Scope:

The work includes furnishing all labor, materials, equipment, tools and performing all operations in connection with the construction of sanitary sewers and appurtenances, including excavation, trenching, back filling and all appurtenant work as required.

The Contractor shall be responsible for the following:

1. Providing a copy of their Florida Underground Utility and Excavation Contractors Certificate.
2. Acquiring all permits, licenses and fees for testing, etc.
3. Complete coordination of work with ALL utility companies.
4. Location of all underground utilities, whether shown on the drawings or not.
5. Provide a means for all tests required for acceptance by the City of Rockledge.
6. Relocation, extension, enlargement or refurbishment of any part of the existing sanitary sewer system, including lift stations, upon which this construction will have a direct impact, as determined by the City of Rockledge. All work is to be done at no cost to the City.
7. Repair or cost of repair to any damaged underground utilities, to the complete satisfaction of the utility company involved.
8. Securing approved permit from Florida Department of Environmental Protection before construction begins.
9. Providing a copy of bid specifications to the city of Rockledge Wastewater Treatment department.
10. Pre-construction with the Wastewater Treatment department shall include the Engineer of record, Contractor, pre-cast supplier, pipe supplier, density testing representative, and surveyor (optional).
11. Easements, Right-of-Ways
12. Benchmark – A permanent benchmark shall be established for the project.

Materials:

The Contractor shall furnish all new materials of the size and kind shown on the shop drawings and/or approved manufacture specifications, which shall meet the following specifications or requirements. If any of the material is not specified on the shop drawings, the Contractor may use any of the types listed in these Specifications.

A. Polyvinyl Chloride Pipe (Gravity):

1. Plastic gravity sewer pipe and fittings shall be polyvinyl chloride (VC) and conform to the requirements of ASTM Designation D-3034, Type PSM, SDR-35.
2. Elastomeric gasket joints shall conform to ASTM Designation F-477.
3. PVC pipefittings and pipe shall be manufactured by the same company or other approved by the Wastewater Treatment department.

B. Ductile Iron Pipe:

1. Ductile iron pipe meeting the following specifications shall be used by the contractor at all locations specified on the drawings or required in the field.
2. Ductile iron pipe shall conform to ANSI Standard A21.51, using 60,000 psi minimum ultimate strength, 42000 psi minimum yield strength and 10% minimum elongation metal.
3. All ductile iron pipe and fitting shall be epoxy lined.

C. Miscellaneous Concrete:

1. Class A concrete shall be used for cradles and the construction of the manhole bases.
2. Class A concrete shall be used for encasement of the pipe in the cradle and encasement of the lines of the drop connection for drop manholes.

D. Clay Brick:

1. Clay Brick shall comply with the latest ASTM C32, Grade SM hard brick, except that the mean of five (5) tests for absorption shall not exceed 9% by weight. The Contractor shall submit at least five (5) bricks of the type he proposes to use in this construction for approval by the City.

E. Concrete Brick:

1. Concrete brick shall conform to ASTM C139.

F. Manhole Frames and Covers:

1. Manhole frames and covers shall be gray cast iron ASTM-A48-Class 35, free from cracks, holes and cold shuts, and shall conform to US Foundry #22S-AS-ORS. Frames and covers shall conform to details shown on the drawings.
2. Bearing surfaces shall be machined to provide even bearing surfaces or shall have a non-rocking feature.
3. Shall be marked City of Rockledge Sanitary Sewer.

Construction:

A. Location and Grade of Sewers:

1. The line, grade and profile of the sewer, as well as the location of manholes, services and all other appurtenances shall be shown on the drawings.
2. Slopes:

All sewers shall be so designed and constructed to give mean velocities when flowing full, of not less than 2.0 feet per second, based on Kutter's formula using an "n" value of 0.013. Use of the other practical "n" values may be permitted by the plan-reviewing agency if deemed justifiable on the basis of research or field data presented. The following are the minimum slopes which should be provided:

Sewer Size	Minimum slope in Feet Per 100 Feet
8 inch	0.40 (+) (-) .03 per plans
10 inch	0.28 (+) (-) .03 per plans
12 inch	0.22 (+) (-) .03 per plans
14 inch	0.17 (+) (-) .03 per plans

2. All gravity sewer lines shall be installed in the pavement. Manholes are to be in the pavement at least 4' from any curb line.

B. Material Handling:

1. Every precaution shall be taken to prevent injury to the pipe and lining materials during transportation and delivery to the job site. Under no condition shall pipe be dropped, bumped or dragged. When hoisting the pipe with a crane, a suitable pipe hook, storage sling around the pipe shall be used. The crane shall be operated so all lifting is done in a vertical plane. Under no condition shall slings be allowed to pass through the pipe, unless adequate measures have been taken to prevent damage to the ends and interior coating.
2. If, in the opinion of the Engineer, during handling or handling, any pipe or fitting is damaged, it shall be rejected and immediately removed from the site.
3. Fittings and special material shall be stored in a manner which will assure the protection of the material from damage and to keep it clean.

