ATTACHMENT 2 – TECHNICAL SPECIFICATIONS
Table of Contents

Division 1

Summary of Work.................................................................01014
Construction Phasing Plans ..................................................01016
Permits...............................................................................01065
Abbreviations.......................................................................01070
Measurement and Payment....................................................01150
Meetings and Conferences...................................................01200
Construction Schedules..........................................................01310
Shop Drawings, Product Data and Permits............................01340
Schedule of Values..............................................................01370
Construction Photographs.....................................................01380
Pre-Construction Audio-Video...............................................01385
Testing Laboratory Services..................................................01410
Mobilization........................................................................01505
Protection of Existing Facilities.............................................01530
Care of Trees Shrubs and Grass............................................01531
Security..............................................................................01540
Safety..................................................................................01541
Site Access and Storage.......................................................01550
Traffic Regulations..............................................................01570
Project Identification and Signs.............................................01580
Demolition and Modification...............................................01583
Material and Equipment.....................................................01600
Maintenance of Traffic........................................................................................................................................01601
Cleaning ..................................................................................................................................................01710
Hurricane Preparedness Plan ................................................................................................................01712
Project Record Documents ...................................................................................................................01720

Division 2

Removal of Existing Equipment........................................................................................................02062
Modification to Existing Structures, Piping and Equipment .......................................................02064
Site Preparation ........................................................................................................................................02100
Silt Barriers .............................................................................................................................................02125
Temporary Dewatering .......................................................................................................................02140
Excavations, Backfill, Fill and Grading of Structures .......................................................................02220
Surface Restoration, Seed and Sod ......................................................................................................02485
Storm Drainage System ......................................................................................................................02720
Exfiltration Trench...............................................................................................................................02730
Plastic Culvert.........................................................................................................................................02733
Precast Drainage ....................................................................................................................................02754
Concrete Driveway, Sidewalk and Curb and Gutter Removal and Replacement ...............................02810
Landscape ..............................................................................................................................................02820

Division 3

Cast-in-place Concrete ..............................................................................................................................03300
Precast Concrete ......................................................................................................................................03400
Concrete Repairs ......................................................................................................................................03732
Modifications and Repair to Concrete .................................................................................................03740
Pavement Removal and Replacement .......................................................... 03750
Asphaltic Concrete Paving ........................................................................... 03755
Casting ............................................................................................................. 03770
Concrete, Mortar and Grout .......................................................................... 03780
Pavement Markings ....................................................................................... 03790
Rock Bed and Bedding Material ................................................................. 03800
PART 1 - GENERAL

1.01 PROJECT SPECIFICATIONS

A. Special attention is called to the fact that certain portions of the work for this project are described by reference to the Standard Specifications. The term Standard Specifications refers to The Standard Specifications for Road and Bridge Construction approved and adopted in by the Florida Department of Transportation. In any case where a specific detail regarding materials or method of construction has been omitted in the specification or on the Drawings, such work shall be performed in accordance with the requirements of the Standard Specifications.

1.02 LOCATION OF WORK

A. All Work of this Contract is located in rights-of-way, County easements, or on property owned by The City of North Miami, Florida.

1.03 WORK TO BE DONE

A. The Contractor shall furnish all labor, materials, equipment, tools, services and incidentals to complete all work required by these Specifications and as shown on the Drawings

B. The Contractor shall perform and complete the work in place and ready for continuous service, and shall include repairs, testing, permits, clean up, replacements, and restoration required as a result of damages caused during this construction.

C. All materials, equipment, skills, tools, and labor which is reasonably and properly inferable and necessary for the proper completion of the work in a substantial manner and in compliance with the requirements stated or implied by these Specifications or Drawings shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.

D. The Contractor shall comply with all Municipal, County, State, Federal, and other codes applicable to the proposed construction work.

1.04 GENERAL DESCRIPTION OF WORK TO BE PERFORMED
A. The work of this Contract comprises the general construction of the following
facilities, as shown on the Contract Drawings and as specified herein.

1. Mobilization, demobilization, insurances, permits and bonds.

2. City of North Miami Design and Permitting for the Arch Creek
North/Arch Creek South Drainage Improvements, which in general
includes:
   a. Installation of new storm sewers
   b. Installation of new drainage structures including catch basins
      and manholes
   c. Removal and disposal of existing structures
   d. Removal and disposal of existing pipes
   e. Rehabilitation/Modification of existing structures
   f. Installation of new Exfiltration Trench (French Drains)
   g. Installation of new pipe
   h. Restoration of project area
   i. Roadway milling and resurfacing
   j. Repair to facilities damaged during construction

3. Providing all required materials testing, cleanup and appurtenant
   items as required, to complete the work in accordance with the
   contract documents.

B. Perform all related demolition and civil work.

C. Perform all associated miscellaneous work, including; site work, clearing,
   excavation, backfill, compaction, drainage works, painting, restoration,
   dewatering, site clean-up, etc.

D. The Contractor is also alerted that various "Standards" are used herein for
   reference and criteria, and that he should obtain copies for his general use
   and protection. Abbreviated titles are used throughout these Specifications
   and although most of them are widely known, their complete titles are given
   below in order to avoid any misunderstanding.

   AASHTO American Association of State Highway and Transportation
   Officials
   ACI American Concrete Institute
   AISI American Iron and Steel Institute
   ANSI American National Standards Institute, Inc.
   ASTM American Society for Testing and Materials
   AWWA American Water Works Association
   FBC Florida Building Code
   FDOT Department of Transportation, State of Florida
   MDCPW Miami-Dade County Public Works Department
The above list shall not be considered complete, as there are other "Standards" used; however, in most cases complete titles have been given.

Wherever "Standards" are indicated herein for reference, the referenced portion shall have the same force and effect as if it were included, herein, in its entirety, latest revision if the date of publication is not shown.

1.05 CONSTRUCTION ACTIVITIES

A. General

1. Upon successful construction completion of each new component, Contractor shall conduct testing as required by the Contract Documents.

2. Contractor shall provide Engineer a minimum of 14-calendar days advance written notice of any requested change in utilities operations, bypass requirements or connections to existing facilities, and shall obtain the Engineer's written approval before scheduling this work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION
SECTION 01016

CONSTRUCTION PHASING PLAN

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. It shall be the responsibility of the Contractor to coordinate all work sequences and interfacing with any other contractor(s) who may be working in the same area at the same time in order to meet the Contract Time(s) stipulated in the Contract and as required by the restrictions and phasing provided hereinafter.

B. The order or sequence of execution of the Work, the general conduct of the Work, and the general arrangement of the construction plant to be installed shall at all times be subject to the review of the Engineer. This includes the requirement that clearing, grading and excavation activities be effectively coordinated in order to minimize erosion, sediment runoff and inconvenience to residents and property owners.

1.02 GENERAL

A. Following receipt of Notice to Proceed (NTP) with the work, the Contractor shall notify the Engineer at least 5 days before he is ready to start actual construction to allow the Department time to make arrangements for inspection of the work.

B. The Contractor's equipment must be in first class operating condition, including proper mufflers and other silencing accessories. All equipment must be properly lubricated on a special maintenance type schedule to reduce noise, including tracks, rollers, idlers, sheaves and other noise producing components. Care must be taken to prevent oil spillage of any kind or oil dripping from equipment.

C. The Contractor shall provide a temporary electric service for his electric. He shall pay all cost thereof, including all charges for electricity used during the entire course of the Project.

D. If the equipment used proves less than satisfactory and is unduly or needlessly disturbing the neighbors, in the opinion of the Engineer, he will have the right to order the Contractor to immediately modify the equipment to make it satisfactory, or to change to other equipment that is satisfactory at no additional cost to the Department.
E. During construction the Contractor shall, by sprinkling with water or by other means approved by the Engineer, eliminate dust annoyance to adjacent property owners. No additional compensation will be paid to the Contractor for any costs incurred in complying with the provisions herein.

F. All items shall be performed by the Contractor with special emphasis on the fact that numerous standard and miscellaneous construction phases are not mentioned specifically, but shall be performed by the Contractor as required for a completed Project.

G. Water in the trench shall be kept below the level of the pipe to prevent the entry of debris and contaminants into the pipe.

H. The Contractor shall fully comply with any special working hours, and with all other requirements of the Permits, at no additional cost to The City of North Miami. Working hours noted in permits or the specifications are subject to change. In the event that changed working hours affects the work of the Contractor, the Contractor's sole remedy shall be a non-compensable time extension. Said extension to be full compensation for all direct and indirect costs, including but not limited to loss of efficiency, loss of opportunity, increased bond or insurance premiums, or home office or extended overhead, incurred by the Contractor as a result of such change, and no additional compensation shall be considered. Night work may be required as a part of the construction.

1.03 WORK SEQUENCE

A. The general sequence of construction shall be as follows, but a detailed sequence of construction shall be submitted by the Contractor and approved by the Engineer before any work is started. The Owner reserves the right to make changes to the sequence as necessary to facilitate the work or to minimize conflict with operations.

1. Submit shop drawings and order all long lead time items after approval of shop drawings, as necessary to comply with the project schedule.

2. Notify “Sunshine State One-Call of Florida Inc., 1-800-432-4770 48 hours prior to any excavation. Locate and field-verify utilities.

3. Contractor shall notify the property owners adjacent to the project site a minimum of two weeks prior to initiating construction and explain the scope of work. If applicable, coordinate with neighborhood association.

4. Mobilize and field verify route; including the horizontal and vertical locations of all utilities within project area.

5. Perform all work related to the installation/removal of drainage structures
and pipes specified in the contract documents, to the satisfaction of the owner.

6. Restore all disturbed pavement, including sidewalk and sod areas to their original condition or better.

7. Perform all work related to milling and resurfacing and pavement markings.

8. Complete all remaining miscellaneous and appurtenant work, including a final cleanup.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01065

PERMITS

PART I – GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall be responsible to ensure that the construction of the project adheres to City, County, State, and Federal standards and regulations, and to all permits and easements acquired for the project.

B. The Contractor shall coordinate all work within rights-of-way with the agency having jurisdiction, including all road/lane closures, road/lane narrowing and detours.

C. Copies of any Permits that the Owner has obtained are included herein as an attachment to the Contract Documents. The Contractor shall conduct all operations in accordance with the requirements of all Permits, Easements and License Agreements.

D. Where Permits require that certain Work is to be performed only in the presence of a representative of the permitting entity, the Contractor shall provide all coordination and notification required to assure full compliance with the permit conditions.

E. The Owner has obtained or will obtain certain Permits required for construction of the project. A listing of those Permits that the Owner has obtained or applied for is listed below. The Contractor shall be responsible for obtaining all other Permits, Easement Agreements, or License Agreements necessary for the proper execution of the Work not specifically noted to be obtained by the Owner.

F. The Contractor shall comply with all terms, conditions, provisions and requirements of all permits issued or to be issued for the Project. Should the Contractor's failure to comply with said permits lead to enforcement action by any of the permitting or jurisdictional agencies, any resultant costs in the forms of repairs, fines, penalties, administrative costs, attorney's fees or consultant fees shall be deducted from the Contract Price or shall be otherwise collectible from the Contractor and its Surety, jointly and severally.

G. The Contractor shall notify the Owner a minimum of 30 days prior to the expiration of a permit if said expiration occurs prior to completion of the Work.
1.02 PERMITS

A. Each bidder shall be familiar with the requirements of the permit conditions that relate to construction activities and shall include the cost of satisfying these permit conditions in developing a bid for the project.

B. The Contractor shall comply with all Federal, State, Miami-Dade County, and City of North Miami building codes, laws, and/or ordinances appropriate to the project, including those of the:

4. Others as noted in the Section entitled “Summary of Work

C. The Contractor shall obtain, implement and comply with all local and state permits required for dewatering, including consumptive or water use permitting, if required for construction from the Water Management District.

D. Contractor shall comply with these codes, laws, regulations, rules, directives of all agencies, boards, districts, and governmental bodies having jurisdiction.

E. Contractor shall obtain and pay the cost of all permits, fees, and/or connection charges associated with the project.

F. The Contractor shall be responsible for obtaining, and complying with, all required permits relating to discharges from dewatering including a State of Florida Department of Environmental Protection Generic Permit for the Discharge of Produced Ground Water From Any Non-Contaminated Site Activity in accordance with 62-621.300(2) FAC. See specification Section 02140 Temporary Dewatering.

G. The Contractor shall obtain, implement and comply with the requirements of a Generic Permit for Storm Water Discharge from Large and Small Construction Activities (CGP), in accordance with 62-621.300(4) FAC. The Contractor shall submit a CGP Notice of Intent (NOI) to the Florida Department of Environmental Protection (FDEP) and develop and submit a Storm Water Pollution Prevention Plan (SWPPP) as part of the CGP. The Contractor shall:

   1. Obtain the CGP form and NOI Application Form from the FDEP or its website, DEP Documents 62-621.300(4)(a) and 62-621.300(4)(b), respectively.
2. Develop an SWPPP in compliance with FDEP storm water permitting rules that shall include, at a minimum, the following:
   a. A site evaluation of how and where pollutants may be mobilized by storm water.
   b. A site plan for managing storm water runoff.
   c. Identification of appropriate erosion and sediment controls including Best Management Practices to reduce erosion, sedimentation, and storm water pollution.
   d. A maintenance and inspection schedule.
   e. Plan and procedures for record keeping.
   f. A map depicting storm water exit areas.

3. Complete and submit the NOI Application, including all attachments, to the local FDEP office along with the appropriate application fee.

4. The Contractor shall furnish a copy of the FDEP Notice of Permit, along with a copy of the SWPPP, to the Engineer.
PART 1 – GENERAL

1.01 THE REQUIREMENT

A. Wherever in these specifications references are made to the standards, other published data of the various national, regional, or organizations may be referred to by their acronym or abbreviation user of these specifications, the following acronyms or abbreviations these specifications shall have the meanings indicated herein.

1.02 ABBREVIATIONS AND ACRONYMS

AAMA Architectural Aluminum Manufacturer’s Association
AASHTO American Association of the State Highway and ACI American Concrete Institute
ACOE Army Corps of Engineers
ACPA American Concrete Pipe Association
AFBMA Anti-Friction Bearing Manufacturer’s Association
AGMA American Gear Manufacturer’s Association
AHGDA American Hot Dip Galvanizers Association
AI The Asphalt Institute
AIA American Institute of Architects
AISC American Institute of Steel Construction
AISI American Iron and Steel Institute
AITC American Institute of Timber Construction
AMCA Air Moving and Conditioning Association
ANSI American National Standards Institute, Inc.
APA American Plywood Association
API American Petroleum Institute
APHA American Public Health Association
APWA American Public Works Association
ASA Acoustical Society of America
ASAE American Society of Agriculture Engineers
ASCE American Society of Civil Engineers
ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLE American Society of Lubricating Engineers
ASME American Society of Mechanical Engineers
ASMM Architectural Sheet Metal Manual
ASSE American Society of Sanitary Engineers
ASTM American Society for Testing and Materials
AWPA American Wood Preservers Association
| 1 | AWPI American Wood Preservers Institute          |
| 2 | AWS American Welding Society                    |
| 3 | AWWA American Water Works Association           |
| 4 | BCDPEP Broward County Department of Planning and Environmental Protection (formerly BCDNRP) |
| 5 | BCEP Broward County Environmental Protection Department (formerly BCDPEP) |
| 6 | BCEPGMD Broward County Environmental Protection and Growth Management Department (formerly BCEPD) |
| 7 | BCHD Broward County Health Department           |
| 8 | BHMA Builders Hardware Manufacturer's Association |
| 9 | CMA Concrete Masonry Association                |
| 10| CRSI Concrete Reinforcing Steel Institute       |
| 11| DIPRA Ductile Iron Pipe Research Association   |
| 12| EIA Electronic Industries Association           |
| 13| ETL Electrical Test Laboratories                |
| 14| FBC Florida Building Code                       |
| 15| FDEP Florida Department of Environmental Protection |
| 16| FDOT Florida Department of Transportation       |
| 17| FS Federal Specifications                       |
| 18| IEEE Institute of Electrical and Electronics Engineers |
| 19| IES Illuminating Engineering Society            |
| 20| IPCEA Insulated Power Cable Engineers Association |
| 21| ISA Instrument Systems and Automation           |
| 22| ISO International Organization for Standardization |
| 23| MBMA Metal Building Manufacturers Association   |
| 24| MDPWD Miami-Dade Public Works Department        |
| 25| MMA Monorail Manufacturers Association          |
| 26| MTI Marine Testing Institute                   |
| 27| NAAM National Association of Architectural Metal Manufacturers |
| 28| NACE National Association of Corrosion Engineers |
| 29| NBS National Bureau of Standards                |
| 30| NEC National Electrical Code                   |
| 31| NEMA National Electrical Manufacturer's Association |
| 32| NFPA National Fire Protection Association      |
| 33| NIOSH National Institute of Occupational Safety and Health |
| 34| NIST National Institute of Standards and Testing |
| 35| NRCA National Roofing Contractors Association   |
| 36| NSF National Science Foundation                |
| 37| OSHA Occupational Safety and Health Administration |
| 38| PCA Portland Cement Association                |
| 39| SMACCNA Sheet Metal and Air Conditioning Contractors National Association |
| 40| SSPC Steel Structures Painting Council          |
| 41| SSPWPC Standard Specifications for Public Works Construction |
| 42| SFWMD South Florida Water Management District  |
| 43| UL Underwriters Laboratories, Inc.             |
1
2 PART 2 - PRODUCTS (Not Used)
3
4 PART 3 - EXECUTION (Not Used)
5
6
7 END OF SECTION
SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

Special attention is called to the fact that certain portions of the work for this project are described by reference to the Standard Specifications. The term Standard Specifications refers to The Standard Specifications for Road and Bridge Construction approved and adopted by the Florida Department of Transportation. In any case where a specific detail regarding materials or method of construction has been omitted in the specification or on the Drawings, such work shall be performed in accordance with the requirements of the Standard Specifications.

1.01 SCOPE OF WORK

A. This section defines the Work included in each bid item section of the contract documents. Payment will be made based on the specified items included in the description in this section for each pay item number.

B. All prices included in the Bid Form / Schedule of Prices of the Proposal will be full compensation for all labor, supervision, materials, tools, equipment, and incidentals necessary to complete the Work as shown on the Drawings and/or as specified in the Contract Documents. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in the manner established for each item in this section. Payment for all items listed in the Schedule of Prices will constitute full compensation for all work shown and/or specified to be performed under this project.

C. Should the Contractor want to install piping using an alternative method to that shown on the Drawings, and the alternative method is specifically approved by the Engineer, then payment will be made for the type of pipe installation shown on the Drawings, unless the unit price for the alternative method is less than the price of the method shown on the Drawings, in which case the Contractor will be paid at the lower of the two unit price rates.

D. Restoration is considered an integral part of the Work, and all bid prices shall include the cost of restoration necessitated by the Work related to that bid item. All existing structures and property including, but not limited to, paving, stabilized roads, drainage piping and ditches, catch basins, head walls, yard culverts, lawns, fences, trees, shrubs, ground areas, walkways, sidewalks, driveways, alleys, curbs, gutters and irrigation systems that are altered, removed or damaged during construction shall be restored to the same or better condition than existed prior to construction at no additional cost to the Contractor.
Owner. The bidder shall hereby be advised that cleanup is an integral part of
the restoration process.

E. Erosion and Sediment Control is considered an integral part of the Work, and
all bid prices shall include the cost of erosion and sediment control
necessitated by the Work related to that bid item. All appropriate erosion and
sediment control measures, as dictated by the NPDES permit and the
Standard Specifications, shall be implemented at no additional cost to the
Owner. The bidder shall hereby be advised that maintenance is an integral
part of the erosion and sediment control process.

F. Clearing and grubbing is considered an integral part of the Work, and all bid
prices shall include the cost of cleaning and grubbing measures necessitated
by the Work related to that bid item. The clearing and grubbing methods used
shall prevent damage to property, trees or retained shrubbery in or outside of
the right of way.

G. The Contractor shall exercise care to preserve and protect existing facilities
during construction. All existing structures and private property, including,
but not limited to paving, stabilized roads, drainage piping and ditches, latch
basins, head walls, yard culverts, lawns, fences, trees, shrubs, ground areas,
walkways, driveways, alleys, curbs, gutters and irrigation systems that are
altered, removed or damaged during construction and are not included in the
proposed alterations of the new work shall be restored to the same or better
condition than existed prior to construction.

H. The Contractor shall be responsible for all traffic maintenance requirements
necessitated by the construction/installation of those specific bid items
requiring traffic maintenance. The cost for this work shall be included in the
specific unit price submitted for that particular bid item.

I. The Contractor shall include the cost of incidental items of work and other
work not particularly specified to be included in one Measurement and
Payment item or another, in the various unit prices for the Work, as no
separate payment shall be made therefore.

J. Under Measurement and Payment when a Section is referenced it is
referencing a section of the latest edition of the Florida Department of
Transportation Standard Specifications for Road and Bridge Construction
Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION
3.01 MEASUREMENT AND PAYMENT

A. Base Bid Item No. 100-1 – Mobilization

1. Measurement: Measurement for payment of mobilization costs shall be on a lump sum basis, but the cost shall not exceed ten percent (10%) of the original contract amount.

2. Price and Payment: Payment of the lump sum price bid under Item 101-1 for Mobilization shall be full compensation for all costs associated with initiating the project as limited by Section 01505 Specifications including the Contractor’s Performance and Payment Bonds. Payment for these performances shall be based on the terms of Section 01505.

B. Base Bid Item No. 100-1 – Maintenance of Traffic

1. Measurement: Includes all items to safely maintain traffic throughout a transportation work zone with minimal inconvenience to public. As specified on Section 102 of the FDOT specifications.

2. Price and Payment: Payment of the lump sum price bid under Item No. 102-1 for Maintenance of Traffic shall be full compensation for all work, material and costs specified under Section 102 of the FDOT specs except as may be specifically covered for payment under other pay items.

C. Base Bid Item No. 443-70-3 – 18” French Drain

1. Measurement: The quantity of French Drains to be paid for under Section 443 of the FDOT Standard Specifications shall be the length in feet, measured in place, completed and accepted as specified on the Plans.

2. Price and Payment: The quantities determined as provided above will be paid for at the Contract unit price per foot for French Drains. Such prices and payments will be full compensation for all the work specified in Section 443 of the FDOT Specifications and will include all materials and all excavation, and will also include sheeting or shoring, if required, the disposal of surplus material, pavement restoration, backfilling and tamping, but will not include payment for items paid for elsewhere in the specifications. Payment shall be made under: Item No. 043-70-3 – 18 in. French Drains per linear foot.

D. Base Bid Item No. 430-175-115 – 15” HDPE

1. Measurement: Measurement for payment for furnishing and installing 15-inch HDPE shall be made on a per foot basis as measured along the horizontal projection of the pipe centerline, including the lengths of fittings and specials measured along the horizontal projection of their centerlines.
2. Price and Payment: Price and payment of the unit price bid per foot under Bid Item No. 430-175-115 for 15-inch HDPE shall be full compensation of the work specified under Section 430 of the FDOT Specifications. When existing pipe is to be removed and replaced with new pipe approximately at the same location, the cost of excavating, removing the old pipe and of its disposal will be included in the contract unit price for this pay item.

E. Base Bid Item No. 334-1-13 – 1” Type SP 9.5, Traffic Level C

1. Measurement: For the work specified in this section for Measurement for payment of 1” of Type SP 9.5 Traffic Level C, the quantity to be paid for will be the weight of the mixture, in tons. The pay quantity will be based on the project average spread rate, excluding overbuild, limited to a max of 105% of the spread rate or as set by the Engineer.

2. Price and Payment: Price and payment will be full compensation for all the work specified under Section 334 of the FDOT Specifications (including applicable requirements of Section 320 and 330) on a per ton basis.

F. Base Bid Item No. 425-1-521 – Type C Ditch Bottom Inlets

1. Measurement: Measurement for payment for furnishing and installing ditch bottom inlets shall be on a per each basis.

2. Price and Payment: Price and Payment of the unit price bid per each under Item No. 425-1-521 for ditch bottom inlets shall be full compensation for the furnishing of all materials for the proper installation of each assembly including, but not limited to submittals; clearing; erosion protection and control; tree removal (as required and as approved by the Engineer); tree protection, excavation; sheeting; shoring; backfill; removal and control of surface and ground water; pipe materials, fittings, joints, gaskets, hardware; appurtenances; precast structures and lids; bedding materials; the location and protection of existing utilities; the repair and/or replacement of all existing utilities damaged during construction; re-grading; surface restoration; fence removal and replacement or protection; connections to existing systems; disposal of waste materials, surplus fill and construction debris; maintenance of traffic; and the furnishing of all tools, equipment, labor, supervision, and materials necessary, specified or required for the proper completion of the Work included in the Contract Documents; as shown on the Drawings; tested and ready for operation and as specified herein.

G. Base Bid Item No.425-1-551 – Type E Ditch Bottom Inlets (<10-feet deep)
1. Measurement: Measurement for payment for furnishing and installing ditch bottom inlets shall be on a per each basis.

2. Payment: Payment of the unit price bid per each under Item No. 425-1-55X for ditch bottom inlets shall be full compensation for the furnishing of all materials for the proper installation of each assembly including, but not limited to submittals; clearing; erosion protection and control; tree removal (as required and as approved by the Engineer); tree protection, excavation; sheeting; shoring; backfill; removal and control of surface and ground water; pipe materials, fittings, joints, gaskets, hardware; appurtenances; precast structures and lids; bedding materials; the location and protection of existing utilities; the repair and/or replacement of all existing utilities damaged during construction; re-grading; surface restoration; fence removal and replacement or protection; connections to existing systems; disposal of waste materials, surplus fill and construction debris; maintenance of traffic; and the furnishing of all tools, equipment, labor, supervision, and materials necessary, specified or required for the proper completion of the Work included in the Contract Documents; as shown on the Drawings; tested and ready for operation and as specified herein.

H. Base Bid Item No. 425-1-552 – Type E Ditch Bottom Inlets (>10 feet deep)

1. Measurement: Measurement for payment for furnishing and installing ditch bottom inlets shall be on a per each basis.

2. Payment: Payment of the unit price bid per each under Item No. 425-1-55X for ditch bottom inlets shall be full compensation for the furnishing of all materials for the proper installation of each assembly including, but not limited to submittals; clearing; erosion protection and control; tree removal (as required and as approved by the Engineer); tree protection, excavation; sheeting; shoring; backfill; removal and control of surface and ground water; pipe materials, fittings, joints, gaskets, hardware; appurtenances; precast structures and lids; bedding materials; the location and protection of existing utilities; the repair and/or replacement of all existing utilities damaged during construction; re-grading; surface restoration; fence removal and replacement or protection; connections to existing systems; disposal of waste materials, surplus fill and construction debris; maintenance of traffic; and the furnishing of all tools, equipment, labor, supervision, and materials necessary, specified or required for the proper completion of the Work included in the Contract Documents; as shown on the Drawings; tested and ready for operation and as specified herein.

I. Base Bid Item No. 425-2-61 – (P-7) Manholes (<10)

1. Measurement: Measurement for payment for furnishing and installing conflict boxes and manholes shall be on a per each basis.
2. Price and Payment: Payment of the unit price bid per each under Item No. 425-2-X for conflict boxes and manhole shall be full compensation for the furnishing of all materials for the proper installation of each assembly including, but not limited to submittals; clearing; erosion protection and control; tree removal (as required and as approved by the Engineer); tree protection, excavation; sheeting; shoring; backfill; removal and control of surface and ground water; pipe materials, fittings, joints, gaskets, hardware; appurtenances; precast structures and lids; bedding materials; the location and protection of existing utilities; the repair and/or replacement of all existing utilities damaged during construction; re-grading; surface restoration; fence removal and replacement or protection; connections to existing systems; disposal of waste materials, surplus fill and construction debris; maintenance of traffic; and the furnishing of all tools, equipment, labor, supervision, and materials necessary, specified or required for the proper completion of the Work included in the Contract Documents; as shown on the Drawings; tested and ready for operation and as specified herein.

J. Base Bid Item No. 425-2-62 – (P-7) Manholes (>10)

1. Measurement: Measurement for payment for furnishing and installing conflict boxes and manholes shall be on a per each basis.

2. Price and Payment: Payment of the unit price bid per each under Item No. 425-2-62 for conflict boxes and manhole shall be full compensation for the furnishing of all materials for the proper installation of each assembly including, but not limited to submittals; clearing; erosion protection and control; tree removal (as required and as approved by the Engineer); tree protection, excavation; sheeting; shoring; backfill; removal and control of surface and ground water; pipe materials, fittings, joints, gaskets, hardware; appurtenances; precast structures and lids; bedding materials; the location and protection of existing utilities; the repair and/or replacement of all existing utilities damaged during construction; re-grading; surface restoration; fence removal and replacement or protection; connections to existing systems; disposal of waste materials, surplus fill and construction debris; maintenance of traffic; and the furnishing of all tools, equipment, labor, supervision, and materials necessary, specified or required for the proper completion of the Work included in the Contract Documents; as shown on the Drawings; tested and ready for operation and as specified herein.

K. Base Bid Item No. 000-1-001 - Catch Basin Pavement

1. Measurement: Measurement for payment items under Catch Basin Pavement shall be on a on a per each basis.
2. **Price and Payment:** Price and Payment will be for full compensation for all the work including but not limited to foundation and soil treatment, shaping and compaction of the foundation, limerock base, and asphalt. Refer to the plans for catch basin pavement details.

L. **Base Bid Item No. 000-1-002 – Reimbursable Fees:**

1. **Permit Fees:** The Contractor shall be reimbursed only for the cost of the construction permits or fees. Any question of whether a construction permit or fee is required shall be decided by the Engineer whose decision shall be final. Any portion of this fund remaining after all authorized payments have been made will be withheld from Contract payments and will remain with the City.

M. **Base Bid Item No. 327-70-1 – Milling of Existing asphalt (1”)**

1. **Measurement:** The quantity to be paid will be the plan quantity area, in square yards, over which milling is completed and accepted.

2. **Price and Payment:** Price and payment will be full compensation for all work specified in Section 370 of the FDOT Specifications, including stockpiling, hauling off site or otherwise disposing of the milled material.

N. **Base Bid Item No. 711-111-25 Thermoplastic 24” White**

1. **Measurement:** Measurement for payment items under Pavement Marking should be on a per linear foot basis.

2. **Price and Payment:** Payment of the unit price per linear foot under pay item no. 711-111-25 for Pavement Marking shall be for full compensation for all labor, materials, equipment and other work necessary to complete the work shown in the Signing Pavement Markings (SPM) section of the Plans.

O. **Base Bid Item No. 711-111-24 Thermoplastic 18” White**

1. **Measurement:** Measurement for payment items under Pavement Marking should be on a per linear foot basis.

2. **Price and Payment:** Payment of the unit price per linear foot under pay item no. 711-111-24 for Pavement Marking shall be for full compensation for all labor, materials, equipment and other work necessary to complete the work shown in the Signing Pavement Markings (SPM) section of the Plans.

P. **Base Bid Item No. 711-111-23 Thermoplastic 12” White**

1. **Measurement:** Measurement for payment items under Pavement Marking should be on a per linear foot basis.
2. Price and Payment: Payment of the unit price per linear foot under pay item no. 711-111-23 for Pavement Marking shall be for full compensation for all labor, materials, equipment and other work necessary to complete the work shown in the Signing Pavement Markings (SPM) section of the Plans.

Q. Base Bid Item No. 711-111-21 Thermoplastic 6” White

1. Measurement: Measurement for payment items under Pavement Marking should be on a per linear foot basis.
2. Price and Payment: Payment of the unit price per linear foot under pay item no. 711-111-21 for Pavement Marking shall be for full compensation for all labor, materials, equipment and other work necessary to complete the work shown in the Signing Pavement Markings (SPM) section of the Plans.

R. Base Bid Item No. 711-121-21 Thermoplastic 6” Yellow

1. Measurement: Measurement for payment items under Pavement Marking should be on a per linear foot basis.
2. Price and Payment: Payment of the unit price per linear foot under pay item no. 711-121-21 for Pavement Marking shall be for full compensation for all labor, materials, equipment and other work necessary to complete the work shown in the Signing Pavement Markings (SPM) section of the Plans.

S. Base Bid Item No. 711-111-60 Thermoplastic Message

1. Measurement: Measurement for payment items under Pavement Marking should be on a per each basis.
2. Price and Payment: Payment of the unit price per linear foot under pay item no. 711-111-60 for Pavement Marking shall be for full compensation for all labor, materials, equipment and other work necessary to complete the work shown in the Signing Pavement Markings (SPM) section of the Plans.

T. Base Bid Item No. 110-3 Removal of Structure

1. Measurement: The quantity to be paid for will be the lump sum quantity or quantities for the specific structures to be removed.
2. Price and Payment: Price and payment will be full compensation for all the work of removal and disposal of the designated structures.

