A. GENERAL CONDITIONS

T.1 MATERIALS

Clearwater Gas System (CGS) shall supply the following materials: piping (carrier and casing); valves and valve boxes; concrete valve rings; fittings; meters & regulators (including associated parts); tracer wire; marker tape; marker poles; and splice kits. The contractor shall supply the labor necessary for loading the materials supplied by CGS. The contractor shall provide all other materials necessary to complete the work. The contractor shall be responsible for all materials disbursed, including twice-per-year accurately inventorying such materials. Contractor shall provide a trailer capable of transporting forty feet (40') or longer lengths of polyethylene pipe without damaging pipe.

T.2 PERMITS

The Contractor shall perform all work in strict accordance with the requirements of the following permits which will be obtained by CGS: Pinellas County Use Permit, Various City Use Permits, Florida Department of Transportation Utility Permit, CSX railroad, Army Corps of Engineers permit and the Florida Department of Environmental Protection Dredge and Fill Exemption. The contractor is responsible for obtaining any necessary permits with gas meter relocations and shall be listed as the contractor of record for underground gas house piping installations.

T.3 JOINING OF PLASTIC PIPE

The Contractor shall provide either a Central, Innogaz or Friatec Universal Electrofusion Control Box, capable of storing a minimum of one hundred (100) fusion records, pipe alignment clamp, tapping tee alignment clamp, tapping wrench, pipe peeler, and all other tooling specified by the electrofusion machine manufacturer in their respective installation procedures.

Contractor shall provide the necessary electric power supply to meet the power requirements as specified by the manufacturer of the fusion equipment. Pipe support stands or rollers shall be utilized to support pipe during fusion joining, directional boring pull in, and while lowering of the pipe into the trench. Pipe support stands shall not be spaced greater than fifteen feet (15') apart for directional boring pull in. Pipe shall be supported with stands or rollers at all times it is placed on pavement to avoid scratching the pipe surface.

The Contractor shall provide a pyrometer capable of testing the temperature of the heating iron, while at fusion temperature, to an accuracy of 0.5%. The fusion temperature of the heating iron shall be verified each morning in the presence of the CGS Inspector. More frequent testing may be required at the discretion of CGS Inspector. Both sides of the heater plates shall be checked for temperature accuracy.

Note: All fusion and related equipment must be in good working order and properly maintained during project installation. CGS will inspect the preceding items and reject those not in compliance. CGS shall have the right to reject any or all equipment judged inadequate to properly fuse Polyethylene Pipe and its Fittings. The Contractor is required to perform and document daily heat fusion equipment and maintenance forms per 49 Code of Federal Regulations (CFR) § 192.756, “Joining plastic pipe by heat fusion; equipment maintenance and calibration”.

B. GENERAL REQUIREMENTS

T.4 TRAFFIC CONTROL

The Contractor shall be responsible for maintaining traffic within the limits of the project for the duration of the construction period, in accordance with the requirements of Florida Department of Transportation (FDOT), Section 102.

When possible, the local streets shall be kept open to two-way traffic for the duration of the construction period. If lane closures are required, one lane of traffic will be permitted providing flagmen are used. Contractor must follow all FDOT guidelines for traffic modifications. The Contractor will not be permitted to isolate access to residences or places of business. Traffic on

County roads and State highways shall be controlled in accordance with the current standards of the agency. The contractor shall only utilize Florida certified Temporary Traffic Control (TTC) personnel when installing and maintaining approved work zone maintenance of traffic devices. No roadway shall be closed without proper advanced notification to CGS and the authority having jurisdiction, such as local police and fire.

The Contractor shall furnish, erect and maintain all necessary traffic control and safety devices, in accordance with the FDOT Design Manual, applicable edition, and shall take all necessary precautions for the protection of the work force personnel and the safety of the traveling public for the duration of the construction period.

T.5 PROGRESS PHOTOGRAPHS

The Contractor shall furnish digital photographs, as directed by CGS, showing the job, before, during and upon completion of the construction.

T.6 STANDARDS

Wherever in these Contract documents reference is made to any of the following, or other, specifications, codes, standards, and requirements, by abbreviation or name, it shall be understood that the specifications, codes, standards, and requirements in effect on the date of advertisement for bids shall govern.

ASTM	American Society for Testing and Materials
ASME	American Society of Mechanical Engineers
ASA	American Standards Association
AWWA	American Water Works Association
NEMA	National Electrical Manufacturers Association
AIEE	American Institute of Electrical Engineers
AASHTO	American Association of State Highway and Transportation Officials
NBFU	National Board of Fire Underwriters
NEC	National Electrical Code
ACI	American Concrete Institute
AGA	American Gas Association
AISC	American Institute of Steel Construction
AWPA	American Wood Protection Association
Fed. Spec.	Federal Specifications
SBCCI	Southern Building Code Congress International
FDOT	Florida Department of Transportation
NFPA 54	National Fuel Gas Code
IFGC	International Fuel Gas Code
FBC-FG	Florida Building Code Fuel Gas

"Standard Specifications" - FDOT Standard Specifications for Road and Bridge Construction, latest edition, including all supplemental specifications, indices and other directives in effect.

T.7 SAFETY AND HEALTH REGULATIONS

The Contractor shall comply with the United States Department of Labor Occupational Safety and Health Administration (OSHA) for construction promulgated under the Occupational and Health Act of 1970, Public Law (PL) 91-596 and PL 91-54. . The Contractor shall comply with OSHA 1926 Subpart P Excavation, the State of Florida Trench Safety Act and the City of Clearwater Trench Safety Regulations during the term of the Contract.

T.8 USE OF CHEMICALS

All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either the Environmental Protection Agency (EPA) or United States Department of Agriculture (USDA). Use of all such chemicals and disposal of residues shall be in strict conformance with instructions. All drill mud and hydraulic oil shall be EPA approved and environmentally friendly.

T.9 REPAIR OF DAMAGED SEWER LINES

The Contractor shall schedule his work to either minimize or eliminate any by-pass of raw sewage during construction. All damaged sewer lines shall be repaired immediately and upon notification.

T.10 TESTS

Tests of material, where required by the specifications, shall be paid for by the Contractor. The selection of bureaus, laboratories, and/or agencies for the inspection and testing of supplies, materials or equipment shall be subject to the approval of the Engineer. Satisfactory documentary evidence that the materials have passed the required inspections and tests must be furnished to the CGS.

Steel Pipe Inspection Radiography Using X-Ray and Gamma Ray on Welds - Radiography is one of the most useful of the non-destructive tests which can be applied for assessing the quality of the welded joints. Radiograph has been used for the inspection of welds of all types and thicknesses ranging from minute welds in electronic components to welds up to half meter thick employed in heavy fabrications. All potential welders operating on CGS facilities shall be weld tested by both destructively and non- destructively methods of evaluation. Welding certification is limited to six (6) months before requalification is required.

Radiography can detect flaws or discontinuities in welds such as:

(i) Cracks.
(ii) Porosity and blow holes.
(iii) Slag, flux or oxide inclusions.
(iv) Lack of fusion between the weld metal and the parent metal
(v) Incomplete penetration

T.11 WATER AND ELECTRIC POWER

The cost of all water for construction and testing purposes, as well as the expense of having the water conveyed to and about the work, must be borne by the Contractor and the cost of this work shall be considered as having been included in the unit or lump sum prices stipulated for the items of work to be done under this contract.

Unless otherwise specifically permitted by the Engineer, all water used for construction purposes shall be obtained from the public water supply main through appropriate metering.

The Contractor shall make his own arrangements for electric light and power, as may be required for his work. Electric light, power, and water shall not be utilized from any location without written consent of the property owner.

T.12 DETOURS

The Contractor must so schedule his work that in no case are two (2) adjoining parallel streets closed for utility construction at any time. If, in the opinion of CGS, a traffic hazard or an unreasonable long detour is caused by the Contractor's plan of work, he shall immediately revise his working schedule and reopen whatever streets are required for maintenance of traffic. The Contractor will, in no case, be permitted to start work in any new location without permission of CGS. If the Contractor shall disregard the instructions of CGS concerning traffic control, it will be considered sufficient cause to invoke that section of the specifications entitled "CGS' Right to Terminate Contract." The Contractor will be responsible for placing and maintaining "Detour" signs when required, or when directed by CGS. ~~The local fire department and 911 dispatch center shall be notified of any street closures in advance of such closure.~~

T.13 EXISTING UTILITIES

The Contractor will be required, at his own expense, to do everything necessary to locate, protect, support, sustain and avoid conflicts with existing water, gas and service pipes, storm and sanitary sewers, existing structures, electric light and power lines, telephone poles, conduits, roads, private utilities, and other fixtures on the site of the work. In case any of the said water, gas, and service pipes, storm and sanitary sewers, existing structures, electric light and power lines, telephone poles, conduits, roads, private utilities, and other fixtures are damaged, they shall be repaired, but the cost thereof shall be considered as having been included in the prices stipulated for the various items of work to be done under contract; in accordance with OSHA 1926.651, Specific Excavation Requirements.

T.14 SANITARY MEASURES

Sanitary, portable chemical toilets, conveniences for the use of all persons employed on the worksite shall be provided and maintained by the Contractor in sufficient number, in such manner and in such places as shall be approved by CGS. All persons connected with this work shall be obliged to use them, and any employees found violating these provisions shall be discharged and not again employed without written consent. All necessary precautions, including the care of employees, and prevention of any pollution of the existing water supply shall at all times be satisfactory to the governing authorities. The Contractor shall promptly and fully comply with all orders and regulations regarding these matters.

