

Title:
Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of
Safety for Climate Change

Client/Project:
 Government of Yukon
 Department of Environment
 Water Resources Branch

Project: 123222320

Project Location: Carmacks, Yukon

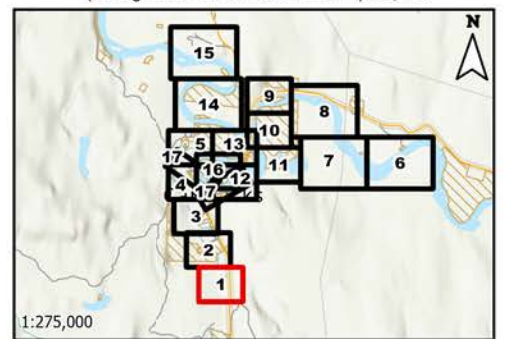
Prepared by MANDERSON on 2024-05-27
 Requested by JMUJIRHEAD on 2024-01-07
 Review by JMUJIRHEAD on 2024-05-27

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| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel of Cross-Section |
| Study Area | |

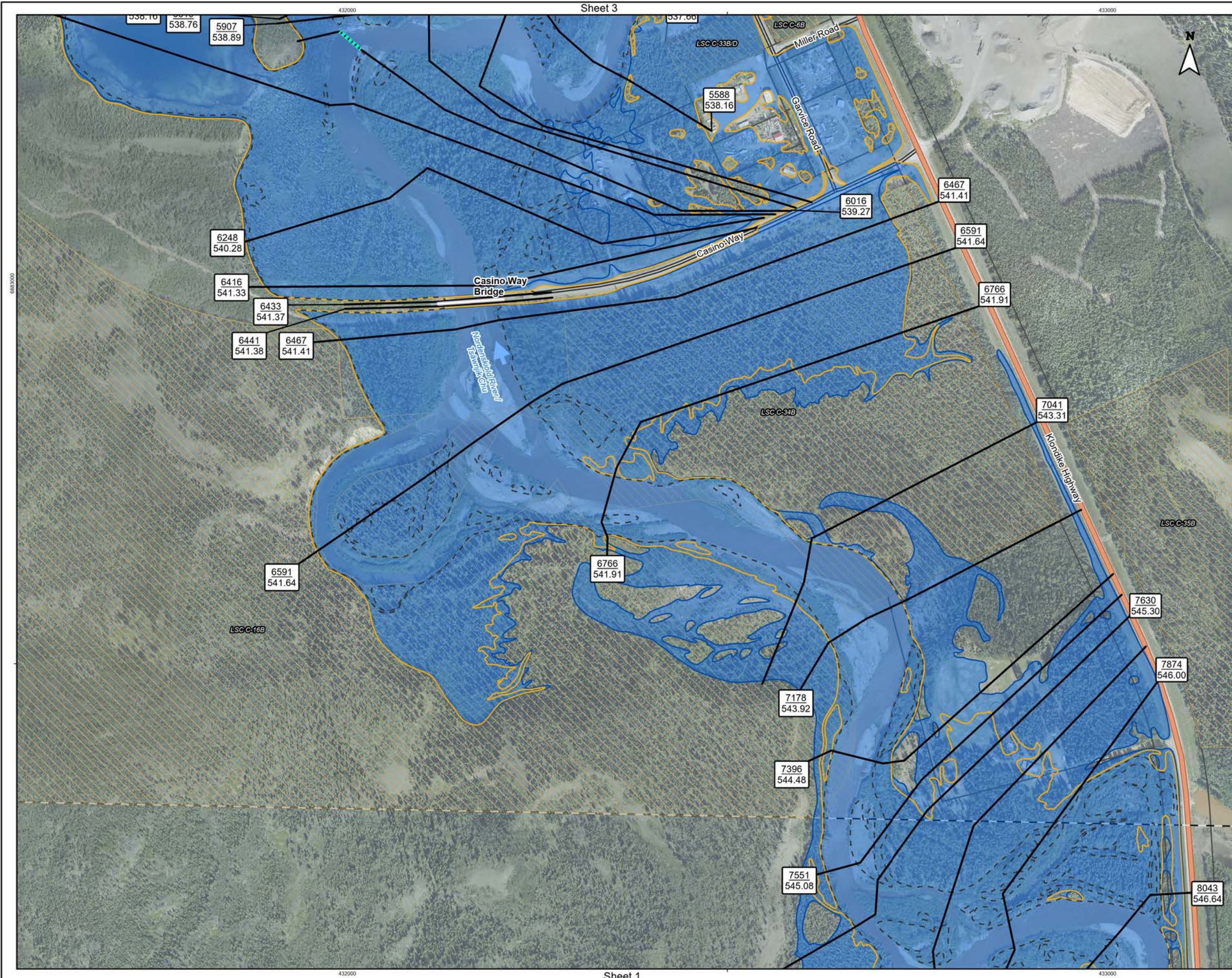
Map Publication Date: May 27, 2024

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(At original document size of 11x 17) 1:5,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Canvec.
 3. Background: Yukon Satellites HighRes: Government of Yukon
World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada
World Hillshade: Esri, USGS
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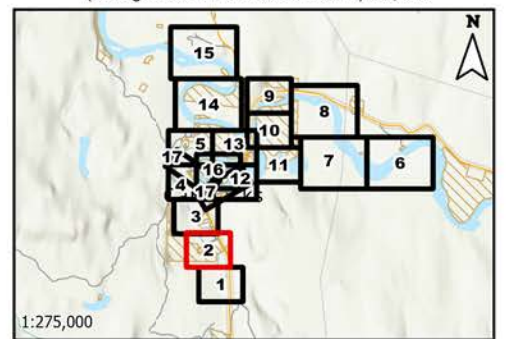
Project: 123222320

Project Location: Carmacks, Yukon

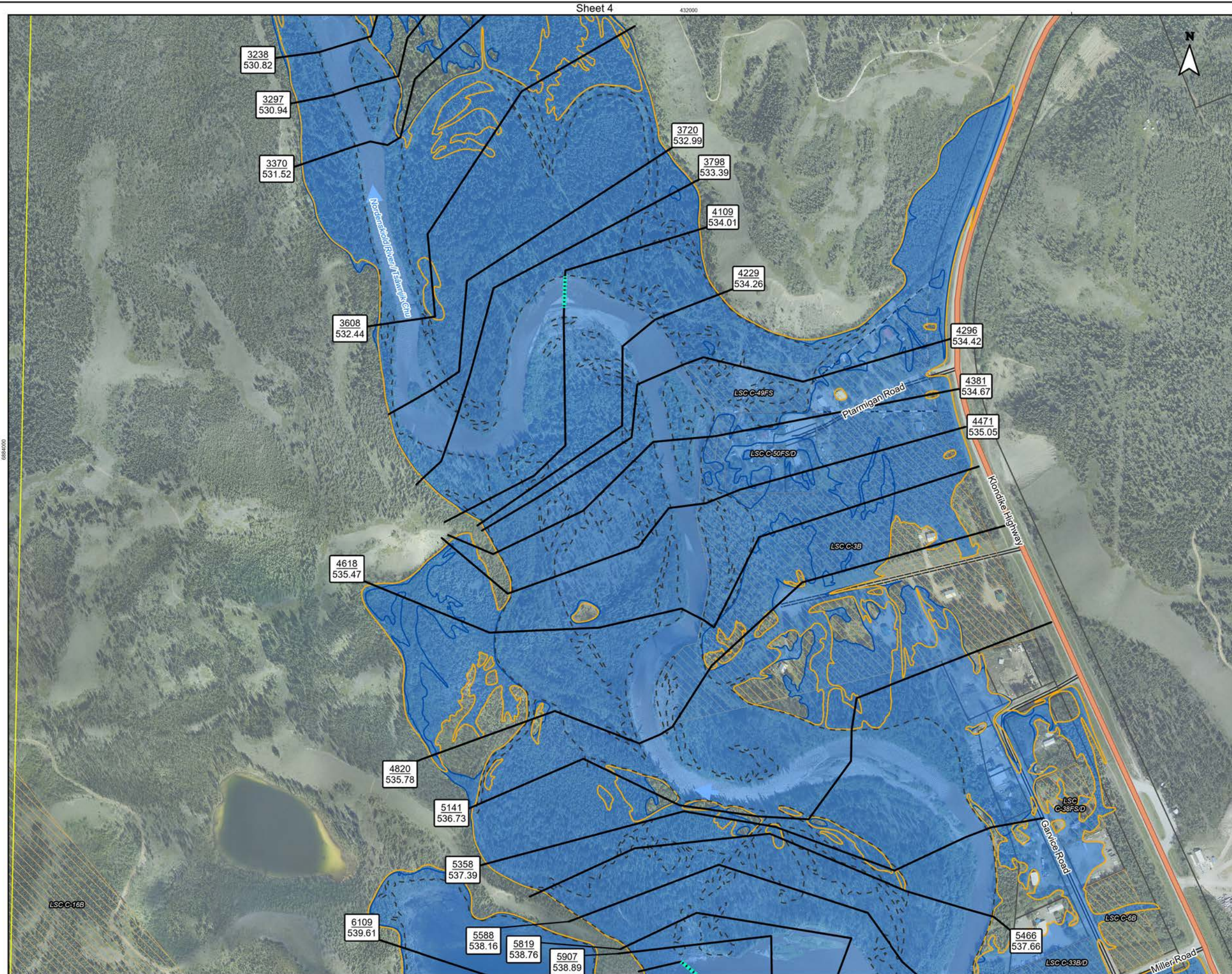
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-27

