEET AND 6 FEET ABOVE PAVEMENT, POTENTIAL OBSTRUCTIONS INCLUDE, BUT ARE NOT LIMITED TO STRUCTURES, GRASS, GROUND COVERS, SHRUBS, VINES, HEDGES, TREES, ROCKS, WALLS AND FENCES.
1. SPACE JOINTS IN ACCORDANCE WITH STANDARD DETAIL 10–17

2. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, AND GRADE.
PLAN VIEW
N.T.S.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CROSS REF.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCRETE DRIVEWAY CURB</td>
<td>10–9</td>
</tr>
<tr>
<td>CURB AND GUTTER</td>
<td>10–6</td>
</tr>
<tr>
<td>CONCRETE SIDEWALK</td>
<td>10–18</td>
</tr>
</tbody>
</table>

NOTE:
1. SPACE JOINTS IN ACCORDANCE WITH STANDARD DETAIL 10–17.
LEGEND

AREA WHERE NO STRUCTURE OR PLANTING WHICH OBSTRUCTS TRAFFIC VISIBILITY BETWEEN THE HEIGHT OF TWO FEET AND TEN FEET ABOVE THE STREET CORNER GRADE IS ALLOWED. REFER TO CITY OF MIAMI BEACH CODE OF ORDINANCES SECTION 142-1135

NO PLANTING OR STRUCTURE PERMITTED WITHIN THESE LIMITS WHICH OBSTRUCTS TRAFFIC VISIBILITY.

E.P. EDGE OF PAVEMENT

R/W RIGHT OF WAY

SIDEWALK

TREE PLANTING LIMITED SPECIES NOT DAMAGING TO ROADWAYS AND UTILITIES

SIDE LOT LINE

NOTE: SEE ADDITIONAL FDOT REQUIREMENTS FOR INTERSECTIONS WITH FDOT RIGHT-OF-WAYS

PLAN VIEW

N.T.S.

TRIANGLE OF VISIBILITY BETWEEN 3 & 6 FEET

ELEVATION VIEW

N.T.S.

NOTES:

1. AT INTERSECTIONS WITH ALL-WAY STOP CONTROL, THE FIRST STOPPED VEHICLE ON ONE APPROACH SHOULD BE VISIBLE TO THE DRIVERS OF THE FIRST STOPPED VEHICLES ON EACH OF THE OTHER APPROACHES. THERE ARE NO OTHER SIGHT DISTANCE CRITERIA APPLICABLE TO INTERSECTIONS WITH ALL-WAY STOP CONTROL AND, INDEED, ALL-WAY CONTROL MAY BE THE BEST OPTION AT A LIMITED NUMBER OF INTERSECTIONS WHERE SIGHT DISTANCE FOR OTHER CONTROL TYPES CANNOT BE ATTAINED.

2. FOR TWO-WAY STOP INTERSECTIONS, SIGHT DISTANCE CRITERIA FOR STOP CONTROLLED INTERSECTIONS ARE LONGER THAN STOPPING SIGHT DISTANCE TO ENSURE THAT THE INTERSECTION OPERATES SMOOTHLY. MINOR ROAD VEHICLE OPERATORS CAN WAIT UNTIL THEY CAN PROCEED SAFELY WITHOUT A MAJOR ROAD VEHICLE TO STOP.
LEGEND

- **AREA WHERE NO STRUCTURE OR PLANTING WHICH OBSTRUCTS TRAFFIC VISIBILITY BETWEEN THE HEIGHT OF TWO FEET AND TEN FEET ABOVE THE STREET CORNER GRADE IS ALLOWED.**

- **NO PLANTING OR STRUCTURE PERMITTED WITHIN THESE LIMITS WHICH OBSTRUCTS TRAFFIC VISIBILITY**

- **E.P. EDGE OF PAVEMENT**

- **R/W RIGHT OF WAY**

- **PLAN VIEW**

- **ELEVATION VIEW**

**NOTES:**

1. AT INTERSECTIONS WITH ALL-WAY STOP CONTROL, THE FIRST STOPPED VEHICLE ON ONE APPROACH SHOULD BE VISIBLE TO ON EACH OF THE OTHER APPROACHES. THERE ARE NO OTHER SIGHT DISTANCE CRITERIA APPLICABLE TO INTERSECTIONS WITH ALL-WAY STOP CONTROL AND, INDEED, ALL-WAY STOP CONTROL MAY BE THE BEST OPTION AT A LIMITED NUMBER OF INTERSECTIONS WHERE SIGHT DISTANCE FOR OTHER CONTROL TYPES CANNOT BE ATTAINED.

2. FOR TWO-WAY STOP INTERSECTIONS, SIGHT DISTANCE CRITERIA FOR STOP CONTROLLED INTERSECTIONS ARE LONGER THAN STOPPING SIGHT DISTANCE TO ENSURE THAT THE INTERSECTION OPERATES SMOOTHLY. MINOR-ROAD VEHICLE OPERATORS CAN WAIT UNTIL THEY CAN PROCEED SAFELY WITHOUT A MAJOR-ROAD VEHICLE TO STOP.

3. THIS STANDARD DETAIL IS FOR 30 MPH RESIDENTIAL STREETS. SEE ADDITIONAL FDOT REQUIREMENTS FOR FDOT INTERSECTIONS WITH FDOT RIGHT-OF-WAYS.
SECTION VIEW
N.T.S.

A. RIGHT-OF-WAY LINE AT OR ABOVE FLOOD CRITERIA
B. CONCRETE SIDEWALK
C. LEVEL LINE
D. ASPHALTIC CONCRETE SURFACE COURSE 2" TYPE S-III OR SP-9.5
E. 8" THICK BASE COURSE, PRIMED ENTIRE WIDTH OF ASPHALT
F. OFFSET FROM LEVEL LINE
G. SWALE (SOLID SOD)
H. 12" THICK STABILIZED SUBGRADE

NOTES:

1. PRIVATE DRIVEWAY APPROACHES TO SLOPE TOWARDS ROADWAYS.
2. AN APPROVED DRAINAGE SYSTEM IS REQUIRED WHERE THIS DETAIL IS USED.
SECTION VIEW
N.T.S.

A RIGHT-OF-WAY LINE AT OR ABOVE FLOOD CRITERIA
B CONCRETE SIDEWALK
C 6" CURB AND GUTTER
D LEVEL LINE
E ASPHALTIC CONCRETE SURFACE COURSE 2" TYPE S-III OR SP-9.5
F 8" THICK BASE COURSE, PRIMED ENTIRE WIDTH OF ASPHALT PLUS
  1 FOOT EXTRA EACH SIDE
G OFFSET FROM LEVEL LINE
H 12" THICK STABILIZED SUBGRADE

NOTE:
1. AN APPROVED DRAINAGE SYSTEM IS REQUIRED WHERE THIS DETAIL IS USED.
SECTION VIEW
N.T.S.

A. RIGHT-OF-WAY LINE AT OR ABOVE FLOOD CRITERIA
B. CONCRETE SIDEWALK
C. LEVEL LINE
D. ASPHALTIC CONCRETE SURFACE COURSE 2" TYPE S-III OR SP-9.5
E. 8" THICK BASE COURSE, PRIMED ENTIRE WIDTH OF ASPHALT PLUS 1 FOOT EACH SIDE
F. OFFSET FROM LEVEL LINE
G. SWALE (SOLID SOD), SEE R14.6 FOR SPECIAL DRAINAGE CONDITION
H. 12" THICK STABILIZED SUBGRADE

NOTES:

1. PRIVATE DRIVEWAY APPROACHES TO SLOPE TOWARDS ROADWAYS.
2. AN APPROVED DRAINAGE SYSTEM IS REQUIRED WHERE THIS DETAIL IS USED.
SECTION VIEW
N.T.S.

A RIGHT-OF-WAY LINE AT OR ABOVE FLOOD CRITERIA
B CONCRETE SIDEWALK
C 6" CURB AND GUTTER
D ASPHALTIC CONCRETE SURFACE COURSE 2" THICK TYPE S-III OR SP-9.5
E LEVEL LINE
F 8" THICK BASE COURSE, PRIMED ENTIRE WIDTH OF ASPHALT
G OFFSET FROM LEVEL LINE
H SOLID SOD
I 12" THICK STABILIZED SUBGRADE

NOTES:

1. THIS DETAIL APPLIES TO LOCAL STREETS IN MULTI-FAMILY RESIDENTIAL AREAS, AND COMMERCIAL AND INDUSTRIAL AREAS. FOR COLLECTOR STREETS USED FOR ACCESS TO THESE LAND USES INDICATED BY TRAFFIC PROJECTIONS SHOWN, USE STANDARD DETAIL 10-33.

2. AN APPROVED DRAINAGE SYSTEM IS REQUIRED WHERE THIS DETAIL IS USED.
SECTION VIEW
N.T.S.

A. LEVEL LINE
B. CONCRETE SIDEWALK
C. RIGHT-OF-WAY LINE AT OR ABOVE FLOOD CRITERIA
D. 6" CURB AND GUTTER
E. ASPHALTIC CONCRETE SURFACE COURSE 2" THICK TYPE S—III OR SP—9.5
F. 8" THICK BASE COURSE, PRIMED ENTIRE WIDTH OF ASPHALT
G. 12" THICK STABILIZED SUBGRADE

NOTES:

1. THIS DETAIL APPLIES TO COLLECTOR STREET WHERE INDICATED BY TRAFFIC PROJECTIONS.

2. AN APPROVED DRAINAGE SYSTEM IS REQUIRED WHERE THIS DETAIL USED.
SECTION VIEW
N.T.S.

A RIGHT-OF-WAY LINE AT OR ABOVE FLOOD CRITERIA
B ASPHALTIC CONCRETE SURFACE COURSE 2" THICK TYPE S-III OR SP-9.5
C LEVEL LINE
D CONCRETE SIDEWALK
E 6" CURB AND GUTTER
F 8" THICK BASE COURSE, PRIMED ENTIRE WIDTH
G 12" THICK STABILIZED SUBGRADE
H OFFSET FROM LEVEL LINE

NOTE:

1. AN APPROVED DRAINAGE SYSTEM IS REQUIRED WHERE THIS DETAIL IS USED.
SCHOOL

8'
9'-8'
4'

SINGLE—LANE PAVEMENT MARKING
N.T.S.

EDGE LINE

24" WHITE (T)
(SEE NOTE 1)

PAVEMENT MARKINGS
SHOULD NOT EXTEND OVER
INTO OPPOSING LANE

24" WHITE (T)
(SEE NOTE 1)

SCHOOL

NOTE:

1. PAVEMENT MESSAGE SHALL INCLUDE THE COST OF 24" WHITE (T)
   STRIPING INDICATED BELOW.
TYPICAL STRIPING
TRAVELED WAY
N.T.S.

NOTES:

1. DIMENSION "A" VARIES ACCORDING TO EXISTING LANE WIDTHS. EXAMPLE: A=3' FOR A 10' LANE WIDTH, A=4' FOR A 12' LANE WIDTH ETC.

2. ALL CROSSWALKS MUST BE HIGH EMPHASIS CROSSWALKS (ZEBRA OR LADDER).
1. REFLECTOR COLOR (WHITE/YELLOW) SHOULD CONFORM WITH THE COLOR OF THE NEAR LANE EDGE LINE.
STREET SIGN POST ASSEMBLY

SIGN POST & BASE POST

WEIGHT – 3.00 LBS/FT

Hex Head – Integral Flange Bolt, Nut & Lockwashers
4 Req’d (See Notes Below)

NOTES:

1. 1/4"-18 UNC: 1 1/2" BOLT – PER ASTM A-354, GRADE BD (GRADE 8).
2. NUT – PER ASTM A-563, GRADE DH.
3. LOCK WASHER—HEAVY DUTY EXTERNAL TYPE FINISH CADMIUM PLATED PER ASTM A-165-80, TYPE OS.
**LARGE ANCHOR PLATE**

A. LINE-UP 6" x 12" ANCHOR PLATE WITH 30" BASE POST.
B. ATTACH ANCHOR PLATE TO BASE POST WITH TWO (2) 5/16" 18 UNC X 2 3/4" BOLTS, NUTS, AND LOCKWASHERS.

**NOTE:**
BASE POST WILL ACTUALLY GROOVE THE CONCRETE AT THE FLANGED ENDS

A. DRIVE BASE POST TO SIX (6) INCHES ABOVE GROUND
B. ROTATE STRAP TO VERTICAL POSITION
C. TO BE USED ON LOOSE FILL AND SANDY SOILS

**PRIOR TO DRIVING BASE POST:**
A. BORE A 3" DIAMETER HOLE THROUGH THE CONCRETE FLAG
B. DRIVE BASE POST TO SEVEN (7) INCHES ABOVE GROUND
C. ROTATE STRAP TO VERTICAL POSITION
USED ON ANY MOUNTABLE TYPE CURB AND GUTTER SECTION (i.e. - VALLEY GUTTER, ETC.)

TYPICAL SIGN ASSEMBLY
N.T.S.

SIGN BLANK
N.T.S.

NOTES:

1. (*) DIMENSIONS ARE FOR 12 INCH BLANK STREET NAME SIGN.
2. LETTER ONE SIDE OF STREET NAME SIGN ONLY.
3. STREET NAME SIGN ATTACHED PERPENDICULAR TO POST ON APPROVED MOUNTING BRACKET ONLY.
4. (**) ALL SIGN SHOULD BE PLACED IN THE FRONT OR BACK OF THE SIDEWALK TO COMPLY WITH PEDESTRIAN CLEAR PATH OF 4- FEET WHERE POSSIBLE. WHERE LIMITS OF ROAD AND RIGHT-OF-WAY PREVENTS, USE 2' SETBACK FROM THE FACE OF THE CURB.
INTERLOCKING CONCRETE
PAVERS (REFER TO
SPECIFICATIONS IN CITY OF
MIAMI BEACH PUBLIC WORKS
MANUAL SECTION 10)

8" x 12" CONCRETE
HEADER CURB

2 #5 STEEL REINFORCING
RODS 54" CONTINUOUS
FOR BREAK AWAY

1/2" BEVEL @ 45°

VARIES

12" TYP.

1 1/2" MIN. SAND-
LEVELING COURSE

3"

12" STABILIZED SUBGRADE

8" LIMEROCK BASE

IRRIGATION SLEEVE, EXTEND
12" BEYOND EDGE OF CURB

FINISH GRADE

SECTION VIEW
N.T.S.

NOTE:

1. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL
REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE
THE MANUFACTURER'S MILL MARKING ROLLED INTO THE BAR WHICH SHALL
INDICATE THE PRODUCER, SIZE, AND GRADE.
INTERLOCKING CONCRETE PAVERS (REFER TO SPECIFICATIONS IN CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10)

1 1/2" BEVEL @ 45°

12"x12" CONC. CAST IN PLACE EDGE RESTRAINTS (TYP)

4 #4 STEEL REINFORCING RODS CONT. W/#3 STRIRRUPS @30: O.C. (TYP)

IRRIGATION SLEEVE, EXTEND 12" BEYOND CONCRETE EDGE RESTRAINTS

COMPACTED SUB-GRADE

1 1/2" MIN. SAND LEVELING COURSE

3000 P.S.I. CONC. SLAB

6x6-W1.4xW1.4 WELDED WIRE MESH, CONT. 3" CL. (TYP)

SECTION VIEW
N.T.S.

NOTE:

1. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, AND GRADE.
INTERLOCKING CONCRETE PAVERS (REFER TO SPECIFICATIONS IN CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10)

- DROP-OFF LANE
- TYPE "D" CONCRETE CURB
- SIDEWALK
- 2' WIDE CONCRETE VALLEY GUTTER
- COMPACTED SUB-GRADE
- 1 1/2" MIN. SAND LEVELING COURSE
- 3000 P.S.I. CONC. SLAB
- 6x6-W1.4xW1.4 WELDED WIRE MESH, CONT. 3" CL. (TYP)
- IRRIGATION SLEEVE, EXTEND 12" BEYOND EDGE OF CURB AND GUTTER

SECTION VIEW
N.T.S.
NOTE:

1. THE DESIRABLE BIKE LANE WIDTH ADJACENT TO A CURBFACE IS 6 FEET. THE DESIRABLE RIDABLE SURFACE ADJACENT TO A STREET EDGE OR LONGITUDINAL JOINT IS 4 FEET, WITH A MINIMUM WIDTH OF 3 FEET. WHERE ILLEGAL PARKING IN BICYCLE LANES IS A CONCERN, 5 FOOT WIDE BICYCLE LANES MAY BE PREFERRED.
NOTE:

1. A BICYCLE LANE NEXT TO A PARKING LANE SHALL BE AT LEAST 5 FEET WIDE, UNLESS THERE IS A MARKED BUFFER BETWEEN THEM. WHEREVER POSSIBLE, MINIMIZE PARKING LANE WIDTH IN FAVOR OF INCREASED BICYCLE LANE WIDTH.
MINIMUM WIDTHS FOR BICYCLE LANES ON ROADWAY WITHOUT CURB & GUTTER

SECTION VIEW
N.T.S.

2' THICK ASPHALT
8" THICK COMPACTED BASE
12" THICK STABLE SUB-BASE

GRASS SHOULDER
4 FT
BICYCLE LANE
4 FT
MOTOR VEHICLE LANES
4 FT
BICYCLE LANE
GRASS SHOULDER
NOTES:

1. ALL SIGNAGE WILL COMPLY WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)" BY U.S. DEPARTMENT OF TRANSPORTATION—FEDERAL HIGHWAY ADMINISTRATION.

2. REFER TO MUTCD CHAPTER 9, NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS URBAN BIKEWAY DESIGN GUIDE AND CITY OF MIAMI BEACH STREET DESIGN GUIDELINES FOR ADDITIONAL SIGNS.

3. 5' MIN CURB RADIUS RETURN AS PER FDOT INDEX 711-002.

4. WHEREVER POSSIBLE, THE DESIRABLE APPLICATION IS A BUFFERED BICYCLE LANE.

5. ALL BICYCLE LANES ON CITY STREETS SHALL BE STRIPED GREEN.
WHITE LINE DETAIL
N.T.S.

6' SOLID WHITE LINE

4' - 0" MIN

BICYCLE LANE
PAVEMENT MARKING
N.T.S.
NOTES:

1. USE 1-1/2" SCHEDULE 40, SATIN #4 POLISH, STAINLESS STEEL PIPE 316 GRADE.

2. USE 1/2" x 13 x 1" STAINLESS STEEL FLAT HEAD SOCKET CAP SCREW WITH 1/2" HDI, CARBON STEEL, HILTI ANCHOR DROP-IN (PART #336427) OR EQUAL TO SECURE BIKE RACK TO MOUNTING SURFACE.

3. WHEN USING MORE THAN ONE LOOP, SEPARATION BETWEEN EACH LOOP SHALL BE A MINIMUM OF 30" CENTER TO CENTER.
NOTES:

1. ALL SIGNAGE WILL COMPLY WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)" BY U.S. DEPARTMENT OF TRANSPORTATION—FEDERAL HIGHWAY ADMINISTRATION.

2. REFER TO MUTCD CHAPTER 9, NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS URBAN BIKEWAY DESIGN GUIDE AND CITY OF MIAMI BEACH STREET DESIGN GUIDELINES FOR ADDITIONAL SIGNS.
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1. ALL SIGNAGE WILL COMPLY WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)" BY U.S. DEPARTMENT OF TRANSPORTATION—FEDERAL HIGHWAY ADMINISTRATION.

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NOTES:

1. STREET NAME SIGN ATTACHED PERPENDICULAR TO POST ON APPROVED MOUNTING BRACKET ONLY.
2. BICYCLE LANE (R3–17) SIGN SHALL BE USED ONLY IN CONJUNCTION WITH MERGED BICYCLE LANES. REFER TO 10–49
3. BICYCLE LANE SIGN SHALL BE PLACED AT REGULAR INTERVALS, SPACING SHALL BE DETERMINED BY AN ENGINEER IN ACCORDANCE WITH MTUCD CHAPTER 9B.
4. IF STANDARD OFFSET IS NOT ATTAINABLE, CONTACT CITY ENGINEER FOR ALTERNATE OFFSET APPROVAL.
# SECTION 11. LANDSCAPE WORK

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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. American National Standards Institute (ANSI)
   ANSI A300  Tree Care Standards Manual

2. City of Miami Beach
   Code of Ordinances
   Urban Forestry Master Plan (June 2020)

3. Florida Building Code

4. Florida Department of Agriculture
   Grades and Standards for Nursery Plants

5. Florida Nursery Grower’s and Landscape Association (FNGLA)
   Best Management Practices


7. Occupational Safety and Health (OSHA) Regulations

8. University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS)
   A Guide to Florida Friendly Landscaping

B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

   Section 1. Design Standards and Guidelines
   Section 3. Right-of-Way Construction Requirements
   Section 8. Surveying, Drawing, and Drafting Requirements
   Section 9. Erosion and Sediment Control
   Section 10. Earthwork and Roadwork
1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.03 GLOSSARY OF TERMS

A. For Glossary of Terms refer to the City of Miami Beach Code of Ordinances Chapter 46 Environment and Chapter 126 Landscape Requirements.

1.04 THE REQUIREMENTS

A. The following are the minimum requirements that any contractor/developer shall consider in order to design, construct, and/or install landscape work within the public right-of-way (ROW).
B. The work included in this Section consists of furnishing all labor, supplies equipment, and materials necessary to complete the installation of all landscaping as per the Contract Documents, as well as all other related responsibilities as specified herein.

C. All plant materials included shall be of the specific size and quality indicated on the Plans and in these Specifications, shall be installed in strict accordance with sound industry standards for plant installation, and shall include maintenance and watering for all work outlined on the Plans and Specifications until Final Acceptance.

D. The City or designee reserves the right to adjust the locations of the designated types and species to be used at any of the locations shown in order to provide for any modifications which might become necessary at no additional cost to the City or Owner.

E. The Contractor shall be responsible for making all site subsurface investigations and examinations to become familiar with the character of the existing material and the construction conditions. These subsurface investigations and examinations shall be included in the Bid.

F. Some or all work areas may contain existing materials such as but not limited to limerock and/or may be compacted. This material and any compacted material may interfere with adequate vertical drainage and/or proper plant survival and growth. Removal of this material to have adequate vertical drainage is part of the scope of work. Therefore, the subsurface investigations and examinations are necessary to determine the extent of removal and excavation required above and beyond the minimum requirements indicated in these Specifications. Compensation for any excavation and removal required, above and beyond the minimum requirements indicated, including any additional planting soil needed to fill the larger excavated area, shall be included in the Bid.

G. No separate, additional compensation will be granted due to any unusual difficulties which may be encountered in the execution of any portion of the work.

H. A Tree Work Permit is required for the removal or relocation of trees, except for trees determined to be exempt per City code. In order to remove or relocate trees, the removal must be justified, and either relocation or replacement of trees must take place. Additional information can be found at: https://www.miamibeachfl.gov/city-hall/environmental-sustainability/urban-forestry/for-approval-for-approval-tree-work-permit-information/.

1.05 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which
may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.

B. The Contractor’s Superintendent shall be well versed in Florida plant material, planting operations, contract document reading, and coordination with other performing contracts or services in the job area. All Contractor employees shall be competent and highly skilled in their particular job in order to properly perform the work assigned to them. The Contractor shall be responsible for maintaining the quality of the material on the job throughout the duration of its responsibility.

C. Acceptance of any proposed individual, company, or corporation shall not relieve the Contractor’s responsibility to supervise the work and to coordinate the activities of the subcontractor with work of all other trades.

D. Subcontractor Qualification: No individual, company, or corporation will be permitted to perform any work under this Section by contract of subcontract unless such individual, company, or corporation is fully qualified to perform the work. The Contractor, if requested, shall provide the following evidence that the proposed contractors or subcontractors are qualified.

1. State or local license, where license is required by law.

2. Membership in trade or professional organizations:
   a. Associated Landscape Contractors of America,
   b. American Association of Nurserymen, or
   c. Florida Nurserymen and Growers Association.

3. List of three (3) similar projects which the individual, company, or corporations performed under contract or subcontract to a General Contractor or Owner.

E. The City of Miami Beach Public Works Department Greenspace Management Division does not conduct nursery inspections for plant material quality assurance. The Contractor is obligated to be familiar with all industry and Plan specifications so there is no cause for growing site inspections for City Staff.

F. In the event that it becomes apparent that any nursery supplying plants for this work has knowingly and consistently represented the grade of plants as being higher than their actual grades as determined under these provisions, all plants already delivered from such sources shall be removed from the job at the Contractor’s expense, and no further plants will be accepted from such nursery until written evidence is submitted and confirmed that all material for delivery has been inspected and approved by inspectors of the State Plant Board as being of the grade as represented.
G. Any supplier of materials misrepresenting the grade or quality of their materials (i.e., a higher grade than they are) as determined by the City or designee through the application of the Plans and Specifications, shall not be allowed to supply any material for this project. All material already supplied and received from such a supplier, which is below specified grade, shall be removed immediately and replaced at no additional cost to the City or Owner. This requirement for removal and replacement shall also include any installed materials. No further materials will be accepted from such supplier until written evidence is submitted and confirmed that all material for delivery is of the grade or quality represented.

H. The City or designee shall have the right, during any phase of the work operations, to reject any and all work and materials which do not meet the requirements of the Plans or Specifications. Rejected work and materials shall be immediately removed from the project area and replaced with acceptable work and material within seven (7) calendar days or as approved by the City or designee.

I. All plants shall be pest-free upon installation.

J. Any work associated with trees or that will come into direct conflict with trees shall adhere to the standards set forth within City of Miami Beach Landscape Ordinance (Code of Ordinances Chapter 126) and ANSI-A300.

K. All work associated to tree care and maintenance and or work that may be in conflict with existing trees/palms need to have an ISA certified Arborist or accredited Consulting Arborist through the American Society of Consulting Arborists (ASCA) present either supervising work or performing work.

L. Shrubs or hedges that grow to 3 feet or taller and serve private developments are not allowed in the public ROW.

M. Landscape proposed within utility easements must be approved by the City of Miami Beach Public Works Department Greenspace Management Division. A recorded Declarative of Restrictive Covenant must be submitted during the plan review phase. Refer to City of Miami Beach Public Works Manual Section 3 for ROW permit requirements.

1.06 SUBMITTALS

A. Minimum criteria are presented in this Section. Landscape plans must be signed and sealed by a licensed State of Florida Landscape Architect. Plans shall be in accordance with Section 8 of the City of Miami Beach Public Works Manual.

B. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital
copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

C. If requested, two color photographs of each item showing different side views of the item shall be submitted with the schedule. Additional color photographs shall be submitted if requested. Greenspace Management will accept photos via e-mail as to provide a preliminary support for plant material selection. E-mail acceptance does not constitute Final Approval. Final Approval will be completed on site when the plant materials are inspected at delivery. Any plant materials that had preliminary approval via photos and subsequently failed site inspection at the job site shall be replaced at the correct specification at no additional cost to the City.

D. Shop drawings shall be submitted for any special conditions not covered in the Contract Documents to the City or designee for review and approval prior to delivery.

E. Submit a sample and analysis of all planting soil types for approval by the City of Miami Beach or designee before the material is delivered and installed on the project. If soil analysis does not meet requirements, the Contractor shall provide recommendations for soil treatments if required.

F. Submit a sample and analysis of mulch for approval by the City or designee before the material is delivered and installed on the project.

G. If requested, submit copies of the manufacturer’s specifications or analysis for all fertilizer including data substantiating that proposed materials comply with specified requirements. Fertilizer shall be approved by the City or designee before the material is delivered and used on the project. During construction, submit tags from bags of fertilizer used on-site to the City or designee.

H. Submit, on an as needed basis, a schedule for spraying and dusting of materials to be used to control pests and disease infestation, the reason for their use, and the method of application. Also, if requested furnish documentation that the implementation of these control measures for pests and disease infestation is in strict compliance with all Local, State, and Federal regulations.

1.07 SUBSTITUTIONS

A. Written requests for approval to substitute a material plant designation (balled-and-burlapped [B&B], wire balled-and-burlapped [WB&B], container-grown [CG], etc.), type, grade, quality, size, quantity, etc. due to the non-availability of the material specified shall be submitted within fourteen (14) calendar days after the pre-construction conference. Approval shall be given by the City or designee before the material is delivered and installed on the project.
B. Substitutions of plant types or change in the size of plant material will only be permitted upon submission of documented proof that the particular plant type and size specified is not obtainable.

C. Where B&B or WB&B plants are specified, CG plants of the same species, etc., will not be accepted. Where a B&B or WB&B is not specified on a particular plant material, B&B, WB&B, or CG plants may be used provided they meet all specifications.

1.08 GUARANTEE AND REPLACEMENT

A. The Contractor shall guarantee and fully maintain all plant materials to industry standards for tree (3) months after Substantial Completion or until the time on Final Acceptance whichever is greater in time at no additional cost to the City.

B. The guaranteeing of plant material shall be construed to mean the complete and immediate replacement of plant material if it is:

1. Not in a healthy growing condition.

2. Its survival ability at the end of the guarantee period is questionable.

3. It is dead.

C. Replacement plant material shall be of the same species, quality, and grade as that of the plant to be replaced. The size of the replacement shall not necessarily be the same size as the original specified plant at its initial planting but shall closely match specimens of the same species. Replacements shall be guaranteed for a period equal to the originally specified guarantee. This guarantee period shall begin at time of plant replacement.

D. The guarantee shall be null and void for plant material which is damaged or dies as a result of “Act of God” limited to hail, freeze, lightning, winds which exceed hurricane force, and lethal yellowing, providing the plant was in a healthy growing condition prior to these “Acts of God”.

PART 2 – PRODUCTS

2.01 PLANT MATERIAL

A. All plant material shall conform to the names given in Hortus Third, 1976 edition. Names of varieties not included therein conform generally with names accepted in the nursery trade.

B. Grade and Quality:
1. All plant materials shall be nursery grown except where specified as collected material, and shall comply with all required inspections, grading standards and plant regulations as set forth in the Florida Department of Agriculture’s *Grades and Standards for Nursery Plants, Part 1 and Part 2*, or with any superseding specifications that may be called for on the Plans or in the Specifications and as established by the Turfgrass Producers Association of Florida, Inc. All plants not listed in the grades and standards for nursery plants shall conform to a Florida No. 1 as to: (1) health and vitality, (2) condition of foliage, (3) root system, (4) freedom from pest or mechanical damage and (5) heavily branched and densely foliated according to the accepted normal shape of the species or sport, (6) form and branching habit.

2. Except where another grade is specifically called for in the Plans, all plant material shall be not less than Florida No. 1, or better, at the time of installation and Final Acceptance.

C. Delivery, Storage, and Handling

1. Movement of nursery stock shall comply with all Local, State, and Federal laws and regulations. Therefore, required inspection certificates shall accompany each shipment and shall be filed with the City or designee.

2. Wire wrap burlap if root ball is not sufficiently compacted.

3. Palms will not require burlap wrapping if the following requirements are met:

   a. Dug from marl or heavy soil that adheres to roots and retains shape without shattering.

   b. Moistenied material used to cover ball and roots not exposed to wind and sun.

   c. Transport material on vehicles large enough to allow plants not to be crowded. Plants shall be covered to prevent wind damage during transit and shall be kept moist, fresh, and protected at all times. Such protection shall encompass the entire period that the plants are in transit, being handled, or are in temporary storage.

4. All plant material shall not remain on the work site longer than two (2) days prior to being installed.

D. Requirements for B&B and WB&B plants

1. Burlap and other wrapping materials made of natural, biodegradable materials shall be used.

2. B&B and WB&B plants shall be properly protected until they are planted. These plants shall be handled only by the root ball and not the plant itself.
3. For WB&B plants, before plant is removed from the hole, sound hog wire shall be placed around the burlapped ball and looped and tensioned until the burlapped ball is substantially packaged by the tightened wire netting, such as to prevent disturbing of the loose soil around the roots during handling. Any wire, synthetic material or chemically treated material will be removed from the rootball at planting time; all ties shall be removed from the rootball and around the trunk at planting.

4. Any B&B or WB&B plant which shows evidence of having been handled by methods other than the method outlined above and resulting in a cracked or broken ball or of the roots being loosened within the ball shall be rejected.

E. For plants grown in soil of loose texture, which does not readily adhere to the root system (especially in the case of large plant material), WB&B plants may be specified.

F. Requirements for CG plants

1. Any CG plants which have become “pot bound” or for which the top system has become out of proportion (larger) to the size of the container will not be acceptable.

2. CG plants shall not be removed from the can until immediately before planting and shall be removed with all due care to prevent damage to the root system.

3. With metal containers, unless the root-ball system slips easily and unbroken from the can, a nursery can-cutter shall be used to slit the can in such a way that the can may be opened fully.

G. Containerized material shall be well established with at least one (1) full growing season in its container. Field grown material shall be well established with at least two (2) full growing seasons in its existing location.

H. All plant material shall have a habit of growth that is normal for that species and shall be sound, healthy, vigorous, and free from insects, plant diseases, and injuries.

I. Trunks of trees and palms shall be free of trunk wounds and branch injuries, and care shall be taken during transport avoid such injuries.

J. Measurement of Plants

1. Trees, Shrubs and Ground Cover

   a. Rootball: Requirements for the measurement of rootball diameter and depth shall comply with requirements as set forth in the latest edition of the Florida Department of Agriculture’s Grades and Standards for Nursery Plants. Part 1 and Part 2.

   b. Height: The height of plant material shall be measured from finish grade and continue up to where the main mass of the plant uniformly ends. The height shall
not include any singular or isolated parts of the plant, such as leaves, shoots, branches, limbs or fronds, which extend out beyond the main mass of the plant.

c. Width: The width of plant material shall be measured from one side of where the main mass uniformly ends and continue to the other side of where the main mass of the plant uniformly ends. The width shall not include any singular or isolated parts of the plant, such as leaves, shoots, branches, limbs or fronds, which extend out beyond the main mass of the plant.

d. Caliper shall be measured at 6 inches above the root flare for all specified tree requirements below 4 inches of caliper. All other specified trees at a 4-inch caliper or higher caliper standard shall be measured at the tree’s diameter at breast height (DBH). DBH is measured at 4 feet above the root flare.

2. Palms: Requirements for the measurement of clear trunk, clear wood, graywood, rootball diameter, and depth shall comply with requirements as set forth in the latest edition of the Florida Department of Agriculture’s *Grades and Standards for Nursery Plants, Part 2*.

K. All sizes shown for plant material on the Plans are to be CONSIDERED AS MINIMUMS. All plant material must meet or exceed these minimum requirements for height, spread, etc. as indicated on the Plans. When plant sizes are specified as a range of size, installed material shall average the mean of the range specified. Plant materials which exceed the minimum dimensions shall not constitute a means for additional compensation to the Contractor or dispensation from other portions of the work.

L. Plant material showing signs of die-back or leaf-drop will not be accepted and must be removed from the project immediately if so directed by the City or designee. Therefore, any plant material with tendencies toward leaf-drop or die-back must be root pruned early enough to provide a sound network of hair roots prior to relocation.

M. Mechanical destruction of foliage resulting from root pruning shall not affect more than 10% of the total foliage prior to planting on the project. Loss of foliage caused by seasonal change will be accepted.

N. Palms:

1. Remove a minimum number of fronds per Florida Department of Agriculture’s *Grades and Standards for Nursery Plants* for transportation purposes.

2. Using biodegradable material, such as a burlap strip or untreated cotton twine, tie *Sabal palmetto* bud and leave in-place until palm is established. If by this time the bud has not opened naturally, then the Contractor shall remove the tie, including any bracing, even if the project has been completed, Final Acceptance has been given, and the Contractor has left the job. There shall be no separate, additional compensation for this task. Tying shall be as set forth in the latest edition of the...
Florida Department of Agriculture’s *Grades and Standards for Nursery Plants*. Tying of other palms shall be at the option of the Contractor.

3. To reduce head volume, palm fronds may be taper trimmed by not more than one-third.

4. Palms with burn marks and frond boots on trunk will not be accepted.

5. Palms showing cable or chain marks and equipment scars shall be rejected.

O. The allowable level of Chlorosis in foliage shall be as set forth in the latest edition of the Florida Department of Agriculture’s *Grades and Standards for Nursery Plants*.

P. Plant material shall not be accepted when the ball of earth surrounding its roots has been cracked, broken, or otherwise damaged.

Q. Root pruning of plant material, when necessary, shall be done a minimum of six (6) weeks or for a period as determined by the Landscape Architect, prior to planting at the project. Prior to root pruning, the Contractor shall give 48 hour advance notice to the City or designee advising of the date to root prune any plant material. This shall allow for any inspections during or after the root pruning, if necessary.

2.02 SOD

A. Sod shall either be Saint Augustinegrass or Bahiagrass unless specified in the Plans. Saint Augustinegrass is the default sod material to be used on all projects unless there is no irrigation system at the job site in which case Bahiagrass shall be the preferred sod material.

B. Sod sections shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10% of the section. Sod shall be moist and relatively free of thatch, up to one half inch allowable (uncompressed). The soil embedded in the sod shall be a clean earth free of stones and debris.

C. The sod shall have been mowed at least three times with a lawn mower with final mowing not more than seven (7) days prior to the sod being cut for placement.

D. Sod shall not be harvested when moisture content (excessively dry or wet) may adversely affect its survival and shall be live, fresh, and uninjured at the time of placement. After approval of source, mow and rake as necessary to remove excessive top growth and debris. Cut sod with mechanical sod cutters, retaining native soil mat of sufficient thickness to withstand handling. The sod shall be provided in commercial pad sizes measuring not less than 12 inches by 24 inches with a uniform thickness of 1 inch to 3/4 inches at time of cutting. Measurement for thickness shall exclude top growth and thatch.
E. Deliver sod on pallets with root system protected from exposure to wind and sun in quantities not greater than what the Contractor is capable of installing within 48 hours of cutting. It shall be planted within 48 hours after being cut and shall be shaded and kept moist from the time it is cut until it is planted.

F. Handle sod in a manner to prevent dislodging native soil mat. Pitchforks, dumping of pallets from vehicles, and tearing of sod are prohibited.

2.03 PLANTING SOIL

A. It is critical that adequate soil volume be provided to allow trees to grow and mature. Refer to the Miami Beach Urban Forestry Master Plan (June 2020) for soil volume requirements.

B. Planting shall be natural, friable, and free from rocks larger than 1/2-inch diameter, weeds, stumps, plant tissue, litter, toxic substances, or any other deleterious materials. The planting soil shall consist of 70% clean, sharp, silica sand and 30% Everglades muck, mixed with the native, excavated soil in a 1:1 ratio (50/50). Soil must be taken from ground that has never been stripped, with a slight acid reaction (5.5 to 6.5 parts hydrogen [pH]), and without an excess of calcium or carbonate. Soil shall be delivered in a loose friable condition.

C. Proof of soil characteristics shall be the Contractor’s responsibility and shall be supplied by independent and certified testing laboratories, independently mailed to the City or designee prior to the delivery and/or use of the soil.

2.04 SOD SOIL BLANKET

A. Shall be natural, friable, and free from rocks larger than ½-inch diameter, weeds, stumps, plant tissue, litter, toxic substances, or any other deleterious materials. The sod soil blanket shall consist of 80% clean, sharp, silica sand and 20% Everglades muck, mixed with the native, excavated soil in a 1:1 ratio (50/50).

2.05 SUSPENDED SOIL BLANKETS

A. If suspended soil blankets are required, products shall be Silva Cell (DeepRoot Green Infrastructure, LLC), Strata Vault (City Green Urban Landscape Solutions), Soil Cells (Cupolex Sustainable Building Solutions), or approved equal.

2.06 ROOTBALL ANCHORING SYSTEMS

A. If rootball anchoring systems are required, products shall be Platipus Earth Anchoring Systems, GreenMax, Arbor Guy (City Green Urban Landscape Solutions), or approved equal.
2.07 TREE TIES

A. If aboveground tree ties are required, products shall be Duckbill Earth Anchors, Tree Frog Environmental Products, Arborbrade, or approved equal.

2.08 WATER

A. The Contractor is responsible to ascertain the location and accessibility of a potable water source. The Contractor is responsible for distribution of water to the areas of planting. If there is no source of potable water available at the job site approved for use, the Contractor shall be responsible for bringing in a water truck or tank for hand watering. If water volumes accessibility and distribution are not satisfactory to the Contractor, it is the Contractor’s responsibility to negotiate acceptable terms with the City prior to signing of a contract. If during the planting, water availability previously agreed to is curtailed, the Contractor shall notify, in writing within 24 hours, the City or designee of the condition and, if the Contractor deems necessary, the intent to cease work until water is restored. For plants already installed prior to cut-off of water availability, the Contractor shall continue to be responsible for providing water as required by specifications.

B. A self-generating water bladder shall be used on all new tree plantings. Products: Treegator, Tree Diaper, or approved equal.

2.09 MULCH

A. Mulch shall be in accordance with City of Miami Beach Code of Ordinances Section 126-6 (i).

B. Mulch shall be shredded, round-wood, recycled mulch, ‘Pine Bark Brown’/dark brown colored mulch.

C. Planting areas not covered in lawn/sod shall be mulched to a minimum depth of three (3) inches to present a finished appearance.

D. Cypress mulch, red colored mulch, and rubber mulch is prohibited.

E. Any other mulch must be submitted to the City of Miami Beach Environment and Sustainability Department for approval prior to delivery.

2.10 FERTILIZER

A. Any required plant material fertilization shall follow the City of Miami Beach’s Fertilization Ordinance latest version. The Contractor shall be well versed in the appropriate fertilizer formulation and application method required in order to comply with both the City Ordinance and plant health.
B. Fertilizer shall be in accordance with City of Miami Beach Code of Ordinances Section 126-6 (h).

C. Fertilizers and application shall comply with all Local, State, and Federal regulations.

D. Container trees and palms shall be fertilized per the City’s requirements during the Maintenance Period. Fertilizer shall be an 8-4-12 “Palm Special” formulation, with a minimum of 50% nitrogen in the slow-release (preferably sulfur-coated) and a complete line of micro-nutrients, or approved equal.

E. Shrubs and ground cover shall be fertilized per City’s requirements during Maintenance Period. Fertilizer shall be an “8-4-12” ‘Palm Special’ formulation, with a minimum of 50% nitrogen in the slow-release (preferably sulfur-coated) and a complete line of micro-nutrients, or approved equal.

F. Fertilizer for sod shall be a granular fertilizer having an analysis of 12-6-8, to be approved by the City or designee.

G. Fertilizer rate of application for sod shall be 12 pounds (lbs) per 1,000 square feet, or as recommended by the Landscape Architect.

H. All fertilizer shall be uniform in composition and dry. Granular fertilizer shall be free flowing and delivered in unopened bags. Tabletized fertilizer shall be delivered in unopened containers or boxes. All bags, containers, or boxes shall be fully labeled with the manufacturer’s analysis.

PART 3 – EXECUTION

3.01 GENERAL

A. Prior to the work, carefully inspect the installed work of other trades and the site conditions and verify that all such work and site conditions are complete to the point where this installation may properly commence.

B. Start of work shall imply acceptance of the site conditions.

C. The work area may have existing utilities. Refer to City of Miami Beach Public Works Manual Section 1 for protection of existing utilities.

D. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage.

E. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.
F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

G. Tree protection and relocation requirements, root cutting, tree relocations, tree pruning, and tree maintenance shall be in accordance with all applicable regulations and City of Miami Beach Public Works Manual Section 1.

3.02 GRADING

A. Grading for drainage, swales, etc. shall be provided by the Contractor.

B. It shall be the responsibility of the Contractor to provide the final grading so the final level for planting areas conforms to surrounding grades and is at the proper elevation with relation to walks, paving, drain structures, and other site conditions, unless indicated otherwise on the Plans.

C. All planting areas next to pavement areas such as, but not limited to, curbs, roads, drives, walks, terraces, decks and slabs shall be set so that the TOP OF THE MULCH IS one (1) inch BELOW THE TOP OF THE PAVEMENT AREA or as indicated otherwise on the Plans, and the top of sod is level with the top of pavement area, measured from the top of pavement to the top of grass blades after mowing.

3.03 HERBICIDE TREATMENT

A. In all areas infected with weed and/or grass growth, a herbicide as approved by the City or designee shall be applied per manufacturer’s rates. When it has been established where work will be done, the herbicide shall be applied in accordance with manufacturer’s labeling to kill all noxious growth. Contractor shall schedule work to allow more than one application to obtain at least 95% kill of undesirable growth. Contractor shall exercise extreme care to prevent damage to desirable existing growth. If necessary, Contractor shall conduct a test to establish suitability of product and applicator to be used on this project prior to execution of the full application.

3.04 PREPARATION

A. All areas proposed for planting not covered by more than 12 inches of new fill shall be scarified by an approved means to a depth of not less than 36 inches and shall be treated with two separate applications of appropriate herbicide as recommended by the manufacturer and approved by the City or designee.

B. Stake or mark plant material locations prior to plant hole excavation based on information from the Plans.
C. The location of a planting bed (shrub or groundcover) next to another bed, walkway, structure, etc., shall have the plants along the perimeter spaced so that the plants can mature properly without growing into the other bed, walkway, structure, etc.

D. The rootballs of B&B plants which cannot be planted immediately shall be covered with moist soil or mulch to insure protection from drying winds and sun. All plants shall be maintained as necessary until planting.

E. Some or all work areas may be compacted and/or contain existing material such as limerock which may interfere with adequate vertical drainage and/or proper plant survival and growth and therefore removal of this material is part of the scope of work for the project. The Contractor shall be responsible for ensuring adequate drainage in these areas and shall remove this existing material, as required by such means as augering, drilling or rototilling.

F. The Contractor shall remove all existing concrete, asphaltic concrete, and rocks, above and below grade, from areas to be landscaped unless indicated otherwise on the Plans.

G. Excavation of Plant Holes

1. General

   a. Excavation of plant holes shall be roughly cylindrical in shape with the sides approximately vertical. The City or designee reserves the right to adjust the size and shape of the plant hole and the location of the plant in the hole to compensate for unanticipated structures or unanticipated factors which are a conflict.

   b. The excavated material from the plant holes shall not be used to backfill around the plant material. Such material shall be disposed of either on the project site or off the site, as directed by the City or designee.

2. Trees and Palms

   a. Depth of hole shall be equal to the rootball depth plus 6 inches, unless further depth is required to provide adequate drainage as specified herein.

   b. Diameter of hole shall be as follows:
### Section 11. Landscape Work

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**ROOTBALL DIAMETER (INCHES)** | **HOLE DIAMETER (INCHES)**
--- | ---
12 or less | Rootball diameter plus 12 inches
13 thru 24 | Rootball diameter plus 18 inches
25 thru 60 | Rootball diameter plus 36 inches
61 or greater | Rootball diameter plus 48 inches

3. Shrubs
   a. Single Plants
      i. Depth of hole shall be equal to the rootball depth plus 4 inches.
      ii. Diameter of hole shall be 50% greater than the rootball width.
   b. Mass Planting (2 or more together) Planted 24 Inches on Center or Less:
      i. Depth shall be equal to the rootball depth plus 4 inches.
      ii. Diameter: Shrub material in mass shall not be planted in individual holes but rather in one continuous hole or excavation for the entire mass.

4. Groundcover Beds - Container Material
   a. Depth shall be equal to the rootball depth plus 4 inches.
   b. Groundcover material in mass shall not be planted in individual holes but rather in one continuous hole or excavation for the entire mass, all at a depth of 4 inches more than the depth of the rootball.

5. AREAS WHERE SOD IS TO BE PLANTED SHALL HAVE THE TOP THREE (3) INCHES OF MATERIAL REMOVED AND REPLACED BY A TWO (2) INCH BLANKET OF PLANTING SOIL PRIOR TO PLANTING. Remove stones, sticks, rubbish, and other extraneous matter. All rough areas and voids shall be eliminated during final grading in order to have a smooth and even grade.

#### 3.05 INSTALLATION

A. Plant installation including staking shall be in accordance with the Standard Details.

B. After container grown plant material is removed from its container, the sides of the root ball shall be given six (6) vertical cuts full length. These cuts shall be about 1/4 inch deep. The bottom of the root ball shall also receive an “X” shaped cut that is 1/4 inch deep.
C. All trees and palms shall have a final planting height at 2 inches above final grade to account for future settling of materials. All shrubs and other smaller plant materials shall have a final planting height at final grade. Any plantings not following these Specifications will be either cause for rejection and replacement by the Contractor at no additional cost to the City or, if in agreement with the City or designee, the Contractor shall be allowed to reset the plant materials to the proper height. Any resetting of plant materials will extend the plant material warranty and Contractor maintenance obligation by three (3) months upon approval that the remedial work is satisfactory to the City or designee.

D. Installation of Sod

1. Contractor shall ensure that a uniform blanket of soil 12 inches in depth is placed on the land forms prior to sod installation. Contractor shall install sod on land forms no later than two (2) days after final grading.

2. Contractor shall ensure that a uniform blanket of soil 2 inches in depth is placed on the sod lawns prior to sod installation. Contractor shall install sod no later than two (2) days after final grading.

3. Sod shall be carefully placed by hand, edge to edge in rows at right angles to slopes, commencing at the base of sloped areas to be sodded and working upward. The sod shall be immediately pressed firmly into contact with a 500 pound hand roller or any other equipment approved by the City or designee that will produce a 90 pound per square inch compression grading. The rolling operation shall provide a true and even surface and insure knitting without displacement of sod or deformation of the surfaces of the sodded area. Hand tamps those areas inaccessible to the roller. The edges of the sodded area shall be staggered in a corresponding manner providing the offset along the edge does not exceed 6 inches. All vertical edging adjacent to sodded areas shall be tamped to produce a feathered edge.

4. On slopes having a ratio greater than one in three, peg the installed sod into place with not less than two stakes per square yard.

5. If, in the opinion of the City or designee, the sod bed, after planting, is in need of an application of sandy top-dressing for reasons of irregularities or shrinking joints, the Contractor shall perform this task at no additional compensation.

6. Spread fertilizer over sodded areas uniformly, as directed the City or designee by use of a device calibrated to distribute fertilizer at specific quantities.

7. Wash fertilizer off the grass blades no later than four (4) hours from time of spreading.

8. Sod shall be installed at a staggered planting pattern.
9. Sod installation shall be rejected if there are any gaps between individual pieces larger than 1/16 inch. If the sod has established before inspection and has been rejected for poor installation, the Contractor can either replace the entire section(s) of concern with new sod or top-dress with approved soil to fill all gaps both at no additional cost to the City.

E. Use planting soil as specified herein for backfilling. Backfill the bottom two thirds of the planting hole and firmly tamp and settle by watering as backfilling progresses. After having tamped and settled the bottom two thirds of the hole, thoroughly puddle with water and fill remaining one third of the hole with planting soil, tamping, and watering to eliminate air pockets.

F. Application rates of fertilizer shall be as recommended by the fertilizer manufacturer or as otherwise approved by the City or designee.

G. Mulch within 24 hours after planting. Planted areas must be mulched uniformly to a depth of approximately two (2) inches, or as indicated on the Plans. Keep mulch approximately one (1) inch away from trunks, stems, or growing points of ground covers.

H. Staking and Guying

1. Staking and guying shall not be attached to the plant material with nails. Staking shall be in accordance with the Standard Details as well as all applicable regulations, ordinances, and code requirements in effect at the time of award of the contract.

2. The decision of whether to stake or guy shall be left to the discretion of the Contractor provided it is not required according to local regulations, ordinances, and code requirements. However, a Contractor’s decision not to stake or guy shall not relieve the responsibility of resetting plant material if it blows, falls, or leans over. Also, it will not relieve the Contractor of the guarantee if the material dies as a result of blowing, falling, or leaning over.

3. Install in the manner indicated in the Plans.

4. The Contractor shall remove and dispose of materials when it is determined by the City or designee that sufficient time has elapsed for the plant’s roots to stabilize the plant.

I. Watering

1. For any agreed use of public water for watering, the Contractor must provide a backflow prevention system from the water source to the water tank to ensure that there is no contamination of public water.
2. Initially, water the plant material to develop uniform coverage and deep water penetration of at least six (6) inches. Avoid erosion, puddling, and washing soil away from plant roots.

3. Provide continuous watering of plant material and sod after planting to achieve optimum growth conditions to establish plants. Water shall be applied as necessary and the amount of water and frequency of watering shall be based on the specific needs of each plant type, the time of year, amount of rainfall, and other environmental conditions present at the time. This watering shall begin after the plant is planted and continue until Final Acceptance or for a minimum of sixty (60) consecutive calendar days, whichever is greater in time. ALL TREES AND PALMS SHALL BE HAND WATERED, ONLY. DURING THIS PERIOD DO NOT RELY ON THE IRRIGATION SYSTEM, IF THERE IS ONE, TO ACHIEVE THIS TASK. It cannot deliver the volume of water required, without flooding areas beyond where water is needed and/or over watering other landscape material. Shrubs and ground cover may be watered by using the irrigation system, if there is one, otherwise hands water during this period.

4. If there is no source for water available at the project, such as a hose bib(s) or fire hydrant(s) if approved for use then the Contractor shall be responsible for supplying water for hand watering by means of a truck or tank.

5. Canopy watering of transplanted existing trees, using misting heads on polyvinyl chloride (PVC) risers to cover entire canopy, may be required at the discretion of the City or designee. Operate by hand or on a time clock to spray as required to keep soil at root ball from getting too wet.

J. Pruning and Thinning

1. The amount of general pruning and thinning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots as a result of transplanting operations. Pruning and thinning shall be done in such a manner as not to change the natural form or shape of a plant. The City or designee shall be contacted prior to performing any major pruning and thinning and may elect to be present during any pruning and thinning.

2. All broken or damaged branches or roots shall be cut off smoothly.

3. “Hat racking” shall only be allowed upon written approval and direction of the City or designee.

4. All pruning and thinning shall be shall follow the ANSI A300 Standards and be in accordance with City of Miami Beach Code of Ordinances.

K. The site’s landscape beds shall be weed-free upon Final Acceptance.
L. All plant material to be removed, shall be removed completely, including the rootball or as directed by the City or designee, from the job site. The remaining hole shall be filled with suitable material or planting soil.

3.06 SITE MAINTENANCE AND CLEANLINESS

A. Contractor shall clean work areas at the end of each working day. All waste and other objectionable material created through planting operations and landscape construction shall be removed completely, on a daily basis, from the job site or as directed by the City or designee. Any paved area, including curbs and sidewalks which contain soil, sod waste fertilizer, or other waste shall be thoroughly swept. Contractor shall store all materials, equipment, and products in an organized manner as directed by the City or designee at the expense of the Contractor.

B. All excess fill which results from the installation of the project shall remain the property of the City and remain on the project site at the option of the City. All excess fill which the City does not want shall be removed and disposed of from the project at no additional cost to the City. No excess fill shall be removed or disposed of from the site until approved by the City or designee.

3.07 MAINTENANCE PRIOR TO FINAL ACCEPTANCE

A. The Contractor shall guarantee and fully maintain all plant materials to industry standards for three (3) months after Substantial Completion or until the time on Final Acceptance whichever is greater in time at no additional cost to the City.

B. Maintenance requirements include but are not limited to the following.

1. Maintenance shall begin immediately after each plant is planted and continue until Final Acceptance except for the watering as indicated in the paragraph below. This watering shall begin as indicated and shall continue until completed, even if the indicated period goes beyond the time of Final Acceptance.

2. Plant maintenance shall include watering, pruning, weeding, cultivating, repair of erosion, mulching, tightening and repairing of guys, stakes, braces, etc., replacement of sick or dead plants, resetting plants to proper grades or upright position, maintenance of the watering saucer, litter removal, and all other care needed for proper growth of the plants. Mowing and edging shall be done at least every fourteen (14) days and the irrigation system shall be checked every fourteen (14) days and report any repairs required to responsible Contractor.

3. Immediately after planting, each plant shall be watered and the watering period shall continue until Final Acceptance or for a minimum of 42 consecutive calendar days, whichever is greater in time.
4. The site’s landscape beds shall be weed-free at all times during the maintenance period up to the Final Acceptance.

5. Insecticides
   a. Use of insecticides shall be in accordance with all Local, State, and Federal regulations.
   b. Contractor shall apply all insecticides as needed for complete control of pests and diseases. The materials and methods shall be in accordance with highest standard horticultural practices and as recommended by the manufacturer and approved by the City or designee prior to implementation.
   c. When a chemical is being applied, the person using it shall have in their possession all labeling associated with the chemical. Also the chemical shall be applied as indicated on said labeling.
   d. The spraying of insecticides and other such chemicals are to be confined to the individual plant. Spraying techniques which may introduce the material being sprayed beyond the immediate area of the individual plant, is strictly prohibited.
   e. The implementation of control measures for pests and disease infestations shall be in strict compliance with all Local, State, and Federal regulations. Upon request, the Contractor shall furnish documentation of such compliance.
   f. All insecticides shall be applied by a licensed/certified operator only. The operator shall have the license/certification in their possession when insecticides are being applied.

6. After the sod has been laid, tamped, and top dressed, all areas and parts of areas which fail to show uniform growth and health shall be resodded repeatedly if necessary, until all sodded areas are covered with a satisfactory lawn. Damage resulting from erosion, gullies, washouts, or other causes shall be repaired by filling with topsoil, tamping, re-fertilizing, and resodding at the Contractor’s expense.

7. Planted trees and plants shall be protected against trespassing and damage. If any plants become damaged or injured, they shall be treated or replaced as directed and in compliance with the Specifications at no additional cost to the City. No work shall be done within or over planting areas or adjacent to plants without proper safeguards and protection.

8. Sidewalks, curbs and gutters, drainage structures, driveways, parking areas, streets, terraces, decks, and pavers shall be kept free of plant cuttings, debris, and stains.

9. Material rejected during construction shall be removed with ten (10) working days and replaced before an inspection for completion will be scheduled.
10. If the Contractor fails to perform maintenance consistent with these Specifications, as determined by the City or designee, the City or designee may, upon five (5) days prior written notice to the Contractor, employ such labor and equipment as it deems necessary for the purpose, and all costs resulting there from shall be charged to the Contractor and deducted from amounts of money that it may be due.

C. Replacement of plant material shall be the responsibility of the Contractor including the possible replacement of plant material resulting from removal by theft or vandalism or acts of negligence on the part of others. All plant material shall be alive and in good growing condition for each specific kind of plant at the time of Final Acceptance.

D. The rating of plant material according to Florida Grades and Standards shall be equal to or better than that called for on the Plans and in these Specifications at the time of Final Acceptance.

3.08 COMPLETION AND FINAL ACCEPTANCE

A. Upon written notice from the Contractor of the presumptive completion, as defined below, of the entire project, the City or designee, along with other appropriate parties, will make an inspection within 48 hours after the written notice. If all construction provided for and contemplated by the Plans and Specifications is found to be completed in accordance with the Plans and Specifications, such inspection shall constitute the Final Inspection. The Contractor shall be notified in writing of Final Acceptance as of the date of the Final Inspection.

B. If the inspection aforementioned in paragraph A discloses any work, in whole or in part, as being unsatisfactory, final acceptance shall not be given the Contractor. The City or designee will give to the Contractor the necessary instructions or “punch lists” for correction of same, and the Contractor shall have up to twenty (20) calendar days from the date such instructions or “punch lists” to correct the work are received. If the instructions or “punch lists” to correct the work are not complete within the twenty (20) calendar days, the City or designee may employ such labor and equipment as it deems necessary for the purpose, and all costs resulting there from shall be charged to the Contractor and deducted from amounts of money that it may be due.

C. Upon correction of work, another inspection will be made which shall constitute the Final Inspection, provided the work has been satisfactorily completed. In such event, the City or designee shall make the Final Acceptance and notify the contractor in writing of this Final Acceptance as of the date of this Final Inspection.

D. Completion of the work shall mean the full and exact compliance and conformity with the provisions expressed or implied in the Plans and Specifications including any and all “punch lists” which may be issued outlining certain items of work which were found unsatisfactory or require completion or correction action.
E. Final Acceptance shall not be given until all construction provided for and indicated in the Plans and Specifications is inspected by the City or designee and found to be completed in accordance with the Contract Documents.

F. Final Acceptance shall not be official until acknowledged in writing by the City of Miami Beach.

G. The guarantee shall not begin until the day Final Acceptance is given.

H. Refer to Section 1 of the City of Miami Beach Public Works Manual for additional project closeout requirements.

3.09 AS-BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.
STANDARD DETAILS

Standard Details for landscape work are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself with all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 11-1  SUSPENDED PAVEMENT PLAN VIEW
DETAIL 11-2  SUSPENDED PAVEMENT SECTION A
DETAIL 11-3  SUSPENDED PAVEMENT SECTION B
DETAIL 11-4  SUSPENDED PAVEMENT SECTION C
DETAIL 11-5  STRUCTURAL SOILS TYPICAL STREET PLANTING
DETAIL 11-6  PALM TREE FIXING SYSTEM
DETAIL 11-7  TREE ROOTBALL FIXING SYSTEM
DETAIL 11-8  ROOT BARRIER (LINER APPLICATION)
PLANT VIEW

LEGEND:

1. LOAD BEARING MODULAR SUSPENDED PAVEMENT SYSTEM (SILVA CELLS WITH DECK, BASE AND POSTS).

2. CURB.

3. ROOT GUIDE 12" DEPTH, INSTALL ADJACENT CONCRETE EDGE. TOP OF ROOT GUIDE 2" BELOW TOP OF CONCRETE.

4. 6" ALUMINUM EDGE WITH 12' STAKES.

5. ADDAPAVE TREE PIT MIX (6-10MM DIAMETER) BONDED POROUS PAVING 3" DEPTH COMPACTED TO ACHIEVE A LEVEL AND UNIFORM FINISH.

6. CONCRETE SIDEWALK THICKENED EDGE (TURNED DOWN TO SOIL DECK) ONLY WHERE SOIL CELLS ARE PRESENT.

NOTE:

1. CONTRACTOR SHALL INSTALL SOIL CELLS AS PER MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, IN CONJUNCTION WITH THESE DETAILS AND PLANS.
LEGEND:

1. CONCRETE SIDEWALK, TURN DOWN TO SILVA CELL DECK AT EDGE OF WALK.
2. LOAD BEARING MODULAR SUSPENDED PAVEMENT SYSTEM (SILVA CELLS WITH DECK, BASE AND POSTS).
3. CURB.
4. CURB SUB-BASE.
5. ROADWAY COMPACTED SUBGRADE.
6. 4' MIN. AGGREGATE BASE COURSE.
7. GEOTEXTILE TO EDGE OF EXCAVATIONS.
8. BACKFILL, TO WITHIN 4–6' BELOW TOP OF SILVA CELL DECK INSTALL IN 8' LIFTS, EACH COMPACTED TO 95% PROCTOR.
9. GEORETAIN TO LINE PERIMETER OF SYSTEM WITH 6" TOE (OUTWARD FROM BASE) AND 12' EXCESS (OVER TOP OF SILVA CELL DECK).
10. 3/16" x 14' ZIP TIES, SECURING GEORETAIN TO SILVA CELLS.
11. GEOTEXTILE FABRIC, PLACED BELOW AGGREGATE SUB-BASE.
12. 4' MIN. AGGREGATE SUB-BASE, COMPACTED TO 95% PROCTOR.
13. SUBGRADE BELOW SILVA CELLS, COMPACTED TO 95% PROCTOR.
14. PLANTING SOIL INSTALL IN 12" LIFTS, EACH COMPACTED TO 70–80% PROCTOR.
15. IRRIGATION LATERALS.
16. PLANTING SOIL BELOW TREE ROOT PACKAGE, COMPACTED TO 85–90% PROCTOR.
17. TREE ROOT PACKAGE, SIZE VARIES.
18. ROOT GUIDE 12" DEPTH, INSTALL ADJACENT CONCRETE EDGE. TOP OF ROOF GUIDE 2' BELOW TOP OF CONCRETE.
19. ROOT WATERING SYSTEM.
20. 6' ALUMINUM EDGE WITH 12' STAKES.
21. #57 WASHED AGGREGATE BASE 3' DEPTH, COMPACT TO ACHIEVE A LEVEL AND UNIFORM FINISH.
22. GEOTEXTILE FABRIC SEPARATING AGGREGATE FROM PLANTING SOIL.
23. ADDAPOSE TREE PIT MIX (6–10MM DIAMETER) BONDED POROUS PAVING 3" DEPTH COMPACTED TO ACHIEVE A LEVEL AND UNIFORM FINISH.
24. ADDAPOSE TREE PIT MIX (6–10MM DIAMETER) LOOSE AGGREGATE WEDGE FUNNEL UPWARD TO WITHIN 3/8' TO 5/8' BELOW FINAL FINISHED GRADE.

NOTE:
1. CONTRACTOR SHALL INSTALL SOIL CELLS AS PER MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, IN CONJUNCTION WITH THESE DETAILS AND PLANS.
LEGEND:

① CONCRETE SIDEWALK, TURN DOWN TO SILVA CELL DECK AT EDGE OF WALK.
② LOAD BEARING MODULAR SUSPENDED PAVEMENT SYSTEM (SILVA CELLS WITH DECK, BASE AND POSTS).
③ CURB.
④ CURB SUB–BASE.
⑤ ROADWAY COMPACTED SUBGRADE.
⑥ 4" MIN. AGGREGATE BASE COURSE.
⑦ GEOTEXTILE TO EDGE OF EXCAVATIONS.
⑧ BACKFILL, TO WITHIN 4–6" BELOW TOP OF SILVA CELL DECK INSTALL IN 8" LIFTS, EACH COMPACTED TO 95% PROCTOR.
⑨ GEOGRID TO LINE PERIMETER OF SYSTEM WITH 6" TOE (OUTWARD FROM BASE) AND 12" EXCESS (OVER TOP OF SILVA CELL DECK).
⑩ 3/16' x 14' ZIP TIES, SECURING GEOGRID TO SILVA CELLS.
⑪ GEOTEXTILE FABRIC, PLACED BELOW AGGREGATE SUB–BASE.
⑫ 4" MIN. AGGREGATE SUB–BASE, COMPACTED TO 95% PROCTOR.
⑬ SUBGRADE BELOW SILVA CELLS, COMPACTED TO 95% PROCTOR.
⑭ PLANTING SOIL INSTALL IN 12" LIFTS, EACH COMPACTED TO 70–80% PROCTOR.
⑮ TREE/PALM BEYOND.
⑯ IRRIGATION LATERALS.
⑰ IRRIGATION SPRAY.

NOTE:

1. CONTRACTOR SHALL INSTALL SOIL CELLS AS PER MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, IN CONJUNCTION WITH THESE DETAILS AND PLANS.
LEGEND:

1. CONCRETE SIDEWALK, TURN DOWN TO SILVA CELL DECK AT EDGE OF WALK.
2. LOAD BEARING MODULAR SUSPENDED PAVEMENT SYSTEM (SILVA CELLS WITH DECK, BASE AND POSTS).
3. 4" MIN. AGGREGATE BASE COURSE.
4. GEOTEXTILE TO EDGE OF EXCAVATIONS.
5. BACKFILL, TO WITHIN 4-6' BELOW TOP OF SILVA CELL DECK INSTALL IN 8' LIFTS, EACH COMPACTED TO 95% PROCTOR.
6. GEOGRID TO LINE PERIMETER OF SYSTEM WITH 6' TOE (OUTWARD FROM BASE) AND 12" EXCESS (OVER TOP OF SILVA CELL DECK).
7. 3/16" x 14" ZIP TIES, SECURING GEOGRID TO SILVA CELLS.
8. GEOTEXTILE FABRIC, PLACED BELOW AGGREGATE SUB-BASE.
9. 4" MIN. AGGREGATE SUB-BASE, COMPACTED TO 95% PROCTOR.
10. SUBGRADE BELOW SILVA CELLS, COMPACTED TO 95% PROCTOR.
11. PLANTING SOIL INSTALL IN 12" LIFTS, EACH COMPACTED TO 70-80% PROCTOR.
12. PLANTING SOIL BELOW TREE ROOT PACKAGE, COMPACTED TO 85-90% PROCTOR.
13. TREE ROOT PACKAGE, SIZE VARIES.
14. ROOT GUIDE 12" DEPTH, INSTALL ADJACENT CONCRETE EDGE. TOP OF ROOF GUIDE 2' BELOW TOP OF CONCRETE.
15. ROOT WATERING SYSTEM.
16. #57 WASHED AGGREGATE BASE 3" DEPTH, COMPACT TO ACHIEVE A LEVEL AND UNIFORM FINISH.
17. GEOTEXTILE FABRIC SEPARATING AGGREGATE FROM PLANTING SOIL.
18. ADDPAVE TREE PIT MIX (6-10MM DIAMETER) BONDED POROUS PAVING 3' DEPTH COMPACTED TO ACHIEVE A LEVEL AND UNIFORM FINISH.
19. ADDPAVE TREE PIT MIX (6-10MM DIAMETER) LOOSE AGGREGATE WEDGE FUNNEL UPWARD TO WITHIN 3/8" TO 5/8" BELOW FINAL FINISHED GRADE.
20. TREE/PALM ROOTBALL STAKING, SEE DETAILS 11-6 AND 11-7.

NOTE:
1. CONTRACTOR SHALL INSTALL SOIL CELLS AS PER MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, IN CONJUNCTION WITH THESE DETAILS AND PLANS.
LEGEND:

1 BUILDING FACE.
2 Poured-in-place concrete.
3 CURB.
4 ASPHALT PAVEMENT.
5 SUB-BASE.
6 PREPARED SUBGRADE.
7 DRAINAGE PIPE TIED TO STORM SEWER.
8 STRUCTURAL SOIL.
9 3' THICK BARK MULCH LAYER.
SECTION VIEW

LEGEND:

1. PALM TREE FIXING SYSTEM:
   * 3 X ALUMINUM ALLOY ANCHOR.
   * 1 X TWO WAY RATCHET TENSIONER GALVANIZED WIRE.
   * 3 X ROOFTAL PROTECTION MESH.

2. ROOTBALL PROTECTION MESH.

3. TWO WAY RATCHET TENSIONER GALVANIZED WIRE.

4. ALUMINUM ALLOY ANCHOR, TYPICAL.

5. TREE PLANTED AT NURSERY LINE.

6. TREE IRRIGATION SYSTEM:
   * 5M (16FT) OF MEMBRANE 1 X 30CM (12") HEADER, BASE AND DEBRIS CAP.

7. ALUMINUM CAP 100MM (4")

NOTE:
1. DUE TO SETTLEMENT, CONTRACTOR SHALL RE-TENSION ALL TREES AND PALMS AFTER PLANTING AND AS NEEDED.
SECTION VIEW

LEGEND:

1. TREE ROOTBALL FIXING SYSTEM:
   - 3 X ALUMINUM ALLOY ANCHOR.
   - 1 X TWO WAY RATCHET TENSIONER GALVANIZED WIRE.
   - 3 X ROOTBALL PROTECTION MESH.

2. ROOTBALL PROTECTION MESH.

3. TWO WAY RATCHET TENSIONER GALVANIZED WIRE.

4. ALUMINUM ALLOY ANCHOR, TYPICAL.

5. TREE PLANTED AT NURSERY LINE.

6. TREE IRRIGATION SYSTEM:
   - 5M (16FT) OF MEMBRANE 1 X 30CM (12") HEADER, BASE AND DEBRIS CAP.

7. ALUMINUM CAP 100MM (4")

NOTE:
1. DUE TO SETTLEMENT, CONTRACTOR SHALL RE-TENSION ALL TREES AND PALMS AFTER PLANTING AND AS NEEDED.
LEGEND:

1. PROPOSED PALM OR TREE.
2. MULCH LAYER.
3. BIOBARRIER ROOF CONTROL FABRIC: VERTICALLY PLACED TO STOP LATERAL ROOT GROWTH. INSTALL FABRIC 2 INCHES BELOW TOP OF CONCRETE WITH ADHESIVE (AS APPROVED BY BIOBARRIER MANUFACTURER).
4. EXISTING OR PROPOSED CONCRETE SURFACE.
5. EXISTING CURB OR PAVED SURFACE.
6. SUB-BASE FOR CONCRETE SURFACE, TYPICAL.
7. PROPOSED ROOTBALL.
8. BACKFILL WITH PLANTING SOIL MIX.
9. EXISTING SOIL, TYPICAL.

NOTES:

1. INSTALL AND COVER BIOBARRIER AS SOON AS POSSIBLE (WITHIN 12 HOURS) AFTER OPENING. HIGH TEMPERATURES AND DIRECT SUNLIGHT REDUCE EFFECTIVE PRODUCT LIFE.
2. INSTALL BIOBARRIER FABRIC AS SHOWN WITH MODULES FACING TOWARD ROOT BALL.
3. WHEN JOINING SEPARATE PIECES OF FABRIC A MINIMUM OF 3" OVERLAP IS REQUIRED AT ALL SEAMS. USE A CONTINUOUS ADHESIVE BEAD AT EACH SEAM, PER MANUFACTURER'S RECOMMENDATION.
4. REFER TO MANUFACTURER'S SPECIFICATIONS AND RECOMMENDED INSTALLATION INSTRUCTIONS FOR ADDITIONAL INFORMATION.
12
SEAWALLS
SECTION 12. SEAWALLS

STANDARD DETAILS

Standard Details for seawalls are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself with all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

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DETAIL 12-2    CONCRETE PANEL SEWALL NOTES
DETAIL 12-3    CONCRETE PANEL SEAWALL - 10' MAX. DEPTH PLAN VIEW
DETAIL 12-4    CONCRETE PANEL SEAWALL - 10' MAX. DEPTH SECTION
DETAIL 12-5    CONCRETE PANEL SEAWALL - 10' MAX. DEPTH STANDARD PANEL ELEVATION
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DETAIL 12-7    CONCRETE PANEL SEAWALL - 14' MAX. DEPTH SECTION
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DETAIL 12-11   STEEL SHEET PILE WITH CONCRETE PILE NOTES
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DETAIL 12-16   SHEET PILE DETAILS AT PIPE CROSSING
GENERAL:

1. THE FOLLOWING STRUCTURAL NOTES APPLY TO THE CONCRETE PANEL AND STEEL SHEET PILE WITH CONCRETE PILE STANDARD DETAILS. THE STANDARD DETAILS DESIGN IS BASED SOLELY ON THE PARAMETERS DESCRIBED IN THE NOTES AND DRAWINGS HEREIN. A STRUCTURAL ENGINEER LICENSED IN FLORIDA SHALL PREPARE CALCULATIONS AND STRUCTURAL DRAWINGS AS PER FLORIDA BUILDING CODE (FBC) LATEST VERSION AND IN ACCORDANCE WITH APPLICABLE CODES AND REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

2. IT IS THE INTENT OF THESE PLANS TO COMPLY WITH LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS ISSUED FOR THIS PROJECT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE AND GOVERN HIMSELF/HERSELF BY ALL PROVISIONS OF THESE PERMITS.

3. NO SEAWALL SHALL BE constructed in the city of MIAMI BEACH (CITY) WITHOUT APPROPRIATE LOCAL, STATE, AND FEDERAL APPROVALS. THE CONTRACTOR SHALL COMPLY WITH ALL NECESSARY LOCAL, STATE AND FEDERAL ENVIRONMENTAL PERMITS ISSUED FOR THE PROJECT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH AND BE GOVERNED BY ALL PROVISIONS OF THESE PERMITS.

4. THE CITY PREFERS CONCRETE PANEL SEAWALLS. STEEL SHEET PILE SEAWALLS MAY BE ALLOWED AT LOCATIONS WHERE CONCRETE PANEL SEAWALLS ARE NOT FEASIBLE. USE OF STEEL SHEET PILE SEAWALLS requires city approval.

5. THESE STANDARD DETAILS ARE FOR NON-OCEANFRONT PROPERTIES only. FOR LOCATIONS SUBJECT TO STORM SURGES WITH POUNDING SURF, ERODING SHORELINES AND WAVES OVERTOPPING FROM COASTAL STORM EVENTS, THE STANDARD SEAWALL DESIGN SHALL NOT BE USED.

6. A BOUNDARY SURVEY PREPARED BY A FLORIDA LICENSED PROFESSIONAL SURVEYOR AND MAPPER FOR THE UPLAND owner DATED WITHIN SIX MONTHS OF THE BUILDING PERMIT APPLICATION must be provided.

7. UPON COMPLETION OF CONSTRUCTION AN AS-BUILT SURVEY IN ACCORDANCE WITH CHAPTER 5J–17.052 FAC and SECTIONS OF THE CITY OF MIAMI BEACH PUBLIC WORKS MANUAL will be required. THE SURVEY shall be SUBMITTED WITH THE APPROVED SET OF THE BUILDING PERMIT PLANS.

8. AT THE REQUEST OF THE CITY, VIBRATION MONITORING shall be conducted in accordance with the city of MIAMI BEACH PUBLIC WORKS MANUAL Section 1.

ELEVATIONS:

1. ELEVATIONS OF PROPOSED AND EXISTING IMPROVEMENTS MUST BE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988) AND BE NOTED ON THE DRAWING.

2. THE SITE-SPECIFIC MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) LEVEL MUST BE INCLUDED IN THE PLANS.

3. THESE STANDARD DETAILS ASSUME TOP OF CAP IS AT EL 5.70 FEET NAVD. NOTE THAT ALL NEW SEAWALLS ON PRIVATE CONSTRUCTION AND ALL SEAWALLS CONSTRUCTED ON PUBLIC PROJECTS shall have a minimum elevation of 5.70 FEET NAVD; HOWEVER, ON EXISTING PRIVATE SEAWALLS THAT ARE BEING REPLACED/REPAIRED not ASSOCIATED WITH NEW BUILDING CONSTRUCTION, A minimum 4.0 FEET NAVD ELEVATION shall APPLY with the CERTIFIED STRUCTURAL DESIGN to ACCOMMODATE A SEAWALL HEIGHT EXTENSION to a minimum 5.70 FEET NAVD.

SOIL:

1. A SUB-SOIL INVESTIGATION REFLECTING THE SOIL CONDITIONS FOR THE PROJECT shall be utilized by the ENGINEER. THE SUB-SOIL INVESTIGATION shall be PREPARED BY A GEOTECHNICAL ENGINEER LICENSED IN FLORIDA. THE ENGINEER shall DETERMINE IF THE SOIL PROPERTIES DETERMINED ARE ADEQUATE CONSIDERING THE ASSUMPTIONS OF THESE STANDARD DETAILS.

2. NEW FILL MATERIAL shall be CLEAN SAND, meeting the REQUIREMENTS FOR THE SOIL PARAMETERS ASSUMED FOR THESE STANDARD DETAILS, EXCEPT AS NOTED. NEW FILL MATERIAL shall HAVE LESS THAN 5% PASSING THE #200 SIEVE and CONTAIN LESS THAN 4% ORGANIC MATERIAL. FILL shall BE COMPACTED in LIFTS of 12-INCHES MAXIMUM THICKNESS to ACHIEVE A MINIMUM 95% of THE MODIFIED PROCTOR MAXIMUM DENSITY as per ASTM D-1557.

