



City of Tacoma

Public Works Engineering

ADDENDUM NO. 3

DATE: 2/20/2026

REVISIONS TO:

Request for Bids Specification No. TR25-0051F

Lincoln Ave and Port of Tacoma Road Railroad Crossings Signal Installation

NOTICE TO ALL BIDDERS:

This addendum is issued to clarify, revise, add to or delete from, the original specification documents for the above project. This addendum, as integrated with the original specification documents, shall form the specification documents. The noted revisions shall take precedence over previously issued specification documents and shall become part of this contract.

REVISIONS TO THE SUBMITTAL DEADLINE:

The submittal deadline is changed to 11:00 a.m., Pacific Time, Tuesday, March 3, 2026

REVISIONS TO THE BID PROPOSAL PAGES:

Remove the Bid Proposal in its entirety and replace with Bid Proposal labeled Addendum No. 3.

Adds bid items:

“Planing Bituminous Pavement”

“Cement Concrete Traffic Curb”

“Cement Concrete Pedestrian Curb”

“Plastic Line”

Removes bid items:

“Extruded Curb Type _____”

“Plastic 12-Inch Wide Line”

REVISIONS TO THE SPECIAL PROVISIONS:

Supplement 1-07.23(1) Opt. 5 Lane Closure Restrictions with Addendum 3 adding Port of Tacoma Road and Lincoln Ave detour lane restriction time and durations.

Remove section 8-04 CURBS, GUTTERS, AND SPILLWAYS and replace it with section 8-04 CURBS, GUTTERS, AND SPILLWAYS noted Addendum No. 3. Adds bid item revisions.

Remove sections 9-29 ILLUMINATION, SIGNALS, ELECTRICAL noted Addendum 2 and replace with section 9-29 ILLUMINATION, SIGNALS, ELECTRICAL noted Addendum No. 3.

REVISIONS TO THE PLANS:

Remove sheet CH03 Channelization and Signage Plan and replace it with CH03 Channelization and Signage Plan noted Addendum No. 3. Construction notes 5 and 9 are revised.



City of Tacoma

REVISIONS TO THE SUBMITTAL PACKAGE:

Remove the Bid Proposal in its entirety and replace with Bid Proposal labeled Addendum No. 3.

Adds bid items:

“Planing Bituminous Pavement”

“Cement Concrete Traffic Curb”

“Cement Concrete Pedestrian Curb”

“Plastic Line”

Removes bid items:

“Extruded Curb Type _____”

“Plastic 12-Inch Wide Line”

NOTE: Acknowledge receipt of this addendum by initialing the corresponding space as indicated on the signature page. Vendors who have already submitted their bid may contact the Purchasing Division at 253-502-8468 and request return of their bid for acknowledgment and re-submittal. Or, a letter acknowledging receipt of this addendum may be submitted in an envelope marked Request for Bids Specification No. TR25-0051F Addendum No. 3. The City reserves the right to reject any and all bids, including, in certain circumstances, for failure to appropriately acknowledge this addendum.

cc: Jon Kulju, Public Works Engineering

Addendum No. 3

BID PROPOSAL

SPECIFICATION NO. TR25-0051F
Lincoln Ave And Port of Tacoma Rd Railroad
Crossings Signal Installation

The undersigned hereby certifies that he/she has examined the location and construction details of work as outlined on the Plans and Specifications for Project No. RAL-00113 and has read and thoroughly understands the Plans and Specifications and contract governing the work embraced in this improvement and the method by which payment will be made for said work, and hereby proposes to undertake and complete the work embraced in this improvement in accordance with said Plans, Specifications and contract and at the following schedule of rates and prices:

- NOTE: 1. Unit prices of all items, all extensions and total amount of bid should be shown. Show unit prices in figures only.
2. The notations below the item numbers refer to the specification section where information may be found regarding each contract item. These notations are intended only as a guide and are not warranted to refer to all specification sections where information may be found.

Item No.	Sect.	Item Description	Unit	Estimated Quantity	Unit Price	Total Amount
T-1	1-05	Roadway Surveying	Lump Sum	1	Lump Sum	\$ _____
T-2	1-05	Record Drawings	Lump Sum	1	Min. Bid \$5000	\$ _____
T-3	1-07	SPCC Plan	Lump Sum	1	Lump Sum	\$ _____
T-4	1-09	Mobilization	Lump Sum	1	Lump Sum	\$ _____
T-5	1-10	Pedestrian Temporary Traffic Control	Lump Sum	1	Lump Sum	\$ _____
T-6	1-10	Project Temporary Traffic Control	Lump Sum	1	Lump Sum	\$ _____
T-7	1-10	Work Zone Safety Contingency	Force Acct.	Est.	Estimated	\$25,000.00
T-8	1-10	Uniformed Police Officer	HR	136	\$ _____	\$ _____
T-9	1-10	Portable Changeable Message Sign	HR	3,600	\$ _____	\$ _____

Contractor's Name: _____
Specification Number: TR25-0051F
Lincoln Ave and Port of Tacoma Rd Railroad Crossings Signal Installation

Addendum No. 3

Item No.	Sect.	Item Description	Unit	Estimated Quantity	Unit Price	Total Amount
T-10	2-01	Clearing and Grubbing	Lump Sum	1	Lump Sum	\$ _____
T-11	2-02	Removal of Structures and Obstructions	Lump Sum	1	Lump Sum	\$ _____
T-12	2-03	Roadway Excavation and Haul (Contaminated)	Ton	98	\$ _____	\$ _____
T-13	2-14	Remove Existing Pavement, Type 1, Class C6	Sq. Yd.	73	\$ _____	\$ _____
T-14	2-14	Remove Existing Pavement, Type 1, Class C12	Sq. Yd.	84	\$ _____	\$ _____
T-15	2-14	Remove Existing Pavement, Type 1, Class A4	Sq. Yd.	172	\$ _____	\$ _____
T-16	2-15	Remove Existing Curb	Lin. Ft.	376	\$ _____	\$ _____
T-17	2-17	Site Health and Safety Plan	Lump Sum	1	Lump Sum	\$ _____
T-18	2-17	Site Health and Safety Officer	Lump Sum	1	Lump Sum	\$ _____
T-19	2-17	Soil Management Plan	Lump Sum	1	Lump Sum	\$ _____
T-20	4-04	Crushed Surfacing Top Course	Ton	145	\$ _____	\$ _____
T-21	5-04	HMA CL 1/2" PG64-22	Ton	77	\$ _____	\$ _____
T-22	5-04	Planing Bituminous Pavement	SY	73	\$ _____	\$ _____
T-23	6-10	Precast Conc. Barrier Type 2	Lin. Ft.	85	\$ _____	\$ _____
T-24	6-21	Concrete Hydrodemolition for Switch Slab Modification	Lump Sum	1	Lump Sum	\$ _____
T-25	8-01	Erosion/Water Pollution Control	Lump Sum	1	Lump Sum	\$ _____
T-26	8-01	Stormwater Pollution Prevention Plan (SWPPP)	Lump Sum	1	Lump Sum	\$ _____
T-27	8-02	Landscape Restoration	Lump Sum	1	Lump Sum	\$ _____

Contractor's Name: _____

Specification Number: TR25-0051F

Lincoln Ave and Port of Tacoma Rd Railroad Crossings Signal Installation

Addendum No. 3

Item No.	Sept.	Item Description	Unit	Estimated Quantity	Unit Price	Total Amount
T-27	8-04	Cement Concrete Traffic Curb	Lin. Ft.	84	\$ _____	\$ _____
T-28	8-04	Cement Concrete Pedestrian Curb	Lin. Ft.	25	\$ _____	\$ _____
T-29	8-05	Bollard Type 2 - Fixed	Each	11	\$ _____	\$ _____
T-30	8-09	Raised Pavement Marker Type 1	Hun.	1.85	\$ _____	\$ _____
T-31	8-09	Raised Pavement Marker Type 2	Hun.	2	\$ _____	\$ _____
T-32	8-13	Cement Conc. Curb and Gutter	Lin. Ft.	240	\$ _____	\$ _____
T-33	8-14	Cement Conc. Sidewalk	Sq. Yd.	85	\$ _____	\$ _____
T-34	8-14	Detectable Warning Surface	Sq. Ft.	25	\$ _____	\$ _____
T-35	8-20	Electrical and Illumination System	Lump Sum	1	Lump Sum	\$ _____
T-36	8-20	Intelligent Transportation System	Lump Sum	1	Lump Sum	\$ _____
T-37	8-20	Traffic Signal System	Lump Sum	1	Lump Sum	\$ _____
T-38	8-22	Plastic Railroad Crossing Symbol	Each	5	\$ _____	\$ _____
T-39	8-22	Painted Railroad Crossing Symbol	Each	1	\$ _____	\$ _____
T-40	8-22	Remove Pavement Marking	Lump Sum	1	Lump Sum	\$ _____
T-41	8-22	Plastic Traffic Arrow	Each	6	\$ _____	\$ _____
T-42	8-22	Plastic Wide Line	Lin. Ft.	910	\$ _____	\$ _____
T-43	8-22	Plastic Traffic Letter	Each	16	\$ _____	\$ _____
T-44	8-22	Painted Traffic Letter	Each	10	\$ _____	\$ _____
T-45	8-22	Plastic Stop Line, 16 in.	Lin. Ft.	76	\$ _____	\$ _____

Contractor's Name: _____

Specification Number: TR25-0051F

Lincoln Ave and Port of Tacoma Rd Railroad Crossings Signal Installation

Addendum No. 3

Item No.	Sect.	Item Description	Unit	Estimated Quantity	Unit Price	Total Amount
T-46	8-22	Plastic Stop Line, 24 in.	Lin. Ft.	127	\$ _____	\$ _____
T-47	8-22	Plastic Crosshatch Marking	Lin. Ft.	90	\$ _____	\$ _____
T-48	8-22	Plastic Line	Lin. Ft.	4470	\$ _____	\$ _____
T-49	8-22	Paint Line	Lin. Ft.	1492	\$ _____	\$ _____
T-50	8-22	Plastic Crosswalk Line	Sq. Ft.	240	\$ _____	\$ _____
T-51	8-40	Safety Action Plan	Lump Sum	1	Lump Sum	\$ _____
T-52	8-41	Highway – Rail Grade Crossing Warning System	Lump Sum	1	Lump Sum	\$ _____

TOTAL BASE BID FOR ITEMS T-1 THRU T-52 \$ _____

Contractor's Name: _____
Specification Number: TR25-0051F
Lincoln Ave and Port of Tacoma Rd Railroad Crossings Signal Installation

Addendum No. 3

Proposal for Incorporating Recycled Materials into the Project

In compliance with a new law that went into effect January 1, 2016 (SHB1695), the Bidder shall propose below, the total percent of construction aggregate and concrete materials to be incorporated into the Project that are recycled materials. Calculated percentages must be within the amounts allowed in Section 9-03.21(1)E, Table on Maximum Allowable Percent (By Weight) of Recycled Material, of the Standard Specifications.

Proposed total percentage: _____ percent.

Note: Use of recycled materials is highly encouraged within the limits shown above, but does not constitute a Bidder Preference, and will not affect the determination of award, unless two or more lowest responsive Bid totals are exactly equal, in which case proposed recycling percentages will be used as a tie-breaker, per the APWA GSP in Section 1-03.1 of the Special Provisions.

Regardless, the Bidder's stated proposed percentages will become a goal the Contractor should do its best to accomplish. Bidders will be required to report on recycled materials actually incorporated into the Project, in accordance with the APWA GSP in Section 1-06.6 of the Special Provisions.

Bidder: _____

Signature of Authorized Official: _____

Date: _____

Contractor's Name: _____

Specification Number: TR25-0051F

Lincoln Ave and Port of Tacoma Rd Railroad Crossings Signal Installation

ADDENDUM NO. 3

1-07.23(1) Opt. 5 Lane Closure Restrictions

Section 1-07.23(1) Opt. 5 is supplemented with the following:

Port of Tacoma Road

- Alternating one-way traffic on Port of Tacoma Road is not allowed.
- No northbound lane restrictions between 5 am and 9 am.
- No southbound lane restrictions between 2 pm and 6 pm.

Lincoln Avenue

- Road closure duration on Lincoln Avenue will be for a maximum 35 working days.
- Local access will need to be maintained to businesses during the road closure. Coordination with the businesses will need to occur prior to the closure being implemented.
- Any alterations to the proposed detour route included in the plans will need to be approved by the City of Tacoma.
- The road closure and proposed detour will need to work with other projects in the vicinity to coordinate closure timelines.

1 **8-04 CURBS, GUTTERS, AND SPILLWAYS**
2 **(March 1, 2004 Tacoma GSP)**
3

4 **8-04.3(1) Cement Concrete Curbs, Gutters, and Spillways**

5 *The first paragraph is revised to read:*
6

7 Cement concrete curb, curb and gutters, gutters, and spillways shall be constructed with air
8 entrained concrete Class 3000 conforming to the requirements of Section 6-02.
9

10 *Section 8-04.3 Construction Requirements is supplemented with the following:*
11

12 **8-04.3(6) Cold Weather Work**
13

14 The following additional requirements for placing concrete shall be in effect from November 1 to
15 April 1:
16

- 17 • The Engineer shall be notified at least 24 hours prior to placement of concrete.
- 18 7. The contractor must submit a "Cold Weather Work Plan" for approval of concrete
19 pavement in cold temperatures.
- 20 • All concrete placement shall be completed no later than 2:00 p.m. each day.
- 21 8. Where forms have been placed and the subgrade has been subjected to frost, no
22 concrete shall be placed until the ground is completely thawed. At that time, the forms
23 shall be adjusted and subgrade repaired as determined by the Engineer.
24

25 **8-04.5 Payment**

26 *This section is supplemented with the following:*
27

28 "Cement Conc. Pedestrian Curb", per linear foot.
29

30 Payment for "Cement Conc. Pedestrian Curb" shall be full pay for all materials, labor, tools,
31 equipment, and supplies necessary for the installation of Cement Concrete Pedestrian Curb per
32 City of Tacoma Standard Plan No. SU-03A.
33

34 "Cement Conc. Traffic Curb", per linear foot.
35

36 Payment for "Cement Conc. Traffic Curb" shall be full pay for all materials, labor, tools,
37 equipment, and supplies necessary for the installation of Cement Concrete Traffic Curb per City
38 of Tacoma Standard Plan No. SU-03A.
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52

ADDENDUM No. 3

9-29 ILLUMINATION, SIGNALS, ELECTRICAL (September 28, 2023 Tacoma GSP)

9-29.1(4) is supplemented with the following new section:

9-29.1(4)E Service Entrance Cap Fittings

Service Entrance Cap Fittings for use with PVC shall be PVC clamp-on type. Where used for signal or flashing beacon conductors, the center of the wire entrance shall be cut or machined out to a large diameter to accommodate entry of multi-conductors. All edges shall be smoothed to avoid chaffing.

