Section 14 – Signing, Pavement Marking, Signalization, and Lighting Infrastructure

SIGNING, PAVEMENT MARKING, SIGNALIZATION, AND LIGHTING INFRASTRUCTURE

The Contractor shall provide permanent signing, pavement marking, traffic signalization, and lighting for the Project.

The Contractor shall be responsible for the design and installation of the Project permanent signing, pavement marking, traffic signalization, and lighting elements within the limits of the Project and comply with the requirements of this Section 14.

Design Requirements

The Contractor shall prepare signing, pavement marking, and traffic signal designs and plans for all areas on the Project in accordance with the requirements of the following sections. These plans shall be a component of all Released for Construction Documents where any signing, pavement marking, traffic signal, or lighting element is required for the Work. No material, part, or attachment of any equipment shall be substituted or applied contrary to the manufacturer's recommendations and standard practices.

The Contractor shall provide permanent signing, pavement marking, delineation, and other traffic control devices that facilitate safe flow of traffic through the completed Project elements.

The Contractor shall prepare lighting, electrical designs, and plans for all areas on the Project. The electrical designs shall include the electrical and power requirements for the Intelligent Transportation Systems (ITS) as described in Book 2, Section 19, ITS. The Contractor shall coordinate with the electrical utility company to determine electric power requirements for the Project and to develop the Project lighting design and construction requirements.

The Contractor shall obtain approval of the power service design from the power service provider and coordinate and meet all requirements as specified by the power service provider for the complete and operational power service to all required locations. All power connections to devices shall include a quick-disconnect.

The Contractor shall be responsible for the coordination of power source work to be performed by Xcel Energy. The Contractor shall contact the Xcel Energy Builder's Call Line at 1-800-628-2121 to request, and process to completion, the required coordination to establish the power sources for traffic signals, traffic signal pole mounted lighting and all roadway and street lighting. The Contractor shall perform all work necessary to maintain existing or establish new power sources for traffic signals and lighting. All cost charges from the power service provider, and all necessary materials, including meter (if required), labor, and coordination required to maintain existing or establish new power sources shall be included in the Work.

Section 14 – Signing, Pavement Marking, Signalization, and Lighting Infrastructure

The Contractor shall design and construct signing, pavement marking, traffic signal, and lighting elements in accordance with the requirements of the standards listed in Table 14.1-1 as appropriate for the jurisdictional ownership, oversight and approval of the Work.

Table 14.1-1
LIGHTING STANDARDS

	Author	Title
1	CDOT	Special Provisions included in Section 14
2	CDOT	*Standard Specifications for Road and Bridge Construction Section 613*
3	Excel	*Excel Outdoor Lighting Standards*
4	CDOT	*Sign Design Manual* – May 21, 2010
5	FHWA	*Manual on Uniform Traffic Control Devices* (Current Edition)
6	AASHTO	*A Policy on Geometric Design of Highways and Streets*
7	AASHTO	*Roadside Design Guide*
8	AASHTO	*Standard Specifications for Highway Bridges*, 16th Edition
9	Local Jurisdiction	*Design Standards, Details, and Specifications*

Permanent Signing

Signing Design

The Contractor shall prepare signing designs and plans for the Project area. These plans shall include all necessary guide, warning, supplemental, and regulatory signs, and additions, removals, or modifications to existing signs and appurtenances. Plans shall also include a preliminary layout of signs, which will be required for future phases of the Project and that may affect placement and configuration of signs placed as a part of the Basic Configuration.

Signing design shall comply with the requirements of the most current publications of the CDOT *Standard Specifications for Road and Bridge Construction*, *M & S Standard Plans*, and *Sign Design Manual*; and the FHWA *Manual for Uniform Traffic Control Devices* (MUTCD). The requirements of the MUTCD shall include both the standard requirements and the guidance recommendations of the manual. The design and plans shall address modifications to permanent signing inside and outside the Project that is rendered inaccurate, ineffective, confusing or unnecessary by the Project. Signing plans shall provide layouts showing the locations of ground-mounted and overhead signs, special sign details, and structural and foundation requirements.