U. Base Bid Item No. 100-3 Contract Complete
1. Measurement: The quantity to be paid for will be the lump sum quantity for all the work required to complete the Scope of Work, including Skimmers and Catch Basin pavement.

2. Price and Payment: Price and payment will be full compensation for all the labor, materials, and other work necessary to complete the work when not covered by other Bid Items.

END OF SECTION
PART 1 – GENERAL

1.01 PRE-CONSTRUCTION CONFERENCE

A. In accordance with the Contract Documents, prior to the commencement of Work, a preconstruction conference shall be held at a mutually agreed time at the Construction Manager’s Office.

B. The purpose of the conference shall be to designate responsible personnel and establish a working relationship. Matters requiring coordination shall be discussed and procedures for handling such matters established. The agenda shall include as a minimum:

1. Contractor’s Initial Construction Schedule
2. Procedures for Transmittal, Review and Distribution of Shop Drawings
3. Procedures for Submittal and Review of Monthly Pay Applications
4. Maintaining Record Drawings
5. Critical Work Sequencing and Construction Restrictions
6. Field Decisions and Change Orders
7. Field Office, Storage Areas and Security
8. Equipment and Material Deliveries
9. Safety Meetings and Program
10. Traffic Control Plan
11. Pre-construction Video

C. The Engineer will preside at the conference and will arrange for keeping the minutes and distributing them to all persons in attendance.

1.02 PROGRESS MEETINGS

A. The Engineer will schedule and conduct regular project meetings at least monthly and at other times as deemed necessary by the progress of the
Work. The Contractor and the Engineer will be represented at each meeting. The Contractor and/or Engineer may request attendance by representatives of material Supplier(s) and Subcontractor(s).

B. The Engineer will preside at the conference and will arrange for keeping the minutes and distributing them to all persons in attendance. The purpose of the meetings will include but not be limited to reviewing the progress of the Work, maintaining coordination of efforts, discussing changes in scheduling and resolving problems which may develop; claims review; and future scheduling.

1.03 TRAFFIC CONTROL MEETINGS

A. The Owner will schedule and conduct meetings as required with the Contractor to attend to matters of traffic control and associated public convenience and safety during the course of the Work.

B. The Engineer will preside at the meetings and provide for keeping the minutes and distribution of minutes to the Owner, the Contractor and others. The purpose of the meetings shall be for the Contractor presentation of traffic control plans and any revisions required during performance of the Work and to discuss related matters.

1.04 PUBLIC INFORMATION MEETINGS

A. The Contractor shall designate a public information specialist for the Project who shall attend and actively participate in periodic public information meetings that may be scheduled by the Owner.
PART 1 - GENERAL

1.01 GENERAL

A. Construction under this contract must be coordinated to assure that construction is completed within the time allowed by the Contract Documents. The Contractor will also coordinate his activities with the other contractors to allow orderly and timely completion of all the work.

B. All construction schedules shall be of the critical path method, bar chart type, and shall be prepared using SURETRACK, PRIMAVERA P3, or equal.

1.02 CONSTRUCTION SCHEDULING GENERAL PROVISIONS

A. Within 15 calendar days after the issuance of the Notice of Proceed, the Contractor shall prepare and submit to the Engineer a preliminary construction progress schedule. The schedule shall contain a sufficient number of tasks such that no single task has a value that exceeds 1.5% of the total Contract Amount. Partial payments will not be approved until an acceptable construction progress schedule has been approved by the Engineer.

B. The schedule shall be updated monthly reflecting the approved baseline schedule and the Contractor’s progress on each activity. No progress payment will be approved until the updated schedule is submitted and approved by the Engineer.

C. Night work may be established by the Contractor as regular procedure only with the prior written permission of the Owner. Such permission, however, may be revoked at any time by the Owner if the Contractor fails to maintain adequate equipment and supervision for the proper execution and control of the work at night.

D. The Contractor shall designate an authorized representative of his firm who shall be responsible for development and maintenance of the schedule and of progress and payment reports. This representative of the Contractor shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the commitments of the Contractor’s schedule.

1.03 PROGRESS OF THE WORK
A. The work shall be executed with such progress as may be required to prevent any delay to the general completion of the work. The work shall be executed at such times and in or on such parts of the project, and with such forces, materials and equipment to assure completion of the work in the time established by the Contract.

B. If the Contractor for his convenience and at his own expense, should desire to carry on his work at night or outside regular hours, he shall submit written notice to the Engineer and he shall allow ample time for satisfactory arrangements to be made for inspecting the work in progress. The Contractor shall reimburse the Owner for extra inspection required for work outside regular hours. The Contractor shall light the different parts of the project as required to comply with all applicable Federal and State regulations and with all applicable requirements of the municipality in which the work is being done.

PART 2 - PROGRESS SCHEDULE SUBMITTALS

2.01 GENERAL REQUIREMENTS

A. As required within the General Conditions, the Contractor shall submit a critical path progress schedule as described herein. The schedule shall take into considerations all work phasing and restrictions as specified elsewhere in the Contract Documents.

B. The critical path progress schedule requirement will consist of a detailed schedule, monthly status reports (Monthly Reports), a start-up schedule, and revisions to the schedules and analyses as described. The planning, scheduling, management and execution of the work are the sole responsibilities of the Contractor. The progress schedule shall allow Engineer to review Contractor's planning, scheduling, management and execution of the work; to assist Engineer in evaluating work progress and make progress payments; to allow other contractors to cooperate and coordinate their activities with those of the Contractor; and to provide Owner with information about "construction schedule" and "cumulative outlay schedule."

C. Engineer's review of the schedule submittals shall not relieve Contractor from responsibility for any deviations from the Contract Documents unless Contractor has in writing called Engineer's attention to such deviations at the time of submission and Engineer has given written concurrence to the specific deviations, nor shall any concurrence by Engineer relieve Contractor from responsibility for errors and omissions in the submittals.

D. Float or slack time is not for the exclusive benefit of the Owner, the Engineer or the Contractor. Extensions of time for performance, as specified in the General Conditions, will be granted only to the extent that equitable time adjustments for
the network activity, or activities affected, exceed the total float or slack time along the affected network paths, as shown in the precedence diagram and computer printout report in effect at the instant of either (a) a notice to proceed with a change, or (b) a notice of suspension of work or possession, or (c) detection of a subsequently acknowledged differing site condition, or (d) occurrence of cause for an excusable delay. Further, use of float time in the schedule, or the allocation of float time to activities by means of special logic restraints or imposed dates, shall be shared to the benefit of Owner, Engineer, Contractor, and his subcontractors and suppliers in proportion of their scope of responsibilities. Excessive use of float time to the detriment of succeeding activities may be cause for denying an extension of time if it can be demonstrated that the float along the network paths affected at the instant of the delaying condition would have been larger than the delay had it not been for the excessive and unreasonable float usage in violation of the sharing concept required by this Specification.

E. Engineer’s review of the schedule submittals shall be only for conformance with the information given in the Contract Documents and shall not extend to the means, methods, sequences and techniques or procedures of construction or to safety precautions or programs incident thereto. Engineer’s review of the schedule submittals will be predicated on a Contractor’s stamp of approval signed off by Contractor. Contractor’s stamp of approval on any schedule submittals shall constitute a representation to Owner and Engineer that Contractor, has either determined or verified all data on the submittal, or assumes full responsibility for doing so, and that Contractor and his subcontractors and suppliers have reviewed and coordinated the sequences shown in the submittal with the requirements of the work under the Contract Documents.

2.02 SUPPLEMENTARY REQUIREMENTS

A. Graphic network diagrams shall be on a time-scaled precedence network format. The graphic network diagram shall include the following format:

1. Description of each activity, or restraint, shall be brief but convey the scope of work described.
2. Activities shall identify all items of work that must be accomplished to achieve substantial completion, or any interim substantial completion, such as the major disciplines of work; items pertaining to the approval of regulatory agencies; contractor’s time required for submittals, fabrication and deliveries; the time required by Engineer to review all submittals as set forth in the Contract Documents; items of work required of Owner to support pre-operational and start-up testing; time required for the relocation of utilities. Activities shall also identify interface milestones with the work of other contract work under separate contracts with Owner.
3. Any activities not shown on the graphic network diagram shall be considered to have no effect on the Contractor's ability to achieve substantial completion, or interim substantial completion, within the Contract Time. Any delays to activities that do not appear in the concurred detailed schedule shall give rise only to non-prejudicial delays. Attempts to impose after-the-fact logic constraints where none existed previously to justify time extensions will not be permitted.

4. Activity durations shall be in whole working days.

5. Graphic diagrams shall be time-scaled and sequenced by work areas. The Diagram of Activities shall show numerical values for total float and be shown on their early schedules. The diagram shall be neat and legible and submitted on sheets no larger than 24 inches by 36 inches on a medium suitable for reproduction.

B. Printout reports shall contain the following data for each activity or restraint:

1. Activity identification, activity description, activity duration, activity man-days, computed or specified early start date, computed early finish date, computed late start date, computed or specified late finish date, and total float and free float.

2. Five separate reports shall be provided, including all activities and restraints, and shall be submitted monthly as follows:
   a. Activity, sort by early start dates in order of ascending numbers.
   b. Activity, sort by department.
   c. Float report, in order of ascending total float values.
   d. Successor/predecessor report.

PART 3 - EXECUTION

3.01 DETAILED SCHEDULE SUBMITTAL

A. Submittal shall include a time-scaled graphic diagram showing all Contract activities, computer printout reports, and a supporting narrative. The initial Detailed Schedule submittal shall be delivered within 10 calendar days after the Notice to Proceed, and shall use the Notice to Proceed as the "data date". Upon receipt of Engineer's comments, Contractor shall meet with Engineer and discuss an appraisal and evaluation of the proposed work plan. Necessary revisions resulting from this review shall be made by Contractor and the detailed schedule resubmitted within 15 calendar days after the meeting. The re-submittal, if agreed to by the Owner, and unless subsequently changed with the concurrence of or at the direction of Owner, shall be the work plan to be used by the Contractor for planning, scheduling, managing and executing the work. If Contractor fails to provide an acceptable Detailed Schedule submittal, he will be deemed not to have provided a basis upon which progress may be
evaluated, which will further constitute reasons for refusing to recommend payment.

B. The graphic diagram shall be formatted in accordance with Article 2.02(A) above. The diagram shall include (1) all detailed activities grouped by major areas of work. The critical path activities shall be identified, including critical paths for interim dates, if applicable, by clearly highlighting the path on the graphics diagram.

C. This submittal shall include five copies of the graphic diagram, the printout reports and the narrative, in accordance with Article 2.02 of these scheduling requirements.

D. The narrative shall include sufficient data to explain the basis of Contractor's determination of durations, describe the contract conditions and restraints plugged into the schedule, and provide a "what-if" analysis pertaining to potential problems and practical steps to mitigate them. Should Engineer require additional data, this information shall be supplied by Contractor within ten calendar days.

3.02 MONTHLY STATUS REPORTS

A. Beginning with the first month, and every month thereafter, Contractor shall submit to Engineer, with each request for payment, a Monthly Status Report (based on the Detailed Schedule) with data as of the last day of the pay period. The monthly Status Report shall include a revised copy of the currently accepted graphic diagram, computer printouts and a narrative. The Monthly Status Report will be reviewed by the Engineer. The Contractor will address the Engineer's comments in the subsequent Monthly Status Report. If Contractor fails to provide acceptable Monthly Status Reports, he will be deemed not to have provided a basis upon which progress may be evaluated, which will be reason for refusing to recommend progress payments.

B. The revised diagram shall show, for the currently accepted detailed diagram, percentages of completion for all activities, actual start and finish dates, and remaining durations, as appropriate. Activities not previously included in the currently accepted detailed schedule shall be added, except that contractual dates will not be changed except by Change Order. Review of a revised diagram by the Engineer will not be construed to constitute concurrence with the time frames, duration, or sequencing for such added activities; instead the corresponding data as ultimately incorporated into an appropriate change order shall govern.

C. The narrative shall include the information shown in the following outline in a narrative form:
1. Construction progress (refer to activity number in the Detailed Schedule) including:
   a. Activities completed this reporting period;
   b. Activities in progress this reporting period;
   c. Activities scheduled to commence next reporting period.

2. Description of problem areas

3. Current and anticipated delays
   a. Cause of the delay;
   b. Corrective action and schedule adjustments to correct the delay;
   c. Impact of the delay on other activities, on milestones, and on completion dates.

4. Changes in construction sequence

5. Pending items and status thereof
   a. Permits
   b. Change Orders
   c. Time extensions
   d. Other

6. Contract completion date status
   a. Ahead of schedule and number of days
   b. Behind schedule and number of days

3.03 REVISIONS

A. All revised Detailed Schedule submittals shall be in the same form and detail as the initial submittal and shall be accompanied by an explanation of the reasons for such revisions, all of which shall be subject to review by Engineer. The revision shall incorporate all previously made changes to reflect current as-built conditions. Minor changes to the submittal may be reviewed at monthly meetings. Changes to activities having adequate float shall be considered a minor change.

B. A revised detailed work plan submittal shall be submitted for review, when required by Engineer, for one of the following reasons:

   1. Owner or Engineer directs a change that affects the date(s) specified in the Agreement or alters the length of a critical path.
   2. Contractor elects to change any sequence of activities so as to affect a critical path of the currently accepted detailed schedule documents.

C. If, prior to agreement on an equitable adjustment to the Contract Time, Engineer requires revisions to the Detailed Schedule in order to evaluate planned progress, Contractor shall provide an interim revised submittal for review with change effect(s) incorporated as directed. Approved interim revisions to the documents will be incorporated during the first subsequent Monthly Status Report.
3.04 CONSTRUCTION PERIOD

A. Whenever it becomes apparent from the current monthly progress evaluation and updated schedule data that any milestone and/or Contract completion date will not be met, the Contractor shall take appropriate action to bring the work back on schedule. Actions could include:

1. Increase construction manpower in such quantities and crafts as to substantially eliminate the backlog of work;
2. Increase the number of working hours per shift, shifts per work day, work days per week, or the amount of construction equipment, or any combination of the foregoing sufficient to substantially eliminate the backlog of work; and
3. Reschedule work items to achieve concurrency of accomplishment.

B. The addition of equipment or construction forces, increasing the working hours or any other method, manner, or procedure to return to the current Detailed Schedule shall be at the Contractor’s own cost and shall not be considered justification for a Change Order or treated as an acceleration order.

END SECTION
SECTION 01340

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.01 THE REQUIREMENTS

A. This section specifies the means of all submittals. A general summary of the types of submittals and the number of copies required is as follows:

<table>
<thead>
<tr>
<th>Copies to City of North Miami</th>
<th>Type of Submittal</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Progress Schedule</td>
</tr>
<tr>
<td>8</td>
<td>Schedule of Payment Items</td>
</tr>
<tr>
<td>8</td>
<td>Shop Drawings</td>
</tr>
<tr>
<td>2</td>
<td>Certificates of Compliance</td>
</tr>
<tr>
<td>2</td>
<td>Warranties</td>
</tr>
<tr>
<td>2*</td>
<td>Product Samples</td>
</tr>
</tbody>
</table>

*Unless otherwise required in the specific Section where requested.

1.02 SUBMITTAL PROCEDURES

A. Transmit each submittal with a form as provided by the Owner, clearly identifying the project Contractor, the enclosed material and other pertinent information specified in other parts of this section. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

B. Revise and resubmit submittals as required, identify all changes made since previous submittals. Resubmittals shall be noted as such.

C. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. All applicable sections of the Specifications.

B. General Conditions.

C. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that reviewed Shop Drawings, Product Data and Samples will be needed.
1.04 PRODUCT DATA

A. The Contractor shall prepare submittals as follows:
   1. Clearly mark each copy to identify pertinent products or models.
   2. Show performance characteristics and capacities.
   3. Show dimensions and clearances required.
   4. Show wiring or piping diagrams and controls.

B. In the case where Manufacturer's standard schematic drawings and
diagrams are submitted the Contractor shall:
   1. Modify drawings and diagrams to delete information which is not
      applicable to the work.
   2. Supplement standard information to provide information specifically
      applicable to the work.

1.05 SAMPLES

A. Where samples are required to be submitted for review at acceptance,
these shall be of sufficient size and quantity to clearly illustrate:
   1. Functional characteristics of the product with integrally related parts
      and attachment devices.
   2. Full range of color, texture and pattern.

1.06 CONTRACTOR RESPONSIBILITIES

A. The Contractor shall Review Shop Drawings, Product Data and Samples
prior to submission. Concurrence with the contents of the submittal shall
be acknowledged by the Contractor.

B. Determine and verify:
   1. Field measurements.
   2. Field construction criteria.
   3. Catalog numbers and similar data.

C. Coordinate each submittal with requirements of the work and of the
Contract Documents.

D. Notify the Engineer through the Owner in writing, at time of submission, of
any deviations in the submittals from requirements of the Contract
Documents.

E. Begin no fabrication or work which requires submittals until return of
submittals with the Engineer's acceptance.

1.07 SUBMISSION REQUIREMENTS
A. Contractor shall furnish to the Owner for review by the Engineer, eight copies of each submittal. The term "Shop Drawing" as used herein shall be understood to include detail design calculations, shop drawings, fabrication and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and similar items.

B. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole. A multiple-page submittal shall be collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the Engineer.

C. Except as may otherwise be indicated herein, the City of North Miami will return copies, as reviewed by the Engineer, of each submittal to the Contractor with its comments noted thereon, within thirty (30) calendar days following their receipt by the City of North Miami. It is considered reasonable that the Contractor shall make a complete and acceptable submittal to the City of North Miami by the second submission of a submittal item. The City of North Miami reserves the right to withhold monies due the Contractor to cover additional costs of the Engineer's review beyond the second submittal. The Engineer's maximum review period for each submittal, including all resubmittals, will be 21 days per submittal. In other words, for a submittal that required two resubmittals before it is complete, the maximum review period for that submittal could be 90 calendar days.

D. If three (3) copies of a submittal are returned to the Contractor marked FURNISH AS SUBMITTED formal revision and resubmission of said submittal will not be required.

E. If three (3) copies of a submittal are returned to the Contractor marked FURNISH AS CORRECTED formal revision and resubmission of said submittal will not be required.

F. If a submittal is returned to the Contractor marked "REVISE AND RESUBMIT," the Contractor shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the City of North Miami, for review by the Engineer.

G. Fabrication of an item shall be commenced only after the City of North Miami has reviewed the pertinent submittals and the returned copies to the Contractor are marked either "FURNISH AS SUBMITTED" or
"FURNISH AS CORRECTED." Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the contract requirements. If the Contractor chooses to proceed with fabrication and/or shipment of any item prior to receipt of requisite acceptance, it does so at its own risk.

H. All Contractor shop drawing submittals shall be carefully reviewed by an authorized representative of the Contractor, prior to submission to the Owner, for distribution to the Engineer. Each submittal shall be dated, signed, and certified by the Contractor, as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the Design Engineer of any Contractor submittals will be made for any items which have not been so certified by the Contractor. All non-certified submittals will be returned to the Contractor without action taken by the Owner, and any delays caused thereby shall be the total responsibility of the Contractor.

I. The Engineer's review of Contractor shop drawing submittals shall not relieve the Contractor of the entire responsibility for the correctness of details and dimensions. The Contractor shall assume all responsibility and risk for any misfits due to any errors in Contractor submittals. The Contractor shall be responsible for the dimensions and the design of adequate connections and details.

J. Shop Drawing Distribution: Shop drawings shall be reviewed by the Engineer and marked either as "Furnish as Submitted," "Furnish as Corrected," or "Revise and Resubmit." The distribution of processed shop drawings shall be as follows:
1. Shop drawings marked "Furnish as Submitted" or 'Furnish as Corrected'.
   - 3 copies returned to Contractor
   - 2 copies transmitted to the Owner
   - 1 copy to remain with the Engineer
2. Shop drawings marked or "Revise and Resubmit"
   - 2 copies returned to Contractor
   - 2 copies remain with the Engineer
   - 4 copies to be discarded

K. Submittals shall contain:
1. The date of submission and the dates of any previous submissions.
2. The Project title and Project number.
4. The names of:
   i. Contractor
ii. Supplier
iii. Manufacturer

5. Identification of the product, with the specification section number and/or drawing.

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.


10. Identification of revisions on resubmittals.

11. An 8" x 3" blank space for Contractor and Engineer’s review stamps.

12. Contractor’s stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

1.08 RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required by the Engineer and resubmit until approved.

B. Shop Drawings and Product Data:
   1. Revise initial drawings or data, and resubmit as specified for the initial submittal.
   2. Indicate any changes which have been made other than those requested by the Engineer.

C. Samples: Submit new samples as required for initial submittal.

1.09 DISTRIBUTION

A. Distribute reproduction of Shop Drawings and copies of Product Data which carry the Engineer’s review stamp:
   2. Record Documents file.
   3. Other affected Contractors.
   4. Sub-Contractors.
   5. Supplier or Fabricator.

B. Distribute samples which carry the Engineer’s review stamp.

1.10 PROCESSING

A. Owner to receive submittals from Contractor.
B. Owner to forward submittals for review to the Engineer with reasonable promptness and in accord with schedule.

C. Engineer shall sign, and indicate requirements for resubmittal, or acceptance of submittal.

D. Engineer to return submittals to Owner with reasonable promptness for forwarding to Contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION
SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall submit to the Engineer a proposed Schedule of Values allocated to the various lump sum price items of the Work, within ten (10) days after the issuance of the Notice to Proceed.

2. Upon request of the Engineer, the Contractor shall support the Schedule of Values with data that shall substantiate their correctness.

3. The Schedule of Values will be used by the Owner and Engineer for the purpose of reviewing lump sum price items and Payment Applications.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

A. The Schedule of Values shall be typed on 8-1/2 inch x 11-inch white paper; Contractor's standard forms and computer printout will be considered for approval by the Engineer upon Contractor's request. The schedule shall identify:

1. Project name and location
2. Project number
3. Name and address of Contractor
4. Engineer's name
5. Date of submission

B. The Schedule of Values shall list the installed value of the component part of the Work in sufficient detail to serve as a basis for computing values for partial payments during construction.

C. Each line item shall be identified with the number and title of the respective major section of the Specifications.

D. For each major line item, the Schedule of Values shall list sub-values of major products or operations under the item.

E. For items on which partial payments will be requested for stored materials, the value shall be broken down into:
1. The cost of the materials delivered and unloaded.
2. Paid invoices shall be required for materials upon request by the Owner.
3. The total installed value.

1.03 SUB-SCHEDULE OF UNIT MATERIAL VALUES

A. The Contractor shall submit a Sub-Schedule of Unit Material Values, including costs and quantities, for products on which partial payments will be requested for stored products.
B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.
C. The unit quantity for bulk materials shall include an allowance for normal waste.
D. The unit values for the materials shall be broken down into:
   1. Cost of the material, delivered and unloaded at the site, with taxes paid.
   2. Copies of paid invoices for component material shall be included with the payment request in which the material first appears.
E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

1.04 REVIEW AND RESUBMITTAL

A. After review by Engineer and Owner, the Contractor shall revise and resubmit the Schedule of Values and Sub-Schedule of Unit Material Values as required.
B. The Contractor shall resubmit revised schedules in the same manner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
PART 1 - GENERAL

1.01 REQUIREMENTS

A. The Contractor shall employ a competent photographer to take construction record photographs periodically during the course of the Work.

1.02 PHOTOGRAPHY REQUIRED

A. Photographs shall be taken in strict conformance with this Section and shall be furnished to the Owner with each Payment Application.

B. Photographs shall be taken at each of the major stages of construction listed below.
   1. Condition of site prior to commencement of work.
   2. Completion of pipeline laying prior to backfilling at 50-foot intervals.
   3. Installation of equipment and facilities as directed by the Engineer.
   4. Completion of site restoration and landscaping.

C. Views and Quantities Required:
   1. Two (2) views of each item listed in Paragraph 1.02(B) above.
   2. Five (5) views weekly of overall project site, where Work is in progress.
   3. Each time photographs are taken, at least one (1) photograph shall be taken from the same overall view as was taken during the previous photograph session.
   4. The Contractor shall consult with the Engineer for instructions concerning views required.
   5. Furnish two (2) prints of each view; distribute one to the Owner's construction manager and one to the Engineer.
   6. Aerial photographs may be used upon prior approval by the Owner.

D. Digital:
   1. All photographs are to be color digital, compiled on Flash Drive, and provided with a description index of the images with dates.
   2. Two electronic file copies of all photographs shall be delivered with each monthly report.

PART 2 - PRODUCTS
2.01 PRINTS

A. Color Prints: Furnish color prints in quantities noted above.
   2. Finish: Smooth surface, glossy.

B. Each print shall be identified, listing:
   1. Name of Project
   2. Orientation of view
   3. Date and time of exposure
   4. Name and address of photographer
   5. Photographer's numbered identification of exposure

C. Aerial photographs shall be color.

D. Each set of prints shall be submitted in standard plastic protectors
   punched for insertion into a standard 3-ring binder.

PART 3 - EXECUTION

3.01 TECHNIQUE

A. The photography shall be a factual presentation of the condition and
   progress of the Work.

B. The photography shall be of correct exposure and focus and:
   1. High resolution and sharpness
   2. Maximum depth-of-field
   3. Minimum distortion

END OF SECTION
SECTION 01385

COLOR AUDIO-VIDEO CONSTRUCTION RECORDS

PART I - GENERAL

1.01 DESCRIPTION

A. Scope

The Contractor shall prepare color audio/video DVDs of all work areas within 20 days of the Notice to Proceed.

B. Requirements Included

Prior to commencing work, the Contractor shall have a continuous color audio/video DVD recording taken along the entire length of the Project including all affected project areas. Streets, easements, rights-of-way, lots or construction sites within the Project must be recorded to serve as a record of pre-construction conditions. One copy of DVD recordings and video log will be submitted to the Owner, remaining copies shall be submitted to Engineer. The Engineer will designate those areas, if any, to be omitted from or added to the audio-visual coverage. All DVDs and written records will become property of the Owner.

C. Scheduling

No construction shall begin prior to review and approval of the DVDs covering the Project construction area(s) by the Engineer. The Engineer and Owner will have the authority to reject all or any portion of video DVD not conforming to specifications and order that it be redone at no additional charge. The Contractor shall reschedule unacceptable coverage within seven days after being notified. DVD recordings shall not be made more than 20 days after Notice to Proceed.

D. Equipment

The Contractor shall finish all equipment, accessories, materials and labor to perform this service. The total audio-video system shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity and be free from distortion and interruptions. In some instances, audio-video coverage may be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking.
The color video camera used in the recording shall be of Industrial Grade and shall have EIA Standard NTSC type color - 1.0V 75 OHMS. Video output from camera shall be capable of horizontal resolution of 350 lines at center and utilize a minimum of 8:1 zoom with a 2/3 Newvicon tube or CCD pick-up element for optimum color imagery plus minimum lag through of one foot candle. The recording shall be made with Industrial Grade recorder. The recordings shall be high resolution, extended still frame capable, in color. The recorded video DVDs shall be compatible for playback with any American TV Standard DVD player.

E. Recorded Information, Audio

Each DVD shall begin with the current date, project name and be followed by the general location, i.e., viewing side and direction of progress. Accompanying the video recording of each video DVD shall be a corresponding and simultaneously recorded audio recording. This audio recording, exclusively containing the commentary of the camera operator or aide, shall assist in viewer orientation and in any needed identification, differentiation, clarification, or objective description of the features being shown in the video portion of the recording. The audio recording shall also be free from any conversations.

F. Recorded Information, Video

All video recordings must continuously display transparent digital information to include the date and time of recording. The date information shall contain the month, day and year. The time information shall contain the hour, minutes and seconds. Additional information shall be displayed periodically. Such information shall include, but not be limited to, project name, contract number, direction of travel and the viewing side. This transparent information shall appear on the extreme upper left hand third of the screen. Camera pan, tilt, zoom-in and zoom-out rates shall be sufficiently controlled such that recorded objects will be clearly viewed during video DVD playback. In addition, all other camera and recording system controls, such as lens focus and aperture, video level, pedestal, chrome, white balance, and electrical focus shall be properly controlled or adjusted to maximize picture quality. The construction documentation shall be recorded in SP mode.

G. Viewer Orientation

The audio and video portions of the recording shall maintain viewer orientation. To this end, overall establishing views of all visible house and business addresses shall be utilized. In areas where the proposed construction location will not be readily apparent to the video DVD viewer, highly visible yellow flags shall be placed, by the Contractor, in such a fashion as to clearly indicate the proposed centerline of construction. When
conventional wheeled vehicles are used as conveyances for the recording system, the vertical distance between the camera lens and the ground shall not exceed 10 feet. The camera shall be firmly mounted such that transport of the camera during the recording process will not cause an unsteady picture.

H. Lighting

All recording shall be done during time of good visibility. No recording shall be done during precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recording and to produce bright, sharp video recordings of those subjects.

I. Speed of Travel

The average rate of travel during a particular segment of coverage shall be directly proportional to the number, size and value of the surface features within that construction areas zone of influence. The rate of speed in the general direction of travel of the vehicle used during recording shall not exceed 44 feet per minute.

J. Video Log/Index

All video DVDs shall be permanently labeled and shall be properly identified by video DVD number and project title. Each video DVD shall have a log of that video DVD’s contents. The log shall describe the various segments of coverage contained on the video DVD in terms of the names of the streets or location of easements, coverage beginning and end, directions of coverage, video unit counter numbers, engineering survey or coordinate values (if reasonably available) and the date.

K. Area of Coverage

DVD coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio coverage. Such coverage shall include, but not be limited to, existing driveways, sidewalks, curbs, pavements, drainage system features, mailboxes, landscaping, culverts, fences, signs, Contractor staging areas, adjacent structures, etc., within the area covered by the project. Of particular concern shall be the existence of any faults, fractures, or defects. DVD coverage shall be limited to one side of the site, street, easement or right-of-way at any one time.

L. Costs of Video Services

The cost to complete the requirements under this section shall be included in the contract items provided in the Bid Form. There is no separate pay item
for this work.

PART 2 - PRODUCTS
(NOT USED)

PART 3 - EXECUTION
(NOT USED)

END OF SECTION
SECTION 01410

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 THE REQUIREMENTS

A. The City of North Miami will employ and pay for the services of an Independent Testing Laboratory to perform certain specified testing. All other required testing services under the Contract Documents shall be provided by the Contractor.

B. The Contractor shall cooperate with The City of North Miami’s hired laboratory to facilitate the execution of its required services.

C. Employment of the laboratory by The City of North Miami for specific testing shall in no way relieve the Contractor's obligations to perform the work of the Contract as specified.

D. The City of North Miami shall pay only for initial testing. The cost of any retesting necessitated by failure of materials or methods shall be deducted from the Contractor's monthly payment request.

E. The following tests will be provided by The City of North Miami, as the Engineer may deem necessary:

   a. Density
   b. Proctor
   c. LBR
   d. Carbonate Content
   e. Gradation
   f. Plastic Index and Liquid Limit
   g. Organic Content
   h. Asphalt Extraction

F. Contractor shall pay and coordinate services for all other testing including bacteriological and pressure testing.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. All applicable sections of the Specifications.

1.03 GENERAL CONDITIONS

1.04 QUALIFICATION OF LABORATORY
A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.

B. Meet basic requirements of ASTM E-329.

C. Authorized to operate in the State of Florida.

D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of Natural Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

E. Testing Equipment

1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
   b. Accepted values of natural physical constants.

1.05 LABORATORY DUTIES

A. Cooperate with The City of North Miami, Engineer and Contractor; provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction:
   1. Comply with specified standards.

C. Promptly notify The City of North Miami, Engineer and Contractor of observed irregularities of deficiencies of work or products.

D. Promptly submit written report of each test and inspection; one copy to the The City of North Miami, one copy to the Engineer and one copy to the Contractor. Each report shall include:
   1. Date issued.
   2. Project title and number.
   3. Testing laboratory name, address and telephone number.
   4. Name and signature of laboratory inspector.
   5. Date and time of sampling or inspection.
   6. Record of temperature and weather conditions.
   7. Date of test.
   8. Identification of fill product and specification section.
   9. Location of sample or test in the project.
10. Type of inspection or test.
11. Results of tests and compliance with Contract Documents.
12. Interpretation of test results, when requested by Engineer and/or The City of North Miami.

E. Perform additional tests as required by the Engineer and/or The City of North Miami.

1.06 LIMITATION OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:
   1. Release, revoke, alter or enlarge on requirements of Contract documents.
   2. Approve or accept any portion of the work.
   3. Perform any duties of the Contractor.

1.07 CONTRACTOR’S RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to work.

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes which require control by the Testing Laboratory.

D. Furnish copies of Products test reports as required.

E. Furnish incidental labor and facilities:
   1. To provide access to work to be tested.
   2. To obtain and handle samples at the project site or at the source of the product to be tested.
   3. To facilitate inspections and tests.
   4. For storage of test samples.