T.15 CLEANING UP

As the work progresses, the Contractor shall remove from the site and dispose of debris and waste material. Longer footage jobs shall be restored on a weekly or bi-weekly basis as work is completed to maintain a like new appearance in the completed sections of the project. Attention shall be given to minimizing any fire hazard from combustibles as may be used in connection with the work. On or before the date of the final estimate for the work, the Contractor shall tear down and remove all temporary structures built by Contractor, shall remove all construction plant used by Contractor and shall repair and replace all parts of existing embankments, fences, sidewalks, shrubbery or structures which were removed or injured by the Contractor's operations or by employees of the Contractor; shall thoroughly clean out all sewers, drains, pipes, manholes and miscellaneous structures and shall remove all rubbish and leave ground, thoroughfares, and right of ways in a neat and satisfactory condition.

T.16 FAILURE TO CLEAN UP

Upon failure of the Contractor to keep the sites of operations clean, to the satisfaction of CGS may upon twenty-four (24) hours' notice to the Contractor, remove any rubbish, materials, earth, etc., which CGS may deem necessary, charging the cost thereof to the Contractor and may deduct the amount from any money that may be due them.

T.17 RESTORATION OF SURFACE

The Contractor shall replace all surface material and shall restore paving with hot asphalt (unless otherwise stipulated), curbing, sidewalks, gutters, shrubbery, fences, sod, and other surfaces disturbed to a condition equal to that before the work began, furnishing all labor and materials incidental thereto. In restoring paved surfaces, new pavement is required except that granite paving blocks, sound brick, or asphalt paving blocks may be reused. Restoration work should be expedited.

T.18 PROJECT RECORD DRAWINGS (AS- BUILTS)

The Contractor shall maintain continuous "record" data for the project, including accurate records of location, length, pressure test charts, elevation of all pipe lines and piping installed and all architectural, mechanical, or structural features of the Contract and will provide specific information to CGS as required. A set of drawings will be provided to the Contractor to be kept at the job site for this purpose. After completion of any portion of the job site, the Contractor shall deliver to CGS a professional drawing of completed work, with accurate notations recorded thereon as necessary to revise the drawings for record purposes. Information to be shown for Gas mains and service lines shall include the location of valves, tees, tapping tee's, any change of direction and offsets dimensions to the nearest permanent object or monument to road centerline measurements. Information to be shown on a submitted as built or service line installation card shall include the

distance to the nearest cross street center line, length of service line, measurement from building corner, a north arrow and building number served. The Contractor will be held responsible for the accuracy of such data and shall bear any monetary costs incurred in finding gas utilities as a result of incorrect data furnished by the Contractor. The contractor shall provide all rod sheets associated with directional boring to include cross measurements to entry and exit pits, and CGS depth of cover variance form.

C. TRENCHING, BACKFILLING AND COMPACTING FOR UTILITY SYSTEMS

PART 1 - GENERAL

T.19 WORK INCLUDED

The work included under this Section consists of clearing, excavating, grading and backfilling as required for the construction of the utility systems consisting of piping and appurtenances as shown on engineering drawings (when applicable) and specified herein.

PART 2 - PRODUCTS

T.20 BEDDING MATERIAL

Bedding material for use below the water table or in wet trenches shall be pea rock, drain field lime rock or similar material as approved by CGS. Pipe bedding material for use in dry trenches shall be lime rock screenings, sand or other fine inorganic material as approved by CGS.

T.21 ADDITIONAL BACKFILL MATERIAL

Additional backfill material shall be a non-cohesive, non-plastic granular mixture of local sand and rock and shall be free from vegetation, organic material, marl, silt or muck. No stones or rocks shall be larger than six inches (6”) in diameter, and when placed within one foot (1’) of piping and appurtenances, stones or rocks shall be no larger than two inches (2”) in diameter (one inch [1’] for PVC).

T.22 ROCK SHIELDING

Rock Shield is a flexible padding designed for the protection of the corrosion coating on pipelines when rocky backfill is encountered. Rock Shield shall be placed in all areas where gas mains placement encounter rock type soil conditions that can damage and further impair epoxy coatings or plastic pipelines.

PART 3 - EXECUTION

T.23 CLEARING

The Contractor shall perform all clearing necessary for the proper installation of all piping and appurtenances in the locations shown on the Drawings. Plantings, shrubbery, trees, utility poles or structures subject to damage resulting from the excavation shall be transplanted, relocated, braced, shored, or otherwise protected, preserved, replaced and restored unless otherwise directed by CGS.

T.24 EXCAVATION

A. The Contractor shall perform all excavation of every description and of whatever substances encountered, to the dimensions and depth shown on the Drawings, or as directed. The contractor shall employ an OSHA 1926 subpart P competent person at each excavation site to promote safe excavation practices. All excavations shall be made by open cut. All existing utilities such as pipes, poles and structures shall be carefully supported and protected from injury, and in case of damage, they shall be restored at no cost to the utility Owner.

B. Trench walls and open holes shall be maintained to protect the safety of workmen, the general public, other work or structures, or to maintain trench widths within the limits hereinafter specified, shall be properly sheeted and braced in accordance with the Florida Trench Safety Act and Occupational Safety & Health Administration (OSHA) 29 CFR 1926.650 Subpart P. Where wood sheeting or certain designs of steel sheeting are used, the sheeting shall be cut off at a level two feet (2’) above the top of the installed pipe and that portion below that level shall be left in place. If interlocking steel sheeting is used, it may be removed providing removal can be accomplished

without disturbing the bedding, pipe or alignment of the pipe. Any damage to the sheeting shall be cause for rejection of the affected portion of the work. Not more than 100-feet of trench shall be opened ahead of pipe laying operations at one (1) time unless CGS approves a greater length of open trench.

C. In areas where trench widths are not limited by right-of-way, and/or easement widths, property line restrictions, existing adjacent improvements, including pavements, structures and other utilities, and maintenance of traffic, the trench sides may be sloped to a stable angle of repose of the excavated material. A substantially and safely constructed movable trench box shield, “box”, or “mole” may be used in place of sheeting when the trench is opened immediately ahead of the shield and closed immediately behind the shield as pipe laying proceeds inside the shield.

D. Ladders or steps shall be provided for and used by workmen to enter and leave trenches.

E. Pipe trenches for utility lines shall be excavated to a width within the limits of the top of the pipe and the trench bottom so as to provide a clearance on each side of the pipe barrel, measured to the face of the excavation or sheeting, if used, of eight inches (8”) to twelve inches (12”). Where the pipe size exceeds twelve inches (12”), the clearance shall be from twelve inches (12”) to eighteen inches (18”). All pipe trenches shall be excavated to a level eight inches (8”) below the outside bottom of the proposed pipe barrel.

F. Excavation for appurtenances shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation or sheeting, if used, of not less than twelve inches (12”). Manhole excavations shall be carried to sufficient depth to permit their construction on the undisturbed bottom of the excavation.

G. Materials removed from the trenches shall be stored and disposed of in such a manner that they will not interfere unduly with traffic on public streets and sidewalks, and they shall not be placed on private property. In congested areas, such materials as cannot be stored adjacent to the trench or used immediately as backfill shall be removed to convenient places of storage.

H. All materials suitable for use as backfill shall be hauled to and used in areas where not enough suitable material is available from the excavation.

I. Suitable material in excess of backfill requirements and all unsuitable or contaminated material shall become the property of the Contractor and shall be removed from the work site and properly disposed of by the Contractor at their expense.

J. Any unsafe excavation condition observed by CGS shall result in the immediate stoppage of the work operation, until the unsafe condition is mitigated.

T.25 REMOVAL OF WATER

A. It is a basic requirement of these specifications that excavations shall be free from water before pipe or structures are installed. However, it is realized that in certain sections of the work this cannot be accomplished economically, and the Contractor may elect to use T.31 ALTERNATE METHOD OF CONSTRUCTION below, when approved by CGS.

B. The Contractor shall provide all necessary pumps, underdrains, well-point systems, sediment sock and other means for removing water from trenches and other parts of the work. The Contractor shall continue dewatering operations until the backfill has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench and so that it is above the natural water table.

C. Water from the trenches and excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the work completed or in progress, to the surface of the streets, or cause any interference with the use of the area by the public. CGS is not responsible for, or the disposal of, or any associated costs relating to the disposal of any contaminated ground water. The Contractor shall submit his proposed methods of handling trench water and locations at which the water will be disposed of to CGS for approval and shall receive approval before starting the excavation.

T.26 PIPE BEDDING

A. As described above, all pipe trenches shall be excavated to a level eight inches (8”) below the

outside bottom of the proposed pipe barrel. The resulting excavation shall be backfilled with approved pipe bedding materials that are free of rock, sharp objects and debris, up to the level of the lower one-third of the proposed pipe barrel. This backfill shall be tamped and compacted to provide a proper bedding for the pipe and shall then be shaped to receive the pipe. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.

B. Any excavation below the levels required for installation of the pipe bedding, except for "T.30 Additional Excavation and Backfill", as hereinafter specified, shall be backfilled with approved bedding material, tamped, compacted and shaped to provide proper support for the proposed pipe, at no additional cost to CGS.

T.27 TRENCH STABILIZATION

No claim for extras or additional payment will be considered for cost incurred in the stabilization of trench bottoms, which are rendered soft or unstable as a result of construction methods, such as improper or inadequate sheeting, dewatering or other causes. In no event shall pipe be installed when such conditions exist, and the Contractor shall correct such conditions to provide proper bedding or foundations for the proposed installation at no additional cost to CGS.

