

APPENDIX D. ENGINEERING DETAILS (TERRESTRIAL)

[Updates Pending]

APPENDIX E. COMMUNITY MAPSET



- Community Map Index
- Segment 1 Connected Community
- Other Communities
- Highway
- Parks, Preserves and Refuges
- ~ Scratch Plow
- ~ Canyon Bypass (Terrestrial)
- ~ Jet Plow



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APPENDIX E ALASKA FIBEROPTIC PROJECT SEGMENT 1 COMMUNITY MAPSET - INDEX

ALASKA FIBEROPTIC PROJECT SEGMENT 1 - PLAN OF WORK

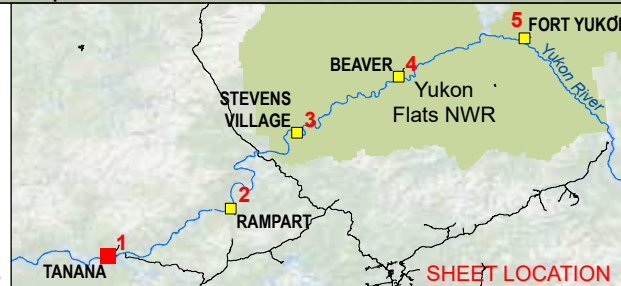
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Notes:
Meridian - Fairbanks

Segment 1 Alignment (Install Type)		DCRA Community Profile - Line	
Scratch Plow	Proposed HDD Bore Alignment	Boundary	PlanOther
Canyon Bypass (Terrestrial)	Communication Shelter	Control	Structure
Jet Plow	DCRA Community Profile - Point Location	Hazard	StructureOther
		Parcel	Utility
		ParcelUnsurveyed	



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APPENDIX E
**ALASKA FIBEROPTIC PROJECT
SEGMENT 1 COMMUNITY MAPSET
TANANA**
ALASKA FIBEROPTIC PROJECT SEGMENT 1 - PLAN OF WORK

SCALE:
0 125 250 Feet
0 37.5 75 Meters

SHEET:
1

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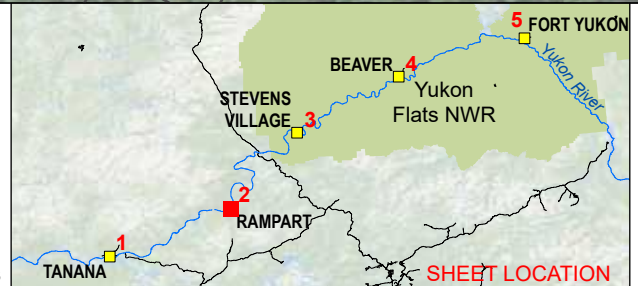
Note: Longer HDD Borings may need to be completed in two segments



Notes:
Meridian - Fairbanks

Segment 1 Alignment (Install Type)		DCRA Community Profile - Line	
Scratch Plow	Proposed HDD Bore Alignment	Boundary	ParcelEasement
Canyon Bypass (Terrestrial)	Communication Shelter	Centerline	ParcelUnsurveyed
Jet Plow	DCRA Community Profile - Point Location	Control	PlanOther
		Hazard	Structure
		Parcel	StructureOther
			Utility

Note: Longer HDD Borings may need to be completed in two segments



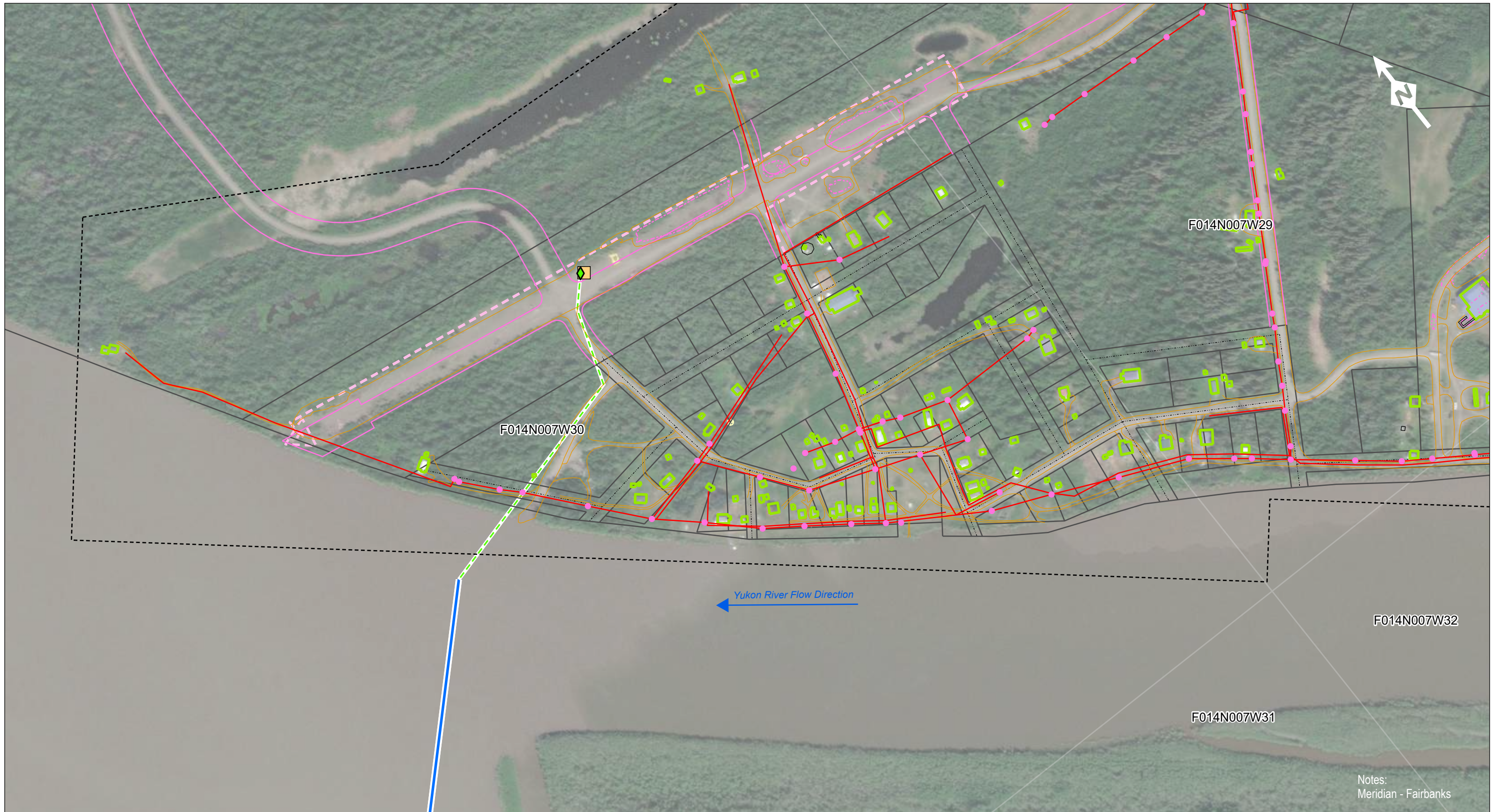
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APPENDIX E
ALASKA FIBEROPTIC PROJECT
SEGMENT 1 COMMUNITY MAPSET
RAMPART

ALASKA FIBEROPTIC PROJECT SEGMENT 1 - PLAN OF WORK

SCALE:
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0 37.5 75 Meters

SHEET:
2

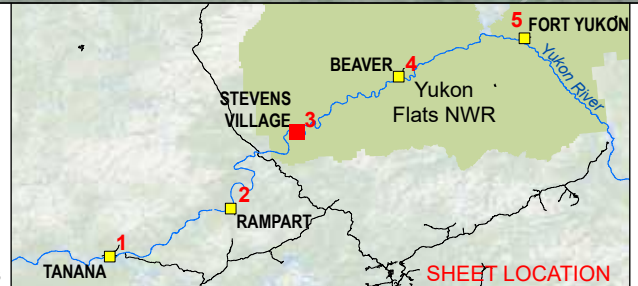
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Notes:
Meridian - Fairbanks

Segment 1 Alignment (Install Type)		DCRA Community Profile - Line	
Scratch Plow	Proposed BMH and HDD Location	Boundary	ParcelEasement
Canyon Bypass (Terrestrial)	Proposed HDD Bore Alignment	ParcelUnsurveyed	PlanOther
Jet Plow	Communication Shelter	Centerline	Structure
	DCRA Community Profile - Point Location	CenterlineEasement	StructureOther
		Control	Utility
		Hazard	
		Parcel	

Note: Longer HDD Borings may need to be completed in two segments



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APPENDIX E
ALASKA FIBEROPTIC PROJECT
SEGMENT 1 COMMUNITY MAPSET
STEVENS VILLAGE
ALASKA FIBEROPTIC PROJECT SEGMENT 1 - PLAN OF WORK

SCALE:
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 0 37.5 75 Meters

SHEET:
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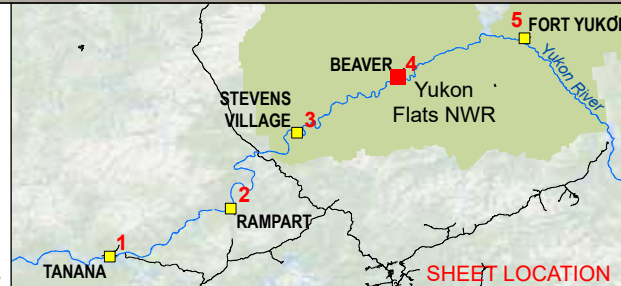
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Notes:
Meridian - Fairbanks

Segment 1 Alignment (Install Type)		DCRA Community Profile - Line	
Scratch Plow	Proposed HDD Bore Alignment	Boundary	PlanOther
Canyon Bypass (Terrestrial)	Communication Shelter	Centerline	Structure
Jet Plow	DCRA Community Profile - Point Location	Hazard	StructureOther
		Parcel	Utility
		ParcelUnsurveyed	

Note: Longer HDD Borings may need to be completed in two segments



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APPENDIX E
ALASKA FIBEROPTIC PROJECT
SEGMENT 1 COMMUNITY MAPSET
BEAVER
ALASKA FIBEROPTIC PROJECT SEGMENT 1 - PLAN OF WORK

SCALE:
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0 37.5 75 Meters

SHEET:
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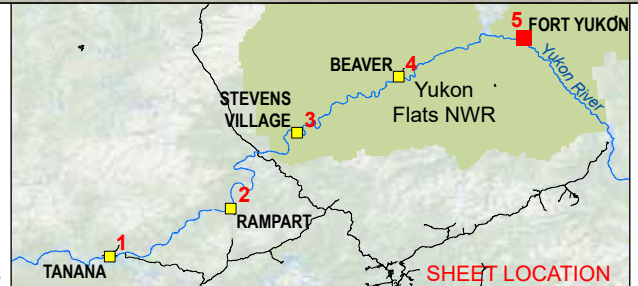
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Notes:
Meridian - Fairbanks

Segment 1 Alignment (Install Type)		DCRA Community Profile - Line	
Scratch Plow	Proposed BMH and HDD Location	Boundary	ParcelUnsurveyed
Canyon Bypass (Terrestrial)	Proposed HDD Bore Alignment	Centerline	PlanOther
Jet Plow	Communication Shelter	CenterlineEasement	Structure
	Proposed Connection to Communication Shelter	Parcel	StructureOther
	DCRA Community Profile - Point Location	ParcelEasement	Utility

Note: Longer HDD Borings may need to be completed in two segments



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APPENDIX E
ALASKA FIBEROPTIC PROJECT
SEGMENT 1 COMMUNITY MAPSET
FORT YUKON

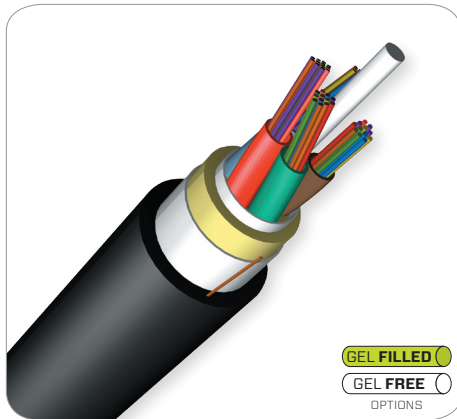
ALASKA FIBEROPTIC PROJECT SEGMENT 1 - PLAN OF WORK

SCALE:
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0 37.5 75 Meters

SHEET:
5

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APPENDIX F. ENGINEERING DETAILS (RIVER)



Flex-Span® ADSS Fiber Optic Cable

AFL Flex-Span All-Dielectric Self-Supporting (ADSS) cable is designed for aerial distribution power lines, as well as underground duct applications. As its name indicates, there are no metallic components and the cable does not require a support or messenger wire. Flex-Span ADSS cables are a single jacket design intended for the shorter pole-to-pole span lengths in a distribution environment. A broad combination of fiber counts and spans lengths in this product family provide network designers with flexibility in their cable selection.