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 27, 2024
0 40 80 120 160 200 m
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Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 12322320

Project Location: Carmacks, Yukon

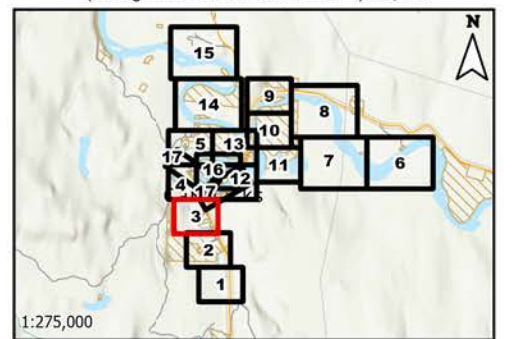
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-27

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|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 27, 2024

0 40 80 120 160 200 m

(At original document size of 11x 17) 1:5,000



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 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Canvec.
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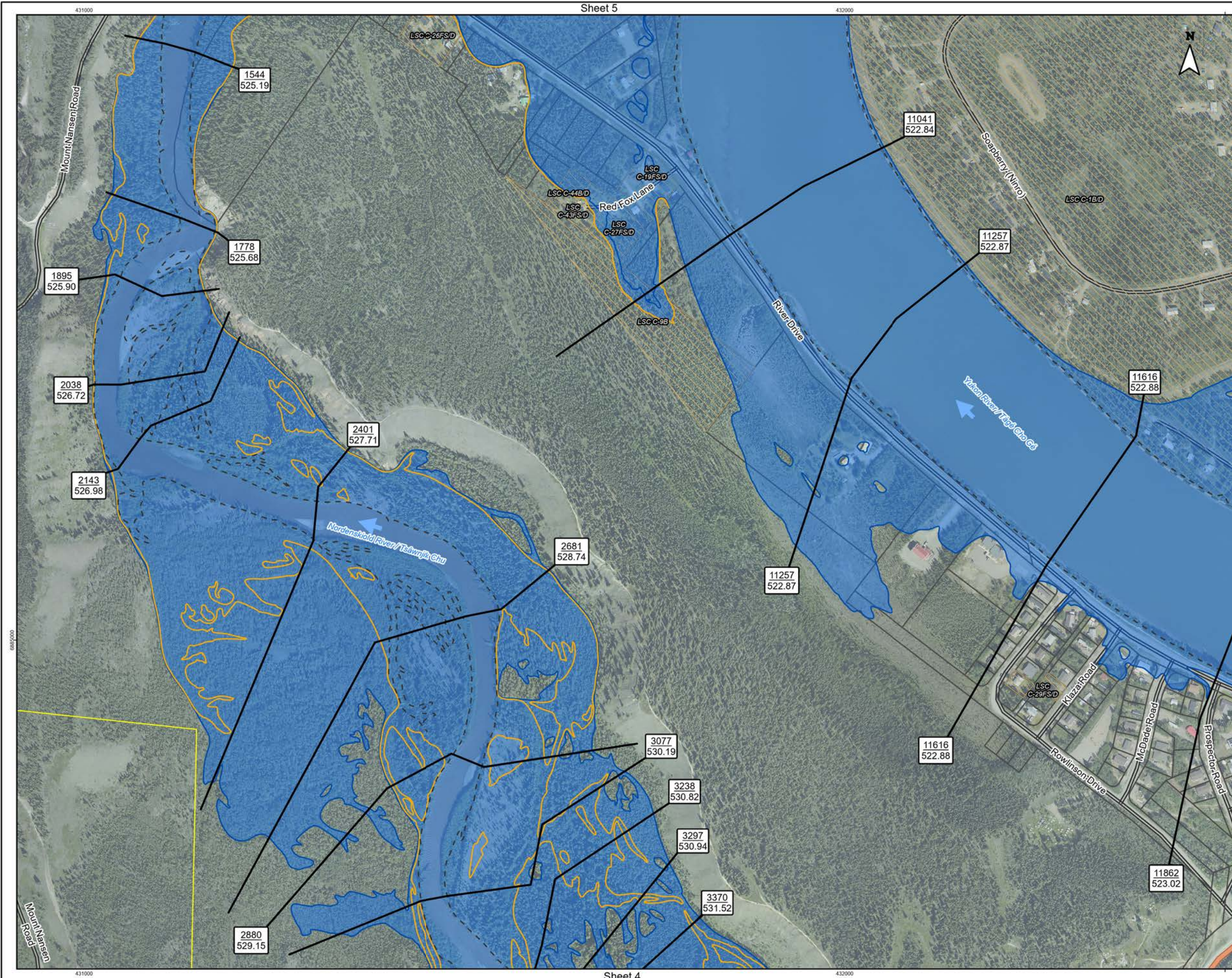


Figure No. **E.5.4** Sheet 4 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of
Safety for Climate Change**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320

Project Location: Carmacks, Yukon

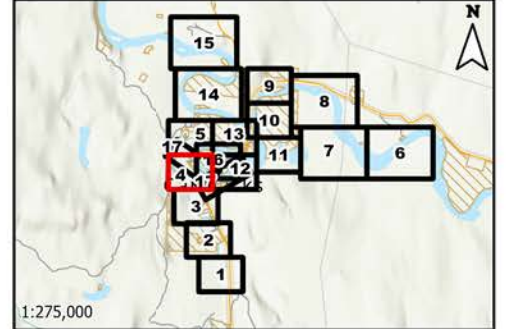
Prepared by MANDERSON on 2024-05-27
Requested by JMUJIRHEAD on 2024-01-07
Review by JMUJIRHEAD on 2024-05-27

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number |
| Study Area | WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 27, 2024

0 40 80 120 160 200 m

(At original document size of 11x 17) 1:5,000



Notes

1. Coordinate System: NAD 1983 UTM Zone 8N
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3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada
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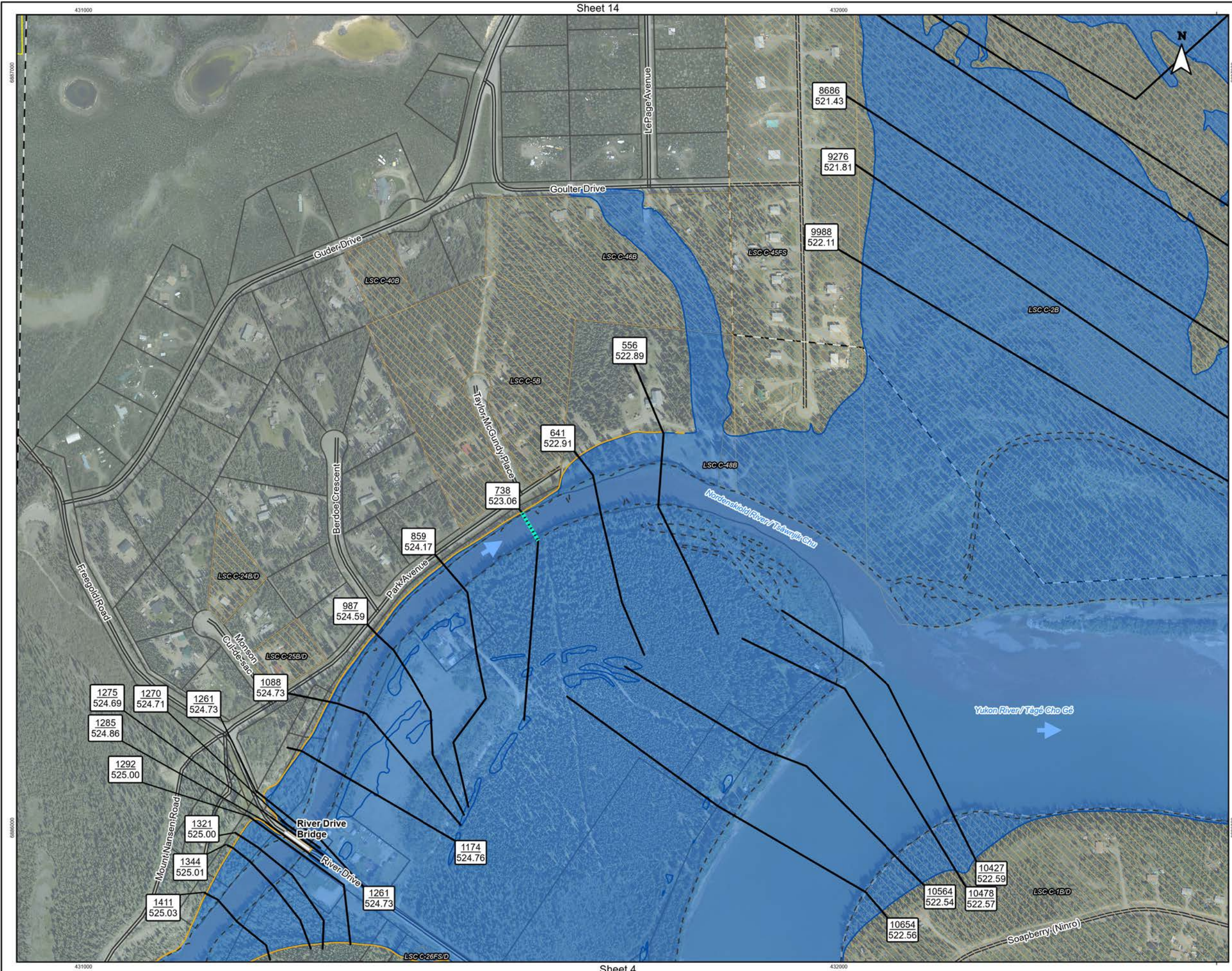


