

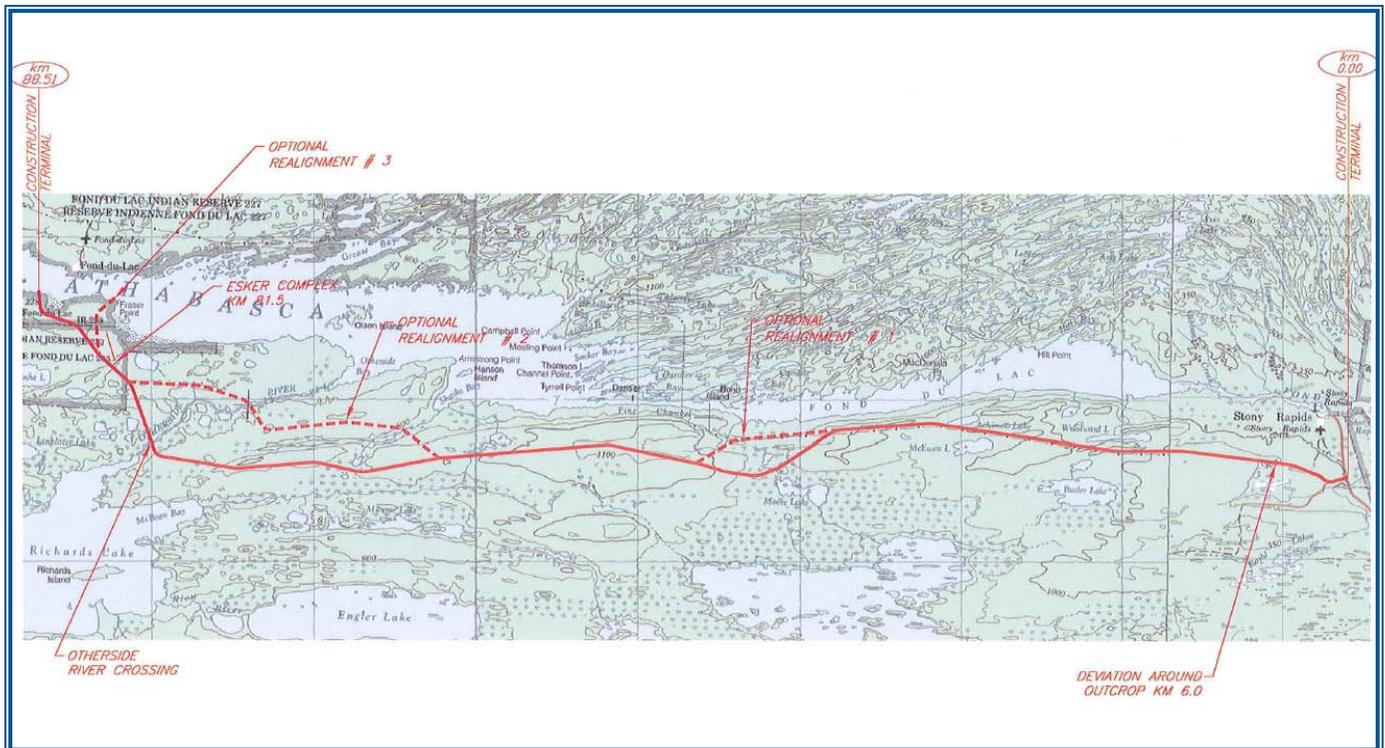
Environmental Project Proposal

Hwy 905 - All Weather Roadway

(Formerly Called Hwy 968)

Stony Rapids to Lake Athabasca

near Fond du Lac



Original Submission January 2010

Submitted to: Saskatchewan Ministry of Environment
Environmental Assessment Branch

Submitted by: Al Loke, Northern Business Coordinator
Ministry of Highways & Infrastructure
Northern Region

1 INTRODUCTION

The community of Fond du Lac is located approximately 85 km west of Stony Rapids in north central Saskatchewan at 59°19'14", 107°11'42". Currently Fond du Lac can be accessed from Stony Rapids by air or water during summer months or by an 80 - 85 km long combination overland/ice road during winter months.

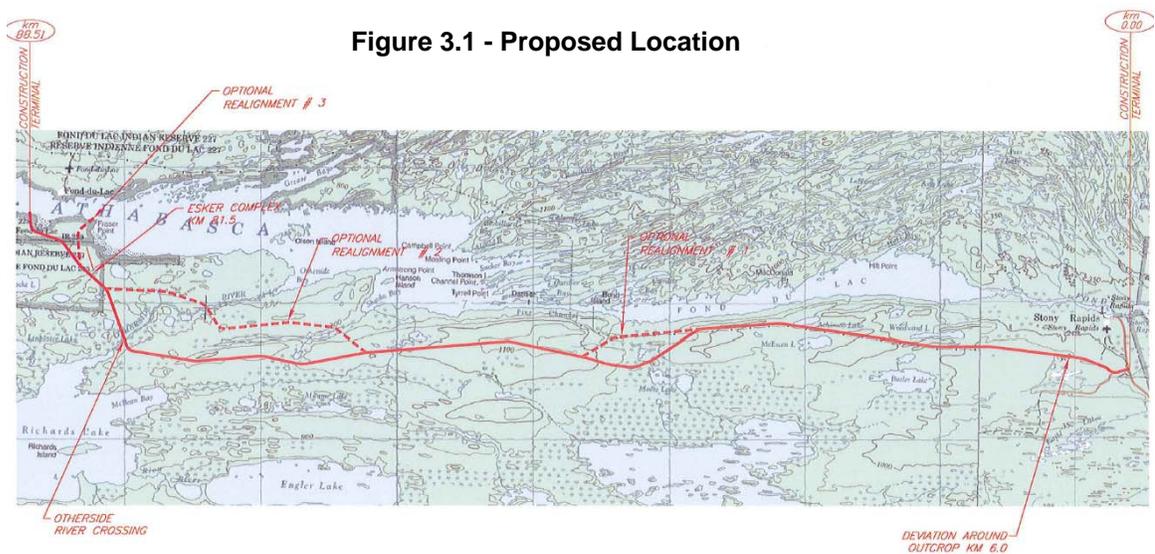
The proposed project consists of constructing a new roadway to serve as an all weather connector from a point near the community of Stony Rapids to a point on the south shore of Lake Athabasca near Fond du Lac. The roadway will be accessible by vehicles year round. From the south shore of Lake Athabasca vehicles will have the option of utilizing a winter ice road to cross Lake Athabasca in the winter or a ferry service in the summer.

2 PROJECT DESCRIPTION

2.1 Location

The proposed all weather roadway traverses the edge of the Athabasca basin from a point approximately 3.5 km south of the Stony Rapids airport to the south shore of Lake Athabasca near Fond du Lac.

Figure 3.1 illustrates an overall view of the proposed location of the road.



In general the first 31.9 km of the proposed roadway follows the existing winter road location west of Stony Rapids, with exceptions where deviations are required to meet Ministry geometric standards. The remaining 56.6 km of roadway will be located on entirely new location. In total the new proposed roadway will be 88.5 km long. The east terminus of the roadway is a tie in point with highway 905 approximately 3.5 km south of the Stony Rapids airport. This point is immediately south of an existing SaskPower station, near the location of the current winter road tie in. The west terminus of the roadway is the south shore of Lake Athabasca near Fond du Lac approximately 2 km west of Fraser Point.

See Appendix A for an overall key plan of the roadway location and optional alignments investigated. See plans in Appendix B for detail on the proposed location of the road, as well as realignment options that were investigated during pre-design studies.

2.2 Project

The Project involves the construction of an 88.5 km all weather roadway from Stony Rapids to Fond du Lac. A location report was recently completed for the project that included a proposed route and three optional realignments. Prior to any construction work it is planned to complete a LiDAR survey along the project. This is a non invasive, remote technique that allows the collection of detailed ground elevation information using a light source. Once this information is collected detailed design work on the project will commence.

A functional design standard was chosen by the Ministry for the new roadway. Details are as follows:

- Road top width = 8.0 m
- Design speed = 90 km/h
- Surface type = Gravel
- Maximum vertical gradient = 8%
- Sideslope = 4:1
- Backslope = 3:1
- Ditch bottom = 5.0 m
- Curve radius (minimum) = 375 m
- Right of Way width = 46 m

This is a typical Ministry standard that has proposed on other recent northern low volume roadways.

Construction of the all-weather road will involve established methods adapted to the remote and rugged northern environment and the specific terrain of the chosen route. In general terms, the construction sequence will be performed along the one chosen route as follows:

- Initial location centerline clearing (approx 5 – 8 m wide trail)
- Right of way clearing and grubbing
- Roadway subgrade construction (including excavation of borrow sources)
- Crushing of granular material for the roadway surface
- Installation of required stream crossings including culverts and bridges
- Cleanup of Right of Way, borrow sources, and granular sources
- Remediation work (As required)
- Post Construction Activities

Overall, the process will adhere to the *Guidelines for Environmental Protection During Road Development* (Saskatchewan Environment, 1981), *Environmental Design of Northern Road*

Developments (Environment Canada, 1978) and *Environmental Code of Good Practice for Highways and Railways* (Environment Canada, 1979).

2.3 Inputs

The initial 32 km portion of the proposed roadway follows the existing location of the winter road to Fond du Lac. As such, the amount of clearing was somewhat minimized. It is anticipated that there will be a total of approximately 360 ha of clearing that will be required based on the proposed Right of Way width. A significant portion of this area has burned in recent years, so merchantable timber in these areas is expected to be minimal. In areas not affected by previous fires, trees of significant enough size to meet MOE guidelines for merchantable timber are present.

It is estimated that approximately 1,600,000 m³ of earth material will be required to construct the roadway with adequate grade. A large portion of this material will come from earth cuts located within the Right of Way limits. There is also expected to be requirements for borrow pits located outside of the right of way along the project limits. These borrow pits will consist of landscape type and deep type pits dependant on terrain in the area. In general deep type pits will be located in flatter areas, and landscape type pit will be located in hilly/undulated areas where it is possible to excavate into hill sideslopes.

Locations for these borrow sources will be finalized during the detailed design stage of the project. Permit applications will be sent in for review by Ministry of Environment staff on a case by case basis for these sources.

For compaction purposes it is anticipated that approximately 32,000 t of water will be required. It is expected that this water will be obtained from sources near or on the proposed Right of Way. Water use permits will be required for each site, and will be applied for prior to use. Provisions will be established in the contract to ensure the Contractor adheres to conditions established in the permit.

Approximately 55,000 m³ of granular material will be required for stabilization of the subgrade and completion of the roadway driving surface. It is anticipated that there will be several sources obtained near the route for use in manufacturing this material. Permit applications will be sent in for review by Ministry of Environment staff on a case by case basis for these sources.

It is anticipated that there will be one bridge required along the route. This will an approximately 50 m long structure located at the Otherside River with an approximately 8 m wide pre-cast concrete deck. Details pertaining to this structure will be completed during the detailed design stage. Applications will be sent to applicable agencies prior to design work being completed.

Numerous small corrugated steel pipe installations will be required for small drainage crossings along the route. Larger open span arch installations may be used for larger stream crossings where fish passage and habitat issues are present.

2.4 Ancillary Projects

At the time of this proposal preparation the proponent (MHI) was unaware of any ancillary projects that are planned in the immediate area of the planned roadway. Due to the nature of this type of project there would be an increased ability to access the area following construction, and a possibility that other developments may be requested by other proponents at locations along the project limits.

2.5 By-products

By-products resulting from the project consist of items typically found in other linear earthworks projects. It is anticipated that there will be disruption to items such as the soil organic layer and vegetation community within the Right of Way along the project limits during clearing and grubbing operations. There will be need to construct water crossings, and it is anticipated that there are several waterways which will be deemed as having fish significance by DFO.

There will be a need for temporary work camps, which will create waste and garbage that will require proper storage and disposal. Items such as air emissions, noise, and socio-economic issues will also occur, but are difficult to quantify prior to work being awarded to a Contractor, and specifics provided.

2.6 Alternatives

During office mapping work several optional alignments were identified that proposed the possibility of shortening the route, and saving construction costs. These areas were investigated in the field during on site work to determine if they represented better options than the main proposed route. A general location of these alternative alignments can be found in Appendix A. Detailed plans illustrating these options are included in Appendix B.

Optional Alignment #1

An optional alignment was investigated starting from km 31.9 that would allow the proposed route to utilize more of the current overland roadway location. The length of this section is 9.3 km, which is 0.4 km shorter than the corresponding portion of the proposed alignment.

Optional Realignment #1 Location



As a portion of this is on existing location it would assist in minimizing new disrupted area, and clearing and grubbing. Several issues were found with this location during on site work. Overall this alignment was found to be quite rugged. There were found to be several areas containing steep grades (Greater than 8%) that are located in unstable sand formations. There were several marshy areas contained through the realignment that would add cost to construction. A large section (Km 6.5 to 8) of this realignment contains boulder lag on surface. The largest overall issue is that majority of this option has sharp cross slope drainage. This is a problem that has caused maintenance issues on the existing location here in the past. For these reasons Optional Realignment #1 is not planned to be constructed unless future work determines problems with the proposed route that cannot be avoided (such as unforeseen environmental issues).

Optional Alignment #2

During a meeting with residents of Fond du Lac in 2006 a possible location for a bridge was identified by elders. A possible route was investigated that deviates from the proposed route at km 57.7, and ties back in at km 80.1. The length of optional realignment #2 is 20.5 km's, which is 1.9 km's shorter than the corresponding portion of the proposed route.

Optional Realignment #2 Location



This alignment contains 5 water crossings, and a crossing at the Otherside River, which is 2 more than are located on the proposed route. There were several wet/low areas that would add to construction cost. An area was encountered at km 17 where a stream

crossing/muskeg area was encountered with a 20 m rock face on each side of the crossing. This area would require blasting and significant fill to maintain reasonable roadway grades.

The most significant issue with this possible alignment is the conditions present at the Otherside River, which is located at km 13.4. The location looks suitable in airphotos, but field investigation determined that the crossing is about 50 m wide, and is located in an area with a relatively steep vertical stream gradient with rapids. Approach grades to the river are also much steeper on each side of the crossing than on the proposed route, which would likely add significant construction costs to the crossing. Also, a large marshy area was found on the west side of the location that would require approximately 200 m of muskeg padding.



Optional Realignment #2 Location – Otherside River Crossing

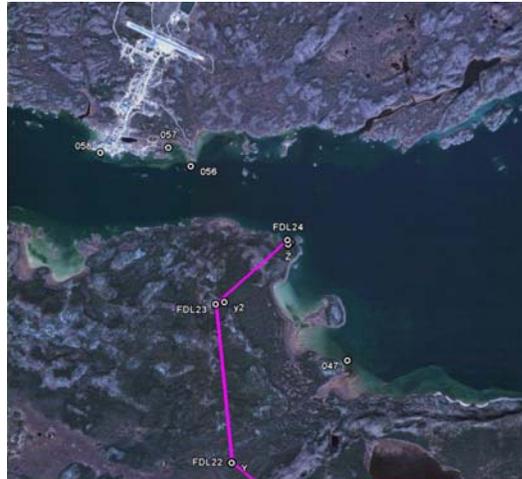
For these reasons it is not recommended that optional realignment #2 be constructed unless future work determines problems with the proposed route that cannot be avoided (such as unforeseen environmental issues).

Optional Alignment #3

Several options for an entry point onto Lake Athabasca were investigated during on site work. The shortest route across the lake would be from the location of the old townsite on Fraser point, which is located immediately across the lake from Fond du Lac. This crossing point was determined to be unfeasible due to limited lake depths and fast moving water. There are also several sandbars located here that would make ferry use difficult during summer months. In the winter, fast flowing water here tends to keep ice too thin to create a winter road.

Options located both west and east of the community of Fond du Lac were looked at for a feasible point of entry. Initial work using airphoto and topographic information identified a possible entry point located to the east of the community. This point was investigated in

the field during on site work and showed good potential of being an effective lake entry point.



Optional Realignment #3 Location – Alternate tie in location

During the community consultation meeting on November 30, 2009 this option was presented. Local residents expressed concern that the ice in this particular area is often dangerous due to the flows near Fraser Point. They also expressed concern about additional roadway being required on the north side of the lake to get to the community after crossing the ice. Some of the residents also expressed concern about travellers needing to pass through the community of Fond du Lac unnecessarily on their way along the ice road to Uranium City.

This point was determined to have sufficient depth to operate a ferry service. An issue that would be presented with the location would be the need to operate the ferry through the rapids near the community, which would be undesirable.

Due to issues identified by the residents regarding ice condition, and possible problems with ferry service this option is not planned to be constructed unless future work determines problems with the proposed route that cannot be avoided (such as unforeseen environmental issues).

3 DESCRIPTION OF THE ENVIRONMENT

The project limits are located in an area which could generally be characterized as un-inhabited. The roadway is to act as a link between the communities of Stony Rapids and Fond du Lac, which are the only two communities in the area. During consultation meetings there were several areas indicated as containing traditional land use items such as fishing and trapping.

According to the Geologic Atlas of Saskatchewan the dominant soil texture in the area is sandy (loamy sands, sands, gravel) and the topography is indicated to be dunes. The Soil Complex for the area is dominantly Podzol (light colored forest soil) with significant occurrence of Regosols (weakly developed soils) and Fibrisol (deep moss peat). Podzol soils are said to have a thin, light grey to white A horizon and a bright brown B horizon.

The initial 32 km of the route is located along an existing cleared winter roadway. Mixed forests can be found along the project limits. A significant portion of the forest contained along the route was burned in a forest fire that occurred during the summer of 2006.

The route traverses past several lakes and waterbodies. Care was taken during the route selection to ensure minimum setbacks from all water bodies along the location (Minimum 90 m). A bridge crossing will be required at the Otherside River. Several culverts and open span arch structures will be required for other drainage along the route. It is anticipated that a portion of the waterways crossed along the route will be deemed fish bearing.

