

Table of Contents

Agenda	2
Approval of the Contract and Change Order #1 with Nelson Construction for the Pass-A-Grille Way Project.	
Nelson Construction Agenda Report	3
Nelson Agreement with SPB	4
Nelson Email	7
Addendum 3	8
Addendum 2	12
Addendum 1	14
Invitation to Bid	19
RFB	311
Nelson Bid Document.	334
Change Order #1	353
Approval and authorization of the Duke Energy Underground Conversion Agreement Based on A Binding Cost Estimate for the undergrounding of power associated with the Pass A Grille Way project.	
Duke Energy Agenda Report	355
Duke Energy Agreement	356
Ordinance 2015-10, Final Reading and Public Hearing, amending Chapter 6, Alcoholic Beverages of the City of St. Pete Beach Code of Ordinances relating to public consumption or possession of alcoholic beverages.	
Agenda Report	373
Ord 2015-10.	374
Ordinance 2015-11, First Reading and Public Hearing, relating to vacation of public Right of Way, conveyance of land and re- platting of real property.	
Agenda Report	379
Ord 2015 - 11	380



SPECIAL COMMISSION MEETING CITY OF ST. PETE BEACH

155 Corey Avenue

Thursday, June 25, 2015

8:00 AM

Call to Order

Pledge of Allegiance

Roll Call

1. Action

- a. Approval of the Contract and Change Order #1 with Nelson Construction for the Pass-A-Grille Way Project.**
- b. Approval and authorization of the Duke Energy Underground Conversion Agreement Based on A Binding Cost Estimate for the undergrounding of power associated with the Pass A Grille Way project.**

2. Ordinances

- a. Ordinance 2015-10, Final Reading and Public Hearing, amending Chapter 6, Alcoholic Beverages of the City of St. Pete Beach Code of Ordinances relating to public consumption or possession of alcoholic beverages.**
- b. Ordinance 2015-11, First Reading and Public Hearing, relating to vacation of public Right of Way, conveyance of land and re-platting of real property.**

3. Adjournment

APPEAL: If a person decides to appeal any decision made at this meeting, he/she will need a record of the proceeding and, for such purpose, will need to ensure that a verbatim recording of the meeting is made that includes the testimony and evidence on which to base the appeal. (Florida Statute 286.0105) The City does not furnish verbatim transcripts. Interested parties should make the necessary arrangements for verbatim transcripts.

AMERICANS WITH DISABILITIES ACT: In accordance with the Americans with Disabilities Act and Florida Statutes, Chapter 286.26, persons needing special accommodations to participate in a meeting should contact City Hall at (727) 367-2735 no later than four (4) days prior to the meeting for assistance.

**The public is cordially invited to attend this meeting.
All agenda material is available for review at City Hall.**

**St. Pete Beach City Commission
Agenda Report**

Issue Considered: Approval of the Contract and Change Order #1 with Nelson Construction for the Pass-A-Grille-Way Project.

Date: June 25, 2015

Prepared By: Wayne Saunders, City Manager

Summary of Issue: The City Commission accepted the bid from Nelson Construction for the Pass-A-Grille Way Project subject to Change Order #1 at the meeting held Wednesday, June 10th. The next step is approval of the contract for a base bid of \$12,855,756.20 and the associated Change Order #1 is for a deduct of \$1,870,000 resulting in an adjustment contract amount of \$10,985,756.20. This is consistent with the amounts provided to the Commission at the June 10th meeting. We request approval of the Contract with Nelson Construction and Change Order #1.

Funding:

Requested Motion: "I move to approve the Contract and Change Order #1 with Nelson Construction for the Pass-A-Grille Way project as presented and authorize the Mayor to sign all required documents associated with the Contract and Change Order #1."

Attachments:

**Reviewed by
City Manager:**

WS

AGREEMENT

(Reconstruction of Pass-A-Grille Way from 19th Avenue to W. Maritana Drive)

THIS AGREEMENT, made and entered into by and between the City of St. Pete Beach, hereinafter designated the CITY, and David Nelson Construction Co. a Florida corporation authorized to do business in the State of Florida, with principal place of business located at 3483 Alternate 19, Palm Harbor, Florida 34683 herein after designated the CONTRACTOR ,

That for and in consideration of the sum of **Twelve Million, Eight Hundred Fifty Five Thousand, Seven Hundred Fifty Six Dollars and 20/100 (\$12,855,756.20)** to be paid by the CITY to the CONTRACTOR as herein provided, and in further consideration of the mutual covenants and promises to be kept and performed by and between the parties hereto, it is agreed as follows:

1. THE CONTRACTOR AGREES:

- A. To furnish all services, labor, materials and equipment necessary for the complete performance, in a thorough and workmanlike manner, of the Work contemplated under Bid Title: Reconstruction of Pass-A-Grille Way from 19th Ave. to W. Maritana Dr. to comply with the applicable standards, and to perform all Work in strict accordance with the terms of the Contract Documents.
- B. To commence Work under this Agreement with an adequate force and equipment within fifteen (15) consecutive calendar days after receipt of written notice from the CITY to proceed hereunder, and to fully complete all necessary Work under the same within not more than Five Hundred Seventy (570) consecutive calendar days. It is understood and agreed that the date on which the consecutive calendar days will begin to be charged to the Project shall be the fifteenth (15th) calendar day from the date of receipt of the Notice to Proceed. Time of performance and completion of the Work of this Agreement is of the essence.
- C. That upon failure to complete all Work within the time provided for above, the Contractor shall pay to the CITY such sums as shall be determined in accordance with the Liquidated Damages provision of this Agreement, and the payment of such sum shall be secured as provided for therein .
- D. To procure all insurance as required by the Instructions to Bidders.
- E. To procure and maintain all permits and licenses which may be required by law in connection with the prosecution of the Work contemplated hereunder, except for those permits obtained by the CITY as expressly set forth in the Contract Documents. Notwithstanding the provisions above, the Contractor shall be responsible for non-compliance of all permit requirements, including all fines resulting from Contractor's non-compliance of said requirements.
- F. To permit any representative(s) of the CITY, at all reasonable times, to inspect the Work in progress or any of the materials used or to be used in connection therewith, whether such Work is located on or off the Project site, and to furnish promptly, without additional charge, all reasonable facilities, labor and materials deemed necessary by the CITY's Design Professional/Engineer/Project Manager, for the conducting of such inspections and tests as it may require.

- G. No subcontract or transfer of Agreement shall in any case release either the Contractor or its surety of any liability under the Agreement and bonds. The CITY reserves the right to reject any subcontractors or equipment.

2. THE CITY AGREES:

- A. To pay to the Contractor the Agreement Amount herein above specified, as follows:

If progress satisfactory to the CITY is being made by the Contractor, the Contractor will receive partial payments on this contract as the work progresses, based upon estimates of the amount of work done less payments previously made. Neither progress payment nor partial or entire use or occupancy of the Project by the CITY shall constitute an acceptance of work not in accordance with the Contract Documents. The CITY, prior to making of any payment, may require the Contractor to furnish a certificate or other evidence showing the amount of work done or completed at that time.

3. IT IS MUTUALLY AGREED:

- A. That no change, alteration, amendment, payment for extra Work or agreement to pay for same, shall be binding upon the CITY until it has been approved the same, and until the same shall be properly approved by the Commission.
- B. The CITY shall designate a representative insofar as prosecution of the Work, and interpretation of the Plans and Specifications are concerned, and that no payments shall be made by the CITY under this Agreement except upon the certificate of the proper CITY designee.
- C. This Agreement shall be interpreted under and its performance governed by the laws of the State of Florida.
- D. The failure of the CITY to enforce at any time or for any period of time any one or more of the provisions of the Contract Documents shall not be construed to be and shall not be a waiver of any such provision or provisions or of its rights thereafter to enforce each and every such provision.
- E. Each of the parties hereto agrees and represents that this Agreement comprises the full and entire agreement between the parties affecting the Work contemplated, and that no other agreement or understanding of any nature concerning the same has been entered into or will be recognized, and that all negotiations, acts, Work performed, or payments made prior to execution hereof shall be deemed merged into, integrated and superseded by this Agreement.
- F. Should any provision of this Agreement be determined by a court to be unenforceable, such determination shall not affect the validity or enforceability of any section or part thereof.

- 4. The following named Documents, which shall be referred to as the "Contract Documents," are by reference hereby incorporated into this Agreement and attached:

- Email dated 5/29/15 at 1:23 p.m. addressing conduit installation
- Addendum #3 dated 5/28/2015
- Addendum #2 dated 5/22/2015
- Addendum #1 dated 5/20/2015
- Project Specifications and Plans labeled 100% Submittal dated 4/27/2015
- Invitation to Bid dated April 2015 (includes Technical Specifications)
- Request for Bid
- Contractor's Bid document

If there is a conflict between the terms of this Agreement and the above referenced documents, then the conflict shall be resolved as follows: the terms of this Agreement shall prevail over the other documents, and the terms of the remaining documents shall be given preference in their above listed order.

5. This Agreement shall be binding upon, and shall inure to the benefit of the executors, administrators, heirs, successors and assigns of the Contractor.

IN WITNESS WHEREOF, the parties hereto have executed this agreement this ____ day of June, 2015.

City of St. Pete Beach

David Nelson Construction Co.

By: _____

By: _____

(Print Name)

(Print Name)

(Title)

(Title)

Eileen Torres

From: David Vekasi <dvekasi@nelson-construction.com>
Sent: Friday, May 29, 2015 1:34 PM
To: Ian Wade
Subject: RE: conduit question

Thanks you

David Vekasi, VP
David Nelson Construction Co.
727-784-7624

From: Ian Wade [<mailto:iwade@stpetebeach.org>]
Sent: Friday, May 29, 2015 1:23 PM
To: David Vekasi
Subject: conduit question

Conduit and installation methods allowed by Duke, bighthouse and/or Verizon are acceptable. Encasing pipe in concrete is not anticipated on this project.

Ian Wade, PE
Project Manager
City of St Pete Beach
155 Corey Ave
St Pete Beach, FL 33706
Tel: 727.363.9254
iwade@stpetebeach.org
www.stpetebeach.org

Under Florida law, e-mail addresses are public records. If you do not want your e-mail address released in response to a public-records request, do not send electronic mail to this entity. Instead, contact this office by phone or in writing.



RFB for Reconstruction of Pass-A-Grille Way from 19th Ave. to W. Maritana Dr.

May 28th, 2015

Addendum 3: Additional Items for Clarification

1. There is conflicting information contained in notes 10 & 11 that repeat on plan sheets 2.01 through 2.10. Both notes state “sampling points for water distribution mains shall be collected and tested” but note 10 says “every 500 feet” and note 11 says “every 1200 feet”. Which is the correct sampling/testing distance for the distribution mains and what will be the required sampling distance for the transmission mains?

Please see the DEP permit for specific testing requirements. Transmission testing is every 1,200. Distribution testing is every 500-ft.

2. On sheet 2.07 at approx. sta. 54+00 there is a callout for a temporary tapping valve on the existing water main, which I am assuming is for the temp connections for MOT purposes as detailed on Sheet 8.13. Where these callout occur are we actually using temporary tapping sleeve and valves assemblies for temp tie-ins? At this location shouldn't we also have a temp tie-in of the reclaimed water main? There is not one shown but there is another location on Sheet 2.05 (sta. 44+50) where these temp tap sleeve & valves are called for on both mains. Should these temporary tapping sleeve & valve assemblies be bid under the pay items for permanent tap sleeve & valves or should there be an item for temp tie-ins?

Please include an item for temporary tie-ins. All temporary tie-ins need to be constructed on the project for both potable water and reclaimed water regardless of if they are specifically called out on the plans.

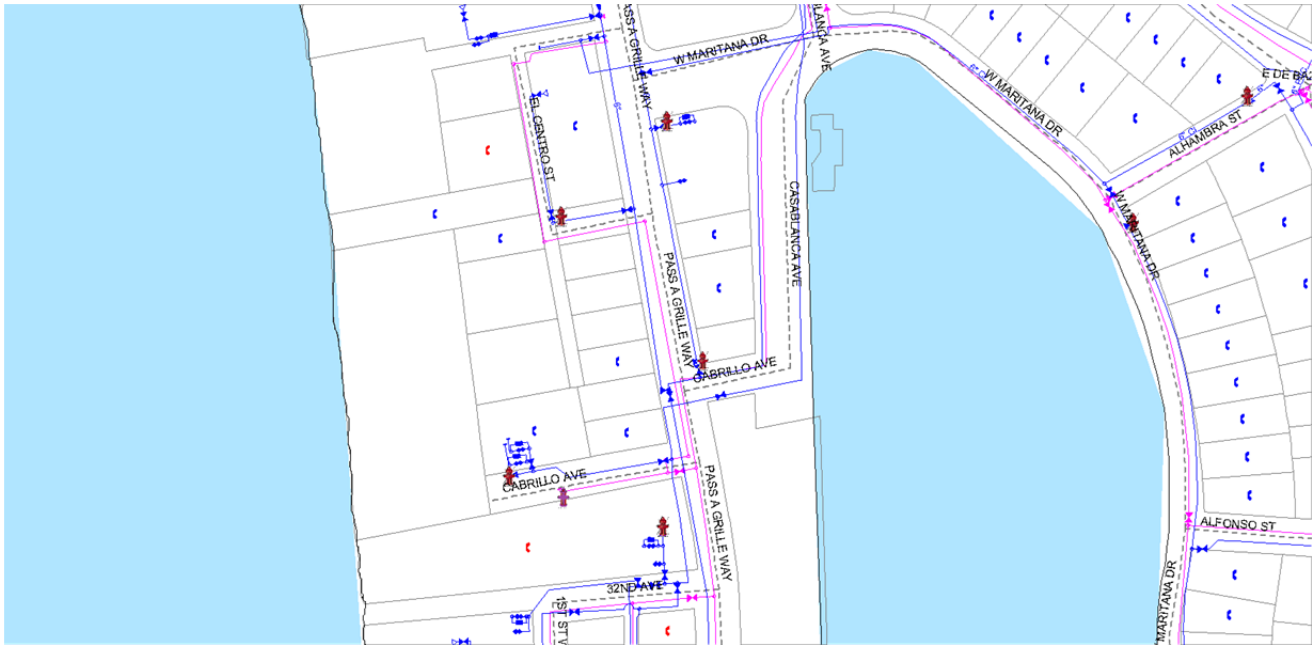
3. Under the reclaimed main and water main pay items on the bid form, there is an item with description 1080-11-43B (& 43F) UTILITY FIXTURES, F&I, 16”, TAPPING SADDLE and an item with description 1080-11-43C (& 43G) UTILITY FIXTURES, F&I, 16”, SLEEVE VALVE & BOX. Is this second item for a tapping sleeve valve & box and if so, what is the difference between the 16” tapping saddle and the 16” tapping sleeve? Can you clarify what we are to bid in these items?

Tapping sleeves are likely what you will be using on this project. If you believe any tapping saddles are needed then include a quantity and cost for that item, otherwise it can be left blank.

4. On Sheet 2.08, the plan view appears to show an existing water main running to the west on 32nd Ave on the south side of the road, outside of the curb. There is no direction as to what to do with this main or what size it is. Does it connect to the existing water main we are removing and, if so, do we tie-it to the new main? If we

are to tie it over, we will need further information on the main itself (size and pipe type).

The referenced water line is to remain. It is connected to an existing water line that will remain. Please see the graphic below for clarification.



5. On sheet 2.09 there are conflicting notes between the plan and profile views. At about sta. 61+50 on the plan view there is a note that says existing 16" PW to remain pointing directly to the existing water main. However at note on the profile view at sta. 61+00 states "existing 16" water main to be removed". Can you please clarify what we are doing with the existing water main at this location?

Between Cabrillo Avenue and 32nd there are two 16-inch water lines. The water line that on the south side of Cabrillo that then turns and goes north the entire distance of the project is being removed. The water line on the south side of cabrillo that head south to 32nd and then turn west will remain. The graphic above may also clarify the situation. The water line that will remain does contain some offset and valves to avoid some proposed stormwater work.

6. There is some additional conflicting information between the plan view and profile view on sheets 2.09 & 2.10. The plan view show us stopping the construction of the new reclaimed main at about sta. 61+80 and the new 16" water main at approx. sta. 63+00. However, the profile view shows the new reclaimed and water mains continuing north to the end of the sheet and has a note at sta. 64+50 to construct 16" DI water main and 16" DI reclaimed water main. The profile view on sheet 2.10 shows both mains continuing on and tying into the new main around sta. 66+20 but the plan

view shows nothing. Can you clarify what information is correct and where we are ending the new main construction and tying into the existing?

The water main construction stops at STA 63+00, except for any needed offsets past this point. The reclaimed water stops at STA 6+8-, except for any needed offsets past this point.

7. In Addendum 1, the answer for Item 15 B describes what you are looking for with regards to reclaimed and water main services but there is no information on the plans as to the quantity of the services or a count of them provided anywhere. The sanitary sewer services are shown on the plans, are we to assume any property with a sewer service also get a water service and reclaimed service? Alternatively, can a service count be provided?

It can be assumed that is sanitary/wastewater service, water and reclaimed should also be provided. We are estimating approximately 56 connections.

8. That same answers states that the existing water meter will be relocated to just inside the private property and outside of the existing right of way. Will Pinellas County forces be completing the meter relocation work? Our work limits are typically limited to inside of the right of way. If we are to complete the meter relocation work, have right of entries been procured from all of the properties or will that be the responsibility of the Contractor during the project?

The contractor will relocate the water meters. Any needed right of entries will be coordinated by Pinellas County or the City. If access cannot be obtained the meter may be place in unobstructed ROW.

9. In Addendum 2 Pinellas County Utilities provided a list of additional pay items for potable and reclaimed water mains to include in our bids. On the bid form, do we add these items under their respective categories or are we to add them at the end of the form? If at the end, does the Utility department want these pay items separately for both reclaimed and water mains or just one time to include work on either type of main?

Please separate the water and reclaimed items and give quantities for each. Please add them under their respective areas.

10. With regards to the added utility pay items requested above, there are some items we cannot find any of on the plans. In those instances how are we to bid those items with respect to a quantity? Do we provide a unit price and quantity of zero for reference if they are needed? As this is a lump sum proposal, we do not want to unnecessarily add to our total bid price by including items that will not be used.

A unit cost with a quantity of zero would be acceptable.

11. Further, there is a note next to the meter boxes for water and reclaimed that states “if the existing is not in good condition”. Again, how are we to bid this item with respect

to quantity? We do not have a count on the existing meters anywhere, no way to know what shape they are in and no what to define what constitutes “not in good condition”. Should this item simply have a unit price for replacement of meter boxes with a quantity of zero? Or can an allowance quantity be provided that all bidders must use.

Assume that all will be replaced and any that are in good condition will be deducted at that time.

12. Under the potable water section on the bid form, items SP-21, 22 & 23 are for 4”, 6” & 8” offset assemblies respectively. We cannot seem to find anywhere on the plans that these are called out. Can you please provide us with the intent of these bid items and define what we are to include in these items? If these are not identified anywhere in the plans, how are we to bid them with respect to quantity? Again are we to provide a theoretical unit price with a quantity of zero? If not, and this is an allowance type item, can a quantity be provided that all contractors must use to bid?

If you do not see the need for any of these items provide a unit price with a quantity of zero. Some may be needed at the connection of the side streets to the west. However, you may have just included 45-degree fitting at the connection point between the new line and the existing line to connect the two pipes. If you used the fitting method then that cost should have been included in the cost of the pipe. In either event, do not double count, making your estimate too high. The goal is that your final lump sum amount is correct.

13. On the bid form, item 1644-113-05 HYDRANT, F&I, STANDARD, 2 HOSE, ONE PUMPER, 2" is included in the potable water items and again at the bottom of the bid form. Is there any difference between the two items that we should be aware of?

There is no difference. Please use the item under the potable water section.

14. **The contractor will be obligated to provide a small work space in their job trailer for the City’s Construction Manager for daily use.**



RFB for Reconstruction of Pass-A-Grille Way from 19th Ave. to W. Maritana Dr.
May 22th, 2015

Addendum 2: Additional Pay Items and Verbiage from Pinellas County Utilities

1. *The following is a list of additional pay items related to potable and reclaimed water that Pinellas County Utilities has requested be included with your bids:*
 - a. 2" Restrained Joints
 - b. 4" Restrained Joints
 - c. 6" Restrained Joints
 - d. 8" Restrained Joints
 - e. 10" Restrained Joints
 - f. 16" Restrained Joints
 - g. 2" Concrete Dead Man
 - h. 4" Concrete Dead Man
 - i. 6" Concrete Dead Man
 - j. 8" Concrete Dead Man
 - k. 10" Concrete Dead Man
 - l. 16" Concrete Dead Man
 - m. Potable Water Meter Boxes (if the existing is not in good condition)
 - n. Reclaimed Water Meter Boxes (if the existing not in good condition)
2. *On page 110 of the Bid Documents and ITB provided by CPWG, Sections 3.8 and 3.9 have been revised to address a second valve for hydrants more than ten (10) feet from the main line and the elimination of U-branch connections, respectively. The revised page 110 is included with this Addendum.*
3. *Pinellas County Utilities has also asked us to reiterate that potable and reclaimed water improvements should be constructed in accordance with the following governing standards:*
 - a. *Pinellas County Technical Specifications for Utilities and Related Constructions*
 - b. *Pinellas County Utilities Standard Engineering Details*
 - c. *Pinellas County Utilities Approved Material Specification Manual*

Each hydrant shall be left turn opening and capable of delivering a flow of at least 500 gallons per minute with a residual design pressure of not less than 20 psi.

Fire hydrants shall be of the dry barrel break-away type conforming to AWWA C502, with two 2-1/2 inch threaded hose nozzles and one 4-1/2 inch threaded pumper nozzle, which must point toward the road. Hydrants shall have a 5-1/4 inch interior valve opening and be restrained from hydrant to the tee at the main. Restraint by use of "all-thread" rods shall not be allowed. At the discretion of the City Manager, additional protection for fire hydrants shall be provided including but not limited to concrete filled ductile iron traffic posts.

Fire hydrant branches (from main to hydrant) shall be a minimum of 6 inches inside diameter. Each branch shall be provided with a resilient seat gate valve located as close as possible to the main. Hydrants shall be located near road lines with pumper discharge nozzle facing as directed by the Fire Marshall. Hydrants shall be laid to minimize their vulnerability to traffic. A clear zone around all fire hydrants shall be adhered to, consisting of a five (5) foot radius around the hydrant and seven (7) feet above the top of the hydrant. Placement of landscaping, fencing, etc. shall be considered in order to meet this clear zone requirement. **In the event that the hydrant is more than ten (10) feet away from the main line, a second valve shall be installed.**

3.9. Water Service Lines and Taps

No direct service taps shall be allowed. Only double strap brass saddles shall be used. Saddles shall be IP thread pattern and material as required by the City.

Water service taps on the main shall be spaced at a minimum distance of 18 inches apart and a minimum of 18-inches from a bell or fitting. Consecutive taps shall be offset 45 degrees. All service line taps shall be supplied with corporation stops. Angle meter valves must be installed for each service. All service lines shall be installed in accordance with the construction details of this manual. Service line tubing shall be polyethylene PE 3408 material conforming with AWWA C901, SDR 9. Tubing shall be installed in a continuous length with no in-line fittings. ~~except for U-branch for multi meters between corporation stop and angle stop.~~ Tubing shall be routed through a 2-inch PVC Schedule 40 sleeve. The minimum size for ~~single and double services shall be 1-inch to the U-branch and 3/4-inch for each service from the U-branch.~~ services over 50-feet shall be 1-1/2 inch minimum.

Services shall not exceed 100 feet from the main to the meter.

A line valve shall be provided by the design Engineer on the building side of the meter in an easily-accessible location for use by the building tenant.

3.10. Meter Installation



RFB for Reconstruction of Pass-A-Grille Way from 19th Ave to Cabrillo Ave
May 20th, 2015

Addendum 1: Various revisions and clarifications

1. *The northern boundary of the project is West Maritana Drive, not Cabrillo Avenue as listed on the Request for Bid and project plan cover pages. This error was in titles only, as the plan sheets and details show the correct boundaries. Therefore, revisions to the project plans, specifications, or bid documents as distributed will not be made. All bids should include reconstruction from 19th Avenue to West Maritana Drive.*
2. *The deadline for bid submittal is June 2nd, 2015 at 11:00 am at City Hall in St. Pete Beach, FL, as indicated on page 4 of the RFB. The title page of the RFB incorrectly states a deadline of 10:00 am.*
3. *The proposed spacing of the Washingtonia Palm trees along Pass-A-Grille Way is one tree every 25 feet on both sides of the road, not one tree every 50 feet as indicated on the project plans. While final planting locations will be determined by the City on a tree by tree basis prior to tree purchase, please assume one tree every 25 feet for bidding purposes.*
4. *Bid Alternate 3 on page 7 of the Bid Documents and ITB provided by CPWG should be replaced with the following:*

Alternate 3 – Extended Work Hours and Night Work (hour and days at contractor's discretion)

Extend work hours to ___ hour per day, from ____ AM to ____ PM on weekdays, _____ hours on Saturday, and ___ hours on Sunday.

Please 'X' _____ Add _____ Deduct

ALTERNATE 3:

_____DOLLARS
(In Words)

\$_____ (in numbers)

NEW DAYS TO FINAL COMPLETION _____

5. *The following is presented to clarify the responsibilities of the contractor with regard to Duke Energy/Brighthouse/Verizon connection to residential and commercial structures:*
 - a. *For residential*
 1. *Install Conduit (transformer/pedestal to meter) - **Contractor***
 2. *Convert meter can to underground if needed - **Contractor***

3. Pull wire from pedestal/transform through the conduit to the meter – Duke, etc. (Contractor to coordinate)
 4. Connect wire to meter – Duke, etc. (Contractor to coordinate)
 5. Confirm structure has power as before – Duke, etc. (Contractor to coordinate)
- b. For commercial (essentially the contractor will be responsible for everything from the pedestal/transformer to the structure)
1. Install Conduit (transformer/pedestal to meter) - **Contractor**
 2. Convert meter can to underground if needed - **Contractor**
 3. Pull wire from pedestal/transformer through the conduit to the meter **Contractor**
 4. Connect wire to meter – **Contractor**
 5. Confirm structure has power as before - **Contractor**
6. The completion date listed on page 7 of the RFB should read “Twelve months from Notice to Proceed”, not “November 30th, 2016”.
 7. There will be no stamped sidewalk incorporated into this project. Therefore, the assertion that stamped sidewalk should be placed for “A. Sidewalk south of 21st Avenue” in section 275 (1.02 Materials) on page 118 of the Bid Documents and ITB provided by CPWG is incorrect and should not be incorporated in bidding.
 8. A “detailed listing of testing schedule” does not need to “accompany bid submission” as stated in Special Provision SP-06 on page 23 of the Bid Documents and ITB provided by CPWG.
 9. The “Utilities” section on page 18 of the RFB incorrectly states that “No extra payment shall be allowed for the removal, replacement, repair or possible increased cost caused by underground obstructions.” This sentence should be removed from the RFB and is not applicable.
 10. The “Labor Provisions” section on page 15 of the RFB incorrectly states “The State of Florida prevailing wage law requires that the Contractor shall fully comply with all provisions contained in Section 215.19, “Schedule of Prevailing Wage Rates for Specified Public Construction.” The wage rates set forth by such determination shall apply to this project.” As this project does not incorporate federal funding, this sentence should be removed from the RFB and is not applicable.
 11. Pay Item 285-708 on page 9 of the Bid Documents and ITB provided by CPWG should read “Optional Base Group 07”, not “Optional Base Group 06”.
 12. The “Liability Insurance” section on page 16 of the RFB incorrectly states that Marine General Liability Insurance including Longshore Harbor Worker’s is required. This insurance is not required.

13. *Change orders for increased material prices, such as asphalt, will not be entertained.*
14. *Any subsurface utility locates needed, should be included in the cost of the pipe system being installed.*
15. *The following is a list of additional clarifications requested via email (in bold below) with responses from the Engineer of Record in italics:*

- A. A number of the pay items provided have FDOT numbers that are not in agreement with the description you have provided. What do you want us to do with those? (One example is 425-1-523. Your item description reads “INLETS DBI TYPE C” whereas the FDOT description for that number reads “INLETS, DT BOT, TYPE C, JBOT, <10”’, a much more expensive version of a C inlet.)**

The pay item numbers and descriptions are provided for informational purposes only. Please add the pay item number and description you are using, along with the unit cost and quantity. If a provided pay item number is not used or incorrect the contract should simply put zero quantity and NA for unit cost.

- B. Please clarify what you expect us to include in item SP-27, CONNECT DUKE, BRIGHTHOUSE AND VERIZION TO HOUSES. Typically this work is performed by the impacted utility. The special provisions do not adequately address this as this item is only addressed in regard to sanitary sewer (SP-27 WASTEWATER LATERALS The contractor will provide new laterals from new wastewater line to ROW line. Contractor will connect new lateral to existing lateral at the ROW line using a clean-out.). Please also clarify if we are to reconnect the wastewater lateral as this is not one of the items of work you list.**

See Item 5 listed above regarding contractor responsibility with regard to Duke Energy, Brighthouse, and Verizon. For estimating purposes it can be assumed that 100-ft of 2-inch conduit will be installed for each utility at each house, or a total of 300-ft of 2-inch conduit per house

New wastewater laterals will be installed from the new pipe to the right-of-way line. A clean out will be installed at the right-of-way line

New reclaimed water service line will be installed from the new reclaimed water line to the right-of-way line. The new pipe will be connected to the existing pipe at the right-of-way line.

New potable water service line will be installed from the new 8-inch pipe to the right-of-way line. The new pipe will be connected to the existing pipe at the right-of-way line. The meter will be relocated to just inside the private property and outside of the existing right-of-way. Representatives from Pinellas County Utilities will be onsite during potable water related activities and can provide additional guidance.

- C. On plan sheet 3.01 at the east end of 22ND Ave. you have a note (with an arrow) that reads “CONNECT EXIST. 8” PIPE TO MANHOLE” where the arrow points to what appears to be a line identified as “UNKNOWN” that currently penetrates the wall on one end and appears to simply end on the other. What do you want done? Neither end is proximate to the proposed manhole or an existing manhole so we are unclear as to what your intent is.**

The survey shows an existing 8-inch pipe discharging into the bay through the seawall. It is assumed that the line is a roof drain or other storm water outfall pipe. The contractor is to confirm if the line is still in use. If it is still in use the pipe should be connected to the new storm water manhole. If it is not in use, it can be removed.

- D. On plan sheet 3.01 at the east end of 22ND Ave. you have a note (with an arrow) that reads “2 WASHI PALMS TO BE PRESERVED”. Please explain what your intent is. The location of these palms is not shown, so we are unsure if they need to be relocated or if they are out of the way and simply need tree barricades or something. Also, is WASHI an abbreviation or something? We are unfamiliar with this description.**

There are two Washingtonia Palms (referred to as “WASHI” in the Project Plans) at the east end of the alleyway at the approximate location of the arrow. These trees are to remain. Your site visit will help to determine what needs to be done with the trees. They likely need to be barricaded and braced, as they are between the existing and new outfalls. The new outfall can be adjusted somewhat to better preserve the trees.

- E. Where we are replacing an existing storm outfall, do the existing inverts match the proposed or will the seawall have to be repaired? If it has to be repaired, please provide a detail of your expected method.**

Please see Sheet 8.02 for the detail associated with the seawall repair. The existing and proposed inverts do not match. Please see the 3.xx series sheets for proposed and existing inverts.

- F. Note 7 of the Paving and Drainage notes calls for all storm pipe to be Nyoplast unless otherwise noted on the plans. The pipe all appears to be called out as RCP, ERCP, or HDPE. Where is it you anticipate using this Nyoplast pipe?**

*Note 7 on the Paving and Drainage notes on page 1.01 of the Project Plans should be changed to all stormwater pipe to be **RCP** unless otherwise noted on the plans.*



III. BID DOCUMENTS/INVITATION TO BID

Paving & Drainage Improvements

PASS A GRILLE WAY FROM 19TH AVE TO CABRILLO AVE

Specifications

City of St Pete Beach, Florida
Wayne Saunders, City Manager
Ian Wade, PE Project Manager

St. Pete Beach
7581 Boca Ciega Dr.
St. Pete Beach, FL 33706
(727) 363-9254

CPWG, Inc.
708 Lithia Pinecrest Road, Suite 101
Brandon FL 33511

TABLE OF CONTENTS

Contents

Specifications	1
SCOPE OF PROJECT	1
CONTACTS	2
GOVERNING SPECIFICATIONS.....	3
BID DOCUMENTS.....	4
SPECIAL PROVISIONS.....	22
LIQUIDATED DAMAGES	30
SECTION 101- MOBILIZATION.....	31
SECTION 102 - MAINTENANCE OF TRAFFIC.....	33
SECTION 104 - PREVENTION, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION.....	47
SECTION 110 - CLEARING AND GRUBBING.....	57
SECTION 120 - EXCAVATION AND EMBANKMENT.....	68
SECTION 160 - STABILIZING	86
SECTION 162 - FINISH SOIL LAYER	92
SECTION 200 - LIMEROCK BASE.....	94
SECTION 2222 - EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES.....	99
SECTION 2660 - WATER DISTRIBUTION SYSTEM	104
SECTION 275 – STAMPED CONCRETE SURFACES.....	118
SECTION 2780 – DETECHABLE WARNING PAVERS	120
SECTION 2830 - CHAIN LINK FENCE AND GATES.....	130
SECTION 285 OPTIONAL BASE COURSE	134
SECTION 334 SUPERPAVE ASPHALT CONCRETE.....	137
SECTION 3100 - CONCRETE FORMWORK.....	161
SECTION 3200 - CONCRETE REINFORCEMENT	166
SECTION 3300 - CAST-IN-PLACE CONCRETE.....	169
SECTION 425 - INLETS, MANHOLES, AND JUNCTION BOXES	178
SECTION 430 - PIPE CULVERTS AND STORM SEWERS	183
SECTION 520 - CONCRETE GUTTER, CURB ELEMENTS, AND TRAFFIC SEPARATOR	198
SECTION 522 - CONCRETE SIDEWALKS	202

SECTION 570 - GRASSING (BY SEEDING)	208
SECTION 575 - SODDING	213
SECTION 580 - LANDSCAPE INSTALLATION	216
SECTIONS 581-2 and 583-4 - LANDSCAPING	223
SECTION 710 - PAINTING TRAFFIC STRIPES	239
SECTION 711 – THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS	245
SECTION 911 – BASE AND STABILIZED BASE MATERIALS	250
SECTION 914 – STABILIZATION MATERIALS	253
SUBSECTION 1715 - WIRE AND CABLE	267
SECTION 16195 - ELECTRICAL IDENTIFICATION	282
Appendix A - Pinellas County Specifications	286
Appendix B – Geotechnical Report	287
Appendix C – SWFWMD Permit Exemption	288
Appendix D – DEP WASTEWATER PERMIT	289

SCOPE OF PROJECT

This project involves the reconstruction of Pass A Grille Way from 19th Avenue to Cabrillo Avenue in St Pete Beach, FL. In addition to the reconstruction of the roadway and roadway base, the project also includes utility replacements (sewer, potable water, reclaimed water, stormwater and undergrounding electric, cable television, telephone) and construction of special drainage and flood control structures.

This document will provide guidance relative to the scope of the work, specifications to be followed, and special provisions to be used in the construction of the project.

CONTACTS

Should bidders have questions, or require clarifications to complete their bids, inquiries should be directed to:

Jeff Earhart, CPWG

407-267-8905 - cell

jeff.earhart@cpwgengineering.com

All items sent to Jeff Earhart should also be copied to Ian Wade.

Ian Wade, Project Manager

7581 Boca Ciega Dr.

St. Pete Beach, FL 33706

(727) 363-9254

iwade@stpetebeach.org

GOVERNING SPECIFICATIONS

The governing specifications for work performed under this contract shall be the following:

- Standard Technical Specification for Roadway and Related Construction, latest edition, Pinellas County Department of Environment and Infrastructure
- Standard Technical Specifications for Utilities and Related Construction, latest edition, Pinellas County Department of Environment and Infrastructure, and
- Standard Specifications for Road and Bridge Construction, latest edition, Florida Department of Transportation

The latest copies of the Pinellas County Specifications are attached, and FDOT's Specifications are available at the following address:
<http://www.dot.state.fl.us/specificationsoffice/>.

If conflicts exist between the Pinellas County and the FDOT specifications, the Pinellas County Specifications will govern. All utility work will be governed by the Pinellas County Specifications.

In addition to the above, there are several special provisions to be followed that are documented herein. These Special Provisions supersede any specifications contained in the above listed documents.

References to Pinellas County or FDOT as the project owner in the project documents shall be interpreted to be the City of St Pete Beach as the owner for this project.

BID DOCUMENTS
FOR
Paving & Drainage Improvements Pass A Grille Way from 19th Ave to Cabrillo Ave

Mail or Hand Deliver

ORIGINAL BID FORM AND FIVE (5) COMPLETE COPIES

BY the date and time specified in the bid documents

COMPANY NAME

COMPLETE MAILING ADDRESS

CITY, COUNTY, STATE, ZIP CODE

TELEPHONE NUMBER FAX NUMBER

CONTACT PERSON E-MAIL ADDRESS

**To the City Commissioners
St. Pete Beach, Florida**

The Undersigned, hereinafter called "Bidder", having visited the site of the proposed project and familiarized himself with the local conditions, nature and extent of the work, and having examined carefully the Contract Form, General Conditions, Supplementary Conditions, Plans, Permitting and Specifications and other Contract Documents, with the Bond requirements herein, proposes to furnish all labor, materials, equipment and other items, facilities and services for the proper execution and completion of: **Paving, Utilities & Drainage Improvements along Pass A Grille Way from 19th Ave to Cabrillo Ave** in full accordance with the drawings and specifications prepared in accordance with the Contract Documents and, if awarded the Contract, to complete the said work within the time limits specified for the following TOTAL BASE BID.

It is understood that this is a lump sum Contract and the resultant Contract will contain lump sum prices for the base bid and alternates. Supporting information including estimated quantities, unit prices, and extended totals will be included as an appendix to the contract. The base bid and alternates shall be sum of all pay item totals from the schedule of prices developed by the contractor.

The Contract resulting from this project is based on plans and specifications provided to the contractor. The contractor will develop a detailed list of pay item and associated unit costs and provide this with the bid package. After bid submittal this will be compared to the quantities developed by the City.

TOTAL BASE BID (Includes Supplement 1 and 2):

_____ DOLLARS
(In Words)

\$_____ (in numbers)

DAYS TO FINAL COMPLETION _____
(preference will be given to accelerated schedules)

In the event the Contract is awarded to this Bidder, he/she will enter into a formal written agreement with the City in accordance with the accepted bid within ten (10) calendar days after said Contract is submitted to him/her and will furnish to the City a Contract Payment and Performance Bond with good and sufficient sureties, satisfactory to the City, in the amount of 100% of the accepted bid. The Bidder further agrees that in the event of the Bidder's default or breach of any of the agreements of this proposal, the said bid deposit shall be forfeited as liquidated damages.

Failure of the Bidder to provide pricing for all unit priced items and/or the Base Bid and ALL requested additive/deductive bid items, or alternate bids may be cause for rejection of the bid as non-responsive at the exclusive discretion of the City.

Supplemental bid Item #1 – Potable Water Line

Pinellas County is providing all funding for the Potable Water Line so it is necessary to have a separate lump sum bid for potable water line.

SUPPLEMENTAL BID ITEM #1:

_____ DOLLARS

(In Words)

\$_____ (in numbers)

Supplemental bid Item #2 – Reclaimed Water Line

Pinellas County is providing partial funding for the Reclaimed Water Line so it is necessary to have a separate lump sum bid for reclaimed water line.

SUPPLEMENTAL BID ITEM #2:

_____ DOLLARS

(In Words)

\$_____ (in numbers)

Alternate 1 – Reclaimed Water

The base bid includes removing the entire length of 16-inch reclaimed water line and replacing it with a new 16-inch reclaimed water line. Alternate 1 is to leave the existing 16-inch reclaimed water line in service and provide deflections at the conflicts with the proposed stormwater line.

Please 'X' _____ Add _____ Deduct

ALTERNATE 1:

_____ DOLLARS

(In Words)

\$_____ (in numbers)

Alternate 2 – Extended Work Hours

Extend work hours to 14 hour days, 6 AM to 8 PM on weekdays and 4 hours on Saturday.

Please 'X' _____ Add _____ Deduct

ALTERNATE 2:

_____ DOLLARS

(In Words)

\$_____ (in numbers)

NEW DAYS TO FINAL COMPLETION_____

Alternate 3 – Extended Work Hours and Night Work

Extend work hours to 14 hour days, 6 AM to 12 PM on weekdays and 4 hours on Saturday.

Please 'X' _____ Add _____ Deduct

ALTERNATE 3:

_____ DOLLARS

(In Words)

\$ _____ (in numbers)

NEW DAYS TO FINAL COMPLETION _____

Alternate 4 – Extended Work Hours (Two Crews)

Provide a cost or credit to add a second crew after the first section of the project with the temporary lane is completed. The second crew would work through the completion of the remainder of the project.

Please 'X' _____ Add _____ Deduct

ALTERNATE 4:

_____ DOLLARS

(In Words)

\$ _____ (in numbers)

NEW DAYS TO FINAL COMPLETION _____

Alternate 5 – Pavers at 21st Avenue Intersection

The base bid includes salvaging existing bricks from under the existing roadway. The alternate is to use new engineered traffic bearing pavers instead of the salvaged bricks.

Please 'X' _____ Add _____ Deduct

ALTERNATE 5:

_____ DOLLARS

(In Words)

\$ _____ (in numbers)

Alternate 6 – Existing Bricks Under the Existing Asphalt

The geotechnical report indicates the presence of historic brick pavers under the existing asphalt. The base bid assumes that this material is to be disposed of by the contractor. This disposal could be through landfilling, storage or sale. The geotechnical report only gives a snapshot at one specific location. However, it is estimated that as much as 5,222 SY of historic brick may be under the asphalt. This alternative is to salvage, stack on pallets, and deliver to City of St. Pete Beach storage area.

Please 'X' _____ Add _____ Deduct

ALTERNATE 6:

_____ DOLLARS

(In Words)

\$_____ (in numbers)

GENERALIZED LIST OF PAY ITEMS

The City, through its engineer, has developed a Generalized List of Pay Items to be used by Contractors to develop bids. This list, however, may not be complete, and bidders are advised to review the list, and add or delete items in their bid as they determine necessary to complete the project.

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
General					
101-1	MOBILIZATION (4.5%)	LS			
102-2	MAINTENANCE OF TRAFFIC (4.5%)	LS			
104-11	FLOATING TURBIDITY BARRIER	LF			
104-12	STAKED TURBIDITY BARRIER – NYLON REINFORCED PVC	LF			
110-1-1	CLEARING AND GRUBBING	LS			
SP-1	AS-BUILT PLANS	LS			
SP-2	INDEMNIFICATION	LS			
SP-3	SURVEY CONTROL	LS			
SUB-TOTAL					
Roadway					
110-4	REMOVAL OF EXISTING CONCRETE (SIDEWALK & CURB)	SY			
120-1	REGULAR EXCAVATION	CY			
120-2-2	BORROW EXCAVATION, TRUCK MEASURE	CY			
160-4	TYPE B STABILIZATION	SY			
285-708	OPTIONAL BASE GROUP 06	SY			

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
327-70-2	MILLING EXISTING ASPHALT PAVEMENT, 3.5" AVERAGE	SY			
334-1-13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	TN			
SP-4	SHELL PAVEMENT (9-INCHES THICK)	SY			
SUB-TOTAL					
Stormwater and Curbing					
400-95-2	COFFERDAM	EA			
425-1-20	INLETS TYPE 9	EA			
425-1-523	INLETS DBI TYPE C	EA			
425-1-549	INLETS DBI TYPE D (MODIFIED)	EA			
425-1-711	INLETS TYPE V , 10'	EA			
425-2-41	MANHOLES P-7, < 10'	EA			
425-2-71	MANHOLES J-7, < 10'	EA			
425-10	YARD DRAIN, 12" HDPE	EA			
425-3-81	JUNCTION BOX , SPECIAL, < 10', BAFFLE BOXES	EA			
430-175-112	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, 12 HDPE	LF			
430-175-115	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, 15" RCP	LF			
430-175-115	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, 15" HDPE	LF			
430-173-218	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, ELLIPTICAL EQUIVALENT FOR 18"	LF			

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
430-175-124	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, 24" RCP	LF			
430-175-224	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, ELLIPTICAL EQUILAVENT FOR 24"				
436-1-1	TRENCH DRAIN, 6"-12"	LF			
430-830	PIPE FILLING AND PLUGGING	CY			
1055-11-274	UTILITY FITTINGS, HDPE, CLEANOUT 15"	EA			
SP-4	SEAWALL REPAIR	EA			
519-78	BOLLARDS	EA			
520-1-10	CONCRETE CURB AND GUTTER, TYPE F	LF			
520-2-4	CONCRETE CURB TYPE D	LF			
520-3	CONCRETE VALLEY GUTTER	LF			
520-2-5	CONCRETE RIBBON CURB	LF			
522-1A	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY			
522-1B	CONCRETE SIDEWALK AT ADA RAMP, 4"	SY			
522-1C	STAMPED CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY			
522-2A	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY			
522-2B	STAMPED CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY			
526-1-1	PAVERS, ARCHITECTURAL	SY			
527-2	DETECTABLE WARNINGS	SF			
SP-5	MANATTE PROTECTION BARRIERS	EA			

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
SP-6	CONCRETE WHEEL STOPS	EA			
SP-7	DEWATER FOR STORMWATER	LS			
SUB-TOTAL					
Landscaping					
570-1-2	PERFORMANCE TURF, SOD	SY			
580-4-447	LANDSCAPE-PALMS, WASHINGTONIA ROBUSTA, 25' TO 30' CT	EA			
SUB-TOTAL					
Wastewater					
1050-11-222	18-INCH C900 PVC (GRAVITY)	LF			
1050-11-222	15-INCH C900 PVC (GRAVITY)	LF			
1050-11-222	10-INCH C900 PVC (GRAVITY)	LF			
1050-11-222	8-INCH C900 PVC (GRAVITY)	LF			
1050-11-222	8-INCH C900 PVC (FORCE MAIN)	LF			
1050-11-222	6-INCH C900 PVC (FORCE MAIN)	LF			
SP-8	18-INCH FERNCO ADAPTER	EA			
SP-9	10-INCH FERNCO ADAPTER	EA			
SP-10	8-INCH FERNCO ADAPTER	EA			
1060-12-12	MANHOLES (WASTEWATER)	EA			
SP-11	LATERALS WITH NEW CLEANOUT	EA			
SP-12	REMOVE EXISTING MANHOLES	EA			
SP-13	REMOVE EXISTING 16" VCP	LS			
SP-14	DEWATERING FOR WASTEWATER	LS			
SUB-TOTAL					

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
Reclaimed					
1050-11-424	UTILITY PIPE, F&I, DI, RECLAIMED WATER, 16"	LF			
SP-15	REMOVE EXISTING 16" DI	LF			
1080-11-23	UTILITY FIXTURES, F&I, 4", SLEEVE VALVE AND BOX	EA			
1080-11-24A	UTILITY FIXTURES, F&I, 4", RESILENT WEDGE VALVE AND BOX	EA			
1080-11-33A	UTILITY FIXTURES, F&I, 6", TAPPING SADDLE	EA			
1080-11-34A	UTILITY FIXTURES, F&I, 6", RESILENT WEDGE VALVE AND BOX	EA			
1080-11-43A	UTILITY FIXTURES, F&I, 10", TAPPING SADDLE	EA			
1080-11-44A	UTILITY FIXTURES, F&I, 10", RESILENT WEDGE VALVE AND BOX	EA			
1080-11-43B	UTILITY FIXTURES, F&I, 16", TAPPING SADDLE	EA			
1080-11-44B	UTILITY FIXTURES, F&I, 16", RESILENT WEDGE VALVE ASSEMBLY	EA			
SP-16	4-INCH PVC OFFSET	EA			
SP-17	SERVICE LINES WITH NEW CLEANOUT	EA			
SP-18	DEWATERING FOR RECLAIMED WATER	LS			
SP-19	16-INCH DI OFFSET (ALTERNATE)	EA			
				SUB-TOTAL	

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
Potable Water					
1050-11-424	UTILITY PIPE, F&I, DI, POTABLE WATER, 16"	LF			
SP-20	REMOVE EXISTING 16" DI	LF			
1050-11-222	UTILITY PIPE, F&I, PVC, WATER (2")	LF			
1050-11-222	UTILITY PIPE, F&I, PVC, WATER (6")	LF			
1050-11-222	UTILITY PIPE, F&I, PVC, WATER (8")	LF			
1050-11-222	UTILITY PIPE, F&I, PVC, WATER (10")	LF			
1080-11-23	UTILITY FIXTURES, F&I, 2", SLEEVE VALVE AND BOX	EA			
1080-11-24B	UTILITY FIXTURES, F&I, 2", RESILENT WEDGE VALVE ASSEMBLY W/BOX	EA			
1080-11-33B	UTILITY FIXTURES, F&I, 6", SLEEVE VALVE AND BOX	EA			
1080-11-34B	UTILITY FIXTURES, F&I, 6", RESILENT WEDGE VALVE ASSEMBLY W/BOX	EA			
1080-11-43C	UTILITY FIXTURES, F&I, 10", SLEEVE VALVE AND BOX	EA			
1080-11-43D	UTILITY FIXTURES, F&I, 16", SLEEVE VALVE AND BOX	EA			
1080-11-44C	UTILITY FIXTURES, F&I, 8", RESILENT WEDGE VALVE ASSEMBLY W/BOX	EA			
1080-11-44D	UTILITY FIXTURES, F&I, 16", RESILENT WEDGE VALVE ASSEMBLY W/BOX	EA			
SP-21	4-INCH PVC OFFSET ASSEMBLY	EA			

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
SP-22	6-INCH PVC OFFSET ASSEMBLY	EA			
SP-23	8-INCH PVC OFFSET ASSEMBLY	EA			
1644-113-05	FIRE HYDRANT, F&I, STANDARD, 2 HOSE, ONE PUMPER, 2"	EA			
SP-24	SERVICE LINES WITH NEW CLEANOUT (1")	EA			
SP-25	SURVEY, CONTROL, TESTING AND ADMINISTRATION (POTABLE WATER ONLY)	LS			
SP-26	DEWATERING FOR POTABLE WATER	LS			
SUB-TOTAL					
Utility Conduits					
630-2-11	CONDUIT, F&I, OPEN TRENCH				
630-2-11A	1-2" (TRAFFIC SIGNAL)	LF			
630-2-11B	1-2" (LIGHTING / DUKE)	LF			
630-2-11C	1-2" (BRIGHTHOUSE)	LF			
630-2-11D	1-2" (CITY)	LF			
630-2-11E	1-4" (DUKE)	LF			
630-2-11F	1-4" (VERIZON)	LF			
630-2-11G	1-4" (CITY)	LF			
630-2-11H	1-6" (DUKE)	FL			
SP-27	CONNECT DUKE, BRIGHTHOUSE AND VERIZON TO HOUSES	EA			
SUB-TOTAL					

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
Traffic Signal					
632-7-2	SIGNAL CABLE, REPAIR	LF			
646-1-11	ALUMINUM SIGNALS POLE, F&I, PEDESTAL	EA			
649-40	STEEL MAST ARM ASSEMBLY - RECOATING, COMPLETE POLE ASSEMBLY, BLACK	EA			
653-1-12	PEDESTRIAN SIGNAL, F&I, 2 WAY LED COUNTDOWN	AS			
660-4-10	VEHICLE DETECTION SYSTEM - VIDEO, F&I, COMPLETE SYSTEM	EA			
665-1-11	PEDESTRIAN DETECTOR, F&I, STANDARD	EA			
670-5-400	TRAFFIC CONTROLLER ASSEMBLY, MODIFY	AS			
690-20	SIGNAL PEDESTRIAN ASSEMBLY, REMOVE	EA			
690-90	REMOVE CONDUIT AND CABLING	PI			
690-100	SIGNAL EQUIPMENT, MISCELLANEOUS REMOVE	PI			
				SUB-TOTAL	
Striping					
700-1-11	SINGLE POST SIGN, F&I, UP TO 12 SF (PED CROSSING)	AS			
700-1-11	SINGLE POST SIGN, F&I, UP TO 12 SF (STOP SIGN)	AS			
700-1-50	SINGLE POST SIGN, RELOCATE	EA			
700-1-60	SINGLE POST SIGN, REMOVE	EA			

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
706-3	RETRO-REFLECTIVE PAVEMENT MARKERS, Y/Y	EA			
711-11-10X	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 4" SOLID LONGITUDINAL (PARKING SPOT)	LF			
711-11-101	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 6" SOLID LONGITUDINAL	LF			
711-11-103	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 12" SOLID LONGITUDINAL	LF			
711-11-105	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 24" SOLID LONGITUDINAL	LF			
711-11-151	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 6" DOTTED/GUIDELINES, 2-4 SKIP	LF			
711-11-160	THERMOPLASTIC, STD, WHITE, MESSAGE (NO PARKING)	EA			
711-11-160	THERMOPLASTIC, STD, WHITE, MESSAGE (BIKE)	EA			
711-11-170	THERMOPLASTIC, STD, WHITE, ARROW	EA			
711-11-201	THERMOPLASTIC PAVEMENT MARKINGS, STD, YELLOW, 6" SOLID LONGITUDINAL	LF			
711-11-201	THERMOPLASTIC PAVEMENT MARKINGS, STD, YELLOW, 6" SOLID LONGITUDINAL DIAGONAL	LF			
SUB-TOTAL					
BASE BID TOTAL					

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
	CITY OF PAY THE FOLLOWING DIRECTLY TO UTILITY COMPANY				
	CHECK TO VERIZON				
	CHECK OF BRIGHTHOUSE				
	CHECK TO DUKE				

CONTRACTOR MAY USE ANY OF THE PAY ITEMS BELOW OR ADD IN ADDITIONAL PAY ITEMS

102-2-1	SPECIAL DETOUR 1	LS			
102-2-2	SPECIAL DETOUR 2	LS			
102-14	TRAFFIC CONTROL OFFICER	MH			
102-60	WORK ZONE SIGN	ED			
102-6	BUSINESS SIGN	EA			
102-71-11	TEMPORARY BARRIER WALL (CONCRETE)	LF			
102-74-1	CHANNELIZING DEVICE (TYPE 1 & 2)	ED			
102-75-1	TEMPORARY LANE SEPARATOR	LF			
102-76	ARROW BOARD / ADV WARNING ARROW PANEL	ED			
102-78	TEMPORARY RETROREFLECTIVE PAVEMENT MARKER	EA			
102-79	TYPE C STEADY BURN LIGHT, TEMPORARY, BARRIER WALL MOUNT	ED			
102-99	PORTABLE CHANGEABLE MESSAGE SIGN TEMPORARY	ED			

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
102-911-1	REMOVABLE TAPE PAVEMENT MARKING - WHITE (SOLID)	LF			
102-912-2	REMOVABLE TAPE PAVEMENT MARKING - YELLOW (SOLID)	LF			
104-10-3	SEDIMENT BARRIER	LF			
104-18	INLET PROTECTION SYSTEM	EA			
110-7-1	MAILBOX (F & I) (SINGLE)	EA			
121-70	FLOWABLE FILL	CY			
125-1	EXCAVATION FOR STRUCTURES	CY			
286-1	TURNOUT CONSTRUCTION	SY			
286-2	TURNOUT CONSTRUCTION, ASPHALT	TN			
337-7-32	ASPHALT CONCRETE FRICTION COURSE, TRAFFIC C	TN			
339-1	MISCELLANEOUS ASPHALT PAVEMENT	TN			
400-2-1	CONCRETE CLASS II (CULVERT)	CY			
425-2-61	MANHOLES P-8, < 10'	EA			
522-4	BUS SHELTER PAD - CONCRETE	SY			
715-4600	LIGHT POLE COMPLETE, REMOVE	EA			
1050-11-222	UTILITY PIPE, F&I, PVC, WATER/ SEWER				
	4"	LF			
	8"	LF			
	16"	LF			
1050-11-314	UTILITY PIPE, F&I, HDPE, STORM				
	12"	LF			
	15"	LF			
1050-11-424	UTILITY PIPE, F&I, DI,	EA			

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
	RECLAIM WATER, 16"				
1055-11-214	UTILITY FITTINGS, PVC, ELBOW				
	8"	EA			
	12"	EA			
	15"	EA			
	16"	EA			
1055-11-224	UTILITY FITTINGS, PVC, TEE				
	8"	EA			
	12"	EA			
	15"	EA			
	16"	EA			
1055-11-244	UTILITY FITTINGS, PVC, UNION				
	8"	EA			
	12"	EA			
	15"	EA			
	16"	EA			
1055-11-274	UTILITY FITTINGS, PVC, CLEANOUT				
	8"	EA			
	12"	EA			
1055-11-274	UTILITY FITTINGS, HDPE, CLEANOUT 15"	EA			
	16"	EA			
1080-11-12	UTILITY FIXTURES, F&I, 1", BACKFLOW ASSEMBLY	EA			

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST
1080-11-22	UTILITY FIXTURES, F&I, 4", BACKFLOW ASSEMBLY	EA			
1080-11-23	UTILITY FIXTURES, F&I, 4", TAPPING SADDLE	EA			
1080-11-24	UTILITY FIXTURES, F&I, 4", VALVE ASSEMBLY	EA			
1080-11-43	UTILITY FIXTURES, F&I, 8", TAPPING SADDLE	EA			
1080-11-45	UTILITY FIXTURES, F&I, 8", BLOW OFF ASSEMBLY	EA			
1080-11-49	UTILITY FIXTURES, F&I, 8", MECHANICAL JOINT RESTRAINT	EA			
1644-113-05	FIRE HYDRANT, F&I, STANDARD, 2 HOSE, ONE PUMPER, 2"	EA			

SPECIAL PROVISIONS

The more stringent of these Special Provisions, Pinellas County or FDOT specifications shall prevail.

The following Special Provisions apply to and should be used for bidding on this project.

SP-01 ROADWAY CONSTRUCTION ITEMS

Roadway construction items for this project shall be constructed in accordance with the latest edition of the Florida Department of Transportation *Standard Specifications for Road and Bridge Construction*. Florida Department of Transportation *Roadway Design and Traffic Standards*, and *Manual of Uniform Traffic Control Devices* (MUTCD) shall be the basis for construction details and guidelines.

The provisions of these Standard Specifications are incorporated as part of the Project Manual by reference and are the basis for issues related to the Roadway Construction items for this project.

SP-02 PAY ITEMS

This is a lump sum project. Pay items are being provided only to support the lump sum contract amount. The pay items numbers for the project are incorporated by reference from the Florida Department of Transportation, *Basis of Estimates Handbook*, latest English edition. Measure shall be based on Division I of the *Standard Specifications for Road and Bridge Construction* (Section 18, Measurement and Payment), unless otherwise noted. All work under this contract shall be included in the pay items listed on the Bid Form if at all possible. Any items for which a specific pay item is not included a special pay item may be added to the bid summary as SP-X, etc. Any items not shown or omitted that are required for a complete installation shall be furnished and installed by the Contractor at no additional cost to the Owner.

SP-03 MAINTENANCE OF TRAFFIC

A detailed Maintenance of Traffic Plan (MOT) has been provided as part of the plan set. The Contractor may propose an alternate MOT plan. However, such plan must be approved by the Engineer and by the City prior to utilization. Should the alternate plan not be approved, the plan as designed shall be utilized.

The Contractor shall be responsible for verifying the complete MOT plan provided, or for proposing an alternate. If an alternate is proposed, it shall be signed and sealed by a Florida registered Professional Engineer. The MOT for this project shall be in strict conformance with section 600 of the Florida Department of Transportation, *Roadway Design Standards* and the *Manual of Uniform Traffic Control Devices*. Cost of all materials necessary to implement this MOT plan shall be included in the lump sum pay item No. 102-1.

The detailed MOT plan, suggested changes, or alternate and construction schedule shall be submitted to the engineer within 15 days after the notice to proceed, for review. The plan will be reviewed and comments shall be submitted to the contractor. Contractor cannot begin construction without an approved MOT plan. All cost for submitting the MOT plan for review is included in pay item No. 102-1.

Contractor is to minimize impacts to the public and will maintain access to all roadways and driveways within the project limits. Where this is not possible, the contractor shall provide temporary access to each property. The cost of any temporary driveways and detours is included in the cost for MOT, pay item No. 102-1.

SP-04 PERMITS AND LICENSES

It will be the responsibility of the Contractor to ensure that all required permits and licenses are obtained and in hand before commencement of construction. Any city permit fees will be waived. The following permit has been obtained: SWFWMD ERP Stormwater Permit. The following permits are in process: DEP Potable Water Permit, DEP Reclaimed Water Permit.

SP-05 DEWATERING AND TEMPORARY SHORING

During the installation and construction of stormwater management systems, wastewater systems, potable water system, and utility conduit systems, all cost of dewatering and temporary shoring, shall be bid separately for each system. Individual pricing is required for stormwater dewatering, wastewater dewatering, potable water dewatering, reclaimed water dewatering, and utility conduit dewatering.

SP-06 BACKFILLING, COMPACTION AND PAVEMENT RESTORATION

The standard specifications require that compacted backfill be placed along side of and over stormwater, wastewater, potable water, reclaimed, utility conduits etc. The Contractor will perform periodic compaction testing to verify that the backfill is being placed according to specification. Results of these tests shall be provided to the City for review.

Backfilling, compaction and pavement restoration due to these systems shall be included in the bid items prices for the various items for Work to which it is incidental. A detailed listing of testing schedule should accompany bid submission.

SP-07 EROSION CONTROL PLAN

The CONTRACTOR shall be responsible for the project complying with applicable state water quality standards during construction. All water and wind erosion shall be minimized as defined within the Standard Specifications, (General Conditions). The plans and specifications provide only the minimum requirement for erosion and sedimentation control; it is the Contractor's responsibility to develop a detailed erosion and sedimentation control plan to be submitted within 15 day of notice of award of contract. The cost of erosion control shall be included in Pay

Item No.'s 104-11 and 104-12. This bid Item shall include silt fences, floating turbidity barriers, plans and placement thereof.

SP-08 CONCRETE SIDEWALK

The quantity of concrete sidewalk shown within the bid tabulation is the amount of proposed sidewalk to be placed. Sidewalks demolished as a result of Contractor negligence, during the installation of proposed underground utilities, stormwater pipe / structures shall be replaced at no direct cost. All sidewalks and curb cut ramps shall comply with ADA and F.D.O.T. Standard Index 310.

SP-09 EXCAVATION REGULAR

Bid Item No. 120-1 shall include all costs associated with the net volume of material excavated between the original ground surface and the surface of the completed earthwork. Bid Item No. 120-1 shall include roadway swale excavation and sidewalk excavation. Excessive dirt from the project site is to be removed and is to remain the property of the Contractor.

SP-10 RESTORATION

The Contractor is responsible for restoration of all disturbed areas inside or outside the limits of construction. The disturbed areas shall be returned to a condition equal to or better than the condition prior to the beginning construction. The contractor shall provide the City of with Video and Photographs of the existing condition prior to commencing construction. The cost of restoration shall be included in 101-1(LS). This bid item includes tree protection, sidewalk, curb and gutter, landscaping, irrigation systems and any other items demolished as a result of construction activities that are not specially accounted for by other bid items.

SP-11 UTILITY ADJUSTMENTS

Any utility adjustments not noted on the plans shall be brought to the owner's attention during the bidding phase. If not noted during the bidding phase, it is assumed that all utility adjustment were include in the bid.

SP-12 NPDES PERMIT

The contractor shall obtain the necessary NPDES permit(s) prior to construction. This cost of obtaining the permits shall be included under erosion control.

SP-13 AS-BUILT DRAWINGS

The contractor shall provide final as-built drawings in both electric (CD ROM) and paper formats. The electronic version shall be in both ACAD and PDF format. The paper drawings shall be signed and sealed by either a registered engineer or survey. The cost for providing the as-built drawings is included in Special Bid Item SP-1 (LS).

SP-14 MATERIAL AND COMPACTION TESTING

In accordance with the general conditions all testing referred to in the technical specifications shall be provided by and at the expense of the contractor.

SP-15 CURBING AT EXISTING ROADWAY

When curbing is placed on an existing paved road the cost of the curb installation shall include all associated costs related to the construction of the curb, including, but not limited to, saw cutting the paving, excavating to construct curb, repairing portions of the road damaged during the construction, etc.

SP-16 WORKING HOURS

Work will be allowed on weeks between 7:30 AM and 4:30 PM. No work will be allowed on weekend, holiday or special events designated by the City, without approval from the City. Night work would also require approval from the City. The site should be secured during none working hours.

SP-17 BUSINESS SIGN

Standard blue FDOT business signs shall be provided. Signs shall be provided for all business including, but not limited to, 1) Condo just south of Maritana, 2) Marina Bay, 3) Nancy Markoe Gallery, 4) AMI Kids, 5) Frank T Hurley Associates, 6) St. Pete Yacht Club, 7) Women's Club, 8) Circle K, 9) Sea critters, 10) Bonnie Bubbles, 11) Gennaro's, 12) Wharf Seafood, 13) Shaners Land and Sea Market, 14) Pass a Grille Marina, 15) Fire Station, 16) Edgewater Boat Storage.

SP-18 MAILBOXES

All mail boxes are to remain accessible to mail carrier. With the consent of the City and the Post Master mail boxes may be clustered at side streets if needed. Existing mail boxes may be moved to the ROW line during construction and then returned to the curb after construction. Any damaged mailbox shall be repaired or replaced by the contractor.

SP-19 DUKE ENERGY CONDUIT

The contractor will furnish and install all conduits. The contractor shall prepare the pad for all transformed, switch gear, pedestals, etc. Duke will place the pre-cast transformers and switch gear base/pads. The contractor will coordinate all activities with Duke.

In general, transformers and switch gears are shown near the intersection of Pass a Grille Way the intersection Street. The actual placement of the transformer and switch gear will be field set with the City and Duke. For the purpose of estimating conduit length, assume the transformer and switch gear are located next to the seawall near the bay when at a street end. Therefore, the

length to be installed will likely be longer than the length shown on the plan. The contractor shall increase the length accordingly.

Duke Energy will provide and install all transformer, switch gear, and wire in the conduit. Duke will be responsible to remove all wooden poles after utilities are removed.

If the undergrounding is not performed in a timely fashion, Duke may need to move the existing service to the ROW. Any coordination associated with this move is to be performed by the contractor.

Contractor will restore all disturbed areas associated with above ground utility undergrounding.

SP-20 BRIGHTHOUSE CONDUIT

The contractor will furnish and install all conduits. Brighthouse will install the wire. The contractor will coordinate all activities with Brighthouse.

SP-21 VERIZON CONDUIT

The contractor will furnish and install all conduits. Verizon will install the wire. The contractor will coordinate all activities with Verizon.

SP-22 CITY CONDUIT

The contractor is responsible for all aspects associated with the City conduit. The contractor will furnish and install all conduits and pull boxes for the City conduit.

SP-23 DUKE, BRIGHTHOUSE & VERIZON SERVICE TO EXISTING STRUCTURES

The contractor shall install a 2-inch conduit for each utility: Duke Energy, Brighthouse, and Verizon. Therefore, a total of three 2-inch conduits will be installed from the ROW to the existing meter or access point on the structure. If the conduit run length is 100-ft, then a total of 300-ft of 2-inch conduit will be installed.

The contractor will be responsible for connecting the electric to the house, business or structure. The contractor's electrician will need to convert the existing overhead wire fed meter to a below ground fed meter.

Brighthouse and Verizon will also need to be reconnected.

SP-24 BOLLARDS

Assume that 3 bollards will be placed at each transformer or switch gear.

SP-25 POTABLE WATER SERVICE

The contractor will provide new service taps and conduit to the existing meters. The existing meters will remain. If needed, the contractor will relocate and level the meter.

SP-26 RECLAIMED WATER SERVICE

The contractor will provide new service taps and conduit to the existing meters/backflow preventor or ROW line. The existing meter/backflow preventor will remain. If needed, the contractor will relocate and level the meter/backflow preventor.

SP-27 WASTEWATER LATERALS

The contractor will provide new laterals from new wastewater line to ROW line. Contractor will connect new lateral to existing lateral at the ROW line using a clean-out.

SP-28 PAVERS

At the intersection of Pass a Grille Way and 21st Avenue brick crosswalks are being installed. It is the intent that the existing bricks under the existing pavement be used for the crosswalk. The contractor shall salvage, clean, prepare and place these bricks at the intersection.

SP-29 DUKE LIGHT POLE INSTALLATION

The contractor is to install 2-inch conduit to support the installation of new light poles and fixtures on both sides of Pass a Grille Way. Duke will install the poles and pull the wire. It is estimated that the light poles will be placed every 100-ft on alternating sides of the roadway. Therefore, between 60 and 70 light poles are anticipated. Duke is still working on the final design. Once the design is provided to the City, it will be provided to the contractor. The contractor is to coordinate all associated activities with Duke Energy.

SP-30 MAST ARM PAINTING

All four (4) mast arms at 21st shall be prepped and painted according to paint manufacturer's requirements of urethane paint. Paint shall be black in color and coordinated with the City for approval. Night work with MOT will be required. Please contact Service Painting Corporation, Paul Weigel 813-972-1400 or equivalent.

SP-31 ASPHALT

Base asphalt shall be installed in two lifts. 2-inches of SP-12.5 will be installed during the construction of each phase. After all phases are complete a final course of 1-inch SP-9.5 will be installed over the entire project length as the final construction step.

The following conditions will be cause for rejection of final pavement course

- No patching is allowed in the final pavement course
- No ponding (bird baths) are allowed
- No standing water is allowed
- Raveling
- Excessive visible course aggregate

SP-32 Clear and Grubbing

Clearing and grubbing includes the removal of all large trees including several Austrian pines and the removal of palms along the ROW. The removal of the palms shall be coordinated with the City. Clearing and grubbing also includes all asphalt, concrete, utility or other removal not specifically addressed in another section.

SP-33 PHASING

The contractor is to construct the project in phases. One phase should be nearly complete before proceeding to the next phase. The phases are shown as part of the MOT plans. The contractor may modify the phasing plan and MOT plan with approval from the City. It is currently expected that the construction will proceed from north to south. In general the phases are:

1. Maritana to 30th
2. 30th to 28th
3. 28th to 25th
4. 25th to 19th

*It is expected for construction to be completed within 12 consecutive calendar months

SP-34 TESTING

The Contractor shall pay for all testing. The sub-contractor selected to perform the testing shall be approved by the owner or owner's representative. Retesting of failed tests is also paid for by the contractor. A variety of tests are outlined in the specifications. These include, but are not limited to.

- Material and Compaction tests (trench and roadway)
- Asphalt density, temperature, and yield tests
- If multiple density tests are referenced in the specifications the modified proctor test is preferred.
- Potable Water and Reclaimed Water pressure tests
- Wastewater line lamp testing
- Potable water bacteriological testing (BT). All testing needed for clearance of the lines with FDEP. It is expected that at least 4 partial/final clearances will be needed. More may be required depending on the contractor's actual phasing of the project. BT test will be required, at a minimum, at the beginning point, ending point, every 1,200-ft in between, and at each branch connection.

SP-35 PROOF ROLLING

All proof-rolling must be observed by the owner or the owner's representative.

SP-36 UNDERCUTTING

Any additional undercutting than shown on the plans must be approved by the owner or owner's representative.

SP-37 COMPACTION

No vibratory compaction will be allowed on this project.

SP-38 BRICK PATTERN AT 21ST CROSSWALK

The pattern shall be herringbone. The design shall be coordinated with the city prior to the submittal of the shop drawing plan for the brick design. The design shall be approved by the City.

SP-39 STORED MATERIAL

The will entertain paying for materials stored on site. The contractor shall be responsible to replace the stored material if lost, damaged or vandalized, etc. The contract final remain responsible for the final completion of the project.

SP-40 CITY DIRECT PURCHASE OF MATERIALS AND SUPPLIES

The City reserves the option to purchase any and all materials and supplies as needed for the project. The pattern shall be herringbone. The design shall be coordinated with the city prior to

SP-41 COMPACTION AROUND PIPES

Care should be taken not to damage pipes during compaction. Notify the City immediately is pipes are damaged during compaction.

SP-41 SIDEWALK FINISH

Sidewalks shall have a light broom finish with a picture framed look.

LIQUIDATED DAMAGES

Should the Contractor fail to substantially complete all Work under this Contract and make the project available for beneficial use on or before the date stipulated for substantial Completion (or such later date as may result from extension of time granted by City), he shall pay and/or the City may retain from the compensation otherwise to be paid to the Contractor, as liquidated damages, the sum of \$1,000.00 for each consecutive calendar day that terms of the Contract remain unfulfilled beyond date allowed by the Contract, which sum is agreed upon as a reasonable and proper measure of damages which City will sustain per diem by failure of Contractor to complete work within time as stipulated; it being recognized by City and Contractor that the injury to City which could result from a failure of Contractor to complete on schedule is uncertain and cannot be computed exactly. In no way shall costs for liquidated damages be construed as a penalty on the Contractor. For each consecutive calendar day that the work remains incomplete after the date established for Final Completion, the City will retain from the compensation otherwise to be paid to the Contractor the sum of \$1,000.00. This amount is the mutually agreed upon minimum measure of damages the City will sustain by failure of the Contractor to complete all remedial work, correct deficient work, clean up the project and other miscellaneous tasks as required to complete all Work specified and this amount of liquidated damages is in addition to the liquidated damages prescribed above for failure to timely achieve Substantial Completion.

IV. PROJECT SPECIFICATIONS

SECTION 101- MOBILIZATION

101-1 Description.

Perform preparatory work and operations in mobilizing for beginning work on the project, including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site and for the establishment of temporary offices, buildings, safety equipment and first aid supplies, and sanitary and other facilities.

Include the costs of bonds and any required insurance and any other preconstruction expense necessary for the start of the work, excluding the cost of construction materials.

101-2 Basis of Payment.

101-2.1 When a Separate Item is Included in the Proposal: When the proposal includes a separate item of payment for this work, the work and incidental costs specified as being covered under this Section will be paid for at the Contract lump sum price for the item of Mobilization.

Payment will be made under:

Item No. 101- 1- Mobilization -lump sum.

Item No. 2101- 1- Mobilization - lump sum.

101-2.2 Partial Payments: When the proposal includes a separate pay item for Mobilization, partial payments will be made therefore in accordance with the following:

Percent of Original Contract Amount Earned	Allowable Percent of the Lump Sum Price for the Item*
5	25
10	50
25	75
50	100

*Partial payments for any project will be limited to 10% of the original Contract amount for that project. Any remaining amount will be paid upon completion of all work on the project.

The standard retainage, as specified in 9-6, will be applied to these allowances. Partial payments made on this item will in no way act to preclude or limit any of the provisions for partial payments otherwise provided for by the Contract.

When more than one project or job (separate job number) is included in the Contract, the above percentages shall apply separately to each job which has a separate pay item for Mobilization.

As an exception to partial payments being made based on Percent of Original Contract Amount Earned, the Department will pay the Contractor the invoice price of the Contract Bond when the Engineer has been furnished with a certified copy of the invoice from the Bonding Company. No other work will be required to receive payment for the Contract Bond included in the bid price for Mobilization.

101-2.3 When No Separate Item is Included in the Proposal: When the proposal does not include a separate item for Mobilization, all work and incidental costs specified as being covered under this Section will be included for payment under the several scheduled items of the overall Contract, and no separate payment will be made therefore.

SECTION 102 - MAINTENANCE OF TRAFFIC

102-1 General Provisions.

102-1.1 Description: Maintain traffic within the limits of the project for the duration of the construction period, including any temporary suspensions of the work. Construct and maintain any necessary detour facilities. Provide necessary facilities for access to residences, businesses, etc., along the project. Furnish, install, and maintain traffic control and safety devices during construction. Furnish and install work zone pavement markings for maintenance of traffic in construction areas. Furnish and apply calcium chloride on the subgrade, unsurfaced base, or other unsurfaced traveled ways in order to control dust during construction operations. Provide any other special requirements for safe and expeditious movement of traffic as may be specified on the plans. The term, Maintenance of Traffic, includes all of such facilities, devices, and operations required for the safety and convenience of the public as well as for minimizing public nuisance.

102-1.2 Sections Not Requiring Traffic Maintenance: In general, do not maintain traffic over those portions of the project where no work is to be accomplished or where construction operations will not affect existing roads. However, do not obstruct or create a hazard to any traffic during the performance of the work, and repair any damage to existing pavement or facilities caused during the work.

102-1.3 Detours Over Existing Roads and Streets: When the Department specifies that traffic be detoured over roads or streets outside the project area, do not maintain such roads or streets. However, maintain all signs and other devices placed for the purpose of the detour.

102-1.4 Contractor's Responsibility: Maintain traffic starting the day work begins on the project or on the first day Contract Time is charged, whichever is earlier.

Continually and adequately review traffic control devices to ensure proper installation and working order, including monitoring of lights. Provide an individual responsible for this review who is certified as an American Traffic Safety Services Association Certified Worksite Supervisor.

102-1.5 Operation of Existing Movable Bridges: The Department will maintain and operate existing moveable bridges which are to be removed by the Contractor until such time as they are closed to traffic. During this period, make immediate repairs of any damage to such structures caused by use or operations related to the work at no expense to the Department, but do not provide routine repairs or maintenance. In the event that use or operations result in damage to a bridge requiring repairs, give such repairs top priority to any equipment, material, or labor available.

102-2 Specific Requirements.

102-2.1 Maintenance of Roadway Surfaces: Maintain all lanes that are being used for the maintenance of traffic, including those on detours and temporary facilities, under all weather conditions. Keep the lanes reasonably free of dust, and, when necessary to accomplish this, sprinkle them with water, or apply some other dust palliative. Provide the lanes with the drainage facilities necessary to maintain a smooth riding surface under all weather conditions.

102-2.2 Number of Traffic Lanes: Maintain one lane of traffic in each direction. Maintain two lanes of traffic in each direction at existing four (or more) lane cross roads, where necessary to avoid undue traffic congestion. Construct each lane used for maintenance of traffic at least as wide as the traffic lanes existing in the area prior to commencement of construction. Do not allow traffic control and warning devices to encroach on lanes used for maintenance of traffic.

The Engineer may allow the Contractor to restrict traffic to one-way operation for short periods of time provided that the Contractor employs adequate means of traffic control and does not unreasonably delay traffic. When a construction activity requires restricting traffic to one-way operations, locate the flaggers within view of each other when possible. When visual contact between flaggers is not possible, equip them with 2-way radios, use flag-carrying, official, or pilot vehicle(s), or use traffic signals.

102-2.3 Crossings and Intersections: Provide and maintain adequate accommodations for intersecting and crossing traffic. Do not block or unduly restrict any road or street crossing the project unless approved by the Engineer.

102-2.4 Access for Residences and Businesses: Provide access to all residences and all places of business.

102-2.5 Protection of the Work from Injury by Traffic: Where traffic would be injurious to a base, surface course, or structure constructed as a part of the work, maintain all traffic outside the limits of such areas until the potential for injury no longer exists.

102-2.6 Alternative Traffic Control Plan: The Contractor may propose an alternative Traffic Control Plan (TCP) to the plan presented in the Contract Documents. Have a Specialty Engineer sign and seal the alternative plan. Prepare the TCP in conformance with and in the form outlined in the current version of the Roadway Plans Preparation Manual. Indicate in the plan a TCP for each phase of activities.

Obtain the Engineer's written approval before beginning work using an alternate TCP. The Engineer's written approval is required for all modifications to the TCP. The Engineer will only allow changes to the TCP in an emergency.

Perform daily inspections, including weekends and holidays, with some inspections at nighttime, of the installations on the project. Replace all equipment and devices not meeting the approved standards during that inspection. Advise the project personnel of the schedule of these inspections and give them the opportunity to join in the inspection as is deemed necessary.

Regardless of the TCP used, maintain the work zone in a safe condition.

102-2.7 Law Enforcement Services: Where specified in the TCP, provide uniformed off-duty law enforcement officers, including marked law enforcement vehicles, to assist in controlling and directing traffic in the work zone. Refer to the TCP for those situations where the officers will be utilized.

102-3 Traffic Control.

102-3.1 Standards: FHWA's MUTCD Part VI is the minimum standard for Traffic Control for Highway Construction, Maintenance, and Utility Operations. Follow the basic principles and minimum standards contained in this manual for the design, application, installation, maintenance, and removal of all traffic control devices and all warning devices and barriers which are necessary to protect the public and workers from hazards within the project limits. Understand that the standards established in the aforementioned manual constitute the minimum requirements for normal conditions. The Engineer will require additional traffic control devices, warning devices, barriers, or other safety devices where unusual, complex, or particularly hazardous conditions exist.

Reflectorize traffic cones used at night with cone collars meeting the following requirements:

(a) Use collars designed to properly fit the taper of the cone when installed. Place the upper 6 inch [150 mm] collar a uniform 3 1/2 inch [90 mm] distance from the top of the cone and the lower 4 inch [100 mm] collar a uniform 2 inch [50 mm] distance below the bottom of the upper 6 inch [150 mm] collar. Ensure that the collars are capable of being removed for temporary use or attached permanently to the cone in accordance with the manufacturer's recommendations. Provide a white sheeting having a smooth outer surface and that essentially has the property of a retroreflector over its entire surface.

(b) For the retroreflective sheeting for the collars, meet the requirements of ASTM D 4956 Table 4, Type III and Table 9, Type VI; excluding 0.1 degree observation angle and -4 degree, ± 30 degree entrance angles.

Provide three certified copies of test reports and certification from the manufacturer that the material furnished meets all requirements of (b) above.

Use reflective collars for cones included on the Qualified Products List.

