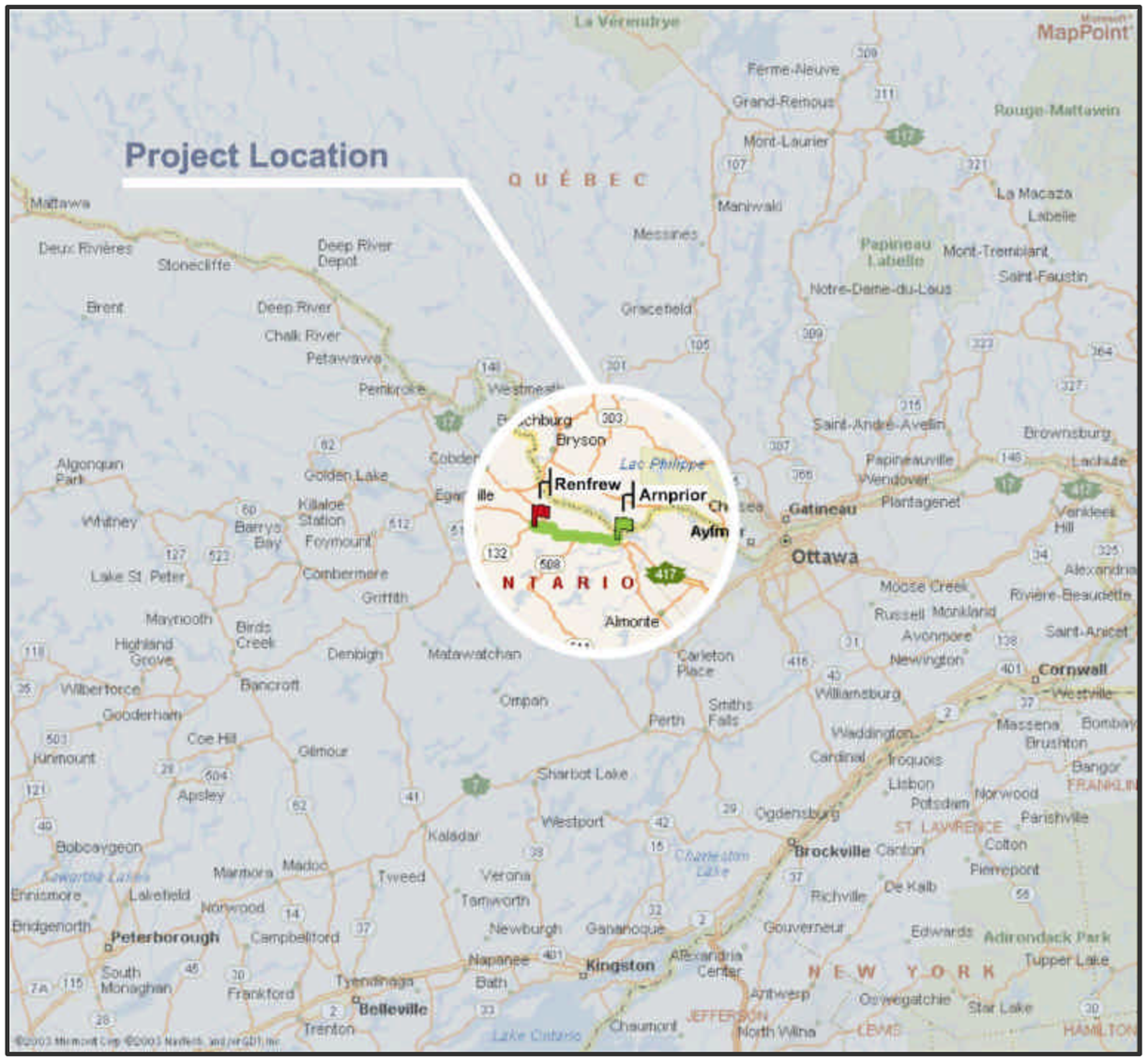
Highway 17 Twinning
from County Road 29 to 3.0 km West of Bruce Street
WP 647-92-00

Transportation Environmental Study Report

Volume 1

December 2003



Ontario
Ministry of Transportation

Highway 17 Twinning
From Arnprior to Renfrew
WP 647-92-00

Transportation Environmental Study Report

December 2003

Prepared by:

NCE

NCE
2002-013

TRANSPORTATION AND VALUE ENGINEERS

Ontario
Ministry of Transportation

Highway 17 Twinning
From Arnprior to Renfrew
WP 647-92-00

Transportation Environmental Study Report

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Ontario
Ministry of Transportation

Highway 17 Twinning
From Arnprior to Renfrew
WP 647-92-00

December 2003

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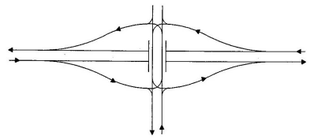
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GLOSSARY OF TERMS

- **AADT** — Annual Average Daily Traffic – the average 24-hour, two-way traffic for the period from January 1st to December 31st.
- **Alignment** — The vertical and horizontal position of a road.
- **Alternative** — Well-defined and distinct course of action that fulfills a given set of requirements. The EA Act distinguishes between alternatives to the undertaking and alternative methods of carrying out the undertaking.
- **Alternative Methods** — Alternative ways of carrying out the selected alternative which may include preliminary design, detail design, construction or maintenance alternatives.
- **Alternatives To** — Alternative ways of solving a documented transportation deficiency or taking advantage of an opportunity.
- **ANSI** — Area of Natural or Scientific Interest
- **Berm** — Earth landform used to screen areas.
- **BMP** — Best management practice.
- **Bump-Up** — The act of requesting that an environmental assessment initiated as a class EA be required to follow the individual EA process. The change is a result of a decision by the proponent or by the Minister of Environment to require that an individual environmental assessment be conducted.
- **Bypass** — A form of realignment in which the route is intended to go around a particular feature or collection of features.
- **CEAA** — Canadian Environmental Assessment Act
- **Class Environmental Assessment Document** — An individual environmental report documenting a planning process which is formally submitted under the EA Act. Once the Class EA document is approved, projects covered by the class can be implemented without having to seek further approvals under the EA Act provided the Class EA process is followed.
- **Class Environmental Assessment Process** — A planning process established for a group of projects in order to ensure compliance with the Environmental Assessment (EA) Act. The EA Act, in Section 13 makes provision for the establishment of Class Environmental Assessments.
- **Compensation** — The replacement of natural habitat lost through implementation of a project, where implementation techniques and other measures could not alleviate the effects.
- **Consortium** — A group of businesses or organizations allied to take on a project.
- **Corridor** — A band of variable width between two locations. In transportation studies a corridor is defined area where a new or improved transportation facility might be located.
- **Criterion(a)** — Explicit feature or consideration used for comparison of alternatives.
- **DCR** — Design and Construction report.
- **Decibel (dB)** — A logarithmic unit of measure used for expressing level of sound.

- **dBA** — 'A' weighted sound level; the human ear cannot hear the very high and the very low sound frequencies as well as the mid-frequencies of sound, and hence the predicted sound levels, measured in dBA, are a reasonable accurate approximation of sound levels heard by the human ear.
- **Designation** — Formal identification of the right-of-way for a proposed highway, through the provisions of the Public Transportation and Highway Improvement Act. This route is registered in the appropriate land registry office, so that those wishing to purchase or develop property will be aware of the intended use.
- **Detail Design** — The final stage in the design process in which the engineering and environmental components of preliminary design are refined and details concerning, for example, property, drainage, utility relocations and quantity estimate requirements are prepared, and contract documents and drawings are produced.
- **DFO** — Department of Fisheries and Oceans.
- **Diamond Interchange Configuration** — Interchange access without freeflow movements and intersections provided at the cross street as follows

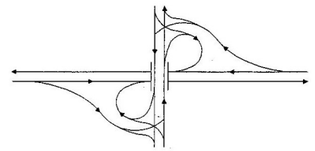


- **Dichotomous Utility Function** — A utility function that represents a desirable or undesirable response from a criterion (yes / no, present / absent, true / false)
- **Dimensionless Number** — A number that does not have a measurement unit, such as length, associated with it. Examples include utility score and overall score.
- **Double Counting** — Unintentional accounting for a particular factor more than once through the evaluation method.
- **EA** — Environmental Assessment
- **EA Act** — Environmental Assessment Act (as amended by S.O. 1996 C.27), RSO 1980.
- **Effective Lane Width** — The lane width as perceived by the driver. The implementation of this policy, will be to implement all freeway effective lane widths to match the actual lane width i.e. the painted lane width will match the design lane width.
- **Emergency Work** — Construction or repair of transportation infrastructure which has been damaged as a result of an accident, natural catastrophe, or sudden facility failure, etc., that is urgently required to restore safety and use of the facility.
- **Environment**
  - Air, land or water,
  - Plant and animal life, including man,
  - The social, economic and cultural conditions that influence the life of man or a community,
  - Any building structure, machine or other device or thing made by man,
  - Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities or man, or
  - Any part or combination of the foregoing and the

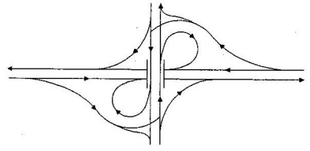
interrelationships between any two or more of them, in or of Ontario.

- **Environmental Effect** — A change in the existing conditions of the environment which may have either beneficial (positive) or detrimental (negative) effects.
- **Environmentally Sensitive Areas (ESA's)** — Those areas identified by any agency or level of government which contain natural features, ecological functions or cultural, historical or visual amenities which are susceptible to disturbance from human activities and which warrant protection.
- **Equivalent Sound Level (Leq)** — The level of a continuous sound having the same energy as a fluctuating sound in a given time period. In this report Leq refers to 24-hour averages.
- **Evaluation** — The outcome of a process that appraises the advantages and disadvantages of alternatives.
- **Evaluation Process** — The process involving the identification of criteria, rating of predicted impacts, assignment of weights to criteria, and aggregation of weights, rates and criteria to produce an ordering of alternatives.
- **Excess Materials** — Materials which are surplus to the requirements of a highway construction or maintenance operation. These materials can be managed through re-use, disposal as fill, open-burning or disposal as waste.
- **External Agencies** — Include Federal departments and agencies, Provincial ministries and agencies, conservation authorities, municipalities, Crown corporations or other agencies other than MTO.
- **Factor** — A category of sub-factors.
- **Flyover** — A grade separation with the side road over the freeway. Also described as an underpass.
- **Freeway** — Freeways are controlled access median divided highway facilities with grade separated crossings and interchanges (i.e. QEW and 400 series).
- **Function Form** — See Utility Function
- **Grade Separation** — The separation of a cross road with a vertical grade difference from the freeway. Also see overpass, underpass or flyover.
- **HADD** — Harmful Alternation, Disturbance or Destruction of fish habitat.
- **Highway Facilities** — Any facility associated with a provincial highway including patrol yards, truck inspection stations, winter maintenance facilities, rest areas, commuter parking lots, travel information centres and service centres.
- **Highways** — Highways are roadways under the jurisdiction of MTO including King's highways, secondary highways and tertiary roads. This includes all components within the associated right-of-way, e.g. structures, drainage works, traffic and safety devices.
- **Individual Environmental Assessment** — An environmental Assessment for an undertaking to which Assessment the EA Act applies and which requires formal review and approval under the Act.
- **Interchange** — The intersection between two roadways at different levels with connecting ramps for traffic turning between them.

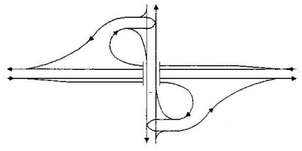
- **Lane Width** — Defined as the travelled way to accommodate a single line of vehicles. It is measured from the centre of the roadway (or adjacent lane) to the inside edge of the shoulder including the pavement markings for the edge striping. The later space of a lane accommodates the vehicle (2.6 m maximum) wheel tracking and provides a lateral offset to hazards (curbs and / or opposing vehicles).
- **Linear Utility Function** — A function that can be defined using a linear equation of the form
  y = a + bx, where
  y is the dependent variable (raw score)
  x is the independent variable (measurement)
  b is the slope of the function, and
  a is the y intercept, normalized in this study to be equal to one or zero
- **MAC** — Municipal Advisory Committee
- **Matrix** — A rectangular array of criteria and values.
- **Median** — The portion of a divided highway separating oncoming traffic (space, barrier or combination).
- **Mitigating Measure** — A measure that is incorporated into a project to reduce, eliminate or ameliorate detrimental environmental effects.
- **Mitigation** — Taking actions that either remove or alleviate to some degree the negative impacts associated with the implementation of alternatives.
- **MNR** — Ministry of Natural Resources.
- **MOE** — Ministry of the Environment
- **MTO** — Ministry of Transportation
- **New Route** — New highway created where no highway facility existed previously.
- **Noise Attenuation** — A mitigation measure used to lessen the intensity of the noise level (dBA) where the noise level is increased in a noise sensitive area greater than 5 dBA 10 years after completion.
- **NSA** — Noise Sensitive Area is a noise sensitive land use, which has an outdoor living area associated with the residential unit.
- **NSSP** — Non-standard special provision. Environmental NSSP's have wording for project-specific environmental protection requirements in construction and maintenance contracts.
- **OLA** — Outdoor Living Area is the part of an outdoor amenity area provided for the quiet enjoyment of the outdoor environment.
- **Overall Score** — The final value of an alternative's score derived at by summing all of the weighted scores.
- **Overpass** — Cross road goes under the highway.
- **PAC** — Public Advisory Committee
- **Parclo A2 Interchange Configuration** — Partial cloverleaf design with inner loops in two quadrants as follows



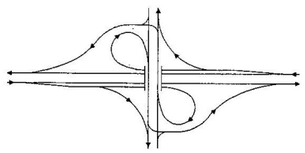
- **Parclo A4 Interchange Configuration** — Partial cloverleaf design with inner and outer loop ramps in four quadrants as follows



- **Parclo B2 Interchange Configuration** — Partial cloverleaf design with inner loops in two quadrants as follows



- **Parclo B4 Interchange Configuration** — Partial cloverleaf design with inner and outer loops in two quadrants as follows



- **Patrol Yard** — Facility established for the maintenance of the highway which includes buildings (officer, garage), fuel tanks, storage domes for sand and salt, material stockpiles, vehicle parking and storage areas, access roads, entrances, accelerating and deceleration lanes and waste storage.
- **PDR** — Preliminary Design Report
- **Performance Factor** — See Utility Function
- **PIC** — Public Involvement Centre
- **Planning** — That part of the planning and design process where alternatives to the undertaking and alternative routes are identified and assessed.
- **Preliminary Design** — That part of the planning and design process, during which various alternative solutions are examined and evaluated including consideration of environmental effects and mitigation; the recommended design solution is then developed in sufficient detail to ensure that the horizontal and vertical controls are physically compatible with the proposed site, that the requirements of lands and rights-of-way are satisfactorily identified, and that the basic design criteria or features to be contained in the design, have been fully recognized and documented in sufficient graphic detail to ensure their feasibility.
- **Prime Agricultural Areas** — Prime agricultural areas as defined in municipal official plans and other government policy sources.
- **Project** — A specific undertaking planned and implemented in accordance with this Class EA including all those activities necessary to solve a specific transportation problem.
- **Proponent** — A person or agency who carries or proposes to carry out an undertaking, or is the owner or person having change, management, or control of an undertaking.
- **Provincial Transportation System** — Provincial highways; provincial freeways; provincial transitways (separate transit facilities directly associated with a provincial highway); provincial ferry boats; private controlled access toll highways that are not part of the King's Highway other transportation corridors which have strategic and economic importance to the province;

	and the service, maintenance and operations facilities to support the above.
• **Public**	Includes the general public, interest groups, associates, community groups, and individuals, including property owners.
• **Ranking**	The ordering of alternatives from first to last for comparison purposes.
• **Raw data**	The measurement of the impact, or measured data, under each criterion.
• **Realignment**	Replacement or upgrading of an existing highway on a new or revised alignment.
• **Risk**	Probability that a given outcome will or will not materialize. Distinct from uncertainty in that the alternative outcomes are known or defined and that the probability of each is measurable.
• **Rounding**	Shoulder rounding is a transition between the shoulder cross fall and the granular side slope. It provides additional material beyond the shoulder for lateral support of the shoulder and provides a smooth transition for control of an errant vehicle leaving the roadway. On the higher speed facilities, this transition is extended over a greater distance.
• **Route Alternatives**	Location alternatives within a corridor.
• **SADT**	Summer Average Daily Traffic – the average 24-hour, two-way traffic for the period from July 1st to August 31st including weekends.
• **Screening**	Process of eliminating alternatives from further consideration, which do not meet minimum conditions or categorical requirements.
• **Shoulder Width**	Defined as the portion of the roadway immediately adjacent to the travelled lane (outside the painted edge striping where edge-striping is utilized). Its function includes storage or disabled vehicles, snow storage and a recovery area.
• **SP**	Standard special provision. Environmental SP's have a standard working for routine environmental protection requirements in construction and maintenance contracts.
• **Step Function**	A function can be defined by several linear functions within separate ranges that have a slope equal to zero. For this study, two linear functions are used y = 1, for x = desirable y = 0, for x = undesirable
• **Sub-factor**	A single criterion used for the evaluation. Each sub-factor is grouped under one of the factors.
• **TAC**	Technical Advisory Committee
• **TESR**	Transportation Environmental Study Report.
• **Traceability**	Characteristics of an evaluation process which enables its development and implementation to be followed with ease.
• **Truck Inspection Station**	Facilities include buildings, weigh scales, parking areas, ramps and storage areas.

- **Twinning** — The addition of one or more lanes to a highway facility where the new lanes are separated from the existing lanes by means of a median.
- **Underpass** — Cross road goes over the highway.
- **Undertaking** — In keeping with the definition of the Environmental Assessment Act, a project or activity subject to this Class Environmental Assessment.
- **Utility Function** — A function (linear, step) that represents the utility score versus the criterion measurement or desirableness.
- **Utility Score** — The "y " value derived from the utility function of the measurement of the impact induced by a particular alternative's criterion. A measurement of the usefulness of an alternative's criterion (a number between 0 and 1).
- **Waste** — Excess materials which are disposed of at a site certified under Part V of the Environmental Protection Act.
- **Weight** — The importance attributed to criterion relative to other criterion. The value of the weight is expressed in a percentage and the sum of all criterion weights is equal to 100%.
- **Weighted Additive Method** — The method used in the evaluation of alternatives, which reduces the project's numerous criteria into a dimensionless number for each alternative suitable for comparison.
- **Weighted Score** — A raw score that has been multiplied by the criterion weights. The weighted scores reflect the social value or importance of the specific group providing weights.
- **Winter Maintenance Facility** — May include a garage, fuel pumps and storage buildings, including facilities for de-icing chemicals.

