

ROADWAY

ITEM 201 - CLEARING AND GRUBBING

THE GROUND BENEATH THE PROPOSED EMBANKMENT SHALL BE STRIPPED AND CLEARED OF ALL SOD, TOPSOIL, TREES, AND OTHER ORGANIC MATERIALS IN ACCORDANCE WITH SECTION 201 OF THE CMS MANUAL. ALTHOUGH THERE ARE NO TREES OR STUMPS SPECIFICALLY MARKED FOR REMOVAL WITHIN THE LIMITS OF THE PROJECT, A LUMP SUM QUANTITY HAS BEEN INCLUDED IN THE GENERAL SUMMARY FOR ITEM 201 - CLEARING AND GRUBBING. ALL PROVISIONS AS SET FORTH IN THE SPECIFICATIONS UNDER THIS ITEM SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 201 - CLEARING AND GRUBBING.

ITEM 203 - EXCAVATION NOT INCLUDING EMBANKMENT CONSTRUCTION, AS PER PLAN (TRENCH DRAIN)

THIS ITEM CONSISTS OF CONSTRUCTING A BIODEGRADABLE POLYMER SLURRY TRENCH DRAIN TO THE LINES, GRADES, AND CROSS-SECTIONS AS SHOWN ON THE DRAWINGS. WORK ON THIS ITEM SHALL BE STARTED AFTER CONSTRUCTION OF THE BUTTRESS FILL. THE TRENCH SHALL HAVE VERTICAL SIDE WALLS, A WIDTH OF THREE (3) FEET, AND SHALL EXTEND TO THE TOP OF ROCK OR TO THE DEPTHS DIRECTED BY THE ENGINEER. DURING EXCAVATION THE TRENCH WALLS SHALL BE SUPPORTED BY A BIODEGRADABLE POLYMER SLURRY. GRANULAR BACKFILL AND PERFORATED DRAIN PIPE SHALL BE PLACED INTO THE TRENCH THROUGH THE SLURRY. THE SLURRY SHALL THEN BE DEGRADED AND FLUSHED FROM THE DRAIN.

SUBSURFACE CONDITIONS AS ENCOUNTERED BY THE BORINGS ARE PRESENTED ON THE BORING LOGS.

SUBMITTALS

QUALIFICATIONS OF CONTRACTOR

THE CONTRACTOR SHALL SUBMIT EVIDENCE AND REFERENCES FROM AT LEAST FIVE SIMILAR PROJECTS TO DOCUMENT SUCCESSFUL USE OF BIODEGRADABLE POLYMER SLURRY TECHNIQUE. A BIODEGRADABLE POLYMER SLURRY SPECIALIST SHALL BE ON-SITE DURING CONSTRUCTION, SLURRY PREPARATION, AND SLURRY DEGRADATION. THE SPECIALIST SHALL BE PROVIDED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. THE QUALIFICATIONS OF THE CONTRACTOR AND SPECIALIST SHALL BE SUBMITTED WITH THE BID.

WORK PLAN

THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION WORK PLAN FOR APPROVAL BY THE ENGINEER AT LEAST THIRTY (30) DAYS PRIOR TO THE START OF WORK. THE WORK PLAN SHALL CONTAIN A DETAILED DESCRIPTION OF THE METHODS OF CONSTRUCTION INCLUDING EXCAVATION METHODS, SLURRY MIXING AND HANDLING, MATERIAL HANDLING AND PLACEMENT, DRAIN PIPE PLACEMENT, AND BACKFILL PLACEMENT. THE WORK PLAN SHALL ALSO INCLUDE A SCHEDULE OF WORK AND A LIST OF MAJOR EQUIPMENT.

QUALITY CONTROL PLAN

THE CONTRACTOR SHALL SUBMIT A QUALITY CONTROL PLAN FOR APPROVAL BY THE ENGINEER WITH THE WORK PLAN. THE PLAN SHALL CONTAIN A LIST OF TEST METHODS AND MINIMUM STANDARDS WHICH WILL BE USED TO MONITOR CONSTRUCTION OF THE BIODEGRADABLE POLYMER SLURRY TRENCH DRAIN. THE PLAN SHALL INCLUDE METHODS USED TO CONTROL SLURRY VISCOSITY, DEPTH MEASUREMENTS, GRADIENT OF PIPES, AND PLACEMENT OF GRANULAR BACKFILL. THE PLAN SHALL ADDRESS THE CHEMICAL AND PHYSICAL PROPERTIES OF ALL MATERIALS INCLUDING BUT NOT LIMITED TO MANUFACTURER'S CERTIFICATION OF QUALITY, MATERIAL SAFETY DATA SHEETS, MILL CERTIFICATES, AND GRADATION TEST DATA.

