SPECIAL PROVISIONS
AND
DETAILED SPECIFICATIONS

"Old Winter Beach Road"

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SPECIAL PROVISIONS

1. COMMENCEMENT AND COMPLETION OF WORK - The Contractor will be required to commence work under this contract within five (5) days after the date of receipt by him of Notice to Proceed, and to complete the work ready for use not later than the time set forth in the contract. The time stated for completion shall include final clean up of the premises.

2. INSPECTION - The work will be conducted under the general direction of the Engineer for the Owner and is subject to inspection by his appointed inspector and the Owner's Representative to insure compliance with the terms of the contract. No inspector is authorized to change any provisions of the specifications without written authorization of the Owner's Engineer, nor shall the presence or absence of an inspector relieve the Contractor from any requirements of the contract.

3. INSURANCE - See Articles 27 and 28 of the GENERAL CONDITIONS. Certificates of Insurance shall be filed with the Owner or his representative before work commences.

4. ESTIMATED QUANTITIES If the quantities are stipulated on the plans and/or bid form by the engineer for clearing and earthwork, these are approximate only. The contractor is required to provide his own estimate of the quantities of work for clearing and earthwork and infrastructure on the proposal/bid form. This estimate shall constitute the full scope of work required to complete the construction in accordance with the lines and grades shown on the plans, and no adjustment to the contract price will be made, regardless of the actual quantity of work performed, unless the Owner or Engineer has made a change to the plans. In this event, the contract shall be increased or decreased as necessary in accordance with Article 15 of the General Conditions. The Contractor shall perform a complete and finished job of the scope designated in the contract whether the final quantities are more or less than those estimated. The contractor is obligated to make his best effort to avoid waste and work efficiently.

5. EXISTING UTILITIES AND STRUCTURES, IF ANY - Existing utilities structures, and facilities shown on the plans, if any exist, were located as accurately as possible from the Owner's records. Guarantee is not made that all existing facilities are shown or that those shown are entirely accurate.

   The Contractor shall assure himself of the actual location of such utilities, structure or facilities prior to performance of any work in the vicinity. The utility companies or utility agencies will cooperate with the Contractor in locating underground utilities that may be subject to damage or interruption of services during the Contractor's operations. Prior to start of work, the Contractor shall request each utility agency to advise him of the location of their facilities in the vicinity. The Owner will assume no liability for damages sustained or costs incurred because of the Contractor's operations in the vicinity of existing utilities or structures, or to the temporary bracing, and shoring of the same. In the event that it is necessary to shore, brace or swing a utility, the utility company or department affected should be contacted and their permission secured as to method used for any such work.

6. TOOLS, PLANT, EQUIPMENT - If at any time before the commencement or during the progress of the work, tools, plant or equipment appear to the Engineer to be insufficient, inefficient or inappropriate to secure the quality of work required, or the proper rate of progress, the Engineer may order the Contractor to increase their efficiency, to improve character, to augment their number or substitute new tools, plant or equipment as the case may be. The Contractor shall conform to such orders. The failure of the Engineer to demand such increase of efficiency shall not relieve the Contractor of his obligation to secure the quality of work and the rate of progress necessary to complete the work within the time required by the contract and to the satisfaction of the Owner.

7. PARTIAL PAYMENTS - partial payments calculated from quantities of work performed will be made

on or about the 10th of each month on pay estimates based on the previous month's progress. The Contractor shall, prior to the 25th of the preceding month, submit invoices for work performed for the previous month. The Engineer will certify all invoices before presenting them to the Owner for payment. The Engineer's form of pay estimate stating that the bill is fair and equitable and in exact accord with the contract prices will be utilized for pay purposes. Ten percent (10%) of the amount due and payable to the Contractor will be retained from each partial payment. Final payment will be accomplished as prescribed in the Form of Agreement. Contractor's invoice forms shall be suitable for Owner's accounting systems.

8. RESTORATION OF DAMAGED PARTS OF THE WORK - It shall be the responsibility of the Contractor to repair, rebuild or restore to its former condition, any and all portions of existing utilities, structures, equipment, appurtenances or facilities other than those to be paid for under the specifications, which may be disturbed or damaged due to his construction operations.

9. TESTS - The Engineer shall have the right to require all materials to be submitted to test prior to incorporation in the work. In some instances, it may be expedient to make these tests at the source of supply and for this reason, it is required that the Contractor furnish the Engineer with information concerning the location of his source before incorporating material in the work. This does not in any way obligate the Engineer to perform tests for acceptance of material and does not relieve the Contractor of his responsibility to furnish satisfactory material. The Contractor shall furnish manufacturer's certificates of compliance with these specifications, covering manufactured items incorporated in the work.

The Contractor will be responsible for the payment of all required testing, as specified in the construction plans, including but not limited to:

- Density and/or F.B.V. or L.B.R. Tests: on sub-grade, base, trench backfill, etc. For the minimum number of tests specified in the construction plans or these documents. The engineer shall be given satisfactory test results prior to payment for any items requiring testing.
- Asphaltic Concrete Surface Course: the owner reserves the right to core sample/test at anytime. The owner will pay for correct results. Otherwise, the Contractor will be responsible for the replacement of all defective materials.

10. GUARANTY - All materials and the installation thereof which are furnished and installed by the Contractor under the terms of the contract, shall be guaranteed by the Contractor and his surety, through the Performance Bond included as a part of the contract documents, and shall guarantee against faulty workmanship, mechanical and physical defects, leakage, breakage and other damages and failure, under normal operation, for a period of one (1) year from the date of final payment, said date to constitute the commencement of the one (1) year warranty period. All materials and installations proving to be defective within the specified period of the guaranty shall be replaced, without cost to the Owner, by the manufacturer, the Contractor or by the surety. The period of guarantee of each such replacement shall be one (1) year from and after date of installation and acceptance thereof.

11. POWER AND WATER - All arrangements and costs for temporary power and water during construction, shall be the responsibility of the Contractor. If the Contractor requires water for his operations, he shall make application for service in compliance with current regulations and pay all costs in connection therewith. Unless otherwise set forth in the Schedule of Bid Items, the cost of power and water shall be included in the contract price.

12. SALVAGED MATERIAL - All pipe, valves and fittings and other materials that are salvaged during this construction shall become the property of the Owner and shall be delivered to the Owner's designated site of storage, and receipts therefore delivered to the Engineer within 48 hours of removal from service.

13. DISTRIBUTION OF MATERIALS ON JOB SITE – Construction materials shall be delivered to and stored on the job site at a location designated on the plans, or as agreed to by the contractor and owner's representative at a suitable location to be determined prior to construction.

14. CONSTRUCTION SCHEDULE REQUIRED - Prior to the commencements of work by the Contractor, he shall have submitted a construction schedule to, and have received approval of the same from the Engineer and the Owner's Representative. The construction schedule will be discussed at the pre-construction meeting of the Engineer and Contractor. Mandatory starting points, required commencement areas, construction sequence, prescribed order of completion, and completion timetables essential to the Owner, in addition to the time for completion as stated in the agreement, will be noted in an appendix to these special provisions, and will be incorporated into the construction schedule. The schedule will also be delivered in electronic format on disk.

15. ORDER OF WORK AND CLEANUP – The order of work shall be substantially the same as that depicted in the construction plan or as agreed to by the owner and contractor prior to construction and in adherence to Paragraph 15 above. Work will include cleanup of all areas disturbed by the contractor, hand brooming of existing streets, seeding and/or sodding of disturbed areas, final dressing and seeding/sodding of all embankments, swales, excavations, etc. All of this work shall be included in the bid price for the units of work involved in the construction.

16. EMERGENCY AND PUBLIC SAFETY - The Contractor is required to maintain 24-hour, 7-day week communications facilities, labor, equipment and supplies to meet emergency repair situations, and correct any and all public safety hazards occasioned by performance of work under this contract. A telephone number to affect this service will be submitted to the Engineer and forwarded by him to the City Manager, Water and Sewer, Fire and Police Departments.

    Closing of streets for construction work requires prior 72-hour notice to Engineer, Fire and Police Department. Requests to shut off water or sewer service require prior 72-hour notice to Engineer, water and sewer department, and fire department. In all street closing and utility shutdowns, the residents so served also shall be notified 72 hours in advance by the Contractor. The Owner will operate or personally direct the closing or opening of any utility service at any and all times.