1.0 PROJECT SUMMARY

1.1 Introduction

The Ministry of Transportation (MTO) initiated a Preliminary Design/Environmental Assessment (EA) Study in April 2002, in order to develop a Preliminary Design for Highway 17 that provides an improved transportation facility from Arnprior to west of Renfrew. This facility will include two additional lanes to twin the existing 2-lane highway. This will separate eastbound and westbound traffic to improve safety and the level of service of the highway. Interchanges will be constructed at strategic access points. The introduction of grade separations, road closures, and service roads to the local road network will provide controlled access to/from Highway 17.

The project is located within the Townships of McNab-Braeside, and Horton, in the County of Renfrew, and extends from the Town of Arnprior through to the Town of Renfrew. Refer to **Figure 1-1 Project Location**.

The purpose of the study is to fully examine the current and projected transportation needs in the Highway 17 study area, and to identify all available opportunities to address these needs. This project has also been completed to review the existing design standards in the context of the previous 1969 planning study, "Highway 17 Planning Study Ottawa to North Bay".

The goal of this report is to document the need and justification for the twinning of Highway 17 and to provide an improvement plan which balances the economic and social interests of the community, external agencies, stakeholders, local property owners, and businesses. The Environmental Assessment (EA) planning process satisfies all provincial and federal environmental legislation. The process addresses the concerns of the community and impacts to the natural and social environments.

This report documents the recommended Preliminary Design and the environmental planning and public consultation program that have led to the study recommendations for the twinning of the highway. The project is a Class Environmental Assessment Group "B" Project, in accordance with the "Class Environmental Assessment for Provincial Transportation Facilities" 2000.

The project was undertaken in a series of phases commencing with the preparation of the Study Design and concludes with the filing of the Transportation Environmental Study Report (TESR). The TESR includes a summary of the public consultation, an analysis and evaluation of the Alternatives to the Undertaking and Alternative Methods of Carrying out the Undertaking and the Recommended Plan including commitments to mitigate any residual effects of the project.

1.2 Study Area

The Study Area, illustrated in **Figure 1-2**, is approximately 30 km in length and follows the existing Highway 17 corridor. The study limits are from Lanark County Road 29, at the Town of Arnprior, westerly to 3.0 km west of Bruce Street (immediately west of the Town of Renfrew).

Figure 1-1 Project Location

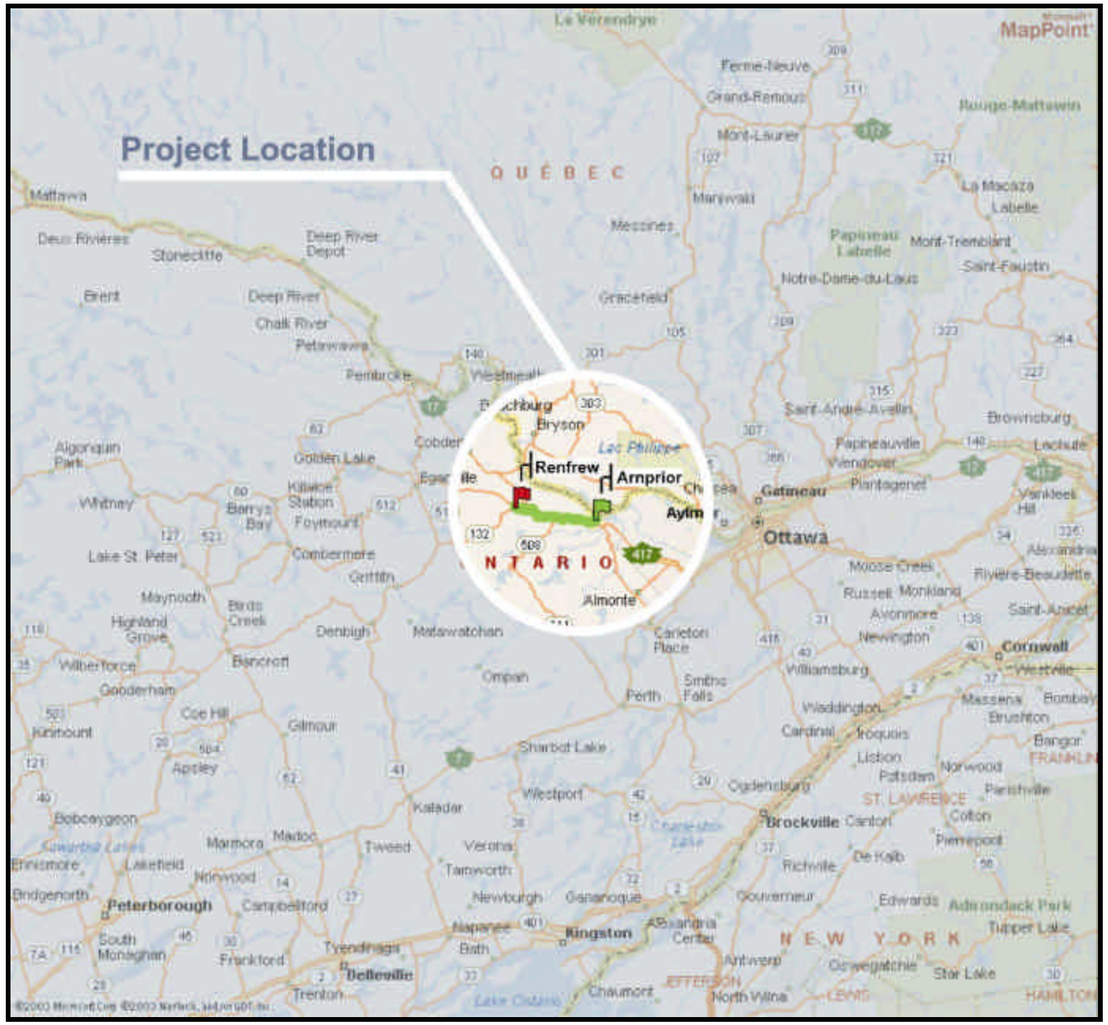
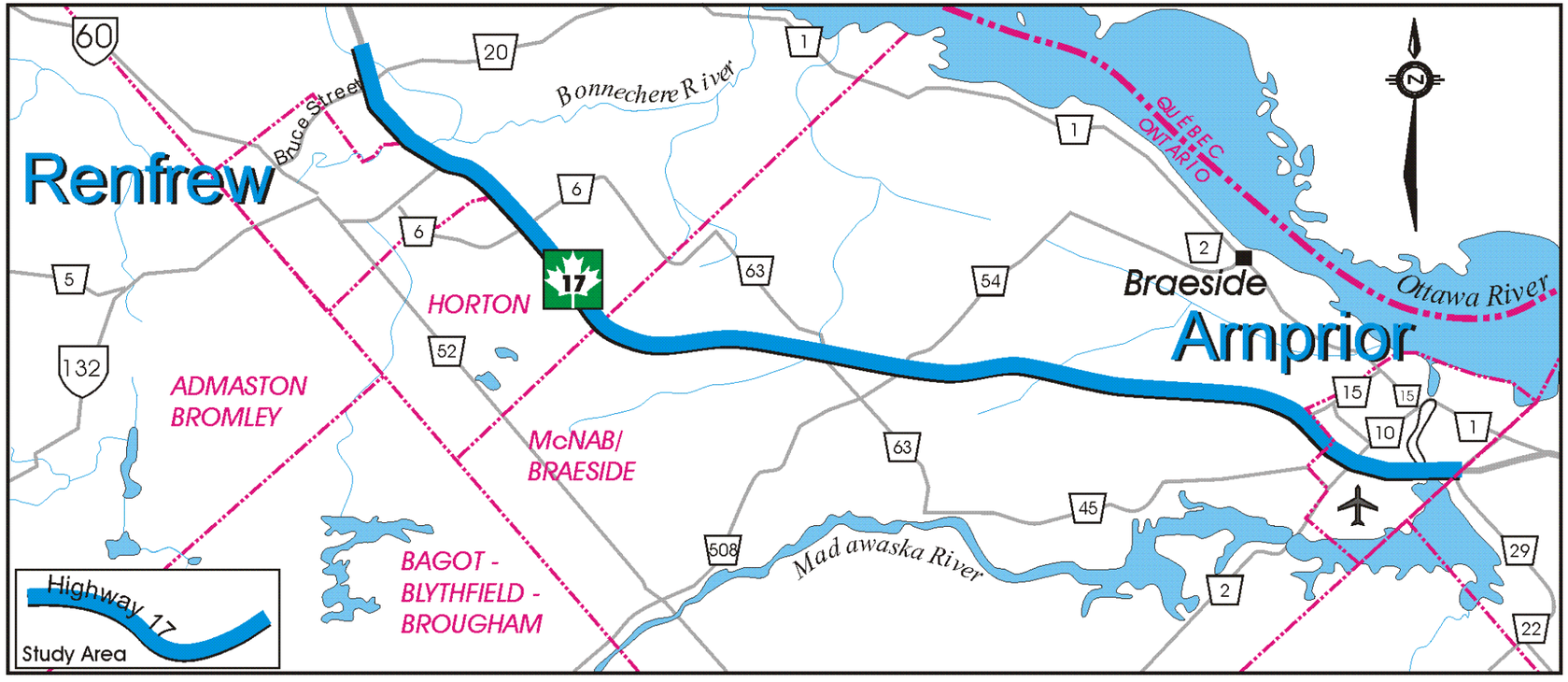


Figure 1-2 Study Area



1.3 Background

Highway 17 comprises a portion of the Trans-Canada Highway and provides a crucial economic link between Northern Ontario and Southeastern Ontario.

In 1969, the Ontario Department of Highways completed the "Highway 17 Planning Study, Ottawa to North Bay", which established the need for a future freeway on this corridor and the property required for the future twinning. Road Closing Plans were completed and registered in 1971-72, and property was acquired based on the limits established in the planning study.

Two-lane highway alignments based on the 1971-72 plans have been constructed in the form of a staged ultimate freeway. The sections of Highway 17 between Arnprior and Renfrew were constructed between 1969 and 1980, respectively.

1.4 Project Purpose

The purpose of this study is to:

- Fully examine the current and projected transportation needs in the Highway 17 study area;
- Identify and evaluate all opportunities for improvements, and to develop an improvement plan to address these needs;
- Identify property needs and protect to ensure availability;
- Optimize roadway design elements to provide a safe and efficient driving environment;
- Provide a roadway configuration that fully integrates with the planned transportation network in the study area;
- Provide a roadway network that ensures the safe and efficient movement of goods and people, and the continued vitality of communities along Highway 17; and
- Provide access to tourism and resource areas within and outside the study area.

1.5 General Description of the Undertaking

The undertaking will include the twinning of the existing 2-lane highway from Lanark County Road 29, at the Town of Arnprior westerly to 3.0 km west of Bruce Street, at the Town of Renfrew.

The project will provide a fully controlled access freeway with a divided median. Access will be provided to the municipal road system with interchanges at: White Lake Road / Daniel Street, Campbell Drive, County Road 508, County Road 6 and County Road 20. Other existing at grade intersections will be removed with grade separations provided at Baskin Drive, Division Street / Pine Grove Road, Scheel Drive and Goshen Road. In addition, new service roads will be provided linking Baskin Drive to White Lake Road and Miller Road to the County Road 508 interchange.

1.6 Purpose of the Transportation Environmental Study Report

The **Transportation Environmental Study Report (TESR)** is prepared in compliance with the requirements of the *Class Environmental Assessment for Provincial Transportation Facilities (2000)*, which has been approved under the Provincial Environmental Assessment Act for highway projects undertaken by the Ontario Ministry of Transportation.

Because of the nature and degree of proposed improvements, this Class Environmental Assessment (EA) study is deemed to be covered by the provisions for a Group B undertaking. Within the Group B category, there is a range of "levels of complexity". Because of the level of public interest in this study, and the potential for natural environment impacts, this was deemed to be a Group B project of "moderate" complexity. Particular attention was given to early and on-going consultation with potentially affected stakeholders and organized special interest groups.

A TESR is available for a 30-day public review period. Interested persons are encouraged to review this document and provide comments. If, after consulting with the Ministry's consultants and staff, a person has serious unresolved concerns, they have the right to request the Minister of the Environment (135 St. Clair Avenue West, Toronto, Ontario, M4V 1P5) to "bump-up" (i.e. make a Part II Order for this project). A Part II Order may lead to preparation of an individual environmental assessment. A copy of the "bump-up" request should be forwarded to the Ministry of Transportation and NCE, at the addresses noted in **Section 1.14**.

If there are no outstanding concerns upon completion of this public review period the project may proceed to detail design.

The TESR contains a description of the project and its purpose, a summary of the assessment of alternatives, environmental effects, commitments to mitigation of these effects and monitoring of activities associated with the implementation and operation of the project.

1.7 Environmental Assessment Process

The Environmental Assessment was undertaken in a series of phases commencing with the preparation of the Study Design, Environmental Plan and Consultation Plan and concludes with the filing of the Transportation Environmental Study Report (TESR).

Included within this report are the following components:

- Justification for the project (Chapter 2);
- Summary of the public consultation program (Chapter 3);
- Description of existing and future conditions within the highway corridor (Chapter 4);
- Summary of the evaluation process and evaluation of the Planning Solutions and Alternative Methods of Carrying Out the Undertaking (Chapter 5); and
- Description of the Recommended Plan and environmental mitigation measures required addressing the anticipated impacts associated with the Recommended Plan (Chapter 6).

The study includes detailed inventories of the natural and social environments, evaluation of alternatives, and public and municipal consultation.

As required, a Transportation Environmental Study Report (TESR) documenting the effects and the corresponding mitigation measures will be filed with the Environmental Assessment Branch of the Ministry of Environment at the completion of the study.

1.8 Canadian Environmental Assessment Act

This project will trigger a Federal Environmental Assessment screening under the Canadian Environmental Assessment Act (CEAA) because of the need to receive approvals under federal legislation. Crossings of the Madawaska and Bonnechere Rivers, which are navigable waters under the Navigable Waters Protection Act, requires a Federal approval process. Secondly, the project will include new culverts and extensions where there is fish habitat protected, under the Canadian Fisheries Act.

The construction of new culverts will result in an alteration of existing fish habitat. This EA document presents a recommended strategy to deal with the proposed Harmful Alteration Disturbance or Destruction (HADD). The measures have been discussed with Ministry of Natural Resources (MNR) and the Department of Fisheries and Oceans (DFO) during the course of this study. A formal application will be made during the subsequent detailed design phase.

1.9 Study Issues

This project included a number of issues, such as the Madawaska and Bonnechere Rivers, residential properties, agricultural operations, businesses, wildlife habitat and fish habitat. However, each of these issues have been mitigated and the documentation of the commitments to mitigate any residual adverse environmental effects of the project is included in this report.

The following issues were identified during the course of the study:

- Need for new interchanges at Baskin Drive, Campbell Road, and County Road 6;
- Concerns regarding the location of the transition area for the current Highway 17 twinning project which will end immediately east of the Madawaska Bridge;
- Environmental sensitivity of the various water crossings and mitigation requirements because of structure widening / twinning and fisheries impacts / compensation issues;
- Construction impacts on the operation of the Hydro One dam on the Madawaska River;
- There is a poor level of service on the highway during peak periods (queues have been measured from Arnprior (White Lake Road) extending to Renfrew (west of County Road 6));
- There has been a history of fatal type collisions that have occurred on the 2-lane sections of Highway 17 and that the frequency of these collisions will increase if improvements are not made;

- Effects of construction on residences and businesses, in particular at County Road 6 and White Lake Road;
- Deer yard habitat loss expressed by MNR (Campbell Drive to Scheel Drive);
- Potential erosion of soils associated with the Bonnechere River floodplain;
- Snowmobile access from Division Street to the Madawaska Dam;
- Removal of vegetation on the right-of-way (specifically, a Provincially Rare Plant Species - the Rams Head Orchid);
- Remediation / management of ministry acquired contaminated property;
- Snow drifting between Campbell Drive and White Lake Road and between Bruce Street and O'Brien Road;
- Visual intrusion;
- Emergency vehicle access;
- Roadside safety – guiderail and barrier requirements, lane and shoulder widths and appropriate clear zone strategies;
- Roadside drainage and ditching; and
- Construction staging schemes and the operation and function of the highway during the twinning process.

Some of the major concerns and proposed mitigation are summarized in **Table 1-1**. A more comprehensive discussion of the public comments and action to be taken is described in **Section 3.5**.

1.10 Alternatives

Examining alternatives under the Environmental Assessment (EA) Act requires considering solutions at two stages. These two steps include:

- Alternatives examined during the Transportation Needs Assessment stage are "**Alternatives To**" the undertaking or Planning Solutions.
- Alternatives examined during the Planning and Preliminary Design, are "**Alternative Methods**" of completing the undertaking.

As part of this planning and preliminary design study, alternatives were identified and evaluated based on appropriate screening level or detailed evaluation methodologies. The process followed is summarized in **Section 1.9** and described in detail in **Section 3.6**.

Table 1-1
Summary of Environmental Concerns and Recommended Mitigation

Issues	Study Recommendations
Deer Yard Crossing from Campbell Drive to Scheel Drive	• Reflector Pilot Project • Reforestation, where surplus land is available.
Visual Intrusion where the highway is widened towards existing residential units	• Landscaping adjacent to existing dwelling units
Loss of fish habitat	• Compensation strategy including such measures as channel substrate enhancement and vegetation specific authorization measures will be documented at the detail design phase of the project
Underground cavern / watercourse west of Campbell Drive	• To be subject of geotechnical investigation during detail design
Provincially Rare Plant Species	• Transplant to similar microclimate adjacent to road right-of-way
Snow drifting	• Plantings along edge of right-of-way
Property Acquisitions / Business impacts	• To be determined but affected land owners have been contacted and commitments presented in this TESR for those to be compensated
Emergency Access to Horton Township	• Provide ramps to County Road 6 to maintain all existing response times to the east half of Horton Township.
Provide alternate truck routes for vehicles who are currently using Campbell Drive to Highway 17 to avoid community disruption to the Town of Arnprior.	• Provide an interchange at Campbell Drive
Provide alternate truck route for quarries currently using Miller Road to avoid residential community disruption on Anderson Road	• Provide north service road to link Miller Road to County Road 508 interchange

1.11 Analysis and Evaluation of Alternatives

1.11.1 Assessment of Alternative Planning Solutions

Planning Solutions represent alternative ways of addressing the identified problem. The list considered for this study includes:

- Do Nothing
- Traffic Systems Management (better use of passing lanes and traffic signals etc.
- Divert Traffic to other roadways (such as County Road 1)
- Alternative Modes of Travel:
  - Rail
  - Inner City Bus Service
  - Rapid Transit
- Expansion of Existing Facility (4-laning existing Highway 17, interchanges, grade separations and road closures).

A coarse screening analysis was undertaken to assess what reasonable planning solution should be carried forward for detailed analysis. The screening criteria considered the following broad factors:

- Transportation
- Land Use
- Economic
- Environment

Based on an evaluation of these alternatives, as described in **Section 5.4**, "Twin Highway 17 as a controlled access facility with select interchange locations" was selected as the preferred planning solution and was carried forward. This conclusion was consistent with the previous planning in the corridor from the 1960's and the 1972 road closing plan that purchased the majority of property for this project. This recommendation was presented to the public at the first Public Involvement Centre (PIC) and there were no objections to this recommendation. The community and its municipal leaders strongly supported this recommendation.