102-3.2 Traffic Control Devices, Warning Devices and Barriers:

102-3.2.1 Installation: Install and maintain adequate traffic control devices, warning devices and barriers to protect the traveling public and workers, and to safeguard the work area. Erect the required traffic control devices, warning devices and barriers to prevent any hazardous conditions and in conjunction with any necessary traffic re-routing. Use only those devices that are included on the Qualified Products List (QPL). Use construction signs meeting the requirements of 700-2.5 and 700-5.5. Specific requirements for Maintenance of Traffic devices, additional to the requirements of this Section, are contained in the 600 series of the Roadway and Traffic Design Standards. Immediately remove, turn or cover any devices or barriers which do not apply to existing conditions.

All QPL approved safety devices must meet the requirements of National Cooperative Highway Research Report 350 (NCHRP 350) and current FHWA directives. Manufacturers seeking evaluation must furnish certified test reports showing that their product meets all test requirements set forth by NCHRP 350.

Notify the Engineer of any scheduled operation which will affect traffic patterns or safety, sufficiently in advance of commencing such operation to permit his review of the plan for the proposed installation of traffic control devices, warning devices or barriers.

Assign an employee the responsibility of maintaining the position and condition of all traffic control devices, warning devices and barriers throughout the duration of the Contract. Keep the Engineer advised at all times of the identification and means of contacting this employee on a 24-hour basis.

102-3.2.2 Maintenance of Devices and Barriers: Keep traffic control devices, warning devices, and barriers in the correct position, properly directed, clearly visible and clean, at all times. Immediately repair, replace or clean damaged, defaced or dirty devices or barriers and have the Engineer approve them for use.

102-3.2.3 Temporary Impact Attenuators: Furnish, install, maintain and subsequently remove temporary vehicular impact attenuators in accordance with the details and notes shown in the plans, and the Roadway and Traffic Design Standards.

Maintain the attenuators until their authorized removal. Repair all attachment scars to permanent structures and pavements after attenuator removal.

102-3.2.4 Flagger: Provide trained flaggers to direct traffic where one-way operation in a single lane is in effect and in other situations as required in 102-3.1. The Worksite Traffic Supervisor or others as approved by the Department will provide training for flaggers using Department-approved training materials.

102-3.2.5 Existing Pavement Markings: Where a detour changes the lane use or where normal vehicle paths are altered during construction, remove all existing pavement markings that will conflict with the adjusted vehicle paths. Do not overpaint. Remove existing pavement markings using a method that will not damage the surface texture of the pavement and which will eliminate the previous marking pattern regardless of weather and light conditions.

Remove all pavement markings that will be in conflict with "next phase of operation" vehicle paths as described above, prior to opening to traffic.

102-3.2.6 No Waiver of Liability: Conduct operations in such a manner that no undue hazard results due to the requirements of this Article. The procedures and policies described herein in no way acts as a waiver of any terms of the liability of the Contractor or his surety.

102-3.3 Work Zone Pavement Markings:

102-3.3.1 General: Provide centerlines, lane lines, edgelines, stop bars, and turn arrows in work zones in accordance with Section 6D of the MUTCD with the following additions:

- (a) Install edgelines when a paved shoulder 4 feet [1.2 m] or greater in width exists along the edge of a lane.
- (b) Place edgelines on all detours, where vehicle paths are altered from normal operations, and where a lane narrows from its normal width for any reason.
- (c) Apply work zone pavement markings, including arrows and messages determined by the Engineer to be required for safe operation of the facility, prior to the end of the day if the highway is open to traffic. The Contractor may use channelizing devices to direct traffic during the day prior to the placement of work zone pavement markings.
- (d) The Engineer or the plans will designate work zone pavement markings as removable or non-removable. For removable work zone pavement markings, use materials which can be taken up by hand without the use of additional equipment such as burners, sand

blasting, etc. An example of this category of markings is reinforced plastic film (Tape). For non-removable work zone pavement markings, use any markings that are not classified as removable. Use removable or non-removable work zone pavement markings as follows:

Application	Category
Finished Pavement*	
All stripes representing final pavement markings.	Non-Removable
All stripes in an area where the traffic pattern will be altered prior to project acceptance.	Removable
*Place all striping representing final markings in the final location unless accepted in writing by the Engineer.	
Intermediate Pavement Course	
All stripes in areas of pavement which will be covered with a subsequent course of pavement prior to altering of the traffic pattern within such area.	Non-Removable
All stripes in an area where the traffic pattern will be altered prior to placing of the subsequent paving course within such area.	Removable
Existing Pavement	
All stripes in areas of pavement which will be removed or overlaid with new pavement prior to altering of the traffic pattern within such area.	Non-Removable
All stripes in areas of pavement where the traffic pattern will be altered prior to removal or overlaying of such area.	Removable

The Contractor may substitute Removable Pavement Markings for Non- Removable Pavement Markings.

If Removable Pavement Markings are substituted for Non-Removable Pavement Markings, the Department will make payment under Non-Removable Pavement Marking.

102-3.3.2 Materials:

102-3.3.2.1 Paint and Glass Beads: For white paint, meet the requirements of 971-12.2. For yellow paint, meet the requirements of 971-12.3.

102-3.3.2.2 Preformed Pavement Marking Film (Tape): For Preformed Pavement Marking Film (Tape), ensure the manufacturer's certification of conformance to the following requirements:

(1) Composition: Use preformed, retro-reflective pavement marking consisting of foil or plastic materials pigments and glass beads uniformly distributed throughout its cross-sectional area and with a retro-reflective layer of beads bonded on the top surface. Use preformed pavement marking precoated with a pressure sensitive adhesive compatible with asphaltic concrete and portland cement concrete road surfaces.

(2) Thickness: Ensure that the thickness of the preformed film without adhesive is not less than 25 mils [640 µm].

(3) Tensile Strength: Use film having a minimum tensile strength of 40 psi [275 kPa] of cross-section when tested in accordance with ASTM D 638.

(4) Pigmentation: Thoroughly blend color pigments to provide a plastic marking film that maintains uniform color under both daylight and night lighting conditions throughout the expected life of the film. Use white pavement marking film similar to Federal Standard Color No. 595-17886. Use yellow pavement marking film similar to Federal Standard Color No. 595-13538.

(5) Glass Beads: Use colorless glass beads with a minimum refraction index of 1.50 when tested using the liquid oil immersion method. Use beads of such size and quantity to maintain the retroreflectivity of the preformed pavement marking. Test bead adhesion such that beads are not easily removed when film surface is scratched firmly with a thumbnail.

102-3.3.2.3 Preformed Removable Pavement Marking Film

(Tape): For Preformed Pavement Marking Film (Tape), meet the following requirements:

(1) Composition: Use removable preformed plastic pavement marking tape consisting of a mixture of polymeric materials, pigments, non-metallic reinforcing medium to facilitate removal, glass beads, and a retro-reflective layer of glass beads firmly bonded to the top surface.

(2) Adhesive: Precoat the removable preformed plastic pavement marking film with a pressure sensitive adhesive capable of being affixed to asphaltic concrete and portland cement concrete pavement surfaces without the use of heat,

solvents, and other additional adhesives or activators. Use an adhesive that exhibits excellent sheer characteristics and minimal tensile characteristics. Ensure that the adhesive does not require a protective liner when the preformed plastic pavement marking film is in rolled form for shipment. Ensure that the adhesive is capable of temporarily bonding to the roadway pavement at temperatures of 50°F [10°C] and above without pick-up distortion by vehicular traffic.

(3) Pigmentation: Thoroughly blend color pigments to provide a plastic marking film that maintains uniform color under both daylight and night lighting conditions throughout the expected life of the film. Use white pavement marking film similar to Federal Standard Color No. 595-17886. Use yellow pavement marking film similar to Federal Standard Color No. 595-13538.

(4) Thickness: Ensure that the thickness of the removable plastic marking film without adhesive is not less than 30 mils [760 µm].

(5) Glass Beads: Provide colorless glass beads having a minimum refraction index of 1.50 when tested using the liquid oil immersion method. Use beads of the size and quantity necessary to maintain the retro-reflectivity of the preformed plastic film as the film wears through the surface course. Firmly adhere approximately 2% by weight of glass beads to the top of the preformed plastic film. Test bead adhesion such that beads are not easily removed when film surface is scratched firmly with thumbnail.

(6) Removability: Provide preformed plastic pavement marking film capable of being removed from bituminous concrete and portland cement concrete pavement intact or in substantially large strips, either manually or by a mechanical roll-up device, at temperatures above 40°F [4°C], and without the use of heat, solvents, grinding, or blasting. Ensure that the manufacturer shows by documented reports that the retro-reflective preformed plastic pavement marking film has met this requirement after being in place for a minimum of 90 days and under an average daily traffic count per lane of at least 9,000 vehicles per day.

102-3.3.3 Construction Methods: Align Non-Removable Pavement Markings (Paint or Preformed Pavement Marking Film) placed on the

finished pavement surface so as to ensure coverage by the permanent traffic stripes.

Removable Pavement Markings (Reinforced Plastic Film) placed on the finished pavement surface may vary from the alignment of permanent traffic stripes.

Install all work zone pavement markings in accordance with the manufacturer's recommendations, except apply paint in accordance with Section 710. Ensure that the pavement surface is dry at the time of work zone pavement marking application. Remove all dirt, debris, loose particles, and heavy oil residues from the road surface application areas immediately prior to the installation of pavement markers.

Apply Removable and Non-Removable pavement marking film with a mechanical applicator to provide pavement lines which are neat, accurate, and uniform. Equip the mechanical applicator with a film cut-off device and with measuring devices which automatically and cumulatively measure the length of each line actually placed within an accuracy tolerance of $\pm 2\%$. Roll or tamp pavement marking films (tape) to facilitate adhesion to the road surface. Tape may be placed by hand on short sections 500 feet [150 m] or less provided that it is done in a neat, accurate manner.

When removable pavement markings are no longer required, remove them just ahead of the permanent pavement markings.

102-4 Detours.

102-4.1 General: Construct and maintain detour facilities wherever it becomes necessary to divert traffic from any existing roadway or bridge, or wherever construction operations block the flow of traffic.

102-4.2 Standards of Construction: Plan, construct, and maintain detours for the safe passage of traffic in all conditions of weather. Provide the detour with all facilities necessary to meet this requirement.

Where the plans call for the Department to furnish detour bridge components, construct the pile bents in accordance with the Structures Design Office Standard Drawings, Index No. 300 and 301, unless otherwise authorized by the Engineer.

Submit a letter with the following: company name, phone number, office address, project contact person, project number, detour bridge type, bridge length, span length, location and usage time frames, to the Engineer at least 30 calendar days prior to the intended pick-up date, to obtain the storage facility location and list of components for the project. Upon receipt of letter, the Engineer will, within ten

calendar days provide an approved material list to the Contractor and the appropriate Department storage yard.

Provide a letter with an original company seal, identifying the representative with authority to pick up components, to the Engineer at least ten calendar days prior to the proposed pick-up date. The yard supervisor is not obligated to load the bridge components without this notice. At the time of issuance the Contractor's representative shall sign for each item loaded.

Provide timber dunnage, and transport the bridge components from the designated storage facility to the job site. Unload, erect, and maintain the bridge, then dismantle the bridge and load and return the components to the designated storage facility.

Notify the Engineer in writing at least ten calendar days prior to returning the components. Include in this notice the name of the Contractor's representative authorized to sign for return of the bridge components. The yard supervisor is not obligated to unload the bridge components without this notice.

The Department will provide a crane and an operator at the Department's storage facility to assist in loading and unloading the bridge components. Furnish all other labor and equipment required for loading and unloading the components.

The Department's representative will record all bridge components issued or returned on the Detour Bridge Issue and Credit Ticket. The Tickets must be signed by a Department and Contractor representative, after loading or unloading each truck to document the quantity and type of bridging issued or returned.

Bind together all bridge components to be returned in accordance with the instructions given by the storage facility. The yard supervisor will repack components that are not packed in compliance with these instructions. Upon request, written packing instructions will be made available to the Contractor, prior to dismantling of the bridge for return to the Department's storage facility.

Assume responsibility for any shortage or damage to the bridge components. Monies due the Contractor will be reduced at the rate of \$35.00 per hour plus materials for repacking, repairs or replacement of bridge components.

The skid resistance of open steel grid decking on the detour bridge may decrease gradually after opening the bridge to traffic. The Department will furnish a pneumatic floor scabbler machine for roughening the roadway surface of the detour bridge decking. Provide an air compressor at the job site with 200 ft³/minute [6 m³/minute] capacity, 90 psi [620 kPa] air pressure for the power supply of the machine, and an operator. Transport the scabbler machine to and from the Department's Structures Shop. Repair any damage to the scabbler machine caused by operations at no expense to the Department. Perform

scabbling when determined necessary by the Engineer. The Department will pay for the cost of scabbling as Unforeseeable Work in accordance with 4-4.

Return the bridge components to the designated storage facility beginning no later than ten calendar days after the date the detour bridge is no longer needed, the date the new bridge is placed in service, or the date Contract Time expires, whichever is earliest. Return the detour bridging at an average of not less than 200 feet [61 m] per week. Upon failure to return the bridge components to the Department within the time specified, compensate the Department for the bridge components not returned at the rate of \$5.00 per 10 feet [\$1.65 per meter], per day, per bridge, for single lane; and \$10.00 per 10 feet [\$3.30 per meter], per day, per bridge, for dual lane until the bridge components are returned to the Department.

102-4.3 Materials: Provide all materials for the construction and maintenance of all detours, except that, where the plans call for the Department to provide borrow or other material pits, the Engineer will allow the Contractor to obtain material from these pits for the detour. The Department will make no separate payment for materials used from these pits to construct detours.

102-4.4 Construction Methods: Do not apply the requirements of the Standard Specifications pertaining to construction and material details to detour construction. Select and use construction methods and materials that shall provide a stable and safe detour facility. Construct the detour facility to have sufficient durability to remain in good condition, supplemented by maintenance, for the entire period that the detour is required.

102-4.5 Removal of Detours: Remove temporary detours when they are no longer needed and before the Contract is completed. Take ownership of all materials from the detour and dispose of them, except for materials which might be on loan from the Department with the stipulation that they be returned.

102-5 Calcium Chloride for Dust Control.

102-5.1 General: The Engineer will direct the locations and the time of using calcium chloride for dust control. Regardless of the quantities which may be shown in the proposal, consider this work as being entirely contingent.

102-5.2 Materials: Meet the following requirements:

Calcium Chloride	986-1
Water	986-2

102-5.3 Equipment: Apply the calcium chloride using any spreader capable of such adjustment and control that the quantity of calcium chloride applied in any 25 foot [10 m] length of road does not vary more than 10% from the quantity

intended for that length. Do not use rotary-type spreaders, as they are not considered capable of proper control.

Use equipment to apply water that is capable of applying the water uniformly within the limitations of moisture required.

102-5.4 Application:

102-5.4.1 Weather Limitations: Even if previously ordered by the Engineer, do not treat surfaces when raining or when the moisture condition exceeds that for proper application of the calcium chloride as determined by the Engineer.

102-5.4.2 Preparation for Treatment: Level the subgrade, base materials, or other surface to be treated to a smooth grade and crown or shape the surface to effect adequate drainage. When so directed, moisten the surface prior to application of the material.

102-5.4.3 Rate of Application: The Engineer will specify the actual rate at which to uniformly spread the material. Apply the flakes at a rate between 1.0 and 1.25 lbs/yd² [0.5 and 0.7 kg/m²] of surface, and pellets at a rate between 0.80 and 1.0 lb/yd² [0.4 and 0.5 kg/m²].

102-5.4.4 Subsequent Applications: If subsequent applications are required over a previously treated area which has previously been treated, make such applications at a rate of approximately 0.75 lb/yd² [0.4 kg/m²] for flakes and 0.6 lb/yd² [0.3 kg/m²] for pellets.

102-5.4.5 Protection from Traffic: Do not allow traffic on the treated surface until two hours after application.

102-6 Materials for Driveway Maintenance.

102-6.1 General: Place material in driveways to residences and businesses to provide safe, stable, and reasonable access.

102-6.2 Materials: Provide material of the type typically used for base and having stability and drainage properties that will provide a firm surface under wet conditions.

102-6.3 Construction Methods: Place, level, manipulate, compact, and maintain the material, to the extent appropriate for the intended use.

As permanent driveway construction is accomplished at a particular location, the Contractor may salvage and reuse previously placed materials that are suitable for reuse on other driveways.

102-7 Method of Measurement.

102-7.1 Maintenance of Traffic (General Work): When an item for this work is included in the proposal, the quantity to be paid for will be at the Contract lump sum price for Maintenance of Traffic.

Where the plans require the use of trucks and truck mounted impact attenuators, these items will not be paid for separately but shall be included in the cost of Maintenance of Traffic. Only use those attenuators that have been tested by a facility approved by the Engineer and certified as meeting the requirements as specified in NCHRP 350 and that have been properly maintained.

102-7.2 Law Enforcement Services: The quantity to be paid for will be at the Contract unit price per hour for the actual number of officers on the project site. Payment will be made only for those off-duty law enforcement officers specified in the TCP and authorized by the Engineer.

102-7.3 Special Detours: When a detour facility is specifically detailed in the plans, or is otherwise described or detailed as a special item, and an item for separate payment is included in the proposal, the work of constructing, maintaining, and subsequently removing such detour facilities will be paid for separately. Traffic control devices, warning devices, barriers, signing, and pavement markings for Special Detours will also be paid for separately.

When the plans show more than one detour, each detour will be paid for separately, at the Contract lump sum price for each.

Where a separate item for a specific detour facility is included in the proposal, payment will be made under Special Detour

102-7.4 Materials for Driveway Maintenance: The quantity to be paid for will be the volume, in cubic yards [cubic meters], of all materials authorized by the Engineer, acceptably placed and maintained for driveway maintenance. The quantity will be determined by truck measurement, loose volume after loading and striking off the material to uniform depth. The quantity which is authorized to be reused and which is acceptably salvaged, placed, and maintained in other designated driveways will be measured in truck bodies and included again for payment.

102-7.5 Calcium Chloride for Dust Control: The quantity to be paid for will be the weight, in tons [metric tons], of calcium chloride authorized and acceptably spread on the road, within the limits specified by the Engineer. The quantity will

be determined from scales, certified freight bills, or other sources, the accuracy of which can be authenticated.

102-8 Basis of Payment.

102-8.1 Maintenance of Traffic (General Work): When an item of Maintenance of Traffic is included in the proposal, price and payment will be full compensation for all work and costs specified under this Section except as may be specifically covered for payment under other items.

102-8.2 Law Enforcement Services: Price and payment will be considered full compensation for the services of the off-duty law enforcement officer, including a marked law enforcement vehicle and all other direct and indirect costs.

102-8.3 Special Detours: Price and payment will be full compensation for providing all detour facilities shown on the plans and all costs incurred in carrying out all requirements of this Section for general maintenance of traffic within the limits of the detour, as shown on the plans.

102-8.4 Calcium Chloride for Dust Control: Price and payment will be full compensation for all work and materials specified for this item, including specifically all required shaping and maintenance of the treated area and all water furnished and applied to the area.

102-8.5 Payment Items: Payment will be made under:

Item No. 102- 1-	Maintenance of Traffic - lump sum.
Item No. 2102- 1-	Maintenance of Traffic - lump sum.
Item No. 102-10-	Off-Duty Law Enforcement Officer - per hour.
Item No. 2102-10-	Off-Duty Law Enforcement Officer - per hour.
Item No. 102- 2-	Special Detour - lump sum.
Item No. 2102- 2-	Special Detour - lump sum.
Item No. 102- 3-	Commercial Materials for Driveway Maintenance per cubic yard.
Item No. 2102- 3-	Commercial Materials for Driveway Maintenance per cubic meter.
Item No. 102- 4-	Calcium Chloride for Dust Control - per ton.
Item No. 2102- 4-	Calcium Chloride for Dust Control - per metric ton.

SECTION 104 - PREVENTION, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION

104-1 Description.

Provide erosion control measures on the project and in areas outside the right-of-way where work is accomplished in conjunction with the project, so as to prevent pollution of water, detrimental effects to public or private property adjacent to the project right-of-way and damage to work on the project.

Construct and maintain temporary erosion control features or, where practical, construct and maintain permanent erosion control features as shown in the plans or as may be directed by the Engineer.

104-2 General.

Coordinate the installation of temporary erosion control features with the construction of the permanent erosion control features to the extent necessary to ensure economical, effective, and continuous control of erosion and water pollution throughout the life of the Contract.

Due to unanticipated conditions, the Engineer may direct the use of control features or methods other than those included in the original Contract. In such event, the Department will pay for this additional work as unforeseeable work.

104-3 Control of Contractor's Operations Which May Result in Water Pollution.

Prevent pollution of streams, canals, lakes, reservoirs, and other water impoundments with fuels, oils, bitumens, calcium chloride, or other harmful materials. Also, conduct and schedule operations to avoid or otherwise minimize pollution or siltation of such water impoundments, and to avoid interference with movement of migratory fish. Do not dump any residue from dust collectors or washers into any live stream.

Restrict construction operations in rivers, streams, lakes, tidal waters, reservoirs, canals, and other water impoundments to those areas where it is necessary to perform filling or excavation to accomplish the work shown in the plans and to those areas, which must be entered to construct temporary or permanent structures. As soon as conditions permit, promptly clear rivers, streams, and impoundments of all obstructions placed therein or caused by construction operations.

Do not frequently ford live streams with construction equipment. Wherever an appreciable number of stream crossings are necessary at any one location, use a temporary bridge or other structure.

Except as necessary for construction, do not deposit excavated material in rivers, streams, canals, or impoundments, or in a position close enough thereto, to be washed away by high water or runoff.

Where pumps are used to remove highly turbid waters from enclosed construction areas such as cofferdams or forms, treat the water by one or more of the following methods prior to discharge into State waters: pumping into grassed swales or appropriate vegetated areas or sediment basins, or confined by an appropriate enclosure such as turbidity barriers when other methods are not considered appropriate.

Do not disturb lands or waters outside the limits of construction as staked, except as authorized by the Engineer.

Obtain the Engineer's approval for the locations of, and method of operation in, borrow pits, material pits, and disposal areas furnished for waste material from the project (other than commercially operated sources) such that erosion during and after completion of the work will not result in probability of detrimental siltation or water pollution.

104-4 Materials for Temporary Erosion Control.

The Engineer will not require testing of materials used in construction of temporary erosion control features other than as provided for geotextile fabric in 985-3 unless such material is to be incorporated into the completed project. When no testing is required, the Engineer will base acceptance on visual inspection.

The Contractor may use new or used materials for the construction of temporary silt fence, staked turbidity barriers, and floating turbidity barrier not to be incorporated into the completed project, subject to the approval of the Engineer.

104-5 Preconstruction Conference.

At the Preconstruction Conference, provide to the Department a special plan to prevent, control, and reduce erosion and water pollution, meeting the requirements or special conditions of all permits authorizing project construction. If no permits are required or the approved permits do not contain special conditions or specifically address erosion and water pollution, the project erosion control plan will be governed by Subarticles 7-1.1, 7-2.2, 7-8.1, 7-8.2, and Articles 104-1 through 104-10.

When a National Pollutant Discharge Elimination System (NPDES) Permit is issued or approved by the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR Part 122.26, the Contractor's plan shall be prepared as a part of the Department's Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will include this erosion control plan and all additional measures that will be employed to dispose of, control, or prevent the discharge of solid, hazardous, and sanitary wastes to waters of the U.S.

Include procedures to control off-site tracking of soil by vehicles and construction equipment and a procedure for cleanup and reporting of non-storm water discharges, such as contaminated groundwater or accidental spills. The Department will review and approve the Contractor's part of the SWPPP, including required signed certification statements, before soil disturbing activities begin.

Failure to sign any required documents or certification statements will be considered a default of the Contract. Any earth disturbing activities performed without the required signed documents or certification statements may be considered a violation of the Clean Water Act by the EPA.

When the SWPPP is required, prepare the erosion control plan in accordance with the sequence of operations and present in the NPDES Stormwater Pollution Prevention Plan required format provided by the Department. The erosion control plan shall describe, but not be limited to, the following items or activities:

(1) For each phase of construction operations or activities, supply the following information:

- (A) Locations of all erosion control devices
- (B) Types of all erosion control devices
- (C) Estimated time erosion control devices will be in operation
- (D) Monitoring schedules for maintenance of erosion control devices
- (E) Methods of maintaining erosion control devices
- (F) Containment or removal methods for pollutants or hazardous wastes

(2) The name and telephone number of the person responsible for monitoring and maintaining the erosion control devices.

(3) Submit for approval the erosion control plans meeting paragraphs 3A, 3B, or 3C below:

(A) Projects permitted by the Southwest Florida Water Management District, require the following:

Submit a copy of the erosion control plan to the Engineer for review and to the appropriate Southwest Florida Water Management District Office (SWFWMD) for review and approval. Include the SWFWMD permit number on all submitted data or correspondence.

The Contractor may schedule a meeting with the appropriate SWFWMD Office to discuss his erosion control plan in detail, to expedite the review and approval process. Advise the Engineer of the time and place of any meetings scheduled with SWFWMD.

Do not begin construction activities until the erosion control plan receives written approval from both SWFWMD and the Engineer.

(B) Projects permitted by the South Florida Water Management District or the St. Johns River Water Management District require the following:

Obtain the Engineer's approval of the erosion control plan.

Do not begin construction activities until the erosion control plan receives written approval from the Engineer.

(C) Projects authorized by permitting agencies other than the Water Management Districts or projects for which no permits are required require the following:

The Engineer will review and approve the Contractor's erosion control plan.

Do not begin construction activities until the erosion control plan receives written approval from the Engineer.

Comply with the approved erosion control plan.

104-6 Construction Requirements.

104-6.1 Limitation of Exposure of Erodible Earth: The Engineer may limit the surface areas of unprotected erodible earth exposed by the construction operation and may direct the Contractor to provide erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal, or other water impoundments or to prevent detrimental effects on property outside the project right-of-way or damage to the project. Limit the area in which excavation and filling operations are being performed so that it does not exceed the capacity to keep the finish grading, grassing, sodding, and other such permanent erosion control measures current in accordance with the accepted schedule.

Do not allow the surface area of erodible earth that clearing and grubbing operations or excavation and filling operations expose to exceed 750,000 ft² [70,000 m²] without specific prior approval by the Engineer. This limitation applies separately to clearing and grubbing operations and excavation and filling operations.

The Engineer may increase or decrease the amount of surface area the Contractor may expose at any one time.

104-6.2 Incorporation of Erosion Control Features: Incorporate permanent erosion control features into the project at the earliest practical time. Use approved temporary erosion control features to correct conditions that develop during construction which were not foreseen at the time of design, to control erosion prior to the time it is practical to construct permanent control features, or to provide immediate temporary control of erosion that develops during normal construction operations, which are not associated with permanent erosion control features on the project.

The Engineer may authorize temporary erosion control features when Topsoil is specified in the Contract and the limited availability of that material from the grading operations will prevent scheduled progress of the work or damage the permanent erosion control features.

104-6.3 Scheduling of Successive Operations: Schedule operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations, and the duration of exposure of uncompleted construction to the elements is as short as practicable.

Schedule and perform clearing and grubbing so that grading operations can follow immediately thereafter. Schedule and perform grading operations so that permanent erosion control features can follow immediately thereafter if conditions on the project permit.

104-6.4 Details for Temporary Erosion Control Features:

104-6.4.1 General: Use temporary erosion and water pollution control features that consist of, but are not limited to, temporary grassing, temporary sodding, temporary mulching, sandbagging, slope drains, sediment basins, sediment checks, berms, baled hay or straw, floating turbidity barrier, staked turbidity barrier and silt fence. For design details for some of these items, refer to the Water Quality Section of the Roadway and Traffic Design Standards.

104-6.4.2 Temporary Grassing: The Engineer may designate certain areas of grassing constructed in accordance with Section 570 as temporary erosion control features. The Engineer may direct the Contractor to omit permanent type grass seed from grassing and the reduce the specified rate of spread for fertilizer used in conjunction with grassing operations when such work is designated as a temporary erosion control feature.

104-6.4.3 Temporary Sod: Furnish and place sod in accordance with Section 575 within areas designated by the Engineer to temporarily control erosion. If the Engineer determines that the sod will be of a temporary

nature, he may not require fertilizer and lime. Keep the sod in a moist condition in order to ensure growth. The Department will pay for all required watering under Item No. 570-9 [2570-9].

104-6.4.4 Temporary Mulching: Furnish and apply a 2 to 4 inch [50 to 100 mm] thick blanket of straw or hay mulch to designated areas, then mix or force the mulch into the top 2 inches [50 mm] of the soil in order to temporarily control erosion. Use only undecayed straw or hay, which can readily be cut into the soil and which otherwise, complies with 981-3.1. The Contractor may substitute other measures for temporary erosion control, such as hydro mulching, chemical adhesive soil stabilizers, etc., for mulching with straw or hay, if approved by the Engineer. When beginning permanent grassing operations, plow under temporary mulch materials in conjunction with preparation of the ground.

104-6.4.5 Sandbagging: Furnish and place sandbags in configurations to control erosion and siltation.

104-6.4.6 Slope Drains: Construct slope drains in accordance with the details shown in the plans, the Roadway and Traffic Design Standards, or as may be approved as suitable to adequately perform the intended function.

104-6.4.7 Sediment Basins: Construct sediment basins in accordance with the details shown in the plans, the Roadway and Traffic Design Standards, or as may be approved as suitable to adequately perform the intended function. Clean out sediment basins as necessary in accordance with the plans or as directed.

104-6.4.8 Berms: Construct temporary earth berms to divert the flow of water from an erodible surface.

104-6.4.9 Baled Hay or Straw: Provide bales having minimum dimensions of 14 by 18 by 36 inches [350 by 450 by 900 mm], at the time of placement. Construct baled hay or straw dams to protect against downstream accumulations of silt. Construct the baled hay or straw dams in accordance with the details shown in the plans or the Roadway and Traffic Design Standards. Meet the provisions of 981-3.1 for all baled hay or straw.

Place the dam to effectively control silt dispersion under conditions present on this project. The Contractor may use alternate solutions and usage of materials if approved.

104-6.4.10 Temporary Silt Fences:

104-6.4.10.1 General: Furnish, install, maintain, and remove temporary silt fences, in accordance with the manufacturer's directions, these Specifications, the details as shown on the plans, and the Roadway and Traffic Design Standards.

104-6.4.10.2 Materials and Installation: Use a geotextile fabric made from woven or nonwoven fabric, meeting the physical requirements of Section 985 according to those applications for erosion control.

Choose the type and size of posts, wire mesh reinforcement (if required), and method of installation. Do not use products which have a separate layer of plastic mesh or netting. Provide a durable and effective temporary silt fence that controls sediment comparable to the Roadway and Traffic Design Standards, Index No. 102.

Install all sediment control devices in a timely manner to ensure the control of sediment and the protection of lakes, streams, gulf or ocean waters, or any wetlands associated therewith and to any adjacent property outside the right-of-way as required.

At sites where exposure to such sensitive areas is prevalent, complete the installation of any sediment control device prior to the commencement of any earthwork.

After installation of sediment control devices, repair portions of any devices damaged at no expense to the Department.

Erect temporary silt fence at upland locations across ditchlines and at temporary locations shown on the plans or approved by the Engineer where continuous construction activities change the natural contour and drainage runoff. Do not attach temporary silt fence to existing trees unless approved by the Engineer.

104-6.4.10.3 Inspection and Maintenance: Inspect all temporary silt fences immediately after each rainfall and at least daily during prolonged rainfall. Immediately correct any deficiencies. In addition, make a daily review of the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, install additional silt fences as directed by the Engineer.

Remove sediment deposits when the deposit reaches approximately 1/2 of the volume capacity of the temporary silt fence

or as directed by the Engineer. Dress any sediment deposits remaining in place after the temporary silt fence is no longer required to conform with the finished grade, and prepare and seed them in accordance with Section 570.

104-6.4.11 Floating Turbidity Barriers and Staked Turbidity Barriers:

Install, maintain, and remove turbidity barriers to contain turbidity that may occur as the result of dredging, filling, or other construction activities which may cause turbidity to occur in the waters of the State. The Contractor may need to deploy turbidity barriers around isolated areas of concern such as seagrass beds, coral communities, etc. both within as well as outside the right-of-way limits. The Engineer will identify such areas. Place the barriers prior to the commencement of any work that could impact the area of concern. Install the barriers in accordance with the details shown in the plans or as approved by the Engineer. Ensure that the type barrier used and the deployment and maintenance of the barrier will minimize dispersion of turbid waters from the construction site. The Engineer may approve alternate methods or materials. Operate turbidity barriers in such a manner to avoid or minimize the degradation of the water quality of the surrounding waters.

104-6.4.12 Rock Bags: Furnish and place rock bags to control erosion and siltation. Place the bags as shown in the plans, the Roadway and Traffic Design Standards or as directed by the Engineer. Use a fabric material with openings that are clearly visible to minimize clogging yet small enough to prevent rock loss. Use material of sufficient strength to allow removing and relocating bags without breakage. The bag size when filled with rocks shall be approximately 12 by 12 by 4 inch [300 by 300 by 100 mm]. Use No. 4 or No. 5 coarse aggregate rock.

104-6.5 Removal of Temporary Erosion Control Features: In general, remove or incorporate into the soil any temporary erosion control features existing at the time of construction of the permanent erosion control features in an area of the project in such a manner that no detrimental effect will result. The Engineer may direct that temporary features be left in place.

104-7 Maintenance of Erosion Control Features.

104-7.1 General: Provide routine maintenance of permanent and temporary erosion control features, at no expense to the Department, until the project is complete and accepted. If reconstruction of such erosion control features is necessary due to the Contractor's negligence or carelessness or, in the case of temporary erosion control features, failure by the Contractor to install permanent erosion control features as scheduled, the Contractor shall replace such erosion control features at no expense to the Department. If reconstruction of permanent or temporary erosion control features is necessary due to factors beyond the

control of the Contractor, the Department will pay for replacement under the appropriate Contract pay item or items.

104-7.2 Mowing: The Engineer may direct mowing of areas within the limits of the project. Mow these designated areas within seven days of receiving such order. Do not mow slopes that are steeper than three horizontal to one vertical.

104-8 Protection During Suspension of Contract Time.

If it is necessary to suspend the construction operations for any appreciable length of time, shape the top of the earthwork in such a manner to permit runoff of rainwater, and construct earth berms along the top edges of embankments to intercept runoff water. Provide temporary slope drains to carry runoff from cuts and embankments that are in the vicinity of rivers, streams, canals, lakes, and impoundments. Locate slope drains at intervals of approximately 500 feet [150 m], and stabilize them by paving or by covering with waterproof materials. Should such preventive measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation. The Engineer may direct the Contractor to perform, during such suspensions of operations, any other erosion control work deemed necessary.

104-9 Method of Measurement.

When separate items for temporary erosion control features are included in the Contract, the quantities to be paid for will be: (1) the areas, in square yards [square meters], of Artificial Coverings; (2) the area, in acres [hectares], of Mowing; (3) the volume, in cubic yards [cubic meters], of Sandbagging, measured in accordance with 530-4.1; (4) the length, in feet [meters], of Slope Drains (Temporary), measured along the surface of the work constructed; (5) the number of Sediment Basins acceptably constructed; (6) the number of Sediment Basin Cleanouts acceptably accomplished; (7) the number of hay or straw bales; (8) the length, in feet [meters], of Floating Turbidity Barrier; (9) the length, in feet [meters], of Staked Turbidity Barrier; (10) the length, in feet [meters], of Staked Silt Fence; (11) seeding materials in accordance with Section 570 and (12) the number of Rock Bags acceptably placed.

The quantity of floating turbidity barrier, relocated turbidity barrier, staked turbidity barrier, and staked silt fence to be paid for will be the total length, in feet [meters], furnished, installed, and accepted at a new location, regardless of whether materials are new or used or relocated from a previous installation on the project.

104-10 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including construction and routine maintenance of temporary erosion control features and for mowing. Any additional costs resulting from compliance with the requirements of this Section, other than construction, routine maintenance, and removal of temporary erosion control features and mowing, will be included in the Contract unit prices for the

item or items to which such costs are related. The work of Grassing or Sodding designated, as a temporary erosion control feature in accordance with 104-6.4.2 or 104-6.4.3 will be paid for under the appropriate pay items specified in Sections 570 and 575.

Separate payment will not be made for the cost of constructing temporary earth berms along the edges of the roadways to prevent erosion during grading and subsequent operations. The Contractor shall include these costs in the Contract prices for grading items.

Additional temporary erosion control features constructed as directed by the Engineer will be paid for as unforeseeable work.

In case of repeated failure on the part of the Contractor to control erosion, pollution, or siltation, the Engineer reserves the right to employ outside assistance or to use the Department's own forces to provide the necessary corrective measures. Any such costs incurred, including engineering costs, will be charged to the Contractor and appropriate deductions made from the monthly progress estimate.

Payment will be made under:

Item No. 104- 1	Artificial Coverings - per square yard.
Item No. 2104- 1	Artificial Coverings - per square meter.
Item No. 104- 4	Mowing - per acre.
Item No. 2104- 4	Mowing - per hectare.
Item No. 104- 5	Sandbagging - per cubic yard.
Item No. 2104- 5	Sandbagging - per cubic meter.
Item No. 104- 6	Slope Drains (Temporary) - per foot.
Item No. 2104- 6	Slope Drains (Temporary) - per meter.
Item No. 104- 7	Sediment Basins - each.
Item No. 2104- 7	Sediment Basins - each.
Item No. 104- 9	Sediment Basin Cleanouts - each.
Item No. 2104- 9	Sediment Basin Cleanouts - each.
Item No. 104- 10	Baled Hay or Straw - each.
Item No. 2104- 10	Baled Hay or Straw - each.
Item No. 104- 11	Floating Turbidity Barrier - per foot.
Item No. 2104- 11	Floating Turbidity Barrier - per meter.
Item No. 104- 12	Staked Turbidity Barrier - per foot.
Item No. 2104- 12	Staked Turbidity Barrier - per meter.
Item No. 104- 13	Staked Silt Fence - per foot.
Item No. 2104- 13	Staked Silt Fence - per meter.
Item No. 104- 16	Rock Bags - each.
Item No. 2104- 16	Rock Bags - each.
Item No. 104- 75	Relocate Floating Turbidity Barrier - per foot.
Item No. 2104- 75	Relocate Floating Turbidity Barrier - per meter.

SECTION 110 - CLEARING AND GRUBBING

110-1 Description.

Clear and grub within the areas of the roadway right-of-way and of borrow pits, sand-clay base material pits, lateral ditches, and any other areas shown in the plans to be cleared and grubbed. Remove and dispose of all trees, stumps, roots and other such protruding objects, and buildings, structures, appurtenances, existing flexible asphalt pavement, and other facilities necessary to prepare the area for the proposed construction, and remove and dispose of all product and debris not required to be salvaged or not required to complete the construction.

Also, perform certain miscellaneous work the Engineer considers necessary for the complete preparation of the overall project site, as follows:

- (a) Plug any water wells that are encountered within the right-of-way and that are to be abandoned.
- (b) Level the terrain outside the limits of construction for purposes of facilitating maintenance and other post-construction operations.
- (c) Trim trees and shrubs within the project right-of-way that are identified in the Contract Documents.

Meet the requirements for such miscellaneous work as specified in 110-10.

110-2 Standard Clearing and Grubbing.

110-2.1 Work Included: Completely remove and dispose of all buildings, timber, brush, stumps, roots, rubbish, debris, and all other obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas, and all other structures and obstructions necessary to be removed and for which other items of the Contract do not specify the removal thereof, including septic tanks, building foundations, and pipes.

Perform Standard Clearing and Grubbing within the following areas:

- (a) All areas where excavation is to be done, including borrow pits, lateral ditches, right-of-way ditches, etc.
- (b) All areas where roadway embankments will be constructed.
- (c) All areas where structures will be constructed, including pipe culverts and other pipe lines.

110-2.2 Depths of Removal of Roots, Stumps, and Other Debris: In all areas where excavation is to be performed and the excavated material is to be used in the construction of roadway embankment or roadway base or pavement, and in all areas where roadway embankments are to be constructed, remove roots and other debris to a depth of at least 12 inches [300 mm] below the ground surface. Plow the surface to a depth of at least 6 inches [150 mm], and remove all roots thereby exposed to a depth of at least 12 inches [300 mm]. Completely remove and dispose of all stumps within the roadway right-of-way.

Where excavating within the roadway area and for structures, remove all roots, etc., protruding through or appearing on the surface of the completed excavation to a depth of at least 12 inches [300 mm] below the finished excavation surface.

In borrow pits, material pits, and lateral ditches, remove or cut off all stumps, roots, etc., protruding through or appearing on the surface of the completed excavation below the finished excavation surface.

In borrow and material pits, do not perform any clearing or grubbing within 3 feet [1.0 m] inside the right-of-way line.

Within all other areas where Standard Clearing and Grubbing is to be performed, remove roots and other debris projecting through or appearing on the surface of the original ground, to a depth of 12 inches [300 mm] below the surface, but do not plow or harrow these areas.

110-2.3 Trees to Remain: As an exception to the above provisions, where so directed by the Engineer, trim, protect, and leave standing desirable trees within the roadway area. Trim branches of trees extending over the area occupied by the roadway as directed, to give a clear height of 16 feet [5 m] above the roadway.

110-2.4 Boulders: Remove any boulders encountered in the roadway excavation (other than as permitted under the provisions of 120-7.2) or found on the surface of the ground, and place them in neat piles inside the right-of-way and adjacent to the right-of-way line. The Contractor may stockpile boulders encountered in Department-furnished borrow areas, which are not suitable for use in the embankment construction, within the borrow area.

110-3 Selective Clearing and Grubbing.

The Contractor shall remove and dispose of all vegetation, obstructions, etc., as provided above except that, where so elected, the Contractor may cut roots, etc., flush with the ground surface. Completely remove and dispose of stumps. Entirely remove undergrowth except in specific areas designated by the Engineer to remain for aesthetic purposes. Trim, protect, and leave standing desirable trees, with the exception of such trees as the Engineer may designate to be removed in order to facilitate right-of-way

maintenance. Remove undesirable or damaged trees as so designated by the Engineer. Perform Selective Clearing and Grubbing only in areas so designated in the plans.

110-4 Protection of Property Remaining in Place.

Protect and do not displace property obstructions which are to remain in place, such as buildings, sewers, drains, water or gas pipes, conduits, poles, walls, posts, bridges, etc.

110-5 Removal of Buildings.

110-5.1 Parts to be Removed: Completely remove all parts of the buildings, including utilities, plumbing, foundations, floors, basements, steps, connecting concrete sidewalks or other pavement, septic tanks, and any other appurtenances, by any practical manner which is not detrimental to other property and improvements. Remove utilities to the point of connection to the utility authority's cut-in. After removing the sewer connections to the point of cut-in, construct a concrete plug at the cut-in point, as directed by the Engineer, except where the utility owners may elect to perform their own plugging. Contact the appropriate utility companies prior to removal of any part of the building to ensure disconnection of services.

110-5.2 Removal by Others: Where buildings within the area to be cleared and grubbed are so specified to be removed by others, remove and dispose of any foundations, curtain walls, concrete floors, basements or other foundation parts which might be left in place after such removal of buildings by others.

110-6 Removal of Existing Structures.

110-6.1 Structures to be Removed: Remove and dispose of the materials from existing structures. Remove the following: (1) those structures, or portions of structures, shown in the plans to be removed; (2) those structures, or portions of structures, found within the limits of the area to be cleared and grubbed, and directed by the Engineer to be removed; (3) those structures, or portion of structures, which are necessary to remove in order to construct new structures; and (4) other appurtenances or obstructions which may be designated in the Contract Documents as to be included in an item of payment for the work under this Article.

110-6.2 Method of Removal: Remove the structures in such a way as to leave no obstructions to any proposed new structures or to any waterways. Pull, cut off, or break off pilings to the requirements of the permit or other Contract Documents, whichever requires the deepest removal, but not less than 2 feet [0.6 m] below the finish ground line. In the event that the plans indicate channel excavation to be done by others, consider the finish ground line as the limits of such excavation. For materials which are to remain the property of the Department or are to be salvaged for use in temporary structures, avoid damage

to such materials, and entirely remove all bolts, nails, etc., from timbers to be so salvaged. Mark structural steel members for identification as directed.

Remove existing steel members painted with a paint identified by the Resource Conservation Recovery Act (RCRA), as a hazardous material. The Contractor removing any material or waste identified as hazardous, must submit proof of QP2, Category "A" certification with the Society of Protective Coatings (SSPC) prior to removal activities. Paint identified as hazardous, that is disturbed or removed from the steel members, is considered hazardous waste.

110-6.3 Partial Removal of Bridges: On concrete bridges to be partially removed and widened, remove concrete by manually or mechanically operated pavement breakers, by concrete saws, or by chipping hammers. Do not use explosives. Where concrete is to be removed to neat lines, use concrete saws capable of providing a reasonably uniform cleavage face. If the equipment used will not provide a uniform cut without surface spalling, first score the outlines of the work with small trenches or grooves. **110-6.4 Authority of U.S. Coast Guard:** For structures in navigable waters, when constructing the project under authority of a U.S. Coast Guard permit, the U.S. Coast Guard may inspect and approve the work to remove any existing structures involved therein, prior to acceptance by the Department.

110-7 Removal of Existing Pavement.

Remove and dispose of existing rigid portland cement concrete pavement, sidewalk, slope pavement, ditch pavement, curb, and curb and gutter, where shown in the plans or ordered by the Engineer to be removed or where required because of the construction operations. Retaining walls, drainage structures and flexible asphalt pavement are not included in the work under this Article.

110-8 Ownership of Materials.

Except as may be otherwise specified in the Contract Documents, the Contractor shall take ownership of all buildings, structures, appurtenances, and other materials removed by him and shall dispose of them in accordance with 110-9.

110-9 Disposal of Materials.

110-9.1 General Disposal: Provide disposal areas approved by the Engineer. Either stack any material designated to remain the property of the Department in neat piles within the right-of-way or load it onto the Department's vehicles.

Dispose of timber, stumps, brush, roots, rubbish, and other objectionable material resulting from clearing and grubbing in areas and by methods approved by the Engineer. Do not block waterways by the disposal of debris.

110-9.2 Burning Debris: Where burning of such materials is permitted, perform all such burning in accordance with the applicable laws, ordinances, and regulations. Perform all burning at locations where trees and shrubs adjacent to the cleared area will not be harmed.

110-9.3 Disposal in Areas Adjacent to Project: The Contractor may dispose of materials on private property, provided the Contractor furnishes the Engineer with a written Statement from the owner of the property giving permission for the disposal of the materials on his property. The Contractor shall locate all disposal areas for materials resulting from clearing and grubbing, both on private property and on property owned by him, (1) in areas out of sight of the project and (2) at least 300 feet [90 m] from the nearest roadway right-of-way line of the project. If burying materials, the Contractor may disregard requirement (2).

110-9.4 Timber and Crops: The Contractor may sell any merchantable timber, fruit trees, and crops that are cleared under the operations of clearing and grubbing for his own benefit, subject to the provisions of 7-1.2, which may require that the timber, fruit trees, or crops be burned at or near the site of their removal, as directed by the Engineer. The Contractor is liable for any claims which may arise pursuant to the provisions of this Subarticle.

110-9.5 Hazardous Materials/Waste: Ensure that all hazardous materials and waste are handled and disposed of in accordance with all Local, State and Federal requirements.

Use one of the following methods for the disposal of all hazardous materials and waste:

- (a) Deliver the steel members and other hazardous waste to a licensed recycling center capable of processing steel members coated with paint identified by RECRA as hazardous.
- (b) Remove all hazardous materials from the steel members and dispose of the hazardous waste, as required by EPA and other governing authorities.
- (c) Deliver the steel members to an approved agency for use as an offshore artificial reef.

Deliver any other hazardous materials or waste to a licensed hazardous materials/waste recycling center.

Submit the name, address and qualifications of the transporter, treatment facility, proposed treatment and disposal methods for the Engineers approval, prior to transport, treatment or disposal of any hazardous materials or waste.

Transport all hazardous waste and/or materials in accordance with applicable 40 CFR 263 Standards. Provide all hazardous materials or waste manifests, certificates of disposal, chain of custody forms and other applicable documents within 21 days of each shipment.

All compensation for the cost of removal and disposal of hazardous materials or waste will be included in the Cost of Removal of Existing Structures.

110-10 Miscellaneous Operations.

110-10.1 Plugging Abandoned Water Wells:

110-10.1.1 Water Wells Required to be Plugged: Fill or plug all water wells within the right-of-way, including areas of borrow pits and lateral ditches, that are not to remain in service, as specified herein.

Cut off the casing of cased wells at least 12 inches [300 mm] below the ground line or 12 inches [300 mm] below the elevation of the finished excavation surface, whichever is lower. Water wells, as referred to herein, are defined either as artesian or non-artesian, as follows:

(a) An artesian well is an artificial hole in the ground from which water supplies may be obtained and which penetrates any water-bearing rock, the water in which is raised to the surface by natural flow or which rises to an elevation above the top of the water-bearing bed. Artesian wells are further defined to include all holes drilled as a source of water that penetrate any water-bearing beds that are a part of the artesian water system of Florida, as determined by representatives of the Division of Interior Resources of the State of Florida Department of Environmental Protection.

(b) A non-artesian (water-table) well is a well in which the source of water is an unconfined aquifer. The water in a non-artesian well does not rise above the source bed.

If the plans do not indicate whether a non-flowing well is artesian or non-artesian, the Engineer will contact the Florida Department of Environmental Protection to determine the type of the particular well and will furnish the information to the Contractor.

110-10.1.2 Plugging Artesian Wells: For plugging artesian wells, obtain advice from the Florida Bureau of Geology, and employ a competent well-driller.

Plug artesian wells, flowing or non-flowing, from bottom to surface with neat portland cement mortar (cement and water only). Substantially stop

the well's flow before the introduction of the cement mixture by introducing "drilling mud", or by other methods approved by the Bureau of Geology.

Introduce the cement mixture into the well bore at the point at which it is to remain, by means of a dump-bailer or by a drop-pipe through which the mixture is pumped into place. Do not allow the cement mixture to fall freely through the water in the well.

For wells intercepting cavities or caverns, fill the cavernous sections with heavy mud, crushed limerock, or clean sand or gravel, in such manner as to form a base to hold the application of the cement mixture. Use other methods to fill wells which involve special or difficult problems, subject to approval by the Bureau of Geology.

Should leakage around the outside of the casing appear after plugging the well, neatly grout the casing with cement mortar to eliminate the leakage.

110-10.1.3 Plugging Non-Artesian Wells: Fill non-artesian wells with cement mortar, concrete, clay, or other material which prevents the flow of surface waters down the well. Perform the work in such a manner that it will not contaminate an underground water supply.

110-10.2 Landscape Areas: When certain areas of the right-of-way, outside of the limits of construction, are shown in the plans or designated by the Engineer to be landscaped, either under the construction Contract or at a later time, remove undesirable trees, stumps, undergrowth, and vegetation, as directed, and preserve and trim natural growth and trees as directed by the Engineer.

110-10.3 Leveling Terrain: Within the areas between the limits of construction and the outer limits of clearing and grubbing, fill all holes and other depressions, and cut down all mounds and ridges. Make the area of a sufficient uniform contour so that the Department's subsequent mowing and cutting operations are not hindered by irregularity of terrain. Perform this work regardless of whether the irregularities were the result of construction operations or existed originally.

110-10.4 Mailboxes: When the Contract Documents require furnishing and installing mailboxes, permit each owner to remove the existing mailbox. Work with the Local Postmaster to develop a method of temporary mail service for the period between removal and installation of the new mailboxes. Install the mailboxes in accordance with the AASHTO publication, "A Guide for Erecting Mailboxes on Highways".

110-11 Method of Measurement.

110-11.1 Clearing and Grubbing:

110-11.1.1 Lump Sum Payment: When direct payment is provided in the Contract, the quantity to be paid for will be either the lump sum quantity or the number of acres [hectares], cleared and grubbed.

110-11.1.2 Areas Paid for Separately (by the acre [hectare]): For borrow pits and other areas of clearing and grubbing which are designated to be paid for separately by the acre [hectare], the quantity to be paid for will be determined by measurement of the areas authorized by the Engineer to be cleared and grubbed, and acceptably completed.

Payment by the acre [hectare] for the clearing and grubbing of borrow pits will be subject to the following provisions:

(a) When the Contractor exercises an option to furnish substitute borrow areas to be used in lieu of pits furnished by the Department, the quantity to be paid for in the substitute borrow areas will be either the area actually cleared and grubbed or the area shown on the plans for the corresponding borrow areas furnished by the Department, whichever is smaller.

(b) When the Contractor is required to furnish the borrow areas, no separate payment for clearing and grubbing of those areas will be made.

(c) Clearing and grubbing performed on haul roads, provided either by the Department or by the Contractor, will not be included in the areas to be paid for under Clearing and Grubbing. The costs of any clearing and grubbing work necessary to open haul roads for the Contractor's use will be included in the particular item (or items) of the Contract to which such work is pertinent.

(d) Areas where Selective Clearing and Grubbing is performed will be included in the measurement under the item of Clearing and Grubbing.

110-11.2 Removal of Existing Structures: When direct payment is provided in the Contract, the quantity to be paid for will be the lump sum quantity or quantities for the specific structures removed, as designated.

110-11.3 Removal of Existing Pavement: Payment for removal of flexible asphalt pavement is included in the Lump Sum price for Clearing and Grubbing. When a separate item for Removal of Existing Pavement is provided, the quantity

to be paid for will be the number of square yards [square meters] of existing pavement of the types listed in 110-7, acceptably removed and disposed of, as specified. The quantity will be determined by actual measurement along the surface of the pavement before its removal. Measurements for appurtenances which have irregular surface configurations, such as curb and gutter, steps, and ditch pavement, will be the area as projected to an approximate horizontal plane. Where the removal of pavement areas is necessary only for the construction of box culverts, pipe culverts, storm sewers, inlets, manholes, etc., these areas will not be included in the measurements.

110-11.4 Plugging Water Wells: When direct payment is provided in the Contract, the quantity to be paid for will be the number of water wells plugged, for each type of well (artesian or non-artesian).

110-11.5 Mailboxes: When direct payment is provided in the Contract, the quantity to be paid for will be the number of mailboxes acceptably furnished and installed.

110-11.6 Delivery of Salvageable Material to the Department: When direct payment is provided in the Contract, the quantity to be paid for will be the Lump Sum quantity for delivery of salvageable materials to the Department as indicated in the plans.

110-11.7 General: In each case, except as provided below, where no item of separate payment for such work is included in the proposal, all costs of such work will be included in the various scheduled items in the Contract, or under specific items as specified herein below or elsewhere in the Contract.

110-12 Basis of Payment.

110-12.1 Clearing and Grubbing:

110-12.1.1 Lump Sum Payment: Price and payment will be full compensation for all clearing and grubbing required for the roadway right-of-way and for lateral ditches, channel changes, or other outfall areas, and any other clearing and grubbing indicated, or required for the construction of the entire project, except for any areas designated to be paid for separately or to be specifically included in the costs of other work under the Contract.

Where construction easements are specified in the plans and the limits of clearing and grubbing for such easements are dependent upon the final construction requirements, no adjustment will be made in the lump sum price and payment, either over or under, for variations from the limits of the easement defined on the plans.

110-12.1.2 General: Price and payment, either lump sum or by the acre [hectare], will be full compensation for all the work specified in this Section (other than as specified below, when separate payment is provided for removal of existing structures, removal of existing pavement, and plugging water wells), including all necessary hauling, furnishing equipment, equipment operation, furnishing any areas required for disposal of debris, leveling of terrain and the landscaping work of trimming, etc., as specified herein.

110-12.1.3 When No Direct Payment is Provided: When no item for clearing and grubbing is included in the proposal, the Contractor shall include the cost of any work of clearing and grubbing which is necessary for the proper construction of the project in the Contract price for the structure or other item of work for which such clearing and grubbing is required.

The Contractor shall include the cost of all clearing and grubbing which might be necessary in pits or areas from which base material is obtained in the Contract price for the base in which such material is used. The clearing and grubbing of areas for obtaining stabilizing materials, where required only for the purpose of obtaining materials for stabilizing, will not be paid for separately.

110-12.2 Removal of Existing Structures: Price and payment will be full compensation for all work of removal and disposal of the designated structures.

When direct payment for the removal of existing structures is not provided in the proposal, the Contractor shall include the cost of removing all structures in the Contract price for Clearing and Grubbing or, if no item of Clearing and Grubbing is included, in the compensation for the other items covering the new structure being constructed.

110-12.3 Removal of Existing Pavement: Price and payment will be full compensation for performing and completing all the work of removal and satisfactory disposal.

When no separate item for this work is provided and no applicable item of excavation or embankment covering such work (as provided in 120-13.1) is included, the Contractor shall include the costs of this work in the Contract price for the item of Clearing and Grubbing or for the pipe or other structure for which the pavement removal is required.

110-12.4 Plugging Water Wells: Price and payment will be full compensation for each type of well acceptably plugged.

If a water well requiring plugging is encountered and the Contract contains no price for plugging wells of that specific type, the plugging of such well will be paid for as unforeseeable work.

110-12.5 Mailboxes: Price and payment will be full compensation for all work and materials required, including supports and numbers.

110-12.6 Delivery of Salvageable Material to the Department: Price and payment will be full compensation for all work required for delivery of the materials to the Department.

110-12.7 Payment Items: Payment will be made under:

Item No. 110- 1	Clearing and Grubbing - lump sum.
Item No. 2110- 1	Clearing and Grubbing - lump sum.
Item No. 110- 2	Clearing and Grubbing - per acre.
Item No. 2110- 2	Clearing and Grubbing - per hectare.
Item No. 110- 3	Removal of Existing Structures - lump sum.
Item No. 2110- 3	Removal of Existing Structures - lump sum.
Item No. 110- 4	Removal of Existing Pavement - per square yard.
Item No. 2110- 4	Removal of Existing Pavement - per square meter.
Item No. 110- 5	Plugging Water Wells (Artesian) - each.
Item No. 2110- 5	Plugging Water Wells (Artesian) - each.
Item No. 110- 6	Plugging Water Wells (Non-Artesian) - each.
Item No. 2110- 6	Plugging Water Wells (Non-Artesian) - each.
Item No. 110- 7	Mailbox (Furnish and Install) - each.
Item No. 2110- 7	Mailbox (Furnish and Install) - each.
Item No. 110- 86	Delivery of Salvageable Material to FDOT - lump sum.
Item No. 2110- 86	Delivery of Salvageable Material to FDOT - lump sum.

SECTION 120 - EXCAVATION AND EMBANKMENT

120-1 Description.

Excavate and construct embankments as required for the roadway, ditches, channel changes and borrow material. Prepare subgrades and foundations, construct embankments, and otherwise use or dispose of the materials excavated. Use suitable excavated materials or authorized borrow. Also compact and dress excavated areas and embankments. For excavation and backfilling of structures, refer to Section 125.

Excavate materials for clearing and grubbing under Section 110. Unclassified material displaced by the storm sewer or drainage structure system is not included in the earthwork quantities shown on the plans.

120-2 Classifications of Excavation.

120-2.1 General: The Department may classify excavation specified under this Section for payment as any of the following: (1) Regular Excavation, (2) Subsoil Excavation, (3) Lateral Ditch Excavation, and (4) Channel Excavation.

If the proposal does not show Subsoil Excavation or Lateral Ditch Excavation as separate items of payment, include such excavation under the item of Regular Excavation.

If the proposal shows Lateral Ditch Excavation as a separate item of payment, but does not show Channel Excavation as a separate item of payment, include such excavation under the item of Lateral Ditch Excavation. Otherwise, include Channel Excavation under the item of Regular Excavation.

120-2.2 Regular Excavation: Regular Excavation includes roadway excavation and borrow excavation, as defined below for each.

120-2.2.1 Roadway Excavation: Roadway Excavation consists of the excavation and the utilization or disposal of all materials necessary for the construction of the roadway, ditches, channel changes, etc., except as may be specifically shown to be paid for separately and that portion of the lateral ditches within the limits of the roadway right-of-way as shown in the plans.

120-2.2.2 Borrow Excavation: Borrow Excavation consists of the excavation and utilization of material from authorized borrow pits, including only material that is suitable for the construction of roadway embankments or of other embankments covered by the Contract, and unsuitable material in borrow areas furnished by the Department that must be excavated as determined by the Engineer in order to obtain the suitable material.

A Value Engineering Change Proposal (VECP) submittal based on using borrow material from within the project limits will not be considered.

120-2.3 Subsoil Excavation: Subsoil Excavation consists of the excavation and disposal of muck, clay, rock, or any other material that is unsuitable in its original position and that is excavated below the finished grading template. For stabilized bases and sand bituminous road mixes, consider the finished grading template as the top of the finished base, shoulders and slopes. For all other bases and rigid pavement, consider the finished grading template as the finished shoulder and slope lines and bottom of completed base or rigid pavement. Subsoil Excavation also consists of the excavation of all suitable material within the above limits as necessary to excavate the unsuitable material. Consider the limits of Subsoil Excavation indicated on the plans as being particularly variable, in accordance with the field conditions actually encountered.

The quantity of material required to replace the excavated material and to raise the elevation of the roadway to the bottom of the template will be paid for separately.

120-2.4 Lateral Ditch Excavation: Lateral Ditch Excavation consists of all excavation of inlet and outlet ditches to structures and roadway, changes in channels of streams, and ditches parallel to the roadway right-of-way. Dress lateral ditches to the grade and cross-section shown in the plans. The Department will classify all excavation in that portion of lateral ditches beyond the limits of the roadway right-of-way, including the sections where dressing is required as provided above, as Lateral Ditch Excavation.

120-2.5 Channel Excavation: Channel Excavation consists of the excavation and satisfactory disposal of all materials from the limits of the channel as shown in the plans.

120-3 Preliminary Soils Investigations.

When the plans contain the results of a soil survey, do not assume such data is a guarantee of the depth, extent, or character of material present.

120-4 Removal of Unsuitable Materials and Existing Roads.

120-4.1 Subsoil Excavation: Where muck, rock, clay, or other material within the limits of the roadway is unsuitable in its original position, excavate such material to the cross-sections shown in the plans or indicated by the Engineer, and backfill with suitable material. Shape backfill material to the required cross-sections. Where the removal of plastic soils below the finished earthwork grade is required, meet a construction tolerance, from the lines shown in the plans as the removal limits, of ± 0.2 feet [± 60 mm] in depth and ± 6 inches [± 150 mm] (each

side) in width. All proof-rolling must be observed by the owner or the owner's representative.

120-4.2 Removal of Existing Old Road: Where a new roadway is to be constructed over an old one, plow or scarify the old road, and break it up full width, regardless of height of fill. If the plans provide that paving materials may be incorporated into the fill, distribute such material in a manner so as not to create voids. Any additional undercut must be approved by the owner or owner's representative.

120-4.3 Obliterating Old Road: Where the plans call for obliteration of portions of an old road outside of the proposed new roadway, obliterate such sections of the old road by grading to fill ditches and to restore approximately the original contour of the ground or a contour which produces a pleasing appearance.

120-5 Disposal of Surplus and Unsuitable Material.

120-5.1 Ownership of Excavated Materials: The Department will retain ownership of all suitable excavated materials until the final job requirements for fill or backfill materials have been fulfilled. Take ownership of remaining excavated materials not needed for job requirements, and dispose of them outside the right-of-way, to the satisfaction of the Engineer.

In urban or other areas where temporary storage of apparent excess suitable materials within the right-of-way may be impracticable, the Contractor may stockpile the materials outside the right of-way in areas provided by him, until the Contractor needs such materials in the job or declares them as surplus. With the written approval of the Engineer, the Contractor may dispose of such apparent excess material with the stipulation that he shall replace any portion of the disposed material required to fulfill the actual job requirements, with equally suitable material, at his own expense.

120-5.2 General Requirements for Disposal: Dispose of excavated muck or other materials unsuitable for the roadway construction as shown in the plans or, if the plans do not indicate the disposal, take ownership of the materials and dispose of them outside the right-of-way.

120-5.3 Disposal of Muck on Side Slopes: As an exception to the provisions of 120-5.2, when approved by the Engineer, in rural undeveloped areas, the Contractor may place muck (A-8 material) on the slopes, or store it alongside the roadway, provided there is a clear distance of at least 6 feet [2 m] between the roadway grading limits and the muck, and the Contractor dresses the muck to present a reasonably neat appearance. In addition, the Contractor may also dispose of this material by placing it on the slopes in developed areas where, in the opinion of the Engineer, this will result in an aesthetically pleasing appearance and will have no detrimental effect on the adjacent developments.

Where the Engineer allows the Contractor to dispose of muck or other unsuitable material inside the right-of-way limits, the Contractor shall not place such material in a manner which will impede the inflow or outfall of any channel or of side ditches. The Engineer will determine the limits adjacent to channels within which the Contractor may place such materials.

120-5.4 Disposal of Paving Materials: Unless otherwise noted, take ownership of paving materials, such as paving brick, asphalt block, concrete slab, sidewalk, curb and gutter, etc., excavated in the removal of existing pavements, and dispose of them outside the right-of-way. If the materials are to remain the property of the Department, place them in neat piles as directed. Existing limerock base that is removed may be incorporated in the stabilized portion of the subgrade. If the construction sequence will allow, incorporate all existing limerock base into the project as allowed by the Contract Documents.

120-5.5 Disposal Areas: Where the Contract Documents require disposal of excavated materials outside the right-of-way, and the disposal area is not indicated in the Contract documents, furnish the disposal area without additional compensation.

Provide areas for disposal of removed paving materials out of sight of the project and at least 300 feet [90 m] from the nearest roadway right-of-way line of any State-maintained road. If the materials are buried, disregard the 300 foot [90 m] limitation.

120-6 Borrow.

120-6.1 Authorization for Use of Borrow: Use borrow only when sufficient quantities of suitable material are not available, as herein prescribed, from roadway and drainage excavation, to properly construct the embankment, subgrade, and shoulders, and to complete the backfilling of structures. Do not use borrow material until so ordered by the Engineer, and then only use material from designated borrow pits. Do not open borrow pits until the Engineer has approved their location and, where measurement of payment quantities is to be in the original position, cross-sections have been taken of the original ground surface.

Do not provide borrow materials that are polluted as defined in Chapter 376 of the Florida Statutes (oil of any kind and in any form, gasoline, pesticides, ammonia, chlorine, and derivatives thereof, excluding liquefied petroleum gas) in concentrations above any local, State, or Federal standards.

Prior to placing any borrow material that is the product of soil incineration, provide the Engineer with a copy of the Certificate of Materials Recycling and Post Burn Analysis showing that the material is below all allowable pollutant concentrations.

120-6.2 Furnishing of Borrow Areas: Unless otherwise specified, furnish areas for borrow material. When the Department is to furnish upland borrow areas, it will secure the necessary rights, permits or waivers. When the Department is to furnish a dredging area, it will obtain any necessary property rights and will make the necessary application for the dredging permits, which permits will be subsequently issued to the Contractor in accordance with 7-2.

To obtain the Engineer's approval to use an off-site construction activity area that involves excavation such as a borrow pit or local aggregate pit, request in writing, a Cultural Resources Assessment. Send the request to the Division of Historical Resources, Department of State, State Historic Preservation Officer, Tallahassee, FL. As a minimum, include in the request the State Project Job Number, the County, a description of the property with Township, Range, Section, etc., the dimensions of the area to be affected, and a location map. Do not start any work at the off-site construction activity area until receiving a clearance letter from the Division of Archives and written clearance from the Engineer concerning compliance with the Federal Endangered Species Act as specified in 7-1.4.

For certain locations, the Division of Archives will require a Cultural Resources Field Survey before approval can be granted. When this is required, secure professional archaeological services to make the survey and prepare a report. Submit the report to the Division of Archives with a copy to the Department. The Engineer will base final approval or rejection of the use of the off-site construction activity area on the report.

The Department will adjust Contract Time in accordance with 8-7 for any suspension of operations required to comply with this Article. The Department will not accept any monetary claims due to delays or loss of off-site construction activity areas.

Except where the plans specifically call for the use of a particular borrow or dredging area, the Contractor may substitute borrow or dredging areas of his own choosing provided: (1) the Engineer determines the materials from such areas meet the Department's standards and other requirements for stability for use in the particular sections of the work in which it is to be placed, and (2) the Contractor absorbs any increase in hauling or other costs.

Before using any borrow material from any substitute areas, obtain the Engineer's approval, in writing, for the use of the particular areas, and, where applicable, ensure that the Engineer has cross-sectioned the surface. Upon such written approval by the Engineer, consider the substitute areas as designated borrow areas.

When furnishing the dredging or borrow areas, supply the Department with evidence that the necessary permits, rights, or waivers for the use of such areas have been secured.

Do not excavate any part of a Contractor furnished borrow area which is less than 300 feet [90 m] from the right-of-way of the project or any State Road until the Engineer has approved a plan for landscaping and restoring the disturbed area. Perform this landscaping and land restoration at no expense to the Department, prior to final acceptance of the project. Do not provide a borrow area closer than 25 feet [8 m] to the right-of-way of any state road. In Department furnished borrow pits, do not excavate material within 5 feet [1.5 m] of the adjacent property lines.

Upon completion of excavation, neatly shape, dress, grass, vegetate, landscape, and drain all exposed areas including haul roads, as necessary so as not to present an objectionable appearance.

Meet the requirements of Section 104 when furnishing borrow areas, regardless of location.

120-6.3 Use of Overburden from Material Pits: Use overburden from areas from which sandclay or other selected material is to be obtained, which is suitable for use in the embankment as borrow, as directed by the Engineer.

120-6.4 Borrow Material for Shoulder Build-up: When so indicated in the plans, furnish borrow material with a specific minimum bearing value, for building up of existing shoulders. Blend materials as necessary to achieve this specified minimum bearing value prior to placing the materials on the shoulders. Take samples of this borrow material at the pit or blended stockpile. Include all costs of providing a material with the required bearing value in the Contract unit price for borrow material.

120-6.5 Requirements for Excavating in Borrow Areas: When borrow material is to be measured for payment, excavate the borrow pits neatly, and shape the bottoms and edges so that the Engineer can make accurate measurements of the excavated material. If the bottom of the pit is above the normal water table, shape it to a regular grade that will not permit the ponding of water. Do not maintain the bottom or edges after the final cross-sections have been taken, except for the correction of erosion along the pit perimeter. Where the plans show the depth and width of excavation, consider such depths and widths as approximations only and subject to variation.

120-6.6 Drainage of Borrow Pits: Where shown in the plans or ordered by the Engineer, construct ditches for draining the borrow pits. Classify the excavation of such pit drains as borrow, and use all suitable materials excavated from pit drains as borrow.

120-6.7 Haul Routes for Borrow Pits: Provide and maintain, at no expense to the Department, all necessary roads for hauling the borrow material. The Department will obtain any necessary property easements for haul roads from pits which it furnishes. Where borrow area haul roads or trails are used by others, do not cause such roads or trails to deteriorate in condition.

Arrange for the use of all non-public haul routes crossing the property of any railroad. Incur any expense for the use of such haul routes. Establish haul routes which will direct construction vehicles away from developed areas when feasible, and keep noise from hauling operations to a minimum. Advise the Engineer in writing of all proposed haul routes.

120-7 Materials for Embankment.

120-7.1 Use of Materials Excavated From the Roadway and Appurtenances: Use all suitable materials resulting from roadway excavation as far as practicable for completion of the work. Where so shown in the plans, use suitable material excavated from lateral ditches in the construction of the roadway and appurtenances. Use overburden stripped from material pits in the construction of embankments.

120-7.2 General Requirements for Embankment Materials: Construct embankments of acceptable material including broken portland cement concrete pavement and portland cement concrete rubble, but containing no muck, stumps, roots, brush, vegetable matter, rubbish, reinforcement bar or other material that does not compact into a suitable and enduring roadbed. Remove and waste material designated as undesirable. Use material in embankment construction in accordance with plan details or as the Engineer directs.\

Complete the embankment using maximum particle sizes as follows:

In top 12 inches [300 mm]: 3 1/2 inches [90 mm] (in any dimension).
12 to 24 inches [300 to 600 mm]: 6 inches [150 mm] (in any dimension).

In the depth below 24 inches [600 mm]: not to exceed 12 inches [300 mm] (in any dimension) or the compacted thickness of the layer being placed, whichever is less.

Spread all material so that the larger particles are separated from each other to minimize voids between them during compaction. Compact around these rocks in accordance with 120-9.2.

When and where approved by the Engineer, the Contractor may place larger rocks (not to exceed 18 inches [450 mm] in any dimension) outside the two to one slope and at least 4 feet [1.2 m] or more below the bottom of the base.

Compact around these rocks to a firmness equal to that of the supporting soil. Compact grassed embankment areas in accordance with 120-9.2.6.

Where constructing embankments adjacent to bridge end bents or abutments, do not place rock larger than 3 1/2 inches [90 mm] in diameter within 3 feet [1.0 m] of the location of any end-bent piling.

120-7.3 Selected Material for Plant Growth: When material suitable for plant growth, as designated by the Engineer, is available from the excavation within the limits of the project, use such material for at least the top 8 inches [200 mm] of earth material in areas designated for subsequent landscape planting. Do not place material, which is unsuitable for plant growth in such areas.

120-7.4 Materials Used at Pipes, Culverts, etc.: Construct embankments over and around pipes, culverts, and bridge foundations with selected materials.

120-8 Embankment Construction.

120-8.1 General: Construct embankments in sections of not less than 300 feet [90 m] in length or for the full length of the embankment.

120-8.2 Dry Fill Method:

120-8.2.1 General: Except as provided below for material placed on unstable ground and for materials used for flattening slopes, construct embankments in successive layers of not more than 8 inches [200 mm] in thickness, measured loose, for the full width of the embankment. However, the Contractor may construct embankments in successive layers of not more than 12 inches [300 mm] compacted thickness, if he can demonstrate with field tests that he has compacting equipment sufficient to achieve density required by 120-9.2 for the full depth of a thicker lift, and if the compactive effort is approved by the Engineer. Construct all layers approximately parallel to the centerline profile of the road.

The Engineer will base his approval on the results of a test section the Contractor constructed using his specified compactive effort. Construct the test section with a minimum length of 300 feet [90 m], full width, and a maximum length of 1,000 feet [300 m].

Once approved, if there is a change in soil classification of the embankment materials, construct a new test section. Do not change the compactive effort once a test section is approved.

The Engineer reserves the right to terminate the Contractor's use of thick lift construction and have him revert to the 8 inch [200 mm] loose lifts whenever it is determined that satisfactory results are not being achieved.

As far as practicable, distribute traffic over the work during the construction of embankments so as to cover the maximum area of the surface of each layer.

Construct embankment in the dry whenever normal dewatering equipment and methods can accomplish the needed dewatering.

120-8.2.1.1 Equipment and Methods: Provide normal dewatering equipment including, but not limited to, surface pumps, sump pumps and trenching/digging machinery. Provide normal dewatering methods including, but not limited to, constructing shallow surface drainage trenches/ditches, using sand blankets, sumps and siphons.

When normal dewatering does not adequately remove the water, the Engineer may require the embankment material to be placed in the water or in low swampy ground in accordance with 120-8.2.2

120-8.2.2 Placing in Unstable Areas: Where depositing the material in water, or in low swampy ground that will not support the weight of hauling equipment, construct the embankment by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers. Once sufficient material has been placed so that the hauling equipment can be supported, construct the remaining portion of the embankment in layers in accordance with the applicable provisions of 120-8.2.1 and 120-8.2.3.

120-8.2.3 Placing on Steep Slopes: When constructing an embankment on a hillside sloping more than 20 degrees from the horizontal, before starting the fill, deeply plow or cut into steps the surface of the original ground on which the embankment is to be placed.

120-8.2.4 Placing Outside Standard Minimum Slope: Where material that is unsuitable for normal embankment construction is to be used in the embankment outside the standard minimum slope (approximately two to one), place such material in layers of not more than 18 inches [450 mm] in thickness, measured loose. The Contractor may also place material which is suitable for normal embankment, outside such standard minimum slope, in 18 inch [450 mm] layers.

120-8.3 Hydraulic Method:

120-8.3.1 Method of Placing: When the hydraulic method is used, as far as practicable, place all dredged material in its final position in the embankment by such method. Place and compact any dredged material that is rehandled, or moved and placed in its final position by any other method, as specified in 120-8.2. The Contractor may use baffles or any form of construction he may select provided the slopes of the embankments are not steeper than indicated in the plans. Remove all timber used for temporary bulkheads or baffles from the embankment, and fill and thoroughly compact the holes thus formed. When placing fill on submerged land, construct dikes prior to beginning of dredging, and maintain the dikes throughout the dredging operation.

120-8.3.2 Excess Material: Do not use excess material placed outside the prescribed slopes, below the normal high-water level, to raise the fill. Remove only the portion of this material required for dressing the slopes.

120-8.3.3 Protection of Openings in Embankment: Leave openings in the embankments at the bridge sites. Remove any material which invades these openings or existing channels without additional compensation to provide the same depth of channel as existed before the construction of the embankment. Do not excavate or dredge any material within 200 feet [60 m] of the toe of the proposed embankment.

120-9 Compaction Requirements.

120-9.1 Moisture Content: Compact the materials at a moisture content such that the specified density can be attained. If necessary to attain the specified density, add water to the material, or lower the moisture content by manipulating the material or allowing it to dry, as is appropriate.

120-9.2 Compaction of Embankments:

120-9.2.1 Density Requirements: Except for embankment constructed by the hydraulic method as specified in 120-8.3 and for the material placed outside the standard minimum slope as specified in 120-8.2.4, and for other areas specifically excluded herein, compact each layer of the material used in the formation of embankments to a density of at least 98% of the maximum density as determined by AASHTO T 99, Method C. Uniformly compact each layer, using equipment that will achieve the required density, and as compaction operations progress, shape and manipulate each layer as necessary to ensure uniform density throughout the embankment.

120-9.2.2 Compaction Over Unstable Foundations: Where the embankment material is deposited in water or on low swampy ground, and in a layer thicker than 12 inches [300 mm] (as provided in 120-8.2.2),

compact the top 6 inches [150 mm] (compacted thickness) of such layer to the density as specified in 120-9.2.1.

120-9.2.3 Compaction Where Plastic Material Has Been Removed:

Where unsuitable material is removed and the remaining surface is of the A-4, A-5, A-6, or A-7 Soil Groups (see Florida Sampling and Testing Methods, M145), as determined by the Engineer, compact the surface of the excavated area by rolling with a sheepsfoot roller exerting a compression of at least 250 psi [1.7 MPa] on the tamper feet, for the full width of the roadbed (subgrade and shoulders). Perform rolling before beginning any backfill, and continue until the roller feet do not penetrate the surface more than 1 inch [25 mm]. Do not perform such rolling where the remaining surface is below the normal water table and covered with water. Vary the procedure and equipment required for this operation at the discretion of the Engineer.

120-9.2.4 Compaction of Material To Be Used In Base, Pavement, or Stabilized Areas: Do not compact embankment material which will be incorporated into a pavement, base course, or stabilized subgrade, to be constructed as a part of the same Contract.

120-9.2.5 Compaction of Grassed Shoulder Areas: For the upper 6 inches [150 mm] layer of all shoulders which are to be grassed, since no specific density is required, compact only to the extent directed.

120-9.2.6 Compaction of Grassed Embankment Areas: For the outer layer of all embankments where plant growth will be established, do not compact. Leave this layer in a loose condition to a minimum depth of 6 inches [150 mm] for the subsequent seeding or planting operations.

120-9.3 Compaction for Pipes, Culverts, etc.: Compact the backfill of trenches to the densities specified for embankment or subgrade, as applicable, and in accordance with the requirements of 125-8. Thoroughly compact embankments over and around pipes, culverts, and bridges in a manner which will not place undue stress on the structures, and in accordance with the requirements of 125-8. **120-9.4 Compaction of Subgrade:** If the plans do not provide for stabilizing, compact the subgrade area (as defined in 1-3) in both cuts and fills to the density specified in 120-9.2.1. Do not apply density requirements where constructing narrow widening strips 4 feet [1.2 m] or less on undisturbed soil.

Where trenches for widening strips are not of sufficient width to permit the use of standard compaction equipment, perform compaction using vibratory rollers, trench rollers, or other type compaction equipment approved by the Engineer.

Maintain the required density until the base or pavement is placed on the subgrade.

120-10 Maintenance and Protection of Work.

While construction is in progress, maintain adequate drainage for the roadbed at all times. Maintain a shoulder at least 3 feet [1 m] wide adjacent to all pavement or base construction in order to provide support for the edges.

Maintain all earthwork construction throughout the life of the Contract, and take all reasonable precautions to prevent loss of material from the roadway due to the action of wind or water. Repair, at no expense to the Department, except as otherwise provided herein, any slides, washouts, settlement, subsidence, or other mishap which may occur prior to final acceptance of the work. Perform maintenance and protection of earthwork construction in accordance with Section 104.

Maintain all channels excavated as a part of the Contract work against natural shoaling or other encroachments to the lines, grades, and cross-sections shown in the plans, until final acceptance of the project.

120-11 Construction.

120-11.1 Construction Tolerances: Shape the surface of the earthwork to conform to the lines, grades, and cross-sections shown in the plans. In final shaping of the surface of earthwork, maintain a tolerance of 0.3 foot [90 mm] above or below the plan cross-section with the following exceptions:

1. Shape the surface of shoulders to within 0.1 foot [30 mm] of the plan cross-section.
2. Shape the earthwork to match adjacent pavement, curb, sidewalk, structures, etc.
3. Shape the bottom of ditches so that the ditch impounds no water.
4. When the work does not include construction of base or pavement, shape the entire roadbed (shoulder point to shoulder point) to within 0.1 foot [30 mm] above or below the plan cross-section.

Ensure that the shoulder lines do not vary horizontally more than 0.3 foot [90 mm] from the true lines shown in the plans.

120-11.2 Operations Adjacent to Pavement: Carefully dress areas adjacent to pavement areas to avoid damage to such pavement. Complete grassing of shoulder areas prior to placing the final wearing course. Do not manipulate any embankment material on a pavement surface. When shoulder dressing is underway adjacent to a pavement lane being used to maintain traffic, exercise extreme care to avoid interference with the safe movement of traffic.

