ALBERTA TRANSPORTATION

ROADSIDE PLANNING AND DEVELOPMENT GUIDELINES DESIGNING AND CONSTRUCTING HIGHWAY ACCESS FOR SUBDIVISION AND DEVELOPMENT APPROVALS

General

Through the Highways Development and Protection Regulation and the Subdivision and Development Regulation, Alberta Transpiration is involved in the review of development activities and subdivision of land that may impact provincial highways.

Often, a new or upgraded access to a highway will be required to accommodate subdivision or development approvals granted by a local municipality.

When highway access is desired as part of a subdivision or development application, it is important that Alberta Transportation is consulted early in the process to identify any potential issues and avoid unnecessary delays. Please consult the local district office for additional information.

https://www.alberta.ca/roadside-development-overview.aspx#toc-3

Direct highway access is a potential safety hazard to highway users, so it is only permitted if it is considered essential by Alberta Transportation. Property with access through a local road, or available through a local road, does not normally qualify. Where direct access is essential, only one direct highway access per quarter section is permitted.

This document is not intended to provide technical guidance with respect to design or construction of highway access or improvements; rather, it is a guideline for the overall process from concept to completion.

Please note that additional guidance is available when a bridge structure over/under a highway will be impacted. In these instances, please consult the local district office for further guidance.

Process

Alberta Transportation will determine the requirements for highway access when a subdivision or development permit application is referred to the department for review and comment.

As part of this review, Alberta Transportation may request a Traffic Impact Assessment to determine the impacts to highway operations and safety, and may require improvements to be constructed to accommodate traffic from the proposed subdivision or development, if warranted.

Prior to making a subdivision or development application that may generate significant traffic and/or potentially impact a provincial highway, the proponent may wish to consult their local Alberta Transportation office for guidance.

Definitions

Consultant – the person or entity that is responsible for preparing the intersection design and for overall project management during construction.

Contractor – the person or entity that is retained by the consultant or permit holder that is responsible for carrying out the construction of the project.

Landowner / Developer – the person or entity who has received approval for a subdivision or development that causes the need for a new or upgraded access to the highway.

Municipality – the local government authority of the road connecting to the highway, and who is authorized by the Municipal Government Act to approve subdivisions or developments within their boundaries.

Permit Holder – the person or entity that is authorized to undertake the construction of the access within the highway right of way, subject to the terms and conditions listed in the permit.

Private Intersection – an intersection of a private access or private roadway with a provincial highway. The private access or roadway is operated and maintained by an individual landowner, or by a private community association.

Public Road Intersection – an intersection of a public road with a provincial highway. The public road is operated and maintained under the jurisdiction of the local municipality.

Design Review & Approvals

The Highway Geometric Design Guide (HGDG) sets out the standards for designing a highway access. The HGDG and other resources are listed at the end of this document. The proponent is required to consult with Alberta Transportation when defining the need, location and standards to obtain Alberta Transportation's approval to ensure adherence to its standards, best practices and guidelines. It is up to the consultant responsible for preparing the design to provide adequate reference to the standards used. This can be provided in the design package submission with the permit application.

The submission to Alberta Transportation will be comprised of the permit application, the detailed design package (i.e. detailed design report and the engineering drawings. A professional engineering consultant qualified to design highway improvements in the province of Alberta must undertake the design. For complex projects, it is recommended that a pre-qualified consultant be utilized to prepare the design and monitor construction. A list of pre-qualified consultants can be found on the Alberta Transportation website:

https://www.alberta.ca/pre-qualified-consulting-firms.aspx.

Permit Application

Issuing permits is the responsibility of the regional / district office of Alberta Transportation.

The proponent must have a permit prior to constructing a new means of highway access, or upgrading an existing highway access.

The Highways Development and Protection Regulation sets out the information requirements for a permit, and are also summarized below. The permit application form and procedures are available on the Alberta Transportation website:

https://www.alberta.ca/roadside-development-permits.aspx

Design Report

The design report is provided as supplementary information to the traffic impact assessment, and is a written description of the proposed improvement. It will include information such as the overall design criteria, sight distance at the intersection, existing and proposed pavement structure, cost estimate, and any other relevant information that may be applicable to the design, construction, and/or operation. The design must be carried out in accordance with relevant Alberta Transportation's manuals such as the HGDG, Pavement Design Manual, relevant Design Bulletins, etc.

Please consult the local Alberta Transportation office to determine the level of detail required in the design report.

Design Drawings

The design drawings will include a plan and profile view of the entire footprint of the proposed intersection improvements.

The drawings should also include cross section(s) for new construction, utility locations and possible conflicts, right of way requirements (e.g. corner cuts), shoulder widths, asphalt cement grade, lift thickness, pavement markings, culvert sizes and locations or other stormwater management facilities, and any other relevant details.

Please consult the local Alberta Transportation office to determine the level of detail required in the design drawings.

Right of Way

Connection of a public roadway to a provincial highway may require additional right of way. This often takes the form of corner cuts to accommodate flatter sideslopes in proximity of an intersection.

