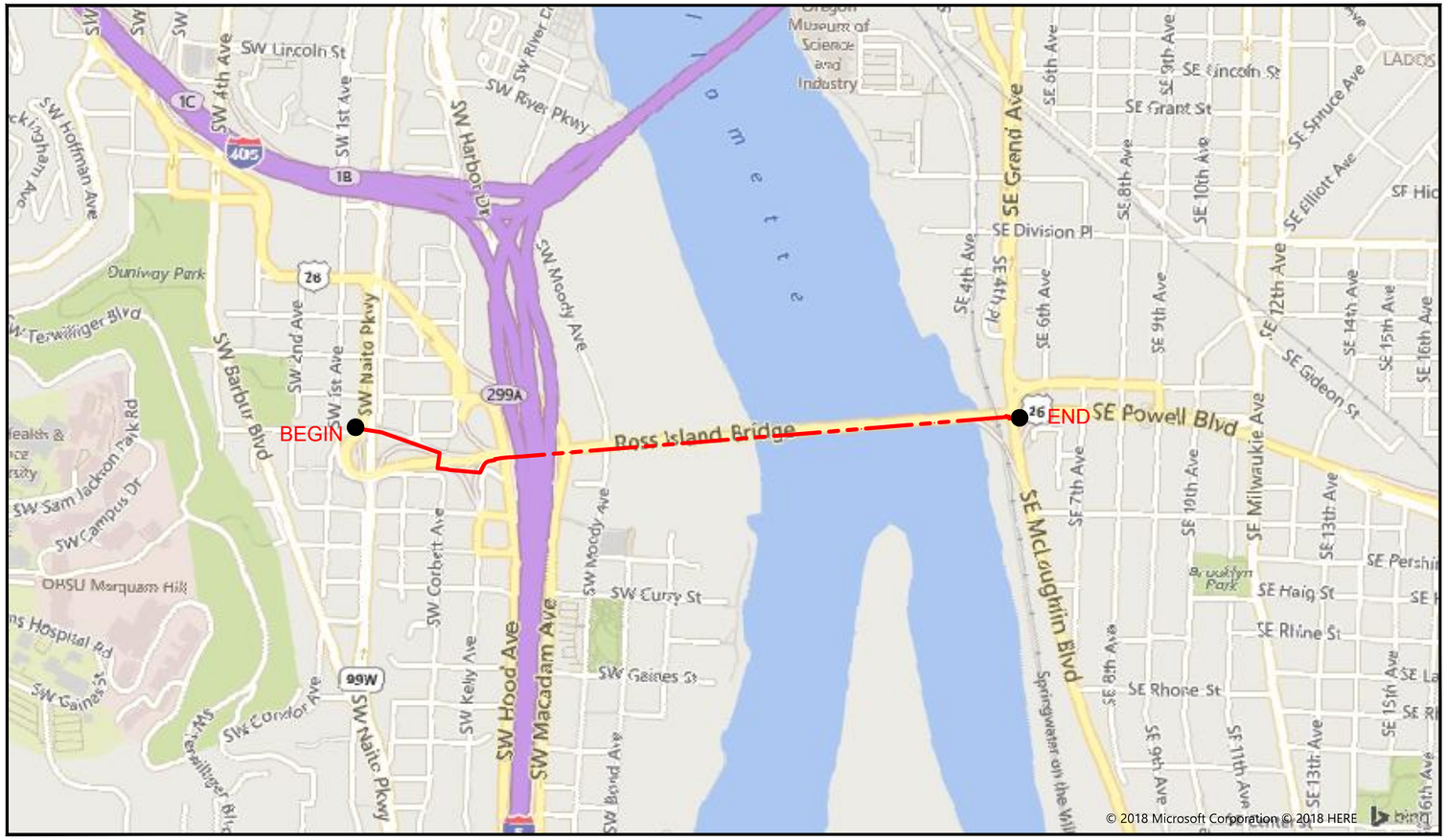
ADDRESS: 3155 SW MOODY AVE, PORTLAND OR, 97202
PROJECT NAME: S1-B1 - ROSS ISLAND BRIDGE



SITE LOCATION

BILL OF MATERIALS

NEW AERIAL	=	0 FT.
OVERLASH	=	0 FT.
NEW UNDERGROUND	=	1,138 FT.
EXISTING UNDERGROUND	=	0 FT.
RISERS	=	0 FT.
BRIDGE ATTACHMENT	=	3,854 FT.
TOTAL FOOTAGE	=	5,092 FT.

CONTACTS

ZAYO CONTACT:
JOSEPH KLEINSASSER
18110 SE 34TH ST, #100
VANCOUVER, WA 98683
T. 541.979.8039
JOSEPH.KLEINSASSER@ZAYO.COM

BRYSON BAILY
MGC TECHNICAL CONSULTING, INC.
6244 185TH AVE NE
REDMOND, WA 98052
C.206.799.3001
BRYSON@MGCTECHNICAL.COM

SHEET INDEX

SCOPE OF WORK:

PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH.

811 Know what's **below.** **Call** before you dig.

0 250' 500'

SCALE: 1"=500'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER
ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.
PROJECT NUMBER:
LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

LEGEND

LINETYPES

- AERIAL FIBER – EXISTING
- AERIAL FIBER – ATTACH
- AERIAL FIBER – OVERLASH
- STRAND – EXISTING
- STRAND – PROPOSED
- CONDUIT – EXISTING
- CONDUIT – PROPOSED
- INNERDUCT – EXISTING
- INNERDUCT – PROPOSED
- GAS (G)
- WATER (W)
- TELEPHONE (T)
- FIBER OPTIC (F/O)
- ELECTRIC (E)
- SANITARY SEWER (SEW)
- STORM DRAIN (SD)
- CABLE TV (TV)
- STEAM (STM)
- OIL (OIL)
- UNKNOWN UTILITY (UNK)
- FENCE (X)
- RIGHT OF WAY (R/W)
- EDGE OF PAVEMENT (EOP)

ABBREVIATIONS

ASW	ASPHALT SIDEWALK
BIP	BLACK IRON PIPE
BSP	BLACK STEEL PIPE
CSW	CONCRETE SIDEWALK
ELECT.	ELECTRIC
EOP	EDGE OF PAVEMENT
EOTW	EDGE OF TRAVEL WAY
FOC	FACE OF CURB
F/O	FIBER OPTIC
HDPE	HIGH DENSITY POLYETHYLENE
HH	HANDHOLE
JB	JUNCTION BOX
MH	MANHOLE
MP	MILE POST
O/S	OFFSET
PR	POWER RISER
PVC	POLY VINYL CHLORIDE
RGS	RIGID GALVANIZED STEEL CONDUIT
ROW	RIGHT OF WAY
SEW	SANITARY SEWER
SD	STORM DRAIN
STA.	STATION
STM	STEAM
TEL	TELECOM

SYMBOLS

- RISER – EXISTING
- RISER – PROPOSED
- CATCH BASIN/INLET (RECTANGULAR)
- CATCH BASIN/INLET (ROUND)
- FIRE HYDRANT
- WATER/GAS VALVE
- LIGHT POST
- STREET LIGHT
- TRAFFIC LIGHT ARM
- TREE
- CULVERT
- WING WALL
- BRIDGE
- STREET SIGN
- ADA RAMP
- UTILITY POLE – EXISTING
- UTILITY POLE – PROPOSED
- TRAFFIC RATED VAULT – EXISTING (SIZE AND UTILITY TYPE MAY VARY)
- TRAFFIC RATED VAULT – PROPOSED (SIZE MAY VARY)
- HANDHOLE – EXISTING (SIZE AND UTILITY TYPE MAY VARY)
- HANDHOLE – PROPOSED (SIZE MAY VARY)
- PEDESTAL – EXISTING (SIZE AND UTILITY TYPE MAY VARY)
- PEDESTAL – PROPOSED (SIZE MAY VARY)
- WET UTILITY MANHOLE – EXISTING (SIZE AND UTILITY TYPE MAY VARY)
- BORE PIT – PROPOSED (SIZE MAY VARY)
- UTILITY POTHOLE
- TRANSMISSION/DISTRIBUTION POLE
- TRANSMISSION POLE
- DISTRIBUTION POLE
- GROUND/BOND
- AERIAL STORAGE – EXISTING
- AERIAL STORAGE – PROPOSED
- VAULT/BUILDING STORAGE – EXISTING
- VAULT/BUILDING STORAGE – PROPOSED
- POLE ANCHOR/DOWN GUY – EXISTING
- POLE ANCHOR/DOWN GUY – PROPOSED
- DOWN GUY TO EXISTING ANCHOR – PROPOSED
- SPLICE POINT – EXISTING
- SPLICE POINT – PROPOSED
- TERMINATION – EXISTING
- TERMINATION – PROPOSED
- PULLBOX – EXISTING
- PULLBOX – PROPOSED
- CONSTRUCTION NOTE / RESTORATION CALLOUT
- PHOTO–MARKER
- NORTH ARROW

INFORMATION TABLES

POLE NUMBER	#
EXISTING UTILITY	0'–0"
PROPOSED ATTACH	0'–0"

UTILITY POLE INFORMATION TABLE (NUMBER OF ATTACHMENTS MAY VARY)

#F	IN:
	OUT:

SEQUENTIAL IN/OUT CALLOUT

#F	IN:
	TAIL:

SEQUENTIAL IN/TAIL CALLOUT

#F	TAIL:
	OUT:

SEQUENTIAL TAIL/OUT CALLOUT

HATCH PATTERNS

- CONCRETE SIDEWALK
- GRASS/VEGETATION
- GRAVEL
- WATER

811 Know what's **below.** **Call** before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS–BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO GROUP — MGC TECHNICAL CONSULTING INC

ZAYO ENGINEER: JOSEPH KLEINSASSER
ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.
PROJECT NUMBER:
LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

GENERAL NOTES

GENERAL NOTES:
The locations of utilities shown on these drawing are only approximate. MGC TECHNICAL CONSULTING, INC. hereby disclaims any responsibility to third parties for the accuracy of this information. Persons working in the area covered by this drawing must contact the statewide Call-Before-You-Dig System to ascertain the location of underground utilities prior to performing any excavation.

1. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION OF UTILITY IMPROVEMENTS SHALL MEET OR EXCEED SITE WORK STANDARDS AND THE STANDARDS AND SPECIFICATIONS SET FORTH IN THE ODOT REGULATIONS AND APPLICABLE STATE AND FEDERAL REGULATIONS. WHERE THERE IS CONFLICT BETWEEN THESE PLANS AND THE SPECIFICATIONS, OR ANY APPLICABLE STANDARDS, THE HIGHER QUALITY STANDARD SHALL APPLY. ALL WORK WITHIN PUBLIC R.O.W. OR EASEMENTS MAY REQUIRE INSPECTED AND APPROVED BY THE ODOT INSPECTOR. INSPECTION SERVICES AND CONSTRUCTION CERTIFICATION TO BE PROVIDED BY DESIGNEE OF PROJECT SPONSOR/OWNER.

2. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES, AS SHOWN ON THESE PLANS, IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE LOCAL UTILITY LOCATION CENTER AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY PERTINENT LOCATIONS AND ELEVATIONS, ESPECIALLY AT THE CONNECTION POINTS AND AT POTENTIAL UTILITY CONFLICTS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM ALL APPLICABLE AGENCIES. THE CONTRACTOR SHALL NOTIFY THE ODOT INSPECTOR AT LEAST 48 HOURS PRIOR TO THE START OF ANY EARTH DISTURBING ACTIVITY OR CONSTRUCTION ON ANY AND ALL PUBLIC IMPROVEMENTS IF REQUIRED.

4. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH THE ODOT AND ALL UTILITY COMPANIES WITH REGARD TO RELOCATIONS OR ADJUSTMENTS OF EXISTING UTILITIES DURING CONSTRUCTION, TO ASSURE THAT THE WORK IS ACCOMPLISHED IN A TIMELY FASHION, AND WITH A MINIMUM DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL PARTIES AFFECTED BY ANY DISRUPTION OF ANY UTILITY SERVICE.

5. THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF THE APPROVED PLANS, ONE (1) COPY OF THE APPROPRIATE STANDARDS AND SPECIFICATIONS, AND ONE (1) COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB ON-SITE AT ALL TIMES.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF SAFETY INCLUDING, BUT NOT LIMITED TO: EXCAVATION, TRENCHING, SHORING, TRAFFIC CONTROL, AND SECURITY.

7. IF, DURING THE CONSTRUCTION PROCESS, CONDITIONS ARE ENCOUNTERED BY THE CONTRACTOR, HIS SUBCONTRACTORS, OR OTHER AFFECTED PARTIES WHICH COULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY.

8. ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD, UNLESS SPECIFICALLY STATED OTHERWISE.

9. FOR WORK AFFECTING PUBLIC ROADWAYS OR IF REQUIRED BY THE ODOT, THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL AND PHASING PLAN IN ACCORDANCE WITH M.U.T.C.D. FOR APPROVAL. PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN OR AFFECTING THE RIGHT-OF-WAY, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY AND ALL TRAFFIC CONTROL DEVICES AS MAY BE REQUIRED BY SAID PLANS. PRIOR TO INSTALLATION A PRECONSTRUCTION CONFERENCE SHALL BE HELD WITH ODOT.

10. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR AND MATERIALS NECESSARY FOR THE COMPLETION OF THE INTENDED IMPROVEMENTS SHOWN ON THESE DRAWINGS OR DESIGNATED TO BE PROVIDED, INSTALLED, CONSTRUCTED, REMOVED OR RELOCATED UNLESS SPECIFICALLY NOTED OTHERWISE.

11. PER AGENCY STANDARDS THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ROADWAYS FREE AND CLEAR OF ALL CONSTRUCTION DEBRIS AND DIRT TRACKED FROM THE SITE.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING RECORD INFORMATION ON A SET OF RECORD DRAWINGS KEPT AT THE CONSTRUCTION SITE AND AVAILABLE TO THE ODOT INSPECTOR AT ALL TIMES.

13. DIMENSIONS FOR LAYOUT AND CONSTRUCTION ARE NOT TO BE SCALED FROM ANY DRAWING. FOR ADDITIONAL INFORMATION CONTACT THE ENGINEER FOR CLARIFICATION AND NOTE ON THE RECORD DRAWINGS.

14. ALL EROSION AND SEDIMENT CONTROL (E.S.C.) MEASURES SHALL BE INSTALLED AT THE LIMITS OF CONSTRUCTION PRIOR TO GROUND DISTURBING ACTIVITY. ALL E.S.C. MEASURES SHALL BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR UNTIL SUCH TIME AS THE ENTIRE DISTURBED AREAS ARE STABILIZED WITH HARD SURFACE OR LANDSCAPING.

15. ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY IS SUBJECT TO THE JURISDICTION OF THE ODOT ENGINEERING DEPARTMENT STANDARD DETAILS AND SPECIFICATIONS.

16. ALL CONSTRUCTION OPERATIONS, INCLUDING THE WARMING UP, REPAIR, ARRIVAL, DEPARTURE OR RUNNING OF TRUCKS, EARTH MOVING EQUIPMENT, CONSTRUCTION EQUIPMENT AND ANY OTHER ASSOCIATED EQUIPMENT SHALL GENERALLY BE LIMITED TO THE TIME PERIOD APPROVED BY THE ODOT.