OUTFALLS:

1. WATER QUALITY must MEET ALL REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION before DISCHARGING STORMWATER to an OUTFALL. TRASH RACKS and WATER QUALITY TREATMENT UNITS shall BE INSTALLED upstream of all STORMWATER OUTFALLS as NECESSARY TO COMPLY with ALL LOCAL, STATE, AND FEDERAL REQUIREMENTS.

2. NO OUTFALL shall BE CONSTRUCTED in the CITY WITHOUT ALL APPROPRIATE LOCAL, STATE, AND FEDERAL APPROVALS. THE CONTRACTOR shall COMPLY WITH ALL NECESSARY LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS issued FOR THE PROJECT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH AND BE GOVERNED BY ALL PROVISIONS OF THESE PERMITS.

3. OUTFALLS REQUIRE RIP RAP and a DISSIPATOR BOX. SIGNED and SEALED CALCULATIONS must be SUBMITTED to RE-DERM showing that the SEA FLOOR WILL NOT BE DISTURBED by the EXIT VELOCITY.

4. OUTFALLS shall HAVE a BACKFLOW PREVENTION DEVICE at the EXIT PIPES and MANATEE GRATES AT THE OPENING.
GENERAL:

1. The notes on this sheet apply to the concrete panel standard details.
2. These standard details are for the replacement of existing seawalls or construction of new seawalls.
3. These standard details are based on a straight seawall layout. The engineer shall be responsible for design details for any alignment changes.

PRECAST CONCRETE PILING:

1. Precast concrete piles shall be 12”x12” or 14”x14” piles with 5000 P.S.I min. concrete and (4) 1/2-inch dia. 270 K.S.I. ASTM A416 low-Lax strands with 2-1/2 inches min. concrete cover to ties. They shall be driven to a minimum bearing capacity of 25 tons with 12’ minimum penetration into firm material below silt layer. A sub-soil investigation and report shall be provided by a certified geotechnical engineer licensed in Florida. Batter piles shall be as shown on standard details.

CONCRETE AND REINFORCING STEEL:

1. All concrete (except precast piles) shall have a 0.40 water/cement ratio and shall attain a minimum compressive strength (fc) of 5000 P.S.I at the end of 28 days. Six (6) concrete cylinders shall be taken for each 50 cubic yards or fraction thereof and shall be tested at 3, 7 and 28 days. Slump shall not exceed 5’(±1”).
2. All reinforcement shall be 60000 psi minimum yield (fy) new billet steel in accordance with ASTM A615 grade 60. All reinforcing steel shall be from domestic mills and shall have the manufacturer’s mill marking rolled into the bar which shall indicate the producer, size, type and grade. All bar laps shall be a minimum of 48 bar diameters. Placing of reinforcement shall conform to the latest ACI manual of standard practice codes.
3. All concrete shall be placed within 90 minutes from batch time, and vibrated as required by the ACI manual of concrete practice. Temperature of concrete at the time of placement shall be between 75’ and 100’ F.
CONCRETE PANEL
SEAWALL - 10' MAX. DEPTH
PLAN VIEW

NOTES:

1. FOR RETAINED FILL NOT TO EXCEED 
   10'-0" DEPTH.
2. MINIMUM STANDARDS ARE DEPICTED 
   ABOVE. STRUCTURE SHALL BE DESIGNED 
   BY A LICENSED STATE OF FLORIDA 
   STRUCTURAL ENGINEER. SIGNED AND 
   SEALED CALCULATIONS SHALL BE 
   PROVIDED TO SUPPORT STRUCTURAL 
   DESIGN.
NEW 36" WIDE (MAX.) x 16" DEEP CONCRETE SEAWALL CAP WITH (5) #6 CONTINUOUS BARS T&B & #3 CLOSED TIES @ 12" O.C. AND (3) #3 CLOSED TIES @ EACH SIDE OF EACH PILE @ 3" O.C. VERIFY CAP REINFORCING BY STRUCTURAL CALCULATIONS. A WIDER PILE CAP REQUIRES CITY APPROVAL.

ALL EXPOSED EDGES TO BE 1/4" CHAMFER

EXISTING SEAWALL, IF PRESENT, ACTUAL CONDITIONS WILL VARY

NEW SEAWALL PANEL PLACED IN FRONT OF EXISTING WALL. SEE REINFORCING DETAIL ON 12-6

WHERE WAVE ACTION OR SWIFT CURRENTS ARE ANTICIPATED PLACE FOOT RUBBLE RIP-RAP (BANK AND SHORE) ON 2:1 SLOPE APPROX. TO CONTROL EROSION. PLACEMENT OF RUBBLE RIP-RAP MUST BE IN COMPLIANCE WITH ALL PERMITS.

NEW 12"x12" PRECAST KING PILE AT 10'-0" O.C. WITH 12" MIN. EMBEDMENT INTO FIRM MATERIAL PILES TO HAVE A 25 TON CAPACITY

NEW 12"x12" PRECAST BATTER PILE ADJ. TO KING PILE AT 10'-0" O.C. WITH 12" MIN. EMBEDMENT INTO FIRM MATERIAL PILES TO HAVE A 25 TON CAPACITY

FOR GAPS BETWEEN EXISTING AND NEW SEAWALL GREATER THAN 6-INCHES, FILL WITH #57 STONE. FOR SMALLER GAPS, FILL WITH CLEAN SAND PER SOIL NOTE 2 ON 12-1

APPROX. FACE OF EXISTING WALL PARTIALLY FAILING AND ROTATING

NOTES:
1. FOR RETAINED FILL NOT TO EXCEED 10'-0" DEPTH.
2. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.
NOTES:
1. VERIFY PANEL THICKNESS AND REINFORCING BY STRUCTURAL CALCULATIONS.
2. #5 VERTICAL BARS EXTEND 12" MIN. BEND PER SECTION DETAIL AFTER PANELS ARE IN PLACE.
3. FOR RETAINED FILL NOT TO EXCEED 10'-0" DEPTH.
4. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.

FOR 10'-0" O/C KING PILES, VERIFY FIELD CONDITION AND FABRICATE PANELS 2" SHORTER THAN ACTUAL KING PILE & TO @ & SPACING

PANEL ELEVATION
N.T.S.

CONCRETE PANEL
SEAWALL - 10' MAX. DEPTH
STANDARD PANEL ELEVATION

DETAIL 12-5
1. FOR RETAINED FILL NOT TO EXCEED 14’-0” DEPTH.
2. MINIMUM STANDARDS ARE DEPICTED ABOVE.
   STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER.
   SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.
NEW 38" wide x 16" deep concrete seawall cap with (5) #6 continuous bars @ 6" o.c. and (4) #3 closed ties @ 4" o.c. of each side of each pile. Verify cap reinforcing by structural calculations. A wider pile cap requires city approval.

All exposed edges to be 2" chamfer.

Existing seawall, if present, actual conditions will vary.

New seawall panel placed in front of existing wall, see reinforcing detail on 12-9.

New 14"x14" precast concrete gussethead panel.

Where wave action or swift currents are anticipated, place foot rubble rip-rap. Placement of rubble rip-rap must be in compliance with all permits.

New 14"x14" precast king pile at 10'-0" o.c. with 12' min. embedment into firm material piles to have a 25 ton capacity.

New 14"x14" precast batter pile adj. to king pile at 10'-0" o.c. with 12' min. embedment into firm material piles to have a 25 ton capacity.

For gaps between existing and new seawall greater than 6" inches, fill with #57 stone.

For smaller gaps, fill with clean sand per soil note 2 on 12-1.

Approach face of existing wall partially failing and rotating.

SECTION

1. For retained fill not to exceed 14'-0" depth.

2. Minimum standards are depicted above. Structure shall be designed by a licensed state of Florida structural engineer. Signed and sealed calculations shall be provided to support structural design.
NOTES:
1. VERIFY PANEL THICKNESS AND REINFORCING BY STRUCTURAL CALCULATIONS.
2. #5 VERTICAL BARS EXTEND 12" MIN. BEND PER SECTION DETAIL AFTER PANELS ARE IN PLACE.
3. FOR RETAINED FILL NOT TO EXCEED 14'-0" DEPTH.
4. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.
PIECE PENETRATION ELEVATION
N.T.S.

NOTES:

1. ADJUST THE DOWEL LOCATIONS AS NEEDED TO AVOID CONTACTING ANY REBAR. IF THE DRILL BIT CONTACTS THE REBAR, DRILLING SHALL STOP. THE HOLE SHALL BE FILLED WITH NON-SHRINK GROUT AND THE HOLE SHALL BE RELOCATED. CONTRACTOR SHALL USE NONDESTRUCTIVE MEANS TO FIELD LOCATE REBAR.

2. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.

3. USE OF THIS DETAIL MUST BE APPROVED BY ALL AGENCIES HAVING JURISDICTION.
NOTES:

1. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.

2. USE OF THIS DETAIL MUST BE APPROVED BY ALL AGENCIES HAVING JURISDICTION.
GENERAL:
1. THE NOTES ON THIS SHEET APPLY TO THE STEEL SHEET PILE WITH CONCRETE PILE STANDARD DETAILS.
2. THESE STANDARD DETAILS ASSUME A MAXIMUM HORIZONTAL DEFLECTION OF 3–INCHES OF THE SEAWALL, BASED ON SECTION 3.13.3 OF THE 2020 FDOT STRUCTURES DESIGN GUIDELINES.

SOIL AND WATER PARAMETERS:
1. EXCAVATED DEPTH: 10–FT, MAXIMUM FROM TOP OF LANDSIDE SOIL TO TOP OF WATERSIDE SOIL/MUDLINE.
2. SOIL PROPERTIES ASSUMED LANDWARD AND WATERWARD OF WALL; FROM TOP OF RETAINED SOIL TO BELOW CONCRETE PILES:
   a. SAND WITHOUT EXCESSIVE ORGANICS NOR CLAY
   b. $\gamma = 110$ PCF (BULK DENSITY)
   c. $\gamma' = 66$ PCF (SUBMERGED DENSITY)
   d. $C = 0$ PSF (COHESION)
   e. $\Theta = 30^\circ$ (ANGLE OF INTERNAL FRICTION)
3. WATER ELEVATIONS:
   a. ACTIVE WATER PRESSURE ELEVATION: 1′–6′ BELOW LANDSIDE GRADE, ASSUMING WEEP HOLES INSTALLED AT APPROXIMATELY 10′–0′ O.C. THE WEEP HOLES SHALL NOT ALLOW THE EROSION/LOSS OF LANDSIDE SOIL.
   b. PASSIVE WATER PRESSURE ELEVATION: MEAN LOW WATER EL., ASSUMED TO BE −2.63 NAVD 88.

LOADS:
1. LANDSIDE LIVE LOAD SURCHARGE: 200 PSF

STEEL SHEET PILE AND COATING:
2. SHEET PILE SHALL BE ASTM A 572 GR 50 STEEL.
3. MINIMUM STEEL THICKNESS OF SHEET PILE SHALL BE 3/8–INCH.
4. SHEET PILE SHALL BE SURFACE PREPARED AND COATED WITH THE FOLLOWING SYSTEM IN ITS ENTIRETY, FRONT AND BACK. THE SURFACE PREPARATION SHALL FOLLOW MANUFACTURER RECOMMENDATIONS FOR SURFACES TO BE IMMERSED IN SEA WATER:
   a. COAT 1: INORGANIC ZINC–RICH COATING 2.5 –4.0 MIL DFT
   b. COAT 2: COAL TAR EPOXY 8.0 –10.0 MIL DFT
   c. COAT 3: COAL TAR EPOXY 8.0 –10.0 MIL DFT
5. COATING REPAIR PLAN SHALL BE PROVIDED BY THE COATING MANUFACTURER, SUBMITTED AND APPROVED PRIOR TO SHEET PILE INSTALLATION. COATING REPAIR SHALL PROVIDE AN AS–GOOD OR BETTER COATING SYSTEM COMPARED TO THE SHOP–APPLIED COATING SYSTEM.

PRECAST Prestressed concrete pilEs:
1. PRECAST PRESTRESSED CONCRETE PILES SHALL BE SQUARE 14′x14′ OR 18′x18′. CONCRETE SHALL HAVE MINIMUM 5,000 PSI 28–DAY COMPRESSIVE STRENGTH. PILES SHALL HAVE (12) 3/4–INCH 270 KSI LOW–LAX STRANDS WITH 2–1/2 INCHES MINIMUM CONCRETE COVER OVER TIES. PILE EMBEDMENT IS SHOWN ON DRAWING AND IS BASED ON SOIL PROPERTIES DESCRIBED HEREIN.

CAST IN PLACE reinforced concrete
1. ALL CONCRETE (EXCEPT PRECAST PILES) SHALL HAVE A W/C RATIO BETWEEN 0.39 AND 0.42 AND ATTAIN A MINIMUM 28–DAY COMPRESSIVE STRENGTH OF 4,500 PSI. SIX (6) CONCRETE CYLINDERS SHALL BE TAKEN FOR EACH 50 CY AND SHALL BE TESTED AT 3, 7 AND 28–DAYS. SLUMP, FOR CONCRETE CONTAINING SUPERPLASTICIZER, SHALL BE 7–INCHES +/- 1.5–INCHES. ALL CONCRETE MUST BE PLACED WITHIN 90–MINUTES OF BATCH TIME AND VIBRATED PER ACI MANUAL OF CONCRETE PRACTICE. TEMPERATURE OF CONCRETE AT TIME OF PLACEMENT SHALL BE BETWEEN 75′ AND 95′.
2. REBAR SHALL CONFORM TO ASTM A615 GRADE 60. ALL BAR LAPS SHALL BE 48 BAR DIAMETERS MINIMUM. PLACEMENT OF REBAR SHALL CONFORM TO THE LATEST ACI MANUAL OF STANDARD PRACTICE CODES UNLESS OTHERWISE NOTED. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE AND GRADE.

STEEL SHEET PILE WITH CONCRETE PILE NOTES

MIAMI BEACH PUBLIC WORKS DEPARTMENT
1700 CONVENTION CENTER DRIVE, MIAMI BEACH, FL 33139

APPROVED:  O5/2020
REVISED:  07/2020
TITLE:  STEEL SHEET PILE WITH CONCRETE PILE NOTES
DETAIL:  12-11
WALL DETAIL

EXPANSION JOINT FILLER, ADHERE TO ONE SIDE OF CONCRETE ONLY WITH WATERSTOP ADHESIVE

ALL REBAR NOT SHOWN, SEE SECTION FOR REBAR

SEALANT ALL AROUND EXPOSED JOINT

NON-LIQUID BOND BREAKER BETWEEN JOINT SEAL AND EXPANSION MATERIAL

3/4" CHAMFER (TYP. ALL EDGES)

EXPANSION JOINT

NOTE:
1. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.
DESIGN PARAMETERS TABLE

<table>
<thead>
<tr>
<th>EXCAVATED DEPTH (FT)</th>
<th>SHEET PILE SECTION</th>
<th>CONC. PILE SIZE (IN)</th>
<th>W (FT-IN)</th>
<th>CONC. PILE EMBED (FT)</th>
<th>SHEET PILE EMBED (FT)</th>
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</thead>
<tbody>
<tr>
<td>10</td>
<td>NZ 14 OR AZ 14-770</td>
<td>14</td>
<td>3'-1&quot;</td>
<td>25</td>
<td>11</td>
</tr>
</tbody>
</table>

TABLE FOOTNOTES:

1. EXCAVATED DEPTH IS MEASURED FROM T/PROPOSED GRADE TO T/SEABED OR MUDLINE.
2. W IS THE CAP WIDTH AS SHOWN IN THE DRAWINGS.
3. CONC. PILE EMBED IS THE VERTICAL DISTANCE FROM THE T/SEABED TO B/CONCRETE PILE.
4. SHEET PILE EMBED IS THE VERTICAL DISTANCE FROM THE T/SEABED TO B/SHEET PILE.
5. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.
NOTES:

1. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.

2. USE OF THIS DETAIL MUST BE APPROVED BY ALL AGENCIES HAVING JURISDICTION.
5/8" x 4" NELSON STUD TO BE WELDED TO FACE OF STEEL SHEET PILES AT 12" O.C. ALONG WATERWARD FACE OF SHEETS (ALONG INNER AND OUTER CORRUGATION)

CONC. CAP REBAR AND SHEAR STUDS NOT SHOWN FOR CLARITY

STEEL SHEET PILE (TYP.)

UTILITY PIPE

#4@12, EW

WATER SIDE

CONCRETE FACE

6"

LAND SIDE

NOTES:
1. MINIMUM STANDARDS ARE DEPICTED ABOVE. STRUCTURE SHALL BE DESIGNED BY A LICENSED STATE OF FLORIDA STRUCTURAL ENGINEER. SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.
2. USE OF THIS DETAIL MUST BE APPROVED BY ALL AGENCIES HAVING JURISDICTION.
NOTES:

1. ENGINEER TO SPECIFY PLATES THICKNESS AND DIMENSIONS ACCORDING TO PIPE DIAMETER.
2. ENGINEER TO SPECIFY WELD TYPE ACCORDINGLY.
CONCRETE
SECTION 13. CONCRETE

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   3.06 Preparation of Surfaces for Concreting
   3.07 Tamping and Vibrating
3.08 Finishing Concrete Surfaces
3.09 Concrete Finish Schedule
3.10 Curing and Damp Proofing
3.11 Testing
PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The requirements of this section shall apply to the following types of concrete.

1. Class A1 Concrete: Normal weight structural concrete to be used in all structures qualifying as environmental concrete structures that are designed in accordance with American Concrete Institute (ACI) 350 including pump stations, tanks, basins, process structures, seawalls, and any structures containing fluid or process chemicals or other materials used in treatment process.

2. Class A2 Concrete: Normal weight concrete in all structures other than structures qualifying as environmental concrete structures as described above, sidewalks, and pavement.

3. Class B Concrete: Normal weight structural concrete used for duct bank encasements, catch basins, fence and guard post embedment and concrete fill.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. American Concrete Institute (ACI)

   - ACI 214 Guide to Evaluation of Strength Test Results of Concrete
   - ACI 301 Specifications for Structural Concrete for Buildings
   - ACI 302.1R Guide for Concrete Floor and Slab Construction
   - ACI 304 Guide for Measuring, Mixing, Transporting, and Placing Concrete
   - ACI 305 Guide to Hot Weather Concreting
   - ACI 306 Guide to Cold Weather Concreting
   - ACI 309 Guide for Consolidation of Concrete
   - ACI 315 Details and Detailing of Concrete Reinforcement
   - ACI 318 Building Code Requirements for Structural Concrete and Commentary
   - ACI 350 Code Requirements for Environmental Engineering Concrete Structures

- ASTM A615: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- ASTM C31: Standard Practice for Making and Curing Concrete Test Specimens in the Field
- ASTM C33: Standard Specification for Concrete Aggregates
- ASTM C39: Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- ASTM C42: Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- ASTM C88: Standard Test Method for Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate
- ASTM C94: Standard Specification for Ready-Mixed Concrete
- ASTM C143: Standard Test Method for Slump of Hydraulic-Cement Concrete
- ASTM C138: Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- ASTM C143: Standard Test Method for Slump of Hydraulic Cement Conc
- ASTM C172: Standard Practice for Sampling Freshly Mixed Concrete
- ASTM C192: Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
- ASTM C231: Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
- ASTM C295: Standard Guide for Petrographic Examination of Aggregates for Concrete
ASTM C311 Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C387 Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar
ASTM C457 Standard Test Method for Microscopical Determination of the Air-Void System in Hardened Concrete
ASTM C494 Standard Specification for Chemical Admixtures for Concrete
ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C989 Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064 Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077 Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1107 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1260 Test Method for Potential Alkali Reactivity of Aggregates (Mortar Bar Method)
ASTM C1602 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM C1778 Reducing the Risk of Deleterious Alkali – Aggregate Reaction in Concrete
ASTM D92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
3. Association of State Highway Transportation Officials (AASHTO)

   AASHTO M45  Standard Specification for Aggregate for Masonry Mortar

4. Florida Building Code

B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

   Section 3. Right of Way Construction Requirements
   Section 10. Earthwork and Roadwork
   Section 12. Seawalls
   Section 14. Water Distribution System
   Section 15. Sanitary Sewer Gravity Collection System
   Section 16. Sanitary Sewer Force Mains and Pump Stations
   Section 17. Stormwater Drainage and Gravity Collection System
   Section 18. Stormwater Force Mains and Pump Stations
   Section 19. Stormwater Wels

1.03 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/ or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.
E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.04 SUBMITTALS

A. Submit sources of all materials and certifications of compliance with specifications for all materials.

B. Certified current (less than 1 year old) chemical analysis of the Portland Cement to be used.

C. Certified current (less than 1 year old) chemical analysis of fly ash or slag cement to be used.

D. Aggregate test results showing compliance with required standards.

E. Manufacturer’s data on all admixtures.

F. Concrete mix design for each class of concrete.

G. Field experience records and/or trial mix data for the proposed concrete mixes for each class of concrete.

1.05 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.
PART 2 – PRODUCTS

2.01 GENERAL

A. All reinforced concrete structures shall conform to ACI 301, ACI 302.1R, ACI 305, ACI 306, ACI 315, ACI 318, and ACI 350.

B. Concrete shall be composed of cement, fine aggregate, coarse aggregate, and water, so proportioned and mixed as to produce a plastic workable mixture in accordance with all requirements under this Section suitable to the specific conditions of placement.

2.02 CEMENT

A. The cement shall be a standard brand of Portland cement manufactured within the continental limits of the United States. It shall meet the requirements of ASTM C150 "Portland Cement" and shall be Type II.

B. The total alkalies in the cement (calculated as the percentage of NA2O plus 0.658 times the percentage of K2O) shall not exceed 0.40%.

C. The proposed Portland Cement shall not contain more than 8% tricalcium aluminate and more than 12% tetracalcium aluminoferrite.

D. Different types of cement shall not be mixed nor shall they be used alternately except when authorized in writing by the City or their designee. Different brands of cement or the same brand from different mills may be used alternately. A resubmittal will be required if different cements are proposed during the Project.

E. Cement shall be stored in a suitable weather-tight building so as to prevent deterioration or contamination. Cement which has become caked, partially hydrated, or otherwise damaged will be rejected.

2.03 FLY ASH

A. If fly ash is used as supplementary cementitious material, it shall meet the physical and chemical requirements of ASTM C618 Class F, except that the loss of ignition shall not exceed 4%. Sampling and testing of fly ash shall follow the requirements of ASTM C311.

B. For Type A1 concrete as required for use in environmental engineering concrete structures, inclusion of fly ash or slag cement in the concrete mix is mandatory.

2.04 SLAG CEMENT

A. Slag cement shall meet the requirements of ASTM C989 including tests for effectiveness of slag in preventing excessive expansion due to alkali-aggregate reactivity as described in Appendix X-3 of ASTM C989.
B. For Type A1 concrete as required for use in environmental concrete structures, i.e., process structures or fluid containing structures, inclusion of fly ash or slag cement in the concrete mix, is mandatory.

2.05 WATER

A. The water used in mixing the concrete shall be from potable water supplies that are approved by the Florida Department of Health.

2.06 AGGREGATES

A. Fine Aggregate (Sand) in the various concrete mixes shall consist of natural or manufactured siliceous sand, clean and free from deleterious substances, and graded within the limits of ASTM C33.

B. Coarse Aggregate: Coarse aggregate shall consist of gravel, broken stone or local limerock. Coarse aggregate shall be size #57 or #67 as graded within the limits given in ASTM C33 unless otherwise specified. It shall be free from adherent coatings.

C. Aggregates shall be tested for gradation by sieve analysis tests in conformance with ASTM C136.

D. When tested for soundness in accordance with ASTM C88, the loss resulting after five cycles shall not exceed 10 percent for fine or coarse aggregate when using either magnesium sulfate or sodium sulfate.

E. When tested in accordance with "Potential Reactivity of Aggregates (Chemical Method)" (ASTM C289), the ratio of silica released to reduction in alkalinity shall not exceed 1.0.

F. When tested in accordance with "Organic Impurities in Sands for Concrete" (ASTM C40), the fine aggregate shall produce a color in the supernatant liquid no darker than the reference standard color solution.

G. When tested in accordance with "Resistance to Abrasion of Small size Coarse Aggregate by Use of the Los Angeles Machine" (ASTM C131), the coarse aggregate shall show a loss not exceeding 42 percent after 500 revolutions, or 10.5 percent after 100 revolutions.

2.07 ADMIXTURES

A. Air entraining agent shall be added to all concrete unless noted otherwise. The agent shall provide entrained air in the concrete in accordance with ASTM C260.

B. The following admixtures are required or used for water reduction, slump increase, and/or adjustment of initial set. Admixtures permitted shall confirm to the requirements of
ASTM C494. Admixtures shall be non-toxic after 30 days and shall be compatible with and made by the same manufacturer as the air-entraining admixtures.

1. Water reducing admixture shall conform to ASTM C494, Type A and shall contain no more than 0.05% chloride ions. Acceptable products are “Eucon Series” by the Euclid Chemical Company, “Master Pozzolith Series” by BASF, and “Plastocrete Series” by Sika Corporation.

2. High range water reducer shall be sulfonated polymer conforming to ASTM C494, Type F or G. The high range water reducer shall be added to the concrete at either the batch plant or at the job site and may be used in conjunction with a water reducing admixture. The high range water reducer shall be accurately measured and pressure injected into the mixer as a single dose by an experienced technician. A standby system shall be provided and tested prior to each day’s operation of the job site system. Concrete shall be mixed at mixing speed for a minimum of 100 mixer revolutions after the addition of the high range water reducer. Acceptable products are “Eucon 37” or Plastol 5000 by the Euclid Chemical Company, “Master Rheobuild 1000 or Master Glenium Series” by BASF, and “Daracem 100 or Advaflow Series” by W.R. Grace. High range water reducer shall be mandatory for class A1 concrete intended for placement in walls.

3. A non-chloride, non-corrosive accelerating admixture may be used where specifically approved by the City or their designee. The admixture shall conform to ASTM C494, Type C or E, and shall not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year’s duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Acceptable products are “Accelguard 80/90 or NCA” by the Euclid Chemical Company and “Daraset” by W.R. Grace.

4. A water reducing retarding admixture may be used where specifically approved by the Engineer. The admixture shall conform to ASTM C494, Type D and shall not contain more than 0.05% chloride ions. Acceptable products are “Eucon NR or Eucon Retarder 100” by the Euclid Chemical Company, “Pozzolith Retarder” by BASF, and “Plastiment” by Sika Corporation.

C. Admixtures containing calcium chloride, thiocyanate or more than 0.05 chloride ions are not permitted.

2.08 CONCRETE MIX DESIGN

A. The proportions of cement, aggregates, admixtures, and water used in the concrete mixes shall be based on the results of field experience or preferably laboratory trial mixes in conformance with Section 5.3. "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318 and ACI 350. When trial mixes are used, they shall
also conform to Article 3.01 of this Section of the Specifications. If field experience records are used, concrete strength results shall be from concrete mixed with all of the ingredients proposed for use on job used in similar proportions to mix proposed for use on job. Contractor shall submit verification confirming this stipulation has been followed. Field experience records and/or trial mix data used as the basis for the proposed concrete mix design shall be submitted to the City or their designee along with the proposed mix.

B. Structural concrete shall conform to the following requirements. Cementitious materials refer to the total combined weight of all cement, fly ash, and slag cement contained in the mix.

1. Compressive Strength (28 day)

<table>
<thead>
<tr>
<th>CONCRETE CLASS</th>
<th>COMPRESSIVE STRENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Class A1</td>
<td>4,500 psi (minimum)</td>
</tr>
<tr>
<td>Concrete Class A2</td>
<td>4,000 psi (minimum)</td>
</tr>
<tr>
<td>Concrete Class B</td>
<td>3,000 psi (minimum)</td>
</tr>
</tbody>
</table>

2. Water/cementitious materials ratio, by weight

<table>
<thead>
<tr>
<th>CONCRETE CLASS</th>
<th>MAXIMUM</th>
<th>MINIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Class A1</td>
<td>0.42</td>
<td>0.39</td>
</tr>
<tr>
<td>Concrete Class A2</td>
<td>0.45</td>
<td>0.39</td>
</tr>
<tr>
<td>Concrete Class B</td>
<td>0.50</td>
<td>0.39</td>
</tr>
</tbody>
</table>

3. Slump Range
   a. 4" nominal unless high range water reducing admixture is used.
   b. 8" max if high range water reducing admixture is used.

4. Air Content
### 2.09 CONCRETE COLOR FOR SIDEWALKS

A. The replacement of gray concrete sidewalks throughout the City shall be with the "Miami Beach Red" sidewalk color standard, unless otherwise specified by any applicable City land use board, in accordance with Resolution 2019-30800.

B. The Public Works Director has the authority to determine on a street-by-street basis if replacement of sidewalks to a "Miami Beach Red" color standard is appropriate.

C. The replacement of gray sidewalks shall be completed gradually over time as new neighborhood projects are implemented and the sidewalks within an entire block are replaced.

### 2.10 REPAIR OF CONCRETE SIDEWALK SURFACE DEFECTS

A. Remove and replace all concrete surfaces that contain surface defects, which includes, but not limited to cracking, cracks which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable and rough conditions and other objectionable conditions deemed unacceptable to the Engineer immediately after form removal. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness.

B. Concrete rejected for any reason is to be removed and replaced, including labor, forms and reinforcing, to meet specifications at no additional cost to the City. Compounds for adhesion or as patching ingredients may be used, if approved by the City or designee. All repair of surface defects to be made require the approval of the City or designee, as to the method and procedure. Approval of the completed work must be obtained from the City or designee.

C. Remove existing sidewalk, or curb and gutter to either the nearest joint beyond or to where no remaining section is less than five (5) feet long.

### 2.11 REINFORCING STEEL

A. Bar reinforcing shall conform to the requirements of ASTM A615 for Grade 60 Billet Steel reinforcing. All reinforcing steel shall be from domestic mills and shall have the manufacturer's mill marking rolled into the bar which shall indicate the producer, size, type, and grade. All reinforcing bars shall be deformed bars. Smooth reinforcing bars shall not be used unless specifically called for on Drawings.

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**CONCRETE CLASS** | **AIR CONTENT**
--- | ---
Concrete Class A1, A2 | 6% ±1.5%
Concrete Class B | 3% Max (non air-entrained)
B. Reinforcing supports shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dops, supports, spacers, and other devices to position reinforcing during concrete placement. Wire bar supports shall be plastic protected (CRSI Class 1).

C. Precast concrete blocks to space and support the reinforcing bars may be used to support and position bottom reinforcing steel. Use concrete blocks with a strength equal to or greater than the concrete in which they are to be placed and have wires cast into them for fastening to the reinforcing bars. Moist-cure the blocks for at least three days.

D. Reinforcing steel shall be accurately positioned as shown on the Drawings and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or plastic protected (CRSI Class 1) metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the reinforcing bars without settlement. In no case shall concrete block supports be continuous.

E. All reinforcement shall be entirely free of rust, scale, grease, or other coating which might destroy or reduce its bond with the concrete.

F. Reinforcing of curbs and gutters shall be in accordance with City of Miami Beach Public Works Manual Section 10 Standard Details.

G. Welded wire fabric reinforcing shall conform to the requirements of ASTM A1064. Welded wire fabric shall be 6X6-W1.4xW1.4 steel to be used in all sidewalks and driveways.

2.12 MORTAR

A. Standard premixed mortar conforming to ASTM C387, Type S, or proportion 1 part Portland cement to 2 parts clean, well-graded sand which will pass a 1/8-inch screen. Portland Cement shall conform ASTM C150.

B. Sand shall conform to AASHTO M45.

C. Admixtures may be used not exceeding the following percentages of weight of cement:
   1. Hydrated lime: 10 percent
   2. Diatomaceous earth or other inert materials: 5 percent.

D. Consistency of mortar shall be such that it will readily adhere to concrete.
2.13 NON-SHRINK GROUT

A. Hydraulic cement (non-shrink) grout shall be chloride-free and shall conform to ASTM C1107.

B. A minimum compressive strength of 5,000 pounds per square inch (psi) shall be obtained at 28 days.

2.14 WATERSTOPS

A. Waterstops shall be Polyvinyl Chloride (PVC) conforming to the requirements of U.S. Army Corps of Engineers Specification CRD-C-572, of the following type:


B. Thermoplastic butt splices shall be performed using approved prefabricated pretested fittings; do not lap splice waterstops.

C. Waterstops for impermeable joints between prefabricated structures Non-hydro expansive based on bituminous resins to seal horizontal and vertical joints; hydrostatic load resistance 7 m column of water; not soluble in water; flashpoint 315 degree Celsius ASTM D92; elongation capacity at 20 degree Celsius 230% compared to its initial dimension. Suitable for tunnels, water treatment plants, sewage, septic tanks, tanks, pipelines, sewer trunk lines and for any prefabricated concrete structure in general.

2.15 MEMBRANE CURING COMPOUND

A. Membrane curing compound shall conform to the requirements of AASHTO Designation M 148, Type 1-clear, or type 2-white pigmented.

2.16 EXPANSION JOINT FILLER

A. Preformed expansion joint filler shall be of the non-extruding and resilient bituminous type and conform to the requirements of AASHTO Designation M 213.

B. Expansion joint filler shall be gray neoprene sponge rubber that conforms to AASHTO Designation M 153, Type I.
PART 3 – EXECUTION

3.01 READY MIX CONCRETE

A. Concrete obtained from a ready-mix plant shall conform to the requirements of these Specifications, and all applicable portions of ASTM C94 “Ready-Mixed Concrete”.

3.02 MIXING AND DELIVERING CONCRETE

A. Produce a completely uniform mixed concrete in a truck mixer for 70 to 100 revolutions at the mixing speed designated by the truck manufacturer.

B. Prior to starting the discharge of the concrete at the jobsite, when water is added, record the added quantity and mix the concrete 30 additional drum mixing revolutions. Do not make more than two mix adjustments. Seek approval from the Engineer prior to using a central mixer and depositing the batch into a truck mixer.

C. Transit Time Using Agitator Trucks: The maximum allowable transit time between the initial introduction of water into the mix and completely discharging all the concrete from the truck will be 60 minutes. The maximum transit time can be 90 minutes if water-reducing and retarding admixture (Type D, Type G, or Type II) is used. Reject concrete exceeding the maximum transit time.

D. All the concrete in a load must be in its final placement position a maximum of 15 minutes after the transit time has expired unless a time extension is approved by the Engineer.

E. Adding Water to Concrete at the Placement Site: Water may be added at the placement site provided the addition of water does not exceed the water to cementitious materials ratio as defined by the mix design. After adding water, perform a slump test to confirm the concrete is within the slump tolerance range stated in Section 2.01. If the slump is outside the tolerance range, reject the load. If an adjustment is made at the concrete production facility, perform a slump test on the next load to ensure the concrete is within the slump tolerance range. Do not place concrete represented by slump test results outside of the tolerance range. Include water missing from the water storage tanks upon arrival at the project site in the jobsite water added.

3.03 PLACING CONCRETE

A. Weather Restrictions

1. Concreting in Cold Weather: Do not place concrete when the air temperature at placement is below 40°F. The requirements of concreting in cold weather do not apply to precast concrete mixing and placement operations occurring in a temperature-controlled environment.
2. Concreting in Hot Weather: Hot weather concreting is defined as the production, placing, and curing of concrete when the concrete temperature at placing exceeds 85°F but is less than 100°F. Unless the specified hot weather concreting measures are in effect, reject concrete exceeding 85°F at the time of placement. Concrete temperature shall be measured per ASTM C1064. Regardless of special measures taken, reject concrete exceeding 100°F. Predict the concrete temperatures at placement time and implement hot weather measures to avoid production shutdown.

B. Inspections Before Placing Concrete: Do not place concrete until the depth and character of the foundation and the adequacy of the forms and falsework have been approved by the Engineer. Do not deposit any concrete until all reinforcement is in place and has been inspected and approved by the Engineer.

C. Exposure to Water: Do not expose concrete other than seal concrete in cofferdams to the action of water before final setting. Do not expose such concrete to the action of salt or brackish water for a period of seven days after placing the concrete. Protect the concrete during this period by keeping salt or brackish water pumped out of cofferdams.

D. Deposit concrete as nearly as possible in its final position. Do not deposit large quantities at one point and then run or work it along the forms. Take special care to fill each part of the forms, to work coarse aggregate back from the face, and to force concrete under and around reinforcing bars without displacing them.

E. Use a method and manner of placing concrete that avoids the possibility of segregation or separation of aggregates. If the Engineer determines that the quality of concrete as it reaches its final position is unsatisfactory, remove it and discontinue or adjust the method of placing until the Engineer determines that the quality of the concrete as placed is satisfactory.

F. Use metal or metal-lined open troughs, chutes, or other means of concrete conveyance which have no aluminum parts in contact with the concrete. As an exception, chutes made of aluminum for ready mixed concrete trucks, no longer than 20 feet, may be used. This exception does not apply to any other means of concrete conveyance. Where steep slopes are required, use chutes that are equipped with baffles or are in short lengths that reverse the direction of movement. Where placing operations would involve dropping the concrete freely more than 5 feet, deposit it through pipes, troughs, or chutes of sheet metal or other approved material. Use troughs, chutes, or pipes with a combined length of more than 30 feet only with the Engineering Department’s authorization. Keep all troughs, chutes, and pipes clean and free from coatings of hardened concrete by thoroughly flushing them with water after each run or more often if necessary.

G. Place concrete against supporting material that is moist at the time of concrete placement. If additional water is required, uniformly apply it ahead of the concrete.
placement as directed by the Engineer. The Contractor may use a moisture barrier in lieu of controlling the foundation grade moisture when approved by the Engineer.

H. Place concrete in continuous horizontal layers, approximately 20 inches thick. To avoid obtaining a plane of separation or a cold joint between layers, vibrate the concrete.

I. Vibrate concrete to avoid honeycomb and voids, especially at construction joints, expansion joints, valleys, and ends of form sheets. Use approved pouring sequences.

J. Do not use calcium chloride or any other admixture containing chloride salts in the concrete.

K. The concrete shall be placed on stabilizing or compacted subgrade to such depth that, when it is consolidated and finished, the slab thickness required by the Drawings will be obtained at all points and surface will at no point be below the grade specified for the finished surface, after application of the allowable tolerance. The concrete shall be deposited on the stabilized subgrade in a manner which will require as little re-handling as possible. Placing of the concrete shall be continuous between transverse joints, without the use of intermediate bulkheads.

L. Concrete shall be thoroughly consolidated against and along the faces of all forms, and along the full length and on both sides of all joint assemblies, by means of hand-operated, vibrators. Vibrators shall not be permitted to come in contact with joint assembly, the subgrade, or a side form. Vibration at any one location shall not continue so long as to produce puddling or the accumulation of excessive grout on the surface. In no case shall the vibrator be operated longer than 15 seconds in any one location.

M. Coloring of concrete shall be done by dry-mixing the compound and broadcasting over the fresh-poured concrete after it has been struck off.

N. Placing of concrete shall be so regulated that the pressure caused by the wet concrete shall not exceed that used in the design of the forms.

O. All concrete for walls shall be placed through openings in the form spaced at frequent intervals or through tremies (heavy duct canvas, rubber, etc.), equipped with suitable hopper heads. Tremies shall be of variable lengths so the free fall shall not exceed five (5) feet and a sufficient number shall be placed in the form to ensure the concrete is kept level at all times.

P. When forms are removed, surfaces shall be even and dense, free from aggregate pockets or honeycomb. To achieve this, concrete shall be consolidated using mechanical vibration, supplemented by forking and spading by hand in the corners and angle of forms and along form surfaces while the concrete is plastic under the vibratory action. Consolidation shall conform to ACI 309.
Q. Care shall be taken to prevent cold joints when placing concrete in any portion of the work. The concrete placing rate shall be such as to ensure that each layer is placed while the previous layer is soft or plastic, so that the two layers can be made monolithic by penetration of the vibrators. Maximum thickness of concrete layers shall be 18 inches. The surface of the concrete shall be level whenever a run of concrete is stopped.

R. Placement in Wall Forms: Concrete shall not be dropped through reinforcement steel or into any deep form, whether reinforcement is present or not, causing separation of the coarse aggregate from the mortar on account of repeatedly hitting rods or the sides of the form as it falls, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, some means such as the use of hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4 feet below the ends of ducts, chutes, or buggies. Concrete shall be uniformly distributed during the process of depositing, and in no case after depositing shall any portion be displaced in the forms more than 6 feet in horizontal direction. Concrete in forms shall be deposited in uniform horizontal layers not deeper than 2 feet; and care shall be taken to avoid inclined layers or inclined construction joints where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in forms shall not exceed 5 feet of vertical rise per hour.

3.04 FORMWORK

A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The Contractor shall assume full responsibility for the adequate design of all forms, and any forms which are unsafe or inadequate in any respect shall promptly be removed and replaced at the Contractor’s expense. All design, construction, maintenance, preparation, and removal of forms shall be in accordance with the FBC, ACI 347 and the requirements specified herein.

B. All forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete.

C. Vertical Surfaces: All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is called for by the Engineer.

D. Construction Joints: Concrete construction joints will not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete.
E. Form Ties: Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties which cause spilling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1 inch back from the formed face or faces of the concrete.

F. Careful procedures for the removal of forms shall be strictly followed, and this work shall be done with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. Members which must support their own weight shall not have their forms removed until they have attained at least 75 percent of the 28-day strength of the concrete as specified herein. Forms for all vertical walls and columns shall remain in place at least 2 days after the concrete has been placed. Forms for all parts of the Work not specifically mentioned herein shall remain in place for periods of time as determined by the City or their designee.

3.05 REINFORCING STEEL

A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings, and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.

B. Bending or Straightening: Reinforcement shall not be straightened or rebent in a manner which will injure the material. Bars with kinks or bends not shown shall not be used. All bars shall be bent cold, unless otherwise permitted by the Engineer. No bars partially embedded in concrete shall be field-bent except as shown or specifically permitted by the Engineer.

C. Reinforcing steel shall be accurately positioned as shown on the Drawings and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcing steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the Contractor shall furnish concrete, metal, plastic, or other acceptable bar chairs and spacers.

D. The portions of all accessories in contact with the formwork shall be made of concrete, plastic, or steel coated with a 1/8-inch minimum thickness of plastic which extends at least 1/2 inch from the concrete surface. Plastic shall be gray in color.
E. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

F. Bars additional to those shown which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at its own expense.

G. Reinforcement placing tolerances shall be within the limits specified in ACI 318, unless otherwise directed by the Engineer.

H. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters having gray, plastic-coated standard type legs as specified herein. Slab bolsters shall be spaced not less than 30 inches on centers, shall extend continuously across the entire width of the reinforcing mat, and shall support the reinforcing mat in the plane shown.

I. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3 feet on centers in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

J. Reinforcement bar splices shall only be used at locations shown. When it is necessary to splice reinforcement at points other than where shown, the character of the splice shall be as acceptable to the City or their designee.

K. Lap length for reinforcement bars shall be in a Class B Splice in accordance with ACI 318, unless otherwise shown. Laps of welded wire fabric shall be in accordance with the ACI 318.

L. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

M. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed. Where there is a delay in depositing concrete, reinforcing shall be reinspected and, if necessary, recleaned.

3.06 PREPARATION OF SURFACES FOR CONCRETING

A. General: No concrete shall be placed until the reinforcement steel and formwork have been erected in a manner acceptable to the City or their designee. The Contractor shall notify the City or their designee not less than two working days prior to concrete placement, allowing for inspection and any corrective measures which are required. Earth surfaces shall be thoroughly wetted by sprinkling, prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of
placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. Joints in Concrete: Concrete surfaces upon or against which concrete is to be placed, where the placement of the old concrete has been stopped or interrupted so that, as determined by the City or their designee, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bond. Except where the Drawings call for joint surfaces to be coated, the joint surfaces shall be cleaned of all laitance, loose or defective concrete, and foreign material. Such cleaning shall be accomplished by sandblasting, followed by thorough washing. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

C. Existing concrete surfaces upon or against which concrete is to be placed shall be given a roughened surface for good bond. Joint surfaces shall be cleaned of all laitance, loose or defective concrete, and foreign material. Such cleaning shall be accomplished by hydroblasting. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

D. Placing Interruptions: When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means that will secure proper union with subsequent work, provided that construction joints shall be made only where acceptable to the City or their designee.

E. Embedded Items: No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the City or their designee at least 4 hours before placement of concrete. All surfaces of forms and embedded items that have become encrusted with dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.

F. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms where shown on the Drawings or by shop drawings and shall be acceptable to the City or their designee before any concrete is placed. Accuracy of placement is the responsibility of the City or their designee.

G. Casting Against Old Concrete: Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydro-blasting (exposing aggregate) prior to the application of an epoxy bonding agent. Application shall be according to the bonding agent manufacturer's instructions and recommendations.

H. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means,
and carried out of the forms, clear of the work. No concrete shall be deposited under water nor shall the Contractor allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the review of the Engineer.

I. Openings for pipes, inserts for pipe hangers and brackets, and the setting of anchors shall, where practicable, be provided for during the placing of concrete.

J. Corrosion Protection: Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2 inches clearance between said items, and any part of the concrete reinforcement will not be permitted.

K. Cleaning: The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

3.07 TAMPING AND VIBRATING

A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense homogeneous mass, filling all comers and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement. Vibrators shall be high speed power vibrators (8,000 or 10,000 rpm) of an immersion type in sufficient number and with (at least one) standby units as required.

B. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly as specified. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the results herein specified with 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall be kept from contact with the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.08 FINISHING CONCRETE SURFACES

A. General: Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and
dimensions shown on the Drawings are defined as tolerances and are specified herein. These tolerances are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.

B. Formed Surfaces: After removal of forms, the finishes described below shall be applied in accordance with Article 3.13, D. Unless the finish schedule specifies otherwise, all surfaces shall receive at least a Type I finish. The Engineer shall be the sole judge of acceptability of all concrete finish work.

1. Type I - Rough: All fins, burrs and other projections left by the forms shall be removed. All holes left by removal of ends of ties, and all other holes, depressions, or voids shall be filled solid with cement grout after first being thoroughly wetted. Honeycombs shall be chipped back to solid concrete as directed, prior to patching with cement grout. Holes shall be filled with a small tool that will permit packing the hole solidly with cement grout. Cement grout shall consist of one part cement to three parts sand, and the amount of mixing water shall be as little as consistent with the requirements of handling and placing. Color of cement grout shall match the adjacent wall surface. At locations where concrete coatings are specified to be applied, epoxy-based patch material or filler surfaces compatible with the coating shall be used in lieu of cement grout specified herein. Concrete finish shall be in strict conformance to the coating / paint manufacturer’s recommendations.

2. Type II - Grout Cleaned: Where this finish is required, it shall be applied after completion of Type I finish. After the concrete has been predampened, slurry consisting of one part cement (including an appropriate quantity of white cement in order to produce a color matching the surrounding concrete) and 1-1/2 parts sand passing the No. 16 sieve, by damp loose volume, shall be spread over the surface with clean burlap pads or sponge rubber floats. Any surplus shall be removed by scraping and then rubbing with clean burlap. The finish shall be kept damp for at least 36 hours after application.

3. Type III - Smooth Rubbed: Where this finish is required, it shall be applied after the completion of the Type I finish. No rubbing shall be done before the concrete is thoroughly hardened and the mortar used for patching is firmly set. A smooth, uniform surface shall be obtained by wetting the surface and rubbing it with a carborundum stone to eliminate irregularities. Unless the nature of the irregularities requires it, the general surface of the concrete shall not be cut into. Corners and edges shall be slightly rounded by the use of the carborundum stone. Brush finishing or painting with grout or neat cement will not be permitted.

C. Unformed Surfaces: The finishes described below shall be applied to unformed surfaces such as floors, slabs, flow channels and top of walls in accordance with Article 3.05 - Concrete Finish Schedule. The Engineer shall be the sole judge of acceptability of all such finish work.
1. Type "A" - Screeded: This finish shall be obtained by placing screeds at frequent intervals and striking off to the surface elevation required. When a Type "F" finish is subsequently to be applied, the surface of the screeded concrete shall be roughened with a concrete rake to ½” minimum deep grooves prior to final set.

2. Type "B" - Wood Floated: This finish shall be obtained after completion of a Type "A" finish by working a previously screeded surface with a wood float until the desired texture is reached. Floating shall begin when the water sheen has disappeared and when the concrete has sufficiently hardened so that a person's foot leaves only a slight imprint. If wet spots occur, water shall be removed with a squeegee. Care shall be taken to prevent the formation of laitance and excess water on the finished surface. The finished surface shall be true, even, and free from blemishes and other irregularities.

3. Type "C" - Cork Floated: This finish shall be similar to Type "B" but slightly smoother than that obtained with a wood float. It shall be obtained by power or band floating with cork floats.

4. Type "D" - Steel Troweled: This finish shall be obtained after completion of a Type "B" finish. When the concrete has hardened sufficiently to prevent excess fine material from working to the surface, the surface shall be compacted and smoothed with not less than two thorough and complete steel troweling operations. In areas, which are to receive a floor covering such as tile, resilient flooring, or carpeting, only one troweling operation is required. The finish shall be brought to a smooth, dense surface, free from defects and blemishes.

5. Type "E" - Broom or Belt: This finish shall provide the surface with a transverse scored texture by drawing a broom or burlap belt across the surface immediately after completion of a Type "B" finish.

6. Type "F" - Swept in Grout Topping: This finish shall be applied after a completion of a Type "A" finish. The concrete surface shall be properly cleaned, washed, and coated with a mixture of water and Portland Cement. Cement grout in accordance with Section 03315 shall then be plowed and swept into neat conformance with the blades or arms of the apparatus by turning or rotating the previously positioned mechanical equipment. Special attention shall be paid to true grades, shapes and tolerances as specified by the manufacturer of the equipment. Before beginning this finish, the Contractor shall notify the Engineer and the equipment manufacturer of the details of the operation and obtain approval and recommendations of the equipment manufacturer.

7. Type "G" - Hardened Finish: Either a liquid hardened finish or an aggregate hardened finish shall be provided at the Contractor's option.
8. Type "H" - Non-Slip Finish: This finish shall be provided by applying a non-slip shake-on aggregate concurrently with the application of a Type "D" finish. Application procedure shall be in accordance with manufacturer's instructions.

9. Type "J" - Raked Finish: This finish shall be provided by raking the surface as soon as the condition of the concrete permits by making depressions of +/-1/4-inch.

### 3.09 CONCRETE FINISH SCHEDULE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>TYPE OF FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner face of walls of tanks, flow channels, wet wells, perimeter walls, and miscellaneous structures to be coated</td>
<td>I</td>
</tr>
<tr>
<td>Exterior concrete walls below grade</td>
<td>I</td>
</tr>
<tr>
<td>Exterior exposed concrete walls and columns (including top of wall) to one foot below grade. All other exposed concrete surfaces not specified elsewhere</td>
<td>II</td>
</tr>
<tr>
<td>All interior exposed concrete vertical surfaces in buildings</td>
<td>III</td>
</tr>
<tr>
<td>Interior exposed ceiling, including beams</td>
<td>III</td>
</tr>
<tr>
<td>Floors of process equipment tanks or basins, and slabs to receive roofing material or waterproof membranes</td>
<td>B</td>
</tr>
<tr>
<td>All interior finish floors of buildings and structures and walking surfaces which will be continuously or intermittently wet</td>
<td>C</td>
</tr>
<tr>
<td>All interior finish floors of buildings and structures which are not continuously or intermittently wet</td>
<td>D</td>
</tr>
<tr>
<td>Floors to receive tile, resilient flooring, or carpeting</td>
<td>D</td>
</tr>
<tr>
<td>Concrete in flow channels not specified to be coated</td>
<td>D</td>
</tr>
<tr>
<td>Exterior concrete sidewalks, steps, ramps, decks, slabs on grade and landings exposed to weather</td>
<td>E</td>
</tr>
<tr>
<td>Floors of process tanks indicated on Drawings or in the specifications to receive cement grout topping</td>
<td>F</td>
</tr>
<tr>
<td>Precast concrete form panels, hollow core planks, double tees</td>
<td>J</td>
</tr>
</tbody>
</table>
3.10 CURING AND DAMP PROOFING

A. All concrete shall be cured for not less than 14 days after placing, in accordance with the methods specified herein for the different parts of the work and described in detail in the following paragraphs.

<table>
<thead>
<tr>
<th>SURFACE TO BE CURED OR DAMPROOFED</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstripped forms</td>
<td>1</td>
</tr>
<tr>
<td>Construction joints between footings and walls, and between floor slab and columns</td>
<td>2</td>
</tr>
<tr>
<td>Encasement concrete and thrust blocks</td>
<td>3</td>
</tr>
<tr>
<td>All concrete surfaces not specifically provided for elsewhere in this Paragraph</td>
<td>4</td>
</tr>
</tbody>
</table>

B. Method 1: Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removed. If steel forms are used, the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed within 14 days of placing the concrete, curing shall be continued in accordance with Method 4.

C. Method 2: The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.

D. Method 3: The surface shall be covered with moist earth not less than 4 hours, nor more than 24 hours, after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 days after placement of concrete.

E. Method 4: The surface shall be sprayed with a liquid curing compound. It shall be applied in accordance with the manufacturers printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film which will seal thoroughly.

F. Care shall be exercised to avoid damage to the seal during the curing period. Should the seal be damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.

G. Wherever curing compound may have been applied by mistake to faces against which concrete subsequently is to be placed and to which it is to adhere, said compound shall be entirely removed by hydroblasting just prior to the placing of new concrete.
H. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on uniformed surfaces, and within 2 hours after removal of forms from contact with formed surfaces. Repairs required to be made to formed surfaces shall be made within the said 2-hour period; provided, however, that any such repairs which cannot be made within the said 2-hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, the area involved shall first be wet-sand blasted to remove the curing compound, following which repairs shall be made as provided herein.

3.11 TESTING

A. Field Testing of Concrete

1. The Contractor shall coordinate with the Engineer’s project representative the on-site scheduling of the materials testing consultant personnel as required for concrete testing.

2. Concrete for testing shall be supplied by the Contractor at no additional cost to the Owner, and the Contractor shall provide assistance to the materials testing consultant in obtaining samples. The Contractor shall dispose of and clean up all excess material.
B. Consistency

1. The consistency of the concrete will be checked by the materials testing consultant by standard slump cone tests. The Contractor shall make any necessary adjustments in the mix as the Engineer and/or the materials testing consultant may direct and shall upon written order suspend all placing operations in the event the consistency does not meet the intent of the specifications. No payment shall be made for any delays, material, or labor costs due to such eventualities.

2. Slump tests shall be made in accordance with ASTM C143. Slump tests will be performed as deemed necessary by the materials testing consultant and each time compressive strength samples are taken.

3. Concrete with a specified nominal slump shall be placed having a slump within 1” (higher or lower) of the specified slump. Concrete with a specified maximum slump shall be placed having a slump less than the specified slump.

C. Unit Weight

1. Samples of freshly mixed concrete shall be tested for unit weight by the materials testing consultant in accordance with ASTM C138.

2. Unit weight tests will be performed as deemed necessary by the Engineer and each time compressive strength samples are taken.

D. Air Content

1. Samples of freshly mixed concrete will be tested for entrained air content by the materials testing consultant in accordance with ASTM C231.

2. Air content tests will be performed as deemed necessary by the materials testing consultant and each time compressive strength samples are taken.

3. In the event test results are outside the limits specified, additional testing shall occur. Admixture quantity adjustments shall be made immediately upon discovery of incorrect air entrainment.

E. Compressive Strength

1. Samples of freshly mixed concrete will be taken by the materials testing consultant and tested for compressive strength in accordance with ASTM C172, C31 and C39, except as modified herein.

2. In general, one sampling shall be taken for each placement, with a minimum of one (1) sampling for each day of concrete placement operations, or for each one fifty (50) cubic yards of concrete, or for each 5,000 square feet of surface area for slabs or walls, whichever is greater.
3. Each sampling shall consist of at least five (5) 6x12 cylinders or eight (8) 4x8 cylinders. Each cylinder shall be identified by a tag, which shall be hooked or wired to the side of the container. The materials testing consultant will fill out the required information on the tag, and the Contractor shall satisfy himself that such information shown is correct.

4. The Contractor shall be required to furnish labor to the Owner for assisting in preparing test cylinders for testing. The Contractor shall provide approved curing boxes for storage of cylinders on site. The insulated curing box shall be of sufficient size and strength to contain all the specimens made in any four consecutive working days and to protect the specimens from falling over, being jarred or otherwise disturbed during the period of initial curing. The box shall be erected, furnished, and maintained by the Contractor. Such box shall be equipped to provide the moisture and to regulate the temperature necessary to maintain the proper curing conditions required by ASTM C31. Such box shall be located in an area free from vibration such as pile driving and traffic of all kinds and such that all specimens are shielded from direct sunlight and/or radiant heating sources. No concrete requiring inspection shall be delivered to the site until such storage curing box has been provided. Specimens shall remain undisturbed in the curing box until ready for delivery to the testing laboratory but not less than sixteen hours.

5. The Contractor shall be responsible for maintaining the temperatures of the curing box during the initial curing of test specimens with the temperature preserved between 60°F and 80°F as measured by a maximum-minimum thermometer. The Contractor shall maintain a written record of curing box temperatures for each day curing box contains test specimens. Temperature shall be recorded a minimum of three times a day with one recording at the start of the workday and one recording at the end of the workday.

6. When transported, the cylinders shall not be thrown, dropped, allowed to roll, or be damaged in any way.

7. Compression tests shall be performed in accordance with ASTM C39. For 6x12 cylinders, two test cylinders will be tested at seven days and two at 28 days. For 4x8 cylinders, three test cylinders will be tested at seven days, three at 28 days. The remaining cylinders will be held to verify test results, if needed.

F. Evaluation and Acceptance of Concrete

1. Evaluation and acceptance of the compressive strength of concrete shall be according to the requirements of ACI 214, ACI 318, and ACI 350.

2. The strength level of concrete will be considered satisfactory if all of the following conditions are satisfied.
a. Every arithmetic average of any three consecutive strength tests equals or exceeds the minimum specified 28-day compressive strength for the mix (see Article 2.08).

b. No individual compressive strength test results falls below the minimum specified strength by more than 500 psi.

3. In the event any of the conditions listed above are not met, the mix proportions shall be corrected for the next concrete placing operation.

4. In the event that condition 2B is not met, additional tests in accordance with Article 3.10, paragraph H shall be performed.

5. When a ratio between 7-day and 28-day strengths has been established by these tests, the 7-day strengths shall subsequently be taken as a preliminary indication of the 28-day strengths. Should the 7-day test strength from any sampling be more than 10% below the established minimum strength, the Contractor shall:

a. Immediately provide additional periods of curing in the affected area from which the deficient test cylinders were taken.

b. Maintain or add temporary structural support as required.

c. Correct the mix for the next concrete placement operation, if required to remedy the situation.

6. All concrete which fails to meet the ACI requirements and these specifications is subject to removal and replacement at no additional cost to the Owner.

G. When non-compliant concrete is identified, test reports shall be sent immediately to the Engineer for review.

H. Additional Tests

1. When ordered by the Engineer, additional tests on in-place concrete shall be provided and paid for by the Contractor.

2. In the event the 28-day test cylinders fail to meet the minimum strength requirements as outlined in Article 3.10, paragraph F, the Contractor shall have concrete core specimens obtained and tested from the affected area immediately.

a. Three cores shall be taken for each sample in which the strength requirements were not met.

b. The drilled cores shall be obtained and tested in conformance with ASTM C42. The tests shall be conducted by a materials testing consultant approved by the Engineer.
c. The location from which each core is taken shall be approved by the Engineer. Each core specimen shall be located, when possible, so its axis is perpendicular to the concrete surface and not near formed joints or obvious edges of a unit of deposit.

d. The core specimens shall be taken, if possible, so no reinforcing steel is within the confines of the core.

e. The diameter of core specimens should be at least 3 times the maximum nominal size of the coarse aggregate used in the concrete but must be at least 2-inches in diameter.

f. The length of specimen, when capped, shall be at least twice the diameter of the specimen.

g. The core specimens shall be taken to the laboratory and when transported, shall not be thrown, dropped, allowed to roll, or damaged in any way.

h. Two (2) copies of test results shall be mailed directly to the Engineer. The concrete in question will be considered acceptable if the average compressive strength of a minimum of three test core specimens taken from a given area equal or exceed 85% of the specified 28-day strength and if the lowest core strength is greater than 75% of the specified 28-day strength.

I. In the event that concrete placed by the Contractor is suspected of not having proper air content, the Contractor shall engage a materials testing consultant approved by the Engineer, to obtain and test samples for air content in accordance with ASTM Specification C457.
WATER DISTRIBUTION SYSTEM
SECTION 14. WATER DISTRIBUTION SYSTEM

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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. American Association of State Highway Transportation Officials (AASHTO)
   AASHTO T-180 Standard Method of Test for Moisture–Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

   ASTM A48 Standard Specification for Iron Castings
   ASTM A536 Standard Specification for Ductile Iron Castings
   ASTM B505 Standard Specification for Copper Alloy Continuous Castings
   ASTM D1248 Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
   ASTM D1784 Standard Classification System and Basis for Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds
   ASTM D2000 Standard Classification System for Rubber Products in Automotive Applications
   ASTM D2584 Standard Test Method for Ignition Loss of Cured Reinforced Resins
   ASTM D2657 Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings
   ASTM D2737 Standard Specification for Polyethylene (PE) Plastic Tubing
   ASTM D3035 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
   ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
3. American National Standards Institute (ANSI)
   ANSI B16.1  Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250

4. American Water Works Association (AWWA)
   AWWA C104  Cement Mortar Lining for Ductile Iron Pipe and Fittings For Water
   AWWA C105  Polyethylene Encasement for Ductile Iron Pipe
   AWWA C110  Ductile Iron and Gray Iron Fittings
   AWWA C111  Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings
   AWWA C115  Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
   AWWA C150  Thickness Design of Ductile Iron Pipe
   AWWA C151  Ductile Iron Pipe, Centrifugally Cast
   AWWA C500  Metal-Seated Gate Valves for Water Supply Service
   AWWA C504  AWWA Standard for Rubber-Seated Butterfly Valves
   AWWA C509  Resilient-Seated Gate Valves for Water Supply Service
   AWWA C600  Installation of Ductile Iron Water Mains and their Appurtenances
   AWWA C651  Disinfecting Water Mains
   AWWA Manual M14  Backflow Prevention and Cross-Connection Control Recommended Practices

5. Florida Administrative Code (FAC)

6. Florida Building Code

7. Florida Department of Environmental Protection (FDEP)

8. Florida Department of Health in Miami-Dade County Regulations

   ISO 8179  Ductile Iron Pipes, Fittings, Accessories and their Joints – External Zinc-Based Coating

10. Miami-Dade County Code of Ordinances
11. Miami-Dade Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM) Regulations

12. National Science Foundation (NSF)

   NSF 14   Plastics Piping System Components and Related Materials
   NSF 61   Drinking Water System Components – Health Effects

13. Occupational Safety and Health (OSHA) Regulations

B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

   Section 1. Design Standards and Guidelines
   Section 8. Surveying, Drawing, and Drafting Requirements
   Section 9. Erosion and Sediment Control
   Section 10. Earthwork and Roadwork
   Section 13. Concrete

1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/ or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so
directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.03 SUBMITTALS

A. Minimum criteria are presented in this Section and the following Standard Details. Water distribution systems, including associated disciplines as required (civil, structural, electrical, instrumentation, etc.) shall be designed by a State of Florida Engineer. Signed and sealed calculations must be provided to support hydraulic and structural design.

B. Plans shall be in accordance with Section 8 of the City of Miami Beach Public Works Manual.

C. Properly identified product data for review, including data of pipe and all other materials used, shall be submitted to the City or designee for review and approval prior to fabrication and/or delivery.

D. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

1.04 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.
1.05 DESIGN CRITERIA

A. The existing water main network shall be analyzed during the design to determine which mains can be abandoned and taken out of service during the construction of water mains. Mains to be abandoned shall be left in place and are to be cut and capped to the nearest valve.

B. The cost of tests including water usage and retesting due to failures shall be at the Contractor’s expense.

C. Pipeline Crossings

1. Water mains shall not be laid in the same trench with sewer mains, stormwater mains, gas lines, fuel lines, or electric cables.

2. The horizontal, vertical, and joint separation shall be in accordance with FAC 62-55.314. Refer to Standard Details 14-1, 14-2, and 14-3.

3. Miami Dade County DERM-RER Water-Sewer General Notes, latest version.

D. All new proposed water mains designs shall include a loop system to ensure water quality. Dead ends will not be allowed without written approval by the City of Miami Beach Public Works Department. Approved dead ends must have a water quality mechanism.

E. Maximum valve separation shall be as follows per Miami-Dade County requirements. Additional valves may be required at the sole discretion of the City of Miami Beach Public Works Department.

1. Transmission system: 1/2-mile maximum separation between valves

2. Distribution system: 660-feet maximum separation between valves

1.06 LEAD AND COPPER RULE

A. Drawings shall identify the material of all water mains and service lines within City right-of-way and on private property.

B. All identified or found lead water mains, service lines or gooseneck/pigtail/connector shall be replaced with Public Works approved materials.

C. All identified or found galvanized pipe located downstream of a lead service line shall be replaced with Public Works approved material.
PART 2 – PRODUCTS

2.01 SIZE AND MATERIAL LIMITATIONS

A. The City of Miami Beach Public Works Department does not permit the use of 10-inch, 14-inch, or 18-inch pipe, fittings, or valves, except as may be approved for connections to existing mains. The minimum distribution line size is 8-inch diameter.

B. Use of PVC C900 pipe is prohibited in the water system. All water main piping shall be zinc-coated poly-wrapped ductile iron (DI) pipe, high density polyethylene (HDPE) pipe, or concrete as approved by the City of Miami Beach Public Works Department in writing.

C. Use of galvanized and lead pipe materials is prohibited.

D. All existing lead watermains, service lines and/ or gooseneck (pigtails) found within the right-of-way (ROW) or private property shall be replaced with City approved material.

E. All water watermain and service line material shall be clearly stated in design, construction, and As-built drawings.

2.02 DUCTILE IRON (DI) PIPE

A. The exterior of all DI pipe shall be zinc-coated and poly-wrapped in accordance with AWWA C105.

B. DI pipe shall be centrifugally cast in metal molds or sand lined molds in accordance with AWWA C151 of grade 60-42-10 ductile iron. The above standard covers ductile iron pipe with nominal pipe sizes from 3 inches up to and including 64 inches in diameter.

C. Unless otherwise specified, the minimum pipe thickness per AWWA C151 for the following pipe sizes is shown below. Flanged (FLG) pipe shall not be less than Class 53 as identified in Table 50.15 of AWWA C150-91.

<table>
<thead>
<tr>
<th>PIPE MATERIAL</th>
<th>NOMINAL PIPE DIAMETER (INCHES)</th>
<th>CLASS</th>
<th>TYPE OF JOINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI</td>
<td>4 thru 12</td>
<td>52</td>
<td>MJ or PO</td>
</tr>
<tr>
<td>DI</td>
<td>14 thru 54</td>
<td>51</td>
<td>MJ or PO</td>
</tr>
<tr>
<td>DI</td>
<td>All</td>
<td>53</td>
<td>FLG</td>
</tr>
</tbody>
</table>

D. Depending on design conditions, the City may opt to conform to standard pressure classes AWWA C151 for the following pipe sizes. The pressure class specified is the minimum permitted.
### NOMINAL PIPE DIAMETER

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(INCHES)</td>
<td></td>
</tr>
<tr>
<td>4 thru 12</td>
<td>350</td>
</tr>
<tr>
<td>14 thru 24</td>
<td>250</td>
</tr>
<tr>
<td>30 thru 54</td>
<td>150</td>
</tr>
</tbody>
</table>

#### 2.03 HIGH-DENSITY POLYETHYLENE (HDPE) PIPE

A. HDPE for water distribution pipe shall be high molecular weight. The resin material shall have a standard PE code designation of PE 4710. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material pipe. The pipe shall be homogeneous throughout and free of visible cracks, bubbles, holes, foreign inclusions or other injurious defects. It shall be uniform in color, capacity, density, and other physical properties.

B. The pipe shall conform to either Iron Pipe Size (IPS) or DIPS standard dimensions. A standard dimension ratio (SDR) of 11 shall be used whenever available. Approval from the City of Miami Beach Public Works Department is required for any pipe with a proposed SDR greater than 11 (i.e., wall thickness is reduced).

C. All HDPE pipe shall be color coded for the intended service. The color coding shall be permanently coextruded on the pipe outside surface as part of the pipe’s manufacturing process. Painting HDPE pipe to accomplish color coding is not permitted. Color coding shall be as follows:

1. Water - blue

D. HDPE pipe for water distribution shall be marked either continuously or on intervals not to exceed five (5) feet by indirect printing with the following information:

1. Name and/or trademark of the manufacturer.

2. Nominal pipe size.

3. Dimension ratio.

4. The letters PE followed by the polyethylene grade per ASTM D1248, followed by the Hydrostatic Design basis in 100's of pounds per square inch (psi).


6. Production Code from which time and date of manufacture can be determined.

E. HDPE fittings shall be manufactured to the requirements of ASTM D3261 and fabricated fittings shall be manufactured from pipe of at least one SDR heavier pipe than the
system piping and shall be pressure rated to match the system piping. The butt fusion outlets of fabricated fittings shall be machined to the same SDR as the system piping to which they are to be fused.

F. HDPE pipes and fittings shall be joined one to another by thermal butt fusion, saddle fusion, or socket fusion in accordance with procedures recommended by the pipe manufacturer and as outlined in ASTM D2657. The manufacturer shall provide fusion training services to the Contractor upon request.

G. Butt fusion joining of unlike SDRs shall not be permitted. Transition from one SDR to another shall be accomplished by the use of mechanical couplings or a transition nipple, which is a short length of the heavier SDR pipe with one end machined to the lighter SDR.

H. All HDPE pipe installed via open cut installation shall have a #12 copper wire laid along with the pipe and attached to a terminal with a cast iron lid that maintains continuity of signal and allows for magnetic location of the pipe in the future.

### 2.04 FITTINGS AND JOINTS

A. Fittings shall be manufactured in accordance with AWWA C110 for nominal pipe sizes 3 inches to 64 inches and shall be either flanged or mechanical joint. Any other fittings, not included in AWWA C110 shall conform in design and performance to the requirements of this Section.

B. Unless otherwise specified, the ductile iron fitting minimum thickness is defined in Section 2.02C. Flanged (FLG) fittings shall not be less than Class 53 as identified in Table 50.15 of AWWA C150-91.

C. Depending on design conditions, the City may opt to conform to standard pressure classes AWWA C151 as defined in Section 2.02D.

D. Flanged pipe shall only be allowed on above ground applications and shall not be allowed in underground applications.

E. Mechanical and push-on type joints shall be in accordance with AWWA C111.

F. Fittings shall be provided with flanges having a bolt circle and bolt pattern the same as the adjacent pipe and/or mechanical devices.

G. No raised face flanges shall be used. The raised faces shall be milled flat.

H. Flange gaskets shall be full face neoprene rubber. Gasket material (push-on) mechanical joint, gasket restrained shall be neoprene.
2.05 PIPE AND FITTING COATINGS

A. A coating of rust inhibitive primer shall be applied to the ductile iron pipe exterior prior to shipment for piping that is above ground and exposed piping within vaults.

B. For buried service, the piping manufacturer’s standard asphaltic coating shall be applied prior to shipment to the exterior wall of buried DI pipe and fittings in accordance with AWWA C151.

C. Zinc Basecoat: The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 grams per square meter (g/m²) of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils. The coating system shall conform in every respect to ISO 8179, Part 1. Ductile iron fittings shall also have a zinc protective coating sprayed on at the factory at a minimum of 3 mils.

D. Poly Wrap
   1. All DI pipe and fittings shall be poly wrapped conforming to the requirements of AWWA C105 and shall have an 8 mil minimum thickness.
   2. Due to the high salinity content of the groundwater, or if corrosive soils are encountered, the City may require the use of V-Bio Enhanced Polyethylene Encasement to protect the ductile iron main, fittings, and valves. All ductile iron pipe and fittings shall be wrapped with the V-Bio Polyethylene Enhanced Encasement and have the zinc protective coating factory applied. The V-Bio Polyethylene Enhanced Encasement shall be accordance with AWWA C600 and AWWA C105. Color shall be blue for potable water. Polyethylene encasement for use with ductile iron pipe systems shall consist of three layers of co-extruded linear low density polyethylene (LLDPE), fused into a single thickness of not less than 8 mils. The inside layer of the polyethylene wrap to be in contact with the pipe exterior shall be infused with a corrosion inhibitor and antimicrobial biocide to control galvanic corrosion. Product: V-Bio, or approved equal.
   3. Polyethylene encasement for ductile-iron pipe shall be supplied as a flat tube meeting the dimensions of Table 1 in AWWA C105 and shall be supplied by the ductile iron pipe manufacturer. Plastic adhesive tape shall consist of polyolefin backing and adhesive which bonds to common pipeline coatings including polyethylene. Products: Canusa Wrrap Tape; Tapecoat H35; Polyken 934; AA Thread Seal Tape, Inc.; or approved equal.

E. Interior of DI pipes and fittings shall be cement-lined and seal-coated in accordance with AWWA C104.
2.06 RESTRAINING

A. Unless otherwise indicated, all below ground DI pipe fittings 30 inches in diameter and greater shall be provided with manufacturer proprietary restrained joints.

B. Underground ductile iron fittings for pipe 24 inches in diameter and less shall be restrained mechanical joint fittings.

C. All fittings and specific pipe joints shall be restrained as outlined below (NO SUBSTITUTIONS). MEGABOND coating system shall be provided for all EBAA products.

<table>
<thead>
<tr>
<th>JOINT</th>
<th>RESTRAINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push-On DI Pipe 3-inch to 48-inch</td>
<td>TR-Flex by U.S. Pipe or Flex Ring by American; or EBAA Iron Series 1700 Megalug</td>
</tr>
<tr>
<td>Fitting with DI Pipe</td>
<td>EBAA Iron Series 1100 Megalug</td>
</tr>
</tbody>
</table>

D. Minimum length of pipe to be restrained shall be in accordance with DIPRA Thrust Restraint Design for Ductile Iron Pipe, latest edition.

E. Thrust blocks are not allowed unless specially approved by City of Miami Beach Public Works Department Engineering Division in writing.

2.07 AIR RELEASE VALVES (ARVS)

A. The pressure automatic air-release valves shall be installed at locations selected by the Engineer of Record to automatically release accumulated air and other gases with the line under pressure.

B. The internal mechanism shall be the compound lever type to permit the valve to open under pressure to vent pockets of entrapped air or gas as they accumulate. Valve shall be selected with orifice sized for venting at an acceptable discharge rate over the entire pressure range the main will be operated. It shall have sealing faces of an adjustable BUNA-N rubber valve and stainless steel. Valves which use a needle valve to seal the orifice shall not be acceptable. Valve shall have a 2-inch NPT screwed inlet connection and shall have cast iron body with stainless steel float and inner mechanisms. For valves where bolts thread into the housing (i.e. bonnet-to-body bolts), bolts shall be stainless steel. Valves shall be supplied with a 1-inch vacuum check valve on the outlet to eliminate the possibility of air entering the system when the pressure decreases or if a vacuum is drawn. The valves shall also be supplied with a 2-inch bronze isolation shut-off ball valve.
2.08 BUTTERFLY VALVES

A. Butterfly valves shall be used on water mains larger than 12-inch diameter.

B. Butterfly valves (water service) shall be of the rubber seated, tight closing type conforming to AWWA C504. The manufacturer shall have a minimum of five (5) years of experience in manufacturing butterfly valves of the sizes required in accordance with AWWA C504. All butterfly valves shall be the product of one manufacturer. Butterfly valves shall be as manufactured by Pratt, Mueller Co., DeZurik, or approved equal.

C. Butterfly valves shall be Class 150B. Unless otherwise required by the City or designee, butterfly valves shall be of the short body design with mechanical joint or flanged ends.

D. Valve bodies shall be epoxy coated cast iron conforming to ASTM A126, Grade B, ASTM A48, Class 40 or Ductile Iron ASTM A536, Grade 65 45 12. Where required to meet design operating conditions, valve bodies shall be manufactured of higher strength materials. Valve bodies shall have integral hubs for housing shaft bearings and seals.

E. Butterfly valves shall be of the concentric or eccentric shaft types. Valve discs shall be constructed of epoxy coated ductile iron, ASTM A536, Grade 65 45 12. Disks shall be of the "offset" design to provide a full 360 degree seating surface with no external ribs transverse to flow, and shall comply with AWWA C504. The valve manufacturer shall furnish shop drawings which include end clearance dimensions when the disc is in the fully open position.

F. The resilient valve seat shall be synthetic rubber designed to seat against a pressure differential of 150 psi on either side of the valve, unless otherwise indicated. The resilient seat shall be mechanically attached to the valve disc or valve body. Any required seat attachment hardware shall be stainless steel. The resilient seat shall be capable of being adjusted or replaced in the field without moving the valve disc along the shaft axis, or removing the valve from the line. The mating seat surface shall be stainless steel or monel.

G. The seats shall be factory tested as per AWWA C504 at a test pressure of 150 psi, unless otherwise indicated, and post adjusted for differential pressures indicated herein.

H. Valve shafts shall be one piece or two piece units of stainless steel construction suitably sized to transmit the torques required to operate the valves under the conditions listed in the valve schedule with appropriate safety factor. Shafts shall be securely attached to valve disc by means of conservatively sized corrosion resistant taper pins, threaded at one end, and secured with lockwashers and nuts (i.e. mechanically attached). Provide O ring seal on taper pin if required to prevent leakage. Shaft key shall be constructed of corrosion resistant material.

I. Shaft bearings shall be contained in the integral hubs of the valve body and shall be the permanently self-lubricated, corrosion resistant, sleeve type of teflon or heavy duty
bronze. The valve assembly shall be furnished with a factory set two way thrust bearing designed to center the valve disc in the valve seat at all times. End cover bolts shall be of stainless steel construction.

J. The shaft seal shall be either the bronze cartridge type with at least two O-rings, monolithic V-Type, or pull down packing type. If monolithic V-Type or pull down packings are utilized, it shall be self-adjusting, self-compensating type. Packing shall be as manufactured by Chevron, or equal. Butterfly valves with pull down packings shall be designed with an extension bonnet so that repacking can be done without removal of the actuator. For buried valves with pull down packing the packing gland cover assembly shall be heavy duty, soil and water resistant. Stuffing boxes for pull down packing shall have a depth sufficient to accept at least four rings of self-compensating type packing specifically selected for the operating pressures to be encountered. Stuffing box bolts, studs and nuts shall be stainless steel.