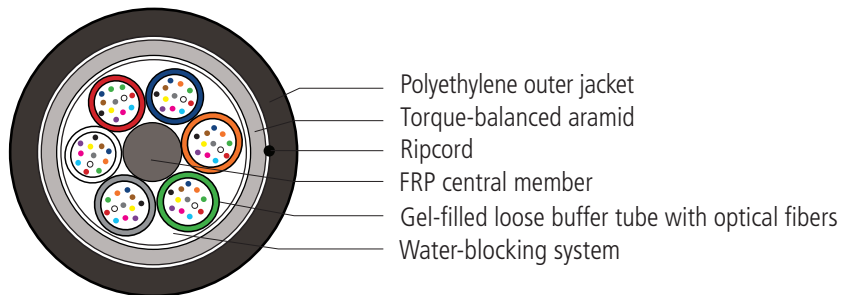
Features

- Gel-Filled Tubes are reverse-oscillated to allow slack for mid-span access – up to 288 fibers in cable
 - Gel-Free Buffer Tube options available – up to 216 fibers
- Pole-to-pole span lengths up to 1100 feet
- Single jacket design decreases the diameter and weight when compared to double jacket ADSS cable; thus reducing pole loading
- No separation requirement of ADSS from conductors per National Electric Safety Code (NESC) section 235

Applications

- Electric utility distribution power lines
 - Framed in supply or communications space
- Underground duct
- Enterprise OSP networks
- Fiber-to-the-X networks

Cable Components (Representative)



Optical Information

FIBER TYPE	MAXIMUM ATTENUATION (dB/km)				OVERFILL LAUNCH MIN. BANDWIDTH (MHz•km)		GIGABIT ETHERNET MINIMUM LINK DISTANCE (meters)	
	850 nm	1300 nm	1310 nm	1550 nm	850 nm	1300 nm	850 nm	1300 nm
(9) Single-mode	N/A	N/A	0.35	0.25	N/A	N/A	N/A	5000
(6) 62.5/125 GIGA-Link™ 300	3.5	1.2	N/A	N/A	200	600	300	550
(5) 50/125 GIGA-Link™ 600	2.9	0.9	N/A	N/A	500	500	600	600
(L) 50 Laser-Link™ 300	2.9	0.9	N/A	N/A	1500	500	900	550

Gigabit Ethernet Minimum Link Distances are based on "bandwidth"/modal dispersion constraints. Actual link distances may be constrained by attenuation, depending on specific loss budget.

continued
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Flex-Span® ADSS Fiber Optic Cable

Reel Information

ITEM	REEL A		REEL B		REEL C		REEL D		REEL E	
	inches	cm	inches	cm	inches	cm	inches	cm	inches	cm
Reel Height	42	106.7	58	147.3	66	167.6	72	167.6	84	213.4
Reel Width Outside	36	91.4	38	96.5	42	106.7	42	106.7	40	101.6
Reel Width Inside	32	81.6	32	81.3	36	91.4	36	91.4	34	86.4
Drum Diameter	23	58.7	28	71.1	36	91.4	36	91.4	35	88.9
Arbor Hole Diameter	3	7.9	3	7.9	3	7.9	3	7.9	3	7.9
Reel Weight with Lagging	180 lbs	82 kg	420 lbs	191 kg	685 lbs	311 kg	710 lbs	311 kg	950 lbs	431 kg

AFL provides ADSS cable on several standard sizes of non-returnable wooden reels. Non-standard reel sizes are available upon request.

Typical Maximum Lengths

CABLE DIAMETER	REEL CAPACITY	
	feet	meters
< 0.85" (21.6 mm)	23,000	7,000

NOTE: Longer lengths may be available upon request.

Recommended Products for ADSS Fiber Optic Cable

DESCRIPTION	AFL NO.
Fiber Optic Cable Accessories	
ADSS Formed Wire Deadends	Refer to the ADSS Formed Wire Deadends spec sheet for specific AFL No.
ADSS Suspension Unit	Refer to the ADSS Suspension Unit spec sheet for specific AFL No.
ADSS Trunnion Assemblies	Refer to the ADSS Trunnion Assemblies spec sheet for specific AFL No.
ADSS Temporary Grip	Refer to the ADSS Temporary Grip spec sheet for specific AFL No.
AGC Downlead Clamp for ADSS	Refer to the AGC Downlead Clamp for ADSS spec sheet for specific AFL No.
AVD Series Spiral Vibration Dampers	Refer to the AVD Series Spiral Vibration Dampers spec sheet for specific AFL No.
Coil Brackets	Refer to the Coil Brackets spec sheet for specific AFL No.
For more ADSS Cable Accessories, go to the ADSS Fiber Optic Cable Hardware web page	
Fiber Optic Splice Closures	
Apex® X-2 Sealed Splice Closure	Refer to the Apex X-2 spec sheet for specific AFL No.
Apex® X-2S Sealed Splice Closure	Refer to the Apex X-2S spec sheet for specific AFL No.

Temperature Specifications

TEMPERATURE RANGE	
Operation	-40°C to +70°C
Storage	-50°C to +70°C
Installation	-30°C to +70°C

Qualifications

GOVERNING BODY	STANDARD CODE	COMPONENT
IEEE	1222	Cable
TIA	598-D	Fiber

Contact AFL for your customized ADSS solution.

continued
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Fiber Optic Cable



Flex-Span® ADSS Fiber Optic Cable

NESC LIGHT @ 1.5% INSTALLATION SAG				
SPAN (ft)	AFL NO.	WEIGHT (lbs/ft)	DIAMETER (inches)	MRCL (lbs)
48 FIBERS				
700	AE048★W520AA4	0.049	0.382	698
1050	AE048★W520EA3	0.052	0.390	1089
72 FIBERS				
700	AE072★O620A08	0.080	0.484	913
1050	AE072★O620EA1	0.083	0.492	1338
96 FIBERS				
700	AE096★O620A08	0.082	0.484	913
1050	AE096★O620EA1	0.085	0.492	1338
144 FIBERS				
700	AE144★O620A08	0.085	0.484	913
1050	AE144★O620EA1	0.087	0.492	1338
288 FIBERS				
700	AE288★OC20EA0	0.185	0.732	1594
800	AE288★OC20EA3	0.187	0.736	1780

NESC MEDIUM @ 1.5% INSTALLATION SAG				
SPAN (ft)	AFL NO.	WEIGHT (lbs/ft)	DIAMETER (inches)	MRCL (lbs)
48 FIBERS				
500	AE048★W520AA4	0.049	0.382	698
700	AE048★W520EA3	0.052	0.390	1089
72 FIBERS				
500	AE072★O620A08	0.080	0.484	913
700	AE072★O620EA1	0.083	0.492	1338
96 FIBERS				
500	AE096★O620A08	0.082	0.484	913
700	AE096★O620EA1	0.085	0.492	1338
144 FIBERS				
500	AE144★O620A08	0.085	0.484	913
700	AE144★O620EA1	0.087	0.492	1338
288 FIBERS				
500	AE288★OC20EA0	0.185	0.732	1594
700	AE288★OC20EA3	0.187	0.736	1780

NESC HEAVY @ 1.5% INSTALLATION SAG				
SPAN (ft)	AFL NO.	WEIGHT (lbs/ft)	DIAMETER (inches)	MRCL (lbs)
48 FIBERS				
300	AE048★W520AA4	0.049	0.382	698
450	AE048★W520EA3	0.052	0.390	1089
72 FIBERS				
300	AE072★O620A08	0.080	0.484	913
450	AE072★O620EA1	0.083	0.492	1338
96 FIBERS				
300	AE096★O620A08	0.082	0.484	913
450	AE096★O620EA1	0.085	0.492	1338
144 FIBERS				
300	AE144★O620A08	0.085	0.484	913
450	AE144★O620EA1	0.087	0.492	1338
288 FIBERS				
300	AE288★OC20EA0	0.185	0.732	1594
450	AE288★OC20EA3	0.187	0.736	1780

NOTE: Diameter and weight subject to change without notice.

★ Fiber Types – Replace asterisk (★) in AFL number with number corresponding to desired fiber type below.

9 = Single-mode

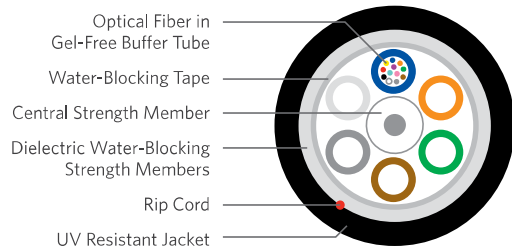
5 = 50/125 μm multimode GIGA-Link™ 600

6 = 62.5/125 μm multimode GIGA-Link™ 300

L = 50/125 μm multimode Laser-Link™ 300

Dri-Lite® Loose Tube Single Jacket All Dielectric

Series 11D



SPECIFICATIONS

Fiber Count Available in 6-fiber up to 432-fiber

Standards Compliance Telcordia® GR-20-CORE
RDUP PE-90 Designation MLT
ICEA S-87-640-2011
RoHS-compliant

Telcordia is a registered trademark of Ericsson Inc.

ENVIRONMENTAL SPECIFICATIONS

Operation/Storage -40°C to +70°C

Installation -30°C to +70°C

PART NUMBER KEY

1	1	–	–	–	x	D	0	y
1	2	3	4	5	6	7	8	9
Product family	Fiber count (006–432)			Fiber type	Internal designator	Water block/marking (1-8)		

Contact Customer Service for availability of non-standard offerings.

PRODUCT DESCRIPTION

Loose tube cables are the product of choice as the backbone in Outside Plant (OSP) environments. The durable loose tube design offers reliable transmission performance over a broad temperature range. Optical fibers and water-blocking elements are placed inside gel-free buffer tubes. The core is constructed by stranding the buffer tubes around a central member using a reverse oscillating lay (ROL). The core is wrapped with flexible strength members covered with a water-blocking tape, then encased with a black jacket. A rip cord is included under the jacket for ease of entry.

