EXHIBIT E
STANDARD SPECIFICATIONS

The Standard Specifications comprise Divisions I, II and III as noted below:

1. Division I General Requirements and Covenants, Sections 1-9 as included herein.

2. Division II-Construction Details and Division III-Materials refer to the FY 2024-25 edition of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, available at the following link:

http://www.fdot.gov/programmanagement/Implemented/SpecBooks/

DIVISION I

General Requirements and Covenants

SECTION 1
DEFINITIONS AND TERMS

1-1 General.

These Specifications are written to the bidder, prior to award of the Contract, and to the Contractor. Within Divisions I and II of the specifications, sentences that direct the Contractor to perform work are written in the active voice-imperative mood. These directions to the Contractor are written as commands. In the imperative mood, the subject "the bidder" or "the Contractor" is understood.

All other requirements to be performed by others, with the exception of the Method of Measurement and the Basis of Payment Articles, have been written in the active voice, but not in the imperative mood. Sentences written in the active voice identify the party responsible for performing the action. For example, "The Engineer will determine the density of the compacted material." Certain requirements of the Contractor may also be written in the active voice, rather than active voice-imperative mood.

Division III of the Specifications (Materials) is written in the passive voice writing style.

1-2 Abbreviations.

The following abbreviations, when used in the Contract Documents, represent the full text shown.

AAN	American Association of Nurserymen, Inc.
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGC	The Associated General Contractors of America, Inc.
AGMA	American Gear Manufacturers Association
AIA	American Institute of Architects
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute, Inc.
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
CRSI	Concrete Reinforcing Steel Institute
EASA	Electrical Apparatus Service Association
EPA	Environmental Protection Agency of the United States Government
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration

FSS	Federal Specifications and Standards
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
ISO	International Organization for Standards
MASH	AASHTO Manual for Assessing Safety Hardware
MUTCD	Manual on Uniform Traffic Control Devices
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIST	National Institute for Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
OSHA	Occupational Safety and Health Administration
SAE	Society of Automotive Engineers
SI	International System of Units
SSPC	Society of Protective Coatings
UL	Underwriters' Laboratories

Each of the above abbreviations, when followed by a number or letter designation, or combination of numbers and letters, designates a specification, test method, or other code or recommendation of the particular authority or organization shown.

Use standards, specifications, test methods, or other codes as specified in the current edition at the time of the bid opening.

1-3 Definitions.

The following terms, when used in the Contract Documents, have the meaning described.

Advertisement.

The public announcement, as required by law, inviting bids for work to be performed or materials to be furnished, usually issued as “Notice to Contractors,” or “Notice to Bidders.”

Article.

The numbered prime subdivision of a Section of these Specifications.

Bidder.

An individual, firm, or corporation submitting a proposal for the proposed work.

Bridge.

A structure, including supports, erected over a depression or over an obstruction such as water, highway or railway, or for elevated roadway, for carrying traffic or other moving loads, and having a length, measured along the center of the roadway, of more than 20 feet between the inside faces of end supports. A multiple-span box culvert is considered a bridge, where the length between the extreme ends of the openings exceeds 20 feet.

Calendar day.

Every day shown on the calendar, ending and beginning at midnight.

Contract.

The term "Contract" means the entire and integrated agreement between the parties thereunder and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract Documents form the Contract between the Department and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the Work and the basis of payment.

Contract Bond.

The security furnished by the Contractor and the surety as a guaranty that the Contractor shall fulfill the terms of the Contract and pay all legal debts pertaining to the construction of the project.

Contract Claim (Claim).

A written demand submitted to the Department by the Contractor in compliance with 5-12.3 seeking additional monetary compensation, time, or other adjustments to the Contract, the entitlement or impact of which is disputed by the Department.

Contract Documents.

The term "Contract Documents" includes: Advertisement for Proposal, Proposal, Certification as to Publication and Notice of Advertisement for Proposal, Appointment of Agent by Nonresident Contractors, Noncollusion Affidavit, Warranty Concerning Solicitation of the Contract by Others, Resolution of Award of Contract, Executed Form of Contract, Performance Bond and Payment Bond, Specifications, Plans (including revisions thereto issued during construction), Estimated Quantities Report, Standard Plans, Addenda, or other information mailed or otherwise transmitted to the prospective bidders prior to the receipt of bids, work orders and supplemental agreements, all of which are to be treated as one instrument whether or not set forth at length in the form of contract.

Note: As used in Sections 2 and 3 only, Contract Documents do not include work orders, and supplementary agreements. As used in Section 2 only, Contract Documents also do not include Resolution of Award of Contract, Executed Form of Contract, and Performance and Payment Bond.

Contract Letting.

The date that the Department opened the bid proposals.

Contract Time.

The number of calendar days allowed for completion of the Contract work, including authorized time extensions.

Contractor.

The individual, firm, joint venture, or company contracting with the Department to perform the work.

Contractor's Engineer of Record.

A Professional Engineer registered in the State of Florida, other than the Engineer of Record or his subcontracted consultant, who undertakes the design and drawing of components of the permanent structure as part of a redesign or Cost Savings Initiative Proposal, or for repair

designs and details of the permanent work. The Contractor's Engineer of Record may also serve as the Specialty Engineer.

The Contractor's Engineer of Record must be an employee of a pre-qualified firm. The firm shall be pre-qualified in accordance with the Rules of the Department of Transportation, Chapter 14-75. Any Corporation or Partnership offering engineering services must hold a Certificate of Authorization from the Florida Department of Business and Professional Regulation.

As an alternate to being an employee of a pre-qualified firm, the Contractor's Engineer of Record may be a Department-approved Specialty Engineer. For items of the permanent work declared by the State Construction Office to be "major" or "structural", the work performed by a Department-approved Specialty Engineer must be checked by another Department-approved Specialty Engineer. An individual Engineer may become a Department-approved Specialty Engineer if the individual meets the Professional Engineer experience requirements set forth within the individual work groups in Chapter 14-75, Rules of the Department of Transportation, Florida Administrative Code. Department-approved Specialty Engineers are listed on the State Construction Website. Department-approved Specialty Engineers will not be authorized to perform redesigns or Cost Savings Initiative Proposal designs of items fully detailed in the Plans.

Controlling Work Items.

The activity or work item on the critical path having the least amount of total float. The controlling item of work will also be referred to as a Critical Activity.

Culverts.

Any structure not classified as a bridge that provides an opening under the roadway.

Delay.

Any unanticipated event, action, force or factor which extends the Contractor's time of performance of any controlling work item under the Contract. The term "delay" is intended to cover all such events, actions, forces or factors, whether styled "delay", "disruption", "interference", "impedance", "hindrance", or otherwise, which are beyond the control of and not caused by the Contractor, or the Contractor's subcontractors, materialmen, suppliers or other agents. This term does not include "extra work".

Department.

State of Florida Department of Transportation.

Developmental Specification.

See definition for Specifications.

Engineer.

The Director, Office of Construction, acting directly or through duly authorized representatives; such representatives acting within the scope of the duties and authority assigned to them.

Note: In order to avoid cumbersome and confusing repetition of expressions in these Specifications, it is provided that whenever anything is, or is to be done, if, as, or, when, or where "acceptable, accepted, approval, approved, authorized, condemned, considered necessary, contemplated, deemed necessary, designated, determined, directed, disapproved, established,

given, indicated, insufficient, ordered, permitted, rejected, required, reserved, satisfactory, specified, sufficient, suitable, suspended, unacceptable, or unsatisfactory," it shall be understood as if the expression were followed by the words "by the Engineer," "to the Engineer," or "of the Engineer."

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. The Engineer of Record may be Departmental in-house staff or a consultant retained by the Department.

The Contractor shall not employ the Engineer of Record as the Contractor's Engineer of Record or as a Specialty Engineer.

Equipment.

The machinery and equipment, together with the necessary supplies for upkeep and maintenance thereof, and all other tools and apparatus necessary for the construction and acceptable completion of the work.

Estimated Quantities Report.

The Estimated Quantities Report contains pay item and quantity information for the project. When the Plans do not adequately describe quantity related information, refer to the Estimated Quantities Report.

Extra Work.

Any "work" which is required by the Engineer to be performed and which is not otherwise covered or included in the project by the existing Contract Documents, whether it be in the nature of additional work, altered work, deleted work, work due to differing site conditions, or otherwise. This term does not include a "delay".

Federal, State, and Local Rules and Regulations.

The term "Federal, State and Local Rules and Regulations" includes: any and all Federal, State, and Local laws, bylaws, ordinances, rules, regulations, orders, permits, or decrees including environmental laws, rules, regulations, and permits.

Highway, Street, or Road.

A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

Holidays.

Days designated by the State Legislature or Cabinet as holidays, which include, but are not limited to, New Year's Day, Martin Luther King's Birthday, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and the following Friday, and Christmas Day.

Inspector.

An authorized representative of the Engineer, assigned to make official inspections of the materials furnished and of the work performed by the Contractor.

Laboratory.
The official testing laboratory used by the Department.

Major Item of Work.
Any item of work having an original Contract value in excess of 5% of the original Contract amount.

Materials.
Any substances to be incorporated in the work under the Contract.

Median.
The portion of a divided highway or street separating the traveled ways for traffic moving in opposite directions.

Plans.

The plans sheets and digital models (2D and 3D) provided as contract documents, including reproductions thereof, showing the location, character, dimensions, and details of the work.

Proposal (Bid, Bid Proposal).
The offer of a bidder, on the prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

Proposal Form.
The official form or the electronically generated bid item sheets on which the Department requires formal bids to be prepared and submitted for the work.

Proposal Guaranty.
The security furnished by the bidder as guaranty that the bidder will enter into the Contract for the work if the Department accepts the proposal.

Request for Correction.
A document initiated by the Contractor proposing a method for correction of work that is not in compliance with the Contract Documents. The Request for Correction is submitted to the Engineer for review and disposition.

Request for Information.
A document initiated by the Contractor that is submitted to the Engineer for interpretation of a Contract Document provision, the meaning of which is not clear to the Contractor. The Request for Information is submitted to the Engineer for review and disposition.

Request for Modification.
A document initiated by the Contractor requesting to modify the Contract Documents, that is submitted to the Engineer for review and disposition.

Right-of-Way.
The land that the Department has title to, or right of use, for the road and its structures and appurtenances, and for material pits furnished by the Department.

Roadbed.
The portion of the roadway occupied by the subgrade and shoulders.

Roadway.
The portion of a highway within the limits of construction.

Secretary.
Secretary of Transportation, State of Florida Department of Transportation, acting directly or through an assistant or other representative authorized by him; the chief officer of the Department of Transportation.

Section.
A numbered prime division of these Specifications.

Special Event.
Any event, including but not limited to, a festival, fair, run or race, motorcade, parade, civic activity, cultural activity, charity or fund drive, sporting event, or similar activity designated in the Contract Documents.

Special Provisions.
See definition for Specifications.

Specialty Engineer.
A Professional Engineer registered in the State of Florida, other than the Engineer of Record or his subcontracted consultant, who undertakes the design and drawing preparation of components, systems, or installation methods and equipment for specific temporary portions of the project work or for special items of the permanent works not fully detailed in the Plans and required to be furnished by the Contractor. The Specialty Engineer may also provide designs and details, repair designs and details, or perform Engineering Analyses for items of the permanent work declared by the State Construction Office to be "minor" or "non-structural".

For items of work not specifically covered by the Rules of the Department of Transportation, a Specialty Engineer is qualified if he has the following qualifications:

1. Registration as a Professional Engineer in the State of Florida.
2. The education and experience necessary to perform the submitted design as required by the Florida Department of Business and Professional Regulation.

Specifications.
The directions, provisions, and requirements contained herein, together with all stipulations contained in the Contract Documents, setting out or relating to the method and manner of performing the work, or to the quantities and qualities of materials and labor to be furnished under the Contract.

Standard Specifications: "Standard Specifications for Road and Bridge Construction" an electronic book, applicable to all Department Contracts containing adopted requirements, setting out or relating to the method or manner of performing work, or to the quantities and qualities of materials and labor.

Supplemental Specifications: Approved additions and revisions to the Standard Specifications, applicable to all Department Contracts.

Special Provisions: Specific clauses adopted by the Department that add to or revise the Standard Specifications or supplemental specifications, setting forth conditions varying from or additional to the Standard Specifications applicable to a specific project.

Technical Special Provisions: Specifications, of a technical nature, prepared, signed, and sealed by an Engineer registered in the State of Florida other than the State Specifications Engineer or his designee, that are made part of the Contract as an attachment to the Contract Documents.

Developmental Specification: A specification developed around a new process, procedure, or material.

Standard Plans.

"Standard Plans for Road and Bridge Construction", an electronic book describing and detailing aspects of the Work. Where the term Design Standards appears in the Contract Documents, it will be synonymous with Standard Plans.

Standard Specifications.

See definition for Specifications.

State.

State of Florida.

Subarticle.

A headed and numbered subdivision of an Article of a Section of these Specifications.

Subgrade.

The portion of the roadbed immediately below the base course or pavement, including below the curb and gutter, valley gutter, shoulder and driveway pavement. The subgrade limits ordinarily include those portions of the roadbed shown in the Plans to be constructed to a design bearing value or to be otherwise specially treated. Where no limits are shown in the Plans, the subgrade section extends to a depth of 12 inches below the bottom of the base or pavement and outward to 6 inches beyond the base, pavement, or curb and gutter.

Substructure.

All of that part of a bridge structure below the bridge seats, including the parapets, backwalls, and wingwalls of abutments.

Superintendent.

The Contractor's authorized representative in responsible charge of the work.

Superstructure.

The entire bridge structure above the substructure, including anchorage and anchor bolts, but excluding the parapets, backwalls, and wingwalls of abutments.

Supplemental Agreement.

A written agreement between the Contractor and the Department, and signed by the surety, modifying the Contract within the limitations set forth in these Specifications.

Supplemental Specifications.
See definition for Specifications.

Surety.
The corporate body that is bound by the Contract Bond with and for the Contractor and responsible for the performance of the Contract and for payment of all legal debts pertaining thereto.

Technical Special Provisions.
See definition for Specifications.

Traveled Way.
The portion of the roadway for the movement of vehicles, exclusive of shoulders and bicycle lanes.

Unilateral Payment.
A payment of money made to the Contractor by the Department pursuant to Section 337.11(12), Florida Statutes (2009), for sums the Department determines to be due to the Contractor for work performed on the project, and whereby the Contractor by acceptance of such payment does not waive any rights the Contractor may otherwise have against the Department for payment of any additional sums the Contractor claims are due for the work.

Work.
All labor, materials and incidentals required to execute and complete the requirements of the Contract including superintendence, use of equipment and tools, and all services and responsibilities prescribed or implied.

Work Order.
A written agreement between the Contractor and the Department modifying the Contract within the limitations set forth in these Specifications. Funds for this agreement are drawn against the Initial Contingency Pay Item or a Contingency Supplemental Agreement.

Working Day.
Any calendar day on which the Contractor works or is expected to work in accordance with the approved work progress schedule.

SECTION 2
PROPOSAL REQUIREMENTS AND CONDITIONS

2-1 Reserved

2-2 Reserved

2-3 Interpretation of Estimated Quantities.

2-3.1 Lump Sum Contracts: The Contractor is responsible for the determination of the quantities for those items constructed within the authorized plan limits or dimensions.

The County does not assume any responsibility for any incidental information in bid documents that may be construed as a quantity of work and/or materials.

2-3.2 Contracts other than Lump Sum: For those items constructed within authorized plan limits or dimensions, use the quantities shown in the Plans and in the Proposal Form as the basis of the bid. The County will also use these quantities for final payment as limited by the provisions for the individual items. For those items having variable final pay quantities that are dependent on actual field conditions, use and measurement, the quantities shown in the Plans and in the Proposal Form are approximate and provide only a basis for calculating the bid upon which the County will award the Contract. Where items are listed for payment as lump sum units and the Plans show estimates of component quantities, the County is responsible for the accuracy of those quantities limited to the provisions of 9-3.3. Where items are listed for payment as lump sum units and the Plans do not show estimates of component quantities, the Contractor is solely responsible for their own estimates of such quantities.

The County may increase, decrease, or omit the estimated quantities of work to be done or materials to be furnished.

2-4 Examination of Plans, Specifications, Special Provisions and Site of Work.

The Contractor is responsible for examining the Contract Documents and the site of the proposed Work carefully before submitting a Proposal for the Work contemplated. Contractor shall investigate the conditions to be encountered, as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of all Contract Documents.

The County does not guarantee the details pertaining to borings, as shown in the Contract Documents, to be more than a general indication of the materials likely to be found adjacent to holes bored at the site of the work, approximately at the locations indicated. The Contractor shall examine boring and pavement core data, where available, and make their own interpretation of the subsoil investigations and other preliminary data and shall base their bid solely on their own opinion of the conditions likely to be encountered.

The Contractor's submission of a Proposal is prima facie evidence that the Contractor has made an examination as described in this Article.

2-5 Reserved

2-6 Reserved

2-7 Reserved

2-8 Reserved

2-9 Reserved

2-10 Reserved

2-11 Reserved

2-12 Material, Samples and Statement.

The County may require that the Contractor furnish a statement of the origin, composition, and manufacture of any and all materials to be used in the construction of the work, together with samples that may be subjected to the tests provided for in these Specifications to determine the materials' quality and fitness for the work.

SECTION 3

RESERVED

SECTION 4
SCOPE OF THE WORK

4-1 Intent of Contract.

The intent of the Contract is to provide for the construction and completion in every detail of the Work described in the Contract. Furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the Contract Documents.

4-2 Work not covered by Standard Specifications.

Proposed construction and any contractual requirements not covered by these Standard Specifications may be covered by Contract Plan notes or by Supplemental Specifications or Special Provisions for the Contract, and all requirements of such Supplemental Specifications or Special Provisions shall be considered as a part of these Specifications.

4-3 Alteration of Plans or of Character of Work.

4-3.1 General: The Director reserves the right to make, at any time prior to or during the progress of the work, such increases or decreases in quantities, whether a significant change or not, and such alterations in the details of construction, whether a substantial change or not, including but not limited to alterations in the grade or alignment of the road or structure or both, as may be found necessary or desirable by the Director. Such increases, decreases or alterations shall not constitute a breach of Contract, shall not invalidate the Contract, nor release the Surety from any liability arising out of this Contract or the Surety bond. Minor increases, decreases or alterations that do not change the scope of the Project, the Project cost, or the Contract Time may be initially authorized in a Field Directive Change Order. The Contractor agrees to perform the work, as altered, the same as if it had been a part of the original Contract. All Field Directive Change Orders shall be approved as a Supplemental Agreement pursuant to 4-3.4 prior to Project close-out.

The term "significant change" applies only when:

1. The Director determines that the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction, or

2. A major item of work, as defined in 1-3, is increased in excess of 125% or decreased below 75% of the original Contract quantity. The County will apply any price adjustment for an increase in quantity only to that portion in excess of 125% of the original Contract item quantity in accordance with 4-3.2 below. In the case of a decrease below 75% the County will only apply a price adjustment for the additional costs that are a direct result of the reduction in quantity.

In (1) above, the determination by the Director shall be conclusive. If the determination is challenged by the Contractor in any proceeding, the Contractor must establish by clear and convincing proof that the determination by the Director was without any reasonable basis.

4-3.2 Increase, Decrease or Alteration in the Work: The Director reserves the right to make alterations in the character of the work which involve a substantial change in the nature of the design or in the type of construction or which materially increases or decreases the cost or time

of performance. Such alteration shall not constitute a breach of Contract, shall not invalidate the Contract or release the Surety.

Notwithstanding that the Contractor shall have no formal right whatsoever to any extra compensation or time extension deemed due by the Contractor for any cause unless and until the Contractor follows the procedures set forth in 5-12.2 for preservation, presentation and resolution of the claim, the Contractor may at any time, after having otherwise timely submitted a notice of intent to claim or preliminary time extension request pursuant to 5-12.2 and 8-7.3.2, submit to the County a request for equitable adjustment of compensation or time or other dispute resolution proposal. The Contractor shall in any request for equitable adjustment of compensation, time, or other dispute resolution proposal certify under oath and in writing, in accordance with the formalities required by Florida law, that the request is made in good faith, that any supportive data submitted is accurate and complete to the Contractor's best knowledge and belief, and that the amount of the request accurately reflects what the Contractor in good faith believes to be the County's responsibility. Such certification must be made by an officer or director of the Contractor with the authority to bind the Contractor. Any such certified statements of entitlement and costs shall be subject to the audit provisions set forth in 5-12.14. While the submittal or review of a duly certified request for equitable adjustment shall neither create, modify, nor activate any legal rights or obligations as to the Contractor or the County, the County will review the content of any duly certified request for equitable adjustment or other dispute resolution proposal, with any further action or inaction by the County thereafter being in its sole discretion. Any request for equitable adjustment that fails to fully comply with the certification requirements will not be reviewed by the County.

The monetary compensation provided for below constitutes full and complete payment for such additional work and the Contractor shall have no right to any additional monetary compensation for any direct or indirect costs or profit for any such additional work beyond that expressly provided below. The Contractor shall be entitled to a time extension only to the extent that the performance of any portion of the additional work is a controlling work item and the performance of such controlling work item actually extends completion of the project due to no fault of the Contractor. All time related costs for actual performance of such additional work are included in the compensation already provided below and any time extension entitlement hereunder will be without additional monetary compensation. The Contractor shall have no right to any monetary compensation or damages whatsoever for any direct or indirect delay to a controlling work item arising out of or in any way related to the circumstances leading up to or resulting from additional work (but not relating to the actual performance of the additional work, which is paid for as otherwise provided herein), except only as provided for under 5-12.6.2.1.

4-3.2.1 Allowable Costs for Extra Work: The Director may direct in writing that extra work be done and, at the Director's sole discretion, the Contractor will be paid pursuant to an agreed Supplemental Agreement or in the following manner:

1. Labor and Burden: The Contractor will receive payment for actual costs of direct labor and burden for the additional or unforeseen work. Labor includes foremen actually engaged in the work; and will not include project supervisory personnel nor necessary on-site clerical staff, except when the additional or unforeseen work is a controlling work item and the performance of such controlling work item actually extends completion of the project due to no fault of the Contractor. Compensation for project supervisory personnel, but in no case higher than a Project Manager's position, shall only be for the pro-rata time such supervisory personnel spent on the contract. In no case shall an officer or director of the Company, nor those persons who own

more than 1% of the Company, be considered as project supervisory personnel, direct labor or foremen hereunder.

Payment for burden shall be limited solely to the following:

Table 4-3.2.1	
Item	Rate
FICA	Rate established by Law
FUTA/SUTA	Rate established by Law
Medical Insurance	Actual
Holidays, Sick & Vacation benefits	Actual
Retirement benefits	Actual
Workers Compensation	Rates based on the National Council on Compensation Insurance basic rate tables adjusted by Contractor's actual experience modification factor in effect at the time of the additional work or unforeseen work.
Per Diem	Actual but not to exceed State of Florida's rate
Insurance*	Actual
*Compensation for Insurance is limited solely to General Liability Coverage and does not include any other insurance coverage (such as, but not limited to, Umbrella Coverage, Automobile Insurance, etc.).	

At the Pre-construction conference, certify to the Director the following:

a. A listing of on-site clerical staff, supervisory personnel and their pro-rated time assigned to the contract,

b. Actual Rate for items listed in Table 4-3.2.1,

c. Existence of employee benefit plan for Holiday, Sick and Vacation benefits and a Retirement Plan, and,

d. Payment of Per Diem is a company practice for instances when compensation for Per Diem is requested.

Such certification must be made by an officer or director of the Contractor with authority to bind the Contractor. Timely certification is a condition precedent to any right of the Contractor to recover compensations for such costs, and failure to timely submit the certification will constitute a full, complete, absolute and irrevocable waiver by the Contractor of any right to recover such costs. Any subsequent changes shall be certified to the Director as part of the cost proposal or seven calendar days in advance of performing such extra work.

2. Materials and Supplies: For materials accepted by the Director and used on the project, the Contractor will receive the actual cost of such materials incorporated into the work, including Contractor paid transportation charges (exclusive of equipment as hereinafter set forth). For supplies reasonably needed for performing the work, the Contractor will receive the actual cost of such supplies.

3. Equipment: For any machinery or special equipment (other than small tools), including fuel and lubricant, the Contractor will receive 100% of the "Rental Rate Blue Book" for the actual time that such equipment is in operation on the work, and 50% of the "Rental Rate Blue Book" for the time the equipment is directed to standby and remain on the project site,

to be calculated as indicated below. The equipment rates will be based on the latest edition (as of the date the work to be performed begins) of the "Rental Rate Blue Book for Construction Equipment" as published by EquipmentWatch division of Informa Business Media, Inc., using all instructions and adjustments contained therein and as modified below. On all projects, the Director will adjust the rates using regional adjustments and Rate Adjustment Tables according to the instructions in the "Rental Rate Blue Book."

Allowable Equipment Rates will be established as set out below:

a. Allowable Hourly Equipment Rate = Monthly Rate/176 x Adjustment Factors x 100%.
b. Allowable Hourly Operating Cost = Hourly Operating Cost x 100%.
c. Allowable Rate Per Hour = Allowable Hourly Equipment Rate + Allowable Hourly Operating Cost.
d. Standby Rate = Allowable Hourly Equipment Rate x 50%.

The Monthly Rate is The Basic Machine Rate Plus Any Attachments. Standby rates will apply when equipment is not in operation and is directed by the Director to standby at the project site when needed again to complete work and the cost of moving the equipment will exceed the accumulated standby cost. Standby rates will not apply on any day the equipment operates for eight or more hours. Standby payment will be limited to only that number of hours which, when added to the operating time for that day equals eight hours. Standby payment will not be made on days that are not normally considered work days on the project.

The County will allow for the cost of transporting the equipment to and from the location at which it will be used. If the equipment requires assembly or disassembly for transport, the County will pay for the time to perform this work at the rate for standby equipment.

Equipment may include vehicles utilized only by Labor, as defined above.

4. Indirect Costs, Expenses, and Profit: Compensation for all indirect costs, expenses, and profit of the Contractor, including but not limited to overhead of any kind, whether jobsite, field office, division office, regional office, home office, or otherwise, is expressly limited to the greater of either (a) or (b) below:

a. Solely a mark-up of 17.5% on the payments in (1) through (3), above.

1. Bond: The Contractor will receive compensation for any premium for acquiring a bond for such additional or unforeseen work at the original Contract bond rate paid by the Contractor. No compensation for bond premium will be allowed for additional or unforeseen work paid by the County via initial contingency pay item.

2. The Contractor will be allowed a markup of 10% on the first $50,000 and a markup of 5% on any amount over $50,000 on any subcontract directly related to the additional or unforeseen work. Any such subcontractor mark-up will be allowed only by the prime Contractor and a first tier subcontractor, and the Contractor must elect the markup for any eligible first tier subcontractor to do so.

b. Solely the formula set forth below and only as applied solely as to such number of calendar days of entitlement that are in excess of ten cumulative calendar days as defined below.

$$D = \frac{A \times C}{B}$$

Where A = Original Contract Amount
B = Original Contract Time
C = 8%
D = Average Overhead Per Day

Cumulative Calendar Days is defined as the combined total number of calendar days granted as time extensions due to either extra work, excluding overruns to existing contract items, that extend the duration of the project or delay of a controlling work item caused solely by the County, or the combined total number of calendar days for which a claim of entitlement to a time extension due to delay of a controlling work item caused solely by the County is otherwise ultimately determined to be in favor of the Contractor.

No compensation, whatsoever, will be paid to the Contractor for any jobsite overhead and other indirect impacts when the total number of calendar days granted for time extension due to delay of a controlling work item caused solely by the County is, or the total number of calendar days for which entitlement to a time extension due to delay of a controlling work item caused solely by the County is otherwise ultimately determined in favor of the Contractor to be, equal to or less than ten calendar days and the Contractor also fully assumes all monetary risk of any and all partial or single calendar day delay periods, due to delay of a controlling work item caused solely by the County, that when combined together are equal to or less than ten calendar days and regardless of whether monetary compensation is otherwise provided for hereunder for one or more calendar days of time extension entitlement for each calendar day exceeding ten calendar days. All calculations under this provision shall exclude weather days, Holidays, and Special Events.

Further, for (a) or (b) above, in the event there are concurrent delays to one or more controlling work items, one or more being caused by the County and one or more being caused by the Contractor, the Contractor shall be entitled to a time extension for each day that a controlling work item is delayed by the County but shall have no right to nor receive any monetary compensation for any indirect costs for any days of concurrent delay.

4-3.2.2 Subcontracted Work: Compensation for the additional or unforeseen work performed by a subcontractor shall be limited solely to that provided for in 4-3.2.1 (1), (2), (3) and (4)(a). In addition, the Contractor compensation is expressly limited to the greater of the total provided in either 4-3.2.1(4)(a) or (4)(b), except that the Average Overhead Per-Day calculation is as follows:

$$Ds = \frac{As \times C}{B}$$

Where As = Original Contract Amount minus Original Subcontract amounts(s)*

B = Original Contract Time
C = 8%
Ds = Average Overhead Per-Day

* deduct Original Subcontract Amount(s) of subcontractor(s) performing the work

The subcontractor may receive compensation for any premium for acquiring a bond for the additional or unforeseen work; provided, however, that such payment for additional subcontractor bond will only be paid upon presentment to the County of clear and convincing proof that the subcontractor has actually submitted and paid for separate bond premiums for such additional or unforeseen work in such amount and that the subcontractor was required by the Contractor to acquire a bond.

The Contractor shall require the subcontractor to submit a certification, in accordance with 4-3.2.1 (1), as part of the cost proposal and submit such to the Director. Such certification must be made by an officer or director of the subcontractor with authority to bind the subcontractor. Timely certification is a condition precedent to any right of the Contractor to recover compensation for such subcontractor costs, and failure to timely submit the certification will constitute a full, complete, absolute and irrevocable waiver by the Contractor of any right to recover such subcontractor costs.

4-3.3 No Waiver of Contract: Changes made by the Director will not be considered to waive any of the provisions of the Contract, nor may the Contractor make any claim for loss of anticipated profits because of the changes, or by reason of any variation between the approximate quantities and the quantities of work actually performed. All work shall be performed as directed by the Director and in accordance with the Contract Documents.

4-3.4 Conditions Requiring a Supplemental Agreement or Unilateral Payment: A Supplemental Agreement or Unilateral Payment will be used to clarify the Plans and Specifications of the Contract; to provide for unforeseen work, grade changes, or alterations in the Plans which could not reasonably have been contemplated or foreseen in the original Plans and Specifications; to change the limits of construction to meet field conditions; to provide a safe and functional connection to an existing pavement; to settle documented Contract claims; to make the project functionally operational in accordance with the intent of the original Contract and subsequent amendments thereto.

A Supplemental Agreement or Unilateral Payment may be used to expand the physical limits of the project only to the extent necessary to make the project functionally operational in accordance with the intent of the original Contract. The cost of any such agreement extending the physical limits of the project shall not exceed $100,000 or 10% of the original Contract price, whichever is greater.

Except for Work included within a Field Directive Change Order, perform no work to be covered by a Supplemental Agreement or Unilateral Payment before written authorization is received from the Director. The Director's written authorization will set forth sufficient work information to allow the work to begin. The work activities, terms and conditions will be reduced to written Supplemental Agreement or Unilateral Payment form promptly thereafter. No payment will be made on a Supplemental Agreement or Unilateral Payment prior to the County's approval of the document.

4-3.5 Extra Work: Extra work authorized in writing by the Director will be paid in accordance with the formula in 4-3.2. Such payment will be the full extent of all monetary compensation entitlement due to the Contractor for such extra work. Any entitlement to a time extension due to extra work will be limited solely to that provided for in 4-3.2 for additional work.

4-3.6 Connections to Existing Pavement, Drives and Walks: Generally adhere to the limits of construction at the beginning and end of the project as detailed in the Plans. However, if the Director determines that it is necessary to extend the construction in order to make suitable connections to existing pavement, the Director will authorize such a change in writing.

For necessary connections to existing walks and drives that are not indicated in the Plans, the Director will submit direction regarding the proper connections in accordance with the Standard Plans.

4-3.7 Differing Site Conditions: During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the Contract, or if unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the Contract are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before the Contractor disturbs the conditions or performs the affected work.

Upon receipt of written notification of differing site conditions from the Contractor, the Director will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the Contract, an adjustment will be made, excluding loss of anticipated profits, and the Contract will be modified in writing accordingly. The Director will notify the Contractor whether or not an adjustment of the Contract is warranted.

The Director will not allow a Contract adjustment for a differing site condition unless the Contractor has submitted the required written notice.

The Director will not allow a Contract adjustment under this clause for any effects caused to any other County or non-County projects on which the Contractor may be working.

4-3.8 Changes Affecting Utilities: The Contractor shall be responsible for identifying and assessing any potential impacts to a utility that may be caused by the changes proposed by the Contractor, and the Contractor shall at the time of making the request for a change notify the County in writing of any such potential impacts to utilities.

County approval of a Contractor proposed change does not relieve the Contractor of sole responsibility for all utility impacts, costs, delays or damages, whether direct or indirect, resulting from Contractor initiated changes in the design or construction activities from those in the original Contract Specifications, Design Plans (including Traffic Control Plans) or other Contract Documents and which effect a change in utility work different from that shown in the Utility Plans, joint project agreements or utility relocation schedules.

4-3.9 Cost Savings Initiative Proposal:

4-3.9.1 Intent and Objective:

1. This Subarticle applies to any cost reduction proposal (hereinafter referred to as a Proposal) that the Contractor initiates and develops for the purpose of refining the Contract to increase cost effectiveness or significantly improve the quality of the end result. County Potential Proposals will be discussed as an agenda item at the pre-construction meeting. This Subarticle does not, however, apply to any such proposal unless the Contractor identifies it at the time of its submission to the County as a proposal submitted pursuant to this Subarticle.

2. The County will consider Proposals that would result in net savings to the County by providing a decrease in the cost of the Contract. Proposals must result in savings without impairing essential functions and characteristics such as safety, service, life, reliability, economy of operation, ease of maintenance, aesthetics and necessary standard design features.

However, nothing herein prohibits the Contractor from submitting Proposals when the required functions and characteristics can be combined, reduced or eliminated because they are nonessential or excessive. The County will not recognize the Contractor's correction of plan errors that result in a cost reduction, as a Proposal.

3. The County shall have the right to reject, at it's discretion, any Proposal submitted that proposes a change in the design of the pavement system or that would require additional right-of-way. Pending the County's execution of a formal supplemental agreement implementing an approved Proposal, the Contractor shall remain obligated to perform the work in accordance with the terms of the existing Contract. The County may grant time extensions to allow for the time required to develop and review a Proposal.

4. For potential Proposals not discussed at the Cost Savings Initiative Workshop, a mandatory concept meeting will be held for the Contractor and County to discuss the potential Proposal prior to development of the Proposal.

4-3.9.2 Subcontractors: The County encourages the Contractor to include the provisions of this Subarticle in Contracts with subcontractors and to encourage submission of Proposals from subcontractors. However, it is not mandatory to submit Proposals to the County or to accept or transmit subcontractor proposed Proposals to the County.

4-3.9.3 Data Requirements: As a minimum, submit the following information with each Proposal:

1. a description of the difference between the existing Contract requirement, including any time extension request, and the proposed change, and the comparative advantages and disadvantages.

2. separate detailed cost estimates for both the existing Contract requirement and the proposed change. Break down the cost estimates by pay item numbers indicating quantity increases or decreases and deleted pay items. Identify additional proposed work not covered by pay items within the Contract, by using pay item numbers in the Basis of Estimates Manual. In preparing the estimates, include overhead, profit, and bond within pay items in the Contract. Separate pay item(s) for the cost of overhead, profit, and bond will not be allowed.

3. an itemization of the changes, deletions or additions to Plan details, plan sheets, Standard Plans and Specifications that are required to implement the Proposal if the County adopts it. Submit preliminary plan drawings sufficient to describe the proposed changes.

4. engineering or other analysis in sufficient detail to identify and describe specific features of the Contract that must be changed if the County accepts the Proposal with a proposal as to how these changes can be accomplished and an assessment of their effect on other project elements. The County may require that engineering analyses be performed by a prequalified consultant in the applicable class of work. Support all design changes that result from the Proposal with drawings and computations signed and sealed by the Contractor's Engineer of Record. Written documentation or drawings will be submitted clearly delineating the responsibility of the Contractor's Engineer of Record.

5. the date by which the County must approve the Proposal to obtain the total estimated cost reduction during the remainder of the Contract, noting any effect on the Contract completion time or delivery schedule.

6. a revised project schedule that would be followed upon approval of the Proposal. This schedule would include submittal dates and review time for the County and Peer reviews.

4-3.9.4 Processing Procedures: Submit Proposals to the Director or his duly authorized representative. The County will process Proposals expeditiously; however, the County is not liable for any delay in acting upon a Proposal submitted pursuant to this Subarticle. The Contractor may withdraw, in whole or in part, a Proposal not accepted by the County within the period specified in the Proposal. The County is not liable for any Proposal development cost in the case where the County rejects or the Contractor withdraws a Proposal.

The Director is the sole judge of the acceptability of a Proposal and of the estimated net savings in construction costs from the adoption of all or any part of such proposal. In determining the estimated net savings, the County reserves the right to disregard the Contract bid prices if, in the judgment of the Director, such prices do not represent a fair measure of the value of work to be performed or to be deleted.

Prior to approval, the Director may modify a Proposal, with the concurrence of the Contractor, to make it acceptable. If any modification increases or decreases the net savings resulting from the Proposal, the County will determine the Contractor's fair share upon the basis of the Proposal as modified and upon the final quantities. The County will compute the net savings by subtracting the revised total cost of all bid items affected by the Proposal from the total cost of the same bid items as represented in the original Contract.

Prior to approval of the Proposal that initiates the supplemental agreement, submit acceptable Contract-quality plan sheets revised to show all details consistent with the Proposal design.

4-3.9.5 Computations for Change in Contract Cost of Performance: If the Proposal is adopted, the Contractor's share of the net savings as defined hereinafter represents full compensation to the Contractor for the Proposal.

The County will not include its costs to process and implement a Proposal in the estimate. However, the County reserves the right, where it deems such action appropriate, to require the Contractor to pay the County's cost of investigating and implementing a Proposal as a condition of considering such proposal. When the County imposes such a condition, the Contractor shall accept this condition in writing, authorizing the County to deduct amounts payable to the County from any monies due or that may become due to the Contractor under the Contract.

4-3.9.6 Conditions of Acceptance for Major Design Modifications of Category 2 Bridges: A Proposal that proposes major design modifications of a category 2 bridge, as determined by the Director, shall have the following conditions of acceptance:

All bridge Plans relating to the Proposal shall undergo an independent peer review conducted by a single independent engineering firm referred to for the purposes of this article as the Independent Review Engineer who is not the originator of the Proposal design, and is pre-qualified by the County in accordance with Rule 14-75, Florida Administrative Code. The independent peer review is intended to be a comprehensive, thorough verification of the original work, giving assurance that the design is in compliance with all County requirements. The Independent Review Engineer's comments, along with the resolution of each comment, shall be submitted to the County. The Independent Review Engineer shall sign and seal the submittal cover letter stating that all comments have been adequately addressed and the design is in compliance with the County requirements. If there are any unresolved comments the Independent Review Engineer shall specifically list all unresolved issues in the signed and sealed cover letter.

The Contractor shall designate a primary engineer responsible for the Proposal design and as such will be designated as the Contractor's Engineer of Record for the

Proposal design. The County reserves the right to require the Contractor's Engineer of Record to assume responsibility for design of the entire structure.

New designs and independent peer reviews shall be in compliance with all applicable County, FHWA and AASHTO criteria requirements including bridge load ratings.

4-3.9.7 Sharing Arrangements: If the County approves a Proposal, the Contractor shall receive 50% of the net reduction in the cost of performance of the Contract as determined by the final negotiated agreement between the Contractor and the County. The net reduction will be determined by subtracting from the savings of the construction costs the reasonable documented engineering costs incurred by the contractor to design and develop a Proposal. The reasonable documented engineering costs will be paid by the County. Engineering costs will be based on the consultant's certified invoice and may include the costs of the Independent Review Engineer in 4-3.9.6. The total engineering costs to be subtracted from the savings to determine the net reduction will be limited to 25% of the construction savings and shall not include any markup by the Contractor or the costs for engineering services performed by the Contractor.

4-3.9.8 Notice of Intellectual Property Interests and County's Future Rights to a Proposal:

4-3.9.8.1 Notice of Intellectual Property Interests: The Contractor's Proposal submittal shall identify with specificity any and all forms of intellectual property rights that either the Contractor or any officer, shareholder, employee, consultant, or affiliate, of the Contractor, or any other entity who contributed in any measure to the substance of the Contractor's Proposal development, have or may have that are in whole or in part implicated in the Proposal. Such required intellectual property rights notice includes, but is not limited to, disclosure of any issued patents, copyrights, or licenses; pending patent, copyright or license applications; and any intellectual property rights that though not yet issued, applied for or intended to be pursued, could nevertheless otherwise be subsequently the subject of patent, copyright or license protection by the Contractor or others in the future. This notice requirement does not extend to intellectual property rights as to stand-alone or integral components of the Proposal that are already on FDOT's Approved Product List (APL) or Standard Plans, or are otherwise generally known in the industry as being subject to patent or copyright protection.

4-3.9.8.2 County's Future Rights to a Proposal: Notwithstanding 7-3 nor any other provision of the Standard Specifications, upon acceptance of a Proposal, the Contractor hereby grants to the County and its contractors (such grant being expressly limited solely to any and all existing or future County construction projects and any other County projects that are partially or wholly funded by or for the County) a royalty-free and perpetual license under all forms of intellectual property rights to manufacture, to use, to design, to construct, to disclose, to reproduce, to prepare and fully utilize derivative works, to distribute, display and publish, in whole or in part, and to permit others to do any of the above, and to otherwise in any manner and for any purpose whatsoever do anything reasonably necessary to fully utilize any and all aspects of such Proposal on any and all existing and future construction projects and any other County projects.

Contractor shall hold harmless, indemnify and defend the County and its contractors and others in privity therewith from and against any and all claims, liabilities, other obligations or losses, and reasonable expenses related thereto (including reasonable attorneys' fees), which are incurred or are suffered by any breach of the foregoing grants, and regardless of whether such intellectual property rights were or were not disclosed by the Contractor pursuant to 4-3.9.8.1, unless the County has by express written exception in the Proposal

acceptance process specifically released the Contractor from such obligation to hold harmless, indemnify and defend as to one or more disclosed intellectual property rights.

4-4 Unforeseeable Work.

When the County requires work that is not covered by a price in the Contract and such work does not constitute a "Significant Change" as defined in 4-3.1, and the County finds that such work is essential to the satisfactory completion of the Contract within its intended scope, the County will make an adjustment to the Contract. The Director will determine the basis of payment for such an adjustment in a fair and equitable amount.

4-5 Rights in and Use of Materials Found on the Site of the Work.

4-5.1 Ownership and Disposal of Existing Materials: Take ownership and dispose of all materials that are not designated as the property of other parties, in both roadway and structures, found on the right-of-way, and all material in structures designated for removal. Such materials do not include earth or other excavated material required for the construction of the project. During construction, the Contractor may use materials from existing structures that are required to be removed and that are designated to remain the property of the County. Do not cut or otherwise damage such material during removal unless the Director gives permission to do so. Store material in an accessible location as the Director directs. The County is not responsible for the quality or quantity of any material salvaged.

4-5.2 Ornamental Trees and Shrubs: Take ownership of all ornamental trees or shrubs existing in the right-of-way that are required to be removed for the construction operations and which are not specifically designated in the Plans to be reset, or to be removed by others prior to the construction operations.

4-6 Final Cleaning Up of Right-of-Way.

Upon completion of the work, and before the County accepts the work and makes final payment, remove from the right-of-way and adjacent property all falsework, equipment, surplus and discarded materials, rubbish and temporary structures; restore in an acceptable manner all property, both public and private, that has been damaged during the prosecution of the work; and leave the waterways unobstructed and the roadway in a neat and presentable condition throughout the entire length of the work under Contract. Do not dispose of materials of any character, rubbish or equipment, on abutting property, with or without the consent of the property owners. The Director will allow the Contractor to temporarily store equipment, surplus materials, usable forms, etc., on a well-kept site owned or leased by the Contractor, adjacent to the project. However, do not place or store discarded equipment, materials, or rubbish on such a site.

Shape and dress areas adjacent to the project right-of-way that were used as plant sites, materials storage areas or equipment yards when they are no longer needed for such purposes. Restore these areas in accordance with 7-11.1 and 7-11.2. Grass these areas when the Director directs.

SECTION 5
CONTROL OF THE WORK

5-1 Plans and Working Drawings.

5-1.1 Contract Documents: Have available the Contract Documents on the worksite at all times.

5-1.2 County Plans: Plans consist of general drawings showing such details as are necessary to give a comprehensive idea of the construction contemplated. In general, roadway plans will show alignment, profile grades, typical sections and general plan view details. Cross sectional views maybe provided or created from provided surface models. In general, structure plans will show in detail all dimensions of the work contemplated. When the structure plans do not show the dimensions in detail, they will show general features and such details as are necessary to give a comprehensive idea of the structure.

Elevations and B.M. Datum shown are North American Vertical Datum 1988 (NAVD-1988), National Geodetic Vertical Datum of 1929 (NGVD-1929), or other datum as noted in the Plans.

5-1.3 Alterations in Plans: The County will issue, in writing, all authorized alterations affecting the requirements and information given on the approved Plans.

The existing surface is a combination of the following:

1.The natural ground or the original ground line,
2.The bottom of the existing pavement,
3.The bottom of existing features removed by clearing and grubbing,
4.The bottom of the existing base, if the base is to be removed,

The finished graded surface includes the completed grades of side slopes, unpaved shoulders, and the bottom of the base for flexible or rigid pavement.

5-1.4 Shop Drawings:

5-1.4.1. Definitions: In addition to the definitions below, also refer to Section 1, Definitions and Terms.

1. Bracing: Temporary structural member(s) placed between beams, girders, piles, precast columns, etc. to provide stability during construction activities.

2. Construction Affecting Public Safety: Construction that may jeopardize public safety such as structures and construction operations spanning over or adjacent to functioning vehicular roadways, pedestrian walkways, railroads, navigable waterways and walls supporting fill sections or excavations immediately adjacent to functioning roadways. Construction Affecting Public Safety may also apply to the construction or demolition of a bridge with continuous beams or girders if traffic is being placed under one of the spans within the unit. It does not apply to those areas of the site outside the limits of normal public access. Adjacent as used above applies to any project or property where normal construction operations could impact functioning vehicular roadways, pedestrian walkways, railroads, and navigable waterways.

3. Contractor Originated Designs: Items which the Contract Documents require the Contractor to design, detail and incorporate into the permanent works.

4. Detailer: The steel detailer that prepares the steel shop drawings for the fabrication, geometry and fit-up for all steel members in accordance with the Plans.

5. Falsework: Any temporary construction work used to support the permanent structure until it becomes self-supporting. Falsework includes steel or timber beams, girders, columns, bracing, piles and foundations, and any proprietary equipment including modular shoring frames, post shores, and adjustable horizontal shoring.

6. Formwork: Any structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Formwork may be comprised of common materials such as wood or metal sheets, battens, soldiers and walers, ties, proprietary forming systems such as

stay-in-place metal forms, and proprietary supporting bolts, hangers and brackets. Formwork may be either permanent formwork requiring a shop drawing submittal such as stay-in-place metal or concrete forms, or may be temporary formwork which requires certification by the Specialty Engineer for Construction Affecting Public Safety and for Major and Unusual Structures.

7. Major and Unusual Structures: Bridges of complex design. Generally, this includes the following types of structures:

a. Bridges with an individual span longer than 300 feet.

b. Structurally continuous superstructures with spans over 150 feet.

c. Steel box and plate girder bridges.

d. Concrete or steel straddle piers and straddle pier caps.

e. Steel truss bridges including proprietary pedestrian steel truss spans not satisfying the Category 1 conditions of FDOT Design Manual 266.4.

f. Concrete segmental, post-tensioned girder bridges and post-tensioned substructures.

g. Cable stayed, extradosed or suspension bridges.

h. Arch bridges.

i. Tunnels.

j. All movable bridges (including specifically structural, electrical and mechanical components).

k. Rehabilitation, widening, lengthening or jacking of any of the above structures.

8. Permanent Works: All the permanent structures and parts thereof required of the completed Contract.

9. QA/QC Shop Drawing Check Points: The Engineer of Record is responsible for conducting a review of all shop drawings regardless of whether the shop drawing is originated by the Engineer of Record or by others. QA/QC Shop Drawing Check Prints shall consist of highlighting items that the EOR is able to verify based on the EOR's plans and design information on each sheet reviewed. Each sheet shall be initialed by the reviewer. QA/QC Shop Drawing Check Prints shall be submitted to the Department along with the stamped Shop Drawing.

10. Scaffolding: An elevated work platform used to support workers, materials and equipment, but not intended to support the structure.

11. Shop Drawings: A shop drawing is a drawing or set of drawings produced by the contractor, supplier, manufacturer, subcontractor, or fabricator for prefabricated components. Shop drawings also include all working drawings, erection plans, associated trade literature, material cut-sheets, calculations, schedules, erection manuals, geometry control manuals and other manuals and similar documents submitted by the Contractor to define some portion of the project work. The type of work includes both permanent and temporary works as appropriate to the project.

12. Shoring: A component of falsework such as horizontal, vertical or inclined support members. In this Section, this term is interchangeable with falsework.

13. Special Erection Equipment: Includes launching gantries, beam and winch equipment, form travelers, segment lifters, beam shifters, erection trusses, launching noses or similar items made purposely for construction of the structure. It does not apply to commonly available proprietary construction equipment such as cranes.

14. Temporary Works: Any temporary construction work necessary for the construction of the permanent works. This includes but is not limited to bracing, falsework, formwork, scaffolding, shoring, stability towers, strong-backs, counterweights, temporary earthworks, sheeting, cofferdams, and special erection equipment.

5-1.4.2 Shop Drawing Submittal and Review Requirements: See table below for shop drawing submittal and review requirements.

Table 5-1
Submittal and Review Requirements

Shop Drawing for:	Originated by Specialty Engineer Not Signed and Sealed	Originated by Detailer Not Signed and Sealed	Originated by Specialty Engineer Signed and Sealed	Originated by Contractor's EOR Signed and Sealed	Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR
Steel Fabrication Drawings		Originator			Reviewer
Steel Erection Plan			Originator		Reviewer
Geometry Control Manual				Originator	Reviewer
Segmental Erection Manual				Originator	Reviewer
Segmental Shop Drawings					Reviewer
Post-tensioning Mock-up Plan			Originator		Reviewer
Post-tensioning Systems[1]			Originator		Reviewer
Pretensioned Prestressed Concrete Products Containing FRP Bars or Strands Excluding Standard Piles and Sheet Piles			Originator		Reviewer
Temporary Works Affecting Public Safety[2]			Originator		Reviewer

Table 5-1 Submittal and Review Requirements					
Shop Drawing for:	Originated by Specialty Engineer Not Signed and Sealed	Originated by Detailer Not Signed and Sealed	Originated by Specialty Engineer Signed and Sealed	Originated by Contractor's EOR Signed and Sealed	Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR
Demolition Plans of Bridges with Continuous Beams or Girders Where One Span Within the Unit is Over Traffic			Originator		Reviewer
Prefabricated Bridge Elements and System Connection Mock-Up Plans			Originator		Reviewer
Bridge Formwork Including SIP Forms			Originator		Reviewer
Construction Equipment Placed on Existing Bridges				Originator	Reviewer
Bridge components not fully detailed in the Plans, i.e. post-tensioning details, handrails, temporary operating systems for movable bridges etc.				Originator	Reviewer
Retaining Wall Systems			Originator		Reviewer

Table 5-1 Submittal and Review Requirements					
Shop Drawing for:	Originated by Specialty Engineer Not Signed and Sealed	Originated by Detailer Not Signed and Sealed	Originated by Specialty Engineer Signed and Sealed	Originated by Contractor's EOR Signed and Sealed	Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR
Precast Box Culverts			Originator		Reviewer
Non-standard structures and components for drainage, lighting, signalization and signing			Originator		Reviewer
Building structures			Originator [3]		Reviewer [4]
Non-standard crash cushions and other nonstructural items			Originator		Reviewer
Design and structural details furnished by the Contractor in compliance with the Contract				Originator	Reviewer
Material or Product Cut-Sheets	Originator				Reviewer

1. Include integration details of the post-tensioning system.
2. Does not include formwork complying with Standard Plans, Index 102-600 (concrete placement is not permitted directly over traffic). Also, does not include critical temporary walls that are fully detailed in the plans unless redesigned by the Contractor. Does not include specialized equipment if traffic is removed from under equipment while equipment is being loaded, launched, and while loads are being transported by equipment.
3. In lieu of a Specialty Engineer, originator may be a licensed Architect.
4. In lieu of the Design Engineer of Record, the reviewer may be the Design Architect of Record.

5-1.4.3 Schedule of Submittals: Prepare and submit a schedule of submittals that identifies the work for which shop drawings apply. For each planned submittal, define the type, and approximate number of drawings or other documents that are included and the planned submittal date, considering the processing requirements herein. Submit the schedule of submittals to the CEI Consultant within 60 days of the start of the Contract, and prior to the submission of any shop drawings.

Coordinate subsequent submittals with construction schedules to allow sufficient time for review, resubmittal and approval prior to beginning fabrication as necessary.

5-1.4.4 Style, Numbering, and Material of Submittals:

5-1.4.4.1 Drawings: Submit all shop drawings that are necessary to complete the structure in compliance with the design shown in the Plans. Prepare all shop drawings using the same units of measure as those used in the Plans. Consecutively number each sheet in the submittal series, and indicate the total number in the series (i.e., 1 of 12, 2 of 12 . . . 12 of 12). Include on each sheet the following items as a minimum requirement: the complete Project Number, Financial Project Identification Number (if applicable), Bridge Number(s), drawing title and number, a title block showing the names of the fabricator or producer and the Contractor for which the work is being done, the initials of the person(s) responsible for the drawing, the date on which the drawing was prepared, the location of the item(s) within the project, the Contractor's approval stamp with date and initials, and, when applicable, the documents shall be signed and sealed by the Specialty Engineer or Contractor's Engineer of Record. A re-submittal will be requested when any of the required information is not included.

Shop drawings shall be submitted in Portable Document Format (PDF) files, formatted on sheets 11 by 17 inches.

5-1.4.4.2 Other Documents: Submit PDF files of other documents such as trade literature, catalogue information, calculations, and manuals formatted on sheets no larger than 11 by 17 inches. Clearly label and number each sheet in the submittal to indicate the total number of sheets in the series (i.e., 1 of 12, 2 of 12 . . . 12 of 12).

Prepare all documents using the same units of measure as the Plans and include a Table of Contents cover sheet. List on the cover sheet the total number of pages and appendices, and include the complete Project Number, Financial Project Identification Number (if applicable), a title referencing the submittal item(s), the name of the firm and person(s) responsible for the preparation of the document, the Contractor's approval stamp with date and initials, and, when applicable, the documents shall be signed and sealed by the Specialty Engineer or Contractor's Engineer of Record.

Submit appropriately prepared and checked calculations and manuals that clearly outline the design criteria. Include on the internal sheets the complete Financial Project Identification Number and the initials of the person(s) responsible for preparing and checking the document.

Clearly label trade literature and catalogue information on the front cover with the title, Financial Project Identification Number, date and name of the firm and person(s) responsible for that document.

5-1.4.5 Submittal Paths:

5-1.4.5.1 General: Shop drawings are not required for items on the Approved Products List used as intended in the relevant Standard Plans and Standard Specifications. For non-prequalified items, details of the submittal path and protocol to be followed will be established by the CEI Consultant and communicated at the preconstruction conference.

Shop drawing review will be performed by the Engineer of Record for the project feature associated with each submittal and communicated through the CEI Consultant. Shop drawing submittals shall include other information such as catalog data, procedure manuals, fabrication/welding procedures, and maintenance and operating procedures when required by the work. Submit material certifications and material tests to the CEI Consultant. The Contractor is responsible for checking and verifying any necessary field dimensions required in the development of shop drawings.

5-1.4.5.2 Building Structures: Submit shop drawings, and all correspondence related to building structures to the CEI Consultant for review and approval.

5-1.4.5.3 Contractor-Originated Design: Submit shop drawings and applicable calculations to the CEI Consultant for review. The shop drawings and applicable calculations must be signed and sealed by the Specialty Engineer or the Contractor's Engineer of Record. Submit in accordance with the requirements of 5-1.4.1 through 5-1.4.3, as appropriate.

5-1.4.5.4 Temporary Works: For Construction Affecting Public Safety, submit to the CEI Consultant shop drawings and the applicable calculations for the design of special erection equipment, bracing, falsework, scaffolding, etc. The shop drawings and applicable calculations must be signed and sealed by the Specialty Engineer. Submit in accordance with the requirements of 5-1.4.1 through 5-1.4.3, as appropriate.

5-1.4.5.5 Demolition Plans of Bridges with Continuous Beams or Girders when Traffic is Under Any of the Spans of the Unit During Demolition Activities: For demolition plans of bridges with continuous beams or girders when traffic is placed under any of the spans of the unit during demolition activities, the Specialty Engineer shall prepare signed and sealed demolition plans and applicable calculations including a step-by-step sequence of demolition, etc. Clearly denote any traffic restrictions for all demolition steps. Submit in accordance with the requirements of 5-1.4. 1 through 5-1.4. 3, as appropriate.

5-1.4.5.6 Falsework Founded on Shallow Foundations: When vertical displacement limits are provided in the Plans for falsework founded on shallow foundations such as spread footings and mats, submit to the CEI Consultant shop drawings and applicable calculations of the falsework system including subsurface conditions and settlement estimates. The shop drawings and applicable calculations must be signed and sealed by the Specialty Engineer. Submit in accordance with the requirements of 5-1.4.5.1 through 5-1.4.5.3, as appropriate.

5-1.4.5.7 Formwork and Scaffolding: The Contractor is solely responsible for the safe installation and use of all formwork and scaffolding. The County does not require any formwork or scaffolding submittals unless such work would be classified as Construction Affecting Public Safety. For formwork, scaffolding, or other temporary works affecting public safety; develop the required designs in accordance with the AASHTO Guide Design Specifications for Bridge Temporary Works, the AASHTO Construction Handbook for Bridge Temporary Works, and Chapter 11 of the Structures Design Guidelines (SDG) using wind loads specified in the SDG.

5-1.4.5.8 Beam, Girder and Column Temporary Bracing: The Contractor is solely responsible for ensuring stability of beams, girders and columns during all handling, storage, shipping and erection. Adequately brace beams, girders and columns to resist wind, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the products, considering actual beam geometry and support conditions during all stages of erection and deck construction. At a minimum, provide temporary bracing at each end of each beam or girder. Develop the required bracing designs in accordance with the AASHTO LRFD

Bridge Design Specifications (LRFD) and Chapter 11 of the SDG using wind loads specified in the SDG. For information not included in the SDG or LRFD, refer to the AASHTO Guide Design Specifications for Bridge Temporary Works and the AASHTO Construction Handbook for Bridge Temporary Works.

For Construction Affecting Public Safety, when temporary bracing requirements are shown in the Plans, submit plans and calculations signed and sealed by a Specialty Engineer for the design of temporary bracing members and connections based on the forces shown in the Plans. In addition, submit a written certification that construction loads do not exceed the assumed loads shown in the Plans.

For Construction Affecting Public Safety, when temporary bracing requirements are not shown in the Plans or an alternate temporary bracing system is proposed, submit plans and calculations signed and sealed by a Specialty Engineer including the stability analysis and design of temporary bracing members and connections.

5-1.4.5.9 Erection Plan, Geometry Control Manual and Erection Manual: Submit, for the Director's review, an Erection Plan that meets the specific requirements of Sections 450, 452 and 460 and this section. Submit in writing for the Engineer's review, an Erection Manual and Geometry Control Manual that meets the specific requirements of Section 462 and this Section. For all Erection Plans and Erection Manuals refer to Standard Plans, Index-102- 600 for construction activities not permitted over traffic. For construction activities not covered in Index 102-600, clearly denote what additional construction steps are not allowed over traffic.

5-1.4.5.10 Other Miscellaneous Design and Structural Details Furnished by the Contractor in Compliance with the Contract: The CEI Consultant shall review all shop drawings and the applicable calculations for miscellaneous design and structural details as required by the Contract. The shop drawings and applicable calculations will be signed and sealed by the Specialty Engineer. Submit in accordance with the requirements of 5-1.4.1 through 5-1.4.3, as appropriate.

5-1.4.5.10 Project Shop Drawing Package: Upon completion of the work, but prior to authorization of final payment, the Contractor shall furnish the Director one complete, indexed and cataloged PDF file containing all of the Contractors, Subcontractors, and manufacturers shop drawings and catalog data as finally checked and reviewed by the Director with all modifications accepted by the Director subsequent thereto, showing the work as actually completed.

5-1.4.6 Processing of Shop Drawings:

5-1.4.6.1 Contractor Responsibility for Accuracy and Coordination of Shop Drawings: Coordinate, schedule, and control all submittals, with a regard for the required priority, including those of the various subcontractors, suppliers, and engineers, to provide for an orderly and balanced distribution of the work.

Coordinate, review, date, stamp, approve and sign all shop drawings prepared by the Contractor or agents (subcontractor, fabricator, supplier, etc.) prior to submitting them to the CEI Consultant. Submittal of the drawings confirms verification of the work requirements, units of measurement, field measurements, construction criteria, sequence of assembly and erection, access and clearances, catalog numbers, and other similar data. Indicate on each series of drawings the specification section and sheet or drawing number of the Contract Plans to which the submission applies. Indicate on the shop drawings all deviations from the

Contract drawings and itemize all deviations in the letter of transmittal. Likewise, whenever a submittal does not deviate from the Contract Plans, clearly state so in the submittal.

Schedule the submission of shop drawings to allow for a 45 calendar day review period for all submittals associated with a category 2 bridge; tolling components identified in the current FDOT General Tolling Requirements (GTR) Part 3; and the tolling-related signing, DMS and ITS infrastructure. Schedule the submission of shop drawings to allow for a 25 calendar day review period for all other items. The review period commences upon the CEI Consultant's receipt of the valid submittal or valid re-submittal and terminates upon the transmittal of the submittal back to the Contractor. A valid submittal includes all the minimum requirements outlined in 5-1.4.4.

Submit shop drawings to facilitate expeditious review. The Contractor is discouraged from transmitting voluminous submittals of shop drawings at one time. For submittals transmitted in this manner, allow for the additional review time that may result.

Only shop drawings distributed with the approval stamps are valid and all work that the Contractor performs in advance of approval will be at the Contractor's risk. Work affecting Public Safety may not be performed prior to approval of appropriate submittals and work may not proceed at the Contractor's risk.

5-1.4.6.2 Scope of Review by Engineer of Record: The Engineer of Record's review of the shop drawings is for conformity to the requirements of the Contract Documents and to the intent of the design. The Engineer of Record's review of shop drawings which include means, methods, techniques, sequences, and construction procedures are limited to the effects on the permanent works. The Engineer of Record's review of submittals which include means, methods, techniques, sequences, and construction procedures does not include an in-depth check for the ability to perform the work in a safe or efficient manner.

5-1.4.6.3 Special Review by Engineer of Shop Drawings for Construction Affecting Public Safety: The Engineer may request copies of shop drawings related to Construction Affecting Public Safety for review and comment. When shop drawings are requested do not proceed with construction of the permanent works until receiving the Engineer's written approval.

5-1.4.7 Other Requirements for Shop Drawings for Bridges:

5-1.4.7.1 Shop Drawings for Structural Steel and Miscellaneous Metals: Submit shop drawings for structural steel and miscellaneous metals. Shop drawings shall consist of shop and erection drawings, welding procedures, and other working plans, showing details, dimensions, sizes of material, and other information necessary for the complete fabrication and erection of the metal work.

5-1.4.7.2 Shop Drawings for Concrete Structures: Submit shop drawings for concrete components that are not cast-in-place and are not otherwise exempted from submittal requirements. Also, submit shop drawings for all details that are required for the effective execution of the concrete work and are not included in the Contract Documents such as: special erection equipment, masonry layout diagrams, and diagrams for bending reinforcing steel, in addition to any details required for concrete components for the permanent work.

5-1.4.7.3 Shop Drawings for Major and Unusual Structures: In addition to any other requirements, within 60 days from the Notice to Proceed, submit information to the Director outlining the integration of the Major and Unusual Structure into the overall approach to the project. Where applicable to the project, include, but do not limit this information to:

1. The overall construction program for the duration of the Contract. Clearly show the Milestone dates. (For example, the need to open a structure by a certain time for traffic operations.)

2. The overall construction sequence. The order in which individual structures are to be built, the sequence in which individual spans of girders or cantilevers are erected, and the sequence in which spans are to be made continuous, and the order that components are to be installed (such as mechanical and electrical devices in moveable bridges).

3. The general location of any physical obstacles to construction that might impose restraints or otherwise affect the construction, and an outline of how to deal with such obstacles while building the structure(s). (For example, obstacles might include road, rail and waterway clearances, temporary diversions, transmission lines, utilities, property, and the Contractor's own temporary works, such as haul roads, cofferdams, plant clearances and the like.)

4. The approximate location of any special lifting equipment in relation to the structure, including clearances required for the operation of the equipment. (For example, crane positions, operating radii and the like.)

5. The approximate location of any temporary falsework, and the conceptual outline of any special erection equipment. Provide the precise locations and details of attachments, fixing devices, loads, etc. in later detailed submittals.

6. An outline of the handling, transportation, and storage of fabricated components, such as girders or concrete segments. Provide the precise details in later detailed submittals.

7. Any other information pertinent to the proposed scheme or intended approach.

Clearly and concisely present the above information on as few drawings as possible in order to provide an overall, integrated summary of the intended approach to the project. The County will use these drawings for information, review planning, and to assess the Contractor's approach in relation to the intent of the original design. Submittal to and receipt by the Director does not constitute any County acceptance or approval of the proposals shown thereon. Include the details of such proposals on subsequent detailed shop drawing submittals. Submit timely revisions and re-submittals for all variations from these overall scheme proposals.

5-1.4.8 Cost of Shop Drawings: Include the cost of shop drawings submittal in the Contract prices for the work requiring the shop drawings. The County will not pay the Contractor additional compensation for such drawings.

5-1.5 Certifications:

5-1.5.1 Special Erection Equipment: Prior to its use, ensure that the Specialty Engineer personally inspects the special erection equipment and submits a written certification to the Director that the equipment has been fabricated in accordance with the submitted drawings and calculations. In addition, after assembly, ensure that the Specialty Engineer observes the equipment in use and submits a written certification to the Director that such equipment is being used as intended and in accordance with the submitted drawings and calculations. In each case, the Specialty Engineer must sign and seal the letter of certification.

5-1.5.2 Falsework and Shoring Requiring Shop Drawings: After its erection or installation but prior to the application of any superimposed load, ensure that a Specialty Engineer or a designee inspects the falsework and certifies to the Director in writing that the falsework has been constructed in accordance with the materials and details shown on the submitted drawings and calculations. The letter of certification must be signed and sealed by the Specialty Engineer.

Where so directed in the shop drawings, ensure all welds are performed by welders qualified under AWS D1.5 for the type of weld being performed.

5-1.5.3 Temporary Formwork: For Construction Affecting Public Safety and for Major and Unusual Structures, prior to the placement of any concrete, ensure that a Specialty Engineer or a designee inspects the formwork and submits a written certification to the Director that the formwork has been constructed to safely withstand the superimposed loads to which it will be subjected. The Specialty Engineer must sign and seal the letter of certification.

5-1.5.4 Erection: For Construction Affecting Public Safety, submit an erection plan signed and sealed by the Specialty Engineer to the Director at least four weeks prior to erection commencing. Include, as part of this submittal, signed and sealed calculations and details for any falsework, bracing or other connection supporting the structural elements shown in the erection plan. Unless otherwise specified in the Plans, erection plans are not required for simple span precast prestressed concrete girder bridges with spans of 170 feet or less.

At least two weeks prior to beginning erection, conduct a Pre-erection meeting to review details of the plan with the Specialty Engineer that signed and sealed the plan, and any Specialty Engineers that may inspect the work and the Director.

After erection of the elements, but prior to opening of the facility below the structure, ensure that a Specialty Engineer or a designee has inspected the erected member. Ensure that the Specialty Engineer has submitted a written certification to the Director that the structure has been erected in accordance with the signed and sealed erection plan.

For structures without temporary supports but with temporary girder bracing systems, perform, as a minimum, weekly inspections of the bracing until all the diaphragms and cross frames are in place. For structures with temporary supports, perform daily inspections until the temporary supports are no longer needed as indicated in the erection plans. Submit written documentation of the inspections to the Director within 24 hours of the inspection.

5-1.6 Request for Correction: For work that the Contractor constructs incorrectly or does not meet the requirements of the Contract Documents, the Contractor has the prerogative to submit an acceptance proposal to the Director for review and disposition. The acceptance proposal shall describe the error or defect and either describe remedial action for its correction or propose a method for its acceptance. In either case, the acceptance proposal shall address structural integrity, aesthetics, maintainability, and the effect on Contract Time. The County will judge any such proposal for its effect on these criteria and for its effect on Contract Administration.

When the Director judges that a proposal infringes on the structural integrity or maintainability of the structure, the Contractor's Engineer of Record will perform a technical assessment and submit it to the Director for approval. Do not take any corrective action without the Director's written approval.

Carry out all approved corrective construction measures at no expense to the County.

Notwithstanding any disposition of the compensation aspects of the defective work, the Director's decision on the technical merits of a proposal is final.

5-1.7 Request for Information: Submit Requests for Information in writing to the Director to request clarification where a provision, detail or drawing in the Contract Documents seems to have more than one meaning, have an unclear meaning, or have conflicts between Plans and Specifications. A Request for Information is not considered a Notice of Claim. Notices of Claim must be submitted in accordance with 5-12.2.

5-1.8 Request for Modification: Where the Director allows the Contractor to make modifications to the permanent works for the purposes of expediting the Contractor's chosen construction methods, the Contractor shall submit proposals to the Director for review and approval prior to modifying the works. Submit proposals for minor modifications under the shop drawing process. Indicate on all drawings the deviations from the Contract Documents and itemize all deviations in the letter of transmittal. Major modifications must be submitted as a Cost Savings Initiative Proposal.

Minor modifications are those items that, in the opinion of the Director, do not significantly affect the quantity of measured work, or the integrity or maintainability of the structure or its components.

The Director's decision on the delineation between a minor and a major modification and the disposition of a proposal is final.

5-2 Coordination of Contract Documents.

These Specifications, the Plans, Special Provisions, and all supplementary documents are integral parts of the Contract Documents; a requirement occurring in one is as binding as though occurring in all. All parts of the Contract Documents are complementary and describe and provide for a complete work. In addition to the work and materials specified in the Specifications as being included in any specific pay item, include in such pay items additional, incidental work, not specifically mentioned, when so shown in the Plans, or if indicated, or obvious and apparent, as being necessary for the proper completion of the work under such pay item and not stipulated as being covered under other pay items.

In cases of discrepancy, the governing order of the documents is as follows:

1. Special Provisions.
2. Technical Special Provisions.
3. Plans.
4. Standard Plans.
5. Developmental Specifications.
6. Supplemental Specifications.
7. Standard Specifications.

Computed dimensions govern over scaled dimensions.

5-3 Conformity of Work with Contract Documents.

Perform all work and furnish all materials in reasonably close conformity with the lines, grades, models, dimensions, and material requirements, including tolerances, as specified in the Contract Documents.

In the event that the Director finds that the Contractor has used material or produced a finished product that is not in reasonably close conformity with the Contract Documents, but that the Contractor has produced reasonably acceptable work, the Director will determine if the County will accept the work in place. In this event, the Director will document the basis of acceptance by Contract modification, which provides for an appropriate reduction in the Contract price for such work or materials included in the accepted work as deemed necessary to conform to the determination based on engineering judgment.

In the event that the Director finds that the Contractor has used material or produced a finished product that is not in reasonably close conformity with the Contract Documents, and that the Contractor has produced an inferior or unsatisfactory product, the Contractor shall remove and replace or otherwise correct the work or materials at no expense to the County.

For base and surface courses, the County will allow the finished grade to vary as much as 0.1 foot from the grade shown in the Plans, provided that the Contractor's work meets all templates and straightedge requirements and contains suitable transitions.

5-4 Errors or Omissions in Contract Documents.

Do not take advantage of any apparent error or omission discovered in the Contract Documents, but immediately notify the Director in writing of such discovery. The Director will then make such corrections and interpretations as necessary to reflect the actual spirit and intent of the Contract Documents.

5-5 Authority of the Director.

Perform all work to the satisfaction of the Director.

The Director will decide all questions, difficulties, and disputes, of whatever nature, that may arise relative to the interpretation of the Plans, construction, prosecution, and fulfillment of the Contract, and as to the character, quality, amount, and value of any work done, and materials furnished, under or by reason of the Contract.

5-6 Authority and Duties of Director's Assistants.

The Director may appoint such assistants and representatives as desired. These assistants and representatives are authorized to inspect all work done and all materials furnished. Such inspection may extend to all or any part of the work and to the manufacture, preparation, or fabrication of the materials to be used. Such assistants and representatives are not authorized to revoke, alter, or waive any requirement of these Specifications. Rather, they are authorized to call to the attention of the Contractor any failure of the work or materials to meet the Contract Documents, and have the authority to reject materials or suspend the work until any questions at issue can be referred to and decided by the Director. The Director will immediately submit written notification to the Contractor of any such suspension of the work, stating in detail the reasons for the suspension. The presence of the inspector or other assistant in no way lessens the responsibility of the Contractor.

5-7 Engineering and Layout.

5-7.1 Control Points Furnished by the County: The Director will provide control points at various locations along the project alignment (Begin Project, End Project, PIs, PTs, etc.) and benchmarks along the line of the project to facilitate the proper layout of the work. Control points and benchmarks provided by the engineer, if any, will be indicated in the Plans. Preserve all control points and benchmarks that the County furnishes. Any points carelessly or willfully disturbed or destroyed shall be reset at the sole expense of the Contractor.

As an exception to the above, for projects where the Plans do not show a centerline or other survey control line for construction of the work (e.g., resurfacing, safety modifications, etc.) the Director may provide only points marking the beginning and ending of the project, and all exceptions.

Prior to commencing the work, the Contractor shall perform a quality control check of all horizontal and vertical control points provided by the County and carefully compare all lines depicted in the plans with existing lines and levels, and shall call any discrepancies to the attention of the Director for resolution. Upon resolution of any discrepancies, the Contractor shall submit a letter to the County accepting the control points and bench marks for use. In any event, the Contractor shall be responsible for the accuracy of the Work and shall make good any work

performed in error, at no cost to the County. All construction surveying and layout work to be provided herein shall be coordinated with and subject to the approval of the Director.

5-7.1.1 Third Party Survey Monumentation: The Contractor is responsible for the protection and preservation of any third party survey monumentation (National Geodetic Survey points, property corners, etc.) located within the project limits. Any points carelessly or willfully disturbed or destroyed shall be reset at the sole expense of the Contractor. Any third party survey monumentation designated by the Director to be removed and re-established will be paid for at the unit prices set forth in the Contract, or if no such item exists in accordance with Section 4-3.2.1.

5-7.2 Furnishing of Stake Materials: Furnish all stakes, templates, and other materials necessary for establishing and maintaining the lines and grades necessary for control and construction of the work.

5-7.3 Layout of Work: Utilizing the control points and bench marks furnished by the County and accepted by the Contractor in accordance with 5-7.1, establish all horizontal and vertical controls necessary to construct the work in conformity to the Contract Documents. Perform all calculations required, and set all stakes needed such as grade stakes, offset stakes, reference point stakes, slope stakes, and other reference marks or points necessary to provide lines and grades for construction of all roadway, bridge, and miscellaneous items.

When performing utility construction as part of the project, establish all horizontal and vertical controls necessary to carry out such work.

5-7.4 Specific Staking Requirements: When performing new base construction as part of the project, set stakes to establish lines and grades for subgrade, base, curb, and related items at intervals along the line of the work. If Automated Machine Guidance is utilized, set stakes as needed. If Automated Machine Guidance is not utilized, set stakes no greater than 50 feet on tangents and 25 feet on curves. Set grade stakes at locations that the Director directs to facilitate checking of subgrade, base, and pavement elevations in crossovers, intersections, and irregular shaped areas.

For bridge construction stakes and other control, set references at sufficiently frequent intervals to ensure construction of all components of a structure in accordance with the lines and grades shown in the Plans.

For projects where the Plans do not show a centerline or other survey control line for construction of the work (resurfacing, safety modifications, etc.), provide only such stakes as necessary for horizontal and vertical control of work items.

For resurfacing and resurfacing-widening type projects, establish horizontal controls adequate to ensure that the asphalt mix added matches with the existing pavement. In tangent sections, set horizontal control points at 100-foot intervals by an instrument survey. In curve sections, set horizontal control points at 25-foot intervals by locating and referencing the centerline of the existing pavement. Alternate intervals may be used on resurfacing projects with prior written approval of the Director.

Establish by an instrument survey, and mark on the surface of the finished pavement at 25-foot intervals, the points necessary for striping of the finished roadway. As an exception, for resurfacing and resurfacing/widening projects, establish these points in the same manner as used for horizontal control of paving operations. Mark the pavement with white paint. If performing striping, the Director may approve an alternate method for layout of striping provided that the Contractor achieves an alignment equal to or better than the alignment that would be achieved using an instrument survey.

For projects that include temporary or permanent striping of “no passing zones”, provide the location and length of these zones as shown in the Plans, except projects where the vertical or horizontal alignment is new or altered from preconstruction alignment. For projects that consist of new or altered vertical or horizontal alignment, the County will provide the location and length of the "no passing zones" during construction. For these projects, submit written notification to the Director not less than 21 calendar days prior to beginning striping.

For all projects, set a station identification stake at each right-of-way line at 100-foot intervals and at all locations where a change in right-of-way width occurs, or as otherwise approved by the Director. Mark each of these stakes with painted numerals, of a size readable from the roadway, corresponding to the project station at which it is located. As an exception to the above, for projects where Plans do not show right-of-way lines, set station identification stakes at locations and intervals appropriate to the type of work being done. For resurfacing and resurfacing/widening projects, set station identification stakes at 200-foot intervals, or as otherwise approved by the Director.

5-7.4.1 As-Built Drawings and Certified Surveys: The Contractor shall maintain one record copy of all specifications, plans, addenda, and shop drawings on site and in good order, annotated in red to depict all changes made during construction and exact location of underground or otherwise concealed components of the project, and any modifications to material types from that specified in the bid plans and specifications (“red line documents”). All subsurface improvements shall be as-built prior to backfilling. As-built red line plans shall be maintained on 11-inch by 17-inch prints and red line annotations shall be completed in a neat draftsman-like manner.

As-built red lines shall include both authorized and unauthorized changes to all project features, including but not limited to: horizontal pavement dimensions; finished pavement grades; finish dimensions, elevations, and alignment of all storm sewer, drainage structures, ponds, water main, sanitary sewer, force main, service lines, conduit, wiring, traffic loops, and signal interconnects; signal poles; light poles; and signs.

Demonstrating proper maintenance of as-built drawings shall be a precedent to each progress payment. The Contractor shall make available to Director, at any time requested, as-built information through the date of the request. If the Director determines the as-built information is inaccurate, inadequate, or untimely payment may be withheld until such time that the Contractor cures any noted deficiencies.

Upon completion of all work, but prior to authorization of final payment, the Contractor shall deliver to the Director one complete set as-built red line documents and certified surveys providing verification of all as-built dimensions and grades for review and approval. The certified survey shall include, but not be limited to:

1. Level Circuit: the survey shall include a final bench mark level circuit indicating the accuracy of vertical closure.
2. Control structure bench marks: the Contractor shall establish and document the location and elevation of bench marks on or within 100-feet of each control structure constructed or modified as part of the project. Each control structure bench mark elevation shall be clearly and permanently indicated on the bench mark.
3. Cross-sections: as-built finished cross-sections shall be performed at intervals not exceeding 100 feet, extending from right-of-way to right-of-way, but also including temporary or permanent easements

as may be applicable. Cross sections shall include all elevation break points, and shall include edge of pavement and centerlines for all pavements.

4. Discharge structures: structure identification number, type, locations (latitude and longitude), dimensions, and elevations of all, including weirs, bleeders, orifices, gates, pumps, pipes, and oil and grease skimmers.
5. Side bank and underdrain filters, or exfiltration trenches: locations, dimensions and elevations of all, including clean-outs, pipes, connections to control structures and points of discharge to receiving waters.
6. Storage areas for treatment and attenuation: storage area identification number, dimensions, elevations, contours, or cross-sections of all, sufficient to determine stage-storage relationships of the storage area and the permanent pool depth and volume below the control elevation for normally wet systems.
7. System grading: dimensions, elevations, contours, and final grades or cross-sections to determine contributing drainage areas, flow directions, and conveyance of runoff to the system discharge points.
8. Conveyance: dimensions, elevations, contours, final grades or cross-sections of systems utilized to divert off-site runoff around or through the new system.
9. Water levels: existing water elevations and the date recorded.
10. South Florida Water Management District (SFWMD): as-built surveys shall conform to any additional requirements and special conditions listed in the SFWMD's Environmental Resource Permit and any applicable local permit(s).
11. Bridge clearances: for projects under the authority of a U.S. Coast Guard bridge permit, as-built clearances as described in the U.S. Coast Guard Owner's Certification of Bridge Completion. For bridges spanning roadways, provide a full as-built clearance envelope across the full width of the lower roadway(s).
12. Projects under the authority of a U.S. Army Corps of Engineers permit: as-built surveys shall satisfy all of the requirements and special conditions listed in the U.S. Army Corps of Engineers permit.

All as-built survey information shall be signed and sealed by a licensed Professional Surveyor and Mapper duly registered in the State of Florida. No direct payment will be made for the cost of preparing, maintaining, and furnishing as-built plans and surveys as specified in this Article, the costs thereof shall be included in other items of work.

5-7.5 Personnel, Equipment, and Record Requirements: Employ only competent personnel and use only suitable equipment in performing layout work. Do not engage the services of any person or persons in the employ of the County for performance of layout work. All construction surveying and layout work, including dimensions and elevations associated with as-builts, shall be completed under the responsible charge of a licensed Professional Surveyor and Mapper duly registered in the State of Florida.

Keep adequate field notes and records while performing as layout work. Make these field notes and records available for the Director's review as the work progresses, and submit to the Director at the time of completion of the project. The Director's inspection, checking, or acceptance of the Contractor's field notes or layout work does not relieve the Contractor of his responsibility to achieve the lines, grades, and dimensions shown in the Contract Documents.

Prior to final acceptance of the project, mark, in a permanent manner on the surface of the completed work, all horizontal control points originally furnished by the County.

5-7.6 Global Navigation Satellite Systems (GNSS) Work Plan: If used, submit a comprehensive written GNSS Work Plan to the Director for County review and acceptance at the preconstruction conference or at least 30 days before starting work using GNSS. Update the plan as necessary during construction and notify the County of all changes. The GNSS Work Plan shall describe how GNSS enabled Automated Machine Guidance technology will be integrated into other technologies employed on the project. At a minimum, the GNSS Work Plan will include the following:

1. Designate which portions of the Contract will be done using GNSS enabled Automated Machine Guidance and which portions will be constructed using conventional survey methodology.

2. Describe the manufacturer, model, and software version of the GNSS equipment.

3. Provide information on the qualifications of Contractor staff. Include formal training and field experience. Designate a single staff person as the primary contact for GNSS technology issues.

4. Describe how project control will be established. Include a list and map showing control points enveloping the site.

5. Describe site calibration procedures. Include a map of the control points used for site calibration and control points used to validate the site calibration. Describe the frequency of site calibration and how site calibration will be documented. At a minimum, verify the site calibration twice daily.

6. Describe the Contractor's quality control procedures for verifying mechanical calibration and maintenance of construction and guidance equipment. Include the frequency and type of verification performed to ensure the constructed grades conform to the Contract Documents.

Keep on site and provide upon request, a copy of the project's most up to date GNSS Work Plan at the project site.

5-7.7 Payment: Include the cost of performing layout work as described above in the Contract unit prices for the various items of work that require layout.

5-8 Contractor's Supervision.

5-8.1 Prosecution of Work: Give the work the constant attention necessary to ensure the scheduled progress, and cooperate fully with the Director and with other contractors at work in the vicinity.

5-8.2 Contractor's Superintendent: Maintain a competent superintendent at the site at all times while work is in progress to act as the Contractor's agent. Provide a superintendent who is a competent superintendent capable of properly interpreting the Contract Documents and is thoroughly experienced in the type of work being performed. Provide a superintendent with the full authority to receive instructions from the Director and to execute the orders or directions of

the Director, including promptly supplying any materials, tools, equipment, labor, and incidentals that may be required. Provide such superintendence regardless of the amount of work sublet.

Provide a superintendent who speaks and understands English, and maintain at least one other responsible person who speaks and understands English, on the project during all working hours.

5-8.3 Supervision for Emergencies: Provide a responsible person, who speaks and understands English, and who is available at or reasonably near the worksite on a 24-hour basis, seven days a week. Designate this person as the point of contact for emergencies and in cases that require immediate action to maintain traffic or to resolve any other problem that might arise. Submit the phone numbers and names of personnel designated to be contacted in cases of emergencies, along with a description of the project location, to the Florida Highway Patrol and all other local law enforcement agencies.

5-9 General Inspection Requirements.

5-9.1 Cooperation by Contractor: Do not perform work or furnish materials without obtaining inspection by the Director. Provide the Director with safe means of access to the work, so the Director can determine whether the work performed and materials used are in accordance with the requirements and intent of the Contract Documents. For bridge projects with construction operations accessible only by watercraft, provide safe passage and transport to facilitate the Engineer's inspection of the Work. If the Director so requests at any time before final acceptance of the work, remove or uncover such portions of the finished work as directed. After examination, restore the uncovered portions of the work to the standard required by the Contract Documents. If the Director determines that the work so exposed or examined is unacceptable, perform the uncovering or removal, and the replacing of the covering or making good of the parts removed, at no expense to the County. However, if the Director determines that the work thus exposed or examined is acceptable, the County will pay for the uncovering or removing, and the replacing of the covering or making good of the parts removed in accordance with Section 4-4.

5-9.2 Failure of Director to Reject Work During Construction: If, during or prior to construction operations, the Director fails to reject defective work or materials, whether from lack of discovery of such defect or for any other reason, such initial failure to reject in no way prevents the later rejection when such defect is discovered, or obligates the County to final acceptance. The County is not responsible for losses suffered due to any necessary removals or repairs of such defects.

5-9.3 Failure to Remove and Renew Defective Materials and Work: If the Contractor fails or refuses to remove and renew any defective materials used or work performed, or to make any necessary repairs in an acceptable manner and in accordance with the requirements of the Contract within the time indicated in writing, the Director has the authority to repair, remove, or renew the unacceptable or defective materials or work as necessary, all at the Contractor's expense. The County will obtain payment for any expense it incurs in making these repairs, removals, or renewals, that the Contractor fails or refuses to make, by deducting such expenses from any moneys due or which may become due the Contractor, or by charging such amounts against the Contract bond.

5-9.4 Inspection by Federal Government: When the United States Government or the State of Florida pays a portion of the cost of construction, its representatives may inspect the construction work as they deem necessary. However, such inspection will in no way make the Federal Government or the State of Florida a party to the Contract.

5-10 Final Inspection.

5-10.1 Maintenance until Acceptance: Maintain all Work until the Director has given final acceptance in accordance with 5-11.

5-10.2 Inspection for Acceptance: Upon submittal of written notification that all Contract Work, or all Contract Work on the portion of the Contract scheduled for acceptance, has been completed, the Director will make an inspection for acceptance. The inspection will be made within seven days of such notification. If the Director finds that all work has been satisfactorily completed, the County will consider such inspection as the final inspection. If any or all of the Work is found to be unsatisfactory, the Director will detail the remedial work required to achieve acceptance. Immediately perform such remedial work. Subsequent inspections will be made on the remedial work until the Director accepts all Work.

