

ADDENDUM #1

1.1 PROJECT INFORMATION

- A. Project Number: 2018-10259
- B. Project Title: Spokane Falls Station
- C. Project Location: Spokane Falls Community College
3410 W. Fort George Wright Dr., Spokane, WA
- D. Agency: Spokane Transit Authority

1.2 NOTICE TO BIDDERS

- A. The following clarifications, changes, additions, and/or deletions are considered as Addendum #1 and are hereby made a party of the contract documents. All bidders are required to base their bid upon the information furnished in this addendum and as required in the contract documents. The Contractor is required to acknowledge Addendum #1 in their company proposal. Failure to acknowledge addendum on the bid form will result in the bid proposal being declared non-responsive.
- B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.
- C. ALL questions about the project, the plans, and the specifications are due by 5pm on February 26, 2019 in order to allow for distribution of any additional addenda before bid time. If you have questions beyond February 26, 2019 please use your best judgement as professionals in your field and err on the side of conservative.
- D. All communications shall be directed to Jessica Charlton as listed in the bid documents at jcharlton@spokanetransit.com or by telephone at 509-325-6049.

1.3 CLARIFICATIONS / GENERAL

- A. **Prevailing Wage:** The minimum prevailing wage provisions for Washington State law apply to this project.
- B. **Work Hours:** It is anticipated that work will be completed within normal business hours, between 7am and 5pm. City of Spokane noise regulations and Washington State labor hour regulations are to be adhered to unless deviation is authorized by the governing authority.
- C. **Permitting:** STA has submitted for and the City of Spokane has approved a plan review of the project. STA will reimburse the contractor the cost of the Parking Lot Permit, Monument Sign Permit, and the Signal Permit with no markup. Do not include these amounts in your bid. All other permits required for successful completion of the job (i.e those that are trade specific or involve obstruction of ROW, etc.) are the responsibility of the contractor and are to be included in the bid.

1.4 REVISIONS/CLARIFICATIONS TO PLANS AND SPECIFICATIONS SECTIONS

- A. **Specification Section 034500 – Precast Architectural Concrete**

DELETE: Section 1.3 ALLOWANCES.

- B. **Specification Section 01 56 39 – Temporary Tree Protection**

REVISE 1.1B to read as follows: “Contractor shall conduct pruning and removal of trees identified on Drawings to be removed, along with removal of stumps. Work of this type shall be completed by a licensed professional arborist, per the standards of the International Society of Arboriculture.”

REVISE 3.3A.2 to read as follows: "Posts: Set welded or precast post bases at perimeter of protection area and secure fence panels with rebar posts driven into ground; tying rebar posts into fence panels and posts as needed to secure fence, taking care to avoid tree roots with driven stakes. Where a post is located on existing paving or concrete to remain, provide precast concrete post base or welded post bases."

REVISE 3.6A to read as follows:

"A. Prune as required only as described within the Base Bid description in paragraph 1.1. These procedures will include standards set forth by the "American National Standard for Tree Care Operations" ANSI A300, current edition, and the International Society of Arboriculture. If this service cannot be performed by the contractor at a professional level, a certified, licensed, and insured arborist may be hired to perform the work directly. Obtain all necessary permits as applicable.

1. Cut branches with sharp pruning instruments; do not break or chop.
2. Do not apply pruning paint to wounds.
3. Promptly repair trees damaged by construction within 24 hours.
4. Treatment of damaged trunks, limbs, and roots will conform to ANSI A300 current edition pruning standards.
5. All pruning will conform to ANSI A300 current edition pruning standards, with the supervision of the Owner's representative, to remove damaged branches and encourage healthy new growth.
6. Owner will review completed pruning and direct additional work if it is necessary in his opinion."

C. **Specification Section 31 10 00 – Site Clearing**

REVISE 3.3.C3 to read as follows: "Treat cuts in roots per ANSI A300, latest edition."

D. **Specification Section 32 95 00 – Illumination, Traffic Signal Systems and Electrical**

REPLACE entire City of Spokane General Special Provisions 8-20 with attached updated City of Spokane General Special Provisions 8-20.

E. **Specification Section 32 96 00 – Illumination, Signal and Electrical**

REPLACE entire City of Spokane General Provisions 9-29 with attached updated City of Spokane General Provisions 9-29.

F. **Sheet 1/6 –**

Add additional remove striping callouts. See attached DWG NO. CC-02.

G. **Sheet 2/6 –**

Revised striping at east entrance on Fort George Wright. Switched "DOTTED WIDE LINE" for "SKIP LINE" on Note D. See attached DWG NO. CC-01

H. **Sheet 3/6 –**

Revised east and west entrance on Fort George Wright to be concrete pavement instead of heavy-duty asphalt. Replaced detail 1 with a concrete pavement detail. Added note for contractor to match existing asphalt section for portion of Fort George Wright that will be replaced. See attached DWG NO. CC-03 and CC-04.

- I. **Sheet C-302 –**
Revised callout to R11 – “REMOVE STORMWATER UTILITIES”. See attached DWG NO. CC-06.
 - J. **Sheet C-042 –**
Added curb inlet, see attached DWG NO. CC-07.
 - K. **Sheet C-802 –**
Revised detail 10 to show one proposed type 1 drywell. See attached DWG NO. CC-05.
 - L. **Sheet L-200 through L-203 –**
Update Plant Schedule to include reference to City standard planting details. Update General Planting Notes with City standard notes. See attached DWG NO. CL-01.
 - M. **Sheet E-101 –**
Revised general note to provide correct contact number for Zayo communications.
Revise Note 9 to read “..Modular Enclosure #AMP~~32P-2625-24RU~~ #AMP47P-2625-24RU..”
- 1.5 QUESTIONS / ANSWERS (from the Pre-Bid Meeting, Emails, and Phone Calls)
- Question 01:** *What is the project budget?*
Answer 01: \$2.963M. The project is funded by a Washington State Regional Mobility Grant and local STA funding.
- Question 02:** *What is the engineers estimate for the project?*
Answer 02: Approximately \$2,374,838.
- Question 03:** *When is Notice to Proceed expected to be given, the signal poles have a long lead time?*
Answer 03: The expectation is that the low, responsive and responsible bidder will be awarded the contract by STA’s Board of Directors on April 18, 2019. STA’s goal would then be to provide notice to proceed immediately after authorization of the contract and receiving all required bonding and insurance documentation.
- Question 04:** *Do we have to avoid any work in the street during Bloomsday?*
Answer 04: If site work does actually start before Bloomsday, May 5, 2019, the contractors schedule must avoid starting any select demolition or new work in Ft. George Wright Drive until after the event. Due to the amount of foot traffic and disruption for the race utility locates are not recommended until after the event.
- Question 05:** *Does work in Area 1 have to be done before work in Area 2 (as related to sheet C-400 Construction Phasing)?*
Answer 05: No. Area 1 is simply the first area that construction can start until June 13, 2019 when SFCC’s spring quarter ends. After June 13, 2019 the contractor may then expand the work area to encompass Area 2.

Question 06: *What permits do we need to have in our bid?*

Answer 06: Please see **Permitting** in part 1.3 of this addendum.

Question 07: *A 2" conduit is shown as related to Communications but there is no indication of what is in the conduit. Is it fiber?*

Answer 07: Conduit is for fiber connection from Zayo communications.

Question 08: *Are there backbone cable requirements between these cabinets, or will this be completed by Zayo?*

Answer 08: Conduit to be provided and installed by contractor. Fiber will be pulled and connected by Zayo.

Question 09: *The Zayo Communications contact info does not appear to be correct. Please verify the contact name and number?*

Answer 09: Contact number has been corrected. See attached DWG No. CE-01.

Question 10: *Please verify that cameras are provided and installed by STA?*

Answer 10: Yes, they are provided and installed by STA.

Question 11: *The part number, #AMP32P-2625-24RU, for the Modular Enclosure in Note 9 on Sheet E101 is not an accurate number. This part number is for a 16 rack unit cabinet. American Products has informed me that we would need to purchase an #AMP47P-2625 to achieve the 24RU requested. Can you clarify what part number and size of cabinet that STA would like for this project?*

Answer 11: The part number should be revised to #AMP47P-2625-24RU. See also part 1.4 of this addendum

Question 12: *Section 015639 2.1B: This specification for tree protection zone fencing is way above and beyond any scope of work we have performed in the City or surrounding county for tree protection. We are very familiar with this practice as we are responsible for protecting the trees during the Riverfront Park Redevelopment Project and we also protect trees for city construction projects as well and have been doing so for many years. Driving posts into the ground of the size specified can cause more root damage than needed and the equipment needed to do this will contribute to the compaction of the soil within the tree protection zone. May I suggest 4' orange construction fencing with #4 rebar posts and caps. Four feet is too high to step over, the posts are 1/2" in diameter, installed by hand and removed by hand and the overall material and installation costs of these products is many times less expensive than the products specified. This is the standard for tree protection for the last 5-10 years in Spokane and it works quite well with some monitoring.*

Answer 12: Four foot orange plastic fencing has shown to be less than robust in a construction project, is easily relocated by workers, resulting in materials storage over root zones and vehicle traffic, despite monitoring. An acceptable alternative to driven posts as specified would be 6' tall chain link construction fencing with precast concrete bases or welded "T" frames, staked in place with rebar to prevent relocation.

Question 13: *Section 015639 3.4C and 3.5 and 3.7E- Root pruning inside the tree protection zones or anytime roots are encountered larger than 1" in diameter should be performed by an arborist after excavation with an air-spade. This ensures the least amount of impact to the root system and goes a long way towards the longevity of the trees being protected. All trenching and pruning of roots in the above situations should always be performed by an arborist.*

Answer 13: Updated specifications see part 1.4 of this addendum.

Question 14: *3.6A1 – This is no longer an accepted practice according to the ANSI A300 standards you are referencing.*

Answer 14: Updated specifications see part 1.4 of this addendum.

Question 15: *3.9D – This does not seem correct. A 5" caliper tree is worth \$9500?*

Answer 15: This is correct for the intent of tree protection.

Question 16: *Section 311000 3.3C3 – this is no longer an accepted practice as per ANSI A300 standards.*

Answer 16: Updated specifications see part 1.4 of this addendum.

Question 17: *According to the specs the fence is to be a (2) rail. Sheet L-501 shows it as a (3) rail. Please clarify.*

Answer 17: The specs are correct; it is a (2) rail fence.

Attachments:

Pre-Bid Meeting Agenda, dated 02.14.19

Pre-Bid Meeting Sign-in sheet, dated 02.14.19

Updated City of Spokane General Special Provisions 8-20

Updated City of Spokane General Special Provisions 9-29

Clarification Civil Drawing No. CC-01

Clarification Civil Drawing No. CC-02

Clarification Civil Drawing No. CC-03

Clarification Civil Drawing No. CC-04

Clarification Civil Drawing No. CC-05

Clarification Civil Drawing No. CC-06

Clarification Civil Drawing No. CC-07

Clarification Electrical Drawing No. CE-01

Clarification Landscaping Drawing No. CL-01

SPOKANE TRANSIT
PRE-BID MEETING
FOR
SPOKANE FALLS STATION
2018-10259
AGENDA

Date: February 14, 2019
Time: 10:00 a.m. – 11:00 a.m.

Meeting Location: Spokane Falls Community College
3410 W. Fort George Wright Dr., Spokane, WA

1. SIGN IN
2. INTRODUCTIONS
3. GUIDELINES
 - a. Questions and comments will be accepted during the meeting.
 - b. Remarks, clarifications, or corrections to the IFB during the meeting shall not change the terms of the solicitation.
 - c. A **written amendment** will be issued following the meeting stating any clarifications, corrections, or additions to the solicitation. The sign in sheet will be included along with an updated Plan Holders list with all information provided. All prospective Bidders and Plan Centers who received the original IFB will receive the amendment. Last day for questions will be 5pm, Tuesday, February 26, 2019. If you have questions beyond that time please use your best judgment as professionals in your field. When in doubt err on the side of conservative.
 - d. **All communications** shall be directed to Jessica Charlton as listed in the bid document. You may contact Jessica Charlton at jcharlton@spokanetransit.com or by telephone at 509-325-6049. **Please do not contact the architects, engineers, or other STA staff directly. The goal is to get consistent information to all prospective Bidders.**
 - e. Reminders & General Information
 - i. Washington State Prevailing Wage rules and regulations apply to this project.
 - ii. Portions of the project qualify as a “public road work” under Rule 171. Please refer to the STA Instructions to Bidders part 1.10 Taxes.
 - iii. STA has submitted the project for plan review with the City. Plan review comments were received on February 12, 2019. Any necessary changes or clarifications will be included in Addenda and distributed to you, plan centers, and uploaded to STA’s web site.
 - iv. Bids are due by 3pm on Tuesday, March 5 at the receptionist’s desk of Spokane Transits headquarters located at 1230 W. Boone Avenue, Spokane, WA. Bid opening will follow in a room of the same facility.

- v. Bonding, insurance, and retainage requirements typical of public works project apply.
- vi. State requirements for inclusion of your MEP subs apply as the project is estimated at greater than \$1 Million. In addition to MEP's, please submit with your bid your selected earthwork contractor.
- vii. The phasing plan was created based on campus operations. Please pay attention to the notes as included on sheet C-400 and ensure you schedule accounts for these requirements.
- viii. Permitting, noise & dust limitations, security, traffic control/access, project safety, project safety, & project safety.
- ix. Budinger & Associates will provide the geotechnical, materials, and environmental inspection/site observation/testing for the project.
- x. Hill International along with support from Coffman, ALSC, and SPVV will provide project management, and administration for the project.
- xi. The contractor is responsible for, and should include in their bid, their own site survey, project layout, staking, etc.

4. TOUR OF WORK GENERAL WORK AREAS:

Please direct any questions during and after the tour to Jessica Charlton, Project Manager. Do not contact the engineers or architects directly. All correspondence must come through Jessica to ensure cohesiveness to the disbursement of additional information or any changes to the project.

PRE-BID MEETING — Spokane Falls Station
DATE February 14, 2019



SIGN-IN

PLEASE PRINT. ALL INFORMATION IS OPTIONAL.

	NAME	COMPANY	PHONE &/OR EMAIL
1	Brandon Smith	Associated Construction	brandon@acisokane.com
2	MATT WESTER	INTERWEST COMMUNICATIONS	mwesterc@interwestcorp.net
3	Pat Kaufman	Interwest Comm.	PKaufman@interwestcorp.net
4	Will Lykos	MHL construction	will@mandkconstruction.net
5	Troy Diederichs	Colvico Inc	tdiederichs@colvicoinc.com
6	Rox Marsh	ERRG	rox.marsh@erreg.com
7	Todd Roberts	ERRG	todd.roberts@erreg.com
8	Lori Porath	VNAC Construct.	Lori.PORATH@vnacinc.com
9	Shawn Chappell	Corridor Contractor	Chappella@corridorcontractors.com
10	Joe Chavez	W.A. Winkler	Schaefer@wawinkler.com
11	Matt Pasotti	VNAC Inc.	Matt.Pasotti@vnacinc.com
12	Mike Reilly	Cameron-Reilly	mike@Cameron-Reilly.com
13	Emmett Bowly	Award construction inc	Todd@Award-inc.com
14	Jess Cumpston	Electric Smith	Jess@Electric-smith.com
15	Jared Bowker	Inland Asphalt Co.	Jared.bowker@Inlandrv.com
*16	Michael Clrbe	MikeC@halmeconstruction.com	Halme Construction
17			
18			
19			
20			

* Attended on 2/20/19 w/ STA P.M. JESSICA C.

SECTION 8-20 ILLUMINATION, TRAFFIC SIGNAL SYSTEMS AND ELECTRICAL

8-20.1 Description

(April 1, 2018 COS GSP)

Replace this section with the following:

This work consists of furnishing, installing and field testing all materials and equipment necessary to complete in place, fully functional system(s) of any or all of the following types including modifications to an existing system all in accordance with approved methods, the Plans, the Special Provisions, and these Specifications:

1. Traffic Signal System
2. Traffic Signal System Retrofit
3. Traffic Signal Conduit System
2. Illumination Conduit System
3. Illumination System
4. Intelligent Transportation System
5. Communication Conduit System
6. Communication Cables and Interfaces
7. Video & Data Transmission and Distribution System
8. Closed Circuit Television System
9. Permanent Variable Message Sign
10. Environmental Sensing Station
11. Non-Intrusive Vehicle Detector System
12. Temporary Traffic Signal System
13. Temporary Intersection Lighting System

8-20.2 Materials

(August 1, 2015 COS GSP)

Add the following after the first paragraph:

Communication Conduit shall meet the requirements of Section 9-29.1(4)A.

Crushed surfacing top course shall meet the requirements of Section 9-03.9(3).

The items provided in the appendices are provided for the convenience of the Contracting Agency and the Contractor, and is not guaranteed to be complete. The Contractor shall assume the responsibility for the making of estimates of size, kind, and quantity of materials included in the work to be done under the contract.

8-20.3 Construction Requirements

8-20.3(2) Excavating and Backfilling **(August 1, 2010 COS GSP)**

Add the following:

Nonmetallic conduit installed by excavation shall be placed on a minimum 2-inch thick bed of sand. A minimum cover of 6-inches of sand shall be installed over the top of nonmetallic conduit installed by trenching.

8-20.3(4) Foundations **(December 19, 2016 COS GSP)**

Replace the third paragraph with the following:

Foundations shall be poured in one pour unless otherwise directed by the Engineer.

When curb and/or sidewalk is to be installed adjacent to the foundation for a signal standard or luminaire standard, the Contractor shall install a CMP of the correct diameter at the foundation location to allow backfilling of the corner and establishment of proper curb grades prior to pouring the signal or lighting foundation. After establishment of the curb grade and prior to pouring the foundation, the CMP shall be cut 1 ft below final grade, and a strippable 1 foot tall form shall be rigidly installed and securely braced.

The foundation shall be poured to the bottom of sidewalk grade or lower.

Add the following after the ninth paragraph:

The Contractor shall furnish and install four 5/8" x 8" x 1-1/2" hot-dipped galvanized anchor bolts with nuts for mounting each controller cabinet.

Revise the thirteenth paragraph to read:

Both forms and ground which will be in contact with the concrete shall be thoroughly moistened before placing concrete; however, excess water in the foundation excavation will not be permitted.

Add the following after the last paragraph:

Whenever the edge of a concrete foundation extends within 18-inches of an existing or proposed concrete improvement, a slab with minimum thickness of 4-inches shall be extended to meet the existing improvement. The cost of such work shall be included in other items of construction.

8-20.3(5) Conduit

8-20.3(5)A General **(March 1, 2014 COS GSP)**

Revise the first paragraph to read as follows:

The ends of all conduit, metallic and nonmetallic, shall be reamed to remove burrs and rough edges. Field cuts shall be made square and true. Malleable duct sealant shall be installed in the cabinet end of all cable vault-to-cabinet conduit that contains conductors and or cable. Mechanical plugs shall be installed in the cabinet end of all empty cable vault-to-cabinet conduit. The threaded ends of metal conduit shall be provided with approved conduit bushings and non-metal conduit shall be provided with end bells. Reducing couplings will not be permitted.

Revise the second sentence of the third paragraph to read as follows:

When conduit is installed for future use, as soon as the bushing or end bell has been installed and the sizing mandrel has been pulled through, the locate wire shall be installed and the cabinet end of the conduit shall be plugged.

8-20.3(5)A1 Fiber Optic Conduit **(March 1, 2014 COS GSP)**

Revise the second paragraph to read as follows:

Location Wire shall be installed with all nonmetallic conduit that contains fiber optic cable and all conduits identified to contain future fiber optic cable. Location Wire shall be installed inside the conduits. Location Wire shall extend 12-feet into boxes or vaults.

8-20.3(5)A2 ITS and Cabinet Outer and Inner Duct Conduit **(March 1, 2014 COS GSP)**

Delete the second paragraph

Delete the third paragraph beginning with "Foam Sealant"

8-20.3(5)B Conduit Type **(March 1, 2014 COS GSP)**

Revise the fifth paragraph to read as follows:

Conduit runs, including outer-duct, which do not enter the traveled way or shoulders shall be Schedule 80 high-density polyethylene (HDPE) or Schedule 80 PVC.

8-20.3(5)B2 Non-Metallic Conduit **(March 1, 2014 COS GSP)**

Revise the second paragraph to read as follows:

PVC conduit ends shall be terminated with end bell bushings. PVC or HDPE conduit entering cable vaults and pull boxes shall be extended one inch inside the structure to allow innerduct to be secured.