811 Know what's below. Call before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

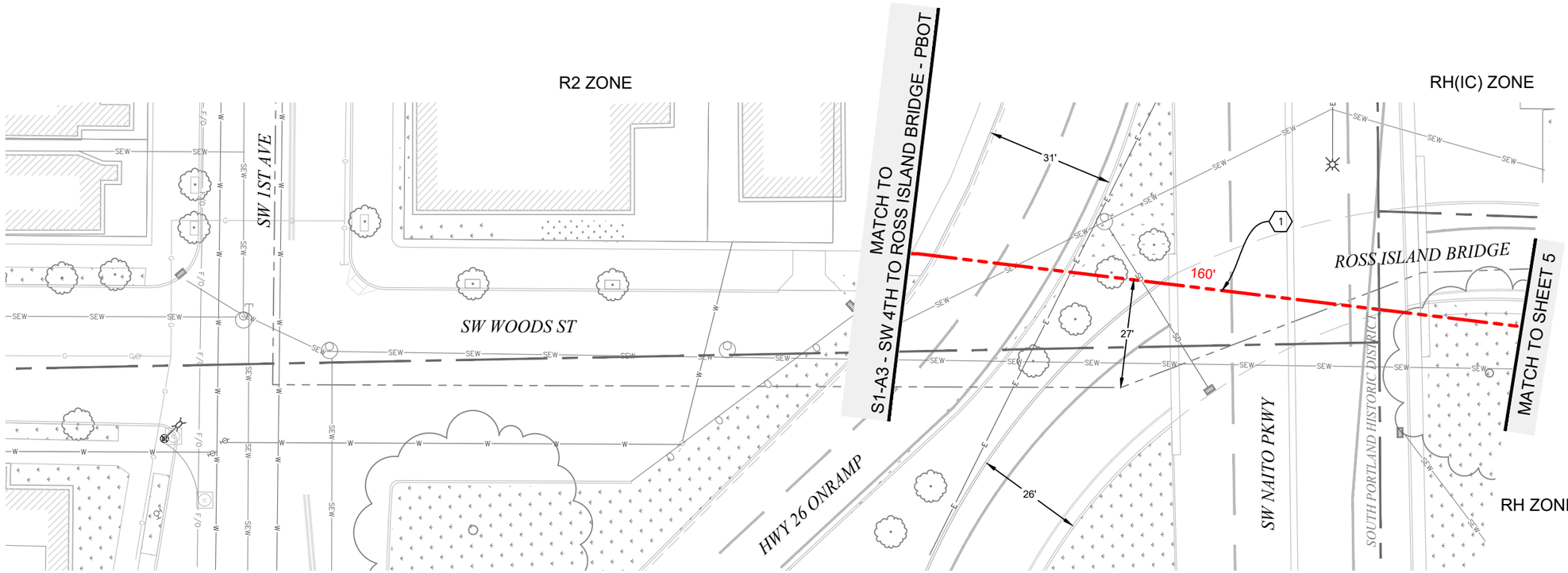
zayo GROUP

MGC TECHNICAL CONSULTING INC

ZAYO ENGINEER: JOSEPH KLEINSASSER
ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.
PROJECT NUMBER:
LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg
---

CONSTRUCTION NOTES

1. PROPOSED BORE NEW (4) 1.25" HDPE SDR 13.5 INNERDUCT. PULL FIBER CABLES THROUGH. REPAIR SURFACE PER LOCAL JURISDICTION STANDARDS. CONTRACTOR TO POTHOLE ALL UTILITIES PRIOR TO CONSTRUCTION.



PLAN VIEW A

Know what's **below.** **Call** before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

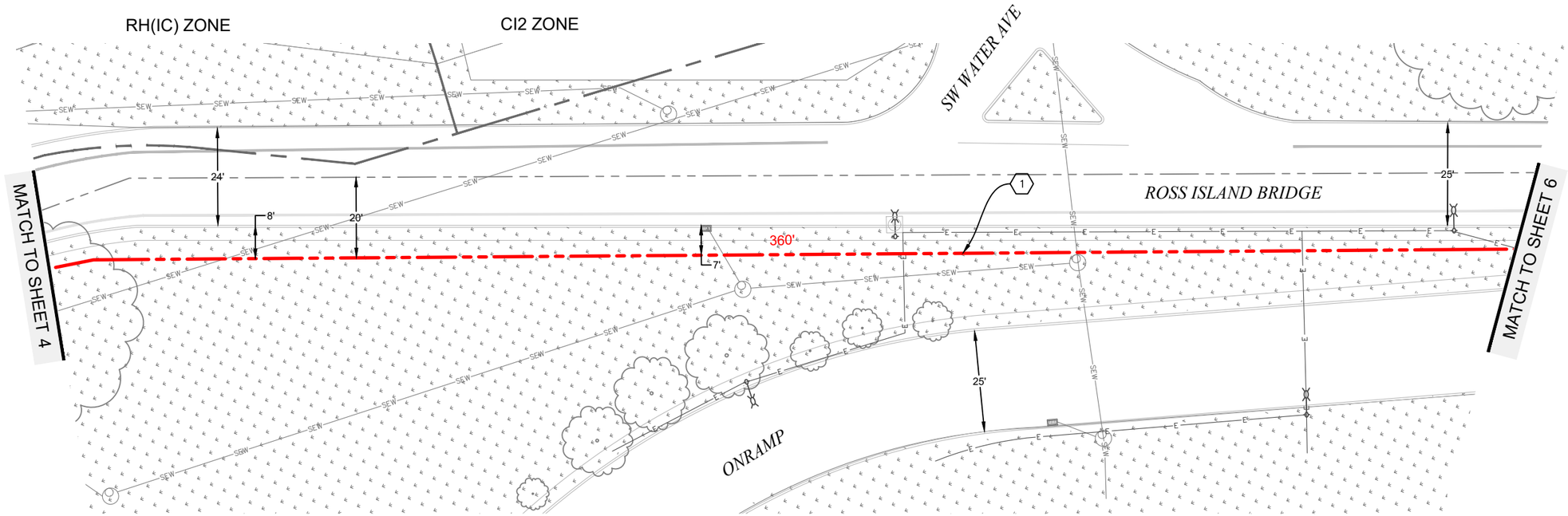
LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

1. PROPOSED BORE NEW (4) 1.25" HDPE SDR 13.5 INNERDUCT. PULL FIBER CABLES THROUGH. REPAIR SURFACE PER LOCAL JURISDICTION STANDARDS. CONTRACTOR TO POTHOLE ALL UTILITIES PRIOR TO CONSTRUCTION.



PLAN VIEW B

Know what's **below.** **Call** before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

1. PROPOSED BORE NEW (4) 1.25" HDPE SDR 13.5 INNERDUCT. PULL FIBER CABLES THROUGH. REPAIR SURFACE PER LOCAL JURISDICTION STANDARDS. CONTRACTOR TO POTHOLE ALL UTILITIES PRIOR TO CONSTRUCTION.

RH ZONE

PLAN VIEW C

0 10' 20' 30'

SCALE: 1"=30'

Know what's below. Call before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

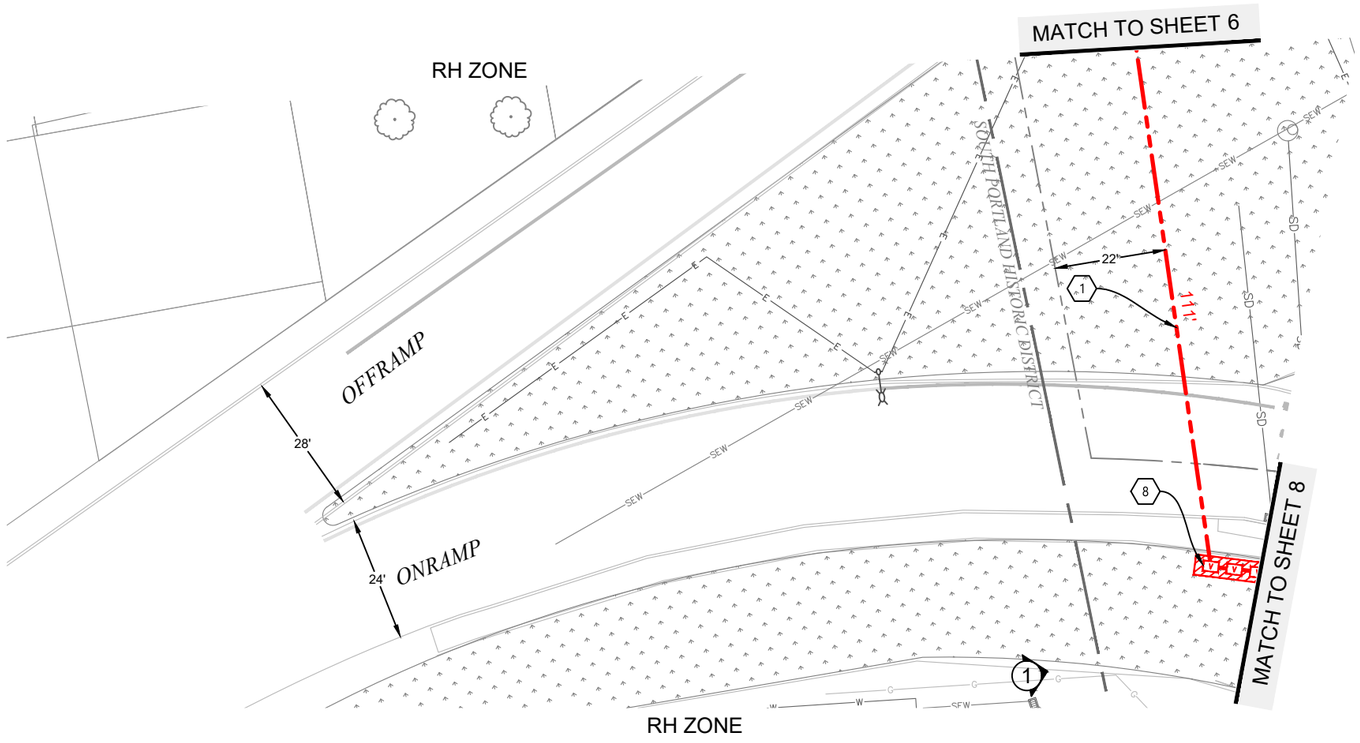
LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

1. PROPOSED BORE NEW (4) 1.25" HDPE SDR 13.5 INNERDUCT. PULL FIBER CABLES THROUGH. REPAIR SURFACE PER LOCAL JURISDICTION STANDARDS. CONTRACTOR TO POTHOLE ALL UTILITIES PRIOR TO CONSTRUCTION.
8. PROPOSED (3) NB2436 VAULTS. PULL FIBER CABLE THROUGH. SEE SHEET 26 FOR DETAILS.



PLAN VIEW D

SYMBOL CORRESPONDS TO PHOTO LOCATIONS AND ORIENTATION. SEE SHEET #27 FOR SITE PHOTOGRAPHS.

Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

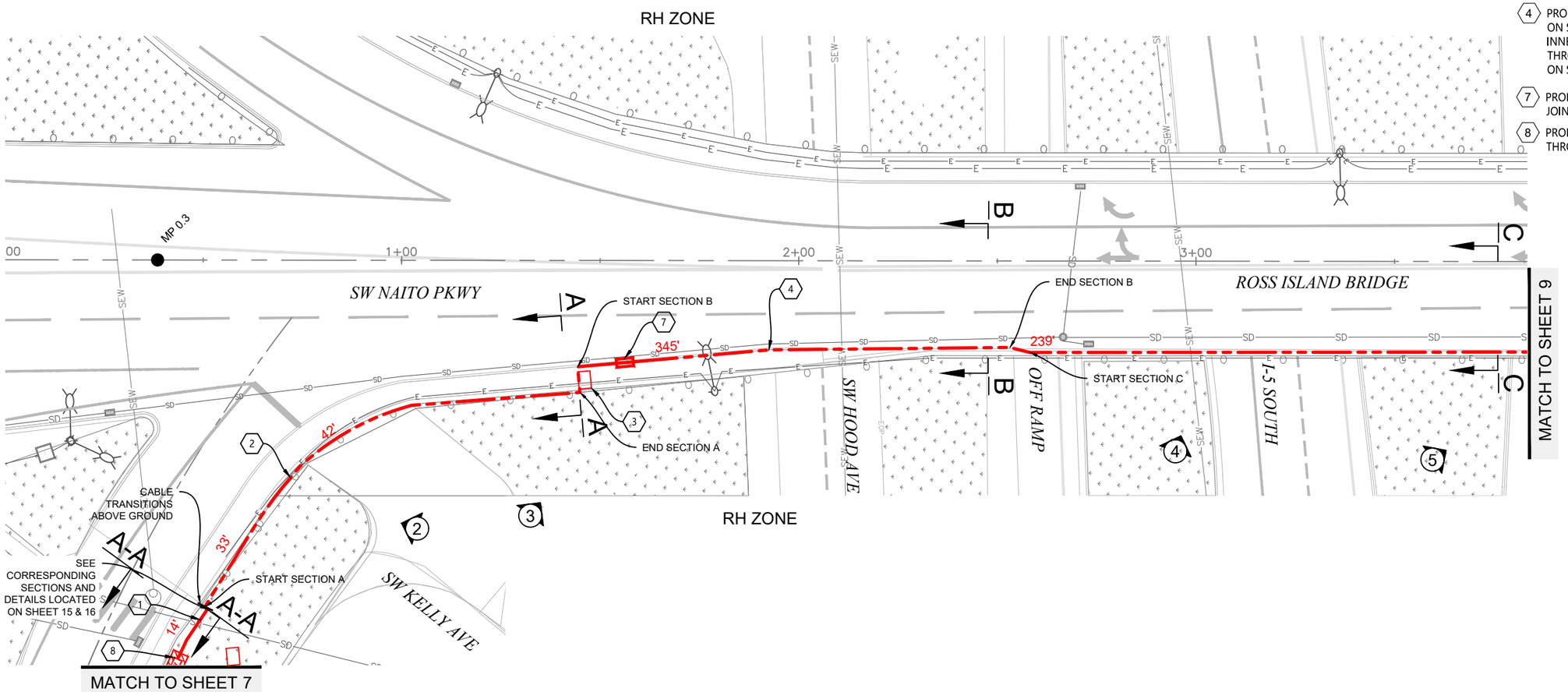
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

---

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

1. PROPOSED BORE NEW (4) 1.25" HDPE SDR 13.5 INNERDUCT. PULL FIBER CABLES THROUGH. REPAIR SURFACE PER LOCAL JURISDICTION STANDARDS. CONTRACTOR TO POTHOLE ALL UTILITIES PRIOR TO CONSTRUCTION.
2. PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SHEET 22 & 23 FOR MOUNTING DETAILS.
3. PROPOSED INSTALL (1) 24"X24" J-BOX. PULL FIBER CABLE AS NEEDED. SEE SHEET 26 FOR DETAILS AND SPECIFICATIONS
4. PROPOSED HANG (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.
7. PROPOSED 8" EXPANSION JOINT. SEE SEE EXPANSION JOINT TYPICAL ON SHEET 23 FOR DETAILS.
8. PROPOSED (3) NB2436 VAULTS. PULL FIBER CABLE THROUGH. SEE SHEET 26 FOR DETAILS.



PLAN VIEW E

SYMBOL CORRESPONDS TO PHOTO LOCATIONS AND ORIENTATION. SEE SHEET #27 FOR SITE PHOTOGRAPHS.

Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

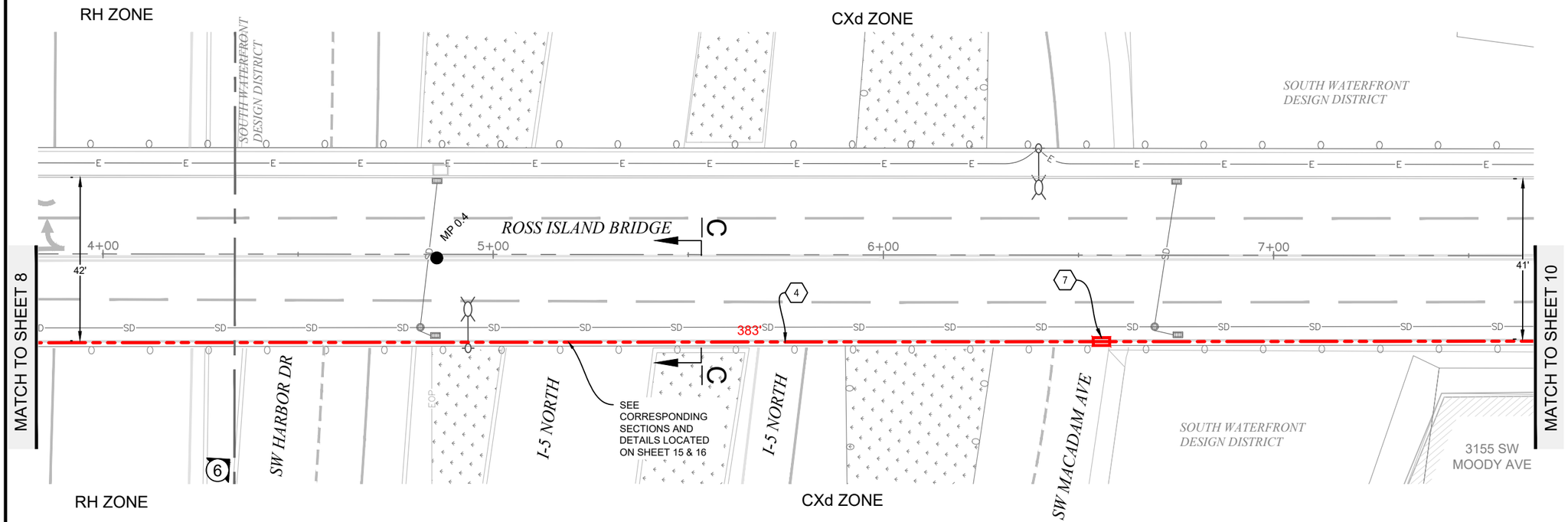
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

4. PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.

7. PROPOSED 8" EXPANSION JOINT. SEE TYPICAL ON DETAILS AND SPECIFICATIONS ON SHEET 23.



PLAN VIEW F

SYMBOL CORRESPONDS TO PHOTO LOCATIONS AND ORIENTATION. SEE SHEET #27 FOR SITE PHOTOGRAPHS.

Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

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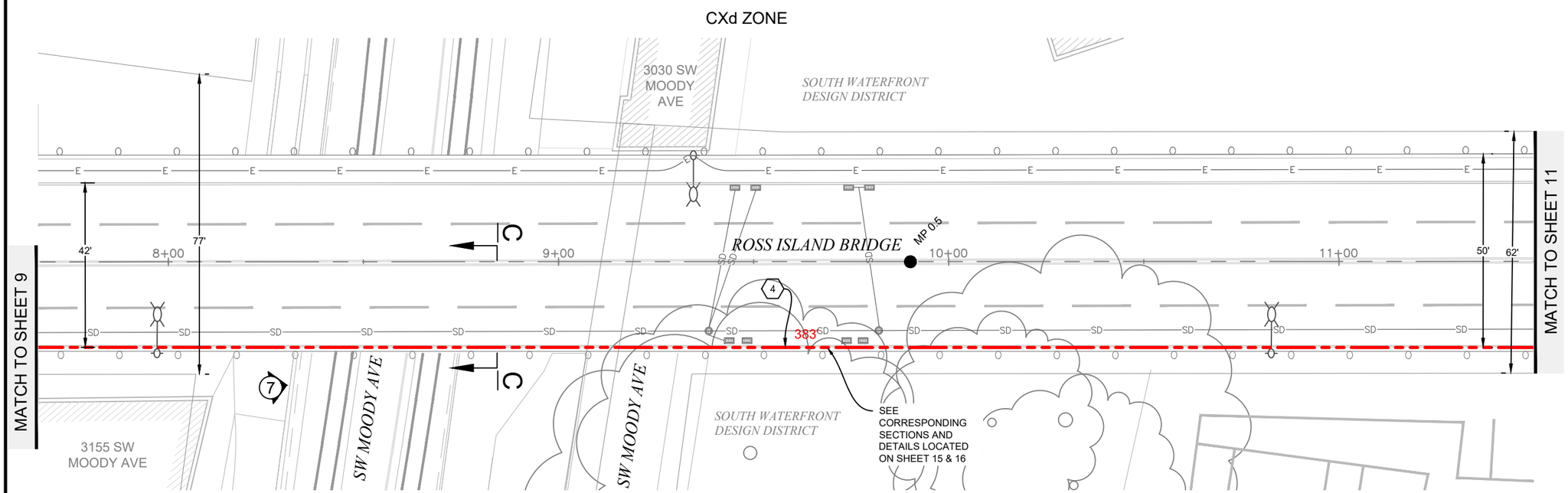
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

4 PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.



PLAN VIEW G

SYMBOL CORRESPONDS TO PHOTO LOCATIONS AND ORIENTATION. SEE SHEET #27-28 FOR SITE PHOTOGRAPHS.

811 Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

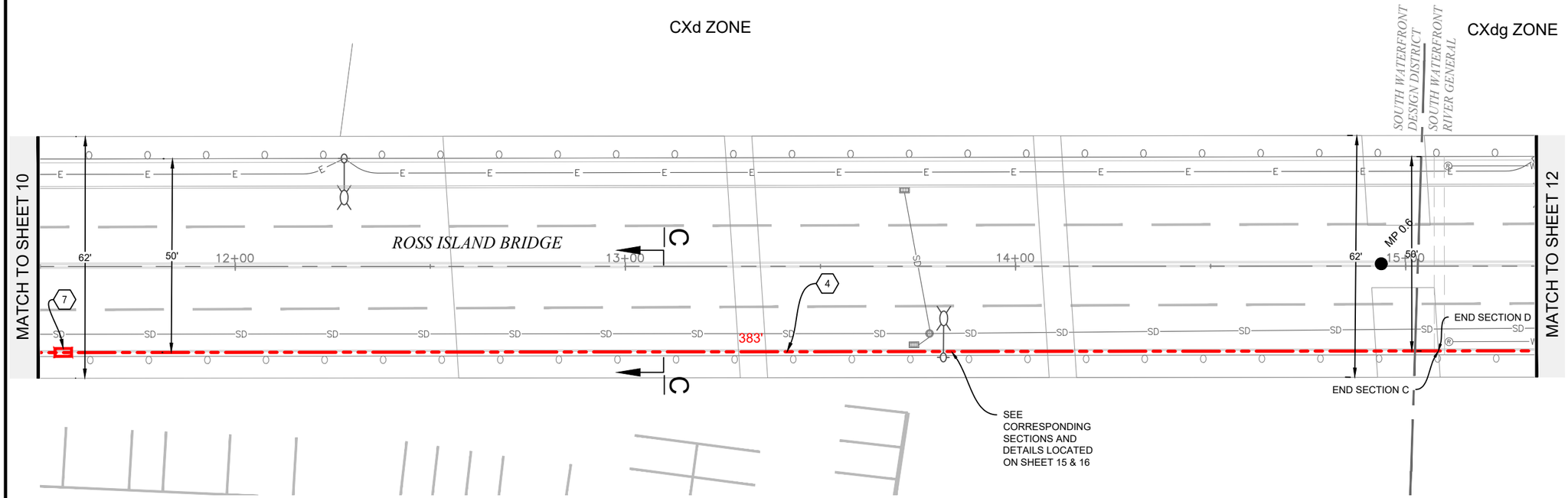
---

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

4. PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.

7. PROPOSED 8" EXPANSION JOINT. SEE TYPICAL ON DETAILS AND SPECIFICATIONS ON SHEET 23.



PLAN VIEW H

Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
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ZAYO ENGINEER: JOSEPH KLEINSASSER

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PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
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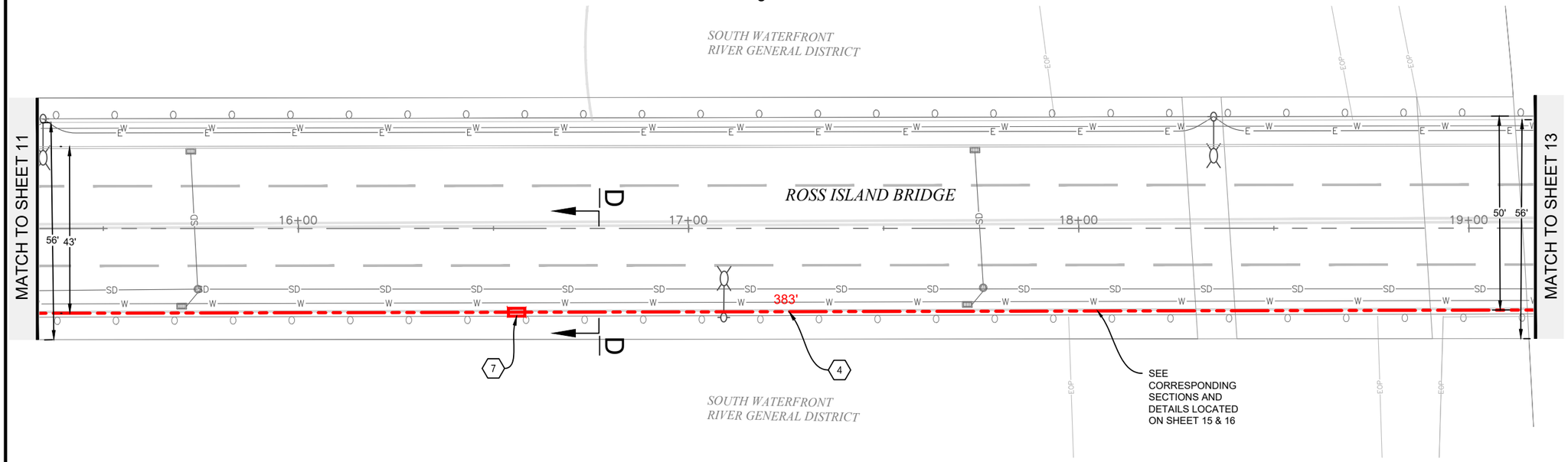
CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

4 PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.

7 PROPOSED 8" EXPANSION JOINT. SEE TYPICAL ON DETAILS AND SPECIFICATIONS ON SHEET 23.

CXdg ZONE



CXdg ZONE

PLAN VIEW I

Know what's **below.** **Call** before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

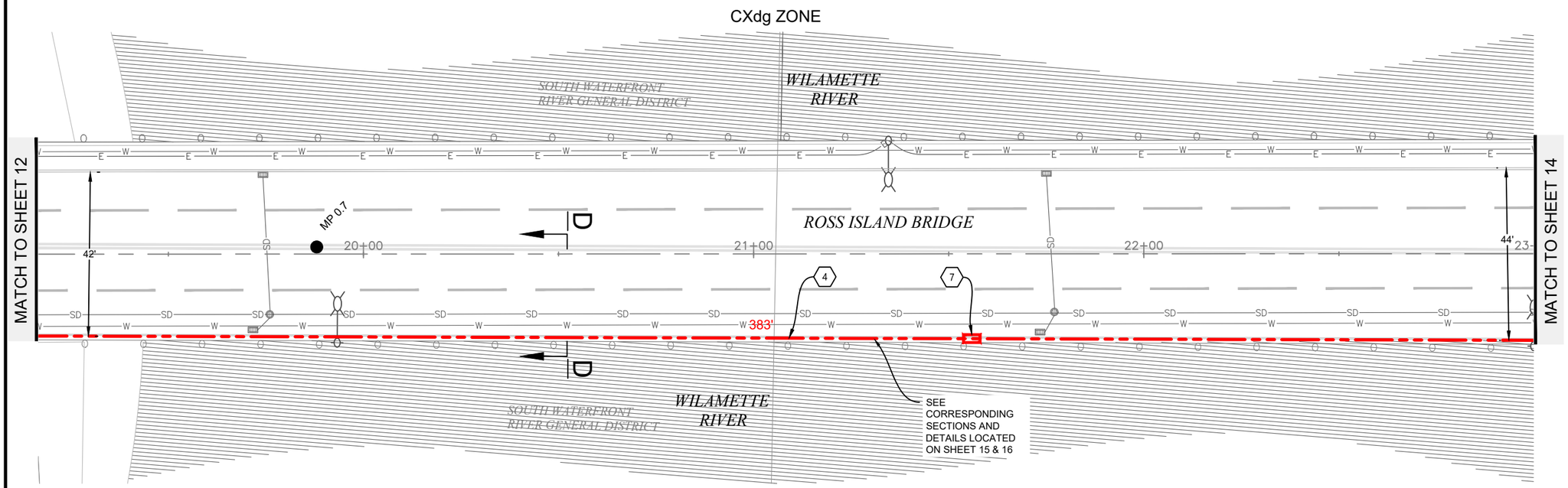
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

4 PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.

7 PROPOSED 8" EXPANSION JOINT. SEE TYPICAL ON DETAILS AND SPECIFICATIONS ON SHEET 23.



PLAN VIEW J

Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

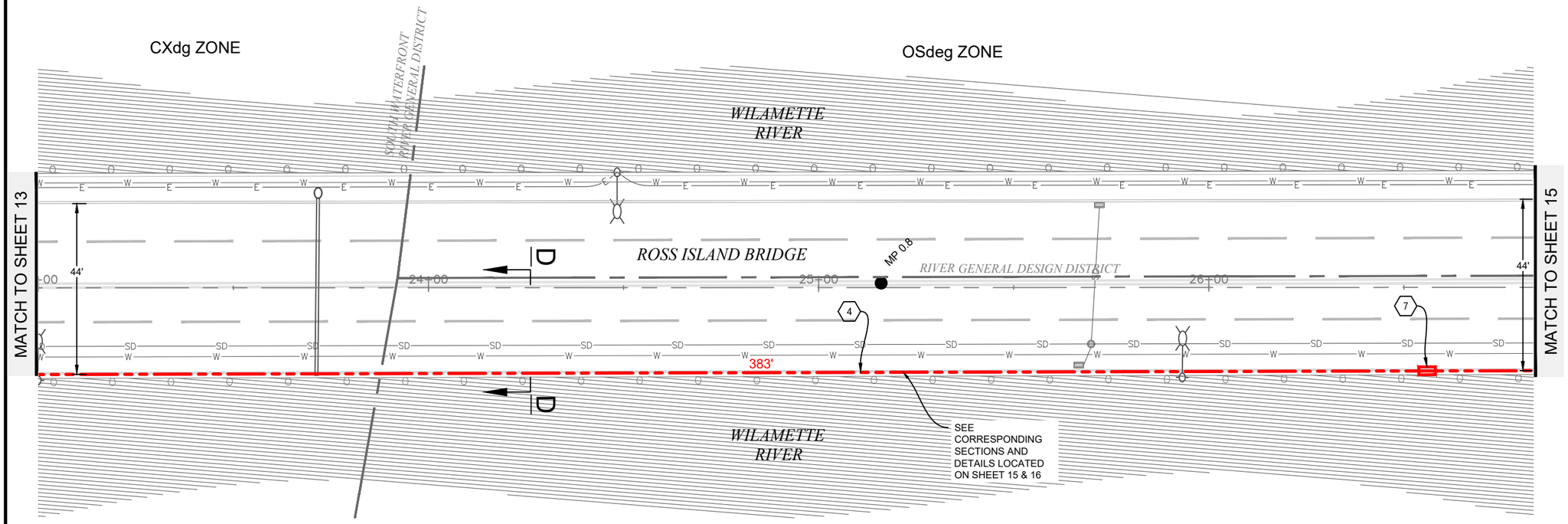
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

4. PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.

7. PROPOSED 8" EXPANSION JOINT. SEE TYPICAL ON DETAILS AND SPECIFICATIONS ON SHEET 23.



PLAN VIEW K

Know what's **below.** **Call** before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

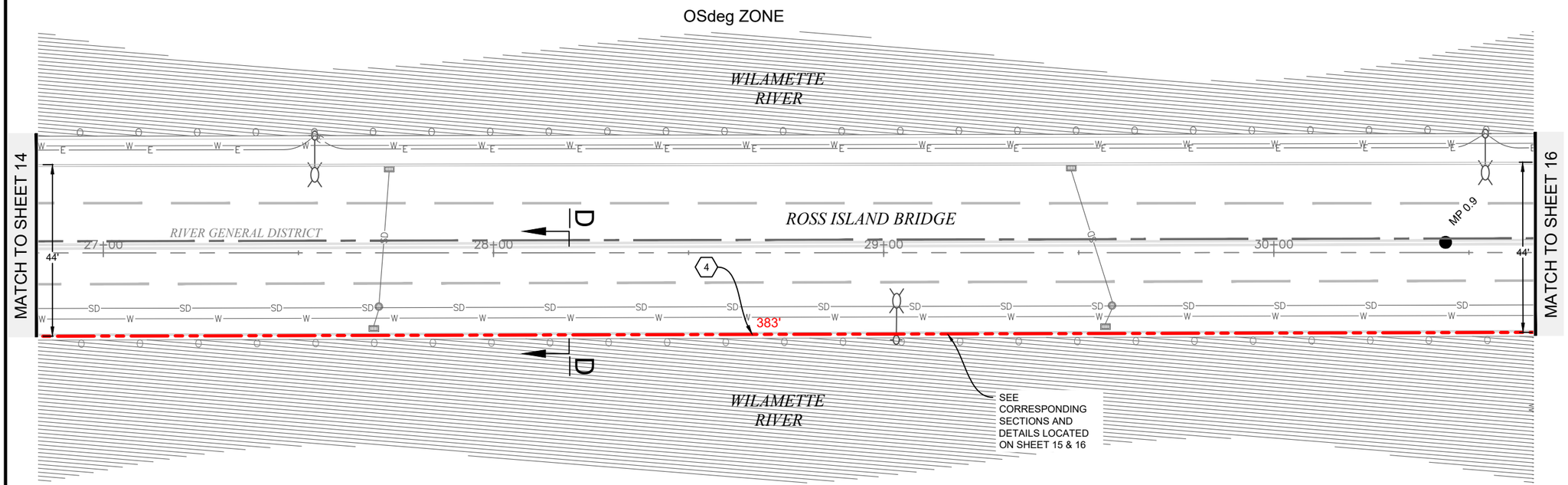
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

4 PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.

OSdeg ZONE



CM2nqs(MU-C) ZONE

PLAN VIEW L

Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

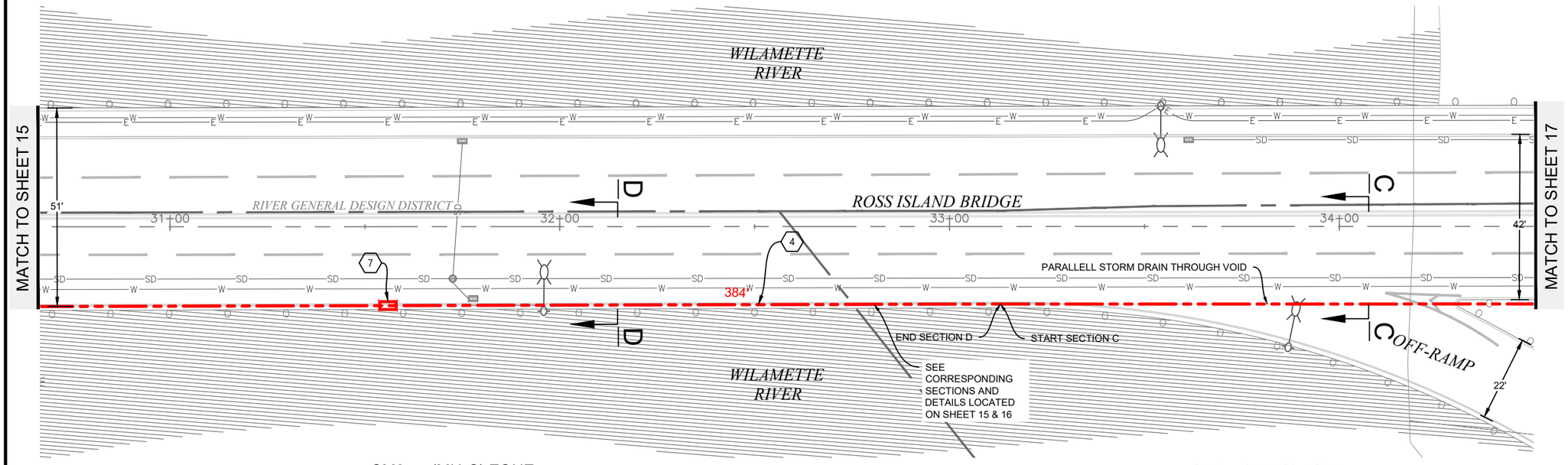
CONFIDENTIAL/PROPRIETARY

CONSTRUCTION NOTES

4 PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.

7 PROPOSED 8" EXPANSION JOINT. SEE TYPICAL ON DETAILS AND SPECIFICATIONS ON SHEET 23.

OSdeg ZONE



CM2nqs(MU-C) ZONE

CM2nq(MU-C) ZONE

PLAN VIEW M

Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

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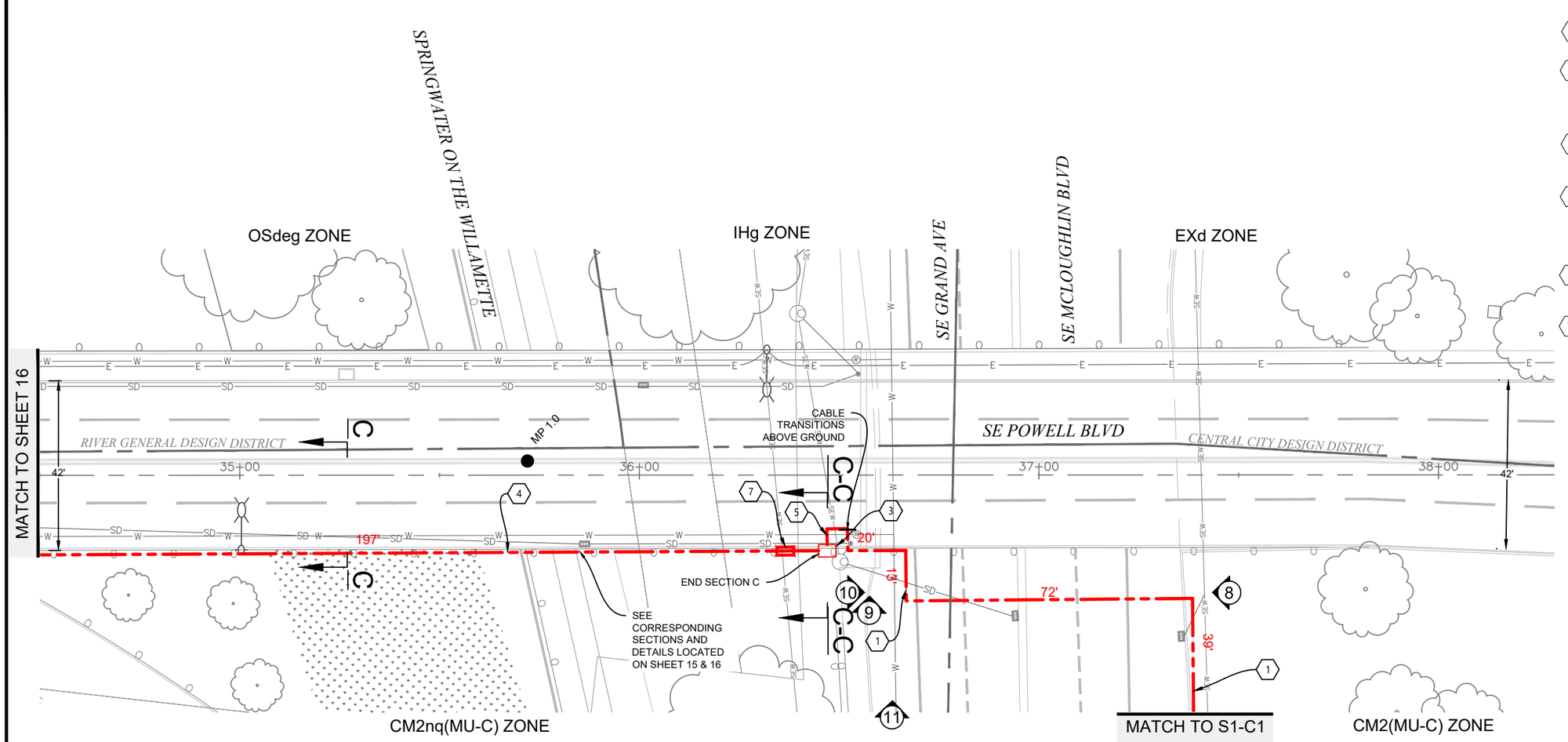
CONFIDENTIAL/PROPRIETARY



CONSTRUCTION NOTES

1. PROPOSED BORE NEW (4) 1.25" HDPE SDR 13.5 INNERDUCT. PULL FIBER CABLES THROUGH.
2. PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.
3. PROPOSED INSTALL (1) 24"X24" J-BOX. PULL FIBER CABLE AS NEEDED. SEE SHEET 20 & 26 FOR DETAILS AND SPECIFICATIONS.
4. PROPOSED HANG (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.
5. PROPOSED PLACE (1) 8" GALVANIZED STEEL CONDUIT TO TRANSITION FROM PULL BOX TO GROUND. PULL FIBER CABLE THROUGH.
7. PROPOSED 8" EXPANSION JOINT. SEE TYPICAL ON DETAILS AND SPECIFICATIONS ON SHEET 23.

PLAN VIEW N

(#) SYMBOL CORRESPONDS TO PHOTO LOCATIONS AND ORIENTATION. SEE SHEET #28 FOR SITE PHOTOGRAPHS.

811 Know what's below. Call before you dig.

0 10' 20' 30'

SCALE: 1"=30'

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

zayo GROUP | MGC TECHNICAL CONSULTING INC

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

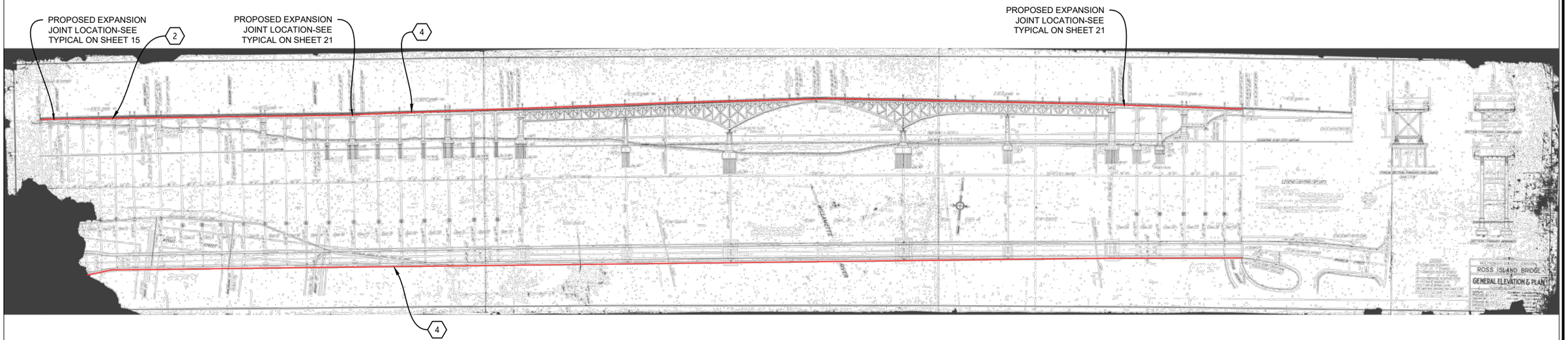
CONFIDENTIAL/PROPRIETARY

ROSS ISLAND BRIDGE PLANS

CONSTRUCTION NOTES

2 PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.

4 PROPOSED HANG (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 15 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.



NOTES:

1. ALL MOUNTING HARDWARE SHALL BE HOT-DIPPED GALVANIZED. UNLESS OTHERWISE NOTED.
2. WEIGHT OF (1) 4"ø BALLISTIC FIBERGLASS CONDUIT: 4.20 LBS/FT
3. MAX WEIGHT OF (3) 1 $\frac{1}{4}$" SDR INNERDUCT: 0.789 LBS/FT
4. WEIGHT OF (1) 144F CABLE : 0.1520 LBS/FT
5. COMBINED WEIGHT : 5.141 LBS/FT

TOTAL PACKAGE WEIGHT - ROSS ISLAND BRIDGE: 5.141 LBS/FT X 3929 FT = 20,198.989 LBS

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NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS–BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

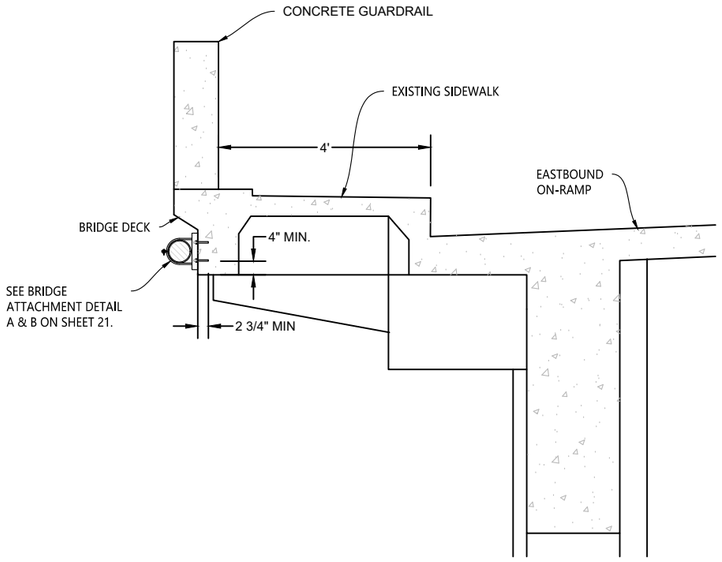
PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

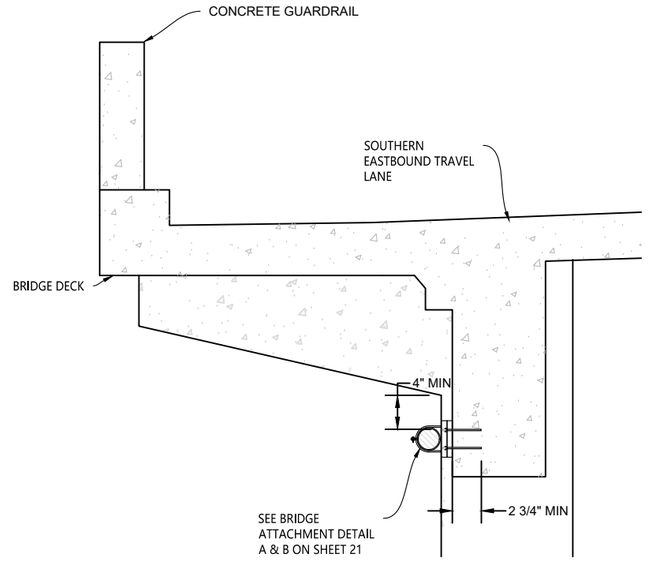
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