9-29.1(6) Detectable Underground Warning Tape

This section is supplemented with the following:

For electrical circuits detectable underground warning tape shall be high visibility red, with continuous legend of "Caution Electric Line Buried Below" or equal. The warning tape shall be polyethylene with a metallic backing. The polyethylene shall be a minimum 3 inches wide, 4 mils thick.

9-29.1(11) Foam Conduit Sealant

This section is deleted.

9-29.2 Junction Boxes, Cable Vaults and Pull Boxes

This section is supplemented with the following:

Unless otherwise specified, all junction boxes containing illumination and signal control cable shall be Type 1, Standard Duty with Alternate 2 Lid Bolt Down Attachment Tab per state standard plan J-40.10-04.

Unless otherwise specified, all junction boxes containing interconnect cabling shall be Type 2, Standard Duty with Alternate 2 Lid Bolt Down Attachment Tab per state standard plan J-40.10-04.

Unless otherwise specified, all junction boxes containing illumination, signal or ITS cable shall have a galvanized slip resistant lid and frame.

9-29.2(1)A2 Non-Concrete Junction Boxes

This section is deleted.

9-29.2(4) Cover Markings

The second paragraph of this section is revised to read:

Covers shall be marked or embossed with "LT" for boxes containing illumination circuits.
Covers shall be marked or embossed with "TS" for boxes containing traffic signal circuits.
Covers shall be marked or embossed with "IC" for boxes containing signal interconnect circuits.

9-29.2(5)C Standard Duty Non-Concrete Junction Boxes

This section is deleted.

ADDENDUM No. 3

9-29.3 Fiber Optic Cable, Electrical Conductors, and Cable

This section is supplemented with the following:

Where not otherwise specified, all wiring shall meet standard of the industry for the application employed. Wiring shall be consistent with manufacturers' recommendations and meet all applicable codes.

9-29.3(1) Fiber Optic Cable

This section is supplemented with the following:

Unless otherwise specified, all fiber optic trunk communication lines (lines between intersections) shall be 48 count single mode fiber optic cable. Fiber Optic cables connecting the Fiber Optic Termination Panel in the signal cabinet to the Fiber Optic Splice Closure in the signal communications junction box shall be 6 count single mode fiber optic cable unless otherwise specified in the Plan.

Section 9-29.3(1) is supplemented with the following new sections:

9-29.3(1)C Sealed Fiber Optic Splice Closures

Fiber optic splice closure shall be a sealed dome closure designed for small count fiber splicing in a butt configuration. Splice closure shall be fully sealed and suitable for aerial and underground environments. Splice closure shall be able to receive up to 5 cables with an outside diameter between 0.30 inches and 0.62 inches and shall be fully kitted with all parts required to enable installation. Splice closure shall support stranded loose tube or ribbon fiber cables in either armored or dielectric configurations. Splice closure shall require only a common can wrench for installation and re-entry. Splice closure shall be a maximum of 18.25 inches long with a maximum diameter of 8.75 inches.

Splice trays shall be of the same manufacturer as the splice closure and designed to operate with the specific splice closure provided. Splice closure shall house between 1 and 4 splice trays with a splice capacity of 12 mechanical fused single splices in each tray for a maximum splice capacity of 48 mechanical fused single splices. One splice tray shall be provided with each splice closure unless otherwise identified in the project documents.

Cable grounding kits shall be of the same manufacturer as the splice closure and designed to operate with the specific splice closure provided. Cable grounding kits shall be installed in accordance with the manufacturer's recommendations.

Splice closure shall be designed and tested to Telcordia® GR-771 requirements Splice closure shall be Rural Utilities Service (RUS) Listed.

9-29.3(1)D Fiber Optic Termination Box

Unless otherwise specified, all fiber optic termination boxes located in signal cabinets shall be Fibertronics FOTB-6-12.

One coupler/adaptor shall be provided and installed in the fiber optic termination box. Coupler shall be a female LC duplex to female LC duplex coupler designed for installation in a standard 12.8mm x 9.3mm adaptor port. Coupler color shall be blue, consistent with singlemode OS2 installations. Coupler shall be installed in the last (right most) adaptor port of the termination box and secured with 2 M2x6mm Philips head screws.

ADDENDUM No. 3

1
2 Two pre-terminated patch cables shall be provided, one 1-foot (0.3m) in length, and one 6 feet
3 (2m) in length. Patch cables shall be LC duplex singlemode OS2 9/125 fiber patch cables and
4 rated for indoor/outdoor use. Patch cables shall have a yellow colored 3mm diameter jacket,
5 and blue LC duplex connectors, consistent with singlemode OS2 installations.
6

9-29.3(2)A Single Conductor

9-29.3(2)A1 Single Conductor Current Carrying

7
8
9
10 *This section is supplemented with the following:*

11
12 Service connections shall be stranded copper size AWG #6 USE unless otherwise shown in the
13 plans. Black conductor insulation shall be used for the service and the neutral conductor shall
14 be white. Color tape marking shall not be acceptable for the neutral conductor.
15

9-29.3(2)A2 Grounding Electrode Conductor

16
17 *This section is supplemented with the following:*

18
19 Grounding electrode conductor shall be minimum #8 AWG unless otherwise shown in the plans.
20 When the ground is pulled through a conduit, the wire shall be insulated. Color tape marking
21 shall not be acceptable for marking the ground conductor.
22

9-29.3(2)A3 Equipment Grounding and Bonding Conductors

23
24 *This section is supplemented with the following:*

25
26 Equipment grounding shall be minimum #8 AWG unless otherwise shown in the plans. When
27 the ground is pulled through a conduit, the wire shall be insulated. Color tape marking shall not
28 be acceptable for marking the ground.
29

9-29.3(2)B Multi-Conductor Cable

30
31 *This section is supplemented with the following:*

32
33 Two-conductor through 10-conductor unshielded signal control cable, shall have stranded
34 copper conductors, size AWG 14, and shall conform to International Municipal Signal
35 Association (IMSA) signal cable 20-1.
36

9-29.3(2)E Two-Conductor Shielded

37
38 *This section is revised to read:*

39
40 Two-conductor shielded (2CS) cable shall be stranded 12 AWG conductors and shall conform
41 to IMSA Specification No. 50-2.
42

9-29.4 Messenger Cable, Fittings

43
44 *This section is supplemented with the following:*

45
46 Messenger cable shall be 5/16-inch, seven-wire strand messenger cables conforming to ASTM
47 A 475, extra-high strength grade, 11,200 lbs. min. breaking strength, Class B galvanized.
48

49 All guy eye anchor rods shall be double-hub type.
50

ADDENDUM No. 3

1 Weatherheads shall be clamp-on type PVC. Where used for signal or flashing beacon
2 conductors, the center of the wire entrance shall be cut or machined out to a large diameter to
3 accommodate entry of multi-conductors. All edges shall be smoothed to avoid chaffing.

4
5 All miscellaneous nuts, bolts, washers and fittings shall be stainless steel or brass unless
6 otherwise noted.

7
8 All metal line hardware shall be hot-dipped galvanized in conformance with the requirements of
9 ASTM Designation A-153. All eyebolts shall be thimble eye design cast or welded to form a
10 solid eye.

11
12 5-strand, class B galvanized steel, pretwisted guy strand dead ends, high strength cable
13 conforming to ASTM Designation A-475, shall be utilized at all span wire terminations. 1/2" rope
14 wire thimbles shall be required where span wire connects to all poles or bull rings, except where
15 thimble eye bolts are used. Span wire shall normally be installed directly pole to pole, unless
16 otherwise directed or specified.

17
18 Strain insulators shall be installed where connecting to wood poles. Where span wire is
19 connected to a steel or concrete pole, insulators shall not be installed. Strain insulators shall be
20 wet process, porcelain, conforming to EEI-NEMA Class 54-2 standards for 12,000-pound
21 ultimate strength and shall be installed 9 feet from the pole.

22 23 **9-29.6 Light and Signal Standards**

24 *This section is supplemented with the following:*

25
26 Pedestrian pushbutton posts (Type PPB) shall have a 7-inch square and 10-inch high aluminum
27 frangible pedestal with an aluminum door and grounding lug, with the post threaded into the top
28 of the pedestal. The post shall be aluminum, 4.5-inch outside diameter, Schedule 40, with no
29 finish. Set screws shall be used to secure the pole to the base. A post cap with set screws shall
30 be provided and installed on the pole top. The bolt circle diameter for the base shall be 6
31 inches. Foundation shall be in accordance with Section 8-20.3(4). Anchor bolts shall be in
32 accordance with Section 9-29.6(5).

33
34 All light and signal standards shall be fixed base, 4-bolt anchor.

35
36 The head of the handhold security bolt shall be flush with the face of plate. The face plate of
37 the handhole shall be flush with pole.

38 **9-29.6(3) Timber Light Standards, Timber Strain Poles, Timber Service Supports**

39 *This section is supplemented with the following:*

40
41 All timber poles shall be Class II unless otherwise specified.

42
43 Mast arms for wood poles shall be "tapered elliptical" or "tapered truss" style, of a size sufficient
44 to be used with a luminaire weight of 48 pounds with an EPA of 1.1 square feet. Arms shall
45 have 2-3/8-inch O.D. x 8-inch long slip fitter for mounting luminaire.

46 47 **9-29.6(5) Foundation Hardware**

48 *This section is supplemented with the following:*

49

ADDENDUM No. 3

1 All pedestrian pushbutton posts (Type PPB) shall be installed utilizing anchor bolts with WSDOT
2 Standard Plan J-20.15-04 and J-20.11-03, with 5/8-inch diameter and hot dip galvanized or
3 stainless steel and shall meet ASTM F1554 Grade 36 specifications. Supplied with each anchor
4 bolt shall be two hex nuts, meeting the requirements of ASTM A563, Grade A and two flat
5 washers, meeting the requirements of ASTM F436.

6
7 *Section 9-29.6 is supplemented with the following new section:*

8 9 **9-29.6(6) City of Tacoma Universal Pole**

10
11 Unless otherwise specified, light standards and strain poles shall be in conformance with the
12 following City of Tacoma standard design.

13 14 **Strength**

15 Each pole and mast arm shall have adequate strength for the designated luminaire with 1.8
16 safety factor for maximum combined stresses using 90 mph isotach (117 mph gusts) per
17 AASHTO LRFD Specifications for Structure Supports for Highway Signs, Luminaires, and
18 Traffic Signals. Design shall be based on total loading of 50 pounds and EPA of 2.0 square feet.

19 20 **Standard Bolt Spacing – for Streetlight Poles Only**

21 30 Foot poles -- Baseplate shall accommodate 1 inch anchor bolts. The bolt circle shall be
22 between 11 inches and 13 inches.

23 40 Foot Poles -- Baseplate shall accommodate 1 inch anchor bolts. The bolt circle shall be
24 between 12.5 inches and 14.5 inches.

25 26 **9-29.6(6)A Steel Strain Poles**

27
28 Each pole shall be of tapered round or octagonal construction.

29
30 CLASS 1 POLE: Design for dead load tensions up to 1500 pounds

31 CLASS 2 POLE: Design for dead load tensions up to 2600 pounds

32
33 Class 1 poles shall have a minimum base diameter of 12-inches for octagonal poles and 12-1/4-
34 inches for round poles. Poles shall have a minimum wall thickness of 0.3125-inches. Anchor
35 bolts shall be 1-1/2-inch by 60-inches and shall have a spacing of 11-5/16-inches on center, on
36 the square. It is the responsibility of the pole manufacturer to maintain proper clearance
37 between the pole shaft and nuts for the anchor bolts.

38
39 Class 2 poles shall have a minimum base diameter of 13-1/2-inches for octagonal poles and 14-
40 inches for round poles. Poles shall have a minimum wall thickness of 0.375-inches. Anchor
41 bolts shall be 2-inch by 66-inches and shall have a spacing of 12-3/4-inches on center, on the
42 square. It is the responsibility of the pole manufacturer to maintain proper clearance between
43 the pole shaft and nuts for the anchor bolts

44
45 Poles shall be of single-ply construction. Multiple-ply poles shall not be allowed.

46
47 Each pole shall be of tapered round or octagonal construction. Pole taper shall be in the range
48 of 0.13 to 0.14 in/ft.

49

ADDENDUM No. 3

1 A base plate and top casting shall be securely attached to each pole. The attachment of the
2 base plate to the pole shall be a welded connection sufficient to develop the full strength of the
3 pole. The base plate shall have four (4) holes which will sufficiently accommodate the specified
4 anchor bolts for the pole class.

5
6 Pole shall be of sufficient strength to allow for the span wire to be installed to sag an amount
7 equal to 5% of the span length.

8
9 The maximum acceptable deflection, at 30 feet above the base, is 5 inches. The specified
10 deflection shall be at a loading condition of 1,500 pounds horizontal pull at 30 feet above the
11 base for Class 1 Poles. For Class 2 Poles, the loading condition shall be 2,600 pounds
12 horizontal pull at 30 feet above the base.

13
14 Structural material shall be zinc-coated by a "hot-dip" process in accordance with ASTM A123
15 and the final coating shall measure 0.0039 inch or more in thickness as determined by a
16 magnetic thickness gauge. All tapped holes shall be chased after galvanizing. Hardware shall
17 be coated in accordance with ASTM A307.

