CONTRACT DOCUMENTS FOR:

ASPHALT PAVING
OCTOBER 2012

ITB #13-001

MAYOR: CRAIG CATES

COMMISSIONERS:

TONY YANIZ

BILLY WARDLOW

JIMMY WEEKLEY

CLAYTON LOPEZ

MARK ROSSI

TERI JOHNSTON

PREPARED BY:
City Of Key West
Engineering Services

COPY NO._____

CITY OF KEY WEST

KEY WEST, FLORIDA

CONTRACT DOCUMENTS

For

ASPHALT PAVING

****

CONSISTING OF: BID DOCUMNETS
CONTRACT FORMS
CONDITIONS OF THE CONTRACT
SPECIFICATIONS
DRAWINGS

****

KEY WEST, FLORIDA

October 2012

ITB #13-001 Copy No._____

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PART 1
BIDDING REQUIREMENTS

INVITATION TO BID

Sealed bids for the City of Key West ASPHALT PAVING, addressed to the City of Key West, will be received at the Office of the City Clerk, City of Key West, 3126 Flagler St., Key West Florida, 33040 until **3:00pm November 21, 2012 ,** and then will be publicly opened and read. Any bids received after the time and date specified will not be considered.

Please submit two (2) originals and two (2) flash drives each one containing a single PDF file of the entire bid package. Bid package is to be enclosed in a sealed envelope, clearly marked on the outside **"BID FOR ASPHALT PAVING"** addressed and delivered to the City Clerk at the address noted above.

The City retains the right to award bid to the bidder that best meet the needs of the City.

The project consists of a variety of milling and paving, minor roadbed reconstruction, reworking of existing roadbed, trench restoration, patching of existing asphalt pavement, asphalt pavement removal, utility adjustments, seepage trench installation, swale reconstruction, temporary and permanent pavement markings, flexible delineators, reflective pavement markings, signage and sod.

Drawings and Specifications may be obtained from Demand Star by Onvia. Please contact Demand Star at www.demandstar.com or call 1-800-711-1712 or City of Key West at www.keywestcity.com

A Pre-bid Conference will be held at **2:00pm November 8, 20122 .** at the City of Key West City Hall, 3132 Flagler Ave, Key West, Florida 33040.

Each Bid must be submitted on the prescribed form and accompanied by bid security as prescribed in the Instructions to Bidders, payable to the City of Key West, Florida, in an amount not less than (5) five percent of the amount of the bid. The contractor shall be a licensed contractor by the State of Florida and submit proof of such with the bid.

The successful Bidder will be required to furnish the necessary additional bond(s) for the faithful performance of the Contract, as prescribed in the Bidding Documents. The Bidder will also be required to furnish documentation showing that he is in compliance with the licensing requirements of the State and the provisions of Chapter 66 section 87 of the Code of Ordinances of the City of Key West. Compliance with these provisions is required before the Contractor can enter into the agreement contained in the Contract Documents. Specifically, Bidder shall demonstrate that he holds, as a minimum, the following licenses and certificates required by State Statute and local codes.

EACH BID MUST BE SUBMITTED ON THE PRESCRIBED FORM AND ACCOMPANIED BY BID SECURITY AS PRESCRIBED IN THE INSTRUCTIONS TO BIDDERS, PAYABLE TO THE CITY OF KEY WEST, FLORIDA, IN AN AMOUNT NOT LESS THAN FIVE (5) PERCENT OF THE AMOUNT BID.

THE BIDDER MUST BE A LICENSED CONTRACTOR BY THE STATE OF FLORIDA AND SUBMIT PROOF OF SUCH WITH THE BID.

The Bidder shall furnish documentation showing that he is in compliance with the licensing requirements of the provisions of Chapter 66 Section 87 of the Code of Ordinances of the City of Key West; within 10 days the following the Notice of Award;

A. City of Key West Tax License Receipt
B. A valid Certificate of Competency issued by the Chief Building Official of Key West, Florida.

All bid bonds, contract bonds, insurance contracts, and certificates of insurance shall be either executed by or countersigned by a licensed resident agent of the Surety or Insurance Company having his place of business in the State of Florida, and in all ways complying with the insurance laws of the State of Florida. Further, the said Surety or Insurance Company shall be duly licensed and qualified to do business in the State of Florida.

Before a Contract will be awarded for the work contemplated herein, the CITY will conduct such investigation as is necessary to determine the performance record and ability of the apparent low Bidder to perform the size and type of work specified under this Contract. Upon request, the Bidder shall submit such information as deemed necessary by the CITY to evaluate the Bidder's qualifications.

For information concerning the proposed work, or for appointment to visit the site of the proposed work, contact the designated Engineer by the General Services of the City of Key West. **Project Manager, Karen Olson, 305-809-3963 or kolson@keywestcity.com**

As stated above at the time of the bid submittal the Bidder must provide satisfactory documentation of State Licenses. The Bidder shall furnish documentation showing that he is in compliance with the licensing requirements of County, and City licenses as would be required within ten days of the award. The successful Bidder must also be able to satisfy the City Attorney as to such insurance coverage and legal requirements as may be demanded by the Bid in question. The City may reject bids for any and/or all of the following reasons: (1) for budgetary reasons, (2) if the bidder misstates or conceals a material fact in its bid, (3) if the bid does not strictly conform to the law or is non-responsive to the bid requirements, (4) if the bid is conditional, or (5) if a change of circumstances occurs making the purpose of the bid unnecessary to the City. The City may also waive any minor formalities or irregularities in any bid, (6) if such rejection is in the best interest of the City. The City may also waive any minor formalities or irregularities in any bid.

Dated this _____ day of_____, 201___.

CITY OF KEY WEST

By_____
Bob Vitas, City Manager

* * * * * *

INSTRUCTIONS TO BIDDERS

1. CONTRACT DOCUMENTS

A. FORMAT

The Contract Documents are divided into parts, divisions, and sections for convenient organization and reference. Generally, there has been no attempt to divide the Specification sections into work performed by the various building trades, work by separate subcontractors, or work required for separate facilities in the project.

B. DOCUMENT INTERPRETATION

The separate sections contained within these Contract Documents are intended to be mutually cooperative and to provide all details reasonably required for the execution of the proposed work.

Should there be any doubt as to the meaning or intent of said Contract Documents, the Bidder should request of the Engineer, in writing (at least 10 working days prior to bid opening) an interpretation thereof. Any interpretation or change in said Contract Documents will be made only in writing in the form of Addenda to the Documents which will be furnished to all registered holders of Contract Documents. Bidders shall submit with their Proposals, or indicate receipt of, all Addenda. The CITY will not be responsible for any other explanation or interpretations of said Documents.

C. DRAWINGS

There are no drawings associated with this document.

2. GENERAL DESCRIPTION OF THE PROJECT

A general description of the work to be done is contained in the Invitation to Bid. The scope is specified in applicable parts of these Contract Documents.

3. QUALIFICATION OF CONTRACTORS

The prospective Bidders must meet the statutorily prescribed requirements before award of Contract by the CITY. Bidders must hold or obtain all licenses and/or certificates as required by the State and Local Statutes in order to bid and perform the work specified herein. Licenses required may include Excavation/Underground Utilities, or other authorized License/Certificate.

4. BIDDER'S UNDERSTANDING

Each Bidder must inform himself of the conditions relating to the execution of the work, and it is assumed that he will inspect the site and make himself thoroughly familiar with all the Contract Documents. Failure to do so will not relieve the successful Bidder of his obligation to enter into a Contract and complete the contemplated work in strict accordance with the Contract Documents. It shall be the Bidder's obligation to verify for himself and to his complete

satisfaction all information concerning site and subsurface conditions.

The CITY will make available to prospective Bidders upon request and at the office of the Engineer, prior to bid opening, any information that he may have as to subsurface conditions and surface topography at the worksite.

Investigations conducted by the Engineer of subsurface conditions were made for the purpose of study and design, and neither the CITY nor the Engineer assumes any responsibility whatever in respect to the sufficiency or accuracy of borings, or of the logs of test borings, or of other investigations that have been made, or of the interpretations made thereof, and there is no warranty or guarantee, either expressed or implied, that the conditions indicated by such investigations are representative of those existing throughout such area, or any part thereof, or that unforeseen developments may not occur.

Logs of test borings, geotechnical reports, or topographic maps showing a record of the data obtained by the Engineer's investigations of surface and subsurface conditions that are made available shall not be considered a part of the Contract Documents, said logs representing only the opinion of the Engineer as to the character of the materials encountered by him in his investigations, and are available only for the convenience of the Bidders.

Information derived from inspection of logs of test borings, or pits, geotechnical reports, topographic maps, or from Drawings showing location of utilities and structures will not in any way relieve the Contractor from any risk, or from properly examining the site and making such additional investigations as he may elect, or from properly fulfilling all the terms of the Contract Documents.

Each Bidder shall inform himself of, and the Bidder awarded a Contract shall comply with, federal, state, and local laws, statutes, and ordinances relative to the execution of the work. This requirement includes, but is not limited to, applicable regulations concerning minimum wage rates, nondiscrimination in the employment of labor, protection of public and employee safety and health, environmental protection, the protection of natural resources, fire protection, burning and non-burning requirements, permits, fees, and similar subjects.

5. TYPE OF PROPOSAL

A. UNIT PRICE

The Proposal for the work is to be submitted on a unit price basis. Unit prices shall be submitted for all items of work set forth in the Proposal. All items required to complete the work specified but not included in the Proposal shall be considered incidental to those set forth in the Proposal. The estimate of quantities of work to be done is tabulated in the Proposal and, although stated with as much accuracy as possible, is approximate only and is assumed solely for the basis of calculation upon which the award of Contract shall be made. Payment to the Contractor will be made on the measurement of the work actually performed by the Contractor as specified in the Contract Documents.

6. PREPARATION OF BIDS

A. GENERAL

All blank spaces in the BID form must be filled in, as required, preferably in BLACK ink. All price information shall be shown in both words and figures where required. No changes shall be made in the phraseology of the forms. Written amounts shall govern in case of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and extended totals, unit prices shall prevail.
Any BID shall be deemed informal which contains omissions, erasures, alterations, or additions of any kind, or prices uncalled for, or in which any of the prices are obviously unbalanced, or which in any manner shall fail to conform to the conditions of the published Invitation to Bid.

Only one BID from any individual, firm, partnership, or corporation, under the same or different names, will be considered. Should it appear to the CITY that any Bidder is interested in more than one Proposal for work contemplated; all Proposals in which such Bidder is interested will be rejected.

B. SIGNATURE

The Bidder shall sign his BID in the blank space provided therefore. If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign Contracts on behalf of the corporation. If Bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign Contracts in behalf of the partnership. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a notarized power-of-attorney must be on file with the CITY prior to opening of Proposals or submitted with the Proposal, otherwise the Proposal will be regarded as not properly authorized.

C. INDEFINITE QUANTITIES

This is an "Indefinite Quantities" Contract with no fixed Contract price. The estimated quantities shown in the Proposal are only for bid evaluation purposes. The amount of work ordered for each item may be less than or exceed the estimated quantities and could vary by an indefinite amount. The actual amount of work to be performed and the time of such performance will be determined by the Owner or his properly authorized representative who will issue written Work Orders to the Contractor. The only work authorized under this Contract is that which is performed upon receipt of such a Work Order.

The Bidder shall not plead misunderstanding or deception because such listed quantities do not correspond with actual quantities. It is understood that the quantities may be increased or decreased as required to fulfill the Owner's needs for installation, repair, and replacement of infrastructure throughout the 2-year term of this Contract.

D. SPECIAL BIDDING REQUIREMENTS

The Bidder's attention is brought to the hiring practices and licenses and permits of the City of Key West. These are defined in the addition to Article 6.09, ORDINANCES, PERMITS, AND LICENSES, as set forth in the Supplementary Conditions.

The successful Bidder shall maintain a yard and office within the Lower Keys (west of the Seven-Mile Bridge). All equipment required for the work shall be available at that site. If the Contractor does not have this equipment at his yard he may obtain it by lease, rent, subcontract, or from another site within his company as required by Work Order as long as the equipment is available within 7 calendar days after receiving notice to do the work.

The Bidder shall submit with his Bid his experience record showing his experience and expertise in asphalt repair and replacement. Such experience record shall provide at least five current or recent projects of similar work, preferably within Florida or the southeastern United States. For each project the following information shall be provided:

1. Description and location of work.
2. Contract amount.
3. Dates work was performed.
4. Owner.
5. Name of Owner's contact person and phone number.
6. Engineer.
7. Name of Engineer's contact person and phone number.

The bidder shall submit with his bid a list of items to be performed by his own labor and that performed by subcontractors or others.

E. ATTACHMENTS

Bidder shall complete and submit the following forms with his bid:
Anti-Kickback Affidavit
Public Entity Crimes Form
Key West Indemnification Form
EQUAL BENEFITS FOR DOMESTIC PARTNERS AFFIDAVIT
FLORIDA TRENCH SAFETY ACT COMPLIANCE
SUSPENSION AND DEBARMENT CERTIFICATION

F. PUBLIC ENTITY CRIMES FORM

Pursuant to the requirements of Chapter 287.133, Laws of Florida, pertaining to the sworn statement on Public Entity Crimes and the Convicted Vendor List, all Bidders shall submit a signed and notarized statement with their Bid on the form provided herein.

G. FLORIDA TRENCH SAFETY ACT

The Bidder's attention is directed to the enactment of the Florida Trench Safety Act which incorporates OSHA Standards 29 CFR s. 1926.650, Subpart P, as the state's trench excavation safety standards. The Bidder shall list separately in the Proposal the cost of compliance with these standards on a lineal footage basis and the method of compliance. The Bidder shall determine if special shoring requirements are needed. Special shoring shall be identified and priced on a square footage basis in the Proposal. The Successful Bidder is fully responsible for cost of and the design of the trench safety system and the compliance with the applicable standards for the project.

7. STATE AND LOCAL SALES AND USE TAXES

Unless the Supplementary Conditions contains a statement that the CITY is exempt from state sales tax on materials incorporated into the work due to the qualification of the work under this Contract, the Contractor, as required by the laws and statutes of the state and its political subdivisions, shall pay all state and local sales and use taxes. Prices quoted in the Proposal shall include all nonexempt sales and use taxes, unless provision is made in the Proposal form to separately itemize the tax.

8. SUBMISSION OF BIDS

All BIDS must be submitted not later than the time prescribed, at the place, and in the manner set forth in the Invitation to Bid. BIDS must be made on the BID forms provided herewith, **submit two (2) originals and two (2) flash drives each one containing a single PDF file of the entire bid package,** must be submitted intact with the volume containing the Bidding Requirements, Contract Forms, Contract Specifications, and Conditions of the Contract.

Each BID must be submitted in a sealed envelope, so marked as to indicate the Bidder's name and its contents (project name and number) without being opened, and addressed in conformance with the instructions in the Invitation to Bid.

9. MODIFICATION OR WITHDRAWAL OF BIDS

Prior to the time and date designated for receipt of BIDS, any BID submitted may be withdrawn by notice to the party receiving BIDS at the place designated for receipt of BIDS. Such notice shall be in writing over the signature of the Bidder or by telegram. If by telegram, written confirmation over the signature of the Bidder shall be mailed and postmarked on or before the date and time set for receipt of BID. No BID may be withdrawn after the time scheduled for opening of BIDS, unless the time specified in paragraph AWARD OF CONTRACT of these Instructions to Bidders shall have elapsed.

10. BID SECURITY

BIDS must be accompanied by cash, a certified check, or cashier's check drawn on a bank in good standing, or a bid bond issued by a Surety authorized to issue such bonds in the state where the work is located, in the amount of five (5) percent of the total amount of the Proposal submitted. This bid security shall be given as a guarantee that the Bidder will not withdraw his BID for a period of sixty (60) days after bid opening, and that if awarded the Contract, the successful Bidder will execute the attached Contract and furnish properly executed Performance and Payment Bonds, each in the full amount of the Contract price within the time specified. Agent and Surety phone numbers must be provided.

The Attorney-in-Fact who executes this bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond. Where State Statute requires, certification by a resident agent shall also be provided.

If the Bidder elects to furnish a Bid Bond, he shall use the Bid Bond form bound herewith, or one conforming substantially thereto in form and content.

11. RETURN OF BID SECURITY

Within 15 days after the award of the Contract, the CITY will return the bid securities to all Bidders who's BIDS are not to be further considered in awarding the Contract. Retained bid securities will be held until the Contract has been finally executed, after which all bid securities, other than Bidders' bonds and any guarantees, which have been forfeited, will be returned to the respective Bidders whose Proposals they accompanied.

12. AWARD OF CONTRACT

Within sixty (60) calendar days after the opening of Proposals, the CITY will accept one of the Proposals or will act in accordance with the following paragraphs. The acceptance of the Proposal will be by written notice of award, mailed to the office designated in the Proposal, or delivered to the Bidder's representative. In the event of failure of the lowest responsive, responsible Bidder to sign the Contract and provide an acceptable Performance Bond, Payment Bond, insurance certificate(s) and evidence of holding required licenses and certificates, the Owner may award the Contract to the next lowest responsive, responsible Bidder. Such award, if made, will be made within seventy-five (75) days after the opening of Proposals.

The CITY reserves the right to accept or reject any or all Proposals, and to waive any informalities and irregularities in said Proposals.

13. BASIS OF AWARD

The award will be made by the Owner on the basis of that Proposal from the lowest responsive, responsible Bidder which, in the Owner's sole and absolute judgment will best serve the interest of the Owner.

If, at the time this Contract is to be awarded, the total of the lowest acceptable Proposal exceeds the funds then estimated by the Owner as available the Owner may reject all Proposals or take such other action as best serves the Owner's interests.

14. EXECUTION OF CONTRACT

The successful Bidder shall, within ten (10) working days after receiving Notice of Award, sign and deliver to the CITY a Contract and six copies in the form hereto attached, together with the insurance certificate examples of the bonds as required in the Contract Documents and evidence of holding required licenses and certificates. Within 10 working days after receiving the signed Contract from the successful Bidder, the City's authorized agent will sign the Contract. Signature by both parties constitutes execution of the Contract.

15. CONTRACT BONDS

A. PERFORMANCE AND PAYMENT BONDS

The successful Bidder shall file with the CITY, at the time of delivery of the signed Contract, a Performance Bond and Payment Bond on the form bound herewith, each in the full amount of the Contract price in accordance with the requirements of Florida Statutes Section 255.05 or 713.23, as applicable, as security for the faithful performance of the Contract and the payment of all persons supplying labor and materials for the construction of the work, and to cover all guarantees against defective workmanship or materials, or both, during the warranty period following the date of final acceptance of the work by the CITY. The Surety furnishing this bond shall have a sound financial standing and a record of service satisfactory to the CITY, shall be authorized to do business in the State of Florida, and shall be listed on the current U.S. Department of Treasury Circular Number 570, or amendments thereto in the Federal Register, of acceptable Sureties for federal projects.

B. POWER-OF-ATTORNEY

The Attorney-in-Fact (Resident Agent) who executes this Performance and Payment Bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond.
All Contracts, Performance and Payment Bonds, and respective powers-of-attorney will have the same date.

C. UNIT PRICES FOR BONDS

Because of the nature of this Contract the Contractor shall provide unit prices in the Proposal for providing the Performance and Payment Bonds. When a specific Work Order is authorized the unit price for providing the Performance and Payment Bonds will be considered in the total cost of that Work Order.

The Bidder shall provide unit prices for each bond item in the Proposal as all work performed within the 2-year Contract time could exceed $1,000,000.00 even though the

Bidder's total of extended unit price items in the Proposal may be less than $1,000,000.00.

The estimated work per year is $750,000.00 to $1,000,000.00, although this is not guaranteed, and may reach $1,500,000.00.

16. FAILURE TO EXECUTE CONTRACT AND FURNISH BOND

The Bidder who has a Contract awarded to him and who fails to promptly and properly execute the Contract or furnish the required Bonds shall forfeit the bid security that accompanied his bid, and the bid security shall be retained as liquidated damages by the CITY, and it is agreed that this said sum is a fair estimate of the amount of damages the CITY will sustain in case the Bidder fails to enter into a Contract or furnish the required Bonds. Bid security deposited in the form of cash, a certified check, or cashier's check shall be subject to the same requirement as a Bid Bond.

17. PERFORMANCE OF WORK BY CONTRACTOR

The Contractor shall perform on the site and with his own organization, labor equivalent to at least forty (40) percent of the total amount of the work to be performed under this Contract. If, during the progress of the work hereunder, the Contractor requests a reduction of such percentage, and the Engineer determines that it would be to the client's advantage, the percentage of the labor required to be performed by the Contractor's own organization may be reduced; PROVIDED prior written approval of such reduction is obtained by the contractor from the Engineer.

Each Bidder must furnish with his Proposal a list of the items that he will perform with his own forces and the estimated total cost of these items.

18. TIME OF COMPLETION

The time of completion of the work to be performed under this Contract is the essence of the Contract. Delays and extensions of time may be allowed in accordance with the provisions stated in the General Conditions. The time allowed for the completion of the work authorized by a WORK ORDER will be stated in that particular WORK ORDER.

When the Contractor receives a Notice to Proceed with the work authorized by each WORK ORDER he shall commence work as soon as possible and shall complete all work within the number of calendar days stipulated in that particular WORK ORDER.

Should the Contractor disagree with the time of completion for a specific WORK ORDER he shall, within five calendar days of the receipt of the WORK ORDER, make a written claim to the Engineer and Owner for an extension in the time of completion. If, in the opinion of the Engineer, the Contractor presents sufficient evidence to justify the claim an extension in the time of completion will be allowed for the period determined by the Engineer.

* * * * * *

NOTE TO BIDDER: Use preferably BLACK ink for completing this Proposal form.

PROPOSAL

To: The City of Key West

Address: 3126 Flagler Street, Key West, Florida 33041

Project Title: ASPHALT PAVING

Project No: ITB #13-001

Bidder's person to contact for additional information on this Proposal:

Name: _____

Telephone: _____

BIDDER'S DECLARATION AND UNDERSTANDING

The undersigned, hereinafter called the Bidder, declares that the only persons or parties interested in this Proposal are those named herein, that this Proposal is, in all respects, fair and without fraud, that it is made without collusion with any official of the Owner, and that the Proposal is made without any connection or collusion with any person submitting another Proposal on this Contract.

The Bidder further declares that he has carefully examined the Contract Documents for the construction of the project, that he has personally inspected the site, that he has satisfied himself as to the quantities involved, including materials and equipment, and conditions of work involved, including the fact that the description of the quantities of work and materials, as included herein, is brief and is intended only to indicate the general nature of the work and to identify the said quantities with the detailed requirements of the Contract Documents, and that this Proposal is made according to the provisions and under the terms of the Contract Documents, which Documents are hereby made a part of this Proposal.

The Bidder further agrees that he has exercised his own judgment regarding the interpretation of subsurface information and has utilized all data which he believes pertinent from the Engineer, Owner, and other sources in arriving at his conclusions.

The Bidder further agrees, as evidenced by signing the Proposal, that if awarded a Contract, the Florida Trench Safety Act and applicable trench safety standards will be complied with.

CONTRACT EXECUTION AND BONDS

The Bidder agrees that if this Proposal is accepted, he will, within 10 days, not including Sundays and legal holidays, after Notice of Award, sign the Contract in the form annexed hereto, and will at that time, deliver to the Owner examples of the Performance Bond and Payment Bond required herein, and evidence of holding required licenses and certificates, and will, to the extent of his Proposal, furnish all machinery, tools, apparatus, and other means of construction and do the work and furnish all the materials necessary to complete all work as specified or indicated in the Contract Documents.

CERTIFICATES OF INSURANCE

Bidder agrees to furnish the CITY, before commencing the work under this Contract, the certificates of insurance as specified in these Documents.

START OF CONSTRUCTION AND CONTRACT COMPLETION TIME

The Bidder further agrees to begin work within 10 calendar days after the date of the Notice to Proceed for a particular Work Order and to complete the construction, in all respects for that particular Work Order, within the number of calendar days set forth in that Work Order.

This Contract will automatically expire and be terminated 2 years after the date of the execution of the Contract by the Owner, unless the Owner and Contractor mutually agree to a 1-year time extension at no greater than a 5% increase in unit prices (based on current pricing) set forth in the Proposal. If the contract is extended, it will expire and be terminated 1- year after the date of the execution of the contract extension by the owner. Up to 3 extensions for as total contract time of 5 years may be executed based on the original bid prices.

LIQUIDATED DAMAGES

In the event the Bidder is awarded the Contract and fails to complete the work authorized by a Work Order within the time limit or extended time limit agreed upon in that Work Order, as more particularly set forth in the Contract Documents, liquidated damages shall be paid to the Owner at the rate of $1,000.00 per day for all work authorized under the Work Order until the work has been satisfactorily completed as provided by the Contract Documents. Sundays and legal holidays shall be included in determining days in default. Liquidated damages shall be assessed individually against each Work Order.

SALES AND USE TAXES

The Bidder agrees that all federal, state, and local sales and use taxes are included in the stated bid prices for the work.

UNIT PRICE ITEMS

The Bidder further proposes to accept as full payment for the work proposed herein the amounts computed under the provisions of the Contract Documents and based on the following unit price amounts, it being expressly understood that the unit prices are independent of the exact quantities involved. The Bidder agrees that the unit prices represent a true measure of the labor and materials required to perform the work, including all allowances for overhead and profit for each type and unit of work called for in these Contract Documents. The amounts shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.

UNIT PRICE BID

CITY OF KEY WEST

Performance and Payment Bonds

ITEM QUANT. UNIT	UNIT PRICE FIGURES	UNIT PRICE WORDS	TOTAL EXT.AMOUNT FIGURES

1.) For First $500,000 Worth of Construction Per / $1,000

1 each $ _____ _____ $_____

2.) For Construction Worth $500,000 to $2,000,000* Per / $1,000

1 each $ _____ _____ $_____

*Bidder shall provide a unit price for Performance and Payment Bonds for construction worth $500,000 to $2,000,000, even though his total of extended unit price items may be less than $500,000. For purposes of determining the low Bidder, the extended total amount shall be developed by multiplying the appropriate unit price(s) by the sum of extended total amounts for all other line items contained in this Proposal. Provide extended total amount for bonds in the $500,000 to $2,000,000 range only if the sum of extended totals exceeds $500,000. Multiply the excess above $500,000 by the appropriate unit price to obtain that line item extended total amount.

MOBILIZATION, DEMOBILIZATION AND M.O.T., WILL BE 10% OF EACH WORK ORDER
(WITH A MINIMUM OF $2,000.00 AND A MAXIMUM OF $20,000.00)

ITEM QUANT. UNIT	UNIT PRICE FIGURES	UNIT PRICE WORDS	TOTAL EXT.AMOUNT FIGURES

1. Stormwater Systems

(a) Seepage Trench
500 L.F.
$_____ _____ $_____

(b) Failed Trench Restoration (per drawing)
1000 L.F.
$_____ _____ $_____

(c) Silt Screen
500 L.F.
$_____ _____ $_____

(d) Swale Restoration (include all equipment, labor and material (washed Miami No. 57 rock)
4,500 S.Y.

$_____ _____ $_____

(e) Florida Trench Safety Act Compliance
2500 L.F.

$_____ _____ $_____

2. Asphalt Pavement

(a) Asphaltic Concrete Friction Course FC-9.5 (1.5" Thick - overlay) (Traffic Level C)
1000 Ton

$_____ _____ $_____

(b) Asphaltic Concrete Friction Course FC-9.5 (1.5" Thick) (Traffic Level C) (Rubber)
550 Ton

$_____ _____ $_____

(c) Asphaltic Concrete Leveling Course SP-12.5 (1.5" Thick) (Traffic Level C)
550 Ton

$_____ _____ $_____

(d) Asphaltic Concrete Friction Course FC-9.5 (1.5" Thick - overlay) (Traffic Level C) (400sf or less)
500 Ton

$_____ _____ $_____

(e) Asphalt Milling (up to 2")
9,000 S.Y.

$_____ _____ $_____

(f) Asphalt Milling (greater than 2")
5,000 S.Y.

$_____ _____ $_____

(g) Asphalt Milling (400sf or less) (any thickness)
4,400 S.Y.

$_____ _____ $_____

(h) Asphalt Removal and Disposal
7,900 S.Y.

$_____ _____ $_____

(i) Rework Existing Base (up to 10")
4,000 S.Y.

$_____ _____ $_____

(j) 12" Limerock Stabilized Base (Per FDOT spec section 230, 98% modified proctor)
3,000 S.Y.
$_____ _____ $_____

(k) Biaxial Geogrid Type 2 (Tensar BX1200)(install per manufacturer's specification)
2,000 S.Y.
$_____ _____ $_____

(l) Micro-Surfacing Rut-Fill (ruts greater than ½" – 6' spreader box)(ISSA A-143 spec, Type III)
50 TON
$_____ _____ $_____

(m) Micro-Surfacing – Single Lift (includes crack and joint sealing) (Type II)
5,000 S.Y.
$_____ _____ $_____

(n) Micro-Surfacing – Double Lift (includes crack and joint sealing) (Type II)
5,000 S.Y.
$_____ _____ $_____

(0) Bituminous Crack and Joint Sealing
5,000 LF
$_____ _____ $_____

(p) Cape Seal (crack seal+chip seal+micro-surfacing)(#89 aggregate / WA 10 washed screenings)
1000 S.Y.
$_____ _____ $_____

3. Sod (w/ screenings and watering)

4,000 SF
$_____ _____ $_____

4. FDOT Signage

(a) Single post sign (includes existing sign/post removal, 3.5"dia. alum. post, sign, brackets, concrete footer and installation)
20 Each.
$_____ _____ $_____

(b) Single sign post (includes post removal, 3.5"dia. alum. post, brackets, concrete footer and installation) (re-use existing sign)
20 Each.
$_____ _____ $_____

5. Pavement Striping (70 Mils Thermoplastic)

(a) 6" Striping (yellow / white / blue)
4,000 LF
$_____ _____ $_____

(b) 12" Striping (white / yellow)
500 LF
$_____ _____ $_____

(c) 18" Striping (white / yellow)
500 LF
$_____ _____ $_____

(d) 24" Striping (white)
250 L.F.
$_____ _____ $_____

(e) Handicap Parking Space (including symbol)
15 Each.
$_____ _____ $_____

(f) Stop Bars (24"x10')
80 Each.
$_____ _____ $_____

(g) Pavement Message (Per word)
25 Each.
$_____ _____ $_____

(h) Directional Markings
10 Each.
$_____ _____ $_____

(i) Reflective Pavement Markers (RPM's)
200 Each
$_____ _____ $_____

(j) Flexible Delineator (surface mount, 48"x3" FDOT approved, white or yellow)
50 Each
$_____ _____ $_____

(k) Flexible Delineator (ground mount w/ 24" anchor, 48"x3" FDOT approved, white or yellow)
30 Each
$_____ _____ $_____

(l) Reinstall Existing Surface Mounted Delineator (includes removal/reinstallation per manufacturer's specification)
50 Each

$_____ _____ $_____

(m) Reinstall Existing Surface Mounted Bike Rack
5 Each

$_____ _____ $_____

(n) Reflective Curb Paint (FDOT Approved)
3000 LF

$_____ _____ $_____

7. Utility Appurtenances Extensions

(a) Raise / Lower Manholes
10 Each

$_____ _____ $_____

(b) Raise / Lower Water Valves
10 Each

$_____ _____ $_____

(c) Raise / Lower Stormwater inlet grate
10 Each

$_____ _____ $_____

(d) Replace existing stormwater inlet grate w/ ADA compliant inlet grate (including frame)
10 Each

$_____ _____ $_____

SUM OF EXTENDED TOTALS

_____ $_____

ADD / ALTERNATE

(a) Sur-charge for Night time work (Min.20 trucks (400tons))
Percentage (%) of work completed

_____ %_____

*Note: If Contractor chooses to perform night time work for his/her own convenience, this Sur-charge will **NOT** apply.*

_____

Name of Firm Submitting Bid

_____

Signature of Bidder

_____

Title

SUBCONTRACTORS

The Bidder further proposes that the following subcontracting firms or businesses will be awarded subcontracts for the following portions of the work in the event that the Bidder is awarded the Contract:

_____, _____, $_____
Name Type Work Value

_____, _____, _____, _____
Street City State Zip Code

_____, _____, $_____
Name Type Work Value

_____, _____, _____, _____
Street City State Zip Code

_____, _____, $_____
Name Type Work Value

_____, _____, _____, _____
Street City State Zip Code

BIDDER

The name of the Bidder submitting this Proposal is_____
_____, doing business at

_____
Street City State Zip Code

which is the address to which all communications concerned with this Proposal and with the Contract shall be sent.

The names of the principal officers of the corporation submitting this Proposal, or of the partnership, or of all persons interested in this Proposal as principals are as follows:

_____ _____

_____ _____

If Sole Proprietor or Partnership

IN WITNESS hereto the undersigned has set his (its) hand this _____day of _____, _____.

_____
Signature of Bidder

_____
Title

If Corporation

IN WITNESS WHEREOF the undersigned corporation has caused this instrument to be executed and its seal affixed by its duly authorized officers this _____ day of _____, 20__.

(SEAL)

_____
Name of Corporation

By_____

Title_____

Attest_____
Secretary

Information Required of Bidder

GENERAL INFORMATION

The Bidder shall furnish the following information. Failure to comply with this requirement may render the Proposal nonresponsive and may cause its rejection. Additional sheets shall be attached as required.

1. Contractor's Telephone Number:__
2. Contractor's License:_____

   Primary Classification:_____
   Florida State License No.:_____

   Supplementary classifications held, if any:_____

   _____
3. Number of years as a contractor in construction work of this type:_____
4. Names of persons who inspected site of proposed work for your firm:

   Name:_____
   Dates of Inspection:_____
   Name:_____
   Dates of Inspection:_____

5. ATTACH TO THIS BID the experience resume of the person who will be designated chief construction superintendent.

6. ATTACH TO THIS BID references and other information sufficiently comprehensive to permit an appraisal of contractor's current financial condition.

A. ATTACH TO THIS BID Contractor's organizational structure, including manpower, to complete the project within the specified limits.

7. ATTACH TO THIS BID Contractor's list of equipment intended for use to complete the project within the specified limits.

9. ATTACH TO THIS BID a list of all construction contracts completed by the Contractor during the last five (5) years involving work of similar type and comparable value. This list shall include the following information as a minimum:

   Name, address, and telephone number of Owner

   Name of project

   Location of project

Brief description of the work involved

Contract amount

Date of completion of contract

Name, address, and telephone number of architect or engineer

Name of the Owner’s Construction Manager

EQUAL BENEFITS FOR DOMESTIC PARTNERS AFFIDAVIT

STATE OF FLORIDA)
: SS
COUNTY OF _____)

I, the undersigned hereby duly sworn, depose and say that the firm of _____ provides benefits to domestic partners of its employees on the same basis as it provides benefits to employees' spouses per City of Key West Ordinance Sec. 2-799.

By: _____

Sworn and subscribed before me this

_____ day of _____, 20___.

_____
NOTARY PUBLIC, State of Florida at Large

My Commission Expires: _____

FLORIDA BID BOND

BOND NO. _____

AMOUNT: $_____

KNOW ALL MEN BY THESE PRESENTS, that _____

_____

hereinafter called the PRINCIPAL, and _____

_____

a corporation duly organized under the laws of the State of _____

having its principal place of business at _____

_____ in the State of _____, and

authorized to do business in the State of Florida, as SURETY, are held and firmly bound unto _____

_____

hereinafter called the OBLIGEE, in the sum of_____

DOLLARS ($_____) for the payment for which we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these present.

THE CONDITION OF THIS BOND IS SUCH THAT:

WHEREAS, the PRINCIPAL is herewith submitting his or its Bid Proposal for GRAVITY INJECTION WELLS PHASE IV, said Bid Proposal, by reference thereto, being hereby made a part hereof.

WHEREAS, the PRINCIPAL contemplates submitting or has submitted a bid to the OBLIGEE for the furnishing of all labor, materials (except those to be specifically furnished by the CITY), equipment, machinery, tools, apparatus, means of transportation for, and the performance of the work covered in the Proposal and the detailed Drawings and Specifications, entitled:

WHEREAS, it was a condition precedent to the submission of said bid that a cashier's check, certified check, or bid bond in the amount of 5 percent of the base bid be submitted with said bid as a guarantee that the Bidder would, if awarded the Contract, enter into a written Contract with the CITY for the performance of said Contract, within 10 working days after written notice having been given of the award of the Contract.

NOW, THEREFORE, the conditions of this obligation are such that if the PRINCIPAL within 10 consecutive calendar days after written notice of such acceptance, enters into a written Contract with the OBLIGEE and furnishes the Performance and Payment Bonds, each in an amount equal to 100 percent of the base bid, satisfactory to the CITY, then this obligation shall be void; otherwise the sum herein stated shall be due and payable to the OBLIGEE and the Surety herein agrees to pay said sum immediately upon demand of the OBLIGEE in good and lawful money of the United States of America, as liquidated damages for failure thereof of said PRINCIPAL.

Signed and sealed this _____ day of _____, 20___.

_____
PRINCIPAL

By_____

_____
SURETY

By _____
Attorney-In-Fact

STATE OF FLORIDA)
: SS
COUNTY OF MONROE)

I, the undersigned hereby duly sworn, depose and say that no portion of the sum herein bid will be paid to any employees of the City of Key West as a commission, kickback, reward or gift, directly or indirectly by me or any member of my firm or by an officer of the corporation.

By: _____

Sworn and subscribed before me this _____day of _____, 20___.

NOTARY PUBLIC, State of Florida at Large

My Commission Expires:

* * * * * *

ANTI – KICKBACK AFFIDAVIT

STATE OF FLORIDA)
: SS
COUNTY OF MONROE)

I, the undersigned hereby duly sworn, depose and say that no portion of the sum herein bid will be paid to any employees of the City of Key West as a commission, kickback, reward or gift, directly or indirectly by me or any member of my firm or by an officer of the corporation.

By: _____

Sworn and subscribed before me this _____day of _____, 20___.

NOTARY PUBLIC, State of Florida at Large

My Commission Expires:

* * * * * *

FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted with Bid or Proposal for Fort street parking lot

2. This sworn statement is submitted by _____
(name of entity submitting sworn statement)

whose business address is _____

_____ and (if applicable) its Federal

Employer Identification Number (FEIN) is _____

(If the entity has no FEIN, include the Social Security Number of the individual signing this

sworn statement _____

3. My name is _____
(Please print name of individual signing)

and my relationship to the entity named above is _____

4. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including but not limited to, any bid or contract for goods or services to be provided to any public or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, material misrepresentation.

5. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication guilt, in any federal or state trial court of record relating to charges brought by indictment information after July 1, 1989, as a result of a jury verdict, non-jury trial, or entry of a plea of guilty or nolo-contendere.

6. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means:

    a. A predecessor or successor of a person convicted of a public entity crime; or

b. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

7. I understand that a "person" as defined in Paragraph 287.133(1)(8), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

8. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. (Please indicate which statement applies).

____Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND (Please indicate which additional statement applies.)

_____There has been a proceeding concerning the conviction before a hearing of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. (Please attach a copy of the final order.)

_____The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. (Please attach a copy of the final order.)

_____The person or affiliate has not been put on the convicted vendor list. (Please describe any action taken by or pending with the Department of General Services.)

_____
(signature)

_____
(date)

STATE OF_____

COUNTY OF_____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____who, after first being sworn by me, affixed his/her
(name of individual signing)

signature in the space provided above on this_____ day of_____ , 20___.

My commission expires:

_____
NOTARY PUBLIC

CITY OF KEY WEST INDEMNIFICATION FORM

The Contractor shall indemnify and hold harmless the City of Key West, its officers, and employees, from liabilities, damages, losses and costs, including, but not limited to reasonable attorney's fees, to the extent caused by the negligence, recklessness or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of this agreement. Except as specifically provided herein, this agreement does not require Contractor to indemnify the City of Key West, its employees, officers, directors, or agents from any liability, damage, loss, claim, action or proceeding.

These indemnifications shall survive the term of this agreement. In the event that any action or proceeding is brought against the City of Key West by reason of such claim or demand, Contractor shall, upon written notice from the City of Key West, resist and defend such action or proceeding by counsel satisfactory to the City of Key West.

The indemnification provided above shall obligate Contractor to defend at its own expense to and through appellate, supplemental or bankruptcy proceeding, or to provide for such defense, at the City of Key West's option, any and all claims of liability and all suits and actions of every name and description covered above which may be brought against the City of Key West whether performed by Contractor, or persons employed or utilized by Contractor.

The Contractor's obligation under this provision shall not be limited in any way by the agreed upon Contract Price as shown in this agreement, or the Contractor's limit of or lack of sufficient insurance protection.

CONTRACTOR: _____ SEAL:

_____
Address

_____
Signature

_____
Print Name

_____
Title

DATE: _____

CITY OF KEY WEST BUSINESS LICENSE TAX RECEIPT

1. A City of Key West Business License Tax Receipt is required for this Project. Contractor must be general contractor or building contractor or engineering contractor.

2. A City of Key West Business License Tax Receipt also is required as for sub-contracting landscaping contractor, engineering services, and professional surveying.

3. A Business License Tax Application can be found on the City's web site.

4. Cost not to exceed $350.00

http://www.keywestcity.com/egov/docs/1162843921181.htm

Business License Tax Application

City of Key West
City Hall Annex
PO Box 1409
Key West, FL 33041

Date Applied _____

License # _____

Phone 305-809-3955
Fax 305-809-3978

Business Type: _____

Business Name: _____

Business Location: _____

Business Owner: _____

State Licensed Qualifier (if applicable): _____

Mailing Address: _____

EIN / SS # _____ Phone # _____

_____ _____ _____
Applicant name (printed) Applicant signature Date

State of Florida
County of Monroe
The foregoing instrument was acknowledged before me this _____ day of _____, 20___, by _____.

_____ (stamp or seal). Personally known ____
Signature of Notary Public Produced id _____.

____ Sales Tax number 3106 Flagler Ave 292-6735 City utility acct _____
____ Commercial garbage Waste Mgmt 296-8297 _____
____ Lease or deed
____ State License DBPR 850-487-1395 / Dept Ag 305-470-6900
____ Home occupation application
____ Fictitious Name registration Previous use _____
____ Corporate or LLC registration
____ Liability / Worker's Comp Zoning _____
____ Fire Inspector 292-8179
____ CO / final inspection on any permits Category _____ Fee $_____
____ Monroe County or local licensing

Licensed in accordance with Chapter 66, Key West Code of Ordinances

_____ Approved _____ Denied / Reason _____

_____ _____
Licensing Official Date

Licensing Division

P.O. Box 1409, Key West, FL 33041
305.809.3955 305.809.3978 (FAX)

REQUIREMENTS FOR STATE CERTIFIED CONTRACTOR REGISTERING TO WORK IN KEY WEST LESS THAN 30 DAYS PER FISCAL YEAR

1. NEED STATE OF FLORIDA CERTIFIED CONTRACTOR LICENSE.

2. BUSINESS LICENSE TAX RECEIPT FROM BASE LOCATION.

3. LIABILITY INSURANCE AND WORKER'S COMPENSATION (WITH THE CITY OF KEY WEST CERTIFICATE HOLDERS) SET AT STATE STUTUTE REQUIREMENTS.

4. FEDERAL I.D. NUMBER /SOCIAL SERCURITY (IF NOT INCORPORATED).

5. LETTER OF INTENT STATING THE FOLLOWING:

BUSINESS NAME

JOB SITE

DAYS INTENDING ON WORKING IN THE CITY

PLEASE FAX DOCUMENTS TO THE TELEPHONE NUMBER LISTED BELOW, OR MAIL TO CAROLYN WALKER / KIM PITA, CITY OF KEY WEST LICENSE DIVISION, P.O. BOX 1409, KEY WEST, FLORIDA 33041.

BIDDER'S CHECKLIST

(Note: The purpose of this checklist is to serve as a reminder of major items to be addressed in submitting a bid and is not intended to be all inclusive. It does not alleviate the Bidder from the responsibility of becoming familiar with all aspects of the Contract Documents and proper completion and submission of his bid.)

1.	All Contract Documents thoroughly read and understood.	[ ]
2.	All blank spaces in BID filled in, using black ink.	[ ]
3.	Total and unit prices added correctly.	[ ]
4.	All issued Addenda acknowledged.	[ ]
5.	Subcontractors are named as indicated in the BID.	[ ]
6.	Experience record included.	[ ]
7.	BID signed by authorized officer.	[ ]
8.	Bid Bond completed and executed, including power-of-attorney dated the same date as Bid Bond.	[ ]
9.	Bidder familiar with federal, state, and local laws, ordinances, rules and regulations affecting performance of the work.	[ ]
10.	Bidder, if successful, able to obtain and/or demonstrate possession of required licenses and certificates within (10) ten calendar days after receiving a Notice of Award.	[ ]
11.	BID submitted intact with the Bidding Requirements, as stated in the invitation to bid.	[ ]
12.	Bid Documents submitted in sealed envelope and addressed and labeled in conformance with the instructions in the Invitation to Bid.	[ ]
13.	Bidder must provide satisfactory documentation of State Licenses.	[ ]

FLORIDA TRENCH SAFETY ACT COMPLIANCE

Trench Excavation Safety System and Shoring

CERTIFICATION

All excavation, trenching, and related sheeting, bracing, etc. on this project shall conform to the requirements of the Florida Trench Safety Act (90-96, CS/SB 2626), which incorporates by reference, OSHA's excavation safety standards, 29 CFR 1926.650 Subpart P including all subsequent revisions or updates to the these standards.

By submission of this bid and subsequent execution of this Contract, the undersigned certifies compliance with the above mentioned standards and further stipulates that all costs associated with this compliance are detailed below as well as included in their lump sum bid amount.

Summary of Costs:

Trench Safety Measure	Units	Quantity	Unit Cost	Extended Cost
A._____	_____	_____	_____	_____
B._____	_____	_____	_____	_____

_____
Signature

_____
Date

STATE OF _____

COUNTY OF _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____, who, after first being sworn by me affixed his /her signature in the space,

provided above on the _____ day of _____, 20___.

_____
Notary Public (Seal)

My Commission expires:_____

SUSPENSION AND DEBARMENT CERTIFICATION

CERTIFICATION REGARDING DEBARMENTS, SUSPENSION, INELIGIBILITY
AND VOLUNTARY EXCLUSION-LOWER TIER FEDERALLY FUNDED TRANSACTIONS

1. The undersigned hereby certifies that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. The undersigned also certifies that it and its principals:
(a) Have not within a three-year period preceding this certification been convicted of or had a civil judgment rendered
against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
(b) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 2.(a) of this Certification; and
(c) Have not within a three-year period preceding this certification had one or more public transactions (Federal, State or local) terminated for cause or default.

3. Where the undersigned is unable to certify to any of the statements in this certification, an explanation shall be attached to this certification.

Dated this day of, 20 .

By_____
Authorized Signature/Contractor

_____
Typed Name/Title

_____
Contractor's Firm Name

_____
Street Address

_____
Building, Suite Number

_____
City/State/Zip Code

_____
Area Code/Telephone Number

PART 2

CONTRACT FORMS

CONTRACT

This Contract, made and entered into this _____ day of _____ 2012,

by and between the City of Key West, hereinafter called the "Owner", and_____

_____

hereinafter called the "Contractor";

WITNESSETH:

The Contractor, in consideration of the sum to be paid him by the Owner and of the covenants and agreements herein contained, hereby agrees at his own proper cost and expense to do all the work and furnish all the materials, tools, labor, and all appliances, machinery, and appurtenances for ASPHALT PAVING, Key West, Florida to the extent of the Proposal made by the Contractor, dated the day of_____ 2012, all in full compliance with the Contract Documents referred to herein.

The CONTRACT DOCUMENTS, including the signed copy of the BID DOCUMENTS, the CONTRACT FORMS, CONTRACT SPECIFICATIONS DIVISION I, PERFORMANCE and PAYMENT BONDS.

In consideration of the performance of the work as set forth in these Contract Documents, the Owner agrees to pay to the Contractor the amount bid in the Proposal as adjusted in accordance with the Contract Documents, or as otherwise herein provided, and to make such payments in the manner and at the times provided in the Contract Documents.

The Contractor agrees to complete the work within the time specified in the Contract and to accept as full payment hereunder the amounts computed as determined by the Contract Documents and based on the said BID.

The Contractor agrees to remedy all defects appearing in the work or developing in the materials furnished and the workmanship performed under this Contract during the warranty period after the date of final acceptance of the work by the Owner, and further agrees to indemnify and save the Owner harmless from any costs encountered in remedying such defects.

It is agreed that the Contract, based upon the BID, shall be fully complete within the stated number of consecutive calendar days from the date the Notice to Proceed is issued with each Work Order.