17. NOTICES FROM CONTRACTOR REQUIRED BY OWNER - Notice shall be given to the Owner in writing, and acknowledged by the Owner 72 hours in advance for any action required of the Owner to close streets, shut off or turn on of utilities, and resumption of inspection of the work after a stoppage of 48 hours or more. Lack of acknowledgment in writing shall be prima-facia evidence that such notice was not given.

18. SHOP DRAWINGS - The Contractor shall check and approve shop drawings before submitting them to the Engineer and Owner's Representative for approval. The shop drawings shall be forwarded in the following statement:

    "The Contractor by approving and submitting these shop drawings represents that he has determined and verified all field measurements and quantities, field construction criteria, materials, catalog numbers and similar data, and that he has reviewed and coordinated the information in the shop drawings with the requirements of the work and the contract documents".

    Shop drawings will not be accepted directly from subcontractors or suppliers.

    Shop drawings that cannot be approved will be returned with reasons for rejection. Subsequent submissions shall be noted as revisions of the original submission.

19. CONTRACTOR'S REPRESENTATIVE - The superintendent designated by the Contractor to supervise his work is to be removed from his capacity as the Contractor's representative, if found unsatisfactory, at the sole discretion of the Engineer, and replaced when the request for assignment of another representative is received by the Contractor.

20. CORROSION PROTECTION – N/A

21. BACKFILLING WELL POINT-HOLES - Where dewatering by well points is required the
The Contractor will backfill the holes with plain sand. The cost of such backfilling will be included in the bid price for the item of construction requiring the use of well points to dewater the excavation. Backfill each drill hole immediately after the well point is withdrawn.

22. OTHER CONTRACTORS - Where the work of other trades is simultaneously pursued with this contract, the procedure of the work shall be cooperative so as to permit continuous operation by each Contractor to his fullest capacity.

23. PROJECT COORDINATION: Testing/Inspections/Completion Reports -The Contractor shall be responsible for the construction progress, including the coordination and scheduling of all required tests, inspections, and survey stake-out (as specified in the plans, contract documents and permit conditions). **The appropriate inspectors from the various regulatory agencies, and the engineer, shall be notified at least 24 hours prior to any required testing and inspections.**

24. SURVEY:

A. CONSTRUCTION STAKE-OUT BY CONTRACTOR -The Contractor shall layout and surveys the proposed construction lines and set grade stakes as required. Survey control points shall be set and/or referenced from a sketch of the boundary survey of the project site provided by the owner. Where any questions as to location, alignment or grade of the proposed construction, the Contractor shall report his findings to the Engineer for any decisions that must be made with regards to location or grade.

The Contractor shall make all necessary computations to establish the exact position of all the work from the control point(s) that are shown on the plans or the sketch of the survey provided by the owner. All work shall be referenced to base lines which the Contractor shall establish from the control points, re-establish when necessary and maintain throughout the life of the Contract so as to permit the Engineer to make necessary preliminary, interim, and final measurements and to check the Contractor's layout if he so desires.

The Contractor shall provide and maintain offset stakes outside the limits of grading and construction. Each stake shall be identified and marked to show the offset distance from the Base Line and the Contractor shall furnish grade sheets showing the cut or fill to the finished profile lines with reference to the offset stakes.

The Contractor shall be responsible for maintaining the points he has established. Any error or apparent discrepancies found in the Plans or Specifications shall be called to the Engineer's attention for interpretation prior to proceeding with the work.

The cost to the Contract of the laying out the work from lines and grades furnished in the plans by the Engineer and the cost of stakes set by the Contractor, shall be included in the price bid for the various items scheduled in the Proposal, unless a separate pay item has been included by the Engineer.

B. AS-BUILT DRAWINGS - Subsequent to the completion of the contract work, but prior to

submission of the request for final payment, **the Contractor will prepare in duplicate "As-Built" drawings of the contract work** showing the final location by centerline stationing or other required measurements, all pavement, drainage, and utility construction depicting any changes in the contract plans, including horizontal location and vertical elevation of all tops, inverts and other pertinent points of drainage and sewer structures, and location and depth of all lines, fittings, valves and appurtenances, all revisions in sizes and types, widths, lengths, and depths, and all information necessary to locate or operate concealed or buried valves, fittings and equipment installed under the contract. **All as-built shall be prepared in accordance with Florida Department of Environmental and Utility Providers requirements.**

All electrical switchgear will be labeled to designate the circuits used. All keys will be tagged to show location of lock. It is the intent of this requirement to record and preserve information for future use, and to the extent the "As-Built" drawings. **Roadway, sidewalk and reclaim line as-builts shall be required to be completed and certified by a professional land surveyor,** licensed in the State of Florida, and shall meet the minimum "Standard Requirements for Construction and As-Built Utility Survey Work" per City of Vero Beach Utility Department, current edition. A copy of these minimum criteria is attached in the regulatory requirements and notification section of these documents. **As-built drawings will be subject to the approval and acceptance of the Engineer, prior to final payment.**

Detailed Specifications

SPECIFICATIONS – GENERAL

All work specified in Construction Documents prepared by Knight, McGuire & Associates, Inc. shall conform to:

1. F.D.O.T. Roadway and Traffic Design Standards, latest edition.
2. F.D.O.T. Standard Specifications for Road and Bridge Construction, latest edition.
3. City of Vero Beach Water and Wastewater Utility standards.
4. Florida Department of Environmental Protection Water and Sewer.
5. Town of Indian River Shores Codes and Ordinances.
6. All permit conditions.
7. Construction plans and all standards referenced therein.

The contractor shall obtain and maintain on site, a copy of all standards referenced within the plans and specification.

SPECIFICATIONS – DETAILED

The work in this contract consists of clearing/grubbing, excavation and embankment construction, and all else incidental, as depicted in the construction plan sheets and listed in the construction documents.

Contract Proposal:

The earthwork portion of the project shall be bid as a lump sum contract price, and shall include all clearing and disposal of vegetation, debris, etc., excavation embankment construction, grading, compaction, de-watering, erosion control, borrow excavation, survey, and all else necessary and incidental thereto.

GENERAL

It is intended that the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction," latest revisions, be used where applicable for various work, and that where such wording therein refers to the State of Florida and it's Department of Transportation and personnel, such wording is intended to be replaced with that wording which would provide proper terminology, thereby making such "Standard Specifications" for this project. In addition the contractor shall refer to the "FDOT Roadway and Traffic Design Standards," latest revisions. If within that particular section another section, article or paragraph is referred to, it shall be a part of the standard specifications, also. All work shall be in a workmanlike manner and shall conform to all applicable city, county, state and federal regulations and/or codes. The contractor shall also be responsible for obtaining all permits and licenses required to begin work. The contractor shall give the engineer 24 hours notice prior to requesting required inspections and shall supply all equipment necessary to properly test and inspect the completed work. The contractor will guarantee all work and materials for a period of one year for the date of project acceptance, during which all faulty construction and/or materials shall be corrected at the contractor's expense.

CLEARING/GRUBBING

The contractor shall completely remove and dispose of all building, timber, trees, brush, stumps, roots, rubbish, debris, including septic tank, building foundations, pipes, pavement, etc., within the limits of the construction, all areas where structures will be constructed including pipe culverts, and as otherwise depicted in the plans, all in accordance with Section 110 of the standard specifications. The owner and/or engineer may designate areas of the site to be protected from clearing operations. Specimen trees located in desirable areas may be designated for protection any work or time related to preservation of trees is considered incidental to contract and no extras will be charged.

SELECTIVE CLEARING

The contractor shall completely remove all exotics (Australian Pine, Brazilian Pepper, Melaleuca, Chinaberry) except that roots etc. may be cut off flush with ground surface – and must be treated with an appropriate herbicide to ensure complete eradication of exotics. Undergrowth shall be completely removed except in

specific areas designated by the engineer and owner's representative to remain for aesthetic reasons. All hardwoods and other desirable trees (non-exotics) shall be protected and left standing.