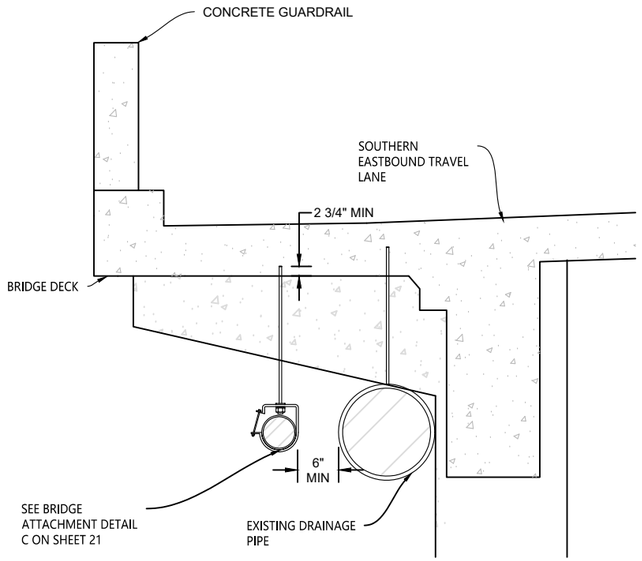
CROSS SECTIONS



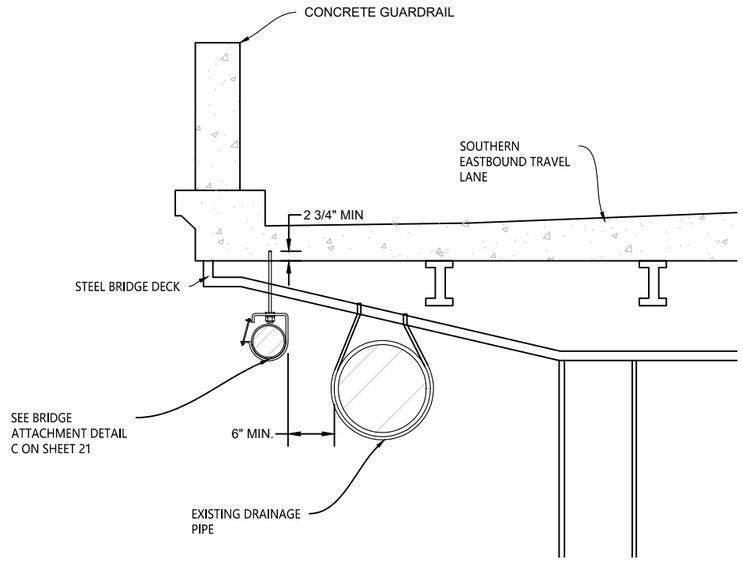
SECTION A - BRIDGE CROSS SECTION DETAIL (FACING WEST)
SCALE: 1"=3'



SECTION B - BRIDGE CROSS SECTION DETAIL (FACING WEST)
SCALE: 1"=3'



SECTION C - BRIDGE CROSS SECTION DETAIL (FACING WEST)
SCALE: 1"=3'



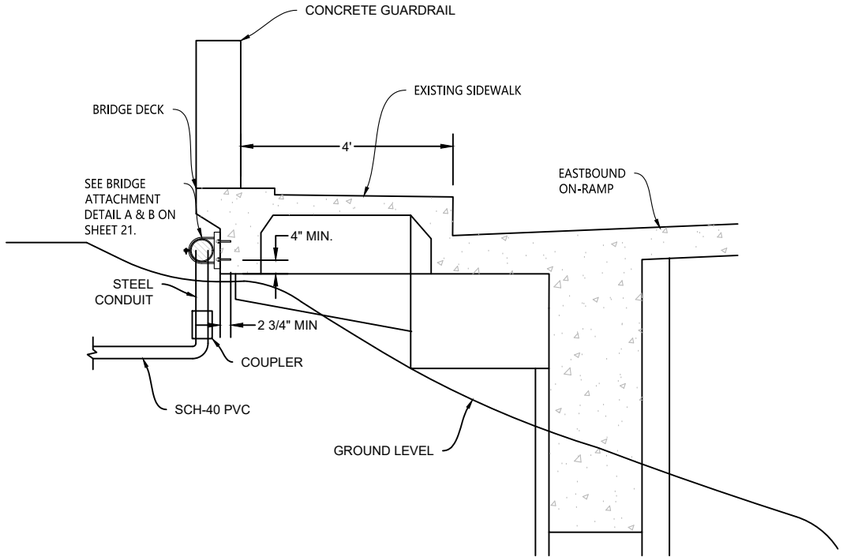
SECTION D - BRIDGE CROSS SECTION DETAIL (FACING WEST)
SCALE: 1"=3'

811
Know what's **below.**
Call before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS–BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

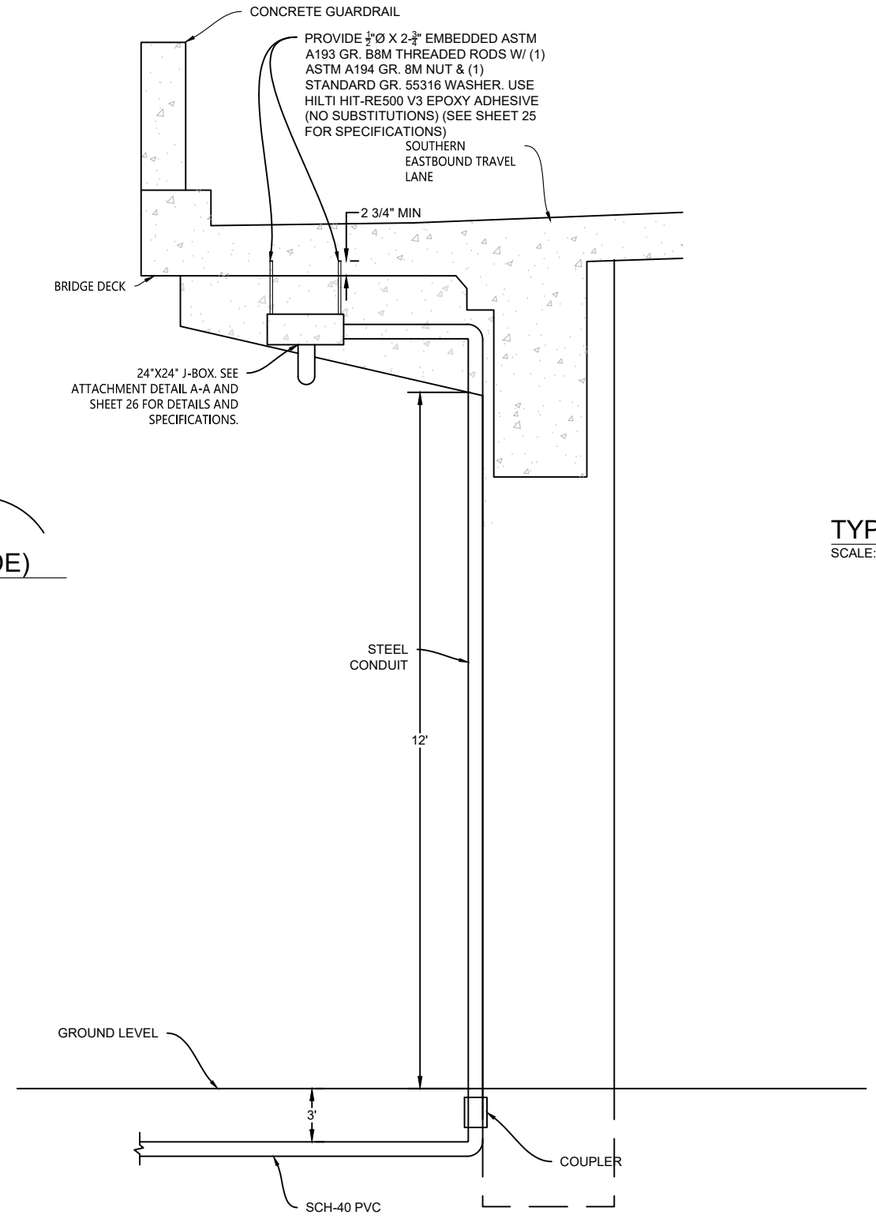
ZAYO ENGINEER: JOSEPH KLEINSASSER
ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.
PROJECT NUMBER:
LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CROSS SECTIONS & ATTACHMENT DETAILS



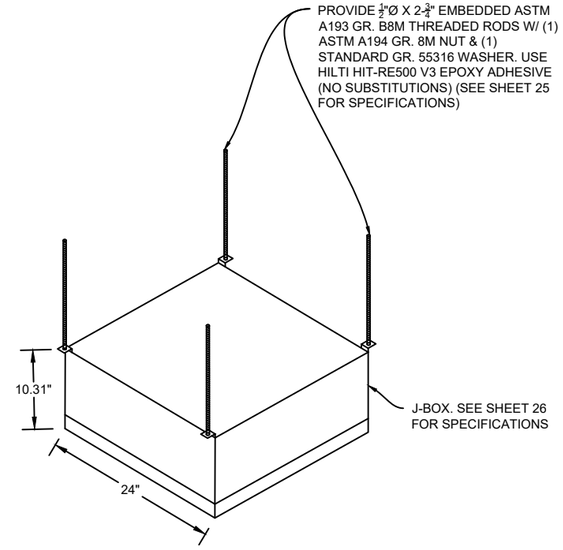
SECTION A-A - CONDUIT TRANSITION DETAIL (WEST SIDE)

SCALE: 1"=3'



SECTION C-C - CONDUIT TRANSITION DETAIL (EAST SIDE)

SCALE: 1"=3'



TYPICAL A-A - J-BOX ATTACHMENT DETAIL

SCALE: NTS

811 Know what's **below.** **Call** before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

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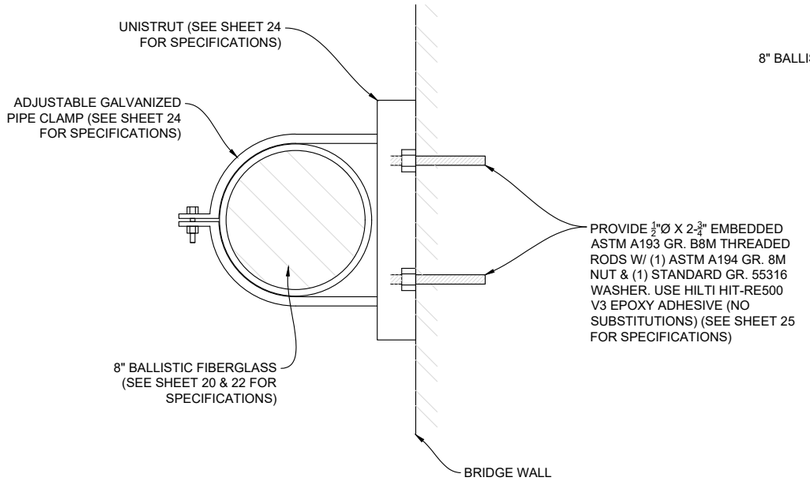
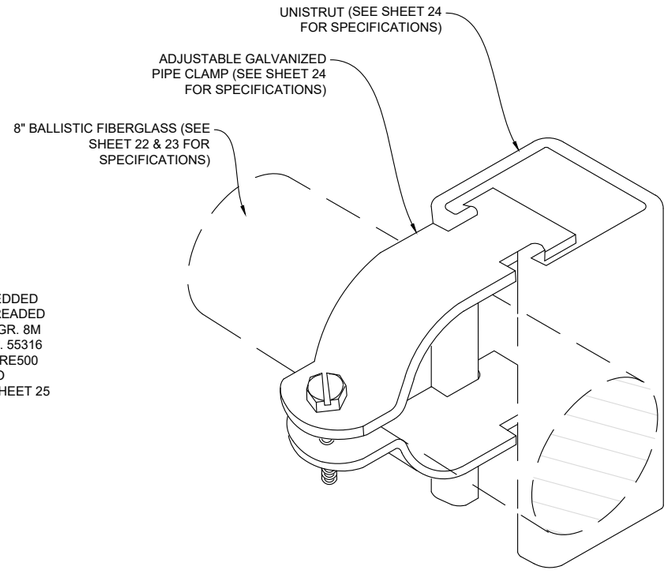
CONFIDENTIAL/PROPRIETARY

BRIDGE ATTACHMENT DETAILS



TYPICAL A - BRIDGE ATTACHMENT DETAIL

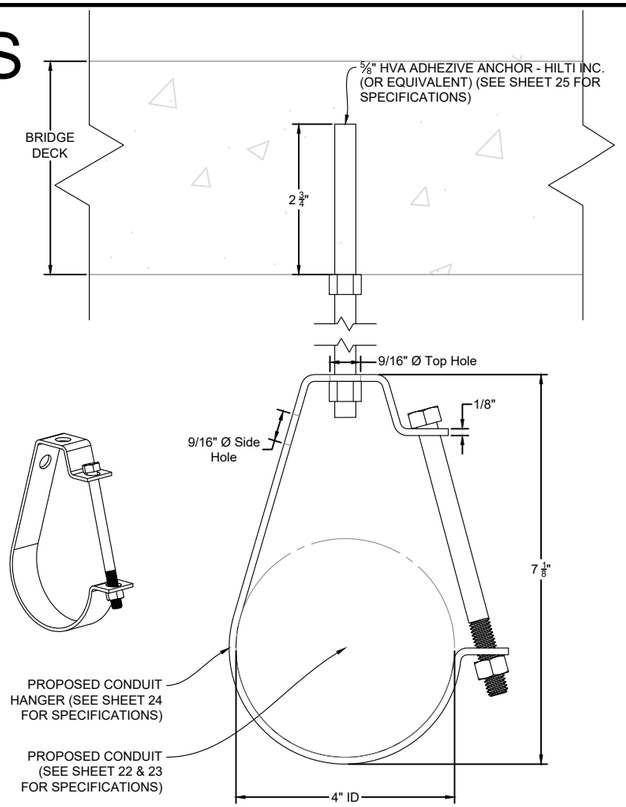
SCALE: NTS



TYPICAL B - BRIDGE ATTACHMENT DETAIL

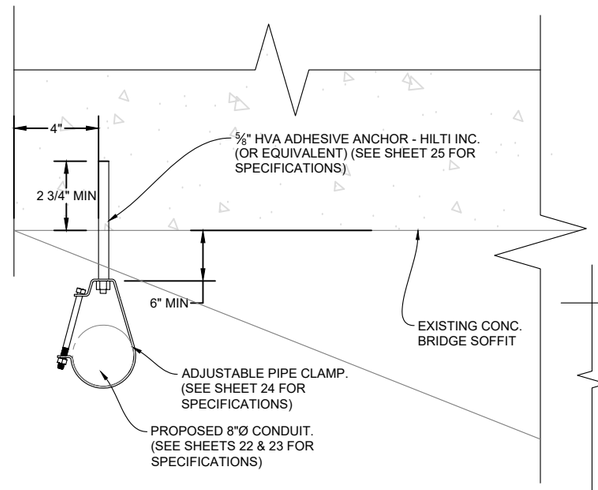
SCALE: NTS

(ISOMETRIC VIEW)