Figure No. **E.5.5** Sheet 5 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of
Safety for Climate Change**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320

Project Location: Carmacks, Yukon

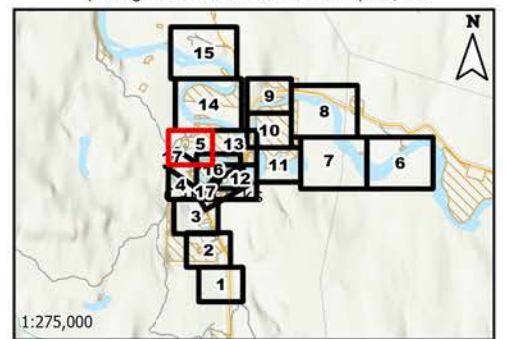
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-27

- | | |
|---|--|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | - - - 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | 57 Cross-Section Number |
| Study Area | 517.2 WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 27, 2024

0 40 80 120 160 200 m

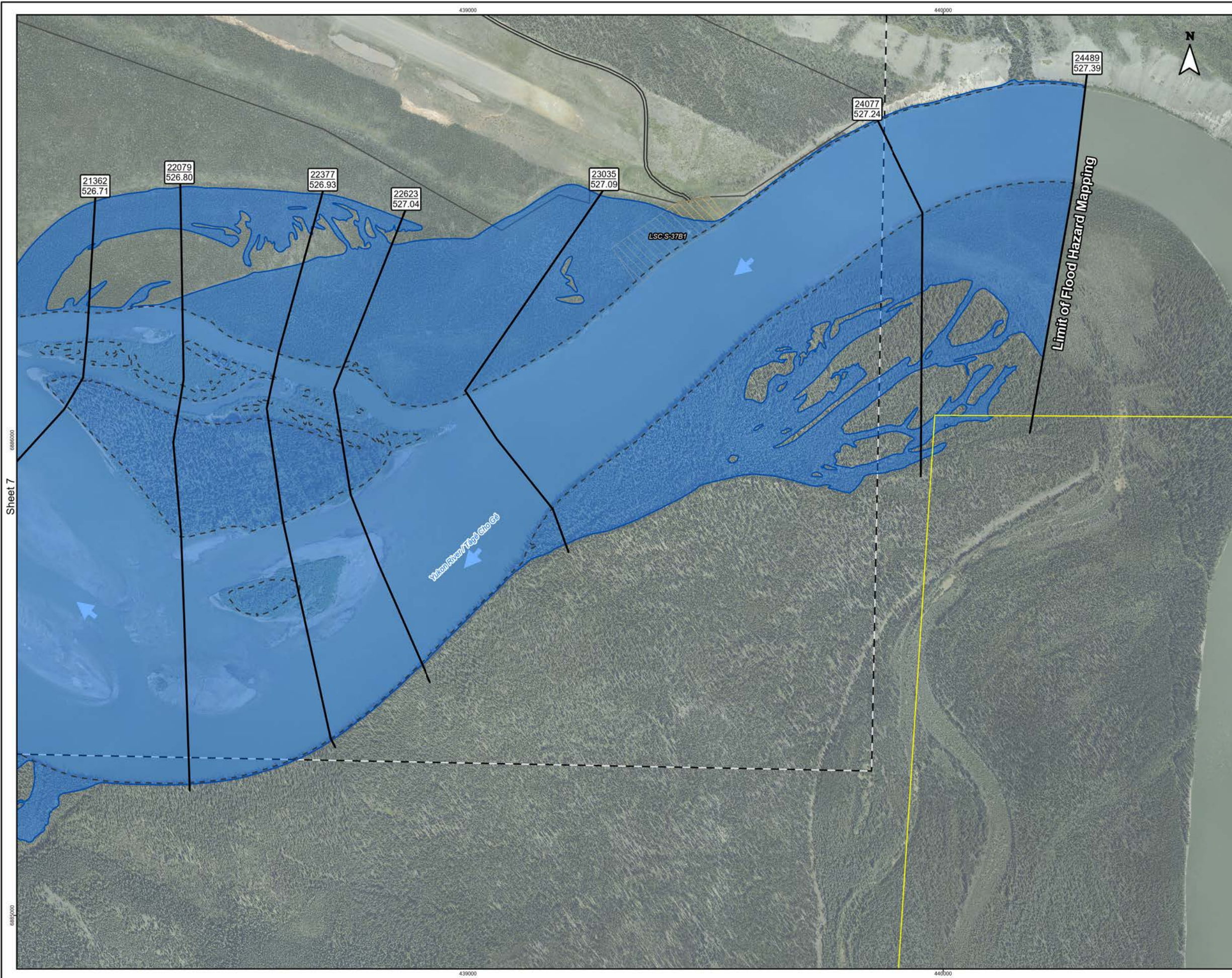
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- Notes**
- Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
 - Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Carvec.
 - Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada
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Sheet 7

**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of
Safety for Climate Change**

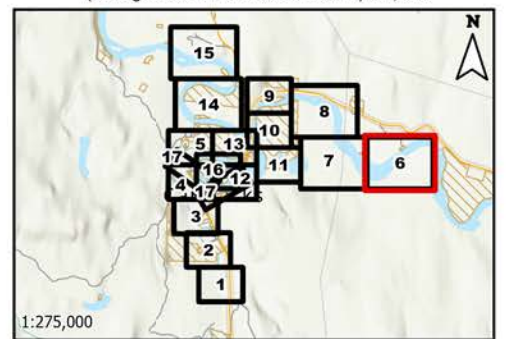
Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320

Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-27
Requested by JMUJIRHEAD on 2024-01-07
Review by JMUJIRHEAD on 2024-05-27