T.28 BACKFILL

A. Backfilling of utility trenches will not be allowed until the work has been approved by CGS in writing, pressure tested if required, and CGS indicates that backfilling may proceed. Any work which is covered or concealed without the knowledge and consent of CGS shall be uncovered or exposed for inspection at no cost to CGS. Partial backfill may be made to restrain the pipe during pressure testing. Sight tubes will be installed on underground house piping installations as appropriate intervals for inspection.

B. Backfill material shall be non-cohesive, non-plastic material free of all debris, organic material, lumps, clods and broken paving. Backfill material placed within one foot (1') of piping and appurtenances shall not contain any stones or rocks.

C. If a sufficient quantity of suitable backfill material is not available from the trench or other excavations within the site of the work, CGS will order the Contractor to provide additional material suitable for this purpose. The additional material shall be installed as specified herein.

D. Selected backfill material containing no stone or rocks shall be placed in six-inch (6") layers and thoroughly tamped to a depth of twelve inches (12") over the top of the pipe. Attention and care shall be exercised in obtaining thorough support for the branch of all service connection fittings. Care shall be taken to preserve the alignment and gradient of the installed pipe.

E. After the backfill has been placed to a level twelve inches (12") over the gas line pipe, the remainder of the backfill shall be placed in layers, not to exceed nine inches (9"), and compacted with mechanical vibrators or other suitable equipment to obtain a density of the backfilled material of not less than ninety-five percent (95%) of its maximum density as hereinafter defined, unless otherwise specified on the plans.

F. After selected backfill has been placed to a depth of twelve inches (12") over the gas line pipe, backfilling shall proceed to a depth of thirty inches (30") over the pipe by placing the backfill material in six-inch (6") layers and thoroughly compacting it with mechanical vibrators. Backfill in this portion of the work shall be compacted to one hundred percent (100%) of maximum density of the material as hereinafter defined, unless otherwise specified on the plans.

G. After the backfill has been placed to a level thirty inches (30") over the gas line pipe, the remainder of the backfill shall be placed in layers, not to exceed nine inches (9"), and compacted with mechanical vibrators or other suitable equipment to obtain a density of the backfilled material of not less than ninety-five percent (95%) of its maximum density as hereinafter defined, unless otherwise specified on the plans.

H. Within paved areas of trench excavation, the base and surfacing shall be reconstructed as specified to previous conditions.

I.

J. No more than eight hundred feet (800') of trench with pipe in place shall be partially backfilled at any time.

K. Shut Down of Work: When work has shut down for each day, all lines shall be capped, sealed, and pressured to ninety (90) pounds with air. When a Project is not immediately tied-in, plug and seal all openings in the pipe and maintain a minimum of ninety (90) pounds of air pressure. If a pipeline is to be abandoned in place, then disconnect the gas supply source, purge all of the gas utilizing nitrogen for all gas lines exceeding one thousand (1,000) linear feet or four-inch (4") pipe size and larger; any length, from the abandoned system, and seal all of the ends.

T.29 COMPACTION AND DENSITIES

A. Methods of control and testing of backfill construction to be employed in this work are:
   1. Maximum density of the material in trenches shall be determined by American Association of State Highway and Transportation Officials (AASHTO) Designation T-180 - Standard Method of Test for Moisture–Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop, most recent version, unless otherwise noted.
   2. Field density of the backfill material in place shall be determined by AASHTO Designation T-238 - Standard Method of Test for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth), in its most recent form.

B. Laboratory and field density tests, which are necessary to establish compliance with the compaction requirements of these specifications, will be conducted at the Contractor's expense. Tests will be made at depths and locations selected by CGS.

C. Trench backfills which do not comply with the specified densities, as indicated by such tests, shall be reworked and recompacted until the required compaction is secured, at no additional cost to CGS. The Costs for retesting such work shall be paid for the Contractor.

T.30 ADDITIONAL EXCAVATION AND BACKFILL

A. Where organic material, such as roots, muck, or other vegetable matter, or other material which, in the opinion of CGS, will result in unsatisfactory foundation conditions, is encountered below the level of the proposed pipe bedding material, it shall be wholly or partially removed as directed by CGS and wasted. Sheeting shall be installed if necessary to maintain pipe trenches within the specified limits. The resulting excavation shall be backfilled with suitable backfill material, placed in 6-inch (6") layers, tamped and compacted up to the level of the bottom of the proposed pipe bedding material. Sufficient compaction of this material shall be performed to protect the proposed pipe against settlement. Construction shall then proceed in accordance with the provisions of the FDOT Drainage Design Guide Specifications.

B. Additional excavation shall be performed only when ordered by CGS. Where organic or other unsuitable material is encountered in the excavation, the Contractor shall bring the condition to the attention of CGS and obtain the determination as to whether or not the material will require removal, prior to preparing the pipe bedding.

C. Additional backfill material, if required, shall be furnished in accordance with the provisions therefore in the FDOT requirements.

T.31 ALTERNATE METHOD OF CONSTRUCTION

A. General:
   1. A combination of conditions in the substrata, water table, or method of disposal may be encountered during the course of the work, which make dewatering impossible, or only possible through the use of unusual methods, the cost of which is excessive. When such conditions are encountered, but only after all reasonable means to dewater the excavation have been employed without success, the Contractor, with the concurrence of CGS, may elect to employ the following alternate method of construction. The concurrence of CGS shall be obtained in writing and shall limit the use of the alternate method of construction to such specific portions of the work as CGS shall determine.

The construction specifications contained in the preceding parts of this section shall establish the required standards of construction quality for this work. Use of the alternate method of construction described hereinafter shall in no way be construed as relieving the Contractor of their basic responsibility for satisfactory completion of the work. No additional payment will be made to the Contractor for excavation, backfilling, sheeting or any costs incurred for work or materials that are already part of the bid items as a result of the use of this alternate method of construction. The unit and lump sum prices established in the Proposal shall be full payment for the various items of work. Costs associated with alternate methods of construction shall be presented to CGS and agreed upon by both parties.

2. Subject to all of the requirements stated hereinabove, including written approval of CGS, construction will be permitted in accordance with local, state and federal codes.

T.32 RESTORATION OF EXISTING SURFACES

Paved and grassed areas disturbed by the operations required under this Section shall be restored as indicated on the Drawings and/or specified herein. All materials required for temporary and permanent street repairs shall include base materials.

PART 4 - MEASUREMENT AND PAYMENT

T.33 MEASUREMENT

The quantity of Trenching, Backfilling and Compacting for Utility Systems for which payment will be made shall be the actual number of units measured in place and accepted. The units measured shall be as listed in Exhibit A – Bid Pricing by Group. If a payment item for Trenching, Backfilling and Compacting for Utility Systems is not specifically included in Exhibit A – Bid Pricing by Group, the quantity for which payment will be made shall be the quantity required to complete the work.

T.34 PAYMENT

Payment for Trenching, Backfilling and Compacting for Utility Systems shall be made at the prices stated in Exhibit A – Bid Pricing by Group. If a payment item for Trenching, Backfilling and Compacting for Utility Systems is not specifically included in Exhibit A – Bid Pricing by Group, payment for the work specified in this Section shall be included in the several unit and lump sum prices for all applicable items of work.

D. PAVEMENT REMOVAL AND REPLACEMENT

PART 1 - GENERAL

T.35 WORK INCLUDED

A. Work includes all labor and materials under this Section for cutting, removing, protecting and replacing existing pavements of the various types encountered including roadways, driveways and sidewalks.

B. Permits: The Contractor shall obtain the necessary permits prior to any roadway work. Additionally, the Contractor shall provide advance notice to the appropriate authority (i.e. city, county, Owner, etc), as noted on the permit prior to construction operations.

C. Protection of Existing Improvements: The Contractor shall be responsible for the protection of all types of pavements, sidewalks and other improvements within the work area. All damage to such improvements, as a result of the Contractor's operations, beyond the limits of the work of pavement replacement as described herein, shall be repaired by the Contractor at their own expense.

PART 2 - PRODUCTS

T.36 MATERIALS

Materials, including lime rock, bituminous prime and tack coat, and asphaltic concrete for the above work shall meet the requirements established therefore by current FDOT Specifications.

1. Lime rock shall be Miami or Ocala Lime rock.
2. Bituminous prime coat material shall be cutback asphalt Grade RC-70.
3. Bituminous tack coat material shall be emulsified asphalt Grade RS-2.
4. Hot Asphaltic concrete shall be Type S-I or S-III.
5. Concrete material shall be Class I or II, and/or as otherwise required to meet FDOT specifications.
6. Welded wire fabric, joint reinforcing welded wire fabric shall conform to ASTM-A185 and ASTM-A615.

PART 3 - EXECUTION

T.37 SCHOOL/ PEDESTRIAN CROSSINGS

Where the work crosses or interferes with school or pedestrian crossings, extreme care shall be taken by the Contractor to ensure the safety of school children or other pedestrians. Contractor shall also make necessary accommodations to provide a safe path for handicap individuals traveling through the work zone, compliant to American Disability Act (ADA).