1.11.2 Assessment of Alternative Methods

The second step in the evaluation process was to generate and assess Alternative Methods or Preliminary Design Alternatives. These preliminary design alternatives included a series of median, grade separation (overpass or underpass), cross road alignment and interchange alternatives.

1.11.2.1 Median Alternatives

As an initial step of the analysis and evaluation of alternatives a coarse screening was carried out for the median alternatives. This step established the most appropriate median type and median width to be used in the future freeway. The analysis assessed both safety and environmental impacts. Four median alternatives were identified:

- Alternative 1 – 7.5 m median including a concrete median barrier;
- Alternative 2 – 22.5 m median;
- Alternative 3 - 32.5 m median; and
- Alternative 4 – 60.0 m median.

Based on a technical assessment of the alternatives it was recommended that Alternative 3 – 32.5 m median be carried forward as the desirable median width. The 32.5 m median could be widened where technically feasible with limited property acquisition. This recommendation was accepted by the Technical Advisory Committee (TAC) and presented to the public at PIC No.1. See Median Analysis Report in **Appendix O**.

1.11.2.2 Cross Roads and Side Road Horizontal Alignment Alternatives

This step established the horizontal alignments for cross roads (overpass versus underpass) prior to establishing the type of structure that would be selected.

Table 1-2
Coarse Screening Of Cross Road and Side Road Alternatives

Cross Road	Alternatives	Carried Forward	Not Carried Forward
Scheel Drive	• 1 – long skewed underpass, tangent Scheel Dr.	✓	
	• 2 – shorter skewed underpass		×
	• 3 – perpendicular underpass		×
Miller Road / Anderson Road	• 1 – long skewed multispan underpass, tangent alignment on Miller Road	✓	
	• 2 – skewed multispan underpass, curvalinear road alignment		×
	• 3 – perpendicular underpass, curvalinear road alignment		×
Goshen Road Overpass	• 1 – tangent alignment	✓	
	• 2 – curvalinear alignment to the south		×
	• 3 – curvalinear alignment to the north		×
Whitton Road Connection	• 1 – connect Whitton Road to Innovation Drive as continuous roadway	✓	
	• 2 – connect Whitton Road to Innovation Drive at T-intersection	✓	
	• 3 – connect Whitton Road to Innovation Drive at T-intersection 30m from O'Brien Road		×
	• 4 – close Whitton Road at O'Brien Road		×

The coarse screening of cross and side road locations recommended the following alignments:

- Goshen Road: Tangent alignment on skew angle crossing Highway 17;
- Miller / Anderson: Tangent alignment on skew angle crossing Highway 17;
- Scheel Drive: Tangent alignment on skew angle crossing Highway 17; and
- Whitton Road: Continuous local road connection of Whitton Road to Innovation Drive.

A complete description of the analysis and evaluation is included in **Appendix P**.

1.11.2.3 Vertical Alignment Alternatives for Cross Roads

This set of analyses determined whether the highway would go over or under the crossroad (overpass or underpass respectively). There are eleven (11) grade separations within the study area. The cross roads and resultant recommendations are listed as follows:

- Baskin Drive — Overpass*
- White Lake Road — Underpass**
- Division Street — Underpass**
- Campbell Drive — Underpass**
- Scheel Drive — Underpass**
- County Road 508 / 54 — Underpass**
- Miller / Anderson Roads — Underpass**
- Goshen Road — Overpass*
- County Road 6 — Underpass**
- O'Brien Road — Overpass*
- Bruce Street — Underpass**

* cross road goes under the highway

** cross road goes over the highway

1.11.2.4 Interchange Needs Analysis

As a result of consultation with the public and the Municipal Advisory Committee, the study assessed the need and justification for the highway

expansion as well as an assessment of the need for three additional interchange locations. The locations of these possible interchange locations were:

- Baskin Drive
- Campbell Drive
- County Road 6

The results of the Needs Analysis identified a long term requirement for interchanges at Campbell Drive and County Road 6. However, the Baskin Drive location was considered too close to the White Lake Road interchange and would reduce highway safety. An alternative to the Baskin Drive interchange was to consider service road alternatives to meet access requirements of the Boeing Plant in Arnprior. They were evaluated as part of the assessment of Alternative Methods.

Both the short term and long term property requirements were reviewed for Campbell Drive because an interchange would change the previous 1972 Road Closing Plan which showed a service road connection between Campbell Drive and Division Street. Short term options at Campbell Drive included a flyover and service road alternatives, long term options included interchange alternatives. Based on community input and comments from municipal partners (Town of Arnprior and Township of McNab-Braeside) the recommendation to construct an interchange was carried forward at Campbell Drive. This avoids any short term community disruption of truck traffic to Arnprior and Pine Grove residents.

Both service road and full interchange property requirements were reviewed for County Road 6, because an interchange was a change from the 1972 Road Closing Plan. Based on input from Horton Township and the Township's Fire Department it was determined that there is a short term need for an in terchange at this location.

1.11.2.5 Interchange Alternatives

The determination of the recommended interchange type at each interchange location required two separate sets of analyses. A long list of interchange alternatives were first subjected to a coarse screening exercise to determine the appropriate alternatives to be carried forward to the detail analysis and evaluation. The summary of the results of both sets of analyses are listed in **Table 1-3, Results of the Interchange Analysis and Evaluation of Alternatives.** The complete description of the evaluation is included in **Appendix T**.

Table 1-3
Results of the Interchange Analysis and Evaluation of Alternatives

Interchange	Alternative	Step 1 Coarse Screening		Step 2 Detailed Evaluation
		Carried Forward to Detailed Evaluation	Not Carried Forward	Technically Preferred Alternative
White Lake Road	1 – Parclo A2		×	
	2 – Parclo A2, 45m loop	✓		
	3 – Parclo A4, 45m loop	✓		✓
	4 – Parclo B2		×	
	5 – Parclo B4		×	
	6 - Diamond	✓		
	7 – Parclo A4 with collector lane		×	
	8 – Parclo A4 with collector lane, 10.5m median		×	
	9 – Parclo A4 with realigned collector road		×	
	10 – south service road		×	
	11 – realigned White Lake Rd. with collector		×	
Campbell Drive	1A – road closure with service road	✓		
	1B – flyover with service road	✓		
	2 – grade separation	✓		
	3 – Parclo A2	✓		✓
	4 – Parclo A4	✓		
	5 – Parclo A2, 90m loops	✓		
	6 – Parclo A4, 90m loops	✓		
	7 – Parclo B2	✓		
	8 – Parclo B4	✓		
	9 - Diamond	✓		
	10 – Half Diamond, ramps to / from west	✓		
	11 – Parclo AB	✓		
	12A – Service road to Staye Court	✓		
Campbell Drive	12B – Service road to Staye Court and flyover	✓		

Table 1-3
Results of the Interchange Analysis and Evaluation of Alternatives

Interchange	Alternative	Step 1 Coarse Screening		Step 2 Detailed Evaluation
		Carried Forward to Detailed Evaluation	Not Carried Forward	Technically Preferred Alternative
County Road 508	1A – Parclo A2	✓		
	1B – Parclo A2, 90m loops	✓		
	2A – Parclo A4	✓		
	2B – Parclo A4, 90m loops	✓		
	3 – Parclo B2		×	
	4 – Parclo B4		×	
	5 - Diamond		×	
	6 – Parclo A4 / Diamond	✓		
	7 – Parclo A4 / Diamond, 90m loop	✓		
	8 – Parclo A4, interchange moved east	✓		✓
	9 – Parclo A4, 90m loop, interchange moved east	✓		
Lochwinnoch Road / Gillan Road (County Rd. 6)	1 - Flyover	✓		
	2 – Service road connection to Goshen Road		×	
	3A – Parclo A2, 75m loops	✓		
	3B – Parclo A2, 55m loops	✓		✓
	4A – Parclo A4, 75m loops	✓		
	4B – Parclo A4, 55m loops	✓		
	5 – Parclo A2, 90m loops	✓		
	6 – Parclo A4, 90m loops	✓		
	7 – Parclo B2	✓		
	8 – Parclo B4	✓		

Table 1-3
Results of the Interchange Analysis and Evaluation of Alternatives

Interchange	Alternative	Step 1 Coarse Screening		Step 2 Detailed Evaluation
		Carried Forward to Detailed Evaluation	Not Carried Forward	Technically Preferred Alternative
Lochwinnoch Road / Gillan	9A – Diamond, protect 90m loop	✓		
	9B – Diamond, protect 55m loop	✓		
	10 - Service Road to O'Brien Road	✓		
O'Brien Road Interchange	1 – Parclo A2, 75m loops		×	
	2 – Parclo A2, 55m loops	✓		
	3 – Parclo A2 / A4, 75m loops		×	
	4 – Parclo A2 / A4, 55m loops	✓		
	5 – Parclo B2		x	
	6 – Parclo B2 / B4		×	
	7 - Diamond		×	
	8 – Trumpet, 75m loop	✓		
	9 – Trumpet / Diamond, 75m loop	✓		✓
	10 – Trumpet, 90m loop	✓		
	11 – Trumpet / Diamond, 90m loop	✓		

Table 1-3
Results of the Interchange Analysis and Evaluation of Alternatives

Interchange	Alternative	Step 1 Coarse Screening		Step 2 Detailed Evaluation
		Carried Forward to Detailed Evaluation	Not Carried Forward	Technically Preferred Alternative
Bruce Street Interchange	1 – Parclo A2, 75 m loop	✓		✓
	2 – Parclo A4, 75 m loop	✓		
	3 – Parclo B2, 90 m loop	✓		
	4 – Parclo B4, 90 m loop	✓		
	5 - Diamond	✓		
	6 – Parclo A4, existing alignment		×	
	7 – Parclo B4, existing alignment		×	
	8 – Diamond, existing alignment		×	
	9 – Parclo A2, 90m loops	✓		
	10 – Parclo A4, 90m loops	✓		
	11 – Parclo A4, 90m loop and 75m loop	✓		

1.11.3 Refinements to the Technically Preferred Plan

The Technically Preferred Plan (TPP) was presented to the public at PIC No. 2 and included those alternatives selected in the technical evaluation in the categories of: interchanges, cross road alignments, median width and bridge types. Refinements to the TPP were considered in response to public concerns and agency review of the TPP. Alternatives were developed in those areas where public concern was expressed. The Recommended Plan and possible refinements were subsequently evaluated and presented to the public at PIC No.3. The following sections provide a brief description of the refinements.

1.11.3.1 Cross Road Profiles

Local residents raised concerns regarding the proposed travel speeds on the underpass structures at Campbell Drive and Scheel Drive. Alternative cross road profiles were developed in response to their input. At Campbell Drive, Scheel Drive and Miller / Anderson the design speed of the cross roads was reduced to 80 km / h, from 100 km / h.

1.11.3.2 White Lake Road/Baskin Drive Service Road

White Lake Road / Baskin Drive Service Road alternatives were carried forward to address concerns regarding out-of-way travel to the Boeing plant, and future development identified by property owners and the Town of Arnprior. The alternative that aligned the service road to the lot lines was selected as the preferred alternative. Sub-options were also developed to determine the location and alignment of the Baskin Drive intersection with the new service road. The preferred intersection location will ensure adequate sightlines on Baskin Drive. This recommendation was endorsed by the Boeing representatives and the Town of Arnprior.

1.11.3.3 Campbell Drive Interchange

The Campbell Drive interchange was initially identified as a longer term need as part of a staged implementation of the interchange. However, community concern regarding truck traffic through the Pine Grove community and the Town of Arnprior resulted in the TAC recommending the interchange be accelerated to a short-term need. This recommendation was shown to the adjacent property owners. There was a concern for loss of farmland on the north side of the highway. Three options were considered to reduce the effects on the adjacent lands, and it was recommended that a Parclo A4 interchange design with narrower median and 75 m inner loops be selected.

1.11.3.4 County Road 508/54 Sideroad Realignment

Sideroad realignment alternatives were carried forward for consideration to address roadway geometric concerns regarding turning radii and sightlines that were included in the original 1972 plan. The recommendation is to improve the

sideroad geometry to meet current MTO and County Road standards for safety and truck and emergency vehicle turning movements.

1.11.3.5 Miller Road Extension

The original 1972 road closing plan indicated that a flyover be constructed at this location. The community is concerned that a flyover will increase future tuck traffic. Consequently, north service road extension alternatives at Miller Road were carried forward. A Value Engineering Review of the Technically Preferred Plan also identified merit in examining other alternatives to providing a flyover structure at Miller / Anderson Road. The recommended alternative is to extend Miller Road to connect to the County Road 508 interchange along the north side of Highway 17.

1.11.3.6 McCallum Drive Road Closing

McCallum Drive Road closing alternatives were carried forward for consideration to address concerns from an adjacent landowner regarding property impacts due to additional property requirements resulting from a widened median at this location. The recommended alternative is to purchase the residential property and provide additional landscaping, a turning basin at the end of the cul-de-sac and berming to reduce visual impacts to remaining residents on McCallum Drive.

1.11.3.7 Deil's Creek Realignment at County Road 6

The twinning of Highway 17 and a new interchange at County Road 6 will require the realignment of Deil's Creek. Concerns were expressed regarding the location and length of the creek realignment. The recommended alternative minimizes the length of the creek realignment and maintains vegetation cover along the watercourse. This recommendation was further refined to ensure the creek channel will not conflict with the construction of a future long range on-ramp, from the north to the west, in the northwest quadrant. This refinement will minimize fish habitat disruption to a one time occurrence.

1.11.3.8 Bonnechere Bridge Location

Alignment alternatives were considered at the Bonnechere River bridge location where property is currently owned by MTO to accommodate twinning to the south of the existing highway. Alternatives included north and south twinning alignments considering natural habitat and cost as the most significant issues. The results of the analysis recommended retaining the current alignment within the right-of-way the Province currently owns. By doing so, it will avoid environmental impacts associated with a north side twinning where the Bonnechere valley ravine is much larger resulting in higher costs and greater natural habitat impacts.

1.12 Public Consultation

Public consultation was a key component for the success of the project. The public, interest groups and external agencies were notified and updated throughout the project through public notices and Public Involvement Centres (PIC's), which were held at key milestone dates. Information on the study was distributed to the general public through a variety of community involvement tools, including:

- Municipal Advisory Committee (MAC);
- Public Advisory Committee (PAC);
- Public Involvement Centres (PIC's);
- Letters and Flyers;
- Newspaper Notices; and
- Supplementary meetings with local residents, interest groups, property owners and external agencies.

Public Involvement Centres were held at key study milestones at the Nick Smith Centre (arena) in the Town of Arnprior and the Renfrew Inn in the Town of Renfrew. All land owners adjacent to Highway 17 and residents within 500 m of the Study Area were notified and invited to attend each PIC. Throughout the study, a number of supplementary meetings were held with affected property owners, local businesses, external agencies and interest groups. The purpose of these meetings was to allow the public an opportunity to participate in the project and provide comments on both the study process and the recommendations.

1.13 Recommended Plan

The Recommended Plan includes the following key features:

- Twinning Highway 17 to the north between County Road 29 and 1 km west of County Road 6 and to the south side from this point westerly with small widenings where property is not currently owned;
- Minimum median width of 32.5 m;
- Baskin Drive overpass with a sidewalk on the west side;
- White Lake Road to Baskin Drive south Service Road including replacement of displaced parking at Boeing;
- Improvements to White Lake Road / Daniel Street from the south service road to Baskin Drive including 4-lane cross section and illumination;
- Parclo A4 interchange at White Lake Road with a sidewalk on the west side;
- Division Street underpass with 2.0 m shoulders to accommodate snowmobiles, pedestrians and cyclists;
- Parclo A2 interchange at Campbell Drive, with protection for a long term Parclo A4 interchange configuration, design speed 80 km / h;
- Scheel Drive underpass with a design speed of 80 km / h;
- Parclo A4 interchange at County Road 508 / 54 on a new alignment;
- Improved geometrics for County Road 508 / 54 side roads;
- New County Road on the north side of Highway 17 between Miller Road (County Road 63) and County Road 54;
- Possible car pool facilities at County Road 508 interchange if surplus land is available;
- New township road to provide access to a land locked property on the south side of Highway 17 at Anderson Road;
- Goshen Road overpass with 2.0 m shoulders to accommodate snowmobiles
- New Parclo A2 interchange at County Road 6 with 2.0 m shoulders to accommodate snowmobiles as well as long term property protection for an ultimate Parclo A4 design;
- Realign Deil's Creek at County Road 6;
- New culverts to accommodate the existing Recreational Trail corridor (along the abandoned railway east of County Road 6);
- Transition of Highway 17 twinning to the south side of the right-of-way west of County Road 6;
- Trumpet / Diamond interchange at O'Brien Street (Highway 60); and
- Parclo A2 interchange at Bruce Street and long term property protection for an ultimate Parclo A4 design.

The freeway plan is expected to be constructed as a series of future projects. An initial plan for the delivery of the project is to carry out the recommendations listed above in two phases. Within each phase the implementation may have several contracts over several years to complete the construction. Staged implementation will include:

- Phase 1 construction, consisting of several projects between County Road 29 to Scheel Drive, including the Scheel Drive underpass;
- Phase 2 construction, including several projects from Scheel Drive to 3 km west of Bruce Street;
- Transitions to the freeway where staging results in the cross section reducing from 4 lanes to 2 lanes at the west limit of the Phase 1 phase and the west limit of Phase 2;
- Landscaping adjacent to residential dwelling units in close proximity to highway construction; and
- Land acquisition, as required, to allow the above noted freeway expansion plan.

The recommended cross section for the Highway 17 Twinning is shown in **Figure 1-3, Recommended Cross Section**. The recommended plan for the Highway 17 Twinning between Arnprior and Renfrew is shown in **Figures 1-4** to **1-23, Recommended Plan**.

1.14 Additional Information

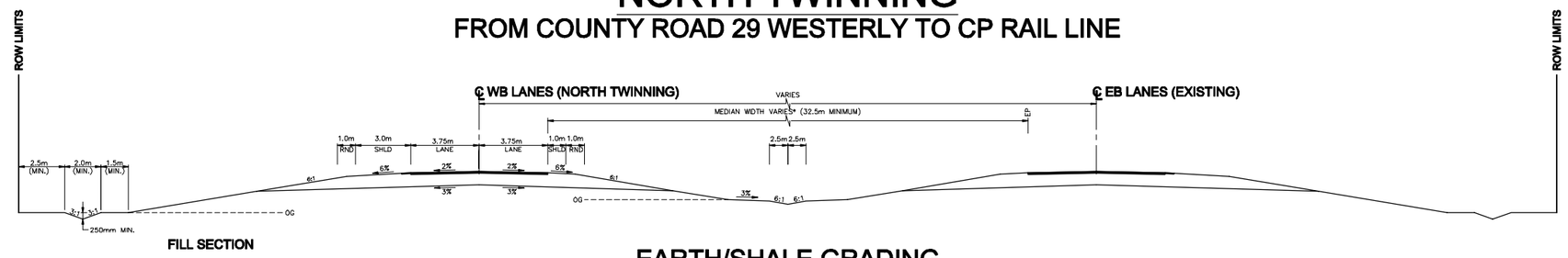
Additional background information for this project resides with the Ministry of Transportation. The Ministry's Project Manager and Consultant Project Manger for this project, noted below, may be contacted at anytime to discuss this project.