8-20.3(5)C Conduit Size
(March 1, 2014 COS GSP)

Revise the second sentence of the first paragraph to read as follows:

Conduits smaller than 2 inch electrical trade size shall not be used unless otherwise specified, except grounding conductors at service points may be enclosed in $\frac{3}{4}$ - inch-diameter conduit.

Delete the third paragraph.

8-20.3(5)E1 Open Trenching
(March 1, 2014 COS GSP)

Add the following after the last paragraph

When open trenching is allowed, trench construction shall conform to the City of Spokane's Pavement Cut Policy.

Add after the last paragraph:

Flat pull tape shall be installed at the same time as conductors in the conduits. Locate wires are not considered conductors.

The minimum allowable radius of sweeps in communication conduit installation is 36-inches.

All PVC conduit installed shall be schedule 80.

One #14 AWG stranded THHN locator wire with orange insulation shall be placed in continuous lengths in empty conduits or where noted on the Plans.

8-20.3(6) Junction Boxes, Cable Vaults, and Pull Boxes
(August 1, 2010 COS GSP)

Add the following after the first paragraph:

Junction boxes, cable vaults, and pull box details are shown in the COS Standard Plans in the 'J' series. Cable vaults and pull boxes shall include racking hardware as detailed. The precise location of the cable vaults, junction boxes, and pull boxes shall be

determined in the field by a representative from the Signal and Lighting Division depending upon conflicts with existing structures and utilities. Special care shall be taken during the placement of the junction boxes to avoid interference with other street items and utilities.

Conduit entering into a cable vault or pull box shall be located in the identical knock out location from the previous pull box or cable vault. Crossing of the conduit is not allowed.

Bell ends shall be placed on all conduits (do not glue in place). Openings around conduits shall be sealed and filled with grout to prevent water and debris from entering the vaults or pull boxes. The grout shall meet the specifications of the cable vaults and pull box manufacturers.

The Contractor shall provide and place a crushed base beneath the junction boxes, for an area the size of the junction box. The Contractor shall excavate to a 4-inch depth and install a compacted 4-inch depth of crushed surfacing top course material.

8-20.3(8) Wiring
(April 1, 2018 COS GSP)

Add the following after the first paragraph:

The copper communication (interconnect) cable shall be installed continuously without splices except where shown on the Plans. The required terminating and splicing of the communication (interconnect) cable will be performed by Contracting Agency forces.

The Contractor shall provide a re-enterable splice closure kit for each underground splice.

Replace the second paragraph with the following:

With the exception of induction loop circuits and illumination circuits, the wiring shall be run continuously, without splices, from a terminal located in a cabinet, compartment, pedestrian push button assembly, signal head, disconnect or luminaire head, to a similarly located terminal. Terminals located below ground are strictly prohibited. Illumination circuits shall be spliced in only the pole base at the hand hole.

Replace the third paragraph with the following:

Splices in underground induction loop circuits shall be made in junction boxes. Splices will be permitted only where shown in the plans or contract provisions. Induction loop circuits shall be spliced, soldered, crimped and isolated with an approved crimp-type connector prior to encapsulation.

Splices shall be enclosed in a rigid body re-enterable splice closure. Splice closures for induction loops shall be factory filled with encapsulant.

Delete the fourth paragraph and the conductor sequence color code chart.

Add the following at the end of the fifth paragraph:

Street Lighting Disconnect. A fused disconnect, GLR-10A, shall be installed in the luminaire circuits in each standard base according to 9-29.7.

Power over Ethernet (POE) Extender. Power over Ethernet extenders shall be located in the signal standard hand hole.

8-20.3(9) Bonding, Grounding
(August 1, 2008 COS GSP)

Revise the eighth paragraph to read as follows:

The connection of the grounding electrode conductor(s) to grounding electrode(s) shall be made by the thermal-welding process.

8-20.3(10) Services, Transformer, Intelligent Transportation System Cabinet
(November 1, 2012 COS GSP)

Add the following after the first paragraph:

The Contractor shall obtain the required electrical permits for installation of electrical service from the Contracting Agency's Building Department. Permit fees shall be included in the unit contract price for the item of work requiring power.

The service shall be manufactured according to the details in the Standard Plans "J" series and meet industry code requirements. The Contractor shall make the necessary arrangements with the servicing utility to complete the service connection prior to the final inspection. A meter base is required unless otherwise specified.

Delete the second, and fifth paragraphs.

8-20.3(14)A Signal Controllers
(October 1, 2017 COS GSP)

Add the following after the last paragraph:

The controller for this project shall be a Siemens M-60 controller.

8-20.3(14)C Induction Loop Vehicle Detectors
(April 1, 2018 COS GSP)

Revise the title of Section 8-20.3(14)C to read as follows:

8-20.3(14)C Vehicle Detectors
(April 1, 2018 COS GSP)

This Section is **supplemented** with the following:

The conductors that form the loop and terminate in a signal standard or junction box shall be joined to the loop lead-in cable as shown on the COS Standard Plans in the 'J' series. Where two or more loops are spliced to one lead-in cable, they will be spliced in series according to the direction of the City of Spokane Signals and Lighting Division Foreperson at 509-232-8801.

The shield in the loop lead-in cable shall not be connected or grounded.

Hot sealant installation shall be as follows:

1. Fill slot using the sealant manufacture's installation procedure and approved equipment nozzle.
2. Fill slot within 1/8-inch of finished grade.
3. Do not overspill onto surface of pavement. Remove overspill excess immediately.

Cold sealant installation shall be as follows:

1. Fill slot using the sealant manufacturer's installation procedure and approved equipment nozzle.
2. Fill slot within 1/8-inch of finished grade.
3. Do not overspill onto surface of pavement. Remove overspill excess immediately.

Loop sealants shall be according to 9-29.100.

Loops shall be tested in accordance with Section 8-20.3(14)D prior to overlay at the splice location.

Loops shall be tested in accordance with Section 8-20.3(14)D after the overlay and prior to signal turn on at the cabinet.

The lead-in conduit or hose shall be installed in unpaved areas between the pavement and the junction box by trenching to a depth of 18-inches.

The lead-in shall be spliced to the two-conductor shielded cable in accordance with COS Standard Plans in the 'J' series.

The Contractor shall notify the Engineer when the traffic signal detectors are fully operable. The Engineer will then schedule the date and time for inspection and acceptance by the City of Spokane Signals and Lighting Division Foreperson at (509) 232-8801. The Contractor shall have a representative present during inspection and acceptance by the Engineer.

The Contractor shall furnish and install the materials necessary for the complete replacement of traffic signal detectors that are damaged due to the Contractor's operations at the Contractor's own expense.

Sawcut Induction Loops. The induction loops shall consist of a wire loop installed in saw cut slots according to the COS Standard Plans in the 'J' series.

No substitute shall be authorized for the types of conductors and insulations herein required, nor shall the loop location be altered by the Contractor without the permission or at the direction of the Engineer.

The loop wire shall be completely embedded in the sealant. The sawcuts for each loop shall be sealed the same working day that the loop wiring is installed.

The loops shall be tested prior to resurfacing in accordance with Section 8-20.3(14)D. A loop which fails testing after resurfacing shall be removed by grinding and then reinstalled in the pavement prior to resurfacing the pavement area. A loop that fails testing shall be replaced at no cost to the Contracting Agency.

8-20.3(14)E Signal Standards
(August 1, 2008 COS GSP)

Replace Item # 6 with the following:

6. Any damage to the galvanized pole surface shall be repaired with approved zinc rich paint.

8-20.3(14)X Traffic Signal Cabinets
(October 1, 2017 COS GSP)

Cabinets shall be completely wired and tested to the 2003 NEMA TS2 Traffic Controller Assemblies Specification with NTCIP Requirements Version 02.06 (as amended here in). In addition, and at a minimum, the following requirements shall be met:

The traffic signal cabinet for this project shall be a NEMA P TS2 Type 2 Cabinet.

NEMA Type P TS2-2

- 1 16 Position load bay TS2-2
- 1 Half Width Detector Rack wired for 1-BIU/16-channels of detection,
- 1 Half Width Detector Rack wired for 1-BIU/16 channels of detection/4
Channels of pre-emption
Auxiliary switch panel, detector panel (32 channel), fan thermostat
assemblies, power supply interface panel, power panel, video panel, final
assembly
- 1 Smart Monitor 16 channel MMU

- 1 Power Supply Shelf Mount
- 2 Bus Interface Units TS2
- 16 Load switches with I/O Indicators
- 1 Flasher
- 6 Flash Transfer Relays
- 8 Loop Amplifier 4 Channel Rack Mount with timing and LCD (1/2 width)
- 1 Opticom Auxiliary Interface Panel GPS
- 1 Opticom Phase Selector 4 Channel GPS

Include Police Panel

The Contractor shall identify and mark each field wire in controller cabinets with PVC marking sleeves bearing the circuit number indicated in the Contract.

The Contractor shall identify and mark each field wire in controller cabinets with PVC marking sleeves bearing the circuit number indicated in the Contract.

Cables and conductors within the cabinet shall be routed and bundled together in such a manner as to present a neat appearance. Self-clinching nylon cable ties shall be used to securely bundle together cables and conductors. Cable ties shall be spaced not more than 12-inches apart nor closer than 6-inches, unless breakouts or routing dictates.

Cables and conductors for the traffic signal circuits, loop detectors, and telemetry circuits shall be routed to the front of the cabinet, then CLOCKWISE around the left side to beneath the appropriate termination point. The AC service and the luminaire wiring shall be routed to the front of the cabinet, then COUNTER-CLOCKWISE to the right side of the cabinet.

Service loops shall be provided whenever a conductor breaks away from a bundle and is terminated. The radius of the service loop shall be three times the diameter of #10 AWG or smaller conductors and 5 times the diameter of conductors larger than #10 AWG.

Terminating conductors shall terminate on the terminal block provided in the controller cabinet. Terminating conductors shall not be spliced together before termination on the terminal block. Terminating conductors shall end in either a solderless spade lug terminal or a high-pressure screw lug. If more than two conductors terminate on the same terminal screw, a high-pressure screw lug shall be used.

Solderless spade lug terminals shall be installed with a crimping tool matched to the terminal as recommended by the terminal manufacturer. The splicing tool shall be designated to prevent the dies from releasing the terminal until the proper compression has been completed.

High-pressure screw lugs, if used, shall have a cast copper body and work on screw and saddle principle. The saddle and cable socket shall be serrated. The saddle shall be of an overlapping design.

Luminaire splices within the controller cabinet shall be made by using insulated crimp-type splices and tape.

Spare conductors shall be taped and tied back.

Controller cabinets manufactured to current NEMA TS2 specifications shall provide for electrical isolation of AC neutral, equipment ground, and logic ground. Grounding conductors (signal commons) shall be terminated on the AC neutral bus. Bonding and equipment grounding conductors shall be terminated on the equipment ground bus. Logic commons (pedestrian push-button and detector unit commons) shall be terminated on the logic ground terminal(s) provided.

Controller cabinets and other concrete base mounted cabinets shall be installed on a bed of exterior-grade silicone caulking compound, white or clear in color, or approved equal sealant. The sealant bed shall cover the entire flange area of cabinet. A neat bead of the same sealant material shall be formed around both the exterior and interior perimeter of the cabinet-concrete joint after the cabinets are bolted down to form an effective watertight seal.

8-20.3(16) Reinstalling Salvaged Material
(August 1, 2008 COS GSP)

Add the following before the first paragraph:

The Contractor shall remove and legally dispose of the affected signal bases, foundations, controller bases, and the other non-salvageable signalization, communication equipment, and appurtenances as determined by the Engineer.

The Contractor shall also remove and preserve for salvage purposes the reusable signalization, communication, or interconnect equipment as determined by the Engineer. The Contractor shall exercise care when removing the reusable signalization, communication or interconnect equipment so as to maintain the reusable equipment's serviceability. For the purposes of this Specification, "Salvage" means that the Contractor shall provide the salvage items to the Contracting Agency.

The Contractor shall arrange an on-site preconstruction field inspection with the Engineer and a representative of the Signal and Lighting Division to determine salvageability of the reusable signalization, communication, or interconnect equipment scheduled for removal within this contract.

The Contractor shall provide a written, itemized list of equipment, including the type, quantity, location and condition of signal items to be salvaged, to the Engineer. The Engineer will forward the list to the Signal and Lighting Division Foreperson. The

Contractor shall provide this list to the Engineer at least 5 working days after the on-site preconstruction field inspection. Each item listed shall be delivered on a normal Contracting Agency workday to the City of Spokane Signal and Lighting Division warehouse located at 901 N. Nelson Street between the hours of 8:00 A.M. and 2:00 P.M. In order for the warehouse to prepare for the delivery of the items, the Contractor shall contact the Signal and Lighting Division Foreperson at (509) 232-8801 at least 2 City business days prior to the delivery date.

Upon delivery, the Contracting Agency will inspect and determine if each salvageable item is in an acceptable condition.

The Contractor shall replace in-kind, repair (to the Engineer's satisfaction) or pay the Contracting Agency to replace the salvageable and insitu signalization, communication, and interconnect equipment that is damaged due to the Contractor's operation, at no cost to the Contracting Agency.

Salvageable items not delivered to the City of Spokane Signal and Lighting Division warehouse by the Contractor by the end of the contract, shall be charged to the Contractor for full replacement cost or required to be replaced by the Contractor in-kind irrespective of its condition prior to removal.

If there was no on-site pre-construction field inspection prior to its removal, each salvageable items removed by the Contractor, delivered to the City of Spokane Signal and Lighting Division warehouse, and deemed not acceptable by the Contracting Agency, shall be charged to the Contractor for full replacement costs or be required to be replaced by the Contractor in-kind, irrespective of its condition prior to removal.

Preservation of Existing Materials to Remain. The Engineer may conduct a pre-acceptance and a post-acceptance inspection of each salvageable item within the limits of this contract.

8-20.4 Measurement **(April 1, 2018 COS GSP)**

Replace this Section in its entirety with the following:

All illumination system, signal system, intelligent transportation system, or other type of electrical system materials and performance of work called for in the plans will not be measured and shall be considered incidental to SPOKANE FALLS STATION Base Bid "B" of this contract.

8-20.5 Payment **(April 1, 2018 COS GSP)**

Replace this Section in its entirety with the following:

Payment will be incidental to SPOKANE FALLS STATION Base Bid “B”.

COS “**Traffic Signal System**, E Mission Ave and N Sycamore St” shall be considered incidental to SPOKANE FALLS STATION Base Bid “B” of this contract. This includes but is not limited to furnishing the tools, labor, equipment, and materials necessary to perform the work as specified, including the removal and legal disposal of the non-salvageable traffic signal equipment and appurtenances, removal and delivery of the salvageable signal equipment and appurtenances to the City of Spokane Signal and Lighting Division warehouse.

The cost of street and sidewalk patching required by signalization and communication conduit are covered under Base Bid “B” of this contract.

Excavation, furnishing, and installing the crushed base material and compaction shall be considered incidental to the installation of the junction boxes and no separate payment will be made.

The Contractor, at own discretion, may substitute an equivalent concrete depth in place of the crushed surfacing top course but no additional payment will be made for such substitution.

SECTION 9-29 ILLUMINATION, SIGNAL AND ELECTRICAL

9-29.1 Conduit, Innerduct, and Outerduct

9-29.1(4)A Rigid PVC Conduit
(March 1, 2014 COS GSP)

Rigid PVC Conduit shall be Schedule 80 for all locations, unless detailed otherwise in the plans.

9-29.1(5) Innerduct and Outerduct
(November 1, 2012 COS GSP)

Delete this section in its entirety.

9-29.1(5)A Rigid Galvanized Steel Outerduct with PVC or PE Innerduct
(April 6, 2009 COS GSP)

Delete this section in its entirety.

9-29.1(5)B Rigid PVC Outerduct with PVC or PE Innerduct
(April 6, 2009 COS GSP)

Delete this section in its entirety.

9-29.1(5)C Innerduct for Straight Sections of Galvanized Steel Outerduct or PVC Outerduct
(April 6, 2009 COS GSP)

Delete this section in its entirety.

9-29.1(5)D Conduit with Innerducts Fittings and Appurtenances
(April 6, 2009 COS GSP)

Delete this section in its entirety.

9-29.1(5)D1 Bends for 4-ince PVC Conduit with Innerducts or Galvanized Steel with Innerducts
(April 6, 2009 COS GSP)

Delete this section in its entirety.

9-29.1(5)D2 Prefabricated Fixed and Flexible Bends (for Innerducts)
(April 6, 2009 COS GSP)

Delete this section in its entirety.

Add the following new Subsection:

9-29.1(100) MaxCell Innerduct
(May 24, 2012 COS GSP)

MaxCell innerduct shall be of the size called out in the plans, contain the number of sleeves as called out in the plans, and be detectable by containing an 18 gauge solid copper core, green TFN insulated wire the entire length.

9-29.2 Junction Boxes
(November 1, 2012 COS GSP)

9-29.2(1) Standard Duty and Heavy Duty Junction Boxes
(November 1, 2012 COS GSP)

Delete the third paragraph beginning with “The Contractor shall provide shop drawings...”.

9-29.2(1)A Standard Duty Junction Boxes
(November 1, 2012 COS GSP)

Add the following to the first paragraph:

Type 7 junction boxes shall meet all the requirements of a type 8 junction box but shall be supplied without the locking bolt.

Revise the sixth paragraph, beginning with “Type1, 2, and 8 non-concrete...” to read: Non-concrete junction boxes shall not be used.

9-29.2(1)C Testing Requirements
(November 1, 2012 COS GSP)

Delete Section 9-29.2(1)C Testing Requirements, in its entirety.

9-29.2(2)A Standard Duty Cable Vaults and Pull Boxes
(November 1, 2012 COS GSP)

Revise the first paragraph to read:
Standard Duty Cable Vaults and Pull Boxes shall be concrete and meet AASHTO M-199 or H-20 loading requirements.

9-29.2(2)B Heavy Duty Cable Vaults and Pull Boxes
(November 1, 2012 COS GSP)

Revise the first paragraph to read: Standard Duty Cable Vaults and Pull Boxes shall be concrete and meet AASHTO HS-20 loading requirements.

9-29.3 Fiber Optic Cable, Electrical Conductors, and Cable
(April 6, 2009 COS GSP)

9-29.3(1) Fiber Optic Cable
(October 11, 2017 COS GSP)

Add the following to this section:

Loose Buffered Cable

The fibers shall be placed in color coded loose buffer tubes in groups of ***12***.

Tight Buffered Cable

Tight buffered cable shall contain single mode fiber optic fibers.

OFNR Rating.

Subcable assemblies containing individual tight buffered fibers shall consist of 3-millimeter diameter outer color coded jackets, aramid strength fibers, 900 micron color coded tight buffering, and acrylate fiber coating.

One acceptable alternate is the B-series breakout riser cable from Optical Cable Corporation with 3 millimeter diameter subcable jackets.

Pigtail Fiber Optic Cables

Pig tails shall contain single mode fiber optic fibers.

Pig tails shall be a 1 meter in length and be OFNR rated

Pig Tails shall contain factory terminated connectors and consist of subcables with a 2.8 to 3.0 millimeter diameter outer jackets, aramid strength fibers, 900 micron color coded tight buffering, and acrylate fiber coating.

Connectors shall match the type called for in the plans and be UPC polished.

9-29.3(2) Electrical Conductors and Cable
(November 1, 2012 COS GSP)

9-29.3(2)A Single Conductor
(November 1, 2012 COS GSP)

9-29.3(2)A1 Single Conductor Current Carrying
(November 1, 2012 COS GSP)

Replace this Section in its entirety with the following:

All current carrying single conductors shall be Type THWN, 600 V cable. Overhead service shall be Type THWN 600 V wire. Service conductors shall be copper of the size required by the Code.

9-29.3(2)A2 Grounding Electrode Conductor
(November 1, 2012 COS GSP)

Replace this Section in its entirety with the following:
Grounding electrode conductor shall be bare stranded copper.

9-29.3(2)A3 Equipment Grounding and Bonding Conductors
(March 1, 2014 COS GSP)

Replace this Section in its entirety with the following:
Equipment grounding and bonding jumpers shall be green insulated stranded copper with THHN 600 volt insulation of the size called out in the plans

9-29.3(2)B Multi-Conductor Cable
(March 1, 2014 COS GSP)

Replace this Section in its entirety with the following:
Two-conductor through 20-conductor unshielded signal control cable shall have stranded copper conductors and shall conform to the International Municipal Signal Association (IMSA) signal cable 20-1.

9-29.3(2)D Pole and Bracket
(March 1, 2014 COS GSP)

Add the following:
Luminaires calling for 30 foot mounting heights according to Standard Plan J-105, J-105B, and J-105C shall be Type UF two-conductor with ground, nonmetallic sheathed, 600 V. The wire size shall be #12 AWG unless otherwise specified.