- | | |
|---|--|
| ➔ Flow Direction | — Hydraulic Model Cross-Sections |
| ★ Point of Interest | — Inundation under Modelled Ice Jam Runs |
| — Bridge | — Inundation under Modelled Open Water Runs |
| — Highway | — Composite Flood Hazard Extent |
| — Local Road | — Ice Jam Location (toe of jam) |
| — Little Salmon / Carmacks First Nation Settlement Land | — 50 % AEP Extent |
| — Land Parcels | — Hydraulic Model Cross-Sections |
| — Municipal Boundary | 57 Cross-Section Number |
| — Study Area | 517.2 WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 27, 2024
0 70 140 210 280 350
m
(At original document size of 11x 17) 1:8,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
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 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Carvec.
 3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada
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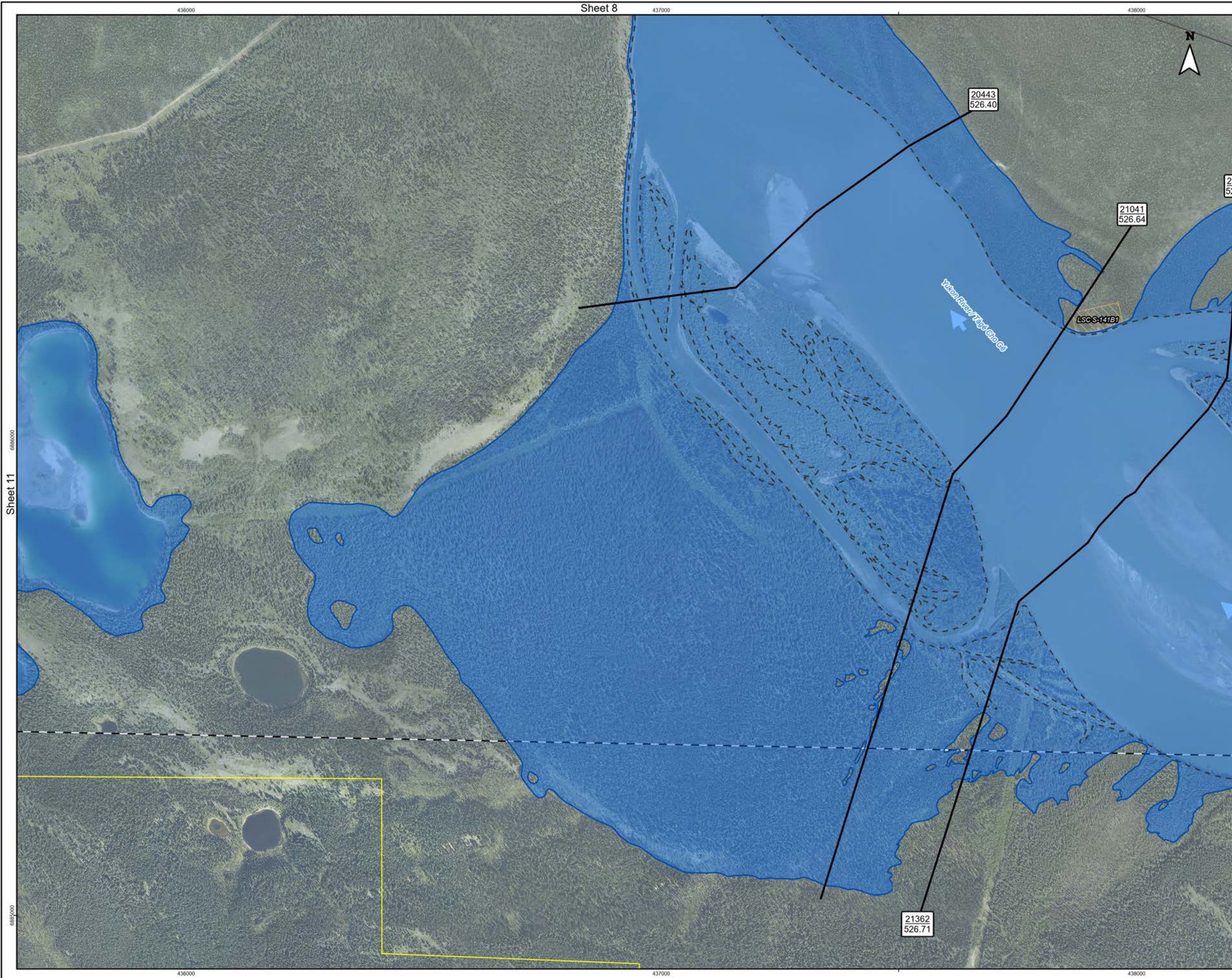


Figure No. **E.5.7** Sheet 7 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of
Safety for Climate Change**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 12322320

Project Location: Carmacks, Yukon

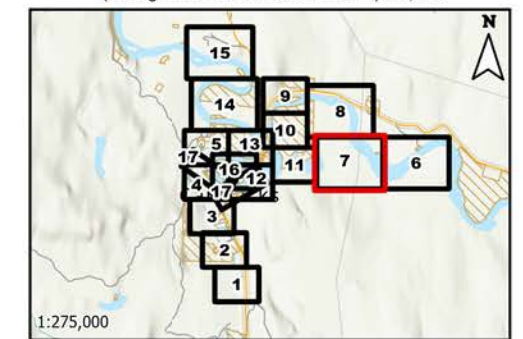
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-27

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 27, 2024

0 70 140 210 280 350
m

(At original document size of 11x 17) 1:8,000



Notes

- Coordinate System: NAD 1983 UTM Zone 8N
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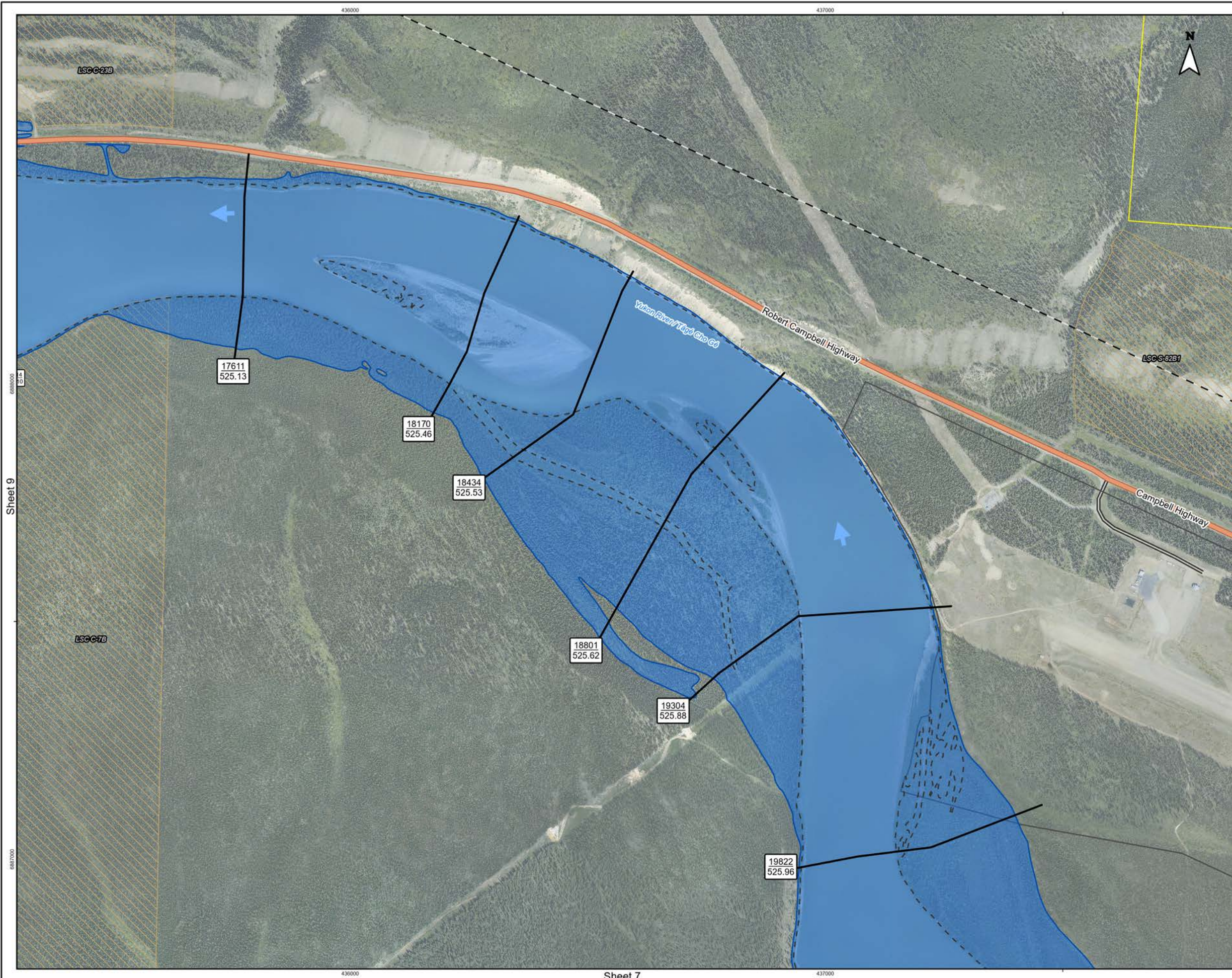


Figure No. **E.5.8** Sheet 8 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of
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Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 12322320

Project Location: Carmacks, Yukon

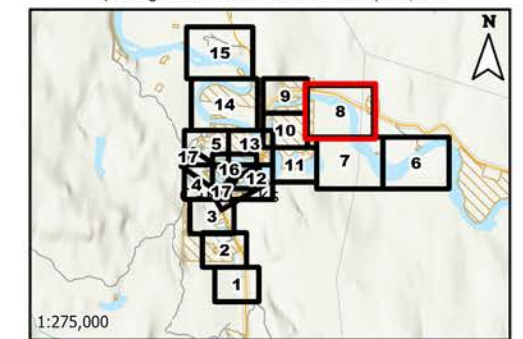
Prepared by MANDERSON on 2024-05-27
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|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 27, 2024

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(At original document size of 11x 17) 1:8,000