Upon satisfactory completion of the Work, the County will submit written notice of acceptance, either partial or final, to the Contractor.

Until final acceptance in accordance with 5-11, replace or repair any damage to the accepted Work. Payment of such work will be as provided in 7-14.

5-10.3 Partial Acceptance: At the Director's sole discretion, the Director may accept any portion of the Work under the provisions of 5-10.2.

5-10.4 Conditional Acceptance: The Director will not make, or consider requests for conditional acceptance of a project.

5-11 Final Acceptance.

When, upon completion of the final construction inspection of the entire project, the Director determines that the Contractor has satisfactorily completed the work, the Director will submit written notice of final acceptance to the Contractor.

5-12 Claims by Contractor.

5-12.1 General: When the Contractor deems that extra compensation or a time extension is due beyond that agreed to by the Director, whether due to delay, additional work, altered work, differing site conditions, breach of Contract, or for any other cause, the Contractor shall follow the procedures set forth herein for preservation, presentation and resolution of the claim.

Submission of timely notice of intent to file a claim, preliminary time extension request, time extension request, and the certified written claim, together with full and complete claim documentation, are each a condition precedent to the Contractor bringing any circuit court, arbitration, or other formal claims resolution proceeding against the County for the items and for the sums or time set forth in the Contractor's certified written claim. The failure to provide such notice of intent, preliminary time extension request, time extension request, certified written claim and full and complete claim documentation within the time required shall constitute a full, complete, absolute and irrevocable waiver by the Contractor of any right to additional compensation or a time extension for such claim.

5-12.2 Notice of Claim:

5-12.2.1 Claims For Extra Work: Where the Contractor deems that additional compensation or a time extension is due for work or materials not expressly provided for in the Contract or which is by written directive expressly ordered by the Director pursuant to 4-3, the Contractor shall submit written notification to the Director of the intention to make a claim for additional compensation before beginning the work on which the claim is based, and if seeking a time extension, the Contractor shall also submit a preliminary request for time extension pursuant to 8-7.3.2 within ten calendar days after commencement of a delay and a request for Contract Time

extension pursuant to 8-7.3.2 within thirty calendar days after the elimination of the delay. If such written notification is not submitted and the Director is not afforded the opportunity for keeping strict account of actual labor, material, equipment, and time, the Contractor waives the claim for additional compensation or a time extension. Such notice by the Contractor, and the fact that the Director has kept account of the labor, materials and equipment, and time, shall not in any way be construed as establishing the validity of the claim or method for computing any compensation or time extension for such claim. On projects with an original Contract amount of $3,000,000 or less within 90 calendar days after final acceptance of the project in accordance with 5-11, and on projects with an original Contract amount greater than $3,000,000 within 180 calendar days after final acceptance of the project in accordance with 5-11, the Contractor shall submit full and complete claim documentation as described in 5-12.3 and duly certified pursuant to 5-12.9. However, for any claim or part of a claim that pertains solely to final estimate quantities disputes the Contractor shall submit full and complete claim documentation as described in 5-12.3 and duly certified pursuant to 5-12.9, as to such final estimate claim dispute issues, within 90 or 180 calendar days, respectively, of the Contractor's receipt of the County's final estimate.

If the Contractor fails to submit a certificate of claim as described in 5-12.9, the County will so notify the Contractor in writing. The Contractor shall have ten calendar days from receipt of the notice to resubmit the claim documentation, without change, with a certificate of claim as described in 5-12.9, without regard to whether the resubmission is within the applicable 90 or 180 calendar day deadline for submission of full and complete claim documentation. Failure by the Contractor to comply with the ten-calendar day notice shall constitute a waiver of the claim.

5-12.2.2 Claims For Delay: Where the Contractor deems that additional compensation or a time extension is due on account of delay, differing site conditions, breach of Contract, or any other cause other than for work or materials not expressly provided for in the Contract (Extra Work) or which is by written directive of the Director expressly ordered by the Director pursuant to 4-3, the Contractor shall submit a written notice of intent to the Director within ten days after commencement of a delay to a controlling work item expressly notifying the Director that the Contractor intends to seek additional compensation, and if seeking a time extension, the Contractor shall also submit a preliminary request for time extension pursuant to 8-7.3.2 within ten calendar days after commencement of a delay to a controlling work item, as to such delay and providing a reasonably complete description as to the cause and nature of the delay and the possible impacts to the Contractor's work by such delay, and a request for Contract Time extension pursuant to 8-7.3.2 within thirty calendar days after the elimination of the delay. On projects with an original Contract amount of $3,000,000 or less within 90 calendar days after final acceptance of the project in accordance with 5-11, and on projects with an original Contract amount greater than $3,000,000 within 180 calendar days after final acceptance of the project in accordance with 5-11, the Contractor shall submit full and complete documentation as described in 5-12.3 and duly certified pursuant to 5-12.9.

If the Contractor fails to submit a certificate of claim as described in 5-12.9, the County will so notify the Contractor in writing. The Contractor shall have ten calendar days from receipt of the notice to resubmit the claim documentation, without change, with a certificate of claim as described in 5-12.9, without regard to whether the resubmission is within the applicable 90 or 180 calendar day deadline for submission of full and complete claim documentation. Failure by the Contractor to comply with the ten-calendar day notice shall constitute a waiver of the claim.

There shall be no Contractor entitlement to any monetary compensation or time extension for any delays or delay impacts, whatsoever, that are not to a controlling work item,

and then as to any such delay to a controlling work item entitlement to any monetary compensation or time extension shall only be to the extent such is otherwise provided for expressly under 4-3 or 5-12, except that in the instance of delay to a non-controlling item of work the Contractor may be compensated for the direct costs of idle labor or equipment only, at the rates set forth in 4-3.2.1(1) and (3), and then only to the extent the Contractor could not reasonably mitigate such idleness.

If the Contractor provides the written notice of intent, the preliminary request for time extension, and the request for Contract Time extension in compliance with the aforementioned time and content requirements, the Contractor's claim for delay to a controlling work item will be evaluated as of the date of the elimination of the delay even if the Contractor's performance subsequently overcomes the delay. If the claim for delay has not been settled, the Contractor must also comply with 5-12.3 and 5-12.9 to preserve the claim.

5-12.3 Content of Written Claim: As a condition precedent to the Contractor being entitled to additional compensation or a time extension under the Contract, for any claim, the Contractor shall submit a certified written claim to the County which will include for each individual claim, at a minimum, the following information:

1. A detailed factual statement of the claim providing all necessary dates, locations, and items of work affected and included in each claim;

2. The date or dates on which actions resulting in the claim occurred or conditions resulting in the claim became evident;

3. Identification of all pertinent documents and the substance of any material oral communications relating to such claim and the name of the persons making such material oral communications;

4. Identification of the provisions of the Contract which support the claim and a statement of the reasons why such provisions support the claim, or alternatively, the provisions of the Contract which allegedly have been breached and the actions constituting such breach;

5. A detailed compilation of the amount of additional compensation sought and a breakdown of the amount sought as follows:

a. documented additional job site labor expenses;

b. documented additional cost of materials and supplies;

c. a list of additional equipment costs claimed, including each piece of equipment and the rental rate claimed for each;

d. any other additional direct costs or damages and the documents in support thereof;

e. any additional indirect costs or damages and all documentation in support thereof.

6. A detailed compilation of the specific dates and the exact number of calendar days sought for a time extension, the basis for entitlement to time for each day, all documentation of the delay, and a breakout of the number of days claimed for each identified event, circumstance or occurrence.

Further, the Contractor shall be prohibited from amending either the bases of entitlement or the amount of any compensation or time stated for any and all issues claimed in the Contractor’s written claim submitted hereunder, and any circuit court, arbitration, or other formal claims resolution proceeding shall be limited solely to the bases of entitlement and the amount of any compensation or time stated for any and all issues claimed in the Contractor’s written claim submitted hereunder. This shall not, however, preclude a Contractor from withdrawing or reducing

any of the bases of entitlement and the amount of any compensation or time stated for any and all issues claimed in the Contractor's written claim submitted hereunder at any time.

5-12.4 Action on Claim: The Director will respond in writing on projects with an original Contract amount of $3,000,000 or less within 90 calendar days of receipt of a complete claim submitted by a Contractor in compliance with 5-12.3, and on projects with an original Contract amount greater than $3,000,000 within 120 calendar days of receipt of a complete claim submitted by a Contractor in compliance with 5-12.3. Failure by the Director to respond to a claim in writing within 90 or 120 days, respectively, after receipt of a complete claim submitted by the Contractor in compliance with 5-12.3 constitutes a denial of the claim by the Director. If the Director finds the claim or any part thereof to be valid, such partial or whole claim will be allowed and paid for to the extent deemed valid and any time extension granted, if applicable, as provided in the Contract. No circuit court proceedings on any claim, or a part thereof, may be filed until after final acceptance per 5-11 of all Contract work by the County or denial hereunder, whichever occurs last.

5-12.5 Pre-Settlement and Pre-Judgment Interest: Entitlement to any pre-settlement or pre-judgment interest on any claim amount determined to be valid subsequent to the County's receipt of a certified written claim in full compliance with 5-12.3, whether determined by a settlement or a final ruling in formal proceedings, the County shall pay to the Contractor simple interest calculated at the Prime Rate (as reported by the Wall Street Journal as the base rate on corporate loans posted by at least 75% of the nation's 30 largest banks) as of the 60th calendar day following the County's receipt of a certified written claim in full compliance with 5-12.3, such interest to accrue beginning 60 calendar days following the County's receipt of a certified written claim in full compliance with 5-12.3 and ending on the date of final settlement or formal ruling.

5-12.6 Compensation for Extra Work or Delay:

5-12.6.1 Compensation for Extra Work: Notwithstanding anything to the contrary contained in the Contract Documents, the Contractor shall not be entitled to any compensation beyond that provided for in 4-3.2.

5-12.6.2 Compensation for Delay: Notwithstanding anything to the contrary contained in the Contract Documents, the additional compensation set forth in 5-12.6.2.1 shall be the Contractor's sole monetary remedy for any delay other than to perform extra work caused by the County unless the delay shall have been caused by acts constituting willful or intentional interference by the County with the Contractor's performance of the work and then only where such acts continue after Contractor's written notice to the County of such interference. The parties anticipate that delays may be caused by or arise from any number of events during the term of the Contract, including, but not limited to, work performed, work deleted, supplemental agreements, work orders, disruptions, differing site conditions, utility conflicts, design changes or defects, time extensions, extra work, right-of-way issues, permitting issues, actions of suppliers, subcontractors or other contractors, actions by third parties, suspensions of work by the Director pursuant to 8-6.1, shop drawing approval process delays, expansion of the physical limits of the project to make it functional, weather, weekends, holidays, special events, suspension of Contract Time, or other events, forces or factors sometimes experienced in construction work. Such delays or events and their potential impacts on the performance by the Contractor are specifically contemplated and acknowledged by the parties in entering into this Contract, and shall not be deemed to constitute willful or intentional interference with the Contractor's performance of the work without clear and convincing proof that they were the result of a deliberate act, without reasonable and good-faith basis, and specifically intended to disrupt the Contractor's performance.

5-12.6.2.1 Compensation for Direct Costs, Indirect Costs, Expenses, and Profit thereon, of or from Delay: For any delay claim, the Contractor shall be entitled to monetary compensation for the actual idle labor (including supervisory personnel) and equipment, and indirect costs, expenses, and profit thereon, as provided for in 4-3.2.1(4) and solely for costs incurred beyond what reasonable mitigation thereof the Contractor could have undertaken.

5-12.7 Mandatory Claim Records: After submitting to the Director a notice of intent to file a claim for extra work or delay, the Contractor must keep daily records of all labor, material and equipment costs incurred for operations affected by the extra work or delay. These daily records must identify each operation affected by the extra work or delay and the specific locations where work is affected by the extra work or delay, as nearly as possible. The Director may also keep records of all labor, material and equipment used on the operations affected by the extra work or delay. The Contractor shall, once a notice of intent to claim has been timely filed, and not less than weekly thereafter as long as appropriate, submit the Contractor's daily records to the Director and be likewise entitled to receive the County's daily records. The daily records to be submitted hereunder shall be done at no cost to the recipient.

5-12.8 Claims for Acceleration: The County shall have no liability for any constructive acceleration of the work, nor shall the Contractor have any right to make any claim for constructive acceleration nor include the same as an element of any claim the Contractor may otherwise submit under this Contract. If the Director gives express written direction for the Contractor to accelerate its efforts, such written direction will set forth the prices and other pertinent information and will be reduced to a written Contract Document promptly. No payment will be made on a Supplemental Agreement for acceleration prior to the County's approval of the documents.

5-12.9 Certificate of Claim: When submitting any claim, the Contractor shall certify under oath and in writing, in accordance with the formalities required by Florida law, that the claim is made in good faith, that the supportive data are accurate and complete to the Contractor's best knowledge and belief, and that the amount of the claim accurately reflects what the Contractor in good faith believes to be the County's liability. Such certification must be made by an officer or director of the Contractor with the authority to bind the Contractor.

5-12.10 Non-Recoverable Items: The parties agree that for any claim the County will not have liability for the following items of damages or expense:

1. Loss of profit, incentives or bonuses;
2. Any claim for other than extra work or delay;
3. Consequential damages, including, but not limited to, loss of bonding capacity, loss of bidding opportunities, loss of credit standing, cost of financing, interest paid, loss of other work or insolvency;
4. Acceleration costs and expenses, except where the County has expressly and specifically directed the Contractor in writing "to accelerate at the County's expense"; nor
5. Attorney fees, claims preparation expenses and costs of litigation.

5-12.11 Exclusive Remedies: Notwithstanding any other provision of this Contract, the parties agree that the County shall have no liability to the Contractor for expenses, costs, or items of damages other than those which are specifically identified as payable under 5-12. In the event any legal action for additional compensation, whether on account of delay, acceleration, breach of contract, or otherwise, the Contractor agrees that the County's liability will be limited to those items which are specifically identified as payable in 5-12.

5-12.12 Settlement Discussions: The content of any discussions or meetings held between the County and the Contractor to settle or resolve any claims submitted by the Contractor against

the County shall be inadmissible in any legal, equitable, or administrative proceedings brought by the Contractor against the County for payment of such claim.

5-12.13 Personal Liability of Public Officials: In carrying out any of the provisions of the Contract, Director or any of their respective employees or agents, there shall be no liability on behalf of any employee, officer or official of the County for which such individual is responsible, either personally or as officials or representatives of the County. It is understood that in all such matters such individuals act solely as agents and representatives of the County.

5-12.14 Auditing of Claims: All claims filed against the County shall be subject to audit at any time following the filing of the claim, whether or not such claim is part of a suit pending in the Courts of this State. The audit may be performed, at the County's sole discretion, by employees of the County or by any independent auditor appointed by the County, or both. The audit may begin after ten days written notice to the Contractor, subcontractor, or supplier. The Contractor, subcontractor, or supplier shall make a good faith effort to cooperate with the auditors. As a condition precedent to recovery on any claim, the Contractor, subcontractor, or supplier must retain sufficient records, and provide full and reasonable access to such records, to allow the County's auditors to verify the claim and failure to retain sufficient records of the claim or failure to provide full and reasonable access to such records shall constitute a waiver of that portion of such claim that cannot be verified and shall bar recovery thereunder. Further, and in addition to such audit access, upon the Contractor submitting a written claim, the County shall have the right to request and receive, and the Contractor shall have the affirmative obligation to submit to the County any and all documents in the possession of the Contractor or its subcontractors, materialmen or suppliers as may be deemed relevant by the County in its review of the basis, validity or value of the Contractor's claim.

Without limiting the generality of the foregoing, the Contractor shall upon written request of the County make available to the County's auditors, or upon the County's written request, submit at the County's expense, any or all of the following documents:

1. Daily time sheets and foreman's daily reports and diaries;
2. Insurance, welfare and benefits records;
3. Payroll register;
4. Earnings records;
5. Payroll tax return;
6. Material invoices, purchase orders, and all material and supply acquisition contracts;
7. Material cost distribution worksheet;
8. Equipment records (list of company owned, rented or other equipment used);
9. Vendor rental agreements and subcontractor invoices;
10. Subcontractor payment certificates;
11. Canceled checks for the project, including, payroll and vendors;
12. Job cost report;
13. Job payroll ledger;
14. General ledger, general journal, (if used) and all subsidiary ledgers and journals together with all supporting documentation pertinent to entries made in these ledgers and journals;
15. Cash disbursements journal;

16. Financial statements for all years reflecting the operations on this project;

17. Income tax returns for all years reflecting the operations on this project;

18. All documents which reflect the Contractor's actual profit and overhead during the years this Contract was being performed and for each of the five years prior to the commencement of this Contract;

19. All documents related to the preparation of the Contractor's bid including the final calculations on which the bid was based;

20. All documents which relate to each and every claim together with all documents which support the amount of damages as to each claim;

21. Worksheets used to prepare the claim establishing the cost components for items of the claim including, but not limited to, labor, benefits and insurance, materials, equipment, subcontractors, and all documents that establish which time periods and individuals were involved, and the hours and rates for such individuals.

5-13 Recovery Rights, Subsequent to Final Payment.

The County reserves the right, if it discovers an error in the partial or final estimates, or if it discovers that the Contractor performed defective work or used defective materials, after the final payment has been made, to claim and recover from the Contractor or his surety, or both, by process of law, such sums as may be sufficient to correct the error or make good the defects in the work and materials.

SECTION 6
CONTROL OF MATERIALS

6-1 Acceptance Criteria.

6-1.1 General: Acceptance of materials is based on the following criteria. All requirements may not apply to all materials. Use only materials in the work that meet the requirements of these Specifications. The Director may inspect and test any material, at points of production, distribution and use.

6-1.2 Sampling and Testing: Use the FDOT's current sample identification and tracking system to provide related information and attach the information to each sample. Restore immediately any site from which material has been removed for sampling purposes to the pre-sampled condition with materials and construction methods used in the initial construction, at no additional cost to the County.

Ensure when a material is delivered to the location as described in the Contract Documents, there is enough material delivered to take samples, at no expense to the County.

6-1.2.1 Pretest by Manufacturers: Submit certified manufacturer's test results to the Director for qualification and use on County projects. Testing will be as specified in the Contract Documents. The County may require that manufacturers submit samples of materials for independent verification purposes.

6-1.2.2 Point of Production Test: Test the material during production as specified in the Contract Documents.

6-1.2.3 Point of Distribution Test: Test the material at Distribution facilities as specified in the Contract Documents.

6-1.2.4 Point of Use Test: Test the material immediately following placement as specified in the Specifications. After delivery to the project, the County may require the retesting of materials that have been tested and accepted at the source of supply, or may require the testing of materials that are to be accepted by manufacturer certification. The County may reject all materials that, when retested, do not meet the requirements of these Specifications.

6-1.3 Certification:

6-1.3.1 Manufacturer Material Certification: Submit material certifications for all materials to the Director for approval when required by the Specifications. Materials will not be considered for payment when not accompanied by a material certification. Sample material certification forms are available on FDOT's website at the following URL: https://www.fdot.gov/materials/administration/resources/library/publications/certifications/sampleforms.shtm . Ensure that the material certification follows the format of the sample form, is submitted on the manufacturer's letterhead and is signed by a legally responsible person employed by the manufacturer.

6-1.3.1.1 FDOT Approved Product List: This list provides assurance to Contractors, consultants, designers, and Department personnel that specific products and materials are approved for use on Department facilities. The Department will limit the Contractor's use of products and materials that require use of APL items to those listed on the APL effective at the time of placement. Where the terms Qualified Products List (QPL) appear in the Contract Documents, they will be synonymous with Approved Product List (APL).

Manufacturers seeking to have a product evaluated for the APL must submit an application, available on the Department's website at the following URL:

https://www.fdot.gov/programmanagement/ProductEvaluation/Default.shtm. Applications must include the following documentation:

1. Supporting documentation as required by the Specifications, Standard Plans, and APL approval process. A sample may be requested to verify the product, in accordance with the specifications.

2. A photograph displaying the product as shipped with packaging.

3. A list displaying all components within the shipped packaging, if applicable.

4. Installation instructions and materials, if applicable.

5. Product packaging or product labels as required by the Specifications.

6. Construction material percentages and country source of materials.

7. Last two manufacturing steps and country of manufacture.

8. Manufacturer name and material designation (product name, product model/part number/style number, etc.) must be as identified on the product, product packaging, and product labels.

9.Applications must be signed by a legally responsible person employed by the manufacturer of the product.

Required test reports must be conducted by an independent laboratory or other independent testing facility. Required drawings and calculations must be signed and sealed by a Professional Engineer licensed in the State of Florida.

Products that have successfully completed the Department's evaluation process are eligible for inclusion on the APL. Manufacturers are required to submit requests to the Department for approval of any modifications or alterations made to a product listed on the APL. This includes, but is not limited to, design, raw material, or manufacturing process modifications. Modification or alteration requests must be submitted along with supporting documentation that the product continues to meet Section 6, the Specification, or Standard Plans requirements. A product sample and additional product testing and documentation may be required for the modification evaluation. Any marked variations from original test values, failure to notify the Department of any modifications or alterations, or any evidence of inadequate performance of a product may result in removal of the product from the APL.

Manufacturers must submit supporting documentation to the Department for a periodic review and re-approval of their APL products on or before the product's original approval anniversary. APL products that are not re-approved may be removed from the APL. Documentation requirements for the product review and re-approval, including schedule and criteria, are available on the Department's website at the following URL: https://www.fdot.gov/programmanagement/ProductEvaluation/Default.shtm.

6-1.3.2 Contractor Installation Certification: Submit installation certifications as required by the Contract Documents.

6-2 Applicable Documented Authorities Other Than Specifications.

6-2.1 General: Details on individual materials are identified in various material specific Sections of the Specifications that may refer to other documented authorities for requirements. When specified, meet the requirements as defined in such references.

6-2.2 Test Methods: Methods of sampling and testing materials are in accordance with the Florida Methods (FM). If an FM does not exist for a particular test, perform the testing in accordance with the method specified in the Specification. When test methods or other standards are referenced in the Specifications without identification of the specific time of issuance, use the most current issuance, including interims or addendums thereto, at the time of bid opening.

6-2.3 Construction Aggregates: Aggregates used on County projects must be in accordance with Rule-14-103,-FAC.

6-3 Storage of Materials and Samples.

6-3.1 Method of Storage: Store materials in such a manner as to preserve their quality and fitness for the work, to facilitate prompt inspection, and to minimize noise impacts on sensitive receivers. More detailed specifications concerning the storage of specific materials are prescribed under the applicable Specifications. The County may reject improperly stored materials.

6-3.2 Use of Right-of-Way for Storage: If the Director allows, the Contractor may use a portion of the right-of-way for storage purposes and for placing the Contractor's plant and equipment. Use only the portion of the right-of-way that is outside the clear zone, which is the portion not required for public vehicular or pedestrian travel. When used, restore the right-of-way to pre-construction condition at no additional cost to the County or as specified in the Contract Documents. Provide any additional space required at no expense to the County.

6-3.3 Responsibility for Stored Materials: Accept responsibility for the protection of stored materials. The County is not liable for any loss of materials, by theft or otherwise, or for any damage to the stored materials.

6-3.4 Storage Facilities for Samples: Provide facilities for storage of samples as described in the Contract Documents and warranted by the test methods and Specifications.

6-4 Defective Materials.

Materials not meeting the requirements of these Specifications will be considered defective. The Director will reject all such materials, whether in place or not. Remove all rejected material immediately from the site of the work and from storage areas, at no expense to the County.

Do not use material that has been rejected, until the Director has approved the material's use. Upon failure to comply promptly with any order of the Director made under the provisions of this Article, the Director has the authority to have the defective material removed and replaced by other forces and deduct the cost of removal and replacement from any moneys due or to become due the Contractor.

6-4.1 Engineering Analysis: As an exception to the above, within 30 calendar days of the termination of the LOT or rejection of the material, the Contractor may submit to the Director a proposed Engineering Analysis Scope to determine the disposition of the material. The Engineering Analysis Scope must contain at a minimum:

1. Description of the defective materials.
2. Supporting information, testing or inspection reports with nonconformities, pictures, drawings, and accurately dimensioned deficiency maps as necessary. For cracked elements, provide drawings showing the location, average width, depth, length, and termination points of each crack along the surfaces. Provide the distance from each termination point to a fixed reference point on the component, such as beam end or edge of flange.
3. Proposed approach of investigation and analysis.
4. Name and credentials of the proposed Specialty Engineer or Contractor's Engineer of Record who will perform the engineering analysis.

5. Proposed testing laboratories, qualified in accordance with Section 105-7.

Upon approval of the Engineering Analysis Scope by the Director, the Specialty Engineer or Contractor's Engineer of Record may perform the engineering analysis as defined in the approved scope and submit a signed and sealed Engineering Analysis Report (EAR) to the Director. The EAR must contain at a minimum:

1. The approved Engineering Analysis Scope.
2. Any investigations performed and the associated results obtained.
3. Analysis and conclusion.
4. Proposed disposition of the material, addressing the performance and durability of the proposed action.

Provide as appropriate:

1. Written evidence of a previously approved comparable deficiency and its repair.
2. Documented research demonstrating the effectiveness of the proposed repair.
3. Engineering calculations.

A Specialty Engineer, who is an independent consultant, or the Contractor's Engineer of Record as stated within each individual Section shall perform any such analysis within 45 calendar days of the Director's approval of the Engineering Analysis Scope, complete and submit the EAR. The EAR must be signed and sealed by the Specialty Engineer or the Contractor's Engineer of Record that performed the engineering analysis. Allow for a 45 calendar day review period for all EARs associated with a category 2 bridge; tolling components identified in the current FDOT General Tolling Requirements (GTR) Part 3; and the tolling-related signing, DMS and ITS infrastructure. Allow for a 25 calendar day review period for all other items. The Director will determine the final disposition of the material after review of the EAR. No additional monetary compensation or time extension will be granted for the impact of any such analysis or review.

6-5 Products and Source of Supply.

6-5.1 Source of Supply–Convict Labor (Designated Federal-Aid Contracts Only): Do not use materials that were produced after July 1, 1991, by convict labor for Federal-aid highway construction projects unless the prison facility has been producing convict-made materials for Federal-aid highway construction projects before July 1, 1987.

Use materials that were produced prior to July 2, 1991, by convicts on Federal-aid highway construction projects free from the restrictions placed on the use of these materials by 23 U.S.C. 114. The County will limit the use of materials produced by convict labor for use in Federal-aid highway construction projects to:

1. Materials produced by convicts on parole, supervised release, or probation from a prison or,
2. Materials produced in a qualified prison facility.

The amount of such materials produced for Federal-aid highway construction during any 12-month period shall not exceed the amount produced in such facility for use in such construction during the 12-month period ending July 1, 1987.

6-5.2 Source of Supply (Designated State or Federal-Aid Contracts Only): Comply with Section 70914 of Public Law No. 117-58, §§ 70901-52, also known as the Infrastructure

Investment and Jobs Act (IIJA), Public Law 117-58, which includes the Build America, Buy America Act (BABA). Domestic compliance for all affected products will be listed on the APL.

6-5.2.1 Steel and Iron: Use steel and iron manufactured in the United States, in accordance with the Buy America provisions of 23 CFR 635.410, as amended. Ensure that all manufacturing processes for this material occur in the United States. As used in this specification, a manufacturing process is any process that modifies the chemical content, physical shape or size, or final finish of a product, beginning with the initial melting and continuing through the final shaping and coating. If a steel or iron product is taken outside the United States for any manufacturing process, it becomes foreign source material. When using steel or iron materials as a component of any manufactured product (e.g., concrete pipe, prestressed beams, corrugated steel pipe, etc.), these same provisions apply. Foreign steel and iron may be used when the total actual cost of such foreign materials does not exceed 0.1% of the total Contract amount or $2,500, whichever is greater. These requirements are applicable to all steel and iron materials incorporated into the finished work but are not applicable to steel and iron items that the Contractor uses but does not incorporate into the finished work. Submit a certification from the manufacturer of steel or iron, or any product containing steel or iron, stating that all steel or iron furnished or incorporated into the furnished product was produced and manufactured in the United States or a statement that the product was produced within the United States except for minimal quantities of foreign steel and iron valued at $ (actual cost). Submit each such certification to the Director prior to incorporating the material or product into the project. Prior to the use of foreign steel or iron materials on a project, submit invoices to document the actual cost of such material, and obtain the Director's written approval prior to incorporating the material into the project.

6-5.2.2 Manufactured Products: Use Manufactured Products that are consumed in, incorporated into, or affixed to an infrastructure project that are manufactured in the United States, in accordance with BABA requirements and applicable waivers.

6-5.2.3 Construction Materials: Use non-ferrous metals, plastic and polymer-based products, glass, lumber, and drywall articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project that are manufactured in the United States, in accordance with BABA requirements.

6-5.2.4 Exemptions to Build America, Buy America: Temporary devices, equipment, and other items removed at or before the completion of the project are exempt from BABA funding eligibility requirements. Aggregates, cementitious materials, and aggregate binding agents or additives are exempted from BABA funding eligibility requirements.

6-5.3 Contaminated, Unfit, Hazardous, and Dangerous Materials: Do not use any material that, after approval and/or placement, has in any way become unfit for use. Do not use materials containing any substance that has been determined to be hazardous by the State of Florida County of Environmental Protection or the U.S. Environmental Protection Agency (EPA). Provide workplaces free from serious recognized hazards and to comply with occupational safety and health standards, as determined by the U.S. County of Labor Occupational Safety and Health Administration (OSHA).

SECTION 7
LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC

7-1 Laws to be Observed.

7-1.1 General: Become familiar with and comply with all Laws and Regulations, including all Federal, State, and Local Rules and Regulations that control the action or operation of those engaged or employed in the work or that affect material used. Pay particular attention called to the safety regulations promulgated by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). In addition, comply with Chapter 403, of the Florida Statutes, regarding control of air pollution. Direct special attention to that portion of Chapter 62-256, Rules of the Department of Environmental Protection, Florida Administrative Code, pertaining to open burning in land clearing operations. Where work or structures included in the Contract are in "Navigable Waters of the U.S.," (reference 33 of the Code of Federal Regulations, Part 329); "Waters of the U.S.," (reference 33 of the Code of Federal Regulations, Parts 323 and 328); or "Waters of the State," (reference Part 4, Chapters 253 and 373 of the Florida Statutes and Section 62-340 of the Florida Administrative Code); comply with the regulatory provisions of Section 404 of the Federal Clean Water Act of 1977; Sections 9 and 10 of the Federal River and Harbor Act of 1899; Chapter 161 of the Florida Statutes; and any local authority having jurisdiction over such waters.

Obtain certification from the Construction Industry Licensing Board as required by Part I, Chapter 489, of the Florida Statutes, regardless of exemptions allowed by subsection 489.103, prior to removing underground pollutant storage tanks. Dispose of tanks and pollutants in accordance with the requirements and regulations of any Federal, State, or local, agency having jurisdiction.

Prior to building construction or renovation, submit current registrations or certifications issued by the Florida Construction Industry Licensing Board in accordance with Chapter 489, for the appropriate category of construction.

Corporations must be registered with the State of Florida, Department of State, Division of Corporations, and hold a current State Corporate Charter Number in accordance with Chapter 607, Florida Statutes.

The Contractor or the authorized subcontractor applying the roofing material must be licensed or be an approved dealer and applicator of the proposed roofing material.

Indemnify, defend, and save harmless the County and all of its officers, agents, and employees, in the amount of the Contract price, against all claims or liability arising from or based on the violation of any such Federal, State, and Local Rules and Regulations, whether by himself or his employees.

The Contractor shall comply with all environmental permits, including measures identified in the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan and Sediment and Erosion Control Plan for the work. The Contractor's attention is also directed to the applicable regulations of the South Florida Water Management District.

The Lee County Noise Control Ordinance is in effect regulating noise generated from construction activity associated with the project. The Contractor shall comply with the requirements therein.

The Contractor shall exert every reasonable and diligent effort to ensure that all labor employed by the Contractor and his subcontractors for work on the project work

harmoniously and compatibly with all labor used by other building and construction contractors now or hereafter on the site of the work covered by this Contract. Include this provision in all subcontracts, and require all subcontractors to include it in their subcontracts with others. However, do not interpret or enforce this provision so as to deny or abridge, on account of membership or non-membership in any labor union or labor organization, the right of any person to work as guaranteed by Article I, Section 6 of the Florida Constitution.

Comply with Chapter 556 of the Florida Statutes during the performance of excavation or demolition operations.

The Executive Order 11246 Electronic version, dated September 24, 1965 is posted on FDOT's website at the following URL address:
https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/deo112468a91904c88e94148b94569982fdff3d2.pdf?sfvrsn=6b78d1d6_2
Take responsibility to obtain the information posted on this website up through five calendar days before the opening of bids and comply with the provisions contained in Executive Order 11246.

If the FDOT's website cannot be accessed, contact the FDOT's Specifications Office Web Coordinator at (850) 414-4101.

7-1.2 Plant Quarantine Regulations: The U.S. Department of Agriculture and the Florida Department of Agriculture and Consumer Services have issued quarantine regulations pertaining to control of the nematodes of citrus, Rule 5B-44, Florida Administrative Code, and other plant pests. Contact the local (or other available) representatives of the Animal and Plant Health Inspection Service of the U.S. Department of Agriculture, and the Division of Plant Industry of the Florida Department of Agriculture and Consumer Services to ascertain all current restrictions regarding plant pests that are imposed by these agencies. Keep advised of current quarantine boundary lines throughout the construction period.

These restrictions may affect operations in connection with such items as clearing and grubbing, earthwork, grassing and mulching, sodding, landscaping, and other items which might involve the movement of materials containing plant pests across quarantine lines.

Obtain quarantine regulations and related information from the following:

Animal and Plant Health Inspection Service
U.S. Department of Agriculture
3029 Lake Alfred Road
Winter Haven, Florida 33881

Director, Division of Plant Industry
Florida Department of Agriculture and Consumer Services
Post Office Box 147100
Gainesville, Florida 32614-7100

7-1.3 Introduction or Release of Prohibited Aquatic Plants, Plant Pests, or Noxious Weeds: Do not introduce or release prohibited aquatic plants, plant pests, or noxious weeds into the project limits as a result of clearing and grubbing, earthwork, grassing and mulching, sodding, landscaping, or other such activities. Immediately notify the Director upon discovery of all prohibited aquatic plants, plant pests, or noxious weeds within the project limits. Do not move prohibited aquatic plants, plant pests, or noxious weeds within the project limits or to locations outside of the project limits without the Director's permission. Maintain all borrow material

brought onto the project site free of prohibited aquatic plants, plant pests, noxious weeds, and their reproductive parts. Refer to Rule 16C-52 and Rule 5B-57, of the Florida Administrative Code for the definition of prohibited aquatic plants, plant pests, and noxious weeds.

7-1.4 Compliance with Federal Endangered Species Act and other Wildlife Regulations: The Federal Endangered Species Act requires that the County investigate the potential impact to a threatened or endangered species prior to initiating an activity performed in conjunction with a road construction project. If the County's investigation determines that there is a potential impact to a protected, threatened or an endangered species, the County will conduct an evaluation to determine what measures may be necessary to mitigate such impact. When mitigation measures and/or special conditions are necessary, these measures and conditions will be addressed in the Contract Documents or in permits as identified in 7-2.1.

In addition, in cases where certain protected, threatened or endangered species are found or appear within close proximity to the project boundaries, the County has established guidelines that will apply when interaction with certain species occurs, absent of any special mitigation measures or permit conditions otherwise identified for the project.

These guidelines are posted at the following URL address: https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/endangeredwildlifeguidelines.pdf?sfvrsn=e27baf3f_4.

Take responsibility to obtain this information and take all actions and precautions necessary to comply with the conditions of these guidelines during all project activities.

Prior to establishing any off-project activity in conjunction with a project, notify the Director of the proposed activity. Covered activities include but are not necessarily limited to borrow pits, concrete or asphalt plant sites, disposal sites, field offices, and material or equipment storage sites. Include in the notification the Project Number, Financial Project ID, a description of the activity, the location of the site by township, range, section, county, and city, a site location map including the access route, the name of the property owner, and a person to contact to arrange a site inspection. Submit this notification at least 30 days in advance of planned commencement of the off-site activity, to allow for the County to conduct an investigation without delaying job progress.

Do not perform any off-project activity without obtaining written clearance from the Director. In the event the County's investigation determines a potential impact to a protected, threatened or endangered species and mitigation measures or permits are necessary, coordinate with the appropriate resource agencies for clearance, obtain permits and perform mitigation measures as necessary. Immediately notify the Director in writing of the results of this coordination with the appropriate resource agencies. Additional compensation or time will not be allowed for permitting or mitigation, associated with Contractor initiated off-project activities. The Contractor shall maintain at the jobsite written proof of authorization for the use of any off-project property in conjunction with the project. All off-project properties shall be maintained in a neat and orderly fashion and then restored to the property owner's satisfaction upon terminating the use associated with the project.

7-1.5 Occupational Safety and Health Requirements: The Contractor shall take all precautions necessary for the protection of life, health, and general occupational welfare of all persons, including employees of both the Contractor and the County, until the Contractor has completed the work required under the Contract as provided in 5-10 and 5-11.

Comply at all times with applicable Federal, State, and local laws, provisions, and policies governing safety and health, including 29 CFR 1926, including all subsequent revisions and updates.

7-1.6 Discovery of an Unmarked Human Burial: When an unmarked human burial is discovered, immediately cease all activity that may disturb the unmarked human burial and notify the Director. Do not resume activity until specifically authorized by the Director.

7-1.7 Insecticides, Herbicides and Fertilizers:

7-1.7.1 Insecticides and Herbicides: Use products found on the following website, http://state.ceris.purdue.edu/, approved by the Florida Department of Agriculture and Consumer Services. The use of restricted products is prohibited. Do not use any products in the sulfonylurea family of chemicals. Herbicide application by broadcast spraying is not allowed.

Procure any necessary licenses, pay all charges and fees, and give all notices necessary for lawful performance of the work.

Ensure that all insecticides and herbicides are applied in accordance with Chapter 5E-9, Florida Administrative Code. Submit a copy of current certificates to the Director upon request.

Ensure that employees who work with herbicides comply with all applicable Federal, State, and local regulations.

Comply with all regulations and permits issued by any regulatory agency within whose jurisdiction work is being performed. Post all permit placards in a protected, conspicuous location at the work site.

Acquire any permits required for work performed on the rights-of-way within the jurisdiction of National Forests in Florida. Contact the Local National Forest Ranger District, or the United States Department of Agriculture (USDA) office for the proper permits and subsequent approval.

Acquire all permits required for aquatic plant control as outlined in Chapter 62C-20, Florida Administrative Code, Rules of the Florida Department of Environmental Protection. Contact the Regional Field Office of Bureau of Invasive Plant Management of the Florida Department of Environmental Protection for proper permits and subsequent approval. If application of synthetic organo-auxin herbicides is necessary, meet the requirements of Chapter 5E-2, Florida Administrative Code.

7-1.7.2 Fertilizer: Ensure that all employees applying fertilizer, possess a current Florida Department of Agriculture and Consumer Services Commercial Applicator license in accordance with Section 482.1562, F.S. Upon request, submit the current certificates to the Director.

7-1.8 Compliance with Section 4(f) of the USDOT Act (Designated State or Federal-Aid Contracts Only): Section 4(f) of the USDOT Act prohibits the U. S. Secretary of Transportation from approving a project which requires the use of publicly owned land of a public park, recreation area or a wildlife and waterfowl refuge, or of any historic site of national, state, or local significance unless there is no prudent or feasible alternative to using that land and the program or project includes all possible planning to minimize the harm to the site resulting from the use.

Before undertaking any off-project activity associated with any federally assisted undertaking, ensure that the proposed site does not represent a public park, recreation area, wildlife or waterfowl refuge, or a historic site (according to the results of the Cultural Resources Survey discussed in 120-6.2). If such a site is proposed, notify the Director and provide a description of

the proposed off-site activity, Project Number, Financial Project ID, the location of the site by township, range, section, a county or city map showing the site location, including the access route and the name of the property. It is the Contractor's responsibility to submit justification for use of Section 4(f) property that is sufficient for the County, the Florida Department of Transportation and the Federal Highway Administration to make a Section 4(f) determination. Submit this notification sufficiently in advance of planned commencement of the off-site activity to allow a reasonable time for the Director to conduct an investigation without delaying job progress. Do not begin any off-project activity without obtaining written clearance from the Director.

7-1.9 Reserved.

7-2 Permits and Licenses.

7-2.1 General: Pursuant to Section 218.80, Florida Statutes, the County will pay for all County permits and fees, including license fees, permit fees, impact fees or inspection fees applicable to the Work. Contractor is not responsible for paying for permits issued by the County wherein the Work is to be performed, but is responsible for acquiring all other permits. The County may require the Contractor to deliver internal budget transfer documents to applicable County agencies when the Contractor is acquiring permits. Except for permits procured by the County, as incorporated by Special Provision expanding this Subarticle, if any, the Contractor will procure all permits and licenses, pay all charges and fees, and give all notices necessary and incidental to the due and lawful prosecution of the work.

The County will also acquire any modifications or revisions to an original permit incorporated by Special Provision to this Subarticle when the Contractor requires such modifications or revisions to complete the construction operations specified in the Plans or Special Provisions and within the right-of-way limits.

Acquire all permits for work performed outside the right-of-way or easements for the project.

In carrying out the work in the Contract, when under the jurisdiction of any environmental regulatory agency, comply with all regulations issued by such agencies and with all general, special, and particular conditions relating to construction activities of all permits issued to the County as though such conditions were issued to the Contractor. Post all permit placards in a protected location at the worksite.

The Contractor shall be fully responsible for the execution and adherence to all directives, instructions, conditions, special conditions, and limiting conditions contained in permits specifically issued for the Work and which pertain to or affect the construction phase of this project, and shall be solely responsible for issuance of any Notices required thereby.

In case of a discrepancy between any permit condition and other Contract Documents, the more stringent condition shall prevail.

7-2.2 Work or Structures in Navigable Waters of the U.S., Waters of the U.S., and Waters of the State: In general, one or more governmental agencies will exercise regulatory authority over work or structures, including related construction operations, in all tidal areas (channelward of the mean high water lines on the Atlantic and Gulf Coast); in the ocean and gulf waters to the outer limits of the continental shelf; in all rivers, streams, and lakes to the ordinary high water line; in marshes and shallows that are periodically inundated and normally characterized by aquatic vegetation capable of growth and reproduction; in all artificially created channels and canals used for recreational, navigational, or other purposes that are connected to navigable waters; and in all tributaries of navigable waters up to their headwaters.

Whenever the work under or incidental to the Contract requires structures or dredge/fill/construction activities in "Navigable Waters of the U.S.," "Waters of the U.S.," and "Waters of the State," the Federal, State, county, and local regulatory agencies may require the County to obtain a permit. For such dredge/fill /construction specified in the Plans to be accomplished within the limits of the project, or for any dredge/fill/construction within the limits of County-furnished borrow areas, the County will procure the necessary permits prior to advertising for bids.

7-2.3 Reserved.

7-3 Patented Devices, Materials and Processes.

Include all royalties and costs arising from patents, trademarks, and copyrights, in any way involved in the work in the Contract price. Whenever using any design, device, material, or process covered by letters patent or copyright, obtain the right for such use by suitable legal agreement with the patentee or owner of the copyright. File a copy of such agreement with the Director. However, whether or not such agreement is made or filed as noted, the Contractor and the surety in all cases shall indemnify, defend, and save harmless, the County from all claims for infringement by reason of the use of any such patented design, device, material, or process on work under the Contract, and shall indemnify the County for all costs, expenses, and damages that it may be obliged to pay by reason of any such infringement, at any time during the prosecution or after the completion of the work.

7-4 Right-of-Way Furnished by the County.

Except as otherwise stipulated in these Specifications or as shown in the Plans, the County will furnish all rights-of-way necessary for the proper completion of the work at no expense to the Contractor.

Should County-furnished areas for obtaining borrow material, contain limerock material do not remove such material from the pit unless the Director gives specific approval.

Use of County owned right-of-way for the purpose of equipment or material storage, lay-down facilities, pre-cast material fabrication sites, batch plants for the production of asphalt, concrete or other construction related materials, or other similar activities, shall require advance written approval by the County prior to making use of said County owned right of way. Use of County owned right of way for these purposes is expressly limited to the storage of equipment and materials for the Project or production of materials or products for the Project. As a precedence to Final Acceptance of the project, any County owned right-of-way used by the Contractor shall be restored to the condition existing prior to construction, or as otherwise approved by the Director.

The County reserves the right to allow parties other than the Contractor, upon presentation of a duly authorized and satisfactory Lee County Department of Transportation Right-of-Way Permit, to perform work within the limits of construction. In all such instances, the Contractor will afford parties bearing such permits reasonable accommodation for the proper execution of the work described under the permit, including the right to store materials and equipment. All parties authorized to perform work within the right-of-way shall make, in an acceptable manner, all necessary repairs due to such work ordered by the Director and shall be subject to the conditions specified in Section 11-12 of the Lee County Administrative Code, as amended.

7-5 Reserved.

7-6 Sanitary Provisions.

The Contractor shall provide and maintain, in a neat and sanitary condition, such accommodations for the use of his employees as are necessary to comply with the requirements and regulations of the State and local boards of health. Commit no public nuisance.

7-7 Control of the Contractor's Equipment.

7-7.1 Traffic Interference: Do not allow equipment, while it is on or traversing a road or street, to unreasonably interfere with traffic.

7-7.2 Overloaded Equipment: Do not operate on any road, street or bridge including a County owned temporary bridge, any hauling unit or equipment loaded in excess of:

1. the maximum weights specified in the Florida Highway Patrol, Commercial Motor Vehicle Manual (Trucking Manual), or

2. lower weight limits legally established and posted for any section of road or bridge by FDOT, the County or other local authorities.

The governmental unit having jurisdiction over a particular road or bridge may provide exceptions by special permit under the provisions of 7-7.3.

This restriction applies to all roads and bridges inside and outside the Contract limits as long as these roads and bridges are open for public use. The Contractor may overload roads and bridges which are to be demolished after they are permanently closed to the public. The Contractor is responsible for all loss or damages resulting from equipment operated on a structure permanently closed to the public.

7-7.3 Crossings: Where it is necessary to cross an existing road or street, including specifically the existing traveled lanes of a divided highway within the limits of the project, obtain permits from the County, for crossing overloaded or oversized equipment. Cross existing roads or streets only at Director-designated points. The Director may require the Contractor to protect the pavement or Roadway at the crossing by using lumber, planks, or fill. Provide flagging and watchman service, or approved signal devices, for the protection of traffic at all such crossings, in accordance with an approved written plan for that activity. Movement of equipment around the project site must be in accordance with requirements of the Standard Plans and not create an undue hazard to the traveling public or workers.

7-7.4 Protection from Damage by Tractor-Type Equipment: Take positive measures to ensure that tractor-type equipment does not damage the road. If any such damage should occur, repair it without delay, at no expense to the County and subject to the Director's approval.

7-7.5 Contractor's Equipment on Bridge Structures: The Contractor's Engineer of Record shall analyze the effect of imposed loads on bridge structures, including County owned temporary bridges, within the limits of a construction contract, resulting from the following operations:

1. Overloaded Equipment as defined in 7-7.2:
    a. Operating on or crossing over completed bridge structures.
    b. Operating on or crossing over partially completed bridge structures.
2. Equipment within legal load limits:
    a. Operating on or crossing over partially completed bridge structures.
3. Construction cranes:
    a. Operating on completed bridge structures.
    b. Operating on partially completed bridge structures.

4. Asphalt Milling Equipment:

a. In excess of 90,000 lbs crossing bridge structures.

b. Less than 90,000 lbs crossing bridge structures listed on the overweight routing map CRN-2 located on the Office of Maintenance Over-Weight Dimension Permits website at https://www.fdot.gov/maintenance/owod-permit-documents#BlanketAttachments.

Any pipe culvert(s) or box culvert(s) qualifying as a bridge under 1-3 is excluded from the requirements above.

A completed bridge structure is a bridge structure in which all elemental components comprising the load carrying assembly have been completed, assembled, and connected in their final position. The components to be considered shall also include any related members transferring load to any bridge structure.

The Contractor's Engineer of Record shall determine the effect that equipment loads have on the bridge structure and develop the procedures for using the loaded equipment without exceeding the structure's design load capacity.

Submit to the County for approval the design calculations, layout drawings, and erection drawings showing how the equipment is to be used so that the bridge structure will not be overstressed. The Contractor's Engineer of Record shall sign and seal the drawings and the cover sheet of the calculations for the County's Record Set.

7-7.6 Posting of the Legal Gross Vehicular Weight: Display the maximum legal gross weight, as specified in the Florida Uniform Traffic Code, in a permanent manner on each side of any dump truck or dump type tractor-trailer unit hauling embankment material, construction aggregates, road base material, or hot bituminous mixture to the project over any public road or street. Display the weight in a location clearly visible to the scale operator, in numbers that contrast in color with the background and that are readily visible and readable from a distance of 50 feet.

7-8 Structures over Navigable Waters.

7-8.1 Compliance with Federal and Other Regulations: When working on structures in, adjacent to, or over, navigable waters, observe all regulations and instructions of Federal and other authorities having control over such waters. Do not obstruct navigation channels without permission from the proper authority, and provide and maintain navigation lights and signals in accordance with the Federal requirements for the protection of the structure, of false work, and of navigation.

When working on moveable bridges, requests for temporarily changing the operating requirements for the moveable bridge must be submitted in writing to the appropriate Coast Guard District Bridge Branch, 90 days before the start of any action.

For all other bridges, notify the appropriate Coast Guard District Bridge Branch, at least 60 days prior to the start of any operations including construction and 30 days prior to any channel operations, closures, or opening restrictions.

When work platforms are indicated in the permit for construction, submit work platform construction plans to the appropriate Coast Guard District for approval. Obtain approval prior to beginning construction on the platform.

7-8.2 Maintenance of Channel: Where the work includes the excavation of a channel or other underwater areas to a required section, maintain the section from shoaling or other encroachment until final acceptance of the project.

In the event of accidental blocking of the navigation channel, immediately notify the U.S. Coast Guard of the blockage and upon removal of the blockage.

7-9 Use of Explosives.

When using explosives for the prosecution of the work, exercise the utmost care not to endanger life or property, including new work. The Contractor is responsible for all damage resulting from the use of explosives. Any use of explosives shall be subject to the prior written authorization of the Director.

Store all explosives in a secure manner in compliance with all laws and ordinances, and clearly mark all such storage places with the words: "DANGEROUS - EXPLOSIVES". Place such storage in the care of a competent watchman. Where no local laws or ordinances apply, provide storage satisfactory to the Director and, in general, not closer than 1,000 feet from the road or from any building, camping area, or place of human occupancy.

Notify each public utility company having structures in proximity to the site of the work of the intention to use explosives. Give such notice sufficiently in advance to enable the companies to take precautionary steps to protect their property from injury.

7-10 Forest Protection.

7-10.1 Compliance with State and Federal Regulations: In carrying out work within or adjacent to State or National forests or parks, comply with all of the regulations of the State or Federal authority having jurisdiction, governing the protection of and the carrying out of work in forests or parks, and observe all sanitary laws and regulations with respect to the performance of work in these areas. Keep the areas in an orderly condition, dispose of all refuse, and obtain permits for the construction, installation, and maintenance of any construction camps, living quarters, stores, warehouses, sanitary facilities, and other structures; all in accordance with the requirements of the forest or park official.

7-10.2 Prevention and Suppression of Forest Fires: Take all reasonable precautions to prevent and suppress forest fires. Require employees and subcontractors, both independently and at the request of forest officials, to do all reasonably within their power to prevent and suppress forest fires. Assist in preventing and suppressing forest fires, and make every possible effort to notify a forest official at the earliest possible moment of the location and extent of all fires. Extinguish the fire if practicable.

7-11 Preservation of Existing Property.

7-11.1 General: Preserve from damage all existing property within the project limits of or in any way affected by the Work, the removal or destruction of which is not specified in the Plans. This applies to, but is not limited to, public and private property, public and private utilities (except as modified by the provisions of 7-11.5), trees, shrubs, crops, sod, signs, monuments, fences, guardrail, pipe and underground structures, Intelligent Transportation Systems (ITS) facilities, traffic control signals and devices, highway lighting, and public highways (except natural wear and tear of highway resulting from legitimate use thereof by the Contractor).

County owned underground facility locations shown in the Plans are approximate. Unless otherwise shown in the Plans, County owned underground facilities will not be located by the County nor through notification to "Sunshine 811". Locate all fiber optic cables. Provide a fiber optic cable locator in accordance with Section 633.

Whenever the Contractor's activities damage such existing property, immediately restore it to a condition equal to or better than that existing at the time such damage occurred, at no expense to the County. Temporary repairs may be used to immediately restore ITS facilities and traffic control signals and devices. Permanent repairs to ITS facilities and traffic control signals and devices shall be made within 90 days of any temporary repairs and prior to final

acceptance of the project. Submit permanent ITS facility repair plans to the Director prior to beginning repair work.

Protect existing bridges during the entire construction period from damage caused by the Work. Immediately repair, at no expense to the County, all damage to existing bridges caused by the Work, prior to continuing the Work. The County will not require the Contractor to provide routine repairs or maintenance for such structures.

Direct special attention to the protection of all geodetic monuments, horizontal or vertical, and Public Land Survey Corners located within the project. If any geodetic monument or Public Land Survey Corner, located within the project, is at risk of being damaged or destroyed, immediately notify the Director. Locate and replace any damaged or destroyed geodetic monuments or Public Land Survey Corners under the direction of a Professional Surveyor and Mapper registered in the State of Florida.

Whenever the actions of a third party damage such existing property and is not otherwise due to any fault or activities of the Contractor, either restore it to a condition equal to or better than that existing at the time such damage occurred or provide access and coordinate with the County's maintenance Contractor in accordance with 8-4.4 as directed by the Director. The County will compensate the Contractor for the costs associated with the repairs for restoring the existing property in accordance with 4-4. Theft and vandalism are considered damage caused by a third party.

7-11.2 Failure to Restore Damaged Existing Property: In case of failure on the part of the Contractor to restore such property, bridge, road or street, or to make good such damage or injury, the Director may, upon 48 hours notice, proceed to repair, rebuild, or otherwise restore such property, road, or street as may be deemed necessary, and the County will deduct the cost thereof from any monies due or which may become due the Contractor under the Contract. Nothing in this clause prevents the Contractor from receiving proper compensation for the removal, damage, or replacement of any public or private property, not shown in the Plans, that is made necessary by alteration of grade or alignment. The Director will authorize such work, provided that the Contractor, or his employees or agents, have not, through their own fault, damaged such property.

7-11.3 Contractor's Use of Streets and Roads:

7-11.3.1 Street and Road System: When hauling materials or equipment to the project over roads and bridges on the State Highway System, State park road system, county road system, or city street system, and such use causes damage, immediately, at no expense to the County, repair such road or bridge to as good a condition as before the hauling began.

The County may modify the above requirement in accordance with any agreement the Contractor might make with the governmental unit having jurisdiction over a particular road or bridge, provided that the Contractor submits written evidence of such agreement to the Director.

7-11.3.2 Reserved.

7-11.3.3 Within the Limits of a Construction Project: The County will not allow the operation of equipment or hauling units of such weight as to cause damage to previously constructed elements of the project, including but not necessarily limited to bridges, drainage structures, base course, and pavement. Do not operate hauling units or equipment loaded in excess of the maximum weights specified in 7-7.2 on existing pavements that are to remain in place (including pavement being resurfaced), cement-treated subgrades and bases, concrete pavement, any course of asphalt pavement, and bridges. The Director may allow exceptions to these weight

restrictions for movement of necessary equipment to and from its worksite, for hauling of offsite fabricated components to be incorporated into the project, and for crossings as specified in 7-7.3.

7-11.4 Operations within Railroad Right-of-Way: Submit written advanced notification of the flagging services and railroad right-of-way access required, construction timeframe, and duration to the Engineer and District Rail Office at least 45 calendar days prior to beginning any operation within the limits of the railroad right-of-way or the adjoining 15 feet. Operations include the movement of employees, equipment, and trucks in areas other than public crossings or any traffic signal work within 500 feet of a signalized at-grade railroad crossing. The Railroad Company will notify the District Rail Office when flaggers are available for use in project scheduling.

No operations shall be conducted that affect railroad operations and property without written approval from the railroad.

7-11.4.1 Notification to the Railroad Company: Submit written notification to the Engineer, District Rail Office and the authorized Railroad Representative at least 72 hours before beginning any operation within the limits of the railroad right-of-way; any operation requiring movement of employees, trucks, or other equipment across the tracks of the railroad company at locations other than an established public crossing; and any other work that may affect railroad operations or property.

7-11.4.1.1 Florida East Coast Railway (FEC): Contact the FEC Signal Office at 904-279-3182 and FEC Railway at 1-800-342-1131, ext. 2377 in addition to the requirements in Section 7-11.4.1.

7-11.4.2 Contractor's Responsibilities: Unless instructed otherwise in writing by the Railroad Company, do not perform work within or adjacent to the railroad right-of-way without a flagger present (including temporary lane closures, lane shifts or detours). Comply with requirements deemed necessary by the railroad company's authorized representative to safeguard the railroad's property and operations.

The Contractor is responsible for all damages, delays, or injuries and all suits, actions, or claims brought on account of damages or injuries resulting from the Contractor's operations within or adjacent to railroad company right-of-way. The work includes all items necessary to relieve the flagger from providing protective services.

Costs incurred by the Railroad Company for Contractor-caused delays that adversely impact railway operations will be forwarded to the Contractor for payment. If the Contractor fails to pay said cost, the Department will deduct the amount from payments owed to the Contractor.

7-11.4.2.1 CSXT: Comply with the Construction Submission Criteria of the CSXT Public Project Information document and Construction Requirements sections of the CSXT Pipeline and Wireline Design and Construction Specifications prior to beginning work. These documents are available at the following URL:
https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/CSXT.shtm .

Perform no work within the limits of the railroad right-of-way on CSXT holidays (except with permission of CSXT for emergencies such as natural disasters). CSXT holidays are New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and the following Friday, Christmas Eve, Christmas Day, and New Year's Eve. Holidays falling on Saturday are observed on Friday and those falling on Sunday are observed on Monday.

7-11.4.2.2 Norfolk Southern (NS): Comply with the NS Special Provisions for Protection of Railway Interests (Appendix E) and the Construction Requirements (Appendix 4.3) of the NS Public Projects Manual document prior to beginning and during all work. These documents are available at the following URL: http://www.nscorp.com/content/dam/nscorp/ship/shipping-tools/Public_Projects_Manual.pdf.

7-11.4.2.3 FEC: Complete the On-Track Contractor Roadway Worker Training Course for FEC Railway. Contact FEC Railway at 1-800-342-1131 for training information.

7-11.4.2.4 South Florida Rail Corridor (SFRC): Complete the On-Track Contractor Roadway Worker Training Course for South Florida Regional Transportation Authority (SFRTA) Railway. Contact SFRTA at 954-788-7920 for training information.

7-11.4.3 Watchman or Flagging Services: The railroad company will furnish protective services (i.e., watchman or flagging services) to ensure the safety of railroad operations during certain periods of the project. The Contractor will reimburse the railroad company for the cost thereof. Schedule work that affects railroad operations so as to minimize the need for protective services by the railroad company.

Submit construction schedules and schedule changes to the Engineer and District Rail Office which include an estimated start date, weekly construction schedule, daily hours of operation, and the calendar day duration for which flagging services will be necessary to perform work activities within railroad right-of-way in accordance with 8-3.2.

7-11.4.3.1 Central Florida Rail Corridor (CFRC) and SFRC: The Department will furnish protective services (i.e., watchman or flagging services) to ensure the safety of railroad operations.

7-11.5 Utilities:

7-11.5.1 Arrangements for Protection or Adjustment: Do not commence work at points where the construction operations are adjacent to utility facilities until all necessary arrangements have been made for removal, temporary removal, relocation, de-energizing, deactivation or adjustment with the utility facilities owner to protect against damage that might result in expense, loss, disruption of service, or other undue inconvenience to the public or to the owners. The Contractor is solely and directly responsible to the owners and operators of such properties for all damages, injuries, expenses, losses, inconveniences, or delays caused by the Contractor's operations.

Do not request utility removal, temporary removal, relocation, de-energizing, deactivation, or adjustment when work can be accomplished within the utility work schedules. In the event that removal, temporary removal, relocation, de-energizing, deactivation, or adjustment of a utility or a particular sequence of timing in the relocation of a utility is necessary and has not been addressed in a utility work schedule, the Director will determine the necessity for any such utility work. Coordinate such work as to cause the least impediment to the overall construction operations and utility service. The County is not responsible for utility removal, temporary removal, relocation, de-energizing, deactivation, or adjustment work where such work is determined not necessary by the Director or done solely for the benefit or convenience of the utility owner or its contractor, or the Contractor.

7-11.5.2 Cooperation with Utility Owners: Cooperate with the owners of all underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication or rearrangement work

may be reduced to a minimum, and that services rendered by the utility owners will not be unnecessarily interrupted.

In the event of interruption of water or other utility services as a result of accidental breakage, exposure, or lack of support, promptly notify the proper authority and cooperate with the authority in the prompt restoration of service. If water service is interrupted and the Contractor is performing the repair work, the Contractor shall work continuously until the service is restored. Do not begin work around fire hydrants until the local fire authority has approved provisions for continued service.

7-11.5.3 Utility Adjustments: Certain utility adjustments and reconstruction work may be underway during the progress of the Contract. Cooperate with the various utility construction crews who are maintaining utility service. Exercise due caution when working adjacent to relocated utilities. The Contractor shall repair all damage to the relocated utilities resulting from his operations at no expense to the County. The requirements of 7-11.1 and 7-11.5.2 outline the Contractor's responsibility for of protecting utility facilities. The County will include in the Contract the utility authorities who are scheduled to perform utility work on the project.

7-11.5.4 Weekly Meetings: Conduct weekly meetings on the job site with all the affected utility companies and the Director in attendance to coordinate project construction and utility relocation. Submit a list of all attendees one week in advance to the Director for approval.

Submit the approved Work Progress Schedule and Work Plan for the project, as specified in 8-3.2, to document the schedule and plan for road construction and utility adjustments.

When utility relocations no longer affect construction activities, the Contractor may discontinue the meetings with the Director's approval.

7-12 Reserved.

7-13 Reserved.

7-13.1 Reserved.

7-13.2 Reserved.

7-13.3 Reserved.

7-13.4 Insurance for Protection of Utility Owners: When the Contract involves work on or in the vicinity of utility-owned property or facilities, the utility shall be added along with the County as an Additional Insured on the policy/ies procured pursuant to subsection 7-13.2 above.

7-14 Contractor's Responsibility for Work.

The Contractor will take charge and custody of the Work, and take every necessary precaution against damage to the Work, by the action of the elements, third parties, or from any other cause whatsoever, until the County's final acceptance of the Work. The Contractor will rebuild, repair, restore, and make good all damage to any portion of the Work occasioned by any of the above causes before final acceptance of the Contract.

The County will have no obligation to pay any reimbursement for damage caused by the execution or nonexecution of the Work by the Contractor or its sub-contractors, or damage the Contractor was negligent in preventing.

The County may, at its sole discretion, reimburse the Contractor for the repair of damage to the Work not caused by a third party and due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to Acts of God, of the public enemy, or of governmental authorities.

7-15 Opening Sections of the Project to Traffic.

Whenever any section of the project is in acceptable condition for use, the Director may direct the Contractor to open it to vehicular or pedestrian traffic. The County's direction to open a section of the project does not constitute an acceptance of the project, or any part thereof, or waive any Contract provisions. Perform all necessary repairs or renewals, on any section of the project thus opened to traffic under direction from the Director, due to defective material or work or to any cause other than ordinary wear and tear, pending completion and the Director's acceptance of the project, or other work, at no expense to the County.

7-16 Wage Rates for Federal-Aid Projects (Designated Federal-Aid Contracts Only).

For all projects that include Federal-aid participation, the Special Provisions contain requirements with regard to payment of predetermined minimum wages. Predetermined Wage Rate Decisions (U.S. County of Labor provided Wage Rate Tables) exist for Heavy, Highway, and Building Construction Projects.

7-17 Supplemental Agreements.

Supplemental Agreements (Change Orders) shall be authorized in accordance with Procurement Policies adopted by the Lee County Board of County Commissioners.

7-18 Scales for Weighing Materials.

7-18.1 Applicable Regulations: When determining the weight of material for payment, use scales meeting the requirements of Chapter 531 of Florida Statutes, pertaining to specifications, tolerances, and regulations, as administered by the Bureau of Weights and Measures of the Florida Department of Agriculture.

7-18.2 Base for Scales: Place such scales on a substantial horizontal base to provide adequate support and rigidity and to maintain the level of the scales.

7-18.3 Protection and Maintenance: Maintain all scale parts in proper condition as to level and vertical alignment, and fully protect them against contamination by dust, dirt, and other matter that might affect their operation.

7-19 Source of Forest Products.

As required by Section 255.2575 of the Florida Statutes, where price, fitness and quality are equal, and when available, use only timber, timber piling, or other forest products that are produced and manufactured in the State of Florida. This provision does not apply to Federal-aid projects.

7-20 Regulations of Air Pollution from Asphalt Plants.

7-20.1 General: Perform all work in accordance with all Federal, State, and local laws and regulations regarding air pollution and burning. In particular, pay attention to Chapters 62-210 and 62-256, Rules of the Department of Environmental Protection, Florida Administrative Code, and to any part of the State Implementation Plan applicable to the project. See also 110-9.2 regarding burning of debris.

7-20.2 Dust Control: Control dust during the storage and handling of dusty materials by wetting, covering, or other means as approved by the Director.

7-20.3 Asphalt Material: Use only emulsified asphalt, unless otherwise stated in the Plans and allowed by Chapter 62-210, Rules of the Department of Environmental Protection, Florida

Administrative Code. Store and handle asphalt materials and components so as to minimize unnecessary release of hydrocarbon vapors.

7-20.4 Asphalt Plants: Operate and maintain asphalt plants in accordance with Chapter 62-210, Rules of the Department of Environmental Protection, Florida Administrative Code. Provide the plant site with a valid permit as required under Chapter 62-210 prior to start of work.

7-21 Dredging and Filling.

Section 370.033 of the Florida Statutes, requires that all persons, who engage in certain dredge or fill activities in the State of Florida, obtain a certificate of registration from the Florida Department of Environmental Protection, Tallahassee, Florida 32301, and that they keep accurate logs and records of all such activities for the protection and conservation of the natural resources. Obtain details as to the application of this law from the Department of Environmental Protection.

7-22 Available Funds.

All funds for payment by the County under this Contract are subject to the availability of an annual appropriation for this purpose by the County. In the event of nonappropriation of funds by the County for the work provided under this Contract, the County will terminate the Contract, without termination charge or other liability, on the last day of the then current fiscal year or when the appropriation made for the then-current year for the services covered by this Agreement has been expended, whichever event occurs first. If at any time funds are not appropriated for the continuance of this Agreement, cancellation shall be accepted by the Contractor upon 30 days prior written notice, but failure to give such notice shall be of no effect and the County shall not be obligated under this Contract beyond the date of termination.

7-23 Contractor's Motor Vehicle Registration (Designated State Aid Projects Only).

The Contractor shall provide the County with proof that all motor vehicles operated or caused to be operated by such Contractor are registered in compliance with Chapter 320 of the Florida Statutes. Submit such proof of registration on FDOT Form 700-010-52 to the County.

The County will not make payment to the Contractor until the required proof of registration is on file with the Department.

If the Contractor fails to register any motor vehicle that he operates in Florida, pursuant to Chapter 320 of the Florida Statutes, the Department may disqualify the Contractor from bidding, or the Department may suspend and revoke the Contractor's certificates of qualification.

7-24 Disadvantaged Business Enterprise Program.

The County encourages the inclusion of Disadvantage Business Enterprise (DBE) participants as defined and certified by FDOT. The Contractor shall submit to the County with the final payment documents a DBE Participation Certification, indicating all DBE Subcontractor(s) and amount(s) utilized for the project. If the Contractor did not utilize the DBE firm(s) listed on the Bid Proposal, a letter of justification shall be submitted along with the DBE Participation Certification.

7-25 On-The-Job Training Requirements (Designated Federal Aid Contracts Only).

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide On-The-Job Training aimed at developing full journeymen in the type of trade or job classification involved in the work. In the event the Contractor subcontracts a portion of the contract work, it shall determine how many, if any, of the trainees are to be trained by the subcontractor provided, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this Section. Ensure that, when feasible, 25% of trainees in each occupation are in their first year of training. The Contractor shall incorporate the requirements of this Section into such subcontract.

The number of trainees will be estimated on the number of calendar days of the contract, the dollar value, and the scope of work to be performed. The trainee goal will be finalized at a Post-Preconstruction Trainee Evaluation Meeting and the goal will be distributed among the work classifications based on the following criteria:

1. Determine the number of trainees on Federal Aid Contract:

a. No trainees will be required for contracts with a Contract Time allowance of less than 275 calendar days.

b. If the Contract Time allowance is 275 calendar days or more, the number of trainees shall be established in accordance with the following chart:

Estimated Contract Amount	Trainees Required
$2,000,000 or less	0
Over $2,000,000 to $4,000,000	2
Over $4,000,000 to $6,000,000	3
Over $6,000,000 to $12,000,000	5
Over $12,000,000 to $18,000,000	7
Over $18,000,000 to $24,000,000	9
Over $24,000,000 to $31,000,000	12
Over $31,000,000 to $37,000,000	13
Over $37,000,000 to $43,000,000	14
Over $43,000,000 to $49,000,000	15
Over $49,000,000 to $55,000,000	16
Over $55,000,000 to $62,000,000	17
Over $62,000,000 to $68,000,000	18
Over $68,000,000 to $74,000,000	19
Over $74,000,000 to $81,000,000	20
Over $81,000,000 to $87,000,000	21
Over $87,000,000 to $93,000,000	22
Over $93,000,000 to $99,000,000	23
Over $99,000,000 to $105,000,000	24
Over $105,000,000 to $112,000,000	25
Over $112,000,000 to $118,000,000	26
Over $118,000,000 to $124,000,000	27
Over $124,000,000 to $130,000,000	28
Over $130,000,000 to *	
*One additional trainee per $6,000,000 of estimated Construction Contract amount over $130,000,000	

Further, if the Contractor or subcontractor requests to utilize banked trainees as discussed later in this Section, a Banking Certificate will be validated at this meeting allowing credit to the Contractor for previously banked trainees. Banked credits of prime Contractors working as Subcontractors may be accepted for credit. The Contractor's Project Manager, the CEI Consultant and the Director will attend this meeting. Within ten days after the Post-Preconstruction Training Evaluation Meeting, the Contractor shall submit to the County for approval an On-The-Job Training Schedule indicating the number of trainees to be trained in each selected classification and the portion of the Contract Time during which training of each trainee is to take place. This schedule may be subject to change if any of the following occur:

1. When a start date on the approved On-The-Job Training Schedule has been missed by 14 or more days;
2. When there is a change in previously approved classifications; or
3. When replacement trainees are added due to voluntary or involuntary termination

The revised schedule will be resubmitted to and approved by the Director.

The following criteria will be used in determining whether or not the Contractor has complied with this Section as it relates to the number of trainees to be trained:

1. Credit will be allowed for each trainee that is both enrolled and satisfactorily completes training on this Contract. Credit for trainees, over the established number for this Contract, will be carried in a "bank" for the Contractor and credit will be allowed for those surplus trainees in subsequent, applicable projects. A "banked" trainee is described as an employee who has been trained on a project, over and above the established goal, and for which the Contractor desires to preserve credit for utilization on a subsequent project.
2. Credit will be allowed for each trainee that has been previously enrolled in the County's approved training program on another contract and continues training in the same job classification and completes their training on a different contract.
3. Credit will be allowed for each trainee who, due to the amount of work available in their classification, is given the greatest practical amount of training on the contract regardless of whether or not the trainee completes training.
4. Credit will be allowed for any training position indicated in the approved On-The-Job Training Schedule, if the Contractor can demonstrate that a good faith effort to provide training in that classification was made.
5. No credit will be allowed for a trainee whose employment by the Contractor is involuntarily terminated unless the Contractor can clearly demonstrate good cause for this action.

Training and upgrading of minorities, women and economically disadvantaged persons toward journeyman status is a primary objective of this Section. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. If a non-minority male is enrolled into the On-The-Job Training Program, the On-The-Job Training Notification of Personnel Action Form notifying the District Contract Compliance Manager of such action shall be accompanied by a disadvantaged certification or a justification for such action acceptable to the County. The Contractor will be given an opportunity and will be responsible for demonstrating the steps that it has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Section. This training is not intended, and shall not be used, to discriminate against any applicant for training, whether a minority, woman or disadvantaged person.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman status, or have been employed as a journeyman. The Contractor may satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established at the Post-Preconstruction Trainee Evaluation Meeting and approved by the County. Graduation to journeyman status will be based upon satisfactory completion of a Proficiency Demonstration set up at the completion of training and established for the specific training classification, completion of the minimum hours in a training classification range, and the employer's satisfaction that the trainee does meet journeyman status in the classification of training. Upon reaching journeyman status, the following documentation must be forwarded to the Director:

1. Trainee Enrollment and Personnel Action Form
2. Proficiency Demonstration Verification Form indicating completion of each standard established for the classification signed by representatives of both the Contractor and the County.

The County and the Contractor shall establish a program that is tied to the scope of the work in the project and the length of operations providing it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classifications concerned, by at least, the minimum hours prescribed for a training classification. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal Aid highway construction contract. Approval or acceptance of a training schedule shall be obtained from the County prior to commencing work on the classifications covered by the program.

A voluntary On-The-Job Training Program is available to a Contractor which has been awarded a state funded project. Through this program, the Contractor will have the option to train employees on state funded projects for "banked credit" as discussed previously in this provision, to be utilized on subsequent Federal Aid Projects where training is required. Those Contractors availing themselves of this opportunity to train personnel on state funded projects and bank trainee hours for credit shall comply with all training criteria set forth in this Section for Federal Aid Projects; voluntary banking may be denied by the County if staff is not available to monitor compliance with the training criteria.

It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial type positions. Training is permissible in lower level management positions such as office engineers, estimators, etc., where the training is oriented toward construction applications. Training in the laborer classifications, except Common/General Laborer, may be permitted provided that significant and meaningful training is provided and approved by the Director.

When approved in advance by the Director, credit will be given for training of persons in excess of the number specified herein under the current contract or a Contractor will be allowed to bank trainees who have successfully completed a training program and may apply those trainees to a training requirement in subsequent project(s) upon approval of the Director. This credit will

be given even though the Contractor may receive training program funds from other sources, provided such other source do not specifically prohibit the Contractor from receiving other form of compensation. Offsite training is permissible as long as the training is an integral part of an approved training program and does not compromise a significant part of the overall training. Credit for offsite training indicated above may only be made to the Contractor when it does one or more of the following and the trainees are concurrently employed on a Federal Aid Project:

1. Contributes to the cost of the training,
2. Provides the instruction to the trainee,
3. Pays the trainee's wages during the offsite training period.

The Contractor shall compensate the trainee at no less than the laborer rate established in the Contract at the onset of training. The compensation rate will be increased to the journeyman's wage upon graduation from the training program for the remainder of the time the trainee works in the classification in which they were trained.

The Contractor shall furnish the trainee a copy of the program they will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed. The Contractor shall enroll a trainee in one training classification at a time to completion before the trainee can be enrolled in another classification on the same project.

The Contractor shall maintain records to document the actual hours each trainee is engaged in training on work being performed as a part of this Contract.

The Contractor shall submit to the Director a copy of an On-The-Job Training Notification of Personnel Action form no later than seven days after the effective date of the action when the following actions occur: a trainee is transferred on the project, transferred from the project to continue training on another contract, completes training, is upgraded to journeyman status or voluntary terminates or is involuntary terminated from the project.

The Contractor shall furnish to the Director a copy of a Monthly Time Report for each trainee. The Monthly Time Report for each month shall be submitted no later than the tenth day of the subsequent month. The Monthly Time Report shall indicate the phases and sub-phases of the number of hours devoted to each proficiency.

Highway or Bridge Carpenter Helper, Mechanic Helper, Rodman/Chainman, and Timekeeper classifications will not be approved for the On-The-Job Training Program.

The number of trainees may be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

The Contractor will have fulfilled the responsibilities of this Specification when acceptable training has been provided to the trainee as specified above.

SECTION 8
PROSECUTION AND PROGRESS

8-1 Subletting or Assigning of Contracts.

Do not, sell, transfer, assign or otherwise dispose of the Contract or Contracts or any portion thereof, or of the right, title, or interest therein, without prior written consent of the County. If the Contractor chooses to sublet any portion of the Contract, the Contractor must submit a written request to sublet work on Form 6-Subcontractor List contained in the Proposal.

The Contractor shall provide the Director a list of all proposed subcontractors and major material suppliers at the preconstruction conference. A revised list shall be distributed each time a modification thereto is made.

Execute all agreements to sublet work in writing and include all pertinent provisions and requirements of the Contract. All other agreements must be in writing and reference all applicable Contract provisions. Upon request, submit to the County a copy of the subcontract and agreement. The subletting of work does not relieve the Contractor or the surety of their respective liabilities under the Contract.

The County recognizes a subcontractor only in the capacity of an employee or agent of the Contractor, and the Director may require the Contractor to remove the subcontractor as in the case of an employee.

8-2 Reserved.

8-3 Prosecution of Work.

8-3.1 Compliance with Time Requirements: Commence work in accordance with the accepted working schedule and provide sufficient labor, materials and equipment to complete the work within the time limit(s) set forth in the proposal. Should the Contractor fail to furnish sufficient and suitable equipment, forces, and materials, as necessary to prosecute the work in accordance with the required schedule, the Director may withhold all estimates that are, or may become due, or suspend the work until the Contractor corrects such deficiencies.

8-3.2 Submission of Contract Schedule: Within 21 calendar days after Contract award or at the preconstruction conference, whichever is earlier, submit to the Director a Contract Schedule for the project. The Director will review and respond to the Contractor within 15 calendar days of receipt.

Provide a Contract Schedule that shows the various activities of work in sufficient detail to demonstrate a reasonable and workable plan to complete the project within the Contract Time. Show the order and interdependence of activities and the sequence for accomplishing the work. Describe all activities in sufficient detail so that the Director can readily identify the work and measure the progress on of each activity. Show each activity with a beginning work date, a duration, and an ending work date. Include activities for procurement, fabrication, and delivery of materials, plant, and equipment, and review time for shop drawings and submittals. Include milestone activities when milestones are required by the Contract Documents. In a project with more than one phase, adequately identify each phase and its completion date, and do not allow activities to span more than one phase.

Conduct sufficient liaison and provide sufficient information to indicate coordination activities with utility owners that have facilities within the limits of construction requiring adjustment.

Submit a working plan with the Contract Schedule, consisting of a concise written description of the construction plan.

The Director will return inadequate Contract Schedules to the Contractor for corrections. Resubmit a corrected schedule within 15 calendar days from the date of the Director's return transmittal.

Submit an updated Contract Schedule, for Director's acceptance, with each application for payment. The Director will review the updated schedule and respond within 7 calendar days of receipt.

By acceptance of the Contract Schedule, the Director does not endorse or otherwise certify the validity or accuracy of the activity durations or sequencing of activities. The Director will use the accepted schedule as the baseline against which to measure the progress.

If the Contractor fails to finalize either the initial or a revised Contract Schedule in the time specified, the Director will withhold all Contract payments until the Director accepts the schedule.

The Contract Schedule may indicate a completion date in advance of the expiration of Contract Time. However, the County will not be liable in any way for the Contractor's failure to complete the project prior to the expiration of Contract Time. Any additional costs, including extended overhead incurred between the Contractor's scheduled completion date and the expiration of Contract Time, shall be the responsibility of the Contractor. The Contractor shall not be entitled to claim or recover any such cost from the County.

8-3.3 Beginning Work: Do not commence work under the Contract until after the County has issued a written Notice to Proceed. The Contract Time shall commence to run from the date specified in the Notice to Proceed. Issuance of the Notice to Proceed is contingent upon and will be done subsequent to the Contractor fully satisfying the County's stated insurance and bond submittal requirements. Until the Contractor receives the Department's Notice to Proceed, the Contractor is advised that the County will not be liable for any expenses which the Contractor may incur relative to the Contract before the written Notice to Proceed is issued.

8-3.4 Provisions for Convenience of Public: Schedule construction operations so as to minimize any inconvenience to adjacent businesses or residences. Where necessary, the Director may require the Contractor to first construct the work in any areas along the project where inconveniences caused by construction operations would present a more serious handicap. In such critical locations, where there is no assurance of continuous effective prosecution of the work once the construction operations are begun, the Director may require the Contractor to delay removal of the existing (usable) facilities.

8-3.5 Preconstruction Conference: County After the award of the Contract but prior to the issuance of the written Notice-to-Proceed, a conference will be held to establish lines of communication; procedures for handling shop drawings, requests for information, applications for payment, and other submissions; and to establish a working understanding between the parties as to the Contractor's project management responsibilities.

Present at the conference will be the Contractor and his subcontractors, utility companies, CEI Consultant and the Director. The time and place of this conference will be set by the Director. The Contractor shall be represented at the conference by a person duly authorized to speak on behalf of and represent the Contractor, together with all of the Contractor's supervisory personnel who will be assigned to the project. The Contractor shall submit the following minimum information to the Director for his review and approval on or prior to the date established for the pre-construction conference:

a. Name of the Contractor's proposed project manager.

b. Name of the Contractor's proposed full-time superintendent.

c. Name of the Contractor's representative for implementing and maintaining the Maintenance of Traffic Plan during construction.

d. Personnel qualifications as may be requested by the County.

e. Listing/qualifications of the Contractor's proposed subcontractors.

f. Project Schedule.

g. Traffic Control Plan/Maintenance of Traffic Plan.

h. Applicable quality control plan(s).

i. Name/qualifications of Contractor's Registered Professional Surveyor and Mapper in responsible charge of project layout.

j. Name/qualifications of Contractor's quality control technician.

k. Schedule and plan for prevention, control and abatement of erosion and water pollution per Section 104-5 of the Standard Specifications.

8-3.6 Progress Meetings: The Contractor shall attend regular progress meetings with and between the County's field representatives and those of the Contractor, subcontractors, utility companies, CEI Consultant and other parties having an interest in the Contract. The progress meetings shall be hosted by the County and shall be held at locations to be mutually agreed upon by the County and the Contractor at no less than two week intervals. The purpose of such meetings shall include, but not to be limited to, discussing all general aspects of the project and specifically addressing problem areas, schedules, progress payments, etc. The CEI Consultant shall be responsible for the preparation and distribution of the minutes.

8-4 Limitations of Operations.

8-4.1 Night Work: During active nighttime operations, furnish, place and maintain lighting sufficient to permit proper workmanship and inspection. Use lighting with 5 ft-cd minimum intensity. Arrange the lighting to prevent interference with traffic or produce undue glare to property owners. Operate such lighting only during active nighttime construction activities. Provide a light meter to demonstrate that the minimum light intensity is being maintained.

Lighting may be accomplished by the use of portable floodlights, standard equipment lights, existing street lights, temporary street lights, or other lighting methods approved by the Director.

Submit a lighting plan at the Preconstruction Conference for review and acceptance by the Director. Submit the plan as a PDF file, in the same scale as the Plans, and formatted on 11 inch by 17 inch sheets. Do not start night work prior to the Director's acceptance of the lighting plan.

During active nighttime operations, furnish, place and maintain variable message signs to alert approaching motorists of lighted construction zones ahead. Operate the variable message signs only during active construction activities.

Include compensation for lighting for night work in the Contract prices for the various items of the Contract. Take ownership of all lighting equipment for night work.

8-4.1.1 Holiday and Weekend Work: If work is authorized by the Director on holidays, weekends, or nights the Contractor shall notify the Director 72 hours in advance of the time and date on which the Contractor or any of his subcontractors propose to perform work during

such time periods to afford the Director ample time to effectively schedule his inspection personnel in accordance with the Contractor's timetable.

8-4.2 Sequence of Operations: Do not open up work to the prejudice of work already started. The Director may require the Contractor to finish a section on which work is in progress before starting work on any additional section. Specific requirements pertaining to the sequence of operations for constructing the project and maintaining traffic shall be included in the Contractor's work progress schedule.

8-4.3 Interference with Traffic: At all times conduct the work in such manner and in such sequence as to ensure the least practicable interference with traffic. Operate all vehicles and other equipment safely and without hindrance to the traveling public. Park all private vehicles outside the clear zone. Place materials stored along the roadway so as to cause no obstruction to the traveling public as possible.

Where existing pavement is to be widened and stabilizing is not required, prevent any open trench from remaining after working hours by scheduling operations to place the full thickness of widened base by the end of each day. Do not construct widening strips simultaneously on both sides of the road, except where separated by a distance of at least 1/4 mile along the road and where either the work of excavation has not been started or the base has been completed.

8-4.4 Coordination with other Contractors: Sequence the Work and dispose of materials so as not to interfere with the operations of other Contractors engaged upon adjacent work; coordinate the Work, including the placement of work zone signs and temporary traffic control device, to that of others in a proper manner, in accordance with the spirit of the Contract Documents; and perform the work in the proper sequence in relation to that of other Contractors; all as may be directed by the Director.

Each Contractor is responsible for any damage done by it or its agents to the adjoining work being performed by another contractor.

8-4.5 Drainage: Conduct the operations and maintain the work in such condition to provide adequate drainage at all times. Do not obstruct existing functioning storm sewers, gutters, ditches, and other run-off facilities. Maintain all existing storm sewers, gutters, ditches, and other run-off facilities in an operable condition as necessary to provide adequate drainage at all times.

8-4.6 Fire Hydrants: Keep fire hydrants on or adjacent to the highway accessible to fire apparatus at all times, and do not place any material or obstruction within 15 feet of any fire hydrant.

8-4.7 Protection of Structures: Do not operate heavy equipment close enough to pipe headwalls or other structures to cause their displacement.

8-4.8 Fencing: Erect permanent fence as a first order of business on all projects that include fencing where the Director determines that the fencing is necessary to maintain the security of livestock on adjacent property, or for protection of pedestrians who are likely to gain access to the project from adjacent property.

8-4.9 Contaminated Materials: When the construction operations encounter or expose any abnormal condition that may indicate the presence of a contaminated material, discontinue such operations in the vicinity of the abnormal condition and notify the Director immediately. Be alert for the presence of tanks or barrels; discolored or stained earth, metal, wood, ground water; visible fumes; abnormal odors; excessively hot earth; smoke; or other conditions that appear abnormal as possible indicators of the presence of contaminated materials. Treat these conditions with extraordinary caution.

Make every effort to minimize the spread of any contaminated materials into uncontaminated areas.

Do not resume the construction operations in the vicinity of the abnormal conditions until so directed by the Director.

Dispose of the contaminated material in accordance with the requirements and regulations of any Local, State, or Federal agency having jurisdiction. Where the Contractor performs work necessary to dispose of contaminated material, and the Contract does not include pay items for disposal, the County will pay for this work as provided in 4-4.

The County agrees to hold harmless and indemnify the Contractor for damages when the Contractor discovers or encounters contaminated materials or pollutants during the performance of services for the County when the presence of such materials or pollutants were unknown or not reasonably discoverable. Such indemnification agreement is only effective if the Contractor immediately stops work and notifies the County of the contaminated material or pollutant problem.

Such indemnification agreement is not valid for damages resulting from the Contractor's willful, wanton, or intentional conduct or the operations of Contaminated and Hazardous Material Contractors.

8-5 Qualifications of Contractor's Personnel.

Provide competent, careful, and reliable superintendents, foremen, and workmen. Provide workmen with sufficient skill and experience to properly perform the work assigned to them. Provide workmen engaged on special work, or skilled work, such as bituminous courses or mixtures, concrete bases, pavements, or structures, or in any trade, with sufficient experience in such work to perform it properly and satisfactorily and to operate the equipment involved. Provide workmen that shall make due and proper effort to execute the work in the manner prescribed in the Contract Documents, or the Director may take action as prescribed below.

