

VIII. Adjudicated Technical
Specifications 03-08-16

**TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS**

DIVISION 200	EARTHWORK.....	2
SECTION 210	FOUNDATION MATERIAL.....	2
SECTION 220	DITCH LINING.....	3
DIVISION 300	CONCRETE	5
SECTION 306	PORTLAND CEMENT CONCRETE CURB RAMPS	5
DIVISION 400	ASPHALT CONCRETE PAVEMENT.....	9
SECTION 402	TRAFFIC MARKINGS.....	9
DIVISION 700	MISCELLANEOUS CONSTRUCTION.....	14
SECTION 702	GEOTEXTILE SYNTHETIC FABRIC.....	14
SECTION 712	CHAIN LINK FENCE	16
DIVISION 8000	ILLUMINATION.....	22
SECTION 8001	GENERAL.....	22
SECTION 8002	ELECTRICAL EXCAVATING AND BACKFILLING	27
SECTION 8003	REMOVING AND REPLACING IMPROVEMENTS	29
SECTION 8004	FOUNDATIONS.....	30
SECTION 8005	MAST ARMS, POLES, STEEL PEDESTALS AND POSTS.....	32
SECTION 8007	CONDUIT.....	42
SECTION 8008	JUNCTION BOXES.....	45
SECTION 8009	EXPANSION FITTINGS.....	48
SECTION 8010	CONDUCTORS.....	49
SECTION 8011	WIRING	54
SECTION 8012	FUSED SPLICE CONNECTORS.....	56
SECTION 8013	BONDING AND GROUNDING	57
SECTION 8014	LOAD CENTERS.....	59
SECTION 8016	MISCELLANEOUS.....	65
SECTION 8023	LUMINAIRES.....	71
SECTION 8024	BALLASTS	73
SECTION 8028	SALVAGING ELECTRICAL EQUIPMENT	74
DIVISION 9000	STORM WATER POLLUTION PREVENTION PLAN (SWPPP).....	76
SECTION 9001	STORM WATER POLLUTION PREVENTION PLAN.....	76
SIGN SHOP DRAWINGS.....		101

DIVISION 200 EARTHWORK

SECTION 210 FOUNDATION MATERIAL

Delete subsections 210.4 and 210.5 and replace with the following under Division 200:

210.4 Method of Measurement

Foundation material shall be measured per subsection 205.4.

210.5 Basis of Payment

Payment for this item shall be made per subsection 205.5.

Add the following new section under Division 200:

SECTION 220 DITCH LINING

220.1 General

The Work under this Section consists of performing all operations pertaining to furnishing and placing a layer of ditch lining rock as shown on the plans or as directed by the Engineer.

220.2 Materials

Ditch Lining material shall consist of angular fragments reasonably uniform in density and quality, and reasonably free from thin and elongated pieces, dirt, and other objectionable material. At least fifty percent (50%) of the coarse aggregate particles shall have two or more mechanically fractured faces.

Materials furnished by the Contractor for ditch lining rock shall be graded within the limitations delineated below:

Ditch Lining	
U.S. Std. Sieve by Weight	Cumulative % Passing
8"	100
6"	50-80
4"	25-50
3"	0-25
2"	0-10
1"	-
#200	0-1

220.3 Construction

The ditch lining rock shall be handled, dumped, or spread into place so as to secure a stone mass of the dimensions shown on the Drawings.

220.4 Measurement

Ditch lining rock shall be measured in tons complete and accepted in place.

220.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
220	Ditch Lining	Ton

DIVISION 300 CONCRETE

Add the following new section under Division 300:

SECTION 306 PORTLAND CEMENT CONCRETE CURB RAMPS

306.1 General

The Work under this Section consists of performing all operations pertaining to furnishing and constructing Portland Cement Concrete curb ramps with a detectable warning surfacing in conformance with the Drawings. The ramps shall comply with the Americans with Disabilities Act Title II as identified in 28 CFR Part 35 – Nondiscrimination on the Basis of Disability in State and Local Government Services.

306.2 Materials

a. General

The Portland Cement Concrete (P.C.C.) materials and installation shall conform to the requirements of Section 30.03 - Portland Cement Concrete Sidewalk and the Drawings. The P.C.C. shall have a slump range of four to seven inches (4" to 7") to permit solid placement of the tactile warning panel. An overly wet mix will cause the tactile warning panel(s) to float. Contractor shall not add color to the concrete unless specified in the Drawings.

The Contractor shall not apply a troweled pattern to the curb ramps. Contractor shall provide a coarse broom finish for the ramps perpendicular to direction of pedestrian traffic.

b. Detectable Warning Panel

Each detectable warning panel shall have a truncated domed surface twenty-four inches (24") in depth for the width of the ramp. The truncated domes shall have a height of two-tenths inch (0.2"), a diameter of nine-tenths inch (0.9"), a center-to-center spacing of one and six-tenth inches (1.6") minimum and two and four-tenth inches (2.4") maximum, and a base-to-base spacing of sixty-five one-hundredth inch (0.65"), measured between the most adjacent domes.

Contractor shall provide panels Federal Yellow in color. The specified color shall be homogeneous throughout the panel.

Contractor shall provide Armor Tile Cast-In-Place In-Line Dome Tactile Panel detectable warning panel(s), manufactured by:

Engineered Plastics, Inc.
300 International Drive, Suite 100
Williamsville, NY 14221
Phone: 1-800-682-2525

or a gray cast iron detectable warning plates, or panels (s), manufactured by:

Neenah Foundry Company, Inc.
4107 E. Madison Street
Phoenix, AZ 85034
Phone: 1-866-765-0850

OR

East Jordan Iron Works, Inc.
301 Spring Street
East Jordan, MI 49727
Phone: 1-800-626-4653

306.3 Construction

The Contractor shall construct each curb ramp and install the detectable warning panel(s) in conformance with the Contract Documents and the manufacturer's recommendations.

No later than five (5) days prior to construction of the curb ramps, Contractor shall submit to the Engineer for review and approval, a layout drawing for each curb ramp to resolve issues related to pattern repeat, tile cuts, expansion joints, control joints, ramp curves, ramp end returns and surface interfaces, and truncated dome spacing.

Contractor shall install and finish the P.C.C. in accordance with the Contract Documents prior to installation of the detectable warning panel(s). Contractor shall tamp the plate(s) or panel(s) with a small sledge hammer with a two inch by six inch by twenty inch (2" x 6" x 20") wood tamping plate, or lightly vibrate into the fresh concrete to ensure that the panel's field level (base of truncated dome) is flush with the adjacent concrete and top back of curb. Contractor shall ensure that the panel's field level is flush with the adjacent concrete surface, proper water drainage is provided, and potential tripping hazards are eliminated. Contractor shall ensure that the back edge of the detectable warning panel(s) form a smooth arc and is parallel to the top back of the curb.

Immediately after the panel placement, Contractor shall check and adjust accordingly the panel's or plate(s) field level to be flush with the adjacent concrete surface. Following final field-level adjustment(s), place suitable twenty-five (25) pound weights, conforming to the manufacturer's recommendations, on each panel and additional weights at panel-to-panel joints as necessary to provide a solid contact between the panel underside and the concrete.

During and after the panel installation and concrete curing time, Contractor shall ensure that there is no walking, leaning, or any external forces placed on the panel, thereby causing a void between the underside of the panel and the concrete.

After the concrete has cured, Contractor shall remove protective plastic wraps. If “concrete bleeding” occurs between the panels, Contractor shall remove the residue without damage to the panel surfaces, in accordance with the manufacturer’s recommendation.

Contractor shall maintain, on-site, an electronic level, a five foot (5’) diameter circle template, and a three foot by five foot (3’x5’) rectangular template. Template may be of any material, including paper. Contractor shall, when requested, demonstrate to the Engineer that there are adequate landing and turning areas that meet the dimensions and slopes required on the Drawings.

Backfill and grade areas disturbed by curb ramp construction and restore ground surface as shown on Drawings.

306.4 Tolerances

In accordance with the Americans with Disabilities Act Public Rights-of-Way Accessibility Guidelines (PROWAG), dimension not stated as “maximum” or “minimum” are absolute. All dimensions are subject to conventional industry tolerances, except where the requirement is stated as a range with specific minimum and maximum end points.

Conventional industry tolerances recognized by the ADAAG include those for field conditions that may be a necessary consequence of a particular manufacturing process. Information on specific tolerances may be available from industry or trade organizations, code groups, building officials, and published references. (Example: American Concrete Institute Standard Specifications for tolerances for concrete construction and materials (ACI-117)).

306.5 Measurement

The Work paid for under “P.C.C. Curb Ramp” shall be measured as furnished, constructed, finished, and accepted in place for each installation or the actual horizontal square yardage of curb ramp (including curb ramp under detectable warnings) and back curb.

The Work paid for under “Detectable Warnings” is measured by the actual horizontal square footage of detectable warning tiles or each as furnished, installed, and accepted in place.

306.6 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment for restoration of existing ground surface disturbed by curb ramp construction is made under "Asphalt Pavement," "Concrete Sidewalk," "Topsoil," and "Seeding," as applicable. No separate payment is made for backfilling and grading in preparation of paid surface treatment. No separate payment is made for backfilling and grading in locations where the existing surface is gravel.

Payment shall be made under the following unit:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
306	P.C.C. Curb Ramp (Parallel)	Each
306	Detectable Warnings	Each

DIVISION 400 ASPHALT CONCRETE PAVEMENT

Delete Section 402 under Division 400 and replace with the following:

SECTION 402 TRAFFIC MARKINGS

402.1 General

The Work under this section consists of performing all operations pertaining to furnishing all materials; placing methyl methacrylate traffic markings and applying glass spheres and anti-skid aggregate thereto. Contractor shall provide all Work in accordance with these specifications at locations shown on the Drawings, the Manual of Uniform Traffic Control Devices (MUTCD), and the Alaska Traffic Manual.

402.2 Materials

a. Glass Spheres for Reflectorizing Highway Pavement Markings

Reflective Glass Beads shall conform to the current State Specifications, and shall be supplied with a moisture-resistant coating.

b. Methyl Methacrylate Pavement Markings

1. General Requirements:

- a. Contractor shall furnish Methyl methacrylate traffic markings which are manufactured and formulated from new material and are free from defects and imperfections that might adversely affect the serviceability of the finished product. Contractor shall furnish Traffic markings free from dirt and other foreign material such as, but not limited to, surface oils or existing road marking material, and shall cure to a tough serviceable film within the time specified by the manufacturer.
- b. Quality Requirements: Use a marking material formulated for spray application without reflective beads or anti-skid aggregate. Use glass beads and aggregate designed to be applied to freshly applied material to meet the specified retroreflectance and anti-skid properties.
- c. Methyl methacrylate traffic markings which are a spray-applied, ambient temperature curing, 2-component system for application on either asphalt or cement concrete surfaces. Traffic markings shall be composed of a Part "A" methyl methacrylate based resin and Part "B" benzoyl peroxide in liquid plasticizer. The mix ratio shall be four (4) parts of "A" to one (1) part of "B."
- d. Glass beads for drop-on applications recommended in writing by the traffic marking material manufacturer and approved by the Engineer.
- e. Submit a manufacturer certification for both the methyl methacrylate material and glass beads to ensure that the materials furnished conform to these Specifications.

- f. Performance Properties:
- 1 No Track Time: Material must be track free after 15 minutes when applied at 40 mils (ASTM D711).
 - 2 Hardness: Shore Durometer, A-1, 80 minimum after 24 hours.
 - 3 Tensile Strength: At break, minimum 125 psi (ASTM D638).
 - 4 Percent Elongation: Minimum 20% (ASTM D638).
 - 5 Water Absorption: Maximum 0.5% (ASTM D570).
 - 6 Chemical Resistance: The material must show no effect after 7-day immersion in anti- freeze, motor oil, diesel fuel, gasoline, calcium chloride, sodium chloride or transmission fluid.
 - 7 Ultra-violet Light: Ultra-violet light must have no effect.
 - 8 Skid Resistance: Minimum 45 units, British pendulum (ASTM E303).
 - 9 Reflectivity: 200 millicandelas, minimum initial
 - 10 Viscosity: Spray Material: 5 - 12 Pa•s (ASTM D2196 Method B, LV Model, Spindle #4 at 60 RPM).
- g. Contractor shall furnish Methyl methacrylate traffic markings Dura-Stripe Type V manufactured by:

TMT – PATHWAY	Phone: 800-835-3357
1675 Commercial Street N.E.	FAX: 800-774-8464
Salem, Oregon 97303	or an approved equal.

402.3 Construction

a. General

This Work shall be done as soon as possible after paving is completed to facilitate traffic.

b. Paint Color

All pavement markings shall conform to the colors shown on the Drawings.

c. Preparation of Surface

Paint will not be applied to pavements which are excessively dirty, damp, or cold. Paint shall not be applied when the pavement temperature is less than forty degree Fahrenheit (40°F). All dirt, oil, grease, and other foreign matter shall be removed from the areas of the pavement upon which the traffic markings are to be painted by a method approved by the Engineer.

d. Types of Lines

The type and color of the lines shall be as shown on the Drawings.

e. Width of Lines

The width and spacing of all lines shall be shown on the Drawings.

1. Methyl Methacrylate

- a. Contractor shall prepare the roadway areas to receive the methyl methacrylate pavement markings in accordance with this Section and the manufacturer's recommendations. Contractor shall submit a current copy of manufacturer's recommendations at least 5 working days prior to application of traffic markings.
- b. Contractor shall apply methyl methacrylate pavement markings as identified in the Contract Documents. The thickness is measured without glass beads.
- c. Contractor shall provide a manufacturer's representative to be present on the first day of striping for each type (sprayed or extruded) and additional days as required by the Engineer.
- d. Contractor shall not apply striping to new asphalt/P.C.C. until the asphalt/P.C.C. has cured to the satisfaction of manufacturer's representative or the Engineer.
- e. The minimum application rate of beading on sprayed markings is twenty pounds (20 lbs) of beads per gallon and twelve pounds (12 lbs) of beads per one hundred (100) square feet for extruded markings.
- f. The surface temperature of the roadway shall be in the range of 30° to 105° Fahrenheit for stripe application. Contractor shall thoroughly clean and dry the roadway surface.
- g. Contractor shall apply methyl methacrylate stripe material with equipment designed and capable of properly mixing at the point and time of application in accordance with the manufacturer's recommendations.

f. Pavement Marking Removal

Pavement markings shall be removed to the fullest extent possible from the pavement by any method that does not materially damage the surface or texture of the pavement or surfacing. Sand or other material deposited on the pavement as a result of removing traffic stripes and markings shall be removed as the Work progresses. Accumulations of sand or other material which might interfere with drainage or might constitute a hazard to traffic are not permitted.

Pavement markings no longer applicable which may create confusion in the minds of motorists shall be removed or obliterated before any change is made in the traffic pattern. Painting over markings is prohibited.

Pavement markings shall be removed by such methods that will cause the least possible damage to the pavement or surfacing. Any damage to the pavement or surfacing caused by pavement marking removal shall be repaired by the Contractor at his expense by acceptable methods.

Where blast cleaning is used for the removal of pavement markings or for removal of objectionable material, and such removal operation is being performed within ten feet (10') of a lane occupied by public traffic, the residue, including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation, or by other approved methods.

g. Preliminary Spotting

The Contractor will provide the necessary control points at intervals including all changes of direction and changes in the basic configuration of striping such as at the beginning and ending of no-passing zones on a two-way, two-lane roadway. These points shall be used in preliminary spotting of lines before striping is commenced. The Contractor shall be responsible for preliminary spotting of the lines to be painted and he must obtain approval from the Engineer for all spotting before striping may begin. Preliminary spotting is required for all longitudinal striping.

h. Inlaid Protected Markings

Apply with certified extrusion equipment. Grind the slot to the depth indicated in the Contract Documents and the dimensions specified, using a grinder capable of grinding the slot to the specified depth and width in a single pass. After grinding, obtain approval before placing marking material.

Dispose of asphalt grinding according to applicable federal, state, and local regulations.

Depth of Inlay Slot. Depth of material shall be measured from the peaks created by the groves to the visible surface of the markings. Minimum depth shall be as identified in the Contract Documents with a nominal variation not to exceed forty (40) mils.

Thickness of Inlaid Marking Material. Fill inlay area completely from the bottom of the inlay to the surface of the pavement. Do not overfill the slots.

i. Tolerances of Lane Striping

The Contractor shall keep his work within the following allowable tolerances:

1. Length of Stripe. The longitudinal error within a forty foot (40') length of lane line shall not be more than plus or minus six inches ($\pm 6''$).
2. Width of Stripe. The width of stripe shall not vary more than plus or minus one-half inch ($\pm 1/2''$).
3. Lane Width. The width of lanes shall not vary more than plus or minus four inches ($\pm 4''$) from the widths shown on the Drawings, measured from the edge of pavement or edge of traveled way to center of lane line or between the centers of adjacent lane lines.

4. Stripes on Tangents. Stripes on tangents shall not vary more than plus or minus one inch (1") laterally within a distance of one hundred feet (100') when using the edge of the stripe as reference.
5. Stripes on Curves. Stripes on curves shall be uniform in alignment with no apparent deviations from the true curvature.
6. All Stripes. All stripes shall remain within four inches (4") from the planed alignment when measured to the center of the stripe.
7. Inlay Slot. The inlay slot shall be as identified in the Contract Documents with a nominal variation not to exceed forty (40) mils.

Traffic markings not within the above tolerances will be considered unacceptable under this Section and shall be replaced by the Contractor at no additional cost to the City.

402.4 Method of Measurement

The method of measurement for Traffic Markings is lump sum.

Removal of traffic stripes and pavement markings as well as repair of any damaged pavement or surfacing caused by the pavement marking removal operations shall be incidental to other items of Work.

Payment for traffic markings is full compensation for preparing and cleaning of pavement, application of painted traffic markings and applying glass beads, spheres, and anti-skid aggregate thereto, furnishing paint, glass beads, and all other material and equipment necessary to complete the Work described in this Section.

402.5 Basis of Payment

Basis of payment for this item shall be in accordance with Section 10.07 Measurement and Payment and shall include full payment for work described in this section.

Payment shall be made under the following unit:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
402	Traffic Markings	Lump Sum

DIVISION 700 MISCELLANEOUS CONSTRUCTION

Delete Section 702 under division 700 and replace with the following:

SECTION 702 GEOTEXTILE SYNTHETIC FABRIC

702.1 General

The placement of synthetic fabric shall be as recommended by the manufacturer and as shown on the plans.

702.2 Material

a. Woven Fabric

The synthetic woven fabric shall, at a minimum, meet the following specifications, or equal, and as approved by the Engineer.

Synthetic Fabric Minimum Specifications:

<u>Properties</u>	<u>Test Method</u>	<u>Value</u>
• Grab Tensile Strength (lbs)	ASTM D4632	400
• Elongation (%)	ASTM D4632	15
• Trapezoid Tear (lbs)	ASTM D4533	180
• CBR Puncture (lbs)	ASTM D6241	2000
• Ultra Violet Stability (Strength Retained % at 500 hours)	ASTM D4355	80
• Apparent Opening Size CW02215 (US Sieve Size)	ASTM D4751	30
• Permittivity (1/sec)	ASTM D4491	0.4
• Vertical Water Flow Rate (GPM / SF)	ASTM D4491 (Falling Head)	30
• Wide Width Tensile Strength (lbs/ft)	ASTM D4595	4800

702.3 Construction

The sub-grade shall be shaped according to the typical section on the plans and shall be free of large rocks, sticks, and deleterious material. Fabric shall be installed full roadway width or as shown on the plans. Fabric shall be joined with adjacent pieces of fabric by overlapping. Sections shall be overlapped a minimum of three feet (3'), or sewn as required by the manufacturer.

Where fabric passes through a horizontal curve, the practice of back lapping on the inside of the curve will be permitted. Where manholes and valve boxes will protrude through the fabric, the fabric shall be neatly cut in the shape of the manhole or the valve box. A second piece of fabric shall then be cut in the same manner and placed on top of the main fabric. The second piece shall extend at least four feet (4') in all directions from the manhole or valve box. Fill and backfill shall be dumped and spilled over the fabric. No

equipment shall operate either directly on the fabric or on less than one foot (1') of classified backfill.

702.4 Method of Measurement

Synthetic fabric shall be measured by the net square yard of ground surface covered. No additional measurement will be made for patches required around manholes and valve boxes or for laps required at fabric joints.

702.5 Basis of Payment

Basis of payment for this item shall be in accordance with *Section 10.7* and shall be full payment for work described in this section.

Payment will be made under

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
702 (W)	Woven Geotextile Fabric	Square Yard

Add the following new section under Division 700:

SECTION 712 CHAIN LINK FENCE

712.1 General

The Work under this Section consists of providing all materials and operations pertaining to construction of chain link fencing and temporary fence.

712.2 Materials

Material used in the construction of chain link fencing shall be in accordance with the Standard Details and the requirements of the "Chain Link Fence Manufacturers Institute," as described below.

a. General

Posts, gate frames, braces, rails, stretcher bars, and truss rods shall be of steel; reinforcing wires shall be of high carbon steel; and gate hinges, post caps, barbed-wire supporting arms, stretcher bar bands, and other parts shall be of steel, malleable iron or equal except that ties and clips may be of aluminum.