AS-BUILT DRAWINGS

THE CONTRACTOR SHALL GENERATE AND MAINTAIN AN AS-BUILT PLAN AND PROFILE OF THE TRENCH DRAIN, INCLUDING DRAIN PIPE ELEVATIONS. TWO (2) COPIES OF THE AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER AT THE COMPLETION OF WORK.

GENERAL NOTES

MATERIALS

BIODEGRADABLE POLYMER

BIODEGRADABLE POLYMER SHALL NATURALLY DEGRADE OR BE BROKEN DOWN TO A NON-TOXIC WATER SOLUTION ONCE BACKFILLING OF TRENCH IS COMPLETE. DEGRADED BIODEGRADABLE POLYMER SHALL NOT MATERIALLY REDUCE TRENCH WALL TRANSMISSIVITY. THE BIODEGRADABLE POLYMER SHALL NOT FORM A FILTER CAKE ON THE TRENCH WALLS WHICH MAY DECREASE THE TRANSMISSIVITY OF THE TRENCH DRAIN-SOIL INTERFACE. SUBSTANCES PROHIBITED BY LOCAL, STATE, OR FEDERAL LAW SHALL NOT BE CONTAINED IN THE BIODEGRADABLE POLYMER.

WATER

WATER USED TO PREPARE THE BIODEGRADABLE POLYMER SLURRY SHALL BE FRESH OR SALT WATER. THE WATER SHALL BE FREE OF OIL, ACID, ALKALI, ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS WHICH COULD ADVERSELY AFFECT THE PROPERTIES OF THE BIODEGRADABLE POLYMER SLURRY. POTENTIAL WATER SOURCES SHALL BE TESTED BY THE CONTRACTOR PRIOR TO TRENCH EXCAVATION TO ENSURE THAT WATER WITH SUITABLE CHARACTERISTICS FOR SLURRY PREPARATION IS USED. WATER USED TO PREPARE THE BIODEGRADABLE POLYMER SLURRY SHALL HAVE THE FOLLOWING CHARACTERISTICS:

- 1) pH BETWEEN 6 AND 8
- 2) TOTAL DISSOLVED SOLIDS LESS THAN 1,000 mg/L
- 3) TOTAL HARDNESS LESS THAN 250 mg/L

THE WATER SHALL BE TESTED IN ACCORDANCE WITH API RP 13B-1 (AMERICAN PETROLEUM INSTITUTE, STANDARD PROCEDURE FOR FIELD TESTING WATER-BASED DRILLING FLUIDS).

SLURRY

THE SLURRY FOR SUPPORTING THE TRENCH SHALL CONSIST OF A STABLE SUSPENSION OF BIODEGRADABLE POLYMER IN WATER. THE CONTRACTOR SHALL ENSURE THAT THE SLURRY MEETS THE NECESSARY REQUIREMENTS AND MONITOR THE SLURRY AND THE TRENCH DURING EXCAVATION. THE VISCOSITY AND pH OF THE SLURRY SHALL BE MONITORED BY THE CONTRACTOR TO DETERMINE WHEN DEGRADATION OF THE SLURRY BEGINS. THE GEL STRENGTH OF THE SLURRY SHALL BE MAINTAINED AT A LEVEL SUCH THAT HYDROSTATIC PRESSURE IS TRANSFERRED FROM THE SLURRY TO THE TRENCH WALLS.

THE SLURRY USED IN TRENCHING SHALL BE TESTED EACH SHIFT IN ACCORDANCE WITH API RP 13B-1 TO ENSURE THE ABILITY OF THE SLURRY TO STABILIZE THE TRENCH. VISCOSITY, DENSITY, AND pH TESTS SHALL BE PERFORMED TWO (2) TIMES PER SHIFT OR AS DIRECTED BY THE ENGINEER. SAMPLES SHALL BE OBTAINED FROM BOTH THE MIXING PLANT AND FROM THE TRENCH FOR TESTING. THE CONTRACTOR SHALL SUPPLY PERSONNEL AND EQUIPMENT TO PERFORM THE TESTS. THE DEGRADED SLURRY IN THE TRENCH SHALL BE TESTED BY THE CONTRACTOR TO DEMONSTRATE THAT THE SLURRY HAS BEEN BROKEN DOWN. THE VISCOSITY AND pH OF THE SLURRY SHALL BE TESTED TO VERIFY DEGRADATION.

ADDITIVES

ADMIXTURES OF SOFTENING AGENTS, PRESERVATIVES, OR DISPERSANTS MAY BE ADDED TO THE SLURRY TO ENHANCE WORKABILITY. ADDITIVES MUST BE BIODEGRADABLE AND BROKEN DOWN PRIOR TO COMPLETION OF THE TRENCH DRAIN. CHEMICAL AND PHYSICAL CHARACTERISTICS OF ADDITIVES SHALL BE SUBMITTED WITH THE QUALITY CONTROL PLAN.