APPLICATIONS

- Underground duct and lashed aerial
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Available with up to 432-fiber
- Multiple fiber types including composites
- Central strength members available in metallic or dielectric
- Dry (SAP) core standard
- Standard tube size for all fiber counts
- Gel-free tubes

BENEFITS

- High fiber density
- Multiple network applications
- Metallic option offers ease of location, dielectric design eliminates grounding issues
- Reduces cable prep and installation time
- Reduces the number of tools required
- Speeds fiber access and cleanup

PART NUMBERS AND PHYSICAL CHARACTERISTICS

Part Number ¹	Fiber Count	Nominal Diameter in (mm)	Approx. Weight lbs/kft (kg/km)	Maximum Tensile Loading		Minimum Bend Radius	
				Install lbs (N)	Long Term lbs (N)	Install in (mm)	Long Term in (mm)
11006xD0y	6	0.41 (10.3)	47 (70)	600 (2,700)	200 (890)	8.2 (206)	4.1 (103)
11012xD0y	12	0.41 (10.3)	47 (70)	600 (2,700)	200 (890)	8.2 (206)	4.1 (103)
11024xD0y	24	0.41 (10.3)	47 (70)	600 (2,700)	200 (890)	8.2 (206)	4.1 (103)
11036xD0y	36	0.41 (10.3)	47 (70)	600 (2,700)	200 (890)	8.2 (206)	4.1 (103)
11048xD0y	48	0.41 (10.3)	47 (70)	600 (2,700)	200 (890)	8.2 (206)	4.1 (103)
11060xD0y	60	0.41 (10.3)	47 (70)	600 (2,700)	200 (890)	8.2 (206)	4.1 (103)
11072xD0y	72	0.43 (11.0)	61 (91)	600 (2,700)	200 (890)	8.6 (220)	4.3 (110)
11096xD0y	96	0.50 (12.7)	79 (118)	600 (2,700)	200 (890)	10.0 (254)	5.0 (127)
11144xD0y	144	0.63 (16.0)	124 (185)	600 (2,700)	200 (890)	12.6 (320)	6.3 (160)
11192xD0y	192	0.69 (17.6)	177 (264)	600 (2,700)	200 (890)	13.8 (352)	6.9 (176)
11216xD0y	216	0.63 (16.0)	120 (179)	600 (2,700)	200 (890)	12.6 (320)	6.3 (160)
11288xD0y	288	0.74 (18.9)	161 (240)	600 (2,700)	200 (890)	14.8 (378)	7.4 (189)
11432xD0y	432	0.82 (21.0)	121.9 (181.5)	600 (2,700)	200 (890)	16.4 (420)	8.2 (210)

FIBER TYPES:

SINGLE MODE

Reduced Water Peak Zero Water Peak TeraFlex® Bend Resistant
G.657.A1 G.657.A2 G.657.B3 NZDS LEAF

¹Replace "x" with:

3 2 K J L 8 S

See "Optical Fiber Specifications" in the "Technical Info" section for detailed fiber type specifications.

MULTIMODE

TeraGain® TeraFlex Bend Resistant Laser Optimized 50/125
62.5/125 10G/150 10G/300 10G/550

6 M N P

WATER BLOCK AND JACKET PRINT CODES

Dry core Dry core special

Feet Meters Feet Meters

¹Replace "y" with: 1 2 5 6

Product Datasheet

fiber optic cable: InWater Submersible SST GSW2 48 Ultra 50kN

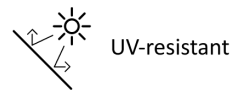
Order information

Design	Part number
InWater Submersible SST GSW2 48 Ultra 50kN	565033

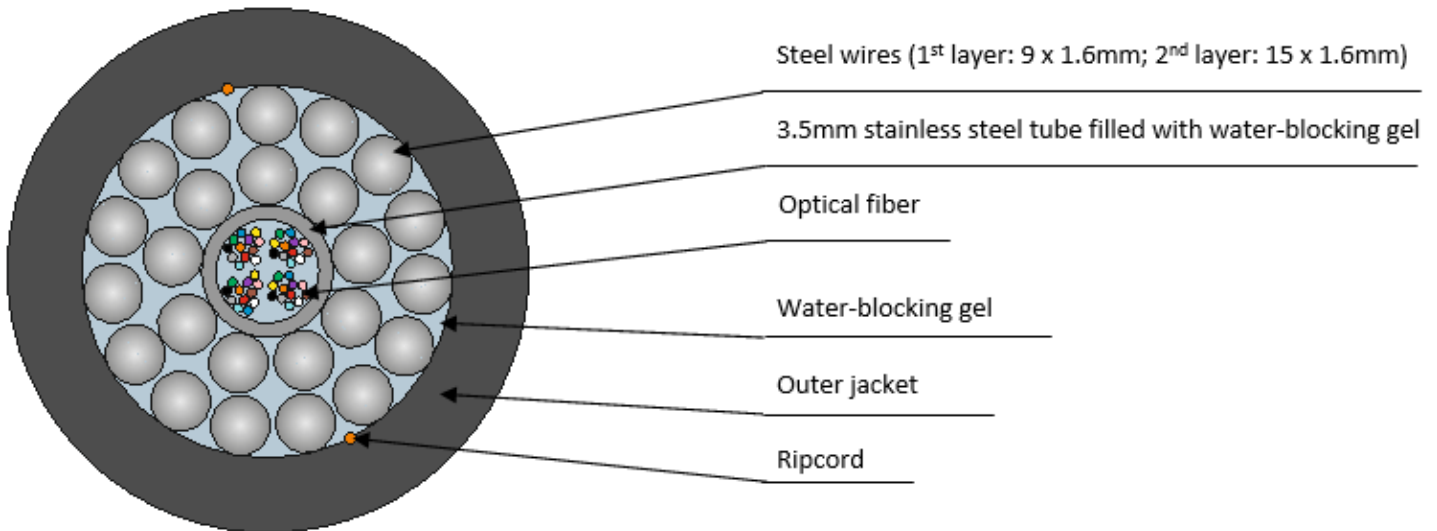
Other fiber counts available upon request

Typical application and features

- Multi-purpose outdoor installation including harsh environment
- Direct buried installation
- Underwater installation



Design



Color identification is according to ANSI/TIA-598-D-2014

1 Blue	2 Orange	3 Green	4 Brown	5 Slate	6 White	7 Red	8 Black	9 Yellow	10 Violet	11 Rose	12 Aqua
13 Blue 1 ring	14 Orange 1 ring	15 Green 1 ring	16 Brown 1 ring	17 Slate 1 ring	18 White 1 ring	19 Red 1 ring	20 Natural 1 ring	21 Yellow 1 ring	22 Violet 1 ring	23 Rose 1 ring	24 Aqua 1 ring
25 Blue 2 rings	26 Orange 2 rings	27 Green 2 rings	28 Brown 2 rings	29 Slate 2 rings	30 White 2 rings	31 Red 2 rings	32 Natural 2 rings	33 Yellow 2 rings	34 Violet 2 rings	35 Rose 2 rings	36 Aqua 2 rings
37 Blue 3 rings	38 Orange 3 rings	39 Green 3 rings	40 Brown 3 rings	41 Slate 3 rings	42 White 3 rings	43 Red 3 rings	44 Natural 3 rings	45 Yellow 3 rings	46 Violet 3 rings	47 Rose 3 rings	48 Aqua 3 rings

Color identification of the binding yarns for bundles 1-4 of 12 fibers:



Other colors upon request

Cable marking example

Marking is made on each 2 feet of cable

00001 FT = INCAB OPTICAL CABLE = 565033 InWater Submersible SST GSW2 48 Ultra 50 kN 2023							
1	2	3	4	5	6	7	8
1	Length marking unit			5	Fiber count		
2	Manufacturer			6	Fiber type		
3	Part number			7	Maximum rated design tension		
4	Cable trade name			8	Year of production		

Additional information upon request. Marking can also be in meters.

Design details

Fiber count		48
Loose tube diameter	in (mm)	0.138 (3.5)
Outer jacket thickness	in (mm)	0.079 (2.0)
Cable diameter ± 0.008 (0.2)	in (mm)	0.547 (13.9)
Cable weight	lb/ft (kg/km)	0.335 (498)

Other design upon request

Optical fiber

Fiber type	«Ultra»	
Product name	Corning SMF 28® ULTRA	
ITU-T Recommendation	G.652.D + G.657.A1	
Transmission Specifications		
Attenuation in the cable (dB/km)*:		
1310 nm wavelength (Typical** / Max.)	0.32 / 0.34	
1550 nm wavelength (Typical** / Max.)	0.19 / 0.20	

* Local attenuation discontinuities caused by cable winding on a reel are allowed

** Typical attenuation is the real level of optical attenuation of at least 90% fibers after cabling

Additional information about optical fiber at www.incabamerica.com

Operating parameters

Maximum rated design tension	11,242 lb (50 kN)	
Crush	571 lbf/in (1 kN/cm)	
Operating temperature	-58°F...+158°F	-50°C...+70°C
Installation temperature	-22°F...+122°F	-30°C...+50°C
Transportation and storage temperature	-58°F...+158°F	-50°C...+70°C
Minimum bending radius	15 x cable diameter	
Design life	25 years (per fiber supplier)	

Reel capacity

Standard maximum reel length*	20,000 ft	6,098 m
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*Longer length may be possible upon request

Performance standard

Complies with applicable ANSI/ICEA S-87-640 and Telcordia GR-20 CORE Issue 4 requirements

Reel packing and marking

Cables are supplied on non-returnable wooden reels. Reel diameter is not less than 40 diameters of the cable. Not less than 2 m of inside end of the cable is fixed to the reel flange. The cable ends are sealed with waterproof covers.

The label on the outer reel flange contains the following information: cable type, customer's name and PO, reel number, production date, cable length, cable weight net/gross.