18
19 The finished pole shall be reasonably straight and free from injurious defects. If galvanizing is
20 damaged, the maximum area to be repaired is defined in accordance with ASTM A123 Section
21 4.6. The maximum area to be repaired in the field shall be determined in advance by the
22 Engineer. Repair areas damaged during construction, handling, transport or installation by one
23 of the approved methods in accordance with ASTM A780 whenever damage exceeds 3/16
24 inches in width. Minimum thickness for repair shall measure 0.0039 inches.

25
26 The company shall furnish the purchaser with template prints showing spacing and size of holes
27 in base for the anchor bolts.

28
29 The material shall carry the manufacturer's standard guarantee against any defect in material or
30 workmanship for a minimum period of one year following the date of installation. The Contractor
31 shall submit mil test reports for all steel used in the manufacturing of strain poles.

32
33 The Contractor shall submit a Certificate of Compliance with ASTM Standards and
34 Specifications for galvanizing. The certificate, signed by the galvanizer, shall detail galvanizing
35 process and testing procedure to determine that galvanizing meets minimum thickness
36 specified.

37
38 The contractor shall submit welder certification. Welders must be certified to AWS standards.

39
40 Each pole shall include the following:

- 41 1. One (1) rain-tight pole cap.
- 42 2. One (1) 4-inch by 6-1/2-inch handhole at base end to include the handhole cover
43 plate and positioned 90 degrees to the luminaire mast arm (traffic downstream side).
- 44 3. Anchor bolts shall be hot dipped galvanized steel with two (2) galvanized nuts and
45 two (2) washers for each bolt. Only 12-inches of threaded end of the bolts must be
46 galvanized. 1-1/2-inch diameter bolts shall have 8-inches of top thread and 2-inch
47 diameter bolts shall have 10-inches of top thread.
- 48 4. Anchor bolts shall have threaded bottom ends to receive an anchor plate and nut.
49 The nut shall be tack-welded to the anchor plate. Anchor plates for 1-1/2-inch

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- 1 diameter anchor bolts shall be 4-inch square by 1-inch thick. Anchor plates for 2-
2 inch diameter anchor bolts shall be 6-inch square by 1-inch thick
- 3 5. One (1) adjustable strain clamp to be mountable between 26 to 28 feet above the
4 base. Clamp shall provide facility to attach span wire at four-quarter points.
- 5 6. Provisions for mounting a mast arm of specified length. All poles shall be supplied
6 with one luminaire mast arm mounting flange. The centerline of the flange shall be
7 approximately 6 inches below the top of pole. The flanges shall conform with the
8 detail drawing included in the Special Provisions. Poles ordered without luminaire
9 mast arms but with provisions for a later addition of a mast arm shall be provided
10 with a metal cover and gasket to protect the opening. The cover shall be bolted to
11 the pole using the holes provided for fastening the luminaire mast arm.
- 12 7. One (1) two-inch coupling to receive clamp-on type aluminum weatherhead
13 positioned at 27 feet, and no more than 45° from the location of the mast arm, unless
14 otherwise specified.
- 15 8. One (1) 1-1/4-inch coupling for wire inlet located directly opposite the mast arm.
- 16 9. One (1) grounding lug-hole in lip of handhole for 1/2-NC brass bolt.
- 17

18 **9-29.6(6)B Luminaire Mast Arms**

19

20 Each luminaire mast arm shall have sufficient strength with a 1.8 safety factor to support a 70-
21 pound luminaire on an 18-foot mast arm per the latest AASHTO Specifications for Structural
22 Supports for Highway Signs, Luminaires and Traffic Signals.

23
24 Material and workmanship shall conform to the best commercial standards of the industry.

25
26 The mast arm and its fastening shall be constructed of steel conforming to Section 9-29.6

27
28 Each mast arm shall support a ballast-in-head luminaire and shall provide a luminaire mounting
29 height of approximately two (2) feet above the strain pole mounting flange.

30
31 The mast arm shall provide a horizontal extension from the center of the pole to the center of
32 the luminaire as shown in the Plans.

33
34 The mast arm shall be of tapered construction. The luminaire end of the mast arm shall not
35 exceed 2.375 inches O.D. for a minimum distance of 8 inches. The outside arm diameter at the
36 pole flange shall not exceed 5.88 inches.

37
38 The mast arm shall be capable of being fastened to the mast arm mounting flange dimensioned
39 in the detail drawing. All mounting bolt heads shall clear the weld.

40 41 **9-29.10 Luminaires**

42 *The third paragraph is deleted*

43
44 *This section is supplemented with the following:*

45
46 Unless otherwise shown in the plans all new luminaires shall be Light Emitting Diode (LED)
47 fixtures conforming to these specifications.

48

ADDENDUM No. 3

1 Cobra-head style luminaires and other overhead fixtures, such as shoebox style fixtures, shall
2 be provided with utility labels. Ornamental post top fixtures shall not have utility labels. Utility
3 labels for LED fixtures shall be green and show actual total system wattage.

5 **9-29.10(1) Conventional Roadway Luminaires**

6 *This section is replaced in its entirety with the following:*

8 All Conventional Roadway Luminaires shall be LED meeting the following requirements:

10 1. Applicable Standards:

- 11 a. American National Standards Institute (ANSI) C78 and C136
- 12 b. Electrical and Electronics Engineers (IEEE) C62
- 13 c. Illuminating Engineering Society of North America (IESNA or IES)
- 14 d. Underwriters Laboratories (UL)

15 2. General:

- 16 a. Luminaire shall be UL Listed
- 17 b. Luminaire shall be listed as a Qualified Product on one of the following lists:
 - 18 i. Energy Star
 - 19 ii. Design Lights Consortium
 - 20 iii. Lighting Design Lab
- 21 c. LED light source and driver shall be compliant with the requirements of the
- 22 European Union (EU) Restriction of Hazardous Substances (RoHS) Directive.
- 23 d. Luminaire shall have an external label per ANSI C136.15.
- 24 e. Luminaire shall have an internal label per ANSI C136.22.

25 3. Luminaire Performance:

- 26 a. Operating Temperature Range: -4 F to +122 F
- 27 b. Correlated Color Temperature: (CCT)
 - 28 i. Residential- 3000K Nominal
 - 29 ii. Arterials - 4000K Nominal
- 30 c. Calculated Lumen Maintenance Factor (LMF): 100,000 hours or more (L70
- 31 at 25°C/77°F) in accordance with IESNA TM-21 and IESNA LM-80
- 32 d. Color Rendering Index (CRI) : >70
- 33 e. Light Distribution per IES Handbook: Best fit to meet design criteria
- 34 f. Minimum Efficacy: 80 Lumens/Watt

35 4. Power Supply and Driver Performance:

- 36 a. Input Voltage: Auto-sensing 120 to 277 VAC 50/60HZ
- 37 b. Power factor: >0.90
- 38 c. Drive current maximum of 1.0A
- 39 d. Total harmonics distortion at full power at specified voltage: <20%
- 40 e. Surge Suppression Protection 10kV Minimum (IEEE/ANSI C62.41.2)
- 41 f. Replaceable surge module
- 42 g. Interference FCC 47 CFR part 15/18, Class A
- 43 h. Driver life >100,000 hours
- 44 i. Dimming: 0-10V DC

45 5. Lighting and Dimming Controls:

- 46 a. The luminaire shall be provided with a 7-pin terminal locking type
- 47 photoelectric control mounting receptacle in accordance with ANSI C136.10
- 48 and ANSI C136.41.
- 49 b. Photocell receptacle dimming contacts shall be factory connected to driver
- 50 dimming leads (violet and gray) per ANSI C136.41.

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- 1 6. Luminaire Housing and Door:
 - 2 a. The luminaire housing shall be cast or extruded aluminum. All hardware shall
 - 3 be stainless steel.
 - 4 b. Cast housing components shall have a light gray polyester powder coat
 - 5 finish. Extruded components shall be anodized. Finish shall meet the
 - 6 requirements of ANSI C57.31, latest revision.
 - 7 c. The power-door shall be fabricated from either aluminum or a UV resistant
 - 8 polymer.
 - 9 d. The door shall be easily removable and shall allow for tool-less entry.
- 10 7. Slipfitter and Vibration Resistance:
 - 11 a. Slipfitter shall be capable of accepting a 1-1/4" through 2" IP pipe tenon (1-
 - 12 5/8" to 2-3/8" OD) with maximum allowable insertion lengths of 7-1/2" and 10"
 - 13 respectively in accordance with Table 2 of ANSI C136.3, latest revision.
 - 14 b. The Slipfitter shall have provisions for clamping the luminaire securely to the
 - 15 tenon and for leveling $\pm 5^\circ$ with respect to horizontal.
 - 16 c. Luminaire shall be certified to ANSI C136.31 3G bridge and overpass
 - 17 vibration standards with 4-bolt configurations.
- 18 8. Ingress Protection:
 - 19 a. The luminaire components shall have minimum moisture rating as specified
 - 20 in IEC 60529, with the ability to shed water from inside the housing(weep
 - 21 holes), and designed to minimize water collection and icing.
 - 22 b. Internal Components: IP66
 - 23 c. Enclosure: IP65
- 24 9. Terminal and Grounding Block:
 - 25 a. Components shall be pre-wired to the terminal board requiring only supply
 - 26 power connections to clearly identified terminals.
 - 27 b. The terminal board shall be located so that there is adequate tool-less access
 - 28 to accommodate user wearing electrical gloves to connect the supply leads.
- 29 10. Manufacturer Warranty:
 - 30 a. 10 Year Minimum including power driver and LED chips.

9-29.10(1)A Luminaire Classifications

33 The City of Tacoma has established five (5) classes of LED Conventional Roadway with specific
34 design criteria to ensure long-term lighting continuity. Luminaires are divided into classes based
35 on function, typical use and historical High Intensity Discharge (HID) equivalents. Current
36 classes are 100WEQ, 200WEQ, 250WEQ, 400WEQ, and RES-45. Each conventional
37 luminaire installed shall meet the design criteria of one of these five luminaires.

38
39 Design assumptions and criteria listed for each luminaire classification may not reflect the actual
40 conditions on the project. The design assumptions and criteria identified are only to be utilized
41 to determine luminaire equivalency, such that another luminaire meeting the same criteria can
42 be used to replace a failed unit without a complete redesign of the entire system.

43
44 Equivalence will be determined as follows:

- 45 1. The City of Tacoma will use Lighting Analysts AGi32 lighting software program for
- 46 determination of equivalence using the design assumptions and criteria identified for
- 47 each class of luminaire.
- 48 2. The roadway optimizer will be used to evaluate the performance criteria in all cases,
- 49 except for the Res-45 class luminaire, where model view will be utilized to calculate
- 50 the photometrics.

ADDENDUM No. 3

- 1 3. Proposed fixtures may not be tilted, rolled, or spun to meet the criteria.
- 2 4. All calculations shall be to the 100th. Rounding will not be permitted.
- 3 5. A copy of the published IES photometric file and BUG (Backlight, Uplight, and Glare)
- 4 Rating shall be provided as a part of product submittal.
- 5 6. It is recognized that there are an infinite number of design variables and it is not
- 6 practical to create a published IES photometric file and BUG rating for each
- 7 combination. In those cases where the wattage is reduced to meet the design
- 8 criteria, the base IES photometric file for the higher wattage configuration shall be
- 9 used as follows:
 - 10 a. Where no IES photometric file exists for the specific configuration, all
 - 11 information required to allow the City to duplicate the results and assure that
 - 12 the fixture meets the criteria must be provided.
 - 13 b. When reducing the system wattage, the BUG rating of the base IES
 - 14 photometric file must be utilized, but may be scaled based on IES LM-79.
 - 15 c. For modified fixtures, the City may require that a representative fixture be
 - 16 provided prior to acceptance. The City reserves the right to have an
 - 17 independent NVLAP approved lab perform an IES LM-79 report for
 - 18 verification of the output for the submitted fixture. A 10 percent margin of
 - 19 error will be allowed in the analysis and comparison of the actual test results.
 - 20 Failure to meet the photometrics within the allowance may be cause for
 - 21 rejection.
- 22

23 Full design assumptions and design criteria for each of the five luminaire classes can be found
24 at the end of this section. Excessive glare or light trespass onto private property is not
25 acceptable. Typical usage for luminaire classes:

- 26 • 100WEQ Luminaires are typically installed along residential roadways at a height of
- 27 25 to 30 feet. 100WEQ Luminaires have a long and narrow light distribution to fit a
- 28 typical residential road.
- 29 • 200WEQ Luminaires are typically installed along local classified arterial roadways
- 30 and along arterials with lower pedestrian conflicts. 200WEQ Luminaires are typically
- 31 installed at a height of 30 feet and will have a slightly wider distribution to cover the
- 32 additional width.
- 33 • 250WEQ Luminaires are typically installed along collector to minor classified arterial
- 34 roadways. 250WEQ Luminaires can be installed at a height of 30 feet or 40 feet
- 35 depending on pedestrian conflict level, road width, and lighting levels required.
- 36 • 400WEQ Luminaires are typically installed along principal classified arterial
- 37 roadways or areas where a higher pedestrian conflict exists. 400WEQ Luminaires
- 38 are typically installed at a height of 40 feet, often installed on both sides of the
- 39 roadway, in a staggered pattern to adequately light the full roadway width.
- 40 • RES-45 Luminaires are typically installed at residential street intersections or for cul-
- 41 de-sacs. For residential intersections, these lights are typically installed on one
- 42 corner of the intersection at a 45 degree angle to the traveled ways. The light
- 43 distribution is designed to provide illumination for the intersection, but not create
- 44 unacceptable light trespass on adjacent properties.
- 45
- 46

47 **9-29.11 Control Equipment**

48 **9-29.11(2) Photoelectric Controls**

49 *This section is revised to read:*
50

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1
2 The photoelectric control shall be the twistlock type and the light sensitive element shall be a
3 solid state photo diode. The control shall be designed to turn on at 2.6 foot-candles (+/- 20%)
4 and turn off at 2.6 foot-candles (+/- 20%). The lighting control shall not drift by more than 1 per
5 cent over a 10-year period.