The Contractor shall assign a full-time superintendent to routinely and constantly supervise, manage, plan, monitor, schedule, and control the construction operations on behalf of the Contractor. Trade workers will not be considered to be a full-time superintendent. The Contractor's superintendent shall be present on the project at all times when the Contractor's work crews, or work crews of other parties authorized by the Director, are engaged in any activity whatsoever associated with the project. Should the Contractor fail to comply with the above condition, the Director may, at his discretion, deduct from the Contractor's partial monthly payment estimate, the amount of $250 per hour for each hour lacking adequate superintendence. This deduction is to account for the County's loss of adequate supervision, not as a penalty, but as liquidated damages for services not rendered.

It is prohibited as a conflict of interest for a Contractor to subcontract with a Consultant to perform Contractor Quality Control when the Consultant is under contract with the County to perform work on any project described in the Contractor's Contract with the County. Prior to approving a Consultant for Contractor Quality Control, the Contractor shall submit to the County a Certificate from the proposed Consultant certifying that no conflict of interest exists.

Whenever the Director determines that any person employed by the Contractor is incompetent, unfaithful, intemperate, disorderly, or insubordinate, the Director will provide written notice and the Contractor shall discharge the person from the work. Do not employ any discharged person on the project without the written consent of the Director. If the Contractor fails to remove such person or persons, the Director may withhold all estimates that are or may become due, or suspend the work until the Contractor complies with such orders. Protect, defend,

indemnify, and hold the County, its agents, officials, and employees harmless from all claims, actions, or suite arising from such removal, discharge, or suspension of employees.

8-6 Temporary Suspension of Contractor's Operations.

8-6.1 Authority to Suspend Contractor's Operations: The Director has the authority to suspend the Contractor's operations, wholly or in part. The Director will order such suspension in writing, giving in detail the reasons for the suspension. Contract Time will be charged during all suspensions of Contractor's operations. The County may grant an extension of Contract Time in accordance with 8-7.3.2 when determined appropriate in the County's sole judgment.

No additional compensation or time extension will be paid or granted to the Contractor when the operations are suspended for the following reasons:

1. The Contractor fails to comply with the Contract Documents.
2. The Contractor fails to carry out orders given by the Director.
3. The Contractor causes conditions considered unfavorable for continuing the Work.

Immediately comply with any suspension order. Do not resume operations until authorized to do so by the Director in writing. Any operations performed by the Contractor, and otherwise constructed in conformance with the provisions of the Contract, after the issuance of the suspension order and prior to the Director's authorization to resume operations will be at no cost to the County. Further, failure to immediately comply with any suspension order will also constitute an act of default by the Contractor and is deemed sufficient basis in and of itself for the County to declare the Contractor in default, in accordance with 8-9, with the exception that the Contractor will not have ten calendar days to correct the conditions for which the suspension was ordered.

8-6.1.1 State of Emergency: The Director has the authority to suspend the Contractor's operations, wholly or in part, pursuant to a Governor's Declaration of a State of Emergency. The Director will order such suspension in writing, giving in detail the reasons for the suspension. Contract Time will be charged during all suspensions of Contractor's operations. The County, at its sole discretion, may grant an extension of Contract Time and reimburse the Contractor for specific costs associated with such suspension. Further, in such instances, the County's determination as to entitlement to either time or compensability will be final, unless the Contractor can prove by clear and convincing evidence to a Disputes Review Board that the County's determination was without any reasonable factual basis.

8-6.2 Prolonged Suspensions: If the Director suspends the Contractor's operations for an indefinite period, store all materials in such manner that they will not obstruct or impede the traveling public unnecessarily or become damaged in any way. Take every reasonable precaution to prevent damage to or deterioration of the work performed. Provide suitable drainage of the roadway by opening ditches, shoulder drains, etc., and provide any temporary structures necessary for public travel through the project.

8-6.3 Permission to Suspend Contractor's Operations: Do not suspend operations or remove equipment or materials necessary for completing the work without obtaining the Director's written permission. Submit all requests for suspension of operations in writing to the Director, and identify specific dates to begin and end the suspension. The Contractor is not entitled to any additional compensation for suspension of operations during such periods.

8-6.4 Suspension of Contractor's Operations - Holidays and Special Events: Unless the Contractor submits a written request to work during one or more days of a Holiday or Special Event at least ten calendar days in advance of the beginning date of the Holiday or Special Event

and receives written approval from the Director, the Contractor shall not work on the following days: Martin Luther King, Jr. Day; Memorial Day; the Saturday and Sunday immediately preceding Memorial Day; Independence Day; Independence Day (Observed); Labor Day; the Friday, Saturday, and Sunday immediately preceding Labor Day; Veterans Day; Veterans Day (Observed); the Wednesday immediately preceding Thanksgiving Day; Thanksgiving Day; the Friday, Saturday and Sunday immediately following Thanksgiving Day; December 24 through January 2, inclusive; and Special Events noted in the Plans. Contract Time will be charged during these Holiday and Special Event periods. Contract Time will be adjusted in accordance with 8-7.3.2. The Contractor is not entitled to any additional compensation beyond any allowed Contract Time adjustment for suspension of operations during such Holiday and Special Event periods.

During such suspensions, remove all equipment and materials from the clear zone, except those required for the safety of the traveling public and retain sufficient personnel at the job site to properly meet the requirements of Sections 102 and 104. The Contractor is not entitled to any additional compensation for removal of equipment from clear zones or for compliance with Section 102 and Section 104 during such Holiday and Special Event periods.

8-7 Computation of Contract Time.

8-7.1 General: Perform the contracted work fully, entirely, and in accordance with the Contract Documents within the Contract Time specified in the proposal, or as may be extended in accordance with the provisions herein below.

The County considers in the computation of the Contract Time the effect that utility relocation and adjustments have on job progress and the scheduling of construction operations required in order to adequately maintain traffic, as detailed in the Plans or as scheduled in the Special Provisions.

8-7.2 Date of Beginning of Contract Time: The date on which Contract Time begins is either the date on which the Contractor actually begins work, or the date for beginning the charging of Contract Time as set forth in the proposal; whichever is earlier.

8-7.3 Adjusting Contract Time:

8-7.3.1 Increased Work: The County may grant an extension of Contract Time when it increases the Contract amount due to overruns in original Contract items, adds new work items, or provides for unforeseen work. The County will base the consideration for granting an extension of Contract Time on the extent that the time normally required to complete the additional designated work delays the Contract completion schedule.

8-7.3.2 Contract Time Extensions: The County may grant an extension of Contract Time when a controlling item of work is delayed by factors not reasonably anticipated or foreseeable at the time of bid. The County may allow such extension of time only for delays occurring during the Contract Time period or authorized extensions of the Contract Time period. When failure by the County to fulfill an obligation under the Contract results in delays to the controlling items of work, the County will consider such delays as a basis for granting a time extension to the Contract.

Whenever the Director suspends the Contractor's operations, as provided in 8-6, for reasons other than the fault of the Contractor, the Director will grant a time extension for any delay to a controlling item of work due to such suspension. The County will not grant time extensions to the Contract for delays due to the fault or negligence of the Contractor.

The County does not include an allowance for delays caused by the effects of inclement weather or suspension of Contractor's operations as defined in 8-6.4, in establishing Contract Time. The Director will continually monitor the effects of weather and, when found

justified, grant time extensions on either a bimonthly or monthly basis. The Director will not require the Contractor to submit a request for additional time due to the effects of weather.

The County will grant time extensions, on a day for day basis, for delays caused by the effects of rains or other inclement weather conditions, related adverse soil conditions or suspension of operations as defined in 8-6.4 that prevent the Contractor from productively performing controlling items of work resulting in:

1. The Contractor being unable to work at least 50% of the normal work day on pre-determined controlling work items; or

2. The Contractor must make major repairs to work damaged by weather, provided that the damage is not attributable to the Contractor's failure to perform or neglect; and provided that the Contractor was unable to work at least 50% of the normal workday on pre-determined controlling work items.

When the County grants a time extension due to rains or other inclement weather, the Contractor shall submit any objection to the additional time in writing within ten calendar days from receipt of written notice from the Engineer. Failure to submit a written appeal within ten calendar days from receipt of the written notice shall constitute a waiver of any and all rights to appeal the County's decision at a later time.

No additional compensation will be made for delays caused by the effects of inclement weather.

The County will consider the delays in delivery of materials or component equipment that affect progress on a controlling item of work as a basis for granting a time extension if such delays are beyond the control of the Contractor or supplier. Such delays may include an area-wide shortage, an industry-wide strike, or a natural disaster that affects all feasible sources of supply. In such cases, the Contractor shall submit substantiating letters from a representative number of manufacturers of such materials or equipment clearly confirming that the delays in delivery were the result of an area-wide shortage, an industry-wide strike, etc. No additional compensation will be made for delays caused by delivery of materials or component equipment.

The County will not consider requests for time extension due to delay in the delivery of custom manufactured equipment such as traffic signal equipment, highway lighting equipment, etc., unless the Contractor submits documentation that he placed the order for such equipment in a timely manner, the delay was caused by factors beyond the manufacturer's control, and the lack of such equipment caused a delay in progress on a controlling item of work. No additional compensation will be paid for delays caused by delivery of custom manufactured equipment.

The County will consider the effect of utility relocation and adjustment work on job progress as the basis for granting a time extension only if all the following criteria are met:

1. Delays are the result of either utility work that was not detailed in the Plans, or utility work that was detailed in the Plans but was not accomplished in reasonably close accordance with the schedule included in the Contract Documents.

2. Utility work actually affected progress toward completion of controlling work items.

3. The Contractor took all reasonable measures to minimize the effect of utility work on job progress, including cooperative scheduling of the Contractor's operations with the scheduled utility work at the preconstruction conference and providing

adequate advance notification to utility companies as to the dates to coordinate their operations with the Contractor's operations to avoid delays.

The Department will consider requests for time extension due to delay in work operations within the limits of the railroad right-of-way, the adjoining 15 feet, or determined by the Railroad or Department to be able to potentially foul the tracks regardless of distance from railroad right-of-way on job progress as the basis for granting a time extension only if all the following criteria are met:

1. Delays are due to a lack of availability of Railroad protective services as required by 7-11.4.

2. Work within the limits of the railroad right-of-way or the adjoining 15 feet actually impacted progress toward completion of controlling work items.

3. The Contractor took all reasonable measures to minimize the effect of work operations within the limits of the railroad right-of-way or the adjoining 15 feet on job progress, including compliance with all provisions of 7-11.4 and 5-12, and cooperative scheduling of the Contractor's operations.

As a condition precedent to an extension of Contract Time the Contractor must submit to the Director:

A preliminary request for an extension of Contract Time must be submitted in writing to the Director within ten calendar days after the commencement of a delay to a controlling item of work. If the Contractor fails to submit this required preliminary request for an extension of Contract Time, the Contractor fully, completely, absolutely and irrevocably waives any entitlement to an extension of Contract Time for that delay. In the case of a continuing delay only a single preliminary request for an extension of Contract Time will be required. Each such preliminary request for an extension of Contract Time shall include as a minimum the commencement date of the delay, the cause of the delay, and the controlling item of work affected by the delay.

Furthermore, the Contractor must submit to the Director a request for a Contract Time extension in writing within 30 days after the elimination of the delay to the controlling item of work identified in the preliminary request for an extension of Contract Time. Each request for a Contract Time extension shall include as a minimum all documentation that the Contractor wishes the County to consider related to the delay, and the exact number of days requested to be added to Contract Time. If the Contractor contends that the delay is compensable, then the Contractor shall also be required to submit with the request for a Contract Time extension a detailed cost analysis of the requested additional compensation. If the Contractor fails to submit this required request for a Contract Time extension, with or without a detailed cost analysis, depriving the Director of the timely opportunity to verify the delay and the costs of the delay, the Contractor waives any entitlement to an extension of Contract Time or additional compensation for the delay.

Upon timely receipt of the preliminary request of Contract Time from the Contractor, the Director will investigate the conditions, and if it is determined that a controlling item of work is being delayed for reasons beyond the control of the Contractor the Director will take appropriate action to mitigate the delay and the costs of the delay. Upon timely receipt of the request for a Contract Time extension the Director will further investigate the conditions, and if it is determined that there was an increase in the time or the cost of performance of the controlling item of work beyond the control of the Contractor, then an adjustment of Contract Time will be

made, and a monetary adjustment will be made, excluding loss of anticipated profits, and the Contract will be modified in writing accordingly.

The existence of an accepted schedule, including any required update(s), as stated in 8-3.2, is a condition precedent to the Contractor having any right to the granting of an extension of Contract Time or any monetary compensation arising out of any delay. Contractor failure to have an accepted schedule, including any required update(s), for the period of potential impact, or in the event the currently accepted schedule and applicable updates do not accurately reflect the actual status of the project or fail to accurately show the true controlling or non-controlling work activities for the period of potential impact, will result in any entitlement determination as to time or money for such period of potential impact being limited solely to the County's analysis and identification of the actual controlling or non-controlling work activities. Further, in such instances, the County's determination as to entitlement as to either time or compensability will be final, unless the Contractor can prove by clear and convincing evidence to a Disputes Review Board that the County's determination was without any reasonable factual basis.

8-8 Reserved

8-9 Default and Termination of Contract.

8-9.1 Determination of Default: The following acts or omissions constitute acts of default and, except as to subparagraphs 9 and 11, the County will give notice, in writing, to the Contractor and his surety for any delay, neglect or default, if the Contractor:

1. fails to begin the work under the Contract within the time specified in the Notice to Proceed;

2. fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure prompt completion of the Contract;

3. performs the work unsuitably, or neglects or refuses to remove materials or to perform anew such work that the Director rejects as unacceptable and unsuitable;

4. discontinues the prosecution of the work, or fails to resume discontinued work within a reasonable time after the Director notifies the Contractor to do so;

5. becomes insolvent or is declared bankrupt, or files for reorganization under the bankruptcy code, or commits any act of bankruptcy or insolvency, either voluntarily or involuntarily;

6. allows any final judgment to stand against him unsatisfied for a period of ten calendar days;

7. makes an assignment for the benefit of creditors;

8. fails to comply with Contract requirements regarding minimum wage payments or EEO requirements;

9. fails to comply with the Director's written suspension of work order within the time allowed for compliance and which time is stated in that suspension of work order; or

10. for any other cause whatsoever, fails to carry on the work in an acceptable manner, or if the surety executing the bond, for any reasonable cause, becomes unsatisfactory in the opinion of the County.

11. fails to comply with 3-9.

For a notice based upon reasons stated in subparagraphs (1) through (8) and (10): if the Contractor, within a period of ten calendar days after receiving the notice described above, fails to correct the conditions of which complaint is made, the County will, upon written certificate

from the Director of the fact of such delay, neglect, or default and the Contractor's failure to correct such conditions, have full power and authority, without violating the Contract, to take the prosecution of the work out of the hands of the Contractor and to declare the Contractor in default.

If the Contractor, after having received a prior notice described above for any reason stated in subparagraph (2), (3), (4), (5), (6) or (8), commits a second or subsequent act of default for any reason covered by the same subparagraph (2), (3), (4), (5), (6) or (8) as stated in the prior notice, and regardless whether the specific reason is the same, then, regardless of whether the Contractor has cured the deficiency stated in that prior notice, the County will, upon written certificate from the Director of the fact of such delay, neglect or default and the Contractor's failure to correct such conditions, have full power and authority, without any prior written notice to the Contractor and without violating the Contract, to take the prosecution of the work out of the hands of the Contractor and to declare the Contractor in default.

Regarding subparagraph (9), if the Contractor fails to comply with the Director's written suspension of work order within the time allowed for compliance and which time is stated in that suspension of work order, the County will, upon written certificate from the Director of the fact of such delay and the Contractor's failure to correct that condition, have full power and authority, without violating the Contract, to immediately take the prosecution of the work out of the hands of the Contractor and to declare the Contractor in default.

Regarding subparagraph (11), if the Contractor fails to comply with 3-9, the County will have full power and authority, without violating the Contract, to immediately take the prosecution of the work out of the hands of the Contractor and to declare the Contractor in default.

The County has no liability for anticipated profits for unfinished work on a Contract that the County has determined to be in default.

Notwithstanding the above, the County shall have the right to declare the Contractor (or its "affiliate") in default and immediately terminate this Contract, without any prior notice to the Contractor, in the event the Contractor (or its "affiliate") is at any time "convicted" of a "contract crime," as these terms are defined in Section 337.165(1), Florida Statutes. The County's right to default the Contractor (or its "affiliate") for "conviction" of a "contract crime" shall extend to and is expressly applicable to any and all County Contracts that were either advertised for bid; for which requests for proposals or letters of interest were requested; for which an intent to award was posted or otherwise issued; or for which a Contract was entered into, after the date that the underlying or related criminal indictment, criminal information or other criminal charge was filed against the Contractor (or its "affiliate") that resulted in the "conviction." In the event the County terminates this Contract for this reason, the Contractor shall hereby forfeit any claims for additional compensation, extra time, or anticipated profits. The Contractor shall only be paid for any completed work up to the date of termination. Further, the Contractor shall be liable for any and all additional costs and expenses the County incurs in completing the Contract work after such termination.

8-9.2 Termination of Contract for Convenience: The County may terminate the entire Contract or any portion thereof, if the Director determines that a termination is in the County's interest. The Director will deliver to the Contractor a Written Notice of Termination specifying the extent of termination and the effective date.

When the County terminates the entire Contract, or any portion thereof, before the Contractor completes all items of work in the Contract, the County will make payment for the actual number of units or items of work that the Contractor has completed, at the Contract unit price, and according to the formulas and provisions set forth in 4-3.2 for items of work partially

completed, and such payments will constitute full and complete compensation for such work or items. No payment of any kind or amount will be made for items of work not started. The County will not consider any claim for loss of anticipated profits, or overhead of any kind (including home office and jobsite overhead or other indirect impacts) except as provided in 4-3.2 for partially completed work.

The County will consider reimbursing the Contractor for actual cost of mobilization (when not otherwise included in the Contract) including moving equipment to the job where the volume of the work that the Contractor has completed is too small to compensate the Contractor for these expenses under the Contract unit prices.

The County may purchase at actual cost acceptable materials and supplies procured for the work, that the County has inspected, tested, and approved and that the Contractor has not incorporated in the work. Submit the proof of actual cost, as shown by receipted bills and actual cost records, at such points of delivery as the Director may designate.

Termination of a contract or a portion thereof, under the provisions of this Subarticle, does not relieve the Contractor or the surety of its responsibilities for the completed portion of the Contract or its obligations for and concerning any just claims arising out of the work performed.

All Contractor claims for additional payment, due to the County's termination of the entire Contract or any portion thereof, must meet the requirements of 5-12.

8-9.3 Completion of Work by County: Upon declaration of default, the County will have full authority to appropriate or use any or all suitable and acceptable materials and equipment on the site and may enter into an agreement with others to complete the work under the Contract, or may use other methods to complete the work in an acceptable manner. The County will charge all costs that the County incurs because of the Contractor's default, including the costs of completing the work under the Contract, against the Contractor. If the County incurs such costs in an amount that exceeds the sum that would have been payable under the Contract, then the Contractor and the surety shall be liable and shall pay the County the amount of the excess.

If, after the ten day notice period and prior to any action by the County to otherwise complete the work under the Contract, the Contractor establishes his intent to prosecute the work in accordance with the County's requirements, then the County may allow the Contractor to resume the work, in which case the County will deduct from any monies due or that may become due under the Contract, any costs to the County incurred by the delay, or from any reason attributable to the delay.

8-10 Liquidated Damages for Failure to Complete the Work.

8-10.1 Reserved.

8-10.2 Amount of Liquidated Damages: Applicable liquidated damages are the amounts established in the following schedule:

Original Contract Amount	Daily Charge Per Calendar Day
$299,999 and under	$980
$300,000 but less than $2,000,000	$1,699
$2,000,000 but less than $5,000,000	$2,650
$5,000,000 but less than $10,000,000	$3,819
$10,000,000 but less than $20,000,000	$4,687
$20,000,000 but less than $40,000,000	$7,625
$40,000,000 and over	$10,467 plus 0.00005 of any

amount over $40 million (Round to nearest whole dollar)
..... The Engineer may approve adjustments to the liquidated damages amounts in accordance with the Construction Project Administration Manual (CPAM) provided all contract work is complete.

8-10.3 Determination of Number of Days of Default: For all contracts, regardless of whether the Contract Time is stipulated in calendar days or working days, the Director will count default days in calendar days.

8-10.4 Conditions under which Liquidated Damages are Imposed: If the Contractor or, in case of his default, the surety fails to complete the work within the time stipulated in the Contract, or within such extra time that the County may have granted then the Contractor or, in case of his default, the surety shall pay to the County, not as a penalty, but as liquidated damages, the amount so due as determined in 8-10.2.

8-10.5 Right of Collection: The County has the right to apply, as payment on such liquidated damages, any money the County owes the Contractor.

8-10.6 Allowing Contractor to Finish Work: The County does not waive its right to liquidated damages due under the Contract by allowing the Contractor to continue and to finish the work, or any part of it, after the expiration of the Contract Time.

8-10.7 Completion of Work by County: In the case of a default of the Contract and the completion of the work by the County, the Contractor and his surety are liable for the liquidated damages under the Contract, but the County will not charge liquidated damages for any delay in the final completion of the County's performance of the work due to any unreasonable action or delay on the part of the County.

8-11 Release of Contractor's Responsibility.

The County considers the Contract complete when the Contractor has completed all work and the County has accepted the work. The County will then release the Contractor from further obligation except as set forth in his bond, and except as provided in 5-13.

8-12 Recovery of Damages Suffered by Third Parties.

In addition to the damages provided for in 8-10.2 and pursuant to Section 337.18 of the Florida Statutes, when the Contractor fails to complete the work within the Contract Time the County may recover from the Contractor amounts that the County pays for damages suffered by third parties unless the failure to timely complete the work was caused by the County's act or omission.

SECTION 9
MEASUREMENT AND PAYMENT

9-1 Measurement of Quantities.

9-1.1 Measurement Standards: The Director will measure all work completed under the Contract in accordance with the United States Standard Measures.

9-1.2 Method of Measurements: The Director will take all measurements horizontally or vertically.

9-1.3 Determination of Pay Areas:

9-1.3.1 Final Calculation: When measuring items paid for on the basis of area of finished work, where the pay quantity is designated to be determined by calculation, the Director will use lengths and widths in the calculations based on the station to station dimensions shown in the Plans; the station to station dimensions actually constructed within the limits designated by the Director; or the final dimensions measured along the surface of the completed work within the neat lines shown in the Plans or designated by the Director. The Director will use the method or combination of methods of measurement that reflect, with reasonable accuracy, the actual surface area of the finished work as the Director determines.

9-1.3.2 Plan Quantity: When measuring items paid for on the basis of area of finished work, where the pay quantity is designated to be the plan quantity, the Director will determine the final pay quantity based on the plan quantity subject to the provisions of 9-3.2. Generally, the Director will calculate the plan quantity using lengths based on station to station dimensions and widths based on neat lines shown in the Plans.

9-1.4 Construction Outside Authorized Limits: The Director will not pay for surfaces constructed over a greater area than authorized, or for material that the Contractor has moved from outside of slope stakes and lines shown in the Plans, except where the Director provides written instruction for the Contractor to perform such work.

9-1.5 Truck Requirements: Provide all trucks with numbers and certify that all trucks used have a manufacturer's certification or permanent decal showing the truck capacity rounded to the nearest tenth of a cubic yard placed on both sides of the truck. This capacity will include the truck body only and any side boards added will not be included in the certified truck body capacity. Ensure the lettering and numbers are legible for identification purposes at all times.

9-1.6 Ladders and Instrument Stands for Bridge Projects: On bridge projects, in order to facilitate necessary measurements, provide substantial ladders to the tops of piers and bents, and place and move such ladders as the Director directs.

For bridge projects crossing water or marshy areas, supply fixed stands for instrument mounting and measurements, in accordance with the details stipulated in the Specifications for the project.

9-2 Scope of Payments.

9-2.1 Items Included in Payment: Accept the compensation as provided in the Contract as full payment for furnishing all materials and for performing all work contemplated and embraced under the Contract; also for all loss or damage arising out of the nature of the work or from the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work until its final acceptance; also for all other costs incurred under the provisions of Division I.

For any item of work contained in the proposal, except as might be specifically provided otherwise in the basis of payment clause for the item, include in the Contract unit price (or lump sum price) for the pay item or items the cost of all labor, equipment, materials, tools and incidentals required for the complete item of work, including all requirements of the Section specifying such item of work, except as specifically excluded from such payments.

9-2.1.1 Reserved

9-2.1.2 Bituminous Material: Prepare a Contractor's Certification of Quantities, using the FDOT's current approved form for Superpave Asphalt Base, Driveway Asphalt Base, Asphalt Treated Permeable Base, Superpave Asphaltic Concrete, Miscellaneous Asphalt Pavement, Asphalt Concrete Friction Course, and Asphalt Rubber Membrane Interlayer pay items. Submit this certification to the Director no later than Twelve O'clock noon Monday after the estimate cut-off or as directed by the Director, based on the quantity of asphalt produced and accepted on the roadway per Contract. Ensure the certification includes the Project Number, Contract Number, Financial Project Identification (FPID) Number (if applicable), Certification Date and Number, the period the certification represents and the tons produced for each asphalt pay item.

On Contracts having an original Contract Time of more than 365 calendar days, or more than 5,000 tons of asphalt concrete, the County will adjust the bid unit price for bituminous material, excluding cutback and emulsified asphalt to reflect increases or decreases in the Asphalt Price Index (API) of bituminous material from that in effect during the month in which bids were received. The Contractor will not be given the option of accepting or rejecting this adjustment. Bituminous adjustments will be made only when the current API (CAPI) varies by more than 5% of the API prevailing in the month when bids were received (BAPI), and then only on the portion that exceeds 5%.

The County will determine the API for each month by averaging quotations in effect on the first day of the month at all terminals that could reasonably be expected to furnish bituminous material to projects in the State of Florida.

The API will be available on the Construction Office website before the 15th day of each month at the following URL:
https://www.fdot.gov/construction/fuel-Bit/Fuel-Bit.shtm .

Payment on progress estimates will be adjusted to reflect adjustments in the prices for bituminous materials in accordance with the following:

$ Adjustment = (ID)(Gallons)

Where ID = Index Difference = [CAPI - 0.95(BAPI)] when the API has decreased between the month of bid and month of this progress estimate.

Where ID = Index Difference = [CAPI - 1.05(BAPI)] when the API has increased between the month of bid and month of this progress estimate.

Payment will be made on the current progress estimate to reflect the index difference at the time work was performed.

For asphalt concrete items payable by the ton or square yard, the number of gallons will be determined assuming a mix design with 6.25% liquid asphalt weighing 8.58 pounds per gallon.

For asphalt concrete items payable by the cubic yard, the number of gallons will be determined assuming a mix design with 3% liquid asphalt weighing 8.58 pounds per gallon.

9-2.2 Non-Duplication of Payment: In cases where the basis of payment clause in these Specifications relating to any unit price in the bid schedule requires that the unit price cover and

be considered compensation for certain work or material essential to the item, the County will not measure or pay for this same work or material under any other pay item that may appear elsewhere in these Specifications.

9-3 Compensation for Altered Quantities.

9-3.1 General: When alteration in Plans or quantities of work not requiring a supplemental agreement as hereinbefore provided for are offered and performed, the Contractor shall accept payment in full at Contract unit bid prices for the actual quantities of work done, and no allowance will be made for increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor, resulting either directly from such alterations, or indirectly from unbalanced allocation among the Contract items of overhead expense on the part of the bidder and subsequent loss of expected reimbursement therefore, or from any other cause.

Compensation for alterations in Plans or quantities of work requiring supplemental agreements shall be stipulated in such agreement, except when the Contractor proceeds with the work without change of price being agreed upon, the Contractor shall be paid for such increased or decreased quantities at the Contract unit prices bid in the Proposal for the items of work. If no Contract unit price is provided in the Contract, and the parties cannot agree as to a price for the work, the Contractor agrees to do the work in accordance with 4-3.2.

9-3.2 Payment Based on Plan Quantity:

9-3.2.1 Error in Plan Quantity: As used in this Article, the term "substantial error" is defined as the smaller of (1) or (2) below:

1. a difference between the original plan quantity and final quantity of more than 5%,

2. a change in quantity which causes a change in the amount payable of more than $5,000.

On multiple job Contracts, changes made to an individual pay item due to substantial errors will be based on the entire Contract quantity for that pay item.

Where the pay quantity for any item is designated to be the original plan quantity, the County will revise such quantity only in the event that the County determines it is in substantial error. In general, the County will determine such revisions by final measurement, plan calculations, or both, as additions to or deductions from plan quantities.

In the event that either the County or the Contractor contends that the plan quantity for any item is in error and additional or less compensation is thereby due, the claimant shall submit, at their own expense, evidence of such in the form of acceptable and verifiable measurements or calculations. The County will not revise the plan quantity solely on the basis of a particular method of construction that the Contractor selects. For earthwork items, the claimant must note any differences in the existing surfaces from that shown in the Plan that would result in a substantial error to the plan quantity, and must be properly documented by appropriate verifiable level notes, acceptable to both the Contractor and the County, prior to disturbance of the existing surface by construction operations. The claimant shall support any claim based upon a substantial error for differences in the existing surface by documentation as provided above.

9-3.2.2 Authorized Changes in Limits of Work: Where the County designates the pay quantity for any item to be the original plan quantity and authorizes a plan change which results in an increase or decrease in the quantity of that item, the County will revise the plan quantity accordingly. In general, the County will determine such revisions by final measurement, plan calculations or both.

9-3.2.3 Specified Adjustments to Pay Quantities: Do not apply the limitations specified in 9-3.2.1 and 9-3.2.2 to the following:

1. Where these Specifications or Special Provisions provide that the County determines the pay quantity for an item on the basis of area of finished work adjusted in accordance with the ratio of measured thickness to nominal thickness.

2. Where these Specifications provide for a deduction due to test results falling outside of the allowable specified tolerances.

3. To payment for extra length fence posts, as specified in 550-6.3.

9-3.3 Lump Sum Quantities:

9-3.3.1 Error in Lump Sum Quantity: Where the County designates the pay quantity for an item to be a lump sum and the Plans show an estimated quantity, the County will adjust the lump sum compensation only in the event that either the Contractor submits satisfactory evidence or the County determines and furnishes satisfactory evidence that the lump sum quantity shown is in substantial error as defined in 9-3.2.1.

9-3.3.2 Authorized Changes in Work: Where the County designates the pay quantity for an item to be a lump sum and the Plans show an estimated quantity, the County will adjust compensation for that item proportionately when an authorized plan change is made which results in an increase or decrease in the quantity of that item. When the Plans do not show an estimated plan quantity or the applicable specifications do not provide adjustments for contingencies, the County will compensate for any authorized plan change resulting in an increase or decrease in the cost of acceptably completing the item by establishing a new unit price through a supplemental agreement as provided in 4-3.2.

9-3.4 Deviation from Plan Dimensions: If the Contractor fails to construct any item to Plan or to authorized dimensions within the specified tolerances, the Director, at his discretion will: require the Contractor to reconstruct the work to acceptable tolerances at no additional cost to the County; accept the work and provide the Contractor no pay; or accept the work and provide the Contractor a reduced final pay quantity or reduced unit price. The County will not make reductions to final pay quantities for those items designated to be paid on the basis of original plan quantity or a lump sum quantity under the provisions of this Article unless such reduction results in an aggregate monetary change per item of more than $100, except that for earthwork items, the aggregate change must exceed $5,000 or 5% of the original plan quantity, whichever is smaller. If, in the opinion of the Director, the Contractor has made a deliberate attempt to take advantage of the construction tolerances as defined in 120-12.1 to increase borrow excavation in fill sections or to decrease the required volume of roadway or lateral ditch excavation or embankment, the County will take appropriate measurements and will apply reductions in pay quantities. The County will not use the construction tolerance, as defined in 120-12.1, as a pay tolerance. The construction tolerance is not to be construed as defining a revised authorized template.

9-4 Deleted Work.

The County will have the right to cancel the portions of the Contract relating to the construction of any acceptable item therein, by making an adjustment in payment to the Contractor of a fair and equitable amount covering the value of all cancelled work less all items of cost incurred prior to the date that the Director cancels the work.

9-5 Partial Payments.

9-5.1 General: The Director will make partial payments on monthly estimates based on the amount of work that the Contractor completes during the month (including delivery of certain

materials, as specified herein below). The Director will make approximate monthly payments, and the County will correct all partial estimates and payments in the subsequent estimates and in the final estimate and payment.

The County will base the amount of such payments on the total value of the work that the Contractor has performed to the date of the estimate, based on the quantities completed and the Contract prices, less payments previously made and less any retainage withheld.

Contract amount is defined as the original Contract amount adjusted by approved supplemental agreements.

9-5.1.1 Applications for Payment: On or before the 25th day of each month, the Contractor shall submit six notarized copies of its monthly application for payment to the CEI Consultant for Work performed during the previous month. Each application for payment shall be accompanied by the certifications described in 9-5.6. The County shall not be required to make payment until and unless these certifications are furnished by the Contractor.

Invoices received after the 25th day of each month shall be considered for payment as part of the next month's application. Within ten calendar days of receipt of each application for payment, the CEI Consultant will either:

1. indicate his approval of the requested amount;
2. indicate his approval of only a portion of the requested payment, stating in writing his reasons therefore; or
3. return the application for payment to the Contractor indicating, in writing, the reason for refusing to approve payment and the action necessary to make the payment request proper.

In the event of a total denial and return of the application for payment by the CEI Consultant, the Contractor may make the necessary corrections and resubmit the application for payment. The County shall, within thirty calendar days after County approval of an application for payment, pay the Contractor the amounts so approved. Provided, however, in no event shall the County be obligated to pay any amount greater than that portion of the application for payment approved by the CEI Consultant. Monthly payments to the Contractor shall in no way imply or constitute approval or acceptance of Contractor's Work.

9-5.1.2 Retainage: The County shall retain five percent of the gross amount of each monthly application for payment or five percent of the portion thereof approved by the CEI Consultant for payment, whichever is less. Such sums shall be accumulated and released to the Contractor with final payment.

Retainage will be determined for each job on multiple job Contracts. The County will not accept Securities, Certificates of Deposit or letters of credit as a replacement for retainage. Amounts withheld will not be released until payment of the final estimate.

9-5.2 Reserved

9-5.3 Withholding Payment:

9-5.3.1 Withholding Payment for Defective Work: If the County discovers any defective work or material prior to the final acceptance, or if the County has a reasonable doubt as to the integrity of any part of the completed work prior to final acceptance, then the County will not allow payment for such defective or questioned work until the Contractor has remedied the defect and removed any causes of doubt.

9-5.3.2 Withholding Payment for Failure to Comply: The County will withhold progress payments from the Contractor if he fails to comply with any or all of the following, as applicable, within 60 days after beginning work:

1. Comply with and submit required documentation relating to prevailing wage rate provisions, Equal Employment Opportunity, On-The-Job Training, and Affirmative Action;

2. Comply with the requirement to report all necessary information, including actual payments to DBEs, all other subcontractors and major suppliers, through the Internet based Equal Opportunity Reporting System;

3. Comply with or make a good faith effort to ensure employment opportunity for minorities and females in accordance with the required contract provisions for Federal Aid Construction Contracts, and

4. Comply with or make a good faith effort to meet On-The-Job Training goals.

The County will withhold progress payments until the Contractor has satisfied the above conditions.

9-5.3.3 Withholding Payment for Other Reasons: The County may withhold any payments otherwise due Contractor under this Agreement or any other agreement between the County and the Contractor, to such extent as may be necessary in the County's opinion to protect it from loss as a result of:

1. Third party claims filed or reasonable evidence indicating probable filing of such claims;
2. Failure of the Contractor to make payment properly to Subcontractors or for labor, materials, or equipment;
3. Reasonable doubt that the Work can be completed for the unpaid balance of the Contract amount;
4. Reasonable indication that the Work will not be completed within the Contract Time;
5. Unsatisfactory prosecution of the Work by the Contractor;
6. Failure to provide accurate and current red line documents, as-built drawings, or certified surveys;
7. Any other material breach of the Contract Documents.

If these conditions are not remedied or removed, the County may, after three calendar days' written notice, rectify the same at Contractor's expense. The County also may offset against any sums due Contractor the amount of any liquidated or unliquidated obligations of Contractor to the County.

9-5.4 Release of Retainage After Acceptance: When the Contractor has furnished the County with all submittals required by the Contract, such as invoices, DBE Participation Certification, properly executed and notarized Release and Affidavit, duly executed Surety's consent to final payment, EEO reports, materials certifications, certification of materials procured, etc., (excluding Contractor's letter of acceptance of final amount due and Form 21-A release) and the Director has determined that the measurement and computation of pay quantities is correct, the County may reduce the retainage to two percent of the Contract plus any amount that the County elects to deduct for defective work as provided in 9-5.3.

The County will not allow a semifinal estimate under the provisions of the above paragraphs unless the time elapsing between (1) acceptance of the project and receipt of all test

reports, invoices, etc., and (2) submission of the final estimate to the Contractor for acceptance, exceeds or is expected to exceed 30 days.

The County may deduct from payment estimates any sums that the Contractor owes to the County on any account. Where more than one project or job (separate project number) is included in the Contract, the County will distribute the reduced retainage as provided in the first paragraph of this subarticle to each separate project or job in the ratio that the Contract value of the work for the particular job bears to the total Contract amount.

9-5.5 Partial Payments for Delivery of Certain Materials:

9-5.5.1 General: The County will allow partial payments for new materials that will be permanently incorporated into the project and are stockpiled in approved locations in the project vicinity. Stockpile materials so that they will not be damaged by the elements and in a manner that identifies the project on which they are to be used.

The following conditions apply to all payments for stockpiled materials:

1. There must be reasonable assurance that the stockpiled material will be incorporated into the specific project on which partial payment is made.

2. The stockpiled material must be approved as meeting applicable specifications.

3. The total quantity for which partial payment is made shall not exceed the estimated total quantity required to complete the project.

4. The Contractor shall submit to the Director certified invoices to document the value of the materials received. The amount of the partial payment will be determined from invoices for the material up to the unit price in the Contract.

5. Delivery charges for materials delivered to the jobsite will be included in partial payments if properly documented.

6. Partial payments will not be made for materials which were stockpiled prior to award of the Contract for a project.

9-5.5.2 Partial Payment Amounts: The following partial payment restrictions apply:

1. Partial payments less than $5,000 for any one month will not be processed.

2. Partial payments for structural steel and precast prestressed items will not exceed 85% of the bid price for the item. Partial payments for all other items will not exceed 75% of the bid price of the item in which the material is to be used.

3. Partial payment will not be made for aggregate and base course material received after paving or base construction operations begin except when a construction sequence designated by the County requires suspension of paving and base construction after the initial paving operations, partial payments will be reinstated until the paving and base construction resumes.

9-5.5.3 Off Site Storage: If the conditions of 9-5.5.1 are satisfied, partial payments will be allowed for materials stockpiled in approved in-state locations. Additionally, partial payments for materials stockpiled in approved out-of-state locations will be allowed if the conditions of 9-5.5.1 and the following conditions are met:

1. Furnish the County a Materials Bond stating the supplier guarantees to furnish the material described in the Contract to the Contractor and County. Under this bond, the Obligor shall be the material supplier and the Obligees shall be the Contractor and the Lee County

Board of County Commissioners. The bond shall be in the full dollar amount of the bid price for the materials described in the contract.

2. The following clauses must be added to the construction Contract between the Contractor and the supplier of the stockpiled materials:

"Notwithstanding anything to the contrary, <supplier> will be liable to the Contractor and Lee County, Florida County<supplier> default in the performance of this agreement."

"Notwithstanding anything to the contrary, this agreement, and the performance bond issued pursuant to this agreement, does not alter, modify, or otherwise change the Contractor's obligation to furnish the materials described in this agreement to Lee County, Florida County."

3. The agreement between the Contractor and the supplier of the stockpiled materials must include provisions that the supplier will store the materials and that such materials are the property of the Contractor.

9-5.6 Certification of Payment to Subcontractors: The term "subcontractor," as used herein, includes persons or firms furnishing materials or equipment incorporated into the work or stockpiled for which the County has made partial payment and firms working under equipment-rental agreements. The Contractor is required to pay all subcontractors for satisfactory performance of their Contracts before the County will make a further progress (partial) payment. The Contractor shall also return all retainage withheld to the subcontractors within 30 days after the subcontractor's work is satisfactorily complete, as determined by the County. Prior to receipt of any progress (partial) payment, the prime contractor shall certify that all subcontractors having an interest in the Contract were paid for satisfactory performance of their Contracts and that the retainage is returned to subcontractors within 30 days after satisfactory completion of the subcontractor's work. Submit this certification in the form designated by the County.

Within 30 days of the Contractor's receipt of the final progress payment or any other payments thereafter, except the final payment, the Contractor shall pay all subcontractors and suppliers having an interest in the Contract for all work completed and materials furnished. The County will honor an exception to the above when the Contractor demonstrates good cause for not making any required payment and submits written notification of any such good cause to both the County and the affected subcontractors or suppliers within said 30 day period.

The Contractor shall indemnify and provide defense for the County when called upon to do so for all claims or suits against the County, by third parties, pertaining to Contractor payment or performance issues arising out of the Contract. It is expressly understood that the monetary limitation on the extent of the indemnification shall be the approved Contract amount, which shall be the original Contract amount as may be increased by subsequent Supplemental Agreements.

9-6 Record of Construction Materials.

9-6.1 General: For all construction materials used in the construction of the project, (except materials exempted by 9-6.2), preserve for the County's inspection the invoices and records of the materials for a period of three years from the date of completion of the project. Apply this requirement when subcontractors purchase materials, and obtain the invoices and other materials records from the subcontractors. By providing the materials, the Contractor certifies that all invoices will be maintained for the required period.

9-6.2 Non-Commercial Materials: The provisions of 9-6.1 do not apply to materials generally classed as non-commercial, such as fill materials, local sand, sand-clay, or local materials used as stabilizer.

9-7 Disputed Amounts Due the Contractor.

The County reserves the right to withhold from the final estimate any disputed amounts between the Contractor and the County. The County will release all other amounts due, as provided in 9-8.

9-8 Acceptance and Final Payment.

9-8.1 Acceptance and Final Payment Documents: Whenever the Contractor has completely performed the work provided for under the Contract and the Director has performed a final inspection and made final acceptance (as provided in 5-10 and 5-11), and subject to the terms of 8-11, the Director will prepare a final estimate showing the value of the work as soon as the Director makes the necessary measurements and computations. The Director will correct all prior estimates and payments in the final estimate and payment. The County will pay the estimate, less any sums that the County may have deducted or retained under the provisions of the Contract, as soon as practicable after final acceptance of the work, along with all executed supplemental agreements received after final acceptance.

If the Contractor fails to furnish all required Contract Documents as listed in (1) through (9) below within 90 days of the County's offer of final payment or request for refund of overpayment, the County will not issue Acceptance and remaining retainage will continue to be withheld..

1. The Contractor has agreed in writing to accept the balance due or refund the overpayment, as determined by the County, as full settlement of his account under the Contract and of all claims in connection therewith, or the Contractor, has through the use of the Qualified Acceptance Letter, accepted the balance due or refunded the overpayment, as determined by the County, 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 County. To receive payment based on a Qualified Acceptance Letter, define in writing the dispute or pending claim with full particular of all items of all issues in dispute, including itemized amounts claimed for all particulars of all items, and submit it as part of the Qualified Acceptance Letter. The Contractor further agrees, by submitting a Qualified Acceptance Letter that any pending or future claim or suit is limited to those particulars, including the itemized amounts, defined in the original Qualified Acceptance Letter, and that he will commence with any such arbitration claim or suit within 820 calendar days from and after the time of final acceptance of the work and that his failure to file a formal claim within this period constitutes his full acceptance of the Director'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 County in the performance of the Contract. Include with the listed tort liability exceptions, if any, evidence of adequate insurance coverage as required in 7-13.

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 complied with and settled all requirements pertaining to any wage-rate provisions.

6. The Contractor has submitted all required mill tests and analysis reports to the Director.

7. The Contractor has furnished the Construction Compliance with Specifications and Plans Certification. Provide the Director with a notarized final certification of compliance with the requirements of Section 105 to accompany the final estimate. Certification must be on a form provided by the Director.

8. The Contractor has submitted and the County has accepted all as-built drawings and certified surveys.

9. The Contractor has furnished all required manufacturers' warranties to the Director.

9-8.2 Reserved

9-9 Reserved

9-10 Offsetting Payments.

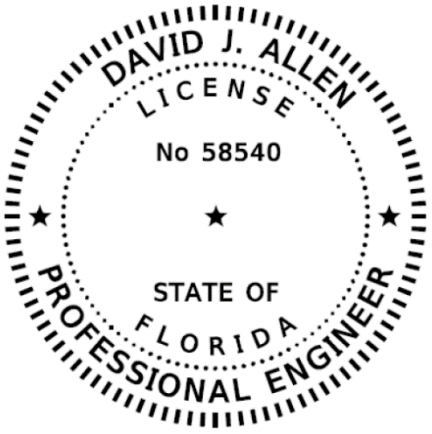
1. After settlement or final adjudication of any claim of the County for work done pursuant to a construction contract with any party, the County may offset such amount from payments due for work done on any construction contract, excluding amounts owed to subcontractors, suppliers, and laborers, which it has with the party owing such amount if, upon demand, payment of the amount is not made within 60 days to the County.

2. Offsetting any amount pursuant to (1) above shall not be considered a breach of Contract by the County.

EXHIBIT I
SUPPLEMENTAL SPECIFICATIONS

INDEX

I hereby certify that these Supplemental Specifications have been properly prepared by me, or under my responsible charge:

Supplemental Specification Section(s): 8-3.2, 102, 200 and 430		
Signature:		
Date:	March 12, 2024	
Engineer of Record:	David Allen, P.E.	
Florida License No.:	58540	
Firm Name:	Stantec	
Firm Address:	3905 Crescent Park Dr	
City, State, Zip Code:	Riverview, FL 33578	
Cert. of Authorization No:		

DIVISION I-GENERAL REQUIREMENTS AND COVENANTS

PROSECUTION AND PROGRESS - PROSECUTION OF WORK - GENERAL (SUBMISSION OF WORKING SCHEDULE).
(REV 5-20-21) (FA 7-7-21) (FY 2023-24)

SUBARTICLE 8-3.2 is deleted and the following substituted:

8-3.2 General: For this Contract, submit the following schedules and reports.

8-3.2.1 Contract Schedule: Submit to the Engineer for acceptance a Critical Path Method (CPM) Contract Schedule for the project within 30 calendar days after execution of the Contract or at the preconstruction conference, whichever is earlier.

The Contract Schedule shall include detailed schedule diagrams and schedule data as described below that shows how the Contractor intends to complete the work within the Contract Time. Any weather days that affect the Critical Path will be added as they occur. When the project includes a Maintenance of Traffic plan, the work breakdown structure (WBS) or project activity codes for the Contract Schedule shall be consistent with the Contract Maintenance of Traffic plan, showing activities for each discrete Contract activity to be accomplished within each Maintenance of Traffic phase. When the project does not include a Maintenance of Traffic plan, the WBS or project activity codes shall be consistent with the phasing shown in the Contract Documents. Include activities for deliverables and reviews in the schedule. Sufficient liaison shall be conducted and information provided to indicate coordination with utility owners having facilities within the project limits. The schedule must incorporate the utility work schedules included in the Contract Documents, unless changed by mutual agreement of the utility company, the Contractor and the Department. Show the interdependence (logic) of the utility work schedule activities with other schedule activities in the Contract Schedule for acceptance by the Department, unless otherwise approved by the Engineer.

Failure to include any element of work or any activity relating to utility work will not relieve the Contractor from completing all work within the Contract Time at no additional time or cost to the Department, notwithstanding the acceptance of the schedule by the Department.

The Contract Schedule may indicate a completion date in advance of the expiration of Contract Time. However, the Department will not be liable in any way for the Contractor's failure to complete the project prior to expiration of Contract Time. Any additional costs, including extended overhead incurred between the Contractor's scheduled completion date and the expiration of Contract Time, shall be the responsibility of the Contractor. The Contractor shall not be entitled to claim or recover any such costs from the Department.

Acceptance by the Engineer of the Contract Schedule or any updates shall not be construed as approval of any particular construction methods or sequence of construction or to relieve the Contractor of its responsibility to provide sufficient materials, equipment and labor to guarantee the completion of the contract in accordance with the Contract Documents.

8-3.2.2 Schedule Submissions: Develop the schedule in Precedence Diagram Method (PDM) format.

Each schedule submission and monthly update shall include a minimum of the following six items:

1. Submit the files electronically in the current Department version of Oracle Primavera P6 format by exporting the full schedule to an .xer file format.

2. A Gantt chart grouped by WBS, then phase, sorted by early start then total float. The chart shall include the following columns:

a. Activity ID
b. Activity Name
c. Calendar
d. Activity Type
e. Original Duration
f. Remaining Duration
g. Duration % Complete
h. Early Start
i. Early Finish
j. Late Start
k. Late Finish
l. Total Float

The chart shall also include activity bars using the Oracle Primavera P6 default color coding for the bars. The chart shall be submitted as a Portable Document Format (.pdf) file and formatted on 11 inch by 17 inch landscape oriented sheets, with the activity table and bars.

3. A Gantt chart with the same columns and bars listed in 8-3.2.2(2), but filtered for the longest path, not grouped but sorted by early start, then early finish. The chart shall be submitted as a.pdf file and formatted on 11 inch by 17 inch landscape oriented sheets, with the activity table and bars.

4. The Schedule log for the calculated schedule, submitted as a.pdf file and formatted on 8-1/2 inch by 11 inch portrait oriented sheets.

5. A schedule narrative report with the following information:

a. Current project schedule status and identify potential delays

b. A description of the progress made since the previous schedule submission

c. Objectives for the upcoming 30 calendar days

d. Indicate if the project is on schedule, ahead of schedule or behind schedule.

1. If ahead or behind schedule, indicate the specific number of calendar days.

2. If behind schedule, include a detailed recovery plan that will put the schedule back on track or identify the alleged delay event for which a preliminary request for an extension of Contract Time has been submitted, which if granted by the Department, will account for the amount of time the project is behind schedule, or provide a fully supported request for a Contract Time extension, which if granted by the Department, will account for the amount of time the project is behind schedule.

e. Description of the current critical path and indicate if the critical path has changed in the last 30 calendar days.

f. Discussion of current successes or problems that have affected either the critical path’s length or have caused a shift in the critical path within the last 30 calendar days.

g. Identify specific activities, progress, or events that may reasonably be anticipated to impact the critical path within the next 30 calendar days, either to affect its length or to shift it to an alternate path.

h. List all changes to schedule logic, calendars, calendar assignments, activity types, activity names, changes to constraints, added activities or duration changes (original and remaining) that have been made to the schedule since the previous submission.

For each change, describe the basis for the change and specifically identify the affected activities by activity ID.

i. Identify any and all activities, either in progress or scheduled to occur within the following 30 days that require Department participation, review, approval, etc.

6. A detailed logic report that provides a list of activities in the schedule sorted by activity ID, no grouping and submitted as a .pdf file and formatted on 8-1/2 inch by 11inch portrait oriented sheets. For each activity listed, the report shall include the activity's predecessors and successors, including the relationship type and lag.

For each submission of the Contract Schedule and monthly update, the Engineer will have 21 days to accept the Contract Schedule or monthly update or to schedule a meeting, if needed, within that time, with the Contractor to resolve any problems that prevent acceptance of the schedule. Attend the meeting scheduled by the Engineer, and submit a corrected schedule to the Engineer within seven days after the meeting. The process will be continued until a Contract Schedule or monthly update is accepted or accepted as noted by the Engineer.

Upon the Engineer's acceptance of the Contract Schedule, submit monthly updates of the Contract Schedule, including all months prior to the start of construction, reflecting progress through the monthly estimate cut-off date within 8 calendar days after the monthly estimate cut-off date.

The Engineer may withhold monthly payments due for failure of the Contractor to submit an acceptable schedule or monthly updates within the time frame described herein.

8-3.2.3 Schedule Content: All schedule submissions shall comply with the following content guidelines as appropriate to the specific submission:

The schedules shall include the sequence, order, and interdependence of major construction milestones and activities. Include procurement of project specific materials and equipment that require submittals and are not readily available, long-lead time items, and key milestones identified by the Contract.

Show the sequence, order, and interdependence of activities in which the work is to be accomplished. Include allowance for Department review, acceptance and return of submittals, samples and shop drawings where Department acceptance is specifically required (in accordance with 5-1.4.6 of the standard specifications). In addition to construction activities, schedule activities shall include the submittals, procurement, and Department or Utility activities:

1. Submittal activities shall include submittal preparation, Department review, and acceptance of submittals. If the Department's action on any submittal is "Not Accepted" or "Revise and Resubmit", a new series of submittal preparation activities shall be inserted into the schedule. Predecessor for the new submittal preparation activity will be the

original acceptance activity and the successor of the new acceptance activity will be the fabrication/delivery activity for the equipment or material.

2. Procurement activities shall include all project specific materials and equipment that require submittals and are not readily available, fabrication of special material and equipment, and their installation and testing.

3. Show activities of the Department or Utilities that affect progress and contract-required dates for completion of all or parts of the work.

Detailed schedule data: shall conform to the following:

1. All activities shall be assigned to a specific project calendar within the software. Specific project calendars will be defined within the software to include planned work days and planned non-work days. These project calendars will include both Contractor and Contract defined holidays and suspension days as non-workdays. The use of global calendars is not permitted. Project calendars shall not inherit holidays from global calendars. Work shifts identified for each project calendar shall be consistent with the Contractor's planned workdays. Actual start and finish date times shall be consistent with the work shift hours on the calendar assigned to the activities.

2. A cost account drawdown schedule depicting amount earned by month through project completion. The sum total of the cost accounts shall be equal to the current contract value.

3. At a minimum, each schedule activity shall contain codes by:

a. Responsibility: for items of work that are not in control of the Contractor including, but not be limited to, Department, Utility, etc.

b. Phasing: identify the appropriate Maintenance of Traffic phase or subphase.

The required coding can be accomplished by WBS codes or project activity codes.

4. Key milestones as identified by Contract. At a minimum, the start and finish of each Maintenance of Traffic phase or subphase shall be represented by a milestone activity. Milestone activities shall be start or finish milestone type activities, as appropriate.

5. All non-procurement activities must be less than or equal to 20 workdays unless approved by the Engineer. Sufficient explanation for activities over 20 days shall be provided for the Engineers review and approval.

6. All activities must include adequate detailed activity descriptions to describe the work that is included. In each activity, provide sufficient detail so that the amount of work the activity involves is clearly communicated.

7. Only two open-ended activities (the first and the last) are allowed.

8. Constraints shall only be used for "project start," and "project completion." Constraints shall not override logic. The project start constraint shall be the Contract execution date. The project completion date shall be the Contract completion date plus any Contract defined holidays and suspension days included on the longest path. The use of any other imposed constraints is not allowed without specific approval by the Engineer. Any other desired constraints must be submitted to the Engineer with the rationale for the use of each desired additional constraint. If allowed by the Engineer, the rationale should be recorded in the activity's notebook field. Mandatory constraints (start and finish) violate network logic and shall not be used.

9. Out of sequence progress shall be corrected on each monthly update by modifying the schedule logic so that the logic accurately depicts the actual sequence of the work. The Retained Logic setting shall be used when calculating the schedule.

10. All changes to activities shall be recorded with a note in the activity notebook field. The notebook entry shall include, as a minimum, the date and reason for the change, as well as reference to a document wherein the Engineer acknowledges and accepts the change.

11. The use of resource leveling, either manual or automatic, is prohibited.

12. Activities shall not be deleted from the schedule. If an activity is not required, then upon approval from the Engineer, the Contractor shall provide actual start and finish dates equal to the date of the Engineer's approval, shall add the word "Removed" to the activity name and shall make a notebook entry explaining the reason for removing the activity from the planned work.

13. Activities shall be added to the schedule upon notifying the Engineer when it is determined that a Contract work element was omitted from the previous accepted Contract schedule or update or if work is added to the Contract, or to reflect a time extension in accordance with 8-7.3.2.

14. Activity names shall only be changed to reflect changes to the scope of the work element represented by the activity, not as a way to remove and replace activities. Changes to activity names shall be approved by the Engineer.

15. Unless otherwise approved by the Engineer, activity types shall be defined as milestones, level-of-effort, WBS summary or task dependent. Resource dependent type shall not be used. All activities shall have percent complete type set to duration and duration type set to either fixed duration and unit/time or fixed duration and units.

8-3.2.4 Weekly Meetings: Attend weekly meetings scheduled by the Engineer to discuss Contract progress, near term scheduled activities, including utility relocations, problems and their proposed solutions. Submit a Three-Week Planning Schedule at each weekly meeting, showing the Contract schedule activities completed in the previous week and planned for the next two weeks. Develop the Three-Week Planning Schedule in Gantt chart format from the updated Contract schedule, identifying completed, current and planned activities. Designate all activities that are controlling work items as determined by the currently accepted Contract Schedule

8-3.2.5 Float: Float is defined as the amount of time the finish of an activity can be delayed. Two kinds of float are possible: Total float is how much an activity can be delayed without affecting the finish date of the project or an intermediate deadline (constraint); it is the difference between the late finish date and the early finish date. Free float is how much an activity can be delayed without affecting its earliest successor.

Float is not for the exclusive use or benefit of either the Department or the Contractor.

Use of float suppression techniques, such as preferential sequencing (arranging critical path through activities more susceptible to Department caused delay), special lead/lag logic restraints, zero total or free float constraints, extended activity times, positive relationship lags, or imposing constraint dates other than as required by the contract, shall be cause for rejection of the project schedule or its updates. The use of finish-to-start lags greater than zero days, start-to-start lags that exceed the duration of the predecessors, or finish-to-finish lags that exceed the duration of the successor, shall not be used without the expressed approval of the

Engineer. The use of Resource Leveling, or similar software features, for the purpose of artificially adjusting activity durations to consume float and influence the critical path is expressly prohibited.

Negative float shall not be a basis for requesting time extensions. Any extension of time shall be addressed in accordance with 8-3.2. 7. Scheduled completion dates that extend beyond the Contract completion date, evidenced by negative float, may be used in computations for assessment of payment withholdings. The use of this computation is not to be construed as a means of acceleration.

8-3.2.6 Critical Path: The critical path shall be defined as the longest path and is represented by the longest logical path through the remaining activities, resulting in the earliest calculated completion date. There may be more than one longest path in the schedule. However, the use of float suppression techniques as described in 8-3.2.5 shall not be used to force the schedule to have more than one longest path.

8-3.2.7 Time Extensions: The Contractor is responsible for submitting a request for Contract Time extension in accordance with 8-7.3.2. An extension of time shall be considered only to the extent that an event impacts the completion date of the schedule such that the impacted completion date is later than the Contract completion date as adjusted previously. The Pre-event Schedule is defined as the latest accepted update of the Contract schedule, statused (actual start dates added, actual finish dates added, remaining durations adjusted) to the end of the day before the start of the event. The Post-event Schedule is defined as the accepted update of the Contract Schedule just after the end of the event and destatused (actual start dates removed, actual finish dates removed, remaining durations adjusted) to the end of the last day of the event.

As a minimum, time extension requests shall contain:

1. A descriptive summary of the event
2. A written analysis supported by a:
    a. Pre-event Schedule
    b. Post-event Schedule
3. Schedule submittal items 1, 2, 3 and 4 required in 8-3.2.2 shall be provided for the Pre-event and Post-event schedules

Time extensions shall not be considered for proposals that do not include full documentation described above. Once a time extension has been approved by the Engineer, the Contract completion date shall be changed accordingly.

8-3.2.7 Performance of Work: By submitting a schedule, the Contractor is making a positive assertion that the project has been and will be constructed in the order indicated in the schedule. Prosecute the work in accordance with the latest accepted Contract Schedule or update. Any costs associated with meeting milestones and completing the project within the authorized Contract Time will be borne solely by the Contractor.

8-3.2.8 As-Built Schedule: Submit an as-built schedule along with the Qualified Acceptance Letter if the Contactor elects the use of the Qualified Acceptance Letter as described in 9-8.1. The as-built schedule shall describe the actual order and start and stop times for all activities by the Contractor.

DIVISION II-CONSTRUCTION DETAILS

SECTION 102 – MAINTENANCE OF TRAFFIC (LCDOT 09/15/2023)

Article 102-4: Delete Article 102-4 in its entirety and substitute the following:

The Contractor shall submit a complete Traffic Control Plan (TCP) to the Engineer for review and approval at the preconstruction meeting. Prepare the TCP in conformance with and in the form prescribed in the current version of the FDOT Design Manual, FDOT Standard Plans – Index 102 series and the MUTCD. Indicate in the plan a TCP for each phase of activities. Take responsibility for identifying and assessing any potential impacts to a utility that may be caused by the TCP, and notify the County in writing of any such potential impacts to utilities. The TCP shall be signed and sealed by a professional engineer duly registered in the State of Florida.

Engineer's approval of the TCP does not relieve the Contractor of sole responsibility for all utility impacts, costs, delays or damages, whether direct or indirect, resulting from Contractor initiated changes in the design or construction activities from those depicted in the original Contract Documents, and which effect a change in utility work different from that shown in the utility plans, joint project agreements, interlocal agreements or utility relocation schedules.

The County reserves the right to reject any Traffic Control Plan. Obtain the Engineer's written approval before beginning work using a TCP. The Engineer's written approval is required for all modifications to the TCP. The Engineer will only allow changes to the TCP without proper documentation on an emergency basis.

Pedestrian and/or bicycle traffic must be safely and continuously maintained through, or around, work zones on highway or streets where pedestrian and bicyclists were permitted at the start of the project. The Contractor shall submit a plan for approval signed and sealed by a professional engineer duly licensed in the State of Florida for the safe passage of pedestrian and bicycle traffic prior to closure of any existing pedestrian facility. Facilities constructed to specifically provide access for pedestrians in or around work zones must be consistent with the current United States Access Board-PROWAG. The plan shall detail the rerouting of users, duration of closure and proposed construction methods for any temporary facility.

All costs for maintenance of traffic including preparation of Traffic Control Plan shall be in included in the price bids for Pay Item 102-1 – Maintenance of Traffic, except as expressly provided for in other pay items in the contract.

Subarticle 102-9.15: Delete Subarticle 102-9.15 in its entirety and substitute the following:

Temporary Traffic Detection Technology – Maintain all existing actuated or traffic responsive mode signal operations for main and side street movements for the duration of the contract and restore any loss of detection within 12 hours. Video detection shall be

installed at the beginning of the project before any loss of detection has occurred. The contractor shall furnish, install and operate video detection using technology approved by Lee DOT Traffic Division and as listed in Lee County DOT Traffic Plan Specifications posted on the county website at https://www.leegov.com/dot/traffic/trafficstandard

SECTION 200 - PRIMING AND MAINTAINING

Article 200-8.1: The following Article shall be added in its entirety:

The Contractor shall select the particular type of base material and prime coat material that are compatible and adhere together. If the prime coat is damaged by subsequent construction equipment, including the paving machine, construction shall be stopped, and the base/prime shall be removed and replaced.

SECTION 430 – PIPE CULVERTS AND STORM SEWERS (LCDOT 10/27/2017)

Article 430-3: Articles 430-3.1 is modified as follows:

Pipe material for storm sewer or cross drain installations under pavement shall consist of steel reinforced concrete pipe in accordance with Section 449 and shall be a minimum of Class III or HE-III.

DIVISION III-MATERIALS

Reserved

EXHIBIT J
SPECIAL PROVISIONS

1. CONTRACT TIME

Contractor shall perform the contracted work fully, entirely, and in accordance with the Contract Documents within the Contract Time specified herein. If the Contractor fails to complete the work within the time stipulated, liquidated damages will apply in accordance with Standard Specification Article 8-10 Liquidated Damages for Failure to Complete the Work.

Contract Time: 365 Calendar Days Commencement Date to Final Acceptance

2. PERMITS

In accordance with Article 7-2 of Division I, permits and licenses procured by the County are listed below and attached hereto.

a. Lee County Development Order, LDO2023-00421, approved 10-30-2023.
b. FDEP CCCL Permit Exemption Pursuant to 161.053/161.052

3. GEOTECHNICAL INFORMATION

Certain subsurface explorations and/or testing were conducted by the County in the design of this Project. Reports summarizing this work are listed below and attached hereto. The attached information is NOT a part of the Contract Documents and is provided as a supplement for informational purposes only. The County is not responsible for the accuracy, completeness or usefulness thereof. The County makes no warranty, express or implied, for the data, interpretations or opinions contained therein. Any person or party that utilizes the attached information does so purely at its own risk, and the County disclaims any responsibility or liability for any user's reliance upon the information.

a. 15-2562 David Douglas Associates-Estero Blvd-Segment 2.pdf
b. 16-1668 David Douglas Associates-Estero Blvd-Segment 3 Geotechnical Report.pdf
c. 16-1668 David Douglas Associates-Estero Blvd-Segment 4 Geotechnical Report
d. 16-1168 David Doulas Associates-Estero Blvd-Segment 5 Geotechnical Report
e. 16-1668 David Doulas Associates-Estero Blvd-Segment 6 Geotechnical Report 2.pdf

4. WARRANTY

If within three (3) year after Final Acceptance, any Work is found to be Defective due to base failure, Contractor shall correct it promptly after receipt of written notice from the County. Prior to Final Payment, Contractor shall provide and maintain through three (3) years after final acceptance a Warranty Bond for base failures. Contractor will repair damage caused by the failure and/or repair.

5. MATERIAL TESTING

For all naturally occurring excavated materials the County reserves the right to sample and test the material at the source at the County's cost and sole discretion. The intent of this testing would be to confirm the material produced at the site meets specification requirements prior to delivery and acceptance at the project site. The County shall notify the contractor and supplier as soon as discrepancies are noticed, if any. Once notified of material issues the Contractor and supplier shall submit to the County for approval a plan to immediately rectify material properties and consistency prior to delivery and acceptance at the project site.

6. UTILITY COORDINATION

The contractor is advised that they will be required to coordinate with other contractors within the utility construction limits and adjacent to them. This coordination could affect staff time, amounts of production, construction sequencing, space availability, etc. These coordination efforts should be considered in the preparation of the bid as they will be considered incidental to the overall utility construction and no separate payment will be provide for them.

Lee County Community Development

Writer's Direct Dial Number: 239-533-8890

October 27, 2023

Karla Dias
Stantec
1821 Victoria Ave
cape coral, 33901

RE: Estero Blvd
LDO2023-00421
Type D Limited Review

Dear Karla Dias:

Your plans for the above-referenced project have been reviewed and approved for a Development Order with stipulation(s). The Development Order is granted for the following:

Improve lighting at crosswalk locations along Estero Blvd from S Crescent St. to Big Carlos Pass and from Palermo Cir. to Estrellita Dr

This approval does not relieve the development from the responsibility to obtain all other necessary Federal, State and local permits.

THIS DEVELOPMENT ORDER WILL BE VALID FOR A PERIOD OF SIX (6) YEARS AND IS SCHEDULED TO EXPIRE ON 10/27/2029.

If you have any questions concerning this matter, please contact this office.

Sincerely,

DEPARTMENT OF COMMUNITY DEVELOPMENT
Development Services Section

Electronically signed on 10/30/2023 by
Ohdet Kleinmann, Development Services Manager
Lee County Development Services

Approval is subject to the following stipulation(s) and/or comment(s):

Development Services Comments:
INFORMATIONAL: Please be advised that, the review of this development order, limited or otherwise, is solely for the improvements proposed in the Lee County right-of-way within an incorporated area per LCLDC Section 10-174(4)(c), and 10-297.

STIPULATION: All fixtures installed as part of this development order must comply with the submitted Estero Photometric Study dated August 25, 2023 included in the official project file.

Please contact Brian Roberts at BRoberts@leegov.com or by calling 239-533-8890 with any questions regarding the above review comments.

From: Cramer, Kelly <Kelly.Cramer@FloridaDEP.gov>
Sent: Friday, July 14, 2023 6:28 AM
To: Dias, Karla
Subject: FW: Exemption Determination Pursuant to section 161.053 or 161.052, F.S - Estero Blvd. at

FYI

Kelly Cramer
Florida Department of Environmental Protection
Office of Resilience and Coastal Protection
Coastal Construction Control Line (CCCL)
Field Permitting and Compliance
Lee, Collier, Charlotte, & Monroe Counties
PO Box 2549, Ft. Myers, FL. 33902-2549
DEP Cell #: 239-770-7502 (NO TEXTS)
Fax #:850-412-0590

CCCL PERMITTING:
For instructions on accessing forms and submitting them, and other documents to DEP please visit our website at: https://floridadep.gov/rcp/coastal-construction-control-line/content/coastal-construction-control-line-cccl-forms or for more information email: CCCL@dep.state.fl.us

Gopher tortoises/Demolition with excavation/Soil Borings:
This is to inform you that you need prior authorization to perform the relocation/demolition with excavation, soil boring activities in any project seaward of the Coastal Construction Control Line. Pursuant to Section 161.053(2)(a), Florida Statutes ("F.S."), a CCCL permit must be obtained in locations seaward of the CCCL prior to: construction of any structure; excavation; removal of any beach material; alteration of existing ground elevations; driving any vehicle on, over, or across any sand dune; or damaging or causing to be damaged such sand dune or the vegetation growing thereon.

Use the link below to search sites in relation to the CCCL on your own:
https://ca.dep.state.fl.us/mapdirect/?focus=beaches

This site gives you additional information as well as on the left you can download GIS data for the CCCL Lines. https://floridadep.gov/rcp/coastal-construction-control-line/content/locate-coastal-construction-control-line-cccl

Additional web resources:
DEP Home Page DEP Business Portal ERP Online Help

From: Spanier, Jason <Jason.Spanier@FloridaDEP.gov>
Sent: Thursday, July 13, 2023 2:11 PM
To: Cramer, Kelly <Kelly.Cramer@FloridaDEP.gov>; Aarons, Douglas <Douglas.Aarons@FloridaDEP.gov>; Jackson, Celora A. <Celora.A.Jackson@FloridaDEP.gov>
Subject: RE: Exemption Determination Pursuant to section 161.053 or 161.052, F.S - Estero Blvd. at

Hi Kelly,
This would be exempt as I'm assuming they are mono-post but also because we don't issue stand alone CCCL permits for just lighting. Obviously, they'll want to be consistent with their own lighting ordinance, if they have one. In addition, you can always forward the link below which might be helpful.

Thanks,
Jason

https://myfwc.com/wildlifehabitats/wildlife/sea-turtle/lighting/

Jason M. Spanier
Office of Resilience and Coastal Protection
Florida Department of Environmental Protection
jason.spanier@floridadep.gov
Phone: (850) 510-5619

From: Cramer, Kelly <Kelly.Cramer@FloridaDEP.gov>
Sent: Thursday, July 13, 2023 1:33 PM
To: Aarons, Douglas <Douglas.Aarons@FloridaDEP.gov>; Spanier, Jason <Jason.Spanier@FloridaDEP.gov>; Jackson, Celora A. <Celora.A.Jackson@FloridaDEP.gov>
Subject: FW: Exemption Determination Pursuant to section 161.053 or 161.052, F.S - Estero Blvd. at
Importance: High

Good afternoon,

How do I handle this one? Field permit with coordination with FWC?

Kelly Cramer
Florida Department of Environmental Protection
Office of Resilience and Coastal Protection
Coastal Construction Control Line (CCCL)
Field Permitting and Compliance
Lee, Collier, Charlotte, & Monroe Counties
PO Box 2549, Ft. Myers, FL. 33902-2549
DEP Cell #: 239-770-7502 (NO TEXTS)
Fax #:850-412-0590

CCCL PERMITTING:
For instructions on accessing forms and submitting them, and other documents to DEP please visit our website at: https://floridadep.gov/rcp/coastal-construction-control-line/content/coastal-construction-control-line-cccl-forms or for more information email: CCCL@dep.state.fl.us

Gopher tortoises/Demolition with excavation/Soil Borings:
This is to inform you that you need prior authorization to perform the relocation/demolition with excavation, soil boring activities in any project seaward of the Coastal Construction Control Line. Pursuant to Section 161.053(2)(a), Florida Statutes ("F.S."), a CCCL permit must be obtained in locations seaward of the CCCL prior to: construction of any structure; excavation; removal of any beach material; alteration of existing ground elevations; driving any vehicle on, over, or across any sand dune; or damaging or causing to be damaged such sand dune or the vegetation growing thereon.

Use the link below to search sites in relation to the CCCL on your own:
https://ca.dep.state.fl.us/mapdirect/?focus=beaches

This site gives you additional information as well as on the left you can download GIS data for the CCCL Lines. https://floridadep.gov/rcp/coastal-construction-control-line/content/locate-coastal-construction-control-line-cccl

Additional web resources:
DEP Home Page DEP Business Portal ERP Online Help

From: Dias, Karla <karla.dias@stantec.com>
Sent: Monday, June 19, 2023 11:22 AM
To: Cramer, Kelly <Kelly.Cramer@FloridaDEP.gov>
Subject: Exemption Determination Pursuant to section 161.053 or 161.052, F.S - Estero Blvd. at

Good Morning Kelly,

I hope you are doing well.

I am following up on my phone call and message I left for you today. Back in 2020, you determined that our traffic light project at the Estero Blvd was exempt from the CCCL General Permit. Please see attached e-mail string on our correspondence.

Lee County would like to add some turtle criteria lighting poles at the crosswalk along Estero Blvd and I would like to confirm with you that the addition of lights at the crosswalks still falls under the exemption.

Please advise, and if you have any question, please do not hesitate to contact me. **(Please see attached lighting plans with the addition of light poles at crosswalks). Light poles are added throughout the project from page L-10 thru L-66.**

Thank you again and have a great day.

Karla Dias
Civil Engineer - EIT

Direct: 239 347-5528
karla.dias@stantec.com

Stantec
1821 Victoria Avenue Suite 1
Fort Myers FL 33901-3436

GFA INTERNATIONAL

FLORIDA'S LEADING ENGINEERING SOURCE

Report of Geotechnical Exploration

Estero Boulevard – Segment 2
Fort Myers Beach, Lee County, Florida

May 2, 2016
GFA Project No.: 15-2562

For: David Douglas Associates, Inc.

May 2, 2016

Mr. George R. Brinson, Jr., P.E.
David Douglas Associates, Inc.
1821 Victoria Ave.
Fort Myers, FL 33901
Phone: (239) 337-3330
GB@DDAI-Engineers.com

Site: **Geotechnical Engineering Services Report**
Estero Boulevard – Segment 2
Fort Myers Beach, Lee County, Florida
GFA Project # 15-2562

Dear Mr. Brinson:

GFA International, Inc. (GFA) has completed the subsurface exploration and geotechnical engineering evaluation for the above-referenced project in accordance with the geotechnical and engineering service agreement for this project. The scope of services was completed in accordance with our Geotechnical Engineering Proposal (15-2562.00), planned in conjunction with and authorized by you.

EXECUTIVE SUMMARY

The purpose of our subsurface exploration was to classify the nature of the subsurface soils and general geomorphic conditions and evaluate their impact upon the proposed construction. This report contains the results of our subsurface exploration at the site and our engineering interpretations of these, with respect to the project characteristics described to us including providing recommendations for site preparation and the design of the foundation system.

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 7,300 feet of Estero Blvd. Documents provided to GFA at the time of this report were Preliminary Plans (30%) completed by T.Y. Lin International, 63 pages updated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

The following was completed for this study:

- Two (2) Standard Penetration Test (SPT) borings to depths of approximately 25 feet below ground surface (BGS).
- Fifteen (15) Hand Auger (HA) borings to depths of approximately 5 feet BGS.
- Three (3) Field Percolation Test borings to depths of approximately 5 feet BGS.
- Eight (8) Asphalt Cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

The subsurface soil conditions encountered at this site generally consists of very loose to medium dense sand (SP) and sand with silt (SP-SM) with shell fragments to the boring termination depths. Please refer to "Appendix D – Record of SPT and HA Boring Logs" for a detailed account of each boring.

The following report presents the project information made available to us, our observation of the existing site conditions, the subsurface geotechnical information obtained during this exploration, and our recommendations on the suitability of the soils encountered for the force main replacement. Also included with this report are the results of our field and laboratory testing. The assessment of site environmental conditions for the presence of pollutants in the soil, rock, and groundwater at this site was not included as a part of our services.

We appreciate the opportunity to be of service to you on this project and look forward to a continued association. Please do not hesitate to contact us if you have any questions or comments, or if we may further assist you as your plans proceed.

Respectfully Submitted,
GFA International, Inc.
Florida Certificate of Authorization Number 4930

Lee S. Khan, E.I.
Staff Engineer

Paul J. D'huyvetter, P.E.
Professional Engineer # 59716
State of Florida

Copies: 2, Addressee
1, CD-R

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Scope of Services

The objective of our geotechnical services was to collect subsurface data for the subject project, summarize the test results, and discuss any apparent site conditions that may have geotechnical significance for force main replacement. The following scope of service is provided within this report:

1. Prepare records of the soil boring logs depicting the subsurface soil conditions encountered during our field exploration.

2. Conduct a review of each soil sample obtained during our field exploration for classification and additional testing if necessary.

3. Analyze the existing soil conditions found during our exploration for the suitability of the soils encountered for the force main replacement.

4. Provide recommendations with respect to backfill material for the force main replacement.

5. Provide criteria and site preparation procedures to prepare the site for the proposed construction.

1.2 Project Description

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, as well as directional bore and installation of a new force main or mains along +/- 7,300 feet of Estero Blvd. Documents provided to GFA at the time of this report were Preliminary Plans (30%) completed by T.Y. Lin International, 63 pages updated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

2.0 OBSERVATIONS

2.1 Site Inspection

A site reconnaissance was conducted by members of our engineering staff prior to mobilization of drilling equipment and crews. The purpose of the site visit was to observe the existing site conditions in order to detect any factors that may impact our studies and recommendations.

Generally, the proposed construction site is level. No standing water on the surface was observed during the time of our drilling. The tested site consists of an urban area and is landscaped.

2.2 Geology

The surficial geologic map of Lee County, Florida consists of a quartz sand blanket that overlies the Tertiary Tamiami Formation (T_t), Tertiary-Quaternary Shell Units (Q_{su}) and Quaternary (Holocene) Costal and Estuarine Sediments (Q_h).The quartz sand blanket is generally less than 20 feet thick deposit, fine to medium grained, well sorted, with no fossils.

The oldest formation is the Tertiary Tamiami Formation (T_t). The Tamiami Formation consists of a mixture of variably sandy limestone, sands and clays containing varying percentage of phosphate grains. Fossils including mollusks, echinoids and corals are abundant. Fossil preservation varies from well preserved to molds and casts.

Overlaying the Tamiami Formation throughout much of the county are sediments indicated as Tertiary-Quaternary Shell Units (Q_{su}). These units consist of sands with subordinate limestone and clay. Fossils, including mollusks and corals, are common and well preserved.

Along the coast, Quaternary (Holocene) Costal and Estuarine Sediments (Q_h) are founded below an altitude of approximately 5 feet. These sediments consist of quartz sand with a variable organics component. The Holocene sediments include the beach ridge and dune sands.

2.3 Field Exploration

The following was completed for soil study:

- Two (2) Standard Penetration Test (SPT) borings to depths of approximately 25 feet below ground surface (BGS).
- Fifteen (15) Hand Auger (HA) borings to depths of approximately 5 feet BGS.
- Three (3) Field Percolation Test borings to depths of approximately 5 feet BGS.

The locations of the borings performed are illustrated in “Appendix B: Test Location Plan". The Standard Penetration Test (SPT) boring method was used as the investigative tool within the borings. SPT tests were performed in substantial accordance with ASTM Procedure D-1586, “Penetration Test and Split-Barrel Sampling of Soils”. This test procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches. The number of blows per foot, for the second and third 6-inch increment, is an indication of soil strength.

The soil samples recovered from the soil borings were visually classified and their stratification is illustrated in “Appendix D: Record of SPT and HA Boring Logs". It should be noted that soil conditions might vary between the strata interfaces, which are shown. The soil boring data reflect information from a specific test location only. Site specific survey staking for the test locations was not provided for our field exploration. The indicated depth and location of each test was approximated based upon existing grade and estimated distances and relationships to obvious landmarks. The boring depths were selected based on our knowledge of vicinity soils and to include the zone of soil likely to be stressed by the proposed construction.

2.4 Laboratory Analysis

Soil samples recovered from our field exploration were returned to our laboratory where they were visually examined in general accordance with ASTM D-2488. Samples were evaluated to obtain an accurate understanding of the soil properties and site geomorphic conditions. After a thorough visual examination of the recovered site soils, laboratory testing was conducted to determine gradation analysis (D-422) on individual samples as well as corrosiveness of two composite samples (North Composite Sample: Sta. 1164+00 to Sta. 1194+00; South Composite Sample: Sta. 1194+00 to Sta. 1238+00) ranging from 3 to 5 feet BGS.

Bulk specific gravity tests were run on the eight asphalt cores obtained during field exploration using the saturated surface-dry procedure (AASHTO T-166). Limerock Bearing Ratio (LBR) tests were run on material obtained within approximately 5 feet of the edge of pavement using the Florida Method FM 5-515.

All laboratory tests were conducted in general accordance with ASTM, AASHTO, or Florida Methods, as applicable. The test method method number for each test and the number of tests completed are presented in the following table.

TEST DESCRIPTION	NUMBER OF TESTS	ASTM TEST METHOD
Soil Classification	41	D-2488
Gradation Analysis	5	D-422
Soil Corrosiveness (pH, Resistivity, Chloride, Sulfate)	2 (North & South Composite Samples)	FM 5-550, FM 5-551, FM 5-552, and FM 5-553
Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens	8	AASHTO T-166
Limerock Bearing Ratio (LBR)	5	FM 5-515

Bag samples of the soil encountered during our field exploration will be held in our laboratory for your inspection for 90 days and then discarded unless we are notified otherwise in writing.

2.4.1 Gradation Tests

A total of five (5) gradation tests were performed on samples obtained during the field exploration program. Material passing the No. 200 sieve is considered “fines” and will be either silt or clay. The percent passing the No. 200 sieve, for the tested samples, ranged from 1.7 to 10.3 percent, this resulted in the sampled material to be considered poorly graded. A summary of the grain size distribution curve is presented in “Appendix H: Gradation Test Results”.

2.4.2 Soil Corrosiveness

This test method covers the laboratory determination for the minimum resistivity of a soil. The principal use of this test method is to determine a soil's corrosivity and thereby identify the conditions under which the corrosion of metals in soil may be sharply accentuated. Soil corrosiveness testing was completed on two (2) composite samples ranging from 3 – 5 feet BGS. Composite Sample – 1 was obtained from material between Station Number 1164+00 to Station Number 1194+00 (North Section of Segment 2). Composite Sample – 2 was obtained from material between Station Number 1194+00 to Station Number 1238+00 (South Section of Segment 2).

The soil samples obtained were considered non-marine structures and classified under the criteria for substructure environmental classifications. The pH (>7.0), chloride (<500 ppm), and sulfate (<1000 ppm) fell under the slightly aggressive classification but due to the resistivity results (<1000 Ohm-cm), **Composite 1 is deemed to be extremely aggressive**.

The pH (>7.0), chloride (<500 ppm), and sulfate (<1000 ppm) fell under the slightly aggressive classification but due to the resistivity results (<1000 Ohm-cm), **Composite 2 is deemed to be extremely aggressive**. The laboratory results for soil corrosiveness can be found in “Appendix I: Soil Corrosive Series Test Results”.

<u>For design purposes we recommend using a classification of “Extremely Aggressive” for this project.</u>

2.5 Geomorphic Conditions

Boring logs derived from our field exploration are presented in “Appendix B: Boring Locations and Soil Profiles”. The boring logs depict the observed soils in graphic detail. The Standard Penetration Test borings indicate the penetration resistance, or N-values, logged during the drilling and sampling activities. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples. All soil samples reviewed have been depicted and classified in general accordance with the Unified Soil Classification System, modified as necessary to describe typical southwest Florida conditions. See “Appendix E: Discussion of Soil Groups", for a detailed description of various soil groups.

The subsurface soil conditions encountered at this site generally consists of very loose to medium dense sand (SP) and sand with silt (SP-SM) with shell fragments to the boring termination depths. Please refer to “Appendix D – Record of SPT and HA Boring Logs” for a detailed account of each boring.

2.6 Hydrogeological Conditions

On March 8, 2016, the groundwater table was encountered in our SPT borings at depths of approximately 4 to 5.5 feet below the existing ground surface. On March 28, 2016, the groundwater table was encountered in our HA borings at depths of approximately 2.75 to 4 feet below the existing ground surface. The groundwater table will fluctuate depending upon tidal events.

Located in "Appendix F: Hydrologic Soils Map" are the following descriptive characteristics of the two (2) types of soil surveys encountered during the drilling operations based on the soil survey of Lee County, Florida, published by the United States Department of Agriculture:

Canaveral-Urban Land Complex (4)

About 50 to 70 percent of each area of the complex consists of nearly level Canaveral soils or areas of Canaveral soils that have been reworked or reshaped, but which still are recognizable as Canaveral soils. Typically, Canaveral soils have a surface layer of lack and dark gray fine sand that is mixed with shell fragments. Beneath the surface layer, to a depth of 80 inches or more, are layers of light brownish gray and light gray fine sand mixed with shell fragments.

About 20 to 30 percent of each area is urban land. This land is used for houses, streets, driveways, buildings, parking lots, and other related uses.

In undrained areas, the water table is at a depth of 18 to 40 inches for a period of 2 to 6 months in most years. Drainage systems have been established in most areas, however, and the depth to the water table is dependent on the drainage system.

Captiva Fine Sand (5)

This is a nearly level, poorly drained soil in sloughs. Slopes are smooth to concave and range from 0 to 1 percent. Typically, the surface layer is black fine sand about 6 inches thick. The underlying layers are fine sand mixed with shell fragments to a depth of 80 inches or more. The upper 9 inches is pale brown with light gray streaks, the next 11 inches is light gray with many pale brown mottles, the next 4 inches is light gray with about 30 percent multicolored shell fragments, and the lower 50 inches is light gray.

In most years, under natural conditions, this soil has a water table within a depth of 10 inches for 1 to 2 months. The water table is at a depth of 10 to 40 inches for 10 months during most years. In some years, the soil is covered by standing water for several days. Permeability is very rapid.

2.6.1 Exfiltration Testing

GFA International performed three Field Percolation (PERC) tests spaced at approximately 2,500-foot centers. The exfiltration testing was performed in accordance with the SFWMD Constant-Head Open-Hole Test Method. The results are presented below.

PERC Test – 1	
Depth (ft)	**Soil Description**
0 – 5	Light Gray Sand (A-3; SP) with Traces of Shell Fragments
Water table: 3 feet below grade.*	
Saturated K = 33.7 Ft./Day – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 2	
Depth (ft)	**Soil Description**
0 – 5	Gray Sand (A-3; SP) with Some Shell Fragments
Water table: 4.6 feet below grade.*	
Saturated K = 36.0 Ft./ Day – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 3	
Depth (ft)	**Soil Description**
0 – 5	Gray Sand (A-3; SP) with Some Shell Fragments
Water table: 4.5 feet below grade.*	
Saturated K = 18.2 Ft./ Day – Ft. of Head	

*Water Table is Tidally Influenced.

The location of the exfiltration test completed is illustrated in Appendix B: "Test Location Plan".

3.0 ENGINEERING EVALUATION AND RECOMMENDATIONS

3.1 General

The geotechnical evaluations for the proposed construction site are based on the subsurface soil and groundwater conditions encountered during this study, the project information made available, our site observations, and our experience in the vicinity. The test data has been evaluated using established geotechnical parameters of the soils recorded at this site, laboratory test results, and the observed performance of similar soil types.

Based on the soil conditions encountered in the performed borings, the near surface soils do not meet the below mentioned Lee County Technical Specifications for select fill. The water main replacement may be designed according to the recommendations and site preparations as discussed below with a fill material meeting the specifications.