K. The O-ring type shaft seal shall be contained in a removable bronze cartridge. The bronze cartridge shall be manufactured from ASTM B505 copper alloy UNS #C93200 and shall meet the requirements of AWWA C504 for bronze, Grade E. The O-ring material shall be nitrile, BUNA N rubber, as intended for use with potable water or wastewater and per ASTM D2000 with a hardness of 70 Shore A Durometer.

L. Manual operators for butterfly valves 18 inches in diameter or larger shall be the worm gear type conforming to AWWA C504. Operators shall be equipped with adjustable AWWA limit stops, shall be sized according to Table IV for Class 150B, and shall require a minimum of 15 turns for 90 degrees or full stem valve travel. The capacity of the manual operator shall be adequate to drive the valve under the differential pressure of 150 psi and maximum anticipated flow, unless otherwise indicated in the appropriate valve schedule.

M. The manufacturer shall certify that the butterfly valves are capable of operating in continuous duty service under these pressures and flow conditions.

N. Each valve shall by hydrostatically tested and tested for bubble tightness after the operator has been mounted and adjusted. Copies of the hydrostatic and leakage test certification and certification of conformance shall be submitted to the City or designee prior to shipment.

O. Each valve shall be performance and leak tested as specified in AWWA C504 revised as follows: In addition to the testing requirements of AWWA C504, each butterfly valve shall be thoroughly cleaned and opened and closed at least three (3) times prior to testing. Certified copies of the test results shall be submitted to the City or designee for approval prior to shipment of the valve.

P. All internal and external ferrous components and surfaces of the valves, with the exception of stainless steel and finished or bearing surfaces, shall be shop painted with
two coats (10 mils min. dry film thickness) of the manufacturer's premium epoxy for corrosion resistance. Damaged surfaces shall be repaired in accordance with the manufacturer's recommendations.

2.09 GATE VALVES

A. Gate valves shall be used on mains 3-inch diameter to 12-inch diameter.

B. All gate valves between 2 inches and less than 4 inches shall be iron body, bronze trimmed, wedge disc, and minimum 150 psi non-shock cold water pressure rating. Exposed valves shall be of the outside screw and yoke (OS&Y), ANSI B16.1, 125 pound flanges and shall be as manufactured by American, Mueller, or approved equal.

C. Valves less than 2 inches shall be of bronze body, rising stem, wedge disc and minimum 300 psi non-shock cold water pressure rating. Valves shall have screwed ends or as specified otherwise.

D. Gate valves 4 inches through 16 inches shall be of the non-rising stem design, shall fully comply with the requirements of AWWA C509 for resilient-seated gate valves. Gate valves shall be designed for a minimum working pressure of 250 psi and a test pressure of 500 psi. Gate valves shall be manufactured by American, Mueller, or approved equal.

E. Gate valves 18 inches and larger shall fully comply with the requirements of AWWA C500 and shall be double disc parallel seat with bypass and inside screw spur geared operator, unless otherwise specified or required by the City or designee. Valves shall be American, Mueller, or approved equal.

F. Gate valve body and bonnet shall be cast iron conforming to ASTM A126, Class B with resilient seat gate and O-ring seals. The gate shall be cast iron with a vulcanized rubber coating with no metal to metal contact when in the fully closed position and a smooth unobstructed waterway when in the fully opened position.

G. Valves shall be flanged or mechanical joint, with non-rising stems, and with a 2-inch square standard AWWA operating nuts unless otherwise specified or required by the City or designee.

H. All internal ferrous components and surfaces of the valves, with the exception of stainless steel and finished or bearing surfaces, shall be shop painted with two coats (10 mils min. dry film thickness) of the manufacturer's premium epoxy for corrosion resistance. Damaged surfaces shall be repaired in accordance with the manufacturer's recommendations.

2.10 VALVE BOXES

A. Valve boxes shall be made from Class 30B gray iron in accordance with ASTM A48.
B. The letter “W” shall be cast in the cover for water mains.

C. Bottom of cover and seat of frame shall be machined to provide a uniform contact surface.

D. The boxes shall be of such length as will be adapted, without full extension, to the depth of cover required over the pipe at the valve location.

E. All service valve boxes shall be No. 2, and all main valve boxes shall be No. 3 regardless of the size.

F. No. 2 valve boxes shall be U.S. Foundry 7615 ring and FC cover, or approved equal.

G. No. 3 valve boxes shall be U.S. Foundry 7630 ring and FD cover, or approved equal.

2.11 FIRE HYDRANTS

A. All fire hydrants to be manufactured by American Darling Model B-84B-5 with threaded pattern. The nozzle sizes shall meet City of Miami Beach Fire Department requirements:

1. Thread and nozzle size for hose: Two 2-½ inch HN

2. Thread of pumper nozzle: One 4 inch PN

3. Operating nut size, shape, location, and rotation: B41 OP NUT OL-Upper

B. Contractor should inspect and verify that threaded equipment and couplings are compatible with City equipment, particularly “Hose Threads”.

C. Fire Hydrants location and distribution shall be in accordance with City of Miami Beach Fire Department requirements:

1. Single Story Residential: Hydrants shall be located that the maximum hose travel distance, as measured in the streets rights-of-way, will not exceed 500 feet to the center of the lot or to the edge of the structure being protected, and no more than 500 feet apart.

2. Multi-Story Residential: Hydrant spacing along a main shall not exceed 300 feet, nor shall a hydrant be more than 300 feet from the structure being protected.

3. Commercial and Industry: Hydrant spacing along a main shall not exceed 300 feet, nor shall a hydrant be more than 300 feet from the structure being protected.

4. Schools, Hospitals, Institutions, prisons, and nursing homes: Two hydrants not more than 300 feet apart must be provided to protect each structure.

D. Where fire department access roads are provided with median dividers incapable of being crossed by fire apparatus, or where fire department access roads have traffic counts of more than 30,000 vehicles per day, hydrants shall be placed on both sides of the fire department access road on an alternating basis and the distances specified in
Section 2.11 C shall be measured independently of the hydrants on the opposite side of the fire department access road.

### 2.12 WATER SERVICE AND FIRE LINES

**A.** All service lines two inches (2") in diameter shall be high density polyethylene pipe CTS-OD with a nominal outside diameter of 2.125-inches, minimum wall thickness of 0.236-inches all in conformance with ASTM D2737. Pipe shall comply with NSF 61 or 14. Submit manufacturer’s certification of compliance with all of the above requirements. Certification shall ship with the pipe on material sold and shall always be submitted with shop drawings and catalogue cuts. Certification shall be signed and sealed by a professional engineer licensed to practice in the State of Florida.

**B.** All service lines shall be wrapped with a #12 copper wire and attached to the corporation stop for continuity of signal.

**C.** Polyethylene services crossing a pavement and connecting to a water main in the swale area shall be installed within a minimum three-inch (3") diameter black iron sleeve pipe with tracer wire, under the pavement and sidewalk.

**D.** Maximum water service length shall be 50 feet. Longer service line lengths require the approval of the City of Miami Beach Public Works Department.

**E.** Fire lines shall be a minimum of 8-inches in diameter. Connections off fire lines for fire hydrants shall be 6-inches, and 8-inches when main fire line is located farther than 50 feet from hydrant.

**F.** Copper or brass piping is not allowed except for special conditions. Use threaded pipes or compression fittings. No solder joints allowed.

**G.** Ductile iron pipes less than 6-inch diameter shall be Class 53.

**H.** Tapping saddles shall have two (2) stainless steel straps and one corporation stop.

**I.** Meters shall be supplied, installed, replaced, and/or maintained by the City.

**J.** Meter boxes are to be supplied by the Contractor in accordance with the Standard Details.

### 2.13 BACKFLOW PREVENTION ASSEMBLY

**A.** Install backflow prevention assembly accordance with AWWA M14 and Miami-Dade County Code of Ordinances.
B. Structures directly supplied from public water mains with an auxiliary water supply dedicated to Fire Department use and available to the premises shall be protected from the Public Water Supply System by a backflow prevention assembly.

C. The backflow prevention assembly shall be installed above the flood plain elevation.

D. All above grade piping shall be copper or DI. No PVC or galvanized pipes are allowed.

E. Backflow prevention devices shall be equipped with proper vertical support and security.

F. Backflow prevention assembly as manufactured by AMES, CONBRACO, FEBCO, Hershey, Watts, Wilkins, or approved equal.

G. Backflow prevention assemblies are tested annually. Refer to Appendix 14-A.

PART 3 – EXECUTION

3.01 PREPARATION

A. Permits: The Contractor shall obtain all required right-of-way, City Building Department, and regulatory permits prior to commencing any work.

B. Maintenance of traffic (MOT) shall be provided by the Contractor in accordance with Section 1 of the City of Miami Beach Public Works Manual.

C. Pre-Shutdown Inspections

1. The following requirements apply to shutdowns for all non-emergency work. These requirements may be waived at the sole discretion of the City of Miami Beach Public Works Department for emergency work.

2. Shutdowns must be scheduled with the City one (1) week in advance.

3. Prior to the shutdown for tie in of any water or fire mains, the City shall perform an onsite inspection in order to verify the following:

   a. Size of pipe

   b. Materials onsite

4. If this inspection does not occur or parts are missing, the shutdown will be canceled.

5. City shall be provided with a minimum of 48 hours notice for pre-shutdown inspection.

6. Timing of all shutdowns will depend on affected stakeholders and shall be coordinated through the City of Miami Beach Public Works Department.
7. The City can, at any time, cancel scheduled shutdowns due to inclement weather events and/or special events.

3.02 GENERAL INSTALLATION OF PIPES AND APPURtenances

A. All ductile iron pipes shall be installed true and straight in accordance with AWWA C600. Allowable pipe deflection shall not exceed 50% of the maximum deflection, as recommended by the pipe manufacturer.

B. Detector Tape: All pipes shall have 3-inch wide blue detector tape for water main. The words "CAUTION WATER LINE BURIED BELOW" on the upper side of the pipe shall be printed at 30-inch intervals along the tape. Tape shall be placed 18 inches below grade above all water mains and services or as recommended by manufacturer. Non-metallic tape shall be used above ductile iron pipe.

C. All HDPE pipe shall be furnished and installed with tracer wire. Special care in handling shall be exercised during delivery, distribution, and storage of tracer wire to avoid damage and unnecessary stresses. Damaged tracer wire will be rejected and shall be replaced at the Contractor’s expense. The tracer wire shall have water-blocking characteristics, be corrosive resistant, and have UV protection. The tracer wire shall be copper or copper clad steel with polyethylene insulation and core material of woven polyester and water blocking polyester yarns. The wire shall have an outer jacket of high-density polyethylene. The wire shall be HDD-CCS PE45 as manufactured by Pro Trace; or Soloshot EHS by Copperhead Industries, or approved equal. Manufacturer/distributor furnished water-blocking connectors and locate clip shall be used as needed. Wire to be strapped to pipe at maximum 10-foot intervals, and the wire is to be brought up at each valve box, leaving and excess length of four (4) feet of wire coiled at each valve. Refer to Standard Detail for additional information. At the water main pressure test, a continuity test shall be performed by the Contractor. The continuity test shall be witnessed and approved by the City’s Representative and Engineer of Record.

D. Bedding and initial backfill shall be in accordance with City of Miami Beach Public Works Manual Section 10 and Standard Detail 14-5 for DI pipe.

E. DI pipe shall be laid with minimum vertical cover of 48 inches.

F. Vertical cover 36 inches to 48 inches below finish grade may be approved in writing on a case-by-case basis by the City of Miami Beach Public Works Department.

G. For vertical cover 30 inches to 36 inches below finish grade, use ductile iron pipe Class 53.

H. For vertical cover less than 30 inches below finish grade, use concrete slab as per Standard Detail 14-7; use of this Standard Detail requires written approval from the City of Miami Beach Public Works Department.
I. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the water-line materials be dropped or dumped into the trench.

J. Care shall be taken to avoid abrasions of the pipe coating. Except where necessary in making connections with other lines, pipe shall be laid with the bells facing in the direction of laying. Defects in coating are to be field repaired.

K. The full length of each section of pipe shall rest solidly upon the completed pipe bed, with recesses excavated and shaped to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and re-laid.

L. Water main connection shall not be made to the City’s main unless water in the trench at the connection point is at least 6 inches below the bottom of the pipe. When work is not in progress, open end of pipes, fittings, and valves shall be securely closed with poly wrap or filter fabric so that no trench water, earth, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the Contractor shall repair the damaged coating or lining in a satisfactory manner at his expense. Pipe ends left for future connections shall be valved, plugged or capped, and properly restrained.

M. City oversees connection between the old and new pipes and all wet taps on existing piping. ALL TAPS MUST BE WITNESSED BY THE CITY. Size-on-size taps are not allowed unless approved in writing by the City of Miami Beach Public Works Department. Tapping sleeve glands shall be tested and pass a pressure test of 150 psi for two (2) hours before the pipe is tapped.

N. CITY TO OPERATE ALL EXISTING VALVES. VALVES BETWEEN EXISTING AND NEW WORK SHALL BE OPERATED BY CITY PERSONNEL. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR’S PERSONNEL OPERATE ANY SUCH GATE OR VALVE.

O. Only the City of Miami Beach Public Works Department is authorized to shut-off water service within the City.

3.03 WATER SERVICES

A. Minimum water service pipe to be installed from the water main to the meter is to be a two (2) inch diameter high-density polyethylene line. Polyethylene water service line connections to the water main (both for new and existing water mains) shall be via a double strap stainless steel saddle with corporation stop. Ductile iron pipe service and fire line connections (three (3) inch and larger) to existing water mains shall be via a tapping saddle and valve, with the valve contained in a valve box. Ductile iron pipe service and fire line connections (three (3) inch and larger) to new water mains shall be via a tee and a gate valve, with the valve contained in a valve box, on the branch line off the water main.
3.04 SETTING OF VALVES AND BOXES

A. Install where shown or specified, and set plumb. Valve boxes shall be centered on the valves and set plumb at finish grade. Boxes shall be installed over each gate valve unless otherwise shown.

B. Where feasible, valves shall be located outside the area of roads and parking. Earth fill shall be carefully tamped around each valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet.

C. There shall be a valve at all branches, tees, and crosses except fire hydrants and fire lines. Valve shall have the top of the operating nut located at maximum of 12 inches below the finished grade.

D. Valve boxes shall have a 24-inch by 24-inch by 8-inch reinforced concrete collar surrounding it in accordance with Standard Detail 14-9.

3.05 AERIAL CROSSINGS

RESERVED

3.06 FLUSHING, TESTING, AND DISINFECTION

A. Before disinfecting, flush and pig all foreign matter from pipe in accordance with AWWA C651. Provide hoses, temporary pipes, ditches, and other conduits as needed to dispose of flushing water without damage to adjacent properties.

B. Flush service connections and hydrants. Flush distribution lines prior to flushing hydrants and service connections.

C. Flush pipe through flushing branches and remove branches after flushing is completed.

D. Operate new valves during flushing process at least twice during each flush.

E. The water shall be properly disposed not to cause a flooding problem. All water used must be metered through a City supplied construction meter. The Contractor can obtain the meter through proper application and payment of the required fee at the City of Miami Beach Public Works Department.

F. Mains shall be tested as a whole or in sections between line valves, unless otherwise specified or approved by the City. Unless otherwise approved by the City, the total length of pipe for any single test shall not exceed 2,000 feet.

G. The complete water system shall be pressure tested and disinfected. The pressure test shall be for two (2) hours at 100 psi minimum test pressure in accordance with AWWA C600 latest revision. No more than five (5) psi drop over the duration of the test. Final
approval will be based on leakage test results. The maximum allowable leakage shall be determined by following AWWA formula:

\[ L = \frac{S \times D \times \sqrt{P}}{148,000} \]

Where:
- \( D \) = Pipe diameter in inches
- \( S \) = Length of lines in lineal feet
- \( P \) = Average test pressure in psi
- \( L \) = Allowable leakage for system in gallons per hour

The pressure test shall be witnessed by a representative of the City of Miami Beach Public Works Department and the Engineer of Record or his/her representative.

H. Disinfection:

1. Advance notice is to be provided to the City of Miami Beach Public Works Department and the Miami-Dade County Department of Health. Bacteriological sampling points shall be provided at the location shown on the Plans or as directed by the Department of Health, and paid by the Contractor.

2. All pipelines shall be disinfected after they have been pressure tested and while still full of water, as specified in AWWA C651 and Miami-Dade County Department of Health procedures.

3. A suitable chlorinator shall be used to inject chlorine into the lines. All connections required for the introduction of chlorine into the water lines shall be made by the Contractor. Chlorine and water shall be introduced at one end and shall be allowed to flow slowly through the lines to the other end where it shall be removed and disposed of at the Contractor’s expenses. Several points of introduction and removal of chlorine solution may have to be employed to get an even distribution through the entire section being disinfected.

4. The quantity of chlorine introduced shall be such as to ensure a concentration of at least 50 parts per million (ppm) in the water flowing from the line.

5. The chlorine solution shall be allowed to stand in the line for at least 24 hours or longer, if required, to destroy all harmful bacteria. At the end of the required time, the concentration of chlorine in all parts of the section shall be at least 25 ppm.

6. All valves and appurtenances in the section shall be operated at least once during the above period. After the required period, the treated water shall be thoroughly flushed from the section and the system filled with potable water.

7. The Contractor shall be responsible for coordination with Miami-Dade County Department of Health, who shall collect and test samples from main. The Contractor
shall provide assistance to the Department of Health for the collection of samples. The samples shall be taken from each main or section of main to be placed in service where designated by the Department of Health. The samples must be approved by the Department of Health before the main is placed in service.

8. The Contractor shall be responsible for circulating and maintaining flowing water through the pipeline from the time that the samples are collected until the water main is placed in service. If the Contractor does not maintain flowing water, sampling shall be repeated at no additional cost to the City.

9. The Contractor shall be responsible for any rechlorination, retesting, and fees that may be required until the Department of Health’s approval is obtained. The Contractor shall be responsible for the disposal of all water flushed from the system and shall safeguard all adjoining properties from damage from flooding. The Contractor shall exercise due care in the protection of private property from water damage due to his operations. In addition, the Contractor shall assume complete liability for any damage which was directly or indirectly caused by his operations.

10. All of the connections shall be disinfected by the Contractor.

11. The inside of each pipe and fitting laid by the Contractor in connecting to existing mains which are isolated from the main by valves shall be swabbed with calcium hypochlorite, HTH, Perchloron, or approved equal, mixed in solution with water. The quantity of hypochlorite shall in all cases be subject to the approval of the City of Miami Beach Public Works Department, Operations Division, whose representative shall be present at all times while this phase of the work is in progress.

12. Wherever practicable, water from the existing mains flowing through the disinfected connections shall be used in disinfecting the main line in order that the hypochlorite may be removed to the greatest extent possible. In other cases, the water from the disinfected connections shall be removed by allowing it to flow into the main line as it is being drained.

13. No pipe shall be placed in service until it has been disinfected as approved by the City of Miami Beach Public Works Department Engineering Division and certified by the Department of Health including certified as-built drawings accepted by the City.

3.07 PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.
3.08 AS-BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.
APPENDIX 14-A:
ANNUAL BACKFLOW ASSEMBLY INSPECTION/TEST REPORT
CUSTOMER: ________________________________
STREET ADDRESS: ________________________________
MAILING ADDRESS: ________________________________
LOCATION OF ASSEMBLY: ________________________________

TYPE OF ASSEMBLY: RP ☐ DC ☐ PVB ☐ SVB ☐ SIZE: ________________

MANUFACTURER: ________________________________ MODEL: ________________________________ SERIAL NO: ________________________________

TEST GAUGE MANUF: ________________________________ GAUGE SERIAL NO: ________________________________

<table>
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<tr>
<th>CHECK VALVE # 1</th>
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<tr>
<td>☐ leaked</td>
<td></td>
<td>☐ leaked</td>
<td>Air inlet: did not open</td>
</tr>
<tr>
<td>☐ closed tight</td>
<td>opened at _____ psi</td>
<td>☐ closed tight</td>
<td>opened at _____ psi</td>
</tr>
<tr>
<td>gauge pressure across</td>
<td>did not open</td>
<td>gauge pressure across</td>
<td>Check Valve: leaked</td>
</tr>
<tr>
<td>check valve _____ psi</td>
<td></td>
<td>check valve _____ psi</td>
<td>held at _____ psi</td>
</tr>
<tr>
<td>cleaned only</td>
<td>☐ cleaned only</td>
<td>cleaned only</td>
<td>cleaned only</td>
</tr>
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</table>

- Replaced:
  - rubber kit: ☐
  - CV assembly or disc: ☐
  - O-rings: ☐
  - seat: ☐
  - spring: ☐
  - stem/guide: ☐
  - retainer: ☐
  - lock nuts: ☐
  - Other: ☐

- Gauge pressure across check valve _____ psi
- Relief Valve opened at _____ psi
- Gauge pressure across check valve _____ psi
- Air inlet _____ psi

NOTE: All repairs shall be completed within five 5 working days.

LIST DEFICIENCIES AND REQUIRED CORRECTIONS: ________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

I hereby certify that this data is accurate and reflects the proper operation and maintenance of the assembly.

TESTER: ________________________________ CERT NO: ________________________________ DATE: ________________________________

RETURN COMPLETED FORM TO: MIAMI BEACH PUBLIC WORKS - WATER DIVISION
451 DADE BLVD.
MIAMI BEACH, FL 33140
TELEPHONE: 305-673-7625
FAX: 305-673-7647

Attn: Percival Balgobin, Backflow Preventor Coordinator
STANDARD DETAILS

Standard Details for water distribution systems are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself will all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
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CROSSING VERTICAL SEPARATION

WATER MAIN CROSSING OVER
STORMWATER OR SANITARY
SEWER GRAVITY MAIN

6" MIN. OUTSIDE OF PIPE
TO OUTSIDE OF PIPE
(12" PREFERRED)

STORMWATER OR SANITARY
SEWER GRAVITY MAIN

WATER MAIN CROSSING OVER
STORMWATER OR SANITARY
SEWER FORCE MAIN

12" OUTSIDE OF PIPE TO
OUTSIDE OF PIPE

STORMWATER OR SANITARY
SEWER FORCE MAIN

WATER MAIN CROSSING UNDER STORMWATER
OR SANITARY SEWER GRAVITY OR FORCE MAIN

12" OUTSIDE OF PIPE TO
OUTSIDE OF PIPE

WATER MAIN

NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.
2. MINIMUM SPACING REQUIREMENTS PER FAC 62-555.314.
3. REFER TO 14-3 FOR EXCEPTIONS.
NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.

2. GRAVITY SEWER ONLY MAY BE REDUCED TO 3 FEET WHERE BOTTOM OF WATER MAIN IS AT LEAST 6 INCHES ABOVE TOP OF SEWER.


4. REFER TO 14–3 FOR EXCEPTIONS.
WHERE IT IS NOT TECHNICALLY FEASIBLE OR ECONOMICALLY SENSIBLE TO COMPLY WITH THE REQUIREMENTS OF FAC 62–555.314 (1) OR (2), THE FLORIDA DEPARTMENT OF HEALTH SHALL ALLOW EXCEPTIONS TO THESE REQUIREMENTS IF SUPPLIERS OF WATER OR CONSTRUCTION PERMIT APPLICANTS PROVIDE TECHNICAL OR ECONOMIC JUSTIFICATION FOR EACH EXCEPTION AND PROVIDE ALTERNATIVE CONSTRUCTION FEATURES THAT AFFORD A SIMILAR LEVEL OF RELIABILITY AND PUBLIC HEALTH PROTECTION. ACCEPTABLE ALTERNATIVE CONSTRUCTION FEATURES INCLUDE THE FOLLOWING:

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(A), F.A.C.

WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THE REQUIRED MINIMUM HORIZONTAL DISTANCE FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND JOINTS IN THE WATER MAIN ARE BEING LOCATED LESS THAN THE REQUIRED MINIMUM DISTANCE FROM JOINTS IN THE OTHER PIPELINE:

1. USE OF PRESSURE–RATED PIPE CONFORMING TO THE AMERICAN WATER WORKS ASSOCIATION STANDARDS INCORPORATED INTO RULE 62–555.330, F.A.C., FOR THE OTHER PIPELINE IF IT IS A GRAVITY–OR VACUUM–TYPE PIPELINE;
2. USE OF WELDED, FUSED, OR OTHERWISE RESTRAINED JOINTS FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE; OR
3. USE OF WATERTIGHT CASING PIPE OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE.

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(B), F.A.C.

WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THREE FEET HORIZONTALLY FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND IS BEING LAID LESS THAN THE REQUIRES MINIMUM VERTICAL DISTANCE FROM THE OTHER PIPELINE:

USE OF PIPE, OR CASING PIPE, HAVING HIGH IMPACT STRENGTH (I.E., HAVING AN IMPACT STRENGTH AT LEAST EQUAL TO THAT OF 0.25–INCH–THICK DUCTILE IRON PIPE) OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR BOTH THE WATER MAIN AND FOR THE OTHER PIPELINE IF IT IS NEW AND IS CONVEYING WASTEWATER OR RECLAIMED WATER.
NOTES:

1. DEFLECTION ANGLE NOT TO EXCEED 50% OF MANUFACTURER’S RECOMMENDED MAXIMUM JOINT DEFLECTION.

2. PIPE CLEARANCES SHALL BE PER FAC AND DETAIL 14–1
NOTES:

1. UNLESS OTHERWISE SPECIFIED, BEDDING MATERIAL SHALL CONSIST OF COMPACTED WASHED AND GRADED LIMEROCK (3/8\"-7/8\"), 6" Lifts.

2. WHERE REQUIRED, SHEETING AND SHORING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS IN THE CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10.

3. WHERE UNSTABLE SOILS ARE ENCOUNTERED, INCLUDING PEAT, MUCK OR OTHER ORGANIC SOILS, ELASTIC SILT AND CLAYS BELOW THE WATER TABLE, A FOUNDATION IS REQUIRED. FOUNDATION MATERIAL SHALL BE SELECT BACKFILL MATERIAL, 2" MAXIMUM SIZE, 6" Lifts, COMPACTED TO AT LEAST 98% OF MAXIMUM DENSITY DENSITY PER AASHTO SPEC. NO. T-180. EXTEND EXCAVATION AT LEAST 2' DEEPER FOR FOUNDATION UNLESS SUITABLE MATERIAL IS FOUND AT A LESSER DEPTH. GRATER DEPTHS MAY BE REQUIRED FOR EXTREMELY POOR CONDITIONS.
SECTION VIEW
N.T.S.

NOTES:

1. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

2. FOR PIPE DIAMETER GREATER THAN 30-INCHES, REINFORCING CONCRETE SLAB TO BE DESIGNED BY A STATE OF FLORIDA ENGINEER AND SUBMITTED TO THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT FOR APPROVAL.

3. USE OF THIS STANDARD DETAIL REQUIRES WRITTEN APPROVAL FROM THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT.

4. EXTEND CONCRETE SLAB UNTIL COVER EXCEEDS 30 INCHES.

5. CONCRETE TO BE 3,000 PSI.

6. AIR RELEASE VALVES (ARV) ARE REQUIRED ON SEWER FORCE MAINS ONLY.
NOTES:

1. TRACER WIRE SHALL BE INSTALLED ON ALL UNDERGROUND HDPE PIPING.

2. THE ENDS OF ALL TRACER WIRES, WHETHER THEY ARE SPLICED, CONNECTED, OR TERMINATED, SHALL HAVE THE LAST THREE INCHES PIG TAILED AS DETAILED HEREON.

3. AFTER INSTALLATION OF THE TRACER WIRE THE SYSTEM SHALL BE SUBJECT TO TESTING, PRIOR TO BACK FILL, IN ORDER TO ESTABLISH THAT THE SYSTEM IS FUNCTIONAL.

4. THE EXTERNAL COLOR OF THE LOCATE WIRE SHALL FOLLOW THE APWA UNIFORM COLOR CODE AS FOLLOWS:
   - RED: ELECTRIC
   - YELLOW: GAS
   - BLUE: POTABLE WATER
   - GREEN: SEWER OR STORMWATER
NOTE:

1. ENTIRE MARKER TO BE COATED WITH EPOXY ADHESIVE TO PREVENT TARNISHING (1/16" MIN. DFT).
NOTES:

1. USE 7615 RING AND FC COVER.
2. MATERIAL: ASTM—A48 CLASS 30B GRAY IRON.
3. MACHINE FINISH BOTTOM OF COVER AND SEAT OF FRAME.
4. THE LETTER “W” SHALL BE CAST IN COVER FOR WATER MAINS.
5. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
6. REFER TO DETAIL 14–9 FOR INSTALLATION REQUIREMENTS.
7. ALL SERVICE VALVE BOXES SHALL BE NO. 2 VALVE BOXES.
NOTES:

1. USF 7630 RING AND FD COVER.
2. MATERIAL: ASTM-A48 CLASS 30B GRAY IRON.
3. MACHINE FINISH BOTTOM OF COVER AND SEAT OF FRAME.
4. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
5. THE LETTER "W" SHALL BE CAST IN COVER FOR WATER MAINS.
6. REFER TO DETAIL 14-9 FOR INSTALLATION REQUIREMENTS.
7. ALL MAIN VALVE BOXES SHALL BE NO. 3 VALVE BOXES REGARDLESS OF SIZE.
CUT THE POLYETHYLENE TUBE 2 FT. LONGER THAN THE LENGTH OF PIPE SECTION. SLIP THE TUBE AROUND THE PIPE SO AS TO ALLOW 1' OVERLAP AT EACH END. OVERLAP THE OTHER PIPE SECTION AFTER PIPE IS INSTALLED.

METHOD A (TUBE) OVERLAP
N.T.S.

CUT THE POLYETHYLENE TUBE 1 FT. SHORTER THAN THE LENGTH OF PIPE SECTIONS. SLIP THE TUBE AROUND THE PIPE SO AS TO ALLOW 6" OF BARE PIPE AT EACH END. BEFORE MAKING A JOINT, SLIP A 3' LENGTH OF POLYETHYLENE TUBE OVER THE PRECEDING PIPE SECTION. OVERLAP BY AT LEAST 1' AND SECURE AFTER JOINT IS MADE.

METHOD B (TUBE) OVERLAP
N.T.S.

EACH SECTION OF PIPE, FITTINGS OR VALVE ETC. IS COMPLETELY WRAPPED WITH A FLAT POLYETHYLENE SHEET OVERLAP BY AT LEAST 1' AND METHOD C (FLAT SHEET) SECURED.

METHOD C (FLAT SHEET) OVERLAP
N.T.S.

NOTES:

1. ALL UNDERGROUND DUCTILE IRON PIPES AND FITTINGS SHALL BE POLYWRAPPED. CONFORMING TO THE REQUIREMENTS OF AWWA C105.

2. POLYETHYLENE TUBE AND SHEET SIZES PER AWWA C105 TABLE 1.

3. PIPE-SHAPED FITTINGS (BENDS, REDUCERS, ETC.) SHALL BE TREATED ACCORDING TO METHODS "A" AND "B". ODD ShAPED FITTINGS (VALVES, TEES, ETC.) SHALL BE TREATED ACCORDING TO METHOD "C".

4. 6" ADHESIVE TAPE SHALL BE USED TO SECURE ENCASEMENT.

5. SPECIAL CARE SHALL BE TAKEN TO PREVENT DAMAGE TO WRAPPING WHEN PLACING BACKFILL.

6. REFER TO ASTM D1248 FOR APPROVED MATERIAL AND ACCESSORIES.

7. ONLY VIRGIN POLYETHYLENE MATERIAL HAVING A MINIMUM THICKNESS OF 8 MILS IS APPROVED.
NOTES:

1. EYE BOLT = GLAND BOLT

2. FOR CONTINUOUS RODDING USE SLEEVE NUT.

3. REFER TO RESTRAINING SCHEDULE ON 14-15.

4. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, LASTEST EDITION AND EBAA IRON'S RESTRAINT LENGTH CALCULATOR, LASTEST VERSION FOR PVC PIPE.
5/8" PLATE, TACK-WELD TO BRACKET.

5/8" PLATE BRACKET WELDED FULL LENGTH TO COLLAR.

4"X3/4" COLLAR

AMERICAN 316 STAINLESS STEEL ROD THREAD ENDS. PAINT THREAD ENDS OF ALL RODS SUFFICIENTLY TO ALLOW FOR PROPER TENSION.

COLLAR MADE OF 3/4" STAINLESS STEEL PLATE, ALLOY 304, 4" WIDE.

1/4" (TYP.)

7/8" BOLT (MIN.)

3/8" (TYP.)

PIPE VARIES

SECTION N.T.S.

NOTES:

1. STAINLESS STEEL THREADED RESTRAINING RODS SHALL BE USED IN SITUATIONS WHERE MAINS ARE CONNECTED TO FITTINGS, VALVES OR SPECIALS AND THE DISTANCE IS LESS THAN 16 FT.; OTHERWISE USE MEGALUGS.

2. REFER TO RESTRAINING SCHEDULE ON 14–15.

3. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, LATEST EDITION AND EBAA IRON'S RERAINT LENGTH CALCULATOR, LATEST VERSION FOR PVC PIPE.
### SANITARY SEWER OR STORMWATER FORCE
MAIN PRESSURE AT 100 P.S.I.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>ROD DIAMETER</th>
<th>NO. OF RODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8” &amp; SMALLER</td>
<td>3/4”</td>
<td>2</td>
</tr>
<tr>
<td>12”</td>
<td>3/4”</td>
<td>3</td>
</tr>
<tr>
<td>16”</td>
<td>3/4”</td>
<td>4</td>
</tr>
<tr>
<td>20”</td>
<td>1”</td>
<td>4</td>
</tr>
<tr>
<td>24”</td>
<td>3/4”</td>
<td>10</td>
</tr>
<tr>
<td>30”</td>
<td>1”</td>
<td>8</td>
</tr>
<tr>
<td>36”</td>
<td>1”</td>
<td>12</td>
</tr>
<tr>
<td>40”</td>
<td>1–1/4”</td>
<td>10</td>
</tr>
<tr>
<td>48”</td>
<td>1–1/4”</td>
<td>12</td>
</tr>
</tbody>
</table>

### WATER MAINS.
PRESSURE AT 120 P.S.I.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>ROD DIAMETER</th>
<th>NO. OF RODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6”</td>
<td>3/4”</td>
<td>2</td>
</tr>
<tr>
<td>8”</td>
<td>3/4”</td>
<td>3</td>
</tr>
<tr>
<td>12”</td>
<td>3/4”</td>
<td>4</td>
</tr>
</tbody>
</table>

**NOTE:**

1. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, LATEST EDITION AND EBAA IRON’S RESTRAINT LENGTH CALCULATOR, LATEST VERSION FOR PVC PIPE.
TYPICAL WATER SERVICE CONNECTION

SECTION VIEW

NOTES:

1. SERVICE LINE UNDER THE PAVEMENT IS TO BE ENCASED IN A 3" Ø BLACK IRON SCHEDULE 40 CASING PIPE.

2. ALL TAPS MUST BE WITNESSED BY CITY OF MIAMI BEACH PERSONNEL.

3. REFER TO CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 14 FOR TAPPING SADDLE REQUIREMENTS.

4. TRACER WIRE SHALL BE INSTALLED PER 14–8
No. 2 VALVE BOX  
(REFER TO 14–10)

WATER MAIN

DUCTILE IRON PIPE

TAPPING SLEEVE AND VALVE

FOR CONTINUATION
SEE WATER METER DETAIL

SECTION VIEW
N.T.S.

NOTES:

1. THIS DETAIL IS FOR CONNECTIONS THREE (3) INCHES & LARGER.
2. NO SIZE ON SIZE TAPS.
3. REFER TO SPECIFICATIONS FOR TAPPING SADDLE REQUIREMENTS.
4. ALL TAPS MUST BE WITNESSED BY CITY OF MIAMI BEACH PERSONNEL.
5. WATER SERVICE VALVES 3" AND LARGER AND DEEPER THAN 40" TO INSTALL AN OPERATING NUT EXTENSION.
VALVE BOX AND COLLAR AS SHOWN ON 14–9, 14–10 AND 14–11

MATCH EXISTING PAVEMENT

10” PVC SCH. 80 OR C900 RISER

D.I. GATE VALVE (M.J.) (NON–RISING STEM)

D.I. WATER MAIN

SECTION VIEW
N.T.S.

VARIES

8’’ MIN.
No. 3 VALVE BOX AND COLLAR AS SHOWN ON 14-9 AND 14-11.

MATCH EXISTING SURFACE

8" MIN.

DRAINAGE
ROCK
12-INCH MIN.

C900 PVC RISER,
RISER TO EXTEND
TO TOP OF MAIN

2" BRONZE
THREADED
COUPLING

2" STRAIGHT BALL VALVE
WITH HAND LEVER

2" TYPE K BRASS OR
POLY TUBING.

SAND

1-1/2" X 2" CORPORATION
STOP

Q WATER MAIN AT
HIGH POINT

TAPPING SADDLE
WITH STRAP

SECTION VIEW
N.T.S.

NOTES:

1. REFER TO SPECIFICATIONS FOR ARV REQUIREMENTS.
2. METALLIC THREADS TO BE COATED WITH BITUMASTIC COATING.
3. INSTALL TAPPING SADDLE FOR THICKNESS CLASS D.I. MAINS 4" & SMALLER, PRESSURE CLASS D.I. MAINS 8" & SMALLER.
4. WHERE SPACE ALLOWS, CONTRACTOR SHALL INSTALL AN AUTOMATIC ARV. MANUAL ARVs REQUIRE WRITTEN APPROVAL FROM CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT.
5. ALL TAPS MUST BE WITNESSED BY CITY OF MIAMI BEACH PERSONNEL.
NOTES:

1. REFER TO SPECIFICATIONS FOR ARV REQUIREMENTS.
2. METALLIC THREADS TO BE COATED WITH BITUMASTIC COATING.
3. INSTALL TAPPING SADDLE FOR THICKNESS CLASS D.I. MAINS 4” & SMALLER, PRESSURE CLASS D.I. MAINS 8” & SMALLER, OR WHEN MAIN IS PVC OR HDPE.
4. ALL TAPS MUST BE WITNESSED BY CITY OF MIAMI BEACH PERSONNEL.
SECTION VIEW
N.T.S.

NOTE:
1. WHERE POSSIBLE USE RESIDENTIAL SERVICES CONNECTION OR FIRE HYDRANTS FOR TEMPORARY BACTERIOLOGICAL SAMPLING POINTS.
NOTES:

1. METER BOX AND COVER IN TRAFFIC AREAS TO BE HS-20 RATED. ALL OTHER AREAS SHALL BE TIER 22 RATED.
2. ALL BRASS FITTINGS TO BE LEAD-FREE MATERIAL.
3. METER SHALL HAVE THREADED END CONNECTIONS.
4. WHEN EXISTING METERS REQUIRE RAISING TO MEET CITY STANDARD DEPTHS, USE FORD 40 SERIES RESETTING, OR EQUAL AS APPROVED BY THE CITY.
5. COVER AND METER BOX MATERIALS: FRP OR POLYMER. CONCRETE AS REQUIRED TO MEET TRAFFIC LOADING.
6. WHERE POSSIBLE, AVOID DRIVEWAYS AND PARKING AREAS FOR PLACEMENT OF METER.
1. METER BOX AND COVER IN TRAFFIC AREAS TO BE HS-20 RATED. ALL OTHER AREAS SHALL BE TIER 22 RATED.
2. ALL BRASS FITTINGS TO BE LEAD-FREE MATERIAL.
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5. COVER AND METER BOX MATERIALS: FRP OR POLYMER. CONCRETE AS REQUIRED TO MEET TRAFFIC LOADING.
6. WHERE POSSIBLE, AVOID DRIVEWAYS AND PARKING AREAS FOR PLACEMENT OF METER.
VAULT COVER Labeled "WATER" should have 2 slots 1" x 0.5" at each side.

VAULT COVER shall be AMI compatible and be able to accommodate end point.

1-1/2" WATER METER with AMI

1-1/2" BRASS METER TAIL FLANGE

2" CURB STOP

2" Ø POLY TUBING

FLOW

2" x 1-1/2" REDUCER

PLAN VIEW

BOX OPEN AT BOTTOM AND BEVEL SIDE

4" THICK CONCRETE SLAB (SIDEWALK)

1-1/2" WATER METER WITH ADVANCED METERING INFRASTRUCTURE TECHNOLOGY (AMI)

1-1/2" BRASS METER TAIL

4" THICK CONCRETE SLAB (SIDEWALK)

VAULT WALLS

2" POLY TUBING

WATER MAIN FLOW

4" THICK #57 PEA ROCK COMPACTED TO 90% DENSITY

1-1/2" Ø GASKETS

2" CURB STOP MIP

1 1/2" FLANGE

2" x 1-1/2" REDUCER

SECTION VIEW

NOTES:

1. METER BOX AND COVER IN TRAFFIC AREAS TO BE HS-20 RATED. ALL OTHER AREAS SHALL BE TIER 22 RATED.

2. ALL BRASS FITTINGS TO BE LEAD-FREE MATERIAL.

3. METER SHALL HAVE FLANGED END CONNECTIONS.

4. WHEN EXISTING METERS REQUIRE RAISING TO MEET CITY STANDARD DEPTHS, USE FORD 40 SERIES RESETTER, OR EQUAL AS APPROVED BY THE CITY.

5. COVER AND METER BOX MATERIALS: FRP OR POLYMER. CONCRETE AS REQUIRED TO MEET TRAFFIC LOADING.

6. WHERE POSSIBLE, AVOID DRIVEWAYS AND PARKING AREAS FOR PLACEMENT OF METER.
VAULT COVER Labeled "WATER" SHOULD HAVE 2 SLOTS 1" X 0.5" AT EACH SIDE.
VAULT COVER SHALL BE AMI COMPATIBLE AND BE ABLE TO ACCOMMODATE END POINT.

PLAN VIEW

1. METER BOX AND COVER IN TRAFFIC AREAS TO BE HS-20 RATED. ALL OTHER AREAS SHALL BE TIER 22 RATED.
2. ALL BRASS FITTINGS TO BE LEAD-FREE MATERIAL.
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VAULT COVER Labeled
"WATER" Should HAVE 2
SLOTS 1" X 0.5" AT EACH SIDE.

VAULT COVER SHALL BE AMI
COMPATIBLE AND BE ABLE TO
ACCOMMODATE END POINT

3" WATER METER WITH AMI AND
TEST PORTS

3" WATER METER WITH AMI AND
TEST PORTS

3" DIP

FLOW

34 7/8"  24 1/4"

17"

35 7/8"

46 1/2"

4" THICK CONCRETE
SLAB (SIDEWALK)

4" THICK CONCRETE
SLAB (SIDEWALK)

VAULT WALLS

3" DIP

WATER MAIN FLOW

3" BRASS METER TAIL
TO BE EXTENDED TO
RIGHT-OF-WAY LINE

NOTES:
1. METER BOX AND COVER IN TRAFFIC AREAS TO BE HS-20 RATED. ALL OTHER AREAS SHALL
   BE TIER 22 RATED.
2. ALL BRASS FITTINGS TO BE LEAD-FREE MATERIAL.
3. ALL HARDWARE SHALL BE 316 STAINLESS STEEL PRODUCED IN AMERICA.
4. METER SHALL HAVE FLANGED END CONNECTIONS.
5. WHEN EXISTING METERS REQUIRE RAISING TO MEET CITY STANDARD DEPTHS, USE FORD 40
   SERIES RESETTER, OR EQUAL AS APPROVED BY THE CITY.
6. COVER AND METER BOX MATERIALS: FRP OR POLYMER. CONCRETE AS REQUIRED TO MEET
   TRAFFIC LOADING.
7. WHERE POSSIBLE, AVOID DRIVEWAYS AND PARKING AREAS FOR PLACEMENT OF METER.
NOTES:

1. PRECAST CONCRETE METER VAULT SHALL BE DESIGN BY A STATE OF FLORIDA ENGINEER TO MEET LOADING REQUIREMENTS. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.
2. ALL BRASS FITTINGS TO BE LEAD FREE MATERIAL.
3. METER SHALL HAVE FLANGED END CONNECTIONS.
4. VAULT COVER TO BE (2) STANDARD 2’x4’ STEEL COVER FOR NON TRAFFIC AREAS.
5. VAULT COVER SHALL BE 48”x72” DOUBLE LEAF ALUMINUM H2O HATCH FOR OCCASIONAL OFFSTREET TRAFFIC.
6. VAULT COVER SHALL BE 48”x72” DOUBLE LEAF DT-AHS OR DT-AHD FOR IN STREET TRAFFIC LOADING.
7. ALL HARDWARE SHALL BE 316 STAINLESS STEEL PRODUCED IN AMERICA.
8. WHERE POSSIBLE, AVOID DRIVEWAYS AND PARKING AREAS FOR PLACEMENT OF METER.
NOTES:

1. METER BOX AND COVER IN TRAFFIC AREAS TO BE HS-20 RATED. ALL OTHER AREAS SHALL BE TIER 22 RATED.

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2. HATCH IN OCCASIONAL OFF STREET TRAFFIC AREAS TO BE HS–20 RATED.
3. ALL BRASS FITTINGS TO BE LEAD FREE MATERIAL.
4. HATCH SHALL BE DT–AHS OR DT–AHD FOR IN–STREET TRAFFIC LOCATIONS.
5. ALL HARDWARE SHALL BE 316 STAINLESS STEEL PRODUCED IN AMERICA.
6. WHERE POSSIBLE, AVOID DRIVEWAYS AND PARKING AREAS FOR PLACEMENT OF METER.
NOTES:

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3. ALL BRASS FITTINGS TO BE LEAD FREE MATERIAL.

4. HATCH SHALL BE DT-AHS OR DT--AHD FOR IN--STREET TRAFFIC LOCATIONS.

5. ALL HARDWARE SHALL BE 316 STAINLESS STEEL PRODUCED IN AMERICA.

6. WHERE POSSIBLE, AVOID DRIVeways AND PARKING AREAS FOR PLACEMENT OF METER.
NOTES:

1. REMOVE TEMPORARY CONNECTION AT CORPORATION STOP ON EXISTING MAIN AFTER FILLING AND FLUSHING OF NEW MAIN.

2. DO NOT REMOVE TEMPORARY CONNECTION AT CORPORATION STOP ON NEW MAIN UNTIL ALL TESTING HAS BEEN COMPLETED.

3. CONTRACTORS MUST CALL CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT (305) 673-7080 BEFORE FLUSHING WATER LINES OR FIRE HYDRANTS.

4. ALL WATER USED FOR FILLING, FLUSHING, AND TESTING SHALL BE METERED AND PAID FOR IN ACCORDANCE WITH PUBLISHED WATER USAGE CHARGES.

5. WATER LINES TO BE CLEANED WITH A SOFT PIG. CONTRACTOR TO REIMBURSE THE CITY FOR RETAKING AND REPROCESSING WATER SAMPLES FOR FAILED TESTS.

6. DOUBLE VALVE SHALL REMAIN IN PLACE AFTER TEST IS COMPLETED.
FIRE HYDRANT AND GUARD POSTS ARE TO BE PAINTED

5 FEET LONG GUARD POST EMBEDDED 30" IN CONCRETE

3'x3'x6" THICK CONCRETE SLAB OR SIDEWALK FLAG (CONCRETE SLAB TO COVER BOLLARDS OR GUARD POST)

#2 VALVE BOX AND COLLAR (REFER TO 14-9 AND 14-10)

12' MAX. FROM ROADWAY

6" D.I. CLASS 53 PIPE (8" WHEN MAIN LOCATED AT 50 FEET OR MORE)

TEE OR TAPPING SADDLE (MIN. 8" MAIN TO ALLOW FOR 6"x6" TAP)

STAINLESS STEEL RESTRAINING RODS WHEN L=1 PIPE LENGTH OR LESS. MEGALUGS MAY BE USED IN PLACE OF RODS

SECTION VIEW N.T.S.

CONCRETE SLAB 3'x3'x6" IN GRASS SWALE AREA

GUARD POST 1.5' 1.5' 1.5' 1.5'

PLAN VIEW

NOTES:
1. THREAD & NOZZLE SIZE FOR THE HOSE: TWO 2-1/2" HN.
2. THREAD OF THE PUMPER NOZZLE: ONE 4" PN.
3. OPERATING NUT SIZE, SHAPE, LOCATION, AND ROTATION: B41 OP NUT OL-UPPER.
4. IF TAP IS REQUIRED IT MUST BE WITNESSED BY CITY.
5. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.

PLAN VIEW WHERE SIDEWALK AND CURB ADJOIN N.T.S.
NOTES:

1. WHEN A PORTION OF THE SIDEWALK IS WITHIN THE 4’-7’ OFFSET, LOCATE FIRE HYDRANT 1’-0” FROM FACE OF WALK, WITHIN GRASS AREA.

2. IN ALL OTHER CASES, CONTACT FIRE DEPARTMENT FOR FIRE HYDRANT LOCATION.

3. IN SIDEWALK, LOCATE GUARD POSTS AT THE FACE OF THE PUMPER AND 2”-6” EITHER SIDE OF CENTER LINE OF FIRE HYDRANT. IN GRASS OR SWALE AREA, LOCATE GUARD POST 18” EITHER SIDE OF CENTER LINE OF FIRE HYDRANT.

4. FIRE HYDRANT SLAB AND GUARD POST CONCRETE WORK SHALL BE DIFFERENT POURS.

5. EXTRA POSTS MAY BE REQUIRED IN INDUSTRIAL AND CONGESTED TRAFFIC AREAS.

6. FIRE HYDRANTS SHALL NOT BE LOCATED WITHIN A RADIUS.

7. GUARD POSTS SHALL NOT BE ALLOWED IN D.O.T. R/W OR WHEN FIRE HYDRANTS ARE BEHIND CURBS OR PROTECTED FROM VEHICULAR ENCROACHMENT. GUARD POSTS TO BE GALVANIZED STEEL PIPE SCHEDULE 40 6” DIAMETER x 5.0’ (BURIED 2.5’). CONCRETE FILL INDEPENDENT OF THE SLAB.

8. WHERE THE DISTANCE OF A FIRE HYDRANT SERVICE CONNECTION IS FIFTY FEET OR GREATER, IT SHALL BE CONSTRUCTED WITH 8” DIAMETER PIPE AND VALVE; AN 8”x 6” REDUCER AT OR BY THE FIRE HYDRANT.

9. SLAB OF CONCRETE AROUND FIRE HYDRANT SHOULD COVER THE GUARD POST.

10. FIRE HYDRANT LOCATION MUST BE ADA COMPLIANT.

11. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.
NOTES:

1. THE FIRE HYDRANT LOCATION SHALL NOT BE CLOSER THAN 15 FEET FROM THE POINT OF CURVATURE OF ANY INTERSECTION.

2. THE DIMENSION FROM THE R/W TO THE CENTER OF THE FIRE HYDRANT SHALL BE 18 INCHES WHEN THE SIDEWALK IS 5 FEET WIDE OR WIDER. MUST TRY TO PLACE FIRE HYDRANT IN A LOCATION WHERE THERE IS NOT A STREET EDGE STRUCTURE IN THE RIGHT-OF-WAY LINE.

3. THE LOCATION OF THE FIRE HYDRANT SHALL BE LOCATED OFF THE FRONT OF THE SIDEWALK WHEN THE SIDEWALK IS LESS THAN 5 FEET.

4. MAINTAIN 36" WIDE ADA CORRIDOR AS REQUIRED BY CODE.

5. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.
FIRE HYDRANT LOCATED CLOSE TO DRIVEWAY

NOTES:

1. THE FIRE HYDRANT LOCATION SHOULD BE PLACED NO CLOSER THAN 10 FEET TO EDGE OF DRIVEWAY.

2. THE DIMENSION OF THE R/W TO THE CENTER OF THE FIRE HYDRANT SHALL BE 18 INCHES. WHEN THE SIDEWALK IS 5 FEET, MUST TRY TO PLACE FIRE HYDRANT IN A LOCATION WHERE THERE IS NOT A BUILDING STRUCTURE IN THE RIGHT-OF-WAY LINE.

3. THE LOCATION OF THE FIRE HYDRANT SHALL BE LOCATED OFF THE FRONT OF THE SIDEWALK WHEN THE SIDEWALK IS LESS THAN 5 FEET.

4. MAINTAIN 36" WIDE ADA CORRIDOR.

5. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.
NOTE:

1. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.
FIRE HYDRANTS
(NO HEDGES NEAR
FIRE HYDRANTS)

3'x3'x6" REINFORCED
CONCRETE SLAB
AROUND FIRE HYDRANT

18"

R/W

SIDEWALK

12 MAX

VALLEY GUTTER

BOLLARDS (SEE NOTE 3)

PLAN VIEW
N.T.S.

NOTES:

1. WHEN THE PORTION OF THE SIDEWALK IS WITHIN THE 4"-7" OFFSET, LOCATE FIRE HYDRANT 1' FROM FACE OF WALK, WITHIN GRASS AREA.
2. IN ALL OTHER CASES, CONTACT FIRE DEPARTMENT FOR FIRE HYDRANT LOCATION.
3. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.
3' x 3' x 6" reinforced concrete slab around the fire hydrant

FIRE HYDRANT

R/W

12 MAX

SIDEWALK

PARKWAY

CURB AND GUTTER

CENTER LINE OF THE STREET

PLAN VIEW

N.T.S.

NOTES:

1. WHEN THE PORTION OF THE SIDEWALK IS WITHIN THE 4' - 7" OFFSET, LOCATE FIRE HYDRANT 1" FROM FACE OF WALK, WITHIN GRASS AREA.

2. IN ALL OTHER CASES, CONTACT FIRE DEPARTMENT FOR FIRE HYDRANT LOCATION.

3. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.
NOTES:

1. PIPING SHALL BE DUCTILE IRON PIPE WITH FLANGED FITTINGS.

2. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.


4. OWNER SHALL MAINTAIN THEIR BACKFLOW PREVENTION ASSEMBLY. REVIEW THE BACKFLOW PREVENTION ASSEMBLY CHECK VALVE TO UPDATE ANY REFERENCES AND THE DEVICES ACCORDING TO PREFERRED MANUFACTURES AND MODELS.
NOTES:

1. BOLLARDS ARE NOT REQUIRED UNLESS IN TRAFFIC AREAS.
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NOTES:

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4. OWNER SHALL MAINTAIN THEIR BACKFLOW PREVENTION ASSEMBLY. REVIEW THE BACKFLOW PREVENTION ASSEMBLY CHECK VALVE TO UPDATE ANY REFERENCES AND THE DEVICES ACCORDING TO PREFERRED MANUFACTURES AND MODELS.
CONCRETE ALL AROUND

2" BRONZE ANGLE VALVE

POLYETHYLENE SHEET 6 MIL MIN. (BETWEEN RMJ CAP AND CONC. ANCHOR)

2" BRASS SCH. 80 STREET ELL

2" BRASS PIPE (SCHEDULE 80) THREADED AT BOTH ENDS.

C900 PVC RISER

2" BRASS COUPLING

2" BRASS NIPPLE

CONCRETE ANCHOR

2" 90° BEND (BRASS)

SHORT NIPPLE (BRASS)

RMJ M.J. CAP TAP AS SHOWN

SECTION VIEW N.T.S.

NOTES:

1. AIR RELEASE RISERS AND VALVE BOX RISERS SHALL BE PLACED AND MAINTAINED IN VERTICAL POSITION.

2. ALL EXPOSED METALLIC THREADS ARE TO BE COATED WITH BITUMASTIC PAINT AFTER INSTALLATION IF ITS NOT BRASS.

3. CONCRETE ANCHOR MUST BE SIZED PROPERLY BASED ON PIPE DIA., OPERATING PRESSURE, AND SOIL CONDITIONS AND MUST BE APPROVED IN WRITING BY THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT.

4. POLYETHYLENE OR PVC PIPE AND FITTINGS MAY BE USED INSTEAD OF BRASS.
NOTE:

1. PROVIDE A 2'-6" CLEARANCE BETWEEN HYDRANT AND POST.
BOLLARD COVER DECORATIVE FROM RELIANCE FOUNDRY, MODEL # R-7576 (OR EQUAL), 5-3/4" DIAMETER, COLOR – TBD, FACTORY CUT TO 30"AFF.

EPOXY SHORT ROD INTO CONCRETE.

4-1/2" MAX DIAMETER SCHEDULE-80 PIPE, 26" MAX HEIGHT AFF, FILLED SOLID WITH GROUT, COORDINATE DIAMETER WITH DECORATIVE COVER.

CONCRETE SIDEWALK

CLASS "A" CONCRETE 3000 PSI MINIMUM

10" MIN. DIA. RECOMMENDED

12" MIN. DEPTH RECOMMENDED

SECTION VIEW
N.T.S.
4"Ø SCHEDULE 80 PAINTED STEEL BOLLARD

YELLOW REFLECTIVE TAPE
3" WIDE AND 6" FROM TOP OF BOLLARD

6" HANDLE, ALIGN ON FRONT & BACK OF BOLLARD

COLOR SHALL BE OSHA YELLOW OR AS DESIGNATED BY THE CITY

1/4" SLOPE
FINISH GRADE

5"Ø GROUND INSERT

CONCRETE ENCASEMENT

1/4" THICK FLANGE

LOCKING EYE WELDED TO GROUND INSERT

LOCKING EYE WELDED TO BOLLARD

SECTION VIEW
N.T.S.
NOTES:

1. ALL FIRE MAIN TAPS MUST BE WITNESSED BY CITY OF MIAMI BEACH PERSONNEL AND COORDINATED WITH AFFECTED STAKEHOLDERS.

2. SIZE-ON-SIZE TAPS ARE NOT ALLOWED UNLESS APPROVED BY THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT IN WRITING.
NOTES:

1. MUST USE RECTANGULAR BOX TO ACCOMMODATE BOTH THE SUB-METER AND SHUT-OFF VALVE.
2. MUST HAVE SHUT-OFF VALVE ON INLET SIDE BEFORE METER.
3. MUST PLACE SUB-METER BOX WITHIN 5 FEET OF MAIN METER, EASILY ACCESSIBLE TO METER READER.
4. MUST CALL METER SHOP AT 305-673-7681 WHEN INSTALLATION IS COMPLETED FOR FINAL INSPECTION IN ORDER TO OBTAIN SEWER CREDIT.
5. SUB-METER CANNOT BE LARGER THAN THE DOMESTIC METER WATER SERVICE LINE.
6. SUB-METER SHALL NOT BE LOCATED MORE THAN 2 FEET FROM THE RIGHT-OF-WAY LINE.
SANITARY SEWER GRAVITY COLLECTION SYSTEM
SECTION 15. SANITARY SEWER GRAVITY COLLECTION SYSTEM

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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. American Association of State Highway Transportation Officials (AASHTO)

   AASHTO T-180 Standard Method of Test for Moisture–Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

2. American Concrete Institute (ACI)

3. American Society for Testing and Materials (ASTM)

   ASTM A48 Standard Specification for Iron Castings
   ASTM A615 Standard Specification for Deformed and Plant Carbon-Steel Bars for Concrete Reinforcement
   ASTM C478 Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
   ASTM D1784 Standard Classification System and Basis for Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds
   ASTM D2584 Standard Test Method for Ignition Loss of Cured Reinforced Resins
   ASTM D3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
   ASTM E1252 Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis
   ASTM F1216 Standard Practice for Rehabilitation of existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
ASTM F1743 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

4. American Water Works Association (AWWA)
   - AWWA C105 Polyethylene Encasement for Ductile Iron Pipe
   - AWWA C151 Ductile Iron Pipe, Centrifugally Cast
   - AWWA C210 Liquid-Epoxy Coatings and Linings for Steel Water Pipe and Fittings
   - AWWA C600 Installation of Ductile Iron Water Mains and their Appurtenances
   - AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. through 60 In. (100 mm through 1,500 mm)
   - AWWA Manual M23 PVC Pipe – Design and Installation
   - AWWA Manual M45 Fiberglass Pipe Design

5. Florida Administrative Code (FAC)

6. Florida Building Code

   - ISO 8179 Ductile Iron Pipes, Fittings, Accessories and their Joints – External Zinc-Based Coating

8. Miami-Dade Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM) Regulations

9. Occupational Safety and Health (OSHA) Regulations

10. Plastic Pipe Institute (PPI)
    - PPI TR-3 Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe

11. Society for Protective Coatings (SSPC)
    - SSPC-PA 2 Procedure for Determining Conformance to Dry Coating Thickness Requirements
B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

- Section 1. Design Standards and Guidelines
- Section 8. Surveying, Drawing, and Drafting Requirements
- Section 9. Erosion and Sediment Control
- Section 10. Earthwork and Roadwork
- Section 13. Concrete
- Section 16. Sanitary Sewer Force Mains and Pump Stations

1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.
F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.03 SUBMITTALS

A. Minimum criteria are presented in this section and the following Standard Details. Sanitary sewer gravity collection systems including associated disciplines as required (civil, structural, etc.) shall be designed by a State of Florida Engineer. Signed and sealed calculations must be provided to support hydraulic and structural design. Signed and sealed buoyance calculations must also be provided for underground structures.

B. Plans shall be in accordance with Section 8 of the City of Miami Beach Public Works Manual.

C. Properly identified product data for review, including data of pipe and all other materials used, shall be submitted to the City or designee for review and approval prior to fabrication and/or delivery.

D. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

1.04 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.

1.05 DESIGN CRITERIA

A. All gravity systems shall be designed in accordance with the rules of FAC 62-604.

B. Minimum slopes: Gravity sewer mains shall be designed and constructed to achieve scouring velocities, when flowing full, of not less than 2.0 feet per second, based on Manning’s formula using an “n” value of 0.013.
C. Manholes shall be installed at the end of each line; at all changes in grade, size, or alignment; at all intersections of mains; and with line distances of not greater than 300 feet between manholes. Written approval is required from the City of Miami Beach Public Works Department for larger spacing between manholes.

D. Pipeline Crossings

1. Sewer mains shall not be laid in the same trench with water mains, stormwater mains, gas lines, fuel lines, or electric cables.

2. The horizontal, vertical, and joint separation shall be in accordance with FAC 62-55.314. Refer to Standard Details 15-1, 15-2, and 15-5.

E. Manhole Uplift: All manholes placed below grade shall have adequate safety factors against uplift (excluding weight of soil and associated skin friction).

PART 2 – PRODUCTS

2.01 PIPE MATERIALS

A. Pipe for use in gravity sewer systems shall be PVC SDR-35, PVC C900, or high-density polyethylene (HDPE), as specified below. PVC C900 pipe larger than 16 inches in diameter shall not be used.

B. Use of galvanized and lead pipe materials is prohibited.

C. Use of ductile iron (DI) pipe is prohibited.

2.02 SIZE LIMITATIONS

A. Gravity sewer mains shall be minimum 8 inches in diameter.

B. Laterals shall be minimum 6 inches in diameter for single family residential properties. Laterals shall be minimum 8 inches in diameter for multi-family and non-residential properties and are to be connected to the main through a manhole.

2.03 POLYVINYL CHLORIDE (PVC) SDR-35 PIPE

A. Type Plastic Sewer Main (PSM) SDR-35 pipe shall be push-on type, with bells, spigots, and elastomeric gaskets, in accordance with ASTM D3034 and ASTM D3212.

B. Joints using solvent cement will not be permitted.

C. SDR-35 PVC sewer pipe shall be impregnated with green pigment and be double labeled (180 degrees apart) as follows at intervals of five (5) feet or less: Date of
We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.

D. Nominal laid length of SDR-35 PVC sewer pipe shall be 13 feet.

2.04 POLYVINYL CHLORIDE (PVC) C900 PIPE

A. PVC C900 pipe 4 inches through 16 inches shall be green in color and conform to AWWA C900 dimension ratio (DR) 18, rubber-ring gasket bell end or plain end with elastomeric gasket coupling, ductile iron pipe size (DIPS) dimensional sizing, ASTM D3034 and shall be made from a 12454B compound which is a Type 1, Grade 1 plastic as defined by ASTM D1784. Rerun or reclaimed materials will not be acceptable.

B. The pipe shall be of the diameter and pressure class specified or shown, shall be furnished complete with rubber gaskets, and all specials and fittings shall be provided as required in the Contract Documents. The dimensions and pressure classes for DRs for large PVC C900 pressure pipe with cast-iron pipe equivalent outside diameters shall conform to the requirements of AWWA.

C. Unless otherwise provided in alternate qualification procedures of PPI-TR3, compounds which have a Hydrostatic Design Basis (HDB) of 4,000 pounds per square inch (psi) at 73.4 degrees Fahrenheit for water shall not contain additives and fillers that exceed the recommended values in Table 1, Part Y of PPI-TR3 (e.g., allowable content range for calcium carbonate is 0.0-5.0 parts per hundred of resin). If requested by the City or designee, the additive and filter content shall be determined using the prolysis method as specified in ASTM D2584.

D. PVC C900 pipe shall be double labeled (180 degrees apart) with the following at intervals of not more than five (5) feet: Date of manufacture - Manufacturer's Name & Record Code - Nominal size - "(Cl)" - "PVC" – "Dimension Ratio (for example "DR25")" – "AWWA pressure class (for example "PC100")" - "AWWA designation number (ANSI/AWWA C900-97)".

E. Nominal laid length of C900 pipe shall be 20 feet.

2.05 HIGH-DENSITY POLYETHYLENE (HDPE) PIPE

A. HDPE for sanitary sewer pipe shall be high molecular weight. The resin material shall have a standard PE code designation of PE 4710. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material pipe. The pipe shall be homogeneous throughout and free of visible cracks, bubbles, holes, foreign inclusions or other injurious defects. It shall be uniform in color, capacity, density, and other physical properties.

B. The pipe shall conform to either Iron Pipe Size (IPS) or DIPS standard dimensions. A standard dimension ratio (SDR) of 11 shall be used whenever available. Approval from manufacture - Manufacturer's name & Code - Nominal size - Cell classification - "Type PSM SDR-35 PVC Sewer Pipe" - "Specification D 3034".

D. Nominal laid length of SDR-35 PVC sewer pipe shall be 13 feet.
the City of Miami Beach Public Works Department is required for any pipe with a proposed SDR greater than 11 (i.e., wall thickness is reduced).

C. All HDPE pipe shall be color coded for the intended service. The color coding shall be permanently coextruded on the pipe outside surface as part of the pipe’s manufacturing process. Painting HDPE pipe to accomplish color coding is not permitted. Color coding shall be as follows:

1. Sewer - green

D. HDPE pipe for water distribution shall be marked either continuously or on intervals not to exceed five (5) feet by indirect printing with the following information:

2. Name and/or trademark of the manufacturer.
3. Nominal pipe size.
4. Dimension ratio.
5. The letters PE followed by the polyethylene grade per ASTM D1248, followed by the Hydrostatic Design basis in 100's of pounds per square inch (psi).
7. Production Code from which time and date of manufacture can be determined.

E. HDPE fittings shall be manufactured to the requirements of ASTM D3261 and fabricated fittings shall be manufactured from pipe of at least one SDR heavier pipe than the system piping and shall be pressure rated to match the system piping. The butt fusion outlets of fabricated fittings shall be machined to the same SDR as the system piping to which they are to be fused.

F. HDPE pipes and fittings shall be joined one to another by thermal butt fusion, saddle fusion, or socket fusion in accordance with procedures recommended by the pipe manufacturer and as outlined in ASTM D2657. The manufacturer shall provide fusion training services to the Contractor upon request.

G. Butt fusion joining of unlike SDRs shall not be permitted. Transition from one SDR to another shall be accomplished by the use of mechanical couplings or a transition nipple, which is a short length of the heavier SDR pipe with one end machined to the lighter SDR.

H. All HDPE pipe installed via open cut installation shall have a #12 copper wire laid along with the pipe and attached to a terminal with a cast iron lid that maintains continuity of signal and allows for magnetic location of the pipe in the future.
2.06 FITTINGS

A. Fittings for gravity sewer mains shall be ductile iron (DI).

B. Each fitting shall be clearly labeled to identify its size and pressure class.

C. Flanged pipe shall only be allowed on above ground applications and shall not be allowed in underground applications.

D. Unless otherwise specified, the minimum fitting thickness per AWWA C151 for the following fitting sizes is shown below. Flanged (FLG) fittings shall not be less than Class 53 as identified in Table 50.15 of AWWA C150-91.

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER (INCHES)</th>
<th>CLASS</th>
<th>TYPE OF JOINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI 4 thru 12</td>
<td>52</td>
<td>MJ or PO</td>
</tr>
<tr>
<td>DI 14 thru 54</td>
<td>51</td>
<td>MJ or PO</td>
</tr>
<tr>
<td>DI All</td>
<td>53</td>
<td>FLG</td>
</tr>
</tbody>
</table>

E. Depending on design conditions, the City may opt to conform to standard pressure classes AWWA C151 for the following fitting sizes. The pressure class specified is the minimum permitted.

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER (INCHES)</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 thru 12</td>
<td>350</td>
</tr>
<tr>
<td>14 thru 24</td>
<td>250</td>
</tr>
<tr>
<td>30 thru 54</td>
<td>150</td>
</tr>
</tbody>
</table>

2.07 PIPE AND FITTING COATINGS

A. A coating of rust inhibitive primer shall be applied to the ductile iron fitting’s exterior prior to shipment for piping that is above ground and exposed piping within vaults.

B. For buried service, the piping manufacturer’s standard asphaltic coating shall be applied prior to shipment to the exterior wall of buried DI fittings in accordance with AWWA C151.

C. Zinc Basecoat: The exterior of ductile iron fittings shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 grams per square meter (g/m²) of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a
local minimum not less than 2 mils. The coating system shall conform in every respect to ISO 8179, Part 1. Ductile iron fittings shall also have a zinc protective coating sprayed on at the factory at a minimum of 3 mils.

D. Poly Wrap

1. All DI fittings shall be poly wrapped conforming to the requirements of AWWA C105 and shall have an 8-mil minimum thickness.

2. Due to the high salinity content of the groundwater, or if corrosive soils are encountered, the City may require the use of V-Bio Enhanced Polyethylene Encasement to protect the ductile iron fittings. All ductile iron fittings shall be wrapped with the V-Bio Polyethylene Enhanced Encasement and have the zinc protective coating factory applied. The V-Bio Polyethylene Enhanced Encasement shall be accordance with AWWA C600 and AWWA C105. Color shall be green for sewer. Polyethylene encasement for use with ductile iron fittings shall consist of three layers of co-extruded linear low-density polyethylene (LLDPE), fused into a single thickness of not less than 8 mils. The inside layer of the polyethylene wrap to be in contact with the fitting exterior shall be infused with a corrosion inhibitor and antimicrobial biocide to control galvanic corrosion. Product: V-Bio, or approved equal.

3. Polyethylene encasement for ductile-iron fittings shall be supplied as a flat tube meeting the dimensions of Table 1 in AWWA C105 and shall be supplied by the ductile iron pipe manufacturer. Plastic adhesive tape shall consist of polyolefin backing and adhesive which bonds to common pipeline coatings including polyethylene. Products: Canusa Wra rapide; Tapecoat H35; Polyken 934; AA Thread Seal Tape, Inc.; or approved equal.

E. The interior of all ductile iron fittings shall be lined with an epoxy lining. The epoxy lining shall be Protecto 401 Ceramic Epoxy as manufactured by the Protecto Division of Vulcan Painters, Inc. All DI fittings shall be lined with a minimum dry film thickness of 40 mils, except for the gasket groove and spigot end up to six (6) inches back from the end of the spigot which shall be lined with ten (10) mils of the material. All ductile iron fittings shall be checked for dry film thickness in accordance with the Society for Protective Coatings Paint Application Standard No. 2 (SSPC-PA 2). Each fitting shall be marked with the date of application of the lining system and with its numerical sequence of application on that date. The fitting supplier shall furnish a certificate stating that lining applicator has complied with all specification requirements relative to the material, its application, and inspection. Surface preparation, number of coats, application of the lining material, and field touch-up shall be in strict accordance with the lining material manufacturer's recommendations. During the installation of the fitting, the lining material manufacturer shall provide the services of a field engineer to instruct and demonstrate to the Contractor’s personnel the procedure for the field touch-up of lining where field cuts and taps were required. Holiday inspection shall be conducted using test equipment.
described in AWWA C210, Section 5.3.3.1. In accordance with coating manufacturer's recommendation, holiday testing may be conducted any time after the coating has reached sufficient cure.

2.08 SERVICE LATERAL CONNECTIONS

A. Service lateral connections shall be watertight and not protrude into the sewer main.

B. A sanitary wye branch connection or tee branch connection, 6-inch diameter or larger, shall be used to connect low density residential properties to the main. All other services shall use a minimum 8-inch diameter connection and shall tie through a new manhole at the main. A saddle type wye connection shall not be used.

C. Vitrified clay pipe mains shall be replaced with PVC SDR-35, PVC C900, or HDPE pipe prior to connecting a new service lateral to the main.

D. All materials used to make service connections shall be compatible with each other and with the pipe materials to be joined and shall be corrosion proof.

2.09 CLEANOUTS

A. Cleanouts on house laterals shall be located in the right-of-way within one foot of the property line.

B. A City approved box and cover, as shown on the Standard Details, shall be used over the cleanout. The top of the cleanouts shall be a maximum of 6 inches below finish grade and have a threaded brass plug with a protruding integrally cast square nut. Plugs with recessed holes for tool grips shall not be used.

2.10 MANHOLES

A. New manholes shall be precast or cast-in-place concrete. New brick masonry manholes will not be allowed.

B. Precast Manholes

4. Precast manholes shall conform to ASTM C478, with Type II cement. All manholes shall have 48 inches minimum inside diameter and shall have monolithically poured base.

1. Concrete in precast manholes shall maintain a minimum compressive strength of 4,000 psi in 28 days, and all reinforcing bars shall be ASTM A615 grade 60 steel. All reinforcing steel shall be from domestic mills and shall have the manufacturer’s mill marking rolled into the bar which shall indicate the producer, size, type, and grade. Rebar cover shall be per ACI 350.
2. Manhole built-in sections shall be joined with a mastic compound or a round compression ring of neoprene material set in annular spaces cast into the spigot end of a bell and spigot type joint. The mastic compound or ring shall be uniformly compressed between the positioned sections so as to form a watertight joint. After the sections are assembled, the remaining space in the joint shall be pointed up and filled with dense cement mortar and finished so as to make a smooth, continuous surface inside and outside the wall sections.

3. Shallow manholes may have an eight inch (8") precast reinforced concrete slab on the top in-lieu of the conical sections. Slabs shall have a twenty-four inch (24") minimum diameter access hole centered in the slab.

4. Precast manholes shall be designed by a State of Florida Engineer with signed and sealed calculations submitted as part of the shop drawing submittal process.

C. Finish and Coatings

1. Finish for outside of new concrete manhole shall be two (2) coats, each 10 mils thick, of Bitumastic 300M Coal Tar Epoxy, or approved equal.

2. For interior of manholes, concrete to be seal coated with 16 mil thickness approved coating. If a force main discharges to the manhole, epoxy coating shall be used. Otherwise, cementitious coating shall be used.
   
   a. Epoxy Manhole Coating: The epoxy coating shall be designed for use in applications where corrosion is anticipated or known to be aggressive; be compatible with the mortar material; have a composition of 100 percent solids; be of gloss white color; and provide a high level of adhesive strength and resistance to abrasion.

   b. Cementitious Manhole Coating: The mortar used for manhole rehabilitation shall be a blend of portland cement, microsilica, thermoplastic fiber, densifiers, admixtures, and other modifiers that produces a high strength, low shrinkage, and low permeability mortar for the rehabilitation of deteriorated concrete structures; produces excellent adhesion to properly prepared existing concrete or brick surfaces; restores structural integrity; seals rough, deteriorated surfaces and resists external hydrostatic water pressure; and, is suitable for permanent water immersion service.

D. Manhole Covers

1. Manhole covers shall be cast iron and have a roadway or pedestrian type surface as required by location and shall have "Sanitary Sewer" and “Miami Beach” in Futura font and Logo cast into them.
2. Material used in the manufacture of the castings shall conform to ASTM A48 for Class 30 iron, designed for AASHTO Highway Loading Class H-20.

3. All lids shall be provided with an HDPE rain guard.

4. Castings shall be as manufactured by United States Foundry & Manufacturing Corp., or approved equal.

2.11 CURED-IN-PLACE SECTIONAL LINERS

A. General

1. The finished liner shall be fabricated from material as specified in this Section which, when cured, will be chemically resistant to the corrosive effects of the raw sewage and hydrogen sulfide. The cured-in-place sectional pipe shall be the New Life System as manufactured by Stephen's Technologies, Inc. or approved equal.

2. Sectional liner ends shall be sealed to prevent infiltration using Insignia™ O-Rings by LMK Technologies, or approved equal.

B. Liner Sizing: The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit to be repaired.

C. Liner Material

1. The lining material shall be a fiberglass matting material and fully impregnated with an epoxy resin as specified.

2. The mixed components of the epoxy resin shall have the following properties.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solids Content</td>
<td>100% by weight</td>
</tr>
<tr>
<td>Pot Life</td>
<td>90 minutes at 70 degrees Fahrenheit</td>
</tr>
<tr>
<td>Shelf Life</td>
<td>At least 1 year (sealed)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>18,000 centipoise (cps) (average at 70 degrees Fahrenheit)</td>
</tr>
<tr>
<td>Density</td>
<td>12 pounds per gallon (max.)</td>
</tr>
</tbody>
</table>

3. The cured epoxy resin material shall have the following properties:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>TEST VALUE</th>
<th>REFERENCE STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexural Strength</td>
<td>5,000 psi</td>
<td>ASTM D790</td>
</tr>
<tr>
<td>Flexural Modulus</td>
<td>400,000 psi</td>
<td>ASTM D790</td>
</tr>
</tbody>
</table>

D. Liner Design
1. The minimum required structural cured-in-place pipe (CIPP) wall thickness shall be based on the physical properties described above and in accordance with the design equations in the appendix of ASTM F1216, and the following design parameters:

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>DESIGN VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Safety Factor</td>
<td>2.0</td>
</tr>
<tr>
<td>Retention Factor for Long-Term Flexural Modulus to be used in Design</td>
<td>50%</td>
</tr>
<tr>
<td>Soil Modulus</td>
<td>700 psi</td>
</tr>
<tr>
<td>Soil Density</td>
<td>120 pounds per cubic foot (pcf)</td>
</tr>
<tr>
<td>Live Load</td>
<td>One H-20 passing truck</td>
</tr>
</tbody>
</table>

2. The lining manufacturer shall submit complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. A safety factor of 2 shall be applied in the design calculation. The host pipe shall be considered fully deteriorated if unlined, and partially deteriorated if lined. The liner shall be designed to withstand a live load equivalent to one H-20 passing truck plus all pertinent dead loads, hydrostatic pressure, and grout pressure (if any). For design purposes, the water table shall be considered at grade elevation. The liner shall be designed in accordance with ASTM F1216. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure, and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. Modulus of soil reaction shall be 700 pcf, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.