120-12 Method of Measurement.

120-12.1 General: When payment for excavation is on a volumetric basis, the quantity to be paid for will be the volume, in cubic yards [cubic meters], calculated by the method of average end areas, unless the Engineer determines that another method of calculation will provide a more accurate result. The material will be measured in its original position by field survey or by photogrammetric means as designated by the Engineer, unless otherwise specified under the provisions for individual items.

Where Subsoil Excavation extends outside the lines shown in the plans or authorized by the Engineer including allowable tolerances, and the space is backfilled with material obtained in additional authorized roadway or borrow excavation, the net fill, plus shrinkage allowance, will be deducted from the quantity of Roadway Excavation or Borrow Excavation to be paid for, as applicable.

The quantity of all material washed, blown, or placed beyond the authorized roadway cross-section will be determined by the Engineer and will be deducted from the quantity of Roadway Excavation or Borrow Excavation to be paid for, as applicable.

Subsoil Excavation that extends outside the lines shown in the plans or authorized by the Engineer including allowable tolerances will be deducted from the quantity to be paid for as Subsoil Excavation

120-12.2 Roadway Excavation: The measurement will include only the net volume of material excavated between the original ground surface and the surface of the completed earthwork, except that the measurement will also include all unavoidable slides which may occur in connection with excavation classified as Roadway Excavation.

The pay quantity will be the plan quantity provided that the excavation was accomplished in substantial compliance with the plan dimensions and subject to the provisions of 9-3.2 and 9-3.4.

120-12.3 Borrow Excavation: The measurement will be in accordance with 120-12.1 except that in special cases, when so shown in the Contract Documents, measurement will be made on a loose volume basis, as measured in trucks or

other hauling equipment at the point of dumping on the road. If measurement is made in vehicles, level the material to facilitate accurate measurement.

Measurement of borrow excavation in borrow areas furnished by the Department will include unsuitable material that is necessary to excavate, as determined by the Engineer, in order to obtain suitable borrow material. Such unsuitable material excavated from borrow pits where truck measurement is provided for and from any borrow pits furnished by the Contractor, will not be included in the quantity of excavation to be paid for.

For suitable material excavated from a borrow pit and not used for roadway fill within specification tolerances, as limited by 9-3.4, either the Contractor shall return the material to the pit before final cross-sections are taken or the Engineer will measure the material in place and deduct the quantity, plus an allowance for shrinkage, from the pay quantity of borrow excavation. In case borrow paid by truck measure is returned to the pit, the Contractor shall keep tabulation records of the material returned, and the Engineer will deduct an equivalent volume of borrow from the measured pay quantity. This provision applies but is not limited to materials used in construction of haul roads, flushed fill slopes, pit rim berms, and backfill of unauthorized Subsoil Excavation.

Except when used as borrow material for construction of the roadway embankment, or when otherwise shown in the plans, overburden stripped from pits from which selected base material is to be obtained will not be measured for payment, but the costs thereof will be included in the Contract unit price for the base.

120-12.4 Lateral Ditch Excavation: The measurement will include only material excavated within the lines and grades indicated in the plans or as directed by the Engineer. The measurement will include the full station-to-station length shown in the plans or directed by the Engineer and acceptably completed. Excavation included for payment under Section 125 will not be included in this measurement

The pay quantity will be the plan quantity provided that the excavation was accomplished in substantial compliance with the plan dimensions and subject to the provisions of 9-3.2 and 9-3.4.

120-12.5 Channel Excavation: The measurement will include only material excavated within the lines and grades indicated in the plans or in accordance with authorized plan changes. The measurement will include the full station-to-station length shown in the plans including any authorized changes thereto.

If shoaling occurs subsequent to excavation of a channel and the Engineer authorized the shoaled material to remain in place, the volume of any such material remaining within the limits of channel excavation shown in the plans will be deducted from the measured quantity of Channel Excavation.

120-12.6 Subsoil Excavation: The measurement will include only material excavated within the lines and grades indicated in the plans (including the tolerance permitted therefore) or as directed by the Engineer.

When no item for Subsoil Excavation is shown in the proposal but Subsoil Excavation is subsequently determined to be necessary, such unanticipated Subsoil Excavation will be paid for as provided in 4-4. The cost of additional material required to replace the unanticipated Subsoil Excavation will be paid for as specified for the particular case shown below:

- (a) No additional payment will be made for backfill material obtained from surplus material available from the normal excavation or grading operations.
- (b) When the necessary material is not available from the normal excavation or grading operations and the Contract includes an item for borrow excavation, backfill material authorized to be obtained from designated borrow areas will be included in the volume of borrow excavation to be paid for.
- (c) When the work of grading for the project is paid for under the item of regular excavation, any backfill material authorized to be obtained by increasing the volume of excavation within the roadway right-of-way will be measured and paid for as regular excavation subject to the provisions of 9-3.2.2.
- (d) When authorization is given for obtaining the material from outside the Right-Of- Way and from other than designated borrow areas, such excavation will be paid for as provided in 4-4.

120-12.7 Embankment: The quantity will be at the plan quantity.

Where payment for embankment is not to be included in the payment for the excavation, and is to be paid for on a cubic yard [cubic meter] basis for the item of Embankment, the plan quantities to be paid for will be calculated by the method of average end areas unless the Engineer determines that another method of calculation will provide a more accurate result. The measurement will include only material actually placed above the original ground line, within the lines and grades indicated in the plans or directed by the Engineer. The length used in the computations will be the station-to-station length actually constructed. The original ground line used in the computations will be as determined prior to placing of embankment subject to the provisions of 9-3.2, and no allowance will be made for subsidence of material below the surface of the original ground.

If there are authorized changes in plan dimensions or if errors in plan quantities are detected, plan quantity will be adjusted as provided in 9-3.2.

Where the work includes excavation of unsuitable material below the finished grading template or original ground line, whichever is lower as defined in 120-2.3, the original ground line is defined as the surface prior to beginning excavation, except that this surface is not outside the permissible tolerance of lines and grades for Subsoil Excavation as indicated in the plans or as directed by the Engineer. Any overrun or underrun of plan quantity for Subsoil Excavation which results in a corresponding increase or decrease in embankment will be considered as an authorized plan change for adjustment purposes as defined in 9-3.2.2.

No payment will be made for embankment material used to replace unsuitable material excavated beyond the lines and grades shown in the plans or ordered by the Engineer.

In no case will payment be made for material allowed to run out of the embankment on a flatter slope than indicated on the cross-section. The Contractor shall make his own estimate on the volume of material actually required to obtain the pay section.

120-13 Basis of Payment.

120-13.1 General: Prices and payments for the various work items included in this Section will be full compensation for all work described herein, including excavating, dredging, hauling, placing, and compacting; dressing the surface of the earthwork; maintaining and protecting the complete earthwork; and hauling.

The Department will not allow extra compensation for any rehandling involved under the provisions of 120-5.1.

The Department will compensate for the cost of grassing or other permanent erosion control measures directed by the Engineer as provided in the Contract for similar items of roadway work.

120-13.2 Excavation:

120-13.2.1 Items of Payment: When no classification of material is indicated in the plans, and bids are taken only on Regular Excavation, the total quantity of all excavation specified under this Section will be paid for at the Contract unit price for Regular Excavation.

When separate classifications of excavation are shown in the proposal, the quantities of each of the various classes of materials so shown will be paid for at the Contract unit prices per cubic yard [cubic meter] for Regular

Excavation, Lateral Ditch Excavation, Subsoil Excavation, and Channel Excavation, as applicable, and any of such classifications not so shown will be included under the item of Regular Excavation (except that if there is a classification for Lateral Ditch Excavation shown and there is no classification for Channel Excavation, any channel excavation will be included under the item of Lateral Ditch Excavation).

120-13.2.2 Basic Work Included in Payments: Prices and payments will be full compensation for all work described under this Section, except for any excavation, or embankment which is specified to be included for payment under other items. Such prices and payments will include hauling; any rehandling that may be necessary to accomplish final disposal as shown in the plans; the dressing of shoulders, ditches and slopes; removal of trash, vegetation, etc., from the previously graded roadway where no item for clearing and grubbing is shown in the plans; and compacting as required.

120-13.2.3 Additional Depth of Subsoil Excavation: Where Subsoil Excavation is made to a depth of 0 to 15 feet below the depth shown on the Contract plans, such excavation will be paid for at the unit price bid.

120-13.2.4 Borrow Excavation: When the item of Borrow Excavation is included in the Contract, and the plans, price and payment will also include the cost of furnishing the borrow areas and any necessary clearing and grubbing thereof, the removal of unsuitable material that it is necessary to excavate in order to obtain suitable borrow material, and also the costs incurred in complying with the provisions of 120-6.4.

120-13.2.5 Materials Excluded from Payment for the Excavation: No payment as excavation will be made for any excavation covered for payment under the item of Embankment.

No payment will be made for the excavation of any materials, which are used for purposes other than those shown in the plans or designated by the Engineer. No payment will be made for materials excavated outside the lines and grades given by the Engineer, unless specifically authorized by the Engineer; except that, in the operations of roadway excavation, all slides and falls of insecure masses of material beyond the regular slopes and not due to lack of precaution on the part of the Contractor will be paid for at the Contract unit price for the material involved. The removal of slides and falls of material classified as Lateral Ditch Excavation or as Subsoil Excavation will not be paid for separately, but will be included in the Contract unit price for the pay quantity of these materials, measured as provided in 120-12.

120-13.3 Embankment:

120-13.3.1 General: Price and payment will be full compensation for all work specified in this Section, including all material for constructing the embankment; all excavating, dredging, pumping, placing and compacting of material for constructing the embankment complete; dressing of the surface of the roadway, maintenance and protection of the completed earthwork, and the removal of rubbish, vegetation, etc., from the roadway, where no clearing and grubbing of the area is specified in the plans. Also, such price and payment, in each case, will specifically include all costs of any roadway, lateral ditch, or channel excavation, unless such excavation is specifically shown to be paid for separately, regardless of whether the materials are utilized in the embankment.

120-13.3.2 Excluded Material: No payment will be made for the removal of muck or overburden from the dredging or borrow areas. No payment will be made for embankment material used to replace muck or other unsuitable material excavated beyond the lines and grades shown in the plans or ordered by the Engineer.

120-13.3.3 Clearing and Grubbing: No payment will be made for any clearing and grubbing of the borrow or dredging areas. Where no clearing and grubbing of such areas is specified in the plans, the cost of any necessary clearing and grubbing will be included in the Contract unit or lump sum price for Embankment.

120-13.3.4 Cost of Permits, Rights, and Waivers: Where the Contractor provides borrow or dredging areas of his own choosing, the cost of securing the necessary permits, rights or waivers will be included in the Contract price for Embankment.

120-13.4 Payment Items: Payment will be made under:

Item No. 120- 1	Regular Excavation - per cubic yard.
Item No. 2120- 1	Regular Excavation - per cubic meter.
Item No. 120- 2	Borrow Excavation - per cubic yard.
Item No. 2120- 2	Borrow Excavation - per cubic meter.
Item No. 120- 3	Lateral Ditch Excavation - per cubic yard.
Item No. 2120- 3	Lateral Ditch Excavation - per cubic meter.
Item No. 120- 4	Subsoil Excavation - per cubic yard.
Item No. 2120- 4	Subsoil Excavation - per cubic meter.
Item No. 120- 5	Channel Excavation - per cubic yard.
Item No. 2120- 5	Channel Excavation - per cubic meter.
Item No. 120- 6	Embankment - per cubic yard.
Item No. 2120- 6	Embankment - per cubic meter.

SECTION 160 - STABILIZING

160-1 Description.

Stabilize designated portions of the roadbed to provide a firm and unyielding subgrade, having the required bearing value specified in the plans. When specified in the plans, provide additional strengthening of the subbase by additional stabilizing of the upper portion of the previously stabilized subgrade, within the limits specified.

160-2 Stabilized Subgrade.

For stabilized subgrade, the Contractor may choose the type of material, Commercial or Local.

When the stabilizing is designated as Type B, the Engineer will determine compliance with the bearing value requirements by the Limerock Bearing Ratio (LBR) Method. If approved by the Engineer and only for materials requiring an LBR value of 40, the Engineer may omit Sections 6.0 and 6.1 of Florida Method of Test for Limerock Bearing Ratio (FM 5-515) and perform an Unsoaked LBR Test. The Engineer or the Contractor may request to use this method. If the Unsoaked LBR Test results in a failing test, then the Engineer will perform a standard Soaked LBR Test. When the stabilizing is designated as Type C, the Engineer will determine compliance by the Florida Soil Bearing Test.

The Contractor is responsible to make the finished roadbed section meet the bearing value requirements, regardless of the quantity of stabilizing materials necessary to be added. Also, the Department will make full payment for any areas where the existing subgrade materials meet the design bearing value requirements without the addition of stabilizing additives, as well as areas where the Contractor may elect to place select high-bearing materials from other sources within the limits of the stabilizing.

After substantially completing the roadbed grading operations, determine the type and quantity (if any) of stabilizing material necessary for compliance with the bearing value requirements. Notify the Engineer of the approximate quantity to be added. Obtain the Engineer's approval for spreading and mixing-in of such quantity of materials to achieve uniformity and effectiveness.

The Engineer may allow, at no additional cost to the Department, the substitution of 6 inches [150 mm] of Granular Subbase meeting the requirements of Section 290, when 12 inches [300 mm] of Type B Stabilization requiring an LBR value of 40 is specified.

160-3 Stabilized Subbase.

When Stabilized Subbase is required, after the mixing operations for the stabilization of the entire subgrade limits, strengthen the upper portion of the subgrade, within the limits shown, by adding and mixing-in a loose depth of commercial stabilizing material as

designated in the plans or as may be otherwise designated by the Engineer. Provide a minimum depth of spread 3 inches [75 mm] (loose measurement).

160-4 Materials.

160-4.1 Commercial and Local Materials: Meet the requirements of Section 914 for the particular type of stabilizing material to be used.

160-4.2 Use of Materials from Existing Base: When the use of materials from an existing base is required as all, or a portion, of the stabilizing additives, the Engineer will direct the location, placement, and distribution of such materials. Perform this work prior to the spreading of any additional commercial or local materials. Do not remove any section of existing base until the need for it in maintaining traffic is fulfilled.

The Engineer may direct the Contractor to use materials from an existing base in combination with either of the designated types of stabilizing.

160-5 Construction Methods.

160-5.1 General: Prior to the beginning of stabilizing operations, construct the area to be stabilized to an elevation such that, upon completion of stabilizing operations, the completed stabilized subgrade will conform to the lines, grades, and cross-section shown in the plans. Prior to spreading any additive stabilizing material, bring the surface of the roadbed to a plane approximately parallel to the plane of the proposed finished surface.

The Contractor may process the subgrade to be stabilized in one course, unless the equipment and methods being used do not provide the required uniformity, particle size limitation, compaction, and other desired results, in which case, the Engineer will direct that the processing be done in more than one course.

160-5.2 Application of Stabilizing Material: When additive stabilizing materials are required, spread the designated quantity uniformly over the area to be stabilized.

When materials from an existing base are to be used in the stabilizing at a particular location, place and spread all of such materials prior to the addition of other stabilizing additives.

Spread commercial stabilizing material by the use of mechanical material spreaders, except that where use of such equipment is not practicable, use other means of spreading, but only upon written approval of the proposed alternate method.

160-5.3 Mixing: Perform mixing using rotary tillers or other equipment meeting the approval of the Engineer. The Contractor may mix the materials in a plant of an approved type suitable for this work. Thoroughly mix the area to be stabilized throughout the entire depth and width of the stabilizing limits.

Perform the mixing operations, as specified, (either in place or in a plant) regardless of whether the existing soil, or any select soils placed within the limits of the stabilized sections, have the required bearing value without the addition of stabilizing materials.

As an exception to the above mixing requirements, where the subgrade is of rock, the Engineer may waive the mixing operations (and the work of stabilizing), and the Department will not pay for stabilization for such sections of the roadway.

160-5.4 Maximum Particle Size of Mixed Materials: At the completion of the mixing, ensure that the gradation of the material within the limits of the area being stabilized is such that 97% will pass a 3 1/2 inch [90 mm] sieve and that the material does not have a plasticity index greater than eight or liquid limit greater than 30. Note that clay balls or lumps of clay size particles (2 microns or less) [(2 µm or less)] and therefore cannot be considered as individual particle sizes. Remove any materials not meeting the plasticity requirements from the stabilized area. The Contractor may break down or remove from the stabilized area materials not meeting the gradation requirements.

160-5.5 Compaction: Except where a stabilized subbase is also to be constructed (as specified in 160-6), after completing the mixing operations and satisfying the requirements for bearing value, uniformity, and particle size, compact the stabilized area in accordance with 160-8. Compact the materials at a moisture content permitting the specified compaction. If the moisture content of the material is improper for attaining the specified density, either add water or allow the material to dry until reaching the proper moisture content for the specified compaction.

160-5.6 Finish Grading: Shape the completed stabilized subgrade to conform with the finished lines, grades, and cross-section indicated in the plans. Check the subgrade using elevation stakes or other means approved by the Engineer.

160-5.7 Requirements for Condition of Completed Subgrade: After completing the stabilizing and compacting operations, ensure that the subgrade is firm and substantially unyielding to the extent that it will support construction equipment and will have the bearing value required by the plans.

Remove all soft and yielding material, and any other portions of the subgrade which will not compact readily, and replace it with suitable material so that the whole subgrade is brought to line and grade, with proper allowance for subsequent compaction.

160-5.8 Maintenance of Completed Subgrade: After completing the subgrade as specified above, maintain it free from ruts, depressions, and any damage resulting from the hauling or handling of materials, equipment, tools, etc. The Contractor is responsible for maintaining the required density until the subsequent base or pavement is in place including any repairs, replacement, etc., of curb and gutter, sidewalk, etc., which might become necessary in order to recompact the subgrade in the event of underwash or other damage occurring to the previously compacted subgrade. Perform any such recompaction at no expense to the Department. Construct and maintain ditches and drains along the completed subgrade section.

160-6 Stabilized Subbase (Additional Strengthening of Upper Portion).

When a stabilized subbase is to be constructed in conjunction with the stabilization operations, after the mixing of the stabilization area as specified in 160-5.3, and determination that the bearing value requirements specified in 160-7 have been met, shape the area over which the stabilized subbase is to be constructed as provided in 160-5.1, and compact it sufficiently to provide a firm surface for the operations to follow. Spread the amount of commercial stabilizing material specified in 160-3 for this operation, in accordance with 160-5.2, and mix it to the depth indicated in the plans, in accordance with 160-5.3. Allow a tolerance of 1 inch [25 mm] in excess of the plan depth in this mixing. The Engineer will not perform any additional tests for bearing value after the mixing of materials for the Stabilized Subbase.

Compact and finish grading, as specified in 160-5.5 and 160-5.6, and meet the provisions of 160-5.4, 160-5.7, and 160-5.8 for this work.

When commercial materials are used as the stabilizing additives for the initial subgrade stabilization, the Engineer may eliminate the work of Stabilized Subbase, either entirely or in designated sections of the overall limits for this work as may be specified in the plans.

160-7 Bearing Value Requirements.

160-7.1 General: The Engineer will obtain and test bearing value samples at completion of satisfactory mixing of the stabilized area. For any area where the bearing value obtained is deficient from the value indicated in the plans, in excess of the tolerances established herein, spread and mix additional stabilizing material in accordance with 160-5.3. Perform this reprocessing for the full width of the roadway being stabilized and longitudinally for a distance of 50 feet [15 m] beyond the limits of the area in which the bearing value is deficient.

The Contractor shall make his own determination of the quantity of additional stabilizing material to be used in reprocessing.

160-7.2 Tolerances in Bearing Value Requirements: Use the following undertolerances from the specified bearing value, as based on tests performed on samples obtained after completing mixing operations:

Specified Bearing Value	Undertolerance
LBR 40	5.0
LBR 35	4.0
LBR 30 (and under)	2.5
All Florida Bearing Values	5.0

The following unsoaked bearing value requirement is based on tests performed on samples obtained after completing mixing operations:

Specified Bearing Value	Unsoaked Bearing Value Required	Undertolerance
LBR 40	LBR 43	0.0

160-8 Density Requirements.

160-8.1 General: Within the entire limits of the width and depth of the areas to be stabilized, other than as provided in 160-8.2, obtain a minimum density at any location of 98% of the maximum density as determined by AASHTO T 180. When bearing value determinations are made by the Florida Soil Bearing Test, the Engineer will use Test Method C of AASHTO T 180, and, when bearing value determinations are made by the Limerock Bearing Ratio Method, the Engineer will use Test Method D of AASHTO T 180 (as modified by the Department's Research Bulletin 22-B, Revised April, 1972).

160-8.2 Exceptions to Density Requirements: The Contractor need not obtain the minimum density specified in 160-8.1 if within the following limits:

- (a) The width and depth of areas which are to be subsequently incorporated into a base course under the same contract.
- (b) The upper 6 inches [150 mm] of areas to be grassed under the same contract. Compact these areas to a reasonably firm condition as directed by the Engineer.

160-9 Method of Measurement.

160-9.1 Type B Stabilization and Type C Stabilization: The quantity to be paid for will be the plan quantity, in square yards [square meters], completed and accepted.

160-9.2 Stabilized Subbase: The quantity to be paid for will be the area, in square yards [square meters], completed and accepted.

160-9.3 Commercial Stabilizing Material: The quantity to be paid for separately will be determined by measurement, loose volumes, in truck bodies, at the point of unloading.

160-10 Basis of Payment.

160-10.1 Type B Stabilization and Type C Stabilization: Price and payment will constitute full compensation for all work specified in this Section applicable to these types of Stabilization, including furnishing and spreading of all stabilizing material required and any reprocessing of stabilization areas necessary to attain the specified bearing value.

160-10.2 Stabilized Subbase: Price and payment will constitute full compensation for the work of incorporating the additional commercial stabilizing material into the designated subbase area.

160-10.3 Commercial Stabilizing Material: Price and payment will be full compensation for furnishing and spreading commercial stabilizing material.

No separate payment will be made for any commercial stabilizing material which the Contractor may elect to use in Type B or Type C Stabilization.

No separate payment will be made for the work of using materials from an existing base, in the stabilizing section.

160-10.4 General: The above prices and payments will constitute full compensation for all work and materials specified in this Section, specifically including all costs of the processing and incorporation of existing base materials into the proposed stabilization area when such work is required by the plans.

If the item of Borrow Excavation is included in the Contract, any stabilizing materials obtained from designated borrow areas will be included in the pay quantity for Borrow Excavation.

160-10.5 Payment Items: Payment will be made under
:

Item No. 160- 3	Commercial Stabilizing Material - per cubic yard.
Item No. 2160- 3	Commercial Stabilizing Material - per cubic meter.
Item No. 160- 4	Type B Stabilization - per square yard.
Item No. 2160- 4	Type B Stabilization - per square meter.
Item No. 160- 5	Type C Stabilization - per square yard.
Item No. 2160- 5	Type C Stabilization - per square meter.
Item No. 160- 6	Stabilized Subbase - per square yard.
Item No. 2160- 6	Stabilized Subbase - per square meter.

SECTION 162 - FINISH SOIL LAYER

162-1 Description.

Prepare a 6 inch [150 mm] thick layer of mixed material favorable to grass growth over areas of the project which are to be seeded, seeded and mulched, or planted, by applying and mixing in a muck blanket, topsoil, compost or commercially available supplements.

162-2 Materials.

Meet the requirements of Section 987.

162-3 Ownership of Surplus Materials.

The Department will retain ownership of all materials suitable for construction of the finish soil layer until the final job requirements have been fulfilled. Unless otherwise provided by the Contract Documents, take ownership of any surplus materials then remaining and not needed for job requirements and dispose of, outside the right-of-way, to the Engineer's satisfaction.

In urban or other areas where temporary storage of apparent surplus materials within the right-of-way may be impracticable, the materials may be stockpiled outside the right-of-way in areas provided by the Contractor until needed on the project or declared surplus. With the Engineer's written approval, the Contractor may dispose of excess material with the stipulation that any portion required to fulfill job requirements will be replaced with equally suitable material at no cost to the Department.

No extra compensation is allowed for any rehandling involved under the provisions of this Subarticle.

162-4 Construction Methods.

162-4.1 Preparation of Areas: Prior to the beginning of the work, construct the surface of the earthwork to such lines and elevations that will provide a surface conforming to the plan lines and elevations upon completion of the finish soil operations. Leave the surface of the earthwork in a roughened and loose condition.

Prevent contamination of the finish soil layer material by other construction operations.

Remove any contaminated material and replace at no cost to the Department.

162-4.2 Spreading and Mixing: Uniformly spread the necessary material over areas to receive treatment.

After spreading, mix the material with the underlying soil to a combined depth of 6 inches [150 mm]. Continue mixing to provide a uniform finish soil layer true to line and grade. Correct any slippage of this material at no cost to the Department.

Immediately after spreading and mixing, the top 6 inches [150 mm] of the mixed material will be sampled and tested for organic matter content in accordance with AASHTO T 267 by the Engineer. The samples will be taken at a minimum of three samples per mile [kilometer]. On projects or areas less than 1/4 mile [400 m] in length, one sample per 1/4 mile [400 m] is sufficient. When the source of added material changes, an additional sample will be required. Test results will be averaged for each shoulder mile [kilometer] or increment thereof to determine specification compliance. Out of tolerance individual tests to a minimum of 1% organic content will be allowed.

162-5 Method of Measurement.

The quantity to be paid for will be the area, in square yards [square meters], for the finish soil layer meeting the requirements of 162-2, completed and accepted.

162-6 Basis of Payment.

Prices and payments will be full compensation for completing all work specified in this Section, including hauling any material from the project right-of-way, designated borrow areas, other sources as may be provided by the Contractor, or any combination of the above; furnishing any materials required to meet the required organic levels; and mixing, grading, and/or leveling as required to provide a relatively uniform homogeneous mix throughout the 6 inches [150 mm] within the prescribed lines and grades.

Payment will be made under:

- | | |
|------------------|---------------------------------------|
| Item No. 162- 3 | Finish Soil Layer - per square yard. |
| Item No. 2162- 3 | Finish Soil Layer - per square meter. |

SECTION 200 - LIMEROCK BASE

200-1 Description.

Construct a base composed of limerock.

200-2 Materials.

Meet the requirements of Section 911. The Contractor may use more than one source of limerock on a single Contract provided that a single source is used throughout the entire width and depth of a section of base. Obtain approval from the Engineer before placing material from more than one source. Place material to ensure total thickness single source integrity at any station location of the base. Intermittent placement or "Blending" of sources is not permitted. Limerock may be referred to hereinafter as "rock".

Do not use any of the existing limerock base that is removed to construct the new limerock base.

200-3 Equipment.

Use mechanical rock spreaders, equipped with a device that strikes off the rock uniformly to laying thickness, capable of producing even distribution. For crossovers, intersections and ramp areas; roadway widths of 20 feet [6 m] or less; the main roadway area when forms are used and any other areas where the use of a mechanical spreader is not practicable; the Contractor may spread the rock using bulldozers or blade graders.

200-4 Transporting Limerock.

Transports the limerock to its point of use, over rock previously placed, if practicable, and dump it on the end of the preceding spread. Hauling and dumping on the subgrade will be permitted only when, in the Engineer's opinion, these operations will not be detrimental to the subgrade.

200-5 Spreading Limerock.

200-5.1 Method of Spreading: Spread the rock uniformly. Remove all segregated areas of fine or coarse rock and replace them with properly graded rock.

200-5.2 Number of Courses: When the specified compacted thickness of the base is greater than 6 inches [150 mm], construct the base in multiple courses of equal thickness. Individual courses shall not be less than 3 inches [75 mm]. The thickness of the first course may be increased to bear the weight of the construction equipment without disturbing the subgrade.

If, through field tests, the Contractor can demonstrate that the compaction equipment can achieve density for the full depth of a thicker lift, and if approved by the Engineer, the base may be constructed in successive courses of not more than 8 inches [200 mm] compacted thickness.

The Engineer's approval will be based on results of a test section constructed using the Contractor's specified compactive effort. Approval requires the compactive effort pass a minimum of five density tests with no failing tests. Construct a test section between 300 feet [90 m] and 1,000 feet [300 m] in length, full width. At each test site, the bottom 6 inches [150 mm] must be tested and pass. Remove the materials above the bottom 6 inches [150 mm], at no expense to the Department. The minimum density required on the thicker lift will be the average of the five results obtained on the thick lift in the passing test section. Maintain the exposed surface as close to "undisturbed" as possible; no further compaction will be permitted during the test preparation. If unable to achieve the required density, remove and replace or repair the test section to comply with the specifications at no additional expense to the Department.

Once approved, a change in the source of base material will require the construction of a new test section. The compactive effort will not be allowed to change once the test section is approved. The Engineer will periodically verify the density of the bottom 6 inches [150 mm] during thick lift operations.

The Department may terminate the use of thick lift construction and have the Contractor revert to the 6 inch [150 mm] maximum lift thickness if satisfactory results are not being achieved.

200-5.3 Limerock Base for Shoulder Pavement: Unless otherwise permitted, complete all limerock base shoulder construction at any particular location before placing the final course of pavement on the traveled roadway. When dumping material for the construction of a limerock base on the shoulders, do not allow material capable of scarring or contaminating the pavement surface on the adjacent pavement. Immediately sweep off any limerock material that is deposited on the surface course.

200-6 Compacting and Finishing Base.

200-6.1 General:

200-6.1.1 Single Course Base: After spreading, scarify the entire surface, then shape the base to produce the required grade and cross-section after compaction.

200-6.1.2 Multiple Course Base: Clean the first course of foreign material, then blade and bring it to a surface cross-section approximately

parallel to the finished base. Before spreading any material for the upper courses, allow the Engineer to make density tests for the lower courses to determine that the required compaction has been obtained. After spreading the material for the top course, finish and shape its surface to produce the required grade and cross-section, free of scabs and laminations, after compaction.

200-6.2 Moisture Content: When the material does not have the proper moisture content to ensure the required density, wet or dry it as required. When adding water, uniformly mix it in by disking to the full depth of the course that is being compacted. During wetting or drying operations, manipulate, as a unit, the entire width and depth of the course that is being compacted.

200-6.3 Density Requirements: When proper moisture conditions are attained, compact the material to not less than 98% of maximum density determined by AASHTO T 180. Compact the limerock base for shoulder pavement to not less than 95% of the maximum density determined under AASHTO T 180.

200-6.4 Density Tests: The Engineer will perform at least three density determinations on each day's final compaction operations on each course, and at more frequent intervals, if deemed necessary. During final compacting operations, blade any areas necessary to obtain the true grade and cross-section before making the Engineer the density tests on the finished base.

200-6.5 Correction of Defects:

200-6.5.1 Contamination of Base Material: If, at any time, the subgrade material becomes mixed with the base course material, dig out and remove the mixture, and reshape and compact the subgrade. Then replace the materials removed with clean base material, and shape and compact as specified above. Perform this work at no expense to the Department.

200-6.5.2 Cracks and Checks: If cracks or checks appear in the base, either before or after priming, which, in the opinion of the Engineer, would impair the structural efficiency of the base, remove the cracks or checks by rescarifying, reshaping, adding base material where necessary, and recompacting.

200-6.6 Compaction of Widening Strips: Where base construction consists of widening strips and the trench width is not sufficient to permit use of standard base compaction equipment, compact the base using vibratory compactors, trench rollers or other special equipment which will achieve the density requirements specified herein.

When multiple course base construction is required, compact each course prior to spreading material for the overlaying course.

200-7 Testing Surface.

Check the finished surface of the base course with a template cut to the required crown and with a 15 foot [4.572 m] straightedge laid parallel to the centerline of the road. Correct all irregularities greater than 1/4 inch [6 mm] to the satisfaction of the Engineer by scarifying and removing or adding rock as required, and recompact the entire area as specified hereinbefore.

200-8 Priming and Maintaining.

200-8.1 Priming: Apply the prime coat only when the base meets the specified density requirements and when the moisture content in the top half of the base does not exceed 90% of the optimum moisture of the base material. At the time of priming, ensure that the base is firm, unyielding and in such condition that no undue distortion will occur.

200-8.2 Maintaining: Maintain the true crown and template, with no rutting or other distortion, while applying the surface course.

200-9 Thickness Requirements.

Meet the requirements of 285-6.

200-10 Calculations for Average Thickness of Base.

Calculations for determining the average thickness of base will be made in accordance with 285-7.

200-11 Method of Measurement.

200-11.1 General: The quantity to be paid for will be the plan quantity, adjusted as specified below.

200-11.2 Authorized Normal Thickness Base: The surface area of authorized normal thickness base to be adjusted will be the plan quantity as specified above, omitting any areas not allowed for payment under the provisions of 200-9 and omitting areas which are to be included for payment under 200-11.3. The adjustment shall be made by adding or deducting, as appropriate, the area of base represented by the difference between the calculated average thickness, determined as provided in 200-10, and the specified normal thickness, converted to equivalent square yards [square meters] of normal thickness base.

200-11.3 Authorized Variable Thickness Base: Where the base is constructed to a compacted thickness other than the normal thickness as shown on the typical section in the plans, as specified on the plans or ordered by the Engineer for providing additional depths at culverts or bridges, or for providing transitions to connecting pavements, the volume of such authorized variable thickness compacted base will be calculated from authorized lines and grades, or by other methods selected by the Engineer, converted to equivalent square yards [square meters] of normal thickness base for payment.

200-12 Basis of Payment.

Price and payment will be full compensation for all the work specified in this Section, including correcting all defective surface and deficient thickness, removing cracks and checks as provided in 200-6.5.2, and the additional limerock required for crack elimination.

Payment shall be made under:

Item No. 285-7	Optional Base - per square yard.
Item No. 2285-7	Optional Base - per square meter.

SECTION 2222 - EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.01 SCOPE OF WORK:

This section includes excavation, bedding, and backfilling for utilities necessary to perform all work necessary to prepare for laying the piping or main, including clearing, digging the trench, preparing the pipe bed, compacting, and preparing the surface restoration, and disposal of surplus material.

Maintain in operating condition existing utilities, active utilities, and drainage systems encountered in utility installation. Repair any surface or subsurface improvements shown on Drawings.

Verify location, size, elevation, and other pertinent data required to make connections to existing utilities and drainage systems as indicated on Drawings. Comply with permits and regulations according to General Conditions.

1.02 SUBMITTALS:

Shop Drawings or details pertaining to excavation and backfill are not required unless use of materials, methods, equipment, or procedures contrary to Drawings or these specifications are proposed. Do not perform work until required shop drawings have been accepted by Owner and Engineer.

1.03 JOB CONDITIONS:

Set all lines, elevations, and grades for utility system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments, or other reference points.

1.04 TRENCH SAFETY:

Care shall be taken to strictly observe all applicable, State, local and Federal standards with respect to the safety of persons during excavation and backfill. The contractor shall recognize OSHA excavation safety standards, agree to abide by them, and identify the costs to comply. The bidder, therefore, acknowledges that the total bid price includes costs for complying the Florida Trench Safety Act (90-96, Laws of Florida), effective October 1, 1990.

1.05 JACK AND BORE, DIRECT BORE CONSTRUCTION (IF APPLICABLE):

Jack and bore, direct bore construction shall be conducted in accordance with the Florida Department of Transportation Utilities Accommodation Guide.

1.06 TESTING:

Testing shall be conducted in accordance with AASHTO T-180, modified proctor density test. Tests shall be conducted on all trench backfill within 10 feet of pavement or proposed pavement areas and under all existing paved areas.

Frequency tests shall be conducted at each public roadway crossing and at no less than 300-foot intervals along the pipeline or on each pipeline run between manholes, inlets or junction boxes in accordance with these specifications. There shall be at least one test per layer placed.

Test report results shall be furnished to the Owner and Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Bedding Material

Processed sand and gravel free from clay lumps, organic, or other deleterious material, and complying with following gradation requirements:

U.S. Sieve Size	Passing by Weight, Percent
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1 Inch	100
3/4 Inch	90-100
3/8 Inch	20- 55
No. 4	0- 10
No. 8	0- 5

PART 3 - EXECUTION

3.01 EXCAVATION, TRENCHING, AND BACKFILLING:

Performing excavation as indicated or specified depths. During excavation, pile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides, or cave-ins.

Remove excavated materials not required or not suitable for backfill or embankments and waste as specified.

Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches or other excavations by pumping or other acceptable methods.

Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel-type trenching machines are used, do not use clods for backfill. Dispose of unsuitable material and provide other suitable material at no additional cost to Owner.

3.02 TRENCH EXCAVATION:

Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks as nearly vertical as practical and remove stones as necessary to avoid point-bearing. Over excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding. The amount of trench to be open at any one time shall be limited at the discretion of the Engineer to minimize public inconvenience and/or damage to life or property. Not more than 1,000' feet of trench shall be opened ahead of pipe laying operations, unless greater length of trench is approved by the Engineer.

All existing utilities such as pipes, poles and structures shall be carefully supported and protected from injury, and in case of damage, they shall be restored at no cost to the Owner.

Any pipes, conduits, wires, mains footings, or other underground structures encountered in trenching operations shall be carefully protected from injury or displacement. Any damage thereto shall be fully, promptly and properly repaired by the Contractor to the satisfaction of the Engineer and the Owner thereof.

Failure of the plans to show the exact location, nature or extent of any sub-surface obstruction shall not be the basis of a claim for extra work.

All trench excavation side walls greater than 5 feet in depth shall be sloped, shored, sheated, braced or otherwise supported by means of the sufficient strength to protect the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to and exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or deeper.

Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on undisturbed soil or bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.

The minimum width of the trench shall be equal to the outside diameter of the pipe at the bell plus six (6) inches on each side of the pipe. All other trench width

requirements for pipe, conduit, or cable shall be least practical width that will allow for proper compaction of trench backfill.

3.03 SHEETING AND BRACING:

Provide sheeting and bracing, when necessary, in trenches and other excavations where protection of workmen required. Sheeting may be removed after excavation has been backfilled sufficiently to protect against damaging or injurious caving.

3.04 PIPE BEDDING:

Accurately cut trenches for pipe or conduit that is installed to designated elevations and grades to line and grade 4" below bottom of pipe and to width as specified. Place 4" of bedding material, compact in bottom of trench, and accurately shape to conform to lower portion of pipe barrel. After pipe installation, place select backfill and compact in maximum 6" layers, measured loose, to at least 1'0" above top of pipe.

3.05 TRENCH BACKFILLING:

A. Criteria

Do not backfill trenches until required tests are performed, utility systems, as installed, comply with specified requirements, and are accepted by applicable governing authority. Backfill trenches as specified. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified, to properly correct condition in an acceptable manner.

B. Backfilling

After pipe or conduit has been installed, bedded, and tested as specified, backfill trench or structure excavation with specified material placed in lifts or layers not exceeding 8" of loose material. Compact to minimum density of 95% of optimum density in accordance with ASTM D 698 or AASHTO T-99.

C. Compaction

Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.

D. Compaction Testing

Independent testing laboratory shall perform test at intervals not exceeding 300 feet of trench for each 12" of compacted trench backfill and furnish copies of test results as specified.

3.06 RESTORATION OF SURFACE:

The top surface of the trench fill shall be restored to the original or planned condition. Paved sections shall conform in grade to the adjacent area. Restoration shall be completed as promptly as practicable and shall not be prolonged until the end of the construction period.

3.07 DEWATERING:

If dewatering activity is required, unless specifically authorized by the Engineer, all pipe shall be laid "in the dry". The Contractor shall minimize the length of excavation in advance of pipe laying so as to minimize the amount of trench dewatering required. The Contractor shall dewater before trench excavation, utilizing one or more of the following approved methods: well point system, trench gravity underdrain system, or sumps with pumps.

Well point systems must be efficient enough to lower the water level in advance of the excavation and maintain it continuously in order that the trench bottom and sides shall remain firm and reasonably dry. The well points shall be designed especially for this type of service, and the pumping unit used shall be capable of maintaining of high vacuum, and at the same time, of handling large volumes of air as well as water.

If the material encountered at trench grade is suitable for the passage of water without destroying the sides or bottom of the main trench, sumps may be provided at intervals to the side of the main excavation, and pumps may be used to lower the water level by taking their suction from these sumps. In the event such pumps are employed, care shall be exercised to prevent the movement of pipe foundation material and to this end a bed of crushed stone may be required.

The Contractor shall be responsible for disposing of all water resulting from trench dewatering operations, and shall dispose of the water without damage or undue inconvenience to the work, the surrounding area, or the general public. He shall not dam, divert, or cause water to flow in excess in existing gutters, pavements, or other structures.

END OF SECTION 2222

SECTION 2660 - WATER DISTRIBUTION SYSTEM

PART-1 - GENERAL

1.01 SCOPE OF WORK:

This Section consists of installation and furnishing of all materials, equipment, tools, labor, and accessories to be used in the construction of the water distribution system, including any work or rework associated with existing laterals. All work shall be in accordance with State, County and City codes and shall conform to the requirements of the Department of Environmental Protection and the Department of Health and Rehabilitation Services. Water mains shall have a minimum cover of thirty-six (36) inches.

1.02 RELATED SECTIONS:

Section 02222 - Excavation, Backfilling and Compacting for Utilities

1.03 SHOP DRAWINGS:

In general, five copies of the following shop drawings shall be submitted to the Engineer for approval prior to construction:

- (i) Manufacturers Data on Pipe
- (ii) Valves and Boxes
- (iii) Hydrants
- (iv) Fittings, Saddles, and Couplings
- (v) Meters, Stops and Check Valves
- (vi) Thrust Restraint

1.04 JOB CONDITIONS:

A. Water In Excavation

Water shall not be allowed in the trenches while the pipes are being laid and/or tested. The Contractor shall not open up more trench than the available pumping facilities are able to dewater to the satisfaction of the Engineer. The Contractor shall assume responsibility for disposing of all water so as not to injure or interfere with the normal drainage of the territory in which he is working. In no case shall pipelines be used as drains for such water, and the ends of the pipe shall be kept properly and adequately blocked during construction by the use of approved stoppers and not by improvised equipment. All necessary precautions shall be taken to prevent the entrance of mud, sand, or obstructing matter into the pipelines. If on completion of the work, any such material has entered the pipelines, it must be cleaned as directed by the Engineer so that the entire

system will be left clean and unobstructed.

PART-2 - APPROVED PRODUCT LIST

See Pinellas County Utility Manual.

PART 3 - BASIS OF DESIGN - WATER SYSTEMS

There shall be no physical connection between a potable water supply and a questionable water supply which would allow unsafe (contaminated) water to enter the potable water system by direct pressure, vacuum, gravity or any other means. All potable water services around sewage pumping facilities shall be provided with an approved reduced pressure backflow-prevention (RPZ) device.

Hydraulic designs shall be based upon pressure data applicable to the portion of the service area which will serve the proposed facility. Air release valves in vaults shall be provided at all high points in the water main as required by the City Manager.

Design standards for water mains are as follows:

3.1. Cover

3.1.1. Minimum cover to finished grade over water mains shall be 30 inches except under asphalt roads where the minimum cover shall be 36 inches. Minimum cover in state roads shall be 36 inches. Minimum cover under ditch bottoms shall be 24 inches.

3.1.2. Maximum cover shall be 48 inches unless approved by the City.

3.2. Horizontal Separation

3.2.1. 10 feet to sanitary sewers or force mains (less than 10 feet requires pipe material to be Ductile Iron Pipe (DIP) for both Water Main and Sewer/Force Main, if permitted by DEP).

3.2.2. 15 feet to buildings, top of bank of lakes and canals, other structures (10-foot absolute minimum - only when unavoidable, and pipe material is required to be DIP).

3.2.3. 10 feet minimum separation to gas mains.

3.2.4. 10 feet minimum to underground electric cable.

3.2.5. Current Florida Department of Protection (DEP) separation requirements.

3.3. Vertical Separation

3.3.1. Water main shall cross over other pipes when possible.

3.3.2. 18 inch minimum separation between all pipes and cables shall be maintained (6-inch absolute minimum separation with DIP) when conforming to DEP separation requirements.

3.4. Layout

3.4.1. Permanent dead ends will not be accepted unless unavoidable. Dead ends, if accepted by the City, shall be equipped with a blow-off for flushing purposes.

3.4.2. All water mains shall be placed in right-of-way areas or dedicated easements.

3.5. Water Main Material

Water mains shall be either ductile iron pipe (DIP) or polyvinyl chloride (PVC) as outlined below.

DIP shall be centrifugally cast and shall conform to AWWA C151/ANSI A21.51. PVC pipe 4-inch to 12-inch diameter shall conform to AWWA C900. PVC pipe 14-inch to 36-inch diameter shall conform to AWWA C905.

For water mains 12-inch diameter or smaller, ductile iron pipe shall be Pressure Class 350 and PVC pipe shall be C900 DR 18. Pipe larger than 12-inch diameter shall be DIP Pressure Class 250 or PVC C905 DR 21. Flanged pipe shall be DIP Special Class 53 or higher. Flanged DIP shall have threaded ductile iron fittings and shall conform to the requirements of AWWA C115. All flanges shall be Ductile Iron Class 150, ANSI B16.5. Flanges shall be flat faced and all joints shall use 1/8-inch black neoprene full faced gaskets. Pipe classes shall be determined based upon the installation and the use intended. Pipe classes shall be appropriately labeled on the drawings. All PVC pipe for potable water service shall bear the approved stamp of the National Sanitation Foundation. PVC pipe for watermain applications shall be color coded blue for water or spiral wrapped with blue marker tape not more than 18-inches on center.

Ductile iron pipe and fittings shall be cement lined in accordance with AWWA C104. Mechanical joint ductile iron glands shall be ductile iron.

Rubber-ring gaskets shall be suitable for the specified pipe sizes. Rubber-gasket joints shall conform to AWWA C111, and gaskets shall be furnished by the pipe manufacturer with the pipe. A nontoxic vegetable soap lubricant shall be supplied with the pipe in sufficient quantities for installing the pipe. The lubricant shall be approved by NSF for use with potable water mains.

3.5.1. DIP shall be required in the following circumstances:

3.5.1.1. Within 10 feet of sanitary and storm pipes.

3.5.1.2. Within 15 feet of structures, canals or lakes.

3.5.1.3. Crossings over or under sewers, and canal crossings, gas and storm pipes with less than 18 inches separation, with no joint allowed within 10 feet of crossing.

3.5.1.4. Beneath all paved areas, excluding driveways or sidewalks.

3.5.2. The City Manager may mandate DIP in any instances of off-site or on-site construction where future abuse to the line is possible due to location or circumstances, extensive length under pavement, or in private property away from right-of-way areas.

3.5.3. Thrust Blocks: Provide 2,500 psi at 28 days minimum concrete thrust blocks for water mains at each fitting per detail shown on construction drawings.

3.5.4. Restrained Joints shall be DIP as follows:

For 12-inch and Smaller - Restrained joint shall be U.S. Pipe Field Lok, American Ductile Iron Pipe Lok-Fast, EBAA Iron Mega-Lug, or an equivalent product.

For 14-inch Diameter and Larger - Restrained joint shall be U.S. Pipe TR Flex, American Ductile Iron Pipe Lok-Ring, or an equivalent product.

The restraint method shall be suitable for the pipe size thickness and test pressure as required for the specific design case. The plans shall indicate the restrained length of pipe each side of the fittings.

3.5.5. Jack and Bore/Directional Bore Installations: Casing pipe used with jack and bores shall be in accordance with requirements of Florida Department of Transportation (FDOT) or railway specifications. Carrier pipe shall be restrained joint DIP as outlined in paragraph 3.5.4.

3.5.6. Mains may be tapped as long as the tapping line is smaller than the tapped line unless otherwise approved by the City. See Section 3.9 for service tap requirements. Equal size line taps not approved by the City shall require that a tee be cut into the main. Tees are also required at locations dictated by the City Manager. Tapped connections in pipe and

fittings shall be made in such a manner as to provide a watertight joint and adequate strength against pull-out.

Tapping Sleeves and Valves shall be ductile iron, mechanical joint. Tapping sleeves and valves are required for all taps 4-inches and greater. Taps less than 4-inches shall be provided with a service saddle. Valves shall be provided on all taps. Tapping sleeves shall be a minimum of 6 feet from pipe joints or other fittings.

- 3.5.7. Schedule 40 PVC shall only be used as sleeves for the installation of service line tubing under all pavement areas. Use in the water distribution system or other areas is not acceptable.
- 3.5.8. Unspecified transitions from different pipe material are not allowed. Material for transition shall be indicated and specified.
- 3.5.9. All construction material shall be first quality, not previously used. Repair clamps are not acceptable. Damaged or faulty pipe and materials must be properly replaced. All gaskets shall be new. When connecting to existing valves or fittings, gaskets shall be replaced, not reused.
- 3.5.10. PVC pipe shall be used in all locations subject to corrosive conditions. Locations shall be indicated on the drawings.
- 3.5.11. The Engineer shall provide a complete set of "shop" drawings which shall indicate the City's specific material requirements. In general, material requirements will be guided by the latest revisions of the specifications of AWWA, ANSI, ASTM, and NSF.

3.6. Water Main Size

The minimum size of water main shall be 6 inches unless approved by the City Manager. The Engineer shall be required to demonstrate the adequacy of such sizing.

The new water main shall have the ability to meet maximum daily demands plus fire flow requirements as mandated by DEP and the City Fire Marshall. The residual design pressure under all conditions shall not be less than 20 psi.

3.7. Valves, Fittings and Appurtenances

Valving of all water distribution systems shall be designed to facilitate the isolation of each section of pipeline between intersections of the network. Generally, the number of valves at an intersection shall be one less than the number of pipes forming the intersection. Gate valves, 4-inches to 12 inches, shall be the resilient seat type conforming to AWWA C509. Valves larger than

12-inches shall be gear operated butterfly valves, conforming to AWWA C504. Wafer valves shall not be accepted. Valves shall generally be installed at intervals of not more than 1,000 LF on transmission mains, at intervals of not more than 700 LF on main distribution loops and feeders, and on all primary branches connected to these mains. In high density areas, valves shall be installed as required by the City Manager to minimize the number of persons affected by a break.

The City Manager shall determine which mains are distribution or transmission.

Valves shall turn counterclockwise to open. Valves shall be provided with valve stem extensions to within six-inches of ground surface, where centerline of pipe to grade is greater than four feet.

All materials, fittings and appurtenances intended for use in pressure pipe systems shall be designed and constructed for a minimum working pressure of 150 psi unless the specific application dictates a higher working pressure requirement.

Standard pressure pipe fittings of sizes 3-inch ID and larger shall be ductile iron conforming to AWWA C110, with mechanical joints unless flanged or restrained joints are required. Gray cast-iron fittings are not allowed. Ductile iron fittings shall be cement lined in accordance with AWWA C104. Mechanical joint fittings, 24-inches and smaller shall be rated for 350 psi working pressure. Flanged joint fittings 24-inches and smaller shall be rated for 250 psi working pressure. All fittings 30-inches and larger shall be rated for 250 psi working pressure. For sizes less than 3-inch ID, fittings shall be suitable to the pipe material and application. Glands for mechanical joint fittings shall be ductile iron, and tee bolts and nuts shall be Cor-Ten steel. Only bolt systems furnished by the manufacturer for mechanical joints are acceptable; nuts and bolts shall be new, not reused. Pipe gaskets shall be new as supplied by the pipe manufacturer. All flanges shall be ductile iron Class 150, ANSI B16.5. All flanges shall be flat faced. Full face, 1/8" black neoprene gaskets shall be used on all flanged joints. All joints shall conform to AWWA C111.

3.8. Fire Hydrants

Fire hydrants shall be provided in all water mains, transmission and distribution systems. Fire hydrants shall be spaced such that the maximum distance for protection will not be more than 500 feet as the fire hose lies. The Fire Marshall has final jurisdiction on all hydrant and fire sprinkler line locations during plan review.

A Fire Marshall approved plan is required with all preliminary plan submissions.

Each hydrant shall be left turn opening and capable of delivering a flow of at least 500 gallons per minute with a residual design pressure of not less than 20 psi.

Fire hydrants shall be of the dry barrel break-away type conforming to AWWA C502, with two 2-1/2 inch threaded hose nozzles and one 4-1/2 inch threaded pumper nozzle, which must point toward the road. Hydrants shall have a 5-1/4 inch interior valve opening and be restrained from hydrant to the tee at the main. Restraint by use of "all-thread" rods shall not be allowed. At the discretion of the City Manager, additional protection for fire hydrants shall be provided including but not limited to concrete filled ductile iron traffic posts.

Fire hydrant branches (from main to hydrant) shall be a minimum of 6 inches inside diameter. Each branch shall be provided with a resilient seat gate valve located as close as possible to the main. Hydrants shall be located near road lines with pumper discharge nozzle facing as directed by the Fire Marshall. Hydrants shall be laid to minimize their vulnerability to traffic. A clear zone around all fire hydrants shall be adhered to, consisting of a five (5) foot radius around the hydrant and seven (7) feet above the top of the hydrant. Placement of landscaping, fencing, etc. shall be considered in order to meet this clear zone requirement.

3.9. Water Service Lines and Taps

No direct service taps shall be allowed. Only double strap brass saddles shall be used. Saddles shall be IP thread pattern and material as required by the City.

Water service taps on the main shall be spaced at a minimum distance of 18 inches apart and a minimum of 18-inches from a bell or fitting. Consecutive taps shall be offset 45 degrees. All service line taps shall be supplied with corporation stops. Angle meter valves must be installed for each service. All service lines shall be installed in accordance with the construction details of this manual. Service line tubing shall be polyethylene PE 3408 material conforming with AWWA C901, SDR 9. Tubing shall be installed in a continuous length with no in-line fittings except for U-branch for multi meters between corporation stop and angle stop. Tubing shall be routed through a 2-inch PVC Schedule 40 sleeve. The minimum size for single and double services shall be 1-inch to the U-branch and 3/4-inch for each service from the U-branch. Services over 50-feet shall be 1-1/2 inch minimum.

Services shall not exceed 100 feet from the main to the meter.

A line valve shall be provided by the design Engineer on the building side of the meter in an easily-accessible location for use by the building tenant.

3.10. Meter Installation

Construction plans shall include a typical meter installation (but not the meter) for each size meter to be installed as outlined in the Standard Details. Meters will be installed by City at the time service is required at the stub-out. Each unit within a residential building (i.e., duplex, triplex, etc.) shall have a separate meter, unless prior approval is received by the City Manager. The proper sizing of service lines is the responsibility of the design Engineer. Meters will be available in the following sizes only: 5/8, 1, 1-1/2, 2, 3, 4-inch, and larger standard sizes as necessary. Meter boxes for 2 inch and smaller meters are standard. Industrial/Office/Commercial type developments will require above grade type meter installations as outlined in the City Standard Details. The City reserves the right to request historical data for meter sizing.

Meters for new installations shall be of the touch read type currently in use by the City. Meters to be changed in existing services shall be changed to the touch read type currently in use by the City. The meter currently in use is the ABB Scancoder.

The City assumes no responsibility for undersized meters and problems associated with it. All meters will be provided and installed by the City. The meters remain the property of the City.

Meters should generally be placed 18 inches inside and adjacent to a utility easement which parallels the right-of-way. In developments where the property line is not clearly defined (condominiums) the meter should be placed for ready access as approved by the City. Meters shall not be placed in areas that can be fenced, such as backyards. Meter boxes shall be kept out of pedestrian walkways and out of driveway areas. For shopping centers, the developer's Engineer should give special consideration to meter layout so as to satisfy these requirements.

3.11. Backflow Prevention Devices

Backflow prevention devices shall be provided, as required by the City Manager and as set forth in these Standards. All irrigation systems, water services for industrial/office/commercial, schools, mobile home parks, multi-family residences and any other locations as determined by the City Manager shall require backflow prevention assemblies. Facilities other than single family residences shall install a reduced pressure backflow prevention device. Water services to lift stations shall be fitted with reduced pressure backflow preventers.

All fire lines shall have a minimum of double check valve backflow preventer and appurtenances as outlined in the Standard Details.

Backflow prevention device assemblies shall be provided with all necessary parts and accessories for a complete operable installation. Assemblies shall be the latest approved product of a manufacturer regularly engaged in the production of

equipment of this type. All assemblies shall be as approved by the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California. All assemblies shall be permanently labeled with the following information:

- A. Type of Assembly (Reduced Pressure, Double Check Valve, etc.)
- B. Name or Trademark
- C. Size
- D. Model Number
- E. Direction of Flow (shown by an arrow)
- F. Unit Serial Number
- G. Rated Working Water Pressure (RWWP)
- H. Rated Working Water Temperature (RWWT)

Type and size of assemblies shall be indicated on the drawings.

Backflow prevention device ownership and maintenance responsibilities shall be set forth in appropriate ordinances. The Owner shall document yearly that the backflow prevention device has been tested annually by a qualified technician. A copy of a valid technician certification must be attached to the test results and submitted to the City Manager.

3.12. System Pressures

The design Engineer shall not assume a pressure greater than 35 psi at the meter or detector check valve without confirmation from the City. The design Engineer, if possible, should field verify the available pressures prior to finalizing their design. The City does not guarantee or warrant any pressure or flow above what the system can furnish. The City reserves the right to limit water usage for irrigation in the event of drought, or requirement by FDEP or the Water Management District.

3.13. Fire Lines

All fire lines shall have at minimum a double detector check or a reduced pressure principle backflow preventor with a 5/8" by-pass meter (to detect low flows) within the right-of-way or dedicated easement. No exceptions shall be made regardless of sprinkler system type, configuration, etc.

PART 4 - CONSTRUCTION SPECIFICATIONS FOR WATER SYSTEMS

4.1. Installation

Installation of water mains and associated appurtenances shall be in accordance with current AWWA specifications and manufacturer's requirements for their particular products. Loading or unloading and storage of pipe, fittings, valves,

etc., shall be done in such a manner so as to avoid damage. The interior of all pipe, fittings, valves, etc., shall be kept free of dirt and foreign matter at all times. All piping shall be placed in a dry trench. Wet trench installation shall be allowed only upon written approval of the City Manager. All mains shall have a minimum of 30 inches (36 inches under roads and state roads) and maximum of 48 inches of cover to finished grade except where otherwise approved by the City. Thrust blocks or mechanical restraint systems shall be required at each fitting involving a change of direction and as specified in plan details. Concrete gravity blocks will be allowed where required. At all thrust and gravity blocks visqueen protection of bolts shall be provided. Calculations shall be provided for thrust blocks and restrained joints.

All pipe shall be laid in trenches having a dry and stable bottom. Backfill shall be free of boulders and debris. Pipe shall be fully supported along its entire length. Sharp or rocky material or unsuitable material such as muck encountered in the base shall be replaced a minimum of 2-feet below the pipe in order to achieve satisfactory bedding of the pipe. The City Manager shall have the right to approve/disapprove this method as reviewed for each particular case. Pipe shall be laid on line and grade as designed. Pipe joints, gravity blocks, conflicts and service connections shall be left exposed until visually inspected and approved by a City inspector.

Electronic markers shall be placed over all fittings and every 100 feet along mains. In addition, metallic backed indicator tape shall be installed over all mains at 12-inches below grade.

Fire hydrants shall be installed true and plumb with the center of the pumper nozzle approximately 18 inches above finished grade with 4-1/2 inch nozzle towards road. Hydrants shall not be placed in sidewalks. It will be the responsibility of the developer and Contractor to move hydrants placed in the sidewalk.

All valves shall be placed according to plan unless movement is mutually agreed to. All valve stems shall be installed plumb. Valve stem extensions are required as described in Section 3.7. Air relief valves shall be installed at all high points in the pipeline where air can collect as shown on approved plans or as directed by the City. Record drawings shall reflect the proper location of all mains, hydrants, services, valves and appurtenances. All taps must be at least 18 inches from a fitting or bell.

All road and railroad crossings and pavement cuttings shall be in accordance with the requirements of the particular authority governing the area.

4.2. Connection to Existing System

All connections to existing mains shall be made under the direct supervision of the City inspector. Valves on existing mains shall be operated by or under the direct supervision of City personnel. Tapping sleeves and valves shall be pressure tested prior to tapping. If service must be cut-off to existing customers, the City must have three days notice to make necessary notifications. The Contractor shall disinfect and secure appropriate Health Department clearances and samples for any service interruptions which occur as a result of a Contractor request for shut down or error. Clearances required under criteria shall be expedited and fully cleared within 72 hours of reactivation unless otherwise approved by the City Manager. The Contractor or developer may be required to assist in notifications. If service must be cut off, the Contractor shall be ready to proceed with as much material preassembled as possible at the site to minimize the length of service interruption. The City will postpone a service cut-off if, in the opinion of the City Manager, the Contractor is not ready to proceed on schedule. Such connections may be required to be made at night to minimize effects.

No customer should be without water service for more than four hours. The Developer or Owner shall provide temporary services to Customers who may be without permanent service for over four hours.

Local chlorination will be required for all pipe and fittings used to complete connections with the potable water system. Tapping sleeves and valves shall be chlorinated in accordance with the requirements of AWWA. All wet taps shall be witnessed by the City inspector. The pipe coupon shall be preserved and submitted to the City inspector.

4.3. Cleaning and Flushing

Foreign material shall be kept out of all pipe or cleaned from the pipe prior to installation. Upon completion of installation, the mains shall be flushed and the water disposed of without creating a nuisance. If, in the opinion of the City there is insufficient water available for proper flushing, the Contractor shall clean the lines by pigging. Flushing must achieve a minimum water velocity of 2.5 feet per second in all portions of the pipe. The duration of the flushing shall be as directed by the City inspector. Cannon flushing may be required at the sole discretion of the City Manager. Temporary fittings, pipe, etc., to allow cannon flushing shall be provided at no cost to the City. No flushing shall take place without a City representative present.

The existing mains that the new mains are connected to may be required to be flushed under the direction of the City when service is restored.

4.4. Testing

Contractor and developer shall provide all equipment (including a pressure gauge acceptable to the City) and materials and labor necessary for pressure

and leakage testing. All mains and services shall be tested for leakage. Water shall be supplied to the main at the expense of the developer and Contractor and pumped to the required pressure of 150 psi. The main tested shall either be isolated from active potable lines or protected from leakage by a double valve arrangement. All water utilized for the pressure and leakage test shall be potable water with an adequate chlorine residual.

Water mains shall be tested by valve sections, based upon the maximum spacing of valves as required in Section 3.7. The maximum length of line to be tested as one section will be 1,500 feet. The maximum allowable leakage shall be as determined in accordance with the current AWWA leakage specifications. The standard test length is two hours. Testing procedures shall meet or exceed AWWA C600. The Contractor shall successfully complete a pretest prior to scheduling the pressure and leakage test with the City. The pressure and leakage test must be observed by a City representative and the design Engineer. The Contractor shall replace or adjust components of the pipeline which fail the test. The pipeline shall then be tested as described above until it passes the test criteria. The pressure and leakage test shall be done concurrently.

Bacteriological testing shall not begin until after the pressure leakage test, flushing and record drawings have been accepted by the City.

4.5. Disinfection

Contractor and developer shall provide all equipment and materials necessary for disinfection. All mains shall be disinfected and DEP/Health Department regulations. Bacteriological samples shall be taken from all sections of the main via standard sampling tap assemblies, and sent to an HRS-approved laboratory for analysis. Clearance is required from the DEP/Health Department before the City will allow the main to be put into service. Sampling taps and testing chlorinated water used for disinfection shall be flushed to a location that will not damage adjacent property, persons, etc., and shall be provided by the Contractor and developer at no cost to the City.

PART 5 - RECORD INFORMATION

Record drawings, certified by the design Engineer and a professional land surveyor, shall be provided for all projects. These drawings shall include elevations, lengths, stations, and locations, as appropriate, for all facilities including services. Mylar drawings shall show location of existing facilities where crossed by new facilities. One reproducible and two paper prints of the plan sheets, profiles, and lift station shall be provided. In addition, an electronic version of the record drawings shall be submitted and shall be in an AutoCAD drawing file format.

A preliminary record set shall be submitted to the City for review prior to submittal of the final record drawings. The preliminary set shall be "blueprint" with all deviations to the

construction drawings clearly indicated in red. The preliminary set shall be certified by the design Engineer and a professional land surveyor.

PART 6 - INSPECTION REQUIREMENTS

No work shall be covered until observed by a representative of the City Utilities Department.

The City representative may inspect all construction and materials and may also inspect preparation, fabrication or manufacture of components, materials and supplies. The representative is not authorized to revoke, alter or waive any requirements of the specifications, but is authorized and expected to call to the attention of the developer's Engineer and/or Contractor any observed failure of work or materials to conform to the plans or specifications. Failure of the representative to call to the attention of the Contractor any item not in conformance to the plans and specs shall not constitute acceptance of the item. The representative shall have the authority to reject materials or suspend the work pending review. The representative shall in no case act as foreman or perform other duties for the Engineer and/or Contractor nor interfere with the management of the work. Advice which the representative may give shall in no way be construed as binding on the City or releasing the developer, his engineer or Contractor from performing according to the intent of the plans and minimum City Standards.

Inspections will be scheduled for regular working hours only, except for nights when service disruptions are involved. Work will not be scheduled for weekends or holidays. The City shall be provided with at least two full working days notice for scheduled inspections. Representatives will make routine passes to the project to inspect such items as gravity blocks, materials on site, clearances between conflicting lines, etc. Scheduled inspections are also required for jack and bores, setting of wet wells, lift station startups with manufacturer's representative present, and any time an existing City facility is to be modified (i.e., manhole tie-in and water taps).

It shall be the Engineer's responsibility to schedule inspections, and their qualified representative shall be present at all scheduled tests and inspections. A scheduled inspection will be canceled if the representative is not present. The Engineer shall have the Contractor pretest water and force mains and gravity sewers to minimize failures and the need for additional inspections. The Engineer shall prepare accurate record drawings and submit to the City two days before a lamping to verify adequacy of gravity sewer slopes. In any case, record drawings must be submitted prior to service being provided to any phase of a project.

The Contractor shall be allowed one scheduled test and one scheduled retest at no cost for the City representative. For additional tests, the City shall bill the developer for the time of the City representative at the amount defined within the City rate structure.

The Contractor shall be solely responsible for safety.

PART 7 - PROJECT ACCEPTANCE

No project shall be put into permanent use until the City has accepted it. The City requires the following items be completed prior to acceptance.

1. Signed and sealed record drawings are received.
2. Release of the project by DEP/HRS.
3. City representative has viewed the items he is required to see.
4. Owner provides a Release of Lien stating all items given to the City are free and clear of liens.
5. Copy of plat with recorded easements are received.
6. (2) O&M Manuals are received and (1) placed in lift station panel (if applicable).
7. Copies of all testing (Bacteriological, Densities, Pressures, etc.) results are received.
8. Contracts for service are executed.
9. All other agencies having jurisdiction have been satisfied.
10. Certification that this project does not detrimentally affect the operations of existing mains and pump/lift stations.

3.07 PAYMENT:

Before payment for water lines is authorized, all sections of water line for which payment is requested shall:

- 1) have passed required pressure tests in accordance with these specifications.
- 2) be accompanied by certified density test reports for trench backfill within the paved roadway limits at the locations and frequencies specified herein.

Final payment for water line construction shall not be made until all chlorination reports and bacterial sample approvals from the Department of Health and Rehabilitative Services and/or Department of Environmental Protection are reviewed by the Engineer.

END OF SECTION

SECTION 275 – STAMPED CONCRETE SURFACES

1.01 SCOPE OF WORK

This item shall consist of all work associated with furnishing and installing concrete stamped surfaces in accordance with these specifications, as detailed on the plans or as directed by the Engineer. This shall include all labor, materials, testing, submittals, tools, and equipment necessary to saw cut, excavate, prepare the base and install the stamped concrete surface to the lines and grades shown on the plans including any incidentals thereto.

1.02 MATERIALS

Base material shall be medium gradation processed aggregate base.

Concrete shall be 6-inch thick concrete sidewalk and shall be of Class I Concrete. Class I Concrete shall comply with F.D.O.T. "Standard Specification for Road and Bridge Construction", Section 346.

The pattern, colors, and dimensions shall be as follows for the following surfaces:

A. Sidewalk south of 21st Avenue

- Pattern - 8-inch hex block
- Color - Natural concrete grey
- Dimensions - 8-inch on 6 sides
- Stamp Size - 5-ft x 5-ft to match width of sidewalk
- Saw joints every 5-ft
- All joints etc to follow Section 522

All materials used shall meet the applicable manufacturer's specifications and recommendations for an installation of this type.

Joint sealer shall meet the requirements of 522

1.03 SAMPLE APPROVAL

- A. Sample Installation: Prior to installation of stamped concrete a sample panel using materials shown or specified for final work shall be prepared. Build panel at the site as directed, of full thickness and approximately 5-ft x 5-ft. Obtain owner's representative acceptance of visual qualities of the panels before start of complete concrete stamping work. Retain panel during construction as a standard for judging completed work.
- B. Remove and re-install sample until work is approved by Owner's Representative.

1.04 SUBMITTALS

The following submittals shall be submitted to the Engineer for review and approval prior to installation:

- All pertinent manufacturers' information for stamped concrete systems shall be submitted to the City for approval. This includes: engineering calculations, colors, patterns and locations of similar installations with names and phone numbers.
- Gradation test results for processed aggregate base
- Manufacturer's cut sheet for any dowels and welded steel fabric
- Concrete specifications from supplier
- Manufacturer's cut sheet for joint sealer
- Manufacturer's cut sheet for expansion joint material

1.05 CONSTRUCTION METHODS

Construction methods for the installation shall conform to the following requirements:

1. Excavation, forms, concrete finishing, backfilling and removal of surplus materials shall meet the requirements of this specification booklet.
2. Work associated with the installation of the stamped concrete surfaces shall be performed by a trained and certified contractor for the product used. All work shall meet the manufacturer's specifications and recommendations for an installation of this type.
3. Reinforcing shall be installed free from dirt, oil, paint, grease, mill scale and loose or thick rust which could impair the bond of steel with the concrete.
4. Unless otherwise approved by the Engineer, crosswalks shall be constructed after completing paving of adjacent roadway bituminous concrete finish course. Only half of the length of the crosswalk may be constructed at one time to allow vehicular access for the roadway. Steel plates with bituminous concrete shims may be used to allow vehicular access.

1.06 MEASUREMENT

Measurement for this item will be based on the number of square feet of stamped concrete surface, completed and accepted.

1.07 PAYMENT

Payment for this item will be based on the unit price per Square Foot of Stamped Concrete surfaces constructed and accepted, including all labor, materials, testing, submittals, tools, and equipment necessary to complete the work as specified.

PAY ITEM

Stamped Concrete (Surface) S.Y.

END OF SECTION

SECTION 2780 – DETECHABLE WARNING PAVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

- A. Furnish materials, labor, transportation, services, and equipment necessary to furnish and install Architectural Concrete Pavers as indicated on drawings and as specified herein.
- B. Related Sections include the following:
1. Division 02 - Section 02210 Grading
 2. Division 02 - Section 02220 Excavation, Backfilling and Compaction.
 3. Division 02 - Section 02770 Concrete Paving, Walks, Curbs and Gutters.
 4. Division 03 - Section 03300 Cast-In-Place Concrete.
 5. Division 07 - Section 07120 Modified Bituminous Sheet Membrane Waterproofing.
 6. Division 07 - Section 07920 Sealants.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
1. ASTM C-150 -Specification for Portland Cement.
 2. ASTM C-33 -Specification for Concrete Aggregates.
 3. ASTM C-140 - Specification for Concrete.
 4. ASTM C-293
 5. ASTM C-1028
 6. ASTM C501, 50
 7. ASTM C241
- B. Tile Council of America (TCA)
1. TCA F102 - Installation Method Cement Mortar Bonded.
 2. TCA F101 - Installation Method Cement Mortar Bonded.
- C. American National Standards Institute (ANSI)
1. ANSI A-118.4 - Latex Portland Cement Mortar.
 2. ANSI A-118.6 - Grout - Latex.
- D. Performance Requirements
1. *Compressive Strength:* At the time of delivery, the average compressive strength shall not be less than 8,000psi with no individual unit less than 7,000psi (48,000kPa) per ASTM C-140.
 2. *Water Absorption:* Shall not be greater than 6% per ASTM C-936.

3. *Flexural Strength*: Shall not be less than 800psi (5,500kPa) per ASTM C-293.
4. *Freeze/Thaw*: Durability of the paver shall meet the freeze/thaw tests per Section 8 of ASTM C-67 and shall have no breakage and not greater than 1 % loss in dry weight of any individual unit when subject to 50 cycles of freeze/ thaw.
5. *Static Coefficient of Friction*: ASTM C-1028 conditionally slip resistant:
 - a. Wet: 0.50 - 0.60 and Dry: 0.60 - 0.70
6. *Sizing Dimensions*: Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data:
 1. Manufacturer's data sheets on each product to be used, including preparation instructions, Installation methods, Storage and handling requirements and recommendations.
 2. Submit test results from an independent testing laboratory for compliance with performance requirements specified herein.
 3. Submit two copies of written instructions for recommended maintenance.
- B. Shop Drawings:
 1. Layout drawings of each paved area showing the pattern of pavers, indicate pavers requiring cutting, indicate setting bed methods in each area, drainage patterns and drains and indicate and relationship of paving joints. Include details of setting beds, noting all materials and their thickness, show details at curbs and vertical surfaces.
 2. Details of custom (nonstandard) curbs and stair tread/risers, include methods of installation.
- C. Samples:
 1. Submit two complete sets of color chips representing manufacturer's full range of available colors and texture. Color will be selected by Architect / Engineer / Landscape Architect / Owner from manufacturer's available standard and custom colors.

1.5 QUALITY ASSURANCE

- A. **Manufacturer Qualifications**: All products covered under this Section shall be produced by a single manufacturer unless otherwise specified with a minimum of ten (10) years proven production experience.

- B. **Installer Qualifications:** Installer shall have a minimum of three (3) years proven specialized construction experience with this product and be capable of estimating & building from blueprint plans and details, in addition to proper material handling. All Work must comply with local, state/provincial licensing and bonding requirements.
- C. **Special Consideration:** The paver manufacturer shall demonstrate, either by proven field performance or a laboratory freeze-thaw test, that the paving units have adequate durability if they are to be subjected to a freeze-thaw environment.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with provisions of Section 01300.
- B. Protect Precast Concrete Pavers during shipment, storage and construction against damage. Store a minimum of 4 inches off the ground on pallets in a dry location and cover with polyethylene to protect from contact with materials which would cause staining or discoloration.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
 - 1. Do not work during freezing weather or on wet or frozen sub-base.

1.8 WARRANTIES / GUARANTEES

- A. Tile Tech Detectable Warning Pavers shall remain free from defects for a period of ten (5) years. The contractor shall warrant that his work will remain free from defects of labor and materials used in conjunction with his work in accordance with the general conditions for this project or a maximum of three (3) years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer or Equivalent:
Tile Tech Pavers Inc, 888-380-5575 Phone: (213) 380-5560 Fax: (213) 380-5561
 E-mail: sales@tiletechpavers.com Website: www.tiletechpavers.com

- B. Precast Concrete Pavers equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals are approved in writing by the City.

2.2 MATERIALS

- A. **Concrete Pavers: Detectable Warning or ADA Truncated Dome Pavers** as manufactured by Tile Tech
 - 1. Color: Red - as manufactured by Tile Tech Pavers Inc.
 - 2. Size: Nominal 12"x12"
 - 3. Thickness: 2"
 - 4. Surface Finish: Shot-blasted & Sealed.
 - 5. Edge Finish: 3/16" bevel on all four (4) sides.
 - 6. Weight: 22 lbs per square foot.

2.3 PRECAST MATERIAL REQUIREMENTS

- A. *Portland Cement*: ASTM C-150 specifications for Portland Cement.
- B. *Aggregates*: All aggregates to meet ASTM C-33 specifications, cleaned and properly graded to size. Aggregate shall be blended to meet individual project requirements. Aggregates to meet ASTM C241 & HA 10 minimum.
- C. *Coloring*: Pigments used shall be inorganic, resistant to alkalinity and used per manufacturer's recommendations.
- D. *Color Blending*: Factory-blend pre-cast paver that has a natural color range so products taken from one batch will have the same range as products from a separate batch.
- E. *Cleaner*: Liquid neutral chemical cleaner with pH factor between 7 and 8, of formulation recommended by sealer manufacturer for type of precast paver used.
- F. *Sealer*: Colorless, slip and stain resistant penetrating or acrylic sealer with pH factor between 7 and 10 that does not affect color or physical properties of precast paver surface.

2.4 INSTALLATION MATERIALS

- A. **Sand-Set Method**
 - 1. *Sand Setting Bed Material*: Sand shall be common sand generally referred to as concrete sand and shall be free of organic materials and any other contaminants that could potentially stain or otherwise damage the unit pavers.
 - 2. *Joint Filler Materials*: Sand conforming with ASTM C-144 with 100% passing a No.16 sieve.
 - 3. *Landscape Filter Fabric*: Woven or non-woven non-biodegradable filter between the compacted base and the sand leveling bed.
 - 4. *Preformed Asphalt Joint Filler*: As indicated on drawings: ASTM D-994, 1/2inch (13 mm) thick, for expansion joints which are not sealed, one of the following:
 - a. *Code 1301* by W.R. Grace and Co.
 - b. *Asphalt Expansion Joint* by W. R. Meadows, Inc.
 - c. *Elastite Asphalt Expansion Joint* by The Celotex Corporation.

B. Mortar Setting Bed (Thin-Set) Method - PEDESTRIAN

1. *Latex Mortar Mix*: ANSI A-118.4.
2. *Water*: Clean and free of deleterious acids, alkalies or organic materials.
3. *Grout*: ANSI A-118.6, Grout - Latex.
4. *Sealant, Back-up & Bond Breaker*: As specified in Section 07920 - Sealants and Caulking.

C. Portland Cement Setting Bed (Thick-Set) Method

1. *Portland Cement Mortar Mix*: ASTM C-150 Custom Bldg Products thick Bed Mortar Mix with Admix, or approved equal.
2. *Reinforcement*: 2inches by 2inches (51mm by 51mm) - 16/16 welded galvanized wire mesh used in thick mortar bed.
3. *Water*: Clean and free of deleterious acids, alkalies or organic materials.
4. *Grout*: Custom Bldg Products Grout with Admix, color as selected or approved equal.
5. *Bond Slurry*: Custom Bldg Products bond coat or approved equal.
6. *Sealant, Back-up & Bond Breaker*: As specified in Section 07920 - Sealants and Caulking.

D. Bituminous Setting Bed Method

1. *Asphalt Setting Bed Materials*:
 - a. *Asphalt Cement*: ASTM D-3381, viscosity grade AC-10 or AC-20.
 - b. *Fine Aggregate*: Clean, hard sand, free of organic matter, uniformly graded from coarse to fine, all passing the No.4 sieve meeting the gradation requirements when testing in accordance with ASTM-C136.
 - c. *Mixing*: Provide plant mixed asphalt setting bed by combining approximately 93% dry fine aggregate and approximately 7% hot asphalt cement and heat to approximately 300 degrees F (149 degree C). Provide each ton of setting bed material apportioned by weight with the approximate ratio of 145lb (66kg) of asphalt to 1,855lb (841kg) of sand.
2. *Setting Bed Primer*: Cut back asphalt, ASTM D-2028, grade as recommended by manufacturer.
3. *Asphalt Adhesive*: Standard neoprene modified asphalt adhesive containing oxidized asphalt combined with 2% neoprene and 10% long fibered mineral fibers with a softening point of 155 degrees F.
4. *Joint Filler Materials*: Sand conforming to ASTM C-144 with 100% passing a No.16 sieve.
5. *Pre-formed Asphalt Joint Filler*: ASTM D-994, 1/2inch (13mm) thick, for expansion joints which are not sealed, one of the following:
 - a. *Code 1301* by W.R. Grace and Co.
 - b. *Asphalt Expansion Joint* by W. R. Meadows, Inc.
 - c. *Elastite Asphalt Expansion Joint* by The Celotex Corporation.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Prior to starting work inspect the sub-grade to ensure that it has been properly prepared. Commencement of work shall imply acceptance of sub-grade conditions.
 - 1. Verify that sub-grade preparation, compacted density and elevations conform to the specifications. Compaction of the soil sub-grade to at least 95% Standard Proctor Density per ASTM D-698 is recommended. Higher density or compaction to ASTM D-1557 may be necessary for areas subject to vehicular traffic.
 - 2. Stabilization of the sub-grade and/or base material may be necessary with weak or saturated sub-grade soils. The Architect/Engineer should inspect sub-grade preparation, elevations, and conduct density tests for conformance to specifications.
 - 3. Verify that Geotextiles, if applicable, have been placed according to specifications.
 - 4. Verify that aggregate base materials, thickness, compaction, surface tolerances, and elevations conform to the specifications.
 - 5. Verify that base is dry, uniform, even, and ready to support sand, pavers, and imposed or anticipated vehicular loads.
 - 6. Verify location, type, installation and elevations of edge restraints around the perimeter area to be paved.
- B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with Tile Tech Pavers Inc. and other contributing manufacturer's instructions. Installation requirements vary for each individual project site. Precast Pavers used, pattern, grid layout, starting point, and finished elevation should be shown on plan view shop drawings, which have been prepared and approved by the designer, installing contractor and/or owner.
- B. **Placement Tolerance:**
 - 1. Maximum of 1/16 inch (1.6 mm) height variation between adjacent pavers.
 - 2. Individual pavers shall not vary more than 1/16 inch (1.6mm) from level across width of the paver.

3. Paved areas shall not vary more than 1/4 inch (6 mm) from level in a distance of 10 feet (3m) measured at any location and in any direction.
4. The surface elevation of pavers shall be 1/8 in. to 1/4 in. (3mm to 6mm) above adjacent drainage inlets, concrete collars or channels.
5. Joints between pavers to be 3/16 inch (4.8mm) or 1/8 inch (3mm).
6. Concrete shall not exceed 1/8 inch in 10 feet (3 mm in 3 m) from required plane. Concrete to be steel troweled with fine broom finish. No curing or sealing compound used.