GRADING

The contractor shall perform all grading necessary to achieve the proposed plan grades, final dressing shall have a tolerance of 0.1 ft. from the plan cross sections. Grading shall include all shaping, rough grading, roadway excavation and final dressing required for the proposed site work, building pads – each lot, roadway and road embankments within the limits depicted in the plans. All building lots shall be filled and graded so as to leave a finished grade 12" above the proposed centerline of the adjacent road, within the "building envelope" of each lot as depicted on the plan sheets, and sloped to drain as indicated on the plan sheets, and typical lot grading detail on the plan sheets. The contractor shall be responsible for maintaining the finished grades until contract closeout, and must re-grade as required when erosion or other disturbance occur. Seed/mulch and/or sodding shall be incorporated to assist in this regard. However, any loss of sod or seed/mulch during these occurrences shall be replaced at the contractor's expense.

SOD

Sod shall be argentine bahia, unless otherwise indicated. Sod shall be well matted with roots and shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh and uninjured at the time of planting and shall be reasonably free of weeds and other grasses. The receiving ground surface shall be graded to proper elevations, free of large voids, roots, weeds or patches of existing grass. Upon lying, the entire area shall be rolled thoroughly. All sodded areas are to be watered to keep sod alive until the contractor is closed out, Contractor shall replace dead sod.

SEED/MULCH

The contractor shall seed/mulch all areas as shown on the plans or as directed by engineer immediately after grading, and at the earliest practical time in the contract time frame. The seed shall be a mixture allowing a quick grow in and a permanent ground cover. The contractor shall meet FDOT standards and shall seed/mulch, water/maintain the planted area until final project acceptance.

EXCAVATION/EMBANKMENT

Shall consist of the excavation and utilization or disposal of all material necessary for the construction of the proposed embankments, berms, ditches, swales, lakes, ponds, retention areas, and other utilization of materials excavated; and shall include the compaction and dressing of the excavated areas and embankments. Materials acceptable for embankments shall conform to FDOT standard specifications Section 120-7 and 120-8, and shall be free of muck, roots, stumps, brush, vegetative matter, rubbish, or other deleterious materials that will not compact. Undesirable materials shall be removed and disposed of at the contractor's expense. All on-site lake excavation material fill is assumed to be acceptable material for the purpose of this contract. Any off-site borrow materials must be approved by the engineer prior to its use.

The excavation and embankment construction shall be classified as follows:

1. Sub-soil excavation:
   The excavation and disposal and/or placement of muck, clay, rock, or any other material that is unsuitable in its regular position. The limits of this excavation are particularly subject to field variations in accordance with conditions actually encountered. Generally, the surface layer of muck and highly silty sands shall be removed from: a point 10 feet outside all building footprints, and 5 feet outside all road ways, driveways, and parking areas, and within the limits of lake excavation. The excavated materials shall be stockpiled and/or placed where designated on the plans, and will be utilized for any required berms, or for general fill in areas not intended for building or pavement embankments.

2. Regular excavation:
   The excavation and placement of suitable materials for the construction of proposed roadway, parking lot, and building pad embankments, ditches, swales, retention areas, lakes. Materials acceptable for these

embankments shall conform to FDOT standard specifications, section 120-7 and 120-8, and shall be free of muck, roots, stumps, brush, vegetation matter, rubbish or other deleterious materials that shall not compact.
Material: select grade A.A.S.H.T.O. M-145, designation A-1, A-3, A-2-4, (reference FDOT index 505)
Compaction: 12" compacted lifts, min. 98% max. dry density (A.A.S.H.T.O. T-180).

3. Borrow excavation:
The excavation and satisfactory utilization of material from authorized borrow pits for the construction of proposed roadway, parking lot, and building pad embankments, ditches, swales, retention areas. Materials acceptable for these embankments shall conform to FDOT standard specifications, section 120-7 and 120-8, and shall be free of muck, roots, stumps, brush, vegetation matter, rubbish or other deleterious materials that shall not compact. Material: select grade A.A.S.H.T.O. M-145, designation A-1, A-3, A-2-4, (reference FDOT index 505)
Compaction: 12" compacted lifts, min. 98% max. dry density (A.A.S.H.T.O. T-180).

COMPENSATION
Compensation for the excavation/ embankment construction shall be made fully by the bid items for borrow excavation (per cy), grading (per lf of roadway or per acre of site), regular excavation (per cy) and sub-soil excavation (per cy) when applicable, or as a lump sum price (as outlined in the proposal).

STAKING
Construction staking shall be the responsibility of the Contractor. See Paragraph 24 of the "Special Provisions" in the contract documents.

TESTING
The contractor shall retain the services of an approved independent testing laboratory to conduct all required testing on the embankment, sub-grade, base, pipe backfill and utilities as applicable. Test results must be approved prior to any request for payment on the above items. The schedule for testing the construction shall be as follows:

EMBANKMENT
1. Density tests shall be taken for each 12" lifts constructed. The contractor shall pay for all tests. Test lab approved by Owner. All reports shall be copied to the Owner and Engineer direct. Testing shall be provided at the following locations, within all phases:
- One location for each 4 consecutive building lots
- 200 ft O.C. along centerline of roadway – all phases.

CLEAN UP
The contractor must provide cleanup of excess construction material upon completion of the project. The site must be left in a neat, clean, graded condition.

<u>Order of Work:</u>
1. Obtain all required permits (clearing, de-watering, etc.)
2. Pre-construction meeting: on-site meeting, scheduled by contractor. Attending: Contractor, engineer, owner's representative, jurisdictional agencies representative (if required by permits).
3. Construct sediment/erosion controls.
4. Clearing of all areas except those areas designated for protection.
5. Selective clearing of areas designated in the plans.
6. Excavate, haul, place, grade and compact the lake excavation and construct required embankment.
7. Stockpile and/or dispose of excess material. (If any) in accordance with the grading plan.
8. Excavate, haul, and place borrow material if needed.
9. Final grade. Seed/stabilize all embankments/graded areas. As-built project.
10. Cleanup.

Construction Conditions:

1. **Provide a temporary construction fence barrier around all trees, plants or groups of trees and "selective clearing areas" that are designated to be saved in the plans, or as determined to be saved in the field by the engineer/owner within areas designated for protection.**
2. Provide appropriate erosion control measure so that silts do not impact the adjacent development right of way(s), waterways, wetlands and existing lake. Include necessary filter barriers (hay bales, silt fence, etc.) in the contract proposal.
3. All work shall be in accordance with permit conditions.
4. Unsuitable materials excavated from the site including that from clearing operations (upper 3 to 4 inches of "scrapings") that could not otherwise be used for roadway and building pad embankments, may be used for berm construction, filling of landscape areas, etc.
5. Any excess fill (if any) shall remain stockpiled on-site.
6. Embankments/graded areas to be seed and mulched or sodded as indicated for in the plans immediately after final grade is achieved, as follows:
   - All lake banks
   - All ditch and swale banks, bottoms
   - All top and back of berms/embankments at perimeter of project
   - All areas outside of the project limits, but disturbed during construction.
7. The priority of use of on-site excavated material.

SPECIFICATIONS – PAVEMENT/RIGHT OF WAY/DRAINAGE/UTILITY CONSTRUCTION

GENERAL

It is intended that the Florida Department of Transportation "standard specifications for road and bridge construction", Latest revisions, be used where applicable for various work, and that where such wording therein refers to the state of Florida and its Department of Transportation and personnel, such wording is intended to be replaced with that wording which would provide proper terminology, thereby making such "standard specifications for road and bridge construction" As the "standard specifications" for this project. In addition the contractor shall refer to the "FDOT Roadway and Traffic design standards", latest revisions. If within that particular section another section, article or paragraph is referred to, it shall be a part of the standard specifications, also. All work shall be in a workmanlike manner and shall conform to all applicable city, county, state, and federal regulations and/or codes. The contractor shall also be responsible for obtaining all permits and licenses required to begin work. The contractor shall give the engineer 24 hours notice prior to requesting required
inspections and shall supply all equipment necessary to properly test and inspect the completed work. The contractor shall guarantee all work and materials for a period of one year from the date of project acceptance, during which all faulty construction and/or materials shall be corrected at the contractor's expense.

CLEARING/GRUBBING

The contractor shall completely remove and dispose of all building, timber, brush, stumps, roots, rubbish, debris, including septic tank, building foundations, pipes, etc., Within the limits of the roadway construction, all areas where structures will be constructed including pipe culverts, and as otherwise depicted in the plans, all in accordance with section 110 of the standard specifications.