9-29.3(2)I Twisted Pair Communication Cable
(November 1, 2012 COS GSP)

Replace this Section in its entirety with the following:
Twisted pair communication cable shall meet REA Specifications PE-39 for filled, data telephone cable. The conductors shall be #22 AWG, solid copper, twisted pairs. The twisted pairs shall be fully color coded. The shield shall be 8 mil aluminum, coated both sides with copolymer.

Add the following new Section:

9-29.3(2)ZZ Illumination Branch Cable
(March 1, 2014 COS GSP)

Illumination branch circuit cable shall be Type UF two-conductor with ground nonmetallic sheathed, 600 V cable. The wire size shall be #12 AWG unless otherwise specified.

Add the following new Section:

9-29.3(2)ZZA CCTV Power Cable
(April 1, 2018 COS GSP)

The power cable shall be outdoor rated and consist of three tinned copper stranded conductors of 14 AWG. The conductors shall be individually insulated and color coded. The cable insulation shall be rated at 300V.

Add the following new Section:

9-29.3(2)ZZB Category 6 Cable
(April 1, 2018 COS GSP)

Cat 6 cable shall be indoor/outdoor rated and contain 4 twisted pairs of 23 AWG solid bare copper conductors individually insulated and color coded according to TIA CAT 6 Standards . The cable shall contain 4 color coded 22 or 24 AWG solid twisted copper pairs, be non-shielded, and include a black UV resistant outer jacket.

Add the following new Section:

9-29.3(2)ZZC Category 5e Cable
(August 9, 2018 COS GSP)

Cat 5e cable shall be outdoor rated, gel-filled, and contain 4 twisted pairs of 24 AWG solid bare copper conductors with shield and drain wire. Conductors shall be individually insulated and color coded according to TIA Cat 5e standards. The cable shall be tested to a minimum of 350 Mhz, and include a black UV resistant outer jacket.

Add the following new Section:

9-29.3(2)ZZD Machine Vision Video Cable
(April 1, 2018 COS GSP)

With conventional Machine vision equipment the video cable shall meet RG-6/U specifications. The machine vision cable shall be BELDEN 1189A or equivalent.

Add the following new Section:

9-29.3(2)ZZE GPS Preemption Cabling
(August 9, 2018 COS GSP)

The cable shall be Opticom Model 1070 GPS cable or meet the following:

The cable shall have a black SR-PVC outer jacket that is UV and moisture resistant.

The cable shall have a 90°C temperature rating.

The cable shall be rated for 300 volts.

The cable shall contain five twisted pairs of AWG #20 (7 x 28) stranded, individually tinned copper. The twisted pairs shall be Yellow/Yellow-Black; Blue/Blue-White; Orange/Orange-Green; Brown/Brown-White; Purple/Purple-White.

The cable shall contain an aluminized polyester shield.

The cable shall contain a drain wire of AWG #22 (7 x 28) stranded individually tinned copper.

9-29.6 Light and Signal Standards
(August 1, 2015 COS GSP)

Replace this Section in its entirety with the following:

Light and Signal Standard manufacturers shall be pre-approved by WSDOT. Light standards and signal standards (including Types 1, 2, 3, and 4) shall be in accordance with the details shown in the Plans, the City of Spokane Standard Plans J series, as specified in the Special Provisions, and as outlined herein. Fabrication of light and signal standards shall conform to the applicable requirements of Section 6-03.3(14).

Light and Signal Standard manufacturers shall provide full mill certification package upon delivery.

Traffic signal standards shall be supplied with mast arms, luminaire arm(s), anchor bolts and required bolts, nuts, and washers as shown on the Traffic Signal Standard Plans.

Poles shall be designed to meet 1994 AASHTO criteria and an 80 MPH sustainable wind loading

Materials for steel light and signal standards, and associated anchorage and fastening hardware, shall conform to Sections 9-29.6(1), 9-29.6(2), and 9-29.6(5) unless otherwise specified in the steel light and signal standard fabricator's shop drawing submittal, including supporting design calculations, as submitted in accordance with Sections 6-01.9 and 8-20.2(1) and the Special Provisions, and as approved by the Engineer.

Supplier shall furnish shop drawings and design calculations for approval if not pre-approved by the City of Spokane except Type I poles.

Anchor bolts for signal standards shall be delivered within thirty (30) days after receipt of order.

9-29.6(1) Steel Light and Signal Standards
(August 1, 2015 COS GSP)

Steel plates and shapes for light and signal standards shall conform to ASTM A 36, except that structural shapes may conform to ASTM A 992. Shafts for light and signal standards shall conform to ASTM A 572 Grade 50. Base plates for light standards shall conform to ASTM A 572, Grade 50. Base plates for signal standards shall conform to ASTM A 36. Connecting bolts shall conform to ASTM A 325. Fasteners for handhole covers, bands on lighting brackets, and connector attachment brackets shall conform to ASTM F 593.

The pole shaft shall be formed into a continuously tapered round shaft with a continuous uniform taper of approximately 0.14 inches per foot, with only one longitudinal welded seam, and no more than three (3) transverse welds for 30 foot poles. Standards with an outside diameter greater than 12 inches shall be round in shape but may be constructed as a multisided standard. Multisided standards shall have a

minimum of 12 sides which shall be convex and shall have a minimum bend radius of 4 inches.

The pole shaft shall be straight with a permissive not to exceed one (1) inch measured at the midpoint in place and unloaded. A maximum theoretical angular rotation of 1 degree, 40 minutes without wind load, will be permitted for poles and shall be measured with all signal heads, mast arms and luminaries in place.

The pole shaft shall contain a handhole with a reinforcing frame and cover. A second handhold shall be installed above the mast arm connection. See Standard Plan J-105b. The lower half of the handhole's (at the base) reinforcing frame shall contain a 9/16 inch diameter hole tapped, with a stainless steel bolt and a stainless steel binding washer for connection of the grounding lug, for grounding purposes.

Signal Mast arms 50 feet and less in length shall be one piece. Signal Mast arm shall have an end cup and be formed into a continuously tapered round shaft.

Luminaire arms shall have a 2 inch tip tenon.

At a minimum, the pole shaft, mast arm(s), and luminaire arm(s) shall be designed to support 3-section traffic signal heads weighing 60 pounds and having 9.2 square feet of wind area, 5-section heads weighing 75 pounds and having 13.9 square feet of wind area and to support luminaries weighing 35 pounds and having 2.5 square feet of wind area. The location of the design load(s) are shown on the COS Standard Plans J Series. The Contract plans may contain additional heads or different attachment points above the minimums illustrated in the City Standard Plans to design. In this case, the standards shall be designed to support what is shown on the Plans.

Light and signal standards shall be hot-dip galvanized in accordance with AASHTO M 111 and AASHTO M 232.

Steel used for light and signal standards shall have a controlled silicon content of either 0.00 to 0.04 percent or 0.15 to 0.25 percent. Mill test certificates verifying the silicon content of the steel shall be submitted to both the galvanizer and the Engineer prior to beginning galvanizing operations.

9-29.6(4) Welding **(August 1, 2015 COS GSP)**

Welding of steel structures shall be in accordance with AWS D1.1/D1.1M, latest edition, Structural Welding Code, and Section 6-03.3(25).

9-29.6(5) Foundation Hardware **(August 1, 2015 COS GSP)**

Anchor bolts shall be furnished with two nuts and two washers. Anchor bolts shall be hot-dipped galvanized for their entire length. Bolts shall be designed in accordance with

ASTM designation F1554 for bolts less than 1.75 inches in diameter and ASTM designation A449 for bolts equal to or greater than 1.75 inches.

9-29.9 Ballast, Transformers

(August 1, 2008 COS GSP)

Replace this Section in its entirety with the following:

9-29.9 Ballasts

(August 1, 2008 COS GSP)

The ballast shall be capable of starting and operating one high pressure sodium lamp at the stated luminaire nominal voltage 60 Hz within the limits specified by the lamp manufacturer. The ballast including starting aid, must protect itself against normal lamp failure modes. The ballast shall be capable of operation with the lamp in an open or short circuit condition for 6 months without significant loss of ballast life.

The ballast shall be of the reactor type providing for a ± 5 percent input voltage range. The ballast design center will not vary more than 5 percent from rated lamp watts for nominal line voltage and nominal lamp voltage.

At any lamp voltage from nominal through life, lamp wattage regulation spread at that lamp voltage shall not exceed 2-1/2 percent or ± 1 line voltage variation.

The luminaire manufacturer will supply ballast electrical data and lamp operating volt-watt traces for nominal and ± 5 percent rated line voltage to verify ballast performance and compliance with lamp specifications, for the rated life of the lamp.

The ballast must reliably start and operate the lamp in ambient temperatures down to -30 degrees F for the rated life of the lamp.

The lamp current crest factor shall not exceed 1-1/2 for plus or minus ± 5 percent line voltage variation at any lamp voltage, from nominal through life. The power factor shall be 90 percent (nominal) or higher.

The ballast shall have a name plate attached permanently to the case, listing all electrical data.

9-29.10 Luminaires

9-29.10(1) Cobra Head Luminaires

(April 1, 2018 COS GSP)

Replace this Section in its entirety with the following:

- A. All LED roadway luminaires shall be a Type III medium distribution with cutoff optics.

- B. LED light sources shall produce a light color temperature of 4,000 K \pm 300 K. The manufacturer shall submit fixture LM-79 and LM-80 reports in conjunction with the luminaire cut sheet. Light sources will also meet or exceed the following efficiency and longevity benchmarks:

Light Emitting Diode (LED) Light Sources

Minimum Luminous Efficacy	Minimum Expected Lamp Life (hours)	Minimum Lumen Maintenance Factor (25°C) @ 50,000 hours
90 lumens/Watt	> 100,000	0.95

BUG Rating (Maximum)		
B: 2	U: 0	G: 2

- C. LED Drivers (Drivers) shall be Class 1 or 2 type, adequately sized for the luminaires designed light output. The Driver shall be an integral part of the luminaire unit. It shall be a prewired, built-in type mounted in the luminaire.

Provide a manufacturer's nameplate on the Driver housing. The nameplate shall have the manufacturer's name, model number, serial number, hook-up diagram, power supply data, LED type and operating wattage.

The Driver shall operate the lamp within the limits specified below throughout the rated life of the lamp:

1. The LED light source shall not vary more than 10% in light output.
2. The LED light source wattage shall not vary more than plus or minus 5% of nominal when the LED light source is at its rated nominal.
3. The minimum efficiency of the Driver (nominal LED light source watts/line watts) shall not be less than 80%.
4. The Driver shall not allow the LED light source to extinguish when a line voltage dip between 40-50% occurs for several seconds.
5. The power factor shall not drop below 90% and the total harmonic distortion shall be less than 20% for the line voltage with allowable fluctuations of +/- 10%.
6. Drivers shall be provided with integral 10kV surge suppression.

7. The line starting current shall not exceed normal line operating current.
8. The Driver shall start and operate the LED light source in ambient temperatures down to -20 °F.
9. The Driver shall conform to all ANSI Standards.

Unless otherwise shown or specified, operate Drivers on a multi-voltage type to be connected to 120 V, 208 V, 240 V, or 277 V.

D. Furnish LED roadway luminaires for horizontal slip fitter end mounting.

Luminaires shall have cast aluminum housings and shall attach to 2 inch pipe tenons on mast arms. The luminaire attachment fitting shall provide for a minimum of plus or minus 3 degree adjustment of the luminaire in the vertical direction.

The lens and doorframe assembly, when closed, shall exert pressure against a gasket. Gaskets shall be composed of material capable of withstanding the temperatures encountered and shall be securely held in place.

All luminaires shall have their components secured to the luminaire frame with corrosion-resistant mounting hardware. The housing, complete with integral Driver, shall be weather tight, IP 66.

If sand-cast, the aluminum housing shall be left in its natural finish. If die-cast, the housing shall be given a coat of aluminum paint.

All traffic signal luminaires shall be Cobra head style, sized according to the illumination requirements of the roadway and energized by 120-240 V.

All Street Luminaires shall be Cobra head style, sized according to the illumination requirements of the roadway and energized by 120-240V

E. One of the following preapproved luminaire series shall be used, or approved equal:

<u>Manufacturer</u>	<u>Series</u>
American Electric	Autobahn
Philips	Roadview
Cree	XSP

The fixture lumen output shall be as specified in the plans.

9-29.11 Control Equipment
(August 9, 2018 COS GSP)

Replace this Section in its entirety with the following:

Each luminaire shall be controlled by plug-in photoelectric control mounted on the luminaire housing.

9-29.11(2) Photoelectric Controls
(August 1, 2008 COS GSP)

Supplement this Section with the following:

The photoelectric control shall be a plug-in device, rated to operate on 120-240 volts, 60 Hz. The unit shall consist of a light sensitive element connected to necessary control relays. The light sensitive element shall have a spectral response such that it is especially sensitive to north sky illumination.

The unit shall be so designed that a failure of any electronic component will energize the lighting circuits.

The control shall be protected by a lightning arrestor to provide surge protection to a minimum of 10,000 amperes and shall be rated to switch on 1,000 watts incandescent.

The photoelectric receptacle shall be in accordance with EEI-NEMA Standards.

9-29.12 Electrical Splice Materials

9-29.12(1) Illumination Circuit Splices
(April 1, 2018 COS GSP)

Replace this Section in its entirety with the following:

Illumination circuit splices shall be either, wirenuts or solderless crimped connections to securely join the wires, both mechanically and electrically, as defined in 8-20.3(8). Splices shall be made in the pole base at the hand hole.

9-29.12(2) Traffic Signal Splice Material
(August 9, 2018 COS GSP)

Replace this Section in its entirety with the following:

Lead-in cable to loop wire or magnetometer sensing probe splices shall be rigid body, re-entenable type with encapsulating gel sealant.

9-29.13(3) Traffic Signal Controller
(April 1, 2018 COS GSP)

Add the following:

Controller Unit (CU)

Siemens M60 Controller

The controller unit shall exceed the requirements of Advanced Traffic Controller (ATC) standard v5.2b., published 2006. The controller shall run on a Linux operating system and shall be configurable as a local, master or local/master depending on the local intersection software in use. The controller shall have a removable light-emitting diode backlit LCD Display with 16 lines of 40 characters with adjustable contrast setting front panel. It shall have a 37 pin D connector for backward compatibility with TS-1 facilities. The following port configurations are required:

Central Processor Unit (CPU)

- Open architecture platform with standard Linux operating system
- MPC 8270 266MHz processor
- 512MB FLASH, 64MB DRAM and 1MB SRAM
- TOD Clock with automatic daylight savings time adjustment
- Power supply will power the SRAM during power failures

Keyboard and Display

- Siemens Multiview Display with dual view screens
- Removable light-emitting diode backlit LCD Display with 16 lines of 40 characters with adjustable contrast setting
- Emulation of terminal per Joint NEMA/AASHTO/ITE Standard
- Key quantity and function per Joint NEMA/AASHTO/ITE Standard

Communications Module

- 10 Base-T Ethernet with built-in switch and 5 front panel
- 4 RJ-45 connectors
- 4 USB 2.0 Ports and a Datakey Port
- Dedicated GPS Port
- Unique MAC address assigned by the Institute of Electrical and Electronic Engineers (IEEE)
- EIA-232 port for uploading/downloading applications software and OS updating
- Single and multi-mode fiber optic options
- 1200 bps Frequency Shift Keying (FSK) modem (optional)

Controller Housing

- 7 expansion slots with card guides for standard size Versa Modules and 2 slots with card guides for standard Joint
- NEMA/AASHTO.ITE ATC modems (optional)
- Polycarbonate construction (excluding back panel), rear mounting tabs and aluminum power supply mounting plate for electrical grounding
- Carrying handle

9-29.13(4) Traffic Signal Controller Software
(April 1, 2018 COS GSP)

Add the following:

The Siemens M60 controller shall come with the most current SEPAC Version of local intersection software and shall be operable with the TACTICS™ regional software platform.

9-29.13(5) Flashing Operations
(April 1, 2018 COS GSP)

Add the following:

All P size cabinets shall be wired to flash for all channels. Flashing operation shall alternate between the used vehicle phases 1,3,5,7 and 2,4,6,8. Flash programming shall be either red or yellow simply by changing wires on the front of the load-bay

All M size cabinets shall be wired to flash for all channels. Flashing operation shall alternate between the used vehicle phases 2,6 and 4,8 Flash programming shall be either red or yellow simply by changing wires on the front of the load-bay.

9-29.13(6) Emergency Preemption
(April 1, 2018 COS GSP)

Add the following:

The Emergency vehicle preemption system shall utilize Global Positioning System technology to provide active vehicle preemption based on an estimated arrival time or distance to the signal.

9-29.13(8) Generator Transfer Switch
(February 1, 2016 COS GSP)

Replace this Section in its entirety with the following:

The cabinet front door shall have a locking generator bypass compartment that shall be used to connect a generator to operate the cabinet during extended loss of service line power. The generator compartment shall be capable of being closed and locked while a generator is connected. The mechanism for allowing generator cable access while the compartment is closed, shall be an integral part of the generator bypass door, via a sliding panel that will normally be in the closed position. Inside the compartment there shall be a silkscreened panel housing a Hubbell HBL2615 30A / 125V flanged inlet receptacle capable of accepting a standard generator plug, a BACO HC52DQG cam switch with split AC+ feeds, and (2) LED lamps with sockets. One LED shall be illuminated when the cabinet has service line power and the other when the cabinet is

under generator control. All LED's shall be field replaceable without putting the intersection in flash and shall carry a 5 year manufacturer warranty.

All wiring to the generator bypass compartment shall be contained in a single cable bundle. The cable shall connect to the backside of the electrical components and shall only be accessible from the inside of the cabinet front door. All electrical components on the inside of the front door that carry AC voltage shall be covered by a see-through plexi-glass cover. The generator bypass cable shall terminate at the same power panel location as service line voltage.

9-29.13(10) A Auxiliary Equipment for NEMA Controllers
(June 21, 2018 COS GSP)

Replace this Section in its entirety with the following:

Auxiliary Equipment shall meet NEMA TS2 Type 2 standards.

Auxiliary Panel

The cabinet shall include an auxiliary switch panel mounted to the interior side of the police panel compartment on the cabinet door. This panel shall be hinged at the bottom to allow access to the soldered switches with the use of clamps or tools. Both sides of the panel shall be silkscreened. All of the switches shall be protected by a hinged see-through Plexiglas cover.

At a minimum the following switches shall be included;

Controller ON/OFF Switch: There shall be a switch that renders the controller and load-switching devices electrically dead while maintaining flashing operations for purpose of changing the controller or load-switching devices. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

Signals ON/OFF Switch: There shall be a switch that renders the field signal displays electrically dead while maintaining controller operation for purpose of monitoring controller operations. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

Stop Time Switch: There shall be a 3-position switch labeled "Normal" (up), "Off" (center), and "On" (down). With the switch in the "Normal" position, a stop timing command shall be applied to the controller by the police flash switch or the MMU (Malfunction Management Unit). When the switch is in its "Off" position, stop timing commands shall be removed from the controller. The "On" position shall cause the controller to stop time. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

Technician Flash Switch: There shall be a switch that places the field signal displays in flashing operation while the controller continues to operate. This flash shall have no

effect on the operation of the controller or MMU. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

Pedestrian Test Switches: There shall be (4) disconnect/test switches for the pedestrian phases. These switches shall have three positions labeled “On” (up) which shall be normal operation, “Off” (center) which shall disconnect the applicable pedestrian phase, and “Test” (down) which shall provide a true input to the controller for the applicable pedestrian phase. These switches shall be labeled 2, 4, 6 and 8.

Pre-Empt Test Switches: All (6) preempt inputs shall have disconnect/test switches. These switches shall have two positions labeled “On” (up) which shall connect the controller to the Opticom output, and “Test” (down) which shall provide a momentary true input to the controller. These switches shall be labeled 1, 2, 3, 4, 5 and 6.

Police Panel

When specified to include the police panel:

Behind the police door the following switch shall be included;

Flash Switch: There shall be a switch for the police that puts the cabinet into flashing operations. The switch shall have two positions, “Auto” (up) and “Flash” (down). The “Auto” position shall allow normal signal operation. The “Flash” position shall immediately cause all signal displays to flash as programmed for emergency flash and apply stop time to the controller. When the police flash switch is returned to “Auto”, the controller shall restart except when the MMU has commanded flash operation. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

Cables

All wire cable bundles shall be encased in flex or expandable braided sleeving along their entire free length.

SDLC cables shall be professionally routed in the cabinet interior to easily reach the controller, malfunction management unit or detector racks. SDLC connectors shall be secured with screws. Spring clips shall not be used.