F. Notify laboratory sufficiently, as agreed between The City of North Miami, Engineer and Contractor, in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
   1. When tests or inspections cannot be performed after such notice, reimburse The City of North Miami for laboratory personnel and travel expenses incurred due to Contractor's negligence.

END OF SECTION
PART 1 – GENERAL

1.01 DEFINITION AND SCOPE

A. The Work specified in this Section consists of all Work necessary to move in personnel and equipment and prepare the site for construction, complete and to remove the same personnel and equipment from the site when construction is complete.

B. Mobilization shall include the obtaining of all permits, insurance, and bonds; moving onto the site with construction equipment; furnishing and erecting temporary facilities, and other construction facilities; all as required for the proper performance and completion of the Work. Mobilization shall include, but not be limited to, the following principal items:

1. Move onto the site all equipment required for first month’s operations.
2. Install temporary construction power, wiring, and lighting facilities.
3. Establish fire protection plan and safety program and Hurricane Preparedness Plan.
4. Secure construction water supply.
5. Providing field office trailers for the Contractor, complete with all specified furnishings and utility services including telephones, telephone appurtenances, and copying machine.
6. Providing all on-site communication facilities, including telephones and radio pagers.
7. Provide on-site sanitary facilities and potable water facilities.
8. Arrange for and erect Contractor’s work and storage yard and employees’ parking facilities.
9. Submit all required insurance certificates and bonds.
10. Obtain all required permits.
11. Post all OSHA, Environmental Protection Agency, Department of Labor, and all other required notices.
12. Have superintendent at the job site full time.

13. Submit a detailed construction schedule acceptable to the Engineer.

14. If required, erect project construction sign(s).

15. Submit a finalized schedule of values of the Work acceptable to the Owner.

16. Submit a finalized schedule of submittals.

17. Construct, maintain, and restore temporary access and haul roads.

18. Provide a continuous color audio-videtape recording of existing conditions.

1.02 PAYMENT FOR MOBILIZATION

A. There shall be no measurement or payment for the work under this Section; it shall be included in the Lump Sum Bid Price for Mobilization.

PART 2 - PRODUCTS

2.01 TEMPORARY UTILITIES

A. The Contractor shall provide all temporary facilities required for performing the Work.

PART 3 - EXECUTION

3.01 LAYOUT

A. The Contractor shall set up construction facilities in a neat and orderly manner. It shall accomplish all required Work in accordance with applicable portions of these specifications and shall confine its operations to Work areas within the right-of-way, unless it makes provisions for otherwise, at its own expense.

3.02 DEMOBILIZATION

A. At the completion of Work the Contractor shall remove its personnel, equipment, and temporary facilities from the site in a timely manner. The Contractor shall also be responsible for transporting all unused materials belonging to the Owner to a place of storage on site designated by the Owner and/or Engineer and for removing from the site and disposing of all
other materials and debris resulting from the construction. It shall then return all areas used for its activities to, its pre-existing condition, or as otherwise agreed to in writing with the Owner and/or Engineer.

END OF SECTION
SECTION 01530

PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall protect all existing utilities, facilities, and improvements not designated for removal and restore damaged or temporarily located utilities, facilities, and improvements to a condition equal to or better than they were prior to such damage or temporary relocation in accordance with the requirements of the Contract Documents.

B. The number of exploratory excavations required shall be that number sufficient to determine the alignment and depth of the existing utility or facility.

C. The Contractor shall determine the exact locations and depths of all existing utilities indicated on the Drawings that affect the Work. In addition to those indicated, the Contractor shall make exploratory excavations of all utilities. All such exploratory excavations shall be performed as soon as practicable after Notice to Proceed and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor's Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 RIGHTS-OF-WAY

A. The Contractor shall not do any Work that would affect any oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line; fiber optic cable; any fence; or any other structure, nor shall the Contractor enter upon the rights-of-way or easements involved with any such utilities until the Contractor has secured authority therefore from the utility, rights-of-way or easement owner, and has provided the Engineer with written proof of same. After authority has been obtained, the Contractor shall give said facility owner a minimum of one week’s notice of the Contractor's intention to begin Work, and shall give said facility owner convenient access for removing, shoring, supporting, or otherwise protecting its pipeline, transmission line, ditch, fence, or structure and for replacing same. Should two (2) or more contracts be executed at one time on the same or adjacent land in such manner that work on one contract may interfere with that on another, the Owner shall decide which Contractor
shall have priority to perform and in what manner. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the Owner to the Contractor so desiring, to the extent, amount, manner, and times permitted by the Owner. No such decision as to the method or time of conducting the Work or the use of territory shall be made the basis of any claim for delay or damage, except as provided for temporary suspension of the Work.

3.02 PROTECTION OF STREET OR ROADWAY MARKERS

A. The Contractor shall not destroy, remove, or otherwise disturb any existing survey markers, or other existing street or roadway markers, without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that may be disturbed by the construction operations have been properly referenced for easy and accurate restoration. It shall be the Contractor's responsibility to notify the proper representatives of the Owner of the time and location that work will be done. Such notice shall be sufficiently in advance of construction that there shall be no delay due to waiting for survey points to be satisfactorily referenced for restoration. All survey markers or points disturbed without proper authorization by the Engineer will be accurately restored by the Contractor at no additional cost to the Owner after all street or roadway resurfacing has been completed.

3.03 RESTORATION OF PAVEMENT

A. General: All paved areas, including asphaltic concrete cut or damaged during construction, shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavements shall conform to the requirements of the affected pavement owner. All pavements subject to partial removal shall be neatly saw cut in straight lines. All restoration shall be performed in accordance with these Specifications.

B. Temporary Resurfacing: Wherever required by the authorities having jurisdiction, the Contractor shall place temporary surfacing promptly after backfilling and maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements. Temporary resurfacing shall be constructed in accordance with these Specifications.

C. Permanent Resurfacing: All pavement restoration shall be in accordance with these Specifications.
3.04 EXISTING UTILITIES AND IMPROVEMENTS

A. General: The Contractor shall protect all utilities and other improvements that may be impaired during construction operations. It shall be the Contractor’s responsibility to ascertain the actual location of all existing utilities and other improvements indicated on the Drawings that may be encountered during construction, and to assure that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines, for uninterrupted utility service and such special protection as may be directed by the Owner.

B. Utilities To Be Moved: If it becomes necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon proper application by the Contractor, be notified by the Owner to relocate such property within a specified reasonable time. The Contractor shall not interfere with said property until it has been relocated by the utility or franchise holder.

C. Owner’s Right of Access: The right is reserved by the Owner, and by the owners of public utilities and franchises, to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work.

D. Known Utilities: Existing utility lines that are shown on the Drawings or the locations of which are made known to the Contractor prior to excavation that are to be retained and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the Contractor at no additional cost to the Owner.

E. Unknown Utilities: If the Contractor damages any existing utility lines that are not shown on the Drawings or the locations of which are not made known to Contractor prior to excavation, or were not, or could not have been verified or located by the Contractor prior to starting the Work, a written report thereof shall be made immediately to the Owner. If directed by the Owner, repairs shall be made by the Contractor under the provisions of the Contract Documents.

F. Utilities To Be Removed: When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the utility owner and the Owner a sufficient time in advance for the necessary measures to be taken to prevent interruptions of the service.
G. Approval Of Repairs: All repairs to a damaged improvement facility shall be inspected and approved by an authorized representative of the improvement's Owner before being concealed by backfill or other Work.

H. Relocation of Utilities: Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility, or other improvement that is shown on the Drawings, the Contractor shall, at Contractor's own expense, remove, and without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Owner and the owner of the facility. In all cases of such temporary removal or relocation, restoration to the former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former location and to as good or better condition as prior to removal.

I. Maintaining In Service: All oil and gasoline pipelines, power, telephone, or other communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the Work shall be maintained continuously in service during all the operations, unless other arrangements satisfactory to the Engineer are made with the Owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, wire, or cable. The Contractor shall be responsible for and shall make good all damage due to Contractor's operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

3.05 TREES WITHIN RIGHTS-OF-WAY AND PROJECT LIMITS

A. General: The Contractor shall exercise all necessary precautions to prevent damage or destruction of any trees or shrubs, including those lying within street rights-of-way and Project limits. The Contractor shall not trim or remove any trees unless such trees have been approved for trimming or removal by all jurisdictional agencies and the Owner. All existing trees and shrubs that are damaged during construction shall be trimmed or replaced by Contractor under permit from the jurisdictional agencies and the Owner and to the satisfaction of said agencies and the Owner. No additional payment will be made for permitting, removing or replacing trees impacted by the work of this project.

3.06 NOTIFICATION BY THE CONTRACTOR

A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state

PROTECTION OF EXISTING FACILITIES
01530-4 1/9/2015
highway rights-of-way, the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three (3) working days nor more than five (5) working days prior to excavation so that representatives of said owners or agencies can be present during such work if they so desire.

3.07 SUBSURFACE OBSTRUCTIONS

A. The Contractor shall field determine, before pipeline trenching or any other excavations are begun, the depth and location of existing utilities. Utility locations indicated on the Drawings are shown based on available data. The Contractor shall submit descriptions, depths, and locations of subsurface obstructions to the Engineer for review if they differ from those shown on the Drawings.

B. In excavation, backfilling, and laying pipe, care shall be taken not to remove, disturb, or damage existing pipes, conduits, or structures. If necessary, the Contractor shall sling, shore-up, and maintain such structures in operation at no additional cost to the Owner.

C. The Contractor shall obtain the permission of and give sufficient Notice to the proper authorities of the Contractor’s intention to remove or disturb any pipe, conduit, structure or facility, and shall abide by their requirements and Laws and Regulations governing such work.

D. In the event subsurface structures are broken or damaged in the execution of the Work, the Contractor shall immediately notify the proper authorities and, at the option of said authorities, either repair the damage at once or pay the proper charges for repairing said damage at no additional cost to the Owner. Repairs shall be made to the satisfaction of the Engineer. The Contractor shall be responsible for any damage to persons or property caused by such breaks or due to the neglect in reporting and/or repairing such damages.

E. Neither the Owner nor the Engineer will be liable for any claims made by the Contractor based on underground obstructions that could have been reasonably identified as being different than that indicated on the Drawings. The Contractor shall uncover subsurface obstructions in advance of construction so that the method of avoiding same may be determined before the Work reaches the obstruction.

3.08 CONFLICTS WITH OTHER UTILITIES

A. It shall be the Contractor’s responsibility to provide the appropriate utility company sufficient advance Notice so their representatives may verify the utility location on the Project site when construction begins. The
Contractor shall coordinate and cooperate with these utilities to ensure that no damages occur which may cause interruption of their services.

B. All temporary support or minor adjustment that does not require replacement or direct by-pass connections to these existing services (such as all direct-buried telephone cables or two-inch and smaller gas lines) shall be the responsibility of the Contractor.

C. Where it may be necessary to relocate gas mains or telephone ducts (defined here as gas lines larger than 2-1/2 inches and telephone cables within ductwork) to allow construction of the Work or where major relocation of small services requires replacement or performing connections to the existing lines, all such relocation work is the responsibility of and must be performed by the respective utility companies. The Contractor shall immediately provide Notice to the proper utility company and the Engineer of the occurrence and location of such required relocations.

D. The Owner will not be responsible for any delay or inconvenience to the Contractor resulting from the existence, removal, or adjustment of any public or private utility that could have been reasonably identified. Additional costs incurred as a result thereof shall be borne by the Contractor and considered as included in the price bid for the various pay items.

E. Relocation or realignment of storm drains or sewer lines that may interfere with the construction of the Work shall be the responsibility of the Contractor.

F. Where storm drains or sewer lines are removed by the Contractor to facilitate construction and replaced in their original position, there shall be no direct payment made. All related costs shall be included in the price bid for the various pay items.

3.09 POLE RELOCATION AND PROTECTION

A. The Contractor shall take notice of the number of power, telephone, and traffic signal support poles along the length of the Project. Several may be in proximity to or in direct conflict with the alignment of the proposed new pipelines. The Contractor shall immediately provide Notice to the proper utility company and the Engineer of the occurrence and location of such required relocations. It is intended that poles shall be supported with mud jacks or by other means of bracing as required to maintain them in a stable condition. The Contractor shall coordinate relocation and protection activities with the pole owner.
3.10 EXISTING FENCE LINES

A. At various locations along the length of the Project, existing fences may conflict with or impair construction operations for the installation of the Work. The Contractor shall protect these fences in places where they do not conflict with construction operations. Where a fence may conflict with the backswing of machinery or otherwise impede construction, the Contractor shall contact the owner and arrange for the temporary removal or relocation of the fence. Any fence temporarily relocated shall be placed in a manner to maintain the intent and integrity of the original fenced area. Any fence removed or temporarily relocated shall be restored to its original condition and location unless otherwise arranged with the owner of the fence. Where it is impossible to salvage the existing materials to reconstruct the fence, the fence shall be replaced "in kind."

B. All cost for such temporary removal, temporary replacement, or "in kind" replacement shall be included in the price bid for the various pay items. No direct payment shall be made for fence replacement.

3.11 UTILITY INVESTIGATION

A. Prior to commencing with trench or other excavations required for the performance of the Work, the Contractor shall conduct a field investigation for the purpose of determining existing locations of all underground utilities and facilities which are shown on the Drawings. The Contractor shall coordinate all utility investigations with Sunshine. The investigation shall be made by hand or machine excavation. All such excavations shall include removal of surface material and obstructions required to perform the excavations. The Contractor shall notify, in writing, the owner of the facility to be excavated and request that a representative of the owner be present during the excavation. The Contractor shall provide the utility owner adequate Notice so that a representative can be there. The Contractor shall provide sheeting, shoring, and bracing as required to minimize the required size of the excavation and support adjacent ground, structures, roadways, and utilities. After the data is obtained at each excavation site, the Contractor shall immediately backfill each excavation site. Backfill shall be compacted sand for the full depth. The surface shall be returned to its original grade and condition except that paved areas may be temporarily surfaced and maintained where excavations required for the performance of the Work coincide with the location of the investigative location. The Contractor shall be responsible for all costs associated with the repair of roadways, paving, structures, underground and above ground utilities and facilities damaged in conducting the investigations.
B. Findings of the investigation shall be reported to the Engineer. The Engineer will furnish one (1) set of full-size Drawings for the Contractor's field use in recording the findings of the investigation. The Contractor shall describe the size, material, and location of existing underground utilities and facilities. Locations and elevations shall be referenced to Project stationing, distance from base line, and Project bench marks. The Contractor shall provide written detailed description of any underground utility or facility conflicting with the elevation or alignment of the Work.

3.12 SPECIAL RESTORATION REQUIREMENTS

A. The Contractor shall schedule and conduct operations to minimize the impact of construction upon lawns, driveways, sidewalks, irrigation systems, and street paving. Restoration for these items shall be completed as soon as practical after installation of proposed pipelines. The following specific requirements apply.

1. Driveways and Sidewalks: The Contractor shall saw cut existing driveway or sidewalk pavement and remove the required section not sooner than the same day the Work is to be installed beneath it. The Contractor shall maintain full access to each driveway at all times. The Contractor shall re-grade and compact disturbed areas immediately after the Work is installed. The Contractor shall provide suitable, safe, temporary walking surfaces where the sidewalk is removed. The Contractor shall construct temporary driveway or sidewalk section within 24 hours of removal of the existing section. The Contractor shall coordinate driveway construction and restoration with property owners. Property owners shall be provided with Notice of proposed method and schedule of construction and restoration a minimum of 72 hours prior to commencement of construction activities affecting the property owner's driveways or sidewalks.

2. Irrigation Systems: The Contractor shall provide 10-day Notice to property owners prior to the Contractor removing irrigation system components.

3. Lawn Areas: The Contractor shall remove existing grass along a straight line to a minimum distance of six inches beyond the areas disturbed by construction activities on each side of the affected area. Sod shall be installed in disturbed lawn areas in a strip of uniform width along each section of lawn area with sod of identical type as existing. The Contractor shall grade and compact the area before the end of the next calendar day after excavation is performed. All sodding shall be performed in accordance with
these Specifications. The Contractor shall install new sod within fourteen days after excavation.

4. Trees, Shrubs, and Landscaping: The Contractor shall use a bonded company, licensed to perform landscape work, to perform all landscaping work required in accordance with these Specifications.

5. Fencings and all other existing facilities impacted by construction operations.

END OF SECTION
SECTION 01531  
CARE OF TREES, SHRUBS AND GRASS  

PART I - GENERAL  

1.01 SCOPE OF WORK  

A. In the course of the work, it may become necessary to remove trees if they interfere with construction. Dade County and various municipalities have ordinances regulating the removal, relocation and pruning of trees in the public right-of-way, and these ordinances shall be strictly adhered to. The Contractor shall obtain a permit from Dade County and/or other regulatory agencies having jurisdiction over the work area before removing, relocating and/or pruning any tree. The Contractor shall abide by all requirements and conditions of the permit, and shall include all costs under the various Pay Items, and no other compensation will be provided.  

B. The Contractor shall be fully responsible for maintaining in good condition all cultivated grass plots, trees and shrubs. Where maintained shrubbery, grass strips or area must be removed or destroyed incident to the construction operation, the Contractor shall, after completion of such work, or as directed by the Engineer, replace or restore to the original condition all destroyed or damaged shrubbery or grass areas. Tree limbs which interfere with equipment operation and are approved for pruning shall be neatly trimmed and the tree cut coated with a tree paint.  

C. Grass replacement shall be solid sod sections laid with closely abutting joints with a tamped or rolled surface. Weeded areas need not be replaced with grass sod, but shall be restored to a "green" area by dressing the area with a 3-inch thick layer of top soil, and sowing a variety of permanent type grass seed, over the area as approved by the Engineer. The grassed or seeded area shall be watered and maintained until the Engineer is assured a good grass growth has developed, but not to exceed a maximum period of 60 days.  

D. In order to protect himself from being held liable for any existing tree damage, the Contractor is advised to notify the Engineer in writing (with photographic documentation) before proceeding with any work.  

PART 2 – PRODUCTS (NOT USED)  

PART 3 – EXECUTION (NOT USED)  

END OF SECTION  

PROTECTION OF EXISTING FACILITIES  
01531-1  1/9/2015
PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall insure that each employee, representative, subcontractor, supplier, and others working for the Contractor use designated access roads and parking areas.

B. The Contractor shall employ watchmen on the Work when necessary and shall erect and maintain such strong and suitable barriers and such lights as shall effectually prevent the happening of any accident to health or to property or to any partially completed Work or to any materials stored on or adjacent to the site of the Work.

C. The Contractor shall provide and maintain temporary fencing and gates and the daily securing of temporary fencing and gates to adequately protect the Work, and shall provide all access required by the Engineer, the Owner, and others requiring access to the Work.

D. Stored materials shall be kept in a neat and orderly manner. Materials that are subject to deterioration by exposure to the sun, rain or other elements shall be kept adequately covered and protected.

E. The Contractor shall be responsible for protecting against loss or damage all material, equipment, and stored materials and the Project site safe from theft and vandalism. The Contractor shall repair or replace damaged or lost materials and equipment and damages to structures resulting from a lack of security. The Contractor shall employ security personnel and erect fences as necessary at no additional cost to the Owner.

F. All security measures shall be provided at no additional cost to the Owner.

G. The Contractor shall provide and maintain at all times proper security along the entire construction site in order to prevent any kind of accidents involving the general public.

PART 2 – MATERIALS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION
PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall be in compliance with all applicable provisions of the Occupational Safety and Health Act of 1970. The Contractor's Manual of Safety Practices, dealing with the firm's policies on field safety procedures for employees shall be submitted to the Engineer for his review before "Notice to Proceed" will be issued.

B. The Contractor's personnel will be in the vicinity of raw sewage. For his own protection, as well as for his employees, he shall check with the Miami-Dade County Health Department and, based upon their recommendation, shall have his personnel properly immunized against disease, if required.

C. Under this Contract, personnel will be required to enter existing manholes/sewers to perform certain items of work. Before entering, the Contractor shall be in compliance with Miami-Dade County Manhole Ordinance No. 83-3, which mandates, in part, that above-ground safety personnel shall be on duty at all times when someone enters, or works in, a manhole/sewer and the air within a manhole/sewer shall be tested with a combination oxygen deficiency meter-explosion meter to determine oxygen content and explosion potential. A test for the presence of hydrogen sulfate shall also be performed. When unsafe air conditions are detected, the manhole covers of upstream and downstream manholes shall be removed to vent the sewer. Thereafter, the work area shall be ventilated mechanically by the use of an air blower, before entry and during occupancy, to ensure that an adequate quantity of oxygen is supplied to the work area.

D. The Contractor shall conduct his operations in such a manner (utilizing warning devices, such as traffic cones, barricades and warning lights, and personnel such as flagmen and uniformed police officers) that the public is given adequate warning of hazards of the work site as may be deemed necessary by the County and/or the Engineer. See Section 6.00.5, "Maintenance of Traffic Control".

E. The Contractor shall comply with, but not limited to, the following OSHA Regulations that are found applicable to this project.

F. In addition, the Contractor shall adhere to any other applicable Federal, State and Local Safety and Health Regulations involving General industry and/or Construction Standards not mentioned in the Specifications.

G. For trench excavations in excess of five (5) feet in depth, the Contractor shall comply with the provisions of the State of Florida "Trench Safety Act" and Section 6.01, "Excavation" of the Specifications.

H. The Contractor shall familiarize himself with the "Underground Facility Damage Prevention and "Safety Act", Florida Statute 556. The Contractor shall contact the Sunshine State One Call of Florida, at 1-800-432-4770, forty-eight hours prior to any excavation. Failure to familiarize himself with the aforementioned safety provisions shall not relieve him from compliance with the obligations and the penalties set forth herein.

I. All open excavations made in the earth shall be performed in compliance with the State of Florida Trench Safety Act, OSHA29 CFR 1926.650, Subpart P (Chapter 90-96, Laws of Florida). The Contractor shall appoint a "competent person", in accordance with Subpart P, who shall be present at the jobsite. A "competent person" shall mean one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

J. The Contractor is responsible for the adequacy of forms, shoring and re-shoring and for safe practice in their use and removal.

K. All Electrical equipment shall be clearly marked to alert service personnel of possible flash arc hazard (NEC 110-16). Provide short circuit coordination / arc flash as needed. Provide warning label indicating severity of potential exposure and level of personal protective equipment (PPE) required (NEC 409-110).

SAFETY REQUIREMENTS

01541-2 1/9/2015
PART 2 - MATERIALS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION
PART 1 - GENERAL

1.01 SITE ACCESS

A. The Contractor shall make its own investigation of the condition of available public and private roads and clearances, restrictions, load limits, and any other limitations affecting transportation, equipment and product delivery, ingress, and egress to the Work site. It shall be the Contractor's responsibility to lawfully construct and maintain any haul roads required for its own construction operations.

1.02 STORAGE

A. Limited storage and lay down area is available within the work area as shown on the drawings. If additional lay down and storage area is required, the Contractor shall obtain such areas from off site sources at no additional cost to the City and shall notify the City of all such arrangements.

B. Responsibility for protection and safekeeping of equipment and materials shall be solely that of the Contractor. Should an occasion arise necessitating access to an area occupied by stored equipment or materials, the Contractor shall immediately move them.

C. Upon completion of the Contract, the Contractor shall remove from the storage and work areas all of equipment, temporary fencing, surplus materials, rubbish, etc., and restore the area to their original or better conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall obey all traffic laws and shall be responsible for all plans and permits required for traffic regulation by the State of Florida, the City of North Miami, and other local authorities having jurisdiction.

B. The Contractor shall be responsible to maintain adequate warning signs lights, barriers, etc., for the protection of traffic and pedestrians on public roadways.

D. The Contractor shall be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public.

D. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

E. Maintenance of Traffic shall be in accordance with the details shown on the drawings and on the Florida Department of Transportation Index requirements.

1.02 TRAFFIC CONTROL

A. The necessary precautions shall include, but not be limited to, such items as proper construction warning signs, signals, lighting devices, markings, barricades, channelization and hand signaling devices. The Contractor shall be responsible for installation and maintenance of all devices and requirements for the duration of the construction period.

B. The Contractor shall provide at least 72 hours notification to the applicable City, County or State Highway Department of the necessity to close any portion of a roadway carrying vehicles or pedestrians so that the final approval of such closings can be obtained at least 48 hours in advance.

C. The Contractor shall also be responsible for notifying Police, Fire and Ambulance Departments whenever roads are impassable.

D. The Contractor shall be responsible for removal, relocation, or replacement
of any traffic control device in the construction area, which exists as part of
the normal pre-construction traffic control scheme. Any such actions shall
be performed by the Contractor under the supervision, and in accordance
with the Specifications, of the Owner, unless otherwise specified.

E. The Contractor shall immediately notify the Owner of any vehicular or
pedestrian safety or efficiency problems incurred as a result of the
construction of the project.

1.03 USE OF PUBLIC STREETS

A. The use of public streets shall be such as to provide a minimum of
inconvenience to the public and to other traffic. Any earth or other
excavated material spilled from trucks shall immediately be removed by the
Contractor and the streets cleaned to the satisfaction of the governing
authority.

B. The City has not made any attempt to define the equipment to be used in
transporting the excavated material since this may vary, however, the
Contractor shall abide by the following general requirements:

C. Transport vehicles must be of the type(s) approved for this application by the
political jurisdictions involved. General requirements are that the vehicles
have watertight bodies that they be properly equipped and fitted with seals
and covers to prohibit material spillage or draining, and that they be cleaned
as often as is necessary to prevent deposit of material on roadways. Vehicles must be loaded within all legal weight limits and operated safely
within all traffic and speed regulations.

D. Access to businesses, schools and homes along the route of the work must
be provided by the Contractor at all times.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01580

PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish, install prior to construction, and maintain three (3) project identification signs at locations to be determined by the Owner.

B. Remove signs upon completion of construction.

C. Allow no other signs to be displayed.

1.02 INFORMATIONAL SIGNS

A. Painted signs with painted lettering, or standard products.

1. Size of signs and lettering: as required by the Owner, or as appropriate to usage.

2. Colors: as required by the Owner, otherwise of uniform colors throughout Project.

B. Erect at appropriate locations, as directed by the Owner or Engineer, to provide required information.

C. Project identification sign shall comply with the Owner’s requirements.

1. Project identification sign will be provided by the Owner.

2. Project identification sign shall be installed by the Contractor.

1.03 QUALITY ASSURANCE

A. Sign Painter: Professional experienced in type of work required.

B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

PART 2 – PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate and suitable for specified finish.
B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.
   1. Thickness: As required to span framing members, to provide even, smooth surface without waves or buckles.

C. Rough Hardware: Galvanized.

   1. Use Bulletin colors for graphics.
   2. Colors for structures, framing, sign surface and graphics:

E. The project sign shall be painted in accordance with the detail provided by the Owner.

F. Owner will provide the standard decal.

PART 3 – EXECUTION

3.01 PROJECT IDENTIFICATION SIGNS
A. Paint exposed surface of supports, framing and surface material; one coat of primer and one coat of exterior paint.

3.02 MAINTENANCE
A. Maintain signs and supports in a neat, clean condition; repair damages to structures, framing or sign.

3.03 REMOVAL
A. Remove signs, framing, supports and foundations at completion of project.

END OF SECTION
PART I – GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall furnish all material, labor, tools, equipment, plant, appliances and services necessary to complete all demolition, modification and relocation work required in the Drawings and specified herein. Examine the various Drawings, visit the site and determine the extent of work affected therein and all conditions under which he is required to perform the various operations.

2. Existing site structures and appurtenances affected herein as indicated on the Drawings.

3. Demolition, removal and relocation work shall be coordinated with the City of North Miami, shall conform to the requirements of Section 3.00 and shall be performed in an agreed upon sequence to minimize down time at the site.

4. Promptly remove all demolished materials and debris from the site. No demolished materials shall be kept at the site for more than 24 hours.

5. Demolition shall result in the complete removal and disposal of existing structures and appurtenances from the site as indicated on Drawings and the cleanup after completion of the demolition work.

6. The cutting and removal of existing work necessary for modifications and installation of new work shall be made with a minimum of damage to the work that is to remain. Any damage done to existing facilities which are to remain shall be repaired at the Contractor’s expense to the satisfaction of the Department.

7. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.

8. Non-shrink grout shall be used for setting wall casting, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as required.
9. Follow other specific instructions for the modification work given in other sections of these specifications and/or as shown on the Drawings.

10. Verify exact location, material, alignment, joint, etc. of existing piping and structure prior to making the modifications and connections called out in the Drawings. The verifications shall be performed with adequate time to correct any potential alignment or other problems prior to the actual time of connection.

11. Dismantle and remove all existing equipment, piping and other appurtenances required for the completion of the work. Where called for or required, cut existing pipeline for the purpose of making connections thereto. Anchor bolts for equipment and structural steel removal shall be cut off one inch below the concrete surface. Surface shall be properly repaired and finished.

12. Where necessary or required for the purpose of making connections, cut existing pipelines in a manner to provide an approved joint. Where required, weld beads, flanges or provide the specified couplings, all as required.

13. Site shall be left in a clean condition satisfactory to the Engineer, free from demolished materials, rubbish or debris. Site shall be graded to meet adjacent contours and provide flow for surface drainage.

14. Restore items intended to remain that have been damaged by demolition work.

15. All interrupted utility services shall be returned to service, and temporary services disconnected, unless otherwise specified.
PART 1 - GENERAL

1.01 THE REQUIREMENTS

The Contractor shall ensure that all material and equipment incorporated into the work:

1. Conform to applicable specifications and standards.

2. Comply with size, make, type and quality specified, or as specifically approved in writing by the Engineer.

3. Manufactured and fabricated products:
   A. Design, fabricate and assemble in accord with the best engineering and shop practices.
   B. Manufacture like parts of duplicate units to standard sizes and gauges to be interchangeable.
   C. Two or more items of the same kind shall be identical, by the same manufacturer.
   D. Products shall be suitable for service conditions.
   E. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. All applicable sections of the Specifications.

B. General conditions of the Contract.

1.03 MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, the Contractor shall obtain and distribute copies of such instructions to parties involved in the installation,
including two copies to the Engineer through the City of North Miami. In addition, the Contractor shall: maintain one set of complete instructions at the job site during installation and until completion.

B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements.
   1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with City of North Miami for further instructions.
   2. Do not proceed with work without clear instructions.

C. Perform work in accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents.

1.04 TRANSPORTATION AND HANDLING

A. The Contractor shall arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site. Products shall be delivered to the job site on an "as needed" basis.
   1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact with legible markings.
   2. Immediately upon delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
   3. Pipe and materials shall not be strung out along installation routes for longer than one (1) week prior to installation.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

C. Coordinate deliveries to avoid conflict with Work and conditions at site:
   1. Work of other contractors, or City of North Miami.
   2. Limitations of storage space.
   3. Availability of equipment and personnel for handling products.
   4. City of North Miami’s use of premises.

D. Deliver products in undamaged condition in original containers or packaging, with identifying labels intact and legible.

E. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.
F. Immediately on delivery, inspect shipment to assure:
1. Product complies with requirements of Contract Documents and reviewed submittals.
2. Quantities are correct.
3. Containers and packages are intact, labels are legible.
4. Products are properly protected and undamaged.

G. Provide equipment and personnel necessary to handle products, including those provided by City of North Miami, by methods to prevent soiling or damage to products or packaging.

H. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.

I. Handle products by methods to prevent bending or overstretching.

J. Lift heavy components only at designated lifting points.

1.05 STORAGE

A. The Contractor shall store products in accord with manufacturer's instructions, with seals and labels intact and legible.
1. Store products subject to damage by the elements in weathertight enclosures.
2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
3. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.

B. Exterior Storage
1. Provide substantial platforms, blocking or skids to support fabricating products above ground, prevent soiling or staining. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
2. Store loose granular materials on solid surface such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.
   a. Provide surface drainage to prevent flow or ponding of rainwater.
   b. Prevent mixing of refuse or chemically injurious materials or liquids.
C. Stored Products shall be periodically inspected on a scheduled basis. The Contractor shall maintain a log of inspections and shall make said log available to the City of North Miami on request.

D. The Contractor shall verify that storage facilities comply with supplier's product storage requirements, subject to the Engineer's review and acceptance.

E. The Contractor shall verify that Supplier required environmental conditions are maintained continually.

1.06 MAINTENANCE OF STORAGE

A. The Contractor shall maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings and finishes is not acceptable under requirements of Contract Documents.

B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1.07 PROTECTION AFTER INSTALLATION

A. The Contractor shall provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.
2. Protect finished floors and stairs from dirt and damage.
   a. In areas subject to foot traffic, secure heavy paper, sheet goods, or other materials in place.
   b. For movement of heavy products, lay planking or similar materials in place.
c. Cover wall and floor surfaces in the vicinity of construction personnel activities and all finished surfaces used by construction personnel.