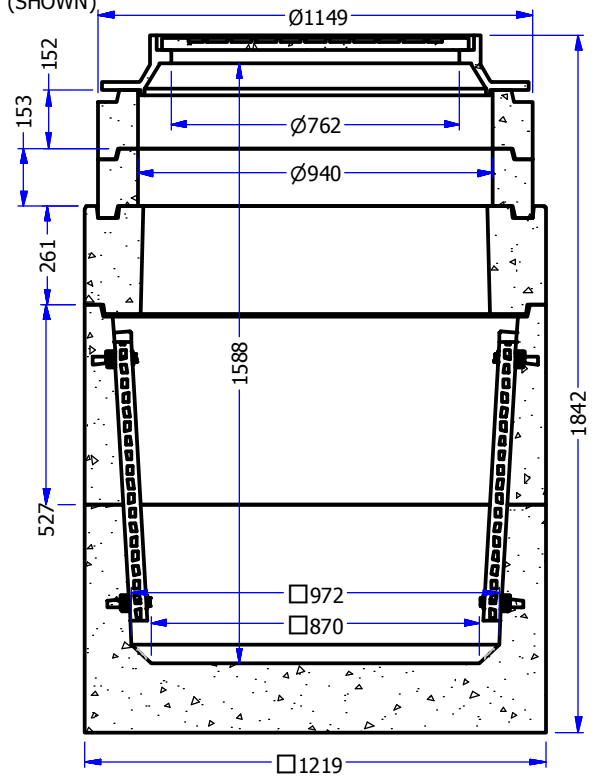
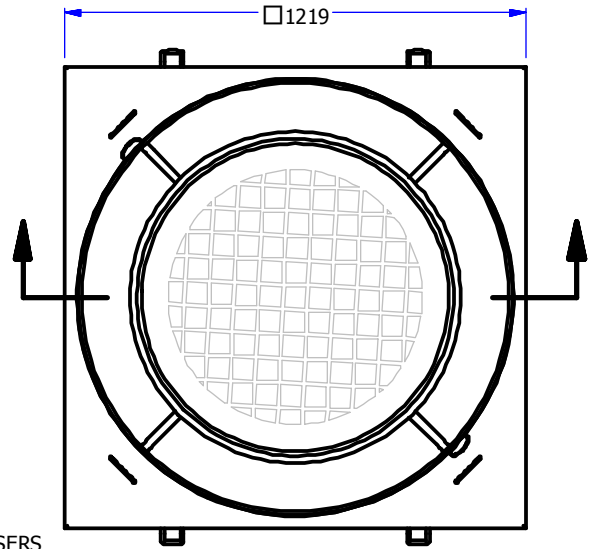
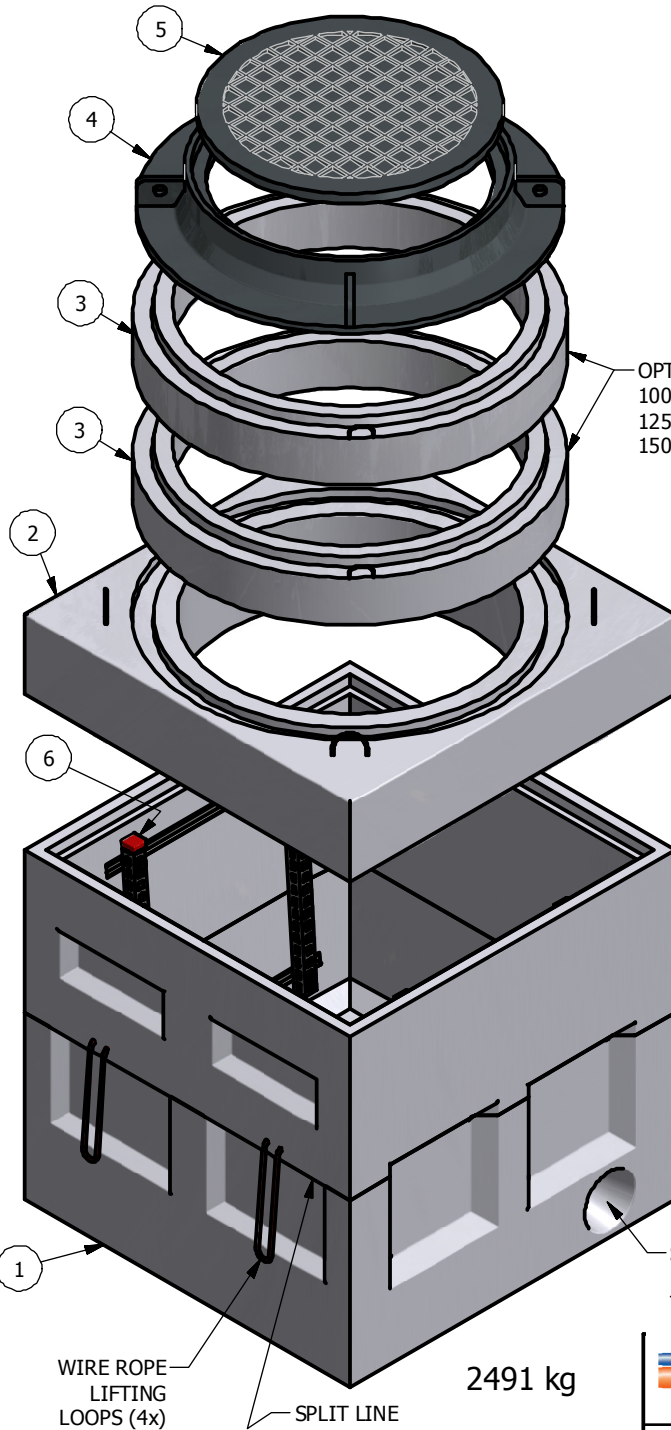
The following information is printed on the reel flange: manufacturer's name and website, rotation direction, cable end indication, shipping and handling summary, labels "Fragile" and "Handle with care".

Our cable passport shows: cable type, technical standard number, cable length, fiber type, fiber coloring, fibers per tube, tube identification coloring, final attenuation for all fibers, refractive index of the fiber, fiber manufacturer and production date.

Cable passport is affixed to the inner flange. Additional information can be included on the passport upon request.

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#	PART #	DESCRIPTION	CODE #	KG
1	1.2M CV KO S	1.2m COMMUNICATIONS VAULT w/ KNOCKOUTS - SPLIT	16517	1470
2	1.2M MHL	1.2m MANHOLE LID	16529	522
3	VRR ø915x6	6" VAULT RISER RING	16619	122
4	TR42B FRAME	CAST IRON FRAME	20332	145
5	TR42	CAST IRON COVER	20331	100
6	1.2M CRK	1.2M CABLE RACK KIT	16508	9



- PRODUCT MANUFACTURED IN ACCORDANCE WITH CSA A23.4
- STEEL PRODUCTS MANUFACTURED UNDER CSA W47.1 IN ACCORDANCE WITH CSA W59
- MIN CONCRETE STRENGTH AT 28 DAYS: 35 MPA
- GRADE 400 REBAR REINFORCEMENT
- DESIGNED FOR ROADWAY USE - BCL625 H20 LIVE LOADING

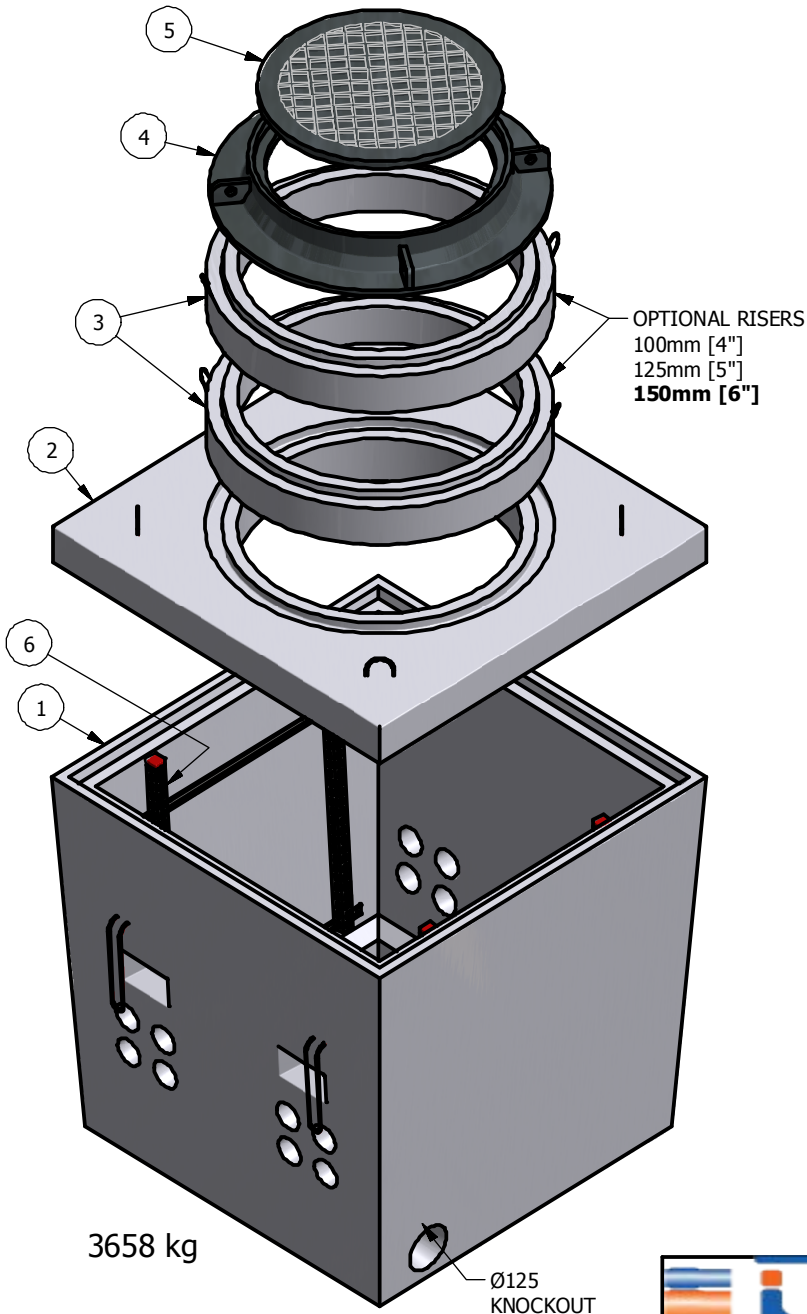


444 Chilcote Road
Kamloops, BC, V2H 1G3
deltahdconduit.ca
TEL: 250-372-9424
TF: 1-888-207-0211
info@deltahdconduit.ca

1.2M COMMUNICATIONS VAULT w/ KNOCK OUTS - SPLIT COMPLETE ASSEMBLY

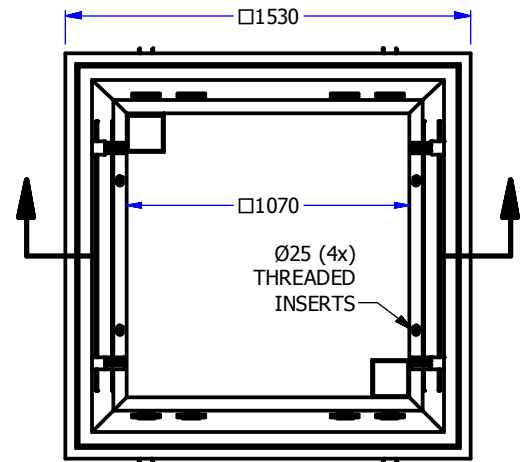
SIZE	DRAWING #	REV	SHEET
A	1.2M CV KOS C		1/1

#	PART #	DESCRIPTION	CODE #	KG
1	1.5M CV DT	1.5m COMM VAULT w/ KNOCKOUTS	16583	2463
2	1.5M MHL	1.5M MANHOLE LID	16604	693
3	VRR $\phi 915 \times 6$	6" VAULT RISER RING	16619	122
4	TR42B FR	CAST IRON FRAME	20332	145
5	TR42	CAST IRON COVER	20331	100
6	1.5M CRK	CABLE RACK KIT	16580	13