4 POTENTIAL IMPACTS AND MITIGATIVE MEASURES

MHI will be the primary proponent for the project, and as such will be responsible for implementing mitigation measures to minimize environmental disruption during all project phases. MHI is committed to working with MOE to ensure that any environmental impacts can be mitigated, or preferably avoided during this project. MHI follows the Habitat Mitigation Guidelines for Road Construction that were developed jointly by MHI, MOE, Ducks Unlimited, Watershed Authority, and SARM.

The proposed route does not pass near any occupied dwellings, residential areas, or other similar land uses. Therefore, the construction activity will have no effect (e.g., noise, dust) on local residents. The connection to the community of Stony Rapids is south of the community near the current access point. There are no residents currently living near either proposed roadway terminus. Construction will generally remain within a 46 meter corridor, with the exception of areas where borrow pits and aggregate sources are required.

During construction MHI (or consultants representing the Ministry) will have field technicians on site to monitor and document construction progress. These individuals will ensure that the contractor works within the MOE permit requirements.

Permits that are anticipated to be required during the project include:

- Work Authorization Permit – from Saskatchewan Environment (La Ronge office) before any construction is initiated.
- Forest Product Permit from Saskatchewan Environment will be required for clearing forest vegetation.
- Temporary Work Camp Permit(s) from Saskatchewan Environment (La Ronge office) for the establishment of any temporary camps for construction.
- Aquatic Habitat Protection Permits – from Saskatchewan Environment (La Ronge office) for carrying out any work within or adjacent to aquatic habitats.
- DFO Letters of Advice and Fisheries Act Authorizations. The crossing details for all streams will be provided to DFO as part of the permitting and approval process.
- Temporary water use permits from Saskatchewan Watershed Authority for any surface water used during construction.

- Approval from Navigable Waters Protection Program for the Otherside River crossing and other navigable crossings along the route.
- Gravel Quarry Dispositions from Ministry of Environment Resource Registry in Prince Albert for all quarry sites.
- Land Tenure – transfer of the new right-of-way to MHI will be required upon completion of the road. An as-built survey plan will be submitted to Saskatchewan Environment Resource Registry in Regina.
- Hazardous Substances and Spill Control – it is important that employees and contractors are fully trained in the proper handling of hazardous substances and waste dangerous goods and in emergency spill response, and that provincial legislation is followed.
- Permits for some aspects of the work camps (e.g. sewage disposal) from Mamawetan Churchill River Health Region in La Ronge.

Vegetation

MHI will obtain from MOE the necessary forest use permits for the clearing of the right-of-way. The exact location of the clearing will be provided at the time of application. A contact person responsible for the clearing of forest vegetation will be identified to MOE and will provide reports on progress and issues encountered. All debris will be disposed of in accordance with The Forest Resources Management Act. Boundaries of the work area will be clearly marked using flagging tape or similar methods to prevent excessive clearing of vegetation outside the designated work area. Vegetation clearing will be restricted to the right-of-way and ancillary development areas. Grubbing will take place only on areas to be filled or excavated. Disruption of the organic layer (topsoil) will be minimized as right-of-way clearing will be performed during the winter when the ground is frozen.

Water Crossings

MHI will consult with Saskatchewan Watershed Authority to obtain flow information, and will provide completed hydraulic reports to MOE, DFO, and other agencies for major water crossings along the route. Stream crossings will be constructed following the Fish Habitat Protection Guidelines: Road Construction and Stream Crossings of Saskatchewan Environment (MOE, 1995). These guidelines deal with fish and fish habitat protection and erosion and sediment control.

Care was taken during route selection to ensure minimum setbacks from all water bodies along the location (Minimum 90 m). Also, as much as possible stream crossings were intersected close to 90 degrees to allow the shortest possible disruption. Hand methods of clearing will be implemented near these crossings during the clearing & grubbing phase of the project.

Erosion and Sediment Control

MHI will work to ensure that the Contractor minimizes the required environmental footprint during construction. An approved MOE seed mixture will be specified for all areas disturbed during construction. Where necessary straw matting, or similar, will be used for erosion control on sideslopes and ditch grades. Silt fence will be used in locations where possible sediment issues could arise.

MHI has developed a construction guide for Best Management Practices (BMP) called Erosion and Sediment Control: Best Management Practices – Field Reference Manual. This guide will be used to help determine the BMP's to use during construction.

Fire Control

In the contract requirements the successful contractor will be required to have on hand a fire protection plan and the necessary safety equipment. The plan and equipment will meet the requirements of The Prairie and Forest Fires Act, 1982, and the Forest Management Requirements for Independent Forest Operations.

Hazardous Waste Storage

In the contract requirements the successful contractor will be required to adhere to regulations set out in The Hazardous Substances and Waste Disposal Goods regulations, along with other guidelines set out by MOE such as the Environmental Spill Control Regulations. In the event of a spill MOE will be informed and water quality tests will be undertaken to assess the damage and to develop a remediation plan if required. MHI will identify remediation needs in consultation with MOE. Contingency plans will be in place for operators to consult in the event of a spill. No fuel, oil or other hazardous material will be stored within 100 m of any water body. Additionally, no servicing of equipment will be permitted within this same zone.

Safety

MHI will require that staff and all contractors adhere to the appropriate Occupational Health and Safety guidelines through all stages (pre-construction, construction, and operation) of this project. The tender documents will clearly state that all contractors shall perform all work in accordance with the rules and regulations of The Occupational Health and Safety Act, 1993 and the Occupational Health and Safety Regulations, 1996. The contractor will also be provided copies of the MHI OH&S Safe Operating Procedures (SOPs). The contractor will also be required to ensure that all workers have access to this information and are aware of all appropriate health and safety procedures relevant to this project. MHI will also reserve the right to have an external safety audit performed at any time during the course of the contract.

5 DECOMMISSIONING AND RECLAMATION

The project as currently planned is for the construction of an all-weather road. The operating life of the roadway is expected to carry on indefinitely. However, should the roadway cease to be required, decommissioning of the roadway would be undertaken. Decommissioning and abandonment would be carried out in accordance with provincial guidelines (Ministry of Environment, 1981). Reclamation of any areas would be completed in a similar manner. Generally, abandonment would involve the removal of bridges and culverts and allowing the right-of-way and road surface to naturally re-vegetate.

6 PUBLIC CONSULTATION

For many years there has been desire by the residents of Fond du Lac to have an improved link to the south. In particular, the need for an all weather roadway that would allow more efficient transportation of goods and services has been stressed by Chief, Council, and residents. On several occasions letters in support of an all weather road have been sent to the Ministry by the band. The Ministry has entered into discussions with residents of Fond du Lac on several occasions about the construction of this all weather roadway.

In 2006 Ministry staff attended a meeting in Fond du Lac to discuss possible locations for the roadway, and to show several alternatives to residents.

As part of the consultation process, plans were also provided to the owner of an Athabasca Camps Inc. to obtain his comments on the route. He mentioned that he is the only outfitter with interest in the immediate area. A location plan showing the general location of the road was provided to him, and he responded favourably.

Staff from Associated Engineering and MHI attended a meeting in Fond du Lac with Chief, council, and elders on November 30, 2009. Illustrations of the proposed route were shown to the attendees for comment. A possible location for the ferry crossing was also discussed, and comments from locals taken. Future steps required prior to construction were discussed and questions were answered. Discussions also took place regarding the need for land through the reserve. No objections to the acquisition of this land were noted at the time of the meeting. Overall, support of the roadway was stressed and residents expressed desire to see the project start as soon as possible.

Recently a letter of support and Band Council Resolution was sent to the Ministry from the Fond du Lac Indian Band showing support of this roadway project and the proposed location. A copy of this correspondence can be found in Appendix C.

7 SOCIO-ECONOMICS

For many years the community of Fond du Lac has expressed the need for a connector roadway to Stony Rapids. This roadway is a strong desire of residents who feel as though it will act as an economic enabler, and will allow residents to have better access to the provincial highway network and in turn the possibility for a better standard of living. Much interest lies in the need for an increase in the cost effectiveness of shipping goods to and from the community.

Construction of the all-weather road will be ongoing for approximately 3 years and will include employment opportunity for an estimated 300 FTE (Full Time Employee equivalent) for the construction period including spin-off employment and work at other sites. Initial opportunities will include surveying for clearing operations, and later for earthworks and bridge construction. There will be employment opportunities for surveyors, survey assistants, labourers, heavy equipment operators, truck drivers, camp cooks and camp attendants, mechanics, as well as supervisors. It is anticipated that contractor requirements for survey assistants, labourers, heavy equipment operators, truck drivers, camp cooks and attendants may be met from within northern communities, to the extent that trained people are available.

There will also be some employment opportunities during the operation and maintenance phase. MHI encourages local contractors to bid on the various contracts, and they encourage contractors to maximize northern employment.

All phases of the project (pre-construction, construction, and operation) could produce potential safety hazards for workers (e.g., use of heavy equipment, blasting of rock, work near water bodies, exposure to dangerous animals, poor weather conditions, etc.). These effects will be avoided through the use of appropriate safety procedures (e.g., adherence to Occupational Health and Safety Guidelines) and through adherence to MHI safety requirements, which will be included in the tender documents and be communicated to all contractors.

8 CONCLUSION

MHI is formally requesting timely feedback from MOE as the efficient delivery of this project is important. MHI appreciates the importance that MOE has put on working with us through these projects to ensure that the people of Saskatchewan get a safe, efficient transportation system that is built in an environmentally sensitive manner.

If you require any further clarification or wish to discuss please feel free to contact me at 306-425-4268.

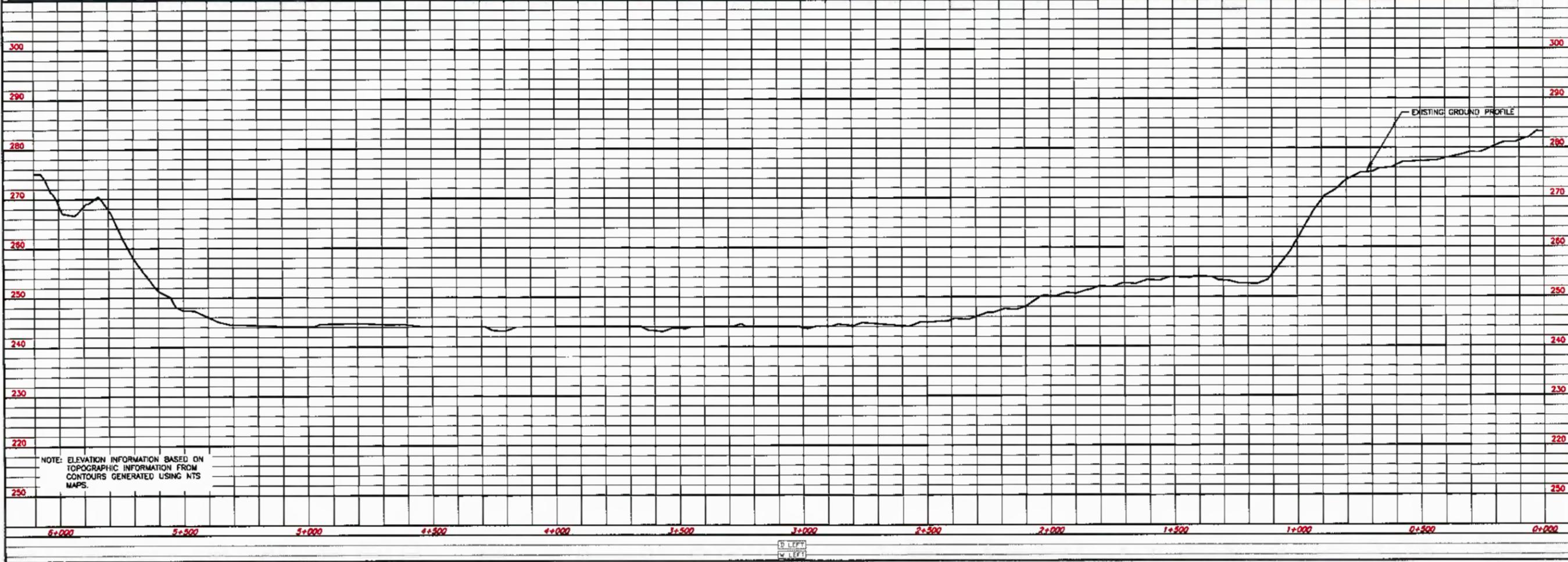
Sincerely

Al Loke
Northern Business Coordinator
Ministry of Highways & Infrastructure
Northern Region

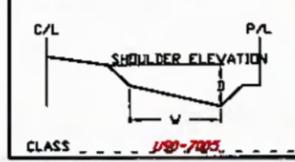
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DETAILED LOCATION
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STONY RAPIDS TO FOND DU LAC
OPTION # 1



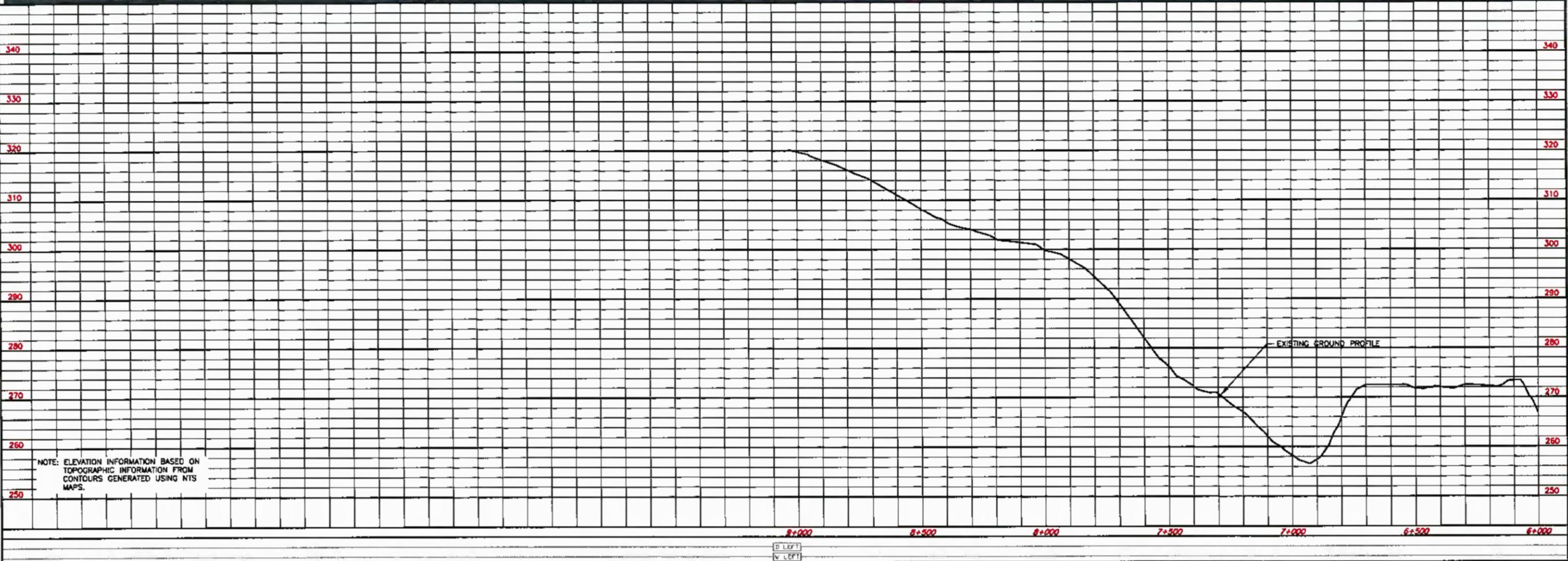
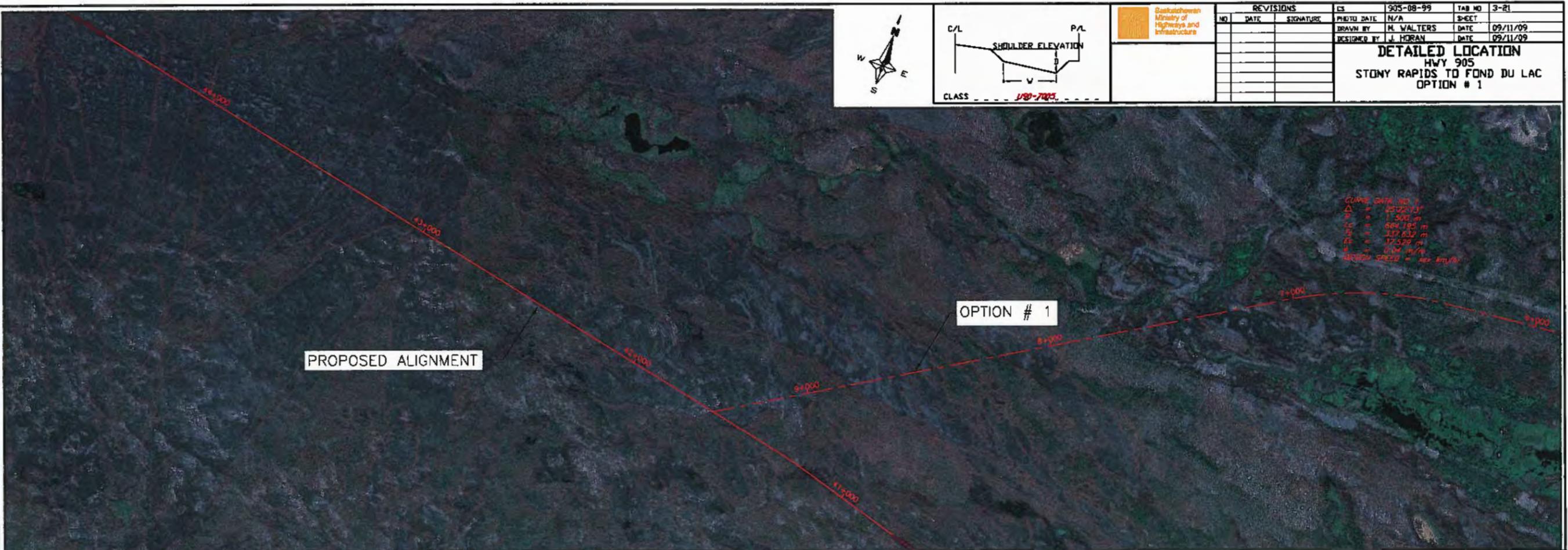
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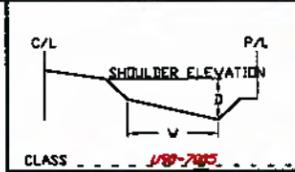
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DETAILED LOCATION
 HWY 905
 STONY RAPIDS TO FOND DU LAC
 OPTION # 1