Signing design for the intersections, local streets and Garrison shall comply with the City of Lakewood Traffic Engineering Standards of Signs and Markings.

The Contractor shall submit plans for all Class III, major overhead signs, and regulatory and guide signs to CDOT for Approval. These plans shall identify the location and legend for each

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sign. Sign legends shall be consistent with the Project Signing Concept Plan in the Reference Documents and the CDOT Sign Design Manual. Sign locations in the Signing Concept Plan are for reference only. The Contractor shall submit sign layouts for all special signs of any size to CDOT for Approval.

Where CDOT sign structure standards cannot be met, provide custom-designed monotube sign structures and foundations for approval from CDOT Staff Bridge. Permanent signage on bridges shall not be hung from or be attached to the face of bridge superstructures. Existing signs attached to bridge superstructures shall be removed and replaced with monotube sign bridges or cantilever structures if signs are to remain.

The Contractor shall mount all overhead signs with a vertical clearance consistent with current CDOT Standard S-614-50 measured from the high point on the roadway surface under the sign panels to the bottom of the VMS, VTMS, or guide sign (whichever is lowest) to allow for the future installation of lane control signals.

Sign lighting and walkways shall not be used on overhead guide signs.

Sign structures and foundations shall be designed in accordance with CDOT Standard S-614-50.

All ground mounted signage, delineators, etc., shall be installed within a full depth PVC sleeve at locations where the device is installed within concrete sidewalk, median cover material, concrete pavement, slope paving, etc.

Materials

The Contractor shall use schedule 80 tubular steel posts per CDOT *S-Standard Plans* for all Class I and Class II ground signs. Wood posts for mounting ground signs shall not be used. All delineators shall have metal posts.

All ground signs shall include breakaway devices per CDOT *S-Standard Plans*.

Sign panel materials shall conform to CDOT *Standard Specifications* Section 713. Sheeting shall be Type IV and Type XI as defined in the CDOT Retroreflective Sheeting Materials Guide, and shall conform to Subsections 713.04 and 713.06 when applicable. For all permanent signs, the legend, borders, and background shall be Type XI.

The Contractor shall not reuse any existing sign structures, ground signs or their components.

Lakewood Standards of Signs and Markings shall be utilized for all signs on Garrison Street.

Permanent Pavement Marking

Pavement Marking Design

The Contractor shall prepare pavement marking designs and plans for roads affected by the construction of the Project. These plans shall include, all striping required for center lines, edge lines, lane lines, gore areas, lane drops, merging lanes, transition lanes, bike lanes, arrows,

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legends, symbols, object markings, delineation, and other striping, as well as any modifications required for transitions to existing pavement markings.

Pavement marking design CDOT facilities shall comply with the requirements of the most current publications of the CDOT *Standard Specifications for Road and Bridge Construction* and *M & S Standard Plans*; and the FHWA MUTCD. The requirements of the MUTCD shall include both the standard requirements and the guidance recommendations of the manual.

Striping design for the local streets, intersections Garrison Street shall comply with City of Lakewood Traffic Engineering Standards of Signs and Markings.

The conceptual mainline and other roadway striping as shown in the Reference Documents is for information and reference only.

Materials

The Contractor shall use the pavement-marking materials on US 6 and Frontage Roads specified in Table 14.1-2.

Table 14.1-2
PAVEMENT MARKING MATERIALS

Location	Pavement Marking Type
Edge lines	Epoxy Pavement Marking
Skip lines, challelizing lines, and lane drop lines on Portland concrete cement pavement (PCCP)	Preformed Plastic Pavement Marking Type II (contrast)(Inlaid)
Skip lines, channelizing lines, and lane drop lines on Hot Mix Asphalt (HMA)	Preformed Plastic Pavement Marking Type I
Words/symbols/cross walks/stop lines	Preformed Plastic Pavement Marking Type I

The City of Lakewood requires the use of Preformed Thermoplastic for all Xwalks, stop bars, and symbols.