Detector Racks

NEMA P Cabinet and NEMA P Plus Cabinet

The cabinet shall have 32 channels of detection within two (2) 1/2 width detector racks. One (1) 1/2 width rack shall support sixteen (16) channels of loop detection using four (4) slots with four (4) channels per slot, one (1) EDI BIU700H Bus Interface Unit (BIU) and one (1) 764 Opticom™ phase selector(s). One 1/2 width rack shall support sixteen (16) channels of loop detection using four (4) slots with four (4) channels per slot and one (1) EDI BIU700H Bus Interface Unit (BIU). The two (2) racks will be mounted, one on top of the other, on the uppermost shelf within the cabinet. The power and loop cabling shall be connected via a 37 pin DB connector using spring clips. The Opticom cable shall be connected via a 24 pin connector. The power cable shall be a 6 pin connector. All power wires shall be 18AWG. The addressing of detector rack shall be accomplished via dipswitches mounted to the PCB. There shall be the capability to turn

off the TS2 status to the BIU for the uses of TS1 detector equipment via dipswitches mounted to the PCB. There shall be a 34 pin connector using locking latches that breaks the output from the detector to the input of the BIU, there shall also be +24VDC and logic ground on this connector. The rack shall have space at the bottom front for labeling.

Detector Panel

The detector panel shall support (32) channels of vehicle detection, (4) channels of emergency vehicle preemption, and (4) channels of pedestrian detection on a single panel. This panel will be mounted on the left side of the cabinet below the bottom shelf. The panel shall also include (19) position neutral and ground buss bars with raised slotted & torque style screw head.

Video Detection Panel

When video detection is specified there shall be video detection interface panel for single point interface for video power and coax cabling. The panel shall provide up to six (6) individual surge arrestor and circuit breaker circuits so that individual cameras can be replaced in the field without disrupting the entire video detection system.

Supplemental Loads

If specified, all pedestrian phase yellows and odd numbered vehicle phase yellows and greens shall be loaded with a 2.5K-ohm, 10-watt resistor. Each load resistor shall be easily accessed from the back of the main panel (load-bay).

Service Surge Suppression

The cabinet shall be equipped with an EDCO model SHP300-10 or approved equivalent surge arrestor mounted on the power panel. Power to all cabinet electronics shall come through this surge suppression circuit.

Power Panel

The power panel shall handle all the power distribution and protection for the cabinet and shall be mounted in the bottom right side of the facility. All equipment shall be mounted on a 12" x 17" silkscreened aluminum panel and include at a minimum the following equipment:

- A 30-amp main breaker shall supply power to the load bay, load switches and auxiliary panel.
- A 20-amp auxiliary breaker shall supply power to the fan, light and GFI.
- A 20-amp equipment breaker shall supply power to the controller, MMU, power supply and convenience outlet and/or power strip.
- A 50-amp, 125 VAC radio interference line filter.
- An EDCO model SHP300-10 surge arrestor.
- A normally open, 50-amp, solid-state relay. The relay shall have a green LED light that is on when energized. (No Mercury Contactors shall be allowed)
- One see-through Plexiglas cover on stand-offs to protect maintenance personnel from AC line voltages. This shall be removable by loosening screws but without removing screws.

- Two (19) position solid aluminum, tin plated neutral buss bar with raised slotted & torque style screw heads.
- One (19) position solid aluminum, tin plated ground buss bar with raised slotted & torque style screw heads.
- Two MOVs shall be terminated on the 120AC in field terminal. One tied between line and ground, the other between neutral and ground.

Malfunction Management Unit (MMU)

The cabinet shall come with an (MMU) that meets all the requirements of NEMA TS2-2003 while remaining downward compatible with NEMA TS1. It shall have (2) high contrast LCD displays and an internal diagnostic wizard. It shall come with a 10/100 Ethernet port. It shall come with software to run flashing yellow arrow operation. The MMU shall be an Eberle Design, Inc. model MMU-16LEip or approved equivalent.

Load Switch

The cabinet shall come with (9 (nine) for M Cabinet or 16 for P Cabinet) load switches. All load switches shall be cube type and have LED indications for both the input and output side of the load. The load switches shall be PDC model SSS87I/O or approved equivalent.

Flasher

The cabinet shall come with (1) flasher. The flasher shall be cube type and have LED indications. The flasher shall be PDC model SSF87 or approved equivalent.

Flasher Transfer Relay

The cabinet shall come with (3 (three) for M Cabinet or 6 for P Cabinet) heavy duty flash transfer relays. The relays shall be Detrol Controls model 295 or approved equivalent.

Bus Interface Unit (BIU)

The cabinet shall come with (3 for M Cabinet and 2 for P Cabinet) bus interface units (BIU). These shall meet all the requirements of NEMA TS-2 1998 standards. In addition, all BIUs shall provide separate front panel indicator LED's for DC power status and SDLC Port 1 transmit and receive status. The (BIU)'s shall be Eberle Design, Inc. model BIU700H or approved equivalent.

Power Supply (PS)

The cabinet shall come with a shelf mounted cabinet power supply meeting at minimum TS 2-2003 standards. It shall be a heavy duty device that provides +12VDC at 5 Amps / +24VDC at 2 Amps / 12VAC at .25 Amp, and line frequency reference at 50 mA. The power supply shall provide a separate front panel indicator LED for each of the four outputs. Front panel banana jack test points for 24VDC and logic ground shall also be provided. The power supply shall provide 5A of power and be able to cover the load of four (4) complete detector racks. The (PS) shall be Eberle Design, Inc. model PS250 or approved equivalent.

Loop Amplifiers

The cabinet shall come with (4 for M Cabinet and 8 for P Cabinet) 4-channel rack mounted loop amplifiers. These devices shall have LCD displays and be capable of monitoring the call strength from all (4) channels (2 at a time) via a pie graph on the front panel. These devices must have the capability to perform directional logic and 3rd car queuing for protected/permissive operation. The loop amplifiers shall be Eberle Design, Inc. model ORACLE4H or approved equivalent.

Opticom™

The cabinet shall come with (1) 4-channel rack mounted Opticom phase selector. The Opticom phase selectors shall be Global Traffic Technologies model 764 or approved equivalent.

BBS System

When specified for inclusion, the uninterruptible power system (BBS) shall include at a minimum a UPS module with SNMP, ATS assembly, batteries, battery heater mats, battery cables and a battery management system. All other ancillary equipment for a complete functioning UPS system shall be included. The BBS shall be located in a separate compartment with a separate external door equipped with one door switch to report door open status. The door shall be mounted with a single continuous stainless steel piano hinge that runs the length of the door.

The key BBS system components include:

UPS Module

The cabinet UPS module shall be (1) FXM 2000W uninterruptible power supply that supplies clean reliable power control and management. It shall have Automatic Voltage Regulation (AVR), an Ethernet SNMP interface and a control and power connection panel that is rotatable for viewing in any vertical or horizontal orientation. It shall have nominal dimensions of 5.22" x 15.5" x 8.75" and come with mounting brackets. The UPS module shall be an Alpha model 017-232-29 or equivalent.

UATS/UGTS Assembly

The UPS cabinet shall contain a universal automatic transfer switch and universal generator transfer switch connected between the UPS module and the batteries. It shall have surge protection, have dimensions of 3.25" x 15.5" x 6.00" and come with mounting brackets. The ATS module shall be an Alpha model 020-168-21 or equivalent.

UPS Batteries

The batteries shall be (4) high performance silver alloy sealed valve regulated lead acid AlphaCell™ GXL GelCell batteries with 109Ah runtime. The BBS batteries shall be Alpha model 220 GXL or equivalent.

UPS Battery Harness

The UPS battery harness shall be a battery cable (5) foot long wired for (4) batteries. The battery harness shall be Alpha model 740-628-27 or equivalent.

Battery Management System

The battery management system shall be AlphaGuard™ battery charge management system which extends battery operational life. It shall be an Alpha model 012-306-21 or equivalent.

9-29.13(10) C NEMA Controller Cabinets **(August 1, 2015 COS GSP)**

Replace this Section in its entirety with the following:

Each NEMA traffic controller shall be housed in a weatherproof cabinet conforming to the following requirements:

The cabinet shall be a completely wired and tested to the most current NEMA TS2-2003 v02.06 Type 2 Traffic Controller Assemblies Specification with NTCIP Requirements Version 02.06 (as amended here in). In addition, and at a minimum the following requirements shall be met:

The P cabinet shall be designed for 16 channel operation where load switch sockets 1-8 will be configured for a vehicle phase, load switch sockets 9-12 will be pedestrian phase and load switch sockets 13-16 will be overlaps A-D These load switch sockets shall be configured in this manor without rewiring the back side of the load-bay.

The M cabinet shall be designed for 9 channel operation. Load switches 1-4 shall be vehicle phases 2,4,6,8; load switches 5 -8 shall be pedestrian phases 2,4,6,8; load switch 9 shall be Overlap A. These load switch sockets shall be configured in this manor without rewiring the back side of the load-bay.

The cabinet shall be wired for (16 for M or 32 for P) channels of detection.

The cabinet shall be capable of integrating transit signal priority equipment.

The use of PC boards shall not be allowed except in detector racks or BIU cages.

The use of plug and play modules shall not be allowed.

All cabinet 120VAC wires shall be 18AWG or greater, including controller "A, B, & C" and MMU "A & B" cables.

The entire cabinet and components shall undergo a 72 hour test burn in before delivery to the testing agency. If the cabinet comes with a controller, the cabinet shall come with an ATSI TS2 Frame grabber communications test report before delivery will be accepted.

The cabinet shall meet "Buy America" specifications.

The cabinet assembly shall be completely manufactured in the United States of America.

Cabinet Enclosure

At a minimum the **P cabinet** shall meet the following criteria:

1. It shall have nominal dimensions of 56" high x 44" width x 25.5" depth and meet the footprint dimensions as specified in Section 7.3 of NEMA standards for a Type P cabinet. The cabinet base shall have continuously welded interior mounting reinforcement plates with the same anchor bolt hole pattern as the footprint dimensions.
2. Shall be fabricated from 5052-H32 0.125-inch thick aluminum.
3. The cabinet shall be double-flanged where it meets the cabinet door.
4. The top of the cabinet shall be sloped 1" towards the rear to facilitate water runoff. And shall bend at a 90° angle at the front of the cabinet. Lesser slope angles are not allowed.
5. The inside of the cabinet shall utilize C channel rails. (2) Welded on the back wall on 34" center and (4) welded on each side wall on 08" center with 04" between sets. C channel rails shall be 48" in length, start 5" from the bottom of the cabinet interior and run the entire usable height the cabinet side walls. Adjustable rails are not allowed.
6. The Cabinet shall be supplied with a natural mill finish inside and out, unless otherwise specified.
7. All external fasteners shall be stainless steel. Pop rivets shall not be allowed on any external surface.
8. The cabinet shall be supplied without a door handle. The door shall incorporate a 3/8" Allen head socket recessed in the cabinet door. The cabinet shall be supplied with (1) 3/8" removable Allen head wrench.
9. When the police panel is specified for inclusion, the main door shall contain a police door with a conventional police lock. A key shall be provided for both the cabinet lock and the police door lock. The police door shall be recessed into the main door so that the police door is flush with the main door.
10. A closed-cell, neoprene gasket seal shall be bonded to all enclosure doors. A stiffener plate shall be welded across the width of the inside of the main door to prevent flexing. A main door bar stop shall be a two-position, three-point stop that accommodates open-angles at 90, 125, and 150 degrees. A louvered air entrance located at the bottom of the main door shall satisfy NEMA rod entry test requirements for 3R ventilated enclosures. Bearing rollers shall be applied to ends of door latches to discourage metal-on-metal surfaces from rubbing. Lock assembly shall be positioned so handle does not cause interference with key when opening the door.
11. When the police panel is specified for omission, the police panel door and all associated appurtenances shall be omitted.

12. The cabinet shall be equipped with a universal lock bracket capable of accepting a Best™ Construction Core and a Corbin#2 tumbler series lock. The cabinet shall come equipped with a Best blue construction core lock.
13. The cabinet shall be supplied with two door switches which control the door open status and the cabinet interior lighting circuits.
14. All exterior seams shall be manufactured with neatly formed continuously weld construction. The weld for the police box door shall be done on the inside of the cabinet door. All welds shall be free from burrs, cracks, blowholes or other irregularities.
15. The fan baffle panel seams shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
16. The cabinet shall be UL listed
17. The cabinet shall come with lifting ears affixed to the upper exterior of the cabinet. These ears shall utilize only one bolt for easy reorientation.
18. The cabinet shall be supplied with a three-stage, multi-ply progressive density polyester, disposable air filter. Filter element shall be attached with Velcro type mounting along the full length of all four edges. Filter performance UL 900 Class 2 listed and shall conform to ASHRAE Standard 52.1.
19. The door shall be mounted with a single continuous stainless steel piano hinge that runs the length of the door. Attaching tamper resistant bolts shall also be stainless steel.

At a minimum the **P-Plus cabinet** shall meet the following criteria:

1. The cabinet shall have nominal dimensions of 56” high x 44” width x 25.5” depth and meet the footprint dimensions as specified in Section 7.3 of NEMA standards for a Type P cabinet. The cabinet base shall have continuously welded interior mounting reinforcement plates with the same anchor bolt hole pattern as the footprint dimensions shown in Standard Plan J-106b.
2. The cabinet shall be fabricated from 5052-H32 0.125-inch thick aluminum.
3. The cabinet shall be double-flanged where it meets the cabinet doors.
4. The top of the cabinet shall be sloped 1” towards the rear to facilitate water runoff. And shall bend at a 90° angle at the front of the cabinet. Lesser slope angles are not allowed.
5. The inside of the cabinet shall utilize “C” channel rails. (2) Welded on the back wall on 34” center and (4) welded on each side wall on 8” center with 4” between sets. “C” channel rails shall be 48” in length, start 5” from the bottom of the cabinet interior and run the entire usable height the cabinet side walls. Adjustable rails are not allowed.
6. The cabinet shall be supplied with a natural mill finish inside and outside.

7. All external fasteners shall be stainless steel. Pop rivets are not be allowed on any external surface.
8. The cabinet shall be supplied without door handles. The doors shall incorporate a 3/8" Allen head socket recessed in the cabinet door. The cabinet shall be supplied with (1) 3/8" removable Allen head wrench
9. When the police panel is specified for inclusion, the main door shall contain a police door with a conventional police lock. A key shall be provided for both the cabinet lock and the police door lock. The police door shall be recessed into the main door so that the police door is flush with the main door.
10. A closed-cell, neoprene gasket seal shall be bonded to all enclosure doors. A stiffener plate shall be welded across the width of the inside of the main door to prevent flexing. The main door and the battery compartment door bar stops shall be a two-position, three-point stop that accommodates open-angles at 90, 125, and 150 degrees. A louvered air entrance located at the bottom of the each door shall satisfy NEMA rod entry test requirements for 3R ventilated enclosures. Bearing rollers shall be applied to ends of door latches to discourage metal-on-metal surfaces from rubbing. Lock assemblies shall be positioned so handle does not cause interference with key when opening the doors.
11. When the police panel is not specified for omission, the police panel door and all associated appurtenances shall be omitted.
12. The cabinet shall be equipped with universal lock brackets capable of accepting a Best™ Construction Core and a Corbin#2 tumbler series locks. The cabinet shall come equipped with a Best blue construction core locks.
13. The cabinet shall be supplied with three door switches which control the door open status of both doors and the cabinet interior lighting circuits.
14. All exterior seams shall be manufactured with neatly formed continuously welded construction. The weld for the police box door shall be done on the inside of the cabinet door. All welds shall be free from burrs, cracks, blowholes or other irregularities.
15. The fan baffle panel seams shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
16. The cabinet shall be UL listed
17. The cabinet shall be supplied with lifting ears affixed to the upper exterior of the cabinet. These ears shall utilize only one bolt for easy reorientation.
18. The cabinet shall be supplied with a two-stage, multi-ply progressive density polyester, disposable air filter. Filter element shall be attached with Velcro type mounting on all four edges. Filter performance UL 900 Class 2 listed and shall conform to ASHRAE Standard 52.1. The filter element shall be attached with Velcro type mounting along the full length of all four edges.

19. The doors shall be mounted with a single continuous stainless steel piano hinge that runs the length of the door. Attaching tamper resistant bolts shall also be stainless steel.

Generator Bypass Compartment and Cable

The cabinet front door shall have a locking generator bypass compartment that shall be used to connect a generator to operate the cabinet during extended loss of service line power. The generator compartment shall be capable of being closed and locked while a generator is connected. The mechanism for allowing generator cable access while the compartment is closed, shall be an integral part of the generator bypass door, via a sliding panel that will normally be in the closed position. Inside the compartment there shall be a silkscreened panel housing a Hubbell HBL2615 30A / 125V flanged inlet receptacle capable of accepting a standard generator plug, a BACO HC52DQG cam switch with split AC+ feeds, and (2) LED lamps with sockets. One LED shall be illuminated when the cabinet has service line power and the other when the cabinet is under generator control. All LED's shall be field replaceable without putting the intersection in flash and shall carry a 5 year manufacturer warranty.

All wiring to the generator bypass compartment shall be contained in a single cable bundle. The cable shall connect to the backside of the electrical components and shall only be accessible from the inside of the cabinet front door. All electrical components on the inside of the front door that carry AC voltage shall be covered by a see-through plexi-glass cover. The generator bypass cable shall terminate at the same power panel location as service line voltage.

At a minimum the **M cabinet** shall meet the following criteria:

1. It shall have nominal dimensions of 51" high x 30" width x 16" depth and meet the footprint dimensions as specified in Section 7.3, Table 7-1 of NEMA TS2 standards for a Type M cabinet. The cabinet base shall have continuously welded interior mounting reinforcement plates with the same anchor bolt hole pattern as the footprint dimensions.
2. Shall be fabricated from 5052-H32 0.125-inch thick aluminum.
3. The cabinet shall be double-flanged where it meets the cabinet door.
4. The top of the cabinet shall be sloped 1" towards the rear to facilitate water runoff. And shall bend at a 90° angle at the front of the cabinet. Lesser slope angles are not allowed.
5. The inside of the cabinet shall utilize C channel rails. (2) Welded on the back wall on 20" center and (2) welded on each side wall on 08" center. The C channel rails on the back and side walls shall be 41" in length. The C channel rail on the back wall shall start 3" from the bottom of the cabinet interior. The C channel rails on the side walls shall start 2" from the bottom of the cabinet interior. Adjustable rails are not allowed.

6. The Cabinet shall be supplied with a natural mill finish inside and out, unless otherwise specified.
7. All external fasteners shall be stainless steel. Pop rivets shall not be allowed on any external surface.
8. The cabinet shall be supplied without a door handle. The door shall incorporate a 3/8" Allen head socket recessed in the cabinet door. The cabinet shall be supplied with (1) 3/8 removable Allen head wrench.
9. When the police panel is specified for inclusion, the main door shall contain a police door with a conventional police lock. A key shall be provided for both the cabinet lock and the police door lock. The police door shall be recessed into the main door so that the police door is flush with the main door.
10. A closed-cell, neoprene gasket seal shall be bonded to enclosure doors. A stiffener plate shall be welded across the width of the inside of the main door to prevent flexing. A main door bar stop shall be a two-position, three-point stop that accommodates open-angles at 90, 125, and 150 degrees. A louvered air entrance located at the bottom of the main door shall satisfy NEMA rod entry test requirements for 3R ventilated enclosures. Bearing rollers shall be applied to ends of door latches to discourage metal-on-metal surfaces from rubbing. Lock assembly shall be positioned so handle does not cause interference with key when opening the door.
11. When the police panel is specified for omission, the police panel door and all associated appurtenances shall be omitted.
12. The cabinet shall be equipped with a universal lock bracket capable of accepting a Best™ Construction Core and a Corbin#2 tumbler series lock. The cabinet shall come equipped with a Best blue construction core lock.
13. The cabinet shall be supplied with two door switches which control the door open status and the cabinet interior lighting circuits.
14. All exterior seams shall be manufactured with a neatly formed continuously weld construction. The weld for the police box door shall be done on the inside of the cabinet door. All welds shall be free from burrs, cracks, blowholes or other irregularities.
15. The fan baffle panel seams shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
16. The cabinet shall be UL listed.
17. The cabinet shall come with lifting ears affixed to the upper exterior of the cabinet. These ears shall utilize only one bolt for easy reorientation.
18. The cabinet shall come with a three-stage, multi-ply progressive density polyester, disposable air filter; and the filter performance shall conform to listed UL 900 Class 2 and shall conform to ASHRAE Standard 52.1. The filter element shall be attached with Velcro type mounting along the full length of all four edges.