3. Liner shall be neither accepted nor installed until design calculations are acceptable to the City.

2.12 CURED-IN-PLACE MANHOLE TO MANHOLE LINERS FOR MAIN LINES

A. Sectional liner ends shall be sealed to prevent infiltration using Insignia™ O-Rings by LMK Technologies, or approved equal.

B. Materials

1. The sewn tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, Section 5. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge breaks and missing sections of the existing pipe, and stretch to fit irregular pipe sections. The new jointless pipe within a pipe must fit tightly against the old pipe wall and consolidate all disconnected sections into a single continuous conduit.
2. The wetout tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the design thickness.

3. The tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe with minimal shrinkage, in such a way as to minimize water migration (tracking) between the liner and the host pipe. Allowance should be made for circumferential stretching during inversion, and longitudinal stretching during pull in. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.

4. The minimum tube length shall be that deemed necessary by the Contractor to effectively span the distance between the access points and to facilitate a good, "non-tracking" seal. The Contractor shall verify the lengths in the field before cutting liner to length and otherwise preparing it for installation.

5. The outside layer of the tube (before wetout) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wetout) procedure.

6. The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

7. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

8. Seams in the tube shall be stronger than the unseamed felt.

9. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 feet. Such markings shall include the Manufacturer's name or identifying symbol. The tubes must be manufactured in the USA.

10. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the design of the CIPP for the project. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.

11. The finished pipe in place shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage. Resin shall be in contact with the original mainline and the impermeable membrane shall be on the interior to be exposed to the wastewater flow. All constituent materials will be suitable for service in the environment intended. The final product will not
We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.

Deteriorate, corrode, or lose structural strength that will reduce the projected product life. In industrial areas a liner system using epoxy vinyl ester resin shall be utilized and a polyester resin may be used in non-industrial areas.

12. The CIPP shall be designed as per ASTM F1216, Appendix X1. The CIPP design shall assume no bonding to the original pipe wall. The structural performance of the finished pipe must be adequate to accommodate all anticipated loads throughout its design life.

13. The CIPP must have a minimum design life of fifty (50) years. The minimum design life may be documented by submitting life estimates by national and/or international authorities or specifying agencies. Otherwise, long term testing and long term in service results (minimum ten (10) years) may be used, with the results extrapolated to fifty (50) years.

14. The Contractor must have performed long term testing for flexural creep of the CIPP pipe material installed by his company. Such testing results are to be used to determine the long term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (tube and resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by ASTM D790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Values in excess of 50% will not be applied unless substantiated by qualified third-party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in design.

15. The minimum required structural CIPP wall thickness shall be based on the physical properties described above and in accordance with the design equations in the appendix of ASTM F1216, and the following design parameters.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>DESIGN VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Safety Factor</td>
<td>2.0</td>
</tr>
<tr>
<td>Retention Factor for Long-Term Flexural Modulus to be used in Design</td>
<td>50%</td>
</tr>
<tr>
<td>Soil Modulus</td>
<td>700 psi</td>
</tr>
<tr>
<td>Soil Density</td>
<td>120 pcf</td>
</tr>
<tr>
<td>Live Load</td>
<td>One H-20 passing truck</td>
</tr>
</tbody>
</table>

16. The lining manufacturer shall submit to the City or designee for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. The buckling analysis shall account for the combination of dead load, live load, hydrostatic.
pressure, and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. Modulus of soil reaction shall be 700 psi, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.

17. As part of the design calculation submittal, the lining manufacturer shall submit descriptions of sampling, preparation, curing, and testing procedures; liner repair methods and materials; and a typical schedule for wetout of the liner together with a typical insertion and curing schedule.

18. As part of the design calculation submittal, the lining manufacturer shall submit a tabulation of time versus temperature. This tabulation shall show the lengths of time that exposed portions of the liner will endure without self-initiated cure or other deterioration beginning. This tabulation shall be at five-degree Fahrenheit (F) increments ranging from 70 degrees F to 100 degrees F. The manufacturer shall also submit his analysis of the progressive effects of such "pre cure" on the insertion and cured properties of the liner. This information shall be submitted in a timely fashion prior to the preconstruction conference so that the City may set procedures for dealing with such an instance caused by construction delays.

19. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

20. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

21. Liner shall be neither accepted nor installed until design calculations are acceptable to the City or designee.

C. Structural Requirements

1. Since the pipe strength is related to the uniformity and density of the pipe wall, only resin vacuum impregnation will be allowed. Resin impregnation without vacuum entraps air and creates voids which weaken the pipe wall. If reinforcing materials (fiberglass, etc.) are used, the reinforcing material must be fully encapsulated within the resin to assure that the reinforcement is not exposed, either to the inside of the pipe or at the interface of the CIPP and the existing pipe.

2. The design for the CIPP wall thickness will be based on the following strengths, unless otherwise submitted to and approved by the City or designee. Strengths in excess of these values will require documentation consisting of test results for recent
installations in which 100 percent of samples tested exceeded the values claimed (minimum 3 projects with minimum 5 samples per project).

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>CURED COMPOSITE PER ASTM F1216</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexural Modulus of Elasticity</td>
<td>ASTM D790</td>
<td>250,000 psi</td>
</tr>
<tr>
<td>Flexural Stress</td>
<td>ASTM D790</td>
<td>4,500 psi</td>
</tr>
</tbody>
</table>

D. Testing Requirements for Mainlines

1. Chemical Resistance: The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.

2. Hydraulic Capacity: Overall, the hydraulic profile shall be maintained as large as possible. The CIPP shall provide at least 100 percent of the flow capacity of the original pipe before rehabilitation. In lieu of actual measurements, calculated capacities may be derived using commonly accepted equations and values of the Manning flow coefficients (designated "n" coefficients). The original pipe material and condition at the time of reconstruction will determine the Manning coefficient used in the host pipe.

3. CIPP Field Samples: When requested by the City or designee, the Contractor shall submit test results from field installations in the USA of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified herein have been achieved in previous field applications.

4. Prior to any liner installation, the Contractor shall submit technical data sheets showing the physical and chemical properties and infrared spectrum analysis per ASTM E1252 (chemical fingerprint) of the proposed resin system as modified for the cured-in-place process. Additionally, copies of the certificates of analysis for resin used on the project must be made available to the City upon request. The Contractor shall test each lot of resin used by conducting infrared spectrum analyses on field samples. These analyses shall be conducted at the Contractor’s expense.

5. The Contractor shall provide resin samples as directed by the City during the duration of the project and infrared spectrography chemical fingerprints shall be run and compared to the submitted fingerprint to verify the resin used is the resin submitted for use on this project. These analyses shall be conducted at the City’s expense.
6. CIPP samples shall be prepared and physical properties tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed.

   a. The Contractor shall submit a method to the City or designee, for approval, to obtain representative samples from the installed liners. These samples will be tested by the City, at the City expense, to verify compliance with the installed material specifications. The Contractor shall produce these test samples when so directed by the City or designee. The City or designee reserves the right to request samples from as many as 10 percent of the liners installed, unless a pattern of failure occurs. In this case, the Contractor will be requested to provide a greater quantity of samples, up to 25 percent, at no additional cost, and the Contractor shall bear all costs of this additional testing. Liners which do not pass these material tests will be accepted at reduced payment or rejected.

   b. Test specimens shall be marked in indelible ink with the appropriate lateral or main section, work order number, date of installation, and orientation to the top of the pipe (direction of up) so the results can be correlated to the field work performed. All test results shall use this designated labeling as a reference.

   c. The extraction and labeling of test specimens shall be done in the presence of the City or designee. The City or designee and Contractor shall, upon completion of sample extraction and labeling, both sign a chain-of-custody form that shall subsequently accompany the sample at all times and shall ultimately be received and signed at the testing laboratory. Test reports shall include a copy of the chain-of-custody form with all signatures to ensure that reported test results are for the correct sample.

   d. The flexural properties must meet or exceed the values specified herein.

   e. Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743.

   f. Visual inspection of the CIPP shall be by closed-circuit television.

7. When directed in advance by the City or designee for specific installations, the Contractor shall implement more extensive monitoring of temperatures inside the liner to verify proper curing.

   a. Temperature sensors shall be placed between the host pipe and the liner in the bottom of the host pipe (invert) throughout the reach to record the heating and cooling that takes place on the outside of the liner during processing. The sensors shall be spaced apart at intervals no greater than 20 feet for pipe sizes up to 15-inches in diameter, and no greater than 10 feet for pipe sizes 18 inches and larger. Additionally, sensors shall be strategically placed at points where a significant heat sink is likely to be anticipated. The monitoring of these sensors shall be by a computer which can record the temperatures at this interface.
throughout the processing of the cured-in-place liner utilizing a tamper-proof database. The proposed temperature sensor monitoring system and related software shall be as manufactured by ZIA Systems, or approved equal.

b. Prior to installing the liner in the host pipe, the temperature monitoring system’s proper functioning shall be confirmed by hooking it up to the computer and seeing that the sensors are reporting their ambient temperatures. No more than two sensors in sequence can be found faulty during this test. If three or more sensors in sequence are discovered faulty, a new sensor array shall be pulled into the host pipe replacing the previously installed array, and the new array shall be again tested for its proper functioning.

c. Curing of the resin system shall be in accordance with the directions and established procedures of the cured-in-place product manufacturer with respect to the temperatures achieved and the duration of holding the liner at those temperatures. If any sensor or sensors along the reach indicates that there is a localized issue with respect to achieving proper curing per the written installation procedure, the Contractor shall address the issue immediately using previously established protocols for such an event.

d. The sensor array’s database shall have an output report that identifies each sensor by its station in the reach and shows the maximum temperature achieved during the processing of the cured-in-place liner and the time sustained at or above the manufacturer’s required curing temperature at each sensor. The Contractor shall deliver to the City or designee a certified copy of the curing report output from the temperature monitoring system used in the control of the curing process or shall provide the City or designee with access to the website where the secure report can be obtained.

2.13 CURED-IN-PLACE MAINLINE TO LATERAL CONNECTION REPAIR SYSTEM

A. Liner Sizing: The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit to be repaired.

B. Liner Material

1. The liner shall be one piece and will consist of a lateral portion and the mainline portion with one or more layers of flexible needled felt or an equivalent non-woven material. The liner will be continuous in length and the wall thickness shall be uniform. No overlapping sections shall be allowed in the circumference or the length of the lateral liner. The tube will be capable of conforming to offset joints, bells, and disfigured pipe sections. The mainline liner will be flat with one end overlapping the second end and sized accordingly to create a circular lining equal to the diameter of the mainline pipe. The resin will be polyester or vinyl ester with proper catalysts as designed for the specific application. The cured-in-place pipe shall provide a smooth
bore interior. Each installation shall have a design report documenting the design criteria for a deteriorated pipe section, relative to the hydrostatic pressures, depth of soil cover, and type of soil. The mainline sectional liner shall be a full-circle, minimum 16-inch long cured-in-place pipe liner integrally manufactured to the lateral liner providing a seamless connection between the mainline pipe liner and the lateral liner. Installation will be accomplished remotely using air or water for inversion and curing. The cured pipe repair system shall be watertight and shall conform to the existing pipe and eliminate any leakage or connection to the outside of the host pipe/service.

2. The composite of the materials above will, upon installation inside the host pipe, exceed the minimum test standards specified by ASTM methods.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>TEST VALUE</th>
<th>REFERENCE STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexural Strength</td>
<td>4,500 psi</td>
<td>ASTM D790</td>
</tr>
<tr>
<td>Flexural Modulus</td>
<td>250,000 psi</td>
<td>ASTM D790</td>
</tr>
</tbody>
</table>
C. Liner Design

1. The minimum required structural CIPP wall thickness shall be based on the physical properties described above and in accordance with the design equations in the appendix of ASTM F 1216, and the following design parameters:

<table>
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<td>Soil Density</td>
<td>120 pcf</td>
</tr>
<tr>
<td>Live Load</td>
<td>One H-20 passing truck</td>
</tr>
<tr>
<td>Design Condition (lateral pipe)</td>
<td>Fully deteriorated</td>
</tr>
<tr>
<td>Design Condition (lined main pipe)</td>
<td>Partially deteriorated</td>
</tr>
<tr>
<td>Design Condition (unlined main pipe)</td>
<td>Fully deteriorated</td>
</tr>
</tbody>
</table>

2. The lining manufacturer shall submit to the City or designee for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. A safety factor of 2 shall be applied in the design calculation. The lateral host pipe shall be considered fully deteriorated and the main host pipe shall be considered fully or partially deteriorated based on whether it is unlined or lined, respectively. The liner shall be designed to withstand a live load equivalent to one H-20 passing truck plus all pertinent dead loads, hydrostatic pressure, and grout pressure (if any). For design purposes, the water table shall be considered at grade elevation. The liner shall be designed in accordance with ASTM F1216. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure, and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. Modulus of soil reaction shall be 700 psi, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45.

3. Liner shall be neither accepted nor installed until design calculations are acceptable to the City or designee.

PART 3 – EXECUTION

3.01 PREPARATION

A. Permits: The Contractor shall obtain all required right-of-way, City Building Department, and regulatory permits prior to commencing any work.
B. Maintenance of traffic (MOT) shall be provided by the Contractor in accordance with Section 1 of the City of Miami Beach Public Works Manual.

C. Flow Control

1. Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the manhole or sewer pipe under construction.

2. Plugging and blocking of flow: A sewer line plug shall be inserted into the line at a manhole upstream from the section where work will be occurring. The plug shall be so designed that all or any portion of the sewage flows can be released. During the inspection, testing, and replacement portion of the construction, flows shall be shut off or substantially reduced as indicated by the City. The upstream manholes shall be constantly monitored for degree of surcharging. After the testing, inspection or repair is complete, flows shall be restored to normal level.

3. Pumping and bypassing of flow: Wherever lines are blocked off and the possibility of backing up the sewage and causing harm to public and private property is foreseen, it shall be the Contractor’s responsibility to bypass flow from manhole to manhole.

3.02 INSTALLATION OF PIPES AND APPURTENANCES

A. All PVC C900 pipes shall be installed in accordance with AWWA M23. Deflection at the joint shall not exceed 1.5 degrees or 50% of the maximum deflection, as recommended by the manufacturer. No deflection of the joint shall be allowed for joints which are overbelled or not belled to the stop mark.

B. Detector Tape: All pipes shall have 3-inch-wide metal green detector tape for sewer mains. The words “CAUTION SEWER LINE BURIED BELOW” on the upper side of the pipe shall be printed at 30-inch intervals along the tape. Tape shall be placed 18 inches below grade above all sewer mains and laterals, or as recommended by manufacturer.

C. Bedding and initial backfill shall be in accordance with City of Miami Beach Public Works Manual Section 10 and Standard Detail 15-5 for PVC pipe.

D. PVC pipe shall be laid with minimum vertical cover of 48 inches.

E. Vertical cover 36 inches to 48 inches below finish grade may be approved on a case-by-case basis by the City of Miami Beach Public Works Department.

F. For vertical cover less than 30 inches below finish grade, use concrete slab as per Standard Detail 15-6; use of this Standard Detail requires written approval from the City of Miami Beach Public Works Department.
G. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the sewer-line materials be dropped or dumped into the trench.

H. Care shall be taken to avoid abrasions of the pipe coating. Except where necessary in making connections with other lines, pipe shall be laid with the bells facing in the direction of laying. Defects in coating are to be field repaired.

I. The full length of each section of pipe shall rest solidly upon the completed pipe bed, with recesses excavated and shaped to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and re-laid.

3.03 AERIAL CROSSINGS
RESERVED

3.04 MANHOLE INSTALLATION

A. Manholes shall be constructed as indicated on Drawings and in accordance with the Standard Details. Manhole pipe openings are to be sealed with non-shrink grout, Link Seal, or approved equal. No molding plaster will be allowed.

B. The invert channels shall be formed of brick or brick rubble thoroughly bedded and covered with sand-cement grout, accurately shaped to a semicircular bottom conforming to the inside of the adjacent sewer section. Steep slopes outside the invert channels shall be avoided. Changes in size and grade shall be made gradually and evenly. Changes in the direction of the sewer or entering branch shall be a smooth curve with radius as long as practical.

C. Riser rings will not be allowed to adjust manholes to final grade, unless specifically approved in writing by the City of Miami Beach Public Works Department.

D. Frames and Covers: Cast iron frames and covers shall be set in a bed of mortar and carefully adjusted to elevation shown on the Drawings. A minimum of 3 and maximum of 5 courses of brick shall be provided under frames for adjusting manhole cover elevations.

3.05 MANHOLE TO SEWER MAIN CONNECTIONS

A. All manhole penetrations must be core drilled.

B. PVC Sewers: The first joint at both influent and effluent sewers at each manhole, including service laterals, shall consist of an approved manhole coupling grouted into the manhole wall, and providing a continuous watertight non-shrink gasket seal between the coupling and the pipe inserted therein. The coupling shall have an increasing tapered interior from the gasket groove to allow flexibility for the pipe in the event of future
settlement of the manhole or pipeline. The first length of PVC pipe into or out of the manhole shall be two (2) feet long, maximum, and shall be either plain-end by plain-end, or plain-end by bell. In the first option, the next joint shall be a double bell PVC repair coupling (no stop) with a maximum one (1) inch gap between the pipes inserted therein. In the latter option, the next joint shall be another two (2) feet long section maximum, of plain-end by bell PVC pipe.

C. DI Pipe Sewers: The first length of pipe into or out of the manhole shall be a 2-foot length of plain end by plain end ductile iron pipe (i.e., two (2) feet, as measured from the outside wall) grouted directly into the opening in the manhole wall. This plain end to plain end short sleeve shall be joined to the spigot end of an adjacent ductile iron pipe with a Fernco Adapter.

D. Vitrified clay pipe (VCP) Sewers: VCP shall be removed and replaced with either PVC SDR-35, PVC C900, or HDPE pipe. New pipes are to be connected to the existing VCP by appropriate Fernco adapters.

E. Where a service lateral enters a manhole at an elevation of two (2) feet or less, an internal drop shall be provided. For drops over two (2) feet above the sewer main invert, a drop connection on the exterior, with a cleanout extension into the manhole shall be provided.

3.06 CURED-IN-PLACE LINER INSTALLATION

A. Cleaning Sewer Lines

1. Prior to any lining of a pipe so designated, it shall be the responsibility of the Contractor to remove internal deposits from the pipeline. Both mainline and lateral line shall be cleaned.

2. It shall be the responsibility of the Contractor to clean the pipeline with a high-pressure water jet and to remove all internal debris out of the pipeline. Both mainline and lateral line shall be cleaned.

B. Television Survey

1. Pre-construction and post-construction digital video recording (Closed Circuit Television [CCTV]) survey shall be performed. CCTV report shall be submitted to the City for approval. Both main line and lateral line shall be televised.

2. The interior of the main and lateral pipelines shall be carefully surveyed to determine the locations and extent of any structural failures. The location of any conditions which may prevent proper installation of lining materials into the pipelines shall be noted so that these conditions can be corrected. A video recording and suitable report shall be kept and turned over to the City for review and approval.
3. The pre-lining video of the prepared pipe shall be reviewed and be acceptable to the City for cleanliness and smoothness before the Contractor begins to line the pipe.

C. Sewer Repairs

1. Any protruding pieces of concrete, dropped joints, or broken pipe shall be subjected to point repairs so that the pipe is left in a clean smooth condition in all respects ready for lining, unless otherwise jointly determined by the Contractor and the City or designee that the defect will not compromise the integrity of the liner.

2. If conditions such as broken pipe and major blockages are found that will prevent proper cleaning, or where additional damage would result if cleaning is attempted or continued, the Contractor shall advise the City or designee so that point repair(s) may be authorized prior to completion of cleaning.

D. Joint, Crack, Annual Space, and Linear End Chemical Sealing

1. Prior to cured-in-place liner installation, all active leaks of a magnitude to compromise the integrity of the liner shall be stopped using chemical grout.

2. Materials shall have the following properties: react quickly to form a permanent watertight seal; resultant seal shall be flexible and immune to the effects of wet/dry cycles; non-biodegradable and immune to the effects of acids, alkalis, and organics in sewage; component packaging and mixing compatible with field conditions and worker safety; excess sealant left inside pipe shall be readily removable; and be compatible with the CIPP liner resin system utilized. The chemical sealing materials shall be acrylic resin type and shall be furnished with activators, initiators, inhibitors, and any other materials recommended by the manufacturer for a complete grout system. Sealing grout shall be furnished in liquid form in standard manufacturer's containers. Sealing grout shall be AV-100 manufactured by Avanti International, or approved equal.

3. The Contractor shall modify his equipment as necessary to seal the leaks; however, both his equipment and sealing method must meet the approval of the City or designee prior to use. Extreme caution shall be utilized during leak sealing (pressure) operations in order to avoid damaging already weakened sewer pipes. If any damage occurs, it shall be repaired at the Contractor's cost and to the satisfaction of the City or designee. Excessive pumping of grout which might plug a service lateral shall be avoided. Any service laterals blocked by the grouting operation shall be cleared immediately by the Contractor.

E. Line Obstructions: It shall be the responsibility of the Contractor to clear the line of obstruction. If survey reveals an obstruction that cannot be removed by conventional cleaning equipment, the Contractor shall make a point repair excavation, to uncover and remove, or repair the obstruction. Such excavation shall be accepted in writing by the City or designee prior to the commencement of the work.
F. Installation of Cured-in-Place Sectional Liners

1. Prior to liner installation, all active severe leaks which may affect the success of liner installation shall be stopped using chemical grout. The Contractor shall impregnate the liner with the 100 percent solids epoxy. Drop cloths, tarpaulins, etc. shall be used to prevent epoxy material from contacting the adjacent ground. Place the liner on the placement carriage and maneuver carriage and liner into position with the use of a video camera. Force the liner against the inside wall of the damaged host pipe allowing epoxy resin to permeate into any cracks in the host pipe. Allow lines to cure in accordance with the manufacturer’s recommendations. Heat may be introduced to speed up curing time. Retract the placement carriage and remove from pipe.

2. After the sectional liner has been cured in place, the Contractor shall reconnect the service connections. Cutting of the liner pipe shall be done from the interior of the pipeline using a robotic cutter. Where holes are cut through the liner, they shall be neat and smooth in order to prevent blockage at the service connections. Cut in service connections shall be opened to a minimum of 95 percent of the flow capacity of the building sewer. Cuts shall be wire-brushed to remove jagged edges. All coupons shall be recovered at the downstream manhole and removed. All reinstated service lateral connections (between the liner and the existing pipe) shall be grouted.

G. Installation of Cured-in-Place Manhole to Manhole Liners for Main Lines

1. The Contractor shall present to the City or designee, for review, a description of his methods for avoiding liner stoppage due to conflict and friction with such points as the manhole entrance and the bend into the pipe entrance. He shall also present plans for dealing with a liner stopped by snagging within the pipe. This information shall be rendered to the City or designee in a timely fashion prior to the pre-construction conference.

2. The Contractor shall immediately notify the City or designee of any construction delays taking place during the insertion operation. Such delays shall possibly require sampling and testing by an independent laboratory of portions of the cured liner at the City or designee’s discretion. The cost of such test shall be borne by the Contractor and no extra compensation will be allowed. Any failure of sample tests or a lack of immediate notification of delay shall be automatic cause for rejection of that part of the work at the City or designee’s discretion.

3. The Contractor shall designate a location where the tube will be impregnated with resin prior to installation. The Contractor shall allow the City or designee to inspect the materials and the wetout procedure.

4. The materials and processes must be reasonably available for pre-installation, installation, and post-installation inspections. Areas which require inspection include, but are not limited to, the following:
a. Product materials should exhibit sufficient transparency to visually verify the quality of resin impregnation.

b. Temperature sensing devices, such as thermocouples, shall be located between the existing pipe and the CIPP to ensure the quality of the cure of the wall laminate.

5. After the inversion is complete, the Contractor shall supply a suitable heat source and water recirculation equipment to circulate heated water throughout the pipeline. The equipment shall be capable of delivering hot water throughout the pipeline to uniformly raise the water temperature to a level required to effectively cure the resin. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gauge shall be placed between the tube and the host pipe at the termination end at or near the bottom to determine the temperatures during cure. Water temperature in the pipe during the cure period shall be as recommended by the resin manufacturer.

6. Initial cure shall be deemed complete when the exposed portions of the tube appear to be hard, and sound and the temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer and may require continuous recirculation of the water to maintain the temperature. The Contractor shall have on hand at all times, for use by his personnel and the City or designee, a digital thermometer or other means of accurately and quickly checking the temperature of exposed portions of the liner.

7. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with modifications as listed herein.

8. Resin Impregnation: The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To ensure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction. After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube. If the Installer uses an alternate method of resin impregnation, the method must produce the same results. Any alternate resin impregnation method must be proven.

9. Tube Insertion: The wetout tube shall be positioned in the pipeline using either inversion or a pull in method. If pulled into place, a power winch should be utilized, and care should be exercised not to damage the tube as a result of pull in friction.
The tube should be pulled in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

10. Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.

11. Curing shall be accomplished by utilizing hot water under hydrostatic pressure in accordance with the manufacturer's recommended cure schedule.

12. Cool down: The Contractor shall cool the hardened pipe to a temperature below 100 degrees Fahrenheit before relieving the hydrostatic head. Cool down may be accomplished by the introduction of cool water into the inversion standpipe to replace water being pumped out of the manhole. Care should be taken in release of static head so that vacuum will not be developed that could damage the newly installed liner.

13. Finish: The new pipe shall be cut off in the manhole at a suitable location. The finished product shall be continuous over the length of pipe reconstructed and be free from dry spots, delamination, and lifts. A watertight seal shall be made at the inside manhole wall using extra polyester fiber felt and epoxy resin, or another method if approved by the City or designee. Pipe entries and exists shall be smooth, free of irregularities, and watertight. No visible leaks shall be present, and the Contactor shall be responsible for grouting to remove leaks or fill voids between the host pipe and the liner.

H. Installation of Mainline to Lateral Connection Repair

1. The tube shall be inspected for tears and frayed sections. The tube, in good condition, will be vacuum impregnated with the resin. The resin will be introduced into the tube creating a slug of resin at the beginning of the tube. A calibration roller will assist the resin slug to move throughout the tube. All air in the tube shall be removed by vacuum allowing the resin to thoroughly impregnate the tube. All resin shall be contained to ensure no public property or persons are exposed to the liquid resin. The mainline liner will be saturated upon a wet-out platform. The resin impregnated sample (wick) shall be retained by the Installer to provide verification of the curing process taking place in the host pipe.

2. The saturated tube along with the inversion bladder will be inserted into the carrying device. The mainline liner will be affixed on the launching device. Both the launching and carrying device shall be pulled into the pipe using a cable winch. The pull is complete when the open port of the launching device is aligned with the interface of the service connection and mainline pipe. The resin saturated lateral tube is completely protected during the pull. No resin shall be lost by contact with manhole walls or the pipe during the pull. The resin saturated mainline liner is supported upon the rigid launcher that is elevated above the pipe invert by means of a rotating skid.
system. The mainline liner should not be contaminated or diluted by exposure to dirt, debris, or water during the pull.

3. The Installer shall document the placement of the liner by internal video inspection.

4. The mainline liner shall be expanded against the mainline pipe and lateral tube inverted out of the launcher/carrying device by controlled air or water pressure. The Installer shall be capable of viewing the lateral liner contacting the lateral pipe. The mainline liner and the lateral tube shall be held tightly in place against the wall of the host pipe by controlled pressure until the cure is complete. Resin shall be in contact with the original mainline and lateral pipes and coatings shall be on the interior to be exposed to the wastewater flow.

5. When the curing process is complete, the pressure will be released. The inversion bladder and launching device shall be removed from the host pipe with the winch. No barriers, coatings, or any material other than the cured tube/resin composite, specifically designed for desirable physical and chemical resistance properties, shall be left in the host pipe. Any materials used in the installation other than the cured tube/resin composite shall be removed from the pipe by the Installer.

I. Reinstatement of Service Laterals, Branch Connections, and Drop Manhole Connections

1. After the pipe has been cured in place, the Contractor shall reconnect the existing service connections. This shall be done from the interior of the pipeline without excavation using a robotic cutter. Where holes are cut through the liner, they shall be neat and smooth in order to prevent blockage at the service connections. Cut in service connections shall be opened to a minimum of 95 percent of the flow capacity of the building sewer. Cuts shall be wire-brushed to remove jagged edges. All coupons shall be recovered at the downstream manhole and removed. The Contractor shall stop all visible leaks, including at service connections as required. All reinstated service lateral connections (between the liner and the existing pipe) shall be grouted.

2. It is the intent of these specifications that service laterals be reopened without excavation, utilizing a remote-controlled cutting device, monitored by a video TV camera. The Contractor shall certify he has a minimum of two (2) complete working cutters plus spare key components on the site before each liner installation. No additional payment will be made for excavations for the purpose of reopening connections and the Contractor will be responsible for all costs and liability associated with such excavation and restoration work.

3. Unless otherwise directed by the City, all laterals will be reinstated. The City will provide specific direction concerning any laterals that will be abandoned and will therefore not require reinstatement. The Contractor shall abandon a lateral by not reinstating the lateral only with the written consent of the City.
4. The language in this section applies equally to branch connections and drop manhole connections.

J. Acceptance: The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, and the like. There shall be no visible infiltration through the liner or from behind the liner.

K. Cleanup: After the liner installation has been completed and accepted, the Contractor shall clean up the entire project area and return the ground cover to grade. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Contractor.

L. Warranty: The liner shall be certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for two (2) years from the date of acceptance. During the warranty period, any defects which affect the integrity or strength of the liner shall be repaired at the Contractor’s expense in a manner mutually agreed by the City and the Contractor.

3.07 FLUSHING AND TESTING

A. At the conclusion of the work, the Contractor shall thoroughly clean all of the pipe by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the lowest outlet. If, after this outlet cleaning, obstructions remain, they shall be removed.

B. The Contractor and City or designee shall inspect all installed sewer lines by visually checking each section for alignment prior to placing into service. A full circle of light shall be seen by looking through the pipe at a light held at the opposite end of the section of sewer line being inspected. The Contractor shall make any corrections required in line or grade.

C. The City’s Inspector must be notified in writing at least 24-hours prior to all scheduled formal tests.

D. All new gravity sewer mains shall undergo an exfiltration test as described below.

1. Prior to testing for leakage, the trench shall be completely backfilled and compacted properly. Test shall be performed just prior to final paving over trench.

2. Test lines for leakage by exfiltration tests. In areas where pipe is laid below groundwater level, assure that there is no infiltration prior to performing the exfiltration tests.
3. Exfiltration test shall be performed at low tide.

4. Visible leaks into the system shall be corrected regardless of the amount of leakage.

5. The exfiltration test procedure shall be performed by filling the manhole, line, and laterals with clean water. The filled lines shall be allowed to stand until the pipe has reached its maximum absorption, but not less than four (4) hours. After absorption, the head shall be re-established. The allowable limits of infiltration or exfiltration for the entire system, or any portion thereof, shall not exceed a rate of 100 gallons per inch of inside pipe diameter per mile of pipe per 24 hours; no additional allowance will be made for service laterals. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and system retested. Correction and retesting shall be made at Contractor’s expense.

6. Manhole exfiltration leakage shall not exceed 4 gallons per day per manhole tested.

7. All water used in testing and flushing shall be furnished at the Contractor’s expense.

E. Closed-Circuit Television: After all testing and paving has been completed, all new gravity sanitary sewer mains shall be televised, at Contractor/Developer’s expense. Digital copy of the sewer line video on acceptable form of media and inspection report shall be reviewed by the City of Miami Beach Public Works Department or designee. Contractor shall be responsible for correcting any deficiencies noted prior to the Engineer of Record’s certification of completion of the work to any agency.

3.08 PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.

3.09 AS-BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.
STANDARD DETAILS

Standard Details for sanitary sewer gravity collection systems are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself will all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
| DETAIL 15-1 | VERTICAL SEPARATION AND JOINT SPACING AT CROSSING |
| DETAIL 15-2 | HORIZONTAL SEPARATION FOR PARALLEL MAINS |
| DETAIL 15-3 | EXCEPTIONS TO MINIMUM SPACING REQUIREMENTS |
| DETAIL 15-4 | RESERVED |
| DETAIL 15-5 | TYPICAL TRENCH SECTION FOR PVC PIPE |
| DETAIL 15-6 | REINFORCING CONCRETE SLAB FOR GROUND COVER LESS THAN 30 INCHES |
| DETAIL 15-7 | POLYETHYLENE ENCASEMENT FOR DUCTILE PIPES AND FITTINGS |
| DETAIL 15-8 | WYE BRANCH SEWER SERVICE CONNECTION |
| DETAIL 15-9 | TEE BRANCH SEWER SERVICE CONNECTION |
| DETAIL 15-10 | INSTALLATION CONNECTION |
| DETAIL 15-11 | SANITARY SEWER CLEANOUT LID DETAIL |
| DETAIL 15-12 | SANITARY SEWER CLEANOUT CONCRETE BOX DETAIL |
| DETAIL 15-13 | NEW LATERAL CONNECTION ON EXISTING DIP OR PVC GRAVITY SEWER MAIN |
| DETAIL 15-14 | NEW LATERAL CONNECTION ON EXISTING VCP GRAVITY SEWER MAIN |
| DETAIL 15-15 | SADDLE TEE FASTENED TO GRAVITY SEWER MAIN LINER |
| DETAIL 15-16 | JOINT FOR SIMILAR OR DISSIMILAR GRAVITY SEWER PIPES |
| DETAIL 15-17 | SANITARY SEWER MANHOLE US FOUNDRY 310 RING & 'OE' TYPE COVER |
| DETAIL 15-18 | SANITARY SEWER MANHOLE FOR NEW GRAVITY SEWER MAIN |
| DETAIL 15-19 | SANITARY SEWER MANHOLE DETAIL A |
| DETAIL 15-20 | CAST-IN PLACE MANHOLE OVER EXISTING GRAVITY SEWER MAIN PLAN VIEW |
| DETAIL 15-21 | CAST-IN PLACE MANHOLE OVER EXISTING GRAVITY SEWER MAIN SECTION VIEW |
| DETAIL 15-22 | PRECAST MANHOLE OVER EXISTING GRAVITY SEWER MAIN PLAN VIEW |
DETAIL 15-23  PRECAST MANHOLE OVER EXISTING GRAVITY SEWER MAIN SECTION VIEW

DETAIL 15-24  FLOW PATTERNS FOR INVERT CHANNELS

DETAIL 15-25  SANITARY SEWER MANHOLE FLOW CHANNELS

DETAIL 15-26  NEW CONNECTION TO EXISTING MANHOLE WHERE NO STUB-OUT EXISTS

DETAIL 15-27  DROP CONNECTION NEW PRECAST MANHOLE

DETAIL 15-28  DROP CONNECTION NEW PRECAST MANHOLE SECTION

DETAIL 15-29  MANHOLE EXTENSION ADJUSTMENT
CROSSING VERTICAL SEPARATION

WATER MAIN

6" MIN. OUTSIDE OF PIPE TO OUTSIDE OF PIPE
(12" PREFERRED)

STORMWATER OR SANITARY SEWER GRAVITY MAIN

WATER MAIN CROSSING OVER STORMWATER OR SANITARY SEWER GRAVITY MAIN

WATER MAIN

12" OUTSIDE OF PIPE TO OUTSIDE OF PIPE

STORMWATER OR SANITARY SEWER FORCE MAIN

WATER MAIN CROSSING OVER STORMWATER OR SANITARY SEWER FORCE MAIN

STORMWATER OR SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

12" OUTSIDE OF PIPE TO OUTSIDE OF PIPE

WATER MAIN CROSSING UNDER STORMWATER OR SANITARY SEWER GRAVITY OR FORCE MAIN

NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.
2. MINIMUM SPACING REQUIREMENTS PER FAC 62-555.314.
3. REFER TO 15-3 FOR EXCEPTIONS.
NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.

2. GRAVITY SEWER ONLY MAY BE REDUCED TO 3 FEET WHERE BOTTOM OF WATER MAIN IS AT LEAST 6 INCHES ABOVE TOP OF SEWER.

3. MINIMUM SPACING REQUIREMENTS PER FAC 62-555.314.

4. REFER TO 15-3 FOR EXCEPTIONS.
WHERE IT IS NOT TECHNICALLY FEASIBLE OR ECONOMICALLY SENSIBLE TO COMPLY WITH THE REQUIREMENTS OF FAC 62–555.314 (1) OR (2), THE FLORIDA DEPARTMENT OF HEALTH SHALL ALLOW EXCEPTIONS TO THESE REQUIREMENTS IF SUPPLIERS OF WATER OR CONSTRUCTION PERMIT APPLICANTS PROVIDE TECHNICAL OR ECONOMIC JUSTIFICATION FOR EACH EXCEPTION AND PROVIDE ALTERNATIVE CONSTRUCTION FEATURES THAT AFFORD A SIMILAR LEVEL OF RELIABILITY AND PUBLIC HEALTH PROTECTION. ACCEPTABLE ALTERNATIVE CONSTRUCTION FEATURES INCLUDE THE FOLLOWING:

**LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(A), F.A.C.**

**WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THE REQUIRED MINIMUM HORIZONTAL DISTANCE FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND JOINTS IN THE WATER MAIN ARE BEING LOCATED LESS THAN THE REQUIRED MINIMUM DISTANCE FROM JOINTS IN THE OTHER PIPELINE:**

1. USE OF PRESSURE–RATED PIPE CONFORMING TO THE AMERICAN WATER WORKS ASSOCIATION STANDARDS INCORPORATED INTO RULE 62–555.330, F.A.C., FOR THE OTHER PIPELINE IF IT IS A GRAVITY–OR VACUUM–TYPE PIPELINE;
2. USE OF WELDED, FUSED, OR OTHERWISE RESTRAINED JOINTS FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE; OR
3. USE OF WATERTIGHT CASING PIPE OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE.

**LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(B), F.A.C.**

**WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THREE FEET HORIZONTALLY FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND IS BEING LAID LESS THAN THE REQUIRES MINIMUM VERTICAL DISTANCE FROM THE OTHER PIPELINE:**

USE OF PIPE, OR CASING PIPE, HAVING HIGH IMPACT STRENGTH (I.E., HAVING AN IMPACT STRENGTH AT LEAST EQUAL TO THAT OF 0.25–INCH–THICK DUCTILE IRON PIPE) OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR BOTH THE WATER MAIN AND FOR THE OTHER PIPELINE IF IT IS NEW AND IS CONVEYING WASTEWATER OR RECLAIMED WATER.
RESERVED
NOTES:

1. CLASS I MATERIALS ARE ANGULAR, 1/4 TO 3/4 INCH WELL GRADED STONE INCLUDING WASHED AND GRADED LIMEROCK. CLASS II MATERIALS ARE WELL GRADED COURSE SANDS AND GRAVEL. SEE TABLE 1 FOR REQUIREMENTS.

2. WHERE REQUIRED, SHEETING AND SHORING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS IN CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10.

3. WHERE UNSTABLE SOILS ARE ENCOUNTERED, INCLUDING PEAT, MUCK OR OTHER ORGANIC SOILS, ELASTIC SILT AND CLAYS BELOW THE WATER TABLE, A FOUNDATION IS REQUIRED. FOUNDATION MATERIAL SHALL BE SELECT BACKFILL MATERIAL 2" MAXIMUM SIZE. 6" Lifts, compacted to at least 98% of max. density per AASHTO SPEC. No. T-180. EXTEND EXCAVATION AT LEAST 2" DEEPER FOR FOUNDATION UNLESS SUITABLE MATERIAL IS FOUND AT A LESSER DEPTH. GREATER DEPTHS MAY BE REQUIRED FOR EXTREMELY POOR CONDITIONS.
NOTES:

1. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER'S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

2. FOR PIPE DIAMETER GREATER THAN 30-INCHES, REINFORCING CONCRETE SLAB TO BE DESIGNED BY A STATE OF FLORIDA ENGINEER AND SUBMITTED TO THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT FOR APPROVAL.

3. USE OF THIS STANDARD DETAIL REQUIRES WRITTEN APPROVAL FROM THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT.

4. EXTEND CONCRETE SLAB UNTIL COVER EXCEEDS 30 INCHES.

5. CONCRETE TO BE 3,000 PSI.

6. AIR RELEASE VALVES (ARV) ARE REQUIRED ON SEWER FORCE MAINS ONLY.
CUT THE POLYETHYLENE TUBE 2 FT. LONGER THAN THE LENGTH OF PIPE SECTION. SLIP THE TUBE AROUND THE PIPE SO AS TO ALLOW 1’ OVERLAP AT EACH END. OVERLAP THE OTHER PIPE SECTION AFTER PIPE IS INSTALLED.

METHOD A (TUBE) OVERLAP
N.T.S.

CUT THE POLYETHYLENE TUBE 1 FT. SHORTER THAN THE LENGTH OF PIPE SECTIONS. SLIP THE TUBE AROUND THE PIPE SO AS TO ALLOW 6” OF BARE PIPE AT EACH END. BEFORE MAKING A JOINT, SLIP A 3’ LENGTH OF POLYETHYLENE TUBE OVER THE PRECEDING PIPE SECTION OVERLAP BY AT LEAST 1’ AND SECURE AFTER JOINT IS MADE.

METHOD B (TUBE) OVERLAP
N.T.S.

EACH SECTION OF PIPE, FITTINGS OR VALVE ETC. IS COMPLETELY WRAPPED WITH A FLAT POLYETHYLENE SHEET OVERLAP BY AT LEAST 1’ AND METHOD C (FLAT SHEET) SECURED.

METHOD C (FLAT SHEET) OVERLAP
N.T.S.

NOTES:

1. ALL UNDERGROUND DUCTILE IRON PIPES AND FITTINGS SHALL BE POLYWRAPPED, CONFORMING TO THE REQUIREMENTS OF AWWA C105.

2. POLYETHYLENE TUBE AND SHEET SIZES PER AWWA C105 TABLE 1.

3. PIPE-SHAPED FITTINGS (BENDS, REDUCERS, ETC.) SHALL BE TREATED ACCORDING TO METHODS “A” AND “B”. ODD SHAPED FITTINGS (VALVES, TEES, ETC.) SHALL BE TREATED ACCORDING TO METHOD “C”.

4. 6” ADHESIVE TAPE SHALL BE USED TO SECURE ENCASEMENT.

5. SPECIAL CARE SHALL BE TAKEN TO PREVENT DAMAGE TO WRAPPING WHEN PLACING BACKFILL.

6. REFER TO ASTM D1248 FOR APPROVED MATERIAL AND ACCESSORIES.

7. ONLY VIRGIN POLYETHYLENE MATERIAL HAVING A MINIMUM THICKNESS OF 8 MILS IS APPROVED.
**WYE BRANCH SEWER SERVICE CONNECTION**

**SCHEMATIC**

- **Gravity Sewer Main**
- **6" Min. Service Line**
- **Limit of City Responsibility**
- **R/W or Easement Line**
- **Clean Out (See Detail 15-10 for Installation Requirements)**

**PLAN VIEW**

- **Wye Branch**
- **Rotate Bend**
- **As Required**
- **12"**
- **6" Clean Out to Grade**
- **Alternate:**
  - **Additional Riser and Bend**
  - **Where Greater Pipe Depth**

**SECTION VIEW**

- **Lay on Undisturbed Soil**
- **6" Min. PVC or Dip Pipe**
- **1/8" Per Foot Minimum Slope**
- **Imported Compacted Pipe**
- **Base Material as Specified**
- **To Undisturbed Earth**
- **Under Service Connection Pipe Min 2'0" Wide**

**NOTES:**

1. Sewer Main Wye Branch Fitting to Match Main Pipe Material (Excluding Clay Pipe).
2. No 90° Bends Shall Be Used for Sewer Service or Clean Out Installations.
3. Service Laterals Shall Terminate 12" Outside the Property Line at a Depth of 30" Except Where a Deeper Invert Is Required by Existing Building Conditions, and Ended With a 1"x2" Treated Wooden Stake.
4. Minimum Distance Between Service Connections Shall Be 18".
NOTES:

1. SEWER MAIN TEE BRANCH FITTING TO MATCH MAIN PIPE MATERIAL (EXCLUDING CLAY PIPE).
2. NO 90° BENDS SHALL BE USED FOR SEWER SERVICE OR CLEAN OUT INSTALLATIONS.
3. SERVICE LATERALS SHALL TERMINATE 12" OUTSIDE THE PROPERTY LINE AT A DEPTH OF 30" EXCEPT WHERE A DEEPER INVERT IS REQUIRED BY EXISTING BUILDING CONDITIONS, AND ENDED WITH A 1"X2" TREATED WOODEN STAKE.
4. MINIMUM DISTANCE BETWEEN SERVICE CONNECTIONS SHALL BE 18".
NOTES:

1. PROVIDE APPROVED PLUG OR JOINT FOR DISSIMILAR GRAVITY SEWER PIPE FOR HOUSE SERVICE CONNECTION.
2. CLEAN OUT ASSEMBLY SHALL BE INSTALLED ADJACENT TO PROPERTY LINE PER DRAWING.
3. 30" MIN. COVER FOR RESIDENTIAL SERVICE UNLESS OTHERWISE SHOWN.
4. 8" DIAMETER LATERALS FOR MULTI-FAMILY AND NON-RESIDENTIAL PROPERTIES ARE TO BE CONNECTED TO THE MAIN THROUGH A MANHOLE.
NOTE:

1. CAST IRON LID TO BE A MODIFIED VERSION OF USF No. 7715 (OR EQUIVALENT) WITHOUT BOLT HOLES, MARKED "SEWER" AND A.D.A. COMPLIANT FOR USE IN SIDEWALKS.
NEW LATERAL CONNECTION ON EXISTING VCP SEWER MAIN

6" MIN. ALL AROUND (TYP.)

SEWER LATERAL

CUT IN WYE (OR TEE) CONNECTION

LIMITS OF PROPOSED CONNECTION

FLOW

EXISTING GRAVITY SEWER MAIN (VCP)

ENCASED CONNECTION USE 3000 PSI CONCRETE

NEW GRAVITY SEWER MAIN (DIP OR PVC)

FLEXIBLE MECHANICAL COMPRESSION JOINT COUPLING TYPE 316 STAINLESS STEEL BANDS (FERNCO OR APPROVED EQUAL)

EXISTING GRAVITY SEWER MAIN (VCP)

BEDDING MATERIAL 6" (MIN)

ENCASED CONNECTION USE 3000 PSI CONCRETE

SECTION VIEW
N.T.S.
GRAVITY SEWER SADDLE TYPE "PVC/U" MODEL U-90A FROM "THE GENERAL ENGINEERING COMPANY" OR APPROVED EQUAL.

NOTE:

1. ALL WORK ASSOCIATED WITH THIS DETAIL SHALL WITNESSED BY CITY OF MIAMI BEACH PERSONNEL.

LEGEND:

1 CUT & REMOVE SECTION OF HOST PIPE WHERE SERVICE CONNECTION IS TO BE MADE.
2 CUT HOLE FOR LATERAL WITH DIAMETER EQUAL TO INSIDE DIAMETER OF THE CUT IN MAIN SEWER WITH POWER TOOL.
3 CONNECT 6" PVC SEWER LATERAL BY U-90A SADDLE.
4 SEAL THE PIPE CUTS WITH HYDRAULIC CEMENT.
FLEXIBLE MECHANICAL COMPRESSION JOINT COUPLING TYPE 316 STAINLESS STEEL BANDS (FERNCO OR APPROVED EQUAL)

NEW PIPE

BEDDING MATERIAL 6" (MIN)

ENCASED CONNECTION USE 3000 PSI CONCRETE

SECTION VIEW
N.T.S.
LEVEL - "0"

(2) 1" DIA. BOLT HOLES 180° APART, ON 32 1/2" B.C.D.

PLAN VIEW
N.T.S.

MACHINED SURFACES

SECTION VIEW
N.T.S.

NOTES:

1. USE H-20 TRAFFIC RATED COVER FOR TRAVEL AREAS.
2. USE PEDESTRIAN DESIGN COVER FOR SIDEWALKS AND WALKWAYS.
HDPE RAIN GUARD
MANHOLE RIM ELEVATION TO BE AT PROPOSED FINISHED GRADE EXCEPT WHERE OTHERWISE NOTED

RING AND COVER TO BE US FOUNDRY RING 310 & 'OE' TYPE COVER WITH THE WORDS SANITARY SEWER CAST IN THE COVER (SEE DETAIL 15–17)

MIN. 3 COURSES OF CLAY BRICK
MAX. 5 COURSES OF CLAY BRICK

REINFORCED CONC. SECTION
(KEYED TO LOWER WALL)

SEAL WITH RAM–NEK
(OR APPROVED EQUAL)

PIPE O.D. PLUS 4" W/ A KEYWAY
(FOR PRE–CAST CONC. ONLY)
SEE DETAIL "A" SHEET 15–19

#4 BARS @ 12"O.C. EACH WAY
AND MID DEPTH

#4 BARS @ 12"O.C. EACH WAY

12" MIN. BEDDING.
LIMEROCK IF ABOVE THE WATER TABLE.
57 STONE IF BELOW THE WATER TABLE

NOTES:
1. PRECAST CONCRETE MANHOLES SHALL CONFORM TO ASTM C478, SHALL BE TYPE II CEMENT AND SHALL MAINTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS.
2. REFER TO FDOT INDEX 200 FOR ADDITIONAL DETAILS AND SPECIFICATIONS.
3. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.
4. ALL OPENINGS SHALL BE SEALED WITH GROUT. SEE DETAIL "A" SHEET 15–19.
5. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO FLOW STREAM.
6. SEE DETAIL 15–24 FOR INFLUENT/EFFLUENT ARRANGEMENT.
7. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW MANHOLE.
8. CONCRETE TO BE SEAL COATED WITH 16 MIL THICKNESS APPROVED COATING. IF A FORCE MAIN DISCHARGES TO THE MANHOLE, EPOXY COATING SHALL BE USED. OTHERWISE, CEMENTITIOUS COATING SHALL BE USED.
9. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE CONCRETE. THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.
NOTES:

1. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW MANHOLE.

2. CONCRETE TO BE SEAL COATED WITH 16 MIL THICKNESS APPROVED COATING. IF A FORCE MAIN DISCHARGES TO THE MANHOLE, EPOXY COATING SHALL BE USED. OTHERWISE, CEMENTITIOUS COATING SHALL BE USED.
EXISTING GRAVITY SEWER MAIN

SAW CUT EXISTING MAIN AFTER FLOW CHANNEL CONSTRUCTION

CONSTRUCT FLOW CHANNELS. BRICK RUBBLE BEDDED AND COVERED WITH GROUT, SLOPED 3/4" PER FOOT

NEW SANITARY SERVICE

FILL CORNERS AND PROVIDE SMOOTH FLOW TO THE CHANNELS (TYP)

6" CONCRETE WALLS REINFORCED WITH #4 @ 12" O.C. EA. WAY

---

PLAN VIEW
N.T.S.

---

(4) 5 BARS EACH FACE

---

TOP SLAB PLAN VIEW
N.T.S.

---

NOTES:
1. REFER TO SHEET 15–21.
NOTES:

1. BRICK MASONRY CONSTRUCTION TO BE STUCCO WITH 3/4" MORTAR INSIDE AND OUTSIDE.
2. CONCRETE TO BE SEAL COATED WITH 16 MIL THICKNESS APPROVED COATING. IF A FORCE MAIN DISCHARGES TO THE MANHOLE, EPOXY COATING SHALL BE USED. OTHERWISE, CEMENTITIOUS COATING SHALL BE USED.
3. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW MANHOLE.
4. ALL OPENINGS SHALL BE SEALED WITH GROUT.
5. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO FLOW STREAM.
6. INVERT CHANNELS ARE TO BE CONSTRUCTED FOR SMOOTH FLOW WITH NO OBSTRUCTION.
7. SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS PROVIDING FOR SMOOTH FLOWS.
8. ALL CONCRETE MATERIALS, REINFORCEMENT, AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH FDOT SPECIFICATION 346, 400 AND 415 EXCEPT AS NOTED.
9. ALL CAST-IN-PLACE CONCRETE SHALL BE A MINIMUM OF 4000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
10. REINFORCEMENT SHALL BE ASTM A615, GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER'S MILL MARKING ROLLED IN TO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE AND GRADE. REBAR COVER PER ACI 350.
11. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING STEEL SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.
NOTES:

1. EXCAVATE AROUND EXISTING GRAVITY MAIN. CLEAR AREA BELOW MAIN AS WELL.
2. INSERT PRECAST MANHOLE BASE BELOW EXISTING GRAVITY MAIN.
3. DROP MANHOLE ON BASE SEALING WALL W/ HYDROPHILIC WATER STOP.
4. SEAL ANNUlar SPACE BETWEEN GRAVITY MAIN AND STRUCTURE WITH BRICK AND HYDRAULIC CEMENT.
5. GROUT TO SPRING LINE OF PIPE TO FLOW CHANNEL.
6. REMOVE TOP OF PIPE TO SPRING LINE.
7. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW MANHOLE.
8. CONCRETE TO BE SEAL COATED WITH 16 MIL THICKNESS APPROVED COATING. IF A FORCE MAIN DISCHARGES TO THE MANHOLE, EPOXY COATING SHALL BE USED. OTHERWISE, CEMENTITIOUS COATING SHALL BE USED.
NOTES:

1. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF MANHOLE EXTENSION.
2. CONCRETE TO BE SEAL COATED WITH 16 MIL THICKNESS APPROVED COATING. IF A FORCE MAIN DISCHARGES TO THE MANHOLE, EPOXY COATING SHALL BE USED. OTHERWISE, CEMENTITIOUS COATING SHALL BE USED.
3. PRECAST MANHOLES SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER WITH SIGNED AND SEALED CALCULATIONS PROVIDED AS PART OF THE SHOP DRAWINGS PROCESS. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.
NOTES:

1. INVERT CHANNELS TO BE CONSTRUCTED FOR SMOOTH FLOW WITH NO OBSTRUCTIONS.

2. SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS PROVIDING FOR SMOOTH FLOWS.

3. CHANNELS FOR FUTURE CONNECTIONS (STUBS) SHALL BE CONSTRUCTED, FILLED WITH SAND AND COVERED WITH 1" OF MORTAR.
NOTE:

1. CONCRETE SHALL BE SEAL COATED WITH 16 MIL THICKNESS APPROVED COATING. IF A FORCE MAIN DISCHARGES TO THE MANHOLE, EPOXY COATING SHALL BE USED OTHERWISE, CEMENTITIOUS COATING SHALL BE USED.
LEGEND:

1. ENTRANCE BY CORE DRILLING ONLY.

2. CONSTRUCT FLOW CHANNELS AS PER 15–25.

3. NEW OPENING SIZE TO BE AT THE PIPE OD+4 INCHES.

4. SEAL ALL OPENINGS WITH NON-SHRINK GROUT OR LINK SEAL.

5. 2'-0" MAX. DISTANCE BETWEEN INVERT OF NEW INFLUENT AND INVERT OF EXISTING MANHOLE.

6. D.I. PIPE CAN NOT EXTEND MORE THAN A MAX. OF 3" BEYOND INSIDE WALL AND MUST BE FEATHERED TO THE WALL WITH CEMENT. P.V.C. PIPE SHALL BE FLUSH WITH INSIDE WALL OF MANHOLE.

SECTION VIEW
N.T.S.
RING AND COVER TO BE US FOUNDRY RING 310 & 'OE' TYPE COVER WITH THE WORDS SANITARY SEWER CAST IN THE COVER (SEE DETAIL 15–17)

LEGEND

1. PVC TEE
2. PVC PE x PE
3. PVC 90° ELBOW
4. 13' PVC LENGTH

CONSTRUCT DAM TO SPRINGLINE OF PIPE

4'0" MINIMUM

CONSTRUCTION JOINT APPLY BONDING AGENT

6" MIN. COVER ALL AROUND

(2) #4 EACH OUTSIDE FACE
#4 12" ON CENTER
SECONDARY POUR BY PRECASTER

CAST IN PLACE BY CONTRACTOR

PIPE BEDDING MATERIAL OR DRAINFIELD LIMEROCK

#4 12" ON CENTER EACH WAY

A 15-2B

3'–0" (MINIMUM)

SECTION VIEW

N.T.S.

NOTES:

1. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT SEWER IS LOCATED TWO (2) FEET OR MORE ABOVE THE MAIN INVERT CHANNEL.
2. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO FLOW STREAM.
3. PIPING IN DROP SHALL BE AS PVC.
4. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW MANHOLE.
5. CONCRETE SHALL BE SEAL COATED WITH 16 MIL THICKNESS APPROVED COATING. IF A FORCE MAIN DISCHARGES TO THE MANHOLE, EPOXY COATING SHALL BE USED. OTHERWISE CEMENTITIOUS COATING SHALL BE USED.
6. PRECAST MANHOLES SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER WITH SIGNED AND SEALED CALCULATIONS PROVIDED AS PART OF THE SHOP DRAWINGS PROCESS. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.
REUSE EXISTING FRAME & GRATE
FINISH GRADE

3–5 COURSES OF RED BRICK TO
ADJUST TO GRADE W/ MORTAR
VENEER INSIDE & OUTSIDE

#4 @ 12" CCEW OR ASTM A185
WIRE FABRIC W/ STEEL AREA
EQUAL TO 0.20 SQ. IN. PER FT.
REINFORCED BOTH HORIZONTAL
& VERTICAL

SEE NOTES 1 AND 2

CHIP OUT EXISTING MANHOLE TO
EXPOSE CLEAN CONCRETE AND
FORM KEYWAY (SEE NOTE 3)

APPLY BONDING AGENT

EXISTING MANHOLE

SECTION VIEW
N.T.S.

NOTES:

1. CONCRETE SHALL USE TYPE II SULFATE RESISTANT CEMENT IN CONFORMANCE
WITH ASTM C478 WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28
DAYS.

2. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60 STEEL. ALL REINFORCING
STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S
MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER,
SIZE, TYPE AND GRADE.

3. PROVIDE DOWELS FOR CONNECTION AT 12" SPACING, PENETRATING AT LEAST 6
INCHES INTO EXISTING MANHOLE AND PROVIDE SEAL ALONG JOINT USING
NON-SHRINK GROUT.

4. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC
MATERIAL TO EXTERIOR SURFACE OF MANHOLE EXTENSION.

5. CONCRETE TO BE SEAL COATED WITH 16 MIL THICKNESS APPROVED COATING. IF A
FORCE MAIN DISCHARGES TO THE MANHOLE, EPOXY COATING SHALL BE USED.
OTHERWISE, CEMENTITIOUS COATING SHALL BE USED.

6. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE
THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA
ENGINEER. SIGNED AND SEALED STRUCTURAL CALCULATIONS MUST BE PROVIDED
TO SUPPORT STRUCTURAL DESIGN.
SANITARY SEWER FORCE MAINS AND PUMP STATIONS
SECTION 16. SANITARY SEWER FORCE MAINS AND PUMP STATIONS

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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. Association of State Highway Transportation Officials (AASHTO)
   - AASHTO T-180 Standard Method of Test for Moisture–Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
   - AASHTO M-306 Standard Specification for Drainage, Sewer, Utility, and Related Casting

2. American Society for Testing Materials (ASTM)
   - ASTM A48 Standard Specification for Iron Castings
   - ASTM B62 Standard Specification for Composition Bronze or Ounce Metal Castings
   - ASTM B92 Standard Specification for Unalloyed Magnesium Ingot and Stick For Remelting
   - ASTM B209 Standard Specification for Deformed and Plant Carbon-Steel Bars for Concrete Reinforcement
   - ASTM C478 Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
   - ASTM D4 Standard Test Method for Bitumen Content
   - ASTM D1784 Standard Classification System and Basis for Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds
   - ASTM D2657 Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings
<table>
<thead>
<tr>
<th>Standard or Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM D3034</td>
<td>Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings</td>
</tr>
<tr>
<td>ANSI B16.1</td>
<td>Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250</td>
</tr>
<tr>
<td>AWWA C105</td>
<td>Polyethylene Encasement for Ductile Iron Pipe</td>
</tr>
<tr>
<td>AWWA C110</td>
<td>Ductile Iron and Gray Iron Fittings</td>
</tr>
<tr>
<td>AWWA C111</td>
<td>Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings</td>
</tr>
<tr>
<td>AWWA C115</td>
<td>Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges</td>
</tr>
<tr>
<td>AWWA C150</td>
<td>Thickness Design of Ductile Iron Pipe</td>
</tr>
<tr>
<td>AWWA C151</td>
<td>Ductile Iron Pipe, Centrifugally Cast</td>
</tr>
<tr>
<td>AWWA C210</td>
<td>Liquid-Epoxy Coatings and Linings for Steel Water Pipe and Fittings</td>
</tr>
<tr>
<td>AWWA C508</td>
<td>Swing-Check Valves for Waterworks Service, 2-In. through 24-In. (50-mm through 600-mm)</td>
</tr>
<tr>
<td>AWWA C550</td>
<td>Protective Interior Coatings for Valves and Hydrants</td>
</tr>
<tr>
<td>AWWA C600</td>
<td>Installation of Ductile Iron Water Mains and their Appurtenances</td>
</tr>
</tbody>
</table>

5. City of Miami Beach Code of Ordinances

6. Florida Administrative Code (FAC)

7. Florida Building Code

8. International Organization for Standards (ISO)

   ISO 8179    | Ductile Iron Pipes, Fittings, Accessories and their Joints – External Zinc-Based Coating |

9. Miami-Dade County Code of Ordinances
10. Miami-Dade Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM) Regulations

11. Occupational Safety and Health (OSHA) Regulations

12. Society for Protective Coatings (SSPC)
   
   **SSPC-PA 2** Procedure for Determining Conformance to Dry Coating Thickness Requirements

13. Ten State Standards

B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.
   
   Section 1. Design Standards and Guidelines
   
   Section 8. Surveying, Drawing, and Drafting Requirements
   
   Section 9. Erosion and Sediment Control
   
   Section 10. Earthwork and Roadwork
   
   Section 13. Concrete
   
   Section 16. Sanitary Sewer Gravity Collection System

1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/ or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.
E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.03 SUBMITTALS

A. Minimum criteria are presented in this Section and the following Standard Details. Sanitary sewer force mains and pump stations, including associated disciplines as required (civil, structural, electrical, instrumentation, HVAC, etc.) shall be designed by a State of Florida Engineer. Signed and sealed calculations must be provided to support hydraulic and structural design. Signed and sealed buoyancy calculations must also be provided for underground structures.

B. Plans shall be in accordance with Section 8 of the City of Miami Beach Public Works Manual.

C. Properly identified product data for review, including cut sheets for pipe and all other materials used, shall be submitted to the City or designee for review and approval prior to fabrication and/or delivery.

D. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

1.04 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which
may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.

1.05 DESIGN CRITERIA

A. Conflict manholes involving other utilities mains are to be avoided.

B. Discharge from private lift station force mains shall discharge only into an epoxy coated gravity sanitary sewer manhole sewer system.

C. Design criteria evaluation for air release valves will be required for vertical elevation changes of more than two (2) pipe diameters. The City of Miami Beach Public Works Department Engineering Division shall review the flow and elevation changes and the Engineer’s recommendations.

D. Plug valves for isolation of segments of force mains shall be installed at a minimum of every one half (1/2) mile along the force main route.

E. Pipeline Crossings

   1. Sewer mains shall not be laid in the same trench with water mains, stormwater mains, gas lines, fuel lines, or electric cables.

   2. The horizontal, vertical, and joint separation shall be in accordance with Florida Administrative Code (FAC) 62-55.314. Refer to Standard Details 16-1, 16-2, and 16-3.

PART 2 – PRODUCTS

2.01 SIZE AND MATERIAL LIMITATIONS

A. The minimum pipe size of any public force main shall be four (4) inches in diameter unless otherwise approved by the City of Miami Beach Public Works Department in writing, on a case-by-case basis.

B. Polyvinyl Chloride (PVC) pipe.

   PVC sanitary sewer force shall meet the following AWWA specifications:

   (1) AWWA PVC C900, DR14 for pipe diameters 4” through 14”.

   (2) AWWA PVC C905, DR 25 for pipe diameters 16” and greater.

C. High Density Polyethylene (HDPE) pipe as specified below.

D. Ductile Iron (DI) pipe as specified below.
E. No galvanized or lead pipe is allowed.

F. No concrete pipe is allowed.

2.02 DUCTILE IRON (DI) PIPE

A. The exterior of all DI pipe shall be zinc-coated and poly-wrapped in accordance with AWWA C105.

B. DI pipe shall be centrifugally cast in metal molds or sand lined molds in accordance with AWWA C151 of grade 60-42-10 ductile iron. The above standard covers ductile iron pipe with nominal pipe sizes from 3 inches up to and including 64 inches in diameter.

C. Unless otherwise specified, the minimum pipe thickness per AWWA C151 for the following pipe sizes is shown below. Flanged (FLG) pipe shall not be less than Class 53 as identified in Table 50.15 of AWWA C150-91.

<table>
<thead>
<tr>
<th>PIPE MATERIAL</th>
<th>NOMINAL PIPE DIAMETER (INCHES)</th>
<th>CLASS</th>
<th>TYPE OF JOINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI</td>
<td>4 thru 12</td>
<td>52</td>
<td>MJ or PO</td>
</tr>
<tr>
<td>DI</td>
<td>14 thru 54</td>
<td>51</td>
<td>MJ or PO</td>
</tr>
<tr>
<td>DI</td>
<td>All</td>
<td>53</td>
<td>FLG</td>
</tr>
</tbody>
</table>

D. Depending on design conditions, the City may opt to conform to standard pressure classes AWWA C151 for the following pipe sizes. The pressure class specified is the minimum permitted.

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER (INCHES)</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 thru 12</td>
<td>350</td>
</tr>
<tr>
<td>14 thru 24</td>
<td>250</td>
</tr>
<tr>
<td>30 thru 54</td>
<td>150</td>
</tr>
</tbody>
</table>

2.03 HIGH-DENSITY POLYETHYLENE (HDPE) PIPE

A. HDPE for force mains shall be high molecular weight. The resin material shall have a standard PE code designation of PE 4710. The pipe shall contain no recycled compound except that generated in the manufacturer’s own plant from resin of the same specification from the same raw material pipe. The pipe shall be homogeneous throughout and free of visible cracks, bubbles, holes, foreign inclusions, or other
injurious defects. It shall be uniform in color, capacity, density, and other physical properties.

B. The pipe shall conform to either Iron Pipe Size (IPS) or DIPS standard dimensions. A standard dimension ratio (SDR) of 11 shall be used whenever available. Approval from the City of Miami Beach Public Works Department is required for any pipe with a proposed SDR greater than 11 (i.e., wall thickness is reduced).

C. All HDPE pipe shall be color coded for the intended service. The color coding shall be permanently coextruded on the pipe outside surface as part of the pipe's manufacturing process. Painting HDPE pipe to accomplish color coding is not permitted. Color coding shall be as follows:

1. Sewer - green

D. HDPE pipe shall be marked either continuously or on intervals not to exceed five (5) feet by indirect printing with the following information:

1. Name and/or trademark of the manufacturer.
2. Nominal pipe size.
3. Dimension ratio (DR).
4. The letters PE followed by the polyethylene grade per ASTM D1248, followed by the Hydrostatic Design basis in 100's of pounds per square inch (psi).
6. Production Code from which time and date of manufacture can be determined.

E. HDPE fittings shall be manufactured to the requirements of ASTM D3261 and fabricated fittings shall be manufactured from pipe of at least one SDR heavier pipe than the system piping and shall be pressure rated to match the system piping. The butt fusion outlets of fabricated fittings shall be machined to the same SDR as the system piping to which they are to be fused.

F. HDPE pipes and fittings shall be joined one to another by thermal butt fusion, saddle fusion, or socket fusion in accordance with procedures recommended by the pipe manufacturer and as outlined in ASTM D2657. The manufacturer shall provide fusion training services to the Contractor upon request.

G. Butt fusion joining of unlike SDRs shall not be permitted. Transition from one SDR to another shall be accomplished by the use of mechanical couplings or a transition nipple, which is a short length of the heavier SDR pipe with one end machined to the lighter SDR.
H. All HDPE pipe installed via open cut installation shall have a #12 copper wire laid along with the pipe and attached to a terminal with a cast iron lid that maintains continuity of signal and allows for magnetic location of the pipe in the future.

2.04 FITTINGS AND JOINTS

A. Fittings shall be manufactured in accordance with AWWA C110 for nominal pipe sizes 3 inches to 64 inches and shall be either flanged or mechanical joint. Any other fittings, not included in AWWA C110, shall conform in design and performance to the requirements of this Section.

B. Unless otherwise specified, the ductile iron fitting minimum thickness is defined in Section 2.02C. Flanged (FLG) fittings shall not be less than Class 53 as identified in Table 50.15 of AWWA C150-91.

C. Depending on design conditions, the City may opt to conform to standard pressure classes AWWA C151 as defined in Section 2.02D.

D. Flanged pipe shall only be allowed on above ground applications and shall not be allowed in underground applications.

E. Mechanical and push-on type joints shall be in accordance with AWWA C111.

F. Fittings shall be provided with flanges having a bolt circle and bolt pattern the same as the adjacent pipe and/or mechanical devices.

G. No raised face flanges shall be used. The raised faces shall be milled flat.

H. Flange gaskets shall be full face neoprene rubber. Gasket material (push-on) mechanical joint, gasket restrained shall be neoprene.

2.05 PIPE AND FITTING COATINGS

A. A coating of rust inhibitive primer shall be applied to the ductile iron pipe exterior prior to shipment for piping that is above ground and exposed piping within vaults.

B. For buried service, the piping manufacturer’s standard asphaltic coating shall be applied prior to shipment to the exterior wall of buried DI pipes and fittings in accordance with AWWA C151.

C. Zinc Basecoat: The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 grams per square meter (g/m²) of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils. The coating system shall conform in every respect to
ISO 8179, Part 1. Ductile iron fittings shall also have a zinc protective coating sprayed on at the factory at a minimum of 3 mils.

D. Poly Wrap

1. All DI pipes and fittings shall be poly wrapped conforming to the requirements of AWWA C105 and shall have an 8-mil minimum thickness.

2. Due to the high salinity content of the groundwater, or if corrosive soils are encountered, the City may require the use of V-Bio Enhanced Polyethylene Encasement to protect the ductile iron main, fittings, and valves. All ductile iron pipe and fittings shall be wrapped with the V-Bio Polyethylene Enhanced Encasement and have the zinc protective coating factory applied. The V-Bio Polyethylene Enhanced Encasement shall be accordance with AWWA C600 and AWWA C105. Color shall be green for sewer. Polyethylene encasement for use with ductile iron pipe systems shall consist of three layers of co-extruded linear low-density polyethylene (LLDPE), fused into a single thickness of not less than 8 mils. The inside layer of the polyethylene wrap to be in contact with the pipe exterior shall be infused with a corrosion inhibitor and antimicrobial biocide to control galvanic corrosion. Product: V-Bio, or approved equal.

3. Polyethylene encasement for ductile-iron pipe shall be supplied as a flat tube meeting the dimensions of Table 1 in AWWA C105 and shall be supplied by the ductile iron pipe manufacturer. Plastic adhesive tape shall consist of polyolefin backing and adhesive which bonds to common pipeline coatings including polyethylene. Products: Canusa Wrand Tape; Tapecoat H35; Polyken 934; AA Thread Seal Tape, Inc.; or approved equal.

E. The interior of all ductile iron pipes and fittings shall be lined with an epoxy lining. The epoxy lining shall be Protecto 401 Ceramic Epoxy as manufactured by the Protecto Division of Vulcan Painters, Inc. All DI pipe and fittings shall be lined with a minimum dry film thickness of 40 mils, except for the gasket groove and spigot end up to six (6) inches back from the end of the spigot which shall be lined with ten (10) mils of the material. All ductile iron pipe and fittings shall be checked for dry film thickness in accordance with the Society for Protective Coatings Paint Application Standard No. 2 (SSPC-PA 2). Each pipe joint and fitting shall be marked with the date of application of the lining system and with its numerical sequence of application on that date. The pipe supplier shall furnish a certificate stating that lining applicator has complied with all specification requirements relative to the material, its application, and inspection. Surface preparation, number of coats, application of the lining material, and field touch-up shall be in strict accordance with the lining material manufacturer’s recommendations. During the installation of the pipe, the lining material manufacturer shall provide the services of a field engineer to instruct and demonstrate to the Contractor’s personnel the procedure for the field touch-up of lining where field cuts and taps were required. Holiday inspection shall be conducted using test equipment described in AWWA C210, Section 5.3.3.1. In
accordance with coating manufacturer’s recommendation, holiday testing may be conducted any time after the coating has reached sufficient cure.

2.06 RESTRAINING

A. Unless otherwise indicated, all below ground fittings 30-inches in diameter and greater shall be provided with manufacturer proprietary restrained joints.

B. Underground ductile iron fittings for DI pipe 24 inches in diameter and less shall be restrained mechanical joint fittings.

C. All fittings and specific pipe joints shall be restrained as outlined below (NO SUBSTITUTIONS). MEGABOND coating system shall be provided for all EBAA products.

<table>
<thead>
<tr>
<th>JOINT</th>
<th>RESTRAINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push-On DI pipe 3-inch to 48-inch</td>
<td>TR-Flex by U.S. Pipe or Flex Ring by American; or EBAA Iron Series 1700 Megalug</td>
</tr>
<tr>
<td>Fitting with DI pipe</td>
<td>EBAA Iron Series 1100 Megalug</td>
</tr>
</tbody>
</table>

D. Minimum length of pipe to be restrained shall be in accordance with DIPRA Thrust Restraint Design for Ductile Iron Pipe, latest edition.

E. Thrust blocks are not allowed unless specially approved by City of Miami Beach Public Works Department Engineering Division in writing.

2.07 AUTOMATIC AIR RELEASE VALVES (ARVS)

A. The body of these valves shall be conical shaped to maintain maximum air gap with the spring-loaded float and seal plug connection combining to ensure no contact between the sewage and the seal.

B. The valve shall have a double float design with the upper float being enclosed in the upper section of the valve and shall be made of foam polypropylene. The lower float shall be in the main body of the valve and shall be constructed of foam polypropylene.

C. The body, cover flange, and lower flange shall be constructed of reinforced nylon, and shall have a funnel shaped lower body to automatically drain sewage back into the system.

D. All internal metal parts are to be made from corrosion resistant 316 stainless steel produced in America, with all operating parts, in the upper and lower sections, to be non-metallic plastic/rubber materials.
E. The hinge for operation for the opening and closing of the seal on the orifice shall be made of EPDM rubber.

F. The rolling resilient seal shall provide smooth positive opening, closing, and leak free sealing over the fluctuation of pressure differentials.

G. The lower bowl of the ARV shall be funnel shaped to assure the raw sewage to run back into the pipe.

H. All hardware shall be of stainless steel 316 produced in America bolts and nuts, and the entire valve, except to upper outlet, shall be constructed of reinforced nylon material.

I. All valves shall be equipped for backflushing maintenance with easy connection or disassembly.

J. Valves with a total weight of more than 10 pounds shall be anchored to relieve the excessive weight to the saddle and pipe. Those valves weighting less than 10 pounds will not be required to be anchored.

K. The ARV shall be no taller than 19-inches. The connection on all pipelines shall be the following sizing with an isolation valve of the same size:

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER</th>
<th>CONNECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-inch and smaller</td>
<td>2-inch threaded</td>
</tr>
<tr>
<td>10-inch thru 16-inch</td>
<td>3-inch flange/threaded</td>
</tr>
<tr>
<td>18-inch and larger</td>
<td>4-inch flange/threaded</td>
</tr>
</tbody>
</table>

L. All air and vacuum combination release valves shall be ARI Model D-025P, or approved equal.

M. Smith Blair 317 series stainless steel tapping saddle shall be used, or approved equal.

N. Size of valve shall be calculated to meet the required flow/design conditions.

2.08 PLUG VALVES

A. Plug valves shall be of the non-lubricated, eccentric seating plug type with synthetic rubber-faced plugs. All valves shall be provided with limit stops and rotate 90° from fully open to fully shut. The minimum working pressure for all valves shall be 150 psi for valves through 36-inch, and the test pressure shall be at least 270 psi for valves up through 12-inch and at least 230 psi for valves 14-inch and larger. Plug valves located at the discharge end of a pump station shall have a 100 percent port area. Plug valve 6-inch and smaller with an 80 percent minimum port area are acceptable only at locations
away from lift stations. Plug valves 8-inch and larger shall be full opening with 100 percent port area. Plug valves, 8-inch and smaller shall be designed for operation in a horizontal pipeline with the valve shaft in a vertical position. Plug valves larger than 8-inch shall be designed for operation in a horizontal pipeline, with the valve shaft in a horizontal position and the operating shaft in a vertical position. The plug valves shall be as manufactured by DeZurik Company, Pratt, Kennedy, or equal as approved by the City, and shall be the standard product of a manufacturer which has produced and sold such equipment for a period of at least five (5) years. Valves shall be suitable for buried, submerged service.

B. All buried valves shall have mechanical joint ends (unless otherwise shown), conforming to AWWA C111, and shall be operated with a standard AWWA 2-inch square nut through a totally enclosed worm gear actuator.

C. Unless otherwise required, all exposed valves 4-inches in diameter and larger shall have flanged ends conforming to ANSI B16.1-125/150-pound standard with face-to-face dimensions of standard plug valves. Valves smaller than 4 inches in diameter shall have screwed ends, unless otherwise noted.

D. Valves shall be bolted bonnet deign and be provided with lever operators for interior and exposed service with nominal pipe sizes six (6) inches and less.

E. Interior and expose service with nominal pipe sizes eight (8) inches and larger shall be provided with totally enclosed worm gear actuators. The actuators shall be properly sized to suit the maximum differential across the valve.

F. For buried or submerged service, valves shall be provided with an AWWA operating nut. Valves with nominal pipe sizes eight (8) inches and larger shall have permanently lubricated total enclosed worm gear actuators.

G. The manufacturer shall certify that the plug valves are capable of operating in continuous duty service under these pressures and flow conditions.

H. Each valve shall by hydrostatically tested and tested for bubble tightness after the operator has been mounted and adjusted. Copies of the hydrostatic and leakage test certification and certification of conformance shall be provided to the City or designee.

I. All internal and external ferrous components and surfaces of the valves, with the exception of stainless steel and finished or bearing surfaces, shall be shop painted with two coats (10 mils min. dry film thickness) of the manufacturer's premium epoxy for corrosion resistance. Damaged surfaces shall be repaired in accordance with the manufacturer's recommendations.
2.09 **CHECK VALVES**

A. Check valves shall be outside lever-and-weight or outside lever-and-spring type, in accordance with AWWA C508, full-opening; designed for a working pressure of 150 psi unless otherwise required and shall have a flanged cover piece to provide access to the disc. Corrosive ferrous surfaces of valves, 4-inch and larger, which will be in contact with sewage, shall receive a fusion-bonded epoxy coating conforming to AWWA C550.