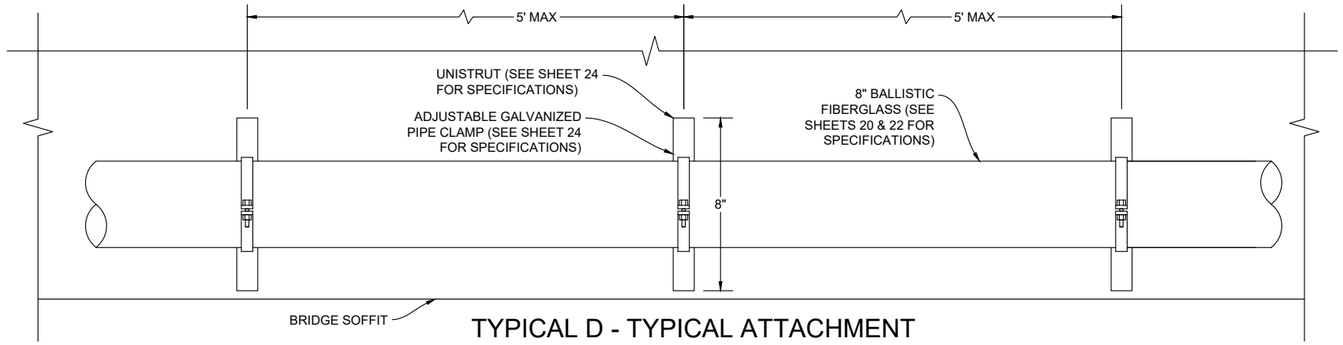
TYPICAL C: CONDUIT HANGER TO BRIDGE DECK ATTACHMENT DETAIL

SCALE: NTS



TYPICAL C.1 - CONDUIT HANGER DETAIL

SCALE: NTS



TYPICAL D - TYPICAL ATTACHMENT SPACING DETAIL

SCALE: NTS

811 Know what's **below.** **Call** before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO GROUP — MGC TECHNICAL CONSULTING INC

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg
---

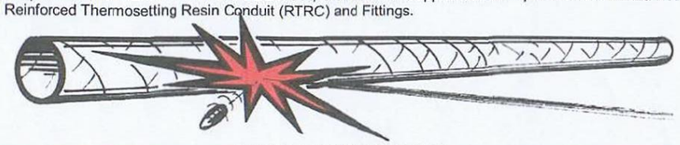
CONFIDENTIAL/PROPRIETARY

MATERIAL SPECIFICATIONS

UNITED FIBERGLASS OF AMERICA

"BULLET RESISTANT" EXTRA HEAVY WALL (XW) ABOVE GROUND FIBERGLASS CONDUIT

Designed for demanding applications including: NEC areas subject to physical damage, under roadways, under rail beds, and under bridges. Applications where "Bullet Resistance" (UL Type XW) is necessary to protect sensitive cables. Our filament wound epoxy fiberglass conduit has shown tp prevent projectile penetration from a .45 caliber slug fired less than 20 feet! United Fiberglass "Bullet Resistant" conduit meets and exceeds the latest requirements of NEMA TC-14 and UL 2515-A, Standard for Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.



OTHER ADVANTAGES ARE:

- **LIGHTWEIGHT** A 20 foot length weights just 55 pounds compared to 200+pounds for Sch. 40 steel.
- **LOW FRICTION** The hard smooth inside diameter yields lower friction for long cable pulls.
- **CORROSION RESISTANCE** Fiberglass conduit is resistant to a wide variety of chemicals including salts and acids. It also contains an ultra-violet (UV) inhibitor.
- **HIGH STRENGTH** The high impact resistance and stiffness of fiberglass conduit make it a truly "tough" material. It has a higher strength to weight ratio than steel.
- **THERMAL STABILITY** The operating range of -40° to +250°F. make it ideal for any outside temperature environment. Its thermal stability means less expansion and contraction and fewer expansion joints.
- **LOW COST** The low initial cost combined with the ease of installation of a lighter material make fiberglass conduit extremely competitive with Sch. 40 steel.

IMINIMUM IMPACT RESISTANCE (ft/lbs)
UL Standard

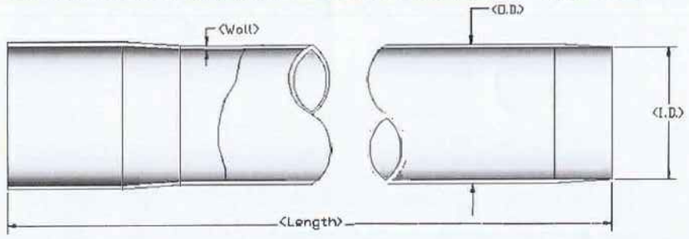
SIZE	73°F (23°C)	32°F (0°C)
3/4"	94	94
1"	150	150
1-1/4"	169	169
1-1/2"	188	188
2"	300	300
2-1/2"	375	375
3"	525	525
3-1/2"	525	525
4"	525	525
5"	525	525
6"	525	525

COMPRESSION TEST FORCE (lbs/ft)
UL Standard

SIZE	N	lbf
3/4"	8900	2000
1"	8900	2000
1-1/4"	8900	2000
1-1/2"	8900	2000
2"	8900	2000
2-1/2"	8900	2000
3"	8900	2000
3-1/2"	8900	2000
4"	8900	2000
5"	8900	2000
6"	8900	2000

UNITED FIBERGLASS OF AMERICA

"BULLET RESISTANT" EXTRA HEAVY WALL FIBERGLASS CONDUIT - Type XW



SIZE	XW PART #	ID	OD	WALL	Length	Lbs./Ft
3/4" XW	UF75A-XW-AG-10-1	.90" (23)	1.40" (36)	.25" (6)	10' (3m)	.74
1" XW	UF10A-XW-AG-10-1	1.18" (30)	1.68" (43)	.25" (6)	10' (3m)	.93
1-1/4" XW	UF12A-XW-AG-10-1	1.51" (39)	2.01" (51)	.25" (6)	10' (3m)	1.14
1-1/2" XW	UF15A-XW-AG-10-1	1.75" (44)	2.25" (57)	.25" (6)	10' (3m)	1.29
2" XW	UF20B-XW-AG-20-1	2.00" (57)	2.50" (64)	.25" (6)	20' (6.1m)	1.51
2-1/2" XW	UF25B-XW-AG-20-1	2.50" (64)	3.00" (76)	.25" (6)	20' (6.1m)	1.85
3" XW	UF30B-XW-AG-20-1	3.00" (76)	3.50" (89)	.25" (6)	20' (6.1m)	2.18
3-1/2" XW	UF35B-XW-AG-20-1	3.50" (89)	4.00" (102)	.25" (6)	20' (6.1m)	2.52
4" XW	UF40B-XW-AG-20-1	4.00" (102)	4.50" (114)	.25" (6)	20' (6.1m)	2.85
5" XW	UF50B-XW-AG-20-1	5.00" (127)	5.50" (140)	.25" (6)	20' (6.1m)	3.53
6" XW	UF60B-XW-AG-20-1	6.00" (152)	6.50" (165)	.25" (6)	20' (6.1m)	4.20
8" XW	UF80A-XW-AG-20-1	8.40" (213)	8.90" (226)	.25" (6)	20' (6.1m)	5.54

Change -20 in Part Number to -10 for 10' lengths (may be supplied with coupling end).

CONDUIT COLOR CHART
Last Number in Part # Indicate color.

1	2	3	7	1-RS
BLACK	GRAY	CONCRETE	BROWN	RED STRIPE

United Fiberglass Above Ground Extra Heavy Wall (Bullet Resistant) Products meet and exceed the latest requirements of NEMA TC-14 and UL 2515A (replaces UL1684A). No UL or NEMA standard for 8".

Conduit and supports are designed to work together as a system. For best system performance and ease of design, use United Fiberglass inserts, brackets and supports.

Dimensions are nominal and average as required by UL and/or NEMA standards.

811 Know what's **below.** **Call** before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO GROUP — MGC TECHNICAL CONSULTING INC

ZAYO ENGINEER: JOSEPH KLEINSASSER
ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.
PROJECT NUMBER:
LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg
CONFIDENTIAL/PROPRIETARY SHEET: 22 OF 29

MATERIAL SPECIFICATIONS

UNITED FIBERGLASS OF AMERICA

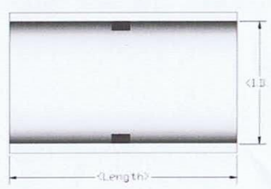
XW SLEEVE COUPLING

SLEEVE COUPLINGS ARE USED TO JOIN SPIGOT ENDS OF CONDUIT, AS SLEEVES THROUGH A BRIDGE ABUTMENT WALL, OR AS SLEEVES AT A HANGER SUPPORT WINDOW. THEY ARE ALSO USED TO REPAIR CONDUIT.

SIZE	XW PART NO.	ID	L
3/4" XW	UF75A-XW-AG-500-1	1.42"	6"
1" XW	UF10A-XW-AG-500-1	1.70"	6"
1-1/4" XW	UF12A-XW-AG-500-1	2.03"	6"
1-1/2" XW	UF15A-XW-AG-500-1	2.27"	6"
2" XW	UF20B-XW-AG-500-1	2.52"	6"
2-1/2" XW	UF25B-XW-AG-500-1	3.02"	6"
3" XW	UF30B-XW-AG-500-1	3.52"	6"
3-1/2" XW	UF35B-XW-AG-500-1	4.02"	6"
4" XW	UF40B-XW-AG-500-1	4.52"	6"
5" XW	UF50B-XW-AG-500-1	5.52"	6"
6" XW	UF60B-XW-AG-500-1	6.52"	6"
8" XW	UF80A-XW-AG-500-1	8.92"	6"

XW STOP COUPLING

STOP COUPLINGS, OR DOUBLE BELL COUPLINGS ARE USED TO JOIN SPIGOT ENDS OF CONDUIT.



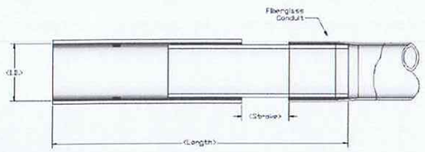
SIZE	XW PART NO.	ID	L
3/4" XW	UF75A-XW-AG-510-1	1.42"	6.5"
1" XW	UF10A-XW-AG-510-1	1.70"	6.5"
1-1/4" XW	UF12A-XW-AG-510-1	2.03"	6.5"
1-1/2" XW	UF15A-XW-AG-510-1	2.27"	6.5"
2" XW	UF20B-XW-AG-510-1	2.52"	6.5"
2-1/2" XW	UF25B-XW-AG-510-1	3.02"	6.5"
3" XW	UF30B-XW-AG-510-1	3.52"	6.5"
3-1/2" XW	UF35B-XW-AG-510-1	4.02"	6.5"
4" XW	UF40B-XW-AG-510-1	4.52"	6.5"
5" XW	UF50B-XW-AG-510-1	5.52"	6.5"
6" XW	UF60B-XW-AG-510-1	6.52"	6.5"
8" XW	UF80A-XW-AG-510-1	8.92"	6.5"

Dimensions are nominal and average as required by UL and/or NEMA standards.

UNITED FIBERGLASS OF AMERICA

XW EXPANSION JOINT

Single Direction, Socket x Spigot, Without O-Ring



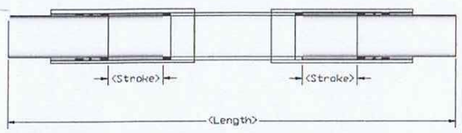
DIAMETER	AG PART NO.	ID	LENGTH	STROKE
3/4" XW	UF75A-XW-AG-400-1	1.42"	26.5"	8"
1" XW	UF10A-XW-AG-400-1	1.70"	26.5"	8"
1-1/4" XW	UF12A-XW-AG-400-1	2.03"	26.5"	8"
1-1/2" XW	UF15A-XW-AG-400-1	2.27"	26.5"	8"
2" XW	UF20B-XW-AG-400-1	2.52"	26.5"	8"
2-1/2" XW	UF25B-XW-AG-400-1	3.02"	26.5"	8"
3" XW	UF30B-XW-AG-400-1	3.52"	26.5"	8"
3-1/2" XW	UF35B-XW-AG-400-1	4.02"	26.5"	8"
4" XW	UF40B-XW-AG-400-1	4.52"	26.5"	8"
5" XW	UF50B-XW-AG-400-1	5.52"	26.5"	8"
6" XW	UF60B-XW-AG-400-1	6.52"	26.5"	8"
8" XW	UF80A-XW-AG-400-1	8.92"	26.5"	6"

EXPANSION JOINTS ARE USED TO ACCOMMODATE CHANGES IN CONDUIT LENGTH DUE TO TEMERATURE FLUCTUATIONS.

Expansion Joints can be manufactured in different configurations and with a longer stroke. Please consult the factory for your requirements.

XW EXPANSION JOINT

Back-to-Back, Spigot x Spigot, Without O-Ring



DIAMETER	AG PART NO.	ID	LENGTH	STROKE
3/4" XW	UF75A-XW-AG-420-1	1.42"	45.5"	8"
1" XW	UF10A-XW-AG-420-1	1.70"	45.5"	8"
1-1/4" XW	UF12A-XW-AG-420-1	2.03"	45.5"	8"
1-1/2" XW	UF15A-XW-AG-420-1	2.27"	45.5"	8"
2" XW	UF20B-XW-AG-420-1	2.52"	45.5"	8"
2-1/2" XW	UF25B-XW-AG-420-1	3.02"	45.5"	8"
3" XW	UF30B-XW-AG-420-1	3.52"	45.5"	8"
3-1/2" XW	UF35B-XW-AG-420-1	4.02"	45.5"	8"
4" XW	UF40B-XW-AG-420-1	4.52"	45.5"	8"
5" XW	UF50B-XW-AG-420-1	5.52"	45.5"	8"
6" XW	UF60B-XW-AG-420-1	6.52"	45.5"	8"
8" XW	UF80A-XW-AG-420-1	8.92"	45.5"	8"

EXPANSION JOINTS ARE USED TO ACCOMMODATE CHANGES IN CONDUIT LENGTH DUE TO TEMERATURE FLUCTUATIONS.

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ZAYO GROUP — MGC TECHNICAL CONSULTING INC

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202

DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

CONFIDENTIAL/PROPRIETARY

MATERIAL SPECIFICATIONS

Side-Load Threaded-Rod-Mount Loop Hangers

Access material quickly without removing the mounted hanger. These hangers have a removable bolt for loading pipe, tube, and conduit from the side. They have an unthreaded hole on top for mounting with a threaded rod or other fastener.

Hangers **with side mounting hole** can also be wall mounted with a fastener.

Zinc-plated steel hangers have good corrosion resistance.

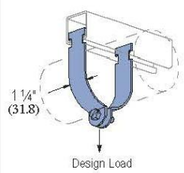
304 stainless steel hangers are more corrosion resistant than zinc-plated steel.

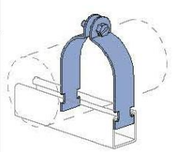
CAD For technical drawings and 3-D models, click on a part number.