Contractor shall form parts accurately to dimensions. All steel and iron parts shall be zinc coated after fabrication, using zinc grade "E" in accordance with Federal Specifications QQ-Z-351.

The weight of the zinc coating per square foot of actual surface shall average not less than 1.2 ounces and no individual specimen shall weigh less than 1.0 ounce. Zinc-coated surfaces shall be free from imperfectly coated spots, bruised or scaled coating, drops of zinc, sharp projections, and sal ammoniac spots.

Posts, gate frames, rails, and braces shall conform to the dimensions and weights shown in the Dimensions and Weights Table in Article 18.3 – Tables.

b. Fabric

Fencing fabric shall be zinc coated by the hot-dip process after fabrication. The zinc coating shall be commercially uniform. It shall not have less than 1.2 ounces per square foot when tested. Fabric gauge shall be as shown in the Fencing Fabric Size Table in Article 18.3 - Tables.

c. Gates

Gates shall be swing or sliding, single or double, as specified, complete with latches, stops, keepers, hinges, or rollers and roller tracks, and, when so specified, with provisions for three (3) strands of barbed wire above the fabric.

Gate frames shall be constructed of tubular members, and shall be constructed in a manner such as to provide a rigid frame and ample strength and shall be free from sag and twist. Where a barbed wire top is specified, the end members of gate frames shall be extended approximately one foot (1') above the top member and arranged for attaching three (3) uniformly spaced strands of barbed wire and furnished with bands or other suitable method for securely attaching the wire. Fabric shall be attached

securely to the gate frame at intervals not to exceed fifteen inches (15").

Hinges shall be of heavy pattern, of adequate strength for the gate, and with large bearing surfaces for clamping them in position. The hinges shall not twist or turn under the action of the gate. The gates shall be capable of being opened and closed easily by one person.

Latches, stops and keepers shall be provided for all gates. Latches shall have the plunger-bar arranged to engage the gate stop, except that for single gates with openings less than ten feet (10') wide, a forked latch may be provided. Latches shall be arranged for locking. Center stops shall consist of a device arranged to be set in concrete and to engage the plunger of the bar latch of double gates. No stop is required for single gates. Keepers shall consist of a mechanical device for securing the free end of the gate when in the full open position.

d. Posts

Posts shall be of the lengths specified and shall be tubular, except that line posts may be H-beam. Dimension and weight shall conform to the Dimensions and Weights Table in Article 18.3 – Tables, unless otherwise specified.

e. Post Braces

Post braces shall be provided for each gate, corner, pull, and end post for use with fabric five feet (5') or more in height, and shall consist of a round tubular brace extending to each adjacent post at mid-height of the fabric, and a truss consisting of a rod not less than three-eighths inch (3/8") in nominal diameter from the adjacent post back to the gate, corner, pull, or end post, with a turnbuckle or other equivalent provision for adjustment.

f. Post Tops

Post tops shall consist of ornamental tops or combination tops and barbed-wire supporting arms, as specified. When so specified or when a top rail is to be provided, the top shall be provided with a hole suitable for the through passage of the top rail. The post tops shall fit over the outside of the posts and shall exclude moisture from the tubular posts.

g. Barbed-Wire Supporting Arms

Barbed-wire supporting arms, when specified to be furnished, shall be at an angle of approximately forty-five degrees (45°) and shall be fitted with clips or other means for attached three lines of barbed-wire. The top outside wire shall be approximately twelve inches (12") horizontally from the fence line and the other wires spaced uniformly between the top of the fence fabric and the outside barbed wire.

h. Top Rails

Top rails shall be round (tubular), shall be in lengths not less than eighteen feet (18'), and shall be fitted with couplings for connecting the lengths into a continuous run. The coupling shall be not less than six inches (6") long, shall provide a substantial connection, and shall allow for expansion and contraction of the rail. Suitable ties or clips shall be provided in sufficient number for attaching the fabric securely to the top rail at intervals not exceeding two feet (2'). Means shall be provided for attaching the top rail to each gate, corner, pull, and end post.

i. Stretcher Bars

Stretcher bars shall not be less than three-sixteenth inch by three-quarter inch (3/16” x 3/4”) and shall be of lengths one inch (1”) less than the full height of the fabric with which they are to be used. The stretcher bars shall be arranged for attaching the fabric to all terminal posts by threading through the fabric, by bands, or by other positive mechanical means.

j. Ties or Clips

Ties or clips of adequate strength shall be provided for attaching the fabric to lineposts.

k. Fabric Bands

Fabric bands of adequate strength shall be provided for attaching the fabric and stretcher bars to all terminal posts.

l. Tension Wires

A bottom tension wire shall be provided unless otherwise specified. Top tension wire shall be provided, when so specified, in lieu of a top rail. The tension wires shall be of coiled spring wire not less than seven (7) gage plus or minus 0.005 inch in diameter. Ties or clips shall be provided for attaching each wire to the fabric at intervals not exceeding two feet (2’).

m. Barbed Wire

Barbed wire shall consist of two (2) strands of twelve and one-half (12.5) gauge wire with fourteen (14) gauge four (4) point barbs spaced approximately five inches (5”) apart. All wire shall be zinc coated with a minimum coating of 0.80 ounces per square foot of surface area on twelve and one-half (12.5) gauge wire.

n. Vinyl Clad Fencing

Those components specified to be vinyl-clad or coated shall have a vinyl covering ten to fourteen (10-14) mils in thickness. Fabric is to be nine (9) gauge wire. Products are to be Colorbond II as manufactured by Colorguard Corporation, or approved equal.

712.3 Tables

DIMENSIONS AND WEIGHTS

Use and Section		Nominal Outside Diameter Dims (Inches)	Nominal Weight per Foot, (Pounds)
Tubular End, Corner, and Pull Posts for:			
fabric height: 6 feet and less	Round	2.375	3.65
fabric height: over 6 feet	Round	2.875	5.79
Rails and Post Braces	Round	1.66	2.27

DIMENSIONS AND WEIGHTS (continued)

Intermediate Posts for:

fabric height: 6 feet and less

Tubular	Round	1.90	2.72
C-Section		1.875 x 1.625	2.28

fabric height: over 6 feet

Tubular	Round	2.375	3.65
C-Section		2.25 x 1.70	2.64

Gate Posts with Fabric Over 6 Feet for Gate Leaf Widths:

leaf width: 6 feet and less	Round	2.875	4.64
leaf width: over 6 to 13 feet	Round	4.000	8.65
leaf width: over 13 to 18 feet	Round	6.625	18.02
leaf width: over 18 to 24 feet	Round	8.625	27.12

Gate Frame Members for:

fabric height: Less than 6 feet	Round	1.66	1.83
fabric height: 6 feet and over	Round	1.90	2.28
Interior Bracing:	Round	1.66	1.83

FENCING FABRIC SIZE

Recommended Usage	Height of Fabric	Mesh Size	Gauge	Nominal Diameter Coated Wire (Inches)
Heavy Industrial	36" through 144"	2"	6	0.192
Industrial/Residential	36" through 144"	2"	9	0.148
Light Industrial/Residential	36" through 84"	2"	11	0.120
Tennis Court	120" through 144"	1-3/4"	11	0.120

712.4 Construction

a. Grading

All trees, brush and other obstacles which would interfere with the construction of the fence shall be removed and disposed of at a Contractor-provided disposal area and shall be considered incidental to the Contract. The fence shall follow a smooth profile. Throughout the fence length the distance between the ground surface and the bottom tension wire shall not

be greater than four inches (4"), nor less than two inches (2"). Where excavation is necessary to meet this requirement, the ground will be graded level not less than one foot (1') on either side of the fence and backslopes of one and one-half to one (1½:1) provided. Where backfill is necessary to meet this requirement, natural surface vegetation will be removed prior to placing fill material. The top of the fill shall be level for one foot (1') on either side of the fence line and the shoulder slopes shall be one-half foot to one foot gradient (½':1'). Grading for all specific conditions shall be such that water will not be allowed to pond in the immediate area of the fence. Where drainage is required across the fence line, the Engineer shall be consulted and channels provided in accordance with his decision.

b. Posts

All posts shall be set in Class B Portland Cement Concrete footings. The tops of the footings shall be level with the ground, shall be crowned to provide drainage and shall be troweled smooth. The dimensions of the footings shall be as shown on the Drawings. The footings shall be allowed to cure for a period of at least seven (7) days before attaching fabric.

The Contractor shall set the posts vertical and of uniform and equal height above the ground with a maximum horizontal spacing of ten feet (10') center. On straight runs, pull posts shall be provided at intervals not to exceed five hundred (500) lineal feet. Changes in line of thirty degrees (30°) or more shall be considered corner posts. Steep slopes and abrupt changes in topography may require changes in various elements of the fence. The chain link fabric shall be stretched taut and securely fastened to end, corner, or gate posts. The top edge of the fabric shall be fastened to the top rail, and the lower edge of the fabric shall be fastened to the bottom tension wire.

c. Fabric

Place fabric on the side specified, stretched taut, and securely fastened to the posts. Fasten fabric to end, gate, and corner and pull posts with stretcher bars and fabric bands spaced at intervals of fifteen inches (15") or less. Fastening to line posts shall be with ties or clips at fifteen inch (15") intervals.

Join rolls of wire fabric by weaving a single strand into the ends of the rolls to form a continuous mesh. Horizontal splices are not permitted.

d. Top Rail

Top rails shall pass through the ornamental tops of the line posts, forming a continuous brace from end to end of each stretch of fence. Join lengths of tubular top rail by sleeve couplings. Secure top rails fastened to terminal posts by pressed steel fittings or other appropriate means.

e. Tension Wire

Provide one continuous length of tension wire between pull posts. Apply sufficient tension to avoid excess sag between the posts. Tie or otherwise fasten tension wires to end, gate, corner, or pull posts by methods approved by the Engineer.

f. General Appearance

Runs of fence shall present the same general appearance and the product of one manufacturer only will be accepted, except for items which do not influence the appearance of the completed fence. No used, rerolled, or open-seam steel will be permitted in posts, gate frames, rails or braces.

712.5 Measurement

Chain link fencing will be measured per linear foot, in place, from outside to outside of end or corner posts, except for the space occupied by gates.

Temporary fence will not be measured.

Gates will be measured per each, complete in place for a particular size.

712.6 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment for installation of temporary fence is incidental to item 712 - Chain Link Security Fence.

Unit cost payment shall be made on the following basis:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
712	Chain Link Security Fence (Include Heights and Gage)	Linear Foot
712	Gate (Type and Size)	Each

Add the following new division:

DIVISION 8000 ILLUMINATION

SECTION 8001 GENERAL

8001.1 Scope of Work

Work shall consist of furnishing and installing, modifying, removing or salvaging one or more illumination systems, electrical equipment on structures, falsework lighting, partial installations for future systems, or combinations thereof, all as required by the Drawings, and as specified. All necessary labor and equipment to provide fully functioning intersection lighting, or roadway illumination is included.

Prior to installation of foundations, junction boxes, and conduits; Contractor shall locate and protect all new and existing underground utilities; including, but not limited to, pipelines, signal systems, thaw wires, lighting systems, storm drain, sanitary sewers, water systems, and telephone, cable television, and electrical cables. Not all of the existing utilities may be present or shown on the Drawings. Contractor shall adjust foundation, junction box, or conduit location if conflict exists with either existing utilities or proposed improvements. No additional monies are paid or owed to Contractor for the adjustment.

Materials furnished shall be new, except such used materials as may be specifically provided for on the Drawings or in the Technical Specifications. Where an existing system is to be modified, the existing material shall be reused on the project, or disposed of as shown in the Drawings, or specified in the Technical Specifications.

All systems shall be complete and in operation with all materials in conformance with Drawings, Specifications and the manufacturer's specifications and recommendations, at the time of final acceptance.

8001.2 Regulations and Codes

All material, and workmanship where applicable, shall conform to the standards of the Underwriters Laboratories, Inc., the National Electrical Code, and the National Electrical Safety Code together with local amendments. Within this Division, the term "Code" shall mean the National Electrical Code, and the National Electrical Safety Code together with local amendments.

Where applicable, all electrical equipment shall conform to the standards of the National Electrical Manufacturers Association.

The 1994 Edition of the "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" published by the American Association of State Highway and Transportation Officials (AASHTO) shall be referred to in this Division as the 1994 AASHTO design criteria. Similarly, the 2001 Edition AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" shall be referred to in this Division as the 2001 AASHTO design criteria.

8001.3 Equipment List(s) and Drawings

- A. The Contractor shall submit for review and approval, within thirty (30) days following award of the Contract, eight (8) collated copies of a portfolio of equipment and materials which he proposes to install. The portfolio(s) shall consist of a table of contents which includes each item's intended use(s) and the following:
1. For materials on the Approved Products List: a description that includes product name, manufacturer, model or part number, and the conditions listed for approval.
 2. For materials not on the Approved Products List: catalog cuts that include the manufacturer's name, type of product, size, model number, conformance specifications, and supplemented by other data as may be required, including manufacturer's maintenance and operations manuals, or sample articles.
 3. A wind stress certificate from the manufacturer of poles, signal mast arms, and luminaire arms. Contractor shall submit to the Engineer for approval the Wind Stress Certificate that includes the signed stamp of a professional engineer registered in the State of Alaska; and a statement that indicates that the poles and mast arms meet the wind and mast arm loading requirements specified in Section 8005, 8005.1 - General.
 4. Contractor shall submit to the Engineer for approval the Materials Certifications for all lighting poles, signal poles, mast arms, connector bolts and anchor bolts, indicating that the steel and galvanizing conform to the requirements in this Division.

The City of Homer will not be liable for any material purchased, labor performed, equipment used, or delay to the Work before all equipment and materials have been reviewed and approved.

- B. The Contractor shall prepare five (5) complete sets of red lined as-built plans which shall be kept current with the construction. These as-built plans shall detail all construction changes made to the Drawings and also include the following information on each appropriate drawing:
1. Location and depth of conduit runs.
 2. Station and offset of all junction boxes.

Copies of such as-built plans shall be furnished at least twice a month during construction so that they may be reviewed for accuracy and completeness. The Contractor shall furnish any additional information required to clarify the as-built plans and shall correct all discrepancies. Progress payment for the signal and illumination Work completed shall not be made until accurate as-built plans reflecting the construction progress have been reviewed and deficiencies corrected.

- C. Prior to final inspection of the Work, Contractor shall submit four (4) complete sets of Record Drawings to the Engineer, and attach the appropriate sheets of a fifth set in clear envelopes to the inside of each load center.

8001.4 Warranties, Guarantees and Instruction Sheets

Manufacturers' warranties, guarantees, instruction sheets and parts furnished with materials used in the Work shall be delivered to the Engineer.

8001.5 Maintaining Existing and Temporary Electrical Systems

The Contractor shall maintain the lighting systems, including payment of electrical costs, from the time of the Notice to Proceed until the time of final acceptance except during any authorized stoppages when the City of Homer shall assume maintenance. Temporary replacement equipment furnished by the Contractor shall be compatible with existing equipment used in the City of Homer and approved by the Engineer. Representatives of the Contractor and the Owner shall inspect the project prior to the winter shutdown and prior to spring start-up to ascertain those items that need repair and determine responsibility for the repairs.

The Contractor shall furnish and install all materials and miscellaneous hardware required to provide a functional lighting system including electrical load centers. All materials shall conform to the requirements of the Drawings and Specifications, except that the branch conductors may be triplex aluminum with messenger cable if they are installed overhead. Illumination conductors shall be sized so that the voltage at the most remote luminaire is not less than the minimum required for the ballast as recommended by the manufacturer. The Contractor shall install intermediate conductor and supports to energize luminaires at locations without electrical service.

Luminaires used in the system may be the existing fixtures or new fixtures with a light distribution compatible with the proposed lighting configuration.

The load centers to power the temporary lighting and signal systems may be the permanent installations, the existing installations, or temporary installations. The existing load centers may be used only if they are scheduled to remain intact until completion of the project, and reused only if they are approved. The Contractor shall provide approved temporary load centers with photoelectrically-controlled lighting circuits whenever a load center is unavailable for use, or when an existing load center that is not approved is retired due to conflict with the Work. An approved load center is any load center UL labeled as Service Equipment, or UL labeled as Industrial Control Equipment and marked "suitable for use as service equipment." The Contractor shall provide all Work to modify these load centers as required to provide functional temporary lighting and signal systems, and to install them completing all Work in accordance with the NEC.

Once the Contractor commences Work on the project, he shall provide all maintenance for the existing electrical facilities. The City of Homer will pay for the electrical power for the above-mentioned electrical systems. The above maintenance does not include any prior damage such as burned out lamps, non-operative detection or other malfunctioning equipment. The Contractor shall present written documentation of all non-functioning and

malfunctioning electrical equipment before commencing Work on the project. This malfunctioning equipment shall be inspected jointly by personnel from the Engineer's staff and the Contractor. In the event the Engineer does not receive notice in writing and the Contractor begins Work on the project, this will suffice as evidence that all equipment is functional and operational.

The Contractor shall furnish the Engineer with the name and phone number of the person responsible for maintaining existing and temporary electrical facilities.

The exact location of existing conduit runs, direct burial cable, pull boxes, and all underground utilities shall be ascertained by the Contractor before using equipment that may damage such facilities or interfere with any system.

Where roadways are to remain open to traffic and existing lighting systems are to be modified, the lighting systems shall remain in operation and the final connection to the modified circuit shall be made so that the modified circuit will be in operation by nightfall of the same day the final connection is made.

Temporary electrical installations shall be kept in effective operation until no longer required. Removal of temporary installations shall conform to the provisions in Section

– Salvaging Electrical Equipment.

These provisions will not relieve the Contractor in any manner of his responsibilities as provided in Division 10, Section 10.06 - Legal Relations and Responsibilities.

8001.6 Scheduling of Work

Work shall be scheduled so that each new lighting system shall be completed and ready for operation prior to opening to traffic of the corresponding section of new alignment.

Conductors shall not be pulled into conduit until pull boxes are set to grade, crushed rock sumps installed, grout placed around the conduit, and metallic conduit bonded.

8001.7 Safety Precautions

Before starting Work on existing series street lighting circuits, the Contractor shall obtain daily, a safety circuit clearance from the serving utility. By-pass switch plugs must be pulled and suitable signs posted at switch boxes before electrical Work begins.

Suitable signs shall be posted at Load Centers when a contractor is working on any of the circuits from that Load Center.

8001.8 Definitions

The Definitions in NEMA TS-2, Traffic Controller Assemblies with NTCIP Requirements Version 02.06, shall be used along with the following:

1. Electrolier: The complete assembly of pole, luminaire arm, luminaire, ballast, and lamp.
2. Luminaire: The assembly which houses the light source and controls the light emitted from the light source. Luminaires consist of the optical, electrical, and mechanical/thermal components of the assembly.
3. Lighting Standard: The pole and luminaire arm which must support the luminaire.
4. Vehicle: Any motor vehicle licensed for highway use by the State of Alaska.
5. Anchor bolts apply to Luminaire poles and anchor rods apply to Signal poles. They are used interchangeably in this Division.

8001.9 Signs

Reference Division 700, Section 707 – Standard Signs.

8001.10 Measurement

All Work under this section is incidental to other Work and shall consist of all labor, materials, and equipment necessary to provide temporary illumination, if required by the Engineer.

8001.11 Basis of Payment

No separate payment will be made for this item.

SECTION 8002 ELECTRICAL EXCAVATING AND BACKFILLING

8002.1 General

The excavations required for the installation of conductors, conduits, foundations and other appurtenances shall be performed in such a manner as to avoid any unnecessary damage to the streets, sidewalks, landscaping, and other improvements. The trenches shall not be excavated wider than necessary for the proper installation of the electrical appurtenances and foundations. Excavation shall not be performed until immediately before installation of conduit and other appurtenances. The material from the excavation shall be placed in a position that will not cause damage or obstruction to vehicular and pedestrian traffic nor interfere with surface drainage.

Trench, backfill, and disposal of surplus material shall be performed in accordance with Division 200 – Earthwork.

Excavations after backfilling shall be kept well-filled and maintained in a smooth and well-drained condition until permanent repairs are made.

All excavations shall be filled, and sidewalks, pavement, and landscaping restored at each intersection prior to excavating at any other intersection. Excavations in the street or highway shall be performed in such a manner that not more than one traffic lane is restricted in either direction at any time, unless otherwise provided in the Technical Specifications.

8002.2 Construction

The Contractor shall excavate the trench to the proper depth as described herein and as shown on the Drawings.

The excavations shall be backfilled with material suitable to the Engineer. All backfill placed in the roadway area shall be Type II classified backfill as specified in Division 200. All backfill material shall be placed in uniform layers of not more than six inches (6”) in depth and compacted to a density of not less than ninety-five percent (95%) of the maximum density as directed by the Engineer.

The Contractor shall be responsible for the restoration of all surfacing, turf, and native material to the original condition and appearance.