19. The door shall be mounted with a single continuous stainless steel piano hinge that runs the length of the door. Attaching tamper resistant bolts shall also be stainless steel.

Shelves

The cabinet shall be provided with two (2) double beveled shelves 10" deep that are reinforced welded with V channel, fabricated from 5052-H32 0.125-inch thick aluminum with double flanged edges rolled front to back. Slotted hole shall be inserted every 7" for the purpose of tying off wire bundles.

Ventilating Fans

The cabinet shall be provided with a finger safe din rail mounted thermostatically controlled (adjustable between 4-176° Fahrenheit) ventilation fan. The fan shall be installed in the top right side of the cabinet plenum. A removable aluminum vent cover shall be supplied to allow a second thermostatically controlled fan to be added per customer request.

Computer Shelf

A slide-out computer shelf 16" length by 12" width by 2" depth shall be installed underneath the lower equipment shelf. The shelf shall be mounted so that controller cables will not interfere with the operation of the shelf when equipment is installed. The shelf shall have a hinged cover that opens from the front and shall be powder-coated black. It shall be a General Devices Part # VC4080-99-1168.

Main Panel Configuration (Load-Bay)

NEMA P and P+ Cabinet

The design of the panel shall conform to NEMA TS2 Section 5, Terminals and Facilities, unless modified herein. This panel shall be the termination point for the controller unit (CU) MSA,B & C and (MMU) MSA & B cables. The terminal and facilities layout shall be arranged in a manner that allows all equipment to be readily accessible.

The load-bay shall be fully wired and meet the following requirements:

- The load-bay shall have the following dimensions; constructed from aluminum with a nominal thickness of 0.125 inches and a maximum width of 37-1/2 inches (31.5" for P+) including attached wiring bundles.
- It shall be a Z type configuration.
- The entire assembly shall roll down and provide access to all of the back of panel wiring. All solder terminals shall be accessible when the load-bay is rolled down. The assembly shall be able to roll down without requiring other components, cables or switches to be removed.
- The load-bay shall be designed so that all other cabinet screw terminals are accessible without removing cabinet electronics.
- All the controller (CU) and malfunction management (MMU) cables shall be routed through the back of the load-bay so that they will not be subject to damage during load-bay roll down.

- The top of the load-bay panel shall attach directly to Unistrut™ spring nuts without the use of standoffs and spacers.
- The load-bay shall be balanced such that it will not roll down when fully loaded with load switches, flashers and flash transfer relays, and the Unistrut™ spring nuts are removed.
- The P cabinet shall be designed for 16 channel operation where load switch sockets 1-8 will be configured for a vehicle phase, load switch sockets 9-12 will be pedestrian phase and load switch sockets 13-16 will be overlaps A-D. These load switch sockets shall be configured in this manor without rewiring the back side of the load-bay. Load-bay channels 1-8 and 13-16 shall be routed through a flash transfer relay.
- Sixteen load sockets spaced on 2” center per NEMA TS2 section 5.3.1.2, figure 5-2.
- SIX flash transfer relay sockets.
- One flasher socket.
- All load switches and flasher shall be supported by a bracket extending at least ½ the length of the load switch.
- A screw terminal shall be provided to access all functions on all BIUs.
- Wiring for one Type-16 MMU.
- All 24 VDC relays shall have the same base socket but different from the 115VAC relays.
- All 115VAC relays shall have the same base socket but different from the 24VDC relays. (not applicable to flash transfer relays or the mercury contactor)
- The load-bay shall be silkscreened on both sides.
- Field wiring terminations shall be per channel across the bottom of the load-bay. Each channel shall have 3 terminations from left to right beginning with phase 1 corresponding to the appropriate vehicle phase Red, Yellow and Green and following the order of the load switches. Field terminals shall be #10 screw terminal and be rated for 600V.
- All cable wires shall be terminated. No tie-off of unused terminals will be allowed.
- Shall be 100% manufactured in the United States of America

NEMA M Cabinet

The design of the panel shall conform to NEMA TS2 Type 2 Section 5, Terminals and Facilities, unless modified herein. This panel shall be the termination point for the controller unit (CU) MSA & B & C and (MMU) MSA & B cables. The terminal and facilities layout shall be arranged in a manner that allows all equipment in the cabinet and all screw terminals to be readily accessible by maintenance personnel.

The load-bay shall be fully wired and meet the following requirements:

- The load-bay shall have the following dimensions; constructed from aluminum with a nominal thickness of 0.125 inches and a maximum width of 17 ¼ inches including attached wiring bundles.
- The entire assembly shall roll down and provide access to all of the back of panel wiring. All solder terminals shall be accessible when the load-bay is rolled down.

The assembly shall be able to roll down without requiring other components, cables or switches to be removed.

- The load-bay shall be designed so that all other cabinet screw terminals are accessible without removing cabinet electronics.
- All the controller (CU) and malfunction management (MMU) cables shall be routed through the back of the load-bay so that they will not be subject to damage during load-bay roll down.
- The top of the load-bay panel shall attach directly to Unistrut™ spring nuts without the use of standoffs and spacers.
- The load-bay shall be balanced such that it will not roll down when fully loaded with load switches, flashers and flash transfer relays, and the Unistrut™ spring nuts are removed.
- The M cabinet shall be designed for 9 channel operation. Load switches 1-4 shall be vehicle phases 2,4,6,8; load switches 5-8 shall be pedestrian phases 2,4,6,8. Load switch 9 shall be Overlap A. These load switch sockets shall be configured in this manor without rewiring the back side of the load-bay.
- Nine Load sockets spaced on 2" center per NEMA TS2 section 5.3.1.2, figure 5-2.
- Three Flash transfer relay sockets.
- (1) Flasher socket.
- All load switches and flasher shall be supported by a bracket extending at least 1/2 the length of the load switch.
- Wiring for one Type-16 MMU. All MMU wiring shall be soldered to backside of a screw terminal. The screw terminals provide access to all functions of the MMU.
- All 24 VDC relays shall have the same base socket, but it shall be different from the 115VAC relays.
- All 115VAC relays shall have the same base socket, but it shall be different from the 24VDC relays. (not applicable to flash transfer relays)
- Shall have a relay that drops +24VDC to load switches when the cabinet is in flash.
- The load bay shall have terminals to access the flash circuits 1 and 2.
- There shall be a wire between the pedestrian yellow field terminals and another terminal on the load bay. The MMU channel 9-12 yellows shall terminate next to said pedestrian yellows terminal.
- The load-bay shall be silkscreened on both sides, numbers and functions on the front side, and numbers only on the back side.
- Field wiring terminations shall be per channel across the bottom of the load-bay. Each channel shall have 3 terminations corresponding to the appropriate vehicle phase Red, Yellow and Green. Default wiring shall be left to right vehicle phases 2, 4, 6, 8, pedestrian phases 2, 4, 6, 8 and Overlap A, following the order of the load switches. Field terminals shall be #10 screw terminal and be rated for 600V.
- All cable wires shall be terminated. No tie-off of unused terminals will be allowed.
- Shall be 100% manufactured in the United States of America

NEMA P, P+ and M Cabinets

Wiring

All wiring shall conform to NEMA TS2 Type 2 section 5.2.5 and table 5-1. Conductors shall conform to military specification MIL-W-16878D, Electrical insulated high heat wire, type B. Conductors #14 or larger shall be permitted to be UL type THHN. Main panel wiring shall conform to the following colors and minimum wire sizes:

Vehicle green load switch output	14 gauge brown
Vehicle yellow load switch output	14 gauge yellow
Vehicle red load switch output	14 gauge red
Pedestrian Don't Walk switch	14 gauge orange
Pedestrian Walk switch	14 gauge blue
Pedestrian Clearance load switch	14 gauge yellow
Vehicle green load switch input	22 gauge brown
Vehicle yellow load switch input	22 gauge yellow
Vehicle red load switch input	22 gauge red
Pedestrian Don't Walk input	22 gauge orange
Pedestrian Walk input	22 gauge blue
Pedestrian Clearance input	22 gauge yellow
Logic Ground	18 gauge gray
+24V DC	18 gauge red with white tracer
+12V DC	18 gauge pink
AC+ Line	14 gauge black
AC- Line	14 gauge white
Earth Ground	16 gauge green
AC line (load bay)	12/14 gauge black
AC neutral (load bay)	12/14 gauge white
Controller A, B and C cables	22 gauge blue <i>with the exception of power wires (AC+ Black, AC- White & Earth Ground Green)</i>
MMU A & B cables	22 gauge orange <i>with the exception of power wires (AC+ Black, AC- White & Earth Ground Green)</i>

The field terminal blocks shall have a screw Type No. 10 post capable of accepting no less than 3 No. 12 AWG wires fitted with spade connectors. Four (4) 12-position terminal blocks shall be provided in a single row across the bottom of the main panel. Spade lugs from internal cabinet wiring are not allowed on field terminal screws. The flash program shall be changeable from the front of the load-bay. All load switches, flasher, and flash transfer relay sockets shall be marked and mounted with screws. Rivets and clip-mounting is unacceptable.

Wire size 16 AWG or smaller at solder joints shall be hooked or looped around the eyelet or terminal block post prior to soldering to ensure circuit integrity. All wires shall have lugs or terminal fittings when not soldered. Lap joint/tack on soldering is not acceptable. All soldered connections shall be made with 60/40 solder and non-corrosive, non-

conductive flux. All wiring shall be run neatly and shall use mechanical clamps and conductors shall not be spliced between terminations. Cables shall be sleeved in braided nylon mesh and wires shall not be exposed.

Load-Bay and Panel Wire Termination

All wires terminated behind the main panel or on the back side of other panels shall be **SOLDERED**. No pressure or solder-less connectors shall be used.

Cabinet Light Assembly

The cabinet shall have an LED lighting fixture with 15 high power LEDs using a cool white color emitting 300lm min @ 12VDC/750mA. The LED shall be a Rodeo Electronics TS-LED-05M02 or equivalent. The LED fixture shall be powered by a Mean Well class 2 power supply LPV-20-12 that shall be mounted on the inside top of the cabinet near the front edge. The cabinet light circuit shall be designed so a second LED fixture can be installed in the cabinet without the need a of a second power supply. An on/off switch that is turned on when the cabinet door is opened and off when it is closed shall activate the lighting fixture(s) power supply.

Convenience Outlet

The cabinet shall be wired with one convenience outlet with a ground fault interrupter and TWO power strips without ground fault interrupters. The ground fault outlet shall be mounted on the right side of the cabinet on or near the power panel. The power strips shall be ...on each side above... the top shelf. No outlets shall be mounted on the door. The GFI power shall be fed through the auxiliary breaker. The power strip shall be fed through an EDCO SHP300-10 transient voltage suppressor located on the cabinet power panel. There shall be a 2-position terminal block on the power panel, between the power strip and the EDCO SHP300-10 for easy replacement.

9-29.16 Vehicular Signal Heads, Displays, and Housings

(October 1, 2017 COS GSP)

Replace the second paragraph with the following:

Backplates shall be constructed of 5-inch-wide, .050-inch-thick corrosion-resistant flat black finish, be non-louvered, and be one-piece. Backplates shall be supplied with a 2 inch wide yellow (#3931) Type 4 High Intensity Prismatic retroreflective sheeting installed on the perimeter.

9-29.17 Signal Head Mounting Brackets and Fittings

(August 1, 2008 COS GSP)

Delete the last paragraph.

9-29.24 Service Cabinets

(November 1, 2012 COS GSP)

Replace this Section in its entirety with the following:

All electrical conductors, buss bars, and conductor terminals shall be copper

The minimum size of control circuit conductors used in service cabinets shall be 14 AWG stranded copper with THWN insulation.

Service cabinets shall be constructed of steel or aluminum. If aluminum, they shall be fabricated from 0.125 inch (minimum) and anodized. If steel, they shall be fabricated from 12-gauge (minimum) steel, and hot dipped galvanized.

Doors shall be lockable with a padlock.

Aerial Service Cabinet

The aerial AC service enclosure shall be Square D model QO2-4L70RB or an approved equal meeting the following:

The AC service enclosure shall be lockable, rain-tight, designed for two large 60 amp circuit breakers expandable to four small circuit breakers, rated at 70 amps, and suitable for mast mounting.

The enclosure for the AC service shall be designed so that the access door to the circuit breakers may be opened without de-energizing either the controller branch service or the street lighting branch service.

The AC service shall be designed so that the street lighting branch circuit and the controller branch circuit may be separately de-energized.

Ground Mounted Service Cabinet

The ground mounted service cabinet with underground service entrance shall be a Tesco Model 26-100 or an approved equal:

The Cabinet shall be UL listed

The cabinet shall be fabricated from 12 gauge, hot dipped galvanized steel, or 1/8 inch anodized aluminum, or 304D 14 gage stainless steel as required, and be rated as a NEMA 3R enclosure.

The internal parts shall be fabricated from 14 gage cold rolled steel.

The cabinet shall be of all welded construction with welding materials specifically designed for the material used.

All fasteners, hinges, latches, and hardware shall be of stainless steel and hinges shall be continuous piano type.

There shall be no exposed nuts, bolts, screws, rivets or other fasteners on the exterior.

The cabinet shall have a fully framed side hinged outer door with swaged close tolerance sides for flush fit with top drip lip and closed cell neoprene flange compressed gaskets.

The cabinet door shall have a 2,000 pound stress rated hasp, welded to the cabinet door. 4- 5/8 inch x 18 inch anchor bolts and applicable appurtenances (including nuts) shall be provided.

The distribution and control panel shall have a hinged deadfront panel with 1/4 turn latch and knurled knobs.

The deadfront shall be hinged on the same side as the front door and shall open a minimum of 120°.

The unit shall contain a removable back panel.

Power Distribution Panel

It shall provide separate main and disconnects- as required.

All circuit breakers shall be installed in a vertical position, handle up for "On", handle down for "Off".

All circuit breakers shall be industrial grade, plug-in breakers shall not be used.

All bushings shall be UL approved THHN cable busing, fully rated for 125 Amps.

At least 6 standard single pole circuit breakers spaces (3/4 inch nominal) shall be provided.

Control Compartment

The cabinet shall be completely prewired in the factory.

All terminals shall be permanently labeled.

All control wiring shall be #14 AWG THHN.

Replace this section in its entirety with the following:

9-29.25 Terminal Cabinets

(April 1, 2018 COS GSP)

Terminal cabinets shall be NEMA 3R and meet the following specifications:

1. Cabinets shall be constructed of 0.125 inch thick 5052-H32 aluminum using continuously welded construction.
2. Nominal cabinet dimensions shall be 8"d x 16"h x 12"w.
3. Cabinet doors shall have a full length, heavy gauge, stainless steel piano hinge.
4. All cabinets shall have a double flanged door with a closed cell neoprene door gasket.
5. Includes a drip shield.
6. Cabinet shall include 2 – 12 position Insulated terminal blocks (Marathon 1512DJ) The blocks shall be 600 volt, heavy-duty, barrier type. The terminal blocks shall be provided with a field-side and a control-side connector separated by a marker strip.
7. Main door lock is a Best CX series Green core lock with latch type locking bolt.
8. Mounting shall be as noted in the Contract.

Add the following new Section:

9-29.100 Pre Formed Loops

(June 22, 2018 COS GSP)

Preformed Loops shall:

Preformed Loops shall:

Contain 16 AWG or 14 AWG stranded copper wire with THHN insulation.

Consist of the number of turns according to the Standard plans or as detailed on the plan sheets.

Constructed with an outer protective duct of 5/8" (outside diameter) hydraulic hose and be injected with rubberized asphalt.

Contain no splices.

Lead-ins shall contain a minimum twist of the loop wire of 3 twists per foot.

Be factory tested and provided with factory test report indicating wire continuity and loop inductance.

Loop sealant for use in HMA pavement shall be one of the following:

QCM EAS – 14 Epoxy Adhesive

RAI Pro-Seal 6006 Ex

CRAFCO 34271 (hot pour)

3M 5000 (cold sealant)

Fields T Series – Type T4 (hot pour)

Loop sealant for use on concrete bridge decks and PCC pavement shall be one of the following:

AHT 1614JFR – HP Joint Sealant (hot pour)

QCM EAS – 14 Epoxy Adhesive

RAI Pro-Seal 6006 Ex

3M 5000 (cold sealant)

Hot loop sealants shall be heated according to the manufacturer's recommendations.

Backer rod shall not shrink when exposed to hot pour sealants. The Contractor shall demonstrate this in the field prior to installation.

The Contractor shall submit catalog cuts of the preformed loop, sealant, and backer rod for review and approval by the Street Department.

Add the following new Section:

9-29.101 Magnetometers
(November 1, 2014 COS GSP)

Microloop Probes. The microloop probe shall be a cylindrical unit designed to be buried beneath the road surface. The device shall transform magnetic field intensity changes into inductance changes. The device when connected to an inductive loop detector shall detect vehicles containing significant ferromagnetic material.

The probe shall be approximately 0.88-inches in diameter and 3.63-inches long. The lead-in cable shall be factory installed, with a length sufficient to connect to other probes and to the junction box where the lead-in will be spliced to the home-run cable. The entire assembly shall be sealed against moisture entry.

The probe shall have a nominal inductance of 25 microhenries per probe plus 21 microhenries per 100-feet of interconnecting and lead-in cable. The sensitivity shall be 3.5 to 8.0 nanohenries per millioerstads at 50 KHz, 400 millioerstads ambient magnetic field intensity.

Microloop probes shall be furnished and installed as shown on the Plans and on the COS Standard Plans in the 'J' series. The Contractor shall measure the vertical component of the magnetic field intensity prior to installation of the microloop probe(s). The location must have a field intensity of between 0.2 Oerstad and 0.8 Oerstad. The Engineer will determine the alternate location if the planned location is not suitable.

Each probe shall be installed vertically in PVC sleeves. The interconnecting cable and lead-in cable shall be installed in a sawcut to the junction box. The microloop lead-in cable shall be spliced into the home run lead-in cable in accordance with the COS Standard Plans in the 'J' series.

Add the following new Section:

9-29.102 Non-Intrusive Vehicle Detection System
(April 1, 2018 COS GSP)

The following preapproved non-intrusive vehicle detection system shall be used:

GRIDSMART®:

- GRIDSMART® Bell Camera with ultra-wide angle fisheye camera
- GRIDSMART® Bell Camera mounting bracket
- GRIDSMART® GS2 Processor with TS2 SDLC connector kit and Performance module software included.

Add the following new Section:

9-29.104 Fiber Optic Patch Cords
(November 1, 2014 COS GSP)

Fiber Optic Patch Cords

Fiber optic patch cords shall utilize singlemode fiber, OFNR rated, ceramic ferules, factory connectorized utilizing thermal cured epoxy, UPC polish, with an ORL of -50 dB and maximum insertion loss of 0.5 dB, and consist of tight buffered cable with a 3 millimeter outer jacket. Duplex patch cables shall contain a clip that allows polarity correction of the connectors without the need for special tools. Hybrid patch cords shall be constructed with differing connector types for each end, according to the plans, for connecting devices to patch panels.

Add the following new Section:

Add the following new Section:

9-29.105 Fiber Optic Connectors
(November 1, 2014 COS GSP)

Fiber Optic Connectors

Unless otherwise noted in the Plans, fiber optic connectors used on this project shall meet the following:

All fiber optic connectors shall be factory connectorized and polished to UPC with an ORL of -50dB. The connectors shall be of the type specified in the Plans.

All fiber optic connectors shall have a maximum insertion loss of 0.5 dB per connector.

All fiber optic connectors shall be capped with a protective dust cover.

The Contractor shall submit catalog cuts with the Request for Approval of Material for review and approval by the Project Engineer.

Add the following new Section:

9-29.106 Fiber Optic Splice Closures **(November 1, 2014 COS GSP)**

Fiber Optic Splice Closures

Underground Fiber Optic Splice Closure

All underground splice closures shall be COYOTE RUNT or appropriately sized COYOTE DOME.

Traffic Signal Cabinet and VMS Control Cabinet Fiber Optic Splice Closures

All splice closures for Traffic Signal Cabinets and VMS Control Cabinets shall be SPH-01P by Corning Cable Systems.

Communication Closet Splice Closures

Splices closures shall be compatible with Siemon patch panel and be contained in the patch panel. Due to space limitations, splice closures that consume rack space below a patch panel will be rejected.

Add the following new Section:

9-29.107 Fiber Optic Patch Panels **(November 1, 2014 COS GSP)**

Fiber Optic Patch Panels

Each patch panel shall be populated with interconnection sleeves according to the Plans. Empty patch panel slots shall have a blank cover. All interconnection sleeves shall have a protective dust cover installed.