The Contractor shall refer to CDOT's Material Striping Chart as shown below for pavement marking materials for US6 and Frontage Roads.

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Freeway / Expressway Striping Materials

Surface	Line	Material
New Asphalt*	4" White Edge Line	Epoxy
	4" Yellow Edge Line	Epoxy
	4" Double-Yellow Centerline	Epoxy
	4" White Lane Line	Preformed Plastic Type I (Inlaid)
	4" White Extension Line	Preformed Plastic Type I (Surface Applied)
	8" White Gore Area	Preformed Plastic Type I (Surface Applied)
	8" White Channelizer	Preformed Plastic Type I (Surface Applied)
	8" White Lane Drop	Preformed Plastic Type I (Inlaid)
	8" White Double-Left Guide	Preformed Plastic Type I (Surface Applied)
	Stop Bar / Crosswalk	Preformed Plastic Type I (Surface Applied)
	Word Message	Preformed Plastic Type I (Surface Applied)
Old Asphalt	4" White Edge Line	Epoxy
	4" Yellow Edge Line	Epoxy
	4" Double-Yellow Centerline	Epoxy
	4" White Lane Line	Preformed Plastic Type II (Inlaid)
	4" White Extension Line	Preformed Plastic Type II (Inlaid)
	8" White Gore Area	Preformed Plastic Type II (Surface Applied)
	8" White Channelizer	Preformed Plastic Type II (Surface Applied)
	8" White Lane Drop	Preformed Plastic Type II (Inlaid)
	8" White Double-Left Guide	Preformed Plastic Type II (Inlaid)
	Stop Bar / Crosswalk	Preformed Thermoplastic**
	Word Message	Preformed Thermoplastic**
New Concrete*	4" White Edge Line	Epoxy
	4" Yellow Edge Line	Epoxy
	4" Double-Yellow Centerline	Epoxy
	4" White Lane Line	Preformed Plastic Type II (Inlaid)
	4" White Extension Line	Preformed Plastic Type II (Inlaid)
	8" White Gore Area	Preformed Plastic Type II (Surface Applied)
	8" White Channelizer	Preformed Plastic Type II (Surface Applied)
	8" White Lane Drop	Preformed Plastic Type II (Inlaid)
	8" White Double-Left Guide	Preformed Plastic Type II (Inlaid)
	Stop Bar / Crosswalk	Preformed Plastic Type I (Surface Applied)
	Word Message	Preformed Plastic Type I (Surface Applied)
Old Concrete	4" White Edge Line	Epoxy
	4" Yellow Edge Line	Epoxy
	4" Double-Yellow Centerline	Epoxy
	4" White Lane Line	Preformed Plastic Type II (Inlaid)
	4" White Extension Line	Preformed Plastic Type II (Inlaid)
	8" White Gore Area	Preformed Plastic Type II (Inlaid)
	8" White Channelizer	Preformed Plastic Type II (Inlaid)
	8" White Lane Drop	Preformed Plastic Type II (Inlaid)
	8" White Double-Left Guide	Preformed Plastic Type II (Inlaid)
	Stop Bar / Crosswalk	Preformed Plastic Type I (Surface Applied)
	Word Message	Preformed Plastic Type I (Surface Applied)

* Inlaid markings are preferred on new construction but not required.
**Preformed Plastic Type I markings may be acceptable depending on pavement condition.
-Typical first application of Preformed Plastic markings is surface-applied; consecutive applications are inlaid.