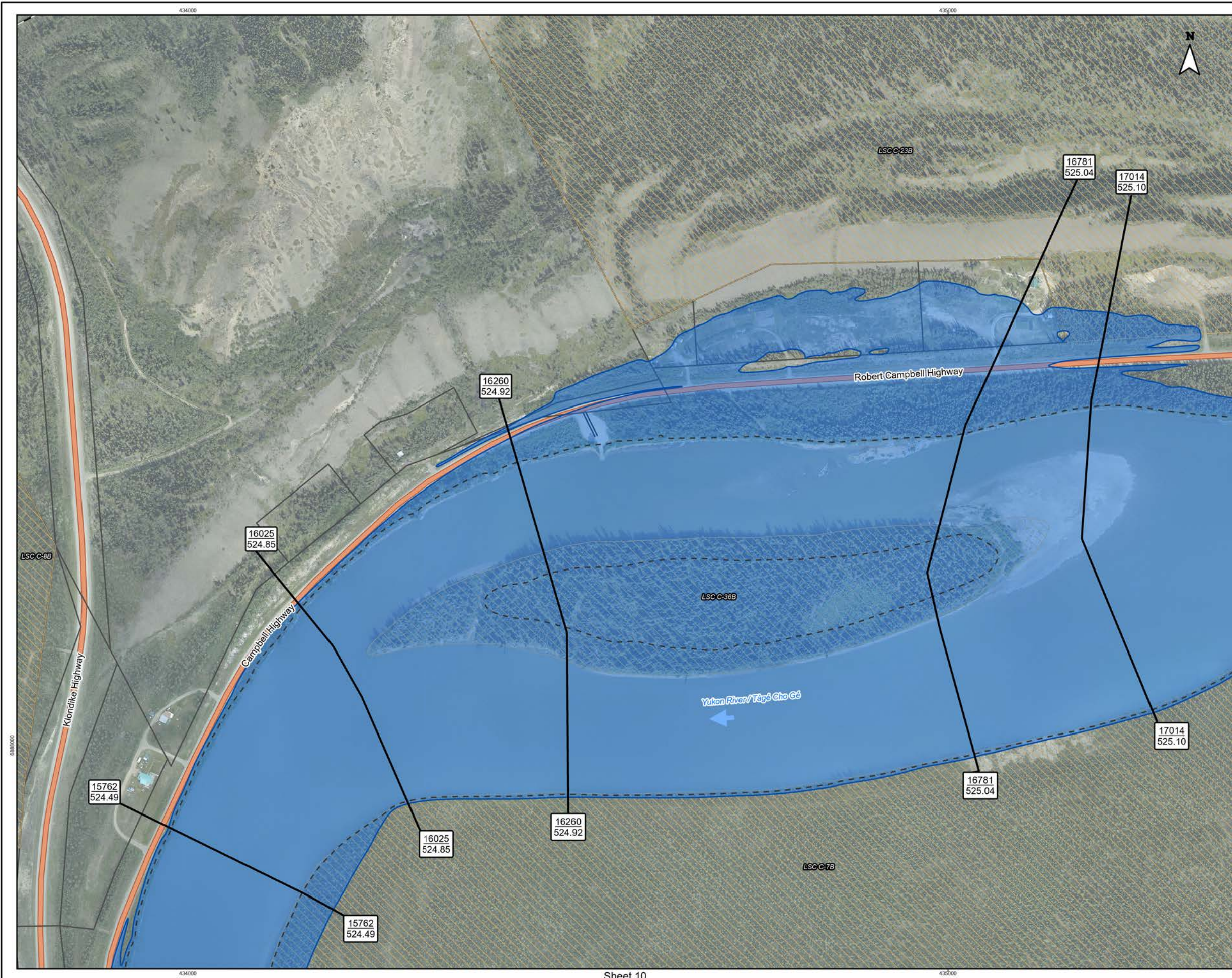


Notes

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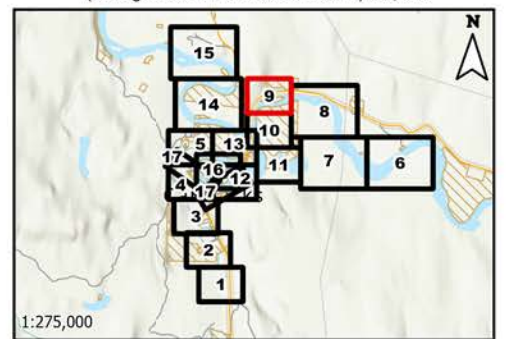
Project: 12322320

Project Location: Carmacks, Yukon

Prepared by MANDERSON on 2024-05-27
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|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number |
| Study Area | WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 27, 2024
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(At original document size of 11x 17) 1:5,000



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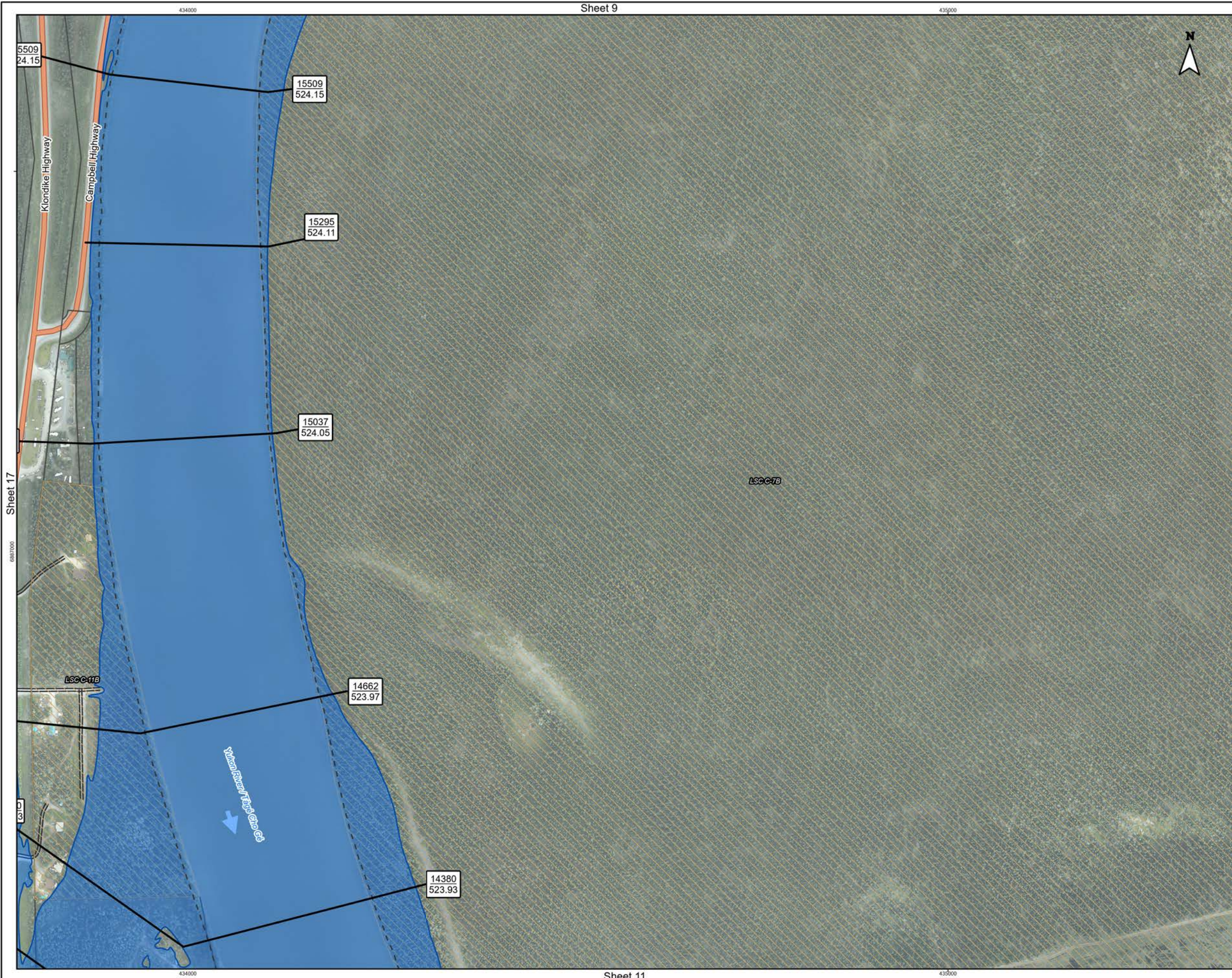


Figure No. **E.5.10** Sheet 10 of 17

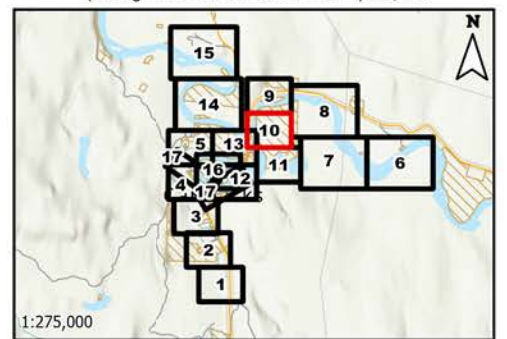
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- | | |
|---|---|
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| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number |
| Study Area | WSE (m) in Main Channel of Cross-Section |