8002.3 Sawcut Trench

Where shown on the Drawings, or as directed by the Engineer, the Contractor shall construct a sawcut trench as detailed in the Drawings. A sawcut trench will be used to cross existing traveled lanes, existing curb and gutter, in median islands, along edges of paved roadways, and in sidewalk areas where a neat cut of the surfacing is required.

The Contractor shall cut the surfacing material full-depth and remove the surfacing material to expose the subgrade materials. The Contractor shall then excavate a trench, dispose of excess and waste materials, and install conduit as described herein.

In sawcuts of asphalt pavement located within the roadway pavement, Contractor shall remove a minimum distance of one foot (1') back from the edge of the trench, on each side of the trench. Contractor shall remove pavement such that cuts parallel to the direction of travel are not located within the wheel paths.

The entire trench shall be backfilled as specified herein, except non-frost-susceptible sand bedding material shall be used.

The existing surface shall then be restored with like pavement in accordance with Division 400, or Division 300 as applicable.

Where applicable, asphalt tack coat shall be applied to all edges of the existing pavement prior to placing new asphalt. Asphalt pavement less than three inches (3") in thickness shall be placed in one lift, and asphalt pavement three inches (3") and greater in thickness shall be placed in a minimum of two equal lifts.

In median islands, the Contractor may elect to remove and replace the entire surface of the island along the length of the conduit run. If the Contractor elects to remove the entire surface of the island, the Work shall still be considered as sawcut trenching. The layer of pavement under the median islands, if encountered (normally at the street pavement grade), may be broken out.

The Contractor shall be responsible for the restoration of all surfacing, turf, and native material to original condition and appearance.

8002.4 Measurement

Measurement for trench and backfill and for sawcut trench shall be per linear foot of horizontal distance of the various widths and depths as set forth in the Bid Schedule. Measurement will be from station to station or from center of device to center of device as staked in the field and as shown on the Drawings.

8002.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Work not specifically identified for payment under a separate pay item, but required for normal completion of trench and backfill, will be considered incidental and shall be included in the linear foot cost of the trench.

Payment shall be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8002	Trench and Backfill (Width) (Depth)	Linear Foot

SECTION 8003 REMOVING AND REPLACING IMPROVEMENTS

8003.1 General

Improvements such as sidewalks, curbs, gutters, Portland cement concrete and asphalt concrete pavement, base material, lawns and plants and other improvements removed, broken or damaged by the Contractor's operations, shall be replaced or reconstructed with the same kind of material as found on the Work or with materials of equal or better quality. The new Work shall be left in a satisfactory serviceable condition.

Whenever a part of a square or slab of existing sidewalk, curb and gutter, or driveway is broken or damaged, the entire square, section or slab shall be removed and the concrete reconstructed as above specified.

The outline of all areas to be removed in concrete sidewalks and driveways and in pavements shall be cut to a minimum depth of one and one-half inches (1 1/2") with an abrasive type saw prior to removing the sidewalk, driveways, and pavement material. The cut for the remainder of the required depth may be made by a method satisfactory to the Engineer. Cuts shall be neat and true with no shatter outside the removal area.

When a foundation is to be abandoned in place, the top of foundation, anchor bolts, and conduit shall be removed to a depth of not less than one foot (1') below surface of sidewalk or unimproved ground. The resulting hole shall be backfilled with material equivalent to and compacted to the density of the surrounding material.

8003.2 Measurement

All Work under this section is incidental to other Work and will not be measured or paid for directly.

8003.3 Basis of Payment

No separate payment will be made for this item.

SECTION 8004 FOUNDATIONS

8004.1 General

All foundations for poles, posts and pedestals shall be cast-in-place Portland Cement Concrete. Luminaire poles may be constructed on driven pile foundations.

Unless otherwise shown on the Drawings, all items to be relocated shall be provided with new foundations and anchor bolts of the proper type and size.

The Contractor shall be responsible for contour grading around all post, pole, and pedestal foundations. Final or finished grading shall be such that the earth shall be two inches (2") below the top of the base and drain away from the base.

Foundations for poles shall be designed for one-hundred-mile-per-hour (100-mph) winds with gusts to one hundred thirty miles per hour (130 mph) in conformance with the requirements of the 1994 AASHTO design criteria for luminaire poles and ten foot (10') signal pedestal poles and the 2001 AASHTO design criteria for signal poles.

The entire controller foundation and the top twelve inches (12") of pole or post foundations shall be formed and the top given a smooth steel trowel finish. Conduits shall be located in the center of the pole-post foundations with clearance allowed for bushings.

Except signal pole foundations constructed in accordance with Standard Details 80-10 and 80-11, the tops of all pole foundations shall be set so that the bottom center of the base plates are between four (4") and six inches (6") above finished grade at the pole's offset. The top of any foundation located on a slope shall be constructed such that the finished slope passes through the top center of the uphill edge of the foundation. The area two feet (2') up and down slope of the edge of the foundation shall be graded so that no portion of the foundation projects above the surrounding slope and so that water will drain away from the foundation. For 42" signal pole foundations, the clearance between the top of the foundation to the bottom of the leveling nut shall not exceed 1".

8004.5 Driven Pile Foundation

Driven pile foundations shall not be used for signal poles.

Contractor shall supply driven pile foundations of the size and length indicated. Contractor shall ensure that the top surface of the anchor plate is three inches (3") above finished grade at luminaire pole locations or as indicated in the Drawings.

After welding on the pile cap adapter and anchor plate to the driven steel pile, Contractor shall cold galvanize the pile cap, the pile cap adapter, anchor plate, and the top three feet (3') of the steel pile including pile cap and anchor plate. Contractor shall furnish galvanization that complies with Federal Specification DOD-P-210354A (Galvanizing Repair Spec) and is U.L. listed. Contractor shall prepare steel surfaces and apply the cold galvanizing compound in accordance with the manufacturers' recommendations. Five days prior to applying the cold galvanizing compound, Contractor shall provide the Engineer a copy of the manufacturers' instructions.

8004.6 Measurement

Foundations will be measured as units, complete and in place.

8004.7 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment will be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8004	Driven Pile Luminaire Pole Foundations	Each

SECTION 8005 MAST ARMS, POLES, STEEL PEDESTALS AND POSTS

8005.1 General

A registered professional engineer shall design the structures and provide stamped shop drawings and calculations. Submit the stamped drawings and calculations for each pole to the Engineer for approval. Design for the complete-in-place structure including the supported hardware.

In the stamped calculations, indicate the edition of Standard Specifications to which the poles are being designed and provide the input data used to design each pole and mast arm, including: design wind speed, cross section shape, yield strengths of the component materials, dimensions of the pole components, and a summary of the loads used.

On the stamped shop drawings, provide design wind speed and the details for building the luminaire poles, signal poles and mast arms, including: materials specifications, slip fit joint dimensions, pole component dimensions, welds that will be made, and the welding inspection that will be done.

Contractor shall submit the mill certifications for the steel items (piles, plates, bolts, and other related items) to the Engineer or designated representative for written approval. Written approval is necessary for acceptance of and payment for the items identified in this Section.

*****Deleted*****

All manufacturing processes starting with initial mixing and melting through the final shaping, welding and coating processes must be undertaken in the United States. Manufacturing includes smelting, rolling, extruding, machining, bending, grinding, drilling, painting and galvanizing. This does not apply to raw materials such as iron ore, pig iron, and processed, pelletized and reduced iron ore.

*****Deleted*****

No exception to the practices mandated by AASHTO shall be allowed.

Poles shall not be relocated or re-used unless Contractor obtains written approval of the Engineer or designated representative.

The Contractor shall verify the shaft lengths and mast arm connector plate locations of all poles to insure the Drawing mounting heights of luminaires and traffic heads are met.

Damage to the galvanized or painted surface of existing poles to be relocated or reused in place and damage to the galvanized or painted surface that occurs during shipping or during

the construction process, shall be repaired in accordance with Section 8016, Article 16.3 – Galvanizing or Article 16.4 – Painting for Steel Structures, as appropriate prior to final acceptance of the poles and mast arms. Holes greater than five-eighths inches (5/8”) in diameter in the shafts of existing poles, due to removal of equipment, shall be repaired. Holes shall be repaired by tapping the hole, coating all exposed edges with zinc rich paint, and plugging the hole with a screw-in type steel plug of the correct size. The plug shall be galvanized, or shall be completely covered with zinc rich paint. Holes less than five-eighths inch (5/8”) diameter shall be ground smooth so there are no notches or cracks, and coated with zinc rich paint. Plugging holes and repainting damaged galvanized or painted surfaces shall be incidental to the Project and no additional payment shall be made.

8005.2 Poles and Arms

A. Calculations: Signal Poles and Arms Less Than 15’ and Luminaire Poles and Arms

Street lighting poles, including luminaire arms and head mounting brackets, shall be designed and fabricated to the 1994 AASHTO design criteria.

Minimum design wind velocity shall be the greater of one-hundred miles per hour (100 mph) or the AASHTO recommendation based upon a fifty (50) year mean recurrence interval dependent upon project location. A factor of 1.3 shall be used in design calculations to account for wind gusts. The design for luminaire poles shall include a traffic sign with an area of sixteen (16) square feet, located with its centroid nine feet (9’) above the base of the pole.

Should project plan loading develop shear or moments greater than those related to the above loading, special design poles are required. Those “Special Design” poles will require calculation submitted to the Engineer for approval prior to use on the project.

Direct-embedded luminaire poles are no longer allowed.

B. Signal Poles and Arms Less Than 15’ and all Luminaire Poles and Arms

Poles, prior to installation, shall be straight, with a permissive variation in sweep not to exceed one-quarter inch (1/4”) per ten feet (10’) of pole length.

A backing plate consisting of a metal sleeve shall be provided at all butt welded, transverse joints. The sleeve shall be No. 12 U.S. standard gauge steel minimum, and made from steel having the same chemical composition as the steel in the pole.

The metal sleeve shall have a minimum length of three inches (3”). The sleeve shall be centered at the joint and have the same taper as the pole outside the sleeve in full contact with the inside of the standard throughout the sleeve length and circumference. The weld metal at the transverse joint shall extend to the sleeve, making the sleeve an integral part of the joint. In round poles, standard steel pipe or tubing may be substituted for the tapered backing sleeve, at the discretion of the Engineer.

All welds shall be continuous. All welding practices shall conform to current AWS

Code, AWS D1.1, latest edition.

All exposed welds, except fillet welds shall be ground flush with the base metal.

1. Poles

Poles less than fifteen feet (15') in length shall be round or multisided (greater than sixteen [16] sides), and constructed of No. 11 or heavier U.S. standard gauge steel or four inch (4") standard (Schedule 40) pipe or conduit, with the top designed for a post-top slip-fitter. Standard pipe shall conform to the specifications of ASTM A53. The tops of tapered poles shall have a four and one-half inch (4 1/2") outer diameter. Pedestrian pushbutton posts shall be constructed of two and one-half inch (2 1/2") standard (Schedule 40) pipe and meet the requirements of ASTM A53. Multi-sided poles shall not be used without prior approval of the Traffic Engineer.

Luminaire poles fifteen feet (15') or longer shall be round *****Deleted***** and fabricated from sheet steel of weldable grade.

Poles may be fabricated of full length sheets or shorter sections. When two pieces are used, the longitudinal welded seams shall be directly opposite one another. When the sections are butt-welded together, the welded seams on adjacent sections shall be placed to form continuous straight seams from base to top of pole.

All exposed edges of the plates which make up the pole base assembly shall be finished smooth, and all exposed corners of such plates shall be neatly rounded to one and one-half inch (1 1/2") radius, unless otherwise shown on the Drawings. Anchor holes in the base plate shall be round. Slotted holes shall not be used. Slotted shafts shall be provided with slip fitter shaft caps of either galvanized steel or cast aluminum.

2. Arms

Arms less than fifteen feet (15') in length shall be round or multisided, and constructed of No. 11 or heavier U.S. standard gauge steel, or four inch (4") standard (Schedule 40) pipe or conduit. Standard pipe shall conform to the specifications of ASTM A53.

Luminaire arms fifteen feet (15') or longer shall be round or multisided and fabricated from sheet steel of weldable grade.

Arms may be fabricated of full-length sheets or shorter sections. Each section shall be fabricated from not more than two (2) pieces of sheet steel for lengths up to forty feet (40'). Where two (2) pieces are used, the longitudinal welded seams shall be directly opposite one another. When the sections are butt-welded together, the welded seams on adjacent sections shall be placed to form continuous straight seams from base end of arm.

Luminaire pole plate to pole shaft connection shall be of the "closed box" type with top and bottom plates of the box forming a continuous stiffening ring around the pole. Gusset assemblies for this connection shall be butt-welded

together. Vent holes, necessary for galvanizing, shall be used.

All exposed edges of the plates which make up the base of the arm shall be finished smooth and all exposed corners of such plates shall be neatly rounded to one-eighth inch (1/8") radius, unless otherwise shown on the Drawings. Bolt holes in the mast arm base plate shall be round. Slotted holes shall not be allowed. Mast arm ends shall be provided with slip-fitter shaft caps of either galvanized steel or cast aluminum.

C. Traffic Signal Poles and Arms Between 15' and 65'

Traffic signal structures shall be designed and fabricated to the 2001 AASHTO design criteria with interim revisions and the Standard Details.

Fabricate signal and lighting structures from tapered steel tubes with a round or 16 sided cross section. Orient handholes located near the base of poles to face downstream of traffic flow.

Provide traffic signal poles, lighting poles, and signal mast arms in lengths evenly divisible by 5 feet.

Furnish poles and mast arms up to 40 feet long in one piece. Poles and mast arms longer than 40 feet may be furnished in one piece or in two segments with a slip type field splice. For slip type joints, provide a minimum overlap of two and one half (2.5) feet or the overlap specified in the Drawings, whichever is greater. In mast arms, locate these splices at least one foot away from the Drawing location of signal heads and signs. In signal poles, locate the edge of the female section at least 6 inches above the top of the signal mast arm connection.

Fabricate tubes with walls up to 1/2 inch thick from the prequalified base metals listed in AWS D1.1. Fabricate elements greater than 1/2 inch thick from steel that conforms to AASHTO M270 and meets the Fracture Critical Impact Test requirements for Zone 3. The Traffic Engineer will not accept structures that use laminated steel elements.

Fabricate the cross section of each tube from no more than 2 pieces of steel. When using 2 pieces, place the longitudinal welded seams directly opposite one another. Place the welded seams on adjacent sections to form continuous straight seams from the base to the top of the pole.

When tenons are needed to install traffic signals and luminaires, make them from two inch nominal schedule 40 pipe that conform to ASTM A 53 Grade B.

The Engineer does not allow holes made for lifting purposes in the ends of tubular segments, except in the free ends of luminaire mast arms. To add lift points, weld them to the tube opposite the longitudinal seam weld on the outside of female segments and on the inside of male segments. Before shipment, remove lift points added to the outside of the tubes, grind the area smooth with the base metal, and hot stick repair the finish in accordance with Section 8016, Article 16.3 – Galvanizing or Article 16.4 – Painting for Steel Structures, as appropriate. Lift points added to the inside of tubes in place may be left in place.

The Engineer will reject poles and mast arms that are:

1. Not fabricated according to these specifications or the approved shop drawings,
2. Bowed with sweeps exceeding 3/4 inch throughout the length of the pole, mast arm, or segment, if furnishing a 2 piece pole or mast arm,
3. Out of round. Sections are out of round when the diameters of round members or the dimension across the flats of multisided members exceed two percent (2%) of the dimension specified on the shop drawings.

MATERIAL REQUIREMENTS			
	Between 15' & 35'	Between 40' & 50'	Between 55' & 65'
ALL ASSEMBLIES			
Steel Through ½" Thick	ASTM A572 or A596		
Steel Over ½" Thick	AASHTO M270 F3 (50 ksi)		
Finish	AASHTO M111 & M232		
Mastarm Bolts	AASHTO M164		
Anchor Rods	Article 5.4 – Signal Pole Anchor Rods & Bolts		
POLE (LOWER SECTION)			
Design Length	21.5'		
Section Shape	Round		
Simplex Height	20'		
Fixed End Diameter	15.0" O.D.	17.0" O.D.	19.0" O.D.
Taper	0.14"/ft		
Tube Thickness	0.375"		
Base Plate	24"x24"x2.25"		
Bolt Circle	24"		
Signal Arm Plate	20"x20"x2.25"	22"x22"x2.25"	24"x24"x2.25"
Top Ring Thickness	0.375"		
Bottom Ring Thickness	0.375"		
Gusset Plate Thickness	0.375"		
Handhole Cover Thickness	10 ga		
Pole Skirt Thickness	10 ga		
MASTARM			
Design Length	35'	50'	65'
Section Shape	Round		
Taper	0.14"/ft		
Tube Thickness	See Illumination Details		
Mastarm Rise	3.0 Degrees		
Base Plate	20"x20"x2.25"	22"x22"x2.25"	24"x24"x2.25"
Bolt Circle	20"	22"	6 Vertical O.C.
Mastarm Bolts	1.5" x 4.5"		

D. Poles and Arms Greater than 65'

Refer to the project-specific Technical Specifications and Drawings.

8005.3 Welding

Perform welding to conform to the 2001 Edition of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals with interim revisions; current American Welding Society code; the latest edition of AWS D1.1 – Structural Welding Code - Steel; the Standard Drawings; and the following:

1. Make welds continuous. Grind exposed welds flush with the base metal at slip fit joints for the length of the slip fit joint plus one half the diameter of the female section.
2. On steels 5/16 of an inch thick and thicker, inspect 100 Percent of CJP welds by either radiography (RT) or ultrasound (UT).
3. Inspect a random 25 percent of PJP and fillet welds by magnetic particle (MT). If a defect is found, inspect 100% of the PJP and fillet welds made to fill the order. In steels less than 1/8 inch thick, complete the tests according to AWS D1.1.
4. Only visually inspect welds made on luminaire arms.

8005.5 Finishing

Finish the edges of poles and mast arms to conform to the following requirements prior to galvanization in accordance with Section 8016, Article 16.3 – Galvanizing. Neatly round the following features to the radius specified.

1. On holes through which electrical conductors pass, provide a 1/16 inch radius on both the entrance and exit edges,
2. On pole base plates, provide a 1/8 inch radius on edges along which plate thickness is measured and a smooth finish on all other exposed edges,
3. On the ends of tubes that form slip type joints, complete the following tasks on the two surfaces that contact one another. First, provide 1/16 inch radii on the inside and outside edges of the female and male segments, respectively. Then for the length of the joint plus one half the diameter of the female section grind down welds until they feature a radius concentric with the mating surface and remove material protruding from the two surfaces.

Provide caps to cover the free ends of poles and mast arms.

8005.6 Identification Tags

Identify critical information for poles and arms with visible permanent aluminum tags that contain the information shown in the Pole Markings Table. The measurements shown are for illustration purposes only. Use tags large enough to include required information using 1/4 inch high text, 3/8 inch of space between successive lines of text, and at least 3/8 inch of space between the edges of the tag and the text. Secure the tags with two 1/8 inch

blind rivets at the base of poles and the underside of mast arms. If furnishing a two piece signal mast arm with slip type joint, mark both pieces with the same message. Provide the holes for the blind rivets before galvanizing.

POLE MARKINGS TABLE

STRUCTURES		MEASUREMENTS	TAG MARKINGS
Signal Poles			
a)	Signal mast arm length	45 ft./55 ft.	SMA 45/ <i>SMA 55</i>
b)	Luminaire mast arm length	22 ft./18 ft.	LMA 22/ <i>LMA 18</i>
c)	Pole height	36 ft.	PH 36
d)	Intersection number (if more than one) - pole number		1 - P 4
e)	Sum of signal mast arm moments about centerline of signal pole		SM 4000/ <i>SM 3200</i>
f)	Design wind speed	100 mph	DWS 100
Light Poles			
a)	Luminaire mast arm length	15 ft./15 ft.	LMA 15/ <i>LMA 15</i>
b)	Pole height	37 ft.	PH 37
Signal Mast Arm			
a)	Mast arm length	40 ft.	SMA 40
b)	Intersection number (if more than one) - pole number		1 - P 4
c)	Sum of signal mast arm moments about centerline of signal pole		SM 3740
d)	Design wind speed	100 mph	DWS 100
Luminaire Mast Arm			
a)	Mast arm length	18 ft.	LMA 18
b)	Pole number (if unique arm design)		P 4

Note:

Italic type indicates additional Tag Markings if poles have 2 luminaire or 2 signal mast arms.

8005.7 Plumbing

Plumbing shall be accomplished by adjusting the nuts on the anchor bolts prior to grouting. A slight raking of the pole will be provided by plumbing the side away from the road. Shims or other similar devices for plumbing or raking will not be permitted.

8005.9 Galvanizing

All signal poles, mast arms, and pedestal poles shall be hot dipped galvanized in accordance with Section 8016, Article 16.3 – Galvanizing.

8005.10 Measurement

Fixed-base luminaire poles shall be measured as units complete and in place, including all hardware, all wiring within the poles, and grouting of the base.