6
7 The output control relay shall be electro-mechanical. The time delay for both turn on and turn
8 off shall be a minimum of one second and maximum of 5 seconds. The output relay shall be
9 rated 1000 watts incandescent or 15 amps inductive load. The contacts shall be normally
10 closed.

11
12 The lighting control shall have a built in metal oxide varistor (MOV) rated a minimum of 160
13 joules for lightning and transient protection. The control shall also have secondary zener diode
14 and transient filter. The relay shall be suitable for operation on 240 volt, 60 hertz electrical
15 circuits.

16
17 Dimensions shall conform to ANSI specifications for twistlock photocells.

18 19 **9-29.12 Electrical Splice Materials**

20 21 **9-29.12(1) Illumination Circuit Splices**

22 *This section is revised to read:*

23
24 Splices and taps shall be made with solderless crimp connectors on underground and overhead
25 circuits to securely join the wires both mechanically and electrically.
26 Splices shall be sealed in accordance with 8-20.3(8).

27 28 **Thermoplastic Electrical Insulating Tape**

29 Electrical tape shall be made by the same manufacturer and compatible with the electrical
30 coating utilized to form a complete system that both insulates and protects the splice. Electrical
31 tape shall be based on polyvinyl chloride (PVC) and/or its copolymers and have a rubber-
32 based, pressure-sensitive adhesive. The tape shall have a voltage rating of 600V (UL510).
33 The tape shall be 7 mils thick, and be UL Listed and marked per UL Standard 510 as "Flame
34 Retardant, Cold and Weather Resistant." The tape shall be resistant to abrasion, moisture,
35 alkalis, acids, corrosion, and varying weather conditions, including ultraviolet exposure. The
36 tape must be applicable at temperatures ranging from 0°F through 100°F (-18°C through 38°C)
37 without loss of physical properties. The tape shall have an operating temperature up to 220°F
38 (105°C). The tape shall be classified for use in outdoor environments. The tape shall be
39 compatible with synthetic cable insulations, jackets and splicing compounds. The tape will
40 remain stable and will not telescope more than 0.1 inches when maintained at temperatures
41 below 120°F (50°C).

42 43 **Moisture Resistant Electrical Coating**

44 Electrical Coating shall be made by the same manufacturer and compatible with the vinyl
45 electrical tape utilized to form a complete system that both insulates and protects the splice.
46 Electrical Coating shall seal and bond the tape and be suitable for direct burial, direct water
47 immersion, and above ground applications. Electrical coating shall be flexible when dry.
48 Electrical coating shall consist of the solvents Acetone, Methyl Ethyl Ketone and Toluene and
49 shall contain synthetic rubber and resin solids.

50

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9-29.12(2) Traffic Signal Splice Material

This section is revised to read:

Induction loop splices and magnetometer splices shall include an uninsulated barrel-type crimped connector capable of being soldered. The insulating material shall be a heat shrink type meeting requirements of 9-29.

9-29.12(3) Splice Enclosures

This section is deleted.

9-29.12(4) Re-Enterable Splice Enclosure

This section is deleted.

9-29.13 Control Cabinet Assemblies

This section is revised to read:

The Traffic Controller Cabinet Assembly shall be completely wired and tested to Section 5 Terminals and Facilities of the NEMA TS2-2021 V03.08 TRAFFIC CONTROLLER ASSEMBLIES WITH NTCIP REQUIREMENTS Specification, unless modified by these specifications.

Cabinet shall be compatible with Econolite Cobalt Shelfmount controller.

The following submittals will be required for the review and approval by the City prior to fabrication and wiring:

1. Proposed cabinet layout diagram including shelving/rack locations. In addition, detailed diagrams shall be provided for the left side, right side, and back panels. Drawings shall be clearly labeled and dimensioned.
2. Proposed cabinet wiring diagram shall be submitted for the review and approval by the City. Wiring of cabinets shall not commence prior to City approval of the cabinet wiring plan.

All submittal comments shall be incorporated into a final set of prints and each cabinet shall be furnished to three (3) complete sets of cabinet prints. All cabinet wiring, and layout shall come on (1) E1 size sheet, multiple pages shall not be allowed. Upon request (1) CDROM or USB flash drive with AutoCAD v2020 cabinet drawing for the cabinet wiring.

9-29.13(1) Traffic Control Cabinets

The following is for P sized cabinets with internal battery backup:

Each of the P sized Traffic Controller Cabinets shall meet the following general operating requirements:

1. The Controller Cabinet meets the requirements of the National Electrical Manufacturers Association (NEMA) STANDARDS PUBLICATION TS 2-2021 V03.08 TRAFFIC CONTROLLER ASSEMBLIES WITH NTCIP REQUIREMENTS.
2. Cabinet is fabricated for 16 Load Switch Channels operation; where each load switch socket can be configured for a vehicle phase, pedestrian phase or overlap operation. Cabinet is wired for 16 Channels of detection, plus 4 Channels of preemption, further details are provided in upcoming sections of these specifications.
3. The detector panel supports thirty-two (32) channels of vehicle detection, four

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1 (4) channels of emergency vehicle preemption, eight (8) channels of pedestrian
2 detection and eight (8) pedestrian return terminals.

- 3 4. The loop inputs are wired to two adjacent field terminals provided for each loop input.
4 Eight adjacent field terminals are provided for pedestrian field inputs and eight common
5 adjacent field terminals for the field ped push button returns connected to AC neutral,
6 eight adjacent field terminals are provided for preempt field input terminals. Additionally,
7 one (1) equipment ground solid aluminum busbar, and one (1) neutral solid aluminum
8 busbar are provided.

9-29.13(1)A Cabinet Enclosures

10 **9-29.13(1)A Cabinet Enclosures**
11 For the P sized cabinets with internal battery backup the Cabinet enclosures shall meet the
12 following requirements:

- 13 1. Cabinet Dimensions are **44** in. wide, **67** in. high and **26** in. deep. Cabinet is constructed
14 to be base mounted.
15 2. Cabinet and up to an 18-inch cabinet riser shall be fabricated from 0.125 in. thickness
16 aluminum alloy sheet meeting the requirements in ASTM Specification No. 5052-H32 or
17 equivalent. All exterior seams meet the requirements for Type 4 enclosures according to
18 NEMA 250.
19 3. The cabinet is manufactured to prevent the accumulation of water on its top surface with
20 a 1-1/2 in. slope from front to back. Cabinets are constructed in accordance with the
21 NEMA 3R rating requirement.
22 4. Cabinet is natural mill finish aluminum, and it is cleaned with appropriate methods to
23 remove oil film, weld black, and mill ink marks to render the surface clean, smooth, and
24 non-sticky to the touch.
25 5. The cabinet is provided with 2 removable lifting ears attached to the top of the cabinet
26 with a single 1/2" bolt.

9-29.13(1)A1 Cabinet Enclosures for UPS Systems

27
28
29 The following is for P sized cabinets with internal battery backup:

30 Controller cabinets that are designated in the project plans and specifications as UPS Controller
31 Cabinets Type P with internal battery backup shall be 67-inches high x 44-inches wide x 26-
32 inches deep (nominal dimensions) and meet the footprint dimensions as specified Section 7.3,
33 Table 7-1 of NEMA TS2 standards for a Type P cabinet.

- 34 1. Cabinet is built in a featured BBS/UPS system compartment. The compartment is
35 designed to allow air flow among the devices for their correct operation; compartment is
36 built in a front panel, designed to accommodate one (1) UPS Module and one (1)
37 Transfer Switch Module, the main cabinet door allows access to the front faces of these
38 modules. Further details of these devices are provided in upcoming sections of these
39 specifications.
40 2. The compartment is built in shelves to support four (4) 12V DC Batteries, compartment
41 has a hinged door that permits access to the batteries, wiring within the compartment
42 and visual inspection. Compartment access door is hinged on the rear right-side wall of
43 the cabinet as viewed from the outside facing the main cabinet door.
44 3. Door hinge, pin, and bolts are made of stainless steel, The hinge pins and mounting are
45 tamperproof.
46 4. The compartment access door is provided with a door stop that holds the door open at
47 the 90° (±10°), 120° (±10°) and 135° (±10°) positions.
48 5. A three-point latch system is provided on the compartment access door. The latching
49 means is operable without the use of tools.

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- 1 6. The door handle will rotate from the locked position such that the handle does not
2 extend beyond the perimeter of the compartment door at any time. The operation of the
3 handle will not interfere with the key, or any other cabinet mechanism or projection.
- 4 7. Compartment access door is provided with a lock, Best-Lock "Green Construction Core",
5 it operates with the compatible operation Best-Lock key. One (1) key is furnished with
6 this lock. The lock prevents the movement of latching mechanism when in the locked
7 position.
- 8 8. Compartment access door is provided with the ability to use padlock to externally lock
9 the latching mechanism. A lock with a 0.375 in. diameter shackle can be
10 accommodated.
- 11 9. The access door is provided with a shield tab welded to the wall of the cabinet just above
12 the upper side of the compartment door to prevent any accumulation of water.

9-29.13(1)B Cabinet Doors and Locks

14 The following is for P sized cabinets with internal battery backup:

- 15 1. The cabinet has a hinged main door that permits access to all equipment within the
16 cabinet and visual inspection of all indications and controls. Door is hinged on the right
17 side of the cabinet as viewed from the outside facing the cabinet door opening.
- 18 2. Door hinge, pin, and bolts are made of stainless steel, The hinge pins and mounting are
19 tamperproof.
- 20 3. The cabinet door is provided with a door stop that holds the door open at the 90° ($\pm 10^\circ$),
21 135° ($\pm 10^\circ$) and 165° ($\pm 10^\circ$) positions. The stop-and- catch arrangement can hold the
22 door open at 90° ($\pm 10^\circ$) with a load of 73.2 kilograms per square meter (15 pounds per
23 square foot) applied uniformly over the face of the door.
- 24 4. A three-point latch is provided on the main door of the cabinet. The latching means is
25 operable without the use of tools.
- 26 5. The main door handle will rotate from the locked position such that the handle does not
27 extend beyond the perimeter of the main door at any time. The operation of the handle will
28 not interfere with the key, the police door, or any other cabinet mechanism or projection.
- 29 6. Cabinet is provided with a main door lock, Best-Lock "Green Construction Core", it
30 operates with a compatible operation Best- Lock key. One (1) key is furnished with each
31 cabinet lock. The lock prevents the movement of latching mechanism when in the locked
32 position.
- 33 7. Cabinet is provided with a padlock to externally lock the latching mechanism. A lock with
34 a 0.375 in. diameter shackle can be accommodated.
- 35 8. The main door opening of the cabinets is around 80% of the area on the side that the
36 door closes, exclusive of the area for plenums.
- 37 9. Gasketing is provided in all door openings and is dust tight. Gaskets are attached with a
38 permanent adhesive bond. The mating surface of the gasket is covered with a silicone
39 lubricant to prevent sticking to the mating surface.
- 40 10. A hinged police compartment door is provided on the outside face of the main cabinet
41 door. The door permits access to a switch panel but does not allow access to exposed
42 electrical terminals or other equipment within the cabinet.
- 43 11. The police compartment door is provided with a lock that can be operated by a standard
44 police key, Corbin Type Blank No. 04266 or equivalent. Two keys are furnished with
45 each cabinet.
- 46 12. The police panel compartment internal dimensions are 5.75 in. high, 12.875 in. wide,
47 and 2.625 in. deep.

48
49

ADDENDUM No. 3

9-29.13(1)D Cabinet Ventilation

The following is for P sized cabinets with internal battery backup:

1. Cabinet is provided with two fuse protected fans rated at 2.832 cubic meters per minute (100 cubic feet per minute) minimum.
2. The fans can operate continuously for a minimum of 6,000 hours in a +50°C (+122°F) environment without the need for after-installation maintenance, excluding filter cleaning or replacement.
3. Cabinet is provided with two thermostats to individually control the operation of the fans. The thermostat turn-on point is manually adjustable between 32°F and 140°F, The Thermostat is an Omega KT011 Series or equal and meets the latest *Caltrans TEES 6.2.4.4*.
4. Thermostats are located on the inside of the top portion of the cabinet at the fan panel.
5. Cabinet is provided with replaceable polyester 2-Ply air filter with the following dimensions: width 16 in. height 12 in. thickness 1 in.

9-29.13(1)E Cabinet Shelving

The following is for P sized cabinets with internal battery backup:

1. The cabinet is provided with three shelves to support the CU and auxiliary equipment. The equipment and shelves are arranged so that it is possible to remove any piece of auxiliary equipment from the cabinet without removing any other piece of auxiliary equipment.
2. Shelves are fabricated from 5052-H32 0.125 in. thickness aluminum with double flanged edges rolled front to back and reinforced with a V channel welded. The shelves have perforations patterns to allow air flow through the devices into the cabinet.
3. Size Type P cabinet has continuous vertical mounting channels welded to interior side cabinet walls to provide shelf and panel adjustable locations at any spacing.

9-29.13(2) Wiring

The following is for P sized cabinets with internal battery backup:

All wiring conforms to NEMA TS2 Section 5.2.5 and table 5-1. No cable or wire is attached to any point where movement of shelves or doors may damage the cable or wire. Conductors conform to military specification MIL-W-16878D, Electrical insulated high heat wire, type B. Conductors #14 or larger are UL or THHN type. All wires terminated behind the main panel or on the back side of other panels are soldered. Properly calibrated crimping tools are used to apply terminal insulated lugs to conductors terminated on terminal strips. No pressure or solderless connectors are used. Printed circuit boards are used on the load-bay to connect the bus interface units (BIU).

The connecting cables are sleeved and protected in braided nylon mesh. The connecting cables are long enough to allow removal or moving to any point the equipment for inspection and testing without stretching or disconnecting any conductor.

Each electrical terminal within the facilities is uniquely identified by terminal reference and functional nomenclature and both are referenced by the cabinet wiring diagram. Terminal reference and functional nomenclature for terminals accessible from the front of a panel is permanent and legible and is visible from the front of the panel adjacent to the terminals.

Component nomenclature for all plug-in devices is legibly and permanently marked next to the receptacle for the device. Markings are visible with the device in place.