GRADING

The contractor shall perform all grading necessary to achieve the proposed plan grades, final dressing shall have a tolerance of 0.1 ft + from the plan cross sections. Grading shall include all shaping, rough grading, roadway excavation and final dressing required for the proposed roadway and road embankments within the limits depicted in the plans. The contractor shall be responsible for maintaining the finished grades until contract closeout, and must re-grade as required when erosion or other disturbances occur. Seed/mulch and/or sodding shall be incorporated to assist in this regard. However, any loss of sod or seed/mulch during these occurrences shall be replaced at the contractor's expense.

SOD
Sod shall be argentine bahia, unless otherwise indicated. Sod shall be well matted with roots and shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh and uninjured at the time of planting and shall be reasonably free of weeds and other grasses. The receiving ground surface shall be graded to proper elevations, free of large voids, roots, weeds or patches of existing grass. Upon lying, the entire area shall be rolled thoroughly. All sodded areas are to be watered to keep sod alive until the contractor is closed out, with dead sod shall be replaced by Contractor.

EMBANKMENT CONSTRUCTION
Roadway embankment construction shall consist of all the embankment construction required for the proposed roadway and/or parking lot, building pads, ditches and swales in accordance with section 120 of the standard specifications. Embankments shall be constructed from material containing no muck, stumps, roots, brush, vegetable matter, rubbish, or other deleterious materials that will not compact to a suitable enduring roadbed.

Material: select grade; AASHTO M-145 designation A-1, A-3, A-2-4. (ref. FDOT Index 505)
Compaction: 12" compacted lifts, minimum 98% maximum dry density (AASHTO T-180).
Compensation: compensation for the embankment construction shall be made fully by the bid items for borrow excavation (per cy), grading (per lf of roadway or per acre of site), and regular excavation (per cy) when applicable, or as a lump sum price (as outlined in the proposal).

STAKING
Construction staking shall be the responsibility of the contractor.

Stabilizing
Stabilized sub-grade shall be constructed to the L.B.R. value of 40 as per plan for the depth and limits shown on the plan, and in accordance with section 160 of the standard specifications. All stabilized areas shall be compacted to at least 98% of the maximum density as determined by AASHTO T-180.

BASE COURSE
The base shall be constructed of either limerock material in accordance with section 911 or cemented coquina shell material in accordance with section 915 of the standard specifications. Limerock base shall be constructed in accordance with section 200 and cemented coquina shell base shall be constructed in accordance with section 250 of the standard specifications. The contractor shall provide rock pit certification for cemented coquina shell material. Base shall be compacted to at least 98% of the maximum density as determined by AASHTO T-180 and shall be constructed to an L.B.R. value of 100. Base shall be approved prior to prime coat.
Prime and Tack Coats for the base course shall be in accordance with section 300 of the standard specifications.

ASPHALT CONCRETE SURFACE COURSE (ACSC)
Type SP9.5 shall be constructed for the depth and limits shown on the plan, in accordance with sections 320, 330 and 331 of the standard specifications.

CURB
All curb construction shall be in accordance with section 520 of the standard specifications, and in accordance with FDOT Index no. 300. Provide contraction joints at 10-foot o.c. maximum. Transition ends of curb from full to zero heights in 3-feet. Curb cut ramps shall be in accordance with FDOT index no. 304.

TESTING
The contractor shall retain the services of an approved independent testing laboratory to conduct all required tests on embankment, sub-grade, base, pipe backfill, and surface course materials. Test results must be submitted prior to any request for payment on the above items. The schedule for testing the road/pavement areas construction shall be as follows:
A. Embankment:

(1) density tests shall be taken at a maximum of 200 ft. Intervals for each 12" lifts constructed. (also, see testing requirements for earthwork – P. DS-2)

B. Subgrade:

(1) L.B.R. value tests shall be taken at intervals of not more than 200 feet, or closer as might be necessary in the event of variations in subsoil conditions.

(2) density tests shall be taken at intervals of not more than 200 feet or closer as might be necessary.

C. Base:

(1) L.B.R. value tests shall be taken at intervals of not more than 200 feet, or closer as might be necessary in the event of variations in subsoil conditions.

(2) density tests shall be taken at intervals of not more than 200 feet or closer as might be necessary.

D. Pipe backfill:

(1) density tests shall be taken at a maximum of 200 ft. intervals over pipe (water, sewer, drainage, etc.) where pipe lies beneath road right of way or within 10 ft of building pads (at side lot lines)

E. Structures:

(1) A minimum of 1 density test shall be performed in the stabilized subgrade adjacent to each structure installed.

F. Building pad:

(1) as specified under Earthwork – P. DS-2.

The contractor shall pay for all tests.

CLEAN UP

The contractor must provide cleanup of excess construction material upon completion of the project. The site must be left in a neat, clean, graded condition.

DRAINAGE SPECIFICATIONS

Storm inlets and manholes shall be constructed in general accordance with section 425 of the standard specifications of the Florida Department of Transportation. Concrete shall have a minimum 28-day compressive strength of 3000 psi. All reinforcing steel to be ASTM a 615-72 grade 40, fy = 40,000 psi, and shall be handled and placed in accordance with ACI 318-71. Precast concrete manholes and storm inlets may be used upon the engineer's approval of the manufacturer's shop drawings.

Precast inlets all storm inlets shall be precast reinforced concrete in accordance with applicable references to FDOT drawings in the "FDOT Roadway and Traffic Design Standards", latest edition. Type II Portland cement shall be used in the concrete mix.

Concrete shall have a minimum compressive strength at 28-days of 4000 psi.

STORM PIPES

Reinforced concrete pipes (RCP) shall be in accordance with section 941 of the standard specifications. Corrugated aluminum pipe shall be in accordance with Section 945 of the standard specifications. Storm sewer construction shall be in accordance with Section 430 and related sections of the standard specifications of the Florida Department of Transportation. Backfilling over pipe culvert and storm sewers shall be completed in maximum 6" lifts, to a point 12" above the pipe, and in 12" lifts beyond, compacted to a minimum of 98% of maximum dry density.

CONCRETE

Unless otherwise specified or indicated, all concrete shall have a minimum compressive strength at 28-days of 3000 psi. All work shall comply with the current edition of the American Concrete Institute (ACI) building code and the applicable building codes having jurisdiction in the area.

RECORD DRAWINGS

Contractor shall keep and maintain record drawings on the project site at all times which shall be annotated by the contractor, depicting any changes made in the field which differ from the contract drawings. Record drawings shall also be prepared by a surveyor provided/paid by the contractor, and will include, but are not limited to, horizontal location, vertical elevations, invert and top elevations of earthwork, pavement, and

infrastructure including: culverts, sewer manholes, drainage structures, inlets, and utility mains. Contractor shall submit complete and final record drawings to engineer upon completion of project and prior to final inspection and final payment. The contractor shall be required to have a surveyor provide certified record drawings.

INSPECTION
Minimum construction inspection checkpoints
The engineer shall be notified:
A. Prior to any major deviation from the approved plans.
B. 24 hours prior to any required testing (other than densities or L.B.R.'s).
C. Upon completion of subgrade and compaction.
D. Upon beginning of spreading of rock base material.
E. Upon completion of grading and compaction of base material and prior to priming.
F. Immediately prior to and upon application of ACSC.
G. Upon completion of construction.

INSPECTION NOTIFICATION
The respective jurisdictional division shall be notified, in writing, with copies to the community development division of the commencement and completion of the following items of construction so that an immediate inspection can be performed to ensure construction in conformance with said approved construction plans and specifications and the requirements.

1. Waterline and sanitary sewer lines prior to backfilling (County Utilities Dept.)
2. Stabilized subgrade (County Public Works Dept.)
3. Curb and concrete work (County Public Works Dept.)
4. Roadway base (County Public Works Dept.)
5. Surface course (County Public Works Dept.)
6. Permanent reference monuments and permanent control points (County Public Works Dept.) The failure to notify the respective divisions of the commencement and the completion of construction of such items shall be good cause to refuse to issue a certification of completion until such further investigation is conducted to verify compliance with the land development permit. All reclaim water improvements must be inspected by the Indian River County Utilities representative or the appropriate representative prior to backfilling.