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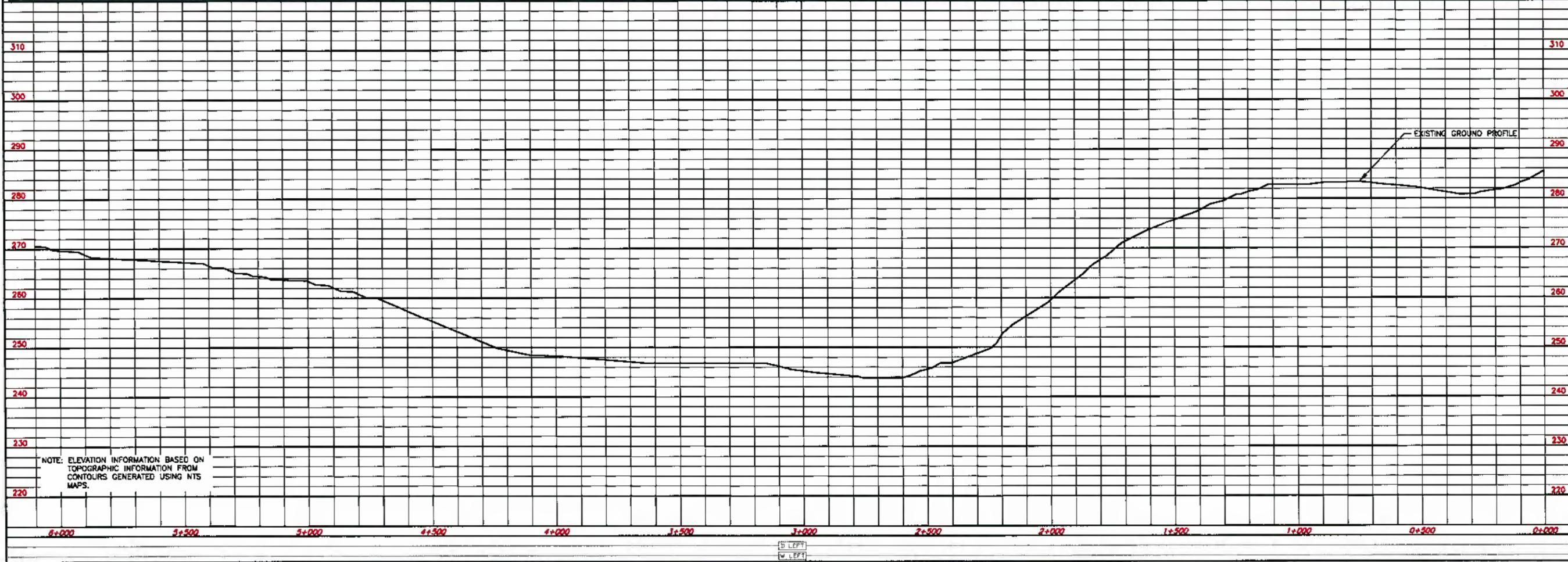
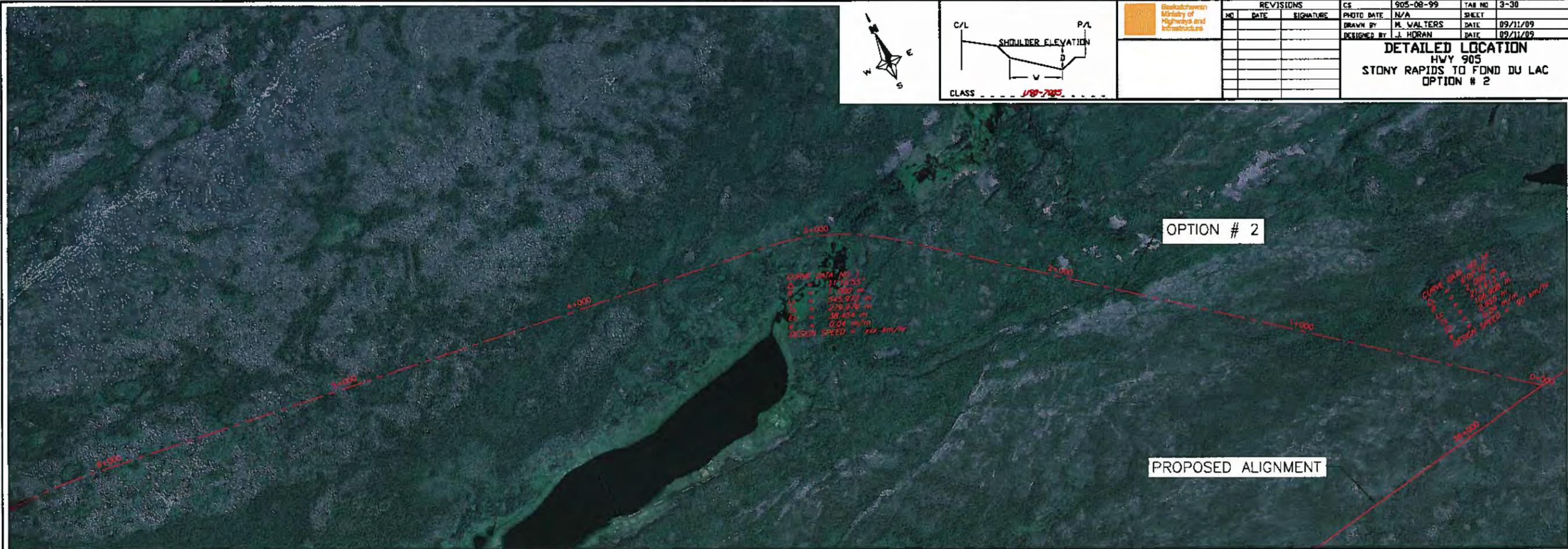


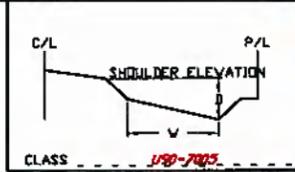
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DETAILED LOCATION
HWY 905
STONY RAPIDS TO FOND DU LAC
OPTION # 2

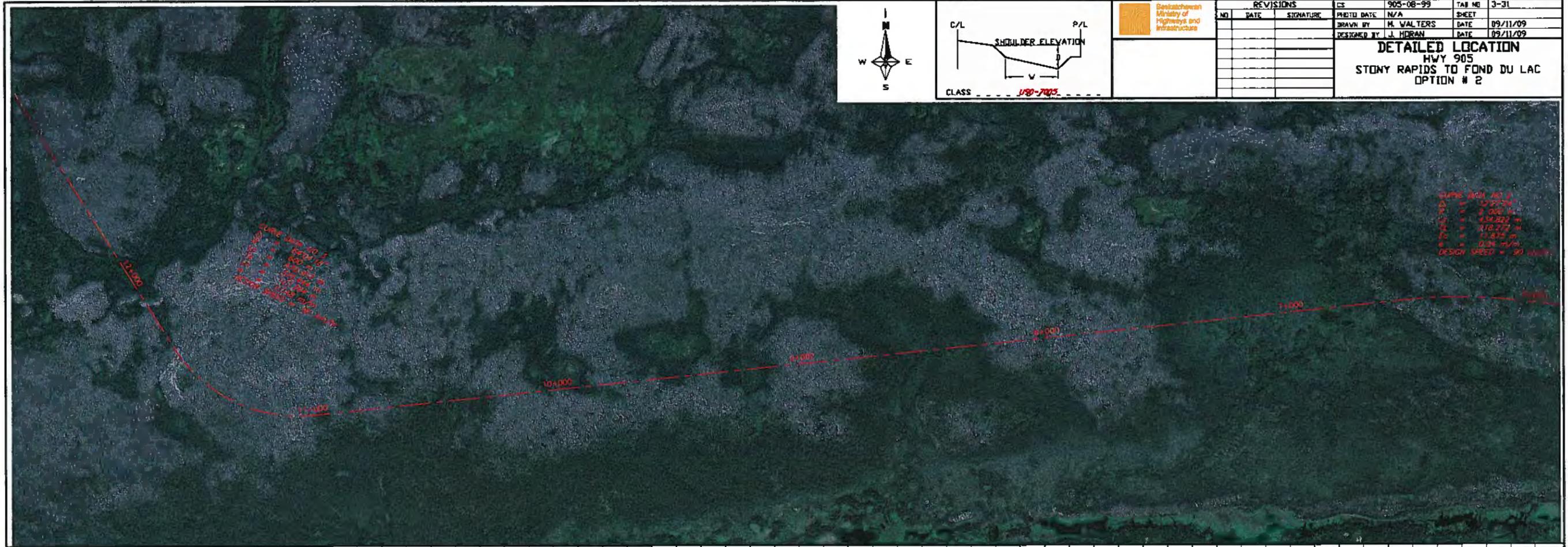




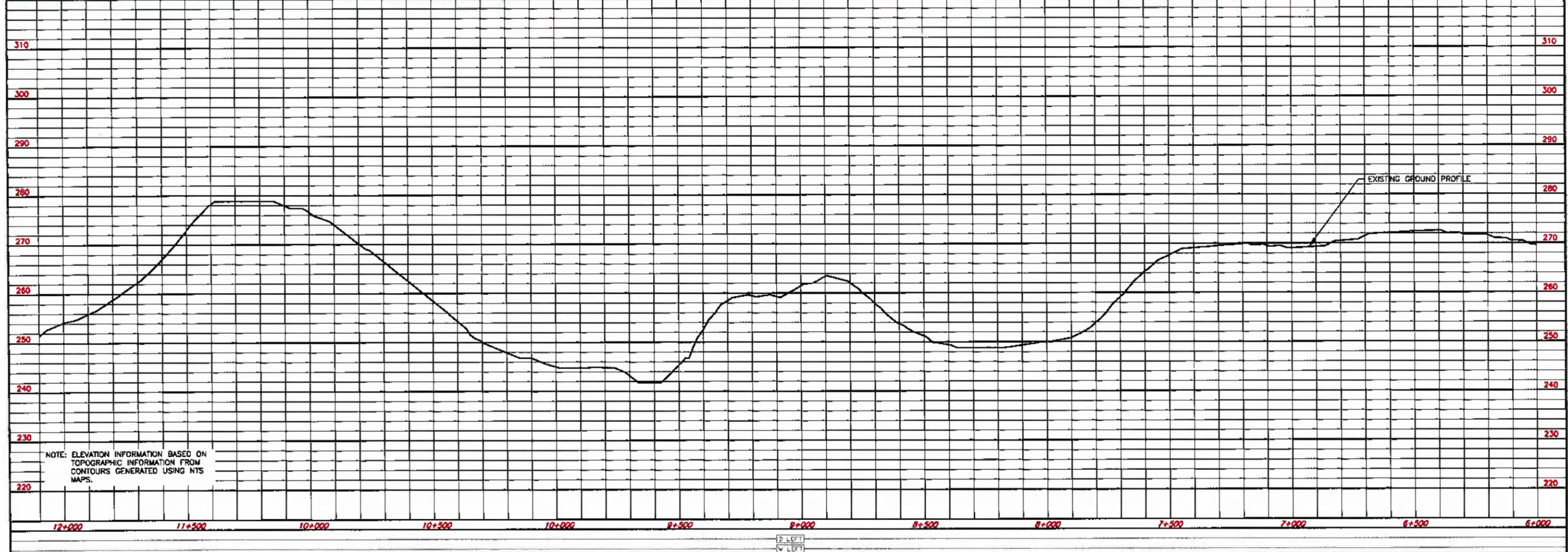
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DETAILED LOCATION
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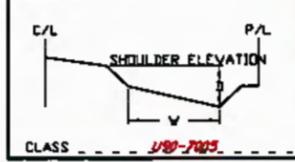


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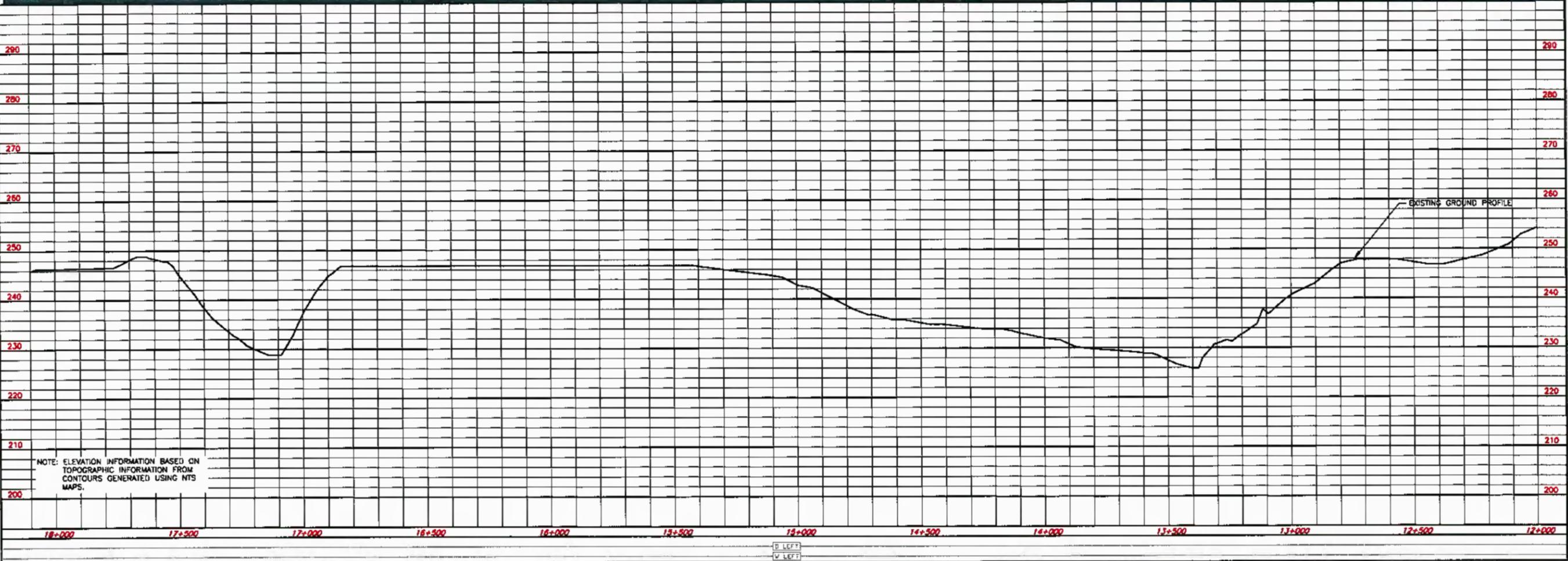
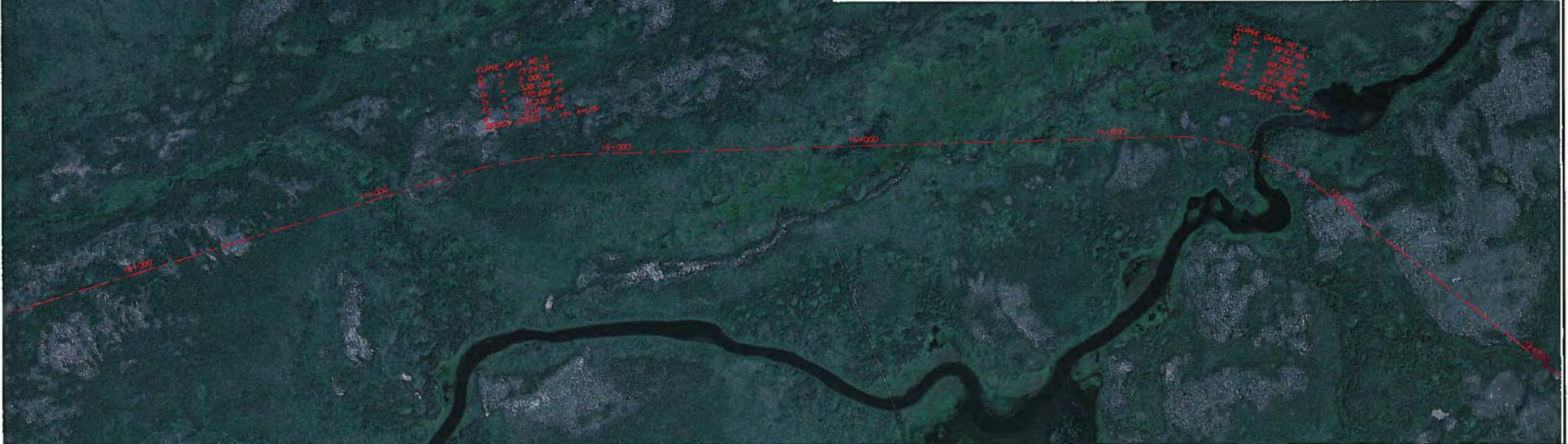