3.2 Pipe Bedding and Initial Backfill (Force Main)

According to the Lee County Technical Specifications, Section 2223, Backfilling, a select fill material shall be used for pipe bedding and initial backfill from top of bedding to 1 foot over the top of pipes. The select fill shall be compacted to not less than 95 percent of the maximum dry density as determined by ASTM D-1557.

Pipe bedding containing very fine sand, uniformly graded sands and gravel, silt, soft earth, or other material that have a tendency to flow under pressure when wet is unacceptable.

Based on the laboratory test results the majority of the near surface soils consist of poorly graded clean sands to slightly silty sands. Material from on-site excavation does not meet the gradation specification for select fill and cannot be used for pipe bedding and initial backfill.

In addition, four of the five samples tested meet the gradation specification for common fill.

3.3 Pipe Bedding and Initial Backfill (Drainage System)

Pipe bedding and initial backfill shall be in accordance with Florida Department of Transportation (FDOT) for Road and Bridge Construction.

3.4 Trench Excavation

Where trench excavations are required, trenches shall be sufficiently wide and deep to allow proper installation of pipes. We recommend about 12 inches clear of the pipe on either side at any point. Boulders, rocks or other hard unyielding material shall be excavated to a depth of 12 inches below the bottom of the pipe elevation.

All trench excavations with side walls greater than 5 feet in depth shall be sloped or shored to protect workers. Material suitable for backfilling, clean to silty or clayey sands, shall be stockpiled far enough from the trench edge to avoid overloading slides or cave-ins. We recommend that distance shall be greater or equal to a depth of the trench.

Sloping is accomplished by cutting the banks of the excavation back to the angle of repose. The angle of repose for "in-situ" fine sands and sands with silt or clay will be about 26 to 30 degrees respectively. Normally, this angle would be not less than 1.5 feet on the horizontal to each foot on the vertical. When the excavation will be performed in the area not large enough to slope to the angle of repose, shoring must be erected to prevent a cave-in. The shoring can be installed in the form of sheeting or sliding trench shield.

In a location, or where buildings are some distance away, structure protection is not involved; sheeting will not require extreme rigidity and can be used without bracing. Wales and rakers may be omitted. The strut or raker system also creates obstruction in the excavation area which is undesirable. Sheeting system can be constructed as Z piles with an embedment depth below the bottom not less than 1/3 of the excavation with a sheet pile hummer or with vibratory driving devices.

3.5 Trench Backfill

Trench backfill material shall be clean earth fill composed of sand, clay and sand, sand and stone, crushed stones or other soils approved by a professional engineer. The trench backfilling shall be accomplished from the top of the initial backfill to the ground surface. The backfill, unless otherwise specified, shall be compacted to 95% of maximum density, as determined by ASTM D-1557.

When trenches are cut in pavements or areas to be paved, compaction shall be in accordance with FDOT for Road and Bridge Construction.

Based on the soil profiles, presented in "Appendix B: Boring Locations and Soil Profiles", the material from on-site excavation that will contain sands and silt or gravel size limestone fragments may be used for the trench backfill. The organic soils, if encountered during construction, are not suitable and shall not be used as a trench backfill material.

4.0 DEWATERING OF EXCAVATIONS

The high groundwater tables, if encountered during construction, in the vicinity of excavations shall be reduced to prevent water inflow into excavations. Each excavation shall be kept dry during subgrade preparation and continually thereafter until installation of the pipe. The dewatering will be required to maintain groundwater elevation at least 24 inches below the bottom at all times to prevent bottom disturbance or failure. Trench sheeting will provide some kind of water barrier around the excavations. However, it will be impossible to create a nearly impervious water barrier.

The surface water and groundwater inflow into excavation shall be removed and disposed. If construction will be performed during a dry season and the groundwater table will be low, the small water inflow into excavations can be pumped out from sump holes (small pits) installed below the bottom of the excavations. During a wet season, when the groundwater table will be around 1 foot below the ground surface, a system of wellpoints shall be installed to depress the water table. This system may consist of a single row of closely spaced wellpoints installed for shallow excavations. For deeper excavations, multiple rows of wellpoints may be required. For excavations that are shored with sheet piles, dewatering may be required outside the sheet piles with additional dewatering at the bottom of the excavation on the inside the sheetpiles.

5.0 SITE PREPARATION PROCEDURES

Site preparation procedures should begin with the removal of existing debris, vegetation, or other unsuitable materials within and beyond the excavation construction.

The organic soils, if encountered during construction, shall be removed and replaced to a required level (the future project specification) with a compacted suitable fill. The suitable fill material shall contain less than 10 percent of fines passing the No. 200 sieve, not contain clay balls and rock fragments greater than 3 inches in diameter.

An adequate dewatering system shall be installed to maintain the water table 2 feet or more below the maximum depth of excavation. The continuous dewatering shall be provided until the pipeline is completed and backfill is above the water table before beginning of the dewatering. When a professional engineer approves the discontinuing of the dewatering, the rate of pumping shall slowly decrease, allowing the water level to rise slowly.

The soils that extend below the water table should be allowed to dry prior to placement as a backfill material and compaction. This can be accomplished by stockpiling the material and allowing it to drain, or by spreading it in relatively thin lifts on the surface and allowing it to dry prior to compaction. The silty or sands with clay may require moisture conditioning so that the soil moisture content at the time of compaction is at or near the optimum moisture content.

The sandy soils may be excavated with normal heavy earthmoving equipment such as large hydraulic excavator. Trenching through the hard limestone can be performed with a rock trencher as it is indicated in the previous paragraphs.

Trench bottoms should be compacted with a small roller or vibratory plate compactor prior to pipe placement. Any loose or soft yielding areas detected during compaction of the trench bottoms should either be further compacted to at least 95% of maximum dry density or removed and replaced with a select fill and compacted to 95% of maximum dry density. Bedding stone may be used in lieu of select fill.

During the compaction operation, a geotechnical engineer or an engineering technician working under his direction should observe the soils to verify that the exposed soils are suitable and that unsuitable soils have been removed. Samples of the backfill materials should be obtained to determine the grain size distribution, its maximum dry density and optimum moisture content in the laboratory in accordance with ASTM D-1557 (Modified Proctor Test).

6.0 ASPHALT EVALUATION

6.1 Asphalt Thickness

Eight (8) asphalt cores with shallow hand auger borings were taken at alternating lanes (southbound or northbound) along Estero Boulevard in Fort Myers Beach starting from the Red Coconut RV Park (Sta. 1167+50) and finishing at Bayland Road (Sta. 1235+50). The location of each individual asphalt core can be found in “Appendix B: Test Location Plan”.

GFA International encountered an average core depth of 9-inches with a range of five (5) to eight (8) lifts per asphalt core. A stratum was initiated from top of existing asphalt (Lift 1) down to the bottom of asphalt (ex.: Lift 6). Asphalt Core AC-5 experienced complete debonding between Lift 1 and Lift 2 due to possibility of intrusion of sands in tack coat prior to placement of asphalt. A summary of the test results are shown in “Appendix J: Asphalt/ Shellrock Thickness by Core Determination”. “Appendix M: Asphalt Core Photographs” confirms the debonding occurred between Lifts 1 and 2 in AC-5, as well as the condition of all cores.

6.2 Base and Subbase Thicknesses

Beneath the asphalt, a layer of shellrock base was encountered. This material consists of sand, shell and shellrock fragments. This shell rock varied in thickness from 3-½ to 9-⅝ inches.

Beneath the shellrock base is a layer of sand with traces of shell and gravel that ranged from 4-½ to 15-⅛ inches. It is unclear if this material is naturally occurring or a mechanically mixed, stabilized subbase. This material is darker than the underlying sands and is most likely a mixed in place stabilized material or an import fill material.

Under the sand with shell and gravel layer, we encountered relatively clean sands (SP, SP-SM) to the boring termination depths. These sands are notably lighter in color (light gray to white) and in our opinion, these sands are naturally occurring. The depths of each layer encountered are illustrated in “Appendix D: Record of SPT and HA Boring Logs”.

6.3 Limerock Bearing Ratio (LBR) Testing

A total of five (5) samples were obtained within approximately 5 feet of the edge of pavement to conduct Limerock Bearing Ratio (LBR) tests using the Florida Method FM 5-515. Based on the laboratory test results, we recommend an LBR value of 70 for shell stabilized base with a structural coefficient of 0.10 to be utilized for pavement design.

For design purposes, we recommend using a structural coefficient for Type B Stabilized subbase, LBR 30 material (0.06). For complete test results, refer to “Appendix L – Limerock Bearing Ratio (LBR) Results”.

6.4 Asphalt Bulk Specific Gravity Testing

A total of eight (8) asphalt core samples were tested using American Association of State Highway and Transportation (AASHTO) T-166 "Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens". The average density of asphalt resulted in 133.2 pounds per cubic foot (PCF). Due to the complete debonding between Lifts 1 and 2 in asphalt core AC-5, only Lift 1 was tested for bulk specific gravity. Asphalt core AC-6 had noticeable air voids within Lift 2.

For complete test results, refer to "Appendix K – Asphalt Bulk Specific Gravity".

7.0 REPORT LIMITATIONS

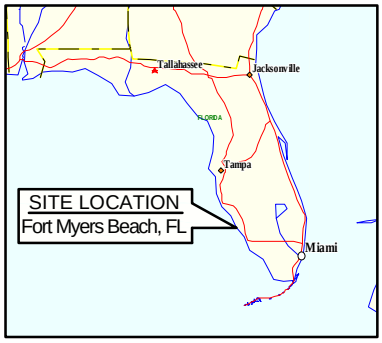
This consulting report has been prepared for the exclusive use of the current project owners and other members of the design team for the Estero Boulevard – Segment 2 located on Estero Boulevard in Fort Myers Beach, Lee County, Florida. This report has been prepared in accordance with generally accepted local geotechnical engineering practices; no other warranty is expressed or implied. The evaluation submitted in this report, is based in part upon the data collected during a field exploration, however, the nature and extent of variations throughout the subsurface profile may not become evident until the time of construction. If variations then appear evident, it may be necessary to reevaluate information and professional opinions as provided in this report. In the event changes are made in the nature, design, or locations of the proposed structure, the evaluation and opinions contained in this report shall not be considered valid, unless the changes are reviewed and conclusions modified or verified in writing by GFA International. GFA is not responsible for damage caused by soil improvement and/or construction activity vibrations related to this project. GFA is also not responsible for damage concerning drainage or moisture related issues for the proposed or nearby structures.

8.0 BASIS FOR RECOMMENDATIONS

The analysis and recommendations submitted in this report are based on the data obtained from the tests performed at the locations indicated on the attached figure in "Appendix B: Test Location Plan". This report does not reflect any variations, which may occur between borings. While the borings are representative of the subsurface conditions at their respective locations and for their vertical reaches, local variations characteristic of the subsurface soils of the region are anticipated and may be encountered. The delineation between soil types shown on the soil logs is approximate and the description represents our interpretation of the subsurface conditions at the designated boring locations on the particular date drilled.

Any third party reliance of our geotechnical report or parts thereof is strictly prohibited without the expressed written consent of GFA International. The methodology (ASTM D-1586) used in performing our borings and for determining penetration resistance is specific to the sampling tools utilized and does not reflect the ease or difficulty to advance other tools or materials.

Appendix A - Vicinity Map



VICINITY MAP

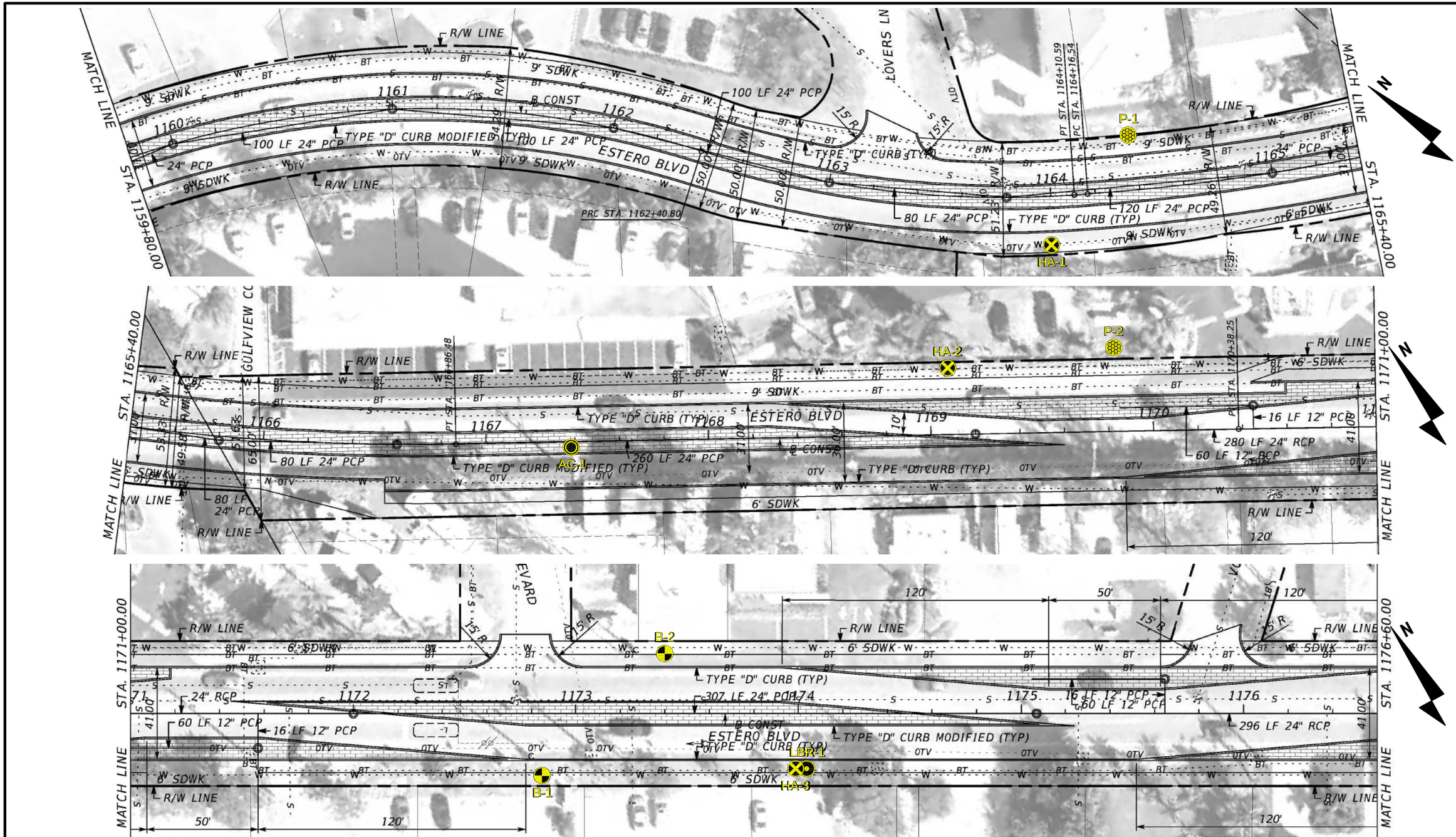
Estero Boulevard

Fort Myers Beach, Lee County, Florida

GFA International Project No.: 15-2562

Oak St
Donora Blvd
Madison Ct
Connecticut St
Mar Dr
Bay M
SITE LOCATION
Hercules Dr
Fort Myers
865
Madera Rd
Williams Dr
Palmetto St
Estero Blvd
Gulf of Mexico
N

Appendix B – Test Location Plan



NOTES:
- SPT BORING LOCATION
- ASPHALT CORE LOCATION
- LBR TEST LOCATION
- PERCOLATION TEST LOCATION
- HAND AUGER LOCATION
- BASE DRAWING PROVIDED BY CLIENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER, P.E. #59716

LEE COUNTY DEPARTMENT OF PUBLIC WORKS

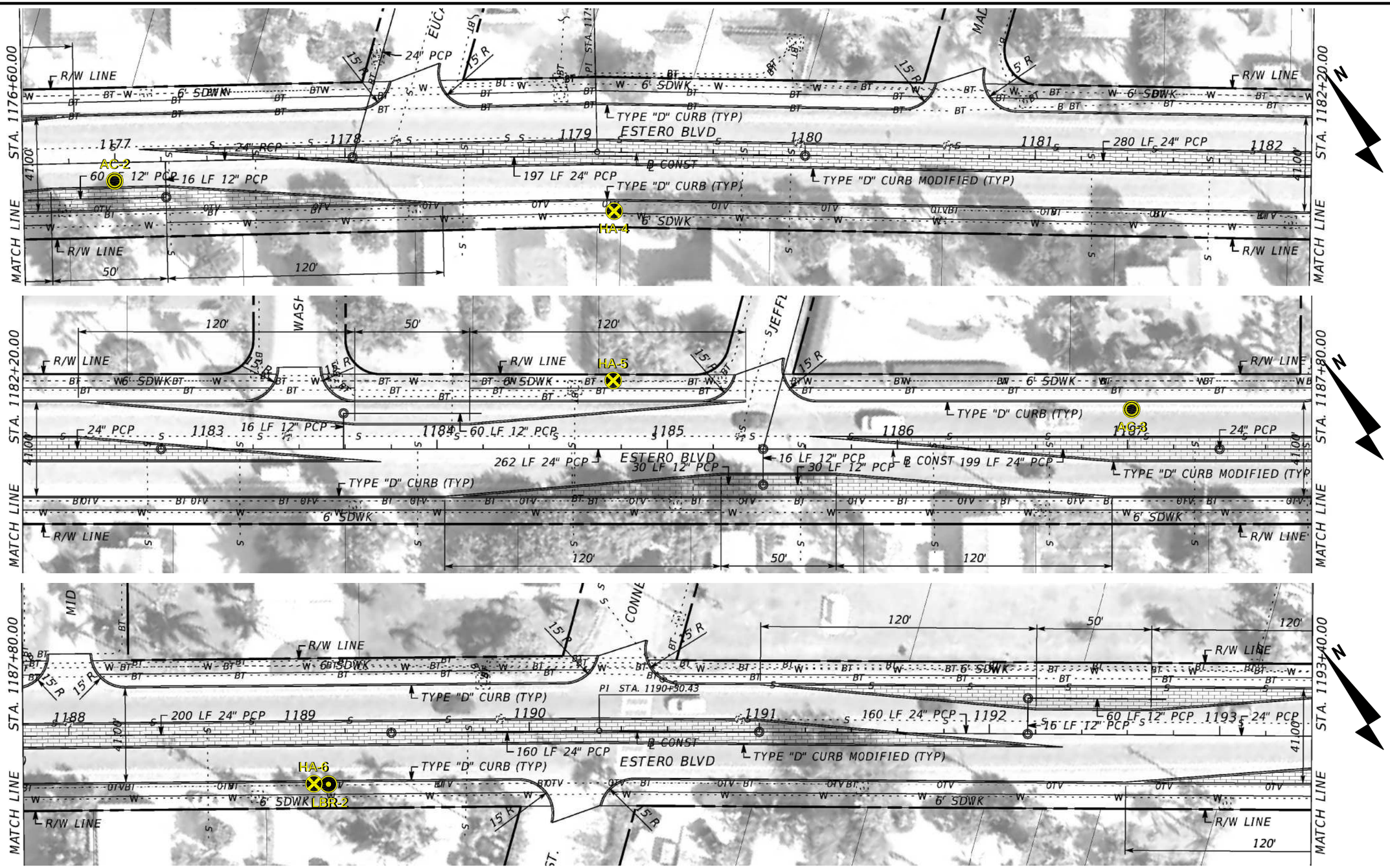
ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	15-2562

TEST LOCATION PLAN

ESTERO BOULEVARD

FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK



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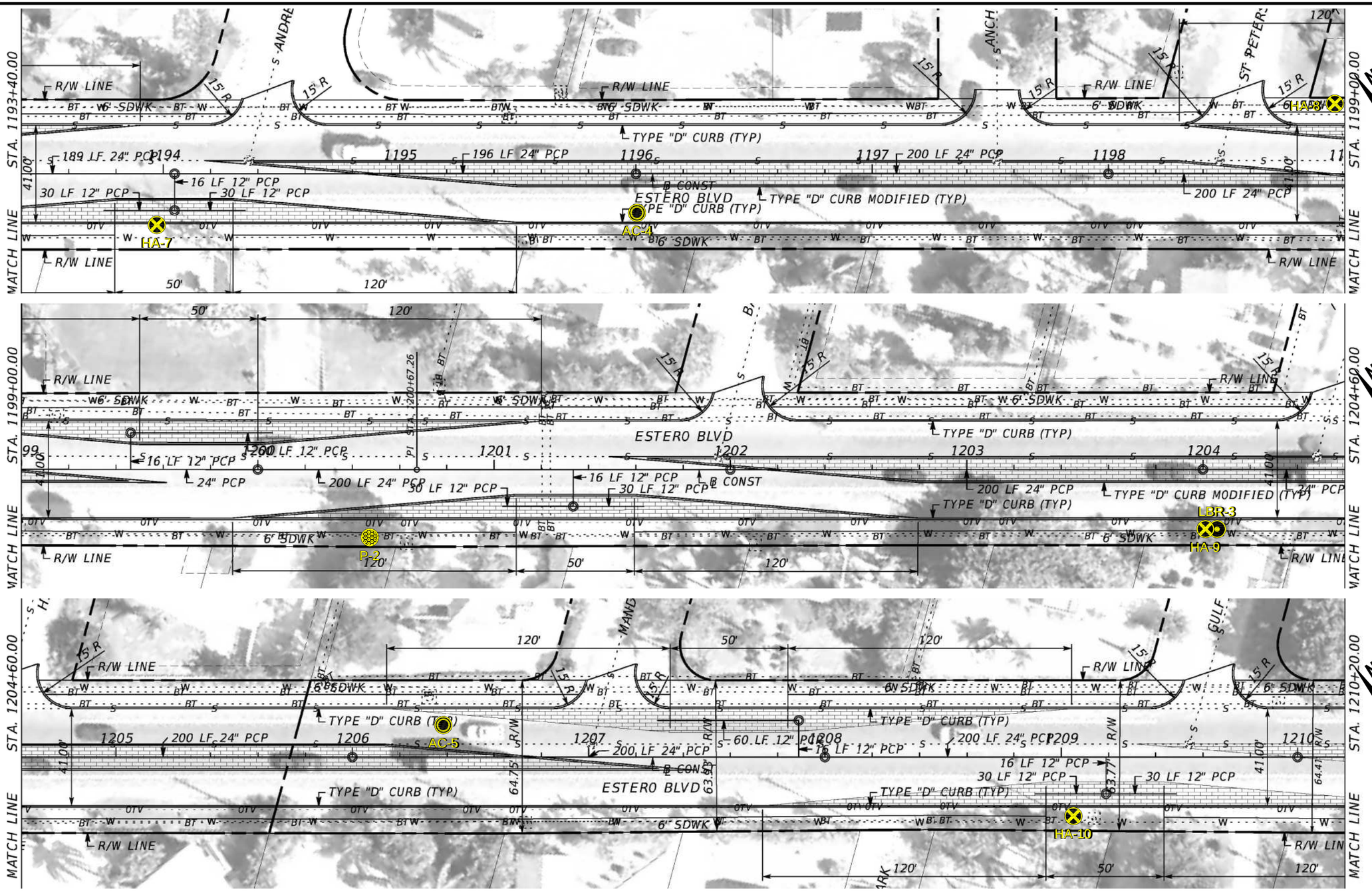
TEST LOCATION PLAN

ESTERO BOULEVARD
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK



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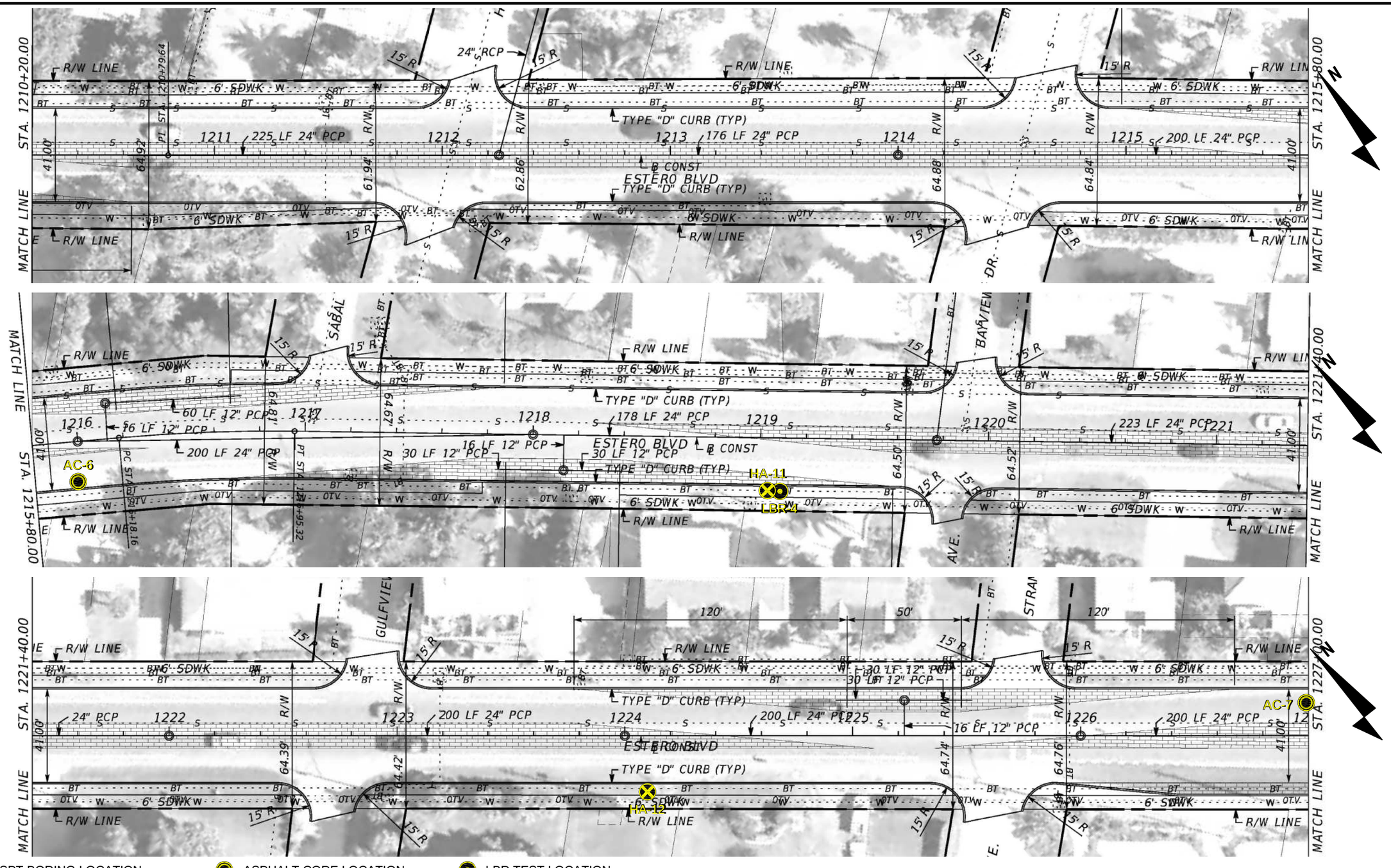
TEST LOCATION PLAN

ESTERO BOULEVARD
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK



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FORT MYERS, FLORIDA 33905

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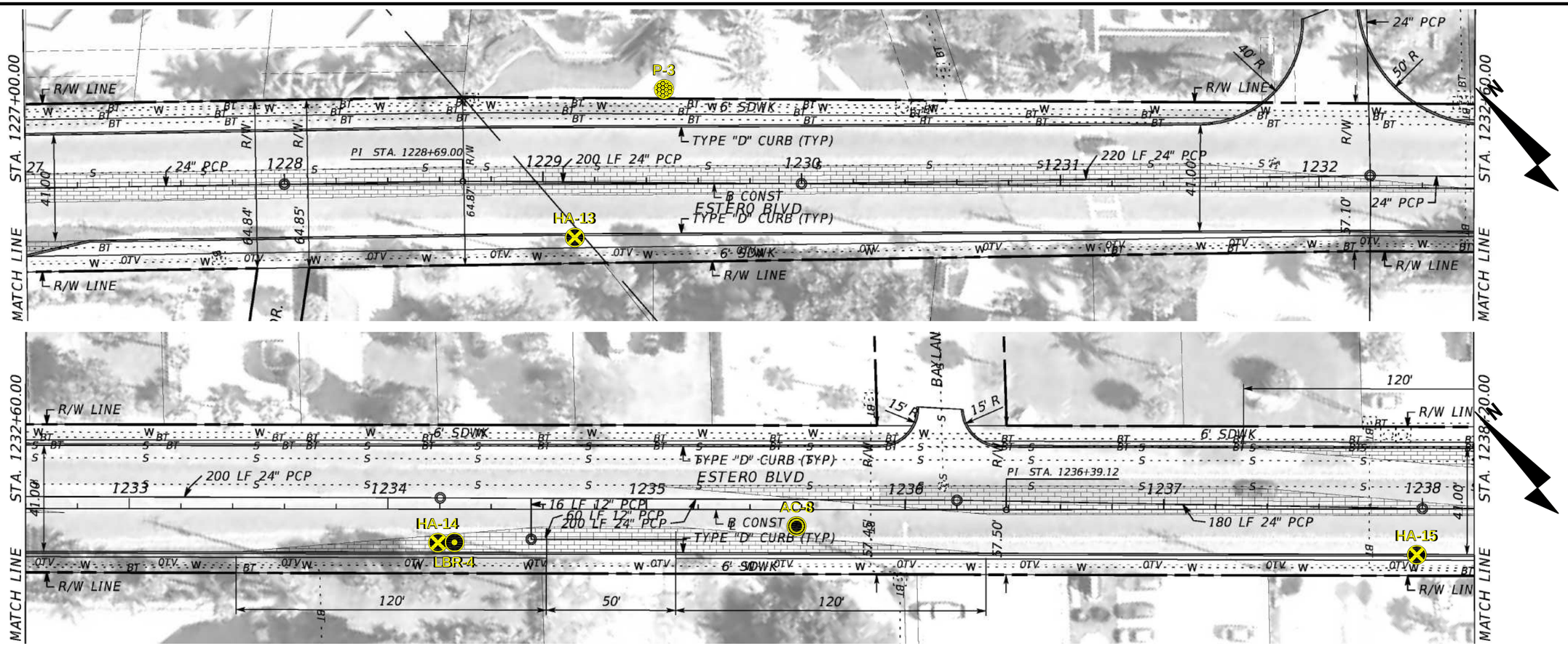
ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	15-2562

TEST LOCATION PLAN
ESTERO BOULEVARD
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK



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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER, P.E. #59716

LEE COUNTY DEPARTMENT OF PUBLIC WORKS

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	15-2562

TEST LOCATION PLAN

ESTERO BOULEVARD
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK

Appendix C - Notes Related to Borings

NOTES RELATED TO
RECORDS OF TEST BORING AND
GENERALIZED SUBSURFACE PROFILE

1. Groundwater level was encountered and recorded (if shown) following the completion of the soil test boring on the date indicated. Fluctuations in groundwater levels are common; consult report text for a discussion.

2. The boring location was identified in the field by offsetting from existing reference marks and using a cloth tape and survey wheel.

3. The borehole was backfilled to site grade following boring completion, and patched with asphalt cold patch mix when pavement was encountered.

4. The Record of Test Boring represents our interpretation of field conditions based on engineering examination of the soil samples.

5. The Record of Test Boring is subject to the limitations, conclusions and recommendations presented in the Report text.

6. "Field Test Data" shown on the Record of Test Boring indicated as 11/6 refers to the Standard Penetration Test (SPT) and means 11 hammer blows drove the sampler 6 inches. SPT uses a 140-pound hammer falling 30 inches.

7. The N-value from the SPT is the sum of the hammer blows required to drive the sampler the second and third 6-inch increments.

8. The soil/rock strata interfaces shown on the Records of Test Boring are approximate and may vary from those shown. The soil/rock conditions shown on the Records of Test Boring refer to conditions at the specific location tested; soil/rock conditions may vary between test locations.

9. Relative density for sands/gravels and consistency for silts/clays are described as follows:

SPT	CPT	SANDS/GRAVELS	SPT	CPT	SILTS/CLAYS
BLOWS/FOOT	KG/CM^2	RELATIVE DENSITY	BLOWS/FOOT	KG/CM^2	CONSISTENCY
0-4	0-16	Very loose	0-1	0-3	Very soft
5-10	17-40	Loose	2-4	4-9	Soft
11-30	41-120	Medium Dense	5-8	10-17	Firm
31-50	over 120	Dense	9-15	18-31	Stiff
over 50		Very Dense	16-30	32-60	Very stiff
			31-50	over 60	Hard

10. Grain size descriptions are as follows:

NAME	SIZE LIMITS
Boulder	12 Inches or more
Cobbles	3 to 12 Inches
Coarse Gravel	¾ to 3 Inches
Fine Gravel	No. 4 sieve to ¾ inch
Coarse Sand	No. 10 to No. 4 sieve
Medium Sand	No. 40 to No. 10 sieve
Fine Sand	No. 200 to No. 40 sieve
Fines	Smaller than No. 200 sieve

11. Definition of Descriptive Terms of Fines:

PROPORTION	ADJECTIVE
Up to 10%	with a trace
10 to 30%	with some

11. Definitions related to adjectives used in soil/rock descriptions:

PROPORTION	ADJECTIVE	APPROXIMATE ROOT DIAMETER	ADJECTIVE
Up to 10%	with a trace	Less than 1/32"	Fine roots
10 to 30%	with some	1/32" to ¼"	Small roots
30 to 50%	with	¼" to 1"	Medium roots
		Greater than 1"	Large roots

Appendix D – Record of SPT and HA Boring Logs

TEST LOCATION PLAN

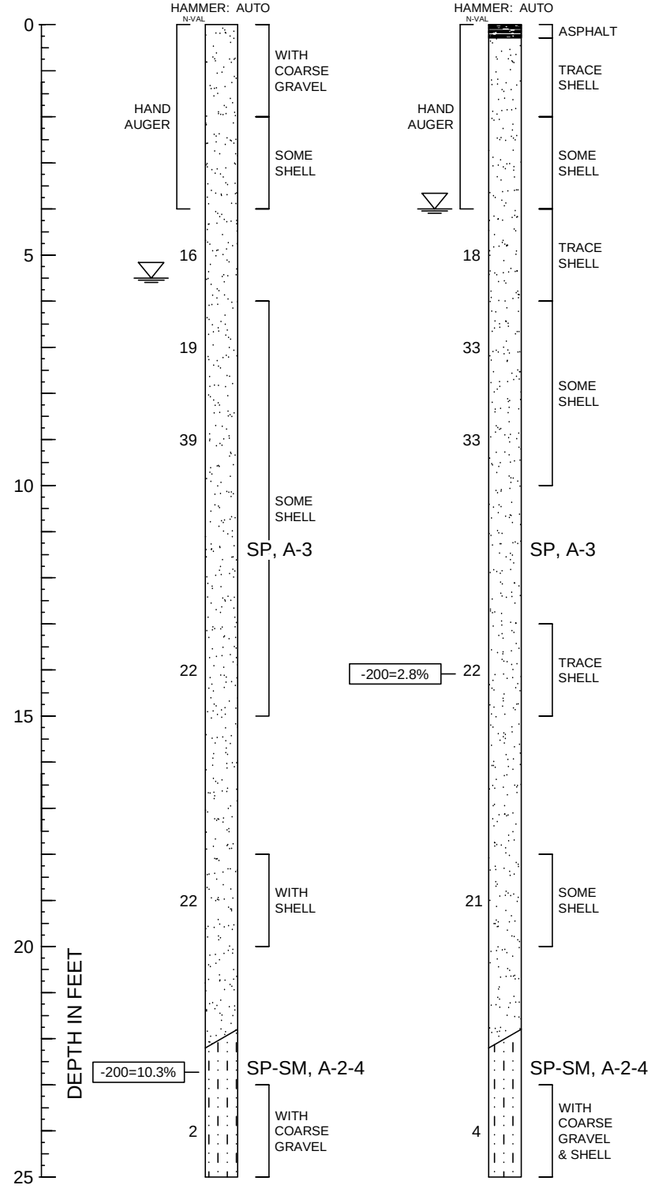
NOTES: SPT BORING LOCATION

BASE MAP OBTAINED FROM GOOGLE EARTH

SCALE IS AN APPROXIMATION AND MAY NOT BE ACCURATE

N

SOIL PROFILES

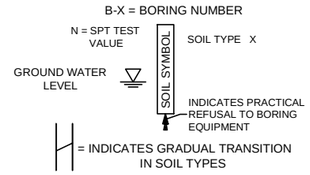


SOIL LEGEND

Light Gray to Gray, SAND, Medium Dense to Dense (SP/ A-3)

Light Gray to White, SAND WITH SILT, Very Loose to Loose (SP-SM/ A-2-4)

SOIL PROFILE LEGEND NOTES



N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

ALL ELEVATIONS BASED ON EXISTING GROUND LEVEL.

WOH = WEIGHT OF HAMMER

LFC = LOSS OF DRILLING FLUID CIRCULATION

SOIL DESCRIPTION

CORRELATION OF N-VALUES WITH RELATIVE DENSITY AND CONSISITENCY -

GRANULAR MATERIALS - SPT N-VALUES

BLOW/FOOT	RELATIVE DENSITY
LESS THAN 3	VERY LOOSE
3 - 8	LOOSE
9 - 24	MEDIUM DENSE
25 - 40	DENSE
GREATER THAN 40	VERY DENSE

APPROXIMATE FINES CONTENT

PERCENTAGE	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR CLAYEY

SILTS AND CLAYS - SPT N-VALUES

BLOW/FOOT	CONSISTENCY
LESS THAN 1	VERY SOFT
1 - 3	SOFT
4 - 6	FIRM
7 - 12	STIFF
13 - 24	VERY STIFF
GREATER THAN 24	HARD

APPROXIMATE SAND/GRAVEL CONTENT

PERCENTAGE	MODIFIERS
5% TO 15%	SLIGHTLY SANDY OR GRAVELLY
16% TO 25%	SANDY OR GRAVELLY
26% TO 49%	VERY SANDY OR GRAVELLY

CORRELATION OF N-VALUES WITH HARDNESS OF LIMEROCK -

LIMEROCK - SPT N-VALUES

BLOW/FOOT	HARDNESS
LESS THAN 20	VERY SOFT
20 - 49	SOFT
50 - 100	MEDIUM HARD
50 FOR 2 TO 5"	MODERATELY HARD
50 FOR 0 TO 2"	HARD

APPROXIMATE ROOT CONTENT

PERCENTAGE	MODIFIERS
5% - 10%	TRACE
11% - 20%	TRACE TO SOME
21% - 40%	SOME
41% - 60%	AND

Boring No.	Stratum	Depth (ft)	Unit Weight (moist) (pcf)	Angle of Internal Friction (°)	Cohesion Cu (psf)	USCS/ AASHTO
B-1	1	0 - 23	108	32	-	SP/ A-3
	2	23 - 25	100	28	-	SP-SM/ A-2-4
B-2	1	0 - 23	108	32	-	SP/ A-3
	2	23 - 25	100	28	-	SP-SM/ A-2-4

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER, P.E. #59716

LEE COUNTY DEPARTMENT OF PUBLIC WORKS

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	15-2562

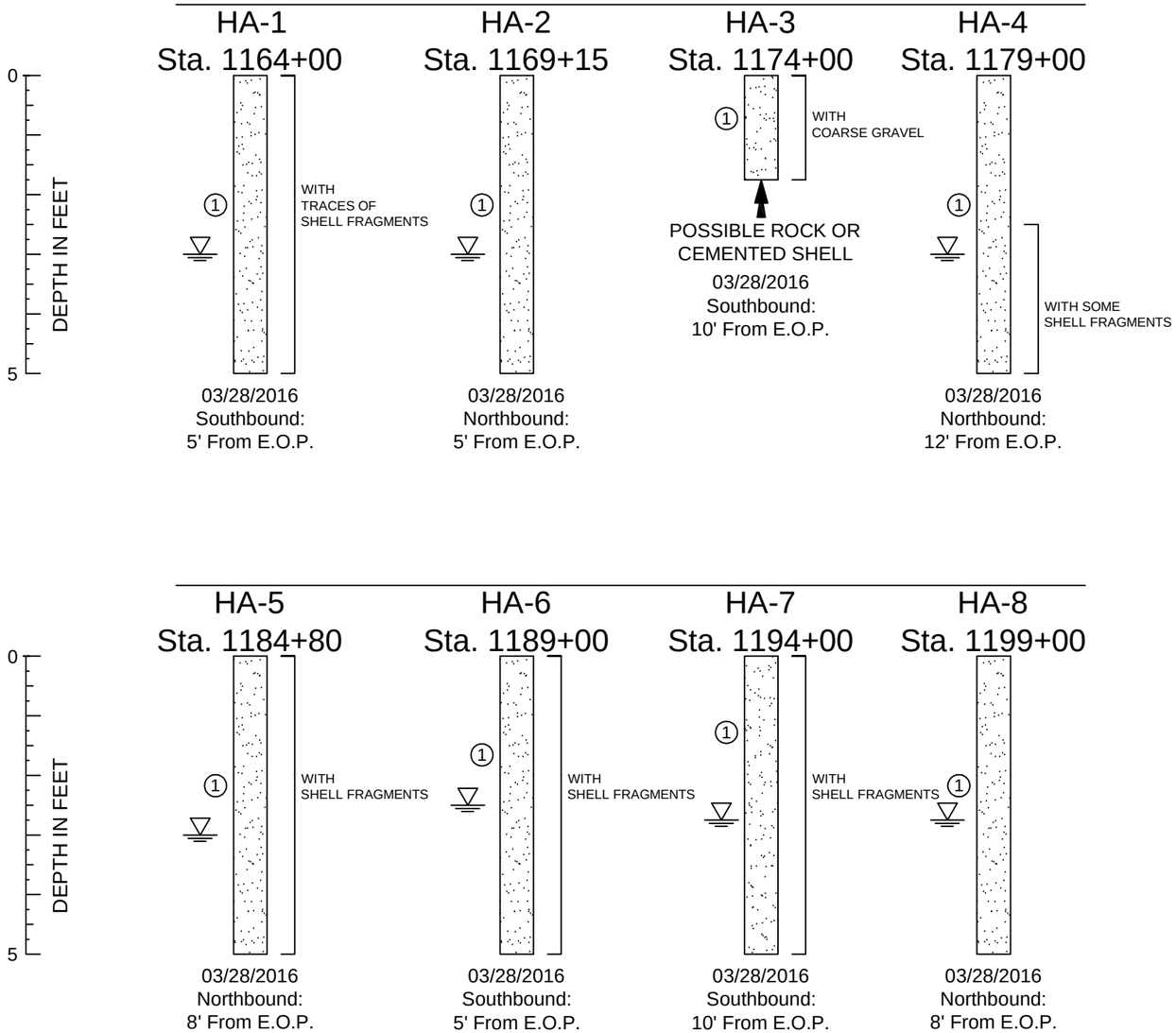
REPORT OF TEST BORINGS

ESTERO BOULEVARD

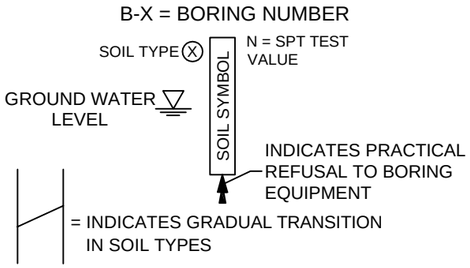
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK

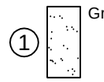
SOIL PROFILES



SOIL PROFILE LEGEND



SOIL LEGEND



NOTES:

N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

WOH - BORING INTERVAL ADVANCED UNDER WEIGHT OF HAMMER.

LFC - LOSS OF DRILLING FLUID CIRCULATION.

SOIL CLASSIFICATION

CORRELATION OF N - VALUES WITH RELATIVE DENSITY AND CONSISTENCY

COHESIONLESS SOIL		SILTS AND CLAYS	
N - VALUE	RELATIVE DENSITY	N - VALUE	CONSISTENCY
0 - 2	VERY LOOSE	UNDER 1	VERY SOFT
3 - 8	LOOSE	1 - 3	SOFT
9 - 24	MEDIUM DENSE	4 - 6	FIRM
25 - 40	DENSE	7 - 12	STIFF
OVER 40	VERY DENSE	13 - 24	VERY STIFF
		OVER 24	HARD

CORRELATION OF N - VALUES WITH HARDNESS DESCRIPTION

LIMEROCK	
N - VALUE	RELATIVE DENSITY
0 - 19	VERY SOFT
20 - 49	SOFT
50 - 100	MEDIUM HARD
50 FOR 3 TO 5"	MODERATELY HARD
50 FOR 0 TO 2"	HARD

APPROXIMATE FINES CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR SLIGHTLY CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR VERY CLAYEY

APPROXIMATE SAND/ GRAVEL CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SANDY OR SLIGHTLY GRAVELLY
16% TO 25%	SANDY OR GRAVELLY
26% TO 49%	VERY SANDY OR VERY GRAVELLY

APPROXIMATE ROOT CONTENT	MODIFIERS
5% TO 10%	TRACE
11% TO 20%	TRACE TO SOME
21% TO 40%	SOME
41% TO 60%	AND

RECORD OF TEST BORINGS

GFA International, Inc.
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 * TeamGFA.com

Client: David Douglas Associates, Inc.

Project:
Estero Boulevard - Segment 2
Fort Myers Beach, Lee County, Florida

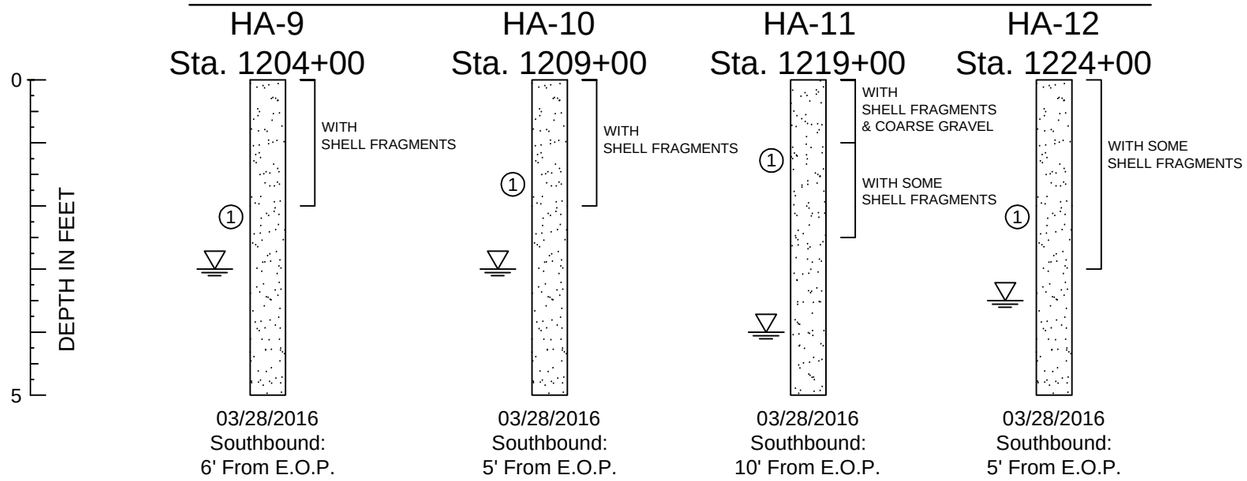
Approved by: PJD

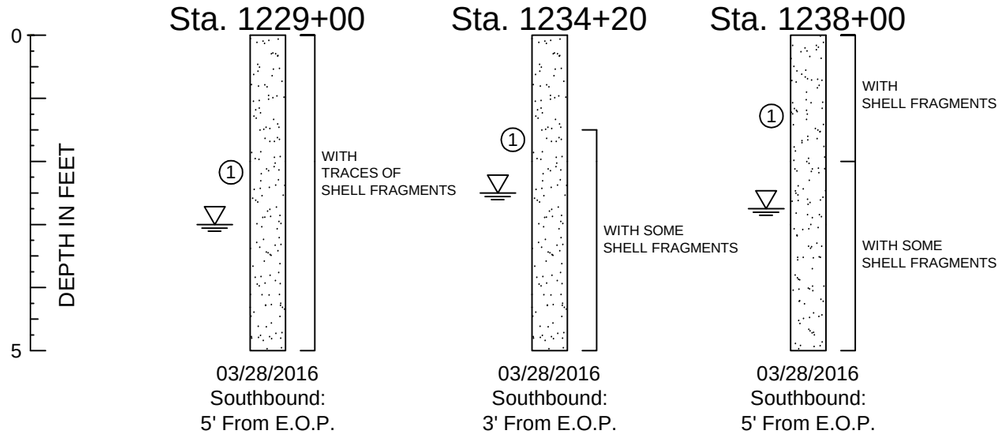
Date: 04/13/2016

Job No: 15-2562

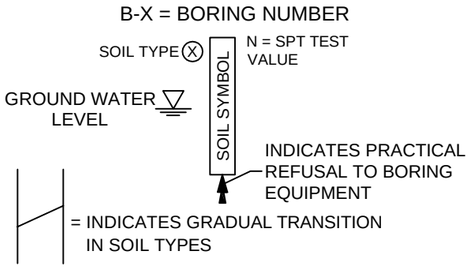
Drawn By: LSK

SOIL PROFILES

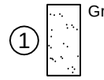




SOIL PROFILE LEGEND



SOIL LEGEND



NOTES:

N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

WOH - BORING INTERVAL ADVANCED UNDER WEIGHT OF HAMMER.

LFC - LOSS OF DRILLING FLUID CIRCULATION.

SOIL CLASSIFICATION

CORRELATION OF N - VALUES WITH RELATIVE DENSITY AND CONSISTENCY

COHESIONLESS SOIL		SILTS AND CLAYS	
N - VALUE	RELATIVE DENSITY	N - VALUE	CONSISTENCY
0 - 2	VERY LOOSE	UNDER 1	VERY SOFT
3 - 8	LOOSE	1 - 3	SOFT
9 - 24	MEDIUM DENSE	4 - 6	FIRM
25 - 40	DENSE	7 - 12	STIFF
OVER 40	VERY DENSE	13 - 24	VERY STIFF
		OVER 24	HARD

CORRELATION OF N - VALUES WITH HARDNESS DESCRIPTION

LIMEROCK	
N - VALUE	RELATIVE DENSITY
0 - 19	VERY SOFT
20 - 49	SOFT
50 - 100	MEDIUM HARD
50 FOR 3 TO 5"	MODERATELY HARD
50 FOR 0 TO 2"	HARD

APPROXIMATE FINES CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR SLIGHTLY CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR VERY CLAYEY

APPROXIMATE SAND/ GRAVEL CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SANDY OR SLIGHTLY GRAVELLY
16% TO 25%	SANDY OR GRAVELLY
26% TO 49%	VERY SANDY OR VERY GRAVELLY

APPROXIMATE ROOT CONTENT	MODIFIERS
5% TO 10%	TRACE
11% TO 20%	TRACE TO SOME
21% TO 40%	SOME
41% TO 60%	AND

RECORD OF TEST BORINGS

GFA International, Inc.
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 * TeamGFA.com

Client: David Douglas Associates, Inc.

Project:
Estero Boulevard - Segment 2
Fort Myers Beach, Lee County, Florida

Approved by: PJD

Date: 04/13/2016

Job No: 15-2562

Drawn By: LSK

Appendix E – Discussion of Soil Groups

DISCUSSION OF SOIL GROUPS:
AASHTO CLASSIFICATION

COARSE GRAINED SOILS

- **Group A-1:** The typical material of this group is a well-graded mixture of stone fragments or gavel, coarse sand, fine sand, and a nonplastic or feebly-plastic soil binder. However, this group also includes stone fragments, gravel, coarse sand, volcanic cinders, etc., without a soil binder.

    - **Subgroup A-1-a:** Includes those materials consisting predominantly of stone fragments or gravel, either with or without a well-graded binder of fine material.

    - **Subgroup A-1-b:** Includes those materials consisting predominantly of coarse sand, either with or without a well-graded soil binder.

- **Group A-3:** The typical material of this group is fine beach sand or fine desert-blow sand without silty or clay fines, or with a very small amount of nonplastic silt. This group also includes stream-deposited mixtures of poorly-graded fine sand and limited amounts of coarse sand and gravel.

- **Group A-2:** This group includes a wide variety of “granular” materials which are borderline between the materials falling in Groups A-1 and A-3, and the silt-clay materials of Groups A-4, A-5, A-6, and A-7. It includes all materials containing 35% or less passing a No. 200 (75-µm) sieve which cannot be classified in Groups A-1 or A-3, due to the fines content or the plasticity indexes, or both, in excess of the limitations for those groups.

    - **Subgroups A-2-4 and A-2-5:** Include various granular materials containing 35% or less passing a No. 200 (75-µm) sieve and with a minus No. 40 (425-µm) portion having the characteristics of Groups A-4 and A-5, respectively. These groups include such materials as gravel and coarse sand with silt contents or plasticity indexes in excess of the limitations of Group A-1 and fine sand with nonplastic-silt content in excess of the limitations of Group A-3.

    - **Subgroups A-2-6 and A-2-7:** Include materials similar to those described under Subgroups A-2-4 and A-2-5, except that the fine portion contains plastic clay having the characteristics of the A-6 or A-7 group, respectively.

FINE GRAINED SOILS

- **Group A-4:** The typical material of this group is a nonplastic or moderately plastic silty soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine silty soil and up to 64% of sand and gravel retained on a No. 200 sieve.

- **Group A-5:** The typical material of this group is similar to that described under Group A-4, except that it is usually of diatomaceous or micaceous character and may be highly elastic as indicated by the high liquid limit.

- **Group A-6:** The typical material of this group is a plastic clay soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine clayey soil and up to 64% of sand and gravel retained on a No. 200 sieve. Materials of this group usually have a high volume change between wet and dry states.

- **Group A-7:** The typical material of this group is similar to that described under Group A-6, except that it has the high liquid limits characteristic of Group A-5 and may be elastic as well as subject to high-volume change.

    - **Subgroup A-7-5:** Includes those materials with moderate plasticity indexes in relation to the liquid limit and which may be highly elastic as well as subject to considerable volume change.

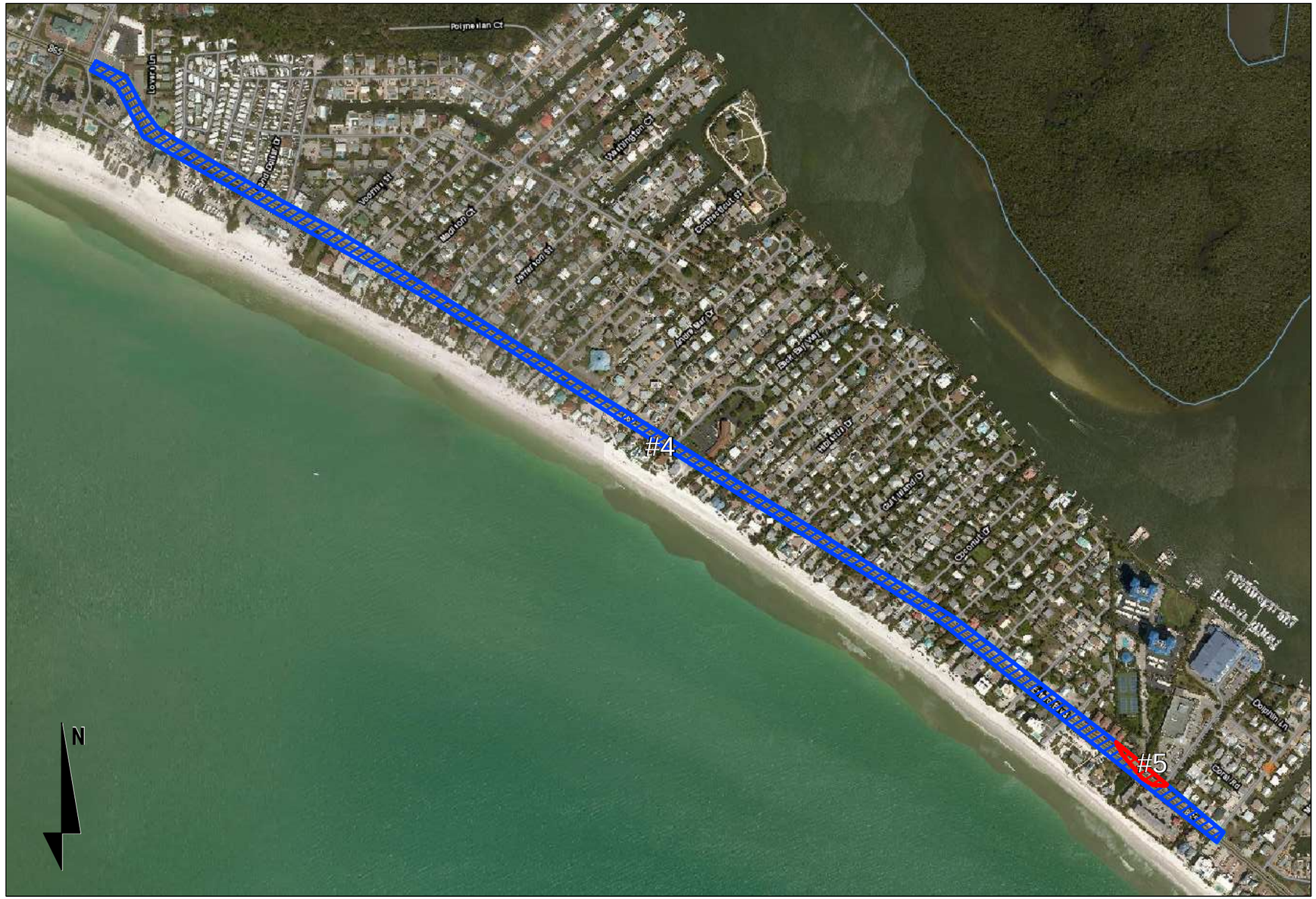
    - **Subgroup A-7-6:** Includes those materials with high plasticity indexes in relation to liquid limit and which are subject to extremely high volume change.

HIGHLY ORGANIC SOILS

- **Group A-8:** Highly organic soils (peat or muck) may be classified in this group. Classification of these materials is based on visual inspection and is not dependent on the percentage passing the No. 200 (75-µm) sieve liquid limit, or plasticity index. The material is composed primarily of partially decayed organic matter, generally has a fibrous texture, a dark brown or black color, and an odor of decay. These organic materials are unsuitable for use in embankments and subgrades. They are highly compressible and have low strength.

Appendix F – Hydrologic Soils Map

HYDROLOGIC SOILS MAP



NOTES:

#4 CANAVERAL-URBAN LAND COMPLEX

#5 CAPTIVA FINE SAND

MAP OBTAINED FROM USDA WEB SOIL SURVEY WEBSITE

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER, P.E. #59716

LEE COUNTY DEPARTMENT OF TRANSPORTATION

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	15-2562

HYDROLOGIC SOILS MAP
ESTERO BOULEVARD
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK

Appendix G – Roadway Soil Survey

LEE COUNTY
DEPARTMENT OF PUBLIC WORKS
ESTERO BOULEVARD

DATE OF SURVEY : APRIL 11, 2016
SURVEY MADE BY : GFA INTERNATIONAL, INC.
SUBMITTED BY : PAUL J. D'HUYVETTER

ROAD NAME : ESTERO BOULEVARD
CITY: FORT MYERS BEACH
COUNTY : LEE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS: STA. 1164+00 SURVEY ENDS: STA. 1238+00

	ORGANIC CONTENT			SIEVE ANALYSIS RESULTS % PASS					ATTERBERG LIMITS (%)					CORROSION SERIES TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC.	% MOISTURE CONTENT	NO. OF TESTS	4 MESH	10 MESH	60 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohms-cm	CHLORIDE ppm	SULFATES ppm	pH
1	–	–	–	4	87.6–99.0	81.7–96.3	67.4–91.5	1.7–8.8	–	–	–	A–3	Gray to Light Gray, White, clean SAND to SAND WITH SILT with Traces of Shell Fragments (SP; SP–SM)	–	–	–	–	–
2	–	–	–	1	60.8	57.4	46.0	10.3	–	–	–	A–2–4	Light gray, gray, silty SAND with trace to some shell fragments (SM)	–	–	–	–	–
3	–	–	–	–	–	–	–	–	–	–	–	–	Composite Soil 1 – Borings 1–2, 3–5ft BGS	1	9.29	20	40.1	7.79
4	–	–	–	–	–	–	–	–	–	–	–	–	Composite Soil 2 – Borings 1–2, 3–5ft BGS	1	8.97	30	70	7.76

NOTES:

EMBANKMENT AND SUBGRADE MATERIAL
STRATA BOUNDARIES ARE APPROXIMATE

Ground water was encountered at depths of about 4 to 5 feet at boring locations at the time of our drilling.

The material from Stratum Numbers 1 & 2 appears satisfactory for use in the embankment when utilized in accordance with Index 505.

It has been the experience of the Department, within projects constructed within this general geographical area, that although preliminary borings did not indicate a presence of rock, rock was encountered while performing underground installations. Therefore, the contractor should consider the increased cost of all underground work activities while preparing the bid. All costs of rock excavation shall be included in the appropriate items of work contained within the contract. No extra compensation or time extention will be allowed for additional work directly associated with the splitting, excavation, crushing, disposal, replacemant of displaced volume of extracted rock with fill material or special handling of rock.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER P.E. #59716

LEE COUNTY DEPARTMENT OF TRANSPORTATION

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	15-2562

ROADWAY SOIL SURVEY
ESTERO BOULEVARD
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK

Appendix H – Gradation Test Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project:	Estero Boulevard - Segment 2	**Project No.:**	15-2562
Client:	David Douglass Associates, Inc.	**Lab No.:**	S001
Location:	Station 1169+00: Hand Auger Boring HA-2 (0 - 3')		
Sampled By:	Lee Khan	**Date Sampled:**	3/28/2016
Tested By:	Jeremy Perminter	**Date Tested:**	4/8/2016
Material Description:	Gray SAND (SP)		

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	**WASHED SAMPLE WEIGHT (g)**	**WEIGHT PASSING (g)**	**PERCENT PASSING**	
	315.9	312.9	3.0	0.9%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	**PARTIAL SIZE (mm)**	**TOTAL WEIGHT RETAINED (g)**	**CUMULATIVE WEIGHT RETAINED (g)**	**CUMULATIVE PERCENT RETAINED**	**PERCENT PASSING**
1/2"	12.7	0	0	0.0%	100.0%
#4	4.76	9.3	9.3	2.9%	97.1%
#10	2.00	18.9	28.2	8.9%	91.1%
#16	1.19	9.6	37.8	12.0%	88.0%
# 40	0.420	11.6	49.4	15.6%	84.4%
# 60	0.250	12.5	61.9	19.6%	80.4%
#100	0.149	210.3	272.2	86.2%	13.8%
#200	0.074	38.3	310.5	98.3%	1.7%
Pan	0.000	1.9	312.4	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project:	Estero Boulevard - Segment 2	**Project No.:**	15-2562
Client:	David Douglass Associates, Inc.	**Lab No.:**	S002
Location:	Station 1172+80: Boring B-1 (23 - 25')		
Sampled By:	Greg Cole	**Date Sampled:**	3/8/2016
Tested By:	Jeremy Perminter	**Date Tested:**	4/8/2016
Material Description:	Gray to Light Green SAND WITH SILT (SP-SM)		

Soil Classification AASHTO M 145-91 (2000) : A-2-4

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	**WASHED SAMPLE WEIGHT (g)**	**WEIGHT PASSING (g)**	**PERCENT PASSING**	
	241.1	220.8	20.3	8.4%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	**PARTIAL SIZE (mm)**	**SIEVE WEIGHT RETAINED (g)**	**TOTAL WEIGHT RETAINED (g)**	**CUMULATIVE PERCENT RETAINED**	**PERCENT PASSING**
1/2"	12.7	70.3	70.3	29.2%	70.8%
#4	4.76	24.1	94.4	39.2%	60.8%
#10	2.00	8.4	102.8	42.6%	57.4%
#16	1.19	5.7	108.5	45.0%	55.0%
# 40	0.420	8.7	117.2	48.6%	51.4%
# 60	0.250	12.9	130.1	54.0%	46.0%
#100	0.149	20.3	150.4	62.4%	37.6%
#200	0.074	65.9	216.3	89.7%	10.3%
Pan	0.000	3.8	220.1	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project: Estero Boulevard - Segment 2 **Project No.:** 15-2562

Client: David Douglass Associates, Inc. **Lab No.:** S003

Location: Station 1173+40: Boring B-2 (13 - 15')

Sampled By: Greg Cole **Date Sampled:** 3/8/2016

Tested By: Jeremy Perminter **Date Tested:** 4/8/2016

Material Description: Light Gray SAND (SP) with Traces of Shell Fragments

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	416.2	407.7	8.5	2.0%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	SIEVE WEIGHT RETAINED (g)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	0	0	0.0%	100.0%
#4	4.76	4.2	4.2	1.0%	99.0%
#10	2.00	11.0	15.2	3.7%	96.3%
#16	1.19	3.7	18.9	4.5%	95.5%
# 40	0.420	5.5	24.4	5.9%	94.1%
# 60	0.250	10.9	35.3	8.5%	91.5%
#100	0.149	132.5	167.8	40.3%	59.7%
#200	0.074	236.9	404.7	97.2%	2.8%
Pan	0.000	3.4	408.1	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project:	Estero Boulevard - Segment 2	**Project No.:**	15-2562
Client:	David Douglass Associates, Inc.	**Lab No.:**	S004
Location:	Station 1194+00: Hand Auger Boring HA-7 (0 - 5')		
Sampled By:	Lee Khan	**Date Sampled:**	3/28/2016
Tested By:	Jeremy Perminter	**Date Tested:**	4/8/2016
Material Description:	Gray SAND (SP) with Traces of Shell Fragments		

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	**WASHED SAMPLE WEIGHT (g)**	**WEIGHT PASSING (g)**	**PERCENT PASSING**	
	451.9	445.1	6.8	1.5%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	**PARTIAL SIZE (mm)**	**SIEVE WEIGHT RETAINED (g)**	**TOTAL WEIGHT RETAINED (g)**	**CUMULATIVE PERCENT RETAINED**	**PERCENT PASSING**
1/2"	12.7	23	23	5.1%	94.9%
#4	4.76	33.2	56.2	12.4%	87.6%
#10	2.00	26.6	82.8	18.3%	81.7%
#16	1.19	15.4	98.2	21.7%	78.3%
# 40	0.420	22.4	120.6	26.7%	73.3%
# 60	0.250	26.9	147.5	32.6%	67.4%
#100	0.149	190.7	338.2	74.8%	25.2%
#200	0.074	104.4	442.6	97.9%	2.1%
Pan	0.000	2.2	444.8	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project: Estero Boulevard - Segment 2 **Project No.:** 15-2562

Client: David Douglass Associates, Inc. **Lab No.:** S005

Location: Station 1234+25: Hand Auger Boring HA-15 (1.5 - 5')

Sampled By: Lee Khan **Date Sampled:** 3/28/2016

Tested By: Jeremy Perminter **Date Tested:** 4/8/2016

Material Description: Light Gray to White SAND WITH SILT (SP-SM) with Traces of Shell Fragments

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	456.2	417.3	38.9	8.5%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	5.2	5.2	1.1%	98.9%
#4	4.76	6.4	11.6	2.5%	97.5%
#10	2.00	7.2	18.8	4.1%	95.9%
#16	1.19	5.4	24.2	5.3%	94.7%
# 40	0.420	12.1	36.3	8.0%	92.0%
# 60	0.250	23.2	59.5	13.0%	87.0%
#100	0.149	250.1	309.6	67.9%	32.1%
#200	0.074	106.6	416.2	91.2%	8.8%
Pan	0.000	1.2	417.4	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix I – Soil Corrosive Series Test Results

1215 Wallace Drive ● Delray, Florida 33444 (561) 347-0070 ● (561)395-3971 (fax)

SOIL CORROSIVENESS

Project:	Estero Boulevard - Segment 2	**Project No.:**	15-2562
Address:	Estero Boulevard, Fort Myers Beach, FL	**Lab No.:**	COR-001
Client:	David Douglass Associates		
Location:	Composite #1: Sta. 1164+00 to Sta. 1194+00 (Depth 3 - 5 Ft.)		
Sampled By:	Lee Khan	**Date Sampled:**	3/28/2016
Tested By:	David May	**Date Tested:**	4/8/2016
Material Description:	Light Gray Sand with Shell		

LABORATORY RESULTS

TEST	LAB RESULTS
pH Content (FM 5-550):	7.79
Resistivity (FM 5-551), ohm-cm:	9.29
Chloride (FM 5-552), ppm:	20
Sulfate (FM 5-553), ppm:	40.1

Comments: Extremely Aggressive due to Resistivity <1000 ohm-cm

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930
State of Florida

1215 Wallace Drive ● Delray, Florida 33444 (561) 347-0070 ● (561)395-3971 (fax)

SOIL CORROSIVENESS

Project:	Estero Boulevard - Segment 2	**Project No.:**	15-2562
Address:	Estero Boulevard, Fort Myers Beach, FL	**Lab No.:**	COR-002
Client:	David Douglass Associates		
Location:	Composite #2: Sta. 1194+00 to Sta. 1238+00 (Depth 3 - 5 Ft.)		
Sampled By:	Lee Khan	**Date Sampled:**	3/28/2016
Tested By:	David May	**Date Tested:**	4/8/2016
Material Description:	Light Gray Sand with Shell		

LABORATORY RESULTS

TEST	LAB RESULTS
pH Content (FM 5-550):	7.76
Resistivity (FM 5-551), ohm-cm:	8.97
Chloride (FM 5-552), ppm:	30
Sulfate (FM 5-553), ppm:	70

Comments: Extremely Aggressive due to Resistivity <1000 ohm-cm

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930
State of Florida

Appendix J – Asphalt/ Shellrock Thickness by Core Determination

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

ASPHALT/ SHELLROCK THICKNESS BY CORE DETERMINATION

Client: David Douglass Associates, Inc. Project #: 15-2562

Project: Estero Boulevard - Segment 2

Address: Estero Boulevard, Fort Myers Beach, FL

Results of Test

Core #	Location	Shell Rock Thickness (in.)	Total Asphalt Core Thickness (in.)	Measured Asphalt Thickness (in.)		Visual Asphalt Type Classification
AC - 1	Sta. 1167+50 9'4" from C.L. Southbound Lane	7 1/4"	8 7/8"	Lift 1	1 1/2	S-III
				Lift 2	1	S-III
				Lift 3	1 5/8	S-III
				Lift 4	7/8	S-III
				Lift 5	3 1/4	ABC-1
				Lift 6	5/8	Sand Asphalt
AC - 2	Sta. 1177+00 9'1" from C.L. Southbound Lane	7 1/2"	9 1/2"	Lift 1	1 1/2	S-III
				Lift 2	1	S-III
				Lift 3	1 1/4	S-III
				Lift 4	2 1/4	S-I
				Lift 5	2 3/4	ABC-1
				Lift 6	3/4	Sand Asphalt
AC - 3	Sta. 1187+00 12' 6" from C.L. Northbound Lane	5 3/8"	9"	Lift 1	1 7/8	S-III
				Lift 2	1 1/4	S-III
				Lift 3	1 1/8	S-III
				Lift 4	3 1/2	S-I
				Lift 5	1 1/4	S-III
AC - 4	Sta. 1196+00 10' from C.L. Southbound Lane	9 5/8"	9"	Lift 1	1 1/2	S-III
				Lift 2	1/2	S-III
				Lift 3	3 1/2	S-I
				Lift 4	1 7/8	ABC-1
				Lift 5	1 3/8	ABC-1
				Lift 6	1/4	Sand Asphalt
AC - 5	Sta. 1206+40 10' from C.L. Northbound Lane	7 1/4"	8 3/4"	Lift 1*	2	S-III
				Lift 2*	1 3/4	S-I
				Lift 3	1 1/2	S-I
				Lift 4	2 3/8	S-I
				Lift 5	1 1/8	S-III

*Asphalt Debonded Between Lifts

The above test results were obtained in accordance with standard laboratory procedures.

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

ASPHALT / SHELLROCK THICKNESS BY CORE DETERMINATION

Client: David Douglass Associates, Inc. Project #: 15-2562

Project: Estero Boulevard - Segment 2

Address: Estero Boulevard, Fort Myers Beach, FL

Results of Test

Core #	Location	Shell Rock Thickness (in.)	Total Asphalt Core Thickness (in.)	Measured Asphalt Thickness (in.)		Visual Asphalt Type Classification
AC - 6	Sta. 1216+00 9'9" from C.L. Southbound Lane	6 3/4"	8"	Lift 1	1 1/4	S-III
				Lift 2	1	S-III
				Lift 3	3	S-I
				Lift 4	2	ABC-1
				Lift 5	3/4	Sand Asphalt
AC - 7	Sta. 1227+00 4'3" from C.L. Northbound Lane	3 1/2" *	9 1/8"	Lift 1	1 1/8	S-III
				Lift 2	1	S-III
				Lift 3	1 1/2	S-I
				Lift 4	1 1/2	S-I
				Lift 5	2	S-I
				Lift 6	1	S-I
				Lift 7	1	S-I
AC - 8	Sta. 1235+50 13' 10" from C.L. Southbound Lane	7"	10"	Lift 1	2	S-III
				Lift 2	1 1/4	S-III
				Lift 3	1 1/4	S-I
				Lift 4	1 1/4	S-I
				Lift 5	1 1/4	S-I
				Lift 6	1 3/8	ABC-1
				Lift 7	1	ABC-1
				Lift 8	5/8	Sand Asphalt

*2-Inches of Blended Asphalt Between Base and Subbase

The above test results were obtained in accordance with standard laboratory procedures.

Appendix K – Asphalt Bulk Specific Gravity

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 office ● (239) 489-3438 fax

ASPHALT CORE SPECIFIC GRAVITY

CLIENT: David Douglass Associates PROJECT # 15-2562

PROJECT: Estero Boulevard - Segment 2

ADDRESS: Estero Boulevard CITY Fort Myers Beach DATE: 4/8/2016

Core #	Location	(A) Weight In Air (grams)	(B) Weight SSD (grams)	(C) Weight In Water (grams)	(D) A/(B-C) Specific Gravity	(E) D x 62.4 Density (PCF)	Core Testing Thickness (in.)
Core - 1	Sta. 1167+50	3034.0	3037.1	1607.1	2.12	132.4	8 1/8
Core - 2	Sta. 1177+00	3186.6	3191.2	1695.1	2.13	132.9	8 1/2
Core - 3	Sta. 1187+00	3376.5	3378.2	1848.4	2.21	137.7	8 3/4
Core - 4	Sta.1196+00	3037.6	3042.6	1606.1	2.11	132.0	8 1/8
Core - 5	Sta. 1206+40	687.4	689.5	355.4	2.06	128.4	2
Core - 6*	Sta. 1216+00	2722.2	2729.8	1436.5	2.10	131.3	7 5/8
Core - 7	Sta. 1227+00	3299.3	3305.0	1787.2	2.17	135.6	8 1/2
Core - 8	Sta. 1235+00	3565.7	3569.4	1923.7	2.17	135.2	9 1/4

*Noticeable Air Voids in 2nd Lift of Asphalt

Respectfully Submitted by:
GFA International, Inc.
FBPE CA # 4930

Appendix L – Limerock Bearing Ratio (LBR) Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 2 **Project ID:** 15-2562

Address: Estero Boulevard, Fort Myers Beach **Report ID:** LBR001

Client: David Douglas Associates, Inc.

Soil Location: Sta. 1174+00, South Bound Shoulder, 10' off Edge of Pavement

Sampled By: L. Khan **Date Sampled:** 3/29/2016

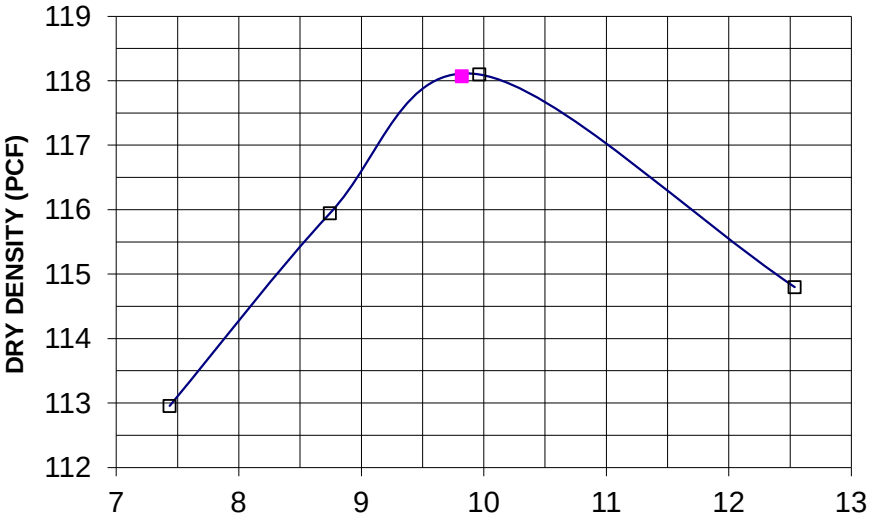
Tested By: M. Stel **Date Tested:** 3/31/2016

Soil Description: Light Gray Sand with Rock

Soil Classification: **Type of Rammer:** Mechanical

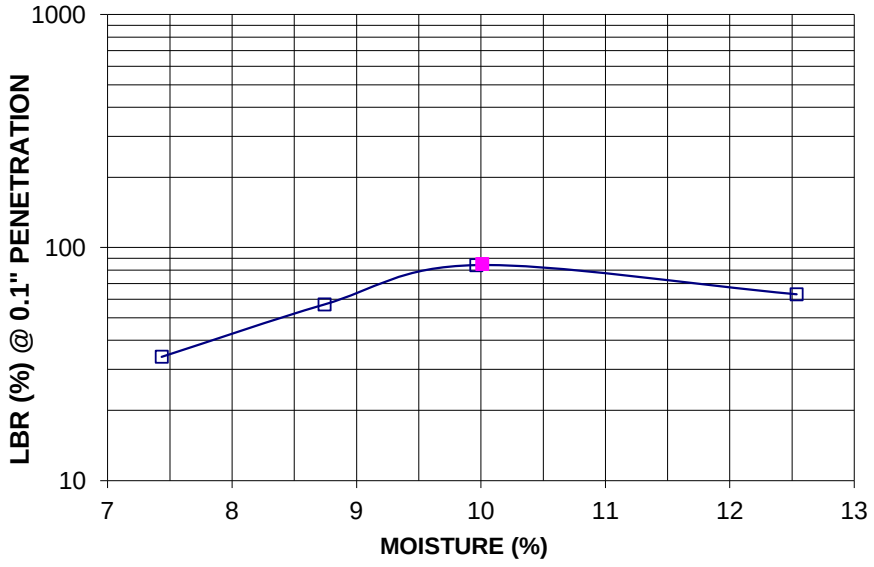
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
113.0	7.4
115.9	8.7
118.1	10.0
114.8	12.5

LBR (%)
34.3
57.0
84.4
62.8



Maximum Dry Density (pcf)
118

Optimum Moisture (%)
10

Limerock Bearing Ratio (%)
85

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

5/2/16

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 2 **Project ID:** 15-2562

Address: Estero Boulevard, Fort Myers Beach **Report ID:** LBR002

Client: David Douglas & Associates, Inc.

Soil Location: Sta. 1189+00, South Bound Shoulder, 5' off Edge of Pavement

Sampled By: L. Khan **Date Sampled:** 3/29/2016

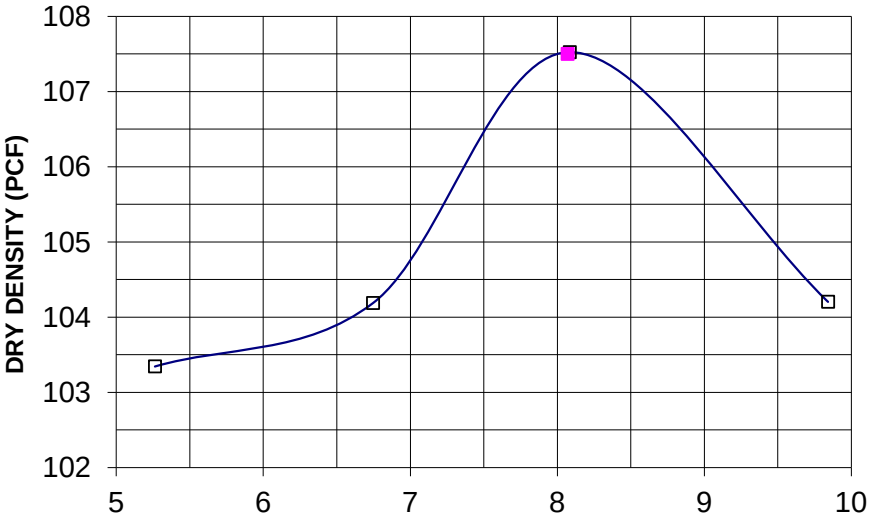
Tested By: M. Stel **Date Tested:** 3/31/2016

Soil Description: Fine Gray Sand, with Shell

Soil Classification: **Type of Rammer:** Mechanical

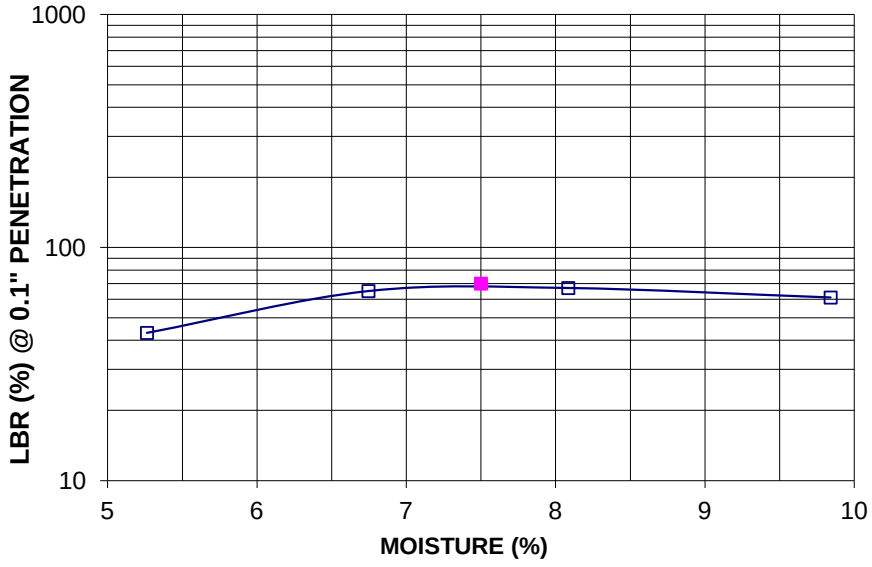
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
103.3	5.3
104.2	6.7
107.5	8.1
104.2	9.8

LBR (%)
42.8
64.5
66.9
61.2



Maximum Dry Density (pcf)
108

Optimum Moisture (%)
8

Limerock Bearing Ratio (%)
70

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

5/2/16

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 2 **Project ID:** 15-2562

Address: Estero Boulevard, Fort Myers Beach **Report ID:** LBR003

Client: David Douglas & Associates, Inc.

Soil Location: Sta. 1204+00 South Bound Shoulder, 6' off Edge of Pavement

Sampled By: L. Khan **Date Sampled:** 3/29/2016

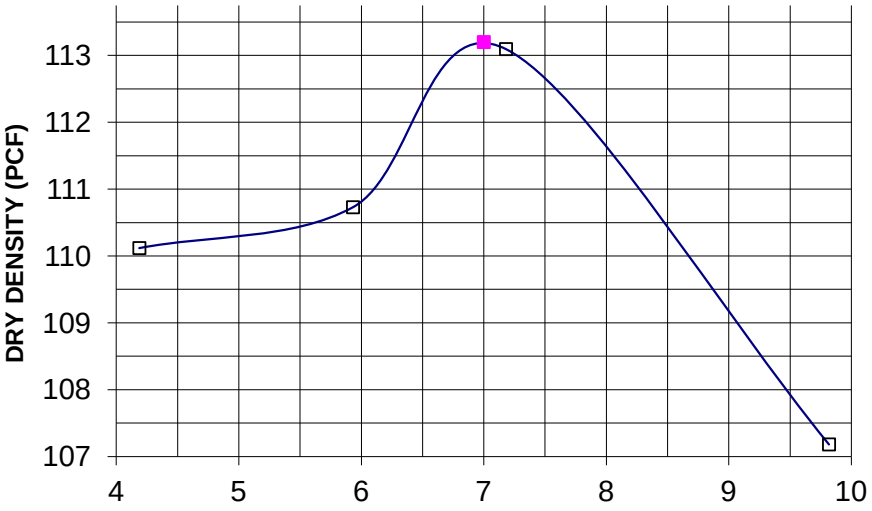
Tested By: M. Stel **Date Tested:** 3/31/2016

Soil Description:

Soil Classification: **Type of Rammer:** Mechanical

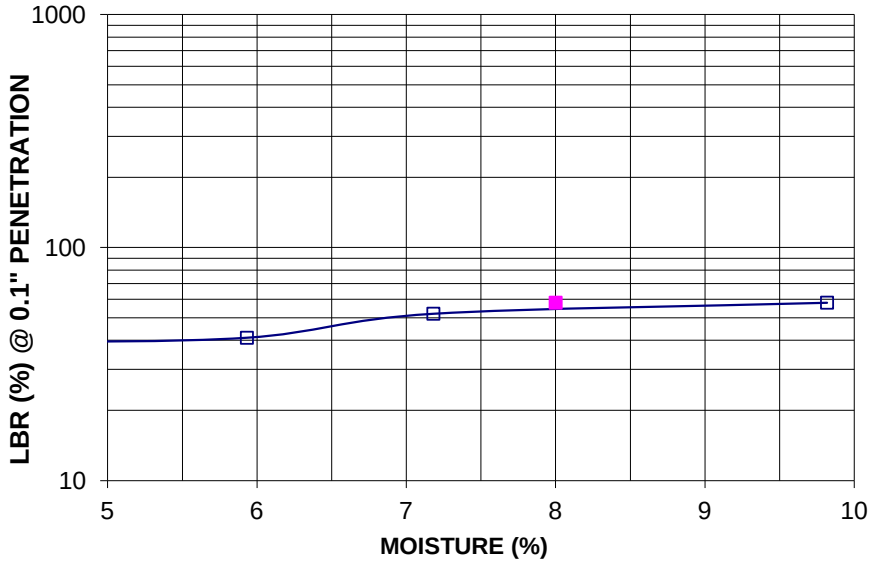
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
110.1	4.2
110.7	5.9
113.1	7.2
107.2	9.8

LBR (%)
39.3
41.3
52.3
58.1



Maximum Dry Density (pcf)
113

Optimum Moisture (%)
7

Limerock Bearing Ratio (%)
58

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

5/2/16

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 2 **Project ID:** 15-2562

Address: Estero Boulevard, Fort Myers Beach **Report ID:** LBR004

Client: David Douglas & Associates, Inc.