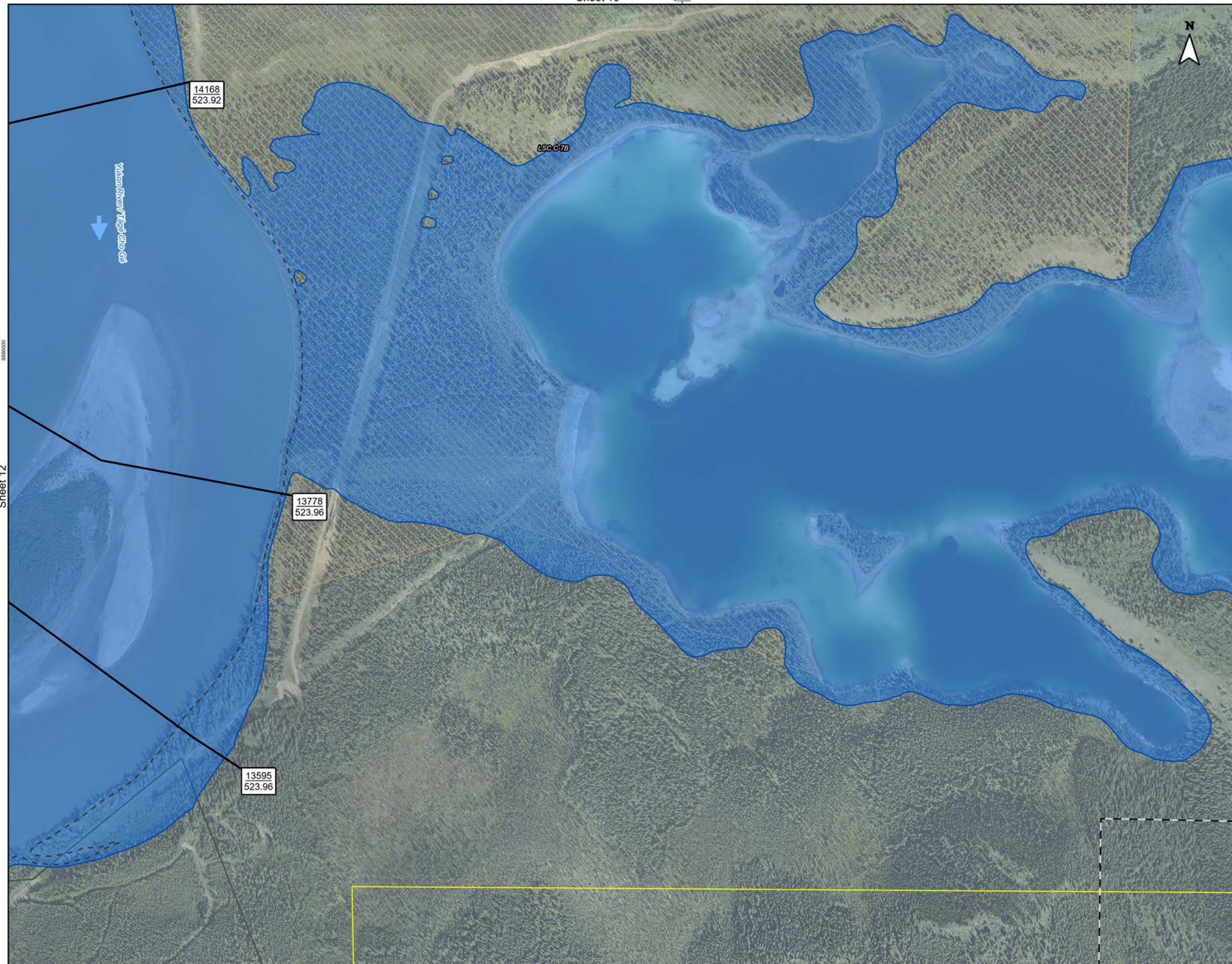
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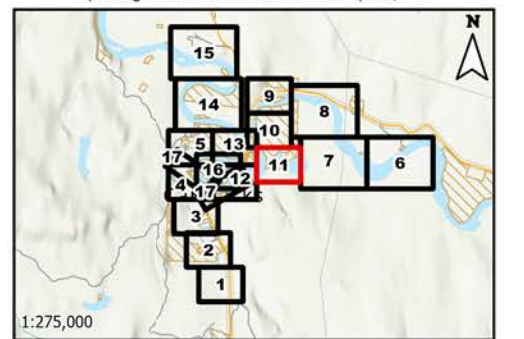
Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 12322320

Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
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| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 27, 2024
0 40 80 120 160 200 m
(At original document size of 11x 17) 1:5,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Carvec.
 3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada
World Hillshade: Esri, USGS
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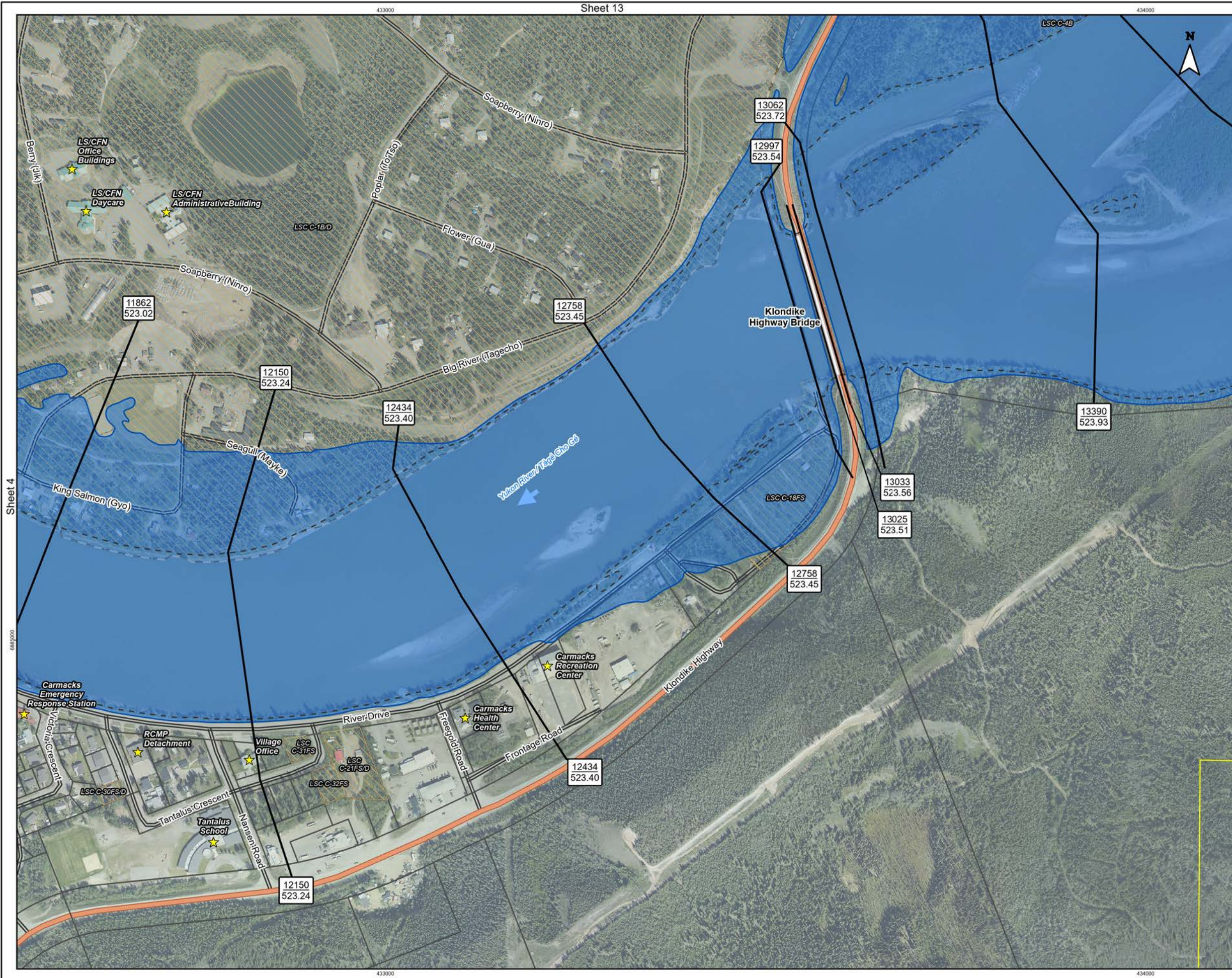


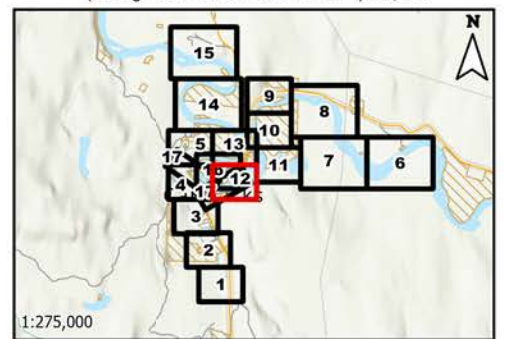
Figure No. **E.5.12** Sheet 12 of 17
 Title: **Carmacks Flood Mapping Study
 Composite Flood Hazard Extents
 0.5% Annual Exceedance Probability (AEP) with Factor of
 Safety for Climate Change**

Client/Project:
 Government of Yukon
 Department of Environment
 Water Resources Branch
 Project: 123222320

Project Location: Carmacks, Yukon
 Prepared by MANDERSON on 2024-05-27
 Requested by JMUIRHEAD on 2024-01-07
 Review by JMUIRHEAD on 2024-05-27

