

# Developer Driven Bridge Guidelines

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## 1 Introduction

The Government of Alberta (GOA) often receives requests from municipalities or private developers who wish to construct, or modify, a **bridge** within the highway right of way. For the purpose of this document, these organizations are referred to as **Developers**.

Development requests that Alberta Transportation (AT) or Alberta Infrastructure (AI), in the case of the Transportation Utility Corridor that encompasses the rings roads in Edmonton and Calgary, receive often involve traditional grade separated bridge crossings while others are unique in nature such as pipeline or transit overpasses. As any structure within Crown land can affect the safety of the travelling public, AT has developed these guidelines as a supplement to the current [Roadside Development Application](#) process and existing engineering standards. The process below is independent of the roadside development process and required for all **bridge** projects, including new projects and retrofitting of existing projects.

The intent of this guideline is to:

- Simplify expectations for Developers with respect to submission requirements and standards
- Provide guidance to Developers on anticipated timelines to minimize schedule impacts
- Clarify requirements through all project stages
- Clarify requirements through the lifecycle of an asset
- Streamline the approval process within the GOA.

## 2 Background

Legal ownership of infrastructure within Crown land is not well defined under current legislation, which has led to varying legal interpretations in the past, based on site-specific details. However, the Department's opinion is that:

- The Crown (AT and municipalities) shall own roadway bridges and pedestrian bridges,
- Private corporations and cities shall own utilities (including pipelines, light rail transit, or other material conveyance structures), and
- Rail companies (Canadian National Railway, Canadian Pacific Railway) shall own rail structures,
- Unless legal agreements state otherwise

Regardless of Ownership, it is more important to define who has **direction, control and management** of the asset. This definition assigns the responsibility of keeping the asset in a reasonable state of repair, and the liability for any damages resulting from non-repair. The assignment of

responsibility occurs through the legal agreement process, which reinforces the need to clearly outline what direct, control, and management means for each unique project.

Early engagement is recommended for all projects to gain upfront project understanding and minimize schedule impacts. The Department encourages Developers to refer to current legislation including, but not limited to, the Highways Development and Protection Act, Municipal Government Act, and City Transportation Act. Private developers are also encourage to engage the local municipal government, who may have additional requirements. Note that the Department does not permit private developers to own structures as there is financial and legal uncertainty associated with longevity of such companies.

AT has pre-qualified Engineering Consultant firms who are familiar with Provincial guidelines. Developers are encouraged to engage these firms for bridge projects, but are permitted to use other companies, at their own discretion. This list is located online at <https://www.alberta.ca/pre-qualified-consulting-firms.aspx>. For major projects such as interchanges, or where the Department does not have sufficient technical resources, pre-qualified **Owner Engineers** will be required to act on behalf of the Department, at the cost of the Developer.

### 3 Project Definition

Developer driven bridge projects are split into two scenarios:

- 1) The bridge carries/will carry traffic (vehicular or other modes) that is connected and has **direct impacts** or interaction on the highway traffic network (e.g. interchanges, ramps); or
- 2) The bridge carries/will carry traffic that is not connected and has **indirect impacts** with the highway traffic network (e.g. flyovers, railways, pedestrian crossings).

#### 3.1 Bridges with Direct Impacts on the Highway Network

Examples include the construction of a new interchange on a highway within an urban center, with the municipality taking on the role of design and construction management; or the modification of existing structure such as cutting back a bridge headslope to add an additional lane beneath a bridge. The following criteria apply:

- All GOA requirements (design standards, construction specifications, engineering submissions, project management, etc.) shall be followed, as further outlined in the [Engineering Consultant Guidelines](#).
- Sections 4 and 5 of this document shall not apply.
- The GOA shall have direction, control, and management of roadway bridges and pedestrian structures, unless otherwise stated in an agreement
- Developers shall have direction, control, and management of utility bridges