GRANULAR BACKFILL

MATERIAL USED TO BACKFILL THE TRENCH SHALL BE FINE AGGREGATE CONSISTING OF NATURAL SAND AND MEETING THE REQUIREMENTS OF 703.02, FINE AGGREGATE FOR PORTLAND CEMENT CONCRETE, AS SPECIFIED IN THE CMS MANUAL.

MATERIALS (CONT.)

ITEM 603 - 8" CONDUIT, TYPE E, PERFORATED, 707.31, WITH FABRIC WRAP

DRAIN PIPE PLACED IN THE TRENCH SHALL BE CORRUGATED POLYETHYLENE DRAINAGE TUBING MEETING THE REQUIREMENTS OF 707.31 AS SPECIFIED IN THE CMS MANUAL. THE PIPE SHALL BE 8 INCHES IN DIAMETER, HAVE SLOTTED PERFORATIONS, AND HAVE A WOVEN OR KNITTED FABRIC WRAP.

ITEM 604 - PRECAST REINFORCED CONCRETE OUTLET

PRECAST REINFORCED CONCRETE OUTLETS SHALL BE INSTALLED AT THE DRAIN PIPE OUTLETS. PRECAST OUTLETS SHALL MEET THE REQUIREMENTS OF 706.15 AS SPECIFIED IN THE CMS MANUAL.

EQUIPMENT

THE CONTRACTOR SHALL FURNISH ALL EQUIPMENT FOR CONSTRUCTION OF THE BIODEGRADABLE POLYMER SLURRY TRENCH AS SHOWN ON THE DRAWINGS. THE EQUIPMENT SHALL BE OF THE TYPE AND CAPACITY TO COMPLETE THE WORK IN AN EFFICIENT MANNER, AND SHALL BE MAINTAINED IN OPERABLE CONDITION AT ALL TIMES.

EXCAVATION EQUIPMENT

EQUIPMENT FOR EXCAVATING THE TRENCH SHALL BE APPROVED EARTHMOVING EQUIPMENT SUCH AS A BACKHOE OR A CLAMSHELL, CAPABLE OF PERFORMING THE INDICATED WORK ON THE DRAWINGS. THE EQUIPMENT SHALL BE CAPABLE OF EXCAVATING TO THE REQUIRED TRENCH DEPTH AND OF EXCAVATING THE REQUIRED MINIMUM WIDTH OF THE TRENCH IN A SINGLE PASS OF THE EXCAVATION EQUIPMENT.

SLURRY MIXING PLANT

THE CONTRACTOR SHALL PROVIDE A SLURRY MIXING PLANT CONTAINING THE NECESSARY EQUIPMENT FOR PREPARING THE BIODEGRADABLE POLYMER SLURRY INCLUDING A HIGH-SHEAR COLLOIDAL MIXER CAPABLE OF PRODUCING A STABLE SUSPENSION OF BIODEGRADABLE POLYMER IN WATER. THE CONTRACTOR SHALL SUPPLY ALL EQUIPMENT TO ADEQUATELY SUPPLY BIODEGRADABLE POLYMER SLURRY TO THE TRENCH. HYDRATION PONDS WILL NOT BE PERMITTED.

BACKFILLING EQUIPMENT

THE CONTRACTOR SHALL PROVIDE EQUIPMENT FOR BACKFILLING THE TRENCH THAT MINIMIZES SEGREGATION OF THE BACKFILL AND AVOIDS TRAPPING POCKETS OF SLURRY.

EXCAVATION

THE CONTRACTOR SHALL BEGIN EXCAVATION AT THE LOCATION SHOWN ON THE DRAWINGS. THE TRENCH SHALL BE EXCAVATED TO THE TOP OF ROCK OR AS DIRECTED BY THE ENGINEER. THE ENGINEER WILL EXAMINE THE TRENCH SPOIL AND APPROVE THE DEPTH OF THE TRENCH IMMEDIATELY AFTER EXCAVATION. SPOIL SHALL NOT BE STORED BETWEEN STA. 173+00 AND STA. 178+00 ABOVE ELEVATION 665 FEET. FROM THE STARTING LOCATION, EXCAVATION SHALL PROCEED IN BOTH DIRECTIONS PARALLEL TO THE ROADWAY. THE DEPTH OF THE TRENCH SHALL BE INCREASED OR DECREASED SO THAT THE TRENCH EXTENDS TO THE TOP OF ROCK AT ALL TIMES. THE TRENCH ALIGNMENT SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND WITH THE APPROVAL OF THE ENGINEER. IN ORDER TO MAINTAIN A 2% MINIMUM SLOPE IN THE DRAIN PIPE FROM THE STARTING LOCATION TO THE DRAIN OUTLETS, THE CONTRACTOR SHALL GRADUALLY TURN THE TRENCH ALIGNMENT DOWNSLOPE AND AWAY FROM THE ROADWAY.

GENERAL NOTES

LAK-90-4.10

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