- Flow Direction
- Point of Interest
- Bridge
- Highway
- Local Road
- Little Salmon / Carmacks First Nation Settlement Land
- Land Parcels
- Municipal Boundary
- Study Area
- Hydraulic Model Cross-Sections
- Inundation under Modelled Ice Jam Runs
- Inundation under Modelled Open Water Runs
- Composite Flood Hazard Extent
- Ice Jam Location (toe of jam)
- 50 % AEP Extent
- Hydraulic Model Cross-Sections
- Cross-Section Number
WSE (m) in Main Channel of Cross-Section

Map Publication Date: May 27, 2024
 0 40 80 120 160 200 m
 (At original document size of 11x 17) 1:5,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Carvec.
 3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada
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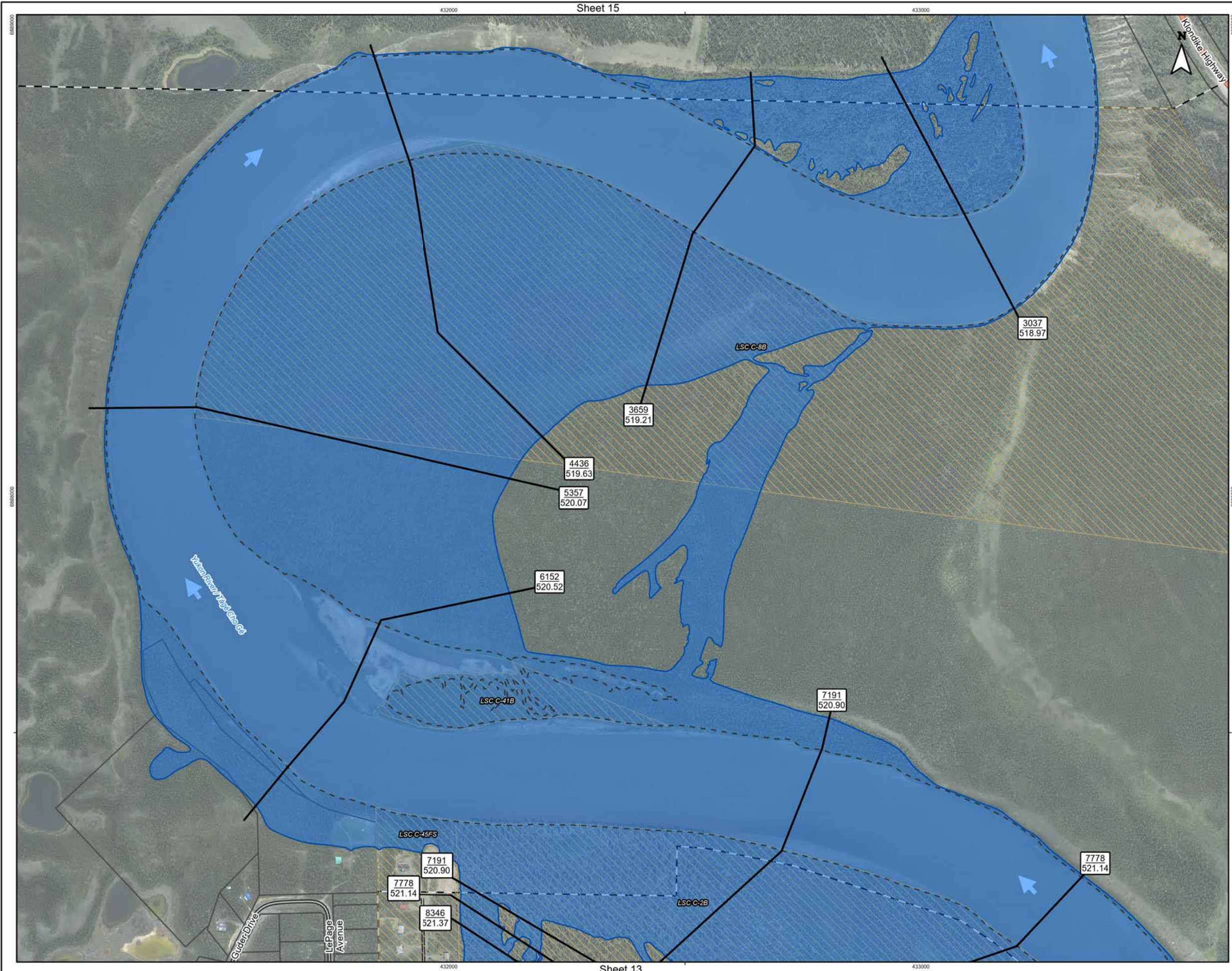


Figure No. **E.5.14** Sheet 14 of 17

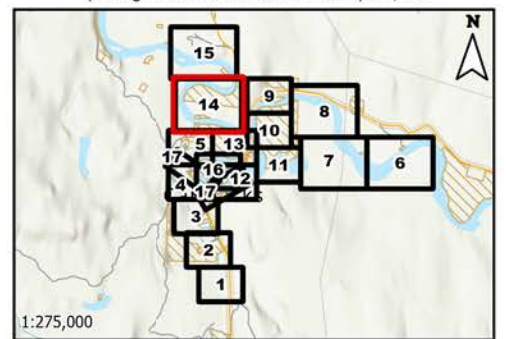
Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of
Safety for Climate Change**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch
Project: 123222320

Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-27

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 27, 2024
0 70 140 210 280 350
m
(At original document size of 11x 17) 1:8,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
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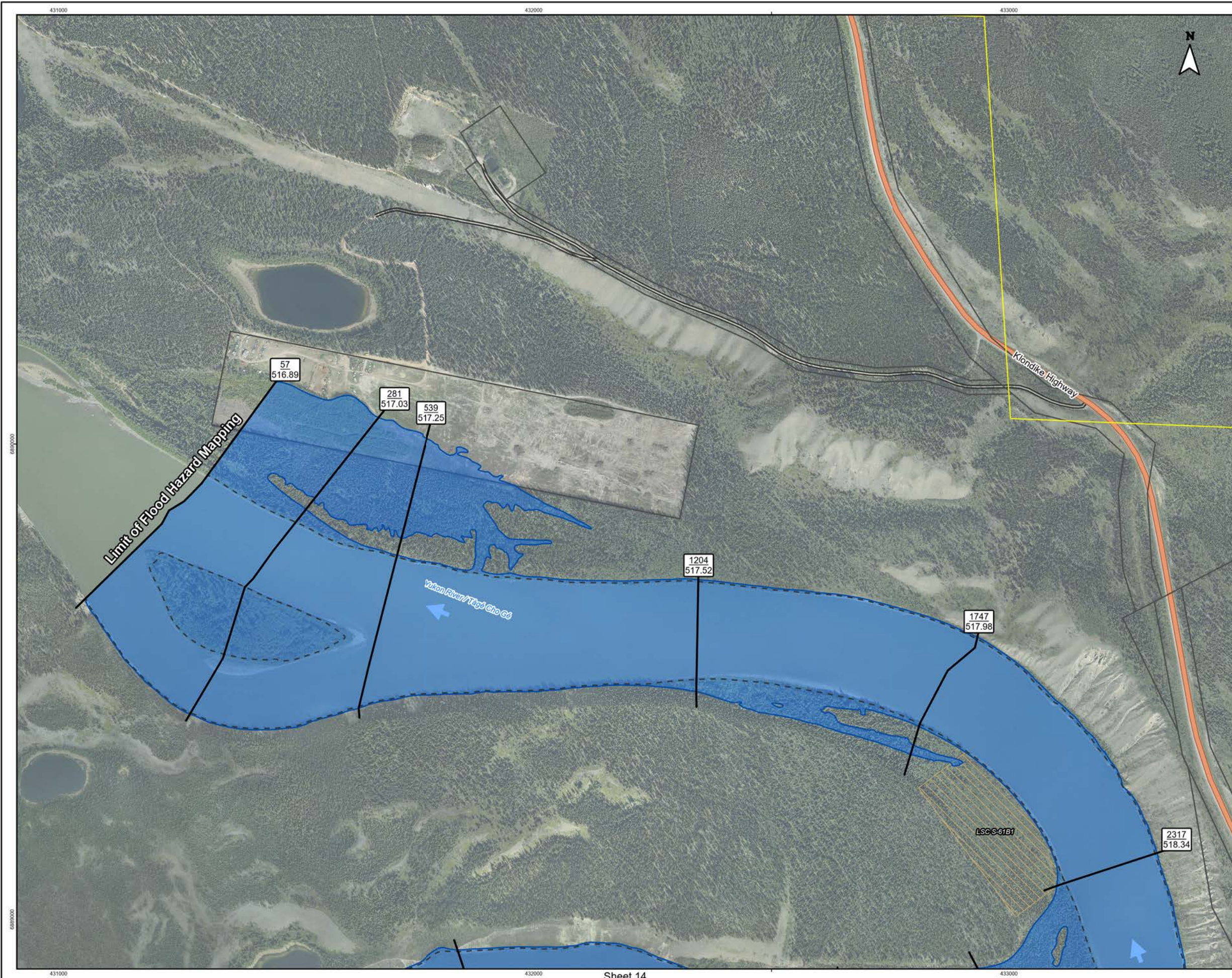