ID	Capacity, lbs.	Lg.	Wd.	Ht.	Thick.	Mounting Fasteners Included	Mounting Hole Dia. Side	Mounting Hole Dia. Top	For Threaded Rod Size	Includes		Each
Zinc-Plated Steel												
1 1/16"	400	2 7/16"	3/4"	3 3/8"	1/8"	No	7/16"	3/8"	3/8"-16	Closure Bolt and Nut	3131T52	$2.12
1 5/16"	400	2 11/16"	3/4"	3 9/16"	1/8"	No	7/16"	3/8"	3/8"-16	Closure Bolt and Nut	3131T53	2.17
1 11/16"	400	3"	3/4"	4 1/16"	1/8"	No	7/16"	3/8"	3/8"-16	Closure Bolt and Nut	3131T54	2.17
1 7/8"	400	3 5/16"	3/4"	4 1/2"	1/8"	No	7/16"	3/8"	3/8"-16	Closure Bolt and Nut	3131T55	2.41
2 3/8"	400	3 11/16"	3/4"	4 7/8"	1/8"	No	7/16"	3/8"	3/8"-16	Closure Bolt and Nut	3131T56	2.99
2 7/8"	500	4 5/16"	1 1/4"	5 13/16"	1/8"	No	9/16"	9/16"	1/2"-13	Closure Bolt and Nut	3131T57	5.89
3 1/2"	500	4 7/8"	1 1/4"	6 9/16"	1/8"	No	9/16"	9/16"	1/2"-13	Closure Bolt and Nut	3131T58	6.13
4"	800	5 1/2"	1 1/4"	8"	1/8"	No	—	1/2"	1/2"-13	Closure Bolt and Nut	3131T59	8.71
4 1/2"	550	6 1/4"	1 1/4"	8 1/4"	3/16"	No	9/16"	11/16"	5/8"-11	Closure Bolt and Nut	3131T61	8.91
5 9/16"	550	7 3/16"	1 1/4"	9 3/8"	3/16"	No	9/16"	11/16"	5/8"-11	Closure Bolt and Nut	3131T62	16.54
6 5/8"	600	8 1/2"	1 1/4"	10 7/8"	1/4"	No	9/16"	13/16"	3/4"-10	Closure Bolt and Nut	3131T63	17.40
304 Stainless Steel												
1 1/16"	400	2 7/16"	1"	3 3/8"	1/8"	No	7/16"	7/16"	3/8"-16	Closure Bolt and Nut	3131T66	8.67
1 5/16"	400	2 1/2"	1"	3 5/8"	1/8"	No	7/16"	7/16"	3/8"-16	Closure Bolt and Nut	3131T67	9.07
1 11/16"	400	2 7/8"	1"	4 1/8"	1/8"	No	7/16"	7/16"	3/8"-16	Closure Bolt and Nut	3131T68	9.89
1 7/8"	400	3 1/8"	1"	4 9/16"	1/8"	No	7/16"	7/16"	3/8"-16	Closure Bolt and Nut	3131T69	10.58
2 3/8"	400	3 9/16"	1"	4 7/8"	1/8"	No	7/16"	7/16"	3/8"-16	Closure Bolt and Nut	3131T71	11.33
2 7/8"	500	4 3/4"	1 1/4"	5 7/8"	1/8"	No	9/16"	9/16"	1/2"-13	Closure Bolt and Nut	3131T72	14.30
3 1/2"	500	5"	1 1/4"	6 5/8"	1/8"	No	9/16"	9/16"	1/2"-13	Closure Bolt and Nut	3131T73	15.13
4"	500	5 1/2"	1 1/4"	7 1/8"	1/8"	No	9/16"	9/16"	1/2"-13	Closure Bolt and Nut	3131T74	15.44
4 1/2"	550	6"	1 1/4"	8 3/8"	3/16"	No	9/16"	11/16"	5/8"-11	Closure Bolt and Nut	3131T75	17.98
5 9/16"	550	7 1/4"	1 1/4"	9 9/16"	3/16"	No	9/16"	11/16"	5/8"-11	Closure Bolt and Nut	3131T76	21.44
6 5/8"	600	8 3/8"	1 1/4"	11 1/16"	1/4"	No	9/16"	13/16"	3/4"-10	Closure Bolt and Nut	3131T77	27.16

CONDUIT HANGER ATTACHMENT SPECS

P1109 THRU P1126 — PIPE CLAMPS FOR RIGID STEEL CONDUIT — EG HG





PART NO.	CONDUIT SIZE IN	O.D. SIZE IN (mm)	THICKNESS GAUGE (mm)	Wt/100 pcs Lbs (kg)	DESIGN LOAD Lbs (kN)
P1109	3/8	0.675 17.1	16 1.5	10 4.5	400 1.78
P1111	1/2	0.840 21.3	16 1.5	11 5.0	400 1.78
P1114	1 1/4	1.660 42.2	14 1.9	19 8.6	600 2.67
P1115	1 1/2	1.900 48.3	12 2.7	29 13.2	800 3.56
P1117	2	2.375 60.3	12 2.7	34 15.4	800 3.56

PART NO.	CONDUIT SIZE IN	O.D. SIZE IN (mm)	THICKNESS GAUGE (mm)	Wt/100 pcs Lbs (kg)	DESIGN LOAD Lbs (kN)
P1118	2 1/2	2.875 73.0	12 2.7	40 18.1	800 3.56
P1119	3	3.500 88.9	12 2.7	47 21.3	800 3.56
P1123	5	5.563 141.3	11 3.0	80 36.3	1,000 4.45
P1124	6	6.625 168.3	10 3.4	102 46.3	1,000 4.45
P1126	8	8.625 219.1	10 3.4	130 59.0	1,000 4.45

SLOTTED HEX HEAD SCREW AND NUT INCLUDED

ADJUSTABLE GALVANIZED PIPE CLAMP SPECS

	Channel Dimensions		Material & Thickness			Hole Pattern Styles						
	Width	Height	Steel	Stainless Steel	Alum.	HS	T	WT	KO	SL	DS	H3
CHANNEL	In (mm)	In (mm)	gauge	gauge	In (mm)							
P1000	1 5/8 (41.3)	1 5/8 (41.3)	12 ga	12 ga	0.109 (2.8)	□	□					
P1100	1 5/8 (41.3)	1 5/8 (41.3)	14 ga	14 ga	-	□	□					
P2000	1 5/8 (41.3)	1 5/8 (41.3)	16 ga	-	-	□	□					
P3000	1 5/8 (41.3)	1 3/8 (34.9)	12 ga	-	-	□	□					
P3300	1 5/8 (41.3)	7/8 (22.2)	12 ga	12 ga	-	□	□					
P4000	1 5/8 (41.3)	13/16 (20.6)	16 ga	16 ga	0.078 (2.0)	□	□					
P4100	1 5/8 (41.3)	13/16 (20.6)	14 ga	-	-	□	□					
P4400	1 5/8 (41.3)	1 (25.4)	12 ga	-	-	□	□	□				
P4520	1 5/8 (41.3)	13/16 (20.6)	12 ga	-	-	□	□	□				
P5000	1 5/8 (41.3)	3 1/4 (82.6)	12 ga	12 ga	-	□	□	□				
P5500	1 5/8 (41.3)	2 7/16 (61.9)	12 ga	-	0.109 (2.8)	□	□	□				

UNISTRUT SPECS

SMOOTHWALL – SPECS

Wall Type	Pipe Size	½"	¾"	1"	1 ¼"
	Nom OD (in)	0.840	1.050	1.315	1.660
	OD Tolerance +/-	0.004	0.005	0.007	0.008
	Bend Radius (in) – Supported	8	10	13	17
	Bend Radius (in) – Unsupported	16	20	26	34
SDR-9	Min. Wall (in)	0.093	0.117	0.146	0.184
	Wall Tolerance +	0.020	0.020	0.020	0.022
	Avg ID (in)	0.634	0.796	1.003	1.270
	Weight (#/ft)	0.098	0.152	0.234	0.370
	Safe Working Load	525	821	1,288	2,052
SDR-11	Min. Wall (in)	0.076	0.095	0.120	0.151
	Wall Tolerance +	0.020	0.020	0.020	0.020
	Avg ID (in)	0.668	0.840	1.055	1.338
	Weight (#/ft)	0.084	0.128	0.199	0.312
	Safe Working Load	440	687	1,078	1,717
SDR-13.5	Min. Wall (in)	0.062	0.078	0.097	0.123
	Wall Tolerance +	0.020	0.020	0.020	0.020
	Avg ID (in)	0.696	0.874	1.101	1.394
	Weight (#/ft)	0.072	0.110	0.167	0.263
	Safe Working Load	365	570	894	1,425

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ZAYO GROUP — MGC TECHNICAL CONSULTING INC

ZAYO ENGINEER: JOSEPH KLEINSASSER

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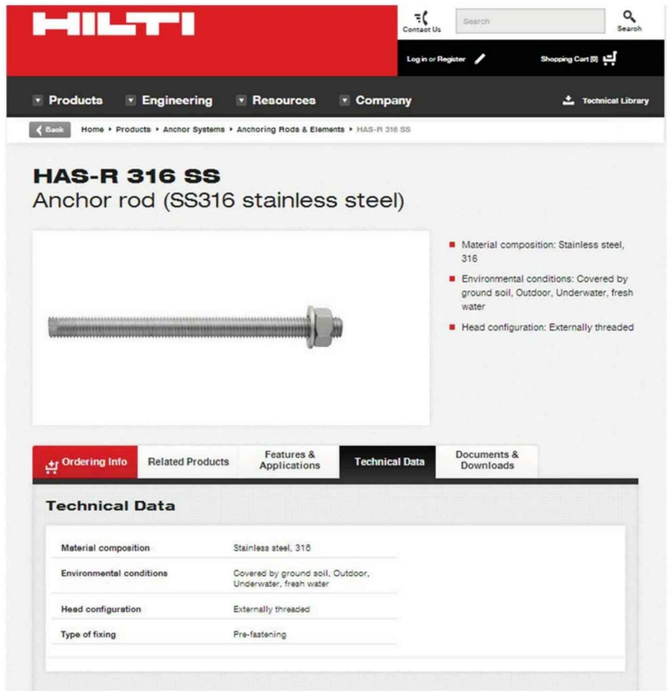
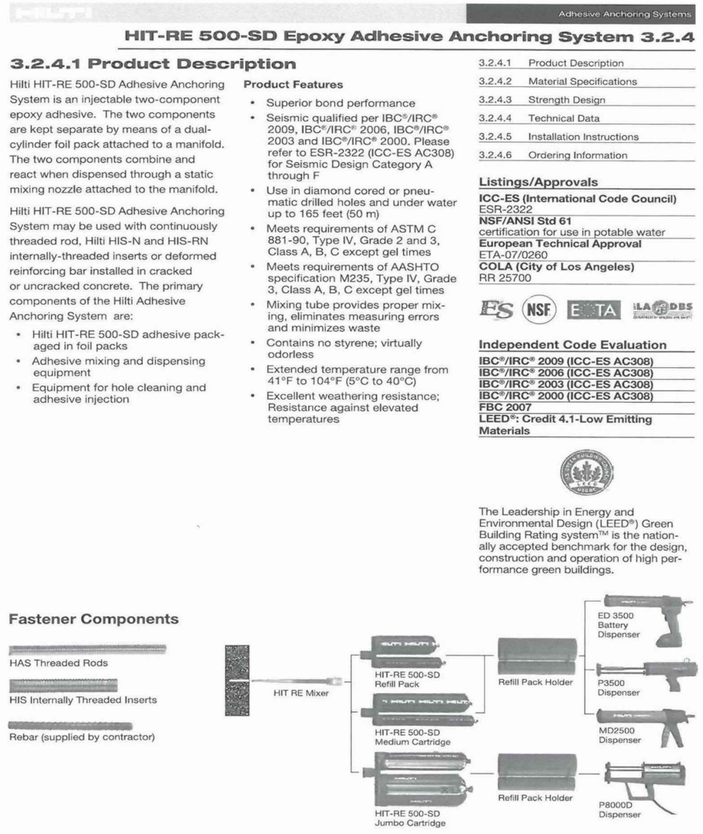
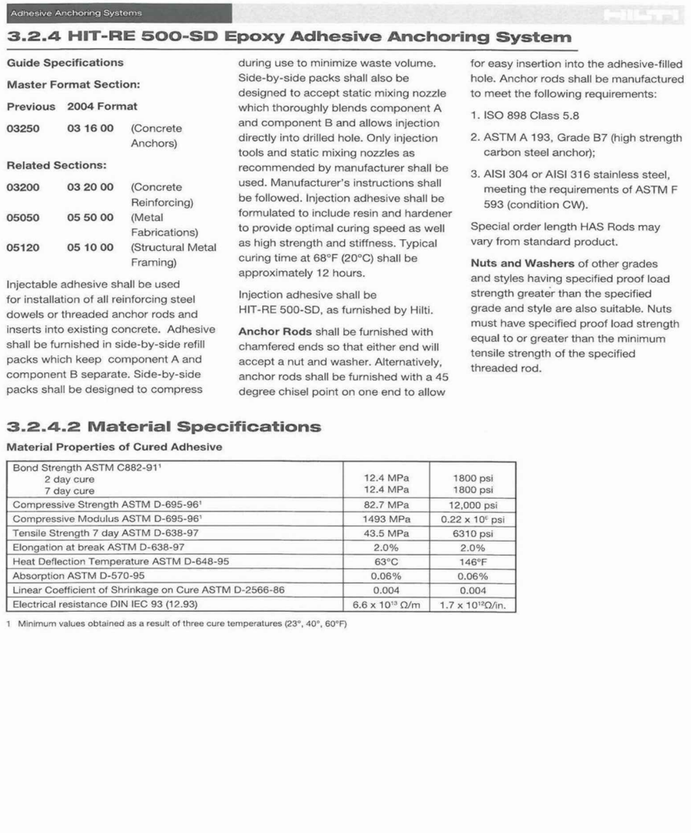
CONFIDENTIAL/PROPRIETARY

MATERIAL SPECIFICATIONS







EPOXY SPECS

ANCHOR BOLT SPECS

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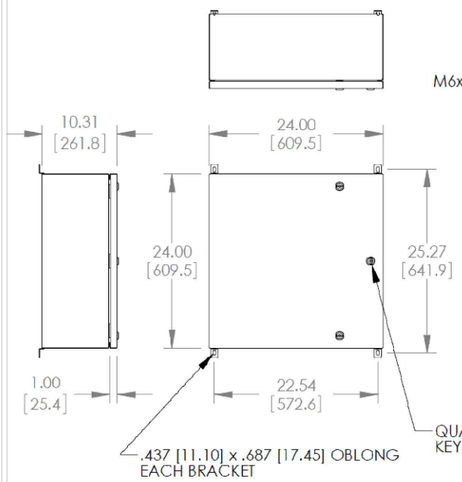
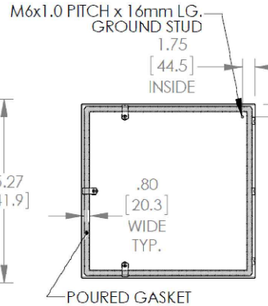
---
CONFIDENTIAL/PROPRIETARY
SHEET: 25 OF 29

MATERIAL SPECIFICATIONS

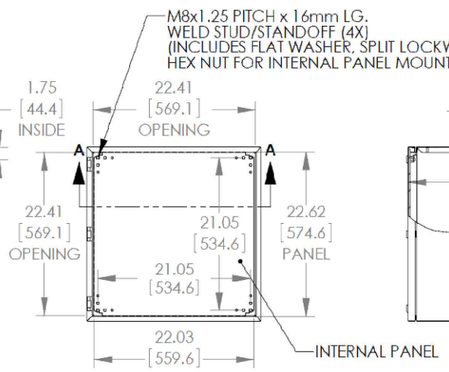
BUD	PART NAME	NEMA SHEET METAL BOX	PART No.	SNB-3754	REVISION DATE	6-7-13

DESIGNED TO MEET NEMA 1, 2, 4, 4X, 12, 13 AND IP-66
UL LISTED AND TESTED TO UL508A. UL FILE #E194432

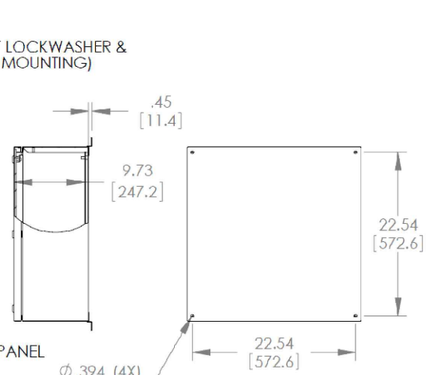




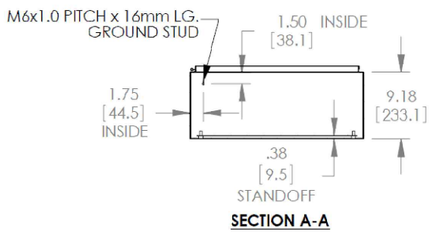
INSIDE VIEW OF COVER



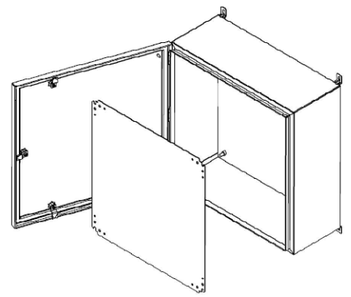
FRONT VIEW (COVER NOT SHOWN)