D. Waterproofed Surfaces

1. Prohibit use of surfaces for traffic of any kind, and for storage of any products.
2. When some activity must take place in order to carry out the Contract, obtain recommendations of installer for protection of surface.
   a. Install recommended protection, remove on completion of that activity.
   b. Restrict use of adjacent unprotected areas.

E. Lawns and landscaping: The Contractor shall prohibit traffic of any kind across planted lawn and landscaped areas.

F. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION
SECTION 01601

MAINTENANCE OF TRAFFIC (MOT)

PART 1 – GENERAL

A. The Contractor shall abide by all applicable laws, regulations, and codes thereof pertaining to maintenance of public streets, detour of traffic, traffic control and other provisions as may be required for this Project.

B. 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 FDOT. Traffic shall be maintained according to corresponding typical traffic control details as outlined in the FDOT.

C. If required by the Owner or Regulator Agencies, the Contractor shall make arrangements for the employment of uniformed off-duty policemen to maintain and regulate the flow of traffic through the construction area. The number of men required and the number of hours on duty necessary for the maintenance and regulation of the traffic flow shall be subject to their approval. The cost of such off-duty policemen will be included in the contract price for MOT. If required by traffic control permits or agencies, the Contractor shall work, odd or night hours, as required for traffic control reasons, and the cost of such work shall be considered as incidental to construction and no extra compensation will be allowed.

D. The Contractor shall provide all barricades and/or flashing warning lights necessary to warn motorists of the construction throughout the Project, and concrete barriers if required.

E. Excavated or other material stored adjacent to or partially upon a roadway pavement shall be adequately marked for traffic safety at all times. 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 FDOT Design Standards & Specifications. 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. Every effort has been made to show the approximate locations on the Plans; however, the Contractor shall verify these locations by inspecting the site.
of the work and by contacting the Traffic Division. 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 Miami-Dade County Department of Public Works Traffic Division.

H. The Contractor shall notify the City of North Miami 24 hours in advance of the
construction date, and 48 hours in advance of construction within any signalized
intersection.

I. Temporary pavement will be required over all cuts in pavement areas, and also
where traffic is to be routed over a 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.

J. Pavement markings damaged during construction shall be remarked promptly by
the Contractor, as required by the Traffic Division.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION
SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall execute cleaning during progress of Work and at completion of the Work as required by the General Conditions.

B. The Contractor shall furnish all materials and equipment necessary for cleaning.

1.02 DISPOSAL REQUIREMENTS

A. The Contractor shall conduct cleaning and disposal operations to comply with all applicable Laws and Regulations.

B. Disposal of waste materials shall be in accordance with City requirements.

C. The Contractor is cautioned that Miami-Dade County or other governing body having jurisdiction over the work location may have regulatory rules and ordinances prohibiting or limiting the discharge of water from any excavation into sanitary and storm sewer systems, or to canals and drainage ditches. The Contractor shall comply with all regulations of all governing agencies.

PART 2 – MATERIALS

2.01 MATERIALS

A. The Contractor shall use only those cleaning materials which do not create hazards to health or property and which do not damage surfaces.

B. The Contractor shall use only those cleaning materials and methods recommended by the Manufacturer of the surface material to be cleaned.

C. The Contractor shall use cleaning materials only on surfaces so recommended by cleaning material Manufacturer.

PART 3 – EXECUTION

3.01 CLEANING DURING CONSTRUCTION

A. The Contractor shall execute daily cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, water,
eroded material, rubbish and windblown debris resulting from construction operations.

B. The Contractor shall provide suitable on-site containers for the daily collection of all waste materials, debris and rubbish.

C. The Contractor shall remove waste materials, debris and rubbish from site containers periodically and dispose of at properly licensed and permitted disposal areas away from the site.

D. The Contractor shall schedule operations so that dust and other contaminants resulting from the cleaning process do not fall on wet or newly-coated surfaces.

E. The Contractor shall remove from the site all surplus materials and temporary structures when no further need therefore develops and as approved by the Engineer. The Contractor shall be responsible and liable for all spillage and shall incur all associated costs including, but not limited to, costs related to repair and maintenance resulting from any such damage.

3.02 FINAL CLEANING

A. The Contractor shall employ skilled workmen for final cleaning.

B. The Contractor shall remove all grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels and all other foreign materials from sight-exposed interior and exterior surfaces.

C. Prior to Final Completion, the Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all Work areas, to verify that the entire Work and the entire construction area of the Work are clean.

END OF SECTION
SECTION 01712

HURRICANE PREPAREDNESS PLAN

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall submit to the Engineer and Owner a Hurricane Preparedness Plan at the Pre-construction Conference. The Plan shall outline the necessary measures that the Contractor proposes to perform at no additional cost to the Owner in case of a hurricane watch and a hurricane warning.

B. During such periods of time as designated by the United States Weather Bureau as being a hurricane alert, the Contractor shall perform all precautions as necessary to safeguard the work and property, including the removal of all small equipment and materials from the site, lashing all other equipment and materials to each other and to rigid construction, and any other safety measures as may be directed by the Engineer.

1.02 UPON NOTIFICATION OF A HURRICANE WATCH

A. Formal notification to all Contractors to prepare and submit for approval a Plan of Action for the specific actions to be taken on their particular projects.

1.03 UPON NOTIFICATION OF A HURRICANE WARNING

A. Formal notification to the Contractors to implement their approved Plan of Action to protect the project and the public.

B. For Construction contracts at a Water or Sewer Plant, a copy of the notifications will be provided to the Plant Superintendent. The Plant Superintendent is also requested to notify the Construction Manager of any assistance he may need from the Contractor in order to secure Plant entities.

C. For pipeline construction projects within the public right-of-ways, the Contractor will be notified by the Construction Manager Office to suspend his construction operations. The Contractor will backfill all open trenches, remove all construction equipment and materials from the right-of-way, remove unnecessary traffic barricades and signs, secure remaining barricades by "half burial" or "double sand bags".

END OF SECTION
SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 THE REQUIREMENTS

A. The Contractor shall at all times maintain at the site of the project a record copy of:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other modifications to the Contract.
5. Approved Shop Drawings, Product Data and Samples.
6. Field Test Records.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. All applicable sections of the Specifications.
B. General conditions.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format.

C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by The City of North Miami's Representatives.

1.04 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the following color code designation:

• Red – Corrections
• Yellow – Deletions
• Green – Comments
Changes to the color code designation must be approved by The City of North Miami.

1.05 RECORDING

A. The Contractor shall label each document, "PROJECT RECORD" in neat large printed letters, or by rubber stamp.

B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

C. Drawings: Legibly mark to record actual construction:
   1. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   2. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
   3. Field changes of dimension and detail.
   4. Changes made by Field Order or by Change Order.
   5. Details not on original Contract Drawings.
   6. The Record Drawing set shall show benchmark positions and their vertical values. Benchmarks are optional for Plan Views, but required for Profile Views.

D. Specifications and Addenda; Legibly mark each Section to record:
   1. Manufacturer, trade name, catalog number, and supplier of each produce and item of equipment actually installed.
   2. Changes made by field order or by Change Order.

1.06 RECORD DRAWINGS

A. The Contractor shall maintain full size (22"X34") field drawings to reflect the "record" items of work as the work progresses. Upon completion of the work, the Contractor shall prepare a record set of drawings in electronic .DWG format (AutoCAD, Version 14.0 or Version 2000). Electronic file of the design drawings on compact disk will be furnished by the Contractor's CONSULTANT for this purpose.

B. At a minimum the record drawings shall be reviewed on the 20th working day of every third month, or more often, as deemed necessary by The City of North Miami, after the month in which the final Notice to Proceed is given as well as on completion of WORK. Failure to maintain the record drawings up-to-date shall be grounds for withholding monthly progress payments until such time as the record drawings are brought up-to-date.
C. Record drawings shall be accessible to The City of North Miami at all times during construction period.

D. The cost of maintaining record changes, and preparation of the Record Drawings shall be included in the lump sum for the affected items. Upon completion of the WORK, the Contractor shall furnish the Engineer through The City of North Miami three (3) sets of Record Drawings and electronic files. The completed Record Drawings shall be delivered to the Engineer through The City of North Miami at least 48 hours prior to final inspection of the work. The Final Inspection will not be conducted unless the Record Drawings are in the possession of the Engineer.

E. The completed (or final) record drawings shall be certified by a Professional Land Surveyor registered in the State of Florida. This certification shall consist of the surveyor's embossed seal bearing the surveyor's registration number, signature and date on each sheet of the drawing set. In addition, the key sheet, cover sheet or first sheet of the plans set shall list the business address and telephone number of the surveyor.

F. Representative items of work that should be shown on the record drawings as verified, changed or added are shown below:

1. Plans:
   a. Structure types, location with grade of rim and flow-line elevations.
   b. Utility type, length, size and elevation in conflict structures.
   c. All maintenance access structures within right-of-way.
   d. Spot (critical) elevations at plateaued intersections.

2. Pavement Marking and Signing Plans: Sign location where installed if different from plans.

3. As-builts of all drainage lines shall include the following information:
   a. Rims, inverts and length of piping between structures and weir elevations if applicable.
   b. The size of the piping shall be verified by the survey crew at the time of as-built.

4. If a change is made via field order or deviation to any structure, pipeline, etc., a new location shall be noted on the as-builts. The Engineer may request additional as-built information to verify horizontal or vertical locations.

5. Every utility (gas, telephone, power, water, forcemain, 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 watermain 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 insure that this information is reflected on the Record Drawing plan set. Crossings will not require state plane coordinates.

6. Pipelines that are “dead” or have been abandoned shall be located during construction and shall be annotated on the Record Drawing Plans.

7. As-built survey drawings shall meet applicable minimum technical standards for land surveys as outlined in Section 61G17 of the Florida Administrative Code.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION
SECTION 02062

REMOVAL OF EXISTING EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, tools, equipment, materials, and incidentals required to remove all existing, structures, equipment, and pipe as noted on the Contract Drawings, as reasonably inferred and as required for the proper installation of the drainage improvements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall not proceed with the removal of any equipment, piping, or structures without specific approval of the Engineer. Any equipment, piping or structures removed without proper authorization, which are necessary for the operation of the existing or of the new facilities, shall be replaced to the satisfaction of the Engineer at the Contractor's expense.

B. All existing equipment, structures, or piping not required to be reused shall become the property of the Contractor immediately upon removal from their present locations, unless otherwise noted. The Contractor shall remove such material from the site at his own expense and it shall not be reused.

C. Equipment to be retained by the Owner shall be carefully removed from the present location, cleaned, and immediately stored on-site as designated by the Owner.

D. The Contractor shall take all necessary precautions against damaging the material and equipment to be stored and reused. The Contractor shall repair any damage resulting from his operations, as directed by and to the satisfaction of the Engineer. Itemized lists of materials removed and stored shall be given to the Owner's Representative daily. A final typed itemized list shall be furnished to the Engineer in 6 copies at the completion of construction. The list shall include items, method of packaging, and place of storage.

END OF SECTION
SECTION 02064

MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidental required to modify, alter and/or convert existing structures as shown or specified and as required for the installation of new piping, and structures. Existing piping and equipment shall be removed and dismantled as necessary for the performance of structural alterations in accordance with the requirements specified herein.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall cut, repair, reuse, excavate, demolish, or otherwise remove parts of the existing structures or appurtenances, as indicated on the Contract Drawings, specified herein, or as necessary to permit completion of the work under this Contract. The Contractor shall dispose of surplus materials resulting from the above work in an approved manner. The work shall include all necessary cutting and bending of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.

B. The Contractor shall dismantle and remove all existing piping or equipment required for the completion of the work. Where called for or required, the Contractor shall cut existing pipelines for the purpose of making connections thereto. Anchor bolts for equipment and structural steel removed shall be cut off one (1) inch below the concrete surface.

C. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered without the express approval of and to the extent approved by the Engineer.

D. When removing materials or portions of existing structures and when making openings in walls and partitions, the Contractor shall take all precautions and
use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work.

E. Materials and equipment removed in the course of making alterations and additions shall remain the property of the Owner, except that items not salvageable, as determined by the Engineer and the Owner’s Representative, will become the property of the Contractor to be disposed of by him off the work site at his own place of disposal.

F. All alterations to existing structures shall be done at such time and in such manner as will comply with the approved time schedule. So far as possible before any part of the work is started, all tools, equipment and materials shall be assembled and made ready so that the work can be completed without delay.

G. All workmanship and new materials involved in constructing the alterations shall conform to the specifications for the classes of work insofar as such specifications are applicable.

H. All cutting of existing concrete or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective section of these Specifications covering the new work. When not covered, the work shall be carried on in the manner and to the extent directed by the Owner’s Representative.

I. Where necessary or required for the purpose of making connections, the Contractor shall cut existing pipelines in a manner to provide an approved joint. Where required, the Contractor shall weld beads, flanges, or provide Dresser Couplings or equal, all as required.

3.02 CONNECTING TO EXISTING PIPING AND EQUIPMENT

A. The Contractor shall verify exact location, material, alignment, joint, etc. of existing piping, structures, and equipment prior to making the connections called out in the Drawings. The verifications shall be performed with adequate time to correct any potential alignment or other problems prior to the actual time of connection.

3.03 CLEANING EXISTING STRUCTURES

A. After dewatering and before commencing work on any structure, the Contractor shall remove and dispose of, away from the site, the grit and other solids remaining in such structures.

END OF SECTION
SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section covers clearing, grubbing and stripping along the construction site.

B. The Contractor shall clear and grub all of the area within the limits of construction, or as required, which includes, but is not limited to, utility easements and swale areas.

C. The Contractor's attention is directed to any Soil Erosion and Sediment Control Ordinances in force in the municipality. The Contractor shall comply with all applicable sections of these ordinances.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CLEARING

A. The surface of the ground, for the area to be cleared and grubbed, shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish, and all other objectionable obstructions resting on or protruding through the surface of the ground. However, the trees and other landscape improvements, which are designated by the Engineer to remain, shall be preserved as specified, herein. Clearing operations shall be conducted, so as to prevent damage to existing structures and installations, and to those under construction, so as to provide for the safety of employees and others.

3.02 GRUBBING

A. Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots, brush, timber, logs, and any other organic or metallic debris not suitable for foundation purposes, resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface, for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

3.03 STRIPPING AND PROOFROLLING
A. Structure areas plus a five (5) foot perimeter around each structure should be stripped and cleared of all surface vegetation and root-laden topsoils.

B. In areas so designated, topsoil shall be stockpiled. Topsoil, so stockpiled, shall be protected until it is placed as specified. The Contractor shall dispose of any topsoil remaining after all work is in place.

C. The stripped and excavated areas should be leveled sufficiently to permit equipment traffic, and then proof-rolled using a large diameter, self-propelled or tractor-drawn vibratory drum roller. The vibratory drum roller should have a minimum static drum weight of five (5) tons and a maximum drum width of 36 inches and should be capable of exerting a minimum impact energy of 36,000 pounds. Careful observations should be made during the proof-roll of the stripped subgrade area to identify any areas of soft yielding soils that may require over-excavation and replacement.

D. Within 75 feet of existing structures or piping, a large vibratory drum roller should make a minimum of 10 overlapping passes in a criss-cross pattern across the entire stripped area prior to placing any fill. Compaction should continue until a minimum density of 95% of the maximum modified proctor dry density, as established in accordance with ASTM D-1557, is achieved for minimum depth of 2 feet below the subgrade surface. This should be determined by a series of field density (compaction) tests conducted during the proof-rolling operations at least one (1) density test per 5,000 ft².

E. Excessive vibration shall be avoided in the proximity of existing structures or buried piping.

3.04 DEWATERING

A. Dewatering of some excavations may be required. The Contractor shall provide all equipment, labor, tools, and power to maintain a dewatered level at least 2 feet below the excavated subgrade, 24 hours per day, 7 days per week until the entire excavation has been replaced with fill compacted in accordance with the Standard Specifications to the original ground surface. The Contractor shall be responsible for obtaining all discharge permits as required by applicable County, State, and Federal authorities.

3.05 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

A. The Contractor shall dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris off-site. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the Contractor; the cost of which shall be included in the prices bid for the work.

END OF SECTION
SECTION 02125

SILT BARRIERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work included under this section consists of furnishing all necessary labor, equipment, tools and materials, and in performing all operations in connection with the installation of a staked silt barrier, of cloth or straw bales, or a floating silt barrier for the protection of open water, wetland systems or areas intended to remain undisturbed by adjoining work.

B. This work shall be performed in strict accordance with the requirements of all applicable sections of these specifications and in conformity with lines, grades, notes and typical sections as shown on the drawings, as directed by the Engineer or as directed by representatives of governmental agencies having permitting jurisdiction over areas to be protected.

PART 2 - PRODUCTS

2.01 STAKED FABRIC SILT BARRIER

A. The sediment control fabric is to be woven polypropylene meeting the following standards:

- Mullen Burst Test (ASTM D-3786) 200 psi (min.)
- Grab Elongation (ASTM D-1682) 30% (max.)
- Slurry Flow Rate (VTM-51) 0.3 gpm/sf (min.)
- Retention Efficiency (VTM-51) 75% (min.)

B. The fabric shall be provided in widths adequate to provide a barrier of a minimum of 24 inches in height and allow for 8 inches of fabric to be buried for restraint.

PART 3 - EXECUTION

3.01 STAKED CLOTH SILT BARRIER

A. The sediment control fabric shall be attached per the manufacturer’s recommendations to the uphill or sediment producing side of the stakes. The stakes shall be spaced at 6 to 10 foot intervals. A 4” to 6” trench shall be dug along the fence line and backfilled with the bottom 8 inches of control fabric in place.
B. The ends of each unit of fence shall be connected to adjoining fence sections with a connector provided by the manufacturer or by intertwining the two end posts to overlap the fabric sufficiently to prevent sediment from escaping, as shown in the Drawings.

3.02 STAKED STRAW/SYNTHETIC BALES

A. Securely bound straw/synthetic bales may be used as a sediment barrier. The bales shall be securely bound with two strands of rope or wire. The bales shall be positioned in a 4 inch trench along the plan alignment and each bale is to be secured by driving two 2"x 2" stakes or #5 rebar through the bale and 18" to 24" into the ground. The tops of the stakes shall then be secured by a continuous wire tie.

B. Deteriorated bales shall be replaced as directed by the Engineer.

3.03 REMOVAL

A. Upon obtaining Substantial Completion, the Contractor shall be responsible for the complete removal of all silt barriers unless so directed by the Engineer. Following removal, all materials shall become the property of the Contractor.

END OF SECTION
SECTION 02140

TEMPORARY DEWATERING

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Work to be performed includes the furnishing of all equipment, materials and labor necessary to remove surface or subsurface waters from excavation areas in accordance with the requirements set forth and as shown on the Drawings or as specified.

B. The specific direction of the Contractor is directed to the Geotechnical Report.

1.02 QUALITY ASSURANCE

A. The dewatering of any excavation areas and the disposal of the water produced shall be in strict accordance with the latest revision of all Laws and Regulations; with the local, State and Federal permits for the project; and, with the Contractor’s approved Storm Water Pollution Prevention Plan (SWPPP).

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 TEMPORARY DEWATERING

A. Prior to commencing work, the Contractor shall submit to the Engineer for approval the Contractor’s plans for dewatering. The dewatering system shall be in conformity with the overall construction plan.

B. The Contractor shall provide adequate equipment for the removal of surface or subsurface waters that may accumulate in the excavation. Flotation and migration of fines shall be prevented by the Contractor by maintaining a positive and continuous operation of the dewatering system. The Contractor shall be fully responsible and liable for all damages that may result from the operation and/or failure of this system.

C. If subsurface water is encountered, the Contractor shall utilize suitable equipment to adequately dewater the excavation so that it will be dry to a depth of 12-inches below the pipeline subgrade compaction level or over-excavation level, whichever is lower, but not more than 5-feet, to facilitate effective subgrade compaction and to provide for a stable trench bottom.
A wellpoint system, trench drain, sump pump operation, or other dewatering method shall be utilized to maintain the excavation in a dry condition for preparation of the trench bottom and until the fills, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels. No water shall be allowed to contact masonry or concrete within 24 hours after being placed.

D. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation and to preserve the integrity of adjacent structures and utilities. Well or sump installations shall be constructed and operated continuously with proper sand filters to prevent drawing of finer grained soil from the surrounding ground. Dewatering by trench pumping shall not be permitted if migration of fine grained natural material from bottom, side walls, or bedding material may occur.

E. In the event that satisfactory dewatering cannot be accomplished due to subsurface conditions, or where dewatering could damage existing structures, the Contractor shall obtain the Engineer's approval of wet trench construction or procedure before commencing construction.

F. Engine-driven dewatering pumps shall be equipped with residential type mufflers. Where practical and feasible, electrical "power drops" and electric motor-driven equipment shall be used in lieu of portable generators.

G. The Contractor shall take all additional precautions to prevent uplift of any structure during construction.

H. The Contractor shall take all precautions to preclude the accidental discharge of fuel, oil, etc. to prevent adverse effects on groundwater quality. All costs associated with any such adverse effects shall be borne by the Contractor.

I. The Contractor shall, at no expense to the Owner, be required to excavate below grade and refill with approved fill material if the Engineer determines that adequate drainage has not been provided.

3.02 DISPOSAL

A. All product water from dewatering shall be pumped from the trench or other excavation and shall be disposed of in strict accordance with the Permits. The Contractor will request permission from the Owner to be allowed to discharge product water from dewatering offsite into storm sewers, or ditches having adequate capacity, canals or suitable disposal
pits, or other surface waters in accordance with the Contractor’s Storm Water Pollution Prevention Plan, provided that the water has been sampled and tested by the Contractor, is in compliance with the concentration limits specified in 62-621.300(2) FAC, and the Contractor has obtained a Generic Permit for the Production of Groundwater. The frequency of water sampling and testing shall be determined by the Engineer based on existing conditions and field observations.

B. Permission to use any storm sewers, or drains, for water disposal purposes shall be obtained from the authority having jurisdiction. Any requirements and costs for such use shall be the responsibility of the Contractor. However, the Contractor shall not cause flooding by overloading or blocking up the flow in the drainage facilities, and shall leave the facilities unrestricted and as clean as originally found. Any damage to existing facilities shall be repaired or restored as directed by the Engineer or the authority having jurisdiction, at no cost to the Owner.

C. Contractor shall be responsible for acquiring and complying with all permits required to discharge the product water from dewatering and shall protect waterways from turbidity during the operation.

D. In areas where adequate disposal sites are not available, partially backfilled trenches may be used for water disposal only when the Contractor’s plan for trench disposal is approved in writing by the Engineer. The Contractor’s plan shall include temporary culverts, barricades and other protective measures to prevent damage to property or injury to any person or persons.

E. No flooding of streets, roadways, driveways or private property shall be permitted.

3.03 EQUIPMENT REMOVAL

A. Removal of dewatering equipment shall be accomplished after the system is no longer required. All materials and equipment constituting the system shall be removed by the Contractor.

B. All sock drains shall be filled with grout when no longer needed, and abandoned in place.

END OF SECTION
SECTION 02220

EXCAVATION, BACKFILL, FILL AND GRADING FOR STRUCTURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall refer to the Geotechnical report in the Appendix of these specifications and shall incorporate the recommendations from the report into the subgrade work.

B. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, and grading for structures required to complete the work shown on the Drawings and specified herein. The work shall include, but not necessarily be limited to, excavation for structures, footings, all backfilling and fill; embankment grading for structures; disposal of waste and surplus materials; and all related work such as sheeting, bracing and dewatering.

C. Structures and structural elements shall be installed at such places as indicated by the drawings at the elevations shown or as directed by the Engineer.

D. Excess topsoil and fill generated during construction of the project shall be stockpiled on site for the Contractor's use. All unused excess fill shall be salvaged/disposed of by the Contractor at no expense to the Owner.

E. During the process of grading, the subgrade shall be maintained in such condition that it will be well drained at all times. Temporary drains and drainage ditched shall be installed by the Contractor as required to intercept or divert surface water at no additional cost to the Owner.

F. If, during the excavation sequence, any earth material that could be used as fill is encountered that cannot be directly placed, it shall be stockpiled for later use. No extra payment will be made for stockpiling or double handling of material.

G. No grading is to be done in areas where there are existing utilities that may be uncovered or damaged until such utilities have been located. Prior to relocating lines, all service must be stopped, including closing required valves, electrical circuits, etc. Pipeline to be abandoned must be plugged and sealed according to these drawings and specifications.
1.02 QUALITY ASSURANCE

A. Soil Testing
   1. Prior to the general placement of fill, and during such placement, the Engineer may select areas within the limits of the fill for testing the degree of compaction obtained. The Contractor shall cooperate fully in obtaining the information desired.
   2. Payment for testing shall be made by the Owner. If test results are unsatisfactory, all costs involved in correcting deficiencies in compacted materials to the satisfaction of the Engineer, shall be borne by the Contractor. Repeated testing cost due to construction deficiencies shall be paid by the Contractor.

   1. ASTM C136 – Sieve or Screen Analysis of Fine and Course Aggregates.
   4. ASTM D422 – Particle Size Analysis for Soils.
   5. ASTM D2216 – Laboratory Determination of Water Content of Soil & Rock.
   6. ASTM D2487 – Classification of Soils for Engineering Purposes.
   7. ASTM D2937 – Density of Soil in Place by the Drive-Cylinder Method.
   8. ASTM D2972 – Density of Soil in Place by the Nuclear Method.
   9. ASTM D4643 – Determination of Water Content of Soil & Rock by the Microwave Oven Method.

1.03 SUBMITTALS

A. Testing laboratory reports that material for controlled fill meets requirements of this Section.

1.04 JOB CONDITIONS

A. Lateral Support of Excavation for Structures

Furnish, put in place, and maintain sheeting and bracing required to support the sides of the excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect structures, pipe and utilities from damage due to
lateral movement or settlement of ground. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, he may order additional supports put in at the expense of the Contractor, and compliance with such order shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports.

B. Dewatering for Structures

Furnish, install, maintain, operate, and remove a temporary dewatering system, as required to lower and control the groundwater level, so that the structures may be constructed in the dry. The Contractor shall, at his own expense, correct all damage resulting from inadequacy of the dewatering system or from flooding or the construction site from other causes.

C. Dewatering System

1. The dewatering system shall be adequate to drain any excavated area, to maintain the water at such a level at least 2 feet below the lowest subgrade within the structure, including utilities. The dewatering system must maintain the lowered water table 24 hours per day, 7 days per week until the structure has been completed to the required stages.

2. Continuously maintain excavation in a dry condition so as to prevent damage to the subsoil or fill during interruptions due to weather, labor strikes, power failures or other delays. Provide and have ready for immediate use at all times diesel or gasoline powered standby pumping units to serve the system in case of failure of the normal pumping units.

3. Piping and boiling, or any form of uncontrolled seepage, in the bottom or sides of the excavation shall be prevented at all times. If for any reason the dewatering system is found to be inadequate to meet the requirements set forth herein, the Contractor shall, at his own expense, make such additions, changes and/or replacements as necessary to provide a satisfactory dewatering system.

4. Contractor shall be responsible for creating and implementing a dewatering plan that shall be submitted to the Engineer for submission to FDEP as specified in the Environmental Resource Permit. The plan should be approved prior to initiating any construction activities.

D. Control of Groundwater Level

1. Maintain the groundwater level at or below subgrade of the structure until the concrete structures are up high enough to: (1) prevent flooding the structure, (2) support both bottom and top levels of walls, and (3) prevent flotation.

2. After the structure has been completed in its entirety, backfill as described hereinafter.

EXCAVATION, BACKFILL, FILL AND GRADING FOR STRUCTURES
02220-3 1/9/2015
3. Flotation shall be prevented by maintaining a positive and continuous operation of the dewatering system. The Contractor shall be fully responsible and liable for all damages, which may result from failure of this system.

4. Disposal of drainage water shall be in an area approved by the Engineer. Precautions shall be taken to prevent the flow or seepage of drainage back into the drainage area. Particular care shall be taken to prevent the discharge of unsuitable drainage to a water supply or surface water body.

5. Removal of the dewatering system shall be accomplished after the dewatering system is no longer required.

PART 2 - PRODUCTS

2.01 MATERIAL FOR CONTROLLED FILL

A. General

Materials for use as fill shall be as described below:

1. For each material, the Contractor shall notify the Owner’s designated representative of the source of the material at least ten (10) calendar days prior to the date of anticipated use of such material, so that necessary laboratory classification testing can be performed.

2. Structural fill shall be used to provide support for building foundations, structure foundations and the reject pond embankments. Common fill shall be used to as backfill over pipes.

B. Structural Fill

1. Compacted granular fill, which will provide support for building or structure foundations, will be referred to as "structural fill." Backfill, which is placed against the exterior side of the building walls or structures, or as fill over pipelines, will be referred to as "common fill."

2. Materials for compacted structural granular fill shall be gravel, sandy gravel, or gravely sand free of organic material, loam, wood, trash, and other objectionable material and shall be well-graded within the following limits:

<table>
<thead>
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<th>Sieve Size</th>
<th>Percent Finer by Weight</th>
</tr>
</thead>
<tbody>
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<td>6-in.</td>
<td>100</td>
</tr>
<tr>
<td>No. 4</td>
<td>20 - 95</td>
</tr>
<tr>
<td>No. 40</td>
<td>0 - 60</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 - 8</td>
</tr>
</tbody>
</table>

C. Common Fill
1. Common fill shall consist of mineral soil, free of organic material, loam, wood, trash and other objectionable material which may be compressible or which cannot be compacted properly. Common fill shall not contain stones larger than 10-in. in any dimension, broken concrete, masonry, rubble or other such materials. It shall have physical properties such that it can be readily spread and compacted during filling.

2. Material falling within the above Specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Engineer is not suitable for reuse, shall be spoiled as specified herein for disposal of unsuitable materials.

D. Crushed Stone

1. Crushed stone shall be used for structure bases where indicated on the drawings or directed by the Engineer. Crushed stone shall be used for manhole bases, as a drainage layer below structures with underdrains and at other locations indicated on the Drawings.

2. Crushed stone shall be size No. 57 with gradation as noted in Table 1 of Section 901 of Department of Transportation, Construction of Roads and Bridges.

2.02 UNSUITABLE MATERIAL

A. Unsuitable material will be designated as highly organic soil ASTM D 2487 Group PT, topsoil, roots, vegetable matter, trash and debris. All unsuitable material shall be removed in it entirety as to provide adequate bearing capacity for proposed structures, buildings, manholes, pipelines, etc.

PART 3 - EXECUTION

3.01 STRUCTURE EXCAVATION AND COMPACTION PROCEDURES - GENERAL

A. Excavation shall be made to such widths as will give suitable room for construction of the structures, for bracing and supporting, pumping and drainage; and the bottom of the excavations shall be rendered firm and dry and in all respects acceptable to the Engineer.

B. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. Subgrade soil which becomes soft, loose, "quick," or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced by structural fill as required by the Engineer at the Contractor's expense.
C. Dewatering shall be such as to prevent boiling or detrimental underseepage at the base of the excavation as specified herein. The Contractor shall install such means as required to preserve the stability of the base of the operation.

D. Excavating equipment shall be satisfactory for carrying out the work in accordance with the Specifications. In no case shall the earth be ploughed, scraped or dug with machinery so near to the finished subgrade as to result in excavation of, or disturbance of material below grade, the last of the excavated material being removed with pick and shovel just before placing of concrete or working mat thereon.

E. During final excavation to subgrade level, take whatever precautions are required to prevent disturbance and remolding of the subgrade. Material which has become softened and mixed with water shall be removed. Hand excavation of the final 3 to 6-in. will be required as necessary to obtain a satisfactory undisturbed bottom. The Engineer will be the sole judge as to whether the work has been accomplished satisfactorily.

F. All structure areas shall be stripped, cleared and grubbed of all surface vegetation and root laden top soils.

G. After stripping, the structure areas should be leveled sufficiently to permit equipment traffic and then proof-rolled. Careful observations should be made during proofrolling of the stripped subgrade area to identify any areas of soft yielding soils that may require over excavation and replacement.

H. Compaction should continue until a minimum density of 95% of the maximum modified Proctor dry density, as established in accordance with ASTM D-1557, is achieved for a minimum depth of 2 feet below the subgrade surface.

3.02 BACKFILLING AND COMPACTION

A. Following satisfactory proof-rolling of the stripped subgrade, the structure areas may be brought up to finished subgrade level. Structural fill shall be placed in loose lifts not exceeding 12-inches and should be compacted to a minimum of 95% of the maximum modified Proctor dry density, as established in accordance with ASTM D-1557. Density tests should be performed in each fill lift to confirm compaction before the next lift is placed.

B. Common fill may be used as backfill against the exterior walls of the structures, including manholes and storm structures, or in other areas as designated by the Engineer. Common fill shall be placed in loose lifts not exceeding 12-inches and should be compacted to a minimum of 95% of the maximum modified Proctor dry density, as established in accordance with ASTM D-1557. Density tests should be performed in each fill lift to confirm compaction before the next lift is placed. Common fill material in place shall
be compacted with such mechanical compaction equipment as approved by
the Engineer.