Any land required to connect, or to improve a connection to a provincial highway from a public road must be dedicated and surveyed as road plan prior to construction. It is the responsibility of the Municipality to lead any acquisition efforts on third party land when required, and lead expropriation efforts if necessary.

Approval Package

Once the design report and design drawings have been reviewed and accepted by Alberta Transportation, a permit will be issued to allow the permit holder to undertake the construction. For a public road intersection, the permit will be issued to the municipality with jurisdiction over the local road. As the permit holder, the municipality may choose to assign responsibility for delivering the construction to a third party (such as the developer or landowner) through a development agreement or other agreement.

For construction projects of significant cost or complexity (e.g. highway twinning, interchange construction), Alberta Transportation will require an agreement with the municipality, in addition to issuing a permit. This agreement may be necessary to provide financial security for the project, protect public safety, and/or any other matters. Additional direction will be provided from the Alberta Transportation regional office in these cases.

Construction

Pre-Construction

Prior to construction, it is recommended that the permit holder, the consultant, the contractor, and Alberta Transportation staff have a pre-construction meeting to review the design plans, Traffic Accommodation Strategy, and construction scheduling. This will help to coordinate the construction with other provincial construction projects and/or ongoing highway maintenance,

provide formal acceptance of the traffic accommodation strategy, and to notify the public of the construction activity through 511 Alberta.

https://511.alberta.ca/

During Construction

The proponent will use Alberta Transportation's Standard Specifications for Highway Construction and monitor construction activities within the highway right of way throughout the duration of the project. The proponent will advise Alberta Transportation of any issues that may arise and respond to any public inquires related to the construction. The proponent is responsible for monitoring any work that is to occur outside of the highway right of way.

Alberta Transportation may audit construction activities at the department's discretion. Alberta Transportation will advise the consultant / contractor of any issues that arise during these audits. Direct intervention by Alberta Transportation may occur when necessary.

Alberta Transportation typically performs winter highway maintenance within the construction project limits, unless otherwise specified in an agreement or permit. A winter shut-down meeting is strongly recommended to ensure that any impacts to winter maintenance equipment are identified and mitigated.

Construction Completion

Once construction is substantially completed, the consultant should provide written notification to Alberta Transportation. This written notification should identify remaining work to take place (e.g. final grading or landscaping), and include a schedule for completing the remaining items.

An inspection may be scheduled once this notification is provided. If Alberta Transportation is satisfied that the work and the plan to complete remaining work or correct noted deficiencies (if required) a construction completion letter will be issued to the permit holder. This letter will outline the remaining obligations of the permit holder, and identify the warranty period. This

letter is not the Construction Completion Certificate, which is the proponent's responsibility to issue.

Final Acceptance

After remaining work or deficiencies have been satisfactorily completed, Alberta Transportation will inspect the work near the end of the warranty period. If there are no further requirements, Alberta Transportation will notify the proponent to provide the final details package, which will include as-built drawings, pavement test results, and a summary of any technical or safety issues that arose during construction. The Engineering Consultant Guidelines provide additional guidance in this regard. On receipt of this information, a letter indicating final acceptance will be provided to the permit holder, with the effective date of the end of warranty period. This letter releases the permit holder from all construction obligations related to the project.

Defaults

A default occurs when work is not completed within the timeframe set out in the construction schedule provided at the pre-construction meeting, with no official amendment to the project schedule.

All reasonable efforts will be made to accommodate issues that arise from construction on the highway.

For a public road intersection, it is strongly recommended that the municipality retain sufficient funds (via security) to ensure that the intersection can be completed using the development agreement between the developer and the municipality.

For a private intersection, it is the permit holder's responsibility to complete the required work to the satisfaction of Alberta Transportation. Alternately, the highway access may be closed and/or removed.

References

- Municipal Government Act
- Subdivision and Development Regulation
- Highways Development and Protection Act
- Highways Development and Protection Regulation
- Who Pays for Highway Improvements Policy
- Highway Geometric Design Guide
- Traffic Impact Assessment Guideline
- Engineering Consultant Guidelines, Volume 1 and Volume 2
- Engineering and Drafting Guidelines for Highway and Bridge Projects
- Standard Specifications for Highway Construction
- Pavement Design Manual
- Highway Pavement Marking Guide
- Highway Lighting Guide
- Traffic Accommodation in Work Zones Manual
- Design Bulletins
- Pavement Preservation Guidelines
- Pavement Design 101 (attached)

PAVEMENT DESIGN 101

1. Background

The document briefly outlines the essential data and information required for pavement design and rehabilitation purposes. The information is applicable to new construction, final paving, pavement preservation and widening designs. Brief design examples are provided.

2. Design Considerations

The vast majority of the Department's pavements are flexible which consist of an asphalt concrete pavement (ACP) on top of a base course which overlies a prepared subgrade. The Department's flexible pavement design process follows the AASHTO 1993 pavement design methodology. Key design considerations include traffic loading, subgrade support, drainage, reliability, materials selection and life-cycle cost analysis. Documents outlining the steps for design are provided in section 4.

3. Design Example

The examples below shows the basic steps involved in the design of new pavements or rehabilitation of existing pavement structures.