Soil Location: Sta. 1219+00 South Bound Shoulder, 5' off Edge of Pavement

Sampled By: L. Khan **Date Sampled:** 3/29/2016

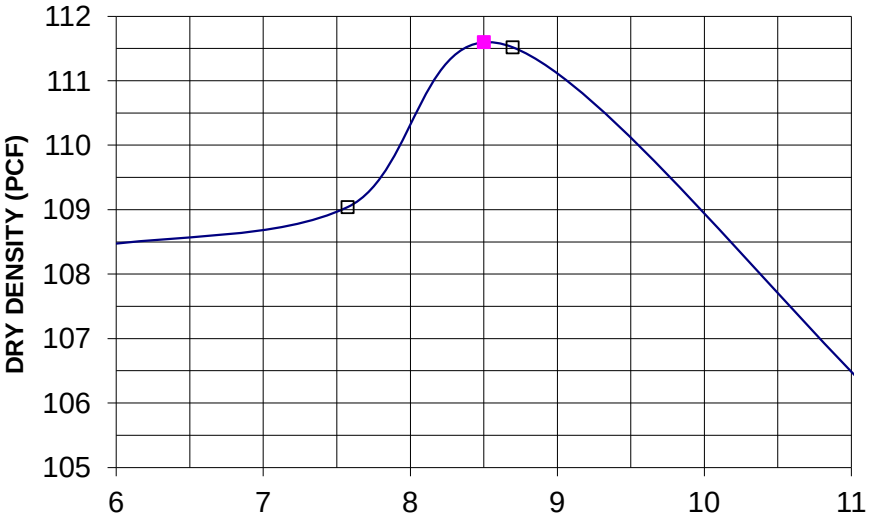
Tested By: M. Stel **Date Tested:** 3/31/2016

Soil Description: Fine Gray Sand with Shell

Soil Classification: **Type of Rammer:** Mechanical

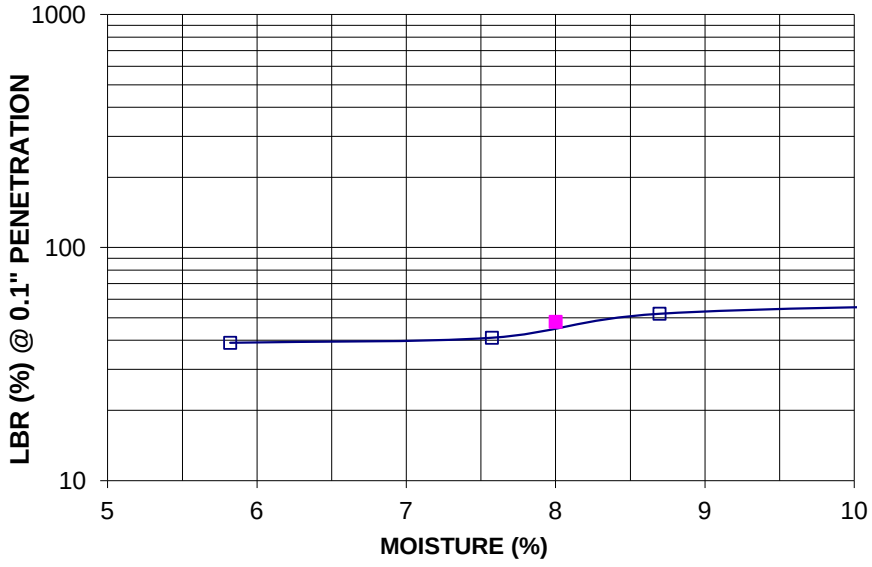
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
108.4	5.8
109.0	7.6
111.5	8.7
105.7	11.3

LBR (%)
39.3
41.3
52.3
58.1



Maximum Dry Density (pcf)
112

Optimum Moisture (%)
9

Limerock Bearing Ratio (%)
48

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

5/2/16

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 2 **Project ID:** 15-2562

Address: Estero Boulevard, Fort Myers Beach **Report ID:** LBR005

Client: David Douglas & Associates, Inc.

Soil Location: Sta. 1234+20, South Bound Shoulder, 3' off Edge of Pavement

Sampled By: L. Khan **Date Sampled:** 3/29/2016

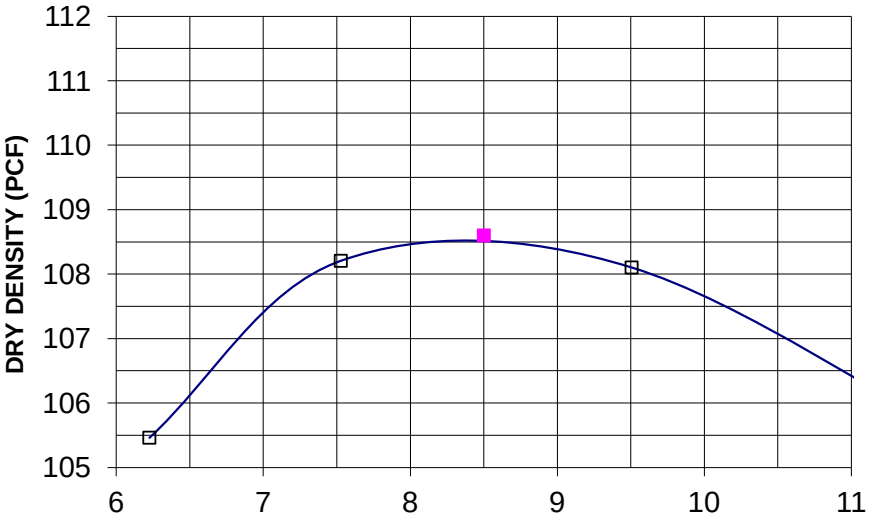
Tested By: M. Stel **Date Tested:** 3/31/2016

Soil Description: Dk. Gray / Brown Sand with Shell

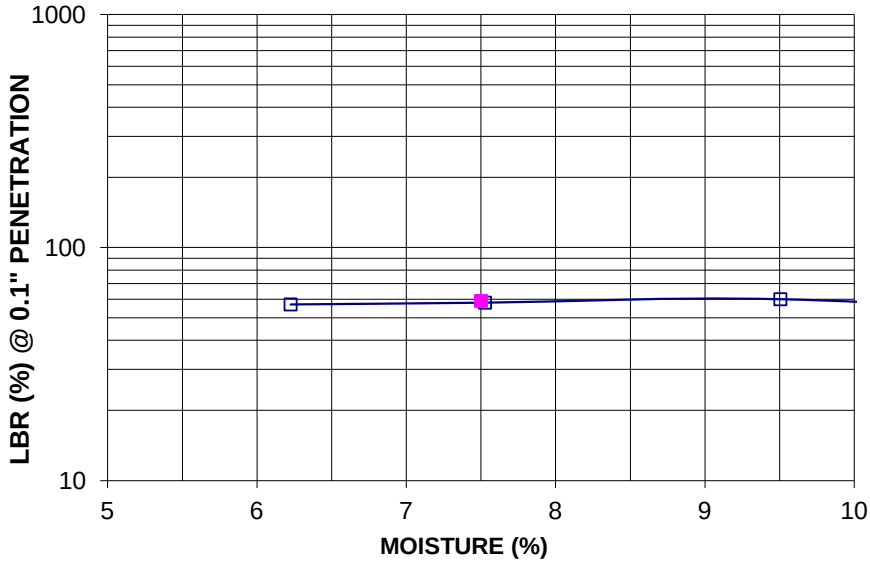
Soil Classification: **Type of Rammer:** Mechanical

Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
105.5	6.2
108.2	7.5
108.1	9.5
105.0	12.1



LBR (%)
56.7
57.6
59.7
50.4

Maximum Dry Density (pcf)
109

Optimum Moisture (%)
9

Limerock Bearing Ratio (%)
59

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

5/2/16

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

Appendix M – Asphalt Core Photographs

ASPHALT CORE AC-1

ASPHALT CORE AC-2

ASPHALT CORE AC-3

ASPHALT CORE AC-4

ASPHALT CORE AC-5

Complete debonding between Lifts 1 and 2.

ASPHALT CORE AC-6

Air voids observed in Lift 2.

ASPHALT CORE AC-7

ASPHALT CORE AC-8

GFA INTERNATIONAL

FLORIDA'S LEADING ENGINEERING SOURCE

Report of Geotechnical Exploration

Estero Boulevard – Segment 3
Fort Myers Beach, Lee County, Florida

March 22, 2017
GFA Project No.: 16-1668

For: David Douglas Associates, Inc.

March 22, 2017

Mr. Dan Craig P.E.
David Douglas Associates, Inc.
1821 Victoria Ave.
Fort Myers, FL 33901
Phone: (239) 337-3330
Email: DC@DDAI-Engineers.com

Site: **Geotechnical Engineering Services Report**
Estero Boulevard – Segment 3
Fort Myers Beach, Lee County, Florida
GFA Project # 16-1668

Dear Mr. Craig:

GFA International, Inc. (GFA) has completed the subsurface exploration and geotechnical engineering evaluation for the above-referenced project in accordance with the geotechnical and engineering service agreement for this project. The scope of services was completed in accordance with our Geotechnical Engineering Proposal (16-1668.00), planned in conjunction with and authorized by you.

EXECUTIVE SUMMARY

The purpose of our subsurface exploration was to classify the nature of the subsurface soils and general geomorphic conditions and evaluate their impact upon the proposed construction. This report contains the results of our subsurface exploration at the site and our engineering interpretations of these, with respect to the project characteristics described to us including providing recommendations for site preparation and the design of the foundation system.

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 4,400 feet of Estero Blvd (Sta. 1238+00: Bayland Road to Sta. 1282+00: Lanark Avenue). Documents provided to GFA at the time of this report were Plan and Profile Plans completed by T.Y. Lin International, Sheet No. 32 through Sheet No. 46, dated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

The following was completed for this study:

- Eight (8) Hand Auger (HA) borings to depths of approximately 5 feet below ground surface (BGS).
- Three (3) Field Percolation Test borings to depths of approximately 5 feet BGS.
- Four (4) Asphalt Cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

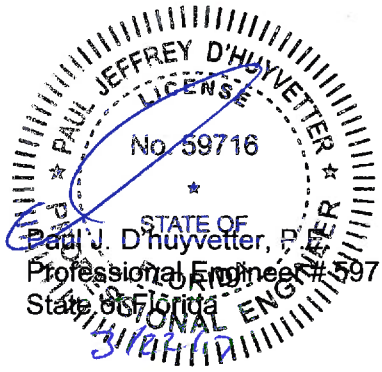
The subsurface soil conditions encountered at this site generally consists of sand (SP) with shell fragments to the boring termination depths. Please refer to "Appendix D – Record of Hand Auger Boring Logs" for a detailed account of each boring.

The following report presents the project information made available to us, our observation of the existing site conditions, the subsurface geotechnical information obtained during this exploration, and our recommendations on the suitability of the soils encountered for the force main replacement. Also included with this report are the results of our field and laboratory testing. The assessment of site environmental conditions for the presence of pollutants in the soil, rock, and groundwater at this site was not included as a part of our services.

We appreciate the opportunity to be of service to you on this project and look forward to a continued association. Please do not hesitate to contact us if you have any questions or comments, or if we may further assist you as your plans proceed.

Respectfully Submitted,
GFA International, Inc.
Florida Certificate of Authorization Number 4930

Lee S. Khan, E.I.
Staff Engineer



Paul J. D'huyvetter, P.E.
Professional Engineer # 59716
State of Florida

Copies: 2, Addressee
1, CD-R

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1.0 INTRODUCTION

1.1 Scope of Services

The objective of our geotechnical services was to collect subsurface data for the subject project, summarize the test results, and discuss any apparent site conditions that may have geotechnical significance for force main replacement. The following scope of service is provided within this report:

1. Prepare records of the soil boring logs depicting the subsurface soil conditions encountered during our field exploration.

2. Conduct a review of each soil sample obtained during our field exploration for classification and additional testing if necessary.

3. Analyze the existing soil conditions found during our exploration for the suitability of the soils encountered for the force main replacement.

4. Provide recommendations with respect to backfill material for the force main replacement.

5. Provide criteria and site preparation procedures to prepare the site for the proposed construction.

1.2 Project Description

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 4,400 feet of Estero Blvd (Sta. 1238+00: Bayland Road to Sta. 1282+00: Lanark Avenue). Documents provided to GFA at the time of this report were Plan and Profile Plans completed by T.Y. Lin International, Sheet No. 32 through Sheet No. 46, dated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

2.0 OBSERVATIONS

2.1 Site Inspection

A site reconnaissance was conducted by members of our engineering staff prior to mobilization of drilling equipment and crews. The purpose of the site visit was to observe the existing site conditions in order to detect any factors that may impact our studies and recommendations.

Generally, the proposed construction site is level. No standing water on the surface was observed during the time of our drilling. The tested site consists of an urban area and is landscaped.

2.2 Geology

The surficial geologic map of Lee County, Florida consists of a quartz sand blanket that overlies the Tertiary Tamiami Formation (T_t), Tertiary-Quaternary Shell Units (Q_{su}) and Quaternary (Holocene) Costal and Estuarine Sediments (Q_h).The quartz sand blanket is generally less than 20 feet thick deposit, fine to medium grained, well sorted, with no fossils.

The oldest formation is the Tertiary Tamiami Formation (T_t). The Tamiami Formation consists of a mixture of variably sandy limestone, sands and clays containing varying percentage of phosphate grains. Fossils including mollusks, echinoids and corals are abundant. Fossil preservation varies from well preserved to molds and casts.

Overlaying the Tamiami Formation throughout much of the county are sediments indicated as Tertiary-Quaternary Shell Units (Q_{su}). These units consist of sands with subordinate limestone and clay. Fossils, including mollusks and corals, are common and well preserved.

Along the coast, Quaternary (Holocene) Costal and Estuarine Sediments (Q_h) are founded below an altitude of approximately 5 feet. These sediments consist of quartz sand with a variable organics component. The Holocene sediments include the beach ridge and dune sands.

2.3 Field Exploration

The following was completed for this study:

- Eight (8) Hand Auger (HA) borings to depths of approximately 5 feet below ground surface (BGS).
- Three (3) Field Percolation Test borings to depths of approximately 5 feet BGS.
- Four (4) Asphalt Cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

The locations of the borings performed are illustrated in “Appendix B: Test Location Plan". The Standard Penetration Test (SPT) boring method was used as the investigative tool within the borings. SPT tests were performed in substantial accordance with ASTM Procedure D-1586, “Penetration Test and Split-Barrel Sampling of Soils”. This test procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches. The number of blows per foot, for the second and third 6-inch increment, is an indication of soil strength.

The soil samples recovered from the soil borings were visually classified and their stratification is illustrated in “Appendix D: Record of Hand Auger Boring Logs". It should be noted that soil conditions might vary between the strata interfaces, which are shown. The soil boring data reflect information from a specific test location only. Site specific survey staking for the test locations was not provided for our field exploration. The indicated depth and location of each test was approximated based upon existing grade and estimated distances and relationships to obvious landmarks. The boring depths were selected based on our knowledge of vicinity soils and to include the zone of soil likely to be stressed by the proposed construction.

2.4 Laboratory Analysis

Soil samples recovered from our field exploration were returned to our laboratory where they were visually examined in general accordance with ASTM D-2488. Samples were evaluated to obtain an accurate understanding of the soil properties and site geomorphic conditions. After a thorough visual examination of the recovered site soils, laboratory testing was conducted to determine particle size distribution (D-422) on individual samples and soil corrosiveness on a composite sample obtained from depths ranging from 2 to 5 feet BGS.

Composite bulk specific gravity tests were run on the four asphalt cores obtained during field exploration using the saturated surface-dry procedure (AASHTO T-166). Limerock Bearing Ratio (LBR) tests were run on material obtained within approximately 5 feet of the edge of pavement using the Florida Method FM 5-515.

All laboratory tests were conducted in general accordance with ASTM, AASHTO, or Florida Methods, as applicable. The test method method number for each test and the number of tests completed are presented in the following table.

TEST DESCRIPTION	NUMBER OF TESTS	ASTM TEST METHOD
Soil Classification	24	D-2488
Gradation Analysis	5	D-422
Soil Corrosiveness (pH, Resistivity, Chloride, Sulfate)	1	FM 5-550, FM 5-551, FM 5-552, and FM 5-553
Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens	4	AASHTO T-166
Limerock Bearing Ratio (LBR)	4	FM 5-515

Bag samples of the soil encountered during our field exploration will be held in our laboratory for your inspection for 90 days and then discarded unless we are notified otherwise in writing.

2.4.1 Gradation Tests

A total of five (5) gradation tests were performed on samples obtained during the field exploration program. Material passing the No. 200 sieve is considered “fines” and will be either silt or clay. The percent passing the No. 200 sieve, for the tested samples, ranged from 0.9 to 2.5 percent, this resulted in the sampled material to be considered poorly graded. A summary of the grain size distribution curve is presented in “Appendix H: Gradation Test Results”.

2.4.2 Soil Corrosiveness

This test method covers the laboratory determination for the minimum resistivity of a soil. The principal use of this test method is to determine a soil's corrosivity and thereby identify the conditions under which the corrosion of metals in soil may be sharply accentuated. Soil corrosiveness testing was completed on one (1) composite sample ranging from 2 – 5 feet BGS.

The soil samples obtained were considered non-marine structures and classified under the criteria for substructure environmental classifications. The pH (>7.0), chloride (<500 ppm), and sulfate (<1000 ppm) fell under the slightly aggressive classification but due to the resistivity results (<1000 Ohm-cm), **Composite 1 is deemed to be slightly aggressive for concrete structures and moderately aggressive for steel structures**. The laboratory results for soil corrosiveness can be found in "Appendix I: Soil Corrosive Series Test Results".

For design purposes we recommend using a classification of "Moderately Aggressive" for this project.

2.5 Geomorphic Conditions

Boring logs derived from our field exploration are presented in "Appendix B: Boring Locations and Soil Profiles". The boring logs depict the observed soils in graphic detail. The Standard Penetration Test borings indicate the penetration resistance, or N-values, logged during the drilling and sampling activities. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples. All soil samples reviewed have been depicted and classified in general accordance with the Unified Soil Classification System, modified as necessary to describe typical southwest Florida conditions. See "Appendix E: Discussion of Soil Groups", for a detailed description of various soil groups.

The subsurface soil conditions encountered at this site generally consists of sand (SP) with shell fragments to the boring termination depths. Please refer to "Appendix D – Record of Hand Auger Boring Logs" for a detailed account of each boring.

2.6 Hydrogeological Conditions

During our field exploration program from February 13, 2017 to February 17, 2017, the groundwater table was encountered in our HA borings at depths of approximately 4 to 5 feet below the existing ground surface. The groundwater table will fluctuate depending upon tidal events.

Located in "Appendix F: Hydrologic Soils Map" are the following descriptive characteristics of the one (1) type of soil survey encountered during the drilling operations based on the soil survey of Lee County, Florida, published by the United States Department of Agriculture:

Canaveral-Urban Land Complex (4)

About 50 to 70 percent of each area of the complex consists of nearly level Canaveral soils or areas of Canaveral soils that have been reworked or reshaped, but which still are recognizable as Canaveral soils. Typically, Canaveral soils have a surface layer of lack and dark gray fine sand that is mixed with shell fragments. Beneath the surface layer, to a depth of 80 inches or more, are layers of light brownish gray and light gray fine sand mixed with shell fragments.

About 20 to 30 percent of each area is urban land. This land is used for houses, streets, driveways, buildings, parking lots, and other related uses.

In undrained areas, the water table is at a depth of 18 to 40 inches for a period of 2 to 6 months in most years. Drainage systems have been established in most areas, however, and the depth to the water table is dependent on the drainage system.

2.6.1 Exfiltration Testing

GFA International performed three field percolation (PERC) tests spaced at approximately 1,450-foot centers. The percolation testing was performed in accordance with the SFWMD Constant-Head Open-Hole Test Method. The results are presented below.

PERC Test – 1 (Sta. 1247+00)	
Depth (ft)	**Soil Description**
0 – 5.5	Gray Sand (A-3; SP) with Shell Fragments
Water table: 5.1 feet below grade.*	
Saturated K = 42.4 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 2 (Sta. 1267+50)	
Depth (ft)	**Soil Description**
0 – 5	Gray Sand (A-3; SP) with Shell Fragments
Water table: 4.0 feet below grade.*	
Saturated K = 51.9 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 3 (Sta. 1282+00)	
Depth (ft)	**Soil Description**
0 – 3	Gray Sand (A-3; SP)
3 – 5	Brown Sand (A-3; SP) with Shell Fragments
Water table: 4.0 feet below grade.*	
Saturated K = 27.0 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

The location of the exfiltration test completed is illustrated in "Appendix B: Test Location Plan".

3.0 ENGINEERING EVALUATION AND RECOMMENDATIONS

3.1 General

The geotechnical evaluations for the proposed construction site are based on the subsurface soil and groundwater conditions encountered during this study, the project information made available, our site observations, and our experience in the vicinity. The test data has been evaluated using established geotechnical parameters of the soils recorded at this site, laboratory test results, and the observed performance of similar soil types.

Based on the soil conditions encountered in the performed borings, the near surface soils do not meet the below mentioned Lee County Technical Specifications for select fill. The water main replacement may be designed according to the recommendations and site preparations as discussed below with a fill material meeting the specifications.

3.2 Pipe Bedding and Initial Backfill (Force Main)

According to the Lee County Technical Specifications, Section 2223, Backfilling, a select fill material shall be used for pipe bedding and initial backfill from top of bedding to 1 foot over the top of pipes. The select fill shall be compacted to not less than 95 percent of the maximum dry density as determined by ASTM D-1557.

Pipe bedding containing very fine sand, uniformly graded sands and gravel, silt, soft earth, or other material that have a tendency to flow under pressure when wet is unacceptable.

Based on the laboratory test results the majority of the near surface soils consist of poorly graded clean sands to slightly silty sands. Material from on-site excavation does not meet the gradation specification for select fill and cannot be used for pipe bedding and initial backfill.

In addition, four of the five samples tested meet the gradation specification for common fill. Hand Auger HA-3 from 2 to 3.5 feet BGS did not meet the gradation specification for common fill.

3.3 Pipe Bedding and Initial Backfill (Drainage System)

Pipe bedding and initial backfill shall be in accordance with Florida Department of Transportation (FDOT) for Road and Bridge Construction – Sections 120 & 125 (January 2017).

3.4 Trench Excavation

Where trench excavations are required, trenches shall be sufficiently wide and deep to allow proper installation of pipes. We recommend about 12 inches clear of the pipe on either side at any point. Boulders, rocks or other hard unyielding material shall be excavated to a depth of 12 inches below the bottom of the pipe elevation.

Due to the depth of excavations and the depth of the water table, we anticipate excavation will require shoring or a trench box. Trenching should be in general accordance with any Lee County trenching requirements and the Occupational Safety and Health Administration (OSHA) requirements, as applicable.

3.5 Trench Backfill

Trench backfill material shall be clean earth fill composed of sand, clay and sand, sand and stone, crushed stones or other soils approved by a professional engineer. The trench backfilling shall be accomplished from the top of the initial backfill to the ground surface. The backfill, unless otherwise specified, shall be compacted to 95% of maximum density, as determined by ASTM D-1557.

When trenches are cut in pavements or areas to be paved, compaction shall be in accordance with FDOT for Road and Bridge Construction (January 2017).

Based on the soil profiles, presented in “Appendix B: Boring Locations and Soil Profiles”, the material from on-site excavation that will contain sands and silt or gravel size limestone fragments may be used for the trench backfill. The organic soils, if encountered during construction, are not suitable and shall not be used as a trench backfill material.

4.0 DEWATERING OF EXCAVATIONS

The high groundwater tables in the vicinity of excavations shall be reduced to prevent water inflow into excavations. Dewatering will be required for the excavation of trenches during construction. Each excavation shall be kept dry during subgrade preparation and continually thereafter until installation of the pipe or wet well structures. The dewatering will be required to maintain groundwater elevation at least 24 inches below the bottom at all times to prevent bottom disturbance or failure.

5.0 SITE PREPARATION PROCEDURES

Site preparation procedures should begin with the removal of existing debris, vegetation, or other unsuitable materials within and beyond the excavation construction.

The organic soils, if encountered during construction, shall be removed and replaced to a required level (the future project specification) with a compacted suitable fill. The suitable fill material shall contain less than 10 percent of fines passing the No. 200 sieve, not contain clay balls and rock fragments greater than 3 inches in diameter.

An adequate dewatering system shall be installed to maintain the water table 2 feet or more below the maximum depth of excavation. The continuous dewatering shall be provided until the pipeline is completed and backfill is above the water table before beginning of the dewatering. When a professional engineer approves the discontinuing of the dewatering, the rate of pumping shall slowly decrease, allowing the water level to rise slowly.

The soils that extend below the water table should be allowed to dry prior to placement as a backfill material and compaction. This can be accomplished by stockpiling the material and allowing it to drain, or by spreading it in relatively thin lifts on the surface and allowing it to dry prior to compaction. The silty or sands with clay may require moisture conditioning so that the soil moisture content at the time of compaction is at or near the optimum moisture content.

Trench bottoms should be compacted with a small roller or vibratory plate compactor prior to pipe placement. Any loose or soft yielding areas detected during compaction of the trench bottoms should either be further compacted to at least 95% of maximum dry density or removed and replaced with a select fill and compacted to 95% of maximum dry density. Bedding stone may be used in lieu of select fill.

During the compaction operation, a geotechnical engineer or an engineering technician working under his direction should observe the soils to verify that the exposed soils are suitable and that unsuitable soils have been removed. Samples of the backfill materials should be obtained to determine the grain size distribution, its maximum dry density and optimum moisture content in the laboratory in accordance with ASTM D-1557 (Modified Proctor Test).

6.0 ASPHALT EVALUATION

6.1 Asphalt Thickness

Four (4) asphalt cores were taken at alternating lanes (southbound or northbound) along Estero Boulevard in Fort Myers Beach starting from Glenview Manor Drive (Sta. 1245+00) and finishing at Aberdeen Avenue (Sta. 1276+00). The location of each individual asphalt core can be found in “Appendix B: Test Location Plan”.

GFA International encountered an average asphalt thickness of 9-1/8 inches with a range of five (5) to seven (7) lifts per asphalt core. A stratum was initiated from top of existing asphalt (Lift 1) down to the bottom of asphalt (ex.: Lift 6). Air voids were observed in Lift 2 of Asphalt Core C-2 as well as complete debonding between Lift 6 and Lift 7 due to possibility of intrusion of sands in tack coat prior to placement of asphalt. A summary of the test results are shown in “Appendix J: Asphalt Thickness by Core Determination”. “Appendix M: Asphalt Core Photographs” confirms the debonding occurred between Lifts 6 and 7 in C-2, as well as the condition of all cores.

Beneath the asphalt, a layer of cemented shell base was encountered. This material consists of sand shell fragments.

6.2 Limerock Bearing Ratio (LBR) Testing

A total of four (4) samples were obtained within approximately 5 feet of the edge of pavement to conduct Limerock Bearing Ratio (LBR) tests on the existing subgrade soils, using the Florida Method FM 5-515. Based on the laboratory test results, we recommend a structural coefficient for Type B Stabilized subbase, LBR 30 material (0.06). For complete test results, refer to “Appendix L – Limerock Bearing Ratio (LBR) Results”. It is our understanding that the existing base material will be removed during utility construction. As such, no LBR samples were collected from the base material.

6.3 Asphalt Bulk Specific Gravity Testing

A total of four (4) asphalt core samples were tested using American Association of State Highway and Transportation (AASHTO) T-166 “Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens”. The top 4-inches of asphalt were tested as a composite sample per each asphalt core. The asphalt density ranged from 131.7 to 134.0 pounds per cubic foot (PCF) which averaged in 133.1 PCF.

For complete test results, refer to “Appendix K – Asphalt Bulk Specific Gravity”.

7.0 REPORT LIMITATIONS

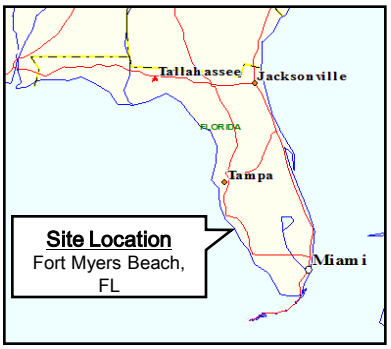
This consulting report has been prepared for the exclusive use of the current project owners and other members of the design team for the Estero Boulevard – Segment 3 located on Estero Boulevard in Fort Myers Beach, Lee County, Florida. This report has been prepared in accordance with generally accepted local geotechnical engineering practices; no other warranty is expressed or implied. The evaluation submitted in this report, is based in part upon the data collected during a field exploration, however, the nature and extent of variations throughout the subsurface profile may not become evident until the time of construction. If variations then appear evident, it may be necessary to reevaluate information and professional opinions as provided in this report. In the event changes are made in the nature, design, or locations of the proposed structure, the evaluation and opinions contained in this report shall not be considered valid, unless the changes are reviewed and conclusions modified or verified in writing by GFA International. GFA is not responsible for damage caused by soil improvement and/or construction activity vibrations related to this project. GFA is also not responsible for damage concerning drainage or moisture related issues for the proposed or nearby structures.

8.0 BASIS FOR RECOMMENDATIONS

The analysis and recommendations submitted in this report are based on the data obtained from the tests performed at the locations indicated on the attached figure in "Appendix B: Test Location Plan". This report does not reflect any variations, which may occur between borings. While the borings are representative of the subsurface conditions at their respective locations and for their vertical reaches, local variations characteristic of the subsurface soils of the region are anticipated and may be encountered. The delineation between soil types shown on the soil logs is approximate and the description represents our interpretation of the subsurface conditions at the designated boring locations on the particular date drilled.

Any third party reliance of our geotechnical report or parts thereof is strictly prohibited without the expressed written consent of GFA International. The methodology (ASTM D-1586) used in performing our borings and for determining penetration resistance is specific to the sampling tools utilized and does not reflect the ease or difficulty to advance other tools or materials.

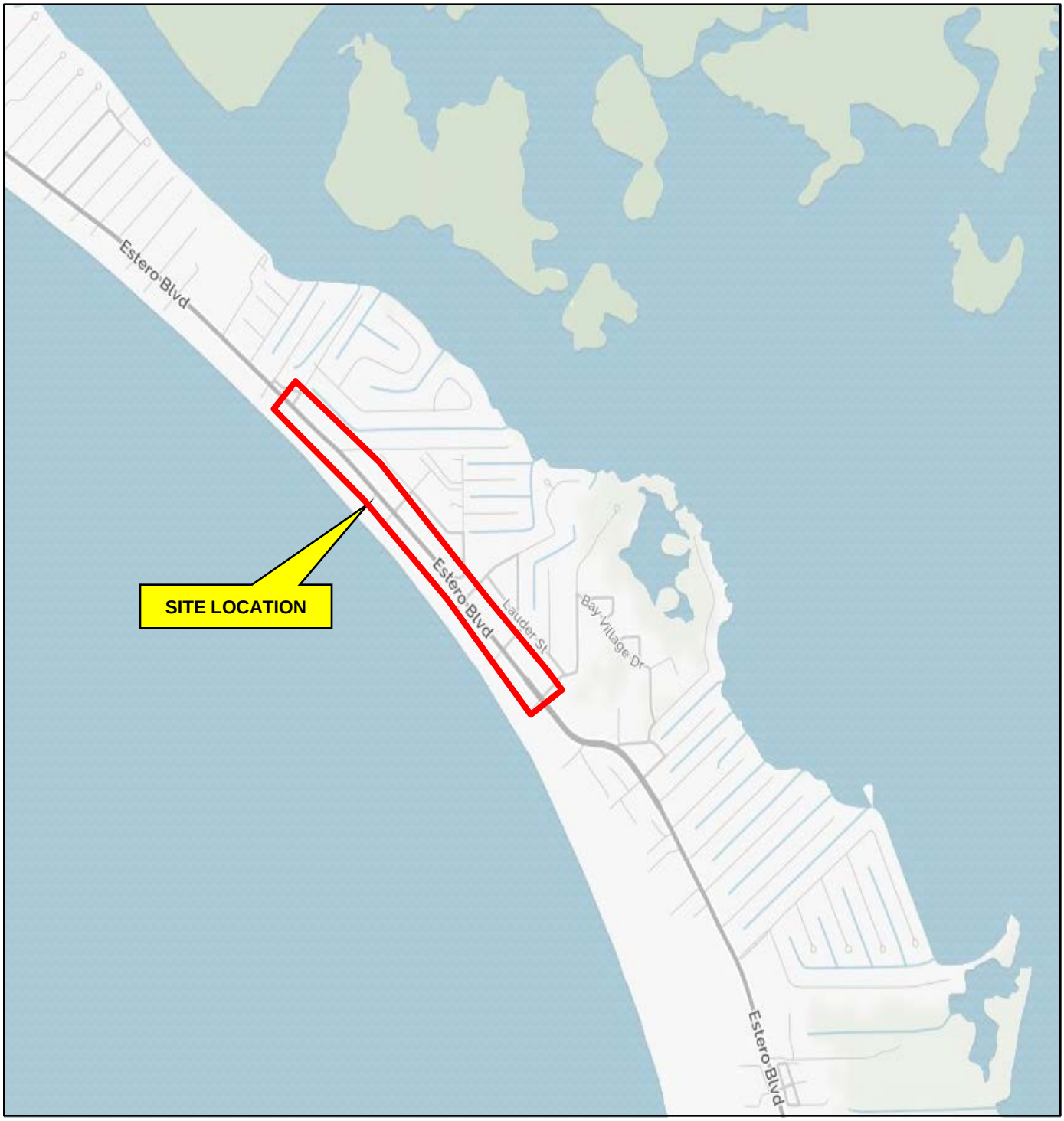
Appendix A - Vicinity Map



VICINITY MAP

Estero Boulevard – Segment 3

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668

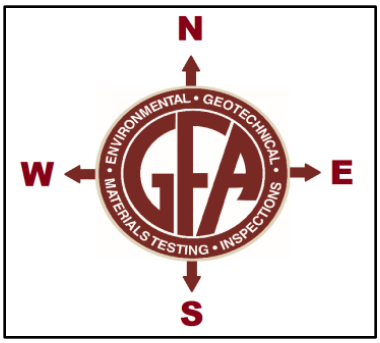


Appendix B – Test Location Plan

TEST LOCATION PLAN

Estero Boulevard – Segment 3

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668



*Scale is an approximation and may not be accurate.

⊗ Hand Auger Boring
⊗ Asphalt Core
⊗ Exfiltration Test
⊗ Hand Auger Boring/ LBR Sample

TEST LOCATION PLAN

Estero Boulevard – Segment 3

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668

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S
ENVIRONMENTAL • GEOTECHNICAL • MATERIALS TESTING • INSPECTIONS
GFA

*Scale is an approximation and may not be accurate.

- Hand Auger Boring
- Asphalt Core
- Exfiltration Test
- Hand Auger Boring/ LBR Sample

TEST LOCATION PLAN

Estero Boulevard – Segment 3

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668

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TEST LOCATION PLAN

Estero Boulevard – Segment 3

Fort Myers Beach, Lee County, Florida
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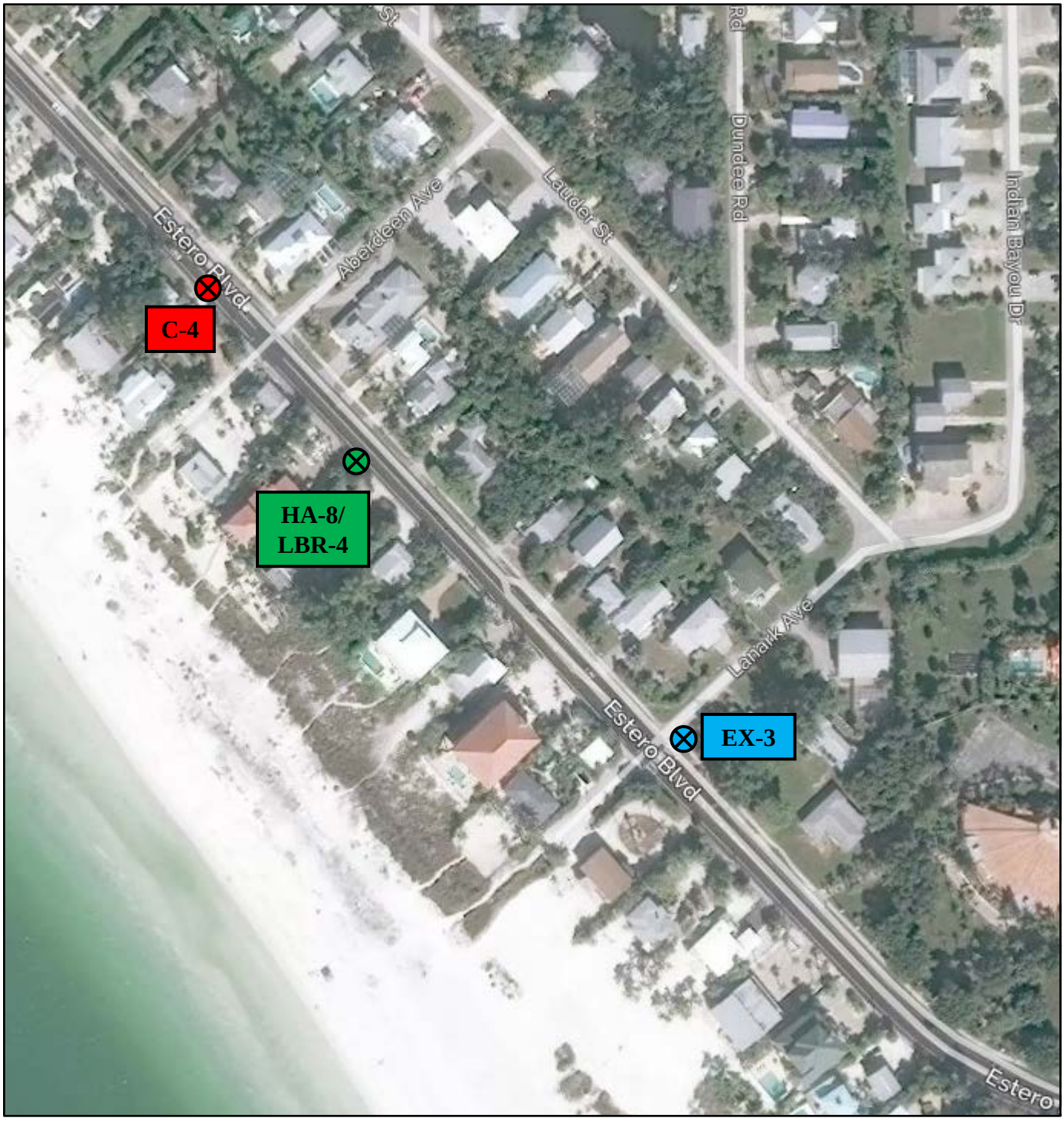


*Scale is an approximation and may not be accurate.

- Hand Auger Boring
- Exfiltration Test
- Asphalt Core
- Hand Auger Boring/ LBR Sample

Appendix C - Notes Related to Borings

NOTES RELATED TO
RECORDS OF TEST BORING AND
GENERALIZED SUBSURFACE PROFILE

1. Groundwater level was encountered and recorded (if shown) following the completion of the soil test boring on the date indicated. Fluctuations in groundwater levels are common; consult report text for a discussion.

2. The boring location was identified and located in the field based on measured and estimated distances from existing site features.

3. The borehole was backfilled to site grade following boring completion, patched with asphalt cold patch mix when pavement was encountered.

4. The Record of Test Boring represents our interpretation of field conditions based on engineering examination of the soil samples.

5. The Record of Test Boring is subject to the limitations, conclusions, and recommendations presented in the report text.

6. The Standard Penetration Test (SPT) was performed in accordance ASTM Procedure D-1586. SPT testing procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches.

7. On the Record of Test Boring listed as "Blow Counts", the N-value is the sum of the SPT hammer blows required to drive the split-tube sampler through the second and third 6-inch increment of the sampling layer, and is an indication of soil strength.

8. Shown on the Record of Test Boring an SPT N-value expressed as 50/2" is descriptive of the fact that 50 hammer blows were required to drive the split-spoon sampler a distance of approximately 2 inches.

9. The soil/rock strata interfaces shown on the Records of Test Boring are approximate and may vary from those in the field. The soil/rock conditions shown on the Records of Test Boring refer to conditions at the specific location tested; soil/rock conditions may vary between test locations.

10. Relative density and consistency for sands/gravels, silts/clays, and limestone are described as follows:

Cohesionless Soils	
SPT (N-Value)	Relative Density
0 – 3	Very Loose
4 – 8	Loose
9 – 24	Medium Dense
25 – 40	Dense
Over 40	Very Dense

Silts and Clays	
SPT (N-Value)	Consistency
0 – 1	Very Soft
2 – 4	Soft
4 – 6	Firm
7 – 12	Stiff
13 – 24	Very Stiff
Over 24	Hard

Limestone	
SPT (N-Value)	Relative Density
0 – 19	Very Soft
20 – 49	Soft
50 – 100	Medium Hard
50 for 3 to 5"	Moderately Hard
50 for 0 to 2"	Hard

11. Definition of descriptive terms of modifiers for silts/clays/shells/gravels are described as follows:

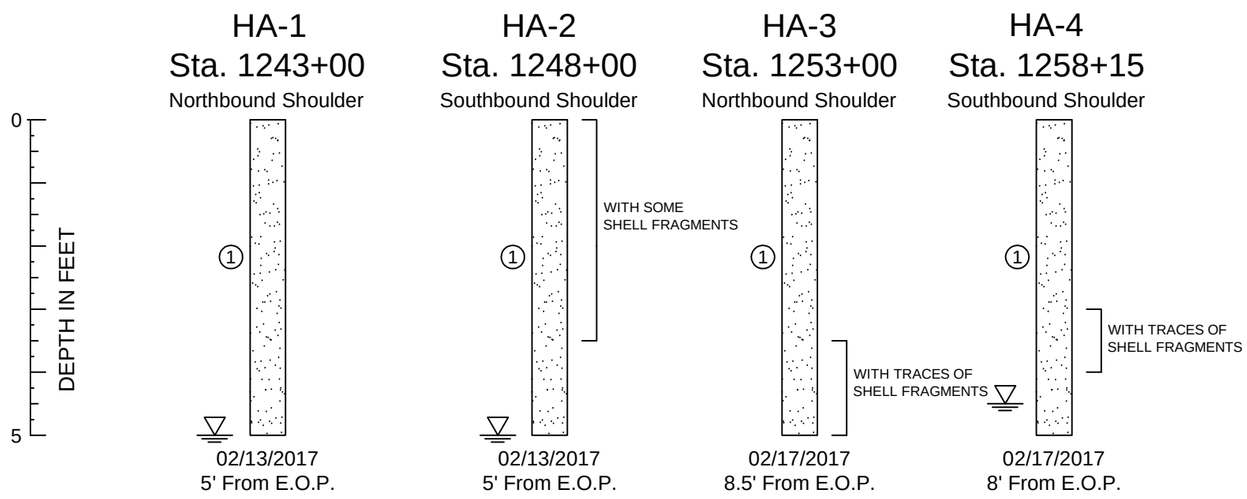
Percentage of Modifier Material	First Qualifier	Second Qualifier
0 – 5	With a Trace of + Modifier	With a Trace
5 – 12	Slightly + Modifier + y	With Some
12 – 30	Modifier + y	With
30 – 50	Very + Modifier + y	And

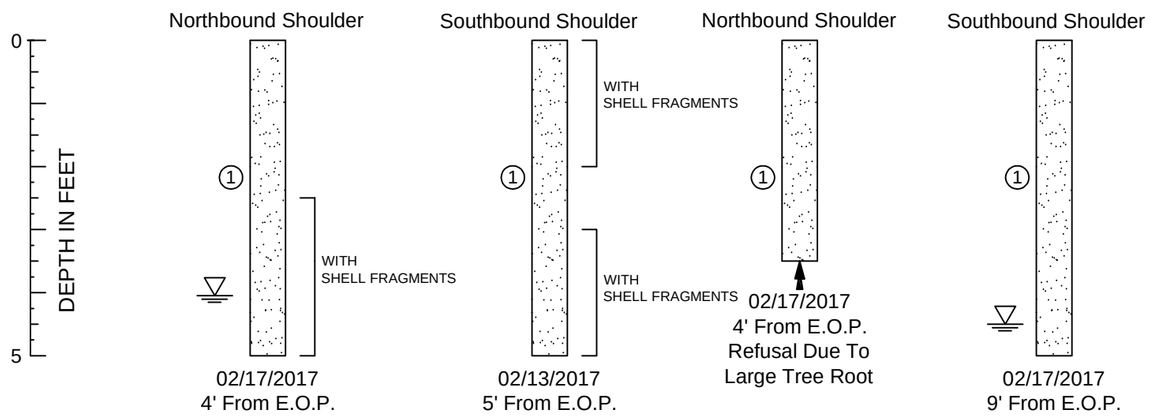
12. Descriptive characteristics for organic content percentages are described as follows:

Percentage of Organic Material	Descriptor
0 – 5	With a Trace
5 – 20	With Organics
20 – 75	Highly Organic
75 – 100	Peat

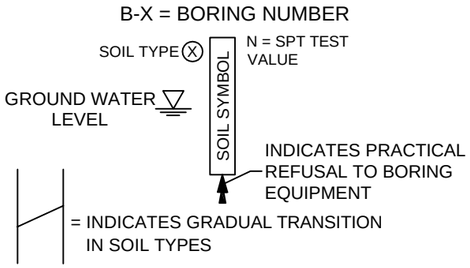
Appendix D – Record of Hand Auger Boring Logs

SOIL PROFILES





SOIL PROFILE LEGEND



SOIL LEGEND

Light Gray to Gray, Orange to Tan, Light Brown to Brown, SAND (SP/ A-3)

NOTES:

N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

WOH - BORING INTERVAL ADVANCED UNDER WEIGHT OF HAMMER.

LFC - LOSS OF DRILLING FLUID CIRCULATION.

E.O.P. - DISTANCE OF HAND AUGER BORING FROM EDGE OF PAVEMENT.

SOIL CLASSIFICATION

CORRELATION OF N - VALUES WITH RELATIVE DENSITY AND CONSISTENCY

COHESIONLESS SOIL		SILTS AND CLAYS	
N - VALUE	RELATIVE DENSITY	N - VALUE	CONSISTENCY
0 - 2	VERY LOOSE	UNDER 1	VERY SOFT
3 - 8	LOOSE	1 - 3	SOFT
9 - 24	MEDIUM DENSE	4 - 6	FIRM
25 - 40	DENSE	7 - 12	STIFF
OVER 40	VERY DENSE	13 - 24	VERY STIFF
		OVER 24	HARD

CORRELATION OF N - VALUES WITH HARDNESS DESCRIPTION

LIMEROCK	
N - VALUE	RELATIVE DENSITY
0 - 19	VERY SOFT
20 - 49	SOFT
50 - 100	MEDIUM HARD
50 FOR 3 TO 5"	MODERATELY HARD
50 FOR 0 TO 2"	HARD

APPROXIMATE FINES CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR SLIGHTLY CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR VERY CLAYEY

APPROXIMATE SAND/ GRAVEL CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SANDY OR SLIGHTLY GRAVELLY
16% TO 25%	SANDY OR GRAVELLY
26% TO 49%	VERY SANDY OR VERY GRAVELLY

APPROXIMATE ROOT CONTENT	MODIFIERS
5% TO 10%	TRACE
11% TO 20%	TRACE TO SOME
21% TO 40%	SOME
41% TO 60%	AND

RECORD OF TEST BORINGS

GFA International, Inc.
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 * TeamGFA.com

Client: David Douglas Associates, Inc.

Project:
Estero Boulevard - Segment 3
Fort Myers Beach, Lee County, Florida

Approved by: PJD

Date: 03/09/2017

Job No: 16-1668

Drawn By: LSK

Appendix E – Discussion of Soil Groups

DISCUSSION OF SOIL GROUPS:
AASHTO CLASSIFICATION

COARSE GRAINED SOILS

- **Group A-1:** The typical material of this group is a well-graded mixture of stone fragments or gavel, coarse sand, fine sand, and a nonplastic or feebly-plastic soil binder. However, this group also includes stone fragments, gravel, coarse sand, volcanic cinders, etc., without a soil binder.

    - **Subgroup A-1-a:** Includes those materials consisting predominantly of stone fragments or gravel, either with or without a well-graded binder of fine material.

    - **Subgroup A-1-b:** Includes those materials consisting predominantly of coarse sand, either with or without a well-graded soil binder.

- **Group A-3:** The typical material of this group is fine beach sand or fine desert-blow sand without silty or clay fines, or with a very small amount of nonplastic silt. This group also includes stream-deposited mixtures of poorly-graded fine sand and limited amounts of coarse sand and gravel.

- **Group A-2:** This group includes a wide variety of “granular” materials which are borderline between the materials falling in Groups A-1 and A-3, and the silt-clay materials of Groups A-4, A-5, A-6, and A-7. It includes all materials containing 35% or less passing a No. 200 (75-µm) sieve which cannot be classified in Groups A-1 or A-3, due to the fines content or the plasticity indexes, or both, in excess of the limitations for those groups.

    - **Subgroups A-2-4 and A-2-5:** Include various granular materials containing 35% or less passing a No. 200 (75-µm) sieve and with a minus No. 40 (425-µm) portion having the characteristics of Groups A-4 and A-5, respectively. These groups include such materials as gravel and coarse sand with silt contents or plasticity indexes in excess of the limitations of Group A-1 and fine sand with nonplastic-silt content in excess of the limitations of Group A-3.

    - **Subgroups A-2-6 and A-2-7:** Include materials similar to those described under Subgroups A-2-4 and A-2-5, except that the fine portion contains plastic clay having the characteristics of the A-6 or A-7 group, respectively.

FINE GRAINED SOILS

- **Group A-4:** The typical material of this group is a nonplastic or moderately plastic silty soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine silty soil and up to 64% of sand and gravel retained on a No. 200 sieve.

- **Group A-5:** The typical material of this group is similar to that described under Group A-4, except that it is usually of diatomaceous or micaceous character and may be highly elastic as indicated by the high liquid limit.

- **Group A-6:** The typical material of this group is a plastic clay soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine clayey soil and up to 64% of sand and gravel retained on a No. 200 sieve. Materials of this group usually have a high volume change between wet and dry states.

- **Group A-7:** The typical material of this group is similar to that described under Group A-6, except that it has the high liquid limits characteristic of Group A-5 and may be elastic as well as subject to high-volume change.

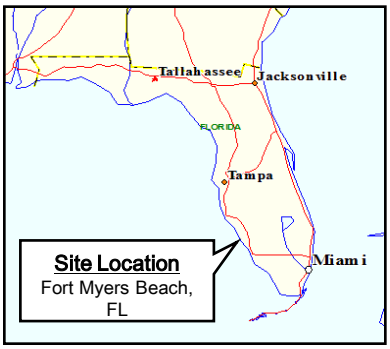
    - **Subgroup A-7-5:** Includes those materials with moderate plasticity indexes in relation to the liquid limit and which may be highly elastic as well as subject to considerable volume change.

    - **Subgroup A-7-6:** Includes those materials with high plasticity indexes in relation to liquid limit and which are subject to extremely high volume change.

HIGHLY ORGANIC SOILS

- **Group A-8:** Highly organic soils (peat or muck) may be classified in this group. Classification of these materials is based on visual inspection and is not dependent on the percentage passing the No. 200 (75-µm) sieve liquid limit, or plasticity index. The material is composed primarily of partially decayed organic matter, generally has a fibrous texture, a dark brown or black color, and an odor of decay. These organic materials are unsuitable for use in embankments and subgrades. They are highly compressible and have low strength.

Appendix F – Hydrologic Soils Map



Hydrologic Soils map

Estero Boulevard – Segment 3

Fort Myers Beach, Lee County, Florida

GFA International Project No.: 16-1668

N
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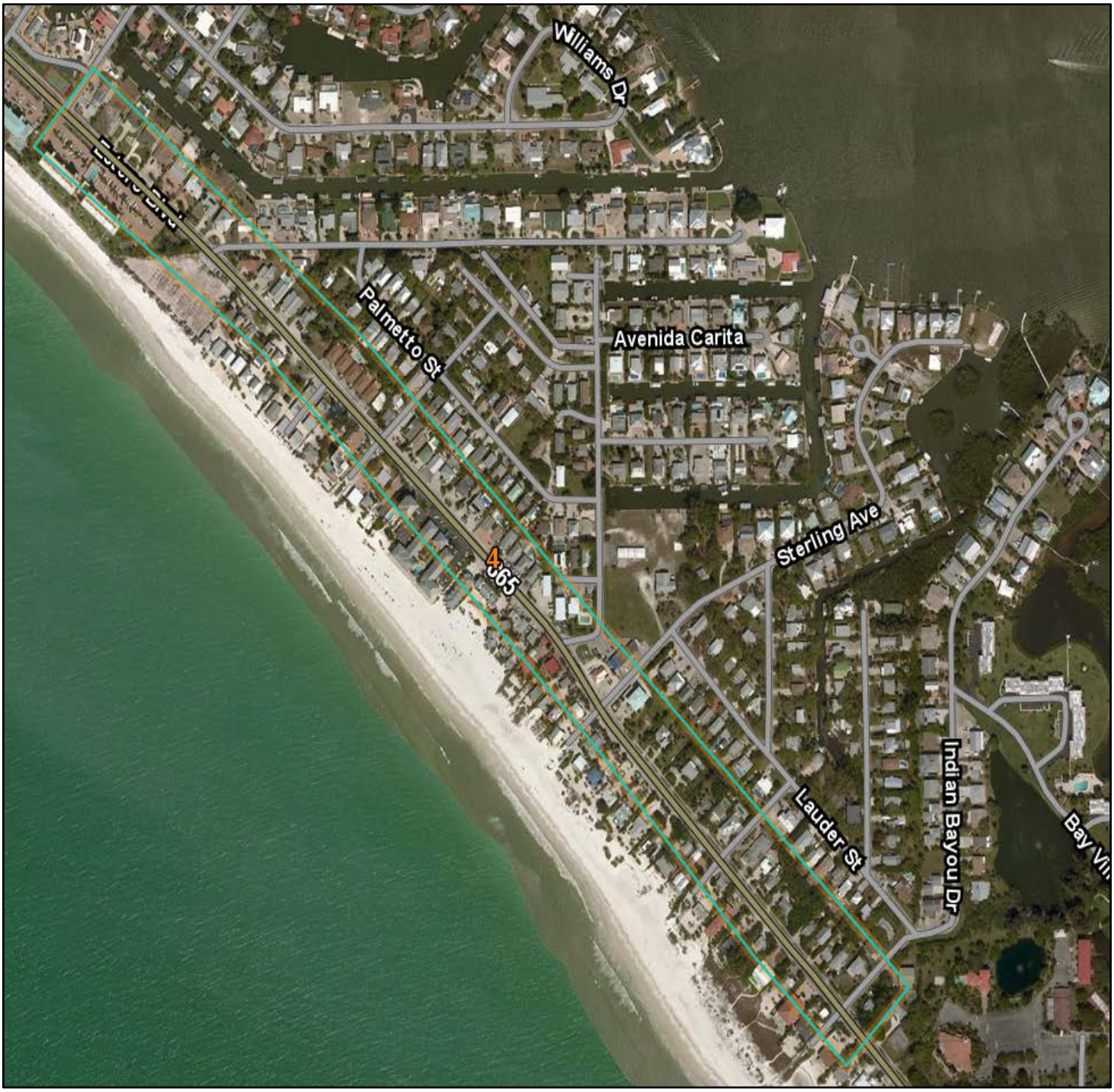
E
S
ENVIRONMENTAL • GEOTECHNICAL • MATERIALS TESTING • INSPECTIONS
GFA



*Map Not To Scale

Map Unit: 4 – Canaveral- Urban Land Complex

Appendix G – Roadway Soil Survey

LEE COUNTY
DEPARTMENT OF PUBLIC WORKS
ESTERO BOULEVARD: SEGMENT 3

DATE OF SURVEY : fEBRUARY 13 – 17, 2017
SURVEY MADE BY : GFA INTERNATIONAL, INC.
SUBMITTED BY : PAUL J. D'HUYVETTER

ROAD NAME : ESTERO BOULEVARD
CITY: FORT MYERS BEACH
COUNTY : LEE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS: STA. 1238+00 SURVEY ENDS: STA. 1282+00

	ORGANIC CONTENT			SIEVE ANALYSIS RESULTS % PASS					ATTERBERG LIMITS (%)					CORROSION SERIES TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC.	% MOISTURE CONTENT	NO. OF TESTS	4 MESH	10 MESH	60 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohms-cm	CHLORIDE ppm	SULFATES ppm	pH
1	–	–	–	5	94.2 – 99.8	90.7 – 99.5	57.8 – 94.5	0.4 – 1.9	–	–	–	A-3	White, Tan, Light Gray to Gray Sand (SP) with Traces of Shell Fragments	1*	3,600	18	48.9	8.27

*Corrosion Series Test ran on one (1) composite sample obtained from hand auger borings during GFA's field exploration program.

NOTES:

EMBANKMENT AND SUBGRADE MATERIAL
STRATA BOUNDARIES ARE APPROXIMATE

Ground water was encountered at depths of about 4 to 5 feet at boring locations at the time of our drilling.

The material from Stratum Number 1 appears satisfactory for use in the embankment when utilized in accordance with Index 505, except where organics are encountered.

It has been the experience of the Department, within projects constructed within this general geographical area, that although preliminary borings did not indicate a presence of rock, rock was encountered while performing underground installations. Therefore, the contractor should consider the increased cost of all underground work activities while preparing the bid. All costs of rock excavation shall be included in the appropriate items of work contained within the contract. No extra compensation or time extention will be allowed for additional work directly associated with the splitting, excavation, crushing, disposal, replacemant of displaced volume of extracted rock with fill material or special handling of rock.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER P.E. #59716

LEE COUNTY DEPARTMENT OF TRANSPORTATION

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	16-1668

ROADWAY SOIL SURVEY
ESTERO BOULEVARD: SEGMENT 3
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK

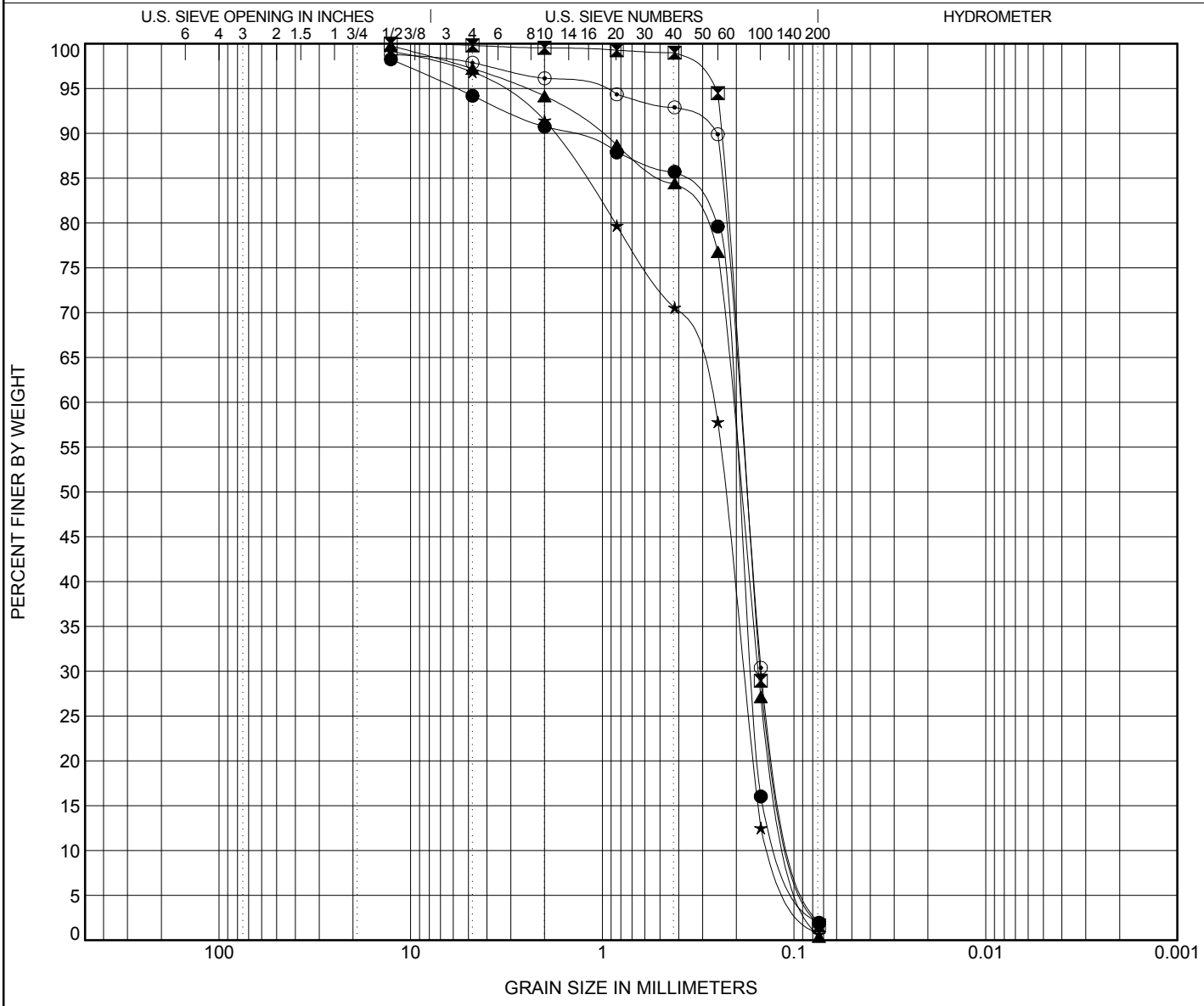
Appendix H – Gradation Test Results

GFA International, Inc
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 P
239-489-3438 F

GRAIN SIZE DISTRIBUTION

CLIENT David Douglas Associates, Inc. **PROJECT NAME** Estero Boulevard - Segment 3

PROJECT NUMBER 16-1668 **PROJECT LOCATION** Sta. 1238+00 to Sta. 1282+00



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● HA-1 (0-3.5')	0.0	**POORLY GRADED SAND(SP)**				**1.18**	**1.93**
⊠ HA-3 (2-3.5')	0.0	**POORLY GRADED SAND(SP)**				**1.29**	**2.08**
▲ HA-4 (3-4')	0.0	**POORLY GRADED SAND(SP)**				**1.18**	**2.21**
★ HA-6 (4-5')	0.0	**POORLY GRADED SAND(SP)**				**0.94**	**2.13**
⊙ HA-8 (0-4')	0.0	**POORLY GRADED SAND(SP)**				**1.25**	**2.14**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● HA-1 (0-3.5')	0.0	**12.7**	**0.213**	**0.167**	**0.11**	**4.1**	**92.0**	**2.2**	
⊠ HA-3 (2-3.5')	0.0	**12.7**	**0.19**	**0.15**	**0.092**	**0.2**	**97.6**	**2.2**	
▲ HA-4 (3-4')	0.0	**12.7**	**0.21**	**0.154**	**0.095**	**2.6**	**96.3**	**0.9**	
★ HA-6 (4-5')	0.0	**12.7**	**0.273**	**0.182**	**0.128**	**2.3**	**95.9**	**0.9**	
⊙ HA-8 (0-4')	0.0	**12.7**	**0.193**	**0.148**	**0.09**	**0.9**	**95.4**	**2.5**	

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SIEVE ANALYSIS

Project: Estero Boulevard - Segment 3

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-1: 0 to 3.5 ft.

Sampled By: Christian Casey **Date Sampled:** 2/13/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Gray Sand (SP) with Traces of Shell Fragments

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	716.0	707.4	8.6	1.2%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	12.5	12.5	1.7%	98.3%
#4	4.76	29.1	41.6	5.8%	94.2%
#10	2.00	24.7	66.3	9.3%	90.7%
#20	0.841	20.5	86.8	12.1%	87.9%
#40	0.420	15.5	102.3	14.3%	85.7%
#60	0.250	43.7	146.0	20.4%	79.6%
#100	0.149	455.2	601.2	84.0%	16.0%
#200	0.074	101.1	702.3	98.1%	1.9%
Pan	0.000	1.2	703.5	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

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SIEVE ANALYSIS

Project: Estero Boulevard - Segment 3

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-3: 2 to 3.5 ft.

Sampled By: Christian Casey **Date Sampled:** 2/13/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Gray Sand (SP)

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	368.2	364.0	4.2	1.1%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	0	0	0.0%	100.0%
#4	4.76	0.7	0.7	0.2%	99.8%
#10	2.00	1.0	1.7	0.5%	99.5%
#20	0.841	1.0	2.7	0.7%	99.3%
#40	0.420	1.0	3.7	1.0%	99.0%
#60	0.250	16.6	20.3	5.5%	94.5%
#100	0.149	241.4	261.7	71.1%	28.9%
#200	0.074	100.4	362.1	98.3%	1.7%
Pan	0.000	2.1	364.2	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project: Estero Boulevard - Segment 3

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-4: 3 to 4 ft.

Sampled By: Christian Casey **Date Sampled:** 2/17/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Gray Sand (SP)

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	470.4	467.0	3.4	0.7%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	1.1	1.1	0.2%	99.8%
#4	4.76	12	13.1	2.8%	97.2%
#10	2.00	14.4	27.5	5.8%	94.2%
#20	0.841	25.8	53.3	11.3%	88.7%
#40	0.420	19.9	73.2	15.6%	84.4%
#60	0.250	36.0	109.2	23.2%	76.8%
#100	0.149	233.6	342.8	72.9%	27.1%
#200	0.074	125.8	468.6	99.6%	0.4%
Pan	0.000	1.1	469.7	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

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SIEVE ANALYSIS

Project: Estero Boulevard - Segment 3

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-6: 4 to 5 ft.

Sampled By: Christian Casey **Date Sampled:** 2/13/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Tan Sand (SP) with Shell Fragments

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	710.1	706.2	3.9	0.5%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	6	6	0.8%	99.2%
#4	4.76	16.4	22.4	3.2%	96.8%
#10	2.00	38.4	60.8	8.6%	91.4%
#20	0.841	83.3	144.1	20.3%	79.7%
#40	0.420	64.9	209.0	29.4%	70.6%
#60	0.250	90.6	299.6	42.2%	57.8%
#100	0.149	321.6	621.2	87.5%	12.5%
#200	0.074	84.1	705.3	99.3%	0.7%
Pan	0.000	0.7	706.0	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project: Estero Boulevard - Segment 3

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-8: 0 to 4 ft.

Sampled By: Christian Casey **Date Sampled:** 2/17/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Gray Sand (SP)

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	480.1	473.4	6.7	1.4%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	5.8	5.8	1.2%	98.8%
#4	4.76	4.4	10.2	2.1%	97.9%
#10	2.00	8.3	18.5	3.9%	96.1%
#20	0.841	8.6	27.1	5.6%	94.4%
#40	0.420	7.0	34.1	7.1%	92.9%
#60	0.250	14.4	48.5	10.1%	89.9%
#100	0.149	285.7	334.2	69.6%	30.4%
#200	0.074	136.6	470.8	98.1%	1.9%
Pan	0.000	2.0	472.8	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix I – Soil Corrosive Series Test Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SOIL CORROSIVENESS

Project: Estero Boulevard Remaining Segments **Project No.:** 16-1668

Address: Estero Boulevard, Fort Myers Beach, Lee County, Florida

Client: David Douglas Associates, Inc.

Location: Segment # 3 / Composite Sample # 1

Sampled By: Christian Casey **Date Sampled:** 2/13/17-2/17/17

Tested By: David May **Date Tested:** 3/3/2017

Material Description: Gray - Brown Sand

LABORATORY RESULTS

TEST	LAB RESULTS
pH Content (FM 5-550):	8.27
Resistivity (FM 5-551), ohm-cm:	3,600
Chloride (FM 5-552), ppm:	18
Sulfate (FM 5-553), ppm:	48.9

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix J – Asphalt Thickness by Core Determination

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

ASPHALT THICKNESS BY CORE DETERMINATION

Client: David Douglas Associates, Inc. Project #: 16-1668

Project: Estero Boulveard - Segment 3

Address: Estero Boulevard, Fort Myers Beach, Lee County, Florida

Results of Test

Core #	Location	Total Asphalt Core Thickness (in.)	Measured Asphalt Thickness (in.)		Visual Asphalt Type Classification
C-1	Sta. 1245+50: Northbound	7-5/8	Lift 1	1-5/8	S-III
			Lift 2	5/8	Binding Layer
			Lift 3	2-1/8	S-I
			Lift 4	1-5/8	S-I
			Lift 5	1-5/8	S-I
C-2	Sta. 1255+50: Southbound	9-1/8	Lift 1	1-3/8	S-III
			Lift 2*	1/2	Binding Layer
			Lift 3	1	S-I
			Lift 4	1-7/8	S-I
			Lift 5	1-3/4	S-I
			Lift 6**	1-1/2	Type II
			Lift 7**	1-1/8	ABC-3
C-3	Sta. 1265+50: Northbound	9-5/8	Lift 1	1-7/8	S-III
			Lift 2	2	S-I
			Lift 3	2	S-I
			Lift 4	2-1/4	S-I
			Lift 5	1-1/2	S-I
C-4	Sta. 1275+50: Southbound	10-1/8	Lift 1	2-1/8	S-III
			Lift 2	1-1/8	S-I
			Lift 3	2-5/8	S-I
			Lift 4	3-3/8	Type II
			Lift 5	7/8	ABC-3

*Air Voids Observed in Lifts

**Asphalt Debonded Between Lifts

The above test results were obtained in accordance with standard laboratory procedures.

Appendix K – Asphalt Bulk Specific Gravity

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 office ● (239) 489-3438 fax

ASPHALT CORE DENSITIES

CLIENT: David Douglas Associates, Inc. PROJECT # 16-1668

PROJECT: Estero Boulevard - Segment 3 REPORT # 1

ADDRESS: Estero Boulevard CITY: Fort Myers Beach DATE: 3/8/2017

Core #	Location/ Offset from Center Line	(A) Weight In Air (grams)	(B) Weight SSD (grams)	(C) Weight In Water (grams)	(D) A/(B-C) Specific Gravity	(E) D x 62.4 Density (PCF)	Tested Thickness (inches)
C-1	Sta. 1245+50 (NB)/ 9 Feet	3765.0	3769.1	1994.0	2.12	132.4	4"
C-2	Sta. 1255+50 (SB)/ 6.5 Feet	3568.3	3578.3	1887.6	2.11	131.7	4"
C-3	Sta. 1265+50 (NB)/ 9.5 Feet	3684.2	3690.2	1974.6	2.15	134.0	4"
C-4	Sta. 1275+50 (SB)/ 6.75 Feet	3661.2	3663.2	1962.0	2.15	134.3	4"

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix L – Limerock Bearing Ratio (LBR) Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 3 **Project ID:** 16-1668

Address: Estero Boulevard, Fort Myers Beach, Lee County, FL **Report ID:** LBR001

Client: David Douglas Associates, Inc.

Soil Location: Sta. 1248+00: Existing Shoulder Material

Sampled By: C. Casey **Date Sampled:** 3/1/2017

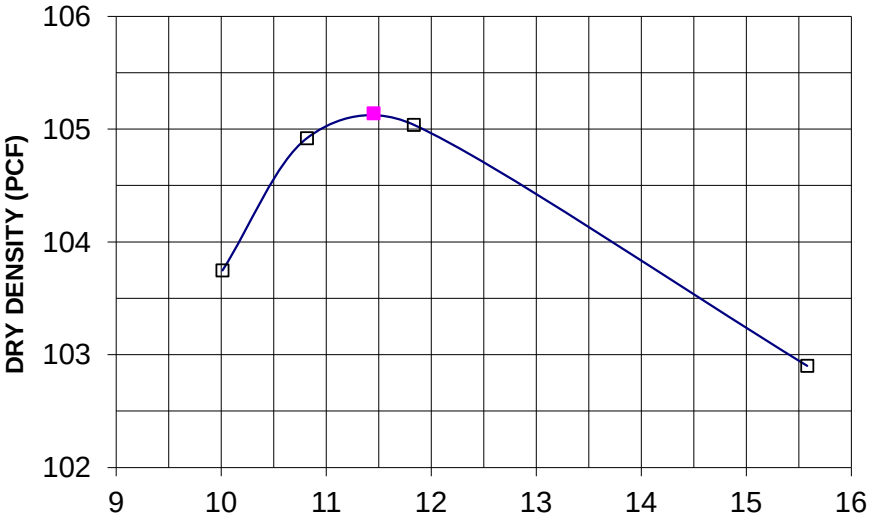
Tested By: M. Stel **Date Tested:** 3/2/2017

Soil Description: Dark Brown Sand

% Passing #4 Sieve: 73.7 **Type of Rammer:** Mechanical

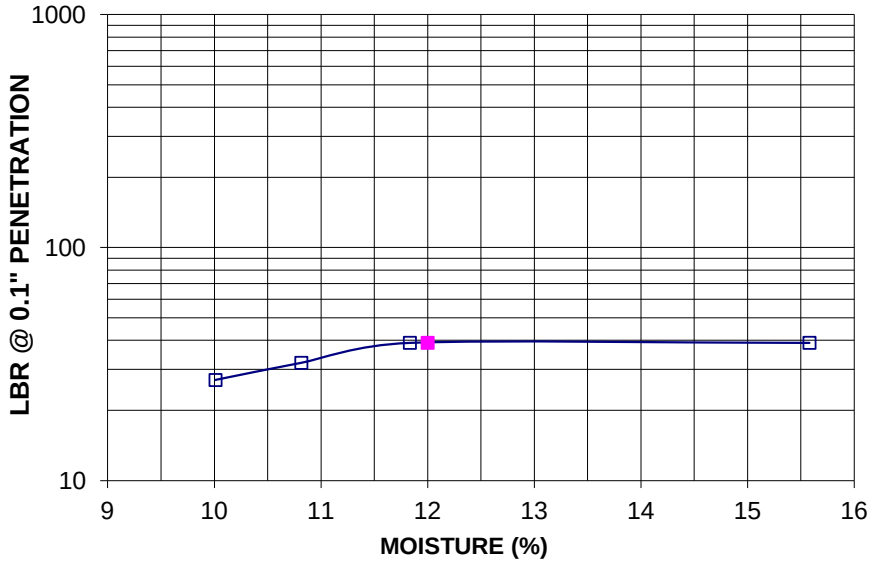
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
103.7	10.0
104.9	10.8
105.0	11.8
102.9	15.6

LBR
27
32
39
39



Maximum Dry Density (pcf)
105.1

Optimum Moisture (%)
11.5

Limerock Bearing Ratio
39

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

3/16/17

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 3 **Project ID:** 16-1668

Address: Estero Boulevard, Fort Myers Beach, Lee County, FL **Report ID:** LBR002

Client: David Douglas Assocaites, Inc.

Soil Location: Sta. 1258+00: Existing Shoulder Material

Sampled By: C. Casey **Date Sampled:** 2/15/2017

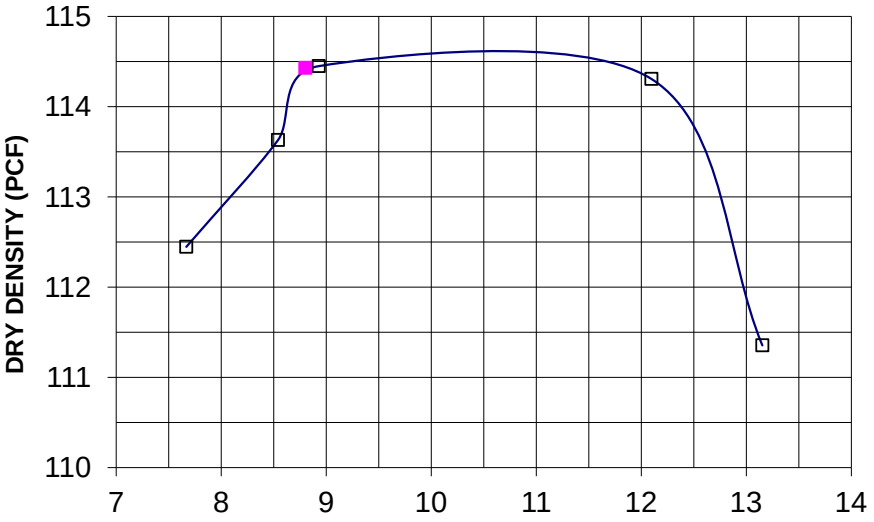
Tested By: M. Stel **Date Tested:** 2/24/2017

Soil Description: Tan to Light Brown Sand

Soil Classification: 73.7 **Type of Rammer:** Mechanical

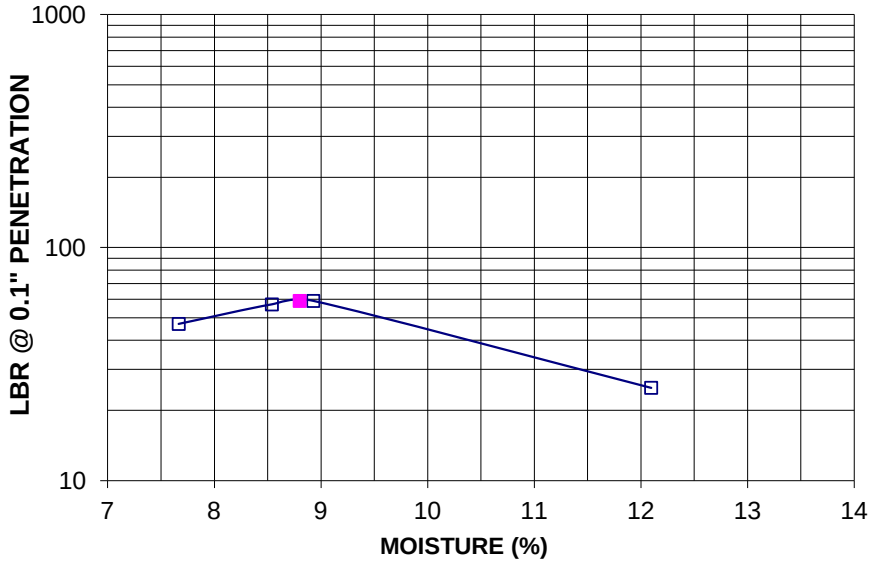
Rammer Face: Sector **Soak Time (hrs):** **Surcharge (lbs):**

Comments:



Dry Density (pcf)	Moisture (%)
112.4	7.7
113.6	8.5
114.4	8.9
114.3	12.1
111.4	13.2

LBR
47.2
56.9
59.3
25.0
15.2



Maximum Dry Density (pcf)
114.4

Optimum Moisture (%)
8.8

Limerock Bearing Ratio (%)
59

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

3/16/17

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 3 **Project ID:** 16-1668

Address: Estero Boulevard, Fort Myers Beach. Lee County, FL **Report ID:** LBR003

Client: David Douglas & Associates

Soil Location: Sta. 1268+00: Existing Shoulder Material

Sampled By: C. Casey **Date Sampled:** 2/15/2017

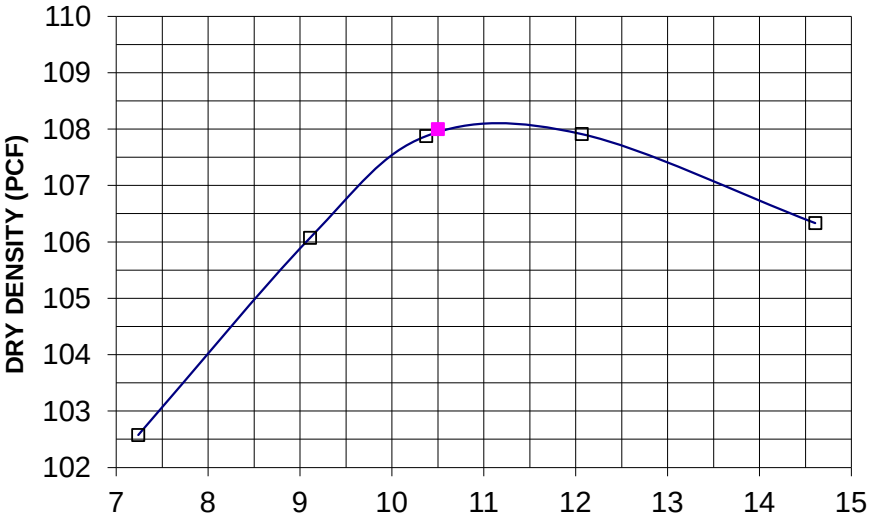
Tested By: M. Stel **Date Tested:** 2/24/2017

Soil Description: Tan Brown Sand, Some Organics

Soil Classification: 73.7 **Type of Rammer:** Mechanical

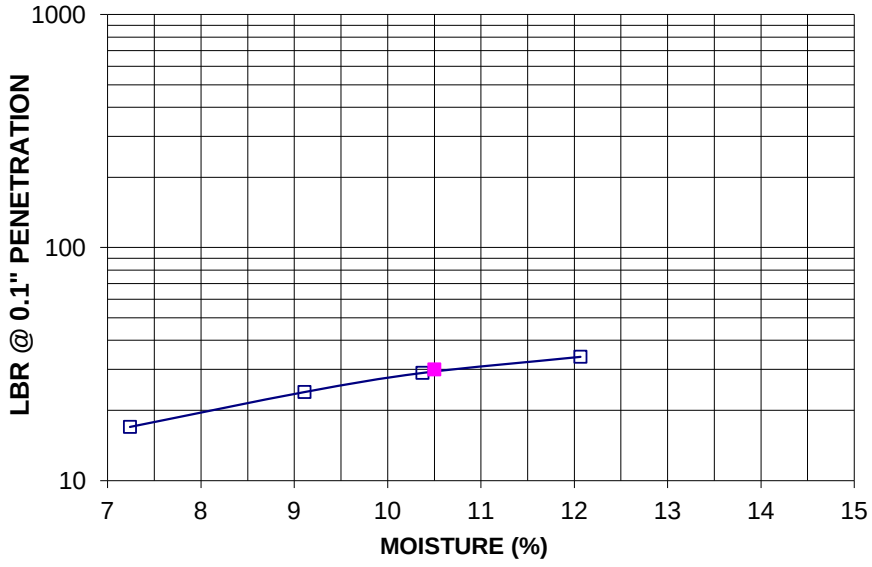
Rammer Face: Sector **Soak Time (hrs):** **Surcharge (lbs):**

Comments:



Dry Density (pcf)	Moisture (%)
102.6	7.2
106.1	9.1
107.9	10.4
107.9	12.1
106.3	14.6

LBR
17.1
23.8
29.3
33.8
29.6



Maximum Dry Density (pcf)
108.0

Optimum Moisture (%)
10.5

Limerock Bearing Ratio (%)
30

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

3/16/17

Paul J. D'huyvetter, P.E.
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(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 3 **Project ID:** 16-1668

Address: Estero Boulevard, Fort Myers Beach, Lee County, FL **Report ID:** LBR004

Client: David Douglas & Associates

Soil Location: Sta. 1278+00: Existing Shoulder Material

Sampled By: C. Casey **Date Sampled:** 3/1/2017

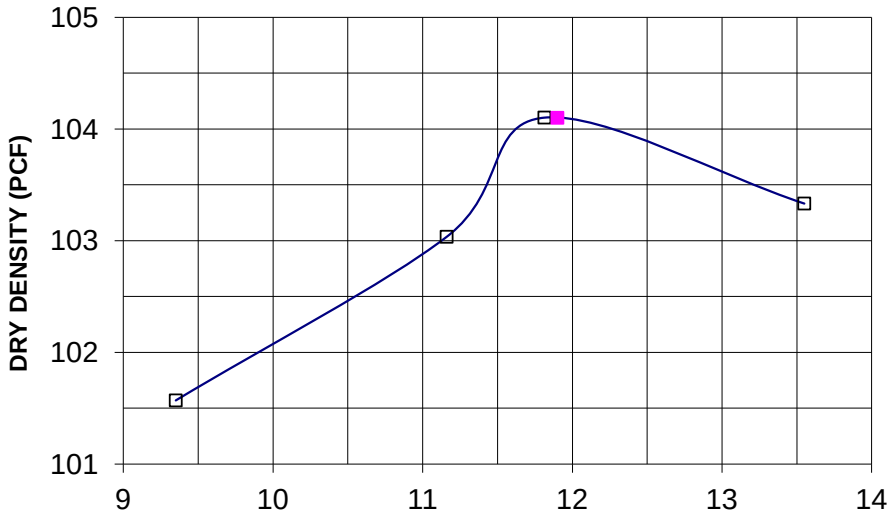
Tested By: M. Stel **Date Tested:** 3/2/2017

Soil Description: Gray Sand

% Passing No. 4 Sieve: 73.7 **Type of Rammer:** Mechanical

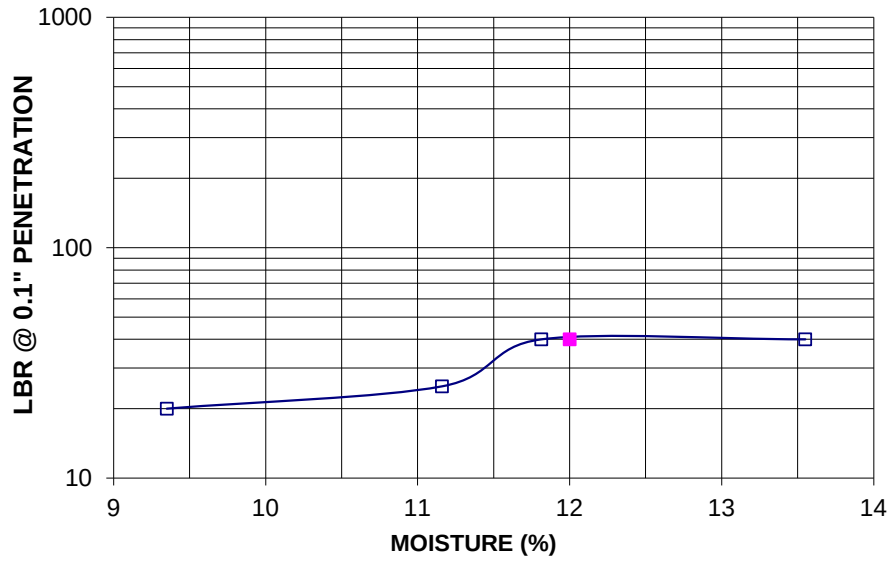
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
101.6	9.4
103.0	11.2
104.1	11.8
103.3	13.5

LBR
20
25
40
40



Maximum Dry Density (pcf)
104.1

Optimum Moisture (%)
11.9

Limerock Bearing Ratio
40

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

3/16/17

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

Appendix M – Asphalt Core Photographs

ASPHALT CORE AC-1

ASPHALT CORE AC-2

ASPHALT CORE AC-3

ASPHALT CORE AC-4

GFA INTERNATIONAL

FLORIDA'S LEADING ENGINEERING SOURCE

Report of Geotechnical Exploration

Estero Boulevard – Segment 4
Fort Myers Beach, Lee County, Florida

March 22, 2017
GFA Project No.: 16-1668

For: David Douglas Associates, Inc.

March 22, 2017

Mr. Dan Craig P.E.
David Douglas Associates, Inc.
1821 Victoria Ave.
Fort Myers, FL 33901
Phone: (239) 337-3330
Email: DC@DDAI-Engineers.com

Site: **Geotechnical Engineering Services Report**
Estero Boulevard – Segment 4
Fort Myers Beach, Lee County, Florida
GFA Project # 16-1668

Dear Mr. Craig:

GFA International, Inc. (GFA) has completed the subsurface exploration and geotechnical engineering evaluation for the above-referenced project in accordance with the geotechnical and engineering service agreement for this project. The scope of services was completed in accordance with our Geotechnical Engineering Proposal (16-1668.00), planned in conjunction with and authorized by you.

EXECUTIVE SUMMARY

The purpose of our subsurface exploration was to classify the nature of the subsurface soils and general geomorphic conditions and evaluate their impact upon the proposed construction. This report contains the results of our subsurface exploration at the site and our engineering interpretations of these, with respect to the project characteristics described to us including providing recommendations for site preparation and the design of the foundation system.

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 4,000 feet of Estero Blvd (Sta. 1282+00: Lanark Avenue to Sta. 1322+00: South of Albatross Street). Documents provided to GFA at the time of this report were Plan and Profile Plans completed by T.Y. Lin International, Sheet No. 32 through Sheet No. 46, dated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

The following was completed for this study:

- Eight (8) Hand Auger (HA) borings to depths of approximately 5 feet below ground surface (BGS).
- Three (3) Field Percolation Test borings to depths of approximately 5 feet BGS.
- Four (4) Asphalt Cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

The subsurface soil conditions encountered at this site generally consists of sand (SP) with shell fragments and traces of organics to the boring termination depths. Please refer to "Appendix D – Record of Hand Auger Boring Logs" for a detailed account of each boring.

The following report presents the project information made available to us, our observation of the existing site conditions, the subsurface geotechnical information obtained during this exploration, and our recommendations on the suitability of the soils encountered for the force main replacement. Also included with this report are the results of our field and laboratory testing. The assessment of site environmental conditions for the presence of pollutants in the soil, rock, and groundwater at this site was not included as a part of our services.