C. Materials placed in fill areas shall be deposited to the lines and grades shown
on the Drawings making due allowance for settlement of the material and for
the placing of topsoil thereon.

D. The surfaces of filled areas shall be grades to smooth true lines, strictly
conforming to grades indicated on the paving and grading Drawings, and no
soft spots or uncompacted areas will be allowed in the work.

E. No compacting shall be done when the material is too wet either from rain or
from excess application of water. At such times, work shall be suspended
until the previously placed and new materials have dried sufficiently to permit
proper compaction.

3.04 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

A. Unsuitable excavated materials and pavement shall become the property of
the Contractor and removed and disposed of by him off the project site.

B. Suitable excavated material may be used for fill or backfill if it meets the
Specifications for common fill and is approved by the Engineer. Excavated
materials so approved may be neatly stockpiled at the site, where there is an
area available that will not interfere with the operation of the plant or
inconvenience traffic or adjoining property owners. If space limitations do not
permit stockpiling on the site, the Contractor will be required to make
arrangements for off-site stockpiling. Transport of such material from and to
the immediate site, including any stockpiling agreements, shall be entirely at
the Contractor's expense and shall not constitute grounds for additional
payment.

C. Surplus excavated material shall be used to fill depressions or other
purposes as the Engineer may direct. All suitable surplus excavated material
shall remain property of the Owner and the Contractor shall stockpile excess
suitable excavated material at a location designated by the City. All
unsuitable excavated material shall become the property of the Contractor
and shall be removed and disposed of off the project site.

3.05 GRADING

A. Grading in preparation for placing of topsoil, planting areas, paved walks and
drives, and appurtenances shall be performed at all places that are indicated
on the Drawings, to the lines, grades, and elevations shown and otherwise as
directed by the Engineer. Such work shall be performed in a manner that the
requirements for formation of slopes, lines, and grades can be followed. All
material encountered, of whatever nature, within the limits indicated, shall be removed and disposed of as directed. During the process of grading, the subgrade shall be maintained in such condition that it will be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the progress or condition of the work.

B. If, at the time of grading, it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled for later use. No extra payment will be made for the stockpiling or double handling of excavated material.

C. The right is reserved to make minor adjustments or revisions in lines or grades, if found necessary as the work progresses, due to discrepancies on the Drawings or in order to obtain satisfactory construction.

D. Stones or rock fragments larger than 4-in. in their greatest dimensions will not be permitted in the top 6-in. of the finished subgrade of all fills or embankments.

E. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross section, and alignment shown on the Drawings or as directed by the Engineer.

F. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until such lines have been located and it has been determined if such lines must be maintained are relocated, or where lines are to be abandoned, all required valves are closed and remaining pipes are plugged.

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, and equipment necessary to satisfactorily return all construction areas to their original conditions or better.

B. Work includes furnishing and placing seed, sod, fertilizer, planting, watering and maintenance until acceptance by the Owner.

1.02 QUALITY ASSURANCE

A. Requirements

It is the intent of this Specification that the Contractor is obligated to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering, and seeding or sodding at no additional cost to the Owner until a satisfactory stand is obtained.

B. Satisfactory Stand

For purposes of grassing, a satisfactory stand of grass is herein defined as a full lawn cover over areas to be seeded or sodded, with grass free of weeds, alive and growing, leaving no bare spots larger than 3/4 sq. yd. within a radius of 10 ft.

1.03 SUBMITTALS

A. Provide technical data as required for shop drawings on all materials or installation procedures required under this Section and in accordance with Section 01340.

B. Submit representative topsoil samples for analysis by a private laboratory to determine nutrient deficiencies and outline a proper fertilization program.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fertilizer
1. Fertilizer shall be a complete fertilizer, the elements of which are derived from organic sources. Fertilizer shall be a standard product complying with State and Federal fertilizer laws.

2. Percentages of nitrogen, phosphorus and potash shall be based on laboratory tests on soils outlined in Paragraph 1.03B and approved by the Engineer. For purpose of bidding, assume 6% nitrogen, 6% phosphorus and 6% potash by weight. At least 50% of the total nitrogen shall contain no less than 3% water-insoluble nitrogen.

3. Fertilizer shall be delivered to the site, mixed as specified, in the original unopened standard size bags showing weight, analysis and name of manufacturer. Containers shall bear the manufacturer's guaranteed statement of analysis, or a manufacturer's certificate of compliance covering analysis shall be furnished to the Engineer. Store fertilizer in a weatherproof place and in such a manner that it will be kept dry and its effectiveness will not be impaired.

4. Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes containing not less than 20% available phosphoric acid.

B. Grass seed shall be the same as existed prior to construction or as approved by the Engineer and shall be 99 percent minimum purity, 80 percent minimum germination and 1 percent maximum weed seed, labeled in accordance with U.S. Department of Agriculture Rules and Regulations under Federal Seed Act in effect. Seed which has become wet, moldy, or otherwise damaged in transit or storage shall not be acceptable.

C. All disturbed areas with the limits of construction shall received vegetative treatment after final grading in accordance with these plans or landscaping plans. Disturbed areas not specifically designated with a vegetative cover shall be vegetated as follows:

1. Side slopes constructed at 4:1 (H to V) shall be sodded with argentine Bahia or seeded and then covered with an erosion control blanket. The blanket shall be the S75BN blanket as manufactured by North America Gree or approved equal.

2. Side slopes less than 4:1 (H to V) shall be seeded and mulched.

D. Sodding

1. Sod shall be of firm texture having a compacted growth and good root development, as approved. The type of Sod shall match the existing conditions or as required by the City of North Miami.

2. Sod shall be certified to meet Florida State Plant Board Specifications, absolutely true to varietal type, and free from weeds or other objectionable vegetation, fungus, insects and disease of any kind.

3. Before being cut and lifted the sod shall have been mowed 3 times with the final mowing not more than a week before cutting into uniform dimensions.

SURFACE RESTORATION, SEED AND SOD

02485-2 1/9/2015
E. Mulch shall be fresh hay. Rate of application specified herein shall correspond to depth not less than 1 inch or more than 3 inches according to texture and moisture content of mulch material.

F. It is the Contractor's responsibility to water the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs for his work. The Contractor shall also furnish all necessary hose, equipment, attachments and accessories for the adequate irrigation of lawns and planted areas as may be required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Following the subgrade preparation, the Contractor shall commence work on lawns and grassed areas. Areas to be seeded or sodded shall be free from soft spots and uneven grades. Apply 20 lbs. of 12-3-6 fertilizer per 1,000 sq. ft.

B. Seeded and sodded areas shall be protected against the traffic or other use by placing warning signs or erecting barricades as necessary. Any areas damaged prior to actual acceptance by the Owner shall be repaired by the Contractor as directed by the Engineer.

3.02 LAWN BED PREPARATION

A. Areas to be sodded shall be cleared of all rough grass, weeds, and debris and the ground brought to an even grade as approved.

B. The soil shall then be thoroughly tilled to a minimum 8-inch depth.

C. Superphosphate at a rate for bidding purposes of 5 pounds per 1,000 square foot and complete fertilizer at a rate for bidding purposes of 16 pounds per 1000 square foot shall be evenly distributed over entire area and cross-disked into a depth of 4-6 inches.

D. The areas shall then be brought to proper grade, free of sticks, stones, or other foreign matter over 1-inch in diameter of dimension. The surface shall conform to finish grade, less the thickness of sod, free of water-retaining depressions, the soil friable and of uniformly fill texture.

3.03 SOD HANDLING AND INSTALLATION
A. A one-foot wide strip of sod shall be provided around all structures, except fencing, along the edges of slabs and along the edge of pavement.

B. During delivery, prior to planting, and during the planting of the lawn areas, the sod panels at all times be protected from excessive drying and unnecessary exposure of the roots to the sun. All sod shall be stacked during construction and planting so as not to be damaged by sweating or excessive heat and moisture.

C. After completion of soil conditioning as specified above, sod panels shall be laid tightly together so as to make a solid sodded lawn area. On mounds and other slopes, the long dimension of the sod shall be laid perpendicular to the slope. Immediately following sod laying the lawn areas shall be rolled with a lawn roller customarily used for such purposes, and then thoroughly watered.

D. Bring the sod edge in a neat, clean manner to the edge of all paving and shrub areas. Top dressing with approved, clean, weed free, sand may be required at no additional cost to the Owner if deemed necessary by the Engineer.

3.07 CLEANUP

A. Soil, mulch, seed, or similar materials spilled onto paved areas shall be removed promptly, keeping those areas as clean as possible at all times. Upon completion of seeding and sodding operations, all excess soil, stones, and debris remaining shall be removed from the construction areas.

3.08 MAINTENANCE

A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the Engineer.

B. Maintain landscape work until Owner accepts project. Watering, weeding, cultivating, restoration of grade, mowing and trimming grass, protection from insects and diseases, fertilizing and similar operations as needed to ensure normal growth and good health for live plant material shall be the responsibility of the Contractor and at no additional cost to the Owner. Sodded areas shall receive no less than 1.5 inches of water per week.

C. The Contractor shall continue to maintain all grassed and restored areas until 60 days subsequent to substantial completion

3.09 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS
A. Lawn areas planted under this Contract and all lawn areas damaged by the Contractor's operation shall be repaired by proper soil preparation, fertilizing, and reseeding, in accordance with these Specifications.

END OF SECTION
1.01 SCOPE OF WORK

A. Furnish all necessary labor, materials, equipment and perform all operations in connection with construction of storm sewers, inlets, manholes, end sections, pipe, and other drainage structures or drainage construction as shown or indicated on the Drawings, or as specified herein.

B. Special attention is called to the fact that certain portions of the work for this project are described by reference to the Standard Specifications. The term Standard Specifications refers to The Standard Specifications for Road and Bridge Construction approved and adopted in by the Florida Department of Transportation. In any case where a specific detail regarding materials or method of construction has been omitted in the specification or on the Drawings, such work shall be performed in accordance with the requirements of the Standard Specifications.

1.02 QUALIFICATIONS

A. All precast structures shall be furnished by a single manufacturer, who is fully experienced, reputable and qualified in the manufacture of items to be furnished. The structures shall be designed, constructed and installed in accordance with the best practices and methods, and shall comply with the requirements of the Standard Specifications.

B. All reinforced concrete pipe shall be furnished by a single manufacturer, who is fully experienced, reputable and qualified in the manufacture of items to be furnished. The reinforced concrete pipe shall be designed, constructed and installed in accordance with the best practices and methods, and shall comply with the requirements of the Standard Specifications.

1.03 SUBMITTALS

A. In general, 6 copies of the following data or shop drawings shall be submitted to the Engineer for approval prior to construction:

1. Manhole frames, covers, grate inlets and other castings.
2. Precast manholes
3. Precast structures

B. The quality of all materials, the process of manufacture and the finished sections, shall be subject to inspection and approval by the Engineer, or
other representative of the Engineer. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places. The sections shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though a sample section may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections, which have been damaged after delivery, will be rejected and, if already installed, shall be acceptably repaired, if approved by the Engineer, or removed and replaced, entirely at the Contractor's expense.

C. At the time of inspection, the sections will be carefully examined for compliance with the ASTM designation specified below and these Specifications, and with the approved manufacturer’s drawings. All sections shall be inspected for general appearance, dimension, "scratch-strength", blisters, crack, roughness, soundness and other features. The surface shall be dense and close-textured.

D. Imperfections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 5,000 psi at the end of 28 days, when tested in 3-in. by 6-in. cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs, subject to the approval of the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS AND DESIGN

A. Precast structures shall conform to ASTM Designation C478 and meet the following additional requirements:
1. Type II cement shall be used, except as otherwise approved.
2. Holes to accommodate pipe shall be precast into the section at the manufacturer's plant.
3. All sections shall be cured by an approved method and shall not be shipped until the concrete compressive strength has attained 4,000 psi and not before 6 days after fabrication and/or repair, whichever is longer.
4. Precast concrete top slabs shall be designed for an AASHTO H-20 wheel loading.
5. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast unit.
6. Minimum wall thickness shall be 6 inches.
7. Minimum inside diameter shall be 48 inches for manholes.
8. The precast reinforced based shall be a minimum of 6 inches thick and be cast monolithically with the bottom section of manhole walls.
9. Manholes sections shall be joined with a tongue and groove joint complete with flexible plastic gasket. The tongue and groove joint shall be sealed with a flexible plastic gasket, as manufactured by K. T. Snyder & Sons, or equal. After the manhole sections have been assembled, the gasket shall be trimmed to a depth of 1/4" and filled with hydraulic cement.
10. Openings for pipes larger than 6 inches in diameter are to be precast. A minimum of 6 inches along the inter-circumference is to remain between the extremities of hole for adjacent pipe in any single unit. A minimum of two (2) reinforcing bars shall remain in wall between any two (2) openings.
11. The Contractor will furnish the fabricator with the angle of alignment and size of all pipes to enter manhole and the height of structure.
12. Base units shall have sufficient height to allow for minimum of 6 inches of wall between top of highest opening for pipes and bottom of joint.
13. Pipes are to be extended into structure wall a minimum of 4 inches, but should not extend beyond interior wall of structure.

B.

C. All bricks for drainage structures shall be first class, dense, free from cracks, true in shape, have square edges, and a clear ringing sound when struck. Clay brick shall be hard burned, sound, and burned entirely through. Brick of any one make shall not vary more than 1/16 inch in thickness, no more than 1/8 inch in width or length. The average amount of water absorbed by the brick, after being thoroughly dried and then immersed for 24 hours, shall not exceed 8 percent. Concrete brick shall conform to the requirements the Standard Specifications.

D. Mortar shall consist of one part cement and two parts clean sharp sand to which may be added lime in the amount of not over 25 percent of the volume of cement. It shall be mixed dry and then wetted to proper consistency for use. No mortars that have stood for more than one hour shall be used.

E. All castings for manhole frames, covers, steps and other purposes shall conform to the ASTM Designation A48-74, Class 25. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength or otherwise make them unfit for the services intended. The seating surfaces between frames and covers or grates shall be machined to fit true. No plugging or filling will be allowed. Lifting or "pick" holes shall be provided but shall not penetrate the manhole.
Cover. Casting patterns shall conform to those shown or indicated on the Drawings.

F. Class I (50 year) corrugated high density polyethylene pipe used for side drain, storm and cross drain or French Drain shall meet the requirements of AASHTO M294 and plant certification from the National Transportation Product Evaluation Program (NTPEP). Corrugations shall be annular. Pipe resin shall conform to ASTM D3350 with a minimum cell classification 435400C and between 2% to 4% carbon black. Mitered end sections are not to be constructed of polyethylene. All pipe produced and shipped to the job site shall meet the requirements of 105-3.2.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Manholes shall be constructed to requirements of the Standard Specifications and as specified herein.

B. Precast concrete sections shall be set, so as to be vertical and with section in true alignment with a 1/4-inch maximum tolerance to be allowed. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides. The Contractor shall install the precast sections in a manner that will result in a watertight joint.

C. Holes in the concrete pipe sections required for handling or other purposes shall be plugged with a non-shrinking grout or by grout in combination with concrete plugs.

D. Where holes must be cut in the precast section to accommodate pipe, cutting shall be done prior to setting them in place.

E. The precast concrete base shall be placed on a bed of 3/4" rock, to provide even bearing and grade control.

F. A tapered hole filled with non-shrink waterproof grout after the pipe is inserted is acceptable, providing the grout is placed carefully to completely fill all around the pipe. If this method is used, place concrete encasement around the stub.

G. Cast iron frames, specified and furnished, shall be placed, shimmed and set in Portland Cement mortar to the required grade.

H. The lines entering the manhole shall be laid to the grade shown on the Drawings.
I. The interior and exterior surfaces of the precast and cast-in-place manholes shall be given two (2) coats of bituminous dampproofing for a total minimum thickness of 16 mils DFT.

J. Manhole frame and cover shall be brought to (or adjusted to) grade from the top of the structure with brick.

K. All manholes and cast-in-place structures shall be constructed watertight. If leaks appear, they shall be corrected to the satisfaction of the Engineer.

L. Manholes shall be provided with stubs and plugs, if indicated on the Drawings. Pipe stubs shall be as specified in the applicable section for pipe and shall be provided via suitable caps.

M. Drainage ditches shall be constructed to the configuration indicated on the Drawings—with care being taken to hold to the specified slope. Sodding or seeding of the ditch as called for on the Drawings shall be accomplished as soon as possible after the slopes are dressed.

N. Pipe Trenches

1. General

Pipe trenches shall be of necessary widths for the proper laying of the pipe, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be excavated to a depth of 6-inches below the outside bottom of the pipe barrel. The resulting excavation shall be backfilled with pipe bedding material up to the level of the lower one-third of the proposed pipe barrel. This backfill material shall be tamped and compacted to provide proper bedding for the pipe and shall then be shaped to receive the pipe. Bell holes and depressions for joints shall be dug after the trench bottom has been graded, and in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, shall be only of such length, depth and width as required for properly making the particular type of joint.

2. Removal of Unstable Material

Soft, spongy, or otherwise unstable material (A-8 Material) encountered below the established grade of the excavation which will not provide a firm foundation for subsequent work, shall be removed and replaced as directed. Unless otherwise directed, all such unstable materials shall be removed for the full width of the excavation and replaced with approved fill material.
3. Pumping, Sheeting and Bracing

Where sheeting and bracing are necessary to prevent caving of the trench sidewalls or sidewalls of excavation for other structures and to safeguard the workmen, the trench or excavation for other structures shall be dug to such width that the proper allowance is made for the space occupied by the sheeting and bracing, and also is in compliance with the Trench Safety Act.

O. Pipe Laying and Jointing

1. General

The grade as shown or indicated on the Drawings is that of the invert and to which the work must conform. Any variation from this grade will be deemed sufficient reason to cause the work to be rejected and rebuilt at the Contractor's expense. Each piece of pipe, just before being lowered into the trench shall be inspected and cleaned. If any difficulty is found in fitting the pieces together, this fitting is to be done on the surface of the street before laying the pipe, and the tops plainly marked in the order in which they are to be laid. No pipe is to be trimmed or chipped to fit. Pipes having defects that have not caused their rejection are to be so laid that these defects will be in the upper half of the sewer. A bell hole is to be cut for each piece. Each piece of pipe is to be solidly and evenly bedded and not simply wedged up. Before finishing each joint, some suitable device is to be used to find that the inverts coincide. Each pipe shall be laid to the line and grade shown or indicated on the Drawings. All pipes shall be laid with bells or grooves uphill. As the pipes are laid throughout the work they must be thoroughly cleaned and protected from dirt and water. No length of pipe shall be laid until the two preceding lengths have been thoroughly embedded in place so as to prevent any movement or disturbance of the finished joint. No walking on or working over the pipes after they are laid, except as may be necessary in tamping earth and refilling, will be permitted until they are covered to a depth of one foot. Whenever the pipe laying is discontinued, as at night, the unfinished end is to be securely protected from displacement by caving of the banks or from other injury and a suitable stopper is to be inserted therein.

2. Reinforced Concrete Pipe Joints

Joints for reinforced concrete pipe storm sewer or culverts shall be made using an approved performed or molded rubber gasket. The gasket and the surface of the pipe joint, including the gasket recess, shall be clean and free from grit, dirt or other foreign matter at the time.
the joints are made. In order to facilitate closure of the joint, application of an approved vegetable soap lubricant immediately prior to closing of the joint will be permitted.

Do not allow the gap between sections of pipe to exceed 5/8 inch for pipe diameters of 12 inches through 18 inches, 7/8 inch for pipe diameters of 24 through 66 inches, and 1 inch for pipe diameters 72 inches and larger. Where minor imperfections in the manufacture of the pipe create an apparent gap in excess of the tabulated gap, the Engineer will accept the joint provided that the imperfection does not exceed 1/3 the circumference of the pipe, and the rubber gasket is 1/4 inch or more past the pipe joint entrance taper. Where concrete pipes are outside of these tolerances, replace them at no expense to the Department. Do not apply mortar, joint compound, or other filler to the gap which would restrict the flexibility of the joint.

Seal the pipe joints with round rubber or profile gaskets meeting the requirements of Section 449. Ensure that the gasket and the surface of the pipe joint, including the gasket recess, are clean and free from grit, dirt and other foreign matter, at the time the joints are made. In order to facilitate closure of the joint, application of a vegetable soap lubricant immediately before closing of the joint will be permitted. Pre-lubricated gaskets may be used in lieu of a vegetable soap lubricant when the lubricating material is certified to be inert with respect to the rubber material.

P. Drainage Structures

1. Excavation for drainage structures shall be sufficient to provide a clearance between their surfaces and the face of the excavation or sheeting, if used, of not less than 12-inches. Backfill shall be placed as specified herein before. Unsuitable material uncovered at the footing elevation shall be excavated to suitable material and the excavation backfilled with pipe bedding material to the required elevation.

2. Brick masonry for manholes, inlets or other structures shall be built of brick and mortar of the specified quality. Every fifth course of brick shall be laid as stretchers, the remainder being laid as headers. Every brick shall have full mortar joints on the bottom and sides which shall have been formed at one operation by placing sufficient mortar on the head and forcing the brick into it. Horizontal joints shall not exceed 1/4 of an inch. All brick shall be thoroughly drenched with water immediately before being laid.
3. Use gratings and frames fabricated from Class 30B gray iron in accordance with the requirements of ASTM A 48.

4. To adjust existing structures, cut down or extend existing manholes, catch basins, inlets, valve boxes, monument boxes, etc., within the limits of the proposed work, to meet the finished grade of the proposed pavement area, to the finished grade designated on the plans for such structures. Use materials and construction methods which meet the requirements specified above to cut down or extend the existing structures. The Contractor may extend manholes needing to be raised using adjustable extension rings of the type which do not require the removal of the existing manhole frame. Use an extension device that provides positive locking action and permits adjustment in height as well as diameter and meets the approval of the Engineer.

END OF SECTION
SECTION 02730

EXFILTRATION TRENCH

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all necessary labor, materials, equipment and perform all operations in connection with construction exfiltration trenches as shown or indicated on the Drawings, or as specified herein.

1.02 QUALIFICATIONS

A. All perforated pipe shall be furnished by a single manufacturer, who is fully experienced, reputable and qualified in the manufacture of items to be furnished. The perforated pipe shall be designed, constructed and installed in accordance with the best practices and methods, and shall comply with the requirements of the Standard Specifications.

1.03 SUBMITTALS

A. In general, 6 copies of the following data or shop drawings shall be submitted to the Engineer for approval prior to construction:
   1. Manhole frames, covers and other castings.
   2. Precast manholes
   3. Precast structures

B. The quality of all materials, the process of manufacture and the finished sections, shall be subject to inspection and approval by the Engineer, or other representative of the Engineer. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places. The sections shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though a sample section may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections, which have been damaged after delivery, will be rejected and, if already installed, shall be acceptably repaired, if approved by the Engineer, or removed and replaced, entirely at the Contractor's expense.

C. At the time of inspection, the sections will be carefully examined for compliance with the ASTM designation specified below and these Specifications, and with the approved manufacturer's drawings. All sections shall be inspected for general appearance, dimension, "scratch-strength", blisters, crack, roughness, soundness and other features. The surface shall be dense and close-textured.

D. Imperfections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result.
Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 5,000 psi at the end of 28 days, when tested in 3-in. by 6-in. cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs, subject to the approval of the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS AND DESIGN

A. Perforated pipe shall be Corrugated High Density Polyethylene Pipe (HDPE) and shall comply with the requirements of the Standard Specifications.

B. Filter Fabric shall be Type D-3 and shall meet the requirements of the Standard Specifications.

C. The coarse aggregate shall be No. 4 Stone and meet the requirements of the Standard Specifications.

D. Use select fill consisting of well-graded limerock or limerock and sand fill. Sand, or fill having a high proportion of sand, will not be accepted as select fill. Prior to placing select fill, obtain the Engineer’s approval.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Excavate the trench in accordance with Section 02221 of these Specifications and to such depths as required to permit the filter fabric, coarse aggregate and the pipe to be placed in accordance with the details shown in the Plans.

B. Lay all pipe conforming to the lines and grades specified in the Plans and in accordance with these Specifications. Unless otherwise specified in the Plans, set the pipe with a 36 inch minimum cover and a maximum cover of 66 inches.

C. After placing the pipe and without disturbing the pipe, carefully place the coarse aggregate around the pipe to a depth shown in the Plans. Fold the filter fabric over the coarse aggregate providing a 12-inch overlap. Backfill and compact as described below.

D. In cases where the exfiltration trench is under pavement, fill the area above the coarse aggregate with select fill material meeting the requirements of this Section. Place and compact the select fill according to the requirements for pipe as specified in Standard Specifications. Additional coarse aggregate may be used over the top of the pipe instead of select fill material. In this case, the filter fabric shall be extended to wrap the additional course aggregate. The top of the coarse aggregate shall not be higher than the bottom of the base, unless shown in the STORM DRAINAGE SYSTEM

02730-2  1/9/2015
Plans. The City will not pay additional costs associated with substituting coarse aggregate for select fill.

E. In cases where the exfiltration trench is not under pavement, fill and compact the area above the coarse aggregate according to the requirements for pipe in Standard Specifications.

END OF SECTION
PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope

1. This specification covers requirements and test methods for corrugated plastic culvert pipe and fittings with a smooth interior. This specification provides for watertight joints only.

2. The work included under this section consists of furnishing all necessary labor, equipment, materials, and performing all operations in connection with construction of stormwater piping and appurtenant structures, including excavation, trenching, backfilling and appurtenant work as required or as directed.

3. Pipe and fittings produced in accordance with this specification shall be installed in compliance with ASTM D2321.

4. This specification covers pipe and fittings using a closed profile only.

5. This specification is compatible, where appropriate, with current AASHTO and ASTM specifications. In relevant instances, when one of these reference documents departs from this specification, or vice versa, a description of that departure is noted for the designer’s consideration.

B. General

1. The Drawings show an outline of the system, various components and the system’s overall relationships. Not all items incidental to the storm drainage system are shown or specified. It is the intent of these Specifications that the Contractor is to provide a complete and workable system whether or not any specific component is shown or specified.

C. Reference Standards


   a. D618 Methods of Conditioning Plastics and Electrical Insulating Materials for Testing
   – Sponge or Expanded Rubber

c. D1600 Terminology for Abbreviated Terms Relating to Plastics

d. D1693 Test Method for Environmental Stress-Cracking of Ethylene Plastics

e. D1784 PVC Cell Classification

f. D2122 Method of Determining Dimensions of Thermoplastic Pipe and Fittings

g. D2321 Practice for Underground Installation of Flexible Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

h. D2412 Test Method for External Loading Properties of Plastic Pipe by Parallel-Plate Loading

i. D2444 Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)

j. D3034 Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings


m. F405 Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings

n. F412 Definitions of Terms Relating to Plastic Piping Systems

o. F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

p. F667 Standard Specification for Large Diameter Corrugated Polyethylene (PE) Tubing and Fittings

q. F794 Standard Specification for Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

PLASTIC CULVERT PIPING

2733-2 10/30/06
1.02 QUALITY ASSURANCE

A. For coordination purposes, all materials, equipment and incidentals, whether or not shown or specified herein, shall be supplied to the Contractor by a single piping vendor.

B. The piping vendor shall have at least five (5) years experience in supplying corrugated plastic culvert piping systems.

C. The supplier of the above equipment shall have a minimum of five (5) installations of similar sized equipment.

1.03 SUBMITTALS

A. Shop drawings shall be submitted in accordance with Specification 01300 for all materials associated with construction of the stormwater collection system.

1.04 GUARANTEE AND WARRANTY

A. Prior to acceptance of the plastic culvert piping, provide written warranty from the system manufacturer that includes the following statements:

PLASTIC CULVERT PIPING
1. System manufacturer has inspected the installation during and after completion and the piping system is free from faults and defects and is in conformance with the Contract Documents.

2. If the equipment requires repair or replacement as a result of ordinary wear under normal conditions, the system manufacturer will repair or replace such equipment as required without cost to the Owner.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All equipment and materials shall be inspected against approved Shop Drawings at time of delivery. Equipment and materials damaged or not meeting requirements of the Approved Shop Drawings shall be immediately returned to the system manufacturer for replacement or repair.

B. Equipment and materials shall be stored in a dry location and protected from the elements according to the system manufacturer's instructions.

C. Equipment and materials shall be handled in an approved manner according to the system manufacturer's instructions.

1.06 TERMINOLOGY

A. Definitions – Definitions are in accordance with ASTM F412 and abbreviations are in accordance with ASTM D1600, unless otherwise specified. The abbreviation for polyethylene is PE.

B. Definitions of Terms Specific to this Standard

C. Type S – A profile having a full circular cross section with a corrugated surface outside and an essentially smooth waterway inside. Corrugations may be annular or helical.

D. Type C – A profile having a full circular cross section with a corrugated surface both inside and outside. Corrugations may be either annular or helical.

E. Type D – A profile having an essentially smooth interior waterway braced circumferentially or spirally with projections or ribs joined to an essentially smooth outer wall. Both walls are fused to, or continuous with, the internal supports.

Note that all piping supplied under this Section shall be Type S.

PART 2- PRODUCTS

PLASTIC CULVERT PIPING

2733-4  10/30/06
2.01 MATERIALS

A. HDPE Piping

1. Corrugated Polyethylene Tubing and fittings shall meet the requirements of AASHTO M 252, except as modified below, Corrugated Polyethylene Pipe shall meet the requirements of AASHTO M 294 and the additional provisions specified below.

2. The tubing or pipe shall not be left exposed to sunlight for periods exceeding the manufacturer’s recommendation or six weeks, whichever is less.

3. The requirements for HDPE piping as specified in AASHTO M 252 are modified as follows:
   a. Section 6.2.4, the minimum wall thickness of the crown, sidewalls or valley shall be 1/32 inch. Coiling of tubing 6 inches in diameter or greater is not permitted.
   b. Section 6.5, (Pipe Stiffness is expanded to add the following minimum stiffness.) Piping for the Odor Control System shall have a minimum pipe stiffness of 50 psi at 5% per ASTM D2412.

4. Basic Materials
   a. Piping shall be watertight bell & spigot type joints. Smooth interior and annular exterior corrugations per AASHTO M294, Type S, or ASTM F2306.
   b. Joint Performance – Pipe shall be joined with the N-12 WT IB joint, meeting the requirements of AASHTO M294 or ASTM F2306. The pipe shall be watertight according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with removable protective wrap. Manufacturer’s joint lubricant shall be used on the gasket and bell during assembly.
   c. Material Properties – Compounds used in the manufacture of the pipe and fittings shall have a cell classification of 435400C as defined in ASTM D3350, except that carbon black content shall not exceed 4%. Compounds that have a higher cell classification in one or more properties shall be acceptable provided product requirements are met. The virgin pipe material shall comply with the notched
constant ligament-stress (NCLS) test as specified in Sections 6.1.1 and 5.1 of ASHTO M294 and ASTM F2306 respectively.

d. Rework Material – In lieu of virgin polyethylene compounds, clean rework material may be used by the manufacturer provided that it meets the cell class requirements as described in item 3 above.

e. Fittings – Fittings shall conform to AASHTO M294 or F2306. Fabricated fittings shall be welded at all accessible interior and exterior junctions.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is completed to the point where fabrication and installation of the work of this Section may properly begin.

2. Make all required measurements in the field to ensure proper and adequate fit of connecting piping.

B. Discrepancies

1. In the event of discrepancy immediately notify the Engineer.

2. Do not proceed with fabrication or installation in areas of discrepancy until all such discrepancies have been fully resolved in writing.

3.02 COORDINATION

A. Coordinate with other trades to assure proper interface of this work with the work of those trades.

3.03 EXCAVATION AND BACKFILL

A. All excavation, preparation of pipe bedding, and backfill for ribbed plastic culverts, sewer connections, manholes and other appurtenances shall be performed in accordance with the requirements of this section.

3.04 INSTALLATION

PLASTIC CULVERT PIPING

2733-6

10/30/06
A. Installation of plastic culvert pipe shall be in accordance with the Vendor's instructions and recommended practices contained in ASTM D-2321 and UNI-B-5. Trench boxes and moveable sheeting shall be constructed and used in the trench to avoid disturbing the piping, bedding and haunching when being moved forward in the trench.

B. Install all components of the culvert piping in the locations shown on the drawings in strict accordance with the manufacturer's instructions and sound construction practices.

C. Installation shall be in accordance with ASTM D-2321 and manufacturer's guidelines.

3.05 JOINING PIPE TO MANHOLES OR OTHER STRUCTURES

A. Structure Connection: Approved standard groutable PVC-to-manhole fitting as manufactured by the Harrington Corporation or a flexible rubber boot shall be used at the manhole connection. The boot shall be manufactured of neoprene or isoprene compounds formulated and tested to resist deterioration due to sewage, hydrogen sulfide, oils, fats, greases, petroleum products and by-products. The connection at the manhole wall shall be flexible and watertight. Any annular space inside the manhole at the connection shall be filled with approved caulking material or joint filler.