### 3.2 Bridges with Indirect Impacts on the Highway Network

Examples include the construction of a pedestrian underpass beneath a highway within an urban center tying into pedestrian facilities out side of the highway right of way, a light rail transit bridge overpassing a highway, or a resource road over the highway. The following criteria apply:

- The submission requirements in Section 4 and technical requirements in Section 5 of this document shall apply.
- The Developer shall determine the appropriate requirements (design, construction, inspection, maintenance, operations) for the project
- The GOA will ensure the minimum requirements noted in this document are adhered to, to protect the integrity and safety of the Highway and travelling public.
- Developers shall have direction, control, and management of roadway bridges and pedestrian bridges, unless otherwise stated in an agreement.
- Developers shall have direction, control, and management of utility bridges, unless otherwise stated in an agreement.

## 4 Submission Requirements

### 1. Project Brief:

The project brief submission is a very high level, 1-2 page overview, of the proposed project. The purpose of the project brief is to identify any existing constraints (such as planned road widening), clarify submission requirements, and identify project personnel. It should include a map of the project area, a description of the proposed scope of work, contact information for the requesting agency, and proposed timelines. Note that additional information may be required to support the bridge portion of a project such as completion of an access management report, traffic impact assessment, and road safety audit, particularly for projects that have **direct impacts** on the Highway (vs **indirect impacts**).

The project brief shall be submitted to the appropriate [District Office](#), who will circulate to Regional Managers and subject matter technical experts such as Bridge Engineering, Highway Geometrics, Roadside Development, and/or Environmental Regulation. Upon submission, the Department will provide high-level comments, confirm whether the project will have a direct or indirect impact, will assign a Bridge File number for tracking in AT's database, and will identify the Department's project coordinator. The typical Department review period is 3 weeks, depending on available resources, details provided, and project complexity. Note that if that additional information is required to support any submissions, the review period and estimated timelines will restart.

In addition, at this stage in the process, the Department will identify if there is internal capacity and/or expertise available for engineering advice. Note that Department engineering reviews will focus on determining adherence to standards and legislation, and is not considered an engineering design check. In the case where appropriate internal resources or internal expertise is not available, an independent

consultant shall be retained by the Developer to act as the Owner's Engineer (OE), with the cost borne by the Developer. For bridge projects the OE shall be on the prequalification list for major bridge projects. In the Department's experience, a competent Owner's Engineer can reduce schedule delays that may be beneficial to time sensitive development requests.

Three additional submissions are required: at the conceptual design, preliminary design, and detailed design stages, as further described below and within the technical requirements. Regular submissions and communication with the Department will help clarify submission requirements, identify issues at an early stage, and minimize potential rework. It is recommended to not proceed further in design until signoff at each stage is received. At each phase, the Department may request additional information depending on the quality of submissions and scope of project, which may affect timelines. Final signoff for these bridge projects will be by the appropriate Regional Director and Executive Director of Technical Services Branch.

## **2. Conceptual Design Submission**

This submission is typically 5-10 pages with an estimated review time of 5 weeks. The purpose of this submission is to clarify if there are any external factors unknown to the Developer that may impact the project, allow the Department to integrate the proposal into future plans, and ensure all feasible options have been assessed before proceeding to preliminary design. The conceptual design submission will provide justification for the option that the Owner has chosen for design. As a minimum, the submission shall include:

- Options considered (pros, cons, risks, rationale for selected alternative)
- Conceptual details for the preferred option (alignment, impact on ROW, sketches in plan and cross-section)
- Geometric details in the vicinity of the ROW, including horizontal and vertical clearances
- Reference to applicable legislation/standards/guidelines etc.
- High level discussion regarding construction, operations, maintenance, and inspections
- Desirable schedule (design, construction, decommissioning)
- Any additional unique project information or constraints
- Sketches in plan and profile view of the preferred concept

## **3. Preliminary Design Submission**

This submission varies depending on the project scope with an estimated review time of one to two months from the Department, depending on resources. The purpose of this submission is to confirm appropriate application of guidelines before detailed design begins. Alberta Transportation will also confirm that no other site-specific knowledge has been missed such as planned construction activities. A bridge file number will be assigned at this stage to be tracked in AT's Bridge Inventory System. As a minimum, the submission shall include:

- Preliminary engineering report (design criteria, preliminary structural design of selected option, preliminary roadway design, etc.)
- Preliminary detail design drawings

- adherence to the [Engineering Drafting Guidelines for Highway and Bridge Projects](#) is recommended to ease review efforts
- Supplementary investigation reports (environmental, geotechnical, noise, traffic impact Assessments, road safety audits, etc.)
- Detailed maintenance, operation, and inspection plans
- Draft legal agreement and draft Roadside Development Application

#### 4. Detailed Design Submission

This submission varies depending on the project scope with an estimated review time of one to two months from the Department. The goal of this submission is to ensure that the final product adheres to detailed engineering requirements and will fit within the Department's goals of ensuring public safety. As a minimum, the submission shall include:

- Final, signed detail design drawings
- Construction plan (including traffic accommodation, erection procedures, schedule)
- Final, signed legal agreement and final Roadside Development Permit Application

The successful submission will result in signoff by the Department, with approval for tendering.

#### 5. Final Details Submission

This submission varies depending on the project scope. The Developer is required to have their project inventoried and entered into the Department's [Transportation Information Management System](#), within one month of construction completion. This will allow the Department to make informed infrastructure management decisions regarding their adjacent facilities, such as maintenance or new construction advancements, throughout the lifecycle of the assets. As a minimum, the submission shall include:

- Authenticated record as-built drawings - complete with any field changes, final elevations, etc.
- Post construction inspection (i.e. the first inspection submission), as required under Section 4.e.
- Construction warranty details

### 5 Technical Requirements

The Developer is responsible to hire appropriate licensed professionals as required by the Engineering and Geoscience Professions Act and adhere to all applicable legislation to ensure their project is designed as a safe and legislatively compliant project. The Department requires that an independent engineering design check be performed for all projects, with both the original designer and checker stamping drawings and report submissions. This requirement includes a full independent design check for the detailed design submission, and a thorough independent review for the remaining submissions. Further information regarding this requirement, is contained within the Department's [Engineering Consultant Guidelines](#). This is required for all bridge projects (traditional and developer driven).

Many guidelines, internal and external to the Department, are available to assist designers. Below is a list of commonly used Department references. Department guidelines shall be adhered to for *direct* impact

projects, and shall be used as a reference in conjunction with the technical requirements listed below for **indirect** projects. Note that in the case of ambiguity within standards, the Department will have final say.

[Highway Geometric Design Guidelines](#) (HGDG)

[Roadside Design Guide](#) (RDG)

[Bridge Conceptual Design Guidelines](#) (BCDG)

[Bridge Structures Design Criteria](#) (BSDC)

[Standard Specifications for Bridge Construction](#) (SSBC)

[Bridge Aesthetics Study](#)

## 1. Geometric Requirements

Highway geometric designs must meet minimum geometric standards. Specific geometric requirements include:

- Must consider future plans of the highway, such as widening or additional lanes.
- Clear zone distances that meet the upper end of the design criteria based on the design speed and design AADT are required (HGDG Table C.5.2.a). Rigid and/or flexible barrier systems to reduce clearzone requirements are not permitted.
- Minimum horizontal offsets to structures must be met (RSDG Figure H7.1)
- The minimum offset between a proposed bridge and an existing structure shall be 10m.
- The vertical clearance between the roadway surface and bridge structure shall be greater than adjacent bridge structures on the Highway Network in the vicinity to minimize the likelihood that they will be struck by a high load. A factor of safety shall be applied depending on the risk of the proposed project. For example, a structure carrying dangerous goods will require a greater vertical clearance to minimize risk to the travelling public.
- No bridge deck drainage shall be directed onto the roadway below or result in any erosion concerns.
- Design details shall be considered to minimize factors such as drifting snow, stormwater drainage, and preferential icing of bridge decks.
- Primary and secondary containment systems are required for dangerous goods spill management.