We appreciate the opportunity to be of service to you on this project and look forward to a continued association. Please do not hesitate to contact us if you have any questions or comments, or if we may further assist you as your plans proceed.

Respectfully Submitted,
GFA International, Inc.
Florida Certificate of Authorization Number 4930

Lee S. Khan, E.I.
Staff Engineer

Paul J. D'huyvetter, P.E.
Professional Engineer #59716
State of Florida

Copies: 2, Addressee
1, CD-R

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Scope of Services

The objective of our geotechnical services was to collect subsurface data for the subject project, summarize the test results, and discuss any apparent site conditions that may have geotechnical significance for force main replacement. The following scope of service is provided within this report:

1. Prepare records of the soil boring logs depicting the subsurface soil conditions encountered during our field exploration.

2. Conduct a review of each soil sample obtained during our field exploration for classification and additional testing if necessary.

3. Analyze the existing soil conditions found during our exploration for the suitability of the soils encountered for the force main replacement.

4. Provide recommendations with respect to backfill material for the force main replacement.

5. Provide criteria and site preparation procedures to prepare the site for the proposed construction.

1.2 Project Description

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 4,000 feet of Estero Blvd (Sta. 1282+00: Lanark Avenue to Sta. 1322+00: South of Albatross Street). Documents provided to GFA at the time of this report were Plan and Profile Plans completed by T.Y. Lin International, Sheet No. 32 through Sheet No. 46, dated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

2.0 OBSERVATIONS

2.1 Site Inspection

A site reconnaissance was conducted by members of our engineering staff prior to mobilization of drilling equipment and crews. The purpose of the site visit was to observe the existing site conditions in order to detect any factors that may impact our studies and recommendations.

Generally, the proposed construction site is level. No standing water on the surface was observed during the time of our drilling. The tested site consists of an urban area and is landscaped.

2.2 Geology

The surficial geologic map of Lee County, Florida consists of a quartz sand blanket that overlies the Tertiary Tamiami Formation (T_t), Tertiary-Quaternary Shell Units (Q_{su}) and Quaternary (Holocene) Costal and Estuarine Sediments (Q_h).The quartz sand blanket is generally less than 20 feet thick deposit, fine to medium grained, well sorted, with no fossils.

The oldest formation is the Tertiary Tamiami Formation (T_t). The Tamiami Formation consists of a mixture of variably sandy limestone, sands and clays containing varying percentage of phosphate grains. Fossils including mollusks, echinoids and corals are abundant. Fossil preservation varies from well preserved to molds and casts.

Overlaying the Tamiami Formation throughout much of the county are sediments indicated as Tertiary-Quaternary Shell Units (Q_{su}). These units consist of sands with subordinate limestone and clay. Fossils, including mollusks and corals, are common and well preserved.

Along the coast, Quaternary (Holocene) Costal and Estuarine Sediments (Q_h) are founded below an altitude of approximately 5 feet. These sediments consist of quartz sand with a variable organics component. The Holocene sediments include the beach ridge and dune sands.

2.3 Field Exploration

The following was completed for this study:

- Eight (8) Hand Auger (HA) borings to depths of approximately 5 feet below ground surface (BGS).
- Three (3) Field Percolation Test borings to depths of approximately 5 feet BGS.
- Four (4) Asphalt Cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

The locations of the borings performed are illustrated in “Appendix B: Test Location Plan". The Standard Penetration Test (SPT) boring method was used as the investigative tool within the borings. SPT tests were performed in substantial accordance with ASTM Procedure D-1586, “Penetration Test and Split-Barrel Sampling of Soils”. This test procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches. The number of blows per foot, for the second and third 6-inch increment, is an indication of soil strength.

The soil samples recovered from the soil borings were visually classified and their stratification is illustrated in “Appendix D: Record of Hand Auger Boring Logs". It should be noted that soil conditions might vary between the strata interfaces, which are shown. The soil boring data reflect information from a specific test location only. Site specific survey staking for the test locations was not provided for our field exploration. The indicated depth and location of each test was approximated based upon existing grade and estimated distances and relationships to obvious landmarks. The boring depths were selected based on our knowledge of vicinity soils and to include the zone of soil likely to be stressed by the proposed construction.

2.4 Laboratory Analysis

Soil samples recovered from our field exploration were returned to our laboratory where they were visually examined in general accordance with ASTM D-2488. Samples were evaluated to obtain an accurate understanding of the soil properties and site geomorphic conditions. After a thorough visual examination of the recovered site soils, laboratory testing was conducted to determine particle size distribution (D-422) on individual samples and soil corrosiveness on a composite sample obtained from depths ranging from 2 to 5 feet BGS.

Composite bulk specific gravity tests were run on the four asphalt cores obtained during field exploration using the saturated surface-dry procedure (AASHTO T-166). Limerock Bearing Ratio (LBR) tests were run on material obtained within approximately 5 feet of the edge of pavement using the Florida Method FM 5-515.

All laboratory tests were conducted in general accordance with ASTM, AASHTO, or Florida Methods, as applicable. The test method method number for each test and the number of tests completed are presented in the following table.

TEST DESCRIPTION	NUMBER OF TESTS	ASTM TEST METHOD
Soil Classification	24	D-2488
Gradation Analysis	4	D-422
Soil Corrosiveness (pH, Resistivity, Chloride, Sulfate)	1	FM 5-550, FM 5-551, FM 5-552, and FM 5-553
Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens	4	AASHTO T-166
Limerock Bearing Ratio (LBR)	4	FM 5-515

Bag samples of the soil encountered during our field exploration will be held in our laboratory for your inspection for 90 days and then discarded unless we are notified otherwise in writing.

2.4.1 Gradation Tests

A total of four (4) gradation tests were performed on samples obtained during the field exploration program. Material passing the No. 200 sieve is considered “fines” and will be either silt or clay. The percent passing the No. 200 sieve, for the tested samples, ranged from 0.9 to 2.0 percent, this resulted in the sampled material to be considered poorly graded. A summary of the grain size distribution curve is presented in “Appendix H: Gradation Test Results”.

2.4.2 Soil Corrosiveness

This test method covers the laboratory determination for the minimum resistivity of a soil. The principal use of this test method is to determine a soil's corrosivity and thereby identify the conditions under which the corrosion of metals in soil may be sharply accentuated. Soil corrosiveness testing was completed on one (1) composite sample ranging from 2 – 5 feet BGS.

The soil samples obtained were considered non-marine structures and classified under the criteria for substructure environmental classifications. The pH (>7.0), chloride (<500 ppm), and sulfate (<1000 ppm) fell under the slightly aggressive classification but due to the resistivity results (<1000 Ohm-cm), **Composite 1 is deemed to be moderately aggressive for concrete structures and moderately aggressive for steel structures**. The laboratory results for soil corrosiveness can be found in "Appendix I: Soil Corrosive Series Test Results".

For design purposes we recommend using a classification of "Moderately Aggressive" for this project.

2.5 Geomorphic Conditions

Boring logs derived from our field exploration are presented in "Appendix B: Boring Locations and Soil Profiles". The boring logs depict the observed soils in graphic detail. The Standard Penetration Test borings indicate the penetration resistance, or N-values, logged during the drilling and sampling activities. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples. All soil samples reviewed have been depicted and classified in general accordance with the Unified Soil Classification System, modified as necessary to describe typical southwest Florida conditions. See "Appendix E: Discussion of Soil Groups", for a detailed description of various soil groups.

The subsurface soil conditions encountered at this site generally consists of sand (SP) with shell fragments and traces of organics to the boring termination depths. Please refer to "Appendix D – Record of Hand Auger Boring Logs" for a detailed account of each boring.

2.6 Hydrogeological Conditions

During our field exploration program from February 13, 2017 to February 17, 2017, the groundwater table was encountered in our HA borings at depths of approximately 4 to 5 feet below the existing ground surface. The groundwater table will fluctuate depending upon tidal events.

Located in "Appendix F: Hydrologic Soils Map" are the following descriptive characteristics of the two (2) types of soil surveys encountered during the drilling operations based on the soil survey of Lee County, Florida, published by the United States Department of Agriculture:

Canaveral-Urban Land Complex (4)

About 50 to 70 percent of each area of the complex consists of nearly level Canaveral soils or areas of Canaveral soils that have been reworked or reshaped, but which still are recognizable as Canaveral soils. Typically, Canaveral soils have a surface layer of lack and dark gray fine sand that is mixed with shell fragments. Beneath the surface layer, to a depth of 80 inches or more, are layers of light brownish gray and light gray fine sand mixed with shell fragments.

About 20 to 30 percent of each area is urban land. This land is used for houses, streets, driveways, buildings, parking lots, and other related uses.

In undrained areas, the water table is at a depth of 18 to 40 inches for a period of 2 to 6 months in most years. Drainage systems have been established in most areas, however, and the depth to the water table is dependent on the drainage system.

Kesson Fine Sand (24)

This is a nearly level, very poorly drained soil in broad tidal swamps. Areas are subject to tidal flooding. Typically, the surface layer is about 6 inches of sand that contains shell fragments. The underlying layers are fine sand that contains shell fragments, and they extend to a depth of 80 inches of more.

The water table fluctuates with the tide. The available water capacity is low. Permeability is moderately rapid or rapid.

2.6.1 Exfiltration Testing

GFA International performed three field percolation (PERC) tests spaced at approximately 1,150-foot centers. The percolation testing was performed in accordance with the SFWMD Constant-Head Open-Hole Test Method. The results are presented below.

PERC Test – 4 (Sta. 1293+00)	
Depth (ft)	**Soil Description**
0 – 3	Gray Sand (A-3; SP) with Shell Fragments
3 – 4	Light Gray Sand (A-3; SP)
4 – 5	Brown Sand (A-3; SP)
Water table: 4.5 feet below grade.*	
Saturated K = 39.2 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 5 (Sta. 1305+00)	
Depth (ft)	**Soil Description**
0 – 1.5	Gray Sand (A-3; SP) with Shell Fragments
1.5 – 3	Gray Sand (A-3; SP)
3 – 5	Brown Sand (A-3; SP) with Traces of Roots
Water table: 3.75 feet below grade.*	
Saturated K = 17.8 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 6 (Sta. 1316+00)	
Depth (ft)	**Soil Description**
0 – 2	Dark Gray Sand (A-3; SP)
2 – 3	Gray Sand (A-3; SP)
3 – 5	Brown Sand (A-3; SP)
Water table: 2.75 feet below grade.*	
Saturated K = 19.0 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

The location of the exfiltration test completed is illustrated in "Appendix B: Test Location Plan".

3.0 ENGINEERING EVALUATION AND RECOMMENDATIONS

3.1 General

The geotechnical evaluations for the proposed construction site are based on the subsurface soil and groundwater conditions encountered during this study, the project information made available, our site observations, and our experience in the vicinity. The test data has been evaluated using established geotechnical parameters of the soils recorded at this site, laboratory test results, and the observed performance of similar soil types.

Based on the soil conditions encountered in the performed borings, the near surface soils do not meet the below mentioned Lee County Technical Specifications for drainage fill, select fill, or common fill. The water main replacement may be designed according to the recommendations and site preparations as discussed below with a fill material meeting the specifications.

3.2 Pipe Bedding and Initial Backfill (Force Main)

According to the Lee County Technical Specifications, Section 2223, Backfilling, a select fill material shall be used for pipe bedding and initial backfill from top of bedding to 1 foot over the top of pipes. The select fill shall be compacted to not less than 95 percent of the maximum dry density as determined by ASTM D-1557.

Pipe bedding containing very fine sand, uniformly graded sands and gravel, silt, soft earth, or other material that have a tendency to flow under pressure when wet is unacceptable.

Based on the laboratory test results the majority of the near surface soils consist of poorly graded clean sands to slightly silty sands. Material from on-site excavation does not meet the gradation specification for select fill or common fill and cannot be used for pipe bedding and initial backfill.

3.3 Pipe Bedding and Initial Backfill (Drainage System)

Pipe bedding and initial backfill shall be in accordance with Florida Department of Transportation (FDOT) for Road and Bridge Construction – Sections 120 & 125 (January 2017).

3.4 Trench Excavation

Where trench excavations are required, trenches shall be sufficiently wide and deep to allow proper installation of pipes. We recommend about 12 inches clear of the pipe on either side at any point. Boulders, rocks or other hard unyielding material shall be excavated to a depth of 12 inches below the bottom of the pipe elevation.

Due to the depth of excavations and the depth of the water table, we anticipate excavation will require shoring or a trench box. Trenching should be in general accordance with any Lee County trenching requirements and the Occupational Safety and Health Administration (OSHA) requirements, as applicable.

3.5 Trench Backfill

Trench backfill material shall be clean earth fill composed of sand, clay and sand, sand and stone, crushed stones or other soils approved by a professional engineer. The trench backfilling shall be accomplished from the top of the initial backfill to the ground surface. The backfill, unless otherwise specified, shall be compacted to 95% of maximum density, as determined by ASTM D-1557.

When trenches are cut in pavements or areas to be paved, compaction shall be in accordance with FDOT for Road and Bridge Construction (January 2017).

Based on the soil profiles, presented in "Appendix B: Boring Locations and Soil Profiles", the material from on-site excavation that will contain sands and silt or gravel size limestone fragments may be used for the trench backfill. The organic soils, if encountered during construction, are not suitable and shall not be used as a trench backfill material.

4.0 DEWATERING OF EXCAVATIONS

The high groundwater tables in the vicinity of excavations shall be reduced to prevent water inflow into excavations. Dewatering will be required for the excavation of trenches during construction. Each excavation shall be kept dry during subgrade preparation and continually thereafter until installation of the pipe or wet well structures. The dewatering will be required to maintain groundwater elevation at least 24 inches below the bottom at all times to prevent bottom disturbance or failure.

5.0 SITE PREPARATION PROCEDURES

Site preparation procedures should begin with the removal of existing debris, vegetation, or other unsuitable materials within and beyond the excavation construction.

The organic soils, if encountered during construction, shall be removed and replaced to a required level (the future project specification) with a compacted suitable fill. The suitable fill material shall contain less than 10 percent of fines passing the No. 200 sieve, not contain clay balls and rock fragments greater than 3 inches in diameter.

An adequate dewatering system shall be installed to maintain the water table 2 feet or more below the maximum depth of excavation. The continuous dewatering shall be provided until the pipeline is completed and backfill is above the water table before beginning of the dewatering. When a professional engineer approves the discontinuing of the dewatering, the rate of pumping shall slowly decrease, allowing the water level to rise slowly.

The soils that extend below the water table should be allowed to dry prior to placement as a backfill material and compaction. This can be accomplished by stockpiling the material and allowing it to drain, or by spreading it in relatively thin lifts on the surface and allowing it to dry prior to compaction. The silty or sands with clay may require moisture conditioning so that the soil moisture content at the time of compaction is at or near the optimum moisture content.

Trench bottoms should be compacted with a small roller or vibratory plate compactor prior to pipe placement. Any loose or soft yielding areas detected during compaction of the trench bottoms should either be further compacted to at least 95% of maximum dry density or removed and replaced with a select fill and compacted to 95% of maximum dry density. Bedding stone may be used in lieu of select fill.

During the compaction operation, a geotechnical engineer or an engineering technician working under his direction should observe the soils to verify that the exposed soils are suitable and that unsuitable soils have been removed. Samples of the backfill materials should be obtained to determine the grain size distribution, its maximum dry density and optimum moisture content in the laboratory in accordance with ASTM D-1557 (Modified Proctor Test).

6.0 ASPHALT EVALUATION

6.1 Asphalt Thickness

Four (4) asphalt cores were taken at alternating lanes (southbound or northbound) along Estero Boulevard in Fort Myers Beach starting just south of Lanark Avenue (Sta. 1285+50) and finishing just north of Albatross Street (Sta. 1315+00). The location of each individual asphalt core can be found in “Appendix B: Test Location Plan”.

GFA International encountered an average asphalt thickness of 10-3/8 inches with a range of six (6) to nine (9) lifts per asphalt core. A stratum was initiated from top of existing asphalt (Lift 1) down to the bottom of asphalt (ex.: Lift 6). Air voids were observed in Lift 3 of Asphalt Core C-7 and C-8. A summary of the test results are shown in “Appendix J: Asphalt Thickness by Core Determination”. Refer to “Appendix M: Asphalt Core Photographs” for a visual record of each asphalt core.

Beneath the asphalt, a layer of cemented shell base was encountered. This material consists of sand shell fragments.

6.2 Limerock Bearing Ratio (LBR) Testing

A total of four (4) samples were obtained within approximately 5 feet of the edge of pavement to conduct Limerock Bearing Ratio (LBR) tests on the existing subgrade soils, using the Florida Method FM 5-515. Based on the laboratory test results, we recommend a structural coefficient for Type B Stabilized subbase, LBR 30 material (0.06). For complete test results, refer to “Appendix L – Limerock Bearing Ratio (LBR) Results”. It is our understanding that the existing base material will be removed during utility construction. As such, no LBR samples were collected from the base material.

6.3 Asphalt Bulk Specific Gravity Testing

A total of four (4) asphalt core samples were tested using American Association of State Highway and Transportation (AASHTO) T-166 “Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens”. The top 4-inches of asphalt were tested as a composite sample per each asphalt core. The asphalt density ranged from 129.7 to 134.6 pounds per cubic foot (PCF) which averaged in 131.3 PCF.

For complete test results, refer to “Appendix K – Asphalt Bulk Specific Gravity”.

7.0 REPORT LIMITATIONS

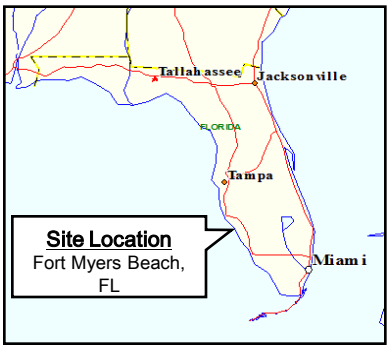
This consulting report has been prepared for the exclusive use of the current project owners and other members of the design team for the Estero Boulevard – Segment 4 located on Estero Boulevard in Fort Myers Beach, Lee County, Florida. This report has been prepared in accordance with generally accepted local geotechnical engineering practices; no other warranty is expressed or implied. The evaluation submitted in this report, is based in part upon the data collected during a field exploration, however, the nature and extent of variations throughout the subsurface profile may not become evident until the time of construction. If variations then appear evident, it may be necessary to reevaluate information and professional opinions as provided in this report. In the event changes are made in the nature, design, or locations of the proposed structure, the evaluation and opinions contained in this report shall not be considered valid, unless the changes are reviewed and conclusions modified or verified in writing by GFA International. GFA is not responsible for damage caused by soil improvement and/or construction activity vibrations related to this project. GFA is also not responsible for damage concerning drainage or moisture related issues for the proposed or nearby structures.

8.0 BASIS FOR RECOMMENDATIONS

The analysis and recommendations submitted in this report are based on the data obtained from the tests performed at the locations indicated on the attached figure in "Appendix B: Test Location Plan". This report does not reflect any variations, which may occur between borings. While the borings are representative of the subsurface conditions at their respective locations and for their vertical reaches, local variations characteristic of the subsurface soils of the region are anticipated and may be encountered. The delineation between soil types shown on the soil logs is approximate and the description represents our interpretation of the subsurface conditions at the designated boring locations on the particular date drilled.

Any third party reliance of our geotechnical report or parts thereof is strictly prohibited without the expressed written consent of GFA International. The methodology (ASTM D-1586) used in performing our borings and for determining penetration resistance is specific to the sampling tools utilized and does not reflect the ease or difficulty to advance other tools or materials.

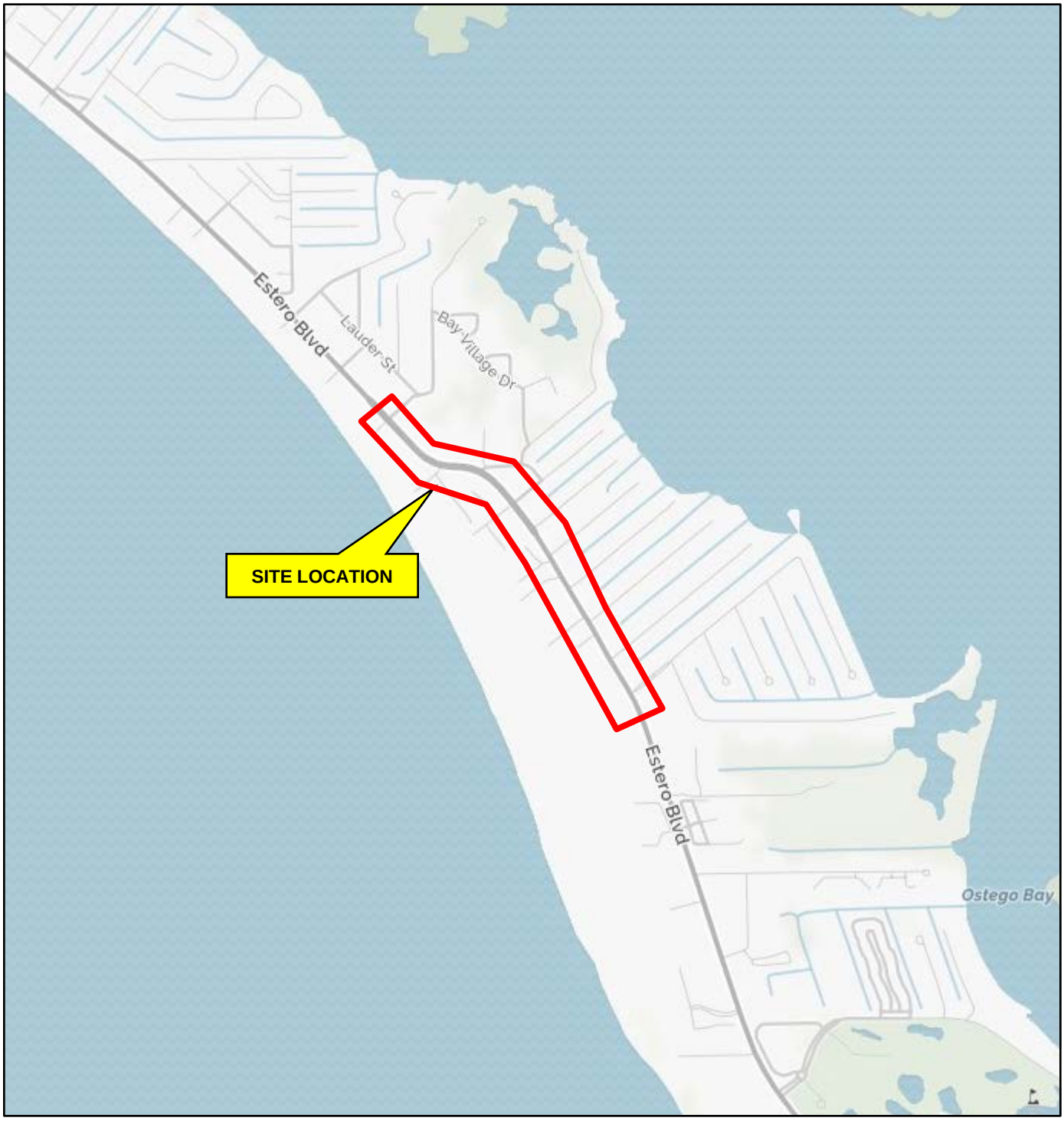
Appendix A - Vicinity Map



VICINITY MAP

Estero Boulevard – Segment 4

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668



Appendix B – Test Location Plan

TEST LOCATION PLAN

Estero Boulevard – Segment 4

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668

N
W
E
S
ENVIRONMENTAL • GEOTECHNICAL • MATERIALS TESTING • INSPECTIONS
GFA

*Scale is an approximation and may not be accurate.

- Hand Auger Boring
- Exfiltration Test
- Asphalt Core
- Hand Auger Boring/ LBR Sample

TEST LOCATION PLAN

Estero Boulevard – Segment 4

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668

N
W
E
S
ENVIRONMENTAL • GEOTECHNICAL • MATERIALS TESTING • INSPECTIONS
GFA

*Scale is an approximation and may not be accurate.

- Hand Auger Boring
- Exfiltration Test
- Asphalt Core
- Hand Auger Boring/ LBR Sample

Appendix C - Notes Related to Borings

NOTES RELATED TO
RECORDS OF TEST BORING AND
GENERALIZED SUBSURFACE PROFILE

1. Groundwater level was encountered and recorded (if shown) following the completion of the soil test boring on the date indicated. Fluctuations in groundwater levels are common; consult report text for a discussion.

2. The boring location was identified and located in the field based on measured and estimated distances from existing site features.

3. The borehole was backfilled to site grade following boring completion, patched with asphalt cold patch mix when pavement was encountered.

4. The Record of Test Boring represents our interpretation of field conditions based on engineering examination of the soil samples.

5. The Record of Test Boring is subject to the limitations, conclusions, and recommendations presented in the report text.

6. The Standard Penetration Test (SPT) was performed in accordance ASTM Procedure D-1586. SPT testing procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches.

7. On the Record of Test Boring listed as "Blow Counts", the N-value is the sum of the SPT hammer blows required to drive the split-tube sampler through the second and third 6-inch increment of the sampling layer, and is an indication of soil strength.

8. Shown on the Record of Test Boring an SPT N-value expressed as 50/2" is descriptive of the fact that 50 hammer blows were required to drive the split-spoon sampler a distance of approximately 2 inches.

9. The soil/rock strata interfaces shown on the Records of Test Boring are approximate and may vary from those in the field. The soil/rock conditions shown on the Records of Test Boring refer to conditions at the specific location tested; soil/rock conditions may vary between test locations.

10. Relative density and consistency for sands/gravels, silts/clays, and limestone are described as follows:

Cohesionless Soils	
SPT (N-Value)	Relative Density
0 – 3	Very Loose
4 – 8	Loose
9 – 24	Medium Dense
25 – 40	Dense
Over 40	Very Dense

Silts and Clays	
SPT (N-Value)	Consistency
0 – 1	Very Soft
2 – 4	Soft
4 – 6	Firm
7 – 12	Stiff
13 – 24	Very Stiff
Over 24	Hard

Limestone	
SPT (N-Value)	Relative Density
0 – 19	Very Soft
20 – 49	Soft
50 – 100	Medium Hard
50 for 3 to 5"	Moderately Hard
50 for 0 to 2"	Hard

11. Definition of descriptive terms of modifiers for silts/clays/shells/gravels are described as follows:

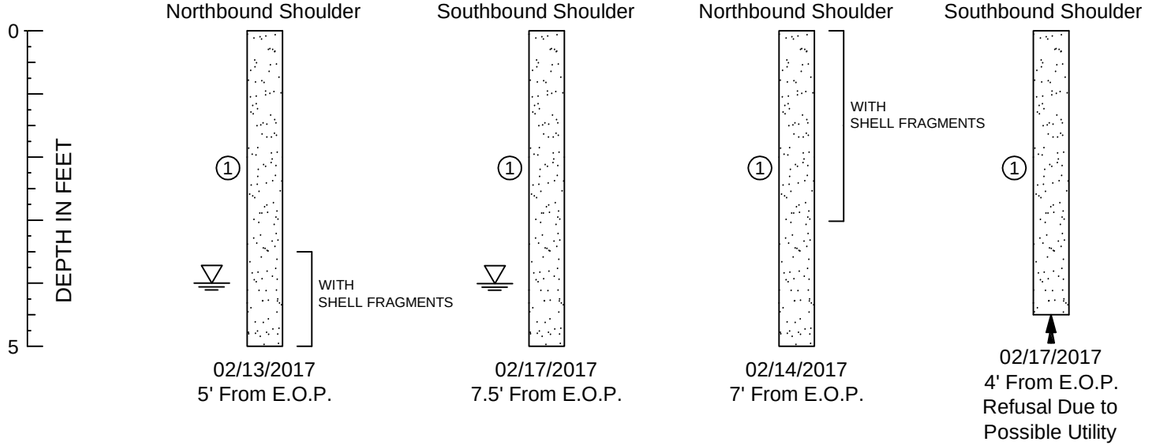
Percentage of Modifier Material	First Qualifier	Second Qualifier
0 – 5	With a Trace of + Modifier	With a Trace
5 – 12	Slightly + Modifier + y	With Some
12 – 30	Modifier + y	With
30 – 50	Very + Modifier + y	And

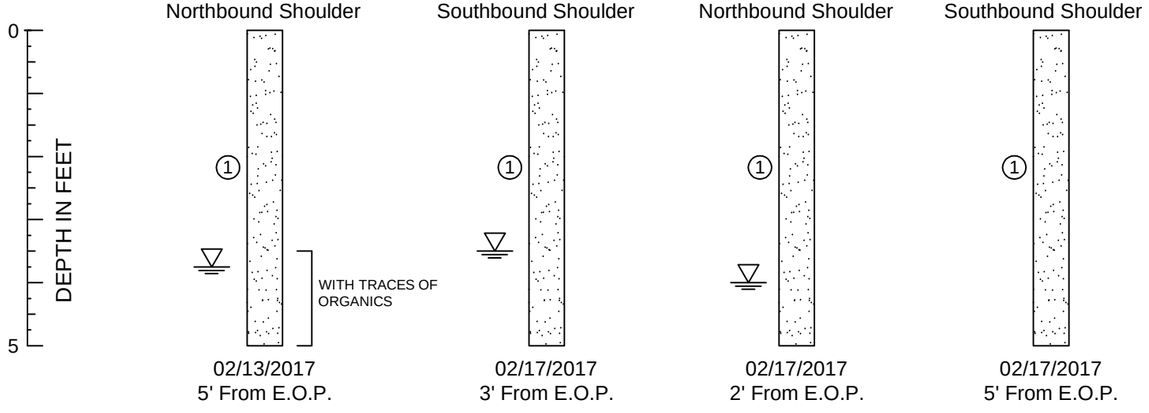
12. Descriptive characteristics for organic content percentages are described as follows:

Percentage of Organic Material	Descriptor
0 – 5	With a Trace
5 – 20	With Organics
20 – 75	Highly Organic
75 – 100	Peat

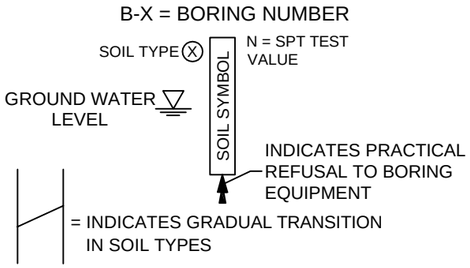
Appendix D – Record of Hand Auger Boring Logs

SOIL PROFILES





SOIL PROFILE LEGEND



SOIL LEGEND

White, Light Gray to Gray, Orange to Tan, Light Brown to Brown, SAND (SP/ A-3)

NOTES:

N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

WOH - BORING INTERVAL ADVANCED UNDER WEIGHT OF HAMMER.

LFC - LOSS OF DRILLING FLUID CIRCULATION.

E.O.P. - DISTANCE OF HAND AUGER BORING FROM EDGE OF PAVEMENT

SOIL CLASSIFICATION

CORRELATION OF N - VALUES WITH RELATIVE DENSITY AND CONSISTENCY

COHESIONLESS SOIL		SILTS AND CLAYS	
N - VALUE	RELATIVE DENSITY	N - VALUE	CONSISTENCY
0 - 2	VERY LOOSE	UNDER 1	VERY SOFT
3 - 8	LOOSE	1 - 3	SOFT
9 - 24	MEDIUM DENSE	4 - 6	FIRM
25 - 40	DENSE	7 - 12	STIFF
OVER 40	VERY DENSE	13 - 24	VERY STIFF
		OVER 24	HARD

CORRELATION OF N - VALUES WITH HARDNESS DESCRIPTION

LIMEROCK	
N - VALUE	RELATIVE DENSITY
0 - 19	VERY SOFT
20 - 49	SOFT
50 - 100	MEDIUM HARD
50 FOR 3 TO 5"	MODERATELY HARD
50 FOR 0 TO 2"	HARD

APPROXIMATE FINES CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR SLIGHTLY CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR VERY CLAYEY

APPROXIMATE SAND/ GRAVEL CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SANDY OR SLIGHTLY GRAVELLY
16% TO 25%	SANDY OR GRAVELLY
26% TO 49%	VERY SANDY OR VERY GRAVELLY

APPROXIMATE ROOT CONTENT	MODIFIERS
5% TO 10%	TRACE
11% TO 20%	TRACE TO SOME
21% TO 40%	SOME
41% TO 60%	AND

RECORD OF TEST BORINGS

GFA International, Inc.
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 * TeamGFA.com

Client: David Douglas Associates, Inc.

Project:
Estero Boulevard - Segment 4
Fort Myers Beach, Lee County, Florida

Approved by: PJD

Date: 03/09/2017

Job No: 16-1668

Drawn By: LSK

Appendix E – Discussion of Soil Groups

DISCUSSION OF SOIL GROUPS:
AASHTO CLASSIFICATION

COARSE GRAINED SOILS

- **Group A-1:** The typical material of this group is a well-graded mixture of stone fragments or gavel, coarse sand, fine sand, and a nonplastic or feebly-plastic soil binder. However, this group also includes stone fragments, gravel, coarse sand, volcanic cinders, etc., without a soil binder.

    - **Subgroup A-1-a:** Includes those materials consisting predominantly of stone fragments or gravel, either with or without a well-graded binder of fine material.

    - **Subgroup A-1-b:** Includes those materials consisting predominantly of coarse sand, either with or without a well-graded soil binder.

- **Group A-3:** The typical material of this group is fine beach sand or fine desert-blow sand without silty or clay fines, or with a very small amount of nonplastic silt. This group also includes stream-deposited mixtures of poorly-graded fine sand and limited amounts of coarse sand and gravel.

- **Group A-2:** This group includes a wide variety of “granular” materials which are borderline between the materials falling in Groups A-1 and A-3, and the silt-clay materials of Groups A-4, A-5, A-6, and A-7. It includes all materials containing 35% or less passing a No. 200 (75-µm) sieve which cannot be classified in Groups A-1 or A-3, due to the fines content or the plasticity indexes, or both, in excess of the limitations for those groups.

    - **Subgroups A-2-4 and A-2-5:** Include various granular materials containing 35% or less passing a No. 200 (75-µm) sieve and with a minus No. 40 (425-µm) portion having the characteristics of Groups A-4 and A-5, respectively. These groups include such materials as gravel and coarse sand with silt contents or plasticity indexes in excess of the limitations of Group A-1 and fine sand with nonplastic-silt content in excess of the limitations of Group A-3.

    - **Subgroups A-2-6 and A-2-7:** Include materials similar to those described under Subgroups A-2-4 and A-2-5, except that the fine portion contains plastic clay having the characteristics of the A-6 or A-7 group, respectively.

FINE GRAINED SOILS

- **Group A-4:** The typical material of this group is a nonplastic or moderately plastic silty soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine silty soil and up to 64% of sand and gravel retained on a No. 200 sieve.

- **Group A-5:** The typical material of this group is similar to that described under Group A-4, except that it is usually of diatomaceous or micaceous character and may be highly elastic as indicated by the high liquid limit.

- **Group A-6:** The typical material of this group is a plastic clay soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine clayey soil and up to 64% of sand and gravel retained on a No. 200 sieve. Materials of this group usually have a high volume change between wet and dry states.

- **Group A-7:** The typical material of this group is similar to that described under Group A-6, except that it has the high liquid limits characteristic of Group A-5 and may be elastic as well as subject to high-volume change.

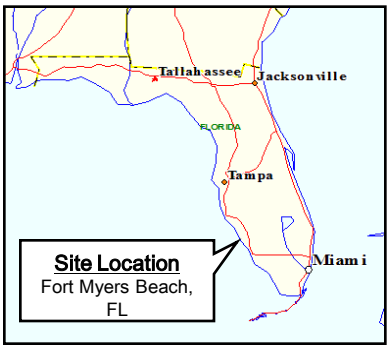
    - **Subgroup A-7-5:** Includes those materials with moderate plasticity indexes in relation to the liquid limit and which may be highly elastic as well as subject to considerable volume change.

    - **Subgroup A-7-6:** Includes those materials with high plasticity indexes in relation to liquid limit and which are subject to extremely high volume change.

HIGHLY ORGANIC SOILS

- **Group A-8:** Highly organic soils (peat or muck) may be classified in this group. Classification of these materials is based on visual inspection and is not dependent on the percentage passing the No. 200 (75-µm) sieve liquid limit, or plasticity index. The material is composed primarily of partially decayed organic matter, generally has a fibrous texture, a dark brown or black color, and an odor of decay. These organic materials are unsuitable for use in embankments and subgrades. They are highly compressible and have low strength.

Appendix F – Hydrologic Soils Map

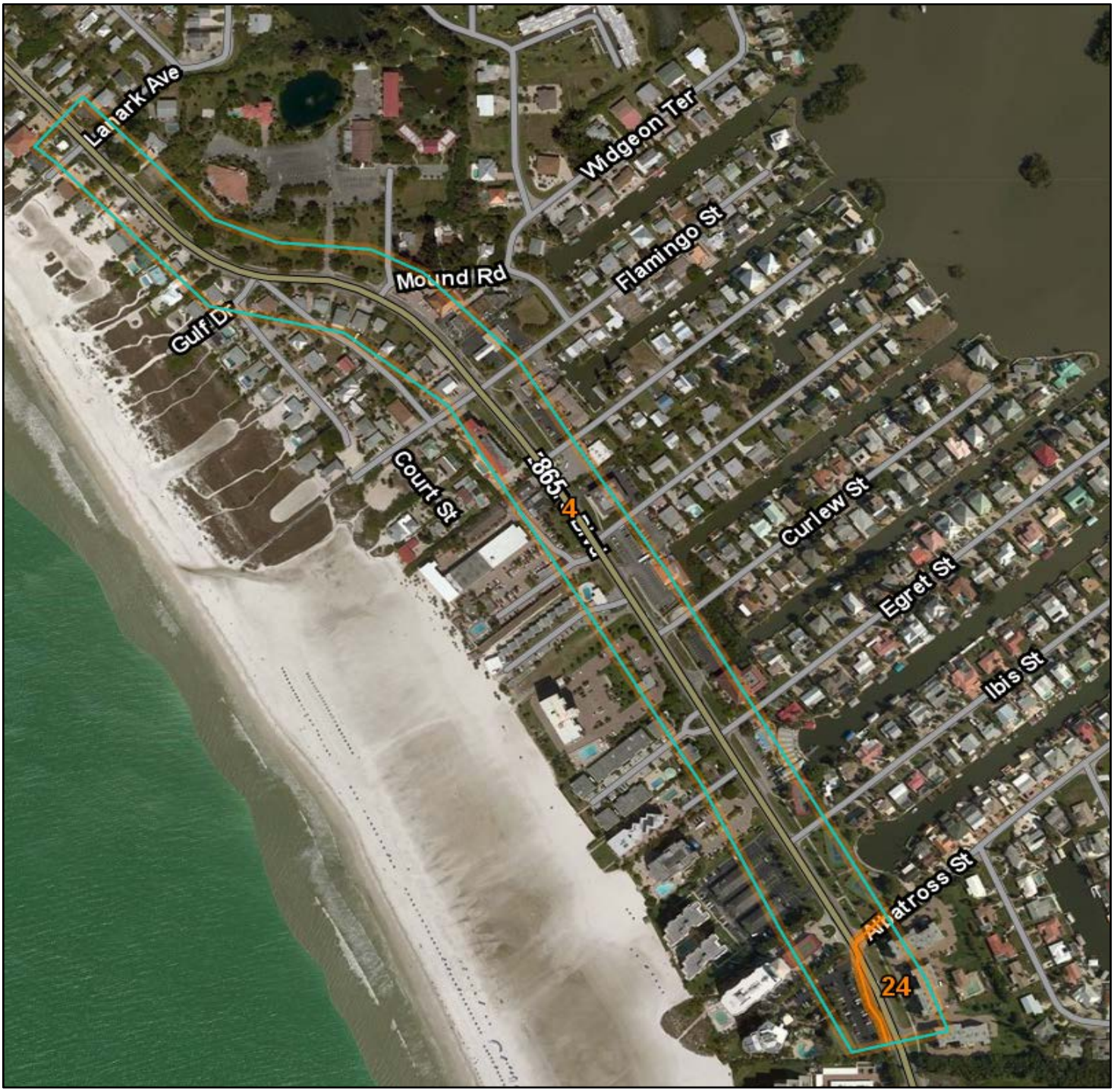


Hydrologic Soils map

Estero Boulevard – Segment 4

Fort Myers Beach, Lee County, Florida

GFA International Project No.: 16-1668



*Map Not To Scale

Map Unit: 4 – Canaveral- Urban Land Complex

24 – Kesson Fine Sand

Appendix G – Roadway Soil Survey

LEE COUNTY
DEPARTMENT OF PUBLIC WORKS
ESTERO BOULEVARD: SEGMENT 4

DATE OF SURVEY : fEBRUARY 13 – 17, 2017
SURVEY MADE BY : GFA INTERNATIONAL, INC.
SUBMITTED BY : PAUL J. D'HUYVETTER

ROAD NAME : ESTERO BOULEVARD
CITY: FORT MYERS BEACH
COUNTY : LEE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS: STA. 1282+00 SURVEY ENDS: STA. 1322+00

	ORGANIC CONTENT			SIEVE ANALYSIS RESULTS % PASS					ATTERBERG LIMITS (%)					CORROSION SERIES TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC.	% MOISTURE CONTENT	NO. OF TESTS	4 MESH	10 MESH	60 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohms-cm	CHLORIDE ppm	SULFATES ppm	pH
1	–	–	–	4	99.2 – 99.9	98.8 – 99.8	95.1 – 98.8	0.6 – 1.3	–	–	–	A-3	White, Tan, Light Gray to Gray Sand (SP) with Traces of Shell Fragments	1*	2,300	33	32.1	8.13

*Corrosion Series Test ran on one (1) composite sample obtained from hand auger borings during GFA's field exploration program.

NOTES:

EMBANKMENT AND SUBGRADE MATERIAL
STRATA BOUNDARIES ARE APPROXIMATE

Ground water was encountered at depths of about 4 to 5 feet at boring locations at the time of our drilling.

The material from Stratum Number 1 appears satisfactory for use in the embankment when utilized in accordance with Index 505, except where organics are encountered.

It has been the experience of the Department, within projects constructed within this general geographical area, that although preliminary borings did not indicate a presence of rock, rock was encountered while performing underground installations. Therefore, the contractor should consider the increased cost of all underground work activities while preparing the bid. All costs of rock excavation shall be included in the appropriate items of work contained within the contract. No extra compensation or time extention will be allowed for additional work directly associated with the splitting, excavation, crushing, disposal, replacemant of displaced volume of extracted rock with fill material or special handling of rock.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER P.E. #59716

LEE COUNTY DEPARTMENT OF TRANSPORTATION

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	16-1668

ROADWAY SOIL SURVEY
ESTERO BOULEVARD: SEGMENT 4
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: LSK

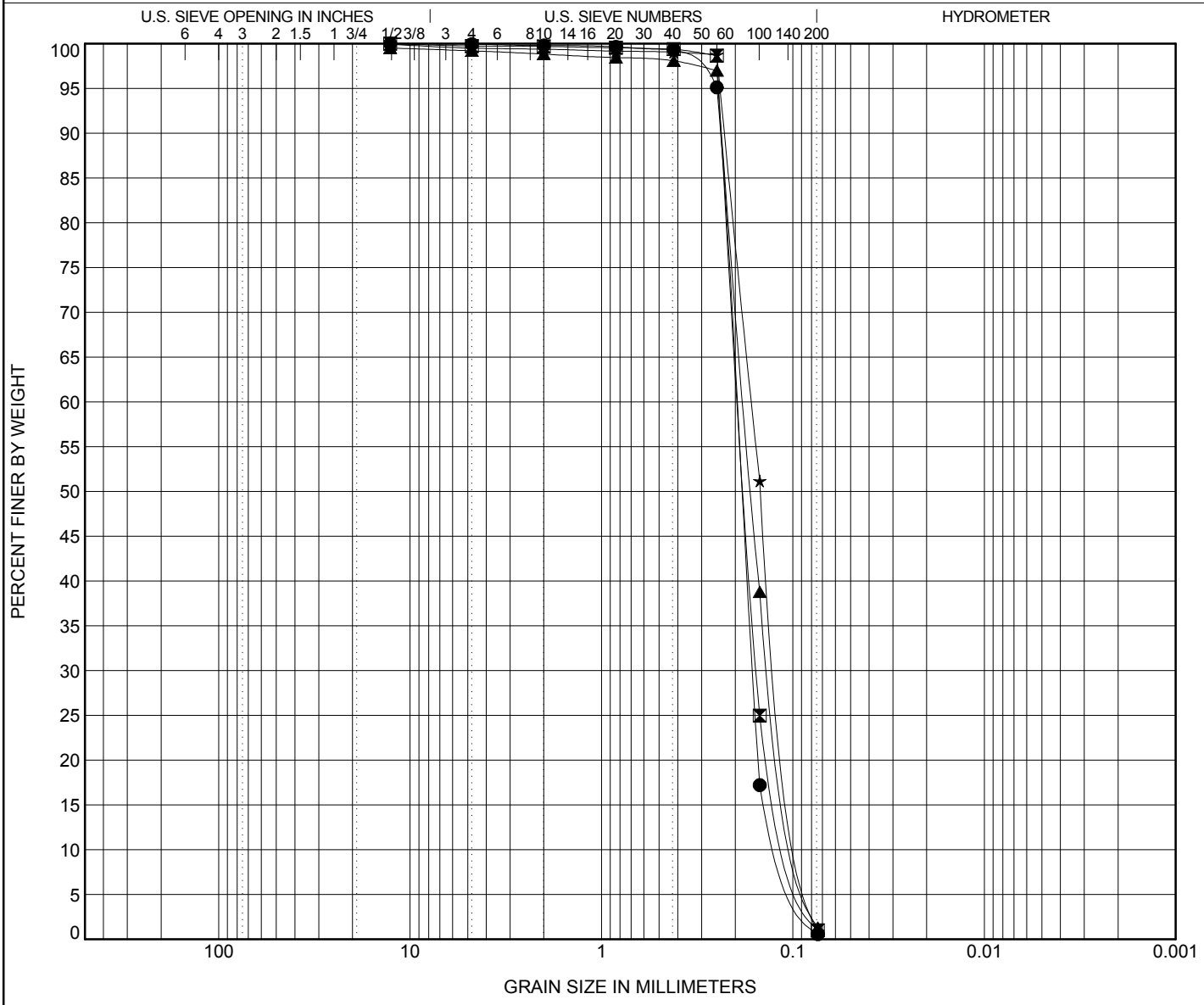
Appendix H – Gradation Test Results

GFA International, Inc
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 P
239-489-3438 F

GRAIN SIZE DISTRIBUTION

CLIENT David Douglas Associates, Inc. **PROJECT NAME** Estero Boulevard - Segment 4

PROJECT NUMBER 16-1668 **PROJECT LOCATION** Sta. 1282+00 to Sta. 1322+00



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	HA-9 (0-3')	0.0	POORLY GRADED SAND(SP)				1.21	1.80
⊠	HA-11 (3-5')	0.0	POORLY GRADED SAND(SP)				1.30	1.98
▲	HA-14 (2-3')	0.0	POORLY GRADED SAND(SP)				1.02	2.07
★	HA-15 (3-5')	0.0	POORLY GRADED SAND(SP)				0.89	1.95

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	HA-9 (0-3')	0.0	12.7	0.198	0.162	0.11	0.1	99.1	0.9	
⊠	HA-11 (3-5')	0.0	12.7	0.191	0.154	0.096	0.3	98.3	1.5	
▲	HA-14 (2-3')	0.0	12.7	0.18	0.126	0.087	0.3	97.2	2.0	
★	HA-15 (3-5')	0.0	12.7	0.164	0.111	0.084	0.4	97.7	1.8	

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project: Estero Boulevard - Segment 4

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-9: 0 to 3 ft.

Sampled By: Christian Casey **Date Sampled:** 2/13/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Light Gray Sand (SP)

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	569.9	568.3	1.6	0.3%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	0	0	0.0%	100.0%
#4	4.76	0.3	0.3	0.1%	99.9%
#10	2.00	0.8	1.1	0.2%	99.8%
#20	0.841	0.9	2.0	0.4%	99.6%
#40	0.420	1.7	3.7	0.6%	99.4%
#60	0.250	24.1	27.8	4.9%	95.1%
#100	0.149	444.0	471.8	82.8%	17.2%
#200	0.074	94.9	566.7	99.4%	0.6%
Pan	0.000	1.3	568.0	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

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SIEVE ANALYSIS

Project: Estero Boulevard - Segment 4

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-11: 3 to 5 ft.

Sampled By: Christian Casey **Date Sampled:** 2/14/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Light Gray Sand (SP)

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	810.4	806.9	3.5	0.4%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	0	0	0.0%	100.0%
#4	4.76	2.1	2.1	0.3%	99.7%
#10	2.00	0.4	2.5	0.3%	99.7%
#20	0.841	1.2	3.7	0.5%	99.5%
#40	0.420	1.3	5.0	0.6%	99.4%
#60	0.250	5.8	10.8	1.3%	98.7%
#100	0.149	597.2	608.0	75.0%	25.0%
#200	0.074	194.3	802.3	99.0%	1.0%
Pan	0.000	4.4	806.7	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project: Estero Boulevard - Segment 4

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-14: 2 to 3 ft.

Sampled By: Christian Casey **Date Sampled:** 2/17/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Gray Sand (SP)

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	386.2	383.3	2.9	0.8%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	1.9	1.9	0.5%	99.5%
#4	4.76	1.2	3.1	0.8%	99.2%
#10	2.00	1.4	4.5	1.2%	98.8%
#20	0.841	1.5	6.0	1.6%	98.4%
#40	0.420	1.4	7.4	1.9%	98.1%
#60	0.250	4.2	11.6	3.0%	97.0%
#100	0.149	224.8	236.4	61.2%	38.8%
#200	0.074	144.8	381.2	98.7%	1.3%
Pan	0.000	1.0	382.2	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS

Project: Estero Boulevard - Segment 4

Client: David Douglas Associates, Inc. **Project No.:** 16-1668

Location: HA-15: 3 to 5 ft.

Sampled By: Christian Casey **Date Sampled:** 2/17/2017

Tested By: Lee Khan **Date Tested:** 3/10/2017

Material Description: Brown Sand (SP) with Traces of Medium Roots

Soil Classification AASHTO M 145-91 (2000) : A-3

#200 SIEVE WET WASH					
	ORIGINAL SAMPLE WEIGHT (g)	WASHED SAMPLE WEIGHT (g)	WEIGHT PASSING (g)	PERCENT PASSING	
	518.0	515.6	2.4	0.5%	

DRY SIEVE ANALYSIS					
STANDARD SIEVE SIZE	PARTIAL SIZE (mm)	TOTAL WEIGHT RETAINED (g)	CUMULATIVE WEIGHT RETAINED (g)	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1/2"	12.7	0.3	0.3	0.1%	99.9%
#4	4.76	2.3	2.6	0.5%	99.5%
#10	2.00	0.6	3.2	0.6%	99.4%
#20	0.841	1.1	4.3	0.8%	99.2%
#40	0.420	0.6	4.9	0.9%	99.1%
#60	0.250	1.5	6.4	1.2%	98.8%
#100	0.149	246.5	252.9	48.8%	51.2%
#200	0.074	260.8	513.7	99.2%	0.8%
Pan	0.000	1.8	515.5	- -	- -

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix I – Soil Corrosive Series Test Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

SOIL CORROSIVENESS

Project: Estero Boulevard Remaining Segments **Project No.:** 16-1668

Address: Estero Boulevard, Fort Myers Beach, Lee County, Florida

Client: David Douglas Associates, Inc.

Location: Segment # 4 / Composite Sample # 2

Sampled By: Christian Casey **Date Sampled:** 2/13/17-2/17/17

Tested By: David May **Date Tested:** 3/3/2017

Material Description: Gray - Brown Sand

LABORATORY RESULTS

TEST	LAB RESULTS
pH Content (FM 5-550):	8.13
Resistivity (FM 5-551), ohm-cm:	2,300
Chloride (FM 5-552), ppm:	33
Sulfate (FM 5-553), ppm:	32.1

Comments:

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix J – Asphalt Thickness by Core Determination

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

LIMEROCK/ASPHALT THICKNESS BY CORE DETERMINATION

Client: David Douglas Associates, Inc. Project #: 16-1668

Project: Estero Boulveard - Segment 4

Address: Estero Boulevard, Fort Myers Beach, Lee County, Florida

Results of Test

Core #	Location	Total Asphalt Core Thickness (in.)	Measured Asphalt Thickness (in.)		Visual Asphalt Type Classification
C-5	Sta. 1285+50: Northbound	7-3/4	Lift 1	1-1/2	S-III
			Lift 2*	3/4	Binding Layer
			Lift 3	1-1/4	S-I
			Lift 4	1-3/4	S-I
			Lift 5	1	S-I
			Lift 6	1-1/2	S-I
C-6	Sta. 1296+50: Southbound	9-3/8	Lift 1	2-1/4	S-III
			Lift 2	1	S-I
			Lift 3	1-1/2	S-I
			Lift 4	1-5/8	S-I
			Lift 5	1-1/2	Type II
			Lift 6	1	Type II
			Lift 7	1/2	ABC-3
C-7	Sta. 1305+50: Northbound	12-3/4	Lift 1	1-1/2	S-III
			Lift 2	1-7/8	S-III
			Lift 3*	1	Binding Layer
			Lift 4	2	S-I
			Lift 5	2-1/8	S-I
			Lift 6	2-1/8	S-I
			Lift 7	2-1/8	S-I
C-8	Sta. 1315+50: Southbound	11-3/8	Lift 1	1-1/2	S-III
			Lift 2	1/2	S-III
			Lift 3*	3/4	Binding Layer
			Lift 4	1-1/2	S-I
			Lift 5	1-3/8	S-I
			Lift 6	1-3/4	S-I
			Lift 7	1-1/8	S-I
			Lift 8	1-3/8	S-I
			Lift 9	1-3/4	Type II

*Air Voids Observed in Lifts

**Asphalt Debonded Between Lifts

The above test results were obtained in accordance with standard laboratory procedures.

Appendix K – Asphalt Bulk Specific Gravity

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 office ● (239) 489-3438 fax

ASPHALT CORE DENSITIES

CLIENT: David Douglas Associates, Inc. PROJECT # 16-1668

PROJECT: Estero Boulevard - Segment 4 REPORT # 1

ADDRESS: Estero Boulevard CITY: Fort Myers Beach DATE: 3/8/2017

Core #	Location/ Offset from Center Line	(A) Weight In Air (grams)	(B) Weight SSD (grams)	(C) Weight In Water (grams)	(D) A/(B-C) Specific Gravity	(E) D x 62.4 Density (PCF)	Tested Thickness (inches)
C-5	Sta. 1285+50 (NB)/ 6.75 Feet	3583.9	3616.5	1892.2	2.08	129.7	4"
C-6	Sta. 1296+50 (SB)/ 8 Feet	3594.6	3601.2	1890.2	2.10	131.1	4"
C-7	Sta. 1305+50 (NB)/ 12 Feet	3534.4	3542.9	1844.3	2.08	129.8	4"
C-8	Sta. 1315+50 (SB)/ 15 Feet	3744.6	3748.7	2012.6	2.16	134.6	4"

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix L – Limerock Bearing Ratio (LBR) Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 4 **Project ID:** 16-1668

Address: Estero Boulevard, Fort Myers Beach, Lee County, FL **Report ID:** LBR005

Client: David Douglas & Associates

Soil Location: Sta. 1293+00: Existing Shoulder Material

Sampled By: C. Casey **Date Sampled:** 3/1/2017

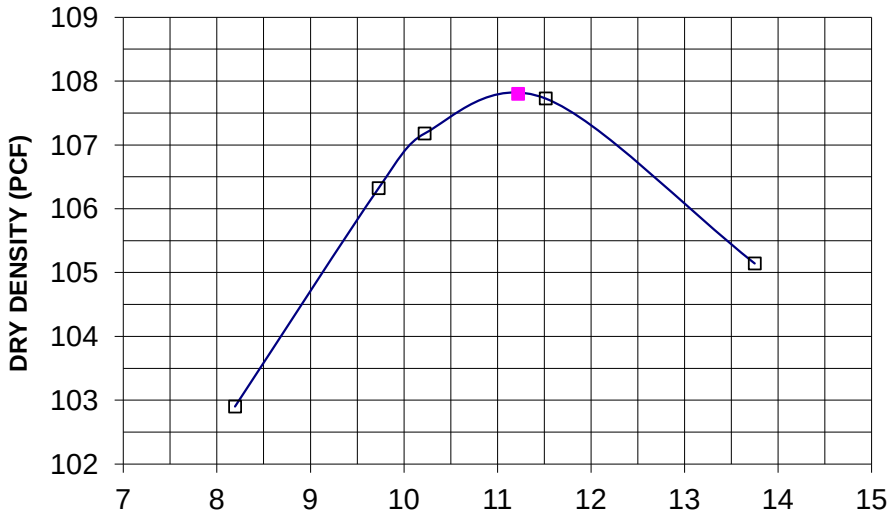
Tested By: M. Stel **Date Tested:** 3/16/2017

Soil Description: Brown Sand with Shell & Organics

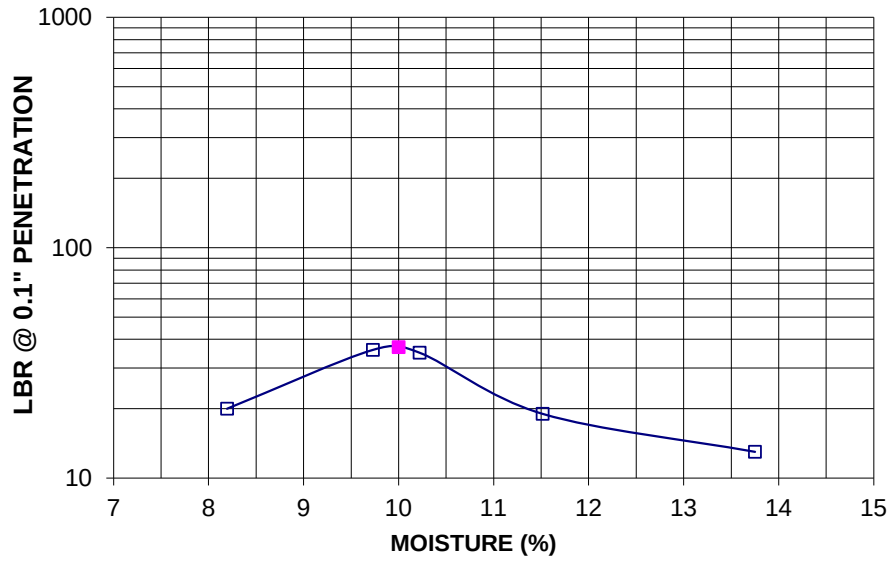
% Passing No. 4 Sieve: 26.3 **Type of Rammer:** Mechanical

Rammer Face: Sector **Soak Time (hrs):** 0 **Surcharge (lbs):** 0

Comments:



Dry Density (pcf)	Moisture (%)
102.9	8.2
106.3	9.7
107.2	10.2
107.7	11.5
105.1	13.8



LBR
20
36
35
19
13

Maximum Dry Density (pcf)
107.8

Optimum Moisture (%)
11.2

Limerock Bearing Ratio
37

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

3/22/17

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 4 **Project ID:** 16-1668

Address: Estero Boulevard, Fort Myers Beach. Lee County, FL **Report ID:** LBR006

Client: David Douglas & Associates

Soil Location: Sta. 1298+00: Existing Shoulder Material

Sampled By: M. Peppler **Date Sampled:** 3/1/2017

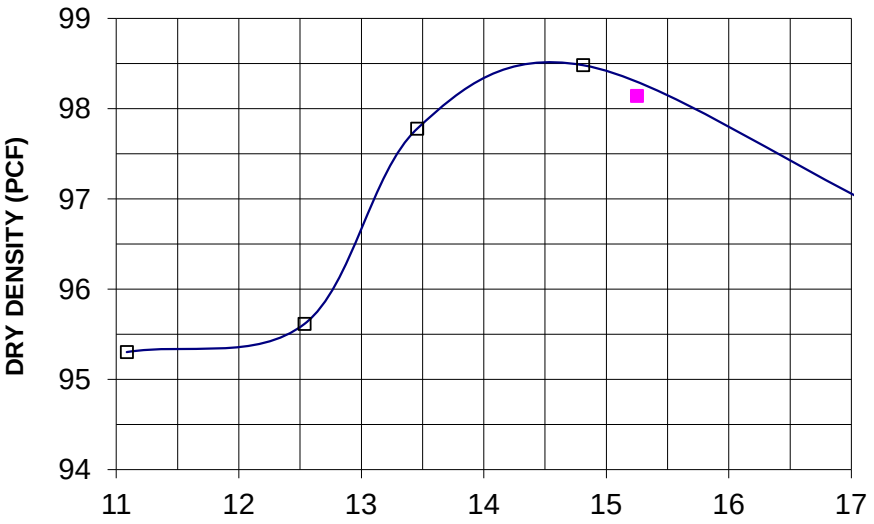
Tested By: M. Stel **Date Tested:** 3/14/2017

Soil Description: Brown Sand with Organics

% Passing #4 Sieve: 73.7 **Type of Rammer:** Mechanical

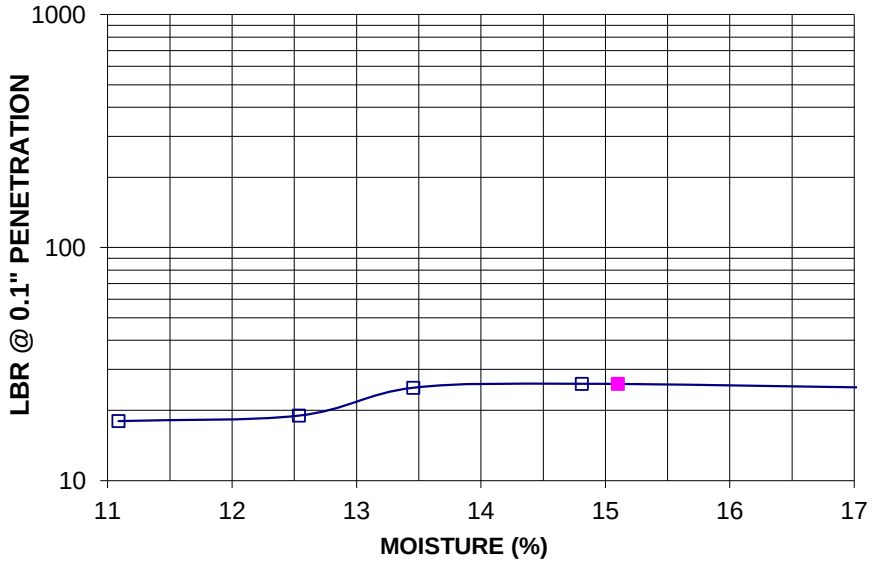
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
95.3	11.1
95.6	12.5
97.8	13.5
98.5	14.8
96.9	17.3

LBR
18
19
25
26
25



Maximum Dry Density (pcf)
98.1

Optimum Moisture (%)
15.3

Limerock Bearing Ratio
26

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

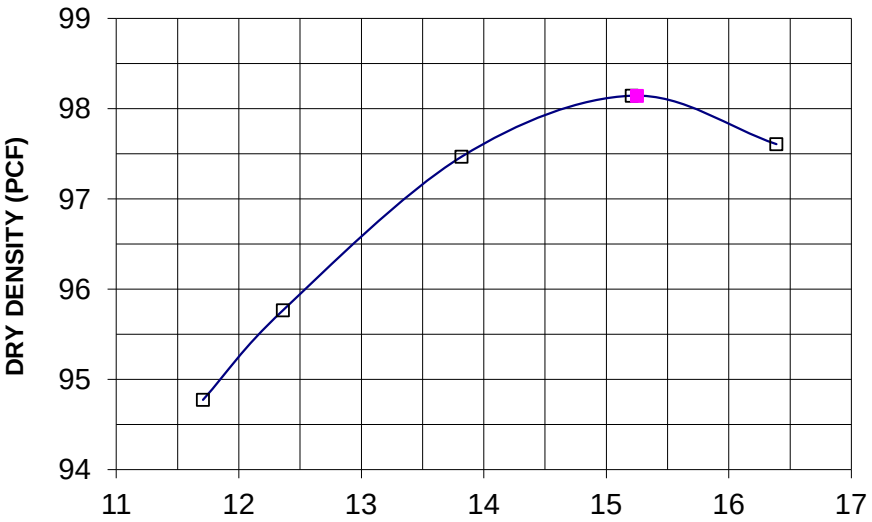
3/17/17

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

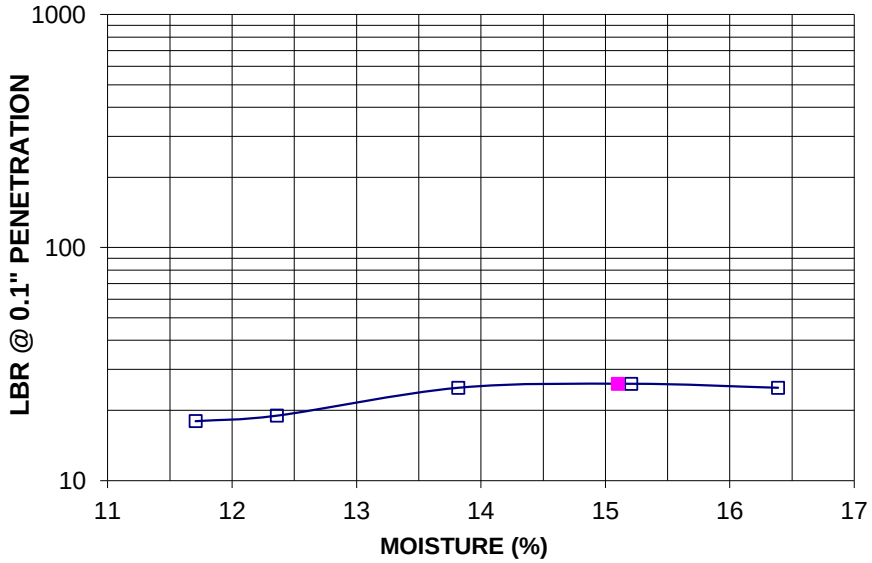
Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 3 **Project ID:** 16-1668
Address: Estero Boulevard, Fort Myers Beach, Lee County, FL **Report ID:** LBR007
Client: David Douglas & Associates
Soil Location: Sta. 1313+00: Existing Shoulder Material
Sampled By: C. Casey **Date Sampled:** 3/1/2017
Tested By: M. Stel **Date Tested:** 3/7/2017
Soil Description: Brown to Dark Brown Sand
% Passing #4 Sieve: 73.7 **Type of Rammer:** Mechanical
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15
Comments:



Dry Density (pcf)	Moisture (%)
94.8	11.7
95.8	12.4
97.5	13.8
98.1	15.2
97.6	16.4

LBR
18
19
25
26
25



Maximum Dry Density (pcf)
98.1

Optimum Moisture (%)
15.3

Limerock Bearing Ratio
26

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

3/17/17

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard - Segment 3 **Project ID:** 16-1668

Address: Estero Boulevard, Fort Myers Beach, Lee County, FL **Report ID:** LBR008

Client: David Douglas & Associates

Soil Location: Sta. 1318+00: Existing Shoulder Material

Sampled By: C. Casey **Date Sampled:** 3/7/2017

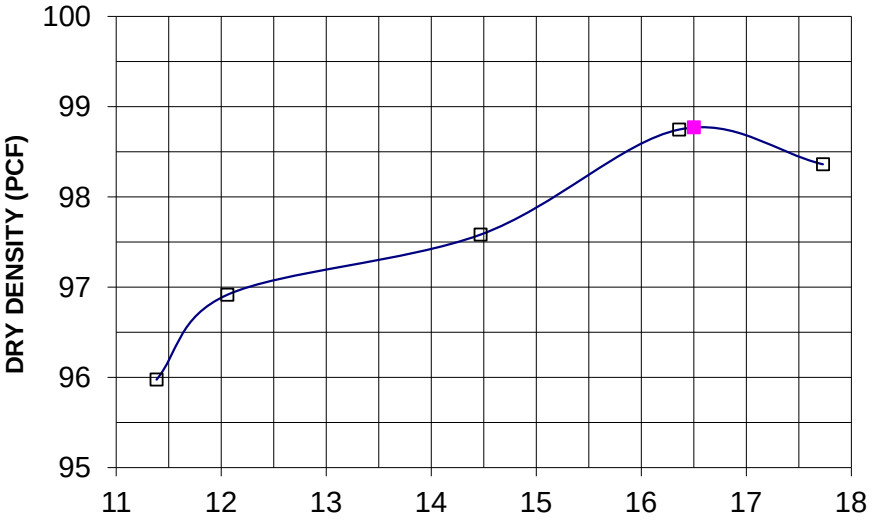
Tested By: M. Stel **Date Tested:** 3/14/2017

Soil Description: Brown Sand with Organics

% Passing #4 Sieve: 73.7 **Type of Rammer:** Mechanical

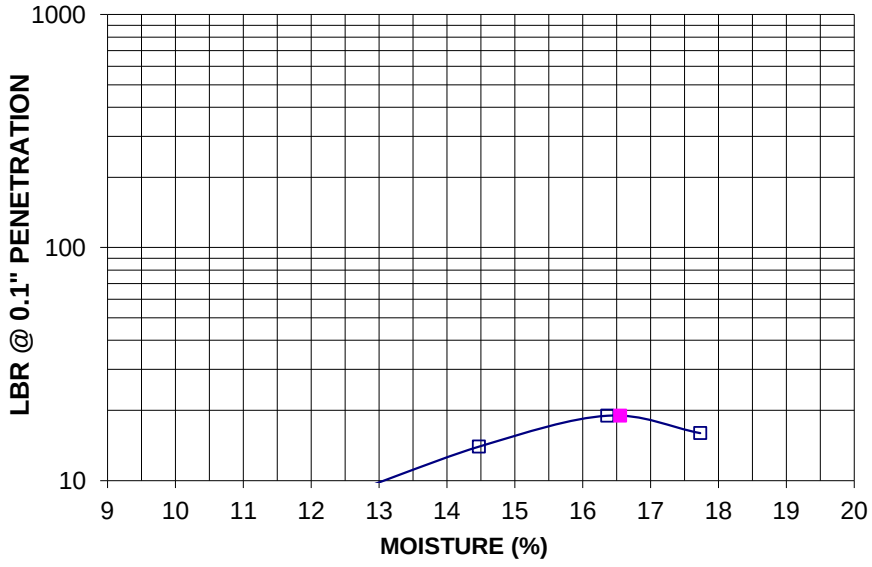
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
96.0	11.4
96.9	12.1
97.6	14.5
98.7	16.4
98.4	17.7

LBR
9
8
14
19
16



Maximum Dry Density (pcf)
98.8

Optimum Moisture (%)
16.5

Limerock Bearing Ratio
19

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

3/17/17

Paul J. D'huyvetter, P.E.
Registered Engineer #59716
State of Florida

Appendix M – Asphalt Core Photographs

ASPHALT CORE AC-5

ASPHALT CORE AC-6

ASPHALT CORE AC-7

ASPHALT CORE AC-8

GFA INTERNATIONAL

FLORIDA'S LEADING ENGINEERING SOURCE

Report of Geotechnical Exploration

Estero Boulevard – Segment 5
Fort Myers Beach, Lee County, Florida

January 31, 2018
GFA Project No.: 16-1668

For: David Douglas Associates, Inc.

January 31, 2018

Mr. Dan Craig P.E.
David Douglas Associates, Inc.
1821 Victoria Ave.
Fort Myers, FL 33901
Phone: (239) 337-3330
Email: DC@DDAI-Engineers.com

Site: **Geotechnical Engineering Services Report**
Estero Boulevard – Segment 5
Fort Myers Beach, Lee County, Florida
GFA Project # 16-1668

Dear Mr. Craig:

GFA International, Inc. (GFA) has completed the subsurface exploration and geotechnical engineering evaluation for the above-referenced project in accordance with the geotechnical and engineering service agreement for this project. The scope of services was completed in accordance with our Geotechnical Engineering Proposal (16-1668.00), planned in conjunction with and authorized by you.

EXECUTIVE SUMMARY

The purpose of our subsurface exploration was to classify the nature of the subsurface soils and general geomorphic conditions and evaluate their impact upon the proposed construction. This report contains the results of our subsurface exploration at the site and our engineering interpretations of these, with respect to the project characteristics described to us including providing recommendations for site preparation and the design of the foundation system.

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 3,900 feet of Estero Blvd (Sta. 1317+00: Albatross St. to Sta. 1356+00: Bay Beach Lane). Documents provided to GFA at the time of this report were Plan and Profile Plans completed by T.Y. Lin International, Sheet No. 46 through Sheet No. 53, dated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

The following was completed for this study:

- Seven (7) Hand Auger (HA) borings to depths of approximately 5 feet below ground surface (BGS).
- Three (3) field percolation tests to depths of approximately 5 feet BGS.
- Four (4) asphalt cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

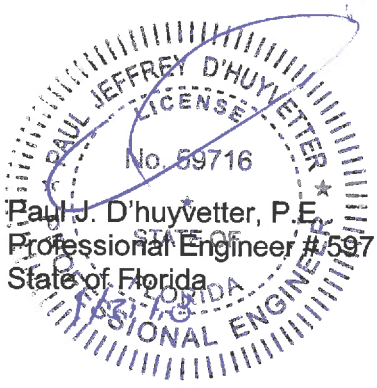
The subsurface soil conditions encountered at this site generally consists of sand (SP; A-3) with shell fragments to the boring termination depths. Please refer to "Appendix D – Record of Hand Auger Boring Logs" for a detailed account of each boring.

The following report presents the project information made available to us, our observation of the existing site conditions, the subsurface geotechnical information obtained during this exploration, and our recommendations on the suitability of the soils encountered for the force main replacement. Also included with this report are the results of our field and laboratory testing. The assessment of site environmental conditions for the presence of pollutants in the soil, rock, and groundwater at this site was not included as a part of our services.

We appreciate the opportunity to be of service to you on this project and look forward to a continued association. Please do not hesitate to contact us if you have any questions or comments, or if we may further assist you as your plans proceed.

Respectfully Submitted,
GFA International, Inc.
Florida Certificate of Authorization Number 4930

Chad A. Cook
Project Professional



Paul J. D'huyvetter, P.E.
Professional Engineer # 59716
State of Florida

Copies: 2, Addressee
1, CD-R

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Scope of Services

The objective of our geotechnical services was to collect subsurface data for the subject project, summarize the test results, and discuss any apparent site conditions that may have geotechnical significance for force main replacement. The following scope of service is provided within this report:

1. Prepare records of the soil boring logs depicting the subsurface soil conditions encountered during our field exploration.

2. Conduct a review of each soil sample obtained during our field exploration for classification and additional testing if necessary.

3. Analyze the existing soil conditions found during our exploration for the suitability of the soils encountered for the force main replacement.

4. Provide recommendations with respect to backfill material for the force main replacement.

5. Provide criteria and site preparation procedures to prepare the site for the proposed construction.

1.2 Project Description

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 3,900 feet of Estero Blvd (Sta. 1317+00: Albatross St. to Sta. 1356+00: Bay Beach Lane). Documents provided to GFA at the time of this report were Plan and Profile Plans completed by T.Y. Lin International, Sheet No. 46 through Sheet No. 53, dated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

2.0 OBSERVATIONS

2.1 Site Inspection

A site reconnaissance was conducted by members of our engineering staff prior to mobilization of drilling equipment and crews. The purpose of the site visit was to observe the existing site conditions in order to detect any factors that may impact our studies and recommendations.

Generally, the proposed construction site is level. No standing water on the surface was observed during the time of our drilling. The tested site consists of an urban area and is landscaped.

2.2 Geology

The surficial geologic map of Lee County, Florida consists of a quartz sand blanket that overlies the Tertiary Tamiami Formation (T_t), Tertiary-Quaternary Shell Units (Q_{su}) and Quaternary (Holocene) Costal and Estuarine Sediments (Q_h).The quartz sand blanket is generally less than 20 feet thick deposit, fine to medium grained, well sorted, with no fossils.

The oldest formation is the Tertiary Tamiami Formation (T_t). The Tamiami Formation consists of a mixture of variably sandy limestone, sands and clays containing varying percentage of phosphate grains. Fossils including mollusks, echinoids and corals are abundant. Fossil preservation varies from well preserved to molds and casts.

Overlaying the Tamiami Formation throughout much of the county are sediments indicated as Tertiary-Quaternary Shell Units (Q_{su}). These units consist of sands with subordinate limestone and clay. Fossils, including mollusks and corals, are common and well preserved.

Along the coast, Quaternary (Holocene) Costal and Estuarine Sediments (Q_h) are founded below an altitude of approximately 5 feet. These sediments consist of quartz sand with a variable organics component. The Holocene sediments include the beach ridge and dune sands.

2.3 Field Exploration

The following was completed for this study:

- Seven (7) Hand Auger (HA) borings to depths of approximately 5 feet below ground surface (BGS).
- Three (3) field percolation tests to depths of approximately 5 feet BGS.
- Four (4) asphalt cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

The locations of the borings performed are illustrated in “Appendix B: Test Location Plan". The Standard Penetration Test (SPT) boring method was used as the investigative tool within the borings. SPT tests were performed in substantial accordance with ASTM Procedure D-1586, “Penetration Test and Split-Barrel Sampling of Soils”. This test procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches. The number of blows per foot, for the second and third 6-inch increment, is an indication of soil strength.

The soil samples recovered from the soil borings were visually classified and their stratification is illustrated in “Appendix D: Record of Hand Auger Boring Logs". It should be noted that soil conditions might vary between the strata interfaces, which are shown. The soil boring data reflect information from a specific test location only. Site specific survey staking for the test locations was not provided for our field exploration. The indicated depth and location of each test was approximated based upon existing grade and estimated distances and relationships to obvious landmarks. The boring depths were selected based on our knowledge of vicinity soils and to include the zone of soil likely to be stressed by the proposed construction.

2.4 Laboratory Analysis

Soil samples recovered from our field exploration were returned to our laboratory where they were visually examined in general accordance with ASTM D-2488. Samples were evaluated to obtain an accurate understanding of the soil properties and site geomorphic conditions. After a thorough visual examination of the recovered site soils, laboratory testing was conducted to determine grain size distribution on individual samples and soil corrosiveness on a composite sample obtained from depths ranging from 0 to 5 feet BGS.

Composite bulk specific gravity tests were run on the four (4) asphalt cores obtained during field exploration using the saturated surface-dry procedure (AASHTO T-166). Limerock Bearing Ratio (LBR) tests were run on material obtained within approximately 5 feet of the edge of pavement using the Florida Method FM 5-515.

All laboratory tests were conducted in general accordance with ASTM, AASHTO, or Florida Methods, as applicable. The test method method number for each test and the number of tests completed are presented in the following table.

TEST DESCRIPTION	NUMBER OF TESTS	ASTM TEST METHOD
Soil Classification	23	D-2488
Gradation Analysis	4	D-422
Soil Corrosiveness (pH, Resistivity, Chloride, Sulfate)	2	FM 5-550, FM 5-551, FM 5-552, and FM 5-553
Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens	4	AASHTO T-166
Limerock Bearing Ratio (LBR)	3	FM 5-515

Bag samples of the soil encountered during our field exploration will be held in our laboratory for your inspection for 90 days and then discarded unless we are notified otherwise in writing.

2.4.1 Gradation Tests

A total of four (4) gradation tests were performed on samples obtained during the field exploration program. Material passing the No. 200 sieve is considered “fines” and will be either silt or clay. The percent passing the No. 200 sieve, for the tested samples, ranged from 0.3 to 2.9 percent, this resulted in the sampled material to be considered poorly graded fine sand (SP; A-3). A summary of the grain size distribution curve is presented in “Appendix H: Gradation Test Results”.

2.4.2 Soil Corrosiveness

This test method covers the laboratory determination for the minimum resistivity of a soil. The principal use of this test method is to determine a soil's corrosivity and thereby identify the conditions under which the corrosion of metals in soil may be sharply accentuated. Soil corrosiveness testing was completed on two (2) composite sample ranging from 0 – 5 feet BGS.

The soil samples obtained were considered non-marine structures and classified under the criteria for substructure environmental classifications. Composite Sample 1 resulted in moderately aggressive for steel and concrete, while Composite Sample 2 resulted in moderately aggressive for steel and slightly aggressive for concrete. The laboratory results for soil corrosiveness can be found in "Appendix I: Soil Corrosive Series Test Results".

For design purposes we recommend using a classification of "Moderately Aggressive" for this project.

2.5 Geomorphic Conditions

Boring logs derived from our field exploration are presented in "Appendix B: Boring Locations and Soil Profiles". The boring logs depict the observed soils in graphic detail. The Standard Penetration Test borings indicate the penetration resistance, or N-values, logged during the drilling and sampling activities. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples. All soil samples reviewed have been depicted and classified in general accordance with the Unified Soil Classification System, modified as necessary to describe typical southwest Florida conditions. See "Appendix E: Discussion of Soil Groups", for a detailed description of various soil groups.

The subsurface soil conditions encountered at this site generally consists of sand (SP) with shell fragments and traces of organics to the boring termination depths. Please refer to "Appendix D – Record of Hand Auger Boring Logs" for a detailed account of each boring.

2.6 Hydrogeological Conditions

During our field exploration program from December 26, 2017 to December 27, 2017, the groundwater table was encountered in our HA borings at depths of approximately 3.5 to 5 feet below the existing ground surface. The groundwater table will fluctuate depending upon tidal events.

Located in "Appendix F: Hydrologic Soils Map" are the following descriptive characteristics of the five (5) types of soil surveys encountered during the drilling operations based on the soil survey of Lee County, Florida, published by the United States Department of Agriculture:

Canaveral-Urban Land Complex (4)

In undrained areas, the water table is at a depth of 18 to 40 inches for a period of 2 to 6 months in most years. Drainage systems have been established in most areas however, and the depth to the water table is dependent on the drainage system.

Captiva Fine Sand (5)

In most years, under natural conditions, this soil has a water table within a depth of 10 inches for 1 to 2 months. The water table is at a depth of 10 to 40 inches for 10 months during most years. In some years, the soil is covered by standing water for several days. Permeability is very rapid.

Kesson Fine Sand (24)

This is a nearly level, very poorly drained soil in broad tidal swamps. Areas are subject to tidal flooding. Typically, the surface layer is about 6 inches of sand that contains shell fragments. The underlying layers are fine sand that contains shell fragments, and they extend to a depth of 80 inches of more. The water table fluctuates with the tide. The available water capacity is low. Permeability is moderately rapid or rapid.

Urban Land (59)

Urban land consists of areas that are more than 85 percent covered with parking lots, large buildings, streets, and sidewalks where the natural soil and ground water table cannot be observed.

Matlacha Gravelly Fine Sand (69)

The depth to the water table varies with the amount of fill material and the extent of artificial drainage. However, in most years, the water table is 24 to 36 inches below the surface of the fill material for 2 to 4 months. It is more than 60 inches below the surface during extended dry periods. Permeability is variable within short distances, but it is estimated to be moderately rapid to rapid in the fill material and rapid in the underlying material.

2.6.1 Exfiltration Testing

GFA International performed three field percolation (PERC) tests spaced at approximately 1,150-foot centers. The percolation testing was performed in accordance with the SFWMD Constant-Head Open-Hole Test Method. The results are presented below.

PERC Test – 1 (Sta. 1320+50)	
Depth (ft)	**Soil Description**
0 – 2.5	Gray Sand (A-3; SP)
2.5 – 5	Light Gray Sand (A-3; SP)
Water table: 2.5 feet below grade.*	
Saturated K = 6.7 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 2 (Sta. 1337+50)	
Depth (ft)	**Soil Description**
0 – 5	Gray Sand (A-3; SP)
Water table: 2.83 feet below grade.*	
Saturated K = 15.4 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 3 (Sta. 1351+00)	
Depth (ft)	**Soil Description**
0 – 2	Gray Sand (A-3; SP)
2 – 5	Light Gray Sand (A-3; SP), Shell Fragments
Water table: 3.0 feet below grade.*	
Saturated K = 35.4 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

The location of the exfiltration test completed is illustrated in "Appendix B: Test Location Plan".

3.0 ENGINEERING EVALUATION AND RECOMMENDATIONS

3.1 General

The geotechnical evaluations for the proposed construction site are based on the subsurface soil and groundwater conditions encountered during this study, the project information made available, our site observations, and our experience in the vicinity. The test data has been evaluated using established geotechnical parameters of the soils recorded at this site, laboratory test results, and the observed performance of similar soil types.

Based on the soil conditions encountered in the performed borings, the near surface soils do not meet the below mentioned Lee County Technical Specifications for drainage fill or select fill. The near surface soils do meet the below mentioned Lee County Technical Specifications for common fill. The water main replacement may be designed according to the recommendations and site preparations as discussed below with a fill material meeting the specifications.

3.2 Pipe Bedding and Initial Backfill (Force Main)

According to the Lee County Technical Specifications, Section 2223, Backfilling, a select fill material shall be used for pipe bedding and initial backfill from top of bedding to 1 foot over the top of pipes. The select fill shall be compacted to not less than 98 percent of the maximum dry density as determined by ASTM D-1557.

Pipe bedding containing very fine sand, uniformly graded sands and gravel, silt, soft earth, or other material that have a tendency to flow under pressure when wet is unacceptable.

Based on the laboratory test results the majority of the near surface soils consist of poorly graded clean sands to slightly silty sands. Material from on-site excavation does not meet the gradation specification for select fill cannot be used for pipe bedding and initial backfill.

3.3 Pipe Bedding and Initial Backfill (Drainage System)

Pipe bedding and initial backfill shall be in accordance with Florida Department of Transportation (FDOT) for Road and Bridge Construction – Sections 120 & 125 (January 2017).

3.4 Trench Excavation

Where trench excavations are required, trenches shall be sufficiently wide and deep to allow proper installation of pipes. We recommend about 12 inches clear of the pipe on either side at any point. Boulders, rocks or other hard unyielding material shall be excavated to a depth of 12 inches below the bottom of the pipe elevation.

Due to the depth of excavations and the depth of the water table, we anticipate excavation will require shoring or a trench box. Trenching should be in general accordance with any Lee County trenching requirements and the Occupational Safety and Health Administration (OSHA) requirements, as applicable.

3.5 Trench Backfill

Trench backfill material shall be clean earth fill composed of sand, clay and sand, sand and stone, crushed stones or other soils approved by a professional engineer. The trench backfilling shall be accomplished from the top of the initial backfill to the ground surface. The backfill, unless otherwise specified, shall be compacted to 98% of maximum density, as determined by ASTM D-1557.

When trenches are cut in pavements or areas to be paved, compaction shall be in accordance with FDOT for Road and Bridge Construction (January 2017).

Based on the soil profiles, presented in “Appendix D: Record of Hand Auger Boring Logs”, the material from on-site excavation that will contain sands and silt or gravel size limestone fragments may be used for the trench backfill. Organic soils are not suitable and shall not be used as trench backfill material, if encountered during construction.

4.0 DEWATERING OF EXCAVATIONS

The high groundwater tables in the vicinity of excavations shall be reduced to prevent water inflow into excavations. Dewatering will be required for the excavation of trenches during construction. Each excavation shall be kept dry during subgrade preparation and continually thereafter until installation of the pipe or wet well structures. The dewatering will be required to maintain groundwater elevation at least 24 inches below the bottom at all times to prevent bottom disturbance or failure.

5.0 SITE PREPARATION PROCEDURES

Site preparation procedures should begin with the removal of existing debris, vegetation, or other unsuitable materials within and beyond the excavation construction.

The organic soils, if encountered during construction, shall be removed and replaced to a required level (the future project specification) with a compacted suitable fill. The suitable fill material shall contain less than 10 percent of fines passing the No. 200 sieve, not contain clay balls and rock fragments greater than 3 inches in diameter.

An adequate dewatering system shall be installed to maintain the water table 2 feet or more below the maximum depth of excavation. The continuous dewatering shall be provided until the pipeline is completed and backfill is above the water table before beginning of the dewatering.

When a professional engineer approves the discontinuing of the dewatering, the rate of pumping shall slowly decrease, allowing the water level to rise slowly.