B. For manholes greater than or equal to 20 feet deep, all sewer connections to precast manholes shall be grouted on the interior and on the exterior in addition to the use of the rubber boot.

3.06 INSPECTIONS OF LINES AND MANHOLES

A. Pipe between manholes shall be true to line and grade. Any infiltration and dips and sags with 1/4" or more of trapped water shall be cause for rejection.

B. Faulty sections of plastic culvert piping rejected by the Owner or Engineer shall be removed and re-laid by the Contractor. Sunken manholes will not be accepted.

3.07 CLEAN-OUTS

A. Clean-outs shall be constructed in accordance with the details, at the locations specified on the plans, and shall be encased from subgrade to frame.

B. Cleanouts at the property line shall be two-way.

3.08 WATER MAINS/STORM SEWER CROSSING

PLASTIC CULVERT PIPING

2733-7

10/30/06
A. In all cases where sanitary sewer mains or storm sewer cross water mains with a minimum clear distance between the top of the sanitary or storm sewer and the bottom of the water main of less than 18", no pipe joint shall occur within 10 feet of the crossed water main.

END OF SECTION
SECTION 02754

PRECAST DRAINAGE STRUCTURES

PART 1 – GENERAL

1.01 SCOPE

A. The work specified in this Section includes all labor, materials, accessories, equipment and tools necessary to install and test precast drainage structures and precast drainage sections. Precast concrete drainage products hereinafter called products, may include but are not limited to, round concrete pipe, elliptical concrete pipe, underdrains, manholes, endwalls, inlets, junction boxes, three-sided precast concrete culverts, and precast concrete box culverts. Ensure that all precast drainage products are designed and manufactured in accordance with the requirements of the Contract Documents.

1.02 SUBMITTALS

A. The CONTRACTOR shall submit Shop Drawings and other information for review in accordance with Section 01340 Shop Drawings, Product data and Samples, including: drainage structure section dimensions; elevations; cement type; concrete strength; reinforcement; lifting hooks; joint material; openings; castings; protective cast-in liners, joint configuration details; dewatering, sheeting and bracing plans and other applicable information.

B. The CONTRACTOR shall obtain the services from the liner manufacturer including, but not limited to the following: prepare shop drawings for liner installation and seal of the joints in the drainage structures; recommend test method for liner installation and welds for ENGINEER’S approval; provide liner installation instructions and safety standards; on-site advisory assistance during installation of liner weld strips, overlaps, etc., and related seal welding; provide warranty for liners and seal joints in the drainage structures.

C. Qualifications

1. Obtain precast concrete pipes, box culverts, and drainage structures from a plant approved by the FDOT that meets the requirements of the Contract Documents.

2. The Qualifications of the Drainage structure Contractor specified herein shall apply to the installation of the large size drainage structures.
3. The Qualifications of the drainage structures Contractor shall be submitted for approval to the Engineer. These Qualifications shall include a detailed description of the following:
   a. Name, business address and telephone number of the Drainage structure Installation Contractor.
   b. Name(s) of all supervisory personnel to be directly involved with drainage structure installation for this project.
   c. The Drainage Structure Installation Contractor superintendent shall be certified by OSHA for training of the Contractor’s crew to work safely in confined space conditions. The Drainage Structure Installation Contractor shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the Engineer.
   d. Specialty technicians shall be certified by the equipment/liner manufacturer and/or its authorized representative. Certifications shall be submitted to the Engineer.
   e. Upon request of Engineer, the Drainage structure Installation Contractor shall provide his references of previous project lists including his customer’s name, address, and telephone number.
   f. Five years of previous related experience are required to be qualified for Drainage structure Installation Contractor for this project.
   g. The Contractor may be the Drainage structure Installation Contractor as long as his qualifications are accepted.

D. Construction Procedures
   1. The Contractor shall submit written descriptions of the construction procedures and equipment to be used and locations required for equipment and material access.

1.03 UPLIFT

A. All precast concrete drainage structures placed below grade shall have adequate safety factors against uplift (excluding weight of soil and associated skin friction) as follows:

<table>
<thead>
<tr>
<th>Water Elevation</th>
<th>Safety Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>High water level (H.W.L)</td>
<td>2.5 feet NGVD</td>
</tr>
<tr>
<td>100 year flood</td>
<td>7.0 feet NGVD</td>
</tr>
</tbody>
</table>

PART 2 – PRODUCTS

02754-2

1/9/2015

PRECAST DRAINAGE STRUCTURES
2.01 FRAMES AND COVERS

A. All workmanship and materials shall be of the highest quality. The drainage structure ring and cover shall be the product of a manufacturer actively engaged in research, development, and manufacturing of watertight drainage structure rings and covers.

B. Frames and covers shall be as indicated in the construction plans, or approved equal. Drainage structure cover shall have cover with the City Logo and details cast into the metal as shown on the Drawings.

C. Drainage structure chimneys shall be constructed with Type II Portland Cement conforming to ASTM C 150 and sewer brick. The bricks used shall be best quality, hard burned sewer brick, regular and uniform in size and shape. They shall be of compact texture and shall not absorb more than 16 percent by volume of water after 24 hours of immersion. The brick shall conform to ASTM Designation C 32. If grade rings are to be used for chimneys, the Contractor must submit a shop drawing for review according to 01340 Shop Drawings, Product data and Samples.

2.02 PRECAST DRAINAGE STRUCTURE SECTIONS

A. Precast concrete sections (hereinafter referred to as "precast sections") shall be furnished with spigot/bell connections as noted on the Drawings. Precast sections shall be watertight and conform to the requirements of ASTM C 478 with reinforcement of ASTM A 615, Grade 60 bars and the following modifications there to:

1. The minimum wall thickness shall be 6 inches.
2. The minimum depth of the spigot of the new precast drainage structure sections to be connected with the existing bell of interceptor tee shall be 4 inches.
3. Cement used in precast drainage structures and grout shall be ASTM C 150, Type II.
4. The design and manufacture of the precast drainage structure sections including concrete section, brick adjustment section and drainage structure frame and cover shall meet H-20 traffic loading requirement.
5. The date and name of manufacturer shall be marked inside each precast section.
6. No more than 2 lift holes may be cast or drilled in each section.
7. Minimum 28-day concrete strength shall be 4000 psi.
8. Precast drainage structure section shall be field welded at the joints.

2.03 MANUFACTURER
A. Precast drainage structure structures shall be manufactured by a qualified precast concrete drainage products plant.

PART 3 - EXECUTION

3.01 PREPARATION

A. Traffic Control: The CONTRACTOR is required to obtain all permits, use appropriate traffic regulating devices, notify all appropriate governmental agencies and conform to all the requirements listed in Section 01550 - Site Access and Storage.

3.02 EXCAVATION AND BACKFILL

A. The Contractor shall excavate and backfill in accordance with Section 02220 - Excavation and Backfill for Structures. Under no circumstances shall the Contractor be allowed to remove concrete or asphalt without prior cutting. The saw cutting shall be deep enough to produce an even, straight cut. Backfilling shall occur in 12-inch lifts with compaction by an engine driven hand tamp or other mechanical means as acceptable to the Engineer.

3.03 DEWATERING, SHEETING AND BRACING

A. The CONTRACTOR shall dewater, sheet and or brace all excavations in accordance with Section 02222 - Excavation and Backfill for Utilities. Well points, pumps, sheeting, bracing and/or sock drain shall be used to provide a safe, dry, open hole for all repairs or replacements specified herein.

3.04 NEW DRAINAGE STRUCTURE CONSTRUCTION

A. General:
1. The Contractor shall locate and excavate the existing utilities indicated on the Drawings in the vicinity of the existing drainage structure construction area prior to driving sheeting in order to avoid damage to the underground utilities. Excavation for utility locating shall be non-disruptive and non-destructive soil extraction. The located utilities within the construction area shall be supported as required. The Contractor shall address utility penetrations of sheeting and related soil stabilization and dewatering impacts. Remaining excavations for drainage structure section removed shall be by hand to ensure no damage to existing utilities. Excavation may be witnessed by the Engineer.
B. Setting Precast Sections:
   1. Precast reinforced concrete sections shall be set so as to be vertical and with sections in true alignment. A flexible, watertight gasket such as "Ram-Nek" or equal shall be used between sections, and between the lowest drainage structure section and the existing interceptor tee.

3.05 TESTING

A. After set each drainage structure section to the existing interceptor tee with Ram-Neck seal, and prior to welding overlap PVC joint strip between the new drainage structure interior liners and interceptor tee interior liners; the drainage structure joints shall be preliminarily tested one hour for excess infiltration by the Contractor in the presence of the Owner. The maximum allowable rate of infiltration is 0.0 gallon per hour per vertical foot of depth of the drainage structure. THERE SHALL BE NO VISIBLE INFILTRATION. All drainage structures shall meet this requirement before welding the joint strip seal and backfill.

B. All welds shall be physically tested by a nondestructive probing method using a blunt instrument such as putty knife.

END OF SECTION
SECTION 02810

CONCRETE DRIVEWAY, SIDEWALK AND CURB AND GUTTER REMOVAL AND REPLACEMENT

PART 1 – GENERAL

1.01 SCOPE OF WORK

Work covered under this Section covers the furnishing of all labor, equipment and material required for cutting, removing, protecting and replacing all existing concrete driveways, sidewalks, and curb and gutter of the various types encountered, removed or damaged under this Contract.

General Requirements

A. Contractor shall be responsible for the protection from damage from his construction operations, all concrete driveways, sidewalk, and curb and gutter within the work area. If payment items are established in the Quotation for the removal and replacement of concrete driveway, sidewalk, and curb and gutter, payment will be made only if such items are encountered within the limits of the trench width plus 2 feet (shoulders). Any concrete driveway, sidewalk, or curb and gutter beyond those limits, damaged as a result of the Contractor’s operation, shall be restored in accordance with the applicable requirements of these Specifications, and to the satisfaction of the Engineer, at no additional cost to the Department. In order to protect himself from being held liable for any existing damaged concrete driveways, sidewalks or curb and gutter, the Contractor is advised to notify in writing the authority having jurisdiction over the street where such damage exists prior to proceeding with any work in the vicinity. A copy of all such notices shall be forwarded to the Engineer.

B. No payment will be made for removal and replacement of concrete driveway, sidewalk, or curb and gutter which falls outside the above described limits required for thrust blocks, and other appurtenant items, and the cost for such work shall be included in the price bid for the applicable item.

C. If payment items have not been established in the Quotation for the removal and replacement of concrete driveways, sidewalks, and curb and gutter, the cost for such work shall be included in the overall Project cost bid. No other compensation will be provided.

D. No form shall be set higher than the elevation of the adjacent concrete surface.
E. As used herein, "driveway" shall mean concrete driveway, and "curb and gutter" shall mean free standing curb, gutter, or combination curb and gutter.

F. All concrete shall be treated with a liquid curing compound, and in some cases, concrete colorant shall be required in order to match the color of the existing concrete being replaced. In each such case the curing compound, the colorant, and the color, shall meet with the approval of the Engineer and the municipality having jurisdiction over the work area. All additives to the concrete shall be applied in strict conformance with the recommendations of the manufacturer.

G. The Contractor shall provide adequate means to protect each driveway, sidewalk, and curb and gutter installation from damage from vandals, animals, weather or other causes, until the concrete is hard. Should damage occur from such causes, the Contractor shall remove and replace the damaged item at his own expense.

H. All concrete and concrete work for driveway, sidewalk and curb and gutter replacement shall conform to Section 03300, "Cast-In-Place Concrete" herein.

Driveways

A. Driveways, and sidewalks crossing driveways, shall be restored in full sections or blocks rather than trench width plus two feet (shoulders), if the original construction was divided into such sections or blocks. Existing concrete driveways (or sidewalk) shall be cut with an abrasive disc saw to trim the edges to straight and true lines, with edges parallel and rectangular in plan. The interior concrete shall then be broken up and removed from the site. Existing paver driveways shall be removed and the original pavers shall be preserved during construction. It is the responsibility of the contractor to restore all driveways and sidewalks to their original condition.

B. Driveways, and sidewalks crossing driveways, shall be replaced with a concrete slab having a minimum thickness of 6 inches. Steel reinforcement is not required unless the existing driveway (or sidewalk) is so reinforced, in which case the replaced driveway shall also be reinforced to match the existing.

C. Such forms as are necessary shall be set up and the subgrade regraded for a slab 6 inches thick. The subgrade shall be thoroughly compacted and wet down prior to placing the concrete. The surface shall be given a surface and edging to match, as nearly as possible, that of the existing driveway (or sidewalk). The finish and edging shall be obtained through
the use of screeds, trowels, edges and any other tool normally required by the trade in performing this kind of work.

D. All forms for driveways (or sidewalks) including those for expansion joints, shall be metal and shall be clean and well oiled prior to placing concrete. The forms shall be set in place far enough in advance of concrete placing for the Engineer to check line and grade. Abrupt changes in line and grade will not be permitted, and forms shall be set to insure smooth curvature and alignment both vertically and horizontally. Forms shall be left in place for a minimum of 24 hours after concrete has been placed.

E. Replacement driveways (and sidewalks) shall match the elevation and alignment of existing driveways (and sidewalk) wherever a connection is made.

F. Paved and other types of driveways affected during construction shall be restored upon completion of construction to the same or better condition than before the beginning of construction at no additional cost to the Owner.

Sidewalks

A. Sidewalks shall be restored in full section rather than trench width plus 2 feet (shoulder).

B. Removal of existing sidewalk, installation of forms, preparation of subgrade, and the final finish shall be performed as specified hereinabove for driveways, except that the minimum thickness of the sidewalk shall be 4 inches thick.

Curb and Gutter

Curb and gutter shall be restored in lengths equal to trench width plus 2 feet (shoulders), or 10 feet, whichever is greater, unless otherwise permitted or ordered by the Engineer.

Miscellaneous Repair Work

All existing items and construction, whether or not indicated by the drawings but which are removed or damaged as a result of construction operations, shall be repaired or replaced unless otherwise required by the drawings. Repair or replacement shall be with materials of like or better quality than the original, and shall in each case restore the item to original or better condition as accepted by the Engineer and the owner thereof.
PART 3 - EXECUTION (Not Used)

END OF SECTION
PART 1 – GENERAL

A. General: Existing plants, trees and grassed areas damaged or destroyed by the Contractor’s operations shall be restored or replaced by the Contractor, at his expense to equal or better than original condition, and to the satisfaction of the Engineer.

B. Solid Sod:

1. Solid sod shall be planted in the unpaved areas abutting the structures and extending to the limits shown on the Plans.

2. When solid sod is to be placed adjacent to or in close proximity to existing sod or grass, the Contractor is to use similar sod or grass and obtain approval from the Engineer prior to installation. In public areas and right-of-ways the Contractor is also required to comply with Governmental Agency requirements and provide the Department with written approval of said agency prior to installation of grass and sod.

3. All areas to be grass sodded shall first be leveled, and debris, rocks, and other undesirable matter removed. Topsoil shall then be placed to a minimum depth of 3”, with all larger lumps broken up. The mixture shall be well worked and raked to a uniform surface and then hand tamped, or lightly rolled. The topsoil shall be moistened with water prior to placing sod.

4. The sod shall be placed with closely abutting joints, and shall completely cover the disturbed areas. The top of the new sod shall coincide with the top of the existing grass. The sod shall be covered with a light top dressing of topsoil and shall then be thoroughly watered.

5. The Contractor shall weed and water the grassed areas until the Project is accepted by the Department; however, the minimum period of this maintenance shall not be less than 60 days even if it extends beyond said acceptance. Any portions of the grassed areas which die, or appear to have succumbed to the shock of transplanting, before the acceptance by the Department, or expiration of the minimum 60-day maintenance period, shall be replaced by the Contractor at his expense.

6. Solid sod shall be certified bitter blue St. Augustine Floratam. The sod shall be firm touch texture having a compact growth of grass with good root development. It shall contain no weeds or other objectionable vegetation.

7. Where sodding is used in drainage ditches, the setting of the pieces shall be staggered so as to avoid a continuous seam along the line of flow.
edges of such staggered areas, the offsets of individual strips shall not exceed 6-inches. In order to prevent erosion caused by vertical edges at the outer limits, the outer pieces of sod shall be tamped so as to produce a featheredge effect.

8. Sodding shall not be performed when weather and soil conditions are, in the Engineer of Record's opinion, unsuitable for proper results.

C. Watering: The areas on which the sod is to be placed shall contain sufficient moisture, as determined by the Engineer, for optimum results. After being placed, the sod shall be kept in a moist condition to the full depth of the rooting zone for at least 2 weeks. Thereafter, the Contractor shall apply water as needed until the sod roots and starts to grow for a minimum of 60 days (or until final acceptance whichever is latest).

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor and materials required to install cast-in-place concrete complete as shown on the Drawings and as specified herein.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
6. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete
8. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete
10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
14. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

B. American Concrete Institute (ACI)

1. ACI 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete.
2. ACI 305R - Hot Weather Concreting.
4. ACI 318 - Building Code Requirements for Structural Concrete.
5. ACI 350R - Environmental Engineering Concrete Structures.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Submittals and product data shall comply with Section 01340.

1.04 QUALITY ASSURANCE

A. Reinforced concrete shall comply with ACI 318, the recommendations of ACI 350R and other stated requirements, codes and standards. The most stringent requirement of the codes, standards and this Section shall apply when conflicts exist.

B. Only one source of cement and aggregates shall be used on any one structure. Concrete shall be uniform in color and appearance.

C. Well in advance of placing concrete, discuss with the Engineer the sources of individual materials and batched concrete proposed for use. Discuss placement methods, waterstops and curing. Propose methods of hot and cold weather concreting as required.

D. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at the Contractor's expense.

E. If, during the progress of the work, the materials from the sources originally accepted change in characteristics, the Contractor shall, at his/her expense, make new acceptance tests of aggregates and establish new design mixes.

F. Testing of the following materials shall be furnished by Contractor to verify conformity with this Specification Section and the stated ASTM Standards.
   1. Fine aggregates for conformity with ASTM C33 - sieve analysis, physical properties, and deleterious substances.
   2. Coarse aggregates for conformity with ASTM C33 - sieve analysis, physical properties, and deleterious substances.
   3. Cements for conformity with ASTM C150 - chemical analysis and physical properties.
4. Pozzolans for conformity with ASTM C618 - chemical analysis and physical properties.

5. Proposed concrete mix designs - compressive strength, slump, and air content.

G. Field testing and inspection services will be provided by the Owner but coordinated and scheduled by the Engineer. The cost of such work, except as specifically stated otherwise, will be paid by the Owner. Testing of the following items will be by the Owner to verify conformity with this Specification Section.

1. Concrete placements - compressive strength (cylinders), compressive strength (cores), slump, and air content.

2. Other materials or products that may come under question.

H. All materials incorporated in the work shall conform to accepted samples.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials shall comply with this Section and any applicable State or local requirements.

B. Cement: Domestic Portland cement complying with ASTM C150. Air entraining cements shall not be used. Cement brand shall be subject to approval by the Engineer and one brand shall be used throughout the Work. The following cement type(s) shall be used:

1. Class A,B,C Concrete - Type II with the addition of fly ash resulting in $C_3A$ being below 5 percent of total cementitious content, Type III limited to 5 percent $C_3A$ or Type V.

C. Fine Aggregate: Washed inert natural sand conforming to the requirements of ASTM C33.

D. Coarse Aggregate: Well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33. Grading requirements shall be as listed in ASTM C33 Table 2 for the specified coarse aggregate size number. Limits of Deleterious Substances and Physical Property Requirements shall be as listed in ASTM C33 Table 3 for severe weathering regions. Size numbers for the concrete mixes shall be as shown in Table 1 herein.

E. Water: Potable water free from injurious amounts of oils, acids, alkalis, salts, organic matter, or other deleterious substances.
F. Admixtures: Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures.

1. Air-Entraining Admixture: The admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

2. Water-Reducing Agent: The admixture shall comply with ASTM C494, Type A. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

3. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the Engineer. When allowed, the admixtures shall be retarding or accelerating water reducing or high range water reducing admixtures.

G. Pozzolan (Fly Ash). Pozzolan shall be Class C or Class F fly ash complying with ASTM C618 except the Loss on Ignition (LOI) shall be limited to 3 percent maximum.

H. Sheet Curing Materials. Waterproof paper, polyethylene film or white burlap-polyethylene sheeting all complying with ASTM C171.

I. Liquid Curing Compound. Liquid membrane-forming curing compound shall comply with the requirements of ASTM C309, Type 1-D (clear or translucent with fugitive dye) and shall contain no wax, paraffin, or oil.

2.02 MIXES

A. Development of mix designs and testing shall be by an independent testing laboratory acceptable to the Engineer engaged by and at the expense of the Contractor.

B. Select proportions of ingredients to meet the design strength and materials limits specified in Table 1 and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogenous mixture which will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.

C. The design mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if such data is not available, be developed by a testing laboratory, acceptable to the Engineer, engaged by and at the expense of the Contractor. Acceptance of mixes based on standard deviation shall be based on the
modification factors for standard deviation tests contained in ACI 318. The water content of the concrete mix, determined by laboratory testing, shall be based on a curve showing the relation between water cementitious ratio and 7 and 28 day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing an average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield the desired data, including the specified design strengths as modified below, without extrapolation. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 percent greater than the specified design strengths. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratio and net minimum cementitious content as specified in Table 1.

D. Compression Tests: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the specified design strength requirements in conformity with the above paragraph.

E. Entrained air, as measured by ASTM C231, shall be as shown in Table 1. 1. If the air-entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal.

F. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 1. If a high-range water-reducer (plasticizer) is used, the slump indicated shall be that measured before plasticizer is added. Plasticized concrete shall have a slump ranging from 7 to 10-in.

G. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.
TABLE 1

CONCRETE MIX REQUIREMENTS

<table>
<thead>
<tr>
<th>Class</th>
<th>Design Strength (1)</th>
<th>Cement (2)</th>
<th>Fine Aggregate (2)</th>
<th>Coarse Aggregate (3)</th>
<th>Cementitious Content (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2500</td>
<td>C150 Type II</td>
<td>C33</td>
<td>57</td>
<td>440 min.</td>
</tr>
<tr>
<td>B</td>
<td>3000</td>
<td>C150 Type II</td>
<td>C33</td>
<td>57</td>
<td>480 min.</td>
</tr>
<tr>
<td>C</td>
<td>4000</td>
<td>C150 Type II</td>
<td>C33</td>
<td>57</td>
<td>560 min.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class</th>
<th>W/C Ratio (5)</th>
<th>Fly Ash (6)</th>
<th>AE Range (7)</th>
<th>WR (8)</th>
<th>HRWR Range</th>
<th>Slump Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.62 max.</td>
<td>-</td>
<td>3.5 to 5</td>
<td>Yes</td>
<td>No</td>
<td>1-4</td>
</tr>
<tr>
<td>B</td>
<td>0.54 max.</td>
<td>25%</td>
<td>3.5 to 5</td>
<td>Yes</td>
<td>No</td>
<td>1-3</td>
</tr>
<tr>
<td>C</td>
<td>0.44 max.</td>
<td>25%</td>
<td>3.5 to 5</td>
<td>Yes</td>
<td>No</td>
<td>3-5</td>
</tr>
</tbody>
</table>

NOTES:
(1) Minimum compressive strength in psi at 28 days
(2) ASTM designation
(3) Size Number in ASTM C33
(4) Cementitious content in lbs/cu yd
(5) W/C is Water-Cementitious ratio by weight
(6) AE is percent air-entrainment
(7) WR is water-reducer admixture
(8) HRWR is high-range water-reducer admixture

PART 3 - EXECUTION

3.01 MEASURING MATERIALS

A. Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, water and admixtures as specified and shall be produced by a plant acceptable to the Engineer. All constituents, including admixtures, shall be batched at the plant.
B. Measure materials for batching concrete by weighing in conformity with
and within the tolerances given in ASTM C94 except as otherwise
specified. Scales shall have been certified by the local Sealer of Weights
and Measures within 1 year of use.

C. Measure the amount of free water in fine aggregates within 0.3 percent
with a moisture meter. Compensate for varying moisture contents of fine
aggregates. Record the number of gallons of water as-batched on printed
batching tickets.

D. Admixtures shall be dispensed either manually using calibrated containers
or measuring tanks, or by means of an automatic dispenser approved by
the manufacturer of the specific admixture.

1. Charge air-entraining and chemical admixtures into the mixer as a
solution using an automatic dispenser or similar metering device.

2. Inject multiple admixtures separately during the batching sequence.

3.02 MIXING AND TRANSPORTING

A. Concrete shall be ready-mixed concrete produced by equipment
acceptable to the Engineer. No hand-mixing will be permitted. Clean
each transit mix truck drum and reverse drum rotation before the truck
proceeds under the batching plant. Equip each transit-mix truck with a
continuous, nonreversible, revolution counter showing the number of
revolutions at mixing speeds.

B. Ready-mix concrete shall be transported to the site in watertight agitator
or mixer trucks loaded not in excess of their rated capacities as stated on
the name plate.

C. Keep the water tank valve on each transit truck locked at all times. No
water may be added onsite without prior approval of the Engineer. Added
water shall be incorporated by additional mixing of at least 35 revolutions.
All added water shall be metered and the amount of water added shall be
shown on each delivery ticket.

D. All central plant and rolling stock equipment and methods shall comply
with ACI 318 and ASTM C94.

E. Select equipment of size and design to ensure continuous flow of concrete
at the delivery end. Metal or metal-lined non-aluminum discharge chutes
shall be used and shall have slopes not exceeding 1 vertical to 2
horizontal and not less than 1 vertical to 3 horizontal. Chutes more than
20-ft long and chutes not meeting slope requirements may be used if
concrete is discharged into a hopper before distribution.
F. Re-tempering (mixing with or without additional cement, aggregate, or water) of concrete or mortar which has reached initial set will not be permitted.

G. Handle concrete from mixer to placement as quickly as practicable while providing concrete of required quality in the placement area. Dispatch trucks from the batching plant so they arrive at the work site just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.

H. Furnish a delivery ticket for ready mixed concrete to the Engineer as each truck arrives. Each ticket shall provide a printed record of the weight of cement and each aggregate as batched individually. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Clearly indicate the weight of fine and coarse aggregate, cement and water in each batch, the quantity delivered, the time any water is added, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of the truck mixer.

I. Temperature and Mixing Time Control
   1. In cold weather, do not allow the as-mixed temperature of the concrete and concrete temperatures at the time of placement in the forms to drop below 40 degrees F.
   2. If water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 degrees F.
   3. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below the maximum placing temperature of 90 degrees F. If necessary, substitute well-crushed ice for all or part of the mixing water.
   4. The maximum time interval between the addition of mixing water and/or cement to the batch and the placing of concrete in the forms shall not exceed the values shown in the following Table 2.
### TABLE 2  
**MAXIMUM TIME TO DISCHARGE OF CONCRETE**

<table>
<thead>
<tr>
<th>Air or Concrete Temperature (whichever is higher)</th>
<th>Maximum Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 to 90 Degree F (27 to 32 Degree C)</td>
<td>45 minutes</td>
</tr>
<tr>
<td>70 to 79 Degree F (21 to 26 Degree C)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>40 to 69 Degree F (5 to 20 Degree C)</td>
<td>90 minutes</td>
</tr>
</tbody>
</table>

If an approved high-range water-reducer (plasticizer) is used to produce plasticized concrete, the maximum time interval shall not exceed 90 minutes.

### 3.03 CONCRETE APPEARANCE

**A.** Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finishability are observed, changes in the concrete mix shall be obtained only by adjusting one or more of the following:
1. The gradation of aggregate.
2. The proportion of fine and coarse aggregate.
3. The percentage of entrained air, within the allowable limits.

**B.** Concrete for the work shall provide a homogeneous structure which, when hardened, will have the required strength, durability and appearance. Mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no finishing. When concrete surfaces are stripped, the concrete, when viewed in good lighting from 10-ft away, shall be pleasing in appearance, and at 20-ft shall show no visible defects.

### 3.04 PLACING AND COMPACTING

**A.** Placing
1. Verify that all formwork completely encloses concrete to be placed and is securely braced prior to concrete placement. Remove ice, excess water, dirt and other foreign materials from forms. Confirm that reinforcement and other embedded items are securely in place. Have a competent workman at the location of the placement who can assure that reinforcing steel and embedded items remain in designated locations while concrete is being placed. Sprinkle semi-porous subgrades or forms to eliminate suction of water from the mix. Seal extremely porous subgrades in an approved manner.
2. Deposit concrete as near its final position as possible to avoid segregation due to re-handling or flowing. Place concrete continuously at a rate which ensures the concrete is being integrated with fresh plastic concrete. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials or on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the section. If the section cannot be placed continuously, place construction joints as specified or as approved.

3. Pumping of concrete will be permitted. Use a mix design and aggregate sizes suitable for pumping and submit for approval.

4. Remove temporary spreaders from forms when the spreader is no longer useful. Temporary spreaders may remain embedded in concrete only when made of galvanized metal or concrete and if prior approval has been obtained.

5. Do not place concrete for supported elements until concrete previously placed in the supporting element (columns, slabs and/or walls) has reached adequate strength.

6. Where surface mortar is to form the base of a finish, especially surfaces designated to be painted, work coarse aggregate back from forms with a suitable tool to bring the full surface of the mortar against the form. Prevent the formation of excessive surface voids.

7. Slabs
   a. After suitable bulkheads, screeds and jointing materials have been positioned, the concrete shall be placed continuously between construction joints beginning at a bulkhead, edge form, or corner. Each batch shall be placed into the edge of the previously placed concrete to avoid stone pockets and segregation.
   b. Avoid delays in casting. If there is a delay in casting, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of that previously placed to avoid cold joints. Concrete shall then be brought to correct level and struck off with a straightedge. Bullfloats or darbies shall be used to smooth the surface, leaving it free of humps or hollows.
   c. Where slabs are to be placed integrally with the walls below them, place the walls and compact as specified. Allow 1 hour to pass between placement of the wall and the overlying slab to permit consolidation of the wall concrete. Keep the top surface of the wall moist so as to prevent cold joints.

8. Place concrete in forms using tremie tubes and taking care to prevent segregation. Bottom of tremie tubes shall preferably be in contact with the concrete already placed. Do not permit concrete to drop freely more than 4-ft. Place concrete for walls in 12 to 24-in lifts, keeping the surface horizontal. If plasticized concrete is used,
the maximum lift thickness may be increased to 7-ft and the maximum free fall of concrete shall not exceed 15-ft.

9. Underwater concreting shall be performed in conformity with the recommendations of ACI 304R. The tremie system shall be used to place underwater concrete. Tremie pipes shall be in the range of 8 to 12-in in diameter and be spaced at not more than 16-ft on centers nor more than 8-ft from an end form. Where concrete is being placed around a pipe, there shall be at least one tremie pipe on each side of each pipe. Where the tremie system is not practical, direct pumped concrete for underwater placement may be used subject to approval of the system including details by the Engineer.

B. Compacting

1. Consolidate concrete by vibration, puddling, spading, rodding or forking so that concrete is thoroughly worked around reinforcement, embedded items and openings and into corners of forms. Puddling, spading, etc, shall be continuously performed along with vibration of the placement to eliminate air or stone pockets which may cause honeycombing, pitting or planes of weakness.

2. All concrete shall be placed and compacted with mechanical vibrators. The number, type and size of the units will be approved by the Engineer in advance of placing operations. No concrete shall be ordered until sufficient approved vibrators (including standby units in working order) are on the job.

3. A minimum frequency of 7000 rpm is required for mechanical vibrators. Insert vibrators and withdraw at points from 18 to 30-in apart. At each insertion, vibrate sufficiently to consolidate concrete, generally from 5 to 15 seconds. Do not over vibrate so as to segregate. Keep a spare vibrator on the site during concrete placing operations.

4. Concrete Slabs: Concrete for slabs less than 8-in thick shall be consolidated with vibrating screeds; slabs 8 to 12-in thick shall be compacted with internal vibrators and (optionally) with vibrating screeds. Vibrators shall always be placed into concrete vertically and shall not be laid horizontally or laid over.

5. Walls and Columns: Internal vibrators (rather than form vibrators) shall be used unless otherwise approved by the Engineer. In general, for each vibrator needed to melt down the batch at the point of discharge, one or more additional vibrators must be used to densify, homogenize and perfect the surface. The vibrators shall be inserted vertically at regular intervals, through the fresh concrete and slightly into the previous lift, if any.

6. Amount of Vibration: Vibrators are to be used to consolidate properly placed concrete but shall not be used to move or transport concrete in the forms. Vibration shall continue until:
a. Frequency returns to normal.
b. Surface appears liquefied, flattened and glistening.
c. Trapped air ceases to rise.
d. Coarse aggregate has blended into surface, but has not disappeared.