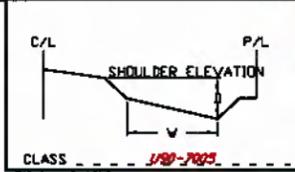
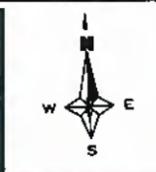
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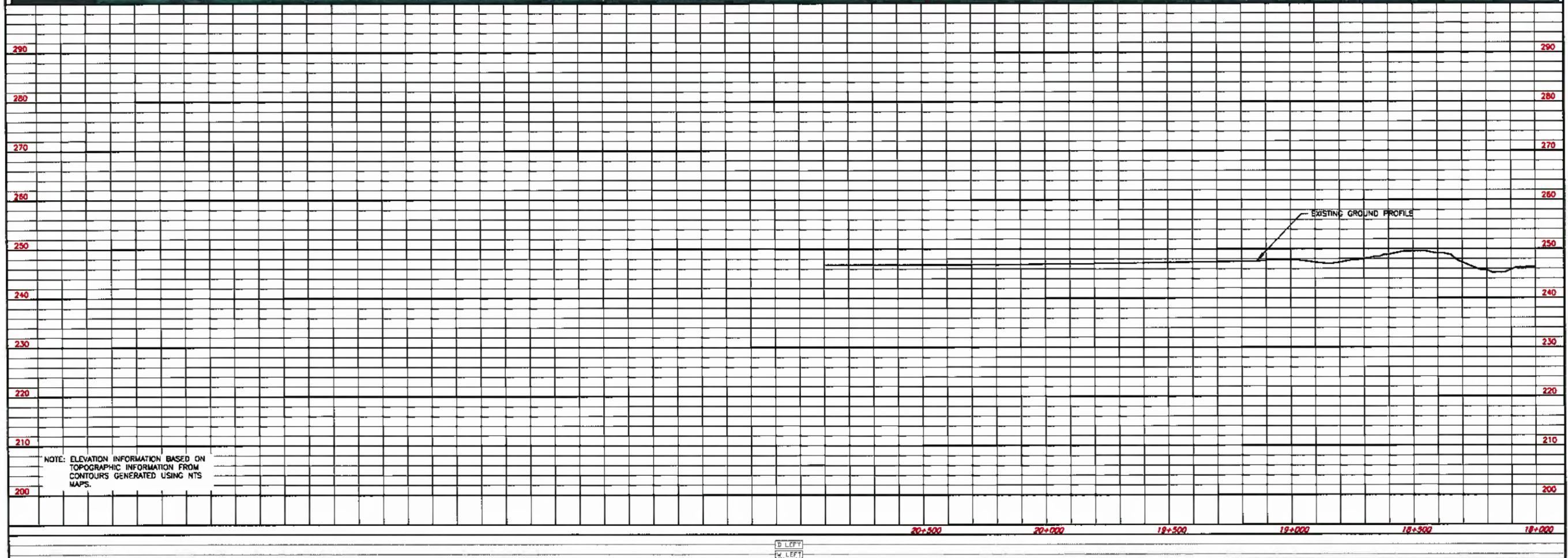
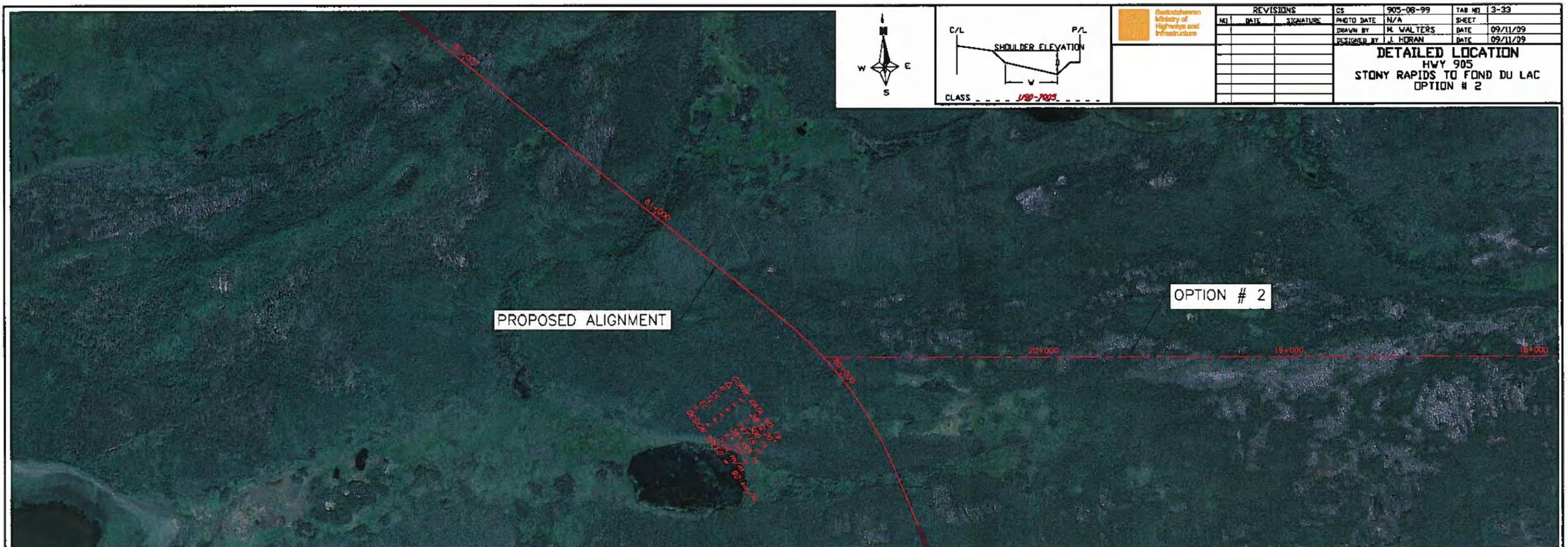
DETAILED LOCATION
HWY 905
STONY RAPIDS TO FOND DU LAC
OPTION # 2



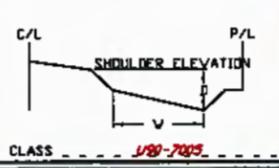
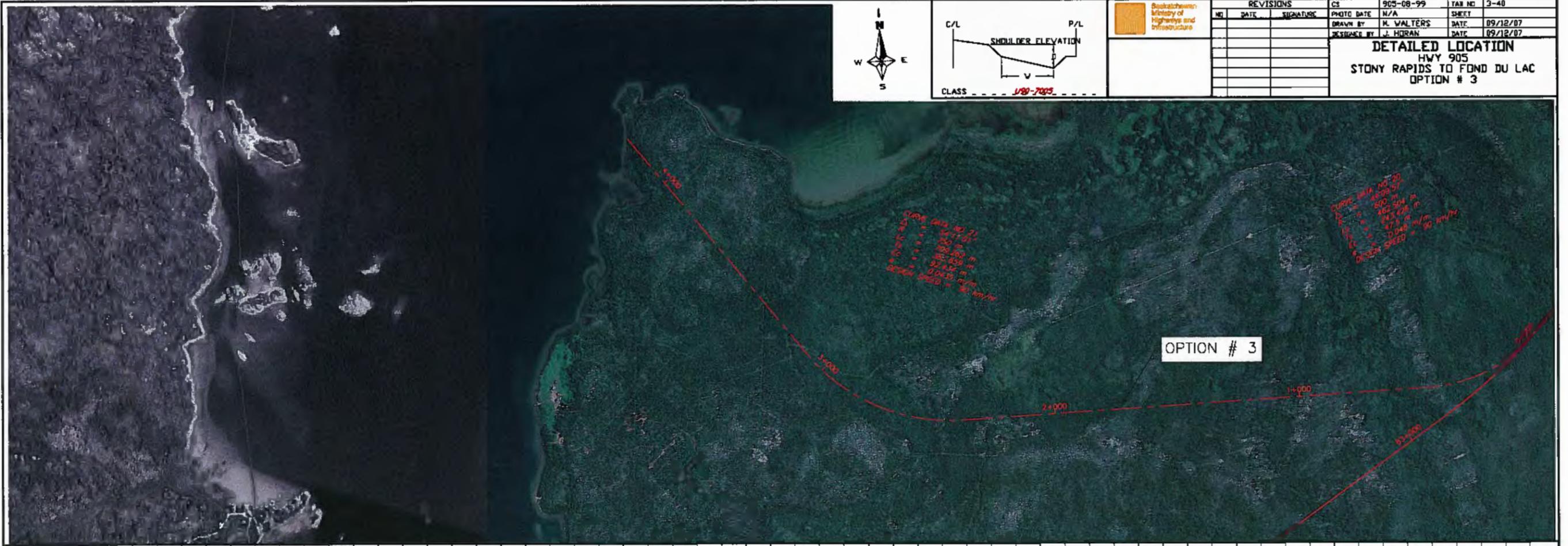


REVISIONS			CS	905-08-99	TAB NO	3-33
NO.	DATE	SIGNATURE	PHOTO DATE	N/A	SHEET	
			DRAWN BY	M. WALTERS	DATE	09/11/09
			DESIGNED BY	J. MORAN	DATE	09/11/09

DETAILED LOCATION
 HWY 905
 STONY RAPIDS TO FOND DU LAC
 OPTION # 2



0 LEFT
 W LEFT

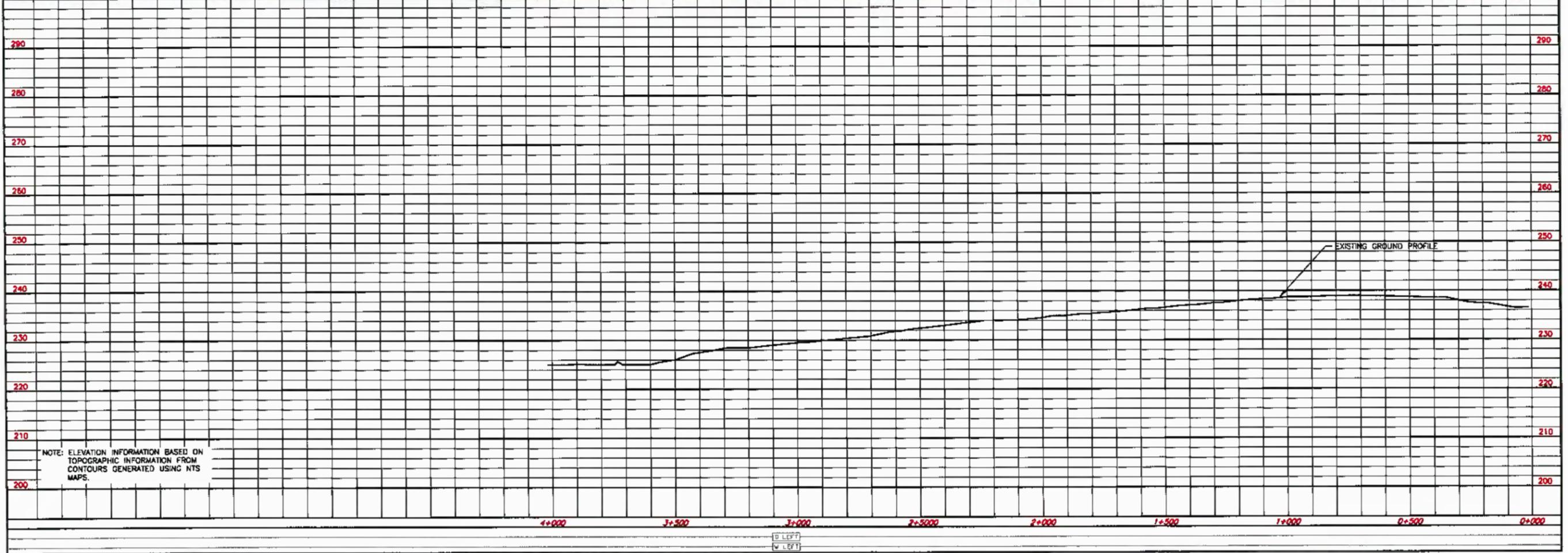


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REVISIONS		
NO.	DATE	SIGNATURE

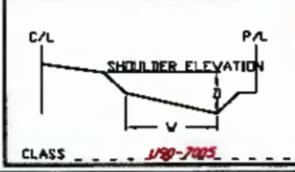
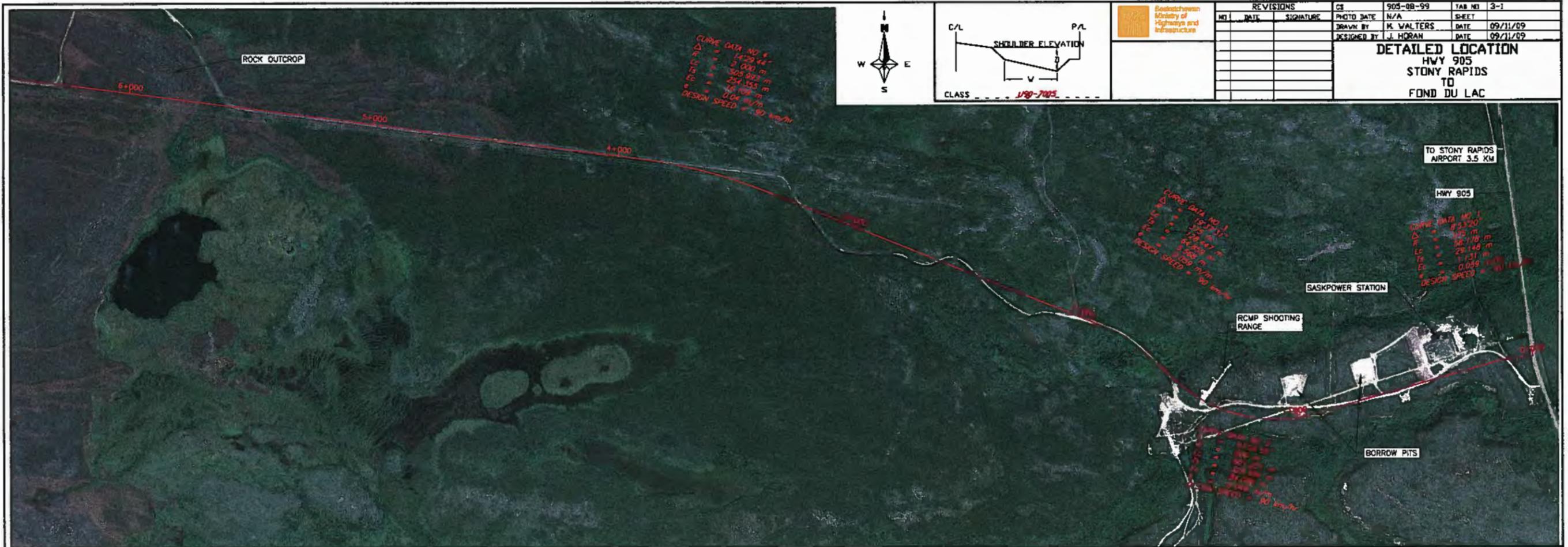
CS	905-08-99	TAB NO.	3-40
PHOTO DATE	N/A	SHEET	
DRAWN BY	H. WALTERS	DATE	09/12/07
DESIGNED BY	J. HURAN	DATE	09/12/07

DETAILED LOCATION
HWY 905
STONY RAPIDS TO FOND DU LAC
OPTION # 3



NOTE: ELEVATION INFORMATION BASED ON TOPOGRAPHIC INFORMATION FROM CONTOURS GENERATED USING NTS MAPS.