The soils that extend below the water table should be allowed to dry prior to placement as a backfill material and compaction. This can be accomplished by stockpiling the material and allowing it to drain, or by spreading it in relatively thin lifts on the surface and allowing it to dry prior to compaction. The silty or sands with clay may require moisture conditioning so that the soil moisture content at the time of compaction is at or near the optimum moisture content.

Trench bottoms should be compacted with a small roller or vibratory plate compactor prior to pipe placement. Any loose or soft yielding areas detected during compaction of the trench bottoms should either be further compacted to at least 95% of maximum dry density or removed and replaced with a select fill and compacted to 95% of maximum dry density. Bedding stone may be used in lieu of select fill.

During the compaction operation, a geotechnical engineer or an engineering technician working under his direction should observe the soils to verify that the exposed soils are suitable and that unsuitable soils have been removed. Samples of the backfill materials should be obtained to determine the grain size distribution, its maximum dry density and optimum moisture content in the laboratory in accordance with ASTM D-1557 (Modified Proctor Test).

6.0 ASPHALT EVALUATION

6.1 Asphalt Thickness

Four (4) asphalt cores were taken at alternating lanes (southbound or northbound) along Estero Boulevard in Fort Myers Beach starting just north of Albatross Street (Sta. 1317+00) and finishing just north of Bay Beach Lane (Sta. 1356+00). The location of each individual asphalt core can be found in “Appendix B: Test Location Plan”.

GFA International encountered an average asphalt thickness of 9-1/16 inches with a range of four (4) to six (6) lifts per asphalt core. A stratum was initiated from top of existing asphalt (Lift 1) down to the bottom of asphalt (ex.: Lift 4). A summary of the test results are shown in “Appendix J: Asphalt Thickness by Core Determination”. Refer to “Appendix M: Asphalt Core Photographs” for a visual record of each asphalt core.

Beneath the asphalt, a layer of cemented shell base was encountered. This material consists of sand and shell fragments with an average thickness of 8-3/4 inches.

6.2 Limerock Bearing Ratio (LBR) Testing

A total of three (3) samples were obtained within approximately 5 feet of the edge of pavement to conduct Limerock Bearing Ratio (LBR) tests on the existing subgrade soils, using the Florida Method FM 5-515. Based on the laboratory test results, we recommend a structural coefficient for Type B Stabilized subbase, LBR 40 material (0.08). For complete test results, refer to “Appendix L – Limerock Bearing Ratio (LBR) Results”. It is our understanding that the existing base material will be removed during utility construction. As such, no LBR samples were collected from the base material.

6.3 Asphalt Bulk Specific Gravity Testing

A total of four (4) asphalt core samples were tested using American Association of State Highway and Transportation (AASHTO) T-166 "Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens". The top 4-inches of asphalt were tested as a composite sample per each asphalt core. The asphalt density ranged from 130.0 to 136.1 pounds per cubic foot (PCF) which averaged in 132.85 PCF.

For complete test results, refer to "Appendix K – Asphalt Bulk Specific Gravity".

7.0 REPORT LIMITATIONS

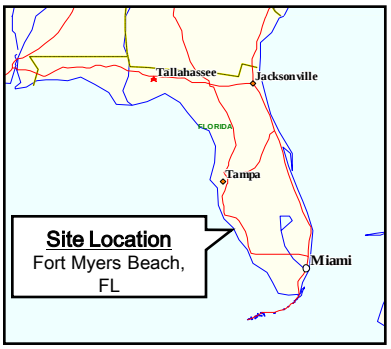
This consulting report has been prepared for the exclusive use of the current project owners and other members of the design team for the Estero Boulevard – Segment 5 located on Estero Boulevard in Fort Myers Beach, Lee County, Florida. This report has been prepared in accordance with generally accepted local geotechnical engineering practices; no other warranty is expressed or implied. The evaluation submitted in this report, is based in part upon the data collected during a field exploration, however, the nature and extent of variations throughout the subsurface profile may not become evident until the time of construction. If variations then appear evident, it may be necessary to reevaluate information and professional opinions as provided in this report. In the event changes are made in the nature, design, or locations of the proposed structure, the evaluation and opinions contained in this report shall not be considered valid, unless the changes are reviewed and conclusions modified or verified in writing by GFA International. GFA is not responsible for damage caused by soil improvement and/or construction activity vibrations related to this project. GFA is also not responsible for damage concerning drainage or moisture related issues for the proposed or nearby structures.

8.0 BASIS FOR RECOMMENDATIONS

The analysis and recommendations submitted in this report are based on the data obtained from the tests performed at the locations indicated on the attached figure in "Appendix B: Test Location Plan". This report does not reflect any variations, which may occur between borings. While the borings are representative of the subsurface conditions at their respective locations and for their vertical reaches, local variations characteristic of the subsurface soils of the region are anticipated and may be encountered. The delineation between soil types shown on the soil logs is approximate and the description represents our interpretation of the subsurface conditions at the designated boring locations on the particular date drilled.

Any third party reliance of our geotechnical report or parts thereof is strictly prohibited without the expressed written consent of GFA International. The methodology (ASTM D-1586) used in performing our borings and for determining penetration resistance is specific to the sampling tools utilized and does not reflect the ease or difficulty to advance other tools or materials.

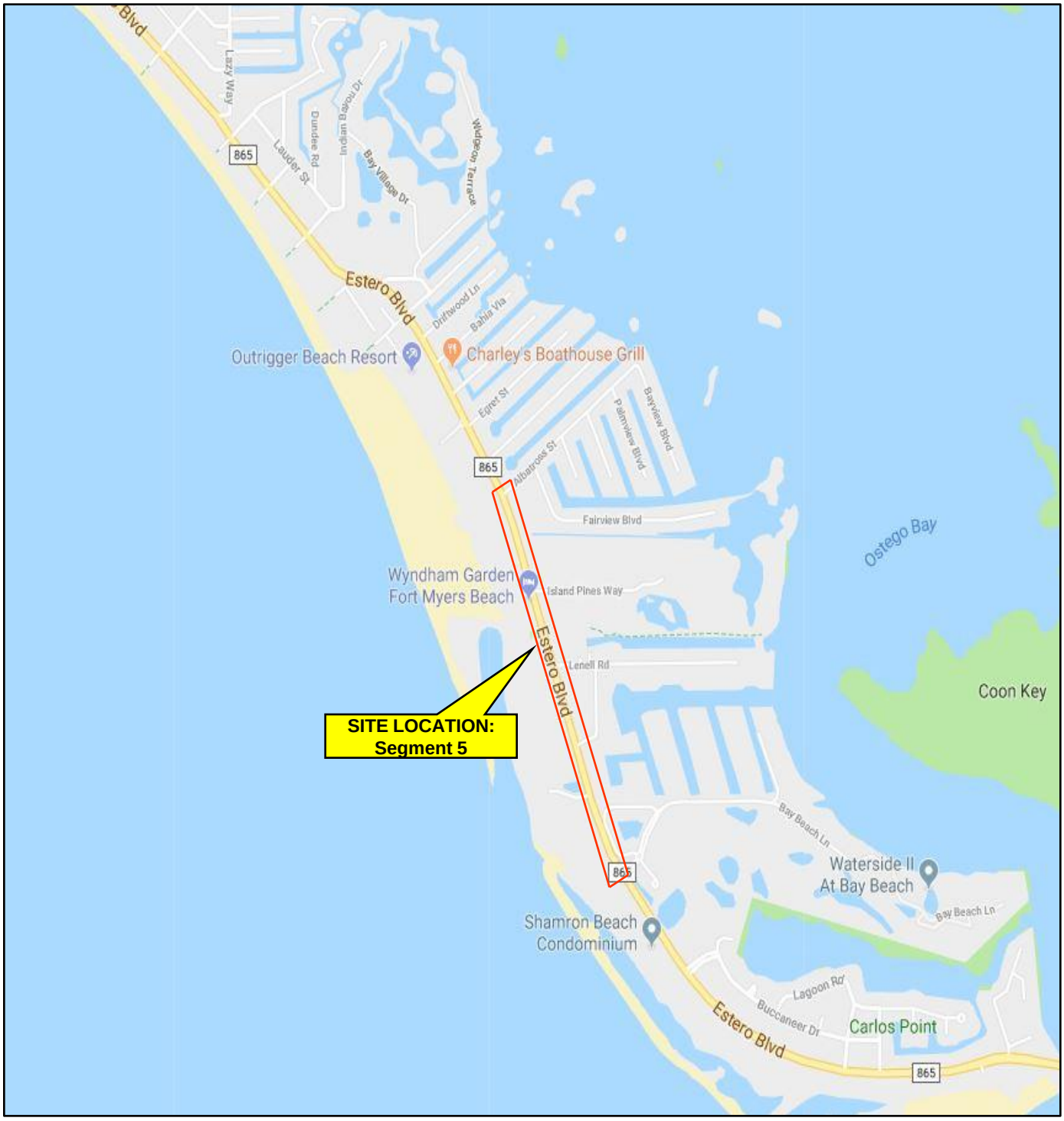
Appendix A - Vicinity Map



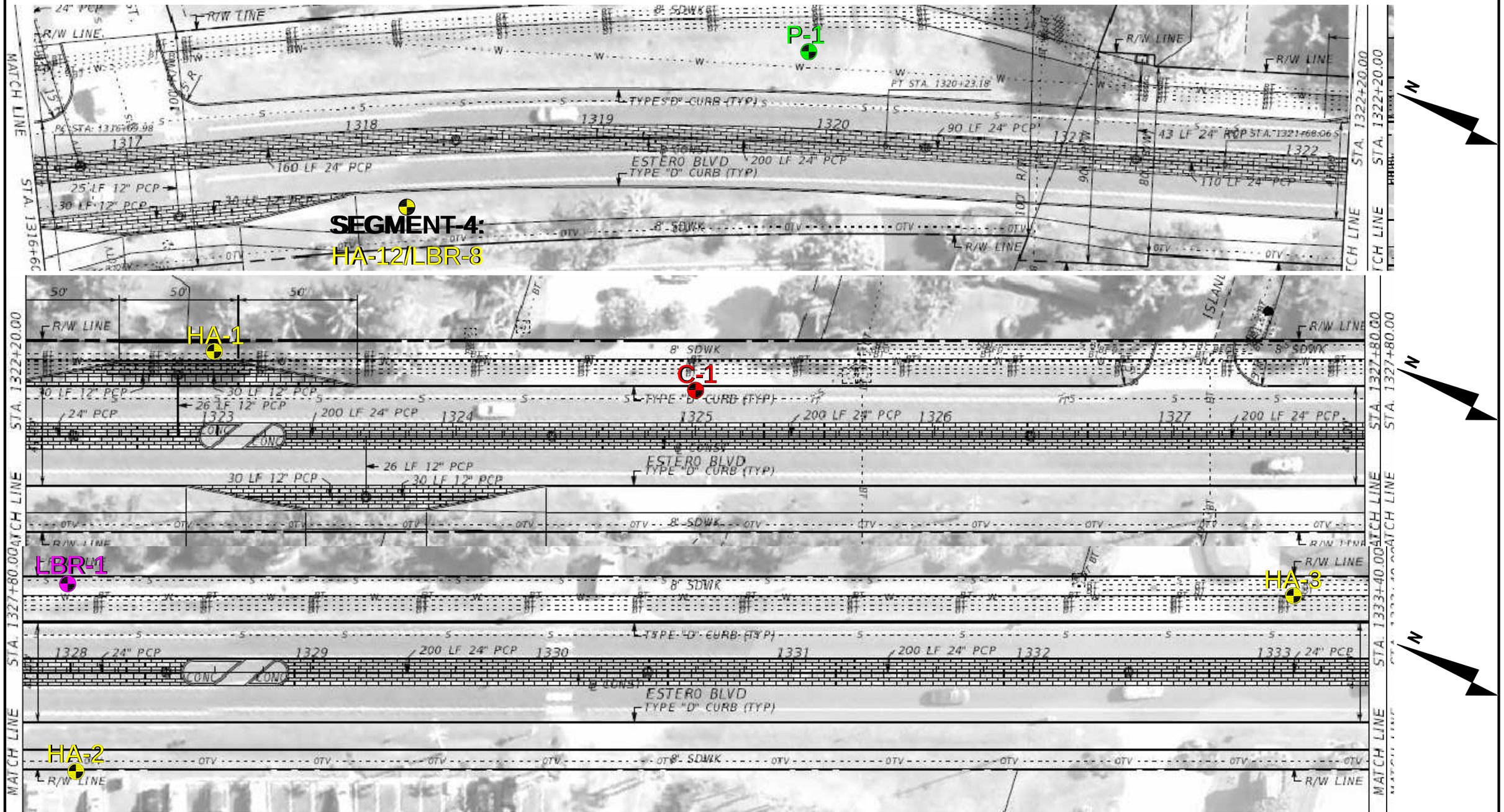
VICINITY MAP

Estero Boulevard – Segment 5

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668



Appendix B – Test Location Plan



NOTES:
- HAND AUGER LOCATION
- PERCOLATION TEST LOCATION
- ASPHALT CORE LOCATION
- LBR TEST LOCATION

BASE DRAWING PROVIDED BY CLIENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER, P.E. #59716

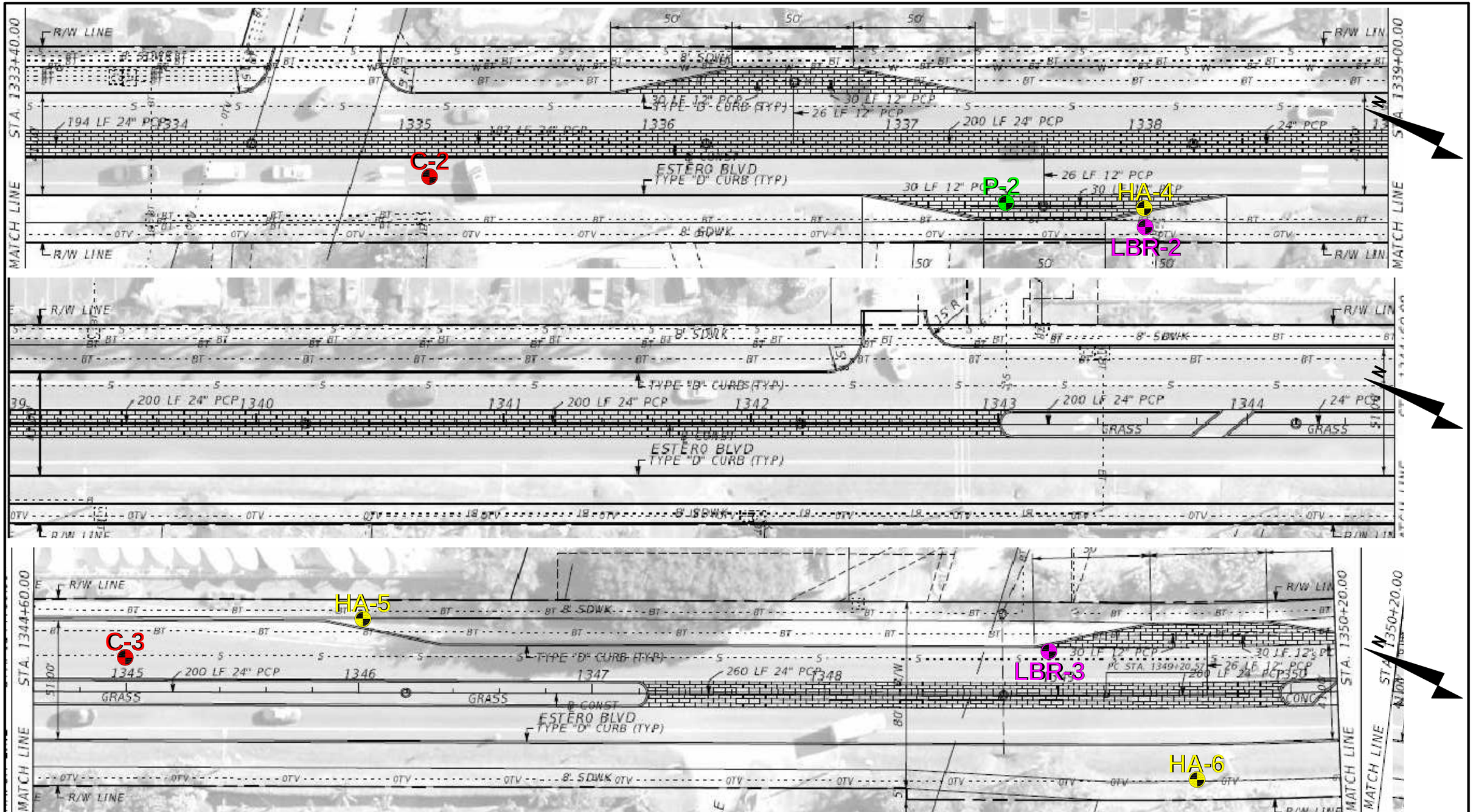
LEE COUNTY DEPARTMENT OF PUBLIC WORKS

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	16-1668

TEST LOCATION PLAN

ESTERO BLVD. UTILITY IMPROVEMENTS
SEGMENT 5 - Albatross St. to Bay Beach Lane
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: CAC



NOTES:
- HAND AUGER LOCATION
- PERCOLATION TEST LOCATION
- ASPHALT CORE LOCATION
- LBR TEST LOCATION

BASE DRAWING PROVIDED BY CLIENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER, P.E. #59716

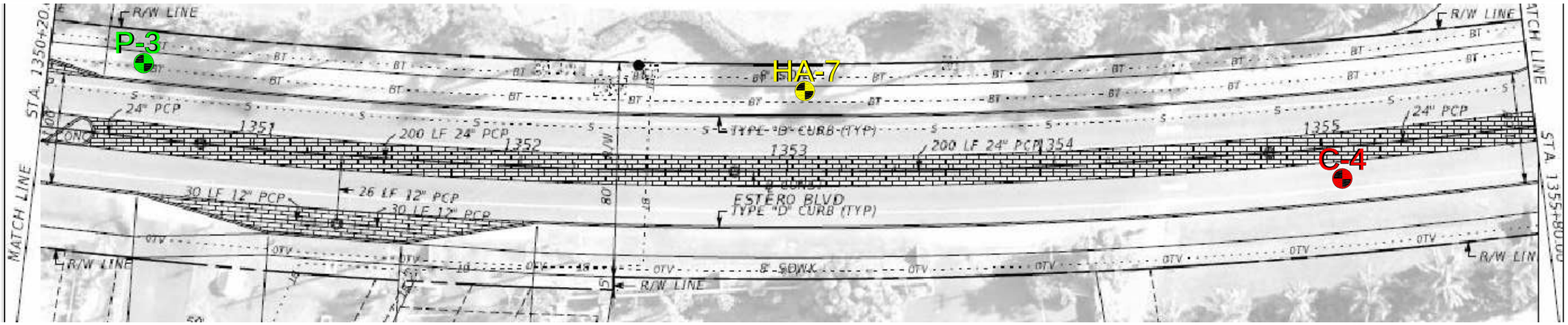
LEE COUNTY DEPARTMENT OF PUBLIC WORKS

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	16-1668

TEST LOCATION PLAN

ESTERO BLVD. UTILITY IMPROVEMENTS
SEGMENT 5 - Albatross St. to Bay Beach Lane
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: CAC



NOTES:
- HAND AUGER LOCATION
- PERCOLATION TEST LOCATION
- ASPHALT CORE LOCATION
- LBR TEST LOCATION

BASE DRAWING PROVIDED BY CLIENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER, P.E. #59716

LEE COUNTY DEPARTMENT OF PUBLIC WORKS

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	16-1668

TEST LOCATION PLAN

ESTERO BLVD. UTILITY IMPROVEMENTS
SEGMENT 5 - Albatross St. to Bay Beach Lane
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: CAC

Appendix C - Notes Related to Borings

NOTES RELATED TO
RECORDS OF TEST BORING AND
GENERALIZED SUBSURFACE PROFILE

1. Groundwater level was encountered and recorded (if shown) following the completion of the soil test boring on the date indicated. Fluctuations in groundwater levels are common; consult report text for a discussion.

2. The boring location was identified and located in the field based on measured and estimated distances from existing site features.

3. The borehole was backfilled to site grade following boring completion, patched with asphalt cold patch mix when pavement was encountered.

4. The Record of Test Boring represents our interpretation of field conditions based on engineering examination of the soil samples.

5. The Record of Test Boring is subject to the limitations, conclusions, and recommendations presented in the report text.

6. The Standard Penetration Test (SPT) was performed in accordance ASTM Procedure D-1586. SPT testing procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches.

7. On the Record of Test Boring listed as "Blow Counts", the N-value is the sum of the SPT hammer blows required to drive the split-tube sampler through the second and third 6-inch increment of the sampling layer, and is an indication of soil strength.

8. Shown on the Record of Test Boring an SPT N-value expressed as 50/2" is descriptive of the fact that 50 hammer blows were required to drive the split-spoon sampler a distance of approximately 2 inches.

9. The soil/rock strata interfaces shown on the Records of Test Boring are approximate and may vary from those in the field. The soil/rock conditions shown on the Records of Test Boring refer to conditions at the specific location tested; soil/rock conditions may vary between test locations.

10. Relative density and consistency for sands/gravels, silts/clays, and limestone are described as follows:

Cohesionless Soils	
SPT (N-Value)	Relative Density
0 – 3	Very Loose
4 – 8	Loose
9 – 24	Medium Dense
25 – 40	Dense
Over 40	Very Dense

Silts and Clays	
SPT (N-Value)	Consistency
0 – 1	Very Soft
2 – 4	Soft
4 – 6	Firm
7 – 12	Stiff
13 – 24	Very Stiff
Over 24	Hard

Limestone	
SPT (N-Value)	Relative Density
0 – 19	Very Soft
20 – 49	Soft
50 – 100	Medium Hard
50 for 3 to 5"	Moderately Hard
50 for 0 to 2"	Hard

11. Definition of descriptive terms of modifiers for silts/clays/shells/gravels are described as follows:

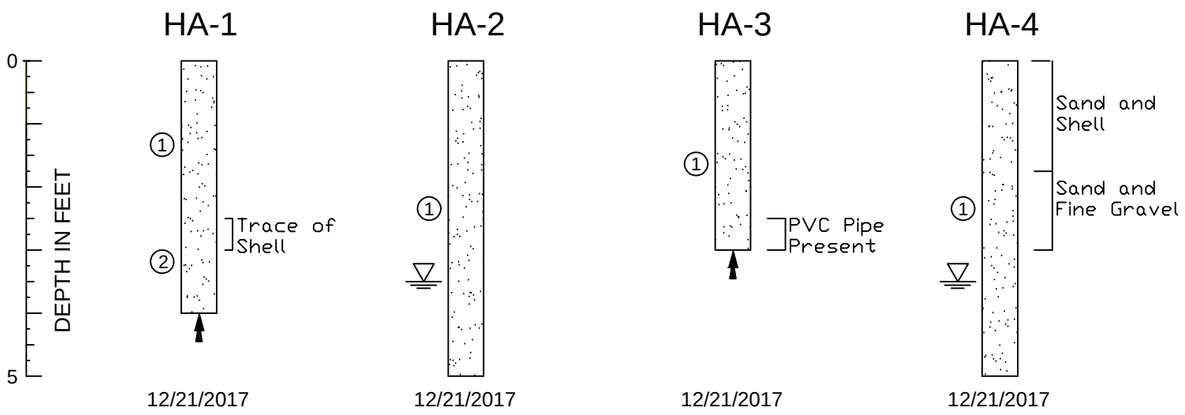
Percentage of Modifier Material	First Qualifier	Second Qualifier
0 – 5	With a Trace of + Modifier	With a Trace
5 – 12	Slightly + Modifier + y	With Some
12 – 30	Modifier + y	With
30 – 50	Very + Modifier + y	And

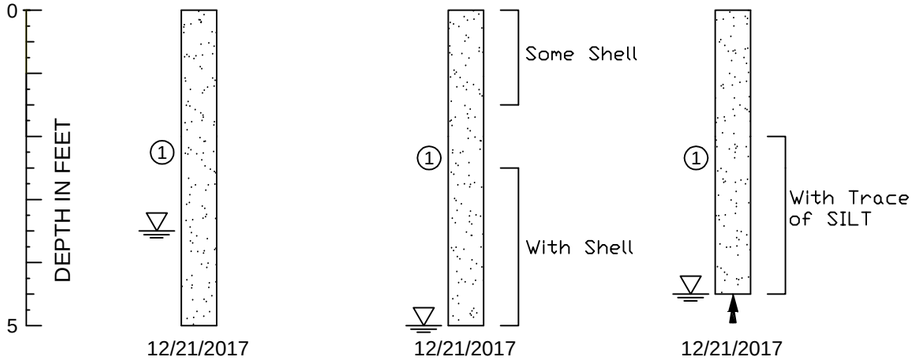
12. Descriptive characteristics for organic content percentages are described as follows:

Percentage of Organic Material	Descriptor
0 – 5	With a Trace
5 – 20	With Organics
20 – 75	Highly Organic
75 – 100	Peat

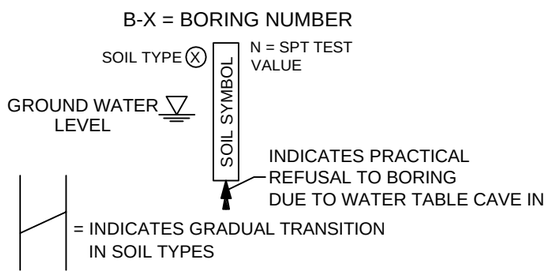
Appendix D – Record of Hand Auger Boring Logs

SOIL PROFILES





SOIL PROFILE LEGEND

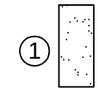


NOTES:

N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

HA - HAND AUGER

SOIL LEGEND



Gray, Dark Gray, LIght Gray, Brown, Light Brown, Loose to Dense SAND (A-3; SP)

SOIL CLASSIFICATION

CORRELATION OF N - VALUES WITH RELATIVE DENSITY AND CONSISTENCY

COHESIONLESS SOIL		SILTS AND CLAYS		CORRELATION OF N - VALUES WITH HARDNESS DESCRIPTION	
N - VALUE	RELATIVE DENSITY	N - VALUE	CONSISTENCY	N - VALUE	RELATIVE DENSITY
0 - 3	VERY LOOSE	0 - 1	VERY SOFT	0 - 19	VERY SOFT
4 - 8	LOOSE	2 - 4	SOFT	20 - 49	SOFT
9 - 24	MEDIUM DENSE	5 - 6	FIRM	50 - 100	MEDIUM HARD
25 - 40	DENSE	7 - 12	STIFF	50 FOR 3 TO 5"	MODERATELY HARD
OVER 40	VERY DENSE	13 - 24	VERY STIFF	50 FOR 0 TO 2"	HARD
		OVER 24	HARD		

APPROXIMATE FINES CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR SLIGHTLY CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR VERY CLAYEY

APPROXIMATE SHELL CONTENT	MODIFIERS
0% TO 5%	WITH A TRACE OF SHELL
6% TO 12%	SLIGHTLY SHELLY
13% TO 30%	SHELLY
31% TO 50%	VERY SHELLY

APPROXIMATE ORGANIC CONTENT	MODIFIERS
0% TO 5%	WITH A TRACE
5% TO 20%	WITH ORGANICS
20% TO 75%	HIGHLY ORGANIC
75% TO 100%	PEAT

DEFINITION OF DESCRIPTIVE TERMS OF MODIFIERS FOR SILTS/CLAYS/SHELLS/GRAVELS ARE DESCRIBED AS FOLLOWS:

PERCENTAGE OF MODIFIER MATERIAL	FIRST QUALIFIER	SECOND QUALIFIER
0 - 5	WITH A TRACE OF + MODIFIER	WITH A TRACE
5 - 12	SLIGHTLY + MODIFIER + Y	WITH SOME
12 - 30	MODIFIER + Y	WITH
30 - 50	VERY + MODIFIER + Y	AND

RECORD OF HAND AUGER BORINGS

GFA International, Inc.
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 * TeamGFA.com

Client: David Douglas Associates, Inc.

Project:
Estero Boulevard Utility Improvements
Segment 5
Fort Myers Beach, Lee County, Florida

Date: 1/09/2018
Job No: 16-1668
Drawn By: CAC
Approved by: PJD

Appendix E – Discussion of Soil Groups

DISCUSSION OF SOIL GROUPS:
AASHTO CLASSIFICATION

COARSE GRAINED SOILS

- **Group A-1:** The typical material of this group is a well-graded mixture of stone fragments or gavel, coarse sand, fine sand, and a nonplastic or feebly-plastic soil binder. However, this group also includes stone fragments, gravel, coarse sand, volcanic cinders, etc., without a soil binder.

    - **Subgroup A-1-a:** Includes those materials consisting predominantly of stone fragments or gravel, either with or without a well-graded binder of fine material.

    - **Subgroup A-1-b:** Includes those materials consisting predominantly of coarse sand, either with or without a well-graded soil binder.

- **Group A-3:** The typical material of this group is fine beach sand or fine desert-blow sand without silty or clay fines, or with a very small amount of nonplastic silt. This group also includes stream-deposited mixtures of poorly-graded fine sand and limited amounts of coarse sand and gravel.

- **Group A-2:** This group includes a wide variety of “granular” materials which are borderline between the materials falling in Groups A-1 and A-3, and the silt-clay materials of Groups A-4, A-5, A-6, and A-7. It includes all materials containing 35% or less passing a No. 200 (75-µm) sieve which cannot be classified in Groups A-1 or A-3, due to the fines content or the plasticity indexes, or both, in excess of the limitations for those groups.

    - **Subgroups A-2-4 and A-2-5:** Include various granular materials containing 35% or less passing a No. 200 (75-µm) sieve and with a minus No. 40 (425-µm) portion having the characteristics of Groups A-4 and A-5, respectively. These groups include such materials as gravel and coarse sand with silt contents or plasticity indexes in excess of the limitations of Group A-1 and fine sand with nonplastic-silt content in excess of the limitations of Group A-3.

    - **Subgroups A-2-6 and A-2-7:** Include materials similar to those described under Subgroups A-2-4 and A-2-5, except that the fine portion contains plastic clay having the characteristics of the A-6 or A-7 group, respectively.

FINE GRAINED SOILS

- **Group A-4:** The typical material of this group is a nonplastic or moderately plastic silty soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine silty soil and up to 64% of sand and gravel retained on a No. 200 sieve.

- **Group A-5:** The typical material of this group is similar to that described under Group A-4, except that it is usually of diatomaceous or micaceous character and may be highly elastic as indicated by the high liquid limit.

- **Group A-6:** The typical material of this group is a plastic clay soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine clayey soil and up to 64% of sand and gravel retained on a No. 200 sieve. Materials of this group usually have a high volume change between wet and dry states.

- **Group A-7:** The typical material of this group is similar to that described under Group A-6, except that it has the high liquid limits characteristic of Group A-5 and may be elastic as well as subject to high-volume change.

    - **Subgroup A-7-5:** Includes those materials with moderate plasticity indexes in relation to the liquid limit and which may be highly elastic as well as subject to considerable volume change.

    - **Subgroup A-7-6:** Includes those materials with high plasticity indexes in relation to liquid limit and which are subject to extremely high volume change.

HIGHLY ORGANIC SOILS

- **Group A-8:** Highly organic soils (peat or muck) may be classified in this group. Classification of these materials is based on visual inspection and is not dependent on the percentage passing the No. 200 (75-µm) sieve liquid limit, or plasticity index. The material is composed primarily of partially decayed organic matter, generally has a fibrous texture, a dark brown or black color, and an odor of decay. These organic materials are unsuitable for use in embankments and subgrades. They are highly compressible and have low strength.

DISCUSSION OF SOIL GROUPS

COARSE GRAINED SOILS

GW and SW GROUPS. These groups comprise well-graded gravelly and sandy soils having little or no plastic fines (less than 5 percent passing the No. 200 sieve). The presence of the fines must not noticeably change the strength characteristics of the coarse-grained fraction and must not interface with it's free-draining characteristics.

GP and SP GROUPS. Poorly graded gravels and sands containing little of no plastic fines (less than 5 percent passing the No. 200 sieve) are classed in GP and SP groups. The materials may be called uniform gravels, uniform sands or non-uniform mixtures of very coarse material and very fine sands, with intermediate sizes lacking (sometimes called skip-graded, gap-graded or step-graded). This last group often results from borrow pit excavation in which gravel and sand layers are mixed.

GM and SM GROUPS. In general, the GM and SM groups comprise gravels or sands with fines (more than 12 percent passing the No. 200 sieve) having low or no plasticity. The plasticity index and liquid limit of soils in the group should plot below the "A" line on the plasticity chart. The gradation of the material is not considered significant and both well and poorly graded materials are included.

GC and SC GROUPS. In general, the GC and SC groups comprise gravelly or sandy soils with fines (more than 12 percent passing the No. 200 sieve), which have a fairly high plasticity. The liquid limit and plasticity index should plot above the "A" line on the plasticity chart.

FINE GRAINED SOILS

ML and MH GROUPS. In these groups, the symbol M has been used to designate predominantly silty material. The symbols L and H represent low and high liquid limits, respectively, and an arbitrary dividing line between the two is set at a liquid limit of 50. The soils in the ML and MH groups are sandy silts, clayey silts or inorganic silts with relatively low plasticity. Also included are loess type soils and rock flours.

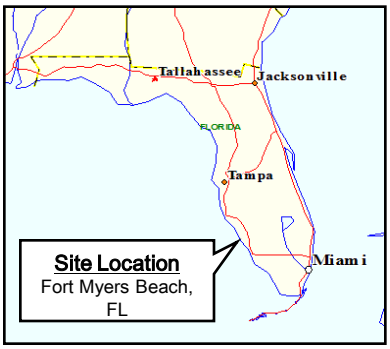
CL and CH GROUPS. In these groups the symbol C stands for clay, with L and H denoting low or high liquid limits, with the dividing line again set at a liquid limit of 50. The soils are primarily inorganic clays. Low plasticity clays are classified as CL and are usually lean clays, sandy clays or silty clays. The medium and high plasticity clays are classified as CH. These include the fat clays, gumbo clays and some volcanic clays.

OL and OH GROUPS. The soil in the OL and OH groups are characterized by the presence of organic odor or color, hence the symbol O. Organic silts and clays are classified in these groups. The materials have a plasticity range that corresponds with the ML and MH groups.

HIGHLY ORGANIC SOILS

The highly organic soils are usually very soft and compressible and have undesirable construction characteristics. Particles of leaves, grasses, branches, or other fibrous vegetable matter are common components of these soils. They are not subdivided and are classified into one group with the symbol PT. Peat humus and swamp soils with a highly organic texture are typical soils of the group.

Appendix F – Hydrologic Soils Map



Hydrologic Soils map

Estero Boulevard – Segment 5

Fort Myers Beach, Lee County, Florida

GFA International Project No.: 16-1668

*Map Not To Scale

Map Unit:

4 - Canaveral- Urban Land Complex
5 – Captiva Fine Sand
24 – Kesson Fine Sand
59 – Urban Land
69 – Matlacha Gravelly Fine Sand
99 - Water

Appendix G – Roadway Soil Survey

LEE COUNTY
DEPARTMENT OF PUBLIC WORKS
ESTERO BOULEVARD: SEGMENT 5

DATE OF SURVEY : December 21–22, 2017
SURVEY MADE BY : GFA INTERNATIONAL, INC.
SUBMITTED BY : PAUL J. D'HUYVETTER, P.E.

ROAD NAME : ESTERO BOULEVARD
CITY: FORT MYERS BEACH
COUNTY : LEE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS: STA. 1317+00 SURVEY ENDS: STA. 1356+00

	ORGANIC CONTENT			SIEVE ANALYSIS RESULTS % PASS						ATTERBERG LIMITS (%)					CORROSION SERIES TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC.	% MOISTURE CONTENT	NO. OF TESTS	4 MESH	10 MESH	40 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohms–cm	CHLORIDE ppm	SULFATES ppm	pH
1	–	–	–	4	93–99.0	88–99	58–96	14–28	0.3–2.9	–	–	–	A–3	Gray to Dark Gray, Brown, SAND (SP) with Traces of Shell Fragments	2*	2,483–3,943	60	0–13	8.22–8.56

*Corrosion Series Test ran on two (2) composite sample obtained from hand auger borings during GFA's field exploration program.

NOTES:

EMBANKMENT AND SUBGRADE MATERIAL
STRATA BOUNDARIES ARE APPROXIMATE

Ground water was encountered at depths of about 3.5 to 5 feet at boring locations at the time of our drilling.

The material from Stratum Number 1 appears satisfactory for use in the embankment when utilized in accordance with Index 505, except where organics were encountered.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER P.E. #59716

LEE COUNTY DEPARTMENT OF TRANSPORTATION

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	16-1668

ROADWAY SOIL SURVEY
ESTERO BOULEVARD: SEGMENT 5
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: CAC

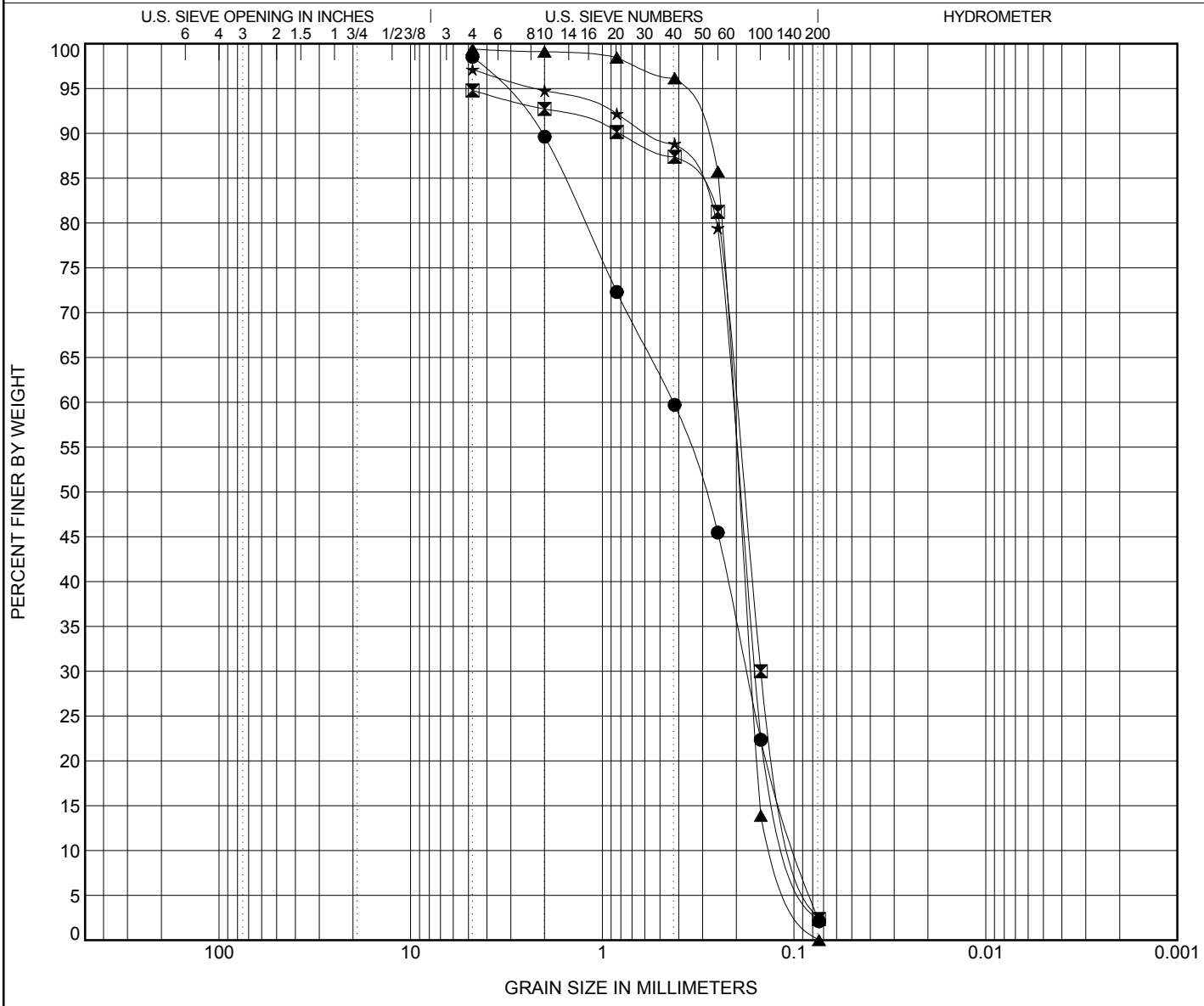
Appendix H – Gradation Test Results

GFA International, Inc
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 P
239-489-3438 F

GRAIN SIZE DISTRIBUTION

CLIENT David Douglas Associates, Inc. **PROJECT NAME** Estero Boulevard: Segment 5

PROJECT NUMBER 16-1668 **PROJECT LOCATION** Sta. 1317+00 to Sta. 1355+80



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	HA-1 (0-2.5')	0.0	Gray to Brown Poorly Graded Sand (SP) With Shell Fragments	NP	NP	NP	0.75	4.39
⊠	HA-4 (3-5')	3.0	Gray Poorly Graded Sand (SP) With Trace Shell Fragments	NP	NP	NP	1.23	2.25
▲	HA-6 (2.5-4')	2.5	Gray Poorly Graded Sand (SP)	NP	NP	NP	1.10	1.70
★	HA-7 (2-3.5')	2.0	Gray Poorly Graded Sand (SP) With Shell Fragments	NP	NP	NP	1.25	2.16

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	HA-1 (0-2.5')	0.0	4.76	0.427	0.177	0.097	0.0	96.0	2.5	
⊠	HA-4 (3-5')	3.0	4.76	0.202	0.149	0.09	0.0	91.9	2.9	
▲	HA-6 (2.5-4')	2.5	4.76	0.208	0.167	0.123	0.0	99.1	0.3	
★	HA-7 (2-3.5')	2.0	4.76	0.21	0.16	0.097	0.0	94.5	2.6	

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S001

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 5: Sta. 1323+00 - Northbound Shoulder - HA-1 (0 to 2.5 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Gray to Brown Sand with Trace Shell Fragments and Organics

Material Classification: SP

Total Sample Weight: 266.1 **Sample Weight After Wash:** 262.2

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	3.9	97%
No. 10	27.6	88%
No. 20	73.7	71%
No. 40	107.2	58%
No. 60	145.1	44%
No. 100	206.6	21%
No. 200	259.0	2.5%
PAN (WT RETAINED)	2.7	
TOTAL	261.7	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/17/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S002

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 5: Sta. 1338+00 - Southbound Shoulder - HA-4 (3 to 5 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Gray Sand with Trace Shell Fragments

Material Classification: SP

Total Sample Weight: 437.9 **Sample Weight After Wash:** 428

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	22.8	93%
No. 10	31.9	90%
No. 20	43.1	88%
No. 40	55.2	85%
No. 60	82.1	79%
No. 100	306.5	28%
No. 200	424.9	2.9%
PAN (WT RETAINED)	2.7	
TOTAL	427.6	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/17/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S003

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 5: Sta. 1349+50 - Southbound Shoulder - HA-6 (2.5 to 4 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Gray Sand

Material Classification: SP

Total Sample Weight: 518.1 **Sample Weight After Wash:** 517

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	3.1	99%
No. 10	4.6	99%
No. 20	8.0	98%
No. 40	19.9	96%
No. 60	73.9	86%
No. 100	446.2	14%
No. 200	516.3	0.3%
PAN (WT RETAINED)	0.7	
TOTAL	517.0	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/17/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S004

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 5: Sta. 1353+00 - Southbound Shoulder - HA-7 (2 to 3.5 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Gray Sand with Shell Fragments

Material Classification: SP

Total Sample Weight: 498 **Sample Weight After Wash:** 487.2

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	14.3	95%
No. 10	26.1	93%
No. 20	38.9	90%
No. 40	55.6	87%
No. 60	102.4	77%
No. 100	386.2	20%
No. 200	485.3	2.6%
PAN (WT RETAINED)	1.9	
TOTAL	487.2	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/17/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

Appendix I – Soil Corrosive Series Test Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

REPORT OF SOIL CORROSION SERIES

Project:	Estero Boulevard Remaining Segments	**Project ID:**	16-1668
Client Address:	1821 Victoria Avenue, Fort Myers, Florida	**Report ID:**	CS001
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	N/A
Material Location:	Segment 5: Composite Sample 1 - Hand Auger Borings HA-1 through HA-4 (0' - 5')		
Sampled By:	G. Watson	**Date Sampled:**	12/21/2017
Tested By:	R. Gibson	**Date Tested:**	1/12/2018
Material Description:	Composite Sample: Gray to Brown Sand with Trace Shell Fragments		
Material Classification:	SP		

	Lab Results
pH (FM 5-550):	8.22
Resistivity (FM 5-551):	2,483 ohm-cm
Chloride (FM 5-552):	30 ppm
Sulfate (FM 5-553):	213 ppm

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

1/26/2018
Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 Office ● (239) 489-3438 Fax

REPORT OF SOIL CORROSION SERIES

Project:	Estero Boulevard Remaining Segments	**Project ID:**	16-1668
Client Address:	1821 Victoria Avenue, Fort Myers, Florida	**Report ID:**	CS002
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	N/A
Material Location:	Segment 5: Composite Sample 2 - Hand Auger Borings HA-5 through HA-7		
Sampled By:	G. Watson	**Date Sampled:**	12/21/2017
Tested By:	R. Gibson	**Date Tested:**	1/12/2018
Material Description:	Composite Sample: Gray to Brown Sand with Trace Shell Fragments		
Material Classification:	SP		

	Lab Results
pH (FM 5-550):	8.56
Resistivity (FM 5-551):	3,943 ohm-cm
Chloride (FM 5-552):	60 ppm
Sulfate (FM 5-553):	Non-Detectable (ppm)

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

1/26/2018
Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

Appendix J – Asphalt Thickness by Core Determination

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

LIMEROCK/ASPHALT THICKNESS BY CORE DETERMINATION

Client: David Douglas Associates, Inc. Project #: 16-1668

Project: Estero Boulveard - Segment 5

Address: Estero Boulevard, Fort Myers Beach, Lee County, Florida

Results of Test

Core #	Location/ Offset From Center Line	Total Asphalt Core Thickness (in.)	Measured Asphalt Thickness (in.)		Visual Asphalt Type Classification
C-1	Sta. 1325+00 Northbound/ 5.0 Feet	11-5/8	Lift 1	1-1/2	S-I
			Lift 2	7/8	S-I
			Lift 3	1-5/8	S-I
			Lift 4	1-7/8	S-II
			Lift 5	2-3/8	S-II
			Lift 6	1-7/8	S-II
			Lift 7	1-1/2	S-I
C-2	Sta. 1335+10 Southbound/ 7.0 Feet	11	Lift 1	1	S-I
			Lift 2	1-1/2	S-I
			Lift 3	1-1/2	S-II
			Lift 4	1-1/2	S-II
			Lift 5	1-1/4	S-II
			Lift 6	3-1/8	S-II
			Lift 7	1-1/8	S-I
C-3	Sta. 1345+00 Northbound/ 5.0 Feet	9-7/8	Lift 1	1	S-I
			Lift 2	1	S-I
			Lift 3	1-1/4	S-II
			Lift 4	1	S-II
			Lift 5	3-1/2	S-II
			Lift 6	2-1/8	S-II
C-4	Sta. 1355+00 Southbound/ 6.5 feet	8	Lift 1	1	S-I
			Lift 2	1	S-I
			Lift 3	1-7/8	S-I
			Lift 4	1-1/8	S-II
			Lift 5	1	S-II
			Lift 6	2	S-II

The above test results were obtained in accordance with standard laboratory procedures.

5851 Country Lakes Drive ● Fort Myers, FL 33905 (239) 489-2443 ● (239) 489-3438 (fax)

ASPHALT/ BASE THICKNESS BY CORE DETERMINATION

Client: David Douglas Associates, Inc.
Project: Estero Boulevard Utility Improvements: Remaining Segments
Location: Segments 5
Tested By: JR Gibbs/ Kevin Mixon
Date Tested: 12/20/2017

Project #: 16-1668
Lab I.D.

Segment 5 - Results of Test

Core #	Location	Limerock Thickness Inches	Subbase Inches	Asphalt Thickness Inches
C-1	Sta. 1325+00: NB	12	N/A	11-5/8
C-2	Sta. 1335+00: SB	12	N/A	11
C-3	Sta. 1345+00: NB	6	N/A	9-7/8
C-4	Sta. 1355+00: SB	5	N/A	8

Appendix K – Asphalt Bulk Specific Gravity

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 office ● (239) 489-3438 fax

ASPHALT CORE DENSITIES

CLIENT: David Douglas Associates, Inc. PROJECT # 16-1668

PROJECT: Estero Boulevard - Segment 5 REPORT # 1

ADDRESS: Estero Boulevard CITY: Fort Myers Beach DATE: 1/26/2018

Core #	Location/ Offset from Center Line	(A) Weight In Air (grams)	(B) Weight SSD (grams)	(C) Weight In Water (grams)	(D) A/(B-C) Specific Gravity	(E) D x 62.4 Density (PCF)	Tested Thickness (inches)
C-1	Sta. 1325+00 (NB)/ 5.0 Feet	3760.0	3769.5	1991.0	2.11	131.9	4
C-2	Sta. 1335+10 (SB)/ 7.0 Feet	4423.2	4427.5	2399.5	2.18	136.1	4-1/2
C-3	Sta. 1345+00 (NB)/ 5.0 Feet	3661.6	3679.9	1922.5	2.08	130.0	3-7/8
C-4	Sta. 1355+00 (SB)/ 6.5 Feet	3593.3	3599.3	1918.9	2.14	133.4	3-13/16

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix L – Limerock Bearing Ratio (LBR) Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard Utility Improvements **Project ID:** 16-1668

Address: 1821 Victoria Avenue **Report ID:** LBR001

Client: David Douglas Associates, Inc. **Lab/MAC ID:** 17-1687

Material Location: Segment 5 : LBR001, Station 1328+00, East Shoulder

Sampled By: G. Watson **Date Sampled:** 12/21/2017

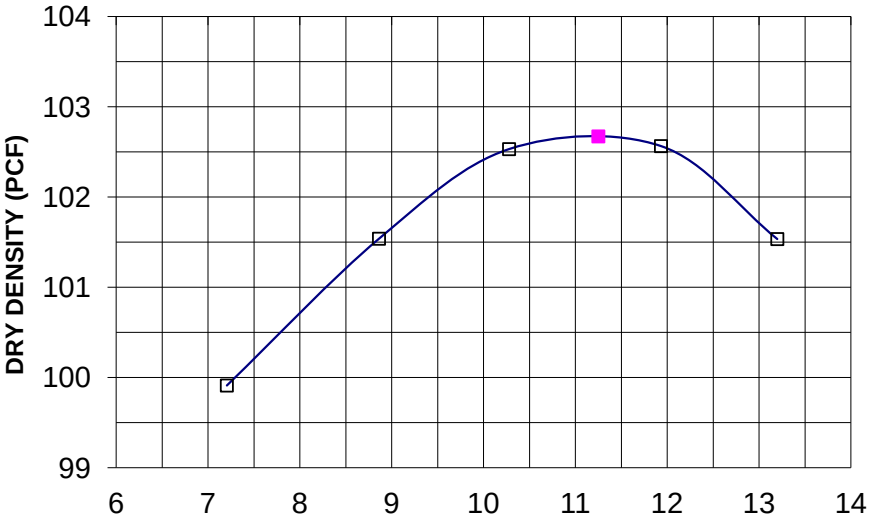
Tested By: J. McStravic/ R. Gibson **Date Tested:** 1/3/2018

Material Description: Existing, Gray Sand with Trace Organics

% Passing #4: 95% **Type of Rammer:** Mechanical

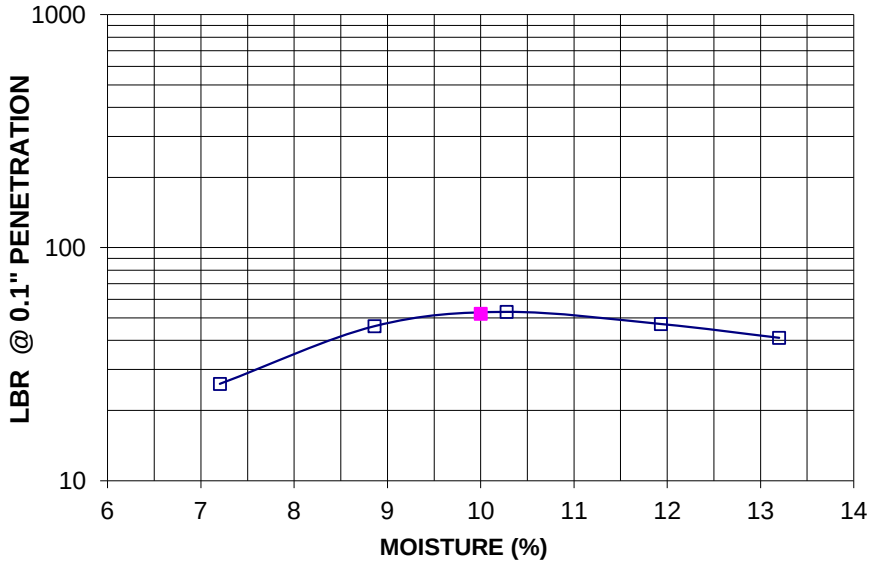
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
99.9	7.2
101.5	8.9
102.5	10.3
102.6	11.9
101.5	13.2

LBR
26
46
53
47
41



Maximum Dry Density (pcf)
102.7

Optimum Moisture (%)
11.3

Limerock Bearing Ratio
52

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

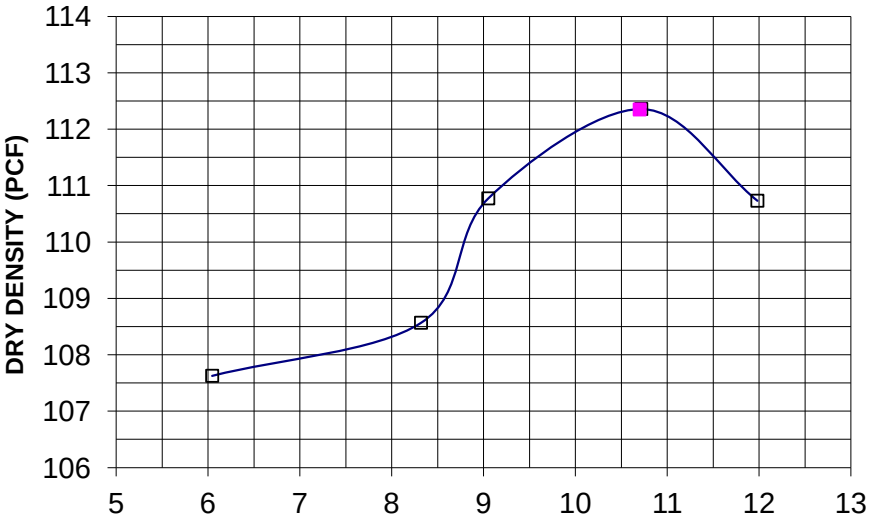
1/31/18

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

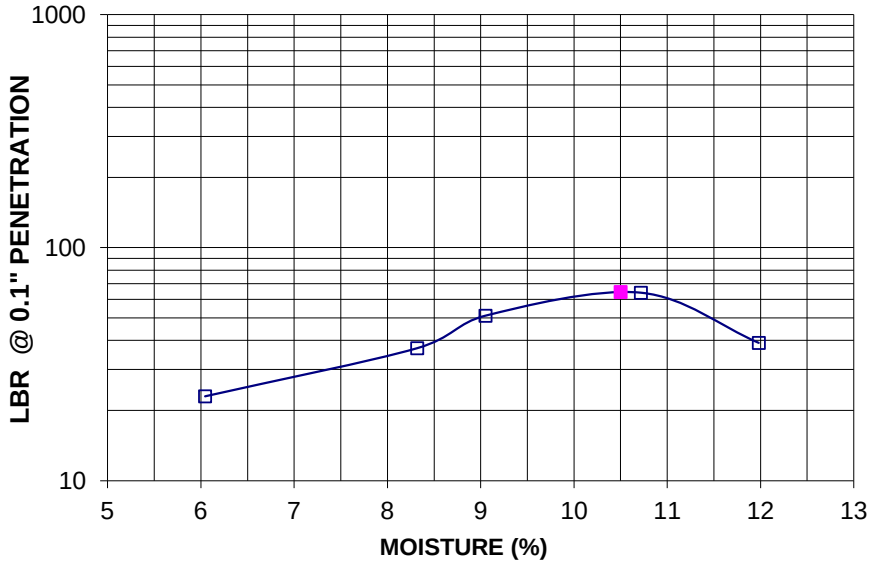
Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard Utility Improvements
Project ID: 16-1668
Address: 1821 Victoria Avenue
Report ID: LBR002
Client: David Douglas Associates, Inc.
Lab/MAC ID: 17-1688
Material Location: Segment 5 : LBR002, Station 1338+00, West Shoulder
Sampled By: G. Watson
Date Sampled: 12/21/2017
Tested By: J. McStravic/ R. Gibson
Date Tested: 1/3/2018
Material Description: Existing Shoulder, Gray Sand with Trace of Shell
% Passing #4: 97%
Type of Rammer: Mechanical
Rammer Face: Sector
Soak Time (hrs): 48
Surcharge (lbs): 15
Comments:



Dry Density (pcf)	Moisture (%)
107.6	6.0
108.6	8.3
110.8	9.1
112.4	10.7
110.7	12.0

LBR
23
37
51
64
39



Maximum Dry Density (pcf)
112.4

Optimum Moisture (%)
10.7

Limerock Bearing Ratio
65

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

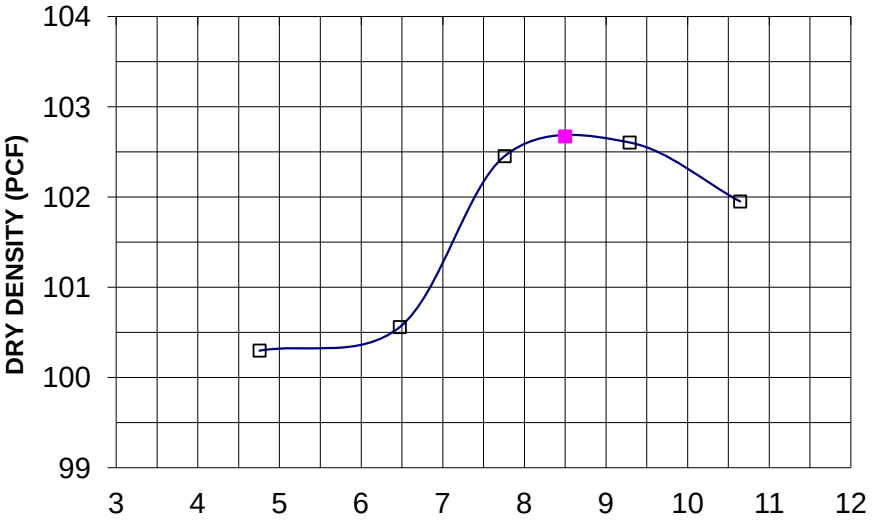
1/31/18
Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

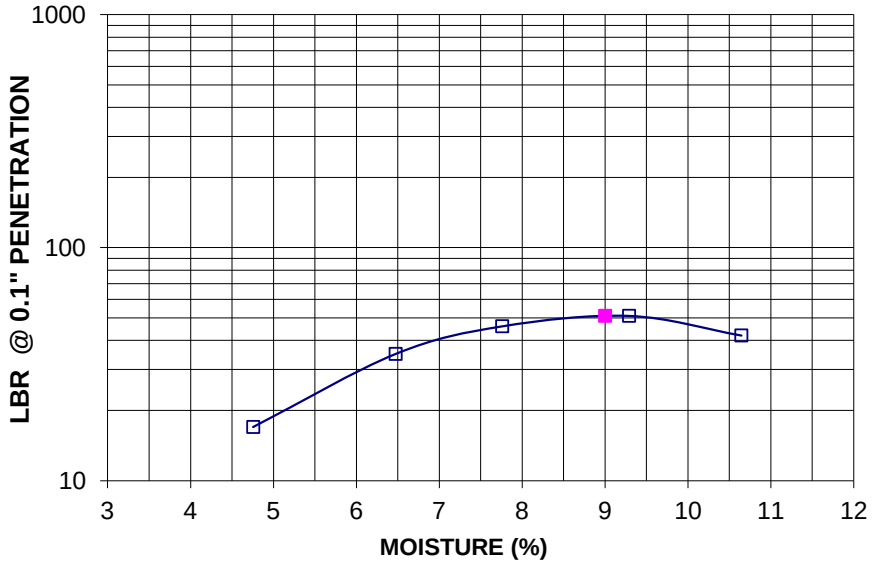
Limerock Bearing Ratio
Florida Method FM 5-515

Project:	Estero Boulevard Utility Improvements	**Project ID:**	16-1668
Address:	1821 Victoria Avenue	**Report ID:**	LBR003
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	17-1689
Material Location:	Segment 5 : LBR003, Station 1348+00, East Shoulder		
Sampled By:	G. Watson	**Date Sampled:**	12/21/2017
Tested By:	J. McStravic/ R. Gibson	**Date Tested:**	1/5/2018
Material Description:	Existing Shoulder, Gray Sand with Trace of Organics		
% Passing #4:	97%	**Type of Rammer:**	Mechanical
Rammer Face:	Sector	**Soak Time (hrs):** 48	**Surcharge (lbs):** 15
Comments:			



Dry Density (pcf)	Moisture (%)
100.3	4.8
100.6	6.5
102.5	7.8
102.6	9.3
101.9	10.6

LBR
17
35
46
51
42



Maximum Dry Density (pcf)
102.7

Optimum Moisture (%)
8.5

Limerock Bearing Ratio
51

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

1/31/18

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

Appendix M – Asphalt Core Photographs

ASPHALT CORE C-1

ASPHALT CORE C-2

ASPHALT CORE C-3

ASPHALT CORE C-4

GFA INTERNATIONAL

FLORIDA'S LEADING ENGINEERING SOURCE

Report of Geotechnical Exploration

Estero Boulevard – Segment 6
Fort Myers Beach, Lee County, Florida

January 29, 2018
GFA Project No.: 16-1668

For: David Douglas Associates, Inc.

January 29, 2018

Mr. Dan Craig P.E.
David Douglas Associates, Inc.
1821 Victoria Ave.
Fort Myers, FL 33901
Phone: (239) 337-3330
Email: DC@DDAI-Engineers.com

Site: **Geotechnical Engineering Services Report**
Estero Boulevard – Segment 6
Fort Myers Beach, Lee County, Florida
GFA Project # 16-1668

Dear Mr. Craig:

GFA International, Inc. (GFA) has completed the subsurface exploration and geotechnical engineering evaluation for the above-referenced project in accordance with the geotechnical and engineering service agreement for this project. The scope of services was completed in accordance with our Geotechnical Engineering Proposal (16-1668.00), planned in conjunction with and authorized by you.

EXECUTIVE SUMMARY

The purpose of our subsurface exploration was to classify the nature of the subsurface soils and general geomorphic conditions and evaluate their impact upon the proposed construction. This report contains the results of our subsurface exploration at the site and our engineering interpretations of these, with respect to the project characteristics described to us including providing recommendations for site preparation and the design of the foundation system.

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 5,500 feet of Estero Blvd (Sta. 1356+00: Bay Beach Lane to Sta. 1413+76.38: Big Carlos Pass). Documents provided to GFA at the time of this report were Plan and Profile Plans completed by T.Y. Lin International, Sheet No. 53 through Sheet No. 63, dated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

The following was completed for this study:

- Eleven (11) Hand Auger (HA) borings to depths of approximately 5 feet below ground surface (BGS).
- Three (3) Field Percolation Test borings to depths of approximately 5 feet BGS.
- Six (6) Asphalt Cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

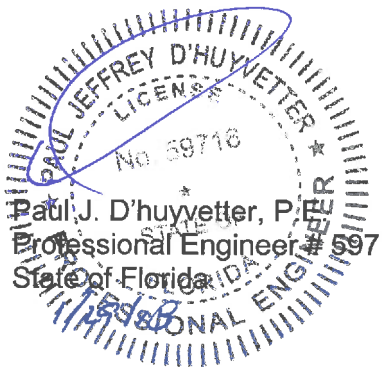
The subsurface soil conditions encountered at this site generally consists of sand (SP;A-3) with shell fragments to the boring termination depths. Please refer to "Appendix D – Record of Hand Auger Boring Logs" for a detailed account of each boring.

The following report presents the project information made available to us, our observation of the existing site conditions, the subsurface geotechnical information obtained during this exploration, and our recommendations on the suitability of the soils encountered for the force main replacement. Also included with this report are the results of our field and laboratory testing. The assessment of site environmental conditions for the presence of pollutants in the soil, rock, and groundwater at this site was not included as a part of our services.

We appreciate the opportunity to be of service to you on this project and look forward to a continued association. Please do not hesitate to contact us if you have any questions or comments, or if we may further assist you as your plans proceed.

Respectfully Submitted,
GFA International, Inc.
Florida Certificate of Authorization Number 4930

Chad A. Cook
Project Professional



Paul J. D'huyvetter, P.E.
Professional Engineer # 59716
State of Florida

Copies: 2, Addressee
1, CD-R

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Scope of Services

The objective of our geotechnical services was to collect subsurface data for the subject project, summarize the test results, and discuss any apparent site conditions that may have geotechnical significance for force main replacement. The following scope of service is provided within this report:

1. Prepare records of the soil boring logs depicting the subsurface soil conditions encountered during our field exploration.

2. Conduct a review of each soil sample obtained during our field exploration for classification and additional testing if necessary.

3. Analyze the existing soil conditions found during our exploration for the suitability of the soils encountered for the force main replacement.

4. Provide recommendations with respect to backfill material for the force main replacement.

5. Provide criteria and site preparation procedures to prepare the site for the proposed construction.

1.2 Project Description

It is our understanding the project will consist of a construction of a new roadway, drainage installation including underground exfiltration trench, and installation of a new force main or mains along +/- 5,500 feet of Estero Blvd (Sta. 1356+00: Bay Beach Lane to Sta. 1413+76.38: Big Carlos Pass). Documents provided to GFA at the time of this report were Plan and Profile Plans completed by T.Y. Lin International, Sheet No. 53 through Sheet No. 63, dated April 9, 2014. The recommendations provided herein are based upon the above considerations. If the project description has been revised, please inform GFA International so that we may review our recommendations with respect to any modifications.

2.0 OBSERVATIONS

2.1 Site Inspection

A site reconnaissance was conducted by members of our engineering staff prior to mobilization of drilling equipment and crews. The purpose of the site visit was to observe the existing site conditions in order to detect any factors that may impact our studies and recommendations.

Generally, the proposed construction site is level. No standing water on the surface was observed during the time of our drilling. The tested site consists of an urban area and is landscaped.

2.2 Geology

The surficial geologic map of Lee County, Florida consists of a quartz sand blanket that overlies the Tertiary Tamiami Formation (T_t), Tertiary-Quaternary Shell Units (Q_{su}) and Quaternary (Holocene) Costal and Estuarine Sediments (Q_h).The quartz sand blanket is generally less than 20 feet thick deposit, fine to medium grained, well sorted, with no fossils.

The oldest formation is the Tertiary Tamiami Formation (T_t). The Tamiami Formation consists of a mixture of variably sandy limestone, sands and clays containing varying percentage of phosphate grains. Fossils including mollusks, echinoids and corals are abundant. Fossil preservation varies from well preserved to molds and casts.

Overlaying the Tamiami Formation throughout much of the county are sediments indicated as Tertiary-Quaternary Shell Units (Q_{su}). These units consist of sands with subordinate limestone and clay. Fossils, including mollusks and corals, are common and well preserved.

Along the coast, Quaternary (Holocene) Costal and Estuarine Sediments (Q_h) are founded below an altitude of approximately 5 feet. These sediments consist of quartz sand with a variable organics component. The Holocene sediments include the beach ridge and dune sands.

2.3 Field Exploration

The following was completed for this study:

- Eleven (11) Hand Auger (HA) borings to depths of approximately 5 feet below ground surface (BGS).
- Three (3) Field Percolation Test borings to depths of approximately 5 feet BGS.
- Six (6) Asphalt Cores with base and subbase thicknesses spaced at approximately 1,000-foot centers.

The locations of the borings performed are illustrated in “Appendix B: Test Location Plan". The Standard Penetration Test (SPT) boring method was used as the investigative tool within the borings. SPT tests were performed in substantial accordance with ASTM Procedure D-1586, “Penetration Test and Split-Barrel Sampling of Soils”. This test procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches. The number of blows per foot, for the second and third 6-inch increment, is an indication of soil strength.

The soil samples recovered from the soil borings were visually classified and their stratification is illustrated in “Appendix D: Record of Hand Auger Boring Logs". It should be noted that soil conditions might vary between the strata interfaces, which are shown. The soil boring data reflect information from a specific test location only. Site specific survey staking for the test locations was not provided for our field exploration. The indicated depth and location of each test was approximated based upon existing grade and estimated distances and relationships to obvious landmarks. The boring depths were selected based on our knowledge of vicinity soils and to include the zone of soil likely to be stressed by the proposed construction.

2.4 Laboratory Analysis

Soil samples recovered from our field exploration were returned to our laboratory where they were visually examined in general accordance with ASTM D-2488. Samples were evaluated to obtain an accurate understanding of the soil properties and site geomorphic conditions. After a thorough visual examination of the recovered site soils, laboratory testing was conducted to determine particle size distribution (D-422) on individual samples and soil corrosiveness on a composite sample obtained from depths ranging from 0 to 5 feet BGS.

Composite bulk specific gravity tests were run on the four asphalt cores obtained during field exploration using the saturated surface-dry procedure (AASHTO T-166). Limerock Bearing Ratio (LBR) tests were run on material obtained within approximately 5 feet of the edge of pavement using the Florida Method FM 5-515.

All laboratory tests were conducted in general accordance with ASTM, AASHTO, or Florida Methods, as applicable. The test method method number for each test and the number of tests completed are presented in the following table.

TEST DESCRIPTION	NUMBER OF TESTS	ASTM TEST METHOD
Soil Classification	42	D-2488
Gradation Analysis	6	C-136
Soil Corrosiveness (pH, Resistivity, Chloride, Sulfate)	2	FM 5-550, FM 5-551, FM 5-552, and FM 5-553
Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens	6	AASHTO T-166
Limerock Bearing Ratio (LBR)	6	FM 5-515

Bag samples of the soil encountered during our field exploration will be held in our laboratory for your inspection for 90 days and then discarded unless we are notified otherwise in writing.

2.4.1 Gradation Tests

A total of six (6) gradation tests were performed on samples obtained during the field exploration program. Material passing the No. 200 sieve is considered “fines” and will be either silt or clay. The percent passing the No. 200 sieve, for the tested samples, ranged from 0.3 to 4.7 percent, this resulted in the sampled material to be considered poorly graded. A summary of the grain size distribution curve is presented in “Appendix H: Gradation Test Results”.

2.4.2 Soil Corrosiveness

This test method covers the laboratory determination for the minimum resistivity of a soil. The principal use of this test method is to determine a soil's corrosivity and thereby identify the conditions under which the corrosion of metals in soil may be sharply accentuated. Soil corrosiveness testing was completed on two (2) composite sample ranging from 0 – 5 feet BGS.

The soil samples obtained were considered non-marine structures and classified under the criteria for substructure environmental classifications. Composite Sample 1 is considered slightly aggressive for steel and moderately aggressive for concrete. Conversely, Composite Sample 2 is deemed to be slightly aggressive for both steel and concrete. The laboratory results for soil corrosiveness can be found in "Appendix I: Soil Corrosive Series Test Results".

For design purposes we recommend using a classification of "Moderately Aggressive" for this project.

2.5 Geomorphic Conditions

Boring logs derived from our field exploration are presented in "Appendix D: Record of Hand Auger Boring Logs". The boring logs depict the observed soils in graphic detail. The Standard Penetration Test borings indicate the penetration resistance, or N-values, logged during the drilling and sampling activities. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples. All soil samples reviewed have been depicted and classified in general accordance with the Unified Soil Classification System, modified as necessary to describe typical southwest Florida conditions. See "Appendix E: Discussion of Soil Groups", for a detailed description of various soil groups.

The subsurface soil conditions encountered at this site generally consists of sand (SP) with shell fragments and traces of organics to the boring termination depths. Please refer to "Appendix D – Record of Hand Auger Boring Logs" for a detailed account of each boring.

2.6 Hydrogeological Conditions

During our field exploration program from December 26, 2017 to December 27, 2017, the groundwater table was encountered in our HA borings at depths of approximately 3.5 to 5 feet below the existing ground surface. The groundwater table will fluctuate depending upon tidal events.

Located in "Appendix F: Hydrologic Soils Map" is the following descriptive characteristic of the one (1) type of soil survey encountered during the drilling operations based on the soil survey of Lee County, Florida, published by the United States Department of Agriculture:

Canaveral-Urban Land Complex (4)

About 50 to 70 percent of each area of the complex consists of nearly level Canaveral soils or areas of Canaveral soils that have been reworked or reshaped, but which still are recognizable as Canaveral soils. Typically, Canaveral soils have a surface layer of light and dark gray fine sand that is mixed with shell fragments. Beneath the surface layer, to a depth of 80 inches or more, are layers of light brownish gray and light gray fine sand mixed with shell fragments.

About 20 to 30 percent of each area is urban land. This land is used for houses, streets, driveways, buildings, parking lots, and other related uses.

In undrained areas, the water table is at a depth of 18 to 40 inches for a period of 2 to 6 months in most years. Drainage systems have been established in most areas, however, and the depth to the water table is dependent on the drainage system.

2.6.1 Ex-filtration Testing

GFA International performed three field percolation (PERC) tests spaced at approximately 1,150-foot centers. The percolation testing was performed in accordance with the SFWMD Constant-Head Open-Hole Test Method. The results are presented below.

PERC Test – 1 (Sta. 1371+50)	
Depth (ft)	**Soil Description**
0 – 3	Gray Sand (A-3; SP)
3 – 5	Gray Sand (A-3; SP), Shell
Water table: 4.33 feet below grade.*	
Saturated K = 24.9 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 2 (Sta. 1391+00)	
Depth (ft)	**Soil Description**
0 – 1.5	Gray Sand (A-3; SP)
1.5 – 5	Light Gray Sand (A-3; SP), Shell
Water table: 4.0 feet below grade.*	
Saturated K = 29.1 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

PERC Test – 3 (Sta. 1406+00)	
Depth (ft)	**Soil Description**
0 – 1.5	Gray Sand (A-3; SP)
1.5 – 5	Gray Sand (A-3; SP), with Silty Sand
Water table: 3.0 feet below grade.*	
Saturated K = 7.5 Ft.^{3}/Day/ Ft.^{2} – Ft. of Head	

*Water Table is Tidally Influenced.

The location of the exfiltration test completed is illustrated in "Appendix B: Test Location Plan".

3.0 ENGINEERING EVALUATION AND RECOMMENDATIONS

3.1 General

The geotechnical evaluations for the proposed construction site are based on the subsurface soil and groundwater conditions encountered during this study, the project information made available, our site observations, and our experience in the vicinity. The test data has been evaluated using established geotechnical parameters of the soils recorded at this site, laboratory test results, and the observed performance of similar soil types.

Based on the soil conditions encountered in the performed borings, the near surface soils do not meet the below mentioned Lee County Technical Specifications for drainage fill or select fill. The near surface soils do meet the below mentioned Lee County Technical Specifications for common fill. The water main replacement may be designed according to the recommendations and site preparations as discussed below with a fill material meeting the specifications.

3.2 Pipe Bedding and Initial Backfill (Force Main)

According to the Lee County Technical Specifications, Section 2223, Backfilling, a select fill material shall be used for pipe bedding and initial backfill from top of bedding to 1 foot over the top of pipes. The select fill shall be compacted to not less than 98 percent of the maximum dry density as determined by ASTM D-1557.

Pipe bedding containing very fine sand, uniformly graded sands and gravel, silt, soft earth, or other material that have a tendency to flow under pressure when wet is unacceptable.

Based on the laboratory test results the majority of the near surface soils consist of poorly graded clean sands to slightly silty sands. Material from on-site excavation does not meet the gradation specification for select fill and cannot be used for pipe bedding and initial backfill.

3.3 Pipe Bedding and Initial Backfill (Drainage System)

Pipe bedding and initial backfill shall be in accordance with Florida Department of Transportation (FDOT) for Road and Bridge Construction – Sections 120 & 125 (January 2017).

3.4 Trench Excavation

Where trench excavations are required, trenches shall be sufficiently wide and deep to allow proper installation of pipes. We recommend about 12 inches clear of the pipe on either side at any point. Boulders, rocks or other hard unyielding material shall be excavated to a depth of 12 inches below the bottom of the pipe elevation.

Due to the depth of excavations and the depth of the water table, we anticipate excavation will require shoring or a trench box. Trenching should be in general accordance with any Lee County trenching requirements and the Occupational Safety and Health Administration (OSHA) requirements, as applicable.

3.5 Trench Backfill

Trench backfill material shall be clean earth fill composed of sand, clay and sand, sand and stone, crushed stones or other soils approved by a professional engineer. The trench backfilling shall be accomplished from the top of the initial backfill to the ground surface. The backfill, unless otherwise specified, shall be compacted to 98% of maximum density, as determined by ASTM D-1557.

When trenches are cut in pavements or areas to be paved, compaction shall be in accordance with FDOT for Road and Bridge Construction (January 2017).

Based on the soil profiles, presented in “Appendix B: Boring Locations and Soil Profiles”, the material from on-site excavation that will contain sands and silt or gravel size limestone fragments may be used for the trench backfill. Organic soils, if encountered during construction, are not suitable and should not be used as a trench backfill material.

4.0 DEWATERING OF EXCAVATIONS

The high groundwater tables in the vicinity of excavations shall be reduced to prevent water inflow into excavations. Dewatering will be required for the excavation of trenches during construction. Each excavation shall be kept dry during subgrade preparation and continually thereafter until installation of the pipe or wet well structures. The dewatering will be required to maintain groundwater elevation at least 24 inches below the bottom at all times to prevent bottom disturbance or failure.

5.0 SITE PREPARATION PROCEDURES

Site preparation procedures should begin with the removal of existing debris, vegetation, or other unsuitable materials within and beyond the excavation construction.

The organic soils, if encountered during construction, shall be removed and replaced to a required level (the future project specification) with a compacted suitable fill. The suitable fill material shall contain less than 10 percent of fines passing the No. 200 sieve, not contain clay balls and rock fragments greater than 3 inches in diameter.

An adequate dewatering system shall be installed to maintain the water table 2 feet or more below the maximum depth of excavation. The continuous dewatering should be provided until the pipeline is completed and backfill is above the water table before beginning of the dewatering. When a professional engineer approves the discontinuing of the dewatering, the rate of pumping shall slowly decrease, allowing the water level to rise slowly.

The soils that extend below the water table should be allowed to dry prior to placement as a backfill material and compaction. This can be accomplished by stockpiling the material and allowing it to drain, or by spreading it in relatively thin lifts on the surface and allowing it to dry prior to compaction. The silty or sands with clay may require moisture conditioning so that the soil moisture content at the time of compaction is at or near the optimum moisture content.

Trench bottoms should be compacted with a small roller or vibratory plate compactor prior to pipe placement. Any loose or soft yielding areas detected during compaction of the trench bottoms should either be further compacted to at least 95% of maximum dry density or removed and replaced with a select fill and compacted to 95% of maximum dry density. Bedding stone may be used in lieu of select fill.

During the compaction operation, a geotechnical engineer or an engineering technician working under his direction should observe the soils to verify that the exposed soils are suitable and that unsuitable soils have been removed. Samples of the backfill materials should be obtained to determine the grain size distribution, its maximum dry density and optimum moisture content in the laboratory in accordance with ASTM D-1557 (Modified Proctor Test).

6.0 ASPHALT EVALUATION

6.1 Asphalt Thickness

Six (6) asphalt cores were taken at alternating lanes (southbound or northbound) along Estero Boulevard in Fort Myers Beach starting just north of Bay Beach Lane (Sta. 1356+00) and finishing just north of Big Carlos Pass (1413+76.38). The location of each individual asphalt core can be found in "Appendix B: Test Location Plan".

GFA International encountered an average asphalt thickness of 9-1/16 inches with a range of four (4) to seven (7) lifts per asphalt core. A stratum was initiated from top of existing asphalt (Lift 1) down to the bottom of asphalt (ex.: Lift 7). A summary of the test results are shown in "Appendix J: Asphalt Thickness by Core Determination". Refer to "Appendix M: Asphalt Core Photographs" for a visual record of each asphalt core.

Beneath the asphalt, a layer of cemented shell base was encountered. This material consists of sand and shell fragments with an average thickness of 26-2/3 inches.

6.2 Limerock Bearing Ratio (LBR) Testing

A total of six (6) samples were obtained within approximately 5 feet of the edge of pavement to conduct Limerock Bearing Ratio (LBR) tests on the existing subgrade soils, using the Florida Method FM 5-515. Based on the laboratory test results, we recommend a structural coefficient for Type B Stabilized subbase, LBR 40 material (0.08). For complete test results, refer to "Appendix L – Limerock Bearing Ratio (LBR) Results". It is our understanding that the existing base material will be removed during utility construction. As such, no LBR samples were collected from the base material.

6.3 Asphalt Bulk Specific Gravity Testing

A total of six (6) asphalt core samples were tested using American Association of State Highway and Transportation (AASHTO) T-166 "Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens". The top 4-inches of asphalt were tested as a composite sample per each asphalt core. The asphalt density ranged from 132.3 to 133.8 pounds per cubic foot (PCF) which averaged in 133.1 PCF.

For complete test results, refer to "Appendix K – Asphalt Bulk Specific Gravity".

7.0 REPORT LIMITATIONS

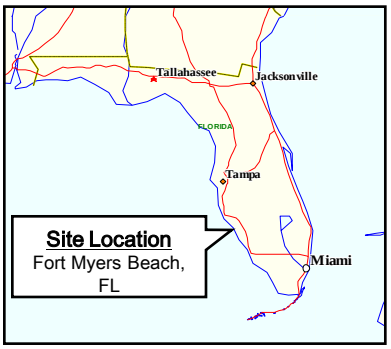
This consulting report has been prepared for the exclusive use of the current project owners and other members of the design team for the Estero Boulevard – Segment 6 located on Estero Boulevard in Fort Myers Beach, Lee County, Florida. This report has been prepared in accordance with generally accepted local geotechnical engineering practices; no other warranty is expressed or implied. The evaluation submitted in this report, is based in part upon the data collected during a field exploration, however, the nature and extent of variations throughout the subsurface profile may not become evident until the time of construction. If variations then appear evident, it may be necessary to reevaluate information and professional opinions as provided in this report. In the event changes are made in the nature, design, or locations of the proposed structure, the evaluation and opinions contained in this report shall not be considered valid, unless the changes are reviewed and conclusions modified or verified in writing by GFA International. GFA is not responsible for damage caused by soil improvement and/or construction activity vibrations related to this project. GFA is also not responsible for damage concerning drainage or moisture related issues for the proposed or nearby structures.

8.0 BASIS FOR RECOMMENDATIONS

The analysis and recommendations submitted in this report are based on the data obtained from the tests performed at the locations indicated on the attached figure in “Appendix B: Test Location Plan”. This report does not reflect any variations, which may occur between borings. While the borings are representative of the subsurface conditions at their respective locations and for their vertical reaches, local variations characteristic of the subsurface soils of the region are anticipated and may be encountered. The delineation between soil types shown on the soil logs is approximate and the description represents our interpretation of the subsurface conditions at the designated boring locations on the particular date drilled.

Any third party reliance of our geotechnical report or parts thereof is strictly prohibited without the expressed written consent of GFA International. The methodology (ASTM D-1586) used in performing our borings and for determining penetration resistance is specific to the sampling tools utilized and does not reflect the ease or difficulty to advance other tools or materials.