Slip base luminaire poles shall be measured as units complete and in place, including slip base adapter, all hardware, and all wiring within the pole.

Signal mast arm poles and signal pedestal poles shall be measured as complete and installed with all hardware, all wiring within the pole, and either grouting of the base or base plate skirt as appropriate.

Combination signal-luminaire poles shall be measured as complete and installed with all hardware, luminaire brackets, all wiring within the pole, and base plate skirt.

Pedestrian push button poles shall be measured as complete and installed with all hardware, all wiring within the pole, and grouting of the base.

All luminaires, luminaire arms, signal heads, pedestrian signal heads, pedestrian pushbutton assemblies, signal mast arms, signs and optical preemption detectors shall be installed and accepted when poles are measured for payment, but shall not be included in payment for poles. These items shall be considered separate pay items, and measured under the appropriate Sections of these Specifications. All other hardware; including wiring within the pole, repair of galvanization when damaged, and grouting of the base; shall be considered incidental to the pay items, and shall not be measured for payment.

Signal and luminaire arms will be measured as units complete and in place, including labor, equipment, and material necessary to make a complete and functioning unit.

All luminaires, signal heads, signs and optical preemption detectors shall be installed and accepted when mast and luminaire arms are measured for payment, but shall not be included in payment for mast or luminaire arms. These items shall be considered separate pay items, and measured under the appropriate sections of these Specifications. All other hardware, including wiring within the arms, shall be considered incidental to the pay items for signal mast arms or luminaire arms, and shall not be measured for payment.

8005.11 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8005	Slip Base Luminaire Pole (ft Length)	Each
8005	Luminaire Arm (ft Length)	Each

SECTION 8007 CONDUIT

8007.1 General

Contractor shall run electrical conductors in conduit, except for overhead wiring, wiring inside poles and when otherwise called for in the Drawings. All conduit and fittings shall be galvanized, rigid type manufactured of mild steel or wrought iron conforming to U.L. Underwriters Laboratory Standard UL-6 and hot dip galvanized in accordance with American National Standards Institute specification ANSI C-80.1. If called for in the Drawings, rigid non-metallic type conduit shall conform to the applicable UL Standard UL-651 or UL-651A. Only one type of conduit shall be used in any one run from one junction box to another. Where non-metallic conduit is to be installed, the conduit runs between a load center and the nearest junction box shall be of the rigid metal type.

Conduit and fittings to be installed on the surfaces of poles or in structures and foundations shall be rigid metal type as specified above for underground installations.

Couplings for new rigid metal conduit shall be threaded. Where existing conduit is intercepted and extended, twist-on compression type couplings will be allowed. Set-screw couplings are not allowed on the project.

Conduit in foundations for ground rods shall be one inch (1") diameter.

Contractor shall join conduits together with standard threaded couplings using a pipe wrench to ensure tight joints. Provide NPT threads on the ends of all shop and field cut conduits. Slip joints and straight threads shall not be used. Cut conduits with a rolling pipe cutter to ensure a square end and proper threading. Before threading, ream the cut ends to remove the sharp edge and all burrs. Thread the ends to within one thread of the factory threaded length and then paint the cut end and threads with a zinc rich paint overlapping the original galvanized finish. Galvanized coatings that have been cut or damaged shall be repaired in conformance with Section 8016.3 - Galvanizing.

Until wiring is started, all conduit ends shall be capped with standard pipe caps or approved plug and coupling combinations. When caps are removed, the threaded ends shall be provided with approved conduit grounding bushings.

Contractor shall lay conduit to a minimum depth of thirty inches (30") below finished grade. See Division 200 for backfill requirements.

Clean all debris and moisture out of conduits before installing conductors or cables. If the conduit is for thaw wire only, then:

Fittings for use in below-grade storm drains shall be suitably rated as NEMA 7, complete with gaskets for watertight installations.

Provide suitable conduit seals and sealant to make connections to junction boxes installed with manholes watertight.

Junction boxes for installation in manholes shall be NEMA Type 7, with gasketed covers for watertight installations.

Couplings and all threaded connections shall be provided with Teflon tape or approved water treatment applied to threads before tightening.

Bottom of trenches for non-metallic conduit shall be relatively free of sharp irregularities which would cause pinching and excessive bending of the conduit. The first six inches (6") of backfill shall be free of rocks exceeding the one inch (1") maximum dimension.

Conduit entering the bottom of concrete junction boxes shall terminate with a ninety degree (90°) sweep inside the box wall. Conduit openings shall terminate not less than five inches (5") above the bottom of all boxes and a minimum of six inches (6") below the top of the Type I and Type IA boxes and twelve inches (12") below the top of Type II and Type III boxes. Conduits entering through the junction box wall shall extend a minimum of two inches (2") inside the box wall, and be a minimum of six inches (6") above the bottom.

All foundations shall be furnished with conduits as shown in the Drawings. The conduits shall extend a maximum of four inches (4") vertically above the foundation and slope towards the hand-hole opening.

Conduit runs shall avoid drainage collection points where possible. At low points in all conduit runs, a one-half inch (1/2") drain hole shall be drilled in the bottom of the lower straight section of the sweep elbow and sump containing approximately two cubic feet of coarse concrete aggregate material shall be installed. Additional drains shall be placed adjacent to all junction boxes and structures, regardless of the method of conduit placement employed. Drilled holes in conduit shall be deburred inside and out to prevent scraping of conductors. The exterior of the one-half inch (1/2") hole shall be wrapped with approved filter cloth material and secured as directed or approved by the Engineer.

Conduits for future use shall be provided with grounding bushings, bonded to ground, and capped with an approved plastic insert type or expandable rubber plug. A polypropylene pull rope with two hundred pound (200 lb) minimum tensile strength shall be installed in all conduits which are to receive future conductors. At least two feet (2') of pull rope shall be doubled back into the conduits at each end.

Contractor shall mark all underground conduits with a continuous strip of 4-mil-thickness, six inch (6") width polyethylene marker tape. Contractor shall mark the tape with a black legend on a red background and buried nine inches plus or minus three inches (9" ± 3") below the finished grade. Contractor shall place two strips of marker tape side-by-side under all road crossings.

Where new junction boxes are placed in existing rigid metal conduit runs, the conduit shall be fitted with threaded bushings and bonded.

Conduit leading to soffit, wall or other lights or fixtures below the grade of the junction box shall be sealed by means of an approved sealing fitting and sealing compound.

Existing underground conduit without conductors to be incorporated into a new system shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air.

The Contractor, at his expense, may use conduit of larger size than shown on the Drawings, and where used, it shall be for the entire length of the run from outlet to

outlet. Reducing couplings are not permitted.

When extending existing conduits or installing junction boxes in existing conduit runs, extend the conduit into the proposed junction box or foundation using drains, elbows and bonding as required for new installations. When adjusting junction boxes, shorten or lengthen existing conduits to meet clearance requirements. Complete extensions and modifications to existing conduits using the same size and types of materials.

Contractor shall clean all debris and moisture out of conduits before installing conductors or cables.

All abandoned conduits shall be removed from junction boxes.

All knockouts for new conduit or removed conduit shall be grouted.

All knockouts for conduits entering through the side of junction boxes shall be grouted.

Cut off abandoned conduits flush with the inside wall or bottom of junction boxes. Contractor shall remove all conductors prior to abandoning conduit.

For thaw wire systems, one inch (1") liquid tight flexible metal conduit (LFMC) shall be used in manholes and oil & grit separator facilities.

8007.2 Measurement

Measurement for furnishing and installing conduit is per linear foot of the size and type set forth in the Drawings and Bid Schedule. Measurement is the horizontal distance from center of device to center of device, or from station to station. Measurement shall include all fittings, couplings, pull wires, caps and elbows, and bonding and grounding conductors, which shall be considered incidental to conduit installation.

Conduits installed in manhole and catch basins will not be measured, but rather the following distances will be considered standard unless determined otherwise by the Engineer:

Manhole	forty feet (40')
Catch Basin	sixteen feet (16')

8007.3 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section. Payment for trench, backfill, and wire are separate bid items.

Payment shall be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8007	GRC Steel Conduit (Size)	Linear Foot
8007	Schedule 40 HDPE Conduit (Size)	Linear Foot

SECTION 8008 JUNCTION BOXES

8008.1 General

The Work under this Section consists of performing all operations pertaining to removing and adjusting existing junction boxes to grade and for furnishing and installing a new junction box of the type specified. This Work shall include all excavation, bedding material, and bonding and grounding hardware.

Type I junction boxes shall not be used.

Junction boxes shall be installed at the approximate locations shown on the Drawings. The Contractor, at his expense, may install additional junction boxes to facilitate his Work. Junction boxes shall be located so they are not in the roadway, sidewalk, driveway, or pathway surfaces, unless otherwise noted in the Drawings. Where practical, junction boxes shown in the vicinity of curbs shall be placed a minimum of two feet (2') from the back of curb. Junction boxes shall not be located in areas where drainage collects or flows, including side slopes.

8008.2 Materials

Contractor shall provide precast reinforced concrete boxes (junction boxes) with cast iron lids, of the sizes and details shown on the Drawings.

Contractor shall provide precast reinforced concrete additions (junction box extensions) of the sizes and details shown on the Drawings with dimensions confirmed by field measurements.

Illumination junction boxes shall be pre-cast reinforced concrete with cast iron lids of the sizes and details shown on the Drawings.

All Portland concrete cement utilized in the adjustment of the Junction Box shall conform to the requirements as specified in Division 500. The joint sealing compound utilized to seal the joint between the electrical vault's lid and walls shall be Ram-Nek Flexible Plastic Gasket or an approved equal.

8008.3 Construction

All junction boxes with metal covers shall have the covers effectively grounded with a four foot (4') tinned copper braid for Type I and Type IA Junction Boxes or a six foot (6') tinned copper braid for Type II and Type III Junction Boxes. Use only stainless steel bolt assembly components to attach bonding braid to the cover (lid). Bond junction box lids to the grounding conductor using copper braid with a cross sectional area equal to an 8 AWG conductor and eyelets spaced at six inch (6") intervals.

The entire bottom of all junction boxes shall be bedded in coarse concrete aggregate material of a minimum depth of eighteen inches (18").

Top of junction boxes shall be one-quarter inch (1/4") below the sidewalk grade or top of adjacent curb. When located in an unpaved section adjacent to a paved shoulder the

junction box shall be located one inch (1") below the finished grade and shall be installed one-quarter inch (1/4") below the surface in paved areas. Junction boxes located in areas requiring grading shall be adjusted as directed by the Engineer.

Junction boxes located in seeded areas shall be adjusted to two inches (2") below the surface.

Junction boxes shall be located immediately adjacent to the pole or fixture they serve and at additional intervals to reduce the distance between junction boxes to:

1. 400 feet maximum for 25 pair interconnect cable.
2. 200 feet maximum for any other conduit runs.
3. If the limitations require additional junction boxes they shall be located on equal spacing's subject to the above limitations.

Emboss the word LIGHTING on the lids of all junction boxes containing only lighting or thaw wire conductors, or only lighting and signal controller power conductors. Emboss the word TRAFFIC on the lid of all other junction boxes.

No later than forty-eight (48) hours prior to commencement of Work on adjustment of the Junction Box, Contractor shall contact the Engineer.

Prior to replacement of the Junction Box, Contractor and Engineer shall inspect the vault lid and vault structure to verify adjustments. Any Work, personnel, and/or materials required to properly correct problems shall be at Contractor's expense.

8008.4 Measurement

The method of measurement is the actual number of junction boxes removed, adjusted to grade and accepted, and the actual number of new junction boxes of the specified types furnished, installed, and accepted.

The unit cost for adjusting the Junction Box to finish grade shall include all labor, materials, and equipment. This shall include all required usable and unusable excavation, classified fill and backfill material, compaction, concrete cutting and removal, and required personnel. If the adjustment of the Junction Box necessitates pulling new cable to meet the specifications, all Work associated with pulling new cable, including the cost of the new cable and the work to pull the cable up into the pole/mast arm, is considered incidental to the bid item "Adjust Junction Box to Grade".

8008.5 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8008	Remove Junction Box	Each
8008	Junction Box (Type)	Each

SECTION 8009 EXPANSION FITTINGS

8009.1 General

Expansion fittings, as detailed on the structure Drawings, shall be installed where the conduit crosses an expansion joint in the structure. Each expansion fitting shall be provided with a bonding jumper of stranded, No. 6 AWG, copper wire.

Expansion-deflection fittings shall be waterproof and permit a three-quarter inch (3/4") expansion and contraction and a three-quarter inch (3/4") deflection without deformation.

8009.2 Measurement

Expansion fittings shall be considered as incidental to other Work.

8009.3 Basis of Payment

No separate payment for these items is allowed.

SECTION 8010 CONDUCTORS

8010.1 General

Conductor sizes shall be based on the American Wire Gauge (AWG). Sizes shall conform to the Drawings or, when not shown, to the Conductor Termination Table below. Conductors shall be seven-conductor No. 14 AWG (7C-#14 AWG) for all vehicle heads, and five-conductor No. 14 AWG (5C-#14 AWG) for all pedestrian heads.

Conductor Termination Table				
CONDUCTORS/ CABLE	CIRCUIT	WIRE COLOR	AWG NO.	BAND LEGEND
7	Vehicle Red Arrow Vehicle Yellow Arrow Vehicle Green Arrow Common Neutral Spare Spare Spare	Red Orange Green White White/Black Black Blue	14	Head Number
7	Vehicle Red Arrow Vehicle Yellow Arrow Vehicle Flashing Yellow Arrow Vehicle Green Arrow Common Neutral Spare Spare	Red Orange Black Green White White/Black Blue	14	Head Number(s)
7	Vehicle Red Vehicle Yellow Vehicle Green Common Neutral Spare Vehicle Yellow Arrow Vehicle Green Arrow	Red Orange Green White White/Black Black Blue	14	Head Number(s)
5	Pedestrian Don't Walk Pedestrian Walk Common Neutral Spare Spare	Red Green White Orange Black	14	Head Number
5	Photo Elec. Control PEC Load to Contactor Neutral Spare Spare	Black Red White Orange Green	14	PEC
3	Pedestrian Pushbutton Neutral Spare	Black White Red	14	Head Number Located Under

CONDUCTORS/ CABLE	CIRCUIT	WIRE COLOR	AWG NO.	BAND LEGEND	
3	Flashing Beacon Ckt 1	Black	14	Head Number	
	Flashing Beacon Ckt 2	Red			
	Neutral	White			
3	Preemption Confirmation Light	Black	14	"PRE" Conf Lt	
	Neutral	White			
	Spare	Red			
3	Luminaire	Black	8	Circuit Number Circuit Number	
	Luminaire	Red			
	Luminaire	White			
3	Service to Controller	Black	6	"SIG"	
	Neutral	White			No Band
	Spare	Red			No Band
3	Sign Luminaire	Black	8	SIGN	
	Sign Luminaire	Red			SIGN
	Sign Spare	White			

All insulated conductors shall consist of uncoated, stranded copper conforming to the specifications of ASTM B8, except for detector loop lead-in which shall consist of stranded, tinned copper.

Grounding conductors shall be bare copper of the gauge required by the Code and may be stranded, solid or braided.

Conductors used for the following purposes shall conform to the referenced specifications.

8010.2 Control Cables

Vehicular signal faces, pedestrian signal faces, pedestrian pushbutton detectors, flashing beacons, preemption devices, and photo electric controls shall be wired with signal cable conforming to IMSA 20-1.

The three-conductor No. 20 AWG (3C-#20 AWG) cable shown on the Drawings shall be used in an optically activated preemption system. The cable shall be sheathed in a black PVC jacket and include three (3) No. 20 AWG insulated conductors, and one (1) No. 20 AWG drain wire enclosed within an aluminized polyester shield. All conductors shall be stranded, individually tinned copper. The cable shall contain one yellow, one blue, and one orange insulated conductor. The cable shall be rated for 600 volts operation and be suitable for direct bury, installation in a conduit, and direct exposure to the atmosphere. Cable shall be a GTT Company's No. 138 Opticom cable, or approved equal.

8010.3 Power Conductors and Cables

Power conductors and cable shall conform to ICEA Publication No. S-66-524, NEMA Publication No. WC7, and U.L. Standards. Conductors shall be insulated with chemically cross-linked polyethylene conforming to U.L. type XHHW or XHHW-2. Insulation shall be rated for 600 volt operation.

Three conductor cables shall have black, white, and red colored conductors. All single-wire conductors and cables shall have clear, distinctive and permanent markings on the outer surface throughout the entire length giving the manufacturer's name or trademark, the insulation type-letter designation, the conductor size, voltage rating and the number of conductors if a cable.

Highway and sign illumination cable shall consist of insulated conductors with a low density, high molecular weight polyethylene jacket.

Power cables with conductors No. 6 AWG and larger shall be PVC or neoprene jacketed.

Load center control circuit wiring shall be No. 12 AWG XHHW.

Conductors in controller cabinets that carry the full signal load circuit shall be No. 10 AWG or larger.

All cabinets shall be wired with conductors sized to handle the amperage drawn under full cabinet use.

Illumination tap conductors that run from the fused disconnect kit in the pole base to the luminaire shall be No. 10 AWG.

Temporary overhead illumination conductors shall be Triplex #6 Aluminum with black cross-linked polyethylene insulation.

INTERCONNECT TERMINATION TABLE

Telemetry Cable: Type PE-39, #19 AWG, Solid Copper

Pair #	Tip	Ring	Pair #	Tip	Ring
1	White	Blue	14	Black	Brown
2	White	Orange	15	Black	Slate
3	White	Green	16	Yellow	Blue
4	White	Brown	17	Yellow	Orange
5	White	Slate	18	Yellow	Green
6	Red	Blue	19	Yellow	Brown
7	Red	Orange	20	Yellow	Slate
8	Red	Green	21	Violet	Blue
9	Red	Brown	22	Violet	Orange
10	Red	Slate	23	Violet	Green
11	Black	Blue	24	Violet	Brown
12	Black	Orange	25	Violet	Slate
13	Black	Green			

8010.6 Measurement

In this Article, the word “structure” means a pole, junction box, load center, or controller cabinet, and the word “cable” also refers to single conductors, when individual conductors are in the bid schedule. Each cable the Contractor installs shall be measured in horizontal feet from the center of a structure to the center of the adjacent structure, or from station to station. All terminations, markings, slack and other incidental supplies required to meet the provision of the Specifications are not measured, and are considered incidental to the Contract.

Wire and cable within poles, cabinets, and other devices are included under those bid units.

8010.7 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment will be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8010	(No. of Conductors) (Size of Conductors) (Type of Cable)	Linear Foot

SECTION 8011 WIRING

8011.1 General

Conductors in fixtures and cabinets shall not be spliced and shall be cabled together with self-clinching nylon ties. All conductors, including spares shall be attached to terminal blocks with "spade" type terminal lugs.

Conductors shall not be pulled into conduit until junction boxes are set to grade, crushed rock sumps installed, grout placed around the conduit, and rigid metal conduits are bonded to ground.

Conductors shall be pulled by hand or by commercially built cable pulling equipment that is specially designed for that purpose. The cable pulling device shall be equipped with a force limiting circuit and force gauge. The cable-pulling device shall be approved by the Engineer before it is allowed to be used. Powdered soapstone, talc, or other inert lubricant shall be used in placing the cables and conductors in conduit.

When new conductors are to be added to a conduit with existing conductors, all conductors shall be removed and the conduit cleaned with a mandrel or brush. Then both old and new conductors shall be pulled through as a unit. In a new installation, all conductors shall be pulled through the conduit as a unit.

Contractor shall leave at least three feet (3') of slack, but not more than four feet (4'), for each conductor at each lighting and combination pole, and in each junction box, splice location, and controller base. Where lighting conductors are contained in a conduit within the pole, the slack is not required.

Contractor shall install a nylon pull rope in all conduits where cable is replaced and/or removed.

The neutral for pedestrian push button circuits shall be separate from the signal light circuit neutral.

All control/signal conductors shall be run continuously without splices from a terminal block located in a cabinet, compartment, or signal head, to a similarly located terminal block.

Contractor shall splice illumination cable in pole bases and shall use approved fuse kits only. Contractor shall not use wire binding screws, studs or nuts.

With the prior approval of the Engineer, Contractor may use illumination cable splices in junction boxes. Contractor shall join the individual conductors by the use of non-insulated, overlap type pressure connectors insulated with mastic-lined shrink tubing. Contractor shall not use wire binding screws, studs or nuts. Contractor shall stagger splices to minimize overall diameter.

Illumination cable conductor splices shall be encapsulated in a rigid, two-piece, transparent, snap together, plastic mold specifically designed for each splice type. Molds shall have dimensions suitable for the splice, encase the cable outer protective jackets, be rated for 600 volts, and have fill and vent funnels for epoxy resin. Contractor shall fill the

splice mold bodies, with epoxy resin, that are resistant to weather, aromatic and straight chain solvents, and does not sustain combustion.