In the event the Bidder is awarded the Contract and fails to complete the work authorized by a Work Order within the time limit or extended time limit agreed upon in that Work Order, as more particularly set forth in the Contract Documents, liquidated damages shall be paid to the Owner at the rate of $300 per day for all work authorized under the Work Order until the work has been satisfactorily completed as provided by the Contract Documents. Sundays and legal holidays shall be included in determining days in default. Liquidated damages shall be assessed individually against each Work Order.

This Contract will automatically expire and be terminated 2 years after the date of the execution of the Contract by the Owner, unless the Owner and Contractor mutually agree to a 1-year time extension at no greater than a 5% increase in unit prices (based on current pricing) set forth in the Proposal. If the contract is extended, it will expire and be terminated 1- year after the date of the execution of the contract extension by the owner. Up to 3 extensions for as total contract time of 5 years may be executed based on the original bid prices.

IN WITNESS WHEREOF, we, the parties hereto, each herewith subscribe the same this

_____ day of _____, A.D., 2012.

CITY OF KEY WEST

By_____

Title_____

CONTRACTOR

By_____

Title_____

APPROVED AS TO FORM

_____

Attorney for Owner

* * * *

FLORDIA PERFORMANCE BOND

BOND NO.
AMOUNT: $

KNOW ALL MEN BY THESE PRESENTS, that in accordance with Florida Statutes Section 255.05, _____
with offices at _____
hereinafter called the CONTRACTOR (Principal), and

_____
with offices at _____
a corporation duly organized and existing under and by virtue of the laws of the State of Florida, hereinafter called the SURETY, and authorized to transact business within the State of Florida, as SURETY, are held and firmly bound unto **CITY OF KEY WEST,** represented by its _____, hereinafter called the CITY (Obligee), in the sum of:

_____DOLLARS ($_____), lawful money of the United States of America, for the payment of which, well and truly be made to the CITY, the CONTRACTOR and the SURETY bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the CONTRACTOR has executed and entered into a certain Contract hereto attached, with the CITY, dated _____, 20___, to furnish at his own cost, charges, and expense all the necessary materials, equipment, and/or labor in strict and express accordance with said Contract and the Contract Documents as defined therein, all of which is made a part of said Contract by certain terms and conditions in said Contract more particularly mentioned, which Contract, consisting of the various Contract Documents is made a part of this Bond as fully and completely as if said Contract Documents were set forth herein;

NOW THEREFORE, the conditions of this obligation are such that if the above bounden CONTRACTOR:

1. Shall in all respects comply with the terms and conditions of said Contract and his obligation there under, including the Contract Documents (which include the plans, drawings, specifications, and conditions as prepared by the CITY, invitation to bid, instructions to bidders, the CONTRACTOR'S bid as accepted by the above CITY, the bid and contract performance and payment bonds, and all addenda, if any, issued prior to the opening of bids), being made a part of this bond by reference, at the times and in the manner prescribed in the contract; and

2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying PRINCIPAL with labor, materials, or supplies, used directly or indirectly by PRINCIPAL in the prosecution of the work provided for in the contract; and

3. Pays CITY all losses, costs, expenses, damages, attorney's fees, including appellate proceedings, injury or loss of whatever kind and however arising including, without limitation, delay damages to which said CITY may be subject by reason of any wrongdoing, misconduct, want of care or skill, negligence, failure of performance, breach, failure to petition within the prescribed time, or default, including patent infringements, on the part of said CONTRACTOR, his agents or employees, in the execution or performance of said Contract; and

4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this obligation shall be void; otherwise, to remain in full force and effect for the term of said Contract.

AND, the said Surety for value received, hereby stipulates and agrees that no change involving any extension of time, or addition to the terms of the Contract Documents, or to the work to be performed, or materials to be furnished there under shall affect said obligation of said Surety on this Bond, and the said Surety does hereby waive notice of any such changes, extension of time, alterations, or additions of the terms of the Contract Documents, or to the work.

Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes.

IN WITNESS WHEREOF, the above parties bonded together have executed this instrument this day of _____, 20___, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR

By: _____

(SEAL)

ATTEST

SURETY

By: _____

(SEAL)

ATTEST

FLORIDA PAYMENT BOND

BOND NO.
AMOUNT: $

KNOW ALL MEN BY THESE PRESENTS, that in accordance with Florida Statutes Section 255.05, _____
with offices at _____
hereinafter called the CONTRACTOR, (Principal), and
_____
with offices at _____
a corporation duly organized and existing under and by virtue of the laws of the State of _____ , hereinafter called the SURETY, and authorized to transact business within the State of Florida, as SURETY, are held and firmly bound CITY OF KEY WEST**,** represented by its _____, hereinafter called the City (Obligee), in the sum of: _____DOLLARS ($_____), lawful money of the United States of America, for the payment of which, well and truly be made to the CITY, and the CONTRACTOR and the SURETY bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the CONTRACTOR has executed and entered into a certain Contract for _____ attached hereto, with the CITY, dated _____, 20_____, to furnish at his own cost, charges, and expense the necessary materials, equipment, and/or labor in strict and express accordance with said Contract and the plans, drawings (if any), and specifications prepared by the CITY, all of which is made a part of said Contract by certain terms and conditions in said Contract more particularly mentioned, which Contract, consisting of the various Contract Documents specifically mentioned herein and relative hereto, is made a part of this Bond as fully and completely as if said Contract Documents were set forth herein.

NOW THEREFORE, the conditions of this obligation are such that if the above bounden CONTRACTOR shall in all respects comply with the terms and conditions of said Contract and his obligation thereunder, including the Contract Documents (which include the plans, drawings, specifications, and conditions prepared by the CITY, invitation to bid, instructions to bidders, the CONTRACTOR'S bid as accepted by the CITY, the bid and contract and payment bonds, and all addenda, if any, issued prior to the opening of bids), and further that if said CONTRACTOR shall promptly make payments to all persons supplying materials, equipment, and/or labor, used directly or indirectly by said CONTRACTOR or subcontractors in the prosecution of the work for said contract is accordance with Florida Statutes, Section 255.05 or Section 713.23, then this obligation shall be void; otherwise to remain in full force and effect for the term of said contract, including and all guarantee periods as specifically mentioned in said Contract Documents.

AND, the said SURETY for value received, hereby stipulates and agrees that no change involving any extension of time, or addition to the terms of the Contract or to the work to be performed, or materials to be furnished thereunder, or in the Contract Documents and specifications accompanying

the said contract shall affect said obligation of said SURETY on this Bond, and the said SURETY does hereby waive notice of any such changes, extension of time, alternations, or additions of the terms of the Contract, or to the work, to the Contract Documents, or to the specifications.

Claimant shall give written notice to the CONTRACTOR and the SURETY as required by Section 255.05 or Section 713.23, Florida Statutes. Any action instituted against the CONTRACTOR or SURETY under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2) or Section 713.23, Florida Statutes.

IN WITNESS WHEREOF, the above parties bounded together have executed this instrument this day of _____, 20_____, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR

By:_____

(SEAL)

ATTEST

SURETY

By:_____

(SEAL)

ATTEST

PART 3

CONDITIONS OF THE CONTRACT

GENERAL CONDITIONS

Whenever in the Contract Documents the following terms are used, the intent and meaning shall be interpreted as follows:

1. AS APPROVED

The words "as approved", unless otherwise qualified, shall be understood to be followed by the words "by the Engineer for conformance with the Contract Document".

2. AS SHOWN, AND AS INDICATED

The words "as shown" and "as Indicated" shall be understood to be followed by the words "on the Drawings".

3. BIDDER

The person or persons, partnership, firm, or corporation submitting a Proposal for the work contemplated.

4. CONTRACT DOCUMENTS

The "Contract Documents" consist of the Bidding Requirements, Contract Forms, Conditions of the Contact, Specifications, Drawings, all modifications thereof incorporated into the Documents before their execution, Change Orders, and all other requirements incorporated by specific reference thereto. These form the Contract.

5. CONTRACTOR

The person or persons, partnership, firm, or corporation who enters into the Contract awarded him by the Owner.

6. CONTRACT COMPLETION

The "Contract Completion" is the date the Owner accepts the entire work as being in compliance with the Contract Documents, or formally waives nonconforming work to extent of nonconformity, and issues the final payment in accordance with the requirements set forth in Article, "Final Payment" of these General Conditions.

7. DAYS

Unless otherwise specifically stated, the term "days" will be understood to mean calendar days. Business day or working day means any day other than Saturday, Sunday, or legal holiday.

8. DRAWINGS

The term "Drawings" refers to the official Drawings, profiles, cross sections, elevations, details, and other working drawings and supplementary drawings, or reproductions thereof, signed by the Engineer, which shows the location, character, dimensions, and details of the work to be performed. Drawings may either be bound in the same book as the balance of the Contract Documents, or bound in separate sets, and are a part of the Contract Documents, regardless of the method of binding.

9. CONSTRUCTION ENGINEER

The person or organization identified as such in the Contract Documents. The Term "Engineer" means Construction Engineer or his authorized representative. This person or organization should be responsible for directing, inspecting, rejecting and approving all construction activities, equipment and materials in order to comply with the plans and specifications prepared by the Engineer of Record.

10. ENGINEER OF RECORD

The Professional Engineer or Engineering Firm registered in the State of Florida that develops the criteria and concept for the project, performs the analysis, and is responsible for the preparation of the Plans and Specifications.

11. NOTICE

The term "notice" or the requirement to notify, as used in the Contract Documents or applicable state or federal statutes, shall signify a written communication delivered in person or by registered mail to the individual, or to a member of the firm, or to an officer of the corporation for whom it is intended. Certified or registered mail shall be addressed to the last business address known to him who gives the notice.

12. OR EQUAL

The term "or equal" shall be understood to indicate that the "equal" product is equivalent to or better than the product named in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the project design requirements will be made by the Engineer. Such equal products shall not be purchased or installed by the Contractor without written authorization.

13. OWNER

The person, organization, or public body identified as such in the Contract Documents.

14. PLANS (See Drawings)

15. SPECIFICATIONS

The term "Specifications" refers to those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the work and certain administrative details applicable thereto. Where standard specifications, such as those of FDOT, ASTM, AASHTO, etc., have been referred to, the applicable portions of such standard specifications shall become a part of these Contract Documents. If referenced specifications conflict with specifications contained herein, the requirements contained herein shall prevail.

16. NOTICE TO PROCEED

A written notice given by the Owner to the Contractor (with a copy to the Engineer and the Engineer of Record) fixing the date on which the Contract time will commence to run and on which the Contractor shall start to perform his obligation under the Contract Documents. The Notice to Proceed will be given within 30 days following the execution of the Contract by the Owner.

17. SUBSTANTIAL COMPLETION

"Substantial Completion" shall be that degree of completion of the project or a defined portion of the project, as evidenced by the Engineer's written notice of Substantial Completion, sufficient to provide the Owner, at his discretion, the full-time use of the project or defined portion of the project for the purposes for which it was intended. "Substantial Completion" of an operating facility shall be that degree of completion that has provided a minimum of 7 continuous days of successful, trouble-free, operation, which period shall begin after all performance and acceptance testing has been successfully demonstrated to the Engineer. All equipment contained in the work, plus all other components necessary to enable the Owner to operate the facility in a manner that was intended, shall be complete on the substantial completion date.

18. WORK

The word "work" within these Contract Documents shall include all material, labor, tools, and all appliances, machinery, transportation, and appurtenances necessary to perform and complete the Contract, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure. As used herein, "provide" shall be understood to mean "furnish and install, complete in-place ".

CONTRACT DOCUMENTS

19. INTENT OF CONTRACT DOCUMENTS

The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intent of the Documents is to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any work, materials, or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe work, materials, or equipment, such words shall be interpreted in accordance with that meaning.

Reference to standard specifications, manuals, or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or laws or regulations in effect on the first published date of the Invitation to Bid, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of Owner, Contractor, Engineer of Record, or Engineer, or any of their consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Engineer, or any Engineer's consultants, Engineer of Record, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the provisions of Article LIMITATIONS ON ENGINEER'S RESPONSIBILITIES.

20. DISCREPANCIES AND OMISSIONS

Any discrepancies or omissions found in the Contract Documents shall be reported to the Engineer immediately. The Engineer will consult with the Engineer of Record and will clarify discrepancies or omissions, in writing, within a reasonable time.

In resolving inconsistencies among two or more sections of the Contract Documents, precedence shall be given in the following order:

A. CONTRACT
B. PROPOSAL
C. SUPPLEMENTARY CONDITIONS
D. INVITATION TO BID
E. INSTRUCTIONS TO BIDDERS
F. GENERAL CONDITIONS
G. SPECIFICATIONS
H. DRAWINGS

Addenda shall take precedence over all sections referenced therein. Figure dimensions on Drawings shall take precedence over scale dimensions. Detailed Drawings shall take precedence over general Drawings.

21. CHANGES IN THE WORK

The Owner, without notice to the Sureties and without invalidating the Contract, may order changes in the work within the general scope of the Contract by altering, adding to, or deducting from the work, the Contract being adjusted

accordingly. All such work shall be executed under the conditions of the original Contract, except as specifically adjusted at the time of ordering such change.

In giving instructions, the Engineer and/or Engineer of Record may order minor changes in the work not involving extra cost and not inconsistent with the purposes of the project, but otherwise, except in an emergency endangering life and property, additions or deductions from the work shall be performed only in pursuance of an approved Change Order from the Owner, countersigned by the Engineer and/ or Engineer of Record.

If the work is reduced by alterations, such action shall not constitute a claim for damages based on loss of anticipated profits.

22. EXAMINATION AND VERIFICATION OF CONTRACT DOCUMENTS

The Contractor shall thoroughly examine and become familiar with all of the various parts of these Contract Documents and determine the nature and location of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract. Failure to make an examination necessary for this determination shall not release the Contractor from the obligations of this Contract. No verbal agreement or conversation with any officer, agent, or employee of the Owner, Engineer of Record or with the Engineer either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

23. DOCUMENTS TO BE KEPT ON THE JOBSITE

The Contractor shall keep one copy of the Contract Documents on the job site, in good order, available to the Engineer and to his representatives.

The Contractor shall maintain on a daily basis at the jobsite, and make available to the Engineer on request, one current record set of the Drawings which have been accurately marked to indicate all modifications in the completed work that differ from the design information shown on the Drawings. Upon Substantial completion of the work, the Contractor shall give the Engineer one complete set of these marked up drawings and a signed and sealed set of As-Built drawings.

24. ADDITIONAL CONTRACT DOCUMENTS

Copies of Contract Documents or Drawings may be obtained on request from the Engineer of Record and by paying the actual cost of reproducing the Contract Documents or Drawings.

25. OWNERSHIP OF CONTRACT DOCUMENTS

All portions of the Contract Documents, and copies thereof furnished by the Engineer and/ or the Engineer of Record are instruments of service for this project. They are not to be used on other work and are to be returned to the Engineer and/ or Engineer of Record on request at the completion of the work. Any reuse of these materials without specific written verification or adaptation by the Engineer and or the Engineer of Record, will be at the risk of the user and without liability or legal expense to the Engineer and or Engineer of Record. Such user shall hold the Engineer and or the Engineer of Record harmless from any and all damages, including reasonable attorneys' fees, from any and all claims arising from any such reuse. Any such verification and adaptation shall entitle the Engineer and or the Engineer of Record to further compensation at rates to be agreed upon by the user and the Engineer and/ or Engineer of Record.

THE OWNER

26. AUDITS

The owner is responsible for performing audits related to the project. Audits will be performed on an annual basis and will be in compliance with the criteria outlined in Section 5.04 of the Local Agency Program agreement.

27. OWNER FORCE ACCOUNT/COST EFFECTIVE JUSTIFICATION

The owner shall not provide construction or construction engineering inspection services related to this contract without prior approval by the District LAP Administrator through submittal of a finding of cost-effectiveness.

THE ENGINEER

28. AUTHORITY OF THE ENGINEER

The Engineer will be the Owner's representative during the construction period. His authority and responsibility will be limited to the provisions set forth in these Contract Documents. The Engineer will have the Authority to reject work which does not conform to the Contract Documents. However, neither the Engineer's authority to act under this provision, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, their respective Sureties, any of their agents or employees, or any other person performing any of the work.

29. DUTIES AND RESPONSIBILITIES OF THE ENGINEER

The Engineer or his representative will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the work and to determine, in general, if the work is proceeding in accordance with the intent of the Contract Documents. He will not make comprehensive or continuous review or observation to check quality or quantity of the work, and he will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the work. Visits and observations made by the Engineer or his representative shall not relieve the Contractor of his obligation to conduct comprehensive inspections of the work and to furnish materials and perform acceptable work, and to provide adequate safety precautions, in conformance with the intent of the Contract.

The Engineer or his representative will make recommendations to the Owner, in writing, on all claims of the Owner or the Contractor arising from interpretation or execution of the Contract Documents. Such recommendations will be of factual and/or technical nature, and will not include the legal interpretation of the Contract Documents. Any necessary legal interpretation of the Contract Document will be made by the Owner. Such recommendation shall be necessary before the Contractor can receive additional money under the terms of the Contract. Changes in work ordered by the Engineer or his representative shall be made in compliance with Article CHANGES IN THE WORK.

One or more project representatives may be assigned to observe the work. It is understood that such project representatives shall have the authority to issue notice of nonconformance and make decisions within the limitations of the authority of the Engineer. The Contractor shall furnish all reasonable assistance required by the Engineer or project representatives for proper observation of the work. The above-mentioned project representatives shall not relieve the Contractor of his obligations to conduct comprehensive inspections of the work and to furnish materials and perform acceptable work, and to provide adequate safety precautions, in conformance with the intent of the Contract.

30. LIMITATIONS ON ENGINEER'S RESPONSIBILITIES

The Engineer or his representative will not be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, and the Engineer or his representative, will not be responsible for Contractor's failure to perform or furnish the work in accordance with the Contract Documents.

The Engineer or his representative, will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any supplier, or of any other person or organization performing or furnishing any of the work.

Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", or "satisfactory", or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of

Engineer or his representative, as to the work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to Engineer or his representative, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the provisions of this Article.

31. REJECTED WORK

Any defective work or nonconforming materials or equipment that may be discovered at any time prior to expiration of the warranty period shall be removed and replaced by work which shall conform to the provisions of the Contract Documents. Any material condemned or rejected shall be removed at once from the project site.

Failure on the part of the Engineer or his representative, to condemn or reject bad or inferior work or to note nonconforming materials or equipment on Contractor submittals shall not be construed to imply acceptance of such work. The Owner shall reserve and retain all of its rights and remedies at law against the Contractor and its Surety for correction of any and all latent defects discovered after the guarantee period.

32. LINES AND GRADES

Lines and grades shall be established as provided in the supplementary conditions. All stakes, marks, and other reference information shall be carefully preserved by the Contractor, and in case of their careless or unnecessary destruction or removal by him or his employees, such stakes, marks, and other information shall be replaced at the Contractor's expense.

33. SUBMITTALS

After checking and verifying all field measurements and after complying with applicable procedures specified in Division I, GENERAL REQUIREMENTS, Contractor shall submit to Engineer of Record, in accordance with the schedule for submittals for review, shop drawings, electrical diagrams, and catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment), which shall bear a stamp or specific written indication that Contractor has satisfied Contractor's responsibilities under the Contract Documents with respect to the review of the submittal. All submittals shall be identified as Engineer of Record may require. The data shown shall be complete with respect to quantities, dimensions specified, performance and design criteria, materials, and similar data to enable Engineer of Record to review the information. Contractor shall also submit to Engineer of Record for review, with such promptness as to cause no delay in work, all samples required by the Contract Documents. All samples shall have been checked by and accompanied by a specific written indication that Contractor has satisfied Contractor's responsibilities under the Contract Documents with respect to the review of the submission and shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended.
Before submission of each submittal, Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each submittal with other submittals and with the requirements of the work and the Contract Documents.

At the time of each submission, Contractor shall give Engineer of Record specific written notice of each variation that the submittal may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each shop drawing submitted to Engineer of Record for review and approval of each variation.

Engineer of Record will review submittals with reasonable promptness, but Engineer of Record's review will be only for conformance with the design concept of the project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences, or procedures of construction (except where a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate review of the assembly in which the item functions. Contractor shall make corrections required by Engineer of Record, and shall return the required number of corrected copies of shop drawings and submit as required

new samples for review. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer of Record on previous submittals.

Engineer of Record's review of submittals shall not relieve Contractor from the responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called Engineer of Record's attention to each such variation at the time of submission and Engineer of Record has given written approval of each such variation by a specific written notation thereof incorporated therein or accompanying the shop drawing or sample approval; nor will any approval by Engineer of Record relieve Contractor from responsibility for errors or omissions in the shop drawings or from responsibility for having complied with the provisions herein.

Where a shop drawing or sample is required by the specifications, any related work performed prior to Engineer of Record's review and approval of the pertinent submission shall be at the sole expense and responsibility of the Contractor.

34. DETAIL DRAWINGS AND INSTRUCTIONS

The Engineer of Record will furnish, with reasonable promptness, additional instructions by means of Drawings or otherwise, if, in the Engineer of Record's opinion, such are required for the proper execution of the work. All such Drawings and instructions will be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom.

THE CONTRACTOR AND HIS EMPLOYEES

35. CONTRACTOR, AN INDEPENDENT AGENT

The Contractor shall independently perform all work under this Contract and shall not be considered as an agent of the Owner or of the Engineer and/ or Engineer of Record, nor shall the Contractor's Subcontractors or employees be subagents of the Owner or of the Engineer and/ or Engineer of Record.

35. (a) ASSIGNMENT OF CONTRACT

Assignment of any part or the whole of this Contract shall be subject to review and approval of the City Commission.

36. SUBCONTRACTING

Unless modified in the Supplementary Conditions, within 10 days after the execution of the Contract, the Contractor shall submit to the Engineer the names of all Subcontractors proposed for the work, including the names of any Subcontractors that were submitted with the Proposal. The Contractor shall not employ any subcontractors to which the Owner may object to as lacking capability to properly perform work of the type and scope anticipated.

The Contractor is as fully responsible to the Owner for the acts and omissions of his Subcontractors and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the Owner or Engineer and/ or Engineer of Record.

37. INSURANCE AND LIABILITY

A. GENERAL

The Contractor shall provide (from insurance companies acceptable to the Owner) the insurance coverage designated hereinafter and pay all costs.

Before commencing work under this Contract, the Contractor shall furnish the Owner with certificates of insurance specified herein showing the type, amount and class of operations covered, effective dates, and date of expiration of policies, and containing substantially the following statement:

"The insurance covered by this certificate shall not be canceled or materially altered, except after 30 days' written notice has been received by the Owner."

In case of the breach of any provision of this Article, the Owner, at his option, may take out and maintain, at the expense of the Contractor, such insurance as the Owner may deem proper and may deduct the cost of such insurance from any monies which may be due or become due the Contractor under this Contract.

B. CONTRACTOR AND SUBCONTRACTOR INSURANCE

The Contractor shall not commence work under this Contract until he has obtained all the insurance required hereunder and such insurance has been reviewed by the Owner, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until insurance specified below has been obtained. Review of the insurance by the Owner shall not relieve or decrease the liability of the Contractor hereunder.

C. WORKER'S COMPENSATION AND EMPLOYER' LIABILITY INSURANCE

The Contractor shall maintain during the life of this Contract the statutory amount of Workmen's Compensation Insurance, in addition, Employer's Liability Insurance in an amount as specified in the Supplementary Conditions, for each occurrence, for all of his employees to be engaged in work on the project under this Contract. In case any such work is subcontracted, the Contractor shall require the Subcontractor to provide similar Worker's Compensation and Employer's Liability Insurance for all of the Subcontractor's employees to be engaged in such work.

D. GENERAL LIABILITY INSURANCE (INCLUDING AUTOMOBILE)

The Contractor shall maintain during the life of this Contract such general liability, completed operations and products liability, and automobile liability insurance as will provide coverage for claims for damages for personal injury, including accidental death, as well as for claims for property damage, which may arise directly or indirectly from performance of the work under this Contract. The general liability policy shall include contractual liability assumed by the Contractor under Article **INDEMNITY.** Coverage for property damage shall be on a "broad form" basis with no exclusions for "X, C & U". The amount of insurance to be provided shall be as specified in the Supplementary Conditions.

In the event any work under this Contract is performed by a Subcontractor, the Contractor shall be responsible for any liability directly or indirectly arising out of the work performed by the Subcontractor; to the extent such liability is not covered by the Subcontractor's insurance.

The Owner, the Engineer and Engineer of Record, their officers, agents, and employees shall be named as Additional Insured on the Contractor's and any Subcontractor's general liability and automobile liability insurance policies for any claims arising out of work performed under this Contract.

E. BUILDERS RISK ALL RISK INSURANCE

Unless otherwise modified in the Supplementary Conditions, the Contractor shall secure and maintain during the life of this Contract, Builders Risk All Risk Insurance coverage in an amount equal to the full value of the facilities under construction. Such insurance shall include coverage for earthquake, landslide, flood, collapse, loss due to the results of faulty workmanship or design, and all other normally covered risks, and shall provide for losses to be paid to the Contractor, Owner, and Engineer as their interests may appear.

The Owner, the Engineer and Engineer of Record, their officers, agents, and employees shall be named as additional insured on the Contractor's and any subcontractor's Builders Risk All Risk insurance policies for any claims arising out

of work performed under this Contract.

This insurance shall include a waiver of subrogation as to the Engineer, the Engineer of Record, the Owner, the Contractor, and their respective officers, agents, employees and subcontractors.

F. NO PERSONAL LIABILITY OF PUBLIC OFFICIALS

In carrying out any of the provisions hereof in exercising any authority granted by the Contract, there will be no personal liability upon any public official.

38. INDEMNITY

To the maximum extent permitted by law, the Contractor shall indemnify and defend the Owner, the Engineer of Record and the Engineer, and their officers, employees, agents, and sub consultants, from all claims and losses, including attorney's fees and litigation costs arising out of property losses or health, safety, personal injury, or death claims by the Contractor, its subcontractors of any tier, and their employees, agents, or invitees regardless of the fault, breach of Contract, or negligence of the Owner, the Engineer of Record or Engineer, excepting only such claims or losses that have been adjudicated to have been caused solely by the negligence of the Owner, the Engineer of Record or the Engineer and regardless of whether or not the Contractor is or can be named a party in a litigation. Nothing herein is intended to waive the sovereign immunity afforded to City pursuant to Florida Law, including section 768.28, Florida Statutes.

39. EXCLUSION OF CONTRACTOR CLAIMS

In performing its obligations, the Engineer or the Engineer of Record and its consultants may cause expense for the Contractor or its subcontractors and equipment or material suppliers. However, those parties and their sureties shall maintain no direct action against the Engineer or Engineer of Record, its officers, employees, agents, and consultants for any claim arising out of, in connection with, or resulting from the engineering services performed or required to be performed.

40. TAXES AND CHARGES

The Contractor shall withhold and pay any and all sales and use taxes and all withholding taxes, whether State or Federal, and pay all Social Security charges and also all State Unemployment Compensation charges, and pay or cause to be withheld, as the case may be, any and all taxes, charges, or fees or sums whatsoever, which are now or may hereafter be required to be paid or withheld under any laws.

41. REQUIREMENTS OF STATE LAW FOR PUBLIC WORKS PROJECTS

When the Contract Documents concern public works of the state or any county, municipality, or political subdivision created by its laws, the applicable statutes shall apply. All parties to this Contract shall determine the contents of all applicable statutes and comply with their provisions throughout the performance of the Contract.

42. CODES, ORDINANCES, PERMITS AND LICENSES

The Contractor shall keep himself fully informed of all local codes and ordinances, as well as state and federal laws, which in any manner affect the work herein specified. The Contractor shall at all times comply with said codes and ordinances, laws, and regulations, and protect and indemnify the Owner, the Engineer, The Engineer of Record and their respective employees, and its officers and agents against any claim or liability arising from or based on the violation of any such laws, ordinances, or regulations. All permits, licenses and inspection fees necessary for prosecution and completion of the work shall be secured and paid for by the Contractor, unless otherwise specified.

43. SUPERINTENDENCE

The Contractor shall keep at the project site, competent supervisory personnel. The Contractor shall designate, in

writing, before starting work, a project superintendent who shall be an employee of the Contractor and shall have complete authority to represent and to act for the Contractor. Engineer shall be notified in writing prior to any change in superintendent assignment. The Contractor shall give efficient supervision to the work, using his best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, and procedures, and for providing adequate safety precautions and coordinating all portions of the work under the Contract. It is specifically understood and agreed that the Engineer or Engineer of Record, its employees and agents, shall not have control or charge of and shall not be responsible for the construction means, methods, techniques, procedures, or for providing adequate safety precautions in connection with the work under Contract. Contractor shall provide PDF copies of the contractor's daily reports and Quality Control Reports with each pay application monthly.

44. RECEPTION OF ENGINEER'S COMMUNICATIONS

The superintendent shall receive for the Contractor all communications from the Engineer. Communications of major importance will be confirmed in writing upon request from the Contractor.

The Engineer may schedule project meetings for the purposes of discussing and resolving matters concerning the various elements of the work. Time and place for these meetings and the names of persons required to be present shall be as determined by the Engineer. Contractor shall comply with these attendance requirements and shall also require his Subcontractors to comply.

45. SAFETY

The Contractor shall be solely and completely responsible for conditions of the jobsite, including safety of all persons (including employees) and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to U.S. Department of Labor (OSHA), and all other applicable federal, state, county, and local laws, ordinances, codes, and regulations. Where any of these are in conflict, the more stringent requirement shall be followed. The Contractor's failure to thoroughly familiarize himself with the aforementioned safety provisions shall not relieve him from compliance with the obligations and penalties set forth therein.

The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.

The duty of the Engineer to conduct construction review of the work does not include review or approval of the adequacy of the Contractor's safety program, safety supervisor, or any safety measures taken in, on, or near the construction site.

The Contractor, as a part of his safety program, shall maintain at his office or other well-known place at the jobsite, safety equipment applicable to the work as prescribed by the aforementioned authorities, all articles necessary for giving first-aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons (including employees) who may be injured on the jobsite.

If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Engineer and the Owner. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.

If a claim is made by anyone against the Contractor or any Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

46. PROTECTION OF WORK AND PROPERTY

The Contractor shall at all times safely guard and protect from damage the Owner's property, adjacent property, and his

own work from injury or loss in connection with this Contract. All facilities required for protection by federal, state, or municipal laws and regulations and local conditions must be provided and maintained.

The Contractor shall protect his work and materials from damage due to the nature of the work, the elements, carelessness of other contractors, or from any cause whatever until the completion and acceptance of the work. All loss or damages arising out of the nature of the work to be done under these Contract Documents, or from any unforeseen obstruction or defects which may be encountered in the prosecution of the work, or from the action of the elements, shall be sustained by the Contractor.

47. RESPONSIBILITY OF CONTRACTOR TO ACT IN AN EMERGENCY

In case of an emergency which threatens loss or injury of property, and/or safety of life, the Contractor shall act, without previous instructions from the Owner or Engineer, as the situation may warrant. The Contractor shall notify the Engineer thereof immediately thereafter. Any claim for compensation by the Contractor, together with substantiating documents in regard to expense, shall be submitted to the Owner through the Engineer and the amount of compensation shall be determined by agreement.

48. MATERIALS AND APPLIANCES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, heat, light, fuel, power, transportation, construction equipment and machinery, appliances, telephone, sanitary facilities, temporary facilities and other facilities and incidentals necessary for the execution and completion of the work.

Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

In selecting and/or approving equipment for installation in the project, the Owner and Engineer assume no responsibility for injury or claims resulting from failure of the equipment to comply with applicable federal, state, and local safety codes or requirements, or the safety requirements of a recognized agency, or failure due to faulty design concepts, or defective workmanship and materials.

49. CONTRACTORS' AND MANUFACTURERS'COMPLIANCE WITH STATE SAFETY, OSHA, AND OTHER CODE REQUIREMENTS

The completed work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items required by the state and federal (OSHA) industrial authorities and applicable local and national codes. Further, any features of the work subject to such safety regulations shall be fabricated, furnished, and installed (including Owner-furnished equipment) in compliance with these requirements. Contractors and manufacturers of equipment shall be held responsible for compliance with the requirements included herein. Contractors shall notify all equipment suppliers and Subcontractors of the provisions of this Article.

50. SUBSTITUTION OF MATERIALS

Except for Owner-selected equipment items, and items where no substitution is clearly specified, whenever any material, article, device, product, fixture, form, type of construction, or process is indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable in design, and shall be deemed to be followed by the words "or equal". The Contractor may, in such cases, submit complete data to the Engineer of Record for consideration of another material, type, or process which shall be substantially equal in every respect to that so indicated or specified. Substitute materials shall not be used unless approved in writing. The Engineer of Record will be the sole judge of the substituted article or material.

51. TESTS, SAMPLES, AND OBSERVATIONS

The Contractor shall furnish, without extra charge, the necessary test pieces and samples, including facilities and labor for obtaining the same, as requested by the Engineer or his representative. When required, the Contractor shall furnish certificates of tests of materials and equipment made at the point of manufacture by a recognized testing laboratory.

The Owner, Engineer, Engineer of Record and authorized government agents, and their representatives shall at all times be provided safe access to the work wherever it is in preparation or progress, and the Contractor shall provide facilities for such access and for observations, including maintenance of temporary and permanent access.

If the Specifications, laws, ordinances, or any public authority require any work, to be specially tested or approved, the Contractor shall give timely notice of its readiness for observations. If any work should be covered up without approval or consent of the Engineer, it shall, if required by the Engineer, be uncovered for examination at the Contractor's expense.

Reexamination of questioned work may be ordered by the Engineer or his representative, and, if so ordered, the work shall be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner will pay the cost of uncovering, exposure, observation, inspection, testing and reconstruction. If such work is found to be not in accordance with the Contract Documents, the Contractor shall correct the defective work, and the cost of reexamination and correction of the defective work shall be paid by the Contractor.

52. ROYALTIES AND PATENTS

The Contractor shall pay all royalty and licenses fees, unless otherwise specified. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner, the Engineer of Record and the Engineer harmless from any and all loss, including reasonable attorneys' fees, on account thereof.

53. CONTRACTOR'S RIGHT TO TERMINATE CONTRACT

If the work should be stopped under an order of any court or other public authority for a period of more than 3 months, through no act or fault of the Contractor, its Subcontractors, or respective employees or if the Engineer should fail to make recommendation for payment to the Owner or return payment request to Contractor for revision within 30 days after it is due, or if the Owner should fail to pay the Contractor within 30 days after time specified in Article PARTIAL PAYMENTS, any sum recommended by the Engineer, then the Contractor may, upon 15 days' written notice to the Owner and the Engineer, stop work or terminate this Contract and recover from the Owner payment for all acceptable work performed and reasonable termination expenses, unless said default has been remedied.

54. CORRECTION OF DEFECTIVE WORK DURING WARRANTY PERIOD

The Contractor hereby agrees to make, at his own expense, all repairs or replacements necessitated by defects in materials or workmanship, provided under terms of this Contract, and pay for any damage to other works resulting from such defects, which become evident within 2 years after the date of final acceptance of the work or within 2 years after the date of substantial completion established by the Engineer for specified items of equipment, or within such longer period as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents. Un-remedied defects identified for correction during the warranty period but remaining after its expiration shall be considered as part of the obligations of the warranty. Defects in material, workmanship, or equipment which are remedied as a result of obligations of the warranty shall subject the remedied portion of the work to an extended warranty period of 2 years after the defect has been remedied.

The Contractor further assumes responsibility for a similar guarantee for all work and materials provided by Subcontractors or manufacturers of packaged equipment components. The effective date for the start of the guarantee or warranty period for equipment qualifying as substantially complete is defined in Article SUBSTANTIAL COMPLETION, AND Article SUBSTANTIAL COMPLETION DATE, in these General Conditions.

The Contractor also agrees to hold the Owner, the Engineer of Record and the Engineer harmless from liability of any kind arising from damage due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written order for same from the Owner. If the Contractor fails to make the repairs and replacements promptly, or in an emergency where delay would cause serious risk, or loss, or damage, the Owner may have the defective work corrected or the rejected work removed and replaced, and the Contractor and his Surety shall be liable for the cost thereof.

PROGRESS OF THE WORK

55. BEGINNING OF THE WORK

Following execution of the Contract, the Contractor shall meet with the Owner and Engineer relative to his arrangements for prosecuting the work.

56. SCHEDULES AND PROGRESS REPORTS

Prior to starting the construction, the Contractor shall prepare and submit to the Engineer, a progress schedule showing the dates on which each part or division of the work is expected to be started and finished, and a preliminary schedule for submittals. The progress schedule for submittals shall be brought up to date and submitted to the Engineer at the end of each month or at such other times the Engineer may request.

The Contractor shall forward to the Engineer, at the end of each month, an itemized report of the delivery status of major and critical items of purchased equipment and material, including shop drawings and the status of shop and field fabricated work. These progress reports shall indicate the date of the purchase order, the current percentage of completion, estimated delivery, and cause of delay, if any.

If the completion of any part of the work or the delivery of materials is behind the submitted progress schedule, the Contractor shall submit in writing a plan acceptable to the Owner and Engineer for bringing the work up to schedule.

The Owner shall have the right to withhold progress payments for the work if the Contractor fails to update and submit the progress schedule and reports as specified.

57. PROSECUTION OF THE WORK

It is expressly understood and agreed that the time of beginning, rate of progress, and time of completion of the work are the essence of this Contract. The work shall be prosecuted at such time, and in or on such part or parts of the project as may be required, to complete the project as contemplated in the Contract Documents and the progress schedule.

If the Contractor desires to carry on work at night or outside the regular hours, he shall give timely notice to the Engineer to allow satisfactory arrangements to be made for observing the work in progress.

58. OWNER'S RIGHT TO RETAIN IMPERFECT WORK

If any part or portion of the work completed under this Contract shall prove defective and not in accordance with the Drawings and Specifications, and if the imperfection in the same shall not be of sufficient magnitude or importance as to make the work dangerous or unsuitable, or if the removal of such work will create conditions which are dangerous or undesirable, the Owner shall have the right and authority to retain such work but will make such deductions in the final payment therefore as may be just and reasonable.

59. OWNER'S RIGHT TO DO WORK

Should the Contractor neglect to prosecute the work in conformance with the Contract Documents or neglect or refuse at his own cost to remove and replace work rejected by the Engineer, then the Owner may notify the Surety of the condition, and after 10 days' written notice to the Contractor and the Surety, or without notice if an emergency or danger to the work or public exists, and without prejudice to any other right which the Owner may have under Contract, or otherwise, take over that portion of the work which has been improperly or non timely executed, and make good the deficiencies and deduct the cost thereof from the payments then or thereafter due the Contractor.

60. OWNER'S RIGHT TO TRANSFER EMPLOYMENT

If the Contractor should abandon the work or if he should persistently or repeatedly refuse or should fail to make prompt payment to Subcontractors for material or labor, or to persistently disregard laws, ordinances, or to prosecute the work in conformance with the Contract Documents, or otherwise be guilty of a substantial violation of any provision of the Contract or any laws or ordinance, then the Owner may, without prejudice to any other right or remedy, and after giving the Contractor and Surety 10 days' written notice, transfer the employment for said work from the Contractor to the Surety. Upon receipt of such notice, such Surety shall enter upon the premises and take possession of all materials, tools, and appliances thereon for the purpose of completing the work included under this Contract and employ by Contract or otherwise, any qualified person or persons to finish the work and provide the materials therefor, in accordance with the Contract Documents, without termination of the continuing full force and effect of this Contract. In case of such transfer of employment to such Surety, the Surety shall be paid in its own name on estimates according to the terms hereof without any right of the Contractor to make any claim for the same or any part thereof.

If, after the furnishing of said written notice to the Surety, the Contractor and the Surety still fail to make reasonable progress on the performance of the work, the Owner may terminate the employment of the Contractor and take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method he may deem expedient and charge the cost thereof to the Contractor and the Surety. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of completing the Contract, including compensation for additional managerial and administrative services, shall exceed such unpaid balance, the Contractor and the Surety shall pay the difference to the Owner.

61. DELAYS AND EXTENSION OF TIME

If the Contractor is delayed in the progress of the work by any act or neglect of the Owner, the Engineer of Record or the Engineer, or by any separate Contractor employed by the Owner, or by strikes, lockouts, fire, adverse weather conditions not reasonably anticipated, or acts of Nature, and if the Contractor, within 48 hours of the start of the occurrence, gives written notice to the Owner of the cause of the potential delay and estimate of the possible time extension involved, and within 10 days after the cause of the delay has been remedied, the Contractor gives written notice to the Owner of any actual time extension requested as a result of the aforementioned occurrence, then the Contract time may be extended by change order for such reasonable time as the Engineer determines. It is agreed that no claim shall be made or allowed for any damages, loss, or expense which may arise out of any delay caused by the above referenced acts or occurrences other than claims for the appropriate extension of time.

No extension of time will be granted to the Contractor for delays occurring to parts of the work that have no measurable impact on the completion of the total work under this Contract. No extension of time will be considered for weather conditions reasonably anticipated for the area in which the work is being performed. Reasonably anticipated weather conditions will be based on official records of monthly precipitation and other historical data. Adverse weather conditions, if determined to be of a severity that would impact progress of the work, may be considered as cause for an extension of Contract completion time.

Delays in delivery of equipment or material purchased by the Contractor or his Subcontractors, including Owner-selected equipment shall not be considered as a just cause for delay, unless the Owner determines that for good cause the delay is beyond the control of the Contractor. The Contractor shall be fully responsible for the timely ordering,

scheduling, expediting, delivery, and installation of all equipment and materials.

Within a reasonable period after the Contractor submits to the Owner a written request for an extension of time, the Engineer will present his written opinion to the Owner as to whether an extension of time is justified, and, if so, his recommendation as to the number of days for time extension. The Owner will make the final decision on all requests for extension of time.

62. DIFFERING SITE CONDITIONS

The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Owner and Engineer of:

A. Subsurface or latent physical conditions at the site which differ materially from those indicated in this contract,

B. Unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

The Engineer and the Engineer of Record will investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this Contract, whether or not changed as a result of the conditions, and equitable adjustment shall be made this Article and the Contract modified in writing accordingly.

No request by the Contractor for an equitable adjustment to the Contract under this Article will be allowed, unless the Contractor has given the written notice required; provided that the time prescribed above for giving written notice may be extended by the Owner.

No request by the Contractor for an equitable adjustment to the Contract for differing site conditions will be allowed if made after final payment under this Contract.

63. LIQUIDATED DAMAGES

Should the Contractor fail to complete the work, or any part thereof, in the time agreed upon in the Contract or within such extra time as may have been allowed for delays by extensions granted as provided in the Contract, the Contractor shall reimburse the Owner for the additional expense and damage for each calendar day, Sundays and legal holidays included, that the Contract remains uncompleted after the Contract completion date. It is agreed that the amount of such additional expense and damage incurred by reason of failure to complete the work is the per-diem rate, as stipulated in the Proposal. The said amount is hereby agreed upon as a reasonable estimate of the costs which may be accrued by the Owner after the expiration of the time of completion. It is expressly under- stood and agreed that this amount is not to be considered in the nature of a penalty, but as liquidated damages which have accrued against the Contractor. The Owner shall have the right to deduct such damages from any amount due, or that may become due the Contractor, or the amount of such damages shall be due and collectible from the Contractor or Surety.

64. OTHER CONTRACTS

The Owner reserves the right to let other Contracts in connection with the work. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.

If any part of the work under this Contract depends for proper execution or results upon the work of any other Contractor, utility service company or Owner, the Contractor shall inspect and promptly report to the Engineer in writing any patent or apparent defects to deficiencies in such work that render it unsuitable for such proper execution and results. The Contractor's failure to so report shall constitute and acceptance of the work by others as being fit and

proper for integration with work under this Contract, except for latent or non apparent defects and deficiencies in the work.

65. USE OF PREMISES

The Contractor shall confine his equipment, the storage of materials and the operation of his workers to limits shown on the Drawings or indicated by law, ordinances, permits, or directions of the Engineer, and shall not unreasonably encumber the premises with his materials. The Contractor shall provide, at his own expense, the necessary rights-of-way and access to the work which may be required outside the limits of the Owner's property and shall furnish the Engineer copies of permits and agreements for use of the property outside that provided by the Owner.

The Contractor shall not load nor permit any part of the structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the work or adjacent property to stresses or pressures that will endanger it.

66. SUBSTANTIAL COMPLETION DATE

The Engineer may issue a written notice of substantial completion for the purpose of establishing the starting date for specific equipment guarantees, and to establish the date that the Owner will assume the responsibility for the cost of operating such equipment. Said notice shall not be considered as final acceptance of any portion of the work or relieve the Contractor from completing the remaining work within the specified time and in full compliance with the Contract Documents. See SUBSTANTIAL COMPLETION under DEFINITIONS of these General Conditions.

67. PERFORMANCE TESTING

Operating equipment and systems shall be performance tested in the presence of the Engineer to demonstrate compliance with the specified requirements. Performance testing shall be conducted under the specified design operating conditions or under such simulated operating conditions as recommended or approved by the Engineer. Schedule such testing with the Engineer at least one week in advance of the planned date for testing.

68. OWNER'S USE OF PORTIONS OF THE WORK

Following issuance of the written notice of Substantial Completion, the Owner may initiate operation of the facility. Such use shall not be considered as final acceptance of any portion of the work, nor shall such use be considered as cause for an extension of the Contract completion time, unless authorized by a Change Order issued by the Owner.

69. CUTTING AND PATCHING

The Contractor shall do all cutting, fitting, or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other Contractors shown upon or reasonably implied by the Drawings.

70. CLEANING UP

The Contractor shall, at all times, keep property on which work is in progress and the adjacent property free from accumulations of waste material or rubbish caused by employees or by the work. Upon completion of the construction, the Contractor shall remove all temporary structures, rubbish, and waste materials resulting from his operations. Cleaning up shall be performed daily.

PAYMENT

71. PAYMENT FOR CHANGE ORDERS

The Owner's request for quotations on alterations to the work shall not be considered authorization to proceed with the

work prior to the issuance of a formal Change Order, nor shall such request justify any delay in existing work. Quotations for alterations to the work shall include substantiating documentation with an itemized breakdown of Contractor and Subcontractor costs, including labor, material, rentals, approved services, overhead, and profit. Owner may require detailed cost data in order to substantiate the reasonableness of the proposed costs.

Any compensation paid in conjunction with the terms of a Change Order shall comprise total compensation due the Contractor for the work or alteration defined in the Change Order. By signing the Change Order, the Contractor acknowledges that the stipulated compensation includes payment for the work or alteration plus all payment for the interruption of schedules, extended overhead, delay, or any other impact claim or ripple effect, and by such signing specifically waives any reservation or claim for additional compensation in respect to the subject Change Order.

At the Owner's option, payment or credit for any alterations covered by a Change Order shall be determined by one or a combination of the methods set forth in A, B, or C below, as applicable:

A. UNIT PRICES

Those unit prices stipulated in the Proposal shall be utilized where they are applicable. In the event the Change Order results in a change in the original quantity that is materially and significantly different from the original bid quantity, a new unit price shall be negotiated upon demand of either party. Unit prices for new items included in the Change Order shall be negotiated and mutually agreed upon.

B. LUMP SUM

A total lump sum for the work negotiated and mutually acceptable to the Contractor and the Owner.

Lump sum quotations for modifications to the work shall include substantiating documentation with an itemized breakdown of Contractor and Subcontractor costs, including labor, material, rentals, approved services, overhead, and profit, all calculated as specified under "C" below.

C. COST REIMBURSEMENT WORK

The term “cost reimbursement" shall be understood to mean that payment for the work will be made on a time and expense basis, that is, on an accounting of the Contractor's forces, materials, equipment, and other items of cost as required and used to do the work.

If the method of payment cannot be agreed upon prior to the beginning of the work, and the Owner directs by written Change Order that the work be done on a cost reimbursement basis, then the Contractor shall furnish labor, and furnish and install equipment and materials necessary to complete the work in a satisfactory manner and within a reasonable period of time. For the work performed, payment will be made for the documented actual cost of the following:

1. Labor including foremen for those hours they are assigned and participating in the cost reimbursement work (actual payroll cost, including wages, fringe benefits as established by negotiated labor agreements, labor insurance, and labor taxes as established by law). Fixed Burden shall not exceed 20%. No other fixed labor burdens will be considered, unless approved in writing by the Owner.

2. Material delivered and used on the designated work, including sales tax, if paid by the Contractor or his Subcontractor.

3. Rental or equivalent rental cost of equipment, including necessary transportation for items having a value in excess of $100.