## 2. Structural Design Requirements

Structural designs must meet minimum structural requirements, as per relevant standards such as the BSDG or Canadian Highway Bridge Design Code. Specific structural design requirements include:

- Meeting the minimum geometric requirements as described above
- The structure must be redundant, as determined in the Department, in case of damage or failure (e.g. high load strike). Redundancy generally requires that the structure will be able to sustain service and dead loads in the case of damage.
- The structure must not result in any snag or crash hazards
- Structural components must meet material specifications
- Consideration to [aesthetics](#) and the surrounding environment. Note that the Department will have final approval of the architectural concept.

### 3. Construction Plan Requirements

The construction plan must meet minimum construction specifications, as per relevant standards such as the SSBC. Specific construction plan requirements include:

- Submission of an erection/construction plan
- Submission of traffic accommodation/management plan
- Submission of a public communication plan

### 4. Operations/Maintenance Requirements

An operation and maintenance program is required, with the following to be included as a minimum, to ensure for minimal impact to the highway and its users:

- Emergency response plan
- Safety plan
- Regular maintenance activities including methodology, duration, and frequency (i.e. snow clearing plan)
  - if impacts such as lane closures on Highways are anticipated, a lane rental fee will be applied with yearly increases to account for inflation and traffic growth. Details are to be included in the agreement.
- Any expected impacts on the ROW (physical, traffic disruptions) should be clearly identified and mitigated
- Submission of a decommissioning plan

### 5. Inspection Plan Requirements

A site-specific inspection plan is required. As a minimum, the following shall be addressed:

- Structural components (i.e. girders, abutments, connection joints, wearing surfaces, welds)
- Operational components (i.e. lighting, crossing arms, controls)
- Environmental components (i.e. erosion, sediment, spill containment systems)
- Inspection cycle timing and schedule (must, at a minimum, meet the requirements of Section 2.5 of the Department's Level 1 BIM Inspection Manual)

Additionally, the Developer:

- Must agree to complete all inspections in accordance with the [AT's Bridge Inspection and Maintenance Program \(BIM\)](#)
- Must submit all inspections to AT, within 1 month of inspection
- Must make available all inspections, upon the request of the Department
- Must submit notice of maintenance and rehabilitation works to the Department, including scope of work, anticipated schedule, and any impacts to the ROW
- Must notify AT of any low rating advisories, including the recommended plan of action
- Must agree to permit access to AT inspectors as required, for bridge condition auditing purposes.
- Must agree to complete maintenance and repairs identified by the Department's BIM, within an agreed upon timeframe.

Adopted by Alberta Transportation,

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## Appendix A: Definitions

**Developer:** any Owner of a development that proposes to cross the right of way owned by Alberta Transportation or Alberta Infrastructure. This may include municipalities or private developers.

**Bridge:** Any structure or facility that crosses over or under an obstruction, gap or facility. This includes underpasses and overpasses that transporting vehicles, other modes of transportation, or other goods.

**Direct Impact:** Any bridge that is connected to the highway network and will likely cause operational impacts to the asset that is owned by Alberta Transportation. Example: A developer interchange is proposed with ramps that will enter/exit a Highway.

**Direction, Control and Management:** refers to the requirement of an Owner to maintain their assets to an acceptable level of safety for their users, while bearing the responsibility for any damages resulting from non-repair. Responsibilities include lifecycle asset management including inspection and maintenance, along with due diligence for carrying out emergency management response procedures.

**Indirect Impact:** Any bridge that is not connected to the highway network will not cause operational impacts to the asset that is owned by Alberta Transportation. Example: A developer flyover bridge is proposed with no access to the Highway.

**Owner's Engineer:** consulting engineers that represent the Owner (Alberta Transportation), acting on the Owner's behalf and in their best interest. Their main role is to ensure compliance to standards and procedures, while providing additional resources and/or technical expertise. Note that OE's do not act as an engineering design checkers.