C. Sand-Set Method Installation:

1. Spread a sand/cement mix evenly over the base course and screed to a nominal 1 in. (25 mm.) thickness, not exceeding 1-1/2 in. (40mm) thickness. The screened sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers. Do not use the bedding sand to fill depressions in the base surface.
2. Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines.
3. Field cut pavers with wet masonry saw in accordance with manufacturer's recommendations for methods, equipment and precautions.
4. Tamp into bedding or use a low amplitude, high frequency plate vibrator to vibrate the pavers into the sand. Cover vibrator plate with carpet or card board to prevent surface damage to pavers.
5. Sweep dry joint sand into the joints & sweep off excess sand when the job is complete.

D. Mortar Setting Bed (Thin-Set) Method Installation - PEDESTRIAN

1. Installation of Mortar bed as per TCA F102. All Materials used shall follow instructions of manufacturer for use in mortar method.
2. Install precast concrete pavers.
3. Grouting of pavers in strict accordance with grout manufacturer's directions and instructions. Use latex or acrylic additives from the same manufacturer as the grout.
4. All expansion and Control joints shall be installed per TCA EJ171. Joint materials used shall follow manufacturer's directions and instructions.
5. Rework mixes from time to time to maintain proper consistency, as recommended by manufacturer but do not add ingredients. Discard mortar that has reached its initial set.
6. Field cut pavers with wet masonry saw in accordance with manufacturer's recommendations for methods, equipment and precautions.
7. Remove, scrub & wash clean mortar stains and all other types of soiling from exposed paver surfaces.

E. Portland Cement Setting Bed (Thick-Set) Method Installation

1. Installation of Mortar bed as per TCA F101. All materials used follow instructions of manufacturer for use in mortar method.

2. Install precast concrete pavers and firmly set, tamp into bedding to ensure minimum 95% surface contact with mortar bed. Coat underside of each precast pavers unit with latex cement mortar.
3. Grouting of pavers in strict accordance with grout manufacturer's directions and instructions. Use latex or acrylic additives from the same manufacturer as the grout.
4. All expansion and Control joints shall be installed per TCA EJ171. Joint materials used shall follow manufacturer's directions and instructions.
5. Field cut pavers with wet masonry saw in accordance with manufacturer's recommendations for methods, equipment and precautions.
6. Remove, scrub & wash clean mortar stains and all other types of soiling from exposed paver surfaces.

F. Bituminous Setting Bed Method Installation

1. Place solid steel 3/4 inch (19 mm) thick control bars directly on the base or slab. Install shims under bars for minor adjustment of depth and finish paver elevations. Space bars approximately 11 feet (3.4m) apart and parallel to each other to serve as guides for strike-off boards.
2. Place asphalt setting bed at not less than 200 degrees F (93 degree C) in panels between control bars on the primed concrete slab or binder course to no less than 3/4 inch (19mm) compacted thickness. Spread material and strike off by pulling the material with a 12 feet long by 2 inches by 6 inches (3.7m by 51mm by 152mm) wood board several times to produce a smooth firm and even setting bed. Add fresh material in low, porous spots after each pass of the strike-off board. After each panel is complete remove and advance the first control bar to the next panel position in readiness for placing and striking adjacent panels. Fill in depressions left by the control bar.
3. Roll setting bed with a roller (not over one ton in weight) to a nominal depth of 3/4 inch (19 mm) thick while it is still hot. Add additional material to adjust thickness required and to allow for setting of pavers to finish elevations and slopes.
 - a. If setting bed is installed greater than 1-1/2 inches (38mm) thick, place in two equal lifts. Place the second lift immediately after the first to assure bond between lifts.
 - b. If pavers are not installed immediately after setting bed, provide protection of setting bed with minimum 1/2 inch plywood sheet laid on the setting bed with butted joints. Repair all damage to the setting bed prior to installing pavers.

F. Concrete Slab Installation – VEHICULAR

1. Install precast concrete pavers, slabs and curbs in locations, patterns and at elevations and with slopes for surface drainage as shown on the Drawings and in accordance with the manufacturer's printed installation instructions and the final reviewed shop drawings.

2. Apply neoprene modified asphalt adhesive on the cured setting bed by squeegeeing or troweling. If troweled on, use a trowel with serrations not exceeding 1/16 inch (1.5 mm) depth. Place adhesive to not more than 1/16 inch (1.6mm) thickness over the total surface of the setting bed. Do not begin installation of pavers, slabs and curbs until adhesive is dry to the touch.
3. Lay out pavement in 30 feet (9m) working area modules. Set precast concrete pavers, slabs and curbs by hand on dry adhesive in patterns shown on the Drawings with hand tight joints 1/16 inch to 1/8 inch (1.6 mm to 3 mm) wide joints and uniform top surfaces.
4. Field cut pavers with wet masonry saw in accordance with manufacturer's recommendations for methods, equipment and precautions.
5. Maintain accurate alignment and check for creep and shrinkage. Make adjustments to creep and shrinkage within the 30 feet (9 m) module area.
6. Sweep fine dry sand over pavement surface to fill joints immediately after installing pavers, slabs and curbs on setting bed. Brush in sand until joints are completely filled, remove surplus sand. Do not allow traffic on installed pavers, slabs or curbing until the joints have been filled.
7. Protect newly laid pavers, slabs and curbs with plywood panels on which workers stand. Advance protective panels as work progresses but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of installed pavers, slabs and curbs.
8. Install the specified joint filler where precast concrete pavers, slabs and curbs abut curbs, other vertical surfaces and other construction.
9. After the precast concrete paving is completed, backfill the spaces along the edges of the walks, metal edging and pavements to the required elevations with material reviewed by the Testing Laboratory. The Material shall then be compacted until firm and the surface neatly graded, with allowance made for top soil.

3.4 PROTECTION

- A. Protect installed pavers until completion of project.
- B. Remove and replace pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement before Substantial Completion.

3.5 CLEANING & SEALING

- A. Wash entire surface with phosphate free neutral cleaner with pH factor between 7 to 10 and rinse with clean water and allow to dry thoroughly.
- B. Apply sealer in accordance with manufacturer's directions.
 1. pH factor between 7 and 10

2. Non-discoloring and UV resistant.
3. Penetrating type designed especially for precast concrete pavers.

3.6 MAINTENANCE

- A. Extra Materials: Deliver supply of maintenance materials to the owner. Furnish not less than 1 percent maintenance materials from same lot as materials installed, and enclosed in protective packaging with appropriate identifying labels.

END OF SECTION

SECTION 2830 - CHAIN LINK FENCE AND GATES

PART 1 - GENERAL

1.01 SCOPE OF WORK:

Provide all labor, materials, equipment and supervision necessary to complete the installation of:

Chainlink fence; Chainlink gate; Excavation and backfill of support posts; Concrete anchoring of posts; Barbed wire and other accessories and equipment as specified herein or illustrated on the Drawings.

1.02 RELATED SECTIONS:

Section 110 – Clearing and Grubbing

1.03 SCOPE:

Furnish all tools, equipment, materials, machinery, appurtenances and labor unless otherwise specified to clear and grub for, excavate for, erect and install fence posts, extra length posts, concrete pull posts, fence fabric, gates, doors, corner posts, barbed wire, and all accessories along the lines shown on or reasonably inferred from the drawings. If any items for a complete job or omitted or not shown, the Contractor shall furnish and install the same without cost to the Owner.

1.04 SHOP DRAWINGS:

Six (6) sets of Shop Drawings for fences and gates shall be submitted for approval by the Project Engineer prior to commencing construction.

PART 2 - PRODUCTS

2.01 MATERIALS:

The fabric, posts, braces and frames shall be hot dip galvanized steel with at least 1.2 ounces of zinc per square foot, applied after weaving for fabric and following fabrication for all other ferrous metal items. Posts, braces, rails and other hollow accessories shall be coated both inside and out. Miscellaneous fittings shall be malleable iron, pressed steel or aluminum forgings. All ferrous fittings shall be thoroughly galvanized by the hot dip method.

2.02 CHAIN LINK FABRIC:

Unless otherwise noted on the drawings, fabric shall be six (6) feet high. Fabric shall be nine (9) gage steel wire, two (2) inch woven mesh. The fabric shall have a twisted and barbed finish at the bottom, the barbing accomplished by cutting the wire on a bias. The top wire shall be rolled over to create a smooth edge.

2.03 BARBED WIRE:

Barbed wire shall conform to the requirements of A.S.T.M. A 121, for wire size no. 122, and for Class 2 zinc coating.

The individual barb shall be four points, twisted around both wires, with the barbs spaced at approximately 52 inches, and at a maximum spacing of 6 inches. Barbed wire shall be used where indicated on the plans.

2.04 POSTS AND BRACES:

All steel posts and braces shall be tubular and shall meet the requirements of Table A2 of A.S.T.M. A 53 for Standard Weight Pipe (Schedule 40). They shall be of the minimum dimensions shown below:

Line Posts: 2 inch nominal diameter

End, corner and pull posts: 22 inch nominal diameter

Top and brace rails: 1 5/8 inch nominal diameter

Gate posts (up to 6 foot wide gate): 22 inch nominal diameter

Gate posts (greater than 6 foot wide gate): 32 inch nominal diameter

Gate frames and intermediate posts: 1 7/8 inch outside diameter

Post caps, designed to provide a drive fit over the top of the post to exclude moisture, shall be provided.

Extension arms for barbed wire shall extend diagonal as shown on the plans and support three strands of barbed wire.

2.05 STEEL ACCESSORIES:

Stretcher bars and truss rods shall be of the following dimensions:

Stretcher bars: 1/4 inch by 3/4 inch

Truss rods: 3/8 inch diameter (minimum)

2.06 CONCRETE:

Concrete used for anchoring posts shall have a compressive strength of 2,500 pounds per square inch, using 3/4 inch maximum size aggregate.

PART 3 - EXECUTION

3.01 CLEARING:

Where the clearing and grubbing for the project does not include the area occupied by the fence, clearing shall be done to the limits shown in the plans. If the limits are not shown in the plans, clearing shall be done to a width of at least two feet on sides of the fence line, except that the Owner may direct that valuable trees be left in place.

3.02 POSTS:

A. POST SPACING:

Post shall be spaced a maximum of ten (10) feet on center. Additional line posts shall be set at abrupt changes in grade.

B. SETTING POSTS:

Line posts shall be set in concrete measuring three (3) feet deep by one foot four inches (3") diameter. End, corner and gate posts shall be set in concrete measuring three (3) feet deep by two (2) foot diameter. All concrete shall be crowned to shed water. Corner posts and regular corner bracing shall be provided at all angles in fence.

C. VERTICAL ALIGNMENT:

The top of the fence shall be constructed to a uniform line or grade to present an even appearance. The bottom of the fence shall be approximately 3 inches above ground level. Over irregular ground, a minimum clearance of 1 inch and a maximum of 6 inches will be permitted for a length not to exceed eight (8) feet. Post shall be set to proper grade alignment and plumb.

3.03 GATES:

Gates shall be swing or sliding, single or double, as noted on the drawings. They shall be complete with latches, stops, keepers, hinges or rollers and roller tracks, fabric and braces. If barbed wire is called for, gates shall also be fitted with barbed wire. The latch assembly shall be capable of being locked with a padlock.

3.04 PLACING FABRIC AND BARBED WIRE:

Fabric and barbed wire shall not be placed until the posts have been permanently positioned and concrete foundations have attained adequate strength. The fabric shall be placed by securing one end and applying sufficient tension to remove all slack before making permanent attachments at intermediate points. The fabric shall be fastened to all end, corner and pull posts by substantial and approved means. Fastening shall be done by use of tools

designed for the purpose, in accordance with the manufacturer's recommendations. The tension for stretching shall be applied by mechanical fence stretchers or with single wire stretchers designed for the purpose. All splices in the fabric shall be securely and neatly made. Fabric shall be attached to top rail not greater than 24 inches on center and on post and stretcher bars at 14 inch centers.

END OF SECTION

SECTION 285 OPTIONAL BASE COURSE

285-1 Description.

Construct a base course composed of one of the optional materials shown on the typical cross-sections.

285-2 Materials.

Meet the material requirements as specified in the Section covering the particular type of base to be constructed.

Graded Aggregate	Section 204
Asphalt	Section 234
Limerock	Section 911
Shell Base	Section 911
Shell-Rock	Section 911
Cemented Coquina	Section 911
Recycled Concrete Aggregate (RCA)*	Section 911

*Do not use on interstate roadways.

285-3 Selection of Base Option.

The Plans will include typical cross-sections indicating the various types of base construction (material and thickness) allowable. Select one base option as allowed for each typical cross-section shown in the Plans. Only one base option is permitted for each typical cross-section. Notify the Engineer in writing of the base option selected for each typical cross-section at least 45 calendar days prior to beginning placement of base material.

285-4 Construction Requirements.

Construct the base in accordance with the Section covering the particular type of base to be constructed.

Graded Aggregate	Section 204
Asphalt	Section 234
Limerock	Section 200
Shell Base	Section 200

Shell Rock	Section 200
Cemented Coquina	Section 200
Recycled Concrete Aggregate (RCA)*	Section 200

*Do not use on interstate roadways.

285-5 Variation in Earthwork Quantities.

The Plans will identify the optional materials used by the Department for determining the earthwork quantities (Roadway Excavation, Borrow Excavation, Subsoil Excavation, Subsoil Earthwork, or Embankment). The Department will not revise the quantities, for those items having final pay based on plan quantity, to reflect any volumetric change caused by the Contractor's selection of a different optional material.

285-6 Thickness Requirements.

285-6.1 Measurements: For non-asphalt bases, meet the requirements of 200-7.3.1.2. For subbases, meet the thickness requirements of 290-4. The Engineer will determine the thickness of asphalt base courses in accordance

with 234-8.1.

285-6.2 Correction of Deficient Areas: For non-asphalt bases, correct all areas of the completed base having a deficiency in thickness in excess of 1/2 inch by scarifying and adding additional base material. As an exception, if authorized by the Engineer, such areas may be left in place without correction and with no payment.

For asphalt bases, correct all areas of deficient thickness in accordance with 234

8.

285-7 Calculation of Average Thickness of Base.

For bases that are not mixed in place, the Engineer will determine the average thickness from the measurements specified in 285-6.1, calculated as follows;

- (a) When the measured thickness is more than 1/2 inch greater than the design thickness shown on the typical cross-section in the Plans, it will be considered as the design thickness plus 1/2 inch.
- (b) Average thickness will be calculated per typical cross-section for the entire job as a unit.
- (c) Any areas of base left in place with no payment will not be included in the calculations.
- (d) Where it is not possible through borings to distinguish the base materials from the underlying materials, the thickness of the base used in the measurement will be the design thickness.
- (e) For Superpave asphalt base course, the average spread rate of each course shall be constructed in compliance with 234-8.

285-8 Method of Measurement.

The quantity to be paid for will be the plan quantity area in square yards,

omitting any areas where under-thickness is in excess of the allowable tolerance as specified in 285-6. The pay area will be the surface area, determined as provided above, adjusted in accordance with the following formula:

$$\text{Pay Area} = \frac{\text{Surface Area} \times \text{Calculated Average Thickness per 285-7}}{\text{Plan Thickness}}$$

The pay area shall not exceed 105% of the surface area. There will be no adjustment of the pay area on the basis of thickness for base courses constructed utilizing mixed-in-place operations. For Superpave asphalt base course, the quantity to be paid for will be the plan quantity.

285-9 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section, including tack coat between base layers, prime coat, cover material for prime coat, bituminous material used in bituminous plant mix, and cement used in soil-cement.

Where the Plans include a typical cross-section which requires the construction of an asphalt base only, price adjustments for bituminous material provided for in 9-2.1.2 will apply to that typical cross-section. For typical cross-sections which permit the use of asphalt or other materials for construction of an optional base, price adjustments for bituminous material provided for in 9-2.1.2 will not apply.

Payment will be made under:

Item No. 285- 7-Optional Base - per square yard.

SECTION 334 SUPERPAVE ASPHALT CONCRETE

334-1 Description.

334-1.1 General: Construct a Superpave Asphalt Concrete course, with the type of mixture specified in the Contract, or when offered as alternates, as selected. Superpave mixes are identified as Type SP-9.5, Type SP-12.5 or Type SP-19.0.

Meet the requirements of Section 320 for plant and equipment. Meet the general construction requirements of Section 330, including the provisions for Quality Control Plans and Quality Control Systems as specified in 6-8.

The Engineer will accept the work on a LOT-to-LOT basis in accordance with the applicable requirements of this Specification. The size of the LOT will be as specified in 334-4.2 for the asphalt mixture produced at the plant and as specified in 334-5.1 for the material placed on the roadway.

334-1.2 Traffic Levels: The requirements for Type SP Asphalt Concrete mixtures are based on the design traffic level of the project, expressed in 18,000 pound [80-kN] Equivalent Single Axle Loads (ESAL's). The five traffic levels are as shown in Table 334-1. Table 334-1

Superpave Traffic Levels

Traffic Level	Traffic Level (1×10^6 ESAL's)
A	<0.3
B	0.3 to <3
C	3 to <10
D	10 to <30
E	≥ 30

334-1.3 Gradation Type: The Superpave mixes are categorized as either “coarse” or “fine”, depending on the overall gradation of the mixture. Coarse mixes are defined as having a gradation that passes below the restricted zone, as defined in 334-2.3. Fine mixes are defined as having a gradation that passes above the restricted zone, as defined in 334-2.3.

334-1.4 Thickness: The total thickness of the Type SP asphalt layer(s) will be the plan thickness as shown in the Contract documents. Before paving, propose a thickness for each individual layer meeting the requirements of this specification, which when combined with other layers (as applicable) will equal the plan thickness. For construction purposes, the plan thickness and individual layer thickness will be converted to spread rate based on the maximum specific gravity of the asphalt mix being used, as well as the minimum density level, as shown in the following equation:

Non-SI Units

$$\text{Spread rate (lbs/yd}^2\text{)} = t \times G_{\text{mm}} \times 43.3$$

Where: t = Thickness (in.) (Plan thickness or individual layer thickness)

G_{mm} = Maximum specific gravity from the verified mix design

SI Units

$$\text{Spread rate (kg/m}^2\text{)} = t \times G_{\text{mm}} \times 0.928$$

Where: t = Thickness (mm.) (Plan thickness or individual layer thickness)

G_{mm} = Maximum specific gravity from the verified mix design

The weight of the mixture shall be determined as provided in 320-2.2.

Plan quantities are based on a G_{mm} of 2.540, corresponding to a spread rate of 110

lbs/yd² -in [23.6 kg/m² /10 mm]. Pay quantities will be based on the actual maximum specific gravity of the mix being used.

334-1.4.1 Layer Thicknesses - Fine Mixes: The allowable structural layer thicknesses for fine Type SP Asphalt Concrete mixtures are as follows:

Type SP-9.5.....1 - 1 1/2 inches [25 - 40 mm]

Type SP-12.5.....1 1/2 - 2 1/2 inches [40 - 60 mm]

Type SP-19.0.....2 - 3 inches [50 - 80 mm]

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on fine mixes when used as a structural course:

Type SP-9.5 - Limited to the final top two structural layers, two layers maximum.

Type SP-19.0 - May not be used in the final (top) structural layer.

334-1.4.2 Layer Thicknesses - Coarse Mixes: The allowable structural layer thicknesses for coarse Type SP Asphalt Concrete mixtures are as follows:

Type SP-9.5.....1 1/2 - 2 inches [40 - 50 mm]

Type SP-12.5.....2 - 3 inches [50 - 80 mm]

Type SP-19.0.....3 - 3 1/2 inches [80 - 90 mm]

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on coarse mixes when used as a structural course:

Type SP-19.0 - May not be used in the final (top) structural layer.

334-1.4.3 Additional Requirements: The following requirements also apply to coarse and fine Type SP Asphalt Concrete mixtures:

1. A minimum 1 1/2 inch [40 mm] initial lift is required over an Asphalt Rubber Membrane Interlayer (ARMI).

2. When construction includes the paving of adjacent shoulders (≤ 5 feet [≤ 1.5 m] wide), the layer thickness for the upper pavement layer and shoulder must be the same and paved in a single pass, unless called for differently in the Contract Documents.
3. All overbuild layers must be Type SP Asphalt Concrete designed at the traffic level as stated in the Contract. Use the minimum and maximum layer thicknesses as specified above unless called for differently in the Contract Documents. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch [13 mm], and the maximum allowable thickness may be increased 1/2 inch [13 mm], unless shown differently in the plans.

334-2 Materials.

334-2.1 General Requirements: Meet the material requirements specified in Division III. Specific references are as follows:

Superpave PG Asphalt Binder or Recycling Agent.....	916-1, 916-2
Coarse Aggregate, Stone, Slag or Crushed Gravel.....	Section 901
Mineral Filler.....	917-1, 917-2
Fine Aggregate.....	Section 902

Crushed Reclaimed Portland Cement Concrete Pavement may be used as a coarse aggregate or screenings component subject to meeting all applicable specifications.

334-2.2 Gradation Requirements: Combine the coarse and fine aggregate in proportions that will produce an asphalt mixture meeting all of the requirements defined in this specification and conform to the gradation requirements at design as defined in AASHTO MP2-01, Table 3. Aggregates from various sources may be combined.

334-2.3 Restricted Zone: The gradation identified in 334-2.2 must not pass through the restricted zones specified in Table 4 of AASHTO MP2-01 (Note: The 0.300 mm boundary does not apply). For Traffic Levels D and E the design gradation must pass below the restricted zone, when plotted on an FHWA 0.45 Power Gradation Chart, unless called for differently in the Contract Documents. For Traffic Levels A, B and C, the design gradation must pass above the restricted zone.

334-2.4 Aggregate Consensus Properties: Meet the following consensus properties at design for the aggregate blend:

334-2.4.1 Coarse Aggregate Angularity: When tested in accordance with ASTM D 5821, meet the percentage of fractured faces requirements specified in Table 5 of AASHTO MP2-01.

334-2.4.2 Fine Aggregate Angularity: When tested in accordance with AASHTO T-304, Method A, meet the uncompacted void content of fine aggregate specified in Table 5 of AASHTO MP2-01.

334-2.4.3 Flat and Elongated Particles: When tested in accordance with ASTM D 4791, (with the exception that the material passing the 3/8 inch [9.5 mm] sieve and retained on the No. 4 [4.75 mm] sieve shall be included), meet the requirements

specified in Table 5 of AASHTO MP2-01. Measure the aggregate using the ratio of 5:1, comparing the length (longest dimension) to the thickness (shortest dimension) of the aggregate particles.

334-2.4.4 Sand Equivalent: When tested in accordance with AASHTO T 176, meet the sand equivalent requirements specified in Table 5 of AASHTO MP2-01.

334-2.5 Use of Reclaimed Asphalt Pavement (RAP) Material:

334-2.5.1 General requirements: Subject to certain requirements, RAP material may be used as a component material of the asphalt mixture. Where the material is recovered from a FDOT project, the Composition of Existing Pavement may be available on the Department's web site. The URL for obtaining this information, if available, is:

www.dot.state.fl.us/statematerialsoffice/Bituminous/CentralBitLab/AsphaltCompositions/Compositions.htm

RAP may be used as a component material of the asphalt mixture subject to the following conditions:

1. The Contractor assumes full responsibility for the design and construction of asphalt mixes which incorporate RAP as a component material.

2. For design purposes, the Contractor assumes responsibility for establishing accurate specific gravity values for the RAP material. This may be accomplished by one of the following methods:

- a) Calculation of the bulk specific gravity value based upon the effective specific gravity of the RAP, determined on the basis of the asphalt binder content and maximum specific gravity. The Engineer will approve the estimated asphalt binder absorption value used in the calculation.

- b) Testing of the extracted aggregate obtained through a vacuum extraction or ignition oven extraction.

3. For projects with Traffic Levels D and E, do not permit the amount of RAP material used in the mix to exceed 30% by weight of total aggregate. For projects with Traffic Levels A, B and C, do not permit the amount of RAP material used in the mix to exceed 50% by weight of total aggregate. When using a PG 76-22 Asphalt Binder, limit the amount of RAP material used in the mix to a maximum of 15%.

4. Use a grizzly or grid over the RAP cold bin, in-line roller crusher, screen, or other suitable means to prevent oversized RAP material from showing up in the completed recycled mixture.

If oversized RAP material appears in the completed recycled mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not immediately taken, stop plant operations.

5. Provide stockpiled RAP material that is reasonably consistent in characteristics and contains no aggregate particles which are soft or conglomerates of fines.

6. Provide RAP having a minimum average asphalt content of 4.0% by weight of total mix. The Engineer may sample the stockpile to verify that this requirement is met.

334-2.5.2 Requirements For RAP Milled From Projects: When material milled from the project is used as a component of the asphalt mixture and a Composition of Existing Pavement is available, use the following procedures for obtaining representative samples for the mix design:

1. Cut a minimum number of cores to be representative of the pavement. Fill the core holes prior to opening to traffic. Assume responsibility for accounting for the degradation that will occur during the milling operation.
2. Representative samples may also be obtained by milling the existing pavement to the full depth shown on the plans for pavement removal for a length of approximately 200 feet [60 m]. If required to maintain traffic, immediately replace the pavement removed with the mix specified in the Contract. This mix will be paid for at the Contract unit price.

In the event that a Composition of Existing Pavement is not available, assume responsibility for determining the characteristics (gradation, binder content, and binder viscosity) of the RAP material either by coring the roadway or by sampling the milled material as it is stockpiled.

334-2.5.3 Requirements For RAP Stockpiled From a Previous FDOT Project: When the RAP to be used as a component in a mix design is stockpiled from a previous FDOT project and the Composition of Existing Pavement is known, design the mix based either on the composition or on representative samples obtained from the stockpiled RAP.

334-2.5.4 Requirements For Stockpiled RAP With Unknown Characteristics: When the composition of stockpiled RAP to be used as a component in a mix design is not known, use the following procedures for design:

1. Assume responsibility for determining the binder content, binder viscosity, gradation, and aggregate bulk specific gravity of the RAP material. Take representative samples at random locations around the stockpile.
2. Request the Engineer to make a visual inspection of the stockpile(s) of RAP. Based on visual inspection, the Engineer will determine the suitability of the stockpiled materials. Once the RAP stockpile has been approved, do not add additional material without prior approval of the Engineer.
3. Submit the data required above when submitting the proposed mix design to the Engineer for approval.

334-2.5.5 Asphalt Binder for Mixes with RAP: Select the appropriate asphalt binder based on Table 334-2. The Engineer reserves the right to change asphalt binder type and grade at design based on the characteristics of the RAP asphalt binder, and reserves the right to make changes during production. Maintain the viscosity of the recycled mixture within the range of 4,000 to 12,000 poises [400 to 1,200 PaAs]. Obtain a sample of the mixture for the Engineer within the first 1,000 tons [1,000 metric tons] and at a frequency of approximately one per 4,000 tons [4,000 metric tons] of mix.

Table 334-2

Binder Grade for Mixes Containing RAP	
% RAP	Asphalt Binder Grade
<20	PG 67-22
20 - 29	PG 64-22
≥ 30	Recycling Agent
Note: When a PG 76-22 Asphalt Binder is called for in the Contract, limit the amount of RAP material used in the mix to a maximum of 15%.	

334-2.6 Use of Recycled Crushed Glass: Recycled crushed glass may be used as a component of the bituminous mixture subject to the following:

1. Consider the recycled crushed glass a local material and meet all requirements specified in 902-6.
2. Limit the amount of recycled crushed glass in any bituminous mixture to a maximum of 15% of the total aggregate weight.
3. Use an asphalt binder that contains a minimum of 0.5% anti-stripping agent from the Department's Qualified Products List. The addition of the specified amount of anti-stripping agent must be certified by the supplier.
4. Do not use recycled crushed glass in friction course mixtures or in structural course mixtures, which are to be used as the final wearing course.

334-3 General Composition of Mixture.

334-3.1 General: Compose the asphalt mixture using a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

334-3.2 Mix Design:

334-3.2.1 General: Design the asphalt mixture in accordance with AASHTO PP28-01, except as noted herein. All mix designs will be developed by individuals who are qualified as a Mix Designer in the Department's Construction Training and Qualification Program (CTQP). Prior to the production of any asphalt mixture, submit the proposed mix design with supporting test data indicating compliance with all mix design criteria to the Engineer. Include representative samples of all component materials, including asphalt binder. Allow the State Materials Engineer a maximum of four weeks to either conditionally verify or reject the mix as designed. Final verification of the mix design will occur when the requirements of 334-4.3 have been met. Do not use more than three mix designs per nominal maximum aggregate size per traffic level per contract year. Exceeding this limitation will result in a maximum Composite Pay Factor of 1.00 for all designs used beyond this limit.

At the sole option of the Engineer, the initial production requirements of 334-4.3 may be waived for Type SP asphalt mixes based on evidence of final verification and satisfactory performance in previous production for that particular mix.

The Engineer will consider any marked variations from original test data for a mix

design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and the Engineer will no longer allow the use of the mix design.

334-3.2.2 Gyratory Compaction: Compact the design mixture in accordance with AASHTO TP4-00. Use the number of gyrations as defined in Table 1 of AASHTO PP28-01. For Traffic Level C mixes, compact the mixture as specified for the Traffic Level of 0.3×10^6 to $< 3 \times 10^6$ ESAL's.

334-3.2.3 Design Criteria: Meet the requirements for nominal maximum aggregate size as defined in AASHTO MP2-01, as well as for relative density, VMA, VFA, and dust-to-binder ratio as specified in Table 6 of AASHTO MP2 01. Use a dust-to-binder ratio of 0.8 to 1.6 for coarse mixes.

334-3.2.4 Moisture Susceptibility: Test the specimens in accordance with FM 1-T 283. Provide a mixture (4 inch [100 mm] specimens) having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (dry and unconditioned) of 100 psi [690 kPa]. If necessary, add a liquid anti-stripping agent, which is on the Department's Qualified Products List or hydrated lime (meeting the requirements of 337-10.2) in order to meet these criteria.

334-3.2.5 Additional Information: In addition to the requirements listed above, provide the following information with each proposed mix design submitted for verification:

1. The design traffic level and the design number of gyrations (N_{design}).
2. The source and description of the materials to be used.
3. The DOT source number and the DOT product code of the aggregate components furnished from a DOT approved source.
4. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation in handling and processing as necessary.
5. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly -No. 200 [-75 μ m]) should be accounted for and identified for the applicable sieves.
6. The bulk specific gravity value for each individual aggregate (and RAP) component, as identified in the Department's aggregate control program.
7. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%.
8. A target temperature at which the mixture is to be discharged from the plant and a target roadway temperature (per 330-6.3). Do not exceed a target temperature of 340°F [170°C] for modified asphalts and 315°F [157°C] for unmodified asphalts.
9. Evidence that the completed mixture conforms to all specified physical requirements.
10. The name of the CTQP Qualified Mix Designer.

11. The ignition oven calibration factor(s).

334-3.3 Revision of Mix Design: During production, the Contractor may request a target value revision to a mix design, subject to: (1) the target change falls within the limits defined in Table 334-3, (2) appropriate data exists demonstrating that the mix complies with production air voids specification criteria, and (3) the mixture gradation meets the basic gradation requirements defined in 334-2.2 and 334-2.3.

Table 334-3 Limits for Potential Adjustments to Mix Design Target Values	
Characteristic	Limit from Original Mix Design
No. 8 sieve [2.36 mm] and Coarser	± 5.0%
No. 16 sieve [1.18 mm]	± 4.0%
No. 30 sieve [600µm]	± 4.0%
No. 50 sieve [300µm]	± 3.0%
No. 100 sieve [150µm]	± 3.0%
No. 200 sieve [75 µm]	± 1.0%
Asphalt Binder Content (1)	± 0.3%
(1) Reductions to the asphalt binder content will not be permitted if the VMA during production is lower than 1.0% below the	

Submit all requests for revisions to mix designs, along with supporting documentation, to the Engineer. In order to expedite the revision process, the request for revision or discussions on the possibility of a revision may be made verbally, but must be followed up by a written request. The verified mix design will remain in effect until the Engineer authorizes a change. In no case may the effective date of the revision be established earlier than the date of the first communication between the Contractor and the Engineer regarding the revision.

A new design mix will be required if aggregate sources change, or for any substitution of an aggregate product with a different aggregate code, unless approved by the Engineer.

334-4 Acceptance of the Mixture At the Plant.

334-4.1 General: The bituminous mixture will be accepted at the plant with respect to gradation (P_{-8} and P_{-200}), asphalt content (P_b), and volumetrics (volumetrics is defined as air voids at N_{design}). Acceptance will be on a LOT-by-LOT basis (for each mix design) based on tests of random samples obtained within each subplot taken at a frequency of one sample per subplot that is tested for each property. Acceptance of the mixture will be based on Contractor Quality Control test results that have been verified by the Department. The bituminous mixture will be sampled in accordance with FM 1-T 168.

The asphalt content of the mixture will be determined in accordance with FM 5-563. The gradation of the recovered aggregate will be determined in accordance with FM 1-T 030. Testing for acceptance includes AASHTO TP4-00, FM 1-T 209, FM 5-563 and FM 1-T 030. Prior to testing samples in accordance with AASHTO TP4-00 and FM 1-T 209, condition the test-sized sample for one hour at the target roadway compaction temperature in a covered, shallow, flat pan. In the event the FM 5-563 ignition oven goes out of service during production, the Contractor may elect to use a replacement oven at another location for no more than 72 hours while the oven is being repaired.

When the total quantity of any mix type in the Contract is less than 500 tons [500 metric tons], the Engineer will accept the mix on the basis of visual inspection. The Engineer may run or require the Contractor to run tests for informational purposes; however as defined in 334-6.

334-4.2 LOT Sizes: The Initial Production LOT of all mix designs used on a project shall consist of 2,000 tons [2,000 metric tons], subdivided into four equal sublots of 500 tons [500 metric tons] each. Following the Initial Production LOT, each remaining LOT will be defined (as selected by the Contractor prior to the start of the LOT) as either (1) 2,000 tons [2,000 metric tons], with each LOT subdivided into four equal sublots of 500 tons each, or (2) 4,000 tons [4,000 metric tons], with each LOT subdivided into four equal sublots of 1,000 tons [1,000 metric tons] each. Before the beginning of any LOT, the Engineer will develop a random sampling plan for each subplot and direct the Contractor on sample points, based on tonnage, for each subplot during construction.

All LOTs with three or more sublots will be accepted based on the standard deviation and percent within specification limits as defined in 334-8.2.

In the event that less than three sublots are produced for a LOT, these sublots will be considered as one LOT, with payment based on small quantities as defined in 334-8.1.

334-4.2.1 Partial LOTs: A partial LOT is defined as a LOT size that is less than a full lot. A partial LOT may occur due to the following:

1. The completion of a given mix type or mix design on a project.
2. A LOT termination due to a 60 day or greater delay in production.
(Time periods other than 60 days may be used if agreed to by both Engineer and Contractor.)
3. A LOT is terminated per 334-7.

All partial LOTs will be evaluated based on the number of tests available, and will not be redefined.

334-4.3 Initial Production Requirements: The Initial Production LOT of all mix designs shall be established at 2,000 tons [2,000 metric tons]. During this period demonstrate the capability to produce and place the mixture as specified unless waived by the Engineer in 334-3.2.1. If necessary, during this time, the Contractor may make adjustments to the mix design, as defined in 334-3.3. Any target value adjustments to the mix design will result in the LOT being terminated and evaluated per 334-8. Do not

begin 4,000 ton [4,000 metric ton] LOT sizes until a 2,000 ton [2,000 metric ton] initial production LOT (for each mix design) has been successfully completed, or is waived by the Engineer.

334-4.3.1 Plant Testing Requirements: Obtain one random sample of mix for testing per 500 ton [500 metric ton] subplot as directed by the Engineer. Split the sample into three parts. Test the Quality Control split sample for gradation, asphalt content and volumetrics in accordance with 334-4.1. All testing by the Contractor must be completed within one working day from the time the samples were obtained.

334-4.3.2 Roadway Testing Requirements: For density determination, obtain a minimum of five 6 inch [150 mm] diameter roadway cores within 24 hours of placement at random locations as directed by the Engineer within each subplot. Test these Quality Control samples for density in accordance with 334-5. The G_{mm} used for the density evaluation will be based on the Quality Control test result for the subplot.

On coarse mixes when the average density for the Initial Production LOT is less than 93.00% of G_{mm} , cut five 6 inches [150 mm] diameter roadway cores (at locations determined by the Engineer) and have evaluated for permeability in accordance with FM 5-565 by a laboratory as approved by the Engineer.

334-4.3.3 Verification of Initial Production LOT: For Verification purposes the Engineer will test a minimum of one split sample (including density per 334-5) from the Initial Production LOT at the completion of the LOT. Results of the testing and analysis for the LOT must be available to the Contractor within one working day from when the LOT is completed.

The Verification test results will be compared with the corresponding Quality Control test results based on the between-laboratory precision values shown in Table 334-4.

If all of the specified mix characteristics compare favorably, then the LOT will be accepted, with payment based on the Quality Control results for the LOT.

If any of the results do not compare favorably, then the split Resolution samples from the LOT will be sent to the Resolution laboratory for testing, as described in 334-4.5.1.

334-4.3.4 Criteria for Initiation of 4,000 Ton [4,000 Metric Ton] LOTs: At the completion of the Initial Production LOT, the quality of the as-produced material will be evaluated by the Engineer. Begin the option of 4,000 ton [4,000 metric ton] LOT sizes only when authorized by the Engineer based upon the Quality Control test results for the Initial Production LOT meeting the following:

1. A minimum Pay Factor of 0.90 for each asphalt quality characteristic as defined in 334-8.
2. A favorable comparison with the Verification test results. Comparisons between the Quality Control and Verification test results will be based on between-laboratory precision values shown in Table 334-4.
3. An average coefficient of permeability of less than 125×10^{-5} cm/s as determined in accordance with FM 5-565. Permeability criteria applies only to coarse mixes when the

average density for the LOT is less than 93.00% of G_{mm} .

In the event that the Initial Production LOT does not meet these criteria, limit production LOT sizes to 2,000 tons [2,000 metric tons] with 500 ton [500 metric ton] sublots until these criteria are met.

334-4.3.5 Acceptance of Initial Production LOT: The Initial Production LOT shall be considered a single LOT and will receive a Composite Pay Factor as determined in 334-8, based on results of the verified Quality Control tests, or as determined by the Resolution System.

334-4.4 Quality Control Sampling and Testing: Obtain all samples randomly as directed by the Engineer. The samples must be of a sufficient quantity to be split into three samples. The split sample for Quality Control (QC), which will be used by the Engineer in the acceptance decision for payment, must be conditioned and tested as described in 334-4.1. The split samples for Verification testing and Resolution testing shall each consist of three boxes for a total sample size of approximately 35 pounds. The approximate size of the box must be 12" x 8" x 4". Label and safely store these boxes in a manner agreed upon by the Engineer for future testing. The Contractor can retain additional split samples at their option.

Should the Engineer determine that the Quality Control requirements are not being met or that unsatisfactory results are being obtained, or should any instances of falsification of test data occur, approval of the Contractor's Quality Control Plan would be rescinded and production will be stopped.

334-4.5 Split Sample Verification Testing: In order to determine the validity of the Contractor's Quality Control test results prior to their use in the Acceptance decision, the Engineer will run verification tests. At the completion of each LOT, the Engineer will test a minimum of one verification split sample randomly from the LOT. Results of the testing and analysis for the LOT must be available to the Contractor within one working day from the time the LOT is completed. Verification samples shall be reheated at the target roadway compaction temperature for 1 1/2 hours, reduced to the appropriate testing size, and conditioned as described in 334-4.1, prior to testing.

The Verification test results will be compared with the Quality Control test results based on the between-laboratory precision values shown in Table 334-4.

Table 334-4 Between-Laboratory Precision Values	
Property	Maximum Difference
G_{mm}	0.019
G_{mb}	0.022

Table 334-4 Between-Laboratory Precision Values Property Maximum Difference

P_b	0.44%
P_{-200}	FM 1-T 030 (Figure 2)
P_{-8}	FM 1-T 030 (Figure 2)

If all of the specified mix characteristics compare favorably, then the LOT will be accepted, with payment based on the Contractor's Quality Control test data for the LOT.

If any of the results do not compare favorably, then the resolution samples from the LOT will be sent to the Resolution laboratory for testing, as described in 334-4.5.1.

334-4.5.1 Resolution System: In the event of an unfavorable comparison between the Contractor's Quality Control test results and the Engineer's Verification test results on any of the properties identified in Table 334-4, the Resolution laboratory identified by the Engineer will test all of the split samples from the LOT for only the property (or properties) in question. Resolution samples shall be reheated at the target roadway compaction temperature for 1 1/2 hours, reduced to the appropriate testing size, and conditioned as described in 334-4.1, prior to testing.

If the Resolution laboratory results compare favorably (for the property or properties in question) with all of the Quality Control results, then acceptance and payment for the LOT will be based on the Quality Control results, and the Department will bear the costs associated with Resolution testing. No additional compensation, either monetary or time, will be made for the impacts of any such testing.

If the Resolution laboratory results do not compare favorably (for the property or properties in question) with all of the Quality Control results, then acceptance and payment for the LOT will be based on the Resolution test data for the LOT, and the costs of the Resolution testing will be deducted from monthly estimates. No additional time will be granted for the impacts of any such testing.

In the event of an unfavorable comparison between the Resolution test results and Quality Control test results, make the necessary adjustments to assure that future comparisons are favorable. Repeated unfavorable comparisons may result in the loss of the approved Quality Control Plan.

334-4.5.2 Lost or Missing Verification/Resolution Samples: In the event that any of the Verification and/or Resolution samples that are in the custody of the Contractor are lost, damaged, destroyed, or are otherwise unavailable for testing, the minimum possible pay factor for each quality characteristic as described in 334-8 will be applied to the entire LOT in question. Specifically, if the LOT in question has more than two sublots, the pay factor for each quality characteristic will be 0.55. If the LOT has two or less sublots, the pay factor for each quality characteristic will be 0.80. In either event, address the material in question in accordance with 334-9.4.

If any of the Verification and/or Resolution samples that are in the custody of the Department are lost, damaged, destroyed or are otherwise unavailable for testing, the corresponding Quality Control test result will be considered verified, and payment will be based upon the Contractor's data.

334-4.6 Independent Sample Verification Testing: Take samples as directed by the

Engineer for Independent Sample Verification testing. These samples may be obtained from the same load as the Quality Control samples or from other loads. Independent Verification samples must be reheated at the target roadway compaction temperature for 1 1/2 hours, reduced to the appropriate testing size, and conditioned as described in 334-4.1, prior to testing. If any of the results do not meet the requirements of Table 334-

5, for asphalt binder content, air voids or density, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test results in accordance with 334-9.4.

Table 334-5 Master Production Range	
Characteristic	Tolerance (1)
Asphalt Binder Content (%)	Target $\pm$ 0.55
Passing No. 8 [2.36 mm] Sieve (%)	Target $\pm$ 5.50
Passing No. 200 [75 μ m] Sieve (%)	Target $\pm$ 1.50
Air Voids (%)	4.00 $\pm$ 1.50
Density, %G _{mm} (2)	
Coarse Graded (minimum)	93.00
Fine Graded	N/A
(1) Tolerances for sample size of n = 1 from the verified mix design	
(2) Based on an average of 5 randomly located cores	

334-4.7 Comparison Testing: At the start of the project (unless waived by the Engineer) and at other times as determined necessary by the Engineer, provide split samples for comparison testing with the Engineer. The purpose of these tests is to verify that the testing equipment is functioning properly and that the testing procedures are being performed correctly. In the event that the Engineer determines that there is a problem with the Contractor's testing equipment and/or testing procedures, the Contractor will be given the opportunity to immediately correct the problem to the Engineer's satisfaction. In the event that the Contractor cannot immediately correct the problem, the Contractor will be required to cease production of the asphalt mixture until the problem is adequately resolved to the satisfaction of the Engineer. If so agreed to by both the Contractor and the Engineer, the split sample used for comparison testing may

also be used for the Quality Control sample. The split sample used for comparison testing will also meet the requirements for Independent Sample Verification Testing described in 334-4.6.

334-5 Acceptance of the Mixture On the Roadway.

334-5.1 General: The bituminous mixture will be accepted at the roadway with respect to density. Acceptance of the mixture on the roadway will be based on Contractor Quality Control test results that have been verified by the Department. The in-place density of each layer of asphalt mix will be evaluated by the use of 6 inches [150 mm] diameter roadway cores randomly located by the Engineer. The roadway cores will be sampled in accordance with FM 1-T 168 and tested in accordance with FM 1-T 166 (Non-Destructive method only). The required average density of a completed course will be based on a percent of the maximum specific gravity (G_{mm}) of the as-produced mix.

Retain all roadway density cores, as directed by the Engineer, for Verification or Resolution testing until the LOT is accepted. A roadway LOT and the plant production LOT shall be the same. When the total quantity of any mix type in the Contract is less than 500 tons [500 metric tons], the Engineer will accept the mix on the basis of visual inspection. The Engineer may run or require the Contractor to run process control tests for informational purposes, as defined in 334-6.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 ft. [1.5 m] or less, open-graded friction courses, variable thickness overbuild courses, leveling courses, first lift of asphalt base course placed on subgrade, miscellaneous asphalt pavement, or any course with a specified thickness less than 1 inch [25 mm] or a specified spread rate less than 100 lb/yd² [55 kg/m²]. In addition, density testing for acceptance will not be performed on the following areas when they are less than 1,000 feet [300 m] in length: crossovers, intersections, turning lanes, acceleration lanes, deceleration lanes, or ramps. Compact these courses (with the exception of open-graded friction courses) in accordance with the rolling procedure (equipment and pattern) submitted as part of the Quality Control Plan and as approved by the Engineer. In the event that the rolling procedure deviates from the approved procedure, placement of the mix shall be stopped.

The pay factor for LOTs where there are areas not requiring density testing for acceptance will be prorated based on a pay factor of 1.00 for the quantity (tonnage) of material in areas not requiring density testing for acceptance and the actual pay factor for the tonnage of material in areas requiring density.

334-5.2 Quality Control Sampling and Testing: Obtain five cores randomly from each subplot within 24 hours of placement as directed by the Engineer for all Quality Control tests used in the acceptance decision. In situations where it is impractical to cut a minimum of five cores per subplot, obtain a minimum of three cores per subplot at random locations as identified by the Engineer. Do not obtain cores any closer than 12 inches [300 mm] from an unsupported edge. Maintain traffic during the coring operation; core the roadway, patch the core holes (within three days of coring); and trim the cores to the proper thickness prior to density testing.

Density for the subplot shall be based on the average value for the five cores with the

target density based on the maximum specific gravity (G_{mm}) of the subplot. Once the average density of a subplot has been determined, do not retest the samples unless approved by the Engineer. Ensure proper handling and storage of all cores until the LOT in question has been accepted.

334-5.3 Same-Sample Verification Testing: In order to determine the validity of the Contractor's Quality Control test results prior to their use in the Acceptance decision, the Engineer will run verification tests. At the completion of each LOT, the Engineer will determine the density of each core (previously tested by Quality Control) from one randomly selected subplot from the LOT. Results of the testing and analysis for the LOT will be available to the Contractor within one working day from the time the LOT is completed.

Individual Verification test results will be compared with individual Quality Control test results by the Engineer based on the between-laboratory precision values given in Table 334-4 for G_{mb} .

If each of the core test results compare favorably, then the LOT will be accepted with respect to density, with payment based on the Contractor's Quality Control test data for the LOT.

If any of the results do not compare favorably, then the core samples from the LOT will be sent to the Resolution laboratory for testing as specified in 334-5.3.1.

334-5.3.1 Resolution System: In the event of an unfavorable comparison between the Contractor's Quality Control test data and the Engineer's Verification test data on the density results, the Resolution laboratory, identified by the Engineer, will test all of the cores from the LOT. Any damaged roadway cores will not be included in the evaluation.

If the Resolution laboratory results compare favorably with all of the Quality Control results, then acceptance and payment for the LOT will be based on the Quality Control data, and the Department will bear the costs associated with Resolution testing. No additional compensation, either monetary or time, will be made for the impacts of any such testing.

If the Resolution laboratory results do not compare favorably with all of the Quality Control results, then acceptance and payment for the LOT will be based on the Resolution test data, and the costs of the Resolution testing will be deducted from monthly estimates. No additional time will be granted for the impacts of any such testing.

In the event of an unfavorable comparison between the Resolution test results and Quality Control test results, make the necessary adjustments to assure that future comparisons are favorable. Repeated unfavorable comparisons may result in the loss of the approved Quality Control Plan.

334-5.3.2 Lost or Missing Verification/Resolution Samples: In the event that any of the Verification and/or Resolution samples that are in the custody of the Contractor are lost, damaged, destroyed, or are otherwise unavailable for testing, the minimum

possible pay factor for each quality characteristic as described in 334-8 will be applied to the entire LOT in question. Specifically, if the LOT in question has more than two sublots, the pay factor for each quality characteristic will be 0.55. If the LOT has two or less sublots, the pay factor for each quality characteristic will be 0.80. In either event, address the material in question in accordance with 334-9.4.

If any of the Verification and/or Resolution samples that are in the custody of the Department are lost, damaged, destroyed or are otherwise unavailable for testing the corresponding Quality Control test result will be considered verified, and payment will be based upon the Contractor's data.

334-5.4 Independent Sample Verification Testing: Obtain five additional roadway cores as directed by the Engineer for Independent Sample Verification testing. These independent cores will be obtained from the same LOTs and sublots as the Independent Verification Plant samples in 334-4.6, or as directed by the Engineer. If the average of the results for the subplot do not meet the requirements of Table 334-5 for density, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test results in accordance with 334-9.4.

334-5.5 Surface Tolerance: The bituminous mixture will be accepted on the roadway with respect to surface tolerance in accordance with the applicable requirements of 330-12.

334-6 Contractor Process Control.

In addition to the Quality Control tests defined above, the Contractor may run any additional tests at any frequency at the plant and roadway for process control purposes. The Engineer will not use these tests in the acceptance payment decision.

334-7 Individual Test Tolerances for Quality Control Testing.

In the event that an individual Quality Control test result of a subplot for air voids, or the average subplot density for coarse graded mixes does not meet the requirements of Table 334-5, the LOT will be automatically terminated and production of the mixture stopped until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test result in accordance with 334-9.4.

In the event that an individual Quality Control test result of a subplot for gradation ($P_{.8}$ or P_{-200}), or asphalt binder content does not meet the requirements of Table 334-5, take steps to correct the situation and report the actions to the Engineer.

In the event that two consecutive individual Quality Control test results for gradation ($P_{.8}$ and P_{-200}) or asphalt binder content do not meet the requirements of Table 334-5, the LOT will be automatically terminated and production of the mixture stopped until the

problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test result in accordance with 334-9.4.

334-8 Compensation.

334-8.1 Pay Factors for Small Quantities: In the event that two or less subplot test results are available for a LOT, Pay Factors (PF) will be determined based on Table 334-6, using the average of the accumulated deviations from the target value. (Deviations are absolute values with no plus or minus signs.) Pay Factors will be calculated for the following quality characteristics: density, air voids, asphalt binder content, percentage passing No. 200 [75 µm] sieve, and percentage passing No. 8 [2.36 mm] sieve. Use the 1-Test column when there is only one subplot and use the 2-Tests column when there are two subplots. Perform all calculations with the Department's Asphalt Plant - Pay Factor Worksheet (Excel spreadsheet). Table 334-6

Small Quantity Pay Table

Pay Factor	1-Test Deviation	2-Test Average Deviation
Asphalt Binder Content		
1.00	0.00-0.45	0.00-0.32
0.90	0.46-0.55	0.33-0.39
0.80	>0.55	>0.39
No. 8 [2.36 mm] Sieve		
1.00	0.00-4.50	0.00-3.18
0.90	4.51-5.50	3.19-3.89
0.80	>5.50	>3.89
No. 200 [75 :m] Sieve		
1.00	0.00-1.10	0.00-0.78
0.90	1.11-1.50	0.79-1.06
0.80	>1.50	>1.06
Air Voids		
1.00	0.00-1.10	0.00-0.78

Table 334-6 Small Quantity Pay Table

Pay Factor 1-Test Deviation 2-Test Average	1.11-1.50	0.79-1.06
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Deviation 0.90		
0.80	>1.50	>1.06
Density (Coarse Graded Mixtures) Note (1)		
1.00	≥ 93.50	≥ 93.50
0.95	93.00-93.49	93.00-93.49
0.90	Note (2)	Note (2)
Density (Fine Graded Mixtures) Note (1)		
1.00	≥ 92.00	≥ 92.00
0.95	91.00-91.99	91.00-91.99
0.90	90.00-90.99	90.00-90.99
0.80	< 90.00 Note (3)	< 90.00 Note (3)

Notes:

(1) Each density test result is the average of five cores.

(2) In the event that the density of a LOT is less than 93.00% of G_{mm} , assess the pavement's permeability in accordance with FM 5-565 by a laboratory as approved by the Engineer. If the coefficient of permeability is less than or equal to 125×10^{-5} cm/s, the pavement will be accepted with a Pay factor for density of 0.90. If the coefficient of permeability is greater than 125×10^{-5} cm/s, the Engineer may require removal and replacement at no cost or may accept the pavement with a Pay Factor for density of 0.90. The Contractor may remove and replace at no cost to the Department at any time.

(3) If approved by the Engineer, based on an engineering determination that the material is acceptable to remain in place, the Contractor may accept the indicated partial pay. Otherwise, the Department will require removal and replacement at no cost. The Contractor may remove and replace at no cost to the Department at any time.

334-8.2 Standard Deviation and Percent Within Specification Limits: When three or more subplot test results are available for a LOT, the variability-unknown, standard deviation method must be used to determine the estimated percentage of the LOT that is within specification limits. Pay Factors will be calculated for the following quality characteristics: density, air voids, asphalt binder content, percentage passing No. 200 [75 μ m] sieve, and percentage passing No. 8 [2.36 mm] sieve. The number of significant figures used in the calculations shall be in accordance with requirements of AASHTO R-11, Absolute Method. Perform all calculations with the Department's Asphalt Plant - Pay Factor Worksheet (Excel spreadsheet).

334-8.2.1 Percent Within Limits: Calculate the percent within limits (PWL) for the LOT as described below. Variables used in the calculations are as follows:

x = individual test value (subplot)

n = number of tests (sublots)

s = sample standard deviation

$\sum(x^2)$ = summation of squares of individual test values

$(\sum x)^2$ = summation of individual test values squared

Q_U = upper quality index

USL = upper specification limit (target value plus upper specification limit from Table 334-7)

Q_L = lower quality index

LSL = lower specification limit (target value minus lower specification limit from Table 334-7)

P_U = estimated percentage below the USL

P_L = estimated percentage above the LSL

(1) Calculate the arithmetic mean ($\bar{x}$) of the test values:

$$\bar{x} = \frac{\sum x}{n}$$

(2) Calculate the sample standard deviation (s):

$$s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$$

(3) Calculate the upper quality index (Q_U):

$$Q_U = \frac{USL - \bar{x}}{s}$$

(4) Calculate the lower quality index (Q_L):

$$Q_L = \frac{\bar{x} - LSL}{s}$$

(5) From Table 334-8, determine the percentage of work below the USL (P_U).

(6) From Table 334-8, determine percentage of work above the LSL (P_L) Note: If USL or LSL is not specified; percentages within (USL or LSL) will be 100.

(7) If Q_U or Q_L is a negative number, then calculate the percent within limits for Q_U or Q_L as follows: enter Table 334-8 with the positive value of Q_U or Q_L and obtain the corresponding percent within limits for the proper sample size. Subtract this number from 100.00. The resulting number is the value to be used in the next step (Step 8) for the calculation of quality level.

(8) Calculate the percent within limits (PWL) = $(P_U + P_L) - 100$

(9) Calculate the Pay Factor (PF) for each quality characteristic using the equation given in 334-8.2.2.

Table 334-7 Specification Limits	
Quality Characteristic	Specification Limits
Passing No. 8 [2.36 mm] sieve (%)	Target $\pm$ 3.1
Passing No. 200 [75 μ m] sieve (%)	Target $\pm$ 1.0
Asphalt Content (%)	Target $\pm$ 0.40
Air Voids (%)	4.00 $\pm$ 1.40
Density (% of G_{mm}):	
Coarse Mixes	94.50 $\pm$ 1.30
Fine Mixes (1)	93.00 + 2.00, - 1.00
Note (1): If the Engineer (or Contract Documents) limits compaction to the static mode only, the specification limits are as follows: 92.00 + 2.00, -1.00	

Table 334-8 Percent Within Limits					
Quality Index	Percent within Limits for Selected Sample Size				
	n = 3	n = 4	n = 5	n = 6	
0.00	50.00	50.00	50.00	50.00	
0.05	51.38	51.67	51.78	51.84	
0.10	52.76	53.33	53.56	53.67	
0.15	54.15	55.00	55.33	55.50	
0.20	55.54	56.67	57.10	57.32	
0.25	56.95	58.33	58.87	59.14	
0.30	58.37	60.00	60.63	60.94	
0.35	59.80	61.67	62.38	62.73	
0.40	61.26	63.33	64.12	64.51	
0.45	62.74	65.00	65.84	66.27	
0.50	64.25	66.67	67.56	68.00	
0.55	65.80	68.33	69.26	69.72	
0.60	67.39	70.00	70.95	71.41	
0.65	69.03	71.67	72.61	73.08	
0.70	70.73	73.33	74.26	74.71	
0.75	72.50	75.00	75.89	76.32	
0.80	74.36	76.67	77.49	77.89	
0.85	76.33	78.33	79.07	79.43	

0.90	78.45	80.00	80.62	80.93
0.95	80.75	81.67	82.14	82.39
1.00	83.33	83.33	83.64	83.80
1.05	86.34	85.00	85.09	85.18
1.10	90.16	86.67	86.52	86.50

Table 334-8					
Percent Within Limits					
Quality Index	Percent within Limits for Selected Sample Size				
	n = 3	n = 4	n = 5	n = 6	
1.15	97.13	88.33	87.90	87.78	
1.20	100.00	90.00	89.24	89.01	
1.25	100.00	91.67	90.54	90.19	
1.30	100.00	93.33	91.79	91.31	
1.35	100.00	95.00	92.98	92.37	
1.40	100.00	96.67	94.12	93.37	
1.45	100.00	98.33	95.19	94.32	
1.50	100.00	100.00	96.20	95.19	
1.55	100.00	100.00	97.13	96.00	
1.60	100.00	100.00	97.97	96.75	
1.65	100.00	100.00	98.72	97.42	
1.70	100.00	100.00	99.34	98.02	
1.75	100.00	100.00	99.81	98.55	
1.80	100.00	100.00	100.00	98.99	
1.85	100.00	100.00	100.00	99.36	
1.90	100.00	100.00	100.00	99.65	
1.95	100.00	100.00	100.00	99.85	
2.00	100.00	100.00	100.00	99.97	
2.05	100.00	100.00	100.00	100.00	
2.10	100.00	100.00	100.00	100.00	
2.15	100.00	100.00	100.00	100.00	
2.20	100.00	100.00	100.00	100.00	

2.25	100.00	100.00	100.00	100.00
2.30	100.00	100.00	100.00	100.00
2.35	100.00	100.00	100.00	100.00
2.40	100.00	100.00	100.00	100.00
2.45	100.00	100.00	100.00	100.00
2.50	100.00	100.00	100.00	100.00
2.55	100.00	100.00	100.00	100.00
2.60	100.00	100.00	100.00	100.00
2.65	100.00	100.00	100.00	100.00

334-8.2.2 Pay Factors (PF): Pay Factors will be calculated for the following quality characteristics: density, air voids, asphalt binder content, percentage passing No. 200 [75 µm] sieve, and percentage passing No. 8 [2.36 mm] sieve by using the following equation:

$$\text{Pay Factor} = (55 + 0.5 \times \text{PWL}) / 100$$

The PWL is determined from Step (8) of 334-8.2.1.

334-8.3 Composite Pay Factor (CPF): A Composite Pay Factor for the LOT will be calculated according to the following formula and the number after each multiplication shall be rounded to the nearest 0.01:

$$\text{CPF} = [(0.050 \times \text{PF No. 8 [2.36 mm]}) + (0.100 \times \text{PF No. 200 [75 µm]}) + (0.250 \times \text{PF AC}) + (0.250 \times \text{PF Air Voids}) + (0.350 \times \text{PF Density})]$$

Where the Pay Factor (PF) for each quality characteristic is determined in either 334-8.1 or 334-8.2, depending on the number of subplot tests.

The pay adjustment shall be computed by multiplying the Composite Pay Factor for the LOT by the bid price per ton [metric ton].

334-9 Low Pay Factor Material.

334-9.1 Pay Factors Below 0.90: In the event that an individual pay factor for any quality characteristic of a LOT falls below 0.90, take steps to correct the situation and report the actions to the Engineer. In the event that the pay factor for the same quality characteristic for two consecutive LOTs is below 0.90 or if the composite pay factor for the LOT falls below 0.90, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Actions taken must be approved by the Engineer before production resumes.

334-9.2 Composite Pay Factors Less Than 0.80 and Greater Than or Equal to 0.75: If the composite pay factor for the LOT is less than 0.80 and greater than or equal to 0.75, or if the LOT is terminated due to a failure to meet the master production range

defined in Table 334-5, address the failing material in accordance with 334-9.4.

334-9.3 Composite Pay Factors Less Than 0.75: If the composite pay factor for the LOT is less than 0.75, the failing LOT will be removed and replaced at no cost to the Department, or as approved by the Engineer.

334-9.4 Failing Material: Assume responsibility for removing and replacing all failing material placed on the project, at no cost to the Department.

As an exception to the above upon approval of the Engineer, obtain an engineering analysis by an independent laboratory (as approved by the Engineer) to determine if the material can:

- (a) can remain in place, with a composite pay factor as determined by 334-8, or
- (b) must be removed and replaced at no cost to the Department. The analysis will be a signed and sealed report by a Professional Engineer licensed in the State of Florida.

The Engineer may, at his sole option determine that an engineering evaluation is not necessary, or perform an engineering evaluation to determine if the material is suitable to:

- (a) remain in place with a composite pay factor as determined by 334-8 or
- (b) be removed and replaced at no cost to the Department.

334-10 Method of Measurement.

For the work specified under this Section (including the pertinent provisions of Sections 320 and 330), the quantity to be paid for will be the weight of the mixture, in tons [metric tons].

The bid price for the asphalt mix will include the cost of the liquid asphalt or the asphalt recycling agent and the tack coat application as directed in 300-8. There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix. For the calculation of unit price adjustments of bituminous material, the average asphalt content will be based on the percentage specified in 9-2.1.2. The weight will be determined as provided in 320-2 (including the provisions for the automatic recordation system).

Prepare a Certification of Quantities, using the Department's current approved form, for the certified Superpave asphalt concrete pay item. Submit this certification to the Engineer no later than Twelve O'clock noon Monday after the estimate cut-off or as directed by the Engineer, based on the quantity of asphalt produced and accepted on the Contract. The certification must include the Contract Number, FPID Number, Certification Number, Certification Date, period represented by Certification and the tons [metric tons] produced for each asphalt pay item.

334-11 Basis of Payment.

Price and payment will be full compensation for all the work specified under this Section (including the applicable requirements of Sections 320 and 330).

Payment will be made under:

Item No. 334- 1- Superpave Asphaltic Concrete - per ton.

Item No. 2334- 1- Superpave Asphaltic Concrete - per metric ton.

END OF SECTION

SECTION 3100 - CONCRETE FORMWORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The work included in this section consists of providing all labor, materials and equipment necessary for providing and installing formwork for concrete.
- B. Related Work Described Elsewhere:
 - 1. Section 03200 - Concrete Reinforcement
 - 2. Section 03300 - Cast-in-Place Concrete
- C. General Design: The Contractor shall be responsible for the design of all formwork and for safety in its construction, use and removal.

1.02 QUALITY ASSURANCE

- A. Qualifications: Formwork shall be constructed in accordance with the specified standards, as well as all pertinent codes and regulations. Where provisions of pertinent codes conflict with the requirements of this section of these specifications, the more stringent provisions shall govern.
- B. Standards: Unless otherwise indicated, all materials, workmanship and practices shall conform to the following standards:
 - 1. Standard Building Code
 - 2. ACI 347 "Recommended Practice for Concrete Formwork".
 - 3. Local codes and regulations

1.03 SUBMITTALS

- A. Materials: Submit manufacturer's literature on form ties, spreaders, corner formers, form coatings and bond breakers.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Form Lumber: Use form lumber when in contact with exposed concrete, conforming to one of the following, a combination thereof, or equivalent as approved by the Engineer.
 - 1. Lumber: Douglas Fir-Larch No. 2 grade, seasoned, surfaced on four sides.
 - 2. Plywood: "Plyform", Class I or II, bearing the label of the Douglas Plywood Association. (Minimum 3/4-inch thickness)
- B. Form Ties: Use form ties which do not leave an open hole through the concrete and which permit neat and solid patching at every hole. Use embedded rods with integral waterstops and cones to provide a 1-inch breakback. Wire ties and wood spreaders will not be permitted.
- C. Form Coatings: Form release coating shall be a paraffin base oil or mineral oil coating which effectively prevents absorption of moisture, prevents bonding with concrete, is non-staining to concrete and leaves the concrete with a paintable surface.
- D. Chamfer Strips: Chamfer strips shall be polyvinyl strips or approved equal, designed to be nailed in the forms to provide a 1-inch chamfer (unless indicated otherwise) at exposed edges of concrete members.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Construction of Formwork: Forms shall be sufficiently strong to withstand the pressure resulting from the placement and vibration of concrete and shall be sufficiently rigid to maintain specified tolerances. Forms shall be sufficiently tight to prevent loss of mortar, and shall be adequately braced against lateral, upward or downward movement.
- B. Coating of Forms: Apply form coating to board forms prior to placing reinforcing. Keep form coatings off steel reinforcing, items to be embedded and previously placed concrete.
- C. Form Erection:

1. Provide a means of holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects of the finished concrete. Insure that forms may be removed without injury to the surface of the finished concrete.
 2. Provide a positive means of adjustment of shores and struts. Insure that all settlement is taken up during concrete placing.
 3. Temporary openings shall be provided in wall forms to limit the free fall of concrete to a maximum of 6 feet unless an elephant trunk is used. Such openings shall be located to facilitate placing and consolidation and shall be spaced no more than 8 feet apart. Temporary openings shall also be provided in the bottom of wall and column forms and elsewhere as necessary to facilitate cleaning and observation immediately prior to placing.
 4. Do not embed any form-tying device or part thereof other than metal in concrete.
 5. Form surfaces of concrete members except where placement of the concrete against the ground is shown on the drawings. The dimensions of concrete members shown on the drawings apply to formed surfaces, except where otherwise indicated.
- D. Form Reuse: Reuse only forms which maintain a uniform surface texture on exposed concrete surfaces. Apply light sanding between uses to obtain such a uniform texture. Plug unused tie rod holes with corks, shave flush, and sandpaper on the concrete surface side.
- E. Removal of Forms:
1. Forms and shoring for elevated structural slabs, girders, and/or beams shall remain in place until the concrete has reached a compressive strength equal to the specified 28-day compressive strength as determined by test cylinders. Do not remove supports and reshore. The following table indicates the minimum allowable time after the last concrete is placed before forms, shoring, and/or bracing may be removed.

<u>Structural Item</u>	<u>Minimum Allowable Time</u>
Bottom side of slabs, girders, beams	When concrete reaches specified 28-day compressive strength
Vertical sides of girders, beams	48 hours
Walls not supporting vertical or horizontal loads	48 hours
Walls supporting vertical or horizontal	When concrete reaches specified 28-day compressive strength
Footings, pipe encasements, pipe supports	24 hours

2. Do not remove forms from concrete that have been placed with outside air temperature below 50°F without first determining if the concrete has properly set without regard for time. Do not apply heavy loading on green concrete. Immediately after forms are removed, the surface of the concrete shall be carefully examined and any irregularities in the surface shall be repaired and finished as specified.

- F. Formed Openings: Openings shall be of sufficient size to permit final alignment of the items within it without deflection or offsets of any kind and to allow space for packing where the items pass through the wall to ensure water tightness around openings so formed. Provide openings with continuous keyways with waterstops where required, and provide a slight flare to facilitate grouting and the escape of entrained air during grouting. Provide formed openings with reinforcement as indicated and specified. Reinforcing steel shall be at least 2 inches clear from the opening.
- G. Embedded Items: Set anchor bolts and other embedded items accurately and hold securely in position in the forms until the concrete is placed and set. Check all special castings, channels, or other metal parts that are to be embedded in the concrete prior to and again after concreting. Check all nailing, blocks, plugs and strips necessary for the attachment of trim, finish and similar work prior to concreting.
- H. Pipes and Wall Spools Cast in Concrete:

1. Install wall spools, wall flanges and wall anchors before placing concrete. Do not weld, tie or otherwise connect the wall spools to the reinforcing steel.
2. Support pipe and fabricated fittings to be encased in concrete on concrete piers or pedestals. Carry concrete supports to firm foundations so that no settlement will be possible during construction.

I. Form Tolerances:

1. Failure of the forms to produce the specified concrete surface tolerance shall be grounds for rejection of the concrete work. Rejected work shall be repaired or replaced at no cost to the Owner.
2. The following table indicates tolerances or allowable variations from dimensions or positions of structural concrete work:

	<u>Maximum Tolerance</u>
Sleeves and Inserts	+1/4" to -1/4"
Projected ends of anchors	+1/4" to -0.0"
Anchor bolt setting	+1/4" to -1/4"
Finished concrete, all locations	+1/4" to -1/4" in 10-feet of length

The planes or axes from which the above tolerances are to be measured shall be as follows:

Sleeves and Inserts	Centerline of sleeve or insert
Projected ends of anchors	Plane perpendicular to the end of the anchor as located on the drawings
Anchor bolt setting	Centerline of anchor bolts
Finish concrete	The concrete surface as located on the drawings

3. Where equipment is to be installed, comply with manufacturer's tolerances if more severe than above.

END OF SECTION

SECTION 3200 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: The work included in this Section consists of providing reinforcing steel and welded wire mesh for cast-in-place or precast concrete structures.
- B. Related Work:
 - 1. Concrete Formwork: Section 03100
 - 2. Cast-In-Place Concrete: Section 03300

1.02 QUALITY ASSURANCE

- A. Standards: Unless otherwise indicated, all materials, workmanship and practices shall meet all requirements of the current editions of the following standards:
 - 1. Standard Building Code.
 - 2. ACI 318 Building Code Requirements for Reinforced Concrete.
 - 3. ACI 315 Details and Detailing of Concrete Reinforcement.
 - 4. CRSI Manual of Standard Practice, MSP-2.

1.03 SUBMITTALS

- A. Complete shop drawings shall be submitted for approval, including bar lists and placing drawings. Drawings shall show the type, spacing and location of metal bar supports, the grade of the reinforcing and the name of the manufacturer. The type of coupler splice devices shall be designated.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reinforcing Bars: ASTM A615, Grade 60, deformed bars of a USA manufacturer.

- B. Welded Wire Fabric: ASTM A185, galvanized.
- C. Metal Bar Supports: CRSI MSP-2, Chapter 3, Class 2, Type B, Stainless Steel Protected Bar Supports.
- D. Coupler Splice Devices: Cadweld, tension couplers capable of developing the ultimate strength of the bar, as manufactured by Erico Products, Incorporated, Solon, Ohio, or equal and where approved by the Engineer.

2.02 FABRICATION

- A. Fabrication shall not begin until the approval of the shop drawings by the Engineer has been received. Fabrication shall meet all requirements of the specified standards. Unless otherwise indicated, the following shall apply:
 - 1. Hooks shall be standard hooks.
 - 2. Bottom bars shall extend a minimum of 6 inches into supporting members.
 - 3. Cover is to the outermost stirrup, tie or bar.
 - 4. Splices are permitted only where indicated on the Drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Supporting Reinforcing: Bar supports shall be provided as required by CRSI MSP-2 and AC1315. Top and bottom bars in slabs formed on earth shall be supported on precast concrete block supports except where such bars are properly supported from formwork. Precast concrete block supports are not required in slabs formed on tremie concrete but may be used at the Contractor's option.
- B. Placing Reinforcing: Placing of reinforcing and welded wire fabric shall be as indicated on the Drawings and as recommended by CRSI MSP-2 and ACI 315. Reinforcing shall be securely tied and supported to prevent displacement during concrete placement.
- C. Welded Wire Fabric: Splices in welded wire fabric shall be such that the overlap between outermost cross wires of each fabric sheet is not less than the spacing of the cross wires, plus 2 inches. Fabric shall not be

extended through expansion joints or construction joints in slabs on grade except as otherwise indicated.

- D. Coupler Splice: Unless indicated on the Drawings or where conventional lap splices cannot be achieved, full positive tension connections shall be provided. Such devices shall be installed in accordance with the recommendations of the manufacturer.
- E. Dowels: Dowels shall be wired in position prior to placing concrete.
- F. Field Bending: Heat shall not be used to bend bars. Bars shall not be bent after being embedded in concrete.
- G. Welding: Welding of reinforcing will not be permitted.
- H. Place reinforcement a minimum of 2 inches clear of any metal pipe or fittings.

END OF SECTION

SECTION 3300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: The work included in this Section consists of providing cast-in-place concrete.
- B. Related Work Described Elsewhere:
 - 1. Concrete Formwork: Section 03100
 - 2. Concrete Reinforcement: Section 03200

1.02 QUALITY ASSURANCE

- A. Standards: Unless otherwise indicated, all materials, workmanship and practices shall conform to the requirements of the following standards:
 - 1. Standard Building Code
 - 2. Local Codes and Regulations
 - 3. ACI 318-83, Building Code Requirements for Reinforced Concrete
- B. Plant Qualification: Plant equipment and facilities shall meet all requirements of the Check List for Certification of Ready Mixed Concrete Production Facilities of the National ready Mixed Concrete Association and ASTM C 94.
- C. Evaluation and Acceptance of Concrete: Evaluation and acceptance of concrete will be in accordance with ACI-318, Chapter 4.

1.03 SUBMITTALS

- A. Materials and Shop Drawings: The following information shall be submitted for approval. No concrete shall be furnished until submittal has been approved.
 - 1. Plant Qualification: Satisfactory evidence shall be submitted indicating
 - 2. Materials: Satisfactory evidence shall be submitted indicating that materials to be used, including cement, aggregates and admixtures meet the specified requirements.

3. Design Mix: The design mix to be used shall be prepared by qualified persons and submitted for approval. Submit affidavit as to design mix performance over the preceding six months. The design of the mix is the responsibility of the Contractor subject to the limitations of the Specifications. Approval of this submission will be required only as minimum requirements of the Specifications have been met. Such approval will in no way alter the responsibility of the contractor to furnish concrete meeting the requirements of the Specifications relative to strength and slump.
4. Ready Mix Concrete: Provide delivery tickets or weighmasters certificate per ASTM C 94, including weights of cement and each size aggregate, amount of water in the aggregate, and amount of water added at the plant. Write in the amount of water added on the job.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement:

1. Cement for all concrete shall be domestic Portland cement that conforms to the requirements of ASTM Designation C 150 Type I, Type II or Type III. All sanitary sewer manholes, wet wells, pumping stations, tanks and structures exposed to wastewater shall be constructed with Type II cement. Type III cement for high early strength concrete shall be used only for special locations and only with the approval of the Engineer. Type I cement may be used for buildings and tremie concrete.
2. Only one brand of cement shall be used in any individual structure unless approved by the Engineer. Cement which has become damaged, partially set, lumpy or caked shall not be used and the entire contents of the sack or container which contains such cement will be rejected. No salvaged or reclaimed cement shall be used.
3. Fly Ash shall not be used in either Class A or Class B concrete.

B. Aggregates:

1. ASTM C 33. Coarse aggregates shall be size No. 57. Block cell fill shall be size No. 89.

2. In addition to requirements of ASTM C 33 for structures exposed to wastewater, the following shall apply:
 - a. Soft particles: 2.0 percent
 - b. Chert as a soft impurity (defined in Table 3 of ASTM C 33): 1.0 percent
 - c. Total of soft particles and chert as a soft impurity: 2.0 percent
 - d. Flat and elongated particles (long dimension more than 5 times short dimension): 15.0 percent
- C. Water: Clean and free from injurious amounts of deleterious materials.
- D. Air Entraining Admixture: ASTM C 260.
- E. Water Reducing and Retarding Admixture: ASTM C 494, Type D. Admixture shall not contain calcium chloride.
- F. Epoxy Bonding Agent: Sikastix 370, Sikadur Hi Mod, Concresive 1001-LPL or approved equal.

2.02 MIXES

- A. General Requirements:
 1. Mix Design: Proportioning shall be on the basis of field experience and/or trial mixtures as specified in ACI 318, Section 4.3. Data on consecutive compression tests and standard deviation shall be submitted. Proportioning for small structures may be by the water/cement ratio under special approval by the Engineer. Concrete mix design shall comply with the Standard Building Code requirements.
 2. Air Content: 5 percent plus or minus 1 percent (Class A and B).
 3. Slump: 4 inches plus or minus 1 inch.
8 inches plus or minus 1 inch for tremie concrete.
 4. Water cement ratio = 0.45 maximum (all concrete exposed to hydrostatic loading), 0.50 maximum (all other concrete).

5. Minimum Compressive Strength at 28 days:

- | | | |
|----|--------------------|---|
| a. | Class A, 4,000 psi | Wastewater structures inclusive of tanks, ditches, pumping stations, tremie concrete and other structures in contact with treated waters. |
| b. | Class B, 3,000 psi | Building structures, encasements, thrust blocks, and pipe supports, etc. not in contact with treated waters. |

B. Production of Concrete:

1. General: Concrete shall be ready mixed and shall be batched, mixed and transported in accordance with ASTM C 94, except as otherwise indicated.
2. Air Entraining Admixture: Air entraining admixture shall be charged into the mixture as a solution and shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water.
3. Water Reducing and Retarding Admixture: Water reducing and retarding admixture shall be added and measured as recommended by the manufacturer. The addition of the admixture shall be separate from the air entraining admixture. The addition of the admixture shall be completed within one minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first. Admixtures shall be stored, handled and batched in accordance with the recommendations of ACI 68.

C. Delivery Tickets: In addition to the information required by ASTM C 94, delivery tickets shall indicate the cement content and the water/cement ratio.

D. Temperatures: The temperature of the concrete upon delivery from the truck shall not exceed 90°F.

E. Modifications To The Mix: No modifications to the mix shall be made in the plant or on the job which will decrease the cement content or increase the water-cement ratio beyond that specified. No modifications of any kind shall be made except by a qualified and responsible representative of the concrete producer.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Preparations Before Placing: No concrete shall be placed until the approval of the Engineer has been received. Approval will not be granted until forms are thoroughly clean, and reinforcing and all other items required to be set in concrete have been placed and thoroughly secured. The Engineer shall be notified a minimum of 24 hours before concrete is placed.
- B. Conveying:
 - 1. General: Concrete shall be handled from the truck to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients to maintain the quality of the concrete. No concrete shall be placed more than 90 minutes after mixing has begun for that particular batch.
 - 2. Buckets and Hoppers: Buckets and hoppers shall have discharge gates with a clear opening equal to no less than one-third of the maximum interior horizontal area, or five times the maximum aggregate size being used. Side slopes shall be no less than 60 degrees. Controls on gates shall permit opening and closing during the discharge cycle.
 - 3. Runways: Extreme care shall be exercised to avoid displacement of reinforcing during the placing of concrete.
 - 4. Elephant Trunks: Hoppers and elephant trunks shall be used to prevent the free fall of concrete for more than 6 feet.
 - 5. Chutes: Chutes shall be metal or metal lined, and shall have a slope not exceeding one vertical to two horizontal, and not less than one vertical to three horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements, may be used only if they discharge into a hopper before distribution.
 - 6. Pumping Equipment: Pumping equipment and procedures, if used, shall conform to the recommendations contained in the report of ACI Committee 304 on "Placing Concrete by Pumping Methods," ACI 304.2R-71. The specified slump shall be measured at the point of discharge. The loss of slump in pumping shall not exceed 1-1/2 inches.

7. Conveying equipment Construction: Aluminum or aluminum alloy pipe for tremies or pump lines and chutes, except for short lengths at the truck mixer shall not be permitted.
8. Cleaning: Conveying equipment shall be cleaned at the end of each concrete operation.

3.02 APPLICATION

A. Placing:

1. General: Concrete shall be deposited continuously, or in layers of such thickness (not exceeding 2 feet in depth) that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness.
2. Supported Elements: At least two hours shall elapse after depositing concrete in columns or walls before depositing in beams, girders, or slabs supported thereon.
3. Segregation: Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concrete shall not be subjected to procedures which will cause segregation.
4. Concrete Under Water: All concrete, except that indicated on the Drawings as Tremie concrete, shall be placed in the dry.

B. Seals and Tremie Concrete:

1. General:
 - a. Wherever practicable, all foundation excavations shall be dewatered and the concrete deposited in the dry. Where conditions are encountered which render it impracticable to dewater the foundation before placing concrete, a concrete foundation seal shall be placed. The foundation shall then be dewatered, and the balance of the concrete placed in the dry.
 - b. When seal concrete is required to be placed, the satisfactory performance of the seal in providing a watertight excavation for placing structural concrete shall be the responsibility of the Contractor. Seal concrete placed by the Contractor, which subsequently fails to perform properly, shall be

repaired as necessary to perform its required function, at the expense of the Contractor.