Mr. Bob Boutilier,
Project Manager
Ministry of Transportation
355 Counter Street
Kingston, ON K7L 5A3
Phone: 613-540-5111
bob.boutilier@mto.gov.on.ca

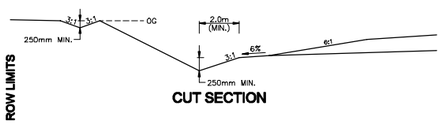
Steve Taylor, P.Eng.,
Consultant Project Manager
National Capital Engineering
202-100 Craig Henry Drive
Ottawa, ON K2G 5W3
Phone: 613-228-8654
steven.taylor@nceltd.com

NORTH TWINNING

FROM COUNTY ROAD 29 WESTERLY TO CP RAIL LINE



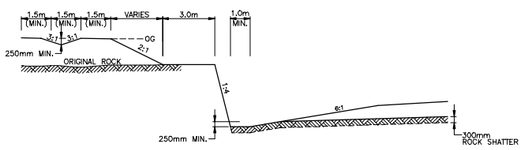
FILL SECTION



CUT SECTION

EARTH/SHALE GRADING

FILL SECTION



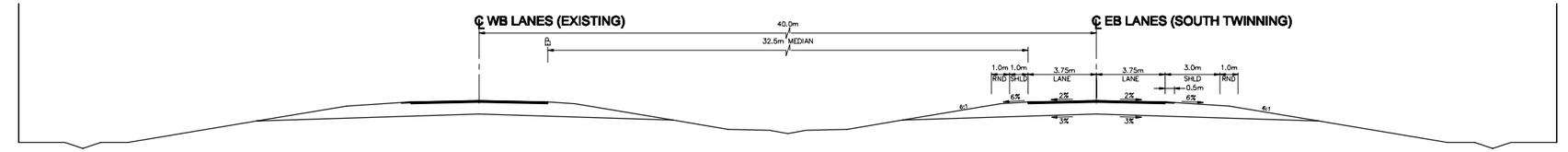
CUT SECTION

ROCK GRADING

* - FROM COUNTY ROAD 29 TO CAMPBELL DRIVE MEDIAN WIDTH IS 32.5m
- FROM CAMPBELL DRIVE TO SCHEEL DRIVE MEDIAN WIDTH VARIES FROM 32.5m MEDIAN TO 52.5m MEDIAN
- FROM SCHEEL DRIVE TO APPROXIMATELY 1.0km EASTERLY OF COUNTY ROAD 508 MEDIAN WIDTH VARIES
- FROM APPROXIMATELY 1.0km EASTERLY OF COUNTY ROAD 508 TO LAVENTURE RD MEDIAN WIDTH IS 32.5m
- FROM LAVENTURE RD TO APPROXIMATELY 500m EASTERLY OF RECREATIONAL TRAIL MEDIAN WIDTH IS 52.5m
- FROM APPROXIMATELY 500m EASTERLY OF RECREATIONAL TRAIL TO CP RAIL LINE MEDIAN WIDTH IS 32.5m

SOUTH TWINNING

FROM CP RAIL LINE TO WESTERLY LIMITS OF PROJECT



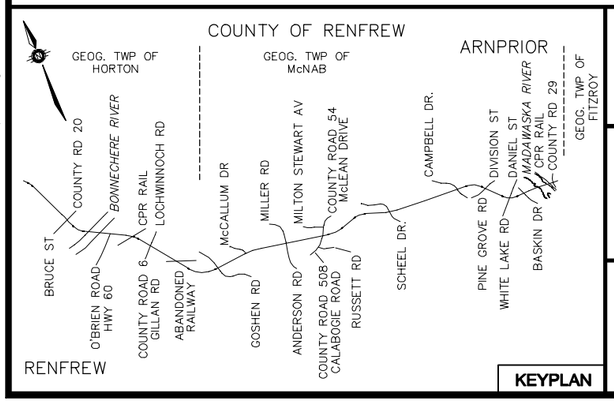


FIGURE 1-3

RECOMMENDED CROSS SECTION

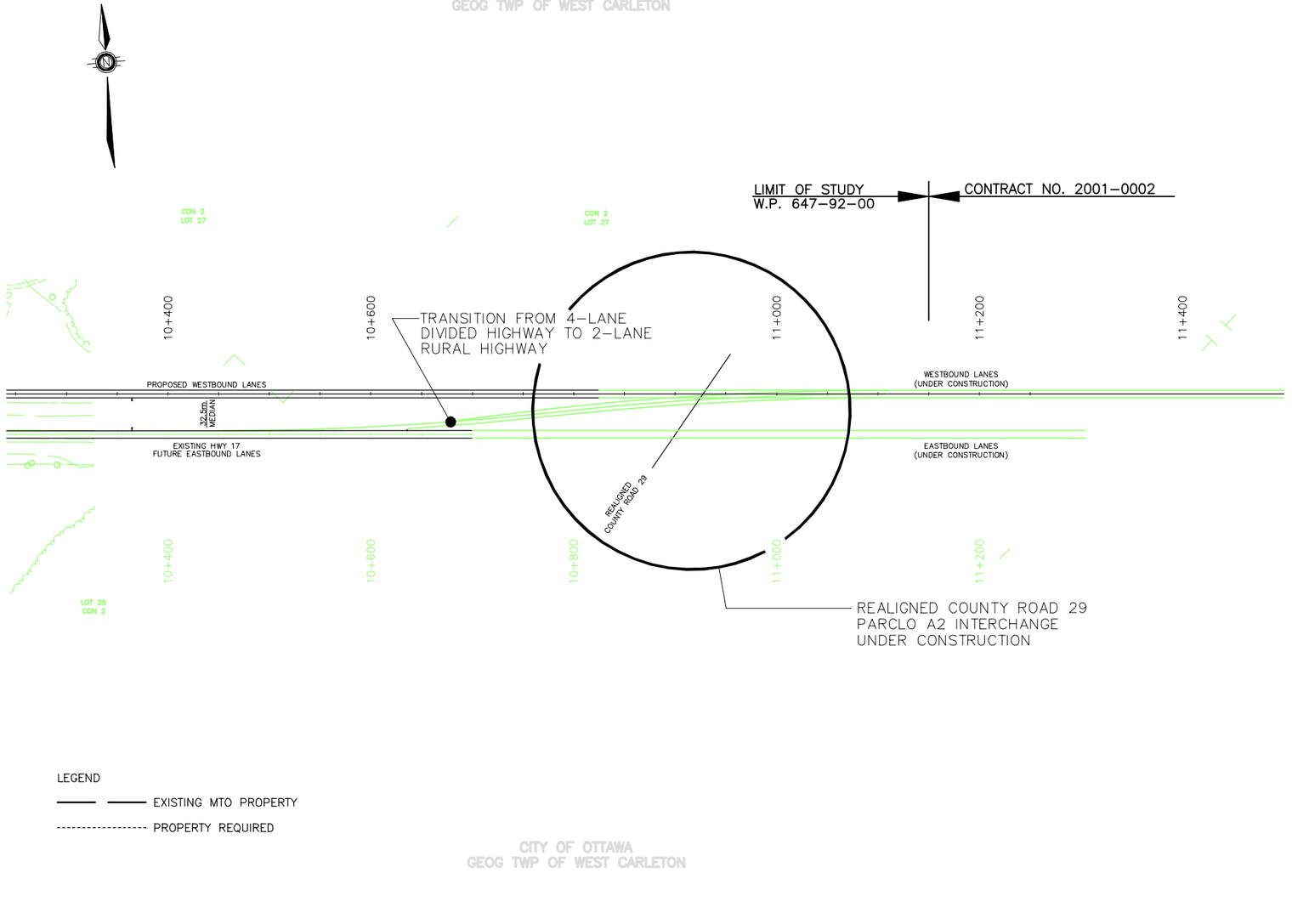
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 15m 0 30m
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Ministry of Transportation

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TRANSPORTATION AND VALUE ENGINEERS

2002-013 DWG TYPICAL SECTIONS chap 1.dwg – Mon, 1 Dec 2003 – 10:15



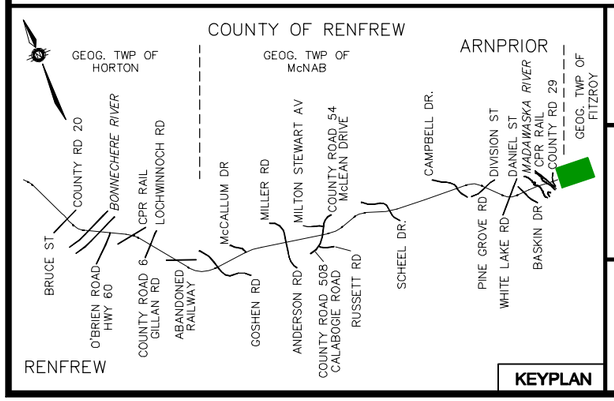


FIGURE 1-4

RECOMMENDED PLAN

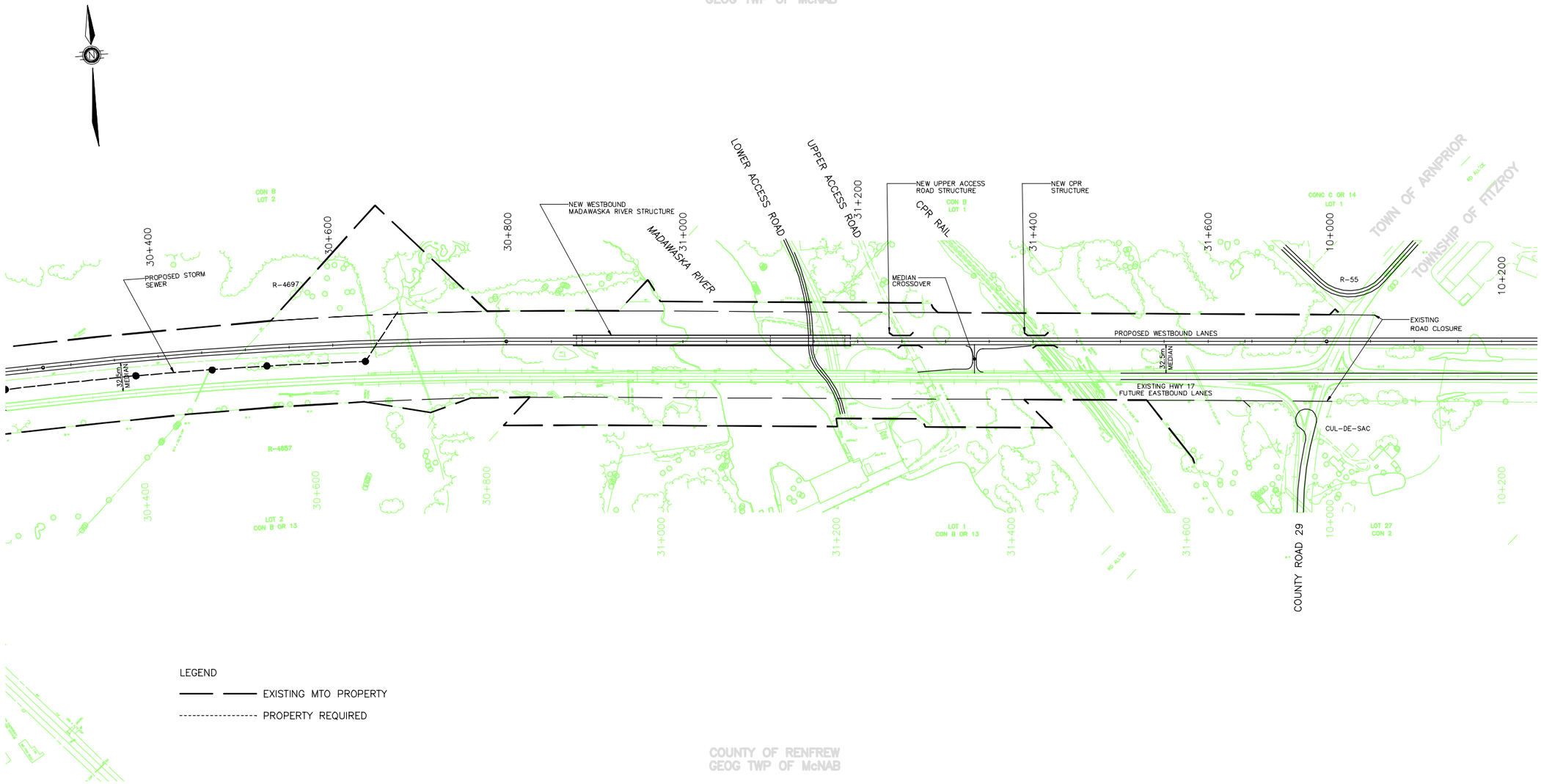
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Horizontal

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HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

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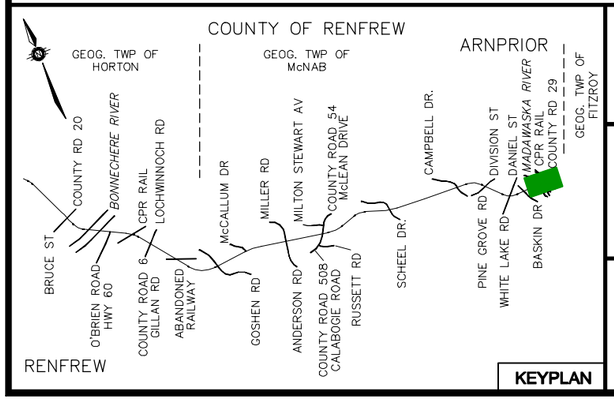


FIGURE 1-5

RECOMMENDED PLAN

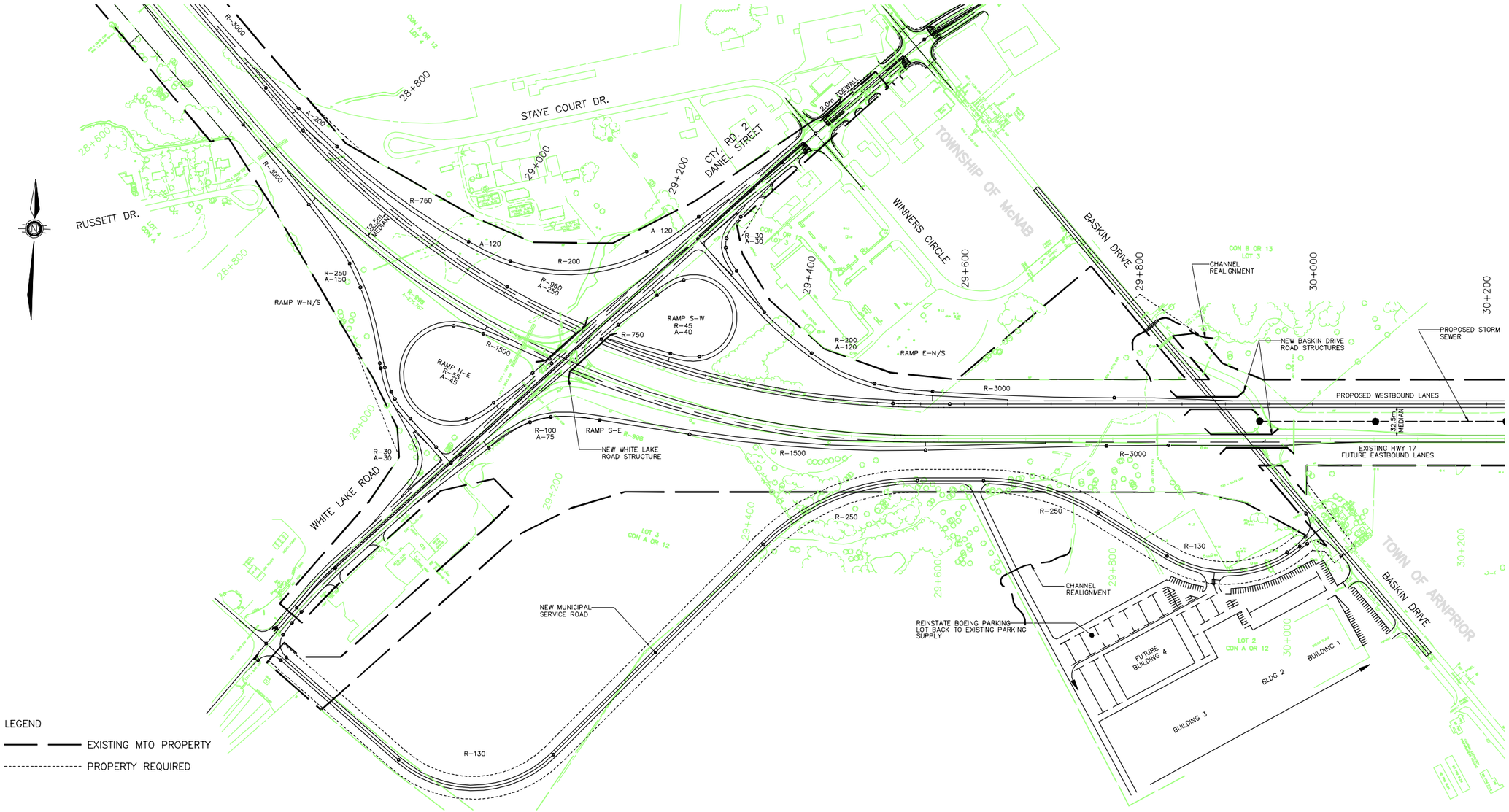
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 12.5m 0 25m
Horizontal

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2002-013 RECOMMENDED PLAN CHAP 1.dwg - Wed, 3 Dec 2003 - 11:49