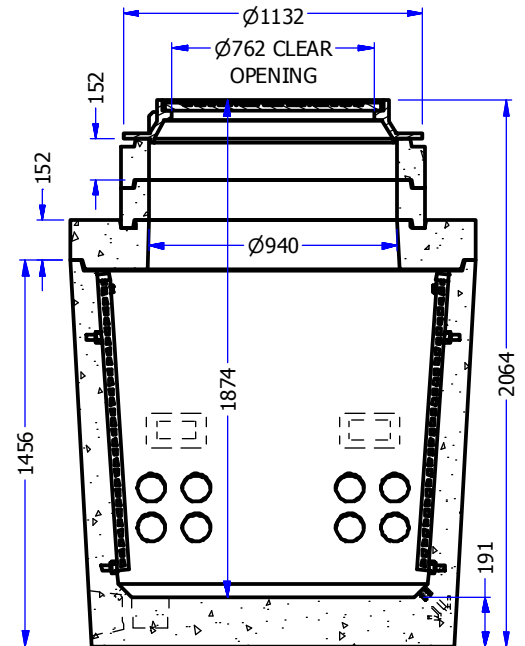


3658 kg

$\phi 125$
KNOCKOUT



COVERS REMOVED FOR CLARITY



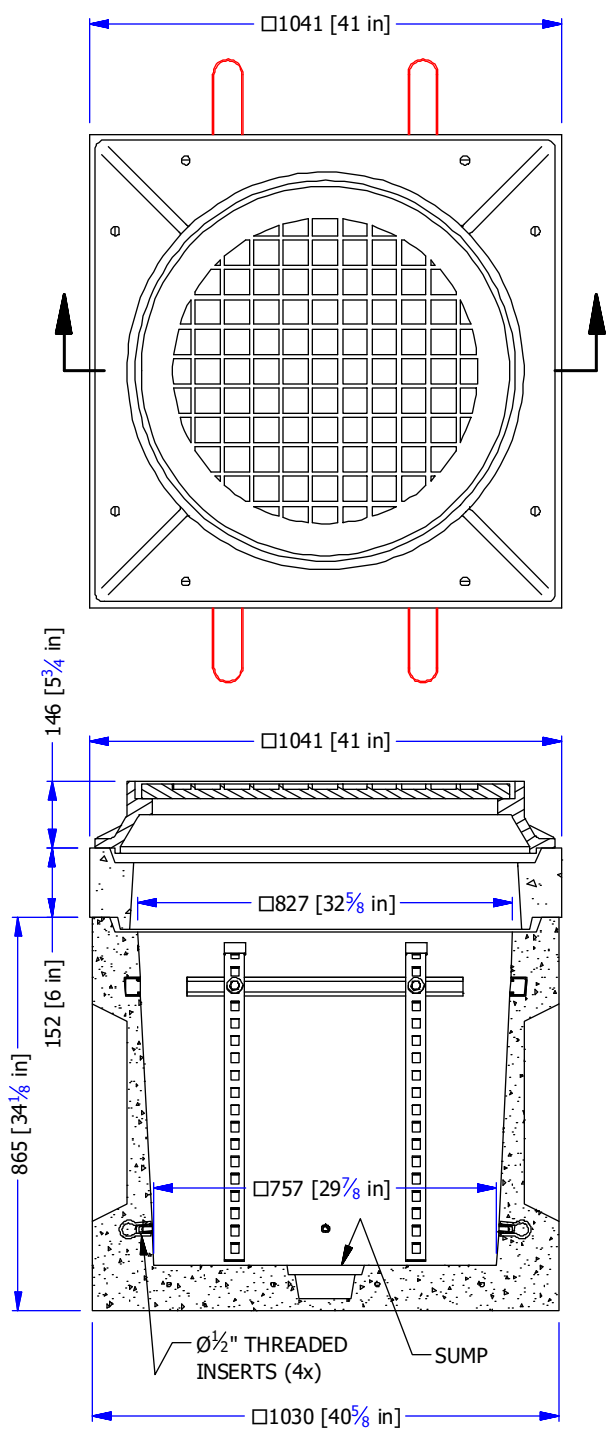
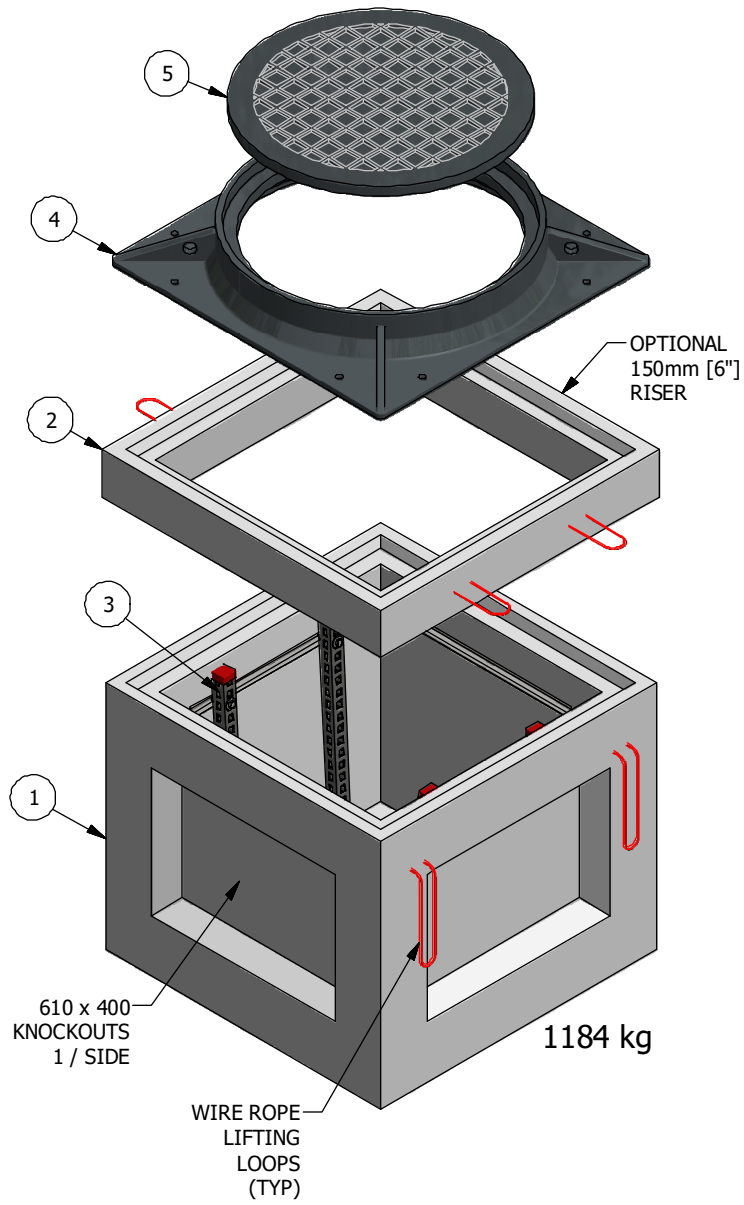
- PRODUCT MANUFACTURED IN ACCORDANCE WITH CSA A23.4
- STEEL PRODUCTS MANUFACTURED UNDER CSA W47.1 IN ACCORDANCE WITH CSA W59
- MIN CONCRETE STRENGTH AT 28 DAYS: 35 MPA
- GRADE 400 REBAR REINFORCEMENT
- DESIGNED FOR BCL625 H20 LIVE LOADING
- CAST IRON FRAME & COVER: BCL625 H20 LIVE LOAD RATED



1.5m COMMUNICATIONS VAULT DUCT TERMINATORS w/ MANHOLE LID COMPLETE ASSEMBLY

SIZE	DRAWING #	REV	SHEET
A	1.5M CV DT MH		1/1

#	PART #	DESCRIPTION	ITEM #	KG
1	4040 B	4040 SERVICE BOX BASE UNIT	16297	803
2	4040 R150	4040 RISER 150 [6"]	16292	123
3	P16F-700 KIT	4040 CABLE RACK KIT	16280	8
4	TR42SF	CAST IRON SQUARE FRAME	20341	150
5	TR42 COVER	CAST IRON COVER TR42	20331	100



- PRODUCT MANUFACTURED IN ACCORDANCE WITH CSA A23.4
- STEEL PRODUCTS MANUFACTURED UNDER CSA W47.1 IN ACCORDANCE WITH CSA W59
- MIN CONCRETE STRENGTH AT 28 DAYS: 35 MPA
- GRADE 400 REBAR REINFORCEMENT
- DESIGNED FOR BCL625 H20 LIVE LOADING

324 Mt. Paul Way
Kamloops, BC V2H 1A6
deltahdconduit.ca

TEL: 250-372-9424
TF: 1-888-207-0211
info@deltahdconduit.ca

TITLE

4040 SERVICE BOX WITH 150 RISER CAST IRON MANHOLE LID COMPLETE

SIZE	SHOP DRAWING	REV	SHEET
A	4040 SB MH C		1/1

Date: 8/27/20

Customer: ACS Alaska

3453 TRUCK STREET • FAIRBANKS, ALASKA 99709
Phone: (907) 456-3733 • Fax: (907) 456-1672
info@summitlogisticsalaska.com
www.summitlogisticsalaska.com

10'x10' Communications Shelter

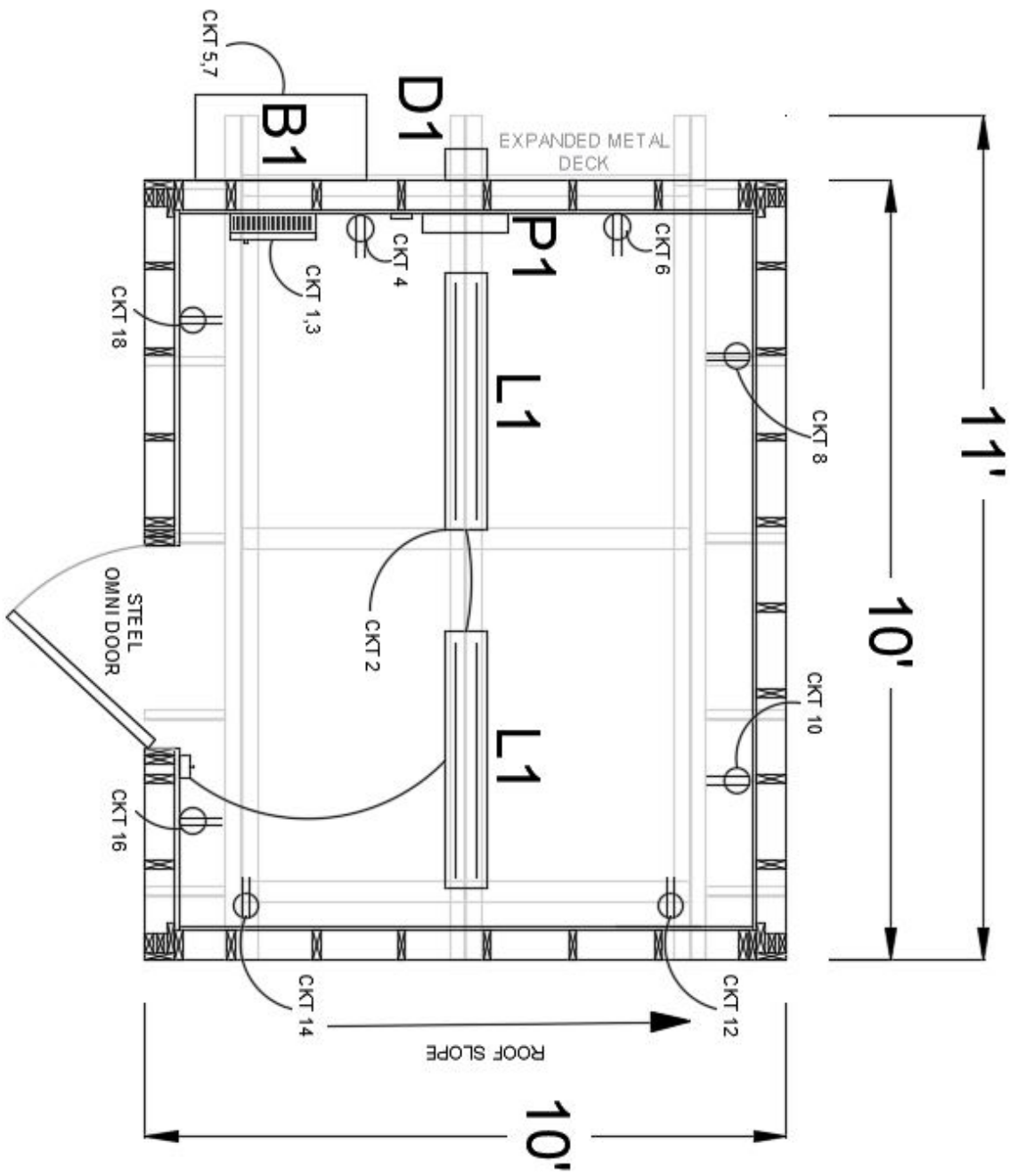
- 8'-8" Wide x 8'8" Long x 8' Tall Interior Dimensions
- Unit Shell construction
 - Skid: 11' Triple 6" H-Beams with Pipe Cross-members and 4" C-Channel Rim Support
 - Flooring: 2"x 8" on 12" centers, 1-1/8" T&G subfloor, and 80 mils Polyurea HT100
 - Flooring Reinforcement: Extra 2x8 blocking over each steel main rail.
 - Wall: 3/8" CDX sheathing, 2"x 6" on 16" center, and interior 3/4" T&G Plywood
 - Ceiling: Tapered 2x12 tapered to 2x8 on 16" center with 3/4" T&G Interior Sheathing
 - Roof: 1/2" cdx plywood, Rubber Membrane, 1"x4" Furring Strips with steel roofing
 - Insulation: 5" Envelo-Seal 2.0 Spray Foam insulation; R38
 - Exterior Siding: 29-Gauge metal siding with custom trim
 - SeamlessAlaska Colors: Stone for siding, Tahoe Blue for trim and roof.
 - Exterior door: 36" steel framed insulated Steel door with Schlage keyed entry
- NEC Approved Electrical System
 - Electrical Service: 200A 240V 1P3W Square D exterior disconnect and interior load center. Disconnect Model: Q23225NRB; Panel Model: QO130L200PG
 - Interior Lighting: 4' Lithonia LBL4 LED fixtures [qty 2]
 - Heat: 4000-Watt, wall flush mounted electric heaters [qty 1]
 - HVAC: Bard 1.5-Ton AC unit with 5 KW Heat Strip and Economizer
 - Control: Digital Hardwired Thermostat
 - Outlets: Commercial grade 120V/20A duplex receptacles [qty 8]
 - XHHW wiring in surface mounted conduit
- Delivery:
 - Deliver Module within city limits of Delta, Junction
 - Adequate gravel pad with access point provided by others