   Rental or equivalent rental cost will be allowed for only those days or hours during which the equipment is in actual use. Rental and transportation allowances shall not exceed the current rental rates prevailing in the locality. The rentals allowed for equipment will, in all cases, be understood to cover all fuel, supplies, repairs,

and renewals, and no further allowances will be made for those items, unless specific agreement to that effect is made.

4. Additional bond, as required and approved by the owner.

5. Additional insurance (other than labor insurance) as required and approved by the Owner.

In addition to items 1 through 5 above, an added fixed fee for general overhead and profit shall be 15% for the Contractor (approved Subcontractor 10%) actually executing the Cost Reimbursement work.

An additional fixed fee shall be 05% and allowed the Contractor for the administrative handling of portions of the work that are executed by an approved Subcontractor. No additional fixed fee will be allowed for the administrative handling of work executed by a Subcontractor of a Subcontractor, unless by written permission from the Owner.

The added fixed fees shall be considered to be full compensation, covering the cost of general supervision, overhead, profit, and any other general expense. The Contractor's records shall make clear distinction between the direct costs of work paid for on a cost reimbursement basis and the costs of other work. The Contractor shall furnish the Engineer report sheets in duplicate of each day's cost reimbursement work no later than the working day following the performance of said work. The daily report sheets shall itemize the materials used, and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the Contractor, Subcontractor or other forces. The daily report sheets shall provide names or identifications and classifications of workers, the hourly rate of pay and hours worked, and also the size, type, and identification number of equipment and hours operated.

Material charges shall be substantiated by valid copies of vendors' invoices. Such invoices shall be submitted with the daily report sheets, or, if not available, they shall be submitted with subsequent daily report sheets. Said daily report sheets shall be signed by the Contractor or his authorized agent.

The Owner reserves the right to furnish such materials and equipment as he deems expedient and the Contractor shall have no claim for profit or added fees on the cost of such materials and equipment. To receive partial payments and final payment for cost reimbursement work, the Contractor shall submit to the Engineer, detailed and complete documented verification of the Contractor's and any of his Subcontractors' actual costs involved in the cost reimbursement work. Such costs shall be submitted within 30 days after said work has been performed.

72. PARTIAL PAYMENTS

A. GENERAL

Nothing in this Article shall be construed to affect the right, hereby reserved, to reject the whole or any part of the aforesaid work, should such work be later found not to comply with the provisions of the Contract Documents. All estimated quantities of work for which partial payments have been made are subject to review and correction on the final estimate. Payment by the Owner and acceptance by the Contractor of partial payments based on periodic estimates of quantities of work performed shall not, in any way, constitute acceptance of the estimated quantities used as a basis for computing the amounts of the partial payments.

B. ESTIMATE

At least 30 days before each progress payment falls due, as specified in the Supplementary Conditions, the Contractor shall submit to the Engineer a detailed estimate of the amount earned during the preceding month for the separate portions of the work, and request payment. As used in this Article, the words "amount earned" means the value, on the date of the estimate for partial payment, of the work completed in accordance with the Contract Documents, and the value of approved materials delivered to the project site suitable stored and protected prior to incorporation into the work.

Engineer will, within 7 days after receipt of each request for payment, either indicate in writing a recommendation of

payment and present the request to Owner, or return the request to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may, within 7 days, make the necessary corrections and resubmit the request.

Engineer may refuse to recommend the whole or any part of any payment if, in his opinion, it would be incorrect to make such representations to Owner. Engineer may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended to such an extent as may be necessary in Engineer's opinion to protect the Owner from loss because:

1. The work is defective, or completed work has been damaged requiring correction or replacement;

2. Written claims have been made against Owner or Liens have been filed in connection with the work;

3. The Contract Price has been reduced because of Change Orders;

4. Owner has been required to correct defective work or complete the work in accordance with Article OWNER'S RIGHT TO DO WORK;

5. Of Contractor's unsatisfactory prosecution of the work in accordance with the Contract Documents; or

6. Contractor's failure to make payment to Subcontractors or for labor, materials, or equipment.

C. DEDUCTION FROM ESTIMATE

Unless modified in the Supplementary Conditions, deductions from the estimate will be as described below:

1. The Owner will deduct from the estimate, and retain as part security, 10 percent of the amount earned for work satisfactorily completed. A deduction and retainage of 10 percent will be made on the estimated amount earned for approved items of material delivered to and properly stored at the jobsite but not incorporated into the work. When the work is 50 percent complete, the Owner will reduce the retainage to 5 percent of the dollar value of all work satisfactorily completed to date provided the Contractor is making satisfactory progress and there is no specific cause for a greater retainage. The Owner may reinstate the retainage up to 10 percent if the Owner determines, at his discretion, that the Contractor is not making satisfactory progress or where there is other specific cause for such withholding.

D. QUALIFICATION FOR PARTIAL PAYMENT FOR MATERIALS DELIVERED

Unless modified in the Supplementary Conditions, qualification for partial payment for materials delivered but not yet incorporated into the work shall be as described below:

1. Materials, as used herein, shall be considered to be those items which are fabricated and manufactured material and equipment. No consideration shall be given to individual purchases of less than $200 for any one item.

2. To receive partial payment for materials delivered to the site, but not incorporated in the work, it shall be necessary for the Contractor to include a list of such materials on the Partial Payment Request. At his sole discretion, the Engineer may approve items for which partial payment is to be made. Partial payment shall be based on the Contractor's actual cost for the materials as evidenced by invoices from the supplier. Proper storage and protection shall be provided by the Contractor, and as approved by the Engineer. Final payment shall be made only for materials actually incorporated in the work and, upon acceptance of the work, all materials remaining for which advance payments had been made shall revert to the Contractor, unless otherwise agreed, and partial payments made for these items shall be deducted from the final payment for the work.

3. Contractor warrants and guarantees that title to all work, materials, and equipment covered by any Application for Payment, whether incorporated in the project or not, will pass to Owner at the time of payment free and clear of all liens, claims, security interests, and encumbrances.

4. If requested by the Engineer, the Contractor shall provide, with subsequent pay requests, invoices receipted by the supplier showing payment in full has been made.

E. PAYMENT

After deducting the retainage and the amount of all previous partial payments made to the Contractor from the amount earned, the amount due will be made payable to the Contractor. Recommendations for payment received by the Owner less than 9 days prior to the scheduled day for payment will not be processed or paid until the following month.

73. CLAIMS FOR EXTRA WORK

In any case where the Contractor deems additional time or compensation will become due him under this Contract for circumstances other than those defined in Article DELAYS AND EXTENSION OF TIME, the Contractor shall notify the Engineer, in writing, of his intention to make claim for such time or compensation before he begins the work on which he bases the claim, in order that such matters may be settled, if possible, or other appropriate action taken. The notice of claim shall be in duplicate, in writing, and shall state the circumstances and the reasons for the claim, but need not state the amount. If such notification is not given or if the Engineer is not afforded proper facilities by the Contractor for keeping strict account of actual cost, then the Contractor hereby agrees to waive the claim for such additional time or compensation. Such notice by the Contractor, and fact that the Engineer has kept account of the cost as aforesaid, shall not in any way be construed as proving the validity of the claim.

No extension of time will be granted to the Contractor for delays resulting from extra work that have no measurable impact on the completion of the total Work under this Contract. Claims for additional time or compensation shall be made in itemized detail and submitted, in writing, to the Owner and Engineer within 10 days following completion of that portion of the work for which the Contractor bases his claim. Failure to make the claim for additional compensation in the manner and within the time specified above shall constitute waiver of that claim. In case the claim is found to be just, it shall be allowed and paid for as provided in Article **PAYMENT FOR CHANGE ORDERS.**

74. RELEASE OF LIENS OR CLAIMS (Notice to Owners)

The Contractor shall indemnify and hold harmless the Owner from all claims for labor and materials furnished under this Contract. Prior to the final payment, the Contractor shall furnish to the Owner, as part of his final payment request, a certification that all of the Contractor's obligations on the project have been satisfied and that all monetary claims and indebtedness have been paid. The Contractor shall furnish complete and legal effective releases or waivers, satisfactory to the Owner, of all liens and notice to owners arising out of or filed in connection with the work.

75. FINAL PAYMENT

Upon completion of all the work under this Contract, the Contractor shall notify the Engineer, in writing, that he has completed his part of the Contract and shall request final payment. Upon receipt of such notice the Engineer will inspect and, if acceptable, submit to the Owner his recommendation as to acceptance of the completed work and as to the final estimate of the amount due the Contractor. Upon approval of this final estimate by the Owner and compliance by the Contractor with provisions in Article **RELEASE OF LIENS OR CLAIMS,** and other provisions as may be applicable, the Owner shall pay to the Contractor all monies due him under the provisions of these Contract Documents.

76. NO WAIVER OF RIGHTS

Neither the inspection by the Owner, through the Engineer or any of his employees, nor any order by the Owner for payment of money, nor any payment for, or acceptance of, the whole or any part of the work by the Owner or

Engineer, nor any extension of time, nor any possession taken by the owner or its employees, shall operate as a waiver of any provision of this Contract, or any power herein reserved to the Owner, or any right to damages herein provided, nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach. Acceptance or final payment shall not be final and conclusive with regards to latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under the warranty.

77. ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE

The acceptance by the Contractor of the final payment shall release the Owner, The Engineer of Record and the Engineer, as representatives of the Owner, from all claims and all liability to the Contractor for all things done or furnished in connection with the work, and every act of the Owner and others relating to or arising out of the work except claims previously made in writing and still unsettled. No payment, however, final or otherwise, shall operate to release the Contractor or his Sureties from obligations under this Contract and the Performance Bond, Payment Bond, and other bonds and warranties, as herein provided.

SUPPLEMENTARY CONDITIONS

The General Conditions are hereby revised as follows:

ARTICLE 9 "CONSTRUCTION ENGINEER"

Add the following:

Wherever in these Documents the word "Engineer" appears, it shall be understood to mean the Construction Engineer or City of Key West authorized representatives.

ARTICLE 13 "OWNER"

Add the following:

Wherever in these Documents the word "Owner" appears, it shall be understood to mean the City of Key West whose address is 3126 Flagler Avenue, Key West, Florida 33040.

ARTICLE 15 "SPECIFICATIONS"

Add the following:

FEDERAL, STATE, COUNTY, AND LOCAL STANDARD SPECIFICATIONS

Where portions of the work traverse or cross federal, state, county, or local highways, roads, or streets, and the agency in control of such property has established standard specifications governing items of work that differ from these Specifications, the most stringent requirements shall apply. The Contractor shall comply with all regulations and requirements of the State Highway Department and the County Road Department wherever the work traverses or crosses state or county highways.

ARTICLE 26 "AUDITS"

Delete article “AUDITS” in its entirety from this contract.

ARTICLE 27 "OWNER FORCE ACCOUNT / COST EFFECTIVE JUSTIFICATION"

Delete article "OWNER FORCE ACCOUNT / COST EFFECTIVE JUSTIFICATION" in its entirety from this contract.

ARTICLE 32 "LINES AND GRADES"

Add the following:

It will be the Contractor's responsibility to layout the work and to transfer elevations from benchmarks. Where new construction connects to existing facilities, the Contractor shall check and establish the exact location prior to construction of the facilities.

The Contractor shall furnish all surveys, labor, and equipment, including setting all alignment and gradient, grade stakes, batter boards, and everything necessary to lay out his work. The Contractor shall be responsible for maintaining and re-establishing at his expense, all control points. After completion of his construction, he shall reset all permanent monuments at their original locations and elevations.

The Engineer and/or Engineer of Record may check all layout work, and the Contractor shall furnish all necessary labor, equipment, and materials, and shall cooperate and assist the Engineer and/ or Engineer of Record in making such checks.

The dimensions for lines and elevations for grades of the structures, appurtenances, and utilities will be shown on Drawings, together with other pertinent information required for laying out the work. If site conditions vary from those indicated, the Contractor shall notify the Engineer immediately, who will make any minor adjustment as required. If major changes are required, the contractor shall notify the Engineer which in turn shall notify the Engineer of Record who will make any adjustments as required in the contract drawings.

ARTICLE 37 "INSURANCE/ INDEMNIFICATION"

Before commencing work as specified in the contract Contractor shall obtain at its own cost and expense the following insurance in insurance companies authorized in the State of Florida, with an A.M. Best rating of A-:VI or higher and shall provide evidence of such insurance to the City. The policies or certificates shall provide thirty (30) days prior to cancellation notices of same shall be given to the City by registered mail, return receipt requested, for all of the required insurance policies stated below. All notices shall name the Contractor and identify the agreement or contract number. The City of Key West, all Departments, Agencies, Boards and Commissions, its officers, agents, servants and employees are to be added as "Additional Insured" as respects liability arising out of activities performed by or on behalf of the Contractor.

Contractor shall maintain limits no less than those stated below:

A. **Worker's Compensation** – Statutory – in compliance with the Workers' Compensation law of the State of Florida. The coverage must include Employer's Liability with a limit of $1,000,000 each accident.

B. **Commercial General Liability** Insurance with a minimum limit of liability per occurrence of One Million ($1,000,000.00) Dollars with an annual aggregate of no less than Two Million ($2,000,000.00) Dollars. Evidence of any and all pending claims which may exhaust the aggregate may be requested.

C. **Business Automobile Liability** Insurance with a minimum limit of liability per occurrence of One Million ($1,000,000.00) Dollars for bodily injury and property damage unless otherwise indicated in the contract specifications. This insurance shall include for bodily injury and property damage the following coverage:
    - Owned automobiles

- Hired automobiles
- Non-owned automobiles

Location of operation shall be "All Locations."

D. **Excess/Umbrella Liability** shall have a minimum limit of Two Million ($2,000,000.00) per occurrence with an annual aggregate of Two Million ($2,000,000.00.) This coverage is to be following form and include the Commercial General Liability and Automobile Liability Policies.

E. All insurance required by this contract shall include a waiver of subrogation as to the Owner, Consultant, Contractor and their respective officers, agents, employees and sub-contractors.

F. WAIVER OF SUBROGATION

All insurance required by this contract shall include a "waiver of subrogation" provision whereas the Contractor's and subcontractor's insurer waives any claim against the City of Key West, the Engineer, and their respective officers, agents, and employees.

G. SCOPE OF INSURANCE AND SPECIAL HAZARDS

The insurance required under Paragraphs A, B, C, D and E hereof is a minimum to provide adequate protection for the Contractor, respectively, against damage claims which may arise from operations under this contract, whether such operation be by the insured or by anyone directly or indirectly employed by the insured and, also against any of the special hazards which may be encountered in the entity's operation under this contract. The insurance required herein and approval of Contractor's insurance by the City of Key West shall not relieve or decrease the liability of the Contractor hereunder.

H. CERTIFICATES OF INSURANCE

Certificates of Insurance shall be filed and maintained throughout the life of this Contract with the City Clerk and Risk Management evidencing the minimum limits of insurance cited above. All policies shall provide they may not be terminated or modified without insurer providing the City of Key West at least thirty (30) days advance notice. Additionally, the Contractor shall immediately notify the City of any cancellation of such insurance.

I. INDEMNIFICATION AGREEMENT

The following **Indemnification Agreement** shall be made a provision of the contract:

The Contractor shall indemnify and hold harmless the City of Key West, its officers, and employees, from liabilities, damages, losses and costs, including, but not limited

to reasonable attorney's fees, to the extent caused by the negligence, recklessness or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of this agreement. Except as specifically provided herein, this agreement does not require Contractor to indemnify the City of Key West, its employees, officers, directors, or agents from any liability, damage, loss, claim, action or proceeding.

These indemnifications shall survive the term of this agreement. In the event that any action or proceeding is brought against the City of Key West by reason of such claim or demand, Contractor shall, upon written notice from the City of Key West, resist and defend such action or proceeding by counsel satisfactory to the City of Key West.

The indemnification provided above shall obligate Contractor to defend at its own expense to and through appellate, supplemental or bankruptcy proceeding, or to provide for such defense, at the City of Key West's option, any and all claims of liability and all suits and actions of every name and description covered above which may be brought against the City of Key West whether performed by Contractor, or persons employed or utilized by Contractor.

The Contractor's obligation under this provision shall not be limited in any way by the agreed upon Contract Price as shown in this agreement, or the Contractor's limit of or lack of sufficient insurance protection.

J. **SURETY AND INSURER QUALIFICATIONS**

All bonds, insurance contracts, and certificates of insurance shall be either executed by or countersigned by a licensed resident agent of the Surety or insurance company, having his place of business in the State of Florida, and in all ways complying with the insurance laws of the State of Florida. Further, the said Surety or Insurance Company shall be duly licensed and qualified to do business in the State of Florida. If requested, Contractor shall Provide Proof of Florida Licensure for all insurance companies. The Engineer's Firm and the Engineer of Record's Firm shall be named along with the City of Key West shall be named as Additional Insured on the insurance certificates

Sec. 2-799. Requirements For City Contractors to Provide Equal Benefits For Domestic Partners.

(a) Definitions. For purposes of this section only, the following definitions shall apply:

(1) ***Benefits*** means the following plan, program or policy provided or offered by a contractor to its employees as part of the employer's total compensation package: sick leave, bereavement leave, family medical leave, and health benefits.

(2) ***Bid*** shall mean a competitive bid procedure established by the city through the issuance of an invitation to bid, request for proposals, request for qualifications, or request for letters of interest.

(3) ***Cash equivalent*** means the amount of money paid to an employee with a domestic partner in lieu of providing benefits to the employee's domestic partner. The cash equivalent is equal to the employer's direct expense of providing benefits to an employee for his or her spouse.

The cash equivalent of the following benefits apply:

a. For bereavement leave, cash payment for the number of days that would be allowed as paid time off for the death of a spouse. Cash payment would be in the form of the wages of the domestic partner employee for the number of days allowed.

b. For health benefits, the cost to the contractor of the contractor's share of the single monthly premiums that are being paid for the domestic partner employee, to be paid on a regular basis while the domestic partner employee maintains such insurance in force for himself or herself.

c. For family medical leave, cash payment for the number of days that would be allowed as time off for an employee to care for a spouse who has

a serious health condition. Cash payment would be in the form of the wages of the domestic partner employee for the number of days allowed.

(4) ***Contract*** means any written agreement, purchase order, standing order or similar instrument entered into pursuant to the award of a bid whereby the city is committed to expend or does expend funds in return for work, labor, professional services, consulting services, supplies, equipment, materials, construction, construction related services or any combination of the foregoing.

(5) ***Contractor*** means any person or persons, sole proprietorship, partnership, joint venture, corporation, or other form of doing business, that is awarded a bid and enters into a covered contract with the city, and which maintains five (5) or more full-time employees.

(6) ***Covered contract*** means a contract between the city and a contractor awarded subsequent to the date when this section becomes effective valued at over twenty thousand dollars ($20,000).

(7) ***Domestic partner*** shall mean any two adults of the same or different sex, who have registered as domestic partners with a governmental body pursuant to state or local law authorizing such registration, or with an internal registry maintained by the employer of at least one of the domestic partners. A contractor may institute an internal registry to allow for the provision of equal benefits to employees with domestic partner who do not register their partnerships pursuant to a governmental body authorizing such registration, or who are located in a jurisdiction where no such governmental domestic partnership registry exists. A contractor that institutes such registry shall not impose criteria for registration that are more stringent than

those required for domestic partnership registration by the City of Key West pursuant to Chapter 38, Article V of the Key West
Code of Ordinances.

(8) ***Equal benefits*** mean the equality of benefits between employees with spouses and employees with domestic partners, and/or between spouses of employees and domestic partners of employees.

(b) Equal benefits requirements.

(1) Except where otherwise exempt or prohibited by law, a Contractor awarded a covered contract pursuant to a bid process shall provide benefits to domestic partners of its employees on the same basis as it provides benefits to employees' spouses.

(2) All bid requests for covered contracts which are issued on or after the effective date of this section shall include the requirement to provide equal benefits in the procurement specifications in accordance with this section.

(3) The city shall not enter into any covered contract unless the contractor certifies that such contractor does not discriminate in the provision of benefits between employees with domestic partners and employees with spouses and/or between the domestic partners and spouses of such employees.

(4) Such certification shall be in writing and shall be signed by an authorized officer of the contractor and delivered, along with a description of the contractor's employee benefits plan, to the city's procurement director prior to entering into such covered contract.

(5) The city manager or his/her designee shall reject a contractor's certification of compliance if he/she determines that such contractor discriminates in the provision of benefits or if the city manager or designee determines that the certification was created, or is being used for the purpose of evading the requirements of this section.

(6) The contractor shall provide the city manager or his/her designee, access to its records for the purpose of audits and/or investigations to ascertain compliance with the provisions of this section, and upon request shall provide evidence that the contractor is in compliance with the provisions of this section upon each new bid, contract renewal, or when the city manager has received a complaint or has reason to believe the contractor may not be in compliance with the provisions of this section. This shall include but not be limited to providing the city manager or his/her designee with certified copies of all of the contractor's records pertaining to its benefits policies and its employment policies and practices.

(7) The contractor may not set up or use its contracting entity for the purpose of evading the requirements imposed by this section.

(c) Mandatory contract provisions pertaining to equal benefits. Unless otherwise exempt, every covered contract shall contain language that obligates the contractor to comply with the applicable provisions of this section. The language shall include provisions for the following:

(1) During the performance of the covered contract, the contractor certifies and represents that it will comply with this section.

(2) The failure of the contractor to comply with this section will be deemed to be a material breach of the covered contract.

(3) If the contractor fails to comply with this section, the city may terminate the covered contract and all monies due or to become due under the covered contract may be retained by the city. The city may also pursue any and all other remedies at law or in equity for any breach.

(4) If the city manager or his designee determines that a contractor has set up or used its contracting entity for the purpose of evading the requirements of this section, the city may terminate the covered contract.

(d) Enforcement. If the contractor fails to comply with the provisions of this section:

(1) The failure to comply may be deemed to be a material breach of the covered contract; or

(2) The city may terminate the covered contract; or

(3) Monies due or to become due under the covered contract may be retained by the city until compliance is achieved; or

(4) The city may also pursue any and all other remedies at law or in equity for any breach;

(5) Failure to comply with this section may also subject contractor to the procedures set forth in Division 5 of this article, entitled "Debarment of contractors from city work."

(e) Exceptions and waivers.

The provisions of this section shall not apply where:

(1) The contractor does not provide benefits to employees' spouses.

(2) The contractor is a religious organization, association, society or any non-profit charitable or educational institution or organization operated, supervised or controlled by or in conjunction with a religious organization, association or society.

(3) The contractor is a governmental entity.

(4) The sale or lease of city property.

(5) The provision of this section would violate grant requirement, the laws, rules or regulations of federal or state law (for example, The acquisition services procured pursuant to Chapter 287.055, Florida Statutes known as the "Consultants' Competitive Negotiation Act").

(6) Provided that the contractor does not discriminate in the provision of benefits, a contractor may also comply with this section by providing an employee with the cash equivalent of such benefits, if the city manager or his/her designee determines that either:

a. The contractor has made a reasonable yet unsuccessful effort to provide equal benefits. The contractor shall provide the city manager or his/her designee with sufficient proof of such inability to provide such benefit or benefits which shall include the measures taken to provide such benefits or benefits and the cash equivalent proposed, along with its certificate of compliance, as is required under this section.

(7) The city commission waives compliance of this section in the best interest of the city, including but not limited to the following circumstances:

a. The covered contract is necessary to respond to an emergency.

b. Where only one bid response is received.

c. Where more than one bid response is received, but the bids demonstrate that none of the bidders can comply with the requirements of this section.

(f) City's authority to cancel contract. Nothing in this section shall be construed to limit the city's authority to cancel or terminate a contract, deny or withdraw approval to perform a subcontract or provide supplies, issue a non-responsibility finding, issue a non-responsiveness finding, deny a person or entity prequalification, or otherwise deny a person or entity city business.

(g) Timing of application. This section shall be applicable only to covered contracts awarded pursuant to bids which are after the date when this section becomes effective.

ARTICLE 38 "INDEMNITY"

Add the following:

The obligation of the Contractor under this Article shall be limited to the contractual liability as specified in the Supplementary Conditions, Article INSURANCE / INDEMNIFICATION.

ARTICLE 42 "CODES, ORDINANCES, PERMITS, AND LICENSES"

Add the following:

A. PERMIT FOR WORK WITHIN THE FEDERAL, COUNTY, AND/OR STATE RIGHTS-OF-WAY

The Owner will obtain from the county and/or state the necessary permit for work within the rights-of-way. A copy of the permit is available at the office of the Owner. The Contractor shall abide by all regulations and conditions stipulated in the permits, and such conditions and requirements are hereby made a part of these Supplementary Conditions, as fully and completely as though the same were fully set forth herein. The Contractor shall examine the permits granted to the Owner, by the county and/or state. Failure to do so will not relieve the Contractor from compliance with the requirements stated therein.

The Contractor shall prepare, submit, and have approved at his expense traffic maintenance plans required by federal, state, county, and local agencies having jurisdiction.

B. PERMIT FOR WORK WITHIN LOCAL RIGHTS-OF-WAY

The Contractor shall obtain from the City of Key West the necessary permits for work within the rights-of-way. The Contractor shall abide by all regulations and conditions, including maintenance of traffic.

C. NOISE ORDINANCE

City of Key West has a noise ordinance that allows working hours between 8:00 AM to 7:00 PM, Monday through Friday. No work should be performed during weekends or City Holidays, State Holidays and National Holidays. Any construction operations outside these hours and these days will require a variance from the City of Key West Commission.

D. "LICENSES"

THE BIDDER MUST BE A LICENSED CONTRACTOR BY THE STATE OF FLORIDA AND SUBMIT PROOF OF SUCH WITH THE BID.

A. Within 10 days of Notice of Award, the successful Bidder must represent that he holds all applicable, county, and City of Key West licenses and permits required to do business as a contractor with respect to the work described in the Contract Documents.

B. Further, the successful Bidder must, within 10 days of Notice of Award, furnish documentation showing that, as a minimum, he has complied with the provisions of Chapter 18 of the Code of Ordinances of the City of Key West in order to enter into the Agreement contained in the Contract Documents.

C. Specifically, within 10 days after Notice of Award, the successful Bidder must demonstrate that he holds, as a minimum, the following licenses and certificates:

1) City of Key West Tax License Receipt;
2) A valid Certificate of Competency issued by the Chief Building Official of Key West, Florida
3) A valid occupational license issued by the City of Key West, Florida.

F. WORK DURING HOLIDAYS

There shall be no work during City Holidays, State Holidays and National Holidays. Any construction operations during these days shall be approved by the City of Key West.

ARTICLE 45 "SAFETY"

Add the following sub article:

OCCUPATIONAL SAFETY AND HEALTH

The Contractor shall observe and comply with all applicable local, state, and federal occupational safety and health regulations during the prosecution of work under this Contract. In addition, full compliance by the Contractor with the U.S. Department of Labor's Occupational Safety and Health Standards, as established in Public Law 91-596, will be required under the terms of this Contract.

ARTICLE 46 "PROTECTION OF WORK AND PROPERTY"

Add the following Article:

HISTORIC PRESERVATION

The Contractor shall comply with Florida's Archives and Historic Act (Florida Statutes, Chapter 267) and the regulations of the local historic preservation board as applicable and protect against the potential loss or destruction of significant historical or archaeological data, sites, and properties in connection with the project.

ARTICLE 60 “OWNERS RIGHT TO TRANSFER EMPLOYMENT”

Add the following Article:

TERMINATION FOR CONVENIENCE AND RIGHT OF SUSPENSION

A. Owner shall have the right to terminate this Contract without cause by written notice of Termination to the Contractor. In the event of such termination for convenience, the Contractor’s recovery against the Owner shall be limited to that portion of the Contract amount earned through the date of termination, together with any retainage withheld and reasonable termination expenses incurred. Contractor shall not be entitled to any other or further recovery against the Owner, including, but not limited to, damages or any anticipated profit on portions of the Work not performed.

B. The Owner shall have the right to suspend all or any portions of the Work upon giving the Contractor prior written notice of such suspension. If all or any portion of the Work is so suspended, the Contractor shall be entitled to reasonable costs, expenses and time extension associated with the suspension.

ARTICLE 63 "LIQUIDATED DAMAGES"

Delete Article "LIQUIDATED DAMAGES" in its entirety and substitute the following:
LIQUIDATED DAMAGES

Should the Contractor fail to complete the work or any part thereof in the time agreed upon in the Contract Documents or within such extra time as may have been allowed for delays by extensions granted as provided in the Contract, the Contractor shall reimburse the Owner for the additional expense and damage for each calendar day, Sundays and legal holidays included, that project outlined in Contract Documents remains uncompleted after the completion date. Liquidated damages shall be assessed. It is agreed that the amount of such additional expense and damage incurred by reason of failure to complete the work is the per diem rate as stipulated in the Proposal. The said amount is hereby agreed upon as a reasonable estimate of the costs which may be accrued by the Owner after the expiration of the time of completion. It is expressly understood and agreed that this amount is not to be considered in the nature of a penalty but as liquidated damages, which have accrued against the Contractor. The Owner shall have the right to deduct such damages from any amount due or that may become due the Contractor or the amount of such damages shall be due and collectible from the Contractor or Surety.

ARTICLE 72 "PARTIAL PAYMENTS"

Delete the first paragraph of Article "PARTIAL PAYMENTS" and substitute the following:

No more than once each month the Contractor shall submit to the Engineer a detailed estimate of the amount earned during the preceding month for the separate portions of the work and request payment. As used in this Article the words "amount earned" means the value, on the date of the estimate, for partial payment of the work completed in accordance with the Contract Documents and the value of approved materials delivered to the project site suitably stored and protected prior to incorporation into the work.

ARTICLE 72 "PARTIAL PAYMENTS"

Add the following:

Payment will be made by the Owner to the Contractor within 40 days receipt of the written recommendation of payment from the Engineer.

ARTICLE 72 "PARTIAL PAYMENTS"

Delete Subarticle C "DEDUCTION FROM ESTIMATE" in its entirety and substitute the following:

DEDUCTION FROM ESTIMATE

The Owner will deduct from the estimate and retain as part security 10 percent of the amount earned for work satisfactorily completed. A deduction and retainage of 10 percent will be made on the estimated amount earned for approved items of material delivered to and properly stored at the jobsite but not incorporated into the work.

ARTICLE 72 "PARTIAL PAYMENT"

Delete Subarticle E "PAYMENT" in its entirety and substitute the following:

PAYMENT

After deducting the retainage and the amount of all previous partial payments made to the Contractor from the amount earned the amount due will be made payable to the Contractor. Recommendations for payment received by the Owner less than 40 days prior to the scheduled day for payment will not be processed or paid until the following month.

ARTICLE 75 "FINAL PAYMENT"

Delete Article "FINAL PAYMENT" in its entirety and substitute the following:

FINAL PAYMENT

Upon completion of the work the Contractor shall notify the Engineer, in writing, that he has completed it and shall request final payment. The Contractor shall be responsible for keeping an accurate and detailed record of his actual construction. Upon completion of construction and before final acceptance and payment the Contractor shall furnish the Engineer as-built drawings of his construction. Upon receipt of a request for final payment and the as-built drawings the Engineer will inspect and, if acceptable, submit to the Owner his recommendation as to acceptance of the completed work and as to the final estimate of the amount due the Contractor. Upon approval of this final estimate by the Owner and compliance by the Contractor with provisions in Article RELEASE OF LIENS OR CLAIMS, and other provisions as may be applicable, the Owner shall pay to the Contractor all monies due him under the provisions of these Contract Documents.

ARTICLE 75 "FINAL PAYMENT"

Add the following;

A. Acceptance and Final Payment.

Whenever the Contractor has completely performed the work provided for under the Contract and the Engineer has performed a final inspection and made final acceptance and subject to the terms of the Engineer will prepare a final estimate showing the value of the work as soon as the Engineer makes the necessary measurements and computations. The Engineer will correct all prior estimates and

payments in the final estimate and payment. The OWNER will pay the estimate, less any sums that the OWNER may have deducted or retained under the provisions of the Contract, as soon as practicable after final acceptance of the work, provided the Contractor has met the requirements of (1) through (8) below.

1 The Contractor has agreed in writing to accept the balance due or refund the overpayment, as determined by the OWNER, as full settlement of his account under the Contract and of all claims in connection therewith, or the Contractor, accepted the balance due or refunded the overpayment, as determined by the OWNER, with the stipulation that his acceptance of such payment or the making of such refund does not constitute any bar, admission, or estoppel, or have any effect as to those payments in dispute or the subject of a pending claim between the Contractor and the OWNER. To receive payment based on a FINAL PAYMENT CERTIIFCATE, The Contractor further agrees, by submitting a FINAL PAYMENT CERTIFICATE that any pending or future arbitration claim or suit is limited to those particulars, including the itemized amounts, defined in the original FINAL PAYMENT CERTIFICATE , and that he will commence with any such arbitration claim or suit within 15 calendar days from and after the time of final PAYMENT of the work and that his failure to file a formal claim within this period constitutes his full acceptance of the Engineer's final estimate and payment. The overpayment refund check from the Contractor, if required, will be considered a part of any Acceptance Letter executed.

2 The Contractor has properly maintained the project, as specified hereinbefore.

3 The Contractor has furnished a sworn affidavit to the effect that the Contractor has paid all bills and no suits are pending (other than those exceptions listed, if any) in connection with work performed under the Contract and that the Contractor has not offered or made any gift or gratuity to, or made any financial transaction of any nature with, any employee of the OWNER in the performance of the Contract.

4 The surety on the Contract bond consents, by completion of their portion of the affidavit and surety release subsequent to the Contractor's completion of his portion, to final payment to the Contractor and agrees that the making of such payment does not relieve the surety of any of its obligations under the bond.

5 The Contractor has furnished all required mill tests and analysis reports to the Engineer.

PART 4

SPECIFICATIONS

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01001
GENERAL REQUIREMENTS

1. PROJECT DESCRIPTION

1.1 GENERAL

A. The following information though not all-inclusive, is given to assist Contractors in the evaluation of the work required to meet the project objectives.

B. A brief description of the work is stated in the Invitation to Bid. To determine the full scope of the project or of any particular part of the project, coordinate the applicable information in the several parts of these Contract Documents.

1.2 FDOT SPECIFICATIONS

A. Portions of The Florida Department of Transportation Standard Specifications for Road and Bridge Construction and their Roadway and Traffic Design Standards, hereinafter referred to as the DOT Specifications, are referred to herein and amended, in part, and the same are hereby made a part of this Contract to the extent of such references and shall be as binding upon the Contract as though reproduced herein. Such reference shall mean the current edition, including all supplements. In case of a conflict in the requirements of the DOT Specifications and the requirements stated herein, the requirements herein shall prevail.

2. SEQUENCE OF OPERATIONS

2.1 MOBILIZATION AND DEMOBILIZATION

A. Contractor shall be responsible for mobilization and demobilization of labor, materials and equipment. Payment for mobilization and demobilization will be included in the unit price indicated in the BID.

B. DAILY REPORTS
   1) The CONTRACTOR shall submit daily reports of construction activities for each site, including non-work days. The report shall include:
      a) Manpower, number of men by craft
      b) Quality Control
      c) Equipment on the Project;
      d) Major deliveries
      e) Activities worked with reference to the CPM schedule activity numbers
      f) New problems
      g) Other pertinent information
   2) A similar report shall be submitted for/by each Subcontractor.
   3) The reports shall be submitted to the ENGINEER each month.

2.2 SCHEDULING

A. Plan the work and carry it out with minimum interference to the operation of the existing facilities. Prior to starting the work, confer with the Engineer and Owner's representative to develop an approved work schedule, which will permit the facilities to function as normally as practical. It may be necessary to do certain parts of the work outside normal working hours in order to avoid undesirable conditions. The Contractor shall do this work at such times and at no additional cost to the Owner.

B. SPECIAL EVENTS: Contractor may be asked to stop work during special events. No work will be allowed for intersections (TBD) on days corresponding to the events and schedule listed below. All material and equipment shall be totally off all streets by 5:00 P.M. the day before these dates:

No work shall be allowed to interfere on Roads and Streets with the city precincts open on election days.

MONROE COUNTY PRECINCTS (as of February 2006)

Prec. #1	Jaycee Clubhouse, 3825 Flagler Avenue, Key West
Prec. #2	Teen Center, 3465 S. Roosevelt Blvd., Key West
Prec. #3	Indigenous Park, 1801 White St. Key West
Prec. #4	Martin Luther King Community Pool, 300 Catherine St., Key West
Prec. #5	Old City Hall, 510 Greene Street, Key West
Prec. #6	St. Mary's Convent, 724 Truman Avenue, Key West
Prec. #7	Moose Club, 700 Eisenhower Drive, Key West
Prec. #8	Glad Tiding Tabernacle Assembly of God1209 United St (Georgia St Entrance) Key West
Prec. #9	Senior Citizens Plaza Auditorium (Rear Entrance), 1400 Kennedy Dr., Key West
Prec. #10	Church of Jesus Christ of Latter Day Saints, 3424 Northside Dr., Key West

2.3 COORDINATION

A. Contractors shall cooperate in the coordination of their separate activities in a manner that will provide the least interference with the Owner's operations and other contractors and utility companies working in the area, and in the interfacing and connection of the separate elements of the overall project work.

B. If any difficulty or dispute should arise in the accomplishment of the above, the problem shall be brought immediately to the attention of the Engineer.

2.4 WORK TO BE PERFORMED BY OTHERS

A. During the construction period for this project, the Owner (either with his own forces or under a separate contract) may be performing work that may require the cooperation of the Contractors in scheduling and coordination to avoid conflicts.

B. If any difficulty or dispute should arise in the accomplishment of the above, the problem shall be brought immediately to the attention of the Engineer.

C. All Contractors working on this site are subject to this requirement for cooperation, and all shall abide by the Engineer's decision in resolving project coordination problems without additional cost to the Owner.

3. SITE CONDITIONS

3.1 SITE INVESTIGATION AND REPRESENTATION

A. The Contractor acknowledges satisfaction as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, access to the site, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can any way affect the work or the cost thereof under this Contract.

B. The Contractor further acknowledges satisfaction as to character, quality, and quantity of surface and subsurface materials to be encountered from his inspection of the site and from reviewing any available records of exploratory work furnished by the Owner or included in these Documents. Failure by the Contractor to become acquainted with the physical conditions of the site and all available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the work.

C. The Contractor warrants that as a result of examination and investigation of all the aforesaid data, the contractor can perform the work in a good and workmanlike manner and to the satisfaction of the Owner.

D. The Owner assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the Owner.

3.2 INFORMATION ON SITE CONDITIONS

A. General: Any information obtained by the Engineer regarding site conditions, subsurface information, water level, existing construction of site facilities as applicable, and similar data will be available for inspection at the office of the Engineer upon request. Such information is

offered as supplementary information only. Neither the Engineer nor the Owner assumes any responsibility for the completeness or interpretation of such supplementary information.

3.3 DIFFERING SUBSURFACE CONDITIONS

A. The Engineer shall investigate such conditions promptly and following this investigation, the Contractor shall proceed with the work, unless otherwise instructed by the Engineer. If the Engineer finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for performing the work, the Engineer will recommend to the Owner the amount of adjustment in cost and time he considers reasonable. The Owner will make the final decision on all Change Orders to the Contract regarding any adjustment in cost or time for completion.

3.4 UTILITIES

A. During excavation the Contractor shall be responsible for determining, at his cost, the locations of all known utilities in the project area.

3.5 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

A. Where the Contractor's operations could cause damage or inconvenience to, telegraph, telephone, television, gas, water, sewer, or irrigation systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the Contractor.

B. Notify all utility offices, which are affected by the construction operation at least 48 hours in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.

C. The Contractor shall be solely and directly responsible to the Owner and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract

D. Neither the Owner nor its Officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work.

E. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.

F. In the event the Contractor encounters water service lines that interfere with trenching, he may, by obtaining prior approval of the property owner, Water Department, or Fire

Department as applicable, and the Engineer, cut the service dig through, and restore service with similar and equal materials at the Contractor's expense.

G. The Contractor shall replace, at his own expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract Documents or ordered by the Engineer.

4. TEMPORARY CONSTRUCTION UTILITIES AND FACILITIES

4.1 TEMPORARY WATER

A. The Contractor shall make his own arrangements to obtain suitable water for any need and shall pay all costs.

4.2 TEMPORARY ELECTRIC POWER

A. The Contractor shall make his own arrangements to obtain and pay for electrical power used until final acceptance by the Owner.

4.3 SAFETY REQUIREMENTS FOR TEMPORARY ELECTRIC POWER

A. Temporary electric power installation shall meet the construction Safety requirements of OSHA, State, and other governing agencies.

4.4 SANITARY FACILITIES

A. The Contractor shall provide and maintain sanitary facilities for his employees and his subcontractor's employees that will comply with the regulations of the local and State Departments of Health and as directed by the Owner.

4.5 STORAGE OF MATERIALS

A. Materials shall be so stored as to ensure the preservation of their quality and fitness for the work. When considered necessary, they shall be placed on wooden platforms or other clean hard surfaces and not on the ground. Stored materials shall be located so as to facilitate prompt inspection. Stored materials in the right –of –way shall be fully barricaded, with bottom height of 47” or lower and top height of 36” min., also they must be fitted and should have lights at night. Private property shall not be used for storage purposes without the written permission of the owner or lessee. Materials shall not be stored where access to any structure, plot, or road is blocked. Any material the Contractor wishes to store on the site must be approved by the Engineer or his designee, and must be stored at the location designated by him.

B. Delicate instruments and materials subject to vandalism shall be placed under lock cover and, if necessary, provided with temperature control as recommended by the manufacturer.

5. SAFETY AND CONVENIENCE

5.1 CONSTRUCTION SAFETY PROGRAM

A. The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.

B. The duty of the Engineer to conduct construction review of the Contractor's performance is not intended to include a review or approval of the adequacy of the Contractor's safety supervisor, the safety program or any safety measures taken in, on, or near the construction site.

C. The Contractor shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities, or unramped grade changes in pedestrian sidewalk or roadway. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work.

D. The performance of all work and all completed construction, particularly with respect to ladders, platforms, structure openings, scaffolding, shoring, lagging, machinery guards and the like, shall be in accordance with the applicable governing safety authorities.

E. During construction, the Contractor shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable at all openings, obstructions, or other hazards in streets, sidewalks, floors, roofs, and walkways. All such barriers shall have adequate warning lights as necessary, or required for safety. Also all barriers shall have a lower horizontal continuous frame member at a maximum of 17” above grade.

5.2 ACCIDENT REPORTS

A. If death or serious injuries or serious damages are caused; the Contractor must promptly report by telephone or messenger to the Engineer. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of or in connection with, the performance of the work whether on, or adjacent, to the site, giving full details and statements of witnesses.

B. If a claim is made against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

5.3 TRAFFIC MAINTENANCE AND SAFETY

A. Comply with all rules and regulations of the state, county, and city authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by express permission of the owner. Conduct the work so as to assure the least

possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by installing approved signs, barricades, and lights where necessary for the safety of the public. The convenience of the general public and residents adjacent to the project and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner.

B. Maintenance of Traffic shall be maintained at all construction sites until the work is either completed or any open trenches have been properly covered and all equipment is properly stored. Contractor shall maintain MOT signs in good repairs and required MOT lights should be operative at all times. The city inspector shall stop work if MOT is not properly maintained; there shall not be any additional cost to the city for this downtime.

C. When flagmen and guards are required by regulation, permits, or when deemed necessary for safety, they shall be furnished with approved orange wearing apparel and other regulation traffic-control devices. Flaggers shall be certified by State approved agency.

5.4 STREET MAINTENANCE

A. CONTRACTOR shall notify all residents and proprietors adjacent to construction site of work to be performed, more specifically the notice shall state the day and time construction will begin, the name and phone number of the

5.5 FIRE PREVENTION AND PROTECTION

A. The Contractor shall perform all work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

5.6 HURRICANE PREPAREDNESS PLAN

A. Within 30 days of the date of Notice to Proceed, the CONTRACTOR shall submit to the ENGINEER and City Representative a Hurricane Preparedness Plan. The plan should outline the necessary measures which the CONTRACTOR proposes to perform at no additional cost to the OWNER in case of a hurricane warning.

B. In the event of inclement weather, or whenever City Representative shall direct, CONTRACTOR will, and will cause Subcontractors to protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of City Representative, any portion of Work or materials shall have been damaged or injured by reason of failure on the part of CONTRACTOR or any Subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of the CONTRACTOR.

6. PRESERVATION, RESTORATION AND CLEANUP

6.1 SITE RESTORATION AND CLEANUP:

A. At all times during the work keep the premises clean and orderly and upon completion of daily work repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences regardless of whether these are on private property, or state county, or city rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition.

6.2 FINISHING OF SITE, BORROW, AND STORAGE AREAS

A. Upon completion of the project, all areas used by the contractor shall be properly cleared of all temporary structures, rubbish and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend in with the surrounding terrain.

6.3 AREA CLEANUP DURING CONSTRUCTION

A. Thoroughly clean all spilled dirt, gravel, sand, concrete, or other foreign materials caused by the construction operations from all streets and roads, grass, pathways, or concrete walkways and from adjacent areas at the conclusion of each day's operation. Wet concrete is not to be stored, dumped, or placed on the ground or other structures on any City property at any time. Truck or equipment wash down is not to be performed on City Property.

6.4 DUST PREVENTION

A. Give all unpaved areas used in the construction area an approved dust-preventive treatment or periodically water to prevent dust during construction. Applicable environmental regulations for dust prevention shall be strictly enforced.

7. CONTRACT CLOSEOUT

A. Comply with requirements stated in the General Conditions of the construction Contract and in Specifications for administrative procedures in closing out the Work.

B. RELATED REQUIREMENTS

a. Standard General Conditions of the Construction Contract and Supplementary Conditions.
b. Cleaning.
c. Project Record Documents.
d. Warranties and Bonds.

e. The respective sections of Specifications: Closeout Submittals Required of Trades.

C. SUBSTANTIAL COMPLETION

a. When CONTRACTOR considers the entire Work will be Substantially Complete, he shall submit to the ENGINEER:
b. A written notice that the Work is Substantially Complete.
c. A list of items to be completed or corrected.
d. Within a reasonable time after receipt of such notice, the ENGINEER and City Representative will make an inspection to determine the status of completion.
e. If the ENGINEER determines that the Work is not Substantially Complete:
f. The ENGINEER will promptly notify the CONTRACTOR in writing, giving the reasons therefore.
g. CONTRACTOR shall remedy the deficiencies in the Work, and send a second written notice of Substantial Completion to the ENGINEER.
h. The ENGINEER and OWNER will re-inspect the Work.
i. When the ENGINEER finds that the Work is Substantially Complete, he will: Prepare and deliver to OWNER a tentative Certificate of Substantial Completion on NSPE Form 1910-8-D, with a tentative list of items to be completed or corrected before final payment. After consideration of any objections made by the OWNER as provided in Conditions of the Contract, and when the ENGINEER considers the Work Substantially Complete, he will execute and deliver to the OWNER and the CONTRACTOR a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.
j. Request the CONTRACTOR to initiate closeout submittals.

D. FINAL INSPECTION

a. When CONTRACTOR considers the Work complete, submit written certification that:
b. Contract Documents have been reviewed.
c. Work has been inspected for compliance with Contract Documents.
d. Work has been completed in accordance with Contract Documents.
e. Equipment and systems have been tested in the presence of the OWNER's representative and are fully operational and operating at design specifications.
f. Work is completed and ready for final inspection.
a. The ENGINEER and City Representative will make an inspection within ten (10) days to verify the status of completion with reasonable promptness after receipt of such certification.
b. Should the ENGINEER consider that the Work is incomplete or defective:
c. The ENGINEER will promptly notify the CONTRACTOR in writing, listing the incomplete or defective work.
d. CONTRACTOR shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the ENGINEER that the Work is complete.
e. The ENGINEER will re-inspect the Work.

E. CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

a. When the ENGINEER finds that the Work is acceptable under the Contract Documents, he shall request the CONTRACTOR to complete any remaining closeout submittals.
b. Evidence of compliance with requirements of governing authorities.
c. Project Record Documents: Certified as-builts.
d. Operating and Maintenance Data, Instructions to OWNER's Personnel: Warranties and Bonds:
e. Spare Parts and Maintenance Materials Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.
f. Certificate of Insurance for Products and Completed Operations.

F. FINAL ADJUSTMENT OF ACCOUNTS

a. Submit a final statement of accounting to the ENGINEER.
b. Statement shall reflect all adjustments to the Contract Sum:
c. The original Contract Sum.
d. Additions and deductions resulting from:
e. Previous Change Orders.
f. Allowances.
g. Unit Prices.
h. Deductions for uncorrected Work.
i. Penalties and Bonuses.
j. Deductions for liquidated damages.
k. Other adjustments.
l. Total Contract Sum, as adjusted.
m. Previous payments.
n. Sum remaining due.

