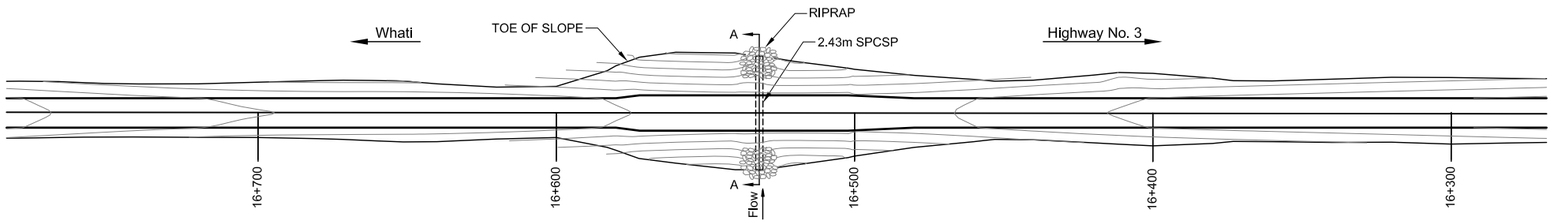
Appendix I: TASR Bridge and Culvert Conceptual Designs 2016

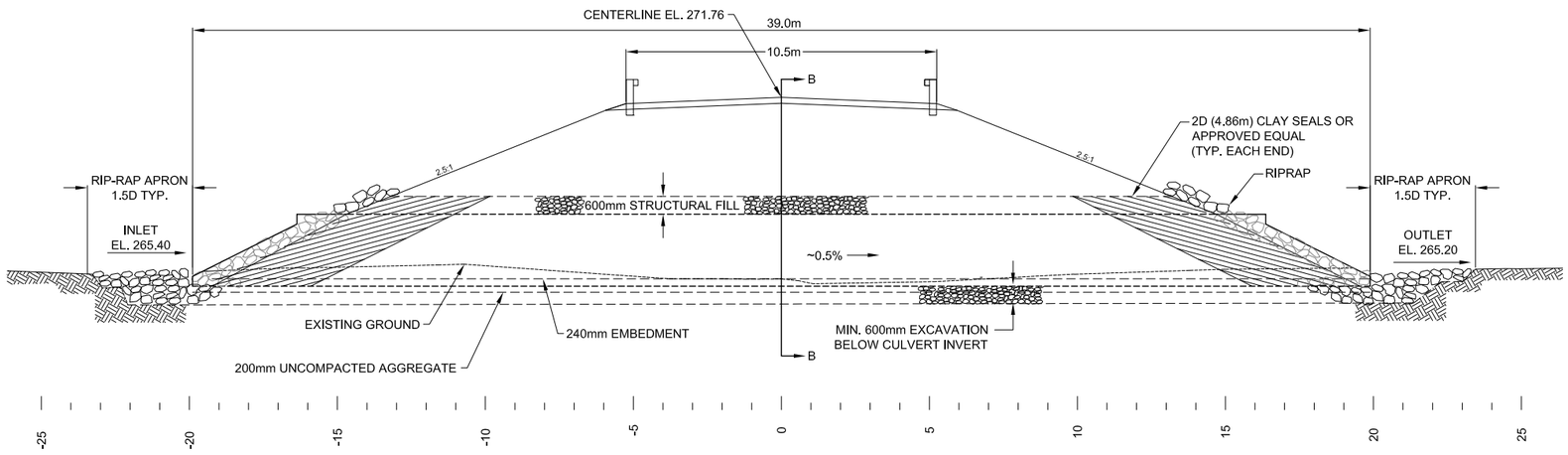
Crossing No.	Station	Crossing Description	Specifications	Action	Notes
1	2+032 2+377	1x1200 CSP at 2+032 1x1200 CSP at 2+377	1200 CSP; 125x25 corrugation profile; 3.5 thickness and 1200 CSP; 125x25 corrugation profile; 3.5mm thickness	D&C	
2	3+206 3+216	2x1400 CSP	CSP; 125x25 corrugation profile; 3.5mm thickness	D&C	
3	7+839 7+859	2x1400 CSP	CSP; 125x25 corrugation profile; 3.5mm thickness	D&C	Increase in fill will be required to accommodate culverts
4	13+228 13+233 13+238	3x1400 CSP	CSP; 125x25 corrugation profile; 3.5mm thickness	D&C	D&C recommended using bigger culverts, not optimal for this site based on the site reconnaissance as well as cost wise.
5	16+532	1x2430 SPCSP, 10% embedment	SPCSP; 152x51 corrugation profile; 4mm thickness	Structures - Peg. Coordinate road profile with D&C.	Suggest decreasing fill if possible to shorten culvert
6	19+427 19+432.5	2x2430 SPCSP, 10% embedment	SPCSP; 152x51 corrugation profile; 4mm thickness	Structures - Peg. Coordinate road profile with D&C.	Increase in fill will be required to accommodate culverts
7	23+584.4 23+594.4	2x1400 CSP	CSP; 125x25 corrugation profile; 3.5mm thickness	D&C	
8 - Duport River	40+400	24 + 24 = 48 meter 40+374.1 to 40+422.1	2 spans, precast concrete girder	Structures - Peg. Coordinate road profile with D&C.	
9	45+175	24 meter clear span 45+168.7 to 45+187.7	1 span, precast concrete girder	Structures - Peg. Coordinate road profile with D&C.	
10a	48+208.8	3660x1910 Arch culvert	Arch Culvert; corrugation profile and thickness to be determined	Structures - Peg. Coordinate road profile with D&C.	Increase in fill will be required to accommodate arch
10	48+275.5	1x1200 CSP	CSP; 125x25 corrugation profile; 3.5mm thickness	D&C	Increase in fill will be required to accommodate culvert
11	54+480.6 54+522.6	2x1400 CSP	CSP; 125x25 corrugation profile; 3.5mm thickness	D&C	Increase in fill will be required to accommodate culverts
12	56+556.4	1x1000 CSP	CSP 68x13 2.8mm	D&C	
13	62+692.3 62+702.3 62+712.3	3x1400 CSP	CSP; 125x25 corrugation profile; 3.5mm thickness	D&C	Increase in fill will be required to accommodate culverts. Road profile limits the installation of bigger culverts as per D&C recommendation.
14 - James River	69+666	20 + 40 + 20 = 80 meter 69+626.5 to 69+706.5	3 spans, steel girder type	Structures - Peg. Coordinate road profile with D&C.	
15 - La Martre	85+397	30 + 40 + 30 = 100 meter 85+347.1 to 85+447.1	3 spans, steel girder type	Structures - Peg. Coordinate road profile with D&C.	

Note: A typical cross section for culverts with a diameter less than 1.5 m is provided with respect to the crossings highlighted in blue.
Detailed designs for the larger crossings highlighted in green have also been provided.