Figure No. **E.5.15** Sheet 15 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of
Safety for Climate Change**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320

Project Location: Carmacks, Yukon

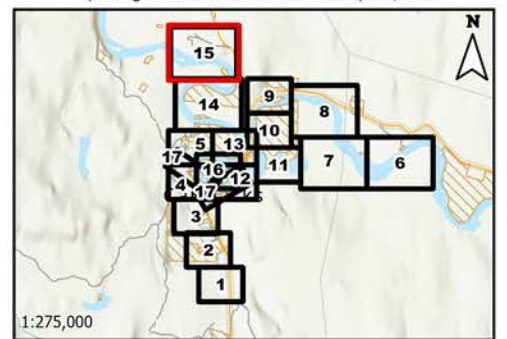
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-27

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 27, 2024

0 70 140 210 280 350
m

(At original document size of 11x 17) 1:8,000



Notes

- Coordinate System: NAD 1983 UTM Zone 8N
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- Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Carvec.
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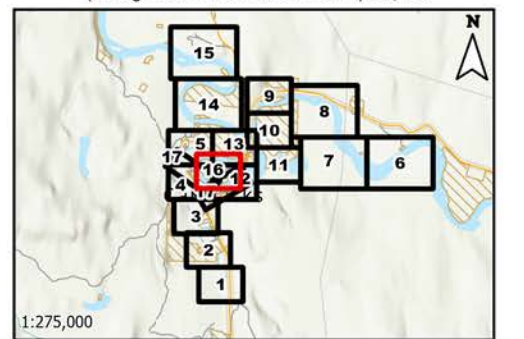
Title: Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of Safety for Climate Change

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch
Project: 123222320

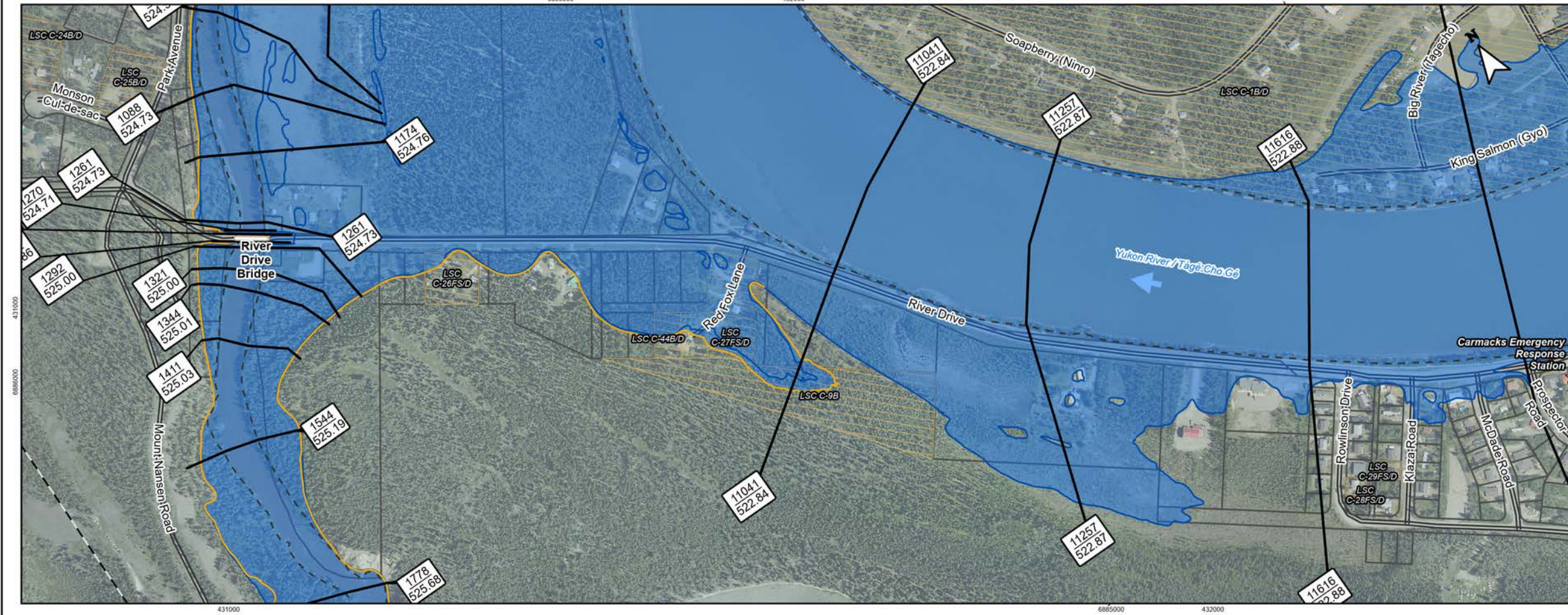
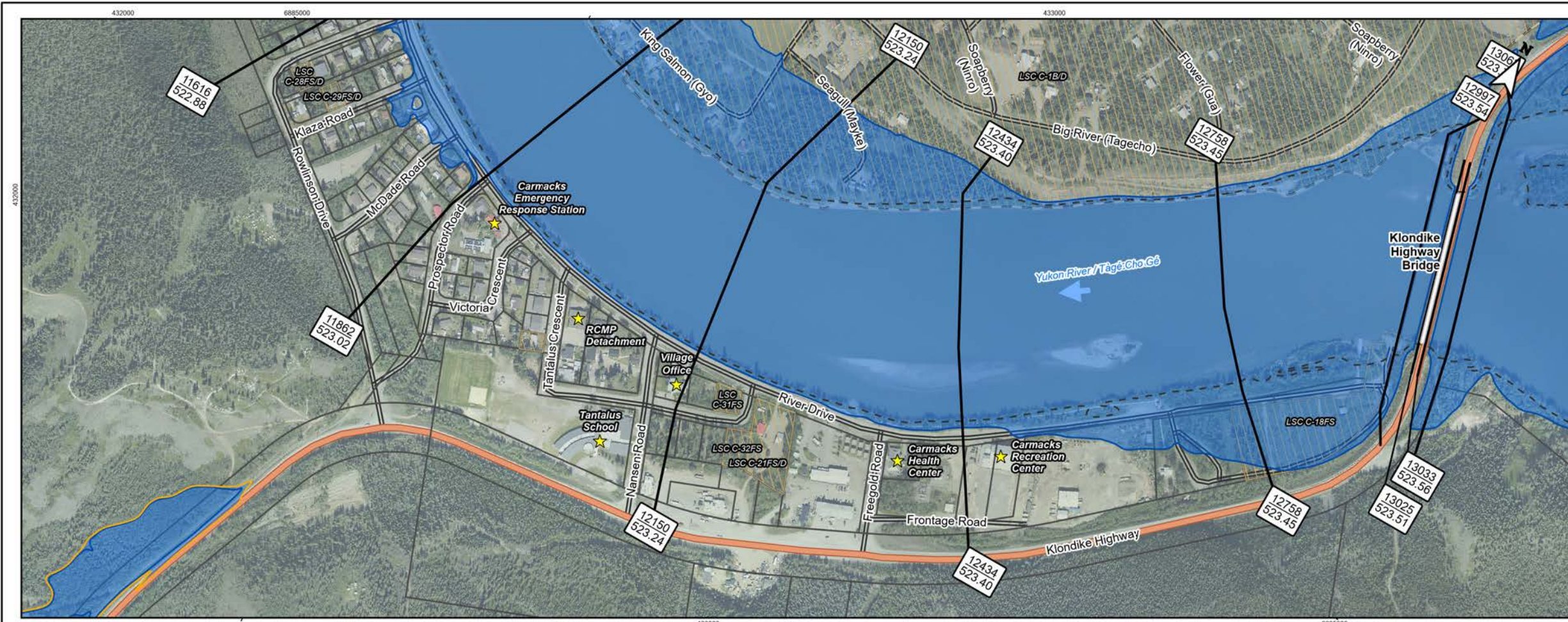
Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-27

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 27, 2024
0 40 80 120 160 200 m
(At original document size of 11x 17) 1:5,000



- Notes**
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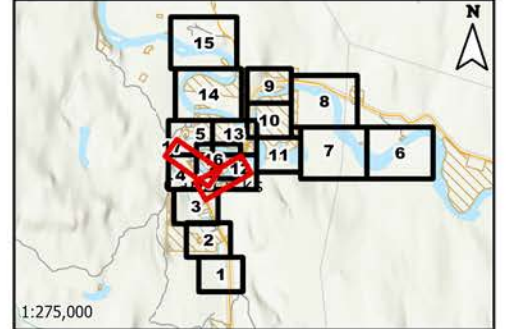
Title: Carmacks Flood Mapping Study
Composite Flood Hazard Extents
0.5% Annual Exceedance Probability (AEP) with Factor of Safety for Climate Change

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320
Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-27
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-27

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number |
| Study Area | WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 27, 2024
0 50 100 150 200 250 m
(At original document size of 11x 17) 1:6,000



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