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9-29.13(3) Electrical Design

9-29.13(3)A Load Bay

The following is for P sized cabinets with internal battery backup:

The design of the load-bay panel conforms to NEMA TS2 Section 5. Terminals and Facilities. The panel is constructed from 5052-H32 brushed aluminum of 0.125 inches thickness and installed to minimize flexing when plug-in components are installed.

Panel is installed and provided with a mounting mechanism which allows easy access to all wiring on the rear of the panel without removing or adjusting any shelving or other panels. Lowering of the Load-bay panel can be performed without the use of hand tools. Complete removal can be possible with the use of simple hand tools.

The **Load-Bay Panel** is located on the lower rear wall just below the bottom shelf, the **Power Supply Interface Panel** is located on the left wall just below the bottom shelf, the **Detector Racks** are placed on the middle shelf, the **Detector Panel** is located on the lower left wall, the **Custom Power Panel** is located just above the detector panel, the **Service Power Panel** is located on the lower right wall just below the **Custom Miscellaneous Panel**, the **Load resistor panel** is mounted on the right wall under the bottom shelf, the power supply, controller unit and monitor unit (not provided) shall be placed on the bottom shelf. the **Neutral Busbars Panel** is located on the lower right wall just below the power panel, the **SDLC Hub Assembly** is located on the rear wall below the middle shelf, the **Automatic Transfer Switch & Generator Inlet panel** is located on the compartment at the main door just below the **Police Panel Compartment**, the **Auxiliary Technician panel** is located on the main door mounted in the rear of the police panel compartment, the **Fans** and **Cabinet LED Light** are located on the top of the cabinet, a second **Cabinet LED Light** is located under the **Drawer** at the bottom shelf, the two eight positions **AC Outlets** are located on the upper left and right sides, and the **Custom Din Rail** is located on the upper rear wall, additionally the **UPS/BBS Equipment Compartment** is located on the right side of the cabinet which further details are provided in upcoming sections of these specifications.

The Load-Bay panel is provided with termination points for the Controller Unit (CU) CA cable, Monitor Unit (MMU) MA & MB cables, bus interface units 1 & 2 (BIU) and field terminal facilities.

The load-bay panel is available in the following configuration:

Sixteen (16) load switch sockets, Eight (8) flash transfer relay sockets, One (1) flasher socket, Two (2) BIU sockets. The Load-bay panel is wired for 16 channels. Load switches 1-8 are vehicle phases 1-8; load switches 9-12 are pedestrian phases 2, 4, 6 & 8; load switches 13-16 are overlaps A, B, C & D. All load switches are routed through a flash transfer relay.

Flashing Operation:

Load-Bay is wired to flash all the vehicle channels. Flashing operation alternates between the vehicle phases 1, 2, 5, 6, pedestrian phases 2, 4, OLA & OLB and vehicle phases 3, 4, 7, 8, pedestrian phases 6, 8, OLC & OLD. Flash programming can be either red, yellow or no flash simply by changing wires on the front of the load-bay. Initial configuration is for all the vehicle and overlap phases **red flash** and for pedestrian phases **no flash**.

9-29.13(3)B Side Panels

The following is for P sized cabinets with internal battery backup:

ADDENDUM No. 3

1 Cabinet is provided with a load resistor panel with thirty-two (32) 2.5K-ohm, 10-watt panel
2 mount resistors. One common side tied to the neutral busbar. The other side terminated to
3 modular din rail mounted terminal blocks for feasible connections.
4

5 Cabinet is provided with a neutral (AC-) busbar panel to provide extra neutral connections
6 capability; it is constructed of solid aluminum bar and is located per section 2.2 (Cabinet layout).
7

8 **9-29.13(3)B1 Power Supply Interface Panel**

9 The following is for P sized cabinets with internal battery backup:

10 The power supply interface panel includes terminations for all the cabinet's power supply inputs
11 and outputs. It has a protective plastic cover. This panel is mounted on the left wall of the
12 cabinet.
13

14 POWER SUPPLY TS2 - EDI PS250: The power supply shall be a shelf-mounted, enclosed, 24
15 VDC supply. Power supply must meet the requirements of NEMA Standards Publication TS 2-
16 2021, Section 5.3.5.
17

18 **9-29.13(3)B2 SDLC Interface Panel**

19 The following is for P sized cabinets with internal battery backup:

20 An SDLC Hub Assembly including ten (10) D-Subminiature Female 15 pin (DB15) connectors
21 that are connected in parallel. The SDLC Hub Assembly is built in PCB. Two connectors are
22 provided with latching blocks, and eight connectors are provided with jackscrews 4-40 to secure
23 SDLC cables.
24

25 Six (6) SDLC cables are provided for the cabinet's operation and one additional spare SDLC
26 cable is provided for an additional device.
27

28 **9-29.13(3)B5 Power Panel**

29 The following is for P sized cabinets with internal battery backup:

30 The power panel is wired to provide all the power distribution and protection for the cabinet. The
31 power panel is equipped with a removable plastic front cover for protection. The design allows
32 the personnel to access the main and auxiliary breakers without removing the protective front
33 cover. The following major components are included within the power panel:
34

- 35 1. One (1) 30-amp main breaker supplying power to the main surge protector device
36 and turns on/off all power to the cabinet.
- 37 2. Two (2) 15-amp Auxiliary breakers for supply power to the fan, light
38 and ac power outlets.
- 39 3. One (1) Surge protection device CITEL DS72US-120S/G One (1)
40 Line Filer, EMI, CITEL DUC 31
- 41 4. One (1) Normally Open Relay Struthers-Dunn 418AXXL-120VAC
42 One (1) NEMA type 5-15R GFCI AC duplex outlet
- 43 5. One (1) Heavy duty 3 Positions Power Block MARATHON model
44 #1423307 for the cabinet power line in.
- 45 6. One (1) Equipment ground aluminum solid busbar Two (2) Neutral
46 aluminum solid busbars
- 47 7. One (1) Field copper lug 8.0-2.0AWG
48

49 **9-29.13(3)B10 Custom Panel**

50 The following is for P sized cabinets with internal battery backup:

ADDENDUM No. 3

1 Cabinet is provided with two customized panels; one panel is intended to provide additional AC
2 power distribution and contains a controlled AC+ power signal termination which turns off during
3 flashing operation, panel is provided with one 10 positions terminal block, one convenient 35mm
4 din rail with an approximate length of 10.75 inches, two solid aluminum equipment ground and
5 neutral busbars. The second customized panel is provided with two 12 positions terminal blocks
6 for customer convenience. Terminal blocks of both panels are phenolic body with #8-32 phil-slot
7 screws; rated to 300VAC/DC @ 30A.

9-29.13(3)D Cabinet Illumination

8
9
10 The following is for P sized cabinets with internal battery backup:

11 Cabinet is provided with a lighting system which includes one (1) 24V DC Power supply driver
12 Mean Well model LPV-60-24 mounted on the Fan Panel and two (2) JKL 24V DC LED light
13 fixtures, one mounted on the fan panel and the second one mounted under the drawer's bottom
14 to provide maximum illumination to the cabinet.

9-29.13(3)E Generator Bypass Compartment and Cable

15
16
17 The following is for P sized cabinets with internal battery backup:

18 **Manual Transfer Switch and Generator Inlet Panel:**

19 The cabinet is provided with a heavy-duty manual transfer switch. The manual transfer switch
20 (MTS) provides a means of switching between normal utility power block and auxiliary backup
21 generator power. The MTS does not allow simultaneous active power from more than one
22 source and does not allow generator backflow into normal utility AC circuits. The generator
23 connection is included and consists of a three-prong, 30-amp L5-30P twist-lock connector with
24 recessed male contacts for generator hookup.

25
26
27 One utility indicator lamp is provided, and it turns on when the MTS is in the "Generator Power"
28 position, and the normal utility power service is available. It turns off when the MTS is in the
29 "Utility Power" position. One generator power indicator lamp is provided and turns on when the
30 Generator Power is available.

31
32 The MTS and Generator Inlet panel is easily accessible in a compartment behind the
33 weatherproof lockable exterior access door equipped with a tamper-resistant hinge. This access
34 door is provided with a lock Best-Lock "Green Construction Core". One (1) compatible key is
35 furnished with this lock. The access door and generator's cable entrance include a means to
36 prevent access to insects when cable is not present. The compartment is recessed and is deep
37 enough to allow closing and locking off the access door when the generator cable is connected.

9-29.13(3)F Police Panel

38
39 The following is for P sized cabinets with internal battery backup:

40 The police panel is accessible in the compartment behind the police access door. The wiring for
41 these switches will be accessible when the auxiliary technician panel is open, and the following
42 switches are included:

- 43 1. **Auto/Flash Switch:** When the switch is in the AUTO position with controller power on,
44 the signal heads shall be in normal operation. When the auto-flash switch is in the
45 FLASH position with controller power on, the signal heads immediately transfer to the
46 flashing mode, AC power is removed from the load switches and stop timing applied to
47 the controller unit. When the switch is returned to the AUTO position the controller
48 restarts and cycles to normal signal operation.
49

ADDENDUM No. 3

- 1 2. **Manual Control Enable Auto/Manual Switch:** When the manual on- off switch is in the
2 ON position, a logic ground is applied to the manual control enable input of the controller
3 unit.
- 4 3. **Interval Advance Control:** It consists of a Manual Control Enable ON/OFF Switch, and
5 a removable Momentary Interval Advance Control Switch with a 6-ft coiled cord, and a ¼”
6 phone plug. The switch ¼” phone plug is connected to a matching panel mounted ¼”
7 phone jack which is wired to the interval advance terminal, and it is clearly shown on the
8 cabinet wiring diagram.
- 9 4. **Momentary Interval Advance Control Switch:** A manual control cord has the minimum
10 length of six feet when extended with a ¼” diameter three circuit plug connected to one
11 end and a hand-held manual pushbutton switch at the other end. When the manual hand
12 cord is plugged into the jack and the push button is pressed, logic ground is connected
13 to the interval advance input of the controller unit. Except for the vehicular yellow and all
14 red clearance intervals, a complete cycle (push-release) of the manual pushbutton
15 terminates the controller unit interval that is active. Cycling the push-button during the
16 vehicular yellow or all red clearance intervals does not terminate the timing of those
17 intervals.

9-29.13(3)G Auxiliary Switch Panel

18
19
20 The following is for P sized cabinets with internal battery backup:

21 The cabinet includes an auxiliary/technician switch panel mounted to the interior side of the
22 police panel compartment on the main cabinet door. The panel is secured to the police panel
23 compartment by (2) screws and is hinged at the bottom to allow access to the soldered side of
24 the switches with the use of only a Phillips screwdriver. All the switches are protected for
25 inadvertent contact by a hinged see-through acrylic cover. The following switches are included:

- 26 1. **Controller On/Off Switch:** A two positions toggle switch is provided. In the “OFF”
27 position, AC power is removed from the controller. In the “ON” position, AC power is
28 applied to the controller.
- 29 2. **Signals On/Off Switch:** A two positions toggle switch is provided. In the “OFF” position,
30 AC power is removed from all signal heads. This switch is connected to the control input
31 of the main signal contactor, and the main signal head power bus is routed through the
32 main signal contactor output contacts.
- 33 3. **Stop Time Normal/Off/On Switch:** A three positions toggle switch is provided. In the
34 “Normal” position, the stop timing command is applied to the controller by the police flash
35 switch or the MMU. In the “Off” position, the stop timing commands shall be removed
36 from the controller. In the “On” position logic ground is applied to the BIU stop-time
37 inputs and shall cause the controller to stop time. A red LED indicator is provided and
38 illuminates when stop time is applied.
- 39 4. **System/Free Switch:** A two positions toggle switch is provided. In the “SYSTEM”
40 position the controller will operate normally as system coordination control. In the
41 “FREE” Position the local controller will be released to operate in an isolated, fully-
42 actuated manner.
- 43 5. **Auto/Flash Switch:** A two positions toggle is provided. This switch places the field
44 signal heads in flashing operation while the controller continues to operate. This flash
45 shall have no effect on the operation of the controller or MMU. In the “AUTO” position the
46 controller cabinet will operate as normal. In the FLASH positions the cabinet will go into
47 flash mode and the controller shall continue to run.
- 48 6. **Cabinet Lights On/Off switch:** A two positions toggle switch is provided. It turns off and
49 on the cabinet lights.

ADDENDUM No. 3

- 1 7. **Pedestrian On/Off/Test Switches:** Four mini toggle three positions switches are
2 provided to cover the even pedestrian phases (2P, 4P, 6P & 8P) of the controller unit. In
3 the "ON" position, switches provide constant calls. In "OFF" position, controller cabinet
4 performs as normal operation (ped calls are received from field push buttons). In the
5 "TEST" position, switches provide momentary test calls.
- 6 8. **Preemption Normal/Test Switches:** Six mini toggle two positions switches are provided
7 to cover six emergency vehicle preemption channels. In the "NORMAL" position,
8 switches have no effect and PE calls are received from preemption modules. In the
9 "TEST" position, switches provide momentary test calls.

9-29.13(4) Auxiliary Equipment

9-29.13(4)A Traffic Signal Controller

14 Traffic Signal Controller shall be an Econolite Cobalt Shelfmount Controller with an Advanced
15 Transportation Controller (ATC) Communications Module and thin film transistor liquid crystal
16 display (TFT LCD) screen. The CPU operating system shall be Linux-based. The Contractor
17 shall contact the City of Tacoma Traffic Signal Shop at 253-255-2443 to obtain the current
18 firmware version to be utilized.

20 Econolite Cobalt traffic signal controllers operating a Pedestrian Hybrid Beacon (PHB Signal),
21 must be configured by the manufacturer for operation of a pedestrian hybrid beacon. The
22 contractor/vendor shall configure and test the operation of the controller and malfunction
23 management unit prior to delivery to the City of Tacoma Signal Shop.