3.05 CURING AND PROTECTION

A. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

B. Curing Methods

1. Curing Methods for Concrete Surfaces: Cure concrete to retain moisture and maintain specified temperature at the surface for a minimum of 7 days after placement. Curing methods to be used are as follows:
   a. Water Curing: Keep entire concrete surface wet by ponding, continuous sprinkling or covered with saturated burlap. Begin wet cure as soon as concrete attains an initial set and maintain wet cure 24 hours a day.
   b. Sheet Material Curing: Cover entire surface with sheet material. Securely anchor sheeting to prevent wind and air from lifting the sheeting or entrapping air under the sheet. Place and secure sheet as soon as initial concrete set occurs.
   c. Liquid Membrane Curing: Apply over the entire concrete surface except for surfaces to receive additional concrete. Curing compound shall NOT be placed on any concrete surface where additional concrete is to be placed, where concrete sealers or surface coatings are to be used, or where the concrete finish requires an integral floor product. Curing compound shall be applied as soon as the free water on the surface has disappeared and no water sheen is visible, but not after the concrete is dry or when the curing compound can be absorbed into the concrete. Application shall be in compliance with the manufacturer's recommendations.

2. Specified applications of curing methods.
   a. Slabs for Water Containment Structures: Water curing only.
   b. Slabs on Grade and Footings (not used to contain water): Water curing, sheet material curing or liquid membrane curing.
   c. Structural Slabs (other than water containment): Water curing or liquid membrane curing.
d. Horizontal Surfaces which will Receive Additional Concrete, Coatings, Grout or Other Material that Requires Bond to the substrate: Water curing.

e. Formed Surfaces: None if nonabsorbent forms are left in place 7 days. Water cure if absorbent forms are used. Sheet cured or liquid membrane cured if forms are removed prior to 7 days. Exposed horizontal surfaces of formed walls or columns shall be water cured for 7 days or until next placement of concrete is made.

f. Concrete Joints: Water cured or sheet material cured.

C. Finished surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

D. Cold Weather Concreting:

1. "Cold weather" is defined as a period when for more than 3 successive days, the average daily outdoor temperature drops below 40 degrees F. The average daily temperature shall be calculated as the average of the highest and the lowest temperature during the period from midnight to midnight.

2. Cold weather concreting shall conform to ACI 306.1 and the additional requirements specified herein. Temperatures at the concrete placement shall be recorded at 12 hour intervals (minimum).

3. Discuss a cold weather work plan with the Engineer. The discussion shall encompass the methods and procedures proposed for use during cold weather including the production, transportation, placement, protection, curing and temperature monitoring of the concrete. The procedures to be implemented upon abrupt changes in weather conditions or equipment failures shall also be discussed. Cold weather concreting shall not begin until the work plan is acceptable to the Engineer.

4. During periods of cold weather, concrete shall be protected to provide continuous warm, moist curing (with supplementary heat when required) for a total of at least 350 degree-days of curing.
   a. Degree-days are defined as the total number of 24 hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g.: 5 days at an average 70 degrees F = 350 degree-days).
   b. To calculate the weighted average daily air temperature, sum hourly measurements of the air temperature in the shade at the surface of the concrete taking any measurement less than 50 degrees F as 0 degrees F. Divide the sum thus calculated by 24 to obtain the weighted average temperature for that day.

5. Salt, manure or other chemicals shall not be used for protection.
6. The protection period for concrete being water cured shall not be terminated during cold weather until at least 24 hours after water curing has been terminated.

E. Hot Weather Concreting

1. "Hot weather" is defined as any combination of high air temperatures, low relative humidity and wind velocity which produces a rate of evaporation estimated in accordance with ACI 305R, approaching or exceeding 0.2 lbs/sqft/hr).

2. Concrete placed during hot weather, shall be batched, delivered, placed, cured and protected in compliance with the recommendations of ACI 305R and the additional requirements specified herein.
   a. Temperature of concrete being placed shall not exceed 90 degrees F and every effort shall be made to maintain a uniform concrete mix temperature below this level. The temperature of the concrete shall be such that it will cause no difficulties from loss of slump, flash set or cold joints.
   b. All necessary precautions shall be taken to promptly deliver, to promptly place the concrete upon its arrival at the job and to provide vibration immediately after placement.
   c. The Engineer may direct the Contractor to immediately cover plastic concrete with sheet material.

3. Discuss with the Engineer a work plan describing the methods and procedures proposed to use for concrete placement and curing during hot weather periods. Hot weather concreting shall not begin until the work plan is acceptable to the Engineer.

3.06 REMOVAL OF FORMS

A. Except as otherwise specifically authorized by the Engineer, forms shall not be removed before the concrete has attained a strength of at least 30 percent of its specified design strength, nor before reaching the following number of day-degrees of curing (whichever is the longer):
TABLE 3

MINIMUM TIME TO FORM REMOVAL

<table>
<thead>
<tr>
<th>Forms for</th>
<th>Degree Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beams and slabs</td>
<td>500</td>
</tr>
<tr>
<td>Walls and vertical surfaces</td>
<td>100</td>
</tr>
</tbody>
</table>

(See definition of degree-days in Paragraph 3.05 D above).

B. Shores shall not be removed until the concrete has attained at least 60 percent of its specified design strength and also sufficient strength to support safely its own weight and construction live loads.

3.07 INSPECTION AND FIELD TESTING

A. The batching, mixing, transporting, placing and curing of concrete shall be subject to the inspection of the Engineer at all times. The Contractor shall advise the Engineer of his/her readiness to proceed at least 24 hours prior to each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing steel and the alignment, cleanliness and tightness of formwork. No placement shall be made without the inspection and acceptance of the Engineer.

B. Sets of field control cylinder specimens will be taken by the Engineer (or inspector) during the progress of the work, in compliance with ASTM C31. The number of sets of concrete test cylinders taken of each class of concrete placed each day shall not be less than one set per day, nor less than one set for each 150 cu yds of concrete nor less than one set for each 5,000 sq ft of surface area for slabs or walls.

1. A "set" of test cylinders consists of four cylinders: one to be tested at 7 days and two to be tested and their strengths averaged at 28 days. The fourth may be used for a special test at 3 days or to verify strength after 28 days if 28 day test results are low.

2. When the average 28 day compressive strength of the cylinders in any set falls below the specified design strength or below proportional minimum 7 day strengths (where proper relation between seven and 28 day strengths have been established by tests), proportions, water content, or temperature conditions shall be changed to achieve the required strengths.

C. Cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss.
through the operations and furnish material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the Owner. Curing boxes shall be acceptable to the Engineer.

D. Slump tests will be made in the field immediately prior to placing the concrete. Such tests shall be made in accordance with ASTM C143. If the slump is greater the specified range, the concrete shall be rejected.

E. Air Content: Test for air content shall be made on a fresh concrete samples. Air content for concrete made of ordinary aggregates having low absorption shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173. If lightweight aggregates or aggregates with high absorptions are used, the latter test method shall be used.

F. The Engineer may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of concrete quality. The results of tests on such cores shall be the basis for acceptance, rejection or determining the continuation of concrete work.

G. Cooperate in obtaining cores by allowing free access to the work and permitting the use of ladders, scaffolding and such incidental equipment as may be required. Repair all core holes. The work of cutting and testing the cores will be at the expense of the Owner.

3.08 FAILURE TO MEET REQUIREMENTS

A. Should the strengths shown by the test specimens made and tested in compliance with the previous provisions fall below the values given in Table 1, the Engineer will have the right to require changes in proportions outlined to apply to the remainder of the work. Furthermore, the Engineer will have the right to require additional curing on those portions of the structure represented by the test specimens which failed. The cost of such additional curing shall be at the Contractor's expense. In the event that such additional curing does not give the strength required, as evidenced by core and/or load tests, the Engineer will have the right to require strengthening or replacement of those portions of the structure which fail to develop the required strength. The cost of all such core borings and/or load tests and any strengthening or concrete replacement required because strengths of test specimens are below that specified, shall be entirely at the expense of the Contractor. In such cases of failure to meet strength requirements the Contractor and Engineer will confer to determine what adjustment, if any, can be made in compliance with Sections titled "Strength" and "Failure to Meet Strength Requirements" of
ASTM C94. The "purchaser" referred to in ASTM C94 is the Contractor in this Section.

B. When the tests on control specimens of concrete fall below the specified strength, the Engineer will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In the case of cores not indicating adequate strength, the Engineer, in addition to other recourses, may require, at the Contractor's expense, load tests on any one of the slabs, beams, piles, caps, and columns in which such concrete was used. Tests need not be made until concrete has aged 60 days.

C. Should the strength of test cylinders fall below 60 percent of the required minimum 28 day strength, the concrete will be rejected and shall be removed and replaced.

3.09 PATCHING AND REPAIRS

A. It is the intent of this Section to require quality work including adequate forming, proper mixture and placement of concrete and curing so completed concrete surfaces will require no patching.

B. Defective concrete and honeycombed areas as determined by the Engineer shall be repaired.

C. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed; recesses left by the removal of form ties shall be filled; and surface defects which do not impair structural strength shall be repaired. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to approval of the Engineer.

D. Immediately after removal of forms remove plugs and break off metal ties. Promptly fill holes upon stripping as follows: Moisten the hole with water, followed by a 1/16-in brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1 to 1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spider web. Trowel smooth with heavy pressure. Avoid burnishing.

E. When patching exposed surfaces the same source of cement and sand as used in the parent concrete shall be employed. Adjust color if necessary by addition of proper amounts of white cement. Rub lightly with a fine Carborundum stone at an age of 1 to 5 days if necessary to bring the surface down with the parent concrete. Exercise care to avoid damaging
3.10 SCHEDULE

A. The following Table 4 describes the general applications for the various concrete classes and design strengths:

<table>
<thead>
<tr>
<th>Class</th>
<th>Design Strength (psi)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2,500</td>
<td>Concrete fill and duct encasement</td>
</tr>
<tr>
<td>B</td>
<td>3,000</td>
<td>Concrete overlay slabs and pavements</td>
</tr>
<tr>
<td>C</td>
<td>4,000</td>
<td>Walls, slabs on grade, suspended slab and beam systems, columns, grade beams and all other structural concrete</td>
</tr>
</tbody>
</table>

END OF SECTION
PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall construct all miscellaneous precast concrete items as required in the Contract Documents, including all appurtenances necessary to make a complete installation.

1.02 REFERENCED SPECIFICATIONS, CODES, AND STANDARDS

A. Codes: Without limiting the generality of other requirements of these Specifications, all Work specified herein shall conform to or exceed the requirements of the Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.

B. Commercial Standards:

   ASTM A 48 Specifications for Gray Iron Castings.

   ASTM A 615 Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

   ASTM C 478 Specification for Precast Reinforced Concrete Manhole Sections.

   ACI 318 Building Code Requirements for Reinforced Concrete.

REFER TO ADDITIONAL FDOT STANDARDS FOR THE PRECAST DRAINAGE STRUCTURES. IN CASE OF CONFLICT FDOT STANDARDS SUPERSEDES.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings for all precast concrete items. Submitted drawings shall show all dimensions, location and type of lifting inserts, and details of reinforcement and joints in accordance with Section 01340. “Shop Drawings, Product Data, and Samples”.

B. A detailed layout of precast slab/plank covers shall be submitted showing joints and the proposed sealing materials and methods.
1.04 DEFINITIONS

A. In these Specifications, where the term "Precast Concrete" shall mean precast slabs, planks, handholes, vaults, meter boxes, pull boxes, inlets, catch basins, clarifier effluent troughs and similar structures. It does not include precast prestressed concrete elements.

PART 2 – PRODUCTS

2.01 PRECAST CONCRETE PRODUCTS

A. Precast Concrete Structures: Precast concrete structures shall be furnished with waterstops, sleeves and openings. Box out for wall pipes and penetrations shall conform accurately to the sizes and elevations of the adjoining pipes. Precast structures and vaults shall be watertight and conform to the requirements of ASTM C 478 with reinforcement of ASTM A 615, Grade 60 bars and the following modifications thereto:

1. The minimum wall thickness shall be 6 inches.

2. Cement to be used in precast structures and grout shall be ASTM C 150, type II.

3. The design and manufacture of precast structures shall be for an H-20 traffic loading.

4. The date and name of manufacturer shall be marked inside each precast section.

5. No more than 2 lift holes may be cast or drilled in each section.

B. Precast Concrete Planks / Slabs: Slabs and/or planks may be precast on-site or off-site at the discretion of the CONTRACTOR. The slabs shall be cast to the dimensions shown on the Contract Drawings. Thickness and reinforcement shall be as specified on the drawings. Unless otherwise indicated on the drawings, the CONTRACTOR shall design and furnish all the required lifting mechanisms. Such mechanisms shall be removed after plank installation and grouted smooth. Concrete shall be structural concrete conforming to Section entitled "Cast-in Place Concrete".

2.02 MORTAR
A. Mortar used between the sections of precast concrete structures and vaults shall be as Recommended by the precast manufacturer.

2.03 NON-SHRINK CEMENT GROUT

A. Non-shrink cement grout used to grout precast to cast-in-place concrete shall be as specified in Section 03300.

PART 3 – EXECUTION

3.01 PRECAST CONCRETE PRODUCTS

A. Precast Concrete Structures: Precast concrete structures and vault sections shall be set so as to be vertical, with sections in true alignment. The joint of the previously set section shall be covered with mortar and preformed joint sealant before the next section is placed. Before the mortar is set, joints shall be pointed, and exterior joints shall be thoroughly tooled so as to be slightly concave with a hard polished surface, free of cracks. Interior joints shall be tooled flush in a similar manner. Connections to precast items shall be made by casting sections of pipe into the items, using non-shrink grout as shown on the Drawings, and/or using an acceptable resilient connector.

B. Precast concrete slabs shall be set on saw cut wall edges and grouted smooth.

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparation of concrete and application of repair materials.
B. Rehabilitation and Restoration of concrete surfaces.
C. Repair of concrete internal reinforcement.

1.02 RELATED SECTIONS

A. Section 3.00 - Sequence of Construction and General Information.
B. Section 03721 - Preparation for Resurfacing Concrete.

1.03 REFERENCES

A. ANSI/ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
B. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.
C. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
D. ASTM C33 - Specifications for Concrete Aggregates.
E. ASTM C150 - Portland Cement.
F. ASTM C404 - Aggregates for Masonry Grouts.
G. ASTM C882 - Bond Strength of Epoxy Resin Systems Used with Concrete.
1.04 SUBMITTALS

A. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

B. Manufacturer's Certificate: Certify that specified products meet or exceed specified requirements.

1.05 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of structural reinforcement repairs, type of repair, and extent.

1.06 QUALITY ASSURANCE

A. Perform welding work in accordance with ANSI/AWS D1.4.

1.07 QUALIFICATIONS

A. Materials Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

B. Applicator: Company specializing in concrete repair approved by manufacturer.

C. Design reinforcement splices under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Florida.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Epoxytec, Sika, or approved equal.

2.02 PATCHING MATERIALS

A. Concrete Patching Material: Epoxytech CPP, Epoxytech MortarTech Silicate, Sika 123 plus, or equal. The final layer of patching material shall be compatible with the concrete protective coating applied.
B. Repair of Removed Concrete Areas: Epoxytech CPP, Epoxytech MortarTech Silicate, Sika 123 plus or approved equal.

C. Bonding Agent, Primer: Provide primer as required by the concrete patching material. Sika Armatech, Epoxytech MortarTech Silicate, Sika Epocem or a scrub coat of the patching material with self-priming characteristics.

D. Portland Cement: ASTM C150, Type I, grey color.

E. Sand: ASTM C33 and C404; uniformly graded, clean.

F. Water: Clean and potable.

G. Cleaning Agent: Commercial muriatic acid of percent strength.

2.03 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615, 40 ksi yield grade billet-steel deformed bars, epoxy finish.

B. Stirrup Steel: ANSI/ASTM A82.

C. Splicing Sleeves: Bar Grip or equal for the size of bar been spliced.

2.04 MIXING MORTARS

A. Mix mortars in accordance with manufacturer's instructions for purpose intended.

B. Mix components in clean equipment or containers. Conform to pot life and workability limits.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.02 PREPARATION
A. Clean concrete surfaces of dirt, laitance, corrosion, or other contamination; wire brush using water; rinse surface and allow to dry.

B. Flush out cracks and voids with water to remove laitance and dirt

C. Provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than the depth of the crack to be filled or port size diameter no greater than the thickness of the crack. Provide temporary seal at concrete surface to prevent leakage of adhesive.

D. For areas patched with epoxy mortar, remove broken and soft concrete 3-12 inches deep. Remove corrosion from steel. Clean surfaces mechanically; wash and rinse with water.

E. Sandblast clean the exposed reinforcement steel surfaces. Mechanically cut away damaged portions of bar.

3.03 REPAIR WORK

A. Repair exposed structural, shrinkage, and settlement cracks of concrete as indicated on Drawings by patching with Epoxytech CPP, Sika 123 plus.

B. Repair spalling. Fill voids flush with surface. Apply surface finish.

C. Repair reinforcement by welding new bar reinforcement to existing reinforcement with sleeve splices. Strength of welded splices and reinforcement to exceed original stress values.

3.04 REPAIR AND ACCEPTANCE OF CONCRETE SURFACE

A. Concrete Repair
   1. Repair of Concrete Surfaces:
      a. Concrete surfaces which are to receive a protective coating system and which have deteriorated to the point where they are not suitable for coating shall be repaired with a structural cement patching compound. The Contractor shall rebuild the concrete surfaces to their original lines and shapes where damaged concrete has been removed as stated above.
      b. All concrete surfaces that are repaired and which are to receive a protective coating system shall have a controlled patter sweep of high pressure waterblast and sandblast to remove all laitance from the repaired areas. The blasting operation shall be followed by a thorough cleanup operation.
including air drying and vacuuming to provide a clean dry surface for the protective coating system. The structural cement patching system shall be applied to the outer 1-inch layer of the restored structure.

2. Cement Patching Compound: Use Epoxytech CPP, Sika 123 plus or equal, shall be used to repair the deteriorated concrete surfaces. The patching compound must be accepted by the protective coating manufacturer and the Engineer as to compatibility with the protective coating. The Contractor shall follow the instructions and recommendations of the patching compound manufacturer as to application, giving special attention to their time requirements, depth of repair, surface preparation procedures and curing time.

3. Structural Concrete Repair:
   a. Structural concrete repair shall be used to repair deteriorated concrete surfaces with fill depths greater than 1-inch that have the existing reinforcing corroded away and at areas as may be required by the Engineer. The areas shall be repaired using epoxy mortar along with reinforcing steel as needed. Existing reinforcing steel that remains and is exposed shall be coated with 40 mils of Epoxytech A-1 Primer with Epoxytech Uroflex, Sikatop 108, Armatec, or 20 mils in two coats of Sika Armatec 110.
   b. All surfaces where structural concrete repair materials will bond with existing concrete shall be coated with a primer if required by the concrete patching material Epoxytech MortarTech Silicate Epoxytech MortarTech Silicate. The bonding agent shall be applied in strict accordance with the manufacturers instruction and shall have a minimum thickness of 20 mils.

4. Finish of Repaired Surfaces:
   a. General: The repaired concrete surface shall in general have a finish that will match the uncorroded surface.
   b. Surface Finish: “Ordinary Surface Finish” shall approximate the required finish for the protective co-lining system.
   c. Procedure for Finishing: The final finish shall be flat and smooth by wood float or steel troweling. The concrete repair material manufacturer’s requirements as to finishing shall be strictly adhered to, as particularly as to time and moisture requirements.

5. Curing: Curing of repaired concrete with Structural Polymer Cement Patching compound shall be in accordance with manufacturer’s instructions. Concrete curing compounds are not allowed. The Contractor shall protect the newly repaired concrete from scarring or other damage.
6. Cleanup:
   a. The Contractor shall provide a continuous cleanup operation for the concrete repair work. Sand, concrete debris, and other materials shall be removed daily from areas that affect plant operation and employee safety.
   b. At completion of the concrete repair work, remove all construction equipment, surplus material, debris and sand; wash down and sweep the area clean, prior to beginning the protective co-lining application. The Contractor is also required to provide a collection system to prevent Structural Polymer, debris and other materials from entering the flow of any part of the sewer system that remains in operation.

B. Acceptance: The Contractor shall measure the surface pH, moisture content and temperature of the prepared concrete surface prior to beginning the lining operation. The acceptable ranges, as recommended by the lining manufacturer, shall be used to determine whether lining application may proceed and shall determine the choice of primer to be applied. The Contractor shall also check the concrete surfaces for residual laitance by visual inspection with magnification if necessary and by primer application on suspect areas. If the primer does not penetrate the concrete surface by turning the surface dark and the laitance area can be visually detected; the Contractor shall not accept the surface and shall have the area sandblasted or waterblasted again for laitance removal.

3.05 INJECTION - EPOXY RESIN ADHESIVE

A. Inject adhesive into prepared ports under pressure using equipment appropriate for particular application.

B. Begin injection at lower entry port and continue until adhesive appears in adjacent entry port. Continue from port to port until entire crack is filled.

C. Remove temporary seal and excess adhesive.

D. Clean surfaces adjacent to repair and blend finish.

3.06 APPLICATION - EPOXY MORTAR

A. Trowel apply mortar mix to an average thickness of 2 inches. Tamp into place filling voids at spalled areas.

B. For patching honeycomb, trowel mortar onto surface, work mortar into
honeycomb to bring surface flush with surrounding area. Finish trowel surface to match surrounding area.

C. Cover exposed steel reinforcement with epoxy mortar, feather edges to flush surface.

3.07 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed by the Department.

B. Test concrete for calcium chloride content during the execution of the Work.

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and cut, remove, repair or otherwise modify parts of existing concrete structures or appurtenances as shown on the Drawings and as specified herein. Work under this Section shall also include bonding new concrete to existing concrete.

1.02 SUBMITTALS

A. Submit to the Engineer, a Schedule of Demolition and the detailed methods of demolition to be used at each location.

B. Submit manufacturer's technical literature on all product brands proposed for use, to the Engineer for review. The submittal shall include the manufacturer's installation and/or application instructions.

C. When substitutions for acceptable brands of materials specified herein are proposed, submit brochures and technical data of the proposed substitutions to the Engineer for approval before delivery to the project.

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

2. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Sheer.
1.04 QUALITY ASSURANCE

A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until authorization is given by the Engineer.

B. When removing materials or portions of existing structures and when making openings in existing structures, all precautions shall be taken and all necessary barriers, shoring and bracing and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work, protect personnel, control dust and to prevent damage to the structures or contents by falling or flying debris. Unless otherwise permitted, shown or specified, line drilling will be required in cutting existing concrete.

C. Manufacturer Qualifications: The manufacturer of the specified products shall have a minimum of 10 years experience in the manufacture of such products and shall have an ongoing program of training, certifying and technically supporting the Contractor’s personnel.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver the specified products in original, unopened containers with the manufacturer’s name, labels, product identification and batch numbers.

B. Store and condition the specified product as recommended by the manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. Materials shall comply with this Section and any state or local regulations.

B. Epoxy Bonding Agent

1. General

a. The epoxy bonding agent shall be a two-component, solvent-free, asbestos-free moisture insensitive epoxy resin material used to bond plastic concrete to hardened concrete complying with the requirements of ASTM C881, Type II and the additional requirements specified herein.
2. Material
   a. Properties of the cured material:
      1) Compressive Strength (ASTM D695): 8500 psi minimum at 28 days.
      2) Tensile Strength (ASTM D638): 4000 psi minimum at 14 days.
      3) Flexural Strength (ASTM D790 - Modulus of Rupture): 6,300 psi minimum at 14 days.
      4) Shear Strength (ASTM D732): 5000 psi minimum at 14 days.
      5) Water Absorption (ASTM D570 - 2 hour boil): One percent maximum at 14 days.
      6) Bond Strength (ASTM C882) Hardened to Plastic: 1500 psi minimum at 14 days moist cure.
      8) Color: Gray.
   
3. Approved manufacturers include: Sika Corporation, Lyndhurst, NJ - Sikadur 32, Hi-Mod; Master Builder's, Cleveland, OH - Concresive Liquid (LPL) or equal.

C. Epoxy Paste
1. General
   a. Epoxy Paste shall be a two-component, solvent-free, asbestos free, moisture insensitive epoxy resin material used to bond dissimilar materials to concrete such as setting railing posts, dowels, anchor bolts and all-threads into hardened concrete and shall comply with the requirements of ASTM C881, Type I, Grade 3 and the additional requirements specified herein. It may also be used to patch existing surfaces where the glue line is 1/8-in or less.

2. Material
   a. Properties of the cured material:
      1) Compressive Properties (ASTM D695): 10,000 psi minimum at 28 days.
      2) Tensile Strength (ASTM D638): 3,000 psi minimum at 14 days. Elongation at Break - 0.3 percent minimum.
      3) Flexural Strength (ASTM D790 - Modulus of Rupture): 3,700 psi minimum at 14 days.
      4) Shear Strength (ASTM D732): 2,800 psi minimum at 14 days.
      5) Water Absorption (ASTM D570): 1.0 percent maximum at 7 days.
      6) Bond Strength (ASTM C882): 2,000 psi at 14 days moist cure.
7) Color: Concrete grey.

3. Approved manufacturers include:
   a. Overhead applications: Sika Corporation, Lyndhurst, NJ - Sikadur Hi-mod LV 31; Master Builders, Inc., Cleveland, OH - Concreseive 1438 or equal.
   b. Sika Corporation, Lyndhurst, N.J. - Sikadur Hi-mod LV 32; Master Builders, Inc., Cleveland, OH - Concreseive 1438 or equal.

D. Non-Shrink Precision Cement Grout, Non-Shrink Cement Grout, Non-Shrink Epoxy Grout and Polymer Modified mortar are included in Section 03600 GROUT.

E. Adhesive Capsule type anchor system shall be equal to the HVA adhesive Anchoring System by Hilti Fastening Systems, Tulsa, OK. The capsule shall consist of a sealed glass capsule containing premeasured amounts of a polyester or vinylester resin, quartz sand aggregate and a hardener contained in a separate vial within the capsule.

F. Acrylic Latex Bonding Agent

G. Crack Repair Epoxy Adhesive
   1. General
      a. Crack Repair Epoxy Adhesive shall be a two-component, solvent-free, moisture insensitive epoxy resin material suitable for crack grouting by injection or gravity feed. It shall be formulated for the specific size of opening or crack being injected.
      b. All concrete surfaces containing potable water or water to be treated for potable use that are repaired by the epoxy adhesive injection system shall be coated with an acceptable epoxy coating approved by the FDA for use in contact with potable water.
   2. Material
      a. Properties of the cured material
         1) Compressive Properties (ASTM D695): 10,000 psi minimum at 28 days.
         2) Tensile Strength (ASTM D638): 5,300 psi minimum at 14 days. Elongation at Break - 2 to 5 percent.
         3) Flexural Strength (ASTM D790 - Modulus of Rupture): 12,000 psi minimum at 14 days (gravity); 4,600 psi minimum at 14 days (injection)
         4) Shear Strength (ASTM D732): 3,700 psi minimum at 14 days.
5) Water Absorption (ASTM D570 - 2 hour boil): 1.5 percent maximum at 7 days.
6) Bond Strength (ASTM C882): 2,400 psi at 2 days dry; 2,000 psi at 14 days dry plus 12 days moist.

3. Approved manufacturers include:
   a. For standard applications: Sika Corporation, Lyndhurst, NJ - Sikadur Hi-Mod; Master Builders Inc., Cleveland, OH - Concressive 1380 or equal.
   b. For very thin applications; Sika Corporation, Lyndhurst, NJ - Sikadur Hi-Mod LV; Master Builders Inc., Cleveland, OH - Concressive 1468 or equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Cut, repair, reuse, demolish, excavate or otherwise modify parts of the existing structures or appurtenances, as indicated on the Drawings, specified herein, or necessary to permit completion of the Work. Finishes, joints, reinforcements, sealants, etc, are specified in respective Sections. All work shall comply with other requirements of this of Section and as shown on the Drawings.

B. All commercial products specified in this Section shall be stored, mixed and applied in strict compliance with the manufacturer's recommendations.

C. In all cases where concrete is repaired in the vicinity of an expansion joint or control joint the repairs shall be made to preserve the isolation between components on either side of the joint.

D. When drilling holes for dowels/bolts at new or existing concrete, drilling shall stop if rebar is encountered. As approved by the Engineer, the hole location shall be relocated to avoid rebar. Rebar shall not be cut without prior approval by the Engineer. Where possible, rebar locations shall be identified prior to drilling using "rebar locators" so that drilled hole locations may be adjusted to avoid rebar interference.

3.02 CONCRETE REMOVAL

A. Concrete designated to be removed to specific limits as shown on the Drawings or directed by the Engineer, shall be done by line drilling at limits followed by chipping or jack-hammering as appropriate in areas where concrete is to be taken out. Remove concrete in such a manner that
surrounding concrete or existing reinforcing to be left in place and existing
in place equipment is not damaged. Saw-cutting at limits of concrete to be
removed shall only be done if indicated on the Drawings, or after obtaining
written approval from the Engineer.

B. Where existing reinforcing is exposed due to saw cutting/core drilling and
no new material is to be placed on the saw-cut surface, a coating or
surface treatment of epoxy paste shall be applied to the entire cut surface
to a thickness of 1/4-in.

C. In all cases where the joint between new concrete or grout and existing
concrete will be exposed in the finished work, except as otherwise shown
or specified, the edge of concrete removal shall be a 1-in deep saw cut on
each exposed surface of the existing concrete.

D. Concrete specified to be left in place that is damaged shall be repaired by
approved means to the satisfaction of the Engineer.

E. The Engineer may from time to time direct the Contractor to make
additional repairs to existing concrete. These repairs shall be made as
specified or by such other methods as may be appropriate.

3.03 CONNECTION SURFACE PREPARATION

A. Connection surfaces shall be prepared as specified below for concrete
areas requiring patching, repairs or modifications as shown on the
Drawings, specified herein, or as directed by the Engineer.

B. Remove all deteriorated materials, dirt, oil, grease, and all other bond
inhibiting materials from the surface by dry mechanical means, i.e. -
sandblasting, grinding, etc, as approved by the Engineer. Be sure the
areas are not less than 1/2-in in depth. Irregular voids or surface stones
need not be removed if they are sound, free of laitance, and firmly
embedded into parent concrete, subject to the Engineer’s final inspection.

C. If reinforcing steel is exposed, it must be mechanically cleaned to remove
all contaminants, rust, etc, as approved by the Engineer. If half of the
diameter of the reinforcing steel is exposed, chip out behind the steel.
The distance chipped behind the steel shall be a minimum of 1/2-in.
Reinforcing to be saved shall not be damaged during the demolition
operation.

D. Reinforcing from existing demolished concrete which is shown to be
incorporated in new concrete shall be cleaned by mechanical means to
remove all loose material and products of corrosion before proceeding
with the repair. It shall be cut, bent or lapped to new reinforcing as shown
on the Drawings and provided with 1-in minimum cover all around.
E. The following are specific concrete surface preparation "methods" to be used where called for on the Drawings, specified herein or as directed by the Engineer.

1. Method A: After the existing concrete surface at connection has been roughened and cleaned, thoroughly moisten the existing surface with water. Brush on a 1/16-in layer of cement and water mixed to the consistency of a heavy paste. Immediately after application of cement paste, place new concrete or grout mixture as detailed on the Drawings.

2. Method B: After the existing concrete surface has been roughened and cleaned, apply epoxy bonding agent at connection surface. The field preparation and application of the epoxy bonding agent shall comply strictly with the manufacturer's recommendations. Place new concrete or grout mixture to limits shown on the Drawings within time constraints recommended by the manufacturer to ensure bond.

3. Method C: Drill a hole 1/4-in larger than the diameter of the dowel. The hole shall be blown clear of loose particles and dust just prior to installing epoxy. The drilled hole shall first be filled with epoxy paste and dowels/bolts shall be buttered with paste and then inserted by tapping. Unless otherwise shown on the Drawings, deformed bars shall be drilled and set to a depth of ten bar diameters and smooth bars shall be drilled and set to a depth of fifteen bar diameters. If not noted on the Drawings, the Engineer will provide details regarding the size and spacing of dowels.

4. Method D: Combination of Method B and C.

5. Method E: Capsule anchor system shall be set in existing concrete by drilling holes to the required depth to develop the full tensile and shear strengths of the anchor material being used. The anchor bolts system shall be installed per the manufacturer's recommendation in holes sized as required. The anchor stud bolt, rebar or other embedment item shall be tipped with a double 45 degree chamfered point, securely fastened into the chuck of all rotary percussion hammer drill and drilled into the capsule filled hole. The anchor may be installed in horizontal, vertical and overhead positions.

3.04 GROUTING

A. Grouting shall be as specified in Section 03600.

3.05 CRACK REPAIR

A. Cracks on horizontal surfaces shall be repaired by gravity feeding crack sealant into cracks per manufacturer's recommendations. If cracks are
B. Cracks on vertical surfaces shall be repaired by pressure injecting crack sealant through valves sealed to surface with crack repair epoxy adhesive per manufacturer's recommendations.