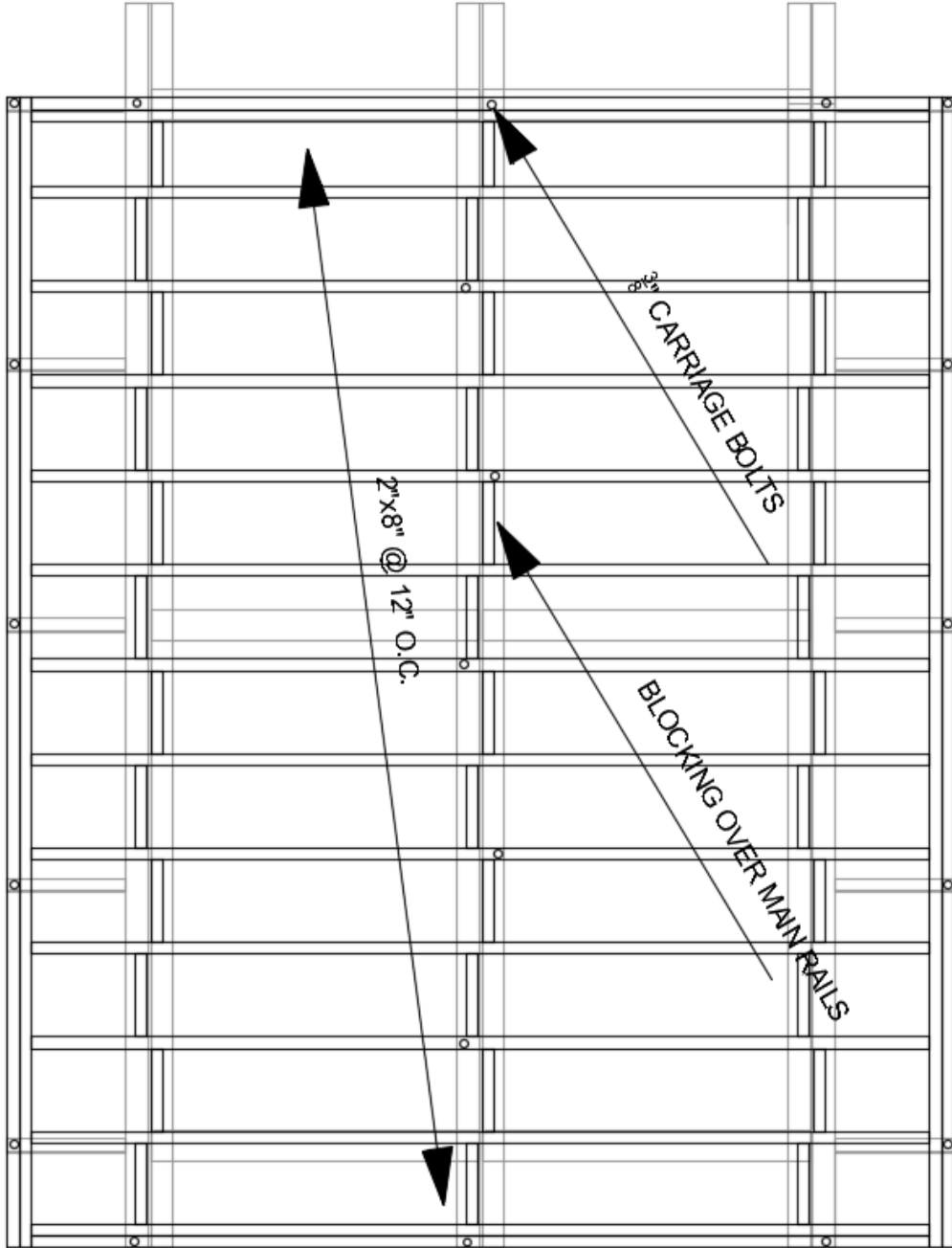
Purchase Price for ONE 10x10 Communication Shelter: \$ 24,200

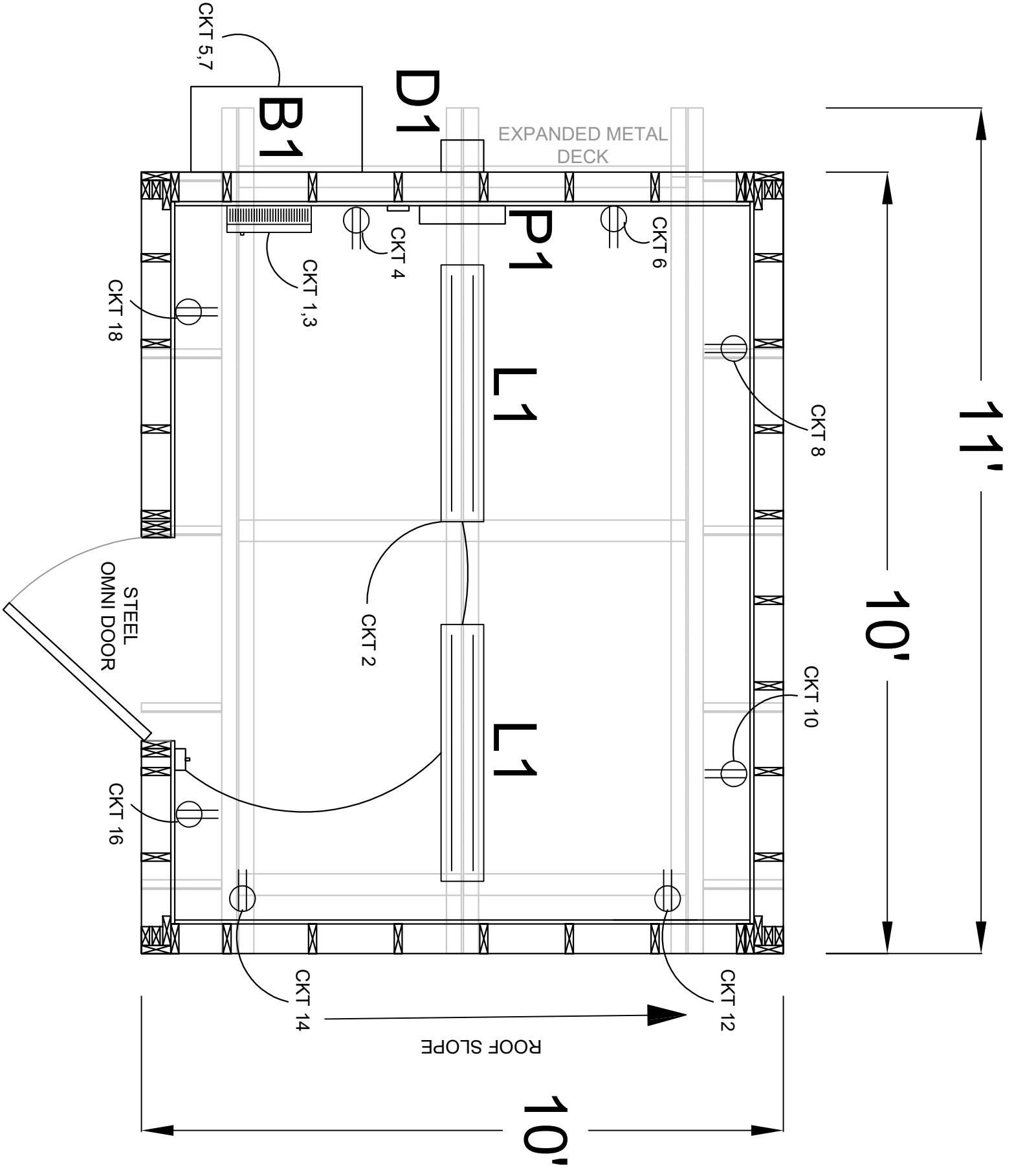
FOB 3453 Truck Street Fairbanks, Alaska 99709.