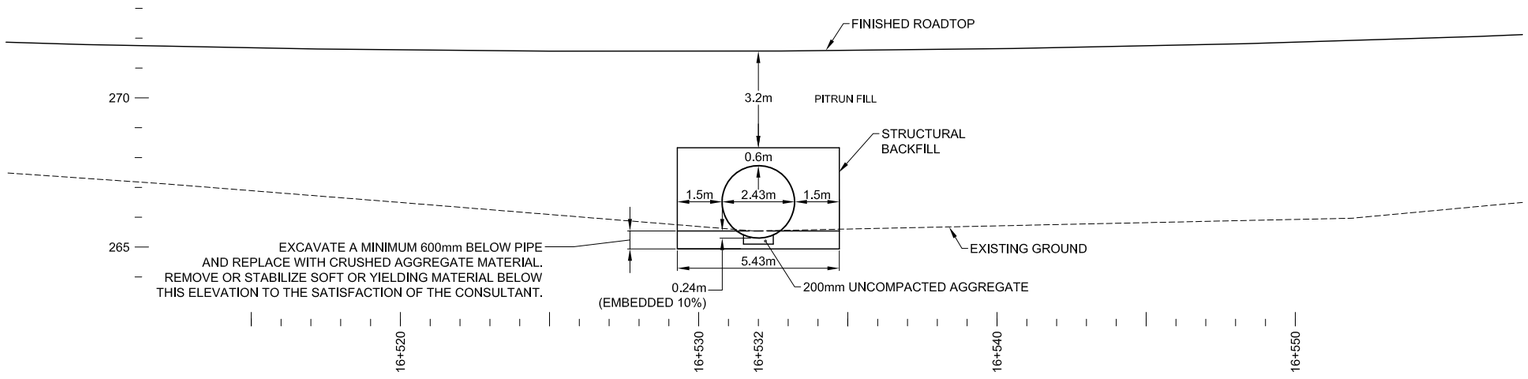
FILE NAME: TASR-02-16 (Crossing #5)



SITE PLAN
1:2,000

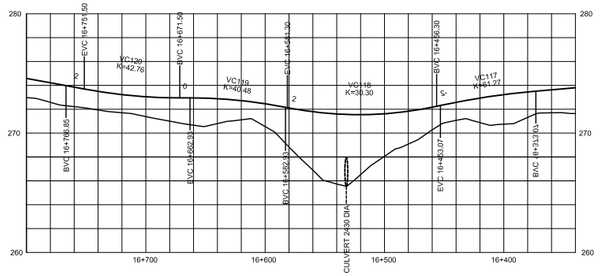


CULVERT PROFILE A-A @ 16+532
1:200



SECTION B-B
1:200

PLAN
1:10,000



ROADWAY PROFILE
H 1:5,000 V 1:500

NOTES:
- Design based on July 2014 field hydrotechnical study and July/August field survey.
- Final design pending geotechnical investigation and further site reconnaissance
- Proposed Structure: 1 - 2430mm Dia. SPCSP culvert, 39.0m length @ station 16+532 of proposed roadway centerline on 0° skew.

HYDROTECHNICAL DATA:
- Drainage area = 3.7 km²
- Design discharge = 4.57 m³/s (estimated 100 year flood)
- Required opening = 2.6 m²
- Opening area with 10% embedment = 3.77 m²

Northwest Territories Transportation

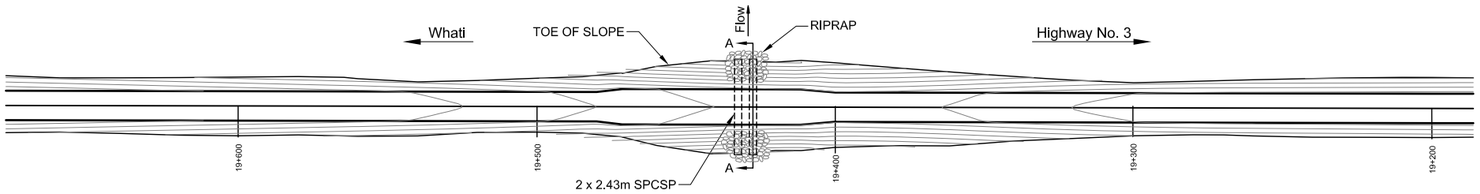
Designed by:	DOT Structures		
Drawn/Drafted by:	DOT Technical Services	Survey By:	Sub-Arctic Surveys Ltd.
Approved by:	DOT Structures		
Scale:	As Shown	Date:	March 2016

Title: Tlicho All Season Road
Crossing #5
Station 16+532
GENERAL LAYOUT

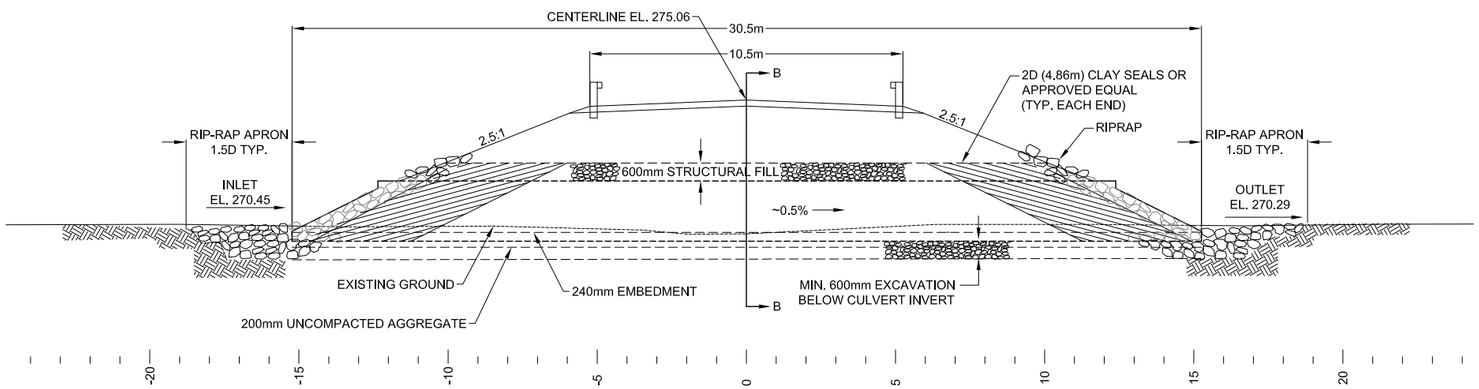
Contract No. Tlicho All Season Road

Drawing No. 1 of 1

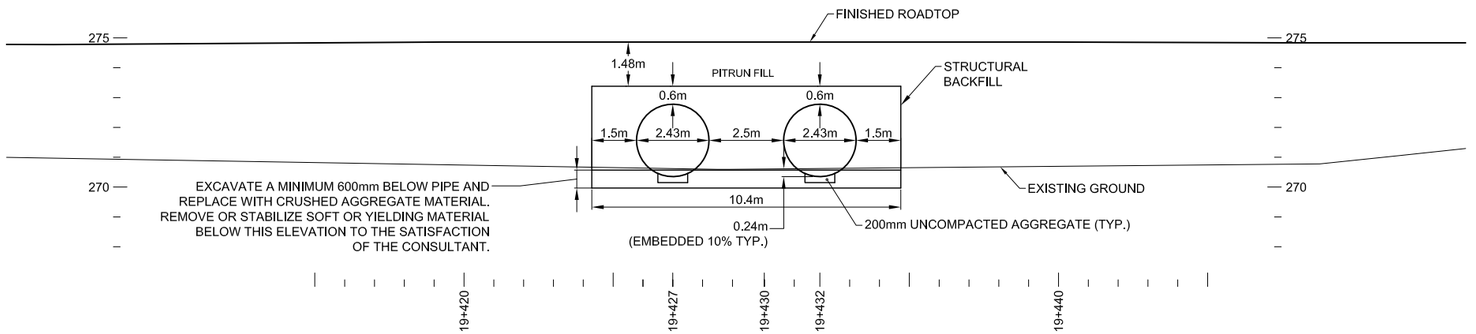
FILE NAME: TASR-03-16 (Crossing #6)



SITE PLAN
1:2,000

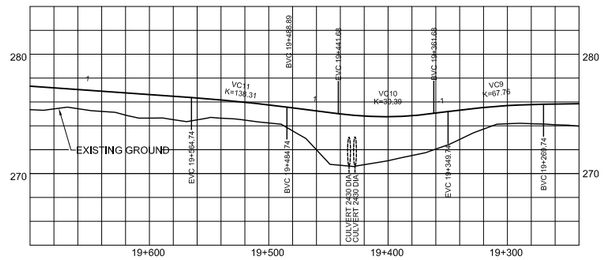


CULVERT PROFILE A-A @ 19+427
1:200



SECTION B-B
1:200

PLAN
1:10,000



ROADWAY PROFILE
H 1:5,000 V 1:500

NOTES:
- Design based on July 2014 field hydrotechnical study and July/August field survey.
- Final design pending geotechnical investigation and further site reconnaissance
- Proposed Structures: 2 - 2430mm Dia. SPCSP culverts, 30.5m length each @ station 19+427 and station 19+432 of proposed roadway centerline on 0° skew.