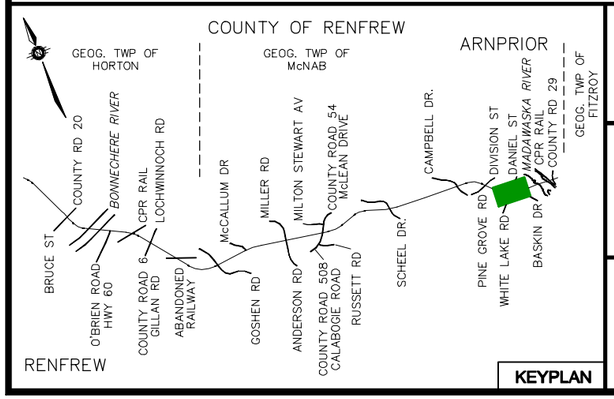


FIGURE 1-6

RECOMMENDED PLAN

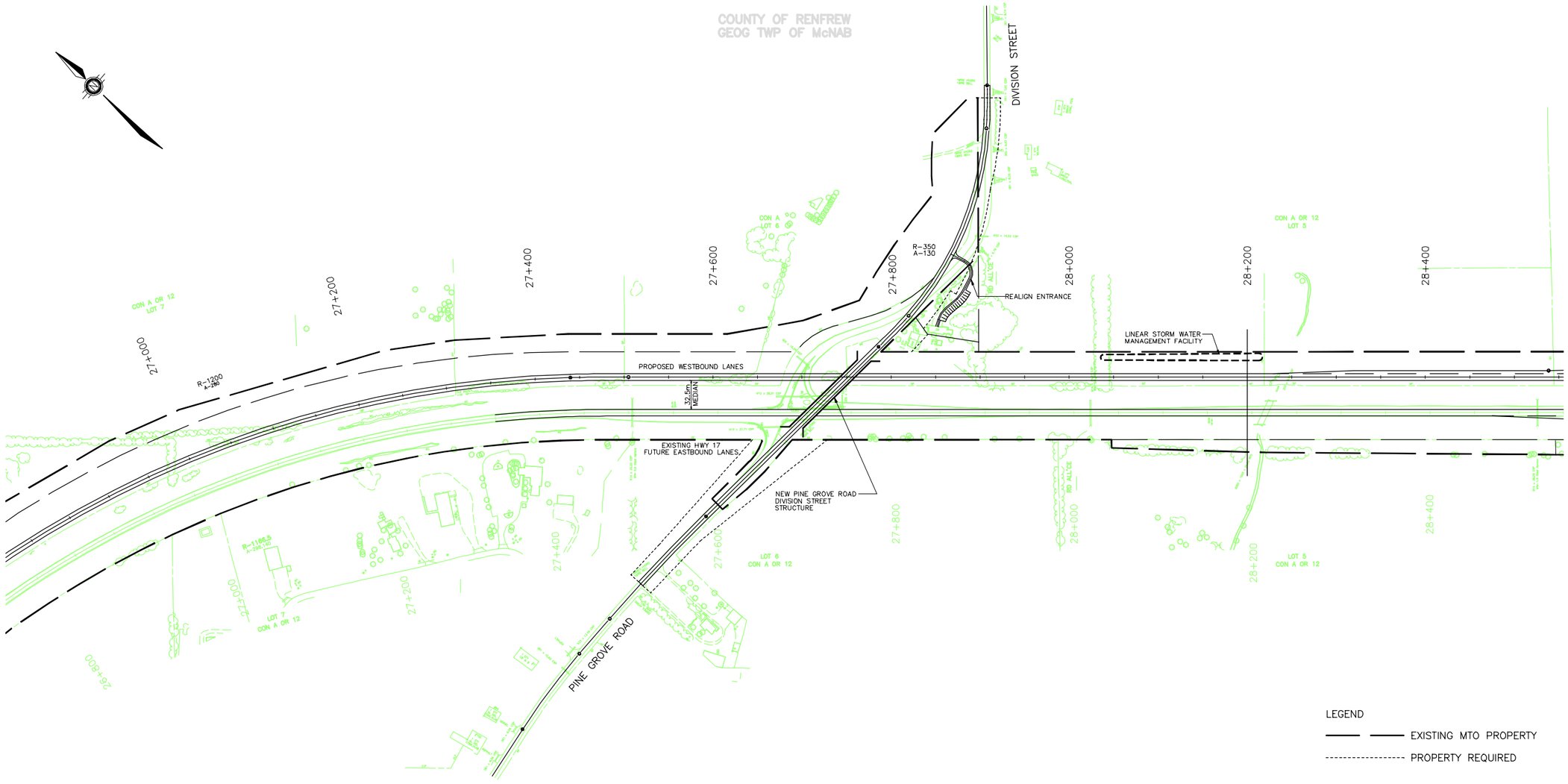
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 12.5m 0 25m
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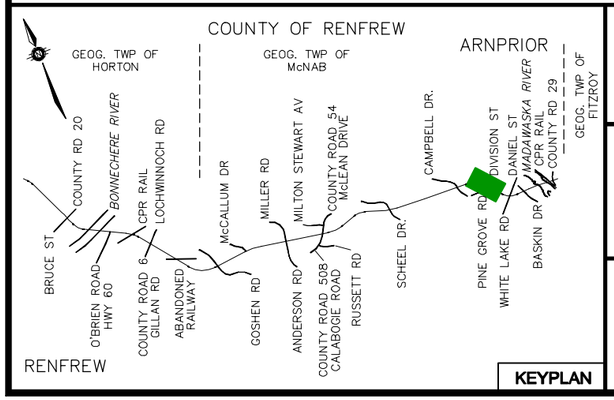


FIGURE 1-7

RECOMMENDED PLAN

HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

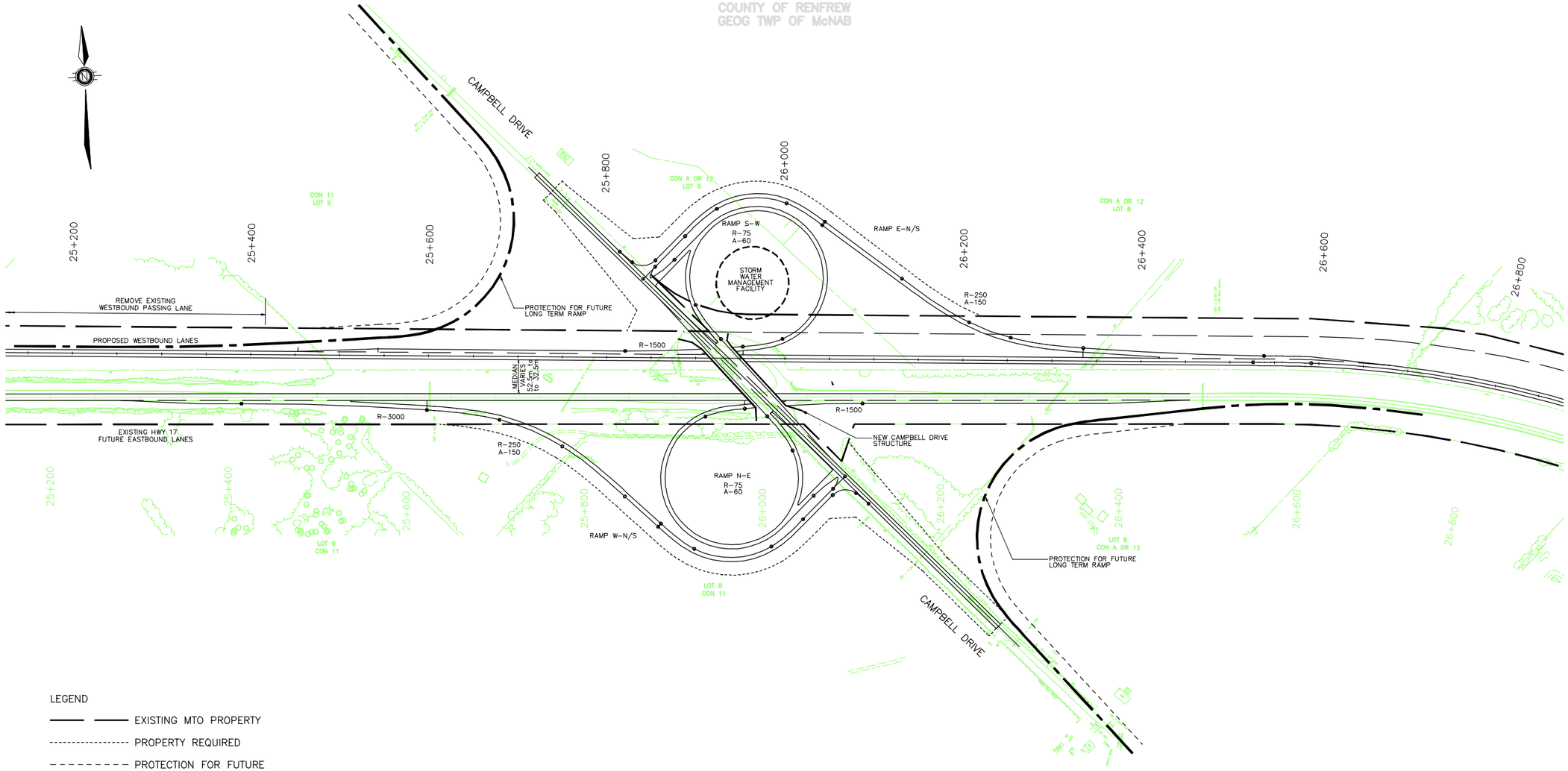
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2002-013 RECOMMENDED PLAN CHAP 1.dwg – Wed, 3 Dec 2003 – 11:17

COUNTY OF RENFREW
GEOG TWP OF McNAB



LEGEND

EXISTING MTO PROPERTY

PROPERTY REQUIRED

PROTECTION FOR FUTURE
LONG TERM RAMP

COUNTY OF RENFREW
GEOG TWP OF McNAB

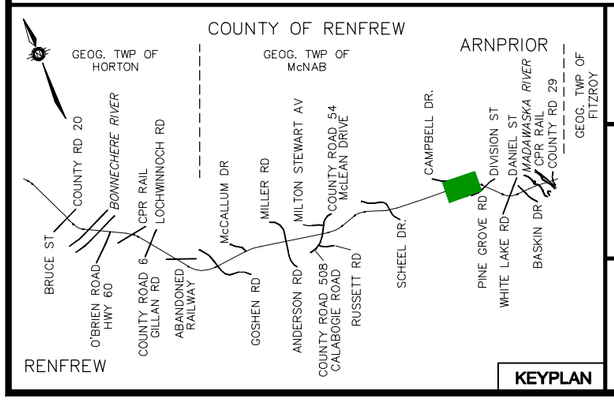


FIGURE 1-8

RECOMMENDED PLAN

HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

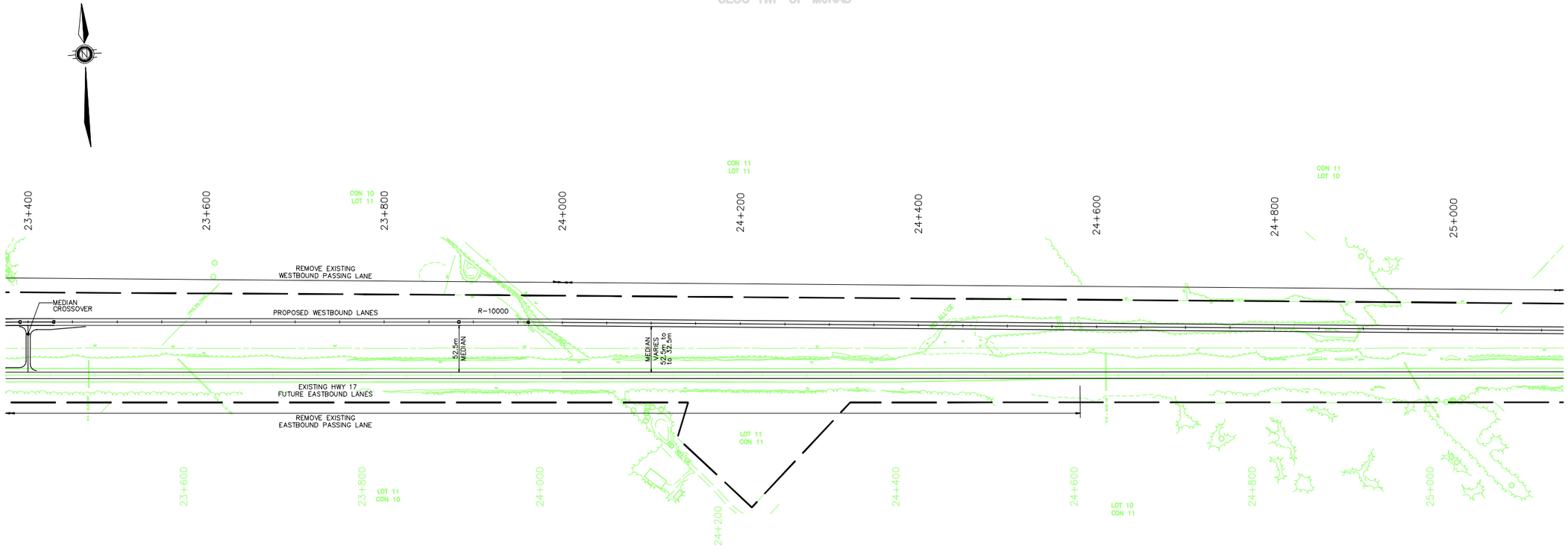
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Ministry of Transportation

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TRANSPORTATION AND VALUE ENGINEERS

2002-013 RECOMMENDED PLAN CHAP 1.dwg - Wed, 3 Dec 2003 - 10:26

COUNTY OF RENFREW
GEOG TWP OF McNAB



LEGEND

EXISTING MTO PROPERTY

PROPERTY REQUIRED

COUNTY OF RENFREW
GEOG TWP OF McNAB

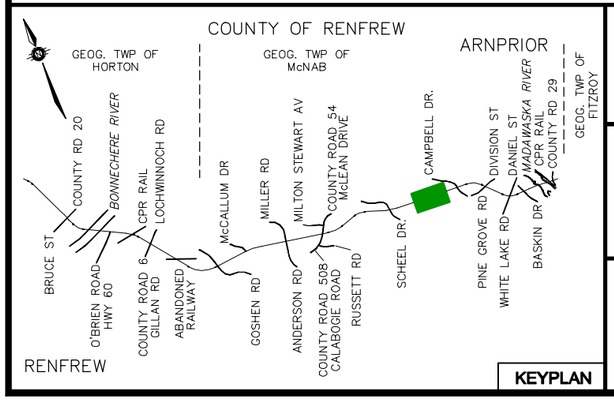


FIGURE 1-9

RECOMMENDED PLAN

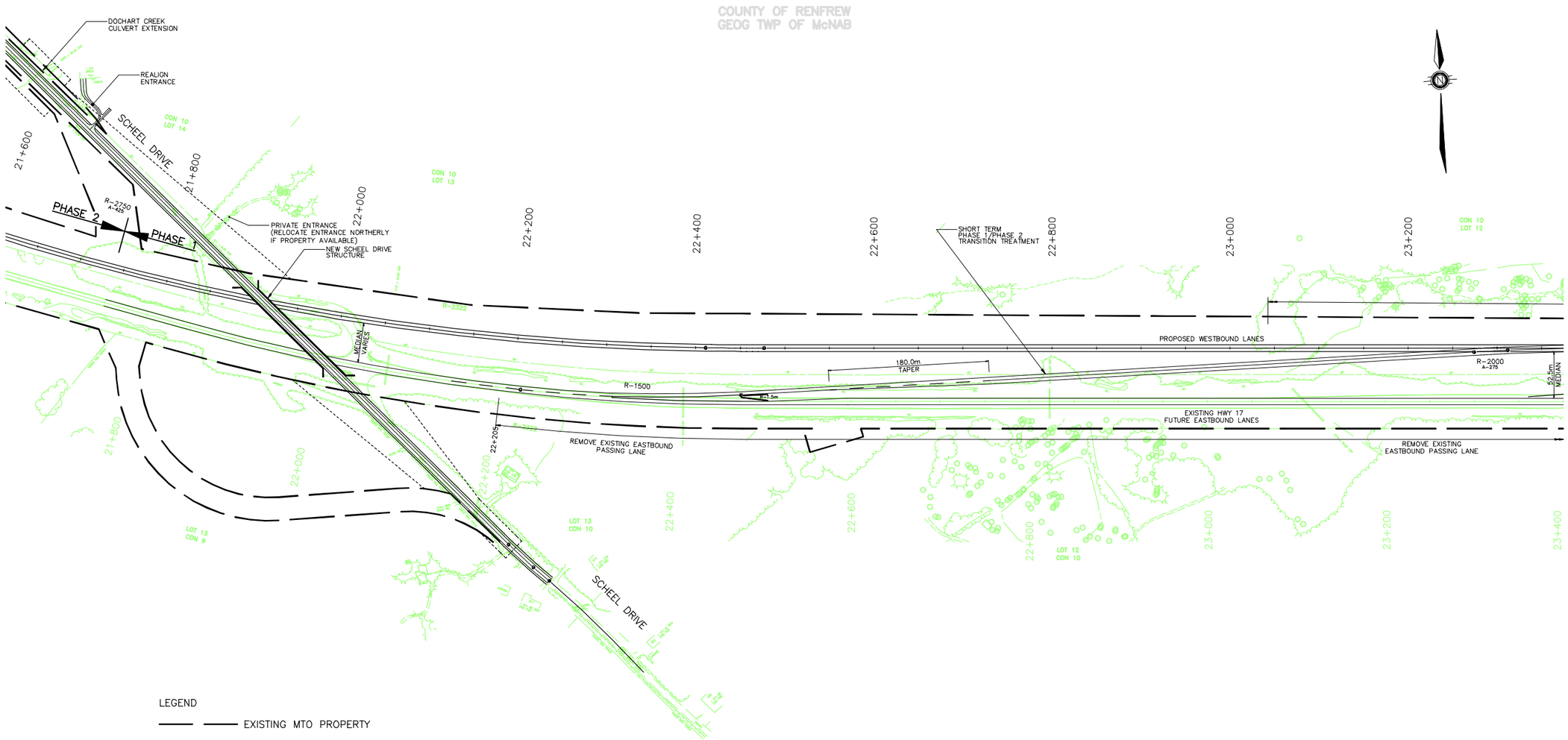
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 12.5m 0 25m
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2002-013 RECOMMENDED PLAN CHAP 1.dwg - Wed, 3 Dec 2003 - 10:26