Splices shall be insulated by: 1) a heat shrink tubing internally coated with an approved sealing compound or, 2) a cast of self-curing epoxy resin which is compatible with the wire insulation to form a weatherproof joint. Each insulated kit shall encompass only one cable and include the outer protective jacket(s).

All cables and single wire conductors shall be permanently identified using labels in all pole bases and cabinets, at each detector loop tail/lead in cable and illumination cable splices and in junction boxes.

Contractor shall furnish the two types of identification tags listed below that require a written legend, and write the legends specified neatly and legibly, using a black marking pen specified by the manufacturer. Contractor shall ensure that legends conform to Section 8010, Conductor Termination Table, or as shown on the Drawings or detailed in the Technical Specifications. Contractor shall replace, at no expense to the Owner, all identifications tags that the Engineer deems are illegible.

Use identification cable ties for labeling loop detector tails and for each set of paired loop lead-in conductors in the controller cabinet. Furnish identification cable ties made of nylon that have a nonmagnetic stainless steel locking device embedded in the head and a tag attached "flag style" to the head. The cable ties shall consist of a single strap with a minimum size tag of three-quarters inch by five-sixteenth inch (3/4" x 5/16").

To label all other cables, use cable tags made of nylon reinforced vinyl that is impervious to the elements and will not tear. Provide tags with a four inch by one and three-quarters inch (4" x 1 3/4") minimum size that are attached flag style at one corner to a single strap. Furnish yellow tags for labeling all signal and interconnect cables and red tags for labeling lighting and feeder cables.

Contractor shall remove abandoned conductors/cables.

The control and power cables shall be terminated as shown in 8010, Conductor Termination Table. Three conductor power cables shall always have a spare. The white or red conductor shall be left as a spare, when the circuit is either 480 volt or a neutral is required, respectively.

Terminate all spare conductors on terminal blocks.

8011.2 Measurement

Work performed under this article is considered incidental to other Work.

Removal and disposal of abandoned conductors is not measured for payment and is incidental to other Work. All splices, pull wire-string, cable tags, connectors, and fused disconnects are also considered incidental and no payment shall be made.

8011.3 Basis of Payment

No separate payment is allowed for this item.

SECTION 8012 FUSED SPLICE CONNECTORS

8012.1 General

A fused, quick disconnect, splice connector shall be installed between the line and luminaire ballast tap conductors in the base of every pole equipped with a luminaire.

The connector shall be weather tight and consist of two halves: a single unit line side socket and load side plug. The plug and socket assembly shall be designed so that the fuse remains in the load side plug without exposing live metal parts when the connector separates. Coil springs shall not be a part of the current carrying circuit.

Contractor shall provide fuses that are ten (10) ampere, midget (13/32" x 1 1/2") ferrule type with a fast acting current limiting (KTK type) design.

The Contractor shall install the fused connectors so they are readily accessible from the handhole. Tap conductors shall be installed so there is no slack when their ends touch the top of the foundation.

8012.2 Measurement

Work performed under this article is considered incidental to other Work.

8012.3 Basis of Payment

No separate payment is allowed for this item.

SECTION 8013 BONDING AND GROUNDING

8013.1 General

Metallic cable sheaths, metal conduit, non-metallic conduit grounding wire, ballast and transformer cases, service equipment, sign switches, metal poles and pedestals shall be made mechanically and electrically secure to form a continuous system, and shall be grounded. Bonding and grounding jumpers shall be copper wire or copper braid of the same cross-sectional area as No. 8 AWG for all systems.

Bonding of slip-base type standards and pedestals shall be by means of two conductors from the conduit, one attached with a ground rod clamp to an anchor bolt and the other connected to the lower portion of the shaft. Bonding of standards with frangible coupling type bases shall be made by attaching one conductor from the conduit to the lower portion of the shaft. The attaching bolt shall be weather resistant and be a minimum of three-sixteenth inches (3/16") in size. The conductor for the shaft shall be forty-eight inches (48") long.

One side of the secondary circuit of step-down transformers shall be grounded.

Grounding of metal conduit, service equipment and neutral conductor at service point shall be accomplished as required by the Code and the serving utility, except that grounding electrode conductor shall be No. 6 AWG, or equal.

Unless otherwise sized on the Drawings, Contractor shall install a bare #8 AWG copper wire in all non-metallic and metallic type conduits for bonding purposes. When wire is pulled into or out of existing conduit and the conduit does not have an existing bare #8 AWG copper wire, Contractor shall install the ground wire.

Contractor shall splice grounding conductors with irreversible compression type connectors listed for the purpose.

Contractor shall install grounding bushings with insulated throats on the ends of all metallic conduits. All non-metallic conduits, except for detector loop home runs, shall have a bushing installed. Contractor shall allow for bushings when installing conduits in foundations.

Contractor shall replace all missing or damaged conduit grounding bushings, conduit bonding jumpers and junction box lid braided bonding jumpers.

Contractor shall provide a minimum #10 AWG green grounding insulated conductor in the pole shaft of all poles with luminaires, and shall terminate the conductor in the lighting fixture.

Bond junction box lids to the grounding conductor using copper braid with a cross sectional area equal to an 8 AWG conductor and eyelets spaced at six inch (6") intervals.

An integral bare ground shall not be used in any cable.

Contractor shall ensure that the grounding conductor, between all ground rods, is continuous or spliced with irreversible ground rated splices.

Contractor shall install a three-quarter inch by ten foot (3/4" x 10') copper clad steel ground rod in the foundation space of a two-piece vault style traffic signal controller foundation. If two-piece vault style controller foundation isn't being installed, then install ground rod within Type 3 junction box adjacent to controller cabinet base.

Contractor shall use only stainless steel bolt assembly components to attach bonding braid to the cover (lid).

Furnishing and installing bonding and grounding conductors for electrical installations is incidental to this Contract and no additional payment is made.

8013.2 Measurement

Work performed under this article is considered incidental to other Work.

8013.3 Basis of Payment

No separate payment is allowed for this item.

SECTION 8014 LOAD CENTERS

8014.1 General

City of Homer shall make application for service and pay for engineering and application fees. Contractor shall provide post mounted load center and meter base and coordinate with HEA to energize.

When the positioning of the load center is not detailed on the Drawings, the location shown is approximate and the Contractor shall determine the exact location from the Engineer or the serving utility.

If a junction box is not shown on the Drawings adjacent to or within five feet (5') of any new or reconstructed load center, contact the Engineer immediately for clarification. A j- box of the appropriate size and type for the new system is required to be installed with the load center.

Where Contractor is required to install the service on a utility-owned pole, the positioning of the riser and service equipment is determined by the serving utility.

The serving utility shall approve load center meters, complete with manual circuit closing device and sealing rings. Contractor shall not mount meter sockets on doors.

All accessible sections containing non-metered conductors shall have sealing provisions that will accept Brooks Type 623 seal (0.047 stainless bail).

Contractor shall ensure that the load center is located ten to fifteen feet (10' to 15') from the power source, with a two inch (2") minimum conduit stubbed to within two feet (2') of the power source, and at a minimum depth of forty-two inches (42"). The conduit shall contain a pull-rope, and the end capped and marked with a two by six inch (2" x 6") board. Contractor shall coordinate exact location with the serving utility.

Contractor shall stub service conduit through base as shown on the Drawings.

Prior to the load center being energized by the serving utility, Contractor shall arrange to have it inspected and approved by the Engineer. Once the Engineer has provided approval, a City of Homer Inspector will provide the final authorization for energizing the load center. The certificate of electrical inspection, attached to the load center, indicates that the load center may be energized.

At all new and existing load centers, which require modification, the Contractor shall furnish conduit, conductors, contactors, breakers, transformers, and all necessary materials to complete the installation of the service, and upgrade to current code requirements.

Contractor shall label the load center as a unit by an Approved Independent Electrical Testing Laboratory (such as UL, ETL, CSA, etc.) defined by ANSI Standard Publication Z34.1 "Third Party Certification Programs for Products, Processes and Services" and conform to applicable published standards noted herein, the Drawings, and Technical Specifications. Contractor shall label the load center as service entrance equipment. All Work shall conform to the latest edition of the National Electric Code as last amended and adopted by the City of Homer.

All lighting load centers shall contain a multi-pole, 3-position control switch to provide selection of photocell operation. Contractor shall label switch positions "Auto," "Off" and "On." In the "Off" and "On" positions of the switch, Contractor shall ensure all leads to the photo control device are de-energized. Contractor shall install the switch inside the load center, accessible only through one of the lockable doors.

Contractor shall provide UL-approved and listed circuit breakers. Contractor shall provide an enclosed operating mechanism that is:

1. trip-free from operating handle on overload
2. trip-indicating
3. plainly marked with trip and frame size.

Multiple-pole circuit breakers shall have a common trip. Contractor shall ensure that all circuit breakers are quick-make, quick-break on either automatic or manual operation, and shall meet the requirements of the serving utility. Contractor shall ensure that the contacts are silver alloy enclosed in an arc-quenching chamber. An ambient temperature range of from -40° to +160° Fahrenheit shall not influence overload tripping of breakers.

The contactors shall have contacts rated to switch thirty (30) or sixty (60) AMP inductive loads as the Drawings specify, and are normally open. Contractor shall provide mechanical armature type contactors consisting of an operating coil, a laminated core, a laminated armature, contacts, and terminals with contacts made of fine silver, silver alloy, or superior alternative materials and rated for 480V.

Contractor shall provide the lighting contactor coil(s) rated for operation at 240 VAC.

Contractor shall connect ground bus of load center to ground rod(s) with #6 soft drawn bare copper and approved connectors.

Dimensions given are typical. Slight variations are allowable, subject to Engineer's approval.

Contractor shall submit four (4) copies of manufacturer's shop drawings for Engineer approval.

Contractor shall indicate the interrupting rating on panel schedules for each location.

On panel schedules for each location, Contractor shall indicate service rating of 120/240V, 3 wire; 240/480V, 3 wire; 100 AMP or 200 AMP.

Contractor shall provide a typed circuit directory for each load panel inside of the load center door, protected with a laminated plastic cover, describing each circuit, with even and odd numbered circuit breaker positions shown on separate parts of the directory. Contractor shall provide a power and control 1-line diagram protected by a laminated plastic cover inside the load center. Contractor shall include the following information on the directory and one-line diagram: Load Center Identification (A, B, etc.), Project Name, Municipal Project Number and Service Voltage.

Contractor shall ensure that the wiring configuration conforms to the appropriate electrical diagram, and as the panel schedule indicates for each intersection. Contractor shall

complete a load center summary per appropriate detail drawing for each load center location.

Contractor shall ensure that all terminals are suitable for AL/CU termination, sized in accordance with ampere ratings.

Contractor shall provide #12 AWG XHHW as the load center control wiring.

Contractor shall ensure that the utility section is isolated from main load section and the distribution load sections by non-removable metal barriers, and equipped with landing lugs for utility termination.

The meter section shall contain a meter safety socket with safety shield and provisions for manual bypass of the meter. Contractor shall provide a link or lever type bypass with no external screws, bolts, or nuts. Horn and sliding types are not acceptable.

External screws, bolts, and nuts are not acceptable.

Contractor shall provide exterior ScotchCAL 220 labels with ownership and purpose, safety labels, interior identification labels, wiring diagram, and installation instructions with the load center enclosures.

Contractor shall label in a prominent manner all switches and circuit breakers for circuit and direction.

Contractor shall ensure the lighting contactor coil is rated for operation at 240 VAC.

Contractor shall install load centers having 30 milliamp (ma) ground fault circuit breakers with ratings for all heat trace circuits as indicated on the Drawings.

Contractor shall label each load center with durable, weather resistant identification tags inscribed with: Maximum Fault Current __A, Calculated ___/___/___.

Load Centers shall be equipped with a hasp for padlocks.

8014.2 Illumination Control

Contractor shall install photoelectric controls capable of switching multiple lighting systems directly.

The photoelectric control shall consist of a photoelectric unit that shall cause a contactor to be energized, thus controlling the lighting circuit. Contractor shall install photoelectric units on the load center, unless the Engineer requires pole mounting of the photoelectric unit because a load center mounted unit will not work properly due to ambient light sources. If required, Contractor shall provide photoelectric units for pole top mounting with a slip fitter, terminal block and with cable supports or clamps to support pole wires. Load center mounted photoelectric units shall be installed using ¾" GRC and mounted a minimum of 18" above the load center. There will be no separate payment for providing the required photoelectric units.

Photoelectric Unit:

1. The photoelectric unit shall consist of a light sensitive element connected directly to a normally closed, single pole throw control relay without intermediate amplifications.
2. The unit is either the horizontal sensing or zenith sensing type and shall conform to the following:
 - a. The supply voltage rated is 60 hertz (Hz), 105-277 volts.
 - b. The maximum rated load is a minimum of 1,800 volt-amperes.
 - c. The operating temperature range is from -40°F. to +150°F.
 - d. The power consumption is less than 10 watts.
 - e. The base of the unit has a 3-prong, EEI-NEMA standard, twist-lock plug mounting.
3. Units for highway lighting shall have a "turn-on" between one (1) and five (5) foot candles and a "turn-off" at between one and one-half and five (1½ and 5) times "turn-on."
4. Contractor shall ensure measurements conform to the procedures set forth in EEI-NEMA Standards for Physical and Electrical Interchangeability of Light-Sensitive Control Devices Used in the Control of Roadway Lighting.
5. The photoelectric control unit shall plug into a phenolic resin twist lock receptacle, adjusted to north sky set in a cast aluminum-mounting bracket with a threaded base. When installed on the load center, Contractor shall ensure the bracket is coupled to the end of a rigid metal conduit. When installed on the top of steel poles, Contractor shall ensure the bracket is installed in the center of the rain cap, secured with a locknut and made watertight with a fillet of silicone caulking compound. When installed inside the load center, Contractor shall ensure the installation conforms to the manufacturer's recommendations and that all load center penetrations/openings are silicon sealed.
6. Contractor shall screen photoelectric units to prevent artificial light from causing cycling.

The load center shall contain a 2-pole, 3-position on/off/auto switch. In the "on" and "off" positions, Contractor shall ensure the switch interrupts all hot leads to the photocell.

8014.3 Step Up/Step Down Transformer

Step up/step down transformers in 480 volt circuits shall be 240-120 volt, 60 Hz type with volt-ampere ratings as shown on the Drawings. Transformers shall carry rated volt-amperes continuously without exceeding 85°C temperature rise above 25°C ambient.

Where installed outside of the load center, use a non-ventilated transformer fabricated of aluminum, stainless steel or galvanized steel. Coat enclosures fabricated of sheet metal with moisture resistant paint.

The case shall be fabricated of aluminum, brass, or galvanized steel. The case shall be coated with moisture resistant paint.

The unit shall be filled with a high melting point insulating compound and shall be hermetically sealed to insure satisfactory operation under continuous submersion in water.

Transformer leads shall be insulated with non-hygroscopic material and shall extend at least nine inches (9") outside the case seal.

The primary and secondary sides of the transformer shall be "protected" in the load center.

8014.4 Load Center Enclosure

All doors shall be equipped with continuous stainless steel pin hinges, coin latches, and hasp for padlock.

Meter section door shall have a clear lexan meter reading window, 0.187" minimum thickness, with a minimum size of eight by eight inches (8.0" x 8.0"), and shall include a silicon seal to door.

The load center shall be provided with internal mounting facilities for a one-half inch (1/2") anchor bolt installation as well as for use with a standard factory mounting base assembly.

Construction shall be of zinc-coated A60 finish steel with minimum thickness as follows:
Exterior Shell- 12 GA.

Interior Doors - 14 GA.

Interior Panels - 14 GA.

Interior Covers - 16 GA.

The load center shall be painted with a two-part urethane paint undercoating inside and out. The final finish shall be a two-part urethane paint, standard white for removable panels and non-gloss silver-gray, Benjamin Moore GN-42, for the enclosure.

The required location for the hand-off-auto switch and the contactor is in the distribution load section.

All non-current carrying parts shall be bonded to ground.

8014.5 Post-Mounted Load Center, Type 2 - Underground Service

A post-mounted load center, Type 2, shall be defined in the Construction Drawings by reference to appropriate Standard Details for the load center, wiring diagram, and panel schedule.

8014.8 Measurement

Load centers shall be measured as units, complete and in place. Bases for load center enclosures shall be a separate bid item under "foundations."

Photoelectric units mounted on the load center shall not be measured separately for payment. The Work performed under Article 14.2 – Illumination Control, is considered incidental to Work performed under Articles 14.5 through 14.7, unless a pole mounted photoelectric unit is required.

8014.9 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8014	Post-Mounted Load Center Underground Service, Type 2	Each

SECTION 8016 MISCELLANEOUS

8016.1 Sign Switches

Each sign illumination installation shall be provided with a disconnect switch mounted on the sign standard or structure, as shown on the Drawings. Where the sign lighting is served from a multiple service, each sign structure shall have a 120-volt, 240-volt, or 480-volt circuit breaker, approved by UL as service equipment, and rated as shown on the Drawings.

Enclosures for the sign breaker shall be galvanized or baked enamel NEMA Type 3R, and shall be provided with top hinged cover, hasp for sealing cover and provisions for locking.

8016.2 Field Tests

Prior to acceptance of the Work, the Contractor shall perform the following tests on all traffic signal, sign illumination, and lighting circuits, in the presence of the Engineer.

A. Tests

Any fault in any material or in any part of the installation revealed by these tests shall be replaced or repaired by the Contractor at his expense in an approved manner, and the same test shall be repeated until no fault appears.

1. Continuity

Each circuit shall be tested for continuity.

2. Grounds

The test for grounds in each circuit shall consist of the physical examination of the installation to insure that all required grounding bushings, bonding jumpers, and ground rods have been installed and are mechanically firm.

3. Insulation

A megohm test shall be made on each circuit, between circuits and between the circuit and a ground. The insulation resistance shall not be less than 100 megohms or the minimum specified by the manufacturer, measured at 500 volts direct current (VDC). All lamps and magnetometer sensing probes shall be disconnected prior to performing the megger test.

4. Circuit

Every signal indication circuit shall be energized with lamps installed prior to installation of the load switches.

5. Functional

The following tests shall be performed on each signal and lighting system after all of the component circuits have satisfactorily passed the tests for

continuity, grounding, insulation integrity and circuitry.

B. Functional Testing

During the test periods, the Contractor will maintain the system or systems. The cost of any maintenance necessary shall be at the Contractor's expense.

1. The functional test for each new or modified traffic signal system shall consist of not less than twenty-four (24) hours nor more than five (5) days of continuous flashing operation.
2. During the functional tests, signals shall not be switched from flashing operation to normal, continuous operation on a Saturday, Sunday, Monday, a Holiday, or the day after a Holiday.
3. The functional test for each lighting system and sign illumination system shall consist of an operational test for five (5) consecutive nights according to the regular lighting schedule.
4. The functional test for each flashing beacon system shall consist of not less than five (5) days of continuous, satisfactory operation.
5. A continuous five (5) day burning test shall be made on each pedestrian overcrossing and undercrossing lighting system before final acceptance.

The initial turn-on shall be made between 9:00 a.m. and 2:00 p.m. unless specified otherwise in the Technical Specifications. Prior to turn-on, all equipment shown on the Drawings shall be installed and operable. This includes, but is not limited to, pedestrian signals and push buttons, signal face backplates and visors, vehicle detectors, highway lighting and all regulatory, warning and guide signs.

8016.3 Galvanizing

A. General

Standards, pedestals, posts and cabinets of ferrous materials shall be galvanized in accordance with the provisions of ASTM A123 except that cabinets and cut out boxes may be constructed of material galvanized prior to fabrication.

Iron or steel pipe standards and mast arms shall be hot-dip galvanized after fabrication in conformance with the ASTM A123.

Tie-rods, nuts, washers, clamps, anchor bolts and other miscellaneous ferrous parts shall be hot-dip galvanized after fabrication in accordance with the provisions of ASTM A153. Anchor bolts shall be fully galvanized.

After galvanizing, the bolt threads shall accept galvanized standard nuts without requiring tools or causing removal of protective coatings.

Rigid metal conduit shall be hot dip galvanized in accordance with American

National Standards Institute specification ANSI C-80.1.

Galvanized coatings that have been cut or damaged shall be repaired in conformance with ASTM A780.

Lighting and signal structures shall be hot-dip galvanized to meet AASHTO M 111 and these specifications. Galvanizing kettles will be large enough to completely submerge each element, the mast arm, and the pole. Submerge the complete/whole element in the galvanizing process. An element galvanized in sections will not be accepted. After the poles and mast arms are galvanized, remove all excess zinc from all drip lines and points and the surfaces of all tube ends that form slip type joints to provide a smooth finish.

B. Cold Galvanizing

Repair hot-dip galvanized finishes that have been cut or damaged and cold galvanize the tops of pipe pile foundations with a premixed, single component, zinc rich paint that:

1. Meets the requirements of Federal Specification DOD-P-21035A, Galvanizing Repair Specification and ASTM A 780, Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings,
2. Contains ninety-five percent (95%) zinc, by weight, in the dried film, and
3. Is recognized under Underwriters Laboratories, Inc. component program as an equivalent to commercial hot-dip galvanizing.