T.38 PERFORMANCE

A. Removals:
   1. Pavement Removal:
      a. Where existing pavement is to be removed, the surfacing shall be mechanically saw cut prior to trench excavation, leaving a uniform and straight edge, with minimum disturbance to the remaining adjacent surfacing. The width of cut for this phase of existing pavement removal shall be minimal.

      b. Immediately following the specified backfilling and compaction, a temporary sand seal coat surface shall be applied to the cut areas. This temporary surfacing shall provide a smooth traffic surface with the existing roadway and shall be maintained until final restoration. Said surfacing shall remain for ten (10) days in order to assure the stability of the backfill under normal traffic conditions. Following this period and prior to fifteen (15) days after application, the temporary surfacing shall be removed, and final roadway surface restoration accomplished.

      c. In advance of final restoration, the temporary surfacing shall be removed and the existing pavement mechanically sawed straight and clean to the stipulated dimensions. Following the above operation, the Contractor shall proceed immediately with final pavement restoration in accordance with these requirements.

   2. Sidewalks, Drive, & Curb Removal: Concrete sidewalks, curbs, combination curb and gutter, walks, drive ribbons, or driveways shall be removed by initially sawing the structure, with a suitable power saw, as specified above for pavement. When a formed joint in the concrete is within three feet (3') of the proposed saw cut and parallels the proposed saw cut, the removal line shall be extended to the formed joint. After sawing, the material shall be removed.

B. Restorations:
   1. General: Cut and remove driveway or roadway pavement in connection with trench excavation shall be replaced or restored in equal or better condition than the original as shown on the Drawings. The Drawings indicate minimum requirements. Backfills shall comply with CGS' Construction Specifications FDOT Standards, whichever are more stringent.

2. Pavement Restoration - Asphalt:
   a. Lime rock base course shall be compacted for its full thickness to not less than 98 % percent of maximum density as determined by AASHTO Designation T-180 field density of lime rock base in place shall be determined by AASHTO Designation T-238.

   b. Construction methods and equipment shall generally meet the requirements therefore as established in the FDOT Specifications.

   c. After the application of the prime coat on the base, the prime coat shall be allowed to cure without sanding for a period of twenty-four (24) hours. The Contractor shall take all necessary precautions to protect the primed surface against damage during this interval. If, at the end of twenty-four (24) hours, it is not proposed to proceed at once with the application of the surface course, primed surface shall be given a light application of clean sand and opened to traffic.

   d. Joints with existing surface and base shall be sawed cut straight and neat. If necessary to obtain a straight net joint, the contractor shall cut out sufficient existing material and replace it with new material.

   e. The upper surface of the completed base course shall be compacted to an elevation to permit the full depth of the surface course to be constructed without deviating from the grade of the pavement surface. The completed surface shall match the line and grade of the existing surface. When pavement is removed to the edge of the roadway, the replaced base course shall extend not less than 6-inches beyond the edge of the surfacing.

   f. After the base course construction in the trench area has been completed and primed, the surface shall be tack coated and the thickness of Type S-I hot asphaltic concrete shall be constructed in accordance with the plans or requirements specified above for pavement restoration.

   g. Cold patch bagged asphalt is not considered a permanent repair and shall only remain for a maximum period of fifteen (15) days, whereupon it shall be replaced with FDOT approved “Hot” asphalt.

3. Driveway Restoration - Asphalt: Driveway pavement with lime rock base cut and removed in connection with trench excavation shall be replaced or restored as specified above for street or roadway pavement, except the new lime rock base course shall be equivalent to the existing base course in thickness, except that in no case shall new driveway base course be less than 6-inches in thickness. Muck or unsuitable material found under existing driveway construction will not be removed and replaced.

4. Concrete, Sidewalk, Walkway, Driveway Ribbon and Curb Restoration:
   a. Concrete sidewalks, walkways, driveways, driveway ribbons and curbs required to be removed for the installation of facilities under this Contract shall be restored. Class I concrete shall be used in all cases.

   b. Replaced portions of these items shall conform to the lines, grades and cross sections of the removed portions. Concrete sidewalks and walkways shall be of four inch (4”) minimum thickness; concrete driveways and driveway ribbons shall be six inch (6”) minimum thickness. Replaced concrete curb and/or gutter shall join neatly to the remaining section.

5. Pavement Restoration - Concrete: Rigid pavement shall be replaced in kind with Class I concrete, using high early strength cement. The subgrade course for rigid pavement shall be replaced with stabilized subgrade or clean fill material and compacted to a thickness to match the existing base.

   a. The Contractor shall saw cut and remove the existing concrete to the nearest joint as directed in the field by CGS. Provision for expansion joints (minimum ½" preformed joint filler) and saw cut joints shall be a part of the restoration work for the driveway and roadway.

6. Asphaltic Concrete Surface Course Overlay:
   a. The work under this section includes asphaltic concrete surface course overlay paving as directed by CGS or an authorized CGS representative. Where this paving is directed it shall take the place of asphaltic concrete pavement restoration as specified herein above. This surface course overlay shall extend over the reconstructed base course and the existing pavement to the limits directed by CGS or an authorized CGS representative, which generally shall be full width of the roadway.

   b. After the base course construction in the trench area has been completed and primed, the surface shall be tack coated and the thickness of Type S-III asphaltic concrete shall be constructed in accordance with the plans or requirements specified above for pavement restoration.

7. Non-surfaced streets, alleys and driveways shall be restored with six inches (6") of compacted lime rock base material placed in the top of the trench.

PART 4 - MEASUREMENT AND PAYMENT

T.39 MEASUREMENT

The quantity of Pavement Removal and Replacement for which payment will be made shall be the actual number of units measured in place and accepted. The units measured shall be as listed in Exhibit A – Bid Pricing by Group. If a payment item for Pavement Removal and Replacement is not specifically included in Exhibit A – Bid Pricing by Group, the quantity for which payment will be made shall be the quantity required to complete the work.

T.40 PAYMENT

Payment for Pavement Removal and Replacement shall be made at the prices stated in Exhibit A – Bid Pricing by Group. If a payment item for Pavement Removal and Replacement is not specifically included in the Bid, payment for the work specified in this Section shall be included in the several unit and lump sum prices for all applicable items of work.

E. NATURAL GAS PIPELINE INSTALLATIONS

PART 1 - GENERAL

T.41 WORK INCLUDED

The work specified under this Section consists of all labor, services, equipment, materials, labor, testing, associated paperwork and purging required to complete the construction of the gas mains and services; including meter sets and connection to the consumer's piping system with integrity testing performed of the customer' system and reinitiating of gas service; consisting of, but not limited to, piping, appurtenances and other accessories as shown on the Drawings and or specifications.

PART 2 - PRODUCTS

T.42 MATERIALS

CGS will furnish all gas related material in connection with the installation of gas mains and service lines. Materials will be available for pick-up by the Contractor at 777 Maple Street, Clearwater, Florida, 33755. Warehouse hours are 7:00 AM until 9:30 AM and 2:30 PM until 3:30 PM. The contractor may pick up materials during these hours only. The contractor shall supply the labor and equipment necessary for loading the materials supplied by the City. CGS will provide only items specifically stated in the contract. The contractor is responsible for all materials obtained and must adhere to the requirements of contractor vehicle and warehouse audits. Contractor will be responsible for all shortages and monetary reimbursement is required.

PART 3 - EXECUTION

T.43 LOADING, STORING AND STRINGING

A. When loading or unloading lengths of plastic pipe, a nylon sling will be used so as not to damage the pipe itself. When unloading lengths of plastic pipe, it shall be done by hand in such a manner as not to damage the pipe itself, nor to endanger the safety of the main or personnel.

B. When storing plastic material and fittings shall be placed on skids and covered with a sheet of polyethylene or like material to protect it from sunlight.

C. When stringing pipe on the job site, the area will be cleared of all sharp objects, and pipe will be placed in the ground in the same manner as unloading, so as not to damage the pipe itself. . Pipe shall not be dragged along the ground surfaces.

T.44 INSTALLATION

A. Installation shall include excavation whether by trenching machine, backhoe, directional drilling, by hand or other methods which may be necessary to prepare a trench in which the pipe will be laid. The word "ditching" is used here and shall mean the maintenance of ditch, including temporary damming, pumping, bailing and draining and dewatering, wherever required, and the furnishing and placing of any temporary shoring used to maintain the ditch. When the gas line parallels other lines, not less than one foot (1') clearance will be permitted from other lines, but the required clearance from parallel lines shall be obtained from moving the ditch lines laterally rather than through reduction of normal minimum cover of the gas line. The foregoing clearances shall be minimum clearances allowable unless owners of the interfering lines require greater clearances from gas lines. Then their requirements shall be met if at all possible.

1. Trench shall be free of debris, sharp rocks, etc., before adding the sand bed for the new gas main. Sand bed shall have a minimum thickness of four inch (4") below and twelve inches (12") above the gas main.

2. Before each section of pipe is installed in the line, internal surface shall be suitably clean.

3. The pipeline shall be pigged and safely purged prior to final acceptance.

4. The open ends of all sections of joined and/or installed pipe (not in service) shall be closed at night to prevent animals or foreign material from entering the pipeline or pipe section. Extreme care must be exercised when moving plastic pipe, support stands and rollers shall be used when fusing and lowering pipe into the trench or bore hole. POLYETHYLENE PIPE SHALL NOT BE DRAGGED ON THE GROUND OR ON PAVED SURFACES. Support/Stands must be used at all times that pipe is placed on paved surfaces.

5. Waterproof nightcaps of approved design may be used but they shall be constructed in a manner that they will prevent the entrance of any type of natural precipitation into the pipe and will be fastened to the pipe in such a manner that the wind cannot blow them loose.