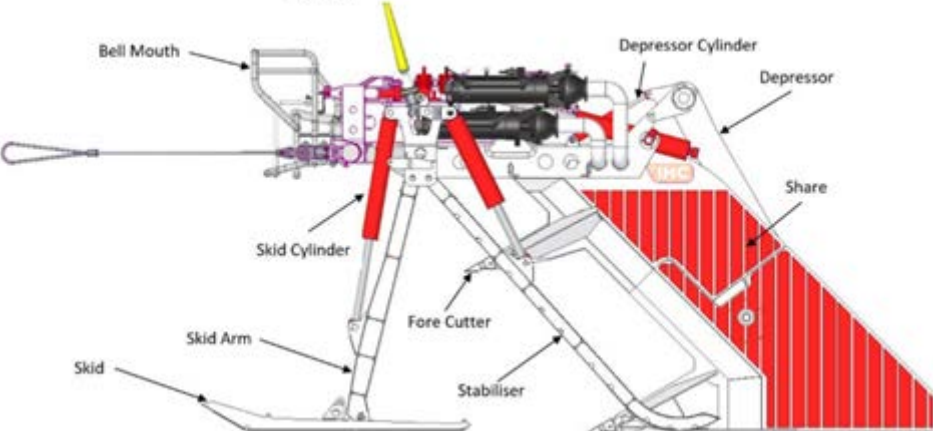
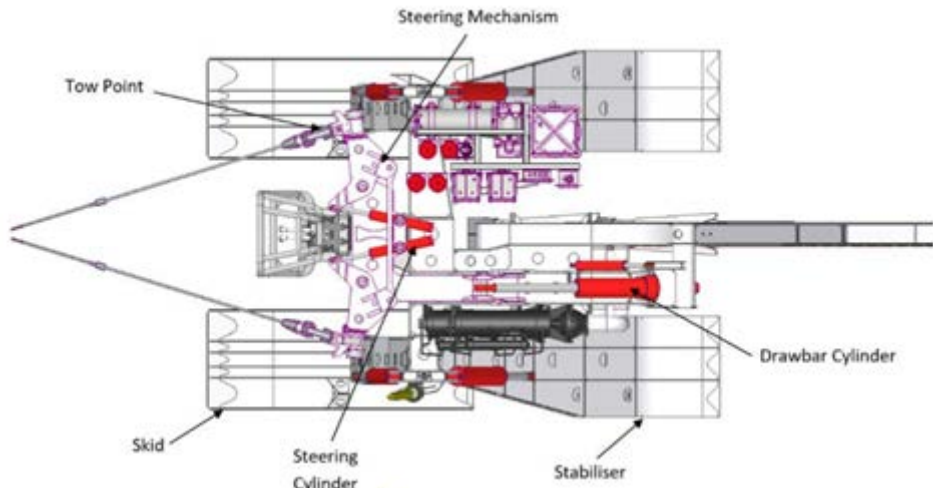
Payment terms, net 30.

Availability: Depends on selected BARD AC unit









APPENDIX G. PRELIMINARY ENVIRONMENTAL RESEARCH

Preliminary Environmental Research Overview

This Preliminary Environmental Overview provides a desktop review of known environmental resources within the project vicinity.

Land Use

Land use within the project area has been divided into two corridors. The terrestrial corridor and the river corridor. Preliminary review of land ownership within each of these corridors is outlined below. Consultation with various landowners and regulators is expected as part of the proposed project.

Terrestrial Corridor

The proposed work is anticipated to occur within the existing utility ROWs along the Old Steese Highway, Steese Highway, Elliott Highway, and Dalton Highway. The land ownership/land management of the route includes the Bureau of Land Management (BLM), Department of Transportation & Public Facilities (DOT&PF), State of Alaska Department of Natural Resources (DNR), Alaska Mental Health Trust Land Office, Fairbanks NorthStar Borough, City of Fairbanks, and private ownership. The following land use permits and authorizations are anticipated:

- BLM Standard Form 299
- DNR – Division of Mining Land and Water (MLW) Public Easement application
- DOT&PF Easement and Utility Permits

River Corridor

This corridor includes all work within the Yukon River, the canyon bypass, and the five communities included in the project. The entire river bottom is submerged land owned by the State of Alaska and managed by the DNR–MLW. A public easement application will be submitted to DNR-MLW for proposed work in the Yukon River. Landownership along the canyon bypass corridor is predominantly owned by the State of Alaska and managed by DNR-MLW. A small portion of the corridor crosses Native lands owned by Doyon, Limited.

Fiber optic shore landings within each of the five communities will primarily be on land managed by DOT&PF and the Federal Aviation Administration as well on tribal, native corporation or city lands. Additional consultation with communities is also expected and may determine the final location permanent infrastructure being installed within each community.

Subsistence

The Yukon River is used by residents for subsistence salmon and non-salmon species. Regulation and management of the Yukon River drainage for subsistence salmon follows the Yukon River Drainage Subsistence Salmon Fishery Management Protocol, which provides a framework for coordinated subsistence fisheries management between Alaska Department of Fish and Game (ADF&G) and the

federal subsistence management programs in the drainage. Due to low salmon runs, the Yukon River Inter-Tribal Fish Commission (YRITFC) with Tanana Chiefs Conference (TCC) was founded in 2014. Each community discussed in this project is represented by this commission.

Consultation with the TCC and other impacted communities is anticipated as part of the proposed project.

Right-of-Way

The proposed project involves placing a FOC within existing DOT& PF highway rights-of-way. A public easement within the Yukon River to place the FOC is also anticipated. Authorization from various federal, state, local, and private entities is anticipated.

Historic Properties, Archeological, and Cultural Resources

Desktop cultural resources surveys have been conducted for both the terrestrial and river corridors. In accordance with Section 106 of the National Historic Preservation Act, an Area of Potential Effect for the project will be developed, there will coordination with consulting parties (including the Alaska State Historic Preservation Officer), and a finding of effect will be made.

Floodplain and Regulatory Floodways

A review of the Federal Emergency Management Agency (FEMA) online flood maps indicated that portions of the project are located within mapped areas and unmapped areas (FEMA 2023). These areas are further defined within the terrestrial and river corridors.

Terrestrial Corridor

Review of FEMAs National Flood Hazard Layer Mapper Viewer, indicates mapped floodplains are located within the project corridor. Mapped floodplains are shown within the vicinity of Fairbanks until MP 31 of the Elliot Highway and are identified on the following Flood Insurance Rate Maps (FIRMs) (FEMA 2023):

- 02090C3440J
- 02090C3420J
- 0250090075F

Within these mapped areas, the FOC alignment is predominately located within Zone X, defined as a non-special flood hazard area with moderate to low flood risk. There are three mapped river crossings where the FOC passes through areas mapped as Zone A, defined as a special flood hazard area with a high flood risk. These areas include (FEMA 2023):

- Fox Creek (MP 0)
- Chatanika Creek (MP 11)
- Washington Creek (MP18.5)

Impacts at Goldstream and Chatanika creeks are not anticipated since the proposed FOC will be hung aerially on an existing utility pole. Horizontal direction drilling (HDD) will occur beneath Washington

Creek. Potential impacts to existing drainage patterns would be minimized during project design; accordingly, no adverse impacts to floodplains are anticipated.

River Corridor

Within the river corridor, there are no mapped floodplains except those in the community of Fort Yukon, which is mapped entirely as Zone AE. Zone AE is defined as a special flood hazard area with a high flood risk (FEMA 2023). Potential impacts to existing drainage patterns would be minimized during project design; accordingly, no adverse impacts to floodplains are anticipated.

Anadromous Streams and Essential Fish Habitat

Review of ADF&G’s Anadromous Water Catalog (AWC) identified the following anadromous streams within the entire project corridor (ADF&G 2023):

- Chatanika River (AWC Code 334-40-11000-2490-3151-4020). The Chatanika River contains the presence of Chum (*Oncorhynchus keta*), Coho (*O. kisutch*), and King (*O. tshawytscha*) salmon species. It is located near MP 14 on the Elliot Highway. The FOC will be hung aerially on existing utility poles. Impacts to this waterbody are not anticipated.
- Yukon River (AWC Code 334-40-11000). The Yukon River contains the presence of all five species of salmon in addition to the presence of arctic lamprey (*Lenthenteron camtschaticum*), broad whitefish (*Coregonus nasus*), least cisco (*C. sardinella*), humpback whitefish (*C. pidschian*), inconnu (sheefish) (*Stenodus leucichthys*), and Whitefish (undifferentiated).
- Garnet Creek (AWC Code 334-40-11000-2538). Garnet Creek contains the presence of Chum (*O. keta*) and King (*O. tshawytscha*), and well as humpback whitefish (*C. pidschian*).

HDD techniques will be used to cross under the Chatanika River and Garnet Creek and impacts to these waterbodies are not anticipated. The FOC will be placed in the thalweg of the Yukon River however the line will not carry current. Consultation with ADF&G to obtain a Fish habitat Permit under Title 16 of Anadromous Fish Act (AS 16.05.871-.901) is anticipated.

Review of the National Marine Fisheries Service’s (NMFS) Essential Fish Habitat (EFH) mapper did not identify EFH within the project area, however, it is known that Yukon River supports all five species of Pacific salmon (NMFS 2023). Consultation with the NMFS under Title 50, Code of Federal Regulations (CFR) 600.05 – 600.930 of the Magnuson-Stevens Fisheries Conservation and Management Act is anticipated.

Navigable Waters

Review of the U.S. Army Corps of Engineers (USACE) navigable waters listed identified the entire length of the Yukon River and the first 139 miles of the Chatanika River as navigable (USACE 2023a).

Review of DNR’s Navigable Water map identified Hess Creek as a navigable waterbody in addition to the Yukon and Chatanika rivers. DNR’s mapper also identified other creeks that cross the terrestrial corridor; however, their status is currently undetermined (DNR 2023a).

HDD techniques will be used to install the FOC under Hess Creek and the Chatanika River. Impacts to these navigable waters are not anticipated. The FOC will be placed in the Yukon River and consultation with USACE under Section 10 of the Rivers and Harbors Act is required. Consultation with DNR and the submittal of an easement throughout the river corridor is anticipated.

Wetlands and Other Waters of the U.S.

Review of the U.S. Fish and Wildlife Service (USFWS) Nationwide Wetlands Inventory (NWI) database identified numerous wetland complexes along the terrestrial and river corridors. Desktop wetland delineations throughout the project corridor will occur (USFWS 2023a). The project is not anticipated to involve dredge and/or fill within wetlands, however, temporary disturbance to install the FOC is anticipated. The proposed project is anticipated to be permitted under Nationwide Permit 57 – Electric Utility Line and Telecommunications Activities. Consultation with the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act is anticipated.

Below is a list of waterbodies within the project area.

Table 1: Waterbodies

Project Corridor	River	
Terrestrial Corridor	Little Blanche Creek	Tatalina River
	Engineer Creek	Bridge Creek
	Glenn Creek	Tolovana River
	First Change Creek	Cleary Creek
	Gilmore Creek	Ester Creek
	Fox Creek	Olive Creek
	Dome Creek	Livengood Creek
	Chatanika River*	Ready Bullion Creek
	Willow Creek	Rosebud Creek
	Washington Creek	Lost Creek
	Cushman Creek	Hess Creek
	Aggie Creek	Isom Creek
	Globe Creek	
River Corridor	Yukon River*	
Canyon Bypass Corridor	Garnet Creek*	Texas Creek
	Stevens Creek	Jordan Creek

Creeks with asterisks (*) are anadromous.

Threatened and Endangered Species

The USFWS’ Information of Planning and Consultation website and ADF&G Special Status Species websites were reviewed to determine if any threatened or endangered species or their habitats are located within or adjacent to the proposed project (USFWS 2023b, ADF&G 2023b). The proposed project is not anticipated to impact any threatened or endangered species and there is no designated critical habitat in the project area.

Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA). Numerous migratory bird species may travel through the proposed project area and may be disturbed by clearing operations. Vegetation clearing associated with the project is expected to follow U.S. Fish and Wildlife Service (USFWS) recommended time periods for avoiding vegetation clearing activities in the Interior Region as follows (USFWS 2017):

- Forest/Woodland and Shrub/Open Habitat: May 1 to July 15 with the exception that raptors may nest two or more months earlier than other birds and Canada geese and swans begin nesting April 20.