B. Body: The valve body shall be of cast iron to ASTM A126, with flanged ends to ANSI B16.1, or mechanical joint ends, as required.

C. Disc: The valve disc shall be of cast iron, ductile iron, or bronze to ASTM B62.

D. Seat and Rings: The valve seat and rings shall be of bronze to ASTM B92 or B148, or of Buna-N.

E. Hinge Pin: The hinge pin shall be 316 stainless steel.

F. Suppliers, or equal as approved by the City: DeZurik, Clow/M&H/Kennedy, Golden Anderson, Mueller.

2.10 **VALVE BOXES**

A. Valve boxes shall be made from Class 30B gray iron in accordance with ASTM A48.

B. The letter “S” shall be cast in the cover for sewer force mains.

C. Bottom of cover and seat of frame shall be machined to provide a uniform contact surface.

D. The boxes shall be of such length as will be adapted, without full extension, to the depth of cover required over the pipe at the valve location.

E. All service valve boxes shall be No. 52, and all Main valve boxes shall be No. 53 regardless of the size.

F. No. 52 valve boxes shall be U.S. Foundry 7605 ring and FB cover, or approved equal.

G. No. 53 valve boxes shall be U.S. Foundry 7635 ring and FJ cover, or approved equal.

2.11 **KAMLOCK**

A. Emergency pump out connections shall be minimum six (6) inch diameter “Kamlock” plug and coupler (female end for sanitary sewer) with dust cover which includes a 316 stainless steel chain to secure cover.
2.12 PUMP STATIONS, GENERAL

A. The station will be designed to meet OSHA, Ten State Standards, and RER-DERM requirements. The station will be comprised of the major following elements:

1. Wet well and valve pit or wet well-dry well
2. Submersible pumps and motors or dry pit pumps and motors
3. Control panel
4. Paved parking area and access, as permitted by site constraints
5. Emergency pump out connection (Kamlock)
6. Electrical service and meter
7. Security fence with gate, as permitted by site constraints
8. Telemetry system and antenna
9. Pressure transducer (for pump stations 25 horsepower [hp] and larger)
10. Flow meter with vault (for pump stations 25 hp and larger)

B. A permanent on-site generator must be provided for all critical pump stations. Critical pump stations are those that require a standby generator due to discharge to a force main size equal to or greater than 12 inches and/or the station repumps upstream stations.

C. For those pump stations without a permanent on-site generator, a GENSET plug shall be provided on the control panel. Location of receptacle on control panel side with best accessibility for portable GENSET. Receptacle cap shall be watertight. The emergency power receptacle shall be as follows:

   APPLETON, Product: AR40044RS 400A 4W4P

D. The entire pump station parcel is to have a 6-inch-thick concrete pad on top of 12 inches (12") of compacted subgrade, compacted to 98% of the maximum density per AASHTO Specification No. T-180. Subgrade is to have a minimum load bearing ratio (LBR) of 40.

E. All pump stations shall pump into adequately sized force mains with velocities not to exceed 8 feet per second which transmit the flow to the appropriate wastewater treatment facility.

F. A six (6) foot high chain link site perimeter fence shall be provided, as allowed by City of Miami Beach and Miami-Dade County codes. The mesh shall be green vinyl fusion-bonded chain link with green aluminum slats each way, pursuant to City of Miami Beach
and Miami-Dade County codes. Alternate screening methodologies may be submitted for review and approval.

G. Fence access gate into the site shall be 14 feet wide roll gate with locking hasp suitable for padlock. Driveway between pump station and road to be 16 feet wide.

H. Pump station shall be provided with a 12-inch wide by 18-inch-high identification sign using the three (3) inch high reflective letters Futura font, and should be designed to resist fading with the following information:

*City logo*

Pump Station No. ___

(Red) Emergency Call: 305-673-7625

I. All concrete associated with the pump station shall be 4,000 psi or greater at 28 days and shall have admixtures as required protect concrete from the corrosive effects of the raw sewage and hydrogen sulfide.

J. Wet well to be a minimum of eight (8) feet in diameter and conform to ASTM C478 for precast concrete manholes with eight (8) inch thick walls (minimum).

K. Use 316 stainless steel produced in America for all metal hardware inside in the valve pit and wet well.

L. Paint exterior of the valve pit and wet well with two (2) coats of Koopers Bitumastic No. 300M alternate color. (Dry thickness of eight (8) mils thick per coat.)

M. Interior of wet well shall be with a 100% solids hydrogen sulfide resistant epoxy coating system, subject to review and approval by the City or designee.

N. Security light shall be mounted on a ten (10) foot corrosion proof metal pole with a red alarm light on top. Mounted on the pole shall be an on-off switch enclosed in a NEMA 4x enclosure located 42 inches above grade.

O. Provided a lightning arrester for the control panels.

P. Provide two (2) inch diameter water service to pump station with one (1) inch hose bib and back flow preventer with tamper resistant housing.

2.13 ODOR CONTROL

A. All submersible pump stations shall have a minimum 6-inch diameter DI pipe vent with activated carbon vent cover, Polylok or equal, installed above flood elevation.

B. At the request of the City, some pump stations may be required to have odor control systems. Depending on pump station conditions, odor emission, and proximity to residents or businesses a Vapex Nano or Biorem odor control systems shall be
provided. Vent size shall be calculated according to size of pump station and design flow rates.

2.14 SUBMERSIBLE PUMPS

A. All typical submersible pump stations shall have at least two (2) centrifugal pumps, one primary and one backup. Proposed pumps shall be installed within a minimum 8 feet diameter wet well. Well depth shall be selected as to provide adequate operating volume to assume that the manufacturer’s allotted maximum number of pump starts per hour is not exceeded. Control volumes shall also be managed to allow for a minimum of 2 to 3 starts per hour to prevent septic conditions from occurring.

B. Pump shall be totally submersible, non-clogging, electrically operated, designed specifically for use in municipal wastewater applications and capable of handling raw unscreened sewage. Pump shall be Flygt/Xylem, ABS, or as otherwise approved by the City.

C. The pump discharge elbow connection for all submersible pumps shall be metal to metal connection capable of accepting Flygt/Xylem CP or NP pump models. The base elbow shall be a product of the pump manufacturer and not a third-party fabricator.

D. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring, or profile gasket shall not be acceptable.

E. Top slab shall be minimum 12-inch thick reinforced with aluminum hatch per Section 2.16.

F. Pump stations are to be designed to have a primary pump in operation and to alternate the start between pumps.

2.15 HATCHES

A. Access hatches, frames, and covers shall be heavy-duty aluminum with stainless steel hinges and bolts, capable to resist an occasional AASHTO H-20-44-wheel load per AASHTO M-306. Watertight hatches may be required depending on the application, as determined by the Engineer, or as required by regulatory agencies. Hatches rated for pedestrian loads are not accepted.

B. The hatches shall be equipped with spring-loaded covers for easy opening, 90-degree hold-open arms, handgrips, and safety chains. Access hatches shall be furnished with a stainless-steel hasp for padlocking. All hardware shall be American Iron and Steel Institute (AISI) Type 316 stainless steel produced in America.
C. The aluminum shall conform to ASTM B209 and shall be Aluminum Association (AA) Designation 6061-T6. Aluminum sheets and plates shall be alloy 5086-H116 conforming with the standards of ASTM B209.

D. After forming and welding operations, and before assembly, each piece of aluminum shall be finished (anodized) in accordance with Aluminum Association Designations: AA-M10C11C21A41, with minimum 0.8 mil coating.

E. The area in contact with concrete to be painted with self-priming bituminous coating, with a minimum solid content of 68% by volume following ASTM D4.

2.16 CONTROL PANEL AND EQUIPMENT

A. City of Miami Beach Building Department is to review, approve, and inspect electrical portion of the pump and controls.

B. Panel to be free-standing NEMA 4x, type 316 stainless steel (produced in America) enclosure for outdoor duty.

C. Per RER-DERM requirements, bottom of control panel elevation shall exceed the following criteria:
   1. 100-year flood elevation + 1 foot + sea level rise (SLR) for non-critical pump stations
   2. 100-year flood elevation + 2 foot + SLR for critical pump stations
   3. Critical pump stations are those that require a standby generator due to discharge to a force main size equal to or greater than 12 inches and/or the station repumps upstream stations.

D. Control panel shall include:
   1. Main circuit breaker disconnect
   2. Combination circuit breaker type
   3. NEMA rated motor starters, 240 volt (V) or 480 V, 3 phase, depending on pump size
   4. 120V ground fault receptacle
   5. Wireless telemetry system
   6. Per RER-DERM requirements, the following elapsed time clocks (at a minimum, more require clocks if more pumps in station) shall be provided:
      a. Pump 1 running
      b. Pump 2 running
c. Pump 1 and Pump 2 running simultaneously

d. Pump 1 running 1-5AM

e. Pump 2 running 1-5AM

E. Provide wireless telemetry system for remote indication of:

1. Pump 1 running
2. Pump 1 in AUTO
3. Pump 1 alarm
4. Pump 2 running
5. Pump 2 in AUTO
6. Pump 2 alarm
7. Wet well high level alarm
8. Wet well low level alarm
9. Wet well level (if a level transducer is provided)
10. LCP intrusion alarm
11. Pump station discharge header pressure (if pressure transducer is provided)
12. Pump station discharge flow rate (if flow meter is provided)
13. Pump station discharge total flow (daily running total) [if flow meter is provided]
14. Pump station discharge total flow (previous 24 hours) [if flow meter is provided]
15. Power fault
16. Power loss
17. Generator operating (if a generator is provided)
18. Generator cool down (if a generator is provided)
19. General fuel tank level (if a generator is provided)

F. All required telemetry conduits shall be installed on PVC conduit 2-inch diameter Schedule 40.
G. Telemetry to have uninterruptible power supply (UPS) system.

H. Control system shall be operated with a submersible level transducer in normal operation with backup float switches with a minimum of five (5) floats.

I. Operation of Pump Stations: The pump station shall be operated based on the following five level control points. The low level all pumps off and high level all pumps on shall be float operated. Pumps off, lead pump on, and lag pump on shall be level transducer controller. Three additional floats shall be installed to meet these operating points should the level transducer fail to operate. Manual switch shall be provided to toggle between level transducer and float control.

1. Low water cut off point elevation
2. Pumps off point elevation
3. Lead pump start point elevation
4. Lag pump start point elevation
5. High water alarm point elevation

PART 3 – EXECUTION

3.01 PREPARATION

A. Permits: The Contractor shall obtain all required right-of-way, City Building Department, and regulatory permits prior to commencing any work.

B. Maintenance of traffic (MOT) shall be provided by the Contractor in accordance with Section 1 of the City of Miami Beach Public Works Manual.

C. Flow Control

1. Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the manhole or sewer pipe under construction.

2. Plugging and blocking of flow: A sewer line plug shall be inserted into the line at a manhole upstream from the section where work will be occurring. The plug shall be so designed that all or any portion of the sewage flows can be released. During the inspection, testing, and replacement portion of the construction, flows shall be shut off or substantially reduced as indicated by the City. The upstream manholes shall be constantly monitored for degree of surcharging. After the testing, inspection, or repair is complete, flows shall be restored to normal level.
3. Pumping and bypassing of flow: Wherever lines are blocked off and the possibility of backing up the sewage and causing harm to public and private property is foreseen, it shall be the Contractor's responsibility to bypass flow from manhole to manhole.

D. Sewer Bypass Pumping

1. Sanitary sewer flows shall be controlled through the section of pipeline and pump stations where work is being performed. Under no circumstances can portions of the system be removed from service for periods of time in excess of that approved by the City of Miami Beach Public Works Department.

2. The Contractor shall be responsible to assess conditions and capacities of the existing sewer lines and pump stations, in coordination with City of Miami Beach Public Works Department, and accommodate the flows in the project workplan in order to implement an acceptable bypass pumping plan at no additional cost to the City.

3. Bypass pumping will be required for all sewers and pump station reconstruction that would result in shutdown of existing facilities. The Contractor shall supply the necessary pumps, conduits, and other equipment to not only divert flow around the pump station, manhole, or section of pipe in which work is to be performed, but also to transmit the flow in downstream sewer lines and/or pump stations without surcharge.

4. The bypass systems shall be of sufficient capacity to handle existing flows plus additional flows that may occur during periods of high tide or rainfall. In addition to the primary bypass pumping system emergency backup pumping capability, such as a vacuum truck with minimum capacity of 1,000 gallons, must be available within one (1) hour in case of emergency.

5. The Contractor shall be responsible for furnishing the necessary labor, power (including Florida Power & Light [FPL] temporary power as warranted), and supervision to set up and operate the pumping and bypass systems.

6. All bypass pumping units shall incorporate sound attenuated enclosures and utilize hospital grade silencers where generators are required to comply with the noise requirements of City of Miami Beach Code of Ordinances, Chapter 46, Article IV.

7. Contractor shall have personnel present at all times during bypassing operation. Bypassing in the roads or within pedestrian traffic areas shall not result in or pose a hazard to pedestrians or traffic.

E. Pre-Shutdown Inspections
1. The following requirements apply to shutdowns for all non-emergency work. These requirements may be waived at the sole discretion of the City of Miami Beach Public Works Department for emergency work.

2. Shutdowns must be scheduled with the City one (1) week in advance.

3. Prior to the shutdown for tie in of any sewer mains, the City shall perform an on-site inspection in order to verify the following:
   a. Size of pipe
   b. Materials on-site

4. If this inspection does not occur or parts are missing, the shutdown will be canceled.

5. City shall be provided with a minimum of 48 hours notice for pre-shutdown inspection.

6. All shutdowns shall occur at night.

7. The City can, at any time, cancel scheduled shutdowns due to inclement weather events and/or special events.

3.02 INSTALLATION OF PIPES AND APPURtenANCES

A. All ductile iron pipes shall be installed true and straight in accordance with AWWA C600. Allowable pipe deflection shall not exceed 50% of the maximum deflection, as recommended by the pipe manufacturer.

B. Detector Tape: All pipes shall have 3-inch-wide metal green detector tape for force mains. The words “CAUTION FORCE MAIN BURIED BELOW” on the upper side of the pipe shall be printed at 30-inch intervals along the tape. Tape shall be placed 18 inches below grade above all force mains or as recommended by manufacturer. Non-metallic tape shall be used above ductile iron pipe.

C. All HDPE pipe shall be furnished and installed with tracer wire. Special care in handling shall be exercised during delivery, distribution, and storage of tracer wire to avoid damage and unnecessary stresses. Damaged tracer wire will be rejected and shall be replaced at the Contractor’s expense. The tracer wire shall have water-blocking characteristics, be corrosive resistant, and have UV protection. The tracer wire shall be copper or copper clad steel with polyethylene insulation and core material of woven polyester and water blocking polyester yarns. The wire shall have an outer jacket of high-density polyethylene. The wire shall be HDD-CCS PE45 as manufactured by Pro Trace; or Soloshot EHS by Copperhead Industries, or approved equal. Manufacturer/distributor furnished water-blocking connectors and locate clip shall be used as needed. Wire to be strapped to pipe at maximum 10 feet intervals, and the wire...
is to be brought up at each valve box, leaving and excess length of four (4) feet of wire coiled at each valve. Refer to Standard Detail for additional information. At the force main pressure test, a continuity test shall be performed by the Contractor. The continuity test shall be witnessed and approved by the City’s Representative and Engineer of Record.

D. Bedding and initial backfill shall be in accordance with City of Miami Beach Public Works Manual Section 10 and Standard Detail 16-4 for DI pipe.

E. DI pipe shall be laid with minimum vertical cover of 48 inches.

F. Vertical cover 36 inches to 48 inches below finish grade may be approved on a case-by-case basis by the City of Miami Beach Public Works Department.

G. For vertical cover 30 inches to 36 inches below finish grade, use ductile iron pipe Class 53.

H. For vertical cover less than 30 inches below finish grade, use concrete slab as per Standard Detail 16-7; use of this Standard Detail requires written approval from the City of Miami Beach Public Works Department.

I. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the stormwater-line materials be dropped or dumped into the trench.

J. Care shall be taken to avoid abrasions of the pipe coating. Except where necessary in making connections with other lines, pipe shall be laid with the bells facing in the direction of laying. Defects in coating are to be field repaired.

K. The full length of each section of pipe shall rest solidly upon the completed pipe bed, with recesses excavated and shaped to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and re-laid.

L. City oversees connection between the old and new pipes and all wet taps on existing piping. ALL TAPS MUST BE WITNESSED BY THE CITY. Size-on-size taps are not allowed unless approved in writing by the City of Miami Beach Public Works Department. Tapping sleeve glands shall be tested and pass a pressure test of 100 psi for two (2) hours before the pipe is tapped.

M. CITY TO OPERATE ALL EXISTING VALVES. VALVES BETWEEN EXISTING AND NEW WORK SHALL BE OPERATED BY CITY PERSONNEL. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR’S PERSONNEL OPERATE ANY SUCH GATE OR VALVE.
3.03 SETTING OF VALVES AND BOXES

A. Install where shown or specified and set plumb. Valve boxes shall be centered on the valves and set plumb at finish grade. Boxes shall be installed over each plug valve unless otherwise shown.

B. Where feasible, valves shall be located outside the area of roads and parking. Earth fill shall be carefully tamped around each valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet.

C. There shall be a valve at all branches, tees, and crosses. Valve shall have the top of the operating nut located at maximum of 12 inches below the finished grade.

D. Valve boxes shall have a 24-inch by 24-inch by 8-inch reinforced concrete collar surrounding it in accordance with Standard Detail 16-9.

3.04 INSTALLATION OF ACCESS PITS AND MANHOLES FOR VALVING

A. Location of check valves and plug valves inside the vault pit shall be staggered. Check levers shall be on the inside. Plug valves shall have hand wheels. Provide a minimum of one (1) foot horizontal, one (1) foot vertical distance from piping to bottom interior of pit walls. Install a 2-1/2 inch liquid-filled pressure gauge on each check valve with 1/2-inch 316 stainless steel (produced in America) isolation valve, diaphragm protection seal, and NPT 316 stainless steel fittings (produced in America).

B. Air release valves are to be located in manholes or access pits large enough to allow maintenance of the equipment.

C. Valve pits that are adjacent to wet wells shall be drained to wet well with a two (2) inch PVC pipe with rubber ring compression joints. PVC shall be sloped, with a “P” trap inside the wet well.

D. Access hatches shall be provided per Section 2.16.

E. Ladders shall be provided for all vault pits.

3.05 AERIAL CROSSINGS

RESERVED

3.06 INSTALLATION OF PUMP STATION

A. Install pumps and equipment in accordance with manufacturer’s printed specifications.

B. The last run of sewer main between the receiving manhole and the wet well shall be DI pipe.
C. Valves and piping shall be supported with concrete supports.

D. All wall openings around pipes are to be sealed with non-shrink grout. Use of link seals for pipe wall penetrations is also acceptable.

3.07 FLUSHING AND TESTING

A. Force mains shall be cleaned and flushed prior to pressure testing, with sufficient pressure to displace all test water and to remove sand, mud, or other deposits. If necessary, other approved methods must be used to ensure the removal of all such deposits. Water used shall be metered and paid for by the Contractor.

B. Mains shall be tested as a whole or in sections between line valves, unless otherwise specified or approved by the City. Unless otherwise approved by the City, the total length of pipe for any single test shall not exceed 2,000 feet.

C. The complete force main system shall be pressure tested. The pressure test shall be for two (2) hours at 100 psi minimum test pressure in accordance with AWWA C600. No more than five (5) psi drop over the duration of the test. Final approval will be based on leakage test results. The maximum allowable leakage shall be determined by following AWWA formula:

\[
L = \frac{S \times D \times \sqrt{P}}{148,000}
\]

Where:
- D = Pipe diameter in inches
- S = Length of lines in lineal feet
- P = Average test pressure in psi
- L = Allowable leakage for system in gallons per hour

The pressure test shall be witnessed by a representative of the City of Miami Beach Public Works Department and the Engineer of Record or his/her representative.

3.08 PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.

3.09 AS BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.
STANDARD DETAILS

Standard Details for sanitary sewer force mains and pump stations are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself with all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 16-1  VERTICAL SEPARATION AND JOINT SPACING AT CROSSING
DETAIL 16-2  HORIZONTAL SEPARATION FOR PARALLEL MAINS
DETAIL 16-3  EXCEPTIONS TO MINIMUM SPACING REQUIREMENTS
DETAIL 16-4  TYPICAL TRENCH SECTION FOR DIP
DETAIL 16-5  UTILITY CROSSING DETAIL
DETAIL 16-6  RESERVED
DETAIL 16-7  REINFORCING CONCRETE SLAB FOR GROUND COVER LESS THAN 30 INCHES
DETAIL 16-8  TRACER WIRE DETAIL
DETAIL 16-9  VALVE COLLAR DETAIL AND VALVE BOX INSTALLATION
DETAIL 16-10  NO. 52 VALVE BOX
DETAIL 16-11  NO. 53 VALVE BOX
DETAIL 16-12  POLYETHYLENE ENCASEMENT FOR DUCTILE IRON PIPES AND FITTINGS
DETAIL 16-13  RESTRAINING DETAIL
DETAIL 16-14  RESTRAINING SECTION
DETAIL 16-15  RESTRAINING SCHEDULE
DETAIL 16-16  FORCE MAIN ENTERING MANHOLE
DETAIL 16-17  AUTOMATIC AIR RELEASE VALVE
DETAIL 16-18  PUMP STATION NOTES
DETAIL 16-19  SUBMERSIBLE PUMP STATION PUMP DATA
DETAIL 16-20  WET WELL AND VALVE PIT PLAN
DETAIL 16-21  WET WELL AND VALVE PIT TYPICAL SECTION
DETAIL 16-22  WET WELL JOINT DETAIL AT BASE
DETAIL 16-23  WET WELL JOINT DETAIL
DETAIL 16-24  VALVE PIT DETAIL AT BASE
DETAIL 16-25  TYPICAL TOP SLAB WALL JOINT
DETAIL 16-26  HOSE BIB DETAIL
CROSSING VERTICAL SEPARATION

**WATER MAIN CROSSING OVER STORMWATER OR SANITARY SEWER GRAVITY MAIN**

6" MIN. OUTSIDE OF PIPE TO OUTSIDE OF PIPE (12" PREFERRED)

**WATER MAIN CROSSING OVER STORMWATER OR SANITARY SEWER FORCE MAIN**

12" OUTSIDE OF PIPE TO OUTSIDE OF PIPE

**WATER MAIN CROSSING UNDER STORMWATER OR SANITARY SEWER GRAVITY OR FORCE MAIN**

JOINT SPACING AT CROSSING

**WATER MAIN CROSSING STORMWATER GRAVITY MAIN OR FORCE MAIN**

3’ MIN.

**WATER MAIN CROSSING SANITARY SEWER GRAVITY MAIN OR FORCE MAIN**

6’ MIN.

NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.
2. MINIMUM SPACING REQUIREMENTS PER FAC 62–555.314.
3. REFER TO 16–3 FOR EXCEPTIONS.
WATER MAIN PARALLEL TO STORMWATER GRAVITY MAIN OR FORCE MAIN

WATER MAIN

3' MINIMUM OUTSIDE OF PIPE TO OUTSIDE OF PIPE

STORMWATER GRAVITY MAIN OR FORCE MAIN

WATER MAIN PARALLEL TO SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

WATER MAIN

6' MINIMUM OUTSIDE OF PIPE TO OUTSIDE OF PIPE (10' PREFERRED) SEE NOTE 2.

SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.

2. GRAVITY SEWER ONLY MAY BE REDUCED TO 3 FEET WHERE BOTTOM OF WATER MAIN IS AT LEAST 6 INCHES ABOVE TOP OF SEWER.

3. MINIMUM SPACING REQUIREMENTS PER FAC 62-555.314.

4. REFER TO 16-3 FOR EXCEPTIONS.
WHERE IT IS NOT TECHNICALLY FEASIBLE OR ECONOMICALLY SENSIBLE TO COMPLY WITH THE REQUIREMENTS OF FAC 62–555.314 (1) OR (2), THE FLORIDA DEPARTMENT OF HEALTH SHALL ALLOW EXCEPTIONS TO THESE REQUIREMENTS IF SUPPLIERS OF WATER OR CONSTRUCTION PERMIT APPLICANTS PROVIDE TECHNICAL OR ECONOMIC JUSTIFICATION FOR EACH EXCEPTION AND PROVIDE ALTERNATIVE CONSTRUCTION FEATURES THAT AFFORD A SIMILAR LEVEL OF RELIABILITY AND PUBLIC HEALTH PROTECTION. ACCEPTABLE ALTERNATIVE CONSTRUCTION FEATURES INCLUDE THE FOLLOWING:

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(A), F.A.C.

WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THE REQUIRED MINIMUM HORIZONTAL DISTANCE FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND JOINTS IN THE WATER MAIN ARE BEING LOCATED LESS THAN THE REQUIRED MINIMUM DISTANCE FROM JOINTS IN THE OTHER PIPELINE:

1. USE OF PRESSURE–RATED PIPE CONFORMING TO THE AMERICAN WATER WORKS ASSOCIATION STANDARDS INCORPORATED INTO RULE 62–555.330, F.A.C., FOR THE OTHER PIPELINE IF IT IS A GRAVITY–OR VACUUM–TYPE PIPELINE;
2. USE OF WELDED, FUSED, OR OTHERWISE RESTRAINED JOINTS FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE; OR
3. USE OF WATERTIGHT CASING PIPE OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE.

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(B), F.A.C.

WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THREE FEET HORIZONTALLY FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND IS BEING LAID LESS THAN THE REQUIRED MINIMUM VERTICAL DISTANCE FROM THE OTHER PIPELINE:

USE OF PIPE, OR CASING PIPE, HAVING HIGH IMPACT STRENGTH (I.E., HAVING AN IMPACT STRENGTH AT LEAST EQUAL TO THAT OF 0.25–INCH–THICK DUCTILE IRON PIPE) OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR BOTH THE WATER MAIN AND FOR THE OTHER PIPELINE IF IT IS NEW AND IS CONVEYING WASTEWATER OR RECLAIMED WATER.
NOTES:

1. UNLESS OTHERWISE SPECIFIED, BEDDING MATERIAL SHALL CONSIST OF COMPACTED WASHED AND GRADED LIMEROCK (3/8"-7/8"), 6" LIFTS.

2. WHERE REQUIRED, SHEETING AND SHORING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS IN THE CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10.

3. WHERE UNSTABLE SOILS ARE ENCOUNTERED, INCLUDING PEAT, MUCK OR OTHER ORGANIC SOILS, ELASTIC SILT AND CLAYS BELOW THE WATER TABLE, A FOUNDATION IS REQUIRED. FOUNDATION MATERIAL SHALL BE SELECT BACKFILL MATERIAL, 2" MAXIMUM SIZE. 6" LIFTS, COMPACTED TO AT LEAST 98% OF MAXIMUM DENSITY DENSITY PER AASHTO SPEC. NO. T-180. EXTEND EXCAVATION AT LEAST 2' DEEPER FOR FOUNDATION UNLESS SUITABLE MATERIAL IS FOUND AT A LESSER DEPTH. DEEPER DEPTHS MAY BE REQUIRED FOR EXTREMELY POOR CONDITIONS.
NOTES:

1. DEFLECTION ANGLE NOT TO EXCEED 50% OF MANUFACTURER’S RECOMMENDED MAXIMUM JOINT DEFLECTION.

2. PIPE CLEARANCES SHALL BE PER FAC AND DETAIL 16-1
NOTES:
1. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

2. FOR PIPE DIAMETER GREATER THAN 30-INCHES, REINFORCING CONCRETE SLAB TO BE DESIGNED BY A STATE OF FLORIDA ENGINEER AND SUBMITTED TO THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT FOR APPROVAL.

3. USE OF THIS STANDARD DETAIL REQUIRES WRITTEN APPROVAL FROM THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT.

4. EXTEND CONCRETE SLAB UNTIL COVER EXCEEDS 30 INCHES.

5. CONCRETE TO BE 3,000 PSI.

6. AIR RELEASE VALVES (ARV) ARE REQUIRED ON SEWER FORCE MAINS ONLY.
TRACER WIRE DETAIL

**NOTES:**

1. TRACER WIRE SHALL BE INSTALLED ON ALL UNDERGROUND HDPE PIPING.

2. THE ENDS OF ALL TRACER WIRES, WHETHER THEY ARE SPLICED, CONNECTED, OR TERMINATED, SHALL HAVE THE LAST THREE INCHES PIG TAILED AS DETAILED HEREON.

3. AFTER INSTALLATION OF THE TRACER WIRE THE SYSTEM SHALL BE SUBJECTED TO TESTING, PRIOR TO BACK FILL, IN ORDER TO ESTABLISH THAT THE SYSTEM IS FUNCTIONAL.

4. THE EXTERNAL COLOR OF THE LOCATE WIRE SHALL FOLLOW THE APWA UNIFORM COLOR CODE AS FOLLOWS:
   - RED: ELECTRIC
   - YELLOW: GAS
   - BLUE: POTABLE WATER
   - GREEN: SEWER OR STORMWATER
VALVE IDENTIFICATION MARKERS (TAG)

1. ENTIRE MARKER TO BE COATED WITH EPOXY ADHESIVE TO PREVENT TARNISHING (1/16" MIN. DFT).
NOTES:

1. USF 7605 RING AND FB COVER.
2. MATERIAL: ASTM—A48 CLASS 30B GRAY IRON.
3. MACHINE FINISH BOTTOM OF COVER AND SEAT OF FRAME.
4. THE LETTER "S" SHALL BE CAST IN COVER FOR SANITARY SEWER FORCE MAINS.
5. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
6. REFER TO DETAIL 16–9 FOR INSTALLATION REQUIREMENTS.
7. ALL SERVICE VALVE BOXES SHALL BE No. 52 VALVE BOXES.
NOTES:
1. USF 7635 RING AND FJ COVER.
2. MATERIAL: ASTM-A48 CLASS 30B GRAY IRON.
3. MACHINE FINISH BOTTOM OF COVER AND SEAT OF FRAME.
4. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
5. THE LETTER "S" SHALL BE CAST IN COVER FOR SANITARY SEWER FORCE MAINS.
6. REFER TO DETAIL 16–9 FOR INSTALLATION REQUIREMENTS.
7. ALL MAIN VALVE BOXES SHALL BE NO. 53 VALVE BOXES REGARDLESS OF SIZE.
CUT THE POLYETHYLENE TUBE 2 FT. LONGER THAN THE LENGTH OF PIPE SECTION. SLIP THE TUBE AROUND THE PIPE SO AS TO ALLOW 1' OVERLAP AT EACH END. OVERLAP THE OTHER PIPE SECTION AFTER PIPE IS INSTALLED.

METHOD A (TUBE) OVERLAP
N.T.S.

CUT THE POLYETHYLENE TUBE 1 FT. SHORTER THAN THE LENGTH OF PIPE SECTIONS. SLIP THE TUBE AROUND THE PIPE SO AS TO ALLOW 6" OF BARE PIPE AT EACH END. BEFORE MAKING A JOINT, SLIP A 3' LENGTH OF POLYETHYLENE TUBE OVER THE PRECEDING PIPE SECTION. OVERLAP BY AT LEAST 1' AND SECURE AFTER JOINT IS MADE.

METHOD B (TUBE) OVERLAP
N.T.S.

EACH SECTION OF PIPE, FITTINGS OR VALVE ETC. IS COMPLETELY WRAPPED WITH A FLAT POLYETHYLENE SHEET OVERLAP BY AT LEAST 1' AND METHOD C (FLAT SHEET) SECURED.

METHOD C (FLAT SHEET) OVERLAP
N.T.S.

NOTES:

1. ALL UNDERGROUND DUCTILE IRON PIPES AND FITTINGS SHALL BE POLYWRAPPED, CONFORMING TO THE REQUIREMENTS OF AWWA C105.
2. POLYETHYLENE TUBE AND SHEET SIZES PER AWWA C105 TABLE 1.
3. PIPE-SHAPED FITTINGS (BENDS, REDUCERS, ETC.) SHALL BE TREATED ACCORDING TO METHODS "A" AND "B". ODD SHAPED FITTINGS (VALVES, TEES, ETC.) SHALL BE TREATED ACCORDING TO METHOD "C".
4. 6" ADHESIVE TAPE SHALL BE USED TO SECURE ENCASEMENT.
5. SPECIAL CARE SHALL BE TAKEN TO PREVENT DAMAGE TO WRAPPING WHEN PLACING BACKFILL.
6. REFER TO ASTM D1248 FOR APPROVED MATERIAL AND ACCESSORIES.
7. ONLY VIRGIN POLYETHYLENE MATERIAL HAVING A MINIMUM THICKNESS OF 8 MILS IS APPROVED.
NOTES:

1. EYE BOLT = GLAND BOLT

2. FOR CONTINUOUS RODDING USE SLEEVE NUT.

3. REFER TO RESTRAINING SCHEDULE ON 16-15.

4. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, LATEST EDITION AND EBAA IRON’S RESTRAINT LENGTH CALCULATOR, LATEST VERSION FOR PVC PIPE.
5/8" PLATE, TACK-WELD TO BRACKET.

5/8" PLATE BRACKET WELDED FULL LENGTH TO COLLAR.

4"X3/4" COLLAR

AMERICAN 316 STAINLESS STEEL ROD THREAD ENDS. PAINT THREAD ENDS OF ALL RODS SUFFICIENTLY TO ALLOW FOR PROPER TENSION.

COLLAR MADE OF 3/4" STAINLESS STEEL PLATE, ALLOY 304, 4" WIDE.

1/4" (TYP.)

7/8" BOLT (MIN.)

3/8" (TYP.)

PIPE VARIES

SECTION

N.T.S.

A

16-13

NOTES:

1. STAINLESS STEEL THREADED RESTRAINING RODS SHALL BE USED IN SITUATIONS WHERE MAINS ARE CONNECTED TO FITTINGS, VALVES OR SPECIALS AND THE DISTANCE IS LESS THAN 16 FT.; OTHERWISE USE MEGALUGS.

2. REFER TO RESTRAINING SCHEDULE ON 16−15.

3. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RERAINT DESIGN FOR DUCTILE IRON PIPE, LATEST EDITION AND EBAA IRON'S RERAINT LENGTH CALCULATOR, LATEST VERSION FOR PVC PIPE.
### SANITARY SEWER OR STORMWATER FORCE
**MAIN PRESSURE AT 100 P.S.I.**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>ROD DIAMETER</th>
<th>NO. OF RODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>B&quot; &amp; SMALLER</td>
<td>3/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>12&quot;</td>
<td>3/4&quot;</td>
<td>3</td>
</tr>
<tr>
<td>16&quot;</td>
<td>3/4&quot;</td>
<td>4</td>
</tr>
<tr>
<td>20&quot;</td>
<td>1&quot;</td>
<td>4</td>
</tr>
<tr>
<td>24&quot;</td>
<td>3/4&quot;</td>
<td>10</td>
</tr>
<tr>
<td>30&quot;</td>
<td>1&quot;</td>
<td>8</td>
</tr>
<tr>
<td>36&quot;</td>
<td>1&quot;</td>
<td>12</td>
</tr>
<tr>
<td>40&quot;</td>
<td>1-1/4&quot;</td>
<td>10</td>
</tr>
<tr>
<td>48&quot;</td>
<td>1-1/4&quot;</td>
<td>12</td>
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</tbody>
</table>

### WATER MAINS.
**PRESSURE AT 120 P.S.I.**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>ROD DIAMETER</th>
<th>NO. OF RODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>3/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3/4&quot;</td>
<td>3</td>
</tr>
<tr>
<td>12&quot;</td>
<td>3/4&quot;</td>
<td>4</td>
</tr>
</tbody>
</table>

**NOTE:**

1. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, LATEST EDITION AND EBAA IRON’S RESTRAINT LENGTH CALCULATOR, LATEST VERSION FOR PVC PIPE.
SECTION VIEW
N.T.S.

NOTES:
1. FORCE MAIN TO ENTER MANHOLE AS CLOSE AS POSSIBLE TO 180° TO GRAVITY OUTLET.
2. THE INVERT LEVEL OF FORCE MAIN AT POINT OF ENTRY SHALL BE 6" ABOVE INVERT OF MANHOLE.
3. CORE ENTRY ONLY INTO EXISTING MANHOLES.
4. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO FLOW STREAM.
5. CONCRETE SHALL BE SEAL COATED WITH 16 MIL THICKNESS APPROVED EPOXY COATING.
6. REFER TO SECTION 15 FOR GRAVITY SEWER AND MANHOLE SPECIFIC REQUIREMENTS.
7. PIPE SUPPORT(S) SHALL BE PROVIDED IN SUFFICIENT QUANTITY AND DESIGNED TO PROPERLY SUPPORT PIPE.
FOR CLEAR COVER LESS THAN 14" USE HINGE TYPE MH (MIN. 5"
AUTOMATIC AIR RELEASE VALVE MATCH FINISH GRADE
RING AND COVER TO BE USF RING 310 AND 'OE' TYPE COVER WITH THE WORDS SEWER CAST IN THE COVER TYPE II CONCRETE ALL AROUND
BRICK
9 #5 EACH WAY
14" CLEAR
2" STAINLESS STEEL BALL VALVE
5'x5'x8" MIN. THICKNESS CONCRETE SLAB FOR MANHOLE FOUNDATION WITH 24"Ø OPENING ON CENTER
20" PVC SHORT PIPE (SCH. 40 OR C900) FOR VALVE HOUSING (EXTEND PIPE TO TOP OF MAIN)
2" PVC PIPE (SCH. 80) THREADED AT BOTH ENDS
BRONZE NIPPLE
FILL WITH SAND
2" BRONZE THREADED COUPLING
1 1/2" x 2" CORPORATION STOP
MAKE TAPPING CONNECTION PRIOR TO PIPE INSTALLATION AND RESTORE CERAMIC LINING AROUND THE AIR RELEASE VALVE CONNECTION
FORCE MAIN AT HIGHEST ELEVATION

NOTES:

1. REFER TO SPECIFICATIONS FOR ARV REQUIREMENTS.
2. METALLIC THREADS TO BE COATED WITH BITUMASTIC COATING.
3. INSTALL TAPPING SADDLE FOR THICKNESS CLASS D.I. MAINS 4" & SMALLER, PRESSURE CLASS D.I. MAINS 8" & SMALLER, OR WHEN MAIN IS PVC OR HDPE.
4. ALL TAPS MUST BE WITNESSED BY CITY OF MIAMI BEACH PERSONNEL.
1. THE STANDARD DETAILS PRESENTED HEREIN ARE NOT CONSTRUCTION DRAWINGS, BUT ARE GUIDELINES FOR MINIMUM DESIGN REQUIREMENTS. THE ENGINEER OF RECORD SHALL VERIFY AND MODIFY INFORMATION SHOWN IN ACCORDANCE WITH ALL APPLICABLE CODES AND STANDARDS TO COMPLY WITH THE REQUIREMENTS OF THEIR DESIGN AND CITY REQUIREMENTS.

2. PUMP STATIONS SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT HYDRAULIC AND STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED FOR UNDERGROUND STRUCTURES.

3. MINIMUM CONC. STRENGTH AT 28 DAYS:
   FC' = 4000 PSI (TYPE II CEMENT)

4. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURERS MILL MARKING ROLLED INTO THE BARS WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

5. WET WELL EPOXY COATING, AS SELECTED BY ENGINEER OF RECORD WITH CITY APPROVAL. SUBMIT SHOP DRAWINGS OF COATING, JOINT DETAILS, PIPE CLAMP AND FASTENER DETAILS, INFUENT PIPE AND OTHER WALL PENETRATION DETAILS, AS APPLICABLE.

6. PUMP STATIONS SHALL BE DESIGNED AS CLASS I, DIVISION 1 CLASSIFIED LOCATIONS IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70.
# Pump Data

## Fluid

<table>
<thead>
<tr>
<th>INSTALLATION LOCATION</th>
</tr>
</thead>
</table>

## Pump Type

<table>
<thead>
<tr>
<th>RATED POINT</th>
<th>CAPACITY, GPM</th>
<th>TDH, FEET</th>
<th>PUMP EFFICIENCY %</th>
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</thead>
</table>

## Shut Off Head, FT

## Continuous Operating Range

<table>
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<tr>
<th>CONTINUOUS OPERATING RANGE</th>
<th>MAXIMUM TDH, FT</th>
<th>CAPACITY, GPM</th>
<th>MINIMUM TDH, FT</th>
<th>CAPACITY, GPM</th>
<th>NPSHR</th>
<th>MINIMUM PUMP EFFICIENCY</th>
</tr>
</thead>
</table>

## Pump Construction

<table>
<thead>
<tr>
<th>PUMP CONSTRUCTION</th>
<th>CASING</th>
<th>IMPELLER</th>
<th>SHAFT</th>
<th>BEARINGS L-10 LIFE, HRS.</th>
<th>MAX. SHAFT DEFLECTION IN OPERATING RANGE, MILS</th>
<th>MAX. VEL. OF VIBRATIONS IN OP. RANGE, INCH/SEC</th>
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</thead>
</table>

## Pump Connections

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<thead>
<tr>
<th>PUMP CONNECTIONS</th>
<th>SUCTION, INCHES</th>
<th>DISCHARGE, INCHES</th>
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</table>

## Electric Motor

<table>
<thead>
<tr>
<th>ELECTRIC MOTOR</th>
<th>RATED HP</th>
<th>RPM</th>
<th>S.F.</th>
<th>AMBIENT TEMP. FOR MOTOR RATING, °C</th>
<th>MAXIMUM TEMP. RISE, °C</th>
<th>BEARINGS L-10 LIFE, HRS.</th>
<th>MAX. VIBRATION AMP., MILS</th>
<th>NOISE LEVEL, dBA IN METER</th>
<th>NEMA DESIGN CODE LETTER</th>
<th>START. CURR. LETTER CODE</th>
<th>INSULATION CLASS</th>
</tr>
</thead>
</table>

| | | | 1.15 | 40 | | | | | | | |

## Manufactures & Models

<table>
<thead>
<tr>
<th>MANUFACTURERS &amp; MODELS</th>
<th>PUMP</th>
<th>MOTOR</th>
</tr>
</thead>
</table>

### Note:

1. This information shall be included in all pump station plans.
NOTES:

1. THIS DETAIL DEPICTS A TYPICAL WET WELL SUBMERSIBLE PUMP STATION LAYOUT AND PROVIDES GUIDELINES FOR MINIMUM DESIGN REQUIREMENTS. THE ENGINEER SHALL VERIFY AND MODIFY THE INFORMATION SHOWN HEREIN IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS, TO COMPLY WITH ALL REGULATORY REQUIREMENTS.

2. MINIMUM CONCRETE THICKNESSES ARE SHOWN IN THIS DETAIL. ALL PROPOSED PRECAST WET WELLS OR VALVE BOXES SHALL BE DESIGNED BY A ENGINEER LICENSED IN THE STATE OF FLORIDA AND SIGNED AND SEALED STRUCTURAL CALCULATIONS SHALL BE PROVIDED.
NOTES:

1. THIS DETAIL DEPICTS A TYPICAL WET WELL SUBMERSIBLE PUMP STATION LAYOUT AND PROVIDES GUIDELINES FOR MINIMUM DESIGN REQUIREMENTS. THE ENGINEER SHALL VERIFY AND MODIFY THE INFORMATION SHOWN HEREIN IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS TO COMPLY WITH ALL REGULATORY REQUIREMENTS.

2. MINIMUM CONCRETE THICKNESSES ARE SHOWN IN THIS DETAIL. ALL PROPOSED PRECAST WET WELLS OR VALVE BOXES SHALL BE DESIGNED BY A ENGINEER LICENSED IN THE STATE OF FLORIDA AND SIGNED AND SEALED STRUCTURAL CALCULATIONS SHALL BE PROVIDED. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.

3. ALL HARDWARE TO BE 316 STAINLESS STEEL PRODUCED IN AMERICA.

4. FIELD APPLY MINIMUM TWO (2) COATS (10 MILS) BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF ALL NEW WET WELLS AND VALVE VAULTS.
NOTE:

1. MINIMUM STEEL AND CONCRETE THICKNESSES ARE SHOWN IN THIS DETAIL. ALL PROPOSED PRECAST WET WELLS OR VALVE BOXES SHALL BE DESIGNED BY A ENGINEER LICENSED IN THE STATE OF FLORIDA AND SIGNED AND SEALED STRUCTURAL CALCULATIONS SHALL BE PROVIDED.
NOTES:

1. MINIMUM STEEL AND CONCRETE THICKNESSES ARE SHOWN IN THIS DETAIL. ALL PROPOSED PRECAST WET WELLS OR VALVE BOXES SHALL BE DESIGNED BY A ENGINEER LICENSED IN THE STATE OF FLORIDA AND SIGNED AND SEALED STRUCTURAL CALCULATIONS SHALL BE PROVIDED.

2. ONLY PERMITTED 1 FOOT ABOVE THE AVERAGE YEARLY HIGHEST GROUNDWATER LEVEL.
NOTE:

1. MINIMUM STEEL AND CONCRETE THICKNESSES ARE SHOWN IN THIS DETAIL. ALL PROPOSED PRECAST WET WELLS OR VALVE BOXES SHALL BE DESIGNED BY A ENGINEER LICENSED IN THE STATE OF FLORIDA AND SIGNED AND SEALED STRUCTURAL CALCULATIONS SHALL BE PROVIDED.
ACCESS ALUM. HATCH W/ S.S. SPRINGS AND HINGES, RATED FOR H-20 LIVE LOAD, USF & M TYPE AHD

1” CHAMFER FOR ALL CONC. CORNERS AS SHOWN

#4 @ 8” EA. WAY

RAMNEK BETWEEN TOP SLAB AND WALL JOINT

SECTION VIEW
N.T.S

NOTE:

1. MINIMUM STEEL AND CONCRETE THICKNESSES ARE SHOWN IN THIS DETAIL. ALL PROPOSED PRECAST WET WELLS OR VALVE BOXES SHALL BE DESIGNED BY A ENGINEER LICENSED IN THE STATE OF FLORIDA AND SIGNED AND SEALED STRUCTURAL CALCULATIONS SHALL BE PROVIDED.
12" WIDE BOX WITH
1/4" GALVANIZED STEEL PLATE
L 2"x2"x3/8"
(GALVANIZED STEEL)

3/4" HOSE BIB
W/VACUUM BREAKER

AS REQUIRED
4"

PADLOCK

6" CONC. SLAB WITH
6x6 W1.4xW1.4 W.W.M.
(20" WIDE SLAB)

4"x4"x3/16" PLATE W/
1/4" GALVANIZED
STEEL BOLTS
STORMWATER DRAINAGE AND GRAVITY COLLECTION SYSTEM
SECTION 17. STORMWATER DRAINAGE AND GRAVITY COLLECTION SYSTEM

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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. American Association of State Highway Transportation Officials (AASHTO)
   
   AASHTO M43 Standard Specification for Sizes of Aggregate for Road and Bridge Construction
   
   AASHTO M45 Standard Specification for Aggregate for Masonry Motor
   
   AASHTO M252 Standard Specifications for Corrugated Polyethylene Drainage Pipe
   
   AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
   
   AASHTO M306 Standard Specification for Drainage, Sewer, Utility, and Related Castings
   
   AASHTO M330 Standard Specification for Polypropylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

2. American Concrete Pipe Association
   
   Concrete Pipe Handbook

3. American Society for Testing Materials (ASTM)
   
   ASTM A48 Standard Specification for Gray Iron Castings
   
   
   ASTM A536 Standard for Ductile Iron Casting
   
   ASTM A615 Standard Specification for Deformed and Plant Carbon-Steel Bars for Concrete Reinforcement
   
   ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
   
   ASTM C33 Standard Specification for Concrete Aggregates
   
   ASTM C76 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
<table>
<thead>
<tr>
<th>Standard Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C443 Standard Specification for Joints For Concrete Pipe and Manholes, Using Rubber Gaskets</td>
</tr>
<tr>
<td>ASTM C478 Standard Specification for Circular Precast Reinforced Concrete Manhole Sections</td>
</tr>
<tr>
<td>ASTM C506 Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe</td>
</tr>
<tr>
<td>ASTM C507 Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe</td>
</tr>
<tr>
<td>ASTM C655 Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe</td>
</tr>
<tr>
<td>ASTM C913 Standard Specification for Precast Concrete Water and Wastewater Structures</td>
</tr>
<tr>
<td>ASTM D4 Standard Test Method for Bitumen Content</td>
</tr>
<tr>
<td>ASTM D1784 Standard Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds</td>
</tr>
<tr>
<td>ASTM D2584 Standard Test Method for Ignition Loss of Cured Reinforced Resins</td>
</tr>
<tr>
<td>ASTM D3034 Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings</td>
</tr>
<tr>
<td>ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials</td>
</tr>
<tr>
<td>ASTM D3517 Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pressure Pipe</td>
</tr>
<tr>
<td>ASTM D6707 Standard Specification For Circular-Knit Geotextile For Use In Subsurface Drainage Applications</td>
</tr>
<tr>
<td>ASTM D6783 Standard Specification for Polymer Concrete Pipe</td>
</tr>
<tr>
<td>ASTM F949 Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings</td>
</tr>
<tr>
<td>ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe</td>
</tr>
</tbody>
</table>
We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.

4. American Water Works Association (AWWA)
   - ASTM F2306 Standard Specification for 12 to 60 in. (300 to 1500 mm) Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications

5. City of Miami Beach
   - Code of Ordinances
     - Resolution 2014-28499
     - Resolution 2017-30039

6. Florida Administrative Code (FAC)

7. Florida Building Code

8. Florida Department of Transportation (FDOT)
   - Design Standards
     - Standard Plans for Road and Bridge Construction

9. Miami-Dade County Code of Ordinances

10. Miami-Dade Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM) Regulations

11. Occupational Safety and Health (OSHA) Regulations

12. Plastic Pipe Institute (PPI)
   - PPI TR-3 Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe

B. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.
1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined
space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.03 SUBMITTALS

A. Minimum criteria are presented in this Section and the following Standard Details. Stormwater drainage and gravity collection systems including associated disciplines as required (civil, structural, etc.) shall be designed by a State of Florida Engineer. Signed and sealed calculations must be provided to support hydraulic and structural design. Signed and sealed buoyancy calculations must also be provided for underground structures.

B. Plans shall be in accordance with Section 8 of the City of Miami Beach Public Works Manual.

C. Properly identified product data for review, including data of pipe and all other materials used, shall be submitted to the City or designee for review and approval prior to fabrication and/or delivery.

D. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

1.04 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specification and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.

1.05 DESIGN CRITERIA

A. Stormwater Design Criteria

1. Design tailwater elevation shall be 2.70 feet North American Vertical Datum (NAVD) per City of Miami Beach Resolution 2014-28499.

2. New gravity drainage systems must be watertight.

3. All new drainage systems must be designed to meet a minimum 10-year 24-hour design storm level of service per Resolution 2017-30039, or latest version. Maximum
stage elevation within a drainage basin shall be 1 foot below the lowest level of finished floor elevation and not higher than the proposed edge of pavement elevation.

4. South Florida Water Management District nomograph with 1.25 safety factor.

5. The rainfall distribution shall be the Soil Conservation Services (SCS) Type III.

6. The unit hydrograph peaking factor shall be 150.

7. For modeling purposes a curve number (CN) of 95 shall be used.

8. Drainage basin boundaries for landlocked lots shall be up to the back property lines and half the lots for waterfront properties. When project is adjacent to residential or commercial developments with an independent and self-contained stormwater system, an offset from the right-of-way line is an acceptable boundary. The City of Miami Beach Public Works Department must approve any deviation from these requirements.

9. All stormwater shall discharge from drainage structures. No manholes or catch basins shall be designed to stage water permanently.

10. The minimum design requirements listed under Item A may be waived at the discretion of the City of Miami Beach Public Works Department.

B. Water Quality: Water quality must meet all requirements of regulatory agencies having jurisdiction. Trash racks and water quality treatment units shall be installed upstream of all stormwater outfalls and wells as necessary to comply with all Local, State, and Federal requirements.

C. Wells: All new stormwater drainage systems shall include well(s) for stormwater disposal. Refer to City of Miami Beach Public Works Manual Section 19 for more details.

D. Outfalls:

1. No outfall shall be constructed in the City without all appropriate Local, State, and Federal approvals. The Contractor shall comply with all necessary Local, State, and federal environmental permits issued for the project. It is the Contractor’s responsibility to become familiar with and be governed by all provisions of these permits.

2. Outfalls require riprap and a dissipator box. Signed and sealed calculations must be submitted to RER-DERM showing that the sea floor will not be disturbed by the exit velocity.

3. Outfalls shall have a backflow prevention device at the exit pipes and manatee grates at the opening.
E. Manholes/inlet structures shall be provided where two or more storm drains converge, where the pipe sizes change, where a change in horizontal or vertical pipe alignment occurs, and where a change in the pipe slope occurs. The maximum separation between manholes shall be as follows.

<table>
<thead>
<tr>
<th>PIPE DIAMETER (INCH)</th>
<th>MAXIMUM SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 to 18</td>
<td>300 feet</td>
</tr>
<tr>
<td>24 to 36</td>
<td>400 feet</td>
</tr>
<tr>
<td>42 and larger</td>
<td>500 feet</td>
</tr>
</tbody>
</table>

F. Manhole Uplift: All manholes placed below grade shall have adequate safety factors against uplift (excluding weight of soil and associated skin friction).

G. Pipeline Crossings

1. Stormwater mains shall not be laid in the same trench with water mains, sewer mains, gas lines, fuel lines, or electric cables.

2. The horizontal, vertical, and joint separation shall be in accordance with FAC 62-55.314. Refer to Standard Details 17-32, 17-33, and 17-34.

H. Minimum Road Elevation

1. As defined by the February 2020 report titled “Road Elevation Strategy and Recommended Sea Level Rise/Tidal Flood Adaptation Projects” prepared by Jacobs, both the Edge of Road (EOR) and Bottom of Road Base (BORB) must adhere to the following constraints:

   a. Local Roads EOR ≥ 3.9 ft & BORB ≥ 2.9 ft
   b. Major Roads: EOR ≥ 3.9 ft & BORB ≥ 2.9 ft
   c. Emergency Roads: EOR ≥ 4.8 ft & BORB ≥ 2.9 ft

2. If the minimum road elevation creates conflict in harmonizing with private property as defined by the constraint criteria in Section 4.1.3 of the report described above, the design must follow the five-step process in determining the minimum road elevation at the area of concern. See Section 4.2 of the report cited in Item (1) to follow the five-step calculation process.
PART 2 – PRODUCTS

2.01 SIZE LIMITATIONS

A. Minimum allowed stormwater pipe size for right-of-way projects is 18-inches or elliptical equivalent.

2.02 PIPE MATERIALS

A. Pipes for stormwater drainage and gravity conveyance systems shall be PVC SDR-35, PCV C900, reinforced concrete, or high-density polyethylene (HDPE) corrugated pipe as specified below unless approved by the City of Miami Beach Public Works Department in writing. PVC C900 pipe larger than 16 inches in diameter shall not be used.

2.03 POLYVINYL CHLORIDE (PVC) SDR-35 PIPE

A. Type Plastic Sewer Main (PSM) SDR-35 pipe shall be push-on type, with bells, spigots, and elastomeric gaskets, in accordance with ASTM D3034 and ASTM D3212.

B. Joints using solvent cement will not be permitted.

C. SDR-35 PVC sewer pipe shall be impregnated with green pigment and be double labeled (180 degrees apart) as follows at intervals of five (5) feet or less: Date of manufacture - Manufacturer's name & Code - Nominal size - Cell classification - "Type PSM SDR-35 PVC Sewer Pipe" - "Specification D 3034".

D. Nominal laid length of SDR-35 PVC sewer pipe shall be 13 feet.

2.04 POLYVINYL CHLORIDE (PVC) C900 PIPE

A. PVC C900 pipe 4 inches through 16 inches shall be green in color and conform to AWWA C900 dimension ratio (DR) 18, rubber-ring gasket bell end or plain end with elastomeric gasket coupling, ductile iron pipe size (DIPS) dimensional sizing, ASTM D3034 and shall be made from a 12454B compound which is a Type 1, Grade 1 plastic as defined by ASTM D1784. Rerun or reclaimed materials will not be acceptable.

B. The pipe shall be of the diameter and pressure class specified or shown, shall be furnished complete with rubber gaskets, and all specials and fittings shall be provided as required in the Contract Documents. The dimensions and pressure classes for DRs for large PVC C900 pressure pipe with cast-iron pipe equivalent outside diameters shall conform to the requirements of AWWA.

C. Unless otherwise provided in alternate qualification procedures of PPI-TR3, compounds which have a Hydrostatic Design Basis (HDB) of 4,000 pounds per square inch (psi) at 73.4 degrees Fahrenheit for water shall not contain additives and fillers that exceed the recommended values in Table 1, Part Y of PPI-TR3 (e.g., allowable content range for
calcium carbonate is 0.0-5.0 parts per hundred of resin). If requested by the City or
designee, the additive and filter content shall be determined using the prolysis method as
specified in ASTM D2584.

D. PVC C900 pipe shall be double labeled (180 degrees apart) with the following at intervals of
not more than five (5) feet: Date of manufacture - Manufacturer's Name & Record Code -
Nominal size - "(Cl)" - "PVC" – "Dimension Ratio (for example "DR25")" – “AWWA pressure
class (for example "PC100") - “AWWA designation number (ANSI/AWWA C900-97)”.

E. Nominal laid length of C900 pipe shall be 20 feet.

2.05 REINFORCED CONCRETE PIPE

A. Reinforced concrete pipes shall conform to ASTM C76.

B. Concrete pipes under D-Load Condition shall conform to ASTM C655.

C. Elliptical pipes shall conform to ASTM C507.

D. Arch culverts shall conform to ASTM C506.

2.06 HIGH-DENSITY POLYETHYLENE CORRUGATED PIPE (HDPE)

A. High-density polyethylene corrugated (HDPE) pipes shall be watertight.

B. HDPE pipe and fittings shall be either AASHTO Type ‘S’ or Type ‘D’ as follows.

1. Sizes 4 inches to 60 inches designated as AASHTO Type 'S' (N-12) shall have a full
circular cross-section, with an outer corrugated exterior wall and an essentially
smooth inner wall. Corrugations for Type ‘S’ sizes 4 inches to 60 inches shall be
annular (N-12).

2. Sizes 42 inches to 60 inches shall conform to AASHTO Type 'D' (N-12HC) consisting
of an essentially smooth inner wall braced circumferentially with circular ribs which
are formed simultaneously with an essentially smooth outer wall.

C. The pipes and fittings manufactured for this specification shall comply with the requirements
for test methods, dimensions, and markings found in AASHTO M252 and AASHTO M294.
Pipes and fittings shall be made from virgin PE compounds conforming to the latest revision
of the AASHTO material specifications for cell classification as defined and described in
ASTM D3350 and ASTM F2306.

2.07 HIGH-PERFORMANCE POLYPROPYLENE PIPE (PP)

A. High-performance (HP) Polypropylene Pipes (PP) up to 30 inches are allowed to the design
of side drain, cross drain, and storm drain, and it shall meet the requirements of AASHTO
M330. PP pipes are not allowed in mitered end sections.
2.08 PIPE JOINTS

A. PVC Fittings: Elastomeric gasket joints providing a watertight seal, conforming to ASTM D3212 and ASTM F477.

B. Concrete Pipes: Rubber gaskets, joint rings, castings, and plates for fittings shall meet the requirements of ASTM C443, with the additional requirement that the gasket used shall be of such cross-sectional area and perimeter as to properly fit the space provided in the pipe joint in which it is to be used. Prior to use, the gasket shall be stored in as cool a place as practicable.

C. Elliptical concrete pipe joints shall conform to the following.

1. Cold adhesive pre-formed plastic gaskets shall meet the requirements of ASTM C443 being of a shape and size of such cross-sectional area and perimeter as to properly fit the space provided in the pipe joint in which it is to be used, so as to effect a permanent watertight seal in joints of elliptical concrete pipe. The gasket sealing the joints shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler. The material shall contain no solvents and shall not produce irritating fumes or obnoxious odors. The gasket shall not depend on oxidizing, evaporation, or chemical action for its adhesive or cohesive strength. A minimum of two pieces of gasket material shall be used in each joint. The minimum size for each of the gaskets used in a joint shall be in accordance with the following:

<table>
<thead>
<tr>
<th>PIPE SIZE (INCHES)</th>
<th>NOMINAL GASKET SIZE (INCHES)</th>
<th>MINIMUM CROSS-SECTION (SQUARE INCHED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 19 x 30</td>
<td>1-1/2</td>
<td>1.75</td>
</tr>
<tr>
<td>19 x 30 to 53 x 83</td>
<td>1-3/4</td>
<td>2.50</td>
</tr>
<tr>
<td>Over 53 x 83</td>
<td>2</td>
<td>3.25</td>
</tr>
</tbody>
</table>

Note: Minimum size requirements are based on a joint designed with a maximum taper of 10 degrees and an in-place annular space of approximately 1/4 inch.

2. The chemical composition of the gasket material shall meet the following requirements:

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>% BY WEIGHT MINIMUM</th>
<th>MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitumen (petroleum plastic)</td>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td>Ash-Inert Mineral Matter</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Volatile Matter (@325°F)</td>
<td>---</td>
<td>2.0</td>
</tr>
</tbody>
</table>

3. The gasket joint sealing compound when immersed for 30 days at ambient room temperature separately in 5% solution of caustic potash, a mixture of 5% hydrochloric acid, a 5% solution of sulfuric acid, and a saturated hydrogen sulfide solution shall show no visible deterioration.
4. The physical properties of the gasket joint sealing compound as shipped shall meet the following requirements:

<table>
<thead>
<tr>
<th>PROPERTY @ 77°F</th>
<th>MINIMUM</th>
<th>MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify Gravity</td>
<td>1.20</td>
<td>1.35</td>
</tr>
<tr>
<td>Ductility</td>
<td>50 mm</td>
<td>---</td>
</tr>
<tr>
<td>Softening Point</td>
<td>320°F</td>
<td>---</td>
</tr>
<tr>
<td>Penetration (0.1 mm) @ (150 gms) five seconds</td>
<td>50</td>
<td>120</td>
</tr>
</tbody>
</table>

D. HDPE pipe joints and fittings shall conform to the following.

1. Smooth lined corrugated HDPE pipe and fittings shall conform to AASHTO M252 Type S for 4-inch to 10-inch diameter and AASHTO M294 Type S for 12-inch to 60-inch diameter.

2. Joints shall be watertight bell and spigot type.

2.09 CONCRETE BOX CULVERTS

A. Concrete box culverts shall conform to FDOT Standard Specifications for Road and Bridge Construction Section 410. Other structures may be approved at the City of Miami Beach Public Works Department’s sole discretion.

2.10 DRAINAGE STRUCTURES

A. Drainage structures such as manholes, catch basins, and retention boxes shall be watertight, and made of precast reinforced concrete unless otherwise approved. All precast concrete structures shall meet the requirements of ASTM C478 for circular structures and ASTM C913 for rectangular structures.

B. Walls shall be not less than 8-inches thick, and top and bottom slabs shall be not less than 8-inches thick. Walls and floor slabs shall be fully dowelled together and sealed with an embedded PVC waterstop. Top slabs shall have an approved anchorage to prevent displacement. Walls shall extend a minimum of 6 inches above the top of the highest pipe hole and 6 inches minimum each side of each opening. For inlet, the invert of the lowest pipe shall be a minimum of 24 inches above the bottom slab, unless approved by the City of Miami Beach Public Works Department in writing.

C. All concrete structures shall be delivered to the job site bearing the stamp of an independent Florida certified engineering testing laboratory, signed and dated by the laboratory’s inspector unless certified by the manufacturer as meeting FDOT standards. These structures shall be unpatched and uncoated and shall remain so until approved by the City of Miami Beach Public Works Department Engineering Division Inspector.

D. Manholes shall have a minimum dimension of four (4) feet between opposing walls. Inflow pipes shall be at an obtuse angle with the outflow pipe.
E. Precast raisers shall not exceed eight (8) feet in height.

F. Holes for pipe connections, with a diameter equal to the outside dimension of the connecting pipe plus an additional 4 inches, shall be formed in the walls of the drainage structure. No cutting or chipping of the pre-formed holes or cutting additional holes in the precast concrete walls will be permitted.

G. Lifting holes through the structure will not be permitted.

H. Three to five courses of brick shall be constructed atop the structure’s corbel for height adjustment.

I. Where a semi-cylindrical baffle is to be installed in a drainage structure, the minimum distance between the baffle and the opposing wall shall be two (2) feet, and the minimum distance between the baffle and the adjacent wall shall be a minimum of one (1) foot or three-fourths of the radius of the baffle, whichever is greater.

2.11 CONFLICT STRUCTURES

A. Conflict structures shall have not less than two (2) feet clearance between penetrating pipes and parallel concrete walls and shall measure not less than four (4) feet between other opposing walls.

B. They shall have a minimum wall thickness of eight (8) inches, unless otherwise approved by the City of Miami Beach Public Works Department in writing.

2.12 TOP FRAMES, GRATES, AND COVERS FOR DRAINAGE STRUCTURES

A. Top frames, grates, and covers for all drainage structures shall be of traffic bearing design and shall be cast of close-ground gray iron conforming to ASTM A48, Class 35B.

B. Frames and covers for manholes and similar appurtenances shall be of cast iron and conform to the dimension shown in the Standard Details. The requirement for tensile strength of the gray iron shall be 30,000 psi minimum in accordance with the requirements of ASTM A48, and the requirement for transverse breaking load shall be 2,000 pounds in accordance with the requirements of ASTM A438. Contact surfaces between frames and covers shall be machined to provide a uniform contact surface. Manhole covers shall have identification letters as shown on the Standard Details.

C. All lids shall be provided with an HDPE rain guard.

D. Frames, covers, and grates shall be furnished with machined horizontal bearing surfaces and shall conform to the Standard Details. The cover or grate shall not rock when rotated to any position in the frame.
E. The requirement for tensile strength of the gray cast iron shall conform to the requirements of AASHTO M306 and have appropriate certifications and be individually marked in accordance with the requirements of AASHTO M306.

F. Castings shall be as manufactured by United States Foundry & Manufacturing Corp., or approved equal.

2.13 HATCHES

A. Access hatches frames and covers shall be heavy-duty aluminum with stainless steel hinges and bolts, capable to resist an occasional AASHTO H-20-44-wheel load per AASHTO M306. Heavy-duty hatches and/or watertight hatches may be required depending on the application, as determined by the Engineer, or as required by regulatory agencies. Hatches rated for pedestrian loads are not accepted.

B. The hatches shall be equipped with spring-loaded covers for easy opening, 90-degree hold-open arms, handgrips, and safety chains. Access hatches shall be furnished with a stainless-steel hasp for padlocking. All hardware shall be American Iron and Steel Institute (AISI) Type 316 stainless steel produced in America.

C. The aluminum shall conform to ASTM B209 and shall be Aluminum Association (AA) Designation 6061-T6. Aluminum sheets and plates shall be alloy 5086-H116 conforming with the standards of ASTM B209.

D. After forming and welding operations, and before assembly, each piece of aluminum shall be finished (anodized) in accordance with Aluminum Association Designations: AA-M10C11C21A41, with minimum 0.8 mil coating.

E. The area in contact with concrete to be painted with self-priming bituminous coating, with a minimum solid content of 68% by volume following ASTM D4.

2.14 HEADWALLS AND REVETMENTS

A. Unless otherwise approved, where embankment slopes at culvert ends and outfalls are steeper than 1:3, approved concrete end walls shall be installed. Where embankment slopes are 1:3 or flatter, approved revetments shall be installed. This preferred type of revetment is the poured concrete-in-fabric form type, with a quilted appearance.

B. Riprap, articulating concrete block (ACB) revetment systems, and gabions shall comply with FDOT Standard Specifications for Road and Bridge Construction, Section 530.

2.15 GEOSYNTHETIC MATERIALS

A. Unless restricted in the Plans or Specifications, the geosynthetic material shall be a woven, non-woven, or extruded material consisting of long-chain polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamides or polyvinylidene chloride formed into
a stable network such that the filaments or yarns retain their relative position to each other. The base plastic shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration due to ultraviolet (UV) light, heat exposure and potential chemically damaging environment. The edges of the material shall be selvage or otherwise finished to prevent unraveling and fraying, and shall be free of any treatment which may significantly alter its physical properties.

B. Physical requirements shall conform to the FDOT Standard Specifications for Road and Bridge Construction, Section 985.

C. Filter fabric shall be Type D-3 in accordance with FDOT Index No. 199.

2.16 SKIMMERS

A. Skimmers shall be in accordance with the City of Miami Beach Public Works Manual Section 17 Standard Details.

2.17 BACKFLOW PREVENTION VALVES

A. All stormwater drainage outfalls shall be provided with a backflow prevention system. HDPE flap valves shall be installed in outfalls to surface water bodies. The HDPE shall contain UV stabilizers meeting the requirements of ASTM D3350. All metal components, such as hinges, handles and reinforcement shall be of stainless steel type 316.

2.18 FLOOR DRAINS

A. Cast iron body with bottom outlet, seepage pan and combination membrane flashing clamp and frame with integrated trap primer and plug for heavy-duty cast iron deep flange slotted round grate with sediment bucket.

2.19 PLASTIC DRAIN BASINS

A. Prefabricated plastic drain basins shall be used only on private properties to be connected to the stormwater sewer mainline. The size of the drain basin will depend on the expected runoff as calculated by the Engineer.

B. Grates up to 24 inches in diameter shall meet as a minimum the AASHTO H-10 load rating. Pedestrian grates greater than 24 inches in diameter shall meet the AASHTO H-20 load rating.

C. Grates and frames shall be ductile iron per ASTM A536, grade 70-50-05.

D. Drainage connection stub joint tightness shall conform to ASTM D3212.

E. Plastic drain basins shall be Nyloplast® as manufactured by Advanced Drainage Systems (ADS), or approved equal.
2.20 TRENCH DRAINS

A. The channel material shall be polyethylene meeting the requirements of ASTM D3350, polymer concrete meeting the requirements of ASTM D6783, or fiberglass meeting the requirements of ASTM D3517.

B. Provide ductile iron frames and grates meeting the requirements of ASTM A536. Unless otherwise specified in the Contract Documents, provide castings to Grade 414-276-18. Ensure that ductile iron grates and frames are compatible and from the same manufacturer. Frames must be anchored into the concrete as shown in the Standard Details. Grates must have at least 30% open area and fasten securely to frames to avoid rattling. Grates must be removable for the entire channel length and have vandal-resistant locking devices.

2.21 BACKFLOW PREVENTION DEVICES

RESERVED

PART 3 – EXECUTION

3.01 PREPARATION

A. Permits: The Contractor shall obtain all required right-of-way, City Building Department, and regulatory permits prior to commencing any work.

B. Maintenance of traffic (MOT) shall be provided by the Contractor in accordance with Section 1 of the City of Miami Beach Public Works Manual.

C. Flow Control

1. Flow control shall be exercised as required to ensure that no flowing stormwater comes into contact with sections of the manhole or sewer pipe under construction.

2. Plugging and blocking of flow: A stormwater line plug shall be inserted into the line at a manhole upstream from the section where work will be occurring. The plug shall be so designed that all or any portion of the stormwater flows can be released. During the inspection, testing, and replacement portion of the construction, flows shall be shut off or substantially reduced as indicated by the City. The upstream manholes shall be constantly monitored for degree of surcharging. After the testing, inspection or repair is complete, flows shall be restored to normal level.

3. Pumping and bypassing of flow: Wherever lines are blocked off and the possibility of backing up the stormwater and causing harm to public and private property is foreseen, it shall be the Contractor’s responsibility to bypass flow from manhole to manhole.
3.02 INSTALLATION OF DRAINAGE PIPING

A. Each pipe to be laid true to line and grade indicated on the Drawings and in such manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line.

B. All PVC pipes shall be installed in accordance with AWWA M23. Deflection at the joint shall not exceed 1.5 degrees or 50% of the maximum deflection, as recommended by the manufacturer. No deflection of the joint shall be allowed for joints which are overbelled or not belled to the stop mark.

C. The laying of reinforced concrete pipe shall conform to the applicable sections of the Concrete Pipe Handbook as published by the American Concrete Pipe Association.

D. Detector Tape: All pipes shall have 3-inch-wide green detector tape for stormwater main. The words “CAUTION STORMWATER MAIN BURIED BELOW” on the upper side of the pipe shall be printed at 30-inch intervals along the tape. Tape shall be placed 18 inches below grade above all stormwater mains or as recommended by manufacturer.

E. Bedding and initial backfill shall be in accordance with City of Miami Beach Public Works Manual Section 10.

F. For PVC pipe, bedding and initial backfill shall also be in accordance with Standard Detail 17-35 for PVC pipe. PVC pipe shall be laid with minimum vertical cover of 48 inches. Vertical cover 36 inches to 48 inches below finish grade may be approved on a case-by-case basis by the City of Miami Beach Public Works Department. For vertical cover less than 30 inches below finish grade, use concrete slab as per Standard Detail 17-36; use of this Standard Detail requires written approval from the City of Miami Beach Public Works Department.

G. PVC SDR-35 and C900 pipe shall be laid with minimum vertical cover of 36 inches; 48 inches is preferred. For vertical cover less than 30 inches below finish grade, use concrete slab as per Standard Detail 17-36; use of this Standard Detail requires written approval from the City of Miami Beach Public Works Department.

H. Bedding and initial backfill shall be in accordance with City of Miami Beach Public Work Manual Section 10 and Standard Detail xxx for PVC pipe.

I. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the stormwater-line materials be dropped or dumped into the trench.

J. The full length of each section of pipe shall rest solidly upon the completed pipe bed, with recesses excavated and shaped to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and re-laid.
K. Connection of pipes to a drainage structure shall be per the Standard Details. Non-shrink hydraulic cement grout shall be used as a seal between the structure and the pipe.

L. Pipe skew shall not exceed the maximum established in the FDOT Index 200 or, if the structure is precast, the maximum established by the manufacturer, whichever is less.

3.03 INSTALLATION OF DRAINAGE STRUCTURES

A. Drainage structures shall be constructed as indicated on Drawings or according to these Standard Details. Openings on structures are to be sealed with non-shrink hydraulic cement grout. No molding plaster will be allowed.

B. Manhole built-in sections shall be joined with a mastic compound or a round compression ring of neoprene material set in annular spaces cast into the spigot end of a bell and spigot type joint. The mastic compound or ring shall be uniformly compressed between the positioned sections so as to form a watertight joint. After the sections are assembled, the remaining space in the joint shall be pointed up and filled with dense cement mortar and finished so as to make a smooth, continuous surface inside and outside the wall sections.

C. Frames and Covers:

1. Paved Areas: Set the cast iron frames and covers in a bed of mortar and carefully adjust to elevation shown on the Drawings. Provide a minimum of 3 but no more than 5 courses of brick under frames for adjusting manhole cover elevation to be leveled with the surrounding grade. This does not apply to curb inlets.

2. Unpaved Areas: Embed the cast iron frame and cover in the concrete top slab or concrete collar to be flush with the top of concrete. If a concrete collar is used, it shall not be less than 12 inches beyond the frame perimeter. The top of the concrete shall be no less than 2 inches and no more than 8 inches above the surrounding soil or grass.

D. Hatches:

1. Paved Areas: Embed the frame in the concrete top slab or concrete collar to be leveled with the surrounding grade. If a concrete collar is used, it shall not be less than 12 inches beyond the frame perimeter.

2. Unpaved Areas: Embed the cast iron frame and cover in the concrete top slab or concrete collar to be flush with the top of concrete. If a concrete collar is used, it shall not be less than 12 inches beyond the frame perimeter. The top of the concrete shall be no less than 2 inches and no more than 8 inches above the surrounding soil or grass.
3.04 INSTALLATION OF ACCESSORIES

A. Skimmers: The bottom of the skimmer shall be 24 inches or more from the bottom of the drainage structure. A neoprene gasket shall be installed between the skimmer and the structure wall to create a watertight joint. The neoprene gasket shall extend 1/2 inch beyond the joint on all sides.

B. Flap valves: Shall be installed inside an accessible reinforced concrete box, per manufacturer recommendations. Access for maintenance shall be provided using a properly dimensioned hatch. The valve shall have a 1-foot clearance all around, even when the valve is fully open.

C. Floor Drains: Shall be embedded in the structural floor slab and installed per manufacturer recommendations. The grate shall be leveled with the surrounding grade. As a retrofitted installation, non-shrink grout shall be used as a fill between the floor drain and concrete slab.

D. Trench Drains: Shall be embedded in concrete as shown in the Standard Details. Place concrete backfill in the trench against undisturbed material at the sides and bottom of the trench in a manner that will prevent floating or shifting of the trench drain and will prevent voids in or segregation of the concrete. Tamp and spade to prevent honeycombing. Form the top surface to the lines shown in the Plans. Remove any foreign material that falls into the trench prior to or during placement of concrete. Connect outlet pipe to the trench drain with standard manufactured connectors.

E. Filter fabric sock for use with underdrain: The knitted fabric sock shall be applied to the tubing in the shop so as to maintain a uniform applied weight. The tubing with knitted fabric sock shall be delivered to the job site in such manner as to facilitate handling and incorporation into the work without damage. The knitted fabric sock shall be stored in UV resistant bags until just prior to installation. Torn or punctured knitted fabric sock shall not be used.

3.05 CONSTRUCTION OF EXFILTRATION TRENCH

A. Exfiltration trenches shall be constructed using a perforated HDPE pipe with a minimum diameter of 18 inches. Cover shall consist of a minimum 12-inch layer of ballast rock and a 24-inch layer of select fill, separated to the ballast rock with a non-woven filter fabric, as shown in the Standard Details.

B. Oils and solid contaminants shall be retained from entering the exfiltration trench. Skimmers shall be installed at the entrance of the exfiltrating pipe.

C. The bottom of the exfiltration trench shall be 15 feet below the ground elevation unless field conditions warrant otherwise. Ballast rock shall be used as fill between the exfiltrating pipe and the bottom of the exfiltration trench.
3.06  CONSTRUCTION OF REVETMENT SYSTEMS

A. Revetment systems such as riprap, articulating concrete block systems, and gabions shall be installed following the requirements of FDOT Standard Specifications for Road and Bridge Construction Section 530.

3.07  FLUSHING AND TESTING

A. At the conclusion of the work, the Contractor shall thoroughly clean all of the pipe by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the lowest outlet. If, after this outlet cleaning, obstructions remain, they shall be removed.

B. The Contractor and City or designee shall inspect all installed stormwater lines by visually checking each section for alignment prior to placing into service. A full circle of light shall be seen by looking through the pipe at a light held at the opposite end of the section of stormwater line being inspected. The Contractor shall make any corrections required in line or grade.