The splice trays and the fiber optic interconnection sleeves shall be enclosed on all sides by the patch panel when the patch panel is closed.

Rack Mount Fiber Optic Patch Panels for Aggregate Points

Rack-mount fiber optic patch panels shall be capable of mounting in a standard 19 inch EIA equipment mounting rack. Rack-mount patch panels shall be Siemon.

Rack Mount Fiber Optic Patch Panels for VMS Cabinets

Rack-mount fiber optic patch panels installed in VMS cabinets shall be Siemon, 1 rack unit tall and be capable of mounting in a standard fixed 19 inch EIA equipment rack. Interconnection sleeves shall be mounted to the front of the panel and be Siemon quick pack or equivalent.

Wall Mount Fiber Optic Patch Panels for Traffic Signal Cabinets

Wall mount fiber optic patch panels shall be corning SPH-01P.

Add the following new Section:

9-29.108 Racks and Cable Management **(November 1, 2014 COS GSP)**

Racks

Equipment mounting racks in buildings shall be Siemon RS-07-S.

Cable Management

Vertical cable managers shall be Siemon RS-CNL.

Horizontal cable managers shall be Siemon WM-143-5, or WM-144-5, or WM-145-5, as noted in the plans.

Add the following new Section:

9-29.109 Video & Data Transmission and Distribution Systems **(November 1, 2014 COS GSP)**

General

If any equipment specified in this section has been superseded by a newer product that is interchangeable, the newer product shall be supplied. If the product is no longer available and has no replacement, the Contractor shall propose a different product meeting the same performance and material specifications as the discontinued one.

Equipment

- Ethernet switching devices shall be by Cisco Industries

Manufacturer:

Cisco Systems Inc.
170 West Tasman Dr.
San Jose, CA 95134
Telephone: 1-800-553-6387

Equipment Model Numbers:

- IE 3000 Switch 8TC 10/100 + 2 T/SFP
- IE 3000 Power transformer
- IE 3000 Rack Mount Adapter
- 1000Mbps Single Mode Rugged SFP LX
- Catalyst 3850 12 Port GE SFP IP Services
 - North America AC Type Power Cable
 - 350W AC Config 1 Secondary Power Supply
 - Cisco Catalyst 3850 4 x 1GE Network Module
 - CAT3850 Universal k9 image
 - 50CM Type 1 Stacking Cable
 - Catalyst 3750X and 3850 Stack Power Cable 30CM
 - 350 W AC Config 1 Power Supply
- 1000BASE-LX/LH SFP transceiver module

The Contractor shall submit catalog cuts with the Request for Approval of Material for review and approval by the Project Engineer.

Add the following new Section:

9-29.110 Closed Circuit Television Systems
(August 1, 2015 COS GSP)

General

If any equipment specified in this section has been superseded by a newer product that is interchangeable, the newer product shall be supplied. If the product is no longer available and has no replacement, the Contractor shall propose a different product meeting the same performance and material specifications as the discontinued one.

Television Camera Assembly

Television cameras shall be supplied as a unit including pan and tilt mechanism, clear lens, and 28 foot pig tail.

1. Equipment Model Numbers:

Camera: Spectra HD dome drive 30x 1080P	D5230P
Back Box: Spectra IV PENDT MT	BB4-PR-E
Dome: Spectra III PPRES DOME PEND CLR	LD53PR-1
Pressurized back Box Modification	SMR-1-252IP7
Adapter pole mount	PA3512
Modify pole mount with internal channel	SMR 1-2FMFAR
28 ft Pigtail	SMR 1-2NOHJV
Power Supply	WCS1-4

2. Manufacturer:

Pelco

3500 Pelco Way
Clovis, CA 93612-5699
www.pelco.com
Telephone: (800) 289-9100

The Contractor shall submit catalog cuts with the Request for Approval of Material prior to ordering this material for review and approval by the Project Engineer.

CCTV System Cabling

The Contractor shall terminate power cables to the terminal strip and make necessary connections to the power surge suppressor and camera power supply.

Category 6 cable shall be terminated to an RJ-45 connector for connection to the Ethernet surge suppressor.

The Contractor shall terminate the 28 foot camera cable pigtail to the RJ-45 surge suppressor and the camera power supply.

Surge Suppression

Signal/Camera Cabinet surge suppressors shall be Transtector SL-Vor consist of:
Six NEMA 5-15 outlets.

Have a nominal operating voltage of 120 VAC.

Equipped with silicone avalanche suppressor diode technology for over current protection.

The surge suppressor shall be equipped a visual status indicator for "Operational" or "Fail" conditions.

Surge suppressors isolating the CCTV camera from the Ethernet Switch and between the Signal Controller and the Ethernet Switch shall be Transtector TSJ 10/100BT or consist of:

Silicone Avalanche Diode Technology

One in and one out RJ 45 connection

Maximum of 12 V peak operating voltage

-30° to +65° C operating environmental temperature

90% relative humidity

Grounding lug

The surge suppressor isolating the CCTV power supply from the Signal Cabinet shall be Transtector ACP100MN.

NEMA 3R Enclosure

The enclosure shall be 16" X 12" X 6" painted gray and rated as a NEMA 3R enclosure.

The enclosure shall contain an 8 position terminal strip capable of accepting spade type connectors and an 8 position grounding bus.

The door shall have a continuous vertically oriented piano hinge.

The Ethernet surge suppressor, the line voltage surge suppressor, and the camera power supply shall be mounted in the enclosure.

Add the following new Section:

9-29.111 Permanent Variable Message Sign
(August 1, 2015 COS GSP)

The VMS display shall be model VF-2420-27 x 110-46A. The VMS display and model 336 pole mounted cabinet shall be supplied by:

Daktronics, Inc,
331 32nd Ave,
Brookings, SD 57006-5128
Phone: (800)
FAX: (605) 697-4300
Email: sales@daktronics.com

The Contractor shall submit catalog cuts with the Request for Approval of Material for review and approval by the Engineer.

Sign Mounting Hardware

The sign housing shall be provided with all necessary hardware including sign mounting beams, vertical and horizontal brackets, and all related hardware to install the VMS onto a truss cantilevered sign structure.

The VMS housing, structural framing, face covering, and mounting members shall be designed to withstand a wind velocity of 100 mph with a 30 percent gust factor and shall otherwise comply with the 2001 requirements of AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

Circuit Boards

The manufacturer's submittal shall include a schematic diagram for each type of circuit board used in the sign display and control system.

Display LEDs

LEDs used in the VMS display shall be from one LED manufacturer and of one part number. LEDs shall conform to the following minimum requirements:

1. Operating temperature range shall be -40° C to +100° C, and storage temperature range shall be -40° C to + 100°C.
2. Minimum half power viewing angle shall be 30°. Half power viewing angle is defined such that, at a given distance from the LED, luminous intensity measured at any point at an angle of 15° from the LEDs center axis shall be no less than half the luminous intensity measured directly on the LEDs center axis.

LED Intensity Control System

The VMS shall be equipped with an LED intensity control system. The control shall support both manual and automatic control. LED intensity control shall consist of photo sensors and associated circuitry. VMS controller analysis of these ambient light measurements shall automatically determine which preprogrammed LED intensity levels will provide the best VMS legibility for the given ambient light condition. The LED intensity control system shall not cause flickering of the LED display.

Power Supplies

The LED hybrid display matrix shall be powered by regulated switching DC power supplies that operate from 120 VAC input power and have an output of 24 volts DC or less. Power supplies shall be wired in a redundant parallel configuration that uses multiple supplies per display. The supplies shall have a “current sharing capability that allows them to provide equal amounts of current to their portion of the LED Display. Power supplies shall be rated such that if one supply fails, the remaining supplies will be able to operate their portion of the display under full load conditions (all pixels on at maximum drive current) while in an ambient temperature of +60° C.

Power supplies shall operate within a minimum input voltage range of +90 to +135 VAC. Power supply output at an ambient temperature of +60° C shall be no less than 65% of its room temperature (+21° C) output. Power supply efficiency shall be a minimum of 74%. Power supplies shall have a minimum power factor rating of 0.95. Power supplies shall be short circuit protected. Under short circuit conditions, the DC side of the power supply shall be powered down. The power supplies shall reset automatically after 5 seconds of AS power off. Power supplies shall be protected by a minimum overload allowance of 105%. Inputs to power supplies shall be fused or circuit breaker protected. A failed power supply shall not interfere with the other operating power supplies.

A copy of the power supply manufacturer’s data sheet and its UL or ETL product card shall be provided with the VMS manufacturer’s submittal.

VMS Control Cabinet

The VMS Control Cabinet shall be supplied as a pole mountable 336 style NEMA 3R cabinet as shown in the plans. The mounting bracket shall be tapered to offset the taper of the sign structure allowing the cabinet to be mounted plumb.

The Cabinet shall be constructed of 5052-H34 Aluminum with continuously welded external seams.

The access doors shall contain a three-point latch with stainless steel handle, one per side for two sides. The doors shall be sealed with 0.5” x 2” closed-cell neoprene gaskets. Lock cores shall be City of Spokane specification M-2 “Best” brand, from Allied Fire & Security located in Spokane Washington.

VMS Cabinet Uninterruptable Power Supply

The VMS Cabinet shall be supplied with an Uninterruptable Power Supply that is mounted in the standard EIA 19” rack.

The UPS shall be capable of being managed over the existing Ethernet network.

The batteries shall be leak proof, Maintenance-free Lead –Acid with suspended electrolyte.

Transient Current Protection

VMS and sign controller signal and power inputs shall be protected from electrical spikes and transients.

AC power for all equipment shall be protected at the load center inside the field cabinet. A parallel-connection surge suppresser, rated for a minimum surge of 10 kJ, shall be connected to the load center in a manner that protects the load center and the equipment it feeds.

AC power for control equipment, such as the field controller and communication equipment, shall be further protected by the use of a series-connected surge suppresser capable of passing 15 Amps of current. This device shall be UL 1149 recognized.

EIA 232/485 communications ports in the sign controller shall be protected by avalanche diodes rated for 11.5 volts at 10 Amps and 14 Volts at 70 Amps. The diodes shall be connected between each signal line and ground.

Digital input and output lines from the VMS to the control equipment shall be protected at the control equipment by optically isolated input and output modules, or optically isolated solid state relays. Inputs shall include, but shall not be limited to the VMS regulated power supply diagnostics and the AC power failure alarm. Outputs shall include, but shall not be limited to the cooling fan and defog/defrost fan control.

Sign Controller

The sign controller shall cause the desired message to be displayed on the VMS. The sign shall display alphanumeric character fonts. The sign controller shall be NTCIP compliant and provide a default value for each NTCIP object supported.

Message Selection

With the sign controller software , the central computer or laptop computer shall be capable of implementing a message selected from those stored in controller memory, or a new message entered via the communication port.

A message shall remain displayed on the sign until either a command to change the current message or a command to blank the display is received.

Data Transmission Requirements

Sign Controllers shall have an integrated RJ45 10/100 Base-T Ethernet communication port, an integrated Hayes compatible RJ11 modem port, 3 integrated RS-232 ports, and an integrated RS422 port.

Memory

Sign controllers shall have non-volatile changeable memory capable of retaining data for a minimum of 30 days following a power failure. The memory shall be capable of storing up to 500 changeable messages.

Power Interruptions

Contents of the sign controller's memory shall be preserved by battery backup during AC power interruptions and the controller shall automatically resume operation once AC power is restored. Upon recovering from a power interruption, the sign controller shall display the message identified by the Power Recovery Message parameter. The sign controller shall report to the central computer that it has recovered from a power interruption.

Control Software

The Contractor shall supply one copy of the Vanguard v4 Standard software. The control software shall be designed to operate on Microsoft Windows 7 operating systems as a minimum.

The software shall be capable of controlling the new VMS and other existing VMS currently controlled from the Spokane Regional Traffic Management Center.

The sign control software shall be a stand alone Personal Computer (PC) application that allows access up to 255 signs through a direct line or dial up connection.

The control software shall provide for command and control of the following functions:

VMS Control

Software shall retrieve, display, update and download/upload the following functional parameters to the local sign controller in response to user-initiated instructions. The pixel service test shall activate every pixel by reversing the image (positive to negative and visa versa) being displayed on the sign at the time of the test, so that the message remains readable. Software shall perform the following operations in conjunction with its monitoring and logging functions:

Display message

Blank the current message

Change message priority

Pixel, lamp and fan tests

Set time and date in the sign controller

Retrieve sign ID, type, and manufacturer

Communications

Communications between the control software and sign controller shall be NTCIP compliant.

The control software shall verify all communications for errors. If a response from a sign controller contains a communications error, or if there is no response the Control Software shall re-establish communications.

Data Collection

The control software shall retrieve errors detected, message number currently being displayed, and current message priority. Using different commands, the software shall retrieve message MULTI strings, a map of defective pixels, the time and date, the event schedule, and configuration parameters.

Message Library

The control software shall store messages and transfer messages to a sign for storage and/or display. When a user desires to send a message to a sign, the control software shall offer as choices only those messages compatible with the sign in question. The control software shall allow message names in plain text representation (no MULTI).

The control software shall display all character fonts supported by the Variable Message Sign System. Message shall be displayed on the computer monitor in exactly the same format (font, text centering and justification) as on the Variable Message Sign.

Software Duplication Rights

The City of Spokane shall have the right to duplicate the Variable message Sign Control Software as needed for use in controlling signs under its jurisdiction.

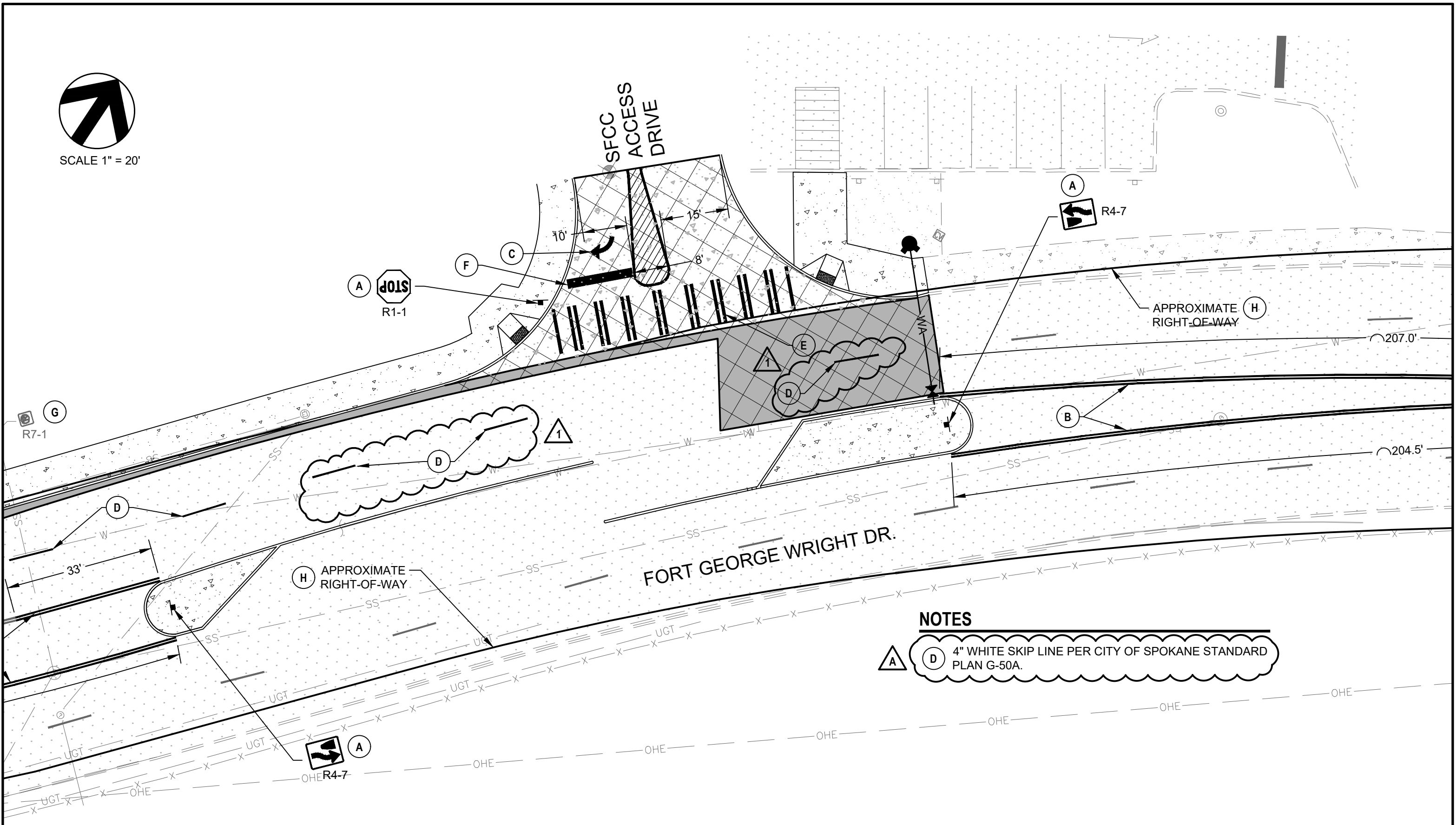
The Contractor shall supply one copy of the Vanguard v4 Professional and one server license to the City for installation on an existing server.

Documentation

The Contractor shall furnish two paper copies of the Control software user manuals, the sign controller cabinet schematic, and the VMS display cabinet wiring schematic, to the Engineer. In addition the Contractor shall provide two CD ROM disks with the same documents in electronic format to the Engineer.



SCALE 1" = 20'



NOTES

- A D 4" WHITE SKIP LINE PER CITY OF SPOKANE STANDARD PLAN G-50A.