Bald and Golden Eagles

Bald and Golden Eagles are protected under the MBTA and the Bald and Golden Eagle Protection Act. The USFWS National Bald Eagle Guidelines, a minimum buffer of 660 feet, or as close as similar existing activities that are tolerated, should be maintained between the construction activity and the nest (USFWS 2007). Should an eagles' nests be identified within the project vicinity, USFWS will be consulted on how to proceed.

Invasive Species

Review of the University of Alaska Anchorage Exotic Plants Information Clearinghouse Invasive Plants (AKEPIC) Mapper indicated there are numerous non-native species infestations along the highway corridor and within each of the 5 communities (AKEPIC 2023). The project is anticipated to involve vegetation clearing and grubbing and ground disturbance. Prior to mobilization, the drilling rig will be thoroughly washed to prevent transmission of invasive plants in compliance with Executive Order 13112 (Invasive Species). Additionally, contractors will ensure that ground disturbing activities are minimized, and disturbed areas are re-vegetated with seed recommended for the region by DNR's A Revegetation Manual for Alaska.

Hazardous Waste

A search of the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Program database indicated that three active sites and five cleanup complete sites with institutional controls are located in the immediate vicinity (within 0.10-mile) of proposed activities (ADEC 2023a).

Hazard ID	Site Name	Status	Distance (mi) (from approximate roadway centerline)	Comments
Terrestrial Corridor				
24360	Tesoro #256 Fox General Store	Cleanup Complete - Institutional Controls	0.07	Located near MP 11 of the Elliot Highway.
4440	Dalton Highway Mile Post 7 Tanker Rollover	Cleanup Complete - Institutional Controls	20 feet	Located near MP 7.5 of the Dalton Highway. This is located within the DOT ROW

Hazard ID	Site Name	Status	Distance (mi) (from approximate roadway centerline)	Comments
3115	Alyeska PS 06 Jet Shed	Cleanup Complete - Institutional Controls	0.05	Located near MP 54 of the Dalton Highway at the Alyeska Pipeline Service Company facility.
1437	Alyeska PS 06 JP4 Fueling Facility	Cleanup Complete - Institutional Controls	0.05	Located near MP 54 of the Dalton Highway at the Alyeska Pipeline Service Company facility.
2965	Alyeska PS 06 Leach Field /Fuel Island	Active	0.10	Located near MP 54 of the Dalton Highway at the Alyeska Pipeline Service Company facility.
2529	Alyeska PS 06 Therminol Spill Site	Cleanup Complete - Institutional Controls	0.10	Located near MP 54 of the Dalton Highway at the Alyeska Pipeline Service Company facility.
Tanana				
2324	FAA Tanana Station	Active	0.10 feet	Site is located west of the proposed HDD, BMH, and Communications Shelter.

State Parks, National Parks, National Forests, Wild and Scenic Rivers

Terrestrial Corridor

A review of DNR’s Division of Parks and Outdoor Recreation identified the Lower Chatanika River State Recreation Area (LCSRA) within the terrestrial corridor of the project area (DNR 2023b). The fiber optic cable will be hung using existing poles within the vicinity of the LCSRA. Approximately 2.5 miles north of the LCSRA, near MP 14 of Elliot Highway, the FOC will transition to the ground. Impacts to the LCSRA are not anticipated.

River Corridor

A review of the U.S. National Park Service (NPS), U.S. Forest Service (USFS), USFWS websites identified the river corridor of the project is located adjacent to the Yukon Flats National Wildlife Refuge. No other State Refuges, National Wildlife Refuges, Critical Habitat Areas and Sanctuaries have been identified within the project area (NPS 2023, USFS 2023, & USFWS 2023c). Impacts to refuge lands are not anticipated. Project activities are limited to the Yukon River and all staging or potential offloading will occur within existing communities.

State Scenic Byway

The Dalton Highway is a State Scenic Byway that is managed by DOT&PF. The corridor planning document identifies the importance of subsistence hunting and access by the communities along the Yukon River. Construction operations should be aware of subsistence activities and impacts during construction operations. Proposed improvements are not anticipated to change the aesthetic of the byway nor permanently impact subsistence activities (DOT&PF 2010).

Air Quality

Review of the Alaska Department of Environmental Conservation (ADEC) Air Non-Point Mobile Source website indicated most of the proposed project is not in an air quality maintenance or non-attainment area for National Ambient Air Quality Standards (ADEC 2023b). The city of Fairbanks where the FOC originates, is located within maintenance areas for carbon monoxide and within a nonattainment area for particulate matter (PM_{2.5}). The proposed project is not anticipated to contribute to an overall decrease in air quality. The communities of Fort Yukon and Tanana are listed as communities experiencing issues with Particular Matter (PM₁₀) (ADEC 2023b).

Water Quality

Review of Alaska’s Final 2022 Integrated Water Quality Monitoring and Assessment Report (approved September 15, 2022) identified Goldstream Creek (AK_R_8030907_014_001), as an impaired waterbody due to turbidity, within the vicinity of the project. Goldstream Creek is listed under the Clean Water Act Section 303(d) list of impaired waterbodies in the vicinity of the project. Goldstream Creek is listed under Category 4a which is defined as having an Environmental Protection Agency-approved Total Maximum Daily Load plan in place and implemented (ADEC 2023c).

ADEC’s Map of Assess Waters also identified the Chatanika River, Hess Creek, and a portion of the Yukon river within the vicinity of the E.L. Patton Bridge as category 2 waterbody. This rating is defined as waterbodies that have enough information to determine that water quality standard are attained for all or some of the designated uses (ADEC 2023c).

Between Rampart and Tanana, a number of tributaries are listed as category 3 as well as the Yukon River itself, in the vicinity of Tanana. This rating is defined as waterbodies where there is not enough information to determine their status (ADEC 2023c).

Overall, the proposed project will not increase impervious surface area. It is anticipated that any storm water would be confined to the immediate construction area. Any storm water that did reach receiving waters is anticipated to be extremely small and would not affect the waterbodies’ attainment status under Section 303 of the Clean Water Act.

Estimated Ground Disturbance and Clearing Activities

Total ground disturbance is estimated to be greater than one acre. Accordingly, the project would require Alaska Pollutant Discharge Elimination System, Construction General Permit coverage. Ground disturbance would result from the installation of the FOC and any supporting permanent infrastructure.

References

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- USFWS. 2017. Timing Recommendations for Land Disturbance & Vegetation Clearing. Accessed October 6, 2023.
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APPENDIX H. PERMITTING MATRIX

Yukon Fiber Plan of Work - Regulatory Matrix

Regulatory Agency Category	Agency with Regulatory Primacy	Agency Division	Authorization, Permit, or Consultation Needed	Description of Activity Requiring Regulatory Permitting or Approval	Permit processing time from submittal to deemed complete by agency
Federal	National Oceanic and Atmospheric Administration (NOAA)	National Marine Fisheries Service (NMFS)	Essential Fish Habitat (EFH) Consultation	Construction activity in Pacific salmon-bearing streams - Yukon, Innoko, Kuskokwim rivers	90-180 days
	U.S. Army Corps of Engineers (USACE)	Regulatory Program and Permits	Clean Water Act, Section 404 Permit Anticipated to be completed with nationwide permit (NWP) 57 and a detailed Pre-construction Notification	Construction/installation in waters of the U.S. (WOTUS) - all wetland areas to be disturbed including dredging/filling activities and construction staging. Cannot import more than 1/2 acre.	180 days
		Regulatory Program and Permits	Rivers and Harbors Act, Section 10 Permit	Construction/installation in WOTUS - all rivers where cable will be installed	180 days
	US BLM	BLM	SF299 Right-of-Way	Required for the portions of the terrestrial installation that cross BLM managed lands.	
	US Fish and Wildlife	National Wildlife Refuge	National wildlife refuge system consultation - no permit needed but USFWS will have the opportunity to comment during the NEPA process and may have concerns or objections	Construction/installation occurring in and near wildlife refuges - route transects Yukon Flats, Yukon Delta, and to a lesser extent Innoko and Nowina (assumption is no terrestrial access or staging is needed during in-water cable installation)	90 days
	Federal Communications Commission (FCC)	Licensing	Request authority to construct, land, and operate a fiber optic system connecting points within Alaska	This is a requirement of installation and is not an expertise of Owl Ridge that will be completed by the operator of the fiber optic system. It requires an accompanying Letter of Assurance (LOA) to the Department of Homeland Security and potentially other federal agencies with jurisdiction in national security, law enforcement and public safety.	Unknown- 120 days and requires as built surveys.
State	Alaska Department of Environmental Conservation (ADEC)	Water	Clean Water Act, Section 401 consultation/certification	Construction/installation activities in waterways	30 days
		Water	Alaska Pollutant Discharge Elimination System (APDES) Storm Water Pollution Prevention Plan (SWPPP) authorization and permit	Stormwater runoff associated with construction/installation and staging activities	30-90 days
		Water	APDES - Water discharge permit	All segments that may require water discharge	90-180 days
		Solid Waste	Drilling waste monofil	ADF&G will require a mud management plan; ADEC will require a plan for the waste	30 days
	Alaska Department of Fish and Game (ADF&G)	Habitat Section	Title 16 Fish habitat permits with Mud Management Plan	Construction activity in fish-bearing streams - Yukon River.	90 days
		Wildlife Conservation	Public safety permit	Wildlife hazing - deterring wildlife interactions during construction/installation and staging activities	30 days
State (contd.)	Alaska Department of Natural Resources (ADNR)	Mining, Land and Water	Early entry authorization to easements	Easement entry authorization to conduct construction/installation and staging activities on state lands prior to final easement designation	180-270 days
		Mining Land and Water	Temporary water use authorization (TWUA)	Construction/installation activities requiring water withdrawal	90 days
		Mining Land and Water	Public easement		180-270 days
		Office of History and Archaeology	Section 106 consultation	All terrestrial construction land disturbance	30 days (unless field reconnaissance needed)
	Alaska Department of Transportation and Public Facilities (ADOT&PF)	Statewide Design & Engineering Services	Easement utility permit	Construction/installation and staging in terrestrial transition zones and construction/installation and staging within existing ROWs	90 days
		Statewide Design & Engineering Services	Letter of non-objection	Construction/installation and staging in existing utility ROWs	90 days
Local	Local community or borough	City or Borough	Lease or easements, or other land use agreement	Terrestrial construction/installation and staging on local community or borough lands	180-270 days
Private	Private landowner	NA	Easements or other land use agreement	Terrestrial construction/installation and staging on private lands	180-270 days
	Alaska Native Claims Settlement Act (ANCSA) Native Lands	Regional Corporation (e.g., Doyon, Calista)	Easements or other land use agreement	Terrestrial construction/installation and staging on private lands	180-270 days
		Village Corporation (e.g., Dinee, Gwichva Zee)			
	Native Lands - Bureau of Indian Affairs (BIA) Administered	Native Allotments	Easements or other land use agreement	These lands should be avoided if possible, lease negotiations require consultation with BIA realty division and will be protracted	180-365 days
Alyeska Pipeline Service Company (APSC)	Lands and ROW		Letter of non-objection	Required for working in the Trans-Alaska Pipeline System (TAPS) ROW	180 days

USACE
USFWS
ADOT&PF
ADNR
ADEC
ADF&G
ROW

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
AK Department of Transportation and Public Facilities
AK Department of Natural Resources
AK Department of Environmental Conservation
AK Department of Fish and Game
Right-of way