2. **Method of Placing:** Concrete deposited under water shall be carefully placed in the space in which it is to remain by means of a tremie, a closed-bottom dump bucket of not less than one cubic yard capacity, or other approved method, and shall not be disturbed after it is deposited. All seal concrete shall be deposited in one continuous pour. No concrete shall be placed in running water. All form work designed to retain concrete under water shall be watertight, and the design of the form work and excavation sheeting shall be by a Professional Engineer, registered in the State of Florida.
3. **Use of Tremie:** The tremie shall consist of a tube having a minimum inside diameter of ten inches, and shall be constructed in sections having tight joints. No aluminum parts which have contact with the concrete will be permitted. The discharge end shall be entirely seated at all times, and the tremie tube kept full to the bottom of the hopper. When a batch is dumped into the hopper, the tremie shall be slightly raised (but not out of the concrete at the bottom) until the batch discharges to the bottom of the hopper, after which the flow shall be stopped by lowering the tremie. The means of supporting the tremie shall be such as to permit the free movement of the discharge end over the entire top surface of the work, and shall permit it being lowered rapidly when necessary to choke off or retard the flow. The flow shall preferably be continuous, and in no case shall be interrupted until the work is completed. Special care shall be exercised to maintain still water at the point of deposit.
4. **Use of Bottom-dump Bucket:** When the concrete is placed by means of a bottom-dump bucket, the bucket shall be lowered gradually and carefully until it rests upon the concrete already placed. The bucket shall then be raised very slowly during the discharge travel; the intent being to maintain, as nearly as possible, still water at the point of discharge and to avoid agitating the mixture. Aluminum buckets will not be permitted.
5. **Time of Beginning Pumping:** Pumping to dewater a sealed cofferdam shall not commence until the seal has set sufficiently to withstand the hydrostatic pressure, and in no case earlier than 72 hours after placement of the concrete.

C. Consolidating Concrete:

1. General: Concrete shall be consolidated by means of internal vibrators operated by competent workmen.
 2. Vibrators: Vibrators shall have a minimum head diameter of at least 2 inches, a minimum centrifugal force of 700 pounds and a minimum frequency of 8,000 vibrators per second.
 3. Vibrators for Confined Areas: In confined areas, the specified vibrators shall be supplemented by others having a minimum head diameter of 1-1/2 inches, a minimum centrifugal force of 300 pounds and a minimum frequency of 9,000 vibrations per second.
 4. Spare Vibrator: One spare vibrator for each three in use shall be kept on the site during all concrete placing operations.
 5. Use of Vibrators: Vibrators shall be inserted and withdrawn at points approximately 18 inches apart. The duration of each insertion shall be from 5 to 15 seconds. Concrete shall not be transported in the forms by means of vibrators.
- D. Protection: Rainwater shall not be allowed to increase the mixing water, nor to damage the surface finish. Concrete shall be protected from construction overloads. Design loads shall not be applied until the specified strength has been attained.

3.03 CONCRETE FINISHING AND CURING

- A. All slabs exposed to view shall receive a steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage.
- B. All other slabs and footings shall receive a smooth steel trowel finish.
- C. All walls of structures or parts of buildings exposed to view shall receive the following finish. Repair defective concrete, remove fins, fill depressions 1/4-inch or deeper, and fill tie holes. In addition, any surface not receiving a special applied finish, shall receive a slurry finish consisting of one part cement and one and one-half parts sand by damp loose volume. Dampen surfaces and then apply the slurry with clean burlap pads or sponge rubber floats. Remove any surplus by scraping and then rubbing with clean burlap. Surfaces which will receive a special applied finish shall be of even color, have no pits, pockets, holes, or sharp changes of surface elevation. Scrubbing with a stiff bristle fiber brush shall produce no dusting or dislodging of cement or sand.

- D. All concrete shall be wet cured a minimum of 7 days; or if not to receive special finishes, coatings or concrete toppings, an Engineer approved curing compound may be utilized.
- E. All surface defects shall be repaired by removing defective concrete down to sound concrete and repairing with patching mortar. Finished repair shall match adjacent concrete and be cured as specified.

3.04 TESTING

- A. A testing laboratory approved by the Owner will make such tests as are deemed advisable. The Contractor shall pay for all tests. The Contractor shall keep the laboratory informed of his schedule.
- B. Standard laboratory compressive test cylinders will be obtained by the laboratory when concrete is discharged at the point of placing (i.e., discharge end of pumping equipment), and cylinders will be made and cured in accordance with the requirements of ASTM Designation C 31. A set of 4 cylinders will be obtained for each 50 cubic yards or fraction thereof placed each day, for each type of concrete. The cylinders will be cured under laboratory conditions and will be tested at 7 and 28 days of age, respectively, in accordance with the requirements of ASTM Designation C 39.
- C. The testing laboratory will make slump tests of Class A and Class B concrete as it is discharged from the mixer at the point of placing. Slump tests will be made for each 25 cubic yards or "pour" of concrete placed. Slump tests may be made on any batch, and failure to meet specified slump requirements will be sufficient cause for rejection of that batch.

END OF SECTION

SECTION 425 - INLETS, MANHOLES, AND JUNCTION BOXES

425-1 Description.

Construct drop inlets, manholes, junction boxes, shoulder gutter inlets, and yard drains from reinforced concrete. Brick masonry may be used if the structure is circular and constructed in place. Furnish and install the necessary metal frames and gratings. Also, adjust those structures shown in the plans to be adjusted or which are required to be adjusted for the satisfactory completion of the work.

425-2 Composition and Proportioning.

425-2.1 Concrete: Use Class I concrete, as specified in Sections 346 and 347.

425-2.2 Mortar: For brick masonry, make the mortar by mixing one part portland cement to three parts sand. Miami Oolitic rock screenings may be substituted for the sand, provided the screenings meet the requirements of 902-5.2.3 except for gradation requirements. Use materials passing the No. 8 [2.36 mm] sieve that are uniformly graded from coarse to fine. Hydrated lime may be added to the mortar in an amount not to exceed 10% of the amount of cement.

Masonry cement may be used in lieu of the above-specified mortar provided it is delivered in packages properly identified by brand name of manufacturer, net weight of package, and whether it is Type 1 or Type 2, and further provided that it has not been in storage for a period greater than six months. Do not use hydrated lime with masonry cement.

425-3 Materials.

425-3.1 General: Meet the following requirements:

Sand (for mortar).....	902-3.2
Portland Cement.....	Section 921
Hydrated Lime	Section 922
Water.....	Section 923
Reinforcing Steel.....	931-1.1 and 415-3
Inlet and Outlet Pipe.....	Sections 941, 943, 945 and 946
Brick and Concrete Masonry Units	Section 949
Castings for Frames and Gratings	962-8

425-3.2 Gratings: Use gratings and frames fabricated from structural steel galvanized in accordance with the requirements of ASTM A 123, or painted, meeting the requirements of 971-8. Use the Qualified Products List to determine the number of dip coats to apply and the thickness of each coat. Apply a black finish coat (Color No. 17038, Federal Standard 595A). Prior to painting, clean the

steel in accordance with the Steel Structures Painting Council Surface Preparation Specifications, SSPC-SP2 or SSPC-SP7. All paint may be applied in the shop, by dipping, provided that the first coat application is thoroughly dry before applying the second coat. Do not follow the requirements of this Subarticle when using ASTM A 588 steel.

425-4 Forms.

Design and construct wood or metal forms so that they may be removed without injuring the concrete. Build forms true to line and grade and brace them in a substantial and unyielding manner. Obtain the Engineer's approval before filling them with concrete.

425-5 Precast Inlets, Manholes, and Junction Boxes.

Precast inlets, manholes and junction boxes, designed and fabricated in accordance with the plans, may be substituted for cast-in-place units.

Smooth welded wire fabric may be substituted for deformed re-bar or welded deformed wire reinforcement in non-circular precast drainage structures provided the following requirements are met:

1. The smooth welded wire fabric complies with ASTM A 185.
2. Substitution of equal areas of smooth wire fabric for the reinforcing steel and provided the width and length of the unit is four times the width of the spacing of the cross wires.
3. Wire is continuous around the box and spliced at a quarter point of one side with an overlap of not less than the spacing of the cross wires plus 2 inches [50 mm].

425-6 Construction Methods.

425-6.1 Excavation: Excavate as specified in Section 125. Where unsuitable material for foundations is encountered, excavate the unsuitable material and backfill with suitable material prior to constructing or setting inlets, manholes and junction boxes.

As an option to the above and with the Engineer's approval, the Contractor may carry the walls down to a depth required for a satisfactory foundation, backfill to 8 inches [200 mm] below the flowline with clean sand and cast a non-reinforced 8 inch [200 mm] floor.

425-6.2 Placing and Curing Concrete: Place the concrete in the forms, to the depth shown in the plans, and thoroughly vibrate it. After the concrete has hardened sufficiently, cover it with suitable material and keep it moist for a period

of three days. Finish the traffic surface in accordance with 522-7.2, or with a simulated broom finish approved by the Engineer.

425-6.3 Setting Manhole Castings: After curing the concrete as specified above, set the frame of the casting in a full mortar bed composed of one part portland cement to two parts of fine aggregate.

425-6.4 Reinforcing Steel: Follow the construction methods for the steel reinforcement as specified in Section 415.

425-6.5 Laying Brick: Saturate all brick with water before laying. Bond the brick thoroughly into the mortar using the shovejoint method to lay the brick. Arrange headers and stretchers so as to bond the mass thoroughly. Finish the joints properly as the work progresses and ensure that they are not less than 1/4 inch [6 mm] or more than 3/4 inch [19 mm] in thickness. Do not use spalls or bats except for shaping around irregular openings or when unavoidable at corners.

425-6.6 Placing Pipe: Construct inlet and outlet pipes of the same size and kind as the connecting pipe shown in the plans. Extend the pipes through the walls for a distance beyond the outside surface sufficient for the intended connections, and construct the concrete around them neatly to prevent leakage along their outer surface. Keep the inlet and outlet pipes flush with the inside of the wall. Resilient connectors as specified in 942-3 may be used in lieu of a masonry seal.

425-6.7 Backfilling: Backfill as specified in Section 125, meeting the specific requirements for backfilling and compaction around inlets, manholes, and junction boxes detailed in 125-8.1 and 125-8.2. However, for outfall lines beyond the sidewalk or future sidewalk area, where no vehicular traffic will pass over the pipe, inlets, manholes, and junction boxes, compact backfill as required in 125-8.3.

425-6.8 Adjusting 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, or if outside 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.

425-7 Method of Measurement.

The quantities to be paid for will be (1) the number of inlets, manholes, junction boxes, and yard drains, completed and accepted; and (2) the number of structures of these types (including also valve boxes and monument boxes) satisfactorily adjusted.

425-8 Basis of Payment.

425-8.1 New Structures: Price and payment will be full compensation for furnishing all materials and completing all work described herein or shown in the plans, including all clearing and grubbing outside the limits of clearing and grubbing as shown in the plans, all excavation except the volume included in the measurement designated to be paid for under the items for the grading work on the project, all backfilling around the structures, the disposal of surplus material, and the furnishing and placing of all gratings, frames, covers, and any other necessary fittings.

425-8.2 Adjusted Structures: When an item of payment for adjusting manholes, valve boxes, inlets, or monument boxes is provided in the proposal, price and payment will be full compensation for the number of such structures designated to be paid for under such separate items, and which are satisfactorily adjusted, at the Contract unit prices each for Adjusting Inlets, Adjusting Manholes, Adjusting Valve Boxes and Adjusting Monument Boxes.

For any of such types of these structures required to be adjusted but for which no separate item of payment is shown in the proposal for the specific type, payment will be made under the item of Adjusting Miscellaneous Structures.

425-8.3 Payment Items: Payment will be made under:

Item No. 425- 1	Inlets - each.
Item No. 2425- 1	Inlets - each.
Item No. 425- 2	Manholes - each.
Item No. 2425- 2	Manholes - each.
Item No. 425- 3	Junction Boxes - each.
Item No. 2425- 3	Junction Boxes - each.

Item No. 425- 4	Adjusting Inlets - each.
Item No. 2425- 4	Adjusting Inlets - each.
Item No. 425- 5	Adjusting Manholes - each.
Item No. 2425- 5	Adjusting Manholes - each.
Item No. 425- 6	Adjusting Valve Boxes - each.
Item No. 2425- 6	Adjusting Valve Boxes - each.
Item No. 425- 7	Adjusting Monument Boxes - each.
Item No. 2425- 7	Adjusting Monument Boxes - each.
Item No. 425- 8	Adjusting Miscellaneous Structures - each.
Item No. 2425- 8	Adjusting Miscellaneous Structures - each.
Item No. 425- 9	Shoulder Gutter Inlets - each.

Item No. 2425- 9 Shoulder Gutter Inlets - each.
Item No. 425- 10 Yard Drains - each.
Item No. 2425- 10 Yard Drains - each.

SECTION 430 - PIPE CULVERTS AND STORM SEWERS

430-1 Description.

Furnish and install drainage pipe and mitered end sections at the locations called for. Also, furnish and construct such joints and connections to existing pipes, catch basins, inlets, manholes, walls, etc., as may be required to complete the work.

Construct structural plate pipe culverts, underdrains, or roof drains; under Sections 435, 440, and 445, respectively.

430-2 Materials.

430-2.1 Pipe: Meet the following requirements:

Concrete Pipe	Section 941
Round Rubber Gaskets.....	Section 942
Corrugated Steel Pipe and Pipe Arch	Section 943
Corrugated Aluminum Pipe and Pipe Arch.....	Section 945
Cast Iron Pipe.....	Section 946
Corrugated Polyethylene Pipe	Section 948
Polyvinyl Chloride (PVC) Pipe.....	Section 948
Do not use bituminized-fiber pipe.	

430-2.2 Joint Materials: Use joint materials as specified in 430-7 through 430-11 for the particular type of pipe and conditions of usage as specified.

430-2.3 Mortar: Use mortar composed of one part portland cement and two parts of clean, sharp sand, for sealing joints in concrete and cast iron pipe, to which mixture the Contractor may add hydrated lime in an amount not to exceed 15% of the cement content. The Contractor need not test the cement, the hydrated lime, or the sand used in the mortar in accordance with Section 346, provided the cement and the hydrated lime are products of the type and quality appropriate for this work as determined by the Engineer, and the sand is a clean commercial sand approved by the Engineer. Use mortar within 30 minutes after its preparation.

430-3 Type of Pipe to Be Used.

The type or types of pipe to be used will be designated in the plans with the following exception:

Use either concrete pipe (at least Class I), corrugated steel pipe, corrugated aluminum pipe, corrugated polyethylene pipe or PVC pipe, for side drains.

430-4 Laying Pipe.

430-4.1 General: Lay all pipe, true to the lines and grades given, with hubs upgrade and tongue end fully entered into the hub. When pipe with quadrant reinforcement, or circular pipe with elliptical reinforcement, is used, install the pipe in a position such that the manufacturer's marks designating "top" and "bottom" of the pipe are not more than five degrees from the vertical plane through the longitudinal axis of the pipe. Take up and relay any pipe that is not in true alignment or which shows any settlement after laying at no additional expense to the Department.

Repair lift holes, if present, by use of a hand-placed, stiff, non-shrink, 1-to-1 mortar of cement and fine sand, after first washing out the hole with water. Completely fill the void created by the lift hole with mortar. Cover the repaired area with a 24 by 24 inch [600 by 600 mm] piece of filter fabric secured to the pipe. Use a Class D filter fabric meeting the requirements shown on Roadway and Traffic Standard Index 199.

Secure the filter fabric to the pipe using a method that holds the fabric in place until the backfill is placed and compacted. Use a grout mixtures, mastics, or strapping devices to secure the fabric to the pipe.

Test plastic and metal pipe larger than 36 inches [900 mm] in diameter to verify that pipe deflection does not exceed 5%. Provide test and testing equipment at no additional expense to the Department. Obtain the Engineer's approval for all testing devices and test methods. The Engineer will supervise the test.

The following minimum joint performance standards apply:

Pipe Application	Minimum Standard
Cross Drains	Soil-tight
Storm Drains	Soil-tight
Gutter Drain	Water-tight
Side Drains	Soil-tight

430-4.2 Trench Excavation: Excavate the trench for pipe culverts and storm sewers as specified in Section 125.

430-4.3 Foundation: Provide a suitable foundation, where the foundation material is of inadequate supporting value, as determined by the Engineer. Remove the unsuitable material and replace it with suitable material, as specified in 125-8. Where in the Engineer's opinion, the removal and replacement of unsuitable material is not practicable, he may direct alternates in the design of the pipe line, as required to provide adequate support. Minor changes in the grade or alignment will not be considered as an adequate basis for extra compensation.

Do not lay pipe on blocks or timbers, or on other unyielding material, except where the use of such devices is called for in the plans.

430-4.4 Backfilling: Backfill around the pipe as specified in 125-8 unless specific backfilling procedures are described in the Contract Documents.

430-4.5 Plugging Pipe: When shown in the plans, seal the ends of the pipe culverts with a masonry plug a minimum of 8 inches [200 mm] in thickness, or by an approved prefabricated pipe plug listed on the Qualified Products List. Install the prefabricated pipe plug in accordance with the manufacturer's instructions.

430-4.6 End Treatment: Place an end treatment at each cross drain, side drain, or storm sewer pipe end as shown in the plans. Refer to the Roadway and Traffic Design Standards for types of end treatment details.

As an exception to the above, when concrete mitered end sections are permitted, the Contractor may use reinforced concrete U-endwalls, if shop drawings are submitted to the Engineer for approval prior to use.

Provide end treatments for corrugated polyethylene pipe and PVC pipe as specified in 948-1.7 and 948-2.3, respectively, or as detailed in the plans.

430-4.7 Metal Pipe Protection: Apply a bituminous coating to the surface area of the pipe within and 12 inches [300 mm] beyond the concrete or mortar seal prior to sealing, to protect corrugated steel or aluminum pipe embedded in a concrete structure, such as an inlet, manhole, junction box, endwall, or concrete jacket.

Ensure that the surface preparation, application methods (dry film thickness and conditions during application), and equipment used are in accordance with the coating manufacturers' published specifications.

Obtain the Engineer's approval of the coating products used.

430-5 Removing and Relaying Existing Pipe.

430-5.1 Removal: If the plans indicate that existing pipe is to remain the property of the Department, collect and stack along the right-of-way all existing pipe or pipe arch so indicated in the plans to be removed, or that does not conform to the lines and grades of the proposed work and that is not to be relaid, as directed by the Engineer. Take care to prevent damage to salvageable pipe during removal and stacking operations.

430-5.2 Relaying: Where so shown in the plans, collect and clean existing culvert pipe, then relay it in the same manner as specified for new culvert pipe. Where necessary, straighten existing metal pipe or pipe arch before it is relaid.

430-6 Placing Pipe Under Railroad.

430-6.1 General: Construct pipe culverts under railroad tracks in accordance with the requirements of the railroad company.

Perform all the shoring under the tracks, and sheeting and bracing of the trench, required by the railroad company or deemed necessary by the Engineer in order to ensure safe and uninterrupted movement of the railroad equipment, at no expense to the Department.

430-6.2 Requirements of the Railroad Company: Install pipe using methods required by the railroad company and shown in the Contract Documents.

When the general method of installation required by the railroad company is indicated in the plans, do not alter such method, or any other specific details of the installation which might be indicated in the plans, without receiving approval or direction from the railroad, followed by written approval from the Engineer.

430-6.3 Notification to Railroad Company: Notify the railroad company and the Engineer at least ten days prior to the date on which pipe is to be placed under the railroad tracks.

430-6.4 Placing Pipe by Jacking: Obtain the Engineer's and the railroad company's approval of the details of the jacking method to be used, when placing pipe through the railroad embankment, before the work is started.

430-6.5 Use of Tunnel Liner: When the railroad company requires that a tunnel liner be used for placing the pipe in lieu of the jacking method, the Department will pay for the tunnel liner material separately in cases where the Contract Documents do not require the use of a tunnel liner. For these cases the Department will reimburse the Contractor for the actual cost of the liner, delivered at the site. The Department will base such cost on a liner having the minimum gage acceptable to the railroad.

430-7 Specific Requirements for Concrete Pipe.

430-7.1 Sealing Joints:

430-7.1.1 Round Concrete Pipe Other than Side Drain: Seal the pipe joints with round rubber or profile gaskets. When round rubber gaskets are used, meet the requirements of 941-1.5. 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 an approved vegetable soap lubricant immediately prior to closing of the joint will be permitted.

Prelubricated 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.

Seal pipe joints with a profile rubber gasket meeting the requirements of 942-4 for joints designed in accordance with the requirements of 941-1.6.

Furnish and install a filter fabric jacket around the first joint of all round concrete pipe entering or leaving a drainage structure.

Use a filter fabric jacket consisting of a piece of woven or non-woven filter fabric which provides an Apparent Opening Size (AOS) of a No. 70 to No. 100 sieve [150 to 212 μm], 24 inches [600 mm] in width and a length sufficient to provide a minimum overlap of 24 inches [600 mm]. Secure the filter fabric jacket against the outside of the pipe by steel or plastic strapping or by other methods approved by the Engineer.

430-7.1.2 Side Drain Pipe: For all concrete pipe which does not have rubber-gasket joints, thoroughly wet the joints before the inside mortar is placed. Before succeeding sections of the pipe are laid, fill the lower half of the joint portion of the pipe in place on the inside with cement mortar, and wipe the upper half of the tongue portion of the next joint with cement mortar, both in sufficient thickness to bring the inner surface of the abutting pipe flush and even, when the pipe is laid. After the pipe is laid, wipe and finish smooth the inside of the joint. Form a mortar bead not less than 3/4 inch [20 mm] thick completely around the outside of the joint.

430-7.2 Laying Requirements for Concrete Pipe with Rubber Gasket Joints:

Lay the pipe to the line and grade shown in the plans within the following tolerances. Do not allow departure from and return to plan alignment and grade to exceed 1/16 inch per foot [5 mm per meter] of nominal pipe length, with a total of not more than 1 inch [25 mm] departure from theoretical line and grade. In addition, do not allow the gap between sections of pipe to exceed 5/8 inch for pipe diameters of 12 inches through 18 inches [16 mm for pipe diameters of 300 through 450 mm], 7/8 inch for pipe diameters of 24 through 66 inches [25 mm for pipe diameters of 600 mm through 1.7 m], and 1 inch for pipe diameters 72 inches and larger [25 mm for pipe diameters 1.8 m 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 [6 mm] 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

Place and compact backfill material consisting of crushed stone/gravel or soils required in 125-8.

430-7.3 Field Joints for Elliptical Concrete Pipe: Use either a preformed plastic gasket material or a profile rubber gasket to make a field joint.

430-7.3.1 Plastic Gasket: Meet the following requirements when field joints are made from preformed plastic gasket material:

430-7.3.1.1 General: Install field joints in accordance with the manufacturer's instructions and the following:

430-7.3.1.2 Material: Meet the requirements of 942-2.

430-7.3.1.3 Joint Design: Ensure that the pipe manufacturer furnishes the Engineer with details regarding configuration of the joint and the amount of gasket material required to effect a satisfactory seal. Do not brush or wipe joint surfaces which are to be in contact with the gasket material with a cement slurry. Fill minor voids with cement slurry.

430-7.3.1.4 Primer: Apply a primer of the type recommended by the manufacturer of the gasket material to all joint surfaces which are to be in contact with the gasket material, prior to application of the gasket material. Thoroughly clean and dry the surface to be primed.

430-7.3.1.5 Application of Gasket: Apply gasket material to form a continuous gasket around the entire circumference of the leading edge of the tongue and the groove joint, in accordance with the detail shown on the Roadway and Traffic Design Standards, Index No. 280. Do not remove the paper wrapper on the exterior surface of the gasket material until immediately prior to joining of sections. Apply plastic gasket material only to surfaces which are dry. When the atmospheric temperature is below 60° F [15°C], either store plastic joint seal gaskets in an area above 70°F [20°C], or artificially warm the gaskets to 70°F [20°C] in a manner satisfactory to the Engineer.

430-7.3.1.6 Installation of Pipe: Remove and reposition or replace any displaced or contaminated gasket as directed by the Engineer. Install the pipe in a dry trench. Carefully shape the bottom of the trench to minimize the need for realignment of sections of pipe after they are placed in the trench. Hold to a minimum any realignment of a joint after the gaskets come into contact. Prior to joining the

pipes, fill the entire joint with gasket material and ensure that when the pipes are joined there is evidence of squeeze-out of gasket material for the entire internal and external circumference of the joint. Trim excess material on the interior of the pipe to provide a smooth interior surface. If a joint is defective, remove the leading section of pipe and reseal the joint.

430-7.3.1.7 Filter Fabric: Completely wrap the outside of each joint with either a woven or non-woven filter fabric which provides an AOS of a No. 70 to No. 100 sieve [150 to 212 μ m], a minimum of 24 inches [600 mm] in width and a length sufficient to provide a minimum overlap of 24 inches [600 mm]. Secure filter fabric against the outside of the pipe by steel or plastic strapping or by other methods approved by the Engineer.

430-7.3.2 Rubber Gasket: Meet the following requirements when field joints are made with profile rubber gaskets:

430-7.3.2.1 General: Install field joints in accordance with the manufacturer's instructions and the following:

430-7.3.2.2 Material: Meet the requirements of 942-4.

430-7.3.2.3 Joint Design: Ensure that the pipe manufacturer furnishes the Engineer with details regarding configuration of the joint and gasket required to effect a satisfactory seal. Do not apply mortar, joint compound, or other filler which would restrict the flexibility of the gasket joint.

430-7.3.2.4 Filter Fabric: Meet the requirements of 430-7.3.1.7.

430-7.4 Requirements for Concrete Radius Pipe:

430-7.4.1 Design: Construct concrete radius pipe in segments not longer than 4 feet [1.2 m] (along the pipe centerline), except where another length is called for in the Contract Documents. Join each segment using round rubber gaskets. Ensure that the pipe manufacturer submits details of the proposed joint, segment length and shape for approval by the Engineer, prior to manufacture.

430-7.4.2 Pre-Assembly: Ensure that the manufacturer pre-assembles the entire radius section in his yard, in the presence of the Engineer, to ensure a proper fit for all parts. At the option of the manufacturer, the Contractor may assemble the pipe without gaskets. Consecutively number the joints on both the interior and exterior surfaces of each joint, and make

match marks showing proper position of joints. Install the pipe at the project site in the same order as pre-assembly.

430-8 Specific Requirements for Corrugated Steel Pipe.

430-8.1 Field Joints:

430-8.1.1 General: Make a field joint with locking bands, as specified in Article 9 of AASHTO M 36.

When existing pipe to be extended is helically fabricated, make a field joint between the existing pipe and the new pipe using one of the following methods:

(1) Cut the new pipe to remove one of the re-rolled annular end sections required in 943-1, or fabricate the pipe so that the re-rolled annular section is fabricated only on one end. Use either a spiral (helical) band with a gasket or a flat band with gaskets as required by 430-8.1.2 (2) to join the pipe sections. Omit the gasket when a helical band is used on side drains.

(2) The Contractor may construct a concrete jacket as shown on the Roadway and Traffic Design Standards, Index No. 280, provided that the minimum cover required by the Roadway and Traffic Design Standards, Index No. 205 can be obtained.

430-8.1.2 Cross Drain, Storm Sewer, and Gutter Drains: Where corrugated steel pipe is used as cross drain, storm sewer, or gutter drain, for the above specified banded joints, use a rubber or neoprene gasket of a design shown to secure the joint performance specified.

Use a gasket of one of the following dimensions:

(1) For annular joints with 1/2 inch [13 mm] depth corrugation: either a single gasket a minimum of 7 inches by 3/8 inch [175 by 9.5 mm] or two gaskets a minimum of 3 1/2 inches by 3/8 inch [90 by 9.5 mm]; and for annular joints with 1 inch [25 mm] depth corrugations: either a single gasket a minimum of 7 inches by 7/8 inch [175 by 25 mm] or two gaskets a minimum of 3 1/2 inches by 7/8 inch [90 by 25 mm].

(2) For helical joints with 1/2 inch [13 mm] depth corrugation: either a single gasket a minimum of 5 inches by 1 inch [125 by 25 mm] or two gaskets a minimum of 3 1/2 inches by 1 inch [90 by 25 mm]; and for helical joints with 1 inch [25 mm] depth corrugations: either a single gasket a minimum of 5 inches by 1 1/2 inches [125 by 40

mm] or two gaskets a minimum of 3 1/2 inches by 1 1/2 inches [90 by 40 mm].

(3) Such other gasket designs as may be approved by the Engineer. If, in lieu of a single gasket spanning the joint, two gaskets are used, place these individual gaskets approximately 2 inches [50 mm] from each pipe end at the joint. When two gaskets are used, seal the overlapping area on the coupling band between the gaskets consistent with the joint performance specified. The Contractor may tuck a strip of preformed gasket material over the bottom lip of the band for this purpose. Use coupling bands that provide a minimum circumferential overlap of 3 inches [75 mm]. As the end connections on the coupling band are tightened, ensure that there is no local bending of the band or the connection. Use precurved coupling bands on pipe diameters of 24 inches [600 mm] or less.

Use flat gaskets meeting the requirements of ASTM D 1056, designation 2C2 or 2B3. In placing flat gaskets on pipe prior to placing the coupling band, do not stretch the gasket more than 15% of its original circumference. Use circular gaskets meeting the requirements of ASTM C 361 [ASTM C 361M]. Do not stretch the circular gasket more than 20% of its original circumference in placing the gasket on pipe. Use preformed plastic gasket material meeting the composition requirements of 942-2.2.

Apply an approved vegetable soap lubricant, as specified for concrete pipe in 430-7.1.1.

The minimum joint performance standards specified in 430-4.1 apply.

430-8.1.3 Alternate Joint: In lieu of the above-specified combination of locking bands and flat gaskets, the Contractor may make field joints for these pipe installations by the following combinations:

(a) Use the metal bands as specified in Article 9 of AASHTO M 36M that are at least 10 1/2 inches [265 mm] wide and consist of a flat central section with a corrugated section near each end, designed to match the annular corrugation in the pipe with which they are to be used. Connect the bands in a manner approved by the Engineer, with a suitable fastening device such as the use of two galvanized 1/2 inch [M12] diameter bolts through a galvanized bar and galvanized strap, suitably welded to the band. Use a strap that is the same gage as the band.

Where helically corrugated pipe is to be jointed by this alternate combination, ensure that at least the last two corrugations of each

pipe section are annular, and designed such that the band will engage each pipe end with the next-to-outside annular corrugation.

(b) For these bands, use a rubber gasket with a circular cross-section of the "O-ring" type conforming to ASTM C 361 [ASTM C 361M]. Use gaskets having the following cross-sectional diameter for the given size of pipe:

Non-SI Units	
Pipe Size	Gasket Diameter
12 inches through 36 inches (with 1/2 inch depth corrugations)	1 3/16 inch
42 inches through 96 inches (with 1/2 inch depth corrugations)	7/8 inch
36 inches through 120 inches (with 1 inch depth corrugations)	1 3/8 inches

SI Units	
Pipe Size	Gasket Diameter
300 through 900 mm (with 13 mm depth corrugations)	20 mm
1,000 through 2,400 mm (with 13 mm depth corrugations)	22 mm
900 through 3,000 mm (with 25 mm depth corrugations)	35 mm

Use preformed gasket material to seal the overlapping area on the coupling band between gaskets.

(c) Use channel band couplers in helical pipe with ends which have been reformed and flanged specifically to receive these bands. Use channel band couplers that are of a two piece design, are fabricated from galvanized steel stock conforming to AASHTO M 36, have 2 by 2 by 3/16 inch [51 by 51 by 4.8 mm] angles fastened to the band ends to allow for proper tightening, and meet the following:

Non SI Units	
Band Thickness	Pipe Wall Thickness
0.079 inch	0.109 inch or lighter

0.109 inch	0.138 inch or heavier
3/4 inch wide	0.109 inch or lighter
1 inch wide	0.138 inch or heavier

SI Units	
Band Thickness	Pipe Wall Thickness
2.01 mm	2.77 mm or lighter
2.77 mm	3.51 mm or heavier
19 mm	2.77 mm or lighter
25 mm	3.51 mm or heavier

Furnish two 1/2 inch [M12] diameter connection bolts with each band, that conform to ASTM A 307, Grade A and are electroplated in accordance with ASTM B 633.

Use a gasket with the joint that is a hydrocarbon blend of butyl rubber meeting the chemical composition and physical properties of 942-2.2. Use a 3/8 by 3/4 inch [9.5 by 19 mm] gasket for pipe fabricated from 0.109 inch [2.77 mm] or lighter material and a 3/8 by 1 inch [9.5 by 25 mm] gasket for pipe fabricated from 0.138 inch [3.51 mm] and heavier material.

The Contractor may use a flange band coupler without the gasket for all applications other than cross drain, storm sewer and gutter drain.

Do not use the flange band coupler to join dissimilar types of pipe.

The Contractor may join reformed flanged helical pipe to existing annular or reformed pipe having annular ends. On non-gasketed installations, use either an annular band or an alternate joint described in 430-8.1.3. On gasketed installations, use an annular band, minimum of five corrugations in width, in conjunction with two O-ring gaskets as specified in 430-8.1.3. Use mastic material to seal the area of band overlap.

430-8.2 Laying and Shape Requirements for Corrugated Steel Pipe: Install pipe using either a trench or open ditch procedure. Place and compact backfill material consisting of crushed stone/gravel or soils as required in 125-8.

Upon completion of the project, and just prior to acceptance by the Department, clean coated corrugated steel pipe and inspect it for breaks, corrosion or other damage to the coating or to the pipe itself, and make necessary repairs. When the pipe is laid, ensure that the interior is reasonably uniform and as near circular as is practical.

Ensure that the vertical diameter is not less than 100%, or more than 105%, of the nominal diameter, and the horizontal diameter is not less than 95%, or more than 100%, of the nominal diameter.

Make all measurements for the above dimensions at the surface of the coating, at the point of smallest diameter on the corrugations.

430-9 Field Joints for Aluminum Pipe.

430-9.1 General: Make a field joint with bands fabricated of the same alloy as the culvert sheeting and meet the requirements of AASHTO M 196M.

430-9.2 Aluminum Cross Drains, Storm Sewers, and Gutter Drains: For aluminum pipe (for circular and helical corrugations), meet the requirements as specified above for corrugated steel pipe, except for the material in the bands and band connections for the alternate combination of joint materials, use the same alloy as the culvert sheeting.

430-10 Joints for Cast Iron Pipe.

Meet the requirements of 430-7.1.2 for mortaring and wetting inside the joints, as specified for concrete side drain pipe without rubber gaskets.

430-11 Specific Requirements for Corrugated Polyethylene Pipe and Polyvinyl Chloride (PVC) Pipe.

430-11.1 Field Joints: Ensure that split couplings, twist couplings or gasketed joints are used to seal side drain. Use gasketed joints, wrapped with filter fabric meeting the requirements of a Type D-3 fabric as specified on Roadway and Traffic Standard Index 199, to seal cross drain and storm drain. Use gaskets meeting the requirements of 941-1.5. Ensure that the pipe manufacturer provides a joint design approved by the Engineer prior to use.

430-11.2 Installation Requirements Including Trenching, Foundation and Backfilling Operations: Do not use any corrugated polyethylene or PVC pipe when fill heights exceed 10 feet [3 m], when minimum cover is less than that shown on the Roadway and Traffic Design Standards, Index No. 205, or when extra base is required as shown on Roadway and Traffic Design Standards, Index No. 205.

When pipe is laid, ensure that the interior is reasonably uniform and as nearly circular as practical. Check structure shape regularly during backfilling to verify acceptability of the construction method used. Do not allow pipe to deflect more than 5% in any direction.

Place and compact backfill material as required in 125-8 under, around and a minimum of 12 inches [300 mm] above the pipe.

430-12 Method of Measurement.

430-12.1 New Pipe: The quantities of storm drain pipe, storm drain trench, and cross drain pipe to be paid for will be plan quantity, in place and accepted. The plan quantity will be measured from the inside wall of the structure as shown on the plans, along the centerline of the pipe. The quantities of side drain pipe and gutter drain pipe to be paid for will be the net length of pipe measured in place, completed and accepted.

430-12.2 Relaid Pipe: The quantity to be paid for (including relaid pipe arch) will be the net length of pipe, measured in place after relaying, completed and accepted.

430-12.3 Mitered End Section: The quantity to be paid for will be the number completed and accepted.

430-13 Basis of Payment.

430-13.1 General: Prices and payments will be full compensation for all work specified in this Section, including all excavation except the volume included in the items for the grading work on the project, and except for other items specified for separate payment in Section 125; all backfilling material and compaction; disposal of surplus material; and all clearing and grubbing outside of the required limits of clearing and grubbing as shown in the plans.

430-13.2 New Pipe: Price and payment will be full compensation for all work and materials for constructing pipe culvert of the kinds and sizes shown in the proposal, including the optional kinds specified as being permissible under the items of Cross Drain Pipe, Side Drain Pipe and Storm Drain Pipe Culvert.

430-13.3 Relaid Pipe: Price and payment will be full compensation for all work, including hauling the pipe to the new location as necessary, any cleaning necessary and, for metal pipe, any straightening, etc., which might be required.

430-13.4 Removing Existing Pipe: When existing pipe is removed and replaced with new pipe approximately at the same location, and clearing and grubbing is not designated to be paid for in the particular area, the cost of excavating and removing the old pipe and of its disposal will be included in the Contract unit price for the new pipe in place.

430-13.5 Replacing Pavement: The cost of restoring pavement, curb, sidewalk, etc., removed only for the purpose of constructing pipe culvert, as specified in

125-9, will be included in the Contract unit price for the pipe culvert, unless designated specifically to be paid for under other items.

430-13.6 Plugging Pipes: The cost of plugging pipes, where so shown in the plans, will be included in the Contract unit price for the pipe culvert.

430-13.7 Flared End Sections: Price and payment will be full compensation for all work and materials required.

430-13.8 Mitered End Sections: Price and payment will be full compensation for all pipe, grates when required, fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets and coupling bands, and all work required.

430-13.9 Railroad Requirements: Where pipe culvert is constructed under railroad tracks, the Contract unit price for the pipe culvert will include the costs of any jacking operations and the operation of placing the pipe by use of a tunnel liner, (except as specified for unanticipated tunnel liner, in 430-6.5, where reimbursement is to be made for such unanticipated liner), and all other work necessary to meet the requirements of the railroad company, excluding the costs of watchman or flagman services provided by the railroad company, except as provided below.

The Department will reimburse the Contractor for the actual costs of any trestle bridge work which is performed by the railroad's forces, as billed to him by the railroad, less the value of any salvage materials derived therefrom, whether such salvage materials are retained by the railroad company or by the Contractor. When the work of shoring and bracing is to be performed by the railroad, such fact will be stipulated in the Contract Documents and the Contractor will be required to pay to the railroad the amount of such costs, which amount will be reimbursed to him by the Department. The Contract unit price for the pipe culvert shall include the costs of all other work of shoring and bracing.

430-13.10 Payment Items: Payment will be made under:

Item No. 430- 1-	Concrete Pipe Culvert - per foot.
Item No. 2430- 1-	Concrete Pipe Culvert - per meter.
Item No. 430- 2-	Corrugated Steel Pipe Culvert - per foot.
Item No. 2430- 2-	Corrugated Steel Pipe Culvert - per meter.
Item No. 430- 3-	Bituminous Coated Corrugated Steel Pipe Culvert – per foot.
Item No. 2430- 3-	Bituminous Coated Corrugated Steel Pipe Culvert – per meter.
Item No. 430- 4-	Bituminous Coated and Paved Corrugated Steel Pipe Culvert –per foot.
Item No. 2430- 4-	Bituminous Coated and Paved Corrugated Steel Pipe Culvert –per meter.

Item No. 430- 5-	Corrugated Steel Pipe Arch Culvert - per foot.
Item No. 2430- 5-	Corrugated Steel Pipe Arch Culvert - per meter.
Item No. 430- 6-	Bituminous Coated Steel Pipe Arch Culvert - per foot.
Item No. 2430- 6-	Bituminous Coated Steel Pipe Arch Culvert - per meter.
Item No. 430- 7-	Bituminous Coated and Paved Steel Pipe Arch Culvert - per foot.
Item No. 2430- 7-	Bituminous Coated and Paved Steel Pipe Arch Culvert - per meter.
Item No. 430- 8-	Corrugated Aluminum Pipe Culvert - per foot.
Item No. 2430- 8-	Corrugated Aluminum Pipe Culvert - per meter.
Item No. 430- 9-	Bituminous Coated Corrugated Aluminum Pipe Culvert - per foot.
Item No. 2430- 9-	Bituminous Coated Corrugated Aluminum Pipe Culvert - per meter.
Item No. 430-10-	Bituminous Coated and Paved Corrugated Aluminum Pipe Culvert - per foot.
Item No. 2430-10-	Bituminous Coated and Paved Corrugated Aluminum Pipe Culvert - per meter.
Item No. 430-11-	Corrugated Aluminum Pipe Arch Culvert - per foot.
Item No. 2430-11-	Corrugated Aluminum Pipe Arch Culvert - per meter.
Item No. 430-12-	Aluminized Corrugated Steel Pipe Culvert - per foot.
Item No. 2430-12-	Aluminized Corrugated Steel Pipe Culvert - per meter.
Item No. 430-14-	Elliptical Concrete Pipe Culvert - per foot.
Item No. 2430-14-	Elliptical Concrete Pipe Culvert - per meter.
Item No. 430-17-	Pipe Culvert Optional Material - per foot.
Item No. 2430-17-	Pipe Culvert Optional Material - per meter.
Item No. 430-96-	Polyvinyl Chloride Pipe Culvert - per foot.
Item No. 2430-96-	Polyvinyl Chloride Pipe Culvert - per meter.
Item No. 430-98-	Mitered End Section - each.
Item No. 2430-98-	Mitered End Section - each.
Item No. 430-99-	Polyethylene Pipe Culvert - per foot.
Item No. 2430-99-	Polyethylene Pipe Culvert - per meter.
Item No. 430-150-	Cast Iron Pipe Culvert - per foot.
Item No. 2430-150-	Cast Iron Pipe Culvert - per meter.
Item No. 430-190-	Relay Existing Pipe - per foot.
Item No. 2430-190-	Relay Existing Pipe - per meter.
Item No. 430-200-	Flared End Sections - each.
Item No. 2430-200-	Flared End Sections - each.
Item No. 430-610-	U-Endwall With Grate - each.
Item No. 2430-610-	U-Endwall With Grate - each.

SECTION 520 - CONCRETE GUTTER, CURB ELEMENTS, AND TRAFFIC SEPARATOR

520-1 Description.

Construct portland cement concrete curb and gutter, concrete traffic separator, valley gutter, special concrete gutter, and any other types of concrete curb not specified in other Sections.

520-2 Materials.

520-2.1 Concrete: Use Class I concrete meeting the requirements of Section 347.

520-2.2 Reinforcement: For all steel reinforcement required by the plans, meet the requirements of Section 415.

520-2.3 Joint Materials: Meet the requirements of Section 932.

520-3 Forms.

520-3.1 Form Materials: Construct forms for this work of either wood or metal. Provide forms that are straight, free from warp or bends, and of sufficient strength, when staked, to resist the pressure of the concrete without deviation from line and grade. For all items constructed on a radius, use flexible forms.

520-3.2 Depth of Forms: Ensure that forms have a depth equal to the plan dimensions for the depth of concrete being deposited against them.

520-3.3 Machine Placement: The Contractor may place these items by machine methods with the approval of the Engineer provided that the Contractor consistently produces an acceptable finished product, true to line, grade, and cross section.

520-4 Excavation.

Excavate to the required depth, and compact the foundation material upon which these items are to be placed as specified in 120-9.

520-5 Placing Concrete.

Place the concrete in the forms, and tamp and spade it to prevent honeycombing, and until the top of the structure can be floated smooth and the edges rounded to the radius shown in the plans.

520-6 Joints.

520-6.1 Contraction Joints: Except for machine placed items, the Contractor may form joints by using dummy joints (either formed or sawed) or by using sheet metal templates. If using sheet metal templates, ensure that they are of the dimensions, and are set to the lines, shown in the plans. Hold templates firmly while placing the concrete. Leave templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Saw contraction joints, for machine placed items, unless the Engineer approves an alternate method. Saw the joints as soon as the concrete has hardened to the degree that excessive raveling will not occur and before uncontrolled shrinkage cracking begins.

Space contraction joints at intervals of 10 feet [3 m] except where closure requires a lesser interval, but do not allow any section to be less than 4 feet [1.2 m] in length.

520-6.2 Expansion Joints: Construct expansion joints at all inlets, at all radius points, and at other locations indicated in the plans. Locate them at intervals of 500 feet [150 m] between other expansion joints or ends of a run. Ensure that the joint is 1/2 inch [13 mm] in width.

520-7 Finishing.

520-7.1 Repair of Minor Defects: Remove the forms within 24 hours after placing the concrete, and then fill minor defects with mortar composed of one part portland cement and two parts fine aggregate. The Engineer will not allow plastering on the face of the curb. Remove and replace any rejected curb, curb and gutter, or valley gutter without additional compensation.

520-7.2 Final Finish: Finish all exposed surfaces while the concrete is still green. In general, the Engineer will only require a brush finish. For any surface areas, however, which are too rough or where other surface defects make additional finishing necessary, the Engineer may require the Contractor to rub the curb to a smooth surface with a soft brick or wood block, using water liberally. Also, if necessary to provide a suitable surface, the Engineer may require the Contractor to rub further, using thin grout or mortar.

520-8 Curing.

520-8.1 General: Continuously cure the concrete for a period of at least 72 hours. Commence curing after completely finishing and as soon as the concrete has hardened sufficiently to permit application of the curing material without marring the surface. Immediately replace any curing material removed or damaged during the 72 hour period.

After removing the forms, cure the surfaces exposed by placing a berm of moist earth against them or by any of the methods described below, for the remainder of the 72 hour curing period.

520-8.2 Wet Burlap Method: Place burlap, as specified in 925-1, over the entire exposed surface of the concrete, with sufficient extension beyond each side to ensure complete coverage. Overlap adjacent strips a minimum of 6 inches [150 mm]. Hold the burlap securely in place such that it will be in continuous contact with the concrete at all times, and do not allow any earth between the burlap surfaces at laps or between the burlap and the concrete. Saturate the burlap with water before placing it, and keep it thoroughly wet throughout the curing period.

520-8.3 Membrane Curing Compound Method: Apply clear membrane curing compound or white pigmented curing compound, as specified in 925-2, by a hand sprayer meeting the requirements of 350-3.10, in a single coat continuous film at a uniform coverage of at least 200 square feet per gallon [0.2 L/m²]. Immediately recoat any cracks, checks, or other defects appearing in the coating. Thoroughly agitate the curing compound in the drum prior to application, and during application as necessary to prevent settlement of the pigment.

520-8.4 Polyethylene Sheeting Method: Place polyethylene sheeting, as specified in 925-3, over the entire exposed surface of the concrete, with sufficient extension beyond each side to ensure complete coverage. Overlap adjacent strips a minimum of 6 inches [150 mm]. Hold the sheeting securely in place and in continuous contact with the concrete at all times.

520-9 Backfilling and Compaction.

After the concrete has set sufficiently, but not later than three days after pouring, refill the spaces in front and back of the curb to the required elevation with suitable material. Place and thoroughly compact the material in layers not thicker than 6 inches [150 mm].

520-10 Surface Requirements.

Test the gutter section of curb and gutter with a 10 foot [3.048 m] straightedge laid parallel to the centerline of the roadway and while the concrete is still plastic. Perform straightedging along the edge of the gutter adjacent to the pavement or along other lines on the gutter cross-section, as directed by the Engineer. Immediately correct irregularities in excess of 1/4 inch [6 mm].

520-11 Method of Measurement.

For curb or curb and gutter, the quantity to be paid will be plan quantity, in feet [meters], measured along the face of the completed and accepted curb or curb and gutter.

For valley gutter or shoulder gutter, the quantity to be paid will be plan quantity, in feet [meters], measured along the gutter line of the completed and accepted valley gutter or shoulder gutter.

For concrete traffic separator of constant width, the quantity to be paid will be plan quantity, in feet [meters], measured along the center of its width, completed and accepted, including the length of the nose.

For concrete traffic separator of varying width, the quantity to be paid will be plan quantity, in square yards [square meters], completed and accepted.

520-12 Basis of Payment.

520-12.1 General: Price and payment will be full compensation for all work specified in this Section.

520-12.2 Excavation: Excavation will be paid for as Roadway Excavation in accordance with 120-12.1.2.

520-12.3 Reinforcement: Reinforcing steel will not be paid for separately. The Contractor shall include the cost of the steel in the Contract unit price for the item in which the steel is placed.

520-12.4 Joint Materials: The Contractor shall include the cost of all joint materials in the Contract unit price for the item in which they are used.

520-12.5 Payment Items: Payment will be made under:

Item No. 520- 1-	Concrete Curb and Gutter - per foot.
Item No. 2520- 1-	Concrete Curb and Gutter - per meter.
Item No. 520- 2-	Concrete Curb - per foot.
Item No. 2520- 2-	Concrete Curb - per meter.
Item No. 520- 3-	Concrete Valley Gutter - per foot.
Item No. 2520- 3-	Concrete Valley Gutter - per meter.
Item No. 520- 4-	Special Concrete Gutter - per foot.
Item No. 2520- 4-	Special Concrete Gutter - per meter.
Item No. 520- 5-	Concrete Traffic Separator - per foot.
Item No. 2520- 5-	Concrete Traffic Separator - per meter.
Item No. 520- 6-	Concrete Shoulder Gutter - per foot.
Item No. 2520- 6-	Concrete Shoulder Gutter - per meter.
Item No. 520-70-	Concrete Traffic Separator - per square yard.
Item No. 2520-70-	Concrete Traffic Separator - per square meter.

SECTION 522 - CONCRETE SIDEWALKS

Construction of 4-inch and 6-inch thick concrete sidewalk shall be of Class I Concrete. Class I Concrete shall comply with F.D.O.T. "Standard Specification for Road and Bridge Construction", Section 346.

FOUNDATION

Foundation material shall meet the specified densities and shall be thoroughly wetted but free of standing water just prior to placing concrete.

CONTRACTION JOINTS

Contraction joints shall be sawed. All joints shall be straight lines oriented at 90 degrees to the edge of sidewalk, radially if in a curve, or as directed otherwise. **Minimum depth** of joints shall be **1 1/2** inches or **1/4** the nominal thickness of concrete placed, whichever is greater.

Joint installation shall proceed in the same direction and sequence as the concrete placement. Sawing shall begin as soon as the concrete has hardened to the degree that excessive raveling will not occur. Every third transverse joint and all longitudinal joint shall be installed within 8 hours after finishing. Remaining transverse joints shall be installed by noon the following day.

CONSTRUCTION JOINTS

Construction joints shall be constructed at the end of all pours and at other locations where the concrete placement operations are stopped for as long as 30 minutes. They shall be placed at least 10 feet from any other transverse construction joint or end of pavement section.

Metal keyways shall be installed at all construction joints in sidewalks 6-inches and greater in thickness. Concrete thickness shall be increased by 2-inches for a minimum distance of 6-inches either side of construction joints.

CURING

Curing material shall be applied to the concrete surfaces after finishing as soon as the concrete has hardened sufficiently to prevent marring the surface or within one hour after finishing is completed, whichever occurs first. Applying curing materials shall not be held up due to other activities on the project. Contractor shall schedule and provide manpower necessary to conform to these requirements.

If Contractor chooses to use membrane-curing compound, it shall be Type 2, white-pigmented, meeting AASHTO M 180 requirements. Curing compound shall be

thoroughly agitated before pouring from original container and periodically agitated during application to prevent settlement of pigment.

Spraying equipment, including spray tip and nozzle, shall be as recommended by manufacturers' printed literature, or equal. Suggested equivalent spraying equipment are :

Pump Sprayer:	Model No. 1949, Chapin Mfg., (8900) 444-3140
Drum Pump Sprayer:	12 Volt DC # 6061, Chapin Mfg.

Equipment shall be maintained and nozzles replaced as required to provide consistent uniform spray pattern.

A uniform coating meeting the manufacturer's recommended minimum application rate shall be applied. Areas appearing to have insufficient curing compound, as determined solely by the owner, shall be re-coated immediately to provide required uniform coverage.

Storage containers greater than five gallon capacity may be utilized only with prior approval by the Engineer. Contractor shall submit the manufacturer's descriptive literature describing the placement, storage and mixing requirements for storage exceeding five gallons. Contractor shall provide and utilize mechanical mixers for all containers larger than five gallons. The mixers shall be equivalent to or exceed the manufacture's requirements. Contractor shall conform to all storage, mixing and application requirements.

REPLACEMENT

Where 6-inch concrete has to be replaced due to cracks, it shall be replaced with a uniform thickness of 8-inch concrete covering no less than 40 square feet and extending to existing sawed contraction joints. Replacement concrete shall extend at least 3-inches beneath existing concrete at a minimum thickness of 3-inches.

REPAIRS

Where replacement is necessary, complete sections between contraction joints shall be removed and replaced. New Joints between initially installed contraction joints are not acceptable.

METHOD OF MEASUREMENT

Quantities measured for payment under this Section shall be the actual area in square yards of concrete constructed in place.

BASIS OF PAYMENT

Concrete driveway will be paid for at the contract unit prices, completed and accepted. Payment shall constitute full compensation for all work described herein, and shall include

all labor, equipment, materials, grading, compaction, and all incidentals necessary to complete the work to the lines, grades, and thicknesses indicated on the plans. Subgrade preparation and additional concrete required for thickened slabs as indicated on the plans or as directed by the Engineer shall be included in the contract unit price.

SECTION 526-70-2 - BRICK PAVERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

Provide all labor, materials, equipment and incidentals required to install pavers in accordance with the drawings and as specified.

1.02 WORK SPECIFIED ELSEWHERE

- A. Section 02611 - Compacted Sub-Base and Section 200 (attached)
- B. Section 02520 - Site Concrete Work (attached)

1.03 QUALITY ASSURANCE

- A. Comply with all requirements of local, state and federal regulatory agencies.
- B. Comply with Florida Department of Transportation Specifications for road and bridge construction, 1986 Edition.

1.04 SAMPLE APPROVAL

- A. Sample Installation: Prior to installation of brick on concrete slab provide sample panel using materials shown or specified for final work. Build panel at the site as directed, of full thickness and approximately 5' x 5'. Obtain owner's representative acceptance of visual qualities of the panels before start of brick paving work. Retain panel during construction as a standard for judging completed work.
- B. Remove and re-install sample until work is approved by Owner's Representative.

1.05 DELIVERY, STORAGE, AND HANDLING

Protect brick materials during storage and construction from groundwater and from staining or intermixture with earth or other types of materials.

1.06 TOLERANCE

All work shall be checked with 10'-0" straight edge and the edge treatment shall not exceed 1/2" in 10'. Remove and replace all work that does not meet tolerances.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Pavers shall meet the requirements set forth in the ASTM C936 specifications with minimum compressive strength of 2000 psi and maximum absorption of 5%.
- B. Pavers shall meet the requirements set forth in ASTM C936 Specifications with a minimum compressive strength of 8,000 psi and maximum absorption of 5%.
- C. Pavers: To be supplied by City of Longwood. Paver shall be of the same type already installed in the downtown area.
- D. Sand leveling bed shall be natural or manufactured from crushed rock, well graded clean washed sharp sand with 100 % passing a 3/8" sieve and a maximum of 2% to 10% passing a number 100 sieve.
- E. Dusting sand to be a fine sharp sand.
- F. Mortar Bed: For only the 8-inch wide border, as shown on the plans, shall be Latex/Sand mortar cement.
 - 1. Mortar Mix: Shall be modified type "M" mortar ASTM C-270. One bag masonry cement, ASTM C-144, 4 gallons Laticrete 8510 and 4 gallons clean potable water.

PART 3 - EXECUTION

3.01 GENERAL

Install all concrete pavers as shown on drawings and materials to be per manufacturer's specification and these specifications.

3.02 SUBGRADE

Compact the road sub-base to a density of 95% of specified in Section 02611 - Compacted Sub-Base.

3.03 SUB-SLAB

Construct sub-slab as specified in Section 02630 - Site Concrete work. Install 4" thick sub-slab for walkways and 6" sub-slab for drive areas as shown on drawings.

3.04 SAND LEVELING BED

Place 2" sand leveling bed on top of concrete sub-slab. Prior to the placement of sand, install 8" wide border on a mortar bed. Place sand slightly above the 2" so after the vibration process, the pavers compact to meet the required finish grade.

3.05 PAVERS

- A. Install pavers with hand tight jointing on a sand bed as recommended by the manufacturer. Only saw cut pavers will be accepted where pavers must be cut.
- B. After all pavers are placed go over entire installation with a flat steel plated vibrator ("Wacker" or approved equal to seat pavers firmly in to sand leveling bed). The finish grade of pavers shall match concrete and asphalt finishes.

3.06 DUSTING SAND

Cover entire paved area with fine dusting sand. Lightly flush area with water and sweep sand into all voids. After sand and work areas have dried, sweep and remove all sand from surface.

3.07 CLEAN UP

Police and remove all construction debris, trash from site and dispose of legally off the property.

BASIS OF PAYMENT

Brick pavement will be paid for at the contract unit prices (SF), completed and accepted. Payment shall constitute full compensation for all work described herein, and shall include all labor, equipment, materials, grading, compaction, concrete material, leveling sand, crushed stone, excavation, all construction means and all incidentals necessary to complete the work to the lines, grades, and thicknesses indicated on the plans.

SECTION 570 - GRASSING (BY SEEDING)

570-1 Description.

Establish a stand of grass on slopes, shoulders and specified other areas, by seeding or by seeding and mulching. Perform seeding and mulching, fertilizing, and wildflower seed application as required, and maintain the grassed areas until the completion of the project.

The Engineer may eliminate at his discretion, any of the items of work covered by this Section.

570-2 Materials.

Meet the following requirements:

Grass	
Seed.....	981-1
Wildflower Seed.....	981-1
Mulch	981-3
Fertilizer, Type I.....	Section 982
Water.....	Section 983
Compost	Section 987

Prior to planting, furnish the Engineer a certification from the grower stating the age of all seed.

570-3 Construction Methods.

570-3.1 General: Do not seed or mulch when wind velocities exceed 15 mph [25 km/h]. Sow seed only when the soil is moist. Do not perform any seeding when the ground is frozen, unduly wet or otherwise not in a tillable condition.

Whenever a suitable length of roadway slopes or adjacent areas has been graded, prepare the area and perform grassing in accordance with the Contract Documents. Incorporate grassing into the project at the earliest practical time.

Complete all grassing on shoulder areas prior to the placement of the friction course on adjacent pavement, unless the friction course is to be placed directly on a non-asphalt base.

570-3.2 Sequence of Operations: Perform the operations in the following sequence: Apply finish soil layer materials in accordance with Section 162, prepare the area to be seeded, seed, spread and cut-in mulch and fertilize.

In preparing the ground for sowing of seeds, disk-harrow and thoroughly pulverize the soil to an average depth of 6 inches [150 mm]. Make the soil true to grade, not compacted and free of large clods, roots, and other material which will interfere with the work or subsequent mowing and maintenance operations. Do not begin subsequent operations until the Engineer has approved the condition of the prepared areas.

570-3.3 Seeding: While the soil is still loose, scatter the seed uniformly over the grassing area and immediately mix it into the seed bed to a depth of 1/4 inch [6 mm] using the specified seed. Thoroughly dry-mix the separate types of seed immediately before sowing. Do not use wet seed.

The Engineer will allow the wildflower seed to be included in the grassing operation or performed separately from the grass seeding operation in areas shown in the plans.

Ensure that the wildflower seed is uniformly planted by drilling or placing the seed into the soil at an average depth of 1/8 inch [3 mm], but not exceeding 1/4 inch [6 mm] into the designated area at the specified rate.

570-3.4 Mulching: When areas require mulch, as shown on the plans, apply approximately 2 inches [50 mm], loose thickness, of the mulch material uniformly over the seeded area, and cut the mulch material into the soil to produce a loose mulched thickness of 3 to 4 inches [75 to 100 mm]. Do not use harrows. The Contractor may use compost meeting the requirements of Section 987 in lieu of mulch.

When mulching on steep slopes, where the use of a machine for the cutting-in process is not practicable, secure the mulch after the seeding operation by either using an erosion control fabric, or; spread a string net over the mulch using stakes driven flush with the top of the mulch at 6 foot [1.8 m] centers and string parallel and perpendicular with diagonals in both directions.

570-3.5 Rolling: Immediately after seeding, roll the entire grassed or mulched area with a cultipacker, traffic roller or a horticultural roller. Make at least two passes over the entire area.

570-3.6 Watering: Provide a vehicle for applying water to the grassed areas equipped with either a calibrated tank or an approved metering device installed at such point on the vehicle to measure the water at time of application. Do not water newly seeded areas to force the seed germination. Do not apply more than 1 inch of water per acre [60 mm of water per hectare] per week for sustaining the grass growth. Use water only on vegetated areas when permitted by the Engineer.

570-3.7 Fertilizing: Spread the fertilizer over the grassed area four to five weeks after the grass seed germinates in one or more applications as specified below:

Spread an initial application of 265 lbs/acre [300 kg/ha] of 16-4-8.

If the project has not reached final acceptance in accordance with Article 5-11, spread subsequent applications of 135 lbs/acre [150 kg/ha] of 16-4-8 approximately 60 calendar days after the initial application without mixing into the soil.

The Contractor may spread the fertilizer by hand on steep slopes or other areas where machine-spreading may not be practicable.

570-4 Maintenance.

Maintain the planted areas as an acceptable stand of grass until final acceptance of the project at no expense to the Department. Include in such maintenance the filling, leveling, and repairing of any washed or eroded areas, as may be necessary.

An acceptable stand of grass is defined as a 1 by 1 foot [300 by 300 mm] area containing a minimum of 16 live, viable, healthy wildflower and/or grass seedlings.

The Department will pay for replanting as necessary due to factors determined to be beyond control of the Contractor.

Mow the planted grass areas to a height of 6 inches [150 mm] when competing vegetation height exceeds 20 inches [500 mm] in height. Do not mow wildflower areas until at least three weeks after the peak of the bloom period and do not mow lower than 6 inches [150 mm]. Do not use selective herbicides in wildflower areas.

570-5 Method of Measurement.

570-5.1 General: The quantities to be paid for will be for the following items, completed and accepted:

- (1) The area, in square feet [square meters], of seeding.
- (2) The area, in square feet [square meters], of seeding and mulching.
- (3) The weight, in pounds [kilograms], of grass seed.
- (4) The weight, in tons [metric tons], of mulch material.
- (5) The weight, in tons [metric tons], of fertilizer.
- (6) The volume, in thousand gallons [kiloliters], of water.
- (7) The weight, in pounds [kilograms], of wildflower seed.
- (8) The area, in acres [hectares], of mowing.

570-5.2 Area Quantities: For the quantities paid for on a square foot [square meter] basis, no deductions will be made for the areas occupied by turnouts in rural sections.

570-5.3 Seed: The quantity of grass or wildflower seed will be determined from packaged weights or by other appropriate methods.

570-5.4 Mulch Material: The quantity will be determined by weighing on truck scales, or by other appropriate methods. The Contractor shall advise the Engineer of the time and place of such weighing. Weighing will be done in the general vicinity of the project.

570-6 Basis of Payment.

570-6.1 General: Prices and payments will be full compensation for all work and materials specified in this Section.

570-6.2 Seeding: When mulching is not specified, price and payment will be full compensation for all work and materials not specifically included in the items of separate payment shown below. The item of Seeding will include specifically all preparations of the ground, the application of the seed, the rolling, tilling or other specified work.

570-6.3 Seeding and Mulching: When mulching is specified, price and payment will be full compensation for everything specified in 570-6.2 and, in addition, will include the cost of applying, cutting-in, rolling, and anchoring, where required, of the mulch material, but will not include the furnishing of the mulch material.

570-6.4 Seed: Price and payment for Grass Seed (Permanent Type) and, Grass Seed (Quick-Growing Type) will be full compensation for the furnishing of the seed, at the site of its use. Price and payment for Wildflower Seed will include furnishing, applying, and mixing the seed into the seed bed.

570-6.5 Mulch Material:

570-6.5.1 General: Price and payment will be full compensation for the furnishing and spreading of the mulch material, at the site of its use.

570-6.6 Water: The quantity of water, ordered at the specific time of its being applied and which is actually used, determined by the specific metering device or by calibrated tank, will be paid for at the Contract price per thousand gallons [kiloliters] of Water for Grassing. Such quantity will include all water authorized by the Engineer, which is used until the time of acceptance of the work.

570-6.7 Payment Items: Payment will be made under:

Item No. 104- 4	Mowing - per acre.
Item No. 2104- 4	Mowing - per hectare.
Item No. 570- 1	Seeding - per square foot.
Item No. 2570- 1	Seeding - per square meter.
Item No. 570- 2	Seeding and Mulching - per square foot.
Item No. 2570- 2	Seeding and Mulching - per square meter.
Item No. 570- 3	Grass Seed (Permanent Type) - per pound.
Item No. 2570- 3	Grass Seed (Permanent Type) - per kilogram.
Item No. 570- 4	Mulch Material - per ton.
Item No. 2570- 4	Mulch Material - per metric ton.
Item No. 570- 5	Fertilizer - per ton.
Item No. 2570- 5	Fertilizer - per metric ton.
Item No. 570- 9	Water for Grassing - per thousand gallons.
Item No. 2570- 9	Water for Grassing - per kiloliters.
Item No. 570- 10	Grass Seed (Quick-Growing Type) - per pound.
Item No. 2570- 10	Grass Seed (Quick-Growing Type) - per kilogram.
Item No. 570- 12	Wildflower Seed - per pound.
Item No. 2570- 12	Wildflower Seed - per kilogram.

SECTION 575 - SODDING

575-1 Description.

Establish a stand of grass within the specified areas, by furnishing and placing sod, and rolling, fertilizing, watering, and maintaining the sodded areas to ensure a healthy stand of grass.

575-2 Materials.

Meet the following requirements:

Sod	981-2
Fertilizer, Type I.....	Section 982
Water.....	Section 983

575-3 Construction Methods.

575-3.1 Preparation of Ground: Fertilize at the rate as shown in Section 570. Scarify or loosen the areas requiring sod to a depth of 6 inches [150 mm]. On areas where the soil is sufficiently loose, particularly on shoulders and fill slopes, the Engineer may authorize the elimination of the ground preparation. Limit preparation to those areas that can be sodded within 72 hours after preparation. Prior to sodding, thoroughly water areas and allow water to percolate into the soil. Allow surface moisture to dry before sodding to prevent a muddy soil condition.

575-3.2 Placing Sod: Place sod immediately after ground preparation. Do not use sod which has been cut for more than 72 hours. Stack all sod that is not planted within 24 hours after cutting and maintain proper moist condition.

Do not sod when weather and soil conditions are unsuitable for proper results. Pre-wet the area prior to placing sod. Do not place sod on eroded or washed out sites.

Place the sod on the prepared surface, with edges in close contact, and embed it firmly and smoothly by light tamping with appropriate tools.

Place the sod to the edge of all the paving and shrub areas and 1 inch [25 mm] below adjoining pavement with an even surface and edge. Place rolled sod parallel with the roadway and cut any exposed netting even with the sod edge.

Roll using a lightweight turf roller. Provide a true and even surface without any displacement of the sod or deformation.

Where sodding in drainage ditches, stagger the setting of the sod pieces to avoid a continuous seam along the line of flow. Ensure that the offsets of individual strips do not exceed 6 inches [150 mm]. Tamp the outer pieces of sod to produce a featheredge effect.

Peg sod at locations where the sod may slide. Drive pegs through sod blocks into firm earth, at intervals approved by the Engineer.

Remove any sod as directed by the Engineer.

575-3.3 Watering: Thoroughly water the sod immediately after placing. Do not apply more than one inch of water per acre [60 mm of water per hectare] per week for establishment.

Use watering equipment that will prevent damage to the finished sod surface. Keep the sod in a moist condition for the duration of the Contract period.

575-3.4 Maintenance: Maintain the sodded areas in a satisfactory condition until final acceptance of the project. Include in such maintenance the filling, leveling, and repairing of any washed or eroded areas, as may be necessary. The Department will pay for resodding necessary due to factors determined to be beyond the control of the Contractor.

Mow the sodded areas to a height of 6 inches [150 mm] when competing vegetation height exceeds 20 inches [500 mm] in height.

575-4 Method of Measurement.

The quantities to be paid for will be for the following items, completed and accepted:

- (1) The area, in square yards [square meters], of sodding.
- (2) The weight, in tons [metric tons], of fertilizer.
- (3) The volume, in thousand gallons [kiloliters], of water.
- (4) The area, in acres [hectares], of mowing.

575-5 Basis of Payment.

Prices and payments will be full compensation for all work and materials specified in this Section, and the satisfactory disposal of excavated material, except the furnishing of the fertilizer, and the furnishing and application of the water.

Fertilizer and water will be paid for as specified in 570-6.

The work and materials for pegging of sod, directed by the Engineer (as provided in 575-3.2), will be paid for as Unforeseeable Work.

Payment will be made under:

Item No. 104- 4	Mowing - per acre.
Item No. 2104- 4	Mowing - per hectare.
Item No. 570- 5	Fertilizer - per ton.
Item No. 2570- 5	Fertilizer - per metric ton.
Item No. 570- 9	Water for Grassing - per thousand gallons.
Item No. 2570- 9	Water for Grassing - per kiloliter.
Item No. 575- 1	Sodding - per square yard.
Item No. 2575- 1	Sodding - per square meter.

SECTION 580 - LANDSCAPE INSTALLATION

580-1 Description.

Plant trees and shrubs of the species, size, and quality indicated in the plans.

The Engineer reserves the right to adjust the number and location of any of the designated types and species to be used at any of the locations shown, in order to provide for any unanticipated effects which might become apparent after the substantial completion of other phases of the project, or for other causes.

580-2 Materials.

580-2.1 Plants:

580-2.1.1 Authority for Nomenclature; Species, etc.: For the designated authority in the identification of all plant material, refer to two publications of L.H. Bailey: "Hortus III" and "Manual of Cultivated Plants," and ensure that all specimens are true to type, name, etc., as described therein. For the standard nomenclature, refer to the publication of the American Joint Committee on Horticultural Nomenclature, "Standardized Plant Names."

580-2.1.2 Grade Standards and Conformity with Type and Species: Only use nursery grown plant material except where specified as Collected Material. Use nursery grown plant material that complies with all required inspection, grading standards, and plant regulations in accordance with the latest edition of the Florida Department of Agriculture's "Grades and Standards for Nursery Plants".

Except where a lesser grade might be specifically specified in the plans, ensure that the minimum grade for all trees and shrubs is Florida No. 1. Ensure that all plants are the proper size and grade at the time of delivery to the site, throughout the project construction period and during the plant establishment period.

Ensure that plant materials are true to type and species and that any plant materials not specifically covered in Florida Department of Agriculture's "Grades and Standards for Nursery Plants" conform in type and species with the standards and designations in general acceptance by Florida nurseries.

Ensure that plant materials are shipped with tags stating the botanical and common name of the plant.

580-2.1.3 Inspection and Transporting: Move nursery stock in accordance with all Federal and State regulations therefore, and

accompany each shipment with the required inspection certificates for filing with the Engineer.

580-2.2 Water: Meet the requirements of Section 983.

580-3 Specific Requirements for the Various Plant Designations.

580-3.1 Balled-and-Burlapped Plants (B&B), and Wired Balled-and-Burlapped (WB & B):

580-3.1.1 General: Properly protect the root ball of these plants until planting them. The Engineer may reject any plant which shows evidence of having been mishandled.

Set the B&B and WB&B plants then remove the top 2/3 of all wire, rope, and binding surrounding the plant. Remove the burlap from the top 4 inches [100 mm] of the root ball. Do not disturb the root ball in any way. Bare root material is not allowed for substitution.

At least 90 days before digging out B & B and WB & B plants, root-prune those 1½ inches [38 mm] or greater in diameter and certify such fact on accompanying invoices.

580-3.1.2 Provisions for Wiring: For plants grown in soil of a loose texture, which does not readily adhere to the root system (and especially in the case of large plants or trees), the Engineer may require WB & B plants. For WB & B plants, before removing the plant from the excavated hole, place sound hog wire around the burlapped ball, and loop and tension it until the tightened wire netting substantially packages the burlapped ball such as to prevent disturbing of the loose soil around the roots during handling.

580-3.2 Container-Grown Plants (CG): The Engineer will not accept any CG plants with roots which have become pot-bound or for which the top system is too large for the size of the container. Fully cut and open all containers in a manner that will not damage the root system. Do not remove CG plants from the container until immediately before planting to prevent damage to the root system.

580-3.3 Collected Plants (Trees and Shrubs) (C): Use C plants which have a root ball according to "Florida Grades and Standards for Nursery Plants". Do not plant any C plant before the Engineer's inspection and acceptance at the planting site.

580-3.4 Collected Plants (Herbaceous) (HC): The root mass and vegetative portions of collected herbaceous plants shall be as large as the specified

container-grown equivalent. Do not plant any collected plant before inspection and acceptance by the Engineer.

580-3.5 Specimen Plants (Special Grade): When Specimen (or Special Grade) plants are required, label them as such on the plant list, and tag the plant to be furnished.

580-3.6 Palms: Wrap the roots of all plants of the palm species before transporting, except if they are CG plants and ensure that they have an adequate root ball structure and mass for healthy transplantation as defined in "Florida Grades and Standards for Nursery Plants".

The Engineer will not require burlapping if the palm is carefully dug from marl or heavy soil that adheres to the roots and retains its shape without crumbling. During transporting and after arrival, carefully protect root balls of palms from wind and exposure to the sun. Muck grown palms are not allowed. After delivery to the job site, if not planting the palm within 24 hours, cover the root ball with a moist material. Plant all palms within 48 hours of delivery to the site.

Move sabal and coconut palms in accordance with the "Florida Grades and Standards for Nursery Plants."

580-3.7 Substitution of Container-Grown (CG) Plants: With the Engineer's approval, the Contractor may substitute CG plants for any other root classification types, if he has met all other requirements of the Contract Documents.

580-4 Planting Requirements.

580-4.1 Layout: Prior to any excavation or planting, mark all planting beds and individual locations of palms, trees, large shrubs and proposed art and architectural structures, as shown in the plans, on the ground with a common bright orange colored spray paint, or with other approved methods, within the project limits. Obtain the Engineer's approval and make necessary utility clearance requests.

580-4.2 Excavation of Plant Holes: Excavate plant holes after an area around the plant three times the size of the root ball has been tilled to a depth of the root ball. Ensure that the plant hole is made in the center of the tilled area only to the depth of the plant root ball.

Where excess material has been excavated from the plant hole, use the excavated material to backfill to proper level.

580-4.3 Setting of Plants: Center plants in the hole. Lower the plant into the hole so that it rests on a prepared hole bottom such that the roots are level with,

or slightly above, the level of their previous growth and so oriented such as to present the best appearance.

Backfill with native soil, unless otherwise specified on the plans. Firmly rod and water-in the backfill so that no air pockets remain. Apply a sufficient quantity of water immediately upon planting to thoroughly moisten all of the backfilled earth. Keep plants in a moistened condition for the duration of the planting period.

When so directed, form a water ring 6 inches [150 mm] in width to make a water collecting basin with an inside diameter equal to the diameter of the excavated hole. Maintain the water ring in an acceptable condition.

580-4.4 Special Bed Preparation: Where multiple or mass plantings are to be made in extended bedding areas, and the plans specify Special Bed Preparation, prepare the planting beds as follows:

Remove all vegetation from within the area of the planting bed and excavate the surface soil to a depth of 6 inches [150 mm]. Backfill the excavated area with peat, sand, finish soil layer material or other material to the elevation of the original surface. Till the entire area to provide a loose, friable mixture to a depth of at least 8 inches [200 mm]. Level the bed only slightly above the adjacent ground level. Then mulch the entire bedding area, in accordance with 580-8.

580-5 Staking and Guying.

580-5.1 General: When specified in the plans, or as directed by the Engineer, stake plants in accordance with the following.

Use wide plastic, rubber or other flexible strapping materials to support the tree to stakes or ground anchors that will give as the tree moves in any direction up to 30 degrees. Do not use rope or wire through a hose. Use guy chords, hose or any other thin bracing or anchorage material which has a minimum 12 inches [300 mm] length of high visibility flagging tape secured to guys, midway between the tree and stakes for safety.

Stake trees larger than 1 inch [25 mm] diameter and smaller than 2 inches [50 mm] diameter with a 2 by 2 inch [50 by 50 mm] stake, set at least 2 feet [0.6 m] in the ground and extending to the crown of the plant. Firmly fasten the plant to the stake with flexible strapping materials as noted above.

580-5.2 Trees of 2 to 3 1/2 inches [50 to 90 mm] Caliper: Stake all trees, other than palm trees, larger than 2 inches [50 mm] caliper and smaller than 3 1/2 inches [90 mm] caliper with two 2 by 4 inch [50 by 100 mm] stakes, 8 feet [2.4 m] long, set 2 feet [0.6 m] in the ground. Place the tree midway between the stakes and hold it firmly in place by flexible strapping materials as noted above.

580-5.3 Large Trees: Guy all trees, other than palm trees, larger than 3 1/2 inches [90 mm] caliper, from at least three points, with flexible strapping materials as noted above.

Anchor flexible strapping to 2 by 4 by 24 inch [50 by 100 by 600 mm] stakes, driven into the ground such that the top of the stake is at least 3 inches [75 mm] below the finished ground.

580-5.4 Special Requirements for Palm Trees: Brace palms which are to be staked with three 2 by 4 inch [50 by 100 mm] wood braces, toe-nailed to cleats which are securely banded at two points to the palm, at a point one third the height of the trunk. Pad the trunk with five layers of burlap under the cleats. Place braces approximately 120 degrees apart and secure them underground by 2 by 4 by 12 inch [50 by 100 by 300 mm] stake pads.

580-6 Tree Protection and Root Barriers.

Install tree barricades when called for in the Contract Documents or by the Engineer to protect existing trees from damage during project construction. Place barricades at the drip line of the tree foliage or as far from the base of the tree trunk as possible. Barricades shall be able to withstand bumps by heavy equipment and trucks. Maintain barricades in good condition.

When called for in the Contract Documents, install root barriers or fabrics in accordance with the details shown.

580-7 Pruning.

Prune all broken or damaged roots and limbs in accordance with established arborculture practices. When pruning is completed ensure that all remaining wood is alive. Do not reduce the size or quality of the plant below the minimum specified.

580-8 Mulching.

Uniformly apply mulch material, consisting of wood chips (no Cypress Mulch is allowed), pine straw, compost, or other suitable material approved by the Engineer, to a minimum loose thickness of 3 inches [75 mm] over the entire area of the backfilled hole or bed within two days after the planting. Compost used for mulch shall meet the requirements of Section 987. Maintain the mulch continuously in place until the time of final inspection.

580-9 Disposal of Surplus Materials and Debris.

Dispose of surplus excavated material from plant holes by scattering or otherwise as might be directed so that it is not readily visible or conspicuous to the passing motorist

or pedestrian. Remove all debris and other objectionable material from the site and clean up the entire area and leave it in neat condition.

580-10 Contractor's Responsibility for Condition of the Plantings.

Ensure that the plants are kept watered, that the staking and guying is kept adjusted as necessary, that all planting areas and beds are kept free of weeds and undesirable plant growth and that the plants are maintained so that they are healthy, vigorous, and undamaged at the time of acceptance.

580-11 Plant Establishment Period and Contractor's Warranty.

Assume responsibility for the proper maintenance, survival and condition of all landscape items for a period of one year after the final acceptance of all work under the Contract in accordance with 5-11. Provide a Warranty/Maintenance Bond to the Department in the amount of the total sums bid for all landscape items as evidence of warranty during this plant establishment period. The costs of the bond will not be paid separately, but will be included in the costs of other bid items.

In addition to satisfying the provisions of Section 287.0935, Florida Statutes, the bonding company is required to have a A.M. Best rating of "A" or better. If the bonding company drops below the "A" rating during the one year Warranty/Maintenance Bond period, provide a new Warranty/Maintenance Bond for the balance of the one year period from a bonding company with an "A" or better rating. In such event, all costs of the premium for the new Warranty/Maintenance Bond shall be at the Contractor's expense.

Take responsibility to apply water as necessary during this period and include the cost in the various landscape items. No separate measurement or payment will be made for water during the plant establishment period.

The Engineer will conduct interim inspections of all landscape items 90 days, 180 days and 270 days into the plant establishment period, as well as at the end of the plant establishment period. As part of the warranty to the Department, and at no cost to the Department, immediately replace all landscape items found not to meet minimum specifications as shown in 580-2.1.2 after each inspection.

At the end of the one year warranty period, the Engineer will release the Contractor from further warranty work and responsibility, provided all landscape items are established and all previous warranty and remedial work, if any, has been completed.

580-12 Method of Measurement.

The quantities to be paid for will be the items shown in the plans, completed and accepted.

580-13 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including furnishing and planting the designated plant types, the furnishing and placing of the plant backfill, fertilizer and mulch, (except where such are shown to be paid for under a separate item), the application of water, the maintenance, care, etc., and all costs of any required replacing of plantings or restoring of damaged areas.

SECTIONS 581-2 AND 583-4 - LANDSCAPING

(the more strict specification will govern)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Nomenclature: Shall conform to the names given in "Standardized Plant Names", 1942 Edition, prepared by the American Joint Committee on Horticultural Nomenclature or by the Bureau of Plant Industry, State of Florida. Names of varieties not included therein shall conform generally with names accepted in the nursery trade.

1.2 SUMMARY

- A. This Section includes provisions for the following items:
 - 1. Trees.
 - 2. Shrubs.
 - 3. Plants.
 - 4. Ground cover.
 - 5. Lawns.
 - 6. Initial maintenance of landscape materials.
- B. Related Sections: The following sections contain requirements that relate to this Section.
 - 1. Excavation, filling, and rough grading required to establish elevations shown on drawings is specified in Division 2 Section, "Earthwork."
 - 2. Underground sprinkler system is specified in Division 2 Section, "Irrigation Systems."

1.3 QUALITY ASSURANCE

- A. Subcontract landscape work to a single firm specializing in landscape work. All planting shall be performed by personnel familiar with planting procedures and under the supervision of a qualified planting foreman. Except as otherwise specified, the contractor's work shall conform to accepted horticultural practices as used in the trade.