Apply the paint directly to surfaces devoid of grease, oil, mill scale, rust, and paint. Clean soiled surfaces according to the following Steel Structures Painting Council (SSPC) specifications before applying the paint:

Solvent clean greases and oils according to SSPC-SP1

Power tool clean rust and easy to remove paint according to SSPC-SP3

Sandblast mill scale and firmly adhered paint according to SSPC-SP6 (commercial).

Apply the paint whenever the temperature of the pipe pile is at least five degrees Fahrenheit (5°F) above the dew point to avoid possible condensation and the relative humidity is less than eighty-five percent (85%). Apply two (2) coats of three (3) mil wet film thickness, applying the second coat at least twelve (12) hours after applying the first coat. (Each gallon will cover about four hundred and fifty (450) square feet of three (3) mil wet film thickness.)

8016.4 Painting for Steel Structures

- A.** General Requirements. Ship paint in strong, substantial containers, plainly marked with the name, weight, and volume of the paint content, together with the color formula, batch number, and the name and address of the manufacturer.

Reduction and clean-up thinners will be as approved by the coating manufacturer. Ship all thinners in the manufacturer's original containers.

- B.** The paint shall conform to the requirements outlined below:

1. Prime Coat. A generic single component, moisture cure, polyurethane (SC-MC-U) containing not less than 78% by weight zinc powder. Volume of solids shall be 60% minimum. Pigment type shall be zinc dust. Zinc in dry film shall be 83% minimum, by weight. Weight per liter shall be 2750 g, minimum. Volatile organic compounds (VOC's) shall not exceed 450 g/L.
 2. Intermediate Coat. A SC-MC-U containing not less than 480 g/L micaceous iron oxide (MIO). Volume of solids shall be 60% minimum. Pigment color shall contrast between the intermediate and prime coat and the intermediate and top coat. Weight per liter shall be 1550 g minimum. VOC's shall not exceed 450 g/L.
 3. Top Coat. A single component, moisture cure, aliphatic polyurethane (SC-MC-ALIP-U), containing not less than 480 g/l micaceous iron oxide (MIO). Volume of solids shall be 60% minimum. Pigment color of the top coat shall be FSS FED-STD-595B, color number 26492. The color match shall be evaluated as a general match under a daylight source using ASTM D 1729. Weight per liter shall be 1550 g minimum. VOC's shall be less than 450 g/L.
3. All coatings shall pass the following tests:
- a. Corrosion Resistance, ASTM B 117, Salt Spray Test. Minimum of 4000 hours with less than 2 mm creep from scribe. Panels shall be 3 mm minimum thickness cold rolled steel, having SSPC Near White Blast with 25 to 50 μm angular profile.
 - b. Accelerated Weathering, ASTM G 53. Minimum 400 hours QUV B bulb with no chalking, cracking, or gloss loss greater than 20%.
 - c. Forward Impact, ASTM D 2794. Minimum 17 Nm impact.
 - d. Abrasion Resistance, ASTM D 4060. Less than 90 mm loss on CS-17 wheel, 1000 g/load, 1000 cycles.
 - e. Moisture Resistance, ASTM D 4585. Minimum 1000 hours at 38o C with no change in appearance.
 - f. Flexibility, ASTM D 522, Cylindrical Mandrel Bend Test. Bend around

12.5 mm diameter mandrel with no cracking.

g. Adhesion, ASTM D 4541. Minimum 3.5 Mpa on a certified pull test.

C. New Equipment.

1. Signal heads, signal head mountings, brackets and fittings, outside of visors, pedestrian push button housings, pedestrian signal head housings and visors, and back faces of backplates, shall be factory finished with two (2) coats of dark olive green enamel. Painting is not required where the color is an integral part of the component material, or powder coated.
2. Interior of signal visors, louvers, and front faces of backplates shall be factory finished with two (2) coats of lusterless black enamel.
3. After erection, all exterior surfaces shall be examined for damage, and such damaged surfaces shall be cleaned and spot coated with primer and finish coat.

D. Reused Equipment.

1. Existing non-galvanized, damaged equipment shall be painted in the field, including Owner-furnished equipment. The equipment shall be washed with a stiff bristle brush using a solution of water containing two tablespoons (2 tbsp/gal) of heavy duty detergent powder per gallon. After rinsing, all surfaces shall be wire brushed to remove all poorly bonded paint, rust, scale, corrosion, grease or dirt. Any dust or residue remaining after wire brushing shall also be removed prior to priming.
2. Factory or shop cleaning methods for metals will be acceptable if equal to the methods specified herein.
3. Immediately after cleaning, all bare metal shall be coated with Pre-Treatment, Vinyl Wash Primer, followed by two (2) prime coats of Zinc Chromate Primer for Metal.
4. Signal equipment, excluding standards, shall be given a spot finishing coat on newly primed areas, followed by one (1) finishing coat over the entire surface.
5. Ungalvanized standards shall be given two (2) spot finish coats on newly-primed areas.
6. All paint coats may be applied either by hand brushing or by approved spraying machines. The Work shall be done in a neat and workmanlike manner. The Engineer reserves the right to require the use of brushes for the application of paint, should the Work done by the paint spraying machine prove unsatisfactory or objectionable.

Galvanized equipment with rusted areas shall be repaired as provided for in Article 16.3
- Galvanizing.

8016.5 Measurement

The Work performed under this section is considered incidental to other Work.

8016.6 Basis of Payment

No separate payment is allowed for Work performed under this Section.

SECTION 8023 LUMINAIRES

8023.1 General

LED street luminaires shall be CREE LEDway Series Luminaires as manufactured by Cree, Inc. 4600 Silicon Drive, Durham, North Carolina 27703

<u>Component</u>	<u>Location</u>	<u>Model No.</u>
LED Luminaire	Street	STR-LWY-3M-HT-06-E-UL-SV-700-40K

8023.2 Light Distribution

Furnish luminaires having standard I.E.S. light distribution patterns as specified in the Contract Documents.

Prior to installation, Contractor shall check the socket position in the luminaire to verify that it corresponds to the setting indicated in the instructions for the light distribution type shown on the Drawings.

Vertical light distribution shall be short (s), medium (m), or long (l). Cutoff shall be full-cutoff (f), partial-cutoff (p), or non-cutoff (n).

Lateral light distribution shall be Type 1, Type II, Type III or Type IV.

When cutoff fixtures are specified in the Technical Specifications or shown on the Drawings, the optical assembly shall provide ninety-degree (90°) cutoff and shielding. The reflector shall be specifically designed to produce the specified ANSI and IES light distribution when used with one hundred fifty (150) through four hundred (400) watt high pressure sodium lamps. The fixture shall have a flat plate glass lens and no part of the lens shall project below the luminaire's metal housing.

Mast arm mounted luminaires shall be provided with slip-fitters designed for mounting on two-inch (2") standard pipe.

All gaskets shall be composed of a material capable of withstanding the temperature involved and they shall be securely held in place.

All parts of the luminaire shall be manufactured from corrosion-resistant materials.

Manufacturer's luminaire specifications, shop drawings, and photometric data shall be submitted and approved before installing any luminaire on the project.

8023.3 Measurement

Luminaires will be measured as units complete and in place, including all labor, equipment, and materials to provide a complete and functioning unit. No measurement for payment will be made until the functional test has been completed in accordance with Section 8016, Article 16.2 – Field Tests.

8023.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment will be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8023	Luminaire, 135W LED, 60 LED, Type 3 Optics	Each

SECTION 8024 BALLASTS

8024.1 General

Ballasts for high-intensity discharge lamps shall be an integral part of each luminaire and designed for the voltages and lamp types specified in the Drawings or Technical Specifications. The current needed to start the lamps shall be less than the operating current.

Ballasts shall be the regulator type with copper windings electrically isolated from each other, and shall start and operate the lamps in temperatures down to -40°F. The allowable line voltage variation shall be at least plus and minus ten percent (10%).

High pressure sodium luminaires, except those with 1000 watt lamps, shall be equipped with magnetic regulator ballasts with the following additional operating characteristics:

1. The lamp wattage regulation spread at any time over the life of the lamp shall not exceed eighteen percent (18%) of nominal lamp watts at plus or minus ten percent ($\pm 10\%$) line voltage variations.
2. With nominal line and lamp voltages, the ballast shall regulate the lamp output to within five percent (5%) of the ballast design center, and sustain lamp operation with a minimum sixty percent (60%) voltage drop lasting four (4) seconds or less.
3. Grounded socket shell.

Luminaires with 1000 watt high pressure sodium lamps shall be equipped with auto-regulator ballasts that provide a maximum thirty percent (30%) lamp regulation spread, a minimum thirty-five percent (35%) voltage dip tolerance, and with nominal line and lamp voltages regulate lamp output to within five percent (5%) of the ballast design center.

Ballasts for use for soffit luminaires shall be furnished with mounting brackets attached and shall be equipped with terminal blocks for primary connections and lamp socket preconnected to the secondary for flush mounted luminaires and with terminal blocks for both primary and secondary connections for use with suspended luminaires.

The Contractor shall submit the ballast manufacturer's volt-watt trace and specification sheets to the Engineer for review and approval.

8024.2 Measurement

This item shall be considered incidental to other Work.

8024.3 Basis of Payment

No separate pay item will be allowed for this item.

SECTION 8028 SALVAGING ELECTRICAL EQUIPMENT

8028.1 General

Unless otherwise specified or shown on the Drawings or Specifications, existing electrical equipment including but not limited to: luminaires, standards, mast arms, poles, caps, handhole covers, mounting bolts, controllers, cabinets, optical detectors, signal heads, pedestrian heads, service equipment, and junction box lids shall be relocated or salvaged and delivered to the nearest DOT&PF maintenance yard or placed as directed by the Engineer.

Street Light Maintenance personnel will be allowed to select the equipment and pole/arm items they would like to salvage. Contractor is responsible for disposal of all remaining items. All poles and arms not selected for relocation or salvage shall have the pole plate or arm plate cut off to render the item unusable.

Salvaged poles and mast arms shall be stripped of all wire and hardware and any damaged areas, and exposed hole edges shall be cleaned and painted with cold galvanizing paint in accordance with Section 8016, Article 16.3 - Galvanizing. All caps, hand-hole covers, mast arms and mounting bolts shall be returned with the pole.

Removal, wire and hardware stripping, listed cleaning and cold galvanize painting, and delivery of all salvaged electrical equipment shall be considered incidental to the Contract and no separate payment shall be made.

Care shall be exercised in removing and salvaging electrical equipment so that it will remain in its original form and existing condition. The Contractor will be required to replace, at his expense, any of the above-mentioned electrical equipment which has been damaged or destroyed by his operations.

Unless otherwise specified, underground conduit, conductors, foundations and detectors not reused shall become the property of the Contractor and shall be removed from the project right-of-way. If said materials do not interfere with other construction, they may, with approval from the Engineer, be abandoned in place except that conductors must be removed from conduit prior to abandonment. Foundations abandoned in place shall conform to the requirements of Section 8003 – Removing and Replacing Improvements.

Holes formed by removing pull boxes and foundations shall be filled with material equivalent to the original and compacted to the same density as the surrounding material.

When existing electrical equipment is to be reused, the Contractor shall furnish and install all necessary materials and equipment, including signal mounting brackets, anchor bolts, nuts, washers and concrete as required to complete the new installation.

All traffic signal, flashing beacon and lighting fixtures to be reinstalled shall be cleaned, and reconditioned in accordance with Section 8016, Article 16.4 – Painting for Steel Structures.

Salvaged materials required to be reused and found to be unsatisfactory by the Engineer shall be replaced by new material and the cost will be paid as extra Work as provided in Division 10, Sections 10.05 – Control of Work and 10.07 – Measurement and Payment.

8028.2 Measurement

Measurement for relocation or removal of poles in this Section is per each unit relocated or removed; and includes all work and materials necessary to relocate or remove poles, hardware disposal, cutting poles to render them unusable, disassemble, salvage, disposal, and delivery to the DOT&PF maintenance yard as specified in the Drawings or in the Technical Specifications. When Drawings are unclear as to the method of pole salvage or disposal, the Contractor shall contact the Engineer to receive specific instructions.

Removal of the pole foundation, in accordance with Section 80.03 - Removal and Replacing Improvements, and disposal of the pole foundation is incidental to the pay items in this Section. Salvage and delivery of existing signs, signal hardware and illumination hardware shall also be considered incidental to the pole removal pay items.

If Owner declines ownership, the poles, mast arms, and associated hardware become Contractor property.

8028.3 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment will be made under the following units:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
8028	Relocate Luminaire Pole	Each

Add the following new division:

DIVISION 9000 STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

SECTION 9001 STORM WATER POLLUTION PREVENTION PLAN

9001.1 General

The Work described in this Section shall consist of providing all labor, equipment, materials, and services to prepare, implement, and maintain a Storm Water Pollution Prevention Plan (SWPPP) for projects that may adversely impact receiving waters or waters of the United States. The type of plan required depends on the area disturbed by the project including the construction site and off-site activities which include, but may not be limited to, material sites, waste disposal sites, borrow and fill sites, and equipment and material storage areas.

For Projects that impact an area greater than five hundred (500) square feet or are deeper than four feet (4'), and less than ten thousand (10,000) square feet, a Type 1 SWPPP is required and the cost of the SWPPP is considered incidental to the Contract and no separate payment shall be made. A Type 2 SWPPP is required for Projects that disturb a project area greater than ten thousand (10,000) square feet and less than one

Acre. A Type 3 SWPPP is required for all Projects that disturb one or more acres of land.

As a requirement of this Contract, the Contractor shall accept a delegation of authority from the City of Homer to act as the City's duly authorized representative for the purpose of overseeing compliance with the APDES Construction Permit at the project site.

9001.2 Definitions

Alaska Certified Erosion and Sediment Control Lead (AK-CESCL) - A person who has completed training, testing, and other requirements of, and is currently certified as, an AK-CESCL from an AK-CESCL Training Program. The City of Homer recognizes AK-CESCLs as "qualified personnel" required by the CGP. An AK-CESCL shall be recertified every three years.

Alaska Department of Environmental Conservation (ADEC) - The State agency authorized by EPA to administer the Clean Water Act's National Pollutant Discharge Elimination System (NPDES).

Alaska Pollutant Discharge Elimination System (APDES) - A system administered by ADEC that issues and tracks permits for storm water discharges.

Best Management Practices (BMPs) - Temporary or permanent structural and non-structural devices, schedules of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or minimize the discharge of pollutants to waters of the United States. BMPs also include, but are not limited to, treatment requirements; operating procedures; practices to control site runoff, spillage or leaks; sludge or waste disposal; or drainage from material storage.

Clean Water Act (CWA) - Federal Water Pollution Control Amendments of 1972, as amended (33 U.S.C. 1251 et seq.).

Construction Activity - Work by Contractor, subcontractor or utility company within the project area that may result in erosion, sedimentation, or a discharge of pollutants into storm water. Construction Activity includes soil disturbing activities (e.g. clearing, grubbing, grading, excavating); construction materials or equipment storage or maintenance areas (e.g. material piles, borrow area, concrete truck chute wash down, fueling); and activities that may discharge storm water and are directly related to the construction process (e.g. concrete or asphalt batch plants).

Construction General Permit (CGP) - The current permit authorizing storm water discharges from Construction Activities, issued and enforced by ADEC. The CGP authorizes storm water discharges provided permit conditions and water quality standards are met.

Electronic Notice of Intent (eNOI) - The electronic Notice of Intent submitted to ADEC to obtain coverage under the CGP.

Electronic Notice of Termination (eNOT) - The electronic Notice of Termination submitted to ADEC to end coverage under the CGP.

Environmental Protection Agency (EPA) - A federal agency charged to protect human health and the environment.

Final Stabilization – The CGP defines Final Stabilization as:

1. All soil disturbing activities at the site have been completed and either of the two following criteria have been met:
 - a. A uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or
 - b. Equivalent non-vegetative permanent stabilization measures have been employed (such as use of rip rap, gabions, porous backfill (ADOT&PF specification 703-2.10), railroad ballast or subballast, ditch lining (ADOT&PF Specification 610-2.01 with <3% smaller than #200 sieve), geotextiles, or fill material with low erodibility as determined by an engineer familiar with the site and documented in the SWPPP.
2. When background native vegetation will cover less than one hundred percent (100%) of the ground (e.g., arid areas, beaches), the seventy percent (70%) coverage is adjusted as follows: if the native vegetation covers fifty percent (50%) ($0.70 \times 0.50 = 0.35$), thirty-five percent (35%) total cover is required for final stabilization. On a beach with no natural vegetation, no stabilization is required.
3. In arid and semi arid areas only, all soil disturbing activities at the site have been completed and both of the following criteria have been met:
 - a. Temporary erosion control measures (e.g., degradable rolled erosion

control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance by the permittee:

- b. Temporary erosion control measures are selected, designed, and installed to achieve seventy percent (70%) vegetative coverage within three years.
- 4. For individual lots in residential construction, final stabilization occurs when either:
 - a. The homebuilder has completed final stabilization as specified above, or
 - b. The home builder has temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization.

Hazardous Material Control Plan (HMCP) - The Contractor's detailed project specific plan for prevention of pollution from storage, use, transfer, containment, cleanup, and disposal of hazardous material (including, but not limited to, petroleum products related to construction activities and equipment). The Contractor shall include the HMCP as an appendix to the SWPPP.

Inspection - An inspection required by the CGP or the SWPPP, usually performed together by the Contractor's SWPPP Manager and the City Inspector.

Multi-Sector General Permit (MSGP) - The Alaska Pollutant Discharge Elimination System General Permit for storm water discharges associated with industrial activity.

Operator(s) - The party or co-parties associated with a regulated activity that has responsibility to obtain permit coverage under the CGP. "Operator" for the purpose of the CGP and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

- 1. The operator has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- 2. The operator has day to day responsibility and operational control for all activities at a project which are necessary to fully comply with the CGP and the project SWPPP for the site or other requirements of the permit. For the purpose of a Contractor executing project Work under this Contract with the City, the Contractor is the operator responsible for CGP and SWPPP coverage and compliance under the CGP for the Work.

Permit - References to permit pursuant to Division 9000, shall mean the Construction General Permit (CGP) defined above.

Pollutant - Any substance or item meeting the definition of pollutant contained in 40 CFR § 122.2. A partial listing from this definition includes: dredged spoil, solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, wrecked or

discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste.

Project Zone - The Project Zone includes the area of street, road, highway or other facility under construction; project staging and equipment areas; and material and disposal sites, when those areas, routes and sites are directly related to the Contract.

Records - Any record, report, information, document, or photograph required to be created or maintained pursuant to the requirements of the CGP, the CGP storm water requirements of the Clean Water Act and applicable local, state, and federal laws and regulations pertaining to document preservation.

Spill Prevention, Control and Countermeasure Plan (SPCC Plan) - Contractor's detailed plan for petroleum spill prevention and control measures that conform to the requirements of 40 CFR 112.

Spill Response Field Representative - Contractor's representative with authority and responsibility for managing, implementing, and executing the HMCP and SPCC Plan.

Storm Event - A rainfall event that produces more than one half inch (0.5") of precipitation in twenty-four (24) hours and that is separated from the previous storm event by at least three (3) days of dry weather. Event can be measured on site using a rain gauge or Contractor can utilize the nearest National Weather Service (NWS) precipitation gauge station to determine the amount of rain fall during a storm event if the NWS gauge used is located within twenty (20) miles of the site.

Storm Water Pollution Prevention Plan (SWPPP) - Contractor's detailed project-specific plan to minimize erosion and contain sediment within the Project Zone and to prevent discharge of pollutants that exceed applicable water quality standards. The SWPPP includes, but is not limited to the plan, amendments, records of activities, inspection schedules and reports, qualifications of key personnel, and all other documentation, required by the CGP and this specification, and other applicable local, state, and federal laws and regulations.

Storm Water Pollution Prevention Plan Type

Type 1- if area of disturbance is 500 to <10,000 square feet or 4 feet or more in depth and is not part of a common plan of development that disturbs 10,000 square feet or more.

Type 2- if the area of ground disturbance is 10,000 square feet or greater but less than 1 acre and not part of a common plan of development that disturbs one acre or more.

Type 3 - if the area of disturbance is 1 acre or greater, or part of a common development that disturbs one or more acres.

Subcontractor Spill Response Coordinator - The Subcontractor's Representative with authority and responsibility for coordinating the Subcontractor's activities in compliance with the HMCP and SPCC Plan.

Subcontractor SWPPP Coordinator - The Subcontractor's Representative has responsible charge of and authority to direct the Subcontractor's Work; is responsible for the subcontractor's compliance with the SWPPP; and performs coordination with the Superintendent and SWPPP Manager.

Superintendent - Contractor's duly authorized representative in responsible charge of the Work. The Superintendent has responsibility and authority for the overall operation of the Project and for Contractor-furnished sites and facilities directly related to the Project.

SWPPP Amendment - A revision or document that adds to, deletes from, or modifies the SWPPP.