6. The practice of stuffing cloth or paper in the open ends of the pipe will not be tolerated.

7. Where possible, the pipe will be raised and supported at a suitable distance from the open end such that the open end will be below the level of the pipe at the point of support.

8. Plastic pipe must be installed below ground level and shall have a minimum thirty-six inch (36") depth of cover unless shown otherwise. **No gas line shall be installed at a depth of less than thirty-six inches (36") or greater than forty-eight inches (48") below finish grade without written approval from CGS and a Depth of Cover Variance Form filled out.** Unless otherwise specified a minimum of twelve inches

(12") vertically and twenty-four inches (24") horizontally shall be maintained between the pipe surface and other utility lines or adjacent foreign structures. In the event that it is not possible to maintain required vertical clearance from other structures, the Contractor shall case the gas main in steel pipe or plastic sheeting topped with concrete at the discretion of the CGS's inspector.

9. Width of ditch shall be no less than twice the pipe diameter.

10. Plastic pipe is not to be installed in a vault or any other below-grade enclosure.

11. Plastic pipe must be installed to minimize shear or tensile stresses.

12. Pipe that has scratches, notches, cuts or any other abrasions that exceed 10% of the pipe wall thickness shall be disposed of. The Contractor shall use pipe stands, rollers, spooling devices, or other means to avoid damaging the pipe during installation. Observe pipe during installation for scratches, gouges or other defects. If defects are present, remove and discard defective section of pipe. The CGS Inspector must be notified of all defects and subsequent repairs.

13. Thermoplastic pipe that is not encased must have a minimum wall thickness of 0.090 inches and labeled ASTM.

14. Any fittings, valves, crosses or laterals shall be accomplished with fusion welds and the installation shall be included in the unit cost of the pipe installation.

All lines shall be marked by #12 insulated copper tracer wire installed twelve inches (12") above the pipe. Gas mains, valves and locating stations shall also be marked by adhesive identification disk affixed to the permanent curb or pavement. In addition, all gas mains that are four inches (4") or larger shall be marked by four inch (4") wide non-metallic marking tape installed eighteen inches (18") above the pipe. Tracer wire shall be looped-up, uncut, into every valve box including main valves and service valves. Installations where five hundred feet (500') of pipe is laid between valves, empty test station boxes shall be installed over the gas main with tracer wire looped up every five hundred feet (500'). In commercially zoned areas, plastic marker poles with tracer wire looped up and attached may be substituted for gas test station type valve boxes with the inspector's approval. All tracer wire splices shall be made by using a direct bury splice kit Electric and duct tape connections are prohibited. Upon completion of the project, and before final payment, the contractor will perform the continuity check of the tracer wire to ensure and demonstrate to the CGS inspector that there are no separations, and the tracer wire can be used for locating purposes. The Contractor shall be responsible for repairing any damaged, broken or otherwise separated tracer wire. All tracer wire, gas marking tape, valve boxes, valve box concrete rings, marker poles and splice kits will be supplied by CGS and the installation cost shall be included in the unit cost of pipe installation.

B. Each plastic main must be installed with sufficient clearance, or must be insulated from any source of heat, to prevent the heat from impairing the serviceability of pipe. Locating wire is to be considered a source of heat, with the exception of directional drilling placement.

C. Valves shall be maintained and protected from outside damage throughout the length of the project and shall be kept accessible. The Contractor shall be responsible for repairing valves, valve boxes, marker poles and test stations that are damaged by construction activities. The Contractor shall also make any adjustments to valve boxes that may be required to be flushed with final grade.

D. Valves and Valve Boxes: All valve boxes shall be installed flushed with the finished grade. Contractor shall support valve boxes with prefabricated valve box rings or other approved formed and poured concrete material. Adequate backfill shall be placed around the valve boxes and valve extension boxes to prevent any damage or settlement to the pipeline that may be transferred to the pipe through the valve box. Protective sleeves shall be installed over fusion joints and extend through the valve boxes on the polyethylene valve installations.

Plastic valves shall be restrained from torque with approved restraints. Gas valves shall be marked by adhesive identification disks affixed to the permanent curb or the permanent pavement and marker poles installed if warranted for visibility. Valves shall be installed at the design marked locations. Valve restraints are required for two-inch (2") valves and larger. Valves shall be installed with the operating nut on top, facing vertically up. CGS will not accept valves that are cocked or oriented in any other direction.

E. Marker Poles: As the pipeline installation has progressed and before completion, the Contractor shall install marker poles and posts at the locations designated by the CGS construction standard of not to exceed five hundred linear foot (500') intervals and prominent locations such as offsets and valve locations. Contractor shall bury the anchor end of all five-foot (5') bumper poles approximately one foot (1') deep to attain a uniform height of four feet (4') above ground exposure as recommended by the manufacturer and to promote safety in the line of sight.

F. All newly installed gas service lines and mains will be located by the utilization of flags, yellow paint or stakes upon completion of construction and final restoration.

T.45 QUALIFICATION OF JOINING PROCEDURES

A. Prior to joining, all individual gas main lengths shall be swabbed. All gas mains shall be double pigged prior to initiation of gas service, but after joining has been complete. The pigs used shall be suitable for different size pipes and be designed for polyethylene pipe use. Any pig that could damage the pipe, such as wire brush type pigs suitable for steel pipe shall not be acceptable for use inside plastic mains. Only use of compressed air to drive the pig through the pipe shall be permitted.

B. Joining procedures shall be in accordance with Section 192.283 of the CFR Title 49, Pipeline Safety Regulations, Part 192.

C. Procedures for making joints in plastic pipe may be tested by the pipe and fitting manufacturers and these tests may be accepted by the operator for qualification of the procedure used by the contractor.

D. A copy of each written procedure being used for joining plastic pipe must be available to the persons making and inspecting joints at the site where joining is accomplished.

E. The Contractor will furnish a copy of the manufacturers recommended Heat Fusion Joining Procedures Manual at the time of certification.

F. Butt Fusions:

1. All butt fusions must only be performed by the person(s) qualified by CGS to butt fuse, as certified by testing of the applicable pipe size category. Contractor's supervisor shall be present during all pipe fusions to ensure that all required procedures are adhered to and to witness the quality of each joint.

2. Pipe fusion shall be conducted in accordance with the "Clearwater Gas System Polyethylene Gas Pipe Training Procedures", Ambient temperature shall be between fifty-five degrees Fahrenheit (55° F) and ninety degrees Fahrenheit (90° F) prior to pipe fusion. Pipe shall be protected from direct sunlight and cooled down until the ambient temperature falls within the above temperature range.

T.46 QUALIFICATIONS OF PERSONNEL

A. Any person joining polyethylene gas pipe must receive training in accordance with Section 192.285 of the CFR, Title 49, Pipeline Safety Regulations, Part 192.

B. No person shall make a joint in a plastic pipe unless that person has been certified through knowledge, skills and ability evaluation. The Gas Construction Inspector will conduct such evaluation initially and on an annual basis. Records shall be maintained of personnel qualified to make joints. NON-QUALIFIED CONTRACTOR EMPLOYEES SHALL NOT BE ALLOWED TO PERFORM POLYETHYLENE JOINING. CGS fusion certifications shall remain in effect

for up to one (1) calendar year.

C. The Contractor's Operator Qualification Plan must explain how their employees have the ability to identify and safely react to natural gas related Abnormal Operating Conditions that may be encountered. The contractor's emergency action plan must also describe the necessary actions their employees will take to protect people and then property in the event of gas pipeline failure resulting in a hazardous, flammable atmosphere.

T.47 INSPECTION OF PLASTIC JOINTS

A. Each joint must be inspected to ensure that it is acceptable. The person who inspects joints in plastic pipes must be qualified by appropriate training and experience in evaluating the acceptability of plastic pipe joints made under the applicable joining method. The inspector must be approved by the CGS' Construction Supervisor with concurrence with the CGS' Operations Manager.

1. CGS will have OQ certified; polyethylene qualified construction inspector at the various gas construction job sites. The Inspector has the right to sample and evaluate field fusion joints,and reject any fusions not meeting CGS requirements. The Contractor shall replace all fusions not meeting CGS requirements at his own expense.

2. The Contractor shall also designate a polyethylene qualified supervisor who will be present on site at all times to observe pipe fuser(s).

3. The CGS's Inspector will employ non-destructive testing methods on polyethylene fusions and reject all deficient fusions. The CGS inspector can request any amount of random fusion samples, cut away from a joined pipeline for destructive testing.

T.48 JOINING PLASTIC PIPE

A. In general, all plastic joining shall be in accordance with *American Standards Code for Pressure Piping*, as outlined.

B. A plastic pipe joint that is joined by heat fusion may not be disturbed until it has been properly set. Plastic pipe may not be joined by a threaded joint. Miter joints are prohibited.

C. Each heat fusion joint on plastic pipe must comply with the following:

1. A heat fusion joint must be joined by a device that holds the heater element square to the ends of the piping, compresses the heated ends together, and holds the pipe in proper alignment while the plastic hardens.