HYDROTECHNICAL DATA:
- Drainage area = 51.3 km²
- Design discharge = 17.18 m³/s (estimated 100 year flood)
- Required opening = 7.9 m²
- Opening area with 10% embedment = 8.35 m²

Northwest Territories Transportation

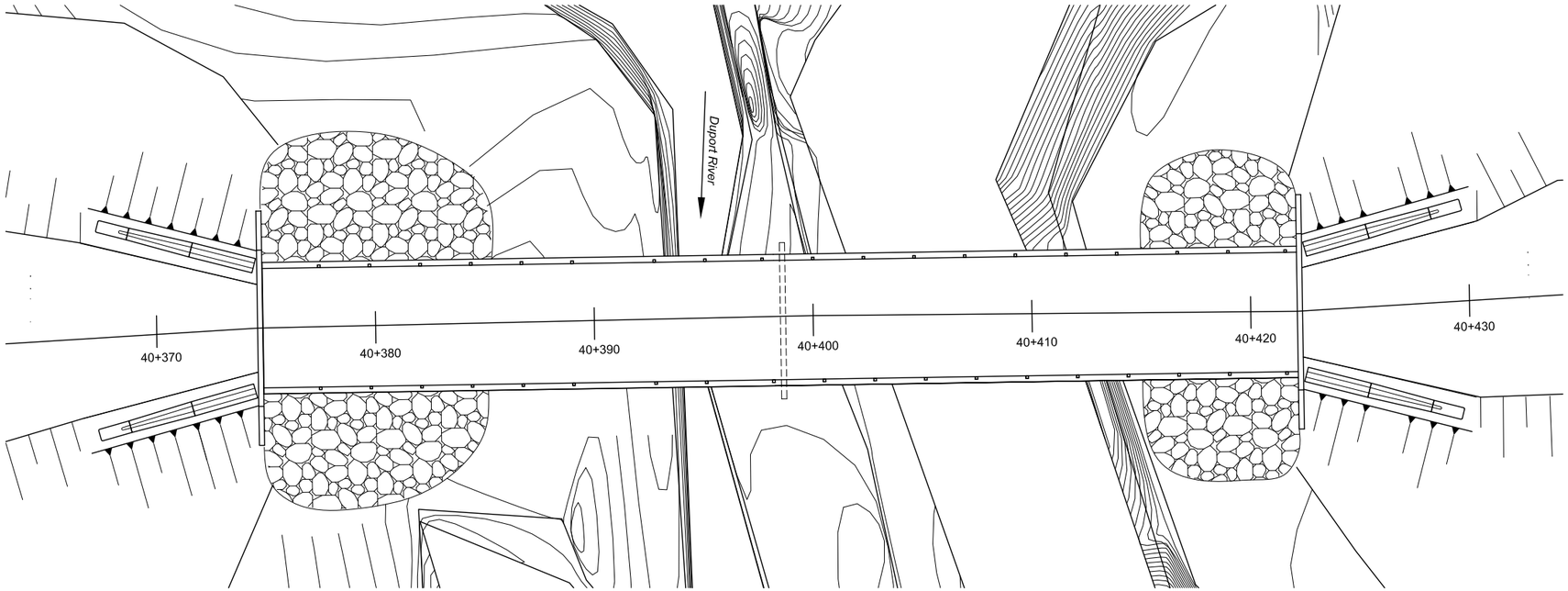
Designed by:	DOT Structures		
Drawn/Drafted by:	DOT Technical Services	Survey By:	Sub-Arctic Surveys Ltd.
Approved by:	DOT Structures		
Scale:	As Shown	Date:	March 2016

Title: Tlicho All Season Road
Crossing #6
Stations 19+427 and 19+432
GENERAL LAYOUT

Contract No. Tlicho All Season Road

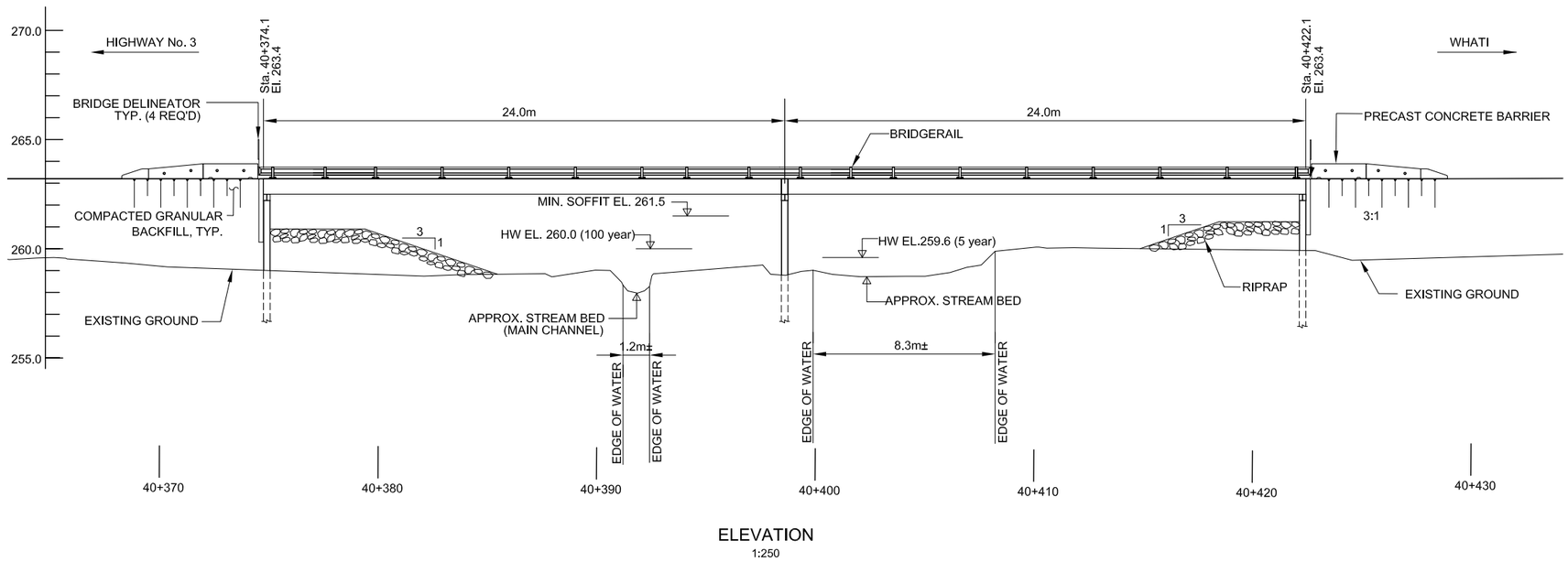
Drawing No. 1 of 1

FILE NAME: TASR-05-16 (Crossing #8)