C. The City’s Inspector must be notified in writing at least 24-hours prior to all scheduled formal tests.

D. All new stormwater mains shall undergo an infiltration test as described below.

1. Prior to testing for infiltration, the trench shall be completely backfilled and compacted properly. Test shall be performed just prior to final paving over trench.

2. Infiltration testing shall be conducted at high tide.

3. Infiltration test duration shall be a minimum of two (2) hours.

4. For stormwater main testing, plug all pipe outlets discharging into the upstream manhole and test the section outlet. Ensure the section of stormwater main to be tested is dry. Visible leaks into the system shall be corrected regardless of the amount of leakage.

5. Any visual water infiltration of water into the manhole shall be repaired using hydraulic cement or other approved materials.

3.08  PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.
3.09 AS BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.
STANDARD DETAILS

Standard Details for stormwater drainage and gravity collection systems are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself with all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 17-1  EXFILTRATION TRENCH (15-FT DEEP) PROFILE VIEW
DETAIL 17-2  EXFILTRATION TRENCH (15-FT DEEP) SECTION VIEW
DETAIL 17-3  EXFILTRATION TRENCH (< 15-FT DEEP)
DETAIL 17-4  SWALE DRAINAGE
DETAIL 17-5  GENERAL SKIMMERS NOTES
DETAIL 17-6  TYPE I SKIMMER
DETAIL 17-7  TYPE I SKIMMER LID DETAILS
DETAIL 17-8  TYPE II SKIMMER
DETAIL 17-9  CIRCULAR STORMWATER MANHOLE SECTION VIEW
DETAIL 17-10 CIRCULAR STORMWATER MANHOLE TOP VIEW
DETAIL 17-11 CIRCULAR STORMWATER MANHOLE BOTTOM VIEW
DETAIL 17-12 CIRCULAR STORMWATER MANHOLE DIMENSIONS AND REINFORCEMENT
DETAIL 17-13 BOX TYPE MANHOLE
DETAIL 17-14 32" SQUARE STORMWATER INLET PLAN VIEW
DETAIL 17-15 32" SQUARE STORMWATER INLET PLAN VIEW
DETAIL 17-16 3' SQUARE STORMWATER INLET PLAN VIEW
DETAIL 17-17 3' SQUARE STORMWATER INLET PLAN VIEW
DETAIL 17-18 OFF-SET DRAINAGE STRUCTURE
DETAIL 17-19 CURB INLET PLAN AND SECTION
DETAIL 17-20 CURB INLET REINFORCEMENT
DETAIL 17-21 CONCRETE APRON PLAN VIEW
DETAIL 17-22 CONCRETE APRON SECTIONS A AND B
DETAIL 17-23 CONFLICT MANHOLE
DETAIL 17-24 PIPE CASING DETAIL
DETAIL 17-25 STORMWATER MANHOLE COVER USF 385 RING & 'OD' COVER
DETAIL 17-26  STORMWATER MANHOLE COVER USF 667-CR RING & 'OD' COVER
DETAIL 17-27  STORM WATER INLET USF 4105 FRAME & 6224 GRATE
DETAIL 17-28  STORMWATER INLET USF 5100 FRAME & 6147 GRATE
DETAIL 17-29  CURB & GUTTER INLET, USF 5129 FRAME & HOOD WITH HINGED 6176 GRATE
DETAIL 17-30  TRENCH DRAIN SYSTEM
DETAIL 17-31  12" HEAVY DUTY FLOOR DRAIN WITH BOTTOM OUTLET
DETAIL 17-32  FILTER FABRIC JACKET
DETAIL 17-33  VERTICAL SEPARATION AND JOINT SPACING AT CROSSING
DETAIL 17-34  HORIZONTAL SEPARATION FOR PARALLEL MAINS
DETAIL 17-35  EXCEPTIONS TO MINIMUM SPACING REQUIREMENTS
DETAIL 17-36  TYPICAL TRENCH SECTION FOR PVC PIPE
DETAIL 17-37  REINFORCING CONCRETE SLAB FOR GROUND COVER LESS THAN 30 INCHES
NOTES:

1. CATCH BASINS FRAME ELEVATION SHALL BE 3" BELOW LOW POINT.
2. PLASTIC FILTER FABRIC EACH SIDE OVERLAPPED ON TOP SHALL BE USED IN SANDY AREAS AS NOTED ON PLANS AND/OR AS DIRECTED BY THE ENGINEER.
3. WRAP AND SECURE SEMIBAND FILTER FABRIC AROUND SOLID SECTION OF PIPE.
4. SELECT FILL AS SPECIFIED IN CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10 OR BY THE ENGINEER.
5. BALLAST ROCK AS SPECIFIED IN CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10 OR BY THE ENGINEER.
NOTES:

1. SELECT FILL AS SPECIFIED IN CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10 OR
   BY THE ENGINEER.

2. BALLAST ROCK AS SPECIFIED IN CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10
   OR BY THE ENGINEER.
DEFINITIONS:

\( D_s \) = VOLUME OF RUNOFF THAT CAN BE STORED.

\( D_u \) = DEPTH OF TRENCH BELOW THE WATER TABLE.

\( H_2 \) = HEIGHT OF GROUND SURFACE ABOVE THE DESIGN WATER TABLE.

NOTE:

1. USE OF THIS DETAIL SHALL BE IN ACCORDANCE WITH THE DESIGN PARAMETERS IN THE SOUTHEAST FLORIDA WATER MANAGEMENT DISTRICT RESOURCE PERMIT INFORMATION MANUAL, LATEST VERSION.
NOTES:

1. PERFORATED HDPE PIPE TO CONFORM ASTM F667 AND SOCK TO CONFORM ASTM D6707.
2. WASHED ROCK SIZE #2 TO CONFORM ASTM C33 OR AASHTO M43 GRADATION.
3. INVERT SHOULD BE AT OR ABOVE WET SEASON WATER TABLE ELEVATION.
GENERAL NOTES

1. THE SKIMMER IS A HOODED COVER, MOUNTED OVER AN OUTLET IN A CATCH BASIN, THAT PREVENTS OIL AND FLOATING DEBRIS FROM EXITING THE BASIN. USE THIS SKIMMER IN CATCH BASINS AND IN OTHER LOCATIONS WHERE THERE IS A NEED TO PREVENT OIL, DEBRIS OR OTHER FLOATING CONTAMINANTS FROM EXITING CATCH BASINS THROUGH OUTLET PIPES.

2. PLACE NEOPRENE GASKET MATERIAL BETWEEN THE SKIMMER AND THE CATCH BASIN AT ALL POINTS OF CONTACT. TRIM THE GASKET NEATLY TO EXTEND ½ INCH BEYOND THE JOINT ON ALL SIDES.

3. SKIMMER BAFFLE, CLEANOUT PIPE AND ANGLES SHALL BE PRIMARILY CONSTRUCTED OF EITHER GALVANIZED STEEL, ALUMINUM, POLYVINYL CHLORIDE, POLYETHYLENE, FIBERGLASS OR ACRYLONITRILE BUTADIENE STYRENE. ALL STEEL COMPONENTS, OTHER THAN STAINLESS, SHALL BE HOT-DIP GALVANIZED.

4. MOUNTING HARDWARE, HINGES AND LATCHES SHALL ALL BE STAINLESS STEEL. LOSS PREVENTION DEVICE SHALL BE EITHER STAINLESS STEEL CHAIN OR RIVETED NYLON STRAP.

5. MATERIAL USED IN CONSTRUCTION OF SKIMMER BODIES (BAFFLES) AND CLEANOUT PIPE SHALL COMPLY WITH FDOT STANDARD SPECIFICATIONS 943 FOR STEEL, 945 FOR ALUMINUM OR 948 FOR PLASTICS.

6. PLASTIC SKIMMERS SHALL CONTAIN A MINIMUM OF 1.5% BY WEIGHT OF CARBON BLACK FOR UV PROTECTION.

DESIGN NOTES

1. THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE DESIGN PRE-FABRICATED EXFILTRATION TRENCH SKIMMER FOR APPROVAL BY THE CITY OR DESIGNEE.

2. SHOW, IN THE PLANS, THE LOCATION OF THE BASIN AND INDICATE THE INTERIOR SIDE(S) OF THE BASIN IN WHICH THE SKIMMER WILL BE INSTALLED.

3. TYPE I SKIMMER DIMENSIONS SHALL BE BASED ON THE OUTLET PIPE DIAMETER AS SHOWN IN THE DIMENSION TABLE ON 17–5.

4. TYPE II SKIMMERS ARE TO BE USED ONLY WITH OUTLET PIPE DIAMETERS OF 15”, 18”, AND 24”.
SIDE ELEVATION
N.T.S.

<table>
<thead>
<tr>
<th>TYPE I SKIMMER</th>
<th>DIMENSION TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTLET PIPE</td>
<td>A</td>
</tr>
<tr>
<td>18&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>15&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>36&quot;</td>
<td>21&quot;</td>
</tr>
</tbody>
</table>

NOTES:
1. REFER TO 17–7 FOR LID DETAIL.
2. REFER TO 17–5 FOR GENERAL NOTES AND DESIGN NOTES.
BOLT ANGLES TO BASIN WALL WITH
(4) $\frac{3}{4}$" x $\frac{3}{4}$" SS EXPANSION ANCHORS
CLEANOUT PIPE
(LID DETAIL BELOW)
NEOPRENE
GASKET
WELD ANGLES
AT ALL POINTS
OF CONTACT
WITH SKIMMER
OUTLET
OPENING IN
BASIN WALL

TOP VIEW SCHEMATIC
N.T.S.

GREAT WALL

LIMITS OF
SKIMMER
ON ROUND
BASIN WALL

TOP VIEW
N.T.S.

PLAN VIEW
N.T.S.

SECTION VIEW
N.T.S.

NOTES:
1. THE BACKS OF SKIMMERS MUST CONFORM TO THE SHAPE OF THE BASIN WALLS ON WHICH THEY ARE MOUNTED.
2. SHOW, IN THE PLANS, THE RADIUS REQUIRED FOR CURVED-BACK SKIMMERS.
3. REFER TO 17–5 FOR ADDITIONAL NOTES.
NOTES:

1. THE CLEANOUT PORT FOR THE TYPE II SKIMMER SHALL BE GASKETED, WITH EITHER A THREADED SCREW-IN LID OR A LID SECURED BY FOUR STAINLESS STEEL QUICK-RELEASE LATCHES.
2. THE BACKS OF SKIMMERS MUST CONFORM TO THE SHAPE OF THE BASIN WALLS ON WHICH THEY ARE MOUNTED.
3. SHOW, IN THE PLANS, THE RADIi REQUIRED FOR CURVED-BACK SKIMMERS.
4. OUTLET PIPE DIAMETER SHALL BE 15", 18" OR 24".
5. REFER TO 17-5 FOR ADDITIONAL NOTES.
NOTES:

1. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.

2. PRECAST CONCRETE MANHOLES SHALL CONFORM TO ASTM C478, USING CEMENT TYPE II AND A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.

3. FOR OTHER SIZE STRUCTURE REFER TO FDOT INDEX 200.

4. FOR SHALLOW MANHOLES, STEEL REINFORCEMENT MAY BE REDUCED IN ACCORDANCE WITH FDOT INDEX 200.

5. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

6. INSTALL LIFT HOOKS AS REQUIRED.

7. CONCRETE STRUCTURE SHALL BE WATERTIGHT.

8. REFER TO CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 17 SPECIFICATIONS FOR REQUIREMENTS IN UNPAVED AREAS.

9. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW MANHOLE.

NOTES:

1. REFER TO 17–12 FOR DIMENSIONS "C" AND "G" AND REINFORCEMENT "H".
2. USE USF 385 RING AND 'OD' COVER FOR MANHOLE SIZE 6"Ø AND SMALLER (REFER TO 17–25).
3. USE USF 667–CR RING AND 'OD' COVER FOR MANHOLE SIZE BIGGER THAN 6"Ø (REFER TO 17–26).
4. REBAR COVER PER ACI 350.
NOTE:

1. DIMENSION “A” AS SHOWN ON 17-12.
CIRCULAR STORMWATER MANHOLE DIMENSIONS AND REINFORCEMENT

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'–0&quot;</td>
<td>φ 8&quot;</td>
<td>8&quot;</td>
<td>#4 AT 12&quot; CCEW</td>
<td>#4 AT 6&quot; CCEW</td>
<td>6'–4&quot;</td>
<td>φ 5'–4&quot;</td>
<td>#4 AT 6&quot; CCEW</td>
</tr>
<tr>
<td>5'–0&quot;</td>
<td>φ 8&quot;</td>
<td>8&quot;</td>
<td>#5 AT 12&quot; CCEW</td>
<td>#5 AT 7&quot; CCEW</td>
<td>7'–4&quot;</td>
<td>φ 6'–4&quot;</td>
<td>#5 AT 8&quot; CCEW</td>
</tr>
<tr>
<td>6'–0&quot;</td>
<td>φ 8&quot;</td>
<td>10&quot;</td>
<td>#5 AT 12&quot; CCEW</td>
<td>#5 AT 5&quot; CCEW</td>
<td>8'–4&quot;</td>
<td>φ 7'–4&quot;</td>
<td>#5 AT 6&quot; CCEW</td>
</tr>
<tr>
<td>7'–0&quot;</td>
<td>φ 8&quot;</td>
<td>10&quot;</td>
<td>#5 AT 12&quot; CCEW</td>
<td>#5 AT 3 1/2&quot; CCEW</td>
<td>9'–4&quot;</td>
<td>φ 8'–4&quot;</td>
<td>#5 AT 6&quot; CCEW</td>
</tr>
<tr>
<td>8'–0&quot;</td>
<td>φ 10&quot;</td>
<td>10&quot;</td>
<td>2 – #5 AT 12&quot; CCEW</td>
<td>#6 AT 5&quot; CCEW</td>
<td>10'–8&quot;</td>
<td>φ 9'–8&quot;</td>
<td>#5 AT 6&quot; CCEW</td>
</tr>
</tbody>
</table>

NOTES:

1. DIMENSIONS AND REINFORCEMENT AS SHOWN ON 17–9, 17–10, AND 17–11.

2. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.
NOTES:

1. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.

2. PRECAST CONCRETE MANHOLES SHALL CONFORM TO ASTM C913, USING CEMENT TYPE II AND A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.

3. FOR OTHER SIZE STRUCTURE REFER TO FDOT INDEX 200.

4. FOR SHALLOW MANHOLES, STEEL REINFORCEMENT MAY BE REDUCED IN ACCORDANCE WITH FDOT INDEX 200.

5. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

6. INSTALL LIFT HOOKS AS REQUIRED.

7. CONCRETE STRUCTURE SHALL BE WATERTIGHT.

8. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW MANHOLE.
NOTE:

1. ADDITIONAL REBAR IS REQUIRED AT THE OPENINGS.
NOTES:

1. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.

2. PRECAST CONCRETE SQUARE STORMWATER INLET SHALL CONFORM TO ASTM C913, USING TYPE II CEMENT, AND SHALL MAINTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.

3. FOR SHALLOW MANHOLES, STEEL REQUIREMENTS MAY BE REDUCED IN ACCORDANCE WITH FDOT INDEX 200.

4. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER'S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

5. OUTLET PIPE MAY BE RELOCATED TO EITHER SIDE OF THE STRUCTURE (6" MINIMUM CLEARANCE WITH ADJACENT WALL).

6. REINFORCING CONTINUOUS AT CORNERS WITH ALL LAPS 1'-3".

7. ASPHALT PAVEMENT/CONCRETE APRON REQUIRED AROUND ALL INLETS.

8. REFER TO CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 17 SPECIFICATIONS FOR REQUIREMENTS IN UNPAVED AREAS.

9. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW DRAINAGE STRUCTURE.
NOTE:

1. ADDITIONAL REBAR IS REQUIRED AT THE OPENINGS.
NOTES:

1. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.

2. PRECAST CONCRETE SQUARE STORMWATER INLET SHALL CONFORM TO ASTM C913, USING TYPE II CEMENT, AND SHALL MAINTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.

3. FOR SHALLOW MANHOLES, STEEL REQUIREMENTS MAY BE REDUCED IN ACCORDANCE WITH FDOT INDEX 200.

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5. OUTLET PIPE MAY BE RELOCATED TO EITHER SIDE OF THE STRUCTURE.

6. REINFORCING CONTINUOUS AT CORNERS WITH ALL LAPS 1”-3”.

7. ASPHALT PAVEMENT/CONCRETE APRON REQUIRED AROUND ALL INLETS.

8. REFER TO CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 17 SPECIFICATIONS FOR REQUIREMENTS IN UNPAVED AREAS.

9. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW DRAINAGE STRUCTURE.
8" MIN. OF COMPACTED 3/4" GRAVEL (SEE NOTE 4.)

#5 BARS @ 12" BOTH WAYS

8" MIN. OF COMPACTED 3/4" GRAVEL (SEE NOTE 4.)

#4 BARS @ 9" O.C. BOTH WAYS

5" DIAMETER REINFORCED CONCRETE SUPPORT POST

WATERSTOP (TYP.)

NOTES:

1. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.

2. PRECAST CONCRETE STRUCTURES SHALL CONFORM TO ASTM C933. SHALL USE CEMENT TYPE II AND SHALL MAINTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4,000 P.S.I. AT 28 DAYS.

3. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER'S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER AC 350.

4. 3/4" GRAVEL TO CONFORM SIZE #6 OF AASHTO M43.

5. FIELD APPLY MINIMUM TWO (2) COATS (10 MILTHICKNESS, EACH) OFBITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW DRAINAGE STRUCTURE.
NOTES:
1. ALIGN TOP SLAB, CURB, AND GUTTER WITH THE ADJACENT SIDEWALK, CURB, AND GUTTER.
2. SLOPE INLET BOTTOM FROM PIPE SPRING LINE TO INVERT – AS SHOWN.
3. OUTLET PIPE MAY BE RELOCATED TO EITHER SIDE OF THE STRUCTURE.
4. REFER TO 17–20 FOR REINFORCEMENT.
1. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.

2. ALL REINFORCING BARS SHALL BE ASTM A615, GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKINGRolled into the bar which shall indicate the producer, size, type, and grade. REBAR COVER PER ACI 350.
NOTE:

1. FOR FURTHER INLET FRAME AND GRATE DETAILS REFER TO 17–14 & 17–16.
NOTES:

1. CONCRETE SHALL BE EITHER TYPE I OR II, WITH A MINIMUM COMPRRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

2. LIMEROCK SHALL COMPLY WITH AASHTO M43, SIZE #57.
FRAME AND COVER USF 385 RING & ‘OD’ COVER. (SEE 17-25)
MANHOLE RIM ELEVATION TO BE AT PROPOSED FINISHED GRADE
EXCEPT WHERE OTHERWISE NOTED.

#4 @ 6” EACH WAY
#4 @ 12” EACH WAY

ENCASING DUCTILE IRON PIPE,
SEE DETAIL IN 17-24
(WALL OPENING SHALL BE
ENCASING PIPE O.D. PLUS 4”)

CONFLICT PIPE

STORMWATER PIPE
(WALL OPENING MUST BE STORMWATER PIPE O.D. PLUS 4”)

4’Ø
MIN.

2’
MIN.

2’ MIN.

8’ MIN.

6’

6’-4’Ø

#4 @ 6” EW (T&B)

WATERSTOP
(TYP.)

NOTES:

1. MINIMUM STEEL SIZES/CONCRETE THICKNESS ARE DEPICTED ABOVE. CONCRETE THICKNESS AND REINFORCING SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED.

2. PRECAST CONCRETE MANHOLES SHALL CONFORM TO ASTM C478, SHALL USE CEMENT TYPE II AND SHALL MAINTAIN A MINIMUM COMpressive STrength OF 4,000 PSI AT 28 DAYS.

3. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

4. DUCTILE IRON PIPE TO CONFORM TO AWWA C151/A21.51, CLASS 50, NO LINING REQUIRED.

5. ALL OPENINGS SHALL BE SEALED WITH NON-SHRINK GROUT.

6. FIELD APPLY MINIMUM TWO (2) COATS (10 MIL THICKNESS, EACH) OF BITUMASTIC MATERIAL TO EXTERIOR SURFACE OF NEW MANHOLE.
SPACERS SHALL BE BOLT ON STYLE, TWO PIECES SHELL OF T-304 STAINLESS STEEL OF A MINIMUM 14-GAUGE THICKNESS. SHELL SHALL BE LINED WITH RIBBED PVC SHEET OF A 0.090" THICKNESS, OVERLAPS AT EDGES.

CARRIER MAIN

DUCTILE IRON CASING

2" MIN. CLR. BETWEEN PIPE JOINT AND CASING OR 4" BETWEEN MAIN CARRIER AND CASING, WHICHEVER IS GREATER.

PROFILE VIEW

NOTES:

1. THE CARRIER MAIN SHALL BE Restrained AT JOINT.
2. INSTALL STAINLESS STEEL PIPE CASING SPACERS PER MANUFACTURER’S RECOMMENDATIONS (CASCADE WATERWORKS MFG. CO. OR APPROVED EQUAL).
3. PIPE CASING SPACERS SHALL BE POSITIONED AT 10 FEET MAXIMUM OR PER MANUFACTURER'S RECOMMENDATIONS, BUT NOT LESS THAN TWO.
4. THE CARRIER MAIN SHALL BE CENTERED AND RESTRAINED IN THE CASING.
5. ALTERNATE METHODS OF PIPE SUPPORT WITHIN THE CASING MUST BE APPROVED BY THE CITY OF MIAMI BEACH PUBLIC WORKS ENGINEERING DEPARTMENT IN WRITING.
NOTE:

1. MATERIAL: ASTM-A48 CLASS 35B GRAY IRON.
PUBLIC WORKS DEPARTMENT
1700 CONVENTION CENTER DRIVE, MIAMI BEACH, FL. 33139

STORMWATER MANHOLE COVER
USF 667-CR RING & 'OD' COVER

NOTE:

1. MATERIAL: ASTM-A48 CLASS 35B GRAY IRON
NOTE:

1. MATERIAL: ASTM-A48 CLASS 35B GRAY IRON.
NOTE:

1. MATERIAL: ASTM-A48 CLASS 35B GRAY IRON
NOTE:

1. MATERIAL: ASTM-A48 CLASS 35B GRAY IRON.
SECTION VIEW
N.T.S.

NOTE:

1. THIS TRENCH DRAIN SYSTEM SHOULD ONLY BE PLACED IN A HARDENED FINISHED SURFACE.
CAST IRON HEAVY DUTY SLOTTED GRATE (H-20 LOAD RATED)
NOTE:

1. SECURE THE FILTER FABRIC TO THE PIPE USING A METHOD THAT HOLDS THE FABRIC IN PLACE UNTIL THE BACKFILL IS PLACED AND COMPACTED. USE GROUT MIXTURES, MASTICS, OR STRAPPING DEVICES TO SECURE THE FABRIC TO THE PIPE.
CROSSING VERTICAL SEPARATION

WATER MAIN

6" MIN. OUTSIDE OF PIPE TO OUTSIDE OF PIPE (12" PREFERRED)

STORMWATER OR SANITARY SEWER GRAVITY MAIN

WATER MAIN CROSSING OVER STORMWATER OR SANITARY SEWER GRAVITY MAIN

WATER MAIN

12" OUTSIDE OF PIPE TO OUTSIDE OF PIPE

STORMWATER OR SANITARY SEWER FORCE MAIN

WATER MAIN CROSSING OVER STORMWATER OR SANITARY SEWER FORCE MAIN

STORMWATER OR SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

12" OUTSIDE OF PIPE TO OUTSIDE OF PIPE

WATER MAIN CROSSING UNDER STORMWATER OR SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

JOMNT SPACING AT CROSSING

WATER MAIN

3' MIN.

STORMWATER GRAVITY MAIN OR FORCE MAIN

WATER MAIN CROSSING STORMWATER GRAVITY MAIN OR FORCE MAIN

WATER MAIN

6' MIN.

SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

WATER MAIN CROSSING SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

WATER MAIN

NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.
2. MINIMUM SPACING REQUIREMENTS PER FAC 62-555.314.
3. REFER TO 17-35 FOR EXCEPTIONS.
NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.

2. GRAVITY SEWER ONLY MAY BE REDUCED TO 3 FEET WHERE BOTTOM OF WATER MAIN IS AT LEAST 6 INCHES ABOVE TOP OF SEWER.

3. MINIMUM SPACING REQUIREMENTS PER FAC 62-555.314.

4. REFER TO 17-35 FOR EXCEPTIONS.
WHERE IT IS NOT TECHNICALLY FEASIBLE OR ECONOMICALLY SENSIBLE TO COMPLY WITH THE REQUIREMENTS OF FAC 62–555.314 (1) OR (2), THE FLORIDA DEPARTMENT OF HEALTH SHALL ALLOW EXCEPTIONS TO THESE REQUIREMENTS IF SUPPLIERS OF WATER OR CONSTRUCTION PERMIT APPLICANTS PROVIDE TECHNICAL OR ECONOMIC justificATION FOR EACH EXCEPTION AND PROVIDE ALTERNATIVE CONSTRUCTION FEATURES THAT AFFORD A SIMILAR LEVEL OF RELIABILITY AND PUBLIC HEALTH PROTECTION. ACCEPTABLE ALTERNATIVE CONSTRUCTION FEATURES INCLUDE THE FOLLOWING:

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(A), F.A.C.

WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THE REQUIRED MINIMUM HORIZONTAL DISTANCE FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND JOINTS IN THE WATER MAIN ARE BEING LOCATED LESS THAN THE REQUIRED MINIMUM DISTANCE FROM JOINTS IN THE OTHER PIPELINE:

1. USE OF PRESSURE–RATED PIPE CONFORMING TO THE AMERICAN WATER WORKS ASSOCIATION STANDARDS INCORPORATED INTO RULE 62–555.330, F.A.C., FOR THE OTHER PIPELINE IF IT IS A GRAVITY–OR VACUUM–TYPE PIPELINE;
2. USE OF WELDED, FUSED, OR OTHERWISE RESTRAINED JOINTS FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE; OR
3. USE OF WATERTIGHT CASING PIPE OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES' THICK FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE.

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(B), F.A.C.

WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THREE FEET HORIZONTALLY FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND IS BEING LAID LESS THAN THE REQUIRED MINIMUM VERTICAL DISTANCE FROM THE OTHER PIPELINE:

USE OF PIPE, OR CASING PIPE, HAVING HIGH IMPACT STRENGTH (I.E., HAVING AN IMPACT STRENGTH AT LEAST EQUAL TO THAT OF 0.25–INCH–THICK DUCTILE IRON PIPE) OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR BOTH THE WATER MAIN AND FOR THE OTHER PIPELINE IF IT IS NEW AND IS CONVEYING WASTEWATER OR RECLAIMED WATER.
NOTES:

1. CLASS I MATERIALS ARE ANGULAR, 1/4 TO 3/4 INCH WELL GRADED STONE INCLUDING WASHED AND GRADED LIMEROCK. CLASS II MATERIALS ARE WELL GRADED COURSE SANDS AND GRAVEL. SEE TABLE 1 FOR REQUIREMENTS.

2. WHERE REQUIRED, SHEETING AND SHORING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS IN CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10.

3. WHERE UNSTABLE SOILS ARE ENCOUNTERED, INCLUDING PEAT, MUCK OR OTHER ORGANIC SOILS, ELASTIC SILT AND CLAYS BELOW THE WATER TABLE, A FOUNDATION IS REQUIRED. FOUNDATION MATERIAL SHALL BE SELECT BACKFILL MATERIAL 2" MAXIMUM SIZE. 6" LIFTS, COMPACTED TO AT LEAST 98% OF MAX. DENSITY PER AASHTO SPEC. NO. T-180. EXTEND EXCAVATION AT LEAST 2" DEEPER FOR FOUNDATION UNLESS SUITABLE MATERIAL IS FOUND AT A LESSER DEPTH. GREATER DEPTHS MAY BE REQUIRED FOR EXTREMELY POOR CONDITIONS.
NOTES:

1. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

2. FOR PIPE DIAMETER GREATER THAN 30-INCHES, REINFORCING CONCRETE SLAB TO BE DESIGNED BY A STATE OF FLORIDA ENGINEER AND SUBMITTED TO THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT FOR APPROVAL.

3. USE OF THIS STANDARD DETAIL REQUIRES WRITTEN APPROVAL FROM THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT.

4. EXTEND CONCRETE SLAB UNTIL COVER EXCEEDS 30 INCHES.

5. CONCRETE TO BE 3,000 PSI.

6. AIR RELEASE VALVES (ARV) ARE REQUIRED ON SEWER FORCE MAINS ONLY.
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STORMWATER FORCE MAINS AND PUMP STATIONS
SECTION 18. STORMWATER FORCE MAINS AND PUMP STATIONS

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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. Association of State Highway Transportation Officials (AASHTO)
   AASHTO M306 Standard Specification for Drainage, Sewer, Utility, and Related Castings

   ASTM A48 Standard Specification for Iron Castings
   ASTM B62 Standard Specification for Composition Bronze or Ounce Metal Castings
   ASTM B92 Standard Specification for Unalloyed Magnesium Ingot and Stick For Remelting
   ASTM B209 Standard Specification for Deformed and Plant Carbon-Steel Bars for Concrete Reinforcement
   ASTM D4 Standard Test Method for Bitumen Content
   ASTM D2584 Standard Test Method for Ignition Loss of Cured Reinforced Resins
   ASTM D2657 Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings

3. American National Standards Institute (ANSI)
   ANSI B16.1 Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250

4. American Water Works Association (AWWA)
   AWWA C104 Cement Mortar Lining for Ductile Iron Pipe and Fittings For Water
AWWA C105    Polyethylene Encasement for Ductile Iron Pipe
AWWA C110    Ductile Iron and Gray Iron Fittings
AWWA C111    Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings
AWWA C115    Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C150    Thickness Design of Ductile Iron Pipe
AWWA C151    Ductile Iron Pipe, Centrifugally Cast
AWWA C508    Swing-Check Valves for Waterworks Service, 2-In. through 24-In. (50-mm through 600-mm)
AWWA C550    Protective Interior Coatings for Valves and Hydrants
AWWA C600    Installation of Ductile Iron Water Mains and their Appurtenances

5. City of Miami Beach
   Code of Ordinances
   Resolution 2014-28499
   Resolution 2016-4009
   Resolution 2017-30039

6. Florida Administrative Code (FAC)

7. Florida Building Code

8. International Organization for Standards (ISO)
   ISO 8179    Ductile Iron Pipes, Fittings, Accessories and their Joints – External Zinc-Based Coating

9. Miami-Dade County Code of Ordinances

10. Miami-Dade Division of Environmental Resources Management, Department of Regulatory and Economic Resources (RER-DERM) Regulations

11. Occupational Safety and Health (OSHA) Regulations

B. Related standards specified elsewhere in the City of Miami Beach Public Works Manual include but are not limited to the following sections.

   Section 1. Design Standards and Guidelines
Section 8. Surveying, Drawing, and Drafting Requirements

Section 9. Erosion and Sediment Control

Section 10. Earthwork and Roadwork

Section 12. Seawalls

Section 13. Concrete

Section 17. Stormwater Drainage and Gravity Collection System

Section 19. Stormwater Wells

1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/ or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions
concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.03 SUBMITTALS

A. Minimum criteria are presented in this Section and the following Standard Details. Stormwater force mains and pump stations, including associated disciplines as required (civil, structural, electrical, instrumentation, HVAC, etc.) shall be designed by a State of Florida Engineer. Signed and sealed calculations must be provided to support hydraulic and structural design. Signed and sealed buoyancy calculations must also be provided for underground structures.

B. Plans shall be in accordance with Section 8 of the City of Miami (City) Beach Public Works Manual.

C. Properly identified product data for review, including data of pipe and all other materials used, shall be submitted to the City or designee for review and approval prior to fabrication and/or delivery.

D. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

1.04 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and working installation according to these Specifications, and any items of labor, equipment, or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.

1.05 DESIGN CRITERIA

A. Stormwater Design Criteria

1. Design tailwater elevation shall be 2.70 feet North American Vertical Datum (NAVD) per City of Miami Beach Resolution 2014-28499.

2. All new drainage systems must be designed to meet a minimum 10-year 24-hour design storm level of service per Resolution 2017-30039, or latest version. Maximum
stage elevation within a drainage basin shall be 1 foot below the lowest level of finished floor elevation and not higher than the proposed edge of pavement elevation.


4. The rainfall distribution shall be the Soil Conservation Services (SCS) Type III.

5. The unit hydrograph peaking factor shall be 150.

6. For modeling purposes a curve number (CN) of 95 shall be used.

7. Drainage basin boundaries for landlocked lots shall be up to the back property lines and half the lots for waterfront properties. When project is adjacent to residential or commercial developments with an independent and self-contained stormwater system, an offset from the right-of-way line is an acceptable boundary. The City of Miami Beach Public Works Department must approve any deviation from these requirements.

8. The minimum design requirements listed under Item A may be waived at the discretion of the City of Miami Beach Public Works Department.

B. Water Quality: Water quality must meet all requirements of regulatory agencies having jurisdiction. Trash racks and water quality treatment units shall be installed upstream of all stormwater outfalls and wells as necessary to comply with all Local, State, and Federal requirements.

C. Wells: All new stormwater drainage systems shall include well(s) for stormwater disposal. Refer to City of Miami Beach Public Works Manual Section 19 for more details.

D. Outfalls:

1. No outfall shall be constructed in the City without all appropriate Local, State, and Federal approvals. The Contractor shall comply with all necessary Local, State, and federal environmental permits issued for the project. It is the Contractor’s responsibility to become familiar with and be governed by all provisions of these permits.

2. Outfalls require riprap and a dissipator box. Signed and sealed calculations must be submitted to RER-DERM showing that the sea floor will not be disturbed by the exit velocity.

3. Outfalls shall have a backflow prevention device at the exit pipes and manatee grates at the opening.

E. Pipeline Crossings
1. Stormwater mains shall not be laid in the same trench with sewer mains, water mains, gas lines, fuel lines, or electric cables.

2. The horizontal, vertical, and joint separation shall be in accordance with FAC 62-55.314. Refer to Standard Details 18-1, 18-2, and 18-3.

PART 2 – PRODUCTS

2.01 PIPE MATERIALS

A. Pipes for stormwater force mains shall be ductile iron (DI) or high-density polyethylene (HDPE) as specified below.

2.02 DUCTILE IRON (DI) PIPE

A. DI pipe shall be centrifugally cast in metal molds or sand lined molds in accordance with AWWA C151 of grade 60-42-10 ductile iron. The above standard covers ductile iron pipe with nominal pipe sizes from 3 inches up to and including 64 inches in diameter.

B. The pipe thickness shall conform to standard pressure classes AWWA C151 for the following sizes. The pressure class specified is the minimum permitted.

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER (INCHES)</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 thru 12</td>
<td>350</td>
</tr>
<tr>
<td>14 thru 24</td>
<td>250</td>
</tr>
<tr>
<td>30 thru 54</td>
<td>150</td>
</tr>
</tbody>
</table>

C. Depending on design conditions, the City reserves the right to require special thickness classes of DI pipe per AWWA C151 for the following sizes. Flanged (FLG) pipe shall not be less than Class 53 as identified in Table 50.15 of AWWA C150-91.

<table>
<thead>
<tr>
<th>PIPE MATERIAL</th>
<th>NOMINAL PIPE DIAMETER (INCHES)</th>
<th>CLASS</th>
<th>TYPE OF JOINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI</td>
<td>4 thru 12</td>
<td>52</td>
<td>MJ or PO</td>
</tr>
<tr>
<td>DI</td>
<td>14 thru 54</td>
<td>51</td>
<td>MJ or PO</td>
</tr>
<tr>
<td>DI</td>
<td>All</td>
<td>53</td>
<td>FLG</td>
</tr>
</tbody>
</table>

2.03 HIGH-DENSITY POLYETHYLENE (HDPE) PIPE

A. HDPE for stormwater force main pipe shall be high molecular weight. The resin material shall have a standard PE code designation of PE 4710. The pipe shall contain no
recycled compound except that generated in the manufacturer’s own plant from resin of the same specification from the same raw material pipe. The pipe shall be homogeneous throughout and free of visible cracks, bubbles, holes, foreign inclusions, or other injurious defects. It shall be uniform in color, capacity, density, and other physical properties.

B. The pipe shall conform to either Iron Pipe Size (IPS) or DIPS standard dimensions. A standard dimension ratio (SDR) of 11 shall be used whenever available. Approval from the City of Miami Beach Public Works Department is required for any pipe with a proposed SDR greater than 11 (i.e., wall thickness is reduced).

C. All HDPE pipe shall be color coded for the intended service. The color coding shall be permanently coextruded on the pipe outside surface as part of the pipe’s manufacturing process. Painting HDPE pipe to accomplish color coding is not permitted. Color coding shall be as follows:

1. Stormwater - green

D. HDPE pipe shall be marked either continuously or on intervals not to exceed five (5) feet by indirect printing with the following information:

1. Name and/or trademark of the manufacturer.
2. Nominal pipe size.
3. Dimension ratio.
4. The letters PE followed by the polyethylene grade per ASTM D1248, followed by the Hydrostatic Design basis in 100’s of pounds per square inch (psi).
6. Production Code from which time and date of manufacture can be determined.

E. HDPE fittings shall be manufactured to the requirements of ASTM D3261 and fabricated fittings shall be manufactured from pipe of at least one SDR heavier pipe than the system piping and shall be pressure rated to match the system piping. The butt fusion outlets of fabricated fittings shall be machined to the same SDR as the system piping to which they are to be fused.

F. HDPE pipes and fittings shall be joined one to another by thermal butt fusion, saddle fusion, or socket fusion in accordance with procedures recommended by the pipe manufacturer and as outlined in ASTM D2657. The manufacturer shall provide fusion training services to the Contractor upon request.

G. Butt fusion joining of unlike SDRs shall not be permitted. Transition from one SDR to another shall be accomplished by the use of mechanical couplings or a transition nipple,
which is a short length of the heavier SDR pipe with one end machined to the lighter SDR.

H. All HDPE pipe installed via open cut installation shall have a #12 copper wire laid along with the pipe and attached to a terminal with a cast iron lid that maintains continuity of signal and allows for magnetic location of the pipe in the future.

2.04 FITTINGS AND JOINTS

A. Fittings shall be manufactured in accordance with AWWA C110 for nominal pipe sizes 3 inches to 64 inches and shall be either flanged or mechanical joint. Any other fittings, not included in AWWA C110 shall conform in design and performance to the requirements of this Section.

B. Fittings shall have a pressure rating of 350 psi for 4-inch to 24-inch fittings and 250 psi minimum working pressure for 30-inch to 64-inch fittings.

C. Ductile iron pipe above grade shall be flanged.

D. Mechanical and push-on type joints shall be in accordance with AWWA C111.

E. Flanges for flanged pipe shall be in accordance with AWWA C115, shall be ductile iron, shall be manufactured in the United States, shall be rated at 250 psi maximum working pressure, and shall be similar to flange Class 125 per ANSI B16.1. Where shown on the Drawings, pipe and fittings shall be furnished with flanges similar to flange Class 250 per ANSI B16.1. Fittings shall be provided with flanges having a bolt circle and bolt pattern the same as the adjacent pipe and/or mechanical devices.

F. No raised face flanges shall be used. The raised faces shall be milled flat.

G. Flange gaskets shall be full face neoprene rubber. Gasket material (push-on) mechanical joint, gasket restrained shall be neoprene.

2.05 PIPE AND FITTING COATINGS

A. A coating of rust inhibitive primer shall be applied to the ductile iron pipe exterior prior to shipment for piping that is above ground and exposed piping within vaults.

B. For buried service, the piping manufacturer’s standard asphaltic coating shall be applied prior to shipment to the exterior wall of buried DI pipe and fittings in accordance with AWWA C151.

C. Zinc Basecoat: The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 grams per square meter (g/m²) of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a
local minimum not less than 2 mils. The coating system shall conform in every respect to ISO 8179, Part 1. Ductile iron fittings shall also have a zinc protective coating sprayed on at the factory at a minimum of 3 mils.

D. Poly Wrap

1. All DI pipe and fittings shall be poly wrapped conforming to the requirements of AWWA C105 and shall have an 8-mil minimum thickness.

2. Due to the high salinity content of the groundwater, or if corrosive soils are encountered, the City may require the use of V-Bio Enhanced Polyethylene Encasement to protect the ductile iron main, fittings, and valves. All ductile iron pipe and fittings shall be wrapped with the V-Bio Polyethylene Enhanced Encasement and have the zinc protective coating factory applied. The V-Bio Polyethylene Enhanced Encasement shall be accordance with AWWA C600 and AWWA C105. Color shall be green for stormwater. Polyethylene encasement for use with ductile iron pipe systems shall consist of three layers of co-extruded linear low-density polyethylene (LLDPE), fused into a single thickness of not less than 8 mils. The inside layer of the polyethylene wrap to be in contact with the pipe exterior shall be infused with a corrosion inhibitor and antimicrobial biocide to control galvanic corrosion. Product: V-Bio, or approved equal.

3. Polyethylene encasement for ductile-iron pipe shall be supplied as a flat tube meeting the dimensions of Table 1 in AWWA C105 and shall be supplied by the ductile iron pipe manufacturer. Plastic adhesive tape shall consist of polyolefin backing and adhesive which bonds to common pipeline coatings including polyethylene. Products: Canusa Wrrapid Tape; Tapecoat H35; Polyken 934; AA Thread Seal Tape, Inc.; or approved equal.

E. Interior of DI pipes and fittings shall be cement-lined and seal-coated in accordance with AWWA C104.

2.06 RESTRAINING

A. Unless otherwise indicated, all below ground DI pipe fittings 30 inches in diameter and greater shall be provided with manufacturer proprietary restrained joints.

B. Underground ductile iron fittings for DI pipe 24 inches in diameter and less shall be restrained mechanical joint fittings.

C. All fittings and specific pipe joints shall be restrained as outlined below (NO SUBSTITUTIONS). MEGABOND coating system shall be provided for all EBAA products.
**Joint**

<table>
<thead>
<tr>
<th>Push-On DI Pipe 3-inch to 48-inch</th>
<th>TR-Flex by U.S. Pipe or Flex Ring by American; or EBAA Iron Series 1700 Megalug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitting with DI Pipe</td>
<td>EBAA Iron Series 1100 Megalug</td>
</tr>
</tbody>
</table>

**Restraint**

D. Minimum length of pipe to be restrained shall be in accordance with DIPRA Thrust Restraint Design for Ductile Iron Pipe, latest edition.

E. Thrust blocks are not allowed unless specially approved by City of Miami Beach Public Works Department Engineering Division in writing.

### Section 2.07 Plug Valves

A. Plug valves shall be of the non-lubricated, eccentric seating plug type with synthetic rubber-faced plugs. All valves shall be provided with limit stops and rotate 90° from fully open to fully shut. The minimum working pressure for all valves shall be 150 psi, for valves through 36-inch, and the test pressure shall be at least 270 psi for valves up through 12-inch and at least 230 psi for valves 14-inch and larger. Plug valves located at the discharge end of a pump station shall have a 100 percent port area. Plug valves 6-inch and smaller, with a 90 percent minimum port area, are acceptable only at locations away from lift stations. Plug valve 8-inch and larger shall be full opening with 100 percent port area. Plug valves, 8-inch and smaller shall be designed for operation in a horizontal pipeline with the valve shaft in a horizontal position. Plug valves larger than 8-inch shall be designed for operation in a horizontal pipeline, with the valve shaft in a vertical position. The plug valves shall be as manufactured by DeZurik Company, Pratt, Kennedy, or equal as approved by the City, and shall be the standard product of a manufacturer which has produced and sold such equipment for a period of at least five (5) years. Valves shall be suitable for buried, submerged service.

B. All buried valves shall have mechanical joint ends (unless otherwise shown), conforming to AWWA C111, and shall be operated with a standard AWWA 2-inch square nut through a totally enclosed worm gear actuator.

C. Unless otherwise required, all exposed valves 4-inches in diameter and larger shall have flanged ends conforming to ANSI B16.1-125/150 pound standard with face-to-face dimensions of standard plug valves. Valves smaller than 4 inches in diameter shall have screwed ends, unless otherwise noted.

D. Valves shall be bolted bonnet design and be provided with lever operators for interior and exposed service with nominal pipe sizes six (6) inches and less.
E. Interior and expose service with nominal pipe sizes eight (8) inches and larger shall be provided with totally enclosed worm gear actuators. The actuators shall be properly sized to suit the maximum differential across the valve.

F. For buried or submerged service, valves shall be provided with an AWWA operating nut. Valves with nominal pipe sizes eight (8) inches and larger shall have permanently lubricated total enclosed worm gear actuators.

G. The manufacturer shall certify that the plug valves are capable of operating in continuous duty service under these pressures and flow conditions.

H. Each valve shall by hydrostatically tested and tested for bubble tightness after the operator has been mounted and adjusted. Copies of the hydrostatic and leakage test certification and certification of conformance shall be provided to the City or designee.

I. All internal and external ferrous components and surfaces of the valves, with the exception of stainless steel and finished or bearing surfaces, shall be shop painted with two coats (10 mils min. dry film thickness) of the manufacturer’s premium epoxy for corrosion resistance. Damaged surfaces shall be repaired in accordance with the manufacturer’s recommendations.

2.08 CHECK VALVES

A. Check valves shall be outside lever-and-weight or outside lever-and-spring type, in accordance with AWWA C508, full-opening; designed for a working pressure of 150 psi unless otherwise required and shall have a flanged cover piece to provide access to the disc. Corrosive ferrous surfaces of valves, 4-inch and larger shall receive a fusion-bonded epoxy coating conforming to AWWA C550.

B. Body: The valve body shall be of cast iron to ASTM A126, with flanged ends to ANSI B16.1, or mechanical joint ends, as required.

C. Disc: The valve disc shall be of cast iron, ductile iron, or bronze to ASTM B62.

D. Seat and Rings: The valve seat and rings shall be of bronze to ASTM B92 or B148, or of Buna-N.

E. Hinge Pin: The hinge pin shall be 316 stainless steel.

F. Suppliers, or equal as approved by the City: DeZurik, Clow/M&H/Kennedy, Golden Anderson, Mueller.

2.09 VALVE BOXES

A. Valve boxes shall be made from Class 30B gray iron in accordance with ASTM A48.

B. The letters “SW” shall be cast in the cover for stormwater mains.
C. Bottom of cover and seat of frame shall be machined to provide a uniform contact surface.

D. The boxes shall be of such length as will be adapted, without full extension, to the depth of cover required over the pipe at the valve location.

E. All service valve boxes shall be No. 52, and all main valve boxes shall be No. 53 regardless of the size.

F. No. 52 valve boxes shall be U.S. Foundry 7605 ring and FB cover, or approved equal.

G. No. 53 valve boxes shall be U.S. Foundry 7635 ring and FJ cover, or approved equal.

2.10 BACKFLOW PREVENTION DEVICES

RESERVED

2.11 PUMP STATIONS, GENERAL

A. The station will be designed to meet OSHA and RER-DERM requirements. The station will be comprised of the major following elements:

1. Trash rack
2. Water quality treatment unit
3. Wet well
4. Axial flow submersible pumps and motors ("Pump 1" and "Pump 2")
5. Sump pump and motor with discharge to well ("Jockey Pump")
6. Emergency bypass pipe
7. Control panel
8. Paved parking area and access
9. Electrical service and meter
10. Security fence with gate
11. Telemetry system and antenna
12. Rain gauge

B. For those pump stations without a permanent on-site generator, a GENSET plug shall be provided on the control panel. Location of receptacle on control panel side with best accessibility for portable GENSET. Receptacle cap shall be watertight. The emergency power receptacle shall be as follows:
APPLETON, Product: AR40044RS 400A 4W4P

C. All pump stations shall pump into adequately sized force mains with velocities not to exceed 8 feet per second.

D. A six (6) foot high chain link site perimeter fence shall be provided, as allowed by City of Miami Beach and Miami-Dade County codes. The mesh shall be green vinyl fusion-bonded chain link with green aluminum slats each way, pursuant to City of Miami Beach and Miami-Dade County codes. Alternate screening methodologies may be submitted for review and approval.

E. Fence access gate into the site shall be 14 feet wide roll gate with locking hasp suitable for padlock. Driveway between pump station and road to be 16 feet wide.

F. Pump station shall be provided with a 12-inch wide by 18-inch-high identification sign using the three (3) inch high reflective letters Futura font, and should be designed to resist fading with the following information:

*City logo*
Pump Station No. ___
(Red) Emergency Call: 305-673-7625

2.12 AXIAL FLOW SUBMERSIBLE PUMPS

A. All typical stormwater pump stations shall have at least (2) two 20,000 gallon per minute (gpm) axial flow submersible pumps, one primary and one backup.

B. Pumps shall be provided with a formed suction intake made of 316 stainless steel.

C. Pump stations are to be designed to have a primary pump in operation and to alternate the start between pumps, separate from the jockey pump.

2.13 HATCHES

A. Access hatches, frames, and covers shall be heavy-duty aluminum with stainless steel hinges and bolts, capable to resist an occasional AASHTO H-20-44-wheel load per AASHTO M306. Watertight hatches may be required depending on the application, as determined by the Engineer, or as required by regulatory agencies. Hatches rated for pedestrian loads are not accepted.

B. The hatches shall be equipped with spring-loaded covers for easy opening, 90-degree hold-open arms, handgrips, and safety chains. Access hatches shall be furnished with a stainless-steel hasp for padlocking. All hardware shall be American Iron and Steel Institute (AISI) Type 316 stainless steel produced in America.
C. The aluminum shall conform to ASTM B209 and shall be Aluminum Association (AA) Designation 6061-T6. Aluminum sheets and plates shall be alloy 5086-H116 conforming with the standards of ASTM B209.

D. After forming and welding operations, and before assembly, each piece of aluminum shall be finished (anodized) in accordance with Aluminum Association Designations: AA-M10C11C21A41, with minimum 0.8 mil coating.

E. The area in contact with concrete to be painted with self-priming bituminous coating, with a minimum solid content of 68% by volume following ASTM D4.

2.14 CONTROL PANEL AND EQUIPMENT

A. City of Miami Beach Building Department is to review, approve, and inspect electrical portion of the pump and controls.

B. Panel to be free-standing NEMA 4x, type 316 stainless steel (produced in America) enclosure for outdoor duty.

C. Bottom of control panel elevation shall be in accordance with sea level rise consideration and regulatory requirements.

D. Control panel shall include:

   1. Main circuit breaker disconnect
   2. Combination circuit breaker type
   3. NEMA rated motor starters, 240 volt (V) or 480 V, 3 phase, depending on pump size
   4. 120V ground fault receptacle
   5. Wireless telemetry system

E. Provide wireless telemetry system for remote indication of:

   1. Pump 1 running
   2. Pump 1 in AUTO
   3. Pump 1 alarm
   4. Pump 2 running
   5. Pump 2 in AUTO
   6. Pump 2 alarm
6. Jockey Pump running
7. Jockey Pump in AUTO
8. Jockey Pump alarm
9. Wet well high level alarm
10. Wet well low level alarm
11. LCP intrusion alarm
12. Rain gauge

F. All required telemetry conduits shall be installed on PVC conduit 2-inch diameter Schedule 40.

G. Telemetry to have uninterruptible power supply (UPS) system.

H. Control system shall be operated with a submersible level transducer in normal operation with backup float switches. Manual switch shall be provided to toggle between level transducer and float control.

I. Typical level control points for a duplex station with a jockey pump are as follows:
   1. All pumps off
   2. Jockey Pump on
   3. Pump 1 and Pump 2 off
   4. Jockey Pump off
   5. Pump 1 and Pump 2 on
   6. High water alarm point elevation

J. Pumps shall be equipped with soft starts.

PART 3 – EXECUTION

3.01 PREPARATION

A. Permits: The Contractor shall obtain all required right-of-way, City Building Department, and regulatory permits prior to commencing any work.

B. Maintenance of traffic (MOT) shall be provided by the Contractor in accordance with Section 1 of the City of Miami Beach Public Works Manual.
C. Flow Control

1. Plugging and blocking of flow: A stormwater line plug shall be inserted into the line at a manhole upstream from the section where work will be occurring. The plug shall be so designed that all or any portion of the stormwater flows can be released. During the inspection, testing, and replacement portion of the construction, flows shall be shut off or substantially reduced as indicated by the City. The upstream manholes shall be constantly monitored for degree of surcharging. After the testing, inspection, or repair is complete, flows shall be restored to normal level.

2. Pumping and bypassing of flow: Wherever lines are blocked off and the possibility of backing up the stormwater and causing harm to public and private property is foreseen, it shall be the Contractor’s responsibility to bypass flow from manhole to manhole.

D. Stormwater Bypass Pumping

1. Stormwater flows shall be controlled through the section of pipeline and pump stations where work is being performed. Under no circumstances can portions of the system be removed from service for periods of time in excess of that approved by the City of Miami Beach Public Works Department.

2. The Contractor shall be responsible to assess conditions and capacities of the existing stormwater lines and pump stations in coordination with City of Miami Beach Public Works Department and accommodate the flows in the project workplan in order to implement an acceptable bypass pumping plan at no additional cost to the City.

3. Bypass pumping will be required for all stormwater force main and pump station reconstruction that would result in shutdown of existing facilities. The Contractor shall supply the necessary pumps, conduits, and other equipment to not only divert flow around the pump station, manhole, or section of pipe in which work is to be performed, but also to transmit the flow in downstream stormwater lines and/or pump stations without surcharge.

4. The bypass systems shall be of sufficient capacity to handle existing flows.

5. The Contractor shall be responsible for furnishing the necessary labor, power (including Florida Power & Light [FPL] temporary power as warranted), and supervision to set up and operate the pumping and bypass systems.

6. All bypass pumping units shall incorporate sound attenuated enclosures and utilize hospital grade silencers where generators are required to comply with the noise requirements of City of Miami Beach Code of Ordinances, Chapter 46, Article IV.
7. Contractor shall have personnel present at all times during bypassing operation. Bypassing in the roads or within pedestrian traffic areas shall not result in or pose a hazard to pedestrians or traffic.

E. Pre-Shutdown Inspections

1. The following requirements apply to shutdowns for all non-emergency work. These requirements may be waived at the sole discretion of the City of Miami Beach Public Works Department for emergency work.

2. Shutdowns must be scheduled with the City one (1) week in advance.

3. Prior to the shutdown for tie in of any stormwater mains, the City shall perform an on-site inspection in order to verify the following:
   a. Size of pipe
   b. Materials on-site

4. If this inspection does not occur or parts are missing, the shutdown will be canceled.

5. City shall be provided with a minimum of 48 hours notice for pre-shutdown inspection.

6. The City can, at any time, cancel scheduled shutdowns due to inclement weather events and/or special events.

3.02 INSTALLATION OF PIPES AND APPURTEANCES

A. All ductile iron pipes shall be installed true and straight in accordance with AWWA C600. Allowable pipe deflection shall not exceed 50% of the maximum deflection, as recommended by the pipe manufacturer.

B. Detector Tape: All pipes shall have 3-inch-wide green detector tape for stormwater mains. The words “CAUTION STORMWATER MAIN BURIED BELOW” on the upper side of the pipe shall be printed at 30-inch intervals along the tape. Tape shall be placed 18 inches below grade above all stormwater mains or as recommended by manufacturer. Non-metallic tape shall be used above ductile iron pipe.

C. All HDPE pipe shall be furnished and installed with tracer wire. Special care in handling shall be exercised during delivery, distribution, and storage of tracer wire to avoid damage and unnecessary stresses. Damaged tracer wire will be rejected and shall be replaced at the Contractor’s expense. The tracer wire shall have water-blocking characteristics, be corrosive resistant, and have UV protection. The tracer wire shall be copper or copper clad steel with polyethylene insulation and core material of woven polyester and water blocking polyester yarns. The wire shall have an outer jacket of high-density polyethylene. The wire shall be HDD-CCS PE45 as manufactured by Pro
Trace; or Soloshot EHS by Copperhead Industries, or approved equal. Manufacturer/distributor furnished water-blocking connectors and locate clip shall be used as needed. Wire to be strapped to pipe at maximum 10-foot intervals, and the wire is to be brought up at each valve box, leaving and excess length of four (4) feet of wire coiled at each valve. Refer to Standard Detail for additional information. At the stormwater main pressure test, a continuity test shall be performed by the Contractor. The continuity test shall be witnessed and approved by the City’s Representative and Engineer of Record.

D. Bedding and initial backfill shall be in accordance with City of Miami Beach Public Works Manual Section 10 and Standard Detail 18-4 for DI pipe.

E. DI pipe shall be laid with minimum vertical cover of 48 inches.

F. Vertical cover 36 inches to 48 inches below finish grade may be approved on a case-by-case basis by the City of Miami Beach Public Works Department.

G. For vertical cover 30 inches to 36 inches below finish grade, use ductile iron pipe Class 53.

H. For vertical cover less than 30 inches below finish grade, use concrete slab as per Standard Detail 18-7; use of this Standard Detail requires written approval from the City of Miami Beach Public Works Department.

I. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the stormwater-line materials be dropped or dumped into the trench.

J. Care shall be taken to avoid abrasions of the pipe coating. Except where necessary in making connections with other lines, pipe shall be laid with the bells facing in the direction of laying. Defects in coating are to be field repaired.

K. The full length of each section of pipe shall rest solidly upon the completed pipe bed, with recesses excavated and shaped to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and re-laid.

L. City oversees connection between the old and new pipes and all wet taps on existing piping. ALL TAPS MUST BE WITNESSED BY THE CITY. Size-on-size taps are not allowed unless approved in writing by the City of Miami Beach Public Works Department. Tapping sleeve glands shall be tested and pass a pressure test of 100 psi for two (2) hours before the pipe is tapped.

M. CITY TO OPERATE ALL EXISTING VALVES. VALVES BETWEEN EXISTING AND NEW WORK SHALL BE OPERATED BY CITY PERSONNEL. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR’S PERSONNEL OPERATE ANY SUCH GATE OR VALVE.
3.03 SETTING OF VALVES AND BOXES

A. Install where shown or specified and set plumb. Valve boxes shall be centered on the valves and set plumb at finish grade. Boxes shall be installed over each gate valve unless otherwise shown.

B. Where feasible, valves shall be located outside the area of roads and parking. Earth fill shall be carefully tamped around each valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet.

C. There shall be a valve at all branches, tees, and crosses. Valve shall have the top of the operating nut located at maximum of 12 inches below the finished grade.

D. Valve boxes shall have a 24-inch by 24-inch by 8-inch reinforced concrete collar surrounding it in accordance with Standard Detail 18-9.

3.04 INSTALLATION OF PUMP STATION

A. Install trash racks and water quality treatment units in accordance with manufacturer’s printed specifications.

B. Install pumps and equipment in accordance with manufacturer’s printed specifications.

C. All wall openings around pipes are to be sealed with non-shrink grout. Use of link seals for pipe wall penetrations is also acceptable.

D. All new construction and substantial improvements to stormwater pump stations shall have the lowest floor, including electrical, heating, ventilation, plumbing, air conditioning equipment, cable, telephone, and other service facilities including duct work, elevated to no lower than the base flood elevation plus two (2) feet per City of Miami Beach Code of Ordinances Section 54-48 and Ordinance 2016-4009.

3.05 FLUSHING AND TESTING

A. Stormwater mains shall be cleaned and flushed prior to pressure testing, with sufficient pressure to displace all test water and to remove sand, mud, or other deposits. If necessary, other approved methods must be used to ensure the removal of all such deposits. Water used shall be metered and paid for by the Contractor.

B. Mains shall be tested as a whole or in sections between line valves, unless otherwise specified or approved by the City. Unless otherwise approved by the City, the total length of pipe for any single test shall not exceed 2,000 feet.

C. The complete force main system shall be pressure tested. The pressure test shall be for two (2) hours at 100 psi minimum test pressure in accordance with AWWA C600. No more than five (5) psi drop over the duration of the test. Final approval will be based on
leakage test results. The maximum allowable leakage shall be determined by following AWWA formula:

\[ L = \frac{S \times D \times \sqrt{P}}{148,000} \]

Where:
- \( D \) = Pipe diameter in inches
- \( S \) = Length of lines in lineal feet
- \( P \) = Average test pressure in psi
- \( L \) = Allowable leakage for system in gallons per hour

The pressure test shall be witnessed by a representative of the City of Miami Beach Public Works Department and the Engineer of Record or his/her representative.

3.06 PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.

3.07 AS BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.
STANDARD DETAILS

Standard Details for stormwater force mains and pump stations are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself with all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 18-1  VERTICAL SEPARATION AND JOINT SPACING AT CROSSING
DETAIL 18-2  HORIZONTAL SEPARATION FOR PARALLEL MAINS
DETAIL 18-3  EXCEPTIONS TO MINIMUM SPACING REQUIREMENTS
DETAIL 18-4  TYPICAL TRENCH SECTION FOR DIP
DETAIL 18-5  UTILITY CROSSING DETAIL
DETAIL 18-6  TYPICAL TRENCH SECTION PVC PIPE
DETAIL 18-7  REINFORCING CONCRETE SLAB FOR GROUND COVER LESS THAN 30 INCHES
DETAIL 18-8  TRACER WIRE DETAIL
DETAIL 18-9  VALVE COLLAR DETAIL AND VALVE BOX INSTALLATION
DETAIL 18-10 NO. 52 VALVE BOX
DETAIL 18-11 NO. 53 VALVE BOX
DETAIL 18-12 POLYETHYLENE ENCASEMENT FOR DUCTILE IRON PIPES AND FITTINGS
DETAIL 18-13 RESTRAINING DETAIL
DETAIL 18-14 RESTRAINING SECTION
DETAIL 18-15 RESTRAINING SCHEDULE
DETAIL 18-16 FORCE MAIN ENTERING MANHOLE
DETAIL 18-17 PUMP STATION NOTES
DETAIL 18-18 PUMP STATION PLAN VIEW
DETAIL 18-19 PUMP STATION SECTION VIEW
DETAIL 18-20 MANATEE GRATE
CROSSING VERTICAL SEPARATION

6" MIN. OUTSIDE OF PIPE TO OUTSIDE OF PIPE
(12" PREFERRED)

STORMWATER OR SANITARY SEWER GRAVITY MAIN

WATER MAIN CROSSING OVER STORMWATER OR SANITARY SEWER GRAVITY MAIN

STORMWATER OR SANITARY SEWER FORCE MAIN

WATER MAIN CROSSING OVER STORMWATER OR SANITARY SEWER FORCE MAIN

STORMWATER OR SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

12" OUTSIDE OF PIPE TO OUTSIDE OF PIPE

WATER MAIN CROSSING UNDER STORMWATER OR SANITARY SEWER GRAVITY OR FORCE MAIN

NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.
2. MINIMUM SPACING REQUIREMENTS PER FAC 62–555.314.
3. REFER TO 18–3 FOR EXCEPTIONS.
WATER MAIN PARALLEL TO STORMWATER GRAVITY MAIN OR FORCE MAIN

WATER MAIN

3' MINIMUM OUTSIDE OF PIPE TO OUTSIDE OF PIPE

STORMWATER GRAVITY MAIN OR FORCE MAIN

WATER MAIN PARALLEL TO STORMWATER GRAVITY MAIN OR FORCE MAIN

WATER MAIN

6' MINIMUM OUTSIDE OF PIPE TO OUTSIDE OF PIPE (10' PREFERRED) SEE NOTE 2.

SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

WATER MAIN PARALLEL TO SANITARY SEWER GRAVITY MAIN OR FORCE MAIN

NOTES:

1. SEPARATIONS SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE.

2. GRAVITY SEWER ONLY MAY BE REDUCED TO 3 FEET WHERE BOTTOM OF WATER MAIN IS AT LEAST 6 INCHES ABOVE TOP OF SEWER.


4. REFER TO 18–3 FOR EXCEPTIONS.
WHERE IT IS NOT TECHNICALLY FEASIBLE OR ECONOMICALLY SENSIBLE TO COMPLY WITH THE REQUIREMENTS OF FAC 62–555.314 (1) OR (2), THE FLORIDA DEPARTMENT OF HEALTH SHALL ALLOW EXCEPTIONS TO THESE REQUIREMENTS IF SUPPLIERS OF WATER OR CONSTRUCTION PERMIT APPLICANTS PROVIDE TECHNICAL OR ECONOMIC JUSTIFICATION FOR EACH EXCEPTION AND PROVIDE ALTERNATIVE CONSTRUCTION FEATURES THAT AFFORD A SIMILAR LEVEL OF RELIABILITY AND PUBLIC HEALTH PROTECTION. ACCEPTABLE ALTERNATIVE CONSTRUCTION FEATURES INCLUDE THE FOLLOWING:

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(A), F.A.C.

WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THE REQUIRED MINIMUM HORIZONTAL DISTANCE FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND JOINTS IN THE WATER MAIN ARE BEING LOCATED LESS THAN THE REQUIRED MINIMUM DISTANCE FROM JOINTS IN THE OTHER PIPELINE:

1. USE OF PRESSURE-RATED PIPE CONFORMING TO THE AMERICAN WATER WORKS ASSOCIATION STANDARDS INCORPORATED INTO RULE 62–555.330, F.A.C., FOR THE OTHER PIPELINE IF IT IS A GRAVITY- OR VACUUM-TYPE PIPELINE;
2. USE OF WELDED, FUSED, OR OTHERWISE RESTRAINED JOINTS FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE; OR
3. USE OF WATERTIGHT CASING PIPE OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR EITHER THE WATER MAIN OR THE OTHER PIPELINE.

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62–555.314(5)(B), F.A.C.

WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THREE FEET HORIZONTALLY FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND IS BEING LAID LESS THAN THE REQUIRED MINIMUM VERTICAL DISTANCE FROM THE OTHER PIPELINE:

USE OF PIPE, OR CASING PIPE, HAVING HIGH IMPACT STRENGTH (I.E., HAVING AN IMPACT STRENGTH AT LEAST EQUAL TO THAT OF 0.25-INCH–THICK DUCTILE IRON PIPE) OR CONCRETE ENCASEMENT AT LEAST FOUR INCHES THICK FOR BOTH THE WATER MAIN AND FOR THE OTHER PIPELINE IF IT IS NEW AND IS CONVEYING WASTEWATER OR RECLAIMED WATER.
NOTES:

1. UNLESS OTHERWISE SPECIFIED, BEDDING MATERIAL SHALL CONSIST OF COMPACTED WASHED AND GRADED LIMEROCK (3/8" - 7/8"), 6" LIFTS.

2. WHERE REQUIRED, SHEETING AND SHORING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS IN THE CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10.

3. WHERE UNSTABLE SOILS ARE ENCOUNTERED, INCLUDING PEAT, MUCK OR OTHER ORGANIC SOILS, ELASTIC SILT AND CLAYS BELOW THE WATER TABLE, A FOUNDATION IS REQUIRED. FOUNDATION MATERIAL SHALL BE SELECT BACKFILL MATERIAL, 2" MAXIMUM SIZE, 6" LIFTS, COMPACTED TO AT LEAST 98% OF MAXIMUM DENSITY DENSITY PER AASHTO SPEC. NO. T-180. EXTEND EXCAVATION AT LEAST 2' DEEPER FOR FOUNDATION UNLESS SUITABLE MATERIAL IS FOUND AT A LESSER DEPTH. GRATER DEPTHS MAY BE REQUIRED FOR EXTREMELY POOR CONDITIONS.
FINISHED GRADE

CONFLICT PIPE

36"
MINIMUM COVER

FITTING TYPE
N.T.S

CONFLICT PIPE

SEE NOTE FOR ACCEPTABLE DEFLECTION

SLOPE UP TO MIN. COVER.

DEFLECTION TYPE
N.T.S

NOTES:
1. DEFLECTION ANGLE NOT TO EXCEED 50% OF MANUFACTURER’S RECOMMENDED MAXIMUM JOINT DEFLECTION.
2. PIPE CLEARANCES SHALL BE PER FAC AND DETAIL 18–1
NOTES:

1. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. REBAR COVER PER ACI 350.

2. FOR PIPE DIAMETER GREATER THAN 30-INCHES, REINFORCING CONCRETE SLAB TO BE DESIGNED BY A STATE OF FLORIDA ENGINEER AND SUBMITTED TO THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT FOR APPROVAL.

3. USE OF THIS STANDARD DETAIL REQUIRES WRITTEN APPROVAL FROM THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT.

4. EXTEND CONCRETE SLAB UNTIL COVER EXCEEDS 30 INCHES.

5. CONCRETE TO BE 3,000 PSI.

6. AIR RELEASE VALVES (ARV) ARE REQUIRED ON SEWER FORCE MAINS ONLY.
TRACER WIRE DETAIL

Title:

PUBLIC WORKS DEPARTMENT
1700 CONVENTION CENTER DRIVE, MIAMI BEACH, FL. 33139

NOTES:

1. TRACER WIRE SHALL BE INSTALLED ON ALL UNDERGROUND HDPE PIPING.

2. THE ENDS OF ALL TRACER WIRES, WHETHER THEY ARE SPLICED, CONNECTED, OR TERMINATED, SHALL HAVE THE LAST THREE INCHES PIG TAILED AS DETAILED HEREON.

3. AFTER INSTALLATION OF THE TRACER WIRE THE SYSTEM SHALL BE SUBJECTED TO TESTING, PRIOR TO BACK FILL, IN ORDER TO ESTABLISH THAT THE SYSTEM IS FUNCTIONAL.

4. THE EXTERNAL COLOR OF THE LOCATE WIRE SHALL FOLLOW THE APWA UNIFORM COLOR CODE AS FOLLOWS:
   RED: ELECTRIC
   YELLOW: GAS
   BLUE: POTABLE WATER
   GREEN: SEWER OR STORMWATER
NOTE:

1. ENTIRE MARKER TO BE COATED WITH EPOXY ADHESIVE TO PREVENT TARNISHING (1/16" MIN. DFT).
NOTES:

1. USF 7605 RING AND FB COVER.
2. MATERIAL: ASTM-A48 CLASS 30B GRAY IRON.
3. MACHINE FINISH BOTTOM OF COVER AND SEAT OF FRAME.
4. THE LETTERS "SW" SHALL BE CAST IN COVER FOR STORMWATER FORCE MAINS.
5. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
6. REFER TO DETAIL 18–9 FOR INSTALLATION REQUIREMENTS.
7. ALL SERVICE VALVE BOXES SHALL BE No. 52 VALVE BOXES.
NOTES:

1. USF 7635 RING AND FJ COVER.
2. MATERIAL: ASTM-A48 CLASS 30B GRAY IRON.
3. MACHINE FINISH BOTTOM OF COVER AND SEAT OF FRAME.
4. ALL DIMENSIONS ARE NET CASTING, NOT PATTERN.
5. THE LETTERS "SW" SHALL BE CAST IN COVER FOR STORMWATER FORCE MAINS.
6. REFER TO DETAIL 18-9 FOR INSTALLATION REQUIREMENTS.
7. ALL MAIN VALVE BOXES SHALL BE NO. 53 VALVE BOXES REGARDLESS OF SIZE.
CUT THE POLYETHYLENE TUBE 2 FT. LONGER THAN THE LENGTH OF PIPE SECTION. SLIP THE TUBE AROUND THE PIPE SO AS TO ALLOW 1’ OVERLAP AT EACH END. OVERLAP THE OTHER PIPE SECTION AFTER PIPE IS INSTALLED.

**METHOD A (TUBE) OVERLAP**

N.T.S.

CUT THE POLYETHYLENE TUBE 1 FT. SHORTER THAN THE LENGTH OF PIPE SECTIONS. SLIP THE TUBE AROUND THE PIPE SO AS TO ALLOW 6” OF BARE PIPE AT EACH END. BEFORE MAKING A JOINT, SLIP A 3’ LENGTH OF POLYETHYLENE TUBE OVER THE PRECEDING PIPE SECTION. OVERLAP BY AT LEAST 1’ AND_secure_after_joint_is_made.

**METHOD B (TUBE) OVERLAP**

N.T.S.

EACH SECTION OF PIPE, FITTINGS OR VALVE ETC. IS COMPLETELY WRAPPED WITH A FLAT POLYETHYLENE SHEET OVERLAP BY AT LEAST 1’ AND METHOD C (FLAT SHEET) SECURED.

**METHOD C (FLAT SHEET) OVERLAP**

N.T.S.

**NOTES:**

1. ALL UNDERGROUND DUCTILE IRON PIPES AND FITTINGS SHALL BE POLYWRAPPED, CONFORMING TO THE REQUIREMENTS OF AWWA C105.
2. POLYETHYLENE TUBE AND SHEET SIZES PER AWWA C105 TABLE 1.
3. PIPE-SHAPED FITTINGS (BENDS, REDUCERS, ETC.) SHALL BE TREATED ACCORDING TO METHODS "A" AND "B". ODD SHAPED FITTINGS (VALVES, TEES, ETC.) SHALL BE TREATED ACCORDING TO METHOD "C".
4. 6” ADHESIVE TAPE SHALL BE USED TO SECURE ENCASEMENT.
5. SPECIAL CARE SHALL BE TAKEN TO PREVENT DAMAGE TO WRAPPING WHEN PLACING BACKFILL.
6. REFER TO ASTM D1248 FOR APPROVED MATERIAL AND ACCESSORIES.
7. ONLY VIRGIN POLYETHYLENE MATERIAL HAVING A MINIMUM THICKNESS OF 8 MILS IS APPROVED.
SECTION VIEW

NOTES:

1. EYE BOLT = GLAND BOLT

2. FOR CONTINUOUS RODDING USE SLEEVE NUT.

3. REFER TO RESTRAINING SCHEDULE ON 18–15.

4. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, LATEST EDITION AND EBAA IRON’S RESTRAINT LENGTH CALCULATOR, LATEST VERSION FOR PVC PIPE.
5/8" PLATE, TACK-WELD TO BRACKET.

5/8" PLATE BRACKET WELDED FULL LENGTH TO COLLAR.

4"X3/4" COLLAR

AMERICAN 316 STAINLESS STEEL ROD THREAD ENDS. PAINT THREAD ENDS OF ALL RODS SUFFICIENTLY TO ALLOW FOR PROPER TENSION.

COLLAR MADE OF 3/4" STAINLESS STEEL PLATE, ALLOY 304, 4" WIDE.

1/4" (TYP.)

7/8" BOLT (MIN.)

3/8" (TYP.)

PIECE VARIATES

NOTES:

1. STAINLESS STEEL THREADED RESTRAINING RODS SHALL BE USED IN SITUATIONS WHERE MAINS ARE CONNECTED TO FITTINGS, VALVES OR SPECIALS AND THE DISTANCE IS LESS THAN 16 FT.; OTHERWISE USE MEGALUGS.

2. REFER TO RESTRAINING SCHEDULE ON 18-15.

3. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, LATEST EDITION AND EBAA IRON'S RESTRAINT LENGTH CALCULATOR, LATEST VERSION FOR PVC PIPE.
### SANITARY SEWER OR STORMWATER FORCE
MAIN PRESSURE AT 100 P.S.I.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>ROD DIAMETER</th>
<th>NO. OF RODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8” &amp; SMALLER</td>
<td>3/4”</td>
<td>2</td>
</tr>
<tr>
<td>12”</td>
<td>3/4”</td>
<td>3</td>
</tr>
<tr>
<td>16”</td>
<td>3/4”</td>
<td>4</td>
</tr>
<tr>
<td>20”</td>
<td>1”</td>
<td>4</td>
</tr>
<tr>
<td>24”</td>
<td>3/4”</td>
<td>10</td>
</tr>
<tr>
<td>30”</td>
<td>1”</td>
<td>8</td>
</tr>
<tr>
<td>36”</td>
<td>1”</td>
<td>12</td>
</tr>
<tr>
<td>40”</td>
<td>1-1/4”</td>
<td>10</td>
</tr>
<tr>
<td>48”</td>
<td>1-1/4”</td>
<td>12</td>
</tr>
</tbody>
</table>

### WATER MAINS.
PRESSURE AT 120 P.S.I.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>ROD DIAMETER</th>
<th>NO. OF RODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6”</td>
<td>3/4”</td>
<td>2</td>
</tr>
<tr>
<td>8”</td>
<td>3/4”</td>
<td>3</td>
</tr>
<tr>
<td>12”</td>
<td>3/4”</td>
<td>4</td>
</tr>
</tbody>
</table>

**NOTE:**

1. MINIMUM LENGTH OF PIPE TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH DIPRA THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, LATEST EDITION AND EBAA IRON’S RESTRAINT LENGTH CALCULATOR, LATEST VERSION FOR PVC PIPE.
NOTES:

1. FORCE MAIN TO ENTER MANHOLE AS CLOSE AS POSSIBLE TO 180° TO GRAVITY OUTLET.

2. THE INVERT LEVEL OF FORCE MAIN AT POINT OF ENTRY SHALL BE 6" ABOVE INVERT OF MANHOLE.

3. CORE ENTRY ONLY INTO EXISTING MANHOLES

4. REFER TO SECTION 17 FOR GRAVITY STORMWATER AND MANHOLE SPECIFIC REQUIREMENTS

5. PIPE SUPPORT(S) SHALL BE PROVIDED IN SUFFICIENT QUANTITY AND DESIGNED TO PROPERLY SUPPORT PIPE.

SECTION VIEW
N.T.S.
NOTES:

1. THE STANDARD DETAILS PRESENTED HEREIN ARE NOT CONSTRUCTION DRAWINGS, BUT ARE GUIDELINES FOR MINIMUM DESIGN REQUIREMENTS. THE ENGINEER OF RECORD SHALL VERIFY AND MODIFY INFORMATION SHOWN IN ACCORDANCE WITH ALL APPLICABLE CODES AND STANDARDS, TO COMPLY WITH THE REQUIREMENTS OF THEIR DESIGN AND CITY REQUIREMENTS.

2. PUMP STATIONS SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT HYDRAULIC AND STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED FOR UNDERGROUND STRUCTURES.

3. MINIMUM CONC. STRENGTH AT 28 DAYS:
   FC'=4000 PSI (TYPE II CEMENT)

4. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. MINIMUM COVER PER ACI 318.

5. PROTECTIVE CONCRETE COATING SHALL BE APPLIED TO INTERIOR OF STRUCTURES.
WET WELL AND PUMPS

NOTES:

1. THIS SCHEMATIC DEPICTS A TYPICAL DUPLEX STORMWATER PUMP STATION LAYOUT. THE ENGINEER SHALL VERIFY AND MODIFY THE INFORMATION SHOWN HEREIN IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS TO COMPLY WITH ALL REGULATORY REQUIREMENTS. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT HYDRAULIC AND STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED FOR UNDERGROUND STRUCTURES.

2. WATER QUALITY MUST MEET ALL REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION PRIOR TO STORMWATER DISCHARGE VIA OUTFALL OR DISPOSAL WELL.