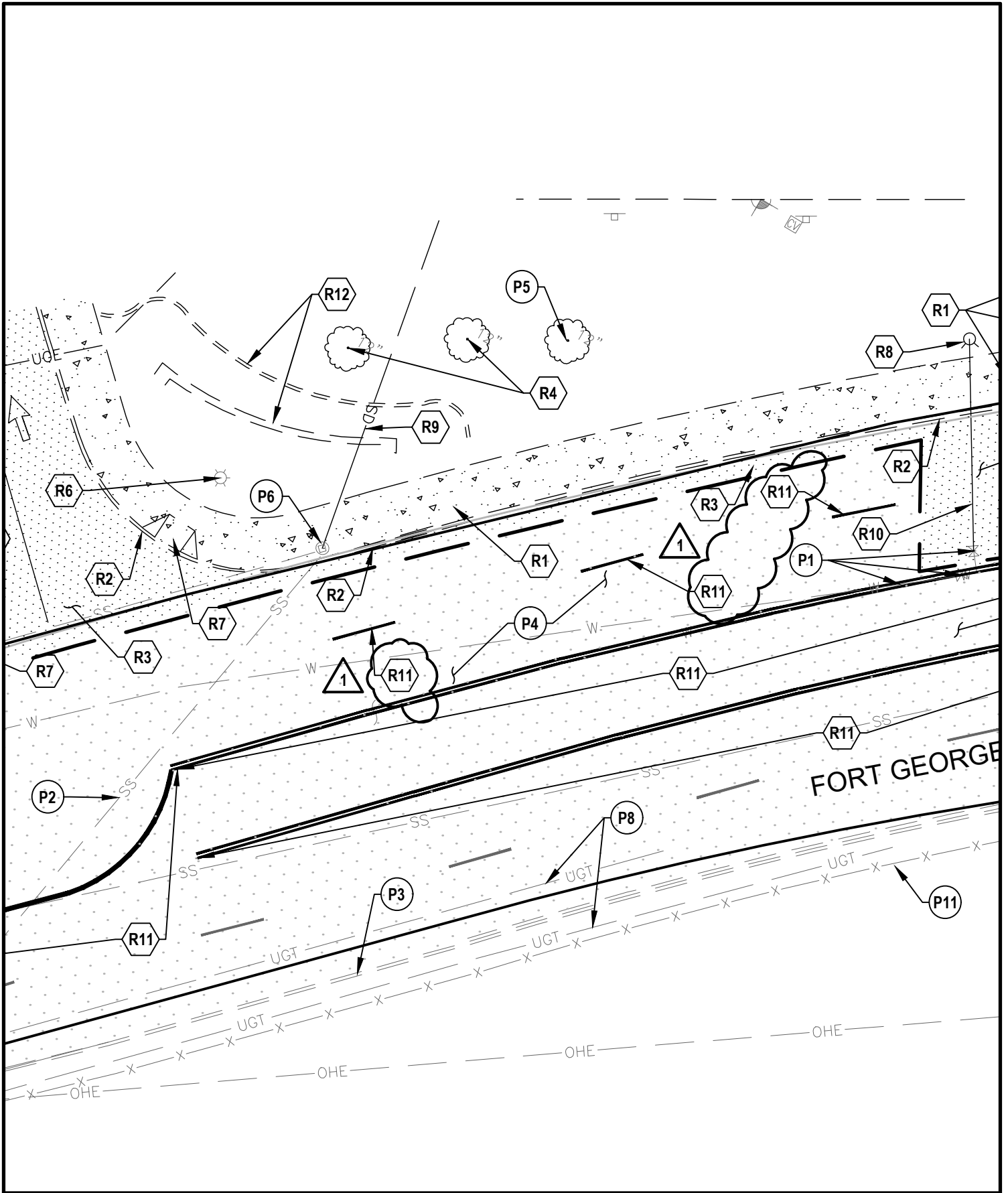
SPOKANE FALLS STATION
2018-10259





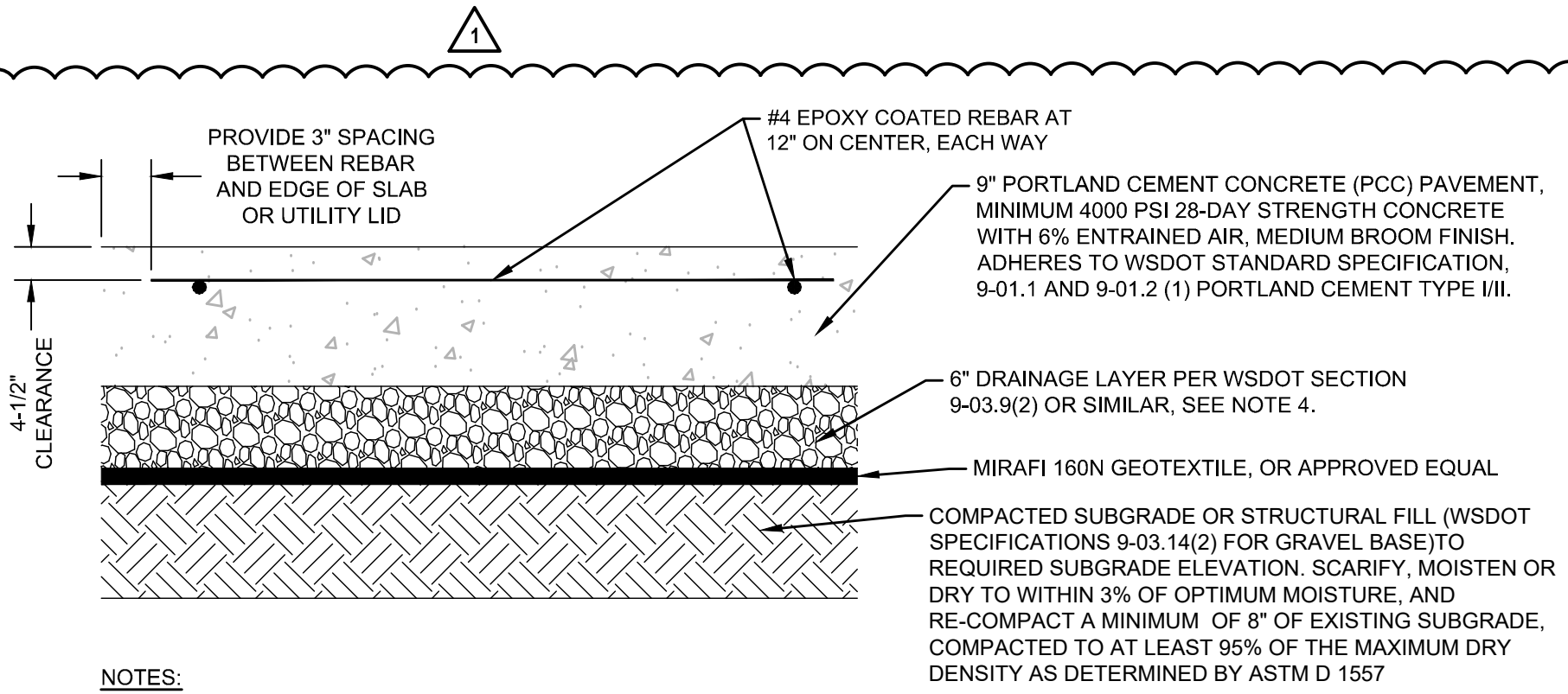
ADDENDUM # 1

DATE	DRAWN	DWG. NO.	JOB NO.	REF. SHT.
2/15/19	BLW	CC-01	2018-10259	2/6

DESCRIPTION
STRIPING UPDATES AT EAST ENTRANCE



 <p>SPOKANE FALLS STATION 2018-10259</p>	 <p>10 N. Pine Street, Suite 500 Spokane, WA 99201 ph 509.328.5994 fax 509.328.2999 coffman.com LASTING quality locally relationships</p>	ADDENDUM # 1			
		DATE 2/15/19	DRAWN BLW	DWG. NO. CC-02	JOB NO. 2018-10259
DESCRIPTION REMOVE ADDITIONAL STRIPING					



NOTES:

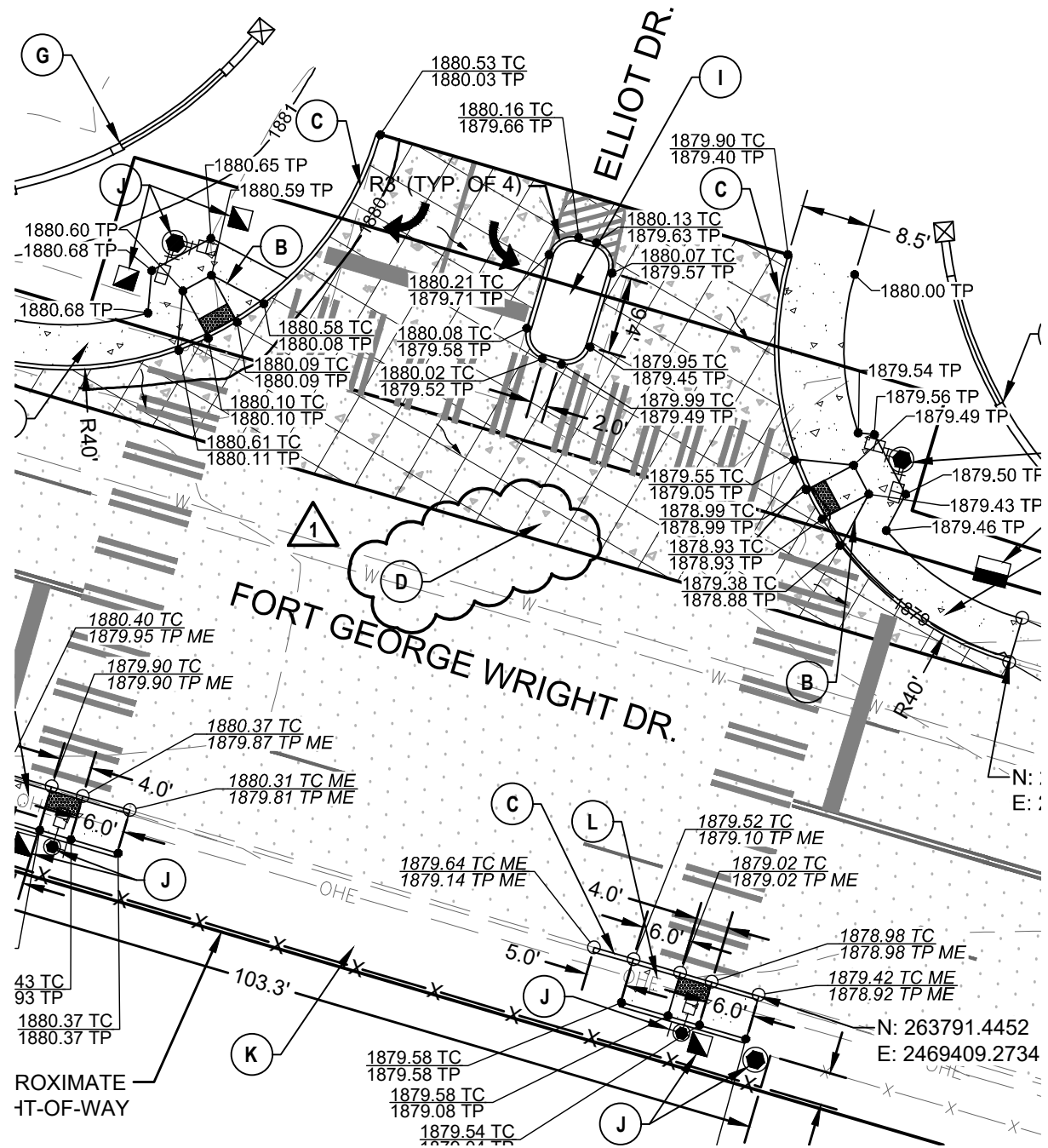
1. EXPANSION (ISOLATION) JOINTS SHALL USE A 3/8" PREMOLDED JOINT FILLER PER SEC 9-04.1(2). JOINTS SHALL EXTEND THROUGH THE FULL CROSS-SECTION OF THE CONCRETE & CURB GUTTER, WHERE APPLICABLE.
2. CONTRACTION (CONTROL) JOINTS SHALL BE SPACED NO FURTHER THAN 1.5 TIMES THE SHORTEST DIMENSION, OR 15'-0" ON CENTER MAX.
3. PROVIDE THICKENED EDGE AT TRANSITIONS TO OTHER PAVED STRUCTURES.
4. OPEN-GRADED, CRUSHED GRAVEL AGGREGATE IS RECOMMENDED. WSDOT MATERIAL SPECIFICATION SHOULD BE USED FOR SELECTION OF THE OPEN GRADED GRAVEL MATERIAL SELECTION. "PERMEABLE BALLAST" AND "AGGREGATE FOR BITUMINOUS SURFACE TREATMENT" ARE ACCEPTABLE WSDOT MATERIALS.
5. CONCRETE SHALL BE JOINTED PLAIN CONCRETE PAVEMENT WITH DOWELED TRANSVERSE JOINTS AND TIED LONGITUDINAL JOINTS. MAXIMUM JOINT SPACING IS 15 FEET. DOWELS SHALL BE 1.5-INCH DIAMETER BY 18 INCHES LONG EPOXY-COATED BAR, SPACED 24 INCHES APART, AND PLACED AT MID SLAB DEPTH. TIES SHALL BE #4 OR LARGER-SIZED BAR, AT LEAST 24 INCHES LONG, SPACED 36 INCHES APART, AND PLACED AT MID-SLAB DEPTH.
6. CONTRACTOR SHALL PROVIDE SUBMITTAL FOR JOINT LAYOUT WITH DOWELS AND TIE BARS. PROVIDE 3-INCH SPACING BETWEEN REBAR AND JOINTS. DO NOT RUN REBAR CONTINUOUSLY BEYOND JOINTS.

1 CONCRETE PAVEMENT
SCALE: NTS

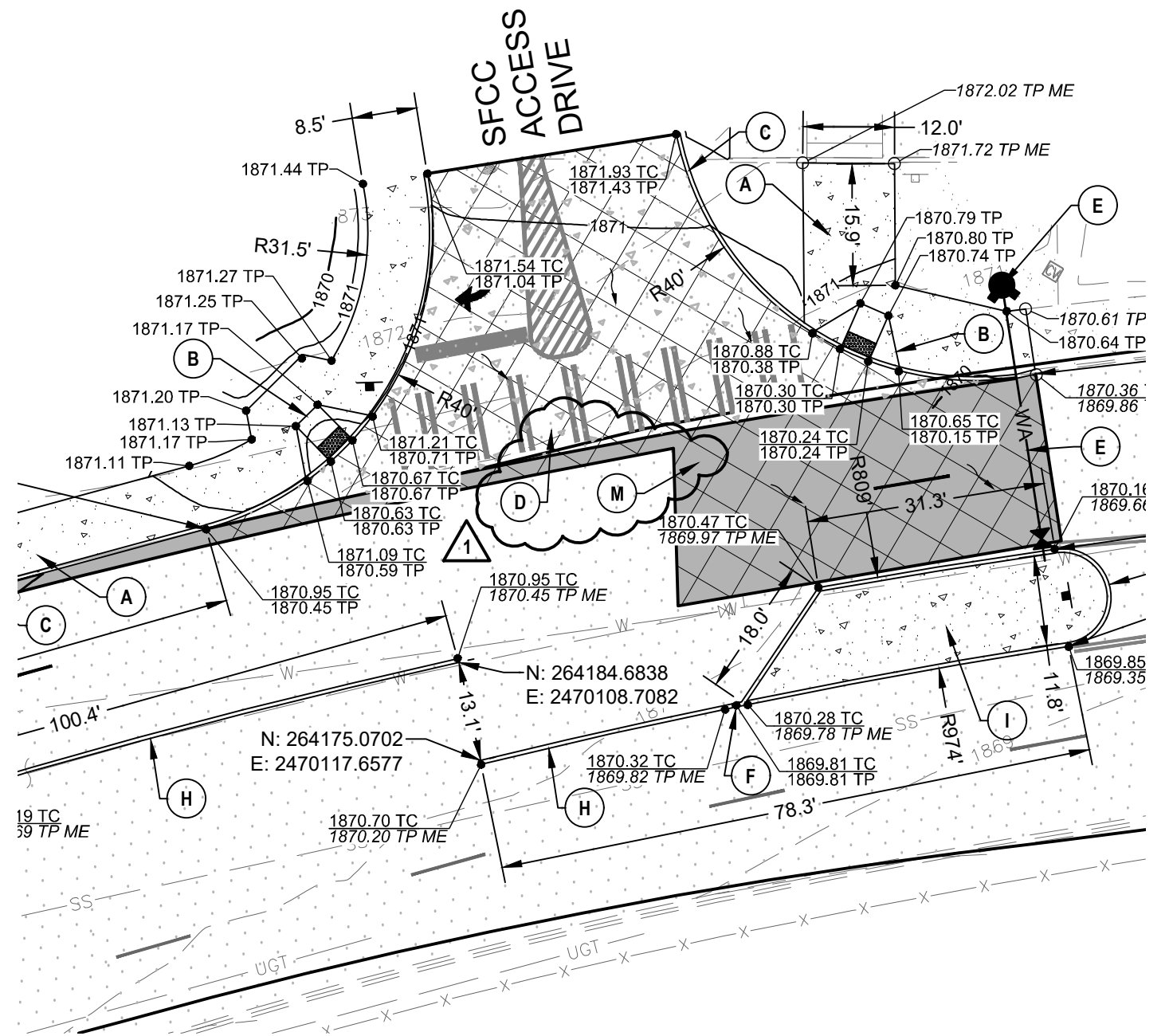
NOTES

- (A) CONCRETE SIDEWALK SHALL CONFORM WITH CITY OF SPOKANE STANDARD PLAN F-102.
- (B) CURB RAMP (TYPE 1) SHALL CONFORM TO CITY OF SPOKANE STANDARD PLAN F-10
- (C) CONCRETE CURB SHALL CONFORM TO CITY OF SPOKANE STANDARD PLAN F-106.
- 1** (D) CONCRETE PAVEMENT SHALL CONFORM TO DETAIL 1, THIS SHEET.
- (E) INSTALL NEW HYDRANT ASSEMBLY PER CITY OF SPOKANE STANDARD PLAN Y-101. CONTRACTOR TO COORDINATE CONNECTION OF WATER MAIN WITH THE CITY WATER DEPARTMENT.
- (F) INSTALL DROPPED CURB AT CURB ISLAND PER DETAIL 2, THIS SHEET.
- (G) SPOKANE FALLS COMMUNITY COLLEGE MONUMENT SIGN. SEE ON-SITE PLANS.
- (H) REINFORCED CONCRETE CURB SHALL CONFORM TO DETAIL 3, THIS SHEET.
- (I) TRAFFIC ISLAND SHALL COMPLY WITH CITY OF SPOKANE STANDARD DETAIL F-108.
- (J) TRAFFIC SIGNAL EQUIPMENT, SEE SIGNAL PLANS FOR MORE INFORMATION.
- (K) INSTALL CHAIN LINK FENCE TOPPED WITH TWO STRANDS OF BARBED WIRE. CONTRACTOR SHALL FIELD VERIFY AND MATCH EXISTING FENCE STYLE.
- 1** (M) ASPHALT PAVEMENT, CONTRACTOR SHALL MATCH EXISTING PAVEMENT SECTION. ASSUME PAVEMENT SECTION IS 5" HMA AND 7" OF CSBC OVER 6" OF CRUSHED ROCK PER CITY OF SPOKANE STANDARD PLAN W-101A.

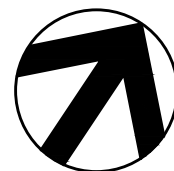
<p>SPOKANE FALLS STATION 2018-10259</p>	<p>10 N. Post Street, Suite 500 Spokane, WA 99201 ph 509.328.2994 fax 509.328.2999 coffman.com LASTING... building... together</p>	ADDENDUM # 1			
		DATE 2/15/19	DRAWN BLW	DWG. NO. CC-03	JOB NO. 2018-10259
DESCRIPTION ADDED CONCRETE APPROACHES					



WEST ENTRANCE



EAST ENTRANCE



SCALE 1" = 20'

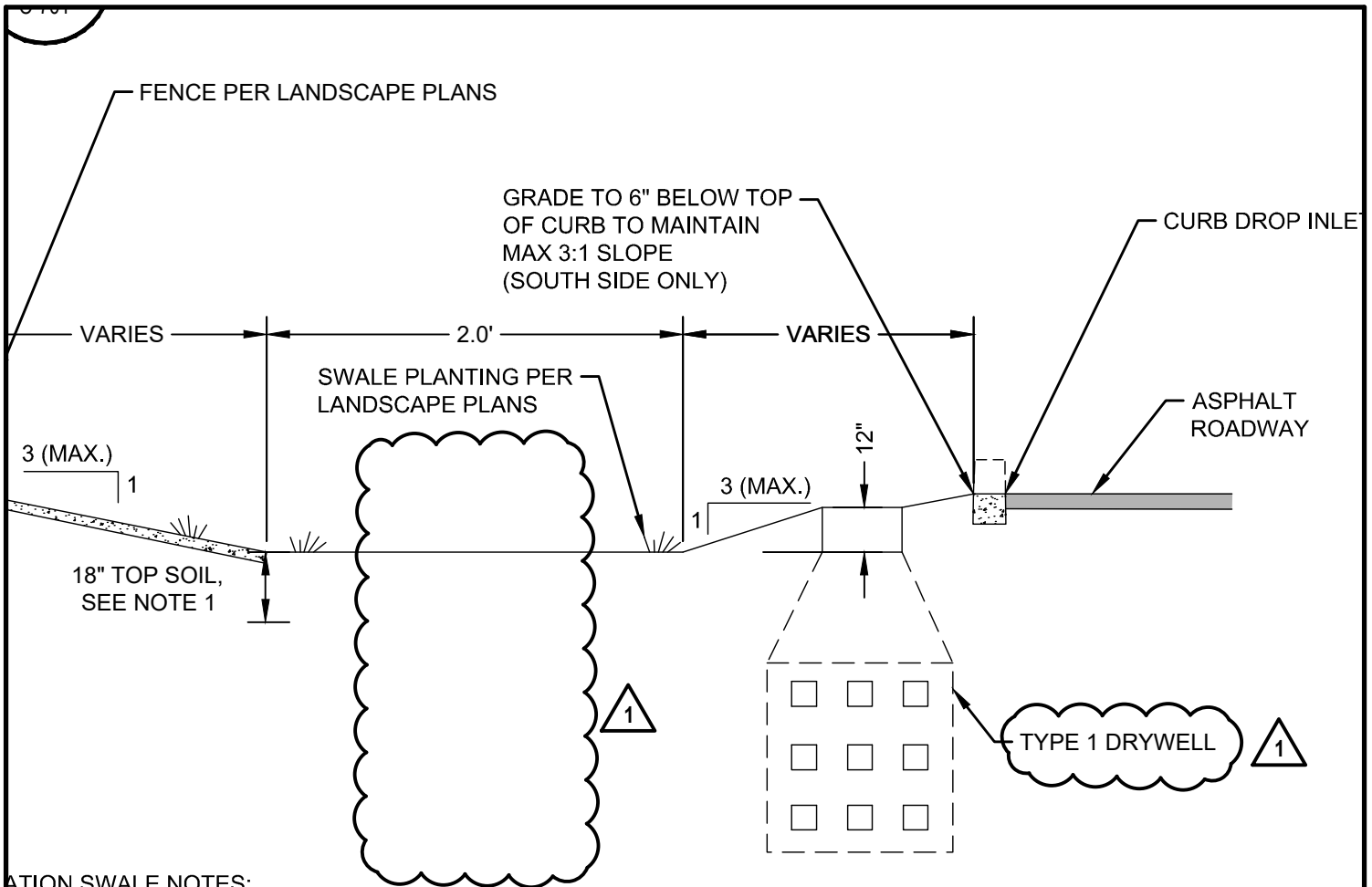


SPOKANE FALLS STATION
2018-10259



ADDENDUM # 1

DATE	DRAWN	DWG. NO.	JOB NO.	REF. SHT.
2/15/19	BLW	CC-04	2018-10259	3/6
DESCRIPTION ADDED CONCRETE APPROACHES				



ATTENTION SWALE NOTES:

IN THE SWALE AREA SHALL COMPLY WITH THE INFILTRATION RATE CRITERIA INDICATED IN 6-1 OF THE SPOKANE REGIONAL STORMWATER MANUAL, APRIL 2008. DO NOT COMPACT SWALE BOTTOM.
 TREATMENT ZONE INFILTRATION RATE (VEGETATED COVER AND TREATMENT LAYER) BETWEEN 0.25 AND 0.50 INCHES/HOUR.
 SUBGRADE INFILTRATE RATE OF AT LEAST 0.15 INCHES/HOUR.
 AVERAGE CATION EXCHANGE CAPACITY OF AT LEAST 15 MILLEQUIVELANTS/100 GRAMS.
 ORGANIC MATTER CONTENT OF AT LEAST 5.0% (8.0% OPTIMUM) BY WEIGHT.
 MINIMUM 18 INCHES OF FREE-DRAINING TOPSOIL.