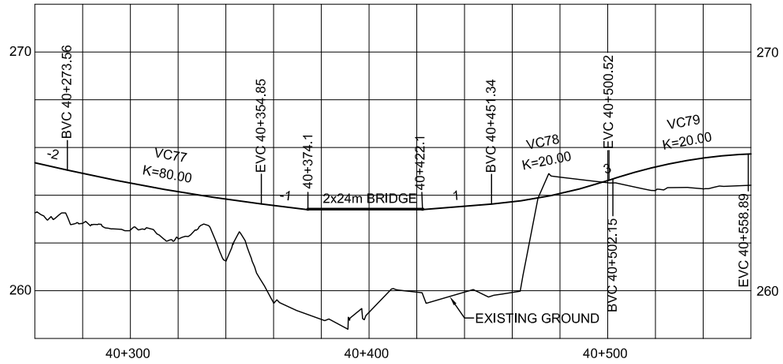


SITE PLAN
1:250

PLAN
1:5,000



ELEVATION
1:250



ROADWAY PROFILE
H 1:2,500 V 1:250

HYDROTECHNICAL DATA

- Drainage area = 287.4km²
- Design discharge = 40.95 m³/s (estimated 1:100 year flood)
- Mean velocity for design discharge = 0.72 m/s (1:100 year)
- Mean velocity = 0.47 m/s (1:5 year)
- Design flood elevation = 260.0

NOTES

- River water levels are based on July 2014 Stantec Hydrotechnical report.
- Design based on Lidar data, July 2014 field hydrotechnical study and July/Aug 2015 field survey - compilation of lidar and survey.
- Final designs pending geotechnical investigation.

Northwest Territories Transportation

Designed by:	DOT Structures		
Drawn/Drafted by:	DOT Technical Services	Survey By:	Sub-Arctic Surveys Ltd.
Approved by:	DOT Structures		
Scale:	As Shown	Date:	March 2016

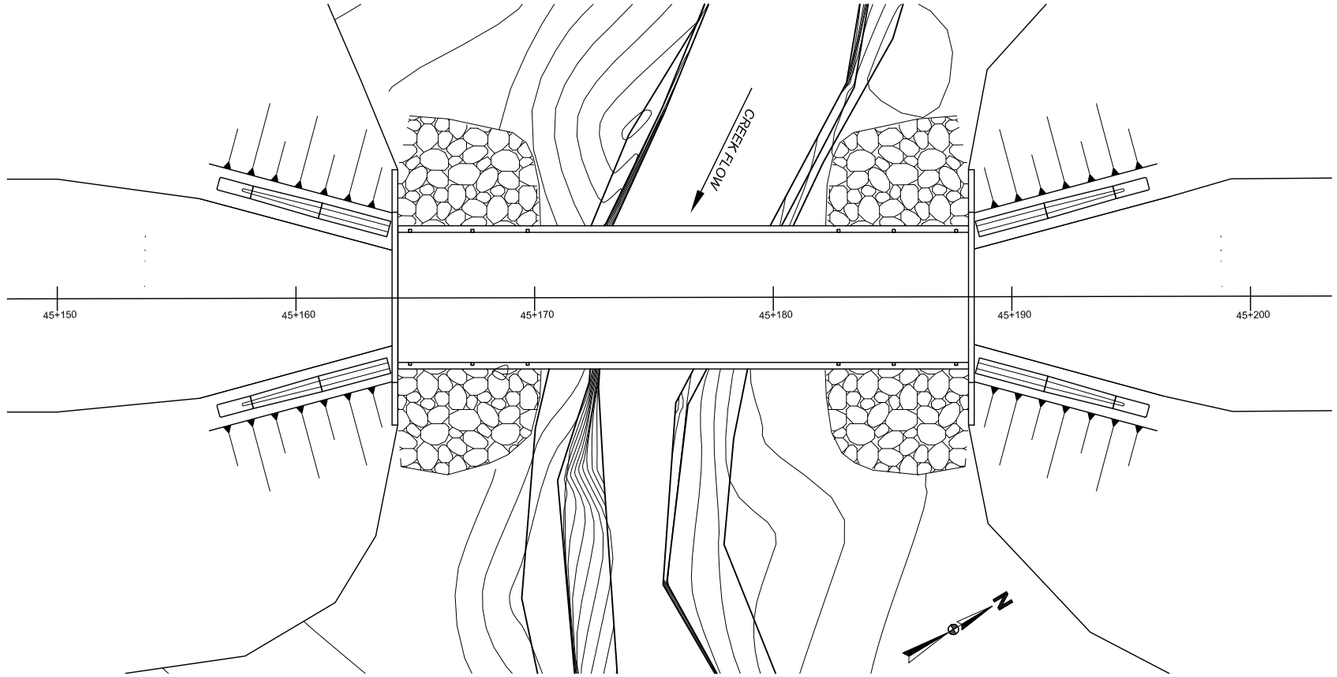
Title:

Tlicho All Season Road
Crossing #8 Duport River
Station 40+400
GENERAL LAYOUT

Contract No. Tlicho All Season Road

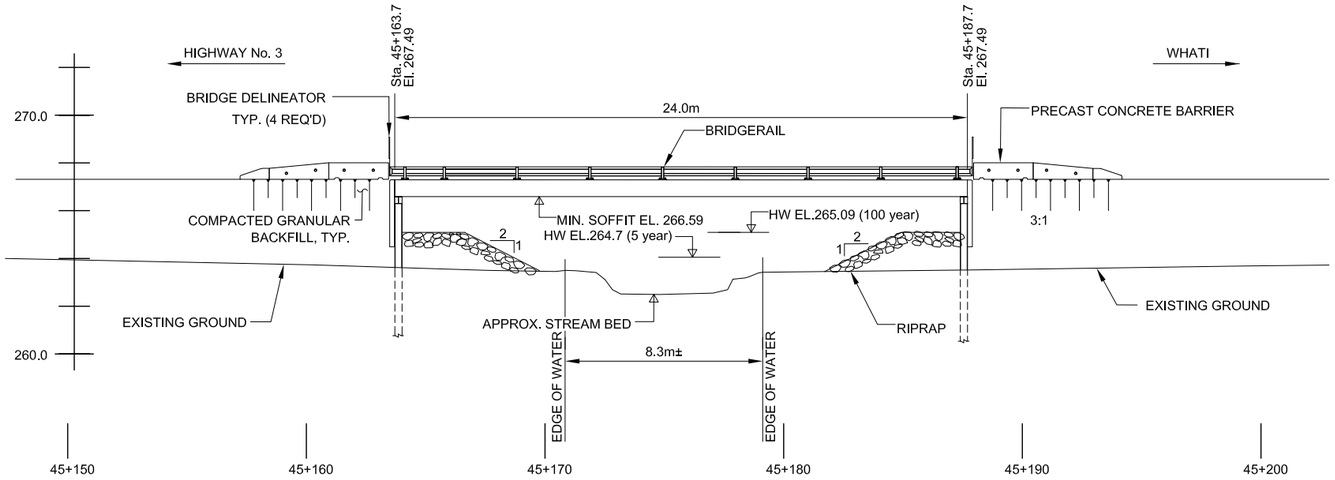
Drawing No. 1 of 1

FILE NAME: TASR-06-16 (Crossing #9)