9-29.13(4)B Malfunction Management Unit (MMU)

26 The cabinet shall come with a Malfunction Management Unit (MMU). The cabinet shall come
27 with a (MMU) that meets all the requirements of NEMA TS2-2003 while remaining downward
28 compatible with NEMA TS1. It shall have (2) high contrast LCD displays and an internal
29 diagnostic wizard. It shall come with a 10/100 Ethernet port. It shall come with software to run
30 flashing yellow arrow operation. The MMU shall be an Eberle Design, Inc. (EDI) model MMU2-
31 16LEip. Contractor shall provide a compatible TS2 program card onboard memory.

33 MMUs monitoring a Pedestrian Hybrid Beacon (PHB Signal), must be configured by the
34 manufacturer specifically for the monitoring and operation of a pedestrian hybrid beacon. The
35 contractor/vendor shall configure and test the operation of the controller and malfunction
36 management unit prior to delivery to the City of Tacoma Signal Shop.

9-29.13(4)C1 Load Switches

39 The following is for P sized cabinets with internal battery backup:

40 LOAD SWITCH, PDC SSS-87 I/O, DUAL INDICATIONS: The solid-state load switches shall be a
41 three-circuit type meeting the requirements of NEMA Standards Publication TS 2-2021, Section
42 6.2.

9-29.13(4)D1 Flasher

44 The following is for P sized cabinets with internal battery backup:

45 FLASHER, 204, PDC, SSF-88 DISCRETE, CALTRANS: The discrete, two-circuit flasher unit, rated
46 at 15A per circuit. The flasher unit shall contain no electro-mechanical devices and must meet the
47 electrical and physical characteristics of NEMA Standards Publication TS 2-2021, Section 6.3.

9-29.13(4)E1 Flash Transfer Relay

48 The following is for P sized cabinets with internal battery backup:

ADDENDUM No. 3

1 FLASH TRANSFER RELAY, STRUTHERS-DUNN #21ACPX-2/21XBP: The flash transfer
2 relays shall part of the back panel. They will be Struthers-Dunn, Part No. 21ACPX-2/21XBP,
3 plug-in type relay.

4 5 **9-29.13(4)F Loop Detector Card Rack**

6 The following is for P sized cabinets with internal battery backup:

7 The detector racks design and configuration conform to TS-2 Table 5-9. The detector racks
8 support (16) channels of loop detection, (1) Bus Interface Unit (BIU) and (4) channel of
9 preemption provided in the first detector rack only. The detector rack can use eight 2-channel or
10 four 4-channel detection cards and two 2-channel or one 4-channel preemption cards. The loop
11 wiring is connected via a 37-pin DB connector using spring clips, The power wiring is connected
12 via 6-pin power connector. The preemption wiring is connected via an 24-pos connector and
13 secured with safety latches. The addressing of detector rack is accomplished via dip switches
14 mounted to the PCB. The detector rack has space at the bottom front for labeling. The eight
15 slots used for detector cards are labeled with the channel numbers as shown in TS-2 Table 5-10
16 (CH1 to CH16). The ninth and tenth slots used for preemptions cards are labeled as follows:
17 ninth slot is labeled "PE CH.C, PE CH.D" and the tenth slot is labeled "PE CH.A, PE CH.B, PE
18 CH.C, PE CH.D". The requirements for preemption cards spacing and card guides are the same
19 as for detector cards per TS-2 Section 5.3.4.2.

20
21 BUS INTERFACE UNIT, EDI BIU-700 or approved equal: The Bus Interface Units (BIU) shall be
22 24V DC, rack mounted meeting the requirements of NEMA Standards Publication TS 2- 2021,
23 Section 8.

24 25 **9-29.13(4)H Ethernet Switch**

26
27 Ethernet switch shall be EtherWAN ED3575-622 Hardened Managed Switch with 2 VDSL2
28 Ethernet Extender ports. 6 10/100TX, + Gigabit SFP Combo + 2 Copper Pair VDSL2 Ports.
29 (Etherwan P/N ED3575-622). A 30 watt, 24VDC output power supply unit shall be provided by
30 the same manufacturer as the switch. A DSL-Octal Cable 2xRJ45, and a minimum 6' Ethernet
31 patch cable shall be provided with each. Two (2) SFP Optics 100Base-FX SM, 1310NM, 15KM,
32 LC fiber optic units shall be provided with each switch.

33 34 **9-29.13(4)I Uninterruptable Power System (UPS)**

35 The following is for P sized cabinets with internal battery backup:

36 The Battery Backup System (BBS) cabinet includes uninterruptable power system (UPS). The
37 UPS includes associated battery terminal cables to link the batteries to the UPS and the
38 batteries. All other ancillary equipment for a complete functioning UPS system shall be
39 included.

40
41 The key UPS system components are identified in the subsections below.

42 43 **9-29.13(4)I1 UPS Module**

44 The following is for P sized cabinets with internal battery backup:

45 UPS SYSTEM, MARATHON TRTC-1124-N1 1100 VA BBS or approved equal: The UPS unit
46 shall be NEMA TS 2 certified, it features fully programmable AC threshold voltage, remote
47 access via RS-232, USB & Network, it offers high output power factor and performs with 24V
48 DC with two or four batteries arrangement for longer run times. It is provided with external
49 connections accessible from front panel and is built in backlit 4-line LCD Display and LED
50 indicators.

ADDENDUM No. 3

1
2 CARD, MARATHON, SNMP-CY54-04, SNMP/WEB or approved equal: A NETAgent 9 SNMP
3 card compatible with Marathon Power Traffic & Ruggedized UPS Series shall be provided, it
4 supports advanced encryption: HTTPS, SSL, SSH, SNMPv3, It features real-time UPS
5 monitoring, record events and data log among other features.
6

7 **9-29.13(4)I2 UATS/UGTS Assembly**

8 The following is for P sized cabinets with internal battery backup:

9 POWER TRANSFER SWITCH, MARATHON TSRC-2003-01 or approved equal: The power
10 transfer switch shall be low profile, space saving design, it shall operate in extreme
11 environments from -40°C to + 74 °C (-40°F to + 165°F). Enclosures with a coordinated visual
12 and technical design to match UPS unit TRTC-1124-N1, it contains a high-quality cam switch
13 with leading and overlapping contacts.
14

15 MOUNTING BRACKETS, MARATHON TRTB-002U-0B FOR TRTC-1124, PAIR or approved
16 equal: Mounting Brackets shall be provided and attached to the UPS unit for the proper
17 installation.
18

19 **9-29.13(4)I3 UPS Batteries**

20 The following is for P sized cabinets with internal battery backup:

21 The cabinet shall come with four (4) valve-regulated Absorbed Glass Mat Technology MK
22 Powered batteries with 91 Ah runtime. The BBS batteries shall be MK Battery model 8A24HEI
23 or equivalent.
24

25 **9-29.13(4)I4 UPS Battery Harness**

26 The following is for P sized cabinets with internal battery backup:

27 BATTERY HARNESS KIT, MARATHON TBHK-2009-24, 24V, W/Y-ADAPTER or approved
28 equal: Battery harness kit will provide the interconnections of four 12V DC batteries arrangement
29 to provide 24V DC to the UPS unit, this arrangement is intended for longer run times.
30

31 **9-29.13(4)J Preemption/Priority Equipment**

32
33 The cabinet shall come with (1) 4-channel rack mounted Opticom™ phase selector. This device
34 shall be capable of receiving encoded signals from Opticom series 700 emitters and detectors.
35 The Opticom™ phase selectors shall be Global Traffic Technologies model 764 or equivalent.
36

37 **9-29.13(4)K BUS Interface Unit (BIU)**

38 The cabinet shall come with four (4) BIU's. They shall meet all requirements of NEMA TS2-
39 1998 standards. In addition, all BIU's shall provide separate front panel indicator LED's for DC
40 power status and SDLC Port 1 transmit and receive status. Each BIU's shall utilize only 1 rack
41 position.
42

43 The (BIU)'s shall be Eberle Design, Inc. model BIU-700H, Econolite model BIU-64, Reno A&E
44 model BIU/2, or Engineer approved equal.
45

46 **9-29.13(4)L Door Actuated Switches**

47 The following is for P sized cabinets with internal battery backup:

48 The cabinet is provided with four door-actuated normally closed push-button switches; they
49 are located at the Main Door Opening and Police Door Opening corner brackets respectively,
50 and their functions are as follows:

ADDENDUM No. 3

1. This switch turns on the cabinet lights when the door is open and turns off the lights when the door is closed.
2. **Door Alarm (DS2):** This switch applies logic ground to the Input BIU2-23B (ALARM 1) when the door is open and removes logic ground when the door is closed.
3. **Manual Control Disable (DS3):** This switch removes the logic ground to the Manual Control Enable Switch for safety purposes when the door is closed.
4. **Door Alarm (DS4):** This switch applies logic ground to the Input BIU2-24A (ALARM 2) when the door is open and removes logic ground when the door is closed.

9-29.13(4)M Unused Red Jumpers

The following is for P sized cabinets with internal battery backup:

Cabinet is provided with sixteen (16) "Red jumpers" for unused phases.

9-29.13(4)N Standard Cables

The following is for P sized cabinets with internal battery backup:

Cabinet is provided with the following cables for its operation:

1. One (1) Controller Power TS 2 type 1
2. One (1) Controller Power TS 2 Type 2
3. One (1) Power Supply

9-29.13(5) Manufacturer Testing and Certification

The complete cabinet assembly with electronics shall undergo complete input/output function testing by the manufacturer before being released to the City of Tacoma.. Testing shall be done via service feed to the 120VAC field terminal. Service power shall be routed through the generator bypass switch, UPS inverter before being connected to the power panel so that all service load circuits are tested.

If the cabinet specified comes with a UPS system (BBS) and batteries; the entire controller cabinet assembly shall undergo a BBS field test procedure where the cabinet is run off battery power for a minimum of one hour.

9-29.16 Vehicular Signal Heads, Displays, and Housing

9-29.16(1) Optically Programmed, Adjustable Face, and Programmable Array 12-Inch Traffic Signal

The second paragraph is supplemented with the following:

Programmable traffic signals are utilized when two intersections are in close proximity. The programmable traffic signal should have the standard features:

- 1) Individual modular sections
- 2) Reinforcing ribs on top and bottom of housings
- 3) Stainless steel door roll pins and eye bolt/wing nut assemblies
- 4) Moisture proof and dust tight neoprene gasket fitted to the gasket channel cast in the door perimeter
- 5) 5-position, barrier-type terminal block with quick-disconnect terminals on one side of each position and screw clamp terminals on opposite side of each position
- 6) 3-prong, PAR-46 lamp secured by a wire ring and a spring load clip
- 7) Acrylic lenses colored to ITE specifications
- 8) Masking kit

ADDENDUM No. 3

9-29.16(2)B Signal Housing

The second paragraph is supplemented with the following:

The door shall open a minimum of 160 degrees.

The third paragraph is supplemented with the following:

The sections shall be held firmly together by corrosion-resistant hardware in such a manner that additional sections may be added easily.

The fourth paragraph is supplemented with the following:

The terminal strip for a standard three-section head shall be a minimum five-position, ten-terminal, barrier-type strip with No. 8 screw-type fasteners. To one side of each terminal shall be attached the white, red, yellow and green signal section leads, leaving the opposite terminal for field wires. Multi-section heads shall be provided with a terminal strip located in the yellow (center) section. Lead shall be No. 18 AWG type with 1/32-inch wall, 105-1/4 centigrade thermoplastic insulation.

9-29.16(3) Polycarbonate Traffic Signal Heads

This section is deleted.

9-29.17 Signal Head Mounting Brackets and Fittings

This section is revised to read:

Vehicle and pedestrian signal heads shall be as detailed in the standard plans.

Span wire vehicle signal hanger hardware shall consist of span wire clamp, wire entrance fitting and vehicle head locking device.

A. Construction

1. Bronze hangers are required.
2. The minimum size of pins shall be 5/8-inch diameter. Pins shall be stainless steel.
3. The minimum size of the 'J' or 'U' cable clamps is 1/2-inch diameter. Cable clamp bolts shall be stainless steel. Clamping insert shall be used.
4. The cable saddle shall be at least 9 inches long.
5. All cotter pins shall be brass and washers shall be stainless steel.
6. All hardware shall be of stainless steel, bronze or brass materials.
7. Signal stem shall be locked with a square headed set screw 1/4-inch minimum in diameter.
8. Wire entrance shall be a minimum of 1-1/4-inch diameter and shall have a female threaded base for nipple.
9. The balance adjuster shall not be used.
10. All stems shall be secured to signal head with proper lock fitting.

Vehicle signal heads attached to a mast arm shall use a type M mounting bracket as detailed in the standard plans and in accordance with Section 8-20.3(14)B and Section 9-29.17.

9-29.18 Vehicle Detector

This section is supplemented with the following:

ADDENDUM No. 3

1 Unless otherwise specified in the contract plans, the vehicle detection system provided shall
2 include the video and record count data for vehicles, pedestrians, bicycles, and provide
3 classification information.