G. FINAL APPLICATION FOR PAYMENT

CONTRACTOR shall submit the final Application for Payment in accordance with procedures and requirements stated in the Standard General Conditions of the Construction Contract.

H. Warranty shall be in effect for five years and shall be covered by bond.

8 PAYMENT

8.1 GENERAL

A. Payment for the work in this section will be included as part of the Contract Unit Bid Prices amount stated in the BID. No separate payment shall be paid.

SECTION 01014
PROTECTION OF THE ENVIRONMENT

PART 1 GENERAL

A. The Contractor shall maintain all work areas within and outside the project boundaries free from environmental pollution, which would be in violation to any federal, state, or local regulations.

B. The work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as necessary.

C. Temporary erosion controls include, but are not limited to, grassing, mulching, setting, watering, and reseeding on-site surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the OWNER.

D. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the OWNER.

E. CONTRACTOR is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

PART 2 PROTECTION OF AIR QUALITY

A. The air pollution likely to occur due to construction operations shall be minimized by wetting down bare soils during windy periods, requiring the use of properly operating combustion emission control devices on construction vehicles and equipment used by contractors, and by encouraging the shutdown of motorized equipment not actually in use.

B. Trash burning will not be permitted on the construction site.

C. Contractor shall provide dust control for any asphalt / concrete removal and during the asphalt milling operations.

PART 3 CONSTRUCTION NOISE CONTROL

1 GENERAL

A. The Contractor shall conduct all his work, use appropriate construction methods and equipment, and furnish and install acoustical barriers, all as necessary so that no noise emanating from the process or any related tool or equipment will exceed legal noise levels, as set forth in the Code of Ordinances, City of Key West, Florida.

2 MITIGATION OF CONSTRUCTION NOISE IMPACT

A. The Contractor shall submit to the Engineer his plans to mitigate the construction noise impacts and to comply with the noise criteria specified herein, including the method of construction, the equipment to be used, and acoustical treatments if necessary.

PART 4 PAYMENT

7.1 GENERAL

A. Payment for the work will be incidental to the contract.

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SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 GENERAL

A. The CONTRACTOR shall receive and accept the compensation as provided in the BID and the Contract in full payment for performing all operations necessary to complete the work under the Unit Price and Lump Sum portions of this Contract, and also in full payment for all loss or damages arising from the nature of the work, until the final acceptance by the OWNER.

B. The Unit prices stated and Lump Sums stated in the BID include all costs and expenses for performing and completing the work as ordered and as shown on Contract Drawings, details, technical specifications, and specified herein. Measurement and payment for an item at a Unit Price or Lump Sum shown in the Proposal shall be in accordance with the description of the item in this section.

C. The CONTRACTOR'S attention is called to the fact that the quotations for various items of work are intended to establish a total price for completing the work in its entirety. Should the CONTRACTOR feel that the cost for an item has not been established in the BID, or this section, he shall include the cost for that work in an applicable BID item, so that this bid reflects his total Unit Prices and Aggregate Sums for completing the work in its entirety. It is the intent of this Contract that the CONTRACTOR provide a completed operating system, and any item required to accomplish this shall be included to establish a total cost.

D. The quantities for payment under this Contract shall be determined by actual measurement of completed items, in-place, and ready for service and accepted by the OWNER, in accordance with the applicable method of payment therefore contained herein. The CONTRACTOR shall designate and provide a representative to be present at, to witness, and to assist in the making of field measurement of payment.

1.2 MEASUREMENT–GENERAL

A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.

B. Whenever pay quantities of material are determined by weight, the material shall be weighed on scales furnished by CONTRACTOR and certified accurate by the state agency responsible. A weight or load slip shall be obtained from the weigher and delivered to the OWNER'S representative at the point of delivery of the material.

C. If material is shipped by rail, the car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through

mixing plants.

D. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by ENGINEER. Each vehicle shall bear a plainly legible identification mark.

E. All materials which are specified for measurement by the cubic yard "measured in the vehicle" shall be hauled in vehicles of such type and size that the actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. All vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting the above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

F. Units of measure shown on the Proposal shall be as follows unless specified otherwise.

Item	**Method of Measurement**
CY	Cubic Yard: Field Measure by ENGINEER within the limits specified or shown
EA	Each: Field Count by ENGINEER
LF	Linear Foot: Field Measure by ENGINEER
LS	Lump Sum: Unit is one; no measurement will be made
SF	Square Foot
SY	Square Yard
TON	Ton

1.3 PAYMENT

A. General: Progress payments will be made monthly on the date established at the preconstruction meeting.

B. Payment for all Work shown or specified in the Contract Documents is included in the Contract Price. No measurement or payment will be made for individual items except as itemized herein as unit price items or lump sum.

1.4 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.

2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by OWNER.
6. Material remaining on hand after completion of Work.

1.5 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored.

PART 2 DESCRIPTION OF PROPOSAL ITEMS

2.1 **BID SCHEDULE**

A. Bonds,

Paid per work order with copy of invoice provided to city.

B. Mobilization / Demobilization and MOT: will be 10% of each work order with a minimum of $2,000.00 and a maximum of $20,000.00

1. Payment for these Items will be made on a lump sum basis per work order.

C. General & Supplementary Conditions: Incidental to contract.

C. Trench Excavation, Backfill:

1. The unit price per linear foot shall constitute full payment for testing, and inspection, backfill material and all other work specified.

1. Payment for work specified in this section will be made at the unit prices per linear foot stated in the BID.

2. No separate payment will be made for preparation of right-of-way, disposal of waste material, removal of obstructions, pavement, curb and sidewalk removal, shoring, sheeting and bracing of trenches, location of excavated materials, brick removal, or temporary trench pavement, and all costs thereof shall be included in the unit price stated in the Proposal.

3. No payment for TRENCH EXCAVATION AND BACKFILL will be made unless all required backfill requirements are met.

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SECTION 01050
FIELD ENGINEERING

PART 1 GENERAL

1.01 DESCRIPTION:

A. Work Included:

1. Provide field-engineering services required for the Project, including but not limited to:
a. Survey work required in execution of the Work.
b. Civil, Structural, or other professional engineering services specified or required to execute the Contractor's construction methods.

B. Related Work:

1. General and Supplementary Conditions of the Contract.
2. Section 02010 Summary of Work.

1.02 QUALITY ASSURANCE:

A. Qualifications of Surveyor or Engineer: Professional Engineer and/or Surveyor currently licensed in the State of Florida.

1.03 SUBMITTALS:

A. Submit name and address of proposed Surveyor and/or Contractor's Engineer to the City.

B. Upon request of the City's Engineer, submit documentation to verify accuracy of field engineering work.

C. Submit certificates signed by the Surveyor or Engineer certifying that elevations and locations of the work of this Project are in conformance, or non-conformance, with the Contract Documents.

PART 2 EXECUTION

2.01 EXAMINATION AND PREPARATION OF SITE

A. Before starting operations, Contractor shall examine site of work to acquaint himself with conditions to be encountered.

B. Compare actual site with drawings and specifications.

C. Report discrepancies affecting work or cost thereof to the City.

D. Verify exact locations of sewers, water mains, gas mains, above or below ground electrical wires and conduits and structures which may interfere with work.
E. No extra compensation will be allowed for any extra work made necessary due to conditions or obstacles encountered during progress of work, which could have been determined by examination of site or by contacting Owners of pipelines and conduits before starting operations.

2.02 LINES AND GRADES

A. Prior to staking out work, Contractor shall verify established base line, benchmarks, and control points provided.

B. Contractor shall furnish and maintain lines and grades.

C. Contractor shall take immediate steps to correct errors or inconsistencies in lines and grades of work to be in conformity with Contract Documents.

D. Contractor shall be fully responsible for accuracy of lines and grades of work and control and checking and immediate correction of it.

2.03 RESTORATION

A. Items to remain which are disturbed, damaged, or removed when performing required work or for convenience of Contractor or to expedite his operations shall be restored, repaired, reinstalled, or replaced with new work and refinished, as appropriate, so as to be left in as good condition as existed before work commenced and such restoration shall be considered incidental to the work.

B. Any sidewalks or pavement replaced or installed shall meet ADA requirements.

C. Existing items to be altered, extended, salvaged, or relocated and reused, if found to be defective in any way, shall be reported to the City before items are disturbed.

D. Materials and workmanship used in restoring work shall conform in type and quality to original existing construction.

PART 4 - PAYMENT

4.1 GENERAL

A. Payment for work specified in this section will be incidental to the contract.

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SECTION 01300
SUBMITTALS

PART 1 GENERAL

1.01 GENERAL

A. Inquiries: Direct to ENGINEER regarding procedure, purpose, or extent of Submittal.

B. Submittal Submission Procedures: As provided in General Conditions, as specified herein, and as may otherwise be established during the preconstruction conference.

C. OWNER's Authorization: At any time, OWNER may authorize changes to procedures and requirements for Submittals, as necessary to accomplish specific purpose of each Submittal. Such authorization will be by Field Order or Work Change Directive.

D. Timeliness: Make submissions in accordance with requirements of individual Specification sections, as shown on the current accepted schedule of Submittals submissions, and in such sequence as to cause no delay in Work or in work of other contractors.

E. Identification of Submittals:

1. Complete, sign, and transmit with each Submittal package, one Transmittal of CONTRACTOR's Submittal Form attached at the end of this section.
2. Identify each Submittal with numbering and tracking system reviewed by ENGINEER:
   a. Sequentially number each Submittal.
   b. Resubmission of a Submittal will have original number with sequential alphabetic suffix.
3. Show date of submission and dates of previous submissions.
4. Show Project title and OWNER's contract identification and contract number.
5. Show names of CONTRACTOR, Subcontractor or Supplier, and manufacturer as appropriate.
6. Identify, as applicable, Contract Document section and paragraph to which Submittal applies.
7. Clearly identify revisions from previous submissions.

F. Incomplete Submittal Submissions:

1. At ENGINEER's sole discretion, ENGINEER will either (i) return the entire Submittal for CONTRACTOR's revision/correction and resubmission, or (ii) retain portions of the Submittal and request submission/resubmission of specified items or as noted thereon.
2. Submittals which do not clearly bear CONTRACTOR's specific written indication of CONTRACTOR review and approval of Submittal or which are transmitted with an unsigned or uncertified submission form or as may otherwise be required under Contract Documents, will be returned to

CONTRACTOR unreviewed for resubmission in accordance with Contract Documents.

3. Delays, resequencing or other impact to Work resulting from CONTRACTOR's submission of unchecked or unreviewed, incomplete, inaccurate or erroneous, or nonconforming Submittals, which will require CONTRACTOR's resubmission of a Submittal for ENGINEER's review, shall not constitute a basis of claim for adjustment in Contract Price or Contract Times.

F. Non-specified Submissions: Submissions not required under these Contract Documents and not shown on schedule of Submittals submissions will not be reviewed and will be returned to CONTRACTOR.

G. Transmit Submittals in accordance with current accepted schedule of Submittal submissions, and deliver as follows:

1. Submittals to: Designated Engineer by the General Service Department of the City of Key West.

H. Disposition of Submittals, Except Shop Drawings and Samples: As specified herein for administrative Submittals. ENGINEER will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:

1. Reviewed and Reviewed as Noted:
   a. Reference the General Conditions for intent.
   b. CONTRACTOR may proceed to perform Submittal related Work.
   c. One copy sent to Resident Project Representative.
   d. One copy for ENGINEER’s file.
   e. Two copies returned to CONTRACTOR, one for onsite records.
2. Revise and Resubmit (Revise/Correct or Develop Replacement and Resubmit):
   a. Revise/correct in accordance with ENGINEER's comments and resubmit.
   b. One copy to ENGINEER's file.
   c. One copy returned to CONTRACTOR appropriately annotated.
   d. Remaining copy will be destroyed.

I. ENGINEER's Review: ENGINEER will act upon CONTRACTOR's Submittal and transmit response to CONTRACTOR not later than 30 days after receipt, unless: (i) specified otherwise or (ii) accepted by ENGINEER as set forth in Paragraph ENGINEER's Duties below and identified on current accepted schedule of Submittals submissions. Re-submittals will be subject to the same review time.

1.02 SHOP DRAWINGS

A. Description: Reference the General Conditions.

B. Excessive Shop Drawing Review: Review of the first submission and two resubmissions of Shop Drawings will be performed by ENGINEER at no cost to CONTRACTOR. Subsequent additional resubmissions of that Shop Drawing will be reviewed by ENGINEER, however, ENGINEER will document work hours and other expenses required to perform such additional review(s). OWNER shall deduct these costs from Contractor's contract for reimbursement to the ENGINEER.

C. Copies: Submit four and one reproducible (total of five).

D. Submit Shop Drawings to ENGINEER in accordance with the General Conditions and as specifically required by individual Specification sections for equipment and materials to be furnished under these Contract Documents.

E. Identify and Indicate:

1. Pertinent Drawing sheet(s) and detail number(s), products, units and assemblies, and system or equipment identification or tag numbers.
2. Critical field dimensions and relationships to other critical features of Work.
    a. Each deviation or variation from Contract Documents.

F. Resubmissions: Clearly identify each correction or change made.

G. Foreign Manufacturers: When proposed, include following additional information:

1. Names and addresses of at least two companies closest to Project that maintain technical service representatives.
2. Complete inventory of spare parts and accessories for each piece of equipment.

H. Preparation:

1. Format: Whenever possible, schedule for and combine Shop Drawings required for submission in each Specification section into a single Submittal package.
2. Present in a clear and thorough manner and of sufficient detail to show kind, size, arrangement, and function of components, materials, and devices and compliance with Contract Documents. Identify details by reference to sheet and detail, and schedule or room numbers shown on Drawings.

PART 4 PAYMENT

A. Payment for the work in this section will be incidental

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SECTION 01390
PRECONSTRUCTION AUDIO-VIDEO RECORDINGS

PART 1 - GENERAL

1.01 REQUIREMENTS

A. The Contractor shall provide a color audio-video recording showing the entire preconstruction site. All videos shall be taken by a professional commercial video photographer. The video photographer shall be an established enterprise that routinely provides these services. The videos shall be in DVD format or .wav files on removable USB drive, indicating the date, project name, and a brief description of the location where the video was taken. The Contractor shall submit one (1) copy of the preconstruction audio-video to the OWNER.

B. No construction shall begin prior to the review and approval of the preconstruction audio-video tape by the OWNER.

1.02 RELATED REQUIREMENTS

Section 01300 Submittals

PART 2 - PRODUCTS

2.01 GENERAL

The total audio-video recording system and the procedures employed in its use shall be such as to produce a finished product that will fulfill the technical requirements of the project. The video portion of the recording shall produce bright sharp, and clear pictures with accurate colors and shall be free from distortion, and any other form of picture imperfection. All video recordings shall, by electronic means, display on the screen the time of day, the month, day, and year of the recording.

PART 3 - EXECUTION

3.01 GENERAL

A. The following shall be included with the audio-video documentation:

1. Coverage is required within and adjacent to the right of way, easements, storage, and staging areas where the work is to be constructed.

2. Documentation of the conditions of the adjacent properties or any affected structures as a result of the impending construction.

3. Videos shall be properly identified by project name. Video shall include direction of coverage, the name of the streets or easements, engineering station numbers, date and time of coverage.

4. Provide a written video log to aid in locating any section of the construction site that may be in question.

B. There will be no separate payment for this preconstruction audio-video recording. The cost will be incidental to the contract.

END OF SECTION

SECTION 01500
TESTING SERVICES

PART 1 GENERAL

1.1 WORK INCLUDED

A. The Contractor shall employ and pay for the services of a qualified commercial independent testing laboratory acceptable to the Engineer and the Owner to perform specified services.

B. Inspection, sampling, and testing is required for:

1. Trench excavation and backfill.
2. Paving and surfacing.
3. Additional quality checks as required by the Engineer.

C. Employment of a testing laboratory shall in no way relieve the Contractor of his obligation to perform work in accordance with the Contract.

PART 2 PRODUCTS

2.1 SUBMITTALS

A. Submit two copies of reports of inspections and tests to Engineer promptly upon completion of inspections and tests, including: Provide one copy in PDF.

1. Date issued.
2. Project title and Engineer's job number.
3. Testing laboratory name and address.
4. Name and signature of inspector.
5. Date of inspection or sampling.
6. Record of temperature and weather.
7. Date of test.
8. Location of inspection or test.
9. Identification of product and specification section.
10. Type of inspection or test.
11. Observation regarding compliance with the Contract Documents.

B. This report shall be signed and sealed by a Registered Professional Engineer Licensed in the State of Florida, and qualified to perform such service.

PART 3 EXECUTION

3.1 LABORATORY DUTIES - LIMITATIONS OF AUTHORITY

A. Cooperate with the Engineer and Contractor; provide qualified personnel promptly on notice.

B. Perform specified inspections, sampling, and testing of materials and methods of construction:

1. Comply with specified standards; ASTM, other recognized standards, authorized and as specified.
2. Ascertain compliance with requirements of Contract Documents.

C. Notify the Engineer and Contractor immediately of irregularities or deficiencies of work that are observed during performance of services.

D. Perform additional services as required by the Engineer.

3.2 ON SITE TESTING

A. On site testing must be performed by certified staff, by state approved agencies and must be approved by a professional engineer.
B. Testing as required by other sections of this document.

PART 4 PAYMENT

A. Payment for the work in this section will be incidental.

END OF SECTION
* * * * *

SECTION 01530
BARRIERS

PART 1 - GENERAL

1.01 REQUIREMENTS

Furnish, install, and maintain suitable barriers as required to prevent public entry, and to protect the work, existing facilities, trees, and plants from construction operations; remove when no longer needed, or at completion of work.

1.02 RELATED REQUIREMENTS

A. Section 02010 Summary of Work.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

2.02 FENCING

Minimum fence height shall be four feet. Open-mesh orange plastic fence shall be used to prohibit entry to the construction zone.

2.03 BARRIERS

Materials are Contractor's option, as appropriate to serve required purpose.

PART 3 - EXECUTION

3.01 GENERAL

A. Install facilities of a neat and reasonably uniform appearance, structurally adequate for the required purposes.

B. Maintain barriers during entire construction period.

C. Relocate barriers as required by the progress of construction.

3.02 FENCES

A. Provide and maintain fences necessary to assure security of the site during construction to keep unauthorized people and animals from the site when construction is not in progress.

B. Provide additional security measures as deemed necessary and approved by the OWNER.

3.03 TREE AND PLANT PROTECTION

A. Preserve and protect existing trees and plants at site which are designated to remain, and those adjacent to site.

B. Consult with the OWNER, and remove agreed-on roots and branches which interfere with construction. Employ a qualified tree surgeon to remove branches and treat cuts.

C. Protect root zones of trees and plants:
   1. Do not allow vehicular traffic or parking.
   2. Do not store materials or products.
   3. Prevent dumping of refuse or chemically injurious materials or liquids.
   4. Prevent puddling or continuous running water.

D. Carefully supervise excavating, grading and filling, and other construction operations, to prevent damage.

E. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.

3.04 REMOVAL

A. Completely remove barricades when construction has progressed to the point that they are no longer needed and when approved by the OWNER.

B. Repair damage caused by construction. Fill and grade areas of the site to the required evaluations, and clean up the area.

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 REQUIREMENTS

Contract completion includes substantial completion, final inspection after completion, final cleaning, contractor's closeout submittals, and final adjustment of accounts.

1.02 SUBSTANTIAL COMPLETION

A. When Contractor considers work has reached substantial completion, he shall submit to the OWNER the following:

1. Written notice that the work is substantially complete in accordance with Contract Documents.
2. A list of items yet to be completed or corrected and explanations thereof.

B. Within a reasonable time upon receipt of such notice, the OWNER will make an inspection, if necessary, to determine the status of completion.

C. Should the OWNER determine that the work is not substantially complete:

1. The OWNER will promptly notify the Contractor in writing, giving the reasons thereof.
2. Contractor shall remedy the deficiencies in the work and send a second written notice of Substantial Completion to the OWNER.
3. Upon receipt of the second notice, the OWNER will reinspect the work.

D. When the OWNER finds that the Work is substantially complete he will issue a Certificate of Substantial Completion with a tentative list of items to be completed or corrected before final inspection.

1.03 FINAL INSPECTION AFTER COMPLETION

A. When Contractor considers the Work is complete with all minor deficiencies completed or corrected, he shall submit written certification that:

1. Contract Document requirements have been met.
2. Work has been inspected for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents.
4. All minor deficiencies have been corrected or completed and the Work is ready for final inspection.

5. Project record documents are complete and submitted.

B. Within a reasonable time upon receipt of such certification, the OWNER will make an inspection to verify the status of completion.

C. Should the OWNER determine that the work is incomplete or defective:
   1. The OWNER will promptly notify the Contractor in writing, listing the incomplete or defective work.
   2. Contractor shall remedy the deficiencies in the work and send a second written certification to the OWNER that the work is complete.
   3. Upon receipt of the second certification, the OWNER will reinspect the Work.

D. When the OWNER determines that the work is acceptable, under the Contract Documents, he shall request the Contractor to make closeout submittals.

1.04 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean site; sweep paved areas, rake clean other surfaces.

C. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS

A. Project Record Documents

   1. At Contract Closeout, submit documents with transmittal letter containing date, project title, Contractor's name and address, list of documents, and signature of Contractor.
   2. Changes made by Field Order or by Change Order.

B. Evidence of payment and Release of Liens.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the OWNER.

B. Statement shall reflect all adjustments to the Contract Sum.
   1. The original Contract sum.
   2. Additions and deductions resulting from:
      a. Previous change orders or written amendment.
      b. Allowances
      c. Unit prices

d. Deductions for uncorrected work.
e. Deductions for liquidated damages
f. Other adjustments

3. Total contract sum as adjusted
4. Previous payments
5. Sum remaining due

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION

DIVISION 2

SITE WORK

SECTION 02010
SUMMARY OF WORK

PART 1 - GENERAL:

1.1 DESCRIPTION

Work Included: The general construction and furnishing of all materials, equipment and labor for the construction of a variety of milling and paving, minor roadbed reconstruction, reworking of existing roadbed, trench restoration, patching of existing asphalt pavement, asphalt pavement removal, utility adjustments, seepage trench installation, swale reconstruction, temporary and permanent pavement markings, flexible delineators, reflective pavement markings, signage, sod, site restoration, site clean-up, and all necessary appurtenances and incidental work to provide a complete and serviceable project identified as:

ASPHALT PAVING

A. Related requirements in other parts of the Contract Documents: General Conditions of the Contract for Construction.

B. Contractor's Duties:

1. In addition to provisions stipulated in other portions of the Contract Documents, the Contractor shall:

a. Secure permits as necessary for proper execution and completion of the work.

b. Give required notices.

C. The Contractor shall be totally responsible for all permits required and shall ensure that construction complies with all applicable local, state, and federal codes.

D. Provide an experienced, qualified, and competent Superintendent to oversee the Work and perform quality assurance inspections. Prior to starting construction, the proposed Superintendent's qualifications shall be submitted in writing to the City for approval. The approved Superintendent shall be expected to remain for the duration of the Project, unless the City or Engineer deem him/her inadequate and requests his/her removal or the Contractor cannot continue his services to the Project for a reason or reasons that shall be communicated in writing to the City.

E. A replacement Superintendent shall be required to follow the same approval process as required for the original. The Superintendent shall provide to the City Inspector Construction Reports for each day of construction, the reports shall be in English, legible, and signed. Contractor shall provide PDF copies monthly. Reports shall include quantity control checks done daily

F. It shall be the Contractor's responsibility to request approval for entrance to the site for work on Saturdays, Sundays, holiday, and weekday hours other than 7:00 am until 7:00 PM. No construction can commence before 8:00 AM on weekdays.

G. The Contractor shall provide material safety data sheets (2 copies) for chemicals, paints, coatings and materials used on-site prior to initiation of work.

H. The Contractor shall submit a site Safety and Health Plan as per OSHA 1910.120.

1.2 CONTRACTOR'S USE OF PREMISES

A. Work shall be scheduled as to not interfere with on-going area activities.

B. Coordinate use of premises and requirements for security under direction of City.

C. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

D. Obtain and pay for the use of additional storage or work areas needed for operation.

E. Contractor shall provide drinking water and toilet facilities for construction personnel; The City will not provide.

1.3 MAINTENANCE OF EXISTING UTILITIES OPERATION

A. Provide at least three week notice prior to interruption of utility services for temporary or permanent connections.

B. Keep interruption of utility services, and utility outages during disconnection, moving, and reconnection to a minimum.

C. Keys Energy shall be notified two weeks in advance in writing by the contractor for any KEYS support equipment required by the Contractor during any excavation. (e.g., Power poles next to excavations requiring support, etc.) No additional payment will be paid for this coordination.

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SECTION 02221
TRENCH EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 WORK INCLUDED

A. This Section covers the work necessary for the failed trench excavation and backfill, complete.

1.2 TRENCH EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type of materials encountered. The CONTRACTOR shall make own estimate of the kind of extent of the various materials, which will be encountered in the excavation. It is the contractors responsibly to comply with the laws and regulations pertaining to the Florida Trench Safety Act. Any cost for any engineering, material, labor, and administrative cost shall be included in the proposal cost for that line item.

1.3 RELATIVE COMPACTION

A. "Relative compaction" is defined as the ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the ENGINEER.

1.4 OPTIMUM MOISTURE CONTENT

A. "Optimum moisture content" shall be determined by the ASTM Standard specified to determine the maximum dry density for relative compaction. Field moisture content shall be determined on the basis of the fraction passing the 3/4-inch sieve.

1.5 SUBMITTALS

A. Submittals shall be made in accordance with the requirements specified in Section GENERAL REQUIREMENTS.

PART 2 PRODUCTS

2.1 FOUNDATION STABILIZATION

A. Foundation stabilization shall be 2-1/2-inch minus crushed rock, with reasonably well gradation from coarse to fine, and free from excessive dirt or other organic material with no more than 20 percent by weight passing the No. 200 sieve.

2.2 TRENCH BACKFILL

A. Backfill above the pipe zone shall be lime rock backfill meeting the requirements of Section 911 of the FDOT Specifications. Lime rock backfill may be excavated trench material if the CONTRACTOR screens or sieves the material to this Specification and maintains moisture content as specified herein. Test results will be required.

2.3 WATER FOR TRENCH BACKFILL

A. The CONTRACTOR shall make all arrangements for a source of water and bear all costs for the delivery of the water to the trench side.

2.4 COMPACTION EQUIPMENT

A. Compaction equipment shall be of suitable type and adequate to obtain the amount of compaction specified. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations and shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort.

B. Plate Tamper shall be sized for maximum of 24" lifts, or sized appropriately for the lift size.

2.5 GRASSING

A. All grassed areas that have been damaged by trench excavation shall be sodded with Floratam St. Augustine Sod as specified in section 02930, FINISH GRADING AND GRASSING.

PART 3 EXECUTION

3.1 PREPARATION OF RIGHT-OF-WAY

A. The CONTRACTOR shall perform all clearing necessary for the proper installation of all utility lines, structures, and appurtenances in the locations shown on the Drawings. All utility poles or structures subject to damage resulting from excavation shall be protected during construction and restored to original condition upon completion of the work.

3.2 DISPOSAL OF CLEARED MATERIAL

A. The CONTRACTOR shall bear all costs of disposing of trees, stumps, brush, roots, limbs, and other waste materials from the clearing operation. Material shall be disposed of in such a manner as to meet all requirements of state, county, and local regulations regarding health, safety, and public welfare.

B. In no case shall any material be left on the project, shoved onto abutting private properties, or be buried in embankments or trenches on the project.

3.3 OBSTRUCTIONS

A. This item refers to obstructions which may be removed and do not require replacement. Remove obstructions within the trench area or adjacent thereto such as tree roots, stumps, abandoned piling, buildings and concrete structures, logs, and debris of all types without additional compensation. The ENGINEER may, if requested, make changes in the trench alignment to avoid major obstructions, if such alignment changes can be made within the easement or right-of-way without adversely affecting the intended function of the facility. The CONTRACTOR shall pay all additional costs or credit the OWNER for any savings resulting from such alignment changes.

B. Dispose of obstructions removed from the excavation in accordance with Paragraph DISPOSAL OF CLEARED MATERIAL.

3.4 PAVEMENT, CURB, AND SIDEWALK REMOVAL

A. Cut all bituminous and concrete pavements, regardless of the thickness, and all curbs and sidewalks, prior to excavation of the trenches with an approved pavement saw, hydro-hammer, or approved pavement cutter. Width of the pavement cut shall be at least equal to the required width of the trench at ground surface. Pavement and concrete materials removed shall be hauled from the site and not used for trench backfill.

3.5 BRICK REMOVAL

A. Carefully remove all bricks encountered during excavation. The CONTRACTOR shall salvage all bricks and deliver them to the City at a specified site. The CONTRACTOR shall make arrangements with the City a minimum of 48 hours in advance of delivery of the bricks. This work shall be considered incidental.

3.6 TRENCH WIDTH

A. Minimum width of un-sheeted trenches in which pipe is to be laid shall be 18 inches greater than the outside diameter of the pipe or as approved. Sheeting requirements shall be independent of trench widths.

B. The maximum width at the top of the trench will not be limited, except where excess width of excavation would cause damage to adjacent structures or property.

C. Confine trench widths to dedicated rights-of-way or construction easements, unless special written agreements have been made with the affected property owner.

3.7 GRADE

A. Excavate the trench to the lines and grades shown or as established by the ENGINEER with proper allowance for pipe thickness and for pipe base or special bedding when required. If the trench is excavated below the required grade, correct any part of the trench excavated below the grade at no additional cost to the OWNER, with lime rock of the type specified for pipe

bedding. Place the lime rock over the full width of trench in compacted layers not exceeding 6 inches deep to the established grade with allowance for the pipe base or special bedding.

B. It shall be the CONTRACTOR'S responsibility to make exploratory excavations as required to verify location, size, and elevation of existing utilities. The CONTRACTOR shall call "48 hours before digging" the underground utilities location center at 1-800-432-4770.

3.8 SHORING, SHEETING, AND BRACING OF TRENCHES

A. Sheet and brace the trench when necessary to prevent caving during excavation in unstable materials, or to protect adjacent structures, property, workers, and the public. Increase trench widths accordingly by the thickness of the sheeting. Maintain sheeting in place until the pipe has been placed and backfilled at the pipe zone. Shoring and sheeting shall be removed, as the backfilling is done, in a manner that will not damage the pipe or permit voids in the backfill. All sheeting, shoring, and bracing of trenches shall conform to the safety requirements of the federal, state, or local public agency having jurisdiction. The most stringent of these requirements shall apply.

3.9 LOCATION OF EXCAVATED MATERIALS

A. During trench excavation, place the excavated material only within the construction easement, right-of-way, or approved working area. Do not obstruct any private or public-traveled roadways or streets. Conform to all federal, state, and local codes governing the safe loading of all trenches with excavated material.

3.10 FOUNDATION STABILIZATION

A. When, in the opinion of the ENGINEER, the existing material in the bottom of the trench is unsuitable for supporting the pipe, excavate below the flow line of the pipe, as directed by the ENGINEER. Backfill the trench to sub-grade of pipe base with foundation stabilization material specified herein before. Place the foundation stabilization material over the full width of the trench and compact in layers not exceeding 6 inches deep to the required grade.

3.11 TRENCH BACKFILL ABOVE PIPE ZONE

A. In trenches under all structures, sidewalks, roads, parking areas, piping, and similar facilities, except where specifically shown, deposit lime rock backfill material conforming to Paragraph 2.2 TRENCH BACKFILL in horizontal lifts not exceeding 12 inches in un-compacted thickness. Compact to not less than 95 percent relative compaction. If compaction requirements are not met, the thickness of the un-compacted horizontal lifts shall be reduced as directed by the ENGINEER. Repair any subsequent damage caused by settlement of trenches at the CONTRACTOR'S sole expense. Under no circumstances allow sharp, heavy pieces of material to drop directly onto the pipe or the tamped material around the pipe. Do not use backfill material of consolidated masses larger than 1/2 cubic foot.

B. Where backfill is placed in water, use # 57 crushed stone backfill at no additional cost to the Owner.

C. The # 57 rock must be vibrated to achieve consolidation to a point where rock does not settle.

3.12 MAINTENANCE OF TRENCH BACKFILL

A. Maintain the backfilled trench surface until surface restoration has been completed.

B. This maintenance shall include, but not be limited to, the addition of crushed rock backfill material to keep the surface of backfilled trenches reasonably smooth, free from ruts and potholes, and suitable for normal traffic flow.

C. No additional payment will be made for the maintenance of the trench backfill prior to completion of the work outlined above.

D. No pavement replacement shall be undertaken until all items outlined above have been completed and approved by the ENGINEER.

3.16 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. Dispose of all excess excavated materials. Make arrangements for the disposal and bear all costs or retain any profit incidental to such disposal.

3.17 BLASTING

A. No blasting of any kind will be permitted.

3.18 SETTLEMENT

A. Any settlement noted within 5 feet from fill and within the 5-year warranty period in accordance with the General Conditions will be considered to be caused by improper compaction methods and shall be corrected at no cost to the OWNER. Structures damaged by settlement shall be restored to their original condition by the CONTRACTOR at no cost to the OWNER.

3.19 MOISTURE CONTROL

A. During all compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of fill. Maintain moisture content uniform throughout the lift. At the time of compaction, the water content of the material shall be at optimum moisture content, plus or minus 2 percentage points.

B. Insofar as practicable, add water to the material at the site of excavation. Supplement, if required, by sprinkling the fill.

C. Do not attempt to compact fill material that contains excessive moisture. Aerate material by blading, disking, harrowing, or other methods, to hasten the drying process.

3.20 TESTING

A. Field Density and Moisture Tests: The Independent Testing Laboratory will determine in-place density and moisture content by any one or combination of the following methods:

1. ASTM D2922, D1556, D2216, or other methods selected by the ENGINEER. Cooperate with this testing work by leveling small test areas as designated.

Test areas shall be backfilled at CONTRACTOR'S sole expense. One (1) field density moisture test per trench, with additional every 50 feet if found that any part of the intersection does not does not meet compaction requirements. Additionally, a Vibratory Test shall be performed every 50 feet in rock back fill, should any settlement occur testing will be performed every 10 feet. Any section found not meeting the requirements shall be removed for 10 feet on either side of the failed tests and be reinstalled in 6 inch lifts. However, any lift of fill may be tested at any time, location, or elevation. See Section TESTING SERVICES.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for work specified in this section will be made at the unit prices stated in the BID.

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SECTION 02246
SILT SCREEN

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General provisions of Contract, including General and Supplementary Construction and Division 1 Specification Sections apply to work of this section.

1.2 SCOPE

A. Geotextile Fabric for Silt Fence: This specification covers material and construction requirements for silt fence.

1.3 SUBMITTALS

A. Submit manufacturer's technical data and design and dimensions for installation of all silt fence items to ensure conformance with plans and specifications and Section 985 of FDOT Specification for silt fence.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fabric: The geotextile fabric shall be a woven fabric consisting of long chain polymeric filaments such as polypropylene, polyethylene, polyester, polyamides, or polyvinylidenechloride and shall be in conformance with Section 985 of FDOT Specifications for silt fences.

B. Posts: Posts shall consist of 2" x 4" or 2 ½" diameter minimum Pressure Treated (P.T.) wood, or steel 1.33 ft./lb. Minimum.

PART 3 – EXECUTION

3.1 INSTALLATION

A. The silt fence (geotextile fabric and posts) shall be installed in strict accordance with plans, manufacturer's specifications and Section 985 of FDOT Specifications for silt fence

B. Silt fence shall be used and placed by the CONTRACTOR as needed and required by SFWMD and FDEP by the 2001 standard construction practice to stop the silts from moving out of the work area

PART 4 - PAYMENT

4.1 GENERAL

A. Payment for this item shall be based on the unit price per linear foot stated in the BID. Payment shall be considered full compensation for furnishing all labor, materials, and equipment to complete the work as specified under this section

****

SECTION 02575
SURFACE RESTORATION

PART 1 GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary to install or replace all pavement, curbs, sidewalks, rock surfacing, and other street features damaged either directly or indirectly by the operations incidental to the construction described in other Sections of these Specifications, or required for new installations.

B. Where the materials, construction procedures, degree of compaction of materials, and the method of control and testing, as required in these Specifications differ from the FDOT requirements, the more stringent requirements shall apply.

C. Cold patch asphalt required for temporary restoration or "make safe" measures is included in TRENCH EXCAVATION AND BACKFILL.

D. Provide finished gradation and grassing in accordance with FINISH GRADING AND GRASSING.

E. Submittals are required for all products identified in this section.

F. The term "Standard Specifications" is used; such reference shall mean the most current edition of Florida Department of Transportation Standard Specification for Road and Bridge Construction. The Standard Specifications shall be considered as part of this section of the Specifications; below are Listed references for the contractor's convenience; the contractor shall be responsible for obtaining and incorporation in the contract all of the Standard Specification's and the most current revisions that apply to this contract scope of work. The contractor shall document in his daily reports the required Standard Specifications that are used.

G. Any reference of the following "FDOT", "Agency" "Engineer" in the References; shall be considered to be the Owner (City of Key West) for this contract. Disregard all Basis of Payments in the FDOT specs. Payment shall be as per the Contractors Bid prices

H. Listed Reference(s):

1. 105 QC GENERAL SS1050000
2. 230 LIMEROCK STABILIZED BASE
3. 234 SUPERPAVE ASPHLAT BASE SS2340000
4. 300 PRIME AND TACK COATS FOR BASE COURSES
5. 300 SS3000203
6. 327 MILLING OF EXISTING ASPHALT
7. SUPERPAVE ASPHALT CONCRETE SS3340000
8. 700 HIGHWAY SIGNING
9. 710 PAINTED PAVEMENT MARKINGS

10. 711 THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS
11. 911 LIMEROCK MATERIAL FOR BASE AND STABILIZED BASE
12. 914 MATERIALS FOR SUBGRADE STABIZATION SS9140000
13. 971 TRAFFIC MARKING MATERIALS

PART 2 PRODUCTS

2.1 GENERAL

A. All materials for replacement of existing base course and asphalt surfacing shall conform to the FDOT Specifications except as modified herein.

B. The CONTRACTOR will be responsible for furnishing satisfactory materials that meet the Specifications and shall make such tests during the course of the work as are necessary to assure that the quality of the material used meets the Specifications.

2.2 RELATIVE COMPACTION

A. "Relative compaction" is defined as the ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer.

2.3 OPTIMUM MOISTURE CONTENT

A. "Optimum moisture content" shall be determined by the ASTM standard specified to determine the maximum dry density for relative compaction. Field moisture content shall be determined on the basis of the fraction passing the 3/4-inch sieve.

2.4 LIME ROCK BASE COURSE

A. Aggregate quality and gradation shall confirm to Section 911 of the FDOT Standard Specifications for Road and Bridge Construction.

2.5 IMPORTED BASE COURSE ACCEPTANCE

A. Imported base course materials specified in this section are subject to the following requirement:

1. All tests necessary for the Contractor to locate an acceptable source of imported material shall be made by the Contractor. Certification that the material conforms to the Specification requirements along with copies of the test results from a qualified commercial testing laboratory shall be submitted to the Engineer for acceptance at least 10 days before the material is required for use. All material samples shall be furnished by the Contractor at the Contractor's sole expense. Samples shall be representative and be clearly marked to show the source of the material is required for use. All material samples shall be furnished by the Contractor at the Contractor's sole expense. Samples shall be representative and be clearly marked to show the source of

the material and the intended use on the project. Sampling of the material source shall be done by the Contractor in accordance with ASTM D75. Notify the Engineer at least 24 hours proper to sampling. The Engineer may, at the Engineer's option, observe the sampling procedures. Tentative acceptance of the material source shall be based on an inspection of the source by the Engineer and/or the certified test results submitted by the Contractor to the Engineer, at the Engineer's discretion. No imported materials shall be delivered to the site until the proposed source and materials tests have been tentatively accepted in writing by the Engineer. Final acceptance will be based on tests made on samples of material taken from the completed and compacted course. The completed course is defined as a course or layer that is ready for the next layer or the next phase of construction.

2. Gradation tests by the Contractor shall be made on samples taken at the place of production prior to shipment. Samples of the finished project for gradation testing shall be taken from each site for prepared materials or more often as determined by the Engineer, if variation in gradation is occurring, or if the material appears to depart from the Specifications. Test results shall be forwarded to the Engineer within 48 hours after sampling.

3. If tests conducted by the Contractor or the Engineer indicate that the material does not meet Specification requirements, material placement which does not meet Specification requirements, material placement will be terminated until corrective measures are taken. Material which does not conform to the Specification requirements and is placed in the work shall be removed and replaced at the Contractor's sole expense. Sampling and testing performed by the Contractor shall be done at the Contractor's sole expense.

2.6 BITUMINOUS PRIME AND TACK COAT

A. Prime Coat: Material shall be cutback asphalt, Grade RC-70 or RC-250 meeting FDOT Specification 916-2, or other material acceptable to the ENGINEER and meeting FDOT Specifications.

B. Tack Coat: Material shall be emulsified asphalt, Grade RS-2, SS-1, or SS-1H meeting requirements of FDOT Specification 916-4.

2.8 ASPHALT CONCRETE

A. The asphalt concrete shall be Type SP 9.5 or SP 12.5 in conformance with the most current, FDOT Specifications. Modification for Key West application may be used upon acceptance by the ENGINEER.

B. Aggregate: Asphalt concrete shall meet the requirements of FDOT Specifications.

C. Submit test results from a commercial testing laboratory to the ENGINEER to show that the materials meet the quality and graduation requirements.

2.9 CONCRETE – NOTE USED

2.10 FLOWABLE FILL – NOT USED

2.11 TRAFFIC STRIPING MARKINGS

A. The CONTRACTOR shall place and maintain temporary striping markings throughout the course of the work until the permanent striping marking is placed on the final roadway surface. Temporary striping shall be 20 mils. As Per FDOT Section 711

PART 3 EXECUTION

3.1 CONSTRUCTION PROCEDURE

A. Trench backfill shall be as specified in Section 02221 TRENCH EXCAVATION AND BACKFILL.

B. Replace all bituminous and concrete pavements damaged or removed under this Contract with asphalt concrete regardless of original type.

C. In addition to the requirements set forth herein, the work shall conform to the applicable workmanship requirements of the state highway or municipal specifications.

3.2 REMOVAL OF PAVEMENT

A. Removal of all pavement shall conform to Section 02221 TRENCH EXCAVATION AND BACKFILL and payment for removal shall be per Bid line item.

3.3 STREET MAINTENANCE

A. Maintain all trenches as specified under Section 02221 TRENCH EXCAVATION AND BACKFILL.

3.4 SUBGRADE

A. Backfill and compaction of trenches shall be as specified in Section 02221 TRENCH EXCAVATION AND BACKFILL. Shape sub-grade to required line, grade, and cross section. Remove all soft or otherwise unsuitable material disclosed by rolling the sub-grade and replace with suitable material from the excavation. Fill holes and depressions, which develop under the roller, to the required grade and cross sections with material from the excavation. The finished sub-grade shall be within a tolerance of plus or minus 0.08 of a foot of the grade and cross section, and shall be smooth and free from irregularities and at the density of 95 percent ASTM D1557.

3.5 CONSTRUCTION OF BASE COURSE

A. Obtain ENGINEER'S acceptance of the sub-grade prior to placing any base course material on the sub-grade. Place BASE COURSE in maximum 6-inch loose lifts and compact to not less than 98 percent relative compaction.

3.6 BASE COURSE REPAIR

A. General:

1. The base course repair work shall consist of constructing a compacted lime rock base course, of the thickness and width in accordance with FDOT Specifications.

2. All base course repair work shall conform to the grades and cross sections of the existing pavement. The finished grade of the lime rock base shall be level with the existing base course. The lime rock for base construction shall be Miami Lime rock, in accordance with Section 911, FDOT Specifications. The base course shall be constructed in accordance with all applicable provisions of Section 200, FDOT Specifications.

3. If at any time the sub-grade material becomes mixed with the base course materials, the Contractor shall, without additional compensation, dig out and remove the mixture, reshape, and re-compact the sub-grade and replace the materials removed with the clean rock which shall be watered and rolled until satisfactorily compacted.

3.7 DEPTH OF LAYERS

A. The base course shall be constructed in lifts of not more than 6 inches in thickness prior to compaction.

3.8 SPREADING MATERIALS

A. The base course material may be spread by any method that will result in an even distribution of the material upon the roadway without perceptible separation in gradation.

B. Should there occur during any stage of the surfacing or stockpiling, a separation of the coarser from the finer materials causing serious lack of uniformity in the grading, the CONTRACTOR shall immediately make changes in the method of handling such as will prevent separation and meet acceptance of the ENGINEER.

C. Equipment such as scrapers and other equipment essentially used for earth excavation will not be permitted.

3.9 ROLLING

A. Compaction of each layer of base shall be performed in accordance with Section 200 of the FDOT Standard Specifications for Roadway and Bridge Construction.

B. Compaction equipment shall be adequate in design to provide compaction and obtain the specified density for each layer. Water shall be applied as needed to obtain the specified densities at the CONTRACTOR'S sole expense.

C. In-place density and moisture content will be determined by any one, or combination of, the following methods: ASTM D2922, 1556, D2216, or other methods selected by the ENGINEER. Cooperate with this testing work by leveling small test areas designated. Backfill of the test areas shall be at the CONTRACTOR'S sole expense. The frequency and location of testing shall be a minimum of one test per intersection, with additional test required in the intersection if the original test fails, at the ENGINEERS direction.

D. Each layer of base course shall be placed and compacted to the specified density before a succeeding layer is placed.

E. The CONTRACTOR shall construct the base course in an orderly manner so that a reasonable length of trench will be ready for testing and a reasonable amount of time will be allowed for the ENGINEER to perform tests and obtain the test results during normal working hours.

F. Prior to testing any completed base course, the CONTRACTOR shall show reasonable proof that the completed section meets the requirements specified.

3.10 CORRECTION OF SURFACE DEFECTS

A. Should irregularities develop in any surface during or after rolling, they shall be remedied by loosening the surface and correcting the defects; after which the entire areas, including the surrounding surface, shall be re-rolled until thoroughly compacted. The finished surface shall be true to the proper grade and crown before proceeding with the surfacing.

3.11 SURFACE TOLERANCES

A. The finished surface of the base course at any point shall be within plus or minus 0.04 foot of the grade required to provide the specified pavement thickness.

3.12 BITUMINOUS PRIME AND TACK COAT

A. The provisions of FDOT Specifications shall be in effect for the construction of the prime coat.

B. The bituminous prime coat shall be applied to the lime rock base immediately prior to the placement of asphalt concrete.

C. The rate of application of the bituminous prime coat shall comply with FDOT Specifications.

D. The provisions of FDOT Specifications shall be in effect for the construction of the tack coat.

E. The bituminous tack coat shall be applied to existing asphalt surfaces prior to the placement of new asphalt, between layers of asphalt concrete surface courses, surfaces of concrete footings

that will come in contact with the asphalt concrete pavement, and vertical faces of all longitudinal and transverse joints that have become compacted or cooled.

F. The rate of application for the bituminous tack cost shall comply with FDOT Specifications.

3.13 ASPHALT CONCRETE PAVEMENT REPLACEMENT

A. Preparation for Paving:

1. A prime coat shall be applied over the full length of the repair, and asphalt concrete pavement shall not be placed until the prime coat has cured as per the manufacturer's recommendations.

2. Should any holes, breaks, or irregularities develop in the roadway surface after the prime coat has been applied, they shall be patched with asphalt concrete immediately in advance of placing the asphalt concrete.

3. After the maintenance, patching, or repair work has been completed and immediately prior to placing the asphalt concrete pavement, the surface of the prime coat shall be swept clean of all dirt, dust, or other foreign matter.

B. The proposed pavement construction schedule consists of immediately paving over storm drain, sewer line, and sewer service line trenches as soon as possible after it has been determined that sub-base and base have achieved required compactions. The base course will be brought up to the elevations indicated on the Drawings and asphalt placed to bring grade up to match existing pavement elevations.

3.14 ASPHALT CONCRETE PAVEMENT

A. Workmanship in producing, hauling, placing, compacting, and finishing asphalt concrete shall conform to the applicable portions of the FDOT Specifications.

3.15 CONSTRUCTION OF COURSES

A. The asphalt concrete pavement shall be constructed in one or more courses as required in the FDOT Specifications. asphalt shall be no less than 1 1/2“ thick final

B. Rolling shall continue until all roller marks are eliminated and the minimum percent compaction stated in the FDOT Specification has been obtained.