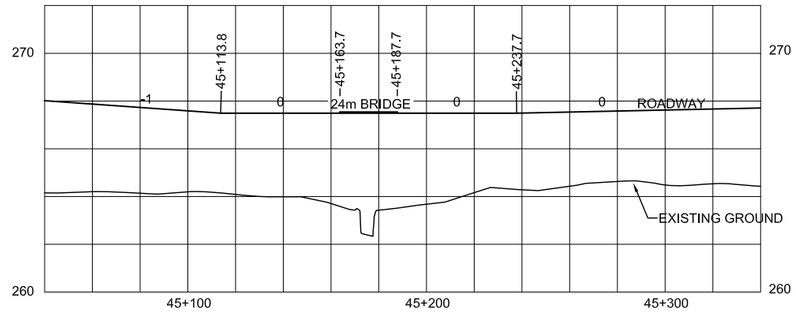


SITE PLAN
1:250

PLAN
1:5,000



ELEVATION
1:250



ROADWAY PROFILE
H 1:2,500 V 1:250

HYDROTECHNICAL DATA:
- Drainage area = 116.8 km²
- Design discharge = 26.02 m³/s (estimated 100 year flood)
- Mean velocity for design discharge = 0.74 m/s (100 year average)
- Mean velocity = 0.51 m/s (5 year average)
- Design flood elevation = 265.09

NOTES:
- Crossing water levels are based on July 2014 Stantec Hydrotechnical report.
- Design based on July 2014 field hydrotechnical study and July/August field survey.
- Final design pending geotechnical investigation.

Northwest Territories Transportation

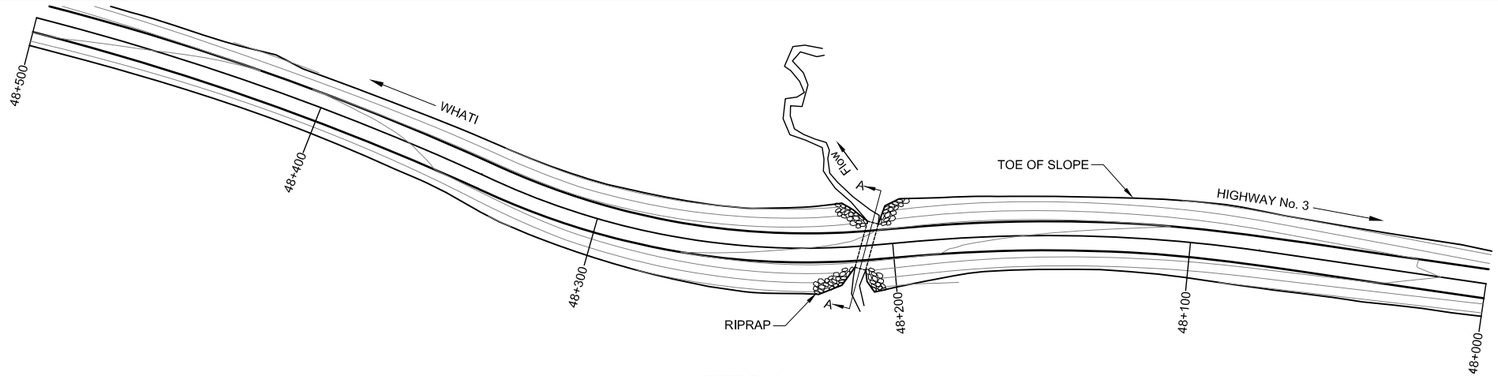
Designed by:	DOT Structures		
Drawn/Drafted by:	DOT Technical Services	Survey By:	Sub-Arctic Surveys Ltd.
Approved by:	DOT Structures		
Scale:	As Shown	Date:	March 2016

Title: Tlicho All SeasonRoad
Crossing #9
Station 45+175
GENERAL LAYOUT

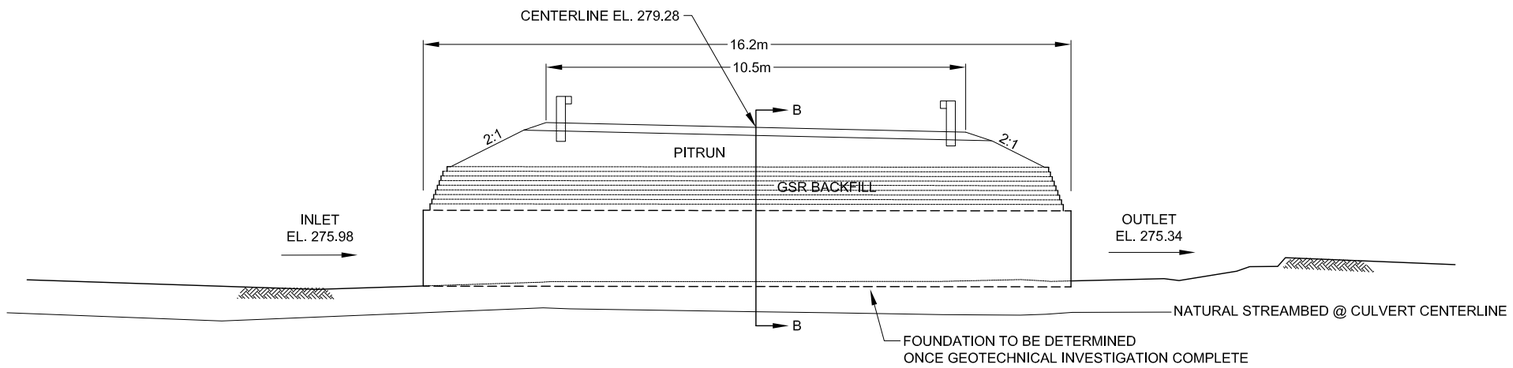
Contract No. Tlicho All Season Road

Drawing No. 1 of 1

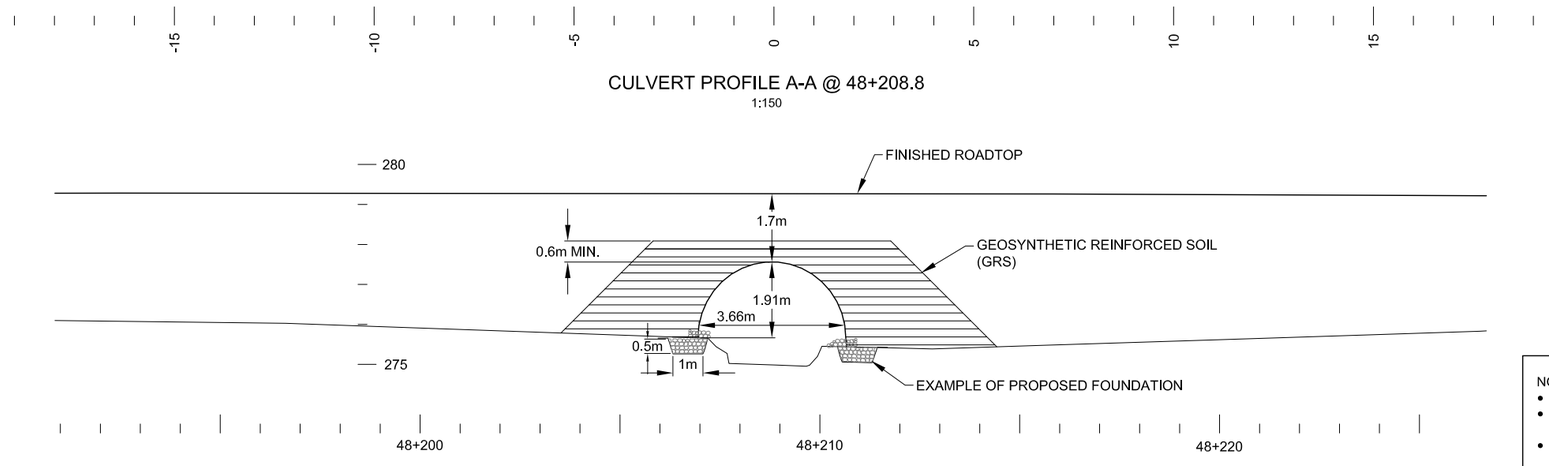
FILE NAME: TASR-04-16 (Crossing #10a)