4 5 **9-29.18(3) Detection System**

6 The detection system provided shall have all necessary components/appurtenances required to
7 install/mount, test, operate and maintain a fully functional detection system including but not
8 limited to the following requirements and components:

9 10 **In Cabinet Device**

11 **Communications Interface**

- 12 A. Must support 4G LTE cellular connectivity with MiMo and diversity (Bands
13 B2/B4/B5/B12/B13/B14/B66/B71), UMTS/HSPA+ and GSM/GPRS/EDGE with peak
14 downlink of 150Mbps and peak uplink of 50Mbps
- 15 B. Must support 802.11 a/b/g/n with MiMo and Diversity antennas with security of at least
16 64/128 bits WEP, WPA, WPA2
- 17 C. Must support GPS and GLONASS
- 18 D. Must support communication of Telemetry Data, Video Data, Alert Data, and Vehicle
19 Identification Data to the server via the Communication Service
- 20 E. Must support direct communication between the server and the devices connected to
21 Controller Interface Hardware

22 23 **Antenna**

- 24 A. Must provide an externally mounted antenna for supporting functionality of
25 Communications Interface
- 26 B. Must contain the following fully-enclosed antenna elements and quantities in a single
27 enclosure:
 - 28 • LTE MIMO (quantity: 2)
 - 29 • 2.4GHz/5GHz WIFI MIMO (quantity: 2)
 - 30 • GPS/GLONASS/BEIDOU (quantity: 1)
- 31 C. Must have labeled antenna terminations for easy installation
- 32 D. Must not exceed 35mm in height
- 33 E. Must be colored Pantone 427 U for blend with traffic cabinet construction
- 34 F. Must be IP67 rated and mounted on the cabinet with a water-tight seal made of a closed
35 cell rubber type foam and medium-firm acrylic adhesive with bonding features including
36 a high initial adhesion and excellent high/low temperature holding power with excellent
37 peel strength

38 39 **Peripheral Interface**

- 40 A. Must support 1 x USB 2.0 device ports
- 41 B. Must support 1 x 10/100/1000 Ethernet WAN port
- 42 C. Must support 2 x 10/100/1000 Ethernet LAN ports
- 43 D. Must support 3 x 10/100/1000 Ethernet LAN ports with PoE (support for 802.3af PoE
44 and 802.3at PoE+ to a maximum of 50W across all three ports)
- 45 E. Must support configuration as an integrated layer 2 ethernet switch to support cabinet
46 device interconnectivity
- 47 F. All ethernet ports must feature in-line, auto-resetting surge protection compliant to IEC
48 61000-4-5 Class 4
- 49 G. Processor must utilize dual NVIDIA GPU's

ADDENDUM No. 3

- 1 H. Must support temperature-rated storage comprising of a solid state drive of at least
2 240GB:
 - 3 • Must be SATA III compliant
 - 4 • Must provide support for SMART command set
 - 5 • Must meet minimum shock resistance of 1500 G/0.5ms
 - 6 • Must meet minimum vibration resistance 5~800 Hz at 5G peak
- 7 I. Must provide light-emitting diode (LED) indicators for heartbeat, server connectivity,
8 ethernet link/activity, power, cellular link/activity and device state
- 9 J. Must support 2 x EIA RS-232 over RJ45 interface (cable included)
- 10 K. Must provide 4 x General Purpose I/Os pins (200mA sinking each), digital input, 0~30V
- 11 L. Must provide galvanic isolation between earth ground and logic ground
- 12 M. Must support one SDLC port that meets the following criteria:
 - 13 • Must provide all necessary cabling to connect to a cabinet's existing Port 1/SDLC
14 bus
 - 15 • Must support reading terminal and facility input & outputs at a frequency of at least
16 10 times per second
 - 17 • Must support reading channel state at a frequency of at least 10 times per second
 - 18 • Must support acquisition of MMU fault status including conflict, red failure and
19 clearance failure
 - 20 • Must support reading information from all detectors wired into the cabinet supporting
21 up to 100 ms resolution between detection events
 - 22 • Must detect failure of a detector in either always high, or always low, mode
 - 23 • Must support capturing and reporting Controller Faults based on MMU status bits of
24 'in conflict', 'red failure', 'diagnostic failure', 'in failure state', and 'local flash'
- 25 N. Must provide data buffering of all Telemetry Data (controller state, detector actuations,
26 pre-emption events) and Alert Data during periods of loss of cellular connection for at
27 least 12 minutes
- 28 O. Must provide data buffering of all Telemetry Data and Alert Data during periods of loss of
29 power for at least 5 seconds
- 30 P. All of the above listed Peripheral Interface must be contained within one device with one
31 power supply
- 32 Q. Must support being powered through NEMA 15-5 receptacle OR direct wire to cabinet
- 33 R. Must offer super capacitor-based power reserve sufficient to continue robust operation
34 during brownouts/intermittent power loss for 5 seconds. System must be able to safely
35 shut down in the event of power loss
- 36 S. Must not exceed 10.5" (height), 3" (width), 10" (depth)
- 37 T. Must support vertical and horizontal orientation for installation
- 38 U. Must be configurable via web interface: No dedicated software required to load onto PC
39 for programming interface unit

40

41 Controller Interface (NTCIP)

- 42 A. Must communicate with an NTCIP compliant controller over ethernet providing auto-
43 negotiation to 10/100 Mbps, half or full duplex
- 44 B. Must provide an ethernet cable for interfacing with NEMA TS2 type A1N, A2N, P1N, or
45 P2N controllers
- 46 C. Must communicate to the controller over TCP/IP
- 47 D. Must support communication over SNMP v1, v2c, and v3 protocols
- 48 E. Must support communication over STMP NTCIP protocols reading all objects defined in
49 NTCIP 1201 and 1202 supported by the controller

50

ADDENDUM No. 3

- 1 In-Cabinet Computation and Actuation
- 2 A. In-cabinet device must support the addition of an optional module for detection and
- 3 counting computation
- 4 B. Computation Module must not increase external physical footprint of cabinet device
- 5 C. Computation Module must derive power from existing in-cabinet device
- 6 D. Must support up to two Intersection Cameras for coverage of larger or irregular
- 7 intersections
- 8 E. Must support up to four Advance Detection cameras in addition to two At-Intersection
- 9 Cameras with the use of vendor recommended POE Switch
- 10 F. Must have an integrated TFT color display which provides diagnostic information such
- 11 as the status of all phases and detectors, as well as diagnostics on the camera IP and
- 12 operational status
- 13 G. Must display status of detection channel on a front panel display
- 14 H. Must display Transmit/Receive status of SDLC bus
- 15 I. Must include onboard processing capabilities to perform video-based vehicle detection
- 16 and generation of traffic analytics
- 17 J. Must integrate with Opticom Cloud Pre-emption without the need for additional hardware
- 18 K. Module must be able to use Interface's existing SDLC port for actuation. Must provide
- 19 the capability to act as one or more SDLC detector racks. Must support generating
- 20 actuations on up to 64 channels over SDLC
- 21 L. Typical system power consumption of the full system should be less than 130W
- 22 M. In cabinet hardware supplied must be able to run Miovision Surtrac adaptive signal
- 23 control
- 24
- 25 Certification Testing
- 26 A. Must be fully NEMA tested and compliant, including shock, vibration, voltage, and
- 27 thermal articles 2.2.7-2.2.11
- 28 B. Must support NEMA operating temperature specification -34 °C to 74 °C (-29 °F to 165
- 29 °F)
- 30 C. Must support NEMA storage temperature specification -34 °C to 74 °C (-29 °F to 165 °F)
- 31 D. Must support humidity operating requirements of 5% - 95% RH non-condensing
- 32 E. External power supplies must be UL and c-UL compliant
- 33 F. Must be FCC tested and compliant
- 34 G. Must be ROHS compliant
- 35
- 36 Intersection 360 Camera
- 37 A. Must provide 360 degrees of visibility from the point of installation
- 38 B. Must be powered via Power over Ethernet (PoE) and be IEEE802.3af compliant
- 39 C. Must NOT require any fiber optic connections from the processor to the camera
- 40 D. Must support configuration in both spherical "fisheye" configuration, and rectangular
- 41 "quad view"
- 42 E. Must support at least 9 megapixel (MP) capture
- 43 F. Must support ability to capture 4K video
- 44 G. Must provide H.264 and MJPEG image compression
- 45 H. Must support H.265
- 46 I. Must support RTSP streaming
- 47 J. Must support third-party integration of RTSP video streams into Video Management
- 48 System (VMS) platforms
- 49 K. Must support maximum aperture ratio of 1:1.9
- 50 L. Must support focal length of 1.38mm

ADDENDUM No. 3

- 1 M. Must include a clear polycarbonate resin-based dome
- 2 N. Must be rated to IP66 (NEMA 4X compliant)
- 3 O. Must include an electronic de-humidification device for use in various weather conditions
- 4 P. Must support the ability for users to zoom in and out, rotate and pan the video feed
- 5 Q. Must allow direct connection of Cat 5e cable from camera to traffic cabinet to limit
- 6 number of connections
- 7 R. Must include lens defrost functionality with total camera power operation not exceeding
- 8 standard PoE
- 9 S. Must utilize a NEMA temperature rated shielded PoE cable with drain wire
- 10 T. Must support in-line ethernet repeaters for long distance cable runs

11

Mount

- 13 A. Must include all mounting hardware with device for vertical and horizontal mounting
- 14 B. Mounting fixture must be constructed of weatherproof painted aluminum or stainless
- 15 steel
- 16 C. Mounting hardware must support 6ft' vertical pole installation, horizontal pole installation,
- 17 or attachment via a 1.5" threaded fitting
- 18 D. Mounting fixture (including camera, 40ft cable) must not exceed 540mm x 460mm x
- 19 205mm in size, and 6kg in weight (not including 6 ft extension)

20

Detection Plus License (Perpetual)

- 22 A. Shall include detection plus license
- 23 B. Must support collection of a rolling 365 day buffer of Occupancy Ratios
- 24 C. Must support collection of a rolling 365 day buffer of Arrivals on Red, and Arrivals on
- 25 Green
- 26 D. Must support collection of a rolling 365 day buffer of Phase Interval
- 27 E. Must support collection of a rolling 365 day buffer of Turning Movement Counts
 - 28 • Turning Movement Count accuracy must be a minimum of 90% during normal
 - 29 weather and operating conditions for correct camera set ups
 - 30 • System must be able to generate bi-directional pedestrian counts for each crosswalk,
 - 31 including for groups of pedestrians
 - 32 • Pedestrian counting accuracy must be a minimum of 85%, including for large groups
 - 33 of pedestrians, during normal weather and operating conditions for correctly camera
 - 34 setups
 - 35 • System must be able to count bicycles both on the road and on the crosswalk. These
 - 36 counts should be able to be measured separately
 - 37 • Bicycle counting accuracy must be a minimum of 80% during normal weather and
 - 38 operating conditions for correctly set up cameras
 - 39 • Count data must be available via a real time local device API
 - 40 • Count data must be available via a local CSV download

41

Upgradability (General)

- 43 A. Must support the ability for in-field devices to receive over-the-air (OTA) upgrades for
- 44 continued improvement of system capabilities and/or security improvements
- 45 B. Must support the ability to remotely add/upgrade the cellular communications plan for
- 46 each system in cases where remote communications to the entire traffic cabinet is
- 47 required. It is understood that additional costs would apply in these cases.
- 48 C. Must support the ability to add cabinet monitoring for UPS and door alarms with
- 49 additional software license and no additional no additional hardware devices (requires
- 50 communications)

ADDENDUM No. 3

- 1 D. Must support the ability to add additional software license for ATSPMs with additional
2 software license and no additional hardware devices (requires communications)
- 3 E. Must include the additional software license for cloud-based multimodal counts and
4 mobility dashboard and database without any additional hardware devices
- 5 F. Must support the ability to add additional software license for remote video recall and
6 cloud based streaming capability (requires communications)
- 7 G. Must include the detection/counts computation module where required to support
8 actuation and counting applications using vendor sensors.

9 10 **Intersection Monitoring Software**

11 Cellular Communications

- 12 A. Must provide 4G LTE cellular data service between the Communications Interface and
13 the Server via a national commercial carrier capable of using LTE Bands 2, 4, 5, 12, 13,
14 14, 66 and 71
- 15 B. Must provide 1GB per month per location for 4G LTE cellular data usage, pooled
16 collectively between total number of Intersection Monitoring locations
- 17 C. Must provide optional upgrades of monthly bandwidth by location to support various use
18 cases

19 20 Server

- 21 A. Must be hosted at a professional cloud hosting facility with redundancy of at least two
22 instances, with automatic load balancing and must scale to support simultaneous
23 number of connections
- 24 B. Must support permanent storage of all Telemetry Data, Alert Data, and Vehicle
25 Identification Data in perpetuity

26 27 Secure Communications

- 28 A. Must provide a Virtual Private Network (VPN) for secure data transmission between the
29 Communications Interface and Server
- 30 B. Must create a private network where IP traffic can be transmitted from a traffic cabinet
31 directly into the traffic management center and any central software systems
- 32 C. Must use authenticated using public key infrastructure (PKI) and encrypting using PKI
33 and the TLS/DTLS1.0+ protocol
- 34 D. Must support HTTPS/SSL communication to the Server from the public internet for
35 access of the User Interface
- 36 E. Must support revoking of all authenticated user names, passwords, or keys at any time
- 37 F. Must support simultaneous integration across a heterogeneous mix of different
38 technologies and providers, including different cellular providers, fibre connected
39 networks, and point-to-point radio solutions.
- 40 G. Must support integrating an unlimited number of intersections with the customers Central
41 Management System and be capable of supporting both IP and serial-over-IP
42 connections to all controller models in the field. The communication system must meet
43 all bandwidth and latency requirements of the customers' CMS
- 44 H. Must meet all bandwidth and latency requirements of the Customer's Central
45 Management System

46 47 Device Monitoring

- 48 A. Must provide a serial-over-LTE connection and appropriate networking support to enable
49 secure communications between cabinet hardware and existing third party software

ADDENDUM No. 3

1 used by the Customer including Central Management Systems and MMU desktop
2 software applications

3

4 User Interface

- 5 A. Must provide a secure web-based Graphical User Interface (GUI) using SSL
- 6 B. Must support an unlimited number of concurrent logins by authenticated users
- 7 C. Must be fully accessible via desktop and tablet on Chrome, Microsoft Edge and Safari
- 8 D. Must provide all the functionality of Signal Monitoring, Alerts Management, Inventory &
9 Asset Management and Traffic Data Analysis from a single software application
10 requiring a single login
- 11 E. Must support user login via OAuth Login
- 12 F. Must support multifactor authentication (MFA)
- 13 G. Must provide a secure means of verifying account registration via email
- 14 H. Must provide a secure means of password reset
- 15 I. Must support the addition and management of user accounts for users that are both
16 inside and outside of the organization at no additional cost
- 17 J. Must support access to all Telemetry Data and Alert Data

18

19 Counts System Capability

- 20 A. Shall include the count system
- 21 B. Must classify road users. Bicycles, Pedestrians, Light Vehicles, Single Unit Trucks,
22 Articulated Trucks, Buses
- 23 C. Must be able to distinguish between lanes for any given vehicle movement. (E.g. NB
24 Thru lane 1, NB Thru lane 2).
- 25 D. Must be cable of counting large groups of pedestrians