3. OUTFALLS REQUIRE RIPRAP AND A DISSIPATOR BOX. SIGNED AND SEALED CALCULATIONS MUST BE SUBMITTED TO RER–DERM SHOWING THAT THE SEA FLOOR WILL NOT BE DISTURBED BY THE EXIT VELOCITY.
1. THIS SCHEMATIC DEPICTS A TYPICAL DUPLEX STORMWATER PUMP STATION LAYOUT. THE ENGINEER SHALL VERIFY AND MODIFY THE INFORMATION SHOWN HEREIN IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS TO COMPLY WITH ALL REGULATORY REQUIREMENTS. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT HYDRAULIC AND STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED FOR UNDERGROUND STRUCTURES.

2. WATER QUALITY MUST MEET ALL REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION PRIOR TO STORMWATER DISCHARGE VIA OUTFALL OR DISPOSAL WELL.

3. OUTFALLS REQUIRE RIP RAP AND A DISSIPATOR BOX. SIGNED AND SEALED CALCULATIONS MUST BE SUBMITTED TO RER-DERM SHOWING THAT THE SEA FLOOR WILL NOT BE DISTURBED BY THE EXIT VELOCITY.
NOTES:

1. GUARDS AT PIPE ENDS SHALL BE MADE OF STAINLESS STEEL GRADE 304L.
2. ALL HARDWARE USED TO SECURE THE GRATE SHALL BE STAINLESS STEEL GRADE 304.
3. MANATEE GRATE SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
STORMWATER WELLS
SECTION 19. STORMWATER WELLS

STANDARD DETAILS

Standard Details for stormwater wells are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself with all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 19-1  STORMWATER WELL NOTES
DETAIL 19-2  STORMWATER WELL PLAN VIEW
DETAIL 19-3  STORMWATER WELL SECTION A
DETAIL 19-4  STORMWATER WELL SECTION B
NOTES:

1. NO STORMWATER WELL SHALL BE CONSTRUCTED IN THE CITY OF MIAMI BEACH (CITY) WITHOUT ALL APPROPRIATE LOCAL, STATE, AND FEDERAL APPROVALS. THE CONTRACTOR SHALL COMPLY WITH ALL NECESSARY LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS ISSUED FOR THE PROJECT. IT IS THE CONTRACTOR’S RESPONSIBILITY TO BECOME FAMILIAR WITH AND BE GOVERNED BY ALL PROVISIONS OF THESE PERMITS.

2. TRASH RACKS AND WATER QUALITY CONTROL DEVICES SHALL BE INSTALLED UPSTREAM OF STORMWATER WELL AS NECESSARY TO COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REQUIREMENTS.

3. MINIMUM CRITERIA ARE PRESENTED IN THESE STANDARD DETAILS. STORMWATER WELLS SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT HYDRAULIC AND STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED FOR UNDERGROUND STRUCTURES.

4. WORK SHALL BE PERFORMED IN ACCORDANCE WITH CONTRACT DOCUMENTS, DRAWINGS, AND/OR CITY OF MIAMI BEACH PUBLIC WORKS MANUAL REQUIREMENTS IN A NEAT AND ACCURATE MANNER. IT IS THE INTENT OF THE CITY TO OBTAIN A COMPLETE AND WORKING INSTALLATION, AND ANY ITEMS OF LABOR, EQUIPMENT, OR MATERIALS WHICH MAY REASONABLY BE ASSUMED AS NECESSARY TO ACCOMPLISH THIS END SHALL BE SUPPLIED WHETHER OR NOT THEY ARE SPECIFICALLY SHOWN ON THE PROJECT PLANS OR STATED HEREIN.

5. RELATED STANDARDS SPECIFIED ELSEWHERE IN THE CITY OF MIAMI BEACH PUBLIC WORKS MANUAL INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING SECTIONS.
   SECTION 1. DESIGN STANDARDS AND GUIDELINES
   SECTION 8. SURVEYING, DRAWING, AND DRAFTING REQUIREMENTS
   SECTION 9. EROSION AND SEDIMENT CONTROL
   SECTION 10. EARTHWORK AND ROADWORK
   SECTION 13. CONCRETE
   SECTION 17. STORMWATER DRAINAGE AND GRAVITY COLLECTION SYSTEM
   SECTION 18. STORMWATER FORCE MAINS AND PUMP STATIONS

6. UPON COMPLETION OF CONSTRUCTION, AS–BUILT DRAWINGS SHALL BE PROVIDED TO THE CITY OF MIAMI BEACH PUBLIC WORKS DEPARTMENT IN ACCORDANCE WITH SECTION 8 OF THE CITY OF MIAMI BEACH PUBLIC WORKS MANUAL.

7. ALL CONCRETE SHALL BE TYPE II, WITH A MINIMUM COMpressive STRENGTH OF 4,000 PSI AT 28 DAYS.

8. ALL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE FROM DOMESTIC MILLS AND SHALL HAVE THE MANUFACTURER’S MILL MARKING ROLLED INTO THE BAR WHICH SHALL INDICATE THE PRODUCER, SIZE, TYPE, AND GRADE. MINIMUM COVER PER ACI 318.

9. NO WELDS ON THE TOP 15 FEET OF THE WELL CASING ARE ALLOWED.

10. PROTECTIVE CONCRETE COATING SHALL BE APPLIED TO INTERIOR OF DRAINAGE WELL STRUCTURE.
USF 230 RING & COVER (30'ø)

USF 667-CR RING & 'OD' COVER (36'ø) CENTERED WITH WELL (LETTERING TO SAY "WELL")

PLAN VIEW N.T.S.

RIA ARE PRESENTED IN THESE STANDARD DETAILS. STORMWATER WELLS SHALL BE
NOTES:

1. MINIMUM CRITERIA ARE PRESENTED IN THESE STANDARD DETAILS. STORMWATER WELLS SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT HYDRAULIC AND STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED FOR UNDERGROUND STRUCTURES.

2. WATER QUALITY MUST MEET ALL REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION PRIOR TO STORMWATER DISCHARGE VIA DISPOSAL WELL.
NOTES:

1. MINIMUM CRITERIA ARE PRESENTED IN THESE STANDARD DETAILS. STORMWATER WELLS SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT HYDRAULIC AND STRUCTURAL DESIGN. SIGNED AND SEALED BUOYANCY CALCULATIONS MUST ALSO BE PROVIDED FOR UNDERGROUND STRUCTURES.

2. WATER QUALITY MUST MEET ALL REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION PRIOR TO STORMWATER DISCHARGE VIA DISPOSAL WELL.
IRRIGATION SYSTEMS
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STANDARD DETAILS
PART 1 – GENERAL

1.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. All relevant American National Standards Institute (ANSI), American Water Works Association (AWWA), and American Society for Testing and Materials (ASTM) Standards and Specifications shall apply, as well as all applicable building codes and approval from other public agencies having jurisdiction over the work.

B. Without limiting the generality of the other requirements, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available.

1. Association of State Highway Transportation Officials (AASHTO)
   AASHTO T-180 Standard Method of Test for Moisture–Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

   ASTM B3 Standard Specification for Soft or Annealed Copper Wire
   ASTM B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
   ASTM D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
   ASTM D2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)

3. City of Miami Beach Code of Ordinances

4. Florida Building Code

5. Miami-Dade County Code of Ordinances

6. Occupational Safety and Health (OSHA) Regulations

C. Related standards specified elsewhere in the City of Miami Beach (City) Public Works Manual include but are not limited to the following sections.

   Section 1. Design Standards and Guidelines
   Section 3. Right-of-Way Construction Requirements
   Section 8. Surveying, Drawing, and Drafting Requirements
   Section 9. Erosion and Sediment Control
1.02 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all Local, State, Federal, and OSHA laws and regulations.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of the Work.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of Local, State, and Federal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. Contractor is solely responsible for site security. Contractor shall properly secure all materials and equipment from damage and/or theft. In the event that the Contractor’s tools or materials delivered to or stored on-site are stolen or damaged, the Contractor shall be responsible for such theft.

E. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or designee or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by or unsafe practices on the part of its employees. In the event of the Contractor’s failure to comply, the City or designee may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the City or designee to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

F. The Contractor shall be in compliance with all applicable provisions of the Florida Building Code and OSHA Regulations in general and specifically the provisions concerning confined space entry and the Trench Safety Act, including notification of the Sunshine State One-Call Center (1-800-432-4770), 48 hours prior to any excavation.

1.03 SCOPE OF WORK

A. Irrigations plans shall be provided to reflect the scope of work with a level of detail that will be required to obtain all necessary permits and comply with all Local, State, and Federal regulations.
B. Unless otherwise specified in the Contract Documents, this scope of work includes the complete and proper construction of the landscape irrigation system including but not limited to the following.

1. All piping including but not limited to mains, laterals, fittings, sleeves, connections, tees, risers, and clamps.

2. All valves including control/shut-off, ball, globe, zone, pressure-reducing, quick coupling including valve boxes, markers, connections, operators, fill, wire splice kits, detectable underground warning tape, and other accessories.

3. Complete automatic control system, including controllers, controller enclosure/slab/pedestal and mounting, programming, wired conduit runs, rain sensor device (if applicable), and control valve wiring connections.

4. Complete electrical connection of the controller to service panel location.

5. Connections of piping to the supply source utilizing a meter and installing a backflow prevention device and flow meter at the meter location as per Miami-Dade County Code of Ordinances Chapter 32.

6. All excavation, site work, relocation, or replacement of utilities, backfill, and restoration of all disturbed areas and circumstances.

7. Adjustment of any system components to work with existing and proposed landscaping.

8. Supply, deliver, store, and protect all equipment and materials, including pipe and fittings, valves, controllers, wire, and all other component parts necessary for the installation of a fully automatic irrigation system as indicated in these Specifications.

C. Complete sod, planting, pavement, and other restoration in all areas that are trenched or damaged during the installation of the irrigation system upon completion of the project.

D. Contractor shall be responsible for obtaining all permits and pay all required fees to any governmental agency having jurisdiction over the work. Inspections required by local ordinances during the course of construction shall be arranged as required. On completion of the work, satisfactory evidence shall be furnished to the City or designee showing that all work has been installed in accordance with all ordinances and code requirements.

1.04 DESCRIPTION OF SYSTEM

A. This system will be designed as a typical block valve type using various components including, but not limited to sprinklers, rain sensor device, programmable electronic automatic controller, remote electronic valves, backflow prevention device, etc. The
individual irrigation system shall be controlled by a new, latest model, Rain Bird® ESP-LX Series electronic controller or approved equal, depending on the size, limits, and conditions of the project, and as determined by the City or designee.

B. The water source for this system shall be from an existing City potable water system. Contractor to coordinate with the City of Miami Beach Public Works Department for necessary requirements of new meter installation. Contractor shall be responsible for all fees to do the necessary work as required by the City, including labor, materials, permit, coordination, etc., and shall consider these fees as part of their contract.

1.05 QUALITY ASSURANCE

A. Work shall be performed in accordance with Contract Documents, Drawings, and/or City of Miami Beach Public Works Manual Specifications and Standard Details, in a neat and accurate manner. It is the intent of the City to obtain a complete and properly-operable system for the irrigation of all proposed landscape areas on the project site. These Specifications are intended to include all items obviously necessary and requisite for the proper irrigation of the project, and any items of labor, equipment, or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically shown on the project plans or stated herein.

B. The Contractor shall be responsible for constructing the system in complete accordance with all Local, State, and Federal codes, ordinances, laws, and regulations. The Contractor shall install all sprinkler heads according to the manufacturer’s specifications with regard to installation depth, distance between heads, etc. unless otherwise directed in writing by the City or designee. Any modification made to conform to any codes, laws, ordinances, and specifications shall be completed at the Contractor’s expense with no additional compensation allowed.

C. The Contractor shall avoid trenching through the roots of any existing trees and shall alert the City Urban Forester and Public Works Department before conducting any such activity that may damage tree root systems.

D. Contractor shall ensure full, 100% overlap coverage (minimum head to head) in all areas to receive irrigation and shall be responsible for adding additional heads, zones, components, or other equipment as required to achieve such coverage. To clarify, “head to head” is defined as the farthest edge of the water throw trajectory of a single head extends to or overlaps the adjacent irrigation head(s).

E. Rotors and pop-ups shall not be on the same irrigation zone per Best Management Practices. Rotor type heads are preferred for turf areas when such areas are large enough to accommodate rotors without overspray on to hard surfaces. Pop-up spray heads utilized in turf areas shall be minimum 6-inch pop-ups to effectively spray over grass between mowing service visits.
F. Pop-up spray heads, spray heads on risers or Netafin micro-irrigation (approved in writing by the City of Miami Beach Public Works Department) to be used to irrigate landscape beds. Landscape beds (shall be irrigated by spray heads/Netafin only) zoned separately from turf areas (irrigated by rotors). At no time should there be both rotors and spray heads, or drip irrigation and spray heads on the same zone.

G. All work shall be installed by skilled personnel, proficient in the trades required, in a neat, orderly, and responsible manner with recognized standards of workmanship. The Contractor should have installed at least five (5) projects of similar magnitude and demonstrated ability in the installation of sprinkler irrigation systems of this type. Some manufacturers may require factory certification for construction/installation of their products. In such cases, Contractor shall verify before bidding/constructing the project and bid shall be inclusive of any and all direct or related costs.

1.06 SUBMITTALS

A. Submit Shop Drawings to the City or designee for all irrigation system equipment, indicating all details required for the proper construction including but not limited to: controller(s), electronic valves, manual valves, flow meters, backflow preventer, rain sensor device, etc. Where appropriate, and when approved by the City or designee, manufacturer's product data for the proposed components may be substituted for Shop Drawings.

B. Contractor shall supply the original factory copy of controller operation/owner’s manual. All manuals, technical information sheets and general information sheets shall be in duplicate and separately bound.

C. Contractor shall register product with manufacturer and provide a copy of completed warranty card/sheet/information to the City or designee.

D. The Contractor shall video/photograph the entire project site during normal working hours including all concrete and asphalt pavements, curb and gutter, fencing, landscaping to remain, structures to be demolished, and existing structures that are to be modified. All videos and photographs shall be date and time stamped and a digital copy submitted on a flash drive/memory stick or media acceptable to the City of Miami Beach Public Works Department prior to beginning construction activities. The video/photographs shall clearly identify existing site and structural conditions prior to construction.

1.07 SUBSTITUTIONS

A. A written request for approval to substitute a material's type, grade, quality, etc. due to the non-availability of the material specified may be submitted to the City or designee. Approval of the substitution must be given in writing by the City or designee before the material is ordered, delivered, or installed on the project.
1.08 GUARANTEE

A. Contractor shall warranty the entire irrigation system against defects, poor workmanship, discrepancies, deficiencies, and malfunction for a minimum of one (1) calendar year from the time of Final Acceptance. Warranty shall include but not be limited to all parts and components included in the system and its installation, and all labor-related items regarding the procurement, assembly, installation, and operation of the system including any and all of its components. An inspection, to be arranged and coordinated by the Contractor and to include the Contractor and the City or designee, shall be made at the beginning and end of the guarantee period.

1.09 QUALITY AND GRADE OF REPLACEMENTS

A. All replacement material shall be equal to or better in regards to size, quality, quantity, and grade, as that of the material to be replaced, unless directed otherwise by the City or designee.

B. Replacement components and labor shall be guaranteed for a period of one (1) year. This guarantee period shall begin at time of acceptance of the replacement material and/or workmanship.

C. Final payment to the Contractor shall in no way, either expressed or implied, relieve the Contractor of any guarantee obligations.

PART 2 – PRODUCTS

2.01 PIPE

A. Polyvinyl chloride (PVC) Pipe

1. As a minimum, provide Schedule 40 solvent weld unplasticized PVC pipe for all main and lateral lines unless otherwise specified.

2. All pipes shall be new, unused, and free from defects and shall be continuously marked indicating size, schedule, and type.

3. All mainline and lateral pipe shall be manufactured from clean, virgin, National Science Foundation (NSF) approved Type 1, Grade 1 PVC, conforming to ASTM D1785 and D2241. All piping placed inside sleeves shall be the same.

B. Galvanized Steel Pipe: Pipe installed above grade for the backflow prevention device shall be Schedule 40 galvanized steel pipe.

C. PVC Sleeves: Pipe used for sleeves routed under pavement, sidewalks, or other shall be PVC Schedule 80 pipe unless noted otherwise. Size of all sleeves shall be able to easily
accommodate specified irrigation line and any necessary electrical conduit for electronic zone valves/other.

D. Thrust blocks are not allowed unless specially approved by City of Miami Beach Public Works Department Engineering Division in writing.

2.02 PIPE FITTINGS

A. All mainline pipe fittings shall be a minimum of Schedule 40 PVC. Make all taps on irrigation mains or branch mains with tee or wye fittings. Provide non-threaded type joints of socket type, designed for solvent-cement type application. Prior to the connection of any joint with PVC glue, treat all fittings and pipes with a high etch (purple) PVC primer. A medium body PVC rated cement shall be used to bond each section of the PVC pipe and its fittings. Use only cleaner and solvent compatible with the PVC pipe. Upon completion of the glue joints, keep irrigation system out of service for the period of time specified by the glue manufacturer. Make screw joints with an acceptable screw joint pipe joint compound. Where adapters are used between threaded and slipped pipes or valves, they shall be only female PVC threaded to socket coupling adapters. No male threaded PVC fittings are to be used, with the exception of street ‘ell’s and Funny Pipe riser adapter.

B. Galvanized steel pipe shall have threaded standard, 150 pound galvanized malleable fittings.

C. All sprinkler heads shall be connected to the supply line via adapters with ½-inch Funny Pipe, or other City-approved flexible hose, unless the intended location falls within a high traffic area or unless indicated otherwise in the Drawings or Specifications. All high traffic or anticipated high traffic areas shall utilize swing-type joints to connect heads within the area of high traffic.

2.03 PRIMER

A. Primer shall be a high etch purple primer manufactured for PVC use and intended to produce a solvent weld. The primer must be color-tinted to aid in visual inspection and verification.

2.04 GLUE

A. Glue shall be slow drying, heavy-duty gray or blue PVC glue. Transparent glue will not be accepted.

2.05 SPRINKLER HEADS

A. Pop-up Spray Heads
1. The sprinklers shall be 1800 PRS series as manufactured by Rain Bird Corporation, unless otherwise specified.

2. The sprinkler shall be of the fixed spray type designed for in-ground installation, unless otherwise noted. The sprinkler shall be capable of covering the head to head radii at a minimum 30 pounds per square inch (psi).

3. The nozzle shall be comprised of one (1) or more orifices at two (2) radius ranges and shall be adjustable from “On” to full “Off”. The nozzle shall elevate 3 to 6 inches when in operation. Retraction shall be achieved by a heavy-duty stainless steel spring. The nozzle piston shall have a smooth external surface operation in a resilient guide. A riser wiper shall be included in the sprinkler for continuous operation under the presence of sand and other foreign material.

4. The spray head body shall be a PRS series, with a pressure regulator built into the stem.

5. Coverage shall be either full or part circle. The part circle coverage shall be available in arcs of 45, 90, 120, 180, 240, and 270 degrees or adjustable part circle. Also included shall be special patterns including an end strip, side, and center strip nozzle configuration. Nozzle delivery shall be such as to allow partial circle patterns to match full circle patterns in precipitation rates.

6. The body of the sprinkler shall be constructed of non-corrosive, ultraviolet resistant heavy-duty plastic. A filter screen shall be in the sprinkler body. All sprinkler parts shall be removable through the top of the unit by removal of a threaded cap.

7. All sprinkler heads shall be connected to the supply line via adapters with ½-inch Funny Pipe, or other approved flexible hose, unless indicated otherwise in the Drawings or these Specifications.

B. Pop-Up Rotary Heads: The rotary heads shall be Falcon® 6504, 5500, or 5000 Series as manufactured by Rain Bird Corporation, unless otherwise specified.

1. The full or part circle sprinklers shall be a single stream, water lubricated, gear driven type capable of covering the specified radius in Drawings at a base pressure of 50 psi. Part circle sprinklers shall have adjustable arc coverage of 40 to 360 degrees. Arc adjustment can be performed with or without the rotor in operation and shall require only a flat blade (standard) screwdriver. The sprinkler shall be capable of full-circle operation in either the single direction or the bi-directional mode.

2. The sprinkler shall have a rotating nozzle turret independent of the riser stem. The portion of the riser stem that is in contact with the wiper seal shall be non-rotating.

3. The sprinkler shall have a pressure activated, multi-function, soft elastomeric wiper seal that will clean debris from the pop-up stem as it retracts. This wiper seal shall
prevent sprinkler from sticking in the up position, and be capable of sealing the sprinkler riser stem to the sprinkler cap under normal operating pressures. The sprinkler shall have a tapered riser stem that will assist in the flushing mode of the sprinkler as it pops up, as well as when it retracts down. The tapered stem shall seal positively against the multi-function wiper seal to assure no flow-by when fully activated.

4. The sprinkler shall have a strong stainless steel retract spring for positive pop-down.

5. The rotor shall have a stainless steel covered nozzle turret and riser stem. The riser stem shall be tapered and conform to the standard plastic stem in all other ways.

6. The sprinkler shall have a screen attached to the drive housing to filter inlet water, protect the drive from clogging, and simplify its removal for cleaning and flushing of the system.

C. Rain Bird® MPR 5 Series Bubbler Nozzles: The sprinklers shall be manufactured by Rain Bird Corporation, unless otherwise specified.

1. The nozzles shall have precipitation rates matched across sets and across patterns.

2. The nozzle shall be capable of covering the specified radius at a minimum pressure of 15 psi at the specified discharge rate.

3. The plastic MPR nozzle shall be constructed of ultraviolet (UV) resistant plastic. The radius adjustment screw shall be constructed of stainless steel.

4. The nozzle shall accept the non-clogging 1800 Series filter screens to allow for radius adjustment and the MPR Plastic Nozzles shall also accept the pressure compensating screens (PCS Series).

5. The nozzle shall be installed in the appropriate irrigation casing as per the manufacturer’s recommendation.

2.06 RISERS

A. Pipe shall be ½-inch PVC Schedule 40 or Schedule 80.

B. Risers shall utilize spray nozzles connected to male threaded fittings. The nozzles shall deliver the appropriate spray radius to provide 100% coverage to the intended area while reducing overspray to non-irrigated areas.

C. Risers shall be secured to #4 steel bar, minimum with stainless steel hose clamps, and risers shall be sized accordingly to the mature size or intended maintained size of the plant material it is scheduled to water.
2.07 CONTROL VALVES

A. Automatic Control (Electronic) Valves

1. Master Control Valves: All irrigation systems are to include a controller-activated master control valve. Valves are to be sized to accommodate maximum flows allowable through the designated water meters for individual systems.

2. Zone Valves: Shall be Rain Bird\textsuperscript{®} PESB or City approved substitute. Each system zone shall contain an electrically activated remote control valve (size as required to maintain minimum friction loss) that shall be constructed with stainless steel trim and close normally with manual bleed plug and manual control (cross handle on 1-1/2 inch and 2-inch models; screwdriver adjustment on 1-inch model) or equal. Solenoid shall be 3.5 watt, 24 volt AC with tamper proof molded coil and twisting wire. Diaphragm shall be of rubber material. Tir-Act solenoid porting shall prevent a continuous flow of water through the ports during operation. Inlet port to solenoid shall be filtered with self-flushing stainless steel screen, removable from outside of valve body for maintenance. All parts shall be serviceable without removing valve from the line. Valve shall have no external plumbing or tubing that can be installed at any angle without affecting valve operation.

B. Manual Ball Valves

1. Manual ball valves shall be installed before each automatic control valve in the system.

2. Ball valves 4 inches and smaller shall be brass-type ball (globe) valves, sized to accommodate meter flow rates.

3. Valves shall have quick disconnect union ends for maintenance/ modification of piping system.

4. Valves shall be installed in a valve box with cover, and, if conditions permit, may be installed in the same valve box as automatic control valves.

C. Quick Coupling Valves

1. Quick coupling valves shall be Rain Bird\textsuperscript{®} 5RC Series or City approved equal.

2. The quick coupling valve shall be a one piece type capable of having a discharge rate of up to 70 gallons per minute (gpm) with a pressure loss not to exceed 14.0 psi.

3. The valve body shall be constructed of heavy cast brass. The cover shall be durable and self-closing. When so specified, the 5RC cover shall be a locking rubber cover (LRC).

4. The valve shall be opened and closed by a brass key from the same manufacturer.
2.08 BACKFLOW PREVENTION DEVICE

A. Backflow prevention device shall be installed as required per Miami-Dade County Code of Ordinances Chapter 32.

B. All connecting pipes installed above grade to be Schedule 40 galvanized steel and painted dark green.

C. Backflow prevention device shall be approved by the City or designee before order, delivery, and installation.

2.09 PAINT

A. Paint for risers, rebar, and visible pipe shall be dark green, outdoor-rated weatherproof.

B. Color sample shall be submitted to City for approval.

C. All parts to be painted should receive the number of coats necessary to completely mask underlying, original colors/materials.

D. Only apply paint as per manufacturer’s instructions.

2.10 VALVE BOXES

A. All valve boxes, where they occur in light or infrequently traversed areas, shall be fiberglass type manufactured by Amtek or approved equal, and manufactured for the primary purpose of an in-ground irrigation box and sized accordingly.

B. Valves shall not be placed in the path of areas that receive motorized traffic. Should it become necessary to place a valve box in more frequently traversed areas, such as areas that may receive high pedestrian volumes or the possibility of incidental maintenance vehicles, use a traffic-rated, precast concrete box with a securable (bolted), galvanized iron lid. Box shall have a minimum H-10 traffic loading value.

C. All valve boxes shall be placed on a minimum 6-inch bed of pea gravel. Contractor to insure proper percolation of water and make adjustments where necessary. No standing or ponding water shall occur inside the valve box.

2.11 IRRIGATION CONTROL WIRE

A. All irrigation control wire from the controller to the electric valve shall be UL approved PE irrigation control wire single conductor insulated, utilizing low density high molecular weight polyethylene insulation suitable for operating at 600 volts and conductor temperatures up to 60 degrees Celsius. The conductor shall be soft drawn, bare copper meeting the requirements of ASTM B3 or B8. Temperature rating shall be from -55 degrees to +60 degrees C. Insulation thickness for conductor size is 14 AWG through 8
AWG minimum. AWG size for wire shall be in accordance with the manufacturer's specifications based upon a relationship between the number of valves and their distance from the controller.

2.12 WIRE CONNECTORS

A. All splices in irrigation control wire shall use Rain Bird® ST-03 UL Snap-Tite connectors and PT-S5 sealer or 3M DBY Direct Bury Splice Kit, or approved equal. All splices shall occur within approved boxes.

2.13 CONDUIT

A. Conduit for irrigation wire shall be gray PVC, UL approved. Size as required by code and as set forth in these Specifications. Conduit shall be used for all irrigation wire runs.

B. Conduit runs shall be assembled to be 100% waterproof and fully protect wire inside from natural elements and corrosive processes.

C. Provide separate disconnect and conduit for irrigation control wires.

D. Provide separate disconnect and conduit for irrigation controller power.

E. Landscape lighting is not to utilize any irrigation conduit for its wire. Provide separate conduit for landscape lighting.

2.14 CONTROL SYSTEM

A. The control system shall be a new, most recent production controlled by a new, most-recent model, Rain Bird® ESP-LX Series electronic controller, unless an equal is approved in writing by the City of Miami Beach Public Works Department. Controller shall have a minimum of two (2) spare stations for future expandability.

B. Contractor shall provide the controller with a 110 volt alternating current (AC) electrical supply. The controller unit shall have input and output surge protection consisting of a ground fault interrupter (GFI) circuit breaker built into the controller enclosure on the input side, and a separate transformer with one relay output module for each zone on the output side.

C. The controller shall be encased in a securable, wall or rack mounted waterproof encasement unless specified otherwise.

D. Irrigation field wires shall not be brought directly into the controller enclosure. A “tray cable” UL listed for Direct Burial and Sunlight Resistant shall be connected to the controller output terminals and placed inside a valve box just outside the enclosure. These wires shall each be a #16 AWG, THWN, stranded. Each wire shall be printed on
its full length with a number, and color coded. Field wires shall be connected to these wires inside the splice box utilizing approved waterproof connectors.

E. Unit shall be grounded as per the manufacturer’s specifications.

F. If electrical supply is not available and with the prior written consent of the City of Miami Beach Public Works Department, an Irritrol systems IBOC Plus solar irrigation controller may be used. Battery Operated On-valve type controllers are not acceptable for use.

2.15 IRRIGATION SUBMETERS

A. Meters shall be supplied, installed, replaced, and/or maintained by the City.

B. Meter boxes are to be supplied by the Contractor in accordance with the Standard Details in the City of Miami Beach Public Works Manual Section 14.

C. Flow meters sizes shall be in accordance with the following table.

<table>
<thead>
<tr>
<th>FLOW (GPM)</th>
<th>FLOW METER SIZE (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 65</td>
<td>1 ½</td>
</tr>
<tr>
<td>Up to 100</td>
<td>2</td>
</tr>
</tbody>
</table>

2.16 BACKUP POWER

A. Each field unit shall each have a nickel-cadmium battery backup system in case of power loss or failure. The battery shall be nickel-cadmium 9-volt capacity and manufactured by Varta, Duracell, or approved equal.

2.17 BACKFILL SOIL

A. Backfill material shall be clean fill and completely free from any rock or other material which, if it came into contact with, could damage the pipe. If material from excavation is not acceptable, then imported clean sand must be used. No rock or concrete/asphalt debris will be permitted in contact with the PVC pipe.

2.18 RAIN SENSOR

A. The rain sensor shall employ an electromechanical actuating device designed to cause a circuit interrupt that temporarily disables the irrigation controller during periods of significant rainfall.

B. The rain sensor shall be connected to the system controller to properly function and achieve its intended purpose. The device shall automatically restore the controller to a normal operating condition after a period of time subsequent to the rainfall. The device
shall be suitable to be wired – normally closed (N.C.) – in series with the valve common and shall include a short-lead to allow wiring normally open (N.O.) when necessary.

C. The device shall be of rugged construction to withstand the elements, including exposure to sunlight (UV).

D. The rain sensor shall incorporate a provision that allows the installer to select from several rainfall settings.

E. The device shall include a vent ring to help control drying time of the mechanical components.

F. Rain sensor shall be securely mounted to a tangible structure, out of human reach, and clear of any overhead obstructions that may negatively impact performance. When possible, location should minimize view by the general public. Contractor to coordinate location with project Landscape Architect.

2.19 BOOSTER PUMP STATION

RESERVED

PART 3 – EXECUTION

3.01 GENERAL

A. The work area may have existing utilities. Refer to City of Miami Beach Public Works Manual Section 1 for protection of existing utilities.

B. Where the grade or alignment of proposed pipe is obstructed by existing utility structures such as conduit, ducts, and pipe branch connections to sewer mains, main drains, water services, electrical lines, or other utilities, the Contractor shall notify the City or designee immediately to coordinate a solution.

3.02 GRADING

A. It shall be the responsibility of the Contractor to provide the compacting and final grading so the final level conforms to surrounding grades and is at the proper elevation with relation to walks, paving, drainage structures and other site conditions, and as identified in the Contract Documents or as directed by the City or designee. Depth of irrigation system components shall be measured from the FINAL grade.

3.03 PREPARATION

A. Layout sprinkler main lines and perform line adjustments and site modification to lateral lines prior to excavation. Any conflicts shall be brought to the immediate attention of the City or designee.
B. Locate valves to assure ease of access for maintenance and that no physical interference with other elements of the project exists. Align valves parallel to each other in manifold systems.

3.04 PIPE INSTALLATION

A. The Contractor shall stake out the location of each run of pipe/valves prior to trenching.

B. Excavation shall include all materials encountered in the excavation of trenches for pipe installation. The trench shall be of sufficient width and depth for installation of the pipe as indicated herein. The Contractor shall cause minimum disturbance to all existing conditions.

C. Any pavement cut must have the prior written consent of the City of Miami Beach. All irrigation lines and wire routed under pavement and sidewalks shall be sleeved inside PVC Schedule 80 pipe unless noted otherwise on the Plans or in these Specifications. Size of all sleeves shall be able to accommodate proposed irrigation line and any necessary electrical conduit with at least ½-inch excess free space.

D. Contractor shall abandon any old irrigation components found below grade during the installation of the new irrigation system except those that are to remain in operation or as directed by the City or designee. The Contractor shall remove and dispose of the unused, abandoned irrigation components, and properly cap all lines that are still connected to a water source. Contractor shall properly cap any old irrigation system mains and branch mains as encountered at limit of construction line/scope of work where complete removal would extend outside of the limit of construction line/scope of work, except those scheduled for use with the new system.

E. Trenches shall be made wide enough to allow a minimum of 6 inches between parallel pipelines. No lines shall be installed directly over another. Trenches for pipelines shall be made of sufficient depths to provide the necessary minimum cover from finish grade. All main line pipes shall have a minimum cover from finish grade as per City of Miami Beach Code.

F. The pipe and fittings shall be carefully inspected before installation of the trench. All rocks and unsuitable bearing materials shall be removed from trench in strict accordance with the manufacturer's recommendations.

1. Solvent welded joints shall be made only on clean, dry, square cut, smooth pipe sections. Fittings shall be "dry" tested for proper size before primer is applied. The assembly shall proceed in strict accordance with recommended procedures furnished by the manufacturer. Once primer and glue are applied and fittings are connected tight, turn pipe or coupling ¼ turn to set. Hold joint fitting and/or components tightly together for a minimum of 30 seconds or as suggested by the glue manufacturer, whichever is greater, to allow for setting.
2. Solvent welded pipe sections shall be "snaked" from side to side in the trench to prevent joint rupture due to thermal expansion and contraction.

3. Pipe openings shall be temporarily plugged during construction to prevent entrance of foreign materials.

G. Backfill shall be carefully placed to avoid pipe dislocation. Backfill material shall be free of rocks, stumps, roots and other unsuitable material. Backfill shall be placed in 6-inch lifts and shall be thoroughly compacted. Any backfill under pavement or sidewalks shall be compacted to 98% of maximum density per AASHTO Specification No. T-180. The soil surface of backfilled trenches shall be manually settled so it is even with the surrounding soil surface grade.

3.05 DRIP TUBING

A. Begin layout of dripline tubing 3 to 4 inches away from all hardscape edges. Mark intended layout of tubing intervals on ground with irrigation flags or other type of marking that can be maintained throughout the installation.

B. Install tubing per manufacturer's recommendation unless directed by City or designee.

C. Install dripline tubing parallel with contours to the greatest extent practical.

D. Install supply and exhaust headers perpendicular to contours to the greatest extent possible.

E. Dripline tubing may be installed with emitter outlets facing up and down or laterally. Place dripline tubing in a manner that will stagger emitter outlets to form a triangular pattern between parallel lines.

F. Secure tubing to all barbed and compression type fittings per manufacturer's directions.

G. Install air/vacuum relief valves per Drawings, below grade at the highest elevation within each zone. Additional air/vacuum relief valves may be required based upon layout and site conditions. Locate an air/vacuum relief valve lateral line for each berm within the system. Provide "blank" dripline tubing from lowest elevation of dripline, perpendicular to the highest elevation of the mound or berm for connection to the valve.

H. Install flushing valves at the hydraulic termination point (or points) in each system. Install valves horizontally level and below grade.

I. Install drip system operation indicator on each zone per manufacturer's detail.

J. Prior to installation of flush valves, flush entire system to remove any dirt and sediment.
K. Prior to backfilling dripline system, open control valves and operate each circuit to test for leaks around fittings and connectors. Make all necessary repairs to correct deficiencies. Re-test repaired circuits for acceptance prior to backfilling.

3.06 SPRINKLER HEADS

A. Irrigation heads shall be installed per manufacturer’s specifications and as provided in these Specifications.

B. Use existing soil profile around each casing.

C. All at-grade heads are to be connected to the supply line using ½-inch Funny Pipe, or approved equal flexible pipe, and adapters, unless otherwise specified or installation is to occur in an anticipated high traffic area, in which case PVC swing joints are to be used. Allow enough slack in the Funny Pipe to allow for proper horizontal adjustment of the heads after installation.

D. Risers extensions are to be utilized in shrub massings when conventional pop-up spray heads would provide inadequate coverage (shrub heights of 18 inches or greater). Risers shall be secured to rebar (#4) with stainless steel hose clamps. Rebar to be secured into the ground to a depth that will not allow for willing movement. Risers in shrub massings shall be a minimum of 12 inches from the edge of the planter bed. All risers and rebar shall be painted with a dark green color, weatherproof outdoor paint.

3.07 AUTOMATIC VALVES

A. All automatic valves shall be installed in a valve box as specified herein and shall be arranged for easy adjustment and removal. A union shall be installed on the downstream side. The flow adjustment feature of each valve shall be utilized to balance operating pressures throughout the system.

B. Master Control Valves shall be located downstream from the backflow preventer in a valve box. The exact location is to be approved by the City or designee.

C. A valve actuator shall be installed on each valve. Follow manufacturer recommendations for installation instructions.

3.08 BALL VALVES

A. Ball valves shall be installed at all paved crossings and before all automatic valves, and arranged in valve box for easy adjustment and operation.

3.09 BACKFLOW PREVENTION DEVICE

A. Contractor to install per Plans and field-adjust as necessary with approval from the City or designee.
3.10 VALVE BOXES

A. Valve boxes shall be installed so that top is flush with surrounding final grade and shall be set on a minimum of six inches of pea gravel, and as per manufacturer’s recommendations. Contractor shall insure proper percolation of water to subsurface.

3.11 CONTROL SYSTEM

A. NOTE - ALL WIRE SHALL BE INSTALLED IN UL APPROVED GRAY PVC CONDUIT, except under the following conditions.

1. When the conduit is directly exposed to UV light, then that exposed portion shall be rigid, threaded, heavy walled galvanized pipe.

2. When the use of PVC conduit is restricted by Local, State, or Federal regulations, the wire shall be installed in the type of conduit required by regulations. NO DIRECT BURIAL WIRE INSTALLATIONS SHALL BE ALLOWED. ALL SPLICES SHALL BE TWISTED AND FULLY INSULATED FROM MOISTURE, SHALL ONLY OCCUR IN VALVE BOXES, AND ARE TO ULTIMATELY BE RECORDED IN THE AS-BUILT DRAWINGS.

B. Contractor to install Control System including Pump System (if applicable), and all associated components, in strict accordance with the manufacturer’s specifications and instructions, and the Specifications contained herein.

3.12 BACKUP POWER

A. The backup power supply for the Controller shall be installed at the same location as the Controller itself. Install as per manufacturer’s specifications and instructions.

3.13 RAIN SENSOR

A. The rain sensor shall be installed in a location that is free from overhead obstructions that may cause improper performance of the unit. It shall be installed in a location that is out of range of the sprinklers and away from trees or overhanging objects which might affect accumulation of rain in the rain cup. Install as recommended by the manufacturers' specifications. Furthermore, where possible, rain sensor shall be installed in an inconspicuous location, away from the direct visibility of passersby, and out of reach of the general public. Coordinate exact location and installation of rain switch with project Landscape Architect.

3.14 CONTROL WIRE INSTALLATION

A. Install control wires in UL approved PVC conduit below final grade, depth in accordance with City of Miami Beach Code of Ordinances and permit requirements, and lay to the
side of the main line. Provide a minimum 24 inches of tightly rolled looped wire slack at valves.

B. All underground splices shall be made at electric valves in valve boxes. Splices shall utilize Rain Bird® ST-03 UL Snap-Tite connectors and PT-S5 Sealer or 3M DBY direct burial splice kit. Splices should be designed into the system and minimize additional splices in the field. Show all splices locations on the as-built drawings.

3.15 TESTING AND INSPECTION

A. The Contractor shall notify the City or designee a minimum 72 hours in advance of testing and shall coordinate as required.

B. Flush irrigation system with water to clear lines of foreign materials after system assembly is complete and prior to installation of the control valves. Cap and/or plug outlets and fill lines with water. Upon completion of the irrigation main and prior to the installation of any control valves, test the entire main line for proper construction. After completion of the flushing operation, test the main lines with 100 psi hydrostatic pressure for a minimum of one (1) hour. No pressure loss shall be allowed over the duration of the test. Remove and/or replace any item or component of the system which does not comply with the test and test the entire system again until satisfactory test results are obtained. All testing shall be done in the presence of the City or designee. All joints, tees, elbows, caps, and connections shall be left exposed during this test. Main line sections of solid unbroken pipe should be buried at intervals adequate to secure stabilization of pipe runs when pressurized. If necessary, repair any leaks and retest entire assembly until achieving satisfactory result. Install sprinkler heads only after approval of test results by the City or designee.

C. Final Inspection shall be made when the complete system is in place, operable, and all repairs, additions, adjustments, and other work is complete. At such time, the Contractor shall adequately demonstrate the proper operation of the system, shall show the system's complete conformance with the Specifications, and shall demonstrate that the irrigation system provides proper and adequate coverage of all landscaped areas. Final test should include two-minute timed intervals of water flow per zone, allowing a one-minute down time between each zone test.

D. Acceptance by the City of Miami Beach in no way removes the Contractor of his responsibility to make further repairs, corrections, and adjustments to eliminate any deficiencies which may later be discovered. Moreover, the Contractor shall fully honor the one-(1) year warranty outlined herein.

3.16 RESTORATION OF EXISTING CONDITIONS

A. Contractor shall coordinate irrigation system installation, and any components thereof, with other project work to avoid disturbance of new work such as turf, planting beds,
paved areas, etc. Contractor shall be responsible for and shall bear all costs of any replacement, repair, or restoration to existing conditions, new or otherwise, as a result of irrigation system installation before the time of Final Acceptance. This shall include any and all irrigation work, initial or as a result of re-installation of unacceptable components, done prior to Final Acceptance of the system. Repairs shall include like materials and conditions, equal to those being replaced or repaired, and to the satisfaction of the City or designee. No system shall be accepted as final until restoration is properly achieved.

3.17 PROJECT CLOSEOUT

A. Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.

3.18 AS-BUILT DRAWINGS

A. Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.
STANDARD DETAILS

Standard Details for irrigation systems are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself will all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 20-1  RAIN BIRD POP-UP SPRAY SPRINKLER 1806 SAM PRS WITH NP CLIP CAP AND SWING JOINT
DETAIL 20-2  RAIN BIRD ROTOR POP-UP SPRINKLER FALCON 6504
DETAIL 20-3  RAIN BIRD ELECTRIC REMOTE-CONTROL VALVE PEBS SERIES
DETAIL 20-4  RAIN BIRD QUICK COUPLER VALVE MODEL 5RC SERIES
FINISH GRADE/TOP OF MULCH.

POP-UP SPRAY SPRINKLER:
RAIN BIRD 1806-SI-PRS WITH 1800 NP WITH VAN NOZZLE

PVC SCH 80 NIPPLE
(LENGTH AS REQUIRED)

PVC SCH 40 ELL.

PVC SCH 40 STREET ELL.

PVC SCH 80 NIPPLE
(LENGTH AS REQUIRED).

PVC SCH 40 STREET ELL.

PVC SCH 40 TEE OR ELL.

PVC LATERAL PIPE.

SECTION VIEW
N.T.S.
ROTAR POP-UP SPRINKLER:
RAIN BIRD FALCON 6505
F4-FC/PC.

PRE-FABRICATED SWING
JOINT: RAIN BIRD
TSJ-100-PRS WITH 70 PSI
PRESSURE REGULATOR

FINISH GRADE.

LATERAL PIPE

PVC SCH 40 TEE OR ELL.

SECTION VIEW
N.T.S.
30-INCH LINEAR LENGTH OF WIRE, COILED

WATERPROOF CONNECTION:
RAIN BIRD SPLICE-1 (1 OF 2)

ID TAG: RAIN BIRD VID SERIES

VALVE BOX WITH COVER:
RAIN BIRD VB-STD

FINISH GRADE/TOP OF MULCH.

REMOTE CONTROL VALVE:
RAIN BIRD PEB.

PVC SCH 80 NIPPLE (CLOSE).

PVC SCH 40 ELL.

PVC SCH 80 NIPPLE (LENGTH AS REQUIRED).

BRICK (1 OF 4)

PVC MAINLINE PIPE.

SCH 80 NIPPLE (2-INCH LENGTH, HIDDEN) AND SCH 40 ELL.

PVC SCH 40 TEE OR ELL.

PVC SCH 40 MALE ADAPTER.

PVC LATERAL PIPE.

3.0-INCH MINIMUM DEPTH OF 3/4-INCH WASHED GRAVEL.

SECTION VIEW
N.T.S.
NOTE:

1. FURNISH FITTINGS AND PIPING NOMINALLY SIZED IDENTICAL TO NOMINAL QUICK COUPLING VALVE INLET SIZE.
STREET LIGHTING SYSTEM
# SECTION 21. STREET LIGHTING SYSTEM

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### APPENDIX 21-A: Citywide Lighting Standards

### STANDARD DETAILS
Street lighting shall be coordinated with the *Miami Beach Urban Forestry Master Plan* (June 2020) and any other master plans that affect the performance and placement of luminaires.

Refer to Section 1 of the City of Miami Beach Public Works Manual for project closeout requirements.

Refer to Section 8 of the City of Miami Beach Public Works Manual for as-built drawing requirements.

The following section is Appendix B “Luminaire General Specifications” from the *Miami Beach Citywide Lighting Standards 100% Design Submittal* dated April 2020, which was adopted by the City of Miami Beach Commission in May 2020. For the complete standards, refer to Appendix 21-A.

### PART 1 – GENERAL

#### 1.01 SUMMARY

A. Included in the Work of this Section are labor, materials, and appurtenances required to complete the Work of this Section, as specified herein, as required by job conditions, or as indicated on drawings. The scope of this section includes general requirements for luminaires and their components, coordination, quality assurances, submittals, and general responsibility for a complete job.

#### 1.02 DEFINITIONS

A. In this specification, the term “City” includes the Architect, Interior Designer, Landscape Architect, Construction Manager, Owner’s representative and/or the Lighting Specifier, together or individually.

B. The term “luminaires” refers to lighting fixtures with their integrated light sources and all other components, except for lighting controls.

C. The use of the word “Approved” shall not extend the City’s responsibilities beyond that as defined in the General Conditions.

#### 1.03 GENERAL REQUIREMENTS

A. Provide labor, materials, and equipment for the installation of roadway luminaires, lighting equipment, control wiring, and sources as shown on the drawings, specified herein, and in the *Miami Beach Citywide Lighting Standards*. Luminaires shall be securely attached to poles as specified.

B. Refer to architectural drawings for locations, dimensions and details, and electrical documents for quantities. Check and verify dimensions and details on drawings before proceeding with the Work. Report any inconsistencies or discrepancies. Should it appear
that the Work intended is not sufficiently detailed or explained on the drawings or in the specifications, apply for further drawings or explanations, as may be necessary. Conform to these explanations in the work. If any question arises about the true meaning of the drawings or specifications, provide timely and written questions before proceeding. Under no circumstances shall any request for extra compensation be honored where the basis of claim is such a clarification. In no case submit a bid or proceed on any Work with uncertainty. The intention of this specification and the accompanying or applicable drawings is to provide a job complete in every respect. Contractor is responsible for this result.

1.04 COORDINATION

A. Luminaire locations and mounting heights as indicated on the electrical drawings are generalized and approximate. Carefully verify locations and mounting heights with City standards, and other reference data prior to installation. Although the location of equipment included in the Work of this Section may be shown on the Contract Drawings in a certain place, actual construction may disclose that the location for the Work does not make its position easily and quickly accessible. In such cases, provide timely and written notification of this situation before installing this Work, and comply with installation directions.

B. Clearly indicate the Work to be performed by other trades’ contractors, and the materials that are adjacent to or abutting the Work of this Section. Coordinate as required. Schedule the Work to prevent Work of this Section being damaged by other construction operations. Remove and replace Work so damaged at no cost to the project. Coordinate and schedule the Work of this Section with the Work of other Sections and Utility Companies so that there shall be no delay in the proper installation and completion of any part of each respective Work. Construction Work shall proceed in its natural sequence without unnecessary delay caused by the Work of this Section.

C. Coordinate with other contractors regarding attachment to or openings in the materials of other trades as needed.

D. Arrange the installation in proper relation to other Work and with architectural finishes so that it shall harmonize in service and appearance and so that there shall be no interference with the Work of others, including interference in location.

E. Where a catalog number and a narrative or pictorial description are provided, follow the specified catalog numbers and narrative. Provide timely requests for clarification to specification as needed.

F. Become familiarized with all equipment listed in the luminaire schedule and take responsibility for the successful completion of the entire lighting installation.
G. Verify compatibility of supply voltage indicated on electrical drawings with voltage specified for each luminaire prior to release. Provide timely and written notification of any and all discrepancies.

1.05 QUALITY ASSURANCES

A. Contractor shall comply with the General Requirements related to Quality Control, in addition to the provisions herein.

B. Manufacturers listed herein, shall be assumed capable of supplying the listed luminaires unless exceptions are set forth in their quotations. Provide timely and written notification of any such exceptions. Acceptable manufacturers are listed in the luminaire schedule. Acceptable manufacturers shall be capable of providing proof of satisfactory production of luminaires of the type and quality shown for a period of at least five years.

C. Statement of Application:

1. By commencing the Work of this Section, the Contractor assumes overall responsibility, as a part of the warranty of the Work, to ensure that assemblies, components and parts shown or required within the Work of this Section, comply with the Contract Documents.

2. Warranty: In addition to any warranties required by the General Requirements, the Contractor of the Work of this section shall:

   a. For a period of one year after Owner's initial acceptance and establishment of the beginning date of the warranty period, and at no additional cost, promptly provide and install replacements for luminaires or components thereof which are defective in materials or workmanship under normal operating conditions, except for sources; or successfully repair installed equipment at the job site. For any time during the warranty period that luminaires are not fully functional due to defects in materials or workmanship, provide or pay for and install and remove suitable and adequate temporary luminaires. Warrant replacement luminaires or components to be free of defects in workmanship or materials for a period of one year following replacement, and replace any defective replacements.

   b. Contractor shall not be held responsible for acts of vandalism or for abnormal or accidental abuse of the luminaires or their components occurring after the beginning of the warranty period, nor shall Contractor be held responsible for deleterious effects caused by maintenance procedures performed without the concurrence of Contractor.
D. Equipment Compatibility:

1. For all similar luminaire types, provide sources, control gears and other components fabricated or supplied by a single manufacturer, to simplify maintenance and replacement of equipment.

2. Luminaire details shown may be modified by the manufacturer provided all of the following conditions have been met:
   a. Luminaire performance is equal or improved.
   b. Structural, mechanical, electrical, safety, and maintenance characteristics are equal or improved.
   c. Cost to the City is reduced or equal.
   d. No conformance to codes has been compromised.
   e. No performance criteria for specified ratings has been compromised.
   f. Modifications have been reviewed and approved in writing.

E. Regulatory Agencies:

1. Provide luminaires constructed, wired and installed in compliance with the current edition of applicable city, state and national codes. Provide luminaires conforming to or exceeding Underwriters Laboratories (UL) standards, and to provisions of applicable codes which exceed those standards.

2. For any category of luminaire tested by any of the following labs, provide luminaires listed and labeled by an independent Nationally Recognized Testing Laboratory (NRTL) such as UL, ETL, CSA, MET.

3. In addition, provide luminaires which conform to additional regulations necessary to obtain approval for use of specified luminaires in locations shown. Use only electrical components listed by the above NRTLs.

F. Recognized Standards: Luminaires shall comply with all applicable standards including but not limited to the following organizations.


2. National Electrical Code (NEC)

3. International Dark Sky Association (IDA)

4. Illuminating Engineering Society (IES)
5. American Society for Testing and Materials (ASTM)
6. American National Standards Institute (ANSI)
7. National Electrical Manufacturers Association (NEMA)
8. International Electrotechnical Commission (IEC)
10. Americans with Disabilities Act (ADA)
11. Design Lights Consortium (DLC)

1.06 SUBMITTALS

A. General:

1. For all submittals, provide documents proving that luminaires meet criteria listed within the report.

2. For standard catalog items with no modifications, submit catalog cut sheets prepared by the manufacturer which clearly show all elements to be supplied and all corresponding product data (including sources, manufacturer and model number of control gears, and other components, as well as voltage; accessories, options and any miscellaneous items detailed in the written description of the specification.) If cut sheet shows more than one (1) luminaire type, all non-applicable information shall be crossed out.

3. For custom luminaires or modified luminaires submit a layout drawing prepared by the manufacturer showing all details of construction, dimensions, source layout, if applicable, mounting hardware or components, power locations, remote control gears, finishes and list of materials. Drawings must be to scale. Provide manufacturer with field dimensions where required. If accessories are required, drawings shall indicate relative position or adjacent vertical surface.

4. When components are indicated as contractor supplied or specified (i.e. remote power supplies, remote control gears housings, NEMA enclosures, etc.), provide submittals for components in conjunction with the luminaire submittal.

5. Provide submittals with luminaire installation instruction sheets.

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Luminaires and their component elements shall be delivered to the Department of Public Works’ designated site or building factory-assembled and wired to the greatest extent...
We are committed to providing excellent public service and safety to all who live, work and play in our vibrant, tropical, historic community.

practical, in strict accordance with the approved shop drawings, certificates and catalogue cuts, and shall be handled in a careful manner to avoid damage.

B. Exposed finishes shall be protected during fabrication, transport, storage and handling. Delivered materials shall be identical to the approved samples. Materials which become damaged shall be repaired and/or replaced as directed.

C. Luminaires shall be stored under cover, above the ground, in clean, dry areas, and shall be tagged and/or marked as to type and location.

D. Delivered luminaires shall include wiring, sockets, control gears, shielding, channels, lenses and other parts and appurtenances necessary for luminaire installation of each luminaire type.

PART 2 – PRODUCTS

2.01 SUMMARY

A. Provide materials, equipment, appurtenances and workmanship for the Work of this Section conforming to the highest commercial standards, as specified and indicated on the drawings. Make luminaire parts and components not specifically identified or indicated on the drawings, of materials most appropriate to their use or function, and resistant to corrosion and to thermal and mechanical stresses encountered in the normal application and function of the luminaires.

B. Named manufacturers, when listed in the luminaire schedule, are representative of an adequate level of quality and reputation, and are allowed to submit a product, provided that they are capable of satisfying the provisions of the specifications in every respect. This does not mean that any standard product provided by that manufacturer is automatically qualified. Manufacturers not on this list may be proposed during the substitution period if they can substantiate that their product meets every particular of the relevant specification, and are of comparable quality, experience and reputation. Any submitted product may be rejected without explanation.

2.02 MARKING OF LUMINAIRES

A. Luminaires shall be equipped with markings showing safety specifications, construction safeguards, and minimum resistance to hazard sources operation under fault conditions. Marking shall include manufacturer/distributor’s name, related voltage or voltage range, rated wattage, light output, optical distribution and rated frequency. LED luminaires not suitable for dimming control are required to indicate this clearly in installation instructions or package labeling. Mark luminaires with replaceable sources according to proper source type. Provide markings that are clear and that are located to be readily visible to service personnel, but invisible from normal viewing angles when sources are in place.
2.03 MATERIALS AND FABRICATION

A. Provide luminaires completely factory-assembled and wired and equipped with necessary sockets, control gears, wiring, shielding, reflectors, channels, lenses, and other parts and appurtenances necessary.

B. Use only completely concealed hardware, unless otherwise noted. Latching of luminaire door frames shall be unobtrusive. Make luminaire free from light leaks by the inherent design of the luminaire body and frame. Bond gaskets, when used, to the luminaire body. Weld power supply support studs, socket saddle studs and reflector support studs to luminaire body.

C. Construct luminaires with the minimum number of joints. Make unexposed joints by approved method such as welding, brazing, screwing or bolting. Soldered joints are not acceptable.

D. Provide metallic cast or extruded parts of luminaires that are close grained, sound, and free from imperfections or discoloration. Provide cast or extruded parts that are rigid, true to pattern, and of ample weight and thickness. Provide cast or extruded parts that are properly fitted, filed, ground, and buffed finished surfaces and joints free of imperfections. Make thickness on cast parts not less than 1/8in (3mm).

E. Provide marine grade copper material, low copper content, with salt spray ASTM B117.

F. Wiring:

1. Provide luminaire wiring between sources, lamp-holders and associated operating and starting equipment in compliance with UL 1570 and NEC, UL 8750 for LED’s.

2. Make connections of wires to terminals of sources, lamp-holders and other accessories in a neat and workmanlike manner and which are electrically and mechanically secure, with no loose strands protruding. Provide of the appropriate amount of wires extending to or from the terminals of a source, lamp-holder or other accessory. These wires shall not be in excess of the number which the accessory is designed to accommodate.

G. All luminaires shall be UL/ETL/CSA-US listed, “Wet Location” rated at a minimum, with greater protection as appropriate or required by code for the application.

H. All luminaires, poles, sensors, and its components are to be applicable for the environment in Coastal Districts.
2.04 SOURCES

A. General:

1. Provide electric sources as required, during construction, including sources for luminaires provided by others.

2. Submit catalogue cuts of all sources to be used in the Work, along with the shop drawing submittal.

B. Solid State Lighting / Light Emitting Diode (LED) Light Sources and Luminaires:

1. General:

   a. Luminaire manufacturer shall have a minimum of five (5) years’ experience in the manufacture and design of LED products and systems and no less than one hundred (100) North American installations.

   b. Unless otherwise specified, luminaire fabrication shall integrate all LED light sources and power/data supplies fabricated by a single manufacturer to ensure compatibility.

   c. All components peripheral devices, integrated photosensors, occupancy sensors, controllers, even if manufactured or provided by others, shall be the responsibility of a single entity, the luminaire manufacturer. All components shall perform successfully as a complete system. Integrated controls shall be programmed on-site to operate as described in by the City standards.

   d. Provide submittals as described herein.

   e. Include all components necessary for a complete installation. Provide all power supplies, synchronizers, data cables, and data terminators for a complete working system.

   f. All white light LED sources within the same luminaire type shall be within four (4) MacAdam ellipses/steps of each other.

   g. All LED sources used in the LED luminaire shall be of proven quality from established and reputable LED manufacturers and shall have been fabricated within 12 months before installation per the date code on the module.

2. Replacement and Spares:

   a. Manufacturer shall provide written guarantee of the following:

      i. Manufacturer’s LED system or equivalent system will be available for ten (10) years: Manufacturer will provide exact replacement parts, complete
replacement luminaires, or provide upgraded parts that are designed to fit into the original luminaire and provide equivalent distribution and lumen output to the original, without any negative consequences.

ii. Manufacturer will keep record of original chromaticity coordinates for each LED module and have replacement modules or luminaires from within four (4) MacAdam Ellipses/ steps of the same coordinates available.

iii. Manufacturer will keep an inventory or ability to supply replacement parts or complete fixtures within two (2) weeks for component parts or the standard lead time of the original fixture for a complete fixture for duration of warranty period.

b. All luminaires and control system devices shall be replaceable in the field as specified in the Luminaire Schedule and Miami Beach Citywide Lighting Standards.

c. System shall carry a full warranty for a minimum of three (3) years from the date of shipment (or longer if required by the project). Manufacturer shall be responsible for a cost of labor and shipping as agreed between parties, to replace any component of the system that fails within the warranty period.

3. Products and Components – Performance

a. LED luminaires and components shall be approved by an NRTL facility such as UL, ETL or CSA/US.

b. For applicable fixtures: all products included in system shall use Mil-Std 810F, Random Vibration 7.698g as a minimum standard. In installations subject to vibration, luminaire shall be installed with vibration isolation hardware to sufficiently dampen vibrations.

c. All LED components shall be mercury and lead-free.

d. All manufacturing processes and electronic materials shall conform to the requirements of the European Union’s Restriction on the Use of Hazardous Substances in Electrical and Electronics Equipment (RoHS) Directive, 2002/95/EC.

e. LEDs shall comply with ANSI/NEMA/ANSLG C78.377-2008 – Specifications for the Chromaticity of Solid-State Lighting Products. Color shall remain stable throughout the life of the source. The chromaticity of the installed product shall match IES LM-80 data showing that the LED’s do not shift more than .005 DuV from an approved sample or submitted documentation.
f. LEDs testing shall be performed in accordance with IES LM-80 - Approved Method for Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules.

g. LEDs shall have a minimum rated source life of 100,000 hours or as specified in the Luminaire Schedule. LED “rated source life” shall be determined per IES TM-21 - Projecting Long Term Lumen Maintenance of LED Light Sources based on LM-80 test data. Calculated lifetimes not exceeding testing hours per TM-21 are not accepted.

h. Luminaire assembly shall include a method of dissipating heat to prevent degradation of source life, electronic equipment, or lenses. LED luminaire housing shall be designed to transfer heat from the LED board to the outside environment. Luminaire housing shall have no negative impact on life of components. High power LED luminaires shall be thermally protected using one or more of the following thermal management techniques: metal core board, gap pad, and/or internal monitoring firmware.

i. Luminaire shall be tested and suitable to operate under a minimum of two (2) case temperatures: 55°C (131°F) and 85°C (185°F) and a relative humidity under 95%.

j. Manufacturer shall supply in writing a range of permissible operating temperatures and relative humidity levels in which system will perform optimally. LEDs shall be adequately protected from moisture or dust per IP66 rating.

k. All hardwired power connections to LED luminaires shall be reverse polarity protected and provide high voltage protection in the event connections are reversed, shorted or otherwise mis-wired during the installation process.

l. For data wiring/cabling, provide pinout information for non-proprietary connectors specified herein.

m. LEDs shall not be overdriven beyond their specified nominal voltage and current.

n. Color-changing luminaires utilizing alternating color LED chips shall use an equal combination of each color of LED and shall be compatible with Miami Beach Citywide Lighting Standards.

o. Manufacturer shall be able to provide supporting documentation of the product meeting third party regulatory compliance.

p. Manufacturer shall ensure that products undergo and successfully meet appropriate design and manufactured testing including Design Failure Mode & Effects Analysis, Process Failure Mode & Effects Analysis, Environmental
Engineering Considerations and Laboratory Tests, IEC standards and UL/CE testing.

q. Manufacturer shall provide Luminaire Efficacy (lm/W), total luminous flux (lumens), luminous intensity (candelas), chromaticity coordinates, CCT and CRI. Optical performance, polar diagrams, and relevant luminance and illuminance photometric data. Provide data in IES file format in accordance with testing standards IES LM-79-08 and IES LM-82-12, based on test results from an independent Nationally Recognized Testing Laboratory or National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

r. All color characteristics, CCT, CRI, Color Fidelity, CIE Chromaticity Coordinates shall be consistent across the entire dimming range.

s. Luminaires shall have less than 30% flicker at frequencies of 200Hz or below at 100% and 20% light output and/or meet IEEE standard PAR 1789.

4. LED Power Supplies/ Drivers:

a. LED drivers shall have a minimum 50,000 hour published life while operating at maximum case temperature and 65 percent non-condensing relative humidity.

b. LED drivers shall have THD no more than 20% with 0.9 power factor.

5. Driver shall be Sound Rated A+.

6. Driver shall be > 90% efficient at full load across all input voltages.

7. Digital LED Control and Communication – Performance

a. LED luminaires shall be network controllable via digital control.

b. Each LED luminaire and/or node shall have the capability to be set to a unique and individual address. Address shall be selectable through onboard switches or by an external hardware or software method.

c. LED luminaire shall be compatible with lighting control system specified herein.

d. Provide interface with minimum of 2 auxiliary contacts.

2.05 RATED LOCATION LUMINAIRES

A. General:

1. Provide luminaires designed and manufactured specifically for “wet-rated” location service. Components, including nuts, bolts, rivets, springs, and similar parts shall be
made of materials of effective corrosion resistance, or of materials which have been subjected to finishing treatment which will assure such resistance.

2. Provide anodized aluminum for aluminum parts of exterior luminaires that are not specified as requiring a painted finish.

3. All luminaires shall be constructed according to UL procedures, and listed by UL ETL or CSA-US for the appropriate category.

B. Wet Location:

1. In addition to the requirements of paragraph, above, wet location luminaires shall meet or exceed the following criteria:

   a. Hermetically sealed.

   b. Provide metal parts of luminaires, which are specified as requiring painting, for use in wet locations, which are painted with suitable weather and/or moisture resisting qualities.

   c. Provide luminaires for use outdoors, or in areas designated as wet locations, which are suitably and effectively gasketed to prevent access of moisture into electrical components or enclosing diffusers, lenses or globes.

   d. Luminaires shall be UL, ETL or CSA-US listed for wet locations.

   e. Luminaires shall have an IP66 wet location rating.

PART 3 – EXECUTION

3.01 SUMMARY

A. Install luminaires complete with light sources, as indicated, and with equipment, materials, parts, attachments, devices, aligner and filler clips, hardware, poles, channels, frames and brackets necessary to make a safe, complete, and fully operative installation.

B. Coordinate with other trades as appropriate to properly interface installation of luminaires with other work.

C. Reject and do not install blemished, damaged, or unsatisfactory luminaires. Replace imperfect or unsatisfactory luminaires, if installed, as directed.

D. All luminaires, poles, sensors, and its components are to be rated to endure the conditions in Coastal Districts and shall be installed to maintain the ratings.
E. Set luminaires, when installed, to be true, and free of light leaks, warps, dents, or other irregularities. No light leaks are permitted from any visible part or joint of the luminaires. Install luminaires plumb, square, and level at site as agreed upon by engineer, in alignment with adjacent luminaires, and secure in accordance with manufacturers’ directions and approved shop drawings.

F. Provide finish for all exposed parts or trims as specified. If not indicated, provide a finish as directed.

G. Mount luminaires at heights and locations indicated on the Contract Drawings, or as required by City. Mounting heights specified or indicated are to be to the top of each luminaire, unless otherwise noted. Obtain approval of the exact mounting for luminaires on the job before ordering is commenced and, where applicable, after coordinating with the type, style, and pattern of the surface being installed.

H. Ground non-current-carrying parts of electrical equipment in accordance with UL and NEC provisions.

I. Upon completion of installation of luminaires, and after circuits have been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at the site, then re-test to demonstrate compliance. Otherwise, remove and replace with new units, and proceed with re-testing. Coordinate all test times and requirements with the City.

1. Test all wiring with an insulation testing instrument, both before and after connection of luminaires and equipment. The minimum resistance shall be 250,000 ohms.

J. Upon completion of the installation, the luminaires and lighting equipment shall be in first class operating order and free from defects in condition and finish. At time of final inspection, all luminaires and equipment shall be clean, fully lamped, and be complete with required lenses or diffusers, reflectors, shields or other components necessary for the function of the luminaires. Any reflectors, lenses, diffusers, shields or other parts damaged prior to the final inspection shall be replaced prior to inspection.

K. Luminaires and sources that are part of the Work of this section shall not be used for work lights during construction. Provide adequate portable or temporary lighting for construction.

3.02 POLES

A. Delivery, Storage, and Handling

1. Package aluminum poles for shipping according to ASTM B 660.

2. Store poles on decay-resistant skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
3. Handle wood poles so they will not be damaged. Do not use pointed tools that can indent pole surface more than 1/4 inch deep. Do not apply tools to section of pole to be installed below finished grade.

4. Retain factory-applied pole wrappings on fiberglass and laminated wood poles until right before pole installation. Handle poles with web fabric straps.

5. Retain factory-applied pole wrappings on metal poles until right before pole installation. Handle poles with web fabric straps.

B. Warranty

1. Special Warranty: Manufacturer agrees to repair or replace components of pole(s) that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within a specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs from special warranty period.

2. Warranty Period: Five years from date of Substantial Completion.

3. Warranty Period for Corrosion Resistance: Five years from date of Substantial Completion.

4. Warranty Period for Color Retention: Five years from date of Substantial Completion.

C. Performance Requirements

1. Shall meet requirements:
   a. AASHTO LTS-6-M for structural and wind load standards
   b. ASTM A 500/A 500M for steel poles
   c. ASTM B 221 for aluminum poles
   d. ASTM A 123/A 123M for hot dipped galvanized finishes
   e. ASTM A 36/A 36M for structural steel in foundations

2. Shall have an oval handhole 2-1/2” x 5” with secured cover by captive stainless or galvanized steel screws.

3. Shall have hot dipped galvanized steel hardware where not welded.

D. Installation
1. This guideline does not include any recommendations or guidelines for the mounting of any luminaires or poles. All installations must be done in coordination with the Florida Building Code and manufacturer provided details.

2. Shall install to manufacturer requirements and materials.

3. Shall maintain code required distances from nearby services above or under ground.

4. Do not mount aluminum poles in contact with earth, concrete, or different metals without proper protection to reduce corrosion.

5. Provide proper grounding as recommended by manufacturer.

3.03 INTELLIGENT LUMINAIRE CONTROLS

A. Refer to Miami Beach Citywide Lighting Standards Chapter 5 page 2, Chapter 6 pages 1 and 2 for controls performance specification framework.

3.04 CALCULATION REPORTS

A. Refer to Miami Beach Citywide Lighting Standards Chapter 6 page 1 for calculation report specification framework.

3.05 SAMPLES AND MOCKUPS

A. Samples and mockups shall be provided at the request of the community for a review period of no less than 3 weeks. Full-scale mockups shall adhere to all parts of the Miami Beach Citywide Lighting Standards, as though they are a complete installation. At the end of the agreed upon duration, mockups shall be completely demolished and removed by the same agency that installed the mockup.
APPENDIX 21-A:
CITYWIDE LIGHTING STANDARDS
Miami Beach Citywide Lighting Standards

100% Design Submittal
April 2020
City of Miami Beach
Miami Beach Citywide Lighting Standards

Project No: 17178.00
Document Title: Miami Beach Citywide Lighting Standards
Revision: F
Date: April 2020
Client Name: City of Miami Beach, FL
Authors: Barbara Horton and C. Webster Marsh, HLB Lighting Design

Document History and Status

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A Technical Terms - Glossary
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# Acronyms and Abbreviations

For full definitions please see Appendix A – Technical Terms

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<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>ANSI</td>
<td>American National Standard Institute</td>
</tr>
<tr>
<td>BUG</td>
<td>Backlight Uplight Glare</td>
</tr>
<tr>
<td>CCT</td>
<td>Correlated Color Temperature</td>
</tr>
<tr>
<td>CMB</td>
<td>City of Miami Beach</td>
</tr>
<tr>
<td>CRI</td>
<td>Color Rendering Index</td>
</tr>
<tr>
<td>FDOT</td>
<td>Florida Department of Transportation</td>
</tr>
<tr>
<td>FPL</td>
<td>Florida Power and Light</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
</tr>
<tr>
<td>IESNA</td>
<td>Illuminating Engineering Society of North America</td>
</tr>
<tr>
<td>IoT</td>
<td>Internet of Things</td>
</tr>
<tr>
<td>IP</td>
<td>Ingress Protection</td>
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<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>LLF</td>
<td>Light Loss Factor</td>
</tr>
<tr>
<td>NEC</td>
<td>National Electric Code</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
</tr>
<tr>
<td>ROW</td>
<td>Right of Way</td>
</tr>
<tr>
<td>SSL</td>
<td>Solid State Lighting (e.g. LED)</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriter’s Laboratory</td>
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</table>
Background and Purpose

Introduction

Light is transformative. It defines how people see their surrounding environment and how they are seen in it. The Miami Beach Citywide Lighting Standards will serve as a guideline to enhance the community and tourist experience by considering appropriate illumination, safety, long distance visual cues, visual acuity, optical performance, advanced technology, environmental conditions, and maintenance. Following these goals and strategies will position the City of Miami Beach as a world leader in sustainable city lighting and advanced technologies to promote the brand identity and serve the community and visitors.

One of the more critical challenges will be community adoption. Residential streets with pedestrian sidewalk lighting and little to no area street lighting may not see a need for new roadway luminaires. Once a luminaire is submitted for use in a district, a visual mock-up shall be installed to educate stakeholders on industry standards and the overarching goals for the solution. This type of community engagement allows the public to vet solutions, raise questions and concerns, endorse the new design, give ownership of the design to the community it impacts, and hopefully lead to a speedy adoption process.

When considering one-for-one upgrades, care must be taken to evaluate existing conditions and lamp type, lighting quality, fixture optics, pole placement, and pole heights. Once calculations are performed and analyzed, new fixture locations may be required and some existing may need to be removed.

Relative to phasing and commissioning, technology is constantly evolving and changing and the technologies need to stay consistent and compatible throughout the entire scope.

Vision

- Create an opportunity for branding and identity for Miami Beach
- Evaluate visual acuity to enhance safety
- Utilize LED technology to maximize energy efficiency and reduce maintenance
- Employ cutting edge controls, adaptive controls methodologies and two way communication
- Consider environmental conditions: Resiliency, Wildlife and Sky Brightness
- Provide a network for Internet controlled devices throughout the city.

Mission

- To address the variety of needs for existing lighting conditions
- To provide a master plan, maintaining consistency throughout the city
- To upgrade existing lighting poles with modern technology
- To gain the support and solicit feedback from the communities directly affected by the lighting improvements
- To provide a specification guide and standard that can be used on projects to improve the light of the City of Miami Beach
- To improve long-term maintenance and upgrade quality of light

Guiding Principles

Decision making for lighting has many factors and requires a comprehensive list of lighting attributes to develop a lighting solution that meets the needs of the municipality and community. Prioritizing the needs for each roadway type and district type is paramount to establishing robust lighting strategies for Miami Beach.

Gathering feedback on the scope and design of a project from the stakeholders and community members directly affected.
Guiding Principles

SAFETY
- Uniformity of 4:1 - 10:1
  Good roadway lighting allows for a co-existence of vehicles, pedestrians, cyclists, and everything else. A basic function of night lighting is to allow all of the road and pedestrian ways to be able to visually survey their immediate surroundings and thus feel secure. People’s perception of safety is highly dependent on good vertical illuminance, good uniformity, visual clarity of the surrounding area, minimal glare, good color rendering, and visual hierarchy to support wayfinding.

VISUAL ACUITY
- Luminances in Appendix F
  Creating visual clarity in the surrounding area works hand in hand with vertical illuminance and uniformity to increase feelings of safety. When surrounding buildings are softly illuminated to provide a visual backdrop and when landscaped areas are conscientiously pruned, it is easy for someone to quickly make a visual assessment of their surroundings and identify an area as safe. This is particularly important along walkways. If only the walkway is illuminated and no vertical illumination in the surrounding environment is provided, it can actually feel uncomfortable to walk there given the feeling of being in a spotlight with no surrounding visual cues. People can instinctively feel that they might be attacked and pulled into a darker surrounding area. Surrounding building interior glow, lighting at entries, supplemental area lighting, and ambient lighting from path and roadway lighting can all contribute to creating good visual clarity.

GLARE
- BUG Rating of G2 or lower.
  Glare from overly bright or poorly aimed light fixtures can be uncomfortable and can also contribute to people feeling unsafe. If a light fixture is overly glaring or aimed in a way that prevents good visual clarity, it can temporarily disable someone’s adaptation to the surrounding illuminance and make it difficult to see. Attention should be paid to fixtures with acceptable source and lens brightness, and roadway lighting should never tilt greater than 5% above the horizontal plane to avoid direct view of light sources. A BUG rating can be used to reduce glare, the IES TM-15-11 has recommended best practices for glare ratings. It is recommended to minimize lighting above 60° to avoid glare, either a G1 or G2 rating at maximum.

COHESION AND CONSISTENCY
- Pole designs in Appendix C
  In kind with visual clarity, we strive to create a simple cohesion and consistency across the city. By selecting fixtures that are a part of a family, this aids in the predictability of the visual experience. A major benefit to selecting fixtures within a family from one manufacturer leads to easier maintenance as well.

COLOR TEMPERATURE AND CRI
- CCT of 4000K and CRI of 80
  Color temperature may affect visual acuity and people’s sense of space. A cooler color can make people feel safer and more alert, while a warmer color temperature is better for the environment and can make people feel more relaxed. There are many other factors that play into how color temperature affects people, but the temperature is best when consistent but may change based on the application.

Good color rendering can significantly contribute to people’s feeling of safety. Some traditional exterior light sources, such as high pressure sodium and older versions of metal halide, have limited color rendering capability and the potential for color shift. Poor color rendering makes the clear differentiation of surface, the identification of cars, or seeing people’s clothing and features difficult. State-of-the-art LED sources have the benefit of good color rendering across all parts of the visible spectrum, allowing all colors to be easily detectable and instantly recognizable, even in lower illuminance ranges.

ENERGY REDUCTION
A combination of energy efficient light sources (LED), proper spacing, interaction between light and site materials, and selective light distribution will lead to an overall efficient project/site. It is important to coordinate with designers and engineers so that all aspects are being thoughtfully selected to ensure the lighting is integrated into the built environment.

COMMUNITY OUTREACH
An important step to consult with the community affected, solicit feedback from community members, and to guide the design to meet the needs of the community.
**Guiding Principles**

**BRANDING**

Branding shall be signage, luminaire and pole finishes, additional decorative only luminaires, or other options that do not affect or go against the Miami Beach Citywide Lighting Standards.

**ADAPTIVE AND INTELLIGENT CONTROLS**

- **Sensors:** Occupancy, daylight, sound/wind
- **Timeclock control**

Adaptive and intelligent controls provide custom-izable and strategic lighting to meet the needs of each community. Daylight and occupancy sensors, energy monitoring and reduction, and time-management systems are great examples of systems. Lighting controls can be used to change lighting intensity to meet the needs of the space based on proximity to important wildlife or natural areas, time of day, weather, adjacent ambient lighting, and current occupancy of the roads.

**ECONOMIC DRIVER**

- **Adjusting intensity in response to sensors**
- **100% ROI by end of life**
- **Light Loss Factor of 0.9**

The opportunity to move to LED and smart technology offers communities a wide variety of beneficial options to decrease cost and increase revenue. Options such as: metering parking, community branding, maintenance cost reduction, electricity cost reduction, citywide data mining, and increased community awareness of safety. Lighting controls in outdoor lighting systems reduce the number of operating hours, lower maintenance costs, and increase energy savings.

**MAINTENANCE**

- **L70 of 100,000 minimum**
- **Replace fixtures at L70**

The adoption of LED technology has significantly increased the lifetimes of exterior lighting systems. With fewer failures and the added benefit of not having to relamp or replace fixtures nearly as often, labor and maintenance costs are reduced. When fixture selections are based off of particular families or manufacturers, the familiarities with maintaining those fixtures will keep labor costs down, too.

**ENVIRONMENTAL FACTORS**

- **BUG rating of U0 and B2 or less**
- **Amber light around habitats**

The rapid growth of urban environments often leads to a changed perception of our night sky, mainly due to uncontrolled outdoor lighting. Light pollution, including sky glow, glare, light trespass, and energy waste should be taken into consideration when designing a quality lighting system. Using proper optics, specifying shielding devices and glare accessories, and aiming fixtures within the intended area aids in an efficient and environmentally conscious lighting system. Wildlife can also be negatively affected, and care should be taken to specify glare-free fixtures and utilize robust controls strategies to dim or extinguish lights when not in use. Declining populations in sea turtles, migratory birds, and even insects are occurring because of poorly controlled and executed lighting systems.