Note:
Where references are made to roadway construction, it is intended to indicate construction for roadways and/or parking lots/driveways.

TRAFFIC/PAVEMENT MARKING AND SIGN SPECIFICATIONS
1. Stop bars shall be 24" wide. Use extruded type alkyd base thermoplastic.
2. All signs and pavement markings shall be in conformance with FDOT Traffic Design Standards and the Manual of Uniform Traffic Control Devices.
3. All pavement markings for the proposed roadways shall be extruded type alkyd base thermoplastic and shall be in accordance with FDOT's Specifications for Road and Bridge Construction, Section No. 711.
4. Special markings (cross walk, stop bars, roadway continuous striping, thru arrows, pavement markings for traffic separators, etc. shall be in accordance with the FDOT Index No. 17346.

SIGNS
1. All signs shall be constructed in accordance with the manual of uniform traffic control devices.
2. All signs shall be Type 'C' single column ground signs in accordance with FDOT Index No. 11860, 11863, 11865, wind load shall be Zone 3 (160 mph).
3. All signs placement shall be in accordance with FDOT Index No. 17302.

GENERAL UTILITY NOTES:
REUSE MAIN LINE – INDIAN RIVER COUNTY UTLITIES

The County Department of Utility Services had developed a minimum standard for water and wastewater utility installation within Indian River County. The Water and Wastewater Utility Standards, March 2014 edition, has been adopted by the County Commission and henceforth all water and wastewater utility installation within Indian River County shall be designed and built in accordance therewith.

The minimum requirements provided herein may be modified on future developments upon approval of the Utility Director or the County Commission upon a finding that the public's health and safety is not adversely affected by such modifications. Any proposed modification to the minimum requirements must be substantiated by a Florida Registered Engineer's certified study, which would indicate compliance with the intent of the minimum requirements as herein provided.

The Department of Utility Services (Utility Department) reserves the right to impose additional field requirements not addressed herein, when in the opinion of the Utility Department, those requirements will improve the integrity of the utility system.

Section 202.20. - Minimum separation between public utilities.

(1) Sanitary sewer mains. A maximum obtainable separation of public access reclaimed water mains and sanitary sewer mains shall be maintained. A minimum horizontal separation of five (5) feet (center to center) or three (3) feet (outside to outside) shall be maintained between reclaimed water mains and sewage mains. Where reclaimed water and sanitary sewer mains cross with less than 18 inches vertical clearance, the sanitary sewage main shall be 20 feet of either ductile iron pipe, concrete encased vitrified clay pipe, concrete encased PVC pipe, or encased in a watertight carrier pipe, centered on the point of crossing.

(2) Potable water mains. A maximum obtainable separation of public access reclaimed water mains and potable water mains shall be maintained. A minimum horizontal separation of five (5) feet (center to center) or three (3) feet (outside to outside) shall be maintained between reclaimed water mains and potable water mains. Where reclaimed water and sanitary sewer mains cross with less than eighteen (18) inches vertical clearance, the sanitary sewage main shall be twenty (20) feet of either ductile iron pipe, concrete encased vitrified clay pipe, concrete encased PVC pipe, or encased in a watertight carrier pipe, centered on the point of crossing.

(3) A seventy-five-foot setback distance shall be provided from public access reclaimed transmission facility/transmission mains to any public potable water supply well.

(4) Testing and Acceptance of the Reuse Lain per IRC Utility Dept. The 16" reuse line will be tested and acceptance per County and DEP standard and then plugged dry for future connection by other.

SECTION 01
DEWATERING (DURING CONSTRUCTION)

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope of Work: The work to be performed under this Section shall include the design and installation of temporary well point systems until completion of construction to remove subsurface waters from structures and piping as necessary. The Contractor shall be responsible for all permitting activities, including permit fees, associated with obtaining applicable permits from the St. John's River Water Management District (SJRWMD) having jurisdiction over the installation and operation of the dewatering systems.

B. Related Work Described Elsewhere:

1. Section 02: Excavation, Trenching, Backfilling and Embankment

1.2 QUALITY ASSURANCE

A. Qualifications: The temporary dewatering system shall be designed by a firm who regularly engages in the design of dewatering systems and who is fully experienced, reputable and qualified in the design of such dewatering systems.

1. Standards: The dewatering of any excavation areas and the disposal of water during construction shall be in strict accordance with all local and state government rules and regulations.

PART 2 – PRODUCTS

2.1 GENERAL

A. The equipment specified herein shall be standard dewatering equipment of proven ability as designed and manufactured by firms having experience in the design and production of such equipment. The equipment furnished shall be designed, constructed and installed in accordance with the best practices and methods.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Dewatering: The Contractor shall install temporary well point dewatering systems for the removal of subsurface water encountered during construction of the proposed structures and pipelines as specified above. The Contractor shall also install temporary monitoring wells to prove compliance with the dewatering depth requirements specified herein.

3.2 PROTECTION AND SITE CLEAN UP

A. At all times during the progress of the Work, the Contractor shall use all reasonable precautions to prevent either tampering with the well points or the entrance of foreign material.

B. Immediately upon completion of the use of the well point system, the Contractor shall remove all of his equipment, materials, and supplies from the site of the work, remove all surplus materials and debris, fill in all holes or excavations, and grade the site to elevations of the surface levels which existed before work started or as shown on the Drawings.

3.3 MINIMIZING NOISE DISTURBANCES

A. All dewatering pumping units shall be enclosed with noise attenuation barricades and equipped with exhaust mufflers. The dewatering pumps shall be boxed or barricaded such as to prevent or minimize disturbances to nearby residential dwellings.

END OF SECTION – 01

SECTION 02
EXCAVATION, TRENCHING, BACKFILLING AND EMBANKMENT

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals necessary to perform all excavation, removal of unsuitable material, backfill, fill and grading required to complete the work shown on the Drawings and specified herein. The work shall include, but not necessarily be limited to, all excavation and trenching; all backfilling; embankment and grading; disposal of waste and surplus materials; and all related work such as sheeting, bracing and dewatering.

B. The Contractor shall examine the site and review the available test borings data prior to submitting his proposal, taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of subsurface conditions.

1.2 RELATED WORK

A. Section: - Dewatering

1.3 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

B. American Association of State Highway and Transportation Officials (AASHTO) Standards:

- M145-82 - The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes.
- T180-74 - Moisture-Density Relations of Soils Using a 10-lb. (4.54 kg) Rammer and an l8-inch (457 mm) Drop.
- T l91-61 - Density of Soil In-Place by the Sand-Cone Method. (R l982)

C. Florida Department of Transportation; "Standard Specifications for Road and Bridge Construction", (FDOT) latest edition

D. ASTM D2487: "Unified Classification System."

1.4 DEFINITIONS

A. Common Fill: Common fill shall consist of any material classified as SW, SW-SM, or SW-SC under the Unified Classification System (ASTM D2487) which does not contain stones larger than 2 inches in any dimension and which has no more than 12 percent of its material by weight passing the No. 200 sieve.

B. Unsatisfactory Materials: Unsatisfactory materials shall be materials that do not comply with the requirements for common fill. Unsatisfactory materials include, but are not limited to, those materials containing roots and other organic matter, trash, debris, and stones larger than 2 inches, and materials classified in AASHTO M145 as groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction.

C. Unyielding Material: Unyielding material shall consist of rock and gravelly soils with stones greater than 2 inches in any dimension, or in pipe installations, as defined by the pipe manufacturer, whichever is smaller. Unstable material shall consist of material without the sufficient bearing capacity to support the utility pipe conduit or appurtenance structure.

C. Select Common Fill: Select common fill shall meet the requirements for common fill specified above with the exception that select common fill shall not have more than 5 percent of its material by weight passing the No. 200 sieve. Also, the maximum allowable aggregate size for select common fill shall be 1 1/2 inches, or in pipe installations, the maximum size recommended by the pipe manufacturer, whichever is smaller.

D. Degree of compaction: Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in AASHTO T180. Field verification will be obtained by the test procedure presented in AASHTO T191. The term "maximum density" shall mean the maximum density determined under AASHTO T180. PROTECTION

1. Prior to commencing excavation or dewatering, the Contractor shall take precautions to ensure that existing structures, which may be subject to settlement or distress resulting from excavation or dewatering are protected. Such precautions shall include establishing reference elevation markings on structures, which are adjacent to new work, and monitoring them to ascertain evidence of settlement or distress throughout construction. If settlement or distress becomes evident, modifications to the excavation, dewatering or protection procedures shall be made to prevent additional settlement or distress and any damage caused to the structure shall be repaired at the Contractor's expense.

2. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove all water entering excavations, and shall keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels. Dewatering shall be conducted in such a manner as to preserve the undisturbed bearing capacity and composition of the subgrade soils at the proposed bottom of the excavation. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed so that the stability of the bottom and sides of the excavations is maintained.

1.5 SUBMITTALS

A. Submit to the Engineer for review, the proposed methods of construction, including dewatering, excavation, bedding, filling, compaction, and backfilling for the various portions of the work. Review shall be for informational purposes only. The Contractor shall remain responsible for the adequacy and safety of the method.

1.6 SOIL TESTING

The Contractor will be required to provide soil tests results of compacted area of the existing subgrades and the proposed new parking area.

A. The Engineer may order the excavation down to any depth of backfilled material, which has not been tested, and have a test performed. The Contractor shall excavate for the test and backfill after the test at no additional cost to the Engineer and/or Owner. The Contractor shall re-excavate to the depth required and re-compact any areas found to be improperly backfilled.

PART 2 – PRODUCTS

2.1 MATERIAL

A. Only common fill or select common fill, as defined above, may be used as backfill unless otherwise directed by the Engineer.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation of every description and of whatever substance encountered shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the excavation, or trench, sufficient to avoid overloading and to prevent slides or cave-ins. Adequate drainage shall be provided for the stockpiles and surrounding areas and measures shall be taken to prevent contamination with unsatisfactory excavated material or other material that may destroy the quality and fitness of the suitable stockpiled material. Should any stockpiled material become so contaminated as to be unsatisfactory, such material shall be removed and replaced with satisfactory on-site or imported material from accepted sources at the Contractor's expense. Excavated material not required or not satisfactory for backfill shall be removed from the site.

B. Rock excavation shall be understood to mean ledge rock. Rock excavation shall be made to the widths and depths directed by the Engineer in the field. Removal of existing concrete foundations shall also be considered rock excavation. Boulder excavation shall be understood to mean only boulders in any kind of excavation exceeding 1 cubic yard in volume, which can be excavated without resorting to blasting. Where rock or boulders are encountered, they shall be uncovered, but not excavated, until directed by the Resident Project Representative. No blasting shall be allowed on the project.

C. All roots 1-1/2 inches and greater in diameter shall be removed for a depth of l8 inches below the bottom of a cut. The excavation shall then be backfilled up to a specified grade in the manner specified.

D. Excavation shall be made to the grades on the Drawings and to such widths as will give suitable room for construction of the structures, for bracing and supporting, pumping and draining. The bottom of the excavations shall be rendered firm and dry and in all respects acceptable to the Engineer. If, in the opinion of the Engineer, the material encountered at the required subgrade elevation, is unsuitable for foundations, it shall be removed to such depth and width and be replaced with suitable materials as directed by the Engineer. A thin seal slab of lean concrete may be placed at the base of the completed excavation.

E. Any underlying lines, conduits, evidence of previous work, or natural condition discovered during the excavation that may affect the integrity of any foundation shall immediately be brought to the attention of the Engineer.

F. An imaginary 45-degree line extending downward and outward from the bottom corner of any existing foundation shall not intersect any intended excavation for adjacent foundations or utilities, unless authorized by the Engineer.

3.2 TRENCHING

A. The trench shall be excavated as recommended by the manufacturer of the pipe to be installed and as shown on Drawings. Trench walls below and above the top of the pipe shall be sloped, or made vertical, as shown on the Drawings.

B. The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom half of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. The trench bottom shall be free from unyielding material. Where unyielding material is encountered in the bottom of the trench, such material shall be removed 4 inches below the required grade and replaced with select common fill.

C. Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select common fill.

3.3 DEMUCKING

A. The Contractor shall remove all muck in areas designated or noted on the Drawings. The muck shall be excavated to the depth required for complete removal, and disposed of at an accepted dumpsite in accordance with all applicable rules and regulations. The Contractor shall notify the Engineer if muck is encountered on the site.

3.4 MISCELLANEOUS EXCAVATION

A. The Contractor shall perform all the remaining miscellaneous excavation. The Contractor shall make all excavations necessary to permit the completion of the work as shown on the Drawings and specified herein.

3.5 BACKFILLING

A. Backfill material shall consist of common fill or select common fill as defined herein and as shown on the Drawings. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 12 inches loose thickness for other than hand-operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent of the maximum dry density as determined by AASHTO T180 for cohesion less soils unless otherwise specified. The bottoms of all excavations shall be compacted to at least 95 percent of the maximum density prior to backfill.

B. Trench Backfilling: For trenches, unyielding material removed from the bottom of the trench and unsuitable or unstable material removed from the trench shall be replaced with common fill or select common fill as shown on the Drawings. Replacement materials and backfill materials shall be placed in layers not exceeding 6 inches loose thickness from the bottom of the trench to 12 inches above the top of pipe and in layers not exceeding 12 inches loose thickness thereafter. In unpaved areas, each layer of replacement material, or backfill material, shall be compacted to at least 95 percent of maximum density. In paved areas, each layer of replacement material, or backfill material, shall be compacted to at least 95 percent of maximum density.

C. For paved areas, backfill shall be placed up to the elevation indicated and compacted to not less than 98 percent maximum dry density as determined by AASHTO T180 in not more than twelve-inch lifts.

D. For Sod Areas and Miscellaneous Areas; Backfill shall be deposited in layers of a maximum of 12 inch loose thickness, and compacted to 95 percent maximum dry density as determined by AASHTO T180.

E. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface or subgrade, or layer of soil material. Prevent free water from appearing on surface during or subsequent to compaction operations.

1. Remove and replace, or scarify and air-dry, soil material that is too wet to permit compaction to specified density.

2. Soil material that has been removed because it is too wet to permit compaction, but is

otherwise satisfactory, may be stockpiled or spread and allowed to dry until moisture is reduced to a satisfactory value.

3.6 EMBANKMENT

A. All organic material, including peat and roots, and other similar unsuitable material shall be removed from area beneath new embankments. The area shall be graded by filling depressions. All depressions shall be filled in layers and compacted as specified below. If the subgrade slopes are excessive, the subgrade shall be stepped to produce a stable surface for the placement of the embankments. The top six (6) inches of the natural subgrade shall then be compacted to 95 percent of the maximum dry density as determined by AASHTO T180. The Engineer will waive this requirement, if, in his opinion, the subgrade will be rendered unstable by such compaction.

B. Earth embankments shall be constructed with common fill or select common fill as specified. The material shall be placed in uniform layers not to exceed twelve (12) inches in thickness measured loose. Material too wet for compaction shall be dried prior to compaction and moisture shall be added to materials too dry prior to compaction. When each layer of material has been conditioned to the best practicable moisture content for compaction purposes, it shall be uniformly compacted by an accepted roller with a minimum of six (6) passes made for each layer. Material shall be compacted to at least 95 percent of maximum dry density determined by AASHTO T180.

C. Select common fill shall be used to raise the subgrade elevation for structures and as backfill around structures where conduit and piping join structures. Select common fill shall be compacted by a minimum of six coverage's with accepted compaction equipment to at least 98 percent of maximum dry density as determined by AASHTO T180.

D. Common fill may be used as fill as indicated on the Drawings, as embankment fill or in other areas as designated by the Engineer. Material conforming to the requirement of common fill shall be placed in layers having a maximum thickness of twelve (12) inches measured before compaction. Each layer of common fill shall be compacted to 95 percent of the maximum dry density as determined by AASHTO T-180.

3.7 SURPLUS MATERIAL

A. Excavated material or borrow fill to be used in construction shall be neatly piled so as to inconvenience, as little as possible, the public and adjoining property owners until used or otherwise disposed of. Suitable excavated material may be used for fill embankments, trench backfill or backfill on the different parts of the work as required. Surplus fill shall become the property of the Contractor, and shall be removed and disposed of by him off the site.