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Temporary and Permanent Traffic Signalization

Traffic Signal Design

New traffic signals are required at the two intersections of Garrison Street with the US 6 Frontage roads. Existing traffic signals at these locations are currently owned and maintained by the City of Lakewood. The Contractor shall prepare traffic signal plans that include existing and proposed intersection plan details, traffic signal pole locations, mast arm and signal head locations, signal pole mounted overhead lighting (luminaires), pedestrian button and signal locations, approach striping and marking locations and types, cabinet and power source locations, conduit and pull boxes, detection systems and locations, and all other plan and component details for complete traffic signal installation in accordance with City of Lakewood Traffic Signal Standards, and shall include Xcel Standards for all traffic signal poles and all non-signal lighting placed on the poles.

All temporary and permanent traffic signals shall be designed and constructed in conformance with City of Lakewood and are subject to Lakewood's review. The Contractor shall coordinate all traffic signal design and installations with the City of Lakewood.

Permanent traffic signalization appurtenances shall not be allowed to hang from, or be attached to the face of bridge superstructures.

One reason traffic signal replacement is required is to that red signal faces are at a location that meet stopping sight distance for approaching drivers. Contractor must consider stopping sight distance and visibility of signal heads in design of the replacement signal and design of the bridge structure.

Lighting

Permanent Lighting Design

The Contractor shall prepare lighting designs and plans for US 6 and all existing permanent lighting conditions on roadways impacted by the Project. All permanent lighting within the Project shall be designed and constructed to be consistent with current City of Lakewood guidelines, including guidelines for required lighting values, CDOT Road and Bridge Construction Specifications and Xcel Standards for Outdoor Lighting.

Lighting plans shall address both temporary and permanent Work and shall include existing topography, right of way, utilities, drainage facilities, structures, and all other existing and proposed facilities. The plans shall include location and orientation of standards and luminaires, wiring, conduits, pedestals, power sources, and all other lighting components required to construct the lighting on the Project.

Roadway lighting shall be provided on US 6 for the entire length of highway being constructed by the Project.

High-mast lighting or any lighting equipment installed in, or integrated with, the median will not be permitted.

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The Contractor shall submit to the City of Lakewood and CDOT for Acceptance software-based lighting calculations showing that the lighting design meets the Luminance Design Method criteria defined in the *CDOT Lighting Design Guide (February 2006, adopted by CDOT September 2008)*). The calculations must show that the proposed design meets the average luminance (L_{avg}), the average-to-minimum uniformity ($L_{avg/min}$), and the veiling luminance ratio (L_{vmax}/L_{avg}).

The *CDOT Lighting Design Guide* can be found on the CDOT website at:

http://www.coloradodot.info/topcontent/searchpage#gsc.tab=0&gsc.q=lighting%20design%20guide&gsc.page=1

The extents of the luminance calculation area shall be defined by the limits of the pavement overlay on US 6 within the Project.

The Contractor shall submit to the City of Lakewood and CDOT voltage-drop calculations for each lighting circuit which show that the electrical design is within the allowable voltage drop limits for the Project.

The Electrical design shall include, and the Plans shall indicate, additional spare conduit and pull boxes within the new bridge structures for future use.

Lighting designs and plans for the Project shall be subject to review and approval by the City of Lakewood, CDOT, and Xcel Energy.

Permanent Lighting Materials

All materials and methods associated with lighting and electric power distribution shall comply with all applicable standards of the City of Lakewood, CDOT and Xcel Energy.

New luminaires installed on the Project, except underdeck luminaires, shall be in conformance with the Colorado Revised Statutes #24-82-901 (Dark Sky statute). All luminaires whose lamp or total lumen output is greater than 3,200 lumens shall be classified as Full Cutoff or have a U-rating in the BUG system (per IESNA TM-15-11) no greater than U0.

All LED type luminaires to be used for roadway lighting shall conform to the current CDOT *LED Roadway Luminaire* standard special provision (January 2014).

Underdeck luminaires shall be a wall or pendant-mounted area luminaire with a 150-watt high pressure sodium lamp, integral ballast, mogul-base socket and accessory glare hood. Color to be Gray. The Xcel catalog identification number for the luminaire is #53993.