SITE PLAN
1:2,000

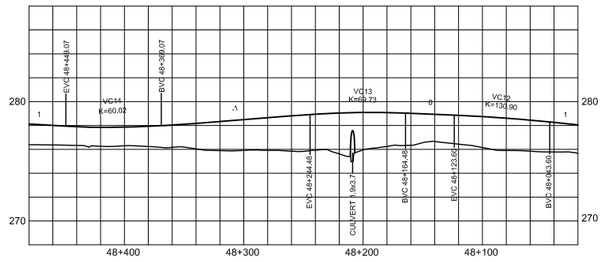


PLAN
1:10,000



CULVERT PROFILE A-A @ 48+208.8
1:150

SECTION B-B
1:150



ROADWAY PROFILE
H 1:5,000 V 1:500

NOTES:
- Design based July/August field survey.
- Final design pending geotechnical investigation, hydrotechnical investigation and further site reconnaissance
- Proposed structure: 3660x1910mm SPCSP Arch Culvert, 16.2m length @ station 48+208.8 of proposed roadway centerline.

HYDROTECHNICAL DATA:
- Drainage area = 10-11 km²
- Design discharge = 7.5 m³/s (estimated 100 year flood)
- Approximate required opening = 4.5 m²
- Opening area = 5.48 m²

Northwest Territories Transportation

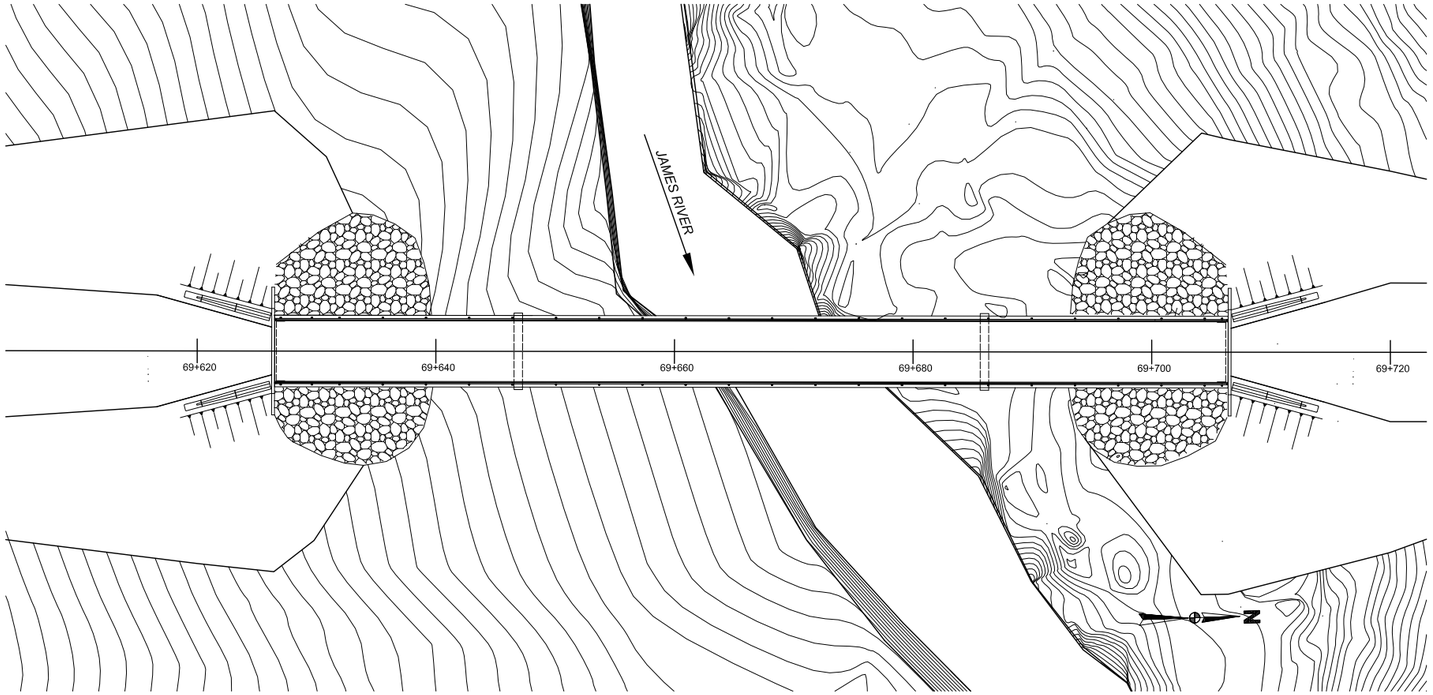
Designed by:	DOT Structures		
Drawn/Drafted by:	DOT Technical Services	Survey By:	Sub-Arctic Surveys Ltd.
Approved by:	DOT Structures		
Scale:	As Shown	Date:	March 2016

Title: Tlicho All Season Road
Crossing #10a
Station 48+208.8
GENERAL LAYOUT

Contract No. Tlicho All Season Road

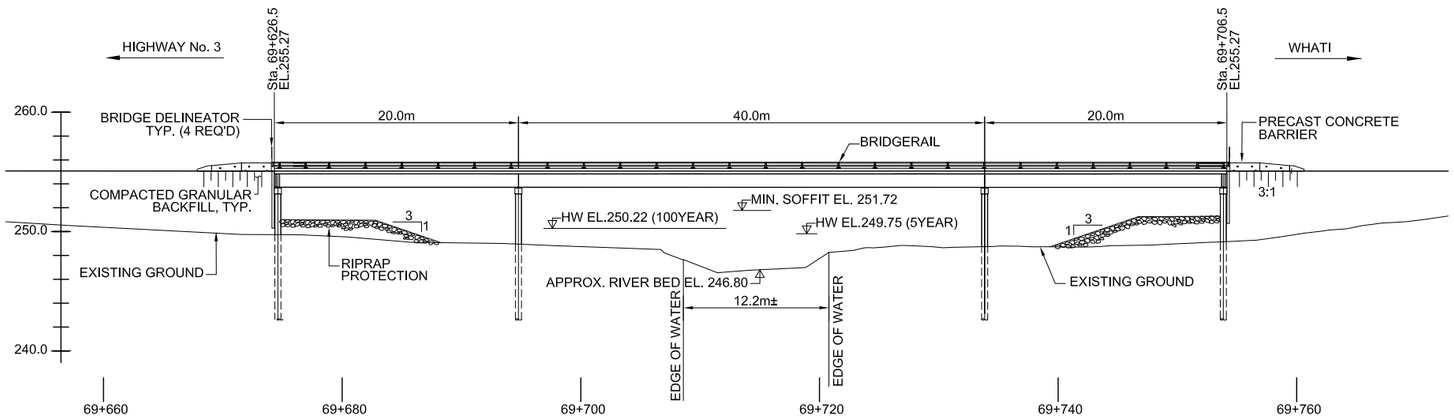
Drawing No. 1 of 1

FILE NAME: TASR-07-16 (Crossing #14)