B. The Contractor shall remove and dispose of all pieces of rock (ledge) and boulders, which are not suitable for use in other parts of the work. Rock disposed of by hauling away to spoil areas is to be replaced by accepted surplus excavation obtained elsewhere in the work insofar as it is available. Any deficiency in the backfill material shall be made up with satisfactory material provided by the Contractor at no additional cost to the Owner. Rock may be used in embankment fill only with approval of the Engineer.

3.8 GRADING

A. Grading shall be performed at all places that are indicated on the Contract Drawings, to the lines, grades, and elevations shown and otherwise as directed by the Engineer and shall be performed in such a manner that the requirements for formation of embankments can be followed. During the process of grading, the subgrade shall be maintained in such condition that it will be well drained at all times.

B. In cuts, all loose or protruding rocks on the back slopes shall be removed to line or finished grade

of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings or as directed by the Engineer.

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

3.9 MEASUREMENT AND PAYMENT

A. Measurement and payment for excavation, trenching, backfill and embankments will be included in the various items of work with no additional compensation for this work. This work shall include all labor, materials, tools, equipment, transportation, and incidentals for excavation, trenching, backfill and embankment in accordance with the Contract Documents.

END OF SECTION

SECTION 03
SLOPE PROTECTION AND EROSION CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

Contractor shall furnish all labor, materials, equipment, and incidentals required to perform all work as specified.

1.2 RELATED SECTIONS

A. Section 02 — Excavation, Trenching, Backfilling, and Embankment

1.3 ENVIRONMENTAL REQUIREMENTS

The Contractor shall protect adjacent properties and water resources from erosion and sediment damage throughout the life of the contract.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Quick growing grasses such as wheat, rye or oats
B. Fencing for siltation control as specified on the plans
C. Fence stakes shall be metal stakes a minimum of 8ft. in length

PART 3 - EXECUTION

3.1 PREPARATION

A. Review site erosion control plan and SWPPP.
B. Deficiency or changes in the erosion control plan as it applies to current conditions will be brought to the attention of the Engineer for remedial action.

3.2 EROSION CONTROL AND SLOPE PROTECTION IMPLEMENTATION

A. Place erosion control systems in accordance with the erosion control plan and SWPP

B. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct the contractor to provide immediate permanent or temporary pollution control measures. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practical time to minimize the need for temporary controls.

C. The temporary erosion control systems installed by the contractor shall be maintained as directed by the Engineer to control siltation at all times during the life of the contract. The Contractor must respond to any maintenance or additional work ordered by the Engineer within a 48-hour period.

D. Slopes that erode easily shall be temporary seeded as the work progress with hydro-mulch or hydro seeding.

END OF SECTION

SECTION 04
RECLAIMED WATER MAINS
DUCTILE IRON PIPE AND FITTINGS

4.01 SCOPE

This section covers cast ductile iron pipe and fittings for reclaimed waterline.

4.02 GENERAL

A. Ductile iron pipe shall be allowed for use as reclaimed water main pipe where compatible with the specific conditions of the project. The use of material other than ductile iron may be required by Indian River County Department of Utility Services (IRCDUS) during construction permit review or by IRCDUS field personnel during construction if it is determined that ductile iron pipe is unsuitable for the particular application.

B. All ductile iron pipes shall be manufactured in accordance with AWWA Standard Specifications C150/A21.50-96 and C151/A51- 96, or latest revisions, and shall be pressure Class 300 or 350 minimum as depicted on Table 6.1 on page 6-2. All ductile iron pipes crossing under roadways shall be pressure Class 350 minimum.

C. Unless specifically indicated otherwise, underground piping shall be bell and spigot and aboveground piping shall be flanged.

D. Cutting of ductile iron pipe shall be by sawing.

E. All exposed ductile iron pipes shall be painted purple in accordance with IRCDUS Approved Manufacturer's Product List.

4.03 PIPE

Ductile iron pipe (DIP) shall be bell and spigot cast in accordance with the latest AWWA Standard Specifications *C150/A21.50-96* and *C151/A51-96,* or latest revisions. Cast ductile iron pipe shall have a minimum tensile strength of 60,000 psi with a minimum yield strength of 42,000 psi.

Pipe wall thicknesses shall be computed in accordance with AWWA Standard Specification *C150/A21.50-96,* or latest revision, using the physical characteristics cited above with a minimum working pressure of 200 psi and a Laying Condition "Type 2."

Unless otherwise indicated or specified herein, the pipe shall have the minimum wall thickness according to class designation for diameters shown. All pipe shall be given a minimum factory hydrostatic test of 500 pounds per square inch.

END OF SECTION

TABLE 5.1
PRESSURE CLASS

SIZE (INCHES)	OUTSIDE DIAMETER (INCHES)	300 PSI THICKNESS (INCHES)	350 PSI THICKNESS (INCHES)
3	3.96	---	0.25
4	4.80	---	0.25
6	6.90	---	0.25
8	9.05	---	0.25
10	11.10	---	0.26
12	13.20	---	0.28
14	15.30	0.30	0.31
16	17.40	0.32	0.34
18	19.50	0.34	0.36
20	21.60	0.36	0.38
24	25.80	0.40	0.43
30	32.00	0.45	0.49
36	38.30	0.51	0.56
42	44.50	0.52	0.63
48	50.80	0.64	0.70
54	57.56	0.72	0.79
60	61.61	0.76	0.83
64	65.67	0.80	0.87

5.1 FITTINGS

A. All underground fittings shall be either push-on, restrained, or mechanical joint. Mechanical joints shall conform to AWWA Standard Specification C110/A21.10-98) or C153/A21.53-00), or latest revisions. All aboveground fittings shall be flanged joint.

B. The pressure rating shall be 350 psi.

C. All fittings shall be lined with the same material as specified for the pipe, as per paragraph 8.05.

5.2 LINING AND COATING

A. Unless otherwise indicated, all ductile iron pipes shall be factory lined and coated.

B. Lining: For 4" and larger, the interior of the pipe shall have a fusion-bonded ceramic epoxy lining. The epoxy material shall be applied in 1 coat with a minimum dry film thickness of 40.0 mils, see Approved Manufacturer's Product List. If and where directed by IRCDUS, a polyethylene encasement shall be provided over pipes and fittings.

C. Coating: Unless otherwise specified, the exterior of the pipe shall have a bituminous coating to a minimum dry film thickness of 1.0 mil.

D. Lining Inspection:

1. All ductile iron pipe and fitting linings shall be checked for thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined SSPC-PA-2 film thickness rating.

2. The interior lining of all pipe and fittings shall be tested for pinholes with a nondestructive 2,500-volt test.

3. Each pipe joint and fitting shall be marked with the date of application of the lining system and with its numerical sequence of application on that date.

E. Certification of Lining Inspection: The pipe or fitting manufacturer must supply a certificate attesting to the fact that the applicator met the requirements of this specification, and that the material used was as specified, and that the material was applied as required by the specification.

F. Repair: Anywhere that the coating is removed purposely or accidentally, the area shall be cleaned of any rust, grease, and dirt and re-coated to a minimum dry film as specified for the individual piece.

F. Encasement: If and when directed by IRCDUS's Engineer, a polyethylene encasement shall be provided around pipe, fittings, and valves. The material, installation, and workmanship shall conform to applicable sections of AWWA Standard Specifications C10S/A21.S-99, or latest revision. Installation methods A or B shall be employed using flat tube polyethylene. The Contractor shall make provisions to keep the polyethylene from direct exposure to sunlight prior to installation. Backfilling following installation shall be completed without delay to avoid exposure to sunlight.

53 BELL AND SPIGOT CONNECTIONS

Joints in bell and spigot pipe shall be push-on, mechanical, or restrained joints in accordance with AWWA Standard Specifications C111/A21.11-00, or latest revision. Pipe restraints shall also be in accordance with IRCDUS Standards or as directed by IRCDUS's Engineer.

5.4 FLANGED CONNECTIONS

A. All flanged pipe barrels shall comply with the physical and chemical requirements as set forth in the Handbook of Ductile Iron Pipe Research Association. Flanges shall be in accordance with ANSI Specification B16.1 for Class 125 flanges. Bolts shall be stainless and comply with ANSI Specification B18.2.

B. Flanged pipes shall be faced and drilled to the American Standard Drilling, unless special drilling is called for or required. Where tap or stud bolts are required, flanges shall be tapped. Flanges shall be accurately faced and drilled smooth and true, at right angles to the pipe axis, and shall be covered with zinc dust and tallow or a rust preventive compound immediately after facing and drilling.