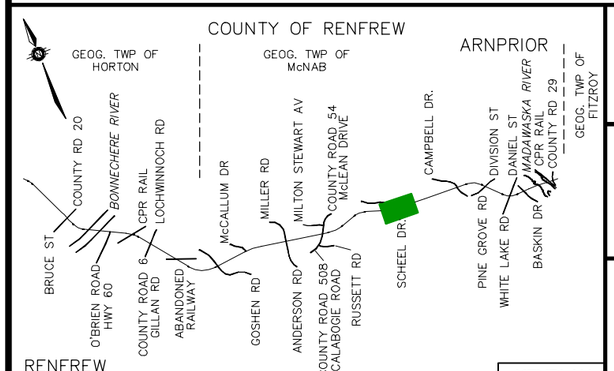


FIGURE 1-10

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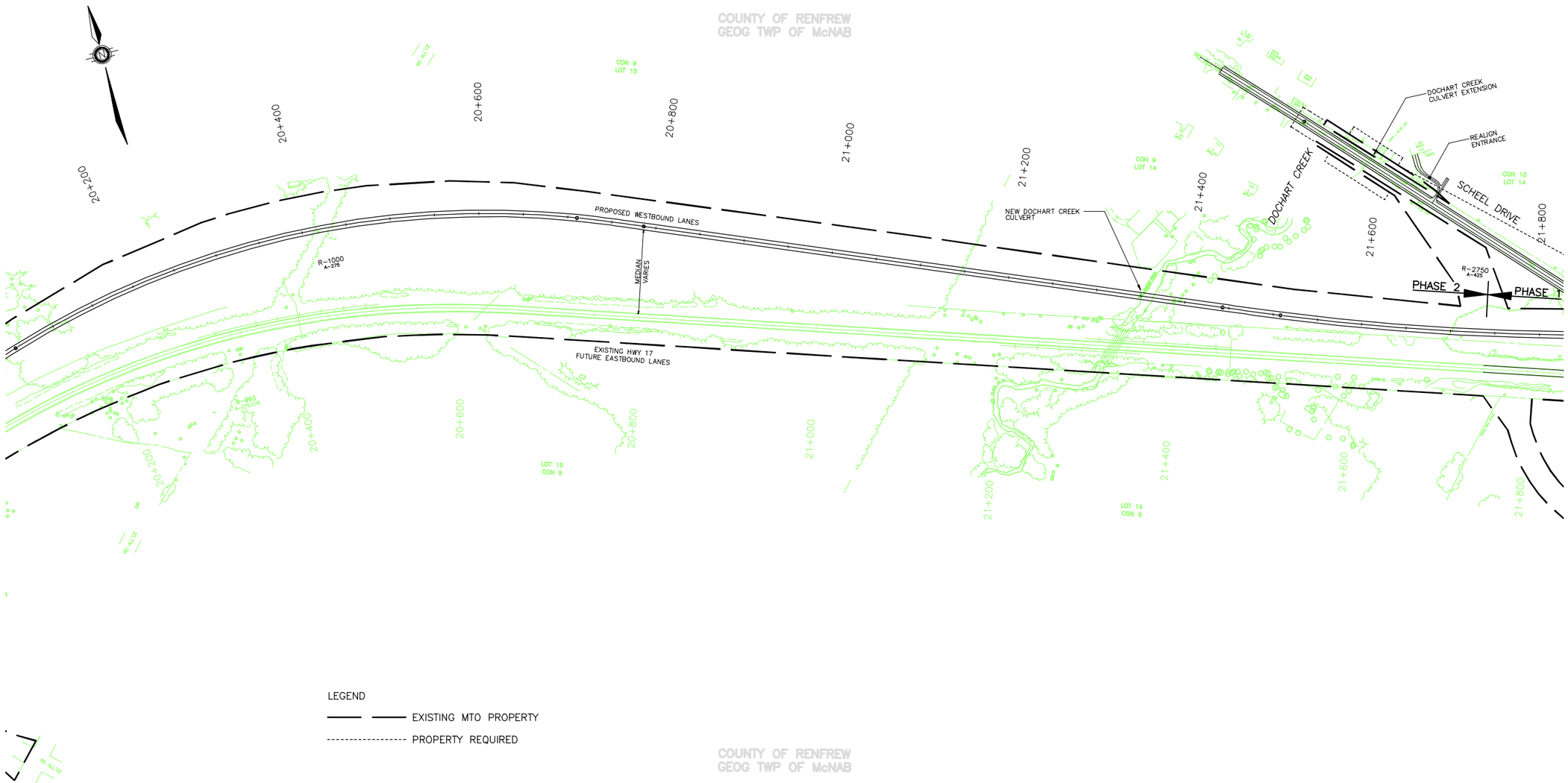
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 12.5m 0 25m
Horizontal

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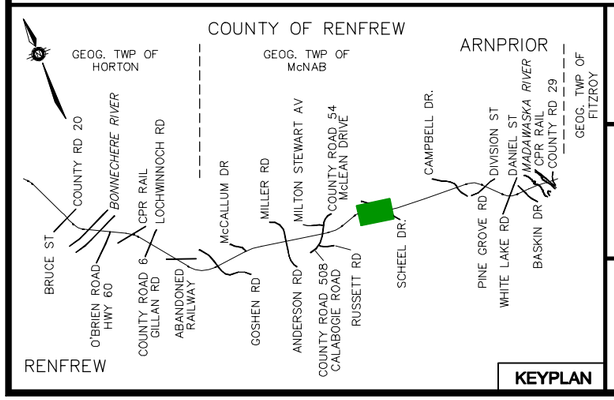


FIGURE 1-11

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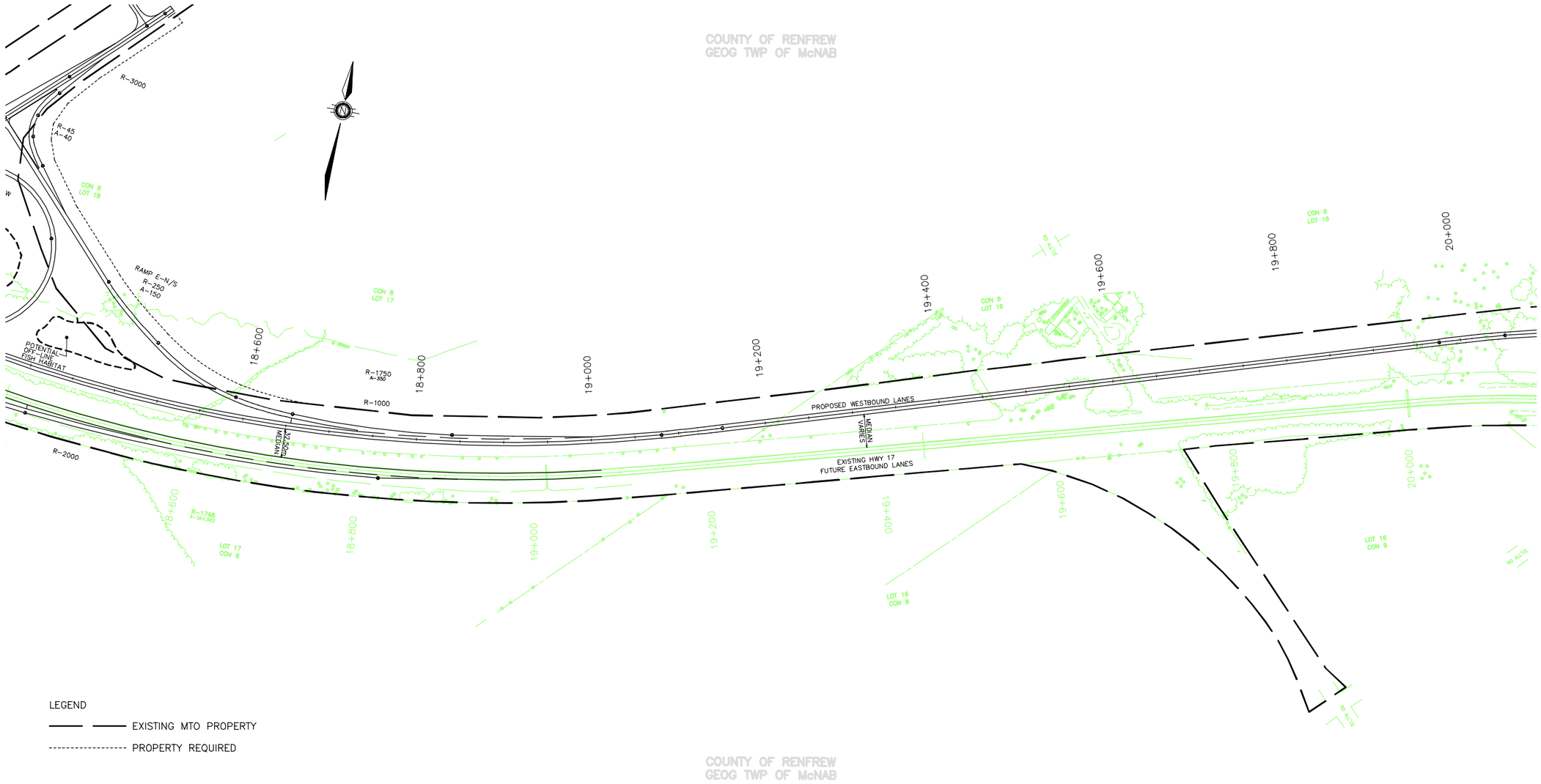
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 62.5m 0 125m
Horizontal

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2002-013 RECOMMENDED PLAN CHAP 1.dwg – Wed, 3 Dec 2003 – 11:15



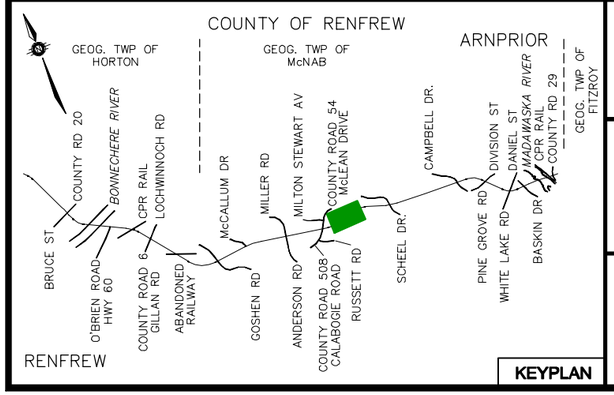


FIGURE 1-12

RECOMMENDED PLAN

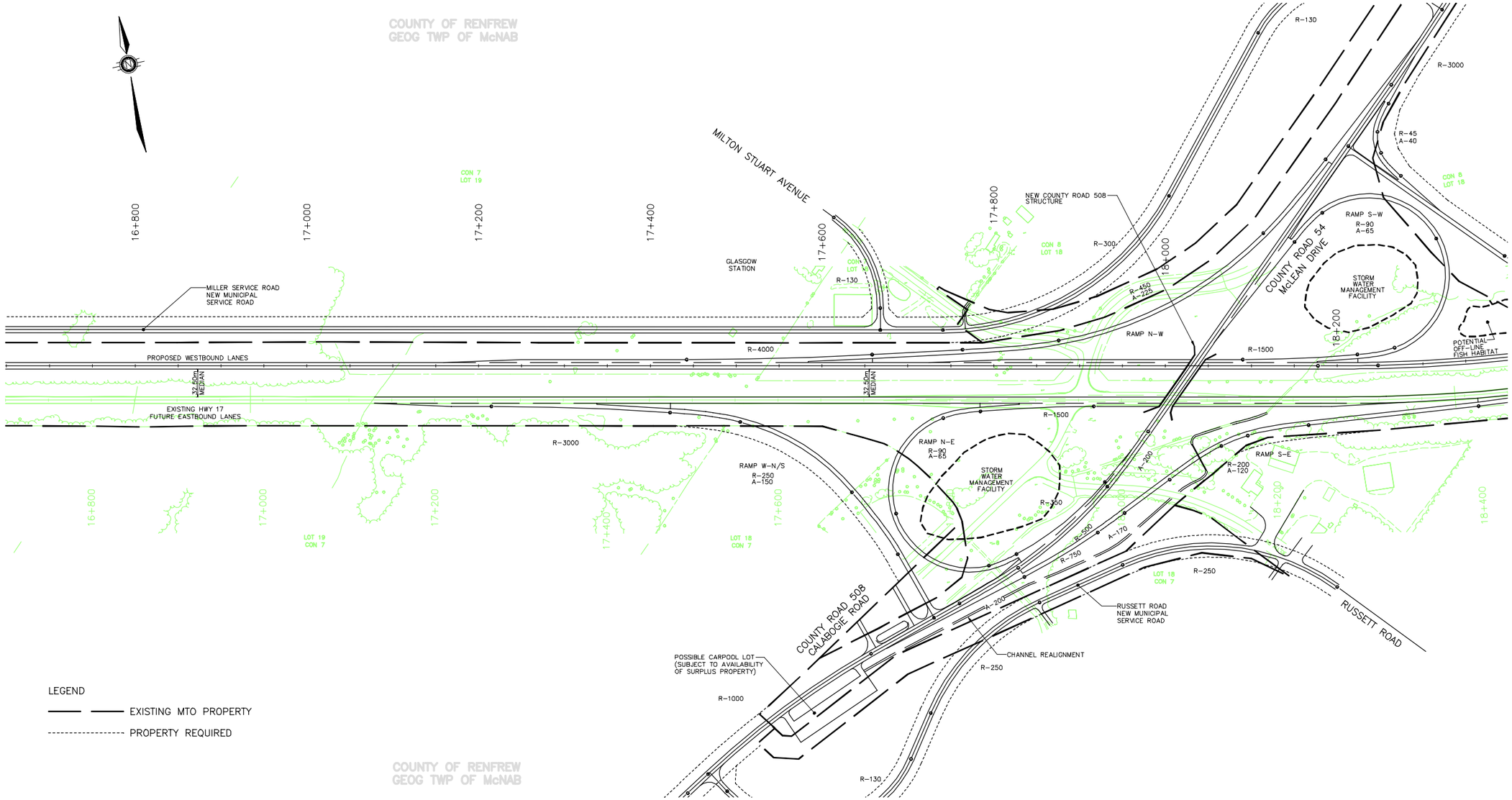
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 12.5m 0 25m
Horizontal

Ministry of Transportation

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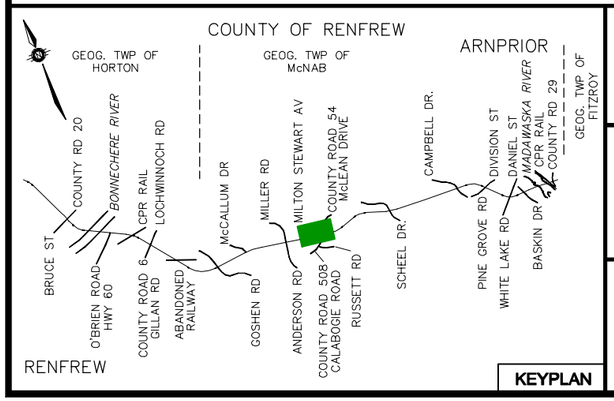


FIGURE 1-13

RECOMMENDED PLAN

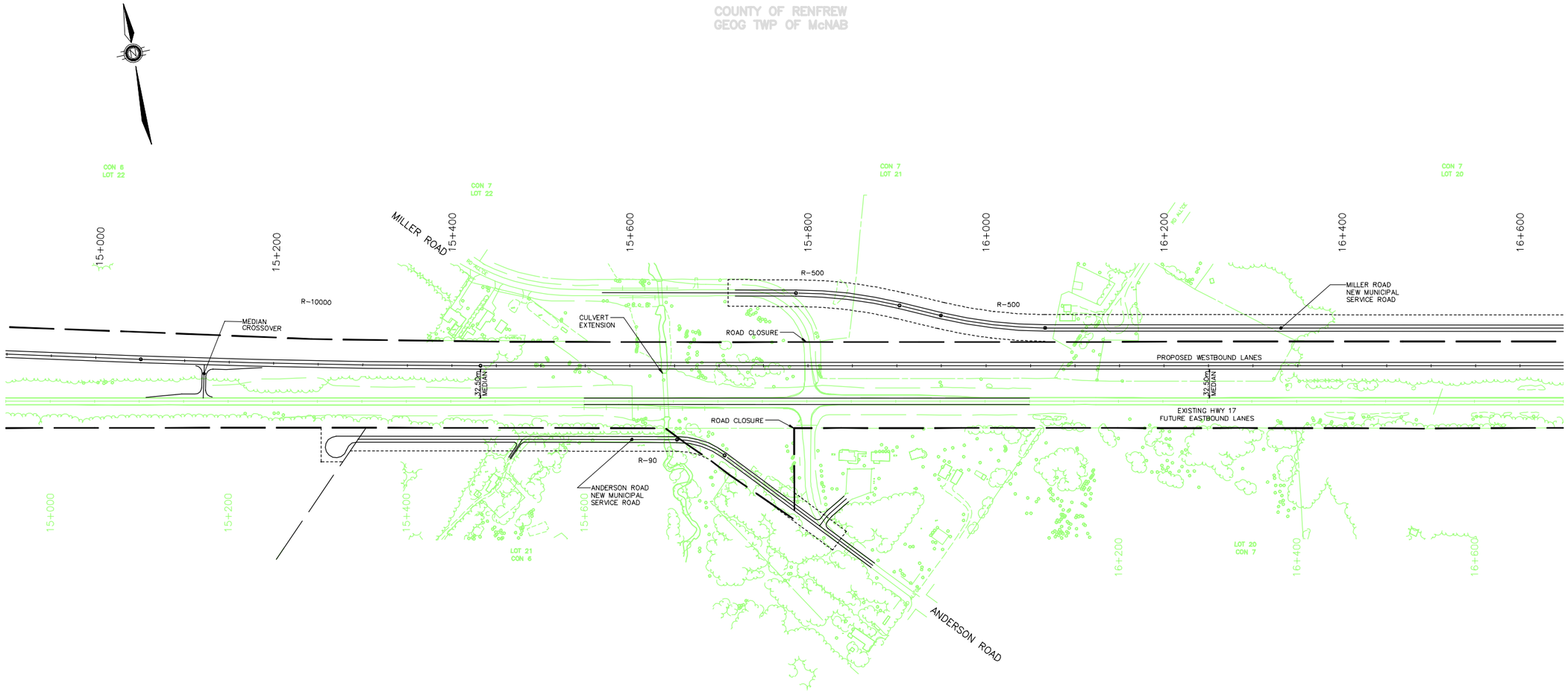
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 12.5m 0 25m
Horizontal