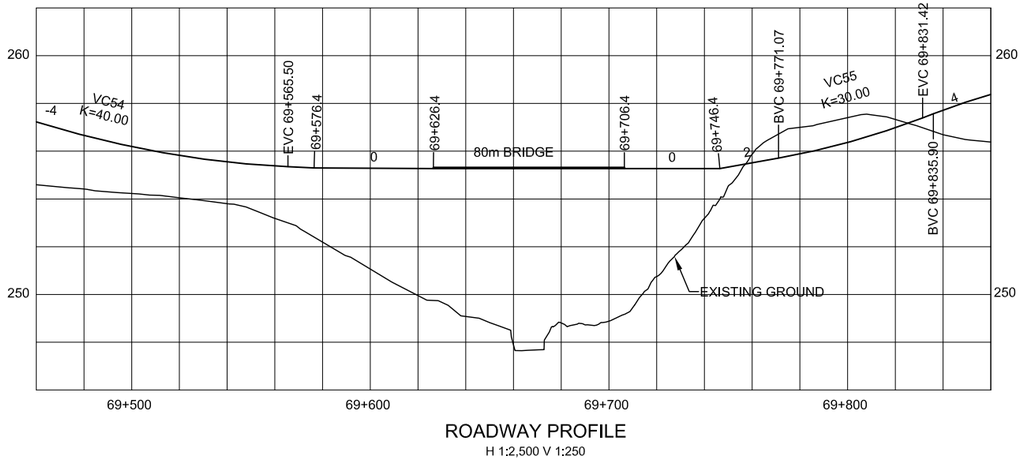


SITE PLAN
1:500

PLAN
1:5,000



ELEVATION
1:500



ROADWAY PROFILE
H 1:2,500 V 1:250

NOTES
- River water levels are based on July 2014 Stantec Hydrotechnical report.
- Design based on July 2014 field hydrotechnical study and July/Aug 2015 field survey.
- Final designs pending geotechnical investigation.

HYDROTECHNICAL DATA
- Drainage area = 647.8km²
- Design discharge = 61.69 m³/s (estimated 1:100 year flood)
- Mean velocity for design discharge = 1.11 m/s (1:100 year)
- Mean velocity = 0.70 m/s (1:5 year)
- Design flood elevation = 250.22

Northwest Territories Transportation

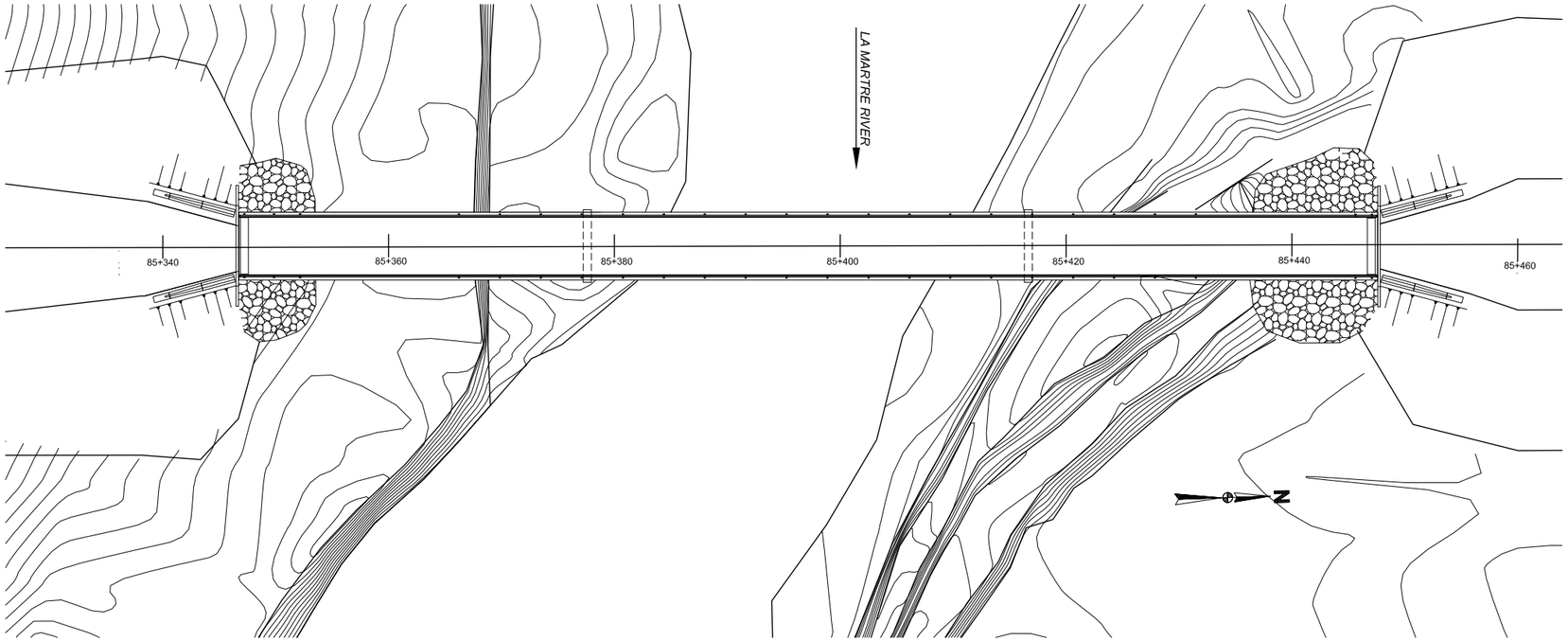
Designed by:	DOT Structures		
Drawn/Drafted by:	DOT Technical Services	Survey By:	Sub-Arctic Surveys Ltd.
Approved by:	DOT Structures		
Scale:	As Shown	Date:	March 2016

Title: Tlicho All Season Road
Crossing #14 James River
Station 69+666
GENERAL LAYOUT

Contract No. Tlicho All Season Road

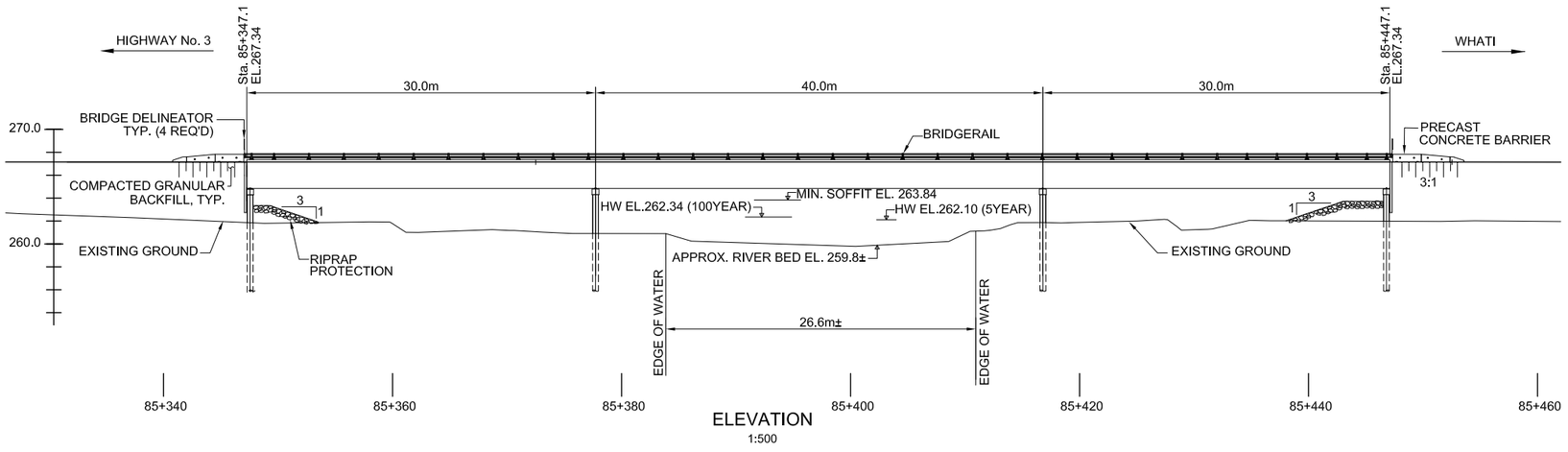
Drawing No. 1 of 1

FILE NAME: TASR-08-16 (Crossing #15)