SWPPP Manager - Contractor's qualified representative who conducts inspections, has authority to suspend work and implement corrective actions required for CPG compliance, except they do not have authority to prepare the initial SWPPP or sign inspection reports.

SWPPP Preparer - Contractor's qualified representative who is responsible for developing the initial SWPPP.

Utility Spill Response Coordinator - a utility's representative with authority and responsibility for coordinating the Utility's activities in compliance with the HMCP and SPCC Plan.

Utility SWPPP Coordinator - a utility's representative with authority to direct the Utility's work, and who is responsible for coordination with the Superintendent and SWPPP Manager, and for the utility's compliance with the SWPPP.

9001.3 Applicable Standards

The latest version of the following permits, standard and requirements are hereby made a part of these specifications:

- A. Alaska 2011 Construction General Permit (CGP) #100000
- B. Alaska Department of Environmental Conservation (ADEC) Storm Water Pollution Prevention Plan (SWPPP) Template

9001.4 Plan and Permit Submittals

Partial and incomplete submittals will not be accepted for review. A submittal that is re-submitted or revised after submission, but before the review is completed, will restart the submittal review timeline. No additional Contract time or additional compensation will be allowed due to delays caused by partial or incomplete submittals, or required re-submittals.

A. Storm Water Pollution Prevention Plan (SWPPP)

Contractor shall submit an electronic copy and three hard copies of the SWPPP to the Engineer for approval. Contractor shall organize and bind the SWPPP and related documents for submittal according to the requirements of Article 2.9

The City will review the SWPPP submittals within ten (10) business days after they are received. Submittals will be returned to the Engineer, and marked as either “rejected” with reasons listed or as “approved” by the City. When the submittal is rejected, the Contractor shall revise and resubmit the SWPPP. The ten

(10) Business days review period will restart when the Contractor resubmits an electronic copy and three hard copies of the revised SWPPP to the Engineer for approval.

After the SWPPP is approved by the City, the Contractor shall sign and certify the approved SWPPP.

B. Hazardous Material Control Plan (HMCP)

Contractor shall submit an electronic copy and three hard copies of the HMCP, as an appendix to the SWPPP, to the Engineer for approval. The HMCP submittal and review timeline, and signature requirements are the same as the SWPPP. The HMCP shall be appended to and submitted with the SWPPP.

C. Spill Prevention, Control and Countermeasure Plan (SPCC)

When a SPCC Plan is required under Article 2.11, Contractor shall submit an electronic copy and three signed hard copies of the SPCC Plan to the Engineer. At least 21 days before beginning Construction Activity. The City reserves the right to review the SPCC Plan and require modifications.

D. Construction General Permit (CGP) Coverage

The Contractor is responsible for permitting of Contractor and subcontractor Construction Activities related to the Project, including any material sites, waste disposal sites, borrow & fill sites, and equipment and material storage areas that are not covered by a different permit.

Prior to beginning Construction Activity, Contractor shall submit an eNOI with the required fee to ADEC for coverage under the Construction General Permit (CGP). Submit a copy of the signed eNOI and ADEC’s acknowledgement letter to the Engineer as soon as practicable and no later than three days after filing eNOI or receiving a written response from ADEC.

The Contractor shall not begin Construction Activity until in full compliance with the conditions listed in Article 2.14.A.

The City will submit an eNOI to ADEC for Construction Activities on City Projects if required. The Engineer will provide the Contractor with a copy of the City’s eNOI and ADEC’s written acknowledgment by letter, or other document for inclusion in the SWPPP.

E. Ending CGP Coverage

Contractor shall submit an eNOT to ADEC, and submit both a copy of the signed eNOT and ADEC's acknowledgement letter to the City, within 30 days after the Engineer has determined the Contractor has fully complied with the conditions listed in Article 2.16.F.

F. Local SWPPP Review

When installing Permanent Storm Water Management Controls in accordance with CGP Part 4.9, the Contractor shall submit information required by the City for the project and shall obtain approval prior to commencement of construction activities.

1. transmit a copy of information;
2. transmit a copy of the delivery receipt confirmation to the Engineer within seven (7) days of receiving the confirmation;
3. transmit a copy of any comments to the Engineer within seven (7) days of receipt;
4. amend the SWPPP as necessary to address the Engineers comments and transmit SWPPP Amendments to the Engineer within seven (7) days of receipt of the comments; and
5. include a copy of the approval letter in the SWPPP.

G. Modifying Contractor's eNOI

When required by The CGP Part 2.7, Contractor shall modify the eNOI to update or correct information. Reasons for modification include a change in start or end dates, small changes in number of acres to be disturbed, change in decision to use or not use treatment chemicals, or change in location of SWPPP Records.

The Contractor shall submit an eNOT and then submit a new eNOI instead of an eNOI modification when: the operator has changed, the original eNOI indicates disturbed area less than five acres and the project will disturb more than five acres, or a project over five disturbed acres grows by more than 50%.

9001.5 Personnel Qualifications.

A. General

Contractor shall provide documentation in the SWPPP that the individuals serving in these positions are "qualified Personnel" pursuant to the CGP.

The City of Homer accepts persons having either of the following certificates as equivalent to AK-CESCL, if the certificates are current according to the sponsoring organization's policies:

- CPESC - Certified Professional in Erosion and Sediment Control, or
- CISEC - Certified Inspector in Sediment and Erosion Control

B. SWPPP Preparer

The SWPPP Preparer shall meet at least one of the following qualifications:

- current certification as a Certified Professional in Erosion and Sediment Control (CPESC); or
- current certification as AK-CESCL, and at least three years' experience in erosion and sediment control (provide documentation including project names, project timelines, and work responsibilities demonstrating the experience requirement); or
- Professional Engineer licensed in the State of Alaska

For Projects disturbing more than 20 acres, the SWPPP Preparer shall also have completed a SWPPP Preparation course.

C. Superintendent

The Superintendent shall hold current certification as AK-CESCL and be a duly authorized representative as defined in the CGP, Appendix A, Part 1.12.3 and Section 20.02 definitions.

D. SWPPP Manager

The SWPPP Manager shall have current certification as AK-CESCL, and shall meet the CGP experience, training, and authority requirements identified for the Storm Water Lead and Storm Water Inspector positions as defined in the CGP, Appendix C, Qualified Person.

E. Storm Water Inspector & Monitoring Person

The Storm Water Inspector and the Storm Water Monitoring Person shall have current certification as AK-CESCL.

F. Active Treatment System Operator

The Active Treatment System (ATS) operator shall have current certification as AK-CESCL and shall be knowledgeable in the principals and practices of treatment systems in general, including the operation of the project-specific ATS. Active Treatment System operator shall have at least six (6) months field experience with ATS, or completion of an ATS manufacturer's training course, or completion of system operator's certification course.

9001.6 Signature Certification Requirements and Delegations

A. eNOI and eNOT

The eNOI and eNOT shall be signed and certified by a responsible Contractor corporate officer according to CGP Appendix A, Part 1.12.2. Signature and certification authority for the eNOI and eNOT shall not be delegated.

B. Delegation of Signature Authority for Other SWPPP Documents and Reports

The Contractor shall delegate signature authority and certification authority to the Superintendent position, according to CGP Appendix A, Part 1.12.3, for the SWPPP, Inspection Reports and other reports required by the CGP. The Superintendent position is responsible for signing and certifying the SWPPP, Inspection Reports, and other reports required by the CGP, except the eNOI and eNOT.

C. Subcontractor Certification

Subcontractors shall certify that they have read and will abide by the CGP and the conditions of the project SWPPP.

D. Signatures and Initials

Contractor and subcontractor personnel shall handwrite (wet ink) signatures or initials on CGP documents and SWPPP forms, wherever a signature or initial is required.

9001.7 Responsibility for Storm Water Permit Coverage

- A.** Contractor is responsible for permitting and permit compliance.
- B.** The Contractor has sole responsibility for compliance with ADEC and other applicable federal, state, and local requirements, and for securing all necessary clearances, rights, and permits.
- C.** An entity that owns or operates a commercial plant, material source, or disposal site receiving materials, waste, or any product generated as a result of the Project is responsible for permitting and permit compliance. The Contractor has sole responsibility to verify that the entity has appropriate permit coverage and to provide a copy of the permit documents to the Engineer.
- D.** Contractor shall indemnify, defend and hold the City of Homer harmless for any and all fines resulting from non-compliance with the permit conditions.

9001.8 Utility Responsibilities

If a utility is working ahead of the main project, the utility shall follow the procedures in this Section, obtain SWPPP approval, and file an eNOI with ADEC prior to starting any ground disturbing activity.

9001.9 Storm Water Pollution Prevention Plan (SWPPP) Requirements

A. General

Contractor shall prepare SWPPP in accordance with the applicable standards of this Section. Contractor shall submit and maintain the SWPPP in three-ring binder with tabbed and labeled dividers for each section and appendix.

B. SWPPP Preparer and Pre-Construction Site Visit

Contractor shall hire or designate a SWPPP Preparer to prepare the SWPPP and associated documents according to the requirements of the CGP. The SWPPP shall identify the SWPPP Preparer and include qualifications (including the expiration date of any

certifications), title, and company name in the SWPPP.

The Contractor and SWPPP Preparer shall conduct a pre-construction inspection at the project site before construction activity begins. If the SWPPP Preparer is not a Contractor employee, the SWPPP Preparer shall visit the site accompanied by Contractor's superintendent. Contractor shall provide the Engineer at least seven (7) days written notice of the site visit, so that the Engineer may participate.

During the pre-construction inspection, the SWPPP Preparer shall identify or, if a draft of the SWPPP has already been prepared, verify that the SWPPP fully addresses and describes:

1. opportunities to phase construction activities;
2. appropriate BMPs and their sequencing; and
3. sediment controls that shall be installed prior to beginning construction activities.

Contractor shall document the SWPPP Preparer's pre-construction inspection in the SWPPP on Form F-106, SWPPP Pre-Construction Site Visit, including the names of attendees and the date.

C. SWPPP Development

Contractor shall prepare the SWPPP with sections and appendices, in accordance with the current ADEC SWPPP template and the following additional information:

1. Add additional appendices for:
 - a. Appendix L -- Hazardous Material Control Plan (HMCP)
 - b. Appendix M -- SWPPP Preparer's Site Visit
 - c. Appendix N -- Rainfall Logs
 - d. Appendix O -- NOT forms and Acknowledgement letters from ADEC
(Include both City of Homer's and Contractor's)
2. Use the following forms for recording information in the SWPPP:
 - a. SWPPP Amendment Log
 - b. SWPPP Certification for Contractor
 - c. SWPPP Construction Site Inspection Report
 - d. SWPPP Corrective Action Log
 - e. SWPPP Daily Record of Rainfall
 - f. SWPPP Delegation of Signature Authority Contractor
 - g. SWPPP Grading and Stabilization Activities Log
 - h. SWPPP Pre-Construction Site Visit
 - i. SWPPP Subcontractor Certification
 - j. SWPPP Training Log

Example forms are available on the City of Anchorage's municipal website, www.muni.org, under Project Management and Engineering Publications.

D. SWPPP Considerations and Contents

The SWPPP shall provide erosion and sediment control measures for all Construction Activity.

The SWPPP shall include the activities of the Contractor, all subcontractors, and utility companies performing Work. The SWPPP shall describe the roles and responsibilities of the Contractor, subcontractors, and utility companies with regard to implementation of the SWPPP.

The SWPPP shall identify all operators for the Project including utility companies performing Construction Activity, and identify the areas over which each operator has operational control and where the City of Homer and Contractor are co- operators.

The SWPPP shall include any material sites, waste disposal sites, borrow and fill sites, and equipment and material storage sites. If those sites are covered under a different permit or operated by a different entity, the Contractor shall provide the permit information and/or operational information as part of the SWPPP.

Contractor shall prepare the SWPPP according to the requirements of the CGP and this specification, including accounting for the Contractor's construction methods and phasing, and identifying the amount of mean annual precipitation.

Contractor shall include an Antidegradation Analysis in the SWPPP, if storm water from the Project discharges into a receiving water that is considered a high quality water and constitutes an outstanding national resource. The City of Homer does not provide the analysis. The Contractor shall perform this analysis according to the CGP Part 2.1.5.

There are special requirements in the CGP Part 3.2, for storm water discharges into an impaired water body, which may include monitoring of storm water discharges. For projects meeting the permit criteria, the Contractor is responsible for compliance with the CGP Part 3.2 inside and outside the Project Zone.

Contractor shall preserve natural topsoil where possible. Contractor shall delineate the site in accordance to CGP Part 4.1. Contractor shall use stakes, flags, or silt fence, etc. to identify areas where land disturbing activities will occur and areas that will be left undisturbed. Contractor shall minimize the amount of soil exposed during Construction Activity in accordance to CGP Part 4.1.2.

Contractor shall conform to the dewatering requirements of CGP Part 4.3.

The SWPPP shall identify specific areas where potential erosion, sedimentation, or pollution may occur. The potential for wind erosion shall be addressed. The potential for erosion at drainage structures shall be addressed.

SWPPP shall include in the "Stabilize Soils" section, a description of how the Contractor will minimize the amount of disturbed and unstabilized ground in the fall season. Contractor shall identify anticipated dates of fall freeze-up and spring thaw. Contractor's SWPPP shall describe how the Contractor will stabilize areas when it is close to or past the seasonal time of snow cover or frozen conditions, and before the first seasonal thaw. Contractor's SWPPP shall include a plan for final stabilization. Plans for Active Treatment Systems shall be submitted to ADEC for review at least fourteen (14) days prior to their application and the Operator of the ATS identified in the SWPPP. Treatment chemicals shall be identified on the NOI.

The SWPPP shall provide designated areas for equipment and wheel washing, equipment fueling and maintenance, chemical storage, staging or material storage, waste or disposal sites, concrete washouts, paint and stucco washouts, and sanitary toilets. These activities shall be done in designated areas that are located, to the extent practicable, away from drain inlets, conveyance channels, and waters of the US. No discharges are allowed from concrete washout, paint and stucco washout; or from release oils, curing compounds, fuels, oils, soaps, and solvents. Equipment and wheel washing water may be treated and discharged.

Contractor shall implement temporary BMPs for a two (2)-year-twenty-four (24) hour storm event. Contractor shall describe BMPs in the SWPPP and in SWPPP Amendments, including source controls, sediment controls, discharge points, and all temporary and permanent stabilization measures. Contractor's SWPPP shall describe the design, placement, installation, and maintenance of each BMP, using words and drawings as appropriate. Contractor shall provide a citation to the BMP Manual or publication used as a source for the BMP, including the title of the BMP Manual or publication, the author (individual or agency), and date of publication. If no published source was used to select or design a BMP, then the SWPPP or SWPPP amendment shall state that "No BMP manual or publication was used for this design."

Contractor shall describe the sequence and timing of activities that disturb soils and of BMP implementation and removal. Contractor shall phase earth disturbing activities to minimize unstabilized areas and to achieve temporary or final stabilization quickly. Whenever practicable, the Contractor shall incorporate final stabilization work into excavation, embankment and grading activities.

Contractor shall identify the inspection frequency in the SWPPP. At a minimum the inspection frequency shall be:

- at least once every seven (7) days during construction; or
- at least once every fourteen (14) days during construction and within twenty-four (24) hours of the end of a storm event of one-half inch (1/2") or greater rainfall in a twenty-four (24) hour period (one-half inch (1/2") rainfall as recorded at the project site rain gauge)

The SWPPP shall cite and incorporate applicable requirements of the Project permits, environmental commitments, and commitments related to historic preservation. Make additional consultations or obtain permits as necessary for Contractor specific activities.

The SWPPP is a dynamic document. The Contractor shall maintain the SWPPP current by noting installation, modification, and removal of BMPs, and by using amendments, SWPPP amendment logs, Inspection Reports, corrective action logs, records of land disturbance and stabilization, and other records necessary to document storm water pollution prevention activities and to satisfy the requirements of the CGP and this specification.

E. Recording Personnel and Contact Information in the SWPPP.

Contractor shall include records of the AK-CESCL cards or certificates for the Superintendent, SWPPP Manager, acting Superintendent and acting SWPPP Managers in the SWPPP.

Contractor shall provide twenty-four- (24)-hour contact information for the Superintendent and SWPPP Manager. The Superintendent and SWPPP Manager shall have twenty-four- (24)-hour contact information for all Subcontractor SWPPP Coordinators and Utility SWPPP Coordinators.

9001.10 Hazardous Material Control Plan (HMCP) Requirements

Contractor shall prepare the HMCP for prevention of pollution from storage, use, containment, cleanup, and disposal of hazardous material, including petroleum products related to construction activities and equipment. Contractor shall append the HMCP to the SWPPP. Contractor shall compile Material Safety Data Sheets (MSDS) in one location and reference that location in the HMCP.

HMCP shall designate a Contractor's Spill Response Field Representative and provide twenty-four- (24)-hour contact information. Contractor shall designate a Subcontractor Spill Response Coordinator for each Subcontractor. The Superintendent and Contractor's Spill Response Field Representative shall have twenty-four- (24)-hour contact information for each Subcontractor Spill Response Coordinator and the Utility Spill Response Coordinator.

HMCP shall list and provide the location and estimated quantities of hazardous materials (including materials or substances listed in 40 CFR 117 and 302, and petroleum products) to be used or stored on the Project. Hazardous materials shall be stored in covered storage areas. Contractor shall provide secondary containment for all hazardous material storage areas.

HMCP shall identify the locations where fueling and maintenance activities will take place and describe the activities, and list controls to prevent the accidental spillage of petroleum products and other hazardous materials. Controls include placing absorbent pads or other suitable containment under fill ports while fueling and under equipment during maintenance or repairs.

HMCP shall use secondary containment under all stationary equipment (equipment that does not have a seat for driving) that contains petroleum products and use secondary

containment under pumps, compressors, and generators.

HMCP shall list the types and approximate quantities of response equipment and cleanup materials available on the Project, including a list and location map of cleanup materials at each different work site and readily available off site (materials sources, material processing sites, disposal sites, staging areas, etc). Spill response materials shall be stored in sufficient quantity at each work location, appropriate to the hazards associated with that site.

HMCP shall describe procedures for containment and cleanup of hazardous materials. Contractor shall describe a plan for the prevention, containment, cleanup, and disposal of soil and water contaminated by spills and a plan for dealing with contaminated soil and water encountered during construction. Contractor shall clean up spills or contaminated surfaces immediately.

HMCP shall describe methods of disposing of waste petroleum products and other hazardous materials generated by the Project, including routine maintenance. Contractor shall identify haul methods and final disposal areas and provide assurance that final disposal areas are permitted for hazardous material disposal.

HMCP shall describe methods of complying with the requirements of AS 46.04.010-900, Oil and Hazardous Substances Pollution Control, and 18 AAC 75, including contact information for reporting hazardous materials and petroleum product spills to the Engineer and reporting to federal, state and local agencies.

9001.11 Spill Prevention, Control, and Countermeasure Plan (SPCC Plan) Requirements

Contractor shall prepare and implement an SPCC Plan when required by 40 CFR 112 and when both of the following conditions are present on the Project:

- oil or petroleum products from a spill may reach navigable waters (as defined in 40 CFR 112); and
- total above ground storage capacity for oil and petroleum products is greater than 1,320 gallons (not including onboard tanks for fuel or hydraulic fluid used primarily to power the movement of a motor vehicle or ancillary onboard oil-filled operational equipment, and not including containers with a storage capacity of less than 55 gallons)

HMCP and SWPPP shall reference the SPCC plan.

9001.12 Superintendent and SWPPP Manager Responsibility and Authority

Contractor's superintendent is responsible for the overall operation of the Project and all Contractor-furnished sites and facilities directly related to the Project. The Superintendent shall sign and certify the SWPPP, Inspection Reports, and other reports required by the CGP except the NOI and NOT. The Superintendent may not delegate the task or responsibility of signing and certifying the SWPPP submitted under Article 2.4, Inspection Reports, and other reports required by the CGP.

The Superintendent may assign certain duties to the SWPPP Manager, which may include:

- ensuring Contractor's and subcontractor's compliance with the SWPPP and CGP;
- ensuring the control of erosion, sedimentation, or discharge of pollutants;
- directing and overseeing installation, maintenance, and removal of BMPs;
- performing Inspections; and
- updating the SWPPP including adding amendments and forms.

Contractor shall ensure that Superintendent and SWPPP Manager are knowledgeable in the requirements of this Section, the SWPPP, CGP, BMPs, HMCP, SPCC Plan, environmental permits, environmental commitments, and historic preservation commitments.

Contractor's Superintendent and SWPPP Manager shall have the complete authority and shall be responsible for suspending construction activities that do not conform to the SWPPP or CGP.

9001.13 Materials

Contractor shall

- use materials suitable to withstand hydraulic, wind, and soil forces, and to control erosion and trap sediments according to the requirements of the CGP and the Specifications.
- use the temporary seed mixture specified by special provision, or use annual rye grass if no temporary seed mix is specified.
- use straw that is certified free of noxious weed by the United States Department of Agriculture(USDA), Natural Resources Conservation Service, Local Soil and Water Conservative District(NRCS). Alaska Weed Free Forage Certification Program shall be used when available. Hay may not be substituted for straw.