C. Flanged pipe with screwed-on flanges shall be furnished with long hubs, and the flanges shall be screwed on the threaded end of the pipe in the shop and the face of the flange and end of pipe refaced together. There shall be no leakage through the pipe threads and the flanges shall be designed to prevent corrosion of the threads from outside.

D. Flanged joints shall be made with bolts or stud bolts and nuts. Bolts, stud bolts, and nuts shall conform to American Standard heavy dimensions, semi-finished with square or hexagonal heads and cold punched hexagonal nuts, 304SS. Bolt sizes shall be American Standard for the flanges specified, and bolts and nuts shall have good, true threads.

E. Gaskets shall be in accordance with AWWA Standard Specifications *C115/A21.15-99,* or latest revision.

5.5 SUBMITTALS

Before starting fabrication of the ductile iron pipe and fittings, the Contractor shall submit complete detailed working drawings for approval by the Engineer and IRCDUS. Such drawings shall show the piping layouts and contain schedules of all pipe, fittings, valves, expansion joints, hangers and supports, and other appurtenances. Where special fittings are required, they shall be shown in large detail with all necessary dimensions. The drawings submitted shall show flanged joined sections placed so as to be removable without disturbance to the main pipe sections.

5.6 MARKING

A. Number 10 stranded conductor copper trace wire shall be spiral wrapped or affixed to the top of the pipe. See Trace Wire Detail M-13 for specifications regarding installation.

B. Trace Wire is required over all pipes.

C. A 2" wide magnetic I.D. location tape is required over all pipes. Tape is to be installed 12" below proposed finished grade and additional tape shall be adhered to top of pipe if required by IRCDUS engineering.

5.7 INSTALLATION

A. Unless otherwise noted on the drawings or in other sections of this specification, the pipe shall be handled and installed in strict accordance with the manufacturer's instructions. The Contractor shall use every precaution during construction to protect the pipe against the entry of non-potable water, dirt, wood, small animals, and any other foreign material that would hinder the operation of the pipeline. Where the groundwater elevation is above the bottom of the trench, the Contractor shall provide suitable dewatering equipment at no additional cost to the IRCDUS. All piping shall be placed in a dry trench, unless the Engineer and IRCDUS approve wet trench installation.

B. Depth of Cover and Pipe Elevation: Unless otherwise shown on the drawings, or otherwise authorized by the Engineer, all pipe shall have a minimum cover of 36 inches. Contractor shall determine top of pipe elevation and top of ground elevation for every two joints of pipe installed using a level. Pipe must have the minimum cover described above and must be within +/- 0.2 feet of the top of pipe elevation indicated on the drawings. Installed pipe, which does not meet these requirements, shall be reinstalled until it does meet these requirements. Contractor shall record top of pipe and top of ground elevations and the locations of where these elevations were determined and submit this information to Engineer. Engineer reserves the right to have Contractor excavate and check top of pipe and top of ground elevations to see if they conform to the aforementioned requirements, at no cost to the Owner.

END OF SECTION

SECTION 06
RECLAIMED WATER MAINS
POLYVINYL CHLORIDE PIPE

6.01 SCOPE

This section covers polyvinyl chloride pipe and fittings for reclaimed water mains.

6.02 GENERAL

A. Polyvinyl chloride (PVC) pipe shall be allowed for use as reclaimed water pipe where compatible with the specific conditions of the project. Indian River County Department of Utility Services (IRCDUS) may require the use of material, other than polyvinyl chloride, during construction permit review or by IRCDUS field personnel during construction if it is determined that polyvinyl chloride pipe is unsuitable for the particular application.

B. The pipe used for wastewater shall be purple in color.

6.03 PIPE MATERIALS FOR SIZES 4" THROUGH 12"

A. All pipe and fittings intended for conveying or transmitting wastewater shall be designed for a minimum working pressure of 150 psi.

B. Polyvinyl chloride pressure pipe shall conform to AWWA Standards Specifications C900 latest revision, or C909, latest revision and ASTM D1784 and D2241, latest revision. PVC pressure pipe shall be made from Class 12454-A or Class 12454-B material and conform to the outside diameter of cast iron pipe.

C. Polyvinyl chloride pressure pipe less than 4" diameter shall be DR-21, PR-200

D. Polyvinyl chloride pipe shall be purchased in accordance with IRCDUS Approved Manufacturer's Product List.

56.04 PIPE MATERIALS FOR SIZES 14" THROUGH 36"

A. All pipe and fittings intended for conveying or transmitting wastewater shall be designed for a minimum working pressure of 150 psi.

B. Polyvinyl chloride pressure pipe shall conform to the latest AWWA Standards Specifications C905-97 and ASTM D1784, latest revisions. PVC pressure pipe shall be made from Class 12454-A or Class 12454B material and conform to the outside diameter of cast iron pipe with a minimum wall thickness of DR18.

C. Polyvinyl chloride pipe shall be purchased in accordance with IRCDUS Approved Manufacturer's Product List.

6.05 JOINTS

A. Joints for PVC pressure pipe shall be bell and spigot push-on rubber gasket type only. No solvent weld or threaded joints will be permitted.

B. IRCDUS may consider other type joints for specific installation upon submission of specifications and approval.

C. Restraint joints, when required, shall be in accordance with IRCDUS Approved Manufacturer's Product List.

6.06 FITTINGS

A. All underground fittings shall be either ductile iron push-on, restrained, or mechanical joint. Mechanical joints shall conform to AWWA Standard Specifications *C110/A21.10*

or *C153/A21.53* latest revisions. Fittings shall be fusion-bonded ceramic epoxy lined. The epoxy material shall be applied in one coat with a minimum dry film thickness of 40.0 mils and shall be Protecto 401 or approved equal. All aboveground exposed fittings shall be flanged.

B. The pressure rating shall be 350 psi.

C. Joint restraint, when required; shall be in accordance with IRCDUS Approved Manufacturer's Product List.

6.07 SUBMITTALS

Before starting fabrication of the PVC pipe and fittings, the Contractor shall submit complete detailed working drawings for approval by the Engineer and IRCDUS. Such drawings shall show the piping layouts and contain schedules of all pipe, fittings, valves, and expansion joints, hangers and supports, and other appurtenances. Where special fittings are required, they shall be shown in large detail with all necessary dimensions. The drawings submitted shall show flanged jointed sections placed so as to be removable without disturbance to the main pipe sections.

6.08 MARKING

A. Number 10 stranded conductor copper trace wire shall be affixed to the top of the pipe. See Trace Wire Detail M-13 for specifications regarding installation.

B. Trace wire is required over all pipes.

C. A 2" wide magnetic 1.0. location tape is required over all pipes. Tape is to be installed 12" below finished grade and additional tape adhered to top of pipe if required by IRCDUS engineering.

6.09 INSTALLATION

A. Unless otherwise noted on the drawings or in other sections of this specification, the pipe shall be handled and installed in strict accordance with the manufacturer's instructions. The Contractor shall use every precaution during construction to protect the pipe against the entry of non-potable water, dirt, wood, small animals, and any other foreign material that would hinder the operation of the pipeline. Where the groundwater elevation is above the bottom of the trench, the Contractor shall provide suitable dewatering equipment at no additional cost to the Owner. All piping shall be placed in a dry trench, unless the Engineer of Record and IRCDUS approve wet trench installation.

B. Depth of Cover and Pipe Elevation: Unless otherwise shown on the drawings, or otherwise authorized by the Engineer, all pipe shall have a minimum cover of 36 inches. Contractor shall determine top of pipe elevation and top of ground elevation for every two joints of pipe installed using a level. Pipe must have the minimum cover described above and must be within +/- 0.2 feet of the top of pipe elevation indicated on the drawings. Installed pipe, which does not meet these requirements, shall be reinstalled until it does meet these requirements. Contractor shall record top of pipe and top of ground elevations and the locations of where these elevations were determined and submit this information to Engineer of Record or his representative and IRCDUS. Engineer of Record or IRCDUS reserves the right to have Contractor excavate and check top of pipe and top of ground elevations to see if they conform to the aforementioned requirements, at no cost to the Owner.

END OF SECTION