Design Parameter	**New Construction**	**Rehabilitation**
Lane configuration	Two lane undivided highway	Two lane undivided highway
Subgrade resilient	30 MPa (determined from FWD analysis of nearby prototypes)	30 MPa (backcalculated from project FWD data)
ESAL/day/direction	50 (from Historic ESAL Report)	50 (from Historic ESAL Report)
Design period	20 years (typically)	20 years (typically)
Growth rate	5% (section 5.2.3 of Pavement Design Manual)	3% (section 5.2.3 of Pavement Design Manual)
Traffic growth factor	33.06 (section 5.2.3 of Pavement Design Manual)	26.87 (section 5.2.3 of Pavement Design Manual)
Lane distribution[1]	100% in the design lane (section 5.2.2 of Pavement Design Manual)	100% in the design lane (section 5.2.2 of Pavement Design Manual)
Design ESAL	$50\times365\times33.06 = 0.60\times10^6$	$50\times365\times26.87 = 0.49\times10^6$
Reliability, R	85% (Table 8.3 of Pavement Design Manual)	50% (Table 10.1 of Pavement Design Manual)
SN required (SN_{req})	SN_{req} = 96 mm (Figure 8.4, Design Chart for M_R=30, of Pavement Design Manual)	SN_{req} = 88 mm (Figure 8.4) SN_{eff}[2] = 40 mm (from FWD analysis) $SN_{overlay} = SN_{req} - SN_{eff}$ = 48 mm
Pavement structure[3]	120 mm ACP (120×0.4 = 48) 350 mm GBC (350×0.14 = 49) Total SN: 48 + 49 = 97 > SN_{req}	48÷0.4 = 120 mm ACP overlay
Asphalt mix type and grade	L1 PG 52-34 (Design Bulletin #13 assuming Zone 2)	L1 PG 58-28 (Design Bulletin #13 assuming Zone 1)

[1] For a four lane divided highway, lane distribution of 85% and 15% are used for outer and inner lanes respectively.
[2] SN_{eff} is the SN of the existing pavement structure.
[3] Material coefficients of 0.4 for ACP and 0.14 for GBC from Table 8.4 of Pavement Design Manual. There are numerous possible combinations of ACP and GBC thicknesses; however GBC:ACP ratio typically 2 to 3:1. Structure would be constructed as a staged pavement in accordance with Design Bulletin #15. Second stage thickness would be confirmed based on FWD data analysis.

4. Design Guides and Bulletins

1. Pavement Design Manual (Edition 1, 1997)
   http://www.transportation.alberta.ca/Content/docType233/Production/pavedm2.pdf

2. Guidelines for Assessing Pavement Preservation Treatments and Strategies (Edition 2, July 2006)
   http://www.transportation.alberta.ca/Content/docType233/Production/gappts.pdf

3. Design Bulletins
   http://www.transportation.alberta.ca/649.htm
   These design bulletins are periodically issued as an update or an addendum to the Pavement Design Manual, Highway Geometric Design Guide, or other related standards. To date, the following bulletins applicable to pavement projects are available:
   (a) Design Bulletin #13 (Updated June 2012) - Revisions to Pavement Design Manual for Selection of ACP Mix Types and Asphalt Binder Grades.
   (b) Design Bulletin # 15/2003 - Recommended Minimum Thickness of First Stage Asphalt Concrete Pavement.
   (c) Design Bulletin #27/2005 (Revised December 2008) - Provincial Highway Service Classification System and Provision of Additional Pavement Width to Allow for Two Future Overlays.
   (d) Design Bulletin #77/2013 (Draft) - Revisions to Pavement Design Manual - Updated Requirements in Regards to Design Inputs, Agency Practices and Design Report Contents

5. Pavement Data for Design Inputs

1. Traffic and load data
   (a) Alberta Highway Historic ESAL Report
   http://www.transportation.alberta.ca/Content/docType181/production/HESAL2011.pdf
   (b) Alberta Highway Traffic Volume History (2000 – 2009)
   http://www.transportation.alberta.ca/Content/docType181/production/HTVH2002-2011.pdf
   (c) Alberta Highway Traffic Volume, Vehicle Classification, Travel and ESAL Statistics Report
   http://www.transportation.alberta.ca/Content/docType181/production/VC2011.pdf
   (d) Turning Movement Diagrams (mainly for intersections, interchanges and ramps)
   Zoom into location on the following map link: http://www2.infratrans.gov.ab.ca/mapping/

2. IRI and rut data
   http://www.transportation.alberta.ca/957.htm

3. PMS Report
   Available on Sharepoint site:
   https://intranet.transportation.alberta.ca/TCE/TSB/Shared%20Documents/Surface%20Engineering%20and%20Aggregates/PMS%20Report%202_2_2012_05_14.pdf

4. FWD data is available on an as requested basis by contacting John Crockett at (780) 415-1009 or john.crockett@gov.ab.ca

5. Cross sections of as-built pavement structure
   Paste link into Explorer:
   ftp://www.tu.gov.ab.ca/Shared/tech_standards/Pavement%20Cross%20Sections/

6. Contact

Questions on this topic can be directed to: Marta Juhasz, Surfacing Standards Specialist, (780) 415-0691.