2. Heat may not be applied with a torch or other open flame.

T.49 TESTING

A. Each segment of a plastic pipeline must be pressure tested. The test procedure must ensure discovery of all potentially hazardous leaks in the segment being tested. The plastic pipeline installation shall be pressure tested to ninety pounds per square inch (90 psi) for MDPE 2406, one hundred and fifty pounds per square inch (150 psi) for HDPE 3408, or no less than the Maximum Allowable Operating Pressure of the Distribution System. The temperature of thermoplastic material must not be more than one hundred degrees Fahrenheit (100° F) during the test. These tests shall be recorded on a chart-type pressure instrument, initially starting at the "0" increment mark and progressing to the testing increment, as testing medium is introduced. Duration shall be a minimum of twenty-four hours and longer as required, depending on the complexity and developed length. A twenty- four (24) hour test shall be placed on the entire system of mains prior to initiation of gas service. If a portion of the gas service has met the requirements of the leak test and it is possible for the other sections to be tested independently, then the CGS inspector or the designated representative of CGS may approve initiation of gas service for that portion.

B. Each day's work shall be tied into the preceding day's work and tested overnight. A pressure-time clock gauge with a range no greater than 0 – 200 psig. and in good working order shall be furnished by the Contractor. All testing shall comply Code of Federal Regulations (CFR) Title 49, Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal

Safety Standards." The location of the project along with the temperature at the time the test pressure is placed upon the pipe shall be recorded on the pressure chart. The pressure charts shall be given to the CGS inspector or the designated representative. In order to facilitate daily testing, appropriate testing apparatus shall be used. Leaks shall be repaired in a manner approved by CGS or the authorized CGS designated representative before additional lengths of pipe that need to be tested are added to the main.

C. Fusion joints shall be a one-half inch (1/2") molten bead of uniform appearance after completion. This bead shall be visible and examined for penetration three hundred and sixty degrees (360°) around the pipe diameter.

D. Purging Pipes and Fittings: A combustible gas indicator shall be used when purging mains, services and house piping. When purging gas from abandoned lines, the air and the gas must be discharged aboveground at a minimum height of eight feet (8') above grade and directed away from electric power lines or structures. When purging air from new lines, installation of a 5/8 service saddle and a grounded metallic riser is required at the end or within four feet (4') from each dead end on all new installations of pipe in order to purge air from all dead ends simultaneously. Contractor shall release gas into new lines at a rate that will prevent formation of a hazardous mixture of gas and air or precede natural gas with a slug of inert gas, such as nitrogen provided by the contractor at no additional cost to CGS.

E. If service lines are installed at the same time as the mains, then service lines shall be included in the testing of the mains. If service lines are installed after gas service has been initiated, then the Contractor shall test each service line individually to stand up to an air test of ninety pounds per square inch gauge (90 psig). for thirty (30) minutes. If a leak is discovered, then the Contractor shall immediately make the appropriate repairs, in a method approved by the CGS inspector or an authorized designated representative of CGS. All existing service lines that are disconnected from the main temporarily shall be tested as if they are new lines before being placed back into service. The pressure shall not decrease during the test period. Air pressure shall be held until after soap testing. Soap testing the service connections by brushing/ spraying an approved liquid leak detection solution around the tapping tee base at the main, both ends of the outlet coupling, the outlet connection of the excess flow valve, and the pipe to riser connection in the customer's yard or business location, and at the meter valve inlet and outlet. If any leaks appear, the CGS's Inspector will direct appropriate repair procedures.

T.50 INSTALLATION - SERVICES

A. Service Lines Connected to a Polyethylene Main. All hot taps shall be made by qualified fusers using self-tapping tees Contractor shall install tapping tees at the locations marked by CGS. Bell holes shall be excavated, if installing the gas mains by boring methods, at each tapping tee installation site to provide an adequate work area for installation and inspection of tapping tees. The tapping tees shall be installed in accordance with the CGS Procedures by the person(s) qualified by CGS to install tapping tees. All tapping tee fusions must be left open to be inspected by the CGS Inspector. TAPPING TEES SHALL ONLY BE INSTALLED ON THE TOP OF MAIN.

B. The main shall be tapped after the tapping tee fitting and final connections have cooled for the time period specified by the manufacturer and the service line has been soaped and pressure tested. The manufacturer supplied tapping wrench or fitting shall be the only tool used for turning the tapping tee cutter to avoid tapping the backside of the main or loss of the cutter into the main, allen wrenches shall not be used.

C. Mechanical Joints. Compression types of mechanical joints to connect polyethylene pipe to steel pipe shall be designed for natural gas use and the gasket material in the coupling must be compatible with the polyethylene pipe. The coupling must be used in combination with an internal tubular rigid stiffener. The preferred method is the utilization of a transition fitting to allow a steel-to-steel connection using a compression dresser style coupling that can be readily restrained from pull out by a mechanical or welding a rod type clamping device. Joints shall be designed and installed to effectively sustain the longitudinal pull-out forces caused by contraction of the piping or by external loading. Compression couplings shall not be used in

above ground installations. All mechanical joint connections shall be noted on the submitted as built drawing, including the coupling manufacturer's pertinent information.

T.51 NATURAL GAS HOUSE (PIPING) PLUMBING

A. It is a mandatory requirement of the Natural Gas House (Piping) Plumbing Section that the contractor possess a Master Plumbers certified or registered with the State of Florida, a local license registered with Pinellas County Construction Licensing Board (PCCLB) and/or Pasco County Building Department, depending where jurisdictionally the work will be performed.

B. The work to be performed shall consist of furnishing all necessary labor, tools, equipment, supplies, power, essential customer communication, and other operations necessary for the modification of existing natural gas house plumbing to accommodate relocation of gas meters including: obtaining required permits if applicable; installation of new house gas pipes by threading pipe, measuring/ fitting and assembling pipe and fittings, new shut off valves, gas meters and regulators and connecting customer piping from a new location and, existing gas piping system code compliant review and subsequent pressure testing – leak check (Drop Test- utilizing a manometer)of the entire house gas plumbing system, and passing required inspections. CGS will reserve the right to mandate the turning on the gas and relighting the applicable appliances. Contractor shall immediately notify CGS dispatch of the "on gas" and complete the required paperwork, including the drop test integrity system testing form, and submit, no later than the following business day. The work shall be complete and performed in strict accordance with the Contract specifications, and in compliance with all applicable codes, CGS requirements, Florida Fuel Gas Code and industry standards. All work, materials, and services not expressly shown or called for in the Contract Documents, which may be necessary for the complete and proper construction of the work in good faith, shall be performed, furnished, and installed by the Contractor as though originally so specified or shown, at no increase in cost to CGS. Gas pipe fitters and plumbers shall be Florida licensed, qualified and thoroughly trained and experienced in the skills required and shall be completely familiar with the design and application of work described.

T.52 EXISTING GAS HOUSE PIPING (PLUMBING)

A. The modification of the existing gas house piping plumbing shall be performed by the contractor only after receiving written approval from the CGS construction inspector. With the inspector's authorization the Contractor shall perform all modifications of existing natural gas plumbing while adhering and remaining compliant with Florida Building Code – Fuel Gas.

B. The Contractor shall remove and dispose of all abandoned existing gas piping. The Contractor shall not cut into the existing gas plumbing until the CGS inspector verifies the new meter stub-out location.

T.53 TESTING

A. Contractor shall pay for all testing and retesting required to show compliance with the Contract Specifications, Codes, Regulations, and all other applicable laws.

1. CUSTOMER SYSTEM PRESSURE TEST
   The Contractor will conduct leakage tests at one and a half times (1.5x) the gas delivery pressure for minimum time of fifteen (15) minutes on the new completed gas plumbing or as required by the City Building Inspector. The pressure shall not decrease or increase during the test period.

2. CODE COMPLIANCE TESTING:
   Before gas is introduced into a system of gas piping, the entire system shall be inspected to determine that there are no open fittings or ends and that all valves at unused outlets are closed and plugged or capped.

3. LEAK DETECTION METHODS
The leakage shall be located by means of an approved gas detector, a noncorrosive detection fluid or other approved leak detection methods

B. The following is an approved procedure for leak testing customer piping systems:
Leak tests are required any time there is an interruption of service meaning the flow of gas was stopped for any reason. Florida Fuel Gas Code 406.6.3 (NFPA 54 -8.2.3) states that "Immediately after the gas is turned on into a new system or into a system that has been initially restored after an interruption of service, the piping system shall be tested for leakage. If leakage is indicated, the gas supply shall be shut off until the necessary repairs have been made".
The leak test will indicate any leaks within the propane or natural gas piping system due to interruption of service or out of gas situation. The leakage test is simply testing the integrity of the system plumbing joints and the seal of the pipe joint compound, piping fittings, pipe, gas equipment & appliances, valves etc. This purpose of performing a leak test is to Protect Life and Then Property in accordance with Federal Pipeline Safety Laws of CFR 49.192, Florida Building Code adopted law/ ordinance and the gas industry.

The leak check tests for leakage throughout the system of piping and appliances. It is used for new and existing gas systems. It is conducted after a system has been successfully pressure tested, inspected and approved.

Normally, the leak check is conducted when one of the following occurs:

- A system of new gas or modified gas piping is placed into service for the first time (drop test)
- A gas leakage is suspected (investigation of an odor complaint)
- A gas meter is replaced
- An appliance or appliance connector is replaced
- An out of gas condition occurs (interruption of service)

The pressure test and leak check are often confused. A pressure test is required for new piping installations, while a leak check is required whenever the gas system is initially placed into service or when the gas is turned back on after it has been turned off. Leak checks differ from the pressure test in that it requires no special preparations. The medium used for a leak check is fuel gas at normal supply pressure. The gas is applied to the total system.