The Contractor shall obtain approval for all lighting and electrical equipment from the agency responsible for maintenance. The City of Lakewood is responsible for street lighting maintenance. Xcel Energy owns and maintains the street lighting in accordance with their franchise agreement with the City. Lighting Plans for which the lighting is the responsibility of the City of Lakewood shall be provided to the City and CDOT for review and approval before any materials are ordered.

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Xcel Energy is responsible for lighting maintenance for the entire project. The Contractor shall submit a list of materials to be used in the proposed lighting system, including under-deck lighting, for review and approval by Xcel Energy prior to ordering material. The Contractor shall contact the Xcel Energy Builder's Call Line at 1-800-628-2121 to request, and process to completion, the required coordination to review and approve the lighting equipment. All cost charges from Xcel Energy for review and approval shall be included in the Work.

Temporary Lighting

The Contractor shall provide installation, maintenance, and removal of all temporary lighting devices. The Contractor shall maintain temporary lighting at a level equivalent to existing lighting provided within the Project limits.

Construction Requirements

Permanent Signing

The Contractor shall remove and dispose of all existing sign structures, ground-mounted signs, and delineators within the Project area, and they shall become the property of the Contractor.

Permanent Pavement Marking

New PCCP shall be sandblasted prior to placement of any primer or pavement-marking material.

Permanent Traffic Signalization

Contractor Requirements

The Contractor shall purchase cabinets, controllers, CCTV's and associated traffic signal equipment, and shall deliver the equipment to the City of Lakewood, Traffic Engineering Services Department a minimum of 6 weeks prior to the scheduled installation date. The Contractor shall transport the devices to the project site for the Contractor's installation after the City of Lakewood staff have completed City performed tasks as identified below.

All existing signalization equipment removed by the Contractor is the property of the City of Lakewood. The Contractor shall deliver in good condition all equipment removed to the City of Lakewood Public Works.

Operational

The City of Lakewood will provide timing plans for the permanent traffic signals for the Contractor to initiate and install with the initial startup.

The Contractor shall coordinate with the City of Lakewood to ensure timing plans function properly, and to ensure they minimize intersection approach delays and accommodate pedestrians.

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All signal timing plan modification requests shall be approved and completed by the City of Lakewood. The Contractor shall allow 28 Days prior to implementation of any signal timing plan modification for review and approval by the City of Lakewood.

Permanent Lighting

Xcel Energy will remove the existing lighting as required within the Project area only for lighting that is owned by Xcel Energy. The Contractor shall be responsible for the coordination of lighting removal and lighting relocation work to be performed by Xcel Energy. The Contractor shall contact the Xcel Energy Builder's Call Line at 1-800-628-2121 to request, and process to completion, the required coordination for Xcel Energy lighting removal or lighting relocation Work. The Contractor shall remove the existing lighting as required within the Project area that is not owned by Xcel Energy, and shall become the property of the Contractor.

Project Special Provisions

The following specifications modify and take precedence over the Standard Specifications.

REVISION OF SECTION 627 - EPOXY PAVEMENT MARKING (SPECIAL) -

Section 627 of the Standard Specifications is hereby revised for this project to include the following:

Delete subsection 627.05 and replace with the following:

Epoxy Pavement Marking (Special). Epoxy Pavement Marking (Special) shall be applied to the road surface according to the epoxy manufacturer's recommendations at 20 mils minimum thickness. Bead system shall be applied into the epoxy pavement marking by means of a pressurized bead applicator at the manufacturer's recommended application rate.

The surface area receiving marking shall be ground prior to placement of the Epoxy Pavement Marking (Special). This applies to new or existing concrete or asphalt pavements. The ground surface shall then be cleaned with a high pressure air blast to remove loose material prior to placement of the Epoxy Pavement Marking (Special). The grooved width for inlaid pavement marking shall be between 4 and 4-1/4 inches in width The depth of the inlaid grooves shall be 80 mils ± 5 mils below the surface of the existing pavement.