- B. General: Comply with applicable Federal, State, County and local codes, ordinances and regulations governing landscape materials and work.
- C. General: Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.
- D. Substitutions will be permitted only upon submission of proof that any specified plant is not obtainable or suitable for the location as specified on the plan and upon written authorization of the Architect.
- E. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.
- F. Topsoil: Before delivery of topsoil, furnish Architect with written statement giving location of properties from which topsoil is to be obtained, names and addresses of owners, depth to be stripped, and crops grown during past 2 years.
- G. Trees, Shrubs, and Plants: Provide trees, shrubs, and plants of quantity, size, genus, species, and variety shown and scheduled for landscape work. Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, abrasions, or disfigurement. All material shall be graded Florida No. 1 or better as outlined under Grades and Standards for Nursery Plants, Division of Plant Industry, State of Florida, unless otherwise noted.
- H. At Architect's request, contractor shall provide, at no additional expense to the Owner, certification by an independent certified horticulturist, botanist and/or agricultural laboratory that the ground covers, shrubs, trees and palms comply with specified genus, species, variety, grade and standards.
- I. Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.
 - 1. Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread, and label with number to assure symmetry in planting.
- J. Inspection: The Architect may inspect trees and shrubs either at place of growth or at site before planting, for compliance with requirements for

genus, species, variety, size, and quality. Architect retains right to further inspect trees and shrubs for size and condition of balls and root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from project site.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
1. Contractor to submit total quantities of the following items to the Architect prior to installation:
 - (a) Topsoil
 - (b) Planting Soil
 - (c) Mulch
 - (d) Sod
 2. Plant and Material Certifications: Furnish manufacturer's certificate of compliance as specified and required.
 3. Certificates of inspection as required by governmental authorities: All required inspection certificates shall accompany the invoices. Required transportation documents are to be submitted with invoices as back-up.
 4. Manufacturer's or vendor's certified analysis for soil amendments, pre-emergent herbicide, and fertilizer materials.
 5. Label data substantiating that plants, trees, shrubs and planting materials comply with specified requirements.
 6. Planting Schedule: Proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delay.
 7. Maintenance Instructions: Typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period(s).

1.5 DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site.
- B. Sod: Time delivery so that sod will be placed within 24 hours after stripping. Protect sod against drying and breaking of pads.
- C. Trees and Shrubs: Provide freshly dug trees and shrubs. Do not prune prior to delivery unless otherwise approved by Architect. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches, or destroy natural shape. Provide protective covering during delivery. Do not drop balled and burlapped stock during delivery.
- D. Deliver trees and shrubs after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by irrigating all trees and shrubs until they have been planted.
- E. Do not remove container-grown stock from containers until planting time.

1.6 JOB CONDITIONS

- A. Utilities: Prior to the preparation of planting areas and plant pits, ascertain the location of all electrical cables, all conduits, all utility lines, oil tanks and supply lines, so that proper precautions may be taken not to disturb or damage any sub-surface improvements. Properly maintain and protect existing utilities. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Architect before planting.
- C. The Contractor shall take all necessary precautions to avoid damage to existing structures or utilities while installing plants. The Contractor shall be responsible for all damages to existing structures or utilities caused by his operations.

1.7 SEQUENCING AND SCHEDULING

- A. Planting Time: Proceed with, and complete landscape work as rapidly as portions of site become available.

- B. Plant or install materials during normal planting seasons for each type of plant material required.
- C. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.
- D. Coordination with Lawns: Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to Architect. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.
- E. The work shall be coordinated with other trades to prevent conflicts. Coordinate the planting with the irrigation work to assure availability of water and proper location of irrigation equipment and plant materials.

1.8 SPECIAL PROJECT WARRANTY

- A. Contractor will warranty lawns through specified lawn maintenance period, and until final acceptance.
- B. Warranty trees, shrubs, and palms for a period of one year from date of final acceptance, against defects including death and unsatisfactory growth, except for defects resulting from abuse or damage by others, or unusual phenomena or incidents which are beyond Contractor's control. The Landscape Contractor shall notify the Owner's Representative in writing, ten (10) days prior to expiration of warranty periods and said warranty period shall be continued until such written notification is received.
- C. At the end of the guarantee period, the Owner's Authorized Representative will conduct an inspection. All plants that are dead or not in satisfactory growth, as determined by the OAR, shall be removed from the site and shall be immediately replaced.
- D. Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period. Replace trees and shrubs that are in doubtful condition at end of warranty period unless, in opinion of Architect, it is advisable to extend warranty period for a full growing season. All replacements shall be plants of the same kind and size as specified in the Plant List. They shall be furnished and planted as specified with no additional cost to the Owner. All replacement shall be guaranteed for an additional period of three (3) months.

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. Topsoil for landscape work is not available at site and must be furnished as specified.
- B. Provide new topsoil that is fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 1/2 inch in any dimension, and other extraneous or toxic matter harmful to plant growth. Topsoil shall be obtained from naturally drained sources; shall contain at least 25 percent organic matter. Acidity shall range from pH 5.5 to pH 6.5 inclusive. Topsoil shall be proportioned by volume rather than weight. No site mixing will be accepted. Topsoil shall be spread at a minimum depth of not less than 2 1/2" over all areas to receive sod. The total cubic yards of topsoil shall be provided to the Architect prior to installation. Alternative topsoil shall be approved by Architect prior to delivery to site.

2.2 PLANTING SOIL

- A. Planting soil shall consist of an evenly blended mixture of the following and as per the depth shown on the planting details provided within the contract documents:
 - 1. 2/3 approved topsoil as specified herein.
 - 2. 1/3 Spaghnum Peat Moss: Finely divided peat, may provide in granular form, free of hard lumps and with pH range suitable for intended use.
- B. Contractor to provide Architect with total cubic yards of planting soil prior to installation.
- C. Mulch: 3" minimum organic mulch free from deleterious materials and suitable for top dressing of trees, shrubs, or ground covers and consisting of the following:
 - 1. Mini Nugget Pine Bark Mulch
- D. Commercial Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources. The fertilizer mixture shall contain minor elements suitable for the plants being used. The source of the nutrients shall be suitable for the various specific types of plants being used (acid or alkaline). All fertilizer to be slow release.

1. All trees and shrubs shall be fertilized with Agriform 20-10-5 Tablets at time of planting. Trees shall receive six tablets evenly spaced around the root ball. Shrubs shall receive three tablets evenly spaced around the root ball. Tablets shall be placed at the mid-depth point of the plant pit.
 2. Fertilizer for ground cover beds shall be evenly applied to all newly planted areas at the rate of 1-1/2 pounds of actual nitrogen, 1-1/2 pounds of actual phosphorous and 1-1/2 pounds of actual potash per one thousand square feet.
 3. For lawns, provide fertilizer with percentage of nitrogen required to provide not less than 1 pound of actual nitrogen per 1,000 sq. ft. of lawn area and not less than 4 percent phosphoric acid and 2 percent potassium. Provide nitrogen in a form that will be available to lawn during initial period of growth; at least 50 percent of nitrogen to be organic form.
- E. All topsoil, planting soil and planting beds shall be treated with a pre-emergent herbicide prior to installation of plant material.

2.3 PLANT MATERIALS

- A. Quality: Provide trees, shrubs, and other plants of size, genus, species, and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock." All plants shall have been transplanted or root pruned at least once in the three years previous to contract date. Root bound container plants will not be accepted. Collected plants shall not be used unless called for in the specifications or approved in writing by the Architect.
- B. Quantities: In the event of a variation between the Plant List and the actual number of plants shown on the plans, the plans shall control.
- C. Trees: Provide trees of height and caliper scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed. The caliper of tree trunks is to be taken one foot above the ground level.
1. Provide container grown trees unless otherwise indicated on plans.
 2. Balled and burlapped (B&B) trees will be acceptable in lieu of container grown trees with Architect's written authorization.

- D. Shrubs: Provide shrubs of the height shown or listed and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.
 - 1. Provide container grown shrubs unless otherwise indicated on plans.
 - 2. Balled and burlapped (B&B) shrubs will be acceptable in lieu of container grown shrubs with Architect's written authorization.
- E. Anti-desiccants: Anti-desiccants for retarding excessive loss of plant moisture and inhibiting will shall be sprayable, water insoluble vinyl-vinylethane complex which will produce a moisture retarding barrier not removable by rain. Wilt-pruf Formula NCF as manufactured by Nursery Specialty Products, Greenwich, CT or approved equal.

2.4 GRASS MATERIALS

- A. Sod: Provide strongly rooted sod, not less than 2 years old, free of weeds and undesirable native grasses, and machine cut to pad thickness of 3/4 inch (plus or minus 1/4 inch), excluding top growth and thatch. Provide only sod capable of vigorous growth and development when planted (viable, not dormant). Sod shall have been mowed twice prior to harvesting.
 - 1. Provide sod of uniform pad sizes with maximum 5 percent deviation in either length or width. Broken pads or pads with uneven ends will not be acceptable. Sod pads incapable of supporting their own weight when suspended vertically with a firm grasp on upper 10 percent of pad will be rejected.
 - 2. Provide Bahia sod (*Paspalum Notatum* 'Argentine') at locations indicated.
 - 3. Provide St. Augustine sod (*Stenotaphrum Secundatum* 'Floratan') at locations indicated.

2.5 GROUND COVER

- A. Provide plants established and well rooted in removable containers or integral peat pots and with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown or listed.

2.6 MISCELLANEOUS LANDSCAPE MATERIALS

- A. Stakes and Guys: Provide pressure treated stakes and deadmen of sound new hardwood or treated softwood, free of knot holes and other defects. Provide wire ties and guys of 2-strand, twisted, pliable galvanized iron wire, not lighter than 12 ga. with zinc-coated turnbuckles. Provide not less than 1/2 inch diameter rubber or plastic hose, cut to required lengths and of uniform color, material, and size to protect tree trunks from damage by wires. All wires must be flagged with red flagging tape above turnbuckle and 4" above finish grade.
- B. Provide the following items for each date palm tree:
1. Guying and Staking System
 - (a) Wide durable synthetic webbing palm collar min. 30 inch diameter by "Duckbill Tree Support Systems" or Architect approved equal.
 - (b) Three (3) Model 88-DTS-O "Duckbill Anchors" with holding capacity of at least 3,000 lbs. per anchor or Architect approved equal.
 - (c) Three (3) 15' x 3/16"-7 x 7 galvanized steel cable vinyl coated in orange with eye to eye type, zinc plated, 3/8" threaded diameter with 3" take-up turnbuckles.
 - (d) Six (6) 1/8" zinc-plated cable clamps.
 - (e) DR-1 steel drive rod 3' long with 1/2" round driving tip by "Duckbill Tree Support Systems" for installation of anchors, or Architect approved equal.
 2. Coarse White Sand: Provide clean coarse white sand with effective size between 0.4 and 0.6 mm with uniformity coefficient less than 4.0, free of debris, stones or other undesirable elements. Contractor shall furnish architect with total cubic yards of coarse white sand to be provided, prior to installation.
 3. Graded Gravel: Provide clean graded gravel all passing through a 2 1/2" sieve and retained on 3/4" to 1/2" sieve screen, free of debris, organic matter and other undesirable elements. Contractor shall furnish architect with total cubic yards of graded gravel to be provided, prior to installation.

PART 3 - EXECUTION

3.1 PREPARATION - GENERAL

- A. Prior to placing planting mix and backfill, or commencing with planting of groundcover or shrubs, roto-till any or all areas that have been mechanically compacted 90% to 95% for construction purposes.
- B. Finish Grade: The Landscape Contractor will grade the site to a finished grade for planting areas as required by the specifications.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure Architect's acceptance before start of planting work. Make minor adjustments as may be required.
- D. Plants shall be protected upon arrival at the site, by being thoroughly watered and properly maintained until planted. Plants shall not remain unprotected for a period exceeding 24 hours. At all times workmanlike methods customary in good horticultural practice shall be exercised.
- E. Irrigation system to be fully functional before planting each area.
- F. The existence and location of underground utilities if shown on the drawings are not guaranteed and shall be investigated and verified in the field before starting work. Excavation in the vicinity of existing structures and utilities shall be carefully done.
- G. Should overhead or underground obstructions be encountered which interfere with plantings, alternate locations will be selected by the Architect.

3.2 PREPARATION OF PLANTING SOIL

- A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.
- B. Mix specified topsoil and fertilizers with existing topsoil at rates specified. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.
- C. For pit and trench type backfill, mix planting soil prior to backfilling, and stockpile at site.
- D. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

3.3 PREPARATION FOR PLANTING LAWNS

- A. Loosen subgrade of lawn areas to a minimum depth of 4 inches. Remove stones measuring over 1-1/2 inches in any dimension. Remove sticks, roots, rubbish, and other extraneous matter. Limit preparation to areas that will be planted promptly after preparation.
- B. Spread topsoil to minimum depth of 2 1/2" or to that which is required to meet lines, grades, and elevations shown, after light rolling and natural settlement.
- C. Place approximately 1/2 of total amount of topsoil required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil.
- D. Preparation of Unchanged Grades: Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for lawn planting as follows: Till to a depth of not less than 6 inches. Remove high areas and fill in depressions. Till soil to a homogenous mixture of fine texture, free of lumps, clods, stones, roots and other extraneous matter.
 - 1. Prior to preparation of unchanged areas, remove existing grass, vegetation and turf. Dispose of such material outside of Owner's property. Do not turn existing vegetation over into soil being prepared for lawns.
 - 2. Allow for sod thickness in areas to be sodded.
 - 3. Apply specified commercial fertilizer at rates specified and thoroughly mix into upper 2 inches of topsoil. Delay application of fertilizer if lawn planting will not follow within a few days.
- E. Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake, and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.
- F. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.

- G. Restore lawn areas to specified condition, if eroded or otherwise disturbed, after fine grading and prior to planting.

3.4 PREPARATION OF PLANTING BEDS

- A. Loosen subgrade of planting bed areas to a minimum depth of 12 inches using a culti-mulcher or similar equipment. Remove stones measuring over 1-1/2 inches in any dimension. Remove sticks, stones, rubbish, and other extraneous matter. Where excessive soil compaction occurs, the contractor shall loosen two and a half (2 1/2) times deeper than specified depth as noted on the planting details located within the Contract Documents.
- B. Spread planting soil mixture to minimum depth required to meet lines, grades, and elevations shown, after light rolling and natural settlement, but not less than 12" deep. Place approximately 1/2 of total amount of planting soil required. Work into top of loosened subgrade to create a transition layer, then place remainder of the planting soil.
- C. Dig beds not less than 12 inches deep.
- D. Remove 12 inches of soil and replace with prepared planting soil mixture and fertilizers.

3.5 EXCAVATION FOR TREES, PALMS AND SHRUBS

- A. Excavate pits, beds, and trenches with vertical sides and with bottom of excavation compacted and raised 6" minimum at center to provide proper drainage and prevent settling. Loosen hard subsoil in remaining bottom of excavation. Where excessive soil compaction occurs, the contractor shall loosen two and a half (2 1/2) times deeper than specified depth as noted on the planting details located within the Contract Documents.
 - 1. Excavate planting pits for palms with vertical sides. Loosen compacted subsoil in the bottom of the excavation. Where excessive soil compaction occurs, the contractor shall loosen subgrade two and a half (2 1/2) times deeper than the specified depth as noted on the planting details located within the Contract Documents. To provide for proper drainage, fill bottom of planting pit with minimum 18" graded gravel and lightly compact.
 - 2. For bare root trees and shrubs, make excavations at least 12 inches wider than root spread and deep enough to allow for setting of roots on a 6" minimum layer of compacted backfill and with collar set at same grade level as in nursery, but 1 inch below finished grade at site.

- (a) Allow for 9 inch setting layer of planting soil mixture.
- 3. For balled and burlapped (B&B trees and shrubs), make excavations at least half again as wide as the ball diameter and equal to the ball depth, plus following allowance for setting of ball on a 6" minimum layer of compacted backfill:
 - (a) Allow for 3 inch thick setting layer of planting soil mixture.
- 4. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.
- B. Dispose of subsoil removed from planting excavations. Do not mix with planting soil or use as backfill.
- C. Fill excavations (planting pits) for trees and shrubs with water and allow water to percolate out prior to planting. If percolation problems exist, contractor shall suspend planting in the area and notify architect immediately for resolution of the problem.

3.6 PLANTING TREES, PALMS AND SHRUBS

- A. Set balled and burlapped (B&B) stock on 6" layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Remove burlap from sides of balls; retain on bottoms. Remove completely any and all synthetic burlap or root ball covering prior to planting. When set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.
- B. Set date palms on 18" minimum lightly compacted graded gravel, plumb and in center of planting pit with top of root ball at the same elevation as adjacent finish landscape grades. When set, place white coarse sand around base and sides of ball and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing the remainder of white coarse sand. Repeat watering until no more is absorbed. Place a final layer of specified planting soil to the specified depth over the white coarse sand and mulch. Water again after final layer.
- C. Set bare root stock on cushion of planting soil mixture. Spread roots and carefully work backfill around roots by hand and puddle with water until

backfill layers are completely saturated. Plumb before backfilling and maintain plumb while working backfill around roots and placing layers of soil mixture above roots. Set collar 1 inch below adjacent finish landscape grades. Spread out roots without tangling or turning up to surface. Cut injured roots clean; do not break.

- D. Set container grown stock, as specified, for balled burlapped stock, except cut cans on 2 sides with an approved can cutter; remove bottoms of wooden boxes after partial backfilling so as not to damage root balls.
- E. Dish top of backfill to allow for mulching.
- F. Mulch pits, trenches, and planted areas. Provide not less than following thickness of mulch, and finish level with adjacent finish grades.
- G. Provide 3 inches minimum thickness of mulch in all areas as specified.
- H. Prune, thin out, and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Architect, do not cut tree leaders, and remove only injured or dead branches from flowering trees, if any. Prune shrubs to retain natural character. Pruning to occur only after planting under direction of the Architect.
- I. Remove and replace excessively pruned or misformed stock resulting from improper pruning.
- J. Wrap tree trunks with burlap at any point where wood baton braces will come in contact with the tree trunk.
- K. Guy and stake trees immediately after planting, as indicated by the planting details submitted by the Architect. Alternative methods must be approved by the Architect.

3.7 SODDING NEW LAWNS

- A. Lay sod within 24 hours from time of stripping.

3.8 PLANTING GROUND COVER

- A. Space ground cover plants as indicated or scheduled. Triangular spacing to be used in all ground cover beds.
- B. Excavate entire ground cover beds to allow for spreading of roots and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water

thoroughly after planting, taking care not to cover crowns of plants with wet soil.

- C. Mulch areas between ground cover plants as specified.

3.9 MAINTENANCE

- A. Begin maintenance immediately after planting.
- B. Maintain trees, shrubs, and other plants until final acceptance, but in no case, less than 180 days after substantial completion of planting.
- C. Maintain palms for a period of 1 year from the date of final acceptance.
- D. Maintain trees, shrubs, and other plants by pruning, cultivating, and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease.
- E. Maintain lawns for not less than the period stated below, and longer as required to establish an acceptable lawn.
 - 1. Sodded lawns, not less than 90 days after substantial completion.
- F. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

3.10 CLEANUP AND PROTECTION

- A. During landscape work, keep pavements clean and work area in an orderly condition.
- B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.
- C. Damage resulting from erosion, gullies, washouts or other causes shall be repaired by filling with topsoil, tamping, re-fertilizing and slope stabilizing by the Contractor.

3.11 INSPECTION AND ACCEPTANCE

- A. When landscape work is substantially completed, Architect will, upon request, make an inspection to determine substantial completion acceptance. If all materials and workmanship are found to be acceptable, the architect will furnish written notification of substantial completion, thus beginning the stipulated maintenance periods.
- B. Landscape work may be inspected for substantial completion in portions as agreeable to Architect provided each portion of work offered for inspection is complete.
- C. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until reinspected by Architect and found to be acceptable. Remove rejected plants and materials promptly from project site.

SECTION 710 - PAINTING TRAFFIC STRIPES

710-1 Description.

Apply Paint Traffic Stripes and Markings in accordance with the details shown in the Contract Documents, and remove traffic stripes and markings when required.

710-2 Materials.

710-2.1 Paint Materials: Use only paint materials listed on the Qualified Products List (QPL), and meet the requirements of 971-1 and 971-19. The Engineer will take random samples of the paint materials in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

710-2.2 Glass Spheres: Use only glass spheres listed on the Qualified Products List (QPL), and meet the requirements of 971-1 and 971-14. The Engineer will take random samples of the glass spheres in accordance with FM 3D-1155 and the Department's Sampling, Testing and Reporting Guide schedule.

710-3 Equipment.

Use equipment that will produce continuously uniform dimensions of traffic stripes and markings of varying widths and meet the following requirements:

(a) capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of paint and capable of following straight lines and making normal curves in true arcs.

(b) capable of applying glass spheres to the surface of the completed stripe by an automatic sphere dispenser attached to the striping machine such that the glass spheres are dispensed closely behind the installed line. Use a glass spheres dispenser equipped with an automatic cut-off control synchronized with the cut-off of the traffic paint and applies the glass spheres in a manner such that the spheres appear uniform on the entire traffic stripes and markings surface with, 50 to 60% embedment.

(c) capable of spraying the paint to the required thickness and width without thinning of the paint. Equip the paint tank with a mechanical agitator and nozzles equipped with cut-off valves which will apply broken or skip lines automatically. Provide each nozzle with suitable line guides, either metallic shrouds or air blasts.

710-4 Application:

710-4.1 General: Mix the paint thoroughly prior to pouring into the painting machine. Apply paint to the pavement by spray or other means approved by the

Engineer. The Engineer will conduct field testing in accordance with FM 5-541. Remove and replace traffic stripes and markings not meeting the requirements of this Section at no additional cost to the Department.

Ensure that existing pavement markings are removed, such that scars or traces of removed markings will not conflict with new stripes and markings by a method approved by the Engineer.

Prior to applying pavement stripes and markings, remove any material that would adversely affect the bond of the pavement stripes and markings by a method approved by the Engineer.

Establish tack points at appropriate intervals for use in aligning stripes, and set a stringline from such points to achieve accuracy.

Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 40°F [5°C] and rising. Follow the manufacturer's recommendations for application temperature. Do not apply pavement markings when winds are sufficient to cause spray dust.

Apply traffic stripes or markings, having well defined edges, over existing pavement markings such that not more than 2 inches [50 mm] on either end and not more than 1 inch [25 mm] on either side is visible. Apply all final traffic stripes and markings prior to opening the road to traffic.

710-4.2 Corrections for Deficiencies to Applied Traffic Stripes and Markings: Remove and reapply a 1.0 mile [1.0 kilometer] LOT centered around any deficiency, at no additional cost to the Department.

710-4.3 Rate of Paint Application: Meet the following minimum rate of application:

6 inch [150 mm] solid traffic stripe: 25 gal/mi [59 L/km].

6 inch [150 mm] skip traffic stripe: 6.2 gal/gm [15 L/gkm].

Any other width stripe: a direct proportion of the above.

710-4.4 Required Film Thickness: Apply paint to attain a minimum wet film thickness of 15 mils [380 µm].

710-4.5 Application of Spheres: Apply glass spheres immediately and uniformly following the paint application, at a rate of not less than 6 lb/gal [0.72 kg/L] of paint.

710-4.6 Retroreflectivity: Apply white and yellow pavement markings that will attain an initial retroreflectance of not less than 300 cd/fc·ft² [300 mcd/lx·m²] and not less than 250 cd/fc·ft² [250 mcd/lx·m²], respectively. Ensure that the intermittent and final retroreflectance of white and yellow pavement markings are

not less than 150 cd/ft² [150 mcd/lx·m²]. This does not apply to transverse lines, bike lane symbols and longitudinal lines adjacent to or in a proposed bike lane.

710-4.7 Color: Use white striping and marking material that is pure white, free from any tint and showing no deviations from magnesium oxide color standard greater than the following:

Scale Definition	Magnesium Oxide Standard	Sample
RD	100 75%	minimum
Reflectance		
a. Red-Green	0	-5 to +5
b. Yellow-Blue	0	-10 to 10

Use yellow striping and marking material which visually matches Federal Test Standard Number 595-color 33538, and meet the following criteria for chromaticity coordinates (x,y):

X	0.455	0.510	0.472	0.530
y	0.444	0.485	0.400	0.456

710-5 Tolerances in Dimensions and in Alignment.

710-5.1 Dimensions:

710-5.1.1 Longitudinal Lines: Apply painted skip segments of 10 foot [3 m], with a 30 foot [9 m] unpainted gap between segments. Apply painted segments with no more than ± 12 inches [± 300 mm] variance, so that over-tolerance and under-tolerance lengths will approximately balance. Apply longitudinal lines at least 2 inches [50 mm] from construction joints of portland cement concrete pavement.

710-5.1.2 Transverse Markings, Gore Markings, Arrows, and Messages: Apply paint in multiple passes when the marking cannot be completed in one pass, with an overall line width allowable tolerance of ± 1 inch [± 25 mm].

710-5.1.3 Contrast Lines: Use black paint to provide contrast on concrete or light asphalt pavement, when specified by the Engineer. Apply black paint in 10 foot [3 m] segments following each longitudinal skip line.

710-5.2 Alignment: Apply painted stripes, that will not deviate more than 1 inch [25 mm] from the stringline on tangents and curves one degree or less. Apply painted stripes that will not deviate more than 2 inches [50 mm] from the stringline on curves greater than one degree. Apply painted edge stripes uniformly, not less than 2 inches [50 mm] or more than 4 inches [100 mm] from

the edge of pavement, without noticeable breaks or deviations in alignment or width.

710-5.3 Correction Rates: Make corrections of variations in width at a maximum rate of 10 feet [3 m] for each 0.5 inch [13 mm] of correction. Make corrections of variations in alignment at a maximum rate of 25 feet [8 m] for each 1 inch [25 mm] of correction, to return to the stringline.

710-5.4 Alignment of Stripes: Remove and replace at no additional cost to the Department traffic stripes that deviate more than 1 inch [25 mm] in any 40 feet [12 meters] from the stringline.

710-6 Contractor's Responsibility for Notification.

Notify the Engineer prior to the placement of the materials. Furnish the Engineer with the manufacturer's name and LOT numbers of the materials and glass spheres to be used. Ensure that the approved LOT numbers appear on the materials and glass spheres packages. Submit a certified test report to the Engineer indicating that the materials meet all requirements specified.

710-7 Protection of Newly Painted Stripes.

Do not allow traffic onto newly applied traffic stripes and markings until they are sufficiently dry to permit vehicles to cross them without damage. Remove and replace any portion of the traffic stripes and markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

710-8 Method of Measurement.

The quantities to be paid for under this Section will be as follows:

- (1) The length, in gross miles [kilometers], of Skip Traffic Stripes.
- (2) The length, in net miles [net kilometers], of Solid Traffic Stripes.
- (3) The length, in feet [meters], of Solid Traffic Stripes and Skip Traffic Stripes.
- (4) The number of directional arrows and pavement messages, painted.
- (5) The area, in square feet [square meters], of Reflective Paint (Island Nose).
- (6) The area, in square feet [square meters], of Remove Existing Markings.

The quantities to be paid for will also include 6/10 foot [2/3 m] skip traffic stripe sections as indicated in the plans. Measurement will be taken as the distance from the beginning of the first painted stripe to the end of the last painted stripe with proper deductions

made for unpainted intervals as determined by plan dimensions or stations, subject to 9-1.3. Unpainted intervals will not be included in pay quantity.

The gross-mile [gross-kilometer] measurement of Skip Traffic Stripes will be taken as the distance from the beginning of the first painted stripe to the end of the last painted stripe, and will include the unpainted intervals. It will not include any lengths of unpainted intervals which, by design or by other intent of the Department, are greater than 30 feet [9 m]. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.

710-9 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

Item No. 710- 6	Directional Arrow, Painted - each.
Item No. 2710- 6	Directional Arrow, Painted - each.
Item No. 710- 7	Pavement Messages, Painted - each.
Item No. 2710- 7	Pavement Messages, Painted - each.
Item No. 710- 11	Remove Existing Markings (Paint) - per square foot.
Item No. 2710- 11	Remove Existing Markings (Paint) - per square meter.
Item No. 710- 21	Skip Traffic Stripe (White/Black) - per gross mile.
Item No. 2710- 21	Skip Traffic Stripe (White/Black) - per gross kilometer.
Item No. 710- 22	Skip Traffic Stripe (Yellow) - per gross mile.
Item No. 2710- 22	Skip Traffic Stripe (Yellow) - per gross kilometer.
Item No. 710- 23	Solid Traffic Stripe (White/Black) - per net mile.
Item No. 2710- 23	Solid Traffic Stripe (White/Black) - per net kilometer.
Item No. 710- 24	Solid Traffic Stripe (Yellow) - per net mile.
Item No. 2710- 24	Solid Traffic Stripe (Yellow) - per net kilometer.
Item No. 710- 25	Solid Traffic Stripe (White/Black) - per foot.
Item No. 2710- 25	Solid Traffic Stripe (White/Black) - per meter.
Item No. 710- 26	Solid Traffic Stripe (Yellow) - per foot.
Item No. 2710- 26	Solid Traffic Stripe (Yellow) - per meter.
Item No. 710- 27	Skip Traffic Stripes (White/Black) - per foot.
Item No. 2710- 27	Skip Traffic Stripes (White/Black) - per meter.
Item No. 710- 28	Skip Traffic Stripe (Yellow) - per foot.
Item No. 2710- 28	Skip Traffic Stripe (Yellow) - per meter.
Item No. 710- 29	Reflective Paint (Island Nose) (White) - per square foot.
Item No. 2710- 29	Reflective Paint (Island Nose) (White) - per square meter.
Item No. 710- 30	Reflective Paint (Island Nose) (Yellow) - per square foot.
Item No. 2710- 30	Reflective Paint (Island Nose) (Yellow) - per square meter.

Item No. 710- 79 Alternating Skip Traffic Stripe - per gross mile.
Item No. 2710- 79 Alternating Skip Traffic Stripe - per gross kilometer.

SECTION 711 – THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS

711-1 Description.

Apply new thermoplastic traffic stripes and markings, or refurbish existing thermoplastic traffic stripes and markings, in accordance with the Contract Documents.

711-2 Materials.

711-2.1 Thermoplastic: Use only thermoplastic materials listed on the QPL. The Engineer will take random samples of all material in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

711-2.1.1 Initial or Recapped Stripes and Markings: Use materials meeting the requirements of 971-1 and 971-5.

711-2.1.2 Refurbishing Existing Stripes and Markings: Use materials meeting the requirements of 971-1 and 971-5.

711-2.1.3 Preformed Stripes and Markings: Use Materials meeting the requirements of 971-1 and 971-6.

711-2.2 Glass Spheres: Use only glass spheres listed on the QPL, meeting the requirements of 971-1 and 971-2. The Engineer will take random samples of all glass spheres in accordance with ASTM D1214 and the Department's Sampling, Testing and Reporting Guide schedule.

711-2.3 Sand: Use materials meeting the requirements of 971-5.4.

711-3 Equipment.

Use equipment capable of providing continuous uniform heating of striping materials to temperatures exceeding 390°F, mixing and agitation of the material reservoir to provide a homogeneous mixture without segregation. Use equipment that will maintain the striping material in a plastic state, in all mixing and conveying parts, including the line dispensing device until applied. Use equipment which can produce varying width traffic stripes and which meets the following requirements:

- (a) capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of striping material and capable of following straight lines and making normal curves in a true arc.
- (b) is capable of applying glass spheres to the surface of the completed stripe by a double drop application for initial traffic striping and marking and a single drop application for recapping and refurbishing. The bead dispenser for the first bead drop shall be attached to the striping machine in such a manner that the beads are dispensed closely behind with the thermoplastic material. The second bead dispenser bead shall be attached to the striping machine in such a manner that the beads are dispensed immediately after the first bead drop application. Glass spheres dispensers shall be equipped with an automatic cut-off control that is synchronized with the cut-off of the thermoplastic material and applies

the glass spheres in a manner such that the spheres appear uniform on the entire traffic stripes and markings surface with, 50 to 60% embedment.

- (c) equipped with a special kettle for uniformly heating and melting the striping material. The kettle must be equipped with an automatic temperature control device and material thermometer for positive temperature control and to prevent overheating or scorching of the thermoplastic material.
- (d) meet the requirements of the National Fire Protection Association, state, and local authorities.
- (e)

711-4 Application.

711-4.1 General: Remove existing pavement markings such that scars or traces of removed markings will not conflict with new stripes and markings by a method approved by the Engineer. Cost for removing conflicting pavement markings during maintenance of traffic operations to be included in Maintenance of Traffic, Lump Sum. Before applying traffic stripes and markings, remove any material by a method approved by the Engineer that would adversely affect the bond of the traffic stripes. Before applying traffic stripes to any portland cement concrete surface, apply a primer, sealer or surface preparation adhesive of the type recommended by the manufacturer. Offset longitudinal lines at least 2 inches from any longitudinal joints of portland cement concrete pavement.

Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 50°F and rising for asphalt surfaces and 60°F and rising for concrete surfaces. Apply striping to the same tolerances in dimensions and in alignment specified in 710-5. When applying traffic stripes and markings over existing markings, ensure that no more than 2 inches on either end and not more than 1 inch on either side of the existing line is visible. Apply thermoplastic material to the pavement either by spray, extrusion or other means approved by the Engineer.

Conduct field tests in accordance with FM 5-541. Take test readings representative of the striping performance. Remove and replace traffic stripes and markings not meeting the requirements of this Section at no additional cost to the Department. Apply all final pavement markings prior to opening the road to traffic.

711-4.1.1 Preformed Thermoplastic: Apply markings only to dry surfaces and when ambient air temperature is at least 32°F. Prior to installation, follow the manufacturer's recommendations for pre-heating.

711-4.2 Thickness:

711-4.2.1 Initial or Recapped Stripes and Markings: Apply or recap traffic stripes or markings such that all lane lines, center lines, transverse markings and traffic stripes and markings within traffic wearing areas, will have a thickness of 0.10 to 0.15 inch when measured above the pavement surface. Also, all gore, island, and diagonal stripe markings, bike lane symbols and messages, wherever located, will have a thickness of 0.09 to 0.12 inch when measured above the pavement surface. Measure, record and certify on Department approved

form and submit to the Engineer, the thickness of white and yellow pavement markings in accordance with FM 5-541.

711-4.2.2 Refurbishing Existing Traffic Stripes and Markings: Apply a minimum of 0.06 inch of thermoplastic material. Ensure that the combination of the existing stripe and the overlay after application of glass spheres does not exceed the maximum thickness of 0.150 inch for all lines.

711-4.3 Retroreflectivity: Apply white and yellow traffic stripes and markings that will attain an initial retroreflectivity of not less than 450 mcd/lx·m² and not less than 350 mcd/lx·m², respectively for all longitudinal lines. All transverse lines, messages and arrows will attain an initial retroreflectivity of not less than 300 mcd/lx·m² and 250 mcd/lx·m² for white and yellow respectively. All pedestrian crosswalks, bike lane symbols or messages in a proposed bike lane shall attain an initial retroreflectivity of not less than 275 mcd/lx·m². Measure, record and certify on Department approved form and submit to the Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.

711-4.4 Glass Spheres:

711-4.4.1 Longitudinal Lines: For initial traffic striping and marking, apply the first drop of Type 4 or larger glass spheres immediately followed by the second drop of Type 1 glass spheres. For refurbishing, apply a single drop of Type 3 glass spheres. Apply reflective glass spheres to all markings at the rates determined by the manufacturer's recommendations.

711-4.4.2 Transverse Stripes and Markings: Apply a single drop of Type 1 glass spheres. Apply reflective glass spheres to all markings at the rates determined by the manufacturer's recommendations. Apply a mixture consisting of 50% glass spheres and 50% sharp silica sand to all thermoplastic pedestrian crosswalk lines and bike lane symbols at the rates determined by the manufacturer's recommendations.

711-4.4.3 Preformed Markings: These markings are factory supplied with glass spheres and skid resistant material. No additional glass spheres or skid resistant material should be applied during installation.

711-5 Contractor's Responsibility for Notification.

Notify the Engineer prior to the placement of the thermoplastic materials. Furnish the Engineer with the manufacturer's name and batch numbers of the thermoplastic materials and glass spheres to be used. Ensure that the approved batch numbers appear on the thermoplastic materials and glass spheres packages.

711-6 Protection of Newly Applied Traffic Stripes and Markings.

Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the Department

711-7 Observation Period.

Longitudinal pavement markings are subject to a 180 day observation period under normal traffic. The observation period shall begin with the satisfactory completion and acceptance of the work.

The longitudinal pavement markings shall show no signs of failure due to blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, loss of reflectivity or vehicular damage. The retroreflectivity shall meet the initial requirements of 711-4.3. The Department reserves the right to check the color and retroreflectivity any time prior to the end of the observation period. Replace, at no additional expense to the Department, any longitudinal pavement markings that do not perform satisfactorily under traffic during the 180 day observation period.

711-8 Corrections for Deficiencies.

Recapping applies to conditions where additional striping material is applied to new or refurbished traffic stripes or markings to correct a deficiency. Recap a 1.0 mile section centered around the deficiency with additional striping material or by complete removal and reapplication at no additional cost to the Department.

If recapping will result in a thickness exceeding the maximum allowed, the traffic stripes or markings will be removed and reapplied.

711-9 Submittals.

711-9.1 Submittal Instructions: Prepare a certification of quantities, using the Department's current approved form, for each project in the Contract. Submit the certification of quantities and daily worksheets to the Engineer. The Department will not pay for any disputed items until the Engineer approves the certification of quantities.

711-9.2 Contractor's Certification of Quantities: Request payment by submitting a certification of quantities no later than Twelve O clock noon Monday after the estimate cut-off date or as directed by the Engineer, based on the amount of work done or completed. Ensure the certification of quantities consists of the following:

- (a) Contract Number, FPID Number, Certification Number, Certification Date and the period that the certification represents.
- (b) The basis for arriving at the amount of the progress certification, less payments previously made and less any amount previously retained or withheld. The basis will include a detailed breakdown provided on the certification of items of payment.

711-10 Method of Measurement.

The quantities to be paid for under this Section will be as follows:

- (a) The length, in net miles, of 6 inch solid traffic stripe, authorized and acceptably applied.

- (b) The total traversed distance in gross miles of 10-30 or 3-9 skip line. The actual applied line is 25% of the traverse distance, for a 1:3 ratio. This equates to 1,320 feet of marking per mile of single line.
- (c) The net length, in feet, of all other types of lines and stripes, authorized and acceptably applied.
- (d) The area, in square feet, of removal of existing pavement markings, acceptably removed.
- (e) The number of pavement messages, symbols and directional arrows, authorized and acceptably applied.

711-11 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

- Item No. 711- Thermoplastic
- Traffic Stripes, Solid - per net mile.
- Traffic Stripes, Solid - per foot.
- Traffic Stripes, Skip - per gross mile.
- Dotted/Guideline - per foot.
- Messages - each.
- Arrows - each.
- Yield Markings - per foot.
- Thermoplastic, Remove - per square foot.

SECTION 911 – BASE AND STABILIZED BASE MATERIALS

911-1 Description.

This Section governs materials to be used in the construction of base and subgrade stabilization including limerock, shell, shell-rock, cemented coquina shell, and recycled concrete aggregate (RCA).

911-2 Materials.

911-2.1 General:

911-2.1.1 Approval of Material: Approval of mineral aggregate sources shall be in accordance with 6-2.3.

911-2.1.2 Deleterious Substances: Materials shall not contain deleterious substances that would result in: prevention of the bituminous prime coat from adhering to the base course; a detriment to the finishing, strength, or performance of the base; or a surface which is susceptible to distortion under construction traffic. Such substances include, but are not limited to: cherty or other extremely hard pieces, lumps, balls or pockets of sand or clay size material, organic matter, loose sand, loose, free shells, corals or skeletal remain of other marine invertebrates retained on the No. 4 sieve, or water sensitive clay minerals.

911-2.3 Limerock Composition: Limerock material shall consist of unconsolidated or partly consolidated limestone of marine origin.

911-2.4 Shell Material: Composition: Shell materials shall consist of naturally occurring deposits formed essentially of broken mollusk shell, corals and the skeletal remains of other marine invertebrates. Live or steamed shell, or man-made deposits as a by-product of the shellfish industry will not be permitted.

911-2.4.1 Bank Run Shell: Shell materials meeting the requirements of this Section which are presently found as “dry land” deposits.

911-2.4.2 Dredged Shell: Shell materials meeting the requirements of this Section which are dredged from ocean, bay or lake deposits.

911-2.5 Shell-Rock Material Composition: Shell-rock materials shall consist of naturally occurring heterogeneous deposits of limestone with interbedded layers or lenses of loose and cemented shell, to include cemented sands (calcitic sandstone). This material shall be mined and processed in a manner that will result in a reasonably homogenous finished product.

911-2.6 Cemented Coquina Shell Material Composition: Cemented coquina shell materials to be used as cemented coquina base or stabilized base, shall be defined as naturally occurring deposits formed essentially of broken mollusk shell, corals and the skeletal remains of other marine invertebrates, which are presently found as “dry land” deposits and which have been cemented together by carbonates or other natural cementing agents.

911-2.7 Recycled Concrete Aggregate (RCA) Composition: RCA shall consist of concrete material derived from the crushing of hard portland cement concrete. In addition to the deleterious materials noted in 911-2.2, RCA shall be asbestos free. The following limits shall not be exceeded:

Bituminous Concrete 1% by weight
 Bricks 1% by weight
 Glass and Ceramics 1% by weight
 Wood and other organic substances 0.1% by weight
 Reinforcing steel and welded wire fabric 0.1% by weight
 Plaster and gypsum board 0.1% by weight

911-3 Material Requirements.

911-3.1 Limerock Bearing Ratio (LBR): Materials shall meet the requirements in Table 911-1 in accordance with FM 5-515:

Table 911-1 Limerock Bearing Ratio (LBR)	
Material	Requirement
Limerock	Average Results per LOT - 100, minimum Individual Results - 90, minimum
Shell	
Shell-Rock	
Cemented Coquina Shell	
RCA	Average Results per LOT - 150, minimum

911-3.2 Liquid Limit and Plasticity: Materials shall meet the requirements in Table 911-2 in accordance with AASHTO T89 and AASHTO T90:

Table 911-2 - Liquid Limit and Plastic Properties

Material		Liquid Limit	Plastic Properties
Limerock	Base	Not to exceed 35	Non-Plastic (NP)
	Stabilized Base		Plasticity not to exceed 10
Shell		-	NP
Shell-Rock			
Cemented Coquina Shell		-	NP
RCA		-	NP

911-3.3 Carbonates: Materials shall meet the carbonate requirements in Table 911-3 in accordance with FM 5-514:

Table 911-3 - Percentage of Carbonates (Calcium and Magnesium)

Material	Requirement
Limerock	minimum - 70%
Shell	minimum - 50%
Shell-Rock	minimum - 50%
Cemented Coquina Shell	minimum - 50%
RCA	Not Applicable

911-3.4 Gradation and Size Requirements: Materials shall meet the gradation and size requirements in Table 911-4 in accordance with FM 1-T27 and FM 1-T11:

Table 911-4⁽¹⁾ - Gradation Requirements

Material		Requirement	
Limerock	Base	At least 97% shall pass a 3-1/2 inch sieve ⁽²⁾	
	Stabilized Base	At least 97% shall pass a 1-1/2 inch sieve ⁽²⁾	
Shell	Dredged shell	Passing 3-1/2 inch sieve - 97% Passing No. 4 sieve - 50%, maximum Passing No. 200 sieve - maximum 7.5% (washed)	
	Bank-run shell	Passing 3-1/2 inch sieve - 97% Passing No. 4 sieve - 80%, maximum Passing No. 200 sieve - 20%, maximum (washed)	
Shell-Rock		Passing 3-1/2 inch sieve - 97%, minimum Passing No. 4 sieve - 70%, maximum Passing No. 200 sieve - 20%, maximum (washed)	
Cemented Coquina Shell			
RCA	Sieve Size		Percent by Weight Passing
	2 inch		100
	3/4 inch		65 to 95
	3/8 inch		40 to 85
	No. 4		25 to 65
	No. 10		20 to 50
	No. 50		5 to 30
	No. 200		0 to 10
(1) The maximum dimension shall not exceed six inches. (2) The material shall be well graded down to dust. The fine material shall consist entirely of dust of fracture.			

911-4 Exceptions, Additions, and Restrictions.

Approved materials shall not be mixed with other approved or non-approved materials.

SECTION 914 – STABILIZATION MATERIALS

914-1 General.

This Section governs materials to be used in subgrade stabilization. Meet the following requirements:

Plasticity Index (AASHTO T90)	Maximum 10
Liquid Limit (AASHTO T89)	Maximum 40
Passing a 3-1/2 inch screen (AASHTO T27)	Minimum 97%
LBR	No Requirement

914-2 Materials for Stabilizing (Limerock Bearing Ratio-LBR).

914-2.1 Commercial Materials: Materials may be either limerock, shell rock, cemented coquina or shell base sources approved in accordance with 6-2.3.

914-2.2 Local Materials: Local materials used for stabilizing may be soils or recyclable materials such as crushed concrete, roof tiles and asphalt coated base, reclaimed pavement or Fossil Fuel Combustion Products (FFCPs) provided the following limits for organic content are met.

Average Organic Content* (FM 1-T267)	Maximum 4%
Individual Organic Content Sample (FM 1-T267)	Maximum 4%
*Note: A minimum of three samples per source. If the organic content exceeds the allowable values and RAP or RAP-blended material is used as stabilizing material, the Engineer may allow FM 5-563 (with the exception of gradation analysis) in lieu of FM 1-T267 after mixing. The maximum allowable test result is 4.7%.	

FFCPs may be used provided they meet the requirements of 403.7047, F.S., are not used outside the paved area and are not less than 3 feet above the design high groundwater table. All materials for stabilizing must meet all applicable air or water quality standards or criteria in Florida Department of Environmental Protection (FDEP) rules.

SECTION 1715 - CONDUIT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to this section.
- B. All sections of Division 16 of these specifications, apply to this section.
- C. The requirements of this section of the specification are in addition to all requirements in sections referenced above.

1.2 SUMMARY

- A. This section includes the requirements for provision and installation of conduit.

1.3 DESCRIPTION

- A. Provide and install all equipment, labor, material, accessories, and mounting hardware for a complete and operating system for the following:
 - 1. Rigid Metallic Conduit (RMC).
 - 2. PVC coated Metal Conduit.
 - 3. Liquid-tight flexible metal conduit.
 - 4. Non-metal conduit (NMC).
 - 5. Fittings and conduit bodies.
- B. Raceways and conduits shall begin at an acceptable enclosure and terminate only in another such enclosure except conduit/raceway stub-outs.
- C. A raceway shall be provided for all electrical power, lighting and electrical systems.

1.4 SUBMITTALS

- A. Submit catalog cut sheet showing brand of conduit to be used and showing that conduit is UL listed and labeled, and manufactured in the United States.
- B. Submit catalog cut sheet on all types of conduit bodies, and fittings.
- C. Product data shall be submitted for approval on:
 - 1. Conduits.
 - 2. Conduit straps, hangers and fittings.
 - 3. PVC solvent(s) and bending box.

4. Fitting entering and leaving the ground or pavement.
- D. Submit UL listed fire and smoke stopping assemblies for each applicable application.
- E. Product data shall prove compliance with Specifications, National Electric Code, National Board of Fire Underwriters, manufacturer's specifications and written installation data.

1.5 PROJECT AS-BUILT DOCUMENTS

- A. Submit as-built documents to accurately record actual routing of conduits larger than 1.25 inches.

1.6 REFERENCE AND REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.
- B. Conform to the following:
 1. ANSI/NFPA 70 - National Electrical Code.
 2. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
 3. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 4. NECA "Standard of Installation."
 5. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
 6. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
 7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site.
- B. Accept conduit on site.
- C. Inspect for damage.
- D. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- E. Protect PVC conduit from sunlight.

1.8 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All conduits shall bear UL label or seal and shall be manufactured in the United States.
- B. Conduit systems and all related fittings, boxes, supports, and hangers must meet all the requirements of national, state, requirements.

2.2 MINIMUM TRADE SIZE

- A. Homeruns: 3/4"C.
- B. Branches: 1/2"C.
- C. Flexible and seal-tite metallic conduit - 1/2"C (maximum 6ft. long).

2.3 RIGID METALLIC CONDUIT

- A. Comply with:
 - 1. ANSI C80.1
 - 2. Spec - No. 6
 - 3. 346
 - 4. Fed. Specification WW-C-581e.
- B. Conduit material:
 - 1. Hot-dipped galvanized steel.
- C. Fittings:
 - 1. Threaded.
 - 2. Insulated bushings shall be used on all rigid steel conduits terminating in panels, boxes, wire gutters, or cabinets, and shall be impact resistant plastic molded in an irregular shape at the top to provide smooth insulating surface at top and inner edge. Material in these bushings must not melt or support flame.
 - 3. Hot-dipped galvanized malleable iron or steel.
- D. Conduit Bodies:
 - 1. Comply with ANSI/NEMA FB 1.
 - 2. Threaded hubs.
 - 3. Hot-dipped galvanized malleable iron.

2.4 PVC COATED METAL CONDUIT

- A. Comply with:
 - 1. UL6
 - 2. ANSI C80.1

3. 346
 4. NEMA RN1
 5. Fed. Specification WW-C-581E.
- B. Conduit material: Hot-dipped galvanized rigid steel with external PVC coating, 20 mil. thick.
- C. Fittings:
1. Threaded.
 2. Insulated bushings on terminations.
 3. Hot-dipped galvanized malleable iron or steel with external PVC coating, 20 mil. thick.
- D. Conduit bodies:
1. Comply with:
 - a) ANSI/NEMA FB 1
 - b) Threaded hubs
 - c) Hot-dipped galvanized malleable iron.

2.5 LIQUID-TIGHT FLEXIBLE METAL CONDUIT

- A. Comply with:
1. 351
 2. ANSI/UL 360
- B. Conduit material:
1. Flexible hot-dipped galvanized steel core, interlocked.
 2. Continuous copper ground, built into core up to 1-1/4" size.
 3. Extruded polyvinyl gray jacket.
- C. Fittings:
1. Threaded for IMC/rigid conduit connections.
 2. Approved for hazardous locations where so installed.
 3. Provide sealing washer in wet/damp locations.
 4. Compression type.
 5. ANSI/NEMA FB 1.
 6. ANSI/UL 5148.
 7. Hot-dipped galvanized malleable iron or steel.
 8. Insulated throat on terminations.
 9. Comply with Fed. Specification W-F-406.

10. Connections to vibrating equipment and transformers.
 - a) Connectors to have wire mesh grip fittings.
 - b) T&B 5331 Series with WMG LT-1 Series wire-mesh grip.

2.6 NON-METALLIC CONDUIT

- A. Comply with:
 1. NEMA TC-2
 2. UL 651
 3. 347
 4. Fed. Specification WC1094A.
- B. Conduit material:
 1. Shall be high impact P.V.C. - tensile strength 55 PSI, flexural strength 11000 PSI.
- C. Fittings:
 1. Comply with: NEMA TC-3 and UL 514.
- D. General:
 1. Shall be UL listed and identified.
 2. Shall conform to all national, state and local codes.
 3. Manufacturer shall have five years experience in manufacturing PVC conduits.

2.7 EXPANSION FITTINGS

- A. Expansion fittings shall be:
 1. Listed, hot dipped galvanized inside and outside providing a 4" expansion chamber - when used with rigid conduit, intermediate metal conduit and electrical metallic conduit, or:
 2. Be polyvinyl chloride and shall meet the requirements of and as specified elsewhere for non-metallic conduit and shall provide a 4" expansion chamber.
 3. Hot dipped galvanized expansion fitting shall be provided with an external braided grounding and bonding jumper with approved clamps, UL Listed for the application.
 4. Expansion fitting, UL Listed for the application and in compliance with the National Electrical Code without the necessity of an external bonding jumper may be considered. Submit fitting with manufacturer's data and UL Listing for approval prior to installation.

PART 3 - EXECUTION

3.1 LOCATION REQUIREMENTS

A. Underground Installations:

1. Use Schedule 40 thick-wall nonmetallic conduit only unless local authority having jurisdiction or applicable codes/utility requirements, etc. require rigid steel conduit.
2. Encase conduit in a concrete envelope of not less than 3" thickness on all sides and not less than 1½" between conduits (where more than 1 conduit is installed together) for:
 - a) All conduits installed under roads.
 - b) All conduits installed for primary electric circuits, main feeders, telephone and fiber optic cables.
3. All conduits or elbows entering or leaving any slab or the ground shall be rigid steel conduit coated with asphaltic paint.
4. Where rigid metallic conduit is installed underground as noted above it shall be coated with waterproofing black mastic before installation, and all joints shall be recoated after installation.
5. All PVC runs shall utilize rigid steel 90° elbows at each riser and at each change in direction. Elbows shall be coated with black mastic or PVC coating. Bond all metal elbows per NEC 250-32 and 300-5.
6. Underground raceway systems shall conform to all national, state, and local regulations, in general and article 300, section 300-5 of the National Electric Code specifically.
 - (a) Depth of conduits shall normally be not less than 36".
7. Included under this Section shall be the responsibility for verifying finished lines in areas where raceways will be installed underground before the grading is complete.

B. In Slab Above or on Grade:

1. Use coated rigid steel conduit, coated intermediate metal conduit (if approved) or thickwall nonmetallic conduit.
2. Coating of metallic conduit to be black asphaltic or PVC.

C. Penetration of Slab:

1. Exposed Location:
 - a) Where penetrating a floor in an exposed location from underground or in slab, a black mastic coated or PVC coated galvanized rigid steel conduit shall be used.

2. Concealed Location:
 - a) Where penetrating a floor in a location concealed in block wall and acceptable by applicable codes, non-metallic conduit may be used up to first outlet box, provided outlet box is at a maximum height of 40" above finished floor.
 - b) Where penetrating a floor from underground or in slab, a black mastic coated or PVC coated galvanized rigid steel conduit shall be used.
- D. Outdoor Location:
 1. Above Grade:
 - a) Where penetrating the finished grade, a black mastic coated or PVC coated galvanized rigid steel conduit shall be used.
 - b) All exterior conduit runs shall be rigid conduit and threaded connectors as specified elsewhere.
 2. Roofs:
 - a) Conduit is not to be installed on roofs, without written authorization by OAR for specific conditions.
 - b) When approved by written authorization conduit shall comply with the following:
 1. Be PVC coated rigid galvanized metal conduit.
 2. All fittings, etc. are to be PVC coated.
 3. Conduit shall be supported above roof at least 6 inches using approved conduit supporting devices. Refer to applicable sections of specifications on roofing, etc.
 4. Supports to be fastened to roof using roofing adhesive or means as approved by roofing contractor.
- E. Interior Dry Locations:
 1. Concealed: Use rigid galvanized steel and electrical metallic tubing. Thick-wall non-metallic conduit may be used inside block walls up to first outlet to a maximum of 40" A.F.F. except where prohibited by the N.E.C. (places of assembly, etc.).
 2. Exposed: Use rigid galvanized steel and electrical metallic tubing. EMT may only be used where not subject to damage which is interpreted by this specification to be above 96" AFF.
 3. Concealed or exposed flexible conduit:
 - a) Concealed:

Flexible steel conduit or seal tight flexible steel conduit shall be in lengths not longer than six (6) feet in length with a

ground conductor firmly attached to the terminating fitting at the extreme end of the flex. Direct change over from conduit to flexible conduit is not acceptable unless written permission is granted by DESIGNER or specifically noted on drawings.

b) Exposed:

Liquid tight flexible steel conduit shall be used for connections to motor or vibration equipment (transformers, etc.) as specified herein. Lengths shall not exceed two (2) feet in length unless written authorization by DESIGNER for specific conduits is granted. Flexible steel conduit is not acceptable in exposed locations. All exposed flexible metal conduit shall be liquid tight.

F. Concrete Columns or Poured in-place Concrete Wall Locations:

1. Use thick-wall non-metallic conduit. Penetration shall be by approved metal raceway (i.e. metal conduit as required elsewhere in these specifications).

G. Locations Near 400Hz Distribution Systems:

1. Metal ferrous conduit or support equipment is not to be installed within 6" of any 400Hz distribution system conduit or wire. Increase distance if so required by 400Hz system manufacturer.

H. Corrosive Locations:

1. All conduits installed in corrosive environments shall be PVC-coated galvanized rigid steel.

3.2 ADDITIONAL REQUIREMENTS FOR RIGID STEEL CONDUIT

A. Rigid steel conduit shall be cut and threaded with tools approved for the purpose and by qualified personnel.

1. Approved pipe vise.
2. Roller/bade type cutter or band saw.
3. Reamer capable of completely removing all ridges or burrs left by the cutter. Reaming with pliers is not acceptable.

B. Hangers shall be installed 8 ft. apart.

C. Conduits stubbed through floor slabs, above grade and not contained inside walls, shall be rigid galvanized metallic conduit.

D. Use of two-piece threaded union fittings and rigid cut screw fittings are not permitted. Threaded unions may be acceptable where required for special field conditions only when special written permission is granted by OAR.

3.3 ADDITIONAL REQUIREMENTS FOR FLEXIBLE STEEL CONDUIT AND SEAL-TITE FLEXIBLE STEEL CONDUIT

- A. Shall be properly grounded.
- B. Shall be installed with approved fittings.

3.4 ADDITIONAL REQUIREMENTS FOR NON-METALLIC CONDUIT (PVC CONDUIT)

- A. PVC conduit is not allowed anywhere inside building(s) except underground, in slab, in poured in place concrete, and in block wall up to first outlet box (if not over 40" AFF) if allowed by codes.
- B. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- C. Threads will not be permitted on PVC conduit and fittings, except for rigid steel to PVC couplings.
- D. Installation of PVC conduit shall be in accordance with manufacturer's recommendations.
- E. PVC conduit shall not be used to support fixture or equipment.
- F. Field bends or direction changes shall be by manufactured bends only.

3.5 SUPPORTS

- A. Arrange supports to prevent misalignment during wiring installation.
- B. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- C. Group related conduits; support using conduit rack. Construct rack using steel channel; (minimum 24", increase distance as required) provide space on each for 25 percent additional conduits. Provide space for Building Automation System (BAS) raceways. (Coordinate all requirements with Division 15 Contractor).
- D. Fasten conduit supports to building structure and surfaces under provisions of Section 16190.
- E. Do not support conduit with wire, metal banding material, or perforated pipe straps. Remove wire used for temporary supports
- F. All horizontal overhead raceways shall be supported from superstructure above by means of 3/8" minimum threaded rod hangers, kindorf trapeze channel racking, etc., quantity of conduit racks shall be kept to a minimum. Racways run from outlet box shall run via racking system. Install all conduits and racking at similar elevation. Supporting of conduit to side and top of partition above ceiling is not acceptable unless written permission is granted from designer and COB. Use

double (two) nuts on bottom side of trapeze hanger system on each all-thread rod.

- G. Hangers shall be of galvanized steel and installed every 8 ft. the entire length of the system.
- H. Non-bolted conduit clamps, as manufactured Caddy Corp. are not approved. Supporting conduit and boxes with wire is not approved. All raceways except those from surface-mounted switches, outlet boxes or panels shall be supported with clamp fasteners with toggle bolt on hollow walls, and with lead expansion shields on masonry.

3.6 EXPANSION FITTINGS

- A. Provide suitable fittings to accommodate expansion and deflection where conduit crosses, control and expansion joints.
- B. Expansion fittings shall be installed in the following cases: In each conduit run wherever it crosses an expansion joint in the concrete structure; on one side of joint with its sliding sleeve end flush with joint, and with a length of bonding jumper in expansion equal to at least three times the normal width of joints; in each conduit run which mechanically attached to separate structures to relieve strain caused by shift on one structure in relation to the other; in straight conduit run above ground which is more than one hundred feet long and interval between expansion fittings in such runs shall not be greater than 100 feet.

3.7 GROUNDING

- A. All raceways shall have a copper system ground conductor throughout the entire length of circuit installed within conduit in strict accordance with NEC codes.
- B. Grounding conductor shall be included in total conduit fill determining conduit sizes, even though not included or shown on drawings.
- C. Grounding conductors run with exterior/ underground feeders shall be bare only.
- D. Grounding conductors run with feeders shall be bonded to portions of conduit that are metal by approved ground bushings.
- E. See other sections of these specifications for additional requirements.
- F. Grounding conductors (including lightning protection down conductors) run in metal conduit shall be bonded to metal conduit at both ends.

3.8 VERTICAL RACEWAYS

- A. Cables in vertical raceways shall be supported as per NEC Article 300-19. Provide and install supporting devices for cables, including any necessary accessible pullbox as required regardless if shown on drawings or not. Provide and install access panels as required.

Coordinate location of pull box and access panel with designer prior to installation. This includes empty raceways for future use.

3.9 GENERAL

- A. Install conduit in accordance with NECA "Standard of Installation." Contractor shall layout all work prior to rough-in.
- B. Install nonmetallic conduit in accordance with manufacturer's instructions.
- C. Arrange conduit to maintain headroom and present neat appearance.
- D. Route conduit installed above accessible ceilings or exposed to view parallel or perpendicular to walls. Do not run from point to point.
- E. Route conduit in and under slab from point-to-point.
- F. Do not cross conduits in slab.
- G. Maintain adequate clearance between conduit and piping.
- H. Maintain 12 inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).
- I. Cut conduit square using saw or pipe-cutter; de-burr cut ends.
- J. Bring conduit to shoulder of fittings; fasten securely.
- K. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- L. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch (50 mm) size.
- M. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- N. Provide and install pull boxes, junction boxes, fire barrier at fire rated walls etc., as required by NEC Article 300, whether shown on drawings or not.
- O. Provide continuous fiber polyline 1000 lb. minimum tensile strength pull string in each empty conduit except sleeves and nipples. This includes all raceways which do not have conductors furnished under this Division of the specifications. Pullcord must be fastened to prevent accidental removal. A phenolic or brass nameplate shall be attached to each end indicating the location of both ends of conduit as follows: THIS END = "LOCATION," OTHER END = "LOCATION."
- P. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- Q. Ground and bond conduit under provisions of Section 16170.

- R. Identify conduit under provisions of Section 16195.
- S. Install all conduits concealed from view unless specifically shown otherwise on drawings
- T. Rigid steel box connections shall be made with double locknuts and bushings.
- U. All raceways shall be kept clear of plumbing fixtures to facilitate future repair or replacement of said fixtures without disturbing wiring. Except where it is necessary for control purposes, all raceways shall be kept away from items producing heat.
- V. All raceway runs in masonry shall be installed at the same time as the masonry so that no face cutting is required, except to accommodate boxes.
- W. All raceways shall be run from outlet to outlet as shown on the drawings, unless permission is granted to alter arrangement shown. If permission is granted arrangement shall be marked on field set of drawings as previously specified.
- X. Spare conduit stubs shall be capped and location and use marked with concrete marker set flush with finish grade. Marker shall be 6" round x 6" deep with appropriate symbol embedded into top to indicate use. Also, tag conduits in panels where originating.
- Y. All conduit stubbed above floor shall be strapped to Kindorf channel supported by conduit driven into ground or tied to steel. Spare conduit stubs shall be capped with a UL listed and approved cap or plug for the specific intended use and identified with ink markers as to source and labeled "Spare".
- Z. All connections to motors or other vibrating equipment including transformers or at other locations where required shall be made with not less than 12" nor more than 24" of flexible liquid-tight steel conduit, with nylon insulated throat connectors and wire mesh grip fittings (manufactured by Thomas & Betts or approved equal) at both terminations of conduit. Use angle connectors wherever necessary to relieve angle strain on flex conduit.
- AA. Provide conduit seal-offs wherever conduit crosses obvious temperature changes (i.e. from inside to outside of coolers, freezers, etc.).
- BB. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation specified under other Sections of these specifications.
- CC. All raceways shall be run in neat and workmanlike manner and shall be properly in accordance with latest edition of NEC with approved conduit clamps, hanger rods and structural fasteners.

- DD. All raceway runs, whether terminated in boxes or not, shall be capped during the course of construction and until wires are pulled in, and covers are in place. No conductors shall be pulled into raceways until construction work that might damage the raceways has been completed.
- EE. Electrical raceways shall be supported independently of all other systems and supports, and shall in every case avoid proximity to other systems which might cause confusion with such systems or might provide a chance of electrolytic actions, contact with live parts or excessive induced heat.

END OF SECTION 1715

SUBSECTION 1715 - WIRE AND CABLE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to this section.
- B. All sections of Division 16 of these specifications apply to this section.
- C. The requirements in this section of the specification are in addition to all requirements in Sections referenced above.

1.2 SUMMARY

- A. This section includes the requirements for provision and installation of Wire and Cable.

1.3 DESCRIPTION

- A. Provide all equipment, labor, material, accessories, and mounting hardware to properly install all conductors and cables rated 600 volts and less for a complete and operating system for the following:
 - 1. Wire and cable.
 - 2. Wiring connectors and connections.
- B. No aluminum wiring shall be permitted.
- C. All sizes shall be given in American Wire Gauge (AWG) or in thousand circular mils (MCM).

1.4 SUBMITTALS

- A. Product Data: Submit catalog cut sheet showing, type and UL listing of each type of conductor, connector and termination.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.6 REFERENCES AND REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.
- B. Conform to the requirements of ANSI/NFPA 70.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.

- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.8 **COORDINATION**

- A. Determine required separation between cable and other work.
- B. Determine cable routing to avoid interference with other work.

PART 2 - PRODUCTS

2.1 **WIRE AND CABLE**

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70, Type THHN/THWN and XHHW.

PART 3 - EXECUTION

3.1 **GENERAL**

- A. Install products in accordance with manufacturers' instructions.
- B. Conductors #10 AWG or #12 AWG shall be 600 volt type THWN/THHN unless noted otherwise, rated 90 degrees C. dry.
- C. Use solid conductor for feeders and branch circuits 10 AWG and smaller (except for control circuits).
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (23 m).
- F. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet (61 m).
- G. Neatly train and lace wiring inside boxes, equipment, and panel boards.
- H. All conductors shall be installed in raceway.
- I. Conductor sizes indicated on circuit homeruns or in schedules shall be installed over the entire length of the circuit unless noted otherwise on the drawings or in these specifications.
- J. Before installing raceways and pulling wire to any mechanical equipment, verify electrical characteristics with final submittal on

equipment to assure proper number and AWG of conductors. (As for multiple speed motors, different motor starter arrangements, etc.).

3.2 EXAMINATION

- A. Verify that mechanical work likely to damage wire has been completed.

3.3 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.4 WIRING METHODS

- A. Use only wire, Type THHN/THWN insulation, in raceway unless noted otherwise.
- B. Wiring in vicinity of heat producing equipment: Use only XHHW insulation, in raceway.
- C. Conductors for light fixtures shall have temperature ratings as required to meet the UL listing of the fixture; however, in no case shall the temperature rating be less than 90 degrees Centigrade. Remove incorrect insulation types in new work.

3.5 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 16195.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.
- C. Identify neutrals with its associated circuit number(s).

3.6 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of the General Requirements of the Contract Documents and 16090.
- B. Inspect wire for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor.
- E. Submit "Conductor Insulation Resistance Test" form as required in Section 16090.

3.7 VERTICAL RISERS

- A. Provide vertical cable riser supports per Article 300-19 in NFPA 70. Cable supports shall be O-Z/Gedney Type "S" or equal. These shall be located in accessible pull boxes of adequate size. Provide for adequate structural connection of cable supports to pull box, which will transfer cable weight to building.

3.8 PULLING

- A. No wire shall be pulled until the conduit system is complete from pull point to pull point and major equipment terminating conduits have been fixed in position.
- B. Mechanical pulling devices shall not be used on conductors sized #8 and smaller. Pulling means which might damage the raceway shall not be used.
- C. Use only powdered soapstone or other pulling lubricant acceptable to the DESIGNER. Compound or lubricant shall not cause the conductor or insulation to deteriorate.
- D. All conductors to be installed in a common raceway shall be pulled together. The manufacturer's recommended pulling tensions shall not be exceeded.
- E. Bending radius of insulated wire or cable shall not be less than the minimum recommended by the manufacturer.
- F. Where coaxial type conductors are installed, special requirements shall apply as outlined under that specific system detail specifications.

3.9 COLOR CODING

- A. All power feeders and branch circuits No. 6 and smaller shall be wired with color-coded wire with the same color used for a system throughout the building. Power feeders above No. 6 shall either be fully color-coded or shall have black insulation and be similarly color-coded with tape or paint in all junction boxes and panels. Tape or paint shall completely cover the full length of conductor insulation within the box or panel.
- B. Unless otherwise approved or required by DESIGNER to match existing, color-code shall be as follows: Neutrals to be white for 120/208V system, natural grey for 277/480V system; ground wire green, bare or green with yellow strips optional. 120/208V, Phase A - black; Phase B - red; Phase C - blue. 480/277V, Phase A brown; Phase B - orange; Phase C - yellow. All switchlegs, other voltage system wiring, control and interlock wiring shall be color-coded other than those above.

3.10 TAPS/SPLICES/CONNECTORS/TERMINATIONS

- A. Clean conductor surfaces before installing lugs and connectors.
- B. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- C. Power and lighting conductors shall be continuous and unspliced where located within conduit. Splices shall occur within troughs, wireways, outlet boxes, or equipment enclosures where sufficient additional room

is provided for all splices. No splices shall be made in in-ground pull boxes (without written approval of designer).

- D. Splices in lighting and power outlet boxes, wireway, and troughs shall be kept to a minimum, pull conductors through to equipment, terminal cabinets, and devices.
- E. No splices shall be made in junction box, and outlet boxes (wire No. 8 and larger) without written approval of Designer.
- F. No splices shall be made in communications outlet boxes, pull boxes or wireways (*i.e.*, fire alarm, computer, telephone, intercom, sound system, etc.) without written approval of Designer. Pull cables through to equipment cabinets, terminal cabinets and devices.
- G. No splices shall be made in circuits of #8 AWG conductors or larger of 1000 feet or less without written approval of the designer.
- H. Allow adequate conductor lengths in all junction boxes, pull boxes and terminal cabinets. All termination of conductors in which conductor is in tension will be rejected and shall be replaced with conductors of adequate length. This requirement shall include the providing by the Contractor of sleeve type vertical cable supports in vertical raceway installations provided in pullboxes at proper vertical spacings.
- I. A calibrated torque wrench shall be used for all bolt tightening.
- J. Exterior Locations:
 - 1. Make splices, taps and terminations above grade in splice or termination cabinets. Do not splice any cable in ground or below finished grade.
 - 2. All taps and splices shall be made with compression type connectors and covered with Raychem heavywall cable sleeves (type CRSM-CT, WCSM or MCK) with type "S" sealant coating with sleeve kits as per manufacturer's installation instructions or be terminated/connected to terminal strips in above grade terminal boxes suitable for use.
 - 3. Provide and install above grade termination cabinets sized to meet applicable codes and standards, where required for splicing.

END OF SUB-SECTION 1715

SECTION 16170

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to this section.
- B. All sections of Division 16 of these specifications apply to this section.
- C. The requirements in this section of the specification are in addition to all requirements in sections referenced above.

1.2 SUMMARY

- A. This section includes the requirements for provision and installation of grounding and bonding.

1.3 DESCRIPTION

- A. Provide all labor, materials, and equipment necessary to properly install a grounding system conductor in all new branch wiring and feeder installations which shall be in full compliance with all applicable Codes as approved by the Authorities having jurisdiction. The secondary distribution system shall include a grounding conductor in all raceways in addition to the return path of the metallic conduit.
- B. In general, all electrical equipment (metallic conduit, motor frames, panel boards, etc.) shall be bonded together with a green insulated or bare copper system grounding conductor in accordance with specific rules of Article 250 of the N.E.C. and State codes. Bonding conductor through the raceway system shall be continuous from main switch ground bus to panel ground bar of each panel board, and from panel grounding bar of each panel board to branch circuit equipment and devices.
- C. All raceways shall have an insulated copper system ground conductor throughout the entire length of circuit installed with-in conduit in strict accordance with NEC. Grounding conductor shall be included in total conduit fill determining conduit sizes, even though not included or shown on drawings. Grounding conductors run with feeders in PVC conduit outside of building(s) shall be bare only.
- D. Section Includes
 - 1. Grounding electrodes and conductors.
 - 2. Equipment grounding conductors.
 - 3. Bonding.
 - 4. Counterpoise System.
 - 5. Ground Ring.

1.4 PROJECT AS-BUILT DOCUMENTS

- A. Submit as-built documents to accurately record actual locations of grounding electrodes.
- B. Submit test results of each ground rod. See Section 16090.

1.5 REFERENCES AND REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.
- B. Conform to requirements of ANSI/NFPA 70 - National Electrical Code.

PART 2 - PRODUCTS

2.1 ROD ELECTRODE

- A. Material: Copper-clad steel.
- B. Diameter: 5/8 inch.
- C. Length: 30 feet (minimum). Increase lengths as required to meet and achieve specified resistance.

2.2 MECHANICAL CONNECTORS

- A. All grounding connectors shall be in accordance with UL 467 and UL listed for use with rods, conductors, reinforcing bars, etc., as appropriate.
- B. Connectors and devices used in the grounding systems shall be fabricated of copper or bronze materials, and properly applied for their intended use. Specified items of designated manufacturers indicate required criteria and equal products may be provided if approved. All connectors and devices shall be compatible with the surfaces being bonded and shall not cause galvanic corrosion by dissimilar metals. Materials in items not listed herein shall be of equal quality to the following specified items:
 - 1. Lugs: substantial construction, of cast copper or cast bronze, with "ground" (micro-flat) surfaces equal to Burndy QA-B Series or T&B equal. Light weight and "competitive" devices shall be rejected.
 - 2. Grounding and Bonding Bushings: Malleable iron, Thomas and Betts (T&B), or equal.
 - 3. Piping Clamps: T&B or equal.
 - 4. Grounding Screw and Pigtail: Raco No. 983 or equal.
- C. Mechanical lugs or wire terminals shall be used to bond ground wires together or to junction boxes and panel cabinets and shall be

manufactured by Anderson, Buchanan, Thomas and Betts Co., or Burndy.

2.3 WIRE

- A. Material: Stranded copper.
- B. Size: Size to meet NFPA 70 requirements as a minimum, increase size if called for on drawings, in these specifications, or as required for voltage drop.
- C. Insulated THWN (or bare as noted elsewhere).

2.4 GROUNDING WELL COMPONENTS

- A. Grass Non-Traffic Areas:
 - 1. Well: Minimum 18 inch (600 mm) long sleeve with minimum 12 inch diameter.
 - 2. Well Cover: High density plastic, composolite, or cast iron with legend "GROUND" embossed on cover.
 - 3. Material: Structural Plastic, composolite, or concrete.
 - 4. Manufacturer: Brooks Products 70 Series or equal by Quazite.
 - 5. Increase depth, diameter or size as required to provide proper access at installed location.
- B. Paving and Low Traffic Areas:
 - 1. Well: Minimum 12 inch long by 12 inch wide by 18 inches deep with open bottom.
 - 2. Well Cover: Traffic rated for use with "GROUND" embossed on cover.
 - 3. Material: Composolite.
 - 4. Manufacturer: Quazite.
 - 5. Increase depth, diameter or size as required to provide proper access at installed location.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding electrodes conductor, bonding conductors, ground rods, etc. with all required accessories.
- C. Grounding shall meet (or exceed as required to meet these specifications) all the requirements of the N.E.C., the NFPA, and applicable standards of IEEE.

- D. Where there is a conflict between these specifications and the above applicable codes/standards or between this section of these specifications and other sections then the most stringent or excessive requirement shall govern. Where there is an omission of a code/standard requirement in these specifications then the code/standard requirements shall be complied with.
- E. Requirement in these specifications to comply with a specific code/standard article, etc. is not to be construed as deleting of requirements of other applicable codes/standards and their articles, etc.

3.2 GROUNDING ELECTRODES

- A. All connections shall be exothermic welded unless otherwise noted herein. All connections above grade and in accessible locations may be by exothermic welding or by brasing or clamping with devices UL listed as suitable for use except in locations where exothermic welding is specifically specified in these specifications or called for on drawings.
- B. Each rod shall be die stamped with identification of manufacturer and rod length.
- C. Install rod electrodes at locations indicated and/or as called for in these specifications.
- D. Ground Resistance:
 - 1. Lightning Protection Ground Locations and Counterpoise Ground Locations:
 - a) Lightning Protection system ground locations shall not exceed 5 ohms measured at ground electrode.
 - 2. Other Locations:
 - a) Resistance to ground of all non-current carrying metal parts shall not exceed 5 ohms measured at motors, panels, busses, cabinets, equipment racks, light poles, transformers, and other equipment
 - 3. Resistance called for above shall be maximum resistance of each ground electrode prior to connection to grounding electrode conductor. Where ground electrode system being measured consists of two (2) or more ground rod electrodes then the resistance specified above shall be the maximum resistance with two (2) or more rods connected together but not connected to the grounding electrode conductor.
- E. Install additional rod electrodes as required to achieve specified resistance to ground (specified ground resistance is for each ground rod location prior to connection to ground electrode conductor). Depending on soil condition, etc. of ground rod locations it has been found that the ground rod lengths required to achieve the specified

resistance may range from the minimum specified length to up to 80 feet or more in length.

- F. Provide grounding well with cover at each rod location. Install grounding well top flush with finished grade.
- G. Verify that final backfill and compaction has been completed before driving rod electrodes.
- H. Install ground rods not less than 1 foot below grade level and not less than 2 feet from structure foundation.

3.3 GROUND RESISTANCE AT LOCATION OTHER THAN LOCATION OF GROUNDING ELECTRODES.

- A. Resistance to ground of all non-current carrying metal parts shall not exceed 5 ohms measured at motors, panels, busses, cabinets, equipment racks, light poles, transformers, and other equipment.

3.4 GROUNDING ELECTRODE CONDUCTOR

- A. Conductor shall be sized to meet (or exceed as required to meet these specifications and/or drawings) the requirements of NEC 250-94.

3.5 EQUIPMENT GROUNDING CONDUCTOR

- A. Grounding conductors shall be provided with every circuit to meet (or exceed as required to meet these specifications and/or drawings) the requirements of NEC 250-95.
- B. At every voltage level, new portions of the electrical power distribution system shall be grounded with a dedicated copper conductor which extends from termination back to power source in supply panel board.
- C. Provide separate, insulated (bare if with feeder in PVC conduit outside of building(s)) conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- D. Except as otherwise indicated, each feeder raceway on the load side of the service entrance shall contain a ground conductor sized as indicated and where not shown shall be sized to meet (or exceed as required to meet these specifications and/or drawings) the requirements of NEC 250-95. Conductor shall be connected to the equipment grounding bus in switchboards and panel boards, to the Grounding Bus in all motor control centers, and as specified, to lighting fixtures, motors and other types of equipment and outlets. The ground shall be in addition to the metallic raceway and shall be properly connected thereto, using a lug device located within each item enclosure at the point of electric power connections to permit convenient inspection.
- E. Provide green insulated ground wire for all grounding type receptacles and for equipment of all voltages. In addition to grounding strap connection to metallic outlet boxes, a supplemental grounding wire and

screw equal to Raco No. 983 shall be provided to connect receptacle ground terminal to the box.

- F. All plugstrips and metallic surface raceway shall contain a green insulation ground conductor from supply panel ground bus connected to grounding screw on each receptacle in strip and to strip channel. Conductor shall be continuous.
- G. Where integral grounding conductor is specified elsewhere in bus duct construction, provide equivalent capacity conductor from supply switchboard or panel board grounding bus to the bus duct grounding conductor. Bond integral conductor to bus duct enclosure at each tap and each termination.
- H. All motors, all heating coil assemblies, and all building equipment requiring flexible connections shall have a green grounding conductor properly connected to the frames and extending continuously inside conduit with circuit conductors to the supply source bus with approved connectors regardless of conduit size or type. This shall include Food Service equipment, Laundry equipment, and all other "Equipment By Owner" to which an electric conduit is provided under this Division.

3.6 LIGHTNING PROTECTION SYSTEMS

- A. Ground per applicable section on lightning protection system, NFPA 780, and as specified herein. The most stringent requirements shall govern.
- B. Bond lightning protection system grounds to electrical service system ground, and counterpoise system ground where provided.
- C. See Section 16671.

3.7 LIGHTING FIXTURES

- A. All new and removed/reinstalled fixtures in building interior, and exterior fixtures shall be provided with green grounding conductor, solidly connected to unit. Individual fixtures grounds shall be with lug to fixture body, generally located at point of electrical connection to the fixture unit.
- B. All suspended fixtures and those supplied through flexible metallic conduit shall have green ground conductor from outlet box to fixture. Cord connected fixtures shall contain a separate green ground conductor.
 - 1. Concrete or Non-Metallic Pole:
 - a) Freestanding pole mounted lighting fixtures shall each have a Class I or Class II lightning protection main copper down conductor connected to grounding electrodes at base of pole.

- b) Conductor shall be extended from grounding electrode to top of pole and terminate at the top of pole in a Class I or Class II copper lightning protection air terminal.
 - c) Each metal part of light fixture assembly, bracket, ballast cabinet, disconnect, transformer, etc. that is mounted to pole shall be bonded to down conductor.
- 2. Fixtures located on elevated roadway ramps shall be specially provided with a connection to lightning counterpoise grounding system, properly installed.
- 3. Grounding electrode(s) at each pole shall be connected (bonded) to site distribution counterpoise system.
- 4. Grounding Electrodes:
 - a) Two or more 30 ft. ground rods at no less than 30 ft. spacing shall be driven vertically to a minimum depth of 30 ft. plus 1 below grade.
 - b) Bond the two or more ground rod electrodes together with a Class I or Class II lightning protection main copper conductor.
 - c) Provide additional rod electrodes as required to achieve specified ground resistance.
 - d) The two (2) or more grounding rod electrodes shall be installed at each light pole.
- 5. Installation shall exceed minimum requirements of NFPA 780.