C. Trench Excavation:

Sewer trenches shall not be opened in advance of the laying of the sewer pipe for a distance greater than that required to install the sewer pipe. In no case shall the open trench ahead of the sewer pipe exceed 75 feet. The total length of sewer trench open at any time shall not exceed 300 feet.

D. Control of Water

1. The Contractor shall furnish, install and operate all necessary machinery, appliances and equipment to keep the excavations free from water during construction. Contractor shall dewater and dispose of the water so as not to cause injury to public or private property or cause a nuisance or a menace to the public and meet all State and local requirements. The contractor shall at all times have on hand sufficient pumping equipment. The dewatering systems shall not be shut down between shifts, on holidays or weekends, or during any work stoppages.
2. The control of ground water shall be such that softening of the bottom of excavations or formations of "quick" conditions or "boils" shall be prevented. Dewatering systems shall be designed and operated so as to prevent the removal of natural soils.
3. The static water level shall be drawn down below the bottom of the excavation so as to maintain the undisturbed state of the required density. The dewatering system shall be installed and operated so that the ground water level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.

E. Pipe Laying and Jointing:

1. Pipe laying shall proceed upgrade, with the spigot ends of the pipe pointing in the direction of flow. Each pipe shall be laid true to line and grade so as to form a close concentric joint with the adjoining pipe, preventing offsets in the flow line.
2. Pipe shall be laid either on a prepared bed of undisturbed earth in the bottom of the trench, shaped as required to fit the pipe, or upon a layer of properly placed bedding material. The requirements for pipe bedding vary with the type of pipe to be installed and these requirements are set forth in other applicable paragraphs or on the drawings.
3. As the work progresses, the interior of the pipe shall be cleaned of all dirt and superfluous materials. Where cleaning of the pipe after laying is difficult because of small pipe diameter, the Contractor shall keep a suitable swab or rag in the pipe and shall pull the swab forward past each joint after the joining operation. Pipe ends shall be carefully cleaned prior to joining.
4. All pipe shall be joined in a workman like manner and in accordance with the manufacturer's instruction.

F. Pipe Location Tape:

1. During the backfilling operation, pipe location tape shall be placed directly above and parallel to the buried pipeline. The tape shall be placed with the printed side up and at a maximum depth of two foot (2') below finished grade.
2. The tape shall be Terra Tape "D" as manufactured by Reef Industries, Houston, Texas consisting of three inch (3") wide plastic and metallic foil construction for detection by pipeline locating equipment. The tape shall bear the legend "Caution Buried Sewer Line Below".

G. Unsuitable Material Below Pipe Grade:

1. Wherever excavation of the trench exposes peat, soft clay, quicksand or other unstable material in the bottom of the trench, which in the opinion of the City if unsuitable foundation upon which to lay or support pipe, backfill or expected superimposed loads, such materials shall be removed to a depth necessary to reach material having adequate bearing capacity, at a width at least equal to the width of the trench, and backfilled to pipe invert depth using Type B back fill or bedding material to provide a suitable foundation.
2. Type B material shall be a select granular material free from organics and of such size and gradation that the desired compaction can be readily attained. When tested in accordance with ASTM D422 it shall conform to the following requirements:
   a) Maximum size shall not exceed three inches (3").
   b) At least 95% shall pass the 1" sieve and not more than 10% shall pass the #200 sieve.
   c) The co-efficient of uniformity shall be 15 or greater.
   d) The material shall have a bearing ratio of 35% or greater.

Manholes:

Manholes, including drop manholes, standard manholes, special manholes and cleanouts, shall be constructed in accordance with the details shown on the drawings and applicable sections of these Specifications. Approved manhole adapters shall be used in all manhole connection when PVC pipe is used. Interior drops in manholes are not allowed.

A. Precast Manholes:

1. Precast, reinforced concrete manholes shall be as shown on the drawings and shall conform to ASTM (C478).
2. Precast manholes must have a minimum of eight-inch (8") walls and bases.
3. Manholes shall consist of a base unit, riser units with necessary openings for sewer pipe and concentric cones, and manhole frame and cover. The base unit shall consist of a monolithically poured eight-inch (8") base and bottom ring section. Ramneck joint compound, or its equal, shall be used between riser units.
4. The top of the cone shall be set between five and one-half inches (5 ½") and fourteen and one-half inches (14 ½") below the bottom of the manhole cover frame. It is the intent of these Specifications to provide a minimum of two and one-half inches (2 ½") to accommodate future grade changes without disturbing the manhole. Where the distance between the bottom of the manhole cover frame and the tope of the cone is greater than fourteen and one-half inches (14 ½"), twelve-in (12") riser units shall be used to bring the tope of the cone to within the limits specified.
5. All holes for pipe are to be precast or cored, and have a flexible pipe to manhole connector that provides a watertight joint that meets or exceeds ASTM-C923 specifications.
6. Manhole frames shall be centered over the barrel opening, raised and tiled as necessary to meet the roadway or finish grade by the use of brick shims and set in a full bed of mortar. Any manhole cover, which rocks in its frame upon installation, will not be accepted.
7. For manholes located in pavement, the frame and cover shall be US Foundry Drawing @22S-AS-ORS or approved equal and shall meet finish grade and shall consist of castings with a duty rating sufficient to safely withstand the pavement design loads.
8. For manholes located other than in the paved roadway, frame and cover shall be as specified above and meet the finish grade or shall have an elevation that prevents infiltration through the cover. Any manhole found to be subject to such infiltration shall be raised.
9. Flow through the manholes shall be continuous. Invert channels shall be constructed smooth and semicircular in shape, conforming to the inside of the adjacent sewer section.