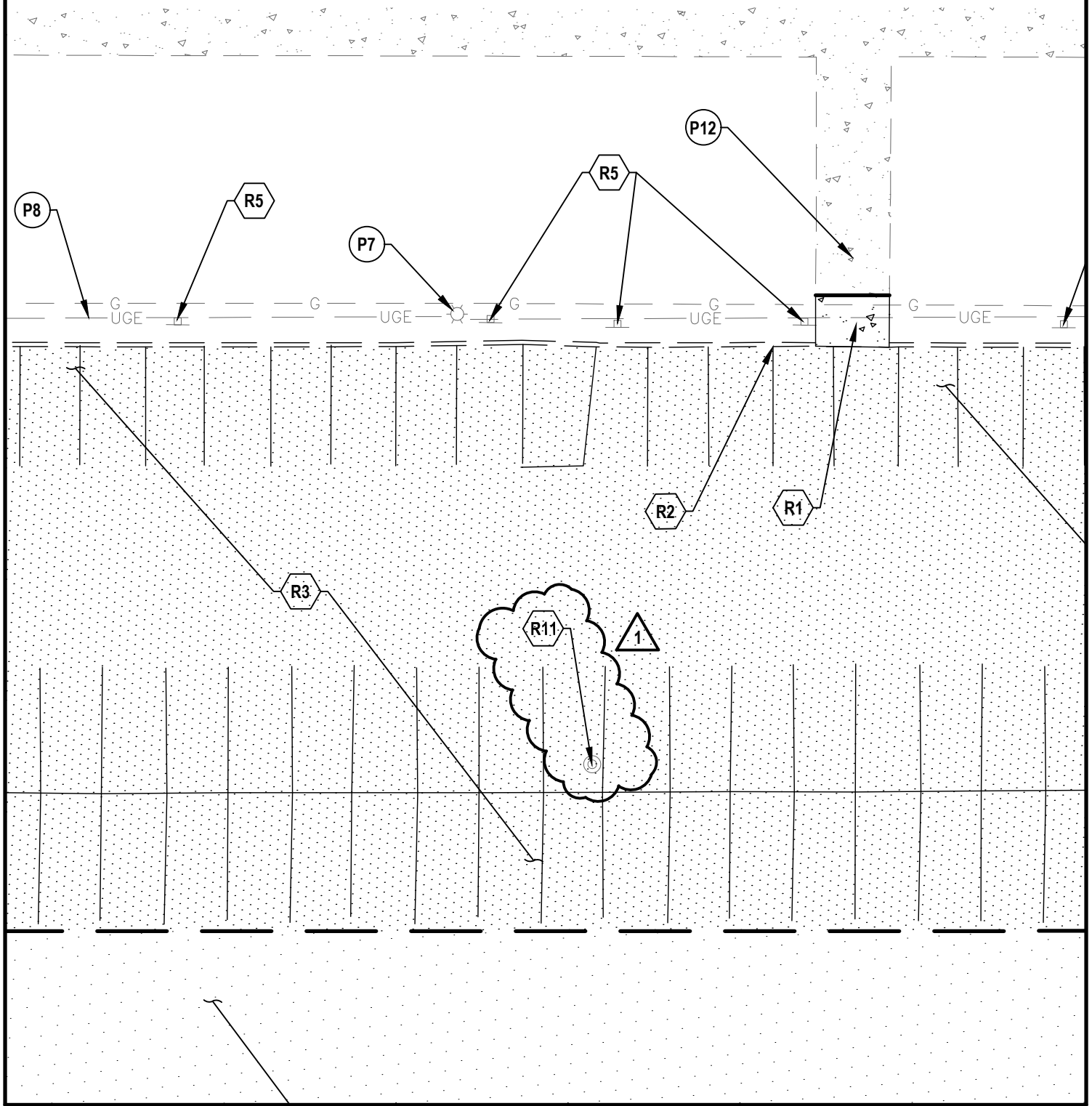
SEE LANDSCAPE PLANS FOR ADDITIONAL INFORMATION REGARDING SWALE PLANTINGS.
 SEE DETAIL 11, THIS SHEET, FOR OVERFLOW BERM DETAILS.



10 BIO-INFILTRATION SWALE #4
 C-702 SCALE: NTS

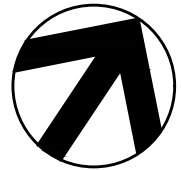
		ADDENDUM # 1			
		DATE 2/15/19	DRAWN BLW	DWG. NO. CC-05	JOB NO. 2018-10259
SPOKANE FALLS STATION 2018-10259		DESCRIPTION REMOVED EXISTING DRYWELL FROM SWALE #4			



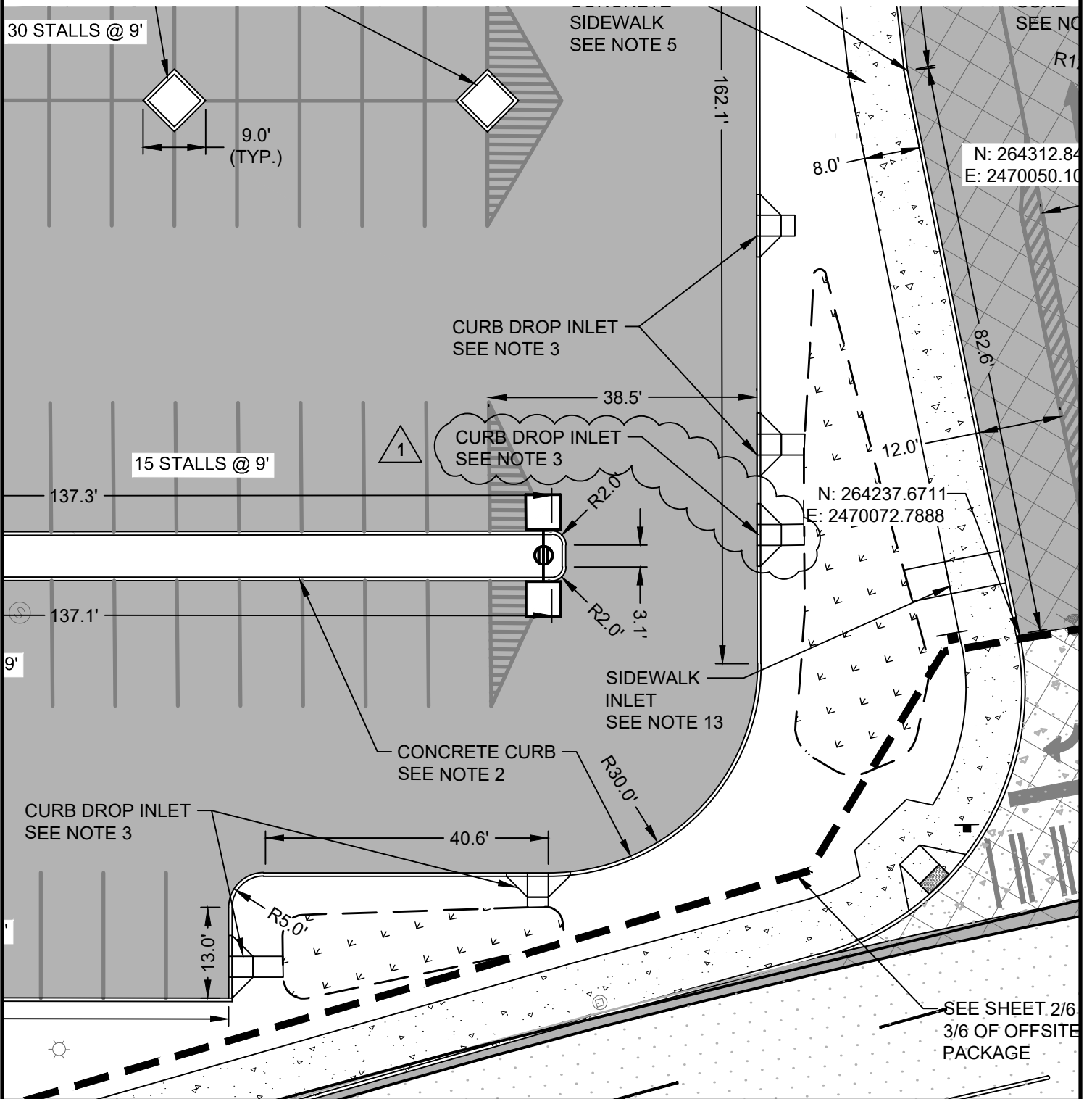
SCALE: 1" = 20'



 <p>SPOKANE FALLS STATION 2018-10259</p>	 <p>10 N. Polk Street, Suite 500 Spokane, WA 99201 ph 509.328.3994 fax 509.328.3999 coffman.com LASTING creativity results relationships</p>	ADDENDUM # 1			
		DATE 2/15/19	DRAWN BLW	DWG. NO. CC-06	JOB NO. 2018-10259
DESCRIPTION REMOVE EXISTING DRYWELL					



SCALE: 1" = 20'



Spokane Transit

SPOKANE FALLS STATION
2018-10259

COFFMAN ENGINEERS

10 N. Pine Street, Suite 500 | Spokane, WA 99201
ph 509.328.3994 | fax 509.328.2999
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ADDENDUM # 1

DATE	DRAWN	DWG. NO.	JOB NO.	REF. SHT.
2/15/19	BLW	CC-07	2018-10259	C-402
DESCRIPTION ADDED CURB INLET				

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE CURRENT EDITION OF THE NEC AS ADOPTED BY THE STATE OF WASHINGTON OR THE LOCAL AUTHORITY HAVING JURISDICTION.
2. COORDINATE ELECTRICAL SERVICE REQUIREMENTS WITH SERVICE PROVIDERS AS FOLLOWS:

AVISTA UTILITIES:
ERIC GRAINGER (509) 495-2325

1

ZAYO COMMUNICATIONS:
DEAN CHRISTIANSON (775) 530-3185

3. ALL CONDUIT SHALL BE RGS OR PVC. MINIMUM BURIAL DEPTH SHALL BE AS REQUIRED IN NEC TABLE 300-5. TRANSITIONS ARE ACCEPTABLE BASED ON TRENCH DEPTH AND CONDITIONS.
4. TRENCHING AND INSTALLATION OF CONDUIT AND ELECTRICAL EQUIPMENT IS IN THE VICINITY OF UNDERGROUND UTILITIES. CALL AND HAVE LOCATED PRIOR TO WORK. EXACT LOCATIONS AND QUANTITY IS UNKNOWN. PROCEED WITH CAUTION. REPAIR ALL DISRUPTIONS.
5. INSTALL INTERMEDIATE PULL BOX FOR HOME RUNS AND WIRE PULLS LONGER THAN 400.
6. COORDINATE WITH ALL UTILITY SERVICE REQUIREMENTS AND UTILITY POINTS OF CONTACT.
7. VERIFY EXISTING SURFACE CONDITIONS FOR FACTORS WHICH MAY AFFECT BID PRIOR TO BIDDING.
8. CONTRACTOR SHALL ENGAGE A COMMERCIAL LOCATE SERVICE TO IDENTIFY EXISTING UNDERGROUND UTILITIES.
9. ALL CONDUIT SHALL BE CONCEALED UNLESS NOTED OTHERWISE.



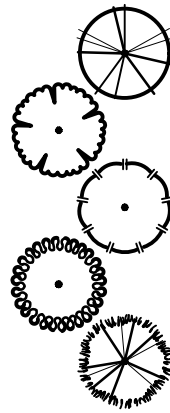
ADDENDUM # 1

SPOKANE FALLS STATION
2018-10259

DATE	DRAWN	DWG. NO.	JOB NO.	REF. SHT.
2/15/19	LLK	CE-01	2018-10259	E-101
DESCRIPTION REVISED CONTACT INFORMATION				

PLANT SCHEDULE

TREES



BOTANICAL NAME / COMMON NAME

CONT

CAL

SIZE

FRAXINUS PENNSYLVANICA `SUMMIT` / SUMMIT ASH
REFER TO CITY STANDARD DETAIL V-101

B # B

2" CAL

GLEDITSIA TRIACANTHOS `SHADEMASTER` / SHADEMASTER LOCUST
REFER TO CITY STANDARD DETAIL V-101

B # B

2" CAL

PINUS FLEXILIS `VANDERWOLFS PYRAMID` / VANDERWOLF'S PYRAMID LIMBER PINE
REFER TO CITY STANDARD DETAIL V-101

B # B

10' HT.

PRUNUS SARGENTII `COLUMNARIS` / COLUMNAR SARGENT CHERRY
REFER TO CITY STANDARD DETAIL V-101

B # B

2" CAL

PSEUDOTSUGA MENZIESII `FASTIGIATA` / FASTIGIATA DOUGLAS FIR
REFER TO CITY STANDARD DETAIL V-101

B # B

10' HT.

SHRUBS



BOTANICAL NAME / COMMON NAME

SIZE

ABIES BALSAMEA `NANA` / DWARF BALSAM FIR
REFER TO CITY STANDARD DETAIL V-102

2 GAL

BERBERIS THUNBERGII `PYGRUZAM` / PYGMY RUBY BARBERRY
REFER TO CITY STANDARD DETAIL V-102

2 GAL

BUXUS SEMPERVIRENS `SUFFRUTICOSA` / TRUE DWARF BOXWOOD
REFER TO CITY STANDARD DETAIL V-102

2 GAL

CALAMAGROSTIS ACUTIFOLIA `KARL FOERSTER` / FOERSTER'S REED GRASS
REFER TO CITY STANDARD DETAIL V-102

1 GAL

CORNUS STOLONIFERA `KELSEY` / KELSEY DOGWOOD
REFER TO CITY STANDARD DETAIL V-102

5 GAL

EUONYMUS ALATUS `COMPACTUS` / COMPACT BURNING BUSH
REFER TO CITY STANDARD DETAIL V-102

B#B 24" MIN.

JUNIPERUS SABINA `BUFFALO` / BUFFALO JUNIPER
REFER TO CITY STANDARD DETAIL V-102

5 GAL

MISCANTHUS SINENSIS `LITTLE ZEBRA` / LITTLE ZEBRA DWARF JAPANESE SILVER GRASS
REFER TO CITY STANDARD DETAIL V-102

1 GAL

RUDBECKIA HIRTA `GOLDBLOCKS` / GOLDBLOCKS BLACK-EYED SUSAN
REFER TO CITY STANDARD DETAIL V-102

1 GAL

SALVIA NEMOROSA `SNOW HILL` / SNOW HILL SAGE
REFER TO CITY STANDARD DETAIL V-102

1 GAL

SPIRAEA BETULIFOLIA `TOR` / BIRCHLEAF SPIREA
REFER TO CITY STANDARD DETAIL V-102

5 GAL

SPIRAEA BUMALDA `GOLD FLAME` / GOLD FLAME SPIREA
REFER TO CITY STANDARD DETAIL V-102

2 GAL

TAXUS CUSPIDATA `MONLOO` / EMERALD SPREADER JAPANESE YEW
REFER TO CITY STANDARD DETAIL V-102

5 GAL

GROUND COVERS

BOTANICAL NAME / COMMON NAME

CONT

SPACING

DETAIL



ARCTOSTAPHYLOS UVA-URSI `MASSACHUSETTS` / MASSACHUSETTS KINNICKINNIK

1 GAL

42" o.c.

16/L-500

GENERAL PLANTING NOTES:

1. THE INFORMATION ON THIS SHEET IS INCOMPLETE UNLESS ACCOMPANIED BY THE CORRESPONDING SPECIFICATION SECTION(S) DEVELOPED FOR THIS PROJECT. REFER TO THOSE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. VERIFY LOCATION OF ALL EXISTING AND PROPOSED UTILITIES EITHER ABOVE OR BELOW GRADE PRIOR TO BEGINNING ANY WORK. COORDINATE WITH IRRIGATION CONTRACTOR TO AVOID CONFLICTS BETWEEN IRRIGATION EQUIPMENT AND TREE/SHRUB PLACEMENT.
3. VERIFY THAT SUB GRADE PREPARATION HAS BEEN COMPLETED TO ACCEPTABLE TOLERANCES PRIOR TO BEGINNING ANY WORK.
4. ALL WORK COMPLETED SHALL BE GUARANTEED PER SPECIFICATIONS.
5. LANDSCAPED AREAS TO RECEIVE 4" OF APPROVED TOPSOIL IN LAWN AREAS AND 6" IN ALL SHRUB PLANTING AREAS.
6. ALL LANDSCAPE AREAS SHALL BE IRRIGATED BY AN AUTOMATIC IRRIGATION SYSTEM - SEE SHEETS L-100 THROUGH L-102.
7. COORDINATE WITH GENERAL CONTRACTOR FOR THE PROTECTION AND WATERING OF EXISTING PLANT MATERIAL UNTIL THE NEW IRRIGATION SYSTEM IS OPERABLE.
8. LAWN AREAS SHALL BE EDGED AS INDICATED IN DETAILS 17 & 18, SHEET L-500.
9. SHRUB PLANTING AREAS SHALL BE MULCHED WITH 2" OF APPROVED 3/4" - 1 1/2" BASALT CHIP MULCH UNLESS OTHERWISE NOTED. GROUND COVER AREAS SHALL BE DRESSED WITH 1" OF APPROVED 3/4" - 1 1/2" BASALT CHIP MULCH UNLESS OTHERWISE NOTED. FINISHED GRADE OF MULCH SHALL NOT BE ABOVE OR MORE THAN 1" BELOW ADJOINING SURFACES.
10. NEW LAWN AREAS SHALL BE SODDED AS PER SPECIFICATIONS. REPAIR LAWN AREAS MAY BE TOP-SEEDED.

11. PLANT SYMBOLS SHALL DICTATE COUNT.

12. PRIOR TO STREET/PUBLIC TREE INSTALLATION, PRUNING (CROWN/ROOT) OR REMOVAL PLEASE HAVE THE CONTRACTED LICENSED CERTIFIED ARBORIST SUBMIT A COMPLETE PUBLIC TREE PERMIT APPLICATION AT LEAST 10 DAYS PRIOR TO WORK BEING PERFORMED FOR THIS PROJECT AND TO INCLUDE CERTIFIED ARBORIST INFORMATION AND START AND COMPLETION DATES.
13. NO TREE SHALL BE PLANTED WITHIN FIFTEEN (15) FEET OF ANY DRIVEWAY, ALLEY, STREET LIGHT, UTILITY POLE, UNDERGROUND UTILITY, NON-SAFETY STREET SIGN (EX. PARKING, STREET NAME), OR FIRE HYDRANT. NO TREE SHALL BE PLANTED WITHIN TWENTY (20) FEET OF CRITICAL STREET SAFETY SIGN (EX. STOP, YIELD, OR PEDESTRIAN CROSSING). THE POTENTIAL PLACEMENT OF STREET SIGNS, STREET LIGHTS, AND UTILITY POLES SHALL BE EVALUATED TO LESSEN THE CONFLICT WITH THE GROWTH OF EXISTING TREES.



SPOKANE FALLS STATION
2018-10259



ADDENDUM # 1

DATE 2/19/19	DRAWN LLT	DWG. NO. CL-01	JOB NO. 2018-10259	REF. SHT. L-200 - L-203
DESCRIPTION UPDATED PLANT SCHEDULE & GENERAL NOTES				