3.8 **PULLBOX, MANHOLE, HANDHOLE GROUNDING.**

- A. One 30 ft. ground rod electrode shall be driven vertically to a minimum depth of 30 ft. plus 1 below grade in each manhole, handhole or pullbox (in ground).
- B. The complete installation shall exceed the minimum requirements of the NEC.
- C. Provide additional ground rod electrodes as required to provide resistance called for herein.
- D. Where more than one ground rod electrode is required bond the two or more ground rod electrodes together with a copper ground conductor as called for under 'COUNTERPOISE SYSTEM'.
- E. Bond to counterpoise system.
- F. Bond grounding electrode to all exposed metal parts of manhole, handhole, pullbox (including metal cover) with #6 copper ground conductor. Connect to ground rod electrode with exothermic weld. Connect to metal cover with exothermic weld. Connect to other metal parts with exothermic weld or UL approved grounding clamp. Provide 3

ft. or more slack ground cable on cover connection as required to facilitate removal of cover.

3.9 HAZARDOUS LOCATIONS

- A. Ground in hazardous locations shall be done in accordance with applicable portions of Articles 500, 501, 502, 503, 511 and 514 of the National Electrical Code.

3.10 MISCELLANEOUS GROUNDING CONNECTIONS

- A. Provide bonding to meet regulatory requirements.
- B. Required connections to building steel shall be with UL approved non-reversible crimp type ground lugs exothermically welded to bus bar that is either exothermically welded to steel or bolted to steel in locations where weld will affect the structural properties of the steel.
- C. Grounding conductors shall: be so installed as to permit shortest and most direct path from equipment to ground; be installed in conduit; be bonded to conduit at both ends when conduit is metal; have connections accessible for inspection; and made with approved solderless connectors brazed (or bolted) to the equipment or to be grounded; in NO case be a current carrying conductor; have a green jacket unless it is bare copper; be run in conduit with power and branch circuit conductors. The main grounding electrodes conductor shall be exothermically welded to ground rods, water pipe, and building steel.
- D. All surfaces to which grounding connections are made shall be thoroughly cleaned to maximum conductive condition immediately before connections are made thereto. Metal rustproofing shall be removed at grounding contact surfaces, for 0 ohms by digital Vm. Exposed bare metal at the termination point shall be painted.
- E. All ground connections that are buried or in otherwise inaccessible locations, shall be welded exothermically. The weld shall provide a connection which shall not corrode or loosen and which shall be equal or larger in size than the conductors joined together. The connection shall have the same current carrying capacity as the largest conductor.
- F. Install ground bushings on all metal conduits entering enclosures where the continuity of grounding is broken between the conduit and enclosure (i.e. metal conduit stub-up into a motor control center enclosure or at ground bus bar). Provide an appropriately sized bond jumper from the ground bushing to the respective equipment ground bus or ground bus bar.
- G. Each feeder metallic conduit shall be bonded at all discontinuities, including at switchboards and all sub-distribution and branch circuit panels with conductors in accordance with Table 250-95 of NEC for parallel return with respective interior grounding conductor.

- H. Grounding provisions shall include double locknuts on all heavywall conduits.
- I. Bond all metal parts of pole light fixtures to ground rod at base.
- J. Install grounding bus in all existing panel boards of remodeled areas, for connection of new grounding conductors, connected to an approved ground point.
- K. Bond together reinforcing steel and metal accessories in pool and fountain structures.
- L. Where reinforced concrete is utilized for building grounding system, proper reinforced bonding shall be provided to secure low resistance to earth with "thermite" type devices, and #10AWG wire ties shall be provided to not less than ten (10) full length rebars which contact the connected rebar (by Division 16 contractor).

3.11 TESTING AND REPORTS

- A. Raceway Continuity: Metallic raceway system as a component of the facilities ground system shall be tested for electrical continuity. Resistance to ground throughout the system shall not exceed specified limits.
- B. Ground resistance measurements shall be made on each system utilized in the project. The ground resistance measurements shall include building structural steel, driven grounding system, water pipe grounding system and other approved systems as may be applicable. Ground resistance measurements shall be made in normally dry weather, not less than 24 hours after rainfall, and with the ground under test isolated from other grounds and equipment. Resistances measured shall not exceed specified limits.
- C. Upon completion of testing, the testing conditions and results shall be certified by the Contractor and submitted to the Designer as called for in Section 16090 - Test and Performance Verification.

3.12 INTERFACE WITH OTHER PRODUCTS

- A. Interface with site grounding system.
- B. Interface with lightning protection system installed under Section 16671.

3.13 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- B. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

END OF SECTION 16170

SECTION 16195 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to this section.
- B. All sections of Division 16 of these specifications apply to this section.
- C. The requirements in this section of the specifications are in addition to all requirements in sections referenced above.

1.2 SUMMARY

- A. This section includes the requirements for provision and installation of identification for electrical equipment.

1.3 DESCRIPTION

- A. Provide and install all equipment, labor and material for a complete identification system, including but not limited to:
 - 1. Nameplates and labels.
 - 2. Wire and cable markers.
 - 3. Conduit markers.
 - 4. Identify all new and existing conduits, boxes, equipment, etc. as specified herein.

1.4 REFERENCES AND REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.
- B. Conform to the requirements of the following:
 - 1. ANSI/NFPA 70 - National Electrical Code.
 - 2. Americans with Disabilities Act - 1990.

PART 2 - PRODUCTS

2.1 NAMEPLATES

- A. Nameplates shall be laminated phenolic plastic, chamfer edges, black front and back with white core, with lettering etched through the outer covering. White engraved letters on black background.
- B. Nameplates for emergency power shall be laminated phenolic plastic. Red front and back, with white core, with lettering etched through outer covering, white engraved letters on red background.

- C. Letter Size:
 - 1. Use 1/8 inch letters for identifying individual equipment and loads.
 - 2. Use 1/4 inch letters for identifying grouped equipment and loads.
- D. Nameplates shall adequately describe the function of the particular equipment involved. Where nameplates are detailed on the drawings, inscription and size of letters shall be as shown and shop drawing submitted for approval. Nameplates for panel boards and switchboards shall include the panel designation, voltage and phase of the supply. For example, "Panel A, 120/208V, 3-phase, 4-wire". In addition, provide phenolic label in panel to describe where the panel is fed from. For example, "Fed From MDP-1:3:5". The name of the machine on the nameplates for a particular machine shall be the same as the one used on all motor starters, disconnect and P.B. station nameplates for that machine.
- E. The following items shall be equipped with nameplates: All motors, motor starters, motor-control centers, push-button stations, control panels, time switches, disconnect switches, transformers, panel boards, circuit breakers (i.e., all 2 pole, 3 pole C.B.'s), contractors or relays in separate enclosures, power receptacles where the nominal voltage between any pair of contacts is greater than 150V, wall switches controlling outlets that are not located within sight of the controlling switch, high voltage boxes and cabinets, large electrical, and electrical systems (Systems Sections 16700 through 16799) junction and pull boxes (larger than 4 11/16"), terminal cabinets, terminal boards, and equipment racks. Nameplates shall also describe the associated panel and circuit number (if applicable).
- F. All Electrical System panels, transfer switches, etc. shall be labeled as per branch, i.e.: "Panel ABC-Life Safety Branch" (similar for critical or equipment branch).

2.2 WIRE MARKERS

- A. Description: Cloth, tape, split sleeve, or tubing type wire markers.
- B. Locations: Each conductor at panel board gutters, pull boxes, outlet and junction boxes, and each load connection.
- C. Legend:
 - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings including neutral conductor.
 - 2. Low voltage circuits (circuits under 120V):
- D. Control wire number indicated on schematic and interconnection diagrams on shop drawings.

2.3 CONDUIT/JUNCTION BOX COLOR CODE

- A. All conduit system junction boxes (except those subject to view in public areas) shall be color coded as listed below:

<u>Color Code for Junction Boxes</u>	<u>Krylon Paint #</u>
Normal Power 277/480 volt	Leather Brown 2501
Normal Power 120/208 volt	Glossy Black 1601
Grounding	Fluorescent Green 3106

- B. Conduits (not subject to public view) longer than 20 feet shall be painted with above color paint band 20 ft. on center. Paint band shall be 4" in length. Where conduits are parallel and on conduit racking, the paint bands shall be evenly aligned. Paint shall be neatly applied and uniformed. Paint boxes and raceways prior to installation or tape conduits and surrounding surfaces to avoid overspray. Paint overspray shall be removed.
- C. Junction boxes and conduit located in public areas (i.e. areas that can be seen by the public) shall be painted to match surface attached to. Provide written request to DESIGNER for interpretation of those public areas which may be in question.

2.4 CONDUIT/JUNCTION BOX MARKER

- A. All new and existing junction boxes/cover plates for power, lighting and systems (except those installed in public areas) shall adequately describe it's associated panel and circuit reference number(s) within, (i.e. ELRW-2, 4, 6) or systems within (i.e. fire alarm, intercom, etc.). Identification shall be by means of black permanent marker. (Paint 1/2 cover plate with appropriate color above, and 1/2 with associated panel/circuit or system as described above.)
- B. Identify conduit not installed in public areas with circuit numbers as described above. Spacing: 20 ft. on center, adjacent to color identification bands.

2.5 DEVICE COVER PLATE IDENTIFICATION

- A. Description: Self-adhesive clear printed labels with Black typed letters (pre-printed, dot matrix, or laser).
- B. Locations:
1. Each new receptacle cover plate.
 2. Each existing receptacle cover plate in areas of remodel/renovation.
 3. Each new communications cover plate (Systems Sections 16700 thru 16799).
 4. Each existing communications cover plate (Systems Sections 16700 through 16799) in areas of remodel/renovation.

C. Legend:

1. Receptacle plates shall adequately describe its associated panel board and circuit reference (i.e., ELRW-3).
2. System plates shall adequately describe its terminal board, or terminal cabinet, termination cable identifier, and assigned user code number, (i.e., TTB-LS2-***).

2.6 UNDERGROUND WARNING TAPE

- A. Description: 4 inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

- A. Install nameplate parallel to equipment lines.
- B. Secure nameplate to equipment front using stainless steel pop rivets.
- C. Secure nameplate to inside surface of door on panel board that is recessed in finished locations.
- D. Nameplates installed inside on dead front cover shall be self adhesive tape. (Do not drill or install screws in dead front.)
- E. Identify new and existing conduit, junction boxes, and outlet boxes using field painting.
- F. Identify new underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.
- G. Install wire markers at all new and existing connections and terminations.

APPENDIX A - PINELLAS COUNTY SPECIFICATIONS

APPENDIX B – GEOTECHNICAL REPORT

APPENDIX C – SWFWMD PERMIT EXEMPTION

APPENDIX D – DEP WASTEWATER PERMIT



City of St Pete Beach Request for Bid

Pass-A-Grille Way Reconstruction

from 19th Avenue to Cabrillo Avenue

Bids due by June 2nd, 2015,
10:00 A.M. at City Hall, St. Pete Beach, FL

CONTENTS

- I. CONTRACTOR'S BID SUBMITTAL
- II. GENERAL CONTRACT/FRONT END DOCUMENTS
- III.BID DOCUMENTS/INVITION TO BID FROM EOR
- IV. PROJECT SPECIFICATIONS
- V. PROJECT PLANS

I. CONTRACTOR'S BID SUBMITTAL

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Bid as principal or principals are named herein, and that no other person than herein mentioned has any interest in the Bid or in the Contract to be entered into; that this Bid or Contract is made without connection with any other person, company, or parties making a Bid; and that it is in all respects fair and in good faith without collusion or fraud.

The Bidder further declares that he/she has examined the site of the work and informed himself/herself fully in regard to all conditions pertaining to the place where the work is to be done; that he/she has examined the RFB, Plans, and Specifications for the work and Contract Documents relative thereto, and has read all special provisions furnished prior to the opening of bids; and that he/she has satisfied himself/herself relative to the materials to be supplied and work to be performed.

The Bidder certifies that the information and responses provided within this bid are true, accurate, and complete. The contractor hereby grants permission for each entity or reference listed in the Bidder's previously submitted Statement of Qualifications to make any information concerning the Contractor available to the City.

The Bidder proposes and agrees, if the Bid is accepted, to contract with the City of St. Pete Beach, Florida, in the form of a Contract or Agreement specified for: *"PASS-A-GRILLE WAY RECONSTRUCTION FROM 19TH AVENUE TO CABRILLO AVENUE."*

In St. Pete Beach, Florida, in full and complete accordance with the shown, noted, described, and reasonably intended requirements of the RFB, Bid Documents, Plans, Specifications, Contract Documents, and Addenda to the full and entire satisfaction of the City of St. Pete Beach, Florida, the Bidder proposes to furnish all materials, equipment, labor, and perform the work submitted in their bid schedule for the City of St. Pete Beach's project: *"PASS-A-GRILLE WAY RECONSTRUCTION FROM 19TH AVENUE TO CABRILLO AVENUE."*

COMPANY:
ADDRESS:

DATE:
PHONE:

BY: _____
(SIGNATURE)

NAME: _____
(PRINT NAME & TITLE)

Sworn to and subscribed before me on this _____ day
of _____, 2015

(Notary Public)

(My Commission Expires)

SUBMIT BID ITEMIZATION WITH BID TO:
CITY OF ST. PETE BEACH

II. GENERAL CONTRACT/FRONT END DOCUMENTS

REQUEST FOR BID

Pass-A-Grille Way Reconstruction from 19th Avenue to Cabrillo Avenue.

LOCATION

The City of St. Pete Beach is soliciting bids from pre-qualified Construction Contractors for the Pass-A-Grille Way Reconstruction project from 19th Avenue to Cabrillo Avenue. This Request for Bid includes front end documents prepared by the City of St. Pete Beach as well as bid documents, project plans, and project specifications.

BID SUBMITTALS

Bid submittals must include a signed Contractor's Bid Submittal (previous page), and completed pages 4-21 of the Bid Documents/Invitation to Bid from Cribb Philbeck Weaver Group/CPGW (Project Engineer of Record (EOR)). Any major sub-contractor that will be hired by the contractor for this project should have been submitted with each contractor's Statement of Qualifications. If any previously unidentified sub-contractors are to be utilized on this project, they must also submit references, contractor's license and insurance certificates. Submit one original and 5 copies of all bid submittal documents. Failure to submit the required bid submittals could result in a contractor's bid being deemed incomplete or non-compliant with bid specifications.

MANDATORY PRE-BID MEETING

Mandatory pre-bid meeting will be held on May 14th, 2015, at 10:00 A.M. at City Hall, 155 Corey Avenue, St. Pete Beach, FL. A site visit will be conducted immediately following the pre-bid meeting.

BID PACKAGES

Sealed bids will be received until 11:00 A.M. on June 2nd, 2015, in the Office of the City Clerk, 155 Corey Avenue, St. Pete Beach Florida at which time they will be publicly opened and read. All bidders are invited to attend this bid opening, which will be held immediately following the closing time specified. Bids received after the deadline will not be accepted.

Bids should be addressed to:

City of St. Pete Beach
City Clerk's Office
155 Corey Ave.
St. Pete Beach, FL 33706

Plainly marked: ***"Pass-A-Grille Way Reconstruction
From 19th Avenue to Cabrillo Avenue"***

CONTACT INFORMATION

Ian Wade, PE - Project Manager
155 Corey Avenue
St. Pete Beach, Florida 33706
Office - (727) 363-9254 Fax - (727) 367-2736
E-mail – iwade@stpetebeach.org

SCOPE OF WORK

The purpose of this request is to obtain bids from prequalified General Contractor's for the Reconstruction of Pass-A-Grille Way from 19th Avenue to Cabrillo Avenue in St. Pete Beach, FL.

This reconstruction project will include, but not be limited to, the following components:

- Full depth pavement replacement, including subgrade evaluation/stabilization.
- Replacement of County (potable water) and City-owned utilities (sanitary sewer, reclaimed water, storm water).
- Accommodations for the undergrounding of overhead electric and other privately owned cable utilities, including installation of conduit and earthwork preparation for supporting infrastructure.
- Complete storm water system reconstruction, including upsizing of pipes, additional inlets, and installation of baffle boxes and tidal control valves near relocated outfalls into Boca Ciega Bay.
- Constructing new "F-curb" and sidewalk.
- Landscaping

Due to the minimal space available at and adjacent to the project site and the lack of available detour routes resulting from the geographic constraints of the Pass-A-Grille neighborhood of St. Pete Beach, the Modification of Traffic (MOT) during construction has limited alternatives. Although the design Engineer of Record (EOR) has included a MOT plan with the design documents, mid-project modifications to the plan (or suggestions from the Contractor) may be required. The City will entertain Contractor suggested modifications to the MOT plan.

Funding is being provided jointly by the Southwest Florida Water Management District (SWFWMD), Pinellas County, and the City of St. Pete Beach. As a result, all invoicing will need to include separate line items for any activity related to storm water and potable water infrastructure.

DETAILED SPECIFICATIONS

- See the provisions included in the Bid Documents prepared by the EOR.
- The contractor shall carefully examine the project site and be familiar with the work required for the project. Contractor is responsible for field measurement and review of existing conditions.

- Standard work hours shall be from 7:30AM until 4:30PM, Monday thru Friday. No work shall take place during the weekends or on City Holidays (Memorial Day, Independence Day, Labor Day, etc.). If weekend or holiday work is required, this must be approved by the City Manager or designee at least 1 week prior to the scheduled work. Contractor will coordinate scheduling of work with the City's Project Manager.
- In an effort to reduce the project duration, extended work hours are being requested as alternate numbers 2, 3, and 4 in the attached documents.

ADDITIONAL WORK DETAILS

As established during the Pre-qualification process, contractors or persons wishing to bid on this project are licensed, bondable and insured in accordance to the city's requirements. The contractor will furnish all necessary labor, materials, tools, equipment and supplies to complete the scope of work. Bid must also include all costs for licenses, permits and any material disposal fees.

Bidders shall bring questions, discrepancies, omissions, conflicts or doubt as to meaning of any part of Contract Documents to the attention of the City of St Pete Beach Public Services Department at least ten (10) days before due date for Bids. Clarification of intent of Contract Documents if necessary shall be made available to bidders in form of Addendum. Failure to request clarification of interpretation of Contract Documents shall not relieve bidders of their responsibilities to perform the work.

The City of St. Pete Beach reserves the right to reject any or all bids or parts of bids, or accept any bid or part thereof deemed to be in the best interests to the City of St. Pete Beach.

STATEMENT OF WORK

The Contractor shall furnish and pay the cost, including sales tax and all other applicable taxes, licenses, permits and fees, of all the necessary materials not furnished by the City and shall furnish and pay for all the superintendence, labor, tools, equipment and transportation and perform all the work required for the execution of all services listed in the Bidder's submittal and Bid Documents attached hereto and in strict accordance with the Plans, Specifications, and requirements of the City of St. Pete Beach which are attached hereto and made a part hereof, and any amendments thereto and such supplemental Plans and Specifications which may hereafter be approved.

BEGINNING DATE

The Contractor shall, within ten (10) days after receipt of the Notice of Award and before commencement of any operations hereunder, execute the Contract. Additionally, the Contractor shall, within twenty (20) days after receipt of the Notice of Award, provide all required documentation to the City. **The Contractor must commence construction activities within thirty (30) days of**

Contract execution. Any change to the start date or the work schedule included with this bid must be submitted in writing to and approved by the City Manager or designee.

Unless otherwise identified through incorporation of bid alternate item's 2-4, work shall not be performed on Saturdays, Sundays and all legal or City designated holidays, except for special operations that may be necessary in order to maintain, check, or protect work already performed. Work may be permitted on weekends or holidays with approval from the City Manager or designee. No work shall be done at night without prior approval of the City Manager or designee.

COMPLETION DATE

November 30th, 2016

EXAMINATION OF SITE

Bidder shall carefully examine project site and be familiar with the work required for the project, investigate all site conditions that may affect execution of work as detailed in the construction documents. Contact the City's Public Services Department or their designee for changes or alterations before proceeding.

ASSURANCES

The responding contractor shall provide a statement of assurance that the contractor is not presently in violation of any statutes or regulatory rules that might have an impact on the firms operations since submittal of the Statement of Qualifications to the City. All applicable laws and regulations of the State of Florida, and ordinances and regulations of the City of St. Pete Beach will apply.

TRAFFIC CONTROL AND STAGING AREA

Contractor shall include all costs associated with traffic control and maintenance during the project. Please refer to the Maintenance of Traffic section of the attached Project Plans.

Contractor shall be provided with a staging area. The proposed primary staging area is the baseball field at Hurley Park, which is adjacent to Pass-A-Grille Way. As denoted in the project plans, this area is currently enclosed by a chain link fence and includes a gate with paved access. The Contractor will be required to control the area including any additional fencing or barricades and Contractor will be responsible for the restoration of this and all other staging areas provided by the City.

ASSIGNMENT AND TRANSFER OF CONTRACT

The Contractor shall not assign or transfer the Contract or any part thereof, or any interest therein, without consent of the City and the contractor's Surety; and any such assignment or transfer without such written consent shall be null and void.

SUBCONTRACTS

The Contractor shall not subcontract the Contract or any part thereof, or any interest therein, without consent in writing of the City and the contractor's Surety.

Any Subcontractor approved by the City will be subject to the same standards and qualifications as stated in the Contract.

PERFORMANCE PAYMENT BOND

Contractor shall furnish the City with a performance and payment bond in a sum equal to the amount of the Contract price; conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions, and agreements of this Contract, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the work provided by the Contract. The Contractor shall execute such bond and a corporate bonding company licensed to transact such business in the State of Florida and acceptable to the City.

The expense of this bond shall be borne by the Contractor. If at any time a Surety on such bond becomes irresponsible or loses its right to do business in the State of Florida, the City may require another Surety that the Contractor shall furnish within ten (10) calendar days after receipt of written notice to do so. Evidence of authority of an attorney in fact, acting for the corporate Surety must be provided in the form of a certificate as to his power of attorney and to the effect that it is not terminated and remains in full force and effect on the date of the bond. The form of the bond shall be subject to approval by the City.

LIQUIDATED DAMAGES

See page 30 of the attached Bid Documents/Invitation to Bid provided by the EOR.

PAYMENT

Payment shall be made to the Contractor for work performed under the Contract for the quantities of work as determined in accordance with Payments for Work Completed and Payments Withheld of the Contract.

See Special Provision SP-02 below for additional information.

CHANGES IN THE WORK

Without invalidating the Contract, the City may, at any time or from time to time, order additions, deletions or revisions in the work authorized by written Change Orders or directive. Upon receipt of a Change Order, the Contractor will proceed with the work involved. All such work shall be executed under the applicable conditions of the Contract documents. If any Change Order causes an increase or decrease in the Contract Amount or any extension or shortening of the Contract Time, an equitable adjustment will be made as provided in Article 13.

Additional Work performed by the Contractor without authorization of a Change Order will not entitle him/her to an increase in the Contract Amount or any extension of the Contract Time, except in the case of an emergency as provided in Article 9.

It is the Contractor's responsibility to notify his/her Surety of any changes affecting the general scope of the Work or change of the Contract Amount and the amount of

the applicable bonds shall be adjusted accordingly, and an amended bond document furnished to the City. In the event the City directs the Contractor to make a change in the Work, and if the City and the Contractor do not arrive at a mutually acceptable increase or decrease in the Contract Amount, the contractor shall not use any such lack of mutual acceptance as a basis or cause to stop or otherwise delay the progress or the execution and completion of any of the work ordered, directed or required pursuant to the Contract Documents.

If the Contractor believes an event or situation has occurred which justifies a change in the Contract Amount or Contract Time, he shall deliver a written notice to the Project Manager. Each such written notice shall be delivered promptly, and in any event no later than fifteen (15) days after the Contractor first discovered the occurrence. The Contractor shall be deemed to have waived the right to collect any and all costs incurred more than fifteen (15) days prior to the date of delivery of the written notice, and shall be deemed to have waived the right to seek an extension of the Contract Time with respect to any delay in the Progress Schedule which accrued more than fifteen (15) days prior to the date of delivery of the written notice.

Any such notice shall include sufficient detail to explain the basis of entitlement to a claim for an adjustment to the Contract Amount or Contract Time. When requested by the Project Manager, the Contractor shall furnish any additional information and details as may be required to determine the facts or allegations involved, which shall be provided within fifteen (15) days of the request unless a longer time period is allowed by the Project Manager.

The Contractor shall prepare proposals detailing proposed adjustments to Contract Amount and/or Contract Time in accordance with Article 13 and submit them to the Project Manager within fifteen (15) days of the City's issuance of a proposed Change Order or the Contractor's submitting a written notice of a change or claim for an adjustment to the Contract Amount or Contract Time. Contractor's proposals shall be irrevocable for a period of at least sixty (60) days after receipt by the City. Any delay in the submittal of a complete, adequate and acceptable proposal will not justify an increase in Contract Amount or Contract Time. Contractor agrees that it shall give the City access to any and all of Contractor's and Subcontractors' books, records and other materials relating to proposed Change Orders and other claims for adjustment to Contract Amount or Contract Time

CHANGE OF CONTRACT AMOUNT

The Contract Amount constitutes the total compensation payable to the Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the Contractor shall be at his expense without change in the Contract Amount. The Contract Amount may only be changed by written Change Order issued by the City. Any claim for an increase in the Contract Amount shall be in writing and delivered to the Project Manager within fifteen (15) days of the occurrence of the event giving rise to the claim.

All claims for adjustment in the Contract Amount shall be determined by the Project Manager. However, no claim for an adjustment to the Contract Amount will be considered for unforeseeable causes that were beyond the fault or negligence of the Contractor or his Subcontractors or supplier such as acts of God, floods, riots, etc. This restriction does not restrict submission of claims for additional Contract Time due to events of this nature. Any change in the Contract Amount shall be incorporated in a Change Order.

Contractor proposals or claims shall cover all aspects of the Work involved and shall be fully documented and itemized as to all costs, quantities and charges for overhead and profit. Amounts for Subcontractors or Suppliers at any tier shall be similarly supported. When determining Subcontractors' costs, the methods to be used shall be those used for the Contractor's costs, except that the term "Subcontractor" shall replace the term "Contractor," context permitting.

Changes in Contract Amount for extensions in Contract Time shall exclude costs that are unaffected or do not relate to the extension in Contract Time, such as: (a) operating costs of construction equipment assigned to the Work on a continuing basis, (b) operating costs and owned/rental costs of construction equipment (crane used for specific lifts, concrete pump used for specific pours, etc.), and (c) fully paid site facilities, tools, etc.

The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Amount where the Work involved is covered by unit prices contained in the Contract Documents shall be determined by application of unit prices to the quantities of the items involved. If the quantities originally contemplated are so changed in a proposed Change Order, that application of the Unit Prices to the quantities proposed will cause substantial inequity to the City or the Contractor, the applicable unit price(s) shall be equitably adjusted by mutual agreement.

If the value of work covered by a Change Order cannot be established or mutually agreed to utilizing previously established unit rates, the value shall be determined by the City on the basis of an estimate of the out-of-pocket cost and percentages that are acceptable to the City for overhead and profit. The out-of-pocket cost shall only include those direct costs which are needed to perform the work such as labor (including payroll taxes, fringe benefits, labor burden and workers' insurance), materials, equipment, and other incidental out-of-pocket construction costs directly involved in the work, including but not limited to small tools, expendables and material costs but shall not include project management or project supervisory costs unless the Change Order includes an increase in the Contract time.

In such case, the Contractor will submit in the form prescribed by the City an itemized cost breakdown together with supporting data.

The amount of credit to be allowed by the Contractor to the City for any such change which results in a net decrease in cost, will be the amount of the actual net

decrease as determined by the City. When both additions and credits are involved in any one change, the combined overhead and profit shall be figured on the basis of the net increase, if any.

To be eligible for consideration, the Contractor's written claim for a change in the Contract price, including claim(s) from sub-contractors, shall include an itemized cost breakdown with supporting data as described below:

- A. For labor: Provide written documentation from the Contractor and Subcontractors or others as appropriate in the form of a detailed breakdown by each labor classification involved indicating the number of hours of Work involved and the hourly payroll rate applicable to each to substantiate the basis and amount of the direct labor cost. The direct labor cost may be increased to provide an allowance for indirect payroll costs (labor burden), such as payroll taxes, fringe benefits, and workers insurance after all premium discounts, rebates and other appropriate reductions have been taken.

Allowable labor costs shall be limited to craft labor (including foremen) in the direct employ of the Contractor (or Subcontractor) assigned to the site and engaged in furnishing and incorporating materials or equipment in the Work involved in the Change Order or Claim.

When determining actual payroll costs, daily time sheets certified by the Contractor and verified by the Project Manager along with certified payroll records shall be the valid records.

- B. For material, supplies, equipment, furnishings, etc., to be installed or included in the Work: Provide written documentation from the Contractor and Subcontractors, suppliers, etc., to substantiate the basis and amount of the various cost items involved. Material costs shall reflect the Contractor's reasonably anticipated net actual cost after consideration of trade discounts and volume rebates.
- C. For construction equipment: Provide written documentation in the form of a detailed breakdown by each construction equipment category indicating, the applicable unit rates (i.e., \$'s per hour, \$'s per day etc.,) and the number of hours, days, etc. to substantiate the basis and amount of the construction equipment out-of-pocket costs.

CHANGE OF CONTRACT TIME

The Contract Time may only be changed by written Change Order. Any claim for an extension in the Contract Time shall be in writing and include an analysis of the Progress Schedule as further described in the Specifications, and shall be delivered to the Project Manager within fifteen (15) days of the occurrence of the event giving rise to the claim. All claims for adjustment in the Contract Time shall be determined by the Project Manager. Any change in the Contract Time resulting

from any such claim shall be incorporated in a Change Order. The Contract Time may be extended for an amount equal to time lost due to unforeseeable causes beyond the control of the Contractor (and his Subcontractors and Suppliers) if he makes a claim therefore. Such delays shall include, but not be restricted to, acts or neglect by any separate Contractor employed by the City; fires; floods; labor disputes; epidemics or acts of God.

All time limits stated in the Contract Documents are of the essence to the Contract. The stated time limits are agreed to be adequate to complete the work, including the procurement, manufacture and delivery of all material and equipment required, and account for any and all potential impact, delays, disruptions and costs that may be expected.

CITY'S RIGHT TO DIRECT PURCHASE

The City has reserved the right to purchase certain items and materials for this project directly in an effort to save applicable sales tax in compliance with Florida Law.

The City will issue purchase orders directly to the vendors supplying the equipment being directly purchased by the City for this project. Each Purchase Order will be accompanied by the City's Certificate of Exemption and a Certificate of Entitlement. All vendor invoices be issued directly to the City of St. Pete Beach and the City will issue payment directly to each direct purchase vendor from City funds. The City will take title to the equipment at time of delivery from the vendor and will issue a separate Certificate of Entitlement for each purchase order.

The Contractor shall assist the City with receipt of materials furnished by the City in accordance with these Special Provisions including, but not limited to, verifying correct quantities, verifying documents of orders in a timely manner, providing and obtaining all warranties and guarantees required by the Contract Documents, assist with inspection of the goods at the time of delivery and notify the City immediately of any deficiencies noted. It is understood that the owner assumes the risk of damage or loss during the time that the building materials are physically stored at the job site prior to their installation or incorporation into the project. The Contractor shall coordinate with the City regarding the delivery schedules, sequence of delivery, loading orientation, and other arrangements normally required by the Contractor for the particular material furnished.

As City Furnished Materials are delivered to the job site and accepted by the City, the City shall notify the Contractor who will assist the City to visually inspect all shipments from the suppliers. The City will approve the vendor's invoice for material delivered upon adequate inspection and recommendation of the Contractor. The City shall assure that each delivery of City Furnished Materials is accompanied by documentation adequate to identify the Purchase Order against which the purchase is made and Contract Documents including but not limited to Contract, Plans, Specifications, and approved Shop Drawings. This documentation may consist of a delivery ticket, bill of

loading and an invoice from the supplier conforming to the Purchase Order together with such additional information as the City may deem necessary.

PAYMENTS FOR WORK COMPLETED

Partial payments will be made as the work progresses at the end of each calendar month, or as soon thereafter as practicable on estimates made by the City Manager or designee and as approved by the City, provided that the Contractor is performing the overall job in a diligent manner. In making partial payments, there shall be retained ten percent (10%) on the amount of each estimate until final completion and acceptance of all work covered by the Contract. Upon completion and acceptance of the work, the City Manager or designee shall issue a certificate that the work has been completed and accepted by him under the conditions of the Contract, and shall make and approve the final estimate of the work. The entire balance found to be due the Contractor, including that retained by the City, should be paid to the Contractor. Such payment shall be conditioned, however, upon the submission by the Contractor of evidence satisfactory to the City that all claims for labor, material, and any other outstanding indebtedness in connection with the Contract have been paid. Such payment shall also be conditioned upon approval and acceptance of the construction and improvements by the City.

If after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor and the City Manager or designee so certifies, the City shall upon the Certificate of the City Manager or designee, and without terminating the Contract make payment for the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claim. If such delay occurs and payment is made under this clause, the Contractor shall nevertheless be prepared to complete the work in a timely manner upon the remedy or removal of such delay, and shall be bound under this Contract for the completion of such work unless this Contract is otherwise terminated.

PAYMENTS WITHHELD

The City Manager or designee may withhold, or, on account of subsequently discovered evidence, nullify the whole or part of any estimate to such extent as may be necessary to protect the City from loss on account of:

- (a). Defective work not remedied.
- (b). Claims and/or liens filed or reasonable evidence indicating probable filing of claims.
- (c). Failure of the Contractor to make payments properly to Subcontractors or for material or labor.
- (d). A reasonable doubt that the Contract can be completed for the balance then unpaid.
- (e). Damage to another Contractor.
- (f). Failure of the Contractor to keep his/her work progressing in accordance with his/her time schedule.

FINAL PAYMENTS

Upon the completion and acceptance of the work, the City Manager or designee shall issue a certificate that designates that the whole work provided for in this Contract has been completed and accepted by him under the conditions and the terms thereof and shall make the final estimate of the work. After issuance of the certificate, the entire balance found to be due the Contractor, including said retained percentage by the City in accordance with existing state laws as may be retained lawfully by said City, shall pay excepting such sums to the Contractor.

Before the approval of the final payment, the Contractor shall submit evidence satisfactory to the City that states that all payrolls, materials, bills and outstanding indebtedness in connection with this Contract have been paid.

LIENS AND/OR LEINS

If at any time there shall be evidence of any lien or claim for which the City might become liable and which is chargeable to the Contractor, the City shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient for complete indemnification against such lien or claim. In the event the City has already paid to the Contractor all sums due under this contract or the balance remaining unpaid is insufficient to protect the City, the Contractor and his Surety shall be liable to the City for any loss so sustained.

RESPONSIBILITY OF THE CITY MANAGER OR DESIGNEE

The term "City Manager or designee" wherever used in the Contract shall be the City of St. Pete Beach or its duly authorized representative. Notices of any change in the City Manager or designee shall be given in writing by the City to the Contractor. The City Manager or designee shall have full authority to interpret the Plans and Specifications and shall determine the amount, quality, and acceptance of the work and supplies to be paid for under the Contract and every question relative to the fulfillment of the terms and provisions therein. It shall be the duty of the City Manager or designee to enforce the Plans and Specifications in a fair and unbiased manner.

If a variation from any requirements is allowed the City Manager or designee shall grant the same in writing with the reasons for his action outlined, and such action will not invalidate or change the Contract in any other manner.

INTENT OF PLANS AND SPECIFICATIONS

The Contractor shall keep on the job a copy of the Plans and Specifications and shall at any time give the City Manager or designee access thereto. Anything mentioned in the Specifications and not shown on the Plans or shown on the Plans and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. The Contractor shall not take advantage of any errors, discrepancies or omissions that may exist in the Plans and Specifications, but shall immediately call them to the attention of the City Manager or designee whose interpretation or correction thereof shall be conclusive. Should a conflict occur between the General Specifications and any Supplemental Specifications and/or Plans, the latter shall govern.

LICENSES AND PERMITS

See Special Provision SP-04 below for additional details on existing permits.

SUPERINTENDENCE

The Contractor shall constantly superintend all the work embraced in this Contract in person or by a responsible agent who shall have in writing, full authority to act for him/her and to carry out all the instructions given by the City Manager or designee.

LABOR PROVISIONS

The Contractor and his Subcontractors shall discharge, whenever ordered to do so by the City Manager or designee, any employee who is disorderly or whose conduct in the opinion of the City Manager or designee is detrimental to the prosecution of the work. No person whose age or physical condition is such as to make this employment dangerous to his/her health and safety or to the health and safety of others shall be employed on the work, and in no event shall any persons under the age of sixteen (16) years be employed. The State of Florida prevailing wage law requires that the Contractor shall fully comply with all provisions contained in Section 215.19, "Schedule of Prevailing Wage Rates for Specified Public Construction." The wage rates set forth by such determination shall apply to this project.

LIABILITY INSURANCE

The Contractor shall procure and maintain at his/her own expense, during the life of the Contract, liability insurance as hereinafter specified. All such insurance shall be subject to the approval of the City for adequacy of protection, and shall include a provision preventing cancellation without twenty (20) days prior notice to the City in writing. The City shall be included as an additional insured on all liability insurance. The liability insurance required is as follows: Contractor's General Public Liability and Property Damage Insurance issued to the Contractor and protecting the Contractor from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under this Contract, whether such operations be by the Contractor or by any Subcontractor hired by the Contractor or anyone directly or indirectly employed by the Contractor or hired by the Contractor.

The successful Contractor shall supply and maintain insurance which defends, indemnifies and holds harmless the City of St. Pete Beach, its officers, employees and agents from and against any and all liability, damage claims, demands, costs, judgments, fees, attorney's fees or loss arising directly out of acts or omissions hereunder by the contractor or third party under the direction or control of the contractor. Such general and excess liability coverage shall be primary to any other coverage carried by the City of St Pete Beach. Contractor must furnish the City with Certificate of Insurance prior to commencement of work. An approved Certificate of Insurance furnished by the contractor's carrier to guarantee the contractor being insured with the City of St Pete Beach must be named as a certificate holder for this contract. The following minimum coverage:

Commercial Liability Insurance \$1,000,000.00.
Comprehensive General Liability Insurance of \$1,000,000.00 each occurrence.
Personal Injury for \$1,000,000.00 each occurrence.
Automobile Liability \$1,000,000.00.
General Workers Compensation Insurance as required by Florida law.
Builder's Risk Insurance.
Marine General Liability Insurance including Longshore Harbor Worker's Compensation.

PROTECTION OF WORK AND PROPERTY

The Contractor shall continuously maintain adequate protection of all his/her work and materials from damage or theft and shall protect the City's property and all adjacent property from injury or loss arising in connection with activities under his/her Contract. The Contractor shall make good any such damage, injury, or loss, except such as may be caused by agents or employees of the City.

The Contractor shall take, use, provide, and maintain all necessary precautions, safeguards, and protection to prevent accidents, or injury to persons or property on, about, or adjacent to the site of the work. Should the situation arise that physical security is needed the Contractor will provide security on off days and holidays. The Contractor shall be responsible for all charges incurred with such action.

The Contractor shall post danger signs warning against any hazards created by the work being done under his/her Contract. He/She shall designate a responsible member of his/her organization on the work, whose duty shall be the prevention of accidents, and the name of the person so designated shall be reported to the City Manager or designee and City in writing. In an emergency affecting the safety of life, or of the work or adjoining property, the Contractor, without special instruction or authorization from the City Manager or designee or City, is hereby permitted to act, at his/her own discretion, to prevent such threatened loss or injury, and he/she must take such action if so instructed or authorized by the City Manager or designee. The Contractor shall also protect adjacent property as required by law.

PARKING

Arrange with City Manager or designee for temporary parking areas to accommodate construction personnel and construction equipment. Note that limited parking spaces are available in the areas surrounding Pass-A-Grille Way. The Contractor will be asked to coordinate with the City's representative on site on a regular basis to minimize the impact on residents and visitors.

TRANSPORTATION, HANDLING and STORAGE

Transport, handle, protect and store products in accordance with manufacturer's instructions and all environmental regulatory agencies.

VEHICLES

Business vehicles shall be identified on both sides with the name of the company.

ENVIRONMENTAL PROTECTION

It shall be the Contractor's responsibility to implement construction methods, best management practices, and erosion control methods that avoid water pollution as required by the State of Florida Department of Environmental Protection, City of St. Pete Beach and Pinellas County. Any Contractors in violation of the City of St. Pete Beach Regulations, Pinellas County Regulations, Florida Department of Environmental Protection Regulations or any other regulatory agency regulations shall be the sole responsibility of the Contractor. The Contractor shall hold harmless the City of St. Pete Beach and the City Manager or designee from any fines and litigation resulting from the Contractor's actions. The Contractor shall pay all attorneys' fees, fines, penalties and any other such expenses resulting from the Contractor's actions. The Contractor shall provide all necessary measures to prevent any materials whatsoever from entering the waterway except for those materials, which are shown, on the plans as completed structures. The Contractor shall provide MSDS sheets to the City Manager or Designee on all applicable materials before applying those materials. The contractor shall secure the necessary education, certifications, licenses and permits required by state and local agencies to operate and manage a construction site. The contractor shall abide by all rules and regulations set forth and required by the City of St. Pete Beach's MS4 NPDES Permit.

TIMELY DEMAND FOR STAKES AND INSTRUCTIONS

The Contractor shall provide reasonable and necessary materials, opportunities and assistance for setting stakes and making measurements, including the furnishing of a rodman, or a chainman at intermittent times during the construction period. He/she shall not proceed until he/she has received such stakes and instructions as may be necessary as the work progresses. The work shall be done in strict conformity with such stakes and instructions. The Contractor shall carefully preserve bench marks, reference points and stakes, and in case of willful or careless destruction, he/she will be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

WORKMANSHIP

The Contractor acknowledges that he/she has satisfied himself/herself as to the nature and location of the work; the general and local conditions including but not restricted to those bearing upon transportation, disposal, handling and storage of materials; availability of labor, water, electric power, roads; and uncertainties of weather, surface conditions, subsurface conditions, tides or similar physical conditions at the site, the character of equipment and facilities required to prosecute the work. Any failure by the Contractor to acquaint himself/herself with any aspect of the work or with any of the applicable conditions shall not relieve the Contractor from the responsibility to successfully perform the work under the Contract Documents, nor shall it be considered the basis for any claim for additional time or compensation.

UTILITIES

The Contractor shall anticipate all underground obstructions such as water lines, gas lines, sewer lines, utility lines, or any other public or private facilities and debris. In all cases where existing utility lines may be interfered with by the work, the Contractor shall give a minimum of thirty six (36) hours' notice to the owners of such utilities, to permit them to relocate the lines prior to construction. No extra payment shall be allowed for the removal, replacement, repair or possible increased cost caused by underground obstructions. The location of existing structures and utilities provided in the plans are approximate only. Any damage to existing structures to remain or work of any kind shall be repaired or restored promptly by, and at the expense of the Contractor.

The Contractor shall at all times protect all desirable trees, plants, curbs, sidewalks, irrigation components, and structures not requiring removal to accomplish the work, whether or not they are shown on the plans. The Contractor must contact the City to obtain tree removal permits for the removal of any tree not identified for removal in the Project Plans.

In matters of restoration all materials, construction and workmanship shall be acceptable to the City of St. Pete Beach and the City Manager or designee. No changes in size, shape, configuration, location, materials or construction shall be made without prior written authorization from the City Manager or designee. Any demolition debris and other debris shall be hauled offsite and properly disposed of by the Contractor and shall be inclusive to the prices as stated in the BID SCHEDULE, unless otherwise stipulated as part of the project to remain. Please see Alternate 6 for information regarding existing brick.

No interruption of ingress and egress to private property shall be made unless the Contractor has made prior arrangements acceptable to the owner of the affected property. The City's Project Manager or designee, shall notify affected residents/property owners of impending activity or inconvenience via door hanger.

The Contractor shall provide all traffic control devices utilized during construction and meet the requirements set forth in the Florida State Department of Transportation "Manual on Traffic Control and Safe Practices for Street and Highway Construction, Maintenance, and Utility Operations."

CLEANING UP

Upon completion or termination of the work the Contractor shall, as directed by the City Manager or designee, remove from the vicinity of the work all equipment and temporary structures, waste materials and rubbish resulting from his operations, leaving the premises in a neat and presentable condition. All debris generated by the Contractor will be removed before leaving the area. All areas will be raked to remove smaller debris. All surrounding sidewalks, parking lots and roadways will be cleared of any dust or debris generated by the Contractor. In the event of his/her failure to do so, the City at the expense of the Contractor may do the same, and his/her Surety shall be responsible therefore.

DEFECTIVE WORK OR MATERIAL

The Contractor shall promptly remove from the premises all work and materials condemned by the City Manager or designee as failing to conform to the Contract, whether incorporated or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the City and shall bear the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement.

If the Contractor does not remove such condemned work or materials within a reasonable time after notice, the City may remove them and store the materials at the expense of the Contractor. If the Contractor does not pay the expense of such removal within ten (10) days' time thereafter, the City may, upon thirty (30) days written notice sell such materials at auction or at private sale and shall account for the net proceeds thereof after deducting all the costs and expenses that should have been borne by the Contractor.

DISPUTE RESOLUTION

The Contract shall be construed under Florida law. The parties agree that all controversies, claims and other matters in question between the parties arising out of or relating to this Contract or its breach shall be resolved through mediation. Upon notice of any party to the Contract of a dispute, question or controversy, the parties shall agree to the appointment of a qualified mediator. A qualified mediator is a person who has received at least forty (40) hours of mediation training and has actual experience as a mediator in resolving contract disputes. If the dispute, question or controversy is not resolved through mediation within sixty (60) days of a notice of the dispute between the parties, the city reserves the right to seek resolution through court action.

INDEMNITY

The Contractor shall indemnify and save harmless the City, and the City's agents and employees, from and against all losses and all claims, demands, payments, suits, actions, recoveries, and judgments of every nature and description brought or recovered against them by reason of any action or omission of the said Contractor, his agents, or employees, in the execution of the work or in guarding the same.

GENERAL WARRANTY

Neither the final certificate nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the City shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting there from that shall appear within a period of eighteen (18) months from the date of final acceptance of the work, unless a longer period is specified. The City shall give notice of observed defects with reasonable promptness.

LAND OF CITY, USE OF, BY CONTRACTOR

The City shall provide the land upon which the work under this Contract is to be done, and will, so far as is convenient, permit the Contractor to use as much of the land as is required for the erection of temporary construction facilities and storage of materials, together with the right of access to same, but beyond this, the Contractor shall provide, at his/her cost and expense, any additional land required. It will be the responsibility of the Contractor to repair or restore to the satisfaction of the City, at their own expense, any damage to land used for the above stated activities or any other activities approved by the City.

OTHER WORK

Wherever work being done by the City or by other Contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the City Manager or designee to secure the completion of the various portions of the work in general harmony.

OTHER CONTRACTS

The City may award other Contracts. The Contractor shall fully cooperate with such other Contractors and carefully fit his/her own work to that provided under other Contracts, as may be with the performance of work by any other Contractor or City.

DELAYS AND EXTENSION OF TIME

If the Contractor should be delayed at any time in the progress of the work by an act or neglect of the city or the City Manager or designee, or of any employee of either, or by any separate Contractor employed by the City, or by changes ordered in the work, or by strike, lockouts, fire, unusual delay in transportation, unavoidable casualties, or any cases beyond the Contractor's control, or by delay authorized by the City Manager or designee, or by any cause which the City Manager or designee shall decide to justify the delay, then the time of completion shall be extended for such reasonable time as the City Manager or designee may decide. No such extension shall be made for a delay that occurs more than seven (7) days before a claim is made in writing to the City Manager or designee. In the case of a continued cause of delay, only one (1) claim is necessary. This section does not exclude the recovery of damages for delay by either party under other provisions in the Contract Documents.

CITY'S RIGHT TO TAKE OVER THE WORK

If the Contractor shall be adjudged bankrupt, or if he/she should make a general assignment for the benefit of his/her creditors, or if a receiver should be appointed to take over his/her affairs, or if he /she should fail to prosecute his/her work with due diligence and carry the work forward in accordance with his/her work schedule and the time limits set forth in the Contract Documents, or if he/she should fail to substantially perform one or more of the provisions of the Contact Documents to be performed by him, the City may serve written notice on the Contractor and the Surety on his/her performance bond, stating its intention to exercise one of the remedies hereinafter set forth and the grounds upon which the City bases its right to exercise such remedy. In any event, unless the matter complained of is

satisfactorily cleared within ten (10) days after the service of such notice, the City may, without prejudice to any other right or remedy exercise one of such remedies at once; having first obtained a certificate from the City Manager or designee that such sufficient cause exists to justify such action.

- (a) The City may terminate the services of the Contractor, which termination shall take effect immediately upon service of notice thereof on the Contractor and his Surety, whereupon the Surety shall have the right to take over and perform the Contract. If the Surety does not commence performance of the Contract within ten (10) ten days after service of the notice of termination, the City may itself take over the work, take possession of and use all materials, tools, equipment, and appliances on the premises and prosecute the work to completion by such means as it shall deem best. In the event of such termination of his service, the Contractor shall not be entitled to any further payment under his Contract until the work is completed and accepted. If the City takes over the work and if the unpaid balance of the Contract price when the City takes over the work exceeds the cost of completing the work, including compensation for damages or expenses incurred by the City through the default of the contractor, such excess shall be paid to the Contractor. In such event, if such cost, expenses, and damages shall exceed such unpaid balance of the Contract price, the Contractor and his Surety shall pay the difference to the City. The City Manager or designee shall certify such cost, expenses, and damages.
- (b) The City may take control of the work and either make good the deficiencies of the Contractor itself or direct the activities of the Contractor in doing so, employing such additional help as the City deems advisable. In such event, the City shall be entitled to collect from the Contractor and his Surety, or to deduct from any payment then or thereafter due the Contractor, the costs incurred by it through the default of the Contractor, provided the City Manager or designee approves the amount thus charged to the Contractor.
- (c) The City may require the Surety on the Contractor's bond to take control of the work at once and see to it that all deficiencies of the Contractor are made good with due diligence. As between the City and the Surety, the cost of making good such deficiencies shall all be borne by the Surety. If the Surety takes over the work, either upon termination of the services of the Contractor or upon instructions from the City to do so, the provisions of the Contract Documents shall govern in respect to the work done by the Surety, the Surety being substituted for the Contractor as to such provisions, including provisions as to the payment for the work and provisions of this section as to the right of the City to do the work itself or to take control of the work.

RIGHT OF OCCUPANCY

The City shall have the right, if necessary, to take possession of and to use any completed or partially completed portions of the work, if such use be approved by the City Manager or designee even if the time for completing the entire work or such portions of the work has not expired and even if the work has not been finally accepted. Such possession and use shall not constitute an acceptance of such

possession and use if it materially interferes with the Contractor's operations. The City shall also have the right to enter the premises with the Contractor for the purpose of doing work not covered by its Contract.

ACCEPTANCE

Final inspection and acceptance of the work shall be made for the City by the City Manager or designee. Such inspection shall be made as soon as practical after the Contractor has notified the City in writing that the work is ready for such inspection.

WAIVER

It is expressly understood and agreed that any waiver granted by the City Manager or designee or the City of any term, provision or covenants of the Contract shall not constitute a precedent or breach of the same or any other terms, provisions, or covenants of the Contract. Neither the acceptance of the work by the City nor the payment of all or any part of the sum due the Contractor hereunder shall constitute a waiver by the City of any claim which the City may have against the Contractor or Surety under this Contract or otherwise.

INSPECTION

The City Manager or designee and his representative shall, at all times, have access to the work during its construction and shall be furnished with every reasonable facility for ascertaining that the stock and materials used and employed, and the workmanship, are in accordance with the requirements and intentions of the Plans. All work done and all materials furnished shall be subject to their inspection and approval by the City Manager or his designee. If any work should be covered up without approval or consent of City Manager or designee, it must, if required by the City Manager or designee, be uncovered for examination at the Contractor's expense.

The City Manager or designee may order re-examination of questioned work and if so ordered, the Contractor must uncover the work. If such work were found in accordance with the Contract Documents, the City shall pay the cost of re-examination and replacement. If such work be found not in accordance with the Contract Documents, the Contractor shall pay such cost unless he /she shall show that the defect in the work was caused by another Contractor, and in that event, the City shall pay such cost.

The inspection of the work shall not relieve the Contractor of any of his/her obligations to fulfill his/her Contract as prescribed, and defective work shall be made good and unsuitable materials shall be rejected, notwithstanding that such defective work and materials have been previously overlooked and accepted on estimates for payment. All work shall be tested to the satisfaction of the City Manager or designee before acceptance.

AS-BUILTS

See Special Provision SP-13.

BID REVIEW AND CONTRACT AWARD

Failure to submit all documents requested at the time of bid may deem the contractor's bid ineligible for award. The City of St. Pete Beach reserves the right to reject any or all bids or parts of bids or accept any bid or part thereof deemed to be in the best interests to the City of St. Pete Beach. The City shall be the sole final judge of qualifications of the bidder to perform service and reserves the exclusive right to accept or reject any bids as it deems to be in the best interests of the City. The City may waive any informalities.

LOCAL, STATE AND FEDERAL COMPLAINT REQUIREMENTS

The laws of the State of Florida do apply to any purchase made under this Request for Bid. Proposers shall comply with all local, state, and federal directives, orders and laws as applicable to their bid and subsequent contracts include but not limited to Equal Employment Opportunity, Minority Business Enterprise, and OSHA as applicable to this contract.

A PROVISION FOR OTHER AGENCIES

Unless otherwise stipulated by the proposer, the proposer agrees to make available to all Government agencies, departments, and municipalities the bid prices submitted in accordance with said bid terms and conditions therein, should any said governmental entity desire to buy under this bid. Eligible users shall meet all State of Florida agencies, the legislative and judicial branches, political subdivisions (counties, local district school boards, community colleges, municipalities, or other public agencies or authorities), which may desire to purchase under the terms and conditions of this contract.

BID BOND

None required due to prequalification of Contractors.

RESERVES THE RIGHT

The City reserves the right to accept or reject any and/or all bids, to waive irregularities and technicalities, and to request re-submission. If only one bid is received by the bid date and time listed, the bid may or may not be rejected by the City depending upon bid review and the needs of the City.

The City reserves the right to select a firm with or without additional interviews, and may decide to select any of the firms submitting bids. The City reserves the right to award the contract to a responsible proposer submitting a responsible bid, with a resulting negotiated agreement which is most advantageous and in the best interest of the City.

Proposers, bidders, their agents, and associates shall not contact or solicit any City Commission member, City employee, or official regarding this RFB during any phase of the bidding process. Failure to comply with the provision may result in disqualification of the bidder, at the option of the City. Only that individual listed, or an approved designee, as the contact person for this RFB shall be contacted.

Once bids are submitted to the City on June 2nd, 2015, they cannot be withdrawn.

COPY

I. CONTRACTOR'S BID SUBMITTAL

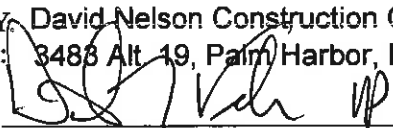
The undersigned, as Bidder, hereby declares that the only person or persons interested in the Bid as principal or principals are named herein, and that no other person than herein mentioned has any interest in the Bid or in the Contract to be entered into; that this Bid or Contract is made without connection with any other person, company, or parties making a Bid; and that it is in all respects fair and in good faith without collusion or fraud.

The Bidder further declares that he/she has examined the site of the work and informed himself/herself fully in regard to all conditions pertaining to the place where the work is to be done; that he/she has examined the RFB, Plans, and Specifications for the work and Contract Documents relative thereto, and has read all special provisions furnished prior to the opening of bids; and that he/she has satisfied himself/herself relative to the materials to be supplied and work to be performed.

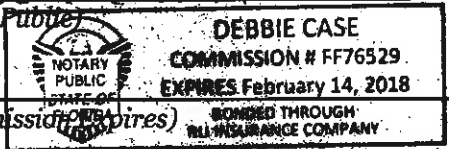
The Bidder certifies that the information and responses provided within this bid are true, accurate, and complete. The contractor hereby grants permission for each entity or reference listed in the Bidder's previously submitted Statement of Qualifications to make any information concerning the Contractor available to the City.

The Bidder proposes and agrees, if the Bid is accepted, to contract with the City of St. Pete Beach, Florida, in the form of a Contract or Agreement specified for: *"PASS-A-GRILLE WAY RECONSTRUCTION FROM 19TH AVENUE TO CABRILLO AVENUE."*

In St. Pete Beach, Florida, in full and complete accordance with the shown, noted, described, and reasonably intended requirements of the RFB, Bid Documents, Plans, Specifications, Contract Documents, and Addenda to the full and entire satisfaction of the City of St. Pete Beach, Florida, the Bidder proposes to furnish all materials, equipment, labor, and perform the work submitted in their bid schedule for the City of St. Pete Beach's project: *"PASS-A-GRILLE WAY RECONSTRUCTION FROM 19TH AVENUE TO CABRILLO AVENUE."*

COMPANY: David Nelson Construction Co. DATE: June 2, 2015
ADDRESS: 3488 Alt 19, Palm Harbor, FL 34683 PHONE: (727)784-7624
BY: 
(SIGNATURE)
NAME: David L. Vekasi, Vice President
(PRINT NAME & TITLE)

Sworn to and subscribed before me on this 2nd day
of June, 2015


(Notary Public)

(My Commission Expires)

SUBMIT BID ITEMIZATION WITH BID TO:
CITY OF ST. PETE BEACH

BID DOCUMENTS
FOR
Paving & Drainage Improvements Pass A Grille Way from 19th Ave to Cabrillo Ave

Mail or Hand Deliver

ORIGINAL BID FORM AND FIVE (5) COMPLETE COPIES

BY the date and time specified in the bid documents

David Nelson Construction Co.

COMPANY NAME

3483 Alternate 19

COMPLETE MAILING ADDRESS

Palm Harbor, FL 34683

CITY, COUNTY, STATE, ZIP CODE

Ph: (727)784-7624 Fx: (727)786-8894

TELEPHONE NUMBER FAX NUMBER

David L. Vekasi dvekasi@nelson-construction.com

CONTACT PERSON E-MAIL ADDRESS

**To the City Commissioners
St. Pete Beach, Florida**

The Undersigned, hereinafter called "Bidder", having visited the site of the proposed project and familiarized himself with the local conditions, nature and extent of the work, and having examined carefully the Contract Form, General Conditions, Supplementary Conditions, Plans, Permitting and Specifications and other Contract Documents, with the Bond requirements herein, proposes to furnish all labor, materials, equipment and other items, facilities and services for the proper execution and completion of: **Paving, Utilities & Drainage Improvements along Pass A Grille Way from 19th Ave to Cabrillo Ave** in full accordance with the drawings and specifications prepared in accordance with the Contract Documents and, if awarded the Contract, to complete the said work within the time limits specified for the following TOTAL BASE BID.

It is understood that this is a lump sum Contract and the resultant Contract will contain lump sum prices for the base bid and alternates. Supporting information including estimated quantities, unit prices, and extended totals will be included as an appendix to the contract. The base bid and alternates shall be sum of all pay item totals from the schedule of prices developed by the contractor.

The Contract resulting from this project is based on plans and specifications provided to the contractor. The contractor will develop a detailed list of pay item and associated unit costs and provide this with the bid package. After bid submittal this will be compared to the quantities developed by the City.

TOTAL BASE BID (Includes Supplement 1 and 2):

Twelve Million Eight Hundred Fifty Five Thousand Seven
Hundred Fifty Six Dollars & Twenty Cents DOLLARS
(In Words)

\$ 12,855,756.20 (in numbers)

DAYS TO FINAL COMPLETION 570 days
(preference will be given to accelerated schedules)

In the event the Contract is awarded to this Bidder, he/she will enter into a formal written agreement with the City in accordance with the accepted bid within ten (10) calendar days after said Contract is submitted to him/her and will furnish to the City a Contract Payment and Performance Bond with good and sufficient sureties, satisfactory to the City, in the amount of 100% of the accepted bid. The Bidder further agrees that in the event of the Bidder's default or breach of any of the agreements of this proposal, the said bid deposit shall be forfeited as liquidated damages.

Failure of the Bidder to provide pricing for all unit priced items and/or the Base Bid and ALL requested additive/deductive bid items, or alternate bids may be cause for rejection of the bid as non-responsive at the exclusive discretion of the City.

Supplemental bid Item #1 – Potable Water Line

Pinellas County is providing all funding for the Potable Water Line so it is necessary to have a separate lump sum bid for potable water line.

SUPPLEMENTAL BID ITEM #1:

**One Million Three Hundred Sixty Two Thousand Five Hundred
Eighty Dollars & No Cents** _____ DOLLARS

(In Words)

\$ 1,362,580.00 _____ (in numbers)

Supplemental bid Item #2 – Reclaimed Water Line

Pinellas County is providing partial funding for the Reclaimed Water Line so it is necessary to have a separate lump sum bid for reclaimed water line.

SUPPLEMENTAL BID ITEM #2:

**Eight Hundred Twelve Thousand Seven Hundred Dollars
& No Cents** _____ DOLLARS

(In Words)

\$ 812,700.00 _____ (in numbers)

Alternate 1 – Reclaimed Water

The base bid includes removing the entire length of 16-inch reclaimed water line and replacing it with a new 16-inch reclaimed water line. Alternate 1 is to leave the existing 16-inch reclaimed water line in service and provide deflections at the conflicts with the proposed stormwater line.

Please 'X' _____ Add _____ Deduct

ALTERNATE 1:

**Seven Hundred Fifteen Thousand Two Hundred Dollars
& No Cents** _____ DOLLARS

(In Words)

\$ 715,200.00 _____ (in numbers)

Alternate 2 – Extended Work Hours

Extend work hours to 14 hour days, 6 AM to 8 PM on weekdays and 4 hours on Saturday.

Please 'X' XX Add _____ Deduct

ALTERNATE 2:

Two Hundred Thousand Dollars & No Cents _____ DOLLARS

(In Words)

\$ 200,000.00 _____ (in numbers)

NEW DAYS TO FINAL COMPLETION 540

Alternate 3 – Extended Work Hours and Night Work (hour and days at contractor's discretion)

Extend work hours to 20 hour per day, from 6:00 AM to 2:00 PM on weekdays, 10 hours on Saturday, and 10 hours on Sunday.

Please 'X' XX Add Deduct

ALTERNATE 3:

Two Hundred Thousand Dollars & No Cents DOLLARS

(In Words)

\$ 200,000.00 (in numbers)

NEW DAYS TO FINAL COMPLETION 540

Alternate 4 – Extended Work Hours (Two Crews)

Provide a cost or credit to add a second crew after the first section of the project with the temporary lane is completed. The second crew would work through the completion of the remainder of the project.

Please 'X' Add Deduct

ALTERNATE 4:

No Dollars & No Cents DOLLARS

(In Words)

\$ 0 (in numbers)

NEW DAYS TO FINAL COMPLETION 570

Alternate 5 – Pavers at 21st Avenue Intersection

The base bid includes salvaging existing bricks from under the existing roadway. The alternate is to use new engineered traffic bearing pavers instead of the salvaged bricks.

Please 'X' XX Add Deduct

ALTERNATE 5:

Fifteen Thousand Dollars & No Cents DOLLARS

(In Words)

\$ 15,000.00 (in numbers)

Alternate 6 – Existing Bricks Under the Existing Asphalt

The geotechnical report indicates the presence of historic brick pavers under the existing asphalt. The base bid assumes that this material is to be disposed of by the contractor. This disposal could be through landfilling, storage or sale. The geotechnical report only gives a snapshot at one specific location. However, it is estimated that as much as 5,222 SY of historic brick may be under the asphalt. This alternative is to salvage, stack on pallets, and deliver to City of St. Pete Beach storage area.

Please 'X' XX Add _____ Deduct

ALTERNATE 6:

One Hundred Fifty Six Thousand Six Hundred Sixty

Dollars & No Cents

_____ DOLLARS

(In Words)

\$ 156,660.00 (in numbers)

Pass a Grille Way Bid Sheet
David Nelson Construction Co.

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST	SUB-TOTAL
General						
101-1	MOBILIZATION (4.5%)	LS	1	\$ 540,000.00	\$ 540,000.00	
102-2	MAINTENANCE OF TRAFFIC (4.5%)	LS	1	\$ 549,000.00	\$ 549,000.00	
104-11	FLOATING TURBIDITY BARRIER	LF	1,100	\$ 10.00	\$ 11,000.00	
104-12	STAKED TURBIDITY BARRIER - NYLON REINFORCED PVC	LF	13,700	\$ 1.75	\$ 23,975.00	
110-1-1	CLEARING AND GRUBBING	LS	1	\$ 800,000.00	\$ 800,000.00	
SP-1	AS-BUILT PLANS	LS	1	\$ 7,500.00	\$ 7,500.00	
SP-2	INDEMNIFICATION	LS	1	\$ 100.00	\$ 100.00	
SP-3	SURVEY CONTROL	LS	1	\$ 75,000.00	\$ 75,000.00	
SUB-TOTAL						\$ 2,006,575.00
Roadway						
110-4	REMOVAL OF EXISTING CONCRETE (SIDEWALK & CURB)	SY	6,582	\$ 12.00	\$ 78,984.00	
120-1	REGULAR EXCAVATION	CY	7,400	\$ 25.00	\$ 185,000.00	
120-2-2	BORROW EXCAVATION, TRUCK MEASURE	CY	0	\$ 20.00	\$ -	
160-4	TYPE B STABILIZATION	SY	22,163	\$ 11.25	\$ 249,333.75	
285-708	OPTIONAL BASE GROUP 06	SY	17,290	\$ 22.00	\$ 380,380.00	
327-70-2	MILLING EXISTING ASPHALT PAVEMENT, 3.5" AVERAGE	SY	0	\$ 15.00	\$ -	
334-1-13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	TN	2,814	\$ 140.00	\$ 393,960.00	
SP-4	SHELL PAVEMENT (9-INCHES THICK)	SY	1,470	\$ 35.00	\$ 51,450.00	
SUB-TOTAL						\$ 1,339,107.75
Stormwater and Curbing						
400-95-2	COFFERDAM	EA	11	\$ 48,750.00	\$ 536,250.00	
425-1-20	INLETS TYPE 9	EA	102	\$ 3,000.00	\$ 306,000.00	
425-1-523	INLETS DBI TYPE C	EA	7	\$ 3,140.00	\$ 21,980.00	
425-1-549	INLETS DBI TYPE D (MODIFIED)	EA	1	\$ 4,100.00	\$ 4,100.00	
425-1-711	INLETS TYPE V, 10'	EA	26	\$ 3,670.00	\$ 95,420.00	
425-2-41	MANHOLES P-7, < 10'	EA	12	\$ 2,440.00	\$ 29,280.00	
425-2-71	MANHOLES I-7, < 10'	EA	12	\$ 4,310.00	\$ 51,720.00	
425-10	YARD DRAIN, 12" HDPE	EA	27	\$ 1,300.00	\$ 35,100.00	
425-3-81	JUNCTION BOX, SPECIAL, < 10', BAFFLE BOXES	EA	12	\$ 37,500.00	\$ 450,000.00	
430-175-112	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, 12 HDPE	LF	255	\$ 60.00	\$ 15,300.00	
430-175-115	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, 15" RCP	LF	70	\$ 67.00	\$ 4,690.00	
430-175-115	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, 15" HDPE	LF	302	\$ 67.00	\$ 20,234.00	
430-173-218	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, ELLIPTICAL EQUIVALENT FOR 18"	LF	245	\$ 80.00	\$ 19,600.00	
430-175-124	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, 24" RCP	LF	1,660	\$ 81.00	\$ 134,460.00	
430-175-224	PIPE CULBERT OPTIONAL MATERIAL, GUTTER DRAIN, ELLIPTICAL EQUIVALENT FOR 24"	LF	4,622	\$ 96.00	\$ 443,712.00	
436-1-1	TRENCH DRAIN, 6"-12"	LF	14	\$ 200.00	\$ 2,800.00	
430-830	PIPE FILLING AND PLUGGING	CY	7	\$ 150.00	\$ 1,050.00	
1055-11-274	UTILITY FITTINGS, HDPE, CLEANOUT 15"	EA	5	\$ 1,670.00	\$ 8,350.00	
SP-4	SEAWALL REPAIR	EA	11	\$ 1,490.00	\$ 16,390.00	
519-78	BOLLARDS	EA	168	\$ 300.00	\$ 50,400.00	
520-1-10	CONCRETE CURB AND GUTTER, TYPE F	LF	10,208	\$ 20.00	\$ 204,160.00	
520-2-4	CONCRETE CURB TYPE D	LF	469	\$ 20.00	\$ 9,380.00	
520-3	CONCRETE VALLEY GUTTER	LF	0	\$ 35.00	\$ -	
520-2-5	CONCRETE RIBBON CURB	LF	425	\$ 20.00	\$ 8,500.00	
522-1A	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY	4,417	\$ 32.00	\$ 141,344.00	
522-1B	CONCRETE SIDEWALK AT ADA RAMP, 4"	SY	273	\$ 60.00	\$ 16,380.00	
522-1C	STAMPED CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY	0	\$ 70.00	\$ -	
522-2A	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY	2,363	\$ 45.00	\$ 106,335.00	
522-2B	STAMPED CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY	0	\$ 85.00	\$ -	
526-1-1	PAVERS, ARCHITECTURAL	SY	301	\$ 118.00	\$ 35,518.00	
527-2	DETECTABLE WARNINGS	SF	2,449	\$ 25.00	\$ 61,225.00	
SP-5	MANATTE PROTECTION BARRIERS	EA	11	\$ 5,860.00	\$ 64,460.00	
SP-6	CONCRETE WHEEL STOPS	EA	9	\$ 75.00	\$ 675.00	
SP-7	DEWATER FOR STORMWATER	LS	1	\$ 3,150.00	\$ 3,150.00	
SUB-TOTAL						\$ 2,897,963.00
Landscaping						
570-1-2	PERFORMANCE TURF, SOD	SY	9,000	\$ 4.75	\$ 42,750.00	
580-4-447	LANDSCAPE-PALMS, WASHINGTONIA ROBUSTA, 25' TO 30' CT	EA	292	\$ 2,500.00	\$ 730,000.00	
SUB-TOTAL						\$ 772,750.00
Wastewater						
1050-11-222	18-INCH C900 PVC (GRAVITY)	LF	3,673	\$ 140.00	\$ 514,220.00	
1050-11-222	15-INCH C900 PVC (GRAVITY)	LF	73	\$ 130.00	\$ 9,490.00	
1050-11-222	10-INCH C900 PVC (GRAVITY)	LF	387	\$ 110.00	\$ 42,570.00	
1050-11-222	8-INCH C900 PVC (GRAVITY)	LF	830	\$ 80.00	\$ 66,400.00	

**Pass a Grille Way Bld Sheet
David Nelson Construction Co.**

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST	SUB-TOTAL
1050-11-222	8-INCH C900 PVC (FORCE MAIN)	LF	52	\$ 75.00	\$ 3,900.00	
1050-11-222	6-INCH C900 PVC (FORCE MAIN)	LF	336	\$ 72.00	\$ 24,192.00	
SP-8	18-INCH FERNCO ADAPTER	EA	1	\$ 2,000.00	\$ 2,000.00	
SP-9	10-INCH FERNCO ADAPTER	EA	3	\$ 1,200.00	\$ 3,600.00	
SP-10	8-INCH FERNCO ADAPTER	EA	8	\$ 800.00	\$ 6,400.00	
1060-12-12	MANHOLES (WASTEWATER)	EA	24	\$ 6,500.00	\$ 156,000.00	
SP-11	LATERALS WITH NEW CLEANOUT	EA	60	\$ 4,000.00	\$ 240,000.00	
SP-12	REMOVE EXISTING MANHOLES	EA	21	\$ 747.00	\$ 15,687.00	
SP-13	REMOVE EXISTING 16" VCP	LS	1	\$ 350,000.00	\$ 350,000.00	
SP-14	DEWATERING FOR WASTEWATER	LS	1	\$ 5,000.00	\$ 5,000.00	
SUB-TOTAL						\$ 1,439,459.00
Reclaimed						
1050-11-424	UTILITY PIPE, F&I, DI, RECLAIMED WATER, 16"	LF	4,200	\$ 88.00	\$ 369,600.00	
SP-15	REMOVE EXISTING 16" DI - INCLUDING DISCONNECT, CUT AND PLUG EXISTING LINE	LF	3,980	\$ 21.00	\$ 83,580.00	
1080-11-23	UTILITY FIXTURES, F&I, 4" SLEEVE CONNECTION	EA	5	\$ 3,400.00	\$ 17,000.00	
1080-11-24A	UTILITY FIXTURES, F&I, 4", RESILENT WEDGE GATE VALVE AND BOX	EA	5	\$ 1,650.00	\$ 8,250.00	
1080-11-33A	UTILITY FIXTURES, F&I, 6", SLEEVE CONNECTION	EA	1	\$ 3,650.00	\$ 3,650.00	
1080-11-34A	UTILITY FIXTURES, F&I, 6", RESILENT WEDGE GATE VALVE AND BOX	EA	1	\$ 1,750.00	\$ 1,750.00	
1080-11-43A	UTILITY FIXTURES, F&I, 10" SLEEVE CONNECTION	EA	6	\$ 5,000.00	\$ 30,000.00	
1080-11-44A	UTILITY FIXTURES, F&I, 10", RESILENT WEDGE GATE VALVE AND BOX	EA	6	\$ 2,550.00	\$ 15,300.00	
1080-11-43B	UTILITY FIXTURES, F&I, 16", TAPPING SADDLE	EA	0	\$ 4,500.00	\$ -	
1080-11-43C	UTILITY FIXTURES, F&I, 16", SLEEVE, VALVE AND BOX	EA	2	\$ 12,300.00	\$ 24,600.00	
1080-11-44B	UTILITY FIXTURES, F&I, 16", RESILENT WEDGE GATE VALVE ASSEMBLY	EA	4	\$ 5,750.00	\$ 23,000.00	
SP-16	4-INCH DI OFFSET	EA	7	\$ 2,950.00	\$ 20,650.00	
SP-17	SERVICE LINES	EA	55	\$ 1,900.00	\$ 104,500.00	
SP-18	DEWATERING FOR RECLAIMED WATER	LS	1	\$ 2,650.00	\$ 2,650.00	
SP-28	2" RESTRAINED JOINTS	EA	0	\$ 350.00	\$ -	
SP-29	4" RESTRAINED JOINTS	EA	0	\$ 450.00	\$ -	
SP-30	6" RESTRAINED JOINTS	EA	0	\$ 550.00	\$ -	
SP-31	8" RESTRAINED JOINTS	EA	0	\$ 600.00	\$ -	
SP-32	10" RESTRAINED JOINTS	EA	0	\$ 650.00	\$ -	
SP-33	16" RESTRAINED JOINTS	EA	74	\$ 550.00	\$ 40,700.00	
SP-34	2" CONCRETE DEAD MAN	EA	0	\$ 1,200.00	\$ -	
SP-35	4" CONCRETE DEAD MAN	EA	0	\$ 1,300.00	\$ -	
SP-36	6" CONCRETE DEAD MAN	EA	0	\$ 1,500.00	\$ -	
SP-37	8" CONCRETE DEAD MAN	EA	0	\$ 1,600.00	\$ -	
SP-38	10" CONCRETE DEAD MAN	EA	0	\$ 1,800.00	\$ -	
SP-39	16" CONCRETE DEAD MAN	EA	2	\$ 1,510.00	\$ 3,020.00	
SP-40	RECLAIMED WATER METER BOXES	EA	55	\$ 310.00	\$ 17,050.00	
SP-41	TEMPORARY TIE-INS FOR MOT PHASES	EA	3	\$ 15,800.00	\$ 47,400.00	
SP-19	16-INCH DI OFFSET (ALTERNATE)	EA	48	\$ 14,900.00	\$ 715,200.00	
SUB-TOTAL (EXCLUDES ALTERNATE)						\$ 812,700.00
Potable Water						
1050-11-424	UTILITY PIPE, F&I, DI, POTABLE WATER, 16"	LF	4,580	\$ 101.00	\$ 462,580.00	
SP-20	REMOVE EXISTING 16" DI - INCLUDING DISCONNECT, CUT AND PLUG EXISTING LINE	LF	4,370	\$ 25.00	\$ 109,250.00	
1050-11-222	UTILITY PIPE, F&I, PVC, WATER (2")	LF	80	\$ 30.00	\$ 2,400.00	
1050-11-222	UTILITY PIPE, F&I, PVC, WATER (6")	LF	100	\$ 47.00	\$ 4,700.00	
1050-11-222	UTILITY PIPE, F&I, PVC, WATER (8")	LF	4,410	\$ 51.00	\$ 224,910.00	
1050-11-222	UTILITY PIPE, F&I, PVC, WATER (10")	LF	46	\$ 190.00	\$ 8,740.00	
1080-11-23	UTILITY FIXTURES, F&I, 2", SLEEVE CONNECTION	EA	2	\$ 600.00	\$ 1,200.00	
1080-11-24B	UTILITY FIXTURES, F&I, 2", RESILENT WEDGE GATE VALVE ASSEMBLY W/BOX	EA	7	\$ 1,800.00	\$ 12,600.00	
1080-11-23	UTILITY FIXTURES, F&I, 4" SLEEVE CONNECTION	EA	1	\$ 3,200.00	\$ 3,200.00	
1080-11-24A	UTILITY FIXTURES, F&I, 4", RESILENT WEDGE GATE VALVE AND BOX	EA	1	\$ 2,000.00	\$ 2,000.00	
1080-11-33B	UTILITY FIXTURES, F&I, 6", SLEEVE CONNECTION	EA	4	\$ 3,500.00	\$ 14,000.00	
1080-11-34B	UTILITY FIXTURES, F&I, 6", RESILENT WEDGE GATE VALVE ASSEMBLY W/BOX	EA	4	\$ 2,000.00	\$ 8,000.00	
1080-11-43D	UTILITY FIXTURES, F&I, 8", SLEEVE CONNECTION	EA	0	\$ 6,500.00	\$ -	
1080-11-44C	UTILITY FIXTURES, F&I, 8", RESILENT WEDGE GATE VALVE ASSEMBLY W/BOX	EA	4	\$ 2,400.00	\$ 9,600.00	
1080-11-43E	UTILITY FIXTURES, F&I, 10", SLEEVE CONNECTION	EA	0	\$ 13,000.00	\$ -	
1080-11-43F	UTILITY FIXTURES, F&I, 16", TAPPING SADDLE	EA	0	\$ 6,000.00	\$ -	

Pass a Grille Way Bid Sheet
David Nelson Construction Co.