   Changes in direction of flow shall be made in a smooth curve, with as large a radius as possible. Change in size and grade of channels shall be made gradually and evenly.
10. Invert channels shall be formed by one of the following methods:
    a) Formed directly into poured concrete manhole base.
    b) Built up with brick or mortar.
11. Free drop in manholes from inlet invert to top of floor (bench) shall not exceed two feet (2'). Standard drop manholes shall be constructed wherever free drop exceeds two feet (2').
12. All manholes shall have a minimum of two (2) coats of epoxy paint (first coat shall be coal tar epoxy), with at least one (1) coat applied in the field. No virgin concrete shall be exposed. All manholes subject to excessive action shall have two (2) coats of epoxy resin on the inside, prior to painting. All seams, joints, and irregular shapes shall be cemented prior to the field coat being applied. Invert channels and bench shall have the field coat.
13. Minimum diameter of manholes shall be four feet (4').
14. Maximum distance between manholes shall be 400 feet.

Fiberglass Manholes:

GENERAL:

Fiberglass reinforced polyester manhole shall be manufactured from commercial grade polyester resin or other suitable polyester or vinyl ester resins, with fiberglass reinforcements. Manholes shall be a one piece unit manufactured to meet or exceed all specifications of A.S.T.M. D-3753 latest edition.

A. Manway Reducer:

Manway reducers will be concentric with respect to the larger portion of the manhole diameters through 60 inches. Larger manholes may have concentric or eccentric Manway reducer openings.

B. Cover and Ring Support:

The manhole shall provide an area from which a grade ring or brick can be installed to accept a typical metal ring and cover with the strength to support a traffic load without damage to the manhole.

C. Certification:

1. As a basis of acceptance, the manufacturer shall provide an independent certification which consists of a copy of the manufacturer's test report and accompanied by a copy of the test results that the manhole has been sampled, tested, and inspected in accordance with the provisions of this specification and meets all requirements.

D. Backfill Procedure:

1. Backfill shall be placed in layers of not more than 12 loose measure inches and mechanically tamped to 98% Standard Proctor Density, unless otherwise approved by Engineer. Flooding will not be permitted. Backfill shall be placed in such a manner as to prevent any wedging action against the fiberglass manhole structure.

Fiberglass Manhole Liner:

GENERAL:

Fiberglass reinforced polyester manhole liner shall be manufactured from commercial grade polyester resin or vinyl resins, with fiberglass reinforcements. The resin system shall be suitable for atmospheres containing hydrogen sulphide and dilute sulfuric acid as well as other gases associated with the wastewater collection systems. The manhole liner shall be a one-piece unit manufactured to meet or exceed all specifications of A.S.T.M. D-3753 latest edition.

A. Cover and Ring Support:

1. The manhole liner shall provide an area for which grade rings or brick can be installed to accept a typical metal ring and cover and have the strength to support a traffic load without damage to the manhole liner.

B. Certification:

1. As a basis of acceptance, the manufacturer shall provide an independent certification which consist of a copy of the manufacturer's test report and accompanied by a copy of the test results stating that the manufacturer's fiberglass manhole has been sampled, tested, and inspected in accordance with the provisions of this specification and meets all requirements.

C. Backfill Material:

1. Unless shown otherwise on drawings and approved by the Engineer, concrete grout shall be used for backfill between the old manhole and the new fiberglass manhole liner. The backfill around the excavated reducer section shall be stabilized sand or crushed stone. The material chosen shall be free of large lumps or clods, which will not readily break down under compaction. This material will be subject to approval by Engineer.

SERVICE CONNECTIONS:

The contractor shall construct new sewer service lines in accordance with the details shown on the drawings. Pipeline constructions shall conform to the requirements of Construction in these Specifications.

A. Service Lines and Wye Branch:

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109 TEL: (423) 790-5880
CLEVELAND, TN 37312
CERTIFICATE OF AUTHORIZATION #30385

DEVELOPER:
HUTTON ROCKLEDGE MF LLC
736 CHERRY STREET
CHATTANOOGA, TN 37402

PROJECT:
ROCKLEDGE FLATS
190 BARTON BLVD
ROCKLEDGE, FL

BENJAMIN M. BERRY LICENSE No 76300 STATE OF FLORIDA PROFESSIONAL ENGINEER

REVISIONS		
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SHEET NAME:
CITY DETAILS

DATE:	11/01/2019
DRAWN BY:	JDS
CHECKED BY:	BMB
PROJECT NO.:	19018

SHEET NUMBER:
C-11