Grooves shall be clean, dry and free of laitance, oil, dirt, grease, paint or other foreign contaminants. The Contractor shall prevent traffic from traversing the grooves, and shall re-clean grooves, as necessary, prior to application of the Epoxy Pavement Markings (Special).

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The Contractor shall grind only those locations on which pavement marking shall be applied on a daily basis.

If a rain event occurs during grinding and marking application, a temporary lane line marking tab shall be placed while the pavement is drying prior to the marking application. Marking application can proceed when pavement is dry and has had no moisture for a minimum of 24 hours. The placement of tabs shall be every other lane line/ skip or approximately 80 feet.

The primary and secondary beads shall be applied in a two drop operation in accordance with the manufacturer's recommendations. If manufacturer recommendations do not address this operation, then the rate of primary beads shall be 10 to 11 pounds per gallon of epoxy. The primary composite cluster shall be applied first from the bead dispenser directly behind the Epoxy binder application gun followed immediately by the application of the secondary beads from a second bead dispenser. The application rates of the primary and secondary beads shall be adjusted from these starting values until the minimum retroreflectivity values have been consistently achieved. The beads shall be applied in such a manner that the beads shall adhere and be embedded within the epoxy binder to produce a high reflective all weather pavement marking.

There shall be two types of glass and/or ceramic beads used for the Epoxy Pavement Marking (Special) reflective elements, a Primary bead which is a high performance, high reflective all weather bead and a Secondary standard glass bead. Beads will be accepted on the project by certificates of compliance (COC). The COC shall be in conformance with subsection 106.02 in addition to the following requirements:

1) The primary bead shall be a composite cluster comprised of a core element and shall contain an outer shell containing elements surrounding it. The shell elements shall be permanently attached to the core element. The core and shell elements shall be manufactured from glass, ceramic, or silica. The primary element shall be coated by manufacturer's recommendations for application within Epoxy binder.

2) The secondary bead shall conform to the following specifications: Gradation:

U.S. Mesh	Microns	% Retained	%Passing
18	1000	20 – 35	65 – 80
30	600	50 – 70	30 – 50
50	300	95 – 100	0 – 5

Roundness: Shall be a minimum of 85 % true spheres above the sieve 20 by visual inspection using test method FLH-520. All beads below the 20 sieve, must meet a minimum of 80% true spheres by ASTM Method D 1155.

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Color / Clarity: Beads shall be colorless / clear and free of carbon residues.

Refractive Index: Minimum 1.50 by oil immersion method.

Air Inclusions: < 5% by visual count.

Hardness: All beads above the 20 sieve shall exhibit an average hardness of C70.5 when measured using the Rockwell C scale method and with a minimum sampling of 100 glass beads.

Crushing Strength: Beads above the 20 sieve shall exhibit an average crushing strength of not less than 60,000 psi when measured with the L/D^2 method and with a minimum sampling of 100 glass beads.

Coatings: Shall use manufacturer's recommended adhesion coating for optimum adhesion and embedment.

Chemical Resistance: Both the primary and secondary beads shall be resistant to hydrochloric acid, water, calcium chloride, sodium sulfide, acid, and magnesium chloride, and shall not develop any haze, dulling or darkening of the bead as tested per methods outlined in sections 4.3.6 to 4.3.9 of the TT-B Federal Spec. 1325C.

3) Primary and secondary glass beads shall be furnished in fully identified, separate containers and shall be free of extraneous materials or clumps. If the use of recycled post consumer glass is used in manufacturing of beads those recycled glass beads shall be manufactured from North American glass waste streams. The bead manufacturer shall submit a notarized certification to the department stating that North American glass waste streams were used in the manufacture of this specification.