T.54 LEAK CHECK PROCEDURE

The procedure for the leak check is not specified in the NFPA 54- National Fuel Gas Code or the IFGC Fuel Gas Code- Florida Fuel Gas Code. Any CGS accepted method can be used, as long as it finds leaks. It is recommended that a written procedure for the method be developed, and the steps be taken to ensure that all employees follow the method established; consequently, every system is tested identically.

T.55 TESTING FOR LEAKAGE

This test can be done by one of the following methods:
For Any Gas System- To an appropriate checkpoint attach a manometer or an appropriate pressure gauge between the inlet to the piping system and the first regulator in the piping system, momentarily turn on the gas supply and observe the gauging device for pressure drop with the gas supply shut off. No evident drop in pressure should occur during a period of three (3) minutes.

Accordingly, each individual equipment shutoff valve should be supplying pressure to its appliance for the leak check. This check will prove the integrity of the one hundred percent (100%) pilot shut off of each gas valve in the on position. Pilots not incorporating a one hundred percent (100%) pilot shut off valve and all manual gas valves not incorporating safety shutoff systems are to be placed in the off position prior to leak checking, by using the following methods:

By inserting a pressure gauge between the container gas shutoff valve and the first regulator in the system, admitting full container gas pressure to the system and closing the container shutoff valve. Enough gas should be released from the system to lower the pressure gauge reading by 10psi.

The system should then be allowed to stand for three (3) minutes without showing an increase or decrease in the pressure gauge reading.

For systems serving appliances that receive gas at a pressure of ½ psi or less, by inserting a water manometer or appropriate pressure gauge into the system downstream of the final regulator, pressurizing the system with either fuel gas or air to test pressure of nine inchnine-inch (9") water column and observing the device for a pressure change. If fuel gas is used as a pressure source, it is necessary to pressurize the system to full operating pressure, close the container service valve, and then release enough gas from the system through a range burner valve or other suitable means to drop the system pressure to nine-inch (9") water column. This ensures that all regulators in the system are unlocked and that a leak anywhere in the system is communicated to the gauging device. The gauging device should indicate no loss or gain of pressure for a period of three (3) minutes.

T.56 WHEN LEAKAGE IS DETECTED

When pressure drops on the gauge or manometer is noted, all equipment or outlets supplied through the system should be examined to see whether they are shut off and do not leak. If they are found tight, there is a leak in the piping system.

Where leakage is indicated, the gas supply at the meter shall be shut off, locked and slugged until the necessary repairs have been made. CGS dispatch shall be notified ASAP.

Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested. Matches, candles, open flames or other methods that could provide a source of ignition shall not be used.

T.57 PLACING GAS EQUIPMENT IN OPERATION

Gas utilization equipment / appliances shall be permitted to be placed in operation after the piping system has been tested and determined to be free of leakage and purged in accordance with Section 406.7.2. of the Florida Fuel Gas Code.

The Contractor will conduct leakage tests at one and a half times (1.5x) the gas delivery pressure for minimum time of fifteen (15) minutes on the existing gas house plumbing or as required by the City Building Inspector. The pressure shall not decrease or increase during the test period. Other inspections and tests required by the City Building Inspector, codes, ordinances, or other legally constituted authority shall be the responsibility of and shall be paid for by the Contractor.
Testing of the existing gas house piping plumbing shall be performed prior to connecting the new supply line.

T.58 CONTRACTOR'S CONVENIENCE TESTING

Inspection and testing performed exclusively for the Contractor's convenience by CGS shall be at the convenience of CGS if available and normal labor rates may be applicable.

T.59 SCHEDULE FOR TESTING

A. If applicable, testing shall be scheduled with the respective City's Building Department in advance.

B. At least forty-eight (48) hours notice shall be provided to the respective City's Building Department, when permits and testing is required.

T.60 COOPERATION WITH THE BUILDING DEPARTMENT

Building Inspectors shall have access to the work at all times and all locations where the work is in progress. Contractor shall provide such access to enable the respective City's Building Department to perform its functions properly.

A. Revising schedule: When changes of construction schedule are necessary during construction, Contractor shall coordinate all such changes with the respective City's Building Department as required.

B. Adherence to Schedule: When the respective City's Building Department is ready to inspect, but is prevented, correction notices fees will be paid for by the contractor.

T.61 NATURAL GAS DISTRIBUTION SYSTEM

Any charges related to incompleteness of work and its associated testing, due to Contractor delays, shall be the Contractors responsibility.

T.62 COORDINATION WITH CUSTOMERS

The Contractor is responsible for coordinating access to private property with the homeowners.

The Contractor shall notify the property owner/ resident at least 14 days in advance of performing work. Prior to starting work at a specific location, the Contractor shall schedule the work with the homeowner or resident, as the customer's presence during the meter upgrades/ change out work is required.

The Contractor shall relight all pilot lights the same day after they install the new gas meter and regulator. Contractor will confirm the regulator settings for the specific flow.

All efforts shall be made to ensure residents are not left without gas service overnight. If possible, each residence shall be reconnected and all pilot lights re-lit before the end of each work day.

F. DIRECTIONAL DRILL UTILITY PLACEMENT

PART 1 – GENERAL

T.63 WORK INCLUDED

A. The work specified under this Section consists of furnishing and installing underground gas utilities by directional drill methods. This work shall include all services, equipment, materials, labor and testing required completing the gas utility installation and restoring any disturbed areas to their existing or better conditions. The maximum depth of installed gas facilities shall not exceed four feet (4') unless prior approval is received. All underground utilities shall be located and potholed prior to the start of boring.

PART 2 – PRODUCTS

T.64 MATERIALS

A. **Plastic Pipe:** For all gas pipes over one inch (1") diameter plastic pipe must meet or exceed the following strength and composition standards **PE (Polyethylene) ASTM D 2513**.

B. **Couplings**: Plastic pipe couplings shall meet or exceed all applicable ASTM strength and composition standards for the particular type pipe being used.

C. **Joints**: Plastic pipe joints shall be made in accordance with applicable ASTM standards. In all cases, the joints shall be made sufficiently strong to withstand the stresses of installation, with joints completely set and cured prior to placement of the pipe.

D. **Drilling Fluids**: Drilling Fluids shall consist of a mixture of potable water and gel-forming colloidal material such as bentonite, or a polymer surfactant mixture producing a slurry of custard-like consistency. All drilling and hydraulic fluids shall be environmentally friendly and approved by the EPA.

T.65 EQUIPMENT

All equipment used in the execution of work shall have the built-in capacity, stability and necessary safety features required to fully comply with these specifications without showing evidence of undue stress or failure.

A. It shall be the responsibility of the Contractor to assure that the equipment to be used in the crossing operation is in sound operating condition. Backup equipment may be required where job site conditions indicate that severe damage to the roadway or a hazardous condition may result in the event of an equipment breakdown and where the condition of the equipment to be used indicates that routine component replacement or repair will likely be necessary during the crossing.

B. General Arrangement of Tunnel Boring System: The tunnel boring equipment shall consist of truck-mounted field power unit and a trailer or dolly mounted drill unit. A minimum crew of three (3) people is required to operate the units.

1. Field Power Unit: The field power unit shall be a self-contained truck-mounted system designed to provide a supply of high-pressure bentonite cutting fluid to the drill unit. It shall contain a one thousand (1,000) gallon (3,800 liter) fluid storage tank and a complete bentonite mixing system. The cutting fluid is to be mixed on site without the need for an external water supply. It shall permit changes to be made to the bentonite concentration during tunneling in response to changing soil conditions. The field power unit shall contain the power-takeoff-driven high-pressure bentonite pumping system.

2. Directional Drill System: A dolly mounted version of the drill system shall include a thrust frame. Both the trailer mounted and dolly mounted drill system shall be designed to rotate and push ten foot (10') or three (3) meter minimum hollow drill sections into the tunnel being created by the boring head. The drill sections shall be made of high strength steel which permits them to bend to a thirty-foot (30') or nine (9) meter radius without yielding. Drill end fittings shall permit rapid make-up of the drill sections while meeting the torque, pressure and lineal load requirements of the system. The boring head itself shall house a watertight battery- operated electronic system used to determine tool depth and location from surface and to orient the head for steering.

3. All tunneling systems shall be in sound operating condition with no broken welds, excessively worn parts, badly bent or otherwise misaligned components. All ropes, cables, clamps and other non-mechanical but essential items shall be in sound condition and replaced immediately when need is apparent.

4. Other: Devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

5. Water sluicing methods, jetting with compressed air, or boring or tunneling devices with vibrating type heads that do not provide positive control of the line and grade shall not be allowed.

C. **Spoils Equipment**: Vacuum truck shall be a self-contained truck which has sufficient vacuum and capacity to remove excess bentonite mixture from the project site as required or directed by CGS.

PART 3 - EXECUTION

T.66 PERSONNEL REQUIREMENTS

A. Responsible representatives of the Contractor and approved Subcontractor(s) (when applicable) shall be present at all times during the actual crossing operations. A responsible representative as specified herein is defined as "a person experienced in the type of work being performed and who has the authority to represent the Contractor in a routine decision-making capacity concerning the manner and method of carrying out the work specified herein".

B. The Contractor and Subcontractor(s) shall have sufficient number of competent workers on the project at all times to ensure the utility placement is made in a timely and otherwise satisfactory manner. Adequate personnel for carrying out all phases of the actual crossing operation (where applicable: tunneling system operators, operator for removing spoil material, and laborers as necessary for various related tasks) must be on the job site at the beginning of work. A competent and experienced supervisor representing the Contractor or Subcontractor that is thoroughly familiar with the equipment and type of work to be performed, must be in direct charge and control of the operation at all times. In all cases the

supervisor must be continually present at the project site during the actual crossing operation.