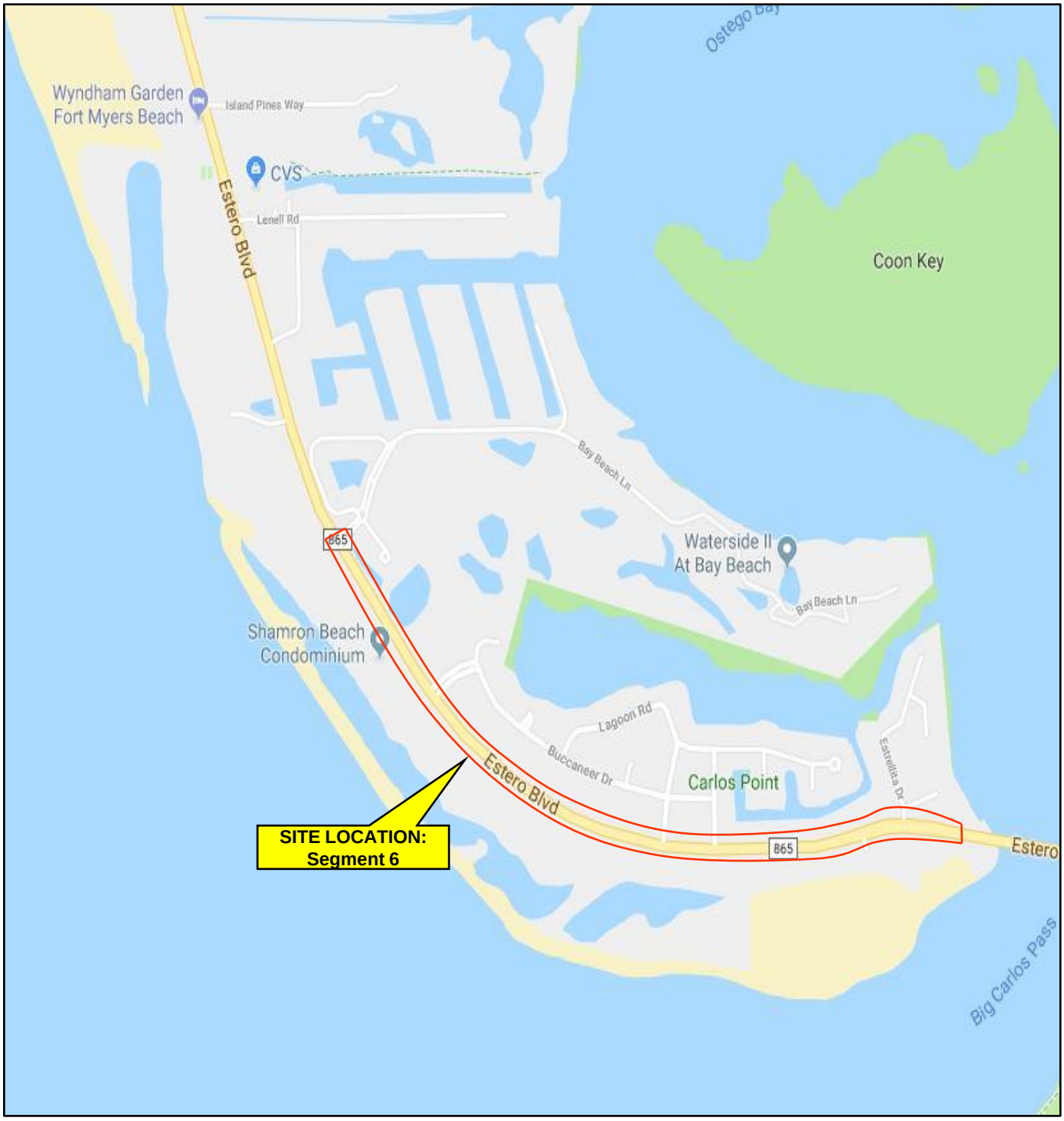
Appendix A - Vicinity Map



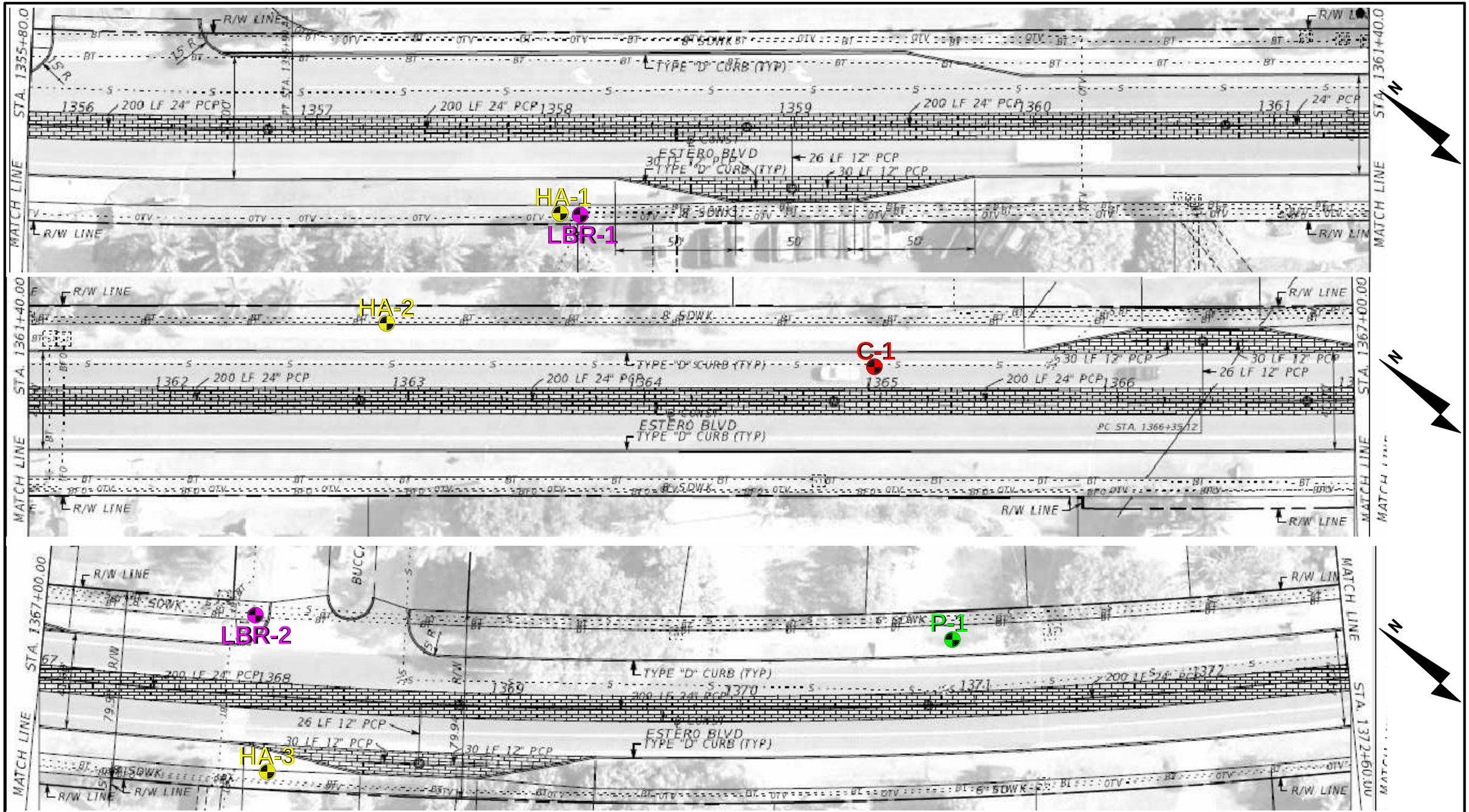
VICINITY MAP

Estero Boulevard – Segment 6

Fort Myers Beach, Lee County, Florida
GFA International Project No.: 16-1668



Appendix B – Test Location Plan



NOTES:
- HAND AUGER LOCATION
- PERCOLATION TEST LOCATION
- ASPHALT CORE LOCATION
- LBR TEST LOCATION

BASE DRAWING PROVIDED BY CLIENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER, P.E. #59716

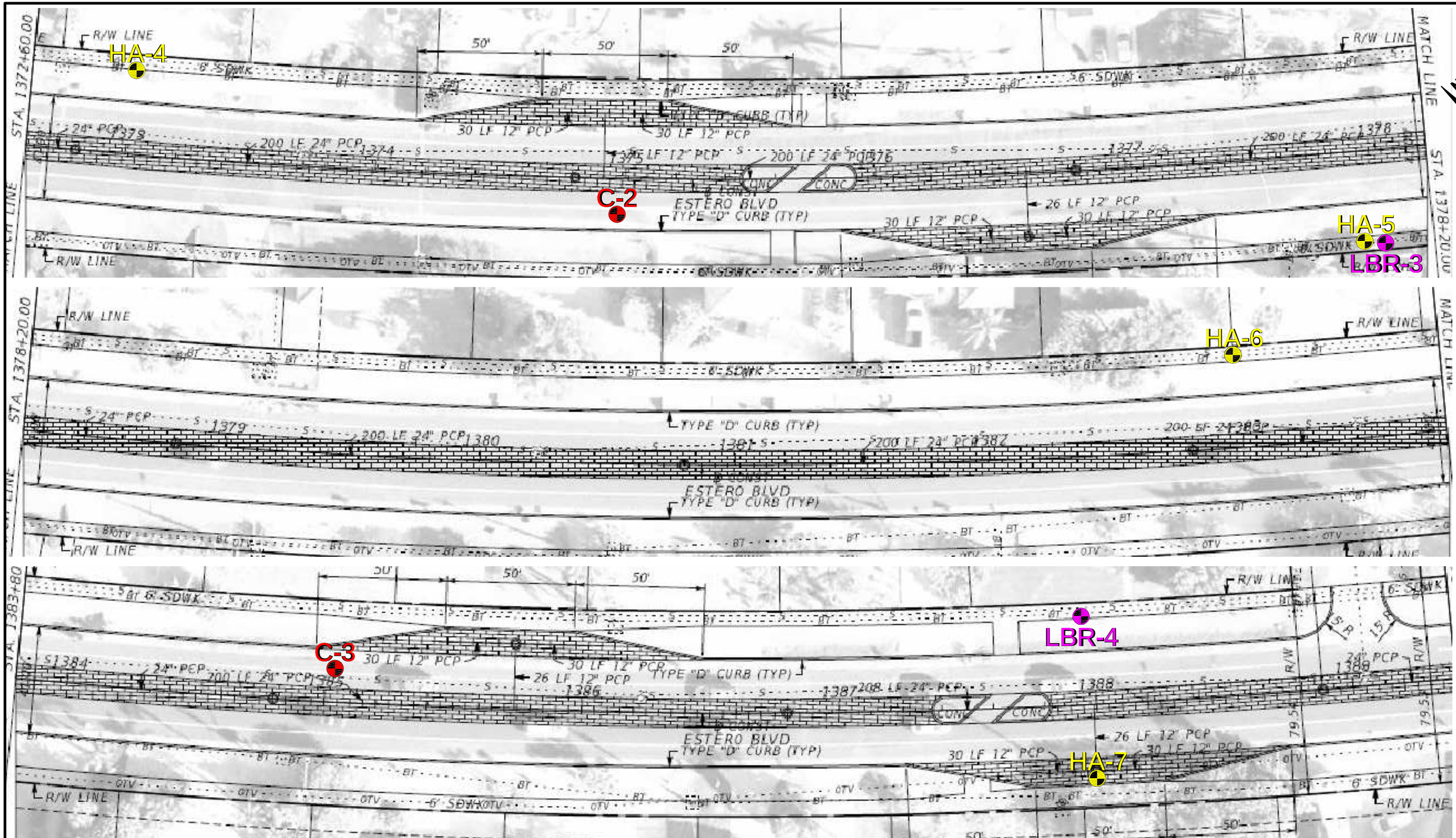
LEE COUNTY DEPARTMENT OF PUBLIC WORKS

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	16-1668

TEST LOCATION PLAN

ESTERO BLVD. UTILITY IMPROVEMENTS
SEGMENT 6 - Bay Beach Ln.to Big Carlos Pass
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: CAC



NOTES:
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- ASPHALT CORE LOCATION
- PERCOLATION TEST LOCATION
- LBR TEST LOCATION

BASE DRAWING PROVIDED BY CLIENT

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DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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TEST LOCATION PLAN

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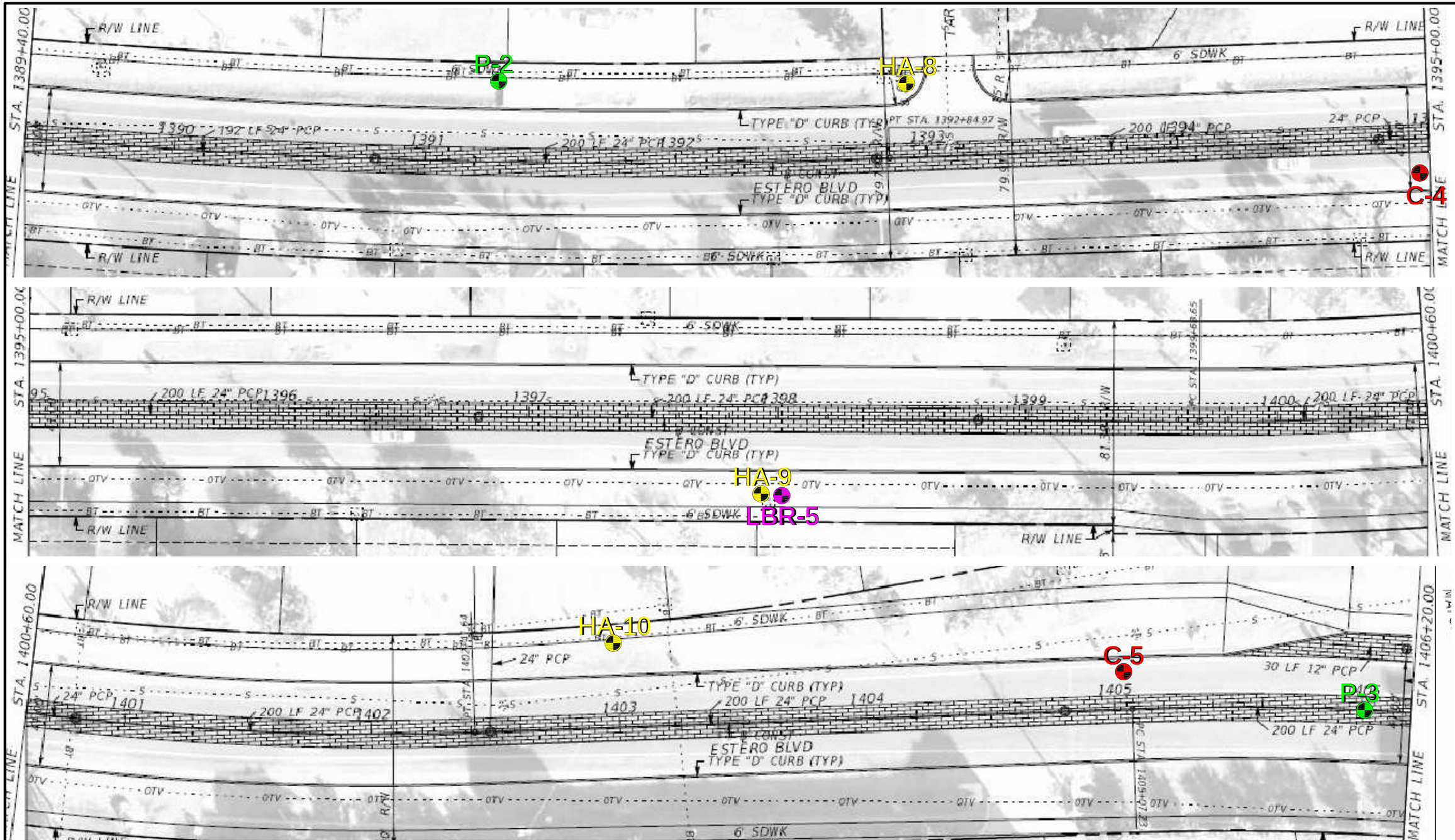
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: CAC



NOTES: HAND AUGER LOCATION; ASPHALT CORE LOCATION; PERCOLATION TEST LOCATION; LBR TEST LOCATION

BASE DRAWING PROVIDED BY CLIENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

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TEST LOCATION PLAN

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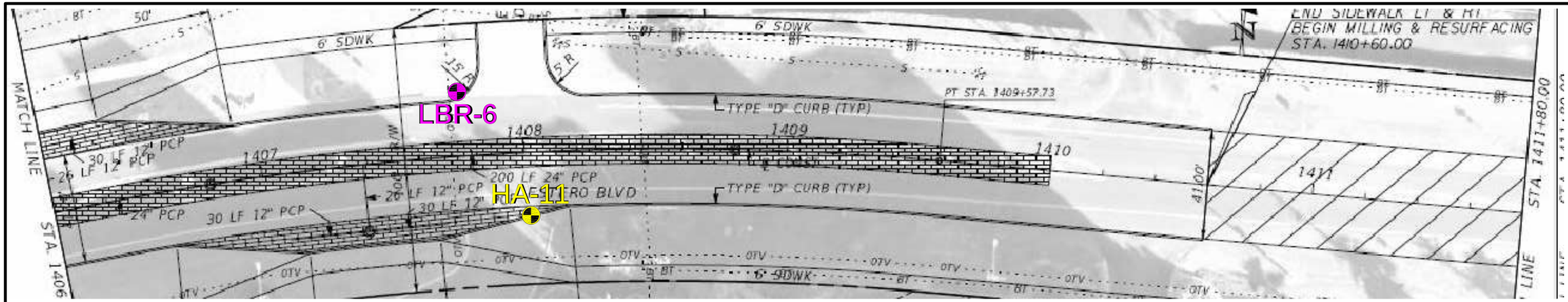

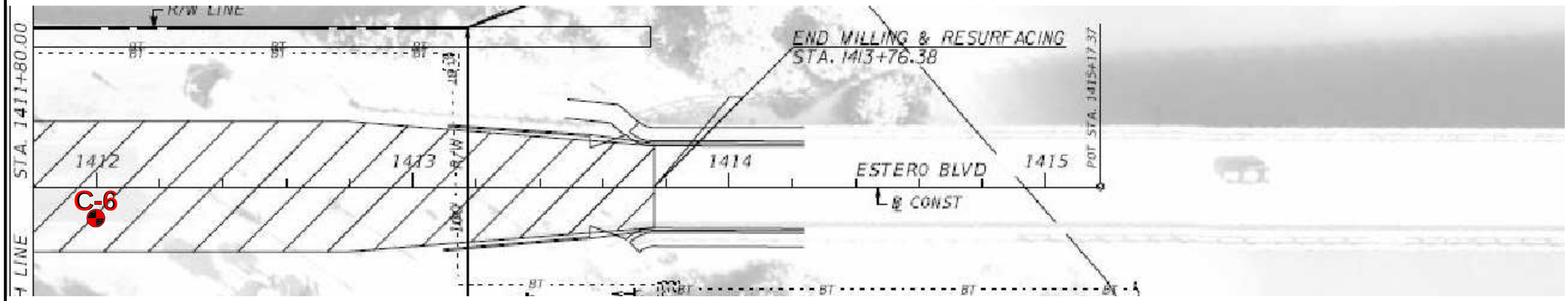

NOTES:
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- PERCOLATION TEST LOCATION
- ASPHALT CORE LOCATION
- LBR TEST LOCATION

BASE DRAWING PROVIDED BY CLIENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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TEST LOCATION PLAN

ESTERO BLVD. UTILITY IMPROVEMENTS
SEGMENT 6 - Bay Beach Ln.to Big Carlos Pass
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: CAC

Appendix C - Notes Related to Borings

NOTES RELATED TO
RECORDS OF TEST BORING AND
GENERALIZED SUBSURFACE PROFILE

1. Groundwater level was encountered and recorded (if shown) following the completion of the soil test boring on the date indicated. Fluctuations in groundwater levels are common; consult report text for a discussion.

2. The boring location was identified and located in the field based on measured and estimated distances from existing site features.

3. The borehole was backfilled to site grade following boring completion, patched with asphalt cold patch mix when pavement was encountered.

4. The Record of Test Boring represents our interpretation of field conditions based on engineering examination of the soil samples.

5. The Record of Test Boring is subject to the limitations, conclusions, and recommendations presented in the report text.

6. The Standard Penetration Test (SPT) was performed in accordance ASTM Procedure D-1586. SPT testing procedure consists of driving a 1.4-inch I.D. split-tube sampler into the soil profile using a 140-pound hammer falling 30 inches.

7. On the Record of Test Boring listed as "Blow Counts", the N-value is the sum of the SPT hammer blows required to drive the split-tube sampler through the second and third 6-inch increment of the sampling layer, and is an indication of soil strength.

8. Shown on the Record of Test Boring an SPT N-value expressed as 50/2" is descriptive of the fact that 50 hammer blows were required to drive the split-spoon sampler a distance of approximately 2 inches.

9. The soil/rock strata interfaces shown on the Records of Test Boring are approximate and may vary from those in the field. The soil/rock conditions shown on the Records of Test Boring refer to conditions at the specific location tested; soil/rock conditions may vary between test locations.

10. Relative density and consistency for sands/gravels, silts/clays, and limestone are described as follows:

Cohesionless Soils	
SPT (N-Value)	Relative Density
0 – 3	Very Loose
4 – 8	Loose
9 – 24	Medium Dense
25 – 40	Dense
Over 40	Very Dense

Silts and Clays	
SPT (N-Value)	Consistency
0 – 1	Very Soft
2 – 4	Soft
4 – 6	Firm
7 – 12	Stiff
13 – 24	Very Stiff
Over 24	Hard

Limestone	
SPT (N-Value)	Relative Density
0 – 19	Very Soft
20 – 49	Soft
50 – 100	Medium Hard
50 for 3 to 5"	Moderately Hard
50 for 0 to 2"	Hard

11. Definition of descriptive terms of modifiers for silts/clays/shells/gravels are described as follows:

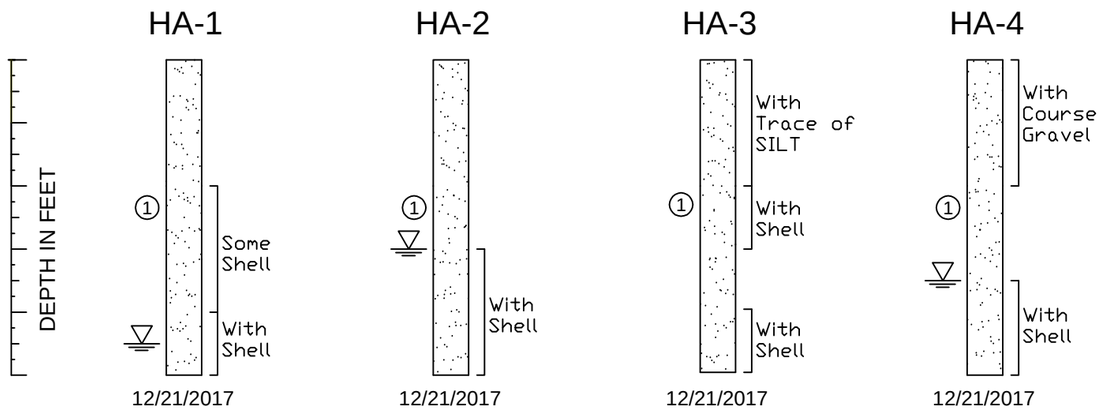
Percentage of Modifier Material	First Qualifier	Second Qualifier
0 – 5	With a Trace of + Modifier	With a Trace
5 – 12	Slightly + Modifier + y	With Some
12 – 30	Modifier + y	With
30 – 50	Very + Modifier + y	And

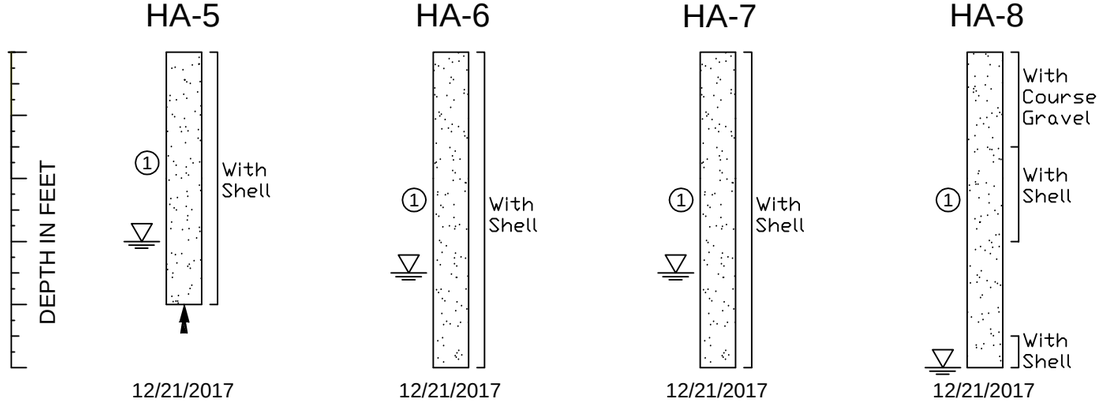
12. Descriptive characteristics for organic content percentages are described as follows:

Percentage of Organic Material	Descriptor
0 – 5	With a Trace
5 – 20	With Organics
20 – 75	Highly Organic
75 – 100	Peat

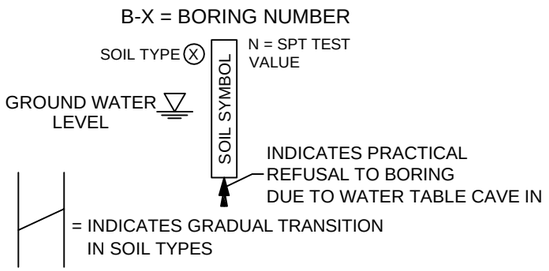
Appendix D – Record of Hand Auger Boring Logs

SOIL PROFILES





SOIL PROFILE LEGEND

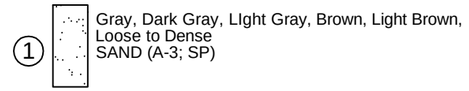


NOTES:

N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

HA - HAND AUGER

SOIL LEGEND



SOIL CLASSIFICATION

CORRELATION OF N - VALUES WITH RELATIVE DENSITY AND CONSISTENCY

COHESIONLESS SOIL		SILTS AND CLAYS	
N - VALUE	RELATIVE DENSITY	N - VALUE	CONSISTENCY
0 - 3	VERY LOOSE	0 - 1	VERY SOFT
4 - 8	LOOSE	2 - 4	SOFT
9 - 24	MEDIUM DENSE	5 - 6	FIRM
25 - 40	DENSE	7 - 12	STIFF
OVER 40	VERY DENSE	13 - 24	VERY STIFF
		OVER 24	HARD

CORRELATION OF N - VALUES WITH HARDNESS DESCRIPTION

LIMEROCK	
N - VALUE	RELATIVE DENSITY
0 - 19	VERY SOFT
20 - 49	SOFT
50 - 100	MEDIUM HARD
50 FOR 3 TO 5"	MODERATELY HARD
50 FOR 0 TO 2"	HARD

APPROXIMATE FINES CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR SLIGHTLY CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR VERY CLAYEY

APPROXIMATE SHELL CONTENT	MODIFIERS
0% TO 5%	WITH A TRACE OF SHELL
6% TO 12%	SLIGHTLY SHELLY
13% TO 30%	SHELLY
31% TO 50%	VERY SHELLY

APPROXIMATE ORGANIC CONTENT	MODIFIERS
0% TO 5%	WITH A TRACE
5% TO 20%	WITH ORGANICS
20% TO 75%	HIGHLY ORGANIC
75% TO 100%	PEAT

DEFINITION OF DESCRIPTIVE TERMS OF MODIFIERS FOR SILTS/CLAYS/SHELLS/GRAVELS ARE DESCRIBED AS FOLLOWS:

PERCENTAGE OF MODIFIER MATERIAL	FIRST QUALIFIER	SECOND QUALIFIER
0 - 5	WITH A TRACE OF + MODIFIER	WITH A TRACE
5 - 12	SLIGHTLY + MODIFIER + Y	WITH SOME
12 - 30	MODIFIER + Y	WITH
30 - 50	VERY + MODIFIER + Y	AND

RECORD OF HAND AUGER BORINGS

GFA International, Inc.
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 * TeamGFA.com

Client: David Douglas Associates, Inc.

Project:
Estero Boulevard Utility Improvements
Segment 6
Fort Myers Beach, Lee County, Florida

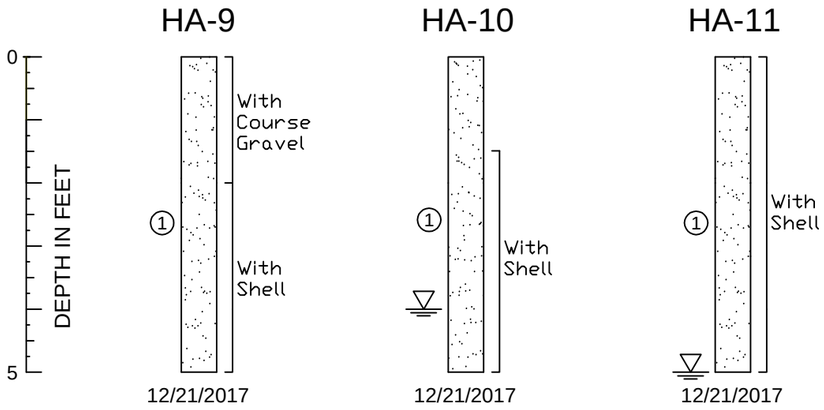
Date: 1/09/2018

Job No: 16-1668

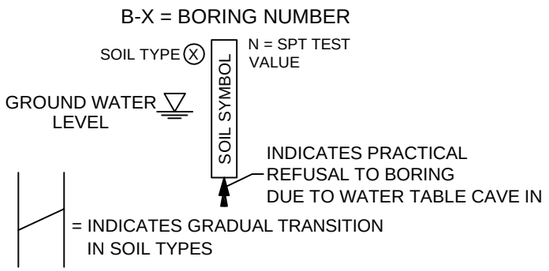
Drawn By: CAC

Approved by: PJD

SOIL PROFILES



SOIL PROFILE LEGEND



SOIL LEGEND

Gray, Dark Gray, LIght Gray, Brown, Light Brown, Loose to Dense SAND (A-3; SP)

NOTES:

N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

E.O.P. - EAST OF PAVEMENT EDGE

W.O.P. - WEST OF PAVEMENT EDGE

HA - HAND AUGER

SOIL CLASSIFICATION

CORRELATION OF N - VALUES WITH RELATIVE DENSITY AND CONSISTENCY

COHESIONLESS SOIL		SILTS AND CLAYS	
N - VALUE	RELATIVE DENSITY	N - VALUE	CONSISTENCY
0 - 3	VERY LOOSE	0 - 1	VERY SOFT
4 - 8	LOOSE	2 - 4	SOFT
9 - 24	MEDIUM DENSE	5 - 6	FIRM
25 - 40	DENSE	7 - 12	STIFF
OVER 40	VERY DENSE	13 - 24	VERY STIFF
		OVER 24	HARD

CORRELATION OF N - VALUES WITH HARDNESS DESCRIPTION

LIMEROCK	
N - VALUE	RELATIVE DENSITY
0 - 19	VERY SOFT
20 - 49	SOFT
50 - 100	MEDIUM HARD
50 FOR 3 TO 5"	MODERATELY HARD
50 FOR 0 TO 2"	HARD

APPROXIMATE FINES CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR SLIGHTLY CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR VERY CLAYEY

APPROXIMATE SHELL CONTENT	MODIFIERS
0% TO 5%	WITH A TRACE OF SHELL
6% TO 12%	SLIGHTLY SHELLY
13% TO 30%	SHELLY
31% TO 50%	VERY SHELLY

APPROXIMATE ORGANIC CONTENT	MODIFIERS
0% TO 5%	WITH A TRACE
5% TO 20%	WITH ORGANICS
20% TO 75%	HIGHLY ORGANIC
75% TO 100%	PEAT

DEFINITION OF DESCRIPTIVE TERMS OF MODIFIERS FOR SILTS/CLAYS/SHELLS/GRAVELS ARE DESCRIBED AS FOLLOWS:

PERCENTAGE OF MODIFIER MATERIAL	FIRST QUALIFIER	SECOND QUALIFIER
0 - 5	WITH A TRACE OF + MODIFIER	WITH A TRACE
5 - 12	SLIGHTLY + MODIFIER + Y	WITH SOME
12 - 30	MODIFIER + Y	WITH
30 - 50	VERY + MODIFIER + Y	AND

RECORD OF HAND AUGER BORINGS

GFA International, Inc.
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 * TeamGFA.com

Client: David Douglas Associates, Inc.

Project:
Estero Boulevard Utility Improvements
Segment 6
Fort Myers Beach, Lee County, Florida

Date: 1/09/2018

Job No: 16-1668

Drawn By: CAC

Approved by: PJD

Appendix E – Discussion of Soil Groups

DISCUSSION OF SOIL GROUPS:
AASHTO CLASSIFICATION

COARSE GRAINED SOILS

- **Group A-1:** The typical material of this group is a well-graded mixture of stone fragments or gavel, coarse sand, fine sand, and a nonplastic or feebly-plastic soil binder. However, this group also includes stone fragments, gravel, coarse sand, volcanic cinders, etc., without a soil binder.

    - **Subgroup A-1-a:** Includes those materials consisting predominantly of stone fragments or gravel, either with or without a well-graded binder of fine material.

    - **Subgroup A-1-b:** Includes those materials consisting predominantly of coarse sand, either with or without a well-graded soil binder.

- **Group A-3:** The typical material of this group is fine beach sand or fine desert-blow sand without silty or clay fines, or with a very small amount of nonplastic silt. This group also includes stream-deposited mixtures of poorly-graded fine sand and limited amounts of coarse sand and gravel.

- **Group A-2:** This group includes a wide variety of “granular” materials which are borderline between the materials falling in Groups A-1 and A-3, and the silt-clay materials of Groups A-4, A-5, A-6, and A-7. It includes all materials containing 35% or less passing a No. 200 (75-µm) sieve which cannot be classified in Groups A-1 or A-3, due to the fines content or the plasticity indexes, or both, in excess of the limitations for those groups.

    - **Subgroups A-2-4 and A-2-5:** Include various granular materials containing 35% or less passing a No. 200 (75-µm) sieve and with a minus No. 40 (425-µm) portion having the characteristics of Groups A-4 and A-5, respectively. These groups include such materials as gravel and coarse sand with silt contents or plasticity indexes in excess of the limitations of Group A-1 and fine sand with nonplastic-silt content in excess of the limitations of Group A-3.

    - **Subgroups A-2-6 and A-2-7:** Include materials similar to those described under Subgroups A-2-4 and A-2-5, except that the fine portion contains plastic clay having the characteristics of the A-6 or A-7 group, respectively.

FINE GRAINED SOILS

- **Group A-4:** The typical material of this group is a nonplastic or moderately plastic silty soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine silty soil and up to 64% of sand and gravel retained on a No. 200 sieve.

- **Group A-5:** The typical material of this group is similar to that described under Group A-4, except that it is usually of diatomaceous or micaceous character and may be highly elastic as indicated by the high liquid limit.

- **Group A-6:** The typical material of this group is a plastic clay soil usually having 75% or more passing a No. 200 (75-µm) sieve. This group also includes mixtures of fine clayey soil and up to 64% of sand and gravel retained on a No. 200 sieve. Materials of this group usually have a high volume change between wet and dry states.

- **Group A-7:** The typical material of this group is similar to that described under Group A-6, except that it has the high liquid limits characteristic of Group A-5 and may be elastic as well as subject to high-volume change.

    - **Subgroup A-7-5:** Includes those materials with moderate plasticity indexes in relation to the liquid limit and which may be highly elastic as well as subject to considerable volume change.

    - **Subgroup A-7-6:** Includes those materials with high plasticity indexes in relation to liquid limit and which are subject to extremely high volume change.

HIGHLY ORGANIC SOILS

- **Group A-8:** Highly organic soils (peat or muck) may be classified in this group. Classification of these materials is based on visual inspection and is not dependent on the percentage passing the No. 200 (75-µm) sieve liquid limit, or plasticity index. The material is composed primarily of partially decayed organic matter, generally has a fibrous texture, a dark brown or black color, and an odor of decay. These organic materials are unsuitable for use in embankments and subgrades. They are highly compressible and have low strength.

DISCUSSION OF SOIL GROUPS

COARSE GRAINED SOILS

GW and SW GROUPS. These groups comprise well-graded gravelly and sandy soils having little or no plastic fines (less than 5 percent passing the No. 200 sieve). The presence of the fines must not noticeably change the strength characteristics of the coarse-grained fraction and must not interface with it's free-draining characteristics.

GP and SP GROUPS. Poorly graded gravels and sands containing little of no plastic fines (less than 5 percent passing the No. 200 sieve) are classed in GP and SP groups. The materials may be called uniform gravels, uniform sands or non-uniform mixtures of very coarse material and very fine sands, with intermediate sizes lacking (sometimes called skip-graded, gap-graded or step-graded). This last group often results from borrow pit excavation in which gravel and sand layers are mixed.

GM and SM GROUPS. In general, the GM and SM groups comprise gravels or sands with fines (more than 12 percent passing the No. 200 sieve) having low or no plasticity. The plasticity index and liquid limit of soils in the group should plot below the "A" line on the plasticity chart. The gradation of the material is not considered significant and both well and poorly graded materials are included.

GC and SC GROUPS. In general, the GC and SC groups comprise gravelly or sandy soils with fines (more than 12 percent passing the No. 200 sieve), which have a fairly high plasticity. The liquid limit and plasticity index should plot above the "A" line on the plasticity chart.

FINE GRAINED SOILS

ML and MH GROUPS. In these groups, the symbol M has been used to designate predominantly silty material. The symbols L and H represent low and high liquid limits, respectively, and an arbitrary dividing line between the two is set at a liquid limit of 50. The soils in the ML and MH groups are sandy silts, clayey silts or inorganic silts with relatively low plasticity. Also included are loess type soils and rock flours.

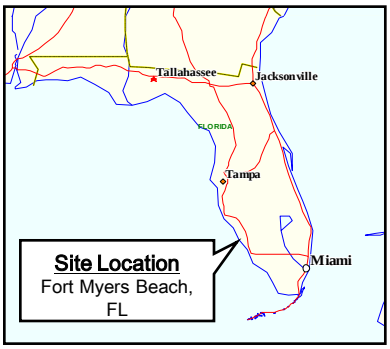
CL and CH GROUPS. In these groups the symbol C stands for clay, with L and H denoting low or high liquid limits, with the dividing line again set at a liquid limit of 50. The soils are primarily inorganic clays. Low plasticity clays are classified as CL and are usually lean clays, sandy clays or silty clays. The medium and high plasticity clays are classified as CH. These include the fat clays, gumbo clays and some volcanic clays.

OL and OH GROUPS. The soil in the OL and OH groups are characterized by the presence of organic odor or color, hence the symbol O. Organic silts and clays are classified in these groups. The materials have a plasticity range that corresponds with the ML and MH groups.

HIGHLY ORGANIC SOILS

The highly organic soils are usually very soft and compressible and have undesirable construction characteristics. Particles of leaves, grasses, branches, or other fibrous vegetable matter are common components of these soils. They are not subdivided and are classified into one group with the symbol PT. Peat humus and swamp soils with a highly organic texture are typical soils of the group.

Appendix F – Hydrologic Soils Map



Hydrologic Soils map

Estero Boulevard – Segment 6

Fort Myers Beach, Lee County, Florida

GFA International Project No.: 16-1668

N W E S

*Map Not To Scale

Map Unit: 4 - Canaveral-Urban Land Complex

Appendix G – Roadway Soil Survey

LEE COUNTY
DEPARTMENT OF PUBLIC WORKS
ESTERO BOULEVARD: SEGMENT 6

DATE OF SURVEY : December 21–22, 2017
SURVEY MADE BY : GFA INTERNATIONAL, INC.
SUBMITTED BY : PAUL J. D'HUYVETTER, P.E.

ROAD NAME : ESTERO BOULEVARD
CITY: FORT MYERS BEACH
COUNTY : LEE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS: STA. 1356+00 SURVEY ENDS: STA. 1413+76.38

	ORGANIC CONTENT			SIEVE ANALYSIS RESULTS % PASS						ATTERBERG LIMITS (%)					CORROSION SERIES TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC.	% MOISTURE CONTENT	NO. OF TESTS	4 MESH	10 MESH	40 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohms–cm	CHLORIDE ppm	SULFATES ppm	pH
1	–	–	–	6	91–98.0	87–93	61–86	10–31	0.3–4.7	–	–	–	A–3	White, Gray, Brown to Tan, SAND (SP) with Shell Fragments, Traces of Silt and Traces of Organics	2*	3,234–6,890	30–75	0–18	8.28–8.58

*Corrosion Series Test ran on two (2) composite sample obtained from hand auger borings during GFA's field exploration program.

NOTES:

EMBANKMENT AND SUBGRADE MATERIAL
STRATA BOUNDARIES ARE APPROXIMATE

Ground water was encountered at depths of about 3 to 5 feet at boring locations at the time of our drilling.

The material from Stratum Number 1 appears satisfactory for use in the embankment when utilized in accordance with Index 505, except where organics were encountered.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GFA INTERNATIONAL, INC.
5851 COUNTRY LAKES DRIVE
FORT MYERS, FLORIDA 33905

PAUL J. D'HUYVETTER P.E. #59716

LEE COUNTY DEPARTMENT OF TRANSPORTATION

ROAD NAME	COUNTY NAME	PROJECT ID
ESTERO BOULEVARD	LEE	16-1668

ROADWAY SOIL SURVEY
ESTERO BOULEVARD: SEGMENT 6
FORT MYERS BEACH, LEE COUNTY, FLORIDA

DRAWN BY: CAC

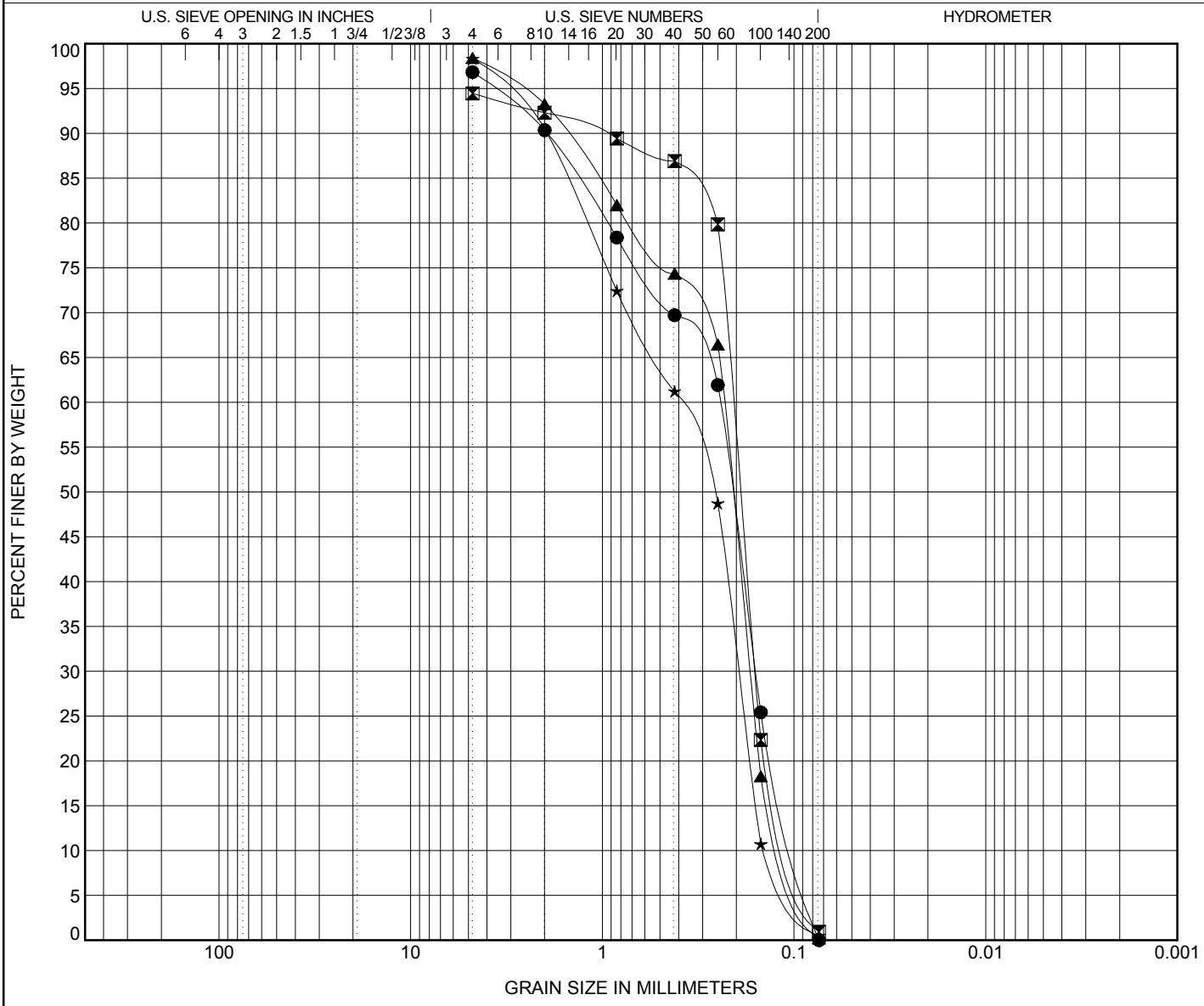
Appendix H – Gradation Test Results

GFA International, Inc
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 P
239-489-3438 F

GRAIN SIZE DISTRIBUTION

CLIENT David Douglas Associates, Inc. **PROJECT NAME** Estero Boulevard: Segment 6

PROJECT NUMBER 16-1668 **PROJECT LOCATION** Sta. 1355+80 to Sta. 1415+00



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	HA-1	4.0	White Poorly Graded Sand (SP) with Shell Fragments	NP	NP	NP	1.07	2.50
⊠	HA-3	2.0	Gray Poorly Graded Sand (SP) with Shell Fragments	NP	NP	NP	1.22	2.10
▲	HA-5	0.0	Tan Poorly Graded Sand (SP) with Trace Shell Frag. & Org.	NP	NP	NP	1.13	2.16
★	HA-7	1.0	Light Brown Poorly Graded Sand (SP) with Shell Fragments	NP	NP	NP	0.66	2.82

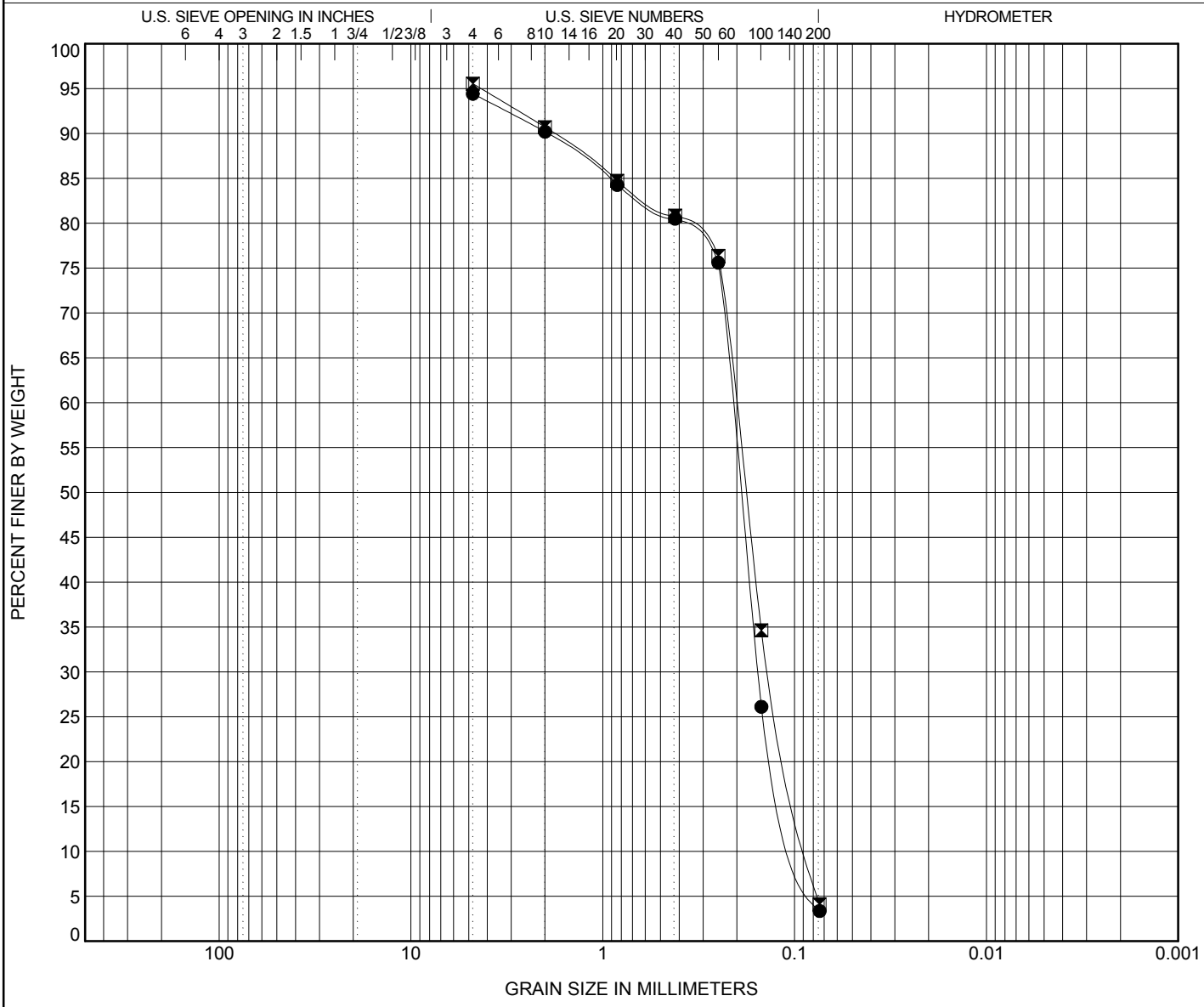
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	HA-1	4.0	4.76	0.243	0.159	0.097	0.0	96.3	0.5	
⊠	HA-3	2.0	4.76	0.209	0.16	0.1	0.0	93.1	1.3	
▲	HA-5	0.0	4.76	0.233	0.169	0.108	0.0	97.9	0.5	
★	HA-7	1.0	4.76	0.399	0.194	0.142	0.0	97.6	0.7	

GFA International, Inc
5851 Country Lakes Drive
Fort Myers, Florida 33905
239-489-2443 P
239-489-3438 F

GRAIN SIZE DISTRIBUTION

CLIENT David Douglas Associates, Inc. **PROJECT NAME** Estero Boulevard: Segment 6

PROJECT NUMBER 16-1668 **PROJECT LOCATION** Sta. 1355+80 to Sta. 1415+00



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HA-9**	**3.0**	**Gray Poorly Graded Sand (SP) with Trace Shell Frag. & Silt**	**NP**	**NP**	**NP**	**1.25**	**2.34**
⊠	**HA-11**	**4.0**	**Gray Poorly Graded Sand (SP) with Trace Shell Fragments**	**NP**	**NP**	**NP**	**1.04**	**2.41**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HA-9**	**3.0**	**4.76**	**0.212**	**0.155**	**0.091**	**0.0**	**90.6**	**3.8**	
⊠	**HA-11**	**4.0**	**4.76**	**0.204**	**0.134**	**0.085**	**0.0**	**90.9**	**4.7**	

GRAIN SIZE SEGMENT 6 SIEVE ANALYSIS.GPJ MASTER BORING LOG.GDT 1/23/18

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S001

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 6: Sta. 1358+00 - Southbound Shoulder - HA-1 (4 to 5 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: White Sand with Shell Fragments

Material Classification: SP

Total Sample Weight: 469.9 **Sample Weight After Wash:** 468.8

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	14.9	97%
No. 10	45.3	90%
No. 20	101.6	78%
No. 40	142.3	69%
No. 60	178.9	62%
No. 100	350.5	25%
No. 200	468.2	0.3%
PAN (WT RETAINED)	0.5	
TOTAL	468.7	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/23/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S002

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 6: Sta. 1368+00 - Southbound Shoulder - HA-3 (2 to 3 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Gray Sand with Shell Fragments

Material Classification: SP

Total Sample Weight: 485.5 **Sample Weight After Wash:** 480.5

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	26.9	93%
No. 10	37.4	91%
No. 20	51.3	88%
No. 40	63.6	86%
No. 60	97.8	79%
No. 100	377.1	21%
No. 200	478.7	1.3%
PAN (WT RETAINED)	1.5	
TOTAL	480.2	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/23/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S003

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 6: Sta. 1378+00 - Southbound Shoulder - HA-5 (0 to 1.5 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Tan Sand with Trace Shell Fragments and Organics

Material Classification: SP

Total Sample Weight: 516.3 **Sample Weight After Wash:** 514.3

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	8.2	98%
No. 10	34.8	93%
No. 20	92.9	82%
No. 40	132.4	74%
No. 60	173.2	66%
No. 100	421.9	18%
No. 200	513.4	0.5%
PAN (WT RETAINED)	0.7	
TOTAL	514.1	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/23/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S004

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 6: Sta. 1388+00 - Southbound Shoulder - HA-7 (1 to 2.5 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Light Brown Sand with Shell Fragments

Material Classification: SP

Total Sample Weight: 494.5 **Sample Weight After Wash:** 491.8

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	8.2	98%
No. 10	47.0	90%
No. 20	136.3	72%
No. 40	191.7	61%
No. 60	253.4	48%
No. 100	441.4	10%
No. 200	490.6	0.7%
PAN (WT RETAINED)	0.7	
TOTAL	491.3	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/23/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S005

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 6: Sta. 1398+00 - Southbound Shoulder - HA-9 (3 to 4.5 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Gray Sand with Trace Shell Fragments and Silt

Material Classification: SP

Total Sample Weight: 610 **Sample Weight After Wash:** 590.2

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	34.0	91%
No. 10	59.8	87%
No. 20	96.0	81%
No. 40	118.9	77%
No. 60	148.8	72%
No. 100	450.7	23%
No. 200	586.6	3.8%
PAN (WT RETAINED)	3.4	
TOTAL	590.0	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/23/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, FL 33905

(239) 489-2443 ● (239) 489-3438 (fax)

SIEVE ANALYSIS ASTM C136

Project: Estero Boulevard: Remaining Segments **Project ID:** 16-1668

Cleient Address: 1821 Victorica Avenue, Fort Myers, Florida **Report ID:** S006

Client: David Douglas Associates, Inc. **Lab/MAC ID:** N/A

Material Location: Segment 6: Sta. 1408+00 - Southbound Shoulder - HA-11 (4 to 5 Ft.)

Sampled By: G. Watson **Date Sampled:** 12/21/2017

Tested By: R. Gibson **Date Tested:** 1/11/2018

Material Description: Gray Sand with Trace Shell Fragments

Material Classification: SP

Total Sample Weight: 485.4 **Sample Weight After Wash:** 466.9

SIEVE#	CUMMULATIVE WEIGHT RETAINED (G)	% PASSING
No. 4	21.6	92%
No. 10	45.1	87%
No. 20	74.2	81%
No. 40	92.9	77%
No. 60	114.8	73%
No. 100	317.3	31%
No. 200	462.4	4.7%
PAN (WT RETAINED)	4.2	
TOTAL	466.6	

The above test results were obtained in accordance with standard laboratory procedures.

Respectfully Submitted
GFA INTERNATIONAL

1/23/2018

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

Appendix I – Soil Corrosive Series Test Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 Office ● (239) 489-3438 Fax

REPORT OF SOIL CORROSION SERIES

Project:	Estero Boulevard Remaining Segments	**Project ID:**	16-1668
Client Address:	1821 Victoria Avenue, Fort Myers, Florida	**Report ID:**	CS001
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	N/A
Material Location:	Segment 6: Composite Sample 1 - Hand Auger Borings HA-1 through HA-6 (0' - 5')		
Sampled By:	G. Watson	**Date Sampled:**	12/21/2017
Tested By:	K. Hazard	**Date Tested:**	1/12/2018
Material Description:	Composite Sample: Gray to Brown Sand with Trace Shell Fragments		
Material Classification:	SP		

	Lab Results
pH (FM 5-550):	8.28
Resistivity (FM 5-551):	3,234 ohm-cm
Chloride (FM 5-552):	75 ppm
Sulfate (FM 5-553):	18 ppm

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

1/29/2018
Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 Office ● (239) 489-3438 Fax

REPORT OF SOIL CORROSION SERIES

Project:	Estero Boulevard Remaining Segments	**Project ID:**	16-1668
Client Address:	1821 Victoria Avenue, Fort Myers, Florida	**Report ID:**	CS002
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	N/A
Material Location:	Segment 6: Composite Sample 2 - Hand Auger Borings HA-7 through HA-11 (0' - 5')		
Sampled By:	G. Watson	**Date Sampled:**	12/21/2017
Tested By:	K. Hazard	**Date Tested:**	1/12/2018
Material Description:	Composite Sample: Gray to Brown Sand with Trace Shell Fragments		
Material Classification:	SP		

	Lab Results
pH (FM 5-550):	8.58
Resistivity (FM 5-551):	6,890 ohm-cm
Chloride (FM 5-552):	30 ppm
Sulfate (FM 5-553):	Non-Detectable (ppm)

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

1/29/2018
Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

Appendix J – Asphalt Thickness by Core Determination

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 ● (239) 489-3438 (fax)

LIMEROCK/ASPHALT THICKNESS BY CORE DETERMINATION

Client: David Douglas Associates, Inc. Project #: 16-1668

Project: Estero Boulveard - Segment 6

Address: Estero Boulevard, Fort Myers Beach, Lee County, Florida

Results of Test

Core #	Location/ Offet From Center Line	Total Asphalt Core Thickness (in.)	Measured Asphalt Thickness (in.)		Visual Asphalt Type Classification
C-1	Sta. 1365+00: Northbound/ 7.0 Feet	7-7/8	Lift 1	1-5/8	S-I
			Lift 2	1-3/4	S-I
			Lift 3	1-1/2	S-II
			Lift 4	1-5/8	S-II
			Lift 5	1-3/8	S-I
C-2	Sta. 1375+00: Southbound/ 6.0 Feet	8-7/8	Lift 1	2-1/4	S-I
			Lift 2	2	S-II
			Lift 3	2	S-II
			Lift 4	1-1/2	S-I
			Lift 4	1-1/8	S-II
C-3	Sta. 1385+00: Northbound/ 6.0 Feet	11-5/8	Lift 1	2	S-I
			Lift 2	2-1/4	S-I
			Lift 3	2	S-II
			Lift 4	1	S-II
			Lift 5	2	S-II
			Lift 6	1-1/2	S-I
			Lift 7	7/8	S-I
C-4	Sta. 1395+00: Southbound/ 6.0 Feet	7	Lift 1	1-1/2	S-I
			Lift 2	3/4	S-I
			Lift 3	3/4	S-I
			Lift 4	1	S-II
			Lift 5	1-1/4	S-II
			Lift 6	1-1/4	S-II
			Lift 7	1/2	S-II
C-5	Sta. 1405+00 Northbound/ 6.5 Feet	12-1/2	Lift 1	1-1/2	S-I
			Lift 2	1-1/2	S-I
			Lift 3	2-3/4	S-II
			Lift 4	3	S-II
			Lift 5	2	S-II
			Lift 6	1-3/4	S-I
C-6	Sta. 1408+00 Southbound/ 7.5 Feet	8-3/8	Lift 1	1-3/4	S-I
			Lift 2	1-1/4	S-I
			Lift 3	1-1/2	S-II
			Lift 4	1	S-II
			Lift 5	1-3/4	S-I
			Lift 6	7/8	S-II

The above test results were obtained in accordance with standard laboratory procedures.

5851 Country Lakes Drive ● Fort Myers, FL 33905 (239) 489-2443 ● (239) 489-3438 (fax)

ASPHALT/ BASE THICKNESS BY CORE DETERMINATION

Client: David Douglas Associates, Inc.
Project: Estero Boulevard Utility Improvements: Remaining Segments
Location: Segments 6
Tested By: JR Gibbs/ Kevin Mixon
Date Tested: 12/20/2017

Project #: 16-1668
Lab I.D.

Segment 6 - Results of Test

Core #	Location	Limerock Thickness Inches	Subbase Inches	Asphalt Thickness Inches
C-1	Sta. 1365+00: NB	16	N/A	7-7/8
C-2	Sta. 1375+00: SB	16	N/A	8-7/8
C-3	Sta. 1385+00: NB	20	N/A	11-5/8
C-4	Sta. 1395+00: SB	12	N/A	7
C-5	Sta. 1405+00: NB	48	N/A	12-1/2
C-6	Sta. 1408+00: SB	48	N/A	8-3/8

Appendix K – Asphalt Bulk Specific Gravity

5851 Country Lakes Drive ● Fort Myers, Florida 33905 (239) 489-2443 office ● (239) 489-3438 fax

ASPHALT CORE DENSITIES

CLIENT: David Douglas Associates, Inc. PROJECT # 16-1668

PROJECT: Estero Boulevard - Segment 6 REPORT # 1

ADDRESS: Estero Boulevard CITY: Fort Myers Beach DATE: 1/26/2018

Core #	Location/ Offset from Center Line	(A) Weight In Air (grams)	(B) Weight SSD (grams)	(C) Weight In Water (grams)	(D) A/(B-C) Specific Gravity	(E) D x 62.4 Density (PCF)	Tested Thickness (inches)
C-1	Sta. 1365+00 (NB)/ 7.0 Feet	3688.5	3690.1	1963.3	2.14	133.3	3 1/2
C-2	Sta. 1375+10 (SB)/ 6.0 Feet	3205.9	3208.1	1696.4	2.12	132.3	5 13/16
C-3	Sta. 1385+00 (NB)/ 6.0 Feet	4178.7	4180.4	2219.9	2.13	133.0	4 3/8
C-4	Sta. 1395+00 (SB)/ 6.0 Feet	3623.4	3626.1	1929.4	2.14	133.3	3 7/8
C-5	Sta. 1405+00 (NB)/ 6.5 Feet	3705.4	3711.5	1982.8	2.14	133.8	3 15/16
C-6	Sta. 1408+00 (SB)/ 7.5 Feet	3669.0	3678.2	1956.6	2.13	133.0	4 1/4

Respectfully Submitted,
GFA International, Inc.
FBPE CA # 4930

Appendix L – Limerock Bearing Ratio (LBR) Results

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard Utility Improvements **Project ID:** 16-1668

Address: 1821 Victoria Avenue **Report ID:** LBR001

Client: David Douglas Associates, Inc. **Lab/MAC ID:** 18-0003

Material Location: Segment 6 : LBR001, SB, Station 1358+00

Sampled By: G. Watson **Date Sampled:** 12/22/2017

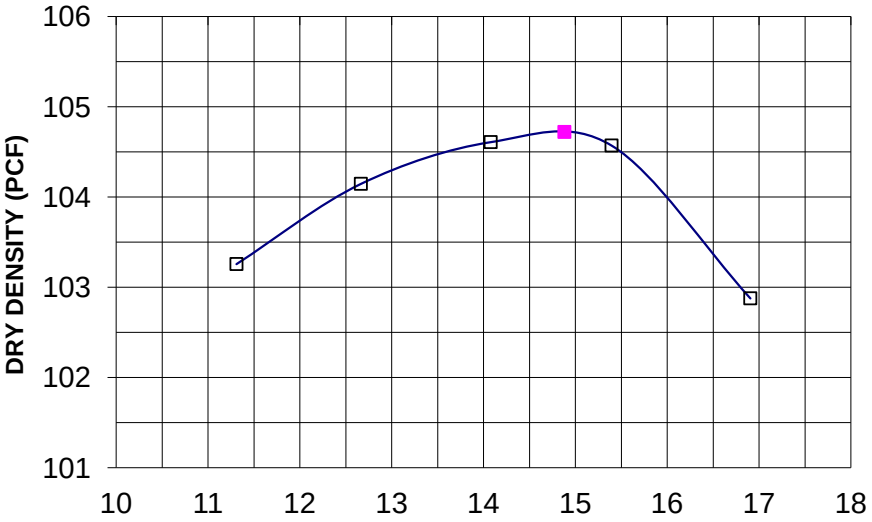
Tested By: J. McStravic / R. Gibson **Date Tested:** 1/10/2018

Material Description: Existing Shoulder, Dark Gray Sand with Trace Organics & Shell

% Passing #4: 98% **Type of Rammer:** Mechanical

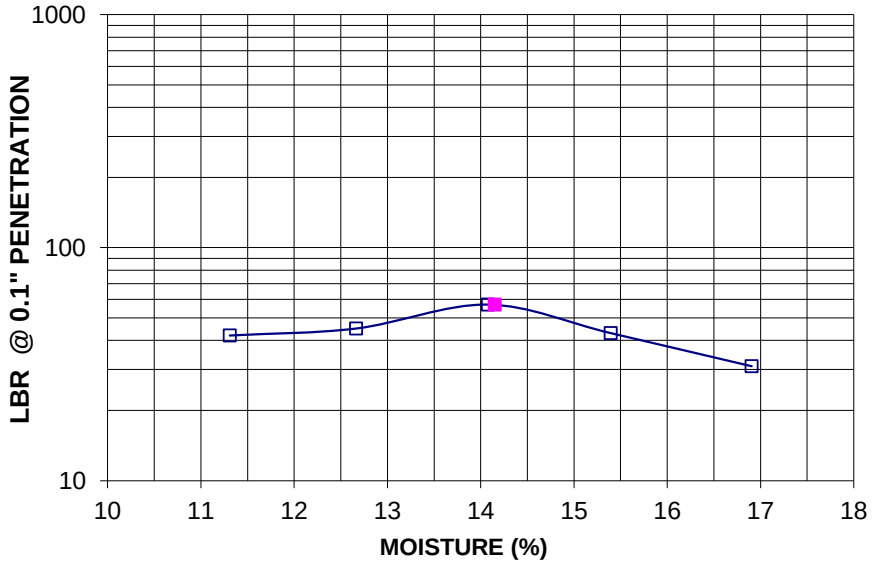
Rammer Face: Sector **Soak Time (hrs):** 48 **Surcharge (lbs):** 15

Comments:



Dry Density (pcf)	Moisture (%)
103.3	11.3
104.1	12.7
104.6	14.1
104.6	15.4
102.9	16.9

LBR
42
45
57
43
31



Maximum Dry Density (pcf)
104.7

Optimum Moisture (%)
14.9

Limerock Bearing Ratio
57

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

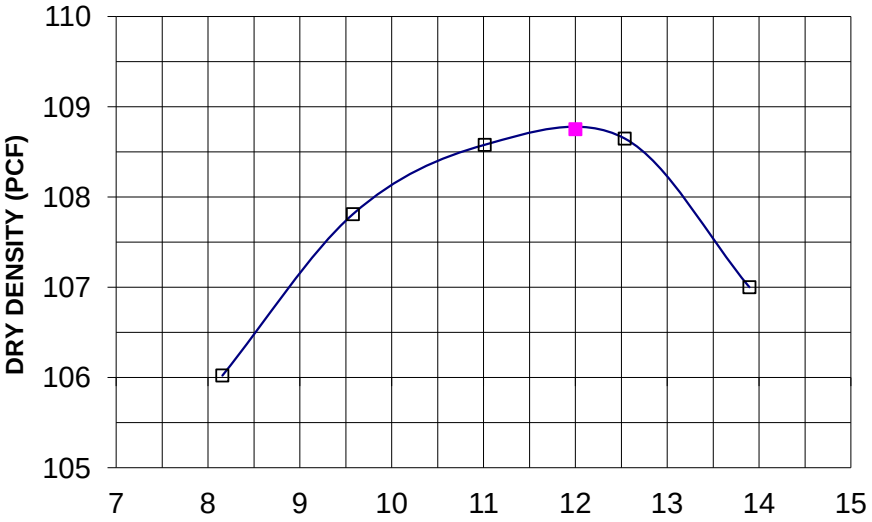
1/29/18

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

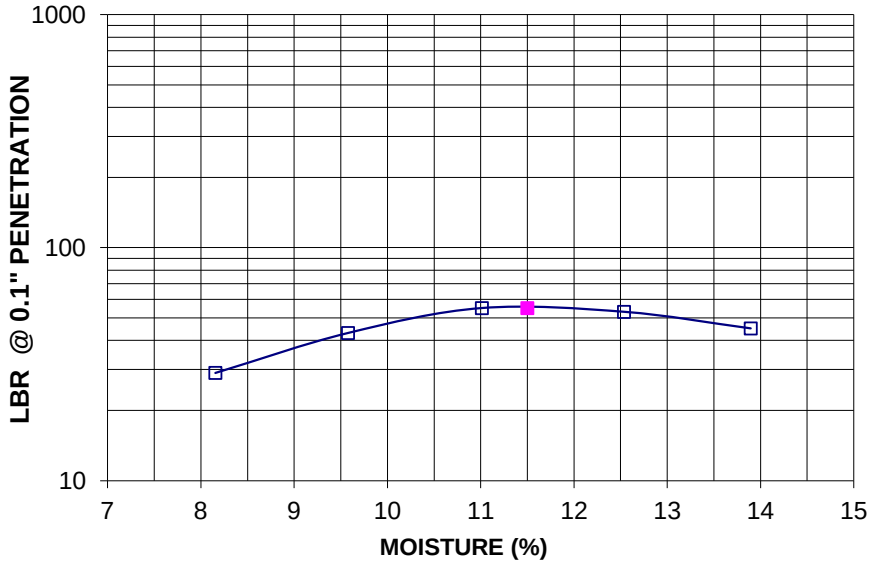
Limerock Bearing Ratio
Florida Method FM 5-515

Project:	Estero Boulevard Utility Improvements	**Project ID:**	16-1668
Address:	1821 Victoria Avenue	**Report ID:**	LBR002
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	18-0004
Material Location:	Segment 6 : LBR002, NB, Station 13671+75		
Sampled By:	G. Watson	**Date Sampled:**	12/22/2017
Tested By:	J. McStravic/ R. Gibson	**Date Tested:**	1/5/2018
Material Description:	Existing Shoulder, Gray Sand with Some Shell		
% Passing #4:	93%	**Type of Rammer:**	Mechanical
Rammer Face:	Sector	**Soak Time (hrs):** 48	**Surcharge (lbs):** 15
Comments:			



Dry Density (pcf)	Moisture (%)
106.0	8.2
107.8	9.6
108.6	11.0
108.6	12.5
107.0	13.9

LBR
29
43
55
53
45



Maximum Dry Density (pcf)
108.8

Optimum Moisture (%)
12.0

Limerock Bearing Ratio
55

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

1/29/18

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
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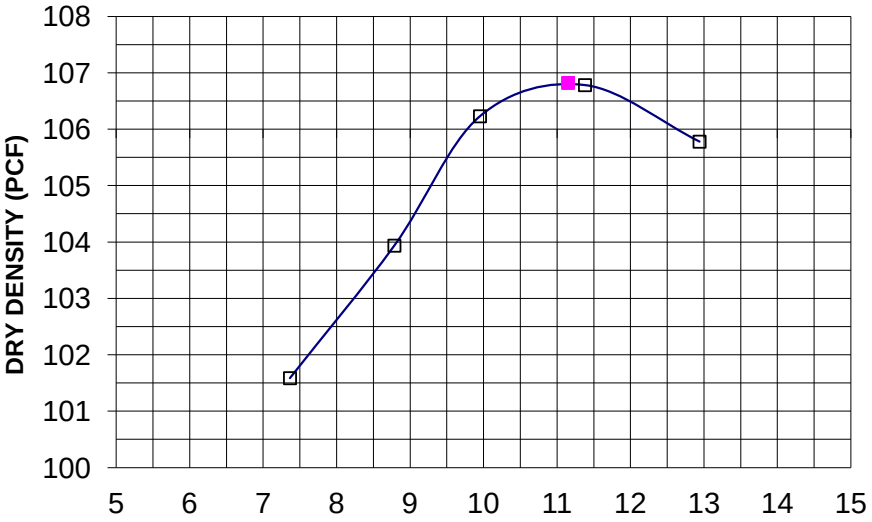
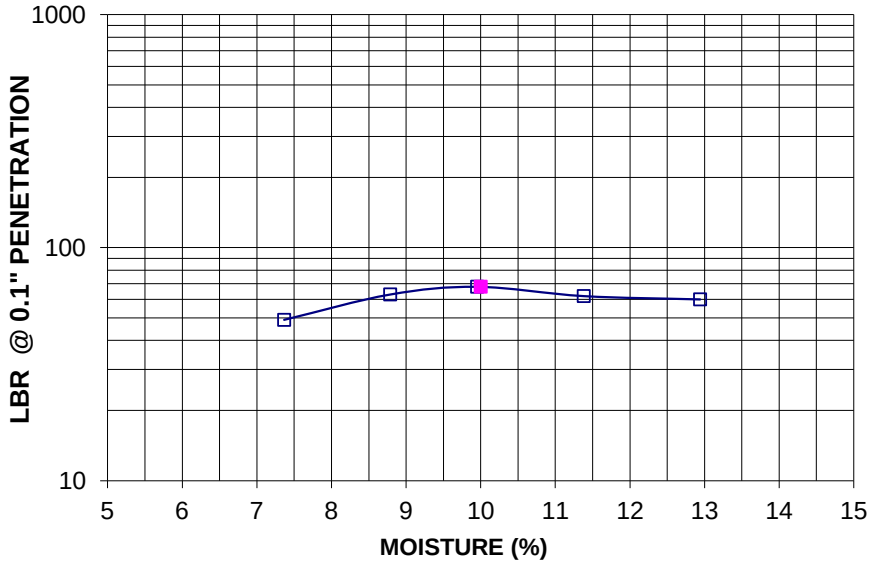
Limerock Bearing Ratio
Florida Method FM 5-515

Project:	Estero Boulevard Utility Improvements	**Project ID:**	16-1668
Address:	1821 Victoria Avenue	**Report ID:**	LBR003
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	18-0005
Material Location:	Segment 6 : LBR003, SB, Station 1378+00		
Sampled By:	G. Watson	**Date Sampled:**	12/22/2017
Tested By:	J. McStravic / R. Gibson	**Date Tested:**	1/10/2018
Material Description:	Existing Shoulder, Gray Sand with Trace Shell		
% Passing #4:	97%	**Type of Rammer:**	Mechanical
Rammer Face:	Sector	**Soak Time (hrs):** 48	**Surcharge (lbs):** 15
Comments:			



Dry Density (pcf)	Moisture (%)
101.6	7.4
103.9	8.8
106.2	10.0
106.8	11.4
105.8	12.9

LBR
49
63
68
62
60



Maximum Dry Density (pcf)
106.8

Optimum Moisture (%)
11.2

Limerock Bearing Ratio
68

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

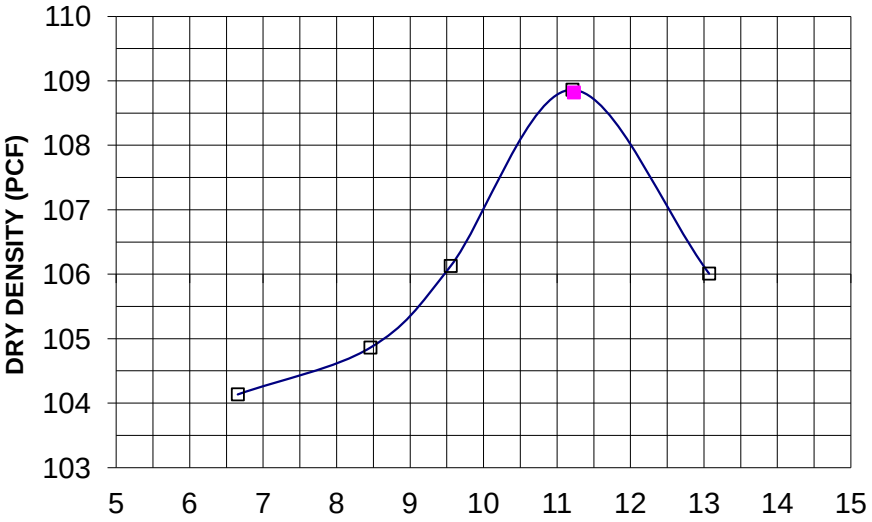
1/29/18

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905
(239) 489-2443 Office ● (239) 489-3438 Fax

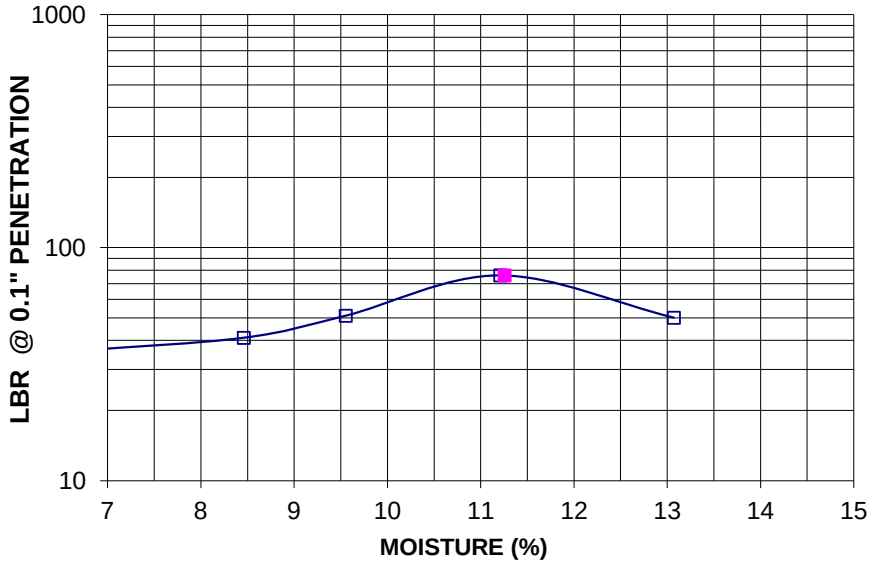
Limerock Bearing Ratio
Florida Method FM 5-515

Project: Estero Boulevard Utility Improvements
Project ID: 16-1668
Address: 1821 Victoria Avenue
Report ID: LBR004
Client: David Douglas Associates, Inc.
Lab/MAC ID: 18-0006
Material Location: Segment 6 : LBR004, NB, Station 1388+00
Sampled By: G. Watson
Date Sampled: 12/22/2017
Tested By: J. McStravic/ R. Gibson
Date Tested: 1/5/2018
Material Description: Existing Shoulder, Gray Sand with Trace Shell & Gravel
% Passing #4: 94%
Type of Rammer: Mechanical
Rammer Face: Sector
Soak Time (hrs): 48
Surcharge (lbs): 15
Comments:



Dry Density (pcf)	Moisture (%)
104.1	6.7
104.9	8.5
106.1	9.6
108.9	11.2
106.0	13.1

LBR
36
41
51
76
50



Maximum Dry Density (pcf)
108.8

Optimum Moisture (%)
11.2

Limerock Bearing Ratio
76

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FBPE CA # 4930

1/29/18
Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

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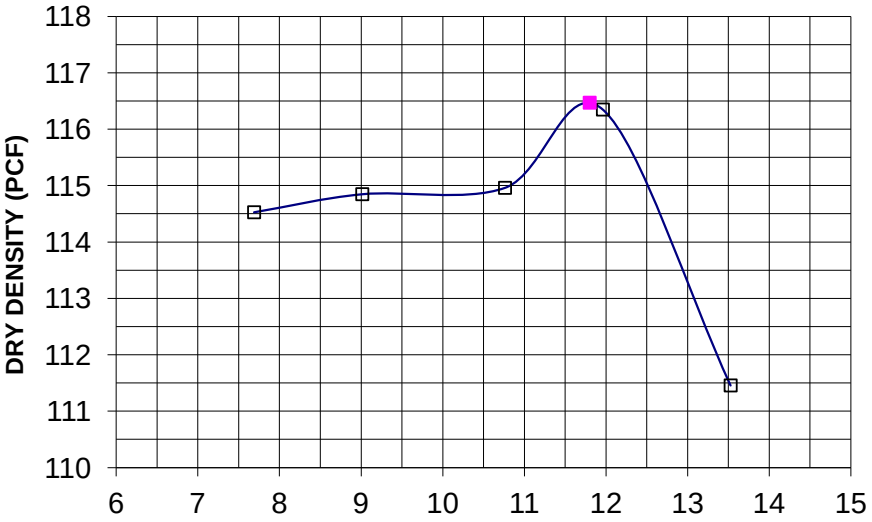
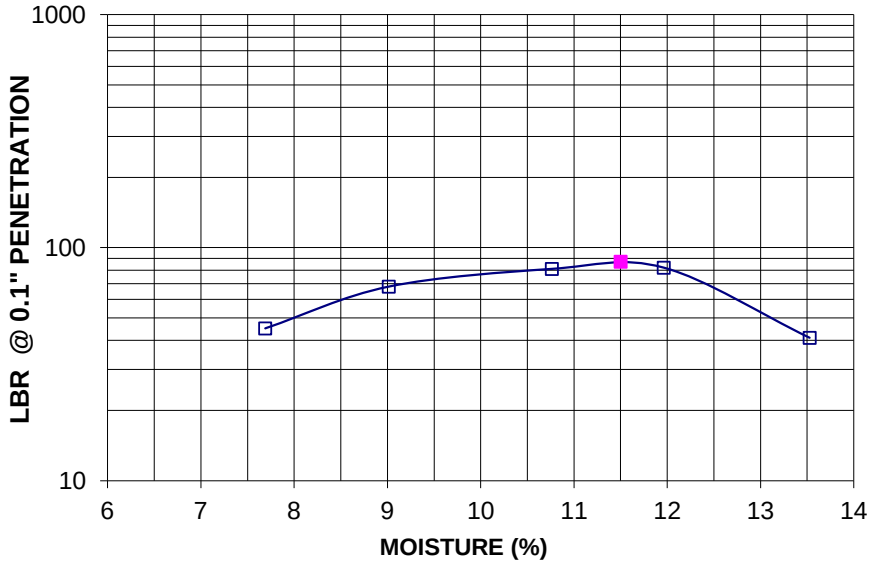
(239) 489-2443 Office ● (239) 489-3438 Fax

Limerock Bearing Ratio
Florida Method FM 5-515

Project:	Estero Boulevard Utility Improvements	**Project ID:**	16-1668
Address:	1821 Victoria Avenue	**Report ID:**	LBR005
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	18-0007
Material Location:	Segment 6 : LBR005, SB, Station 1398+00		
Sampled By:	G. Watson	**Date Sampled:**	12/22/2017
Tested By:	J. Permenter / R. Gibson	**Date Tested:**	1/10/2018
Material Description:	Existing Shoulder, Gray Sand with Some Shell		
% Passing #4:	85%	**Type of Rammer:**	Mechanical
Rammer Face:	Sector	**Soak Time (hrs):** 48	**Surcharge (lbs):** 15
Comments:			



Dry Density (pcf)	Moisture (%)
114.5	7.7
114.8	9.0
115.0	10.8
116.3	12.0
111.5	13.5



LBR
45
68
81
82
41

Maximum Dry Density (pcf)
116.5

Optimum Moisture (%)
11.8

Limerock Bearing Ratio
87

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

1/29/18

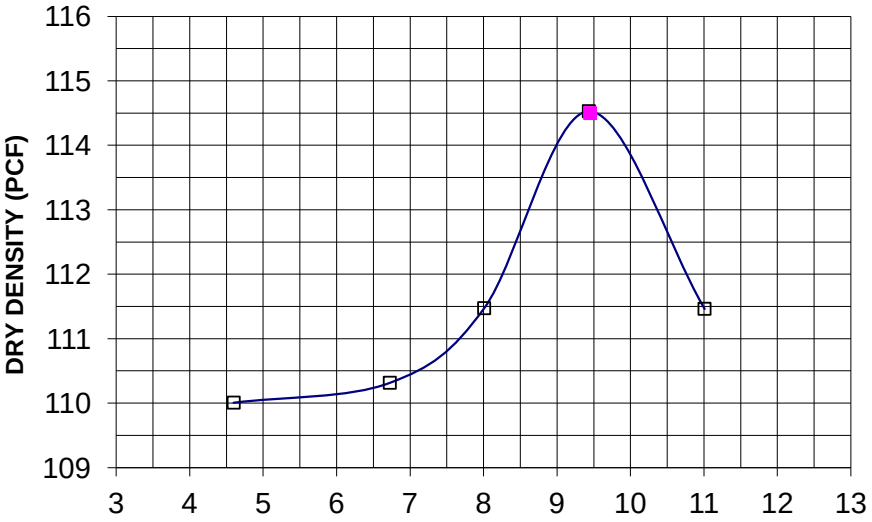
Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

5851 Country Lakes Drive ● Fort Myers, Florida 33905

(239) 489-2443 Office ● (239) 489-3438 Fax

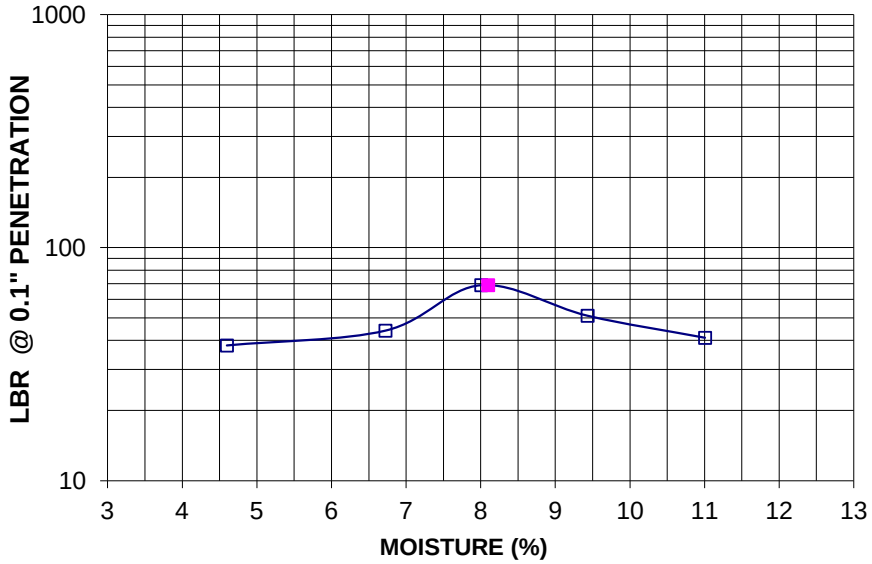
Limerock Bearing Ratio
Florida Method FM 5-515

Project:	Estero Boulevard Utility Improvements	**Project ID:**	16-1668
Address:	1821 Victoria Avenue	**Report ID:**	LBR006
Client:	David Douglas Associates, Inc.	**Lab/MAC ID:**	18-0008
Material Location:	Segment 6 : LBR006, NB, Station 14071+75		
Sampled By:	G. Watson	**Date Sampled:**	12/22/2017
Tested By:	J. Permenter / R. Gibson	**Date Tested:**	1/5/2018
Material Description:	Existing Shoulder, Light Gray Sand with Some Shell & Gravel		
% Passing #4:	90%	**Type of Rammer:**	Mechanical
Rammer Face:	Sector	**Soak Time (hrs):** 48	**Surcharge (lbs):** 15
Comments:			



Dry Density (pcf)	Moisture (%)
110.0	4.6
110.3	6.7
111.5	8.0
114.5	9.4
111.5	11.0

LBR
38
44
69
51
41



Maximum Dry Density (pcf)
114.5

Optimum Moisture (%)
9.5

Limerock Bearing Ratio
69

Respectfully Submitted.
GFA INTERNATIONAL, INC.
FBPE CA # 4930

1/29/18

Paul J. D'huyvetter, P.E.
Registered Engineer # 59716
State of Florida

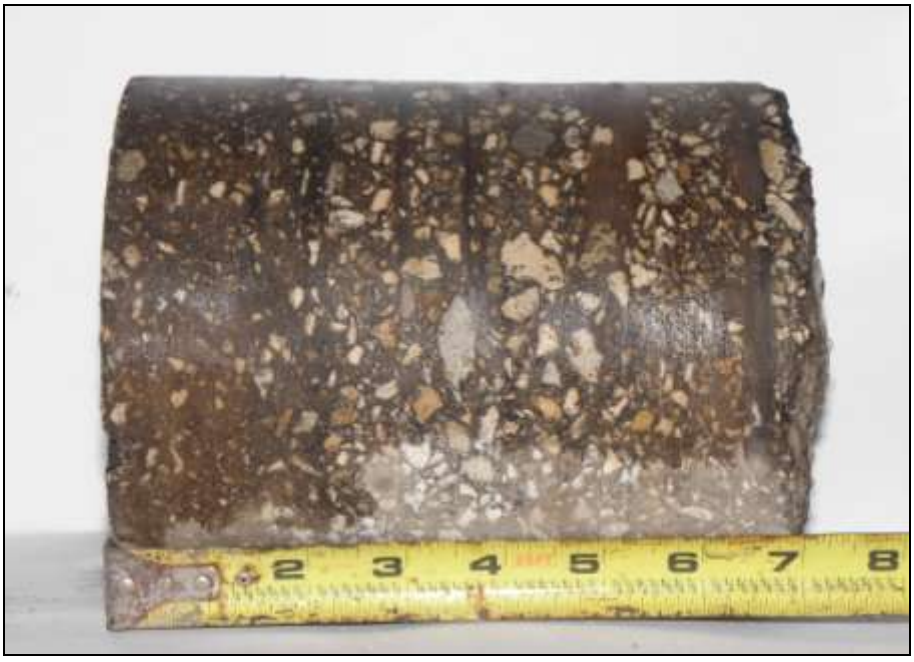
Appendix M – Asphalt Core Photographs

ASPHALT CORE C-1

ASPHALT CORE C-2

ASPHALT CORE C-3

ASPHALT CORE C-4



ASPHALT CORE C-5

ASPHALT CORE C-6

EXHIBIT K
TECHNICAL SPECIAL PROVISIONS

RESERVED

I hereby certify that these Technical Special Provisions have been properly prepared by me, or under my responsible charge:

Technical Special Provision Section(s):		
Signature:		
Date:		
Engineer of Record:		
Florida License No.:		
Firm Name:		
Firm Address:		
City, State, Zip Code:		
Cert. of Authorization No:		

EXHIBIT L
FDOT AND LEE COUNTY DESIGN STANDARDS

The following design standards are expressly agreed to be incorporated by reference and made a part of this Agreement:

1. Florida Department of Transportation **FY 2024-25** Standard Plans as published at the following link:

https://www.fdot.gov/design/standardplans/SPRBC.shtm

2. Lee County Department of Transportation Plan Specifications for Sign Installation, the latest edition as published at the following link:

http://www.leegov.com/dot/traffic/trafficsigninstallation

3. Lee County Department of Transportation Plan Specifications for Signal & Street Lighting, the latest edition as published at the following link:

http://www.leegov.com/dot/traffic/trafficstandard

4. Lee County Utilities Design Manual, the latest edition as published at the following link:

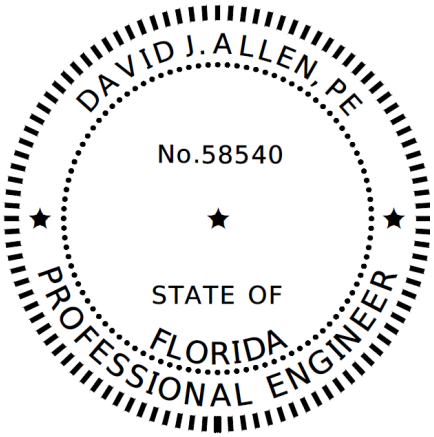
http://www.leegov.com/utilities/design-manual

In the event of discrepancies between the Lee County and FDOT Design Standards, Lee County Standards shall govern.

EXHIBIT M
DEVELOPMENTAL SPECIFICATIONS

RESERVED

I hereby certify that these Developmental Specifications have been properly prepared by me, or under my responsible charge:

Developmental Specifications Section(s):		
Signature:	David J Allen 2024.03.13 10:37:28 -04'00'	
Date:	**3/12/24**	
Engineer of Record:	**David J. Allen, PE**	
Florida License No.:	**58540**	
Firm Name:	**Stantec**	
Firm Address:	**3905 Crescent Park Drive**	
City, State, Zip Code:	**Riverview, FL 33578**	
Cert. of Authorization No:		