Products will be accepted on the project by certificates of compliance (COC). The COC shall be in conformance with subsection 106.02, and shall include that the materials conform to the following:

1) Retroreflectivity. The applied finish system shall have an initial minimum dry retroreflectivity reading of 700 mcd·m-2·1x-1 for white and 500 mcd·m-2·1x-1for yellow. The Contractor shall use an industry accepted and available Retro-meter for retroreflectivity readings and it shall be calibrated each day testing occurs. For information: (CDOT will be using a Delta LTL-X Retro-meter for retroreflectivity readings). CDOT will obtain retroreflectivity readings from the Contractor for each 1 mile of line placed or fraction thereof. CDOT will determine a random testing location for each 1 mile section of line placed or fraction thereof. Each test location shall represent

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that 1 mile of line placed or fraction thereof. At each random testing location two reflectivity readings will be taken on 11 different skip lines or 22 readings will be taken with a 440 foot section of the continuous line. Of those 22 readings the highest and lowest will be disregarded and the remaining 20 readings will be averaged and that average value will represent the reflectivity of that 1 mile section or fraction thereof. The contractor shall remove and replace at their expense each 1 mile of line placed or fraction thereof where the test result from that random location fails the minimum retro reflectivity reading.

The retroreflectivity readings shall be taken between two and three days after the marking is tack free. Prior to taking reflectivity readings, the Contractor shall remove at the retroreflectivity reading locations any excess beads placed during marking application.

Applied markings shall have uniform mil thickness and bead distribution across the entire width of the line. Unless otherwise shown on the plans, typical pavement markings shall conform to the shapes and sizes as shown on Standard Plan S-627-1.

The Contractor will be required to submit to CDOT certification from the manufacturer that the installed epoxy binder and both the primary and secondary beads have been installed in accordance with this specification and with their recommendations and has achieved the minimal retroreflectance values stated herein. If the pavement marking system is comprised of multiple manufacturers, then all manufacturers will be required to affirm to the certification. A manufacturer's representative shall be onsite at the installation of the epoxy binder, primary bead, and secondary bead materials to identify areas of the installation falling below the minimum manufacturer's recommendations and these specifications to assist in the calibration of equipment, set up of equipment and the proper adjustment of equipment during installation to achieve the minimums outlined herein. The cost of the manufacturer(s) representation will not be measured and paid for separately but shall be included in the cost of the work.

Subsection 627.13 shall include the following:

Pay Item	Pay Unit
Epoxy Pavement Marking (Special)	Gallon

The work to groove the asphalt or concrete and clean the grooving residual or debris will not measured and paid for separately but shall be included in the work.

The primary and secondary beads will not be measured and paid for separately but shall be included in the cost of the Epoxy Pavement Marking (Special).

Temporary markings will not be measured and paid separately, but shall be included in the cost of work.

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Deliverables

At a minimum, the Contractor shall submit the following to CDOT and or CCD for review, Approval, and/or Acceptance:

Deliverable	Review, Acceptance, or Approval	Schedule
Pavement Marking Plans	Approval	60 Days prior to issuance of Released for Construction Documents
Class III, major overhead signs, and regulatory and guide signs plan	Approval	90 Days prior to issuance of Released for Construction Documents
Sign layouts for all special signs of any size	Approval	90 Days prior to issuance of Released for Construction Documents
Custom-designed monotube sign structure and foundation plans	Approval	90 Days prior to issuance of Released for Construction Documents
All temporary and permanent traffic signal plans within CDOT ROW	Approval	90 Days prior to issuance of Released for Construction Documents
All temporary and permanent traffic signal plans within Lakewood ROW	Review	90 Days prior to issuance of Released for Construction Documents
All permanent lighting plans at intersections and local streets owned and maintained by Lakewood	Review	60 Days prior to issuance of Released for Construction Documents
Traffic Signal Timing Plans and associated electronic timing plan software files (by Lakewood)	Approval	28 Days prior to implementation
Lighting and electrical design calculations (by Lakewood)	Acceptance	90 Days prior to issuance of the Released for Construction Documents