26

27 Web-based API

- 28 A. Must make all multimodal counts data collected since initial installation available via a
29 securely hosted REST API
- 30 B. Must require a secure API key for access to the REST API
- 31 C. REST API must be able to provide up to 48 hours worth of data in a single response
- 32 D. REST API must provide an endpoint that returns data in a CSV format compatible with
33 MS2, with 15 minute bins
- 34 E. REST API must provide an endpoint that returns data formatted in JSON with 1 minute
35 bins

36

37 Web-based Dashboard

- 38 A. Must provide access to a secure (authentication required) dashboard for counts data
- 39 B. Must provide summaries of total Vehicles, Pedestrians, Bicycles, and Truck Percentage
- 40 C. Must make it possible to retrieve data from all dates the system was installed for using a
41 date selector
- 42 D. Must show raw data for ranges of a day or less
- 43 E. For ranges of a day or more, it must be possible to show 5th, 50th (median), 85th, and
44 100th percentiles of data for the date range.
- 45 F. It must be possible to export the raw Binned data or Typified data when a percentile
46 aggregation is selected.
- 47 G. Must have at least 15 minute bin resolution

48

49 Support and Training (Included)

50 Technical Support

ADDENDUM No. 3

- 1 A. Vendor must provide technical support via email and toll-free telephone for all included
- 2 hardware and software between the hours of 9:00 and 17:00 EST/EDT, Monday to
- 3 Friday.
- 4 B. Local partner support can be scheduled from the Distributors network
- 5 C. Must provide onsite training can be scheduled if required (under Covid-19 safety
- 6 protocols)
- 7 D. Vendor must provide guidance on camera placement for optimal performance
- 8 E. Vendor must have dedicated technical account manager supporting installations and
- 9 issue resolution resolutions
- 10 F. Must support periodic internal automated validation of detection accuracy for each
- 11 configured presence zone in the intersection
- 12

Training

- 13
- 14 A. Vendor must provide free training videos and webinars for device installation of cabinet
- 15 devices, camera locations, configuration of zones and counts, operation, and
- 16 troubleshooting.
- 17

Construction

General

- 18
- 19
- 20 A. Provide the devices as indicated on the plans
- 21 B. Provide antenna(s) on the cabinet per provided instructions
- 22 C. Support using settings that were approved at equipment mock up (if required per the
- 23 Special Provision for Testing and Integration) or as approved by the Engineer to ensure
- 24 interoperability and security, including VPN settings, local IP address, port forwarding
- 25 and Network Address Translation (NAT), and IP-based filtering
- 26 D. Integrate and test to meet specifications for integration and as shown on the plans
- 27

Warranty

- 28
- 29 A. Provide devices with a standard manufacturer's warranty, transferable to the Customer.
- 30 The device must carry a warranty on parts and labor for 3 years from the date of
- 31 installation. Device-level Firmware and Software are updated for the life of the product.
- 32 Software and Web application updates, and security patches, must be provided by the
- 33 vendor over the term of the contract.
- 34

35 All mounting hardware and cabling shall meet the manufacturer's recommendations, unless
36 otherwise specified herein.

37

38

9-29.22 Preemption Hardware

39

40 Preemption Hardware shall be Opticom TM Model 721 unless otherwise specified in the Plan.
41 Railroad preemption hardware and wiring shall be provided as specified in the Plan.

42

43

9-29.24 Service Cabinets

44 *This section is supplemented with the following:*

45

46 Service cabinets shall be pole mounted, exterior NEMA 3R Rated with a bolt on HUB for top

47 entry. Cabinet shall be a maximum 10 inches wide, 14 inches high, and 5 inches deep.

48

49

ADDENDUM No. 3

1 Load Center shall have between 100 and 150 Amps, with capacity for 6 spaces and 12 circuits,
2 or 8 spaces and 16 circuits as required by Code.

3

4 Service panels shall be Square D – QO Series

5

6 **9-29.24(2) Electrical Circuit Breakers and Contactors**

7 *The first paragraph is supplemented with the following:*

8

9 Mercury relays shall not be accepted. Contactors shall be one of the following brands:

- 10 1. Square D
- 11 2. Siemens
- 12 3. Eaton/Cutler Hammer
- 13 4. Engineer Approved Equal

14

15 *The second paragraph is deleted.*

16

17 *The third sentence of the third paragraph is deleted.*

18

19 *The third paragraph is supplemented with the following:*

20

21 All service panel breakers shall be one of the following brands/series

- 22 1. Square D – QO Series
- 23 2. Siemens – Type BL
- 24 3. Eaton/Cutler Hammer – Quick Lag Type BA
- 25 4. Engineer approved Equal

26

27 All surface mount breakers shall be one of the following Brands/Series:

- 28 1. Square D (Type QOU)
- 29 2. Siemens
- 30 3. Eaton/Cutler Hammer
- 31 4. General Electric
- 32 5. Engineer approved Equal

33

34 **9-29.25 Amplifier, Transformer, and Terminal Cabinets**

35 *This section is supplemented with the following:*

36

37 Terminal compartments may be incorporated into the signal standard as an alternative to
38 providing a separate terminal cabinet attached to the pole. Terminal compartment should offer
39 similar physical and electrical capacity as specified. Contractor shall provide submittals in
40 accordance with the contract documents and obtain approval from the engineer for the alternate
41 design prior to proceeding. Signal standards and terminal compartments shall meet all other
42 structural, mechanical, electrical, and finish requirements as specified, and be suitable for the
43 intended purpose.

44

45

46

END OF SECTION

47

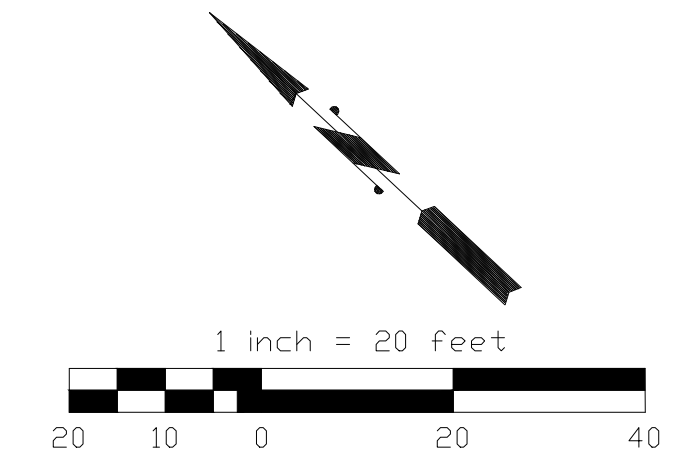
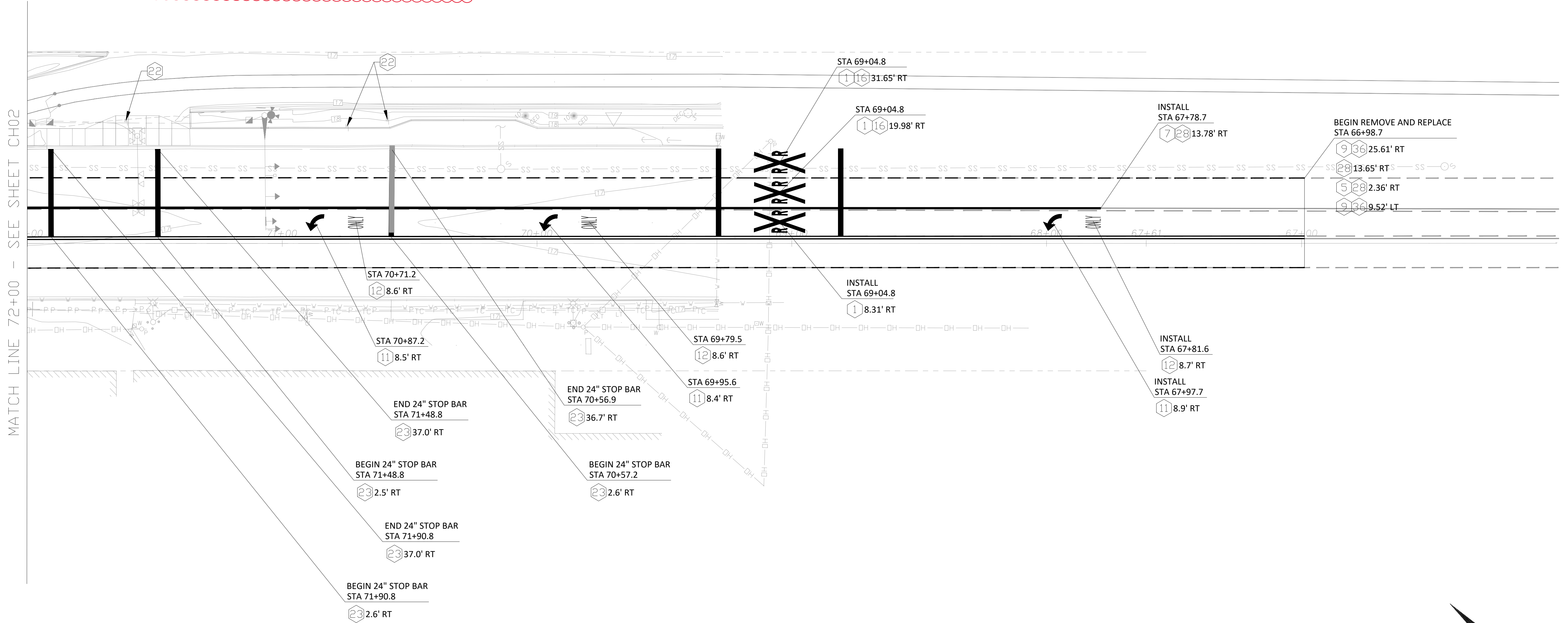
CONSTRUCTION NOTES

- 1 REFRESH RAILROAD CROSSING SYMBOL WITH 24" TRANSVERSE LINE, THERMOPLASTIC. SEE WSDOT STD PLAN M-11.10-04 LAYOUT A AND CITY OF TACOMA STD PLAN CH-10.
- 5 REFRESH YELLOW DOUBLE LINE, **PAINT**. SEE CITY OF TACOMA STD PLAN CH-03A DOUBLE YELLOW CENTER LINE (4" X 2) DETAIL.
- 6 REFRESH YELLOW DOUBLE LINE, **THERMOPLASTIC**. SEE CITY OF TACOMA STD PLAN CH-03A DOUBLE YELLOW CENTER LINE (4" X 2) DETAIL.
- 7 INSTALL YELLOW TWO-WAY LEFT-TURN CENTERLINE, THERMOPLASTIC. SEE CITY OF TACOMA STD PLAN CH-03A YELLOW TWO WAY LEFT TURN LINE (4" X 2) DETAIL.
- 9 INSTALL WHITE WIDE SOLID LANE LINE, THERMOPLASTIC. SEE CITY OF TACOMA STD PLAN CH-03A WHITE GORE LINE (8") DETAIL.
- 11 REFRESH WHITE LANE LINE, **PAINT**. SEE CITY OF TACOMA STD PLAN CH-03A WHITE LANE LINE (4") DETAIL.
- 12 REFRESH WHITE LANE LINE, **THERMOPLASTIC**. SEE CITY OF TACOMA STD PLAN CH-03A WHITE LANE LINE (4") DETAIL.
- 11 INSTALL LEFT TURN ARROW PAVEMENT MARKING, THERMOPLASTIC. SEE CITY OF TACOMA STD PLAN CH-09 AND CH-10.
- 12 INSTALL LEFT TURN ONLY PAVEMENT MARKING, THERMOPLASTIC. SEE CITY OF TACOMA STD PLAN CH-09 AND CH-10.
- 16 REMOVE EX RAILROAD CROSSING PAVEMENT MARKINGS, THERMOPLASTIC.

- 22 PROTECT EX SIGNS AND SIGN SUPPORT.
- 23 INSTALL 24" STOP BAR, THERMOPLASTIC.
- 28 REMOVE YELLOW TWO-WAY LEFT-TURN CENTERLINE, THERMOPLASTIC.
- 36 REMOVE EX WHITE LANE LINE AND RPM'S.

GENERAL NOTES

1. CONTRACTOR SHALL REMOVE AND REPLACE EXISTING MARKINGS IN PLACE. STATIONING SHOWN FOR EXISTING MARKINGS ARE PER SURVEY DATA. CONTRACTOR SHALL VERIFY LOCATIONS PRIOR TO REMOVING EXISTING MARKINGS.
2. STATIONS AND OFFSETS ARE SHOWN FOR THE CENTER OF THE SYMBOLS AND WORDS.



ISSUED FOR BID ADDENDUM NO. 3

CALL BEFORE YOU DIG

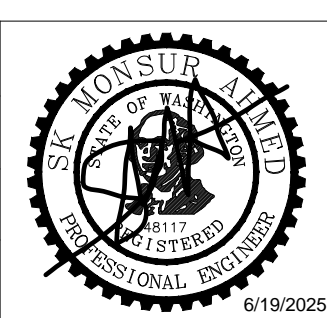
EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY PER BEST AVAILABLE INFO, AND MAY BE INCOMPLETE. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING, POTHOLES AND AVOIDING ALL EXISTING UTILITIES.

CALL TWO BUSINESS DAYS BEFORE YOU DIG (1-800-424-5555) OR VISIT ONLINE: www.callbeforeyoudig.org



NO	0	ISSUED FOR BID	02/24	DATE	APPD
NO		REVISION		DATE	APPD

FINAL CONSTRUCTION CHECKED	DATE	SCALE
BY	FEB 2024	1:20
DESIGNED	WXD	CHECKED
DRAWN	JSB	SMA
DATE		PROJECT NAME
		TACOMA RR
FIELD BOOKS	DRAWING NAME	
	X-CHAN.DWG	



CITY OF TACOMA
DEPARTMENT OF PUBLIC WORKS
CHANNELIZATION AND SIGNING PLAN
PORT OF TACOMA & LINCOLN AVE
RAILROAD CROSSING IMPROVEMENTS

RAIL-0003S (595)
SHEET NO. CH03
SHEET 114 OF 114