BMP's shall conform to the latest version of Municipality of Anchorage Storm Water Manual or as approved by the Engineer

9001.14 Construction Requirements

Contractor shall be familiar with the requirements of the CGP. Contractor shall fully comply with the SWPPP and the requirements of the CGP.

A. Prior to Construction

Contractor shall complete the following actions before construction activity begins:

1. the SWPPP Preparer shall visit the Project, the visit shall be documented in the SWPPP, and the SWPPP shall be developed (or amended) with findings from the visit ;
2. the SWPPP shall be approved by the Engineer;

3. the Contractor shall be authorized to begin construction only by the Engineer;
4. the Project eNOIs for the City of Homer and for the Contractor, as well as other eNOIs if there are additional operators, shall be listed as Active Status on the ADEC website before construction activity commences ;
5. Contractor shall post notices on project site containing the following information:
 - **Copy of all eNOIs related to this project**
 - Name and twenty-four- (24)-hour phone number of SWPPP Manager and Superintendent
 - Location of the SWPPP
6. Contractor shall prominently post notices on the outside wall of the Contractor's Project office and near the main entrances of the construction project. Postings shall be protected from the weather. Contractor shall locate postings so the public can read them without obstructing construction activities or the traveling public (for example, at an existing pullout). Do not use retro-reflective signs for the SWPPP posting. Do not locate SWPPP signs in locations where the signs may be confused with traffic control signs or devices. Contractor shall update the notices if the listed information changes.
7. Contractor shall install an outdoor rain gauge in accordance with manufacturer's guidance in a readily accessible location on the Project.
8. Contractor shall delineate the site for both ground disturbing activities and areas that will be left undisturbed and install sediment controls and other BMPs that shall be placed prior to the initiation of Construction Activity.

B. During Construction

1. Contractor shall ensure subcontractors understand and comply with the SWPPP and the CGP, and have signed a SWPPP Subcontractor Certification, Form F-105. Contractor shall include SWPPP Subcontractor Certifications as an appendix to the SWPPP. Contractor shall provide SWPPP information to utility companies and coordinate with Subcontractors and utility companies doing work in the Project Zone so that BMPs, including but not limited to, temporary and permanent stabilization, are installed, maintained, and protected from damage.
2. Contractor shall provide on-going training to employees and Subcontractors, on control measures at the site and applicable storm water pollution prevention procedures. Training shall be documented on the SWPPP Training Log Form F-125, including the dates and attendees to these trainings. Contractor shall include the SWPPP Training Log as an appendix to the SWPPP.
3. Contractor shall notify the Engineer immediately if the actions of any utility company or Subcontractor do not comply with the SWPPP and the CGP.
4. Contractor shall not install concrete washout containment within one hundred (100) feet of wetlands and/or other water bodies.

5. Contractor shall comply with requirements of the HMCP and SPCC Plan, and all local, state and federal regulations that pertain to the handling, storage, containment, cleanup, and disposal of petroleum products or other hazardous materials.
6. Contractor shall keep the SWPPP current (refer to Article 2.9.C SWPPP Considerations and Contents)

C. Pollutant and Hazardous Materials Reporting Requirements

Contractor shall immediately report incidents of non-compliance with the CGP that may endanger health or the environment to ADEC. Incident report shall conform to the CGP, Appendix A, Part 3.0. Contractor shall immediately notify the Engineer and coordinate reports to ADEC with the Engineer. The report shall include:

- a description of the noncompliance and its causes;
- the exact dates and times of noncompliance;
- if not yet corrected, the anticipated time the project will be brought back into compliance; and
- the corrective action taken or planned to reduce, eliminate and prevent re-occurrence.

Contractor shall report spills of petroleum products or other hazardous materials to the Engineer and other agencies as required by law. Contractor shall use the HMCP and SPCC Plan for contact information to report spills to regulatory agencies.

D. Corrective Action and Maintenance of BMPs

If a corrective action is not implemented within the time requirements of this Section, the Contractor shall document the situation in the SWPPP, notify the Engineer and immediately implement alternative BMPs.

1. Contractor shall implement maintenance of BMP's as required by the CGP, SWPPP, and manufacturer's specifications, whichever is more restrictive.
2. Contractor shall implement corrective action should any of the following occur:
 - a. if an incident of non-compliance with the SWPPP or CGP is identified;
 - b. if an Inspection identifies the SWPPP or any part of the SWPPP is ineffective in preventing erosion, sedimentation or the discharge of pollutants;
 - c. if the Engineer determines the SWPPP or any part of the SWPPP is ineffective in preventing the erosion, sedimentation, or the discharge of pollutants;
 - d. if any BMP is damaged, undercut, or unable to effectively perform the intended function;
 - e. before sediment or debris fills any BMP (including sediment traps, ponds and silt fences) to 50% of its design storage capacity (or manufacturer's specifications or SWPPP requirements, whichever is lower); or
 - f. whenever there is a change in conditions, design, construction, operation,

or maintenance that could result in erosion, sedimentation, or the discharge of pollutants.

3. Contractor shall implement corrective actions so that the following time requirements are satisfied:
 - a. corrective action is completed as soon as possible;
 - b. corrective action is completed before the next storm event ;
 - c. corrective action is completed in time to protect water quality; and
 - d. Corrective action is completed no later than the Complete-by-Date that was entered in an Inspection Report (see Article 2.16 for more information).

E. Stabilization

Contractor shall stabilize disturbed areas using temporary or permanent BMP's. Contractor shall initiate stabilization of disturbed soils, erodible stockpiles, disposal sites, and of erodible aggregate layers so that all of the following conditions are satisfied:

- as soon as practicable;
- as soon as necessary to avoid erosion, sedimentation, or the discharge of pollutants;
- as identified in the SWPPP; and
- disturbed land or land surface shall be stabilized within fourteen (14) days after the temporary or permanent cessation of land-disturbing activities on a portion of the site in accordance with the SWPPP.

Contractor shall coordinate work to minimize the amount of disturbed soil at any one time. Contractor shall not disturb more soil than the Contractor can stabilize with the resources available. Land which is disturbed multiple times during a project will require as necessary multiple stabilization efforts.

Contractor shall temporarily stabilize from wind and water erosion those portions of disturbed soils, portions of stockpiles, and portions of disposal sites that are not in active construction. Temporary stabilization measures may require a combination of measures including, but not limited to, vegetative cover, mulch, stabilizing emulsions, blankets, mats, soil binders, non-erodible cover, dust palliatives, or other approved methods.

Before applying temporary or permanent seeding, Contractor shall prepare the surface to be seeded to reduce erosion potential and to facilitate germination and growth of vegetative cover. Contractor shall apply seed, maintain seeded areas, and reseed areas where growth of temporary vegetative cover is inadequate to stabilize disturbed ground.

Contractor shall apply permanent seed, within the time periods required, at locations where seeding is indicated on the Drawings and after land-disturbing activity is permanently ceased.

When installing a culvert or other drainage structure where a stream bypass is not used, Contractor shall install temporary or permanent stabilization concurrently or immediately after placing the culvert or drainage structure in a manner that complies with the SWPPP,

applicable project permits and prevents discharge of pollutants. Contractor shall install temporary and permanent stabilization:

- at the culvert or drainage structure inlet and outlet and
- in the areas upstream and downstream that may be disturbed by the process of installing the culvert, culvert end walls, culvert end sections, or drainage structure.

Before deactivating a stream bypass or stream diversion used for construction of a bridge, culvert, or drainage structure, the Contractor shall install permanent stabilization:

- at the inlet and outlet of the culvert, drainage structure, or bridge;
- in the area upstream and downstream of the culvert, drainage structure, or bridge, that is disturbed during installation or construction; and
- under the bridge.

F. Ending CGP Coverage and BMP Maintenance

The Engineer will determine the date that all the following conditions for ending CGP coverage have been met within the Project Zone based on, but not limited to, the following:

- land disturbing activities have ceased;
- Final Stabilization has been achieved (including at City-furnished material sources, disposal sites, staging areas, equipment areas, etc.)
- temporary BMPs have been removed.

After the Engineer has determined the conditions for ending CGP coverage have been met, the City of Homer will:

- provide written notice to the Contractor with the date that the conditions were met;
- submit an eNOT to ADEC; and
- provide a copy of the eNOT and ADEC's acknowledgement letter to the Contractor

Contractor shall end permit coverage within the Project Zone by submitting an eNOT to ADEC within 30 days of meeting the conditions for ending CGP coverage. The Contractor is responsible for BMP maintenance and SWPPP updates until permit coverage is ended.

If the Contractor's coverage includes areas where the City of Homer is not an Operator, the Contractor may not be able to file an eNOT at the same time as the City of Homer. In this case, the Contractor shall amend the SWPPP to remove the City of Homer from CGP coverage and state that the City of Homer is no longer an Operator within the Project Zone.

Contractor shall indicate in the SWPPP the areas that have reached Final Stabilization, and the dates land disturbing activities ended and Final Stabilization was achieved. The Contractor shall submit an eNOT to ADEC, and insert copies of the City of Homer's and the Contractor's eNOTs with ADEC's acknowledgement letters in the appendix of the SWPPP.

Contractor shall submit a copy of each signed eNOT and ADEC's acknowledgement letter

to the Engineer within 30 days of receiving them.

G. Transmit final SWPPP

Contractor shall transmit one (1) copy of the final SWPPP, including all amendments and appendices, to the Engineer when the project eNOTs are filed, or within thirty (30) days of the City of Homer's eNOT being filed, whichever is sooner. Transmittal shall be by both electronic and hard copy.

9001.15 SWPPP Documents (Location on-site and Record Retention)

Contractor shall maintain the SWPPP and related documents as the Record that demonstrates compliance with the CGP. Copies of SWPPP documents transmitted to the Engineer under the requirements of this specification are informational and do not relieve the Contractor of his responsibility to maintain complete records as required by the CGP and this Section.

Contractor shall maintain the SWPPP, HMCP and SPCC Plan at the on-site project office. If there is not an on-site project office, the Contractor shall maintain the documents at an onsite project location that meets CGP requirements and this specification. Records may be moved to another office for record retention during winter shutdown or after the eNOTs are filed. Contractor shall update on-site postings if records are relocated during winter shutdown. Contractor shall update and maintain all postings current and shall provide the City of Homer with copies of all Records.

Contractor shall retain Records and a copy of the SWPPP for at least three years after the date of eNOT. If EPA or ADEC inspects the project, issues a Notice of Violation (NOV), or begins investigation for a potential NOV before the retention period expires, Contractor shall retain the SWPPP and all Records related to the SWPPP and CGP until at least three years after EPA and/or ADEC has determined all issues related to the investigation are settled.

The SWPPP and related documents shall be made available for review and copies provided to other regulatory agencies that request them. The project site documents, including related off-site areas or support activities, shall be made available for inspection, or sampling and monitoring, by the City of Homer and other regulatory agencies.

9001.16 SWPPP Inspections, Amendments, Reports, and Logs

Contractor shall perform inspections, prepare inspection reports, and prepare SWPPP Amendments in compliance with the SWPPP and the CGP. Contractor shall update the SWPPP Corrective Action Log, SWPPP Amendment Log, SWPPP Grading and Stabilization Activities Log, and SWPPP Daily Record of Rainfall forms. For active projects the Contractor shall update the Records daily.

A. Inspection during Construction

Contractor shall conduct periodic inspections according to the schedule and requirements of the SWPPP and CGP.

Inspections required by the CGP and SWPPP shall be performed jointly by the

Contractor's SWPPP Manager and the City of Homer's inspector.

B. Inspection Reports

Contractor shall use the City of Homer's SWPPP Construction Site Inspection Report Form F-100 to record Inspections. Changes or revisions to Form F-100 are not permitted; except for adding or deleting data fields that list the location of discharge points and site specific BMPs. Contractor shall complete all fields included on the Inspection Report form; do not leave any field blank.

Unless otherwise directed by the Engineer, Contractor shall insert a Complete-by- Date for each listed corrective action. Complete-by-date is a date that either complies with the time requirements listed in Article 2.16.D or six calendar days after the date of the inspection, whichever is sooner. Contractor shall provide a copy of the completed Inspection Report to the Engineer by noon of the day after inspection.

The Superintendent shall review, correct errors, and sign and certify the Inspection Report, within three days of the date of Inspection. The Engineer may coordinate with the Superintendent to review and correct errors or omissions before the Superintendent signs the report. Corrections are limited to adding missing information or correcting entries to match field notes and conditions present at the time the Inspection was performed. Contractor shall deliver the signed and certified Inspection Report to the Engineer on the same day the Superintendent signs it.

The Engineer may make corrections after the Superintendent has signed and certified the Inspection Report. The Engineer will initial and date each correction. If the Engineer makes corrections, the Superintendent shall re-certify the Inspection Report by entering a new signature and date in the white space below the original signature and date lines. Contractor shall deliver a copy of the recertified Inspection Report to the Engineer on the day it is recertified.

If subsequent corrections to the certified Inspection Report are required, Contractor shall document the corrections in an addendum that addresses only the omitted or erroneous portions of the original Inspection Report. The Superintendent shall sign and certify the addendum.

C. Inspection before Seasonal Suspension of Work

Contractor and the City of Homer shall conduct an inspection not more than fourteen (14) days before seasonal suspension of work to confirm BMPs are installed and functioning according to the requirements of the SWPPP and CGP.

D. Reduced Inspection Frequencies

Contractor shall conduct inspections according to the inspection schedule in the approved SWPPP. Changes in inspection frequency, including beginning and ending dates shall be approved by the Engineer, and documented as an amendment to the SWPPP.

Inspection frequency during winter work or seasonal suspension of work may be reduced to at least one Inspection every thirty (30) days, if approved by the Engineer, and one of the following requirements is met:

- the entire site is temporarily stabilized;

- runoff is unlikely due to winter conditions (e.g. the site is covered with snow, ice or the ground is frozen, and water flow or seepage is not likely to occur); or
- soil disturbing activities are suspended.

The Engineer may waive winter monthly Inspection requirements until twenty-one (21) days before thawing conditions are expected to result in a discharge, if the following requirements are met:

- frozen conditions are anticipated to continue for more than one month; and
- land disturbance activities have been suspended.

Inspections shall resume according to the normal inspection schedule identified in the SWPPP, at least twenty-one (21) days before anticipated spring thaw.

The Engineer may waive requirements for updating the Grading and Stabilization Activities Log and Daily Record of Rainfall during seasonal suspension of work. If so, Contractor shall resume collecting and recording weather data on the Daily Record of Rainfall form one month before thawing conditions are expected to result in runoff. The Contractor shall resume recording land disturbance and stabilization activities on the Grading and Stabilization Activities Log when Construction Activity resumes.

E. Stabilization before Spring Thaw

Construction Activities within the Project Zone shall be stabilized in accordance with the CGP by the Contractor with appropriate BMPs prior to spring thaw.

F. Inspection before Project Completion

Contractor shall conduct an inspection to ensure Final Stabilization is complete throughout the Project, and temporary BMPs that are required to be removed are removed. Temporary BMPs that are biodegradable and are specifically designed and installed with the intent of remaining in place until they degrade, may remain in place after project completion.

G. Items and Areas to Inspect

Contractor shall conduct inspections of the areas required by the CGP and SWPPP.

H. SWPPP Amendments and SWPPP Amendment Log

The Superintendent and the SWPPP Manager are the only persons authorized to amend the SWPPP and update the SWPPP Amendment Log, Form F-114. The Superintendent or the SWPPP Manager shall sign and date amendments to the SWPPP and updates to the SWPPP Amendment Log.

SWPPP Amendments shall be approved by the Engineer.

Amendments shall be prepared whenever:

- there is a change in design or construction operation;
- maintenance occurs at the construction site that has or could cause erosion or sedimentation;

- there is a discharge of pollutants that has not been previously addressed in the SWPPP;
- an Inspection identifies that any portion of the SWPPP is ineffective in preventing erosion, sedimentation, or the discharge of pollutants;
- an Inspection identifies a problem that requires additional or modified BMPs;
- a BMP is modified during construction or a BMP not shown in the original SWPPP is added ;
- the Inspection frequency is modified (note beginning and ending dates); or
- a change occurs in personnel who are identified in the SWPPP, according to Article 2.9.D.

Contractor shall record removal of BMPs as amendments to the SWPPP. See Article 2.9.C for documenting removal of BMPs.

Contractor shall amend the SWPPP narrative as soon as practicable after a change or modification, but in no case, later than seven (7) days following identification of the need for an amendment. The SWPPP Amendment shall be signed, dated, and cross-reference the amendment number with the Corrective Action Log or SWPPP page number, as applicable. When a BMP is modified or added, describe the BMP according to Article 2.9.C

The Contractor shall maintain the SWPPP Amendment Log. Prior to performing each scheduled Inspection, the Contractor shall submit to the Engineer a copy of the pages of the Amendment Log that contain new entries since the last submittal, including copies of any documents amending the SWPPP.

The Contractor shall append the SWPPP Amendment Log to the SWPPP.

I. Site Maps

Contractor shall document installation, routine maintenance and removal of BMPs by annotating the SWPPP Site Maps, including the date and the recording person's initials by these notes. Contractor shall identify areas where Construction Activities begin, areas where Construction Activities temporarily or permanently cease, and areas that are temporarily or permanently stabilized.

J. Corrective Action Log

The Superintendent and SWPPP Manager are the only persons authorized to make entries on the SWPPP Corrective Action Log, Form F-112. Contractor shall document the need for corrective action within twenty-four (24) hours of either:

- identification during an inspection; or
- discovery by the City of Homer's or Contractor's staff, a subcontractor, or a regulatory agency inspector.

Modification or replacement of a BMP, installation of a new BMP not shown in the original SWPPP, or overdue maintenance (for example after a sediment trap exceeds fifty percent (50%) of capacity) is a corrective action and shall be documented on the Corrective Action

Log. Do not record removal of BMPs on the Corrective Action Log.

After each Inspection Report has been signed and certified, Contractor shall update the Corrective Action Log with the date of inspection and all proposed corrective actions noted on the Inspection Report.

After the corrective action has been accomplished, the Contractor shall note the action taken if a SWPPP amendment was needed and date and initial the entry.

Contractor shall maintain the Corrective Action Log current and submit a copy to the Engineer prior to performing each scheduled SWPPP Inspection.

Contractor shall append the Corrective Action Log as an appendix to the SWPPP.

K. Grading and Stabilization Activities Log

The Superintendent and SWPPP Manager are the only persons authorized to date and initial entries on the SWPPP Grading and Stabilization Activities Log, Form F-110. Contractor shall use the SWPPP Grading and Stabilization Activities Log to record land disturbance and stabilization activities.

Contractor shall keep the Grading and Stabilization Activities Log current and submit a copy to the Engineer prior to performing each scheduled SWPPP Inspection.

Contractor shall append the Grading and Stabilization Activities Log as an appendix to the SWPPP.

L. Daily Record of Rainfall

Contractor shall use SWPPP Daily Record of Rainfall, Form F-115 to record weather conditions at the Project and update the form daily, including the initials of the person recording each day's entry. Contractor shall submit a copy to the Engineer prior to performing each scheduled Inspection. Contractor shall append the Daily Record of Rainfall to the SWPPP.

9001.17 Failure to Perform Work

The Engineer will suspend Work and withhold monies for incidents of non-compliance with either the CGP or SWPPP. If the suspension is to protect workers, the public, or the environment from imminent harm, the Engineer may orally order the suspension of Work. Following an oral order of suspension, the Engineer will promptly give written notice of suspension. In other circumstances, the Engineer will give the Contractor written notice of suspension before suspension of Work. A notice of suspension will state the defects or reasons for a suspension, the corrective actions required to stop suspension, and the time allowed to complete corrective actions. If the Contractor fails to take the corrective action within the specified time, the Engineer may:

1. suspend the work until corrective action is completed;
2. withhold monies due the Contractor until corrective action is completed;
3. assess damages or equitable adjustments against the Contract amount; and
4. employ others to perform the corrective action and deduct the cost from the Contract amount.

Reasons for the Engineer to take action under this section include, but are not limited to, the Contractor's failure to:

- obtain appropriate permits before Construction Activities occur;
- perform SWPPP Administration;
- perform timely Inspections;
- update the SWPPP;
- transmit updated SWPPP, Inspection Reports, and other updated SWPPP forms to the Engineer;
- maintain effective BMPs to control erosion, sedimentation, and pollution in accordance with the SWPPP, the CGP, and applicable local, state, and federal requirements;
- perform duties according to the requirements of this Section; or
- meet requirements of the CGP, SWPPP, or other permits, laws, and regulations related to erosion, sediment, or pollution control.

No additional Contract time or additional compensation is allowed due to delays caused by the Engineer's suspension of Work under this Article.

9001.18 Measurement

The Work in this Section is measured by lump sum and will consist of all labor, materials, and equipment required to prepare and implement a SWPPP, including all required SWPPP amendments, revisions, inspections, and all other measures necessary to complete the Work.

9001.19 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 - Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment will be made under the following item:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
9001	Storm Water Pollution Prevention Plan (Type)	Lump Sum