BACK VIEW (HOLE PLUGS NOT SHOWN)



SECTION A-A



MATERIAL:
BODY & COVER - 16 GA. [1.5mm] C.R.S.
INTERNAL PANEL - 14 GA. [2.0mm] C.R.S.
WALL MOUNTING BRACKETS - 14 GA. [2.0mm] TYPE 430 STAINLESS STEEL
STRIKERS - 11 GA. STAINLESS STEEL 304
HINGE PINS & WALL MOUNTING HARDWARE - TYPE 201 STAINLESS STEEL
INTERNAL PANEL MOUNTING HARDWARE & GROUND STUD
HARDWARE - PLAIN STEEL
LATCHES - ZINC DIE CAST
LATCH GASKET WASHER - BLACK ACRYLONITRILE-BUTADIENE RUBBER
POURED GASKET - BLACK POLYURETHANE FOAM
SEALING WASHERS - BLACK NEOPRENE
HOLE PLUGS - LIGHT GRAY NEOPRENE

FINISH:
BODY & COVER - LIGHT GRAY SMOOTH POWDER COAT
INTERNAL PANEL, INTERNAL PANEL MOUNTING HARDWARE
& GROUND STUD HARDWARE - CLEAR ZINC PLATED
WALL MOUNTING BRACKETS, STRIKERS & HINGE PINS - NATURAL
LATCHES - CHROME PLATED

SUPPLIED WALL MOUNTING BRACKET KIT CONTAINS:
QTY. (4) WALL MOUNTING BRACKETS
QTY. (4) HEX HEAD BOLT M10x1.5 PITCH x 19.5mm LG.
QTY. (8) SEALING WASHERS
QTY. (4) FLAT WASHERS M10
QTY. (4) SPLIT LOCKWASHERS M10
QTY. (4) HEX NUTS M10x1.5

SUPPLIED GROUNDING KIT CONTAINS:
QTY. (1) GROUND WIRE 14-16 GA. YELLOW/GREEN
WITH RING TERMINAL (M6) AT EACH END
QTY. (4) FLAT WASHER M6
QTY. (2) SPLIT LOCKWASHER M6
QTY. (2) HEX NUT M6x1.0

FCA243624T-00006

FIBERGLASS / POLYMER CONCRETE ASSEMBLY

24"X36"X24"
(For actual dimensions see drawing)

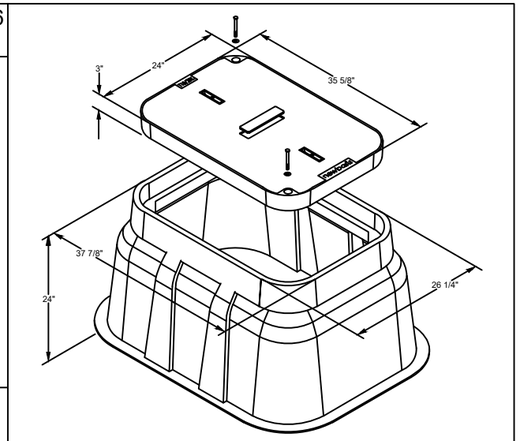
Fiberglass/ Polymer Concrete Assembly, Tapered Sides, No Floor, WUC 3.6, ANSI/SCTE 77-"T15/20K, 3/8 " Hex Bolts, Standard Nameplate (Specify at time of order) Installed

LOAD RATINGS
Incidental traffic - Parking Lot, Sidewalk
Conforms to:
WUC 3.6
ASTM C 857
ANSI/SCTE 77

FEATURES:
UL classified polymer concrete
Drop-in nameplate
Shipped assembled
Skid resistant cover
Stainless steel bolts
Cast-in floating nut box
- Integral drain holes

Additional product information continued on the reverse

newbasis
Composites for Infrastructure
2626 Kansas Avenue
Riverside, California 92507
951.787.0600
951.787.0632 (fax)
info@newbasis.com
newbasis.com



Inside Dimensions		
Length	Width	Depth
33 3/8"	21 1\2"	21"
44 1\4"	32 5\8"	

NB2436 HANDHOLE DETAIL

Know what's **below.**
Call before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS–BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER
ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.
PROJECT NUMBER:
LOCATION: 3155 SW MOODY AVE
PORTLAND OR, 97202
DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg
----

SITE PHOTOGRAPHS

PHOTO #1: FACING NORTH ON SOUTH SIDE OF ROSS ISLAND BRIDGE

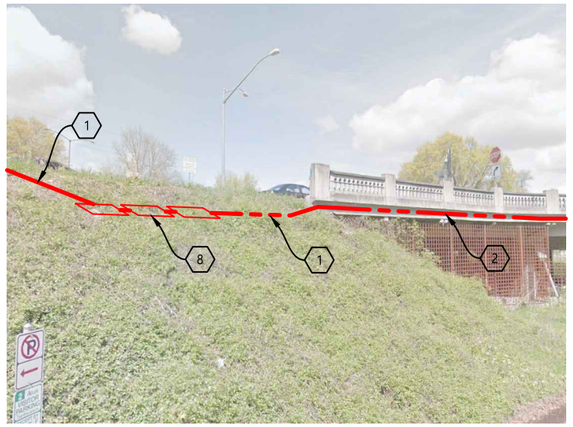


PHOTO #2: FACING WEST ON SOUTH SIDE OF ROSS ISLAND BRIDGE

PHOTO #3: FACING EAST ON SOUTH SIDE OF ROSS ISLAND BRIDGE

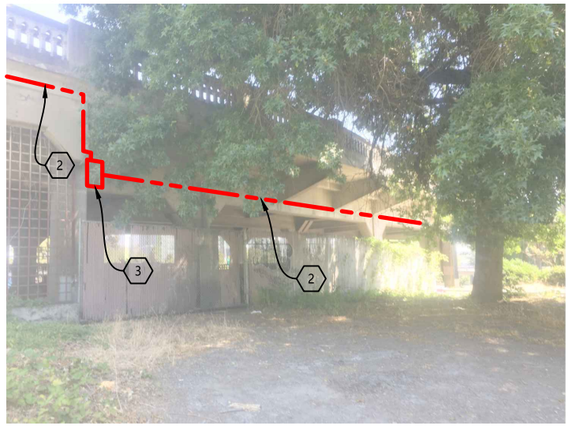


PHOTO #4:FACING WEST ON SOUTH SIDE OF BRIDGE EAST SIDE OF WILLAMETTE RIVER

PHOTO #5: FACING EAST ON SOUTH SIDE OF ROSS ISLAND BRIDGE

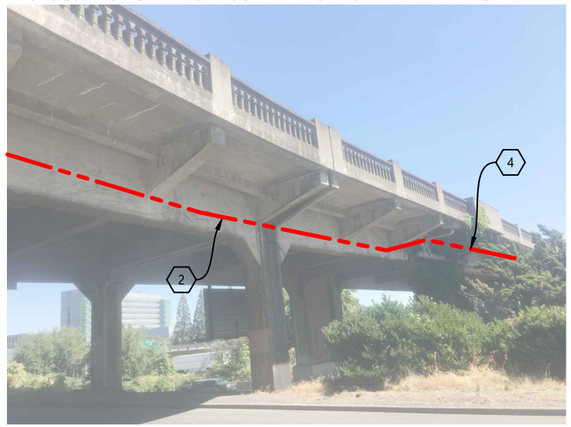
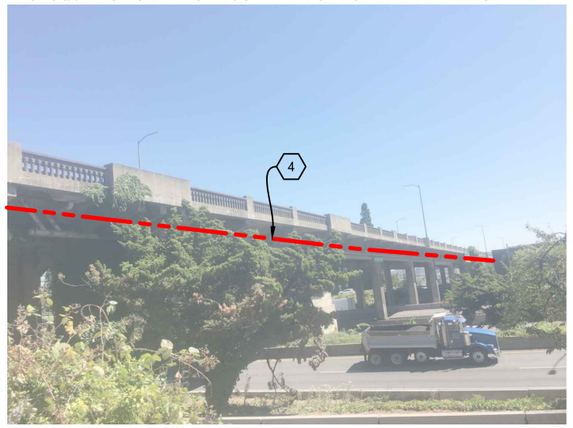


PHOTO #6: FACING EAST ON SOUTH SIDE OF ROSS ISLAND BRIDGE



CONSTRUCTION NOTES

1. PROPOSED BORE NEW (4) 1.25" HDPE SDR 13.5 INNERDUCT. PULL FIBER CABLES THROUGH. REPAIR SURFACE PER LOCAL JURISDICTION STANDARDS. CONTRACTOR TO POTHOLE ALL UTILITIES PRIOR TO CONSTRUCTION.
2. PROPOSED PLACE (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SHEET 19 & 20 FOR MOUNTING DETAILS.
3. PROPOSED INSTALL (1) 24"X24" J-BOX. PULL FIBER CABLE AS NEEDED. SEE SHEET 20 & 26 FOR DETAILS AND SPECIFICATIONS.
4. PROPOSED HANG (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.
8. PROPOSED (3) NB2436 VAULTS. PULL FIBER CABLE THROUGH. SEE SHEET 26 FOR DETAILS.

811 Know what's **below.** **Call** before you dig.

NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS–BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

ENGINEERING FIRM: MGC TECHNICAL CONSULTING INC.

PROJECT NUMBER:

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DRAWING NAME: ZAYO - PORTLAND TO THE DALLES - S1B1 - ROSS ISLAND BRIDGE - PLANS.dwg

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SITE PHOTOGRAPHS

PHOTO #7: FACING EAST ON SOUTH SIDE OF ROSS ISLAND BRIDGE ON SW MOODY AVE.

PHOTO #8: FACING WEST ON SOUTH SIDE OF BRIDGE, EAST SIDE OF WILLAMETTE RIVER

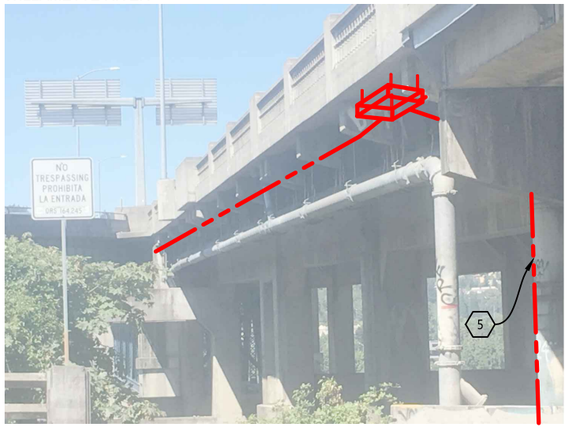


PHOTO #9: FACING NORTH ON SOUTH SIDE OF BRIDGE, EAST SIDE OF WILLAMETTE RIVER

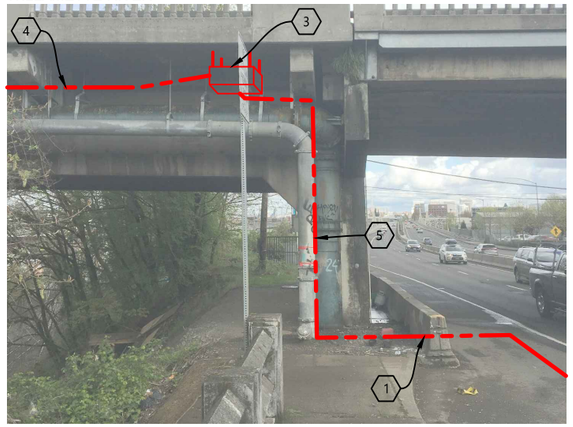


PHOTO #10: FACING EAST ON SOUTH SIDE OF BRIDGE, EAST SIDE OF WILLAMETTE RIVER

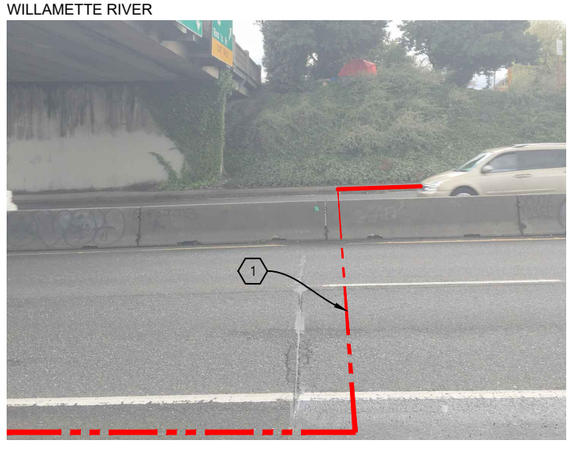
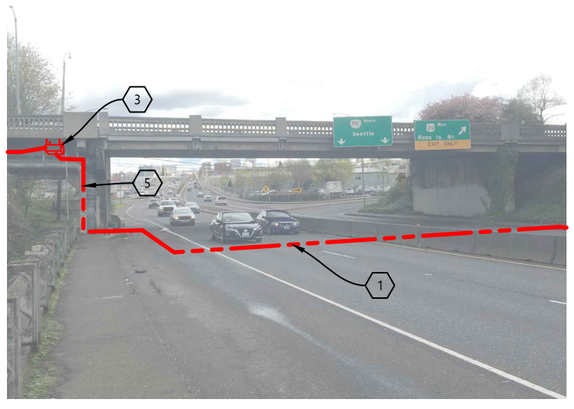


PHOTO #11: FACING NORTH ON SOUTH SIDE OF BRIDGE, EAST SIDE OF WILLAMETTE RIVER



CONSTRUCTION NOTES

1. PROPOSED BORE NEW (4) 1.25" HDPE SDR 13.5 INNERDUCT. PULL FIBER CABLES THROUGH. REPAIR SURFACE PER LOCAL JURISDICTION STANDARDS. CONTRACTOR TO POTHOLE ALL UTILITIES PRIOR TO CONSTRUCTION.
3. PROPOSED INSTALL (1) 24"X24" J-BOX. PULL FIBER CABLE AS NEEDED. SEE SHEET 20 & 26 FOR DETAILS AND SPECIFICATIONS.
4. PROPOSED HANG (1) 8" BALLISTIC FIBERGLASS CONDUIT ON SOUTH SIDE OF BRIDGE. PLACE (4) 1.25" HDPE SDR 13.5 INNERDUCT IN NEW 8" CONDUIT. PULL FIBER CABLE THROUGH. SEE SECTIONS ON SHEET 19 & 20 AND DETAILS ON SHEET 21 FOR HANGING DETAILS.
5. PROPOSED PLACE (1) 8" GALVANIZED STEEL CONDUIT TO TRANSITION FROM PULL BOX TO GROUND. PULL FIBER CABLE THROUGH.

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NO.	DATE	ENGINEER	DRAFTER	COMMENT
3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

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SITE PHOTOGRAPHS 2 - BUCKET TRUCK

811
Know what's **below.**
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3				AS-BUILT
2	4/16/19	JS	CH	REVISION # 3
1	08/03/17	LS	DHN	ORIGINAL

ZAYO ENGINEER: JOSEPH KLEINSASSER

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