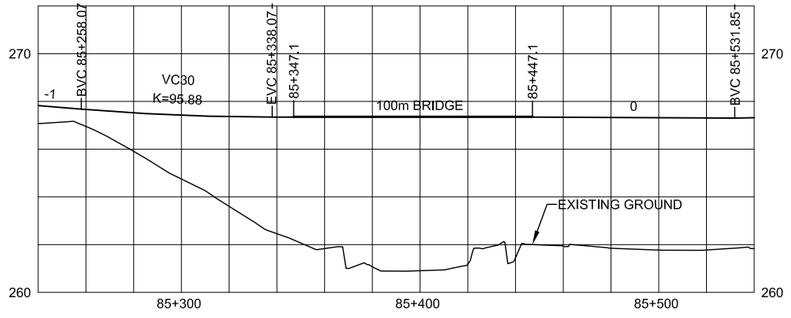


SITE PLAN
1:500

PLAN
1:5,000



ELEVATION
1:500



ROADWAY PROFILE
H 1:2,500 V 1:250

HYDROTECHNICAL DATA

- Drainage area = 13,900 km2
- Design discharge = 98.78 m3/s (estimated 1:100 year flood)
- Mean velocity for design discharge = 0.92 m/s (1:100 year)
- Mean velocity = 0.70 m/s (1:5 year)
- Design flood elevation = 262.34

NOTES

- River water levels are based on July 2014 Stantec Hydrotechnical report.
- Design based on July 2014 field hydrotechnical study and July/Aug 2015 field survey.
- Final designs pending geotechnical investigation.

Northwest Territories Transportation

Designed by:	DOT Structures		
Drawn/Drafted by:	DOT Technical Services	Survey By:	Sub-Arctic Surveys Ltd.
Approved by:	DOT Structures		
Scale:	As Shown	Date:	March 2016

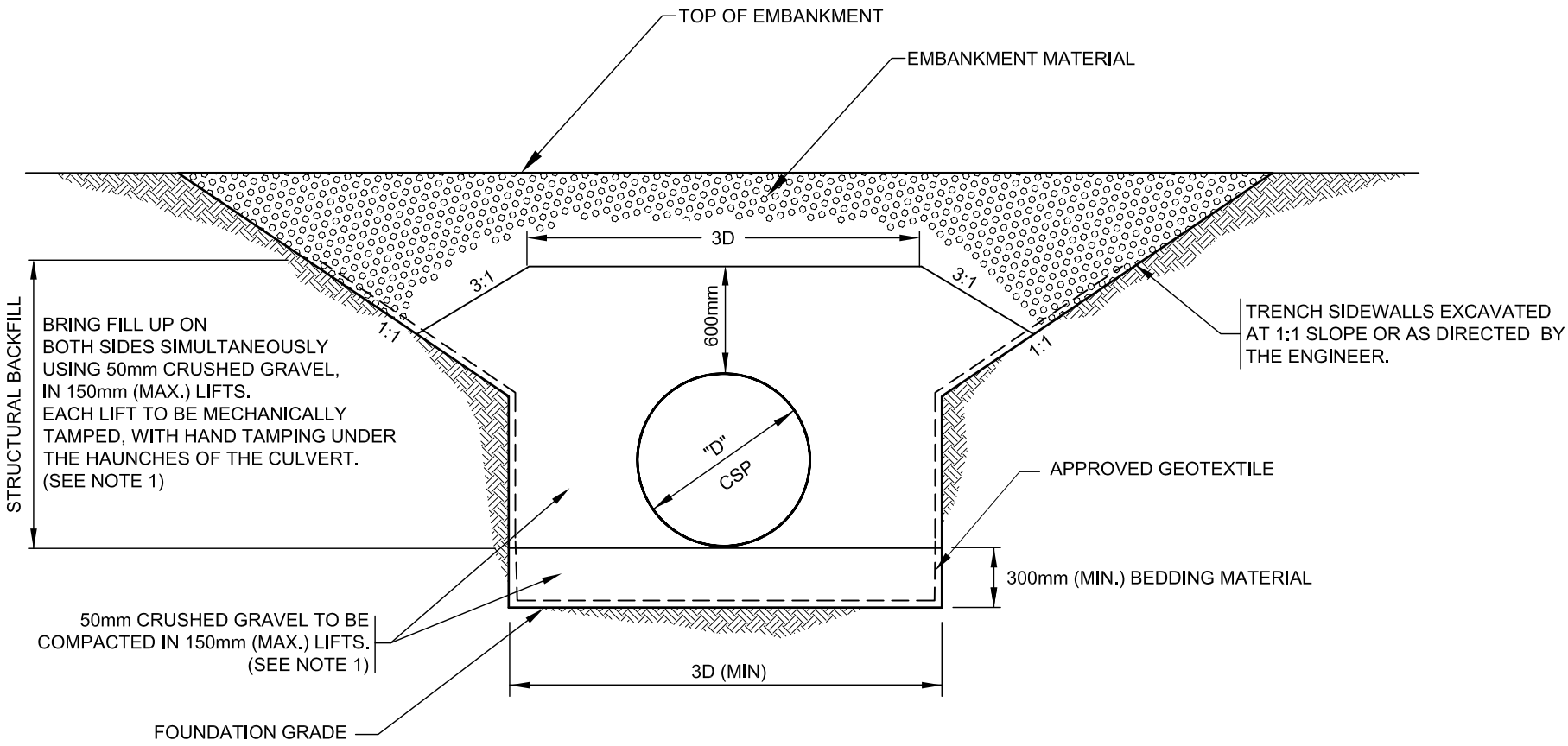
Title:

Tlicho All Season Road
Crossing # 15 La Martre River
Station 85+397
GENERAL LAYOUT

Contract No. Tlicho All Season Road

Drawing No. 1 of 1

FILE NAME: Drawings\TASR-04-15



NOTE:
1. BEDDING MATERIALS TO BE COMPACTED TO 100% OF MAX. DENSITY. BACKFILL 98% OF MAX. DENSITY IN ACCORDANCE WITH AASHTO T-99.

LEGEND:

D = DIAMETER
CSP = CORRUGATED STEEL PIPE

Northwest Territories Transportation

Designed by:	DOT Highways		
Drawn/Drafted by:	P. Embleton		
Approved by:	Z. Rahman		
Scale: N.T.S.	Date: November 2015		

Title:
Tlicho All Season Road
TYPICAL CROSS-SECTION FOR PIPE CULVERT CROSSING
DIAMETER LESS THAN 1.5m

Project No.: PDR	Drawing No. -