A BUG rating can be used to reduce sky glow, the best option is to use luminaires with a rating of U0 which minimizes uplight to an undetectable level. A BUG rating of B1 or B2 minimizes lighting trespass onto properties or habitats, but may still require shielding to prevent trespass completely.

**LUMINAIRE STYLE**

Any new luminaires need to be provided with a marine grade and salt spray rating as specified in Appendix B.

Pole height from base of pole to top of pole/luminaire range shall be between:

- **12 feet and 16 feet in residential and coastal communities**
- **20 feet and 25 feet in commercial communities**

Pole heights shall be defined by the community having jurisdiction so long as it meets the other criteria in the Miami Beach Citywide Lighting Standards.
Executive Summary

The standards and specifications set forth in this document shall be included in the Publics Works Manual upon adoption of the document and will be updated pursuant to the Public Works Department’s administrative process.

This report covers the City of Miami Beach citywide lighting standards for illumination of all city owned lighting, including: luminaires, poles, and controls, located within the Miami Beach right of way. Specifications on luminaires, poles, and controls can be found in Appendix B - Luminaire and Controls General Specifications.

The Miami Beach Citywide Lighting Standards will coordinate with the tree master plan and any other master plans that affect the performance and placement of luminaires.

This standard does not include the following:
1. Infrastructure specific standards that affect the design and function of roadways.
2. Power and Electrical specific standards that affect the design and layout of power feeding the luminaires, other than how it will be controlled.
3. Engineering specific standards that affect structural or electrical needs by code or condition.
4. Aesthetic lighting standards for applications such as facade, street pole decoration, or bridge lighting.
Districts and Zones

This report utilizes three categories of functional districts within the City of Miami Beach, distinguished by function: Residential, Commercial, and Coastal. These districts would be divided into all possible roadway conditions as sub-categories, based on ANSI/IES RP-8-18 roadway standards as shown in Miami Beach Citywide Lighting Standards Appendix F Page 2. Pedestrian traffic will be classified by the Florida Department of Transportation Level of Service model as shown in Appendix F Page 3.

This report also utilizes Specialty Zones that are unique and have standards in addition to their district.

Roadway functional districts shall be defined every 2,000 linear feet of contiguous road. Roadways that can be categorized by different Functional Districts, do not exceed 2,000 feet, and cannot be categorized as Coastal shall be designed to the district requirements with the higher luminance requirements. Roadways that can be categorized as coastal shall be designed to coastal requirements.

Functional Districts
- Residential - Roadways that provide access to single family dwelling units.
- Commercial - Roadways that provide access to commercially zoned structures and multi-family dwellings.
- Coastal - Roadways that are within line of sight of beaches or waterways or that provide access to structures that are adjacent to beaches or waterways.

Roadway Conditions, Type
- Major
- Collector
- Local

Roadway Conditions, Pedestrian Traffic
- High
- Medium
- Low

Specialty Zones
- Specialty Design Zones
- Lincoln Road
- Public Parking
- Other Specialty Lighting Zones

Retrofit Luminaires

Retrofit Luminaires that preserve the look of the original luminaire and replace luminaires 1-for-1, but do not replace poles, must be capable of meeting the same requirements as specified in the Miami Beach Citywide Lighting Standards. The City of Miami Beach has multiple types of existing luminaires, but retrofits in the style that are full cutoff, have low BUG ratings, and have good CRI are available and so retrofits should not be exempt to these standards. Lighting controls must also be provided for new retrofit luminaires, as specified herein.

House shield accessories and controls for custom applications may be necessary to meet the requirements of the roadway.
New Lighting Performance Specifications

Introduction

The new lighting performance specifications shall be used to provide guidance to the city, but shall also conform to the specifications in Appendix B of this document and any city ordinances that may supersede this document. These specifications have been created to ensure a positive and consistent lighting design throughout the City of Miami Beach and the city has considered a variety of options prior to creating these specifications. The below specifications shall apply to all districts:

Roadway, Pedestrian Way, and Veiling Luminance Values

If not in conflict with specifications listed in each district, the luminance values of roadways and pedestrian ways shall conform to or exceed the most up-to-date IES standards as defined in RP-8. At the time of this report, RP-8-18 is the most up-to-date version, but it shall be up to the agency responsible for the calculation reports to identify the most up-to-date version.

Color Rendering Index (CRI)

The color rendering of the luminaires shall conform to the standards established by IES in ANSI/IES TM-30-18 to ensure a minimum CRI of 80.

Correlated Color Temperature (CCT)

The correlated color temperature rendering of the luminaires shall be 4000K, unless otherwise specified herein.

Return on Investment (ROI)

The return on investment shall be implemented for limited budget reasons and shall allow the City of Miami Beach to recover the entire cost of the project through energy reduction implemented by the luminaires upgraded to newer technology. When replacing installed before the implementation of the Miami Beach Citywide Lighting Standards, the cost of materials for the project must be recovered by the predicted lifetime of the components.

Field Replaceable Components

Luminaires installed shall implement field replaceable components for easy maintenance and upgrades. Field replaceable components shall be removable by city employees without risk of damaged or voiding the luminaire warranty. This specification shall also apply to controls components as specified here-in.

Wildlife/Turtles

Wildlife and Sea Turtle districts shall have special lighting considerations. Habitat districts shall be identified by the Florida Fish and Wildlife Conservation Commission and an Independent Environmental Lighting Impacts Consultant. These districts shall employ the most current recommended lighting design methods to protect the wildlife while providing adequate illumination for roadway and pedestrian way safety.
New Lighting - Residential Neighborhoods

Luminaire Specifications- Disclaimer

Specifications
The specifications in the Miami Beach Citywide Lighting Standards are to be used to ensure consistency in roadway luminances, color temperature, luminaire style, controls protocol, and the overall lighting design for the city. Manufacturers shall provide components such as: lenses, house-side shields, output, and different lighting distributions to meet design criteria specified. Independent Lighting Designers or Engineers may specify lighting and accessories in addition to, but not in lieu of these specifications.

Performance Specification, Residential
• The color temperature of the luminaires shall be 4000K and conform to the industry best practices established by IES in ANSI/IES LM-80-15 and a 4-step MacAdam ellipse, as defined in Appendix A (A1-3), to ensure consistency from luminaire to luminaire.
  • A color temperature of 3000K may be used if prior written approval is given by the City of Miami Beach.
• Shall meet the design criteria of using the right light in the right place at the right time. Must be conscious of light trespass onto property and into homes. Luminaires shall utilize beam control, shielding, and cutoff angles to achieve best practices for minimizing glare and trespass.
• Lighting shall employ a full cut-off optic with accessories such as house-side shields to avoid trespass and limit sky glow.
New Lighting - Commercial Neighborhoods

Luminaire Specifications- Disclaimer

Specifications
The specifications in the Miami Beach Citywide Lighting Standards are to be used to ensure consistency in roadway luminances, color temperature, luminaire style, controls protocol, and the overall lighting design for the city. Manufacturers shall provide components such as: lenses, house-side shields, output, and different lighting distributions to meet design criteria specified. Independent Lighting Designers or Engineers may specify lighting and accessories in addition to, but not in lieu of these specifications.

Performance Specification, Commercial
• The color temperature of the luminaires shall be 4000K and conform to the industry best practices established by IES in ANSI/IES LM-80-15 and a 4-step MacAdam ellipse, as defined in Appendix A (A1-3), to ensure consistency from luminaire to luminaire.
• Lighting shall employ a full cut-off optic with accessories such as house-side shields to avoid trespass and limit sky glow.
New Lighting - Coastal Neighborhoods

Luminaire Specifications- Disclaimer

Specifications
The specifications in the Miami Beach Citywide Lighting Standards are to be used to ensure consistency in roadway luminances, color temperature, luminaire style, controls protocol, and the overall lighting design for the city. Manufacturers shall provide components such as: lenses, house-side shields, output, and different lighting distributions to meet design criteria specified. Independent Lighting Designers or Engineers may specify lighting and accessories in addition to, but not in lieu of these specifications.

Performance Specification, Coastal

• Wildlife and Sea Turtle districts shall have special lighting considerations. Habitat districts shall be identified by the Florida Fish and Wildlife Conservation Commission and an Independent Environmental Lighting Impacts Consultant. These districts shall employ the most current recommended lighting design methods to protect the wildlife while providing adequate illumination for roadway and pedestrian way safety.

• Lighting for coastal areas shall provide an environmentally conscious illumination that does not over-illuminate spaces or increase sky-glow but also provides pathfinding to pedestrian ways.

• Lighting shall employ a full cut-off optic with accessories such as house-side shields to avoid trespass into and visibility from habitats.
  - A habitat is defined as: A sandy beach in a Sea Turtle Lighting District adjoining the waters of the Atlantic Ocean, the Gulf of Mexico, and the Straits of Florida, including all inlet shorelines of those beaches.

  • Lighting shall employ warm colored illumination of a long wavelength amber that is at minimum 560 nanometers.

  • Lighting shall employ a limited number of luminaires to meet minimum foot-candles as necessary to meet federal, state, and local requirements for each area.

  • Where lighting is required adjacent to habitat areas, lighting shall employ long wavelength colored low illumination that is shielded, that does not affect nearby habitats. Shielding shall be mounted to prevent lighting from trespassing onto and visibility from habitat areas.

  • New roadway luminaires that are in Sea Turtle Lighting Districts and are within line of sight of the beach shall meet the following criteria:
    - Shall be at a height no greater than 12'-0" or at a height agreed upon by the Florida Fish and Wildlife Conservation Commission and an Independent Environmental Lighting Impacts Consultant.
    - Shall have an angle of illuminance that cannot be seen from any part of the habitat.
    - Shall not provide a cumulative illuminance greater than 0.1 FC at the boundary to the habitat.
    - Shall employ a long wavelength amber illumination that is at minimum 560 nanometers.
    - Minimize adding additional lights unless for safety. Justification for additional lighting under the argument of safety must be reviewed and approved by an Independent Road Safety Consultant in consultation with the Florida Fish and Wildlife Conservation Commission.
    - Use the lowest acceptable illumination levels.
    - Keep mounting height low, if possible without additional lighting.
    - Provide buffer zones, where possible.
    - All roadway lighting shall adhere to any and all guidance provided by FDOT.

• All standards listed above were written in coordination with the Florida Fish and Wildlife Conservation Commission “FWRI Technical Report TR-2, Version 2” and shall not supersede direction or recommendations from the Florida Fish and Wildlife Conservation Commission.
New Lighting - Specialty Lighting Zones

Explanation

These zones have been identified as unique and therefore require additional standards. Each zone may include multiple districts, but shall still adhere to the Miami Beach Citywide Lighting Standards.

Performance Specification, Specialty Design Zones

Zones that utilize an independent lighting designer or engineer may deviate from these standards in appearance with City approval. Alternate designs must still meet the performance criteria.

Performance Specification, Lincoln Road

Lincoln Road Improvements began in 2016 and cover the pedestrian mall starting at the intersection of Lincoln Road and Lenox Avenue and ending at the intersection of Washington Avenue and Lincoln Road. This zone shall be considered a special zone and any additional lighting within this area shall align with the improvements already being implemented. Adjacent zones shall adopt the Miami Beach Citywide Lighting Standards as specified herein.

Performance Specification, Public Parking

Areas designated to Public Parking lots or structures shall be considered a special zone and any additional lighting within these areas shall align with the City of Miami Beach lighting ordinance Ord. No. 98-3108, § 7(F), 1-21-98 as shown below:

Adequate lighting shall be provided. The lighting shall be arranged and installed to minimize glare on property in a residential district. Parking facilities shall be illuminated from one-half hour after sunset to one-half hour before sunrise at the levels specified below with a uniformity ratio of 10:1:

<table>
<thead>
<tr>
<th>Use</th>
<th>Minimum Illumination (FC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential lots</td>
<td>0.4</td>
</tr>
<tr>
<td>Commercial lots</td>
<td></td>
</tr>
<tr>
<td>Small (5—10 spaces)</td>
<td>0.4</td>
</tr>
<tr>
<td>Medium (11—99 spaces)</td>
<td>0.6</td>
</tr>
<tr>
<td>Large (100+ spaces)</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Additionally, consideration should be given to Public Parking structures where lighting may be in line of sight to Coastal districts, even from long distances. Luminaires and lighting within line of sight to Coastal districts shall comply with the requirements in the Coastal districts and consult with the Florida Fish and Wildlife Conservation Commission.

Other Specialty Lighting Zones

Information for these zones has been provided in the Urban Lighting Report. See Appendix E for a map and design criteria for of these zones.

- Hospital District
- Mixed-Use Entertainment District
- Town Center Area
- Open Space and Parks
- Convention Center District
- City Hall / City Services
- Oceanfront Environmental
Calculation Report Criteria

Roadway Calculation Reports

All Roadway Calculation Reports shall follow IES Recommended Practice RP-8-18 Chapter 3, show documents verifying compliance with the standards herein, and utilize 90% of initial output for Light Loss Factor (LLF of 0.9). Documents shall show the following information:

Calculation Summary for Roadway and Sidewalks
- Average Luminance $\text{cd/m}^2$
- Average Illuminance fc
- Uniformity Ratio $\frac{\text{Average}}{\text{Minimum}}$
- Uniformity Ratio $\frac{\text{Maximum}}{\text{Minimum}}$
- Veiling Luminance Ratio
- Mounting Heights (grade to source of light)

Photometry and IES Files
- An IES file shall be prepared in compliance with ANSI/IES LM-63-02/R08 and the following information shall be provided with the Roadway Calculation Report for each Luminaire used in the calculations:
  - Test Number
  - Test Lab
  - Test Date
  - Test Method
  - Issue Date
  - Manufacturer
  - Exact Luminaire Part Number
  - The Following Information as Shown in the IES File
    - Number of Lamps
    - Lumens to Lamps
    - Multiplier
    - Number of Vertical Angles
    - Number of Horizontal Angels
    - Photometric Type
    - Units Type
    - Width
    - Length
    - Height

Commissioning Summary for Typical Roadway and Sidewalks
- Commissioning Agency
- Commissioning Date
- Commissioning Method
- Measured Luminance
- Measured Illuminance, this can be in lieu of Measured Luminance, if properly measured and converted to Luminance per guidelines in RP-8-18.
- Mounting Heights (grade to source of light)
## Calculation Report Tables

### Table 5-2.1 - Example Calculation Report

<table>
<thead>
<tr>
<th>Spacing</th>
<th>217 feet</th>
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<tbody>
<tr>
<td>Quantity</td>
<td>10</td>
</tr>
<tr>
<td>Left</td>
<td>Right</td>
</tr>
</tbody>
</table>

#### Roadway Luminance
- **Average**: [0.6] 1.4 1.4 cd/m²
- **Max**: 2.8 2.8 cd/m²
- **Min**: 0.8 0.8 cd/m²
- **Ave/Min**: [3.5] 1.8 1.8
- **Max/Min**: [6] 3.8 3.8
- **Lv Ratio**: [0.3] 0.3 0.3
- **STV**: 3.3 3.3

#### Roadway Illuminance
- **Average**: [·] 1.7 1.7 fc
- **Max**: 3.5 3.5 fc
- **Min**: [·] 0.9 0.9 fc
- **Ave/Min**: [·] 1.9 1.9 fc
- **Max/Min**: [·] 3.8 3.8 fc

#### Sidewalk Illuminance
- **Average**: 1.6 1.6 fc
- **Ave/Min**: 2.3 2.4 fc
- **Ev Min**: 0.2 0.2 fc

#### Bikelane Illuminance
- **Average**: -- -- fc
- **Ave/Min**: -- -- fc
- **Ev Min**: -- -- fc

### Table 5-2.2 - Example Photometry and IES File Report

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<thead>
<tr>
<th>TEST #:</th>
<th>ISF 34786942</th>
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<tbody>
<tr>
<td>TEST LAB:</td>
<td>SCALED PHOTOMETRY</td>
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<tr>
<td>TEST DATE:</td>
<td>5/31/2017</td>
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<tr>
<td>CATALOG:</td>
<td>ATB2 40BLEDE10 XXXXX R2 3K</td>
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<tr>
<td>DESCRIPTION:</td>
<td>ATB2 SERIES LED 1000MA TYPE 2 3000K CCT</td>
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<td>SERIES:</td>
<td>AUTOBAHN ATB2</td>
</tr>
<tr>
<td>LAMP CATALOG:</td>
<td>LED</td>
</tr>
<tr>
<td>LAMP:</td>
<td>LED ARRAY</td>
</tr>
<tr>
<td>LAMP OUTPUT:</td>
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</tr>
</tbody>
</table>

**BALLAST / DRIVER:** LED DRIVER, LED DRIVER

**INPUT WATTAGE:** 133

**LUMINOUS OPENING:** RECTANGLE W/LUMINOUS SIDES (L: 5.4", W: 9.6", H: 0.36")

**MAX CD:** 11,099.0 AT HORIZONTAL: 80°, VERTICAL: 72.5°

**ROADWAY CLASS:** MEDIUM, TYPE II

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![Polar Candela Distribution](image1)

![Instant candela Plot](image2)
Controls Performance Specifications

Central Intelligence

The lighting controls for the City of Miami Beach shall utilize a central control intelligence that utilizes a dedicated location for the lighting controls central processor for housing and shelter. Gateways to repeat signal from the central processor shall not be capable of overriding signal sent by the central processor. Each device on the system shall be visible and controllable in real-time on the central processor display. Luminaires shall be fully energized at all times to provide power to controls devices which shall switch or dim luminaires as designed.

Integration and Ongoing Development

The lighting controls for the City of Miami Beach shall utilize a non-proprietary and open protocol to allow ongoing improvements for the foreseeable future. An integrator shall be retained by every contractor providing intelligent luminaire controls, the integrator shall be capable of integrating new lighting controls into the intelligent lighting controls systems specified here-in.

Daylight Responsive Controls

The lighting controls shall be capable of adjusting the luminaire’s output from off to 100% intensity in response to the presence or absence of daylight.

Inter-Communication Occupancy Controls

The lighting controls shall be capable of gradually dimming the luminaire’s output from low to full intensity in response to the presence or absence of pedestrians, vehicles, or other forms of occupancy on the pedestrian ways or roadways. Luminaires shall be able to communicate with each other to provide full illumination for the luminaire directly above the occupant and the luminaires immediately adjacent to the occupant, but keep all other luminaires at the low dimmed state. The lighting shall follow the occupant as it moves along the illuminated way and gradually dim up or down to provide an efficient and safe illumination. Intensity levels are specified in Appendix E.

Internet Enabled Luminaires

The lighting controls devices mounted directly to luminaires shall be capable of communicating with the central intelligence and other controls devices within the vicinity and shall also be able to control the luminaire directly in response to commands from the central intelligence. Luminaire shall be able to report the following: Driver failure, LED failure, pole knocked over, loss of power, communication failure, auxiliary devices not working, end of LED life.

Maintained Illuminance Controls

The lighting controls shall be capable of maintaining a set point illuminance level directly below the luminaire.

Other Unspecified Controls

The lighting controls shall be capable of adapting to the surrounding environment in sound, wind, and other environmental criteria essential but not specific to lighting. The luminaire shall be capable of responding to any of the sensors connected to the lighting controls system.

Auxiliary Controls Ports

The lighting controls shall have expanded capacity, per luminaire, through unused non-proprietary auxiliary controls ports. Provide at minimum, (2) ports per fixture.
Controls Performance by District

Intelligent Luminaire Controls Specifications - Disclaimer

Specifications
The lighting controls needs for the City of Miami Beach shall be a flexible system that is easy to add or remove devices, as needed by the city. The specifications in this report for controls shall be adhered to for consistency in roadway luminances, color temperature, luminaire style, controls protocol, and the overall lighting design for the city.

Additional components shall include: photosensors, occupancy sensors, dimmers, sound detection, wind sensors, and safety beacons.

Performance Specification, Residential
• The City of Miami Beach will provide controls that meet the controls sequence as specified in Appendix E. Residential districts may change the sequence after installation to meet the needs of their specific roadways. Lighting controls manufacturer shall be consulted for any revisions to the controls sequence.

Performance Specification, Commercial
• The City of Miami Beach will provide controls that meet the controls sequence as specified in Appendix E. Commercial districts may change the sequence after installation to meet the needs of their specific roadways. Lighting controls manufacturer shall be consulted for any revisions to the controls sequence.

Performance Specification, Coastal
• Lighting controls implemented in Coastal districts shall comply with all Citywide Standards. Amber luminaires shall be compatible with lighting controls specified and shall provide flicker-free illumination at dimmed states.

Performance Specification, Specialty Lighting Zones
• The lighting controls of Specialty Lighting Zones that utilize an independent lighting designer or engineer may deviate from these standards in appearance with City approval. Alternate controls designs must still meet the performance criteria.
Intelligent Luminaire Controls Report Criteria

Lighting Control Report

All Intelligent Luminaire Controls Reports shall comply with the strictest standards for the controls protocol and cybersecurity and shall show documents verifying compliance with the standards here-in. Documents shall show the following information:

Report of Compliance, for Each Device
• ANSI Standards
• ASTM Standards
• FCC Standards
• IEC Standards
• IEEE Standards
• IP Rating
• NEC Standards
• NEMA Standards
• NRTL Standards
• UL and/or ETL Standards

Report of Functionality
• Wired Maximum Distance
• Wireless Maximum Distance, Line of Sight
• Communications Frequencies
• Frequency Rates and Bandwidth

Report of Compatibility
• Tested as Compatible Devices, Interfaces, and Luminaires
• Report of tested applications or proof of concept showing compliance with the Miami Beach Citywide Lighting Standards and functional testing
• Evidence that all devices in the control system meet cybersecurity standards as required by the Design Lights Consortium (DLC) listing for Networked Lighting Controls Qualified Products List. This shall be applied to the most up-to-date version, presence on an older listing and absence on the latest listing is disqualifying.

Commissioning Summary for Typical Controls
• Commissioning Agency
• Commissioning Date
• Commissioning Method
• Functional Testing Results
  • Sensor detection range
  • Sensor response time and timeout duration
  • Sensor field measured set points
  • Communication signal strength to nearest repeating device
  • Ping time to Central Intelligence
Appendix A
Technical Terms
Appendix A - Technical Terms

Aesthetics
Luminaires that are visually pleasing, even when off during the day and may take into account surrounding historic architecture.

Branding
Using light poles for signage or distinguishing a community through aesthetics.

BUG Rating
A BUG rating is used to identify intensity and directionality of light provided by a roadway luminaire. It is used to minimize backlight (B0-5), uplight (U0-5), and glare (G0-5). A lower number in each category is preferable but not always warranted to the application, but a U0 rating should be observed if sky glow is to be reduced.

CCT (Correlated Color Temperature)
How warm or cold a white source of light appears. Common CCT’s in exterior applications are 3000K (warm) or lower for residential or parks. To ensure consistent color between fixtures, CCT should also have a 4-step or smaller binning.

CRI (Color Rendering Index)
How accurately the light reveals colors when compared to daylight. A high CRI (80 or higher) is necessary for tasks that require higher accuracy of color such as in store fronts or sports centers, otherwise lower CRI may be better suited.

Digital Lumen Management
Compensates for diminished lumens over time to maintain illumination levels. Fixtures use an integral sensor to maintain a set level of output and increases the lifespan of the fixture, in some cases adding 15 or more years to the fixture. This also reduces initial energy consumption of the fixture.

Dynamic Color Change
Color is useful to create a sense of place and attract pedestrian traffic, to tell a civic story, facilitate event/seasonal celebrations, or create an interactive social hub. There is a lot of creativity and community engagement that can come from dynamically controlled colored light.

Ease of Maintenance
How easy it is to fix or replace a broken fixture or to re-adjust the aiming.

Economic Driver
Improving light in areas may bring more street traffic to under-served neighborhoods or light poles can provide technology for paid parking where it wasn’t before.

Efficiency
How much energy the luminaire consumes to produce its light. Shown as lumens per watt (lm/W), a higher lumen number will increase efficiency. 100lm/W or higher is a good efficiency for a LED.

Energy Reduction
Modern design techniques strive to reduce energy consumption with fewer poles and more efficient LED modules and more adaptive controls.

Environmental Considerations
Providing for all aspects of code compliance with resiliency, wild life, and tropical conditions. Modern equipment can be rated to withstand harsh environments without compromising the aesthetics.

Glare Control
How the luminaire controls glare. Can be achieved with a glare shield or specialized optics.

IES LM-80-15
A standard used to ensure consistent and accurate measurements of LEDs. Luminaire manufacturers must provide a report that uses this standard for measurements. This report will be used to meet specification requirements as described in Appendix B.

Illuminance
Measures light incident on a point or surface, defined as luminous flux per unit area incident on a point or surface; measured in foot-candles (fc) or (lm/ft²) and lux (lm/m²). A mathematical conversion from Luminance to Illuminance is not recommended and should be avoided unless measuring Illuminance is impossible.

IOT
Internet of Things refers to the ability to connect anything to the Internet so that it can be controlled and monitored remotely.
**Controls / Adaptive Controls**
Dynamic sensors for motion and daylight sensing increase or decrease illumination, can be used to monitor asset maintenance as needed among other features, and can collect traffic data for roadway optimization.

**Life and Warranty**
LED fixtures lose intensity over time and are recommended to be replace at 70% of intensity, known as L70. A good L70 is 100,000 hours of use or 23 years of 12 hours operation per day.

**Luminance**
The magnitude of light energy emitted from a surface per unit area in a given direction; measured in candela per meter squared (cd/m²). A mathematical conversion from Illuminance to Luminance is not recommended and should be avoided unless measuring Luminance is impossible.

**Light Loss Factor (LLF)**
A prediction of luminaire performance after heavy use, typically as a percentage of initial output.

**Maintenance**
With intelligent controls response time can be improved with instant feedback monitoring and safety can be maintained by quickly identifying and repairing unresponsive equipment or poor lighting conditions.

**MacAdam Ellipse**
A region on a chromaticity diagram, in which all colors are indistinguishable. This metric is used during LED binning to ensure consistency of color across multiple diodes and luminaires.

**Off Roadway Luminance Compensation**
Automated light output control for the luminaires to be able to adapt brightness to adjacent luminances. This provides easier programming/re-programming and allows a better transition when driving on streets with high contrast areas. Luminaires will be able to conserve energy by adapting to adjacent luminances when there is a change to a lower intensity.

**Optical Control**
Control that the luminaire has over the light and where it is projected. Can completely cut off light from a specific direction or guide it in a different direction. Good optical control is important to avoid trespass, glare, and other undesirable illumination.

**Photo-voltaic Cells (Solar Power)**
Continues to be of interest but the form factor, limitations on locations/conflicts with available light, reliability, and the cost of long term maintenance are limiting on its widespread usage. Currently, large solar arrays (Utility-Scale Solar Farms) are the best recommended practice for any solar energy collection.

**Return on Investment (ROI)**
Many intelligent lighting controls systems are designed to reduce unnecessary energy consumption and can pay for themselves in energy savings over time. An energy audit to compare how much energy is consumed with how much would be saved can reveal how soon the project can repay the money spent in the form of an ROI report.

**Safety**
With sufficient vertical and horizontal illumination lighting can provide safe conditions for people, cars, and objects to co-exist.

**Uniformity Ratio**
The contrast between the brightest lit area to the darkest area. A good ratio is where the average illumination of the area is at most 3 times brighter than the darkest area, but specific recommendations are included in this report.

**Various Technology Integration**
Modern lighting poles can incorporate technology into the architectural design and improve the overall aesthetic. Technology can include but is not limited to: 5G, Control Mesh, Wi-Fi, IOT, Cameras, Speakers, Charging Stations, Parking Metering, Security Stations, Gunshot Detection, Digital Signage, and Inclement Weather Detection.

**Visual Acuity**
The ability to have clarity and sharpness of vision, which needs different light levels to achieve based on the task and environment.

**Way-finding**
The use of a combination of lighting and signage to guide vehicles, pedestrians, and all others in a safe and orderly manner.

**Wildlife Lighting Certified**
Lighting specially designed for areas with sensitive ecosystems. Darkness is the best option for these areas, but where illumination must be provided, certified luminaires should be installed to standards by the Florida Fish and Wildlife Conservation Commission and the U.S. Fish and Wildlife Service.
Appendix B

Luminaire General Specifications
1. **GENERAL**

1.1 **SUMMARY**

1.1.1 Included in the Work of this Section are labor, materials, and appurtenances required to complete the Work of this Section, as specified herein, as required by job conditions, or as indicated on drawings. The scope of this section includes general requirements for luminaires and their components, coordination, quality assurances, submittals, and general responsibility for a complete job.

1.2 **DEFINITIONS**

1.2.1 In this specification, the term “City” includes the Architect, Interior Designer, Landscape Architect, Construction Manager, Owner’s representative and/or the Lighting Specifier, together or individually.

1.2.2 The term “luminaires” refers to lighting fixtures with their integrated light sources and all other components, except for lighting controls.

1.2.3 The use of the word “Approved” shall not extend the City’s responsibilities beyond that as defined in the General Conditions.

1.3 **GENERAL REQUIREMENTS**

1.3.1 Provide labor, materials, and equipment for the installation of roadway luminaires, lighting equipment, control wiring, and sources as shown on the drawings, specified herein, and in the Miami Beach Citywide Lighting Standards. Luminaires shall be securely attached to poles as specified.

1.3.2 Refer to architectural drawings for locations, dimensions and details, and electrical documents for quantities. Check and verify dimensions and details on drawings before proceeding with the Work. Report any inconsistencies or discrepancies. Should it appear that the Work intended is not sufficiently detailed or explained on the drawings or in the specifications, apply for further drawings or explanations, as may be necessary. Conform to these explanations in the work. If any question arises about the true meaning of the drawings or specifications, provide timely and written questions before proceeding. Under no circumstances shall any request for extra compensation be honored where the basis of claim is such a clarification. In no case submit a bid or proceed on any Work with uncertainty. The intention of this specification and the accompanying or applicable drawings is to provide a job complete in every respect. Contractor is responsible for this result.

1.4 **COORDINATION**

1.4.1 Luminaire locations and mounting heights as indicated on the electrical drawings are generalized and approximate. Carefully verify locations and mounting heights with City standards,
and other reference data prior to installation. Although the location of equipment included in the Work of this Section may be shown on the Contract Drawings in a certain place, actual construction may disclose that the location for the Work does not make its position easily and quickly accessible. In such cases, provide timely and written notification of this situation before installing this Work, and comply with installation directions.

1.4.2 Clearly indicate the Work to be performed by other trades' contractors, and the materials that are adjacent to or abutting the Work of this Section. Coordinate as required. Schedule the Work to prevent Work of this Section being damaged by other construction operations. Remove and replace Work so damaged at no cost to the project. Coordinate and schedule the Work of this Section with the Work of other Sections and Utility Companies so that there shall be no delay in the proper installation and completion of any part of each respective Work. Construction Work shall proceed in its natural sequence without unnecessary delay caused by the Work of this Section.

1.4.3 Coordinate with other contractors regarding attachment to or openings in the materials of other trades as needed.

1.4.4 Arrange the installation in proper relation to other Work and with architectural finishes so that it shall harmonize in service and appearance and so that there shall be no interference with the Work of others, including interference in location.

1.4.5 Where a catalog number and a narrative or pictorial description are provided, follow the specified catalog numbers and narrative. Provide timely requests for clarification to specification as needed.

1.4.6 Become familiarized with all equipment listed in the luminaire schedule and take responsibility for the successful completion of the entire lighting installation.

1.4.7 Verify compatibility of supply voltage indicated on electrical drawings with voltage specified for each luminaire prior to release. Provide timely and written notification of any and all discrepancies.

1.5 QUALITY ASSURANCES

1.5.1 Contractor shall comply with the General Requirements related to Quality Control, in addition to the provisions herein.

1.5.2 Manufacturers listed herein, shall be assumed capable of supplying the listed luminaires unless exceptions are set forth in their quotations. Provide timely and written notification of any such exceptions. Acceptable manufacturers are listed in the luminaire schedule. Acceptable manufacturers shall be capable of providing proof of satisfactory production of luminaires of the type and quality shown for a period of at least five years.

1.5.3
1.5.4 Statement of Application:

1. By commencing the Work of this Section, the Contractor assumes overall responsibility, as a part of the warranty of the Work, to ensure that assemblies, components and parts shown or required within the Work of this Section, comply with the Contract Documents.

2. Warranty: In addition to any warranties required by the General Requirements, the Contractor of the Work of this section shall:
   a. For a period of one year after Owner’s initial acceptance and establishment of the beginning date of the warranty period, and at no additional cost, promptly provide and install replacements for luminaires or components thereof which are defective in materials or workmanship under normal operating conditions, except for sources; or successfully repair installed equipment at the job site. For any time during the warranty period that luminaires are not fully functional due to defects in materials or workmanship, provide or pay for and install and remove suitable and adequate temporary luminaires. Warrant replacement luminaires or components to be free of defects in workmanship or materials for a period of one year following replacement, and replace any defective replacements.
   b. Contractor shall not be held responsible for acts of vandalism or for abnormal or accidental abuse of the luminaires or their components occurring after the beginning of the warranty period, nor shall Contractor be held responsible for deleterious effects caused by maintenance procedures performed without the concurrence of Contractor.

1.5.5 Equipment Compatibility:

1. For all similar luminaire types, provide sources, control gears and other components fabricated or supplied by a single manufacturer, to simplify maintenance and replacement of equipment.

2. Luminaire details shown may be modified by the manufacturer provided all of the following conditions have been met:
   a. Luminaire performance is equal or improved.
   b. Structural, mechanical, electrical, safety, and maintenance characteristics are equal or improved.
   c. Cost to the City is reduced or equal.
   d. No conformance to codes has been compromised.
   e. No performance criteria for specified ratings has been compromised.
   f. Modifications have been reviewed and approved in writing.

1.5.6 Regulatory Agencies:

1. Provide luminaires constructed, wired and installed in compliance with the current edition of applicable city, state and national codes. Provide luminaires conforming to or exceeding Underwriters Laboratories (UL) standards, and to provisions of applicable codes which exceed those standards.

3. For any category of luminaire tested by any of the following labs, provide luminaires listed and labeled by an independent Nationally Recognized Testing Laboratory (NRTL) such as UL, ETL, CSA, MET.

4. In addition, provide luminaires which conform to additional regulations necessary to obtain approval for use of specified luminaires in locations shown. Use only electrical components listed by the above NRTLs.
1.5.7 Recognized Standards: Luminaires shall comply with all applicable standards including but not limited to the following organizations.

2. National Electrical Code (NEC)
3. International Dark Sky Association (IDA)
4. Illuminating Engineering Society (IES)
5. American Society for Testing and Materials (ASTM)
6. American National Standards Institute (ANSI)
7. National Electrical Manufacturers Association (NEMA)
8. International Electrotechnical Commission (IEC)
10. Americans with Disabilities Act (ADA)
11. Design Lights Consortium (DLC)

1.6 SUBMITTALS

1.6.1 General:

1. For all submittals, provide documents proving that luminaires meet criteria listed within the report.
2. For standard catalog items with no modifications, submit catalog cut sheets prepared by the manufacturer which clearly show all elements to be supplied and all corresponding product data (including sources, manufacturer and model number of control gears, and other components, as well as voltage; accessories, options and any miscellaneous items detailed in the written description of the specification.) If cut sheet shows more than one (1) luminaire type, all non-applicable information shall be crossed out.
3. For custom luminaires or modified luminaires submit a layout drawing prepared by the manufacturer showing all details of construction, dimensions, source layout, if applicable, mounting hardware or components, power locations, remote control gears, finishes and list of materials. Drawings must be to scale. Provide manufacturer with field dimensions where required. If accessories are required, drawings shall indicate relative position or adjacent vertical surface.
4. When components are indicated as contractor supplied or specified (i.e. remote power supplies, remote control gears housings, NEMA enclosures, etc.), Provide submittals for components in conjunction with the luminaire submittal.
5. Provide submittals with luminaire installation instruction sheets.
1.7  PRODUCT DELIVERY, STORAGE, AND HANDLING

1.7.1 Luminaires and their component elements shall be delivered to the Department of Public Works' designated site or building factory-assembled and wired to the greatest extent practical, in strict accordance with the approved shop drawings, certificates and catalogue cuts, and shall be handled in a careful manner to avoid damage.

1.7.2 Exposed finishes shall be protected during fabrication, transport, storage and handling. Delivered materials shall be identical to the approved samples. Materials which become damaged shall be repaired and/or replaced as directed.

1.7.3 Luminaires shall be stored under cover, above the ground, in clean, dry areas, and shall be tagged and/or marked as to type and location.

1.7.4 Delivered luminaires shall include wiring, sockets, control gears, shielding, channels, lenses and other parts and appurtenances necessary for luminaire installation of each luminaire type.

2.  PRODUCTS

2.1  SUMMARY

2.1.1 Provide materials, equipment, appurtenances and workmanship for the Work of this Section conforming to the highest commercial standards, as specified and indicated on the drawings. Make luminaire parts and components not specifically identified or indicated on the drawings, of materials most appropriate to their use or function, and resistant to corrosion and to thermal and mechanical stresses encountered in the normal application and function of the luminaires.

2.1.2 Named manufacturers, when listed in the luminaire schedule, are representative of an adequate level of quality and reputation, and are allowed to submit a product, provided that they are capable of satisfying the provisions of the specifications in every respect. This does not mean that any standard product provided by that manufacturer is automatically qualified. Manufacturers not on this list may be proposed during the substitution period if they can substantiate that their product meets every particular of the relevant specification, and are of comparable quality, experience and reputation. Any submitted product may be rejected without explanation.
2.2 MARKING OF LUMINAIRES

2.2.1 Luminaires shall be equipped with markings showing safety specifications, construction safeguards, and minimum resistance to hazard sources operation under fault conditions. Marking shall include manufacturer/distributor’s name, related voltage or voltage range, rated wattage, light output, optical distribution and rated frequency. LED luminaires not suitable for dimming control are required to indicate this clearly in installation instructions or package labeling. Mark luminaires with replaceable sources according to proper source type. Provide markings that are clear and that are located to be readily visible to service personnel, but invisible from normal viewing angles when sources are in place.

2.3 MATERIALS AND FABRICATION

2.3.1 Provide luminaires completely factory-assembled and wired and equipped with necessary sockets, control gears, wiring, shielding, reflectors, channels, lenses, and other parts and appurtenances necessary.

2.3.2 Use only completely concealed hardware, unless otherwise noted. Latching of luminaire door frames shall be unobtrusive. Make luminaire free from light leaks by the inherent design of the luminaire body and frame. Bond gaskets, when used, to the luminaire body. Weld power supply support studs, socket saddle studs and reflector support studs to luminaire body.

2.3.3 Construct luminaires with the minimum number of joints. Make unexposed joints by approved method such as welding, brazing, screwing or bolting. Soldered joints are not acceptable.

2.3.4 Provide metallic cast or extruded parts of luminaires that are close grained, sound, and free from imperfections or discoloration. Provide cast or extruded parts that are rigid, true to pattern, and of ample weight and thickness. Provide cast or extruded parts that are properly fitted, filed, ground, and buffed finished surfaces and joints free of imperfections. Make thickness on cast parts not less than 1/8in (3mm).

2.3.5 Provide marine grade copper material, low copper content, with salt spray ASTM B117.

2.3.6 Wiring:

1. Provide luminaire wiring between sources, lamp-holders and associated operating and starting equipment in compliance with UL 1570 and NEC, UL 8750 for LED’s.
2. Make connections of wires to terminals of sources, lamp-holders and other accessories in a neat and workmanlike manner and which are electrically and mechanically secure, with no loose strands protruding. Provide of the appropriate amount of wires extending to or from the terminals of a source, lamp-holder or other accessory. These wires shall not be in excess of the number which the accessory is designed to accommodate.
2.3.7 All luminaires shall be UL/ETL/CSA-US listed, “Wet Location” rated at a minimum, with greater protection as appropriate or required by code for the application.

2.3.8 All luminaires, poles, sensors, and its components are to be applicable for the environment in Coastal Districts.

2.4 Sources

2.4.1 General:
1. Provide electric sources as required, during construction, including sources for luminaires provided by others.
2. Submit catalogue cuts of all sources to be used in the Work, along with the shop drawing submittal.

2.4.2 Solid State Lighting / Light Emitting Diode (LED) Light Sources and Luminaires:
1. General:
   a. Luminaire manufacturer shall have a minimum of five (5) years’ experience in the manufacture and design of LED products and systems and no less than one hundred (100) North American installations.
   b. Unless otherwise specified, luminaire fabrication shall integrate all LED light sources and power/data supplies fabricated by a single manufacturer to ensure compatibility.
   c. All components peripheral devices, integrated photosensors, occupancy sensors, controllers, even if manufactured or provided by others, shall be the responsibility of a single entity, the luminaire manufacturer. All components shall perform successfully as a complete system. Integrated controls shall be programmed on-site to operate as described in by the City standards.
   d. Provide submittals as described herein.
   e. Include all components necessary for a complete installation. Provide all power supplies, synchronizers, data cables, and data terminators for a complete working system.
   f. All white light LED sources within the same luminaire type shall be within four (4) MacAdam ellipses/steps of each other.
   g. All LED sources used in the LED luminaire shall be of proven quality from established and reputable LED manufacturers and shall have been fabricated within 12 months before installation per the date code on the module.

2. Replacement and Spares:
   a. Manufacturer shall provide written guarantee of the following:
      (i) Manufacturer’s LED system or equivalent system will be available for ten (10) years: Manufacturer will provide exact replacement parts, complete replacement luminaires, or provide upgraded parts that are designed to fit into the original luminaire and provide equivalent distribution and lumen output to the original, without any negative consequences.
      (ii) Manufacturer will keep record of original chromaticity coordinates for each LED module and have replacement modules or luminaires from within four (4) MacAdam Ellipses/steps of the same coordinates available.
      (iii) Manufacturer will keep an inventory or ability to supply replacement parts or complete fixtures within two (2) weeks for component parts or the standard lead time of the original fixture for a complete fixture for
b. All luminaires and control system devices shall be replaceable in the field as specified in the Luminaire Schedule and Miami Beach Citywide Lighting Standards.

c. System shall carry a full warranty for a minimum of three (3) years from the date of shipment (or longer if required by the project). Manufacturer shall be responsible for a cost of labor and shipping as agreed between parties, to replace any component of the system that fails within the warranty period.

3. Products and Components – Performance
   a. LED luminaires and components shall be approved by an NRTL facility such as UL, ETL or CSA/US.
   b. For applicable fixtures: all products included in system shall use Mil-Std 810F, Random Vibration 7.698g as a minimum standard. In installations subject to vibration, luminaire shall be installed with vibration isolation hardware to sufficiently dampen vibrations.
   c. All LED components shall be mercury and lead-free.
   d. All manufacturing processes and electronic materials shall conform to the requirements of the European Union’s Restriction on the Use of Hazardous Substances in Electrical and Electronics Equipment (RoHS) Directive, 2002/95/EC.
   e. LEDs shall comply with ANSI/NEMA/ANSLG C78.377-2008 – Specifications for the Chromaticity of Solid-State Lighting Products. Color shall remain stable throughout the life of the source. The chromaticity of the installed product shall match IES LM-80 data showing that the LED’s do not shift more than .005 DuV from an approved sample or submitted documentation.
   f. LEDs testing shall be performed in accordance with IES LM-80 - Approved Method for Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules.
   g. LEDs shall have a minimum rated source life of 100,000 hours or as specified in the Luminaire Schedule. LED “rated source life” shall be determined per IES TM-21 - Projecting Long Term Lumen Maintenance of LED Light Sources based on LM-80 test data. Calculated lifetimes not exceeding testing hours per TM-21 are not accepted.
   h. Luminaire assembly shall include a method of dissipating heat to prevent degradation of source life, electronic equipment, or lenses. LED luminaire housing shall be designed to transfer heat from the LED board to the outside environment. Luminaire housing shall have no negative impact on life of components. High power LED luminaires shall be thermally protected using one or more of the following thermal management techniques: metal core board, gap pad, and/or internal monitoring firmware.
   i. Luminaire shall be tested and suitable to operate under a minimum of two (2) case temperatures: 55°C (131°F) and 85°C (185°F) and a relative humidity under 95%.
   j. Manufacturer shall supply in writing a range of permissible operating temperatures and relative humidity levels in which system will perform optimally. LEDs shall be adequately protected from moisture or dust per IP66 rating.
   k. All hardwired power connections to LED luminaires shall be reverse polarity protected and provide high voltage protection in the event connections are reversed, shorted or otherwise mis-wired during the installation process.
   l. For data wiring/cabling, provide pinout information for non-proprietary connectors specified herein.
   m. LEDs shall not be overdriven beyond their specified nominal voltage and current.
   n. Color-changing luminaires utilizing alternating color LED chips shall use an equal combination of each color of LED and shall be compatible with Miami Beach Citywide Lighting Standards.
o. Manufacturer shall be able to provide supporting documentation of the product meeting third party regulatory compliance.

p. Manufacturer shall ensure that products undergo and successfully meet appropriate design and manufactured testing including Design Failure Mode & Effects Analysis, Process Failure Mode & Effects Analysis, Environmental Engineering Considerations and Laboratory Tests, IEC standards and UL/CE testing.

q. Manufacturer shall provide Luminaire Efficacy (lm/W), total luminous flux (lumens), luminous intensity (candels), chromaticity coordinates, CCT and CRI. Optical performance, polar diagrams, and relevant luminance and illuminance photometric data. Provide data in IES file format in accordance with testing standards IES LM-79-08 and IES LM-82-12, based on test results from an independent Nationally Recognized Testing Laboratory or National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

r. All color characteristics, CCT, CRI, Color Fidelity, CIE Chromaticity Coordinates shall be consistent across the entire dimming range.

s. Luminaires shall have less than 30% flicker at frequencies of 200Hz or below at 100% and 20% light output and/or meet IEEE standard PAR 1789.

4. LED Power Supplies/ Drivers:
   a. LED drivers shall have a minimum 50,000 hour published life while operating at maximum case temperature and 65 percent non-condensing relative humidity.
   b. LED drivers shall have THD no more than 20% with 0.9 power factor.

5. Driver shall be Sound Rated A+.

6. Driver shall be > 90% efficient at full load across all input voltages.

7. Digital LED Control and Communication – Performance
   a. LED luminaires shall be network controllable via digital control.
   b. Each LED luminaire and/or node shall have the capability to be set to a unique and individual address. Address shall be selectable through onboard switches or by an external hardware or software method.
   c. LED luminaire shall be compatible with lighting control system specified herein.
   d. Provide interface with minimum of 2 auxiliary contacts.

2.5 RATED LOCATION LUMINAIRES

2.5.1 General:

1. Provide luminaires designed and manufactured specifically for “wet-rated” location service. Components, including nuts, bolts, rivets, springs, and similar parts shall be made of materials of effective corrosion resistance, or of materials which have been subjected to finishing treatment which will assure such resistance.

2. Provide anodized aluminum for aluminum parts of exterior luminaires that are not specified as requiring a painted finish.

3. All luminaires shall be constructed according to UL procedures, and listed by UL ETL or CSA-US for the appropriate category.
2.5.2 **Wet Location:**

1. In addition to the requirements of paragraph, above, wet location luminaires shall meet or exceed the following criteria:
   a. Hermetically sealed.
   a. Provide metal parts of luminaires, which are specified as requiring painting, for use in wet locations, which are painted with suitable weather and/or moisture resisting qualities.
   b. Provide luminaires for use outdoors, or in areas designated as wet locations, which are suitably and effectively gasketed to prevent access of moisture into electrical components or enclosing diffusers, lenses or globes.
   c. Luminaires shall be UL, ETL or CSA-US listed for wet locations.
   d. Luminaires shall have an IP66 wet location rating.
3. **EXECUTION**

3.1 **SUMMARY**

3.1.1 Install luminaires complete with light sources, as indicated, and with equipment, materials, parts, attachments, devices, aligner and filler clips, hardware, poles, channels, frames and brackets necessary to make a safe, complete, and fully operative installation.

3.1.2 Coordinate with other trades as appropriate to properly interface installation of luminaires with other work.

3.1.3 Reject and do not install blemished, damaged, or unsatisfactory luminaires. Replace imperfect or unsatisfactory luminaires, if installed, as directed.

3.1.4 All luminaires, poles, sensors, and its components are to be rated to endure the conditions in Coastal Districts and shall be installed to maintain the ratings.

3.1.5 Set luminaires, when installed, to be true, and free of light leaks, warps, dents, or other irregularities. No light leaks are permitted from any visible part or joint of the luminaires. Install luminaires plumb, square, and level at site as agreed upon by engineer, in alignment with adjacent luminaires, and secure in accordance with manufacturers’ directions and approved shop drawings.

3.1.6 Provide finish for all exposed parts or trims as specified. If not indicated, provide a finish as directed.

3.1.7 Mount luminaires at heights and locations indicated on the Contract Drawings, or as required by City. Mounting heights specified or indicated are to be to the top of each luminaire, unless otherwise noted. Obtain approval of the exact mounting for luminaires on the job before ordering is commenced and, where applicable, after coordinating with the type, style, and pattern of the surface being installed.

3.1.8 Ground non-current-carrying parts of electrical equipment in accordance with UL and NEC provisions.

3.1.9 Upon completion of installation of luminaires, and after circuits have been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at the site, then re-test to demonstrate compliance. Otherwise, remove and replace with new units, and proceed with re-testing. Coordinate all test times and requirements with the City.

1. Test all wiring with an insulation testing instrument, both before and after connection of luminaires and equipment. The minimum resistance shall be 250,000 ohms.
3.1.10 Upon completion of the installation, the luminaires and lighting equipment shall be in first class operating order and free from defects in condition and finish. At time of final inspection, all luminaires and equipment shall be clean, fully lamped, and be complete with required lenses or diffusers, reflectors, shields or other components necessary for the function of the luminaires. Any reflectors, lenses, diffusers, shields or other parts damaged prior to the final inspection shall be replaced prior to inspection.

3.1.11 Luminaires and sources that are part of the Work of this section shall not be used for work lights during construction. Provide adequate portable or temporary lighting for construction.

3.2 POLES

3.3 Delivery, Storage, and Handling
1. Package aluminum poles for shipping according to ASTM B 660.
2. Store poles on decay-resistant skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
3. Handle wood poles so they will not be damaged. Do not use pointed tools that can indent pole surface more than 1/4 inch deep. Do not apply tools to section of pole to be installed below finished grade.
4. Retain factory-applied pole wrappings on fiberglass and laminated wood poles until right before pole installation. Handle poles with web fabric straps.
5. Retain factory-applied pole wrappings on metal poles until right before pole installation. Handle poles with web fabric straps.

3.4 Warranty
1. Special Warranty: Manufacturer agrees to repair or replace components of pole(s) that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within a specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs from special warranty period.
2. Warranty Period: Five years from date of Substantial Completion.
3. Warranty Period for Corrosion Resistance: Five years from date of Substantial Completion.
4. Warranty Period for Color Retention: Five years from date of Substantial Completion.

3.5 Performance Requirements
1. Shall meet requirements:
   a. AASHTO LTS-6-M for structural and wind load standards.
   b. ASTM A 500/A 500M for steel poles
   c. ASTM B 221 for aluminum poles
   d. ASTM A 123/A 123M for hot dipped galvanized finishes
   e. ASTM A 36/A 36M for structural steel in foundations
2. Shall have an oval handhole 2-1/2” x 5” with secured cover by captive stainless or galvanized steel screws.
3. Shall have hot dipped galvanized steel hardware where not welded.

3.6 Installation
1. This guideline does not include any recommendations or guidelines for the mounting of any luminaires or poles. All installations must be done in coordination with the Florida Building Code and manufacturer provided details.
2. Shall install to manufacturer requirements and materials.
3. Shall maintain code required distances from nearby services above or under ground.
4. Do not mount aluminum poles in contact with earth, concrete, or different metals without proper protection to reduce corrosion.
5. Provide proper grounding as recommended by manufacturer.

### 3.7 INTELLIGENT LUMINAIRE CONTROLS

3.7.1 Refer to Miami Beach Citywide Lighting Standards Chapter 5 page 2, Chapter 6 pages 1 and 2 for controls performance specification framework.

### 3.8 CALCULATION REPORTS

3.8.1 Refer to Miami Beach Citywide Lighting Standards Chapter 6 page 1 for calculation report specification framework.

### 3.9 SAMPLES AND MOCKUPS

3.9.1 Samples and mockups shall be provided at the request of the community for a review period of no less than 3 weeks. Full-scale mockups shall adhere to all parts of the Miami Beach Citywide Lighting Standards, as though they are a complete installation. At the end of the agreed upon duration, mockups shall be completely demolished and removed by the same agency that installed the mockup.
Appendix C
Typical Drawings
Typical A - “Roadway Luminaire”
25’ - 30’ Overall Height
Typical B -  “Roadway / Pedestrian Luminaire”
25’ - 30’ Overall Height
12’ - Pedestrian Head
Typical C - “Branded Pedestrian Luminaire” in South Beach
14’ - 16’ Overall Height

Fixture type not approved for use within Coastal Districts.
Typical D - “Pedestrian Luminaires”
14’ - 16’ Overall Height

Fixture types not approved for use within Coastal Districts.
Typical E - “Turtle-Friendly Luminaire”
12’ Maximum Overall Height

Must be approved by the Florida Fish and Wildlife Conservation Commission
Depending on mounting location, additional shielding may be required.
Appendix D
References
## Reference Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>City Wide Lighting Standard</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Factors</td>
<td>BUG Rating of B1 or B2 Minimizes Lighting Trespass</td>
<td>Section 1, Page 2</td>
</tr>
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<td>BUG Glare Rating</td>
<td>Section 1, Page 3</td>
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<tr>
<td></td>
<td>Backlight and Up Light</td>
<td>Section 1, Page 3</td>
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<tr>
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<td>Trespass</td>
<td>Section 4, Pages 2 &amp; 4</td>
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<td></td>
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<td></td>
<td>Trespass</td>
<td></td>
</tr>
<tr>
<td>Wildlife and Sea Turtle Districts</td>
<td>Use lighting only when necessary. Keep it low in mounting height, keep it shielded so no light is visible from the beach, keep it long wavelength (560nm or longer) during breeding season.</td>
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<td></td>
<td>Wildlife and Sea Turtle Districts</td>
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<td></td>
<td>Miami Beach ordinance 46-203, Florida Fish and Wildlife Conservation Chapter 62B-55 Model Lighting Ordinance for Marine Turtle Protection and Coastal Construction Control Line (CCL) established by the State of Florida pursuant to F.S. § 161.053.</td>
<td>Chapter 62B-55*</td>
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<td>Calculation Report</td>
<td>Bi-level lighting system recommended see section 6 controls performance specification.</td>
<td>Section 5, Pages 1-2</td>
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<td>Section 6, Page 1</td>
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<td>Luminaire specifications</td>
<td>Section 4</td>
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<td>Color Rendering Index</td>
<td>80 / ANSI TM-30-18 minimum requirement</td>
<td>Section 4, Page 1</td>
</tr>
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<td>Residential Color Temperature</td>
<td>3000K/4000K-ANSI/IES LM-80-15/4 STEP Macadam</td>
<td>Section 4, Page 2</td>
</tr>
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<td>Commercial Color Temperature</td>
<td>4000K-ANSI/IES LM-80-15/4 STEP Macadam</td>
<td>Section 4, Page 3</td>
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<td>Luminaire Values</td>
<td>IESNA RP-8-18 or latest</td>
<td>Appendix F, Page 2</td>
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<tr>
<td>Pedestrian Traffic</td>
<td>State of Florida Department of Transportation 2013 Quality/Level of Service Handbook or latest</td>
<td>Appendix F, Page 3</td>
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<td>Parking</td>
<td>Miami Beach ordinance 98-3108, § 7(F), 1-21-98</td>
<td>Section 4, Page 5</td>
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Appendix E

Lighting Zone Design Matrix and Map
Environmental overlay shall take precedence over these specified districts. The Oceanfront take precedence over corridors which run through Open Space and Parks. Lighting standards specified for districts shall take precedence over corridors which run through Open Space and Parks.
Miami Beach Citywide Lighting Standards

**LIGHTING ZONE DESIGN MATRIX**

<table>
<thead>
<tr>
<th>Lighting Zone</th>
<th>Average Luminance (cd/m²)</th>
<th>Average Uniformity Ratio (avg:min)</th>
<th>Maximum Uniformity Ratio (max:min)</th>
<th>Maximum Veiling Luminance Ratio (v:max:avg)</th>
<th>Correlated Color Temperature</th>
<th>New Lighting Specifications (see note 4)</th>
<th>Fixture Type</th>
<th>Controls Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corridor – Major Commercial</td>
<td>1.2</td>
<td>3:1</td>
<td>5:1</td>
<td>0.3</td>
<td>4000K</td>
<td>Commercial</td>
<td>Roadway</td>
<td>ON = Dusk OFF = Dawn DIM</td>
</tr>
<tr>
<td>Corridor – Major Residential</td>
<td>0.6</td>
<td>3.5:1</td>
<td>6:1</td>
<td>0.3</td>
<td>4000K See note 5</td>
<td>Residential</td>
<td>Roadway or Pedestrian (see note 12)</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =10:00pm -6:00am.</td>
</tr>
<tr>
<td>Corridor – Collector Commercial</td>
<td>0.6</td>
<td>3.5:1</td>
<td>6:1</td>
<td>0.4</td>
<td>4000K</td>
<td>Commercial</td>
<td>Roadway</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =11:59pm -4:30am.</td>
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<td>Corridor – Collector Residential</td>
<td>0.4</td>
<td>4:1</td>
<td>8:1</td>
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<td>4000K See note 5</td>
<td>Residential</td>
<td>Roadway or Pedestrian (see note 12)</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =10:00pm -6:00am.</td>
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<td>Corridor - Local Commercial</td>
<td>0.6</td>
<td>6:1</td>
<td>10:1</td>
<td>0.4</td>
<td>4000K</td>
<td>Commercial</td>
<td>Roadway</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =10:00pm -6:00am.</td>
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<tr>
<td>Corridor - Local Residential</td>
<td>0.3</td>
<td>6:1</td>
<td>10:1</td>
<td>0.4</td>
<td>4000K See note 5</td>
<td>Residential</td>
<td>Roadway or Pedestrian (see note 12)</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =10:00pm -6:00am.</td>
</tr>
<tr>
<td>Hospital District</td>
<td>0.6</td>
<td>6:1</td>
<td>10:1</td>
<td>0.4</td>
<td>4000K</td>
<td>Commercial</td>
<td>Roadway</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =10:00pm -6:00am.</td>
</tr>
<tr>
<td>Mixed-Use Entertainment District</td>
<td>0.9</td>
<td>4:1</td>
<td>4:1</td>
<td>4:1</td>
<td>4000K</td>
<td>Commercial</td>
<td>Roadway or Pedestrian (see note 12)</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =11:59pm -4:30am.</td>
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<td>Town Center Area</td>
<td>0.9</td>
<td>4:1</td>
<td>4:1</td>
<td>4:1</td>
<td>4000K</td>
<td>Commercial</td>
<td>Roadway or Pedestrian (see note 12)</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =11:59pm -4:30am.</td>
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<td>Open Space and Parks</td>
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<td>4000K</td>
<td>Residential</td>
<td>Pedestrian</td>
<td>ON = Dusk OFF = Dawn DIM DIM 20% and OCC =10:00pm -6:00am.</td>
</tr>
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</table>
## LIGHTING ZONE DESIGN MATRIX

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<thead>
<tr>
<th>Lighting Zone</th>
<th>Average Luminance (cd/m²)</th>
<th>Average Uniformity Ratio (avg:min)</th>
<th>Maximum Uniformity Ratio (max:min)</th>
<th>Maximum Veiling Luminance Ratio (v,max:avg)</th>
<th>Correlated Color Temperature</th>
<th>New Lighting Specifications (see note 4)</th>
<th>Fixture Type</th>
<th>Controls Sequence</th>
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</thead>
<tbody>
<tr>
<td>Parking</td>
<td>0.4 - 0.9 (per district)</td>
<td>6:1</td>
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<td>4000K</td>
<td>Residential Pedestrian</td>
<td></td>
<td>ON = ½ hour after sunset. OFF = 2 hours after closing or ½ hour before sunrise. DIM. OCC = 2 hours after closing until dawn.</td>
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<td>Convention Center District</td>
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<td>Commercial Branded</td>
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<td>ON = Dusk</td>
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<tr>
<td>City Hall/City Services</td>
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<td>OFF = Dawn DIM. DIM 20% and OCC = 10:00 pm - 6:00 am.</td>
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<td>Amber</td>
<td>Coastal Turtle Friendly (see note 11)</td>
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<td>Specialty Branded</td>
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<td>OFF = Dawn DIM. DIM 20% and OCC = 10:00 pm - 6:00 am.</td>
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</table>

**Notes:**

1. All luminaires to have 80 CRI minimum and full cut off optics.
2. All luminaires to have efficiency of 100lm/W, with L70 of 100,000 hours.
3. All luminaires capable of dimming.
4. New Lighting specifications are listed in Section 4 of the Citywide Lighting Standards.
5. See residential specification for options on color temperature.
6. ON refers to when the lights are to be illuminated.
7. OFF refers to when the lights are to not provide illumination but remain energized.
8. DIM refers to when the lights are to dim to maintain a target illuminance. Refer to luminance to illuminance conversion chart for associated foot-candle values.
9. DIM 20% refers to when the lights are to dim to 20% of target illuminance in DIM.
10. OCC refers to when the lights are to fade from the current intensity to 100% over 5 seconds in response to motion sensors. Sensors timeout after 15 seconds and lights fade down to previous intensity over 30 seconds. Controls shall be capable of triggering luminaires in response to traffic 300 hundred feet away on approach. Sensors of adjacent luminaires shall be capable of triggering multiple luminaires on the roadway in response to approaching traffic. Controls shall be field tested by controls manufacturer and adjusted as needed for optimal safety.
11. Fixture should be approved by the Florida Fish and Wildlife Conservation Commission and comply with the coastal lighting specifications.
12. Roadway, Pedestrian, or Roadway/Pedestrian fixture types may be used in these districts.
13. Lighting standards specified for districts shall take precedence over corridors which run through these specified districts. The Oceanfront Environmental overlay shall take precedence over all districts and corridors.
Appendix F
Lighting Standards, Referenced
## LIGHTING DESIGN CRITERIA FROM ANSI/IES RP-8-18

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Pedestrian Activity Classification*</th>
<th>Average Luminance $L_{avg}$ (cd/m²)</th>
<th>Average Uniformity Ratio $L_{avg}/L_{min}$</th>
<th>Maximum Uniformity Ratio $L_{max}/L_{min}$</th>
<th>Maximum Veiling Luminance Ratio $L_{v,max}/L_{avg}$</th>
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<td>6.0</td>
<td>10.0</td>
<td>0.4</td>
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* Pedestrian Activity Classifications are defined in Section 11.3.3.

$L_{avg}$: Maintained average pavement luminance

$L_{min}$: Minimum pavement luminance

$L_{v,max}$: Maximum veiling luminance

Table Notes:
CLASSIFICATION OF PEDESTRIAN TRAFFIC FROM FLORIDA DOT

PEDESTRIAN LEVEL OF SERVICE SCORE

If pedestrian traffic is not known, a survey shall be performed following these criteria:

Surveyor shall use the most up-to-date version of State of Florida Department of Transportation LOSPLAN software and follow the guidelines as written in the State of Florida Department of Transportation 2013 Quality/Level of Service Handbook. Newer versions of this handbook will supersede this standard.

LOSPLAN level of service numbers shall be used in the following equation and scores shall be used to define pedestrian classifications listed below.

\[ PLOS_f = \sum d_1 (p_1)^2 + \ldots + d_n (p_n)^2 / \sum d_1 (p_1) + \ldots + d_n (p_n) \]

Where:

- \( PLOS_f \) = Pedestrian level of service for the facility
- \( d_1 \) = Length of the first segment
- \( p_1 \) = Pedestrian level of service score for the first segment
- \( d_n \) = Length of the last segment
- \( p_n \) = Pedestrian level of service score for the last segment

**Low:** Less than or equal to 2.75

**Medium:** Greater than 2.5 but less than or equal to 4.25

**High:** Greater than 4.25
# Miami Beach Citywide Lighting Standards

## LUMINANCE (cd/m²) TO ILLUMINANCE (fc) CONVERSION CHART

<table>
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<tr>
<th>Lighting Zone</th>
<th>Average Luminance (cd/m²)</th>
<th>Average Illuminance for R1 pavement (fc)</th>
<th>Average Illuminance for R2 &amp; R3 pavement (fc)</th>
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<td>0.6</td>
<td>0.9</td>
<td>0.8</td>
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<td>Corridor – Collector Commercial</td>
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<td>0.6</td>
<td>0.9</td>
<td>0.8</td>
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<td>0.4</td>
<td>0.6</td>
<td>0.5</td>
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<td>0.6</td>
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<td>0.8</td>
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<td>0.45</td>
<td>0.4</td>
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<td>Hospital District</td>
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<td>0.6</td>
<td>0.9</td>
<td>0.8</td>
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<tr>
<td>Mixed-Use Entertainment District</td>
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<td>0.9</td>
<td>1.35</td>
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<td>Town Center Area</td>
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<td>0.9</td>
<td>1.35</td>
<td>1.2</td>
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<td>Open Space and Parks</td>
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<td>0.9</td>
<td>0.8</td>
</tr>
<tr>
<td>Parking</td>
<td>0.4 - 0.9 (per district)</td>
<td>0.4 - 0.9 (per district)</td>
<td>0.6-1.35 (per district)</td>
<td>0.53-1.2 (per district)</td>
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<td>Convention Center District</td>
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<td>0.9</td>
<td>0.8</td>
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<tr>
<td>City Hall/City Services</td>
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<td>0.9</td>
<td>0.8</td>
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<tr>
<td>Oceanfront Environmental Overlay</td>
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<td>0.9</td>
<td>0.8</td>
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<tr>
<td>Lincoln Road Pedestrian Mall</td>
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<td>0.9</td>
<td>1.35</td>
<td>1.2</td>
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</tbody>
</table>

**Notes:**

1. Conversions assume 1fc = 10 lux
2. Conversion of each roadway type in foot-candles (fc) are based on IES RP-8-18 Section 11.7.1. The foot-candle numbers are approximations based on roadway reflectances and may not be accurate for all roadway types. The luminance method is the preferred method for lighting of roadways and mathematical conversion should only be used when it is impossible to calculate or measure luminance.
3. R1 Pavement: Mostly diffuse reflectance properties characteristic of Portland cement or asphalt surface with a minimum of 15% of the aggregates composed of artificial brightener aggregates.
5. R4 Pavement: Mostly specular surface typical of very smooth asphalt texture.
STANDARD DETAILS

Standard Details for street lighting systems are presented on the following pages.

Minimum criteria are presented in these Standard Details. The Engineer of Record shall verify and modify the information shown as required to meet design intent and comply with all applicable Local, State, and Federal codes, standards, and regulations. All designs documents must be signed and sealed by a State of Florida licensed Engineer and signed and sealed calculations must be provided as applicable.

It is the responsibility of the user to familiarize him/herself will all Sections of the City of Miami Beach Public Works Manual that are applicable to the proposed work.

Projects shall not be constructed in the City of Miami Beach without all appropriate Local, State, and Federal approvals.
LIST OF DETAILS

DETAIL 21-1  13” X 24” QUAZITE PULL BOX
DETAIL 21-2  17” X 30” QUAZITE PULL BOX
DETAIL 21-3  RECTANGULAR CONCRETE POLE BASE FOR STREET LIGHTING LUMINARIES
DETAIL 21-4  CYLINDRICAL POLE BASE FOR STREET LIGHTING LUMINARIES
DETAIL 21-5  TYPICAL GROUNDING DETAIL FOR STREET LIGHTING LUMINARIES
DETAIL 21-6  TYPICAL A ROADWAY LUMINAIRE
DETAIL 21-7  TYPICAL B ROADWAY / PEDESTRIAN LUMINAIRE
DETAIL 21-8  TYPICAL C BRANDED PEDESTRIAN LUMINAIRE IN SOUTH BEACH
DETAIL 21-9  TYPICAL D PEDESTRIAN LUMINAIRE
DETAIL 21-10 TYPICAL E TURTLE-FRIENDLY LUMINAIRE
DETAIL 21-11 TYPICAL GROUNDING DETAIL FOR BOLLARD LIGHTS
DETAIL 21-12 LIGHTHOUSE BOLLARD
DETAIL 21-13 LIGHTHOUSE BOLLARD BASE
DETAIL 21-14 LIGHTHOUSE BOLLARD BASE ASSEMBLY
DETAIL 21-15 LIGHTHOUSE BOLLARD SHIELD ASSEMBLY
DETAIL 21-16 ELECTRICAL DUCT INSTALLATION
DETAIL 21-21 SERVICE POINT DETAIL
DETAIL 21-18 NEW SERVICE POINT RISER
DETAIL 21-19 SERVICE POINT EQUIPMENT ENCLOSURE DETAIL
DETAIL 21-20 WIRING COLOR CODE
NOTE:

1. TYPICAL PULL BOX WITHOUT LIGHT POLE OR SERVICE POINT.
CITY OF MIAMI BEACH
PULL BOX COVER

INSCRIBED LETTERS
APPROX. 3" HIGH & 1/4" DEEP
MARKED WITH ARROWS SHOWING
DIRECTION OF RUN

LOCKING DEVICE

17" x 30" QUAZITE PULL BOX

3' KNOCKOUT
(4 PLACES)

BOX FILLED
WITH PEA ROCK

PEA ROCK

12" MIN.
NOTES:

1. WIND DESIGN CRITERIA:
RISK CATEGORY: II
EXPOSURE CATEGORY: C
WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.
NOTES:

1. WIND DESIGN CRITERIA:
   RISK CATEGORY: II
   EXPOSURE CATEGORY: C
   WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.
SECTION VIEW
N.T.S.

NOTES:

1. FOR PURPOSE OF CADWELDING, ALL GROUND WIRES MUST BE OF #6 AWG MINIMUM.

2. WIRING COLOR CODE TO BE USED, SEE SHEET 21-20.
NOTES:

1. WIND DESIGN CRITERIA:
   RISK CATEGORY: II
   EXPOSURE CATEGORY: C
   WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.

3. PROVIDE MARINE GRADE COPPER MATERIAL, LOW COPPER CONTENT, WITH SALT SPRAY ASTM B117.

4. OVERALL HEIGHT: 25' – 30'.

5. REFER TO GROUNDING DETAIL ON 21–5.
NOTES:

1. WIND DESIGN CRITERIA:
   - RISK CATEGORY: II
   - EXPOSURE CATEGORY: C
   - WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.

3. PROVIDE MARINE GRADE COPPER MATERIAL, LOW COPPER CONTENT, WITH SALT SPRAY ASTM B117.

4. OVERALL HEIGHT: 25' – 30'. PEDESTRIAN HEAD: 12'.

5. REFER TO GROUNDING DETAIL ON 21–5.
NOTES:

1. WIND DESIGN CRITERIA:
   - RISK CATEGORY: II
   - EXPOSURE CATEGORY: C
   - WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.

3. PROVIDE MARINE GRADE COPPER MATERIAL, LOW COPPER CONTENT, WITH SALT SPRAY ASTM B117.

4. OVERALL HEIGHT: 14' – 16'.

5. FIXTURE TYPE NOT APPROVED FOR USE WITHIN COASTAL DISTRICTS.

6. REFER TO GROUNDING DETAIL ON 21–5.
NOTES:

1. WIND DESIGN CRITERIA:
   RISK CATEGORY: II
   EXPOSURE CATEGORY: C
   WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.

3. PROVIDE MARINE GRADE COPPER MATERIAL, LOW COPPER CONTENT, WITH SALT SPRAY ASTM B117.

4. OVERALL HEIGHT: 14’ – 16’.

5. FIXTURE TYPE NOT APPROVED FOR USE WITHIN COASTAL DISTRICTS.

6. REFER TO GROUNDING DETAIL ON 21–5.
NOTES:

1. WIND DESIGN CRITERIA:
   RISK CATEGORY: II
   EXPOSURE CATEGORY: C
   WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.

3. PROVIDE MARINE GRADE COPPER MATERIAL, LOW COPPER CONTENT, WITH SALT SPRAY ASTM B117.

4. MAXIMUM OVERALL HEIGHT: 12'.

5. MUST BE APPROVED BY THE FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION. DEPENDING ON MOUNTING LOCATION, ADDITIONAL SHIELDING MAY BE REQUIRED.

6. REFER TO GROUNDING DETAIL ON 21-5.
NOTES:

1. FOR PURPOSE OF CADWELDING, ALL GROUND WIRES MUST BE OF #6 AWG MINIMUM.

2. WIRING COLOR CODE TO BE USED, SEE SHEET 21-20.
NOTES:

1. WIND DESIGN CRITERIA:
   RISK CATEGORY: II
   EXPOSURE CATEGORY: C
   WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING
   CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND
   LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN
   THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE
   WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE
   AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.

3. PROVIDE MARINE GRADE COPPER MATERIAL, LOW COPPER CONTENT, WITH SALT SPRAY
   ASTM B117.

4. REFER TO GROUNDING DETAIL ON 21-11.
NOTES:

1. WIND DESIGN CRITERIA:
   - RISK CATEGORY: II
   - EXPOSURE CATEGORY: C
   - WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

2. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL A POLE WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.

3. REFER TO GROUNDING DETAIL ON 21–11.
NOTES:

1. WIND DESIGN CRITERIA:
   RISK CATEGORY: II
   EXPOSURE CATEGORY: C
   WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

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3. PROVIDE MARINE GRADE COPPER MATERIAL, LOW COPPER CONTENT, WITH SALT SPRAY ASTM B117.

4. REFER TO GROUNDING DETAIL ON 21-11

MIAMI BEACH
PUBLIC WORKS DEPARTMENT
1100 CONVENTION CENTER DRIVE, MIAMI BEACH, FL 33139

APPROVED
06/2020
09/2020

TITLE:
Lighthouse Bollard Base Assembly

DETAIL
21-14
NOTE:

1. PROVIDE MARINE GRADE COOPER MATERIAL, LOW COOPER CONTENT, WITH SALT SPRAY ASTM B117
ELECTRICAL DUCT IN EARTH
N.T.S

4" COMPACTED ASPHALT (MATCH EXISTING TYPE). FOR PAVEMENT RESTORATION REFER TO CITY OF MIAMI BEACH PUBLIC WORKS MANUAL SECTION 10

SAWCUT 6" EXISTING ASPHALT FOR TRENCHING

MATCH EXISTING FINISH GRADE

ELECTRICAL DUCT UNDER ROADWAY
N.T.S

NOTE:

1. IF DIRECTIONAL BORING IS USED FOR DUCT INSTALLATION, CLEARANCE SHALL BE 30" MINIMUM.
NOTES:

1. CONTRACTOR SHALL VERIFY POLE SIZE AND LOCATION WITH OWNER PRIOR TO INSTALLATION.

2. F.D.O.T. APPROVED POLES, S641-0700 & S641-0100.

3. WIRING COLOR CODE TO BE USED (SEE 21-20).

4. CONTRACTOR SHALL VERIFY FLOOD ELEVATION.

5. WIND DESIGN CRITERIA: RISK CATEGORY: II; EXPOSURE CATEGORY: C; WIND SPEED IN ACCORDANCE WITH THE HIGH VELOCITY WIND ZONE PER FLORIDA BUILDING CODE, LATEST EDITION.

6. WIND LOADING CALCULATION SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED INSTALLATION WILL MEET THE WIND DESIGN CRITERIA LISTED ABOVE MUST BE PROVIDED. CONTRACTOR SHALL ADJUST THE SIZE OF BASE AND DEPTH OF POLE AT NO ADDITIONAL COST TO MEET THE REQUIRED WIND LOADING.

7. DISCONNECT FOR STREET LIGHT SHALL BE KEPT SEPARATE FROM DISCONNECT FOR IRRIGATION SYSTEM.
SERVICE POINT INSTALLATION NOTES:

1. CONTRACTOR SHOULD PROVIDE AND INSTALL 1—NEW 100 AMP, 120/240V METER IN A NEMA 4X ALUMINUM ENCLOSURE MOUNTED ON THE NEW CONCRETE POLE PER FPL STANDARDS AND REQUIREMENTS. CONTRACTOR SHALL MAKE ALL CONNECTIONS NECESSARY FOR A COMPLETE WORKING SYSTEM IN PLACE.

2. CONTRACTOR SHALL PROVIDE AND INSTALL 1—NEW 100A RATED, 120/240V SINGLE PHASE SERVICE RATED PANELBOARD WITH A BOTTOM MOUNTED 100A MAIN BREAKER IN A NEMA 4X 316 STAINLESS STEEL LOCKABLE ENCLOSURE MOUNTED ON THE NEW CONCRETE POLE. CONTRACTOR SHALL MAKE ALL CONNECTIONS NECESSARY FOR A COMPLETE WORKING SYSTEM IN PLACE.

3. CONTRACTOR SHALL PROVIDE AND INSTALL 1—NEW EXTERNAL MOUNTED 50KA SURGE PROTECTIVE DEVICE (SPD) IN A NEMA 4X 316 STAINLESS STEEL ENCLOSURE. CONTRACTOR SHALL INSTALL SPD PER MANUFACTURE RECOMMENDATION FOR A COMPLETE WORKING SYSTEM.

4. PHOTO CELL LIGHT CONTROLS.

5. LIGHTING CONTACTOR.
NOTE:

1. CONCRETE SLAB SHALL BE DESIGNED BY A STATE OF FLORIDA ENGINEER. SIGNED AND SEALED CALCULATIONS MUST BE PROVIDED TO SUPPORT STRUCTURAL DESIGN.
### Wiring Color Code:

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<th>120/240V 3Ø</th>
<th>120/208V 3Ø</th>
<th>270/480V 3Ø</th>
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<td>A—BROWN</td>
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<td>B—RED</td>
<td>B—ORANGE</td>
</tr>
<tr>
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<td>C—BLUE</td>
<td>C—YELLOW</td>
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<th>480V TO GROUND</th>
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<td>A—BLACK</td>
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</tr>
<tr>
<td>B—RED</td>
<td>B—RED</td>
<td>GROUNDED (N)—GREY</td>
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<tr>
<td>N—WHITE</td>
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<tr>
<td>G—GREEN</td>
<td>G—GREEN</td>
<td></td>
</tr>
</tbody>
</table>

A – UNGROUNDED (HOT)  
B – NEEDS TO BE A  
C – #6 OR SMALLER  
N – GROUNDED (NEUTRAL)  
G – GROUND