T.67 COORDINATION OF THE WORK

A. The Contractor shall notify CGS and the Engineer at least twenty-four (24) hours in advance of starting work. In addition, the actual crossing operation shall not begin until the Engineer or his representative is present at the project site and agrees that proper preparations for the crossing have been made. The Engineer's approval for beginning the crossing shall in no way relieve the Contractor from the ultimate responsibility for the satisfactory completion of the work.

B. The Contractor and the Engineer shall select a mutually convenient time for crossing operation to begin in order to avoid schedule conflicts.

T.68 PROCEDURE

A. Erection or installation of appropriate safety and warning devices in accordance with the Florida Department of Transportation (FDOT) Manual on Traffic Control and Safe Practices shall be completed prior to beginning work.

B. Subsurface Soil and Drainage Investigation: To correctly plan individual crossing procedures such as dewatering, use of cutting heads, positioning of auger within the casing and to accurately locate potential problem areas, an adequate subsurface investigation shall be made by the Contractor.

C. Equipment Set-Up:

1. The general operating sequence of the tunneling system shall be as follows:
    a. The trailer or dolly is positioned at the starting location.
    b. The tool head and first drill pipe are loaded onto the thrust frame.
    c. The proper cutting fluid pressure is set on the field power unit.
    d. The tool is advanced and steered level at the proper depth using the locator to sense tool position.
    e. More drill pipe is added as the tool is advanced.
    f. After each new drill pipe is advanced into the ground, the tool is located, and a computer generates the steering command for the next length of drill pipe to keep the tool on course.
    g. Steps "e" and "f" are repeated until the tool advances to the end of the run.
    h. At the end of the run the drilling head is removed and a reamer is attached to enlarge (if necessary) the hole for the utility.
    i. The utility is attached to the reamer and necessary weak-link (breakaway device).
    j. The drill pipe is withdrawn from the hole pulling the utility.
    k. Utility connections are made.
    l. The area is restored.

D. Crossing Operation: The actual crossing operation shall be accomplished during daylight hours and shall not begin after the latest starting time that will allow completion during daylight hours except as noted below:

1. In emergency situations, or where delay would increase the likelihood of a failure, nighttime work will only be allowed to complete a delayed crossing. In addition, where the obvious hazards of nighttime work are carefully considered and determined to be insignificant, nighttime work will be allowed to complete a properly planned crossing if the Engineer agrees that the delay was caused by reasonably unavoidable circumstances, when such nighttime work is necessary to avoid placing an undue hardship on the Contractor.

2. Planned nighttime work is expressly prohibited and will not be allowed except for in the event of extenuating circumstances. Any nighttime work shall be in strict conformance with the Florida Department of Transportation (FDOT) Manual on Traffic Control and Safe Practices.

E. Equipment Breakdowns or Other Unforeseen Stoppages: If forward motion of the tunneling tool has halted at any time other than for reasons planned for in advance and prevention of voids under paved areas cannot be assured, the tunnel must be filled with bentonite by injection as soon as possible and abandoned.

When an obstruction is encountered that cannot be passed or an existing utility is damaged, open cutting for inspection may be allowed if approved in writing by the Engineer when consideration of all pertinent facts indicate such action is warranted. Any such authorized excavation shall be repaired according to the appropriate specifications herein or otherwise directed.

T.69 WAIVER OF REQUIREMENTS

A. These specifications are appropriate for most common crossing situations. Under unusual conditions, not adequately covered herein, these requirements may be altered or waived when their strict adherence would increase the likelihood of crossing failure. Any such alteration or waiver shall be based on sound engineering judgment and must be fully documented as further specified herein. Any alteration or waiver must be approved by CGS' Engineer.

T.70 REPORTING PROCEDURES

A. An accurate drill log shall be kept by the Contractor on all crossings. The purpose of this log is to record and report the data necessary to isolate and identify all common factors associated with underground crossing failures. The log shall also be for the inspector's use as a checklist of essential items pertaining to the crossing. The data shall be recorded on the job site during the actual crossing operation. The log shall include elevation readings of the utility every ten feet (10') along the crossing. All drill logs shall be submitted to CGS at the time of work.

B. The bore log shall include date, drill operator and company information, total footage, entry and exit pit measurements from two (2) adjoining intersections and elevation readings of the utility every ten feet (10') along the bore path.

C. Any main or service placement beyond a forty-eight inch (48") depth requires inspector pre approval and variance of depth form to include the identified conflict and cross street measurements.

D. All drill logs, as-builds, pressure charts and variance of depth paperwork shall be submitted at the time of work invoicing.

PART 4 - MEASUREMENT AND PAYMENT

T.71 MEASUREMENT

A. The quantity of Directional Drill Utility Placement for which payment will be made shall be the actual number of units measured in place and accepted. The units measured shall be as listed in Exhibit A – Bid Pricing by Group. If a payment item for Directional Drill Utility Placement is not specifically included in the Bid, the quantity for which payment will be made shall be the quantity required to complete the work.

T.72 PAYMENT

A. Payment for Directional Drill Utility Placement shall be made at the prices stated in Exhibit A – Bid Pricing by Group. If a payment item for Directional Drill Utility Placement is not specifically included in the Bid, payment for the work specified in this Section shall be included in the several unit and lump sum prices for all applicable items of work.

G. SODDING

PART 1 - GENERAL

T.73 WORK INCLUDED

A. The work specified in this section consists of the establishing of a stand of grass, within the areas indicated on the Drawings and/or areas disturbed by construction activities, by the furnishing and placing of grass sod, fertilizing, watering and maintaining the sodded areas to assure a healthy stand of grass, until rooted.

PART 2 – PRODUCTS

T.74 GRASS SOD

A. Grass sod shall match existing grass type and shall be well matted with grass roots. The sod shall be taken up in rectangles, preferably twelve inches (12”) by twenty-four inches (24”), shall be a minimum of two inches (2”) in thickness and shall be live, fresh and uninjured at the time of planting. It shall be reasonably free of weeds and other grasses and shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. The sod shall be planted as soon as possible after being dug and shall be shaded and kept moist until it is planted. After sod is installed, it shall be maintained until it is rooted, which will necessitate watering frequently.

T.75 WATER FOR GRASSING

A. The water used in the sodding operations may be obtained from any approved spring, pond, lake, stream or municipal water system. The water shall be free of excess and harmful chemicals, acids, alkalis, or any substance which might be harmful to plant growth or obnoxious to traffic. Salt water shall not be used.

PART 3 - EXECUTION

T.76 PREPARATION OF GROUND

A. The area over which the sod is to be placed shall be scarified or loosened to a suitable depth and then raked smooth and free from rocks or stones. Where the soil is sufficiently loose, CGS at their discretion, may authorize the elimination of ground preparation.

T.77 PLACING SOD

A. The sod shall be placed on the prepared surface, with edges in close contact and shall be firmly and smoothly embedded by light tamping with appropriate tools.

B. Where sodding is used in drainage ditches, the setting of the pieces shall be staggered so as to avoid a continuous seam along the line of flow. Along the edges of such staggered areas, the offsets of individual strips shall not exceed six inches (6”). In order to prevent erosion caused by vertical edges at the outer limits, the outer pieces of sod shall be tamped so as to produce a featheredge effect.

C. On steep slopes, the Contractor shall, if so directed by CGS, prevent the sod from sliding by means of wooden pegs driven through the sod blocks into firm earth, at suitable intervals.

D. Sod which has been cut for more than seventy-two (72) hours shall not be used unless specifically authorized by CGS after their inspection thereof. Sod which is not planted within twenty-four (24) hours after cutting shall be stacked in an approved manner and maintained and properly moistened. Any pieces of sod which, after placing, show an appearance of extreme dryness shall be removed and replaced by fresh, uninjured pieces.

E. Sodding shall not be performed when weather and soil conditions are, in CGS’ opinion, unsuitable for proper results.

T.78 WATERING

A. The areas on which the sod is to be placed shall contain sufficient moisture, as determined by CGS, for optimum results. After being placed, the sod shall be kept in a moist condition to the full depth of the rooting zone for at least two (2) weeks. Thereafter, the Contractor shall apply

water as needed until the sod roots and starts to grow for a minimum of sixty (60) days (or until final acceptance, whichever is latest).

T.79 MAINTENANCE

A. The Contractor shall, at their expense, maintain the sodded areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include repairing of any damaged areas and replacing areas in which the establishment of the grass stand does not appear to be developing satisfactorily.

B. Replanting or repair necessary due to the Contractor's negligence, carelessness or failure to provide routine maintenance shall be at the Contractor's expense. Replanting necessary due to factors determined to be beyond the control of the Contractor shall be paid for under the appropriate bid pricing amount.

PART 4 - MEASUREMENT AND PAYMENT

T.80 MEASUREMENT

A. The quantity of sodding for which payment will be made shall be the actual number of units measured in place and accepted. The units measured shall be as listed in Exhibit A - Bid Pricing by Group. If a payment item for sodding is not specifically included in the Bid, the quantity for which payment will be made shall be the quantity required to complete the work.

T.81 PAYMENT

A. Payment for sodding shall be made at the prices stated in Exhibit A – Bid Pricing by Group. If a payment item for sodding is not specifically included in the Bid, payment for the work specified in this Section shall be included in the several unit and lump sum prices for all applicable items of work.

---End of Technical Specifications--