Ministry of Transportation

NCE
TRANSPORTATION AND VALUE ENGINEERS

2002-013 RECOMMENDED PLAN CHAP 1.dwg – Wed, 3 Dec 2003 – 11:49



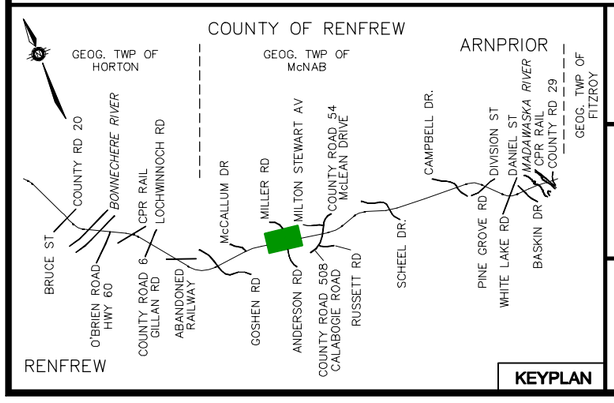


FIGURE 1-14

RECOMMENDED PLAN

HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

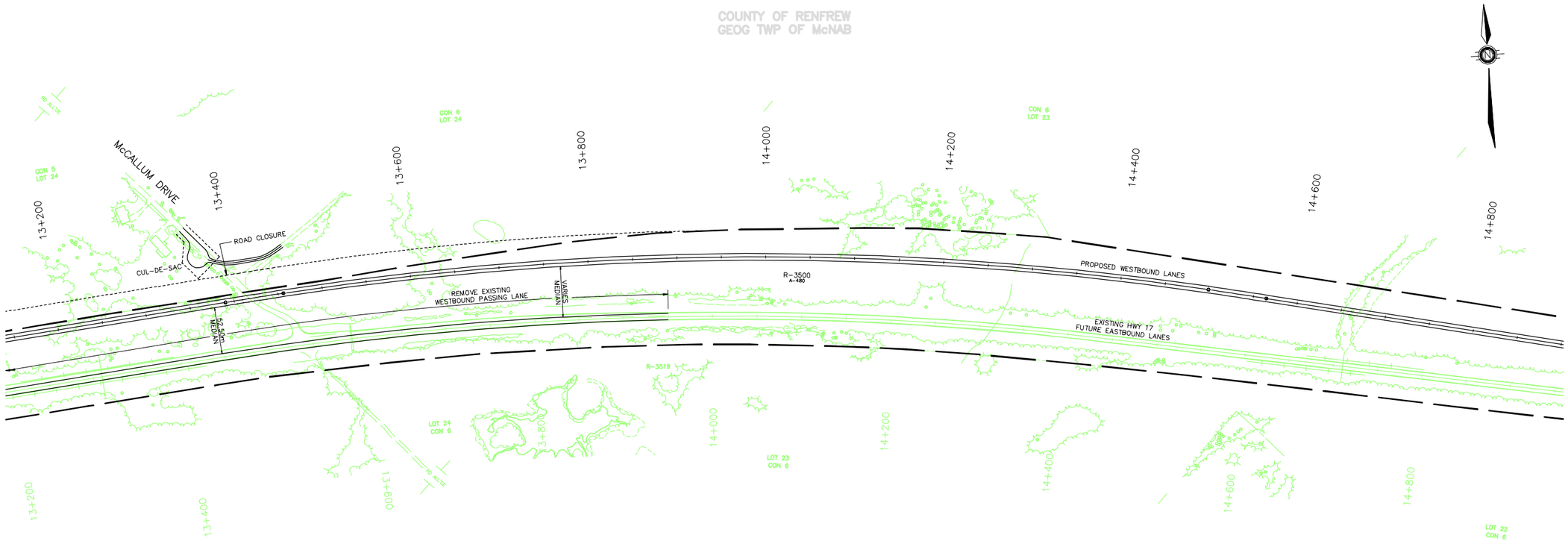
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Horizontal

Ministry of Transportation

NCE
TRANSPORTATION AND VALUE ENGINEERS

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COUNTY OF RENFREW
GEOG TWP OF McNAB



LEGEND

EXISTING MTO PROPERTY

PROPERTY REQUIRED

COUNTY OF RENFREW
GEOG TWP OF McNAB

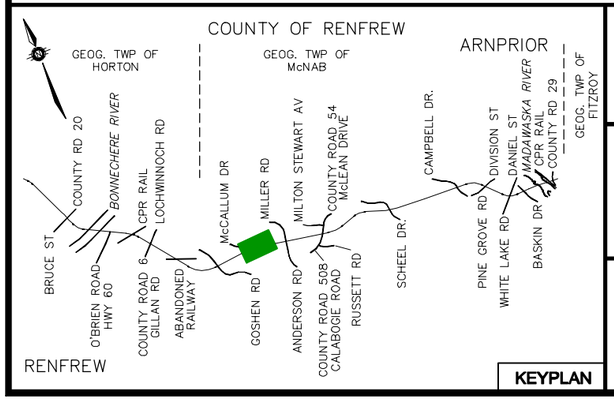


FIGURE 1-15

RECOMMENDED PLAN

HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

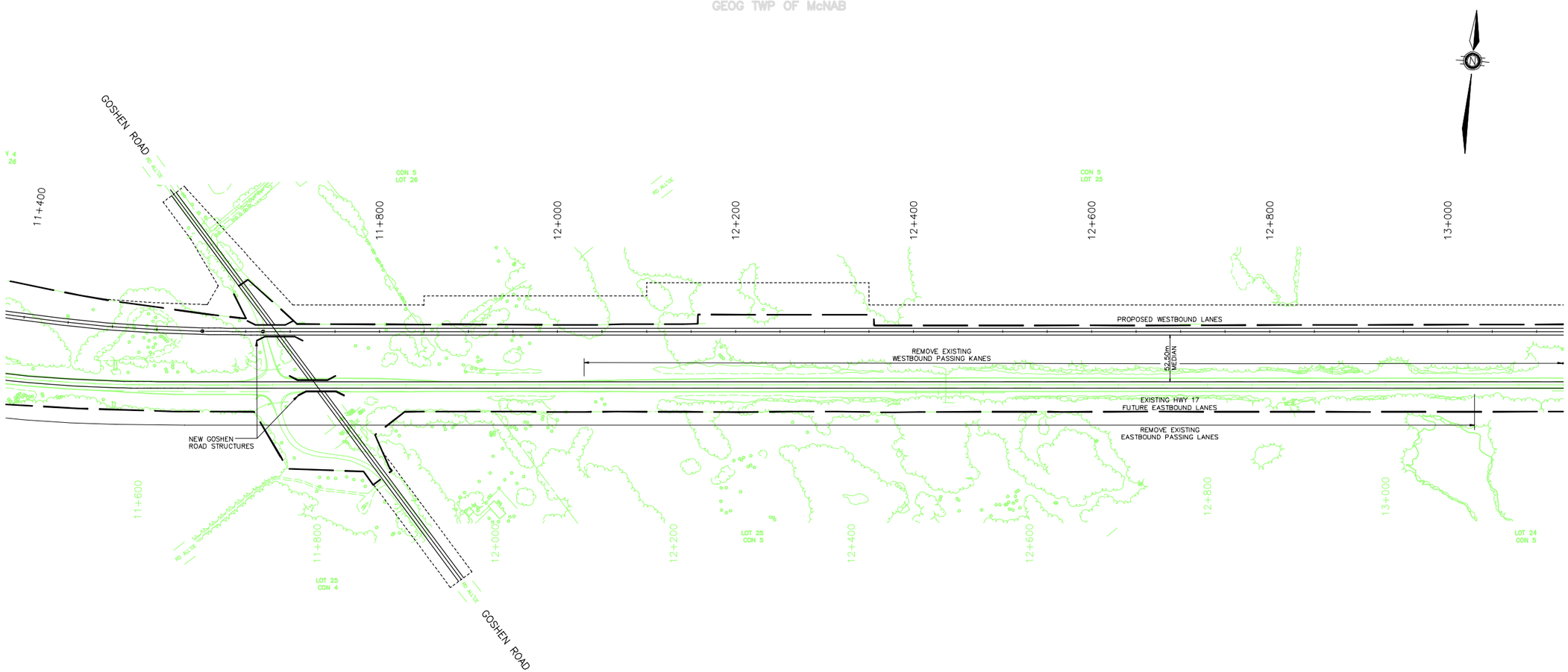
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Ministry of Transportation

NCE
TRANSPORTATION AND VALUE ENGINEERS

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COUNTY OF RENFREW
GEOG TWP OF McNAB



COUNTY OF RENFREW
GEOG TWP OF McNAB

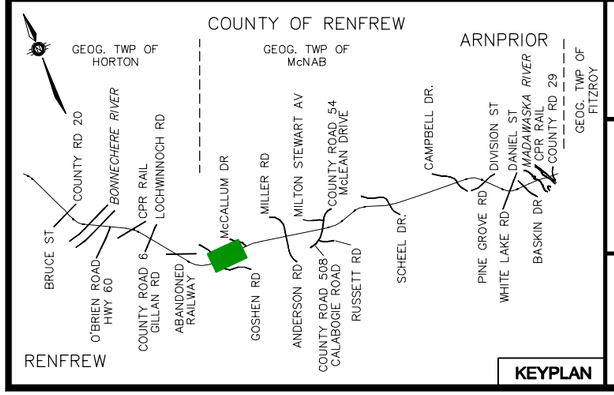


FIGURE 1-16

RECOMMENDED PLAN

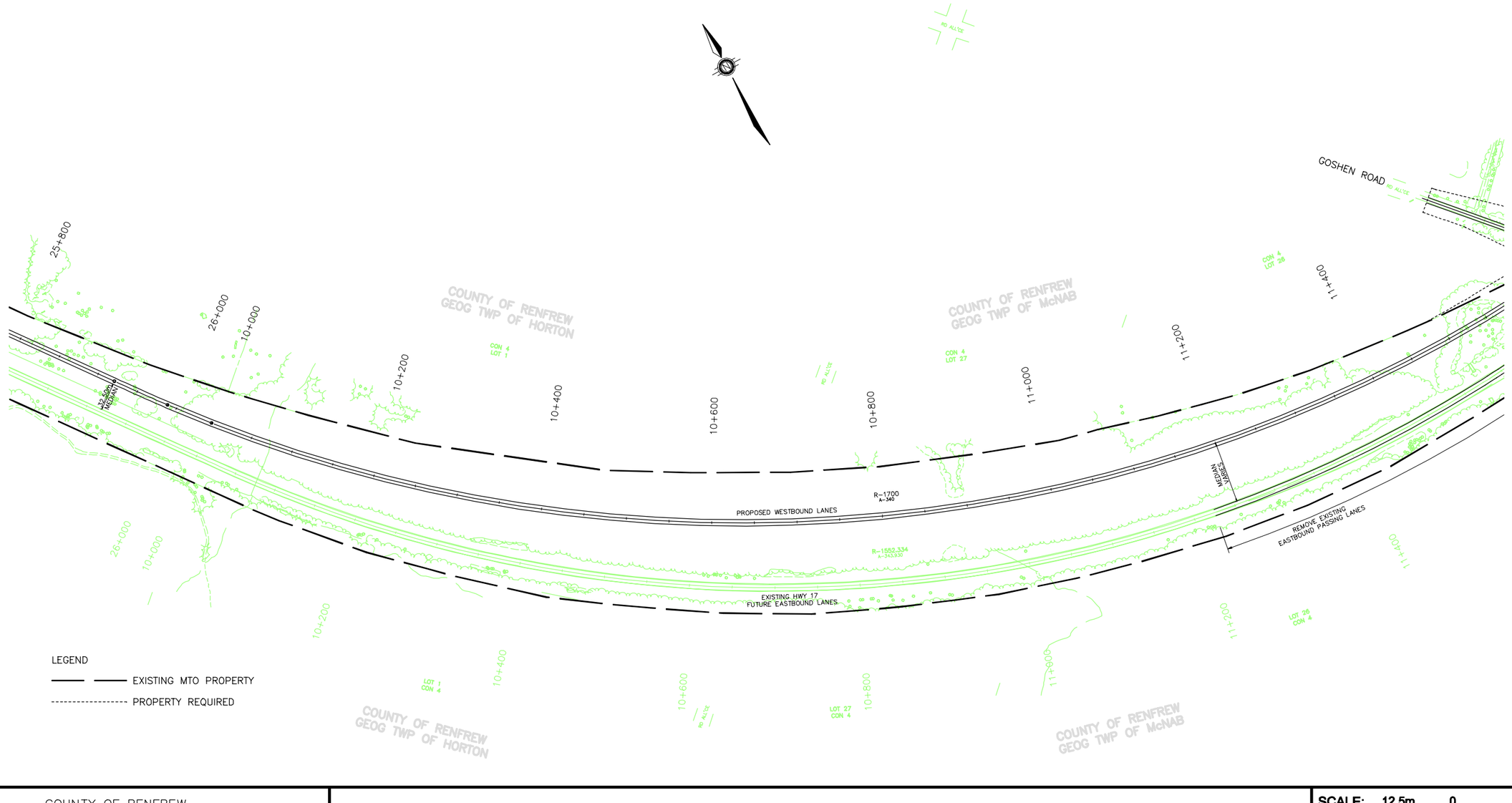
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

SCALE: 12.5m 0 25m
Horizontal

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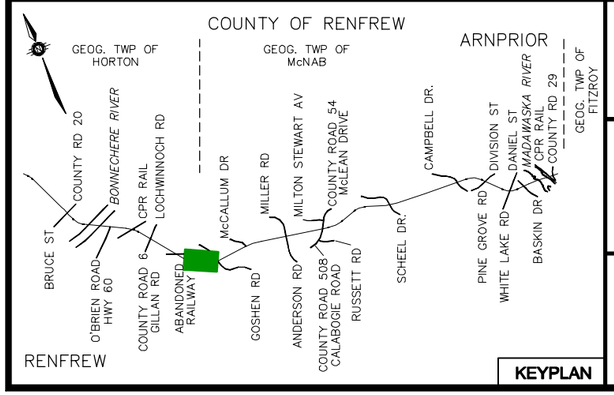


FIGURE 1-17

RECOMMENDED PLAN

SCALE: 12.5m 0 25m
Horizontal

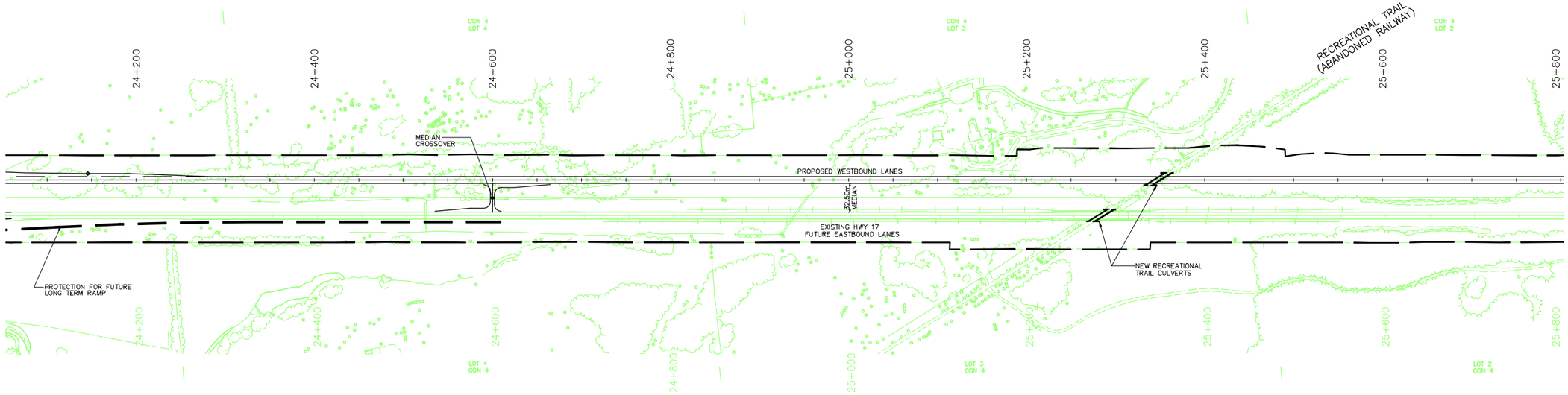
Ministry of Transportation

HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
WP 647-92-00

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COUNTY OF RENFREW
GEOG TWP OF HORTON



LEGEND

EXISTING MTO PROPERTY

PROPERTY REQUIRED

COUNTY OF RENFREW
GEOG TWP OF HORTON

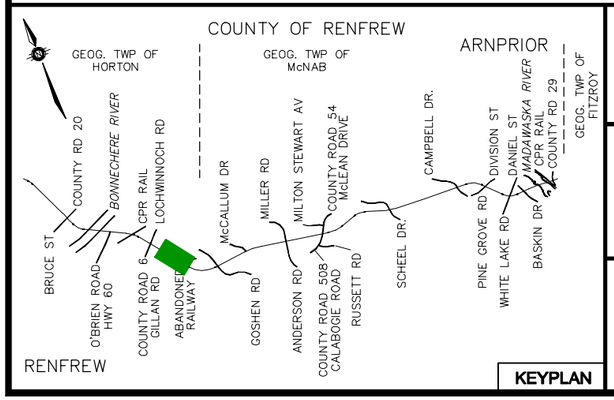


FIGURE 1-18

RECOMMENDED PLAN

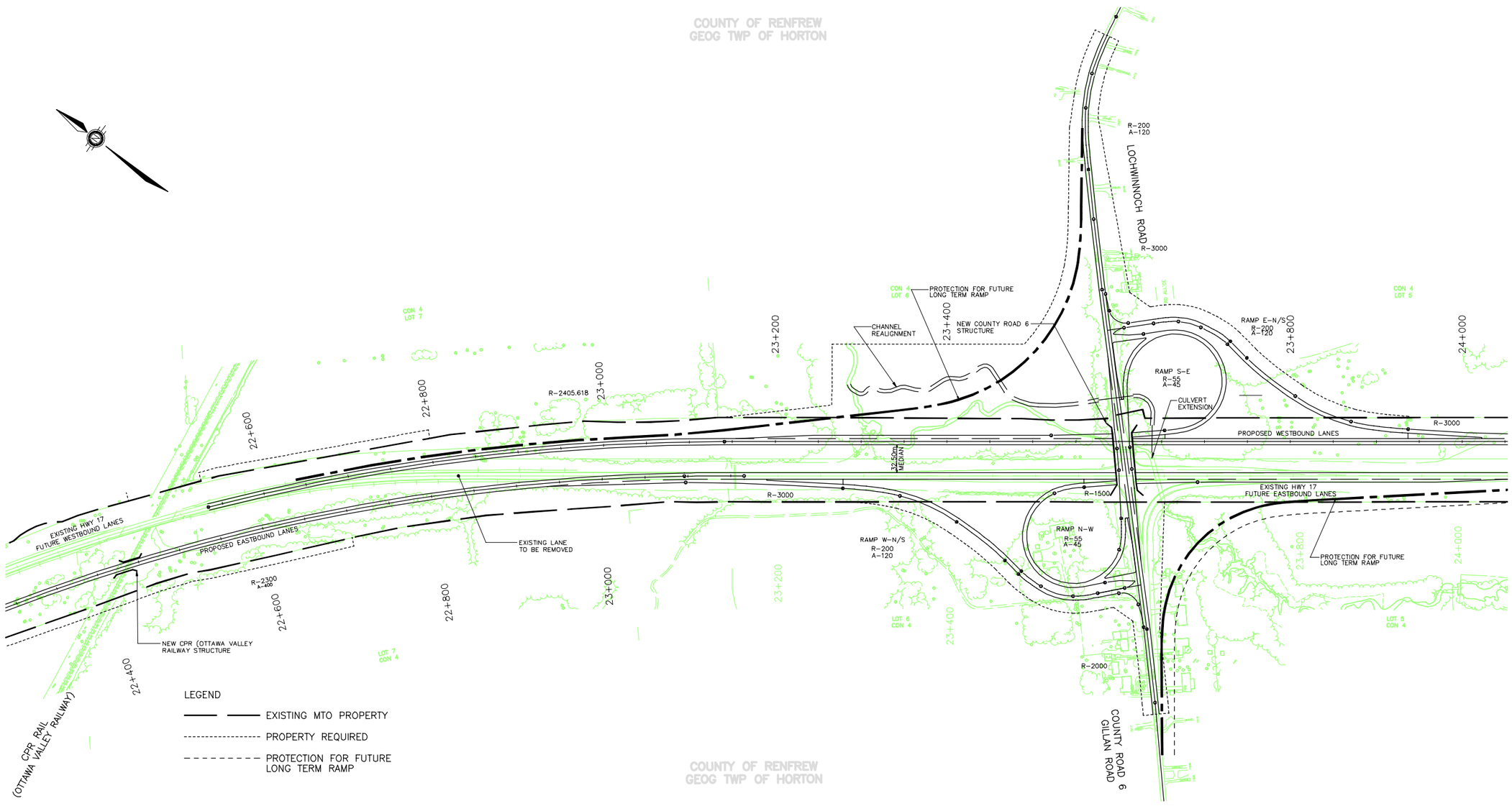
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
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SCALE: 12.5m 0 25m
Horizontal