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST	SUB-TOTAL
1080-11-43G	UTILITY FIXTURES, F&I, 16", TAPPING SADDLE, VALVE AND BOX	EA	4	\$ 14,500.00	\$ 58,000.00	
1080-11-43H	UTILITY FIXTURES, F&I, 16", SLEEVE CONNECTION	EA	2	\$ 17,500.00	\$ 35,000.00	
1080-11-44D	UTILITY FIXTURES, F&I, 16", RESILENT WEDGE GATE VALVE ASSEMBLY W/BOX	EA	5	\$ 6,700.00	\$ 33,500.00	
SP-21	4-INCH DI OFFSET ASSEMBLY	EA	0	\$ 7,000.00	\$ -	
SP-22	6-INCH DI OFFSET ASSEMBLY	EA	0	\$ 8,000.00	\$ -	
SP-23	8-INCH DI OFFSET ASSEMBLY	EA	5	\$ 5,000.00	\$ 25,000.00	
1644-113-05	FIRE HYDRANT, F&I, STANDARD, 2 HOSE, ONE PUMPER, 2", 5-1/4" VALVE ASSEMBLY	EA	17	\$ 4,500.00	\$ 76,500.00	
SP-24	SERVICE LINES WITH METER (1")	EA	55	\$ 2,100.00	\$ 115,500.00	
SP-25	SURVEY, CONTROL, DISINFESTION, TESTING & ADMINISTRATION (POTABLE WATER ONLY)	LS	1	\$ 500.00	\$ 500.00	
SP-26	DEWATERING FOR POTABLE WATER	LS	1	\$ 4,000.00	\$ 4,000.00	
SP-42	2" RESTRAINED JOINTS	EA	0	\$ 250.00	\$ -	
SP-43	4" RESTRAINED JOINTS	EA	0	\$ 300.00	\$ -	
SP-44	6" RESTRAINED JOINTS	EA	0	\$ 350.00	\$ -	
SP-45	8" RESTRAINED JOINTS	EA	42	\$ 400.00	\$ 16,800.00	
SP-46	10" RESTRAINED JOINTS	EA	0	\$ 600.00	\$ -	
SP-47	16" RESTRAINED JOINTS	EA	74	\$ 650.00	\$ 48,100.00	
SP-48	2" CONCRETE DEAD MAN	EA	0	\$ 1,200.00	\$ -	
SP-49	4" CONCRETE DEAD MAN	EA	0	\$ 1,300.00	\$ -	
SP-50	6" CONCRETE DEAD MAN	EA	0	\$ 1,500.00	\$ -	
SP-51	8" CONCRETE DEAD MAN	EA	0	\$ 1,600.00	\$ -	
SP-52	10" CONCRETE DEAD MAN	EA	0	\$ 1,800.00	\$ -	
SP-53	16" CONCRETE DEAD MAN	EA	6	\$ 1,850.00	\$ 11,100.00	
SP-54	POTABLE WATER METER BOXES	EA	55	\$ 280.00	\$ 15,400.00	
SP-55	TEMPORARY TIE-INS FOR MOT PHASES	EA	3	\$ 20,000.00	\$ 60,000.00	
	SUB-TOTAL				\$	1,362,580.00
Utility Conduits						
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	12,675	\$ 60.00	\$ 760,500.00	
630-2-11A	1-2" (TRAFFIC SIGNAL)	LF	40	\$ 3.20	\$ 128.00	
630-2-11B	1-2" (LIGHTING / DUKE)	LF	9,550	\$ 3.20	\$ 30,560.00	
630-2-11C	1-2" (BRIGHTHOUSE)	LF	23,115	\$ 3.75	\$ 86,681.25	
630-2-11D	1-2" (CITY)	LF	12,602	\$ 3.80	\$ 47,887.60	
630-2-11E	1-4" (DUKE)	LF	23,108	\$ 5.65	\$ 130,560.20	
630-2-11F	1-4" (VERIZON)	LF	2,614	\$ 6.45	\$ 16,860.30	
630-2-11G	1-4" (CITY)	LF	12,602	\$ 5.75	\$ 72,461.50	
630-2-11H	1-6" (DUKE)	FL	17,268	\$ 8.20	\$ 141,597.60	
SP-27	CONNECT DUKE, BRIGHTHOUSE AND VERIZON TO HOUSES	EA	56	\$ 15,000.00	\$ 840,000.00	
	SUB-TOTAL				\$	2,127,236.45
Traffic Signal						
632-7-2	SIGNAL CABLE, REPAIR	LF	235	\$ 8.30	\$ 1,950.50	
646-1-11	ALUMINUM SIGNALS POLE, F&I, PEDESTAL	EA	2	\$ 1,775.00	\$ 3,550.00	
649-40	STEEL MAST ARM ASSEMBLY - RECOATING, COMPLETE POLE ASSEMBLY, BLACK	EA	4	\$ 3,000.00	\$ 12,000.00	
653-1-12	PEDESTRIAN SIGNAL, F&I, 2 WAY LED COUNTDOWN	AS	2	\$ 1,500.00	\$ 3,000.00	
660-4-10	VEHICLE DETECTION SYSTEM - VIDEO, F&I, COMPLETE SYSTEM	EA	4	\$ 10,000.00	\$ 40,000.00	
665-1-11	PEDESTRIAN DETECTOR, F&I, STANDARD	EA	4	\$ 900.00	\$ 3,600.00	
670-5-400	TRAFFIC CONTROLLER ASSEMBLY, MODIFY	AS	1	\$ 1,500.00	\$ 1,500.00	
690-20	SIGNAL PEDESTRIAN ASSEMBLY, REMOVE	EA	0	\$ 500.00	\$ -	
690-90	REMOVE CONDUIT AND CABLING	PI	0	\$ 750.00	\$ -	
690-100	SIGNAL EQUIPMENT, MISCELLANEOUS REMOVE	PI	0	\$ 750.00	\$ -	
	SUB-TOTAL				\$	65,600.50
Striping						
700-1-11	SINGLE POST SIGN, F&I, UP TO 12 SF (PED CROSSING)	AS	4	\$ 350.00	\$ 1,400.00	
700-1-11	SINGLE POST SIGN, F&I, UP TO 12 SF (STOP SIGN)	AS	9	\$ 300.00	\$ 2,700.00	
700-1-50	SINGLE POST SIGN, RELOCATE	EA	18	\$ 200.00	\$ 3,600.00	
700-1-60	SINGLE POST SIGN, REMOVE	EA	15	\$ 15.00	\$ 225.00	
706-3	RETRO-REFLECTIVE PAVEMENT MARKERS, Y/Y	EA	207	\$ 4.50	\$ 931.50	
711-11-10X	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 4" SOLID LONGITUDINAL (PARKING SPOT)	LF	500	\$ 2.00	\$ 1,000.00	
711-11-101	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 6" SOLID LONGITUDINAL	LF	7,625	\$ 1.00	\$ 7,625.00	
711-11-103	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 12" SOLID LONGITUDINAL	LF	298	\$ 2.00	\$ 596.00	

**Pass a Grille Way Bid Sheet
David Nelson Construction Co.**

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST	SUB-TOTAL
711-11-105	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 24" SOLID LONGITUDINAL	LF	200	\$ 3.50	\$ 700.00	
711-11-151	THERMOPLASTIC PAVEMENT MARKINGS, STD, WHITE, 6" DOTTED/GUIDELINES, 2-4 SKIP	LF	424	\$ 1.50	\$ 636.00	
711-11-160	THERMOPLASTIC, STD, WHITE, MESSAGE (NO PARKING)	EA	6	\$ 135.00	\$ 810.00	
711-11-160	THERMOPLASTIC, STD, WHITE, MESSAGE (BIKE)	EA	12	\$ 220.00	\$ 2,640.00	
711-11-170	THERMOPLASTIC, STD, WHITE, ARROW	EA	2	\$ 75.00	\$ 150.00	
711-11-201	THERMOPLASTIC PAVEMENT MARKINGS, STD, YELLOW, 6" SOLID LONGITUDINAL	LF	8,231	\$ 1.00	\$ 8,231.00	
711-11-201	THERMOPLASTIC PAVEMENT MARKINGS, STD, YELLOW, 6" SOLID LONGITUDINAL DIAGONAL	LF	270	\$ 2.00	\$ 540.00	
SUB-TOTAL						\$ 31,784.50
BASE BID TOTAL(EXCLUDES RECLAIMED ALTERNATE)						\$ 12,855,756.20
RECLAIMED ALTERNATE						\$ 715,200.00
	CITY OF PAY THE FOLLOWING DIRECTLY TO UTILITY COMPANY					
	CHECK TO VERIZON					
	CHECK OF BRIGHTHOUSE					
	CHECK TO DUKE					
GRAND TOTAL						\$ 13,570,956.20

**CONTRACTOR MAY USINIG ANY OF THE PAY ITEMS
BELOW OR ADD IN ADDITIONAL PAY ITEMS**

102-2-1	SPECIAL DETOUR 1	LS				
102-2-2	SPECIAL DETOUR 2	LS				
102-14	TRAFFIC CONTROL OFFICER	MH				
102-60	WORK ZONE SIGN	ED				
102-6	BUSINESS SIGN	EA				
102-71-11	TEMPORARY BARRIER WALL (CONCRETE)	LF				
102-74.1	CHANNELIZING DEVICE (TYPE 1 & 2)	ED				
102-75-1	TEMPORARY LANE SEPARATOR	LF				
102-76	ARROW BOARD / ADV WARNING ARROW PANEL	ED				
102-78	TEMPORARY RETROFLECTIVE PAVEMENT MARKER	EA				
102-79	TYPE C STEADY BURN LIGHT, TEMPORARY, BARRIER WALL MOUNT	ED				
102-99	PORTABLE CHANGEABLE MESSAGE SIGN TEMPORARY	ED				
102-911-1	REMOVABLE TAPE PAVEMENT MARKING - WHITE (SOLID)	LF				
102-912-2	REMOVABLE TAPE PAVEMENT MARKING - YELLOW (SOLID)	LF				
104-10-3	SEDIMENT BARRIER	LF				
104-18	INLET PROTECTION SYSTEM	EA				
110-7-1	MAILBOX (F & I) (SINGLE)	EA				
121-70	FLOWABLE FILL	CY				
125-1	EXCAVATION FOR STRUCTURES	CY				
286-1	TURNOUT CONSTRUCTION	SY				
286-2	TURNOUT CONSTRUCTION, ASPHALT	TN				
337-7-32	ASPHALT CONCRETE FRICTION COURSE, TRAFFIC C	TN				
339-1	MISCELLANEOUS ASPHALT PAVEMENT	TN				
400-2-1	CONCRETE CLASS II (CULVERT)	CY				
425-2-61	MANHOLES P-8, < 10'	EA				
522-4	BUS SHELTER PAD - CONCRETE	SY				
715-4600	LIGHT POLE COMPLETE, REMOVE	EA				
1050-11-222	UTILITY PIPE, F&I, PVC, WATER / SEWER					
	4"	LF				
	8"	LF				
	16"	LF				
1050-11-314	UTILITY PIPE, F&I, HDPE, STORM					
	12"	LF				
	15"	LF				
1050-11-424	UTILITY PIPE, F&I, DI, RECLAIM WATER, 16"	EA				
1055-11-214	UTILITY FITTINGS, PVC, ELBOW					
	8"	EA				
	12"	EA				
	15"	EA				
	16"	EA				

**Pass a Grille Way Bid Sheet
David Nelson Construction Co.**

PAY ITEM	DESCRIPTION	UNITS	QTY	UNIT COST	COST	SUB-TOTAL
1055-11-224	UTILITY FITTINGS, PVC, TEE					
	8"	EA				
	12"	EA				
	15"	EA				
	16"	EA				
1055-11-244	UTILITY FITTINGS, PVC, UNION					
	8"	EA				
	12"	EA				
	15"	EA				
	16"	EA				
1055-11-274	UTILITY FITTINGS, PVC, CLEANOUT					
	8"	EA				
	12"	EA				
1055-11-274	UTILITY FITTINGS, HDPE, CLEANOUT 15"	EA				
	16"	EA				
1080-11-12	UTILITY FIXTURES, F&I, 1", BACKFLOW ASSEMBLY	EA				
1080-11-22	UTILITY FIXTURES, F&I, 4", BACKFLOW ASSEMBLY	EA				
1080-11-23	UTILITY FIXTURES, F&I, 4", TAPPING SADDLE	EA				
1080-11-24	UTILITY FIXTURES, F&I, 4", VALVE ASSEMBLY	EA				
1080-11-43	UTILITY FIXTURES, F&I, 8", TAPPING SADDLE	EA				
1080-11-45	UTILITY FIXTURES, F&I, 8", BLOW OFF ASSEMBLY	EA				
1080-11-49	UTILITY FIXTURES, F&I, 8", MECHANICAL JOINT RESTRAINT	EA				
1644-113-05	FIRE HYDRANT, F&I, STANDARD, 2 HOSE, ONE PUMPER, 2"	EA				



Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

JIM BOXOLD
SECRETARY

April 29, 2015

NELSON, DAVID, CONSTRUCTION CO.
3483 ALTERNATE 19
PALM HARBOR FL 34693

RE: CERTIFICATE OF QUALIFICATION

Dear Sir/Madam:

The Department of Transportation has qualified your company for the type of work indicated below. Unless your company is notified otherwise, this Certificate of Qualification will expire 6/30/2016. However, the new application is due 4/30/2016.

In accordance with S.337.14 (1) F.S. your next application must be filed within (4) months of the ending date of the applicant's audited annual financial statements and, if applicable, the audited interim financial statements. Section 337.14 (4) F.S. provides that your certificate will be valid for 18 months after your financial statement date. This gives a two month period to allow you to bid on jobs as we process your new application for qualification. To remain qualified with the Department, a new application must be submitted subsequent to any significant change in the financial position or the structure of your firm as described in Section 14-22.005(3), Florida Administrative Code.

Your company's maximum capacity rating has been established based on X Audited Reviewed financial statements. To access it, please log into the Contractor Prequalification Application System via the following link:
<https://www3.dot.state.fl.us/ContractorPreQualification/>

Once logged in, select "View" for the most recently approved application, and then click the "Manage" and "Application Summary" tabs.

FDOT APPROVED WORK CLASSES:

DRAINAGE, FENCING, FLEXIBLE PAVING, GRADING, GRASSING, SEEDING AND SODDING, HOT PLANT-MIXED BITUM. COURSES, INTERMEDIATE BRIDGES, MAJOR BRIDGE - MULTI-LEVEL ROADWAYS, MAJOR BRIDGE - STEEL TRUSS CONSTRUCTION, MINOR BRIDGES, PAVEMENT MARKING, PORTLAND CEMENT CONCRETE ROADWAY PAVING, ROADWAY SIGNING

FDOT APPROVED SPECIALITY CLASSES OF WORK:

UTILITY CONSTRUCTION, BRICK PAVERS, SIDEWALKS, PRESSURE GROUTING, CONCRETE CURBS & SEPARATORS, CONCRETE SLOPE & DITCH BOTTOM PAVING, CONCRETE RETAINING & BARRIER WALLS, STRUCTURAL CONCRETE FORM WORK, PLACEMENT AND FINISHING FOR RETAINING WALLS, SIDEWALKS AND MINOR ASPHALT FOR TRAILS.

www.dot.state.fl.us

NELSON, DAVID, CONSTRUCTION CO.
April 29, 2015
Page Two

You may apply, in writing, for a Revised Certificate of Qualification at any time prior to the expiration date of this certificate according to Section 14-22.0041(3), Florida Administrative Code. Please be advised if certification in additional classes of work is desired, documentation is needed to show that your company has done such work with your own forces and equipment or that experience was gained with another contractor and that you have the necessary equipment for each additional class of work requested.

Sincerely,



Juanita Moore, Manager
Contracts Administration Office

W:cj



CERTIFICATE OF LIABILITY INSURANCE

DAVINEL-01

JFAVA

DATE (MM/DD/YYYY)

4/22/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER ASSOCIATES AGENCY, INC. 11470 N 53rd St Temple Terrace, FL 33617	CONTACT NAME:	
	PHONE (A/C, No, Ext): (813) 988-1234	FAX (A/C, No): (813) 988-0989
INSURED David Nelson Construction Co. 3483 Alternate 19 Palm Harbor, FL 34683	E-MAIL ADDRESS: agent@associatesins.com	
	INSURER(S) AFFORDING COVERAGE	
	INSURER A: National Trust Ins. Co.	
	INSURER B: FCCI INSURANCE CO.	
	INSURER C: FCCI Commercial Ins. Co.	
	INSURER D: Westchester Surplus Lines Ins. Co.	
INSURER E:		
INSURER F:		

COVERAGES**CERTIFICATE NUMBER:****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	☒ COMMERCIAL GENERAL LIABILITY		GL 0010298 6	05/01/2015	05/01/2016	EACH OCCURRENCE \$ 1,000,000
	☐ CLAIMS-MADE ☒ OCCUR	DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000				
	☒ Contractual Liab.	MED EXP (Any one person) \$ 5,000				
	☒ No Deductible	PERSONAL & ADV INJURY \$ 1,000,000				
GENL AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE \$ 2,000,000
☐ POLICY ☒ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG \$ 2,000,000
OTHER:						\$
A	AUTOMOBILE LIABILITY		CA 0015954 6	05/01/2015	05/01/2016	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000
	☒ ANY AUTO	☐ SCHEDULED AUTOS				BODILY INJURY (Per person) \$
	☐ ALL OWNED AUTOS	☒ NON-OWNED AUTOS				BODILY INJURY (Per accident) \$
	☒ HIRED AUTOS					PROPERTY DAMAGE (Per accident) \$
PIP						\$ 10,000
A	☒ UMBRELLA LIAB	☒ OCCUR	UMB0010683 6	05/01/2015	05/01/2016	EACH OCCURRENCE \$ 10,000,000
	☐ EXCESS LIAB	☐ CLAIMS-MADE				AGGREGATE \$ 10,000,000
	DED ☒ RETENTION \$ 10,000					EXC10006896100 \$ 10,000,000
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	Y/N ☐ N/A	001-WC15A-65778	01/01/2015	01/01/2016	☒ PER STATUTE ☐ OTH-ER
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)					E.L. EACH ACCIDENT \$ 500,000
	If yes, describe under DESCRIPTION OF OPERATIONS below					E.L. DISEASE - EA EMPLOYEE \$ 500,000
						E.L. DISEASE - POLICY LIMIT \$ 500,000
C	InlandMarine/Prop.		CM 0005408 6	05/01/2015	05/01/2016	of Others/Baillees 250,000
D	Professional Liab.		G2427343A 004	05/01/2015	05/01/2016	Occ \$2,000,000 Agg 2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER**CANCELLATION**

FOR INSURED'S FILE

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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**STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION**

**CONSTRUCTION INDUSTRY LICENSING BOARD
1940 NORTH MONROE STREET
TALLAHASSEE FL 32399-0783**

(850) 487-1395

**VEKASI, DAVID L
DAVID NELSON CONST CO
3483 ALTERNATE 19
PALM HARBOR FL 34683**

Congratulations! With this license you become one of the nearly one million Floridians licensed by the Department of Business and Professional Regulation. Our professionals and businesses range from architects to yacht brokers, from boxers to barbecue restaurants, and they keep Florida's economy strong.

Every day we work to improve the way we do business in order to serve you better. For information about our services, please log onto www.myfloridalicense.com. There you can find more information about our divisions and the regulations that impact you, subscribe to department newsletters and learn more about the Department's initiatives.

Our mission at the Department is: License Efficiently, Regulate Fairly. We constantly strive to serve you better so that you can serve your customers. Thank you for doing business in Florida, and congratulations on your new license!



**STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND
PROFESSIONAL REGULATION**

CCC012229

ISSUED 07/29/2014

**CERTIFIED GENERAL CONTRACTOR
VEKASI, DAVID L
DAVID NELSON CONST CO**

**IS CERTIFIED under the provisions of Ch. 489 FS
Expiration date: AUG 31, 2016 L1407290001644**

DETACH HERE

RICK SCOTT, GOVERNOR

KEN LAWSON, SECRETARY

**STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION
CONSTRUCTION INDUSTRY LICENSING BOARD**

LICENSE NUMBER	
CCC012229	

**The GENERAL CONTRACTOR
Named below IS CERTIFIED
Under the provisions of Chapter 489 FS.
Expiration date: AUG 31, 2016**

**VEKASI, DAVID L
DAVID NELSON CONST CO
3483 ALTERNATE 19
PALM HARBOR FL 34683**



Company Name: Central Florida Contrators Inc.

SCHEDULE H - PROJECT REFERENCES: Interested General Contractors are required to list references for prior work your firm has performed as set forth in Section VI(C)(2)(a) of the RFQ for this Project.

PROJECT TITLE	COMPANY NAME ADDRESS	CONTACT PERSON/ADDRESS	TELEPHONE#	EMAIL
City Of Clearwater sidewalks	OWNER: City of Clearwater tara.kivett@myclearwater.com DESIGNER:	Tara Kivett	727-562-4758	
City of Pinellas Park sidewalks	City of Pinellas Park bdiebold@pinellas-park.com	Bart Diebold	727-541-0767	
Keystone Rd	Pinellas County (worked as a sub to Nelson Construction)			
SR 616 (W Spruce St/WBoyscout Rd)	OWNER: FDOT DESIGNER:	(worked as a sub to Nelson Construction)		
	OWNER: DESIGNER:			

Company Name: Central Florida Contractors Inc

SCHEDULE I - CREDIT REFERENCES: Interested General Contractors are required to list a minimum of five (5) credit references from banks, suppliers and/or vendors as set forth in Section VI(C)(2)(b) of the RFQ for this Project.

CHECK ONE	COMPANY NAME	CONTACT PERSON	TELEPHONE#	EMAIL ADDRESS
BANK SUPPLIER VENDOR	Cemex Tamara Morrison tamara.morrison@cemex.com	813-269-1032		
BANK SUPPLIER VENDOR	Gerdau Paul Morin paul.morin@gerdau.com	813-759-4407		
BANK SUPPLIER VENDOR	Construction Materials aphillips@constmat.com	Ann Phillips 800-370-7764 ext133		
BANK SUPPLIER VENDOR	Suntrust Bank 9130 Oakhurst Rd, Seminole	727-431-6926		
BANK SUPPLIER VENDOR				



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

05/29/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

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PRODUCER Masi Insurance Inc 10912 Hamlin Blvd Largo, FL 33774 License #: d084372	CONTACT NAME: Sharon Murphy	
	PHONE (A/C No. Ext): (727)398-1900 FAX (A/C No.): (727)398-2500	
INSURED Central Florida Contractors Inc Christine Gomes Po Box 3987 Seminole, FL 33775	E-MAIL ADDRESS: info@masiinsurance.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A: Catlin Specialty Insurance Co	
	INSURER B: Mercury Insurance	
	INSURER C: Summit	
	INSURER D: Great American	
	INSURER E:	
	INSURER F:	

COVERAGES

CERTIFICATE NUMBER: 00000000-0

REVISION NUMBER: 4

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☒ PROJECT ☐ LOC OTHER:	Y		3200100811	05/31/2015	05/31/2016	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000 \$
B	AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☒ SCHEDULED AUTOS ☒ HIRED AUTOS ☒ NON-OWNED AUTOS			BA090000008719	05/31/2015	05/31/2015	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	UMBRELLA LIAB ☐ OCCUR EXCESS LIAB ☐ CLAIMS-MADE DED ☐ RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A	8302864	03/01/2015	03/01/2016	☒ PER STATUTE ☐ OTH-ER E.L. EACH ACCIDENT \$ 500,000 E.L. DISEASE - EA EMPLOYEE \$ 500,000 E.L. DISEASE - POLICY LIMIT \$ 500,000
D	Inland Marine			IMP429459600	05/31/2015	05/31/2015	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

CANCELLATION

David Nelson Construction Co
3483 Alternate 19
Palm Harbor, FL 34683

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

(SHM)

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ACORD 25 (2014/01)

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Printed by SHM on May 29, 2015 at 05:04PM



PINELLAS COUNTY CONSTRUCTION

LICENSING BOARD

COMPETENCY CARD

**THIS CERTIFIES THAT George Gomes
DBA Central Florida Contractors Inc**

**HAS MET ALL THE REQUIREMENTS FOR HOLDING A
COUNTYWIDE CERTIFICATE OF COMPETENCY NO.
C-7923**

AND IS DULY CERTIFIED AS A(N)

Flatwork Masonry Spec Contr

**IN GOOD STANDING UNTIL September 30, 2015
DATE OF ISSUANCE 06/09/2014**

C-7923

*Gomes, George
P.O. Box 3987
Seminole, FL 33775*

*** Please cut out license along lines**



CHANGE ORDER NO. 1

PROJECT IDENTIFICATION:

Project Name: Pass-A-Grille Way Reconstruction from W. Maritana Dr. to 19th Ave

CONTRACTOR: David Nelson Construction Company

CONTRACT: The Agreement dated _____ between David Nelson Construction Company and the City of St. of St. Pete Beach for the above described Project.

The Contract is changed as follows:

- *580-4-447 Landscape palms - All palm tree furnishing and installation is removed from Nelson Construction's scope of work and will be self-performed by the City. Additionally, all trees, palms, shrubs, flowers or other landscape items other than sod indicated on the plans to be protected may be removed, if necessary, by Nelson at their cost. Replacement of these items is not included in Nelson's scope of work. Nelson will install sod at all areas not receiving any other surface improvement.* **\$ 730,000.00**
- *SP-27 Connect Duke, BH & Version - All services for Verizon, Brighthouse and Duke Energy are deleted from Nelson Construction's scope of work, including all conduits, fittings, wire, restoration, service coordination, as well as all wiring for commercial properties.* **\$ 840,000.00**
- *527-2 Detectable warning mats – The quantity of mats is reduced to reflect a two foot wide strip in-lieu of the entire ADA ramp being a detectable warning area* **\$ 46,225.00**
- *SP-5 Manatee Protection Barrier – The barriers are changed to be a removable grate mounted to the existing seawall with a maximum opening to be 4". The grate material will be galvanized iron with design to be submitted to the Engineer of Record for final approval with the objective of ensuring easy removal for maintenance* **\$ 37,400.00**
- *SP-12 and 13 Remove Existing Manholes and 16" VCP - The removal of all sanitary sewer pipe and manholes is to be taken out of Nelson Construction's scope of services. Nelson will grout fill the mains using flowable fill poured into the upstream manholes and will grout fill the laterals by pouring into the upstream abandoned lateral at the ROW after the main has been filled with ready mix flowable fill or field mix flowable fill. All manholes will be removed to +/-4' below the proposed grades and filled with sand or flowable fill (Nelson to decide which). This credit also reflects the reduced maintenance of traffic cost this change creates.* **\$ 216,375.00**

Total Deduction from Contract Sum

\$1,870,000.00

Contract Sum with prior approved Change Orders was: \$12,855,756.20

The Contract Sum will be decreased by this Change Order
for the items described above in the amount of: \$1,870,000.00

The new Contract Sum, including this Change Order, will be: \$10,985,756.20

The Contract Time will be changed as follows: No Change

Execution of this Change Order shall constitute a final settlement of all matters relating to the change in the Work as described above which is the subject of this Change Order. Unless the Contract Time has been adjusted as provided above, the change approved by this Change Order shall not result in a change in the Contract Time.

OWNER(S):

CONTRACTOR:

By: _____

By: _____

Name: Wayne Saunders

Name: _____

Title: City Manager, St. Pete Beach

Title: _____

Date: _____

Date: _____

**St. Pete Beach City Commission
Agenda Report**

Issue Considered: Approval and authorization of the Duke Energy Underground Conversion Agreement Based on A Binding Cost Estimate for the undergrounding of power associated with the Pass A Grille Way project.

Date: June 25, 2015

Prepared By: Wayne Saunders, City Manager

Summary of Issue: Enclosed is Duke Energy's Binding Cost Estimate for the undergrounding of power associated with the Pass A Grille Way Project. The binding estimate is \$738,366.96 which is \$91,633 less than the non-binding estimate previously provided for the project. We are requesting approval and authorization for the City Manager to sign the Underground Conversion Agreement Based on A Binding Cost Estimate.

Funding:

Requested Motion: "I move to approve the Duke Energy Binding Cost Estimate for the undergrounding of power associated with the Pass A Grille Way project."

Attachments: Duke Energy's Binding Cost Estimate

**Reviewed by
City Manager:** _____WS_____

June 9, 2015

Wayne Saunders
City of St Pete Beach
155 Corey Ave
St Pete Beach, FL 33706

Subject: *Binding cost estimate to underground between Cabrillo Ave and 19th Ave on Pass a Grille Way*

Dear Mr. Saunders:

Thank you for submitting your request to Duke Energy. The purpose of this proposal is to provide a binding cost estimate for the area you have identified. The effective date of this proposal is June 9, 2015. This cost estimate is based on current labor and material rates and is valid for 180 days. Requests beyond that period will require review and adjustments as needed.

Project Scope

To underground Duke Energy's existing electrical facilities on Pass a Grille Way between Cabrillo Ave and 19th Ave. The City of St Pete Beach to provide and install all required conduits and trenching associated to this project.

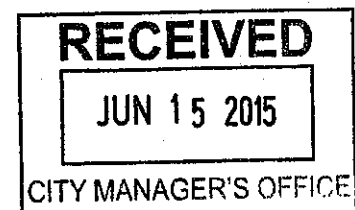
Binding Cost Estimate

The binding cost estimate for Pass a Grille Way between Cabrillo Ave and 19th Ave: **\$738,366.96**

Proposal Assumptions

This cost estimate is based on normal construction methods. The City of St Pete Beach to provide and install all required conduits and trenching associated to this project. Below is a non-inclusive list of assumptions used in calculating this estimate:

- ✦ All underground facilities to be located in private property easements, not in the right of way. Easements to be obtained by customer at no cost to Duke Energy.
- ✦ Does not include cost to underground joint users, such as telephone and cable television.
- ✦ Does not include cost for restoration of any street, right of way, easement, private property or pavement reconstruction that may be necessary as a result of the construction. This cost only includes backfilling the affected area to safe condition.
- ✦ Does not include costs associated with new streetlights.
- ✦ Does not include cost to replace existing meter cans to accept new underground service.
- ✦ Does not include any survey work that may be required to identify right of way and easements.
- ✦ Duke Energy's design does NOT guarantee construction feasibility in the field until a constructability review is completed.



Next Steps

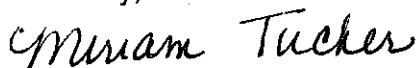
Following is a list of "Next Steps" if you wish to proceed with this project.

	Action Step	Responsible Party
1	Gather cost estimates from all other joint utilities (Telephone and cable TV)	Customer
2	Obtain easements to install facilities and locate equipment	Customer / Duke Energy
3	Coordinate customer obligations and possible outages	Customer (Support from Duke Energy)
4	Payment to Duke Energy prior to construction	Customer
5	Schedule and complete conversion	Duke Energy / Other utilities

Enclosed is a copy of our Tariff as well as the "Underground Conversion Agreement Based on a Binding Cost Estimate" document for your approval should you decide to proceed with this project. The agreement document will need to be approved and signed by all parties to proceed with this project.

We appreciate your business and look forward to providing you with excellent customer service. Please feel free to call me at (727)562-5742 with any questions you may have regarding this letter or your service.

Sincerely,



Miriam Tucker
Distribution Project Manager

Enclosures (3)

PART XII**CHARGES FOR CONVERSION OF EXISTING OVERHEAD TO UNDERGROUND ELECTRIC DISTRIBUTION FACILITIES****12.01 DEFINITIONS:**

The following words and terms used under this Part shall have the meaning indicated:

- (1) Applicant: The Applicant is the person or entity seeking the undergrounding of existing or newly planned electric distribution facilities by the Company. When a developer requests local government development approval, the local government shall not be deemed the Applicant for purposes of these rules.
- (2) Commission: Florida Public Service Commission.
- (3) Cost Estimate Fee: A fee charged an Applicant by the Company for the purpose of preparing a cost estimate of the amount required for the Company to construct or convert particular distribution facilities as underground.
- (4) Company: Duke Energy Florida, Inc.
- (5) Distribution Facilities: All electrical equipment of the Company required to deliver electricity to homes and businesses.
- (6) Facility Charge: That charge required to be paid by an Applicant for the Company to construct or convert particular distribution facilities as underground.
- (7) Overhead: Pertains to distribution facilities consisting of conductors, switches, transformers, etc. which are installed above ground on supporting poles.
- (8) Underground: Pertains to distribution facilities consisting of conductors, switches, transformers, etc. which are installed below ground or on the ground.

12.02 GENERAL:

- (1) Application:

Underground electric distribution facilities are offered in lieu of overhead facilities in accordance with these rules.
- (2) Applicant Request:

An Applicant shall submit a request in writing for the Company to develop a cost estimate to accomplish the undergrounding of particular electric facilities. The request shall be accompanied by an appropriate fee and shall specify the following information:

 - (a) the area(s) being sought to be undergrounded
 - (b) a list of all electric customers affected
 - (c) an estimated time frame for undergrounding to be accomplished
 - (d) details of any construction by the Applicant.
 - (e) any other pertinent information which the Applicant possesses that may aid the Company in preparing an appropriate cost estimate

(Continued on Next Page)

12.05 CONSTRUCTION CONTRACT:

(1) GENERAL:

Upon acceptance by the Applicant of the binding cost estimate, the Applicant shall execute a contract with the Company to perform the construction of the underground distribution facilities. The contract shall specify the type and character of system to be provided; establish the Facility Charge to be paid by Applicant prior to commencement of construction; specify details of construction to be performed by Applicant, if any; and address any other pertinent terms and conditions including those described in Part (4) below.

(2) FACILITY CHARGE:

Charge = Remaining net book value of existing overhead facilities to be removed;

plus, removal cost of existing overhead facilities;

minus, salvage value of existing overhead facilities;

plus, estimated construction cost of underground facilities including underground service laterals to residential customers meters or point of delivery for general service customers;

minus, estimated construction cost of overhead facilities including overhead service drops to customers' meters;

minus, qualifying binding cost estimate fee.

Plus, \$4,576 per mile, (or \$0.87 per foot) of the existing overhead facilities.
This represents the net present value of the lifecycle operational costs differential including storm restoration.

3) CONSTRUCTION BY APPLICANT:

If agreed upon by both the Applicant and the Company, the Applicant may construct or install portions of the underground system as long as such work meets the Company's engineering and construction standards. The Company will own and maintain the completed distribution facilities upon accepting the system as operational. The type of system provided will be determined by the Company's standards.

Any facilities provided by the Applicant will be inspected by Company inspectors prior to acceptance. Any deficiencies discovered as a result of these inspections will be corrected by the Applicant at his sole expense, including the costs incurred by performing the inspections. Corrections must be made in a timely manner by the Applicant, otherwise the Company will undertake the correction and bill the Applicant for all costs of such correction. These costs shall be additional to the original binding estimate.

(Continued on Next Page)



UNDERGROUND CONVERSION AGREEMENT BASED ON A BINDING COST ESTIMATE

THIS UNDERGROUND CONVERSION AGREEMENT (the "Agreement") entered into this _____ day of _____, _____ (the "Effective Date") by and between Duke Energy Florida, Inc, d/b/a Duke Energy ("DE") and _____ (the "Applicant"). DE and the Applicant shall be referred to individually as a "Party" and collectively as the "Parties."

WITNESSETH:

WHEREAS, the Applicant desires to have DE relocate and replace certain of its existing overhead distribution lines and related facilities with new underground distribution lines and related facilities, all as noted in the Work Request, which is attached hereto and incorporated herein as Exhibit A; and

WHEREAS, DE is willing to relocate and replace the aforesaid existing overhead facilities with the new facilities set forth in the attached Work Request ("Facilities") at the locations set forth more specifically in the attached Work Request ("Cable Route"); and

WHEREAS, Applicant has paid a deposit in the amount of \$ _____ ("Deposit") and requested a binding estimate ("Binding Cost Estimate") of the total cost it will be responsible to pay DE for the Relocation Work (as that term is defined below); and

WHEREAS, DE has provided Applicant with the Binding Cost Estimate (in the amount referenced in Article 7 below) and in consideration of DE's performance of the Relocation Work, Applicant agrees to pay DE the Binding Cost Estimate as it may be adjusted in accordance with the terms of this Agreement below;

NOW THEREFORE, in consideration of the foregoing and of the mutual promises contained herein, the receipt and sufficiency of which are hereby acknowledged and intending to be legally bound, DE and the Applicant hereby agree as follows:

ARTICLE 1. RECITALS

The foregoing recitals are true and correct and are a part of this Agreement.

ARTICLE 2. DEFINITIONS

"Additional Work"- Shall mean the additional work to be performed by DE with respect to this underground conversion project beyond the Relocation Work, as said Additional Work may be authorized by the Parties in accordance with the terms of this Agreement.

"Additional Binding Cost Estimate"- Shall have the meaning given to it in Article 9 of this Agreement.

"Additional Deposit"- Shall have the meaning given to it in Article 9 of this Agreement.

"Agreement"- Shall mean this Underground Conversion Agreement entered into between the Parties.

"Applicant"- Shall mean the counter party to DE under this Agreement as noted in the above first paragraph of this Agreement.

"Applicant Delay"- Shall have the meaning given to it in Article 8 of this Agreement.

"Binding Cost Estimate"- Shall have the meaning given to it in the recitals above and in Article 7 of this Agreement.

"Cable Route"- Shall have the meaning given to it in the recitals above.

"CPR"- Shall have the meaning given to it in Article 17 of this Agreement.

"Deposit"- shall have the meaning given to it in the recitals above.

"Effective Date"- Shall be the date entered in the above first paragraph of this Agreement.

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

"Facilities"- Shall mean the facilities specifically described and detailed in the Work Request.

"Final Price"- Shall have the meaning given to it in Article 7 of this Agreement.

"Final Statement"- Shall have the meaning given to it in Article 7 of this Agreement.

"Force Majeure"- Shall have the meaning given to it in Article 14 of this Agreement.

"Notice to Proceed"- Shall mean duly authorized and executed written notice given by the Applicant to DE requesting DE to proceed with the Relocation Work (or Additional Work, if any) under the terms and conditions of this Agreement.

"Party"- Shall mean any single party to this Agreement.

"Parties"- Shall mean both parties to this Agreement.

"DE"- Shall mean Duke Energy Florida, Inc.

"Relocation Work"- Shall mean only that work which is specifically described and detailed in the Work Request and Article 4 of this Agreement.

"Work"- Shall mean the Relocation Work and the Additional Work.

"Work Request"- Shall mean the documents attached to this Agreement as Exhibit A.

ARTICLE 3. CONDITIONS PRECEDENT

3.1 Notwithstanding any other provision hereof to the contrary, this Agreement and the rights and obligations of the Parties set forth herein are expressly subject to and contingent upon:

- A. Applicant securing all required easements and rights-of-way for the performance of the Relocation Work;
- B. Applicant receiving funding adequate for the payment of all costs and expenses that will be due and owing by Applicant to DE under this Agreement, and the Applicant providing reasonable evidence to DE that Applicant has received or otherwise secured such funding;
- C. The issuance by governmental agencies of all required permits and approvals necessary for the performance by both Parties under this Agreement;
- D. Applicant paying DE all funds that are required by this Agreement to be paid prior to DE beginning the Relocation Work; and
- E. Applicant obtaining written confirmation from all affected DE customers agreeing to accept underground service upon customer's property.

3.2 In the event the conditions in this Article have not been fulfilled or satisfied within ____ days of the Effective Date of this Agreement, either Party may terminate this Agreement upon written notice to the other Party with no obligation or liability under this Agreement to the other Party resulting from such termination (other than DE's right to retain the Deposit), or the Parties may mutually agree upon an extension of time within which such conditions may be met. Notwithstanding anything herein to the contrary, DE shall not be required to proceed with the Relocation Work unless and until the above noted conditions precedent have been satisfied or mutually waived in writing by the Parties. Further, notwithstanding anything herein to the contrary, it is the intention of the Parties that the provisions of this Article 3 also shall apply to any Additional Work, so that the Parties' rights and obligations with respect to any such Additional Work is expressly subject to and contingent upon the satisfaction of the conditions set forth above within ____ days of the date of the amendment authorizing such Additional Work, and failing which either Party may terminate the subject amendment upon written notice to the other Party with no obligation or liability under this Agreement or that amendment to the other Party resulting from such termination (other than DE's right to retain the Additional Deposit, if any), or the Parties may mutually agree upon an extension of the time within which such conditions may be met.

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

ARTICLE 4. DE'S SCOPE OF WORK

4.1 In consideration of the payments by Applicant of the amounts set forth in Article 7 below, DE shall provide (except to the extent excluded in the Work Request) the following as part of the Relocation Work:

A. Dismantle and at DE's discretion salvage or dispose of existing overhead distribution lines and facilities which will be replaced by the Facilities;

B. Design, permit, install and test the Facilities within the designated locations in the Cable Route;

C. Install, by directional bore, open-trench or such other means or methods as DE may determine in its sole discretion, all new primary and secondary cable, wire, conduit and appurtenances;

D. Perform all Relocation Work in accordance with applicable laws, including locating, positioning and installing (at DE's sole discretion) switchgear, pad-mounted transformers, service pedestals, pull boxes, and other related distribution equipment in accordance with the National Electrical Safety Code and other applicable industry standards, if any;

E. Modify existing DE distribution facilities located outside the Cable Route boundary as determined by DE in its sole discretion for connection to the Facilities;

F. To the extent authorized in the Work Request and to the extent the Applicant has obtained the necessary consents of the residential service users to the conversion, coordinate with such users and convert affected residential service laterals from overhead to underground;

G. Procure and maintain such insurance as DE may determine in its sole discretion is appropriate to cover property damage, personal injury and general liability of DE and its contractors, if any, arising out of or relating to their performance of the Relocation Work;

H. Provide reasonable notice to DE's customers regarding planned interruptions of electric service occasioned by the Relocation Work; and,

I. Maintain a safe work site in compliance with applicable laws, rules and safety standards pertaining to installation of the Facilities.

4.2 The above noted provisions also shall apply to and be deemed a part of any Additional Work hereafter authorized by the Parties in accordance with the terms set forth herein, except to the extent otherwise expressly noted in the applicable amendment.

ARTICLE 5. APPLICANT'S RESPONSIBILITIES

The following are Applicant's responsibilities, to be provided or satisfied by Applicant at no cost to DE:

A. Within _____ days of the Effective Date, Applicant shall provide a Notice to Proceed for the Relocation Work to DE, and shall convey to DE a non-exclusive and irrevocable license to use any easement, right-of-way or other appropriate real property interest which Applicant has with respect to the performance of the Relocation Work and the delivery of utility services thereafter by DE. Subject to the other terms of this Agreement, upon receipt of the Notice to Proceed, DE shall commence with the performance of the Relocation Work. DE shall notify Applicant, in writing, when DE believes it has received all necessary easements and rights-of-way for the Relocation Work to be obtained and provided by Applicant;

B. With respect to any Additional Work authorized by the Parties in accordance with the terms set forth herein, each amendment authorizing any such Additional Work shall address the date by when Applicant is to provide a Notice to Proceed for the subject Additional Work, as well as the date by when Applicant shall convey to DE a non-exclusive and irrevocable license to use any easement, right-of-way or other appropriate real property interest which Applicant has with respect to the performance of the subject Additional Work and the delivery of utility services thereafter by DE. DE shall notify Applicant in writing when DE believes it has received all necessary easements and rights-of-way for the subject Additional Work to be obtained and provided by Applicant. Subject to the other terms of this Agreement and the applicable amendment, DE shall not commence performance of the subject Additional Work until all conditions to be fulfilled by Applicant as to that Additional Work have been satisfied and DE has received Applicant's Notice to Proceed for that subject Additional Work;

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

C. The Applicant shall cooperate and assist DE's permitting efforts with respect to the Work and shall not take any action (or fail to take any action required of it) that violates the conditions of any permits and approvals from any applicable governmental entities so as to allow DE to: (a) relocate the Facilities within the Cable Route, (b) cross any federal, state, or local highway or cross any rail lines or corridors along the Cable Route necessary to relocate the Facilities, and (c) otherwise perform the Work as planned by DE;

D. With respect to all easements and rights-of-way to be provided by Applicant, it is Applicant's responsibility to clear, survey, stake, and grade to within six inches of final grade, at no cost to DE, all such easements and rights-of-way. All such clearing, surveying, staking and grading must be accomplished by Applicant so as to cause no delay to DE's performance of the Work. Accordingly, as part of its clearing and grading obligation hereunder, Applicant is responsible for all removal and restoration of buildings, roads, driveways, sidewalks, patios, fences, ditches, landscaping, sprinkler systems, and all other improvements or utilities located within the easements and rights-of-way to be provided by Applicant, at no cost to DE, all such removal and restoration work located within the easements and rights-of-way to be performed so as to cause no delay to the performance of the Work by DE;

E. Applicant shall provide traffic management along affected roadways within the Cable Route;

F. Applicant is responsible for making all arrangements necessary with all other utilities or joint users of DE's above ground facilities (including telephone and cable) to remove their equipment and facilities at no cost to DE and in a manner and schedule so as not to delay DE's performance of the Work. Applicant shall acquire all contracts or agreements required to provide for the timely removal of all such joint users' equipment and facilities, and provide a copy of all such contracts and agreements to DE upon request from DE;

G. Applicant is responsible for ensuring that DE's distribution facilities are not damaged, destroyed or otherwise disturbed during the performance of Applicant's responsibilities hereunder. This obligation extends not only to Applicant's employees, but also to any contractors, subcontractors, consultants or agents of Applicant. Applicant is responsible for the full cost of repairing any such damage, destruction or disturbance; and

H. Applicant is responsible for making all necessary arrangements with all affected DE customers to prepare their premises and service entrance in a timely manner for underground service, so as not to delay DE's performance of the Work. All such consents, arrangements, and preparations shall be provided by Applicant at no cost to DE.

ARTICLE 6. TERM

The Term of this Agreement shall commence upon the Effective Date and shall continue until the end of the period set forth in Article 8, unless terminated earlier by a Party in accordance with the terms set forth herein.

ARTICLE 7. PRICE AND PAYMENT TERMS

A. DE has provided Applicant, and Applicant has accepted, the Binding Cost Estimate of DE's costs to perform the Relocation Work in the amount of \$_____, which is the price to be paid by Applicant for the Relocation Work performed by DE under this Agreement, subject to adjustment for the Final Price in accordance with the provision of this Article.

B. The Binding Cost Estimate shall be paid by Applicant in accordance with the Payment Schedule attached hereto and incorporated herein as Exhibit B. With respect to any Additional Work authorized hereunder, the compensation to be paid DE for such Additional Work, including the payment of any Additional Deposit and Additional Binding Cost Estimate amount for such Additional Work, shall be made by Applicant in accordance with the terms set forth in the subject amendment authorizing that Additional Work.

C. Because the Binding Cost Estimate is only for the Relocation Work to be performed by DE, it does not cover the costs associated with Applicant's performance of its responsibilities with respect to this Project, which costs include the cost of: (a) conversion of customers' meter bases to accommodate underground service, (b) an underground street lighting system, (c) easement acquisition; (d) restoration of landscaping, sprinkler system sidewalks, road pavement and other existing improvements within the required easements or rights-of-way, and (e) underground conversion or relocation of other utilities' facilities (telephone, cable, etc.).

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

D. The Parties acknowledge that the Binding Cost Estimate and any Additional Binding Cost Estimate(s) are based on estimates of the various cost components that comprise the Relocation Work and Additional Work, and that the actual cost of the Work subject to the Binding Cost Estimate and Additional Binding Cost Estimate(s) may be more or less than the amounts reflected in the Binding Cost Estimate and applicable Additional Binding Cost Estimates. Within approximately ninety (90) days following the completion of the Work, DE shall furnish to Applicant an itemized statement signed by an authorized representative of DE setting forth the actual final costs of the Work ("Final Statement"). The sums of the final actual costs of the Relocation Work plus the Additional Work (if any) is the final price to be paid hereunder by Applicant to DE ("Final Price"); provided, however, in no event may a sum of more than 10% above the Binding Cost Estimate for the Relocation Work or a sum of more than 10% above the Additional Binding Cost Estimate for any particular Additional Work, be included in the Final Price amount. If the sum of all payments theretofore made by Applicant for the Work (including the Deposit and any Additional Deposits) is less than the Final Price, Applicant shall pay the remaining balance to DE within thirty (30) days after presentment of the Final Statement by DE. If the sum of such payments made by Applicant for the Work is greater than the Final Price, DE shall refund the difference to Applicant within thirty (30) days after the presentment of the Final Statement. If Applicant objects to any of the amounts reflected in the Final Statement, Applicant shall provide DE with written notice of same, stating in detail the objections Applicant has to the Final Statement. Applicant shall provide that written notice within fourteen (14) calendar days of receiving the Final Statement. All items in the Final Statement not expressly objected to by Applicant in writing within said fourteen (14) day period shall be deemed accepted by Applicant as being final and binding, without any further right to challenge or appeal such items.

E. If Applicant fails to pay any amount owed DE hereunder when due, such past due amounts shall accrue interest at the rate of 18% per annum or the maximum legal rate, whichever is lower. Further, if Applicant fails to make any undisputed payment owed DE hereunder within five (5) business days of receiving written notice from DE that such payment is past due, DE may suspend performance of all or any portion of the Work until such past due amounts have been paid in full. Any such suspension shall be deemed an Applicant Delay (as defined in Article 8 below) and Applicant shall be liable for all costs and damages incurred by DE as provided in Article 8.

ARTICLE 8. WORK SCHEDULING

A. Upon DE's receipt of Applicant's Notice to Proceed and the satisfaction or mutual waiver of the conditions precedent set forth in Article 3 above, DE will commence performance of the Relocation Work.

B. DE shall endeavor to complete the Relocation Work by _____, as said date may be extended for reasons beyond the fault or control of DE.

C. DE may utilize contractors in the performance of the Work, but such use of contractors shall not relieve DE of any of its obligations under this Agreement. Any such contractor shall not be considered a contractor to Applicant and Applicant shall not enter into any contracts directly with any such contractors during the term of this Agreement regarding any work associated with the conversion project anticipated under this Agreement.

D. If the Work falls behind schedule: (i) for reasons due to a Force Majeure event (as defined in Article 14) or any other reason not due to the fault or beyond the control of DE, its contractors, agents or employees; (ii) as the result of the actions or inactions of Applicant, its contractors, employees or agents ("Applicant Delay"), or (iii) as a result of the actions or inactions of any third parties, the time period referenced in Section 8.B above shall be extended for each such day of delay. Further, in the event of any such delay, DE, at its sole discretion, may accelerate the performance of the Work to mitigate the impact of such delay on the schedule. To the extent the delay is attributable to an Applicant Delay; Applicant shall be liable to DE for all increased costs and expenses incurred by DE, including any acceleration or other schedule impact costs and delay damages incurred by DE or its contractors, as a result of such delay. All such increased cost and expenses, damages, acceleration and other impacts associated with any such delay shall be deemed Additional Work under this Agreement. If Applicant refuses to execute an amendment to this Agreement reasonably acceptable to DE equitably adjusting DE's time and compensation under this Agreement for such Additional Work, among any other rights or remedies it may have hereunder, DE may suspend all or any portion of the Work until such time as that amendment is executed by the Parties and delivered to DE. If the delay is due to any reason other than an Applicant Delay or the fault or neglect of DE, Applicant shall have the right to request DE to accelerate its performance of the Work, to the extent commercially reasonably

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

possible, in an attempt to mitigate the impact of the delay upon the schedule. Provided, however, DE shall perform such requested acceleration work only if the Parties reach written agreement upon the scope and the time and compensation adjustment for such acceleration work, which agreement shall be in the form of an amendment to this Agreement, and the acceleration work shall be deemed Additional Work hereunder. Until such amendment is executed by the Parties, DE shall have no obligation to accelerate its performance of the Work as a result of any such delay. If the Work falls behind schedule for reasons attributable to the fault or neglect of DE, its contractors, agents or employees, DE shall, to the extent commercially reasonably possible and as Applicant's sole and exclusive remedy for any such delay, accelerate its performance of the Work in an attempt to mitigate the impact of such delay upon the schedule, at no increased cost to Applicant.

ARTICLE 9. ADDITIONAL WORK

Any Additional Work to be performed by DE beyond the Relocation Work with respect to this underground conversion project must be authorized by a written amendment to this Agreement executed by both Parties. DE shall not be required to perform any Additional Work except to the extent a mutually acceptable amendment is executed by the Parties that sets forth the scope, compensation, schedule and other relevant terms concerning such Additional Work. To the extent the Additional Work involves the underground conversion of overhead facilities owned by DE that are not included within the scope of Relocation Work, Applicant may request DE to provide a binding estimate for the cost of such Additional Work ("Additional Binding Cost Estimate"). In the event that Applicant makes such a request, Applicant shall be required to pay an additional deposit ("Additional Deposit") in an amount to be mutually agreed to by the Parties. If the Parties fail to reach agreement on the Additional Deposit or Applicant otherwise fails to pay the Additional Deposit, DE shall not be required to provide the Additional Binding Cost Estimate. In the event an Additional Binding Cost Estimate is provided by DE for certain Additional Work, but the parties fail to reach agreement on the amendment for such Additional Work within 180 days from the date the Additional Binding Cost Estimate is provided to Applicant, besides not being required to perform such Additional Work, DE shall retain the Additional Deposit as compensation for preparing and providing the Additional Binding Cost Estimate. Notwithstanding anything herein to the contrary, in the event Applicant requests DE to perform additional underground conversion work beyond the scope of the Work then authorized by this Agreement, DE shall have the right to require any such work be performed pursuant to a new and separate agreement between the Parties.

ARTICLE 10. DIFFERING SITE CONDITIONS; INSPECTIONS BY THE APPLICANT

A. DE shall stop the performance of the Work and immediately notify Applicant, if any of following differing or changed site conditions is discovered:

1. Subsurface or latent physical conditions in the Cable Route differing materially from those anticipated by DE in preparing its Binding Cost Estimate or Additional Binding Cost Estimate, as applicable; or
2. Other conditions, differing materially from those reflected in any information or documents concerning site conditions provided to or obtained by DE or of a nature not ordinarily encountered and generally recognized as inherent in work of the character provided for in this Agreement.

B. As soon as practical after such notice, DE shall provide Applicant a written notice including a general description of any such differing or changed site conditions, a determination of whether DE can proceed with the Work despite such conditions and, if so, whether such conditions will cause an increase or decrease in the cost of, or the time required for, performance of the Work. Upon receipt of any such notice, and if DE has determined it can proceed with the Work, Applicant may either (i) request the Work to proceed, in which event, all increased and additional work incurred by DE in response to the differing or changed conditions shall be deemed Additional Work subject to the terms of Article 9 above, (ii) request DE to otherwise modify the scope of the Work to avoid the cost of the differing or changed conditions on terms mutually acceptable to both Parties, or (iii) request DE to discontinue the Work and demobilize its work force. Applicant shall issue its request in writing to DE as soon as possible, but in any event, within five (5) business days from its receipt of the notice. In the event Applicant exercises its right under (iii) above, it shall be considered a termination for convenience by Applicant and DE shall determine the Final Price based on the Work performed, including DE's reasonable demobilization costs. The Parties acknowledge that any costs associated with differing or changed site conditions are separate and not included in the Binding Cost Estimate or any Additional Binding Cost Estimate.

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

C. The discovery of hazardous material within the Cable Route, not specifically identified in either the Work Request or applicable amendment with respect to its location and quantity, shall be deemed to be a differing site condition pursuant to this Article. If hazardous materials are discovered, DE shall give prompt notice to Applicant of such discovery and stop that portion of the Work affected by such materials, and DE shall not recommence such portion of the Work until Applicant, at no cost to DE, has removed or otherwise neutralized such hazardous materials to DE's satisfaction. Any such suspension of the Work being deemed an Applicant Delay, with Applicant being responsible for all costs and damages as provided in Article 8 above. To the maximum extent permitted by law, Applicant agrees to indemnify, defend and hold DE and its contractors, employees and agents harmless from any cost, expense, damage, claim, liability, obligation, demand, loss, cause of action, or suit arising out of or relating to any such hazardous materials encountered during the performance of the Work, except to the extent such hazardous materials were brought onto the Cable Route by DE or its contractors, employees or agents. This indemnification, defense and hold harmless obligation shall survive the termination or expiration of this Agreement.

D. Applicant reserves the right during the performance of the Work to conduct, at its own expense, reasonable field inspections to verify compliance of the Work with the requirements of this Agreement, provided, however, that any such inspections by Applicant shall be conducted in a manner so that they do not unreasonably interfere with or delay the performance of the Work. Applicant shall promptly notify DE in writing of any Work that is incomplete or otherwise fails to comply with this Agreement. Any such Work that the Parties mutually agree to be non-compliant or incomplete shall be corrected by DE.

ARTICLE 11. WARRANTY

A. In the event that DE uses its own employees to perform such portions of the Work performed under this Agreement, DE warrants only that such Work hereunder shall be performed with that degree of skill and care which is customarily exercised in the industry by experienced firms with respect to work of a similar or like nature. In the event that DE hires a contractor to perform a portion of the Work required hereunder, DE makes no warranties or representations concerning that Work, except DE agrees to assign the contractor's warranties, if any, to Applicant for such Work.

B. EXCEPT AS EXPRESSLY STATED HEREIN, DE MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WHETHER STATUTORY, BY OPERATION OF LAW OR OTHERWISE, AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ALL WARRANTIES ARISING FROM COURSE OF DEALING AND USAGE OF TRADE, OR ANY OTHER MATTER WITH RESPECT TO THE WORK PERFORMED HEREUNDER. ANY AND ALL SUCH REPRESENTATIONS AND WARRANTIES ARE EXPRESSLY WAIVED.

ARTICLE 12. INDEMNIFICATION

Subject to the other terms of this Agreement, including the terms of Article 13 below, the Parties shall indemnify, defend and hold each other harmless from any and all claims, liabilities, obligations, damages, costs and expenses (including, but not limited to, reasonable attorney's fees) or causes of action of whatsoever kind or nature for injury to or death of any person (including indemnitee's employees), and for damage to or destruction of property (including indemnitee's property), to the extent resulting from any or all negligent acts or omissions or willful misconduct of the indemnifying Party or anyone for whose acts that the indemnifying Party may be liable in connection with this Agreement. The indemnification, defend and hold harmless obligation shall survive the termination or expiration of this Agreement.

ARTICLE 13. LIMITATION OF LIABILITY

A. Notwithstanding anything in this Agreement to the contrary, in no event shall DE be liable for demands by Applicant for any incidental, indirect, special, consequential, exemplary, punitive, or multiple damages resulting from any claim or cause of action, whether brought in contract, tort, or under any other legal theory.

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

B. Notwithstanding anything in this Agreement to the contrary, DE's sole liability to Applicant for any non-conforming Work shall be to correct the defective Work, of which written notice must be given by Applicant to DE no later than seven (7) business days after such non-conforming Work is discovered or should have reasonably been discovered by Applicant. In any event, the aggregate liability of DE to Applicant arising out of or in connection with this Agreement shall not exceed the Final Price payable to DE for the Work performed hereunder.

ARTICLE 14. FORCE MAJEURE

A. Except for a Party's obligation to pay the other Party any sum of money owed it hereunder, neither Party shall be liable for its failure to perform hereunder if such failure is due to any act or circumstance beyond the reasonable control, and not due to the fault or neglect of, of the Party claiming the event of Force Majeure event including, but not limited to the following acts or circumstances: (i) act(s) of God, (ii) war or wars, (iii) government regulation by a governmental authority having jurisdiction (including, but not limited to, any law, rule, order, proclamation, regulation, ordinance, demand, or requirement of any governmental agency), (iv) act(s) or threatened act(s) of terror, including, but not limited to any acts by organized groups of terrorists or any acts of a public enemy (v) disaster(s) (including, but not limited to, hurricane, tornado, tropical storm, earthquake, or major storm), (vi) any pandemic, epidemic, pestilence, plague, or outbreak, (vii) strike, lockout, or industrial disputes, (viii) civil disorder, riot, or disturbance of the peace, (ix) any third party act for which the Party who fails to perform is not responsible, or (x) any other condition or circumstance, whether similar to or different from the foregoing (it being agreed that the foregoing enumeration shall not limit or be characteristic of such conditions or circumstances) beyond the reasonable control and fault of the Party claiming the Force Majeure event.

B. In the event that either Party is rendered unable, wholly or in part, by reason of an event of Force Majeure to perform any obligations set forth in the Agreement, other than an obligation to pay a sum of money owed hereunder by one Party to the other, then such Party shall give the other Party written notice and reasonably full particulars of such event as soon as practicable after the occurrence thereof, and thereafter, the obligations of both Parties shall be suspended to the extent and for the period of such Force Majeure condition and such cause shall be remedied with all reasonable dispatch. Settlement of strikes and lockouts shall be entirely within the discretion of the Party affected and the requirement that any event of Force Majeure shall be remedied with all reasonable dispatch shall not require the settlement of strikes or lockouts by acceding to the demands of the parties directly or indirectly involved in such strikes or lockouts when such course is inadvisable in the discretion of the Party having such difficulty.

C. To the extent the Force Majeure event causes a delay or an increase in costs or expenses to DE, Applicant shall be liable to DE for all increased costs and expenses incurred by DE, including any acceleration or other schedule impact costs and delay damages incurred by DE or its contractors, as a result of such Force Majeure event. All such increased cost and expenses, damages, acceleration and other impacts associated with any such delay shall be deemed Additional Work under this Agreement. If Applicant refuses to execute an amendment to this Agreement reasonably acceptable to DE equitably adjusting DE's time and compensation under this Agreement for such Additional Work, among any other rights or remedies it may have hereunder, DE may suspend all or any portion of the Work until such time as that amendment is executed by the Parties and delivered to DE.

ARTICLE 15. NOTICE

A. Unless otherwise stated herein, any notice required hereunder must be given in writing to the below-designated representative of each Party within the required specified period of time. Notice is deemed to be delivered by the Party providing such notice to the receiving Party at the address provided in Paragraph B below in the following manner: (1) upon hand-delivery; (2) upon confirmation of transmittal by facsimile or telex; (3) within five (5) business days after depositing such notice with the United States Postal Service first-class, registered or certified mail; or (4) within two (2) business days after depositing such notice with a nationally-recognized overnight courier service.

B. The Parties' respective authorized representatives and mailing addresses are as follows:

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

DE:
Duke Energy Florida, Inc.

The Applicant:

The _____ of _____

Attn: _____

Attn: _____

Fax: _____

Fax: _____

- C. Either Party may change its address or designated representatives for the receipt of notice, requests or other communications hereunder by providing the other Party with notice within ten (10) business days and in accordance with Paragraph A of this Article.

ARTICLE 16. TERMINATION

In the event either Party is unable to perform its obligations because of any Force Majeure as defined in Article 14 herein, the Party awaiting performance by the other Party may elect to terminate this Agreement by giving written notice to the non-performing Party if the Force Majeure exceeds one hundred twenty (120) days. In the event either Party is in default of any of its material obligations under this Agreement, the non-defaulting Party shall notify the defaulting Party in writing, setting forth in detail the default. If the defaulting Party fails to commence to diligently and continuously cure such default within fourteen (14) days of receipt of the written notice from the non-defaulting Party, the non-defaulting Party may terminate this Agreement upon giving the defaulting Party written notice of such termination. Within approximately ninety (90) days following any termination of this Agreement, DE shall furnish to Applicant the Final Statement referenced in Article 7 above setting forth the Final Price for the Work to be paid by Applicant, including DE's reasonable demobilization costs.

ARTICLE 17. DISPUTE RESOLUTION

Either Party may give the other Party written notice of any dispute not resolved in the normal course of business. Executives of both Parties shall meet at a mutually acceptable time and place within ten (10) business days after delivery of such notice and thereafter as often as they reasonably deem necessary, to exchange relevant information and to attempt to resolve the dispute. In such meetings and exchanges, a Party shall have the right to designate any information that a Party offers as confidential, and no designated confidential information exchanged in such meetings for the purpose of resolving a dispute will be used by a Party in litigation against another Party. If the matter has not been resolved by these individuals within thirty (30) calendar days of the disputing Party's notice, or if the Parties fail to meet within ten (10) business days as required above, either Party may initiate mediation as provided hereinafter. The mediation proceeding shall be conducted in accordance with the then current Center for Public Resources ("CPR") Model Procedure for Mediation of Business Dispute or other mutually agreed upon procedures, with the following exceptions:

(1) if the Parties have agreed to pursue mediation but have not agreed within thirty (30) calendar days of the request for mediation on the selection of a mediator willing to serve, the CPR, upon the request of either Party, shall appoint a member of the CPR Panel of Neutrals as the mediator; and

(2) efforts to reach a settlement shall continue until the conclusion of the proceeding, which is deemed to occur when: a) a written settlement is reached, or b) the mediator concludes and informs the Parties in writing that further efforts would not be useful, or c) the Parties agree in writing that an impasse has been reached. Neither Party may withdraw before the conclusion of the proceeding; provided, however, notwithstanding the foregoing, an impasse shall be deemed to have occurred if the Parties have failed to execute a written settlement within ninety (90) calendar days after the date the mediation proceeding was initiated by either Party.

If the Parties are unable to resolve the dispute and litigation proves necessary, either Party may initiate such litigation.

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

ARTICLE 18. GOVERNING LAW AND VENUE

This Agreement and the rights and obligations of the Parties to this Agreement shall be governed by and construed in accordance with the laws of the State of Florida without giving effect to any principles of conflicts of laws where the giving of effect to any such principles would result in the laws of any other state or jurisdiction being applied to this Agreement.

ARTICLE 19. ENTIRE AGREEMENT

The Agreement constitutes the entire understanding between DE and Applicant relating to the subject matter hereof, superseding any prior or contemporaneous agreements or understanding between the Parties. The Parties shall not be bound by or be liable for any statement, prior negotiation, correspondence, representation, promise, draft agreements, inducement or understanding of any kind or nature not set forth or provided for herein. No prior course of dealing, usage of trade or course of performance shall be used to supplement or explain any term, condition, or instruction used in this Agreement.

ARTICLE 20. MODIFICATION

No statements or agreements, oral or written, made prior to the date hereof, shall vary or modify the written terms set forth herein and neither Party shall claim any amendment, modification or release from any provision hereof by reason of a course of action or mutual agreement unless such agreement is in writing, signed by both Parties and specifically states it is an amendment to this Agreement.

ARTICLE 21. WAIVER

There shall be no waiver by either Party of any right, remedy, term, condition, or provision of this Agreement unless such waiver is expressed in writing and signed by the Party against which such waiver is sought to be enforced. Nor shall any usage of trade, course of dealing, practice of performance, or failure to strictly enforce any term, right, obligation or provision of this Agreement by either Party be construed as a waiver of any provision herein unless such waiver is expressed in writing and signed by the Party against which such waiver is sought to be enforced.

ARTICLE 22. SEVERABILITY

In the event any provision, or any part or portion of any provision of this Agreement shall be deemed or defined by any law or order any court or any governmental agency, or regulatory body having jurisdiction over either Party, or held or declared by a court of competent jurisdiction to be unlawful, invalid, void or otherwise unenforceable, the rights and obligations of the Parties shall be reduced or abated only to the extent required to remove or cure such illegal or unenforceable portion, so long as the Agreement is not affected in a manner or to the extent which would render it economically, technically, materially, or commercially infeasible to either Party.

ARTICLE 23. SURVIVAL OF PROVISIONS

Neither termination nor cancellation of this Agreement shall be deemed to relieve the Parties of any obligations hereunder that by their nature survive termination or cancellation including, but not limited to, all warranty, indemnification, and limitation of liability obligations.

ARTICLE 24. CAPTIONS

The headings used throughout this Agreement are inserted for reference purposes only and are in no way to be construed as a limitation of the scope of the particular sections to which they refer.

ARTICLE 25. REPRESENTATIONS AND WARRANTIES FROM APPLICANT

25.1 Applicant represents and warrants as follows:

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

A. Applicant is a [public body/association/company] duly formed, validly existing, and in good standing under the laws of the State of Florida with its principle place of business and chief executive offices at its address set forth herein.

B. This Agreement, including all Exhibits referenced herein, on execution, will constitute valid obligations of Applicant, enforceable in accordance with their terms. The consummation of the transactions or actions contemplated by this Agreement, and the performance of any of the terms and conditions of this Agreement, will not result in a breach of, or constitute a default in, Applicant's organizational documents or in any deed, deed of trust, covenant, restriction of record, note, loan agreement, credit agreement, bond or trust indenture, or any other agreement to which Applicant is a party or by which Applicant may be bound or affected. Applicant is not in default of any order of any court or any requirement of any governmental authority that could materially adversely affect this Agreement or the easements or rights-of-way for and property along the Cable Route.

C. This Agreement is not misleading, and fully and fairly states all material facts relevant to the matters with which it purports to deal. There is no fact of which Applicant is aware that Applicant has not disclosed to DE in writing that could materially adversely affect this Agreement or the easements or rights-of-way for and property along the Cable Route. Applicant has furnished DE with a true and complete copy of all documents relating to this Agreement.

D. Applicant holds or will hold within the time periods set forth in this Agreement for obtaining easements and rights-of-way necessary for the Work, full legal and equitable title to the easements and rights-of-way obtained and provided to DE for the Work. The terms and conditions of all new easements and rights-of-way to be provided by Applicant hereunder, shall be substantially similar to the terms and conditions of the original easements or rights-of-way for the existing overhead facilities being relocated hereunder, unless otherwise agreed to in writing by DE, in its sole discretion.

E. There are no actions, suits, or proceedings pending or, to the knowledge of Applicant, threatened, in any court or before or by any governmental authority against or affecting Applicant or any of the property along the Cable Route, which, if adversely determined, would have a material adverse effect on the property along the Cable Route or impair the ability of Applicant to complete its obligations under this Agreement, or which involve the validity, enforceability, or priority of this Agreement and any easements or rights-of-way for the Work, at law or in equity.

F. There are no governmental requirements prohibiting the use and operation of the property along the Cable Route for the Relocation Work. There are no, nor are there any alleged or asserted, violations of governmental requirements, law, regulations, ordinances, codes, permits, licenses, declarations, covenants, conditions, or restrictions of record, or other agreements relating to the easements and rights-of-way for or property along the Cable Route. Applicant has obtained or is not aware of any reason why it cannot obtain all necessary easements, rights-of-way, permits, licenses, consents, or approvals for performance of the Relocation Work.

G. DE will have adequate access to perform the Relocation Work. Further, the property along the Cable Route is not located in a flood zone as defined in the Flood Disaster Protection Act of 1973, as amended, and the property along the Cable Route is not located within wetlands as defined by any governmental authority, or where wetlands are located on the property along the Cable Route, they have been delineated and all required governmental approvals for the Relocation Work have been obtained by Applicant.

H. The Applicant warrants and represents that it has the legal authority and is duly authorized to enter into each and every provision within this Agreement and to abide by and comply with each and every provision in this Agreement.

25.2 The representations and warranties in this Agreement are made by Applicant as an inducement to DE to enter into this Agreement and Applicant understands that DE is relying on these representations and warranties. These representations and warranties shall survive any breach or default of this Agreement, any bankruptcy

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____



proceedings involving Applicant, any termination of this Agreement, and any assignment or conveyance of this Agreement.

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____



IN WITNESS WHEREOF, the Parties have duly executed this Agreement as of the date and year first above written.

DUKE ENERGY FLORIDA, INC. D/B/A

DUKE ENERGY

By: _____

By: _____

printed name

printed name

title

title

ISSUED BY: Lori Cross, Manager, Regulatory Services - Florida

EFFECTIVE: _____

**St. Pete Beach City Commission
Agenda Report**

Issue Considered: Ordinance No 2015-10, amending Chapter 6, Alcoholic Beverages of the City of St. Pete Beach Code of Ordinances relating to public consumption or possession of alcoholic beverages

Date: June 25, 2015

Prepared By: Jennifer Bryla – Community Development Director

Through: Wayne Saunders, City Manager *WS*

Summary of Issue: This Ordinance was presented at the June 9th City Commission meeting as a result of the denial of Ord 2015-06 (3-2) final reading. Ordinance 2015-10 had its first reading on the 9th and further clarifies our current alcohol ordinance which prohibits the consumption of alcoholic beverages on or upon all public streets, all public beach lands, any public sidewalk, any city park, and all private and sand beach areas upland of the Gulf of Mexico excluding the conditional use process for special events and special occasions.

Requested Motion: The first reading of the Ordinance passed 5-0.
I move to approve Ordinance No. 2015-10 on final reading.

Attachment: Ordinance No. 2015-10

ORDINANCE 2015-10

AN ORDINANCE OF THE CITY COMMISSION OF THE CITY OF ST PETE BEACH, FLORIDA, AMENDING CHAPTER 6, ALCOHOLIC BEVERAGES, ARTICLE I, IN GENERAL OF THE CITY OF ST PETE BEACH CODE OF ORDINANCES BY AMENDING SECTION 6.1, DEFINITIONS, AMENDING THE DEFINITION OF ESTABLISHMENT DEALING IN ALCOHOLIC BEVERAGES AND ADDING NEW DEFINITIONS OF SAND BEACH AREAS AND SOVEREIGNTY SUBMERGED LAND; AMENDING SECTION 6.3, SALE TO CERTAIN PERSONS PROHIBITED, BY PROHIBITING THE SALE OF ALCOHOLIC BEVERAGES TO ANY PERSON BELOW THE LEGAL AGE AS ESTABLISHED BY STATE LAW; AMENDING SECTION 6.5, PUBLIC CONSUMPTION OR POSSESSION RELATING TO RESTRICTIONS AND PERMITTING OF PUBLIC ALCOHOL CONSUMPTION ON PUBLIC LANDS, RIGHTS-OF-WAY, SAND BEACH AREAS AND SOVEREIGNTY SUBMERGED LANDS; PROVIDING FOR PUBLICATION IN ACCORDANCE WITH THE REQUIREMENTS OF LAW; AND PROVIDING FOR AN EFFECTIVE DATE.

BE IT ORDAINED BY THE CITY COMMISSION OF THE CITY OF ST PETE BEACH, FLORIDA, IN SESSION DULY AND REGULARLY ASSEMBLED THAT:

SECTION 1. Section 6.1 of Article I, Chapter 6, of the City of St. Pete Beach Code of Ordinances is hereby amended as follows:

Sec. 6-1. - Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Alcoholic beverage means any beverage containing more than one percent of alcohol by weight.

Club means any group of persons associated together as a duly chartered or incorporated organization, including a social club incorporated by order of the circuit court, which holds a license issued by the state for the sale of alcoholic beverages.

Establishment dealing in alcoholic beverages means any business or establishment licensed by the state for the sale of alcoholic beverages; any area or part of any property, building or structure in which alcoholic beverages are kept for sale, offered for sale, sold, served or dispensed under license by the state; any other area, property, building or structure or part thereof having an entrance, door or other passageway that could in any manner be used or utilized as a means of access, ingress or egress into the area in which alcoholic beverages are kept, offered for sale, sold or dispensed; or which is in any other manner capable of access,

ingress or egress at any time to the area in which alcoholic beverages are kept, offered for sale, sold, served or dispensed. However, the term "establishment dealing in alcoholic beverages," when applied to a hotel or club, as defined in this section, means that area (indoor or outdoor) or part of such hotel or club in which alcoholic beverages are kept, sold, served or dispensed when such area is capable of being closed or in some other manner set apart and forbidden to access, including sand beach areas as defined herein and as depicted in the Vendor's state alcoholic beverage license.

Sale or sell includes any transfer of liquor, wine or beer or other alcoholic beverages for a consideration, and any gift of liquor, beer or wine in connection with or as a part of a transfer of property other than liquor, beer or wine or other alcoholic beverages for a consideration.

Sand beach areas means the zone of unconsolidated material that extends landward from the mean high water line to the place where there is marked change in material or physiographic form.

Sovereignty submerged land include, but are not limited to, tidal lands, sandbars, shallow banks and lands waterward of the ordinary or mean high water line, beneath navigable fresh water or beneath tidally-influenced waters.

Vendor means any person who keeps for sale, sells or dispenses any alcoholic beverages in any quantity in any place or business licensed by the state for the sale of alcoholic beverages, or any person who holds a license from the state for the sale of alcoholic beverages, including the owner, manufacturer, operator, proprietor or licensee or the servant, agent or employee of any one of such.

SECTION 2. Section 6.3 of Article I, Chapter 6, of the City of St. Pete Beach Code of Ordinances is hereby amended as follows:

Sec. 6-3. - Sale to certain persons prohibited.

No person who is a vendor of alcoholic beverages shall sell, furnish or deliver or permit any person in his employ to sell, furnish or deliver any alcoholic beverages in any quantity to any person who is intoxicated or below the legal age as established by state law.

SECTION 3. Section 6.5 of Article I, Chapter 6, of the City of St. Pete Beach Code of Ordinances is hereby amended as follows:

Sec. 6-5. - ~~Public e~~Consumption or possession of alcoholic beverages.

~~(a) As used in this section, the term "beach" means the zone of unconsolidated material that extends landward from the mean low water line to the place where there is marked change in material or physiographic form.~~^[2]

~~(b)~~ Except as provided in subsection (d) of this section, it shall be unlawful to drink or consume alcoholic beverages on or upon:

- (1) All public streets.
- (2) All public beach lands. ¹³¹
- (3) Any public sidewalk.
- (4) Any city park.
- (5) All private sand beach areas upland of the Gulf of Mexico and adjacent to private property. ¹⁴¹
- (6) All sovereignty submerged land.

(~~eb~~) Notices. For public beach landses, notice of this section shall be posted in a prominent beach access location by the city. ~~For~~ ~~Where the upland property is used for some commercial use, including but not limited to hotels and resorts on the beach,~~ notice shall be posted by the owner and shall contain language determined to be acceptable by the City Attorney. For upland property used as ~~Where the upland property is a~~ multifamily residential use, the owner or condominium association shall be responsible for posting the notice. ~~For~~ ~~Where the upland property is less than three residential living units, the city shall post the notice at the closest public access to the beach.~~

(~~dc~~) Containers. It shall be unlawful for any person to carry on or about his person any container of alcoholic beverages, whether or not the container is a bottle, can, carton or other form of container, in those areas described in subsection (~~ba~~) of this section unless a permit has been issued pursuant to subsection (e) of this section otherwise allowing said activity to occur under any certain terms and conditions stated in the permit. This subsection shall not be applicable in those areas described in subsections (~~ba~~)(1), and (3), ~~and (5)~~ of this section if the alcoholic beverage is contained in a sealed container or if the bottle, can, carton or other container has never been opened since the time the beverage was originally bottled at the manufacturer's or bottler's plant. Possession of any container of alcoholic beverages wherein the seal has been broken, the bottle cap or pop-top has been opened or removed or where the container may seem to be open or to have been opened shall constitute prima facie evidence of a violation of this section.

(~~ed~~) ~~Possession of any container of alcoholic beverages wherein the seal has been broken, the bottle cap or pop top has been opened or removed or where the container may seem to be open or to have been opened shall constitute prima facie evidence of a violation of this section.~~

(~~fd~~) Permits. Permits allowing for the consumption of alcohol for special occasions events, outdoor dining or outdoor drinking areas, or special occasions may be issued as follows:

- (1) Special Event Permit on Public Lands. The city commission may ~~approve special permits for~~ authorize the consumption of alcoholic beverages in the areas described in subsections (~~ba~~)(1), (2), (3), and (4) ~~and (5)~~ in connection with the approval of a special event permit issued pursuant to Article II of Chapter 26 of this Code.
- (2) Special Event Permit on Private Lands. Owners of private ~~property upland of the beach~~ sand beach areas may obtain a special event permits for the consumption of alcoholic

beverages for special occasions. The permits shall be issued by the ~~department of planning and development~~ city manager or designee and shall include conditions necessary to protect the safety, health and welfare of the public. The upland owner shall be entitled to no more than three permits per month. The area of the beach subject to the permit shall be marked with approved temporary markers, and the consumption of alcohol shall be confined to the marked area. Permits shall not authorize consumption before 8:00 a.m. and shall terminate no later than 10:00 p.m.

- (3) Conditional Use Permit on Public Land. The city commission may authorize the sale and consumption of alcoholic beverages in connection with the approval of a conditional use permit for an outdoor dining area or outdoor drinking area in the area described in subsection (a)(1) and (a)(3) as provided by the City of St. Pete Beach Land Development Code.

SECTION 4. This Ordinance shall be published in accordance with the requirements of law.

SECTION 5. This Ordinance shall become effective immediately upon final passage and adoption.

PASSED ON FIRST READING _____, a.d. 2015

PASSED ON SECOND AND FINAL READING _____, a.d. 2015

Maria Lowe, MAYOR

FIRST READING: _____

PUBLISHED: _____

SECOND READING: _____

PUBLISHED: _____ I, Rebecca C. Haynes, City Clerk of the City of St. Pete Beach, Florida, do hereby certify that the foregoing Ordinance was duly adopted in accordance with the provisions of applicable law this _____ day of _____, 2015.

Rebecca C. Haynes, City Clerk

APPROVED AS TO LEGAL FORM AND CORRECTNESS:

City Attorney
Andrew Dickman, Esq.

**St. Pete Beach City Commission
Agenda Report**

Issue Considered: Re-plat of property, vacation and conveyance of ROW

Date: June 25 2015

Prepared By: Jennifer Bryla– Community Development Director

Through: Wayne Saunders – City Manager

Summary of Issue The owners of property at 5810 Bimini Way have requested that three lots; 16, 17 & 18, be combined to create two lots for the purpose of building one home. The intent is that lots 17 & 18 be aggregated and lot 16 would remain vacant. At a later date the owners may sell it for single family home construction. The re-configuration of the lots eliminates the need for a portion of ROW that was adjacent to the end of the existing cul-de-sac. The reason the ROW was initially included was that if lot 17 stood alone there would not be adequate space to locate a driveway. Since the lots are being combined there is no longer the deficiency.

In addition there is a portion of property located on lot 18 that will be conveyed to the city as part of the ROW. This remnant portion of the lot 18 was as a result of the previous cul-de-sac being located on the home owner's property. Notices were sent to all homeowners within 300 feet of the property in accordance with the St. Pete Beach Land Development Code as well as all the pertinent utility companies.

In accordance with Florida Statutes chapter 177, the re-plat has been reviewed by a licensed surveyor on behalf of the city and the opinion of title has been inspected by the City Attorney.

Requested Motion: "I move to accept the the re-plat, and the vacation and conveyance of ROW as presented."

Attachment: Re-plat of Lots 16, 17, and 18 Bahia Shores First Addition

**Reviewed by the
City Manager**

WS

CITY OF ST. PETE BEACH, FLORIDA

ORDINANCE NO. 2015-11

AN ORDINANCE OF THE CITY OF ST. PETE BEACH, FLORIDA PROVIDING FOR THE VACATION OF A PORTION OF THE RIGHT-OF-WAY LOCATED ADJACENT TO THE LOTS 17 & 18, BAHIA SHORES FIRST ADDITION, ST. PETE BEACH, AS DETAILED IN THE ATTACHED SURVEY; CONSIDERING THE PRELIMINARY AND FINAL PLAT OF LOTS 16, 17 & 18 OF BAHIA SHORES FIRST ADDITION; PROVIDING FOR THE DEDICATION OF LANDS ADJACENT TO LOTS 17 & 18, AS DETAILED IN THE ATTACHED SURVEY; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the record owners of real property located at 5810 Bimini Way have requested the City vacate the Right-of-Way located adjacent to the subject property; and

WHEREAS, the record owners of real property located at 5810 Bimini Way have requested the aggregation of lots 17 & 18 into one lot 17; and

WHEREAS, the record owners of real property located at 5810 Bimini Way have requested a reconfiguration of lot 16; and

WHEREAS, the record owners of real property located at 5810 Bimini Way have requested the City accept conveyance of land adjacent to lot 18; and

WHEREAS, the City Commission has found that the subject application meets all of the criteria for approval of the vacation, conveyance and re-plat request, and that it would be in the best interest of the citizens of the City of St. Pete Beach for the application to be granted;

WHEREAS, all property owners within 300 feet have been notified pursuant to Section 3.4(b)(3) of the St. Pete Beach Land Development Code.

NOW, THEREFORE, THE CITY COMMISSION OF THE CITY OF ST. PETE BEACH, FLORIDA, HEREBY ORDAINS:

Section 1. The City of St. Pete Beach, Florida, hereby vacates that portion of Bimini Way Right-of-Way coincident with Lots 16, 17 & 18, Bahia Shores First Addition, as recorded in plat book 36, page 3 of the public records of Pinellas County, Florida, as shown on that certain survey filed with the City by the applicant for such vacation, as more particularly described in the legal description set forth in Exhibit "A" attached hereto.

Section 2. The City of St. Pete Beach makes no warranties of any kind as to the title or ownership of the property being vacated, or as to the existence of any liens, easements or encumbrances against the same. This Ordinance shall only be construed to release any legal or equitable interest the City may have in the subject property. Nothing contained herein shall be construed to affect the rights of parties having an interest in the subject property prior to its becoming a City Right-of-Way, except to the extent provided in this Ordinance and allowed by law.

Section 3. Nothing contained herein shall be construed to alter the application of all City laws, regulations and Ordinances to the subject property.

Section 4. If any section paragraph, provision or term of this Ordinance, or any portion thereof, shall be determined by a Court of competent jurisdiction to be invalid, such decision shall not otherwise affect the validity of the remaining portions of this Ordinance that were not declared to invalid.

Section 5. This Ordinance shall become effective immediately upon final passage or as otherwise provided by law.