3.16 SURFACE TOLERANCE

A. Tests for conformity with the specified grade shall be made by the CONTRACTOR immediately after initial compression. Any variation shall be immediately corrected by the removal or addition of materials and by continuous rolling.

B. The completed surface of the pavement shall be of uniform texture, smooth, uniform as to grade, and free from defects of all kinds. The completed surface shall not vary more than 1/ 8 inch from the lower edge of a 10-foot straightedge placed on the surface along the centerline or across the trench.

C. After completion of the final rolling, the smoothness and grade of the surface shall again be tested by the CONTRACTOR.

D. When deviations in excess of the above tolerances are found, the pavement surface shall be corrected as stated in Section 330-12.4 of the FDOT Standard Specifications for Road and Bridge Construction.

E. All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the ENGINEER.

F. All costs involved in making the corrections of defects described above shall be borne by the CONTRACTOR and no compensation will be made for this work.

3.19 SAMPLES

A. If directed by the ENGINEER, the CONTRACTOR shall without additional charge, provide the ENGINEER with test results of samples of asphalt concrete cut from the completed pavement or the individual courses thereof. Provide a minimum of three test cores located as directed by the ENGINEER. He shall also provide the ENGINEER with test results of samples of the uncompressed asphalt concrete mixtures, and all materials incorporated in the work.

3.20 WEATHER CONDITIONS

A. Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall or any imminent storms that might adversely affect the construction. The ENGINEER will determine when surfaces and materials are dry enough to precede with construction.

3.22 PROTECTION OF STRUCTURES

A. Provide whatever protective coverings may be necessary to protect the exposed portions of bridges, culverts, curbs, gutters, posts, guard fences, road signs, and any other structures from splashing oil and asphalt from the paving operations. Remove any oil, asphalt, dirt, or any other undesirable matter that may come upon these structures by reason of the paving operations.

B. Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within the area to be surfaced, the resurfacing shall be level with the top of the existing finished elevation of these facilities. If they are not in accordance with the proposed finished surface elevations the CONTRACTOR shall notify the proper authority and either raise or lower the appurtenances or make arrangements with that authority and either raise or lower the appurtenances or make arrangement with that authority for having the facilities altered

before proceeding with the resurfacing around the obstruction. The CONTRACTOR will be responsible for making certain that appurtenances are brought to proper grade to conform with finished surface elevations and any delays experienced from such obstructions will be considered as incidental to the paving operation. No additional payment will be made. Protect all covers during asphalt application.

3.23 EXCESS MATERIALS

A. Dispose of all excess materials in complete compliance with Federal, State and Local Statues. Make arrangements for the disposal and bear all costs or retain any profit incidental to such disposal.

3.24 CONTRACTOR'S RESPONSIBILITY

A. Settlement of replaced pavement over trenches within the 5 year warranty period shall be considered the result of improper or inadequate compaction of the sub-base or base materials. The CONTRACTOR shall promptly repair all pavement deficiencies noted during the warranty period at the CONTRACTOR'S sole expense.

3.25 SIDEWALKS AND CURBS

A. Replace concrete sidewalks and curbs to the same section width, depth, line, and grade as that damaged. The minimum thickness of sidewalks shall be 4 inches. Driveways will be 6". Cut ends of existing curb to a vertical plane. Prior to replacing the sections, properly backfill, and compact the trench to prevent subsequent settlement.

B. Replace concrete sidewalks and curbs between scored joints and make replacement in a manner that will avoid a patched appearance. Provide a minimum 2-inch thick compacted leveling course of clean, crushed rock or gravel of quality herein before specified. Finish concrete surface similar to the adjacent sidewalks while meeting all current codes. Cut back sidewalks as required to ensure transition from existing to new sidewalks meets ADA code.

C. Concrete shall be a 3000 psi minimum rating.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work under this section shall be based on the appropriate unit prices stated in the Contractor's BID. Payment shall be considered full compensation for furnishing all labor, materials, and equipment to complete the work as specified under this section.

B. Payment for replacing sidewalks damaged by contractor will be incidental to the contract.

C. Payment for replacing curbs damaged by contractor will be incidental to the contract.

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SECTION 02731
ROADWAY SIGNS

PART 1 GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary for establishing a standard of signs, including furnishing and placing of signs and posts.

B. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

C. Areas disturbed by the CONTRACTOR whether inside or outside the limits of the construction area shall be restored in accordance with this section. Areas outside the limits of construction shall be restored at the CONTRACTOR'S sole expense.

1.2 SUBMITTALS

A. Shop Drawings: Product labels/data sheets.

PART 2 PRODUCTS

2.1 SIGNS

A. Signs shall meet the requirement of the most current Standard Specifications" Section 700.

PART 3 MATERIALS

3.1 CONCRETE

A. For footings, use Class II concrete meeting the requirements of FDOT Section 346.

3.2 ALUMINUM MATERIALS

A. For aluminum materials, meet the general provisions of FDOT 965-1.

PART 4 EXECUTION

4.1 ACCEPTANCE OF SIGNS

A. Manufacturer's Certification and Recommendations: Ensure that the sign manufacturer provides producer's certifications of materials incorporated into the signs. Ensure that the sign manufacturer certifies that the delivered signs conform to this Section and provides recommendations for storing and repairing signs.

B. Packaging and Shipping: Have the manufacturer package and ship the signs in a manner which will minimize possible damage.

C. Storage of Signs: If signs are stored prior to installation, store them in accordance with the manufacturer's recommendations.

D. Sign Inspection: Do not install signs until the Engineer inspects them for conformance with this Section. Provide all manufacturer certifications and recommendations prior to the Engineer's inspection. The Engineer will inspect the signs upon delivery to the storage or project site and again at the final construction inspection. Repair and replace signs deemed unacceptable by the Engineer at no expense to the City.

E. Imperfections and Repairs: Repair and replace signs containing imperfections or damage regardless of the kind, type, or cause of the imperfections or damage. Make repairs according to the manufacturer's recommendations and to the satisfaction of the Engineer. Ensure that completed repairs provide a level of quality necessary to maintain the service life warranty of the sign and are satisfactory in appearance to the Engineer.

4.2 FOOTINGS FOR SIGNS, POSTS, AND SUPPORTS

A. Excavation and Backfilling: Perform excavation and backfilling for the footings in accordance with Section 125, with the exceptions that no specific density is required and that the backfill may be tamped in 4 inches maximum layers. Use material that is at near optimum moisture and neither dry or saturated, and tamp to the extent directed by the Engineer. The City may require that the backfilling be done with poured concrete.

B. Removal of Footings: When existing ground mounted signs are to be modified or removed, immediately remove supports and footings that project more that 6 inches above the ground surface after removing sign panel from the assembly. Remove existing footings to a depth of at least 12 inches below the ground surface. The cost will be included in the Contract unit price of the item to which it is incidental.

PART 5 PAYMENT

A. The Contractors Unit price Payment in the proposal shall include removal and replacement of roadside traffic signs of each designated class of assembly, complete. Signs shall meet the requirement of the most current Standard Specifications" Section 700.

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SECTION 02735

MICRO-SURFACING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products and procedures for mixing and spreading a properly proportioned mixture of aggregate, mineral filler, additives, polymer-modified asphalt emulsion, and water.

B. Products and procedures for a cured mixture with a homogeneous appearance, a firm surface adhesion, and a skid resistant texture.
   1. Provide a micro-surface mixture that is capable of being spread in variable thickness cross-sections, ruts, scratch courses, and surfaces.

1.2 RELATED SECTIONS

A. Section 02746: Hydrated Lime

1.3 REFERENCES

A. AASHTO M 17: Standard Specification for Mineral Filler for Bituminous Paving Mixtures

B. AASHTO M 208: Standard Specification for Cationic Emulsified Asphalt

C. AASHTO T 11: Materials Finer Than 75 µm (No. 200) Sieve in Mineral Aggregate

D. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

E. AASHTO T 49: Penetration of Bituminous Materials

F. AASHTO T 53: Softening Point of Bitumen

G. AASHTO T 59: Testing Emulsified Asphalts

H. AASHTO T 96: Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

I. AASHTO T 104: Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

J. AASHTO T 176: Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test

K. AASHTO T 278: Surface Frictional Properties Using the British Pendulum Tester

L. AASHTO T 279: Accelerated Polishing of Aggregates Using the British Wheel

M. AASHTO T 316: Viscosity Determination of Asphalt Binder Using Rotational Viscometer

N. ASTM D 6372: Standard Practice for Design, Testing and Construction of Micro-Surfacing

O. ISSA A 143 Guidelines (Current edition)

P. FDOT Minimum Sampling and Testing Requirements

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Provide the Engineer with Mix Design 10 days prior to beginning construction.
   1. Meet requirements of this Section, article 2.6.

B. Provide the Engineer with the following for asphalt/polymer emulsion with job-mix design.
   1. Test report: Meet the requirements of this Section, article 2.1.
   2. A sample of asphalt/polymer emulsion with job-mix design.
   3. A certificate of analysis and compliance from the manufacturer for each shipment
   4. Target gradation for combined aggregate and mineral filler.
   5. Verify asphalt/polymer emulsion supplier adheres to FDOT Minimum Sampling and Testing Requirements.

C. Provide test reports for mineral aggregate.
   1. Meet the requirements of this Section, article 2.2.

D. Provide verification that Hydrated Lime meets. Refer to Section 02746.

E. Provide a Manufacturer's Certificate of Compliance for Mineral Filler.

F. Provide calibration documentation for each mixing unit that includes an individual calibration for each material at various settings, which can be related to the machines metering devices.

G. To make changes in the job-mix gradation:
   1. Submit a written request for a change in the job-mix gradation.
   2. Submit a new job-mix design if any changes in gradation are outside the gradation band allowed by the stockpile tolerance in Table 2.

PART 2 PRODUCTS

2.1 EMULSIFIED ASPHALT

A. Use a CSS-1h, quick-set polymer-modified asphalt emulsion conforming to AASHTO M 208; delete the cement mixing test requirements.

B. Mill or blend the polymer material into the asphalt or emulsifier solution prior to the emulsification process.

C. The asphalt/polymer emulsion must parallel the standard from an established infrared spectrum characterizing the asphalt/polymer emulsion.

D. Modified Emulsion Residue, meet Table 1:

Table 1

MODIFIED EMULSION RESIDUE		
TEST	**DESCRIPTION**	**SPECIFICATION**
AASHTO T 49	Penetration, 77°	40-90
AASHTO T 53	Softening point	135° Min
AASHTO T 59-modified (a)	F Residue by distillation	62% Min.
AASHTO T 316	Rotational Viscosity 275° F	650 CPS
(a) Modified distillation procedure: Heat emulsion residue to 270 ± 10 degrees F and maintain that temperature for 20 minutes. Perform the distillation within 60 ± 15 minutes		

2.2 MINERAL AGGREGATE

A. Use 100 percent manufactured mineral aggregates that meet the following requirements:
   1. Clean and free from organic matter, clay balls, or other detrimental substances.
   2. Maximum weighted sodium sulfate soundness loss of 15 percent. Refer to AASHTO T 104.
   3. Maximum loss by abrasion of 30 percent. Refer to AASHTO T 96.
   4. Sand equivalent of sixty or greater. Refer to AASHTO T 176.
   5. Minimum polishing value of 31. Refer to AASHTO T 278 and T 279.
      a. Performed on aggregate prior to crushing.
      b. Predominantly limestone or dolomite aggregates will not be accepted.

B. Select a job mix or target gradation within the gradation band. Base the mix design on this gradation. The percent passing each sieve will not vary by more than the stockpile tolerance and still remain within the gradation band after the target gradation has been submitted. Refer to AASHTO T 11, AASHTO T 27, and Table 2.

Table 2

Job-Mix Gradation Design Limits		
Sieve Size	Broad Band Gradation Percent Passing	Stockpile Tolerances
⅜	100	0
#4	70-90	±5
#8	45-70	±5
#16	28-50	±5
#30	19-34	±5
#50	12-25	±4
#100	7-18	±3
#200	5-15	±2

2.3 MINERAL FILLER

A. Use portland cement, hydrated lime, or aluminum sulfate as specified in AASHTO M 17

2.4 WATER

A. Use water that is potable and free from harmful salts, reactive chemicals, and any other contaminants.

2.5 ADDITIVES

A. Use additives as required to accelerate or retard the break-set of the micro-surface mix, to improve the resulting finished surface, or to increase adhesion.
   1. Determine the initial additive quantities from the mix design for the micro-surface mix or individual materials.
   2. Use additives that are compatible with the other components of the mix.
   3. Obtain Engineer approval for use of additives.

2.6 JOB-MIX DESIGN

A. Design according to ASTM D 6372-99a.
   1. Show each ingredient amount:
      a) Residual asphalt cement content, within 7.5 ± 2 percent by dry total weight of aggregate.
      b) Aggregate gradation (target) within the job-mix gradation design limits in Table 2.
      c) Mineral filler, percentage by total dry weight of aggregate.
      d) Polymer modifier 2.5 percent minimum polymer solids based on the residual asphalt content.

2. Identify additives as determined by design testing to control mix set times and adhesion.
   a) Provide acceptable percent limits for additives.
3. Conform to the ISSA A143 specifications listed in Table 3.
4. Use the same materials and aggregate gradation to be used on the project.

Table 3

ISSA Specifications		
ISSA TEST NO.	**DESCRIPTION**	**SPECIFICATION**
ISSA TB-139	Wet Cohesion @ 30 Minutes Minimum (Set) @ 60 Minutes Minimum (Traffic)	 12 kg-cm Minimum 20 kg-cm Minimum or Near Spin
ISSA TB-109	Excess Asphalt by LWT Sand Abrasion	50 g/ft^2 Maximum (538 g/m^2 Maximum)
ISSA TB-114	Wet Stripping	Pass (90% Minimum)
*ISSA TB-100	Wet-Track Abrasion Loss One-hour Soak Six-day Soak	 50 g/ft^2 (538 g/m^2) Maximum 75 g/ft^2 (807 g/m^2) Maximum
ISSA TB-147	Lateral Displacement Specific Gravity after 1,000 Cycles of 125 Pounds	5% Maximum 2.10 Maximum
ISSA TB-144	Classification Compatibility	11 Grade Points Minimum (AAA, BAA)
ISSA TB-113	Mix Time @ 77 degrees F	Controllable to 120 Seconds Minimum

* Perform the wet track abrasion test under laboratory conditions as a component of the mix design process.

2.7 EQUIPMENT

A. Use mixing equipment specifically designed and manufactured to mix and place micro-surfacing.
   1. Mix the material by an automatically sequenced, self-propelled micro-surfacing mixing machine that will be a continuous flow mixing unit, able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral filler, control setting additive, and water to a revolving multi-blade double shafted mixer and discharge the mixed product on a continuous flow basis.
   2. Use a machine with sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, control additive, and water to maintain an adequate supply to the proportioning controls.
   3. Use a machine capable of self-loading materials while continuing to place micro-surfacing.
   4. Equip the machine to allow the operator to have full control of the forward and reverse speed during applications of the micro-surfacing material.

a) Use original equipment manufacturer design for the self-loading device, opposite side driver stations, and forward and reverse speed controls.

5. Use proportioning devices with individual volume or weight controls for proportioning each material, such as aggregate, mineral filler, emulsified asphalt, additive, and water to be added to the mix.
   a) Use proportioning devices with controls properly marked that calibrate and determine the material output at any time.

B. Use spreading equipment that will agitate and spread the mixture uniformly by means of twin-shafted paddles or spiral augers fixed in the spreader box.
   1. Provide a front seal that results in no loss of mixture at the road contact point.
   2. Provide an adjustable rear seal that acts as final strike-off.
   3. Use a spreader box with the rear strike-off designed and operated to produce a free flow of uniformly consistent materials to the rear strike-off.
   4. Use a spreader box with a suitable means provided to side shift the box to compensate for variations in the pavement geometry.
   5. Provide a secondary strike-off to improve surface texture and with the same adjustments as the spreader box.
   6. Use a rut filling spreader box specifically designed to fill ruts when filling ruts with an average depth greater than one-half inch.
      a) Apply micro-surface as a scratch-coat pass when required to fill ruts less than ½ inch at the direction of the Engineer.
      b) Make multiple passes with the rut filling spreader box for ruts of over ½ inch at the direction of the Engineer.
      c) Allow a 24-hour cure time after filling ruts before placing final micro-surfacing layer.

C. Calibrate each mixing unit in the presence of the Engineer as follows:
   1. Prior to using on the project.
   2. After repairs or as directed by the Engineer.

PART 3 EXECUTION

3.1 LIMITATIONS

A. Do not apply micro-surface during rain, when road surface moisture is present, or during other adverse weather conditions.

B. Do not apply micro-surface if either the pavement or air temperature is below 50 degrees F.

C. Do not apply micro-surface when the temperature is projected below 33 degrees F within 24 hours of placing micro-surface.

D. Cease micro-surface operations when the weather or other conditions prolong opening road surface to traffic beyond two hours.

E. Keep traffic off roadway surface until the micro-surface has cured.

3.2 STOCKPILE

A. Construct individual 100-ton stockpiles of micro-surface aggregates.
   1. Engineer approves stockpiles a minimum of one and a maximum of seven days prior to use.

B. Notify the Engineer a minimum of seven calendar days prior to micro-surface placement in order for the initial stockpiles to be sampled and tested for acceptance.

C. Obtain the Engineer's written acceptance of a stockpile prior to its use in micro-surface.

D. Remove material not meeting specifications from the stockpile area.

E. Retest corrected material for acceptance.

3.3 PREPARATION

A. Clean the surface of all dirt, sand, dust, oil, and other objectionable material immediately prior to applying micro-surface.

B. Allow un-sealed cracks to dry thoroughly prior to applying micro-surface when using water to clean the road surface.

C. Cover manholes, valve boxes, drop inlets, and other service utility entrances prior to surfacing.

3.4 APPLICATION

A. Pre-wetting the surface is allowed when required by local conditions by fogging ahead of the micro-surface box.
   1. Do not over apply causing free water to sit on the pavement in front of the micro-surface box.

B. Place micro-surface mix that meets the job-mix design.
   1. Control the ingredients proportions by metering or measuring devices on the micro-surfacing equipment.
      a. Use readings from the metering or measuring devices to determine compliance with limits stated in the approved job-mix design.
   2. Limit any increase or decrease in the amount of mineral filler added to the mix during production to ±1 percent of the job-mix design.
   3. The emulsion submitted with the job-mix design will serve as the standard to assure the same emulsion is used throughout the project.

a. Engineer may request a new job-mix design and re-approval of the micro-surfacing if large disparities occur.

C. Pass the mineral aggregate over a scalping screen prior to transfer to the micro-surfacing mixing machine to remove oversize material.

D. Carry a sufficient amount of micro-surface in all parts of the spreader so that full width and complete coverage is obtained with no streaks or narrow spots.
1. Avoid overloading the spreader.

E. Apply micro-surface of proper consistency at an average rate of 24 to 30 lb/yd^2.
1. Apply micro-surface for rut filling as required.

F. Do not add additional water for any reason once the mixture has been placed onto the road surface.

G. Remove and replace the micro-surface if any of the following occurs:
1. Lumping, balling, or unmixed aggregates.
2. Separation of the coarse aggregate from the emulsion and fines.
3. Excessive breaking of emulsion inside the spreader box.
4. Streaking caused by oversized aggregate.
5. Flushing or excessively rich areas appearing in the micro-surfacing after two hours from the time of placement.
6. Any measurable rutting, shoving, or other evidence of premature deformation when exposed to traffic with re-approved micro-surfacing materials and procedures.

3.5 TEST STRIP

A. Apply a test strip of at least 200 ft in length on the roadway before initial placement commences.
1. Achieve initial set within 30 minutes and show no visual signs of distress when exposed to traffic action after curing for 2 hours.
2. Become part of the completed item if the above conditions are present and all other requirements are met.
3. Remove and replace the micro-surfacing at no expense to the Department if the test strip fails to meet the conditions stated above.

B. Make necessary adjustments if test strip does not pass.
1. Obtain approval from the Engineer prior to repeating the test strip process.
2. The Engineer may require a new job-mix design if failures indicate an ingredient problem.

3.6 FINISHING DETAILS

A. Place the micro-surface so the depth of each course does not exceed twice the maximum aggregate size.

B. Do not create build-up when constructing longitudinal and transverse joints.

C. Place micro-surface adjacent to concrete pavements or concrete curb and gutter with a straight longitudinal edge.
   1. Do not allow over-lap in these areas.

D. Maintain straight lines at all locations.

E. Place micro-surface at side streets and intersections out to right-of-way line.

F. Use hand squeegees to spread micro-surface in areas that cannot be reached with micro-surface machine.
   1. Lightly dampen areas prior to mix placement.
   2. Provide complete and uniform coverage.
   3. Avoid unsightly appearance from handwork.
   4. Use the same type of finish in hand worked areas as applied by the spreader box.

G. Use construction paper or comparable products so all beginning and ending joint lines from each construction pass are straight.

PART 4 PAYMENT

4.1 GENERAL

B. Payment for the work under this section shall be based on the appropriate unit prices stated in the Contractor's BID. Payment shall be considered full compensation for furnishing all labor, materials, and equipment to complete the work as specified under this section.

END OF SECTION

SECTION 02746
HYDRATED LIME

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products and procedures for incorporating hydrated lime into all asphalt mixes.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

A. AASHTO M 303: Lime for Asphalt Mixtures

B. ASTM C 110: Physical Testing of Quicklime, Hydrated Lime, and Limestone

C. ASTM C 1097: Hydrated Lime for Use in Asphaltic-Concrete Mixtures

D. ASTM C 1602: Mixing Water Used in the production of Hydraulic Cement Concrete

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Verification that the supplier is pre-qualified.

PART 2 PRODUCTS

2.1 HYDRATED LIME

A. Hydrated Lime: Meet AASHTO M 303, Type I, as specified.
   1. Conform physical requirements to ASTM C 1097, subparagraph d.1.
   2. Use test method ASTM C 110, paragraph 5.4.

2.2 WATER

B. Use potable water or water meeting ASTM C 1602.

PART 3 EXECUTION

3.1 APPLICATION

A. Add hydrated lime to all asphalt pavement mixes.
   1. Add the determined quantity of lime, following mix design.
   2. Base the amount of hydrated lime used on the dry weight of the aggregate.
   3. Use either Method A or B, unless Method B is called for in the bid schedule.

B. Method A: Lime Slurry – One part lime and three parts water by weight.
   1. Add lime at a minimum of 1 percent by weight.
   2. Maintain the lime slurry mix in a malted milk consistency.
   3. Deliver lime slurry to the twin shaft pugmill for mixing with aggregate.
   4. Adjust quantity (percent) of lime as necessary, based on results of Hamburg Wheel Tracker test.

C. Method B: Lime and Aggregate Stockpile Marination:
   1. Provide sufficient free moisture to thoroughly wet the aggregate and activate the lime before introducing hydrated lime.
   2. Add lime at a minimum of 1 ½ percent by weight.
   3. Thoroughly mix wet aggregate/lime mixture in a twin shaft pugmill.
   4. Marinate the aggregate/lime mixture in the stockpile for a minimum of 48 hours.
   5. Adjust quantity (percent) of lime as necessary, based on results of Hamburg Wheel Tracker test.
   6. Use the wet cured aggregate within 60 days.

D. Mixing Methods A and B: Provide a horizontal twin shaft pugmill.
   1. Adjust mixing paddles in the pugmill so that the aggregate being discharged is completely coated by the lime slurry.
   2. Do not allow volume of material in the pugmill to extend above the vertical position of the blade tips.

3.2 CONTROL AND MONITOR

A. Control the lime batching operation by the Program Logic Control (PLC) System based upon production set up data.

B. Monitor the following aspects and record on the computer data log printout:
   1. Display target and actual rates.
   2. Belt weight bridge for lime.
   3. Locked-in water meter.
   4. Meter to transfer lime slurry.
   5. Closed end loop to mainframe computer.

3.3 QUALITY CONTROL

A. Tolerance Controls
   1. Tolerance lime weight vessel static calibration ± 1.5 percent.
   2. Dynamic delivery calibration ± 1.5 percent.
   3. Inlet flow meter ± 2 percent.
   4. Discharge flow meter ± 1.5 percent.

PART 4 PAYMENT

4.1 GENERAL

A. The items under this section will be incidental to the contract.

END OF SECTION

SECTION 02930
FINISH GRADING AND GRASSING

PART 1 GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary for establishing a stand of grass, including furnishing and placing of grass sod, and fertilizing, watering, and maintenance of sodded areas.

B. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

C. Areas disturbed by the CONTRACTOR whether inside or outside the limits of the trench area shall be restored in accordance with this section. Areas outside the limits of trench shall be restored at the CONTRACTORS' sole expense.

1.2 SUBMITTALS

A. Shop Drawings: Product labels/data sheets.

B. Quality Control Submittals: Certification of sod, include source harvest date of sod and sod seed mix.

PART 2 PRODUCTS

2.1 FERTILIZER

A. Commercial Fertilizer: A complete plant food containing 12 percent nitrogen, 8 percent available phosphoric acid, and 8 percent potash at least 50 percent of the phosphoric acid shall be from normal super phosphate or an equivalent source which will have a minimum of two units of sulfur. The fertilizer shall be uniform in composition, dry, free flowing, and delivered in original, unopened containers bearing manufacture's guaranteed analysis.

2.2 SOD

A. Sod shall be grown by a certified turf nursery. The CONTRACTOR shall inform the owner as to the source of the sod to be used prior to ordering and delivery of sod.

B. Sod shall be St. Augustine Floratam, free of weeds or growth detrimental to economical maintenance, proper establishment, or appearance of completed turf. It shall be well matted with roots and certified in writing to be free of weeds and mole crickets by the supplier. Mow to height of 3 inches before lifting.

C. Dimensions: The sod shall be taken up in commercial-size rectangles, 12 inches by 24 inches or larger, except where 6-inch strip sodding is called for.

2.3 WATER

A. Water used in the grassing operations may be obtained from FKAA. The CONTRACTOR shall make all arrangements and pay for the cost of all water required for the establishment and maintenance of the grass.

2.4 TOPSOIL

A. Topsoil shall be crushed lime rock screening or tailings of a graduation similar to coarse sand.

PART 3 EXECUTION

3.1 INSTALLATION

A. These areas shall be fine graded to achieve the finished sub-grade after compaction which shall be obtained by rolling, dragging, or by an approved method which obtains an equivalent compaction to that produced by a hand roller weighing from 75 to 100 pounds per foot of width. All depressions caused by settlement or rolling shall be filled with additional existing or furnished topsoil and re-graded and prepared as specified above until it presents a reasonably smooth and even finish as the required sod sub-grade.

B. All sod furnished shall be living sod containing at least 70 percent of thickly matted grasses as specified and free from noxious weeds.

C. No broken pads or torn or uneven ends will be accepted. Standards size sections of sod shall be strong enough to support own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the section. Sod shall not be harvested when its moisture content (excessively wet or dry) may adversely affect its survival.

D. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not installed within this time period shall be subject to inspection and rejection by owner and shall be removed from the side and a fresh sod supply shall be furnished at no extra cost to the owner.

E. The sub-grade shall not be moist at time of installation; however, it should contain sufficient moisture so as not to be powdery or dusty, both as determined by the supplier's representative.

F. The overlapping of existing lawn with new sod along limit of work lines will not be permitted. Sod shall be laid in stripes, edge, with the lateral joints staggered. All minor or unavoidable openings in the sod shall be closed with sod plugs or with topsoil, as directed by the Engineer. However, sod laid with joints determined to be too large shall be lifted and 43 lay as specified herein at no extra cost to the owner.

G. Immediately after the sod is laid, the sod shall be watered thoroughly by hand or mechanical sprinkling until the sod and at least 2 inches of the topsoil bed have been thoroughly moistened.

H. CONTRACTOR shall be responsible to furnish his own supply of water to the site at no extra cost. If possible, owner should furnish CONTRACTOR, upon request, with a source and supply of water. CONTRACTOR shall apply for temporary meter and pay owner for water used at current utility billing rates. However, if owner's water supply is not available or not functioning, CONTRACTOR shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to lack of, or the use of, too much water, shall be the CONTRACTOR'S responsibility to correct.

3.2 MAINTENANCE

A. Maintenance Period: Begin maintenance immediately after each portion of grass is planted and continued for eight (8) weeks after all planting is completed.

B. Maintenance Operations: Maintenance shall include watering as specified, weeding, and removal of any stones that may appear. All bare or dead spots which become apparent shall be properly prepared, limed, fertilized, and re-sodded at CONTRACTOR'S expense as many time as necessary to secure a good growth. Mow to 3 inches after grass reaches 4 inches in height, and mow frequently enough to keep grass from exceeding 3½ inches. Weed by local spot application of selective herbicide only after first planting season when grass is established.

C. Take whatever measures are necessary to protect the sod while it is developing. These measures shall include furnishing or warning signs, barriers, or any other necessary measures of protection.

D. If, at the end of the 8-week maintenance period, a satisfactory stand of grass has not been produced, the CONTRACTOR shall renovate and re-sod the grass or unsatisfactory portions thereof immediately.

3.3 INSPECTION FOR ACCEPTANCE

Eight weeks after the star of maintenance on the last section of completed grass and on written notice from the CONTRACTOR, the ENGINEER will, within 15 days of such a written notice, make an inspection to determine if a satisfactory stand has been produced. If a satisfactory stand has not been established, another inspection will be made after written notice from the CONTRACTOR that the grass is ready for inspection following the next growing season.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work under this section shall be based on the appropriate unit prices stated in the Contractor's BID. Payment shall be considered full compensation for furnishing all labor, materials, and equipment to complete the work as specified under this section.

END OF SECTION

DIVISION 3
MATERIALS

SECTION 305
BITUMINOUS CRACK AND JOINT SEALING

305-1 Description.

Clean and seal joints and cracks in asphalt concrete roadway surfaces using the Cut and Seal method or the Crack Fill method.

305-2 Materials.

305-2.1 General Requirements: Use only hot applied sealants as described in this specification. Use either asphalt rubber or polymer modified asphalt rubber sealants as shown in the Contract Documents. Certify that each lot of premixed material meets the requirements of this Section and submit the test results of each lot used. Deliver each lot of sealant in containers with the manufacturer's name and lot number plainly marked.

305-2.2 Asphalt Rubber Binder Joint and Crack Sealer: Meet the following requirements:

305-2.2.1 Rubber Type and Content: Use ambient ground rubber at 18 plus or minus 1% by weight of virgin asphalt cement meeting the following gradation requirements:

Sieve Size	Percent Passing
No. 10	100
No. 16	95 to 100
No. 30	40 to 80
No. 80	0 to 5

305-2.2.2 Workability: The mixture pours readily and penetrates a 0.25 inch pavement joint or crack to a depth of at least 1.0 inch when the application temperature of the fully reacted mixture is 350ºF and the air temperature is 35ºF or higher.

305-2.2.3 Curing: The mixture, when placed in conventional field installation equipment, readily melts to a pumping consistency after being heated to 400°F for 2 hours maximum. The mixture remains in a pumping consistency when the temperature of the field installation equipment is reduced to the normal operating temperature range of 300ºF to 350ºF.

305-2.2.4 Softening Point: The minimum softening point shall be 185ºF when tested in accordance with ASTM D36.

305-2.2.5 Flexibility: Bend a 0.125 inch thick x 1.0 inch wide x 6.0 inches long mixture specimen after conditioning to 10.0ºF at a minimum bending rate of 9 degrees per second (10 seconds maximum for a 90º bend) over a 1.0 inch diameter mandrel without cracking in accordance with ASTM D3111.

305-2.2.6 Separation: Test for phase separation by pouring a representative sample of the mixture into aluminum tubes 1.0 inch in diameter and 5.5 inches long as described in AASHTO PP5. Cure the samples at 325ºF for 48 hours. Take samples from the top and bottom of the tube and determine the softening point as described in ASTM D36. Average the test results from the top and bottom samples. If there is 4.0% or more difference between the average test result and either of the top or bottom test results, reject the mixture due to separation.

305-2.2.7 Adhesion: When cooled, the mixture shall bond strongly to both asphalt and concrete pavement surfaces. The mixture shall contain no materials that chemically react with these surfaces to reduce the short-term and long-term adhesion bonds.

305-2.3 Polymer Modified Asphalt Rubber Binder Joint and Crack Sealer: In addition to

the requirements provided in 305-2.2, meet the following additional requirements:

Property	Specification
Cone Penetration, 77.0ºF (ASTM D5329)	30 - 60 dmm
Resilience, 77.0ºF, % Recovery (ASTM D5329)	30% minimum
Ductility, 77ºF, 50 mm/minute (AASHTO T 51)	300 mm minimum
Asphalt Compatibility (ASTM D3407)	Pass
Bitumen Content (ASTM D4)	60% minimum
Tensile Adhesion (ASTM D3583)	500% minimum
Rotational Viscosity (Brookfield), No. 5 spindle, 20 RPM, 400 ºF (AASHTO T 316)	3,000 – 15,000 cp

305-2.4 Delivery, Storage, and Handling: Package the premixed sealant material in units weighing no more than 30 pounds with a maximum of two 30-pound units per shipping container. Ensure that the plastic film used to package the units melts at normal application temperatures when placed in the installation equipment.

305-2.5 Field Performance: There shall be no pulling or tracking of the in-place crack sealant material by vehicle traffic after 20 minutes of material application. Failure to meet this requirement is cause for rejection of the material regardless of specified laboratory test results.

305-3 Equipment.

Use field equipment that produces or maintains specified temperatures, even if filled to capacity. Ensure that the equipment produces or maintains a homogeneous mixture of asphalt and rubber at a uniform temperature without hot or cool spots or segregation in the mixture. Ensure that the equipment for filling the joints and cracks directs the sealant into the crack. Ensure that the air compressors are satisfactory to the Engineer.

305-4 Construction.

305-4.1 General: All single transverse cracks in the travel lanes shall be sealed by the Cut and Seal method. All other cracks in the travel lanes, shoulders, and other auxiliary areas may be filled by either the Cut and Seal method or the Crack Fill method. Do not begin operations when the ambient air temperature is less than 40°F or when the roadway surface is moist.

305-4.2 Cut and Seal Method: Cut, clean and seal cracks and joints that are 1/16 inch or greater in width. Cut along the crack or joint to construct a uniform rectangular reservoir in which the sealant is to be placed. The reservoir shall be between 1/2 inch and 3/4 inch in width. The depth of the reservoir shall be between 1/2 inch and 1 inch. The cut reservoir shall have vertical, intact sides with no loosely bonded aggregate. Following cutting, the reservoir shall be cleaned using the air blast method or other acceptable method. The reservoir shall be inspected prior to the application of the sealant to ensure that it is clean, dry, and free of dirt, debris, adhered fines, or other contamination. If reservoirs are not clean and dry, they shall be re-cleaned to achieve the required condition. Sealant shall be applied to slightly overfill the reservoir and then struck off using a "V" shaped squeegee. The remaining squeegee material shall be flush with the pavement surface. In no case shall the remaining material be lower than the pavement surface or exceed 1/16 inch above the pavement surface. In no case shall the width of excess material on the pavement surface exceed 3 inches.

305-4.3 Crack Fill Method: Clean and seal joints and cracks that are 1/16 inch or greater in

width. Clean joints and cracks with air blast cleaning or other acceptable methods to a depth of at least twice the joint or crack width. Joints and cracks shall be inspected prior to the application of the sealant to ensure that they are clean, dry, and free of dirt, debris, adhered fines, or other contamination. Apply sealing material with a pressure nozzle. Completely fill cracks and joints. Sealant shall be applied to slightly overfill the crack or joint and then struck off using a "V" shaped squeegee. The remaining squeegee material shall be flush with the pavement surface. In no case shall the remaining material be lower than the pavement surface or exceed 1/16 inch above the pavement surface. In no case shall the width of excess material on the pavement surface exceed 3 inches.

305-4.4 Other: Prevent tracking with an application of fine sand, unless it can be demonstrated that the crack and joint sealer will not track without the application of sand. Other methods may be used if approved by the Engineer. Repair any pavement striping or markings affected by the application of crack and joint sealer. Repair any pavement striping or markings using material meeting the Department's specifications.

305-5 Method of Measurement.

The quantity of crack sealing to be paid for will be the linear feet of cracks or joints completed and accepted, determined by field measure.

305-6 Basis of Payment.

Price and payment will be full compensation for furnishing all materials and performing the work specified in this Section. Bituminous Crack and Joint Sealing - per linear feet.

333.1 General Description

This work includes placing one or more applications of bituminous material and aggregate on a previously prepared base or pavement.

333.1.01 Definitions

- **Single Surface Treatment:** One application of bituminous material that is covered with aggregate.
- **Double Surface Treatment:** A bituminous material application that is covered with aggregate of the size specified in the proposal followed by a second bituminous material application that is covered with a second specified size aggregate.
- **Triple Surface Treatment:** A bituminous material application that is covered with a specified size aggregate followed by subsequent applications of bituminous material that are covered with successively smaller size nominal aggregates.

333.1.03 Submittals

General Provisions 1 through 9.

333.2 Materials

A. Bituminous Material

Select the bituminous material from any type and grade listed in the materials table below. Notify the Engineer at least 10 days before ordering the bituminous material. The Engineer must approve the bituminous material choice.

Ensure that materials meet the requirements of the following Specifications:

Material	
Asphalt Cement, Performance Grade PG 58-22 or PG 64-22*	
Cationic Asphalt Emulsion, Grade CRS-2h or CRS-3*	
Latex-Modified Cationic Asphalt Emulsion, Grade CRS-2L	
* Use PG 64-22 or CRS-3 only at the Engineer's direction. (See Subsection 333.3.05.B.)	

B. Aggregates

The size and group of aggregates used in the surface treatment are specified in the Proposal under the appropriate Line Item.

Do not use unconsolidated limerock unless provided for in the Plans or Proposal.

Use Class B aggregates only where the surface treatment is used for shoulder construction or where it is to be overlaid with asphaltic concrete.

Material	
Coarse Aggregate, Class A Crushed Stone or Crushed Slag, Group I or II	
Fine Aggregate for Asphaltic Concrete*	
*For sand seal application, use WA 10 washed screenings made from Group II aggregates.	

333.2.01 Delivery, Storage, and Handling

General Provisions 1 through 9.

333.3 Construction Requirements

333.3.01 Personnel

General Provisions 1 through 9.

333.3.02 Equipment

Have the Engineer approve equipment types and quantities before using equipment on the Project.

Ensure that the equipment used to construct the surface treatment:

- Produces work that complies with the standards in this section
- Is on the Project and in proper working order before construction begins and during construction.

A. Aggregate Spreader

The Department will inspect annually the aggregate spreader before it is used in the work. If the spreader is approved, the Department will attach an equipment certification sticker to the spreader.

Use a self-propelled aggregate spreader that can apply aggregate at the desired rate uniformly and accurately without corrugation, overlaps, or excess deficient areas.

Ensure that the spreader can spread courses to the required widths. Provide spreaders to promptly cover the full width of the asphalt application.

B. Pressure Distributor

The Department will inspect annually the pressure distributor before it is used in the work. If the distributor is approved, the Department will attach an equipment certification sticker to the distributor. The pressure distributor should be equipped as follows:

1. Mount the pressure distributor on pneumatic tires wide enough to prevent damage to the road surface.
2. Design, equip, maintain, and operate the distributor so that the bituminous material will be heated and applied evenly throughout the length of the spray bars. Ensure that it maintains a constant, uniform pressure on the nozzles.
3. Install screens between the tank and the nozzles and clean them frequently to prevent clogging.

4. Use an adjustable distributor that can deliver controlled amounts of bituminous material from 0.04 to 1.0 gal/yd², ± 0.02 gal/yd² (0.18 to 4.53 L/m², ± 0.10 L/m²) up to 24 ft (7.2 m) wide without atomization, streaking, or pulsation in the flow.
5. Use a distributor equipped with the following:
    - A tachometer and thermometers to indicate the application rate and the temperature of the tank contents
    - Measuring devices to accurately indicate the amount of bituminous material, in gallons (liters), in the distributor before and after each application
    - Full circulating spray bars that can be adjusted laterally to conform to a stringline and capable of vertical and horizontal adjustment.
    - A positive shut-off control to prevent dripping bituminous material on the roadway
    - A distributor tank equipped with a sample valve in a safe and convenient location to obtain bituminous material samples

C. Heating Equipment

Ensure that heating equipment will heat and maintain the bituminous material uniformly at the temperature required. Provide an accurate thermometer.

D. Steel-Wheeled Rollers

Use self-propelled, tandem-type steel-wheeled rollers. The rollers shall weigh from 3 to 8 tons (3 to 7 Mg). Ensure that the roller weights within these limits can properly seat the aggregate without fracturing the aggregate particles. Equip the roller drums with scrapers to prevent pick up of material. Combination rollers with pneumatic-tired wheels that can be alternated with a steel drum are permitted as a substitute for steel-wheeled rollers.

E. Pneumatic-Tired Rollers

Use self-propelled, two axles, pneumatic-tired rollers with smooth-tread rubber tires aligned such that gaps between the tires on one axle are covered by the tires of the other axle. Equip the roller tires with scrapers and scrubbers to prevent pick up of material. Ensure that all tires are of the same size and ply rating and inflated to a minimum of 60 psi (415 kPa). Maintain tire pressure such that the difference in pressure between any two tires does not exceed 5 psi (35 kPa). Provide ballast as directed by the Engineer.

F. Power Broom and Power Blower

Provide at least one power broom and one power blower, or a combination power broom and blower, that can remove dust or loose materials from the road surface.

333.3.03 Preparation

Firmly compact, finish, and prime new bases. Ensure that the bases conform to the lines, grades, and cross sections within the tolerances specified.

A. Removing Foreign Material

Use power brooms, power blowers, hand brooms, or other means to remove loose material, dust, dirt, clay, and other materials that prevent bituminous materials from adhering to the base.

Take special care to clean the outer edges thoroughly. Where necessary, use a motor grader blade to remove excess material off the paving edge.

B. Condition of Prime

Check the condition of prime as follows:

1. Ensure the prime is cured before placing the mat course.
2. Repair the prime if it is loose, soft, unbonded, removed, or damaged.
3. Remove concentrations of excess prime.
4. Perform additional rolling with a pneumatic-tired roller before surface treatment when directed by the Engineer.

333.3.04 Fabrication

General Provisions 1 through 9.

333.3.05 Construction

A. Observing Seasonal and Weather Limitations

Apply bituminous surface treatment only when:

- Ambient temperature has not been less than 45 ºF (7 ºC) for 48 hours immediately prior to application.
- No forecast of ambient temperature less than 45 ºF (7 ºC) for 48 hours immediately following application.
- Ambient temperature and road surface temperature is at least 60 ºF (16 ºC) and stable at the time of application.

No exceptions are permitted except as authorized by the Engineer.

Do not apply asphalt cement to a wet surface.

NOTE 1: When the relative humidity exceeds 80%, the ambient temperature exceeds 95 ºF (35 ºC), the pavement temperature exceeds 125 ºF (52 ºC) or the weather is windy or overcast, application of bituminous surface treatment will be at the discretion of the Engineer.

NOTE 2: If hot mix asphaltic concrete will be applied over the surface treatment, the Engineer may waive the seasonal limitations providing that traffic is not permitted on the surface treatment until it is covered with hot mix asphaltic concrete.

B. Using PG 64-22 or CRS-3

Only use PG 64-22 or CRS-3 when directed by the Engineer due to a problem with excessive aggregate pickup during high ambient temperature.

C. Observing Sequence of Operations and Quantities of Materials

The sequence of operations and quantities of materials are shown in Table 1, Table 2 and Table 3 (Table 1a—metric, Table 2a—metric and Table 3a—metric).

The Engineer will determine the material quantities to be used during construction and may change the minimum or maximum application rate of any course during construction if the total quantities are within the amounts shown in the Tables. Any deviation, or minus from the table quantities, will require a negotiated adjustment of the Contract price, which will be authorized by an approved Supplemental Agreement.

When a single application of bituminous surface treatment is used as a Crack-Relief Interlayer, use the quantities of materials shown in Table 2 (Table 2a—Metric).

When a sand seal application is Specified, use the quantities of materials shown in Table 3 (Table 3a—Metric).

Section 333—Bituminous Surface Treatment – Table 1

Application		**Type Construction**									
		Single				**Double**			**Triple**		
Stone Sizes	**1st appl.**		#89	#7	#6		#7	#6		#6	#5
	2nd appl.						#89	#7		#7	#7
	3rd appl.									# 89	# 89
		Control Tolerance				Control Tolerance			Control Tolerance		
1st Application Bituminous Materials (gal/yd²) PG58-22 or PG64-22		± .02	.17–.19	.18–.25	.22–.30	± .02	.20–.27	.26–.34	± .02	.20–.30	.24–.34
CRS-2h, CRS-3		± .02	.20–.22	.21–.29	.25–.35	± .02	.23–.32	.30–.40	± .02	.23–.35	.28–.40
1st Application Stone (ft³/yd²)		± .03	.14–.18	.18–.26	.30–.42	± .03	.18–.26	.30–.42	± .03	.30–.42	.41–.53
2nd Application Bituminous Materials (gal/yd²) PG58-22 or PG64-22						± .02	.18–.24	.24–.31	± .02	.20–.27	.20–.27
CRS-2h, CRS-3						± .02	.21–.28	.28–.36	± .02	.23–.32	.23–.32
2nd Application Stone (ft³/yd²)						± .03	.14–.18	.18–.26	± .03	.18–.26	.18–.26
3rd Application Bituminous Materials (gal/yd²) PG58-22 or PG64-22									± .02	.18–.24	.18–.24
CRS-2h, CRS-3									± .02	.21–.28	.21–.28
3rd Application Stone (ft³/yd²)									± .03	.14–.18	.14–.18

Total Bituminous Materials (gal/yd²) PG58-22 or PG64-22	± .02	.17–.19	.18–.25	.22–.30	± .03	.38–.51	.50–.65	± .04	.58–.81	.62–.85
CRS-2h, CRS-3	± .02	.20–.22	.21–.29	.25–.35	± .03	.44–.60	.58–.76	± .04	.67–.95	.72–1.0
Total Stone (ft³/yd²)	± .03	.14–.18	.18–.26	.30–.42	± .04	.32–.44	.48–.68	± .05	.62–.86	.73–.97

Notes:

- The bituminous material and stone for each application may be varied by the Engineer, at no increase in cost, outside of the minimum or maximum shown in the table provided the total of the materials is within the limits of the total minimum and total maximum of all courses.
- Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
- Apply at least one seal coat to the mat course on the same day when multiple applications are specified.

Section 333—Bituminous Surface Treatment, Crack-Relief Interlayer – Table 2

Bituminous Material Application (gal/yd^2)	**Application Rate**	**Control Tolerance**
PG 58-22 or PG 64-22	.20 – .25	± .02
CRS-2h, CRS-2L or CRS 3	.25 – .29	± .02
Aggregate Application (ft^3/yd^2)	**Application Rate**	**Control Tolerance**
#7	.22 – .26	± .02

Notes:

- Target application rates for bituminous material and cover aggregate will be established by the Engineer within the limits shown in Table 2.
- Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
- Cover the single surface treatment Crack-Relief Interlayer with HMA Leveling on the same day.

Section 333—Bituminous Surface Treatment, Sand Seal – Table 3

Bituminous Material Application (gal/yd^2)	**Application Rate**	**Control Tolerance**
PG 58-22 or PG 64-22	.18 – .22	± .02
CRS-2h, CRS-2L or CRS 3	.20 – .26	± .02
Aggregate Application (ft^3/yd^2)	**Application Rate**	**Control Tolerance**
WA 10 Washed Screenings	.10 – .14	± .02

Notes:

- Target application rates for bituminous material and seal sand will be established by the Engineer within the limits shown in Table 3.
- Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
- Cover the coarse aggregate seal stone with seal sand on the same day.