Ministry of Transportation

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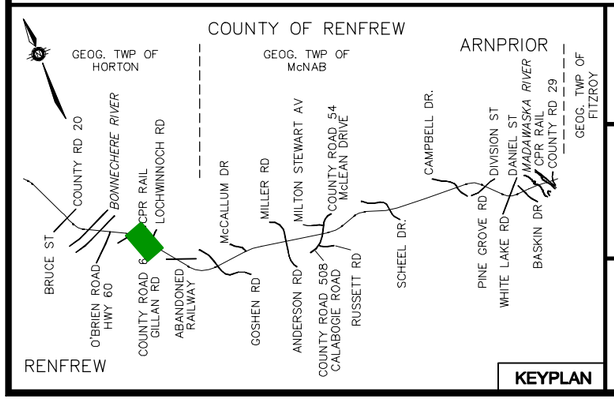


FIGURE 1-19

RECOMMENDED PLAN

HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
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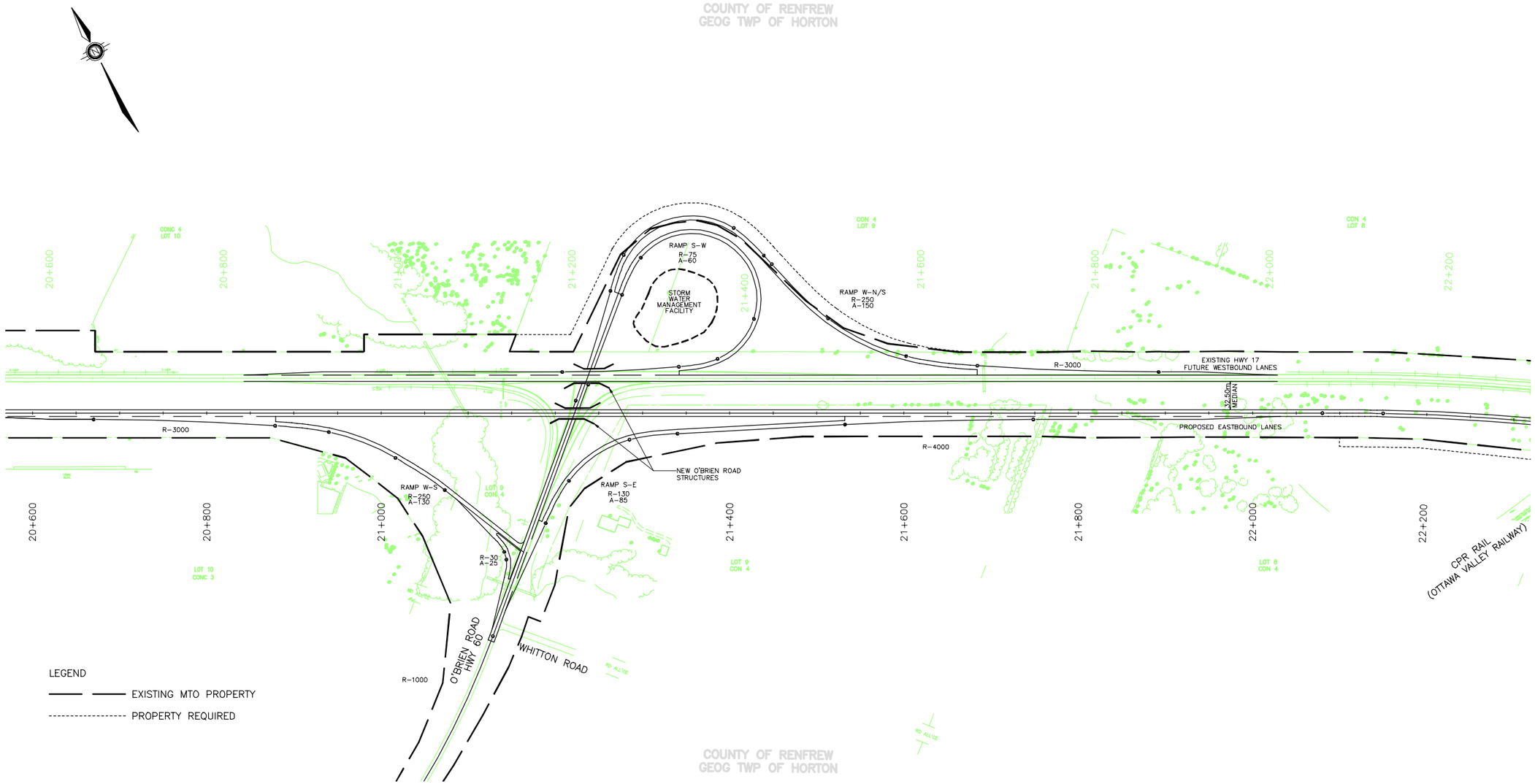
SCALE: 62.5m 0 125m
Horizontal

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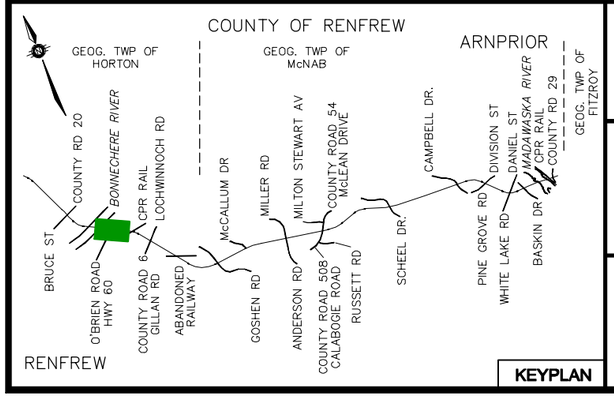


FIGURE 1-20

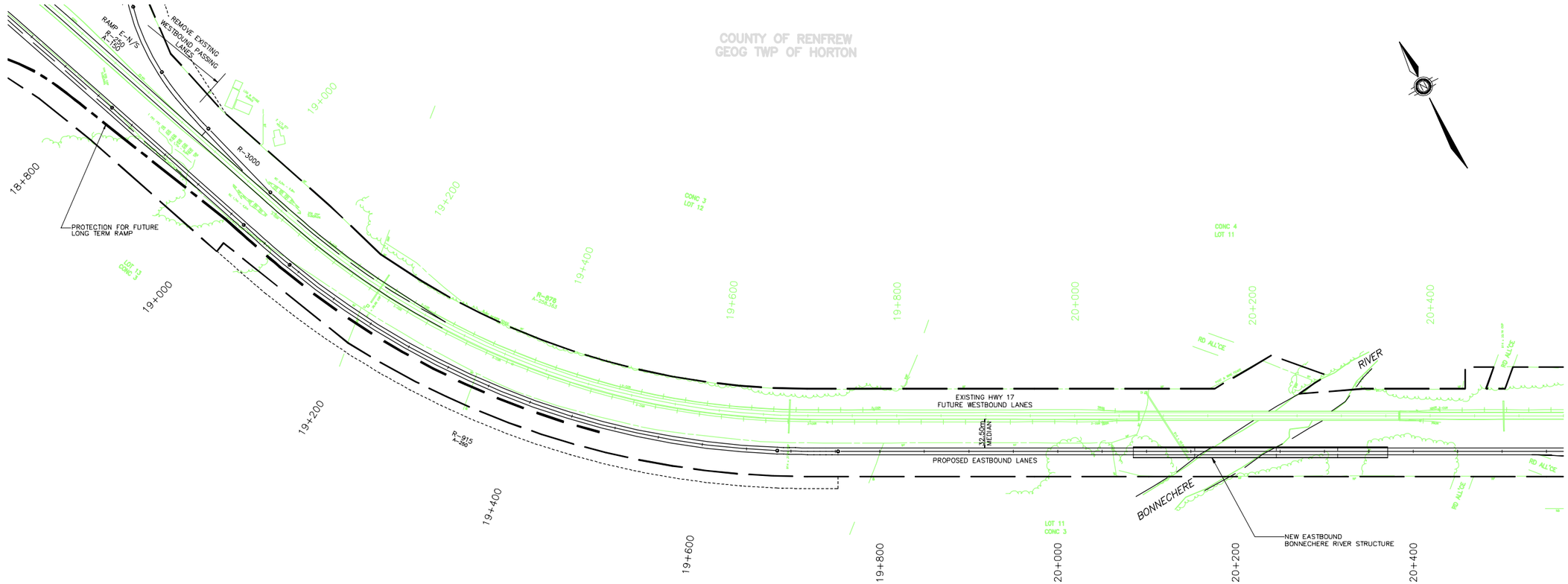
RECOMMENDED PLAN

SCALE: 12.5m 0 25m
Horizontal

Ministry of Transportation

HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
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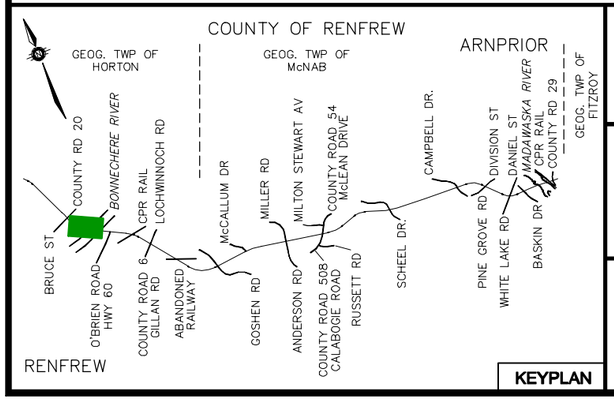


FIGURE 1-21

RECOMMENDED PLAN

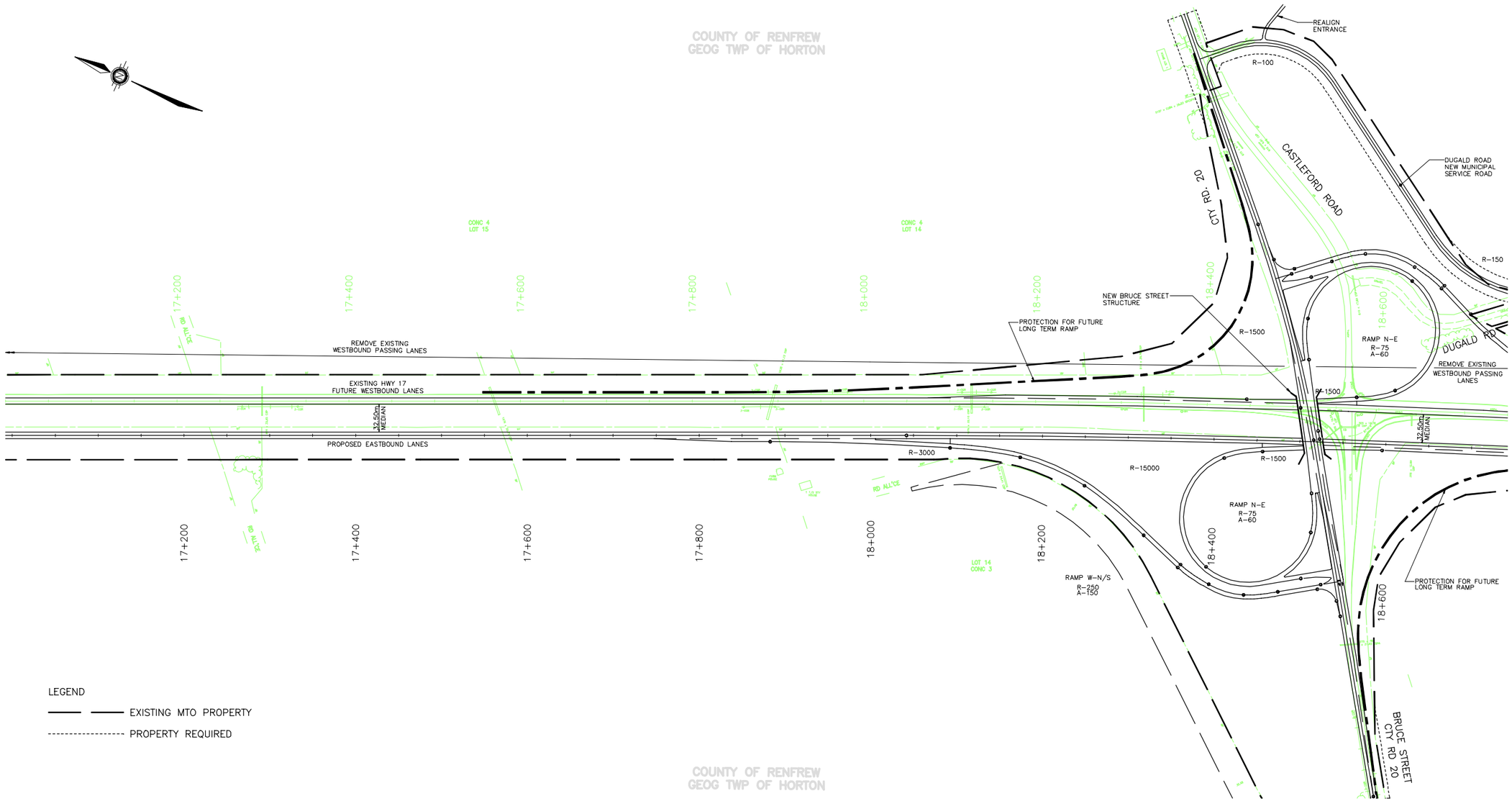
HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
PRELIMINARY DESIGN/ ENVIRONMENTAL ASSESSMENT STUDY
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SCALE: 12.5m 0 25m
Horizontal

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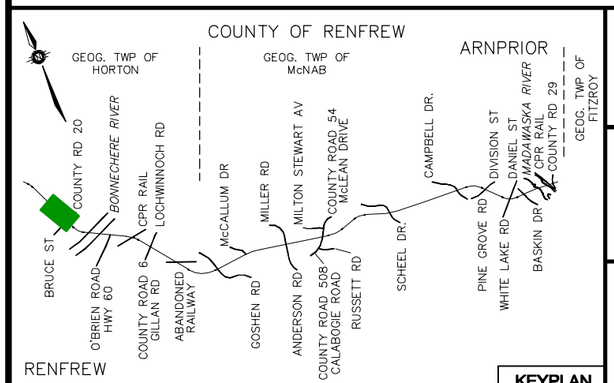


FIGURE 1-22

RECOMMENDED PLAN

SCALE: 12.5m 0 25m
Horizontal

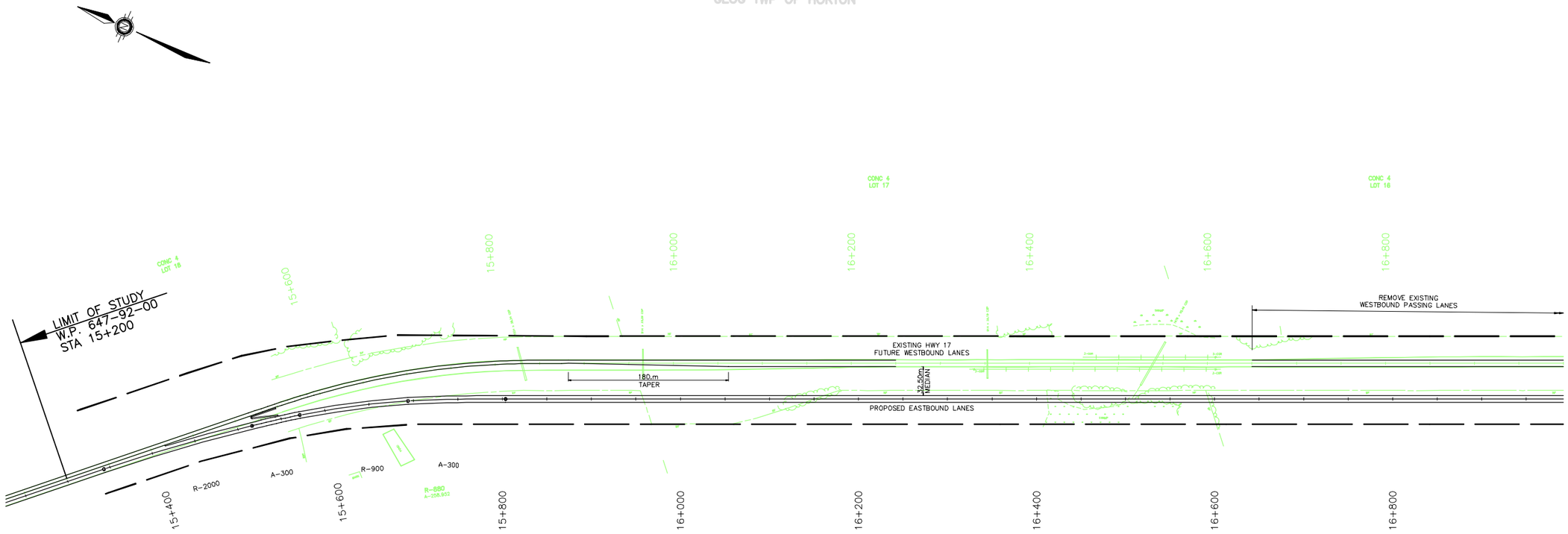
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HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
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COUNTY OF RENFREW
GEOG TWP OF HORTON



LEGEND

——— ——— EXISTING MTO PROPERTY

---------- PROPERTY REQUIRED

COUNTY OF RENFREW
GEOG TWP OF HORTON

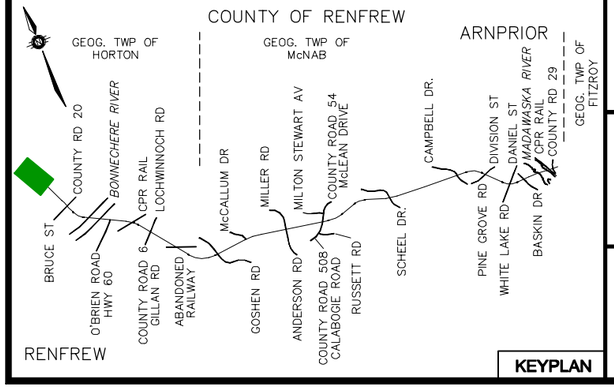


FIGURE 1-23

RECOMMENDED PLAN

SCALE: 62.5m 0 125m
Horizontal

Ministry of Transportation

HIGHWAY 17 TWINNING, COUNTY ROAD 29 to 3.0 km WEST OF BRUCE STREET
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