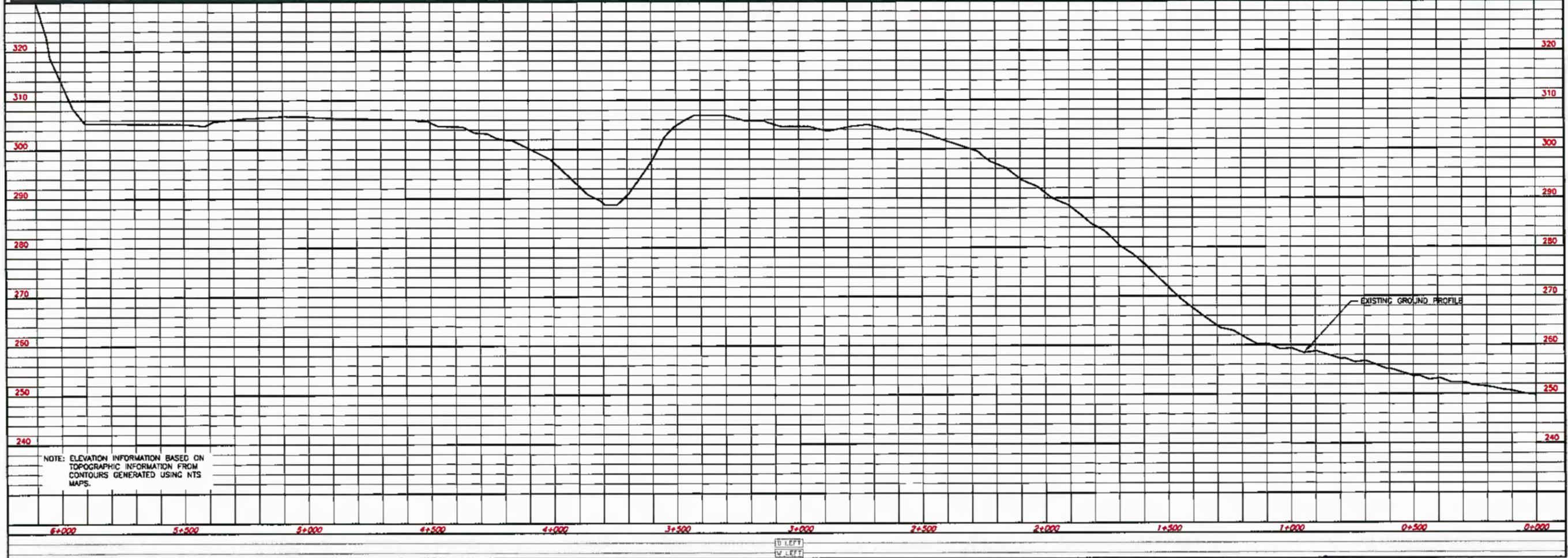
0 LEFT
0 LEFT

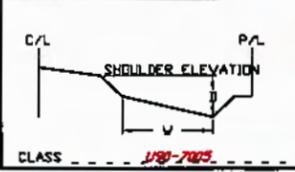


REVISIONS		
NO.	DATE	SIGNATURE

CE	905-08-99	TAB NO	3-1
PHOTO DATE	N/A	SHEET	
DRAWN BY	K. WALTERS	DATE	09/11/09
DESIGNED BY	J. HORAN	DATE	09/11/09

DETAILED LOCATION
 HWY 905
 STONY RAPIDS
 TO
 FOND DU LAC



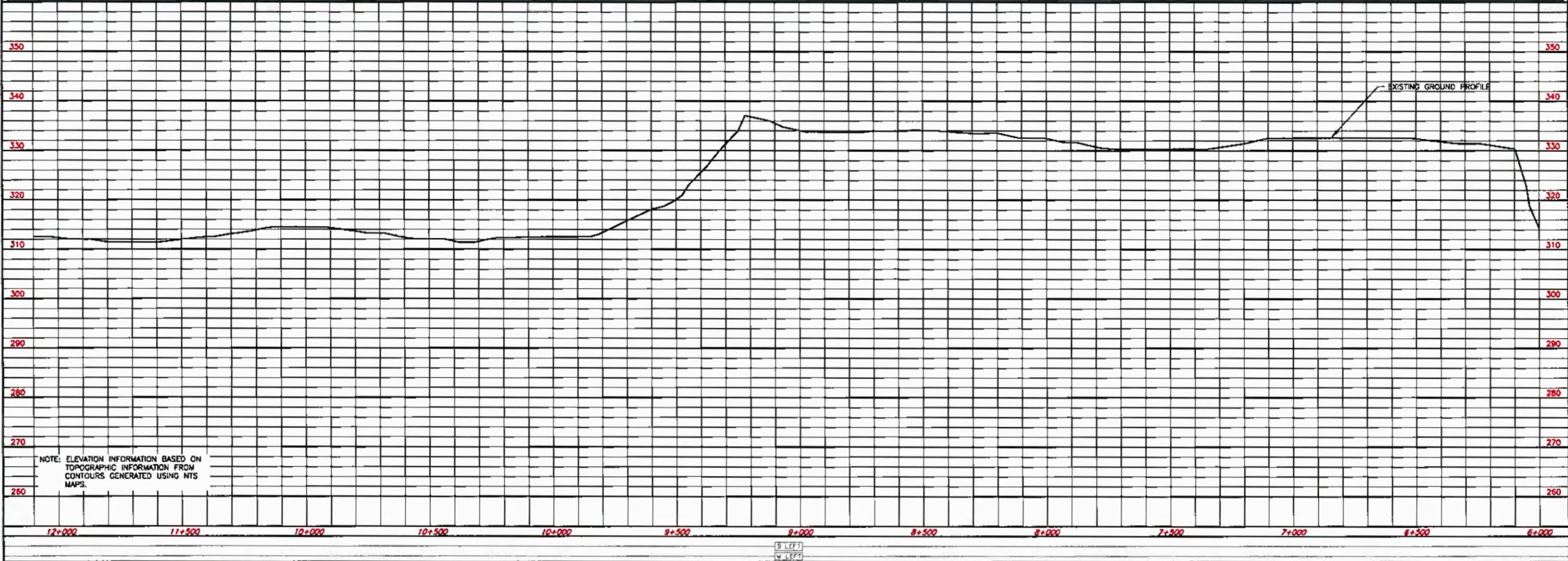


REVISIONS		
NO	DATE	SIGNATURE

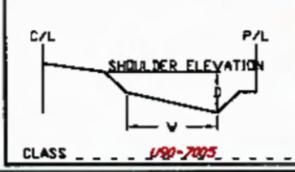
CS	905-08-99	TAB NO	3-2
PHOTO DATE	N/A	SHEET	
DRAWN BY	M. WALTERS	DATE	09/11/09
DESIGNED BY	J. HORAN	DATE	09/11/09

DETAILED LOCATION
 HWY 905
 STONY RAPIDS
 TO
 FOND DU LAC

CURVE DATA NO. 5
 $\Delta = 212.24^\circ$
 $R = 2,000.00$ m
 $L_c = 251.581$ m
 $T_s = 125.947$ m
 $L_c = 3.962$ m
 $e = 0.04$ m/m
 DESIGN SPEED = 90 km/hr



8 LEFT
 10 LEFT

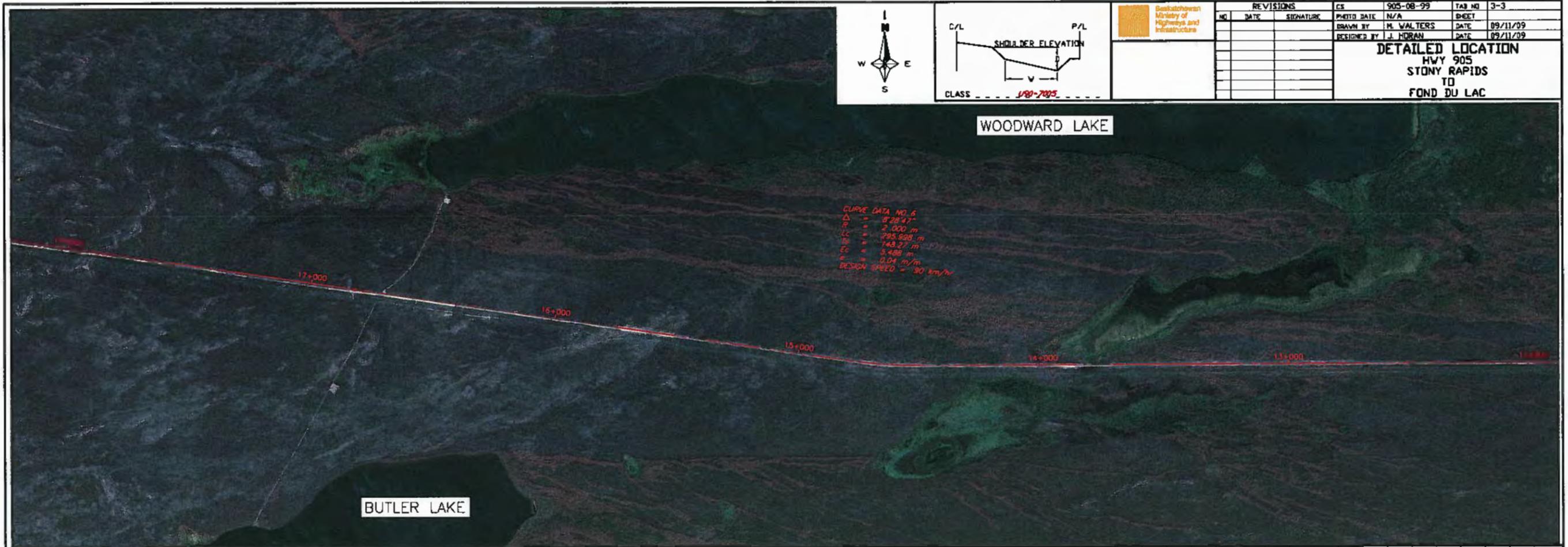


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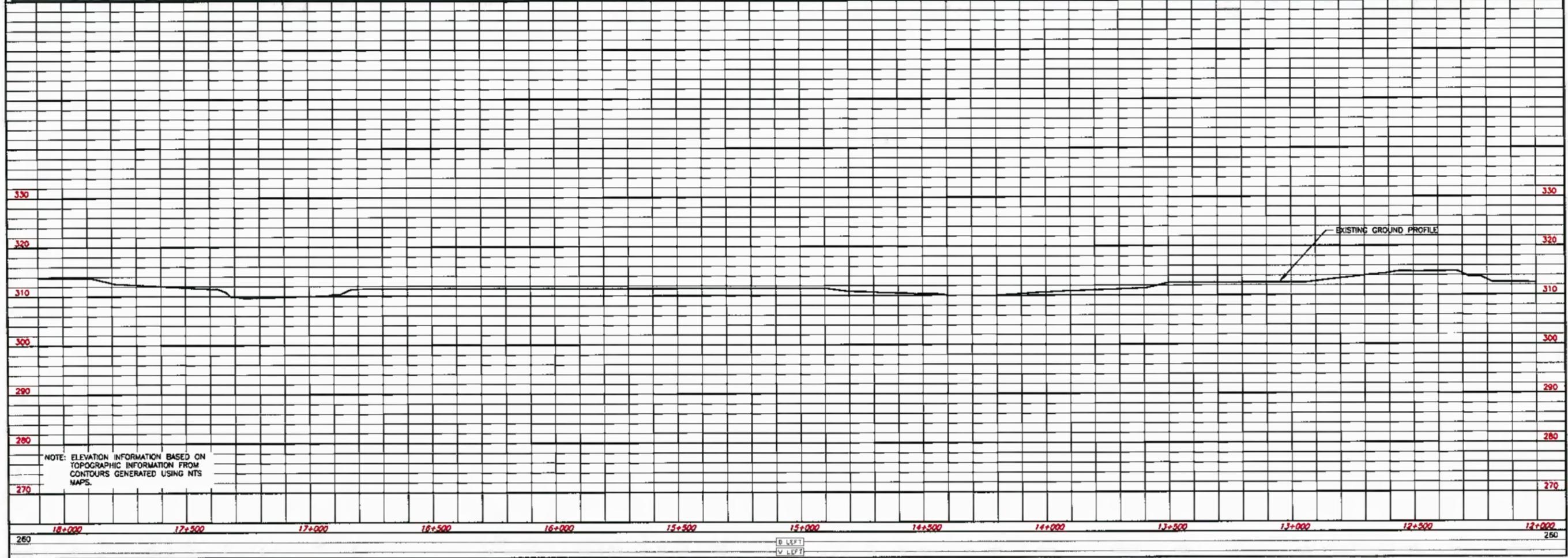
REVISIONS		
NO	DATE	SIGNATURE

CS	905-08-99	TAB NO	3-3
PHOTO DATE	N/A	SHEET	
DRAWN BY	H. WALTERS	DATE	09/11/09
DESIGNED BY	J. HOBAN	DATE	09/11/09

DETAILED LOCATION
HWY 905
STONY RAPIDS
TO
FOND DU LAC

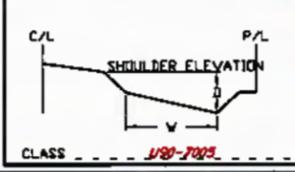
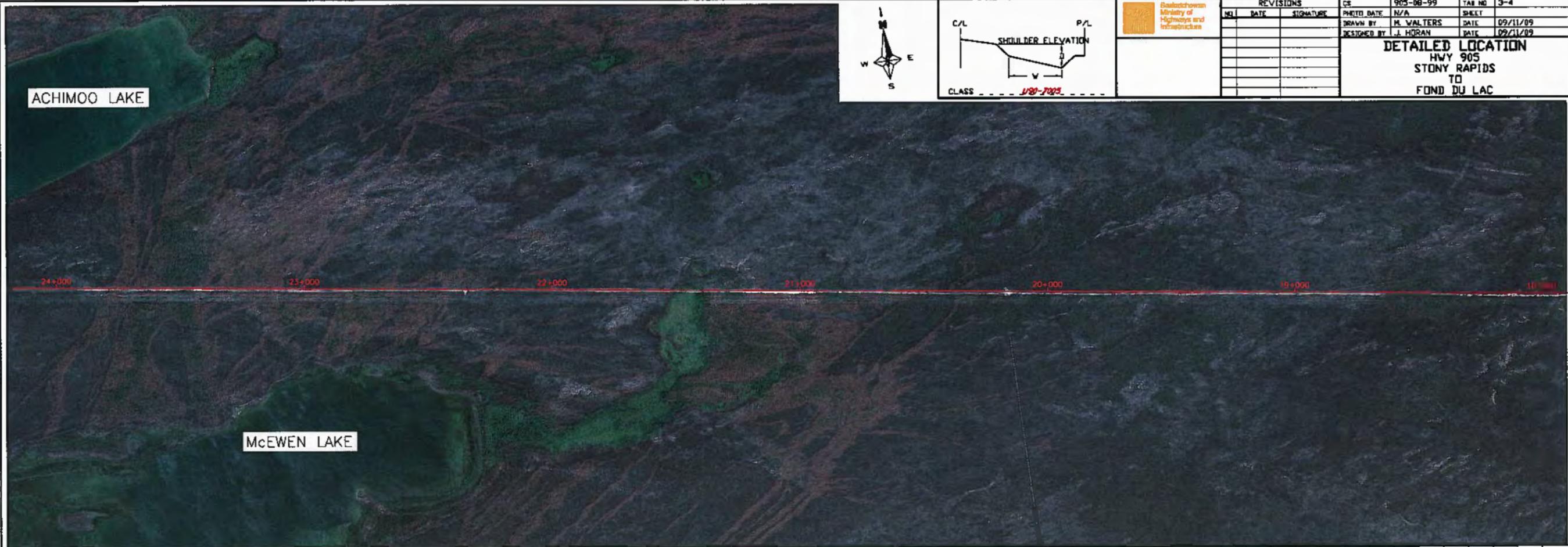


CURVE DATA NO. 6
 $\Delta = 8.2842^\circ$
 $P = 2.000 \text{ m}$
 $LC = 293.098 \text{ m}$
 $Ea = 149.27 \text{ m}$
 $Ec = 5.488 \text{ m}$
 $e = 0.04 \text{ m/m}$
 DESIGN SPEED = 30 km/hr



NOTE: ELEVATION INFORMATION BASED ON TOPOGRAPHIC INFORMATION FROM CONTOURS GENERATED USING NTS MAPS.

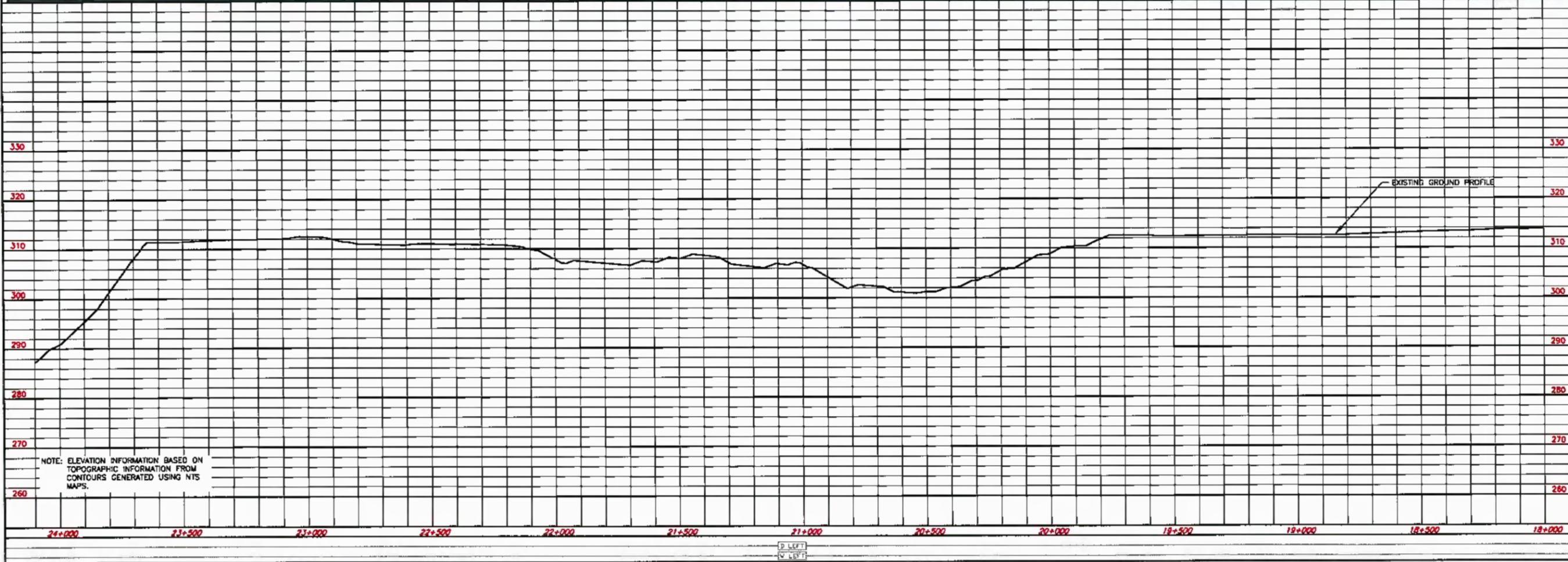
B LEFT
V LEFT



REVISIONS		
NO.	DATE	SIGNATURE

CS	905-08-99	TAB NO	3-4
PHOTO DATE	N/A	SHEET	
DRAWN BY	M. WALTERS	DATE	09/11/09
DESIGNED BY	J. HORAN	DATE	09/11/09

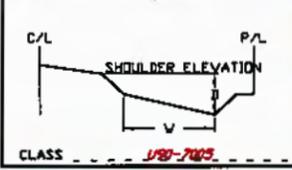
DETAILED LOCATION
 HWY 905
 STONY RAPIDS
 TO
 FOND DU LAC



NOTE: ELEVATION INFORMATION BASED ON TOPOGRAPHIC INFORMATION FROM CONTOURS GENERATED USING NTS MAPS.

D LEFT
 W LEFT

FOND DU LAC

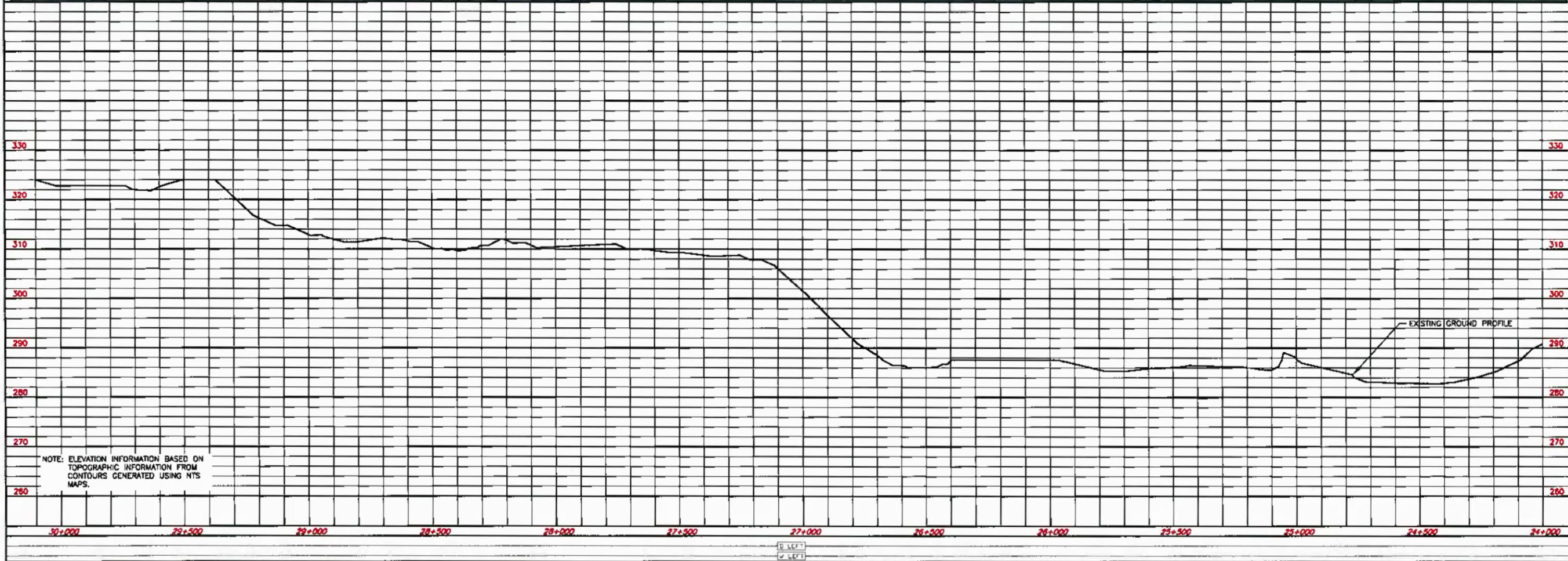


REVISIONS		
NO.	DATE	SIGNATURE

CS	905-08-99	TAB NO	3-5
PHOTO DATE	N/A	SHEET	
DRAWN BY	M. WALTERS	DATE	09/11/09
DESIGNED BY	J. HEBRAM	DATE	09/11/09
DETAILED LOCATION			
HWY 905			
STONY RAPIDS			
TO			
FOND DU LAC			

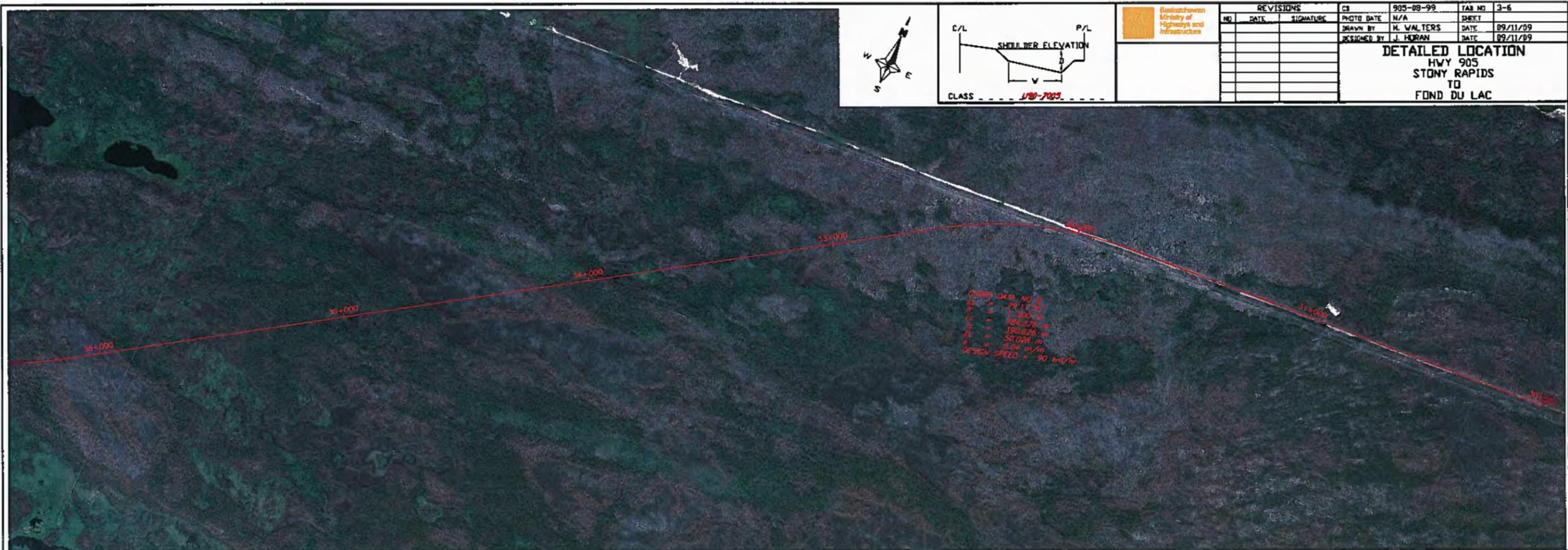
CURVE DATA: 100' R
 Δ = 17.30°
 P = 2.000 m
 Lc = 4.32 826 m
 Ls = 219.286 m
 Ee = 1.1958 m
 B = 0.04 m/m
 DESIGN SPEED = 90 km/h

ACHIMOD LAKE

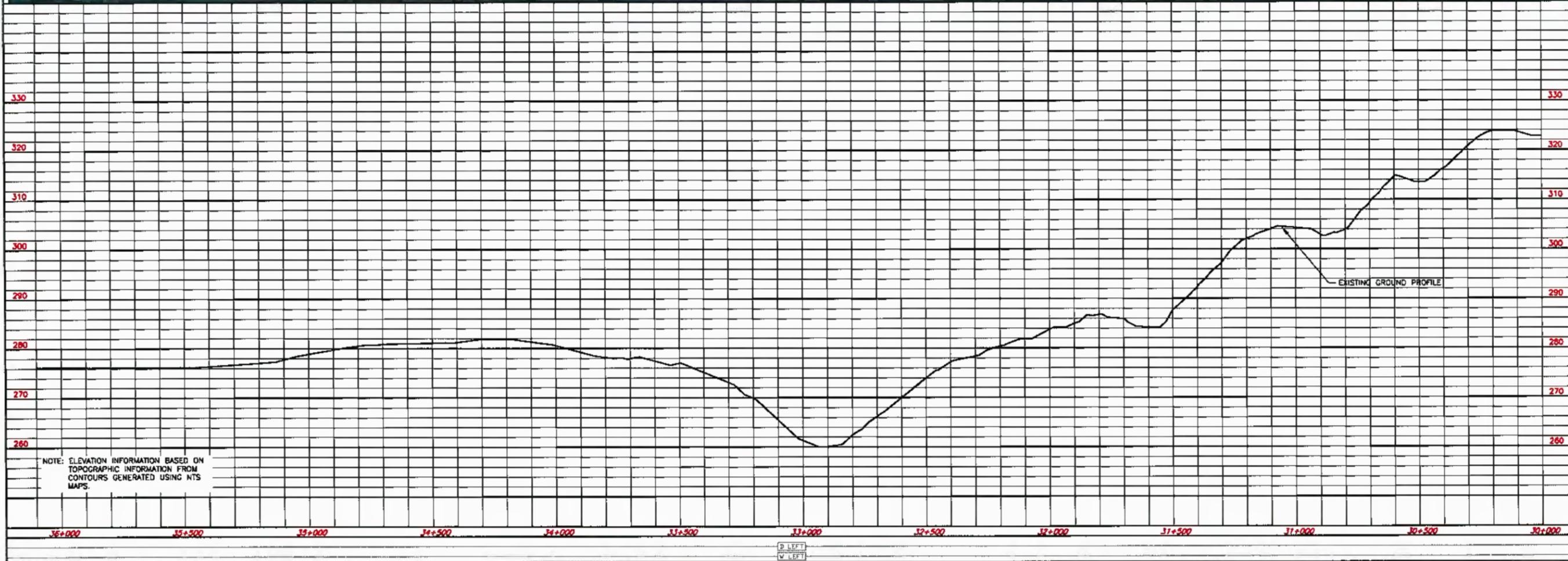


LEFT LEFT

			REVISIONS		CS	905-08-99	TAB NO	3-6		
			NO	DATE	SIGNATURE	PHOTO DATE	N/A	SHEET		
						DRAWN BY	M. WALTERS	DATE	09/11/09	
						DESIGNED BY	J. HORAN	DATE	09/11/09	
			DETAILED LOCATION HWY 905 STONY RAPIDS TO FOND DU LAC							

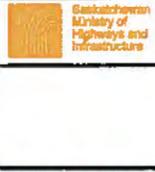
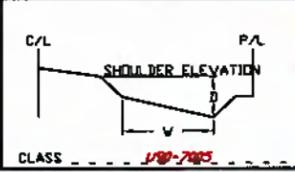


CURVE DATA NO. 8
 PC = 28+11.30'
 PI = 31+300.00'
 PT = 35+278.70'
 LC = 180.000'
 EC = 30.000'
 DESIGN SPEED = 90 km/h



NOTE: ELEVATION INFORMATION BASED ON
 TOPOGRAPHIC INFORMATION FROM
 CONTOURS GENERATED USING NTS
 MAPS.

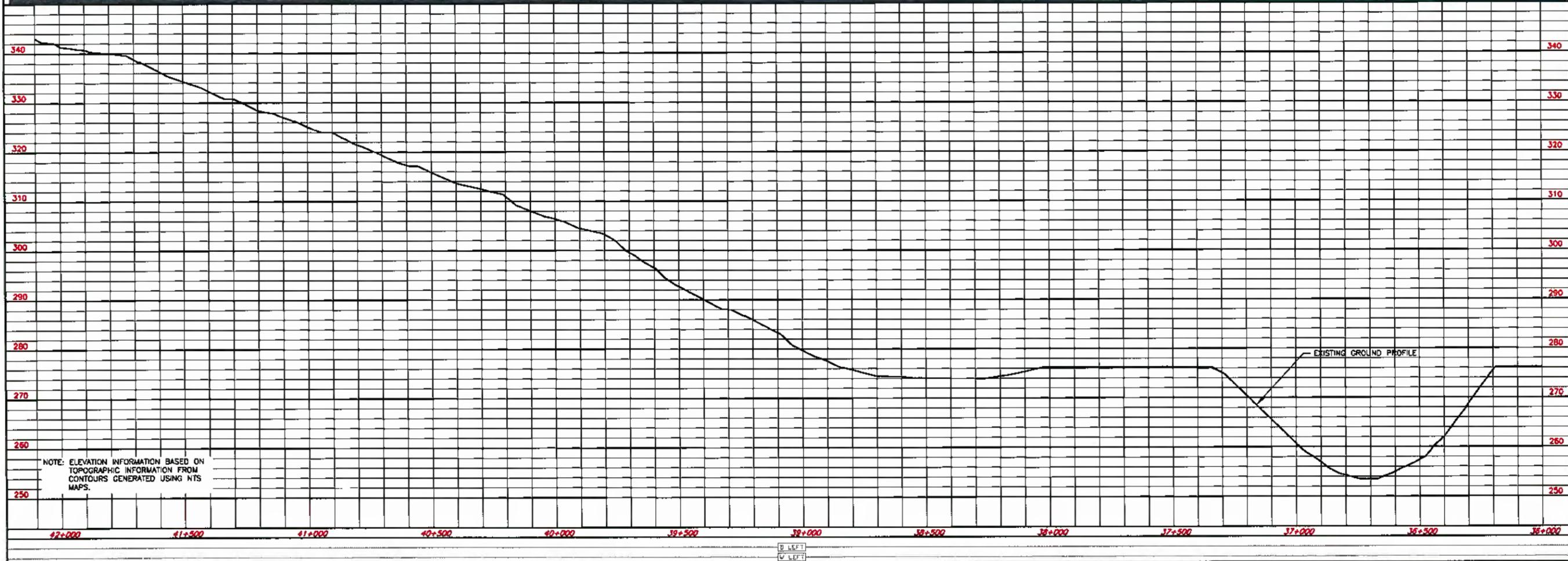
D LEFT
 V LEFT



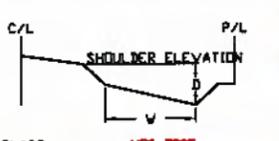
REVISIONS		
NO	DATE	SIGNATURE

CS	905-08-99	TAB NO	3-7
PHOTO DATE	N/A	SHEET	
DRAWN BY	M. WALTERS	DATE	09/11/09
DESIGNED BY	J. HORAN	DATE	09/11/09

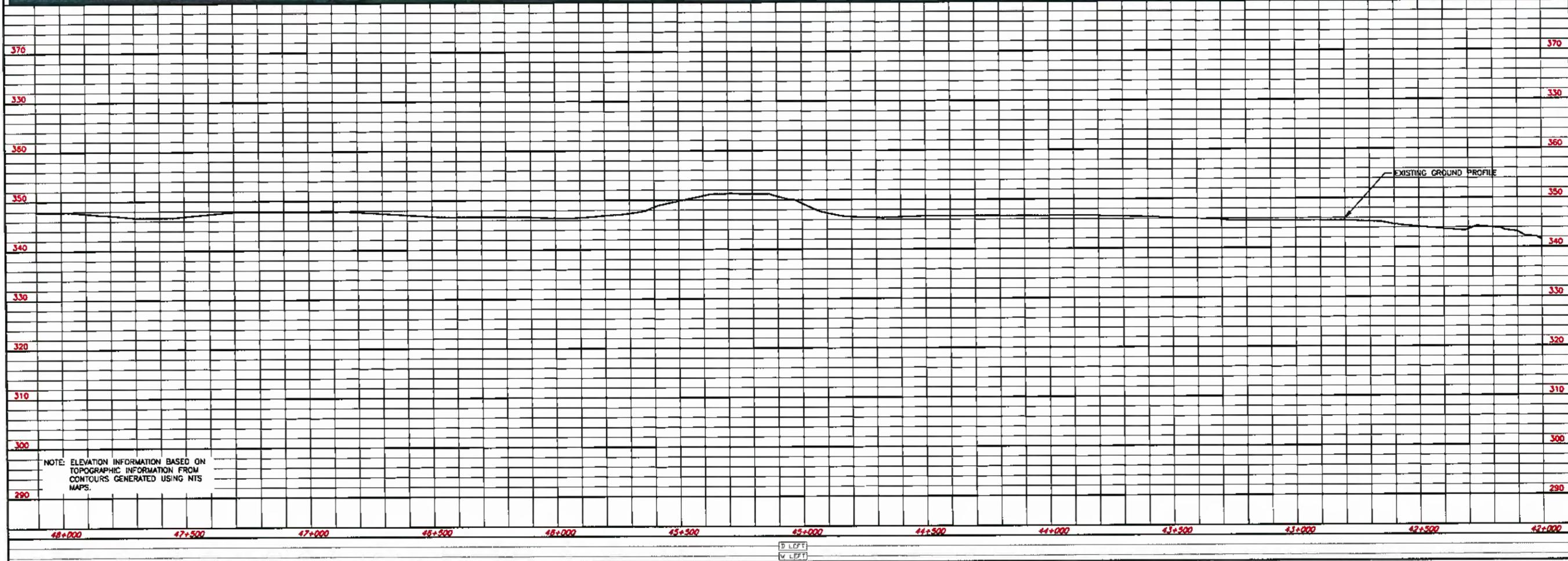
DETAILED LOCATION
 HWY 905
 STONY RAPIDS
 TO
 FOND DU LAC

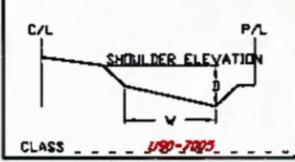
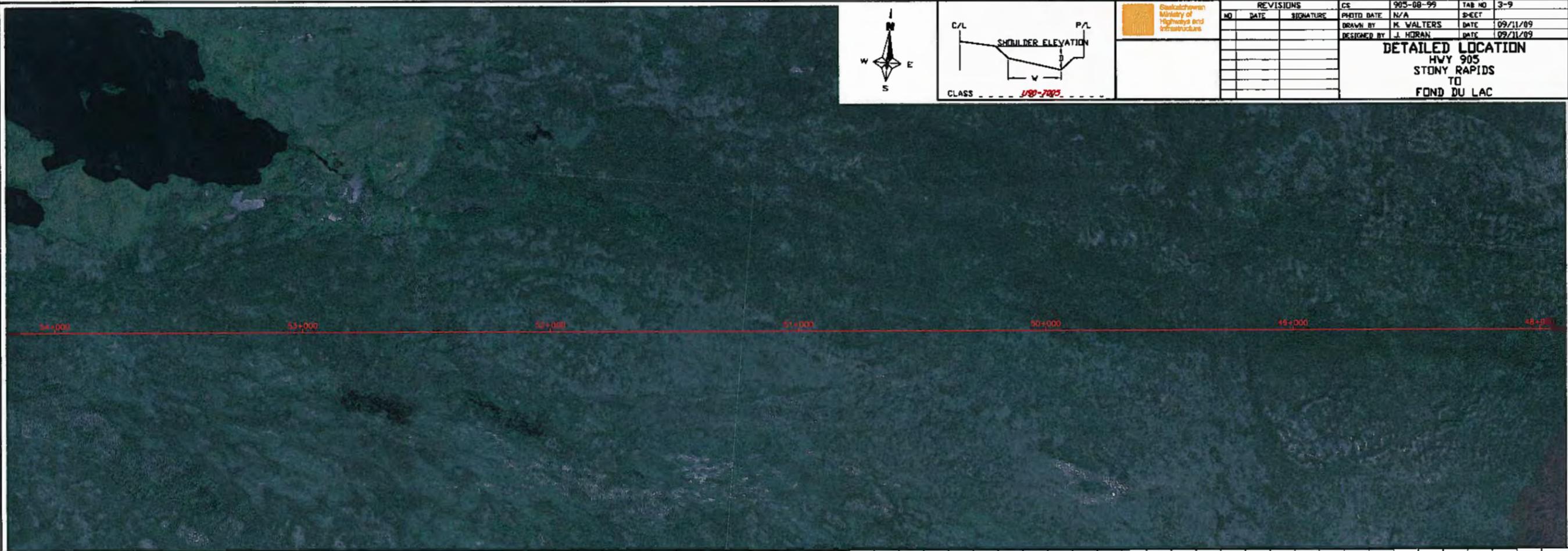


LEFT
 LEFT

			REVISIONS		CS	905-08-99	TAB NO	3-8	
			NO.	DATE	SIGNATURE	PHOTO DATE	N/A	SHEET	
						DRAWN BY	M. WALTERS	DATE	09/11/09
			DESIGNED BY	J. HORAN	DATE	09/11/09	DETAILED LOCATION HWY 905 STONY RAPIDS TO FOND DU LAC		

CURVE DATA NO. 13
 Δ = 16.28 1/8°
 R = 2,000 m
 Lc = 375.823 m
 Ts = 209.932 m
 Tc = 20.906 m
 W = 0.04 m/m
 DESIGN SPEED = 90 km/h

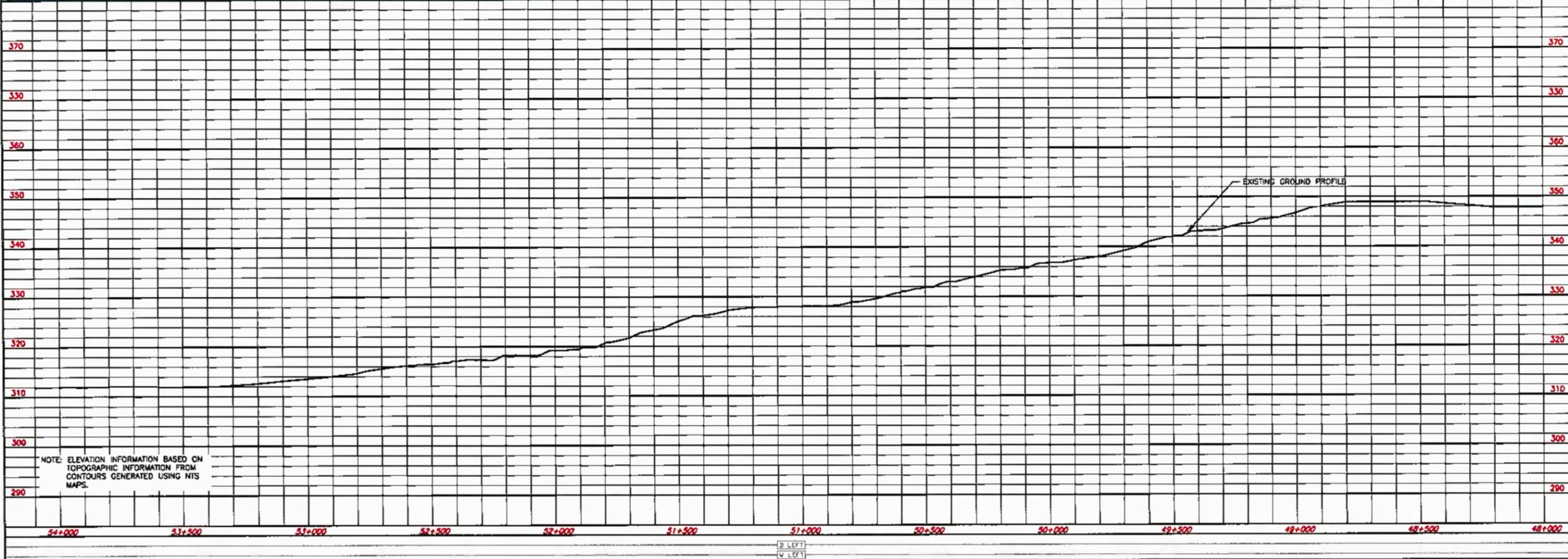




REVISIONS		
NO	DATE	SIGNATURE

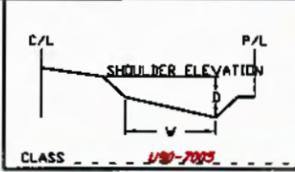
CS	905-08-99	TAB NO	3-9
PHOTO DATE	N/A	SHEET	
DRAWN BY	K. WALTERS	DATE	09/11/09
DESIGNED BY	J. HORAN	DATE	09/11/09

DETAILED LOCATION
 HWY 905
 STONY RAPIDS
 TO
 FOND DU LAC



NOTE: ELEVATION INFORMATION BASED ON TOPOGRAPHIC INFORMATION FROM CONTOURS GENERATED USING NTS MAPS.

0 LEFT
 V LEFT



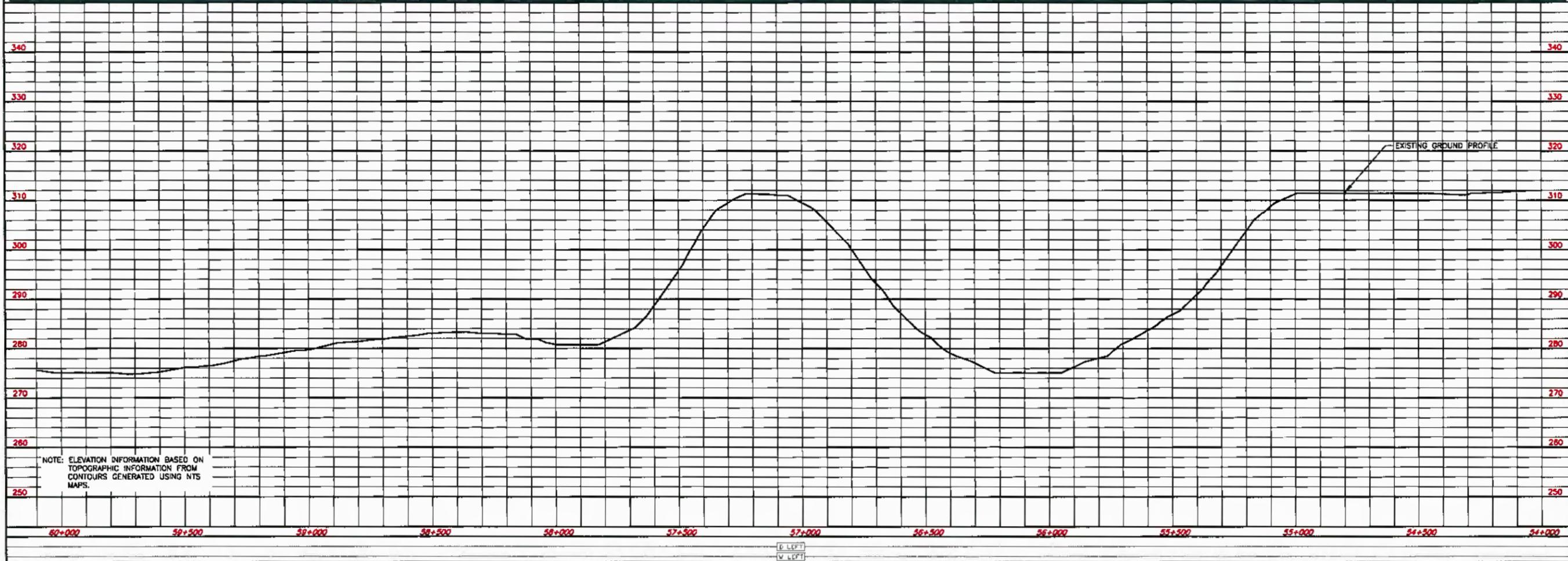
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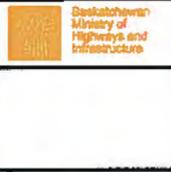
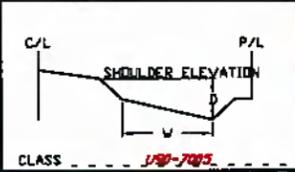
REVISIONS		
NO	DATE	SIGNATURE

CS	905-08-99	TAB NO	3-10
PHOTO DATE	N/A	SHEET	
DRAWN BY	M. WALTERS	DATE	09/11/09
DESIGNED BY	J. HORAN	DATE	09/11/09

DETAILED LOCATION
HWY 905
STONY RAPIDS
TO
FOND DU LAC

CURVE DATA: $R = 1700.10$
 $P = 2.000$ m
 $LC = 211.613$ m
 $TS = 106.908$ m
 $ES = 2.853$ m
 $e = 0.04$ m/m
 DESIGN SPEED = 90 km/h



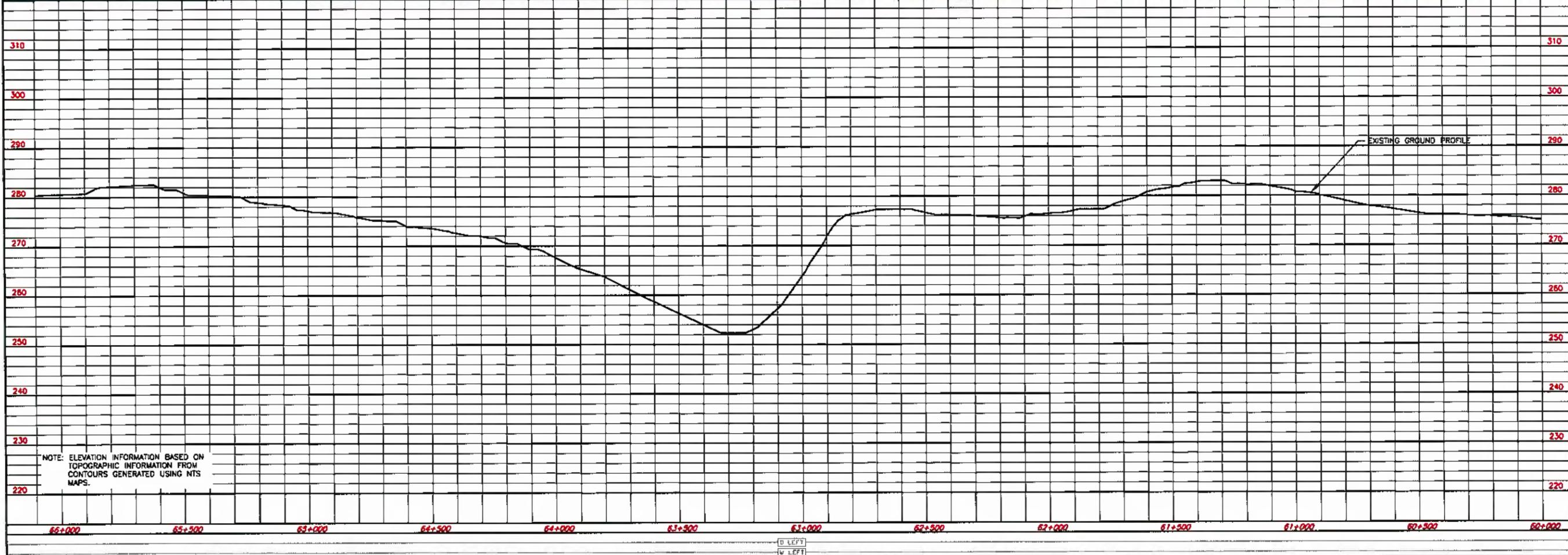


REVISIONS			CS	905-08-99	TAB NO	3-11
NO	DATE	SIGNATURE	PHOTO DATE	N/A	SHEET	
			DRAWN BY	M. WALTERS	DATE	09/11/09
			DESIGNED BY	J. HORAN	DATE	09/11/09

DETAILED LOCATION
 HWY 905
 STONY RAPIDS
 TO
 FOND DU LAC

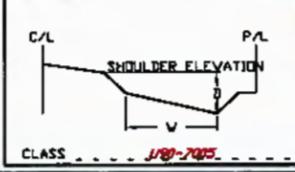
CURVE DATA NO. 75
 Δ = 18.00°
 P = 1.700 m
 EC = 209.900 m
 ES = 212.800 m
 LC = 18.000 m
 e = 0.04 m/m
 DESIGN SPEED = 30 km/h

CURVE DATA NO. 76
 Δ = 21.03°
 P = 1.700 m
 EC = 209.900 m
 ES = 212.800 m
 LC = 18.000 m
 e = 0.04 m/m
 DESIGN SPEED = 30 km/h



NOTE: ELEVATION INFORMATION BASED ON TOPOGRAPHIC INFORMATION FROM CONTOURS GENERATED USING NTS MAPS.

0 LEFT
 W LEFT

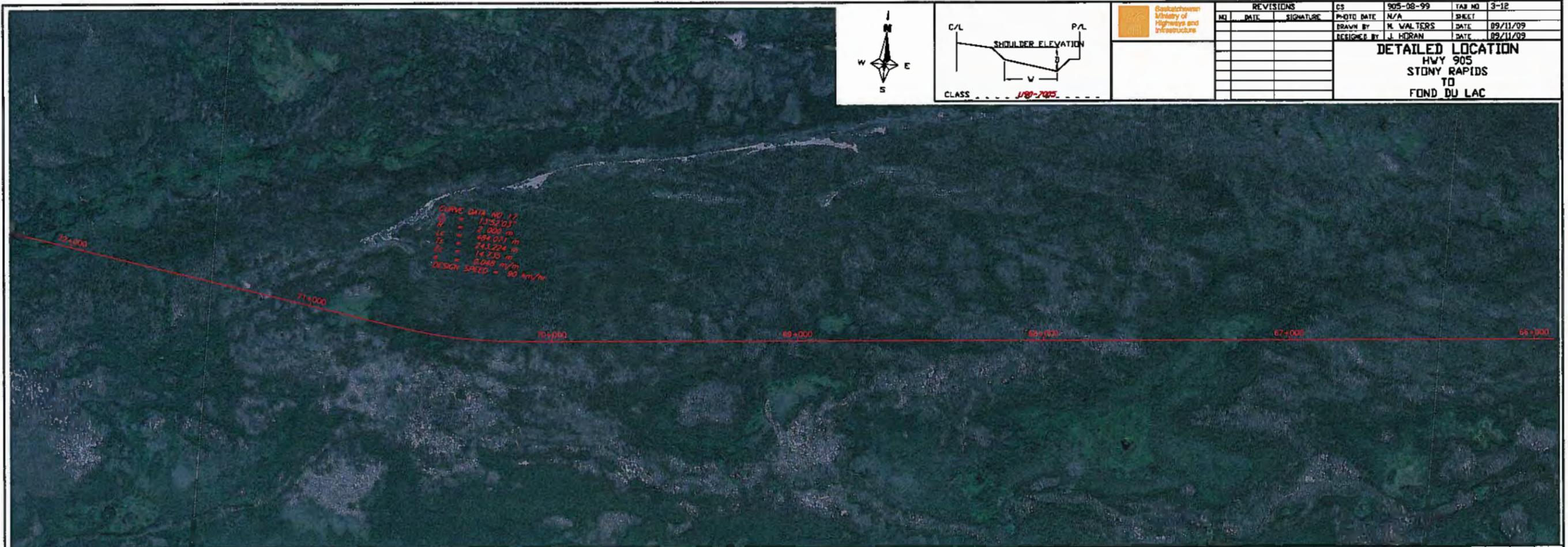


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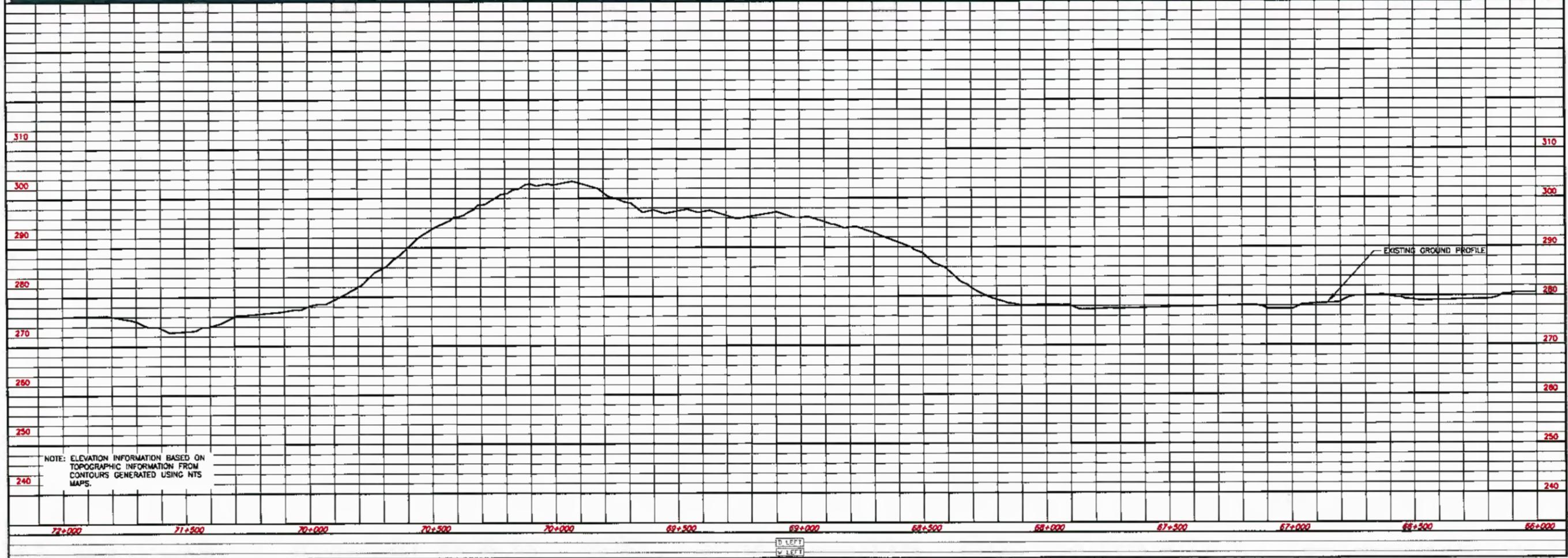
REVISIONS		
NO	DATE	SIGNATURE

CS	905-08-99	TAB NO	3-12
PHOTO DATE	N/A	SHEET	
DRAWN BY	K. WALTERS	DATE	09/11/09
DESIGNED BY	J. HORAN	DATE	09/11/09

DETAILED LOCATION
HWY 905
STONY RAPIDS
TO
FOND DU LAC

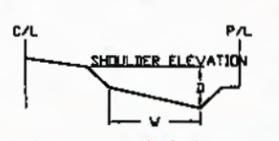


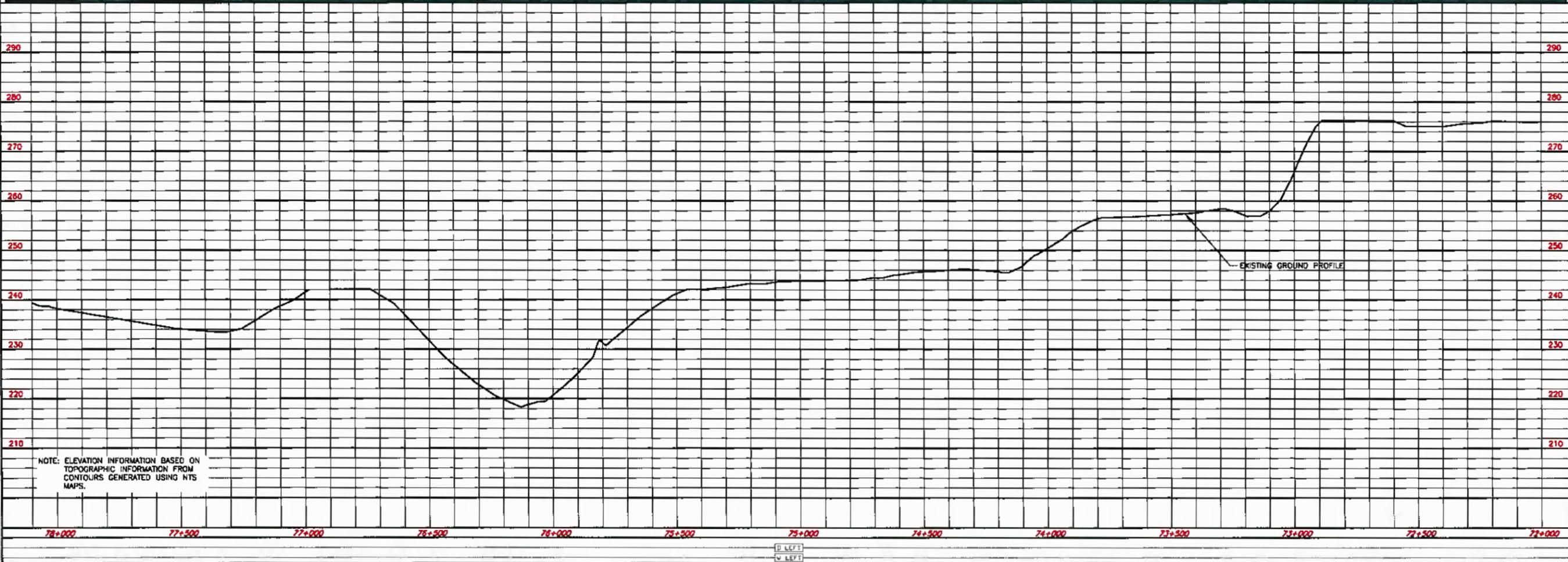
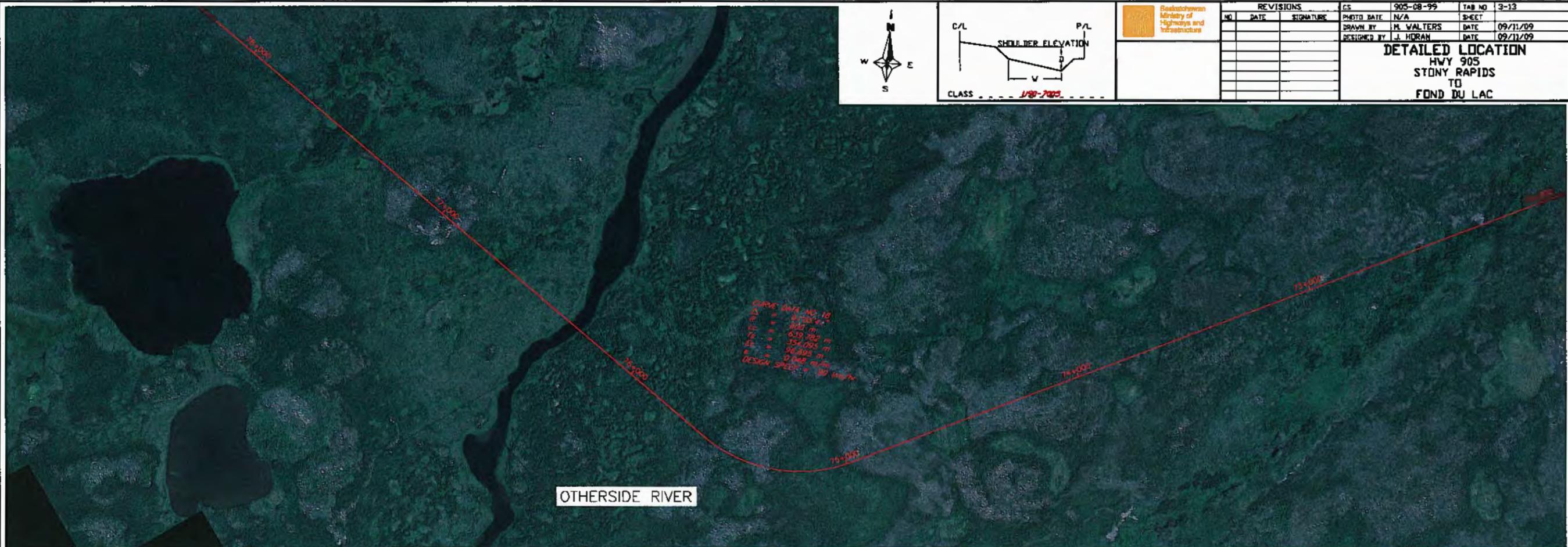
CURVE DATA NO. 12
 R = 1152.037
 LC = 2.000 m
 TS = 498.031 m
 PC = 241.224 m
 PE = 14.225 m
 S = 0.048 m/m
 DESIGN SPEED = 90 km/h



NOTE: ELEVATION INFORMATION BASED ON TOPOGRAPHIC INFORMATION FROM CONTOURS GENERATED USING NTS MAPS.

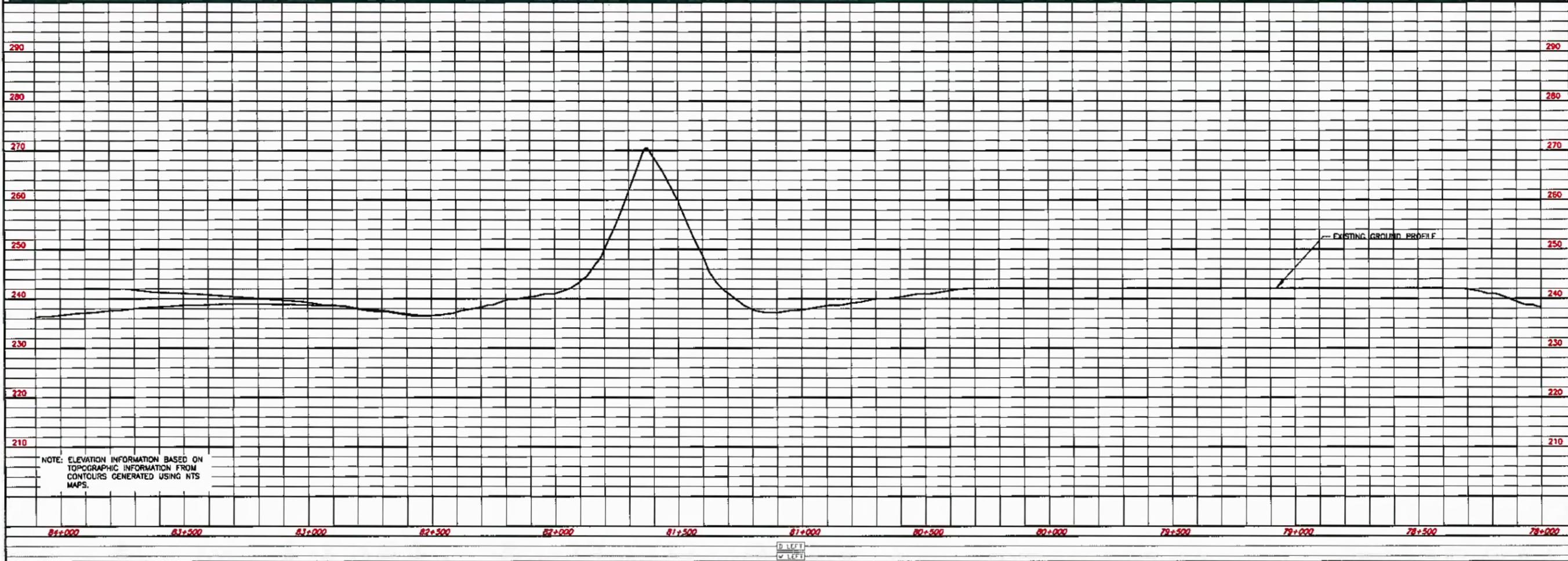
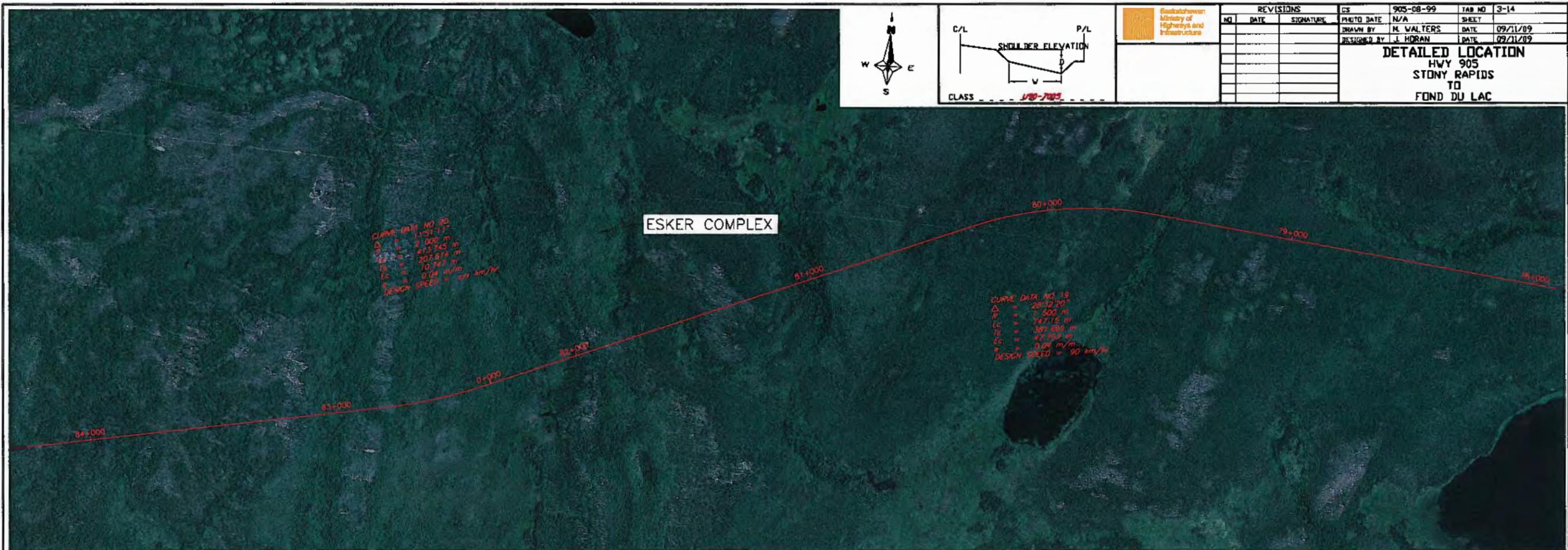
0 LEFT
0 LEFT

			REVISIONS		CS	905-08-99	TAB NO	3-13		
			NO	DATE	SIGNATURE	PHOTO DATE	N/A	SHEET		
						DRAWN BY	M. WALTERS	DATE	09/11/09	
						DESIGNED BY	J. MORAN	DATE	09/11/09	
			DETAILED LOCATION HWY 905 STONY RAPIDS TO FOND DU LAC							



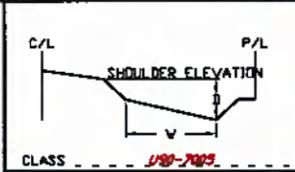
REVISIONS			CS	905-08-99	TAB NO	3-14
NO	DATE	SIGNATURE	PHOTO DATE	N/A	SHEET	
					09/11/09	
					09/11/09	

DETAILED LOCATION
 HWY 905
 STONY RAPIDS
 TO
 FOND DU LAC



FOND DU LAC

LAKE ATHABASCA

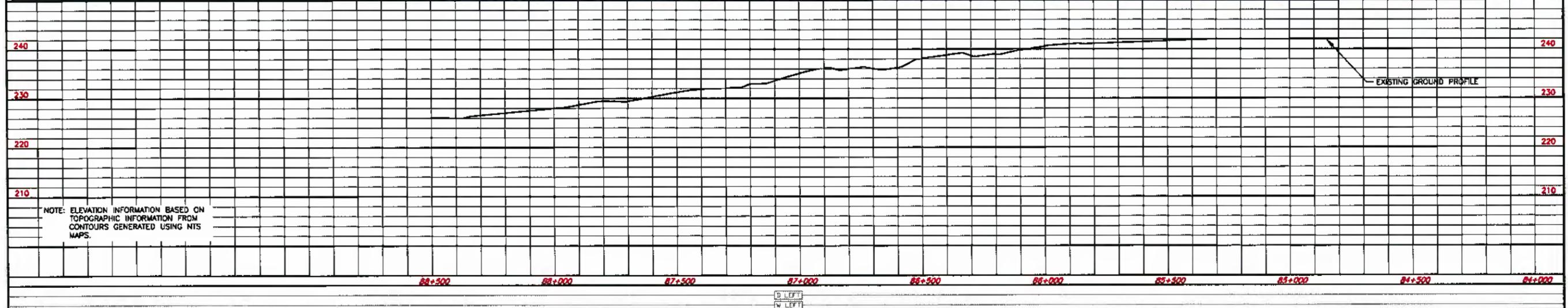


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REVISIONS		
NO.	DATE	SIGNATURE

CS	905-08-99	TAB NO	3-15
PHOTO DATE	N/A	SHEET	
DRAWN BY	M. WALTERS	DATE	09/11/09
DESIGNED BY	J. HORAN	DATE	09/11/09

DETAILED LOCATION
HWY 905
STONY RAPIDS
TO
FOND DU LAC



0 LEFT
1 LEFT

km 88.51

km 0.00

CONSTRUCTION TERMINAL

CONSTRUCTION TERMINAL

OPTIONAL REALIGNMENT # 3

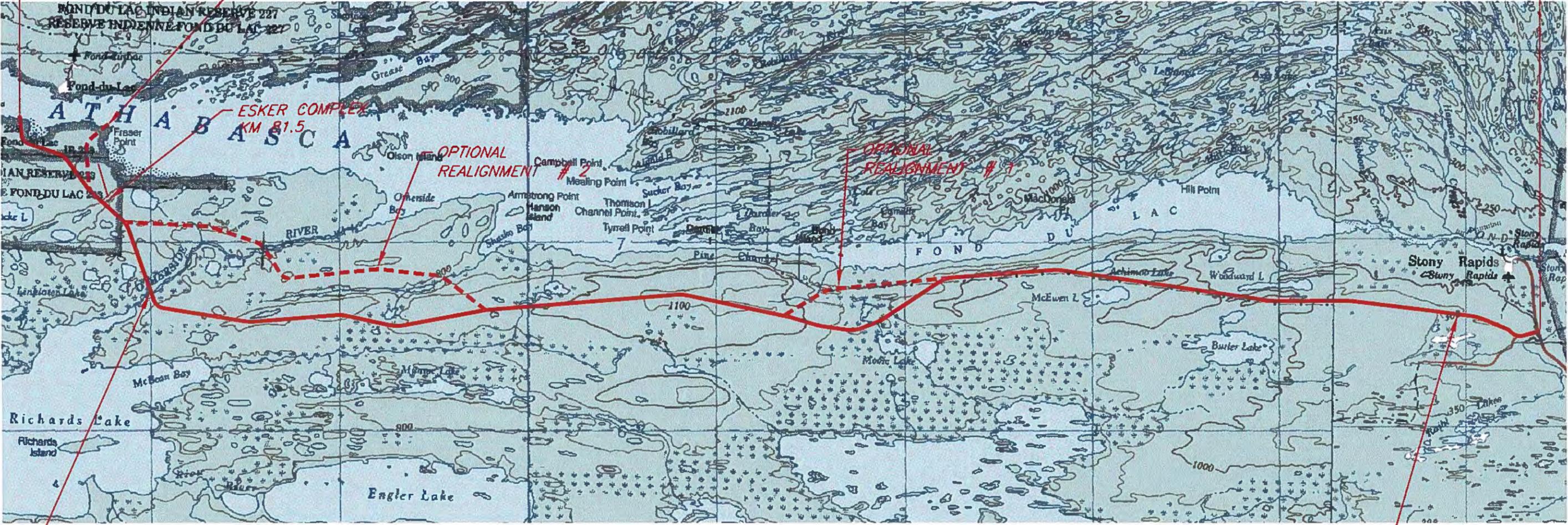
ESKER COMPLEX KM 81.5

OPTIONAL REALIGNMENT # 2

OPTIONAL REALIGNMENT # 1

OTHERSIDE RIVER CROSSING

DEVIATION AROUND OUTCROP KM 6.0



 Saskatchewan Ministry of Highways and Infrastructure		LOCATION PLAN HIGHWAY NO 905 km 0.00 TO km 85.51					
DRAWN BY	M. WALTERS	DATE	09/11/04	CS	905-08-99	TAB NO	3-1
DESIGNED BY	J. HORAN	DATE	09/11/04	CONTRACT		SHEET	1 OF 1