Section 333—Bituminous Surface Treatment – Table 1a (Metric)

Application		**Type Construction**									
		Single				**Double**			**Triple**		
Stone Sizes	**1st appl.**		#89	#7	#6		#7	#6		#6	#5
	2nd appl.						#89	#7		#7	#7
	3rd appl.									# 89	# 89
		Control Tolerance				Control Tolerance			Control Tolerance		
1st Application Bituminous Materials (L/m^2) PG58-22 or PG64-22		± .09	.77–.86	.82–1.13	1.00–1.36	± .09	.91–1.22	1.18–1.54	± .09	.91–1.36	1.09–1.54
CRS-2h, CRS-3		± .09	.91–1.00	.95–1.31	1.13–1.58	± .09	1.04–1.45	1.36–1.81	± .09	1.04–1.58	1.27–1.81
1st Application Stone (m^3/m^2)		± .001	.005–.006	.006–.009	.01–.014	± .001	.006–.009	.01–.015	± .001	.01–.014	.014–.018
2nd Application Bituminous Materials (L/m^2) PG58-22 or PG64-22						± .09	.82–1.09	1.09–1.40	± .09	.91–1.22	.91–1.22

CRS-2h, CRS-3					± .09	.95–1.26	1.27–1.63	± .09	1.04–1.45	1.04–1.45
2nd Application Stone (m^3/m^2)					± .001	.005–.006	.006–.009	± .001	.006–.009	.006–.009
3rd Application Bituminous Materials (L/m^2) PG58-22 or PG64-22								± .09	.82–1.09	.82–1.09
CRS-2h, CRS-3								± .09	.95–1.27	.95–1.27
3rd Application Stone (m^3/m^2)								± .001	.005–.006	.005–.006
Total Bituminous Materials (L/m^2) PG58-22 or PG64-22	± .09	.77–.86	.82–1.13	1.00–1.36	± .14	1.72–2.31	2.26–2.94	± .18	2.63–3.67	2.81–4.53
CRS-2h, CRS-3	± .09	.91–1.00	.95–1.31	1.13–1.58	± .14	1.99–2.72	2.63–3.44	± .18	3.04–4.30	3.26–4.53
Total Stone (m^3/m^2)	± .001	.005–.006	.006–.009	.01–.014	± .0013	.011–.015	.016–.024	± .0016	.021–.029	.025–.033

Notes:

- The bituminous material and stone for each application may be varied by the Engineer, at no increase in cost, outside of the minimum or maximum shown in the table provided the total of the materials is within the limits of the total minimum and total maximum of all courses.
- Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
- Apply at least one seal coat to the mat course on the same day when multiple applications are specified.

Section 333—Bituminous Surface Treatment, Crack-Relief Interlayer – Table 2a (Metric)

Bituminous Material Application (L/m^2)	**Application Rate**	**Control Tolerance**
PG 58-22 or PG 64-22	.91 – 1.13	± .09
CRS-2h, CRS-2L or CRS 3	1.13 – 1.31	± .09
Aggregate Application (m^3/m^2)	**Application Rate**	**Control Tolerance**
#7	.007 – .009	± .0007

Notes:

- Target application rates for bituminous material and cover aggregate will be established by the Engineer within the limits shown in Table 2a (Metric).
- Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
- Cover the single surface treatment Crack-Relief Interlayer with HMA Leveling on the same day.

Section 333—Bituminous Surface Treatment, Sand Seal – Table 3a (Metric)

Bituminous Material Application (L/m^2)	**Application Rate**	**Control Tolerance**
PG 58-22 or PG 64-22	.81 – 1.00	± .09
CRS-2h, CRS-2L or CRS 3	.90 – 1.18	± .09
Aggregate Application (m^3/m^2)	**Application Rate**	**Control Tolerance**
WA 10 Washed Screenings	.003 – .005	± .0007

Notes:

- Target application rates for bituminous material and seal sand will be established by the Engineer within the limits shown in Table 3.
- Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
- Cover the coarse aggregate seal stone with seal sand on the same day.

D. Heating Bituminous Material

Evenly heat the entire mass of bituminous material for each application under positive control. While the material is being applied, maintain it within the specified temperature range.

E. Applying Bituminous Material

The following are temperatures at which bituminous material shall be applied.

Bituminous Material	**Asphalt Cement**	**CRS-2h**	**CRS-3**	**CRS-2L**
Application temperature °F (°C)	275–350 (135–177)	140–180 (60–82)	140–180 (60–82)	140–180 (60–82)

NOTE 1: Do not store emulsified asphalts at temperatures exceeding 150 °F (65 °C) for any extended time.

NOTE 2: Do not place bituminous surface treatment on fresh asphaltic concrete, except for paved shoulders, until the asphaltic concrete has been in place at least 30 days.

The Engineer will designate the maximum area to which bituminous material may be applied at one time. Apply the material as follows:

1. After applying the bituminous material to the section, immediately cover it with the correct application rate of aggregate before beginning the next section.

   Do not apply the bituminous material to the full width of the pavement unless the aggregate spreader can immediately cover the full width of the applied material.

NOTE: Never allow bituminous material to chill, set up, dry, or reach a condition that impairs the retention of cover aggregate before the aggregate is applied.

2. When a longitudinal joint is necessary:
   - Do not overlap the applications more than 4 in (100 mm).
   - Do not leave any area uncovered.
   - Never allow excess quantities of bituminous materials to build up.
3. On curves that require widening:
   a. Shoot the extra width on the outside first.
   b. Shoot the normal width with the distributor and follow the inside paving edge.
4. Ensure that the spray of bituminous material is uniform at all times. If the spray is not uniform:
   a. Stop the work.
   b. Change equipment, personnel, or methods to attain the required uniformity.
   c. Apply bituminous material at one-half the width of the roadway, if necessary.
5. If streaking develops:
   a. Stop the distributor and correct the problem before proceeding.
   b. Use a hand hose or a hand pouring pot to cover the streaked areas at approximately the same application rate of bituminous material.
6. If a part of the work cannot be reached by the distributor, treat it by hand hoses with nozzles.
7. Protect curbs, gutters, handrails, and other structures from discoloration by the bituminous material. Remove bituminous material that is sprayed or spilled on these structures.
8. Ensure that the bituminous material joins neatly in place by beginning and ending the asphalt application from a heavy paper or tight trough that is longer than the width of the treatment being applied. Place it to catch and hold the surplus material.
9. When cleaning and emptying the distributor, empty it where the bituminous material can be covered with dirt and completely disposed of without damaging the Rights-of-Way.

F. Spreading Aggregates

Spread the aggregates as follows:

1. Ensure that aggregates do not contain free moisture when spread.
2. Apply aggregate immediately after applying bituminous materials.
3. Uniformly spread the aggregate at the specified rate without corrugations, overlaps, excess, or deficient areas.
4. Move the spreader at a uniform speed, regardless of the grade.

5. Ensure that the distance that the aggregate free falls remains constant during spreading.
6. Remove corrugations. Operate the spreader to prevent overlap of aggregates. If overlap occurs, remove the excess aggregate before rolling.
7. Ensure a uniform aggregate spread by hand spotting and brooming as necessary.

G. Rolling

Observe the following guidelines for rolling bituminous surface treatment:

1. Synchronize the speed of the distributor and aggregate spreader with that of the rolling operation.
2. Use a minimum of two (2) individual rollers, one of which must be a pneumatic-tired roller meeting the requirements of Subsection 333.3.02.E.
3. If a steel-wheeled roller will fracture the aggregate, use pneumatic-tired rollers only.
4. Begin rolling within one minute after spreading the aggregate.
5. Operate rollers at speeds not exceeding 5 mph.
6. Proceed in a longitudinal direction, beginning at the outside edge of the aggregate application.
7. A roller pass is defined as one trip in a single direction.
8. Overlap each roller pass by approximately 1/2 the roller width.
9. Provide a minimum of three (3) roller passes per roller for each layer of aggregate to properly embed the aggregate particles.

Note: Unless a sufficient number of rollers are in operation to complete the above requirements, do not make subsequent applications of bituminous material until rolling of the previous application is completed.

H. Brooming

Use a revolving broom as necessary, supplemented by hand brooming, to remove or redistribute excess stone. Sweep the completed surface treatment within the first three hours of the next available workday following placement. Take care not to unseat bonded stone when sweeping.

I. Controlling Traffic

Do not allow traffic on the surface treatment until the bituminous material has cured sufficiently to ensure that the aggregate will not be loosened, dislodged, or whipped off by slow moving traffic.

Control traffic to speeds not exceeding 25 mph for a minimum of two hours after application of the seal stone and until the Engineer permits the road to be opened to normal traffic speeds.

Use pilot vehicles to control traffic speeds.

333.3.06 Quality Acceptance

General Provisions 1 through 9.

333.3.07 Contractor Warranty and Maintenance

Maintain and protect the surface course as required until the Project has been accepted. Make repairs as the Engineer directs. The cost of maintenance, protection, and repair is included in the Unit Prices Bid for the Item for which they apply.

333.4 Measurement

The area to be measured is the number of square yards of surface treatment completed and accepted.

333.4.01 Limits

The length is measured along the surface. The width is specified on the Plans, plus or minus any authorized changes. Irregular areas are measured by the surface square yard within the lines shown on the Plans or authorized changes.

424.5 Payment

The accepted area of surface treatment will be paid for at the Contract Unit Price per square yard (meter) complete under Cape Seal.

SECTION 335
MICRO-SURFACING

335-1 Description.

Construct a micro-surfacing pavement with the type of mixture specified in the Contract. Meet the general construction requirements of Section 330, except as modified herein. Micro-surfacing is a mixture of polymer-modified asphalt emulsion, mineral aggregate, mineral filler, water, and other additives, properly proportioned, mixed and spread on a paved surface.

The mix shall be capable of being spread in variable thickness cross-sections (wedges, ruts, scratch courses and surfaces) which, after curing and initial traffic consolidation, resists compaction throughout the entire design tolerance range of asphalt binder content and variable thickness to be encountered. The end product should maintain a skid-resistant surface in variable thick sections throughout the service life of the micro-surfacing.

The mix shall be a quick-traffic system that will be able to accept traffic two hours after application. Longer time periods will be acceptable, if approved by the Engineer.

335-2 Materials.

335-2.1 Emulsified Asphalt:

335-2.1.1 General Requirements: Provide a quick-traffic, polymer-modified asphalt emulsion conforming to the requirements specified in AASHTO M 208 for CSS-1h. The cement mixing test shall be waived for this emulsion.

The polymer material shall be co-milled into the asphalt or emulsifier solution prior to the emulsification process.

The minimum amount and type of polymer modifier shall be determined by the laboratory performing the mix design. The minimum amount required will be based on the asphalt content (by weight) and will be certified by the emulsion supplier; however, the amount shall not be less than 3.0% polymer solids.

The Engineer may waive the five-day settlement test, provided job-stored emulsion is used within thirty-six hours from the time of the shipment or the stored material has had additional emulsion blended into it prior to use.

335-2.1.2 Quality Tests: Meet the requirements of AASHTO M 208 for CSS-1h emulsion, plus the following criteria shown in Tables 335-1 and 335-2.

Table 335-1
Quality Tests for Asphalt Emulsion

AASHTO Test No.	Emulsion Property	Specification Requirements
AASHTO T 59	Residue after Distillation (1)	62% Minimum

(1) Maintain the test temperature below 280°F (138°C)

Table 335-2
Quality Tests for Asphalt Emulsion Residue

AASHTO Test No.	Residue Property	Specification Requirements
AASHTO T 53	Softening Point	135°F Minimum
AASHTO T 49	Penetration at 77°F	40 – 90 dmm

335-2.1.3 Sampling, Certification, and Verification: For the first load of emulsified asphalt produced for the project, the supplier shall submit a sample to the State Materials Office for

testing before use. A pretest number will then be assigned by the State Materials Office, which shall be furnished with all emulsified asphalt delivered to the project.

The Engineer may sample and test all subsequent loads of emulsified asphalt delivered to the project to verify and determine compliance with specification requirements. Where these tests identify material outside specification requirements, the Engineer may require the supplier to cease shipment of that pretested emulsified asphalt product. Further shipment of that pretested emulsified asphalt product to Department projects will remain suspended until the cause of the problem is evaluated and corrected by the supplier as necessary to the satisfaction of the Engineer.

335-2.2 Aggregate:

335-2.2.1 General: Use an aggregate blend which consists of 100% crushed granite. Use aggregates source(s) from the list of granitic aggregates available on the Department's website and also meeting the requirements of this specification. The URL for obtaining the list of granitic aggregates is:
ftp://ftp.dot.state.fl.us/fdot/smo/website/sources/frictioncourse.pdf

335-2.2.2 Aggregate Quality Tests: In addition to the requirements of Sections 901 and 902, meet the minimum aggregate requirements of Table 335-3.

Table 335-3
Quality Tests for Aggregate

AASHTO Test No.	Aggregate Property	Specification Requirements
AASHTO T 176	Sand Equivalent	65 Minimum
AASHTO T 104	Soundness	15% Maximum using Na_2SO_4 or 25% Maximum using $MgSO_4$
AASHTO T 96	Abrasion Resistance (1)	30% Maximum

(1) The abrasion test will be performed on the parent aggregate.

335-2.2.3 Gradation Requirements: When tested in accordance with FM 1-T 027 and FM 1-T 011, the target (mix design) aggregate gradation, including the mineral filler, shall be within the gradation range for a Type II mixture shown in Table 335-4.

Table 335-4
Aggregate Gradation Requirements

Sieve Size	Type II Mix Design Range Percent Passing	Stockpile Tolerance from Mix Design Percent Passing
3/8 inch	100	N/A
No. 4	90 – 100	± 5%
No. 8	65 – 90	± 5%
No. 16	45 – 70	± 5%
No. 30	30 – 50	± 5%
No. 50	18 – 30	± 4%
No. 100	10 – 21	± 3%
No. 200	5 – 15	± 2%

The aggregate will be accepted from the stockpile located at the project location. The stockpile will be accepted based on five quality control gradation tests conducted in

accordance with FM 1-T 002. If the average of the five gradation tests is within the stockpile tolerances shown in Table 335-4 for all of the sieve sizes, then the stockpile is accepted. If the average of the five gradation tests is not within the stockpile tolerances shown in Table 335-4 for any sieve size, remove the stockpiled material and replace it with new aggregate or blend other aggregate sources with the stockpiled material. Aggregates used in blending must meet the quality tests shown in Table 335-3 before blending and must be blended in a manner to produce a consistent gradation. If new aggregate is obtained or blending of aggregates is performed, submit a new mix design to the Engineer for approval prior to production of the mix. The new mix design gradation shall be within the gradation range for a Type II mixture shown in Table 335-4.

The Engineer may obtain stockpile samples at any time. If the average of five gradation tests conducted in accordance with FM 1-T 002 is not within the gradation tolerances shown in Table 335-4 for any sieve size, cease production until the problem is corrected to the satisfaction of the Engineer.

Screen the stockpiled aggregate prior to delivery to the paving machine to remove oversize material and non-desirable particles.

335-2.3 Mineral Filler: If mineral filler is required, utilize non-air entrained Portland cement or hydrated lime that is free from lumps. The Engineer will accept the mineral filler by visual inspection. The type and amount of mineral filler needed shall be determined by a laboratory mix design and will be considered as part of the aggregate gradation. An increase or decrease of less than one percent mineral filler may be permitted during production if it is found to result in better consistency or set times.

335-2.4 Water: Utilize water that is potable and free of harmful soluble salts or reactive chemicals and any other contaminants.

335-2.5 Additives: Additives may be added to the mixture or any of the component materials to provide the control of quick-trafficking properties. The additives to be used should be indicated on the mix design and be compatible with the other components of the mix.

335-2.6 Crack Filler: Utilize a PG 67-22 binder, meeting the requirements of Section 916, reinforced with fibers at 5-8% by weight of binder. Other crack filler products may be used, if approved by the Engineer.

335-3 Mix Design.

Before work commences, submit a mix design to the Engineer incorporating the specific materials to be used on the project. The mix design shall be developed by a laboratory which has experience in designing micro-surfacing mixtures.

Submit the proposed mix design with supporting test data indicating compliance with all mix design criteria. Allow the State Materials Engineer a maximum of one week to either conditionally verify or reject the mix as designed. Compatibility of the aggregate, polymer-modified emulsion, mineral filler, and other additives shall be verified on the mix design. Meet the requirements provided in Table 335-5. After the mix design has been approved, no substitutions to the mix design will be permitted, unless approved by the Engineer. 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.

Table 335-5 Mix Design Testing Requirements		
ISSA Test No. (1)	Property	Specification Requirements
ISSA TB-139	Wet Cohesion @ 30 Minutes Minimum (Set) @ 60 Minutes (2)	12 kg-cm Minimum 20 kg-cm Minimum or Near Spin
ISSA TB-109	Excess Asphalt by Loaded Wheel Tester (LWT) Sand Adhesion	50 g/sf Maximum
ISSA TB-114	Wet Stripping	90% Minimum
ISSA TB-100	Wet-track Abrasion Loss: One-hour Soak Six-day Soak	 50 g/ft^2 Maximum 75 g/ft^2 Maximum
ISSA TB-147	Lateral Displacement Specific Gravity after 1,000 Cycles of 125 lb.	5% Maximum 2.10 Maximum
ISSA TB-144	Classification Compatibility	11 Grade Points Minimum (AAA, BAA)
ISSA TB-113	Mix Time @ 77°F	Controllable to 120 Seconds Minimum
(1) ISSA = International Slurry Surfacing Association. (2) The mixing test and set-time test should be checked at the highest temperatures expected during construction.		

The mix design must clearly show the proportions of aggregate, mineral filler, water, additive usage, and polymer-modified asphalt emulsion based on the dry weight of the aggregate. Meet the mix design component material requirements provided in Table 335-6.

Table 335-6 Mix Design Component Material Requirements	
Component Materials	Specification Requirements
Residual Asphalt	5.5 to 10.5% by dry weight of aggregate
Mineral Filler	0.0 to 3.0% by dry weight of aggregate
Polymer-based Modifier	Minimum of 3% solids based on bitumen weight content
Additives	As needed
Water	As required to produce proper mix consistency

335-4 Rate of Application.

The average single application rate, as measured by the Contractor, shall be 20 – 26 lb/sy. Application rates are based upon the weight of dry aggregate in the mixture. The maximum drop off at the edge of the pavement shall be 1/4 in.

335-5 Equipment.

335-5.1 General: Maintain all equipment, tools, and machines, used in the performance of this work, in satisfactory working condition at all times to ensure a high-quality product.

335-5.2 Mixing Equipment: Use a machine specifically designed and manufactured to place micro-surfacing. Truck mounted, trailer mounted, and self-loading continuous machines are acceptable. Mix the material with an automatic-sequenced, self-propelled micro-surfacing mixing machine, which is able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral filler, control setting additive, and water to a revolving multi-blade, double-shafted mixer. The machine shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, control

additive and water to maintain an adequate supply to the proportioning controls. Self-loading continuous machines shall be capable of loading materials, while continuing to lay micro-surfacing, thereby minimizing construction joints. Self-loading continuous machines shall be equipped to allow the operator to have full control of the forward and reverse speeds during applications of the micro-surfacing material and shall be equipped with opposite-side driver stations to assist in alignment. The self-loading device, opposite-side driver stations, and forward and reverse speed controls shall be original equipment manufacturer design.

335-5.3 Proportioning Device: Provide and properly mark individual volume or weight controls for proportioning each material to be added to the mix (i.e., aggregate, mineral filler, emulsified asphalt, additives, and water).

335-5.4 Spreading Equipment: Agitate and spread the mixture uniformly in the surfacing box by means of twin-shafted paddles or spiral augers fixed in the spreader box. Provide a front seal to insure no loss of the mixture at the road contact point. The rear seal shall act as a final strike-off and shall be adjustable. The spreader box and rear strike-off shall be so designed and operated that a uniform consistency is achieved to produce a free flow of material to the rear strike-off. The spreader box shall have suitable means provided to side shift the box to compensate for variations in the pavement geometry.

335-5.4.1 Secondary Strike-off: Provide a secondary strike-off to improve surface texture. The secondary strike-off shall have the same adjustments as the spreader box.

335-5.4.2 Rut-filling Box: Place preliminary micro-surfacing material to fill ruts, utility cuts, depressions in the existing surface, etc., when required on the plans and before the final surface course is placed. Fill in ruts of 1/2 inch or greater in depth independently with a rut-filling spreader box either five or six feet in width. For irregular or shallow rutting of less than 1/2 inch in depth, place a full-width scratch-coat pass, if so directed by the Engineer. Ruts that are in excess of 1-1/2 inches in depth may require multiple placements with the rut-filling spreader box to restore the cross-section. Cure all rut-filling leveling material under traffic for at least a twenty-four hour period before additional material is placed on top of the leveling material. For ruts 1/2 inch or greater in depth, place a full-width scratch coat after the rut-filling box operation is completed and the material has cured until the following work day.

335-5.5 Auxiliary Equipment: Provide suitable surface preparation equipment, traffic control equipment, hand tools, and any other support and safety equipment necessary to perform the work.

335-6 Calibration.

Calibrate each mixing unit to be used in the performance of the work in the presence of the Engineer prior to the start of construction. Document the individual calibration of each material at various settings, which can be related to the machine metering devices. Do not utilize any mixing unit on the project until the calibration has been completed and approved by the Engineer.

335-7 Weather Limitations

Do not apply micro-surfacing if either the pavement or air temperature is below 50°F. Do not apply micro-surfacing when there is the possibility that the finished product will freeze within 24 hours. Do not apply micro-surfacing in the rain or when there is standing water on the pavement. The mixture shall not be applied when weather conditions prevent opening to traffic within a reasonable amount of time, as determined by the Engineer.

335-8 Surface Preparation.

335-8.1 General: Remove any thermoplastic striping materials in the areas to be micro-

surfaced. Provide temporary striping as necessary to comply with the Contract requirements. Immediately prior to applying the micro-surfacing, clear the surface of all loose material, silt spots, vegetation, and other material that will negatively affect the quality of the micro-surfacing utilizing any standard cleaning method. If water is used for cleaning, allow cracks to dry thoroughly before applying micro-surfacing. Protect manholes, valve boxes, drop inlets and other service entrances from the micro-surfacing mixture by a suitable method. The Engineer will approve the surface preparation prior to micro-surfacing. No loose aggregate, either spilled from the lay-down machine or existing on the road, will be permitted.

335-8.2 Cracks: Pre-treat any cracks in the surface of the pavement, with a crack filler meeting the requirements of 335-2.6, prior to the application of the micro-surfacing. Fill any cracks with a width greater than 1/4 inch. Do not overfill the cracks.

335-8.3 Rumble Strips: Where shoulders are not to be micro-surfaced, take precautions to prevent micro-surfacing material from filling the rumble strip depressions. Remove any micro-surfacing material that enters the rumble strip depressions.

For shoulder areas that are to be micro-surfaced, place a scratch coat to fill the depressions prior to placing the final micro-surfacing surface course.

335-9 Application.

335-9.1 General: Pre-wet the surface by fogging ahead of the spreader box. Adjust the rate of application of the fog spray to suit temperatures, surface texture, humidity, and dryness of the pavement.

The micro-surfacing shall be of the desired consistency upon leaving the mixer. Carry a sufficient amount of material in all parts of the spreader at all times so that complete coverage is obtained. Avoid overloading of the spreader. Do not allow lumping, balling or unmixed aggregate in the micro-surfacing mixture.

Do not leave streaks, such as those caused by oversized aggregate, in the finished surface. If excess streaking develops, stop production until the situation has been corrected. Excessive streaking is defined as more than four drag marks greater than 1/2 inch wide and 4 inches long, or 1 inch wide and 3 inches long, in any 30 square yard area. Do not permit transverse ripples or longitudinal streaks of 1/4 inch in depth or greater, when measured by placing a 10-foot straight edge over the surface.

335-9.2 Joints: Prevent excessive buildup, uncovered areas, or unsightly appearance on longitudinal and transverse joints. Provide suitable-width spreading equipment to produce a minimum number of longitudinal joints throughout the project. Place longitudinal joints on lane lines, where possible. Use half passes and odd-width passes only when absolutely necessary. Do not use a half pass as the last pass of any paved area. Do not overlap longitudinal lane line joints by more than three inches. Do not construct joints having more than a 1/4 inch difference in elevation when measured by placing a 10-foot straight edge over the joint and measuring the elevation drop-off. Construct the longitudinal joints so that water is not held at the joint.

335-9.3 Mix Stability: Produce a micro-surfacing mixture that possesses sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogeneous during and following mixing and spreading. The mixture shall be free of excess water or emulsion and free of segregation of the emulsion and aggregate fines from the coarser aggregate. Do not spray water directly into the lay-down box while laying micro-surfacing material under any circumstances.

335-9.4 Handwork: Utilize hand squeegees to provide complete and uniform coverage of micro-surface areas, which cannot be reached with the mixing machine. Lightly dampen the area to be hand-worked prior to mix placement, if necessary. Care shall be exercised to leave no unsightly

appearance from handwork. When performing handwork, provide the same type of finish as that applied by the spreader box.

335-9.5 Lines: Construct straight lines along curbs and shoulders. Do not permit runoff on these areas. Keep lines at intersections straight to provide a good appearance. If necessary, utilize a suitable material to mask off the end of streets to provide straight lines. Do not allow edge lines to vary by more than plus or minus 2 inches in horizontal variance in any 96 feet of length.

335-9.6 Cleanup: Remove micro-surfacing mixture from all areas, such as manholes, gutters, drainage structures, intersections, rumble strips, and as otherwise specified by the Engineer. On a daily basis, remove any debris resulting from the performance of the work.

Within 24 to 48 hours after the completion of the micro-surfacing, broom the surface of any loose material. Perform this operation again at 7 to 10 days after completion of the micro-surfacing, if necessary, or as directed by the Engineer. Additionally, clean the surface, as necessary, prior to application of the final pavement markings.

335-10 Quality Acceptance.

335-10.1 Sampling and Testing: The Engineer shall obtain two samples of micro-surfacing mixture for each day of production. The samples shall be obtained at different periods during the production day and the Engineer shall test each sample in accordance with FM 5-563 and FM 1-T 030 to determine the residual asphalt content and the gradation of each sample. Evaporate all water from the sample prior to testing. Determine the deviation of the test results for each sample from the mix design target values. Average the absolute values of the deviations for the two tests. Compare the average deviation from the mix design to the mixture control tolerances shown in Table 335-7.

Table 335-7
Micro-surfacing Mixture Acceptance Limits

Mix Property	Tolerance from Mix Design Target Values
Percent Passing No. 4 Sieve	± 5 percent
Percent Passing No. 8 Sieve	± 5 percent
Percent Passing No. 50 Sieve	± 4 percent
Percent Passing No. 200 Sieve	± 3.0 percent
Residual asphalt content (based on dry weight of aggregate)	± 0.5 percent

335-10.2 Residual Asphalt Content: If the average deviation of the residual asphalt content for a day's production is greater than the allowable tolerance in Table 335-7, then a two percent reduction in unit price will be assessed for each 0.1 percent the residual asphalt content is outside the allowable tolerance for each day that the tolerance was exceeded. Stop production of the mixture and make adjustments to correct the problem to the satisfaction of the Engineer prior to resuming production.

335-10.3 Aggregate Gradation: If the average deviation of any of the gradation properties for a day's production is greater than the allowable tolerance in Table 335-7, then stop production of the mixture and make adjustments to correct the problem to the satisfaction of the Engineer prior to resuming production.

335-10.4 Aggregate Application Rate: Control the application rate for micro-surfacing to within the range specified in 335-4 on a daily basis. No additional compensation will be paid for micro-surfacing application rates placed in excess of the specified range. he unit price will be reduced by five percent for each lb/sy rate less than the specified range. For application rates outside

the specified range, stop production of the mixture and make adjustments to correct the problem to the satisfaction of the Engineer prior to resuming production. Accept a pay reduction for deficient daily production or overlay the deficient area at full plan width and depth at no additional cost to the Department.

335-11 Basis of Payment.

335-11.1 General: The micro-surfacing shall be paid for at the Contract unit price per square yard, completed and accepted. Such price and payment shall be full compensation for performing all work, and shall include the cost of all materials, including the cost of the emulsified asphalt and virgin aggregate.

335-11.2 Payment Items:

Micro-surfacing, per square yard
Micro-surfacing crack filling, incidental to Micro-surfacing
Micro-surfacing rut-fill (over 1/2”), per ton.
Micro-surfacing rut-fill / scratch coat (up to 1/2”), incidental to Micro-surfacing

SECTION 710
PAINTED PAVEMENT MARKINGS

710-1 Description.

Apply Painted Traffic Stripes and Markings, in accordance with the Contract Documents.

710-2 Materials.

Use only materials listed on the Qualified Products List (QPL) meeting the following requirements:

Raised Retro-reflective Pavement Markers and Bituminous Adhesive .....Section 970
Waterborne Paint .....971-1 and 971-3
Fast Dry Solvent Paint .....971-1 and 971-4
Glass Spheres .....971-1 and 971-2

The Engineer will take random samples of all material in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

710-3 Equipment.

Use equipment that will produce continuous uniform dimensions of pavement 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 a true arc.

(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 that is 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 pavement 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 nozzles equipped with cut-off valves, which will apply broken or skip lines automatically.

710-4 Application:

710-4.1 General: Remove existing pavement markings, such that scars or traces of removed markings will not conflict with new pavement markings, by a method approved by the Engineer. Payment for marking removal will be in accordance with 02102-5.8.

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.

Apply traffic stripes and markings only to dry surfaces, and when the ambient air and surface temperature is at least 40ºF and rising. Do not apply traffic stripes and markings when winds are sufficient to cause spray dust.

Apply traffic stripes and markings, having well defined edges, over existing pavement markings such that not more than 2 inches on either end and not more than 1 inch on either side is visible.

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.

Conduct field testing in accordance with FM 5-541 and 5-579. Remove and replace traffic stripes and markings not meeting the requirements of this Section at no additional cost to the Department.

Apply all pavement markings prior to opening the road to traffic.

710-4.1.1 Final Surface: Painted Pavement Markings (Final Surface) will include two applications of painted pavement markings and one application of retro-reflective pavement markers applied to the final surface. Wait at least 14 days after the first application to apply the second application of Painted Pavement Markings (Final Surface). Second application must be applied prior to final acceptance of the project.

Apply all retro-reflective pavement markers meeting the requirements of Section 02706.

710-4.2 Thickness: Apply paint to attain a minimum wet film thickness in accordance with the manufacturer's recommendations.

710-4.3 Retroreflectivity: Apply white and yellow pavement markings that will attain an initial retroreflectance of not less than 300 mcd/lx·m^2 and not less than 250 mcd/lx·m^2, respectively. Measure, record and certify on a Department approved form and submit to the Engineer, the retroreflectivity of white and yellow pavement markings in accordance with

Florida Method FM 5-579.

The Department reserves the right to test the markings within 3 days of receipt of the Contractor's certification. Failure to afford the Department opportunity to test the markings will result in non-payment. The test readings should be representative of the Contractor's striping performance. If the retroreflectivity values measure below values shown above, reapply the striping at no additional cost to the Department.

For work zone markings, ensure that the minimum retrorefectance of white and yellow pavement markings are not less than 150 mcd/lx m^2. If the retroreflectivity values fall below the 150 mcd/lx m^2 value within six months of initial application, the striping will be reapplied at the Contractor's expense.

710-4.4 Color: Use paint material that meets the requirements of 971-1.

710-4.5 Glass Spheres: Apply glass spheres on all pavement markings immediately and uniformly following the paint application. The rate of application shall be based on the manufacturer's recommendation.

710-5 Tolerances in Dimensions and in Alignment.

Establish tack points at appropriate intervals for use in aligning stripes, and set a stringline from such points to achieve accuracy.

710-5.1 Dimensions:

710-5.1.1 Longitudinal Lines: Apply painted skip line segments with no more than ±12 inches variance, so that over-tolerance and under-tolerance lengths between skip line and the gap will approximately balance. Apply longitudinal lines at least 2 inches 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

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 segments following each longitudinal skip line.

710-5.2 Alignment: Apply painted stripes that will not deviate more than 1 inch from the stringline on tangents and curves one degree or less. Apply painted stripes that will not deviate more than 2 inches from the stringline on curves greater than one degree. Apply painted edge stripes uniformly, not less than 2 inches or more than 4 inches from the edge of pavement, without noticeable breaks or deviations in alignment or width.

Remove and replace at no additional cost to the Department, traffic stripes that deviate more than the above stated requirements.

710-5.3 Correction Rates: Make corrections of variations in width at a maximum rate of 10 feet for each 0.5 inches of correction. Make corrections of variations in alignment at a maximum rate of 25 feet for each 1 inch of correction, to return to 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 batch numbers of the materials and glass spheres to be used. Ensure that the approved batch numbers appear on the materials and glass spheres packages.

710-7 Protection of Newly Painted Pavement 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.

710-8 Corrections for Deficiencies to Applied Painted Pavement Markings.

Reapply a 1.0 mile section centered around any deficiency, at no additional cost to the Department.

710-9 Submittals.

710-9.1 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.

710-9.2 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.

710-10 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 each of all other types of lines and stripes, authorized and acceptably applied.

(d) The number of pavement messages, symbols and directional arrows, authorized and acceptably applied.

(e) Lump Sum, as specified in 710-4.1.1 when the item for Painted Pavement

Markings (Final Surface) is included in the proposal.

The net length, in feet of dotted and skip stripes other than 10-30 and 3-9 will be measured 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 01025. Unpainted intervals will not be included in pay quantity.

The gross-mile measurement of 10-30 and 3-9 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. Final measurement will be determined by plan dimensions or stations, subject to 01025.

710-11 Basis of Payment.

710-11.1 General: 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.

710-11.2 Lump Sum Payment: When the item for Painted Pavement Markings (Final Surface) is included in the proposal, prices and payments will be full compensation for two applications of all painted pavement markings applied to the final surface, and one application of retro-reflective pavement markers applied to the final surface in accordance with Section 02706.

Payment will be made under:

Item No. 710 Painted Pavement Markings.

Traffic Stripes, Solid – per net mile. Traffic Stripes, Solid – per foot. Traffic Stripes, Skip – per gross mile. Traffic Stripes, Skip – per foot. Dotted/Guideline – per foot. Messages –each.

Arrows – each.

Yield Markings – per foot.

Item No. 710-90 Painted Pavement Markings (Final Surface) – lump sum.

SECTION 901
COARSE AGGREGATE

901-1 General.

901-1.1 Composition: Coarse aggregate shall consist of naturally occurring materials such as gravel, or resulting from the crushing of parent rock, to include natural rock, slags, expanded clays and shales (lightweight aggregates) and other approved inert materials with similar characteristics, having hard, strong, durable particles, conforming to the specific requirements of this Section.

Coarse aggregate for use in nonstructural concrete applications or hot bituminous mixtures may also consist of reclaimed Portland cement concrete meeting the requirements of 901-5. Washing of this material will not be required if the requirements of 901-1.2 for maximum percent of material passing the No. 200 sieve can be met without washing.

Materials substantially retained on the No. 4 sieve, shall be classified as coarse aggregate.

Approval of mineral aggregate sources shall be in accordance with Section 6-3.3 of the FDOT Standard Specifications.

901-1.2 Deleterious Substances: All coarse aggregates shall be reasonably free of clay lumps, soft and friable particles, salt, alkali, organic matter, adherent coatings, and other substances not defined which may possess undesirable characteristics. The weight of deleterious substances shall not exceed the following percentages:

Coal and lignite (AASHTO T 113)	1.00
Soft and friable particles (AASHTO T 112)*	2.00
Clay lumps (AASHTO T 112)*	2.00
Plant root matter (visual inspection in AASHTO T 27)****	0.005
Wood and wood matter (visual inspection in AASHTO T 27)****	0.005
Cinders and clinkers	0.50
Free shell**	1.00
Total Material passing the No. 200 sieve (FM 1-T 011) At Source with Los Angeles Abrasion less than or equal to 30	2.50
At Source with Los Angeles Abrasion greater than 30	1.75
At Point of Use	3.75
Fine-Grained Organic Matter (AASHTO 194)	0.03
Chert (less than 2.40 specific gravity SSD) (AASHTO T-113)***	3.00

*The maximum percent by weight of soft and friable particles and clay lumps together shall not exceed 3.00.

**Aggregates to be used in asphalt concrete may contain up to 5% free shell. Free shell is defined as that portion of the coarse aggregate retained on the No. 4 sieve consisting of loose, whole, or broken shell, or the external skeletal remains of other marine life, having a ratio of the maximum length of the particle to the shell wall thickness exceeding five to one. Coral, molds, or casts of other shells, and crushed clam and oyster shell indigenous to the formation will not be considered as free shell.

***This limitation applies only to coarse aggregates in which chert appears as an impurity. It is not applicable to aggregates which are predominantly chert.

****Plant root matter, and wood and wood matter shall be considered deleterious when any piece exceeds two inches in length or 1/2 inch in width.

901-1.3 Physical Properties: Coarse aggregates shall meet the following physical property requirements, except as noted herein:

Los Angeles Abrasion (FM 1-T 096) .... maximum loss 45%
Soundness (Sodium Sulfate) AASHTO T104 ..... maximum loss 12%*
Flat or elongated pieces** ..... maximum 10%

*For source approval - Aggregates exceeding soundness loss limitations will be rejected unless performance history shows that the material will not be detrimental for Portland Cement Concrete or other intended usages.

**A flat or elongated particle is defined as one having a ratio between the maximum and the minimum dimensions of a circumscribing prism exceeding five to one.

901-1.4 Gradation: Coarse aggregates shall conform to the gradation requirements of Table 1, when the stone size is specified. However, Table 1 is waived for those aggregates intended for usage in bituminous mixtures, provided the material is graded on sieves specified in production requirements contained in Section 6-3.3 of the FDOT Standard Specifications, and meets uniformity and bituminous design requirements.

TABLE 1
Standard Sizes of Coarse Aggregate

Amounts Finer than Each Laboratory Sieve (Square Openings), weight percent								
Size No.	Nominal Size Square Openings	4 inches	3 1/2 inches	3 inches	2 1/2 inches	2 inches	1 1/2 inches	1 inch
1	3 1/2 to 1 1/2 inches	100	90 to 100	-	25 to 60	-	0 to 15	-
2	2 1/2 inches to 1 1/2 inches	-	-	100	90 to 100	35 to 70	0 to 15	-
24	2 1/2 inches to 3/4 inch	-	-	100	90 to 100	-	25 to 60	-
3	2 inches to 1 inch	-	-	-	100	90 to 100	35 to 70	0 to 15
357	2 inches to No. 4	-	-	-	100	95 to 100	-	35 to 70
4	1 1/2 inches to 3/4 inch	-	-	-	-	100	90 to 100	20 to 55
467	1 1/2 inches to No. 4	-	-	-	-	100	95 to 100	-
5	1 inch to 1/2 inch	-	-	-	-	-	100	90 to 100
56	1 inch to 3/8 inch	-	-	-	-	-	100	90 to 100
57	1 inch to No. 4	-	-	-	-	-	100	95 to 100
6	3/4 inch to 3/8 inch	-	-	-	-	-	-	100
67	3/4 inch to No. 4	-	-	-	-	-	-	100

68	3/4 inch to No. 8	-	-	-	-	-	-	-
7	1/2 inch to No. 4	-	-	-	-	-	-	-
78	1/2 inch to No. 8	-	-	-	-	-	-	-
8	3/8 inch to No. 8	-	-	-	-	-	-	-
89	3/8 inch to No. 16	-	-	-	-	-	-	-
9	No. 4 to No. 16	-	-	-	-	-	-	-
10	No. 4 to 0	-	-	-	-	-	-	-

TABLE 1 (Continued)
Standard Sizes of Coarse Aggregate

Amounts Finer than Each Laboratory Sieve (Square Openings), weight percent

Size No.	Nominal Size Square Openings	3/4 inch	1/2 inch	3/8 inch	No. 4	No. 8	No. 16	No.50
1	3 1/2 inches to 1 1/2 inches	0 to 5	-	-	-	-	-	-
2	2 1/2 inches to 1 1/2 inches	0 to 5	-	-	-	-	-	-
24	2 1/2 inches to 3/4 inch	0 to 10	0 to 5	-	-	-	-	-
3	2 inches to 1 inch	-	0 to 5	-	-	-	-	-
357	2 inches to No. 4	-	10 to 30	-	0 to 5	-	-	-
4	1 1/2 inches to 3/4 inch	0 to 15	-	0 to 5	-	-	-	-
467	1 1/2 inches to No. 4	35 to 70	-	10 to 30	0 to 5	-	-	-
5	1 inch to 1/2 inch	20 to 55	0 to 10	0 to 5	-	-	-	-
56	1 inch to 3/8 inch	40 to 85	10 to 40	0 to 15	0 to 5	-	-	
57	1 inch to No. 4	-	25 to 60	-	0 to 10	0 to 5	-	-
6	3/4 inch to 3/8 inch	90 to 100	20 to 55	0 to 15	0 to 5	-	-	-
67	3/4 inch to No. 4	90 to 100	-	20 to 55	0 to 10	0 to 5	-	-
68	3/4 inch to No. 8	90 to 100	-	30 to 65	5 to 25	0 to 10	0 to 5	-
7	1/2 inch to No. 4	100	90 to 100	40 to 70	0 to 15	0 to 5	-	-
78	1/2 inch to No. 8	100	90 to 100	40 to 75	5 to 25	0 to 10	0 to 5	-

8	3/8 inch to No. 8	-	100	85 to 100	10 to 30	0 to 10	0 to 5	-
89	3/8 inch to No. 16	-	100	90 to 100	20 to 55	5 to 30	0 to 10	0 to 5
9	No. 4 to No. 16	-	-	100	85 to 100	10 to 40	0 to 10	0 to 5
10	No. 4 to 0	-	-	100	85 to 100	-	-	-
NOTE: The gradations in Table 1 represent the extreme limits for the various sizes indicated, which will be used in determining the suitability for use of coarse aggregate from all sources of supply. For any grade from any one source, the gradation shall be held reasonably uniform and not subject to the extreme percentages of gradation specified above.								

901-2 Natural Stones.

Course aggregate may be processed from gravels, granites, limestones, dolomite, sandstones, or other naturally occurring hard, sound, durable materials meeting the requirements of this Section.

901-2.1 Gravels: Gravel shall be composed of naturally occurring quartz, free from deleterious coatings of any kind. The minimum dry-rodded weight AASHTO T 19 shall be 95 lb/ft^3.

Crushed gravel shall consist of a minimum of 85%, by weight, of the material retained on the No. 4 sieve, having at least three fractured faces.

901-2.2 Granites: Coarse aggregate produced from the crushing of granites shall be sound and durable. For granites to be used in bituminous mixtures and surface treatments, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T 096). Maximum amount of mica schist permitted is 5% (FM 5-584).

901-2.3 Limestones, Dolomite and Sandstone: Coarse aggregates may be produced from limestone, dolomite, sandstones, and other naturally occurring hard, durable materials meeting the requirements of this Section.

Pre-Cenozoic limestones and dolomite shall not be used as crushed stone aggregates either coarse or fine for Asphalt Concrete Friction Courses, or any other asphalt concrete mixture or surface treatment serving as the final wearing course. This specifically includes materials from the Ketone Dolomite (Cambrian) Newala Limestone (Mississippian), and Northern Alabama and Georgia.

As an exception to the above up to 20% fine aggregate from these materials may be used in asphalt concrete mixtures other than Friction Courses which serve as the final wearing course.

901-2.4 Cemented Coquina Rock: For Cemented Coquina Rock to be used in bituminous mixtures, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T 096) provided that the amount of material finer than No. 200 generated during the Los Angeles Abrasion test is less than 18%.

901-3 Manufactured Stones.

901-3.1 Slags: Coarse aggregate may be produced from molten nonmetallic by-products consisting essentially of silicates and aluminosilicates of calcium and other bases, such as air- cooled blast-furnace slag or phosphate slag, provided it is reasonably uniform in density and quality, and reasonably free from deleterious substances as specified in 901-1.2. In addition, it must meet the following specific requirements:

Sulphur content ..... not more than 1.5%
Dry rodded weight AASHTO T 19..... minimum 70 lb/ft^3
Glassy Particles..... not more than 10%

Slag shall not be used as an aggregate for Portland cement concrete.

For Air-Cooled Blast Furnace Slag, the Los Angeles Abrasion requirement of

901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T 096) provided that the amount of material finer than No. 200 sieve generated during the Los Angeles Abrasion test is less than 18%.

901-4 Lightweight Aggregates.

901-4.1 Lightweight Coarse Aggregate for Bituminous Construction: Lightweight coarse aggregate may be produced from naturally occurring materials such as pumice, scoria and tuff or from expanded clay, shale or slate fired in a rotary kiln. It shall be reasonably uniform in quality and density, and free of deleterious substances as specified in 901-1.2, except that the term cinders and clinkers shall apply to those particles clearly foreign to the extended aggregate in question.

In addition, it must meet the following specific requirements:

Material passing the No. 200 Sieve
.....maximum 3.00%, (FM 1-T 011)
Dry loose weight (AASHTO T 19)*..... 33-55 lb/ft^3
Los Angeles Abrasion (FM 1-T 096) maximum 35%
Ferric Oxide (ASTM C 641)..... maximum 1.5 mg

*Source shall maintain dry-loose unit weight within ±6% of Quality Control average. Point of use dry-loose unit weight shall be within ±10% of Source Quality Control average.

901-4.2 Lightweight Coarse Aggregate for Structural Concrete: The requirements of 901-4.1 are modified as follows:

Aggregates shall not be produced from pumice and scoria.

Los Angeles Abrasion (FM 1-T 096, Section 12) shall be 45%, maximum.

Gradation shall meet the requirements of AASHTO M 195 for 3/4 inch, 1/2 inch and 3/8 inch.

901-5 Reclaimed Portland Cement Concrete.

The reclaimed Portland cement concrete shall be from a source which was produced and placed in accordance with applicable Specifications. The material shall be crushed and processed to provide a clean, hard, durable aggregate having a uniform gradation free from adherent coatings, metals, organic matter, base material, joint fillers, and bituminous materials.

The Contractor's (Producer's) crushing operation shall produce an aggregate meeting the applicable gradation requirements. The physical property requirements of 901-1.3 for Soundness shall not apply and the maximum loss as determined by the Los Angeles Abrasion (FM 1-T 096) is changed to 50.

The sources of reclaimed Portland cement concrete will be treated as a mine and subject to the requirements of Section 6 and Section 105 of the FDOT Standard Specifications

901-6 Exceptions, Additions and Restrictions.

Pertinent specification modifications, based on material usage, will be found in other Sections of the specifications.

SECTION 902
FINE AGGREGATE

902-1 General.

902-1.1 Composition: Fine aggregate shall consist of natural silica sand, screenings, local materials, or subject to approval, other inert materials with similar characteristics, or combination thereof, having hard, strong, durable particles, conforming to the specific requirements of this Section.

Approval of mineral aggregate sources shall be in accordance with the Section 6-3.3 of the FDOT Standard Specifications.

902-1.2 Deleterious Substances: All fine aggregate shall be reasonably free of lumps of clay, soft or flaky particles, salt, alkali, organic matter, loam or other extraneous substances. The weight of deleterious substances shall not exceed the following percentages

Shale.....1.0
Coal and lignite.....1.0
Cinders and clinkers.....0.5
Clay Lumps.....1.0

902-2 Silica Sand.

902-2.1 Composition: Silica sand shall be composed only of naturally occurring hard, strong, durable, uncoated grains of quartz, reasonably graded from coarse to fine, meeting the following requirements, in percent total weight.

Sieve Opening Size	Percent Retained	Percent Passing
No. 4	0 to 5	95 to 100
No. 8	0 to 15	85 to 100
No. 16	3 to 35	65 to 97
No. 30	30 to 75	25 to 70
No. 50	65 to 95	5 to 35
No. 100	93 to 100	0 to 7
No. 200	minimum 96	maximum 4

Silica sand from any one source, having a variation in Fineness Modulus greater than 0.20 either way from the Fineness Modulus of target gradations established by the producer, may be rejected.

902-2.2 Organic Impurities: Silica sand shall be subject to the colorimetric test for organic impurities. If the color produced is darker than the standard solution, the aggregate shall be rejected unless it can be shown by appropriate tests that the impurities causing the color are not of a type that would be detrimental to Portland Cement Concrete. Such tests shall be in accordance with AASHTO T 21 and AASHTO T 71.

When tested for the effect of organic impurities on strength of mortar, the strength ratio at seven and 28 days, calculated in accordance with Section 11 of AASHTO T 71, shall not be less than 95%.

902-3 Sands for Miscellaneous Uses.

902-3.1 Anchor Bolts and Pipe Joints: Sand for setting anchor bolts, pipe joints or other similar uses shall meet the quality requirements of 902-2 except that gradation requirements are waived.

902-3.2 Brick Masonry: Sand for brick masonry shall meet the quality requirements of 902-2 except for gradation requirements. All the materials shall pass the No. 8 sieve, and be uniformly graded from coarse to fine.

902-3.3 Sand-Cement Riprap: Sand for sand-cement riprap shall meet the quality requirements of 902-2 except for gradation requirements. The material shall meet the following gradation limits:

Sieve Size	Percent Passing
No. 4	minimum 97%
No. 100	maximum 20%
No. 200	maximum 5%

902-4 Filter Material for Underdrains.

Silica sand for use as filter material for Types I through IV Underdrains shall meet the requirements of 902-2 except that the requirements of 902-1.2 and 902-2.2 shall not apply. The aggregate shall be reasonably free of organic matter and other deleterious materials. The gradation requirements of 902-2.1 shall apply except no more than 2% shall pass the No. 200 sieve.

Filter material for Type V Underdrain shall meet the above requirements except that there shall be no more than 1% of silt, clay and organic matter, that the aggregate shall have a Uniformity Coefficient of 1.5 or greater, and that 10% diameter shall be No. 70 to 35 sieve. The Uniformity Coefficient shall be determined by the ratio D60 divided by D10, where D60 and D10 refer to the particle diameter corresponding to 60 and 10% of the material which is finer by dry weight.

902-5 Screenings.

902-5.1 Composition: Screenings shall be composed of hard, durable particles, either naturally occurring, such as gravel screenings, or resulting from the crushing or processing of the parent rock, to include natural rock, slags, expanded clays or shales (lightweight aggregates), or other approved inert materials with similar characteristics.

Aggregates classified as screening shall conform to the following gradation requirements:

Sieve Size	Percent Passing
3/8 in.	100%
No.4	75 to 100%

902-5.2 Specific Requirements:

902-5.2.1 Screenings from Department Approved Sources of Coarse Aggregate: Processed screenings from fully Approved Sources of Coarse Aggregate are subject to gradation. Should Coarse Aggregate Source Approval status change, or unsatisfactory in-service history develop, additional control requirements may be implemented.

Screenings for use in hot bituminous mixture may consist of screenings from the processing of reclaimed portland cement concrete pavement to produce coarse aggregate.

902-5.2.2 Screenings from Other Sources: Screenings, from sources other than Department Approved Sources of Coarse Aggregate, must meet the following additional general requirements:

Modified Los Angeles Abrasion: 95% statistical probability of meeting maximum loss of 23%.

Specific Gravity*
Absorption* Soundness*
Sulfur* Phosphate*
Extraneous Substances*

*Specific specification requirements based on material usage found in appropriate Bituminous or Portland Cement Sections.

Based on specific material characteristics, processing techniques and in-service history on Department projects, specific source requirements may be assigned.

902-5.2.3 Screenings for Use in Portland Cement Concrete: Screenings produced from either the Miami Oolite, Miami Ft. Thompson, or Loxahatchee Ft. Thompson Formations may be substituted for silica sand for use in concretes, except for concrete pavements, approach slabs, bridge decks and precast superstructure segments. (However, screenings will be permitted in the concrete when the bridge deck or approach slab is to be covered with an asphalt concrete surface course.)

These screenings must meet the gradation requirements of AASHTO M 6, Section 6.1, as well as the maximum percent passing the No. 200 sieve, Fineness Modulus, and Organic requirements of 902-2 Silica Sand. In addition, the saturated, surface dry specific gravity shall be at least 2.48.

902-6 Local Materials.

Local materials shall be composed of hard, strong, durable particles, either naturally occurring, such as natural sands, or resulting from the crushing or processing of parent rock, to include natural sand and rock, slags, expanded clays or shales (lightweight aggregate), or other approved inert materials with similar characteristics.

Aggregates classified as local material shall conform to the following gradation requirements:

Sieve Size	Percent Passing
3/8 in.	100%
No. 10	85 to 100%
No. 200	maximum 15%

In addition to meeting the requirements of 902-1.2, the material shall not contain excessive quantities of other deleterious substances, such as roots, cans, debris, etc. If clay size material is present, it shall not exceed 7%, as determined by AASHTO T 88, and it shall be of a type which will not produce clay balls when used. The aggregate must be suitable for designated use, as determined by laboratory tests. If the deposit consists of stratified layers of varying characteristics and gradation, the producer shall employ such means as necessary to secure a uniform material.

Local materials will not be required to be produced under the requirements of Section 6-3.3 of the FDOT Standard Specifications, provided they can meet the above requirements.

902-7 Exceptions, Additions and Restrictions.

Other specification modifications, based on material usage may be found in the appropriate Sections of the specifications.

SECTION 923
WATER FOR CONCRETE

923-1 General Requirements.

Water for use with cement shall be clear and free from injurious amounts of oil, acid, alkali, chlorides, organic matter, and other deleterious substances. It shall not be salty or brackish. If it contains quantities of substances which discolor it or make it smell or taste unusual or objectionable or cause suspicion, it shall not be used unless service records of concrete made with it indicates that it is not injurious to the quality of the concrete or approved by the Engineer. Wash water from mixer washout operations, (stored in a lined settling pond), and recycled wash water may be used only to sprinkle the coarse aggregate stockpiles and for use in the batching of concrete meeting the requirements of Section 344-1.2.1. Samples arriving at the laboratory shall be allowed 14 days for completion of tests. The frequency of testing, by the Department, of approved sources will be as outlined in the Sampling, Testing and Reporting Guide. At the discretion of the Engineer, the Department may require additional compliance testing at any time, of any water source.

923-2 Evaluation of Water for Concrete.

923-2.1 General: Water from city water supplies that are approved by a public health department may be accepted without testing. Wash water from mixer washout and recycled wash water shall meet the requirements of 923-3.2. and 923-4. All other sources of water shall meet the requirements 923-3.3 and 923-4. The concrete producer shall provide test data of water samples.

923-2.2 Source Approval: Wash water from mixer washout operations and recycled wash water shall be tested once per week for four weeks initially, and thereafter once per month for four months prior to its use, provided that the results of the test samples comply with all the applicable limits. All other sources shall test one sample initially.

923-2.3 Source Sampling: Open bodies of water and recycled water shall be tested monthly. Well and other sources of water will be tested once every three months. If the last eight consecutive well water samples meet the requirements, then the sample frequency may be reduced to one sample every six months, as approved by the Engineer. If a well water sample fails once the frequency has been changed, then the sampling frequency shall revert back to once every three months.

923-3 Chemical Requirements.

923-3.1 Testing: All chemical analysis or test shall be performed in accordance with AASHTO T-26 or Standard Methods for the Examination of Water and Wastewater.

923-3.2 Reclaimed Water: Water from mixer washout and recycled wash water shall be tested and approved before use and shall not exceed the following allowable limits:

Chemical Test	Maximum (%)
Equivalent Alkalis as (Na_2O + 0.658 K_2O)	0.06
Total Solids	5.00
Total Chlorides as Sodium Chloride	0.05
Sulfate as SO_4	0.30

923-3.3 All Other Sources: Water from all sources, other than public health approved sources, shall be tested and approved before use and shall not exceed the following allowable limits:

Chemical Test	Maximum (%)

Acidity or alkalinity calculated in terms of calcium carbonate	0.05
Total organic solids	0.05
Total inorganic solids	0.08
Total chlorides as sodium chloride	0.05

923-4 Physical Requirements for Mortar.

Mortar shall be tested in accordance with AASHTO T-106 with the following exception: the mortar shall not be tested for flow. The mortar, composed of the sampled water, shall have a compressive strength of not less than 90% when compared to a mortar prepared using distilled water and tested at seven days.

Water of a questionable quality, as determined by the Engineer, shall be subject to the acceptance criteria for time of set as required by AASHTO M-157, Table 1.

SECTION 924
ADMIXTURES FOR CONCRETE

924-1 General.

This Section covers materials for use as admixtures for concrete. The use of admixtures is restricted to those admixtures as may be allowed or required elsewhere in the specifications for specific concrete applications. Admixtures shall comply with applicable AASHTO and ASTM specifications as modified in 924-2.3 through 924-2.7. Admixtures that have been previously qualified for Department use are listed on a Qualified Products List.

924-2 Acceptance of Admixtures.

924-2.1 Qualified Products List (QPL): The Department maintains a list of qualified admixtures for air-entraining, water-reducing (Type A), accelerating (Type C), water-reducing and retarding (Type D), water-reducer and accelerating (Type E), high range water reducing (Type F) and high range water-reducing and retarding (Type G), high range water-reducing (Type I - Plasticizing and Type II - Plasticizing and retarding) in producing flowing concrete, and corrosion inhibitor, which have been determined as meeting requirements for use on Department projects. Admixtures included on this list, will be permitted without further testing.

The inclusion of any specific product on the QPL, as specified in 6-1, indicates that the product has been given contingent approval, as evidenced by previous tests and apparent effectiveness under field conditions.

Except as specified in Sections 346 and 347, no further testing will be required for any product on the QPL unless there is indication in actual field use of inadequate or unreliable results.

924-2.2 Certification: Manufacturers of admixtures shall provide certified test results from an independent laboratory inspected by the Cement and Concrete Reference Laboratory (CCRL) on a regular basis for applicable tests, with all deficiencies corrected for QPL approval and upon request of the Engineer.

924-2.3 For Air-Entraining: Air-entraining admixtures shall meet the requirements of AASHTO M-154, except for the flexural strengths, relative durability factor, and length change requirements are waived.

924-2.4 For Type A (Water-Reducing) and Type D (Water-Reducing and Retarding): Water-reducing and water-reducing and retarding admixtures shall meet the requirements of AASHTO M-194 for Type A and D, respectively, except for the compressive strength at six months and one year, flexural strengths, and relative durability factor requirements are waived.

924-2.5 For Type C (Accelerating) and Type E (Water Reducing and Accelerating): Accelerating and water reducing and accelerating admixtures shall meet the requirements of AASHTO M 194 for Type C and Type E, respectively, except for the compressive strength at six months and one year, flexural strengths and relative durability factor requirements are waived.

924-2.6 For High Range Water-Reducing: High range water reducing admixtures shall meet the requirements of the applicable AASHTO or ASTM specifications as modified in 924-2.6.1 and 924-2.6.2.

924-2.6.1 For Type F or Type G: High range water reducing (Type F) and high range water reducing and retarding (Type G), shall meet the requirements of AASHTO M-194, except for the compressive strengths, at one year, and relative durability factor requirements are waived.

924-2.6.2 For Type I and Type II: High range water reducing (Type I) and high range water reducing and retarding (Type II), for use in producing flowing concrete shall meet the requirements of ASTM C-1017, except for the compressive strength, at one year, and relative durability factor requirements are waived.

924-2.7 For Corrosion Inhibitors: Corrosion inhibitors shall meet the requirements of ASTM G-109 and all requirements in this Section.

Calcium nitrite is a chemically reactive admixture used in concrete to inhibit the corrosion of embedded reinforcing steel and other metallic components. The calcium nitrite supplier shall furnish the Engineer with test certificates from an independent laboratory indicating compliance with this Specification. The test certificate shall include corrosion inhibiting properties per ASTM G-109 and results of physical tests included in this section. Calcium nitrite shall be supplied by the same manufacturing source throughout the project. If a single primary source of calcium nitrite cannot be maintained throughout the project, new test certificates shall be submitted. The Engineer will determine specification compliance of a new supplier's product, and evaluate the effectiveness of the new calcium nitrite product before approving the source.

The active ingredient shall be calcium nitrite $Ca(NO_2)_2$.

The calcium nitrite shall be furnished in solution containing not less than 29% calcium nitrite solids. The concentration of the calcium nitrite solution shall be verified by spectrophotometric analysis or other comparable methods. The nitrite concentration shall be measured in accordance with Standard Methods for the Examination of Water and Waste Water, 18th Edition.

A volume of one gallon of calcium nitrite solution shall weigh within the range of 10.40 to 11.92 lb.

The calcium nitrite solution shall be added to the concrete mixture at a rate of 4.50to 4.60 gal/yd^3 of concrete.

The addition of calcium nitrite to the concrete mix shall not adversely affect the properties of fresh and hardened concrete.

Calcium Nitrite concrete shall meet the following physical requirements when mixed and tested in accordance with AASHTO M-194:

Water Content, % of control	95 to 100
Time of setting, allowable deviation from control, h:min:	
Initial: at least not more than	1:00 earlier nor 1:30 later
Final: at least not more than	1:00 earlier nor 1:30 later
Compressive Strength, min. % of control:	shall be 100 for all ages
Flexural strength, min, % of control:	shall be 100 for all ages
Length change, max Shrinkage (alternative Requirements): % of control	135
Increase over control	0.010
Relative durability factor, min	80

The following table lists the corrosion inhibiting test result limits for calcium nitrite concrete tested in accordance with ASTM G-109:

Maximum Allowable Test Results of Calcium Nitrite Concrete	
Measured average macrocell current any time during the test	10 μA
Average macrocell current at test completion	2 μA
Average visible corrosion measured as percent corroded area of control	85%

924-3 Performance Test on Air-Entraining Admixtures, for Effect on Strength of Concrete.

924-3.1 Conditions under which Test is Required: For any air-entraining admixture selected for use the Engineer may call for a performance test (either prior to or at any time during construction) for determining its effect on the strength of the concrete. In general, this check-test will be required only when there is indication that such admixture is giving erratic results or is unduly reducing the strength of the concrete. Testing shall be in accordance with 924-3.2 and 924-3.3.

924-3.2 Permissible Reduction in Strength of the Concrete: For concrete composed of the same cement and aggregates (and in the same proportions) to be used in the work, and containing the admixture under test, in an amount sufficient to produce between 3 and 5% entrained air in the plastic concrete, the compressive strength at seven days shall be at least 90% of the strength of the same concrete without the admixture.

924-3.3 Method of Test for Strength Reduction: The percentage reduction in strength shall be calculated from the average strength of at least three standard 6 inch by 12 inch cylinders of each class of concrete. Specimens shall be made and cured in the laboratory in accordance with ASTM C-192, and shall be tested in accordance with ASTM C-39. The percentage of entrained air shall be determined in accordance with ASTM C-173 or ASTM C-231.

924-4 Retesting.

The approved admixtures are required to be tested for their uniformity and equivalence whenever there is an indication of erratic results. The tests shall be performed in accordance with the following procedure. The admixture shall be checked for comparison between infrared spectrophotometry, pH value, specific gravity, and solids content. Any marked variation from the original curve, pH value, specific gravity, or solids content will be considered sufficient evidence that the chemistry of the original material has been changed and, therefore, the use of this material will be rejected and the material will be removed from the QPL.

SECTION 929
POZZOLANS AND SLAG

929-1 Basis for Source Approval.

929-1.1 General: The cementitious materials supplier shall submit the proposed quality control plan, certified test reports from an approved independent laboratory acceptable to the State Materials Office, and a sample of the material for Department verification. The quality control program of a cementitious materials supplier shall conform to 105-3. Continuance of Department Qualifications is subject to satisfactory results from periodic verification evaluations. A verification sample may be taken at the manufacturer's plant, distribution facility or at the concrete producer's plant.

Upon review of the quality control plan and satisfactory verification of the test results, the plant will be placed on the Department's list of cementitious materials sources with accepted Quality Control Programs. The cementitious materials supplier shall utilize a quality control plan accepted by the State Materials Office. The Department reserves the right to withdraw quality control plan acceptance and to require cementitious material shipments to be individually tested prior to incorporation into Department work. Quality control plans may be suspended when the performance of cementitious material is in question, including problems with concrete quality, inconsistent quality control data, or failure of quality control or verification test results.

Repulpable bags may be accepted by the Engineer, provided a successful demonstration by the producer has indicated complete degradation of the repulpable bags during the mixing operation and before the mix is discharged.

929-1.2 Approved Laboratory: The cementitious materials supplier's testing laboratory must maintain Cement and Concrete Reference Laboratory (CCRL) accreditation, be currently inspected by the CCRL, be actively participating in the CCRL proficiency program and have all deficiencies noted at the time of inspection corrected. The laboratory must authorize the CCRL to send a copy of the final inspection report to the State Materials Office.

929-2 Fly Ash.

929-2.1 Class C or Class F: Fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C-618, Class C or Class F Fly ash. Sampling and testing of fly ash shall follow the requirements of ASTM C-311.

929-2.2 Petroleum Coke Class F: Fly ash resulting from the combustion of coal and petroleum coke shall meet the physical and chemical requirements of ASTM C-618 Class F fly ash. When petroleum coke Class F fly ash is used in concrete, the test results shall verify improved or comparable strength, sulfate resistance, corrosion protective properties and other durability requirements of concrete, as compared to ASTM C-618 Class F fly ash concrete. The strength and durability tests of concrete shall be performed in accordance with ASTM C-39, ASTM C-157, ASTM C-1012, ASTM C-1202, ASTM G-109, FM 5-516 and FM 5-522. Fly ash shall not include the residue resulting from the burning of municipal garbage or any other refuse with coal, or the burning of industrial or municipal garbage in incinerators. Sampling and testing of fly ash shall follow the requirements of ASTM C-311.

929-2.3 Bark Ash Class F: Fly ash resulting from the combustion of timber bark ash and coal shall meet the physical and chemical requirements of ASTM C-618 Class F fly ash. When bark ash is used in concrete, the strength and durability of the bark ash concrete shall be improved or comparable to the strength and the durability properties of ASTM C-618 Class F fly ash concrete. The tests shall be performed as specified in 929-2.2. Sampling and testing of fly ash shall follow the requirements of ASTM C-311.

929-2.4 Special Requirements:

929-2.4.1 Fly Ash (Class C): When a Class C fly ash is used in moderately or extremely aggressive environments, tests made by the CCRL approved independent laboratory shall verify improved sulfate resistance of the concrete in accordance with ASTM C-1012, and improved or comparable corrosion protective properties measured by FM 5-522, as compared to similar concrete made with Class F fly ash.

929-2.4.2 Petroleum Coke and Bark Ash (Class F): For sources where the fly ash is not derived solely from ground or powdered coal combustion, certified test results performed by an independent approved laboratory, shall be submitted by the supplier. The performance-based comparison test results shall meet the requirements of 929-2.2 and 929-2.3 for petroleum coke and bark ash fly ashes, respectively.

929-2.5 Exceptions: Fly ash shall not be used in conjunction with Type IP or Type IS cements.

929-2.6 Acceptance Testing of Fly Ash: Acceptance of fly ash from sources operating under an approved quality control plan shall be based on the monthly certified quality control tests meeting the chemical (Supplementary Optional included) and physical requirements of ASTM C-618. When the loss on ignition exceeds 5%, the Uniformity Requirements in the Supplementary Optional Physical Requirements shall be mandatory. An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials Office when the material is in use on Department projects. The certification shall indicate that the fly ash meets the requirements of this Specification. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request.

929-3 Silica Fume.

929-3.1 General: Silica Fume shall meet the requirements of ASTM C-1240 using the referenced test methods and frequencies.

929-3.2 Acceptance Testing of Silica Fume: Acceptance of silica fume from sources operating under an approved quality control plan shall be based on the monthly certified quality control tests meeting the chemical (Supplementary Optional included) and physical requirements of ASTM C-1240. An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials Office when the material is in use on Department projects. The certification shall indicate that the silica fume meets the requirements of this Specification. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request.

929-4 Metakaolin.

929-4.1General: Metakaolin shall meet the requirements of ASTM C-618 Class N with the following modifications:

1. The sum of SiO_2 + Al_2O_3 + Fe_2O_3 shall be at least 85%. The Material Safety Data Sheet shall indicate that the amount of crystalline silica, as measured by National Institute of Occupation Safety and Health (NIOSH) 7500 method, after removal of the mica interference, is less than 1.0%.

2. The loss on ignition shall be less than 3.0%.

3. The available alkalies, as equivalent Na_2O, shall not exceed 1.0%.

4. The amount of material retained on a No. 325 mesh sieve shall not exceed 1.0%.

5. The strength activity Index, at 7 days, shall be at least 85%.

6. When metakaolin is used in concrete, the test results shall verify improved or comparable strength, sulfate resistance, corrosion protective properties and other durability performance properties of concrete, as compared to the performance of silica fume concrete. The comparison strength and durability tests shall be performed in accordance with ASTM C-39, ASTM C-157,

ASTM C-1012, ASTM C-1202, ASTM G-109, FM 5-516 and FM 5-522, by an approved independent testing laboratory. Sampling and testing of metakaolin shall follow the requirements of ASTM C-311.

929-4.2 Acceptance Testing of Metakaolin: Acceptance of metakaolin from sources operating under an approved quality control plan shall be based on the monthly certified quality control tests meeting the chemical (Supplementary Optional included) and physical requirements of ASTM C-618 Class N, as modified herein. An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials

Office, when the material is in use on Department projects. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request. The certification shall indicate that the metakaolin meets the requirements of this Specification.

929-5 Slag.

929-5.1 General: Slag shall meet the requirements of ASTM C-989. Sampling and testing procedures shall follow the requirements of ASTM C 989.

929-5.2 Special Requirements: Only Ground Granulated Blast-Furnace Slag Grade 100 and 120 will be permitted.

929-5.3 Exceptions: Slag shall not be used in conjunction with Type IP or Type IS cements.

929-5.4 Acceptance Testing: Acceptance of slag from sources operating under an approved quality control plan shall be based on the monthly certified quality control tests meeting the chemical and physical requirements of ASTM C-989. An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials Office when the material is in use on Department projects. Reference Cement used for determination of Slag Activity shall meet the requirements of ASTM C-989. The certification shall indicate that the slag meets the requirements of this Specification. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request.

929-6 Ultra Fine Fly Ash.

929-6.1 General: Sampling and testing of the ultra fine fly ash shall follow the requirements of ASTM C-311. Ultra fine fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C-618 as a Class F fly ash with the following modifications:

1. The pozzolanic activity index, at 7 days, shall be at least 85% of the control and the pozzolanic activity index, at 28 days, shall be at least 95% of the control.

2. Particles less than 3.25 microns shall be at least 50% of the particle size distribution, as measured by laser particle size analyzer. Particles less than 8.50 microns shall be at least 90% of the particle size distribution, as measured by laser particle size analyzer.

3. The amount of material retained when wet-sieved on a 45-µm sieve shall be less than 6.0%.

4. The moisture content shall be less than 1.0%.

5. The loss on ignition shall be less than 2.0%.

929-6.2 Exceptions: Ultra Fine Fly ash shall not be used in conjunction with Type IP or Type IS cements.

929-6.3 Acceptance Testing of Ultra Fine Fly Ash: Acceptance of fly ash from sources operating under an approved quality control plan shall be based on the monthly certified quality control tests meeting the chemical (Supplementary Optional included) and physical requirements of ASTM C-618. When the loss on ignition exceeds 2.0%, the Uniformity Requirements in the Supplementary Optional Physical Requirements shall be mandatory. An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials Office when the material is in use on Department projects. The certification shall indicate that the fly ash meets the requirements of this Specification. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request.

SECTION 949
BRICK AND CONCRETE MASONRY UNITS FOR MANHOLES, INLETS AND OTHER STRUCTURES

949-1 Clay Brick and Shale Brick. This brick shall meet the requirements of AASHTO M-114, for Grade MW.

949-2 Concrete Brick. Concrete brick shall meet the requirements of ASTM C-55 for Grade S-II.

949-3 Concrete Masonry Units. Concrete masonry units for use in manholes, inlets and similar structures shall meet the requirements of ASTM C-139.

When the masonry units are produced by a manufacturer exercising quality control procedures acceptable to the Department, such units may be accepted on the basis of six test certificates furnished to the Department. Such certificates shall be signed by an authorized agent of the manufacturer, and identified by project number.

SECTION 970
MATERIALS FOR RAISED RETRO-REFLECTIVE PAVEMENT MARKERS AND BITUMINOUS ADHESIVE

970-1 Raised Retro-Reflective Pavement Markers.

970-1.1 Composition: The marker shall consist of materials conforming to ASTM D-4280.

970-1.2 Physical Requirements: The physical size of the RPM shall conform to the requirements of ASTM D-4280. Laboratory and field samples for RPMs and bituminous adhesives shall meet the requirements of ASTM D-4280 and include the following requirements:

The minimum area of each reflective face shall be 2.5 in^2. The minimum base size shall be 12 in^2.

970-1.2.1 Designation of Marker Type, Color and Classification: the marker description shall be in order of type, color and reflective surface condition in accordance with ASTM D4280 and the following chart.

RPM Class			
Class	Description	Expected Normal Service	ASTM Surface Designation
A	Temporary marker	Up to six months	none
B	Permanent marker	Long life	H, hard abrasion resistant lens
D	Work zone marker	Per project requirement	none
E	Temporary work zone	Up to five days	none

970-1.3 Performance Requirements: The RPM shall meet the performance requirements specified in ASTM D-4280, Section 6.2, for luminous intensity, flexural strength, compressive strength, resistance to cracking, and thermal cycling, as modified herein. Test method FM 5-566 will be used to evaluate marker performance.

970-1.3.1 Class A Markers: Meet the coefficient of luminous intensity requirements of ASTM D-4280. Abrasion treatment is not required for Class A Markers.

970-1.3.2 Class B (Abrasion Resistant) Markers: Meet the coefficient of luminous intensity requirements of ASTM D-4280 after abrasion. Each marker shall be marked as abrasion resistant by the manufacturer.

970-1.3.3 In-service Minimum Reflective Intensity: The Class B reflective pavement marker shall retain a minimum coefficient of luminous intensity for 18 months of not less than 30% of the values shown in Table 1 of ASTM D-4280, and a minimum luminous intensity of 0.2 cd/fc at the end of two years.

970-1.4 Application Properties: Application properties shall meet the requirements of Section 02706.

970-1.5 Packaging and Labeling: Shipment shall be made in containers which are acceptable to common carriers and packaged in such a manner as to ensure delivery is in perfect condition. Each package shall be clearly marked as to the name of the manufacturer, type, color, quantity enclosed and date of manufacture. Show the designation of the marker in accordance with ASTM D-4280.

970-2 Bituminous Adhesive for Pavement Markers.

970-2.1 General: Bituminous adhesive as recommended by the marker manufacturer shall be used for bonding the markers to the pavement.

970-2.2 Specific Requirements for Bituminous Adhesives: The bituminous adhesive shall meet the properties of adhesives per ASTM D-4280 Section A1, including filler-free and filler alone properties.

970-2.3 Performance Requirements: The performance of the adhesive shall be determined in accordance with the test methods listed in ASTM D-4280.

970-3 Product Acceptance on the Project. Acceptance will be made in accordance with the requirements of Section 02706. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

SECTION 971
TRAFFIC MARKING MATERIALS

971-1 General Requirements.

971-1.1 Packaging and Labeling: All traffic marking materials shall be shipped in strong containers plainly marked with the weight in pounds per gallon, the volume of traffic marking materials content in gallons, the color, user information, date of manufacture, LOT, batch and DOT code number. Each batch manufactured shall have a unique number. A true statement of the percentage composition of the pigment, the proportion of pigment to vehicle, and the name and address of the manufacturer, also shall be shown. The label shall warn the user of any special handling or precautions of the material, as recommended by the manufacturer.

Any package not so marked will not be accepted for use under these specifications.

Preformed thermoplastic materials and permanent tape products shall be marked with content, color, date of manufacture and lot number.

971-1.2 Storage: Any traffic marking materials which, although inspected and approved at the point of manufacture, hardens or livers in the containers so that it cannot be readily broken up with a paddle to a smooth, uniform painting consistency, will be rejected. All materials shall have a container storage life of one year from date of manufacture. Any traffic marking materials not acceptable for proper application will be rejected, even though it conforms to these Specifications in all other respects.

971-1.3 Mixing: All paints shall be delivered to the project completely mixed, and ready to be used without additional oil or thinner. Gasoline shall not be used for thinner under any circumstances.

971-1.4 Qualified Products List: All traffic marking materials shall be one of the products listed on the Qualified Products List (QPL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6 accompanied by a copy of the infrared identification curve (2.5 to 15 µm) for the vehicle component. Products may only be used for applications recommended by the manufacturer. A notation of the number of coats and the thickness of each coat at which the product passes testing may be placed on the QPL. When listed, this will be the minimum criteria for application of the traffic marking material.

971-1.5 Samples: Field samples will be obtained in accordance with the Department's Sampling, Testing and Reporting Guide Schedule.

971-1.6 Color: Materials for pavement markings shall meet the following performance requirements.

The initial daytime chromaticity for yellow materials shall fall within the box created by the following coordinates:

Initial Daytime Chromaticity Coordinates (Corner Points)

	1	2	3	4
X	0.530	0.510	0.455	0.472
Y	0.456	0.485	0.444	0.400

The in-service daytime chromaticity for yellow materials shall fall within the box created by the following coordinates:

In-Service Daytime Chromaticity Coordinates (Corner Points)

	1	2	3	4
X	0.530	0.510	0.435	0.449
Y	0.456	0.485	0.429	0.377

The nighttime chromaticity for yellow materials shall fall within the box created by the following coordinates:

Nighttime Chromaticity Coordinates (Corner Points)

	1	2	3	4
X	0.575	0.508	0.473	0.510
Y	0.425	0.415	0.453	0.490

971-1.7 Additional Requirements: Traffic stripe materials shall be characterized as non-hazardous as defined by Resource Conservation and Recovery Act (RCRA) Subarticle C rules, Table 1 of 40 CFR 261.24 "Toxicity Characteristic". Traffic stripe materials shall contain no more than 3.0 ppm lead by weight in a cured state when tested by EPA methods 050 and 6010.

The material shall not exude fumes which are hazardous, toxic or detrimental to persons or property.

971-2 Glass Spheres.

971-2.1 General Requirements: Glass spheres shall be of a composition designed to be highly resistant to traffic wear and to the effects of weathering for the production of a reflective surface, creating night visibility of the pavement markings without altering day visibility of the marking. The general requirements of 971-1 apply to glass spheres.

The glass spheres shall conform to the requirement of AASHTO M-247 and FP 96.

971-2.2 Specific Properties: the large (Type 3 or Larger) glass spheres used for drop on beads shall have an adhesion coating. Type 1 glass spheres used for drop on beads shall have a dual coating. Beads used in the intermix of materials are not required to be coated.

The following physical requirements apply:

Property	Test Method	Specification
Gradation	ASTM D-1214	AASHTO M-247 & FP
Roundness	ASTM D-1155	Min: 70 % true spheres by weight per sieve size
Refractive Index	Becke Line Method (25+/-5C)	1.5 minimum

Sieve Size	Percent by Mass Passing Designated Sieve (ASTM D-1214)			
	Grading Designation			
	Type 1 (AASHTO)	Type 3 (FP 96)	Type 4 (FP 96)	Type 5 (FP 96)
No. 8				100
No. 10			100	95 – 100

No. 12		100	95 – 100	80 – 95
No. 14		95 – 100	80 – 95	10 – 40
No. 16	100	80 – 95	10 – 40	0 – 5

Sieve Size	Percent by Mass Passing Designated Sieve (ASTM D-1214)			
	Grading Designation			
	Type 1 (AASHTO)	Type 3 (FP 96)	Type 4 (FP 96)	Type 5 (FP 96)
No. 18		10 – 40	0 – 5	0 – 2
No. 20	95 - 100	0 – 5	0 – 2	
No. 25		0 – 2		
No. 30	75 – 95			
No. 40				
No. 50	15 – 35			
No. 80				
N0. 100	0 – 5			

Provide the Engineer Certified test reports from the manufacturer confirming that all glass spheres conform to the requirements of this Section.

971-2.3 Sampling:

971-2.3.1 Sampling: A random 50 lb sample of glass spheres shall be obtained for each 50,000 lb shipped. Upon arrival, the quantity of material will be reduced in a sample splitter to a size of approximately 1 quart by the Engineer, or one 50 lb unopened bag.

971-2.3.2 Containers: The spheres shall be furnished in new 50 lb moisture- proof bags. All containers shall meet ICC requirements for strength and type and be marked in accordance with AASHTO 247 Part 5

971-3 Fast Dry Traffic Paint - Water Borne.

971-3.1 General: Fast dry traffic paints intended for use under this Specification shall include water reducible products that are single packaged and ready mixed. Upon curing, these materials shall produce an adherent, reflective pavement marking capable of resisting deformation by traffic. The material shall have the capability of being cleaned and flushed from the striping machines using regular tap water and any required rust inhibitors. The manufacturer shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification and Section 710 shall apply regardless of the type of formulation used. The material shall be free from all skins, dirt and foreign objects.

971-3.2 Composition:

Component	Test Method	Criteria
Total Solids, by weight	ASTM D-2369	minimum 75%
Pigments, by weight	ASTM D-3723	minimum 57%
Vehicle Solids % on Vehicle*		minimum 40%
TiO_2, Type II Rutile (white paint only)	ASTM D-476	minimum 1.5 lb/gal
Volatile Organic Content, (VOC)	ASTM D-3960	maximum 150 g/L

* % total solids - % pigment 100 - % pigment

971-3.3 Physical Requirements: the material shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Density	ASTM D-1475	13.5 ± 1.4 lb/gal	-
Consistency at 77ºF	ASTM D-562	80 KU	100 KU
Fineness of Grind	ASTM D-1210	2(HS)	3(HS)
Dry Opacity at 5 mils WFT	Fed Std 141a Method 4121	0.96	-
Bleed Ratio	Fed Spec TT-P-85D	0.95	-
Flexibility	Fed Spec TT-P-115D	Pass	-
Abrasion Resistance	971-3.3.2	Pass	-

971-3.3.1 Set To Bear Traffic Time: The material shall set to bear traffic in not more than two minutes.

971-3.3.2 Abrasion Resistance: Test four samples per LOT using a Taber Abrader. The paint shall be applied to specimen plates using a drawdown blade having a clearance of 26 mils. Air dry each sample for 30 minutes and bake at 220ºF for 18 hours. Clean with a soft brush and weigh each sample. Abrade samples for 1,000 cycles with 500 g weights and CS-10 wheels. Clean the samples with a soft brush and weigh again. The average weight loss for the four plates shall not exceed 50 mg per plate.

971-3.3.3 Retroreflectivity: The white and yellow pavement markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m^2 and 250 mcd/lx·m^2. The retroreflectance of the white and yellow pavement markings at the end of the six month service life shall not be less than 150 mcd/lx·m^2.

971-3.4 Packaging and Labeling: The traffic paint shall be placed in 55 gallon open-end steel drums with a re-usable multi-seal sponge gasket. No more than 50 gallons of material shall be placed in any drum to allow for expansion during transport and storage.

971-4 Fast Dry Solvent Traffic Paint.

971-4.1 General: Fast dry traffic paints intended for use under this Specification shall include products that are single packaged and ready mixed. Upon curing, these materials shall produce an adherent, reflective pavement marking capable of resisting deformation by traffic. The manufacturer shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification and Section 710 shall apply regardless of the type of formulation used. The material shall be free from all skins, dirt and foreign objects.

971-4.2 Composition:

Component	Test Method	Criteria
Total Solids, by weight	ASTM D-2369	75% minimum
Pigments, by weight	ASTM D-3723	57% minimum
Vehicle Solids, % on Vehicle*		40% minimum
TiO_2, Type II Rutile (white paint only)	ASTM D-476	1.5 lb/gal minimum

Volatile Organic Content, (VOC)	ASTM D-3960	150 g/L maximum

971-4.3 Physical Requirements: the material shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Density	ASTM D-1475	13.5 ± 0.37 lb/gal	N/A
Consistency at 170ºF	ASTM D-562	80 KU	100 KU
Fineness of Grind	ASTM D-1210	2 (HS)	3(HS)
Dry Opacity at 5 mils WFT	Fed Std 141a Method 4121	0.96	-
Bleed Ratio	Fed Spec TT-P-85D	0.95	-
Flexibility	Fed Spec TT-P-115D	Pass	-
Abrasion Resistance	971-4.3.2	Pass	-

971-4.3.1 Set To Bear Traffic Time: The material shall set to bear traffic in not more than two minutes.

971-4.3.2 Abrasion Resistance: Test four samples per LOT using a Taber Abrader. The paint shall be applied to specimen plates using a drawdown blade having a clearance of 26 mils. Air dry each sample for 30 minutes and bake at 220ºF for 18 hours. Clean with a soft brush and weigh each sample. Abrade samples for 1,000 cycles with 1.1 lb weights and CS-10 wheels. Clean the samples with a soft brush and weigh again. The average weight loss for the four plates shall not exceed 0.178 oz per plate.

971-4.3.3 Retroreflectivity: The white and yellow pavement markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m^2 and 250 mcd/lx·m^2, respectively. The retroreflectance of the white and yellow pavement markings at the end of the six month service life shall not be less than 150 mcd/lx·m^2.

971-4.4 Application Properties: Application properties shall meet the requirements of Section 710.

971-4.5 Packaging and Labeling: The traffic paint shall be placed in 55 gallon open-end steel drums with a re-usable multi-seal sponge gasket. No more than 50 gallons of material shall be placed in any drum to allow for expansion during transport and storage.

971-5 Thermoplastic Materials for Traffic Stripes.

971-5.1 General: Upon cooling to normal pavement temperature, these materials shall produce an adherent, reflective pavement marking capable of resisting deformation by traffic. The manufacturer shall utilize alkyd based materials only and shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification and Section 02711 shall apply regardless of the type of formulation used. The pigment, glass spheres, and filler shall be well dispersed in the resin. The material shall be free from all skins, dirt and foreign objects.

971-5.2 Composition:

Component	Test Method	White	Yellow

Binder		20.0% minimum	20.0% minimum
TiO_2, Type II Rutile	ASTM D-476	10.0% minimum	-
Glass Spheres	AASHTO T-250	40.0% minimum	40.0% minimum
Yellow Pigment		-	% minimum per manufacturer
Calcium Carbonate and Inert Filler (-200 mesh sieve)		30.0% maximum	37.5% maximum
Percentages are by weight.			

The alkyd/maleic binder must consist of a mixture of synthetic resins (at least one synthetic resin must be solid at room temperature) and high boiling point plasticizers. At least one-half of the binder composition must be 100% maleic-modified glycerol of rosin and be no less than 15% by weight of the entire material formulation.

971-5.3 Glass Spheres: The glass spheres in the intermix shall consist of 50% Type 1 and 50% Type 3. Glass spheres shall meet the requirements of 971-2.

971-5.4 Sharp Silica Sand: Sharp silica sand used for bike lane symbols and pedestrian crosswalk lines shall meet the following gradation requirements:

Sieve Size	% Passing
20	100
50	0 to 10

971-5.5 Physical Requirements: Laboratory samples shall be prepared in accordance with ASTM D-4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Water Absorption	ASTM D-570	-	0.5%
Softening Point	ASTM D-36	195ºF	-
Low Temperature Stress Resistance	AASHTO T-250	Pass	-
Specific Gravity	Water displacement	1.9	2.3
Indentation Resistance	ASTM D-2240* Shore Durometer, A2	40	75
Impact Resistance	ASTM D-256, Method A	1.0 N·m	-
Flash Point	ASTM D-92	475ºF	-
*The durometer and panel shall be at 110ºF with a 4.4 lb load applied. Instrument measurement shall be taken after 15 seconds.			

971-5.5.1 Set To Bear Traffic Time: The thermoplastic shall set to bear traffic in not more than two minutes.

971-5.5.2 Retroreflectivity: The white and yellow pavement markings shall attain an initial retroreflectance of not less than 450 mcd/lx·m^2 and not less than 350 mcd/lx·m^2, respectively. The retroreflectance of the white and yellow pavement markings at the end of the three year service life shall not be less than 150 mcd/lx·m^2.

971-5.5.3 Durability: Durability is the measured percent of thermoplastic material completely removed from the pavement. The thermoplastic material line loss must not exceed 5.0% at the end of the service life.

971-5.6 Application Properties: Application properties shall meet the requirements of Section 02711.

971-5.7 Packing and Labeling: The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. The container of thermoplastic material shall weigh approximately 50 lb. The label shall warn the user that the material shall be heated in the range as recommended by the manufacturer.

971-6 Thermoplastic Material-Hot Spray.

971-6.1 General: This work shall consist of furnishing and applying thermoplastic material when the project requires refurbishing existing thermoplastic stripes. The manufacturer shall utilize alkyd based materials only and shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification and Section 02711 shall apply regardless of the type of formulation used.

971-6.2 Composition:

Component	White	Yellow
Binder	25.0% minimum	25.0% minimum
TiO_2 (ASTM D-476 Type II Ructile)	10.0% minimum	-
Glass Spheres	35.0% minimum	35.0% minimum
Yellow Pigment	-	% minimum per manufacturer
Calcium Carbonate and Inert Filler (No. 200 sieve)	30.0% maximum	40.0% maximum

971-6.3 Binders: The manufacturer shall have the option of formulating the material according to his own specifications. However, the physical and chemical properties contained in this Specification shall apply regardless of the type of formulation used. The pigment, beads and filler shall be well dispersed in the resin. The material shall be free from all skins, dirt and foreign objects.

971-6.4 Physical Requirements: Sample specimens shall be prepared in accordance with ASTM D-4960.

Procedure shall meet the following requirements:

Property	Test Method	Minimum	Maximum
Water Absorption	ASTM D-570	-	0.5%
Softening Point	ASTM D-36	190ºF	-
Low Temperature Stress Resistance	AASHTO T-250	Pass	-
Specific Gravity	Water displacement	1.87	2.3
Indentation Resistance	ASTM D-2240* Shore Durometer, A2	5	30
Impact Resistance	ASTM D-256, Method A	1.0 N·m	-

Flash Point	ASTM D-92	475ºF	-
*The durometer and panel shall be at 110ºF with a 4.4 lb load applied. Instrument measurement shall be taken after 15 seconds.			

971-6.4.1 Set To Bear Traffic Time: The thermoplastic shall set to bear traffic in not more than two minutes.

971-6.4.2 Retroreflectivity: The white and yellow pavement markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m^2 and not less than 250 mcd/lx·m^2, respectively. The retroreflectance of the white and yellow pavement markings at the end of the one year service life shall not be less than 150 mcd/lx·m^2.

971-6.4.3 Durability: Durability is the measured percent of thermoplastic material completely removed from the pavement. The thermoplastic material line loss must not exceed 5.0% at the end of the one year service life.

971-6.5 Glass Spheres: Glass spheres shall be Type 1 and meet the requirements of 971-2.

971-6.6 Sharp Silica Sand: Sharp silica sand used for bike lane symbols and pedestrian crosswalk lines meet the following gradation requirements:

Sieve Size	% Passing
20	100
50	0 to 10

971-6.7 Application Properties: The thermoplastic material shall readily apply and adhere to the existing traffic stripe at temperatures as recommended by the manufacturer from equipment approved by the Engineer to produce a line which shall be continuous and uniform in shape having clear and sharp dimensions at a minimum thickness as identified in the plans. No signs of moisture shall be visible on the pavement surface as determined in accordance with the binder manufacturer's recommendations.

The material, when formed into traffic stripes, must be readily renewable by placing an overlay of new material directly over an old line of the same material. Such new material shall bond itself to the old line in a manner such that no splitting or separation occurs.

Overlay stripe thicknesses shall be measured as specified in Section 02711 for refurbishing of thermoplastic stripes.

971-6.8 Packing and Marking: The thermoplastic material shall be packed in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. The container of thermoplastic material shall weigh approximately 50 lb. The label shall warn the user that the material shall be heated in the range as recommended by the manufacturer.

971-7 Preformed Thermoplastic Materials for Traffic Stripes.

971-7.1 General: Upon cooling to normal pavement temperature, these materials shall produce an adherent, reflective pavement marking capable of resisting deformation by traffic. The manufacturer shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification and Section 02711 shall apply regardless

of the type of formulation used. The pigment, glass spheres, and filler shall be well dispersed in the resin. The material shall be free from all skins, dirt and foreign objects.

971-7.2 Composition: The preformed thermoplastic shall consist of high quality materials, pigments and glass spheres or other reflective material uniformly distributed throughout their cross-sectional area, with a reflective layer of spheres or other reflective material embedded in the top surface.

971-7.3 Glass Spheres: Material shall contain no less than 30% glass spheres by weight.

971-7.4 Color: Materials shall meet the performance requirements specified in 971-1 and the following additional requirements. The initial luminance factor, Cap Y, shall not be less than 55. The in-service luminance factor at the end of the three year service life shall not be less than 35 when measured outside the wheel paths.

971-7.5 Physical Requirements: Laboratory samples shall be prepared in accordance with ASTM D-4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Softening Point	ASTM D-36	195ºF	-
Low Temperature Stress Resistance	AASHTO T-250	Pass	-
Indentation Resistance	ASTM D-2240* Shore Durometer, A2	40	75
Impact Resistance	ASTM D-256, Method A**	1.0 N·m	-
*The durometer and panel shall be at 110ºF with a 4.4 lb load applied. Instrument measurement shall be taken after 15 seconds. **The test specimen for ASTM D-256 shall be 1 in. x 1 in. x 6 in. and shall not be notched.			

971-7.5.1 Retroreflectivity: The white and yellow pavement markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m^2. The retroreflectance of the white pavement markings at the end of the three year service life shall not be less than 150 mcd/lx·m^2. All pedestrian crosswalks, bike lane symbols and messages in a proposed bike lane shall attain initial retroreflectivity of not less than 275 mcd/lx·m^2.

971-7.5.2 Skid Resistance: The surface of the stripes and markings shall provide a minimum skid resistance value of 35 BPN (British Pendulum Number) when tested according to ASTM E-303. Bike lane symbols and pedestrian crosswalks shall provide a minimum skid resistance value of 55 BPN.

971-7.5.3 Durability: Durability is the measured percent of thermoplastic material completely removed from the pavement. The thermoplastic material line loss must not exceed 5.0% at the end of the service life.

971-7.6 Application Properties: Application properties shall meet the requirements of Section 02711.

971-7.7 Packing and Labeling: The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage.

971-8 Permanent Tape Materials for Pavement Stripes and Markings.

971-8.1 General: The materials for pavement stripes and markings shall consist of white or yellow weather-resistant reflective film as specified herein. The markings are divided into two classes: Standard and High Performance. The classes are differentiated by their durability and retroreflectivity. The pigment, glass spheres, and filler shall be well dispersed in the resin. However, the requirements delineated in this Specification and Section 713 shall apply. The material shall be free from all skins, dirt and foreign objects.

971-8.2 Composition: The pavement stripes and markings shall consist of high-quality plastic materials, pigments, and glass spheres uniformly distributed throughout their cross-sectional area, with a reflective layer of spheres embedded in the top surface.

971-8.3 Skid Resistance: The surface of the stripes and markings shall provide a minimum skid resistance value of 35 BPN (British Pendulum Number) when tested according to ASTM E-303. Bike lane symbols and pedestrian crosswalks shall provide a minimum skid resistance value of 55 BPN.

971-8.4 Thickness: The QPL will list the specified thickness of each approved product.

971-8.5 Durability and Wear Resistance: When properly applied, the material shall provide neat, durable stripes and markings. The materials shall provide a cushioned resilient substrate that reduces sphere crushing and loss. The film shall be weather resistant and, through normal wear, shall show no significant tearing, rollback or other signs of poor adhesion. Durability is the measured percent of pavement marking material completely removed from the pavement. The pavement marking material line loss must not exceed 5.0% of surface area at the end of its service life.

971-8.6 Conformability and Resealing: The stripes and markings shall be capable of conforming to pavement contours, breaks and faults under traffic at pavement temperatures recommended by the manufacturer. The film shall be capable of use for patching worn areas of the same types of film in accordance with the manufacturer's recommendations.

971-8.7 Tensile Strength: The stripes and markings shall have a minimum tensile strength of 40 psi when tested according to ASTM D-638. A rectangular test specimen 6 by 1 by 0.05 minimum thickness shall be tested at a temperature range of 40 to 80ºF using a jaw speed of 0.25 inch/min.

971-8.8 Elongation: The stripes and markings shall have a minimum elongation of 25% when tested in accordance with ASTM D-638.

971-8.9 Plastic Pull Test: The stripes and markings shall support a dead weight of 4 lb for not less than five minutes at a temperature range of 70 to 80ºF. Rectangular test specimen size shall be 6 by 1 by 0.05 inch minimum thickness.

971-8.10 Pigmentation: The pigment shall be selected and blended to provide a material which is white or yellow conforming to standard highway colors through the expected life of the stripes and markings.

971-8.11 Glass Spheres: The stripes and markings shall have glass retention qualities such that, when at room temperature a 2 by 6 inches specimen is bent over a 0.5 inch diameter mandrel axis, a microscopic examination of the area on the mandrel shall show no more than 10% of the spheres with entrapment by the material of less than 40%. The bead adhesion shall be such that spheres are not easily removed when the film surface is scratched firmly with a thumbnail.

971-8.12 Standard Markings: The preformed materials for pavement stripes and markings shall have a service life of three year. The materials shall attain an initial retroreflectance of not less than 300 mcd/lx·m^2 for white and contrast markings and not less than 250 mcd/lx·m^2, for yellow markings. The retroreflectance of the white, yellow and contrast pavement markings at the end of the three year service life shall not be less than 150 mcd/lx·m^2. All pedestrian crosswalks, bike lane symbols and messages in a proposed bike lane shall attain initial retroreflectivity of not less than 275 mcd/lx·m^2.

971-8.13 High Performance Markings: The preformed materials for pavement stripes and markings shall have a service life of five years. The materials shall attain an initial retroreflectance of not less than 450 mcd/lx·m^2 for white and contrast markings and not less than 350 mcd/lx·m^2 for yellow markings. The pavement stripes and markings shall retain a minimum retroreflectance for two years of not less than 300 mcd/lx·m^2 for white and contrast markings and not less than 250 mcd/lx·m^2 for yellow markings. The retroreflectance of the white, yellow and contrast pavement markings at the end of the five year service life shall not be less than 150 mcd/lx·m^2.

971-9 Two Reactive Component Materials For Traffic Stripes And Markings.

971-9.1 General: Two reactive component materials intended for use under this Specification shall include, but not be limited to, epoxies, polyesters and urethanes. Upon curing, these materials shall produce an adherent, reflective pavement marking capable of resisting deformation by traffic. The manufacturer shall have the option of formulating the material according to his own specifications. However, the criteria outlined in this Specification and Section 709 shall apply regardless of the type of formulation used. The material shall be free from all skins, dirt and foreign objects.

971-9.2 composition:

Component	Test Method	Criteria
TiO_2, Type II Rutile (white material only)	ASTM D-476	minimum 10% by weight
Volatile Organic Content, (VOC)	ASTM D-3960	maximum 150 g/L

971-9.3 Physical Requirements: The material shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Adhesion to Concrete	ASTM D-4541	Pass	-
Hardness	ASTM D-2240	75	-
Flexibility	Fed Spec TT-P-115D	Pass	-
Abrasion Resistance	971-9.5.2	Pass	-

971-9.3.1 Set To Bear Traffic Time: The material shall set to bear traffic in not more than two minutes.

971-9.3.2 Abrasion Resistance: Test four samples per LOT using a Taber Abrader. The material shall be applied to specimen plates using a drawdown blade having a clearance of 26 mils. Air dry each sample for 30 minutes and bake at 220ºF for 18 hours. Clean with a soft brush and weigh each sample. Abrade samples for 1,000 cycles with 1.1 lb weights and CS-10 wheels. Clean the samples with a soft brush and weigh again. The average weight loss for the four plates shall not exceed 0.178 ounce per plate.

971-9.3.3 Retroreflectivity: The white and yellow pavement markings shall attain an initial retroreflectance of not less than 450 mcd/lx·m^2 and not less than 350 mcd/lx·m^2, respectively. The retroreflectance of the white and yellow pavement markings at the end of the one year service life shall not be less than 150 mcd/lx·m^2.

971-9.4 Application Properties: Application properties shall meet the requirements of Section 709.

971-9.5 Packaging and Labeling: The two reactive component material shall be placed in 55 gallon open-end steel drums with a re-usable multi-seal sponge gasket. No more than 50 gallons of material shall be placed in any drum to allow for expansion during transport and storage. Other containers will be used for applicable products. Each container shall designate the color, generic type (e.g. epoxy), user information, manufacturer's name and address, batch number and date of manufacture. Each batch manufactured shall have a unique number. The label shall warn the user of hazards associated with handling or using the material.

971-10 Thermoplastic Material for Audible and Vibratory Traffic Stripes.

971-10.1 General: Upon cooling to normal pavement temperature, the thermoplastic material shall produce an adherent, reflective pavement marking capable of resisting deformation by traffic. The manufacturer shall utilize alkyd based materials only and shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification shall apply regardless of the type of formulation used. The pigment, glass spheres, and filler shall be well dispersed in the resin. The material shall be free from all skins, dirt and foreign objects.

971-10.2 Composition:

Component	Test Method	White	Yellow
Binder		20.0% minimum	20.0% minimum
TiO_2, Type II Rutile	ASTM D-476	10.0% minimum	-
Glass Spheres	AASHTO T-250	40.0% minimum	40.0% minimum
Yellow Pigment		-	% minimum per manufacturer
Calcium Carbonate and Inert Filler (-200 mesh sieve)		% minimum per manufacturer	% minimum per manufacturer
Percentages are by weight.			

The alkyd/maleic binder must consist of a mixture of synthetic resins (at least one synthetic resin must be solid at room temperature) and high boiling point plasticizers. At least one-half of the

binder composition must be 100% maleic-modified glycerol of rosin and be no less than 15% by weight of the entire material formulation.

971-10.3 Glass Spheres: The glass spheres in the intermix shall be Type 1 and meet the requirements of 971-2.

971-10.4 Physical Requirements: Laboratory samples shall be prepared in accordance with ASTM D-4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Water Absorption	ASTM D-570	-	0.5%
Softening Point	ASTM D-36	210ºF	-
Low Temperature Stress Resistance	AASHTO T-250	Pass	-
Specific Gravity	Water displacement	1.9	2.3
Indentation Resistance	ASTM D-2240* Shore Durometer, A2	65	-
Impact Resistance	ASTM D-256, Method A	1.0 N·m	-
Flash Point	ASTM D-92	475ºF	-
*The durometer and panel shall be at 80ºF, but not exceeding 90ºF with a 4.4 lb load applied. Instrument measurement shall be taken after 15 seconds.			

971-10.4.1 Set To Bear Traffic Time: The thermoplastic shall set to bear traffic in not more than 10 minutes at ambient air temperatures of 80ºF or less and in not more than 15 minutes for ambient air temperatures exceeding 80ºF.

971-10.4.2 Retroreflectivity: The white and yellow pavement markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m^2 and not less than 250 mcd/lx·m^2, respectively. The retroreflectance of the white and yellow pavement markings at the end of the three year service life shall not be less than 150 mcd/lx·m^2.

971-10.4.3 Durability: Durability is the measured percent of thermoplastic material completely removed from the pavement. The thermoplastic material line loss must not exceed 5.0% at the end of the three year service life. Durability shall also include flattening of the profile or raised portions of the line. The flattening of the profile or raised portion of the line shall not exceed 25% at the end of the three year service life.

971-10.5 Application Properties: Application properties shall meet the requirements of Section 701.

971-10.6 Packing and Labeling: The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. The container of thermoplastic material shall weigh approximately 50 lb. The label shall warn the user that the material shall be heated in the range as recommended by the manufacturer.

SECTION 981
TURF MATERIALS

981-1 General.

The types of seed and sod will be specified in the Contract Documents. All seed and sod shall meet the requirements of the Florida Department of Agriculture and Consumer Services and all applicable state laws, and shall be approved by the Engineer before installation.

All seed, sod and mulch shall be free of noxious weeds and exotic pest plants, plant parts or seed listed in the current Category I "List of Invasive Species" from the Florida Exotic Pest Plant Council (FLEPPC, www.fleppc.org). Any plant officially listed as being noxious or undesirable by any Federal Agency, any agency of the State of Florida or any local jurisdiction in which the project is being constructed shall not be used. Furnish to the Engineer, prior to incorporation onto the project, a certification from the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, stating that the seed, sod or mulch materials are free of noxious weeds. Any such noxious or invasive plant or plant part found to be delivered in seed, sod or mulch will be removed by the Contractor at his expense and in accordance with the law.

All materials shall meet plant quarantine and certification entry requirements of Florida Department of Agriculture & Consumer Services, Division of Plant Industry Rules.

981-2 Seed.

The seed shall have been harvested from the previous year's crop. All seed bags shall have a label attached stating the date of harvest, LOT number, percent purity, percent germination, noxious weed certification and date of test.

Each of the species or varieties of seed shall be furnished and delivered in separate labeled bags. During handling and storing, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents and other causes.

All permanent and temporary turf seed shall have been tested within a period of six months of the date of planting.

All permanent and temporary turf seed shall have a minimum percent of purity and germination as follows:

1. All Bahia seed shall have a minimum pure live seed content of 95% with a minimum germination of 80%.

2. Bermuda seed shall be of common variety with a minimum pure live seed content of 95% with a minimum germination of 85%.

3. Annual Type Ryegrass seed shall have a minimum pure live seed content of 95% with a minimum germination of 90%.

981-3 Sod.

981-3.1 Types: Unless a particular type of sod is called for in the Contract Documents, sod may be either centipede, bahia, or bermuda at the Contractor's option. It shall be well matted with roots. Where sodding will adjoin, or be in sufficiently close proximity to, private lawns, other types of sod may be used if desired by the affected property owners and approved by the Engineer.

981-3.2 Dimensions: The sod shall be taken up in commercial-size rectangles, or rolls, preferably 12 by 24 inch or larger, except where 6 inch strip sodding is called for, or as rolled sod at least 12 inches in width and length consistent with the equipment and methods used to handle the rolls and place the sod. Sod shall be a minimum of 1 1/4 inch thick including a 3/4 inch thick layer of roots and topsoil. Reducing the width of rolled sod is not permitted after the sod has been taken up from the

initial growing location. Any netting contained within the sod shall be certified by the manufacturer to be bio-degradable within a period of three months from installation.

981-3.3 Condition: The sod shall be sufficiently thick to secure a dense stand of live turf. The sod shall be live, fresh and uninjured, at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be planted within 48 hours after being cut and kept moist from the time it is cut until it is planted. No sod which has been cut for more than 48 hours may be used unless specifically authorized by the Engineer. A letter of certification from the turf Contractor as to when the sod was cut, and what type, shall be provided to the Engineer upon delivery of the sod to the job site.

The source of the sod may be inspected and approved by the Engineer prior to being cut for use in the work.

981-4 Mulch.

The mulch material shall be compost meeting the requirements of Section 987, hardwood barks, shavings or chips; or inorganic mulch materials as approved by the Engineer; or hydraulically applied wood fiber mulch or bonded fiber matrix (BFM).

981-5 Source Requirements for Sod and Mulch.

The Contractor shall comply with all current restrictions in regard to movement of sod and mulch material, as required by the Division of Plant Industry, Florida Department of Agriculture and Consumer Services (www.doacs.state.fl.us/pi/plantinsp/pi_reg_summary.html).

SECTION 982
FERTILIZER

982-1 Fertilizers.

Fertilizers shall comply with the State fertilizer laws.

The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid, and (3) water-soluble potash, contained in the fertilizer. At least 50% of the nitrogen shall be from a slow-release source.

982-2 Certification.

The Contractor shall provide the Engineer a certified test report from the manufacturer of the commercial fertilizer confirming that the requirements of this Section are met. The certified test report shall conform to the requirements of Section 6 and include test results for total nitrogen, available phosphoric acid, water-soluble potash, and sulfur. Each certification shall cover one batch per type for dry type fertilizer.

982-3 Fertilizer Rates.

Soil laboratory fertilization recommendations are based on the amount (lbs) of nutrients (N, P_2O_5, K_2O) to apply per given area (usually 1,000 sq. ft.). From this recommendation it is necessary to select an appropriate fertilizer grade and then determine how much of this fertilizer to apply to the area.

If a complete fertilizer (containing all three primary nutrients) is not available in the ratio of N-P-K necessary to match the ratio required in the fertilizer recommendation, mixed-grade or single-nutrient fertilizers should be used to satisfy each nutrient requirement.

To calculate fertilizer rates:

1. Measure the area to be fertilized in square feet.

2. Select fertilizer(s) to be used based on the soil testing laboratory recommendations by matching the ratio of nutrients recommended to the fertilizer grades available.

3. Determine the amount of fertilizer to apply to a given area (1,000 sq. ft.) by dividing the recommended amount of nutrient by the percentage of the nutrient (on a decimal basis) in the fertilizer. Apply no more than 0.25 lbs P_2O_5/1000 sf per application prior to planting.

4. Adjust the amount of fertilizer to the project area.

SECTION 983
WATER FOR GRASSING

The water used in the grassing operations may be obtained from any approved source. The water shall be free of any substance which might be harmful to plant growth. Effluent water shall meet all Federal, State and local requirements.

SECTION 990
TEMPORARY TRAFFIC CONTROL DEVICES MATERIALS

990-1 General.

This Section specifies the material requirements for Temporary Traffic Control Devices.

990-2 Reflective Sheeting for Temporary Traffic Control Signs and Devices.

990-2.1 Qualified Products List: Sheeting for use on Temporary Traffic Control Signs and Devices shall be one of the products listed on the Qualified Products List (QPL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

990-2.1.1 Sign Panels, Vertical Panels, Barricades and other Devices: Sign Panels, Vertical Panels, Barricades and other Devices shall meet the requirements of ASTM D-4956 for Type III or higher retroreflective sheeting materials identified in Section 994 except for mesh signs shall meet the color, daytime luminance and nonreflective property requirements of Section 994, Type VI.

990-2.1.2 Collars for Traffic Cones and Bands for Tubular Markers: Collars for Traffic Cones and Bands for Tubular Markers shall meet the requirements of ASTM D-4956 Type VI.

990-2.1.3 Drums: Drums shall meet the requirements of ASTM D-4956 for Type III or higher retroreflective sheeting materials identified in Section 994 including Supplementary requirements for Reboundable Sheeting.

990-3 Portable Devices (Arrow Boards, Changeable (Variable) Message Signs, Regulatory Signs and Radar Speed Display Units).

990-3.1 General: All portable devices shall meet the physical display and operational requirements of the MUTCD and be listed on the QPL. Manufacturers seeking approval of their portable devices shall provide a working sample to be evaluated by the Department that meets all requirements specified herein.

990-3.1.1 Electrical Systems:

990-3.1.1.1 Diesel Engine: The Diesel Engine shall meet the following:

a) The power supply and electrical system shall be self contain within the unit

b) The engine shall have an electrical starting system

c) The power source furnished shall be of sufficient size to provide the required maximum load energy plus 25%.

d) The electrical system shall meet the National Electrical Code where applicable.

e) The electrical system that will operate the unit for a minimum of three hours automatically when the motor driven generator fails to operate.

f) The starting batteries and back-up power supply system batteries shall be automatically charged when the generator is operating.

g) The engine shall be supplied with an ammeter and the generator shall be supplied with a voltmeter showing voltage to the sign assembly.

990-3.1.1.2. Solar Powered Unit: The Solar Powered Unit shall meet the following:

(a) The unit shall provide automatic recharging of power supply batteries to normal operating levels with meters showing charge.

(b) Solar array recovery time for Arrow Boards and Regulatory Signs shall be accomplished in a maximum of three hours.

(c) Arrow Boards and Changeable Variable Message Signs shall be designed to provide 180 days of continuous operation with minimum onsite maintenance.

990-3.1.1.3 Battery Life Test: Meet the following:

(a) The photovoltaic unit shall be designed to provide 21 days of continuous operation without sunlight with a minimum of onsite maintenance for arrow boards and changeable message signs, or 10 days of continuous operation without sunlight with a minimum of onsite maintenance for regulatory signs and radar speed display units.

(b) The battery shall be equipped with a battery controller to prevent overcharging and over-discharging. An external battery level indicator shall be provided.

(c) The battery, controller, and power panel shall be designed to be protected from the elements and vandalism.

(d) Automatic recharging of power supply batteries shall be provided with charge indicator meter.

(e) An AC/DC battery charger unit shall be provided.

990-3.1.2 Display Panel and Housing:

i. The display housing assembly shall be weather-tight.

ii. All nuts, bolts, washers and other fasteners shall be corrosion resistant material.

iii. The display assembly shall be equipped with an automatic dimming operational mode capable of minimun of 50 % dimming and a separate manual dimmer switch.

iv. The display panel background and frame for the display assembly shall be painted flat black and shall meet Federal Specification TT-E-489

v. The display panel for arrow boards and changeable message signs, when raised in the upright position, shall have a minimum height of 7 feet from the bottom of the panel to the ground, in accordance with the MUTCD. The display panel for radar speed display units, when raised in the upright position, will have a minimum height of 5 feet from the bottom of the panel to the ground.

vi. The regulatory speed sign panel for regulatory signs and radar speed display units, when raised in the upright position, shall have a minimum height of 7 feet from the bottom of the regulatory sign panel to the ground.

vii. The unit shall have an accessible mechanism to easily raise and lower the display assembly. A locking device shall also be provided to ensure the display panel will remain in the raised or lowered position.

990-3.1.3 Controller: The Controller shall meet the following:

(a) Controller and control panel shall be housed in a weather, dust, and vandal resistant lockable cabinet.

(b) Controller and associated on-board circuitry shall meet the requirements of the Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise by Class A digital devices.

(c) For Changeable Variable Message Signs and Arrow Boards ensure that the sign control software provides an on-site graphical representation that visibly depicts the message displayed on the sign face.

(d) For Changeable Variable Message Signs, if remote communication is included, meet the following National Transportation Communications for ITS Protocol (NTCIP) requirements: Ensure

that the sign controller software implements all mandatory objects as defined in the FDOT Standard Global MIB v01 in Appendix A, all mandatory objects as defined in the FDOT Standard DMS MIB v01 in Appendix B, and all mandatory objects as defined in the FDOT Specific DMS MIB v01 in Appendix C. Ensure that additional objects implemented by the software do not interfere with the standard operation of mandatory objects.

990-3.1.4 Support Chassis: The Support Chasis shall meet the following:

(a) The support chassis shall be self-contained and self-supporting without the use of additional equipment or tools.

(b) Both trailer and truck-mounted units are allowed for arrow panels. Trailer mounted units are required for changeable message signs, regulatory signs and radar speed display units.

(1) Trailer mounted unit:

(a) The sign, power supply unit and all support systems shall be mounted on a wheeled trailer.

(b) the trailer shall be equipped with a class A lights, using a plug adaptor.

(c) the trailer shall be equipped with adjustable outrigger leveling pads, one for each of the four corners.

(d) The trailer shall be designed to be set up at the site with its own chassis and outriggers, without being hitched to a vehicle.

(e) The trailer shall be equipped with fenders over the tires and shall be made from heavy-duty material sufficient to allow a person to stand and operate or perform maintenance on the unit.

(f) The trailer shall meet all equipment specifications set forth in Chapter 316 of the Florida Statutes, and by such rule, regulation or code that may be adopted by the Department of Highway Safety and Motor Vehicles.

(g) The trailers should be delineated on a permanent basis by affixing retroreflective material, known as conspicuity material, in a continuous line on the face of the trailer as seen by oncoming road users.

(2) Truck mounted unit:

(a) the truck –mounted assembly shall be designed to fit on a ½ ton or greater duty truck.

(b) the unit shall be self-contained with its own power supply, controls, raising and lowering device and shall be capable of being operated by one person.

(c) the unit shall be secured in the vehicle for normal operation.

990-3.1.5 Other Requirements: meet the following:

i. The portable device assembly shall be designed to function in dry, wet,hot or cold weather (ambient temperature ranges from-30 to 165ºF. Other environmental requirements shall be as specified in Section A-615 of the Minimum Specifications for Traffic Control Signal Devices, which can be located at the following URL: (www.dot.state.fl.us/TrafficOperations/Traf_Sys/terl/minspec/A615.pdf), Sections A 615-4 Temperature and Humidity, A 615-5 Vibration, and A 615-6 Shock

ii. The controller shall not be affected by mobile radio, or any other radio transmissions.

iii. An operator's manual shall be furnished with each unit.

iv. The manufacturer's name and FDOT approval number shall be affixed on the equipment.

990-3.2 Portable Arrow Board:

990-3.2.1 Arrow Board Matrix:

(a) The minimum legibility distance for various traffic conditions are based on the decision-sight distance concept. The minimum legibility distance is the distance at which a driver can comprehend the arrow panel message on a sunny day or a clear night. The arrow panel size that is needed to meet the legibility distance is listed as follows:

Type	Minimum Size	Minimum Number of Panel Lamps	Minimum Legibility Distance
B	30 by 60 inches	13	3/4 mile
C	48 by 96 inches	15	1 mile

For use on the state highway system, the Types "B" or "C" advance warning arrow boards may be used for low to intermediate (0 to 50 mph) facilities and for maintenance or moving operations on high-speed roadways. Type "C" arrow boards shall be used on high-speed (50 mph and up).

(b) Devices shall meet all arrow board displays identified in the MUTCD. (c) The lamp lens should be 5 3/4 inches in diameter. Smaller lamp lens diameters are permissible only if they provide an equivalent or greater brightness indication and meet the legibility criteria in Section (a) of this Specification.

(d) The color of the light emitted shall be in accordance with the MUTCD. (e) There shall be a 360-degree hood for close-up glare reduction.

(f) For solar powered arrow boards the bulbs shall provide a 350-candle power intensity for day use and an automatic reduction or dimming capacity for night use. The dimmed night operation shall provide adequate indication without excessive glare.

(g) The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute as required in the MUTCD.

(h) The minimum lamp "on time" shall be 50% for the flashing arrow and 25% for the sequential chevron.

990-3.3 ChangeableVariable Message Sign:

990-3.3.1 Message Matrix:

(a) Message matrix panel shall be a maximum height of 7 feet by a maximum width of 10 feet.

(b) The message matrix panel shall contain three separate lines. Each line shall consist of eight characters, equally spaced a minimum of 3 inches. Each character shall contain 35 pixels in a five by seven horizontal to vertical grid arrangement.

(c) Each message line of the 7 foot by 10 foot PCMS shall provide for characters 13 inches in width by 18 inches in height minimum and variable graphic and symbol sizes to a minimum of 18 inches in height.

(d) For flip disk matrix signs, the disk elements shall be coated on the display side with a highly reflective florescent yellow Mylar material, and on the back with a flat black to blend in with the flat black background.

(e) Similar components shall be interchangeable

990-3.3.2 Operation and Performance:

(a) The message shall be displayed in upper case except when lower case is project specific and is allowed by the MUTCD.

(b) The message matrix panel shall be visible from 1/2 mile and legible from a distance of 650 feet under both day and night conditions. Under variable light level conditions the sign shall automatically adjust its light source to meet the 650 feet visibility requirement. The message panel shall have adjustable display rates, so that the entire message can be read at least twice at the posted speed.

(c) The control panel shall have the capability to store a minimum 50 pre-programmed messages.

(d) The controller in the control panel shall be able to remember messages during non-powered conditions.

(e) The controller shall allow the operator to generate additional messages on site via the keyboard.

(f) For a PCMS using Flip-Disk technology, the controller shall have the capability to provide a stipulated default message upon loss of controller function.

(g) All messages shall be flashed or sequenced. In the sequence mode, the controller shall have the capability to sequence three line messages during one cycle.

990-3.4 Portable Regulatory Signs:

990-3.4.1 Sign Panel Assembly: The sign panel assembly shall consist of a 24 by 30 inches "SPEED LIMIT XX" sign panel and a "WHEN FLASHING" sign panel, intended to notify oncoming traffic the speed limit where workers are present. The sign panel assembly shall meet the following minimum physical requirements:

(a) all nuts, bolts, washers, and other fasteners shall be of corrosion resistant material.

(b) the sign panel shall fold down and be pinned in place for towing. Maximum travel height shall be 80 inches.

(c) construct the sign panel and light housing to allow the unit to be operated in the displayed position at speeds of 30 mph. Design the sign panel assembly to withstand transport speeds of 65 mph.

(d) construct the sign panel such that, when in the raised position, the sign panel will have a height of seven feet from the bottom of the lowest panel to the ground, in accordance with the MUTCD.

(e) provide the unit with a mechanism to raise and lower the sign panel. Provide the unit with a device to lock the sign panel in the raised and lowered position.

990-3.4.2 Flashing Lights: Provide a pair of hooded PAR 46 LED advance warning flashing lamps on each side of the top of the sign panel. These lamps shall be visible day or night at a distance of one mile with a flash rate of approximately 55 flashes per minute.

The lamp lens should be at least 5 3/4 inches in diameter. Smaller diameter lens are permissible if they provide an equivalent or greater brightness indication and meet the legibility criteria above.

The color of the light emitted shall be in accordance with the MUTCD. For solar powered units, the bulbs shall provide a 350 candlepower intensity for day use and an automatic reduction or dimming capacity for night use. The dimmed night operation shall provide adequate indication without excessive glare.

990-3.5 Radar Speed Display Unit:

990-3.5.1 Display Unit Panel and Housing: Meet the requirements of 990-3.1.2 and the following physical requirements as a minimum:

(a) Provide capability to mount a 24 by 30 inches regulatory sign with interchangeable numbers showing the posted speed limit above the message display.

(b) Provide legend "YOUR SPEED" either above or below the message display.

990-3.5.2 Message Display: The message Display shall meet the following physical requirements as a minimum:

(a) Provide a bright LED, two digit speed display on a flat black background with bright yellow LEDs.

(b) Each digit shall contain either a seven-segment layout or matrix-style design. Each digit shall measure a minimum 18 inches in height.

(c) Speed display shall be visible from a distance of at least 1/2 mile and legible from a distance of at least 650 feet under both day and night conditions.

(d) Display shall adjust for day and night operation automatically with a photocell.

990-3.5.3 Radar: The radar unit shall not be affected by normal radio transmissions and meet the following physical requirements as a minimum:

(1) Approach-Only sensor.

(2) Equipped with a low power K-Band transmitter.

(3) Part 90 FCC acceptance, 3 amps, 10.8 to 16.6 vdc. Fuse and reverse polarity protected.

(4) Range of 1,000 feet for mid-size vehicle, capable of accurately sensing speeds of 10 to 99 mph with over speed function that operates when a vehicle approaches over the posted speed limit.

990-3.5.4 Traffic Counter: The unit shall be fitted with a device, which counts the number of vehicles passing the Radar Speed Display Unit. The counter device shall be capable of:

(1) Digital readout of the number of vehicles passing the radar speed display unit. (2) Digital readout of the number of vehicles exceeding the speed shown on the radar speed display unit.

990-4 Removable Tape.

990-4.1 Composition: The pavement stripes and markings shall consist of high quality plastic materials, pigments, and glass spheres or other retroreflective materials uniformly distributed throughout their cross-sectional area, with a reflective layer of spheres or other retroreflective material embedded in the top surface. No foil type materials shall be allowed.

990-4.2 Skid Resistance: The surface of the stripes and markings shall provide a minimum skid resistance value of 35 BPN (British Pendulum Number) when tested according to ASTM E-303. Bike lane symbols and pedestrian crosswalks shall provide a minimum skid resistance value of 55 BPN.

990-4.3 Thickness: The Qualified Products List will list the specified thickness of each approved product.

990-4.4 Durability and Wear Resistance: When properly applied, the material shall provide neat, durable stripes and markings. The materials shall provide a cushioned resilient substrate that reduces sphere crushing and loss. The film shall be weather resistant and, through normal wear, shall show no significant tearing, rollback or other signs of poor adhesion. Durability is the measured percent of pavement marking material completely removed from the pavement. The pavement marking material line loss must not exceed 5.0% of surface area.

990-4.5 Conformability and Resealing: The stripes and markings shall be capable of

conforming to pavement contours, breaks and faults under traffic at pavement temperatures recommended by the manufacturer. The film shall be capable of use for patching worn areas of the same types of film in accordance with the manufacturer's recommendations.

990-4.6 Tensile Strength: The stripes and markings shall have a minimum tensile strength of 40 psi when tested according to ASTM D 638. A rectangular test specimen 6 by 1 by 0.05 inch minimum thickness shall be tested at a temperature range of 40 to 80ºF using a jaw speed of 0.25 inch/minute.

990-4.7 Elongation: The stripes and markings shall have a minimum elongation of 25% when tested in accordance with ASTM D-638.

990-4.8 Plastic Pull test: The stripes and markings shall support a dead weight of 4 lb for not less than five minutes at a temperature range of 70 to 80ºF. Rectangular test specimen size shall be 6 by 1 by 0.05 inch minimum thickness.

990-4.9 Adhesive: Precoat removable tape with a pressure sensitive adhesive capable of being affixed to asphalt concrete and portland cement concrete pavement surfaces without the use of heat, solvents, and other additional adhesives or activators. Ensure that the adhesive does not require a protective liner when the removable tape is in rolled form for shipment. Ensure that the adhesive is capable of temporarily bonding to the roadway pavement at temperatures of 50ºF and the above without pick-up distortion by vehicular traffic.

990-4.10 Color: Meet the requirements of 971-1.7.

990-5 Work Zone Raised Pavement Markers.

Work Zone Raised Pavement Markers (WZRPM's) shall meet the requirement of 970-1.2.1 and are certified as meeting the following except for Class E markers as noted below:

(a) Composition: Use markers made of plastic, ceramic or other durable materials. Markers with studs or mechanical attachments will not be allowed.

(b) Dimensions: Marker minimum and maximum surface dimensions is based on an x and y axis where the y dimension is the axis parallel to the centerline and the x axis is 90 degrees to y. Class E markers shall be 4 inch (W) by 2 inch (H) by 1 inch (D).

The x and y dimension of Class D markers shall be a maximum of 5 inches. The x dimension shall be a minimum of 4 inches and the minimum y dimension will be 2.25 inches.

The maximum installed height of Class D markers shall be 1 inch. The maximum installed height of Class E markers shall be 2 inches. Use Class D markers having a minimum reflective face surface of 0.35 in^2. Use Class E markers having a minimum reflective surface area of 1 in^2.

The marker's reflective face shall be completely visible and above the pavement surface after installation, measured from a line even with the pavement perpendicular to the face of the marker.

(c) Optical Performance: Ensure that the specific intensity of each white reflecting surface at 0.2 degrees observation angle shall be at least the following when the incident light is parallel to the base of the marker:

Horizontal Entrance Angle	Specific Intensity
0 degrees	3
20 degrees	1.2

For yellow reflectors, the specific intensity shall be 60% of the value for white.

For red reflectors, the specific intensity shall be 25% of the value for white. Reflectivity of all WZRPM's shall not be less than 0.2 Specific Intensity (SI) any time after installation.

(d) Strength requirements: Markers shall support a load of 5,000 pounds. Three markers per lot or shipment will be randomly tested as follows:

Position the marker base down between the flat parallel platens of a compression testing machine. Place on top of the marker a flat piece of 65 durometer rubber 6 by

6 by 0.375 inch centered on the marker. Apply the compressive load through the rubber to the top of the marker at a rate of 0.2 in/s.

Either cracking or significant deformation of the marker at any load less than 5,000 pounds will constitute failure.

(e) Adhesion: Use bituminous adhesive materials recommended by the marker manufacturer for bonding the markers to the pavement. The adhesive used shall be one of the products included on the QPL.

(f) Removability: Ensure that the pavement marker is removable from asphalt pavement and portland cement concrete pavement intact or in substantially large pieces, either manually or by mechanical devices at temperatures above 40°F, and without the use of heat, grinding or blasting.

(g) Replacement Requirements: Replace markers any time after installation when more than two markers in a skip, or more than three consecutive markers on an edgeline are missing at no expense to the Department. Replace all failed markers in a timely manner as directed by the Engineer.

990-6 Temporary Glare Screen.

990-6.1 Design and Installation: Meet the following requirements:

(a) Glare screen units shall be manufactured in lengths such that when installed the joint between any one modular unit will not span barrier sections. Color shall be green, similar to Federal Color Standard 595-34227.

(b) Blades, rails and/or posts shall be manufactured from polyethylene, fiberglass, plastic, polyester or polystyrene, and be ultraviolet stabilized and inert to all normal atmospheric conditions and temperature ranges found in Florida.

(c) For paddle type designs, the blade width shall not be more than 9 inches. Blades or screen for individual or modular systems shall be 24 to 30 inches high and capable of being locked down at an angle and spacing to provide a cut-off angle not less than 20 degrees.

(d) For glare screen mounted on temporary barrier wall, a strip (6 by 12 inches) of reflective sheeting as specified in 994-2 shall be placed on a panel, centered in each barrier section (at a spacing not to exceed 15 feet) and positioned in such a manner as to permit total right angle observation by parallel traffic. When glare screen is utilized on temporary concrete barriers, warning lights will not be required.

(e) Prior to approval an impact test shall be performed by the manufacturer to verify the safety performance of the proposed system. The minimum impact strength of the posts, blades, rail and the barrier attachment design shall be sufficient to prevent the unit from separating from the barrier when impacted by a 3 inches outside diameter steel pipe traveling at 30 mph and impacting mid-height on the glare screen assembly.

(f) All hardware shall be galvanized in accordance with ASTM A-123 or stainless steel in accordance with AISI 302/305.

Alternative designs for temporary glare screen may be submitted as a Value Engineering Change Proposal (VECP) in accordance with 4-3.9.

990-6.2 Qualified Products List: Manufactured glare screen systems may be modular or individual units listed on the QPL.

990-7 Temporary Traffic Control Signals.

990-7.1 General: Meet the physical display and operational requirements of conventional traffic signal described in the MUTCD for portable traffic signals. The standard includes but is not limited to the following:

(a) Use signal heads having three 12 inch vehicular signal indications (Red, Yellow and Green). Ensure there are two signal heads for each direction of traffic.

(b) The traffic signal heads on this device will be approved by the Department. (c) Department approved lighting sources will be installed in each section in accordance with the manufacturer's permanent directional marking(s), that is, an "Up Arrow", the word "UP" or "TOP," for correct indexing and orientation within a signal housing.

(d) The masts supporting the traffic signal heads will be manufactured with the lowest point of the vehicular signal head as follows:

(1) Eight feet above finished grade at the point of their installation for "pedestal" type application or

(2) Seventeen to 19 feet above pavement grade at the center of roadway for "overhead" type application.

(e) The yellow clearance interval will be programmed three seconds or more. Under no condition can the yellow clearance interval be manually controlled. It must be timed internally by the controller as per Department specifications.

(f) The green interval must display a minimum of five seconds before being advanced to the yellow clearance interval.

(g) The controller will allow for a variable all red clearance interval from 0 to 999 seconds.

(h) Portable traffic control signals will be either manually controlled or traffic actuated. Indicator lights for monitoring the signal operation of each approach will be supplied and visible from within the work zone area.

(i) When the portable traffic control signals are radio actuated the following will apply:

(1) The transmitter will be FCC Type accepted and not exceed 1 watt output per FCC, Part 90.17. The manufacturer must comply with all "Specific limitations" noted in FCC Part 90.17.

(2) The Controller will force the traffic signal to display red toward the traffic approach in case of radio failure or interference.

(j) The trailer and supports will be painted construction/maintenance orange enamel in accordance with the MUTCD color.

(k) The device will meet NEMA environmental standard. The test report certified by an independent laboratory will be provided.

(l) Ensure the certification number is engraved or labeled permanently on equipment.

(m) Ensure the device has an external, visible, water resistant label with the following information: "Certification of this device by the Florida Department of Transportation allows for its use in Construction Zones Only."

SECTION 994
REFLECTIVE AND NON-REFLECTIVE SHEETING FOR TRAFFIC CONTROL DEVISES

994-1 Description.

994-1.1 General: This Section specifies the requirements for retroreflective and nonreflective sheeting materials, transparent and opaque process inks for retroreflective sheeting materials and film overlays for traffic control devices. The sheeting materials used shall be one of the products included on the Qualified Products List (QPL), as specified in 6-1.

994-1.2 Classification: Retroreflective sheeting material Types III, IV, V, and VI shall be classified in accordance with ASTM D-4956. In addition, a special classification,

Type VII (Special) is added for super high intensity retroreflective sheeting. This special classification shall include materials classified as Type VII and above in accordance with ASTM D-4956. A special classification for Type VI fluorescent pink is also added.

994-2 Materials.

Retroreflective sheeting, screen processing inks and film overlay materials used for any of the applications described herein shall be one of the products included on the QPL, as specified in 6-1. The retroreflective sheeting shall meet the requirements of Types III, IV, V, VI in ASTM D-4956 or Type VII (Special) and fluorescent pink listed below in accordance with their approved usage. Samples shall be taken in accordance with the Department's Sampling, Testing and Reporting Guide Schedule and on a random basis at the discretion of the Engineer.

994-3 Performance Requirements.

994-3.1 Testing: The retroreflective sheeting shall be tested in accordance with ASTM D-4956 and the Florida Test Method for retroreflective and nonreflective sheeting, FM 5-571. For retroreflectivity, the sheeting materials shall meet the minimum requirements as stated for 0.2 degree and 0.5 degree observation angles in ASTM D-4956. Evaluation of test samples shall be field tested in accordance with FM 5-571 for each color.

994-3.2 Retroreflective Intensity: The retroreflective sheeting shall meet the minimum initial requirements as stated for 0.2 degree and 0.5 degree observation angles in ASTM D-4956. Type VI fluorescent pink sheeting and Type VII (Special) sheeting shall meet the minimum retroreflectivity requirements listed below.

994-3.3 Color: The retroreflective and nonreflective sheeting or film shall conform to both the daytime and nighttime color requirements of ASTM D-4956, In addition to ASTM D-4956, the fluorescent pink initial color shall meet the following x, y chromaticity coordinates:

Fluorescent Pink	1	2	3	4
x	.450	.590	.644	.536
y	.270	.350	.290	.230

The daytime luminance factor shall meet ASTM D-4596 except for fluorescent pink sheeting which shall have a minimum luminance factor of 25.

994-3.3.1 Accelerated Outdoor Test: The retroreflective and nonreflective materials shall meet the ASTM D-4956 Accelerated Outdoor Table weathering requirements for performance except Type VI fluorescent pink and fluorescent yellow.

994-3.4 Adhesive Backing: The adhesive backing of the retroreflective and nonreflective sheeting or film shall be either Class 1, Class 2 or Class 5 per ASTM D-4956. The retroreflective and nonreflective sheeting or film, after application, shall tightly adhere to the application surface and show no discoloration, cracking, crazing, blistering or dimensional change.

994-3.5 Physical Properties: The retroreflective and nonreflective sheeting or film material shall meet the ASTM D-4956 minimum requirements for colorfastness, shrinkage, flexibility, liner removal, adhesion, impact resistance and specular gloss.

994-3.6 Color Processibility: The retroreflective sheeting shall permit color processing with compatible transparent and opaque process inks as approved by the sheeting manufacturer and listed on the QPL.

Type VII (Special) Sheeting										
Minimum Coefficient of Retroreflection ($cd/foot\text{-}candle \cdot ft^2$)($cd/fc \cdot ft^2$)										
Observation/Entrance Angle (degree)	White	Yellow	Red	Orange	Blue	Green	Brown	Fluorescent Orange	Fluorescent Yellow	Fluorsecent Yellow/Green
0.2/-4	380	304	95	250	19	38	19	180	220	360
0.5/-4	250	195	55	100	12	25	8	60	145	235
0.2/30	220	176	48	110	11	22	9	85	125	205
0.5/30	135	105	30	50	7	14	3	33	75	125

Type VI Sheeting	
Minimum Coefficient of Retroreflection ($cd/foot\text{-}candle \cdot ft^2$)($cd/fc \cdot ft^2$)	
Observation/Entrance Angle	Fluorescent Pink
(degree)	
0.2/-4	160
0.5/-4	100
0.2/30	100
0.5/30	40

994-4 Direct and Reverse Screen Processing.

994-4.1 General: The transparent and opaque process inks furnished for direct and reverse screen processing shall be of a type and quality formulated for retroreflective sheeting materials as listed on the QPL and applied in accordance with the manufacturer's instruction. Screen processing in accordance with the techniques and procedures recommended by the manufacturer shall produce a uniform legend of continuous stroke width of either transparent or opaque ink, with sharply defined edges and without blemishes on the sign background that will affect the intended sign use. The process inks shall be one of the products listed on the QPL.

994-4.2 Color: The daytime color of the finished transparent process inks shall conform to the requirements as specified in 994-3.3.

994-5 In-Service Minimum Requirements.

The retroreflective sheeting and screen processed retroreflective sheeting shall have the minimum coefficient of retroreflection as shown in ASTM D-4956, Outdoor Weathering Photometric Requirements for All Climates except Type VI fluorescent pink and fluorescent yellow. In addition, Type VII (Special) classified sheeting materials shall have a minimum coefficient of retroreflection of 80% of the values listed in the above table. Only the observation angle of 0.2 degrees and an entrance angle of -4 degrees shall be used in measuring in-service minimums. The in-service life for opaque overlay films, black processing inks and opaque lettering shall equal the life of the reflective sheeting to which it is applied.

994-6 Packaging and Labeling.

Shipment shall be made in containers which are acceptable to common carriers and packaged in such a manner as to ensure delivery is in perfect condition. Each package shall be clearly marked as to the name of the manufacturer, series, color, quantity enclosed and date of manufacture.

994-7 Certification.

For permanently installed signs, the Contractor shall be required to furnish to the Engineer one material certification from the sheeting manufacturer documenting that the retroreflective sheeting meets the requirements of this Section. Each certification shall cover only one type of retroreflective or non reflective sheeting or film. The certification shall meet the requirements in Section 6.

Certification shall not be required for signs and devices used in the work zone.

994-8 Qualified Products List.

994-8.1 General: All reflective and nonreflective sheeting materials and process inks shall be one of the products listed on the QPL. Products may only be used for applications recommended by the manufacturer. A notation of the sheeting materials approved for the inks may be placed on the QPL.

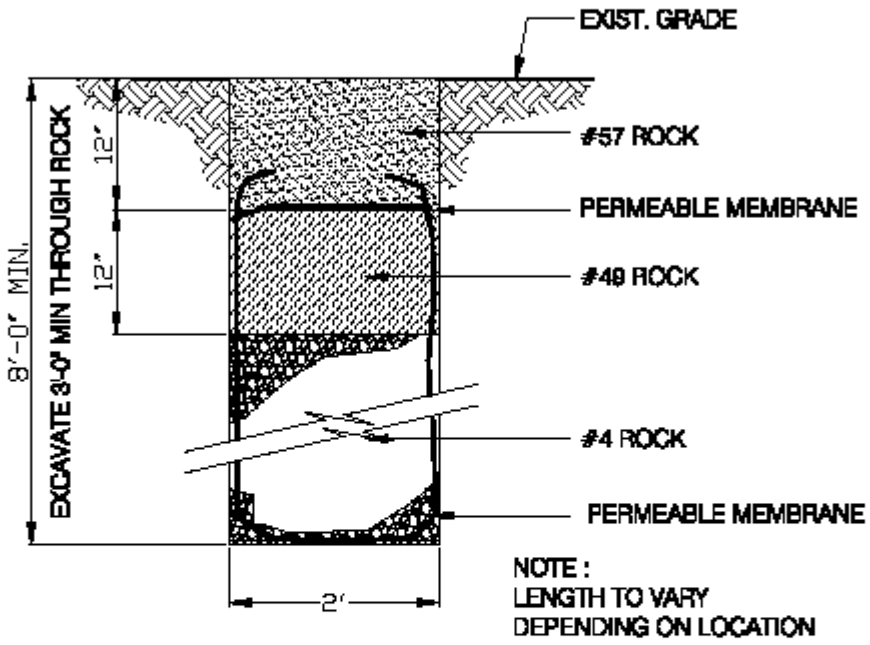
994-8.2 Other Requirements: Manufacturers seeking approval of sheeting material products shall submit an application, Material Safety Data Sheet (MSDS), and certification. Non-sheeting materials may be submitted under this Section with reference to specific equivalency of performance requirements of overall end product. Final acceptance will be based on tests and verification in accordance with this Specification, FM 5-571 and 6-1.

994-9 Samples.

Field samples will be obtained in accordance with the Department's Sampling, Testing and Reporting Guide Schedule.

PART 5

DRAWINGS



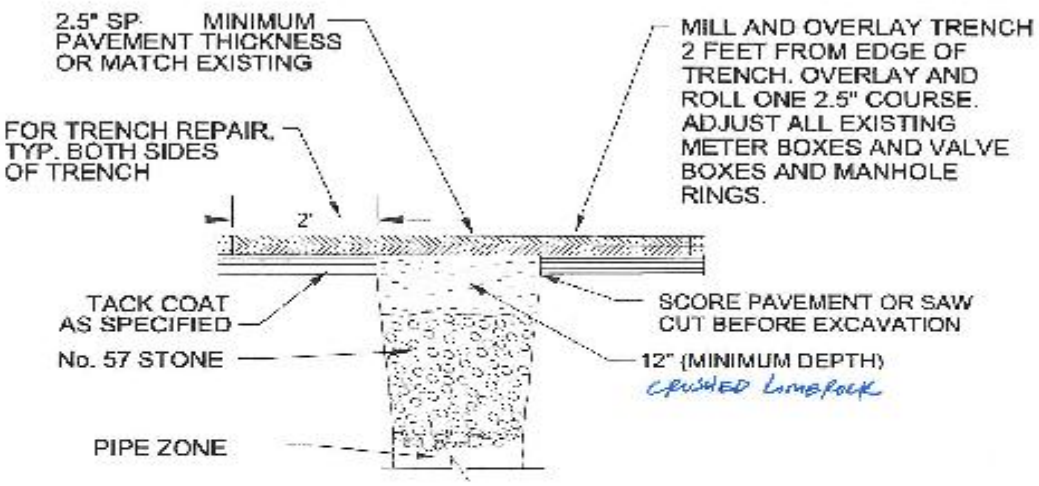
COMPACT IN 6" LIFTS W/ VIBRATORY COMPACTOR.

SEEPAGE TRENCH

NTS

City of Key West
Engineering Services
604 Simonton Street
Key West, FL 33040

TITLE	TYPICAL SEEPAGE TRENCH DETAIL
DESIGNED	A. MANNIX
DRAWN	K. OLSON
CHK'D	A. MANNIX
SCALE	NOT TO SCALE
PROJ. No.	
DWG. No.	A-514
DATE	3-3-09
SHEET	1 of 1



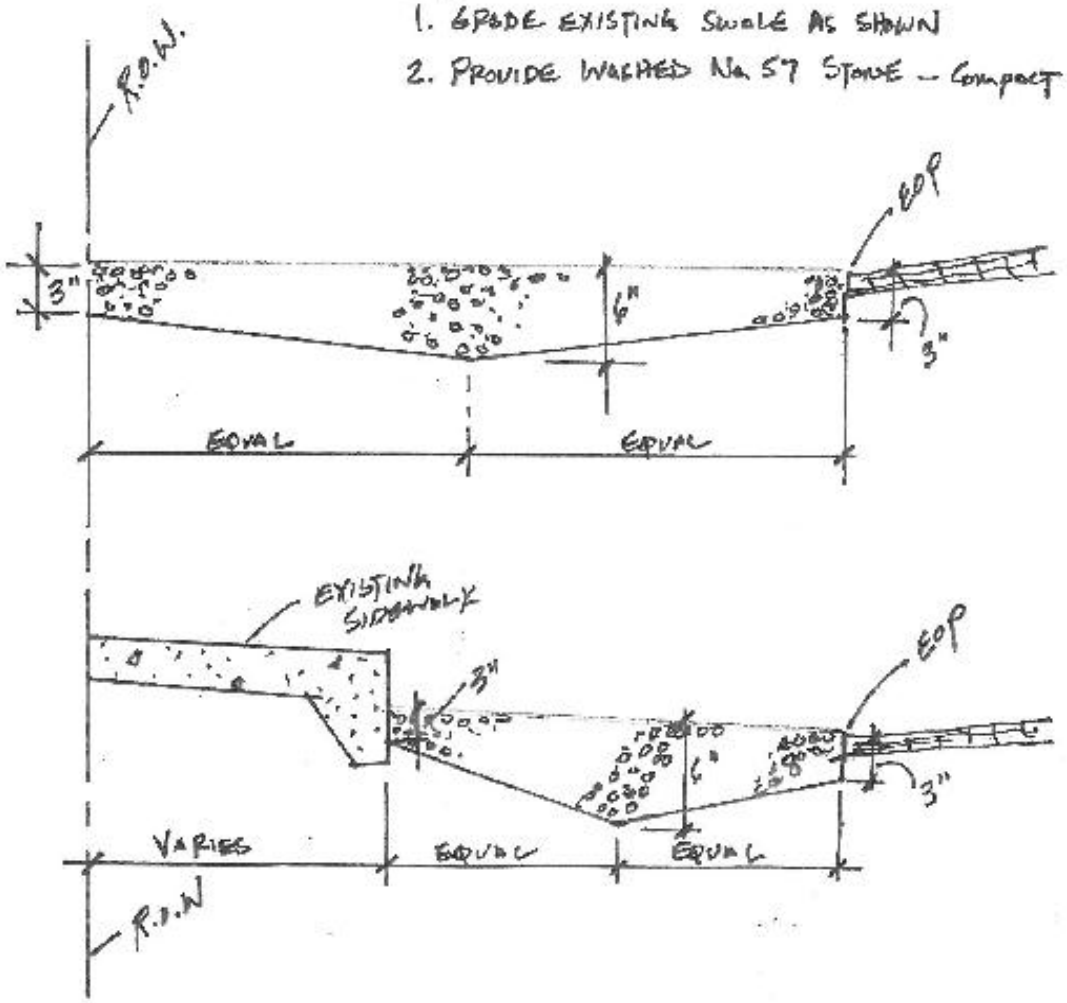
ASPHALT TRENCH

REPAIR FOR TRENCH

NTS

NOTES:

1. GRADE EXISTING SWALE AS SHOWN
2. PROVIDE WASHED No. 57 STONE – COMPACT



SWALE RESTORATION

NTS