END OF SECTION
SECTION 03750

PAVEMENT REMOVAL AND REPLACEMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Work included under this Section covers the furnishing of all labor, equipment and material required for cutting, removing, protecting, replacing or stabilizing all existing roadways, driveways and pavements of the various types encountered, removed or damaged under this Contract.

B. In addition, all existing utility castings, including valve boxes, junction boxes, manholes, handholes, pull boxes, inlets and similar structures in the areas of trench restoration, pavement replacement and pavement overlay shall be adjusted by the Contractor to bring them flush with the surface of the finished work.

1.02 GENERAL

A. The Contractor shall be responsible for the protection from damage from his construction operations, all pavements, including all base courses and surface courses, within the work area. Payment for pavement restoration will be made only where such base courses or surface courses are encountered within the limits defined in the pavement repair details shown on the Plans and/or in the Standard Details at the rear of the Specifications. Any base course or surface course beyond those 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 Engineer, and to the satisfaction of the governing authority having jurisdiction over the work area at no additional cost to the Department. Any damage to adjacent lanes of pavement which amounts to 25 percent or more in any one block (approximately 600 feet) will require that the Contractor resurface the entire width of the lane in which the damage occurred for the entire block, at no cost to the Department. In order to protect himself from being held liable for any existing damaged pavement, including detour routes, the Contractor is advised to notify in writing the authority having jurisdiction over the street where such defective pavement exists prior to proceeding with any work in the vicinity. A copy of all such notices shall be forwarded to the Engineer.

B. No payment shall be made for pavement restoration which falls outside the above described limits and is required for thrust blocks and other appurtenant items. The cost for such work shall be included in the price bid for the applicable item.
C. It is brought to the Contractor's attention that wherever the line of the nominal
repaving for trenches extend to within two feet of the edge of the existing
paving, he shall repave to this edge.

D. Permanent pavement repair shall be in accordance with the details shown on
the Plans and/or in the Standard Details herein, with edges straight and
parallel and patches rectangular in plan. Any paving replacement required
beyond the limits shown in the details, and as called for in the Specifications,
shall be at the Contractor's expense. Where trenches are located out of the
existing pavement and damage occurs to the pavement, it shall also be
replaced by the Contractor at his expense.

E. Pavement markings removed or obliterated by the Contractor's operations
shall be promptly replaced in kind by him at his expense, to the satisfaction of
the Miami-Dade County Department of Public Works, Traffic Engineering
Division, or other authority having jurisdiction over the work area.

F. The percentages of maximum density for subgrade and limerock base
specified herein are minimum. Greater percentages of maximum density shall
be obtained, if so required by the governing authority having jurisdiction over
the work location.

G. Asphaltic concrete mixtures shall be obtained only from plants which comply
with the requirements of D.O.T. Specifications, Section 320 as applicable,
using materials specified herein, and producing the specified mixture. General
construction requirements for all hot bituminous mixtures specified herein shall
conform to D.O.T. Specifications, Section 330, as applicable.

H. All equipment necessary for construction shall be on the job site in first class
working condition.

I. Asphaltic concrete shall be laid only where the surface to be covered is intact,
firm, cured and dry, and only when weather conditions are suitable. The
temperature of the mixture at the time of spreading shall be within 25 degrees
F. of the temperature set by the Engineer. No mixture shall be spread when
the air temperature is less than 40 degrees F, nor when the spreading cannot
be finished and compacted during daylight hours.

J. Any mixture caught in transit by a sudden rain may be laid at the Contractor's
risk, if the base is in suitable condition. Under no circumstances shall asphalt
material be placed while rain is falling, or when there is water on the area to be
covered.

1.03 TEMPORARY PAVING

A. Prior to commencing excavation, the asphalt surface shall be saw-cut within
the limits of the construction area. Temporary paving shall be placed the same
day the trench is backfilled. The trench shall be backfilled as required in
Section 6.14, "Compacted Backfill", up to a level one 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 D.O.T. Specifications, Section 916-2. The sand shall conform to the requirements of D.O.T Specifications, Section 902, for fine aggregate.

B. The cold mix is to be installed one block at a time, not crossing any intersections, to a maximum of 1,200 feet. Work in these 1,200 (max.) 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 Department and the municipal agency permitting the work to allow greater lengths than 1,200 feet. Permitting agencies may reduce the allowable limits in their permit, or for other unforeseen right-of-way conditions.

C. Prior to completion of the work, the Contractor shall remove the one inch of cold mix and surplus backfill. He shall replace it with the specified compacted limerock base course and asphalt within the approved working limits. Municipal agencies permitting this work may accelerate the 30-day time limit specified below for replacement of temporary with permanent pavement at their discretion. No additional compensation will be allowed due to such acceleration.

D. The temporary pavement shall be maintained by the Contractor in a condition satisfactory to the Engineer until its removal. Removal shall include any surplus backfill material. Replacement shall be made within 30 days with the permanent pavement. In replacing the temporary paving with permanent pavement, all work shall be completed in sections compatible with specified traffic maintenance procedures.

E. No payment shall be made for temporary paving work and the cost for such work shall be included in the prices bid for other applicable items of work.

F. Should the Contractor elect to install temporary hot mix asphalt, to be left in place, in lieu of cold mix asphalt, a suitable credit for cold mix will be provided to the Department when the hot mix temporary asphalt is left in place and installed over properly compacted limerock base course and shall be incorporated into the specified permanent pavement restoration as part of Type I paving replacement.

G. Sand seal on the limerock base course will not be permitted in lieu of temporary paving.

PART 2 - PRODUCTS

PART 3 - EXECUTION
3.01 TYPE I PAVING REPAIRS (LIMEROCK BASE AND ASPHALTIC CONCRETE SURFACE)

A. Type I paving repairs shall be made with an 8-inch thick compacted limerock base and a minimum 2-inch thick asphaltic concrete surface as detailed in the Standard Details. On Miami-Dade County Public Works roads asphaltic concrete shall have a thickness of 2-inches placed in a minimum of two (2) compacted 1-inch lifts.

B. Limerock for pavement base shall be Miami limerock obtained from local sources where the overburden was removed from the pits prior to mining operations. The limerock shall comply with the requirements of D.O.T. Specifications, Section 911.

C. The backfill previously placed and compacted shall be excavated to the required depth below the existing road surface and the existing paving shall be cut back beyond all excavations, using an abrasive disc saw to trim the edges to straight and true lines. Eight inches of limerock base shall be placed in two layers, each layer compacted to not less than 98 percent density as specified in Section 6.14, "Compacted Backfill". During rolling, it shall be wet down as necessary to secure the greatest possible compaction. After rolling, the entire surface shall be thoroughly scarified to a depth of not less than 3 inches and shaped to conform to the existing surface, then watered and rolled again. Rolling and watering shall continue until the entire depth of the base is bonded and compacted into an unyielding mass.

D. If at any time the subgrade material becomes churned up and mixed with the limerock base course materials, the Contractor shall, without additional compensation, dig out and remove the mixture, reshape and compact the subgrade and replace the materials removed with clean rock which shall be watered and rolled until satisfactorily compacted.

E. After the limerock base course has been properly prepared and is dry and ready to receive the wearing surface, a tack coat of emulsified asphalt (Grade RS 2) shall be applied at a rate of 0.10 gallon per square yard, immediately followed by the asphaltic concrete. The tack coat shall be applied to the entire limerock base course uniformly, and shall thoroughly coat all surfaces. Care shall be taken to tack coat and bond the edges of surrounding pavement. The tack coat shall not advance ahead of the paving by more than 300 feet in business or residential areas unless otherwise approved by the Engineer.

F. The asphaltic concrete shall be plant mixed, using the best grade of local aggregates of approved size and gradation and mixed with an approved binder and conforming to either the State of Florida Department of Transportation Specifications, Type S-1 Asphaltic Concrete, Section 331-1 through 331-5, or, Miami-Dade County Public Works Type I, as ordered by the Engineer. Where the width of the repair permits, the material shall be placed
by means of an approved mechanical spreader and finisher. The mixture shall be compacted to true grade and cross section by means of a tandem roller weighing not less than eight tons. The compacted asphaltic concrete mixture shall not be, in any case, less than one inch in thickness. Rolling shall proceed as closely behind the spreader as possible and all material shall be completely compacted the same day it is placed.

3.02 TYPE V PAVING REPAIRS (ASPHALTIC CONCRETE WEARING SURFACE OVERLAY)

A. Type V paving repairs shall be made where noted on the Plans and/or as ordered by the Engineer. Type V paving repair is usually in addition to required Type I or State Road paving repairs. Since the quantity of Type V repairs that may be required is usually unknown until Contract pavement restoration work begins, Type V repairs may be established in the Proposal on a contingent basis. A Contingent Item may or may not be used at the option of the Department, and any provisions contained within the Contract Documents for quantity overruns will not be applicable.

B. Type V paving repairs shall consist of a machine-laid asphaltic concrete wearing surface overlay which shall be nominal one-inch thick asphaltic concrete meeting the requirements of Type I repairs as specified hereinabove. As used herein, "overlay" shall mean Type V paving repairs.

C. In general, the overlay will be applied in a full lane width or widths, after the permanent paving repairs over the trench have been made.

D. Where the overlay will abut existing pavement which is not to be overlaid, such as at extreme ends, the marked centerline of the pavement, or other lane markings, the existing asphaltic concrete surface shall be saw cut for its full depth or 1-inch minimum, and then stripped back for at least 2 feet into the area to be overlaid to a second cut which shall also be in clean straight lines. The second, or interior, cut edge shall be rolled with a tandem roller weighing not less than 8 tons before the overlay is applied. The stripped area shall be used to provide a transition or "feather" area between the overlay and the existing pavement. Before placing the overlay, all cut edges and the stripped area shall be tack coated with emulsified asphalt as specified herein below.

E. Before the overlay is applied, existing surfaces shall be swept clean of all dirt and debris, using a power driven broom if warranted by the size of the location to be overlaid and/or as ordered by the Engineer. Pavement edges shall be cleared of all encroaching vegetation, loose sand, rock and all other foreign matter. When the existing surface is thoroughly clean, a tack coat of Emulsified Asphalt, Grade RS-2 (anionic) shall be applied at the rate of approximately 0.10 gallon per square yard, immediately followed by the asphaltic concrete overlay. The tack coat shall not advance ahead of the paving by more than 300 feet in business or residential areas unless otherwise approved by the Engineer.
F. Machine-laid overlay shall be placed by means of an approved mechanical spreader and finisher, and the mixture shall be compacted to true grade and cross section by means of a tandem roller weighing not less than 8 tons.

G. The compacted overlay mixture shall be thicker as required to produce a smooth uniform surface free of any irregularities, but shall not be less than one inch in thickness. Rolling shall proceed as close behind the spreading of the mixture as possible, and all materials shall be completely compacted the same day it is placed.

3.03 ASPHALT COLD MILLING

A. Cold milling of the existing pavement for a 1-inch depth shall be done by using an automated pavement planer capable of maintaining an accurate depth. Cold milling equipment shall meet the approval of the Engineer and the governing agency having jurisdiction at the location of the pavement milling operation. The Engineer's word as to the acceptability of the equipment shall be final.

B. After the pavement has been milled and the existing pavement removed, a tack coat shall be applied as specified above.

C. The required width of one inch thick asphaltic concrete wearing surface of the specified wearing course shall be applied in accordance with the above specifications.

END OF SECTION
SECTION 03755

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 SCOPE OF WORK

Work under this Section covers the furnishing of all labor, material and equipment required for the replacement of existing pavement as shown on the Drawings or called out elsewhere herein; or which is removed or damaged during construction under this Contract, if any, and for the construction of new pavement areas as shown on the Plans or called out elsewhere herein.

PART 2 - PRODUCTS

2.01 MATERIALS

Limerock Base: The limerock shall comply with the requirements of D.O.T. Specifications, Section 911 (1982) for Miami limerock.

Primer: 0.10 gallon per square yard of cut back asphalt, Grade RC 70, conforming to the requirements of D.O.T. Specifications, Section 916.2 (1982).

Tack Coat: Provide a tack coat of emulsified asphalt, Grade RS 2 (anionic). The emulsified asphalt shall conform to the requirements of D.O.T. Specifications, Section 916.4 (1982).

Surface Course: The asphaltic concrete shall be plant mixed, using the best grade of local aggregates of approved size and gradation and mixed with an approved binder and conforming to the D.O.T. Specification for Type S 1 Asphaltic Concrete, Sections 331 1 through 331 5 (1982), or Miami Dade County Public Works Type I, as ordered by the Engineer.

PART 3 - EXECUTION

3.01 Pavement, New:

1. Construction of new pavement for driving areas shall include clearing and grubbing removal and disposal of roots, boulders or other objectionable material, 6-inch compacted sub base, 8 inch compacted limerock base, prime coat, tack coat, 1 1/2 inch asphaltic concrete surface course, etc., for a complete installation.

2. After clearing and grubbing and all objectionable materials have been removed, existing voids filled and compacted, the pavement bed shall be stabilized with a 6 inch thick sub base composed of existing selected materials.
if approved as suitable by the Engineer, or by the addition of and mixing in of
suitable stabilizing material supplied by the Contractor. The top 6 inches of
sub grade in both cuts and fills shall be compacted to a density of not less
than 98 percent of the maximum density as determined by AASHTO
Specification T 180 84. The compacted sub base shall extend under
proposed curbing and sidewalks.

3. After completion of the sub base, a 8 inch thick limerock base shall be placed.

4. Limerock for pavement base shall be obtained from a source approved by the
Engineer.

5. Where the new paving abuts the existing paving, the existing base course
shall be cut back a minimum of 12 inches, and the existing surface course a
minimum of 18 inches, using an abrasive disc saw to trim the edges to straight
and true lines. Six inches of limerock base shall then be placed in two layers,
and each layer compacted to not less than 98 percent of maximum density as
determined by AASHTO Specifications No. T 180 84.

6. During rolling, the limerock shall be wet down as necessary to secure the
greatest possible compaction. After rolling, the entire surface shall be
thoroughly scarified to a depth of not less than 3 inches and shaped to
conform to the proposed grades, then watered and rolled again. Rolling and
watering shall continue until the entire depth of the base is bonded and
compacted into an unyielding mass.

7. If at any time the subgrade material becomes churned up and mixed with the
base course materials, the Contractor shall, without additional compensation,
dig out and remove the mixture, reshape and compact the subgrade and
replace the materials removed with clean rock which shall be watered and
rolled until satisfactorily compacted.

8. After the base surface has been properly prepared and dry, all dust, dirt, etc.,
which might prevent bonding and penetration, shall be removed and any “hard
planing” which is required shall be completed. The base shall then be primed
with not less than 0.10 gallon per square yard of cut back asphalt, Grade RC
70, conforming to the requirements of D.O.T. Specifications, Section 916.2
(1982). Prior to the application of the tack coat and surface course, the newly
primed base shall be cleaned of loose sand and dust.

9. After the base surface has been properly prepared and is dry and ready to
receive the wearing surface, a tack coat of emulsified asphalt, Grade RS 2
(anionic) shall be applied at the rate of approximately 0.05 to 0.15 gallons per
square yard, immediately followed by the asphaltic concrete. The emulsified
asphalt shall conform to the requirements of D.O.T. Specifications, Section
916.4 (1982).

10. A 12-inch thick asphaltic concrete surface course shall then be applied. The
asphaltic concrete shall be plant mixed, using the best grade of local
aggregates of approved size and gradation and mixed with an approved
binder and conforming to the D.O.T. Specification for Type S 1 Asphaltic
Concrete, Sections 331 1 through 331 5 (1982), or Miami Dade County Public
Works Type I, as ordered by the Engineer. The material shall be placed by
means of an approved mechanical spreader and finisher. The mixture shall be
compacted to true grade and cross section by means of a tandem roller
weighing not less than eight tons. The compacted asphaltic concrete mixture
shall not be, in any case, less than 1 1/2 inch thick. Rolling shall proceed as
closely behind the spreader as possible and all material shall be completely
compacted the same day it is placed.

3.02 Pavement Replacement:
1. Remove existing asphaltic concrete surface from the existing limerock base
   saw cutting at edges as specified above.
2. Fill, compact, and otherwise repair any damaged, low or thin areas of the
   existing base and/or subbase in compliance with the appropriate specifications
   of Division 2 and to the satisfaction of the Engineer.
3. Repave as specified for new pavement above in this Section.

END OF SECTION
SECTION 03770
CASTINGS

PART 1 - GENERAL

A. Shop drawings shall be furnished for all castings supplied and said drawings shall include certified dimensions and weights of all components. Dimensions shall conform to Department Standard Detail requirements.

B. Finish casting dimensions shall be held to the following tolerances: Up to 4 inches, ±1/32 inch; 4 to 8 inches, ±3/64 inch; 8 to 12 inches, ±1/16 inch; 12 to 24 inches ±1/8 inch; above 24 inches, add the appropriate (minimum) value from those given above to ±1/8 inch. Note that this shall not affect the requirement that mating surfaces shall be machined and shall bear for their full length. Components shall be interchangeable with new and existing units without exceeding the tolerance add up specified above.

C. Weight of castings supplied shall not vary more than ±5 percent from the certified weight supplied by the Contractor as a part of his shop drawings.

D. The foundry's name (and if not domestically produced, foundry's name and country) shall be cast in the bottom of each lid. Body and lid or frame and cover shall be manufactured by the same foundry. Manufacture of the various components comprising one set, such as for example; a valve box and lid, by different manufacturers is expressly forbidden.

E. Each shipment of castings provided by the Contractor shall be accompanied by a certification specifically stating that the materials of that shipment comply with all requirements of this Specification, specifically including dimensions and tolerances, materials of manufacture, weights of components, marking and foundry of origin. This certification shall be signed, dated and sealed by a registered professional Engineer licensed to practice in state where the materials are cast or if not of domestic manufacture in the state where the supplying firm is located. One original of this certification shall ship with the materials and one original shall be sent to: Supervisor, Specifications Unit, Miami-Dade Water and Sewer Department, P.O. Box 330316, Miami, Florida 33233-0316. Shipments sent without the certification as required above may not be accepted.

F. Materials used in the manufacture of the castings shall conform to ASTM Standard A48 94a), "Gray Iron Castings", for Class 30 iron. Manhole and valve box covers shall have a roadway type surface, machined mating surface and shall be non-rocking.
1. Material used in the manufacture of the castings shall conform to ASTM A48, "Gray Iron Castings", for Class 30 iron. Manhole and valve box covers shall have a roadway type surface.

2. Castings shall be as manufactured by U.S. Foundry and Manufacturing Corp., Neenah Foundry, or approved equal.

3. Castings shall be furnished unpainted with shot blasted finish.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
PART 1 – GENERAL

1.01 GENERAL

A. All concrete work shall be constructed in accordance with all of the applicable provisions of attached Section 03300 - Cast in Place Concrete, Reinforcing and Formwork" included herein as the last section of the Specifications, except as hereinafter specified.

B. All reinforced concrete shall have a minimum design strength of 4,000 psi, a minimum content of 564 pounds of Portland cement per cubic yard, and a water-cement ratio which will produce a slump of 4-inches plus or minus 1-inch. All concrete exposed to potential sewage gas shall be Type II Portland Cement, and all other concrete shall have either Type I or Type II Portland Cement.

C. Non-reinforced concrete for sidewalk, concrete and curb and gutter repairs, if required, shall have a minimum design strength of 3000 psi a minimum content of 517 pounds of Type I Portland cement per cubic yard, and a water-cement ratio which will produce a slump of 4 to 6 inches. Non-reinforced concrete for thrust blocks shall have a minimum design strength of 2,500 Psi. A minimum content of 470 pounds of Type I Portland cement per cubic yard and a water-cement ratio which will produce a slump of 4 to 6 inches.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials for concrete shall conform to the following requirements:

1. Cement: 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 Standard C 150-85 "Portland Cement", Type I and Type II.

The Contractor shall provide suitable means for storing and protecting the cement against dampness. Bags of cement which for any reason may become partially set, or which contain lumps of caked cement, shall be rejected. In no instance shall any portion of a bag of damaged cement, or a bag containing lumps of caked cement, be used. Cement salvaged from discarded or used sacks shall not be used. Different brands of cement, even if tested and approved, shall not be mixed.
during use, nor used alternately in any section of the work without written permission of the Engineer.

2. Fine Aggregate: The fine aggregate shall consist of sand or stone screenings, composed of hard durable grains, having not more than three percent (3%) by weight of foreign matter, such as loam clay, dirt or other impurities, and shall be free from injurious amounts of organic impurities. When subjected to the calorimetric test for organic impurities and producing a color darker than the standard No. 2 color, it shall be rejected unless it passes the mortar strength test. Fine aggregate, when subjected to the mortar strength test, shall have tensile and compressive strengths at the end of seven (7) and twenty-eight (28) days, not less than 100 percent of those developed by mortar of the same proportions and consistency, made of the same cement and standard Ottawa sand. Fine aggregate, when tested by means of laboratory sieves shall conform to the following requirements:

<table>
<thead>
<tr>
<th>Size Sieve</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>100</td>
</tr>
<tr>
<td>No.4</td>
<td>90 to 100</td>
</tr>
<tr>
<td>No.8</td>
<td>70 to 95</td>
</tr>
<tr>
<td>No. 16</td>
<td>50 to 85</td>
</tr>
<tr>
<td>No. 30</td>
<td>30 to 70</td>
</tr>
<tr>
<td>No. 50</td>
<td>10 to 45</td>
</tr>
<tr>
<td>No. 100</td>
<td>0 to 10</td>
</tr>
</tbody>
</table>

Subsequent samples of fine aggregate shall have a fineness modulus varying not more than 0.20 either way from that of the initial sample submitted by the Contractor, when determined by ASTM methods. Fine aggregate from more than one source shall not be mixed nor used alternately in the construction without written permission from the Engineer.

3. Coarse Aggregate: Coarse aggregate shall consist of gravel, broken stone or local limerock. It shall be free from adherent coatings, and the amount of contained deleterious substances shall not exceed the following:

<table>
<thead>
<tr>
<th>Contained Deleterious Matter Percentage by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removed by decantation</td>
</tr>
<tr>
<td>Shale</td>
</tr>
<tr>
<td>Coal</td>
</tr>
<tr>
<td>Soft fragments</td>
</tr>
<tr>
<td>Other local deleterious substances</td>
</tr>
<tr>
<td>such as alkali, friable, thin elongated or laminated pieces</td>
</tr>
<tr>
<td>Total shale, coal, clay lumps and soft fragments</td>
</tr>
</tbody>
</table>
Tests for impurities shall be made in accordance with applicable methods of the American Society for Testing and Materials.

Coarse aggregate shall have a loss of not greater than forty (40) percent when tested in accordance with ASTM Standard C 131-81 "Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine".

Coarse aggregate, unless otherwise specified, shall meet the following gradation requirements:

<table>
<thead>
<tr>
<th>Size Sieve</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ½&quot;</td>
<td>100</td>
</tr>
<tr>
<td>1&quot;</td>
<td>95 to 100</td>
</tr>
<tr>
<td>½&quot;</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 6</td>
</tr>
</tbody>
</table>

Sieve sizes and tests for gradation of fine and coarse aggregate shall be in accordance with applicable specifications of the American Society for Testing and Materials.

Coarse aggregate from more than one source shall not be mixed or used alternately in the construction without written permission of the Engineer.

4. Mixing Water: The water used in mixing the concrete that is not in the form of surface moisture on the aggregate shall be from the Department water supply or other approved source.

5. Ready-Mixed Concrete:
The Contractor will be permitted to use concrete from a ready-mix concrete plant provided he submits the name of the company to the Engineer for approval, and no concrete shall be placed in the work until such approval has been obtained. Concrete obtained from a ready-mix plant shall conform to the requirements of these Specifications, and to all applicable portions of ASTM Standard C94-86 "Ready-Mixed Concrete".

6. Mortar:
Mortar shall be composed of one part of Type II Portland cement to three parts of sand, with sufficient lime putty added to secure workability. In no case shall the lime putty exceed 10% of the cement used.

7. Grout:
a. Nonshrink, nonmetallic grout shall be Five Star Special Grout 150, Five Star Products, Inc.; Grout F-100, Sauereisen Cement; Masterflow 713, BASF Building Systems; NS Grout, Euclid Chemical Company, pre-mixed type, or approved equal.
b. Nonshrink metallic grout shall be Embeco 636 Plus Grout, BASF Building Systems, pre-mixed type, or approved equal.
c. Nonshrink hydraulic cement grout shall be Waterplug, Thoro Products, BASF Building Systems, or approved equal.
d. Nonshrink epoxy grout shall be Five Star HP Epoxy Grout, Five Star Products, Inc., available from Coastal Construction Products, Inc. or Wall-Nu Trowelable, Steelcote Manufacturing Co., available from Florida Wire and Rigging Works, or approved equal.
e. Cementitious grout shall be composed of one part of Type II Portland cement to three parts of sand.

PART 3 - EXECUTION (NOT USED)

END OF SECTION
PART 1 - GENERAL

1.01 GENERAL

A. Pavement markings for this Project shall conform to the latest version of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, and shall be in accordance with the Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

Traffic Paint

A. Traffic paint shall conform with D.O.T. Specifications, Section 971.

B. The colors of the paint shall be yellow or white as existed before the repair.

C. All equipment shall be of a type and design which will readily obtain the required uniformity of application of the stripes, both as to thickness of coating and alignment. The paint machine shall be of the spray type and shall be capable of spraying the paint to the required spread without thinning of the paint. The paint tank shall be equipped with a mechanical agitator. The nozzle shall have cut-off valves which will apply broken or skip lines automatically. Each nozzle shall also be provided with suitable line guides, either metallic shrouds or air blasts.

D. Painting shall be done only during daylight hours and, as far as practicable, shall be terminated in time to permit sufficient drying by sunset. No paint shall be applied when any moisture is present on the surface to be painted or when the air temperature is below 40 degrees F. Painting shall not be done when winds are sufficient to cause spray dust.

E. The surface which is to be painted shall be cleaned, by compressed air or other effective means, immediately before the start of painting, and shall be clean and dry when the paint is applied. Any vegetation of soil shall be removed from the pavement before edge striping is begun.

F. The paint shall be thoroughly mixed before it is poured into the painting machine and no thinning of the paint will be allowed at any time. Before the start of each day's work, the paint container, the connections, and the
spray nozzles on the machine shall be thoroughly cleaned with paint thinner or other suitable cleaner.

G. The traffic stripe shall be of the specified width, with clean, true edges and without sharp breaks in the alignment. A uniform coating of paint shall be obtained and the finished stripe shall contain no light spots or paint skips. Any stripes which do not have a uniform, satisfactory appearance, both day and night, shall be corrected.

H. All newly painted stripes, including edge stripes, shall be protected until the paint is sufficiently dry to permit vehicles to cross the stripe without damage from the tires. While the center line stripes are being painted, all traffic shall be routed away from the painting operations and the newly painted stripe. When necessary, a pilot car shall be used to protect the painting operations from traffic interference.

I. Any portions of the stripes damaged by passing traffic or from other cause shall be repainted at the Contractor's expense.

J. Thermoplastic and reflective markers obliterated or removed by the Contractor's operation, within the construction limits shown in the drawings, shall be replaced with Traffic paint as specified hereinabove.

K. Paint for temporary pavement markings shall also be used where the thermoplastic markings are to be applied after the asphaltic concrete has "cured". The cure time shall be based on the thermoplastic manufacturer's recommendation. This traffic paint shall be completely compatible with the thermoplastic paint to be installed after cure.

Thermoplastic Traffic Stripes and Markings

A. Thermoplastic pavement markings, including stripes, pavement messages, stop bars, directional arrows, reflective pavement markers and other miscellaneous items, will be replaced as existed before the repair was made. The thermoplastic compound shall be as specified in Section 711 of the D.O.T. Specifications. The thermoplastic compound shall be extruded or sprayed onto the pavement surface in a molten state by mechanical means, with surface application of glass spheres, when required, and upon cooling to ambient pavement temperature shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation.

B. The colors of the compound shall be white or yellow as existed before the repair.
C. Reflective Pavement Markers and their installation shall conform to the D.O.T. Specifications, Section 706.

D. Where thermoplastic is to be applied to cement concrete pavement, a sealing primer as specified in D.O.T. Specifications Section 711, shall be applied in advance of the placing of the stripes.

E. The thermoplastic shall be applied to the pavement utilizing either extrusion or spray application equipment. The application equipment shall be so constructed as to provide continuous mixing and agitation of the material. Conveying parts of the equipment between the main material reservoir and the shaping die or gun shall be so constructed as to prevent accumulation and clogging. The equipment shall be constructed so that all mixing and conveying parts up to and including the shaping die or gun, maintain the material at the plastic temperature with heat transfer oil or electrical element controlled heat. Direct fire heat transfer will not be allowed.

F. The application equipment shall be so constructed as to insure continuous uniformity in the dimensions of the stripe. The applicator shall provide a means for cleanly cutting off square stripe ends and shall provide a method of applying "skip" lines. The use of pans, aprons, or similar appliances resulting in die overruns will not be permitted.

G. Glass spheres applied to the surface of the completed stripe shall be applied by an automatic bead dispenser attached to the striping machine in such a manner that the beads are dispensed almost instantaneously upon the installed line.

H. Special kettle(s) shall be provided for melting and heating the thermoplastic material. The kettle(s) shall be equipped with automatic thermostatic control devises in order to provide uniform temperature control and prevent overheating of the material. The applicator and kettle(s) must be so equipped and arranged as to satisfy the requirements of the National Fire Underwriters, the State of Florida, Dade County and any municipal authority applicable to where the work is being done.

I. Applicators shall be mobile and maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. The applicator equipment to be used on roadway installations shall consist of either hand equipment or truck mounted units depending on the type of marking required.

J. The hand applicator equipment shall be insulated and shall have sufficient capacity to hold 150 pounds of molten material and shall be sufficiently maneuverable to install crosswalks; lane, edge and center lines; arrows
and legends. The truck mounted unit for lane, edge and center lines shall consist of a mobile self-contained unit carrying its own material capable of operating at a minimum speed of five miles per hour while installing striping.

K. Application time, weather limitations and surface preparation shall be in accordance with D.O.T. Specifications Sections 710.

L. The material, when formed into traffic stripes or other markings must be readily renewable by placing an overlay of new material directly over an old line of compatible material in such a manner that no splitting or separation takes place.

M. The application temperature shall be within the range specified by the manufacturer of the thermoplastic compound being used.

N. All pavement edge lines, gore, island and diagonal strip markings, bike lane symbols and messages, wherever located, shall have a minimum thickness of 0.060 inch at the edges and a maximum thickness of 0.120 inch at the center. A minimum average film thickness of 0.060 inch shall be maintained. All lane lines, center lines, transverse markings (except shoulder markings) and pavement markings within traffic wearing area (such as dotted turning guide lines) shall have a minimum thickness of 0.090 inch at the edges and a maximum thickness of 0.188 inch at the center. A minimum average film thickness of 0.090 shall be maintained. All thickness measurements shall be an average in any three foot length.

O. The glass sphere top coating shall be applied by a type of glass sphere dispenser or gun which will embed the spheres into the line surface to at least one-half their diameter. The glass sphere top coating shall not incur more than a 10 percent loss during the first 30 days of traffic exposure.

P. Reflective pavement markers shall be installed as they existed before the repair. They shall be replaced with the appropriate color or colors and oriented in the correct direction as specified in Section 706 of the D.O.T. Specifications.

END OF SECTION
SECTION 03800

ROCKBED AND BEDDING MATERIAL

PART 1 – GENERAL

A. Rockbed (also called bedding material herein) shall be washed and graded limerock obtained from local sources. Aggregate size shall be 3/8-inch to 7/8-inch in diameter. Select backfill material, 2" maximum size, or washed and graded limerock (3/8" - 7/8"), compacted to at least 90% of maximum density, 6" lifts per AASHTO Specification No. T-180.

B. Pea rock shall be used for small diameter (less than 24-inch) pipe bedding (except copper pipe) as shown on the Standard Details. Pea rock shall consist of hard, durable 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 Pea rock shall conform to the requirements of ASTM C 33, Size Number 8, and be graded within the following limits:

<table>
<thead>
<tr>
<th>U.S. Sieve Size</th>
<th>Percent Fines by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ½-inch</td>
<td>100</td>
</tr>
<tr>
<td>2. 3/8-inch</td>
<td>85 to 100</td>
</tr>
<tr>
<td>3. No. 4</td>
<td>10 to 30</td>
</tr>
<tr>
<td>4. No. 8</td>
<td>0 to 10</td>
</tr>
<tr>
<td>5. No. 16</td>
<td>0 to 5</td>
</tr>
</tbody>
</table>

C. Crushed stone shall be used for bedding of 24-inch and larger diameter pipe and/or manholes as shown on the Standard Details. 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 Fines by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ½-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 100</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>

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION