Town of OLDS

2018 MINIMUM DESIGN GUIDELINES

Town of Olds

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1. PURPOSE

The Design Guidelines provide the technical information required to construct the development or project, whose bases starts with the elements contained in the Municipal Development Plan, Transportation Studies, Alberta Environment and Parks guidelines, and other Town guiding documents.

The Design Guidelines provide the guidance to the Engineering professionals, working within the Town regarding the Town's standards and requirements in the preparation and presentation of design and construction information to support their project, be it a single lot development, a new subdivision or rebuilding of existing infrastructure. It is the responsibility of the Consulting Engineer to ensure that the design conforms to these Guidelines and to notify The Town if any deviations have been made.

Although The Design Guidelines contain specific standards, where the Developer wants to develop alternate designs that may require an engineering deviation, the Developer is to be aware that engineering deviations may lengthen the approval process.

In some circumstances an alternate engineering design may be required by the Town of Olds. Where unusual or complicated design situations arise, The Town reserves the right to require a deviation from these Guidelines where conditions dictate.

The Design Guidelines are predominately for use in new ("greenfield") development areas. Slight modifications to these guidelines may be required in older neighbourhoods (e.g. right of way restrictions, etc.), which The Town acknowledges and typically does not consider this as a deviation to the guidelines.

All engineering submissions that are made to The Town to support the project, and based on requirements found within this document, will be reviewed to ensure that the Development is designed and constructed in general conformance with Town Standards (or alternate acceptable standards) and to ensure that maintenance falls within normal and reasonable service levels, as directed by Town Council, to meet Community needs.

2. OTHER "MASTER PLAN" DOCUMENTS

1. OLDS MVC TRANSPORTATION AND UTILITIES MASTER PLAN

This document provides an overview of the Town's transportation needs as it grows. It covers new growth areas and upgrades to existing road rights-of-way. If the area being developed is not covered under the existing Transportation

Master Plan, than it may require a Traffic Impact Assessment (TIA) prior to approval.

2. OLDS OPEN SPACE AND TRAILS MASTER PLAN

The goal of the Open Space and Trails Master Plan is to provide a detailed long range plan which will facilitate the further expansion and integration of this network throughout the town. The Town recognizes that a more integrated, easily accessible and safe trail network will result in increased recreational use as well as encouraging the use of trails as a means for “Active Transportation” within the town.

These documents, in conjunction with others with provide a more defined subject and scope that connect to provide direction towards a better town. The Design Guidelines are one of the technical documents that support these visions.

3. PLANNING’S DESIGN ELEMENTS

The Town has several Neighbourhood Planning, and Accessibility Elements that are incorporated into The Town’s overall layout. These Elements should be utilized when designing new developments, or performing municipal improvements in older neighbourhoods.

A. 1. ELEMENTS FOR NEIGHBOURHOOD PLANNING AND DESIGN

1. Natural Areas

Each neighbourhood contains natural open spaces and is sensitive to the existing land conditions and local ecology. Neighbourhoods are designed to include existing or enhanced natural and conservation areas or a response to these natural features. This may include greenways, wetlands, watercourses, woodlots and native plant vegetation.

2. Mixed Land Uses

Each neighbourhood has a mix of land uses and densities that provide options to live, learn, work, and play. More intensive land uses are connected and focused around transit, alternative transportation modes and parks. All citizens can easily access daily shopping and recreational needs in their neighbourhood regardless of mode choice.

3. Multi-Modal Choice

Each neighbourhood offers real mobility choices for residents to travel to, from and within the neighbourhood. Streets and trails are well connected to

encourage active modes of travel. Traffic and parking are managed and do not dominate the neighbourhood.

4. Compact Urban Form and Density

Each neighbourhood is designed to use land wisely and efficiently. Higher density housing is clustered and located with commercial and institutional uses and public transit stops. Higher density areas gradually transition to lower density areas.
Density supports a mix of uses and viable transit ridership.

5. Integrated Parks and Community Spaces

Each neighbourhood offers high quality public spaces, with a variety and mix of leisure and recreational opportunities. Open spaces are well connected and integrated. Public space is accessible and suitable to a range of ages and abilities. Active and passive spaces provide areas to congregate, socialize, recreate, be physically active and spend time outdoors.

6. Housing Opportunity & Choice

Neighbourhoods provide a mixture of buildings, unit sizes and housing types. Housing options provide choice within the neighbourhood, appealing to a range of incomes, family types and opportunities for ‘aging in place’.

7. Resilient & Low Impact Neighbourhoods

Each neighbourhood is designed to be resilient and adapt to changing conditions such as growth rates, demographics, regional context, energy price changes, climate change and change in resident’s needs and preferences. Cost effective neighbourhoods are designed with consideration for construction, long term maintenance, operation and resident affordability. Neighbourhoods are planned to accommodate a variety of future uses that will allow buildings, public spaces and amenities to be adapted efficiently as needed.

8. Safe and Secure Neighbourhoods

Each neighbourhood is designed to promote citizen’s health and well-being and increase overall neighbourhood safety and social interaction. Streets are designed for pedestrian and cyclist safety. Residents know their neighbours, feel confident to play, walk, cycle, and take transit, use neighbourhood spaces and access community amenities.

9. Unique Neighbourhoods

Each neighbourhood has a distinct identity fostering community pride and a sense of belonging. Arrival features, focal points, natural elements, public art

and other symbols of the community are integrated at important intersections and other locations within the neighbourhood. Architecture and site design express creativity, a distinct 'look and feel' for each neighbourhood, including relationships between buildings and public space, size of homes, street widths, block size, choice of materials and architectural character.

B. 2. ELEMENTS FOR ACCESSIBILITY

1. Put Pedestrians first

Streets should be for people, not just cars.
The physical dimensions as humans, and the speed at which we move - 5km/hour
- requires a street environment that is in keeping with these parameters. Visual stimuli, comfortable noise levels, benches to rest on and trees to shade us are all important.

Create walkable hubs.
Local neighbourhood hubs are crucial to sustaining a good quality of local life. It has been shown that amenities within 600m increase the likelihood of walking significantly. Hubs should offer continuous and direct routes to and around them for pedestrians.

Build quality footpaths and maintain them.
Inviting walking requires an offer of a pleasant and high quality walking environment. The width of the sidewalk, the material, how it behaves in different conditions and its life-cycle are all very important to consider. How well the sidewalk can be maintained and the frequency of this maintenance is also crucial to this.

2. Create a balanced network

Define a set of street typologies based on the desired end users.
While each street has their own unique character and qualities the current classification system for streets in Olds is not sensitive to these differences. A new framework that identifies categories of streets based on their unique functions and priority uses will be critical for future mobility planning.

Balance the network with all users in mind.
Olds needs a balanced network of streets that are designed and operated to enable safe, accessible and enjoyable travel for all users. Key nodes in the town such as employment, commercial, and service hubs need to be linked with multiple modes including walking, cycling, riding the bus, and driving.

Ensure drivers have a place without infringing on quality for other modes.
Driving will always play a key role in the transportation system in Olds.

Despite some streets maintaining a certain level of service for vehicles, all streets must provide a good quality level of service for the most vulnerable road users.

3. Land Use and Mobility Together

Enforce and incentivize minimum density targets.
Olds has a minimum density standard of 12.35 units per hectare.

Establish new housing standards.
Currently policy states mixed housing, with a minimum of 30% Multi-family development area. Provide incentives for density and have reduced off street parking requirements where housing is within 500m of transit corridors creating better value for developers. Higher density does not necessitate tall buildings. Low-rise density can be delivered when considering different types of housing geometries.

Require Transit Oriented Development.
Growth that can utilize existing infrastructure supports the provision of municipal services in a cost effective manner. Enforce proximity requirements to transit for new development, and link density targets to distance from transit making transit oriented development the most profitable

4. Make Transit Part of the Journey

Place stops where other things are happening.
Transit should link with hubs, centres of education and work. The network needs to be integrated to provide pleasant, seamless and logical journeys. Waiting for transit can also be time for shopping or social time if it is well placed so riders interact with other places and people.

Ensure access for pedestrians, motorists, cyclists.
Transit should act as a support to other modes, a cyclist should be able to put their bike on for a ride home or a motorist should rely on it if having a drink in town.
Everyone should know the transit service routes and be occasional riders.

Improve the waiting experience.
Service information, protection from the elements and proximity are all important features of transit stops. Real time updates to smart phones can help make transit convenient and accessible; this should be integrated with climate protected stops.

5. **Connect the Trails:**

   Tie urban network into recreation.
   The existing trail network can only reach its full potential if connected to an on- street network helping people be active and reach home and destinations. For cycling to be integrated into transportation options, direct, convenient routes must be available to employment and hubs. People cycle for pleasure, and they need to be encouraged to integrate this into their journey to work or school.

   Plan with the entire street section in mind.
   The proportion of space given to each mode should be addressed case by case on each road according to where it falls in the hierarchy of streets and its predominant use patterns. Cars, cyclists and pedestrians all move at different speeds and require different space; cycling and walking should be separated where appropriate.

While most, if not all, of the elements from both the Neighbourhood Planning and Design Elements and the Elements for Accessibility should be incorporated into the adopted Area Structure Plans, some of these standards also have a bearing on the details that are submitted for approval as part of the development agreement, as such the use of the elements noted above will guide any variation to the detailed engineering drawings contained herein and may, in some cases, override the standard drawings currently used.

1. DEFINITIONS

Except where the context otherwise requires, the following expressions or words, when used in this document, shall have the following meanings:

- **The Town** shall mean the Corporation of The Town of Olds in the Province of Alberta.

- **Construction Drawings** shall mean those Engineering Plans and Profiles, in hard copy or electronic form, prepared by the Consulting Engineer, showing the details of the installation of the various Municipal Improvements within the Development using standard engineering symbols and forms, and conforming to the Design Guidelines and Construction Specifications.

- **Construction Specifications** means the Town's minimum requirements as outlined in the current Design Guidelines and Contract Specifications. Variances from or additions to the Design Guidelines and Contract Specifications must be prepared by the Consulting Engineer and specify the legal, administrative and technical aspects of the variation. Any variation must be approved by the Town.

- **Contract Specifications** means the current Town of Olds Contract Specifications. The Contract Specifications provide guidance for the safe, efficient and uniform construction and maintenance of Municipal Improvements using defined standards, definitions, drawings and specifications.

- **Consulting Engineer** means a Professional Engineer who is an authorized officer of a consulting engineering firm, retained by the Developer, who has designed the Municipal Improvements and/or supervised the installation of the same within the Development according to the approved plans and specifications.

- **Applicant** shall mean a person who has applied for approval of a proposed subdivision or to service and existing parcel of land, whether as the owner or an agent for the owner of the land included therein.

- **Contractor** shall mean any person, persons, or corporation which shall undertake the installation of Municipal Services on behalf of either the Applicant or the Town.

- **Developer** shall mean the registered and equitable owner(s) of the Development.

- **Development** means the land to be serviced, as determined by the Developer, approved by the Engineer and specifically illustrated by plan of subdivision.

- **Development Agreement** shall be the document prepared by The Town specifying legal, administrative, and technical requirements of the Developer.

- **Ecological Profile** means a report prepared by the Town, or the Town's Consulting Engineers which identifies all natural features (e.g. treed areas, wetlands etc.) located on undeveloped land in the Town and rates them for preservation purposes.

- **EL&P** means The Electric, Light, and Power service provider for the Town or their duly authorized Representative.

- **Engineer** means the Engineering Services Manager or their duly authorized Representative.

- **Level One Landscaping** means the work of preparing the site to specified grades, placing and levelling topsoil, seeding to grass, and establishing turf; all in accordance with these Design Guidelines, Contract Specifications and approved landscape drawings.

- **Level Two Landscaping** means the work of planting shrubs, trees, and/or other plant material, in accordance with these Design Guidelines, Contract Specifications and approved landscape drawings.

- **Level Three Landscaping** means the work of supplying and installing various park facilities and/or amenities (e.g. trails, trail directional signs, playground equipment, bollards, post and cable fencing, site furnishings, etc.), in accordance with these Design Guidelines, Contract Specifications and approved landscape drawings.

- **Level Four Landscaping** means the work of supplying and installing optional/enhanced amenities (e.g. ornamental structures, sculptures, feature walls, water features, fountains, spray pools, etc.) all in accordance with these Design Guidelines, Construction Specifications and approved landscape drawings.

- **Municipal Improvements** shall mean all improvements, including oversized and shared infrastructure within, adjacent to and/or serving the Development, including, but not restricted to:

  - paved roadways,

  - sidewalk, curb and gutter and walkways including all trail types,

  - paved or gravel lanes,

  - water mains, sanitary sewer mains, storm sewer mains, service

connections, and utility trunk work which includes storm water management facilities,

- shallow utilities, including electrical distribution (excluding service leads), street lighting, natural gas, telephone, fibre optic; and cable television,
- landscaped berms, boulevards, medians, municipal reserves, and public utility lots,
- optional, enhanced subdivision amenities, including subdivision entrance signs, Level Four landscaping, sound attenuation walls, decorative sign pedestals, decorative street name markers, etc.,
- traffic control including signals, street signs, pavement markings,
- general subdivision signage (including updates) etc.

- **Professional Engineer** shall mean a licensed member of The Association of Professional Engineers and Geoscientists of Alberta (APEGA).
- **Public Sector Accounting Board (PSAB)** requires all municipalities to maintain an Asset Management Plan therefore The Town of Olds is requiring all Developers to provide actual costs for the infrastructure the Town will take ownership of. These costs are to be from the final progress payment made to the contractor and required at time of submission for all Construction Completion (submitted with Plan of Record drawings).
- **RFP** refers to the Request for Proposal process that the Town currently uses in place of a standard Tendering process. Unit prices are still a standard with this.
- **Servicing Study** shall be a document prepared to show the proposed Development is serviceable and will not negatively impact the existing town infrastructure and surrounding areas.
- **Shallow Utilities** refers to telephone, power, gas, fibre optic cable, cable TV, etc.
- **TAC** refers to the Transportation Association of Canada.
- **Trail** refers to a pathway (or walkway), used for the conveyance of pedestrian and cyclist traffic, typical located in or through open spaces. Where a trail is adjacent to and within the road right-of-way, forming the primary pedestrian / cyclist route along the roadway, it will typically be referred to as a sidewalk.

2. DEVELOPMENT AGREEMENTS

A. GENERAL

In the Town of Olds the construction of municipal improvements within a new subdivision are subject to the terms and conditions of a Development Agreement (DA).

Note: Development Agreement applications will not be considered until all Servicing Study issues have been approved by the Engineer and the relevant information, as listed in "Section 5 – Servicing Study and Associated Reports", has been provided to The Town.

The average processing times for the submissions required for various development approvals will vary, based on the development complexity and timely, accurate submissions from the Developer and / or consultant will impact the actual processing time frame also. Depending on the type of development, other Town departments may also be involved in the development approval process at different times which may impact the length of time required for approval.

Prior to the request for a DA the Developer shall provide Construction Drawings, conforming to the requirements of Section 2 – Drawing Standards, and proposed variances to The Town of Olds Contract Specifications. Along with the construction drawings submission include a cover letter indicating any variances between the Servicing Study and this submission, if any, with an explanation of the rational for the variances. The initial review of the Construction Drawings will identify such items as: concerns with infrastructure design, pedestrian mobility, overland drainage, etc. Identifying outstanding cost recoveries for area, boundary and/or oversize improvements, connection to existing mains requiring Town work, future cost recoveries, etc. will also be determined at this time.

Following the approval of the preliminary Construction Drawings, the Developer may request in writing to the Towns Engineering Services Department, to proceed with the preparation of a Development Agreement. The request for a DA must be accompanied by the items listed under "initial submission" noted later in this section.

If during the course of a Development Agreement application, a revision to the subdivision layout and / or its land-use occurs, whether initiated by the Town or the Developer, and the Town's Planning and Development Department deems that an amendment to the Area Structure Plan (ASP) is required, the Development Agreement will be placed on hold until the ASP amendment is approved by Town Council. If drawing reviews are also occurring during this amendment period, Engineering Services may also place drawing submissions and / or reviews on hold.

When a Development Agreement is placed on hold, Engineering Services may elect to return the application package and submitted drawings to the Consulting Engineer until the outstanding issue(s) that led to the application being placed on hold is (are) resolved.

If the revision to the subdivision involves a significant change to the development concept (e.g. changes overall site grades, road or lane locations which affect traffic movements, deep utility layout feasibility, storm water management, etc.) the Consulting Engineer will update the Servicing Study for the development. At the discretion of Engineering Services, the Development Agreement may be placed on hold until the Servicing Study revision has been accepted by Engineering Services.

Once the application process resumes the scheduled timelines for departmental reviews may be shifted or reset, depending upon the nature of the original issue and departmental workload at the time.

A Development Agreement, either “Draft” or “Final” which has not been acted upon or executed within 60 days will be considered cancelled. Written notification of the cancellation will be provided to the Developer. The Developer is able to request an extension of time which may be granted at the discretion of the Development Engineer. If, after a granted extension(s) (not exceeding an additional 60 days) and the Agreement has not been executed, the Town will consider the Agreement cancelled. Any further work on the Agreement after this time will be treated as a “NEW” application and subject to the processes thereof.

Agreements not executed, as defined above, may be subject to additional fees being applied. These additional fees may exceed the cost of the current Administration Fee charged for an executed Agreement, depending upon Engineering Services staff time involved prior to cancelation of the Agreement; be the cancelation from the Town or the Developer. These additional fees may be invoiced directly to the Developer and will not be credited towards the Administration Fee for subsequent Agreements or Amendments.

The Developer and/or his Consultant will only receive a “Notice to Proceed” once the Development Agreement has been approved by the Engineer. Approval of the Development Agreement by the Engineer can only be considered after receiving an appropriately executed Development Agreement from the Developer along with all required payments, letter of credit, and insurance.

No building permits shall be issued until the subdivision plan is registered, all essential services have been provided, completed and inspected as specified in the Development Agreement or Development Permit, and underground utility services record drawings have

been submitted and accepted by the Town Engineer. An exception may be considered for the construction of a “show home”.

B. SUBMISSIONS REQUIRED FOR A DEVELOPMENT AGREEMENT

1. Initial Development Agreement Submissions

The Developer shall provide the following information to The Town of Olds Engineering Services, and Planning and Development Departments, along with their initial request for preparation of the Development Agreement.

a. Name and address of Developer,

b. A copy of the land title for the development phase, no more than 30 days old,

c. Letter of consent that the Developer is duly authorized by the landowner to act as their agent,

d. Off-site Levy Payment Option as follows:

   i. Developer has elected to pay the total Off-site Levy Payment amount on signing the Development Agreement, or

   ii. Refer to the Town of Olds off-sire levy by-laws, or contact the Planning and Development department for more information. NOTE: Offsite Levies are for the total development area, including all right of ways, easements, roads, municipal reserves, etc.

e. 8½” x11” Phase boundary and location drawing including the Development name and Phase number,

f. Copy of Legal Plan of Survey (Scale 1:1000) showing the following information:

   i. Total subdivision area,

   ii. Legal description and area for each parcel, including any non-developable lands (i.e. addition to any expressway and/or arterial road right of ways, high pressure

   gas main right of ways, power transmission right of ways, environmental reserve parcels, etc.), and

   iii. CAD file.

g. Copy of the utility right of way plan, including CAD file,

h. Letter from the Planning and Development Department outlining the Conditions of Subdivision,

i. Cost estimates for the following Municipal Improvements, when applicable:

   i. Power distribution and street lighting from the Electric, Light and Power provider, or engineer,

   ii. Pavement Marking and Signage,

   iii. Connections to Existing Mains,

   iv. Future Municipal Improvement "Endeavour to Assist" Cost Recoveries (Area, Boundary and/or Oversize improvement costs),

   Note: Separate cost estimates must be provided if recoveries are to be paid to two or more previous Developers. Estimate to be based on as-constructed quantities and current contract prices.

   v. Level Four Landscaping – Optional / Enhanced Amenities (i.e. cairns, subdivision entry feature, sound attenuation wall, etc.),

   vi. The following information that will be used to calculate Stormwater Management Facility maintenance costs:

      a. Permanent water surface area,

      b. Number of water fountains and/or any other aeration equipment,

      c. Source of make-up water.

   vii. Utility Trunk Facilities and/or Expressways and Arterial roadways by the Developer on behalf of The Town. Separate estimates for expressway and arterial roadway street lighting and pavement marking are to be provided, if applicable,

   viii. Municipal Improvements to be constructed by the Developer as listed in the Development Agreement. All estimates are to include an allowance for Engineering and Contingencies.

*Note: The Town will **not** proceed with finalizing the Development Agreement if the Servicing Study has not been approved.*

2. Final Development Agreement Submissions

Following the review of the Draft Development Agreement, the Developer shall return the draft Agreement with comments regarding errors and/or omissions, if any, and provide the following information to the Engineering Services Department:

a. Copy of the applicable Alberta Environmental Protection and

Enhancement Act document(s) including Consulting Engineers cover letter to the Town:

i. Copy of the "Written Notification for Extension to a Waterworks, Wastewater, or Storm Drainage System".

ii. Copy of the "Application for Letter of Authorization for Storm Drainage Treatment Facilities".

AND / OR

iii. Completed Application Form and Guide for Registration to Construct and Operate a Municipal Storm Drainage System.

(See Clause 3 below for additional information regarding the noted EPEA Documents)

iv. Approval letter from Alberta Environment and Parks regarding wetland infill or modification.

b. Pavement Markings and Signage Drawings accepted and signed by the Traffic Engineer.

c. Landscape Drawings accepted and signed by Engineering Services.

d. Letter and plan from Canada Post illustrating proposed community mailbox locations within the Development.

(For additional information on community mailboxes see Clause 6 of this section.)

e. Letter from the Emergency Services Chief Safety Codes Officer, or designate, approving proposed hydrant locations, fire flows, and fire access.

f. Letter and plan from the Transit Department outlining future transit routes and bus stop locations.

g. Copy of accepted Temporary Traffic Control plan, if applicable.

h. Letters from the Shallow Utility companies approving the proposed alignments and utility right of way plan(s). *(See Section 12 for additional information.)*

i. Copies of applicable approved Crossing, Proximity, Excavation Permit and/or Encroachment Agreements.

j. Water Distribution System Flushing Drawing approved and signed by the Environmental Services Department.

k. Electrical Servicing Plans, where servicing is to be completed by a private Contractor, which conform to the requirements of Section 12; accepted and signed by the EL&P provider.

l. Proposed Development Schedule.

m. Confirmation letter of remediation completion or remediation certificate from AER (if applicable, where commercial or industrial activity may have environmental implications and has been identified in the Phase 1 Environmental Site Assessment).

n. Provide digital files per requirements of Section 2 - Drawing Standards.

C. PERFORMANCE AND MAINTENANCE SECURITY

The Engineer shall determine security requirements in accordance with the Terms and Conditions of the Development Agreement.

D. NOTICE TO PROCEED WITH THE CONSTRUCTION OF MUNICIPAL IMPROVEMENTS

The “Notice to Proceed” will not be issued until the Developer has provided the following:

1. 3 signed and sealed copies of the Development Agreement.

2. The Developer’s net initial payment amount, if applicable.

3. An Original Irrevocable Letter of Credit in accordance with the Development Agreement.

4. Evidence of insurance coverage in accordance with of the Development Agreement.

5. A copy of the Contractor’s Certificate of Insurance ensuring The Town of Olds is named as a Certificate Holder and additional insured.

Two copies of the Development Agreement and the “Notice to Proceed” will be sent to the Consultant once the Development Agreement has been signed by The Town. **Construction is not permitted to start prior to the issuance of a “Notice to Proceed”.**

At the discretion of the Engineer, a conditional “Notice to Proceed” may be issued as an interim measure due to extraneous circumstances. The conditional issuance does

not relieve the Developer of the responsibility to provide the aforementioned items in order to enter into the Development Agreement.

3. PROVINCIAL LEGISLATION

A. GENERAL

The Province of Alberta publishes standards and guidelines for municipal water supply, wastewater, and storm water drainage systems. Alberta Environment and Parks (AE&P) govern these Acts, Regulations, Codes, and Guides that municipalities are required follow. The primary Acts that affect municipal utilities and development are:

- The Water Act,
- The Environmental Protection and Enhancement Act (EPEA).

The Town of Olds is responsible to have its municipal water supply, wastewater, and storm water drainage systems designed to meet these Acts and amendments. As part of any development and/or construction project, other federal and provincial regulations will have additional requirements. Those Acts, Regulations, Codes, and Guides may be noted in the Sections throughout this document that pertain primarily to the subject of the Section. The Town does not guarantee all Federal and Provincial Acts, Regulations, Codes and Guides will be listed in this document.

It is the Consulting Engineer's responsibility to be familiar with the latest versions of the Federal and Provincial Acts, Regulations, Codes, and Guidelines that relate to their project.

Excepting the submissions regarding "Notification of Extension…" and "Letter to amend…Storm Drainage Permit" The Town of Olds may not allow construction to proceed until confirmation of the required EPEA and/or Water Act approvals have been provided by Alberta Environment and Parks. This may affect the issuance of a "Clearing, Stripping and Grading Permit" and "Notice to Proceed" for a Development Agreement.

B. WATER ACT

Under the Water Act the following Codes of Practice, Policy's and Standards governing municipal works may be found:

- Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems,
- Wetlands Policy,
- Codes of Practice: *(These have specific submission and approval requirements not included here.)*

    1. For Outfall Structures on Water Bodies,

2. For Watercourse Crossings,

3. For Pipelines and Telecommunications Lines Crossing Water Bodies.

i. **Wastewater and Storm Drainage Regulations 119/93**

This regulation governs the construction and operation of storm drainage treatment facilities.

"Storm drainage treatment facility", as defined in the Regulations, means any structure or thing used for the physical, chemical or biological treatment of storm drainage, and includes any of the storage or management facilities that buffer the effects of the peak runoff.

Note: The Regulations do not apply to storm water treatment units installed upstream of a storm water storage facility as these units are included in the Code of Practice for Wastewater (Sanitary Sewer and Storm) Collection Systems.

Alberta Environment and Parks, Central Region, uses a questionnaire style form for new Storm Drainage Treatment Facility registration (“Application Form and Guide for Registration to Construct and Operate a Municipal Storm Drainage System”).

The form and supporting documentation is to be completed by the Consultant and **submitted to The Town of Olds Engineering Services Department** for review and acceptance. The questionnaire is available on the Alberta Environment and Parks website.

ii. **Codes of Practice**

The design and construction of water distribution systems, sanitary sewer collection systems and storm drainage systems is regulated by the following Codes of Practice:

a. Waterworks System Consisting Soley of a Waterworks Distribution System.

   The Environmental Protection and Enhancement Act, RSA 2000, c.E-12, as amended and the Environmental Protection and Enhancement (Miscellaneous) Regulation, AR 118/93, as amended.

b. Wastewater (Storm Drainage and Sewage) Systems Consisting Solely of a Wastewater Collection System

   This above noted Code is made under the Environmental Protection and Enhancement Act, RSA 2000, c.E-12, as amended and the Wastewater and Storm Drainage Regulation, A.R. 119/93.

As specified in the above noted Codes, the Developer shall submit a "**Written Notification for Extension to a Waterworks, Wastewater, or Storm Drainage System**" for the water distribution systems, sanitary sewer collection systems and storm drainage systems. A copy of this notice is appended to this Section.

C. SUBMISSION OF APPLICABLE LETTERS AND FORMS

There are two forms required to meet Provincial regulations where The Town submits on behalf of the Consulting Engineering, all other applications are the responsibility of the Consulting Engineer.

a. The written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System, and

b. A Letter of Application for Authorization for an amendment to The Town of Olds Wastewater and Storm Drainage Permit,

(Note: The Wastewater and Storm Drainage Permit amendment is posted for a 30-day appeal period. The permit amendment will be issued following the appeal period. At the discretion of the Engineer, The Town may hold the issuance of permits for clearing, stripping, grading, and the Development Agreement until the appeal period has passed.)

The Consulting Engineer will provide the necessary supporting documentation and forms, filled out, signed and sealed as directed by the application. This information is to be provided to The Town electronically, in PDF format. The following is to be submitted:

a. An application letter (See Appendix A1 – Sample Application Letter),

b. A complete set of approved "Issued For Construction" drawings, on 11" x 17" page (50% reduction),

Once Engineering Services has received the documentation the following action will be taken by the Town and Alberta Environment and Parks:

a. The Town will add a confirmation letter and forward the documentation to Alberta Environment and Parks.

b. No further action will be taken by Alberta Environment and Parks (AEP) in regards to a "Written Notification for Extension…" application. Submission of the application, notice and confirmation letter by The Town is AEP's approval of the Work.

c. In regards to a "Letter of Authorization…" for an amendment to the Town of Olds "Wastewater and Storm Drainage Permit" application, AEP will issue an amendment to the existing storm water master registration number for new Storm Water Treatment facilities.

All of the above noted documentation may be included in the Development Agreement at the discretion of the Engineer or representative.

4. AGREEMENTS: CROSSING, PROXIMITY, ENCROACHMENT, EXCAVATION PERMIT

A. GENERAL

A Crossing, Proximity, Encroachment Agreement and/or Excavation Permit may be required if the Developer's proposed work and/or future municipal infrastructure requires crossing of and/or construction activity adjacent to the following:

- oil or gas pipelines,
- high pressure gas mains,
- overhead or underground telecommunications lines,
- overhead or underground power lines,
- creeks and rivers,
- streets or highways,
- railways, and/or
- other registered rights-of-way.

B. THE AGREEMENT

The Town and Third Party

This Agreement is written for when The Town will take **future** possession of the municipal infrastructure that has been constructed under a Development Agreement or Development Permit Development Agreement. This type of Agreement must contain an Assignability clause whereby the Agreement is between the Third Party and The Town and must be signed by The Town, NOT the Developer or representative. The Agreement must not contain any reference to the Developer or Consulting Engineer even though the Developer is responsible to ensure the agreement is prepared and administers the process.

At the time of The Town signing the Agreement it will issue a letter temporarily "assigning" the Agreement obligations to the Developer until the Developer receives an FAC for the infrastructure covered under the Agreement. The Town will notify the Third Party that the temporary assignment has ended.

The Developer will not be allowed to proceed with the construction of any Municipal Improvement until all approvals, if required, have been received and provided to The Town for inclusion in the Development Agreement.

The Assignability clause is not required for temporary agreements between the Developer and the third party or when the Town is the Developer or the agreement relates to a Town Capital Project contract.

C. APPLICATION PREPARATION

The Developer shall be fully responsible for the preparation and submission of plans and the necessary agreements to enter upon, cross over, or construct under said facility or right of way to the appropriate utility company or land-owner whose property and / or infrastructure is impacted by the development.

The Developer shall be responsible for the payment of all application fees, advertising costs, extra costs, damage claims, and/or insurance costs related to the noted agreements.

Applications shall be prepared as specified by the various approving agencies, minimally including the following information:

1. A covering letter outlining the type of Agreement required (crossing, proximity, encroachment, and/or excavation permit),

2. A drawing(s) (8 1/2” x 11” or 11” x 17” original size) the location of the proposed crossing, proximity, encroachment, and/or excavation, clearly marked in RED and highlighted,

3. Plan/profile drawing(s) is required for all crossings.

If an Encroachment Agreement is needed, the applicant shall provide a current up to date Certificate of Title.

D. SUBMISSION OF AGREEMENT TO THE TOWN

Prior to execution of the Final Development Agreement being executed, The Developer will provide the information required for the application(s) along with duly authorized Agreement(s), as outlined above. The application is to be provided to the Town in a PDF format.

Any temporary agreement a Developer may require does not need to be submitted to the Engineering Department (excepting for Town projects).

5. ROAD CLOSURES AND DETOURS

A. GENERAL

The Developer must submit an application for a road closure or detour to the Engineer at least three weeks prior to the start of any work.

The Developer will not be allowed to proceed with using or crossing a roadway, or construction of Municipal Improvements across a roadway, until all approvals, if required, have been received.

The closure/detour must be advertised in the local newspaper at least 48 hours prior to the start of any work.

All warning / construction signage must be in accordance with The Town of Olds Contract Specification – 01 58 99.

This clause also applies if construction is covered under a Development Permit Development Agreement, Town contract or Development Permit.

B. APPLICATION PREPARATION AND SUBMISSION

The Developer shall be fully responsible for the preparation and submission of plans and application for a road closure/detour to the Engineer to obtain the necessary permission to enter upon, cross over, or construct under said roadway.

The Developer shall be responsible for the payment of all application fees, advertising costs, extra costs, damage claims, and/or insurance costs related to the noted Agreement.

The application shall be prepared as follows:

1. A covering letter requesting approval to close all or part of a roadway.

2. Drawing(s):

    a. 8 ½” x 11” OR 11” x 17”,

    b. North Arrow, Location Title, Road Names,
    c. Extents of work area where detour or crossing to take place (highlighted with shading and outlined in RED),

    d. Extents of detour (one drawing showing detour route if more than one block and one half of a road is to be closed,

    e. Submitted in PDF format.

6. COMMUNITY MAILBOXES

A. GENERAL

The Consulting Engineer shall submit a copy of the Neighbourhood Area Structure Plan and a copy of the current subdivision plan along with a request for mailbox locations to:

Delivery Planning
Canada Post Prairie Region
Suite 839, 1100 – 49 Avenue NE
Calgary, Alberta T2E 9A9
Telephone Number (403) 974-2000

B. LOCATION CRITERIA

Canada Post has prepared a document entitled “Delivery Planning Standards Manual for Builders and Developers” which is available on the Canada Post website.

Canada Post will suggest the final location of Community Mailboxes (CMB) based on various criteria, including the effect upon the ratepayer who is immediately adjacent to the scheduled community mailbox location. The Town will decide on the final location of the CMB’s.

Upon receipt of the mailbox location plan from Canada Post, the Consulting Engineer shall ensure that the Community Mailbox locations conform to Delivery Planning Standards Manual for Builders and Developers and the following Town of Olds criteria, wherever possible.

Community Mailbox locations shall be set according to the following criteria:

1. Along the flank (side yard) of corner lots midway between the front and rear property lines.

   Note: Current design standards for local roadways allow for a 1.0 m boulevard (back of walk to property line); however, the width of the concrete pad for the Community Mailbox is 1.2 m (back of walk to back of pad). The length of the pad parallel to the sidewalk will vary depending on the number of modules to be located at any location. The Developer will be required to provide a 0.5 m easement along the side yard of a lot at these locations to allow for the encroachment of the Community Mailbox onto private property. Canada Post will confirm the final location of the mailbox pad with the Developer and/or property owner prior to installation.

2. Next to, or within, an open space or playground.

3. CMB’s grouping size to be limited by the number of addresses that are located within 500 m of the site.

4. CMB's to be arranged per Canada Post "mini-park standards" with preference to the boxes facing each other thus leaving the back side of the box to be decorated and displayed.

5. CMB's should not limit public viewing of the surrounding area (Crime Prevention Through Environmental Design).

6. Where CMB's are along a park trail, they are to be located at the intersection of the sidewalk and trail.

7. If the CMB's become located further down the trail the following conditions will apply:

   .a A parking lot is to be incorporated into the park area to accommodate the public stopping and walking to the mailbox and returning to their vehicle.

   .b The parking lot to be a minimum of 5 stalls, including a handicap stall.

   .c Lighting to be provided for both security and accessing of the boxes.

8. Location to consider ease of snow removal by mechanized equipment (access width, planting proximity, etc.).

9. Hard surface access and pad area required for the site.

10. On the predominantly homecoming side of the street, so that people can pick up their mail on the way home without crossing the street.

11. In The Town's boulevard, close to the sidewalk, to avoid creating small remnant grass areas.

12. Not along an expressway or arterial, as no parking is allowed on these roads.

13. No closer than 10 m from a fire hydrant or bus stop.

14. Not on a utility easement or over a utility trench (deep or shallow).

15. No closer than 3 m to streetlight standards, street name poles or any raised utility boxes such as a transformer.

16. The location of the boxes shall not impede the pedestrian nor impact vehicular sight distances.

17. Community mailboxes are normally installed within public road rights of way. Multiple unit developments, such as townhouses or condominiums, may have the community mailboxes installed within the boundaries of said private development lands. The Developer must enter into a Delivery Services

Agreement/License with Canada Post if this type of delivery is desired or required. The Developer should contact Canada Post for further information.

18. If a structure is proposed for the CMB's, the shelter may not contain solid walls and doors; lighting may be required depending upon the structure style and proximity to street lighting.

19. Approval of the Planning and Development department.

The Consulting Engineer shall advise Canada Post of the acceptability of the locations or suggest a revised location for consideration by Canada Post based upon the Town's criteria.

Following approval of the sites by Canada Post, the Developer shall prepare a dimensioned drawing, similar to the Building Grade Certificate Drawing, and forward it to Canada Post.

The Community Mailbox locations are to be shown on:

1. applicable construction drawings as noted in Section 2 – Drawing Standards,

2. Developer's sales brochures.

7. DEVELOPER'S SIGNAGE REQUIRED AT DEVELOPMENT

As part of a subdivision development project, the Developer is required to provide general public information signs. A representation of these signs is to be included on the Traffic Control Devices and Subdivision Signage drawing (see Section 2 – Drawing Standards). The information to be displayed on the sign is noted in the following clauses.

A sample of the signage required in this clause is included in Section 16 – Design Drawings, "Sample Information Signs".

A. SUBDIVISION MAP SIGNS

Subdivision Map Signs shall be installed on collector roadways at expressway/collector or arterial/collector roadway intersections. The signs should show the total area that uses the same prefix letter (i.e. Deer Park – 4 Quarter Sections). Subdivision maps (or revisions to same) shall conform to Public Works Department's standards. Information regarding the design of these signs is included in Section 16 – Design Drawings.

1. Roadway and Pedestrian Network Sign

The Roadway Network side of the sign shows the roadway outline of the subdivision providing relationship to the adjoining arterial roadways. The map is to display the following information:

a. Oriented north

b. Common subdivision name

c. Roadway names

d. “You are here” marker

In support of the Town’s elements of Accessibility, information being part of, where a Roadway Network sign is situated such that the back side of the sign faces or is easily accessible to pedestrian traffic, typically where there is separate sidewalk on the pedestrian side of the sign, a Pedestrian Network Map of the subdivision shall be provided.

The Pedestrian Network map is to display the following information:

a. sidewalks, trials, pathways,

b. green spaces (grey or colour toned shapes),

c. note where the Community activity centre is, if applicable,

d. note green spaces containing recreational facilities (playfields, playground equipment area etc.),

e. roadway names, and

f. other features that would be a typical destination point for foot or cyclist traffic.

Due to subdivision development being constructed in phases over a period of years, the addition of the Pedestrian Network to the Roadway Network is **only required at the time of the last Phase** of development, as part of the last update to the sign.

The Developer will be responsible for the costs associated to retrofit any existing Subdivision Map signs in their subdivision to meet this requirement.

2. Area Structure Plan Sign (ASP)

The purpose of this sign is to ensure that initial and subsequent homeowners are aware of the concept proposed for that area of the development of interest to them. The Area Structure Plan (ASP) signs are to be located on the collector roadways at the entrance to the subdivision, near the expressway or arterial roadway intersection.

The ASP sign is to be installed prior to the issuance of Building Permits and removed once the subdivision has been fully developed. The size, material, and construction of the sign shall be equivalent to the Roadway Network sign and shall

conform to the Public Works Department's standards. The following information is to be displayed on the sign:

1. The approved ASP / Land-use map,

2. The subdivision name, as approved by the Planning and Development Department,

3. The land-use zones, either in color with a legend OR black and white with land-use designation per block,

4. The Town's Planning and Development Department website information,

5. The Developer's website information (optional).

The Developer's corporate name and the Marketing name used for the subdivision may be displayed, but not as prominently as the subdivision name.

The Developer will be responsible to update the sign's information if a ASP amendment is passed by Council and provide general maintenance of the sign(s) until the subdivision is fully built-out or the Town has issued the last Final Acceptance Certificate related to the last Phase of the subdivision covered in the respective Development Agreement.

B. SUBDIVISION INFORMATION SIGNS

Subdivision Information signs provide the Public with contact information and provide general information regarding the subdivision. There are four signs under this category; Neighbourhood Park Site sign, Future School Site sign, general Information sign, and storm water pond warning sign.

1. General Information Sign

The purpose of this sign is to provide the public contact information of the Developer and Town Departments. The following information shall be displayed on the sign:

a. Developers contact information,

b. Town Departments (typically Planning and Development Department, Engineering Services), and

c. The Public, Catholic and Francophone school boards.

General Information signs shall be installed near the entrance to each new phase of Development along the collector roadway. As the subdivision develops they are to be moved to the principal access roadways to subsequent phases.

These signs may be removed upon the Town issuing the last Final Acceptance Certificate and takes full ownership of the subdivision as covered under the Area Structure Plan.

2. **Neighbourhood Park Site Sign**

Neighbourhood Park Site signs shall be installed near the boundary of the Neighbourhood Park Site, as designated in the Area Structure Plan. They are to indicating where the public may obtain information related to the parks development. These signs are to be maintained by the Developer until the Town has issued the Final Acceptance Certificate and takings ownership of the site. These signs may be removed once the site is fully developed.

3. **Future School Site Sign**

Future School Site signs shall be installed near the boundary of the future school site. They are to indicate where the public may obtain information related to the future construction of a school. These signs are to be maintained by the Developer until the Town has issued the Final Acceptance Certificate and takes ownership of the site.

Sign maintenance becomes the responsibility of the applicable school board after the subdivision development has been completed. These signs may be removed once the school site is fully developed.

4. **Storm water Pond Warning Sign**

Storm Pond Warning Signs shall be installed near the boundary of the storm water management facility (storm pond) indicating where the public may obtain information related to the storm water management facility operation. Minimally four signs shall be required (one per side) however more signs may be required depending upon the size and shape of the pond. Each maintenance access point may have a Warning sign adjacent to it, which may be in addition to the previous statement. These signs are to be maintained by the Developer until the Town has issued the Final Acceptance Certificate and takes ownership of the site; sign maintenance then becomes the responsibility of the Town.

C. TEMPORARY SIGNS FOR STREET NAMES

For new subdivisions only: once road access is available and prior to building permits being issued, the Developer is required to install temporary street name signage. This signage is to assist contractors, delivery companies, Emergency Services, and other party's in navigation through the new subdivision until the Town's approved street name signs are installed.

The signage is to be of a substantive material, easily replaced or repaired, and portable (to avoid surface construction activity) (e.g. poster board on 2x4-10' stack or sandwich board). The text sizing is to be similar to or larger than the Town's street name boards.

Installation and maintenance costs are the responsibility of the Developer. Engineering Services may withhold issuance of Construction Completion Certificates if this temporary signage is not installed.

D. FENCING FOR THE PROTECTION OF GREEN SPACES DURING HOME CONSTRUCTION

The Developer will be responsible for providing fencing to protect designated green space areas prior to home construction beginning. Green space area protection to be provided for:

- Environmental Open Space (EOS) – permanent decorative fence
- Municipal Reserves (MR) – permanent decorative fence
- Public Utility Lot (PUL) – permanent or temporary fencing

The permanent fence is to be of an acceptable material with long term durability and minimal maintenance. The permanent fence is to be wholly located within the private property (i.e. post, rail, screening etc.). A restrictive covenant is to be registered, by the Developer, against the individual lots containing the fence stating that the home owner is responsible for maintenance of the fence and, if required, any future replacement thereof.

The restrictive covenant is also to note that the fence is not to be removed permanently or replaced with a different style without prior approval from the Planning and Development.

Prior to permanent decorative fencing being installed, the Developer may install temporary fences in the interim. Temporary fencing is to conform to Town of Olds Contract Specifications.

8. OPTIONAL/ENHANCED AMENITIES FOR A SUBDIVISION

As part of creating a Theme, per the Neighborhood Planning and Design Elements, the Developer may want to enhance the subdivision by providing decorative structures. These structures are considered to be within the Level Four Enhanced Amenities definition of the Development Agreement.

The structures design and integrity are the responsibility of the designer (Consulting Engineer) and the contractor. The Town's review is limited to aesthetics, conflicts with utilities, sightlines, general layout, maintenance, compliance to Land-use bylaw etc. Section 13 – Road Design contains the design criteria and information required to support a proposal to use Optional/Enhanced Amenities.

1. GENERAL INFORMATION

This Section lists the requirements for the preparation and submission of Construction Drawings and Plan of Record Drawings and the digital requirements for each. All drawings shall conform to the general standards noted in Clauses 2, 3 and 4. Other sections in this publication may have additional drawing requirements noted within their specific section.

2. CONSTRUCTION DRAWING REQUIREMENTS

A. GENERAL

1. Individual plan drawings are to be prepared for each Municipal Improvement being constructed.

2. Street names shall be shown on all drawings for reference purposes.

3. The “Limits of Construction” shall be shown on all plan drawings.

4. All drawings will show a minimum “overlap” of 30 m beyond the Phase boundary to provide clarity of off-site conditions.

B. SHEET SIZE

Drawing sheet sizes to be as follows:

1. 560 mm x 864 mm (ANSI D, 22” x 34”) or

2. 610 mm x 914 mm, (Arch D, 24” x 36”).

C. TITLE BLOCK

Title blocks shall be placed along the right side or bottom of the drawing.

D. NORTH ARROW

Place the north arrow in the upper right-hand corner of sheet. The drawing should be oriented such that north faces up or to the right side of the sheet.

E. DIMENSIONS

All dimensions on plans and profiles are to be in SI metric units. Dimension notation to be consistent throughout the drawing set and appropriate to the actual size of the subject. (e.g. a detail will be labeled to ‘mm’ whereas a site plan will be labelled to ‘m’.)

1. **Accuracy**

    a. Design:

        i. 3 decimals for (centreline) lengths and elevations,

        ii. 2 decimals for grade,

        iii. 2 decimals for sidewalk, trails, and boulevard widths,

        iv. 3 decimals for other general dimensioning.

    b. Plan of Record:

        i. 2 decimals for all dimensions.

F. LETTERING

Lettering is to be an engineering style font (e.g. Arial). Vertical lettering is to be used for existing information and slanted (italic) lettering for proposed information. Discretion is to be used in selection of lettering size and line weight. Plotted lettering size should be legible at the scale of the drawing.

G. LINE WORK

Line weight and shape shading are to be used to differentiate between existing and proposed construction. Typically thinner line weights or lighter shading is used for existing information and bolder line work and darker shading for “proposed” information.

H. COLOUR USAGE

The use of colours for engineering drawings will be limited to presentation drawings or concept drawings. Construction drawings, issued for review, will be black and white. Text and line work must be of a quality that when reproduced in black and white the information is legible and symbols are discernible. The Original’s quality must be such that copies of the original maintain legibility and discernibility.

I. LEGEND

The symbols illustrated in the Appendix A - Digital Drawing Standards are to be used on the construction drawings to provide consistency for the preparation of Town record drawings.

J. DRAWING SCALE

The following scales are to be used for the preparation of the construction drawings. Exceptions will be noted for specific drawings.

1. A drawing scale of 1:1000 should be used for all **plan** drawings,
2. A drawing scale of 1:500 (h), 1:50 (v) should be used for all **plan/profile** drawings,
3. **Detailed** drawings will be at a scale of 1:100, 1:250 or 1:500.

Note: Engineering Services or other departments may reject a drawing for use of a non-typical scale.

K. CAD STANDARDS

*Note: All CAD drawing files submitted to the Town must conform to NAD'83 3TM projected coordinate system. The file **must** contain all layers as defined in Appendix A (Digital Drawing Standards) regardless of whether the layer contains an entity (element) or not.*

When submitting digital information (CAD, PDF, TIF) a transmittal form is to accompany it containing the following information:

1. Project Name,
2. Consultant's name,
3. Contract Number,
4. Graphic File Format (DWG),
5. CAD Version (e.g. AutoCAD 2014),
6. Projection: NAD'83 3TM,
7. List of CAD files submitted.

3. PLAN VIEW DRAWING REQUIREMENTS

A. COVER SHEET(S)

1. Name of subdivision or project, Phase number, and Year.
2. Names of Developer and Consulting Engineer (Logos optional),
3. A portion of the Town (either shown in block outline or as single line) showing the project location. The map scale is to be 1:25,000 and include a minimum of two intersecting arterial roadways. Arterial roadway names are to be shown on the map.
4. List of drawings,
5. Signature block, and
6. Limits of construction.

B. TENTATIVE LEGAL PLAN WITH EASEMENTS

1. Property Line work,
2. Lot and Block Numbers,
3. Lot dimensions,
4. Right-of-Way widths dimensioned,
5. Easement line work,
6. Easement dimension (and / or note for typical width),
7. Roadway names.

C. CLEARING, STRIPPING AND GRADING (CSG) DRAWING(S)

1. General Requirements:

a. Identify the owners of all lands adjacent to or within the clearing, stripping and/or grading area,

b. Identify intended CSG on adjacent lands, including details of edge conditions, back sloping requirements, and areas where topsoil is to be placed and/or seeded until natural conditions are restored,

c. Provide cross-sections, along adjacent lands, minimally at 200 m intervals and specifically where proposed ground and existing ground exceeds 300 mm difference in elevation change,

d. Provide cross-sections for temporary drainage swales showing basic dimension, longitudinal grades, and side slopes rates,

e. Show Phase boundaries; indicate the area expected to be developed during the current year and the type of soil stabilization proposed for areas to be developed in following years,

f. Any unusual site conditions (wells, structures, etc.) or contamination areas,

g. Existing utility rights of way (easements),

h. Existing survey control stations and markers,

i. Existing ground contours,

j. Proposed ground contours,

k. Test hole locations and original ground elevations at test hole locations,

l. Identify natural features that are to be preserved and/or removed,

m. Details of topsoil stockpiles; include height, width, length and volume,

n. Location of all existing utilities (e.g. water, sanitary sewers, storm sewers, gas, electrical, pipelines, etc.),

o. The means by which all storm water in and from the subject lands will be controlled and disposed of, including:

    i. How will the drainage from its natural route(s) be controlled?

    ii. What erosion and sediment control measures are to be installed?

p. Additional areas to note (particularly in existing developed locations):

    i. Work zone for equipment access,

    ii. Staging areas,

    iii. Storage areas.

2. **Cut/Fill Plans:**

   a. To show cut/fill design elevations and depth of cut or fill as applicable, for all clearing and grading projects.

   b. Recommended grid spacing is 15 m x 15 m, maximum grid is 20 m x 20 m. For more sensitive grading areas (e.g. sports field) a 10 m x10 m grid may be requested.

   c. Areas with fills ≥ 1.2 metre are to be highlighted on the drawing(s).

   Refer to Section 7 – Site Clearing, Stripping and Grading for additional information.

D. ROADS, LANES, AND WALKWAYS DRAWING

1. Street and/or Lane Name (e.g. Lane “A”),
2. Carriageway widths (FOC to FOC),
3. Sidewalk and/or appropriate curb & gutter type and width,
4. Boulevard widths,
5. Roadway V.P.I. elevations,
6. Roadway centre line length and grade between V.P.I.’s,
7. Direction of flow along roadways,
8. Vertical curve information (length and mid-ordinate difference in elevation),
9. Centreline curve radii. Table format is acceptable,
10. Lane and Public Utility Lot V.P.I. elevations,
11. Lane and Public Utility Lot distance and centre line grade between V.P.I.’s *(NOTE: additional information required for public greenspace may be found under the Landscaping Drawing)*,
12. Direction of flow along lanes and utility lots,
13. Drainage swales (concrete, grass, etc.) including grades,
14. Catch-basin manholes and catch-basins,
15. Erosion and sedimentation control measures,

16. Reinforced lane and/or driveway crossings,

17. Curb ramps,

18. Berms complete with top of berm grades,

19. Temporary access roads and/or turnarounds including grades and drainage flow direction information,

20. If storm water facility (pond) is applicable, access for maintenance vehicles,

21. And storm water facility's normal water level and high water level,

22. Walkways, including bollard locations,

23. Safety barriers & railings,

24. Cross-sections for all roadway designations,

25. Community Mailboxes,

26. Enhanced Amenities (e.g. subdivision entry feature, sound wall, etc.),

27. Transit Stops including the area of geo-grid reinforcement (or noted in the legend).

28. Where the proposed Development abuts an Expressway or Arterial roadway, the drawing limits shall include (minimally) the nearest (may be proposed) curb line of the expressway or arterial; preference would be for the entire road section of the expressway or arterial be shown at future intersections to provide context for traffic flow and show how the boulevard will integrate with the proposed subdivision.

Refer to Section 13 - Roadway Design for additional information

E. TRAFFIC CONTROL DEVICES AND SUBDIVISION SIGNAGE

1. Pavement Marking Drawing

a. Show existing and proposed sidewalks including curb ramps, roadway medians. For this drawing, this information is to be shown in a lighter tone than the proposed markings,

b. Show existing trail and pathways on-site (not part of project) and/or 30 m beyond the Phase boundary at the proposed connection point(s). For this drawing, this information is to be shown in a lighter tone than the proposed markings,

c. Traffic Control Signs,

d. Pavement Markings including parking stalls, bike lanes, arrows, etc., as applicable to the project,

e. Street Name Identification Signs,

f. Decorative Street Name Markers,

g. Subdivision Information Signs, *(see Section 1)*

h. Subdivision Map Sign, *(see Section 1)*

i. Detention Pond Warning Signs, *(see Section 1)*

j. NASP sign, *(see Section 1)*

2. Traffic Signal Drawing

a. Show existing and proposed sidewalks including curb ramps, roadway medians. For this drawing, this information is to be shown in a lighter tone than the proposed Signal, cabling and infrastructure required for the Signal

b. Show existing trail and pathways on-site (not part of project) and/or 30 m beyond the Phase boundary at the proposed connection point(s). For this drawing, this information is to be shown in a lighter tone than the proposed Signal, cabling and infrastructure required for the Signal

c. Show all existing and proposed municipal improvements located within and/or adjacent to the site. For this drawing, any utility shown, deep mains and shallow utility, are to be shown in a lighter tone than the proposed Signal, cabling and infrastructure required for the Signal,

d. Location of signal bases,

e. Signal structure dimensions and parts list,

f. Location of Control box,

g. Cabling runs, dimensioned alignment,

h. Junction boxes,

i. Timing plan & schematic.

Refer to Section 15 - Traffic Design for additional information.

F. OVERALL UTILITIES DRAWING

1. Water main and trunks including hydrant and valves. No text or identifiers required. Alignments to be dimensioned to property lines or survey pins/monuments.

2. Sanitary main and trunks including manholes. No text or identifiers required. Alignments to be dimensioned,

3. Storm main and trunks including manholes, catch-basin manholes, catch-basins, treatment units, outfalls, inlets, etc. No text or identifiers required. Alignments to be dimensioned,

4. Shallow utilities including duct crossings. No text or identifiers required,

5. Easements. No text or identifiers required,

6. Sidewalks, trails, curb lines, curb ramps, medians, community mailboxes, transit stops, and enhanced feature (structure). No text or identifiers required.

G. WATER DISTRIBUTION DRAWING

1. Invert elevation at all V.P.I.'s,

2. Distance, pipe size, pipe material (general note acceptable), and grade between P.I.'s,

3. Main alignments,

4. Hydrants and hydrant identification numbers,

5. Valves and valve identification numbers,

6. Fittings,

7. Insulated sections of mains, if applicable

Refer to Section 8 - Water Design for additional information

H. WATER DISTRIBUTION DISINFECTION AND FLUSHING DRAWING

Note: This drawing is a requirement of Contract Specifications - Section 33 11 17.

1. Show lot and block numbers for all lots,

2. Show hydrants and hydrant identification numbers,

3. Show valves and valve identification numbers,
4. Show receiving sanitary sewer manholes and manhole identification numbers,
5. Show proposed sequence of flushing, including valve opening and closing sequence.

Refer to Section 8 - Water Design for additional information

I. SANITARY SEWER DRAWING

1. Invert elevations at all manholes,
2. Rim to lowest invert depths,
3. Distance, pipe size, pipe material (general note acceptable), and grade between manholes,
4. Insulated sections of mains, as applicable,
5. Main alignments,
6. Direction of pipe flow,
7. Manholes and manhole identification numbers to conform to Town standards.
8. Identify Drop Manholes (interior/exterior),
9. Identify manholes requiring safety platforms, as applicable,
10. Sanitary calculation worksheet.

Refer to Section 9 - Sanitary Design for additional information

J. STORM SEWER DRAWING 'A' – MAJOR/MINOR SYSTEM

This drawing is to show the catchment area and sub-catchment areas that affect the immediate development phase. The drawing is to minimally include the information noted below; this information is a supplement to that provided per Section 5 - Servicing Study.

1. Major drainage routes,
2. Location of trapped lows including accurate extents of water ponding area and ponding depth,

3. Minor drainage catchment areas,
4. Minor drainage main alignments,
5. Direction of minor drainage pipe flow,
6. An Area, Volume and Discharge Table as described in Section 5 - Servicing Study for a storm water management facility, if applicable,
7. Natural overland drainage routes,

For catchment areas beyond the Phase boundary, the entire catchment area may be shown on the drawing or, if the area is too large for practical display, a note is to be added at the point(s) where this off site drainage contacts the Phase under consideration. The note is to state the area, discharge volume and rate of run-off that was used for the storm water calculations.

K. STORM SEWER DRAWING 'B' – MINOR SYSTEM

1. Invert elevations at all manholes,
2. Rim to lowest invert depths (MH depth),
3. Distance, pipe size, pipe material (general note acceptable), and grade between manholes,
4. Insulated sections of mains, as applicable,
5. Main alignments,
6. Direction of pipe flow,
7. Manholes, catch-basin manholes, and manhole identification numbers,
8. Identify manholes requiring safety platforms, as applicable,
9. Catch-basin type and identification numbers,
10. Catch-basin leads,
11. Underdrains,
12. Storm Water Management Facility (SWMF), including contours and utility infrastructure (e.g. pipes, outlets, treatment units, etc.) and if any enhancement

features are proposed (e.g. water fountain, dock for a wet pond or sports field for a dry pond), etc.,

13. SWMF normal and high water level, overflow route, free board elevation, etc.,

14. Access road to SWMF,

15. Erosion and sedimentation control measures, and

16. Storm water calculation spreadsheet.

Refer to Section 10 – Storm water Management for additional information

L. SHALLOW UTILITIES DRAWING / ELECTRICAL PLAN

As the shallow utilities are based on the alignments for power, the following information relates to the design of the electrical distribution system specifically. Once the other utility companies have provided their requirements a revised plan is required to incorporate all alignments of all the shallow utilities (power, telephone, cable television, and gas etc.).

(Note: Generally power, telephone, and cable TV are installed in a common trench however each utility may require separate right of ways).

1. Electrical Plan Drawing (Shallow Utility base plan)

a. Property lines, block numbers, lot numbers, and street names,

b. Primary and secondary cable runs, including, in symbol form, the number of cables to be installed,

c. URD pull boxes and service stub outs,

d. Transformers,

e. Street lighting,

f. Power supply and lighting for trails and enhanced landscaping features etc., where the Developer has indicated such,

g. Location of Community mailboxes,

h. Location of proposed Enhanced Amenities structure, if applicable. *(Note: For a definition of Enhanced Amenities structures refer to Section 13, Road Design.)*

i. Proposed utility right of ways (easements) to accommodate all shallow utilities, as applicable.

2. Switching Diagram

A preliminary switching diagram shall be provided as a separate drawing for each Development area, identifying feeder and distribution circuits, switching cubicles, and transformer numbers, etc. for the primary distribution system only, in accordance with EL&P provider's standards.

Refer to Section 12 - Shallow Utilities for additional information

M. LOT GRADING DRAWING

Drawn at a scale of 1:500 or 1:750 to better illustrate all of the following information:

1. Legal description (Lot and block number) for each parcel of land,
2. Civic (Municipal) address,
3. Elevations at front lot corners,
4. Elevations at rear lot corners,
5. Intermediate side yard elevations along property lines (See sample drawing in Section 16 - Drawings),
6. Service locations and invert elevations,
7. Insulated services, as applicable ,
8. Recommended lowest top of footing elevation,
9. Indicate lot drainage type for residential lot (e.g. A, B, C, L, W). Refer to Section 16-Drawings for lot grading and building grade certificate samples,
10. Show proposed lot drainage for multi-family, commercial or industrial sites with elevations, distances and grades,
11. Show proposed drainage for green spaces (i.e. municipal reserves, berms, public utility lot, park areas, etc.) specifically elevations that determine drainage patterns and courses (e.g. swale along a linear park, raised area in park for sports field, etc.) See Landscaping Drawing, below, for further information,
12. Location of power, telephone, and television service,

13. Location of hydrants, streetlights, transformers, switch gear cubicles, URD's, telephone pedestals, and cable television pedestals,

14. Location of community mailboxes,

15. Location of any No Parking zones,

16. Indication of areas where depth of fill exceeds 1.2 m and a note is to be added to the drawing stating a Load Bearing Certificate is required from a Geotechnical professional,

17. Show lots with proposed Restrictive covenants.

Refer to Section 11 – Service Connections for additional information

N. LANDSCAPE DRAWING

1. Show existing and proposed sidewalks, including curb ramps and roadway medians. For this drawing, this information is to be shown in a lighter tone than the proposed landscaping,

2. Storm water facility access for maintenance vehicles,

3. Show existing trail and pathways on-site (that are not part of this Phase's work) and/or 30m beyond the Phase boundary at the proposed connection point(s). For this drawing, this information is to be shown in a lighter tone than the proposed landscaping,

4. Show all existing and proposed municipal improvements located within and/or adjacent to the site. For this drawing, any utility shown, deep mains and shallow utility, are to be shown in a lighter tone than the proposed landscaping,

5. Show existing vegetation, significant topography, and natural encumbrances to be retained,

6. Show or identify existing land-uses adjacent to the Phase boundary (e.g. add note on drawing showing adjacent lot is C1 or commercial – single family residential is not required to be identified),

7. Show proposed community mailbox locations, transit stops, and other street furniture, etc.,

8. Show all proposed Level One landscaped areas (i.e. grass) including the boulevard and remnant areas that *will* be disturbed (e.g. along edge of area where trees were cleared),

9. Show conceptual tree and shrub planting areas (beds), including the boulevard,

10. Show conceptual layout of Level Three landscaping (i.e. park amenities) including trails, ensuring they connect all the proposed pedestrian amenities and activity areas within the development and adjacent neighbourhoods,

11. Provide a typical cross-section for those trails which are also intended to be used for vehicular access (e.g. emergency or maintenance access) in addition to pedestrians and cyclists,

12. Show proposed layout of recreational facilities (e.g. playgrounds, baseball diamonds, sports fields, buildings, rinks, tennis courts, etc.) to be installed in the larger green spaces (e.g. park and/or school site), or other designated green spaces with the necessary area requirements,

13. Where recreational facilities (as noted above) are to be constructed, typically the area is built-up above the finished ground; show proposed elevations and drainage grades for these built-up areas, (see also Detail Drawings in this Section)

14. Drainage pattern(s) in green spaces (MR's, PUL's etc.) are to be identified by showing corner elevations (as calculated on the Lot Grading Plan, see above item) with elevations, distance and grade descriptors, along swale and/or ridge lines.

    Note: If the development includes a Neighbourhood Park site, ***the drawing is to note*** *if the elevations shown are "finished" or "interim". As The Town; typically¸ is responsible to finish the site grading and construction of Level One, Two, and Three Landscaping, the "interim" elevations are to be 150 mm lower than "finished" elevation.*

15. The proposed tree and shrub species are to be identified on the drawing or detail for bedding areas. The species "common name", botanical name, and quantity are to be provided either on the drawing or in a table format. (See Section 14 – Landscaping appendixes for acceptable plant material).

16. Show proposed residential fencing where housing either sides or backs onto existing municipal reserve, environmental reserve or public utility lots. No private fence is allowed within MR's, ER's or PUL's.

17. Show proposed Optional / Enhanced Amenities (see Section 13 – Roads for description of Optional / Enhanced Amenity).

Refer to Section 14 – Landscape Design for additional information

4. PLAN PROFILE DRAWING REQUIREMENTS

A. GENERAL

The Plan Profile Drawing is divided into three parts, two plan views and one profile view.

B. TOP PLAN VIEW – SURFACE IMPROVEMENTS

The following information related to surface improvements should be illustrated in the top plan view:

1. Street and/or Lane Name (e.g. Lane “A”),
2. Carriageway widths (Face of Curb to Face of Curb),
3. Sidewalk and/or curb & gutter type and width,
4. Boulevard widths,
5. Roadway V.P.I. and H.P.I. elevations,
6. Roadway centre line distance and grade between V.P.I.’s,
7. Direction of flow along roadways,
8. Vertical curve information (length and mid-ordinate difference in elevation),
9. Face of curb radii, including all curb returns,
10. Lip of Gutter (L.O.G.) / Edge of Pavement (E.O.P.) elevations at the following locations:
    a. Vertical Points of Intersection (V.P.I.’s),
    b. Beginning of Vertical Curves (B.V.C.’s) and End of Vertical Curves (E.V.C.’s),
    c. Beginning of Horizontal Curves (B.H.C.), Point of Curve to Curve (P.C.C.’s) and End of Horizontal Curves (E.H.C.’s),
    d. Beginning (B.V.C.), Midpoint (M.P.) and End (E.V.C.) for all curb returns,
    e. Location and rim elevation of any catch basins.
11. L.O.G. grades for all curves,
12. Curb return grades,

13. Lane and Public Utility Lot V.P.I. elevations,
14. Lane and Public Utility Lot distance and property line grade between V.P.I.'s,
15. Direction of flow along lanes and utility lots,
16. Catch-basin manholes and catch-basins, including type and identification number,
17. Reinforced lane and/or driveway crossings,
18. Curb ramps,
19. Berms, complete with toe and top of berm grades and spot elevations,
20. Temporary access roads and/or turnarounds,
21. Trails and pathways, including bollard locations,
22. Optional / Enhanced Amenities, and
23. Reference drawing number(s) for adjacent sheets.

C. BOTTOM PLAN VIEW – UNDERGROUND UTILITIES

The following information related to underground utilities should be illustrated in the bottom plan view:

1. Property lines,
2. Main sizes, lengths, and alignments dimensioned to right-of-way,
3. Hydrant locations and identification numbers,
4. Hydrant flange elevation,
5. Valve locations and identification numbers,
6. Fitting sizes and locations,
7. Manhole and catch basin locations and identification numbers,
8. Catch basin lead sizes, lengths, and alignment,
9. Direction of flow (storm and sanitary mains),

10. Insulation, as applicable.

D. PROFILE VIEW

The profile view should be shown on the bottom half of the drawing and illustrate the following road and utility information:

1. Stationing for road, lane and/or utility lot centre lines,
2. Vertical point of intersection (V.P.I.) elevations for surface improvements,
3. Length and grade between V.P.I.'s for surface improvements,
4. Vertical curve information, if applicable,
5. V.P.I. elevations for water fittings and vertical bends,
6. Valve and hydrant ‘Tee’ location,
7. Vertical alignments of manholes,
8. Manhole rim and invert elevations,
9. Utility main lengths, sizes, materials, and gradients,
10. Insulation, drop manhole, safety platform, as applicable,
11. Oil and gas pipelines, power and / or communication concrete duct banks, etc.

5. DETAIL AND OTHER DRAWINGS

A. DETAILED PLANTING BED DRAWING

The planting bed detailed drawing is to be to a scale of 1:500 and show the following:

1. Specific location for all proposed plantings,
2. Size (height and calliper), botanical name, species names of all plant material and intended number of plants from each species indicated on a planting list and referenced to the specific plant location,
3. Mixture ratios and application rates for all grass seed and fertilizer,
4. Locations of all utility lines, services, and easements (refer to Section 16 - Drawings for a sample of a typical landscape and utility plan),

5. Existing and proposed elevations and grades including tie-in grades to existing adjacent parcels of land (refer to Landscape Drawing for more detail on grading information required).

B. DETAILED MUNICIPAL RESERVE LANDSCAPE DRAWINGS

The detailed drawing(s) for municipal reserves and park sites are to be at a scale of 1:500 and show the following:

1. Grading plan showing drainage patterns, tie-in grades and slopes annotation to adjacent land uses, existing site elevations, and storm water facility if applicable,

2. Existing vegetation to be retained,

3. Existing and proposed utilities and easements, including storm sewer and catch basin rim elevations for site drainage,

4. Baseball diamond and / or sports field layout, including proposed elevations and grading,

5. Multi-purpose play area / tennis courts including surface finish (e.g. asphalt), elevations, and grading for the “pad”,

6. Park furniture and playground structures indicating manufacturer and model number, edge material, pad finish material (e.g. paving stone, sand, asphalt) including proposed elevations and grading for the “pad”,

7. Design and specifications for the parking lot including, but not limited to:

    a. conceptual layout of parking spaces to verify the number of vehicles accommodated,

    b. finished elevations and grading with particular attention given to tie-in of adjacent green space and road grade,

    c. underground storm drainage design, if applicable (preference will be for surface drainage to the adjoining road)

8. Design and specifications for all trails including cross-section of non-typical trail (as provided in the Contract Specifications).

9. Design and specifications for the Community Shelter,

10. Tree and shrub planting details,

11. Plan and profile for paved trails in areas of significant ground contour change (e.g. escarpment).

C. DETAILED STORM WATER MANAGEMENT FACILITY LANDSCAPE DRAWINGS

Detailed plans shall be prepared for construction at a scale of 1:500 indicating the following:

1. Detailed grading plan showing side slope grades, drainage swale grades, the tie-in to grading on adjacent land uses, and existing site elevations,
2. Existing and proposed utilities and easements, including storm sewer mains, weeping tile drains and catch basins for site drainage,
3. Detailed design and specifications for any trails,
4. Show vehicle maintenance access route to and in pond area,
5. Tree and shrub planting details.
6. Show HWL and NWL
7. Outflow maximum and minimum design is to specified.

D. OPTIONAL / ENHANCED FEATURES DETAIL

See Section 13 – Roads for design information required for this detail drawing.

E. BUILDING GRADE CERTIFICATES

The following information shall be shown on the Building Grade Certificate:

1. Water, sanitary, and/or storm services location and inverts,
2. Insulation, if required,
3. Power, telephone, and cable television service location,
4. Sidewalk and boulevard width,
5. Utility rights of way (easements),
6. Lot surface elevations,
7. Intermediate side yard surface elevations,
8. Lot drainage type (refer to Section 16 – Drawings for types),

9. Add note if Restrictive Covenant is applicable,

10. Streetlights, hydrants, transformers, telephone and/or cable television pedestals, community mailboxes, and other surface improvements.

This information shall be provided in the form shown on the sample drawing included in Section 16 - Drawing 4.11 - New Residential Building Grade Certificate.

6. DRAWING SUBMISSIONS

A. SUBMISSION(S) FOR REVIEW

The following items shall be submitted for review:

1. Hard copy submission

a. Two complete sets of construction drawings, stamped and sealed, unbound, on bond media, to be sent to Engineering Services. *It will be the responsibility of Engineering Services to distribute drawings to the appropriate departments for their review and comment.*

b. One complete set of construction drawings, unbound, on bond media, shall be submitted to the Electric, Light, and Power provider, as it becomes necessary.

2. Electronic submission

A CD, DVD or USB containing the PDF file of the submission for review drawing set (including the plan/profile drawings, details etc.) which have the professional practice stamp and Consulting Engineer's signature inscribed.

B. "ISSUED FOR CONSTRUCTION" SUBMISSION

Upon receiving the various approvals of the preliminary construction drawings, the Consulting Engineer shall submit the following:

1. Hard copy submission

- Two sets of construction drawings, stamped and sealed, unbound, on bond media, and marked "Issued for Construction",

2. Electronic submission

- A CD, DVD or USB containing the PDF and TIF files of the submission drawing set (including the plan/profile drawings, details etc.) which have the professional practice stamp and Consulting Engineer's signature inscribed.

- A CD, DVD, or USB containing the CAD files, adhering to the requirements as defined in Clause 9 and Appendix A, of the following drawings:

  - water, sanitary and minor storm utility,
  - building grade plan (for curb stop location),
  - roads (includes concrete work, lanes),
  - pavement marking and traffic control signage,
  - landscaping

- An electronic copy of the technical manual for any treatment unit, or unique piece of infrastructure, that will require regular maintenance and is proposed to be, or was installed, as part of the construction project covered by the drawing set being submitted.

If the electrical utility is installed by a private contractor, a CAD file(s) will be required to be submitted to EL&P provider, and Engineering Services.

Note: The Consulting Engineer is not required to submit CAD plan/profile construction drawings.

7. CHANGES (REVISIONS) TO APPROVED CONSTRUCTION DRAWINGS

The Approved Construction Drawings form an integral part of the Development Agreement between the Developer and The Town or a Unit Price Contract between a Contractor and the Town.

If significant design changes are made following approval of the construction drawings and execution of a Development Agreement or Unit Price Contract, the Consulting Engineer shall submit revised construction drawings (on bond paper and in PDF format).

If a Development Agreement is involved, a cover letter is to be provided from the Consulting Engineer explaining the changes and why they are required and a note that previous drawings are superseded and are to be destroyed.

If a Unit Price Contract is involved the Consulting Engineer shall submit a "Change Order" in a format that is acceptable to The Town of Olds, explaining the changes and why they are required and a note that previous drawings are superseded and to be destroyed.

The Town's Engineer must approve the revised drawings when revisions are considered to be significant.

Examples of significant changes would include, but not limited to:

- revisions to site grading,
- revisions to drainage boundaries,
- changes to pipe sizes, grades, alignments, etc.,
- Addition and / or deletion of lot services, and
- changes to roadway grades, cross-sections, pavement structure, etc.

The revision(s) is to be identified on the (new / revised) construction drawing(s) by crossing out (strike through) the original information and adding the revised information in a red colour. When there is a large amount of revisions, a completely new drawing may be required to be submitted for review and approval.

When the revision is deemed minor by the Engineer, a PDF file is to be submitted; if the revision(s) is deemed major, a PDF file, CAD file including TAG data, if applicable, will be required.

Note: Due to electrical code and safety practices, revisions to electrical drawings have a modified process from what is shown above, these modifications are noted in Section 12 - Plan of Record.

8. SUBMISSION OF PLAN OF RECORD INFORMATION

Upon completion of the construction project the Consulting Engineer or project manager, on behalf of a Developer or Town project respectively, shall submit a complete drawing set, labeled "Plan of Record" and showing the "as-constructed" or "as-built" changes to the design based on field installation records. **All information, as outlined in this Section's clauses 3, 4 and 5, is to be as-constructed.**

Note: The Town will not release any C.C.C's, F.A.C's and/or security being held if the Plan of Record drawing requirements have not been met.

Note: Additional submission requirements are provide in Sections 12, 14, and 15.

A. AS-CONSTRUCTED TOLERANCES

The Plan of Record drawings are to note field changes as recorded however where elevation changes would result in a grade change difference of 0.01%, or an elevation change is within 10 mm of design it is acceptable to show the grade and elevation have met design.

B. AS-CONSTRUCTED NOTATION

All information on the construction drawings needs to be “as-constructed” or field checked to ensure the design was met. If the as-constructed field survey and inspection(s) shows the infrastructure is acceptable for Construction Completion requirements, the changes to the design at the time of construction are to be recorded.

C. COMPLETION DATE

The month and year of completion of construction shall be shown on all drawings contained within the Plan of Record set.

D. TIMELINE FOR SUBMISSIONS

Plan of Record information for each applicable municipal improvement shall be submitted with, or prior to, a Construction Completion Certificate (C.C.C.) application submission. Although not acceptable for C.C.C. approval, The Town recognizes that the Plan of Record information for roadways with curb & gutter may be submitted prior to road paving as the grades and cross section dimensions will have been established at this stage of construction, allowing for the calculation of the Plan of Record centre line grades, P.I. elevations and vertical curves.

E. HARD COPY SUBMISSION

One hard copy of each of the Plan of Record drawing pages of all the improvements, forming a complete drawing set, must be submitted on bond paper, professionally stamped, signed, dated and titled to indicate Plan of Record information.

Under some circumstances, the Engineer may accept a partial drawing set for C.C.C. issuance purposes. These drawing(s) may be issued electronically however prior to issuance of the final C.C.C. a complete drawing set, on bond paper will be required.

F. CAD SUBMISSION

The following plan drawings are to be submitted in CAD, adhering to the requirements as defined in Clause 9 and Appendix A, at time of C.C.C. application:

- water, sanitary and storm utility + TAG data per utility,
- building grade plan (for curb stop location),
- roads (includes concrete work, lanes) + TAG,
- pavement marking and traffic control signage + TAG,
- landscaping
- Shape files of all water, sanitary sewers, storm water sewers, and any other mapping.

Note: The Consulting Engineer is not required to submit CAD plan/profile construction drawings.

Submission medium shall be a CD, DVD, or USB device.

G. OTHER SUBMISSIONS

1. Building Grade Certificate

The Developer shall provide 2 hard copies of the relevant Building Grade Certificates for each lot in the Development. These drawing are to be submitted to Engineering Services and Planning and Development for review.

2. Service Location Form and Report

For each serviced lot within a development, a service location form is to be provided. A sample report form is included as Appendix B at the end of this Section. The service location report consists of all the forms, correlated to the roadway name, starting at the lowest numbered block and lowest numbered lot.

The Service Location Report is to be submitted as a PDF file at the time the Building Grade Certificate is submitted.

9. CAD DATA SUBMISSION

A. GENERAL

As part of The Town's Infrastructure Management System (IMS) certain CAD data submissions must strictly adhere to Town requirements as defined here and in Appendix A.

These requirements include the association of tag data to all entities (elements) that have attributes (i.e. slope, material, etc.) through block attributes and the inclusion of all layers as defined in Appendix A regardless of whether or not a given layer contains entities (elements).

The purpose of these requirements is to facilitate the importation of infrastructure data and associated attribution into the infrastructure database. Failure to comply with the requirements as defined in Appendix A may result in the rejection of C.C.C. applications.

The underground utilities require the attachment of tag data to various features. Because AutoCAD cannot attach attribute data to linear elements, the tag data is attached to the flow arrow. Therefore, flow arrows are required on the water system. Infrastructure features that require tag data include pipe, manholes, hydrants, valves, and catch basins.

B. DRAWING REQUIREMENTS FOR TAG DATA

The following information must be included in the CAD drawing for proper importing of data:

1. Pipes are to be drawn as a single continuous element from feature to feature (i.e. manhole to manhole, reducer to tee, bend to hydrant). Simple lines or line strings are preferred. Multiple pipes at a manhole should all connect to the centre point of the manhole.

2. Flow arrows are to be placed on all pipe segments for the water, sanitary, and storm systems. The insertion point of the arrow must be placed at the downstream end of the pipe, at approximately 2.5 m (scaled) from the end of pipe (i.e. to ensure that the flow arrows on sanitary and storm sewers are located on the outer edge of the manhole symbol).

3. Valves are placed on top of the water pipe. The water pipe is to be broken at the insertion point of the valve.

4. The dimension style should resemble the dimensions shown in Appendix A. Dimensioning should be dropped to primitive elements.

C. TAG DATA FORMAT

Appendix A - Digital Drawing Standards specify the AutoCAD Layer, MicroStation Level, Element Type, Cell or Block Name, the Tag or Attribute Field information, placement notes and illustrations for each improvement.

1. Tag data must contain only the required values with no units (i.e. 35.0 not 35.0 m; 200 not 200 mm; 0.45 not 0.45%),

2. Approved pipe material and class abbreviations for each improvement are listed on the bottom of the standards sheets,

3. Tags are to be named as shown in Appendix A.

Example: A flow arrow for a storm main having a description of "*45.23 – 200 mm PVC-DR 35 @ 0.15%*" would have the following tag or attribute set:

FIELD NAME	VALUE
Size	200
Material	PVC
Length	45.23
Slope	0.15
Class	DR 35
Upperz	880.15
Lowerz	880.08

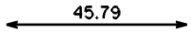
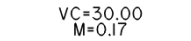
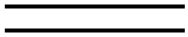
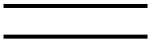
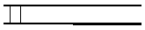
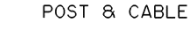
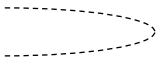
APPENDIX A

Digital Drawing Standards

ROADWAYS

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name
ROAD INFORMATION				
Road Grade 36.50 @ 0.60%	R1-road_grade	7	text	-
PI Elevation 885.03	R1-PI_elevation	5	text	-
PI Point +	R1-PI_point	57	cell/wblock	PI
Road Cross-Section 75 / 100 / 450	R1-X-section	17	text & line	-
Asphalt / base course / pitrun. Also identify areas where filter fabric is used.				
Boulevard & Median Width → ← 3.05 BV	R1-boulevard_dim	4	text & cell/wblock	DIMA
Carriage Width 12.00	R1-carriage_dim	3	text & cell/wblock	DIMA
Curb Line	R1-curb	1	line	-
Curb Cut	R1-curb_cut	30	line	-
Curb or Centre Radius RFC=13.00	R1-radius	10	text	-
Drainage Arrow	R1-drain_arrow	24	cell/wblock	DRARW
Edge of Road (no curb)	R1-edge_of_road	49	dashed line	-
Standard Curb Lip of Gutter	R1-gutterline	2	line	-
Exaggerate gutter width by 2 times. Gutterline is not shown for rolled curb.				
Median Curb	R1-median_curb	18	line	-
Median Gutter Line	R1-median_gutter	19	line	-

ROADWAYS

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name
ROAD INFORMATION				
Turning Bay Dimension 	R1-turnbay_dim	12	text & cell/wblock	DIMA
Vertical Curve 	R1-vertical_curv	8	text	-
SIDEWALKS AND TRAILS				
Back of Walk	R2-back_of_walk	47	line	-
Bike Trail 	R2-trail	21	line	-
Bike Trail Text 	R2-trail_text	22	text & cell/wblock	DIMA
Curb Ramp 	R2-ramp	13	cell/wblock	RPARA
Separate Sidewalk 	R2-sep_sidewalk	48	line	-
Sidewalk - Brick Inlay 	R2-sidewalk_bric	27	pattern/hatch	-
Sidewalk Text	R2-sidewalk_text	28	text & cell/wblock	DIMA
BARRRIERS				
Barrier Text 	R3-barrier_text	37	text	-
Berm 	R3-berm	25	line	-
Berm Text 	R3-berm_text	26	text	-
Concrete Barrier 	R3-barrier_con	32	cell/wblock	CBARR

ROADWAYS				
Item/ Symbol	**AutoCad Layer**	**MStation Level**	**Element Type**	**Cell/Wblock Name**
BARRRIERS				
Fence —x———x———x—	R3-fence	33	line & cell	X
Guard Rail	R3-guard_rail	42	line	-
Guard Rail Post	R3-guard_post	43	cell/wblock	GRP
Guard Rail End Post	R3-guard_endpost	44	cell/wblock	GRE
Retaining Wall	R3-retain_wall	36	line	-
DITCH				
Culvert	R4-culvert	20	line & cell	CUL
Ditch and Swale	R4-ditch	14	cell/wblock	DIT
Ditch, Swale and Culvert Text	R4-ditch_text	15	text	-
MISCELLANEOUS				
Miscellaneous Graphics	R5-misc_line	38	line	-
Miscellaneous Text	R5-misc_text	39	text	-
Property Lines	X-base	62	line	-
Registered and proposed lot lines				

Ensure:

- Proposed text is bold and italic (slanted); dimensions 2 decimal; elevations 3 decimal places
- As-constructed text is upper case, centre bottom justified, not italicized; dimension and elevations 2 decimal places
- All layers listed above **must** be included in the associated CAD file whether or not it contains entities (elements). Example: If a roadway CAD file does not include any Curb Cut entities, the file still must contain the R1-curb_cut layer.

WATER

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name	Tag/Attribute Field
WATER MAINS					
Pipe Description 14.56-150mm PVC-DR 18 @ 0.40%	W2-pipe_descript	4	text	-	-
	Format: length-diameter 'mm' material-class '@' slope'%'.				
Invert Elevation 881.57	W2-invert_elev	8	text	-	-
	Placed below the pipe. Use only 2 decimal places				
Bends, Tees & Crosses 200x150 TEE	W2-tees	15	text	-	-
	Pipe is broken at these points. Include 'LIVE TAP' text for tapping sleeve or saddle tap.				
Curve Information R=115.00	W2-curve_info	24	text	-	-
	Placed below the pipe and contains the radius, format 'R=15.00' . Radius is not required if the pipe follows a property line.				
Flow Arrow	W2-flow_arrow	9	cell/wblock	FLARW	size, material, length, slope, class, upperz, lowerz
	Placed once per pipe segment at the downstream end of the pipe.				
Grade Deflection	W2-grade_deflect	18	cell/wblock	UPI	-
	Pipe is broken at these points.				
Pipe	W2-pipe	1	dashed line	-	-
	Pipes are to be drawn as simple lines, line strings or polylines and can contain NO arcs. Each pipe is placed at the centre of the element. (ie. tee to tee.)				
Pipe Alignment 1.40	W2-pipe_align	3	text & cell/wblock	DIMA	-
	Dimension the shortest distance.				
HYDRANTS					
Hydrant	W1-hydrant	6	cell/wblock	HYD	fieldnum
Hydrant Valve	W1-hyd_valve	2	cell/wblock	HV	-

WATER

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name	Tag/Attribute Field
VALVES					
Air Release Valve 	W3-air_release	41	cell/wblock	ARV	fieldnum
Check Valve 	W3-check_valve	42	cell/wblock	CV	fieldnum
Valve	W3-valve	40	cell/wblock	VV	fieldnum
Valve Chamber 	W3-valve_chamber	43	line	-	-
Valve in a Manhole 	W3-valve_in_mh	44	cell/wblock	VMH	fieldnum
MISCELLANEOUS					
Encasements 	W4-encasement	22	cell/wblock	ENC	-
Insulation	W4-insulation	27	dashed line	-	-
Parks Service Box 	W4-ps_box	14	cell/wblock	PSB	-
Plug	W4-plug	10	cell/wblock	PL	-
Reducer 	W4-reducer	13	cell/wblock		
Misc Graphics	W4-misc_line	12	line	-	-
Misc Text	W4-misc_text	11	text	-	-
	CLASS A BEDDING', 'TEMP HYDRANT', 'EXISTING PIPE REMOVED' and other relevant information				
Property Lines	X-base	62	line	-	-
	Registered and proposed lot lines				

Ensure:

- Flow arrows **must** be included, tag information attached to.
- Flow arrows are placed 1.5m (true measure) from the low invert of the pipe.
- Pipes are drawn as lines, line strings or polylines.
- Valves used to isolate a hydrant to be shown as a hydrant valve, **not** a main valve.
- ***Proposed*** text is bold and italic (slanted); dimensions to 2 decimal; elevations 3 decimal places
- Pipe material and class are abbreviated as listed.
- Tag sets are **not** to include any units or symbols (e.g. mm or %) (Example: PVC-CL 150 pipe is labelled as PVC-DR 18)
- As-constructed text is upper case, centre bottom justified, not italicized; dimension and elevations 2 decimal places
- All layers listed above **must** be included in the associated CAD file whether or not it contains entities (elements). Example: If a water CAD file does not include any Check Valve entity, the file still must contain the W3-check_valve layer.

Material-Class
AC-CL 150
AC-CL 200
CI-MJ
DI-CL 50
DI-CL 51
DI-CL 52
PVC-DR 18
HPC 301-CL 12
HPC 303-CL 150

SANITARY

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name	Tag/Attribute Field
SANITARY SEWER MAINS					
Pipe Description 82.36-450mm C76-CL 3 @ 0.50%	S2-pipe_descript	4	text	-	-
	Format: length-diameter 'mm' material-class '@' slope'%'.				
Invert Elevation 881.57	S2-invert_elev	8	text	-	-
	Place text below the pipe				
Curve Information R=115.00	S2-curve_info	24	text	-	-
	Placed below the pipe and contains the degree, rad, delta, tangent. The information is not required when the pipe follows the property line				
Flow Arrow	S2-flow_arrow	9	cell/wblock	FLARW	size, material, length, slope, class, upperz, lowerz
	Placed on the low end of the pipe, approximately 0.5m from the end.				
Grade Deflection	S2-grade_deflect	18	cell/wblock	UPI	-
	Pipe is broken at these points				
Pipe	S2-pipe	1	dashed line	-	-
	Pipes are to be drawn as simple lines or linestrings (no arcs). Each pipe is placed at the centre of the element. i.e.. centre of manhole to centre of manhole.				
Pipe Alignment 1.40	S2-pipe_align	3	text & cell/wblock	DIMA	-
	Dimension the shortest distance				
MANHOLES					
Manhole	S1-manhole	5	cell/wblock	SMH	fieldnum, rimelev, baselev.
Manhole Dimension 1.40	S1-manhole_dim	7	text & cell/wblock	DIMA	-
	Only required when a manhole is not aligned with an adjacent property line				
MISCELLANEOUS					
Encasement	S3-encasement	22	lines & cell/wblock	ENC	-

SANITARY					
Item/ Symbol	**AutoCad Layer**	**MStation Level**	**Element Type**	**Cell/Wblock Name**	**Tag/Attribute Field**
MISCELLANEOUS					
Insulation	S3-insulation	19	dashed line	-	-
Lift Station	S3-lift_station	26	cell/wblock	LST	-
Plug	S3-plug	10	cell/wblock	PL	-
Misc Graphics	S3-misc_line	12	line	-	-
Misc Text	S3-misc_text	11	text	-	-
Property Lines	X-base	62	line	-	-
Registered and proposed lot lines					

Ensure:

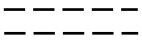
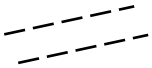
- Flow arrows are placed 1.5m from the low invert of the pipe.
- Pipes are drawn as lines, line strings or polylines.
- ***Proposed*** text is bold and italic (slanted); dimensions to 2 decimal; elevations 3 decimal places
- Pipe material and class are abbreviated as listed.
- Tag sets are not to include any units or symbols (e.g. mm or %). (Example: PVC-CL 150 pipe is labelled as PVC-DR 18)
- As-constructed text is upper case, centre bottom justified, not italicized; dimension and elevations 2 decimal places
- All layers listed above **must** be included in the associated CAD file whether or not it contains entities (elements). Example: If a sanitary CAD file does not include any encasement entity, the file still must contain the S3-encasement layer.

Material-Class
AC-XS
VCT-XS
C14-XS
C14-CL 1
C14-CL 2
C14-CL 3
PVC-DR 28
PVC-DR 35
PVC-DR 41
PVC-KF
PVC-PL
PVC-UR
PE-SER 60
C76-CL 2
C76-CL 3
C76-CL 4
C76-CL 5

STORM

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name	Tag/Attribute Field
STORM SEWER MAINS					
Pipe Description 82.36-450mm C76-CL 3 @ 0.50%	D2-pipe_descript	4	text	-	-
	Format: length-diameter'mm' material-class '@' slope'%				
Invert Elevation 881.57	D2-invert_elev	8	text	-	-
	Text is placed below the pipe				
Curve Information R=115.00	D2-curve_info	24	text	-	-
	Placed below the pipe and contains the degree, rad, delta, tangent. The information is not required if the pipe follows the property line.				
Flow Arrow	D2-flow_arrow	9	cell/wblock	FLARW	size, material, length, slope, class, upperz, lowerz
	Placed once per pipe segment at the downstream end of the pipe.				
Grade Deflection	D2-grade_deflect	18	cell/wblock	UPI	-
	Pipe is broken at these points.				
Pipe	D2-pipe	1	line	-	-
	Pipes are to be drawn as simple lines or linestrings (no arcs). Each pipe is placed at the centre of the element. ie. centre of manhole to centre of manhole.				
Pipe Alignment 1.40	D2-pipe_align	3	text & cell/wblock	DIMA	-
	Dimension the shortest distance				
MANHOLES					
Manhole	D1-manhole	5	cell/wblock	DMH	fieldnum, rimelev, baselev.
Catchbasin Manhole	D1-cb_manhole	6	cell/wblock	CBMH	fieldnum, rimelev
Manhole Dimension 1.40	D1-manhole_dim	7	text & cell/wblock	DIMA	-
	Only required when a manhole is not aligned with an adjacent property line				

STORM

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name	Tag/Attribute Field
CATCHBASINS					
Catchbasin – Standard 	D3-cb_standard	40	cell/wblock	SCB	fieldnum
Catchbasin – Rolled 	D3-cb_rolled	41	cell/wblock	RCB	fieldnum
Catchbasin Dimension 	D3-cb_dim	14	text & cell/wblock	DIMA	-
	Only required when the manhole is not in alignment with an adjacent property line				
Catchbasin Lead 	D3-cb_lead	13	line	-	-
	Leads are drawn from the centre of manhole to the origin of the catchbasin.				
MISCELLANEOUS					
Encasement 	D4-encasement	22	line & cell/wblock	ENC	-
Insulation 	D4-insulation	19	dashed line	-	-
Lift Station 	D4-lift_station	26	cell/wblock	LST	-
Outfall	D4-outfall	15	cell/wblock	OFSTR	-
Underdrain 	D4-underdrain	17	dashed line	-	-
Underdrain Text 	D4-underdrain_text	18	text	-	-
Plug	D4-plug	10	cell/wblock	PL	-
Misc Graphics	D4-misc_line	12	line	-	-
Misc Text	D4-misc_text	11	text	-	-

STORM					
Item/ Symbol	**AutoCad Layer**	**MStation Level**	**Element Type**	**Cell/Wblock Name**	**Tag/Attribute Field**
MISCELLANEOUS					
Property Lines	X-base	62	line	-	-
	Registered and proposed lot lines				

Ensure:

- Flow arrows are placed 1.5m from the low invert of the pipe.
- Pipes are drawn as lines, line strings or polylines.
- ***Proposed*** text is bold and italic (slanted); dimensions to 2 decimal; elevations 3 decimal places.
- Pipe material and class are abbreviated as listed.
- Tag sets are not to include any units or symbols (e.g. mm or %). (Example: PVC-CL 150 pipe is labelled as PVC-DR 18)
- As-constructed text is upper case, centre bottom justified, not italicized; dimension and elevations 2 decimal places
- All layers listed above **must** be included in the associated CAD file whether or not it contains entities (elements). Example: If a storm CAD file does not include any insulation entity, the file still must contain the D4-insulation layer.

Material-Class
AC-XS
VCT-XS
PVC-DR 28
PVC-DR 35
PVC-KF
PVC-UR
C14-XS
C14-CL 1
C14-CL 2
C14-CL 3
C655-85D
C76-CL 2
C76-CL 3
C76-CL 4
C76-CL 5
C655-85D
C655-100D
C655-115D
C655-145D
C655-150D
C655-170D

TRAFFIC MARKING AND SIGNAGE

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name
PAINTED LINES				
Solid Centre Line	T4-solid_pnt_c	31	line	-
Broken Centre Line	T4-broken_pnt_c	31	broken line	-
Solid Lane Line	T2-solid_pnt_l	21	line	-
Broken Lane Line	T2-broken_pnt_l	21	broken line	-
Edge Line	T2-edge_pnt_l	21	line	-
Intersection Guide Line	T2-turning_pnt_l	21	dashed line	-
Stop Bar	T8-stopbar_pnt	26	line	-
Crosswalk Line	T8-pedest_pnt	33	line	-
Cross Hatching	T2-hatch_pnt_l	28	line	-
Cross Hatching	T4-hatch_pnt_c	32	line	-
PERMANENT LINES				
Solid Centre Line	T1-solid_perm_l	1	line	-
Broken Centre Line	T3-broken_perm_c	11	broken line	-
Solid Lane Line	T3-solid_perm_c	11	line	-
Broken Lane Line	T1-broken_perm_l	1	broken line	-
Edge Line	T1-edge_perm_l	1	line	-
Intersection Guide Line	T1-turning_perm_l	1	dashed line	-
Stop Bar	T7-stopbar_perm	6	line	-
Crosswalk	T7-pedest_perm	13	line	-
Cross Hatching	T1-hatch_perm_l	8	line	-
Cross Hatching	T3-hatch_perm_c	12	line	-

TRAFFIC MARKING AND SIGNAGE

Item/ Symbol	AutoCad Layer	MStation Level	Element Type	Cell/Wblock Name
PAINTED SYMBOLS				
Straight Only Arrow	T6-straight_pnt	24	cell/wblock	STD
Left Turn Only Arrow	T6-left_pnt	24	cell/wblock	LTN
Right Turn Only Arrow	T6-right_pnt	24	cell/wblock	RTN
Straight / Left Turn Arrow	T6-st_left_pnt	24	cell/wblock	LST
Straight / Right Turn Arrow	T6-st_right	24	cell/wblock	RST
Merge Arrow	T6-merge_pnt	24	cell/wblock	MERGE
PERMANENT SYMBOLS				
Straight Only Arrow	T5-straight_perm	4	cell/wblock	STD
Left Turn Only Arrow	T5-left_perm	4	cell/wblock	LTN
Right Turn Only Arrow	T5-right_perm	4	cell/wblock	RTN
Straight / Left Turn Arrow	T5-st_left_perm	4	cell/wblock	LST
Straight / Right Turn Arrow	T5-st_right_perm	4	cell/wblock	RST
Merge Arrow	T5-merge_perm	4	cell/wblock	MERGE
PAINTED TEXT				
Directional Markings	T6-dir_text_pnt	25	text	-
Painted Stop Bar	T8-stopbar_text	27	text	-
Painted Crosswalk	T8-pedest_text	29	text	-
PERMANENT TEXT				
Directional Markings	T5-dir_text_perm	5	text	-
Stop Bar	T7-stopbar_text	7	text	-
Crosswalk	T7_pedest_text	13	text	-

TRAFFIC MARKING AND SIGNAGE				
Item/ Symbol	**AutoCad Layer**	**MStation Level**	**Element Type**	**Cell/Wblock Name**
REGULATORY SIGNS				
Sign Location 	T9-sign_location	39	cell/wblock	SIGN
Stop Sign 	T9-stop_sign	40	cell/wblock	STOP
Yield Sign 	T9-yield_sign	40	cell/wblock	YIELD
MISCELLANEOUS				
Property Lines	X-base	62	line	-
	Registered and proposed lot lines			

Ensure:

- All layers listed above **must** be included in the associated CAD file whether or not it contains entities (elements). Example: If a traffic CAD file does not include any Stop Sign entity, the file still must contain the T9-stop_sign layer.
- Broken lines are to be drawn to scale.

SERVICE LOCATION FORM

Subdivision	*Country Meadows Estates*
Civic Address	*15 Country Boulevard*
Legal Description	Lot *1* Block *2* Plan *003-0000*
Consulting Engineer	*XYZ Consulting Ltd.*
Contractor	*ABC Construction Ltd.*
Service Completion Date	*dd/mm/yy*

1. SERVICE CONNECTION DETAILS

Item		Water Service	Sanitary Service	Storm Service
Location of Service from Side Property Line		*4.75m N of S*	*5.05m N of S*	*4.45m N of S*
Location of Curb Stop		*1.72m E of W*		
Service Size (mm)		*25 mm*	*150 mm*	*100 mm*
Type of Material (e.g. Copper, PE or DR28		*PE*	*DR 28*	*DR 28*
Water, sanitary and/or storm invert at curb stop location (m)		*887.79*	*887.93*	*887.88*
Service Information				
a. Saddle	(Y/N)	*N*	*Y*	*Y*
b. Killed	(Y/N)	*N*	*N*	*N*
c. Main Stop	(Y/N)	*Y*		
d. Insulated	(Y/N)	*N*	*N*	*N*
e. Riser	(Y/N)		*Y*	*Y*
f. Service into Manhole	(Y/N)		*N*	*N*
g. Inspection Manhole	(Y/N)		*N/A*	*N/A*
If insulated, specify type, size, and dimension of insulation:				

2. STATUS OF EXISTING MAINS

Item	Existing Water Main	Existing Sanitary Main	Existing Storm Main
Main Location (e.g. Lane, PUL, Street, etc.)	*Lane*	*Lane*	*Lane*
Main Size	*200 mm*	*200 mm*	*375 mm*
Main Material (e.g. DR18, DR35, Ultra-rib, etc.)	*DR 18*	*DR 35*	*Ultra-Rib*

Report Prepared By *John Doe, P.Eng.& Engineering Stamp* — Consulting Engineer

Month dd, yyyy — Date

1. GENERAL INFORMATION

This Section describes the engineering services to be provided by a Consulting Engineer relative to the construction, installation, and inspection of Municipal Improvements as listed in a Development Agreement for private development projects or in an Engineering Agreement for Town Projects.

The Consulting Engineer, as per the definition in Section 1 of this document, is expected to be the primary contact and overall project manager in relation to private developments. The Consulting Engineer is to provide a professional level of design, field oversight, and inspection services.

As part of the Consulting Engineer's overall project management, all submissions (e.g. technical reports, drawings, etc.) shall be stamped and signed by the Consulting Engineer. The Permit to Practice number is only required for the **final** document submission.

If other professional persons have provided their expertise to the project (e.g. authored a report, designed a specific part of the project, etc.), which they have been assigned to take responsibility for, their professional stamp and signature shall be provided on the document. The Consulting Engineer will be required to sign the document or provide a signed transmittal to show verification that the submission meets the Town's requirements and purpose that it is intended.

It shall be the responsibility of the Consulting Engineer to determine if inspections and/or testing in excess of the levels specified in the Contract Specifications are necessary, and to so advise the Developer and the Engineer.

Once the projects construction is completed, the Consulting Engineer's work concludes with the signing, stamping and sealing of the certification statement on the Construction Completion Certificate and Final Acceptance Certificate and The Town issuing an accepted certificate.

2. CONSULTING ENGINEER / TOWN RELATIONSHIP

A. PRIVATE DEVELOPMENTS

There is no direct contractual relationship between the Consulting Engineer and the Town for private development projects. However, as the Consulting Engineer is the authorized representative of the Developer, the Engineer has the right to request that the Developer, through the Consulting Engineer, correct deficiencies as the Engineer observes them. It is understood and agreed that the Developer is and shall remain responsible to the Town for full and proper performance of all obligations and Work included in the Development Agreement.

The Engineer may, as specified in the Development Agreement stop the construction and installation of the Work.

Should the Developer for any reason not fulfill the obligations of the Development Agreement, abandon the Project, not complete the works, or elect not to correct the deficiencies identified by the Engineer or the Consulting Engineer, the Consulting Engineer shall not be held responsible to complete the Project.

B. TOWN DEVELOPMENTS / PROJECTS

For Town Developments and Projects, there is a direct contractual relationship between the Consulting Engineer and the Town as defined in an Engineering Agreement. Any directions to the Consulting Engineer shall be as specified in the Engineering Agreement.

Any directions to the Contractor will be as specified in the Unit Price Contract Document.

3. DOCUMENTS AND SCHEDULES

a. The Consulting Engineer, prior to commencement of construction, shall be completely familiar with:

   1. The Town of Olds Design Guidelines,

   2. The Town of Olds Contract Specifications,

   3. The Development Agreement for the Private Project, or

   4. The Engineering Agreement, and

   5. The Request for Proposal Contract (Best Value) for Town Projects.

b. The Consulting Engineer shall notify the Engineer when and where all work, construction, and maintenance on underground utilities, overland drainage facilities, parks, and other surface improvements are to be performed and shall advise the Engineer of all changes to the Work schedule.

c. Notification by the Consulting Engineer shall be by letter or e-mail (operations@olds.ca) at least 48 hours prior to commencing construction (re-notification is required after 48 hours of construction inactivity), excluding Saturdays, Sundays, and Holidays. The notification shall include the following information:

   1. Name of Developer,

   2. Subdivision Name and Phase Number,

   3. Type of inspection (utility, subgrade, concrete structures, gravel placement, parks development, landscaping, etc.),

4. Start-up date and time,

5. Contractor's name, Superintendent's name, and phone numbers.

4. PRE-CONSTRUCTION AND SITE MEETINGS

The Consulting Engineer shall schedule and attend a pre-construction site meeting with the Contractor(s) and the Engineer, which shall address work progress, schedule, coordination items, and safety issues as applicable.

The Consulting Engineer shall schedule regular site meetings with the Contractor and the Engineer as the work is in progress for the purpose of addressing ongoing coordination items as applicable and shall maintain recorded minutes of these meetings.
The Consulting Engineer shall supply the following documentation to the Engineer in a timely manner:

a. Minutes of the pre-construction site meeting,

b. Minutes of the site meetings,

c. A copy of the Contractor's proposed schedule,

d. Copies of change orders as applicable.

5. DOCUMENTATION

A. GENERAL

The Consulting Engineer shall prepare Construction Completion Certificates and Final Acceptance Certificates as required and have any maintenance deficiency items dealt with expeditiously.

1. **Private and Town Developments**

Construction Completion and Final Acceptance Certificates for Developments are to be submitted as detailed in, and on the form appended to, the Development Agreement. Copies of these Certificates are available at Engineering Services.

2. **Town Developments / Projects**

Seasonal Completion Certificates, Substantial Completion Certificates, Construction Completion Certificates, and Final Acceptance Certificates as they pertain to the RFP contracts for Town Developments and projects are to be submitted as detailed in the RFP Contract Document.

As Town Subdivision development requires a Development Agreement (DA), there is potential for warranty conflicts between the DA and RFP/Unit Price Contracts. Typically, the intent for warrantee periods is to align the warranty periods requested by the Development Agreement with the warranty period in the Contract, however in certain situations, this may not apply (e.g. multi-year contracts, front servicing, etc.). In those cases, two separate warranty periods may apply whereby the Developer may be responsible for the extended warranty period and not the contractor.

B. REPORTING OF DEFICIENCIES BY THE ENGINEER

Any deficiencies observed by the Engineer during construction are to be brought to the attention of the Developer (if a Development Agreement is involved) and / or the Consulting Engineer as they are observed, in writing, as soon as possible. The Consulting Engineer will notify the Engineer with a minimum of 48 hours notice, excepting weekends and holidays, when the deficiency is to be corrected.

C. MATERIALS COMPLIANCE

All materials supplied and installed shall comply in all respects to The Town of Olds Construction Specifications.

If the Contractor proposes to use materials not approved in the current Town of Olds Contract Specifications, the Developer shall retain the services of an accredited testing company to conduct material compliance testing.

The Consulting Engineer shall obtain the certified results of tests conducted for submission to and approval by the Engineer.

To assist in identifying the basic information that Engineering Services will require to complete a product review, a general check list is provided in the Contract Specifications, Section 01 61 10.

Depending upon workload, season, etc. a preliminary review will be conducted of the submitted information, checking that it provides the minimal information as outlined in Specification 01 61 10, within a week of the initial submission. If that review is satisfactory Engineering Services will continue with a more in-depth review, which will include requesting comments from other Departments who will be maintaining the product. The complete process may take up to three months plus.

If the Town does not approve the product, but accepts it for testing (field trial or limited use) the Department that has accepted the product for testing will govern the requirements and specifications. Testing requirements are to be included as Supplementary Conditions in the Development Agreement, Unit Price Contract or Development Permit, as applicable.

If the Town accepts the product, Engineering Services will provide a letter confirming the acceptance. Although a product may pass a testing phase, it does not mean the

Town will automatically accept it. Products not listed in the Town's Contract Specifications do not necessarily mean the product is not acceptable; products will be reviewed on a case-by-case basis.

The Contractor will not be permitted to install any material not approved by the Engineer.

Note: Engineering Services, when solicited by a salesperson regarding a new product related to the municipal engineering field, shall follow the above reviewing procedure except that a consulting engineer may not be involved.

D. TESTING FREQUENCIES

The following is a summary table of the minimum required testing frequencies for all construction projects in the Town of Olds.

Test	Minimum Test Frequency
Backfill Soil	
Standard Proctor	1 per material type
Field Densities - Trench	2 tests per 600 mm of depth per 100 m of trench
Road Base/Subbase/Subgrade	
Standard Proctor/Sieve for Granular	1 per material type
Field Densities - Grading Fill	1 test per 250 m^3
Field Densities - Subgrade Preparation	1 test per 1000 m^2
Field Densities - Subbase	1 test per 3000 m^2
Field Densities - Base	1 test per 1000 m^2
Asphalt	
Field Marshall	1 test per 1000 tonne
Cores	1 core per 1000 tonne
Concrete *(See Specification 03 05 13 for further testing details)*	
Strength, Slump and Air Content Testing	1 per 50 cubic metres
Compressive Strength Testing	3 specimens (1 for 7 day; 2 for 28 Day)

These frequencies may be amended through a Development Agreement, Unit Price Contract or Construction Specification.

Front Servicing has modifications to this table; refer to Section 13 – Roadway Design, Clause 5.D.

6. CONSTRUCTION INSPECTION

A. GENERAL

Regardless of a project being private or Town, inspections shall be carried out by the Consulting Engineer to ensure conformance with the Contract Specifications and Drawings. The Town has the right to inspect all sites to ensure conformance.

Inspections are required at key times before and during the Project. The Consulting Engineer is responsible for determining the site supervision and inspection requirements and how these inspections are to be provided.

The Engineer shall be given a minimum of 48 hours notice when requesting a joint inspection with the Consulting Engineer and/or Contractor.

Failure to notify the Engineer may require all work to be exposed for an inspection at the Contractor's expense.

Note: For a front street serviced area, the Consulting Engineer will provide full time inspection during trench and backfilling operations.

B. INSPECTION CHECK LISTS

Appended at the end of this Section are Construction Inspection Checklists for various construction activities. The Check Lists provide an overview of the work to be completed by a Site Inspector in conjunction with the Work specified on the Drawings and in the Contract Specifications.

The checklists are not intended to be a complete comprehensive list, but rather are to be used as a general guideline by the Consulting Engineer prior to and during construction of the various Municipal Improvements.

Project specific requirements of the Drawings and Specifications will require additional inspections and shall take precedence over any comment included in the Check Lists.

7. POST CONSTRUCTION SERVICES

A. ACTIVITY PRIOR TO ISSUANCE OF A CONSTRUCTION COMPLETION CERTIFICATE

The Consulting Engineer shall inspect the Work with the Contractor, record any deficiencies, and advise the Contractor to repair any deficiencies. After the Contractor has repaired the deficiencies, the Consulting Engineer shall arrange for a joint inspection with the Contractor and the Engineer. For both private and Town development projects, the Consulting Engineer shall apply for a Construction Completion Certificate as detailed in Development Agreement.

Where the Consulting Engineering is under contract to the Town (Engineering Agreement), all related outstanding change orders and deficiencies are to be resolved and any omissions are to be approved by the Engineer prior to forwarding any Construction Completion Certificates to the Engineer.

The Construction Completion Certificate application shall be accompanied by the following documentation. Further explanation / detail regarding these items are outlined throughout this document and the Development Agreement, or Engineering Agreement and Unit Price Guide.

1. **Underground Utilities**

    a. Letter documenting completion of successful water pressure testing, flushing, and disinfections.

    Note: Bacteriological Water Samples are to be conducted within the 2 weeks prior to water commissioning. If the Bacteriological Report date and the date of the field inspection for water Construction Completion do not fall within this time frame, the Town Inspector may reject the water inspection and / or request new bacteria testing.

    b. Plan of Record drawings,

    c. Copy of video inspection log reporting deficiencies and corrective action taken, and

    d. Letter of compliance covering compaction and materials testing.

2. **Surface Improvements**

    a. Plan of Record drawing,

    b. Letter of compliance covering compaction and materials testing, and

    c. Documentation of any deficiencies, which may have payment reductions as per the Contract Specifications.

Note: Construction Completion Certificates for Landscaping, Power, and Traffic must also be approved by the Engineering Services), respectively. See specific Sections in this document for further information.

B. ACTIVITY SUBSEQUENT TO ISSUANCE OF A CONSTRUCTION COMPLETION CERTIFICATE

The Consulting Engineer shall conduct periodic checks of the project, covered under a Development Agreement, or Unit Price Contract, during the maintenance period and

note any failures, settlements, or other deficiencies in the Work, as well as respond to any public concerns forwarded by The Town.

C. ACTIVITY PRIOR TO ISSUANCE OF A FINAL ACCEPTANCE CERTIFICATE

Regardless of the Consulting Engineers' Client (or project), prior to the submission of the Final Acceptance Certificate, the Consulting Engineer and the Contractor shall conduct an inspection of the Work and shall record and repair all deficiencies.

Once all deficiencies have been corrected, the Consulting Engineer shall request a joint inspection with the Contractor and the Engineer of the Works referred to in the Final Acceptance Certificate.
The Consulting Engineer shall prepare a list of the deficiencies from this joint inspection, if further deficiencies are noted, and submit the list to the Engineer.

When the additional deficiencies have been corrected, the Consulting Engineer shall then, within a reasonable period of time, request from the Engineer a re-inspection of only those items noted as being deficient in the prior inspection.

Clearing and Stripping Checklist		
Item		Completed Or Not Applicable
General		
	Review plans for all site conditions. Check for encroachments to be removed and notices to adjacent property owners, if required.	
	Check limits of work and make sure they are clearly staked in accordance with the plans.	
	Check location and protection of all survey markers and monuments.	
	Check where and what action is to be taken when contaminated land and/or infrastructure has been identified in an Environmental Site Assessment.	
	Determine and protect structures, trees and other improvements that are to remain.	
	Locate all utilities and other substructures. Pipelines and conduits should be uncovered as specified by the specific utility company.	
	Local depressions or holes caused by grubbing or removals must be filled and compacted before any subsequent grading or fill operations begin.	
	Check for proper haul roads and permits.	
	Check for contractor's authority to stockpile or dispose of material on private or Town property. Check for spillage and dust on public roadways and take corrective measures.	
	Check for drainage, erosion control and protection of adjoining property from damage or loss of lateral support.	
	Has a herbicide been applied to the finished surface in the proper proportions and rate of application, where required by the Specifications?	

Site Grading Checklist		
Item		Completed Or Not Applicable
General		
	Review Clearing and Stripping Checklist.	
	Check for seepage and other latent conditions that might affect the foundation of the fill.	
	Report unsuitable foundation conditions to the Contractor for investigation.	
	Order survey to establish ground lines for payment purposes.	
	Are organic materials removed and surfaces scarified? Are benches cut into existing fill to tie in new fill?	
	Check for adequate drainage. Do not permit ponding of water in new fill.	
	Check for haulage conditions on public roadways; spillage and dust control.	
	Test for optimum moisture content range for adequate compaction.	
	See that compaction tests are performed at an early stage to verify contractor's method.	
	Observe the operations and verify the uniformity of spreading, mixing, lift thickness and moisture control.	
	Check for uniformity of compaction effort, equipment used, coverage and number of passes.	
	Evaluate adequacy of equipment; quantity, type and condition.	
	Be sure the mixing equipment (plows, discs, etc.) are adequate to break up and mix soil and distribute moisture uniformly.	

	Observe earth under roller for movement and signs of excess moisture. Have contractor rip and aerate, if necessary.	
	Watch for changes in fill material.	
	Order sufficient compaction tests to evaluate quality. Remember that good fill construction results and fewer tests will be required when the material is uniform, the moisture is uniform (at or near optimum), and the compacting method and procedure are uniform.	
	Have all areas and lifts that have failed been reworked and retested satisfactorily?	
	Observe the finished surfaces, contours and slope rounding for appearance, drainage and other requirements.	
	Order survey to check for conformity and payment quantities.	

Erosion and Sediment Control Checklist		
Item		Completed Or Not Applicable
General		
	Have erosion and sediment control plans been approved by the Engineer?	
	Are temporary and permanent erosion and sediment control devices being installed as required?	
	Has the contractor provided for standby crews for emergency work?	
	Have retention and desilting basins been promptly dewatered and cleaned following a rainfall event?	
	Do you have the contractor's emergency telephone number?	

Water, Sanitary and Storm Main Checklist		
Item		Completed Or Not Applicable
Preliminary		
	Check plan requirements, utilities and other substructure (ducts) pipe materials, joints, and bedding. Are shop drawings required?	
	Has Water Flushing Plan been approved by Public Works Department staff.	
	Are road closures required for connections to existing mains?	
	Are connections to existing mains being made by Contractor or other Forces?	
	If required, are temporary traffic signs, delineators, and barricades in place?	
	Are utilities (gas, electrical, telecommunications, etc.) marked by the respective companies? Have their depths been confirmed by hydrovac or other approved means?	
	Have Crossing, Proximity, Ground Disturbance and/or Encroachment Agreement(s) been received? Field copies available?	
	Is construction surveying complete? Is off-set distance sufficient for protection of hubs? Grade sheets on job-site? Are off-sets correct for alignments approved on drawing set?	
Trenching		
	Does trench comply with Alberta Occupational Health and Safety requirements for slope and protection?	
	Check for maximum trench depth.	
	Line and grade control satisfactory?	
	Does actual soil condition agree with geotechnical report? Is approved shoring	

	method adequate for the actual trench condition?	
	Is spoil pile clear of trench?	
	Check subgrade. Is it granular or will imported bedding material be required?	
	Check trench for evidence of unconsolidated fill. If in trench bottom, it may require additional excavation and backfill with select material. If located above pipe invert, it may require additional compaction.	
	Is temporary support of existing utilities and improvements being provided? In the event of damage, are the owners promptly notified?	
	Are sufficient ladders provided? Check AOH&S requirements.	
Pipe Laying		
	All loose soil removed from the trench?	
	Required granular bedding material and thickness provided? Shaped to cradle pipe?	
	Excavation provided for projecting bells?	
	Method of transferring line and grade into trench accurate?	
	Provisions for increased bedding at locations where maximum trench width is exceeded?	
	Pipe handling satisfactory? Not being damaged?	
	Is ground water being controlled adequately (not allowed to enter pipe)?	
	Jointing of pipe satisfactory? Gaskets and contact surface lubricated as required?	
	In-place pipeline checked for line and grade?	
	Has additional bedding (if required) been placed alongside and under haunches of the pipe after laying? Is the bedding rodded or spaded so that it completely fills all the space in the trench?	
Backfill and Compaction		
	Is backfill material placed in lifts and compacted as specified?	
Manholes, Structures and Catch basins		
	Is excavation size sufficient for working room? Sloped back or shored?	
	Is grading for bottom of excavation completed properly? All loose earth removed, firm and unyielding?	
	Is bedding material properly placed and compacted?	
	Are stubs set to correct alignment and inverts?	
	Are rungs aligned properly? Spaced and located as per specifications?	
	Check frames and covers for compliance. Does cover seat in frame without rocking?	
	Are all joints and openings sealed properly?	
Miscellaneous and Testing		
	Water disinfection and testing procedures completed in accordance with specifications?	
	Sewer cleaning and testing completed in accordance with specifications?	

Trenchless Pipe Installation Checklist		
	Item	Completed Or Not Applicable
General		
	Have all required crossing permits been obtained?	
	Does the contractor have a Safety Program for the tunneling operation?	
	Has a pre-construction meeting been held prior to beginning of any tunnel work?	
	When a trenchless technology is proposed, has the Consulting Engineer	

	provided additional soil information and reports?	
	Have the contractor's shop drawings for jacking pit bracing, shaft bracing, and tunnel supports been approved?	
	Is the contractor's plan for monitoring ground movement submitted to the Consulting Engineer for approval prior to beginning any tunneling or jacking operation?	
Pipe Installation		
	Is the supplied pipe designed for the trenchless technology proposed and does it meet dimensional tolerances?	
	Has the contractor implemented the approved plan to monitor groundwater?	
	Is the jacking force monitored to ensure that the maximum is not exceeded?	
	Is the unlined portion of lined RCP being oriented at the bottom (invert) when less than 360^{o} of liner coverage is specified?	
	Have spacers been properly installed?	
Back Packing and Grouting		
	Are tunnel supports back packed as soon as possible after loss of ground occurs?	
	When grouting of voids around the outside face of the pipe is required, is the method of placement and mix design approved by the Consulting Engineer?	
	Has the contractor's method to prevent pipe shifting or flotation been approved by the Consulting Engineer?	

Service Connection Checklist

Item		Completed Or Not Applicable
Preliminary		
	Check plan requirements, utilities and other substructure (ducts) pipe materials, joints, and bedding.	
	Are connections to existing mains being made by Contractor or other forces?	
	If required, are temporary traffic signs, delineators, and barricades in place?	
	Are utilities (gas, town, telecommunications, etc.) marked by the respective companies? Have their depths been confirmed by hydrovac or other approved means?	
	Is construction surveying complete? Off-set distance sufficient for protection of hubs? Grade sheets on job-site? Are off-sets correct for alignments approved on drawing set?	
Trenching		
	Does trench comply with AOH&S requirements for slope and protection?	
	Check for maximum trench depth.	
	Line and grade control satisfactory?	
	Check subgrade. Is it granular or will imported bedding material be required?	
	Is temporary support of existing utilities and improvements being provided? In the event of damage, are the owners promptly notified?	
Pipe Laying		
	All loose soil removed from the trench?	
	Required granular bedding material and thickness provided? Shaped to cradle pipe?	
	Excavation provided for projecting bells?	
	Method of transferring line and grade into trench accurate?	
	Provisions for increased bedding at locations where maximum trench width is exceeded?	

	Pipe handling satisfactory? Not being damaged?	
	Is ground water being controlled adequately (not allowed to enter pipe)?	
	Are connections to mains properly made?	
	Jointing of pipe satisfactory? Gaskets and contact surface lubricated as required?	
	In-place pipeline checked for line and grade?	
	Has additional bedding (if required) been placed alongside and under haunches of the pipe after being laid? Is the bedding rodded or spaded so that it completely fills all the space in the trench?	
Backfilling and Compaction		
	Sanitary and storm sewer services checked for cross connection? Stubs painted proper colors?	
	Have as-constructed invert elevations and locations been obtained prior to start of backfilling?	
	Has location of standpipe and end of service stubs been properly marked? Has corporation cock been turned on?	
	Is backfill material placed in lifts and compacted as specified?	
	Have test results and other reports been forwarded to the Engineer?	

Concrete Work Checklist

Item		Completed Or Not Applicable
General, Before Placing Concrete		
	Check drawings and specifications and review with contractor.	
	Check for completion of site work and grading; completion of underground construction; and utility clearance before beginning concrete work.	
	Check Subgrade. Firm and on grade? Any base material required? Elevation proper for thickness required?	
	If required, check forms. Rigid? To correct alignment? Elevation?	
	Joints laid out and expansion joints installed, if required.	
	Curing compound and spray equipment on job.	
	Check finishing tools.	
Extruded Concrete Work		
	Check alignment and off-set before start of work.	
	Check extruding machine and mold; does the mold form conform to the specifications?	
	How will grade be controlled? Check wire line for sensor or track setting.	
	If a crawler type is used, check smoothness of subgrade (machine sensor cannot correct for rough grade); check transverse grade (should be level for the operating width of the machine).	
	Check extruded shape for accuracy (use level and rule); check for sag before concrete sets; check alignment.	
	Check cross-slope.	
Concrete Placement and Finishing		
	Are weather and temperature suitable for pouring concrete as per Contract Specifications? (Cold weather requirements being used, as required?)	
	Subgrade dampened prior to concrete placement?	
	What finishes are required?	
	Finishers and equipment on job are sufficient for work to be done?	
	Check delivery tickets and observe concrete mixture as it is being placed. Is the type of concrete correct? From approved source? General appearance and	

	consistency satisfactory?	
	Check slump and prepare compression test cylinders as required.	
	Is concrete being deposited properly? Without segregation? Spaded, tamped or vibrated?	
	Spreaders being removed as concrete is placed in curb?	
	Curb alignment checked after front face is stripped and curb straightened while still plastic? Check back edge for alignment.	
	Check sidewalk finishing sequence; spaded at face of form or header; screed and tamped; bull floated and edged; steel floated? Check for surface humps and hollows? Edge sloped down?	
	Additional toweling of sidewalk after water sheen has disappeared? Broom finish timed for proper texture?	
	Expansion joints located and edged?	
	Construction joints installed and edged?	
	Check cross slope.	
After Placing and Finishing		
	Curing compound applied at specified rate?	
	Work properly barricaded to protect finished concrete?	
	Notices to adjacent property owners to avoid vehicular/pedestrian traffic over fresh concrete?	
	Site cleaned up?	
	Have test results been forwarded to the Engineer?	

Geotextile and Subgrade Check List

Item		Completed Or Not Applicable
Preliminary		
	Is the fabric of the specified type and thickness?	
	Is each lot clearly identified and accompanied with a test certificate from an approved testing laboratory?	
	Is the fabric in good condition, free of shipping and handling damage, and is it wrapped in a protective envelope?	
	Has the fabric been properly stored in a clean, dry place or if outdoors, stored at least 0.3 m above the ground? Is it protected from exposure to ultraviolet (sunlight)?	
	Has the fabric been re-covered while in storage?	
	Are fabric rolls being handled properly in transporting to site or while being installed in the field?	
Subgrade Preparation		
	Has the subgrade been shaped to the proper section? Is it free of rocks or other sharp objects that could puncture the fabric?	
	Has all vegetation been removed from the area and the subgrade sterilized?	
	Is there standing water or mud in any area where fabric is to be placed?	
	Are anchor trenches properly located and of the proper depth?	
Fabric Installation		
	Has the fabric been stretched taut to eliminate major wrinkles, but not to the extent that there is no provision for shrinkage?	
	Are the panels properly aligned with the specified lap at adjacent joints?	
	Have the seams been heat welded and do they meet the specified tensile strength?	
	Are all tears, punctures or scuffed areas properly repaired?	

	Has aggregate fill over the fabric been properly placed, spread and compacted?	

Roadway and Lane Subgrade, Sub-base and Base Checklist		
	Item	Completed Or Not Applicable
	Is all underground construction complete? Deficiencies corrected? Concrete work?	
	Locate manholes and valves to be brought to grade or to be plated over during Subgrade and base construction.	
	Check plan requirements for existing soil foundation preparation and stabilization, sub-base and base. Thickness? Density?	
	Grade stakes set? Check for protection and setting of hubs by contractor.	
	Review requirements and procedure with contractor. Sources of sub-base and base materials; soil stabilization method, if required; material tests and approvals; compaction tests.	
	Check for soil movement and under rollers and hauling equipment to detect soft spots. Backfilled trenches may not be sufficiently dried out and ready for sub-base and base construction.	
	Are all pockets of soft or yielding material ripped up and dried out or replaced with suitable material?	
	Is existing soil processed to required depth and at Subgrade for sub-base? Watered; ripped; disked and mixed; large rocks removed; rolled to required density; required grade, cross section and smoothness tolerance; and tested?	
	Imported sub-base or base material sampled from material delivered to site? Test results okay?	
	Maintain adequate dust and noise control during all grading operations.	
	Watch for changes in grading of material and appearance of all types of sub-base and base material (imported or jobsite processed); and if warranted, order additional sampling and testing.	
	Watch for degradation during spreading operations.	
	Check for adequacy and uniformity of operations; moisture control and mixing; lift thickness; compaction effort (coverage and number of passes of equipment).	
	Collect delivery tickets for weight payment, if required.	
	Test for compacted density of sub-base material and base.	
	Have test results been forwarded to the Engineer?	
	Check finished base surface for grade, cross section and surface smoothness as specified in specifications.	
	Check contractor's provisions for protection of finished base course surface. Do not permit base to dry out prior to being covered with a finish surface (prime coat or asphalt).	
	Have approved erosion control devices been installed at/in catch basins to prevent silt infiltration?	

Asphalt Checklist		
	Item	Completed Or Not Applicable
Preliminary		
	Check drawings and specifications for pavement type, thickness, number of courses, method of payment, and other project paving requirements.	
	Inspect base course surface. Has surface been checked for grade, cross section and compaction? Is it firm, hard and unyielding?	
	Are weather and temperature suitable for paving as per Contract Specifications?	
	Is all underground construction complete? Deficiencies corrected?	
	Are manholes and valve boxes marked?	
	Are contact surfaces and joints prepared? Existing pavement trimmed? Surfaces cleaned? Tack coat applied to gutter edges, pavement joints?	
	Review procedures and requirements with contractor.	
	Overlay of existing pavement required? Check fills for variations and thickness to determine necessity for leveling course. Check for broken pavement that should be removed.	
	Gutter and other concrete strength okay to lay pavement against.	
Delivery of Paving Mixture		
	Does delivered material meet the requirements of the job? Truck beds free of holes and depressions? Equipped with tarpaulins (when required)? Compatible with paver? Beds covered with an approved bond breaking agent and properly drained?	
	Check for truck spillage of mix on base or previous lift.	
	Collect delivery tickets for weight payment, if required.	
	Check temperature periodically. If bottom dump trucks are delivering and windrowing the mix, check temperature in windrow ahead of pickup by paver. Stop asphalt placement if temperature drops below minimum for laying.	
Spreading Operation		
	Is direction of spreading satisfactory (generally in same direction as traffic)?	
	Check operation of spreader. Thickness of mat being laid? Lane width okay? Joint overlap?	
	Check surface appearance of mat behind spreader. Uniformity of texture; evidence of degradation or poor mixing?	
	Check handwork at joints. Is overlapped material being laid pushed back into mat with lute?	
	Check for source of irregularities in surface and require correction. Try to minimize hand raking. When depressions are corrected, surface must be loosened and material added and graded, preferably with a lute. High spots loosened, excess material removed and area graded.	
	Stop delivery from plant if weather conditions warrant. Permit pave- out of remaining material if possible.	
	Have test results been forwarded to the Engineer?	
Traffic Control Marking and Signage		
	Has the Traffic Control Marking and Signage plan been approved?	
	Has the Public Works Department been advised that seasonal or all roadwork	

	is complete and ready for signage and/or marking?	
	Have Street Identification signs been installed?	
	Have all information signs been installed?	
	Have the Subdivision Map signs been installed / amended?	

Landscaping - General Check List		
Item		Completed Or Not Applicable
Site Preparation and Topsoil Placement		
	Has the area been graded to the approved grades on the Lot Grading Plan?	
	Has wetland substrate been separated from other stripped material?	
	Have all ponding areas been repaired?	
	Has any erosion damage been repaired?	
	Does the new landscape area tie into existing landscaping? (includes garages)	
	Is the area to be landscaped excavated to the proper depth and scarified for topsoil placement?	
	Is the area to be landscaped graded to required dimension below curbs and/or walks?	
	Is the source of topsoil approved?	
	Is the mixture and preparation of the topsoil in accordance with the requirements?	
	Is the topsoil backfill consolidated with the areas to receive planting not excessively compacted?	
	Has a weed control program been implemented?	
	Verify layout of major plant materials and adjustment to field conditions.	

Level One Landscaping Check List		
Item		Completed Or Not Applicable
Seeding		
	Has the seed mixture been approved? Does it comply with the specifications?	
	Has the proper fertilizer been applied at approved application rate?	
	Has the proper seed coverage been achieved?	
	Is seed germinating properly?	
Sodding		
	Is the finished surface even?	
	Have the edges been knitted in?	
	Does the new sod blend into existing landscaping?	
	Is the area being watered as specified?	

Level Two Landscaping and Collector Roadway Tree Planting Check List		
Item		Completed Or Not Applicable
	Do the tree locations conflict with other improvements?	

	Have the plant (shrub) materials been approved, checked and recorded?	
	Do the plants have any diseases, insect damage?	
	Are the trees approved, tagged and of the proper size?	
	Complete a fertilizer and spoil amendment check for type and class required.	
	Does the preparation of topsoil meet specified requirements?	
	Are the tree holes of the size, depth, and shape required?	
	Has strapping, wire and/or burlap been removed?	
	Are the trees staked and properly tied as specified?	
	Are root barriers required for tree wells?	
	Are tree grates flush and tight to adjacent walk?	

Level Three Landscaping Check List		
Item		Completed Or Not Applicable
Fencing		
	Has fencing been installed?	
Pathways/Hard surfaces		
	Alignment/location correct?	
	Acceptable slopes?	
	Defects/ponding?	
	Base structure correct and tested?	
	Asphalt tests?	
Play Equipment		
	Equipment layout as per approved plans?	
	Adequate safety zones?	
	Protruding concrete bases/anchor bolts?	
	Equipment height to specifications?	
	Correct base depth?	
	CSA Certificate of Compliance?	
	Manufacturer's warranty?	
Parks Amenities		
	Have benches been properly installed?	
	Are garbage receptacles in place?	
	Have all other amenities been installed as per the drawings?	

Level Four Landscaping Check List (Optional Subdivision Amenities)		
Item		Completed Or Not Applicable
General		
	Have special amenities been approved by Engineering Department?	
	Have maintenance agreements been negotiated?	

1. INTRODUCTION

This section highlights various reports and provides the basic technical Engineering standards and guidelines that may be required depending upon what the application is for and how it relates to existing Town infrastructure.

2. ENVIRONMENTAL SITE ASSESSMENT (ESA)

The Town is responsible to ensure that the land to be developed is suitable for the proposed land use (e.g. commercial, industrial, and residential). Environmental Site Assessments are used to determine the environmental condition of the property and the site's suitability for the development proposed.

An Environmental Site Assessment is required for any situation where contamination on or adjacent to the subject site poses a current or future environmental concern to the Public. The level of ESA required will vary depending on circumstance with each level building on the previous.

A. DEFINITIONS

1. Phase I ESA

A Phase I Environmental Site Assessment is a non-intrusive, historical evaluation of a site, intended to determine the potential of contamination on the site. A complete Phase I Environmental Site Assessment is a requirement for all proposed developments at the Neighbourhood Area Structure Planning stage. This is required to be prepared in accordance with accepted guidelines, practices, and procedures that include, but are not limited to, those outlined in the Canadian Standards Association Publication titled "Phase 1 Environmental Site Assessment – Z768-01", and where applicable, those outlined in Alberta Environment and Parks publication No. T/573 titled "Phase I Environmental Site Assessment Guidelines for Upstream Oil and Gas Sites".

2. Phase II ESA

A Phase II Environmental Site Assessment is an intrusive assessment intended to determine and characterize potential site contamination and to compare the concentrations of the contaminants to current relevant regulatory guidelines. This report shall be prepared in accordance with accepted guidelines, best practices, and procedures that include, but are not limited to, those outlined in the Canadian Standards Association Publication titled "Phase II Environmental Site Assessment - Z769-00

3. Remediation Plan

The purpose of remediation is to mitigate site contamination. Once samples from a site meet the applicable guidelines the site is considered remediated. Where

applicable, remediation certificates shall be applied for with the appropriate regulatory agency and submitted to The Town.

4. **Risk Management Plan**

Where site remediation is not possible a Risk Management Plan shall be developed and implemented to protect the public from contaminants of concern. The plan will achieve this goal by managing exposure pathways to separate receptors from contaminants.

B. TRIGGERS AND TIMING

1. A Phase I ESA report is required for an Area Structure Plan (ASP) approval, or if applicable, where environmental issues have not been considered in the past at subdivision, re-designation of land use or Development Permit application stage.

2. A Phase II ESA **is** required when:

   a. The Phase I ESA indicates contamination exists, or

   b. There is a likelihood that contamination exists, or

   c. There is insufficient information to determine the likelihood of contamination existing on site, or

   d. Historically the site contained or had an oil or gas operation / infrastructure,

   e. Historically the site contained or had an environmentally hazardous operation / infrastructure (e.g. railway yard service area),

   f. The site currently operates or contains environmentally hazardous materials (e.g. gas station),

   g. The site contains high concentrations of substances which, due to the concentration, become harmful to the environment (e.g. salt storage).

   h. The Phase I ESA indicates potential issues / impacts as a result of adjacent properties and to identify the impacts of the adjacent properties on the subject site

   i. The Town has reason to suspect a potential issue relating to the site or adjacent sites.

   If there is an identified need for a Phase II ESA, it will be required prior to a Stripping and Grading Permit being issued.

3. Remediation and / or Risk Management Plan are required when the Phase II ESA indicates that there is a requirement for remediation or risk management. The report(s) shall document how the site will be remediated and / or the risk managed to a level suitable for the intended development. Final confirmation testing and reporting will be required to verify remediation has taken place.

   Note: *No development permits will be issued for the contaminated land area (including a buffer zone if required or requested) until the affected lands are remediated. (Refer to Section 7 – Clearing… for further information).*

C. ENVIRONMENTAL SITE ASSESSMENT REPORTS

1. General

Environmental Site Assessments, Remediation and Risk Assessment Reports for development of a site shall include but not be limited to the following:

a. A definition of the scope of the assessment and the assessment criteria to be used for the study site,

b. A summary of the qualifications of the person who completed the assessment and reporting,

c. A detailed discussion of the site assessment and / or previous assessments, including a review of the chemical or biophysical data with respect to the assessment criteria,

d. A clear and concise summary of the conclusions of the study and/or recommendations for further investigation / remediation,

e. A complete package of supporting documentation and appendices including, but not limited to, plans, photographs, aerial photographs, borehole logs, test results, checklists, etc., and

f. A statement of limitations for the report related to the reliability and availability of data.

g. Reports are to be stamped and signed by the professional responsible for authoring the report.

2. Phase I ESA Criteria

The following outlines The Town's guidelines for completing a Phase I ESA:

(This is not to be considered an exhaustive list nor intended to dictate the report style.)

a. The CSA Z768-01 mandatory records review list and justification for any deviation from this list.

b. A list of completed optional record reviews recommended in CSA Z768-01.

c. A record of a physical site visit, including photographs of the site (preferably not when the land is covered with snow) and adjacent sites and a detailed description of the site visit. It should also include an assessment of the outside and inside of any structures.

d. Details of interviews with people knowledgeable of current and historical environmental site conditions.

e. A review of reasonably available historical data, including data related to solid, liquid and hazardous waste, oil and gas activities and any other activities that may have an impact on the environment of the site.

f. A thorough review of the Licensee's corporate files for any oil or gas site or rights-of-way on the subject property or within 200 meters of the subject property. Any potential contaminant sources must be listed (e.g. flare pit, drilling sump, surface and/or subsurface storage tanks, spills, pipelines, process facilities, emissions, noise etc.).

g. A list of water wells on or within 200 meters of the subject property. Information such as well depth, depth of aquifer, status, lithology and owners' name, etc. should also be included.

h. Aerial photos for well or facility sites should include one pre-disturbance, one post disturbance and one photo for every 5-7 year interval during operation, where available. The photos should be at a scale of 1:5000 minimally. Include a copy of the aerial photos and a summary table with a description of each photo, the land use and any notable activities and/or features.

i. Data searches and interviews should include provincial regulatory agencies, municipalities, present and past site owners and adjacent land owners, tenants and lease holders on the site, as well as anyone else with knowledge of the environmental conditions of the site.

j. Data searches should include adjacent properties, where reasonable.

k. If the Phase I ESA is more than 1 year old, or significant development has occurred on or around the subject property, it will need to be updated. An update would include a site visit, assessment of new development on and around the

subject property, changes to environmental standards, a statement from the property owner regarding any knowledge of any contamination, etc.

l. If the ESA is more than 3 years old a new ESA is required.

m. The Developer is required to address the recommendations in the Phase 1 ESA.

3. Phase II ESA Criteria

a. A sampling plan with field and laboratory QA/QC, including field duplicates and blanks.

b. Discussion of the logic behind the placement of boreholes and monitoring wells.

c. Justification for any exceedances that are determined to not be of concern.

d. Justification for the choice of criteria to which the samples are compared.

e. Monitoring wells installed downgradient of all known or expected contamination sources, or a justification for not installing monitoring wells at those locations.

f. Sufficient and appropriate information for remediation and/or risk management.

4. Remediation and Risk Management Plans

Remediation / Risk Management Plans are to be prepared in accordance with best practices and procedures and shall meet the requirements of AEP, AHS and the Tier 1 and Tier 2 Guidelines, as applicable.

D. TOWN'S REVIEW AND ACCEPTANCE PROCESS

1. General

Environmental Reports will be reviewed to the satisfaction of The Town and its appointed review agencies and/or other Government Departments if applicable. The Town may also retain an independent environmental consultant to provide a technical review of any submitted ESA reports. ESA reports are to be submitted to Engineering Services.

Where available, the Developer will provide the Town with a copy of the Alberta Environment and Parks or Alberta Energy Regulator Remediation Certificate for the subject site. For sites where the Remediation Certificate is not available, the Developer shall provide the Town with a letter from the party responsible for obtaining the certificate that clearly outlines why the certificate was not obtained.

2. Phase I ESA Report

Phase I ESA report is required for an Area Structure Plan (ASP) approval, or if applicable, where environmental issues have not been considered in the past at subdivision, re-designation of land use or Development Permit application stage.

The consultant submits a Phase 1 ESA as part of the ASP application to the Planning and Development Department to be reviewed by Engineering Services.

The ESA Review Team will respond within 3 weeks from submission.

3. Phase II ESA Report

If a Phase II ESA report is required, it shall be provided prior to Servicing Study approval and prior to issuance of a Stripping and Grading Permit.

If applicable, a Phase II report may be required where environmental issues have not been considered in the past at subdivision, re-designation of land use or Development Permit application stage.

The consultant submits a Phase II ESA to the Planning and Development Department to be reviewed by Engineering Services.

The ESA Review Team will respond within 3 weeks from submission.

4. Remediation Plan and Risk Management Plan Reports

The Remediation / Risk Management Plan reports are required for a Development Permit / Development Agreement approval.

The consultant submits these reports to the Planning and Development Department to be reviewed by The Town's ESA Review Team.

The ESA Review Team will respond within 3 weeks from submission.

3. OIL WELLS, GAS WELLS AND PIPELINES

There are or may be a number of active, suspended and abandoned oil and gas wells, including associated pipelines, compressor stations, etc., located in future development areas. The Alberta Energy Regulator (AER) has established minimum development setbacks for the wells and pipelines. The setbacks are based on the content of the well or the product being conveyed in the pipeline. (e.g. sweet gas, sour gas (H_2S), etc.).

The developer is to review AER Directive 079 and Bulletin 2013-13 in determining proposed setback distances. Specific setback distances will be imposed by the AER if an

application is filed. The Developer should contact The Town of Olds Planning and Development Department for further Town requirements prior to a NASP application.

For initial Area Structure Planning, assuming an active oil or gas well has a low level of sour gas, the minimum setback will be 100m, up to a minimum setback of 1.5 km from any urban centre or public building for a hazardous (high level) sour gas well.

For abandoned wells, the minimum setback is 5 m from any overhead or underground structure. Access to the well is to be provided; typically the well will be located in a Public Utility Lot upon final subdivision registration.

The minimum setback for abandoned pipelines is the edge of the pipeline right of way. Accordingly, the Developer shall use the following offsets for adjacent development: (Refer to Section 16 - Drawing 4.01)

a. A minimum separation width of 2 metres shall be provided between the property line of the pipeline right-of-way and an adjacent lane and/or public utility lot containing a Town utility main (e.g. water, sanitary, storm pipes) where a pipeline right-of-way is located parallel to a lane and/or public utility lot.

b. Where a 1:1 trench slope from the pipeline's right- of-way property line to the invert of the adjacent main cannot be maintained, the width of the separation shall be increased as the depth of the adjacent utility main increases.

c. A 2.0 m easement must be provided between the pipeline right-of-way and adjacent side yard where a building or infrastructure is proposed.

The Developer shall include the following information in the NASP submission:

a. Drawing showing location and type of the well, including dimensions to ¼ lines,

b. Drawing showing location of any pipelines, including right of way dimensions,

c. Copy of development approvals, including setbacks, issued by EUB and the Licensee,

d. Copies of any reclamation certificates,

e. Phase 1 Environmental Site Assessments (ESA) reports for the property.

4. GEOTECHNICAL REPORT

A. GENERAL

The Developer shall engage the services of a qualified soils consultant to prepare a report prior to commencing detailed subdivision design. The report shall evaluate soil

characteristics and existing groundwater conditions and be based on test holes drilled at a maximum spacing of 150 m throughout the Development. The test holes are to be of sufficient depth to indicate soil conditions for utility construction. Standard piezometers shall be installed in each test hole.

B. REQUIRED TESTING

The minimum number of tests required for this report is as follows:

1. Soil moisture contents at 1 m intervals throughout each borehole,

2. A sufficient number of soil sulphate tests to represent the various soil types throughout the Development,

3. A sufficient number of California Bearing Ratio (CBR) tests to represent the road subgrade soils throughout the Development,

4. Grain size distribution (hydrometer or sieve analysis) for each predominant soil type,

5. Standard penetration tests for determination of in-situ relative soil density and consistency of the various soil strata,

6. Measurement of groundwater table and analysis of its influence with respect to the design of roadways, utility trenches, and foundations. Groundwater readings shall be provided on completion of drilling, 1 day after drilling, 7 days after drilling, 14 days after drilling and 1 month after drilling. Five additional readings are to be taken in the following months, of which a minimum of 2 readings are to be taken in late Spring and the early Summer months.

C. FINAL REPORT

The report, in PDF format, shall be submitted to The Town's Engineering Services Department including the following information:

1. Test hole location plan and soil logs for each test hole,

2. Results of the tests noted above,

3. A water table contour map shown at 0.50 m intervals. The contours are to reflect an average seasonally adjusted water level of the area under development,

4. Recommendation on suitability of site for the proposed Development,

5. Comments on the soil bearing capacity and recommended setbacks from escarpments for utility and roadway infrastructure and various types of building foundations,

6. Recommendations with regard to trench excavation and backfill specifications, roadway embankment, and pavement structure requirements,

7. In areas where fill depths are greater than 1.2m, recommendations are to cover both site grading and post development conditions for building foundations and municipal infrastructure,

8. Comment on soil chemistry and recommendations with regard to materials or types of products that may be best suited for soil chemistry.

5. SLOPE STABILITY GEOTECHNICAL REPORT

A. GENERAL

A Slope Stability Geotechnical Report is required for all sites where, in the opinion of the Engineer or their duly appointed representative, the slope stability is a concern. For development that borders an escarpment or embankment the Report should be provided as part of the ASP submissions. If a Report is not identified at the ASP, it may be required as part of the Servicing Study as more detail is available to land grading.

Geotechnical Report requirements to be applied, relative to the intended land use, shall include the following:

1. The assessment of the Factor of Safety (FS) for the existing slope or the proposed design slope profile, with respect to a safe set-back or buffer zone back from the crest or away from the toe of the slope.

2. If the FS for a slope for the proposed setback is less than that recommended by the Geotechnical Engineer, the slope may be modified using remedial measures recommended by the Geotechnical Engineering Consultant. Any remedial measures to increase the FS must consider the effect on adjacent man-made and natural features and be approved by the Engineer.

3. If the development is proposed to be constructed on a slope, the Geotechnical Engineer shall recommend a suitable FS for the on-slope development, based on a specific risk assessment of the proposed development.

4. It is the responsibility of the Developer and/or builder to ensure that all development conditions identified in the Slope Stability Geotechnical Report are complied with.

B. SLOPE STABILITY GEOTECHNICAL REPORT REQUIREMENTS

1. As a minimum, the scope of the report should provide setback limits or development recommendations based on the recommended Factor of Safety. The minimum recommended setback shall be shown on the final development plan.

2. The basis for the presented conclusions shall be clearly defined and the selected method of analysis shall be adequate, relative to the site specific conditions, project type and size, and public interests.

3. The Geotechnical Report requirements must consider the following issues, as well as other site-specific issues identified by the Geotechnical Engineer.

    a. Property lines and setbacks as per the Land Use By-law,

    b. Establish a Factor of Safety with respect to the most probable adverse groundwater and loading conditions,

    c. Top of embankment or escarpment,

    d. Toe of slope *(Note: Where the development at the toe of the slope is proposed, the report is to address the effect and extent of slope failure on the subject land and the adjacent properties and the protection of same)*,

    e. Erosion control and other mitigation measures (e.g. drainage works, grading, etc.) close to, along, and on the slopes crest, toe and face,

    f. Appropriate recommendations pertaining to re-vegetation, dewatering, and slope reconfiguration (e.g. cutting, filling, re-grading, retaining walls, etc.),

    g. Building location and foundation design,

    h. Utility and road infrastructure, and

    i. The effect of surcharges due to the proposed structures, retaining walls, and future site grading.

C. VERIFICATION

1. The Developer shall retain the Geotechnical Engineer to review the final drawings and confirm, in writing, that the plans are in accordance with the recommendations made in the Slope Stability Geotechnical Report. This documentation is required before the Foundation and/or Building Permit will be issued.

2. The Developer shall retain the Geotechnical Engineer to inspect slope and site improvements during and after completion of the work.

3. The Geotechnical Engineer shall certify, in writing, that construction procedures were conducted in accordance with design recommendations and that the completed work complies with the recommendations made in the Slope Stability Geotechnical Report.

6. ROADWAYS

A. GENERAL

The Town of Olds uses the Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads and the Urban Supplement as the basis for the Town's roadway design. When a Developer proposes modifications to the Town's requirements, as part of an Area Structure Plan, TAC material will be one of the various resources used by the Town when reviewing the proposed modification. Section 13 – Roadway Design contains further details for designing roadway infrastructure.

B. ROADWAY CLASSIFICATION

The Town's preferred roadway system will be designed with a grid or modified grid system in accordance with the direction given in this document. Other roadway pattern designs may be considered dependent on the size and shape of the parcel being developed.
The Town of Olds uses the following road classifications for the Town roadway system:

1. Expressways,
2. Arterial Roadways,
3. Residential Collector Roadways,
4. Residential Local Roadways,
5. Industrial Collector Roadway,
6. Industrial Local Roadways, and
7. Lanes.

Road connections by classification are summarized in the following Table:

Roadway Classification	Normally Connects With
Expressway	Expressway, Arterial Roadway
Arterial Roadway	Expressway, Arterial Roadway, Collector Roadway
Collector Roadway	Arterial Roadway, Collector Roadway, Local Roadway, Lane
Local Roadway	Collector Roadway, Local Roadway, Lane
Lane	Collector Roadway, Local Roadway, Lane

Classification of the roadway system must be undertaken during neighbourhood design to ensure that the necessary right of way requirements can be established and approved by The Town.

Geometric design standards are summarized in Section 13 – Roads, Appendix 'A' and described in the following clauses.

C. ROADWAY CHARACTERISTICS

The roadway characteristics should contribute to a balanced network of streets that are designed and operated to enable safe, accessible and enjoyable travel for all users. Some street types will prioritize specific modes of transportation, however all streets must provide a good quality level of service for the most vulnerable road users.

IF the Developer proposes to use new roadway cross-sections or traffic calming measures those measures should be brought to the Town's attention as early in the process as possible to reduce the chances of undue delay. All new road cross-sections or traffic calming measures will need to be approved at the ASP stage, and shall provide the following information:

- Cross-sections where ever the road has "deviations" (narrows / widens),
- Details of intersections showing all necessary traffic movements,
- List of existing examples, and where they are located, and
- Landscaping concepts

Note: In this clause there is a "number" of "lots" given in some of the following items. This "number" is provided as an estimate for determining roadway classification and cross-section. A Transportation Impact Assessment may be required or requested to support greater density for a particular roadway design.

1. Expressways

Expressways prioritize motor vehicle movement and carry large volumes of all types of traffic moving at medium to high speeds at a slightly higher level of service than arterial roadways. Some intersections with arterials are grade separated to provide free flow conditions. At-grade signalized intersections are widely spaced to minimize the number of conflict points and increase traffic mobility. Left turn and right turn bays are provided at all at-grade intersections. The provision of dual left turn bays is a typical design consideration.

Direct access to adjacent developments from expressways is prohibited in order to provide a high level of service for through traffic on the expressway.

Note: Where The Town has identified a berm as the preferred sound attenuation strategy, The Town, at its discretion, may require the Developer to construct the berm. The Developer will need to verify who will be responsible for the berm (Refer to Section 7 – Clearing, Stripping, and Grading Guidelines).

2. Arterial Roadways

Arterial roadways prioritize motor vehicle movement and carry large volumes of all types of traffic moving at medium to high speeds. These roadways serve the major traffic flows between the principal areas of traffic generation and connect to rural highways and collectors.

Direct access to adjacent developments from arterial roads is normally prohibited. Such access should be confined to collector roads or auxiliary lanes for new development. A Frontage roadway is not an acceptable access method for the adjacent development.

Note: Where The Town has identified a berm as the preferred sound attenuation strategy, The Town, at its discretion, may require the Developer to construct the berm. The Developer will need to verify who will be responsible for the berm (Refer to Section 7 – Clearing. Stripping, and Grading Guidelines).

3. Residential Collector Roadways

Residential collector roadways prioritize pedestrians and provide both traffic service and land service (access to front yards, park sites, school sites, playgrounds, etc.). The function for this type of roadway is to carry traffic between local and arterial roadways. Full access is generally allowed on undivided collectors.

A residential collector roadway should generally not collect traffic from more than 600 dwelling units before connecting to an arterial roadway.

Note: See Section 15 – Traffic, for explanation of circumstances where "No Parking" restrictions may be imposed.

4. Residential Local Roadways

Residential local roadways prioritize pedestrians and provide land access and connections to residential collector roadways. They primarily carry traffic with an origin or destination along its length. They are not intended to carry through traffic. Direct access is normally allowed to all abutting properties.

An undivided residential local roadway should generally not collect traffic from more than 100 dwelling units before connecting to a collector roadway.

Note: See Section 15 – Traffic, for explanation of circumstances where "No Parking" restrictions may be imposed.

5. Industrial Collector Roadways

Industrial collector roadways provide both traffic service and land service. The function for this type of roadway is to carry traffic between arterial and local industrial roadways. Access to adjacent properties is permitted however the Engineer must approve all access locations and widths.

6. Industrial Local Roadways

Industrial local roadways provide land access and connections to industrial collector roadways. They normally carry traffic with an origin or destination along its length and are not intended to carry through traffic. Direct access is normally allowed to all abutting properties.

7. Lanes

Lanes provide access to the rear yard of residential, commercial, and/or industrial lots. Lanes are not intended to carry through traffic. The lane layout should not encourage shortcutting by vehicles between roadways.

All lanes are to be paved.

8. Frontage Roadways

Frontage roadways have historically been located adjacent to arterial roadways. These roadways are not permitted for new development. As part of a re-development ASP where a frontage road exists, The Town may require removal or re-alignment of the frontage road to allow for better traffic flow.

D. HORIZONTAL LAYOUT OF ROADWAYS

1. Minimum Curve Radii

Minimum radii are listed in TAC's Geometric Design Guide for Canadian Roads (most current version available), Chapter 2.1 - Alignments and Lane Configuration. These are summarized in Section 13 – Road Design, Appendix A.

2. Broken Back Curves

Broken back curves (two curves in the same direction connected by a short tangent) are to be avoided in any curvilinear design unless the distance (measured in metres) from the end of one curve to the beginning of the next curve is greater than four times the design speed (measured in kilometres per hour).

3. Intersection Angle

For curvilinear roadways, the intersection angle shall be measured at the approach beginning of curb return. Tangent sections of at least 20 m in length should be used leading in to intersections where possible, particularly at high volume intersections.

The preferred intersection angle is 90^{o}, angles less than 75^{o} are not acceptable.

4. Expanded Bulb Corners

Expanded bulb corners, as illustrated in Section 16 - Drawings, may be used on local roadways in lieu of the minimum radius of curvature noted in Section 13 – Roads, Appendix A.

5. Medians

Medians are generally not preferred to be used on collector and local roadways except where required to separate or delineate traffic streams (e.g. at arterial intersections or on large P-Loop entries where two distinct roadways are required). Use of medians to create entry features is permitted, but should be kept to a minimum length.

Medians shall be at least 5 m wide if tree planting is to be included (see Sections 13 and 14 for restrictions). For medians less than 5 m in width, preference is for hard surface capping (to reduce maintenance requirements). The minimum width for a median is 1.5 m.

Consideration of median placement adjacent to proposed R3 and commercial zoning to be given as this may create access restrictions (e.g. right in / right out only or no access).

Note: Section 15 – Traffic Design, indicates some circumstances where driveway restrictions may be imposed.

6. Interim Access

Interim secondary access shall be provided for traffic on dead-end roadways or phased developments having a single access point serving more than 85 dwelling units, or as required by the Engineer and Emergency Services Department.

A temporary gravel surface turnaround suitable for HSU-9 vehicle shall be provided at the end of any temporary dead-end roadway or lane.

7. Cul-de-Sacs

Cul-de-sacs are discouraged in new subdivision design. If they are proposed, the maximum length of a cul-de-sac shall be 100 m measured along the road centerline from the property line of the intersecting roadway to the end of the bulb. R1 districts are the preferred zoning for cul-de-sacs, but if other zoning is proposed for a cul-de-sac, than it is at the discretion of the Town if it will be approved.

An emergency access is required within 50 m of the end of the cul-de-sac if the lots within the cul-de-sac are serviced from the roadway, as there is a higher probability of road closure due to utility repairs in this situation. The emergency access must be designed as outlined in Section 13.

E. P-LOOPS

The maximum length of a “P-Loop” with an undivided entrance road is 850 m, measured along the road centerline and including the length of the entrance and all internal roadways. The length of the P-Loop entrance road shall not exceed 200 m. No more than 85 dwelling units shall be developed on a P-Loop with an undivided entrance roadway.

The maximum length of a “P-Loop” with a divided entrance road is 1200 m, measured as above with no more than 150 dwelling units. The entrance roadway must meet the divided collector roadway standard cross section (i.e. four travel lanes and no parking).

An emergency access or lane connection must be provided within the loop section if the “P-Loop” entrance road is undivided or if there are deep utilities routed along the entrance road. The emergency access must be designed as outlined in Section 13 – Road Design.

F. CRESCENTS

The maximum length of a “Crescent” or any other local roadway with two entrance roads is 1200 m, measured along the road center line and including the length of all contributing roadways. No more than 180 dwelling units shall be developed on a crescent or other local roadway with only two collector access points.

G. LANE

The maximum length of lane before connecting to a roadway should not exceed 350 m.

Cross (four-legged) lane-to-lane intersections are not permitted. Lanes adjacent to parks are not preferred.

Dead-end lanes are to be kept to a minimum and used only when a looped lane design is not possible. Dead-end lanes shall end with a turnaround designed to accommodate a HSU-9 vehicle (e.g. garbage truck). See Section 16 – Drawings for standard turnaround details.

Curved lanes are not permitted. A series of chords should replace the curves (this will allow property owners to construct straight fences rather than curved fences).

H. DRIVEWAYS

Supplementary to the restrictions noted above, refer to Section 15 – Traffic Design for parking restrictions which may affect potential driveway access. The type of residential zoning in these areas shall take into account these restrictions.

All lots affected by these restrictions will require rear access to be provided from a laneway. For all other driveway restrictions, refer to the Town's land use bylaw.

I. ROADWAY INTERSECTION SPACING

1. Expressways

The desirable intersection spacing along expressways is 800 m to 1600 m.

2. Arterial Roadways

The desirable minimum intersection spacing along arterial roadways is 400 m. This spacing allows for signalization of the intersection.

For new growth areas where a grid or modified grid roadway system is proposed, access to the arterial is to be maintained, minimally, at the 400 m spacing. If, in areas of intense existing development or restrictive physical controls where feasible alternatives do not exist, and supported with a Transportation Impact Assessment, the intersection spacing may be reduced to 200 m, subject to the Engineer's approval.

3. Collector and Local Roadways

a. Curvilinear Style Roadway

The minimum distance between intersections along collector or local roadways in residential or industrial subdivisions is 45 m, measured from centre to centre of the respective intersections; however, spacing of less than 60 m should be avoided, if possible.

With the exception of using a grid or modified grid roadway design, as described below, The Town does not prefer cross (4 legged) intersections, particularly on local roadways. If this occurs, either the intersections are to be separated (two of the cross roads shall be shifted to create two “T” intersections) or a roundabout may be used.

b. Grid or modified grid roadway

If a new subdivision’s roadway system is proposed to be a grid layout which represents 25% or more of the area covered under the Neighbourhood Area Structure Plan, the creation of cross intersections becomes intentional. Under this circumstance, land blocks may be sized to a minimum grid pattern of 70 m by 150 m to 200 m including a laneway. The minimum intersection spacing (measured intersection centre to centre) along the roadway shall be 70 m; however, spacing of less than 60 m should be avoided.

Based on a block size of 70 m by 150 m; this represents approximately 22 single family residents per block.

4. Lanes

The minimum offset distance from a lane to a roadway intersection, along collector or local roadways in residential or industrial subdivisions, is 35 m if that intersection is “Stop” controlled or 55 m if that intersection is signalized. Lane to intersection distance is measured from centre to centre of the respective intersections.

Where a lane forms the 4th leg of a roadway “T” intersection, the lane centreline should be a continuation of the roadway centreline. Where a lane connects to a roadway within the limits of an expanded bulb corner, the lane centreline shall intersect with the horizontal point of intersection of the two legs of the roadway.

7. MISCELLANEOUS SUBDIVISION LAYOUT CONSIDERATIONS

A. PUBLIC UTILITY LOTS

Curved public utility lot rights-of-way are not permitted. A series of chords should replace the curves; this allows property owners to construct straight segments of fence rather than curved.

B. CONSIDERATION FOR WASTE MANAGEMENT COLLECTION ALONG A ONE-WAY STREET

When proposing a one-way street within a development, and that street has development on both sides the following requirements are to be met:

- Consider all collection vehicles as only collecting from the right-hand side,

- Both sides of the street require a back alley (to allow for collection from the rear of the lots on the opposite side of the one-way street).

C. WALK-OUT BASEMENT

The Town discourages walk-out basement homes from backing onto Expressway and Arterial roadways due to potential noise concerns. Where this situation arises, The Town may require a Noise Study to be completed (regardless if an earth berm is present or proposed) in order to confirm that no additional noise attenuation will be required. See Clause 8 for further requirements of a Noise Study.

D. STORM WATER MANAGEMENT FACILITY (SWMF)

The land-use and areas for a SWMF shall be determined at the time of the ASP. The pond area shall be located in a Public Utility Lot sized to accommodate the high water level plus the freeboard. Depending upon the Facility's proposed location, additional PUL may be required for access and maintenance purposes.

8. NOISE STUDY

A Noise Study is required where a proposed residential neighbourhood is located adjacent to Provincial highways, expressways, railways, industrial development, commercial development, and/or other potential noise generators.

Although the Town generally accepts a typical 1.5 m high earth berm as satisfying sound attenuation along arterial roadways, the Engineering Department reserves the right to request a Noise Study along an arterial based on the development proposal, adjacent developed areas, future traffic growth on the arterial, etc. (Example: Proposed senior's complex (R3) adjacent to an arterial, commercial, light industrial, and residential (R1) area. The arterial is part of the long term transportation plan to accommodate growth. This may warrant a Noise Study due to the nature of the development, the adjacent land uses, and future road widening.)

The Noise Study may be delayed until the Servicing Study stage to allow the Developer time to propose what type of attenuation may be used and how it affects the subdivision layout. The Noise Study will be required at the time of the initial submission of design drawings for the first Phase of the development where the attenuation feature is located.

Although Earth berms and/or development setbacks are the preferred measures for noise attenuation, when berms cannot be constructed or setbacks are not preferred, The Developer will be required to construct sound attenuation walls (or combination of earth berm / wall structure) to the recommended height as determined in the Noise Study.

Section 16 - Drawings 5.02 and 5.03, show a typical earth berm cross-section for expressways and arterial roadways. Additional design information is included in Section 13 – Road Design.

9. TRANSPORTATION IMPACT ASSESSMENT STUDY

At the planning stage, the Developer may be required to provide a Transportation Impact Assessment (TIA); they are typically required whenever a development has a significant impact on traffic operations on the adjacent transportation network. The Engineering Department will determine if and to what level of detail a TIA will be at the time of the Area Structure Planning review process. The information, process, and data to be used for the study are detailed in Section 13 – Road Design.

10. UTILITY CORRIDORS

In planning development servicing, corridors may be required for routing of utility mains, secondary emergency accesses, trails, and major drainage outside of the lanes or roadway rights of way. The following items are to be considered as part of the neighbourhood design. Where a proposed utility corridor(s) is:

1. To cross a natural area, an alignment that minimizes the impact on the natural area is to be selected.

2. Used for access, trail, and/or major drainage, a Public Utility Lot should be provided. The Public Utility Lot is typically 7.0 m wide and may include a requirement for a 2.0 m easement on each side of the utility lot for a total right of way width of 11.0 m.

3. Only required for the routing of utility mains, the utility corridor will be protected in an easement. The easement width shall be based on the proposed number of utilities and their depth of installation. This is to ensure an appropriate easement width is provided to allow for the trench excavation to be outside of the building envelope on the affected lots in the event the utility(s) is required to be removed or replaced as part of future maintenance. The width of the easement will be equal to the depth of the deepest utility, doubled (plus spacing between utilities) plus one metre (or pipe width if greater than one metre); the minimum easement width is 6.0 m.

11. ENHANCED / OPTIONAL SUBDIVISION AMENITIES

Neighborhoods should have a unique identity. The Developer may choose to create a unique identity through construction of various structural features which may be incorporated throughout the subdivision for both practical and aesthetic purposes. Some examples of these features are Entrance signs, decorative columns, decorative street light poles, street name markers, fencing material & style, gazebos, docks, formal planting beds, decorative lighting, etc.

If the Developer chooses to use a structural feature(s), that feature is to be used throughout the entire area covered by the Neighbourhood Area Structure Plan. The Developer will be responsible for all costs associated with the design and construction of the enhanced feature as well as the payment of a Long Term Maintenance Fee for the maintenance of the feature(s). Long Term Maintenance Fees are calculated in the Development Agreement.

If the Town and the Developer agree to a Homeowners Association (HOA) as the method of providing Long Term Maintenance, minimally, the agreement must require:

1. The HOA to be registered on all privately owned parcels within the NASP area,

2. The HOA must be structured to address the maintenance of the enhancement in perpetuity,

3. The recourse of the Town if the HOA fails to meet its commitment of the agreement, and

4. Contain reference to the basic structural requirements and professional assurances as noted in Section 13 – Road Design.

A. OTHER STIPULATIONS

Approval of any structural feature(s) or landscaping / lighting enhancement is to be obtained from The Town prior to, or at the time of detailed construction drawing submission for that phase of development.

The structural design and integrity of the structure remains the responsibility of the designer (Consultant) and the Contractor. The Town may require a structural engineer's stamp and signature for these features.

Where the Town has accepted responsibility for an amenity and considered it a Town asset to be maintained through the Town's operations budget, that amenity is to be located wholly within Town owned lands. Where The Town accepts the amenity, but does not accept it as an asset, the amenity is to be located on private land with a covenant placed on the land title to reflect that the amenity is not a Town responsibility. The Developer may want to clarify with the Town regarding this matter at the ASP stage, but before the design drawing submission / Development Agreement stage.

It will be at the discretion of the party responsible for the maintenance of an amenity, be it private or public, to replace/repair the amenity either due to age or damage unless a registered restrictive covenant on the land title states otherwise.

B. EXISTING NEIGHBOURHOODS REQUESTING ENHANCED AMENITIES

When a structure is to be retrofitted to an existing neighborhood, Engineering Services shall be notified to ensure that the basic requirements for the structure (e.g. location, etc.) are met.

Structural features will require a Development Permit and may require a Development Agreement or an amendment to a Development Agreement for the construction of the structure. The Developer or community group will be responsible for contacting Planning and Development for any required Development Permits.

1. GENERAL

Once the Area Structure Plan (ASP) has been adopted by Town Council, the Developer is to provide a more detailed servicing report for the area covered by the ASP, typically a quarter section of land.

The report, consisting of textual documents and engineered drawings, is intended to provide the next level of information establishing the site's development details and servicing requirements. The report will ultimately form the basis for the detailed design of each phase of development.

In addition to providing basic information with respect to site grading, water distribution, sanitary sewage collection, storm water management, and public roadways, etc. additional studies may be required once Engineering has made its initial review (e.g. Phase 2 ESA, Slope Stability Geotechnical Report, Noise Study, etc.). Further information on the requirements for these reports is found in Section 4 – Area Structure Planning.

The Servicing Study report is to be a compilation of all this information. Where separate reports, relating to specific topics, have been created, these reports are to become sub-reports / sub-sections to the Servicing Study Report; all under cover of one title page. The Servicing Study report shall also provide a summary of the relevant information from these sub-reports.

If the ASP requires revisions due to the servicing study report findings or the Developer initiates an ASP revision(s), revisions to the Servicing Study must be provided prior to the time the ASP revisions are approved by Council. Further Development Agreements will not be issued until a revised servicing study report is submitted and approved.

At the discretion of the Town, a Clearing and /or Stripping Permit may be issued prior to an approved servicing study report based on certain conditions being met, as stated in Section 7 of this publication.

*Note: A Development Agreement will **not be issued** until the Service Study report is approved.*

2. SERVICING STUDY DOCUMENT

The Servicing Study document refers to the textual component of the Servicing Study. This document should include discussion pertaining to:

1. Pre-development site conditions including, but not limited to vegetation, soil types, groundwater, structures, contaminants, topographic features, ESA's, remediation's, geotechnical information, etc.

2. What issues were found and clarifications as to how recommendations from the reports or studies, typically done prior to or during the time of the ASP process and /

or as part of the Servicing Study (as noted in clause 5 in this Section), will be addressed in the development,

3. The purpose of and proposed outcome of the site grading (e.g. to achieve walkout basements),

4. An Erosion and Sediment Control (ESC) report providing the basic and common measures to monitor, maintain, prevent off-site storm runoff, dust mitigation, erosion control etc. over the course of the development,

5. The basics of the proposed utility infrastructure system as it relates to Town standards, connectivity to future development (e.g. oversize piping to service adjacent development in the future), connectivity to existing developed areas (e.g. water looping), and its relationship to Town planning documents,

6. Storm water management report, including computer modelling, covering runoff from both on-site and off-site from adjacent lands, and whether by overland routing and/or underground piping,

7. The development's road layout and cross-sections including explanations on how it provides the connectivity and mobility proposed in the ASP,

8. The analyses from calculations and computer modelling, for sanitary, storm, and water infrastructure, including the parameters used,

9. The identification and description of site issues/constraints found and their remediation through the design of the subdivision,

10. The neighbourhood's theme,

11. Landscaping enhancements,

12. Construction Specification variances (including new technologies and / or practices to manage storm water).

(Note: The aforementioned list is a representative, but not exhaustive, list of all items that may be required in the Servicing Study document.)

3. SERVICING STUDY DRAWINGS

The basic drawing standards to be used for the Servicing Study drawings (symbols, line styles, font types, etc.) are described in Section 2 - Digital Drawing Submissions. The base plan for all drawings, except details and cross-sections, should show the entire ASP area and be in the form of a tentative legal plan and at a drawing scale of 1:1500 or 1:2000.

Note: If the servicing study relates to anything other than a typical quarter section / new subdivision development, the drawing list provided here may be modified.

The following clauses describe the requirements of what information is to be displayed on the drawings required for the Servicing Study Report.

A. SITE GRADING PLAN

The purpose of the Site Grading Plan is to establish the major drainage routing, address issues related to boundary conditions and site grading designs with respect to roadway slopes and depth of cover for underground utility pipes, and address any issues related to boundary conditions. The following information shall be shown on the drawing:

1. Contours

Existing and proposed elevation contours of the site at a sufficient interval to define both the existing and proposed drainage patterns. The existing contours shall extend onto the adjacent properties to show how the proposed grading ties into the neighboring property. Contours shall also identify areas where back sloping (at 5:1 or less) will occur or will be required.

2. Natural Features

Locate and identify trees, shrubs, grass, water bodies, streams, highly erodible earth strata that may be exposed due to development, and other natural features that are to be retained, removed, and/or altered. Identify any future variances in the natural grade adjacent to these areas which would either impact drainage, root systems, erosion and / or off-site sedimentation.

3. Geotechnical Information

a. Test hole locations,

b. Boundaries of different soil types within the development,

c. Define areas NOT to be cleared, stripped or graded,

d. Show stockpile locations; consideration is to be given to proximity to homes, watercourses, escarpments, etc.,

   Stockpile locations require approval from the Engineering Services (refer to Section 7 - Site Clearing and Grading Guidelines for further information).

e. Location of storm water management facility and the overflow route(s).

4. Erosion and Sediment Control Measures

a. Location of all proposed temporary and permanent control measures for both water and wind erosion. Ensure all surface drainage is filtered or run through a sediment control feature before leaving the site.

B. ROADWAY GRADING PLAN

The purpose of the Roadway Grading Plan is to confirm the major drainage routing along streets, lanes, and public utility lots and to evaluate the lot grading. The plan is to show the following:

1. Proposed P.I. elevations,

2. Tentative road and lane centre line grades,

3. Proposed Canada Post community mailbox locations where 3 or more units are proposed to be clustered together,

4. Proposed road cross-sections that DO NOT meet the typical sections shown in the Design Guidelines, Section 16 - Drawings. The consultant will need to identify the roads per the Design Guidelines designation (e.g. 16-10 local).

5. Where the proposed Development abuts an Expressway or Arterial roadway, the drawing limits shall include (minimally) the nearest curb line (may be proposed) of the expressway or arterial. It is recommended that the entire cross-section of the expressway or arterial be shown to provide context of future intersections and boulevard construction.

C. WATER DISTRIBUTION SYSTEM

The purpose of the Water Plan is to establish the water main sizes to ensure that the proposed water system conforms to the Town's network requirements, establish preliminary hydrant locations, and establish any high demand areas (i.e. schools, commercial sites, etc.). The plan is to show the following:

1. Proposed main sizes and,

2. Hydrant locations,

3. Hydrant Coverage limits (suggest a light toned circle under laying the base and design line work).

1. Development Advanced from Normal Progression

If a proposed development is outside the Town's current growth projection, it will **not** be allowed to proceed unless the developer is willing to pay all of the costs of initial oversizing with no endeavour to assist from the Town. If a proposed development is between the current two to five year growth projection the development **may** be allowed to proceed.

Where a development is proposed that is ahead of the Town's natural extension of existing development, beyond the existing water network, the Developer will be required to provide detailed calculations if he proposes to service the development with a single, un-looped, water supply line. The single, un-looped, supply line is required to meet the Maximum Day Demand and Fire Flow Demand for the development proposed. In order to meet the required flow demands, the Developer has the following options:

a. The Developer may decrease the size of the proposed development (units serviced), and /or

b. Provide a secondary supply line to create a redundant loop, or

c. Provide another option to meet the Fire Flow Demand.

Note: If the Developer chooses any of these options (or combination thereof), the total water supply must meet the Fire Flow Demand. The Town will review the submitted information to evaluate the effects on water pressure, velocity and chlorine residuals to ensure a safe, clean water supply is provided. In the affected development phase's Development Agreement, additional obligations of the Developer will be outlined relating to the costs to be borne by the Developer in order to ensure adequate water quality in these situations.

The water system design submission is to include a copy of the computer modelling analysis.

Detailed water system design criteria are included in Section 8 – Water Design, of this document.

D. SANITARY SEWER SYSTEM

The purpose of the sanitary sewer system plan is to establish the contributory sanitary service area(s) and discharge points to the existing system based on topographic considerations and downstream transmission capacities. This may include existing system analysis in terms of planned and projected flows, and assessment and monitoring of existing system capacities and flows. Future growth areas, beyond the limits of the base plan area (or Area Structure Plan-ASP area) must also be considered, and alternatives for service extensions to these areas (e.g. trunk main extension, oversize main through development, etc.) must be determined. The plan is to show the following:

1. Proposed main sizes,

2. Only those manholes within one or more of the situations list below need to be shown:

   a. Existing manholes where the new system will tie to,

   b. Manholes that have contributing areas to them,

   c. Manholes at the junction of lines where multiple flows combine,

   d. Where depth of cover is anticipated to be less than 2.7m.

3. Manhole invert elevations,

4. Grades between manholes, and

5. Proposed manhole depths.

The sanitary sewer system design submission shall include a copy of the digital computer modelling analysis and a PDF version of the design table (spreadsheet).

Detailed sanitary sewer system design criteria are included in Section 9 – Sanitary Design, of this document.

E. MAJOR DRAINAGE SYSTEM

Generally, the Area Structure Plan will only cover a portion of the watershed defined by natural topographic features. The watershed will, however, continue to act as a single integrated system during rainfall and snowmelt events. The urban drainage systems must be incorporated into the natural watershed in such a way as to account for flows from remaining undeveloped areas. Consequently, urban drainage design must be carried out on a total watershed basis.

Planning and design for major drainage systems must include the incorporation of surface drainage and overland flow routes, ponding areas, and runoff storage facilities, and where possible escape routes to receiving watercourses.

New development must provide storm detention to suppress surcharging in the downstream storm sewer system and to contain the major drainage within the Area Structure Plan area.

The major drainage plan is to show the following:

1. Major drainage area boundaries,

2. Major (overland) drainage routes including cross-sections of swales and/or channels including depth of flow,

3. Manhole numbers and pipe sizes,

4. Storm water Management facility locations and shapes (e.g. volume, depth, area, elevations);

5. The minor storm sewer system, including manhole locations and catchment areas for the minor system;

6. Any major drainage flows to be intercepted from areas beyond the boundary of the Area Structure Plan and show how this drainage is to be redirected or stored,

7. A table listing pond water detention area, volume and discharge rate for notable pond elevations and rainfall frequencies for each pond in the development area (refer to the sample table below).

Design Parameter	**Elevation**	**Pond/Water Surface Area (ha)**	**Pond Volume (m3)**	**Outlet Discharge (l/sec.)**	**Notes**
Original Ground	*884.3*	*3.6*	*N/A*	*N/A*	
Plugged Outlet (1:100)	*882.2*	*2.8*	*42,000*	*0*	L.T.F. Elevation
1:100	*881.6*	*2.7*	*28,500*	*510*1*	Weir crest regulated
1:50	*881.2*	*2.1*	*27,300*	*490*	Orifice flow regulated
1:25	*881.1*	*2.0*	*18,600*	*420*	Orifice flow regulated
1:10	*880.8*	*1.8*	*12,400*	*380*	Orifice flow regulated
1:5	*880.2*	*1.6*	*7,500*	*350*2*	Orifice flow regulated
Pond Bottom	*880.1*	*1.2*	*500*	*250*	Nominal pond bottom
Inlet Crest	*880.0*	*0.01*	*0*	*245*	
Invert By-pass pipe	*878.0*	*0*	*0*	*0*	

*1 – equates to 0.01 L/sec/ha
*2 – equates to 0.001 L/sec/ha

The major storm sewer system design submission shall include a copy of the computer modelling analysis and a PDF version of the design table (spreadsheet).

Detailed major drainage design criteria are included in Section 10 – Storm Water Design, of this document.

F. MINOR STORM SEWER SYSTEM

Planning and design for the storm sewer system must always address provision of both the minor system of surface drainage, gutters, inlets, and enclosed pipes and the major system. The purpose of the storm sewer system plan is to establish the contributory storm service area(s) and discharge points for the Area Structure Plan area to the existing minor system based on topographic considerations and downstream transmission capacities. This may include analysis of the existing minor system in terms of planned and projected flows, and assessment and monitoring of existing system capacities and flows. Future growth areas beyond the limits of the ASP area must also be considered, and alternatives for service extensions to these areas (e.g. trunk main extension, oversize main through development, etc.) must be determined. The plan is to show the following:

1. Minor storm sewer system, including proposed main sizes,

2. Only those manholes within one or more of the situations list below need to be shown:

    a. Existing manholes where the new system will tie to,

    b. Manholes that have contributing areas to them,

    c. Manholes at the junction of lines where multiple flows combine,

    d. Where depth of cover is anticipated to be less than 2.7m.

3. Manhole invert elevations,

4. Grades between manholes, and

5. Proposed manhole depths.

If new technologies are proposed and relate to infrastructure, that new technology is to be noted or shown on the drawing.

The minor storm sewer system design submission should include a copy of the computer and/or rational method modelling analysis.

Detailed storm sewer system design criteria are included in Section 10 – Storm Design, of this document.

G. CONCEPTUAL LANDSCAPING PLAN

A Conceptual Landscape Plan is to be provided to illustrate how the green spaces will be developed. These spaces include the Environmental Open Spaces, Municipal

Reserves, Neighbourhood Park Sites and Public Utility Lots as identified in the ASP. The plan is to show the following:

1. Areas of existing wetlands, trees, and vegetation that is to be removed or retained, as identified in the Ecological Profile prepared by the developer, or the Town.

2. Identify topographic features (e.g. ravines) that will be removed or incorporated into the landscaping design,

3. Proposed trail system, including connection to the trail system in adjacent developments,

4. Show the existing and proposed hydrants and manholes, per the water, sanitary and minor storm drawing requirements noted above,

5. Show the existing and proposed water, sanitary and storm piping (lighter tone under laying the base and design line work),

6. Layout of the park site(s) where enhanced amenities (e.g. gazeboes, playground apparatus etc.), are proposed. The layout and amenities are to be shown to scale with preliminary spot elevations (corners and centre of site, and general overall dimensions provided to show that enough space and grading can be achieved at the future detailed design stage. Planting beds and new trees are **not** required to be shown unless the plantings proposed exceed the basic landscaping requirements provided in Section 14 – Landscape Design,

7. All existing and proposed easements.

Minor landscaping details (e.g. park benches, post & cable, bollards etc.) are **not** required to be shown.

The drawing page is to be overlaid on an orthographic photograph.

Detailed landscaping design criteria are included in Section 14 – Landscape Design, of this document.

4. SUBMISSION OF SERVICING STUDY REPORT AND DRAWINGS

A. REVIEW SUBMISSION(S)

The following shall be submitted to the Engineering Services Department for review, comment and distribution:

1. One (1) copy of the computer modelling analysis per utility on CD, DVD, or USB,,

2. A PDF copy of the report including the drawing set, and

3. One (1) PDF copy of all referenced and related supporting reports (e.g. Slope Stability).

Note: Engineering Services will be responsible to distribute drawings to Emergency Services for their review and comment. The Consulting Engineer will be required to provide an electronic copy to The Town's Engineering Department, the shallow utility companies and Canada Post.

B. FINAL SUBMISSION

Following approval of the report and drawings please submit to the Engineering Services Department:

1. Three (3) hard copies of the report,
2. One complete, unbound, set of drawings, on 3mm Mylar media,
3. A PDF version of the report including drawings,
4. One (1) copy of the computer modelling analysis per utility on CD, DVD, USB,,
5. Digital CAD files of the drawings, and
6. One (1) copy of all referenced and related supporting reports (e.g. Slope Stability) **IF** the report(s) were not previously received by The Town.

Note: Engineering Services will be responsible to distribute the approved drawings to Emergency Services. The Consulting Engineer will be responsible to provide a copy of the approved Servicing Study drawings to Engineering Services, the shallow utility companies and Canada Post.

5. OTHER REPORTS

Other reports that, if not provided at the Area Structure Planning stage, may be requested as part of the Servicing Study are:

a. Environmental Site Assessment Report(s) (see Section 4 – ASP),

b. Geotechnical Report (see Section 4 – ASP)

c. Geotechnical Slope Stability Report (see Section 4 – ASP)

d. Erosion and Sediment Control Report (see Section 6 – ESC)

e. Transportation Impact Assessment Report (See Section 13 – Road Design)

f. Noise Study (see Section 13 – Road Design)

Note: The sections referenced contain the detailed requirements of the corresponding report.

1. EROSION AND SEDIMENT CONTROL OBJECTIVES

Soil erosion is the removal and loss of soil by the actions of wind, rainfall and runoff. In construction activities, soil erosion is caused by the force of falling and flowing water, resulting in the detachment and transport of soil particles. Erosion is a temporary phenomenon that has the potential to carry significant amounts of sediment into storm sewers and watercourses during and immediately after rainstorm events.

Sedimentation is the settling out process of soil particles transported by water. Sedimentation can occur in slower moving, quiescent water bodies or in treatment facilities such as storm water ponds.

The main objective of erosion and sediment control is to prevent sediment pollution in the various watercourses. Secondarily, it is to prevent nuisance airborne dust or tracked-on dirt to Town roadways and surrounding neighbourhoods. The majority of these concerns related to urban development are as a result of construction activities. An Erosion and Sediment Control (ESC) Plan is to be accepted by the Town prior to the start of any site clearing and grading.

Erosion and sediment control techniques are part of Best Management Practices (BMP's). BMP's operate by trapping storm water runoff and detaining it until unwanted pollutants such as sediment, phosphorous and other harmful contaminants are allowed to settle out or be filtered through underlying soils. The trapped pollutants are then removed through regularly scheduled maintenance.

Therefore, any preventative measures that will reduce erosion and sedimentation are beneficial.

2. REFERENCE MATERIAL

The following reference materials (current editions) have been used in preparing this Section of the Design Guidelines and should be referred to for further detail:

- Alberta Transportation - Design Guidelines for Erosion and Sediment Control for Highways,
- Alberta Transportation – Field Guide for Erosion and Sediment Control for Highways,
- Alberta Transportation - Fish Habitat Manual,
- Alberta Transportation - Navigable Waters Protection Act Manual,
- The City of Calgary - Guidelines for Erosion and Sediment Control,
- The City of Calgary – Field Manual for Effective Erosion and Sediment Control,

- The City of Edmonton - Erosion and Sediment Control Guidelines,
- The City of Edmonton - Erosion and Sediment Control Guidelines Field Manual.

3. REGULATORY REQUIREMENTS

There are a number of federal and provincial acts and regulations governing activities that cause, or can cause harm to the environment, including construction projects that result in erosion and/or sedimentation. Regulatory agencies also publish codes of practice, guidelines and standards that set out requirements for undertaking certain types of activities. Most legislation and other types of regulatory tools make reference to preventing the release of harmful or deleterious substances, including silt, to the environment.

The Federal Department of Fisheries and Oceans (DFO), operates in Alberta to enforce relevant federal legislation. Alberta Environment enforces relevant provincial legislation in collaboration with DFO enforcement of federal legislation.

A. FEDERAL LEGISLATION

Navigable Water Protection Act

The Navigable Water Protection Act, R.S. 1985, c. N-22 applies to in-stream work involving construction or placement in, on, over, under, through or across any navigable water. “Navigable waters” includes a canal and any other water created or altered as a result of construction of any work. In particular reference section 22, but other sections may also, affect municipal development.

Fisheries Act

The Fisheries Act, R.S. 1985, c. F-14, exists to protect fish and fish habitat.

Silt is amongst the most common types of deleterious substances released into waterways.

In particular reference sections: 34, 35, 36, 38 and 42, but other sections may also affect municipal development.

Migratory Birds Convention Act and Regulations

The purpose of the Migratory Birds Convention Act, 1994, c. 22 and the Migratory Birds Regulations, C.R.C., c. 1035 are to protect migratory birds and migratory bird habitat. The Act and Regulations apply to various types of birds, as follows:

a. Migratory game birds, including ducks, geese, swan, cranes, shorebirds and pigeons,

b. Migratory insectivorous birds, including chickadees, hummingbirds, robins, swallows and woodpeckers, and

c. Other migratory non-game birds, including gulls, herons and loons.

A complete list of birds is included in Schedule 1 of the Act. It is prohibited to deposit or permit to be deposited oil, oil wastes or any other substances harmful to migratory birds in any waters or any area frequented by migratory birds.

Canadian Environmental Protection Act

The Canadian Environmental Protection Act, 1999, c. 33 (CEPA), targets pollution prevention and protection of the environment, human life and health from the risks associated with toxic substances.

In particular reference sections 64 and 95 to 99, but other sections may also affect municipal development.

B. PROVINCIAL LEGISLATION

Alberta Environmental Protection and Enhancement Act

The Environmental Protection and Enhancement Act, Chapter E-12 exists to support and promote the protection, enhancement and wise use of the environment.

In particular reference: 108 to 112 and 118, but other sections may also affect municipal development.

Water Act

The Water Act, Chapter W-3 regulates the allocation, protection and conservation of water in the Province of Alberta, and is administered by Alberta Environment (AENV).

In particular reference Section 36, but other sections may also affect municipal development.

The Water (Ministerial) Regulation, A.R. 205/98, Schedule 1, lists the activities that are exempt from the approval requirement.

Public Lands Act

The Public Lands Act, R.S.A 2000, c. P-30 applies to public lands under the administration of the Minister of Sustainable Resources and includes all naturally occurring bodies of water.

In particular reference to Section 3, but other sections may also affect municipal development.

The extent of Provincial ownership of the bed and the shore is limited by the bank of the body of water, which is defined in the Surveys Act R.S.A. 2000, Section 16 - Drawings.

Approval is required prior to developing or modifying the beds, shores or banks of a water body.

Soil Conservation Act

The Soil Conservation Act, R.S.A. 2000, c. S-15 applies to all land within the Province of Alberta.

In particular reference Section 3, but other sections may also affect municipal development.

If a landowner is not taking appropriate measures to prevent soil loss or deterioration, or stop it from continuing, a soil conservation officer appointed under the Act can serve a notice ordering the landholder or owner to take remedial measures. If the remedial orders are not carried out, the officer may enter on the land and carry out the measures set out in the order.

C. MUNICIPAL LEGISLATION

Refer to the Town of Olds municipal bylaws for local legislation.

4. PENALTIES FOR CONTRAVENTION OF ENVIRONMENTAL LEGISLATION

A. CONTINUATION OF A CONTRAVENTION

Where a contravention is committed or continued on more than one day, each day is considered a separate offence.

B. RELEASE INFORMATION

The Environmental Protection and Enhancement Act and the Release Reporting Regulation deal with the release of substances into the environment and set out what must be reported, when, how and to who reports must be made. Additionally, individual approvals and Codes of Practice may have requirements for the reporting of contraventions of the terms and conditions of the approval or the sections of the Code of Practice.
Where the incident, release or contravention triggers a requirement to immediately report, then this report should be made to the **Energy and Environmental Response Line** as follows:

1. Verbal Reports can be phoned to **1-800-222-6514** (on a 24 hour basis).

2. A reference number will be provided at the time of the verbal report to confirm that the report of the release was made.

3. Written reports can be e-mailed to: ESRD.info-Centre@gov.ab.ca

C. DUE DILIGENCE

Most environmental legislation provides for "due diligence" (defined simply as "the exercise of reasonable care") as a defense to the majority of environment offences. By ensuring due diligence is exercised, the responsible party may prevent the occurrence of a violation altogether.

D. INCIDENT REPORT

Where the incident, release or contravention requires a report to Alberta Environment, a copy of that report is to be provided to the Town's Engineering Department.

5. INTRODUCTION OF AN ESC PLAN

A. GOALS AND OBJECTIVES

The main objective of erosion and sediment control is to protect our watercourses from pollution, primarily sediment pollution.

B. RESPONSIBILITIES

Erosion and sediment control is the responsibility of the Developer. It is **not** the responsibility of The Town to ensure that the ESC plan is appropriate for the level of work being proposed.

The Developer shall promptly correct, at his own expense, all defects, damages, and deficiencies in the erosion and sediment control measures, whether related to materials, workmanship, operation, vandalism, or otherwise.

The Developer shall maintain permanent erosion and sediment control measures until the Phase and / or project covered under a Development Agreement or Development Permit has received its last Final Acceptance Certificate.

C. ELEMENTS OF AN EFFECTIVE ESC PLAN

The following elements are to be considered in the preparation of an effective ESC plan:

Minimize Needless Clearing and Grading
Some areas of a development site should never be cleared or graded, or these activities should be restricted. This includes stream buffers, forest conservation

areas, wetlands, springs, highly erodible soils, steep slopes and environmental areas.

Protect Waterways and Stabilize Drainage Ways

Streams and waterways are particularly susceptible to sedimentation. Clearing adjacent to a waterway should not be permitted, and a silt fence should be installed along the perimeter of the buffer. Existing drainage ways should be identified; as these will likely be the major routes that eroded sediments will take to reach streams, rivers, and storm sewers. Drainage ways are also prone to erosion due to the high velocity of runoff. Erosion should be minimized.

Phase Construction to Limit Soil Exposure

Large areas of grading should be avoided since this maximizes erosion potential. Construction phasing, where only a portion of the site is disturbed at one time, minimizes sediment load potential.

Stabilize Exposed Soils Immediately

To provide soil stabilization, it is important to establish ground cover over the denuded area within a short period of time with the soils being exposed. Covers such as grass, mulch, erosion control blankets, hydro seeding and/or plastic sheeting can be used to achieve this.

Protect Steep Slopes and Cuts

Steep slopes are the most highly erodible surfaces within construction sites. Steep slopes are generally defined as 6H:1V or greater. Where possible, clearing and grading of steep slopes should be avoided. Otherwise, special techniques, such as uphill flow diversion and silt fencing, should be used to prevent uphill runoff from flowing down the slopes.

Install Perimeter Controls to Filter Sediment

Perimeter controls should be implemented at the edge of the construction site to retain or filter runoff before it leaves the site. Silt fences and earth dikes or diversion are two of the more common control methods.

Employ Advanced Sediment Settling Controls

Even when the best ESC measures are employed, high concentrations of sediments may be discharged during larger storms. Therefore, the ESC plan should include some sediment traps or basins to allow captured sediments to settle out. To improve the trapping efficiency, these basins should be designed to incorporate such features as larger storage volumes, use of baffles, skimmer’s and other outlet

devices, and multi-cell construction. Regular inspection and maintenance are also critical to the operation of these practices.

Ensure Contractors Are Trained On ESC Plan

The most important element in the implementation of an ESC Plan is the training and experience of the contractors, as they are usually responsible for the installation and maintenance of the practices. In the end, everyone is responsible for the erosion and sediment control. Therefore, training and education is important for everyone, from the **Developer** to the **Homebuilder**. Everyone is working towards the same goal of protecting our waterways.

Adjust ESC Plan at Construction Site

For an ESC Plan to be effective, it may have to be modified due to discrepancies between planned and as-constructed grades, weather conditions, altered drainage and unforeseen requirements. Regular inspections by the Consulting Engineer are needed to ensure that the ESC controls are working properly. Inspections should be conducted every seven days and following heavy rainstorms or snowfall events.

Assess ESC Practices after Rainstorms or Snow Melt Events

After a rainstorm or snow melt, it is usually clear whether an ESC Plan worked or not. If the event was unusually large or intense, it is likely that many of the controls will require repair, clean out or reinforcement. Therefore, a quick response to assess and correct damages of the control is required.

D. DESIGN OF AN ESC PLAN

An Erosion and Sediment Control Plan must be prepared for all construction projects. Best Management Practices (BMP's) should be indicated on the construction drawings.

General principles should consider the following:

1. Prevent pollutant release. Source control BMP's should be selected as the first line of defense.

2. Erosion and sediment control measures, or other BMP's, should be selected based on the site characteristics and the construction plan.

3. Site drainage and soil conditions should be reviewed to determine the most significant factors for the site and planned construction.

4. Runoff should be diverted away from exposed areas where possible.

5. Existing vegetation should be preserved.
6. The extent of clearing and phased construction should be limited.

7. Natural drainage features shall be incorporated. Adequate buffers should be used to protect areas where flows enter the drainage system.

8. Minimize slope length and steepness.

9. Runoff velocities should be reduced to prevent channel erosion.

10. Prevent tracking of sediment off-site.

11. Select appropriate control measures for the control of pollutants other than sediment.

E. CONCERNS AND PRACTICES

There are many erosion and sedimentation concerns that arise due to construction activities. These include, but are not limited to the following:

1. Mud tracking from construction sites onto adjacent properties and roadways,

2. Silt and debris washed into existing storm sewer (drainage) system,

3. Silt and debris transported to receiving watercourse by surface runoff and the sewer system,

4. Windblown dust.

Good maintenance practices will help to minimize erosion and sediment concerns, and should be considered when preparing the construction schedule. While some may be impractical under certain conditions, others should be considered based on suitability, practicality and cost effectiveness.

1. Stockpiles should be located away from watercourses, environmentally sensitive areas, drainage courses, and existing adjacent developments. The stockpiles should be stabilized against erosion immediately following stripping operations. Stabilization can include, but is not limited to establishment of a cover crop or hydro seed matrix consisting of seed, fiber bond and tackifier.

2. All construction traffic should leave the site at a designated point or points. Gravelling or paving (where practical) of frequently used access roads will help ensure that minimal material such as mud is tracked off-site. The access road should consist of a bed of non-erodible material (i.e. gravel) of sufficient length to ensure that a minimum of material (mud) is tracked off-site onto adjacent municipal roadways. Internal haul roads and/or track packs can also be designated and maintained to help reduce off-site tracking.

3. When storm sewers have been installed or are existing, measures should be undertaken to ensure sediment and debris does not get into the municipal storm sewer system. Both catch basins and manholes should be protected. This may be accomplished by sealing the openings, setting up sumps or weirs inside the structure or by providing appropriate inlet protection (filter fences, sediment traps, etc.). A temporary drainage system should be used with appropriate velocity controls and temporary storage areas for sediment control. This will ensure that sediment and debris does not get into the municipal storm sewer system and into the downstream waterways. Diligent efforts must be taken to ensure that the temporary drainage system does not flood adjacent properties.

4. Where on-site or downstream detention facilities are provided, use can be made of a quality control facility (through placing temporary weirs or check dams) for sediment control during construction. Temporary detention facilities are to be in-place prior to the installation of site services, underground utility installation or the commencement of earth moving operations.

5. Dust control measures should be implemented to prevent wind transport of dust from disturbed soil surfaces. This may be accomplished several ways:

    a. Vegetate, hydro seed, or mulch areas that won't receive vehicular traffic,

    b. Construct windbreaks or screens,

    c. Site may be sprinkled with water or a chemical dust suppressant to control dust (care must be taken to prevent tracking of mud that may result), or

    d. A combination of the above noted methods.

6. All accumulated sediment and debris should be removed as required. Once construction activities are complete, all related materials and temporary structures must be removed and properly disposed of.

6. BEST MANAGEMENT PRACTICES (BMP'S)

A. GENERAL

BMP's for erosion and sedimentation control are various methods that have been proven to work on past construction sites when they are properly planned and constructed.

These measures reduce erosion potential by stabilizing exposed soil or reducing surface runoff flow velocity. There are generally two types of erosion control BMP's that can be used in conjunction with the minimum requirements. They are as follows:

1. Source control BMP's for the protection of exposed surfaces, and

2. Conveyance BMP's for control of runoff.

These measures reduce off-site sedimentation potential by promoting sedimentation before surface water flows leave the construction site. There are generally two types of BMP's that can be used in conjunction with the minimum requirements of an erosion control plan. They are as follows:
1. Filtering and Entrapment BMP's, and
2. Impoundment BMP's.

It is the Consultant's responsibility to ensure that BMP's are appropriate for the site conditions.

B. BEST MANAGEMENT PRACTICES

This clause provides general information on BMP's that may be used in the Town. Additional information can be found in the references noted in Clause 2. The following list includes BMP's that would be most likely used in an urban setting. Non-inclusion of BMP's in this list does not mean that a BMP is not acceptable in the Town of Olds. The Consultant is to use flexibility and good judgment to select BMP's appropriate for the site and situation.

Permanent Best Management Practices

Permanent BMP's to be incorporated in the final site storm water plan may include:

a. Storm water Management Facility,

b. Armouring,

c. Vegetation,

d. Constructed wetlands,

e. Sediment (Grit) Separation Storm water Treatment Units.

For permanent ESC installations:

a. Make sure the proper vegetation is being used in each situation.

b. Pond and pipe situations are designed to overflow, therefore plan for the pond overflow situation. Know where the overflow will go and provide the required surface armour.

Erosion Control BMP's

Erosion control BMP's protect the soil surface and prevent soil particles from being detached by rain and wind. These tend to be the least expensive and most effective

BMP's. Erosion control treats soil as a resource with value and works to keep it in place. Erosion control BMP's are the first line of defense against erosion and sedimentation. Temporary BMP's are intended to address temporary conditions, be easily removed or be biodegradable. The following list includes some of the current erosion control BMP's. Other erosion control BMP's may also be considered:

a. Preservation of existing vegetation,

b. Construction sequence scheduling,

c. Just-in-time grading,

d. Slope treatments,

e. Seeding,

f. Mulches,

g. Hydro-seeding and hydro-mulching,

h. Erosion control netting,

i. Erosion control blankets, and

j. Rip-rap.

Temporary Sediment Control BMP's

Sedimentation control BMP's help collect sediment on the site in selected locations and minimize the sediment transfer off the site. Sedimentation controls are generally passive systems that rely on filtering or settling of soil particles out of the water or air. Sedimentation controls treat soil as a waste product and works to remove it from the transport system. Sedimentation control BMP's are the last line of defense against erosion and sedimentation. The following list includes some of the current sediment control BMP's. Other erosion control BMP's may also be considered:

a. Sedimentary basins,

b. Sedimentary traps,

c. Sedimentary barriers,

d. Inlet protection measures,

e. Stabilized construction entrance,

f. Dust control,

g. Brush/rock filter berms,

h. Dewatering.

C. BMP INSTALLATION

The sequence of BMP installation must minimize erosion and sedimentation. The following should be considered:

1. Established methods may not meet the objective of preventing erosion and sedimentation.

2. If the contractor can demonstrate that substitute materials can provide the same level of protection, then alternative methods may be considered.

3. Consider the proposed approach and methods in light of achieving the desired goal as well as the economics.

The Consultant and the Contractor should consider the following when designing, installing and maintaining the BMP's:

1. Time the grading work to avoid rainy periods where possible (typically May to June),

2. Leave as much undisturbed vegetation as possible,

3. Minimize the duration of soil disturbance,

4. Disturb and then restore small areas rather than fewer large areas,

5. Protect soil stockpiles from eroding and trap sediment,

6. Break up slope lengths, reduce slope steepness, and control flow concentrations,

7. Emphasize erosion control by vegetating, mulching or stabilizing disturbed areas quickly,

8. Direct runoff away from disturbed areas,

9. Design and construct drainage channels and outlets to handle concentrated flows until permanent structures and vegetation are functional,

10. Use sufficiently sized temporary sediment basins, traps, etc.,

11. Inspect and maintain control measures, especially before and after storms,

12. Install backup BMP's upstream of critical areas and have materials available for emergencies, and

13. Keep good records.

BMP's will not work properly unless they are installed properly and in accordance with specifications and the manufacturer's recommendations. Regular inspection and maintenance of BMP's is required to keep them fully functional. Deficiencies in quality control can make the ESC situation worse and lead to disastrous failures.

7. EROSION AND SEDIMENT CONTROL REPORT

A. GENERAL

The Erosion and Sediment Control Report provides a description of the overall strategy for ESC. In conjunction with a Stripping and Grading Permit, as a condition of a Development Permit and / or a Development Agreement the Developer or applicant will be required to prepare a detailed Erosion and Sediment Control Report to summarize the aspects of the project that are important for erosion and sediment control. The report should include discussion on the following topics:

1. Location and Site Characteristics,
2. Proposed Development Characteristics,
3. Erosion and Sediment Controls,
4. Sediment Control Calculations,
5. Inspection and Maintenance,
6. Modifications to an ESC Plan,
7. ESC Plan Checklist.

B. LOCATION AND SITE CHARACTERISTICS

1. Describe the location of the proposed development, including a legal description of the site and a reference to adjacent properties and landmarks.
2. Describe the existing land use:
   a. General topography (slope and slope lengths within the site),
   b. Vegetation,
   c. Soil types (particule size, erodibility),

d. Extent and nature of development,

e. Drainage patterns,

Critical areas within the proposed development site that have the potential for serious erosion or sediment problems.

3. Identify neighbouring areas such as streams, lakes, residential, commercial and/or industrial areas, environmental and/or municipal reserves, escarpments, and/or roads that may be affected by the land disturbance.

C. PROPOSED DEVELOPMENT CHARACTERISTICS

1. Provide a general description of the proposed development with a brief description of the land disturbing activity.

2. Indicate the area and the amount of grading for each phase of development.

3. Describe the permanent storm water management system and the use of these facilities during the construction period.

D. EROSION AND SEDIMENT CONTROLS

1. Determine runoff (snowmelt and rainfall) quantities from within the development area and from the upstream watershed area.

2. Provide a description of the methods that will be used to control erosion and sediment transport on the site. Provide detailed design information and calculations as required in Clause 6. Stabilization of soils should be the first line of defense.

3. Identify permanent and temporary control methods for each phase of development.

4. Determine the impact on the receiving water bodies if the erosion and sediment controls are breached or fail.

5. Indicate schedule of regular field checks to ensure ESC measures are operational and functional (e.g. check silt fence is upright, sediment trap not filled after an event, etc.).

6. Show the location, height and volume of stockpiles. Indicate erosion control measures to control sediment runoff from the stockpiles.

7. Indicate the types and scheduling of individual erosion control measures, including interim or short-term measures (Less than 45 days duration).

8. Clearly indicate the measures to control sediment export off the development site.

9. Describe how the site will be stabilized after construction (site grading and servicing) is completed.

E. SEDIMENT CONTROL CALCULATIONS

The following calculations/specifications should be provided in the report:

1. Design criteria and calculation such as the design particle size for sediment basins.

2. Calculations to demonstrate the design sediment removal efficiency from the runoff from the site as a percentage.

Note: Calculations to determine soil loss using the Revised Universal Soil Loss Equation (RUSLE) can be found in Section 6 of the Alberta Transportation - Design Guidelines for Erosion and Sediment Control for Highways.

3. Seeding and vegetative specifications.

4. Inspection and maintenance notes.

F. ESC PLAN CHECKLIST

A checklist can assist in ensuring that all necessary elements of a comprehensive ESC Plan have been addressed. Appendix A, included at the end of this section, provides a checklist of the minimum requirements for an ESC Plan.

G. MODIFICATIONS TO ESC PLAN

The ESC Plan must be a stand-alone document that can be located on the construction site for use by site personnel, inspectors and regulators. As site work progresses, the ESC Plan should be modified by the consultant and/or contractor, in consultation with Town staff, to reflect changing conditions.

H. INSPECTION AND MAINTENANCE

1. Establish a schedule of regular inspections and expected repairs of erosion and sediment control devices.

2. Record changes to the ESC Plan due to changing conditions, revised phase boundaries, etc.,

3. Appendix B, included at the end of this section, is a sample ESC Inspection/ Maintenance Report.

Note: The Town considers that a Developer, project manager, and / or contractor who fails to provide and maintain an ESC Plan for the duration of the project may be considered in contravention of The Acts and Bylaws outlined in Clause 3 of this section.

ESC PLAN CHECKLIST

Project Name
Name of Developer
Consultant
Legal Land Description
Civic Address (If applicable)

Note: The ESC Plan must be developed to apply to the specifics of the site and project, but as a minimum the ESC Plan must address the following information. (Note: An "**X**" appears if the information should appear/be addressed in the report, drawings, and/or calculations portions of the ESC Report and/or ESC Plan.)

Item	Report	Drawing		Calculations
		Site Plan	BMP Details	
Site Characteristics				
Nature of proposed development	**X**	**X**		
Size of proposed development	**X**	**X**		
Proposed site access locations	**X**	**X**		
Adjacent properties/landmarks	**X**	**X**		
Existing Land Use				
Existing Use (agricultural, residential, etc.)	**X**	**X**		
General topography (slope gradients, lengths, orientation, etc.)	**X**	**X**		**X**
Drainage patterns – provide topography map with contour intervals sufficient to show drainage patterns, drainage divides and flow directions.	**X**	**X**		**X**
Vegetation (e.g. location and types of trees, shrubs, grass, rare vegetation, etc.)	**X**	**X**		
Soil types (grain size, erodibility, etc.)	**X**	**X**		**X**
Critical areas (protected vegetation, ravines, escarpments, etc.)	**X**	**X**		

Item	Report	Drawing		Calculations
		Site Plan	BMP Details	
Existing Land Use				
Neighbouring areas that may be impacted by development (e.g. rivers, streams, lakes, residential/commercial/industrial/public service developments, parks, roads, etc.)	**X**	**X**		
Proposed Development				
General Description of proposed development	**X**			
Development phasing	**X**	**X**		
Clearing and grading phasing	**X**	**X**		
Stockpile locations, heights, volumes and timing	**X**	**X**		**X**
Surplus topsoil disposal, including proposed haul routes	**X**	**X**		
Drainage flow directions and divides for each drainage area after each stage of development, including contours of finished grades.	**X**	**X**		**X**
Location and description of permanent stormwater management facilities including storm drain inlets, pipes, outlets, waterways, swales, ponds, emergency flow routes, etc.	**X**	**X**	**X**	**X**
Erosion and Sediment Control Measures				
Erosion potential – slope lengths/gradients, soil erodibility, evaluation summary	**X**		**X**	**X**
Erosion control – protection of exposed surfaces, runoff control, wind erosion.	**X**		**X**	
Sediment control – filtering, impoundment, mud control (vehicle tracking), catchbasin protection.	**X**	**X**	**X**	
Description, location and timing of all temporary and permanent ESC measures, including construction details	**X**	**X**	**X**	
Describe good housekeeping measures	**X**		**X**	
Stockpile locations, heights, volumes and timing	**X**	**X**		

Item	Report	Drawing		Calculations
		Site Plan	BMP Details	
Erosion and Sediment Control Measures				
Cut/fill slope locations, heights, volumes and timing	**X**	**X**		
Exposed soil horizons, soil types (topsoil, fill, bedrock, clay, sand, etc.), locations and timing	**X**	**X**		
Temporary diversion of water on-site	**X**	**X**		
Winter operations/shut-down measures	**X**			
Control of spring runoff from adjacent lands	**X**	**X**	**X**	
Post-construction stabilization measures	**X**			
Seeding and mulching descriptions and locations	**X**	**X**		
Signage, Inspection and Maintenance				
Signage (Private property/No trespassing/No unauthorized personnel beyond this point, etc.)	**X**			
Schedule and records of regular inspections and expected maintenance of ESC measures	**X**			
Records of inspections and maintenance after storm events	**X**			
Update ESC plan for changing conditions	**X**			

SAMPLE ESC INSPECTION/MAINTENANCE REPORT				
Project Name:				
Inspection Date/Time:				Date of Last Inspection:
Inspected by:				
Verbal/Written Notification given to:				Date:
Current Weather:		Weather Forecast		
mm of rain last week:		mm of rain in last 24 hours		
Stage of construction				
Contractors on -site				
Construction activities on-site				
Inspection Checklist	**Yes**	**No**	**Comments**	**Action Required**
Has stripping and grading been phased where possible?				
Have stripped areas/exposed soils/steep slopes been protected and stabilized?				
Have waterways and drainage ways been protected and Stabilized?				
Are perimeter controls in place and functioning adequately?				
Are off-site/downstream properties/waterways protected?				
Are construction entrances stabilized to minimize tracking of soil and mud off-site?				
Are Sediment Control BMP's in place and functioning adequately?				
Are Transport Control BMP's in place and functioning adequately?				
Are Erosion Control BMP's in place and functioning adequately?				

1. GENERAL

In accordance with the Town Land Use Bylaw, the Developer and/or landowner shall not do any fieldwork including site clearing, topsoil stripping and/or grading prior to receiving a Development Permit. A condition of the Development Permit will be to apply for a Clearing, Stripping and Grading (CSG) Permit (referred to as Mechanized Excavation, Stripping & Grading Permit in the Land Use Bylaws). The CSG Permit is applied for through the Engineering Services Department.

Once the Developer has an approved Servicing Study a CSG Permit may be applied for. As part of the CSG Permit application a Grading Plan is to be provided. That plan is to conform to the grading plan prepared with the Servicing Study, as detailed in Section 5 – Servicing Study.

Where CSG operations require or may affect adjacent lands, the Developer shall identify the owners of all lands adjacent to the CSG area and provide written documentation (letters and/or agreements) from the affected property owners giving permission to access such lands, including Town owned lands (e.g. Affecting adjacent lands would be for back-sloping, drainage or other purposes).

Appendices ‘A’ and ‘B’ in this section are checklists identifying the required submissions for a permit application. Appendix ‘C’ is a basic list of items that field inspectors are to review as part of the project over the course of its duration.

A. EXCEPTIONS:

1. Non-sensitive land

Once the Area Structure Plan (ASP) has been through the initial open house, the Development Authority may permit clearing and topsoil stripping only of “non-sensitive lands” (e.g. Non-sensitive land typically refers to “greenfield” or agricultural land) at the discretion of the Town. Permits for grading of “non-sensitive lands” will not be issued until a Servicing Study has been accepted by the Town.

2. Sensitive Lands

No clearing, stripping or grading of “sensitive lands” such as wetlands, drainage courses, natural areas for possible preservation, or areas of public concern may occur until the ASP has been approved by Council. Developers and Consultants are advised to contact Alberta Environment and Parks if proposed developments contain existing wetlands.

a. Wetlands

1. The Developer is responsible to provide correspondence from Alberta Environment and Parks that no wetland or natural preserve area is located within the ASP area they are developing, OR

2. Provide a letter from Alberta Environment and Parks stating that a Water Act approval has been granted. Further information regarding the requirements to receive the Water Act approval may be found on the Alberta Environment and Parks website.

b. Natural Areas

Natural areas typically refer to tree stands and areas of ecological sensitivity and / or diversity. These areas will be designated through the Town's Engineering Services and require their approval prior to disturbance of a natural area.

3. Contaminated Site(s)

The Developer may apply for a Stripping and Grading Permit for areas outside the contaminated site prior to the contamination being remediated if:

a. As part of a Phase 2 ESA the extents of the contaminated site(s) is to be clearly delineated on a plan, by a qualified Consulting Engineer, and

b. Depending upon the cause of the contamination, a buffer area(s) is to be created around the contaminated site(s). The land in the buffer area is not to be disturbed until the contaminated site(s) has been remediated. If multiple sites are involved, the Developer may apply for relaxation of the buffer area(s) as the individual sites are remediated.

2. REGULATORY REQUIREMENTS

The Developer must implement erosion and sediment control measures as part of ground disturbance work. Federal, Provincial and Municipal regulatory requirements for clearing and grading are included in Section 6 – Erosion and Sediment Control Measures, Clause 3.

3. SPECIAL CONDITIONS

A. RESTRICTIONS, NOTICES AND SITE PREPARATION

After a CSG permit has been approved by The Town and prior to the commencement of site clearing and grading, the Developer shall:

1. Notify the Engineer 48 hours in advance and arrange a site meeting with the Consultant and the Contractor.

2. Erect fencing and provide other measures to ensure that the clearing, topsoil stripping and grading operation does not encroach into Environmental Reserves and other restricted areas.

3. Erect “Private Property” and “No Trespassing” signs on the perimeter of the Lands, stating the Developer’s name and the telephone number of a representative.

4. No grading, filling or excavation is permitted within utility and road right of ways, under any overhead utility lines, or over any underground utilities, unless prior written authorization has been received from the utility agencies concerned (see Section 1 – General Information, Clause 4).

5. Where the Developer proposes to establish a haul route which crosses an existing roadway, the Developer shall apply for a Crossing Agreement as outlined in Section 1 – General Information, Clause 4.

6. When possible, clearing and stripping should take place outside of the nestling/fledgling time period. If work is to occur during the nestling/fledgling time period, information regarding any restrictions shall be noted in the Contract Documents as a Supplementary Condition in the Development Agreement, or on the Clearing, Stripping, and Grading Permit as applicable.

B. ENVIRONMENT PROTECTION

All work associated with clearing, stripping and grading shall be completed in accordance with Section 01 35 43 of the Town of Olds Contract Specifications.

C. PLANT PROTECTION

The Developer shall protect trees and plants on site and on adjacent properties where indicated on the Drawings. Clearing work and tree preservation is to be completed in accordance with Town of Olds Contract Specification Section 31 11 00 and 32 93 50.

D. WEED AND VEGETATIVE GROWTH CONTROL

Per the Alberta Weed Control Act, the Developer shall be responsible for controlling / prohibiting noxious weeds, prohibitive noxious weeds, and excessive vegetative growth within the clearing, stripping and grading area.

4. TOPSOIL STOCKPILES AND DISPOSAL

A. GENERAL

The Developer shall strip and stockpile topsoil within the Development as necessary to facilitate development of the lands and / or arrange for the appropriate disposal of all topsoil that is surplus to the requirements of the Developer's Lands.

Where a Development is located adjacent to an Expressway and/or Arterial Roadway, the Town **may request** the Developer to construct or complete the construction of the sound attenuation berm to the design cross sections illustrated in Section 16 – Drawings. The Developer will need to confirm this prior to stripping of topsoil. The Developer, at his option, may utilize waste excavation material and/or surplus topsoil for this work.

B. TOPSOIL (LOAM) STOCKPILES

1. The amount of topsoil stockpiled on Municipal Reserve parcels shall be restricted to the quantity required to complete the topsoil replacement on the Park Site(s), any other Municipal Reserve parcels within the Development area, and the adjacent arterial roadway berms. Stockpile side slopes shall be no steeper than 3:1 for safety purposes and to allow for weed control.

2. All topsoil that is set aside for later use on residential lots shall be stockpiled on a non-reserve parcel elsewhere in the Development.

3. Surplus topsoil shall not be stockpiled within undeveloped road right of ways.

4. The stripped loam shall be stockpiled in approved locations as shown on the Drawings. The stockpiles shall be neat in appearance, free from any hazardous conditions and treated to prevent erosion from wind and rainfall and shall be posted against dumping and designated "Private Property", "No Trespassing" and "No Unauthorized Personnel Beyond This Point".

5. The loam pile(s) shall be removed as development progresses. All loam piles, with the exception of the loam pile on the Neighbourhood School/Park site(s), must be removed prior to the last phase of development of the Developer's Lands.

C. OFF-SITE DISPOSAL CONSIDERATIONS

Where the Consultant has identified topsoil and / or waste excavation will be disposed of off-site of the development or construction project consideration is to be taken into account for Town road infrastructure, the effect on future development and the environment (e.g. natural lowlands, woodlands, etc.). The

Town may require drawings and documents to support the choice of disposal locations.

5. STORM WATER MANAGEMENT FACILITIES

A. GENERAL

Construction of a storm water management facility, require Alberta Environment and Parks approval. Although the Town may allow grading of a storm water management facility prior to an Alberta Environment and Parks approval it does not negate the Developer from the responsibility of ensuring an application has been made (typically prior to or at the time of a Development Agreement application). Only the approved construction drawings can be used for the submission to Alberta Environment and Parks for the permit application.

Refer to the Development Agreement and Section 10 – Storm water Management Design for information regarding the Developer's financial obligations for the construction of the storm facility.

B. CONTROL OF DRAINAGE

The Developer shall, at no expense to the Town, before, during and after the clearing, topsoil stripping and grading of the area, implement the drainage control measures for the control and disposal of all storm water (rainwater or snow melt) in and from the lands which may be cut off from its natural drainage route by the development, but not limited to, inlet protection to any adjacent storm sewer system.

6. EROSION AND SEDIMENT CONTROL MEASURES

A. GENERAL

1. The Developer shall prepare Erosion and Sediment Control Plans as detailed in Section 6.

2. The Developer of the lands being stripped and graded shall employ appropriate measures to control dust, particularly in the vicinity of existing roadways and dwellings to ensure traffic safety and to minimize dust nuisance complaints from the public.

B. EROSION AND SEDIMENT CONTROL (ESC) PLAN MODIFICATIONS

The Developer shall submit any modifications to the drainage plans and the ESC plan that may be necessary from time to time for various reasons, but not limited to, portions of the Lands becoming developed, or adjacent lands becoming

developed, or drainage and erosion control facilities that may require rerouting or redesigning.

7. REHABILITION OF ADJACENT LANDS

The Developer shall not do any work on adjacent lands without express written permission from adjacent landowners. Where clearing, stripping and grading operations have encroached on adjacent lands, the Developer, at its sole expense, and to the satisfaction of the Engineer, shall rehabilitate in a timely manner, any off-site areas or operations, storm water runoff, soil erosion, soil instability, sedimentation, dust or other problems which may arise from the clearing, stripping and grading operation.

8. DEEP FILLS GEOTECHNICAL REPORT

Where areas of fills greater than 1.2 m are proposed, a geotechnical report will be required if no or limited information is available in the Geotechnical Report required at time of Servicing Study. For more information regarding the requirements for the report, refer to Section 4 – ASP, of this document.

9. CONSTRUCTION COMPLETION AND FINAL ACCEPTANCE

The Town will **not** issue a Construction Completion or Final Acceptance certificate for clearing, stripping or grading work, however failure by the Developer to implement, maintain and comply with the ESC plan can result in legal action as outlined in Section 6 – Erosion and Sediment Control.

10. DRAWING SUBMISSION

Specifications for the detailed CSG Plan are included in Section 2 - Drawing Standards.

CLEARING, STRIPPING & GRADING PERMIT REQUIREMENTS

DEVELOPMENT OF INDUSTRIAL, COMMERCIAL, INSTITUTIONAL AND/OR MULTI-FAMILY PARCELS

	Item	Provided	Deficiency Corrected
1.	Provide completed Stripping and Grading Permit application.		
2.	Provide Permit Fee		
3.	Provide one (1) - 8 ½" x 11" copy of an area map (to be attached to Stripping and Grading Permit) showing the following, if applicable:		
.1	The area to be cleared, stripped, and/or graded to be outlined with a bold solid line.		
.2	The location of any preservation areas including wetlands and tree stands within or adjacent to the limits TO BE outlined with a bold dashed line.		
.3	The location of any contaminated lands within or adjacent to the limits TO BE outlined with a bold dashed line		
.4	The locations of any topsoil stockpiles to be outlined with a bold dashed line and crosshatched with lighter lines.		
.5	Identify the owners of all lands adjacent to the clearing and grading area.		
4.	Where clearing and/or grading operations will encroach beyond the boundary of the parcel, provide the following:		
.1	Written documentation (Letters and/or Agreements) from the affected property owners giving permission to access such lands, including Town owned lands.		
.2	Cross sections must be submitted where the clearing and grading boundary abuts other property owners,		
5.	If wetland area is within site, has a letter from Alberta Environment been provided?		
6.	Provide copies of Crossing Agreements for crossing gas mains, electrical transmission right of ways, etc., if required.		
7.	Copies of Contractor Insurance Documents (as detailed in The Town of Olds Development Agreement)		
8.	Certificate of Insurance (Signed Original) as detailed in The Town of Olds Development Agreement)		
9.	Provide one (1) - 11" x 17" drawing (to be attached to Stripping and Grading Permit) showing the following:		
.1	Identify the owners of all lands adjacent to the clearing and grading area.		
.2	Any intended clearing, stripping and grading on adjacent lands, including details of edge conditions, back sloping requirements and areas where topsoil is to be placed and/or seeded until natural conditions are restored.		
.3	Clearing and Grading design (as detailed in the Town of Olds Design Guidelines – Section Seven)		
.4	Showing temporary and/or permanent Erosion and Sediment Control measures to be incorporated in the work (as detailed in the Town of Olds Design Guidelines – Section Six.)		
.5	Show the means by which all storm water in and from the subject lands will be controlled.		
.6	If applicable, show how flow along natural drainage courses will be intercepted or diverted around the site.		

CLEARING, STRIPPING & GRADING PERMIT REQUIREMENTS

SUBDIVISION DEVELOPMENT

Item	Provided	Deficiency Corrected
1. Completed Stripping and Grading Permit Form		
2. Permit Fee, if clearing and grading work is to be completed prior to the signing of a Development Agreement.		
3. One (1) - 8 ½" x 11" copy of an area map (to be attached to Stripping and Grading Permit) showing the following:		
.1 The area to be cleared, stripped and/or graded to be outlined with a bold solid line.		
.2 The location of any preservation areas including wetlands and tree stands within or adjacent to the limits TO BE outlined with a bold dashed line.		
.3 The location of any contaminated lands within or adjacent to the limits TO BE outlined with a bold dashed line		
.4 The locations of any topsoil stockpiles to be outlined with a bold dashed line and crosshatched with lighter lines.		
.5 Identify the owners of all lands adjacent to the clearing and grading area.		
.6 Any intended clearing, stripping and grading on adjacent lands, including details of edge conditions, back sloping requirements, and areas where topsoil is to be placed and/or seeded until natural conditions are restored.		
4. Where the stripping and/or grading boundary abuts other property owners:		
.1 Provide written documentation (Letters and/or Agreements) from the affected property owners giving permission to access such lands, including Town owned lands, to be used for back sloping or other purposes.		
.2 Cross sections must be submitted.		
5. If a wetland area is within the site, has a letter from Alberta Environment been provided?		
6. Provide copies of Crossing Agreements for crossing gas mains, electrical transmission right of ways, etc., if required.		
7. Copies of Contractor Insurance Documents (as detailed in The Town of Olds Development Agreement)		
8. Certificate of Insurance (Signed Original) as detailed in The Town of Olds Development Agreement)		
9. Submit One (1) set of the servicing study drawings, with a minimum scale of 1:1000 (as detailed in the Design Guideline – Section Five). The Drawing requirements are summarized as follows:		
.1 **General Drawing Requirements**		
.1 North arrow		
.2 Municipal Address		
.3 Legal Description		
.2 **Clearing and Grading Drawing**		
.1 Existing utility rights of way (easements).		
.2 Existing survey control stations and markers.		
.3 Existing ground contours.		
.4 Proposed ground contours.		
.5 Identify natural features that are to be preserved and/or removed.		
.6 Note any unusual site conditions.		
.7 Test hole locations and original ground elevations.		

		.8	Details of topsoil stockpiles; include height, width, length and volumes.		
		.9	Location of all proposed utilities (e.g. water, sanitary sewers, storm sewers, gas, electrical, etc.)		
		.10	The means by which all storm water in and from the subject lands will be controlled and disposed of, including:		
			.1 How flow along natural drainage courses will be controlled, whether flow is intercepted or diverted.		
			.2 What erosion and sediment control measures are to be installed.		
	.3	**Cut/Fill Plans**			
		.1	Cut/Fill Plans are required for every stripping and grading project.		
		.2	Areas with fills ≥ 1.2 metre are to be highlighted on the drawing(s).		
	.4	**Development Phasing Plan**			
		.1	The Phasing Plan should indicate the area expected to be developed during the current year and the type of soil stabilization proposed for areas to be developed in following years.		
10.	Deep Fills Geotechnical Report				
	.1	A “Deep Fills” report, completed by a Geotechnical Engineer, is required when the proposed depth of fill is ≥ 1.2 metre.			
	.2	The report shall make general recommendations for different types of building foundations.			
11.	Additional Support Information				
	.1	Cross sections may be required to provide more information on the impact of the proposed clearing, stripping and grading on adjacent properties. The cross-section(s) should show the existing grade of the site, proposed grade for the site, grade of adjacent sites, and grade of adjacent Town, County and/or Provincial roads. Datum points are required to ensure accuracy.			
	.2	A revised site plan showing fencing, including the snow fence required at the boundary of any environment reserve land.			
	.3	An Erosion Control Report is necessary when erosion control measures are required.			

INSPECTION CHECK LIST

Project Name:	Agreement No.

STAGE OF CONSTRUCTION

	Pre-construction Meeting Clearing and Grubbing		Rough Grading Finish Grading		Final Stabilization Maintenance Period

INSPECTION CHECKLIST

Item	Yes	No	NA	Comments
Have all cleared and stripped areas requiring temporary or permanent stabilization been stabilized?				
Seeded?				
Mulched?				
Graveled?				
Are stockpiles adequately stabilized with seeding and/or sediment trapping measures?				
Does permanent vegetation provide adequate stabilization?				
Have sediment-trapping facilities been constructed as the first step in stripping and grading?				
For perimeter tapping measures, are earthen structures stabilized?				
Are sediment basins installed where needed?				
Are finished cut and fill slopes adequately stabilized?				
Are on-site channels and outlets adequately stabilized?				
Do all operational storm sewer inlets have adequate inlet protection?				
Are stormwater conveyance channels adequately stabilized with channel lining and/or outlet protection?				
Are properties and waterways downstream from the development adequately protected from erosion and sediment deposition due to increases in peak stormwater runoff?				
Is runoff upstream of the development adequately directed to the temporary and/or permanent stormwater management facilities?				
Are soil and mud kept off public roadways at all access points to the site?				
Is in-stream construction conducted using measures to minimize channel damage?				
Are temporary stream crossings on non-erodible material installed where applicable?				
Is necessary restabilization on in-stream construction complete?				
Have all temporary control measures that are no longer required been removed?				
Have all permanent control structure repairs and sediment removal been performed?				

Report Completed By:	Date:

White – Engineering Services Green - Consultant Yellow - Contractor

1. GENERAL INFORMATION

The water system consists of the treatment plants, reservoirs, booster stations, trunk water mains, distribution mains, and appurtenances.

In general, water mains 350 mm and larger will be designated "Trunk Water" and the cost of these trunks are included in the current Water Off-site Levy Rate. The current Trunk Water lines identified in the most recent Council approved Off-site Levy Report. Individual lot services and hydrants should not be connected to Trunk Water lines unless approved by Environmental Services.

Water mains 150 mm - 300 mm will be designated "Distribution Mains".

The design of the water system shall conform to the Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems, as published by Alberta Environment and Parks and as amended by these guidelines.

2. DESIGN FACTORS

A. HYDRAULIC ANALYSIS REQUIREMENTS

The Developer shall perform a hydraulic network analysis using WaterCAD for all developments to ensure both domestic and fire flow requirements are met. To ensure that residual disinfectant levels and water age requirements are met, a minimum water exchange rate of 100% every 5 days is to be maintained. A report outlining the results of the analysis shall be submitted to the Town with the subdivision design drawings. The Developer is to utilize a current copy of the Town's WaterCAD model for the analysis, or request boundary conditions to the site.

B. DESIGN PARAMETERS

The following parameters shall be used in the design or evaluation of the water distribution system:

1. Hazen-Williams Coefficient (C)

a.	Polyvinyl Chloride (PVC)	140
b.	Asbestos Cement (AC)	130
c.	Ductile Iron (DI) or Cast Iron (CI)	80 to 100
d.	HDPE	150

2. Distribution Main Sizes

The minimum size of Distribution Mains shall be as follows:

a. Residential (low-density) = 200 mm diameter
(150mm diameter may be considered for short cul-de-sacs.)

b. Multi-Family Residential (Medium Density) = 250mm

c. Industrial = 250 mm diameter

Where two hydrants are to be installed on an un-looped distribution main the minimum size of the main shall be 200 mm diameter.

3. Consumption Rates

a. Residential per capita consumption rates:

1. Average Day Demand: 375 litres (82 imp. gal.) per capita per day

2. Maximum Day Demand: 600 litres (132 imp. gal.) per capita per day

3. Peak Hour Demand: 1200 litres (264 imp. gal.) per capita per day

b. Non-residential consumption rates:

For non-residential developments, the minimum water consumption rate shall be equal to 0.15 litres per second per hectare. The applied peaking factor shall be $P_F = 10Q^{-0.45}$ to a maximum of 25 and a minimum of 2.5 where Q is in litres per second. In addition, water demand for large developments should be evaluated based on site specific service requirements as well as fire flow requirements.

4. Design Population

The design population shall be the ultimate population in the area under consideration based on the approved Zoning By-law requirements.

5. Fire Flow Requirements

Fire flow requirements shall be in accordance with the recommendations of the Fire Underwriters Survey for the type of development being considered. The minimum fire flow used for single family residential subdivisions shall be 4,500 litres/minute (1000 igpm).

The minimum fire flow used for developments larger than a single family (e.g. commercial, apartment) should also be in accordance with the fire flow requirements set out by the architect.

6. Pressure

a. Minimum residual line pressure under maximum day plus fire flow conditions shall be 150 kPa at ground level of any point in the system. Minimum residual line pressure under peak hour flow conditions shall be 300 kPa.

b. Minor pressure losses through valves and fittings must be accounted for.

7. Velocity

Main line flow velocities should not exceed 1.5 m/s during peak hour flow conditions and 2.5 m/s during maximum day demand plus fire flow conditions.

8. Chlorine Residuals

The design must address low demand conditions, even if they will be temporary, which could affect chlorine residuals in the system.

3. DISTRIBUTION MAINS

A. GENERAL

The standard grid main network required within residential subdivisions is as shown in Section 16, Drawing 1.02. The grid mains must coincide with those in adjacent subdivisions to maintain the continuity of main sizes between subdivisions. Distribution Mains shall be continuous (looped) wherever possible. The maximum length of main permissible between ties in residential developments is 300 m. No more than 30 dwelling units shall be permitted service on an un-looped (dead end) section of water main. Where the circumstance relates to development beyond current Town water infrastructure on a single feed, refer to Section 5 – Servicing Study.

Water demands in industrial, commercial, and high density areas must be analysed to determine the grid and main sizes required.

An air release valve or hydrant shall be placed at significant high points in the water main profile to allow for purging of stale water or air.

A hydrant shall be installed at the end of all dead-end water mains to facilitate flushing and disinfection of the main.

Refer to the Contract Specifications – Division 33 for pipe material information.

B. ALIGNMENTS

Water mains shall be located on the standard alignment shown in Section 16, Drawing 4.07 for streets and Drawings 4.08 and 4.09 for lanes and public utility lots. A minimum

horizontal separation of 2.5 m (3.0 m separation is preferred) from sanitary and storm sewers shall be provided in all instances, unless approved otherwise by the Engineer. Consistent alignments shall be used along the entire length of a street, lane, or public utility lot.

Where it is necessary for a water main to cross below a sewer main, the water main shall be protected by providing:

1. a minimum vertical separation of 0.5 metres between water pipe crown and sewer pipe invert;

2. structural support of the sewer to prevent excessive joint deflection and settling; and

3. centre the length of watermain at the point of crossing so that the joints are equidistant from the sewer.

C. DEPTH OF COVER

Water mains shall be installed with a minimum depth of cover of 2.7 m from the road/lane/utility lot surface grade to the top of the main. Where existing conditions dictate that the depth of bury be less than 2.7 m, the main/service is to be insulated as specified in the Contract Specifications – Section 50.

D. OVERSIZE

Oversize of a water pipe will not apply to distribution water mains installed in accordance with the standard grid.

4. HYDRANTS

A. SPACING

The maximum spacing between hydrants, as measured along the centre line of the right of way, shall be 180 m in residential areas and 120 m in multiple family residential, school, and industrial/commercial areas. The distance from the primary entrance of any building to a hydrant shall not be greater than 90 m as measured along the line of the emergency vehicle access.

B. APPROVALS

A plan showing all proposed hydrant locations within the Development, must be submitted to The Town of Olds Engineering Services, and Planning and Development for distribution and review by the Emergency Services Department, Fire Prevention Bureau, for approval of locations and spacing prior to finalizing the design of the water distribution system.

C. ALIGNMENT AND PLACEMENT

Hydrants should be placed at street intersections where possible to improve their visibility to emergency vehicles, particularly at cul-de-sac entrances. Fire hydrants shall be located at an alignment of 2 m back of face of curb (typically where separate sidewalk is used) or 0.5 m back of walk (typically where monolithic sidewalk is used). Where a hydrant is installed at the corner of an intersection, it shall be installed at the beginning or end of the curb return located on the side yard of the adjacent lot.

Where the road cross-section does not allow for these requirements to be met, the Developer will either provide additional right-of-way or easement to protect the hydrant.

D. HYDRANT TYPE

Hydrants shall have self-draining holes and be from a Town approved hydrant manufacturer. Approved hydrant manufacturers are Mueller Co. and Canada Valve. All hydrants shall have a 5” Storz pumper nozzle and two 2.5” hose nozzles.

E. DEPTH OF BURY

The depth of bury is defined as the distance from the invert of the suction elbow to the underside of the grade line flange. Minimum depth of bury is 2.65 m. The underside of the grade line flange shall be set at an elevation of 100 mm above the finished back of walk elevation.

5. VALVES AND FITTINGS

A. ALIGNMENT AND PLACEMENT

Main valves shall be located such that no more than 30 single family lots and one hydrant are involved in a shut down and a maximum of two valves are required to shut down any section of distribution line.

The design standard shall be three valves at a tee and four valves at a cross, unless accepted otherwise by the Engineer. The exception will be at a hydrant lead tee where only one valve on the distribution main is required in addition to the hydrant valve. A valve, one length of pipe, and a temporary flushing hydrant or blow-off valve shall be installed at the interim limits of construction. See Section 16 – Drawings for typical valve locations.

If a valve alignment, as per the drawings in Section 16, places it in a sidewalk, the proposed location is to be modified so the valve is within the road surface. All hydrant valves will be located 0.5m from the distribution main tee.

B. PROTECTION

Where required by the Engineer, or as indicated by soils testing, all cast iron valves and fittings shall be wrapped with Denso Anti-Corrosion Product or approved equivalent to prevent corrosion.

C. OPERATION OF BOUNDARY VALVES DURING CONSTRUCTION

The Consulting Engineer shall clearly identify boundary valves on the engineering design drawings. Basic procedures for operating existing valves during construction are as outlined in The Town of Olds Contract Specifications – Section 33 11 16.

6. WATER MAIN FLUSHING AND DISINFECTION PROCEDURES

A. GENERAL

The following procedures will be followed when installing water mains connected to The Town's water distribution system:

1. Basic procedures to meet the standards outlined in AWWA C651 Current Edition, "Disinfecting Water Mains" and The Town of Olds Contract Specifications – Section 33 11 16.

   Note: The Consulting Engineer must collect all water samples.

2. Water supply for public consumption will not be turned on until Environmental Services has approved a flushing drawing(s), received clean water sample results from the testing laboratory and the mains have been cleared of flushing water.

7. RURAL WATER WELLS

A. GENERAL

Generally, water wells are not permissible within the Town of Olds, however, where Town infrastructure is unavailable, a private water well may be acceptable, at the discretion of the Engineering Services Department.

Design and construction of new or upgraded water wells shall be in accordance with the guidelines and standards set out by the Department of Agriculture and Rural Development (Province of Alberta). The Developer / landowner should construct their water system such that it will be at a depth and alignment to connect to the Town’s water main once it is available.
Refer to the Utility Bylaw for the requirements for connecting an existing development to Town mains once Town water infrastructure has been provided.

1. GENERAL INFORMATION

The sanitary system must be designed with consideration for the service area boundaries established by the Town for each sanitary trunk system.

In general, sanitary mains 375 mm or greater, and/or smaller diameter mains installed at depths greater than 6.0 m, complete with related pumping facilities, will be designated "Trunk Sanitary", and the cost of these mains are included in the current Sanitary Off-site Levy Rate. The current Trunk Sanitary is identified in the most recent Council approved Off-site Levy Report.

The design of the sanitary sewer system should conform to the Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems, as published by Alberta Environment and Parks and these guidelines.

The Town currently maintains the infrastructure modelling utilizing PC-SWMM. It is the responsibility of the consultant to provide data in a format which is compatible to it.

2. DESIGN FLOWS

A. RESIDENTIAL (POPULATION GENERATED)

Residential dry weather flows are to be calculated as follows:

$Q_{PDW} = (G \times P \times Pf) / 86.4$

Q_{PDW} = the peak dry weather design flow rate (litres/sec)

G = 320 litres/day/person

P = the design contributing population in thousands
(Population per hectare x contributing area/1000)
(Design population = 45 people per hectare)

Pf = Harmon's Peaking Factor = $1 + 14/(4 + P^{0.5})$

B. NON-RESIDENTIAL

For detailed system design, the average wastewater flow from non-residential land use areas are to be estimated as outlined in Section 4.0 of the Alberta Environment and Parks Standards and Guidelines for Municipal Water Supply, Wastewater, and Storm Drainage Systems and as modified below.

1. Average Flow Generation Estimates for Planning

   For system planning purposes, when specific land uses and zoning are unknown and the requirements cannot be defined, the recommended lower limits for estimation of average flow generation (to be used for preliminary planning unless the use of other values is justified with more specific or reliable information) are as follows:

   a. Commercial and Industrial Land Uses

      The lower limit for Average Flow Generation should be 40 m3/day/ha (0.46 L/s/ha).

   b. Industrial Land Uses

      The lower limit for average flow generation should be 30 m3/day/ha (0.35 L/s/ha).

2. Determination of Peak Dry Weather Flow Rate

   Peak dry weather flow rates for specific design areas are to be determined by application of a peaking factor (Pf), related to the average flow rate (QAVG in L/s) in accordance with the following expression to a maximum value of 5.0:

   Pf = 6.659 (QAVG^-0.168)

   Following from this, the peak dry weather flow rate (QPDW in L/s) may be determined as follows:

   QPDW = Pf.QAVG
   6.659 (QAVG^0.832)

C. EXTRANEOUS FLOW ALLOWANCES - ALL LAND USES

For The Town of Olds, a general allowance of 0.20 L/sec/ha shall be applied, irrespective of land use classification, to account for wet weather inflow to manholes and for infiltration into pipes and manholes.

An effort should be made during the design stage to locate sanitary manholes away from roadway sag points.

3. SANITARY SEWER MAINS

A. GENERAL

Sanitary sewers shall be designed for gravity flow unless approved otherwise by the Engineer.

B. MINIMUM SLOPE

Sanitary mains shall be laid in a straight alignment between manholes at the following minimum grades:

Pipe Diameter	Minimum Grade
200 mm	0.40 %
250 mm	0.28 %
300 mm	0.22 %
375 mm	0.15 %
450 mm	0.12 %
525 mm or greater	0.10 %

The hydraulic capacity of a gravity sanitary sewer shall be based on such factors as projected in-service roughness coefficient, slope, pipe material, and actual in-service flows. Sewers larger than the minimum size required shall be chosen so that the minimum velocity at the peak flow is not less than 0.6m/s for self-cleaning purposes.

C. PIPE MATERIAL

Refer to the Town of Olds Contract Specifications – Section 33 31 13 for pipe material.

D. PIPE STRENGTH

The strength of the pipe shall be sufficient to carry the loads due to trench backfill and wheel loads. The strength of pipe shall be calculated on the basis of the external loads, trench conditions, and class of bedding provided. 19-25mm washed rock bedding is the minimum bedding requirement.

E. CURVED SEWER

Although it is recommended that sanitary sewers be laid with straight alignments between manholes, curved sewers will be permitted with the following restrictions:

1. The sewer shall be laid as a simple curve with a radius equal to or greater than that recommended by the pipe manufacturer. Minimum radius shall not be less than 60 m.

2. Manholes shall be located at the beginning and end of the curve, and at intervals of not greater than 90 m along the curve unless approved otherwise by the Engineer.

3. The curve shall run parallel to the centre line of the right of way.

4. The minimum grade for sewers on curves shall be 50% greater than the minimum grades noted above.

F. ALIGNMENT

Sanitary mains shall be located on the standard alignment shown in Section 16 - Drawing 4.07 for streets and Drawings 4.08 and 4.09 for lanes and public utility lots. A minimum separation of 2.5 m (3.0 m preferred) from water mains shall be provided in all instances, unless approved otherwise by the Engineer. Consistent alignments shall be used along the entire length of a street, lane, or public utility lot.

G. DEPTH OF COVER

All sewers shall be designed so that the top of the main is at the minimum depth required to meet the conditions of Section 11 – Service Connections, Clause 4; but not shallower than 2.7 m, unless otherwise approved by the Engineer. Where conditions dictate that the depth of bury be less than 2.7 m, the main/service is to be insulated as specified in the Town of olds Contract Specifications - Section 50.

The maximum depth of cover shall not exceed 5.5 m in cases where sanitary service connections are to be installed. In situations where depth of cover exceeds 5.5 m, the Consulting Engineer shall redesign the sanitary sewer system and /or the site grading to reduce the depth of cover to less than 5.5 m. Where the depth of cover cannot be reduced to less than 5.5 m, a second small diameter main shall be installed on the same alignment as the deep main, at the minimum depth required to meet the conditions of Section 11 – Service Connections.

4. MANHOLES

Manholes shall be installed at the end of each line, at all changes in sewer size, grade, or alignment, at all junctions, and at intervals of no greater that 150 m along the length of the sewer.

To maintain a continuous energy gradient through manholes, the obvert (crown) elevation of the lowest upstream pipe shall be equal to, or higher than the obvert of the downstream pipe. Where the upstream and downstream pipe sizes are equal, the downstream pipe invert will be 30 mm lower than the upstream invert. Where a bend in pipe alignment occurs in a manhole, the invert elevation of the downstream pipe shall be at least 50 mm below that of the lowest upstream pipe.

Sanitary sewers are to be extended 1.5 m past the last house service lead, with the exception of sanitary mains in cul-de-sacs where service leads may be connected directly to the manhole provided that the lead enters the manhole less than 0.60 m above the invert of the main.

The flow channel through manholes shall be made to conform in shape and slope to that of the sewer. The depth of the flow channel should be at least one-half the diameter of the downstream sewer.

An interior drop manhole shall be used where invert levels of inlet and outlet sewers differ by more than 750 mm. If the interior drop pipe is greater than a 450 mm pipe a custom built Type 1-S manhole vault is required.

Safety platforms are to be installed in manholes having a depth of 6.0 m or greater.

Standard 1200 mm diameter pre-cast manholes shall be used on mains 750 mm in diameter or less. Pre-cast manhole vaults, or an oversized manhole barrel shall be used on mains 900 mm in diameter or greater. "T-Riser" manholes may be used on mains 1200 mm in diameter and larger, providing there is no deflection in alignment or grade. For safety reasons, all precast manholes shall be spigot-up.

Manhole bases may be cast-in-place or pre-cast complete with flow channel, benching, and pipe stubs. See manhole details in The Town of Olds Contract Specifications – Section 33.

5. OVERSIZE

Oversize may be applicable for sanitary mains. Oversize costs will be determined as outlined in the Development Agreement.

6. RURAL PRIVATE SEWAGE SYSTEMS

Generally private sewage systems (e.g. septic fields or ponds) are not allowed within the Town of Olds, however, where Town infrastructure is unavailable, private sewage systems may be acceptable, at the discretion of the Engineering Services Department.

Design and construction of a new or upgraded private sanitary sewer system shall be of **a pump-out only design** in accordance with the most recent version of the Alberta Municipal Affair's Alberta Private Sewage Systems Standards of Practice. The Developer / landowner should construct their sanitary sewer system such that it will be at a depth and alignment to connect to the Town's sanitary sewer main once it is available.

Refer to the Utility Bylaw for the requirements for connecting an existing development to Town mains once Town sanitary sewer infrastructure has been provided.

1. STORM WATER DESIGN

A. GENERAL

This section provides the design guidelines to achieve the principles of storm water management, through the combined use of the storm drainage system (a.k.a. minor system / pipes) and storm water management facilities, ensuring naturally cleaned water is returned to nature thus sustaining a healthy environment.

The storm sewer system must be designed with consideration for the existing drainage area boundaries established by the Town for each storm trunk system. All pertinent data regarding the Development should be discussed with the Engineer prior to design proceeding.

In general, storm mains 1200 mm or greater as well as storm water storage facilities and associated outlet piping will be designated "Storm Trunk"; the cost of these trunks are included in the Storm Off-site Levy Rate. The current Storm Trunks are identified in the most recent Council approved Off-site Levy Report.

The design of the storm sewer system should conform to the Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems, as published by Alberta Environment and Parks and as amended by these Guidelines. Detailed storm water management standards and guidelines are described in the Alberta Environment and Parks publication entitled “Stormwater Management Guidelines for The Province of Alberta”.

B. STORM WATER MANAGEMENT

These Guidelines, along with Alberta Environment and Parks Storm Water Management Policy, are the basis for storm water management for all developable land, including land upstream of existing pipe systems.

The main objectives of storm water management are as follows:

1. Ensure that the hydraulic capacities of existing pipe systems and/or watercourses are not exceeded.

2. Reduce to acceptable levels (1:100 year probability of occurrence, where reasonably attainable), the potential risk of property damage from flooding within new development areas, and in existing downstream developments.

3. Reduce to acceptable levels (1:5 year probability of occurrence, where reasonably attainable), the inconvenience caused by surface ponding within development areas.

Based on the preceding criteria, storm water management is to be implemented for all developable land unless approved otherwise by the Engineer.

C. MAJOR/MINOR SYSTEM

The storm drainage system shall be designed using a dual drainage concept consisting of a minor system and a major system.

The minor system comprised of pipes, manholes, catch basins, swales, storm water storage facilities, and outfall structures, shall convey run-off from snowmelt and rainfall events to an adequate receiving stream or pond without sustaining any surface ponding or excessive surface flows for events up to a 1 in 5 year return period, where reasonably attainable in the opinion of the Engineer.

The major system comprises the street system, storm water storage facilities, parkland, and any other routes required to convey run-off during rainfall events up to a 1 in 100 year return period, to the receiving water body. The major system shall be evaluated in a manner sufficient to determine that no flooding that may cause significant property damage (e.g. flooding of buildings) occurs during the 100-year storm event, where reasonably attainable in the opinion of the Engineer.

Development layouts shall be created in such a way so as to ensure that storm water runoff from public lands, rights-of-way, etc. is not directed through private property by allowing for appropriate space in rights-of-way for drainage swales as necessary.

D. RAINFALL INTENSITY-DURATION-FREQUENCY

The following formulas define the Intensity-Duration-Frequency Curves (IDF Curves) used by the Town. The formulas have been developed from the precipitation data from Atmospheric Environment Services of Environment Canada taken at Red Deer Industrial Airport from 1959 to 2012 (data published 2014).

1. Extrapolated IDF Formulas

Frequency	Interpolated Intensity (mm/hour)
2 year	$15.3 / t^{\wedge 0.674}$
5 years	$21.6 / t^{\wedge 0.697}$
10 years	$25.7 / t^{\wedge 0.706}$
25 years	$30.9 / t^{\wedge 0.715}$
50 years	$34.8 / t^{\wedge 0.719}$
100 years	$38.6 / t^{\wedge 0.723}$

t = storm duration in hours

E. RATIONAL METHOD DESIGN

The Rational Method of analysis shall be used to determine design flows for piped storm sewer systems of predominantly residential, commercial, and/or industrial land. Alternatively, computer modelling may be used (see item 'F' of this Section).

The Rational Method formula is:

Q = (CiA)/360

Where:
"Q" is the design peak flow rate (m^3/sec)
"C" is the run-off coefficient
"i" is the rainfall intensity (mm/hr) corresponding to the time of concentration
"A" is the area of contributing run-off surface (ha)

1. Run-off Coefficients

Minimum recommended run-off coefficient (C) values to be used in the Rational Method are as follows:

Land Use or Surface Characteristics	Storm Frequency	
	5 Year	100 Year
Residential	0.35	0.60
Apartments	0.70	0.80
Downtown Commercial	0.85	0.90
Neighbourhood Commercial	0.65	0.80
Lawns, Parks, Playgrounds	0.20	0.30
Undeveloped Land (Farmland)	0.10	0.20
Paved Streets	0.90	0.95
Gravel Streets	0.25	0.65

In development areas where a mixture of land uses or surface characteristics are proposed, the weighted average of pervious and impervious area run-off coefficients shall be used.

2. Storm Duration

The storm duration used to determine the rainfall intensity for the Rational Method is equal to the time of concentration for the catchment (which equals the inlet time plus the time of travel in the sewer). The inlet time is the time for

run-off from the furthest reach of the catchment to flow overland to the first inlet; and normally should not exceed 10 minutes. The time of travel is the time taken for flow from the furthest inlet to reach the point of design; based on full flow pipe velocities.

F. COMPUTER MODELLING

The selection of an appropriate computer model shall be based on an understanding of their principles, assumptions, and limitations in relation to the system being designed. The Town currently maintains the infrastructure modelling utilizing PC-SWMM. It is the responsibility of the consultant to provide data in a format which is compatible to it.
Note: When creating a project title for the model ensure there is no "space" in the nomenclature.

Wherever possible, the computer model shall be calibrated. In all analyses, the parameters used, the drainage boundaries, the pipe network and its connectivity shall be clearly identified on an overall drawing, and submitted to the Town along with computer model input and output and a design summary report.

Computer models shall be used for subdivision developments when any of the following conditions are proposed:

1. Contains a storm water management facility (pond),
2. Includes an offsite area's catchment basin,
3. Proposes to connect to the existing Town storm system,
4. Proposes to discharge water onto a separate private site or development, or
5. Proposes an unusual or complex storm water system.

G. COMPUTER MODELLING REQUIREMENTS

1. Software used is compatible with PC-SWMM (The Town will import data into its model upon project completion).
2. Legal boundaries (subdivision layout) included as a background/reference file in the model.
3. The subdivision shall be divided up into individual on-site catchments with areas no greater than 5 ha. Catchment boundaries shall be based on

topography, land-use, manhole separation or other factors that may affect runoff rates.

4. Offsite catchments draining into the Development shall be included in the model.

5. Link and node layout is to be consistent with design pipe and manhole locations, as well as pipe size, elevation, slope, etc.

6. Pond area, depth, volume, etc. to be consistent with the design.

7. Existing drainage features that are to be retained as part of the drainage concept shall be included in the model.

8. Model parameters shall be consistent with the site conditions. These include, but are not limited to:

    a. Infiltration parameters (Horton method is preferred),

    b. Manning's 'n',

    c. Percent Imperviousness,

    d. Depression storage,

    e. Surface slope,

    f. Surface flow length.

H. COMPUTER MODELLING OUTPUT

The following items are to be included in an output report:

a. A 1:5 year occurrence,

b. A 1:100 year occurrence,

c. All pages to have a header and/or footer with:

    i. the project name,

    ii. page number,

    iii. total number of pages,

iv. date,

v. Report descriptor (ex. Post Development Output Report), and

vi. Column titles repeated on each page.

The storm duration used for modelling simulations will depend on the type of system being analysed. Depending on basin characteristics and outlet rates, short duration storms (1 - 4 hours) will generally govern the design of the storm sewer systems and the longer duration storms (6 - 24 hours) will generally govern the design of detention ponds and major system components. Therefore, several design storms should be evaluated to determine the worst run-off result for the system being designed.

In some instances, a Development may wish to incorporate an existing water body into the development's storm water system. Depending on the nature of the water feature and associated regulatory requirements, the Town may request that the water levels of the feature over the long term be predicted. In this instance, historical, continuous rainfall data in one-hour increments, over the past 25 or more years, may be routed through the storm model to provide a prediction of the changes in the water level during wet and dry periods. Statistical analysis may be required to determine storage volumes for storm water features/ponds using continuous simulation.

Where allowable (pre-development) storm water release rates are not available, a regional frequency analysis of the catchment may be required to determine the allowable release rate.

The design storm hyetograph shall be developed using the Chicago Method, unless otherwise approved by the Engineer.

2. SERVICE CONNECTIONS

In conjunction with the Utility Bylaw, where restriction of contaminated surface drainage entering the Town's storm sewer system is provided, precautions are to be taken when a storm sewer service connection is provided. The connection is to ensure effluent from the sanitary sewer service (cross connections) and / or surface drainage that may be contaminated is not allowed to discharge to the Town's storm sewer. Direct connections between roof leaders and the Town's storm sewer system are not permitted.

Roof drainage, regardless of land-use, shall discharge to grassed or pervious areas. Where direct drainage to grassed areas becomes impractical (e.g. central business district) the following options are available:

1. Roof leaders may be connected to private storm sewers which minimally will have a control / inspection manhole at property line, prior to connecting to the Town system, and

2. If the private system is also picking up drainage from a parking lot, an oil / grit separator is to be incorporated into the private system prior to the inspection manhole.

Weeping tile connections to the storm sewer shall be provided for all buildings. Where the storm sewer service will be higher than the footing elevation, the connection shall be made using a sump pump in accordance with Section 16 - Drawing 4.04.

A. SITE DRAINAGE

All developments are required to provide a detailed site grading drawing(s) identifying storm drainage patterns, on-site detention, storm sewers, manholes, and catch basins.

Where a storm sewer exists adjacent to a multi-family, commercial, school, industrial property and / or contains a parking lot, the installation of on-site catch basins and connection to The Town's storm sewer system are generally required.

If the site is between 0.2 ha and 0.4 ha and a large portion of the site is landscaped, on-site catch basins and storm sewer connection requirements may not be required at the discretion of the Engineering Services Department.

Calculations for storm sewer and detention sizing must be provided for sites containing an on-site storm sewer system.

B. STORM SERVICE DESIGN CRITERIA

The storm service size is to be determined based on the following, depending on the capacity of the downstream storm sewer system:

1. Redevelopment Areas

At the discretion of Engineering Services, the Developer shall provide calculations to show that the proposed new service’s discharge will be within the capacity limits of the Town’s storm system. This may require the Developer to, in part, calculate a pre and post storm volume for the Town’s system where the service is to be connected. If the on-site release rate is deemed excessive to the capacity of the existing Town system, the Developer will be required to ensure on-site storm detention / release control.

The calculated allowable capacity of the service will likely be less than a 1:5 year, 4 hour storm discharge, but the allowable discharge shall not be greater than the 1:5 year, 4 hour storm discharge as calculated for new development areas.

2. New Development Areas

Where the new service is being connected to an existing main in a recently developed area of the Town, the allowable release rate for the development will be determined by using one of the following methods:

a. Using the flow rate generated by the 1:5 year storm IDF curve and the appropriate run-off coefficient where a Servicing Study is unavailable, or

b. Using the unit area release rate defined in an approved Servicing Study for the development area.

3. Major Drainage Ponding

The 1:25 year storm is to be detained on site with an emergency drainage route for the 1:100 year event being provided. The 1:100 year, 24 hour storm must be detained on site if an emergency route cannot be provided.

3. LENGTH OF RUN

Surface water should not be permitted to run a distance greater than 150 m in streets or 200 m in lanes and swales without interception by a catch basin.

4. LOT GRADING

Lot grading plans are a critical component of the major drainage system and are required to establish the drainage relationship between streets, adjacent lots, surrounding developments and existing topography. This clause provides the design requirements for grading of land, whether it relates to a new subdivision (e.g. a quarter section of land), a large site (e.g. industrial, commercial, multi-family or open space) or an individual residential lot.

A. SUBDIVISION GRADING

All Single Family Detached residential lot grading shall be designed in accordance with the Lot Grading design as specified on Drawing 3.07 in Section 16 - Drawings. The following considerations and criteria shall apply to the detailed lot grading design:

a. Each lot shall be graded to drain to public rights-of-way. Stormwater discharge to adjacent private property will not be permitted.

b. A 10% grade (minimum slope) directed away from the foundation is required for a 2.0 m perimeter around the foundation. Where the foundation wall is less than 2.0 m from the property line, typical on the narrow side of the lot, there is to be a minimum of 0.15 m elevation difference between the property line elevation and where the topsoil elevation meets the house foundation wall.

c. Lots lower than adjacent roadways should be avoided where possible.

d. All lowest top of footings shall be above the major storm systems hydraulic grade line for a 100 year storm event plus a minimum freeboard of 0.60 m.

For multi-plex developments of three or more units where surface drainage for individual lots cannot drain directly to a public right-of-way, cross lot surface drainage will be required. The Lot Grading Plan shall clearly define the cross lot drainage swale required to convey surface drainage to a public right-of-way or internal storm system. Refer to the Storm Service clause above for other requirements regarding on-site storm systems.

B. BACK OF LOT DRAINAGE

The following will apply to back of lot drainage in lane-less subdivisions:

a. For back-to-back lots with split drainage patterns, a concrete swale is to be constructed along the rear property lines within a Town right-of-way to direct overland drainage to a street.

b. For lots backing onto a park, public utility lot or reserve area (green space) a grass swale is to be provided 1.0 m inside the green space adjacent to the rear property line of the developable lot. All grass swales are to be 2.0% slope (minimum).

   The flow from rear lot swales should not be allowed to cross a sidewalk (to prevent ice build-up and dirt accumulation on the sidewalk). A catch basin shall be required at back of walk to intercept these flows (Refer to Section 16 - Drawing 3.07). In older areas of the Town, during maintenance of a drainage swale, a catchbasin should be retrofitted if none was present however if circumstances / constraints dictate a catchbasin can’t be installed, refer to the Town of Olds Contract Specifications for an alternate design.

C. SWALES

When swales have been incorporated as part of the major drainage, the Lot Grading Plan is to include swale locations, easement requirements, and grading

information. Concrete swales are required by the Town when swales are required to cross multiple properties.

1. **Concrete swale**

   a. Concrete swales located within private property are to be constructed within a 2.0 m easement (minimum) (refer to Section 16 - Drawing 3.07).

   b. Concrete swales are to be constructed with a continuous grade line at 0.80% slope (minimum).

2. **Grass swale**

   a. Grass swales located within private property are to be constructed within a 2.0 m easement (minimum) (refer to Section 16 - Drawing 3.07).

   b. Grass swales are to be constructed with a continuous grade line at 2.00% slope (minimum).

   c. Sod is the preferred method of finishing a grass swale that is located within an easement and over multiple properties.

   d. Erosion control measures are to be implemented and maintained until grass is established enough to ensure no significant ground rutting occurs and to the approval of Engineering Services.

The number of lots which may drain to a swale depends on the swale's capacity and the CB's 1:5 year storm flow inlet capacity.

D. PUBLIC UTILITY LOTS

a. The minimum longitudinal surface grade for a grassed Public Utility Lot in new subdivisions is 2.00%. Where a hard surface is to be used to convey the overland drainage the longitudinal grades may be reduced to 0.80% subject to the approval of the Engineer.

b. The boulevard is defined as from the back-of-walk or curb to the edge of the right of way and shall be graded to the curb at a minimum slope of 2.00% to provide positive drainage to the street.

E. OPEN / GREEN SPACES

No drainage is allowed to run from public open spaces or the right of way onto or through private property. If private property abuts a public open space or a right

of way, a swale shall be provided on the public open space or right of way to direct drainage from the public open space or right of way and convey it to the storm sewer system.

5. STORM SEWER MAINS (MINOR SYSTEM)

A. GENERAL

Storm sewer mains shall be designed for gravity flow unless approved otherwise by the Engineer.

B. FLOW CAPACITY

Sewer hydraulics shall be calculated using Manning's equation. Manning's ‘n’ value shall be 0.013 for concrete and P.V.C. For other pipes and open channels, the values suggested in "Modern Sewer Design" (AISI, 1980) shall be used, but shall not be less than 0.013.

C. PIPE MATERIAL

Refer to the Town of Olds Contract Specifications – Division 33

D. PIPE STRENGTH

The strength of the pipe shall be sufficient to carry the loads due to trench backfill and live loads. The strength of pipe shall be calculated on the basis of the external loads, trench conditions, and bedding class provided. 19-25mm washed rock bedding is the minimum bedding requirement.

E. DEPTH OF COVER

All sewers shall be designed so that the top of the main shall be located at the minimum depth required to meet the conditions of Section 11 – Service Connections, Clause 4, but not shallower than 1.5 m, unless otherwise approved by the Engineer. Where existing conditions dictate that the depth of bury be less than 2.7 m, the main/service is to be insulated as specified in the Town of Olds Construction Specifications, Section 50.

The maximum depth of cover shall not exceed 5.5 m in cases where storm service connections are to be installed. In situations where depth of cover exceeds 5.5 m, the Consult Engineer shall redesign the storm sewer system and /or the site grading to reduce the depth of cover to less than 5.5 m. Where the depth of cover cannot be reduced to less than 5.5 m, a second small diameter main shall be installed on the same alignment as the deep main at the minimum depth required to meet the conditions of Section 11- Service Connections, Clause 4.

F. MINIMUM SIZES

The minimum size of a storm sewer main shall be 300 mm in diameter. Mains installed for weeping tile connections only shall be 200 mm in diameter with a minimum grade of 0.40%.

G. MINIMUM SLOPES

Sewer velocities shall not be less than 0.60 m/sec when flowing full. Flow velocities of less than 0.9 m/sec are not recommended. When the flow velocity exceeds 3.0 m/sec, special consideration shall be given to the design of junctions and bends in the system. See Minimum Design Slopes for Storm Sewer in Alberta Environment and Parks publication titled “Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems in Alberta”, Table 5.1.

H. CURVED SEWERS

Although it is recommended that storm sewers be laid with straight alignments between manholes, curved sewers will be permitted with the following restrictions:

1. The sewer shall be laid as a simple curve with a radius equal to or greater than that recommended by the pipe manufacturer. Minimum radius shall not be less than 60 m.

2. Manholes shall be located at the beginning and end of curves, and at intervals not greater than 90 m along the curve unless approved otherwise by the Engineer.

3. The curve shall run parallel to the street centre line.

4. The minimum grade for sewers on curves shall be 50% greater than the minimum grade required for straight runs of sewer.

I. ALIGNMENT

Storm sewers shall be located on the standard alignment shown on Section 16 - Drawing 4.07 for streets and Drawings 4.08 and 4.09 for lanes and public utility lots. A minimum separation of 2.5 m (3.0 m preferred) from water mains shall be provided. Consistent alignments shall be used along the entire length of a street, lane, or public utility lot.

J. MANHOLES

Manholes shall be installed at the end of each line, at all changes in size, grade, or alignment, at all junctions, and at a spacing of no greater than 150 m along the length of the sewer.

To maintain a continuous energy gradient through manholes, the obvert (crown) elevation of the lowest upstream pipe shall be equal to or higher than the obvert of the downstream pipe. Where the upstream and downstream pipe sizes are equal, the downstream pipe invert will be 30 mm lower than the upstream invert. Where a bend in pipe alignment occurs in a manhole, the invert elevation of the downstream pipe shall be at least 50 mm below that of the lowest upstream pipe.

Storm sewers for weeping tile connections are to be extended 1.5 m past the last house service lead, with the exception of storm mains in cul-de-sacs where service leads may be connected directly to the end of the line manhole provided that the lead enters the manhole less than 0.60 m above the invert of the main.

The flow channel through manholes shall be made to conform in shape and slope to that of the sewer. The depth of the flow channel should be at least one-half the diameter of the downstream sewer.

Standard 1200 mm diameter precast manhole shall be used on mains 750 mm in diameter or less. Precast manhole vaults or an oversized manhole barrel shall be used on mains of 900 mm in diameter or greater. A "T-Riser" manhole may be used on mains 1200 mm in diameter and larger, providing there is no deflection in alignment or grade. For safety reasons, all precast manholes shall be spigot-up.

Safety platforms are to be installed in manholes having a depth of 6 m or greater.

6. CATCH BASINS AND CATCH BASIN MANHOLES

A. GENERAL

Catch basins at street intersections shall normally be located at beginning or end of the curb return, whichever side is higher in elevation. Catch basins are not to be located within the limits of a curb ramp.

Where roadway grades create a (trapped) low point, catch basins are required.

Invert crossings of streets (swales) are not permitted for new roadway construction, unless otherwise approved by the Engineer. Where a roadway is being rebuilt as part of regular maintenance or upgrade a concrete swale may be installed across an intersection, along the gutter alignment of the conjoining curbs, with approval from the Engineer. The minimum slope for this swale is 0.5% (equivalent to the minimum gutter grade noted in Section 13 – Road

Design; which intentional contradicts the minimum slope noted for a swale used in the previous Lot Grading context.)

B. CATCH BASIN LEADS

Catch basin leads shall connect directly to a manhole. If a twin catch basin is required to drain an area, the twinned unit shall consist of a catch basin and a catch basin manhole interconnected by means of 250 mm pipe. The lead from the catch basin manhole to main line manhole shall be a 300 mm pipe. Single catch basins require 250 mm leads. All leads shall have a minimum grade of 2.0%.

The length of catch basin leads shall not exceed 30 m. If it is required to extend a lead more than 30 m, a catch basin manhole shall be used.

C. DESIGN CAPACITY

For design purposes, catch basin capacities in litres/second are approximately as follows:

Norwood Model	Sump Condition *	Continuous Slope **	
		Capture	Overflow
F-51 (with side inlet)	190	30	95
F-51 (grate only)	155	35	85
F-39	80	15	40
F-49	105	20	50

* based on 100 mm depth of ponding
** based on 50 mm depth on 1% slope

D. TYPES OF CATCH BASINS AND CATCH BASIN MANHOLES

Catch basins shall be built with a 900 mm barrel. Catch basin manholes shall be built with a 1200 mm barrel.

The type of inlet assembly, as illustrated in the Town of Olds Contract Specifications – Section 50, to be used for catch basins and catch basin manholes shall be as follows:

1. Type K-1 catch basin assembly is to be used in conjunction with standard curb and gutter, and standard monolithic sidewalk construction,
2. Type K-3 catch basin assembly is to be used in conjunction with lane construction,

3. Type K-6 catch basin assemblies may be used to drain landscape areas and swales,

4. Type SK-7 catch basin is to be used in conjunction with rolled monolithic sidewalk construction,

5. Type SK-7 and Type DK-7 catch basin assemblies are to be used for expressways and arterial roadways,

6. F-50 trash grate may be used to drain ditches typically in a rural area where maintenance of the ditch may be infrequent or not possible by mechanical means. An alternate is the “pyramid” style grating where regular access is required to the manhole.

Note: Additional clarification of the type of curb and gutter used for roadways is provided in Section 13 – Roadway Design.

7. CULVERTS

Culvert design should consider flow capacity and back water effects over a range of flows. The design capacity of the culvert requires assessment of both its nominal design and its performance during the 100-year storm event. For maintenance purposes, the minimum nominal diameter for any culvert is 500 mm however 600 mm is preferred.

A culvert and an earth embankment shall be installed where a proposed driveway crosses an existing ditch.

8. MAJOR DRAINAGE SYSTEM

A. GENERAL

The grading of streets and the layout of the major drainage system shall be assessed, relative to the following guidelines, during the 100-year storm event:

1. No building shall be inundated at its ground line.

2. Continuity of the overland flow routes between adjacent developments shall be maintained.

3. The depth of water at curb side should be less than 300 mm for all roadways. Depths greater than 300 mm are not preferred.

4. On arterial roads, during a major storm event, the design is to consider:

   a. One lane of traffic (each direction) is not to have ponding and / or overland flow depths exceeding 200 mm,

   b. Where overland flow crosses the road, the depth of flow should not exceed 100 mm.

5. On collector roads, during a major storm event, the design is to consider:

   a. One lane of traffic is not to have ponding and / or overland flow depths exceeding 250 mm,

   b. Where overland flow crosses the road, the depth of flow should not exceed 150 mm.

6. The velocities and depths of flow in the major drainage system shall not exceed the following values:

Depth of Flow (m)	Maximum Water Velocity (m/s)
0.8	0.5
0.3	1.0
0.2	2.0
0.1	3.0

7. Trapped low storage should be implemented to offset peak flows where necessary to keep water velocities and depths below those noted above. Overland flow capacities of typical local and collector street cross sections and a typical trap low storage area are illustrated in Section 16 - Drawings.

The Developer shall recommend a building elevation to the lot purchaser that is above trapped low ponding elevations and designed to drain surface run-off to the street or lane/utility right of way.

B. STORM WATER MANAGEMENT FACILITY (SWMF)

1. General

Construction of storm water management facilities (e.g. storm ponds, constructed wetlands and/or natural overland drainage (bioswales and infiltration trenches)), including any storm sewer mains required to drain the storm water management facility, require Alberta Environment and Parks

approval. Refer to Section 7 - Clearing, Stripping and Grading Guidelines for submission requirements to Alberta Environment and Parks.

2. Development Costs

Detention pond financing information is provided through the Development Agreement and construction responsibility is detailed in Section 14 - Landscaping. For the purposes of reimbursement from the Off-site Levy, the SWMF is based on a dry pond located at the lowest point of elevation within the area it receives drainage from.

Where a SWMF is funded by off-site Levy, in accordance with the Municipal Government Act and the Town's financial policy regarding debt management as it relates to off-site levies, the Developer, prior to proceeding with a Clearing, Stripping and Grading permit for the SWMF, is to confirm with Engineering Services that financing has been approved in the budget for the SWMF. If the Town has not adopted a budget for the work prior to the start of construction, the Developer may not be reimbursed for the SWMF.

3. Land-use Designation (MR & PUL)

The requirements for Land-use designation and dedication of land on which a storm water management facility is to be situated will be in accordance with Council Policy and will be determined at time of Area Structure Planning.

C. DESIGN REQUIREMENTS

1. General

The use of storm water management facilities (a.k.a. storm pond, SWMF) are required to reduce peak flow rates to downstream sewer systems and/or watercourses, or to provide a temporary receiving area for peak major drainage flows. Their approximate location and size must be identified at the time of Area Structure Planning approval to avoid conflicts with adjacent land uses. The effects of the maximum pond water levels shall be considered in the design of the minor system and lot grading. If possible, the crown elevations of the pipes in the first manhole upstream of a pond shall be at or above the maximum pond level during the five-year storm event.

2. Geotechnical Considerations

Soils investigations specific to the SWMF shall be undertaken to determine the soil's permeability and salinity (or other potential contaminants), and the elevation of the groundwater table. Where the facility is sited above a shallow aquifer, the potential for groundwater contamination must be minimized.

If the pond is to be a dry pond and the pond bottom is below the water table, a weeping tile system may be required to keep the pond bottom dry enough to support grass growth and maintenance equipment traffic.

3. Water Quality

To achieve water quality in accordance with provincial and federal regulations, the Developer shall incorporate storm water treatment measures ranging from mechanical treatment units (oil / grit separators) to the various forms of detention ponds, in the design of any storm water management facility.

4. Erosion and Sediment Control

An erosion and sediment control plan, as detailed in Section 6 – Erosion Control, is required as part of the Storm Water Management Study to define measures which must be undertaken for the control of sediment into the storm water management facility and into the receiving stream.

5. Storage Alternatives

As part of the review of the storm water management alternatives for application to a specific area, the following storage methods should be considered:

a. Dry Pond Storage

Dry pond (detention) storage is the storm water management method where the storm run-off is collected and the excess runoff is temporarily detained for a short period of time, and released after the storm run-off from the contributing area has ended. Generally, low flows do not enter the pond. A mechanical treatment unit is generally required for this method of storm detainment in order to achieve required water quality treatment before releasing the detained storm water into the storm sewer system.

b. Wet Pond Storage

Wet pond (retention) storage functions the same as dry pond detention except that a portion of the storm water is permanently retained below the detention volume.

c. Constructed Wetlands

Constructed Wetlands are treatment systems that capture storm water and use natural processes involving wetland vegetation, soils, and

their associated microbial assemblages to improve water quality that are beneficial to both humans and wildlife.

d. Natural Overland Drainage

Storm water is guided through vegetated swales, rather than concrete pipes. Use of this alternate system is at the discretion of Engineering Services.

D. OUTFLOW CONTROL

The outlet from a storm water management facility must incorporate appropriate means for the control of outflow and to limit the rate of discharge. Preliminary release rates have been determined for the various drainage areas in the Town of Olds. The Town of Olds uses the City of Red Deer IDF curve as a reference. These release rates have been determined based on preliminary studies and are shown on Section 16 - Drawing 3.01. Alberta Environment and Parks (AEP) also has a pre-development curve that will take precedence over all other information. The proposed release rates are to be confirmed by detailed modelling of the existing storm sewer system and are to be based on any proposed changes in the release rate to the receiving water body and revisions to the basin boundaries.

E. EMERGENCY SPILLWAY PROVISIONS

The feasibility of an emergency overflow spillway is to be evaluated for each SWM facility (wet or dry) design, and where feasible, such provisions are to be incorporated in to the pond design.

As part of the pond design process, the probable frequency of operation of the spillway should be determined. Where it is not possible to provide an emergency spillway route, the design is to include an analysis of the impact of over-topping the pond and a significant (greater than 0.6 m) freeboard above the 100-year level.

The functional requirements of the spillway, and the impact analysis for the absence of one, are to consider the possible consequences of blockage of the system outlet or overloading due to run-off events, such that the storage capacity of the facility may be partially or completely unavailable at the beginning of a run-off event.

F. LANDSCAPING REQUIREMENTS

Detention pond landscaping requirements are detailed in Section 14 - Landscaping.

G. SIGNAGE FOR SAFETY

The design of storm water management facilities shall include adequate provisions for the installation of signage to warn of anticipated water level fluctuations, with demarcation of maximum water levels to be expected for design conditions. Warning signs will be designed by the Developer and approved by the Engineer. (see Section 16 – Drawings.)

H. VEHICLE ACCESS FOR MAINTENANCE

1. A combination of pathway and reinforced turf shall be designed to provide pond access for maintenance vehicles to reach the pond's inlet/outlet structure, inlet pipes and/or treatment unit as well as providing a working area.

2. The access road is to be the most direct route between the road/lane and the storm structure.

3. The access design and working area are to be site specific and approved by the Engineer subject to the following conditions:

    a. Base structure equal or greater than a lane (consideration may be given to the base being in a wet condition),

    b. Reinforced turf product acceptable for turf growth and ease of maintenance,

    c. Minimum access width of 3.0 meters,

    d. Working area of up to 500 sq.m. at inlet structures,

    e. Turf reinforcement product to be installed per manufacturer's instructions,

    f. Refer to Town of Olds Construction Specification drawings 50 08 10 & 11 for further information,

    g. Pond slope along access may require adjustment to meet typical road grade requirements,

    h. A minimum centreline radius of 10.25 m to be provided on curved portions of the vehicle access road including any potions of a pathway that may be used.

9. DRY DETENTION PONDS

A. GENERAL

Although dry ponds are not preferred, they may be acceptable if proposed provided that they can meet the water quality treatment requirements, and they must be approved at the Area Structure Plan stage. As dry ponds become a “green space” within a subdivision they should have gentle side slopes and be aesthetically contoured and landscaped to provide an attractive feature for the neighbourhood.

Recreational features (e.g. sports field) are not preferred in dry ponds. Engineering Services is to be contacted if the Developer proposes to use the pond area for an active site. Park uses should not be located adjacent to the inlet/outlet facilities nor in areas that flood frequently (more than twice per year on average).

B. DESIGN PARAMETERS

The following general design parameters should be considered for a dry pond in a residential subdivision:

1. Storage capacity for up to the 100-year storm event.

2. Detention time to be determined based on downstream capacity, recommended maximum detention time is 24 hours.

3. Maximum active detention storage depth to be 1.5 m. The maximum water level should be below adjacent house basement footings (a greater freeboard will be required if an emergency overflow route cannot be provided).

4. Maximum interior side slopes of 5:1 (7:1 is recommended).

5. Minimum freeboard of 0.6 m between lowest top of footing and the 1:100 year high water level (for buildings adjacent to the pond) when an emergency overland route is available.

6. If an emergency overland route cannot be provided (or plugged outlet) the lowest top of footing shall be raised to 0.6 m above the high water level generated by the 1:100 year storm under a zero release rate scenario.

7. Maximum 4:1 ratio of effective length to effective width measured at 100-year high water level.

8. Minimum lateral slope in the bottom of the pond of 2.0% and minimum longitudinal slope of 1.0%.

9. Low flow bypass for flows from minor events to be provided.

10. French drains are to be provided within the pond bottom to alleviate water percolating or pooling due to the water table being near the bottom of the pond.

11. Address potential safety issues (e.g. catch-basin as a mowing hazard, access to pipe system by a person, etc.) through design and warning signage.

12. Storm water Treatment Unit, see clause 13 of this Section.

10. WET DETENTION POND

Wet detention ponds are to be approved at the Area Structure Planning stage. The Developer will be responsible for all construction costs in excess of the cost to construct a dry pond facility. The Developer will also be required to establish a maintenance fund for perpetual maintenance of the pond.

Design of a wet pond is to be in accordance with the Alberta Environment and Parks publication entitled “Storm water Management Guidelines”. Some general design parameters to consider are:

1. Minimum water surface area of 2.0 ha,

2. Maximum side slopes of 7:1 between the high water level and 1.0 m below normal water level,

3. Minimum permanent pool depth of 2.0 m; maximum permanent pool depth of 3.0 m,

4. Maximum 1:100 year active storage depth of 1.5 m,

5. Sedimentation fore bays required at each inlet to the pond,

6. Hard edge treatment required along pond perimeter,

7. Minimum freeboard depth of 0.6 m between lowest top of footing and 1:100 year high water level (for buildings adjacent to the pond), when an emergency overland route is available

8. If an emergency overland route cannot be provided (or plugged outlet) the lowest top of footing shall be raised to 0.6 m above the high water level generated by the 1:100 year storm under a zero release rate scenario,

9. Design of outlet control structure is to be capable of maintaining the permanent pool depth and capable of draining the permanent pool for maintenance purposes,

10. When possible, preserve existing wetlands by incorporating them into the storm water management plan.

11. CONSTRUCTED WETLAND

Design of a natural wetland into, or in conjunction with, a storm pond is to be in accordance with the Alberta Environment and Parks publication entitled “Storm water Management Guidelines”. Constructed Wetlands are to be approved at the Area Structure Planning stage.

Some additional design considerations for constructed wetlands are as follows:

1. Protective silt fencing around the wetland is required until the adjacent new development is landscaped,

2. A buffer area is to be maintained between the wetland water body and the developable area,

3. Where existing wetland material is excavated as part of the storm water management facility construction, the following information is to be noted on the drawing and / or in the contract:

    a. Top substrate material (aquatic vegetation roots) to be stockpiled separate from the lower excavation material,

    b. The separated substrate material is to be placed as the finish layer on the pond bottom and side embankment to promote the return of natural aquatic vegetation,

    c. The aquatic substrate is to be placed within one season of removal,

4. Storm pond is to have an irregular shore line along wet areas, deep pools, shallow fore bays, etc. to promote and support aquatic life while providing storage and silt control.

12. NATURAL OVERLAND DRAINAGE

While the Town is open to considering natural overland drainage (e.g. bioswales), as part of a storm management solution, there are no facilities currently within the Town, therefore the Town requires computer modelling showing how this system will work to achieve storm water management within the development area. This must be approved at the Area Structure Planning stage.

13. STORMWATER TREATMENT UNITS

A. PURPOSE

Storm Water Treatment Units are a variation of traditional settling tanks. They are designed to capture sediment suspended in storm water runoff as the runoff is conveyed through a storm sewer system. The unit is a below ground structure that takes the place of a conventional manhole or catch basin in a storm sewer system. The unit uses a permanent pool of water in the removal of sediment from storm water run-off before discharging into the receiving water body.

The use of a treatment unit is a design consideration. Typically, dry ponds will require a treatment unit whereas a wet pond may require a unit for additional treatment. The intent of a wetland is to filter all contaminants and sediments without treatment units however a wetland design may require a treatment unit for sedimentation control if the pond bottom has not been contoured to incorporated sediment traps.

B. DESIGN CRITERIA

Alberta Environment and Parks guidelines state that Treatment units are to be sized based on a minimum treatment flow rate of 75 l/s per hectare of development area and must be capable of conveying at least 150 1/s per hectare of flow through the treatment unit without re-suspending sediments or floatable materials within the treatment unit. The treatment unit shall remove at least 85% of all sediments of a 75-micrometer particle size or larger.

Calculations and information showing how removal rates were achieved or modeled must be submitted at the design stage.

C. MANUFACTURER'S MANUAL

Due to the variety of products available, the technical and maintenance manual for the treatment unit installed is to be submitted with the Issued for Construction drawings.

14. MISCELLANEOUS DESIGN CONCERNS

A. OUTFALLS

Obverts of outfall pipes shall be above the five-year flood level in the receiving stream. Inverts of outfall pipes shall be above winter ice level. Outfalls shall be located so as to avoid damage from moving ice during break-up. Drop structures and energy dissipaters shall be used where necessary to prevent erosion.

Inlet/outlet structures in detention ponds are to be aesthetically blended into the landscape design, include adequate erosion protection and shall be designed to require low maintenance. Outlet velocities should be kept below those noted in Clause 8.A. of this Section.

Outfalls to a receiving water body require approvals under the Water Act, Fisheries Act, Public Lands Act Historical Resources Act and other pertinent Acts at the time of construction.

B. SAFETY PROVISIONS AT INLETS, OUTLETS, AND OUTFALLS

All inlet and outlet structures associated with a storm water management facility shall have grates provided over their openings to restrict access and prevent entry into the sewers by unauthorized persons.

A maximum clear bar space of 100 mm shall be used for gratings. Grated outlet structures are to be designed with a hydraulic capacity of at least twice the required capacity to allow for possible plugging. Appropriate fencing and guardrails are to be provided to restrict access and reduce the hazard presented by the structure head and wing walls.

C. TEMPORARY DRAINAGE SYSTEM

Temporary drainage systems to intercept agricultural drainage and snowmelt shall be provided adjacent to new developments. The temporary system may involve a berm for redirection and/or swale to direct the run-off to the storm system. Appropriate erosion and sediment control is required. No ponding or trapped water shall be allowed on the adjacent property.

D. RECEIVING WATERS

Measures such as detention ponds or constructed wetlands should be incorporated in new developments to prevent any increase in the amount of erosion and downstream flooding to existing receiving streams. Where erosion control or bank stability work must be done, preservation of watercourse aesthetics and wildlife habitat must be considered.

E. BRIDGES

Bridge design should consider backwater effects over a range of flows. The design of a hydraulic structure requires assessment of both its nominal design "capacity" and its performance during the 100-year storm event as well as the 100-year ice level and break up.

1. GENERAL INFORMATION

This Guideline pertains to that portion of the service connection installed from the main to the property/easement line.

2. SERVICE SIZES AND LOCATIONS

Minimum service sizes for single family and duplexes shall be as follows:

Water	25 mm
Sanitary	150 mm
Storm	100 mm

The sanitary service shall have a 150 mm - 100 mm reducer at property line and a plug installed at the end of service stub to allow for 100 mm private connections. The storm service shall have a 100 mm - 75 mm reducer at property line and a plug installed at the end of service stub. All service lines to be brought to property line at 2.0% slope minimum.

Services of a size larger than those indicated will be required where, in the opinion of the Engineer, the lengths of service pipe or other conditions warrant these.

The location of services for residential lots shall be as shown in the drawings in Section 16.

The sizes and locations of services to non-residential buildings, including proposed schools, shall be subject to the approval of the Engineer. Service locations for a proposed school site shall be close to the proposed area of the school building. Avoid alignments that would cross the proposed recreation amenity areas (playgrounds, sports field, etc.). Water, sanitary and storm services are to be provided at the same location. If the site is a multi-use site (e.g. high school(s) or college, and / or recreation facility included) a minimum of 2 water services shall be provided for internal looping.

3. SANITARY AND STORM SEWER CONNECTIONS TO MAIN

Sanitary and storm sewer services to the main may be made as follows:

1. Service saddles,
2. In-line tees, and/or
3. “Inserta” tees.

“Inserta Tees” shall not be used on mains having a nominal internal diameter of 200mm or less as the protrusion of stub into the main interferes with the operation of camera inspection equipment. Accordingly, all 200 mm sanitary sewer and storm sewer mains shall be PVC SDR 35 Pipe. This will also allow for the use of service saddles for future service connection installation.

4. DEPTH OF BURY

Water service invert at property/easement line shall be a minimum depth of 2.7 m and a maximum depth of 3.0 m below finished grade.

Sanitary and storm service inverts at property/easement line shall be a minimum depth of 2.7 m below finished lane grade or 2.4 m below back of walk elevation, whichever is lower, and deep enough to be extended below the anticipated building footing elevation. Sanitary and storm inverts at property/easement line should be set at the same elevation and no deeper than 3.5 m if possible. These requirements are illustrated in Section 16.

Where existing conditions dictate that the depth of bury be less than 2.7 m, the main/service is to be insulated as specified in the Town of Olds Contract Specifications, Section 50.

5. ALIGNMENT

The sanitary, water, and storm services shall be laid in a single trench. When facing the lot being serviced, the water service shall be laid along the centre of the service alignment, the sanitary service 0.30 m to the left of the water service, and the storm service 0.30 m to the right of the water service. The services shall intersect the property line at an angle as near to 90° as possible unless otherwise approved by the Engineer.

The curb stop, with the standpipe, shall be located 0.3 m from the easement line, within the easement, as shown on Section 16, drawing 4.02.

To aid in locating the service, temporary markers shall be installed at the end of the service stub as shown if the Town of Olds Contract Specification Drawing 50 04 01.

In developed areas where services are being replaced, alignment from the side property line may vary from that shown in Section 16 – Drawings due to existing obstruction however the spacing of each service pipe is not to be less than the spacing note above.

6. WATER CURB STOP

The curb stop is to be installed at the time of service installation. The service should extend approximately 3.0 m past the curb stop location.

7. RISERS

Vertical risers shall not be used unless otherwise approved by the Engineer. Instead, the service shall be installed on a continuous grade from the main to the service stub at property/easement line.

Where the use of a vertical riser is approved by the Engineer, a vertical long radius bend shall be installed immediately prior to the reduction fitting/plug to reduce the pipe slope to approximately 2%. Alternatively, the riser section may be placed at a 45° angle (1:1 slope), with the vertical long radius bend installed in an appropriate location between the main and property/easement line.

8. SERVICE CONNECTION RESTRICTIONS

When sanitary and storm services are 200 mm or larger, connections may require the installation of a manhole at the main (also dependent upon the main size); refer to the manhole requirement chart in Section 16 – Drawings.

Note: In situations where sanitary and storm service connections for commercial sites, institutional developments (including schools), multi-family sites and industrial lots are proposed to connect to an existing manhole, the Developer is encouraged to confirm the configuration of the tie-in at the manhole with the Town's Engineering Services. This confirmation of the tie-in's configuration is to ensure that the existing benching in the manhole is taken into account when designing the service to ensure adequate slope is maintained for the service.

9. BENDS

No horizontal bends shall be allowed on sanitary and storm service connections. A maximum of two vertical bends will be allowed; one at the main and one at the property/easement line.

10. INSPECTION MANHOLES AND TREATMENT UNITS

As per the Utility bylaw, all commercial, industrial, and institutional developments shall have an inspection manhole installed on their sanitary service connection prior to the connection with the common main.

For a multi-building commercial retail unit (CRU) (e.g. strip mall, neighbourhood mall, etc.) additional sanitary inspection manholes are to be installed on the service to the **individual units** prior to the service connecting to the site's common main.

For multi-building CRU's with storm service, an Oil & Grit Separator (OGS) is to be installed upstream of an inspection manhole, with both being located prior to the site's connection to the common main.

The preferred location for the inspection manhole and an OGS unit is within the parking lot or green space of the CRU complex. These manholes are to be easily accessible (at any time of the day) and should not be installed in, under or near any structures on the site. Generally allow for a 3 m x 3 m clear space for ease of access.
An inspection manhole shall be a standard 1200 mm diameter concrete manhole with appropriate frame and cover.

1. GENERAL INFORMATION

A. SHALLOW UTILITIES AND UTILITY RIGHT OF WAY APPROVALS

The Developer is required to prepare a detailed Shallow Utility Plan for each phase of development. The Developer is responsible for co-ordinating the location of all shallow utilities, including obtaining alignment and utility right of way approvals. The tentative Legal Plan and Utility Right of Way plan, together with the Utility Right of Way agreements, is to be submitted to the Town's Engineering Services and Planning and Development Department for acceptance prior to its submittal to Land Titles for registration.

The Developer will be required to provide the shallow utility companies a copy of the design drawings for the proposed development for the utility company to plan their servicing needs. The Developer is also responsible to ensure that appropriate easements have been provided for all shallow utilities.

B. DISTRIBUTION OF DRAWINGS TO SHALLOW UTILITY COMPANIES

The Developer shall provide the digital base plans and EL&P alignments for their development directly to the utility companies which service the Town. The following suppliers currently are the providers of natural gas, telephone and cable service to the Town of Olds residents. Any variation in service providers must be approved by the Engineer.

a. ATCO Gas Ltd
   - provides natural gas and may be contacted at the following address:

District Engineer
ATCO Gas
7590 Edgar Industrial Drive
Red Deer, Alberta, T4P 3R2

b. Telus Communication Inc.
   - provides telephone service and may be contacted at the following address:

TELUS Communications Inc.
National Access Network Design
Floor 12
411 - 1 Street S.E.
Calgary, Alberta T2G 4Y5

c. Shaw Cable Systems
   - provides cable television service and may be contacted at the following address:

Technical Manager
Shaw Cable Systems Ltd.
4761 62 Street
Red Deer, Alberta T4N 2R4

d. O-NET
   - Provides television, phone, and internet service and may be contacted at the following address:

Experience & Customer Services
O-NET
#8b, 5221 – 46 Street
Olds, Alberta T4H 1T5

C. REVIEW AND ACCEPTANCE OF DRAWINGS FROM SHALLOW UTILITY COMPANIES

The Developer shall forward the following information to all shallow utility providers following Engineering Services, and EL&P's approval of the power distribution and street lighting design.

1. Copy of the roadway and deep utilities plan drawings,

2. Copy of the approved EL&P power distribution and street lighting design drawing.

Following the completion of the design of each service provider's facilities, copies of their alignments and easement requirements will be forwarded to the Developer for preparation of the Shallow Utilities Plan. Alignment approval letters are required from the shallow utility companies for inclusion in the Development Agreement.

Note: The Developer is responsible for any costs related to the provision of all shallow utilities to service a subdivision, including the cost of installing ducts for road crossings.

2. ELECTRICAL UTILITY

A. DESIGN AND CONSTRUCTION OPTIONS

As detailed in the Development Agreement, the Developer is to arrange for the installation of street lighting and power distribution in accordance with one of the following options:

1. Arrange with EL&P for the design and installation of such work, or

2. Have an Electrical Consulting Engineer prepare the design in accordance with these Guidelines and EL&P's electrical specifications, or

3. Have a qualified contractor complete all electrical installations in accordance with the following:

   .a The Town of Olds Contract Specifications,

   .b EL&P Construction Standards, and

   .c EL&P's Material Specifications.

Any power systems designed by an Electrical Consulting Engineer must be approved by EL&P prior to installation. Electrical installations completed by any contractors, other than EL&P, must be inspected by EL&P. Energization of the system will be done by EL&P once they have inspected and accepted the system.

B. GENERAL DESIGN GUIDELINES

Before starting with the detailed design of the electrical system, the Developer should review the Shallow Utilities Plan prepared in conjunction with the Electric, Light, and Power service provider to confirm the proposed alignments. Standard utility alignments are included in Section 16 - Drawings.

Note: If lighting enhancements are proposed to be a part of a subdivision development or construction project (e.g. along park trails, or as part of enhanced landscaping; refer to Section 13- Roads for definition of Enhanced Amenities), EL&P will need to be notified at time of preliminary design submission.

Distribution cables (i.e. primary, secondary, and streetlight power, telephone, and cable television) are normally installed in a common 500 mm wide trench at the required alignment. Associated apparatus (e.g. streetlight poles, URD boxes, pad mounted transformers, and switching cubicles) shall be installed as detailed in the EL&P service providers specifications.

The following requirements are to aid the Developer in the design of his distribution system, but shall not limit EL&P from withholding approval of the Developer's plans where, in the opinion of EL&P, circumstances warrant deviation from these Guidelines.

1. **Trench Locations**

   Where cables are installed along a street, walkway, or public utility lot, they shall be located with standard clearances to other utilities. Where power, telephone, or cable television cables cross the water main, they shall be at a minimum distance of 3.0 m from any valve or hydrant, unless approved otherwise.

2. **Pad Mount Transformers**

   Pad mount transformers are mounted on precast bases. Transformers shall be no closer to a corner cut than 6.0 m. Four transformer sizes are used for the residential distribution: 25 kVa, 37 kVa, 50 kVa and 75 kVa. Twenty-five kVa transformers may be loaded to a maximum of 8 services, 37 kVa transformers to a maximum of 13 services, 50 kVa transformers to a maximum of 18 services and 75 kVa transformers to a maximum of 25 services.

3. **Switching Cubicles**

   Dead-front switching cubicles are mounted on precast bases located on centre line of the trench no closer to a corner cut than 30 m without relaxation, and must maintain a 3.0 m clearance to all other utility fixtures. The main function of these cubicles is to provide a fused/sectionalised switching of the "primary distribution" system.

4. **Primary Distribution 25 KV**

   Primary distribution may be one phase or three phase loop circuits through the Development area. The Developer must ensure that the distribution of the primary circuits throughout the Development area is adequate for the zoning involved. The cable used for these circuits is a single conductor; #1 copper jacketed 25 kV (nominal) insulation, 100% current carrying concentric neutral conductor. These loop circuits may be loaded to a maximum of 1,000 kVa (single phase) and 3,000 kVa (three phase). EL&P will be responsible for identifying the entry point (or points) of the primary circuits into the Development area; however, it is the responsibility of the Developer to obtain this information before he proceeds with the preliminary layout.

   An open loop system is achieved by using either 200/600 amp three phase dead-front switching cubicles or a lateral that connects to the overhead lines. At each end of the loop it will be the responsibility of the Developer to ensure that each phase of the primary distribution system is balanced in accordance with EL&P requirements of the adjacent Developments. The Developer shall provide a detailed transformer connected-load-per-phase schedule to EL&P for approval with the preliminary drawings, including proposed multiple family site and commercial site loadings.

   EL&P will determine the normal “open points” on the looped circuits.

5. **Secondary Distribution and Services**

   Secondary distribution circuits are defined as being radially fed from each transformer. A maximum of six secondary connections are allowed at each transformer. The cable used for secondary distribution is two conductor #4/0 aluminium 600V insulated 100% current carrying concentric neutral conductor. Transformer loading, wire size, and distances will be such that CSA bulletin CAN3-C235-83 recommended minimum voltage limit at the service entrance is met. The

#4/0 Cable provides the distribution from the transformer to all URD boxes. At this point the secondary services are stubbed out at the easement line or property line where the service connection is made.

Secondary services are radially fed from the URD boxes or transformer. Each service is considered to be a 1/0A1 cable for the normal 100 amp service.

Service stubs to each lot shall be capped with heat shrink caps at the easement line. Each service "stub-in" shall be marked and enter the property at the prescribed offset. Design Drawings illustrating this procedure can be obtained from the EL&P service provider.

6. **Street Lighting**

Residential roadway lighting shall be designed as follows:

a. Local roadways mounted on 9.1 m (30') poles capable of meeting IES-RP8 table 3 for local road category,

b. Collector roadways mounted on 9.1 m (30') poles capable of meeting IES-RP8 table 3 for collector road category,

All lights shall be cobra style, full cut-off LED fixtures. The pole will be mounted on a steel augured base.

Decorative lighting must be coordinated with EL&P before materials are ordered or final plans are submitted.

Each luminary is to be individually controlled by photocell and shall utilize a 120 volt feed from the secondary mole located in the closest URD service box.

7. **Grounding**

Grounding consists of driven ground rods and has copper strand wire as described in EL&P's Construction Standards. Primary and secondary neutrals are both tied to the appropriate ground. Grounding is required at all switching cubicles, URD boxes, streetlights, and transformers as indicated on the appropriate drawing. All concentric neutrals shall be tied to the grounding facilities in the equipment.

8. **Materials**

All materials used for this project shall be new and as specified by EL&P. The Developer shall not substitute any materials without prior written approval of EL&P. Material specifications are to be obtained from the EL&P service providers.

C. ELECTRICAL SYSTEM DRAWINGS

Refer to Section 2 – Drawing Standards for general drawing requirements. In addition to these requirements, the Electrical Servicing plan shall conform to the current EL&P service provider's standards.

EL&P will review the drawings with respect to adherence to the standards, but will accept no responsibility for engineering omissions and errors shown on or relating to these plans. Where special crossings are involved, the Developer shall meet the requirements noted in Section 1 – General Information, clause 4 - Crossing Agreements.

D. SUBMISSION OF DRAWINGS

Refer to Section 2 – Drawing Standards for the various stages of submission requirements. An additional submission is the Telus "approval" print. The Consulting Engineer will need to ensure this drawing is provided with their submission package.

E. DESIGN REVISIONS AFTER APPROVAL

Where it is necessary for any reason to make any change to the design drawings after they have been approved two prints of each of the original drawings affected shall be submitted with the proposed changes shown in red accompanied by a letter outlining the reasons for the required changes. If the proposed changes meet with the approval of EL&P service provider and Engineering Services, one copy will be signed and returned, accompanied by a letter authorizing the changes. Revised drawing and digital submission will follow the procedure outlined in Section 2 – Drawing Standards. No changes are to be made to any original approved drawings without following this procedure.

F. PLAN OF RECORD DRAWINGS AND OTHER RECORDS

For safety concerns, the Developer shall, after satisfactory completion of the work and prior to energization, submit to EL&P and Engineering Services a PDF copy of the Plan of Record drawings, indicating all changes made to the original or revised approved Engineering drawings. Additional Plan of Record submission requirements are found in Section 2 – Drawing Standards.

1. REFERENCE MATERIAL

The following reference materials (current editions) have been used in preparing these Guidelines and should be referred to for further detail:

Transportation Association of Canada (TAC) (www.TAC-ATC.ca)

- Manual of Uniform Traffic Control Devices for Canada (MUTCDC)
- Geometric Design Guide for Canadian Roads
- Turning Vehicle Templates
- TAC/ITE Canadian Guide to Neighbourhood Traffic Calming
- Synthesis of North American Roundabout Practice

Alberta Transportation (www.transportation.alberta.ca)

- Roadside Design Guide (AT-RDG)

Institute of Transportation Engineers (ITE) (www.ite.org)

- TAC/ITE Canadian Guide to Neighbourhood Traffic Calming
- Transportation Impact Analysis Guidelines for Site Development

American Association of State Highway and Transportation Officials (AASHTO) (www.transportation.org)

- A Policy on Geometric Design of Highways and Streets Roadside Design Guide

Federal Highway Association (FHWA) (www.fhwa.dot.gov)

- Roundabouts: An Informational Guide, 2nd Edition

NOTE: The TAC Geometric Design Guide for Canadian Roads and TAC Urban Supplement noted above shall be adhered to unless otherwise specified in these Design Guidelines or by the Engineer.

2. DESIGN INFORMATION

The following standards will apply to the roadway classifications listed in Section 4 – Neighbourhood Area Structure Planning. These standards are summarized in Appendix A and Appendix B appended to this Section.

A. DESIGN VEHICLES

Based on recommendations included in TAC's Geometric Design Guide for Canadian Roads (Chapter 1.2), the following design vehicles have been selected as being representative of vehicles operating in Canada:

1. Passenger Cars (P)**,
2. Light Single-Unit Truck (LSU)**
3. Medium Single-Unit Trucks (MSU)**,
4. Heavy Single-Unit Trucks (HSU)**,
5. WB-19 Tractor Semitrailers (WB-19)
6. WB-20 Tractor Semitrailers (WB-20),
7. WB-21 Tractor Semitrailers (WB-21)**,
8. A-Train Doubles (ATD),
9. B-Train Doubles (BTD),
10. Standard Single-Unit Buses (B-12)**,
11. Articulated Buses (A-BUS),
12. Intercity Buses (I-BUS)

** Designates design vehicles selected as being representative of vehicles operating in the Town. The Engineer may specify the use of smaller or larger WB design vehicles in special circumstances.

Note: The minimum travel way designs for the HSU design vehicle will accommodate the single-unit truck, Town transit bus, fire truck, garbage truck and other vehicles with a similar wheelbase.

Additional information on design vehicles is included in TAC's Geometric Design Guide for Canadian Roads – Chapter 1.2 and A Policy on Geometric Design of Highways and Streets (AASHTO).

B. ROUNDABOUTS

At the time of this report, TAC has not adopted a formal roundabout design guideline. In the interim, for new installations, The Town will follow the approaches outlined in “Roundabouts: An Informational Guide, Second Edition” (NCHRP Report 672, Dec 2010). Once TAC publishes a roundabout design guide, the Town of Olds will evaluate and consider TAC guidelines for adoption.

C. AUXILIARY LANE / FRONTAGE ROADWAY

An auxiliary lane will be required where access from an Arterial roadway to adjacent developments has been granted by The Town. The access will be limited to a right turn in / right turn out. The auxiliary lane shall have a minimum lane width of 3.7 m.

Frontage roadways are no longer permitted. Where a Frontage roadway exists and the adjacent property(s) are being developed (or re-developed) the Town may require the Frontage roadway to be removed, re-aligned and/or upgraded. Under these circumstances the Frontage roadway design is considered as an Urban Industrial Local roadway standard.

D. VERTICAL CURVES

Vertical curves shall be provided where a grade change takes place in accordance with the following criteria:

1. Length of Vertical Curve, L = KA
    - Where “K” is the vertical curve calculation factor, and
    - “A” is the algebraic difference between grades.
2. Crest "K" Factor based on L > SSD

    a. $SSD = 0.278tV + d$ (TAC Formula 2.1.5)

    Where $d = V^2 / 254f$ (TAC Formula 2.1.7)

    Where Perception and reaction time (t) = 2.5 sec., and ‘f’ is as listed in Table 13.1 and TAC – Table 1.2.5.2

    b. $K_{(Crest)} = SSD^2 / 200 (h_1^{-0.5} + h_2^{-0.5})^2$ (TAC Formula 2.1.24)

    Where h_1 = 1.05 m and h_2 = 0.38 m

3. Sag "K" Factor based on Comfort Control

   a. $K(Sag) = V^2 / 395$ (TAC Formula 2.1.28)

Table 13.1
Vertical Curve "K" Values

Design Speed	Coefficient of Friction	Stopping Sight Distance	K Factor	
(km/hr)	(f)	(m)	Crest Vertical Curve	Sag Vertical Curve
30	0.40	30	2	2
40	0.38	44	4	4
50	0.35	63	7	6
60	0.33	85	13	9
70	0.31	111	23	12
80	0.30	140	36	16
90	0.30	169	53	21
100	0.29	205	78	25
110	0.28	247	113	31
120	0.28	286	152	36
130	0.28	328	200	43

Note:

1. Crest vertical curves are not required if "L" is less than the following values:

   Local Roadway L < 20 m
   Collector Roadway L < 30 m
   Arterial Roadway L < 40 m
   Expressway Roadway L < 50 m

2. Sag vertical curves are not required for any roadway if L is less than 15 m.

3. The mid-ordinate difference in elevation between vertical point of intersection elevation and pavement design elevation on the vertical curve, "M" is to be calculated and shown on the drawings, the formulas for calculating the various vertical curve elements are included in Section 16.

E. SUPERELEVATION/TRANSITION SPIRALS FOR ARTERIAL ROADWAYS

Superelevation is normally rotated about the centre line of the median, however other rotation points can be used if the Engineer feels it is necessary and the ride-ability of the end product would be better.

The length of tangent runout shall be as shown in the following table:

Table 13.2
Superelevation Runout Rates
(Based on AASHTO (1990) Table lll-14 and TAC Urban Supplement)

Design Speed (km/hr)	Runout Length Factor
60	1:167
70	1:182
80	1:200
90	1:222
100	1:250

Runout Length Factor = Maximum relative slopes for profiles between the edge of two lane pavement and the centerline (percent)

Tangent Runout Length = w x 0.02 x Design Speed Factor
w = width of roadway from centre line to edge of pavement.

Example:
Design Speed = 80, w = 10.5, and normal cross-fall = 2.00%
Tangent Runout Length = 10.5 x 0.02 x 200 = 42.0 m

F. DESIGN AND POSTED SPEED

1. Design Speed

The design speeds for the various roadway classifications are summarized in Appendix A.

2. Posted Speed

The Consultant is required to provide written recommendations and/or confirmation of the posted speed for all expressways and arterial (divided and undivided) roadways within their project limits.

The posted speed limit for collector and local roadways is 50 km/hr.

G. ROADSIDE SAFETY

Roadside safety design is one component of roadway design. Roadside safety is defined as the design of the area between the outer edge of the roadway and the

right of way limits. There are many reasons why a vehicle will leave the pavement and encroach on the roadside. Regardless of the reason for the vehicle leaving the roadway, a roadside environment free of fixed objects with stable, flattened slopes enhances the opportunity for reducing crash severity.

Design options for reducing roadside obstacles, in order of preference, are as follows:

1. Remove the obstacle,

2. Redesign the obstacle so it can safely be traversed,

3. Relocate the obstacle to a point where it is less likely to be struck,

4. Reduce impact severity by using the appropriate breakaway device,

5. Shield the object with a longitudinal traffic barrier designed for redirection or use a crash cushion, or

6. Delineate the obstacle if the above alternates are not appropriate.

Design features, such as horizontal and vertical curvature, lane and shoulder widths, signing, pavement marking, etc. play an important role in keeping the motorist on the travelled way.

Establishing a traversable and unobstructed roadside area (clear zone) extending beyond the edge of the traveled way, particularly on high-volume, high speed roadways will help prevent collisions with fixed objects. The term “clear zone” is used to designate the unobstructed, relatively flat area provided beyond the edge of the traveled way for the recovery of errant vehicles. The clear zone includes any shoulders or auxiliary lanes.

The edge of the travelled way is generally determined as follows:

1. Expressways and Arterial Roadways – measured from the Face of Curb or the shoulder (edge) line.

2. Divided Collector and Local roadways - measured from the Face of Curb.

3. Undivided Collector and Local roadways – measured from the edge of the parking lane (refer to Section 16 – Drawings, for typical parking lane widths).

Note: Trees with a trunk diameter of 150 mm or greater, when mature, are considered to be fixed objects that should be planted outside of the established clear zone.

H. TRAFFIC CALMING

Traffic Calming is defined by the ITE as follows:

> "Traffic Calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users."

As part of The Town's initiative to improve and foster pedestrian safety, traffic calming at intersections (e.g. bulbing of curb returns) and narrowing of a roadway section at a mid-block crosswalk are becoming more acceptable. However, all proposed traffic calming will be approved on a case-by-case basis. Therefore the Developer needs to submit plans, details and supporting documentation at the time of the first drawing submission for the first Phase of Development in order to allow time for Town review. Other traffic calming measures the Town may consider are illustrated in the Canadian Guide to Neighbourhood Traffic Calming manual.

The design of traffic calming measures should consider the following factors:

1. Weather, particularly winter conditions,
2. Topography,
3. Existing roadway design standards, especially widths,
4. Ensuring the longitudinal gutter grade remains within standards,
5. On-street parking conditions,
6. Driveway locations near intersections,
7. Transit, truck, service and emergency vehicle requirements,
8. Designated cycling routes,
9. Classification and characteristics of vehicles travelling in the community,
10. Sightlines, both vehicle and pedestrian,
11. Pathway connectivity if a green space is located nearby,
12. Legislation and legal precedents, and
13. Town policies.

If the Developer chooses a traffic calming measure other than a mid-block or intersection bulb, a Technical Brief will be required to support the proposal. In addition to discussion related to the topics noted above, the Technical Brief should discuss any additional safety features that may be required to support the proposed traffic calming measures and is to take into consideration the volumes of pedestrian, cyclist and vehicular traffic.

Typical roadway narrowing measures are illustrated in Section 16 - Drawings.

I. LONGITUDINAL TRAFFIC BARRIER SYSTEMS

The following guidelines will apply to barrier systems for lanes and roadways. These guidelines are general in nature and are not a substitute for sound professional engineering judgment. All designs must adhere to the most current version of TAC's Geometric Design Guide for Canadian Roads and the Alberta Transportation Roadside Design Guide (AT-RDG).

Existing non-compliant longitudinal traffic barrier systems should be upgraded to current standards during replacement, reconstruction and/or widening projects, and wherever practical to do so. In exceptional cases, risk analysis may show that existing barriers may remain; the decision to keep these barriers is at the discretion of the Engineer.

New barriers will be required based on warrant analysis as outlined in the AT-RDG. Generally a barrier may be required when a hazard with no suitable mitigation strategy exists in a clear zone, and the hazard severity is more extreme than the presence of the barrier system.

Where barriers are installed adjacent to a proposed or existing walkway, the barrier shall be positioned to minimize the hazard to pedestrians or cyclists resulting from barrier deflection. The design barrier deflection should pose no more severe hazard to the public, the motorist, or the surrounding property than the severity of the hazard for which the protection was originally designed.

Unless directed by the Engineer, all barriers shall incorporate crashworthy end treatments. End treatments, crash cushions and other elements are detailed in the AT-RDG.

For barriers provided for pedestrian / cyclist safety refer to Section 14 – Landscape Design.

1. Expressways and Arterial Roadways

When a longitudinal barrier system is required, steel post, Strong Post W-Beam barrier systems are preferred on expressways and arterial roadways.

500 mm mountable curb is to be installed adjacent to longitudinal barrier systems with the barrier face vertically aligned with or offset a suitable distance behind the back of curb to allow for snow storage where practical.

2. Local and Collector Roadways

Where a longitudinal barrier system is required, steel post, Weak Post W-Beam barriers are preferred on local and collector roadways.

250 mm rolled curb is to be installed adjacent to longitudinal barrier systems with the barrier face vertically aligned with or offset a suitable distance behind the back of curb to allow for snow storage where practical.

3. Lanes

Where a barrier is required, steel post, Weak Post W-Beam barriers are preferred. End treatments will not typically be required for lane installations. W-Beam systems are **not** a substitute for post and cable systems where Engineering Services OR Planning and Development has identified a barrier separation is required for green spaces (refer to Section 14 – Landscaping).

The barrier face is to be offset 0.5 m from the edge of the lane or otherwise positioned to minimize other impacts.

4. Thrie Beam with Steel Posts

Thrie Beam barriers are to be used in transition from a flexible W-Beam barrier system to a rigid barrier system or structure such as concrete bridge barriers. For barrier transitions and connections to bridge rails refer to the standard bridge rail drawings in the AT-RDG.

5. Other Barrier Systems, End Treatments and Crash Cushions

Other barrier systems, end treatments, crash cushions, etc., as outlined in the AT-RDG, are to be approved by the Engineer.

J. POST AND CABLE FENCING

Refer to Section 14 – Landscape Design for requirements.

K. PEDESTRIAN & CYLISTS ACCESSIBILITY / SAFETY

As part of the planning for a new project, be it a new subdivision, a new site, a local improvement of an existing area, or upgrading infrastructure as part of routine maintenance, the design is to take into consideration the needs of pedestrians and cyclists, regardless of age and / or ability; this is the philosophy of The Town. The design principals presented in TAC's Geometric Design Guide

for Canadian Roads (Chapters 3.3 and 3.4) and The Town's Open Space and Trails Master Plan documents provide the basis for improving pedestrian accessibility, safety, quality, and level of service for the most vulnerable roadway user.

Additional information may be found in Section 4 – ASP regarding the Town's philosophy to improve pedestrian accessibility and safety as it relates to general roadway cross-section and streetscape design.

Included in Section 16 are drawings illustrating typical traffic calming at intersections and crosswalk locations and roadway cross-sections modified to meet this philosophy.

For railings provided for pedestrian / cyclist safety refer to Section 14 – Landscape Design.

3. CURB, GUTTER, MEDIANS, AND SIDEWALKS

A. GENERAL

1. All curb and gutter is to be concrete; asphalt curbs are not allowed except as interim measures in the short term for emergency or temporary surface drainage diversion during construction. Catch-basin information is provided in Section 10 – Storm water Management. Curb and gutter types are detailed in the Town of Olds Contract Specifications – Section 50.

2. Roadway design shall utilize curb and gutter to convey drainage, guide traffic and generally contain traffic within the travelled section of the right-of-way. Where the adjacent paved surface drains away from the curb, such as adjacent to raised centre medians on divided roadways or the outside edge of super-elevated curves, reverse gutter shall be used. To eliminate ponding in the gutter, roadway design shall ensure positive longitudinal grade is maintained in the gutter when transitioning from standard to reverse curb and gutter.

3. The minimum width for a median is 1.5 m (allows for traffic signal) however in older areas of the Town, if right-of-way restrictions are present, the width may be reduced to 1.2 m.

4. Where raised median curb is installed with the intent it will be replaced in 5 years or less, and provided that the roadway cross-falls away from the median, pinned on curb may be used as a temporary installation.

5. Refer to the Longitudinal Traffic Barrier System clause for modifications to curb types.

6. Sidewalk material is noted as per the roadway classifications, below.

7. The Consultant is required to provide written recommendations and/or confirmation of the cross-section for all roadways within their project limits.

B. EXPRESSWAYS

1. Where the design speed is greater than 70 km/h, the curb and gutter shall be 500 mm semi-mountable. Where the design section excludes curb and gutter (rural section) a 4.25 m (minimum) emergency shoulder will be required. If ditch drainage is present, the ditch side slope and back slope shall be cut at 4:1 or flatter.

2. Where center medians narrow to less than 3.0 m in the turn bay and at intersections, a 200 mm barrier curb shall be used to increase visibility and minimize the potential for vehicles departing the roadway and crossing into oncoming traffic.

3. Islands used to channelize diverging traffic (e.g. pork chops) shall be constructed using 200 mm barrier curb however roadway design speed should be taken into consideration.

4. A 5.0 m wide separate asphalt pathway shall be constructed on one side of the roadway to form part of the trail systems. The pathway is to be delineated with a 3.0 m pedestrian throughway and a 2.0 m cycling throughway, preferable with a visual barrier (e.g. 1.0 m wide grassed area) between. A secondary pathway of 3.0 m is optional on the opposite side of the expressway, to be confirmed by the Engineer.

C. ARTERIAL ROADWAYS

1. Where the design speed is greater than 70 km/h, curb and gutter shall be 500 mm semi-mountable. Where the design speed is less than or equal to 70 km/hr, the curb and gutter shall be a 150 mm barrier face curb with a 500 mm gutter pan.

2. Where center medians narrow to less than 3.0 m in the turn bay and at intersections, a 200 mm barrier curb shall be used to increase visibility and minimize the potential for vehicles departing the roadway and crossing into oncoming traffic.

3. Islands used to channelize diverging traffic (e.g. pork chops) shall be constructed using 200 mm barrier curb.

4. A 3.0 m wide separate sidewalk or pathway is required on both sides of arterial roadways, to form part of the trail systems. Asphalt is the preferred surface material however concrete is acceptable.

5. Acceptable traffic volumes for undivided arterial roadways is 5,000 to 12,000 vpd.

D. RESIDENTIAL COLLECTOR ROADWAYS

1. Residential Collector roadways are to have a 250 mm standard curb and gutter.

2. Where there are single family residential lots (zoned for front driveways) a 250 mm rolled curb & gutter shall be used.

3. If the centre median is grassed a 250 mm semi-mountable curb shall be used.

4. A 2.5 m wide separate sidewalk is required on one side of the roadway and a 1.5 m (minimum width) separate sidewalk is required on the opposite side of the roadway. The 1.5 m sidewalk may be monolithic to the curb if there are constraints on the right-of-way.

5. Concrete is the preferred sidewalk surface material however asphalt may be acceptable for the 2.5 m sidewalk with the Engineer's approval.

6. Consideration for which side of the road the 2.5 m sidewalk is on should be made with regard to parks, other trails, commercial areas, school sites and connectivity to Arterial sidewalks and adjacent neighbourhood roadway connections. It is preferred the sidewalk remain consistent to one side of the right-of-way throughout the Neighbourhood, as defined by the Area Structure Plan.

7. Acceptable traffic volumes for residential collector roadways is a maximum of 5,000 vpd.

E. RESIDENTIAL LOCAL ROADWAYS

1. Residential Local roadways are to have a 250 mm rolled curb and gutter.

2. Where there are parks, schools, front driveway restrictions, commercial sites, or other access restrictions, 250 mm standard curb & gutter shall be used.

3. Centre medians are to have a 250 mm standard curb.

4. If the centre median is grassed a 250 mm semi-mountable curb shall be used.

5. A 1.5 m sidewalk is to be constructed along both sides of the right-of-way. Separate sidewalk is preferred however monolithic to the curb is acceptable if there are constraints on the right-of-way. Sidewalks are to be concrete.

6. Acceptable traffic volumes for residential local roadways is 1,000 vpd maximum.

F. INDUSTRIAL ROADWAYS

1. Industrial roadways (collector or local) are to have a 250 mm standard curb and gutter.

2. To enhance the aesthetics and ensure mobility in industrial areas, a 1.5 m separate sidewalk shall be constructed on the industrial roadway.

3. Consideration for which side of the roadway the sidewalk is on should be made with regard to parks, natural areas, nearby commercial areas, connectivity to Arterial sidewalks / trails, and adjacent neighbourhood roadway connections. It is preferred the sidewalk remain consistent to one side of the right-of-way throughout the Neighbourhood, as defined by the Area Structure Plan. Sidewalks are to be concrete.

4. Centre medians are to have a 250 mm standard curb.

5. If the centre median is grassed a 250 mm semi-mountable curb shall be used.

G. SIDEWALKS WITHIN A PRIVATE DEVELOPMENT

1. Sidewalks will be required for commercial, multi-family, and institutional areas. Internal sidewalks are to connect on-site areas to Town sidewalks, trails, and/or pathways to allow for direct pedestrian access to the building(s). Consideration for a continuous, well defined pedestrian route (e.g. sidewalk) from buildings to the public sidewalk, with minimal requirements for pedestrians to cross open parking lot areas, is preferred.

2. Specific requirements will depend on the anticipated pedestrian volumes and desirable walking routes as determined at the time of a Development Permit application review by Engineering Services.

H. FRONTAGE ROAD IMPROVEMENTS

1. Where a frontage road exists and is to be re-aligned due to adjacent arterial road or intersection upgrades or re-development of adjacent property a 1.5 m monolithic or separate sidewalk is required along the private property side of the frontage road.

2. In existing developed areas, an auxiliary lane may be added to an arterial roadway to replace the frontage road, at the discretion of Engineering Services (see Auxiliary Lane requirements in this Section).

3. Frontage roads are not permitted for new developments.

I. TRAIL TYPES

Refer to Section 14 – Landscaping for further information on the various trail types and usage.

J. CURB RAMPS

To provide barrier-free access, curb ramps shall be installed at the corner of any intersection which connects to an existing or planned sidewalk or pathway, as part of any new or upgrading construction project. Two curb ramps shall be installed on the through street of a three-legged intersection. Engineering approval is required whenever a curb ramp cannot be placed at the midpoint of the curb return.

4. MINIMUM SURFACE GRADES

Requirements for storm water management, major drainage design standards, minor storm sewer design criteria, catch basin locations, length of drainage run, etc. are included in Section 10 – Storm Design.

A. ROADWAYS

The minimum longitudinal surface grade for all road classifications is 0.50%. For curved roadways, cul-de-sacs, and expanded bulb corners, centre line grades are to be increased to provide a minimum gutter grade of 0.50%. It is also desirable to use slightly steeper grades where possible. Reverse curb and gutter is the exception to this requirement.

Roadway cross-fall is 2.50%, from centerline of roadway to the lip of gutter. For a divided roadway, cross-fall drainage is taken from the center of the median to the outside lip of gutter. Although not preferred, under some circumstances roadways may be crowned to split the drainage along the centerline of the carriage way. In such cases storm drainage will be required both in the median and along the outside gutter. For expressways with a grassed swale median, storm drainage will be required. The grass median's minimum longitudinal grade for the swale shall meet the requirements for Lot drainage as specified in Section 10 – Storm Water Design.

B. LANES

The minimum longitudinal surface grade for paved lanes in new subdivisions is 0.60%. In older developed areas where the lane grade cannot be reconstructed to its original grade due to adjacent development restrictions (e.g. existing concrete or paved driveways, garages, etc.), the centreline grade may be reduced to no less than 0.60%.

C. BOULEVARDS

Boulevards, generally, are to have a 2.00% grade from property line to face of curb unless otherwise approved by the Engineer.

D. PUBLIC UTILITY LOTS

Refer to Section 10 – Storm Water Design, Lot Drainage for additional information.

E. TRAIL GRADES

Trail grades are not to exceed 8% grade without approval from Engineering Services. Consideration for the length of a continuous grade is required for purposes of speed control and maneuvering around corners. Corners of less than 135^{o} angles should be avoided at the bottom of long and / or short steep grades.

Where a trail is adjacent to or along an embankment, a protective railing may be required. Refer to Section 14 – Landscape Design for further information regarding protective railings used for pedestrian / cyclist barriers.

Natural trails (walking) may not exceed 12% grade and require approval from Engineering Services.

5. ROADWAY CONSTRUCTION

A. EXISTING SOIL CONDITIONS

In Olds, high ground water and heavy clay are very common. This condition may impact roadbed construction depending on seasonal groundwater and weather at the time of construction. It is recommended that all design roadway grades be established as high above the groundwater table as possible.

B. PAVEMENT DESIGN

The minimum pavement structure permitted for each road classification shall be as outlined in the following table:

Table 13.3 - Pavement Structure

Road Classification	Asphaltic Concrete Depth (mm)	Granular Base Depth (mm)	Granular Subbase Depth (mm)	Total Depth (mm)
Expressway, Divided Arterial & intersections	A traffic analysis is required to verify design traffic volumes and pavement structures are to be determined accordingly (includes reconstruction / upgrade projects).			
Undivided Arterial	150	150	400	700
Industrial Collector	150	150	350	650
Residential Collector	150	150	300	600
Industrial Local	150	150	300	600
Residential Local	100	150	250	500
Front Serviced Residential Local	100	150	250	500
Paved Lanes	100	150	250	500
Trails	75	300	0	375

The pavement structures shown in Table 13.3 provide for the minimum allowable thickness for asphalt, granular base, and granular sub-base.

These pavement structures are founded on a prepared sub-grade having a California Bearing Ratio (CBR) of at least 4.0 in a soaked condition; assumes a granular sub-base having a CBR of at least 20, and assumes the granular base has a CBR of at least 80.

These conditions are considered representative of the level of sub-grade support that would exist on a site during spring thaw when the sub-grade soils exist in a weakened condition. Where weaker sub-grade soils are found to exist, an increase in the pavement structure will be required.

For each phase of development, after pre-grading and prior to initiating roadway construction, the Developer will be required to complete a separate geotechnical investigation to confirm the pavement structure design assumptions contained within the original geotechnical investigation report. This geotechnical investigation will verify the subgrade support strength that the in-situ soils will provide for proposed road sections. In-situ moisture contents and soaked CBR

values shall be determined on soil samples taken from test pits and/or boreholes advanced to a depth representative of the upper 1.0 m of the proposed roadway's subgrade. The frequency of the test pit and/or borehole locations shall be at least one test per 200 m along proposed roadway alignments.

The findings of the geotechnical investigation will be stated in a geotechnical report. The geotechnical report will be required to verify the original pavement design assumptions and based on the findings of the above mentioned field sampling and testing requirements, substantiate the proposed pavement structure design. The report will include in-situ moisture contents and the soaked CBR values for subgrade soils from all test pits. The report is to be approved by the Engineering Services before roadway construction proceeds.

C. SUBGRADE PREPARATION AND IMPROVEMENT

Based on experience, the level of sub-grade support from most fine grained surface soils in Olds is expected to be equivalent to a soaked CBR value in the order of 2 to 5. Sub-grade support at this level is on average, slightly below the minimum design values. In areas where shallow groundwater conditions exist (or seasonally high ground water is temporarily perched close to the existing surface grades), there will be the potential for groundwater to be pumped up into the sub-grade soils by surface vibrations from construction traffic.

Typical local practice for road base construction for weak or sensitive sub-grades (having a soaked CBR value <4) is to thicken the granular sub-base layer of the pavement section (i.e. construct a working platform of free draining course gravel) to improve the effective strength of the sub-grade. In most cases the subgrade is overlaid with a geotextile or combination of geotextile and geogrid prior to placing the gravel. Placement of this thickened granular sub-base will support construction traffic and will improve the level of sub-grade support for the design pavement section. The required thickness of the sub-base gravel will vary across the site depending on actual sub-grade conditions. Where geotextile is used to separate the sub-base gravels from the in-situ soils, geotextile will be returned up the sides of the sub-base excavation to prevent lateral migration of the fine grained subgrade soils into the granular sub-base layer.

Construction procedures should be designed to minimize disturbance to the sensitive sub-grades and to protect the integrity of the granular working mats. If the sub-grade has failed during construction, the weakened material may have to be sub-cut and replaced.

Required granular thickness, initial lift thickness, and the need for any special construction procedures are best determined by a qualified geotechnical engineer based on observations at the time of construction. All changes or modifications recommended by the geotechnical engineer to the original design due to site conditions encountered during construction shall be contained within a written letter to be signed and sealed by the geotechnical engineer. This letter

verifying the design change recommendation is to be submitted to Engineering Services prior to the issuance of CCC.

Where seasonally high ground water has been identified, either through a Geotechnical Report or field conditions, within 1.0 m of the proposed finished roadway elevation, weeping tile drains are to be installed, particularly at sag points in the roadway.

1. Transit Stop

For new development, where a transit stop is planned on an ACP surfaced roadway and the CBR value of subsoils is less than or equal to 4, a layer of non-woven geotextile overlaid with biaxial geo-grid or a laminated combination product is to be placed below the sub-base for additional subgrade support. The geo-grid is to be one lane wide (minimally), adjacent to the transit stop. Using the "Transit Stop" sign as a reference point, the geo-grid is to be placed starting 60 m in advance of the stop and continue to a distance of 40 m beyond the stop, for a total length of 115 m (minimum). The exception to this length will occur where a transit stop is proposed at an intersection; the before or after length will be shortened to the Face of Curb of the intersecting roadway.

Prior to the start of construction for the phase of development that includes the planned transit stop the Developer is to confirm the location of the stop location with the Transit Department.

This subgrade reinforcement will also apply when a transit stop is located on a roadway that is being rebuilt.

D. FRONT STREET / PRIMARY ACCESS SERVICING

In residential subdivisions where deep utility services are proposed from the street or primary access laneway of the lot, the following design changes and construction practices are required:

1. To ensure a uniform subgrade condition is achieved to minimize the potential for adverse impacts on the roadway surface due to differential settlements between trench (i.e. main and services) backfill and non-trenched areas within the roadway, the existing material shall be excavated to a depth of 1.5m below finished grade, thoroughly mixed and replaced in the roadway to create a homogenous subgrade condition below the finished roadway elevation for the full width of the roadway. Full width of the roadway is defined as being from 300 mm behind the back of concrete to 300 mm behind back of concrete. Back of concrete is considered to be back of monolithic walk or separate sidewalk for the relevant road cross-section.

2. The first lift of asphalt paving, 50 mm, is to be delayed a minimum of one year following the issuance of the Construction Completion Certificate for the

gravel base. The top lift shall not be placed until at least two (2) years have passed or after the issuance of Final Acceptance Certificate for the road base **and** concrete work. Prior to placing top lift asphalt, deviations in the first lift of asphalt in excess of specified vertical tolerance shall be rectified by milling and/or overlaying the bottom lift asphalt such that the top lift can be placed at a uniform depth. The other option the developer has is to complete all lifts of Asphalt for the roads as well as all of the concrete at the time of CCC. These need to be decided before construction is started.

3. The minimum finished depth of asphaltic concrete on local roads and primary access lanes with deep utility services shall be 100 mm.

4. The minimum finished depth of asphaltic concrete on collector roadways with front servicing shall be 150 mm.

5. The initial lift of asphalt may be installed with a 3% crown to reduce the impact of potential settlement.

6. Field testing shall be modified from that which is specified in Section 3 – General information, per the table below:

Table 13.4

Test	Minimum Test Frequency
Backfill Soil	
Standard Proctor	1 per material Type
Field densities - Trench	2 tests per 600mm of depth per **50m** of trench
Road Base/Subbase/Subgrade	
Standard Proctor/Sieve for Granular	1 per material type
Subbase and base	1 per material type
Field Densities - Grading Fill	1 test per **125 m^3**
Field Densities - Subgrade Preparation	1 test per **500 m^3**
Field Densities - Subbase	1 test per **1500 m^2**
Field Densities - Base	1 test per **500 m^2**
Asphalt	
Field Marshall	1 test per 1000 tonne
Cores	1 core per 1000 tonne

The Consulting Engineer shall provide full time inspection during trench (main and service) backfilling operations. Written certification of compliant backfill material placement and compaction, stamped and sealed by a Professional Engineer licensed to practice in the Province of Alberta, is to be provided to the Town of Olds

at the time of application for the Construction Completion Certificate for the deep underground utilities.

Note: Standard testing frequencies are provided in Section 3 – Engineering Services.

6. ASPHALT PLACEMENT

The maximum depth of a single lift of asphalt shall be 75 mm. The minimum initial depth of asphalt shall be 50 mm. The minimum depth of successive lifts including levelling course required to correct grades prior to placing top lift shall be 40 mm.

7. STAGED CONSTRUCTIONS OF LANES

A. GRAVEL LANES

Gravel lanes are not permitted in any new developments. All existing gravel lanes will be constructed to paved lanes when upgrades are necessary.

B. PAVED LANES

Where a paved lane is proposed, the initial stage of construction shall follow the gravel lane requirements noted above. After one year of the initial construction, the lane should be rehabilitated as outlined in the Gravel Lanes clause above, shaped to the proper cross section, and then paved. All paved lanes shall be paved in two mats maintaining a straight grade from the centreline to edge of lane.

8. STANDARD ROAD CROSS-SECTIONS

Standard roadway cross-section drawings are included in Section 16 - Drawings.

9. TRAFFIC SIGNAGE AND PAVEMENT MARKINGS

For information regarding Traffic signage and pavement markings refer to Section 15 – Traffic Design.

10. EMERGENCY ACCESS DESIGN REQUIREMENTS

The clear unobstructed width of an emergency access right of way shall be a minimum width of 6.0 m with a 4.5 m driving surface. The driving surface may be concrete, asphalt, paving stone, or turf stone on an appropriately constructed base. The emergency access shall be structurally and geometrically designed (e.g. width, turning radii, structure) to safely carry fire-fighting vehicles to a connecting street or lane.

Avoid placing an emergency access in line with an opposing roadway to avoid the appearance of the access as an extension of the roadway.

The overhead clearance through an emergency access shall be a minimum of 5.0 m.

Emergency access roads must be signed at each street or lane intersection as “Emergency Access” and the signs designed such that they meet the intent of the Alberta Fire Code.

Collapsible or removable bollards must be installed at each roadway or lane intersection to deter access by public vehicles. Reflective strips must be installed on the bollards to make them visible to cyclists and pedestrians at night.

11. LANDSCAPING

Boulevard tree planting is required on residential and industrial roadways. For roadway landscaping requirements, including berms, see Section 14 – Landscaping.

12. DRIVEWAYS

A. GENERAL

1. Direct access from private property to an expressway or arterial roadway is not permitted. If circumstances dictate direct access to an arterial as the only alternative, the access may be granted upon approval of the Engineer. If direct access from private property to an arterial roadway is granted by the Engineer, an auxiliary lane will be required and the access will be limited to a right turn in / right turn out. Refer to Auxiliary Lanes in this Section.

2. In residential areas, driveways are acceptable unless restricted by land-use or roadway conditions. Roadway condition restrictions typically relate to median location, no parking areas, intersections, roundabouts, etc. Refer to other clauses within this Section and Section 15 – Traffic Design, for further information on these restrictions.

3. Where a proposed driveway would be located opposite a laneway or public roadway at a “T” intersection, the driveway should be centred on the opposing roadway or off-set a minimum distance (45 m preferred) to the nearest edge of driveway in accordance with TAC standards, but is not permitted to be off-set less than 30 m unless approved by the Engineer.

4. If the driveway is on a roadway with ditch drainage, a culvert shall be installed (unless the location is the high point of the ditch drainage). Refer to Section

10 – Storm Drainage for information on culvert design and Section 16 – Drawings.

5. If the Developer requests commercial or industrial driveway sizes greater than provided here or the proposed size is not required for the development proposed (or land-use), the Developer may be required to provide turning movements and show estimated traffic volumes through the access and the impacts on the adjoining Town roadway(s) and neighbouring driveways to support the request. The analysis will follow the guidelines provided in TAC.

6. Refer to Section 16 – Drawing 5.75 for general layout.

B. RESIDENTIAL

1. Residential driveways shall meet the standards of the Land Use By-laws.

2. In areas where rolled curb is used, no driveway crossing will be required for the driveway, however in areas where a standard face curb is present (typically the older existing areas of the Town) a reinforced curb crossing will be required. Curb crossings may be applied for through The Town's Engineering Department during normal business hours.

3. For corner lots, the driveway should be located as far as possible from the intersection and must not encroach on the curb return.

4. Where a driveway is proposed at or adjacent to a curb ramp, typically at mid-block, the driveway and ramp are to be separated by 1.0 m.

5. Front driveways shall be graded back (garage) to front (curb) and hard surfaced.

6. Residential driveways entering onto collectors shall be set back from intersections in accordance with TAC's Design Guide for Canadian Roads / Urban Supplement. Driveways will not be permitted to be located on divided sections of collector and local roadways. These lots must have vehicle access provided from a rear laneway only.

7. For multi-family residential sites, commercial driveway requirements shall be used.

8. Driveways are to be oriented and modified to avoid Town or shallow utility infrastructure. In areas of new subdivision development where infrastructure and driveway conflicts arise, the Developer will be responsible to resolve the issue between the home owner and builder, to the satisfaction of the Town.

9. If no satisfactory resolution is found and a driveway is in conflict with Town or shallow utility infrastructure a barrier shall be installed to protect the

infrastructure in question. The barrier shall be a durable and unmovable object (e.g. steel posts). The barrier(s) shall be set back from the infrastructure to provide a minimum 1.0 m clear working space around the infrastructure to accommodate maintenance of the infrastructure. The barrier must have the street side open if a fence or solid wall barrier is used. A barrier(s) shall be placed on all sides (or corners) of the infrastructure that border the driveway. The barrier should be minimally 1.5 m in height above ground and have reflective markings for visibility.

C. COMMERCIAL

1. Allowable driveway widths are defined in the current Land Use By-law.

2. Where monolithic sidewalk or no sidewalk is present the driveway width is taken at 4.5 m from face of curb or the property line, whichever is the lessor distance away from the curb. The flared width is measured at the face of curb.

3. Where separate sidewalk is present the driveway width is measured at the back of the separate walk and the flared width measured at the face of curb.

4. The driveway ramp is to be sloped from back of ramp to the gutter.

5. A sidewalk / boulevard transition is required along the side of the ramp; the maximum sidewalk transition width will be 0.7 m at the face of curb.

6. For corner lots, the driveway should be located at least 30 m from the face of curb of the adjacent roadway.

7. Driveways with radial curb returns are not permitted.

D. INDUSTRIAL

1. Allowable driveway widths are defined in the current Land Use By-law.

2. Where monolithic sidewalk or no sidewalk is present the driveway width is taken at 4.5 m from face of curb or the property line, whichever is the lessor distance away from the curb. The flared width is measured at the face of curb.

3. Where separate sidewalk is present the driveway width is measured at the back of the separate walk and the flared width measured at the face of curb.

4. The driveway ramp is to be sloped from back of ramp to the gutter.

5. A sidewalk / boulevard transition is required along the side of the ramp; the maximum sidewalk transition width will be 0.7 m at the face of curb.

6. For corner lots, the driveway should be located at least 30 m from the face of curb of the adjacent roadway.

7. Driveways with radial curb returns are not permitted.

E. RE-DEVELOPMENT SITE

For a redevelopment project which requires an existing driveway to be widened, the driveway will be revised to match the existing driveway cross section. If the existing driveway is being removed and replaced with new curb, gutter, and / or sidewalk, they will be reconstructed to match the existing cross section. If an existing driveway is being replaced by a new driveway, the curb, gutter, driveway crossing and sidewalk, if applicable, shall be reinforced per the Town of Olds Contract Specifications.

13. NOISE STUDY

The Town's Traffic Noise bylaws establish the maximum design noise levels throughout town, and for new development areas adjacent to expressways and arterial roadways the maximum noise level of 60 dBA Leg (24) is to be used.

When a Noise Study is required, typically at Area Structure Planning (Section 4) or Servicing Study (Section 5), to support a project or development the following criteria shall be used:

1. The maximum noise level of 60 dBA Leq (24) relates to the outdoor leisure area. The receiver is located 1.5 m above the ground and 3 m from the face of the building. If the location of the building is not known, the receiver should be located 4.5 m from the property line.

2. *Noise levels are to be predicted for the 20-year traffic volume as forecast in the current Town of Olds Transportation Study. Predicted traffic volumes for highways (i.e. Hwy. 2, Hwy. 2A, and Hwy. 27) should be obtained from Alberta Transportation.*

3. The Noise Study is to contain a report of the findings and scaled drawing(s) of the site including the following:

    a. building location(s),

    b. receiver location(s),

    c. road alignment,

    d. proposed noise barrier(s),

    e. coordinate grid (for FHWA method),

f. scaled cross-section at each receiver location showing roadway, receiver, and ground elevation as required,

g. traffic volumes and percentage of heavy vehicles,

h. detailed calculations used to determine noise levels and barrier heights, and

i. table showing receiver noise levels with and without a barrier.

The package of information provided shall include the construction specifications for the sound attenuation barrier, if the Study's results warrant one. The sound attenuation structure should meet the applicable items shown under the Optional / Enhanced Amenities section, below.

14. OPTIONAL / ENHANCED AMENITIES

Optional / Enhanced amenities are any structures, located within public property, which are used by Developers or Community groups to create a "theme" and / or uniqueness and give character to their neighborhood. This may range from simple items (e.g. carved wooden signs, decorative street name plates, boulders with identifying text, typical wood or vinyl fencing, etc.) to structural items (e.g. Entry Features, wrought iron fences, columns, or post with hard surface veneers, etc.).

In the Land-use Bylaw, a structure is defined as "Anything constructed or erected, the use of which requires location on the ground or attachment to something located on the ground…", for purposes of these clauses "structure" would typically include:

A. footings or piles, designed to minimize frost heaving and ground settlement , provide overall stability for the structure through Best Practices for construction of a structure,

B. a core that is formed concrete, concrete block, large timbers (> 150mmx150mm), etc.,

C. the skeletal framing material constructed from wood and / or metal components.

A. GENERAL

1. The structural design and integrity of the structure(s) remains the responsibility of the designer (Consultant) and the Contractor. Depending upon the size, complexity of the structure, its intended purpose, etc. The Town may require a Structural Engineer's stamp and signature for the feature,

2. The finishes are to be long lasting (e.g. metal, concrete, composite materials), resistant to fading, extreme weather (e.g. hail), graffiti and low to no maintenance,

3. The structure's design is to consider public safety due to material fatigue, collapse, and public trespass onto it,

4. The location of any structure(s) must be reviewed and approved by the Engineer,

5. The Developer will be required to provide a maintenance fund for enhanced amenity structures through the Development Agreement or a Development Permit,

6. A cost estimate for the structure(s) construction and a material list, including supplier(s), is to be provided,

7. The Developer's commercial name or company logo may appear on an Entry Feature Sign upon approval of the Engineer. The name or logo is to be discreetly placed (typical a lower corner of the sign) and sized to 10% of the subdivision name.

Enhanced amenities will require a Development Permit and may require a Development Agreement, or an amendment to a Development Agreement for the construction of the structure. The Developer or community group will need to contact the Town's Planning and Development Department and / or Engineering Services regarding their proposal in order to determine if it meets the Land-Use Bylaw and these requirements.

B. SUBDIVISION ENTRANCE SIGNS (FEATURES)

1. The Entrance Feature is to be located within the Development and be shown on a location plan drawing.

2. The location of the Entrance Feature(s) shall be at the subdivision's primary access (collector) roadway adjacent to, and facing, the arterial roadway or quarter section line dividing neighborhoods. Refer to Section 16 - Drawings for further information.

3. The proposed Entrance Feature is to be located on public property (e.g. road right-of-way, PUL, etc.).

4. A cost estimate for the Entrance Feature(s) construction and a material list, including supplier(s), is to be provided.

5. Additional Entrance Features will not be permitted within the subdivision without the approval of the Town.

C. DECORATIVE SIGN PEDESTALS (CAIRNS)

1. The pedestals may only be used on Stop and Yield signs.

2. The pedestals are to be located within the Development and shown on the Pavement Markings and Signage plan.

3. The location of the pedestals is to be within the road right-of-way and in accordance with MUTCDC regulatory signage placement requirements.

4. The pedestals will not be located adjacent to arterial roadways, on center medians, or traffic islands.

5. The pedestal can be no taller than 900mm (ground to cap) nor have a base area larger than 900mm x 900mm. A pole shall be provided atop the structure to mount the stop or yield sign in accordance with the MUTCDC height and placement requirements.

6. A cost estimate for the pedestal(s) construction and a material list, including supplier(s), is to be provided.

7. A Development Permit is required for the construction of any pedestal(s) and they are to be addressed through a Development Agreement. The location of pedestal(s) must be reviewed and approved by the Engineer.

D. SOUND ATTENUATION STRUCTURE

1. The location, material, dimensions, etc. of the structure are to be determined as per the Noise Study results. This clause refers to a concrete structure; if the Noise Study determines that a typical fence (wood, vinyl etc.) is sufficient, it is to be located on private property and be registered on the affected lot's title by a restrictive covenant to identify that the maintenance of the fence is the homeowner's responsibility.

2. Generally, sound attenuation structures are to be located on public property, typically within a Public Utility Lot (PUL) except wood or vinyl fences as noted in the previous item.

3. A cost estimate for the structure's construction and a materials list, including supplier(s), is to be provided.

4. Where a structural wall is used for sound attenuation, the finish of the wall should be designed to match with a subdivision's character (as defined in the NASP). Wall construction shall be done in such a manner as to minimize the potential for vandalism. For example; Concrete plank walls consisting of

planks weighing less than 100Kg. per plank shall have the top two planks glued together to prevent their removal.

5. If the structure is located along the top of a berm, access for maintenance vehicles must be considered. If the berm is adjacent to a laneway, public utility lot, green space or a boulevard with appropriate width to accommodate maintenance vehicles (e.g. crane and outriggers) a 1.0 m wide working area along the top of the berm, adjacent to each side of the structure, is required for maintenance personal. Under this circumstance the width of the berm's top will be minimally 2.0 m plus the structures thickness.

   When circumstances arise where a sound attenuation structure is required and there is no laneway or PUL or boulevard (green space) adjacent to the wall for maintenance vehicle access, the vehicles will be required to use the top of the berm itself, a 6.0 m wide working space (width to accommodate equipment such as a crane with outriggers) is required along one side of the structure and a 2.0 m working space on the opposing side of the structure. Assuming 1.0 m for the structures thickness the top of the berm shall be a minimum of 9.0 m wide with the wall offset 6 m from one edge.

E. DRAWINGS REQUIRED

The following drawings are to be provided for Optional / Enhanced Amenities:

1. Location: A plan view including surface and underground infrastructure (shallow and deep) plus contours (if berm or pond present).

2. Structural: Plan and details relating to the structure and foundation; materials and specifications to be included.

3. Architectural: Plan and details showing and listing the finishing materials and overall appearance of the finished structure.

4. Shop drawings: of the structure are to be provided at time of review, prior to construction.

5. Landscape drawings: Plans and details showing proposed landscaping and a list of proposed plant materials. This information may be combined with one of the other drawings noted above. For detailed information requirements refer to Section 14 –Landscape.

F. SUBMISSIONS

1. Two sets of construction drawings, unbound, on bond media, and marked "Issued for Construction",

2. A CD, DVD or USB containing the PDF file of the drawings which have the professional practice stamp and Consulting Engineer's signature inscribed.

The submission is to be provided to the Engineering Services Department for distribution to the following Town Departments for their review:

- Planning and Development
- Engineering Services

Plan of Record drawing submission is the same requirement as noted above.

Note: No work is to proceed until these departments have provided the Development Section with their approval.

15. TRANSPORTATION IMPACT ASSESSMENT (TIA)

This section provides an outline of The Town's requirements governing the preparation and submission of a TIA. It is the responsibility of the Developer (or their designated Consultant – referred to as "Consultant" for the remainder of this clause) to ensure the latest information available is used when preparing a TIA for a proposed Development.

The TIA will identify and evaluate the potential impact to the transportation network (both onsite and offsite) associated with the proposed Development. It is to identify the transportation infrastructure and programs needed to mitigate transportation impacts to an acceptable level.

When completing transportation network improvements, the TIA is to consider the elements outlined in these guidelines.

If a TIA is required as part of new "green field" Development, the Town's Planning and Development Department will be the sole point of contact for the Developer (or their representatives). All information and/or requests pertaining to the TIA (e.g. TIA scope, traffic counts, signal timing information, TIA submission, etc.) will be processed through the appropriate Planner and not directly with the Engineering Services Department.

If a TIA is required as part of the Development Permit (DP) conditions, The Town's Engineering Services Department will be the sole point of contact for the Developer (or their representatives). All information and/or requests pertaining to the TIA (e.g. TIA scope, traffic counts, signal timing information, TIA submission, etc.) will be processed through the appropriate Development.

Generally, a TIA study accepted by The Town will be valid for a period of up to five (5) years. An updated TIA will be required if an acceptable amount of development has not occurred within the five (5) year period or if significant changes to the development plan are proposed (e.g. land-use assumptions). As a development

continues with phased build out, the developer may be required to submit intermittent "short form" TIA's that shows the impacts and growth as the development is built.

A. SCOPE AND STUDY LIMITS

This clause outlines the general scope of TIA's submitted to the Town. At the beginning of the project, it is the responsibility of the Consultant to submit a scope document to the Town, specific to the proposed development. This document is to include, at a minimum, the following:

1. The site location,
2. The proposed land-uses,
3. Development schedule (known or assumed),
4. The proposed study area (including intersections to be analyzed),
5. Future analysis horizon years, and
6. Any proposed deviations from The Town's standard requirements for TIA's.

In general, the study area should contain the roadways, intersections, and access points that would likely be affected from the proposed Development. For most developments, the following analysis horizons are required:

1. Existing/Base (represents conditions in the field at the time of the writing of the TIA),
2. Opening Day, and
3. Ultimate (Opening Day + 10 years).

The Opening Day shall be defined as the Full Build Out of small developments (approximately less than 20 hectares) and 50% build out of larger developments. The Ultimate horizon shall be 10 years after the opening day and is to include full build out of larger developments.

In an effort to expedite approval and reduce the possibility of re-work by the Consultant, the TIA's scope document may, at the Consultant's discretion, also include analysis assumptions or methodology, including:

1. Trip generation rates,
2. Trip distribution,

3. Analysis software type and version, and

4. Background growth rates.

The scope prepared by the Consultant must be submitted to The Town, allowing for two (2) weeks, from the date of receipt by the Engineering Services Department, for The Town to provide comments on the proposed scope. Depending on the scale of the proposed Development and factors specific to the time of submission (e.g. Town staff workloads), this review of scope may take longer than 2 weeks. This scope document will serve as a tool to ensure that the Consultant and the Town are in agreement on key items. The Town reserves the right to modify the study area or other items in the scope document based on the findings in the TIA. The Town will not issue any formal acceptance or approval of the submitted scope.

B. TURNING MOVEMENT COUNTS (TMC'S)

In most cases, it will be acceptable to use TMC data that is up to two (2) years old. New TMC data will be required if available information is older than two (2) years.

TMC's (pedestrian/bike/vehicle) are to be conducted at intersections as determined in the study scope (see section below). TMC data is to be collected for the weekday AM and PM peak hours. TMC's shall not be collected on a Monday, Friday, statutory holiday, or days when traffic patterns / weather conditions are not normal (unless explicitly requested by the Engineering Services Department). Weekday midday peak and weekend peak hour TMC's may be required depending on the type and location of the proposed Development at the discretion of the Engineering Services Department (e.g. shopping centre, recreation centre, hospital, etc.).

C. SIGNAL TIMING PLANS

Signal timing plans can be requested from The Town's Engineering Services for existing signalized intersections. The majority of signalized intersections within the Town are part of the SCOOT system. The majority of signalized lights in the Town are owned and operated by AT.

D. TIA PREPARATION

1. Study Objective

The objective of the TIA is to:

a. Discuss existing and proposed pedestrian, bicycle, transit, and vehicle facilities and connections and how they relate to the priorities of Town

policies. The Town may require incorporating appropriate Transportation Demand Management (TDM) strategies as determined for the TIA.

b. Document the existing and projected traffic flows on internal and/or adjacent arterial and/or collector roadways as a result of the proposed Development.

c. Recommend access points, intersection/road geometry, traffic controls and internal road layout required to meet the traffic demands of the proposed Development.

d. Minimize traffic and parking impact to the neighbouring subdivisions and roads.

e. Address potential safety or operational issues (e.g. sightlines, geometry, review crash data, weaving, etc.) and access management.

f. Address any shortcutting traffic issues, parking requirements/restrictions, etc.

g. Create a Functional Plan of improvements needed complete with order of magnitude cost estimates.

2. Required Development and Volume Information

The following items, assumptions, and methodology are to be presented and discussed:

a. Existing Conditions

i. Existing site conditions,

ii. Existing transportation network (including lane configuration).

b. Background Volumes

i. Background growth rates,

ii. Background AM and PM peak hour volumes for the Existing/Base, Opening Day, and Ultimate horizons (in Figures),

iii. Assumed geometry of each Background analysis horizon.

c. Development Information

i. Site plan,

ii. Site location and context within existing road network,

iii. Proposed land use,

iv. Details on the proposed site conditions in accordance with the proposed or approved ASP, site development plan, or other plans available.

v. Identify pedestrian walkway system, bicycle connections, and transit stops to serve the Development including connections to adjacent developments and destinations nodes. The report should clearly identify improvements that are onsite and offsite.

d. Development Volumes

i. Trip generation rates and volumes.

ii. Mode split assumptions.

iii. Adjustments to background volumes due to the Development or proposed road network (such as shortcutting, road closures, or new roads and intersection movements).

iv. Trip distribution and assignment assumptions (in Figure(s)).

Trip distribution depends on location specific factors including surrounding land uses, growth areas, size and type of proposed improvements, existing traffic distribution, population distribution, and employment distributions. The assumed trip distribution with percentage values are to be displayed on the figure(s).

Traffic assignment is to be estimated either using an acceptable assignment algorithm or based on the existing traffic patterns in the area, proposed development and future road network, the most direct routes/connections or shortest path available.

The trip assignment of the proposed Development may need to be adjusted to account for pass-by trips, internal trips, diverted trips, etc. Assumptions for trip adjustment must be based on the most current version of the ITE Trip Generation Handbook.

v. Development-generated AM and PM peak hour volumes for the Opening Day and Ultimate horizons (in figures).

vi. Total AM and PM peak hour volumes (Background + Development) for the Opening Day and Ultimate horizons (in figures).

3. Capacity Analysis

Capacity analysis shall be completed for the AM and PM peak hours for all intersections within the study area for Background Volumes and Total Volumes for all analysis horizons. The Town has preferred software and methodology for analysis. The Consultant may request use of another analysis tool in the scope document, however, in order to provide comparable results between all TIAs, the Town may still require a portion of the analysis to also be analysed in the preferred alternatives.
The preferred capacity analysis methodology for signal, stop, and yield controlled intersections is HCM 2000 within the Synchro software with queues from Synchro/SimTraffic.

The preferred software for the roundabout capacity analysis is Sidra Intersection.

The following are expected as part of the capacity analysis:

- Discuss intersection operational issues,
- Summarize the measures of effectiveness (see below) for each movement and provide software printouts in the appendix of the report showing key inputs and outputs. Consultants are encouraged to minimize the size (e.g. combining pages) of this part of the Appendices. Outputs are expected to be legible if printed on 8.5”x11” paper.
- Movements exceeding performance thresholds (see below) must be discussed and improvements identified (if required)

The Town’s measures of effectiveness are:

- Volume to Capacity (V/C) Ratio,
- Level of Service (LOS), and
- 95th percentile queue lengths.

The Town’s performance thresholds are a maximum V/C ratio of 0.85, maximum LOS “D” and the 95th percentile queue length being contained within the existing / proposed storage bays (excluding taper length). These thresholds may be adjusted in cases where the Base/Existing scenario exceeds the typical thresholds, or other circumstances support the adjustment at the approval of the Engineering Department. For an analysis horizon beyond 10 years, a maximum V/C ratio of 0.90 and LOS “E” may be considered acceptable, with approval of the Engineering Department.

The TIA is to include (either in the body of the report or in the appendices), summary tables for the completed capacity analysis (all completed scenarios) that include, at a minimum, the following information for each individual lane (tables that only include the information for each approach or intersection as a whole is not acceptable):

- Lane characteristics (e.g. number of lanes for that movement or if it is a shared movement),
- Traffic volume,
- V/C Ratio,
- LOS,
- 95% queue length (in metres), and
- Available or proposed storage bay length (in metres, as applicable).

In order to identify the appropriate type of intersection traffic control, the following traffic control hierarchy is to be used for both intersection analysis within a development, as well as for external intersection analysis (e.g. warrants converting un-signalized to signalized intersection, etc.).

- 1st consideration – Stop control
- 2nd consideration – Multi way stop control
- 3rd consideration – Roundabout
- 4th consideration – Traffic signals

Depending on the constraints of existing conditions, The Town may choose to deviate from the above traffic control hierarchy.

4. TAC's Traffic Signal Warrant Analysis

Traffic Signal Warrant analysis is to be completed for the non-signalized intersections for the horizons described above. The analysis is to be based on the Traffic Signal Warrant Matrix procedure using six hours of traffic information (i.e. AM, mid-day and PM peak hours). Actual six hours traffic volumes are preferable in evaluating signal warrants; however, estimated mid-day peak hour traffic volumes is an acceptable alternative in absence of mid-day peak TMC's.

5. Safety and Operational Issues

Address safety and operational issues (e.g. sight lines, review crash data, weaving, traffic calming, onsite traffic circulation, queuing, parking issues, etc.).

6. Functional Plan of Improvements

Provide scaled drawing(s) showing the internal and external road improvements required to accommodate the projected traffic. Improvements identified on the drawing(s) must also be described in the text of the TIA. At a minimum, (depending on the nature of the proposed improvements) the drawing(s) will identify the following:

a. The internal arterial and/or collector street layout,

b. The external access points and intersection locations,

c. The number of lanes and the length of any turn bays required for each arterial and collector street intersection,

d. The spacing of controlled accesses inside the development area and around each major intersection,

e. Any traffic control device addition, deletion, or modification required. This includes parking, pavement markings, signs, traffic signals and/or phasing, and timing revisions,

f. Any addition, deletion, or modification to the pedestrian, cyclist and/or transit networks. This includes sidewalks, trails, bus stops, etc.,

g. The year and/or development level in which the improvements shown are required.

7. Report Contents

Notwithstanding the other requirements noted in this section, the TIA report shall include the following information:

a. Professional stamp and Permit to Practice number – it is mandatory that every submitted TIA report be stamped and signed by a Professional Engineer licensed to practice in the Province of Alberta, including the company's Permit to Practice number and authorized signature.

b. The TIA is to include Conclusion and Recommendation sections. sections that clearly identify the onsite and offsite proposed improvements, and the year / development level when they are required.

c. A Figure identifying pedestrian / cyclist networks and transit stops to serve the development, including connections to adjacent developments and destination nodes. The report should clearly identify improvements that are onsite and offsite.

d. Estimated costs are to be included for the recommended improvements.

e. Appendices shall, at minimum, include the following information:

- Correspondence exchanged between the Consultant and The Town regarding the scope of work (including a copy of the final proposed Scope of Work), changes to scope as required by the project, as well as any project-related decisions.
- Traffic Counts (TMC summary sheets).
- Signal timing plans provided by The Town or AT(Alberta Transportation) for existing signalized intersections.
- Synchro / SimTraffic and/or SIDRA (or other approved traffic modeling software) outputs. Consultants are encouraged to minimize the size (e.g. combining pages) of this part of the Appendices. Outputs are expected to be legible.
- TAC signal warrant spreadsheets.
- Site plans.
- Excerpts of other supporting documentation, as appropriate.

8. Digital Information

The following digital information shall be provided on CD, DVD or USB:

a. Traffic Counts – raw data and summary TMC spreadsheets,

b. Trip generation / distribution / assignment files,

c. Synchro / SimTraffic and/or SIDRA (or other approved traffic modeling software) files,

d. TAC signal warrant spreadsheets, and

e. Complete PDF copy of the report, including Appendices.

E. TIA SUBMISSION AND REVIEW PROCESS

The TIA submission and review process is outlined below:

a. Submit an electronic copy, PDF format (colour), of the Final TIA Report to the Planning and Development, and Engineering Services. The submission is also to include all electronic information (e.g. raw and summary TMC spreadsheets, trip generation/distribution/assignment files, Synchro and SIM Traffic / SIDRA files, TAC Signal Warrant spreadsheets, etc.). No paper copies are required to be submitted.

b. From the date that Planning and Development, and Engineering Services receives the initial, complete TIA submission, (including all electronic files), it is expected to take approximately four (4) weeks to review and provide comments. Depending on the scale of the proposed Development and factors specific to the time of submission (e.g. Town staff workloads), this review of the initial TIA submission may take longer than 6 weeks.

c. Any TIA submissions not meeting the requirements outlined in this document will be returned within five (5) days without comment or further review. Documents not meeting the requirements will not be considered as valid submissions. The four (4) week review period will only begin once a valid and complete submission is received.

d. Any additional submissions (e.g. a revised Final TIA Report, supplementary info, etc.) will require a two (2) week review period for each separate submission package. Depending on the size and nature of the proposed development, factors specific to the time of submission (e.g. Town staff workloads), the review may take longer than 2 weeks.

e. All submissions from the Consultant must be on company letter head and include both the Professional Engineer's stamp and Permit to Practice number with authorizing signatures. The Consultant must clearly identify how each Town comment has been addressed and provide an explanation for any comments that have not been incorporated.

f. Points 'c', 'd', 'e', and 'f' above will be repeated until the responses provided and the final TIA submission is acceptable to the Town.

F. FINAL APPROVAL OF TIA

When satisfied, The Town will issue a formal acceptance of the Final TIA report using the Acceptance Page included in Appendix C of this document.

A TIA checklist is included in Appendix D. The list is not meant to be exhaustive, but to assist Developers and Consultants to assess the completeness of the TIA final submission (report and supporting files).

G. DOCUMENTATION AND AVAILABLE INFORMATION

A summary list of documentation and other available information is listed in Appendix E.

ROADWAY GEOMETRIC DESIGN ELEMENTS

Roadway Designation	Design Elements								
	TAC Design Classification and Typical Design Speed	Daily Service Volume (vpd)	Right Of Way Width	Horizontal Alignment Minimum Radius of Curvature	Minimum Intersection Angle (degrees)	Intersections "Corner Cut-Off Dimensions" (m)			
						Arterial Roadway	Collector Roadway	Local Roadway	Lanes
Expressway	UED 90	>30,000	90 m	380	75	Site Specific (See Dwg 5.04d)	10 x 10	N/A	N/A
Divided Arterial	UAD 70	>20,000	60 m	250 m	75	Site Specific (See Dwg 5.04d)	10 x 10	N/A	N/A
Undivided Arterial	UAU 70	<12,000	48 m	250 m	75	Site Specific (See Dwg 5.04d)	10 x 10	N/A	N/A
Divided Residential Collector (See Note)	UCD 60	<10,000	See Drawing 5.06	185 m NC 135 m RC	75	10 x 10	5 x 5	5 x 5	N/A
Undivided Residential Collector (See Note)	UCU 60	<5,000	See Drawing 5.07	185 m NC 135 m RC	75	10 x 10	5 x 5	5 x 5	N/A
Divided Residential Local (See Note)	ULD 60	<3,000	See Drawing 5.08	115 m	75	N/A	5 x 5	5 x 5	N/A
11 m Undivided Residential Local (See Note)	ULU 50	<1,000	See Drawing 5.09	115 m	75	N/A	5 x 5	5 x 5	N/A
10 m Undivided Residential Local (See Note)	ULU 50	<1,000	See Drawing 5.10	115 m	75	N/A	5 x 5	5 x 5	N/A
Rural Industrial Collector	RCU 60	<10,000	30 m	185 m	75	10 x 10	10 x 10	10 x 10	N/A
Urban Industrial Collector	UCU 60	<10,000	22 m	185 m	75	10 x 10	10 x 10	10 x 10	N/A
Rural Industrial Local	RLU 50	<3,000	22 m	115 m	75	N/A	10 x 10	10 x 10	N/A
Urban Industrial Local	ULU 50	<3,000	22 m	115 m	75	N/A	10 x 10	10 x 10	N/A
Frontage (Service) Road (NOT allowed for new development)	ULU 50	<3,000	20m	115 m	75	N/A	10 x 10	10 x 10	N/A
Lanes	20	<250	7 m	No Permitted	75	N/A	N/A	N/A	5 x 5

Note: Environmental capacity of Collector and Local Roadways within residential areas is 5,000 vpd and 1,000 vpd respectively.

ROADWAY DESIGN ELEMENTS

Roadway Designation	Design Elements									
	TAC Design Classification	Horizontal Alignment		Minimum "K" for Vertical Curves	Vertical Alignment			Intersections		
		Rate of Superelevation (As per TAC)			Road Gradient (%)			Curb Return Radii (m) *		
		Desirable Rate (m/m)	Maximum Rate (m/m)		Maximum Grade	Desired Maximum Grade	Minimum Grade	Arterial Roadway	Collector Roadway	Local Roadway
Urban Expressway	UED 90	0.04	0.06	See Section 13 – Clause 3.3 and Table 13.1	6.00	3.00	0..50	See Dwg. 5.26		N/A
Divided Arterial	UAD 70	0.04	0.06		6.00	3.00	0.50	Drawings 5.19 & See 5.20	15	N/A
Undivided Arterial	UAU 70	0.04	0.06		6.00	5.00	0.50		15	N/A
Divided Residential Collector	UCD 60	Normal Crown 0.02	Reverse Crown 0.02	>	9.00	6.00	0.50	15	8	8
Undivided Residential Collector	UCU 60	Normal Crown 0.02	Reverse Crown 0.02	>	9.00	6.00	0.50	15	8	8
Divided Residential Local	ULD 60	Normal Crown 0.02	Normal Crown 0.02	>	9.00	6.00	0.50	N/A	8	8
10 m Undivided Residential Local	ULU 50	Normal Crown 0.02	Normal Crown 0.02		9.00	6.00	0.5	N/A	8	8
11 m Undivided Residential Local	ULU 50	Normal Crown 0.02	Normal Crown 0.02		9.00	6.00	0.50	N/A	8	8
Rural Industrial Collector	RCU 60	Normal Crown 0.02	Reverse Crown 0.02		6.00	6.00	0.50	See Drawing 5.32		
Urban Industrial Collector	UCU 60	Normal Crown 0.02	Normal Crown 0.02		6.00	6.00	0.50			
Rural Industrial Local	RLU 50	Normal Crown 0.02	Normal Crown 0.02		6.00	6.00	0.50	N/A	See Drawing 5.20	
Urban Industrial Local	ULU 50	Normal Crown 0.02	Normal Crown 0.02	<	6.00	6.00	0.50	N/A		
Rural Frontage (Service) Road	ULU 50	Normal Crown 0.02	Normal Crown 0.02	<	6.00	6.00	0.50	N/A		
Urban Frontage (Service) Road	ULU 50	Normal Crown 0.02	Normal Crown 0.02	<	6.00	6.00	0.50	N/A		
Gravel Lanes	20	N/A	N/A		9.00	6.00	0.80	N/A	N/A	N/A
Paved Lanes	20	N/A	N/A		9.00	6.00	0.60	N/A	N/A	N/A

*Alternate curb return Radii in commercial areas may be considered subject to the submission of turning movement diagrams & the approval of the Engineer.

TIA Acceptance Letter

Name of the TIA:

_____

The *(insert Project Name)* Transportation Impact Assessment (TIA) Report (Final) has been prepared by (*insert name of Developer's Engineering Consulting Firm*) on behalf of (*insert name of the Developer*) to support the (*insert name of Development and include DP file number as appropriate*).

The TIA Report (final) submitted has been reviewed and is satisfactory. The specific contents of the document remain the responsibility of the Engineer of record and their company.

TIA Submitted By……. Date……..

TIA Subsequent Submission……. Date……

Town Review By……. Date……..

Town Subsequent Review……... Date…….

Town Acceptance By…….. Date……..

TIA Check List

The following list is not meant to be exhaustive, but to assist Developers and Consultants to assess the completeness of the TIA final report.

1. TIA Final Report

   ☐ Completed, colour PDF report, including Appendices.

   ☐ Stamped,and signed by a Professional Engineer licensed to practice in Alberta, including Permit to Practice number.

   ☐ Electronic information on CD, DVD, or USB device (e.g. raw and summary TMC spreadsheet, trip generation/distribution/assignment files, Synchro and SIM Traffic / SIDRA files, TAC Traffic Signal Warrants spreadsheet, etc.).

2. Traffic Counts

   ☐ Turning Movement Counts (TMC) summary sheets included in the report.

3. Traffic Growth

   ☐ Manual projection – 2.5% growth rate compounded annually, unless otherwise specified by The Town.

   OR

   ☐ Projection using larger traffic models (e.g. VISUM/VISSIM), if approved by The Town.

4. Development Details

   ☐ Site plan showing building footprints, access configuration (including geometrics, etc.) with supporting auto turns if larger vehicles need to be accommodated. The plan must show adjacent streets (properly labelled), intersections with existing geometrics, adjacent accesses, drive thru queuing and storage lines, etc.

   ☐ Pedestrian / cyclist / transit connections.

   ☐ Parking layout.

5. Land Use and Trip Generation/Distribution

   ☐ Table showing the proposed land use and trip generation based on trip generation rates in the Town of Olds Traffic Characteristics and Design Parameters and the latest version of Institute of Transportation Engineers (ITE)

Trip Generation Manual

6. Analysis Horizons

   - ☐ Current year
   - ☐ Opening day
   - ☐ Full Build-out/ultimate

7. Figures

   - ☐ Showing trip generation, distribution and assignment. Background, development and total trips for each horizon.

   - ☐ Identifying pedestrian / cyclist networks and transit stops to serve the development, including connections to adjacent developments and destination nodes, clearly identifying improvements that are onsite and offsite.

   - ☐ Improvements needed (e.g. # of lanes, storage bay lengths, trails/sidewalk, transit stops, traffic controls, etc.) for each horizon.

8. Improvements and Cost

   - ☐ Functional plan of improvements in a suitable scale.

   - ☐ Estimated cost of improvements.

9. TIA Acceptance

   - ☐ TIA acceptance letter filled out.

LIST OF DOCUMENTATION AND AVAILABLE INFORMATION

The following information is available from Engineering Services upon request:

1. Legal plans of existing roadway rights of way,
2. Engineering Record Drawings (digital and/or paper copy),
3. 2010 Town of Olds/Mountain View County 2009-2035 Transportation & Utilities Master Plan,
4. 2013 Town of Olds Open Space and Trails Master Plan,
5. Engineering Design Guidelines,
6. Traffic Safety Action Plan,
7. Municipal Development Plan (MDP),
8. Area Structure Plans,
9. Traffic signal timing plans at existing intersections.

APPLICABLE REGULATIONS, GUIDELINES AND RESOURCES (LATEST VERSIONS TO BE REFERENCED)

1. Traffic Safety Act, Province of Alberta
2. Geometric Design Guide for Canadian Roads, Transportation Association of Canada
3. Manual of Uniform Traffic Control Devices for Canada, Transportation Association of Canada
4. Pedestrian Crossing Control Guide, Transportation Association of Canada
5. Canadian Traffic Signal Warrant Matrix Procedure, Transportation Association of Canada
6. Transportation Impact Analyses for Site Development, Institute of Transportation Engineers
7. Trip Generation, An Institute of Transportation Engineers Information Report
8. Trip Generation Handbook, An Institute of Transportation Engineers Recommended Practice

9. Parking Generation Manual, Institute of Transportation Engineers

10. Highway Capacity Manual, Transportation Research Board

1. INTRODUCTION

This Section provides information regarding landscaping requirements for new development, capital projects (Town contracts), and / or restoration of an existing area after construction disturbance.

For new subdivision development, The Town and Developer have defined responsibilities in the financing, design, and construction of a landscaped area and the facilities therein. The financial responsibilities are in part defined through the Development Agreement with additional notes throughout this Section.

When the question of “excessive” or enhanced landscaping (this refers to plant material, not Level Four landscaping) arises as part of a development or construction project, Engineering Services will provide their comments in terms of what maintenance is normally done in a neighbourhood to guide their assessment of what constitutes an enhanced landscaping proposal. The quantitative review will be based on the quantities provided in the Appendixes at the end of this section. The Town will deal with enhancements on a case by case basis. Shrub beds are not permitted unless otherwise approved by the Town.

In the Development Agreement a Recreation Amenity Fee is collected via the off-site levies.

For Town contracted projects the responsibility of landscaping will be defined in the RFP or Contract issued.

Information provided here will be the landscape requirements for a site construction or redevelopment that has been issued through a Development Permit.

2. REFERENCE MATERIAL

- Open Spaces and Trails Master Plan

3. LEVEL ONE LANDSCAPING

A. GENERAL

Level One Landscaping is the basic landscaping treatment: grading a site, placing and finishing topsoil, and planting grass (either seed or sod).

All public open space areas (e.g. parkettes, linear parks, natural parks, ornamental parks, boulevards, medians, utility lots, buffer areas, roadway berms, storm water facilities, etc.) are to have Level One landscape treatment.

The Developer is required to provide Level One Landscaping for all public open space areas. If the open space is a Neighbourhood Park site, refer to Clause 7.B. for information related to the division of the Developer / Town responsibilities.

Level One Landscaping requirements and cost recoveries for storm water management facilities are included in Clause 8.

B. EXPRESSWAY AND ARTERIAL ROADWAYS

1. The Developer may be required to landscape the boulevard from back-of-walk/streetlight alignment to the property line. This area is typically where a berm would be located. During the Area Structure Planning Stage, responsibility for who is landscaping the boulevard / constructing a berm, if applicable, will be determined.

2. No drainage is allowed to run from the right of way onto or through private property. If private property abuts a right of way, a swale shall be provided on the right of way to convey the drainage to the storm sewer system.

3. For berm requirements, refer to clause 3, item E below.

C. COLLECTOR AND LOCAL ROADWAYS

1. The Developer will be responsible for landscaping all boulevards located between the curb and separate sidewalk and medians. The property owner shall landscape the boulevard area located between the back of walk and the property line.

2. The boulevard from the back-of-walk/curb to the edge of the right of way shall be graded to provide positive drainage to the street. The minimum boulevard cross slope shall be 2.0%.

D. MEDIANS

In general, the surface treatment for medians shall be as follows:

1. EXPRESSWAYS AND ARTERIAL ROADWAYS

a. The median shall be capped with concrete where the median width is 3.0 m or less. For stamped concrete, the colour shall be “maple” and the pattern shall be Belgian Cobblestone.

b. The median shall be finished to Level One Landscaping standards where the median width is greater than 3.0 m. A 1.5 m depressed curb is required for mower access. The mower access is preferred to be located in the transition area of a left turn bay.

c. Refer to Level Two Landscaping for requirements / restrictions with regard to the planting of trees / shrubs in a median.

d. Refer to Section 16 – Drawings and the Town of olds Contract Specifications – Section 50 for typical median details.

2. DIVIDED COLLECTOR AND LOCAL ROADWAYS

a. The median shall be capped with concrete where the median width is 3.0 m or less; stamped concrete or paving stone are optional, or

b. The median may be finished to Level One Landscaping standards where the median width is greater than 3.0 m. A 1.5 m depressed curb is required for mower access.

c. Refer to Level Two Landscaping for requirements / restrictions with regard to the planting of trees / shrubs in a median.

d. Refer to Section 16 – Drawings and the Town of Olds Contract Specifications – Section 50 for typical median details.

E. BERMS

1. Berms shall have a side slope not steeper than 4:1, have a horizontal crest not less than 1.0 m wide, and be shaped to the approved grades and cross sections. The bottom of all berms shall transition into adjacent elevations while ensuring appropriate allowances are provided to convey drainage from the berm to the storm system. A retaining wall will be required if the berm side slope is steeper than 4:1. The height of the wall will be determined using a 4:1 slope on either the fore slope or the back slope while maintaining a constant alignment for the centre of the berm. Refer to Section 16 - Drawings for a typical berm/retaining wall cross sections.

2. Berms along arterial roadways shall be graded to provide ±400 mm depressions at regular intervals along the length of the berm for tree and shrub planting. The length of the depressions shall vary from 25 m to 50 m in length. The spacing of the depressions along the berm will follow a regular pattern, using either a single planting bed or a combination of no more than four bed variations for planting. The spacing between depressions should be approximately 25 m. Linear hedge planting will be planted along the entire length of the upper crown of the berm between depressions, as shown on the drawing in Section 16.

3. Design elevations of the berm are to account for the 150 mm finishing (screened) topsoil lift to ensure minimum slopes are achieved at time of construction completion inspection.

4. LEVEL TWO LANDSCAPING

A. GENERAL

Level Two Landscaping refers to the requirements for plant materials: trees, shrubs, planter beds, etc.

All public open space areas (e.g. parkettes, linear parks, natural parks, ornamental parks, boulevards, medians, utility lots, buffer areas, roadway berms, storm water facilities, etc.) are to have Level Two Landscape treatment.

The Developer is required to provide Level Two Landscaping for all public open space areas. If the open space is a Neighbourhood Park site refer to Clause 7 for information related to the division of the Developer / Town responsibilities.

At the discretion of Engineering Services, a Developer may propose to develop the parks in excess of the maximum standards provided in the Appendices to this Section; when this is proposed, notification is to be given to Engineering Services at the time of Area Structure Planning. If the excess landscaping and / or amenities are given approval, the Developer will enter into a long-term maintenance agreement prior to execution of the Development Agreement.

Level Two Landscaping requirements and cost recoveries for storm water management facilities are included in Clause 8.

B. RECOMMENDED TREE SPECIES

1. The Town is located in Hardiness Zone 3. Appendix A, appended at the end of this Section, identifies trees and shrubs recommended for planting in these zones.

    a. Appendix A identifies tree species that are suitable for planting in this area.

    b. Appendix B identifies shrubs suitable for planting in this area.

    c. Appendix C identifies trees that are suitable for arterial roadway, collector roadway boulevards, and median tree planting.

2. If the Developer proposes to plant species that are not listed in the Tables, the Developer shall submit a list of the proposed species for approval to Engineering Services.

3. The Developer shall provide trees and shrubs to the minimum standards included in Section 32 93 10 of the Town of Olds Contract Specifications. The minimum size of deciduous trees suitable for arterial roadway and median tree planting shall be 60 mm (2½ in.) calliper.

C. PLANTING GUIDELINES

1. Deep rooting trees, such as poplars and willows, shall not be planted within 8.0 m of any utility line, road, or lane.

2. Shallow rooting trees or shrubs may be planted over deep utility lines (i.e. water, sanitary, or storm), but must be set back at least 1.5 m from shallow utilities (i.e. gas, power, telephone, or cable television); measured horizontally from the center of the tree to the nearest utility alignment.

3. Trees and shrubs shall be set back at least 5 m from hydrants, valves, service valves, manholes, catch basins, transformers, pedestals, pond inlets/outlets or other surface utility equipment.

4. Hedge plants shall be spaced 1.0 m apart.

5. For trees and shrubs planted in the medians and boulevards, an excavation to the following dimensions is required to accommodate the root zone/planting area:

    a. Trees: 2.0 m wide x 2.0 m long x 1.5 m deep,

    b. Shrubs: 1.0 m wide x 1.0 m long x 250 mm deep.

Note: The excavated areas shall be backfilled with topsoil and prepared for tree and shrub planting as detailed in the current Town of Olds Contract Specifications.

6. Loose landscape materials (e.g. bark mulch) used around planting beds, trees, etc. should not be designed on a median, an embankment, adjacent to storm catchment infrastructure, or within a designed drainage path where the material may be easily washed into storm infrastructure during a storm event. Where loose bedding cover is to be used, sufficient distance shall be designed to allow for the material to settle out thereby preventing the material from entering a drainage path, blocking catchment infrastructure, and/or entering the storm system. General considerations:

    a. Berms - limit to along the flattened top or pockets that are flattened to contain the material,

    b. Storm ponds – above the high water level, preferred along the flattened top and in pockets to contain the material,

    c. Drainage swales – to be avoided,

    d. Back of curb or walks adjacent to roads – maintain a 2 m green space.

D. EXPRESSWAYS AND ARTERIAL ROADWAYS

Trees and shrubs located in the boulevard, measured horizontally from the center of the tree, shall be set back a minimum of:

1. 4.5 m from the face of curb or,

2. 1.5 m from back of walk or,

3. Along the centreline of a berm.

Refer to Section 16 – Drawings for typical median planting requirements.

E. COLLECTOR AND LOCAL ROADWAYS

Trees and shrubs located in the boulevard, measured horizontally from the center of the tree, shall be set back a minimum of 2.0 m from the face of curb.

1. TREE PLANTING POLICY

All tree, and shrubbery planting shall conform with the Town of Olds Land Use By-law.

2. TREE PLANTING STANDARDS

a. Trees are to be planted within the road right of way, including boulevards adjacent to all municipal reserve parcels, in a straight line parallel to the property line.

b. Where a separate boulevard between the curb and sidewalk is provided, the Town will determine the tree spacing. Typical tree and streetlight spacing is shown on drawings in Section 16 - Drawings.

c. After obtaining a Final Acceptance Certificate for the Collector Roadway Tree Planting, the maintenance of trees planted within the road right of way (boulevard) shall be the responsibility of The Town.

d. All boulevard trees planted in a single neighbourhood shall be of the same variety or a combination of varieties as determined by the Town, but may vary from neighbourhood to neighbourhood. The neighbourhood is determined at time of or from an existing Area Structure Plan.

F. INDUSTRIAL ROADWAYS

Trees and shrubs located in the boulevard, measured horizontally from the center of the tree, shall be set back a minimum of 2.0 m from the face of curb. Tree or shrub beds shall be spaced approximately every 15 m to 20 m with consideration for driveways, business signage, etc. affecting the spacing.

Where overhead utility (e.g. power) lines are present, shrub beds may be substituted for tree planting. This will require approval from the owner of the overhead utility line.

G. MEDIANS

1. EXPRESSWAYS

No trees shall be planted in an expressway's median where the width is less than 6.0 m.

2. ARTERIALS

No trees shall be planted in an arterial roadway median where the width is less than 5.0 m.

3. COLLECTOR AND LOCAL

a. Level Two Landscaping may be provided in collector and/or local roadway median areas where the median width is equal to or greater than 5.0 m.

b. Where plantings are proposed the following restrictions shall apply: (refer to Drawing 5.59)

   i. Shrubs shall not be greater than 900 mm high, from road surface, with a ground cover width not exceeding the median width,

   ii. A mature deciduous tree's canopy bottom shall be above 2.4 m, from the road surface, and

   iii. Coniferous tree species shall not be allowed.

c. At an intersection / access containing a median, shrubbery is the preferred plant material with trees being placed furthest from the intersection. A sight line calculation may be required to support having trees in the median.

5. LEVEL THREE LANDSCAPING

A. GENERAL

Level Three Landscaping refers to the basic facility and amenity requirements to provide both safety and delineation between mobility modes plus enhance the comfort and recreational enjoyment of the Town's open spaces.

All public open space areas (e.g. parkettes, linear parks, natural parks, ornamental parks, utility lots, buffer areas, roadway berms, boulevards, storm water facilities, etc.) may have Level Three Landscape treatments as specified by The Town.

At the time of the Neighbourhood Servicing Study The Town will identify the Level Three amenities required to be supplied and installed by the Developer; exceptions may be noted in specific clauses.

The Developer is required to provide Level Three Landscaping for all public open space areas. If the open space is a Neighbourhood Park site, refer to Clause 7.B. for information related to the division of the Developer / Town responsibilities.

Level Three Landscaping requirements and cost recoveries for storm water management facilities are included in Clause 8.

B. EXPRESSWAYS AND ARTERIAL ROADWAYS

Level Three amenities will be limited to those roadways with a 2.5 m wide or greater trail / sidewalk that is separate from the roadway. The amenities are to be located along the back of walk. Typical amenities may be benches and garbage receptacles.

C. COLLECTOR AND LOCAL ROADWAYS

Generally, Level Three amenities will not be required in the boulevard of these roadways.

D. FACILITY / AMENITY TYPES

1. Post and cable fences,
2. Bollards,
3. Paved, gravel, and/or shale trails,
4. Site furnishings (e.g. garbage receptacles, benches, etc.),
5. Tot lots and playground play structures,
6. Trail signage, and / or
7. Protective Metal Railings.

E. AMENITY CRITERIA

1. POST AND CABLE

a. Separating a public roadway from a lane or Public Utility Lot, and / or

b. Separating a lane from a park or other open space, unless excluded as a requirement by The Town,

c. At other locations specified by the Engineer.

Note: Where a Weak Beam barrier system has been proposed (or exists and is to be replaced) a Post and Cable fence may not be used as a substitute unless approved by the Engineer. Refer to Section 13 – Road Design for barrier information).

2. BOLLARDS

a. Bollards are to be placed on Public Utility Lots to allow for pedestrian and/or emergency vehicle access while preventing other vehicular traffic on these lots. Bollards are to be located at the rear yard, on the easement line projection unless approved otherwise by Engineering Services.

3. TRAILS

a. Types

The **minimum** width for a trail based on location and usage is:

i. Natural setting - asphalt
- shall be 2.5 m wide

ii. Sidewalk adjacent to or along a roadway - asphalt
- shall be 2.5 m wide (Refer to Section 13 – Roadway Design)

iii. Emergency access - asphalt
(Refer to Section 13 – Roadway Design)

iv. Storm water facility maintenance (SWMF) access - asphalt
(Refer to Section 10 – Storm Water Design)

v. Aggregate
- The width is to be decided between the developer and the Town. Each path will be treated on a case by case situation and be consisting of a minimum 100 mm crushed gravel

vi. Natural
- The width is to be decide between the developer and the Town. Each path will be treated on a case by case situation and be consisting of a minimum of 100 mm wood mulch

Note: Refer to the Town of Olds Contract Specifications – Section 50 for details on trails.

b. Grade and Geometry
(Refer to Section 13 – Road Design)

c. Signage and Pedestrian information
Trail Signage supply and installation shall be at locations specified by the Town. All signage shall conform to the Town's Standard Drawings.

Note: Where the ecological profile has identified a unique or sensitive natural area which is to be incorporated in the Development, contact Engineering Services for type of trail to be constructed.

4. SITE FURNISHINGS

The Developer shall supply and install site furnishings at locations specified by The Town. All furnishings shall conform to The Town's Standard Drawings in the Town of Olds Contract Specifications – Section 50.

5. TOT LOTS, PLAYGROUNDS, ETC.

The supply and installation of Tot Lots, playgrounds etc. shall be at locations specified by The Town. All equipment shall conform to The Town's Standard Drawings in the Town of Olds Contract Specifications – Section 50.

6. PROTECTIVE METAL RAILINGS

Protective Metal Railings are to be used functionally where pedestrian / cyclist traffic is to be protected from situations that may endanger them or to delineate their movement path from gathering areas or vehicle traffic. These railings are typically used where aesthetics is important. These railings are not to be substituted for Longitudinal Traffic Barriers referred to in Section 13 – Road Design.

Protective metal railings are to be placed adjacent to the top of slopes steeper than 1:1 where pedestrian friendly surfaces are developed at the top of slope, and where the vertical elevation difference from top to bottom of the slope is greater than 600mm.

Where pedestrian friendly surfaces are intended for shared use with bicycles, a bicycle railing conforming to Alberta Building Code and Alberta Bridge Code Standards must be used. Railing requirements for Parks amenities are to be approved by the Engineering Services.

In locations where pathways are located over or directly adjacent to, and more than 3.0 m above roadways, where there is possibility for pedestrians to

throw debris onto a roadway, a railing designed to restrict such occurrences may be required as directed by the Engineer.

Railing design shall be approved by the Engineer. Where no detailed railing design is provided, the protective metal railings shall conform to the standard detail in the Town of Olds Contract Specifications - Drawing 50 07 07.

6. LEVEL FOUR LANDSCAPING

Level Four Landscaping is the supply and installation of optional/enhanced amenities (e.g. Ornamental structures, gazeboes, sculptures, feature walls, water features, fountains, spray pools, etc.) and will be at the discretion of The Town. Level Four Landscaping will only be considered if arrangements for long-term maintenance by the Developer are agreed to at the time of development submission for the first phase, and maintenance agreements are established prior to execution of the Development Agreement. The Developer will be responsible for any and all capital costs of any permitted optional amenities.

Further information and requirements regarding Level Four amenities can be found in Section 13 – Road Design.

7. MUNICIPAL RESERVE (MR) / PARK SITE(S)

A. GENERAL

The Developer is to provide Municipal Reserve (MR) land in each new development area to be used for various recreational purposes. The land area required for the parks and / or school site(s) will be determined as part of the Area Structure Planning process.

The cost of developing these lands is the responsibility of the Developer and The Town, as follows:

1. Multi-neighbourhood (High School) Park Sites: *Town of Olds*
2. Neighbourhood Park site(s), may include a school area: *Developer and Town as noted in Clause 7.B.*
3. Parkette Sites: *Developer*
4. Linear Parks: *Developer*
5. Miscellaneous Reserve Parcels: *Developer*

Note: This can be different, but must be identified at the ASP stage.

B. FINANCING RESPONSIBILITES

1. DEVELOPER

For all open spaces, the Developer will be responsible for the design, earthwork, all Levels of landscaping, and generating the Plan of Record. Refer to Section 2 – Drawing Standards for further details of the requirements.

The **exception** to the Developer's responsibility is when the open space is the Neighbourhood Park site. For this type of site the Developer is required to bring the site to a "ready to complete" state which includes, but is not limited to, bringing the earthwork to the design grades and elevations, ensuring proper drainage grades are meet, ensuring amenity sites are to required grades and elevations with the appropriate base material (e.g. topsoil or clay), and the sites are ready for final surface work and amenity installation. For the Neighbourhood Park site the Developer shall leave the interim elevations 150 mm below proposed finish elevation (+/- 25 mm).

If a school is proposed for the site, the Developer is required to provide stubs for the service connections as well as rough grade the school site (with clay, compacted and graded to drain away from site at 2%) in preparation for a future building foundation.

If Level Four landscaping is proposed for a school site, the conditions as noted in the Level Four clause above, will need to be met.

2. TOWN

The Town will be responsible for the completion of a Neighbourhood Park site **excluding** Level Four amenities. The work will include bringing the Level One landscaping to final grade, seeding the site, and ensuring drainage grades are maintained including tie-ins to adjacent property. If Level Two plantings and Level Three landscaping are required, it will include, but not be limited to, bringing pad sites to final grade, ensuring drainage of the site is appropriate, and the installation and assembly of the appropriate amenity.

The Town will not commence this work until the Developer has provided the Plan of Record for the site grading and a field inspection has taken place by Engineering Services.

This work is financed through the off-site levies.

Note: For a storm water management facility located in the Neighbourhood Park site(s), the landscape finance / construction responsibility between the Developer and The Town is as noted in Clause 8.

C. MR / PARK STANDARDS

The Developer will be responsible to construct all the landscaping amenities for open spaces based on the Appendices at the end of this Section.

Appendix 'D' lists a summary of the various park facilities and amenities to be provided in those open spaces. The quantity of these items is based on 60 hectares (a typical full quarter section subdivision).

The minimum and maximum quantities of various site amenities for the following municipal reserve designations are included in the noted Appendices, at the end of this Section.

1. Multi-neighbourhood (High School) Park Sites – Appendix E,

2. Neighbourhood School and Park site(s) – Appendix F

3. Neighbourhood Park Sites – Appendix G

4. Parkette Sites – Appendix H,

5. Linear Parks – Appendix I.

At the discretion of the Town, a Developer may propose to develop the parks in excess of the maximum standards including Level Four Enhanced / Optional Amenities however notification is to be given to the Town at the time of Area Structure Planning in those cases. If the excess landscaping and / or amenities are given approval, the Developer will enter into a long-term maintenance agreement prior to execution of the Development Agreement.

Drawing requirements are provided in Section 2.

D. SITE FACILITIES AND AMENITIES

Recreation Amenity fees are collected for the construction of a variety of park facilities and amenities in the Neighbourhood Park Sites. The following list provides additional information for the amenities noted in the Appendices:

1. PARK FURNITURE

- Installation of bollards, post and cable fences, chain link fences, tables, waste receptacles, park benches, etc.

2. PLAYGROUND EQUIPMENT

One set of elementary playground equipment (5 to 12 year age group), one set of pre-school playground equipment (18 months to 5 years old age), and a tot lot are required on the site. The playground equipment must comply with

current CSA standards and with the specific playground models approved by the Town. The design must include the structural and installation details based on adopted standards and policies.

3. SPORTS FIELDS AND BASEBALL DIAMONDS

a. Class A ball diamond complete with shale infield,

b. Class A soccer pitch/football field.

4. MULTI-PURPOSE ASPHALT PAD/OUTDOOR RINK

a. An area should be provided for the development of a multi-purpose asphalt pad designed to accommodate two tennis courts and a basketball court (summer) and an ice surface with rink boards (winter).

b. The design of the skating rink should include the design of the rink boards around the perimeter of the ice surface and the installation of poles and lights to light the rink surface.

5. PAVED PARKING LOT

a. Constructed as per the minimum Engineering standards for a paved laneway,

b. Surface to be crowned for storm drainage to outside edge or storm sewer piping will be required if a centre swale drainage pattern is proposed,

c. Post and cable fencing around the perimeter,

d. Located in close proximity to the Community Shelter,

e. Designed to accommodate 20 vehicles.

6. ACTIVITY CENTRE

A Level One Activity Centre, totalling, approximately, 100 sq. m. to 112 sq. m. (1100 sq. ft. to 1200 sq. ft.) is planned for every two ¼ sections, with preference given to Neighbourhood Park sites where a school is proposed. The Centre may be a “stand alone” building or it may be incorporated in the School building envelope. The shelter should include an area for skate changing, a kitchen area, a storage area, and washroom facilities. Services to the building should include sanitary sewer, water, natural gas, telephone, cable television, and electricity. An electrical transformer should be located near the building.

7. SLIDING HILLS

a. Sliding hill and run out must be smooth and free of any fixed, collision hazard. A single sled run-out landing must be a minimum of six metres wide.

b. Access to the hill should be from the bottom only. The top must have a level area to allow for safe gathering and seating prior to take-off.

c. The maximum allowable slope angle is 14 degrees or 4:1, with a maximum slope length of 15 metres.

d. If slope angle is reduced, slope length can be increased. The run out length shall be a minimum of two times the slope length.

e. The directional slope should not be directed towards any natural or constructed amenities (e.g. sports field standards, storm water structures).

f. The non-sliding slope areas (e.g. rear and side slopes) shall have a maximum allowable slope angle of 6:1 so as to discourage sliding and prevent unsafe slide run-out.

8. TREE PLANTING

Planting of approximately 160 trees (60 mm diameter deciduous trees and 2.0 to 2.5 m high coniferous trees).

8. STORM WATER MANAGEMENT FACILITY

The Developer may be required to construct a storm water management facility in one or more locations in the Development. A storm facility may be located within the Neighbourhood Park Site however, every effort should be made to exclude storm water management facilities from a site where a school is proposed.

A. CONSTRUCTION RESPONSIBILITY

Where a storm water management facility is required in a new development, the Developer will be responsible for the following:

1. Topsoil stripping,

2. Pond excavation and grading,

3. Topsoil replacement to rough finished grades,

4. Grading topsoil to final grades,

5. Level One landscaping,

6. Level Two landscaping in excess of the nominal value calculated as part of the Development Agreement, and

7. Level Three and Four landscaping.

9. DRAWING SUBMISSION AND APPROVAL PROCESS

The Town shall approve all landscaping design and layout regardless if the project is related to a new subdivision, Town's Capital project, or existing maintenance where landscaping is to be disturbed. Disturbance of landscaping refers to the removal of any plant material be it grass in a boulevard, clearing native trees, removing topsoil and vegetation from farmland. The approval process is as follows:

A. When the project relates to a new subdivision (covered under a Development Agreement) the Consulting Engineer and/or project manager shall submit a Landscaping drawing(s) to Engineering Services, and Planning and Development.

B. If the project relates to a Development Permit, Development Agreement, or a condition of a Development Permit the Consulting Engineer and/or project manager shall submit a Landscaping drawing(s) to Engineering Services.

C. If the project relates to a Town project or annual maintenance program where road improvements are involved the Town's Consulting Engineer and/or project manager shall submit a Landscaping drawing(s) Engineering Services for review.

D. Once the review has been completed, Engineering Services will return the drawing(s) to have the drawing(s) revised in accordance with the Town's comments. Once the revisions are complete, the drawing(s) is to be resubmitted for final review as per the procedures noted in items A, B, or C above.

E. Upon approval in principle, the Consulting Engineer and/or project manager shall submit original drawings (on bond paper) for acceptance and signing by the Town.

F. The Consulting Engineer and/or project manager is to arrange for the installation of the landscaping through the use of a private contractor or by Town Forces depending upon what the project relates too.

Plan of Record drawings will be submitted to Engineering Services; the drawings will be reviewed and approved prior to the Construction Completion Certificate inspection. Plan of Record drawings will be required for finished rough grade, finished grade, Levels One through Three landscape treatments, and roadway collector tree planting.

Note: Plan of Record grid survey notes or digital files may be required to support a Construction Completion Certificate application.

10. FIELD INSPECTIONS

All CCC inspections will be conducted between the dates of June 1st through to October 15th. Engineering Services will require a minimum of 48 hours notice prior to conducting an inspection. All applications for inspection must be received by the Engineering Services a minimum of 30 days prior to October 15th in order to be processed in the current year.

Note: Inspection for CCC / FAC will not occur until Plan of Record drawings are provided.

TREE SPECIES

COMMON NAME	BOTANICAL NAME	SIZE AT MATURITY HEIGHT/SPREAD (METRIC)	SIZE AT MATURITY HEIGHT/SPREAD (IMPERIAL)
CONIFEROUS TREES			
Colorado Blue Spruce	Picea pungens 'Glauca'	12 m/5 m	40'/16'
Colorado Spruce	Picea pungens	12 m/5 m	40'/16'
Lodgepole Pine	Pinus contorta latifolia	12 m/3 m	40'/10'
Norway Spruce	Picea abies	15 m/8 m	49'/26'
Ponderosa Pine	Pinus ponderosa	12 m/6 m	40'/20'
Scots Pine	Pinus sylvestris	12 m/6 m	40'/20'
Siberian Larch	Larix sibirica	12 m/5 m	40'/16'
White Spruce	Picea glauca	15 m/5 m	49'/16'
DECIDUOUS TREES			
American Elm	Ulmus americana	20 m/15 m	65'/49'
Amur Cherry	Prunus maackii	12 m/10 m	40'/33'
Brandon Elm	Ulmus americana 'Brandon'	15 m/10 m	49'/33'
Bur Oak	Quercus macrocarpa	10 m/10 m	33'/33'
Flowering Crabapple	Malus species	5 m/4 m	16'/13'
Hawthorn	Cratageus species	3 m/2.5 m	10'/8'
Laurel-Leaf Willow	Salix pentandra	15 m/15 m	49'/49'
Dropmore Linden	Tilia flavescens 'Dropmore'	12 m/6 m	40'/20'
Little-leaf Linden	Tilia cordata	12 m/6 m	40'/20'
Mountain Ash	Sorbus americana	10 m/6 m	33'/20'
Silver Maple	Acer saccharinum	12m/7m	40'/23'
Hot Wings Tartarian Maple	Acer tartaricum	6m/5m	20'/15'
Unity Sugar Maple	'Acer saccharinium 'Unity'	10m/8m	33'/26'
Northwest Poplar	Populus x 'Northwest'	20 m/15 m	65'/49'
Ohio Buckeye	Aesculus glabra	12 m/10 m	40'/33'
Patmore Green Ash	Fraxinus pennsylvanica 'Patmore'	12 m/8 m	40'/26'
Swedish Columnar Aspen	Populus tremula 'Erecta'	12 m/1.5 m	40'/5'
Tower Poplar	Populus x canescens 'Tower'	10 m/1.5 m	33'/5'
Ussurian Pear	Pyrus ussuriensis	8 m/5 m	26'/16'

SHRUB SPECIES

COMMON NAME	BOTANICAL NAME	SIZE AT MATURITY HEIGHT/SPREAD (METRIC)	SIZE AT MATURITY HEIGHT/SPREAD (IMPERIAL)
Alpine Currant	Ribes alpinum	1 m/1.5 m	3’/5’
Amur Maple	Acer ginnala	4 m/4 m	13’/13’
Blue Fox Willow	Salix brachycarpa ‘Blue Fox’	2 m/1.5 m	6 ½’/5’
Canada Buffaloberry	Shepherdia canadensis	1 m/1 m	3’/3’
Cherry Prinsepia	Prinsepia sinensis	2 m/1.5 m	6 ½’/5’
Common Lilac	Syringa vulgaris	3 m/2.5 m	10’/8’
Dart’s Gold Ninebark	Physocarpus opulifolius ‘Dart’s Gold’	1 m/1 m	3’/3’
Diabolo Ninebark	Physocarpus opulifulius “Diablo”	2 m/2 m	6 ½” /6 ½”
Double-Flowering Plum	Prunus triloba ‘Multiplex’	2 m/2 m	6 ½’/6 ½’
Elder	Sambucus species	3 m/2 m	10’/6 ½'
Fern-leaved Caragana	Caragana-arborescens ‘Lorbergii’	3 m/2 m	10’/6 ½’
French Lilac Varieties or Cultivars	Syringa vulgaris	3 m/2.5 m	10’/8’
Globe Caragama	Caragana Frutex ‘Globosa’	1 m/1 m	3’/3 ‘
Globe Cedar	Thuja occidentalis ‘Globosa’	1.5 m/1.5 m	5'/5'
Golden Ninebark	Physocarpus opulifolius ‘Luteus’	2 m/2 m	6 ½’/6 ½’
Golden Twig Dogwood	Cornus sericea ‘Flaviramea’	1.5 m/2 m	5’/6 ½’
Golden-Flowering Currant	Ribes aureum	2 m/2 m	6 ½’/6 ½’
Hansa Rose	Rosa species	1.5 m/1.5 m	5’/5’
Highbush Cranberry	Viburnum trilobum	3 m/2 m	10’/6 ½ '
Miss Kim Lilac	Syringa patula ‘Miss Kim’	3 m/2 m	10’/6 ½’
Mugo Pine	Pinus mugo	2 m/2 m	6 ½'/6 ½'
Nanking Cherry	Prunus tomentosa	2 m/2 m	6 ½’/6 ½’
Nannyberry	Viburnum lentago	4 m/3 m	13’/10’
Persian Yellow Rose	Rosa species	1.5 m/1.5 m	5’/5’
Potentilla (Shrubby Cinquefoil)	Potentilla fruticosa	1 m/1 m	3’/3’
Pussy Willow	Salix discolor	4 m/4 m	13’/13’
Pygmy Caragana	Caragana pygmaea	1 m/2 m	3’/6 ½'

COMMON NAME	BOTANICAL NAME	SIZE AT MATURITY HEIGHT/SPREAD (METRIC)	SIZE AT MATURITY HEIGHT/SPREAD (IMPERIAL
Red Osier Dogwood	Cornus sericea	2m/3m	6 ½'/10'
Russian Almond	Prunus tenella	1m/1m	3'/3'
Sakhalin Honeysuckle	Lonicera-maximiwoczii sachalinensis	1.5m/1.5m	5'/5'
Sandbar Willow	Salix exigua	3m/1m	10'/3'
Saskatoon	Amelanchier alnifolia	3m/2m	10'/6 ½'
Savin Juniper Varieties or Cultivars	Juniperus sabina species	.6 m/2 m	2'/6 ½'
Siberian-Coral Dogwood	Cornus alba 'Sibirica'	1m/1m	3'/3'
Silver Buffaloberry	Shepherdia argentea	4m/3m	13'/10'
Silver-Leaved Dogwood	Cornus alba 'Argenteo-marginata'	1m/1m	3'/3'
Smooth Sumac	Rhus glabra	3m/4m	10'/13'
Snowberry	Symphoricarpos albus	1m/1m	3'/3'
Spirea	Spirea species	1m/1m	3'/3'
Theresa Bugnet Rose	Rosa species	2m/2m	6 ½'/6 ½ '
Turkestan-Burning Bush	Euonymus nana'Turkestanica'	1m/1m	3'/3'
Upright Juniper	Juniperus scopulorum species	3m/1.5m	10'/5'
Wayfaring Tree	Viburnum lantana	3m/2m	10'/6 ½'
Wild Rose (Nursery)	Rosa species	1m/1m	3'/3'
Wolf Willow	Elaeagnus commutata	2m/2m	6 ½'/6 ½'

TREES LISTED IN APPENDIX "A" SUITABLE FOR ROADWAY PLANTING

COMMON NAME		
American Elm		Swedish Columnar Aspen
Amur Cherry	Mountain Ash	Tower Poplar
Brandon Elm	Ornamental Crabs	Ussurian Pear
Bur Oak	Patmore Green Ash	Silver Maple
Hawthorn	Pine	Hot Wings Tartarian Maple
Larch		Unity Sugar Maple
Linden	Spruce	

SUBDIVISION PARK DEVELOPMENT STANDARDS

ITEM	QUANTITY		DETAILS
	Minimum	Maximum	
Site Preparation	Developer	Developer	Approved by Department
Final Grading/Seeding	Entire site	Entire site	As per Contract Specifications
Tree Planting	10 trees/acre	15 trees/acre	Approved species
Shrub Planting	50 m^2/ha (5shrubs/10$m^{2)}$	100 m^2/ha	Approved species
Pre-School Play Structure	1 per neighbourhood	1 per neighbourhood	Department approved
Elementary Play Structure	1 per neighbourhood	1 per neighbourhood	Department approved
Tot Lot	1 per neighbourhood	2 per neighbourhood	Department approved
Class A Soccer Field	1 per neighbourhood	1 per neighbourhood	As per RP&C Specifications
Class B Ball Diamond	1 per neighbourhood	1 per neighbourhood	As per RP&C Specifications
Multi Use Pad	1 per 2 neighbourhoods	1 per neighbourhood	As per RP&C Specifications
Activity Center	1 per 2 neighbourhoods	1 per neighbourhood	Subject to School/Town approval
Boarded Rink/Power/Lights	1 per neighbourhood	1 per neighbourhood	As per RP&C Specifications
Snow Bank Rink	1 per neighbourhood	1 per neighbourhood	As per RP&C Specifications
Sliding Hill	1 per neighbourhood	1 per neighbourhood	As per RP&C Specifications
Power to Site	1 per neighbourhood park site	1 per neighbourhood park site	As per RP&C Specifications
On-Site Asphalt Parking Pad	1 per neighbourhood park site	1 per neighbourhood park site	18 parking stalls/sports field
Trails	500 lin. meters		As per 2.5m asphalt Contract Specifications
Bollards	1 set/trail opening	1 set/trail opening	As per RP&C Specifications
Picnic Tables	5 per neighbourhood	8 per neighbourhood	As per RP&C Specifications
Pedestal Park Benches	10 per neighbourhood	14 per neighbourhood	As per RP&C Specifications
Pedestal Garbage Receptacles	15 per neighbourhood	22 per neighbourhood	As per RP&C Specifications
Park Signage	1 per neighbourhood park site	1 per neighbourhood park site	As per RP&C Specifications

MULTI-NEIGHBOURHOOD PARK STANDARDS (may inc. HIGH SCHOOL)

ITEM	QUANTITY		DETAILS
	Minimum	Maximum	
Site Preparation	Entire site	Entire site	As per Contract Specifications
Final Grading/Seeding	Entire site	Entire site	As per Contract Specifications
Tree Planting	10 trees/acre	15 trees/acre	Approved species
Shrub Planting	50 m^2/ha	100 m^2/ha	Approved species
Pre-School Play Structure	RP&C discretion	RP&C discretion	Department approved
Elementary Play Structure	1 per site	1 per site	Department approved
Class A Soccer Field	1 per site	1 per site	As per RP&C Specifications.
Class B Ball Diamonds	2 per site	2 per site	As per RP&C Specifications
Multi Use Pad	1 per site	1 per site	As per RP&C Specifications
Activity Center	As required	1 per site	Subject to School/Town approval
Boarded Rink/Power/Lights	1 per site	1 per site	As per RP&C Specifications
Snow Bank Rink	1 per site	1 per site	As per RP&C Specifications
On-Site Asphalt Parking Pad	1 per site	1 per site	18 parking stalls/sports field
Trails	1.5 m aggregate	3.0 m asphalt	As per RP&C Specifications
Bollards	1 set/trail opening	1 set/trail opening	As per RP&C Specifications
Picnic Tables	4 per site	6 per site	As per RP&C Specifications
Pedestal Park Benches	6 per site	10 per site	As per RP&C Specifications
Pedestal Garbage Receptacles	10 per site	16 per site	As per RP&C Specifications
Park Signage	2 per site	2 per site	As per RP&C Specifications

NEIGHBOURHOOD PARK STANDARDS (may inc. a SCHOOL SITE)

ITEM	QUANTITY		DETAILS
	Minimum	Maximum	
Site Preparation	Entire site	Entire site	As per Contract Specifications
Final Grading/Seeding	Entire site	Entire site	As per Contract Specifications
Tree Planting	10 trees/acre	15 trees/acre	Approved species
Shrub Planting	50 m^2/ha	100 m^2/ha	Approved species
Pre-School Play Structure	As required/school type	1 per site	Department approved
Elementary Play Structure	1 per site	1 per site	Department approved
Class A Sports Field	1 per site	1 per site	As per RP&C Specifications
Multi-Use Pad	1 per 2 sites	1 per 2 sites	As per RP&C Specifications
Activity Center	As required	1 per site	Subject to school/Town approval
Boarded Rink/Power/Lights	1 per site	1 per site	As per RP&C Specifications
Snow Bank Rink	1 per site	1 per site	As per RP&C Specifications
On-Site Asphalt Parking Pad	1 per site	1 per site	Lot shared with school
Trails	1.5 m aggregate	3.0 m asphalt	As per RP&C Specifications
Bollards	1 set/trail opening	1 set/trail opening	As per RP&C Specifications
Picnic Tables	2 per site	3 per site	As per RP&C Specifications
Pedestal Park Benches	3 per site	5 per site	As per RP&C Specifications
Pedestal Garbage Receptacles	5 per site	8 per site	As per RP&C Specifications
Park Signage	1 per site	1 per site	As per RP&C Specifications

NEIGHBOURHOOD PARK STANDARDS

ITEM	QUANTITY		DETAILS
	Minimum	Maximum	
Site Preparation	Entire site	Entire site	As per Contract Specifications
Final Grading/Seeding	Entire site	Entire site	As per Contract Specifications
Tree Planting	10 trees/acre	15 trees/acre	Approved species
Shrub Planting	50 m^2/ha	100 m^2/ha	Approved species
Pre-School Play Structure	1 per site	1 per site	Department approved
Class A Soccer Field	1 per site	1 per site	As per RP&C Specifications
Boarded Rink/Power/Lights	1 per site	1 per site	As per RP&C Specifications
Snow Bank Rink	1 per site	1 per site	As per RP&C Specifications
On-Site Asphalt Parking Pad	1 per site	1 per site	18 parking stalls/sports field
Trails	1.5 m aggregate	2.5 m Asphalt	As per RP&C Specifications
Bollards	1 set/trail opening	1 set/trail opening	As per RP&C Specifications
Picnic Tables	1 per site	2 per site	As per RP&C Specifications
Pedestal Park Benches	2 per site	4 per site	As per RP&C Specifications
Pedestal Garbage Receptacles	3 per site	6 per site	As per RP&C Specifications
Park Signage	1 per site	1 per site	As per RP&C Specifications

PARKETTE STANDARDS

ITEM	QUANTITY		DETAILS
	Minimum	Maximum	
Site Preparation	Entire site	Entire site	As per Contract Specifications
Final Grading/Seeding	Entire site	Entire site	As per Contract Specifications
Tree Planting	10 trees/acre	15 trees/acre	Approved species
Shrub Planting	50 m^2/ha	100 m^2/ha	Approved species
Pre-School Play Structure	1 per site	1 per site	Department approved
Elementary Play Structure	RP&C discretion	RP&C discretion	Department approved
Trails	1.5 m aggregate	2.5 m asphalt	As per RP&C Specifications
Bollards	1 set/trail opening	1 set/trail opening	As per RP&C Specifications
Picnic Tables	1 per site	1 per site	As per RP&C Specifications
Pedestal Park Benches	1 per site	2 per site	As per RP&C Specifications
Pedestal Garbage Receptacles	2 per site	3 per site	As per RP&C Specifications
Park Signage	1 per site	1 per site	As per RP&C Specifications

LINEAR PARK STANDARDS

ITEM	QUANTITY		DETAILS
	Minimum	Maximum	
Site Preparation	Entire site	Entire site	As per Contract Specifications
Final Grading/Seeding	Entire site	Entire site	As per Contract Specifications
Tree Planting	10 trees/acre	15 trees/acre	Approved species
Shrub Planting	30 m^2/ha	70 m^2/ha	Approved species
Trails	1.5 m aggregate	2.5 m Asphalt	As per RP&C Specifications
Bollards	1 set/trail opening	1 set/trail opening	As per RP&C Specifications
Pedestal Park Benches	1/acre	1/acre	As per RP&C Specifications
Pedestal Garbage Receptacles	1/acre	1/acre	As per RP&C Specifications
Park Signage	1 per site	1 per site	As per RP&C Specifications

PARKS SECTION LANDSCAPE INSPECTION CHECKLIST – CAC

LEVEL1 LANDSCAPING Location: _____

*See Contract Specifications document for full detail of requirements

WORK INSPECTED	CHECK-BOX	COMMENTS
SURFACE CONDITION		
• Acceptable drainage		
• Free of erosion damage		
• Free of rocks and debris ≥ 50mm		
• Smooth, even grades (+ or – 25mm)		
• Acceptable grade tie-ins		
• Acceptable slopes (≤ 4:1)		
SEEDING		
• Seed establishment (≥ 85%)		
• Acceptable weed levels (≤ 15%)		
• Grass maintained (≤ 20mm)		
SODDING		
• Even surface		
• Well knitted		
• Acceptable tie-ins		
• Sufficient watering		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

LEVEL 2 LANDSCAPING

Size and species as per approved plan		
Free of disease/insect damage		
Acceptable tree spacing/setbacks		
Planted as per plan/alignment		
Correct planting depth		
Proper tree well		
Acceptable staking		
Strapping, wire and burlap removed		
Sufficient watering		
Beds weed free		
Proper mulch depth		
Acceptable tree grates		

Date: _____ Printed Name: _____ Signature: _____

LEVEL 3 LANDSCAPING

WORK INSPECTED	CHECK-BOX	COMMENTS
Fencing acceptable		
Benches acceptable		
Tables acceptable		
Garbage receptacles acceptable		
Post and cable acceptable		
Bollards acceptable		
Pathways acceptable		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

LEVEL 4 LANDSCAPING

Special amenity acceptable		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

ADDITIONAL COMMENTS:

LANDSCAPE INSPECTION CHECKLIST - CCC

PARKS SECTION

LEVEL 1 LANDSCAPING Location: _____

*See Contract Specifications document for full detail of requirements

WORK INSPECTED	CHECK-BOX	COMMENTS
SURFACE CONDITION		
• As-built approval		
• Acceptable drainage		
• Free of erosion damage		
• Free of rocks or debris ≥ 50mm		
• Smooth, even grades (+ or – 25mm)		
• Acceptable grade tie-ins		
• Sufficient topsoil (≥ 150mm)		
• Acceptable slopes (≤ 3.5:1)		
• Distances between fixed objects (slopes:20 ft on center; flats:8 ft on center)		
SEEDING		
• Seed coverage (≥ 85%)		
• Even seed distribution		
SODDING		
• Even surface		
• Well knitted		
• Acceptable tie-ins		
• Sufficient watering		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

LEVEL 2 LANDSCAPING

Size and species as per approved plan		
Free of disease/insect damage		
Acceptable tree spacing/setbacks		
Planted as per plan/alignment		
Correct planting depth		
Proper tree well		
Acceptable staking		
Strapping, wire and burlap removed		
Sufficient watering		
Beds weed free		
Proper mulch depth		
Acceptable tree grates		

Date: _____ Printed Name: _____ Signature: _____

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LEVEL 3 LANDSCAPING

WORK INSPECTED	CHECK-BOX	COMMENTS
Fencing installed correctly		
Benches installed correctly		
Tables installed correctly		
Garbage receptacles installed correctly		
Post and cable installed correctly		
Bollards installed correctly		
Pathways acceptable		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

LEVEL 4 LANDSCAPING

Special amenity approval by appropriate Department		
Maintenance agreements in place		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

ADDITIONAL COMMENTS:

PARKS SECTION

LANDSCAPE INSPECTION CHECKLIST - FAC

LEVEL 1 LANDSCAPING

Location: _____

*See Contract Specifications document for full detail of requirements

WORK INSPECTED	CHECK-BOX	COMMENTS
SURFACE CONDITION		
• Acceptable drainage		
• Free of erosion damage		
• Free of rocks and debris ≥ 50mm		
• Smooth, even grades (+ or – 25mm)		
• Acceptable grade tie-ins		
• Acceptable slopes (≤ 3.5:1)		
SEEDING		
• Seed establishment (≥ 85%)		
• Acceptable weed levels (≤ 15%)		
• Grass maintained (≤ 20mm)		
SODDING		
• Even surface		
• Well knitted		
• Acceptable tie-ins		
• Sufficient watering		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

LEVEL 2 LANDSCAPING

Size and species as per approved plan		
Free of disease/insect damage		
Acceptable tree spacing/setbacks		
Planted as per plan/alignment		
Correct planting depth		
Proper tree well		
Acceptable staking		
Strapping, wire and burlap removed		
Sufficient watering		
Beds weed free		
Proper mulch depth		
Acceptable tree grates		

Date: _____ Printed Name: _____ Signature: _____

LEVEL 3 LANDSCAPING

WORK INSPECTED	CHECK-BOX	COMMENTS
Fencing acceptable		
Benches acceptable		
Tables acceptable		
Garbage receptacles acceptable		
Post and cable acceptable		
Bollards acceptable		
Pathways acceptable		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

LEVEL 4 LANDSCAPING

Special amenity acceptable		

*See Contract Specifications document for full detail of requirements

Date: _____ Printed Name: _____ Signature: _____

ADDITIONAL COMMENTS:

1. GENERAL

This section contains design information that relates to pavement markings, traffic control signage, traffic signals, and other traffic safety related items to give guidance on required information to support a project and/or Development that will impact The Town's roadway system.

Pavement markings, traffic control signage, and signals shall conform to the Manual of Uniform Traffic Control Devices for Canada (MUTCDC) and the Traffic design drawings included in Section 16, Design Drawings.

Note: under Section 1 there is a temporary street name signage requirement which will not meet these standards. The temporary signage is only required during the construction phases of development until such time as the permanent signage is installed.

2. PARKING RESTRICTIONS

To assist with safer roads and so as to not impede traffic flow the following parking restrictions may be imposed on collector and local roadways:

1. Median – No parking allowed for the entire length of the median plus 40 m (minimum) through the taper. Exception: If a 4.0 m travel lane and a 3.5 m parking lane (minimum) is available.

2. Roundabouts – No parking within the roundabout and along those portions of a roadway where a splitter island exists, or as otherwise identified by the Engineer.

   Driveways will not be permitted between the crosswalk and the circulatory lanes of a roundabout. It is noted that any driveways located adjacent to the splitter island (but not between the crosswalk and circulatory lanes) will have access from one direction only.

3. PAVEMENT MARKING AND SIGNAGE

A. TYPES

Pavement markings for the various roadway classifications are as follows:

Table 15.1

Acceptable Pavement Marking Materials

Item	Type of Material		
	Expressways and Arterial Roadways	Collector Roadway	Local Roadway
1. Longitudinal Pavement Markings	Type 1	Type 1	Paint
2. Transverse Pavement Markings	Type 1	Type 1	Paint
3. Turn Arrow Markings	Type 1	Type 1	Paint
4. Gore Area Markings	Type 1	Type 1	Paint

5.	Railway Crossing Markings	Type 1	Type 1	Paint
6.	Bike Symbol Markings	Type 1	Type 1	Paint
7.	Parking Line Markings	Paint	Paint	Paint
8.	Speed Hump Markings	Type 1	Type 1	Paint
9.	Diamond Symbol Marking	Type 1	Type 1	Paint
10.	Lettering Markings	Paint	Paint	Paint
11.	Concrete Bridge Deck Markings	Paint	Paint	Paint
12.	Asphalt Bridge Decks Markings	Type 1	Type 1	Paint

Note:

1. *Expressway and Arterial roadways include any portion of a Collector or Local roadway within 50 metres of an intersecting expressway or arterial roadway.*
2. *Type 1 - Thermoplastic "Hot Inlaid" material as specified in the Town of Olds Contract Specifications 32 17 26.*

B. DRAWINGS

Drawing requirements are shown in Section 2 - Drawing Standards.

4. DECORATIVE STREET NAME MARKERS

In conjunction with the current standard street name marker style, a Developer may choose one of the approved optional street marker styles. Examples of these styles are shown in Section 16, Design Drawings.

When an optional street marker style is chosen that style shall be used throughout the area defined by the Neighbourhood Area Structure Plan (NASP) in conformance the Traffic section’s guidelines.

When a Developer proposes to use Decorative Street Name Markers, the design shall be submitted prior to, or with, the first phase of a development. The following design criteria shall be used:

1. The location and placement of Decorative Street Name Markers shall be determined by the Town.

2. Decorative Street Name Markers will not be considered adjacent to arterial roadways.

3. See Section 16 - Design Drawing 6.03, for permitted sign blank options.

4. The background colour: green, black, white or blue are acceptable. Lettering will follow the MUTCDC standard for font type and letter size. Lettering, border and logo colour will be black or silver only.

5. The Developer is required to submit a 1:1 scaled digital and hard copy of the proposed logo to the Development Coordinator who will forward the plan to the Traffic section for review and comment.

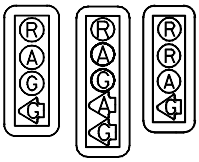
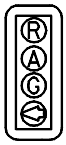
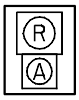
5. TRAFFIC SIGNAL DESIGN

A. TRAFFIC SIGNAL HEADS NUMBER, SIZE, POSITION AND DISPLAY

1. Eleven standard signal types shall be used for different intersection configurations as outlined in the following tables:

SIGNAL TYPE				
Median ≥1.5m?		No	Yes	Reference Drawing
Left Turn Phasing	No Left Turn Phase	A, B, D	A, B, D	8.01
	Protected-Permissive	A, B, F	A, B, G	8.02
	Protected-Permissive	A, B, L	A, B, M	8.03
	Protected-Prohibited	A, B, H	A, B, J	8.04
	Separate Protected	A, B, C	A, B, E	8.05

Signal Head Type	Lens Dimension	Signal Head Position
A 	200mm	Vertically aligned on the far right side of all intersection approaches.
B 	300mm	Horizontally aligned overhead on the far side of the intersection, centred over the receiving lane(s). If there are two type B signal heads for one direction, one should be centred over the curb lane, the other over the remaining receiving lanes. (Refer to clause 5.A.5 below)
C  F  H   L	300mm	Horizontally aligned overhead on the far side of the intersection and located as near as possible to the center of the left turn lane(s) for which the signals are intended.

Signal Head Type	Lens Dimension	Signal Head Position
D 	300mm	Vertically aligned on the median or far left side of all intersection approaches that do not display left turn phasing. See clause 5.A.5 below.
E G J  M 	300mm	Vertically aligned on the median and located as near as possible to the center of the left turn lane(s) for which the signals are intended.
K 	Red 300mm Amber 200mm or 300mm	Vertically aligned. A supplementary tab sign (ID-22SR or ID-22SL) is mounted below the two-section signal head to indicate the direction from which a fire vehicle would enter the road. (See Drawing 8.10)

2. If the overhead signals (Types B, C, F, H or L) cannot practically be installed within the range of 15 - 45m from the near side stop line, additional auxiliary heads shall be installed at a location within that range as near as possible to the near side stop line. (See Drawing 8.08)

3. If the Far Right signals (Type A) cannot practically be installed within the 20° Cone of Vision, or are otherwise obscured, the Far Right signal shall be replaced with a Type B signal head centered over the curb lane as described in clause 5.1. The primary Overhead signal (Type B) shall be centered over the remaining receiving lanes. (See Drawing 8.06)

4. Required signal head assemblies for any one approach shall be mounted no less than 3.0m apart, measured horizontally between the centre of the signal faces.

5. Either Far Left or Median signals shall be installed at signalized intersections that commenced operation in year 2003 or later. At existing signals, Far Left signals may be installed on intersection legs without medians to improve visibility when requested by the public.

6. Additional auxiliary signal heads shall be installed where signal heads stipulated in Clauses 5.A.1, 5.A.2, 5.A.3, and 5.A.4 are not visible for a distance as follows:

Speed Limit (km/h)	Distance (m)
50	85
60	110
70	135
80	165

7. Different types of Traffic Cantilevers and posts may be used for traffic and pedestrian signal installations as outlined below:
   a. 7.3m Cantilever (Fixed or rotating)
   b. 10.7m Cantilever (Fixed or rotating)
   c. 12.2m Cantilever (Fixed or rotating)
   d. 15.3m Cantilever (Fixed or rotating)
   e. Bridge Cantilever
   f. 5.0m Post
   g. 3.0m Post
   h. 1.5m Post; only for Pedestrian Pushbutton

B. TRAFFIC SIGNAL STRUCTURE LOCATIONS

1. Traffic Signal heads shall be placed on the far side of an intersection and shall be located:

   a. Within the range of 15 – 45 m from the near side stop line (see Clause 5.A.2 of this section for exceptions). (See Drawing 8.07)

   b. Within 20° from either side of a line originating at the near side stop line, and centered on the approaching lanes excluding any parking lane(s). (Left turn lanes should be included unless the left turn lane is slotted or the signal for left turn movement is different than the straight through traffic (e.g. 4 or 5 section signal, See Drawing 8.07).

2. Traffic signal structures shall be placed at a distance of 2.0 m or as close to 2.0 m as possible from the face of curb. The minimum clearance from the traffic signal structure to the face of curb must equal or exceed 0.61 m.

3. Signal structures shall not be placed on islands with areas less than 6 sq. m.

4. On islands, structures are to be placed at the corner of the island, closest to the centre of the intersection, centred 2.0 m from the face of curb or as close to 2.0 m as possible. The minimum clearance from the traffic signal structure to the face of curb must equal or exceed 0.61 m.

5. Signal posts shall not be placed on medians narrower than 1.2 m; 1.5 m medians are preferred.

6. On medians, signal posts shall be placed at a distance of 3.0 m back from the bull-nose.

C. PEDESTRIAN CONTROL EQUIPMENT

1. Pedestrian signal heads shall be installed at each leg of the intersection where pedestrians are permitted to cross. If pedestrian crossing is prohibited, Pedestrian Prohibited signs shall be installed. Pedestrian pushbuttons shall be installed only where actuation is required.

2. If a pedestrian countdown signal is installed, the counter symbol signal head shall be vertically aligned underneath the pedestrian signal head which displays the combination of “orange outline hand” and “white walking person” symbols.

3. An “orange outline hand” on top of a “white solid walking person” symbol (300 mm x 600 mm) shall be vertically aligned on the traffic structure or pedestrian post located nearest the crosswalk that the signals are intended for. The clearance between this post and the face of curb must equal or exceed 0.61 m. This post shall not be located further than 5.5 m from the face of curb or 2.0 m from the back of the sidewalk, whichever is greater. (See Drawing 8.08).

   a. The “orange outline hand” on top of a “white solid walking person” symbol (300 mm x 600 mm) may be replaced with a combined display (300 mm x 300 mm).

4. The post shall be in line or as close as possible to the crosswalk line adjacent to the stop bar.

5. Pedestrian pushbuttons shall be located 1.25 m above the sidewalk on the same post as specified in Clause 5.C.1. The pushbuttons are to be mounted parallel to the direction of pedestrian traffic, on the sidewalk side of the signal structure. The pedestrian pushbutton walk sign (ID-21R or ID-21L) shall be mounted immediately above the pushbutton.

6. If installed, pedestrian half signals shall comply with all specifications in Drawings 8.08 and 8.09.

7. Audible/Accessible signal indications, if used, shall be installed in accordance with the Operational Details as stated in the Canadian Manual on Uniform Traffic Control Devices. Button Activated Timers will be installed to separate audible signal indication from visual signal actuation.

D. VISORS AND BACKBOARDS

1. “Cowl” or “cut away” type visors shall be used on all traffic signal head lenses except Far Left signal heads.

2. “Tunnel” type visors shall be used on all Far Left heads installed in 2003 or later.

3. “Tunnel” type visors shall be used on all pedestrian head lenses.

4. Backboards shall be used on all traffic signal heads except the Far Right secondary signal head (Type A). In special circumstances, backboards may also be used with secondary signal heads to increase signal conspicuity.

E. EQUIPMENT COLOURS

Controller Cabinets:	Gray
Signal Structures and Median Posts:	Galvanized
Backboards:	Yellow
Signal Heads:	Dark Green

F. EQUIPMENT MOUNTING HEIGHTS

Signal equipment shall be installed at the following mounting heights above the sidewalk. Where a sidewalk does not exist, these measurements refer to the mounting height above the pavement surface of the nearest travelled lane.

Description	Mounting Height
Cantilever Arm	5.79 m
Secondary Signal Head	3.25 m
Median Signal Head (measured from near edge of the nearest traffic lane)	2.85 m
Pedestrian Head – Regular Mount	2.50 m
Pedestrian Head – Pedestal Mount	3.00 m
Pedestrian Pushbutton	1.25 m
Median Left Turn Control Sign (measured from near edge of nearest traffic lane)	2.25 m

G. LEFT TURN LANE CONTROL SIGN LOCATION

Left turn control signs (RB-41L, RB-42L, RB-43L, RB-46L, or RB-47L), when warranted, shall be mounted at a minimum of 2.25 m above the traffic lane immediately below the traffic signal. (See Drawings 8.02, 8.03, 8.04, 8.05).

H. TRAFFIC SIGNAL START-UP PROCEDURES

1. Newly installed traffic or pedestrian signals shall commence full operation on Wednesdays or Thursdays off peak hours only.

2. Newly installed traffic or pedestrian signals shall be placed on flash for approximately 48 hours before being put into normal operation.

3. Where pedestrian signals have been upgraded to full signals, they shall be placed on flash only if the conversion requires the signals to be out of operation for more than one (1) day.

4. Before newly installed traffic or pedestrian signals are placed on flash, a News Release should be issued.

I. FLASHING OPERATION

Traffic signals may display “flashing red” or “flashing amber” under one of the following conditions:

1. New Signal: Typically placed on “flash” for approximately 48 hours before going into full operation.

2. Malfunction: If a malfunction is detected, the signal will automatically go on flash.

3. Road Construction or Emergencies: The signal may temporarily be placed on “flash”.

If signals are put on “flash” mode, the signals facing the main road will display flashing amber and the signals facing the side road will display flashing red. If both roads are classified as a major road, all signals will display flashing red.

J. INSTALLATION DRAWINGS

Drawings 8.01 to 8.10 depict typical signal layouts. Drawing 8.11 depicts the standard symbols that shall be used for signal layout drawings.

6. VEHICLE DETENTION LOOPS

1. Generally, one SCOOT loop can cover one or two traffic lanes. The loops should, in general, cover between 50% and 60% of each signal direction carriageway.

2. The SCOOT loop should be at least 0.5m wide (perpendicular to the direction of travel).

3. The SCOOT loops shall be 2.0m long (parallel to the direction of travel).

4. The SCOOT loop should be approximately 1.0m from the centre of the road. The centre line is taken to be the line least occupied by vehicles in either direction, and may not coincide with the marked centre line.

5. The gap between adjacent SCOOT loops on a link should be approximately 2.0m.

A. SITING OF SCOOT LOOPS

1. In general, at least one SCOOT loop for each link is required, normally located at the entry to the link. The SCOOT loops should be positioned in such a way that free flow

conditions can be achieved over the SCOOT loops. The loops should be at least 10 to 15 m downstream of the entry point to the link, in the case of a signalised junction.

2. The detector loop shall be sited so that the journey time from SCOOT loop to stop line, under free flow conditions, is 10 to 12 seconds. The optimal SCOOT loop location is 140 m upstream of the stop bar for a roadway with a speed limit of 50 km/h. The optimal distance at 60 km/h is 170 m.

3. The SCOOT loop shall be far enough upstream to be beyond the normal expected back of queue for that link.

4. The maximum allowable homerun length is 250 m.

5. Avoid sighting loops near highly travelled entrances, or near regular stopping places for deliveries or armoured vehicles.

6. The detector loop shall be sited to avoid vehicles parking over it. Where parking is allowed or is a problem, the detector should be located 3.5 m from the curb.

7. If possible, SCOOT loops should be installed downstream of a bus stop to avoid queuing on the SCOOT loops.

8. Un-signalized entry/exit side roads into the link should be taken into account if they contribute or withdraw cumulatively more than 10% of the total traffic on the link. Journey time for these links should be equal to those on the main road and on the same link.

B. CONNECTION PROCEDURES FOR SCOOT LOOPS

1. Provide one (1) lead in and one (1) homerun per leg for each intersection.

2. Site the URD box as near to the loops as possible.

3. A maximum of eight (8) loop homeruns can be connected, per signalised intersection, to the central computer station.

4. Loop homeruns shall be connected to the nearest signalised intersection, subject to Clause 6.B.3 above.

5. SCOOT loop and homerun design will maintain the following minimum clearances to other underground utilities and curbing whenever feasible:

Utilities	Suggested Clearance
Hydrants, Valves, Manholes	3.0 m
Water, Wastewater, Storm mains	3.0 m

Streetlights	2.0 m
Shallow Utility	1.0 m
Curb and Gutter	1.5 m
Pinned Curb	1.0 m

C. TYPICAL SCOOT LOOP INSTALLATION DRAWINGS

Drawings 8.12 to 8.16 show the typical configurations of SCOOT loop installations.

D. LOCAL / STOP BAR DETENTION LOOPS

1. Local loops shall be a “Figure 8” style.
2. One local loop is required per lane.
3. The local loop shall be between 1.5 m and 3.0 m wide, and is typically 1.85 m wide.
4. The local loop shall be between 9.0 m and 15.0 m long and is typically 9.0 m long.

E. SITING OF LOCAL LOOPS

1. Local loops for through lanes shall be set back 1.5 m from the projection of the face of curb.
2. The local loop shall be centred in each lane, with approximately 1.0 m to 2.0 m separation between adjacent loops, as lane widths permit.
3. Whenever possible, local loops shall be 1.5 m away from the face of curb and shall be 1.0 m away from pinned medians or curbs.
4. No local loop shall be placed within 3.0m of any large electrical power source.

F. CONNECTION PROCEDURE FOR LOCAL LOOPS

1. One lead-in per loop shall be provided on each leg of the intersection.
2. The URD shall be situated to accommodate ducts from as many loops as possible.

7. MODERN VEHICLE DETECTORS

1. Modern Vehicle Detectors such as virtual detection zones drawn by video detention cameras mounted overhead, in-pavement magnetic sensors (e.g. Sensys) can be installed as an alternate of induction loops for SCOOT detection and local / stop bar detection on approval of Traffic Engineer.

NOTE: The Engineering Services Department is to approve all pre-marking of vehicle detection locations prior to installation.

8. DRAWING SUBMISSION AND APPROVAL PROCESS

Drawing submissions will follow the procedures noted in Section 2 - Design Drawing.

The Town Engineer shall approve all pavement marking, traffic control signage and traffic signal design and layout regardless if the project is related to a new subdivision, road widening or existing road maintenance, etc. The approval process is as follows:

1. When the project relates to new a subdivision (covered under a Development Agreement) the Consulting Engineer and/or project manager shall submit a Traffic Signal and / or Traffic Signing and Pavement Marking drawing(s) to Engineering Services for distribution and review.

2. If the project relates to a Development Permit / Development Agreement or a condition of a Development Permit the Consulting Engineer and/or project manager shall submit a Traffic Signal and / or Traffic Signing and Pavement Marking drawing(s) to Engineering Services.

3. If the project relates to a Town Capital project or annual maintenance program where road improvements are involved, the Town's Consulting Engineer and/or project manager shall submit a Traffic Signal and / or Traffic Signing and Pavement Marking drawing(s) to Engineering Services for review.

4. Once the review has been completed Engineering Services will return the drawing(s) and comments back to the Developer or Consulting Engineers to have the drawing(s) revised in accordance with Engineering Services comments. Once the revisions are complete the drawing(s) are to be resubmitted for final review per the procedures noted in items 1, 2, or 3 above.

5. Upon approval in principle, the Consulting Engineer and/or project manager shall submit original drawings (on bond paper) for acceptance and signing by Engineering Services.

6. The Consulting Engineer and/or project manager is to arrange for the installation of the traffic signals and / or traffic signs and pavement markings through the use of a private contractor.

1. WATER DESIGN

2. SANITARY DESIGN

No drawings

3. STORMWATER MANAGEMENT DESIGN

4. SERVICE CONNECTIONS

5. ROADWAY DESIGN

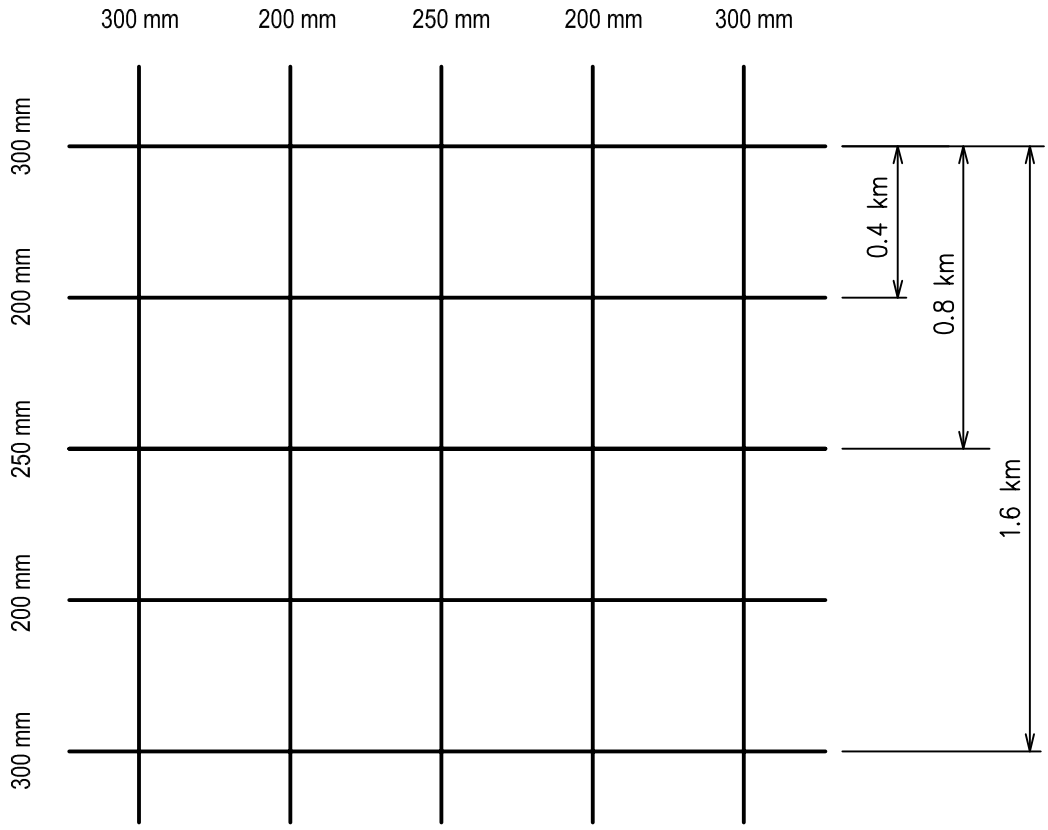
A. INTRODUCTION

B. CROSS-SECTIONS

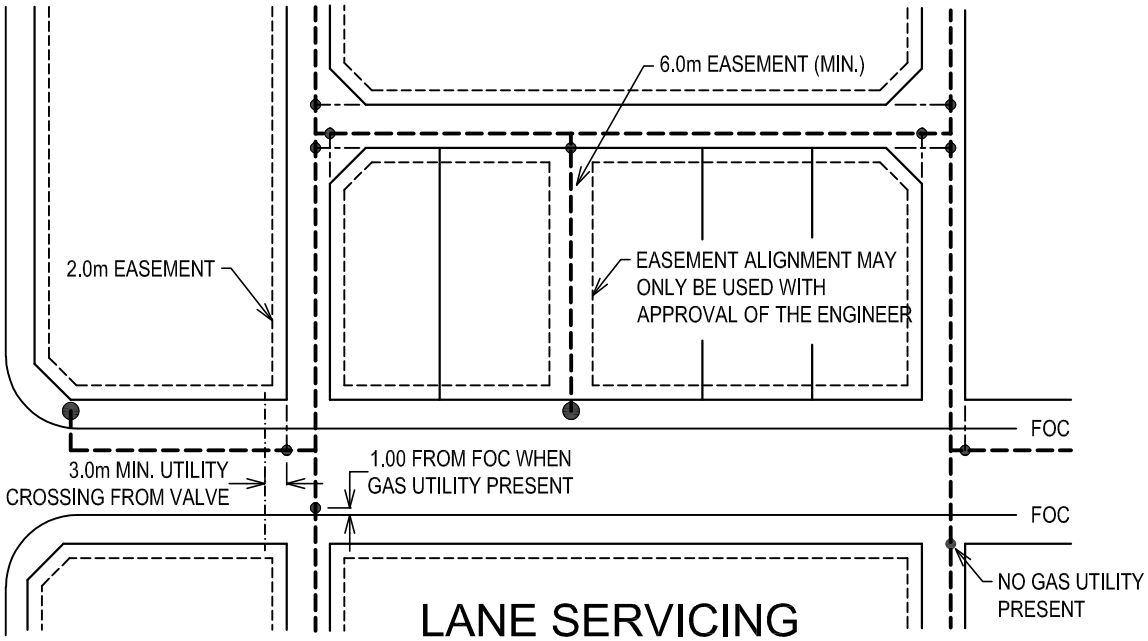
C. PAVEMENT STRUCTURES

D. DETAILS

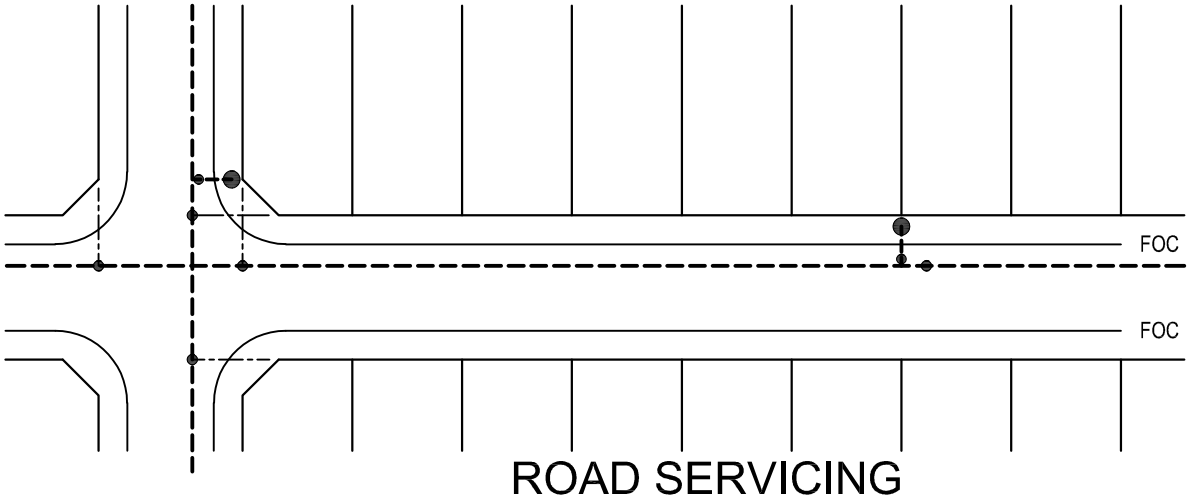
Expressway / Arterial



NO.	DATE	REVISION			
			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS WATER DESIGN	APPROVED BY: ENGINEER
			DATE: 11-04-2017	BASIC WATER MAIN GRID	DRAWING NO. 1.01
			SCALE: N.T.S.		



LANE SERVICING



ROAD SERVICING

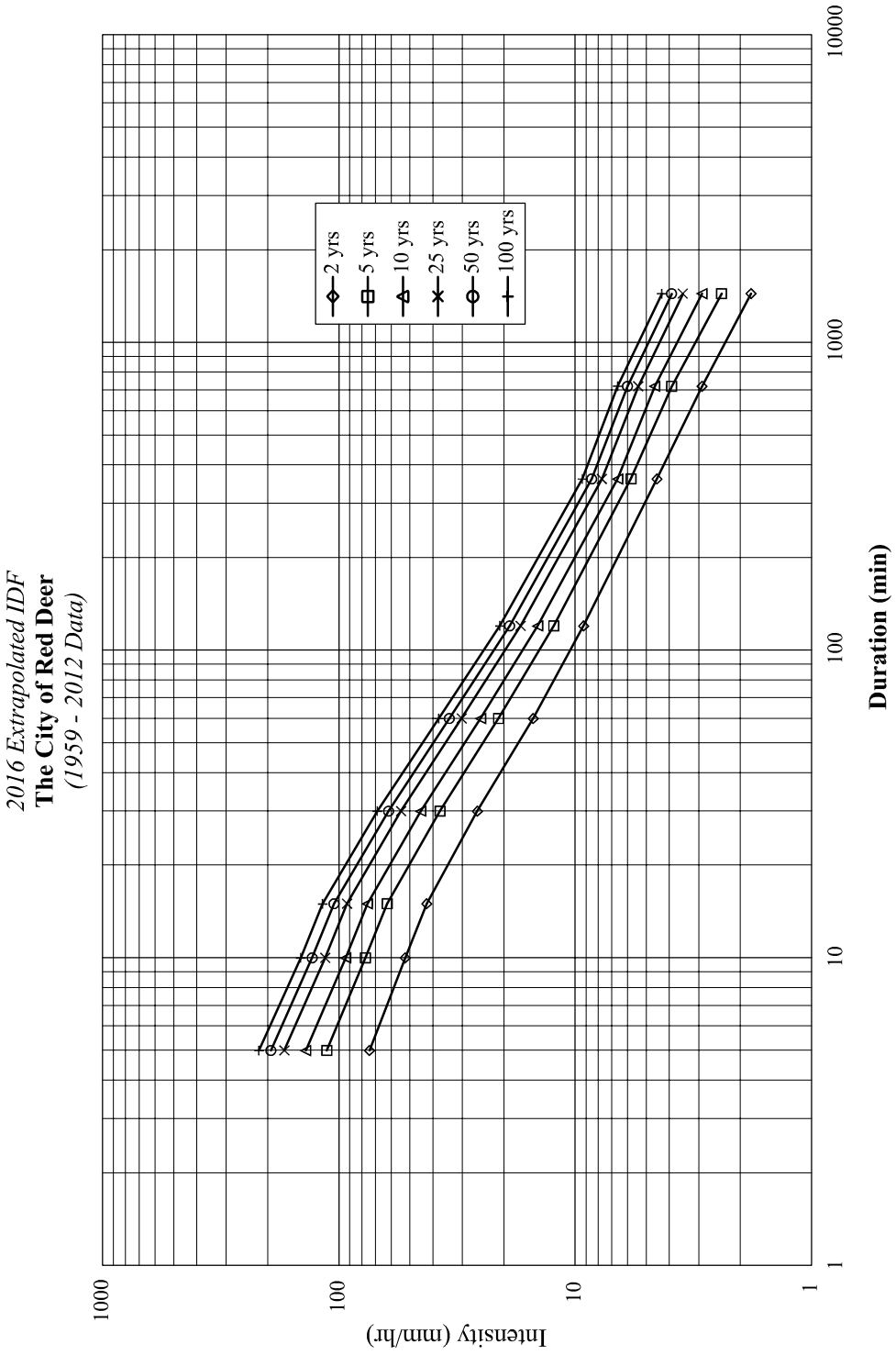
- VALVE
- HYDRANT
- HYDRANT AND VALVE

NOTE :
- AVOID USE OF EASEMENTS WHERE A STREET OR LANE ALIGNMENT IS AVAILABLE.
- HYDRANTS NORMALLY TO BE LOCATED NEAR STREET INTERSECTIONS.
- VALVES TO BE LOCATED OPPOSITE PROPERTY LINES AS ILLUSTRATED.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

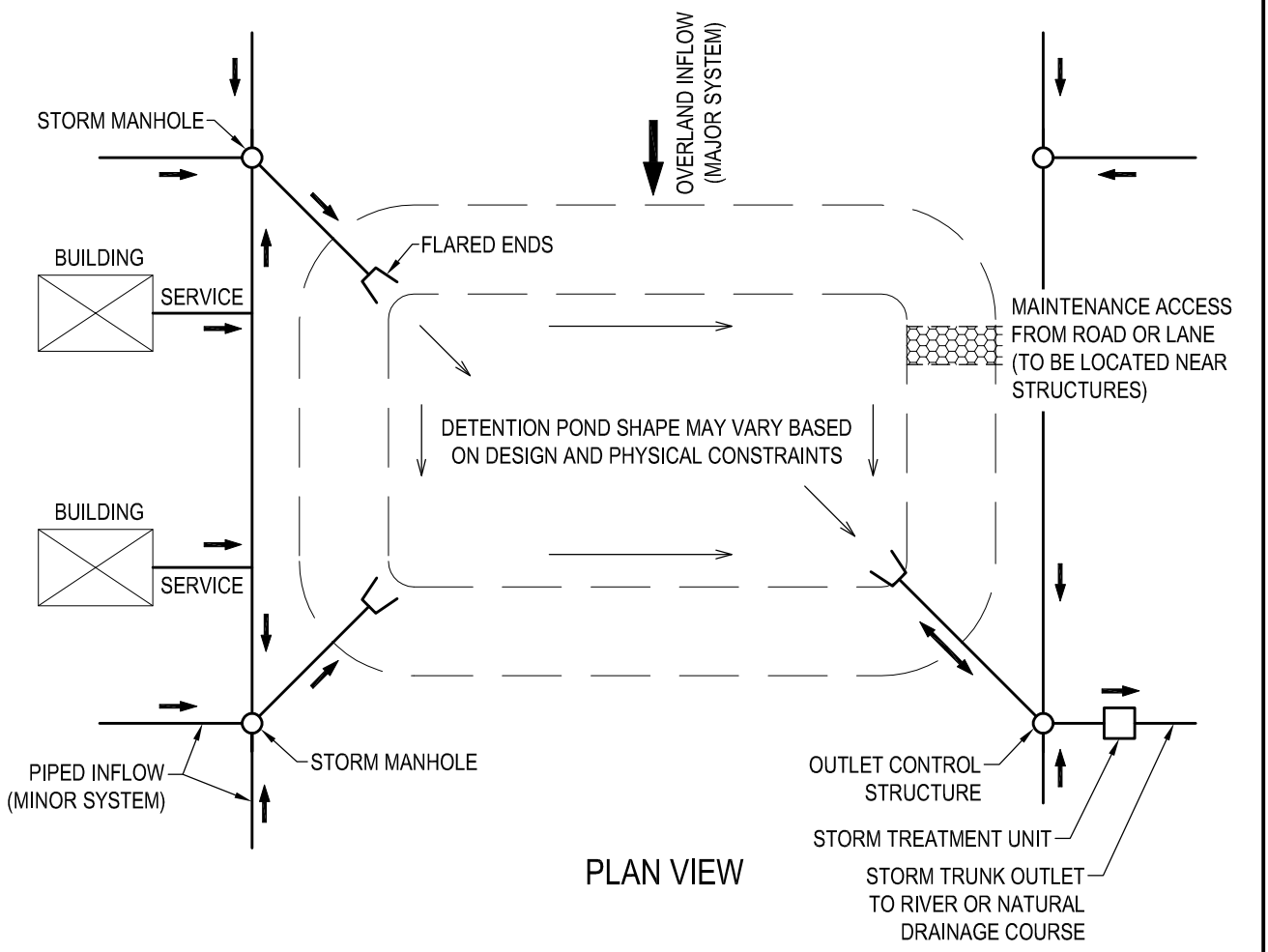
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS WATER DESIGN**	APPROVED BY:
DATE: 11-04-2017	**TYPICAL VALVE & HYDRANT LOCATIONS**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **1.02**



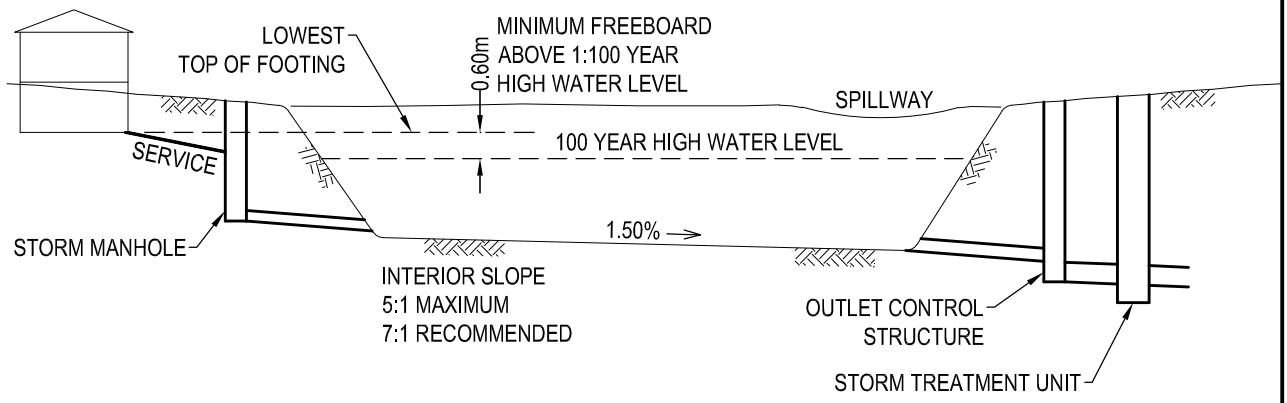
2016 Extrapolated IDF
The City of Red Deer
(1959 - 2012 Data)

Source: Environment Canada Short Duration IDF Data, 2014 / 12 / 21

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS STORMWATER MANAGEMENT DESIGN	APPROVED BY: ENGINEER
			DATE: 11-04-2017	2012 STATISTICAL CURVES FOR RAINFALL INTENSITY - DURATION - FREQUENCY	
			SCALE: N.T.S.		DRAWING NO. 3.01

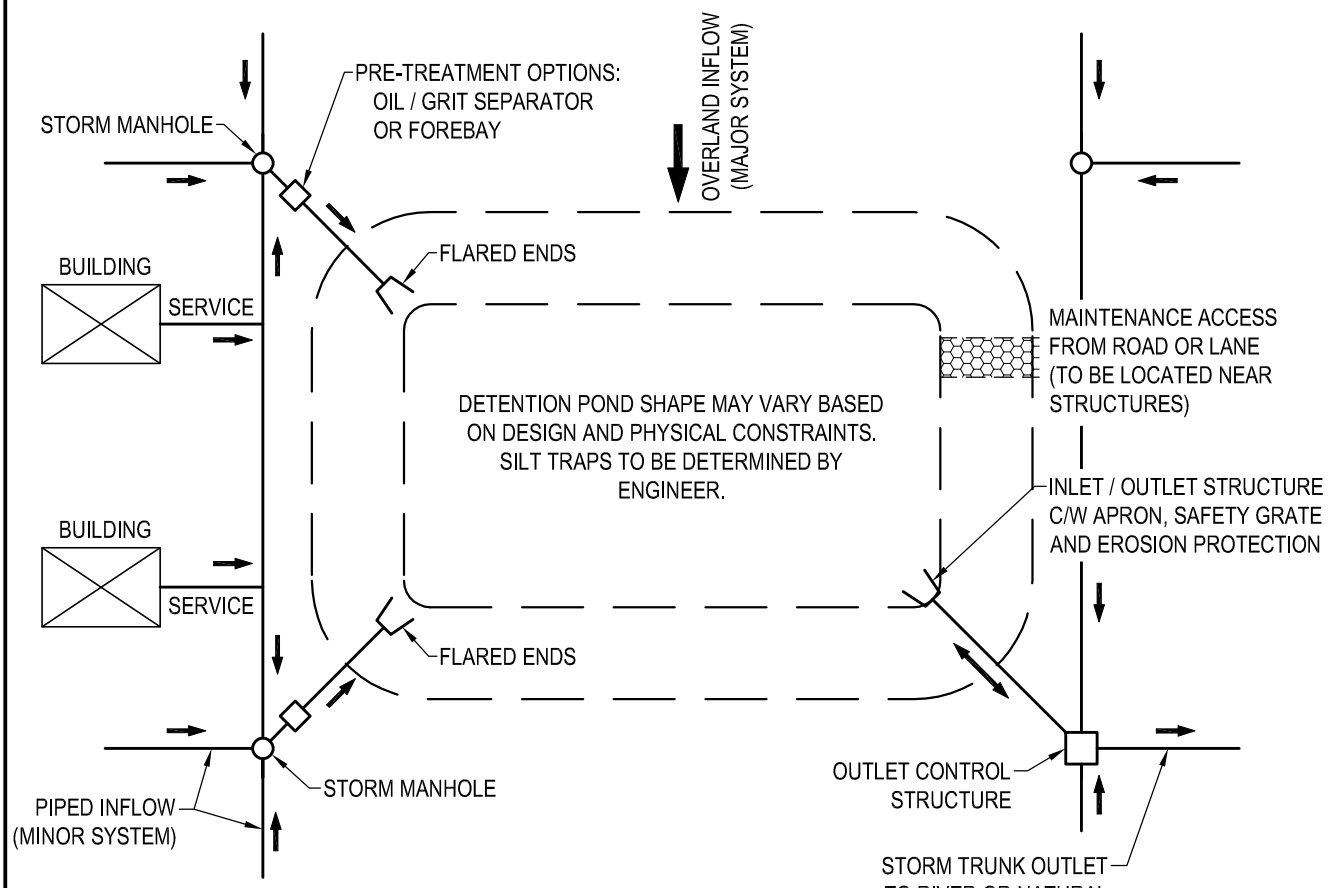


PLAN VIEW

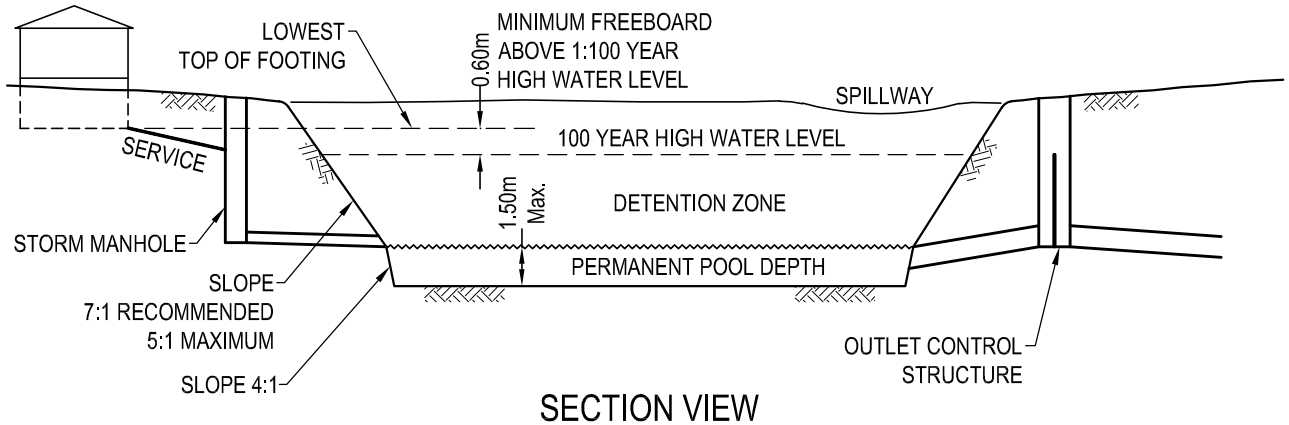


SECTION VIEW

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS STORMWATER MANAGEMENT DESIGN	APPROVED BY:
			DATE: 11-04-2017	DRY STORMWATER STORAGE FACILITY	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 3.02A



PLAN VIEW

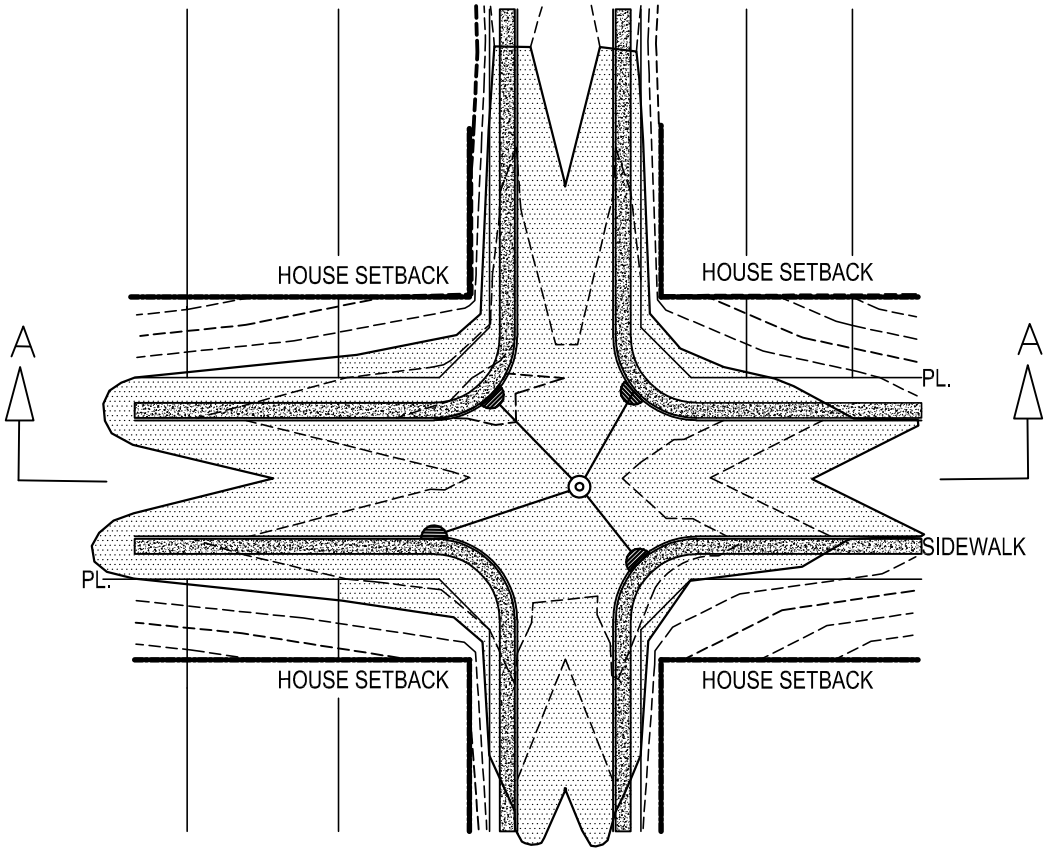


SECTION VIEW

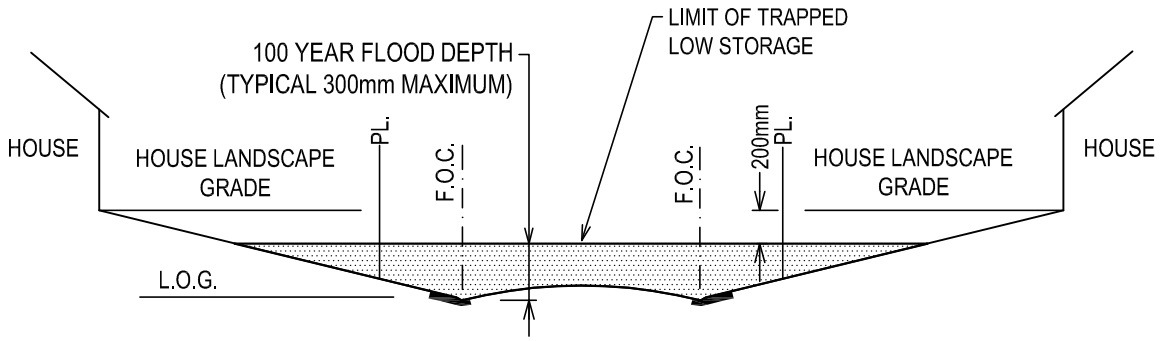
NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS STORMWATER MANAGEMENT DESIGN**	APPROVED BY:
DATE: 11-04-2017	**WET STORMWATER STORAGE FACILITY**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **3.02B**

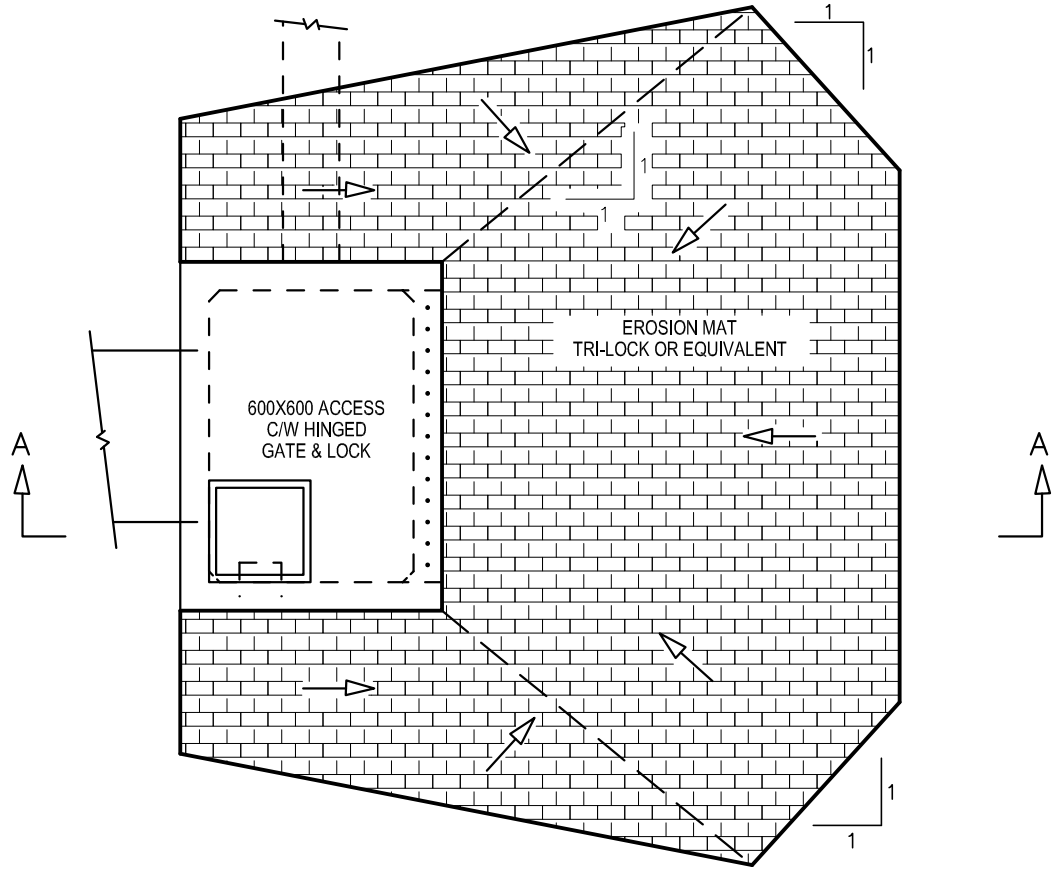


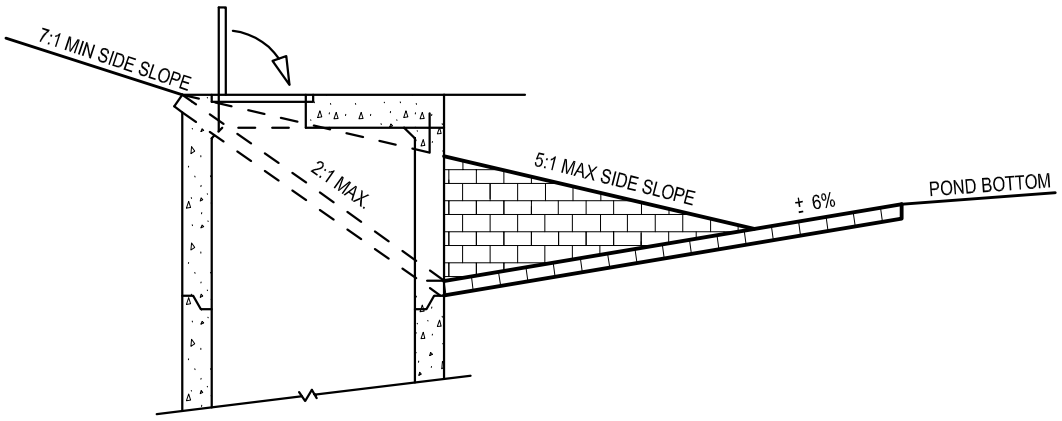
PLAN



SECTION 'A - A'

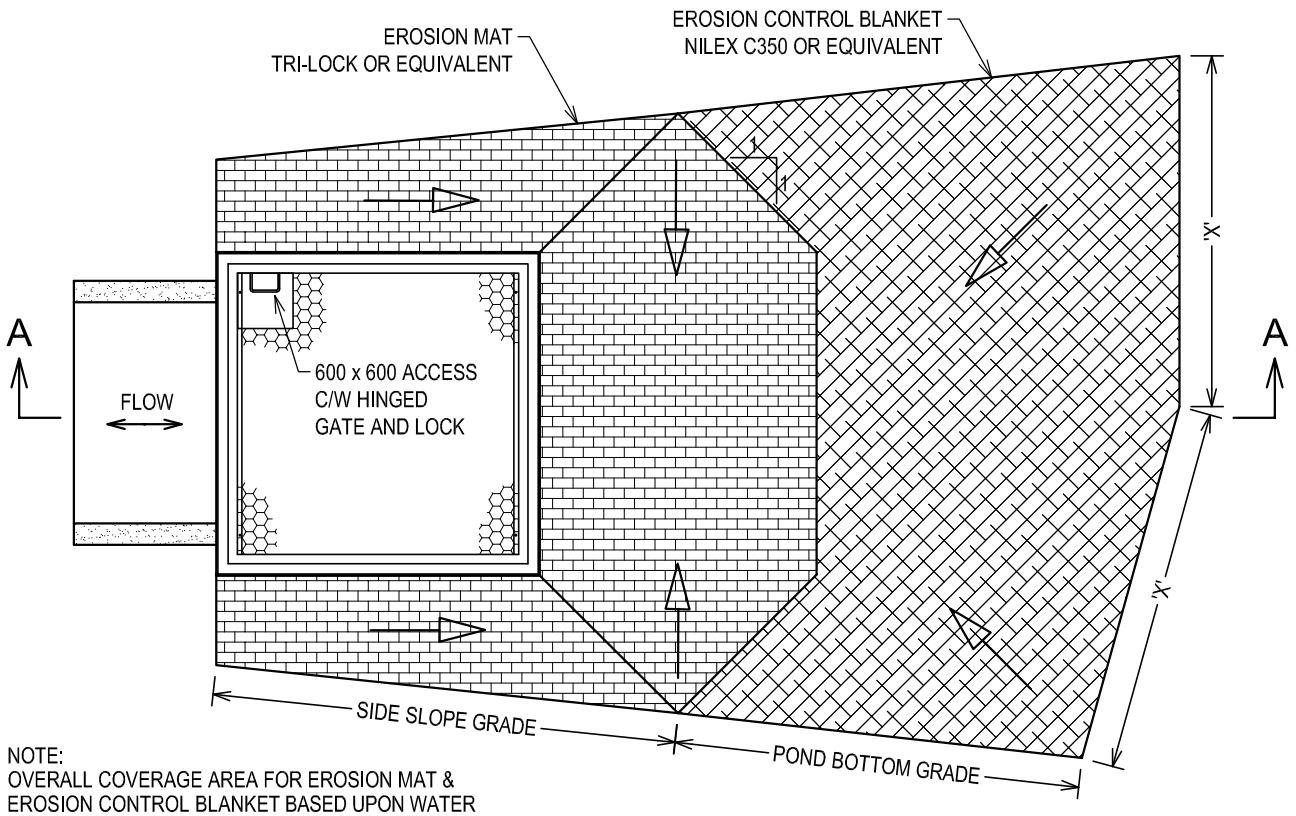
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS STORMWATER MANAGEMENT DESIGN	APPROVED BY:
			DATE: 11-04-2017	TYPICAL TRAPPED LOW STORAGE AREA	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 3.03



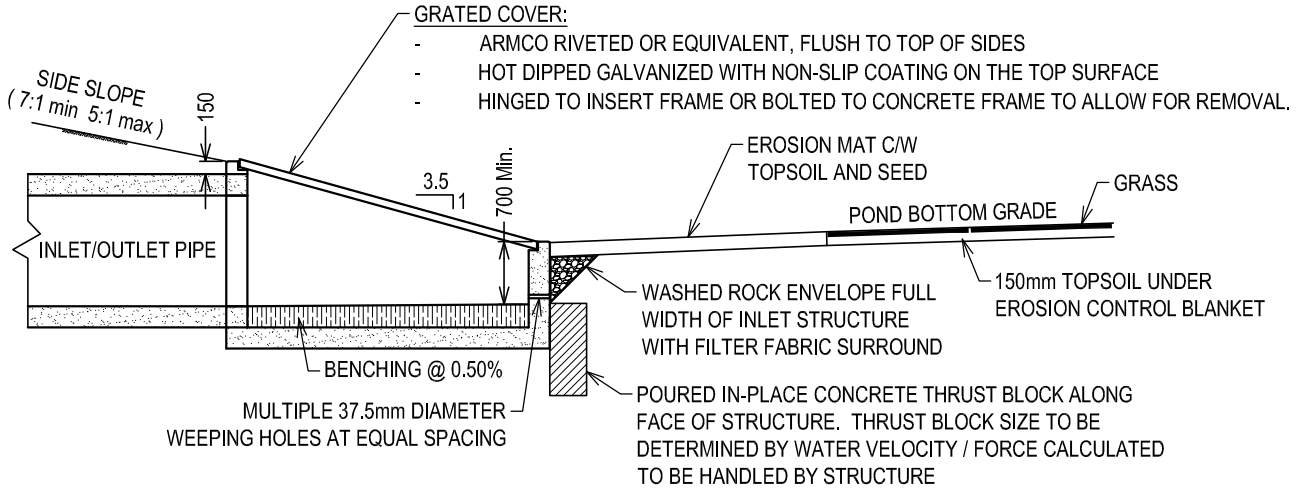


SECTION 'A - A'

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINES DRAWINGS STORMWATER MANAGEMENT DESIGN	APPROVED BY:
			DATE: 11-04-2017	INLET / OUTLET STRUCTURE APRON FOR A DRY POND	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 3.04



NOTE:
OVERALL COVERAGE AREA FOR EROSION MAT &
EROSION CONTROL BLANKET BASED UPON WATER
VELOCITIES TO BE HANDLED BY THE STRUCTURE.

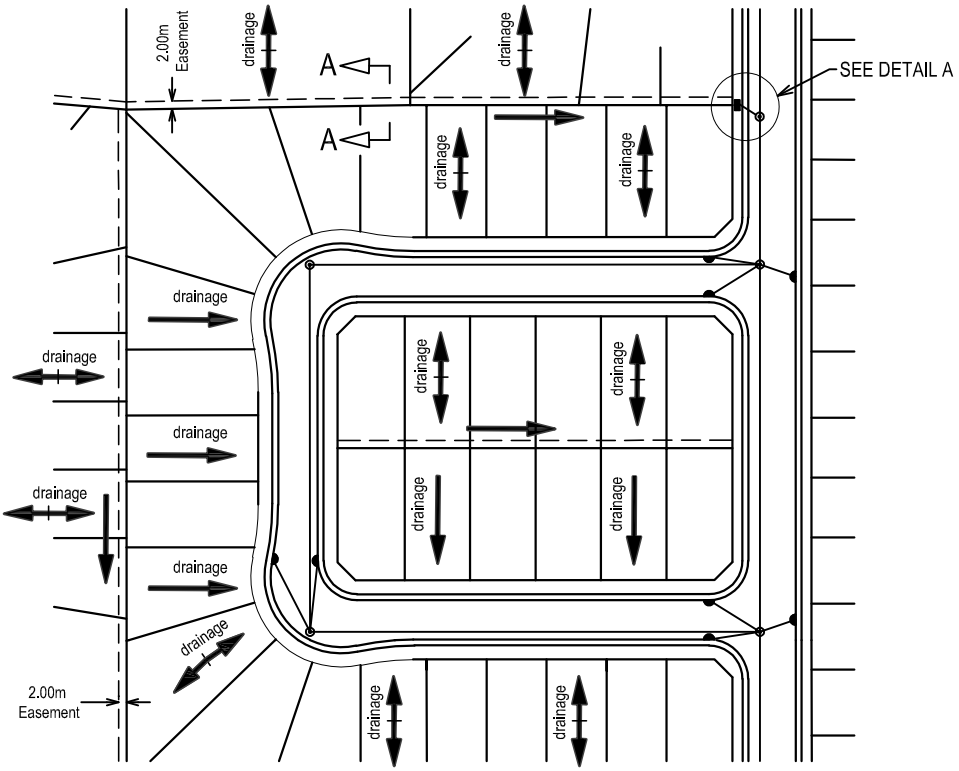


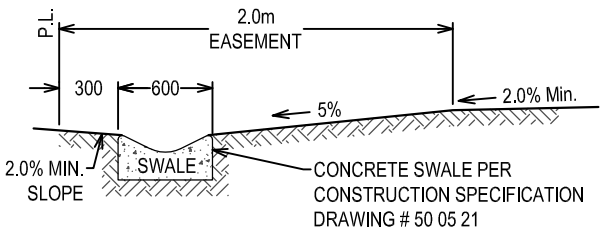
SECTION "A - A"

NO.	DATE	REVISION

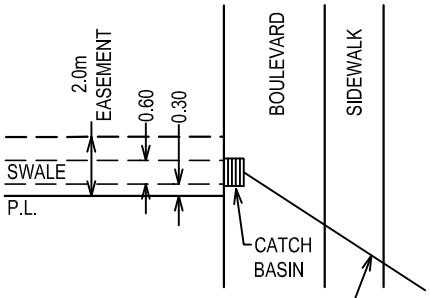
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINES DRAWINGS STORMWATER MANAGEMENT DESIGN**	APPROVED BY:
DATE: 11-04-2017	**LOW PROFILE INLET / OUTLET STRUCTURE APRON (DRY POND)**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **3.05**

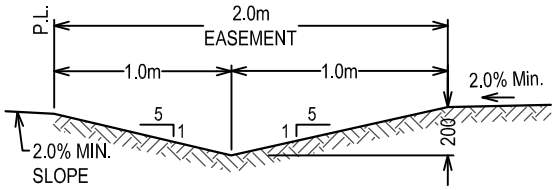




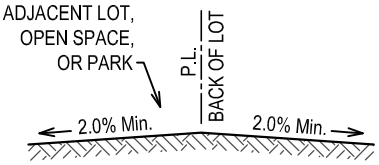
CONCRETE SWALE



DETAIL A



GRASS SWALE

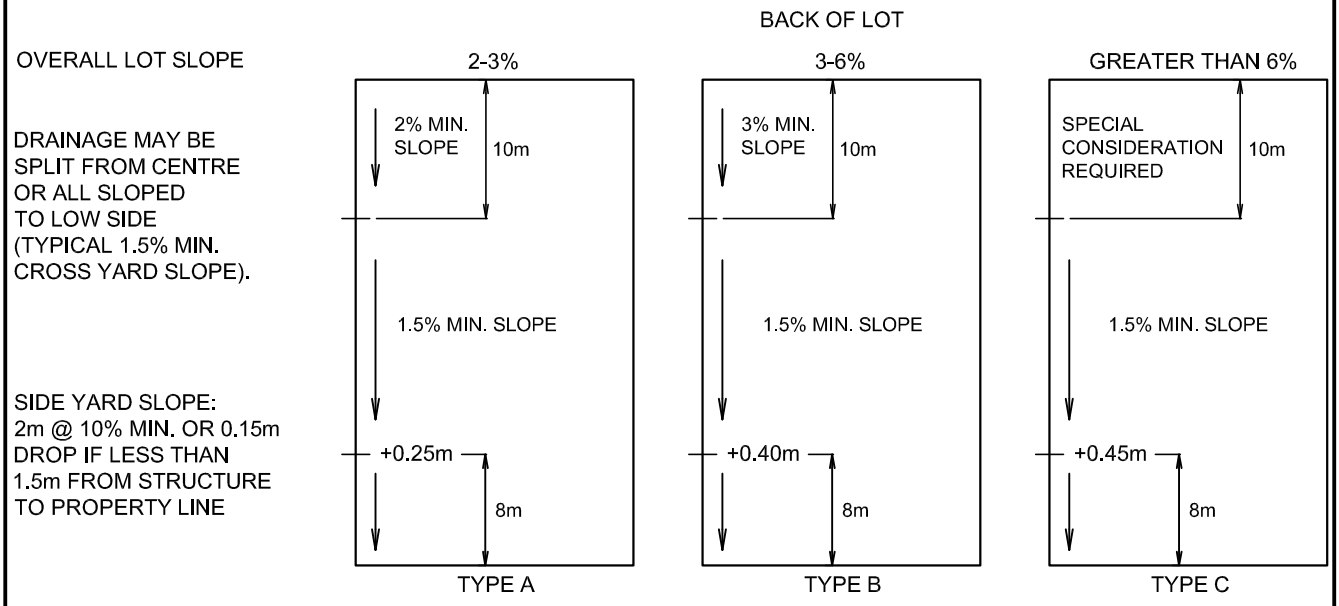


BACK TO FRONT DRAINAGE OPTIONS

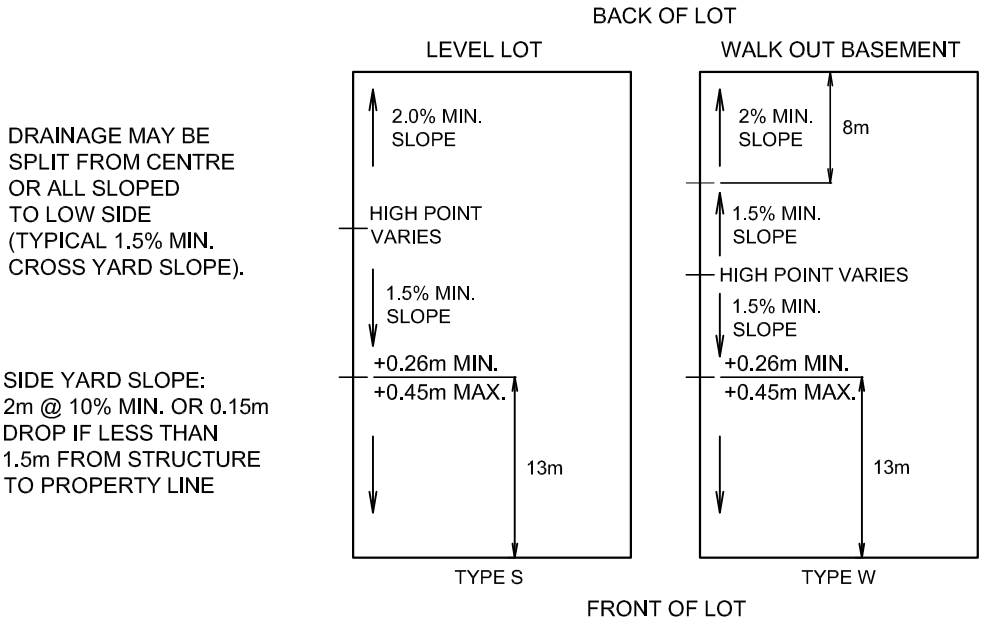
NOTE:
IF LOT IS BACKING ON TO AN OPEN SPACE OR PARK, CENTER OF GRASS SWALE TO BE 2.0m OFF PROPERTY LINE, INTO THE PARK OR OPEN SPACE, EASEMENT MAY NOT BE REQUIRED.

SECTION 'A - A'

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS STORMWATER MANAGEMENT DESIGN	APPROVED BY:
			DATE: 11-04-2017	LANELESS SUBDIVISION DRAINAGE OPTIONS	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 3.06



REAR TO FRONT LOT GRADING DETAILS

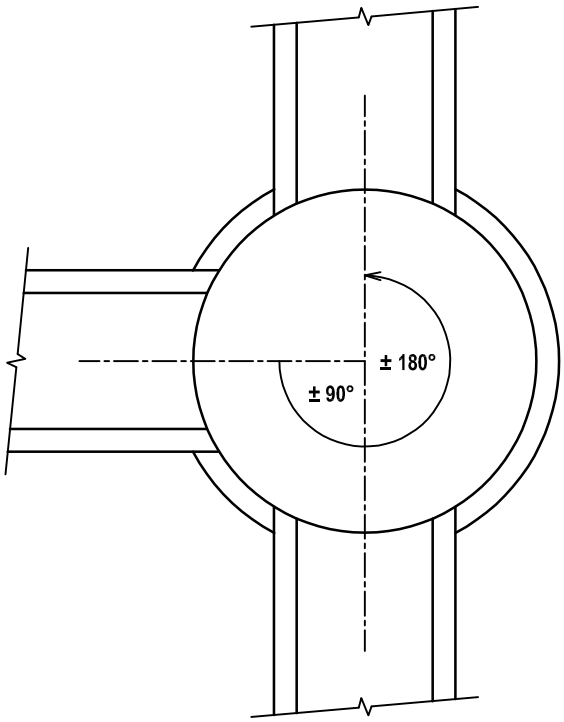


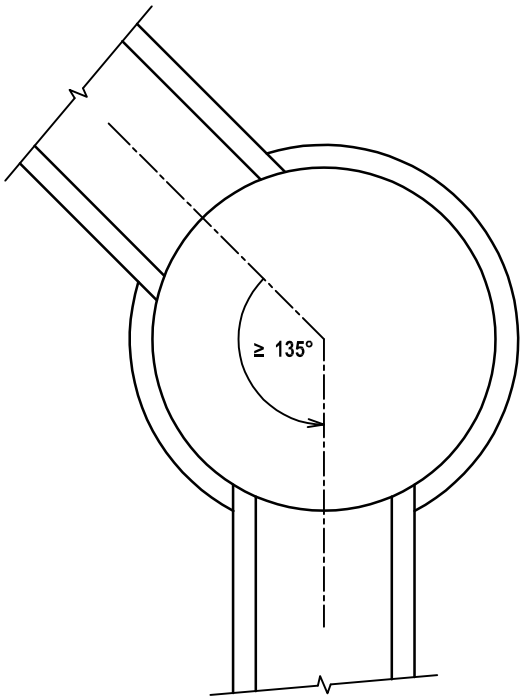
SPLIT/WALK OUT LOT GRADING DETAILS

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS STORMWATER MANAGEMENT DESIGN**	APPROVED BY: ENGINEER
DATE: 11-04-2017	**LOT GRADING DESIGN**	
SCALE: N.T.S.		DRAWING NO. **3.07**





MANHOLE NOMINAL INSIDE DIAMETER	INLET / OUTLET PIPE SIZE (max)		
	DEFLECTION ANGLE		
	± 90°	≥ 135°	± 180°
1200	600mm CONC. (765mm MAX. O.D.)	675mm CONC.	750mm CONC. 750mm PVC (940mm MAX. O.D.)
1500	750mm CONC. (940mm MAX. O.D.)	750 & 900mm CONC.	900mm CONC. (1120mm MAX. O.D.)
1800	900mm CONC. (1120mm MAX. O.D.)	1050mm CONC.	1200mm CONC. (1475mm MAX. O.D.)
2100	1050mm CONC. (1335mm MAX. O.D.)		1500mm CONC. (1828mm MAX. O.D.)
2400	1200mm CONC. (1475mm MAX. O.D.)		1800mm CONC. (2184mm MAX. O.D.)
3000	1500mm CONC. (1828mm MAX. O.D.)		2100mm CONC. (2540mm MAX. O.D.)

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
STORMWATER MANAGEMENT DESIGN

APPROVED BY:

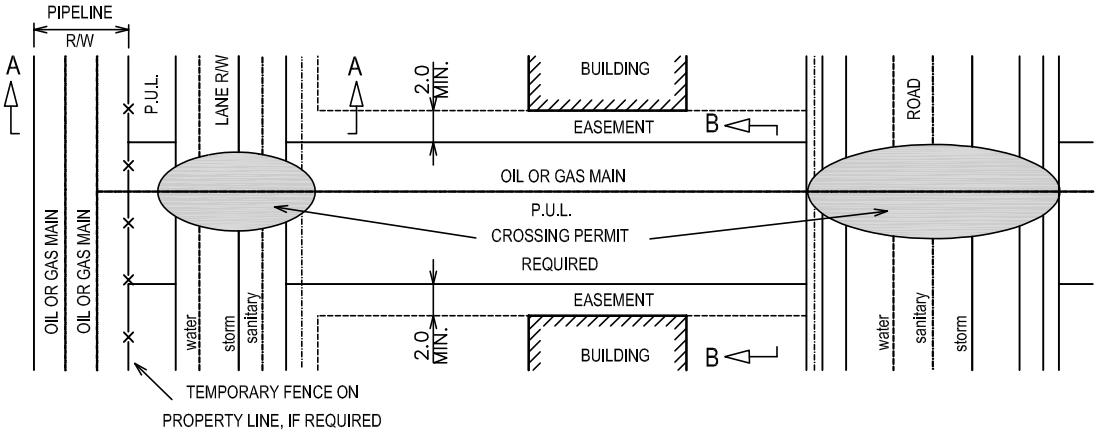
ENGINEER

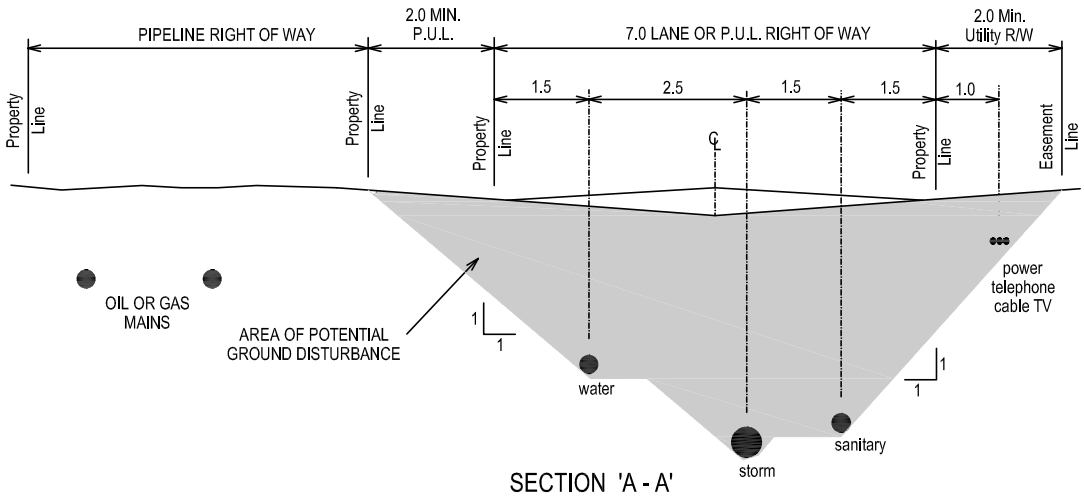
DATE: 11-04-2017

MANHOLE INLET / OUTLET PIPE DESIGN CONSIDERATIONS

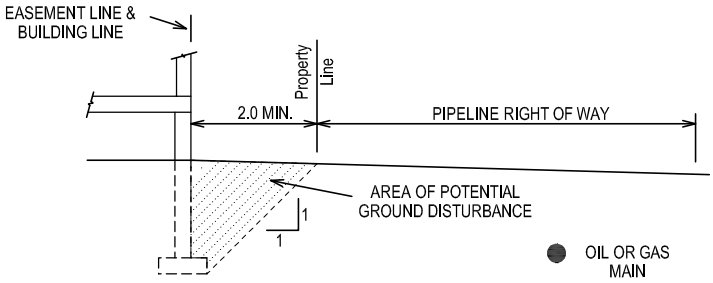
SCALE: N.T.S.

DRAWING NO. **3.08**





SECTION 'A - A'



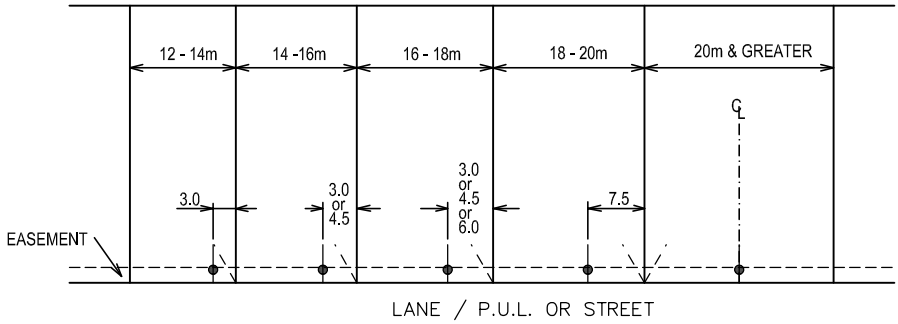
SECTION 'B - B'

NOTE :
- NO TRENCH ENCROACHMENT PERMITTED INTO PIPELINE R/W.
- BUILDING OR UTILITY SETBACKS TO BE ESTABLISHED ACCORDINGLY.

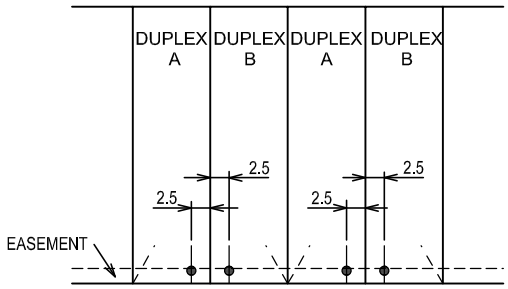
NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINES DRAWINGS SERVICE CONNECTIONS**	APPROVED BY: ENGINEER
DATE: 11-04-2017	**OIL AND OR GAS RIGHT-OF-WAY CLEARANCES**	
SCALE: N.T.S.		DRAWING NO. **4.01**

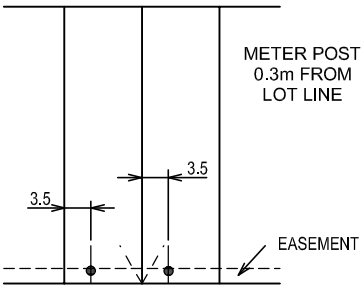


SINGLE FAMILY DWELLING

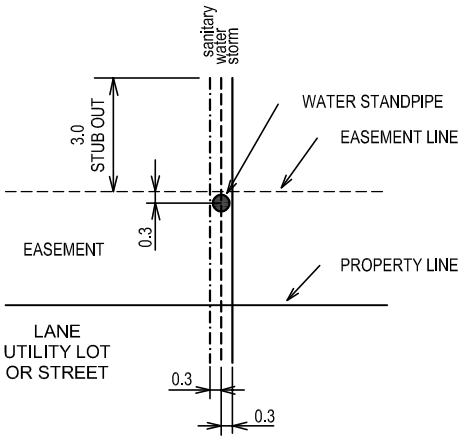


NOTE: ONLY ONE STORM SEWER SERVICE REQUIRED FOR DUPLEX LOTS

DUPLEX



MANUFACTURED HOME



SERVICE DETAIL

LEGEND

SANITARY SEWER, STORM SEWER & WATER SERVICE

ELECTRICAL SERVICE

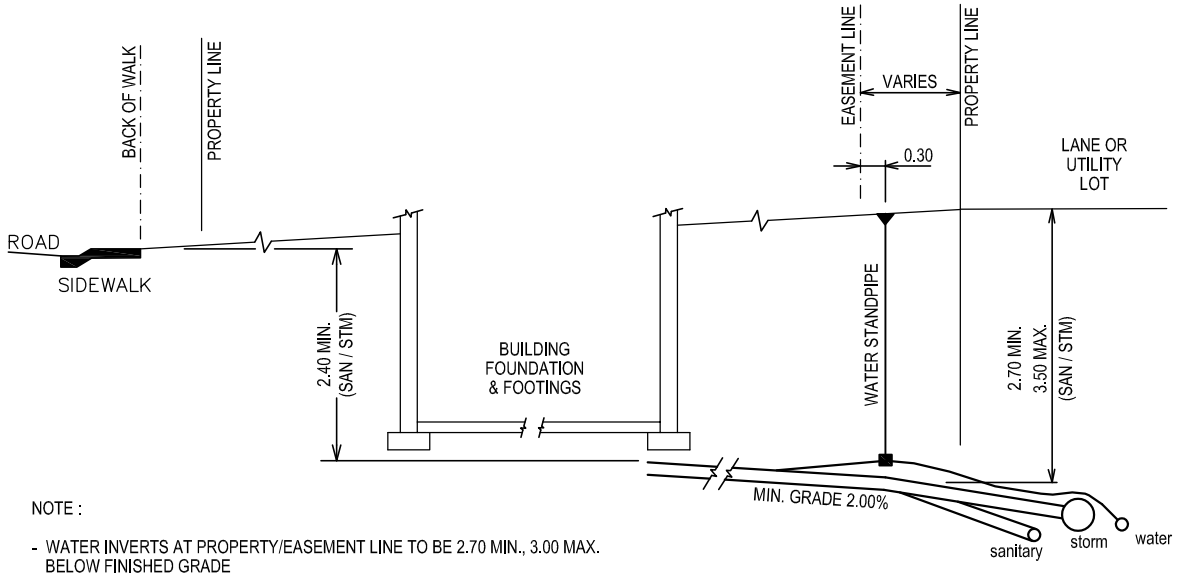
NOTE :

1. STANDPIPE & CURB STOP TO BE LOCATED 0.30m FROM EASEMENT LINE.
2. MINIMUM CLEARANCE FROM EDGE OF EL&P TRANSFORMER TO CENTRE OF WATER SHALL BE 3.30m.
3. EASEMENT WIDTH AS REQUIRED.
4. SERVICES MEASURED PERPENDICULAR TO THE PROPERTY LINE, WHERE THE PROPERTY LINE AND EASMENT LINE INTERSECT.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

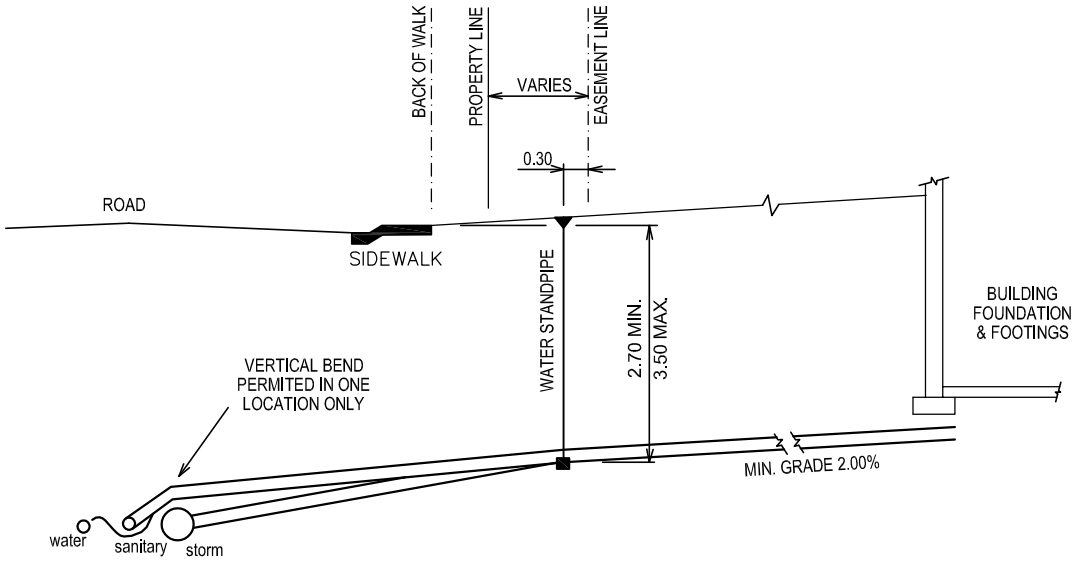
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS SERVICE CONNECTIONS**	APPROVED BY:
DATE: 11-04-2017	**SERVICE LOCATIONS**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **4.02**



NOTE :

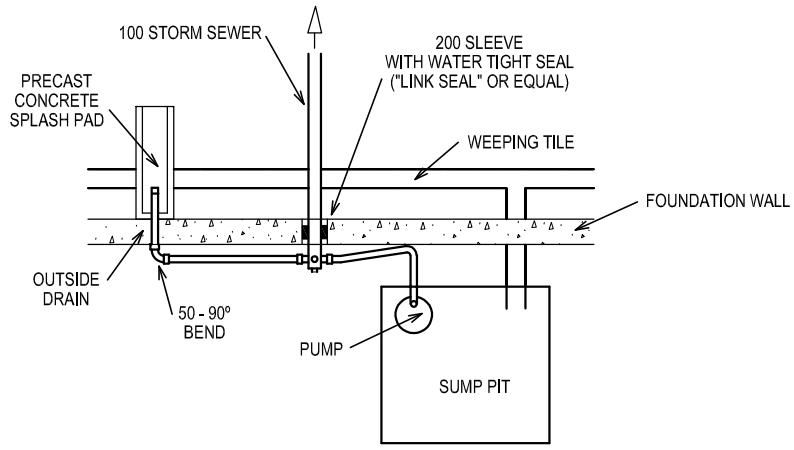
- WATER INVERTS AT PROPERTY/EASEMENT LINE TO BE 2.70 MIN., 3.00 MAX. BELOW FINISHED GRADE

REAR YARD SERVICE CONNECTION

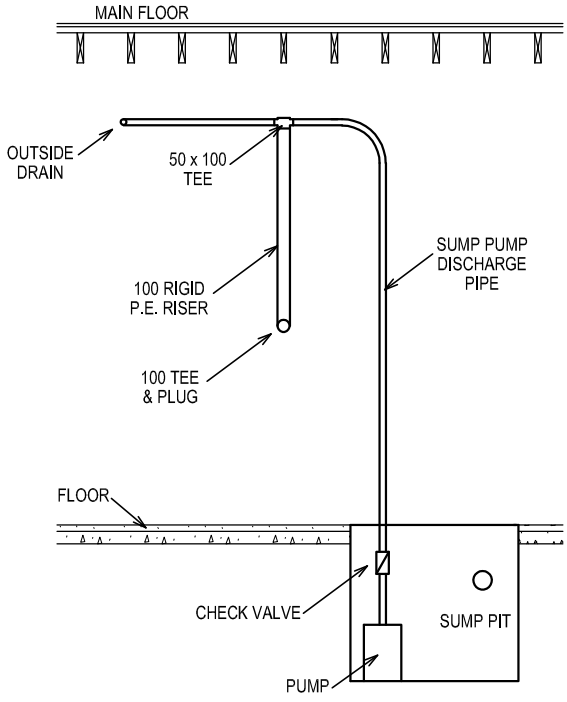


FRONT YARD SERVICE CONNECTION

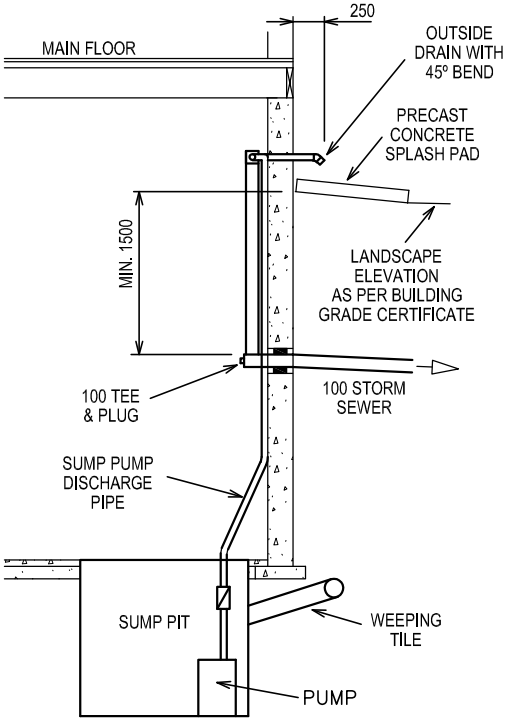
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINES DRAWINGS SERVICE CONNECTIONS	APPROVED BY:
			DATE: 12-04-2017	TYPICAL SERVICE CROSS-SECTIONS	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 4.03



TOP VIEW



FRONT VIEW

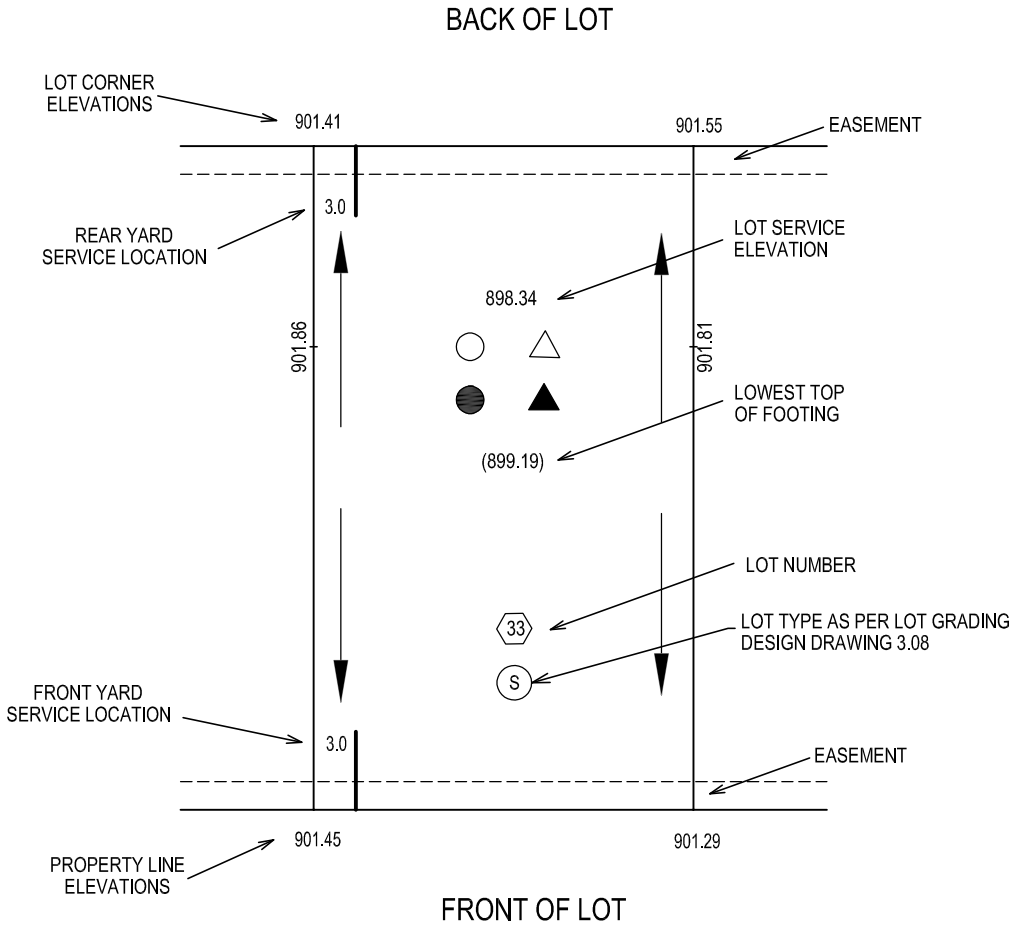


SIDE VIEW

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINES DRAWINGS SERVICE CONNECTIONS**	APPROVED BY: ENGINEER
DATE: 12-04-2017	**SHALLOW STORM SEWER SERVICE CONNECTION**	
SCALE: N.T.S.		DRAWING NO. **4.04**



LEGEND :

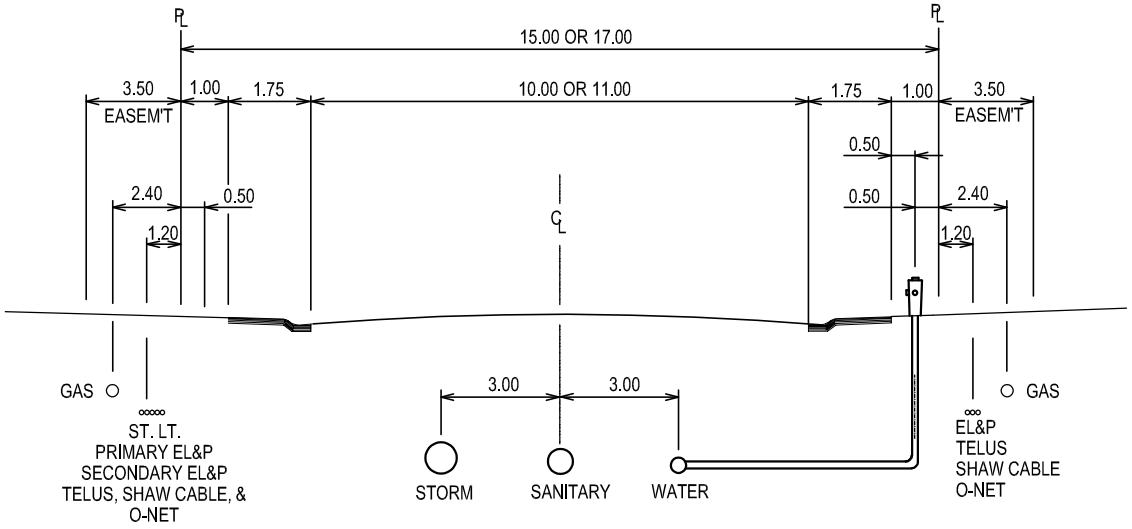
- SINGLE WATER & SANITARY SERVICE
- DUAL WATER & SANITARY SERVICE
- SINGLE WATER, SANITARY & STORM SERVICE
- DUAL WATER, SANITARY & STORM SERVICE
- DRAINAGE PATTERN

NOTE :
- EASEMENT WIDTHS VARY
- SERVICE LOCATION DIMENSIONS VARY (SEE DWG. 4.02)

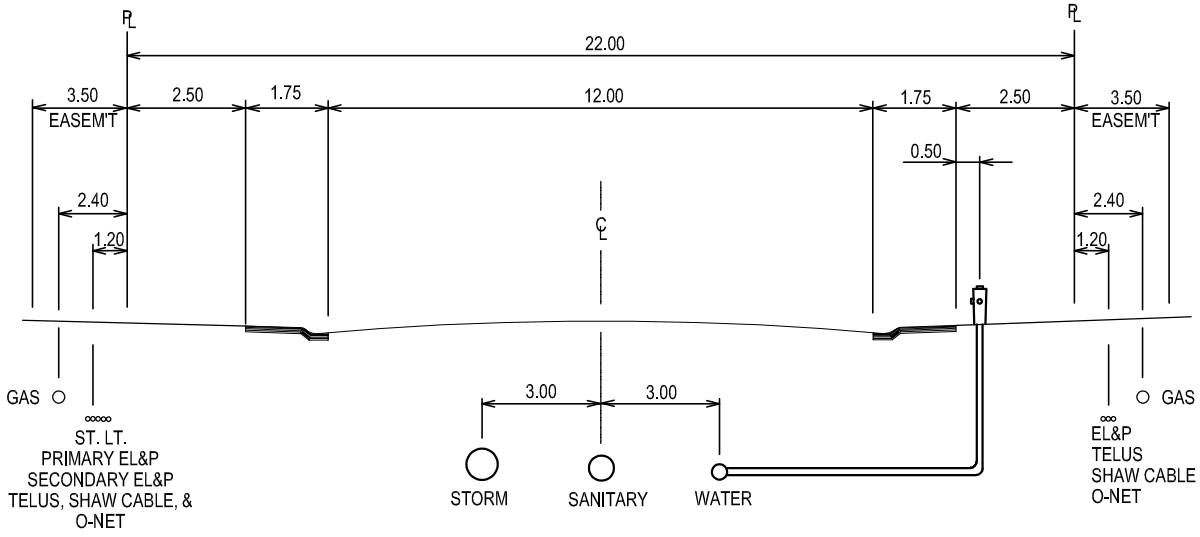
NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINES DRAWINGS SERVICE CONNECTIONS**	APPROVED BY: ENGINEER
DATE: 12-04-2017	**TYPICAL LOT GRADING PLAN REQUIREMENTS**	
SCALE: N.T.S.		DRAWING NO. **4.05**

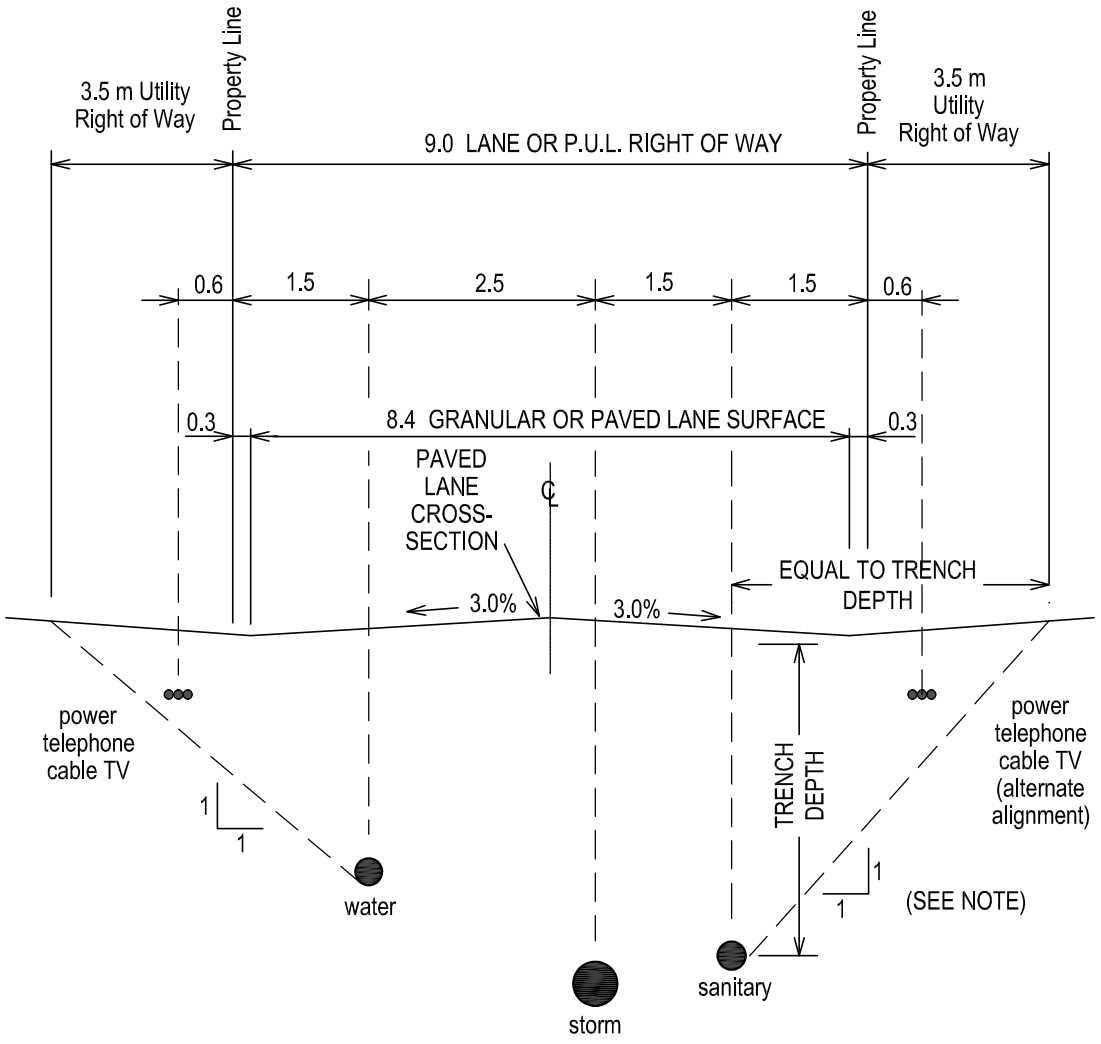


RESIDENTIAL LOCAL ROAD W/LANES OR W/O LANES



RESIDENTIAL COLLECTOR ROAD

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS SERVICE CONNECTIONS	APPROVED BY: ENGINEER
			DATE: 18-04-2017	TYPICAL FRONT SERVICING ALIGNMENTS	
			SCALE: N.T.S.		DRAWING NO. 4.06

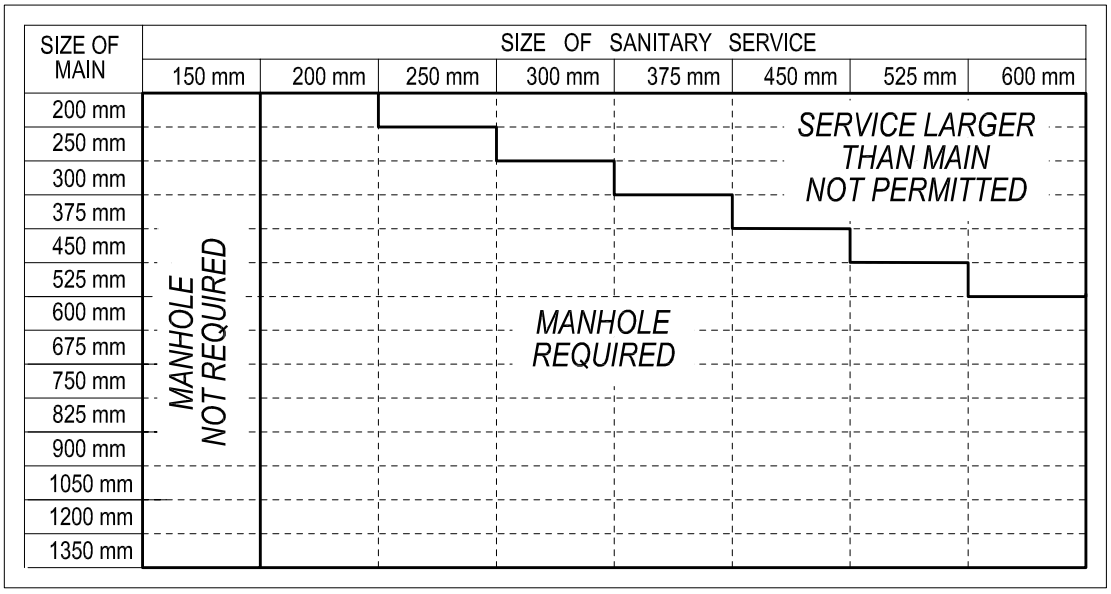


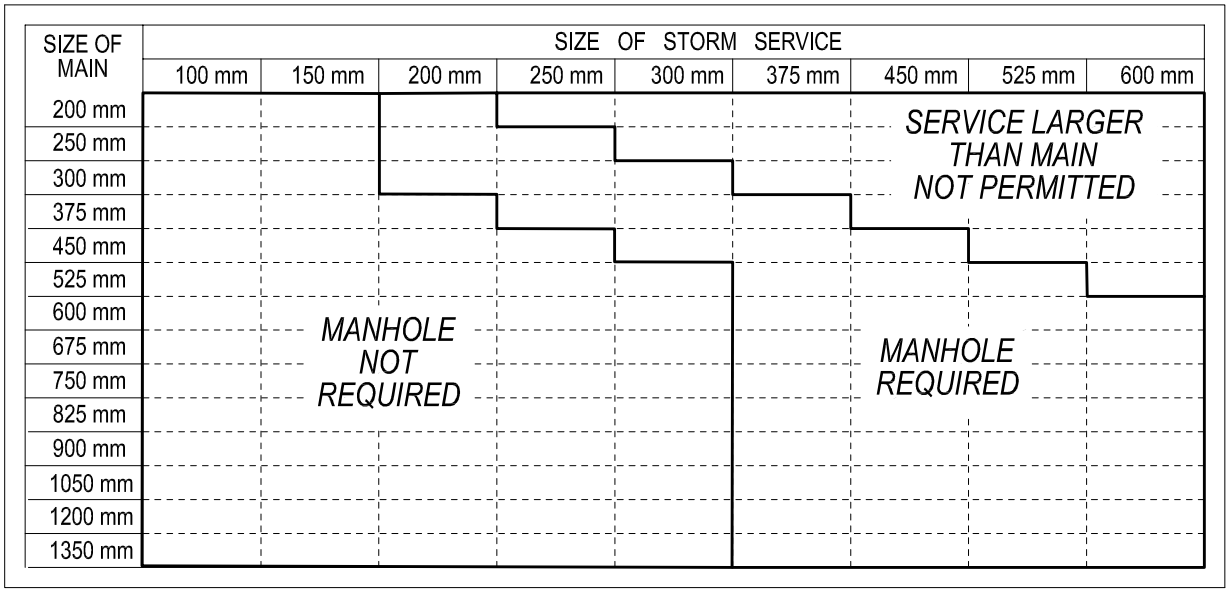
NOTE :

- 1:1 SIDESLOPE SHOWN IS TO BE USED AS A GUIDELINE FOR ESTABLISHING EASEMENT REQUIREMENTS TO PROVIDE A MINIMUM SETBACK FOR EXISTING REAR YARD BUILDINGS (EG. GARAGE, STORAGE SHED).

- ACTUAL TRENCH SIDESLOPES ARE TO BE BASED ON OCCUPATIONAL HEALTH & SAFETY GUIDELINES (SEE SPECIFICATION DRAWING 50 01 01)

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINES DRAWINGS SERVICE CONNECTIONS	APPROVED BY: ENGINEER
			DATE: 18-04-2017	CURRENT LANE / P.U.L. SERVICING ALIGNMENTS	
			SCALE: N.T.S.		DRAWING NO. 4.07





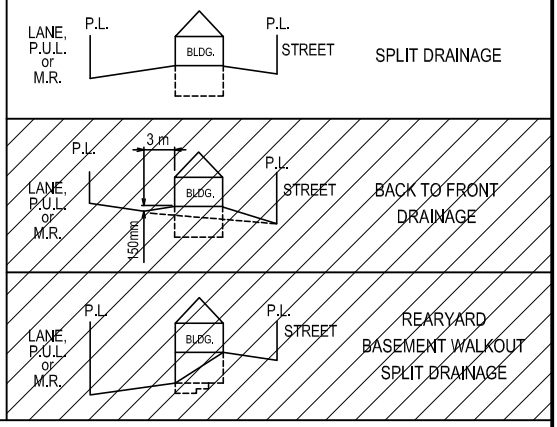
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS SERVICE CONNECTIONS	APPROVED BY: ENGINEER
			DATE: 18-04-2017	SANITARY & STORM MANHOLE REQUIREMENTS FOR SERVICE CONNECTIONS	
			SCALE: N.T.S.		DRAWING NO. 4.08

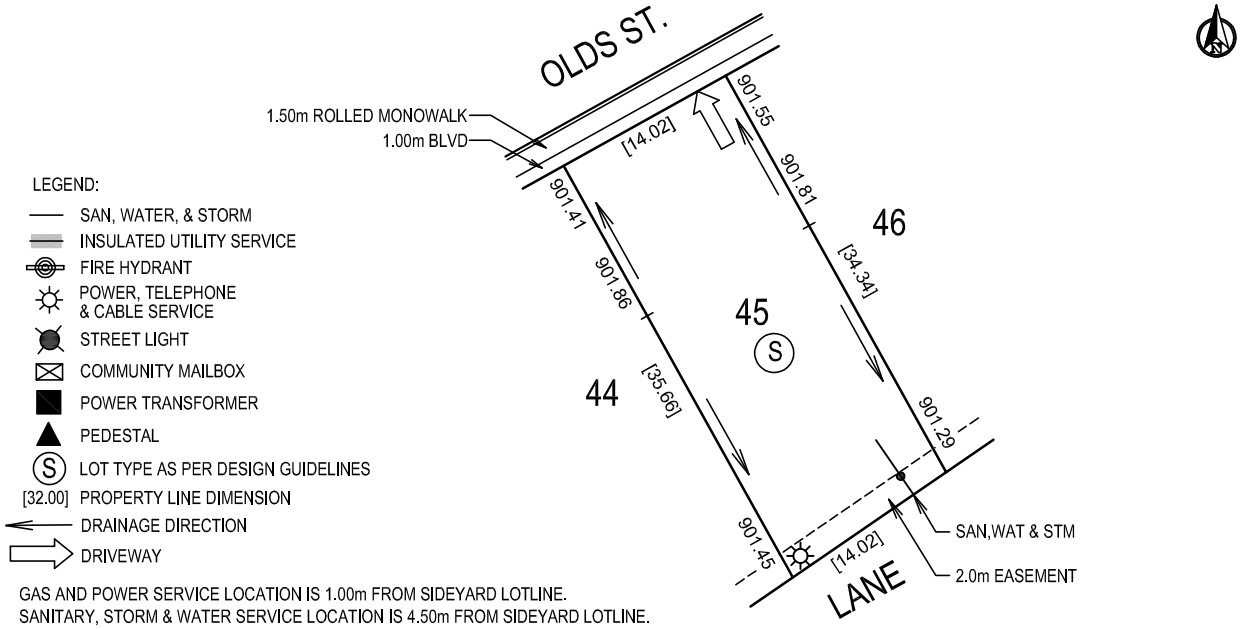
BUILDING GRADE CERTIFICATE

TOWN OF OLDS

Issued by: | No.

1. LOT GRADING IS TO CONFORM TO THE TYPICAL LOT GRADING DETAILS OUTLINED IN THE CITY OF RED DEER DESIGN GUIDELINES.
2. STANDING AT THE WATER SHUTOFF AND FACING THE BUILDING, THE SANITARY SERVICE (PAINTED RED) IS ON THE LEFT SIDE OF THE WATER SERVICE. STORM SERVICE (PAINTED GREEN) IS ON THE RIGHT SIDE OF THE WATER SERVICE.
3. THE BUILDER MUST CONSTRUCT WITHIN 50mm OF THE DESIGN LOT LINE ELEVATIONS & ILLUSTRATED DRAINAGE PATTERNS UNLESS OTHERWISE APPROVED BY THE DEVELOPMENT OFFICER.
4. POSITIVE DRAINAGE IS TO BE MAINTAINED AND SHALL BE DIRECTED TO A PUBLIC RIGHT OF WAY. DRAINAGE SHALL NOT HAVE ANY ADVERSE AFFECT ON ADJACENT PROPERTY OWNERS.
5. WHEN EXCAVATING IN A RIGHT OF WAY (EASEMENT), CHECK FOR UTILITIES.
6. IF THE INFORMATION ON THIS CERTIFICATE HAS BEEN PREPARED BY A PRIVATE DEVELOPER OR THEIR AGENT, THE CITY OF RED DEER ACCEPTS NO RESPONSIBILITY FOR ITS ACCURACY.
7. DIMENSIONS ARE IN METRES.





GAS AND POWER SERVICE LOCATION IS 1.00m FROM SIDEYARD LOTLINE.
SANITARY, STORM & WATER SERVICE LOCATION IS 4.50m FROM SIDEYARD LOTLINE.
PARKING RESTRICTIONS - NONE OR AS NOTED.

TOP OF FOOTING:
MAX. DEPTH BELOW AVERAGE SIDEWALK = 2.29
LOWEST ELEVATION = 899.19

AS-BUILT SEWER INVERT ELEVATIONS:
SANITARY AT 5.0m INSIDE LOT = 898.34
STORM AT 5.0m INSIDE LOT = 898.34

CIVIC ADDRESS: 72 OLDS STREET
LOT: 45 BLOCK: 4 PLAN No.: 972 9999
DEVELOPER: ABC DEVELOPMENTS Ltd. SCALE: 1:500
DRAWN BY: XYZ CONSULTING Ltd. DATE: JUNE 28, 2000
APPROVED BY: _____ DATE: _____

I CERTIFY THAT THE AS-CONSTRUCTED LOT LINE GRADES WILL BE WITHIN 50mm OF THE VALUES STATED ON THIS CERTIFICATE.

OWNER OR REPRESENTATIVE: _____ DATE: _____
(PRINT NAME)

SIGNATURE: _____

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
SERVICE CONNECTIONS

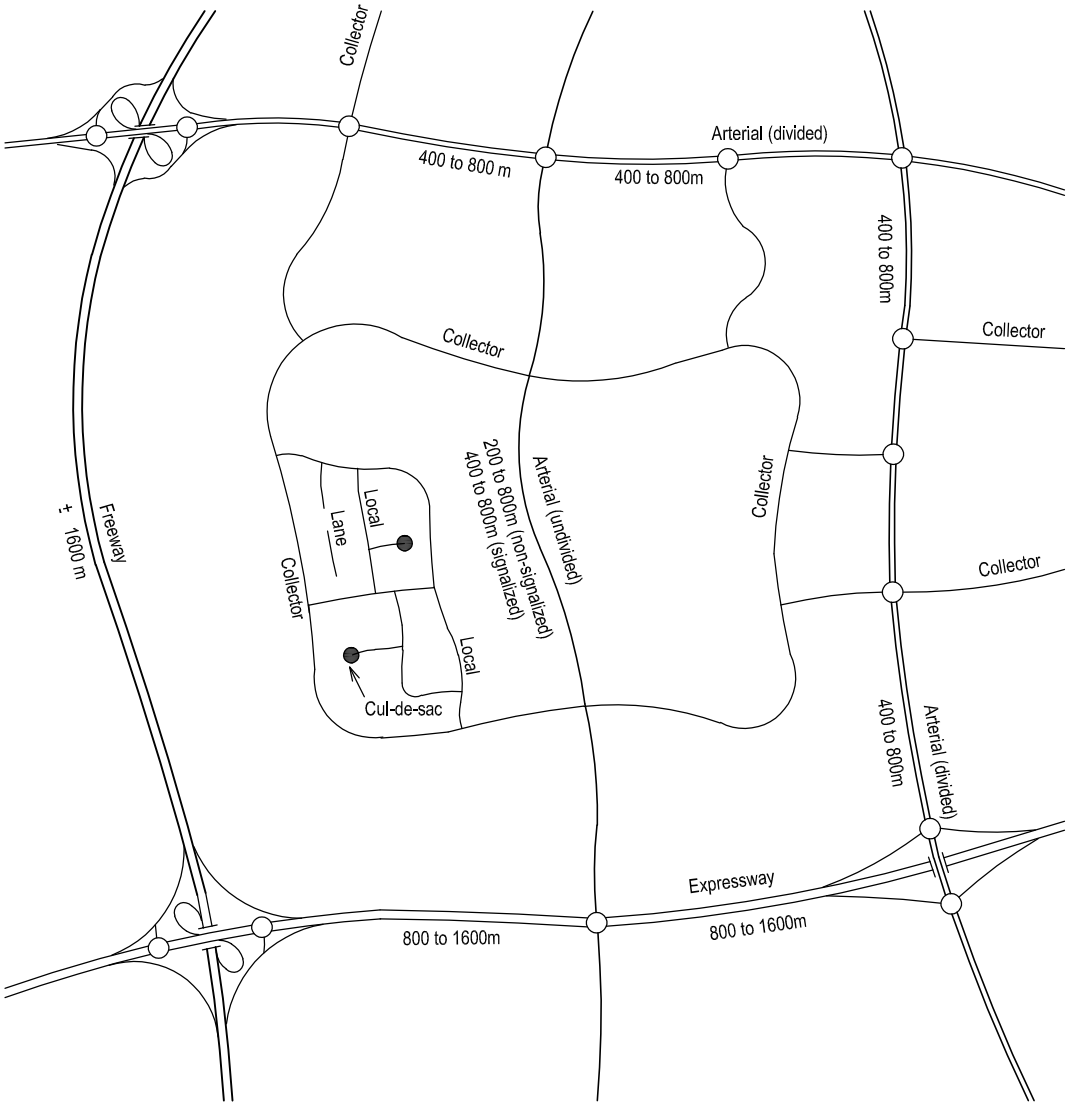
APPROVED BY: _____
ENGINEER

DATE: 18-04-2017

SAMPLE RESIDENTIAL BUILDING GRADE CERTIFICATE

SCALE: N.T.S.

DRAWING NO. **4.09**



LEGEND

- FREEWAY
- EXPRESSWAY
- ARTERIAL
- COLLECTOR
- LOCAL
- PUBLIC LANE
- SIGNALIZED INTERSECTION
- CUL-DE-SAC

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINES DRAWINGS
ROADWAY DESIGN

APPROVED BY:

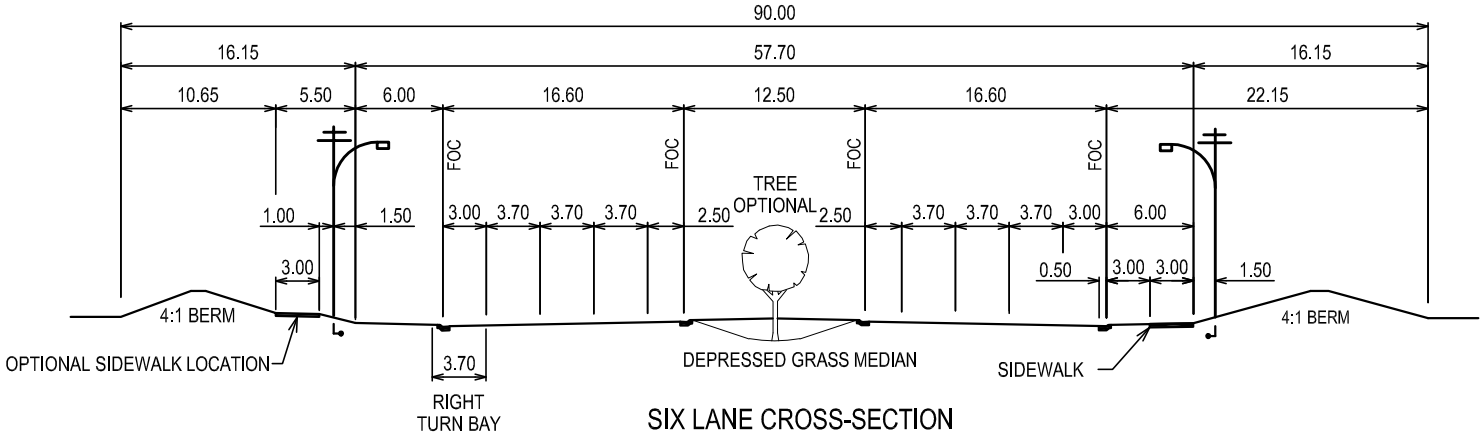
ENGINEER

DATE: 18-04-2017

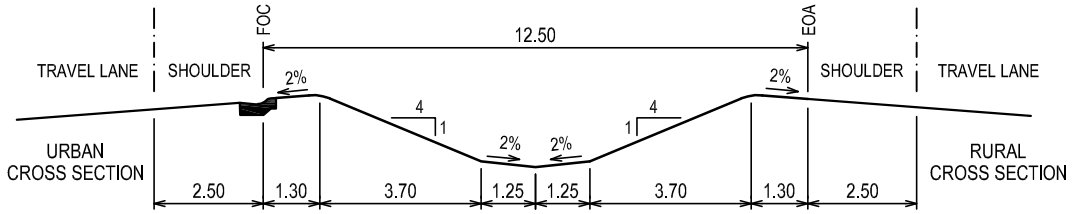
SCALE: N.T.S.

RELATIONSHIP OF STREET CLASSIFICATIONS

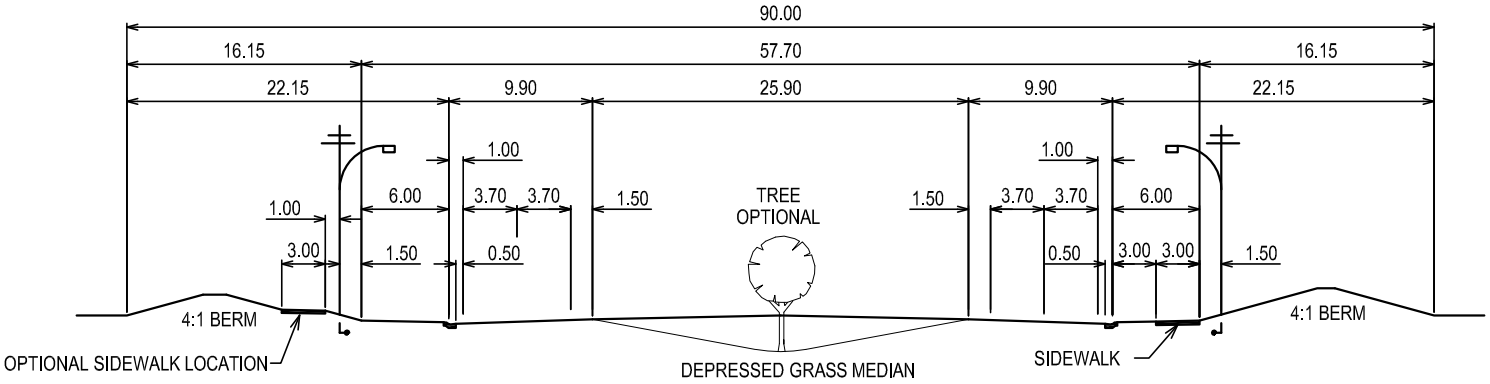
DRAWING NO. **5.01**



SIX LANE CROSS-SECTION



DEPRESSED GRASS MEDIAN



FOUR LANE INTERIM CROSS-SECTION

NO.	DATE	REVISION
1		

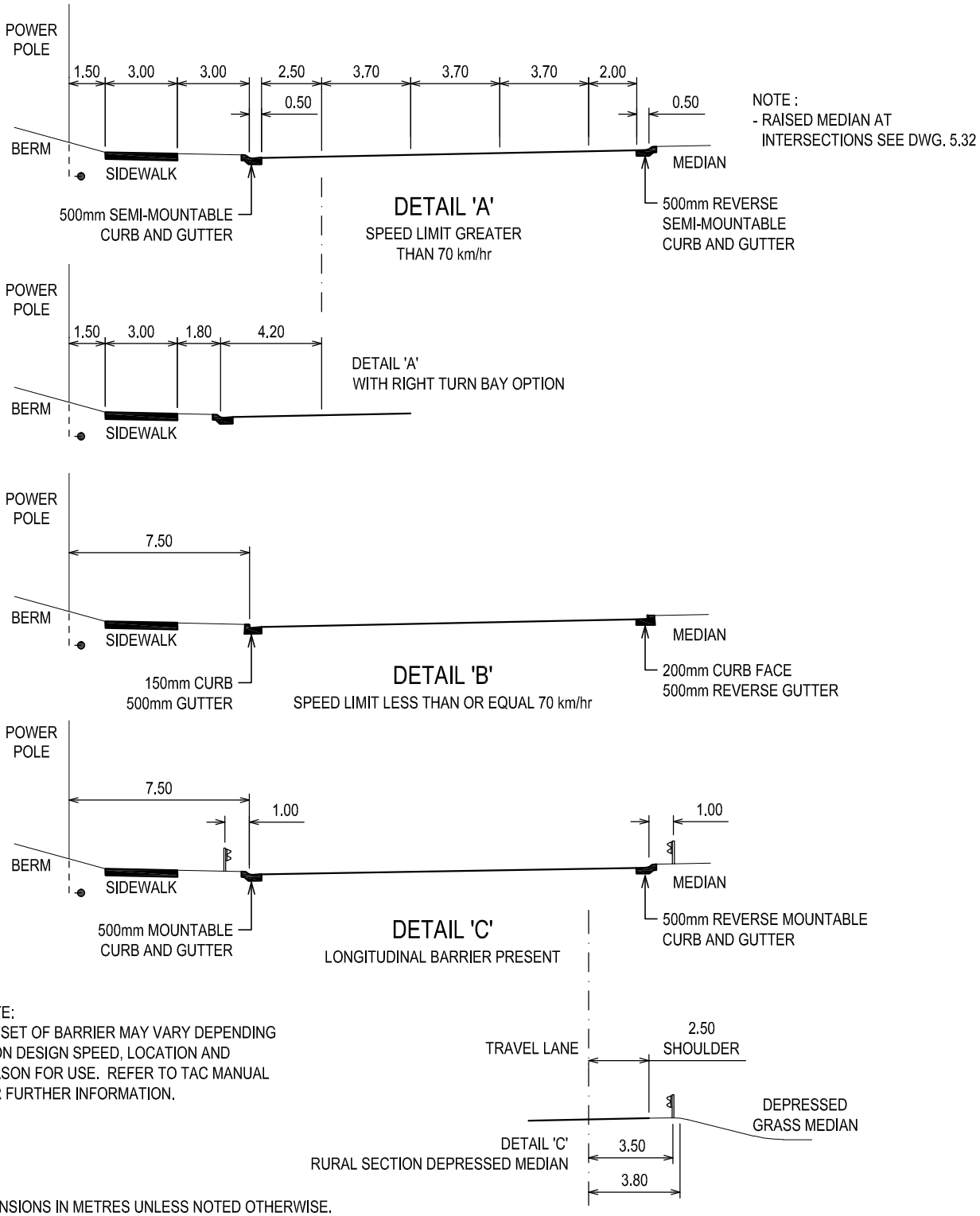
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

EXPRESSWAY
(UNDER REVIEW)

DRAWN BY: B.M
DATE: 18-04-2017
SCALE: N.T.S.

APPROVED BY:
ENGINEER
DRAWING NO. 5.02A

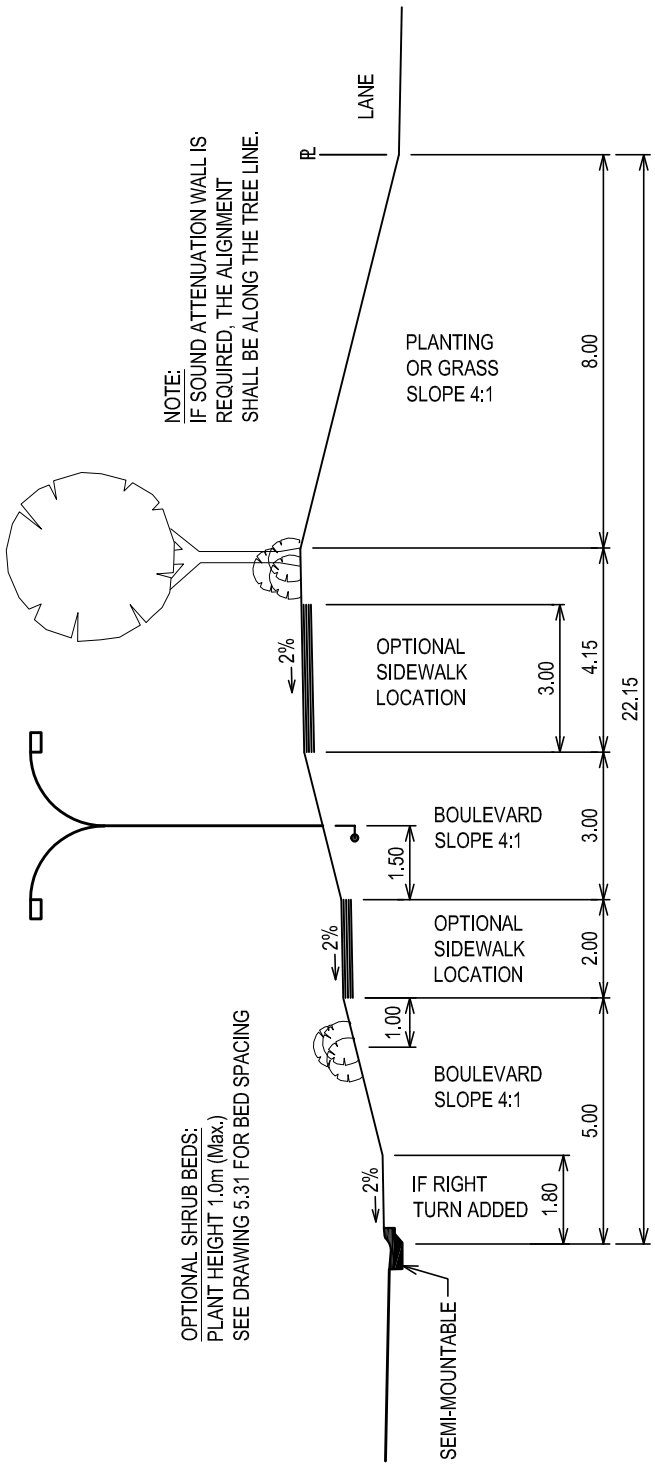


DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

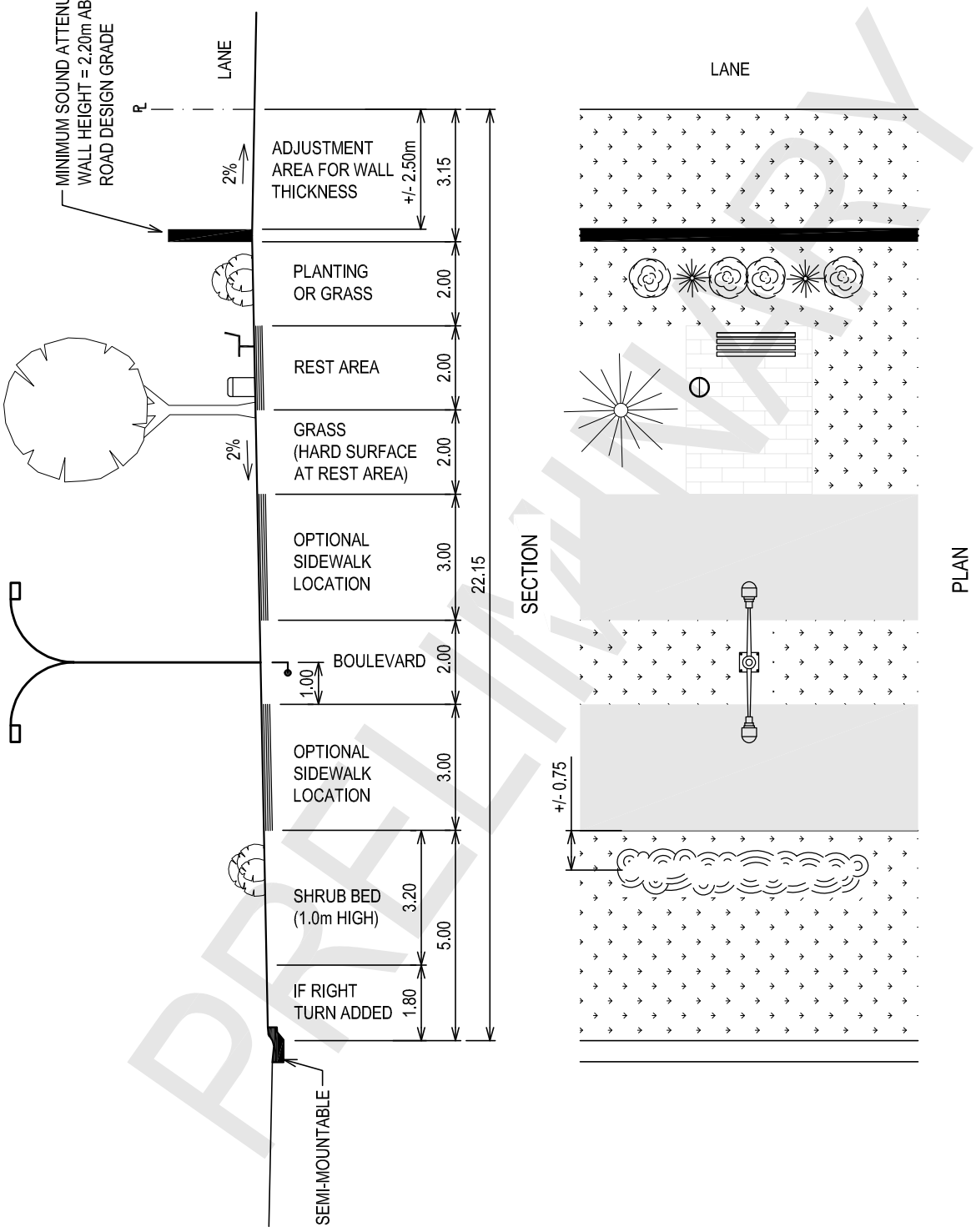
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 18-04-2017	**EXPRESSWAY DETAILS (UNDER REVIEW)**	
SCALE: N.T.S.		DRAWING NO. **5.02B**



NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY:
DATE: 18-04-2017	**EXPRESSWAY BOULEVARD OPTION - BERM**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **5.02C**



NO.	DATE	REVISION
1		

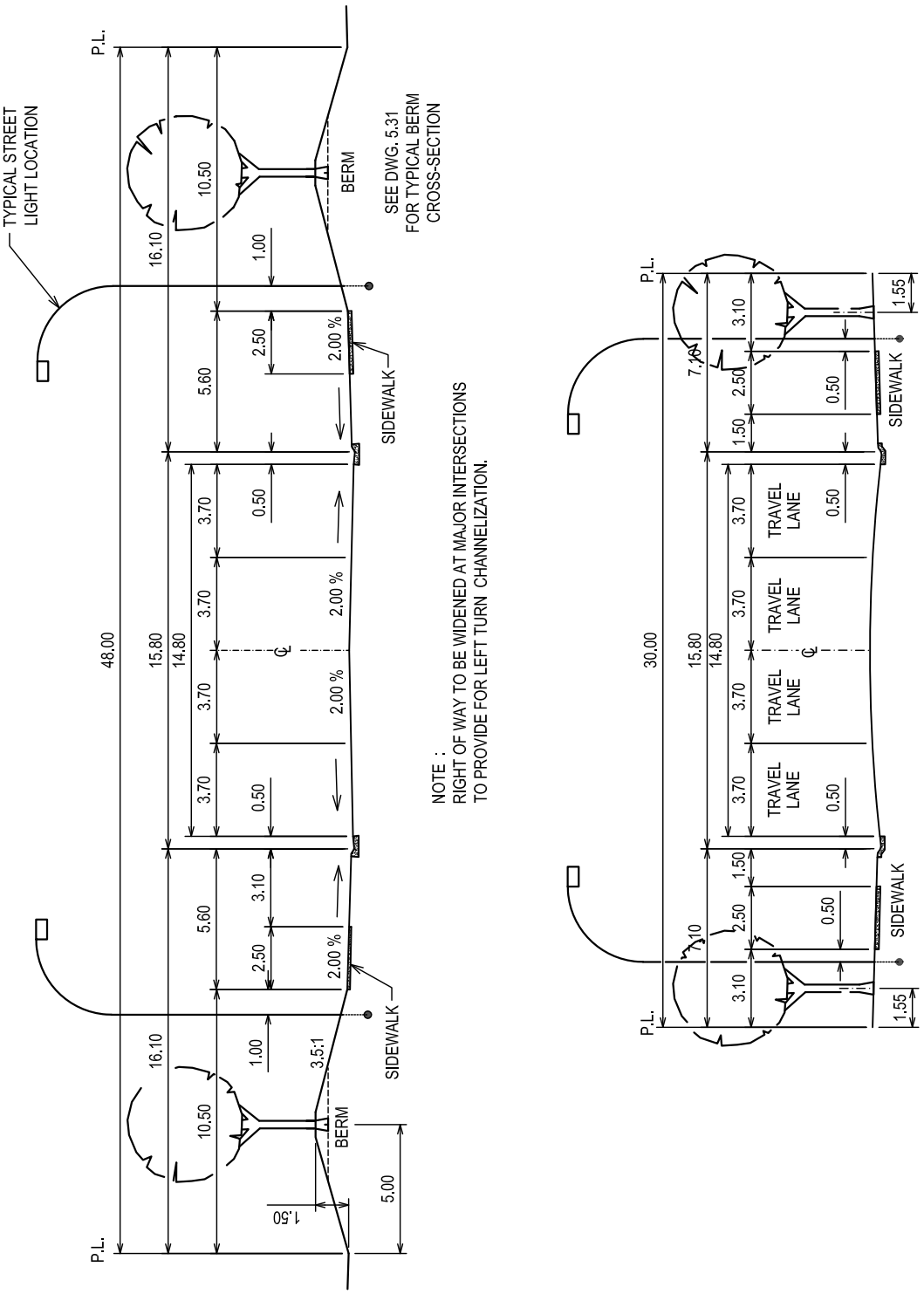
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 18-04-2017	**EXPRESSWAY BOULEVARD OPTION SOUND ATTENUATION WALL**	
SCALE: N.T.S.		DRAWING NO. **5.02D**

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

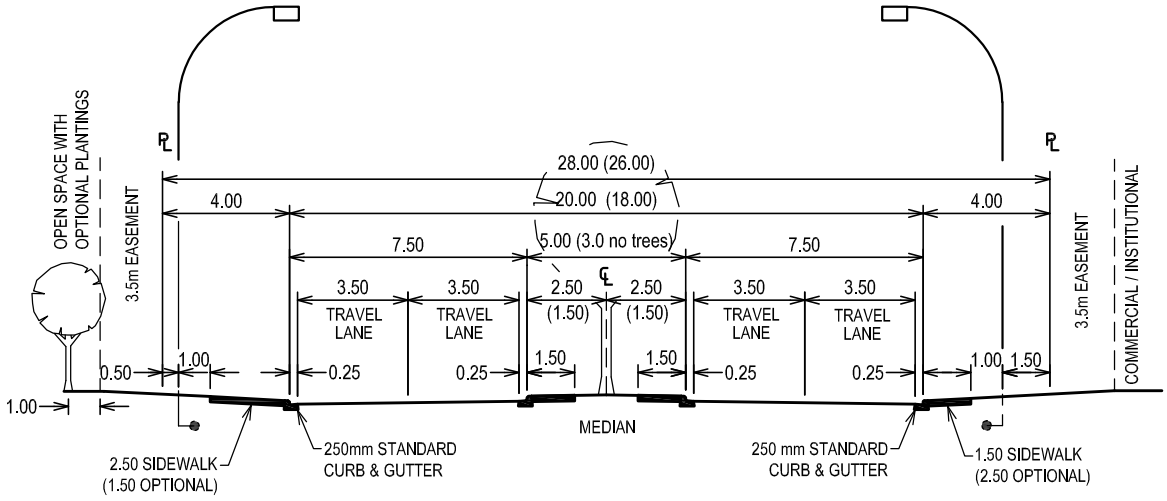
DRAWN BY: B.M	**ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**DIVIDED ARTERIAL ROADWAY**	
SCALE: N.T.S.		DRAWING NO. **5.03**



NO.	DATE	REVISION
1		

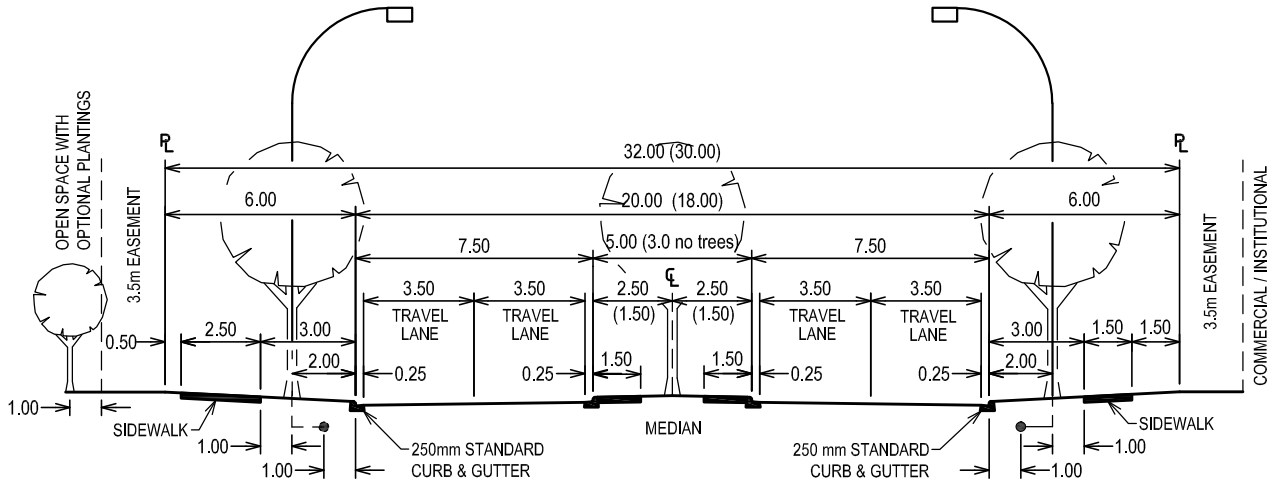
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**UNDIVIDED ARTERIAL ROADWAY**	
SCALE: N.T.S.		DRAWING NO. **5.04**



CONTROLLED ACCESS

LOTS (RESIDENTIAL, M.R., COMMERCIAL, INSTITUTIONAL) ADJACENT TO DIVIDED ROADWAYS SHALL NOT BE PERMITTED VEHICULAR ACCESS TO THE DIVIDED ROADWAY.



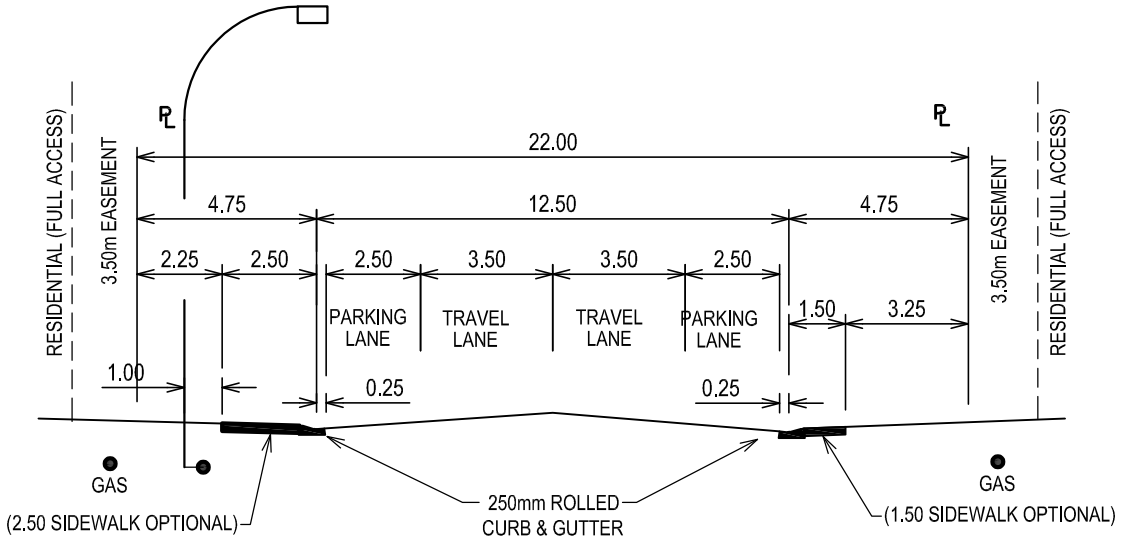
CONTROLLED ACCESS

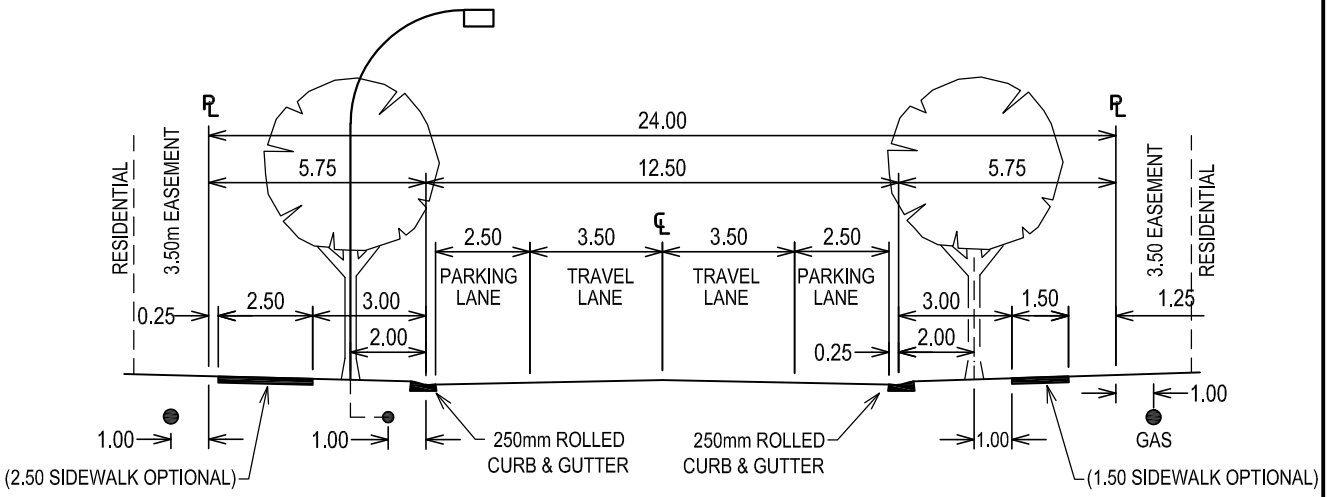
LOTS (RESIDENTIAL, M.R., COMMERCIAL, INSTITUTIONAL) ADJACENT TO DIVIDED ROADWAYS SHALL NOT BE PERMITTED VEHICULAR ACCESS TO THE DIVIDED ROADWAY.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY:
DATE: 19-04-2017	**RESIDENTIAL DIVIDED COLLECTOR ROADWAY**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **5.05**





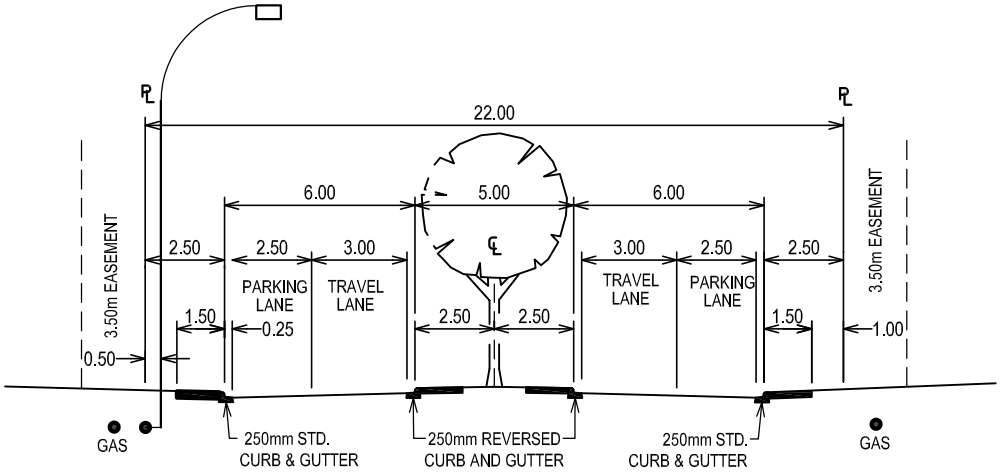
NOTE:

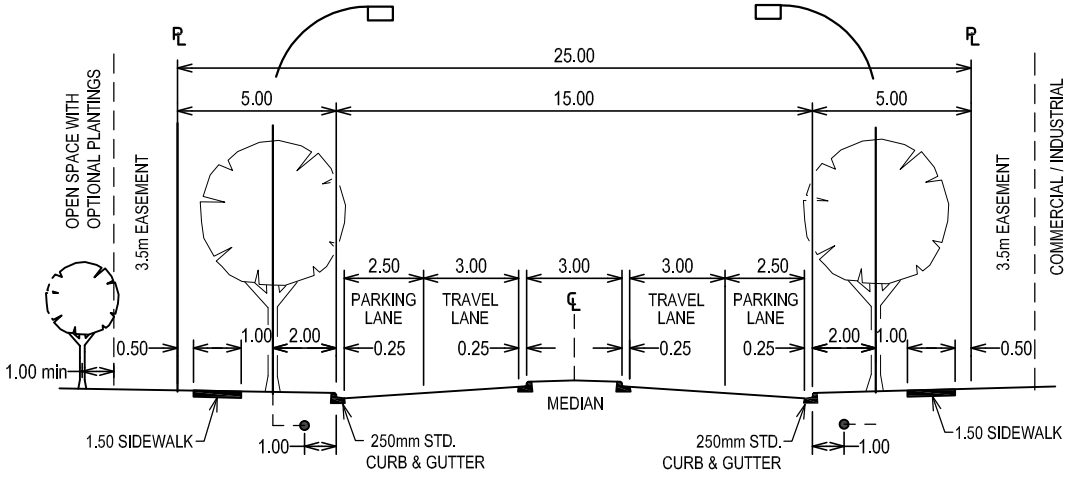
-WHERE ACCESS IS RESTRICTED OR NO FRONT DRIVEWAYS ALLOWED, STANDARD CURB & GUTTER IS REQUIRED

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**RESIDENTIAL UNDIVIDED COLLECTOR ROADWAY**	
SCALE: N.T.S.		DRAWING NO. **5.06**





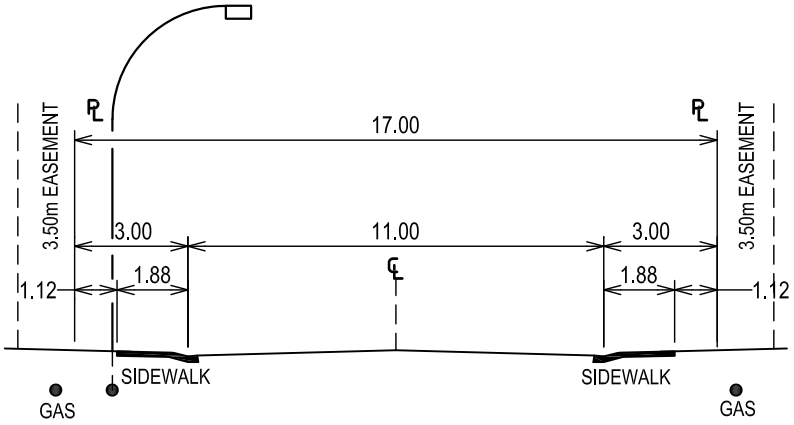
CONTROLLED ACCESS

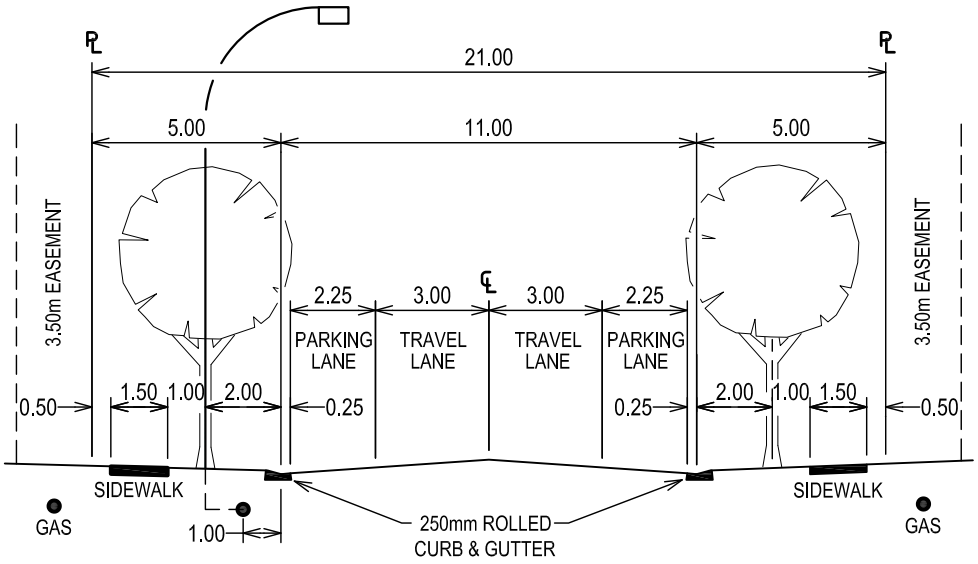
LOTS (RESIDENTIAL, M.R., COMMERCIAL, INSTITUTIONAL) ADJACENT TO DIVIDED ROADWAYS SHALL NOT BE PERMITTED VEHICULAR ACCESS TO THE DIVIDED ROADWAY.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**RESIDENTIAL DIVIDED LOCAL ROADWAY**	
SCALE: N.T.S.		DRAWING NO. **5.07**

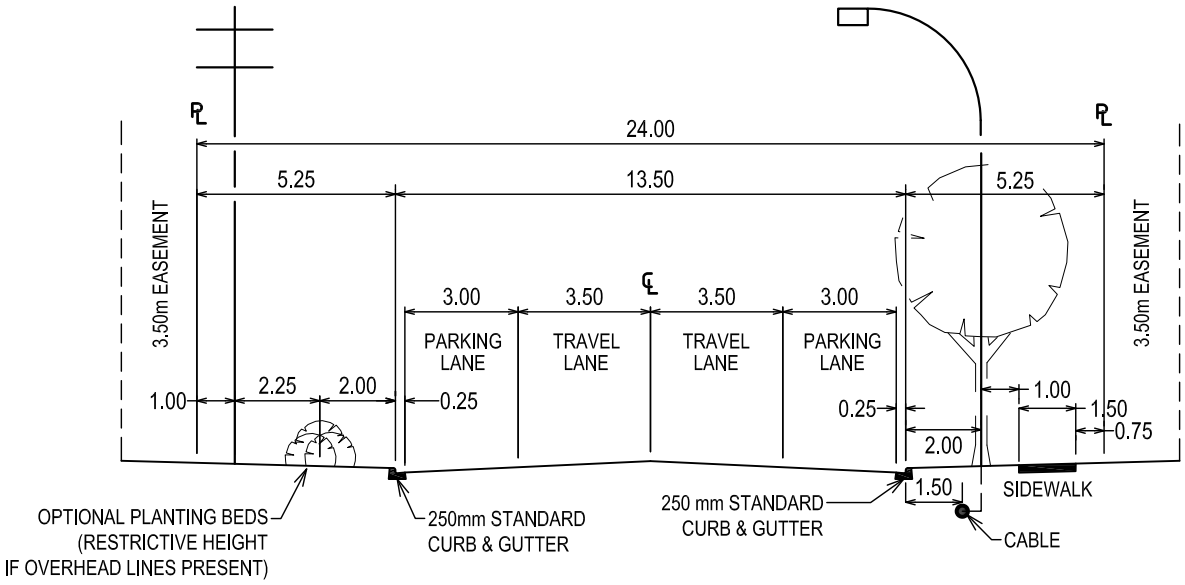




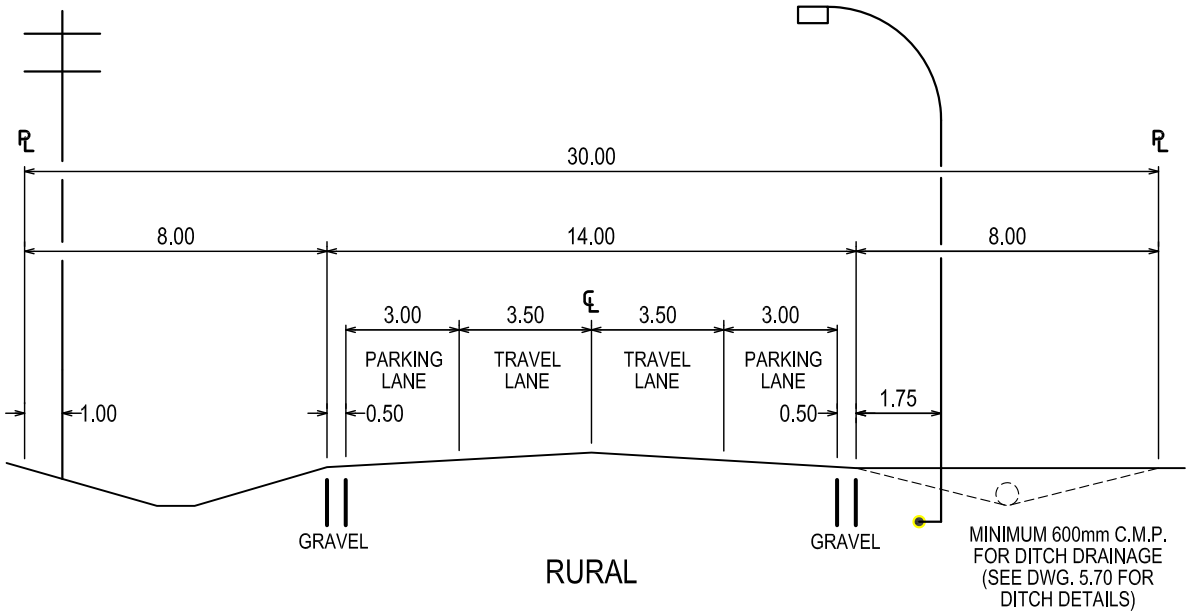
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY:
DATE: 19-04-2017	**11m LOCAL ROADWAY**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **5.08**



URBAN

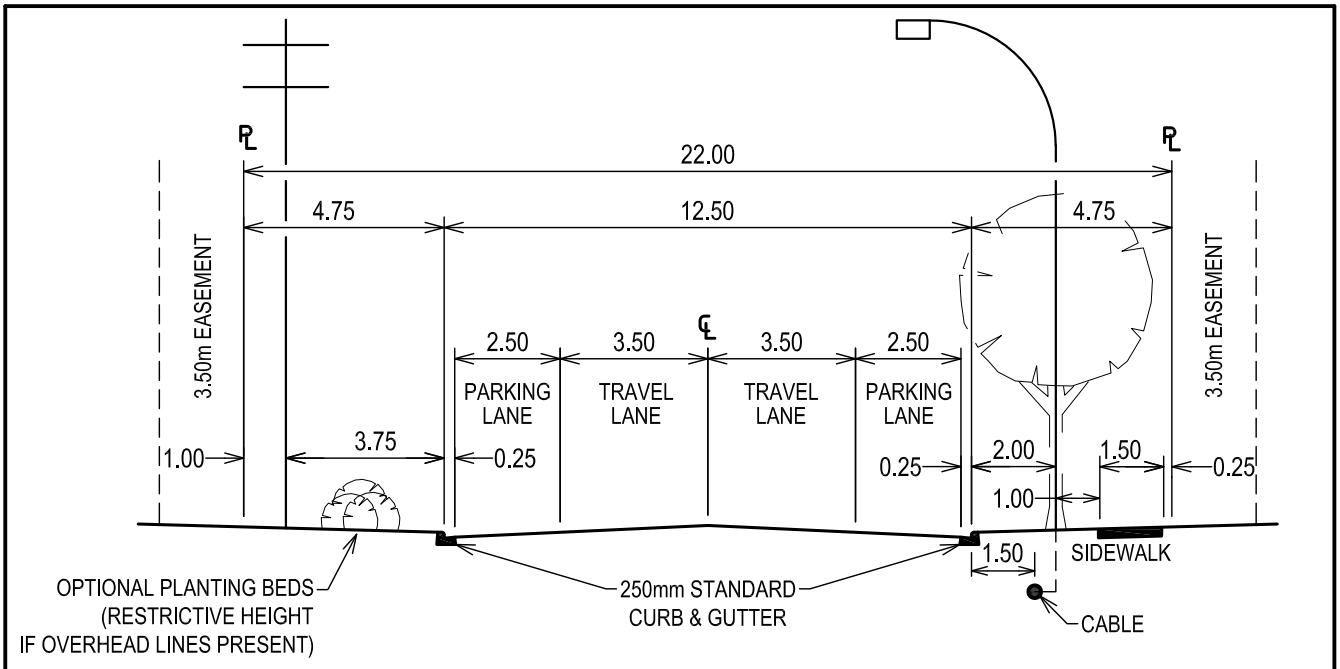


RURAL

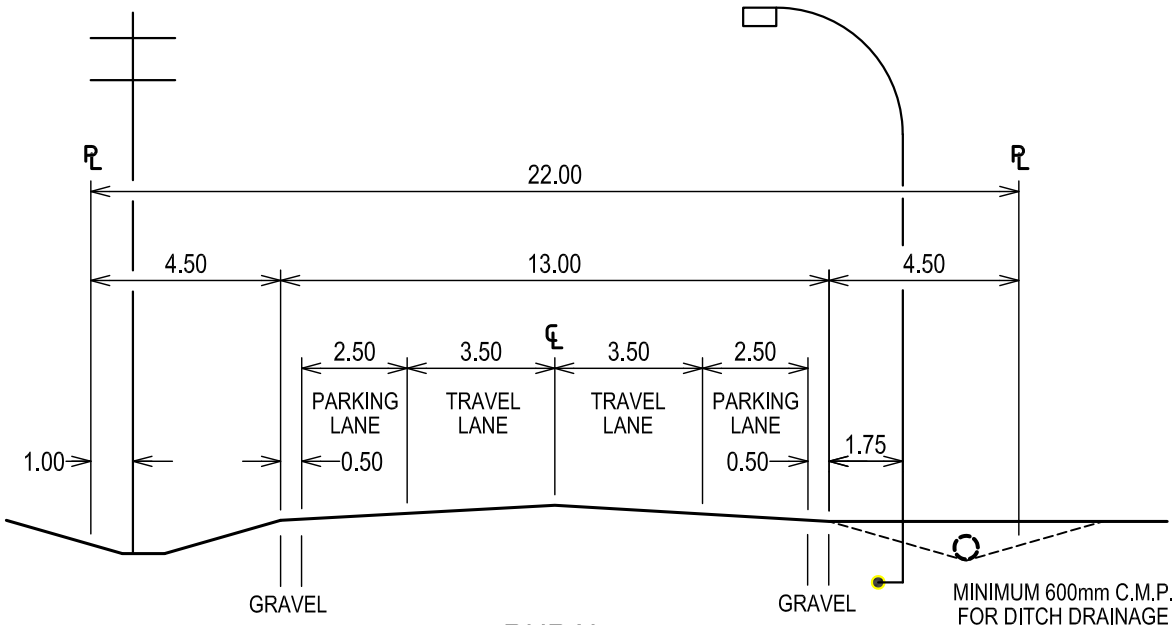
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**INDUSTRIAL COLLECTOR ROADWAY**	
SCALE: N.T.S.		DRAWING NO. **5.09**



URBAN

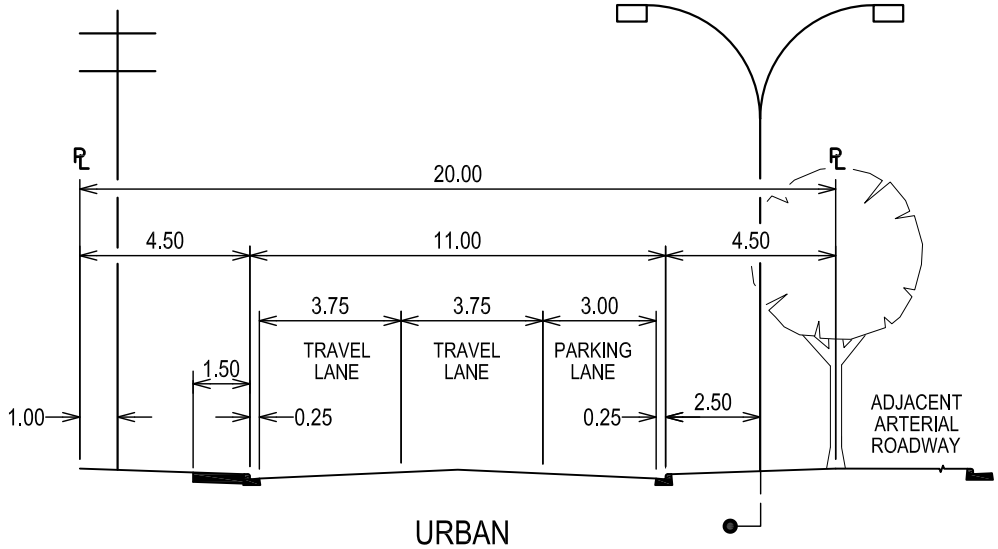


RURAL

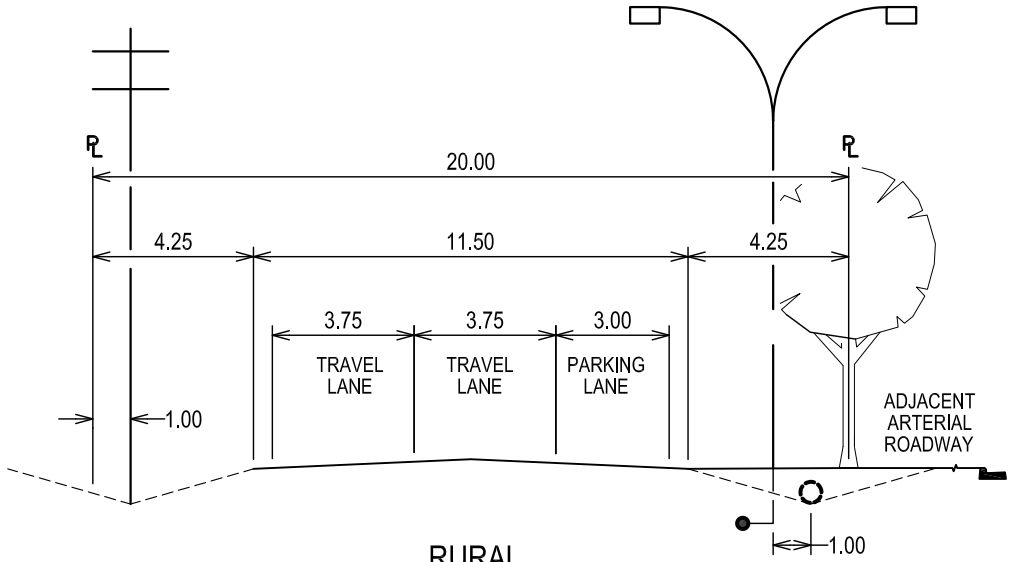
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**INDUSTRIAL LOCAL ROADWAY**	
SCALE: N.T.S.		DRAWING NO. **5.10**



URBAN
SERVICE ROAD

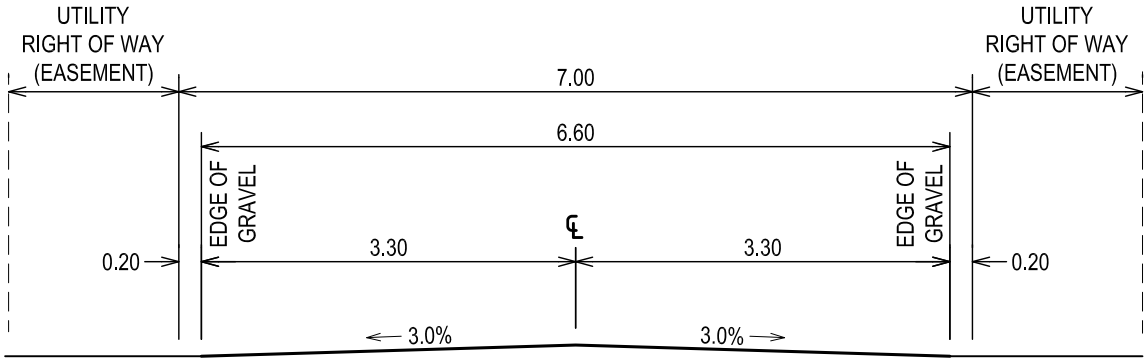


RURAL
SERVICE ROAD

NO.	DATE	REVISION
1		

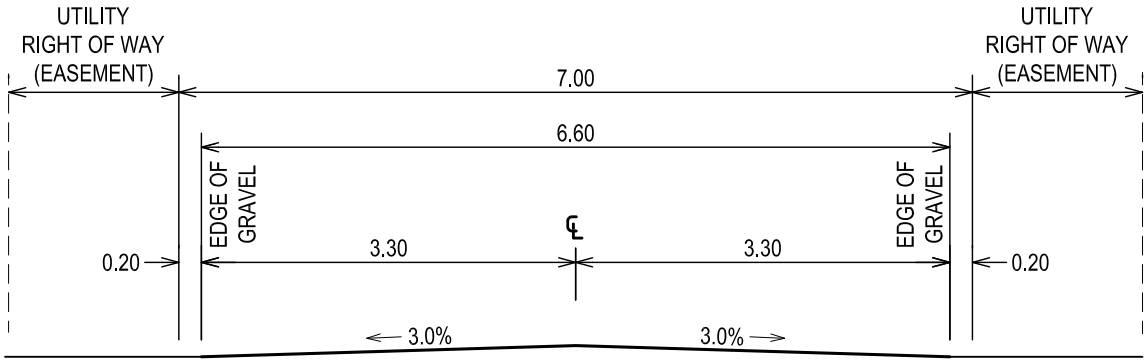
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**SERVICE ROAD ADJACENT TO ARTERIAL ROADWAY**	
SCALE: N.T.S.		DRAWING NO. **5.11**



PAVED LANEWAY

NOTE:
CONSTRUCT A 10.0m ASPHALT SECTION AT THE INTERSECTION OF THE LANEWAY TO A ROADWAY.
(REFER TO CONTRACT SPECIFICATION 50 05 11).



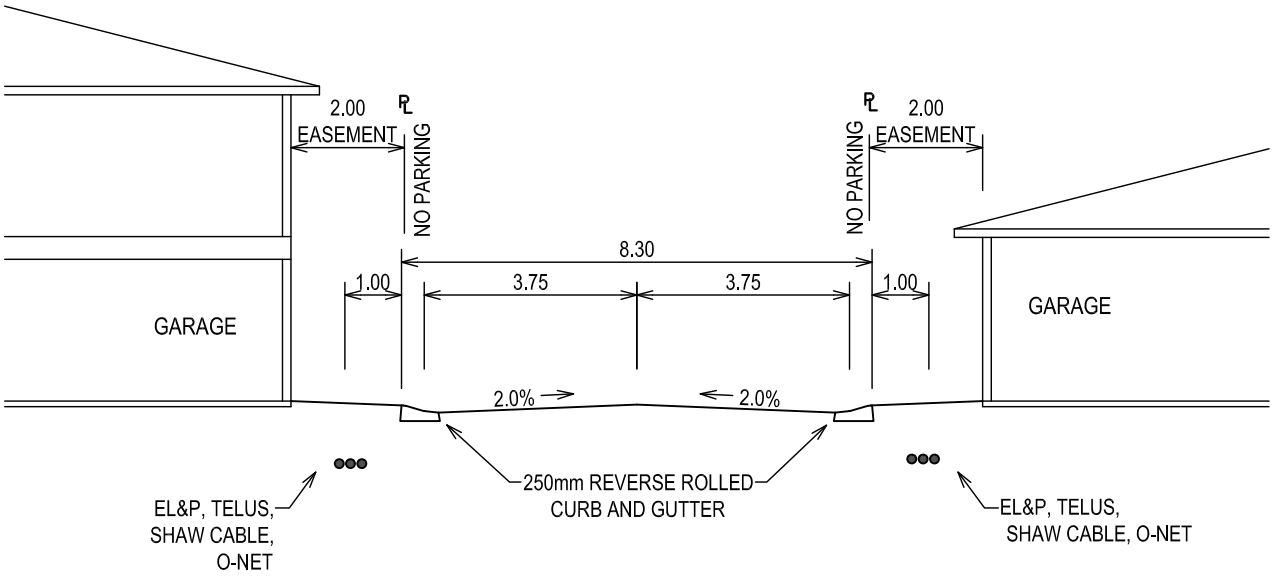
PAVED LANEWAY

NOTE:
- MINIMUM 2.0m WIDE EASEMENT REQUIRED ON BOTH SIDES OF LANEWAY FOR REAR SERVICING.
- LANEWAY TO BE PAVED ADJACENT TO MULTI-FAMILY AND COMMERCIAL DEVELOPMENT WHERE LANEWAY ACCESS IS PROVIDED.
- LANEWAY RIGHT-OF-WAY WIDTH MAY VARY IN ESTABLISHED SUBDIVISION, CROSS-SECTIONAL DIMENSIONS TO BE ADJUSTED ACCORDINGLY.
- LANEWAY TO BE PAVED IN 2 MATS.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**PAVED LANEWAYS**	
SCALE: N.T.S.		DRAWING NO. **5.12**



NOTES:
- RESTRICTIONS ON THE NUMBER OF LOTS SERVICED OFF ACCESS LANE MAY BE IMPLEMENTED.
-100mm ASPHALT IF LOTS **NOT** SERVICED BY DEEP UTILITIES IN PRIMARY ACCESS LANE.
-100mm ASPHALT IF LOTS ARE SERVICED BY DEEP UTILITIES IN PRIMARY ACCESS LANE.

NO.	DATE	REVISION
1		

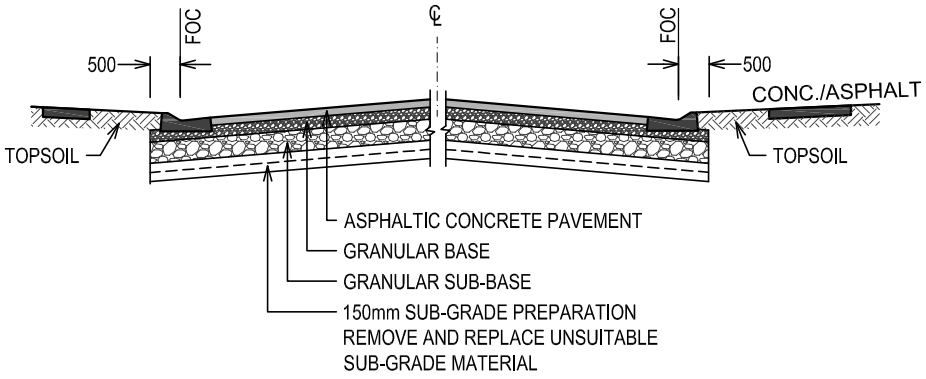
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**PRIMARY ACCESS LANE**	
SCALE: N.T.S.		DRAWING NO. **5.13**

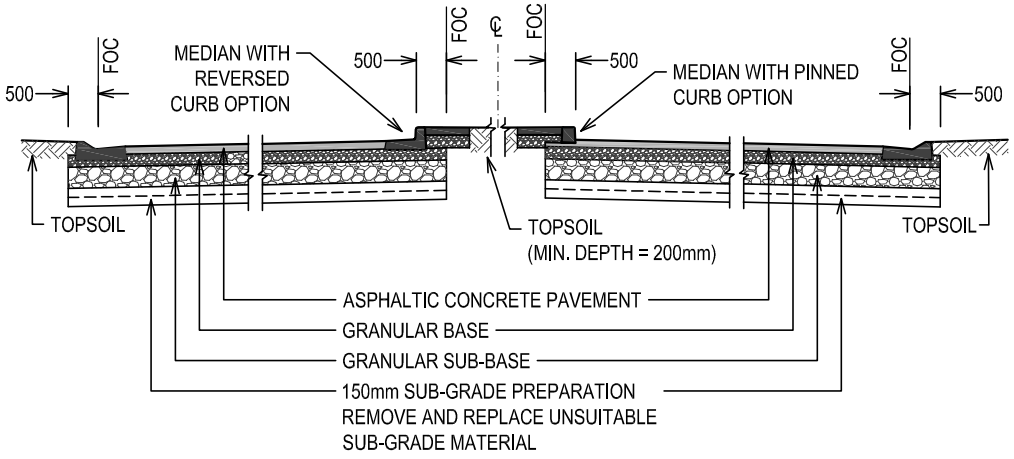
DRAWING NUMBERS

5.14 TO 5.19

INTENTIONALLY OMITTED



UNDIVIDED ROADWAY



DIVIDED ROADWAY

MINIMUM DESIGN PAVEMENT STRUCTURE				
ROAD CLASSIFICATION	ASPHALTIC CONCRETE PAVEMENT (mm)	GRANULAR BASE (mm)	GRANULAR SUB-BASE (mm)	TOTAL DEPTH (mm)
ARTERIAL AND EXPRESSWAY	150	150	400	700

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

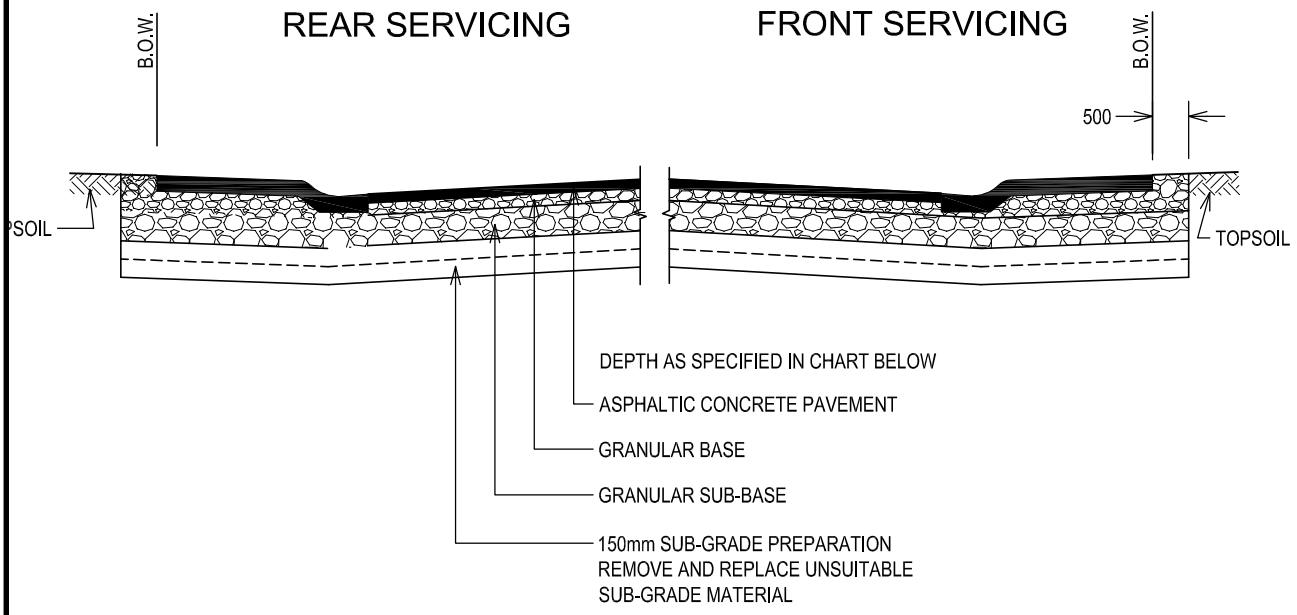
ENGINEER

DATE: 19-04-2017

SCALE: N.T.S.

ARTERIAL ROADWAY PAVEMENT STRUCTURE

DRAWING NO. **5.20**



MINIMUM DESIGN PAVEMENT STRUCTURE				
ROAD CLASSIFICATION	ASPHALTIC CONCRETE PAVEMENT (mm)	GRANULAR BASE (mm)	GRANULAR SUB-BASE (mm)	TOTAL DEPTH (mm)
RESIDENTIAL LOCAL	100	150	250	500
FRONT SERVICED RESIDENTIAL LOCAL	100	150	250	500
RESIDENTIAL COLLECTOR	150	150	350	650

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

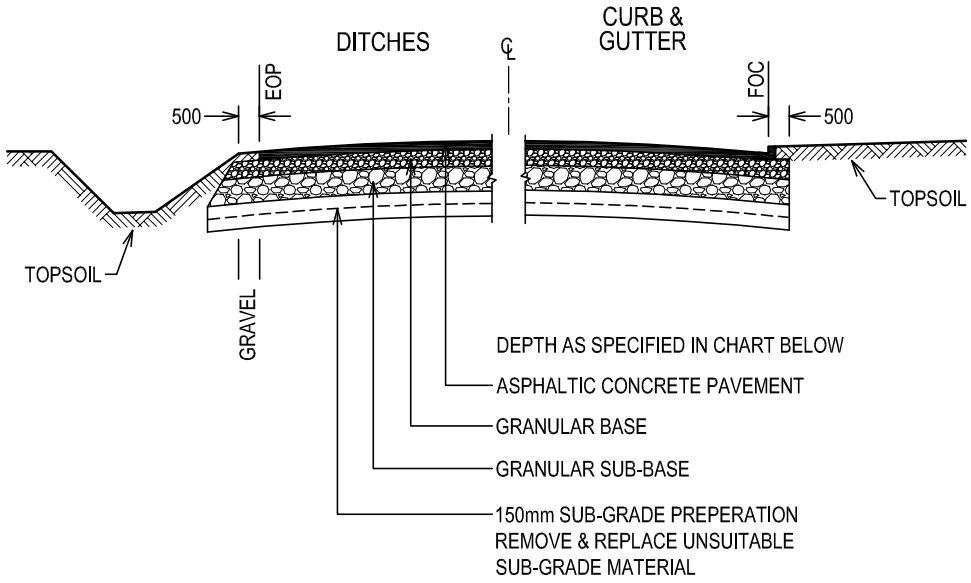
ENGINEER

DATE: 19-04-2017

SCALE: N.T.S.

RESIDENTIAL ROADWAY PAVEMENT STRUCTURE LOCAL AND COLLECTOR

DRAWING NO. 5.21



DESIGN PAVEMENT STRUCTURE				
ROAD CLASSIFICATION	ASPHALTIC CONCRETE PAVEMENT (mm)	GRANULAR BASE (mm)	GRANULAR SUB-BASE (mm)	TOTAL DEPTH (mm)
INDUSTRIAL LOCAL	150	150	300	600
INDUSTRIAL COLLECTOR	150	150	350	650

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

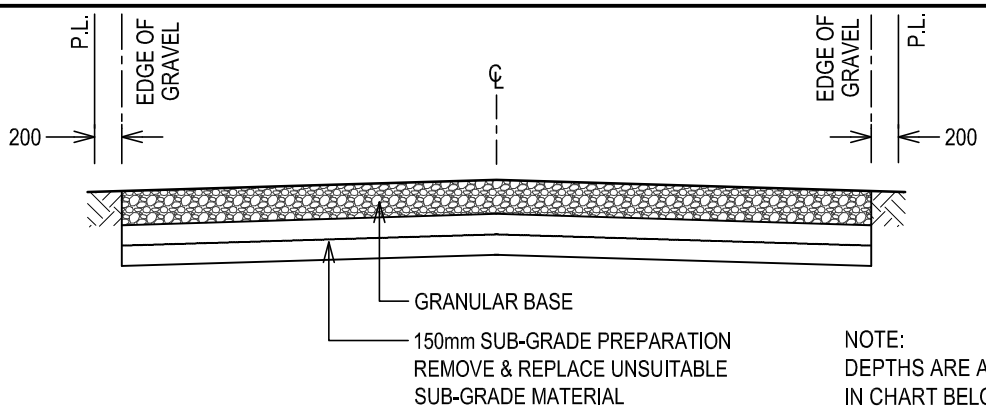
ENGINEER

DATE: 19-04-2017

SCALE: N.T.S.

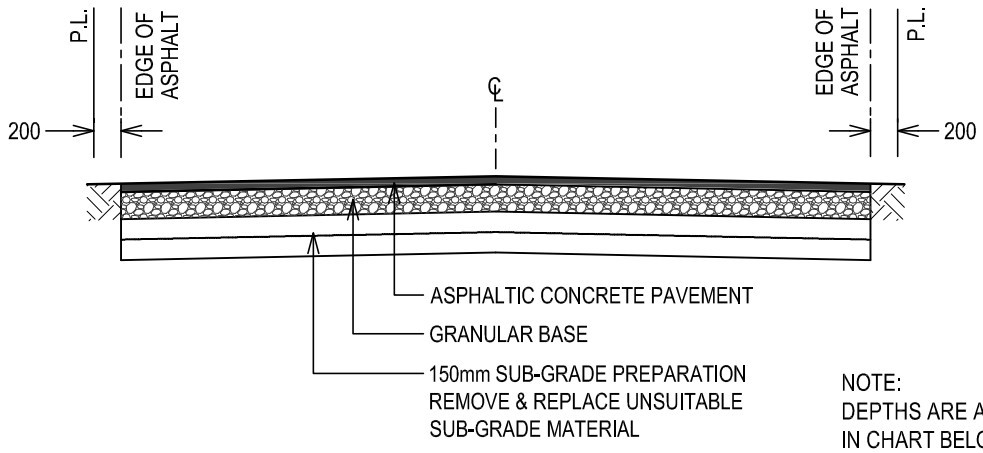
INDUSTRIAL ROADWAY PAVEMENT STRUCTURE LOCAL AND COLLECTOR

DRAWING NO. **5.22**



NOTE:
DEPTHS ARE AS SPECIFIED IN CHART BELOW.
GRAVEL LANES ARE NOT PERMITTED IN NEW DEVELOPMENT.

GRAVEL LANE



NOTE:
DEPTHS ARE AS SPECIFIED IN CHART BELOW

PAVED LANE

DESIGN PAVEMENT STRUCTURE				
ROAD CLASSIFICATION	ASPHALTIC CONCRETE PAVEMENT (mm)	GRANULAR BASE (mm)	GRANULAR SUB-BASE (mm)	TOTAL DEPTH (mm)
RESIDENTIAL GRAVEL LANES	--	300	--	300
RESIDENTIAL PAVED LANES	100	150	250	500
FRONT SERVICED RESIDENTIAL PRIMARY ACCESS PAVED LANE	100	150	150	400
REAR SERVICED RESIDENTIAL PRIMARY ACCESS PAVED LANE	100	150	150	400
COMM. / IND. GRAVEL LANES	--	300	–	300
COMM. / IND. PAVED LANES	100	150	150	400

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

ENGINEER

DATE: 19-04-2017

SCALE: N.T.S.

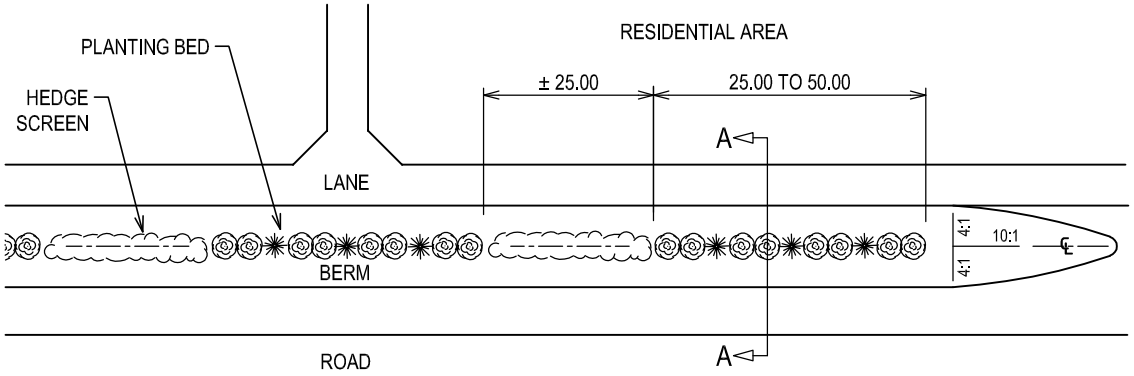
GRAVEL / PAVED LANE PAVEMENT STRUCTURE

DRAWING NO. **5.23**

DRAWING NUMBERS

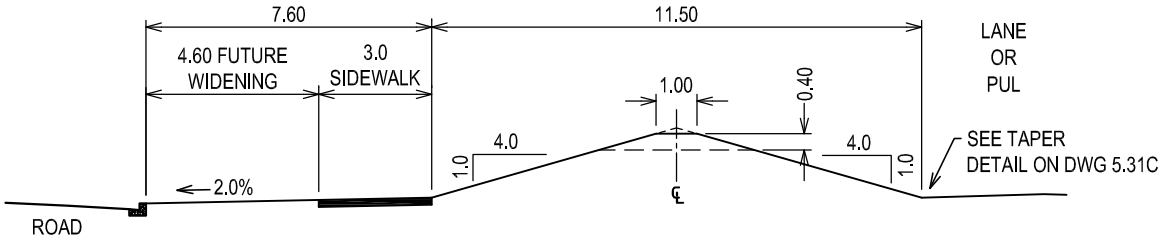
5.24 TO 5.30

INTENTIONALLY OMITTED

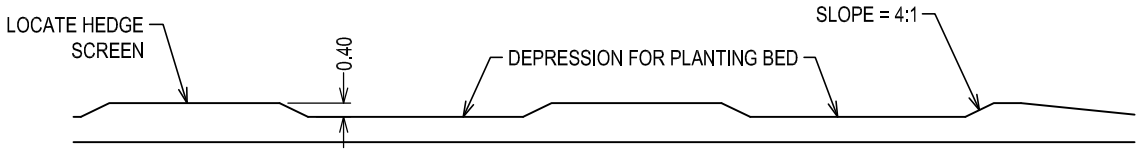


BERM PLAN VIEW

NOTE :
SEE DWG. 5.31B FOR BERM DETAIL
LOCATED ADJACENT TO COMMERCIAL SITES



CROSS SECTION A-A

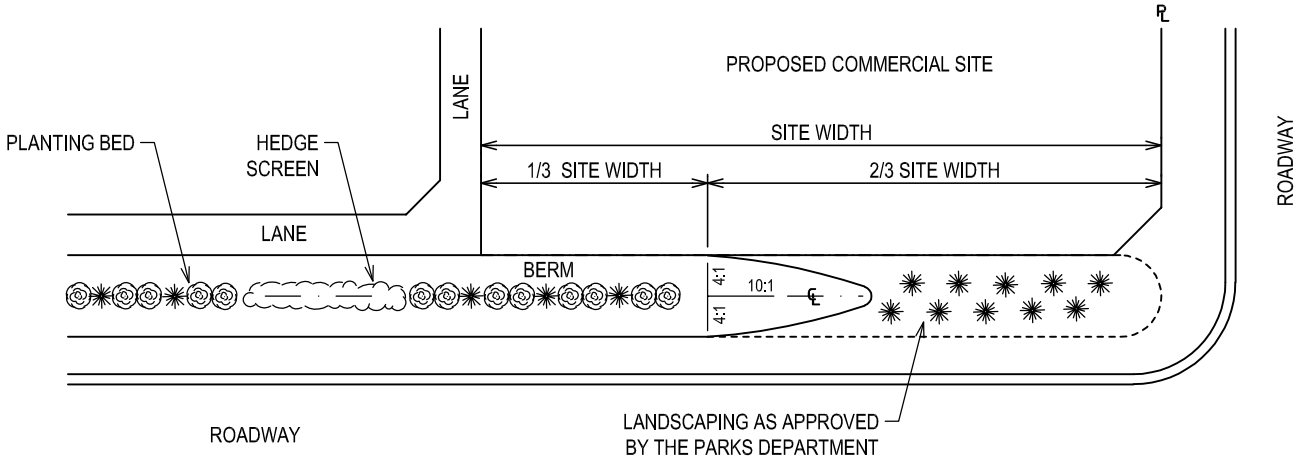


BERM ELEVATED VIEW

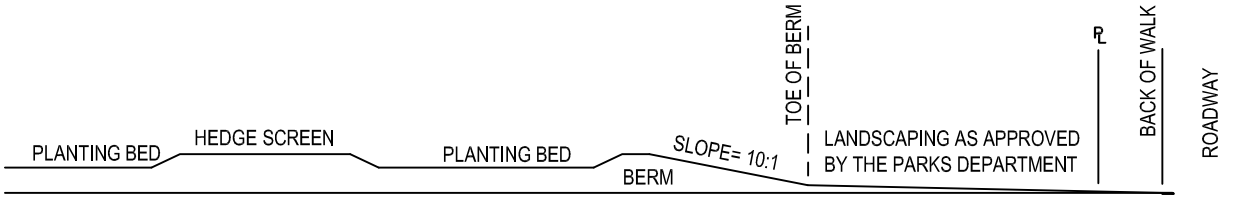
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**ARTERIAL ROADWAY BERM CROSS SECTION**	
SCALE: N.T.S.		DRAWING NO. **5.31A**



BERM PLAN VIEW

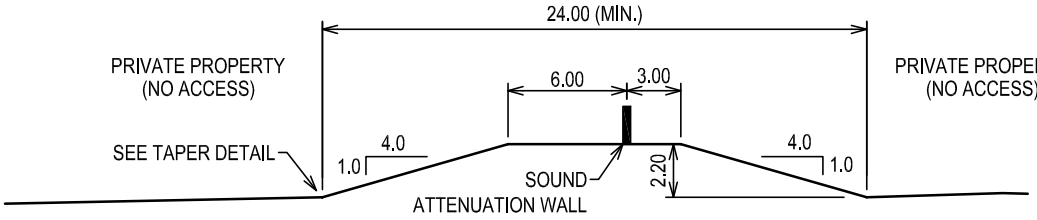


BERM ELEVATED VIEW

NO.	DATE	REVISION
1		

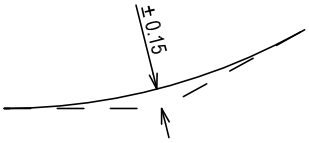
THE TOW OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**ARTERIAL ROADWAY BERM HEIGHT REDUCTION NEXT TO A COMMERCIAL SITE**	
SCALE: N.T.S.		DRAWING NO. **5.31B**



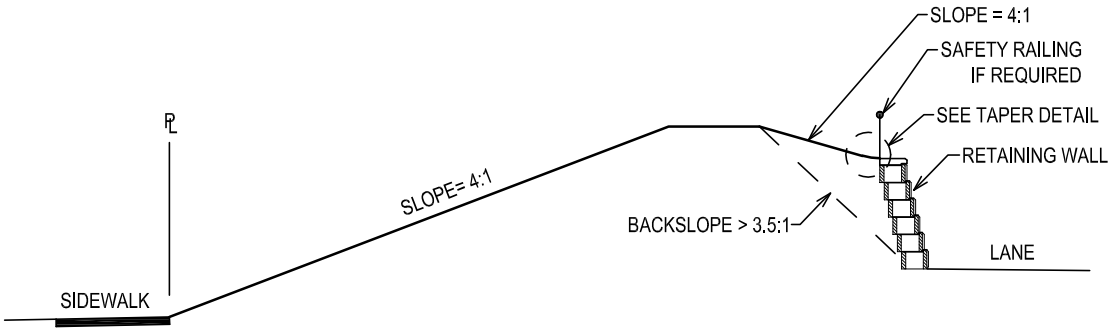
SOUND ATTENUATION WALL
(LIMITED MAINTENANCE ACCESS)

NOTE : LEVEL 1 LANDSCAPE ONLY UNLESS ADDITIONAL WIDTH IS ADDED TO BERM TO ALLOW FOR PLANTINGS.

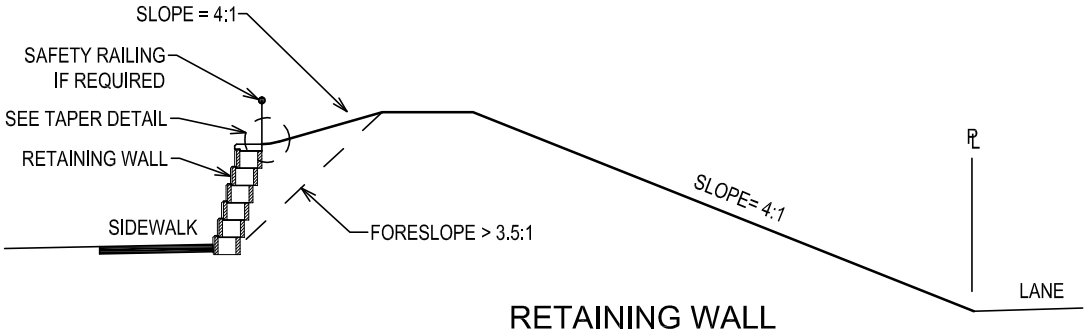


BERM TAPER DETAIL

NOTE :
- PROVIDE A TAPER TO THE BERM ADJACENT TO THE BOULEVARD AND PUBLIC UTILITY LOT/M.R. FOR MOWER TRANSITION.
- A TRANSITION IS NOT REQUIRED IF A LANE IS CONSTRUCTED ADJACENT TO THE BERM.



RETAINING WALL
BACKSLOPE CROSS SECTION



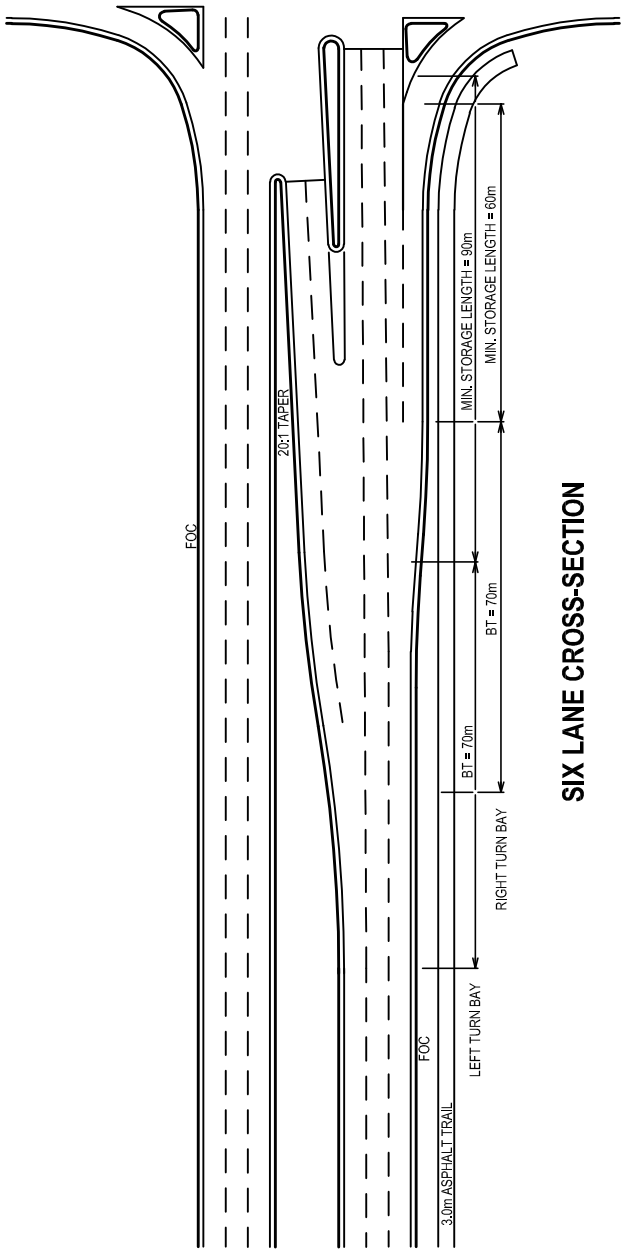
RETAINING WALL
FORESLOPE CROSS SECTION

NOTE :
RETAINING WALLS, INCLUDING END TREATMENT, MUST BE DESIGNED ON A SITE-SPECIFIC BASIS IN ACCORDANCE WITH THE MANUFACTURER'S DESIGN SPECIFICATIONS.

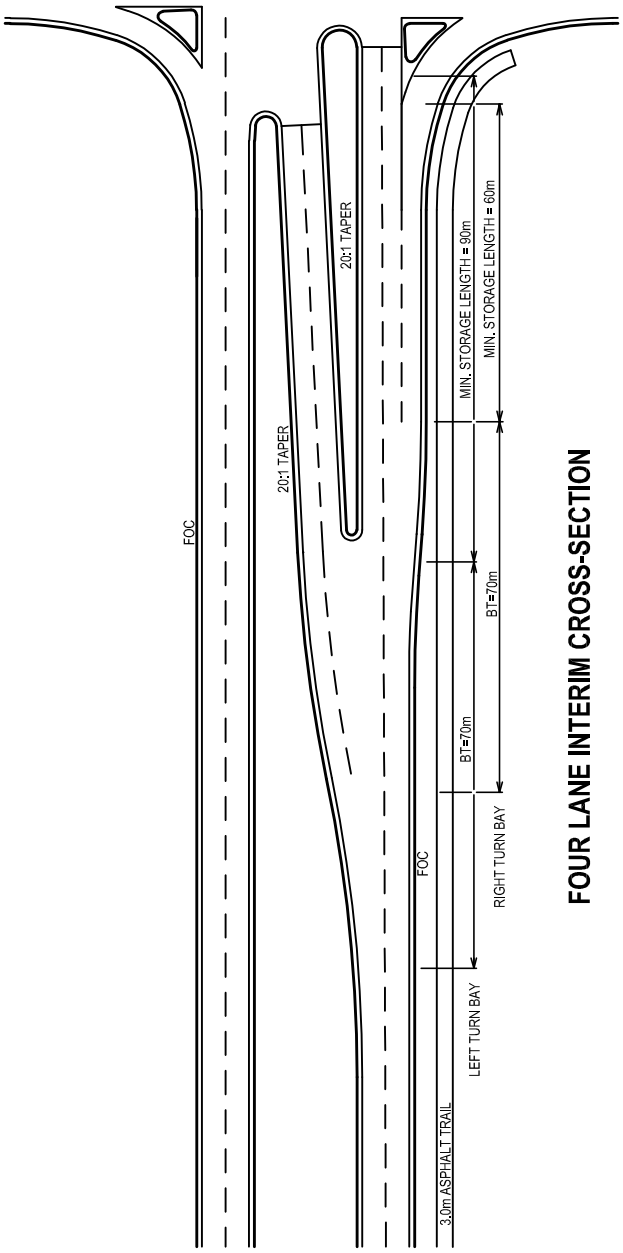
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**ARTERIAL ROADWAY BERM DETAILS**	
SCALE: N.T.S		DRAWING NO. **5.31C**



SIX LANE CROSS-SECTION

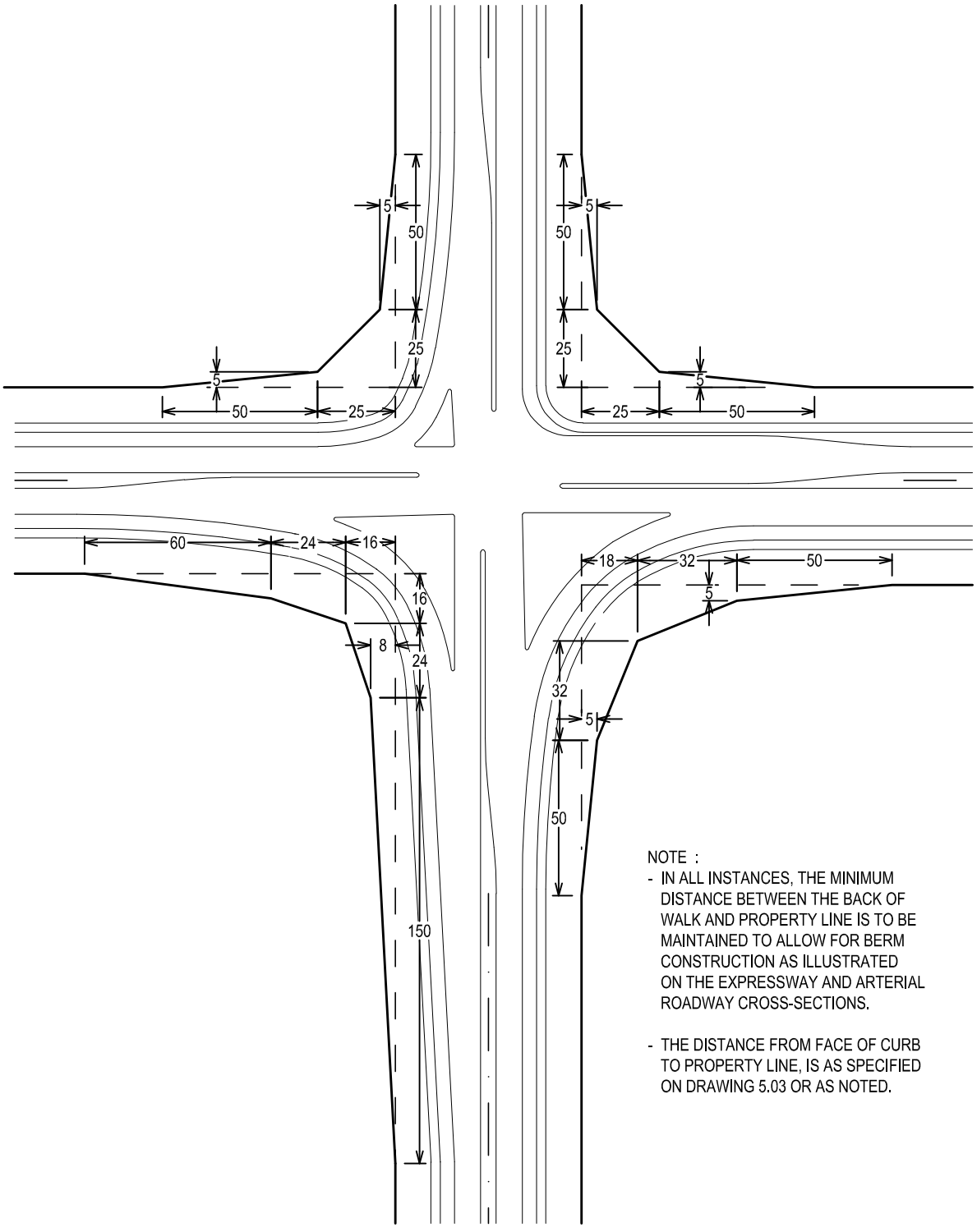


FOUR LANE INTERIM CROSS-SECTION

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**EXPRESSWAY / ARTERIAL LEFT TURN CHANNELIZATION**	
SCALE: N.T.S.		DRAWING NO. **5.32**



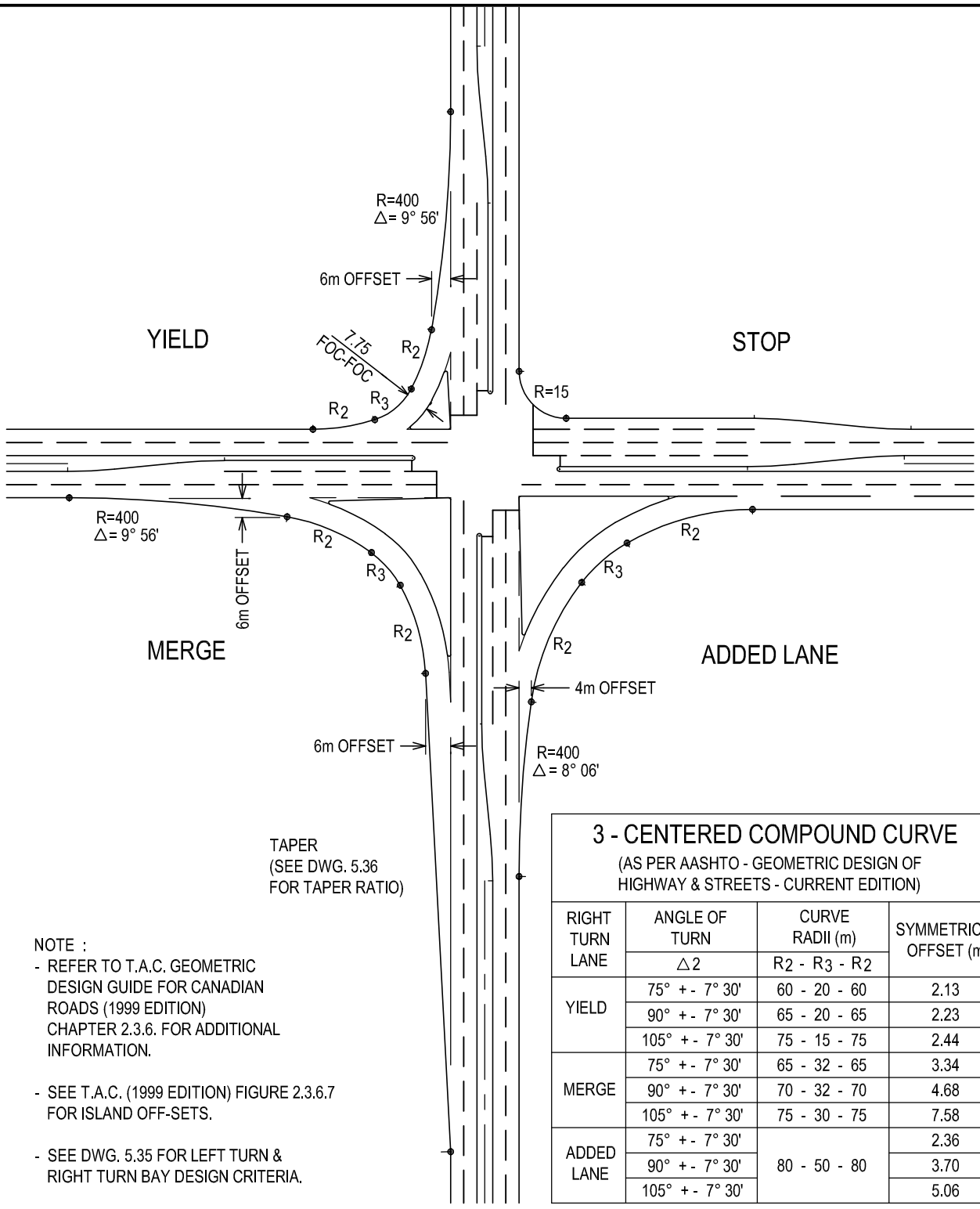
NOTE :

- IN ALL INSTANCES, THE MINIMUM DISTANCE BETWEEN THE BACK OF WALK AND PROPERTY LINE IS TO BE MAINTAINED TO ALLOW FOR BERM CONSTRUCTION AS ILLUSTRATED ON THE EXPRESSWAY AND ARTERIAL ROADWAY CROSS-SECTIONS.
- THE DISTANCE FROM FACE OF CURB TO PROPERTY LINE, IS AS SPECIFIED ON DRAWING 5.03 OR AS NOTED.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY:
DATE: 19-04-2017	**ARTERIAL PROPERTY LINE LAYOUT FOR INTERSECTIONS**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **5.33**



NOTE :
- REFER TO T.A.C. GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS (1999 EDITION) CHAPTER 2.3.6. FOR ADDITIONAL INFORMATION.
- SEE T.A.C. (1999 EDITION) FIGURE 2.3.6.7 FOR ISLAND OFF-SETS.
- SEE DWG. 5.35 FOR LEFT TURN & RIGHT TURN BAY DESIGN CRITERIA.

3 - CENTERED COMPOUND CURVE

(AS PER AASHTO - GEOMETRIC DESIGN OF HIGHWAY & STREETS - CURRENT EDITION)

RIGHT TURN LANE	ANGLE OF TURN	CURVE RADII (m)	SYMMETRICAL OFFSET (m)
	△2	R_2 - R_3 - R_2	
YIELD	75° +- 7° 30'	60 - 20 - 60	2.13
	90° +- 7° 30'	65 - 20 - 65	2.23
	105° +- 7° 30'	75 - 15 - 75	2.44
MERGE	75° +- 7° 30'	65 - 32 - 65	3.34
	90° +- 7° 30'	70 - 32 - 70	4.68
	105° +- 7° 30'	75 - 30 - 75	7.58
ADDED LANE	75° +- 7° 30'	80 - 50 - 80	2.36
	90° +- 7° 30'		3.70
	105° +- 7° 30'		5.06

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

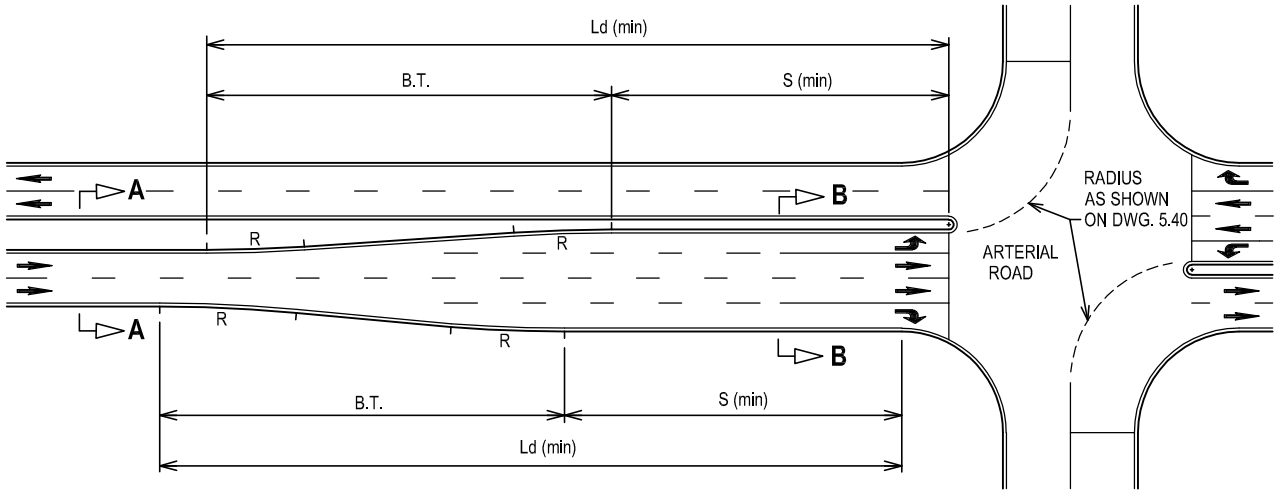
ENGINEER

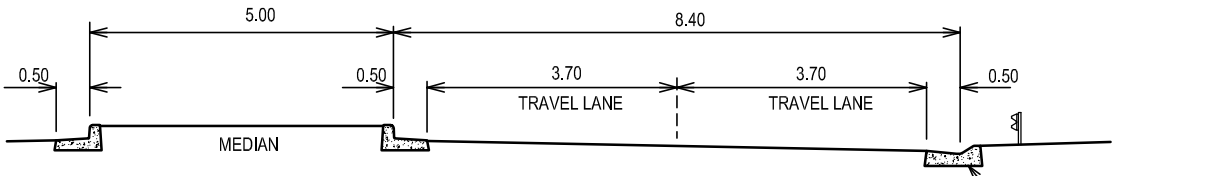
DATE: 19-04-2017

ARTERIAL ROADWAY RIGHT TURN GEOMETRY

SCALE: N.T.S.

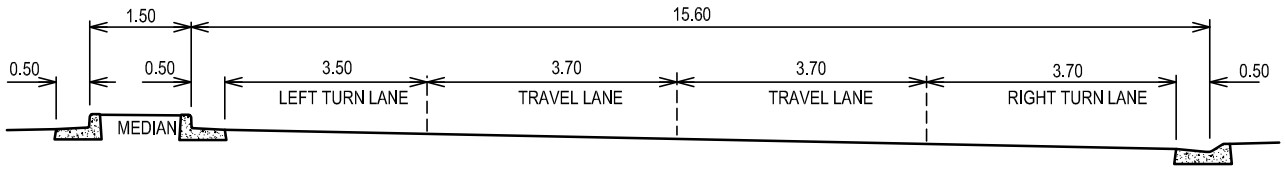
DRAWING NO. **5.34**





SECTION 'A - A'

500mm MOUNTABLE
CURB AND GUTTER
WHEN BARRIER PRESENT



SECTION 'B - B'

DESIGN SPEED km/h	APPROACH DIMENSIONS (m)			
	Ld (min)	B.T.	R (F.O.C.)	S (min)
60	90	50	150	40
70	110	60	220	50
80	130	70	280	60

NOTES :
- DESIGN TO BE BASED ON BAY TAPER - SYMETRICAL REVERSE CURVES.
- SEE TAC (1999 EDITION) - FIGURES 2.3.8.4 AND 2.3.8.8.
- STORAGE LENGTH(S) SHOULD BE DETERMINED BASED ON TRAFFIC VOLUMES, SIGNALIZATION, ETC. TO PROVIDE THE FULL STORAGE LENGTHS REQUIRED.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

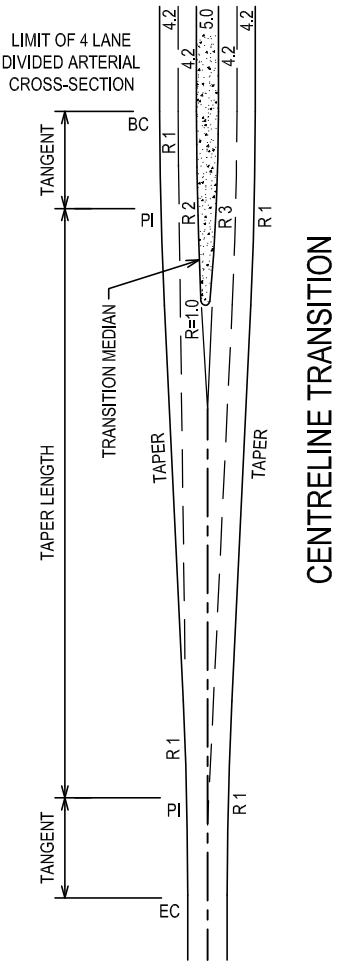
ENGINEER

DATE: 19-04-2017

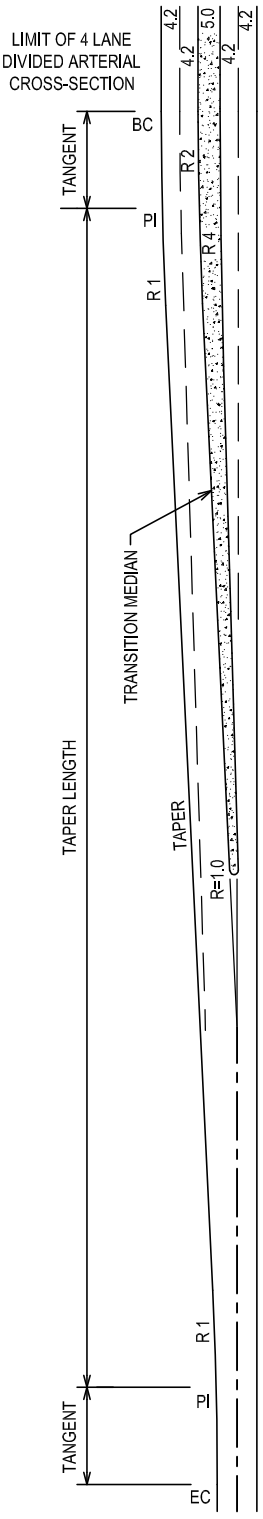
SCALE: N.T.S.

ARTERIAL ROADWAY LEFT AND RIGHT TURN LANE DESIGN

DRAWING NO. **5.35**

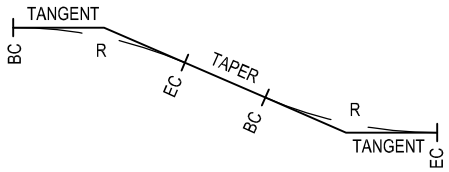


CENTRELINE TRANSITION



OFFSET TRANSITION

OVERALL APPROACH OR DEPARTURE TAPER LENGTHS					
DESIGN SPEED KM/H	TAPER RATIO	TRANSITION RADII (m)			
		R 1	R 2	R 3	R 4
70	21:1	930	921.6	475	2000
80	24:1	1200	1191.6	475	2000



NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

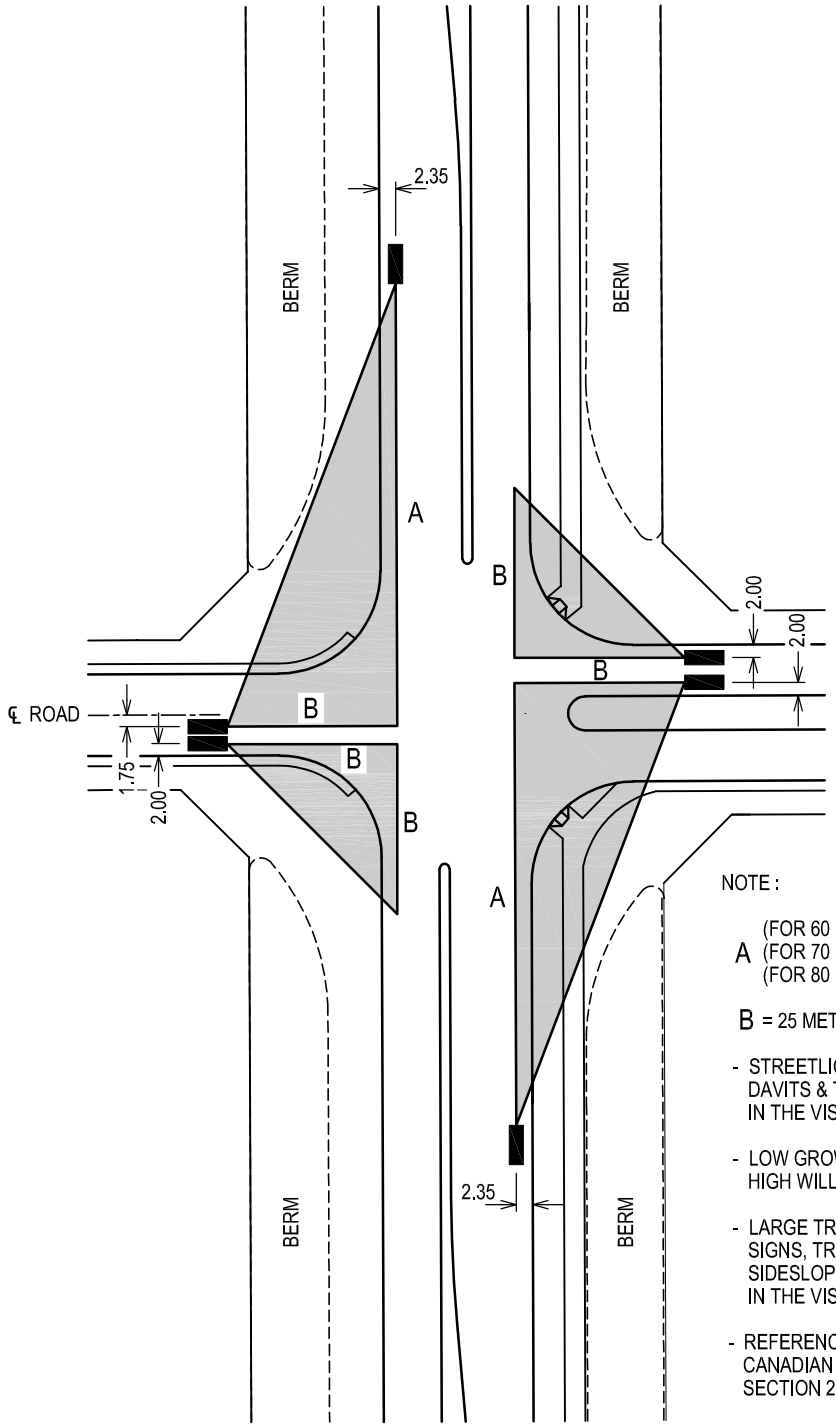
ENGINEER

DATE: 19-04-2017

SCALE: N.T.S.

ARTERIAL ROADWAY DIVIDED TO UNDIVIDED ROADWAY TRANSITION

DRAWING NO. **5.36**



NOTE :

A
(FOR 60 KM/HR) = 50 METERS
(FOR 70 KM/HR) = 60 METERS
(FOR 80 KM/HR) = 65 METERS

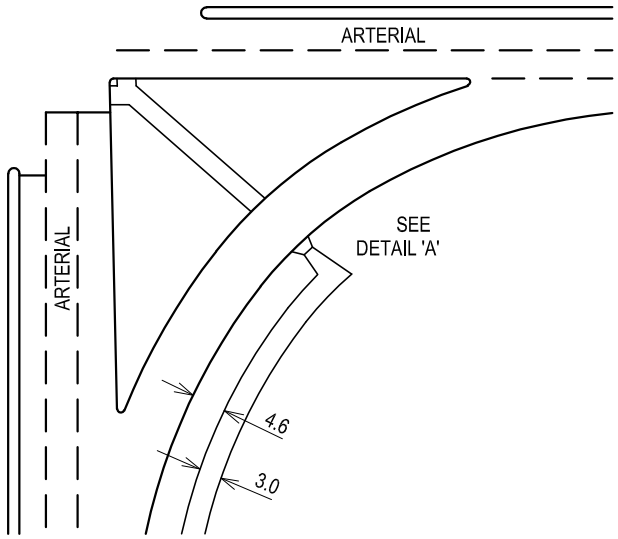
B = 25 METERS

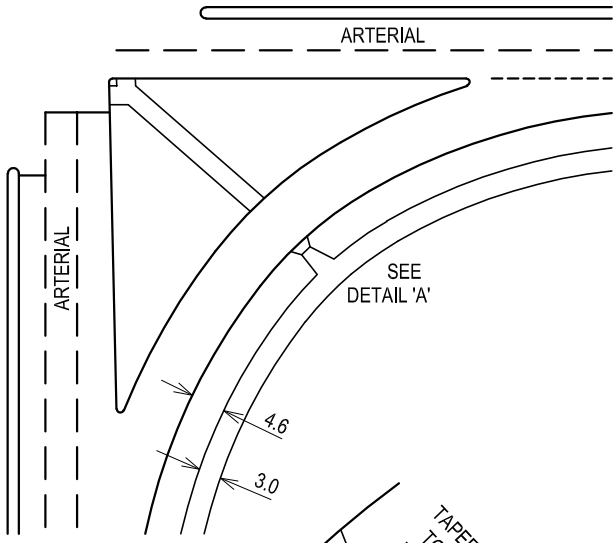
- STREETLIGHT POLES, POWER POLES, TRAFFIC DAVITS & TRAFFIC SIGNS WILL BE PERMITTED IN THE VISIBLITY TRIANGLE.
- LOW GROWING SHRUBS LESS THAN 900 MM HIGH WILL BE PERMITTED
- LARGE TREES (DECIDUOUS & CONIFEROUS), SIGNS, TRAFFIC CONTROL CABINETS, BERM SIDESLOPES, ETC. WILL NOT BE PERMITTED IN THE VISIBILITY TRIANGLE.
- REFERENCE : GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS (1999 EDITION) SECTION 2.3.3 : SIGHT DISTANCE.

NO.	DATE	REVISION
1		

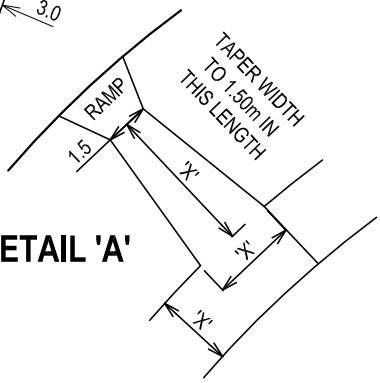
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**ARTERIAL ROADWAY SIGHT TRIANGLE**	
SCALE: N.T.S.		DRAWING NO. **5.37**

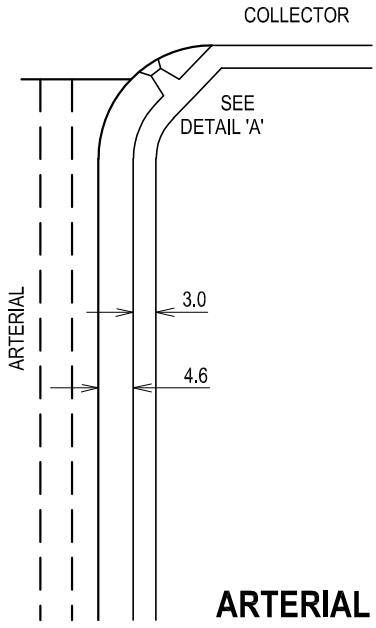


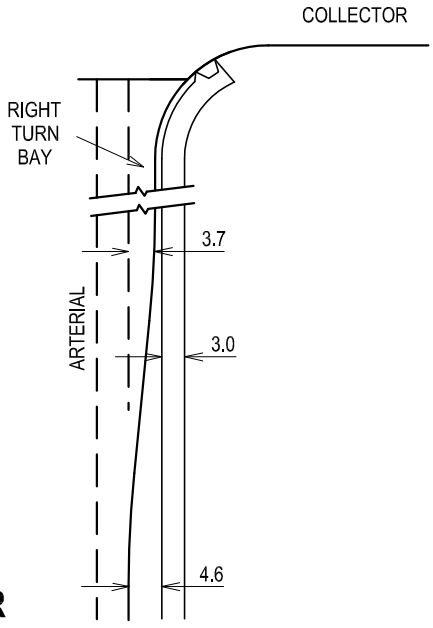


ARTERIAL TO ARTERIAL



DETAIL 'A'



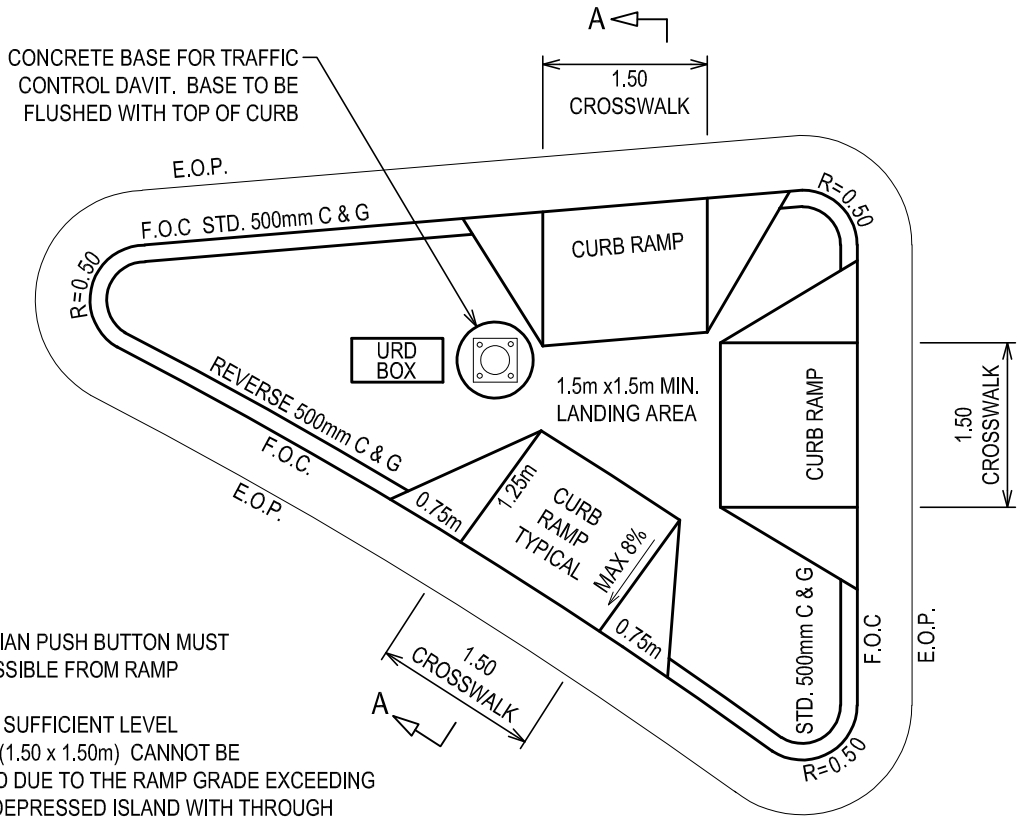


ARTERIAL TO COLLECTOR

NO.	DATE	REVISION
1		

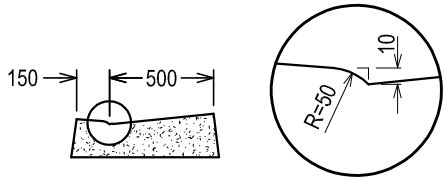
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**ARTERIAL ROADWAY SIDEWALK ALIGNMENT AT INTERSECTIONS**	
SCALE: N.T.S.		DRAWING NO. **5.38**

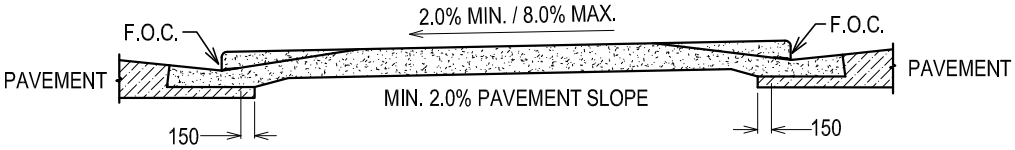


NOTE:
- PEDESTRIAN PUSH BUTTON MUST BE ACCESSIBLE FROM RAMP

- WHERE A SUFFICIENT LEVEL LANDING (1.50 x 1.50m) CANNOT BE PROVIDED DUE TO THE RAMP GRADE EXCEEDING 8%, THE DEPRESSED ISLAND WITH THROUGH WALKWAYS IS TO BE USED (SEE 5.39B).

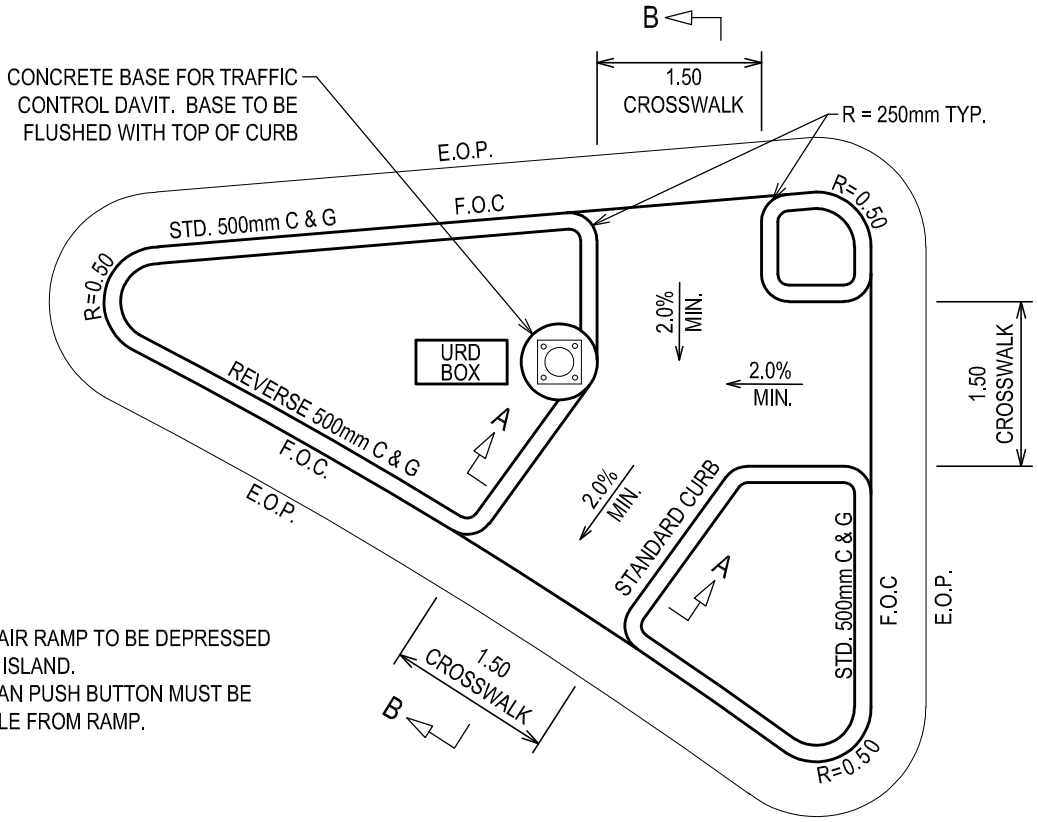


CROSSWALK CURB DETAIL

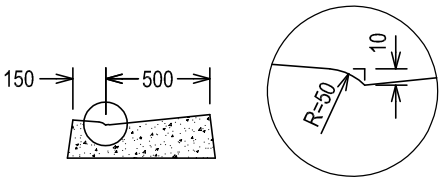


SECTION 'A - A'

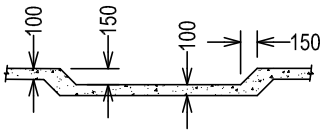
			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN	APPROVED BY:
			DATE: 19-04-2017	STANDARD RIGHT-TURN ISLAND DETAIL WITH CURB RAMPS	ENGINEER
1			SCALE: N.T.S.		DRAWING NO. 5.39A
NO.	DATE	REVISION			



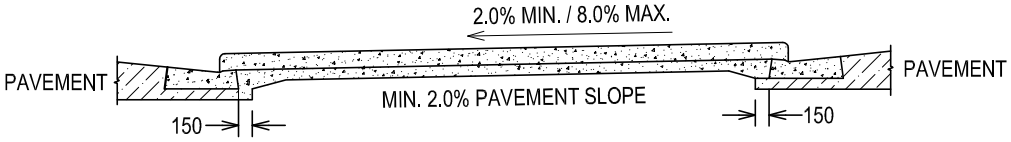
NOTE:
- WHEELCHAIR RAMP TO BE DEPRESSED THROUGH ISLAND.
- PEDESTRIAN PUSH BUTTON MUST BE ACCESSIBLE FROM RAMP.



CROSSWALK CURB DETAIL

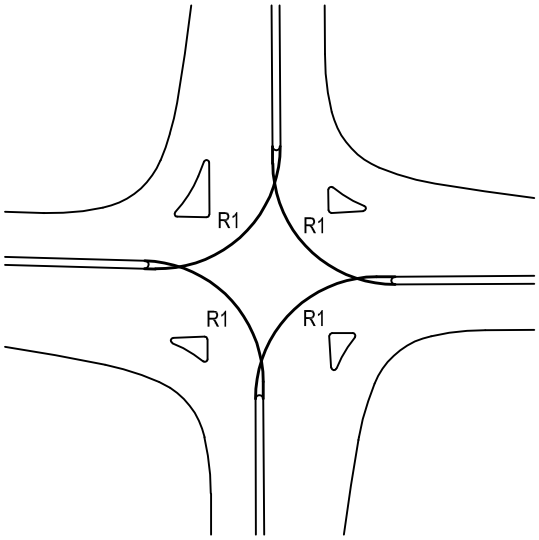


SECTION 'A - A'

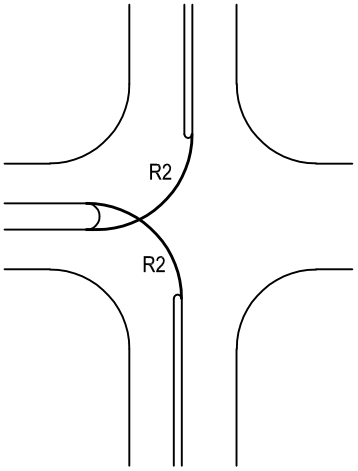


SECTION 'B - B'

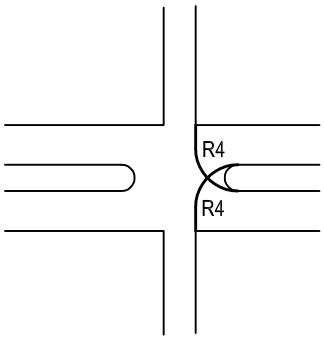
			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN	APPROVED BY:
			DATE: 19-04-2017	STANDARD RIGHT TURN ISLAND DETAIL WITH THROUGH WALKWAYS	ENGINEER
1			SCALE: N.T.S.		DRAWING NO. 5.39B
NO.	DATE	REVISION			



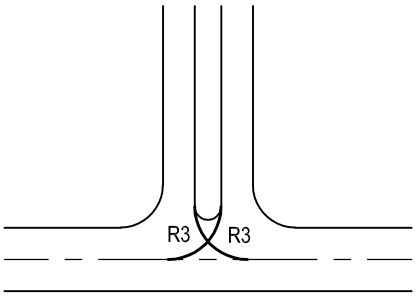
ARTERIAL TO ARTERIAL



ARTERIAL TO COLLECTOR



DIVIDED COLLECTOR OR LOCAL
TO LANE OR DRIVEWAY



COLLECTOR OR LOCAL
TO COLLECTOR OR LOCAL

TURNING RADII

ARTERIAL TO ARTERIAL	R1	22m
ARTERIAL TO COLLECTOR	R2	18m
COLLECTOR TO COLLECTOR	R3	15m
COLLECTOR TO LOCAL	R3	12m
LOCAL TO LOCAL	R3	10m
COLLECTOR / LOCAL TO LANE	R4	8m

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

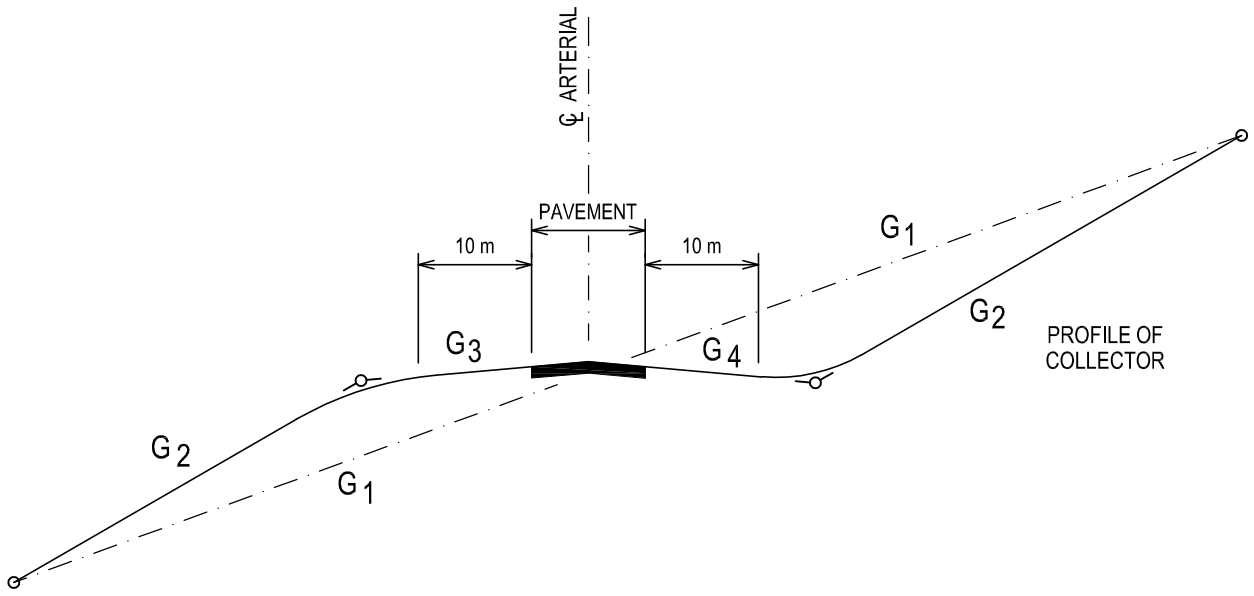
ENGINEER

DATE: 19-04-2017

INTERSECTION CENTRE LINE CONTROL RADII

SCALE: N.T.S.

DRAWING NO. **5.40**



NOTE :

G_1	ORIGINAL GRADE OF MINOR ROAD
G_2	GRADE INTRODUCED TO ADJUST GRADE AT INTERSECTION
G_3 & G_4	GRADE ON COLLECTOR CONFORMS TO CROSS SLOPE ON ARTERIAL ROADWAY (EG, 0.5% TO 5.0%, NORMAL CROWN TO SUPERELEVATION).

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

ENGINEER

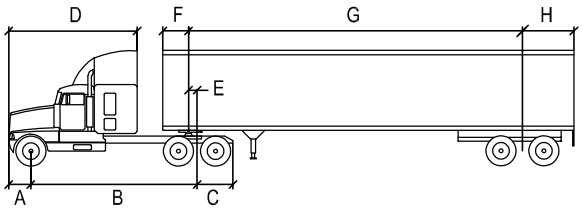
DATE: 19-04-2017

SCALE: N.T.S.

INTERSECTION GRADE ADJUSTMENT

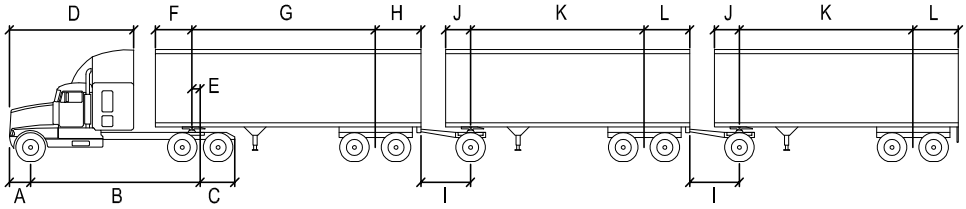
DRAWING NO. **5.41**

WB-15, 17, 20 & 21



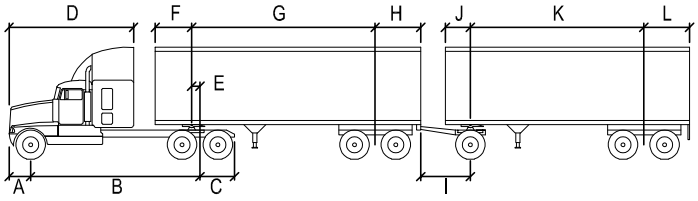
Tractor Width	: 2.60	Trailer Track	: 2.60
Trailer Width	: 2.60	Steering Angle	: 26.22
Tractor Track	: 2.60	Tractor/Trailer Angle	: 48.24

WB-29



Tractor Width	: 2.60	Steering Angle	: 17.17
Trailer Width	: 2.60	Tractor/Trailer Angle	: 28.08
Tractor Track	: 2.60	Trailer1/Trailer2 Angle	: 45.56
Trailer Track	: 2.60	Trailer2/Trailer3 Angle	: 48.94

WB-35



Tractor Width	: 2.60	Steering Angle	: 21.01
Trailer Width	: 2.60	Tractor/Trailer Angle	: 46.18
Tractor Track	: 2.60	Trailer/Trailer Angle	: 66.23
Trailer Track	: 2.60		

DESCRIPTION	T.A.C. DESIGN VEHICLES					
	WB-15	WB-17	WB-20	WB-21	WB-29	WB-35
TRACTOR						
A Tractor Front	1.0	1.0	1.0	1.9	1.0	1.0
B Tractor Wheelbase	5.5	5.5	5.5	6.2	5.5	5.5
C Tractor Rear	1.3	1.3	1.3	1.3	1.3	1.3
D Cab Length	3.5	3.5	3.0	3.0	3.0	3.0
E Axle to Kingpin	0.0	0.0	0.0	0.0	0.0	0.0
FIRST TRAILER						
F Trailer Front	1.3	1.3	1.3	1.3	1.3	1.3
G Pin to Trailer Axle	9.1	11.5	14.3	12.5	6.3	12.2
H Trailer Rear	1.5	1.5	1.5	4.4	1.0	1.0
SECOND AND / OR THIRD TRAILER						
I Towbar	N/A	N/A	N/A	N/A	1.8	2.4
J Trailer Front	N/A	N/A	N/A	N/A	0.9	1.2
K Pin to Trailer Axle	N/A	N/A	N/A	N/A	6.6	12.2
L Trailer Rear	N/A	N/A	N/A	N/A	1.0	1.2

THE NOTED DIMENSIONS FOR THE VARIOUS DESIGN VEHICLES, ARE BASED ON FIELD DIMENSIONS OBTAINED FROM THE TWO MAJOR TRUCKING FIRMS OPERATING IN RED DEER.

WB-21 DIMENSIONS HAVE BEEN TAKEN FROM THE ALBERTA INFASTRUCTURE HIGHWAY GEOMETRIC DESIGN GUIDE.

SEE DWG. 5.43 FOR VEHICLE TURNING RADII.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

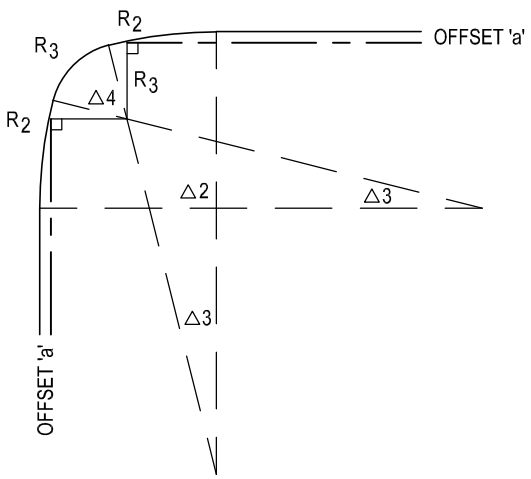
ENGINEER

DATE: 19-04-2017

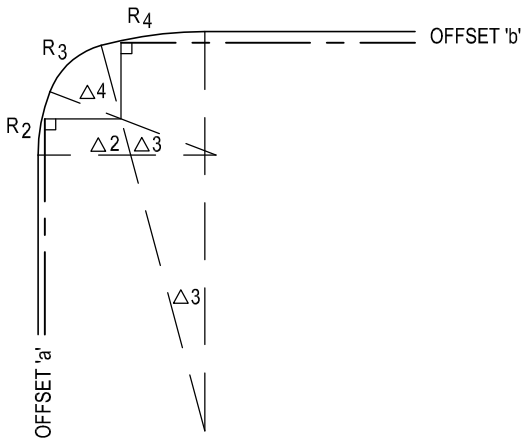
W.B. DESIGN VEHICLES

SCALE: N.T.S.

DRAWING NO. **5.42**



3 - CENTERED SYMMETRICAL COMPOUND CURVE



3 - CENTERED ASYMMETRICAL COMPOUND CURVE

NOTE :
△3 AND △4 TO BE CALCULATED USING
R_2 , R_3 AND OFFSET DISTANCE

MINIMUM DESIGN FOR TURNS AT INTERSECTIONS

Reference : A Policy on Geometric Design of Highways and Streets (AASHTO 1994 Metric Edition)

Design Vehicle (see Dwg 5.42)	Angle of Turn (degrees)	3 - Centered Symmetrical Compound Curve				3 - Centered Asymmetrical Compound Curve				
		Minimum Curve Radii (meters)			Symmetric Off-set (meters)	Minimum Curve Radii (meters)			Asymmetric Off-set (meters)	
		R_2	R_3	R_2	a	R_2	R_3	R_4	a	b
WB-15	75° + - 7° 30'	46	15	46	1.83	46	15	69	0.61	3.05
	90° + - 7° 30'	55	18	55	1.83	37	12	61	0.61	3.05
	105° + - 7° 30'	55	14	55	2.44	46	12	64	0.61	3.05
WB-17	75° + - 7° 30'	61	21	61	2.13	37	18	61	0.61	3.05
	90° + - 7° 30'	61	20	61	2.13	30	17	79	0.61	3.05
	105° + - 7° 30'	73	15	73	2.44	30	14	152	1.22	3.05
WB-20 *WB-21	75° + - 7° 30'	134	23	134	4.57	43	30	165	1.52	3.66
	90° + - 7° 30'	122	21	122	3.05	49	21	110	1.83	3.05
	105° + - 7° 30'	158	15	158	4.57	110	23	183	1.22	3.20
WB-29	75° + - 7° 30'	76	24	76	1.40	30	24	91	0.50	1.50
	90° + - 7° 30'	76	21	76	1.40	61	21	91	0.30	1.50
	105° + - 7° 30'	76	18	76	1.50	30	18	91	0.50	1.80
WB-35	75° + - 7° 30'	213	38	213	2.00	46	34	168	0.50	3.50
	90° + - 7° 30'	213	34	213	2.00	46	29	168	0.60	3.50
	105° + - 7° 30'	213	29	213	2.40	46	24	152	0.90	4.60

* Curve radii verified through Alberta Transportation.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

ENGINEER

DATE: 19-04-2017

W.B. VEHICLE COMPOUND CURVE TURN DESIGN

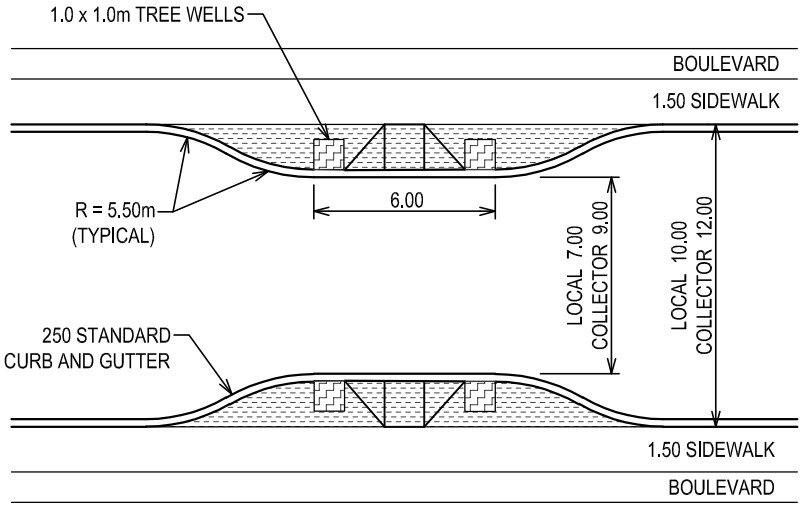
SCALE: N.T.S.

DRAWING NO. **5.43**

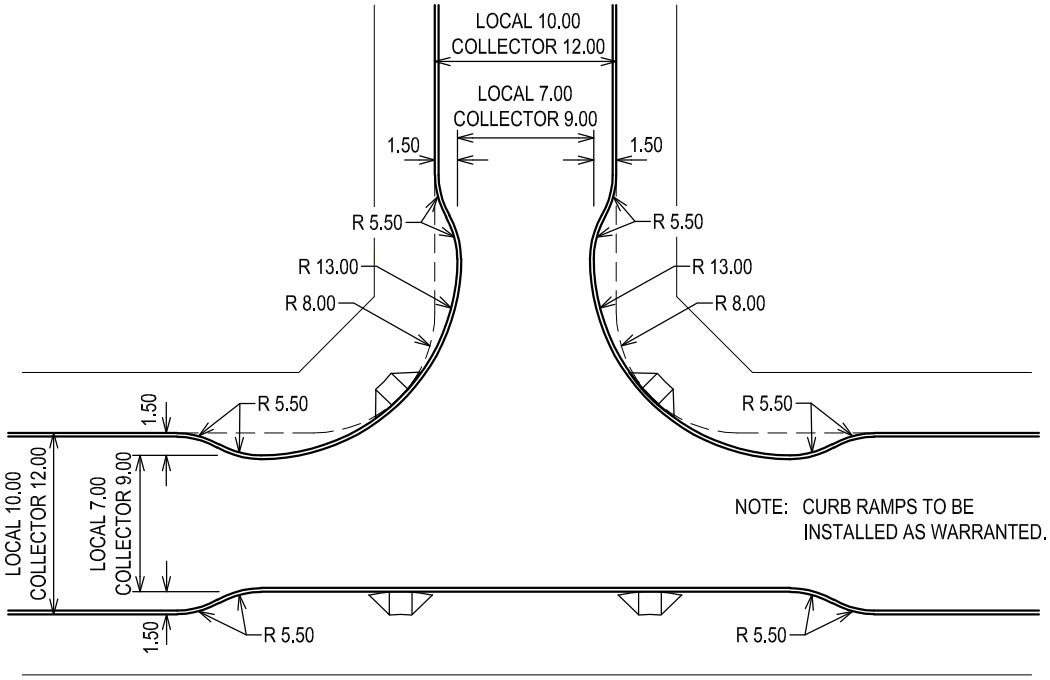
DRAWING NUMBERS

5.44 TO 5.49

INTENTIONALLY OMITTED



NOTE: WRITTEN APPROVAL FROM THE ENGINEERING SERVICES MANAGER IS REQUIRED FOR ALL ROADWAY NARROWING.

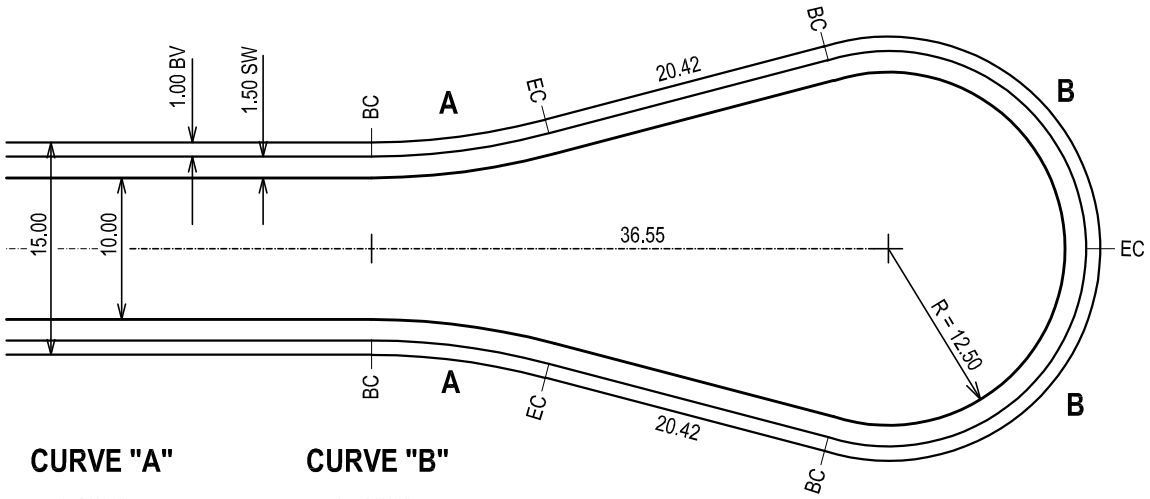


NOTE: CURB RAMPS TO BE INSTALLED AS WARRANTED.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**TRAFFIC CALMING FOR PEDESTRIAN ACCOMMODATION**	
SCALE: N.T.S.		DRAWING NO. **5.50**

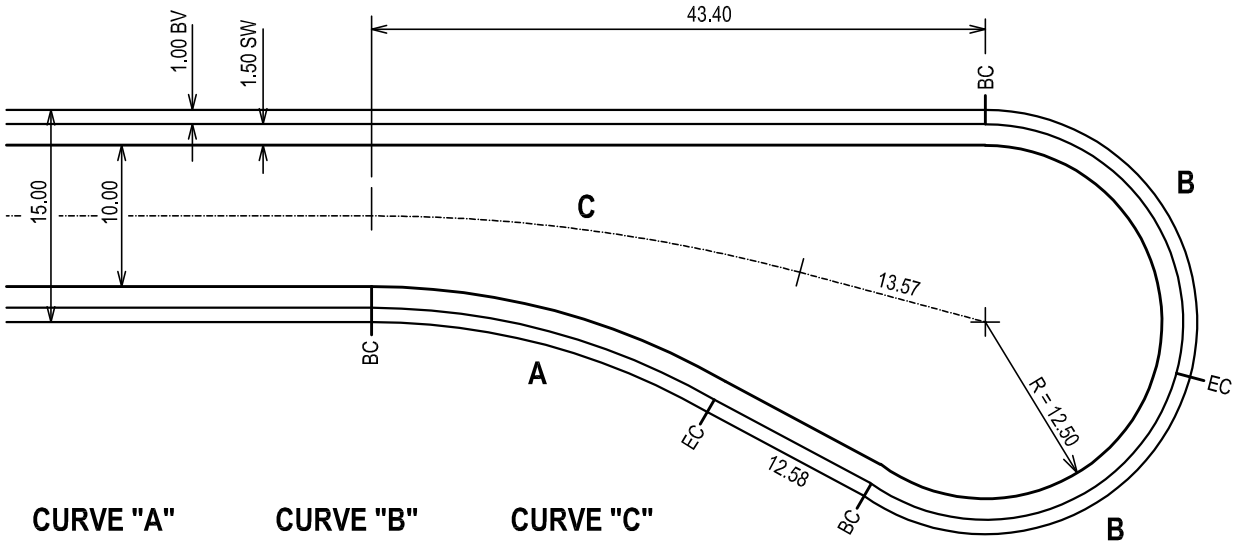


CURVE "A"

△ =15°0'00"
R=50.00
ARC=13.09
TAN=6.58
(at property line)

CURVE "B"

△ =105°0'00"
R=15.00
ARC=27.49
TAN=19.55
(at property line)



CURVE "A"

△ =30°0'00"
R=50.00
ARC=26.18
TAN=13.40
(at property line)

CURVE "B"

△ =105°0'00"
R=15.00
ARC=27.49
TAN=19.55
(at property line)

CURVE "C"

△ =15°0'00"
R=117.03
ARC=30.64
TAN=15.41

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

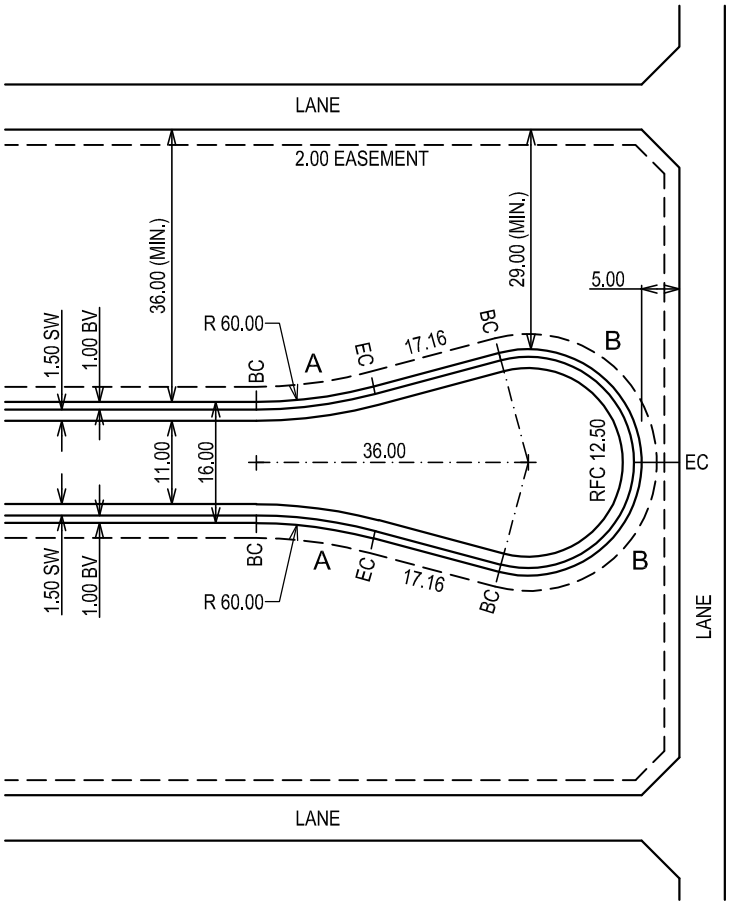
ENGINEER

DATE: 19-04-2017

SCALE: N.T.S.

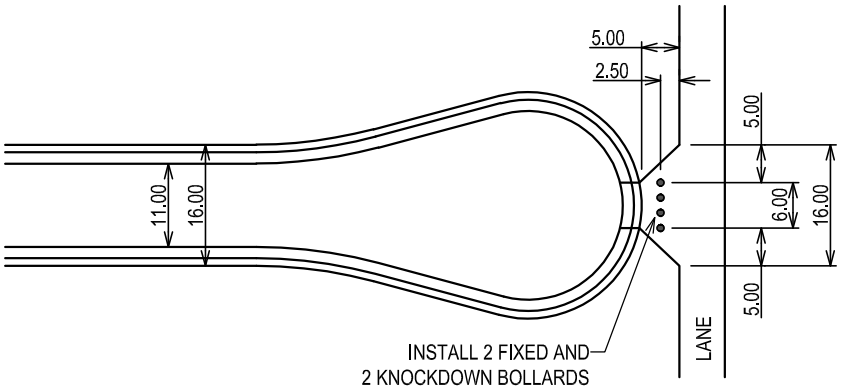
15 / 10 LOCAL RESIDENTIAL CUL-DE-SAC

DRAWING NO. **5.51**



CURVE "A"
Δ = 15°0'00"
R = 50.00
ARC = 13.09
TAN = 6.58

CURVE "B"
Δ = 105°0'00"
R = 15.00
ARC = 27.49
TAN = 19.55



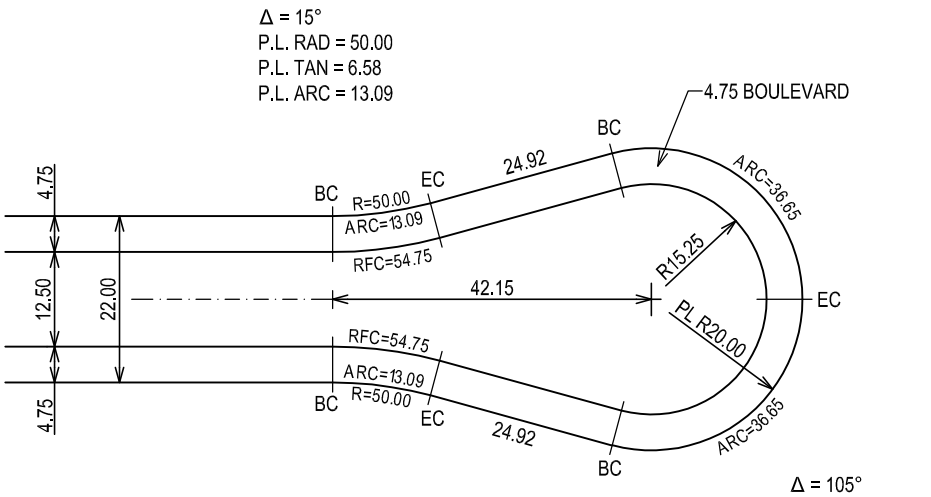
LANE ACCESS

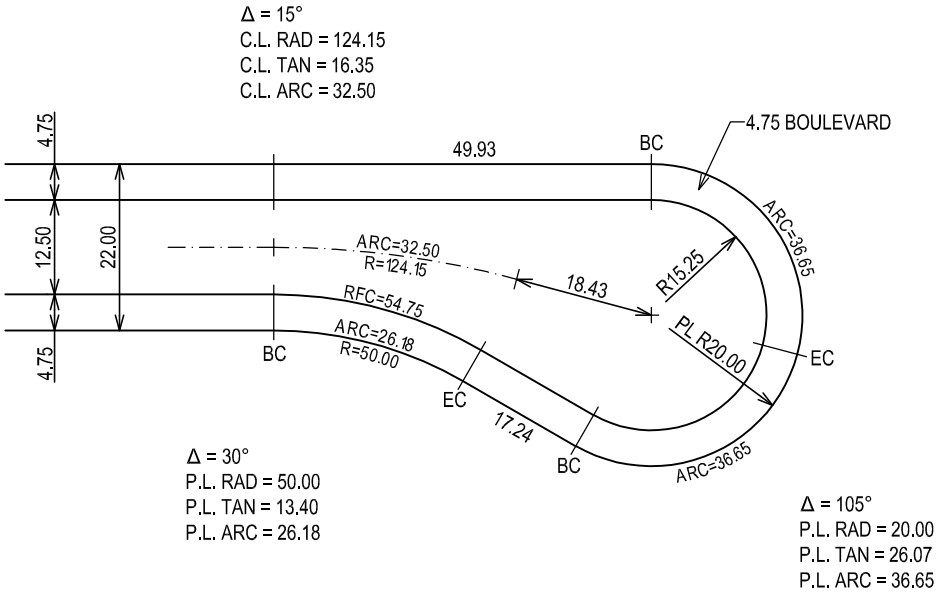
NOTE:
THIS DESIGN IS TO BE USED FOR DUPLEX,
R1N AND ROW HOUSING DEVELOPMENTS.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**16 / 11 LOCAL RESIDENTIAL (MULTI-FAMILY) CUL-DE-SAC**	
SCALE: N.T.S.		DRAWING NO. **5.52**

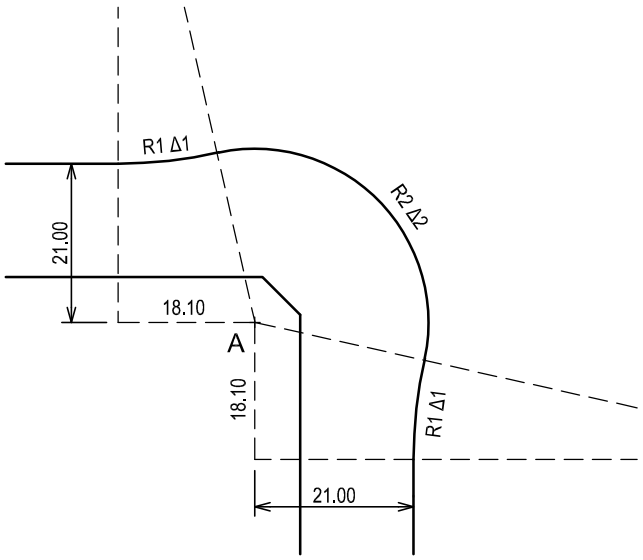




NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**22 / 12.5 LOCAL INDUSTRIAL CUL-DE-SAC**	
SCALE: N.T.S.		DRAWING NO. **5.53**

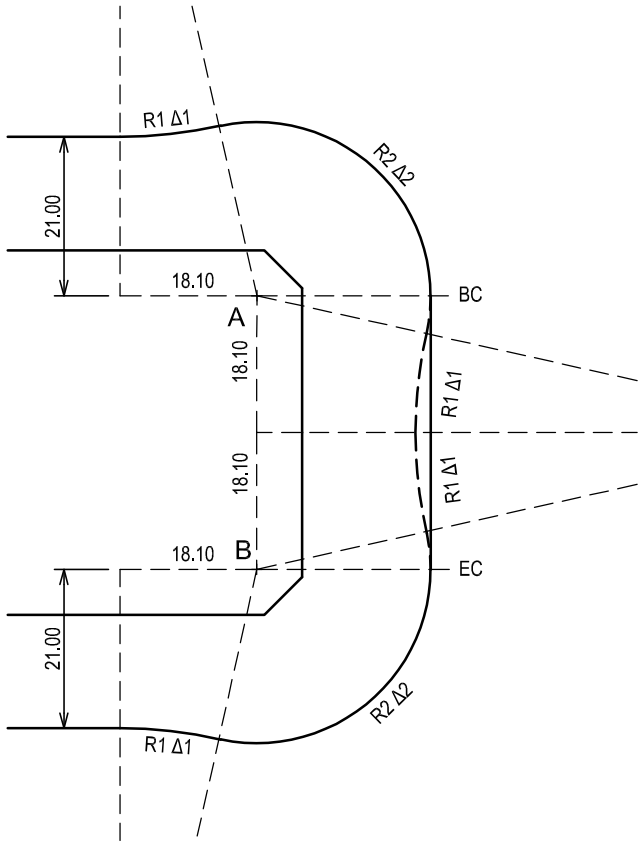


CURVE DATA

R1 = 60.00m
Δ1 = 12°36'12"
ARC = 13.20

R2 = 23.00m
Δ1 = VARIES
ARC = VARIES

ROAD RIGHT-OF-WAY
WIDTH VARIES



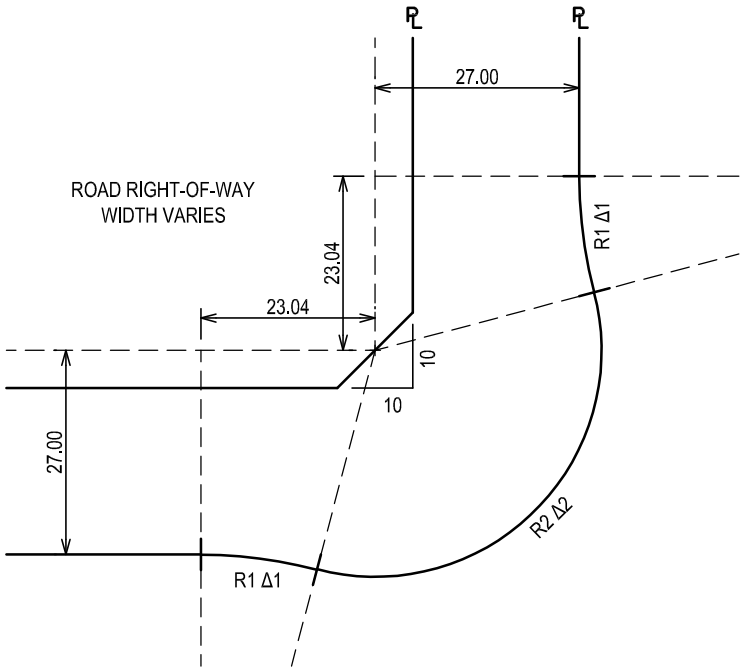
NOTE:
IF THE DISTANCE BETWEEN A AND B IS LESS THAN 36.20m REPLACE THE 60.00M RADIUS CURVES WITH A TANGENT FROM B.C. TO E.C.

ROAD RIGHT-OF-WAY WIDTH VARIES

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**LOCAL RESIDENTIAL EXPANDED BULB CORNER**	
SCALE: N.T.S.		DRAWING NO. **5.54**



CURVE DATA
R1 = 60.00m Δ1 = 14°50'05"
R2 = 30.00m Δ2 = VARIES

EXPANDED CORNER
FOR INDUSTRIAL LOCAL

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: BM

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

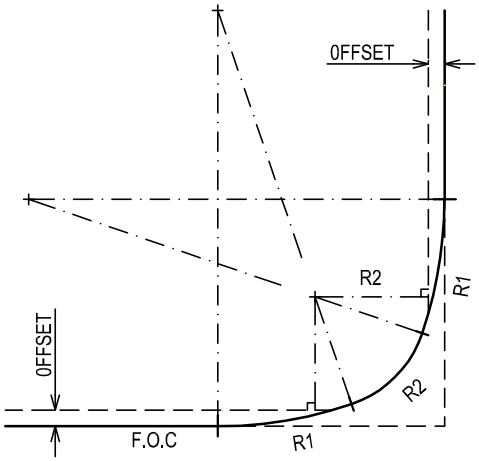
ENGINEER

DATE: 19-04-2017

SCALE: N.T.S.

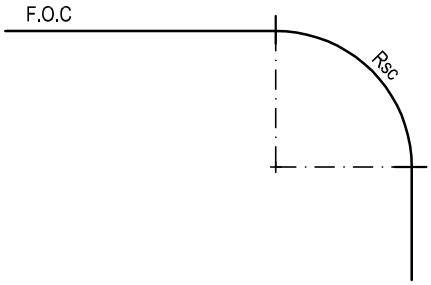
INDUSTRIAL ROADWAY EXPANDED BULB CORNER

DRAWING NO. **5.55**



ANGLE OF TURN Δ	CURVE RADII R1 - R2 - R1	SYMETRICAL OFFSET FOR R2
FOR COLLECTOR TO COLLECTOR (WB-15)		
75° ± 7° 30'	50 - 15 - 50	1.83
90° ± 7° 30'	55 - 15 - 55	2.13
105° ± 7° 30'	60 - 15 - 60	2.44
FOR COLLECTOR TO LOCAL & LOCAL TO LOCAL (SU-9)		
75° ± 7° 30'	40 - 15 - 40	0.65
90° ± 7° 30'	40 - 12 - 40	0.65
105° ± 7° 30'	30 - 11 - 30	0.92

THREE CENTRED COMPOUND CURVE



FOR COLLECTOR TO COLLECTOR	18.00
FOR COLLECTOR TO LOCAL	15.00
FOR LOCAL TO LOCAL	13.00

SIMPLE CURVE RADIUS (Rsc.)

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

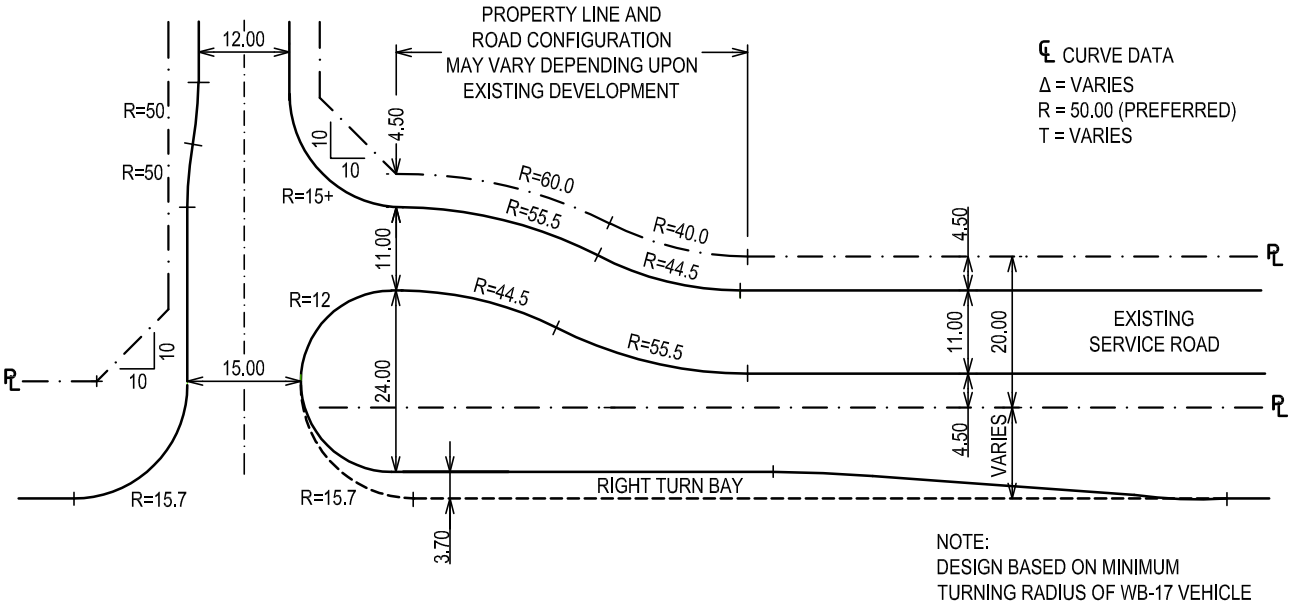
ENGINEER

DATE: 19-04-2017

SCALE: N.T.S.

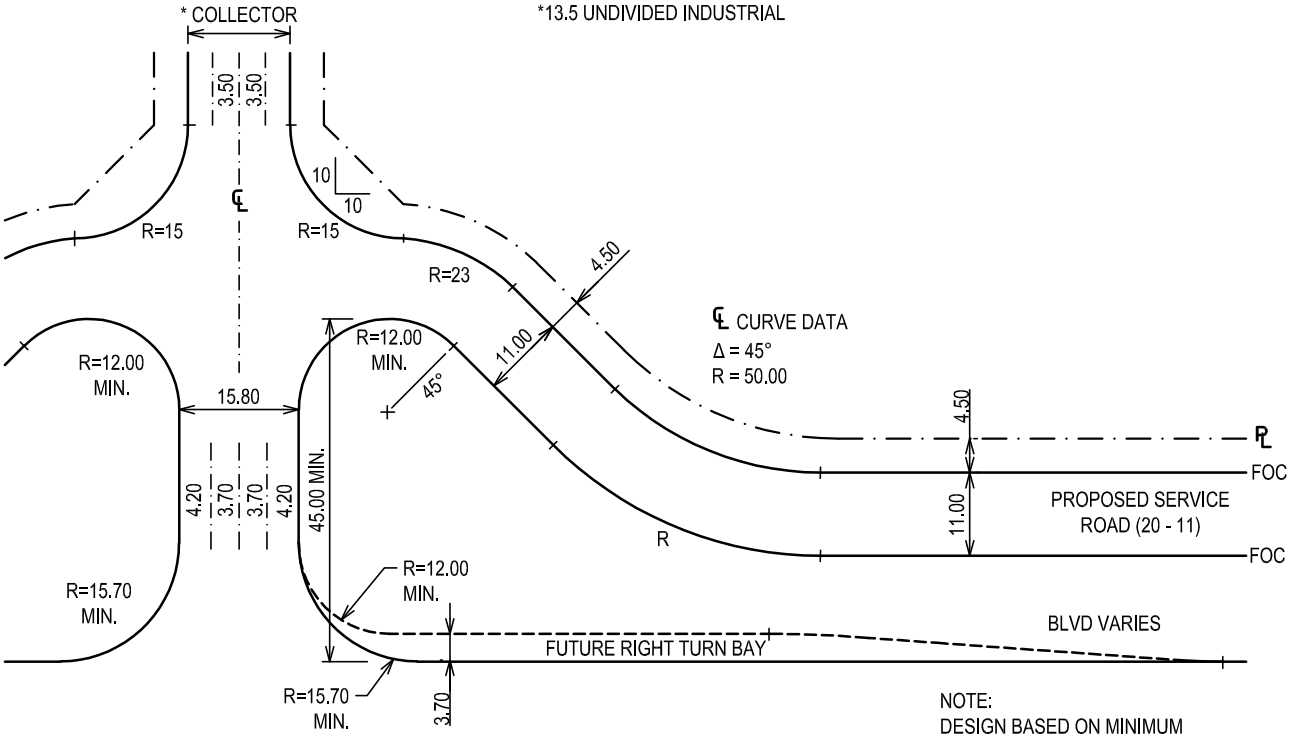
INDUSTRIAL ROADWAY CURB RETURN RADII

DRAWING NO. **5.56**



EXISTING DEVELOPED AREA

*12.0m UNDIVIDED RESIDENTIAL OR
*13.5 UNDIVIDED INDUSTRIAL

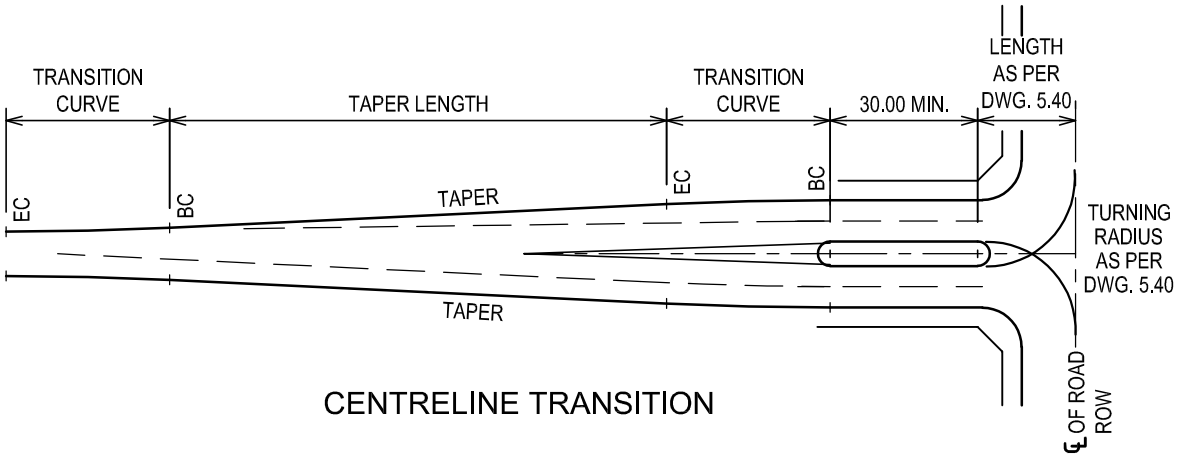


NEW DEVELOPMENT / RETROFIT OPTION

NO.	DATE	REVISION
1		

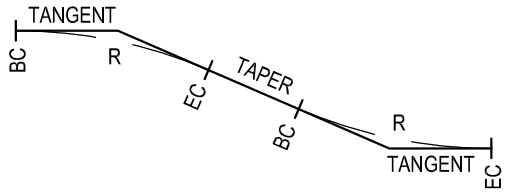
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY:
DATE: 19-04-2017	**SERVICE ROAD AND CROSS STREET INTERSECTION DESIGN**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **5.57**



CENTRELINE TRANSITION

OVERALL APPROACH OR DEPARTURE TAPER LENGTHS			
ROADWAY	DESIGN SPEED KM/H	TAPER RATIO	TRANSITION RADII (m)
LOCAL	50	15:1	500
COLLECTOR	60	18:1	700



NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

ENGINEER

DATE: 19-04-2017

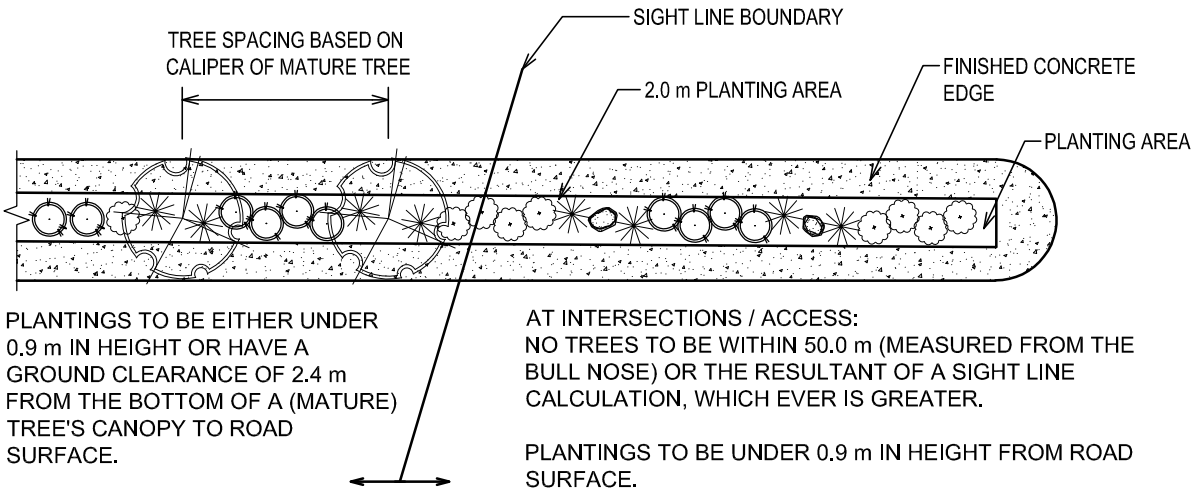
SCALE: N.T.S.

COLLECTOR AND LOCAL ROADWAY TRANSITION DETAIL

DRAWING NO. **5.58**

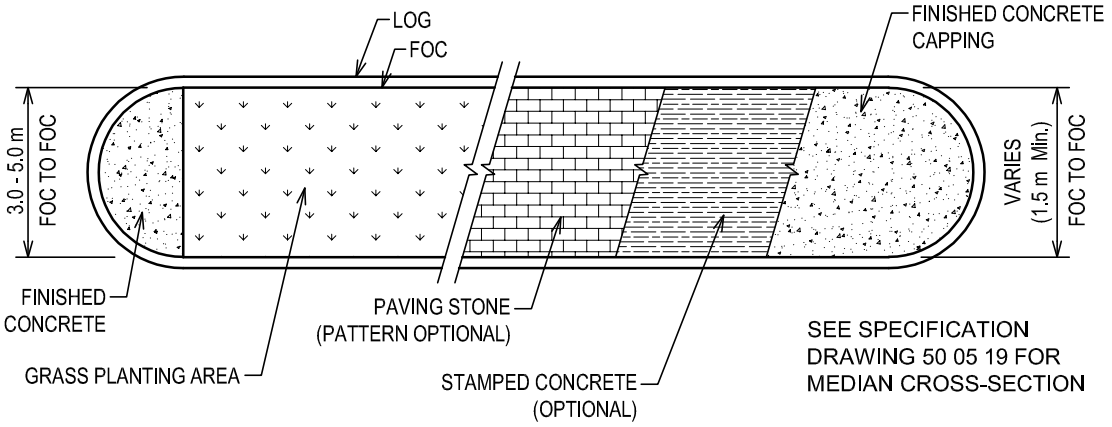
PLANTING OPTION

(TREE AND SHRUB PLANTINGS IN 5.0 m OR WIDER MEDIAN)



Note: For additional information refer to Section 14, clause 4.G.

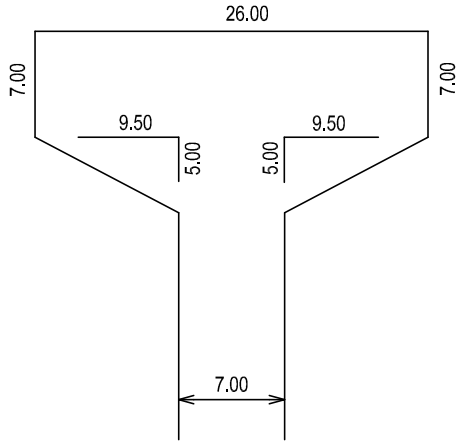
CAP OPTIONS



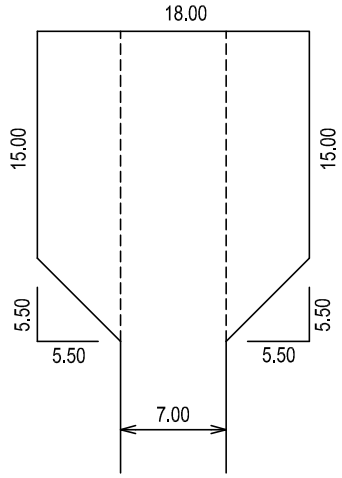
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

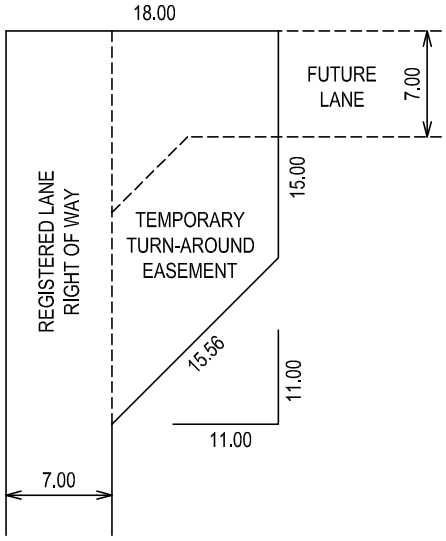
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**COLLECTOR AND LOCAL ROADWAY MEDIAN FINISHING DETAIL**	
SCALE: N.T.S.		DRAWING NO. **5.59**



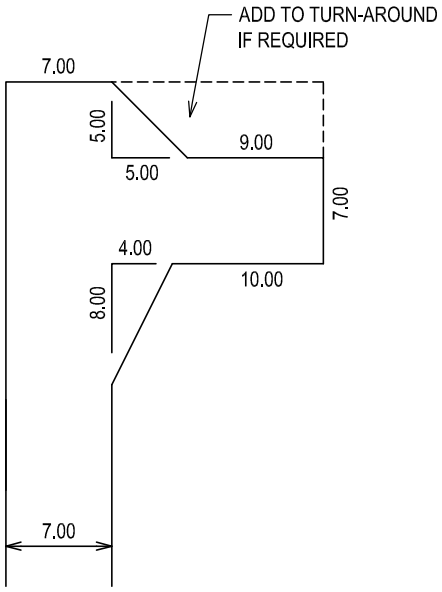
" T " TYPE



STANDARD TYPE



OFFSET TYPE



BRANCH TYPE

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
ROADWAY DESIGN

APPROVED BY:

ENGINEER

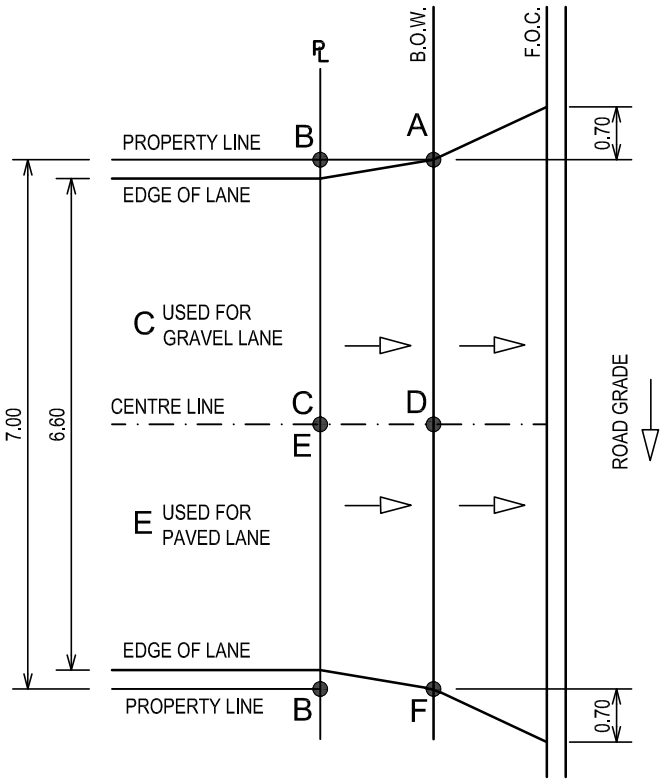
DATE: 19-04-2017

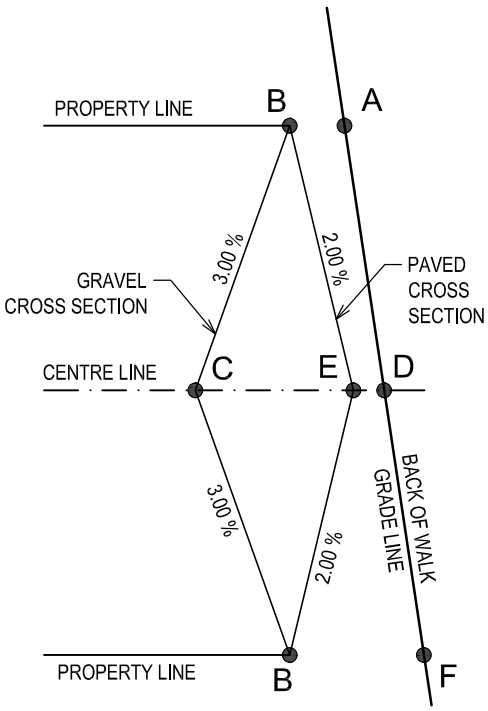
SCALE: N.T.S.

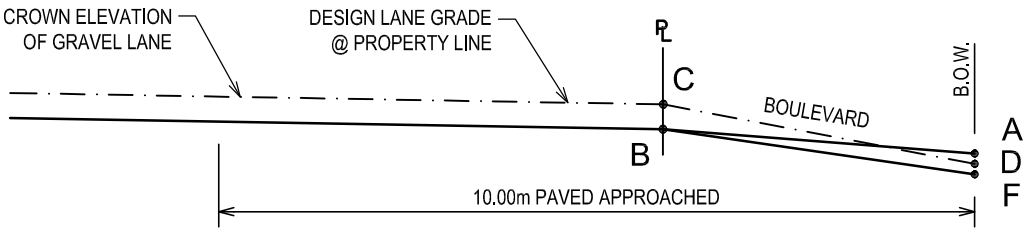
LANE TURN-AROUND OPTIONS

DRAWING NO.

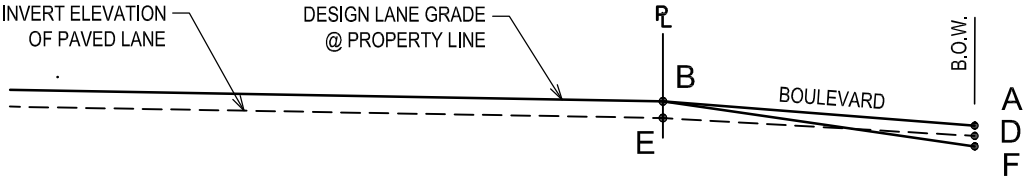
5.60







GRAVEL LANE



PAVED LANE

NOTE:
CROSSING AS PER CONTRACT SPECIFICATION
DRAWING 50 05 11 MAY BE REQUIRED FOR DRAINAGE.

NO.	DATE	REVISION
1		

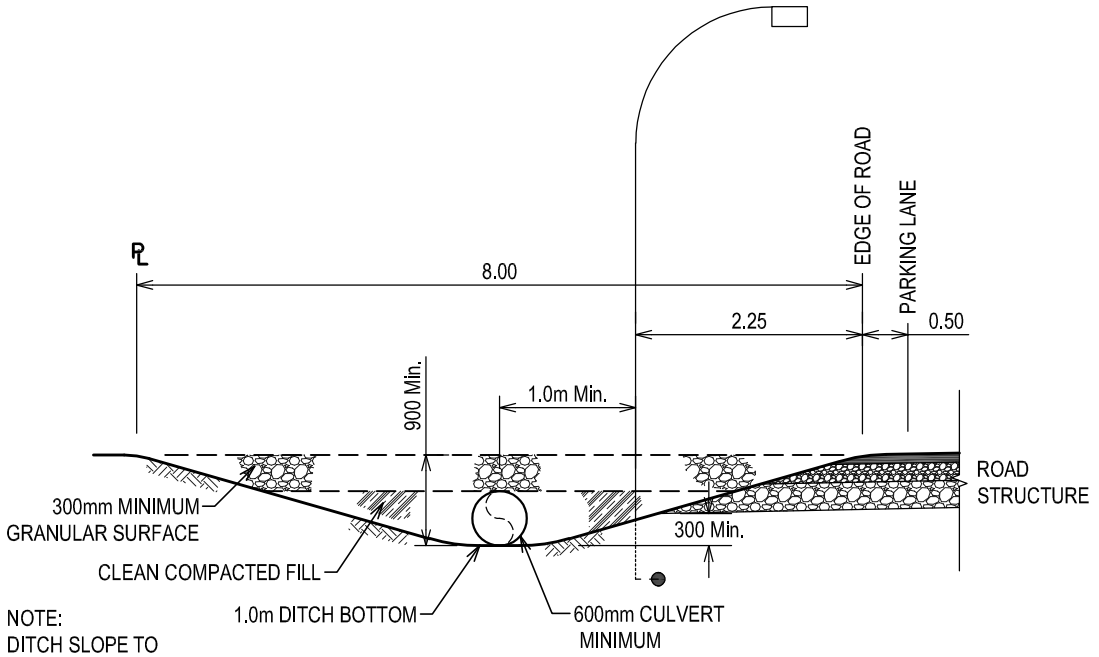
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**LANE GRADE CALCULATIONS**	
SCALE: N.T.S.		DRAWING NO. **5.61**

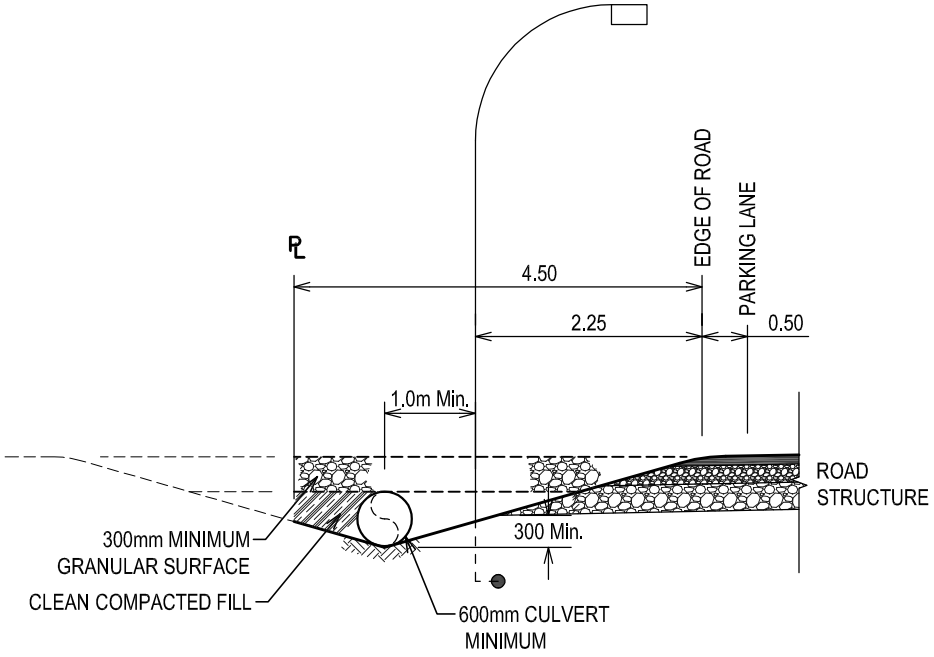
DRAWING NUMBERS

5.62 TO 5.69

INTENTIONALLY OMITTED

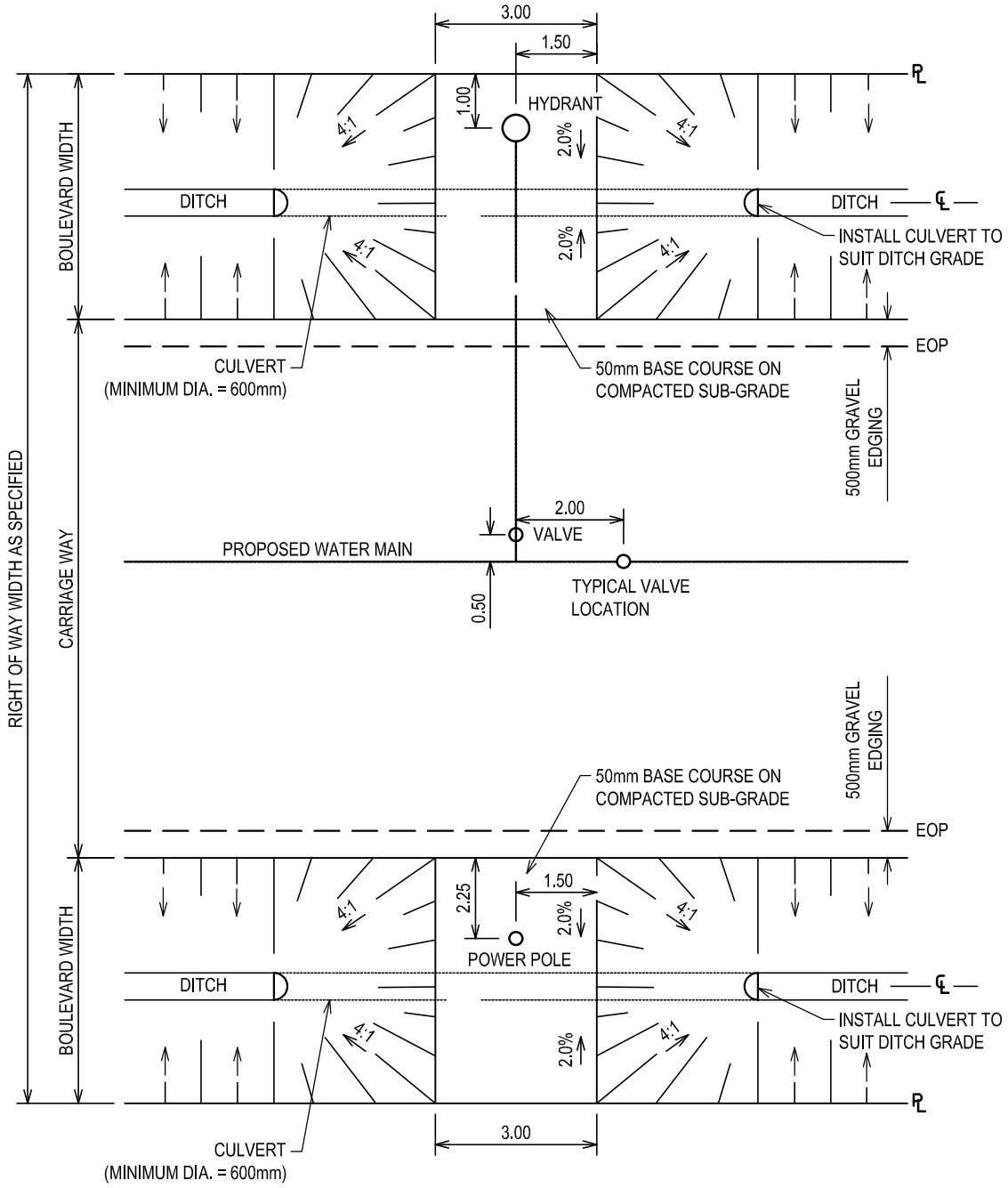


DITCH CROSSING WITH CULVERT
(VEHICLE ACCESS)



TYPICAL DITCH SECTION

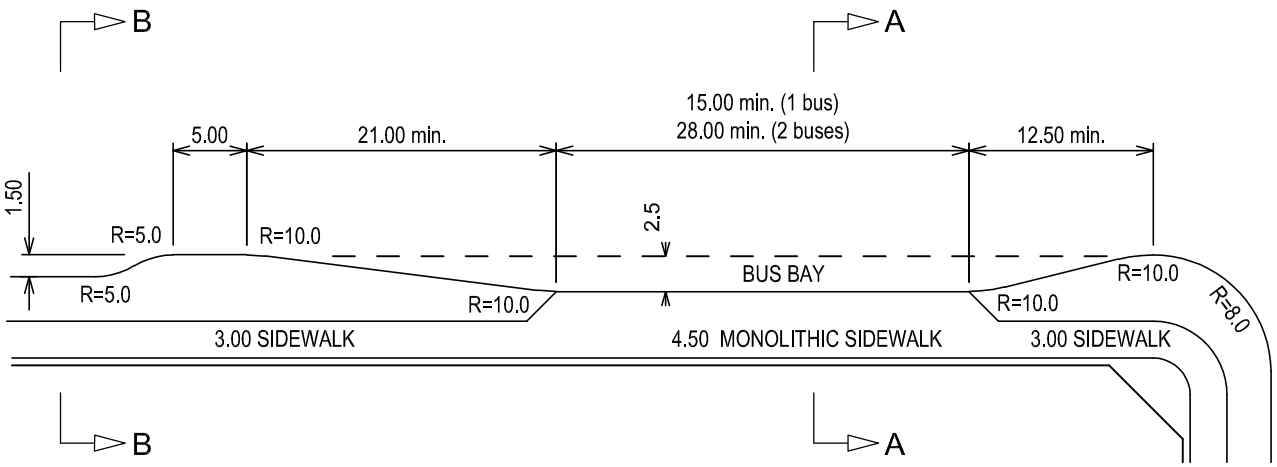
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN	APPROVED BY:
			DATE: 19-04-2017	RURAL DITCH SECTION	ENGINEER
1			SCALE: N.T.S.		DRAWING NO. 5.70



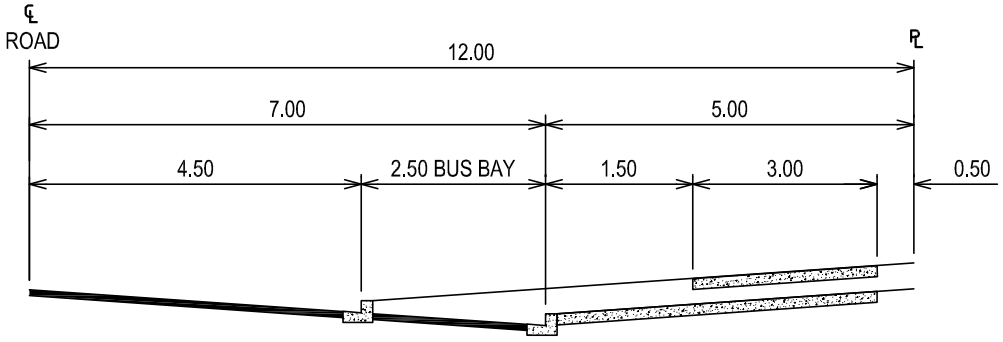
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

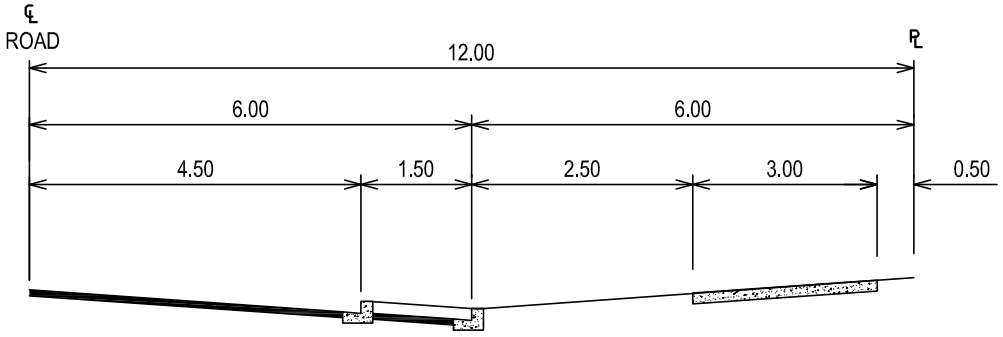
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**RURAL CROSS-SECTION HYDRANT AND POWER POLE ACCESS**	
SCALE: N.T.S.		DRAWING NO. **5.71**



PLAN VIEW



SECTION "A-A"

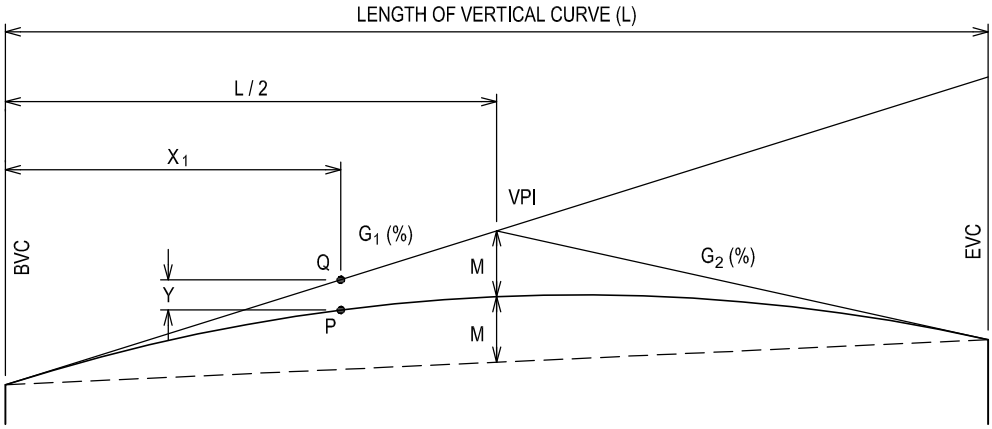


SECTION "B-B"

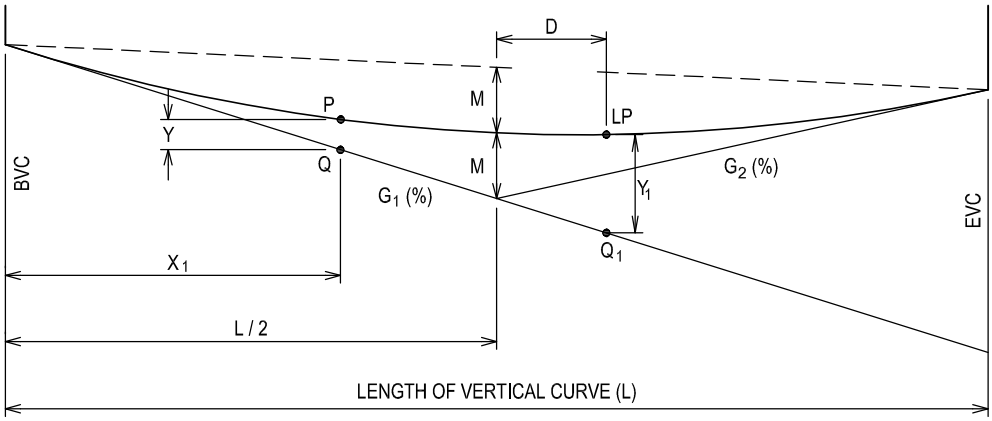
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**BUS BAY DESIGN**	
SCALE: N.T.S.		DRAWING NO. **5.72**



CREST VERTICAL CURVE



SAG VERTICAL CURVE

LENGTH OF VERTICAL CURVE (L) = K x A WHERE;
- A = ALGEBRAIC CHANGE IN GRADE, AND
- K = VERTICAL CURVE CALCULATION FACTOR (SEE TABLE 13.1 FOR K FACTORS

MID ORDINATE OFFSET (M) = A x L / 8

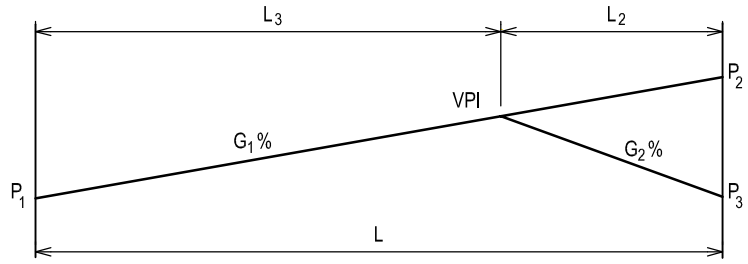
CALCULATE ELEVATION "P" AT VARIOUS STATIONS ALONG THE VERTICAL CURVE
- FIRST DETERMINE DISTANCE "X" FROM BVC
- CALCULATE ELEVATION AT POINT "X" ALONG G
- SOLVE FOR "Y" WHERE Y = (X^2 x A / 100) / (2L)
- CALCULATE ELEVATION AT "P" WHERE P = Q + Y OR P = Q - Y

SAG VERTICAL CURVE LOW POINT (LP) DISTANCE FROM VPI
- D = (L / 2) - G (LESSOR GRADE) x L / A

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**VERTICAL CURVE CALCULATIONS**	
SCALE: N.T.S.		DRAWING NO. **5.73**



CASE 1

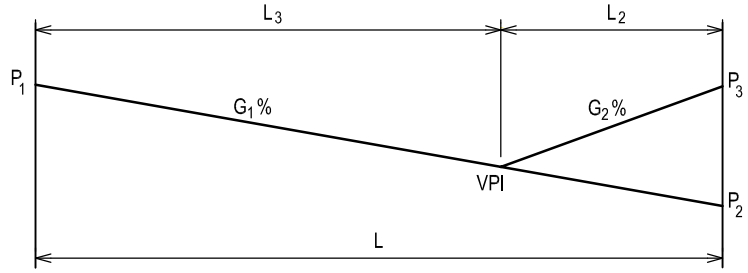
CALCULATE THE LOCATION OF VPI;
WHERE L , P_1, P_3, G_1, AND G_2 ARE KNOWN

ELEVATION @ $P_2 = P_1 + (L \times G_1 / 100)$

LENGTH OF $L_2 = (P_2 - P_3) \times 100 / (G_1 + G_2)$

ELEVATION @ VPI $= P_3 + (L_2 \times G_2 / 100)$

$L_3 = L - L_2$



CASE 2

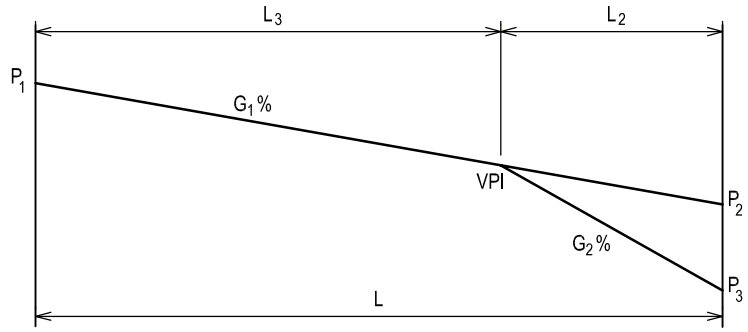
CALCULATE THE LOCATION OF VPI;
WHERE L , P_1, P_3, G_1, AND G_2 ARE KNOWN

ELEVATION @ $P_2 = P_1 - (L \times G_1 / 100)$

LENGTH OF $L_2 = (P_3 - P_2) \times 100 / (G_1 + G_2)$

ELEVATION @ VPI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$



CASE 3

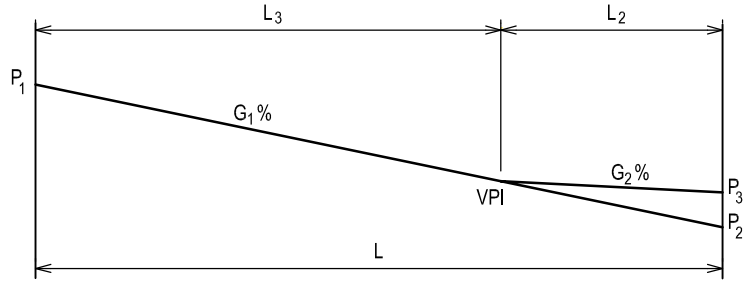
CALCULATE THE LOCATION OF VPI;
WHERE L , P_1, P_3, G_1, AND G_2 ARE KNOWN

ELEVATION @ $P_2 = P_1 - (L \times G_1 / 100)$

LENGTH OF $L_2 = (P_2 - P_3) \times 100 / (G_1 - G_2)$

ELEVATION @ VPI $= P_3 + (L_2 \times G_2 / 100)$

$L_3 = L - L_2$



CASE 4

CALCULATE THE LOCATION OF VPI;
WHERE L , P_1, P_3, G_1, AND G_2 ARE KNOWN

ELEVATION @ $P_2 = P_1 - (L \times G_1 / 100)$

LENGTH OF $L_2 = (P_3 - P_2) \times 100 / (G_1 - G_2)$

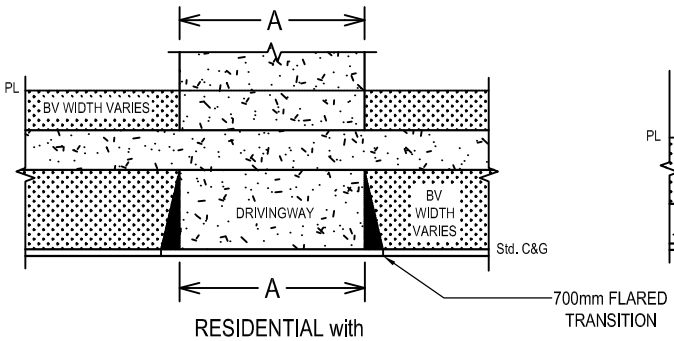
ELEVATION @ VPI $= P_3 + (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

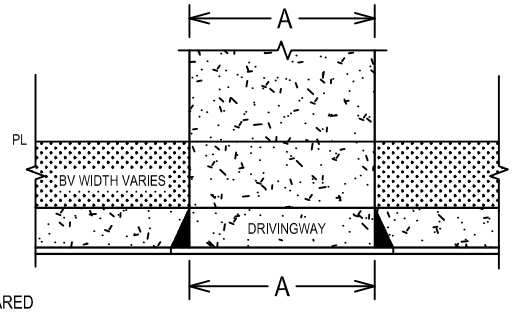
NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

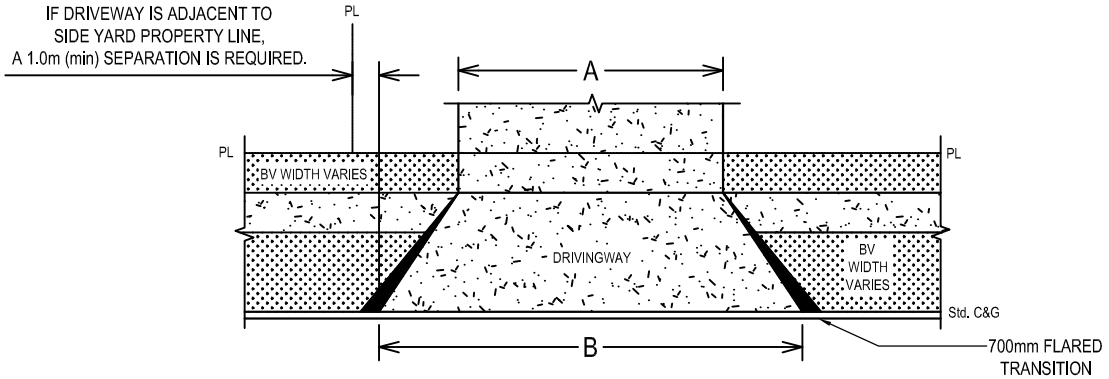
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN**	APPROVED BY: ENGINEER
DATE: 19-04-2017	**V.P.I. LOCATION CALCULATION**	
SCALE: N.T.S.		DRAWING NO. **5.74**



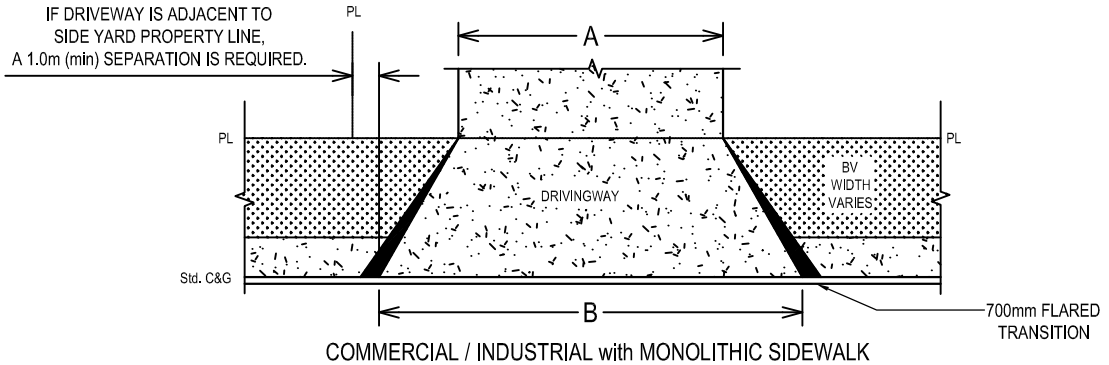
RESIDENTIAL with
SEPARATE SIDEWALK



RESIDENTIAL with
MONOLITHIC SIDEWALK



COMMERCIAL / INDUSTRIAL with SEPARATE SIDEWALK

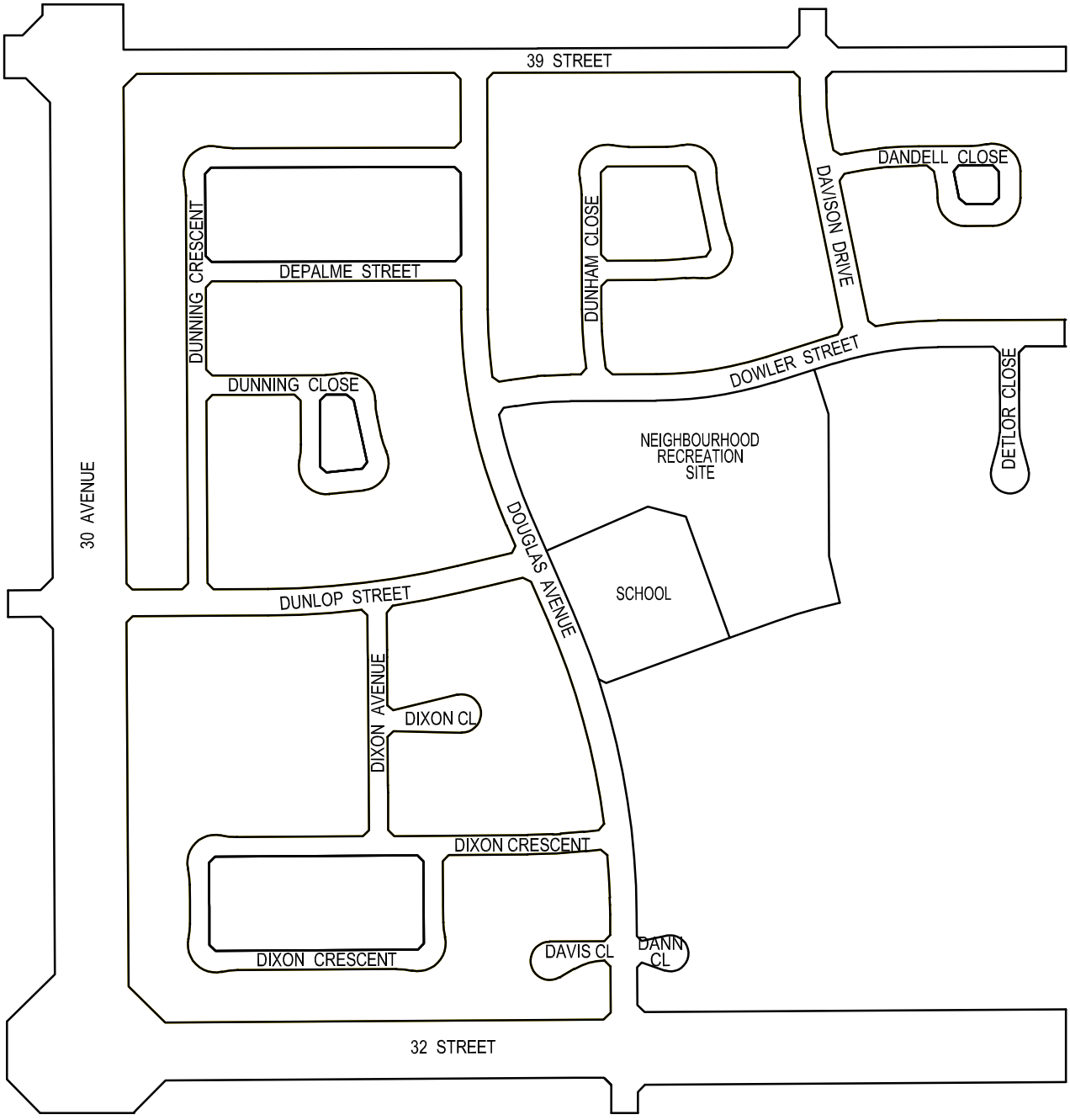


COMMERCIAL / INDUSTRIAL with MONOLITHIC SIDEWALK

NOTE: REFER TO THE TOWN LAND USE BYLAW FOR DRIVEWAY WIDTHS.

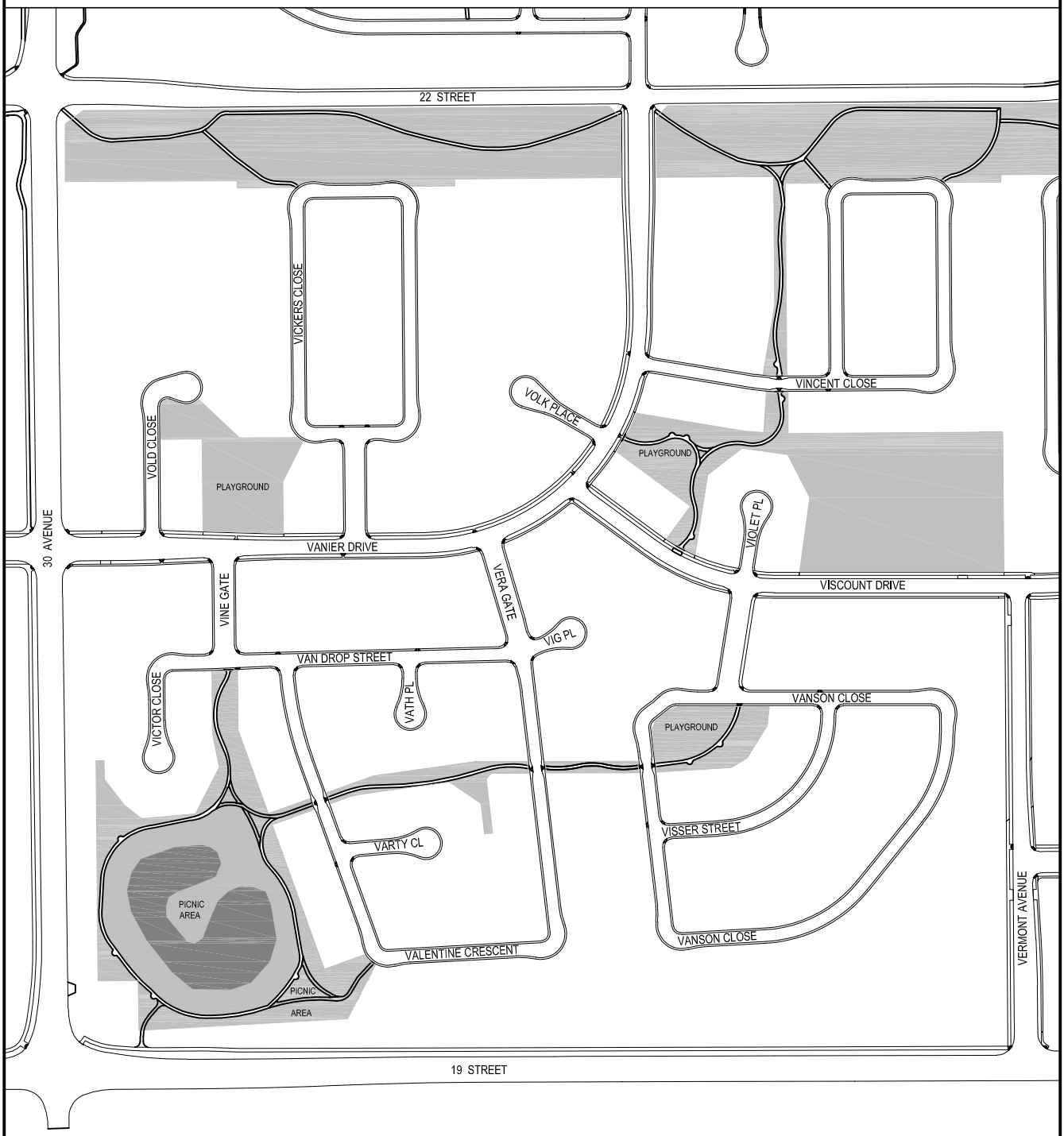
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS ROADWAY DESIGN	APPROVED BY:
			DATE: 19-04-2017	TYPICAL DRIVEWAY LAYOUTS	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.75

SUBDIVISION NAME



			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS SUBDIVISION SIGNAGE	APPROVED BY:
			DATE: 19-04-2017	SAMPLE ROADWAY NETWORK SIGN	ENGINEER
1			SCALE: N.T.S.		DRAWING NO. 6.01A
NO.	DATE	REVISION			

SUBDIVISION NAME



			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS SUBDIVISION SIGNAGE	APPROVED BY:
			DATE: 19-04-2017	SAMPLE PEDESTRIAN NETWORK SIGN	ENGINEER
1			SCALE: N.T.S.		DRAWING NO. 6.01B
NO.	DATE	REVISION			

SUBDIVISION NAME
Developer's Corporate Name Telephone Number Subdivision Servicing and Lot Sales Information
Town Planning & Development Department 403.556.6981 Land Use and Area Structure Plans
Town Engineering Services Department 403.556.6981 Development Engineering Information
Chinook Edge School District No. 73 403.887.2412 Information regarding Public Schools
Holy Trinity Catholic School 403.556.8444 Information regarding Catholic Schools

GENERAL INFORMATION SIGN

SUBDIVISION NAME
In accordance with the approved Outline Plan, this site is proposed to be a Neighbourhood Recreation Park For additional information, please contact the Town Planning and Development Department 403.556.6981

NEIGHBOURHOOD
RECREATION SIGN

SUBDIVISION NAME
In accordance with the approved Area Structure Plan, this site is proposed to be the site of a K - 9 School For additional information, please contact the Chinook Edge School District No. 73 403.887.2412 or Holy Trinity Catholic School 403.556.8444

FUTURE SCHOOL SITE SIGN

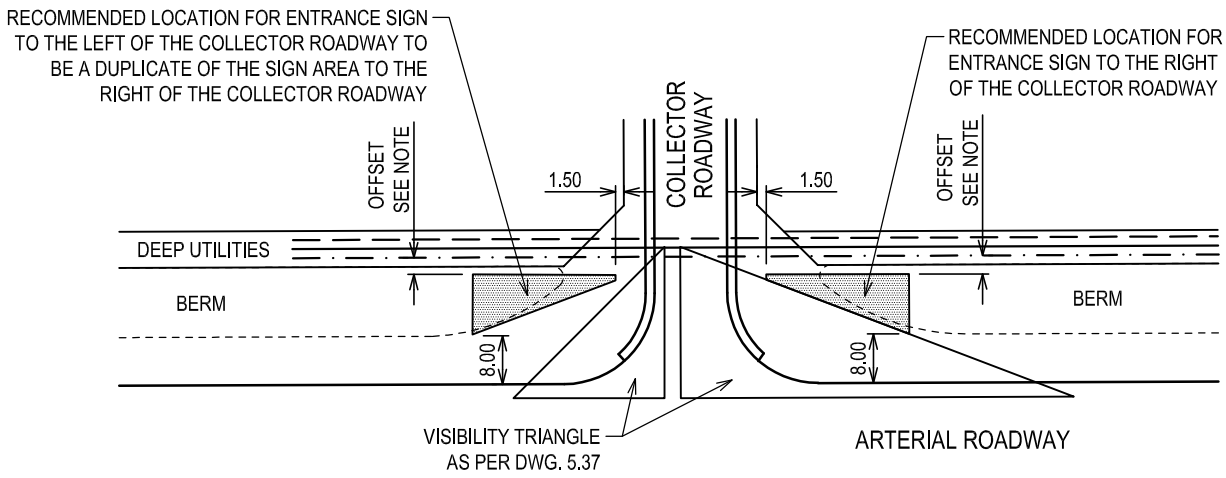
STORM WATER POND
This area contains a storm water pond. During heavy rainfalls, water will flow into the pond and then drain away when the rainfall decreases. Please keep clear of this area during one of these events as the pond may fill with water rapidly. For further information contact : The Town of Olds Engineering Services 403.556.6981

STORM WATER
POND WARNING SIGN

NO.	DATE	REVISION
1		

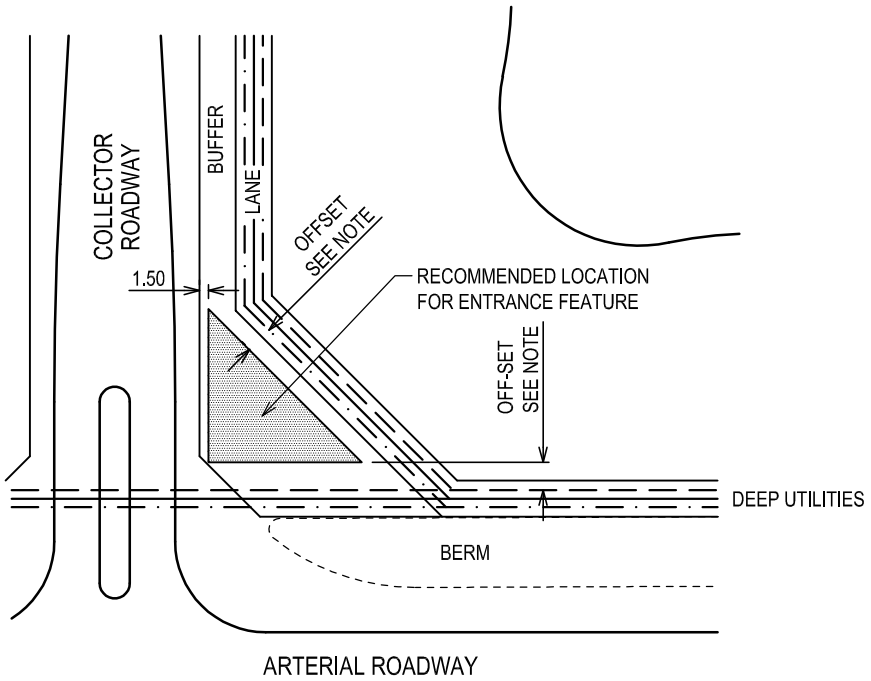
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS SIGNAGE AND PAVEMENT MARKING**	APPROVED BY:
DATE: 19-04-2017	**SAMPLE INFORMATION SIGNS**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **6.02**



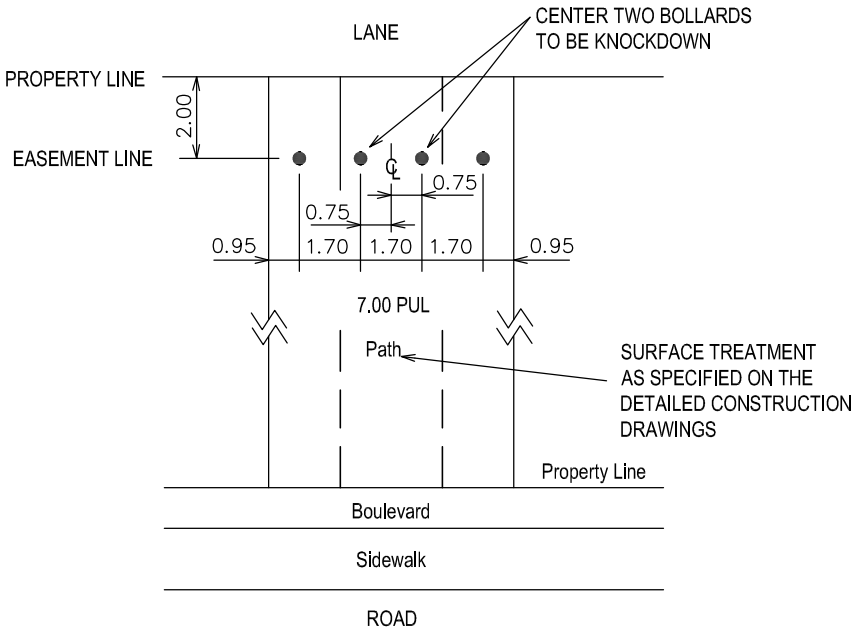
OPTION 1

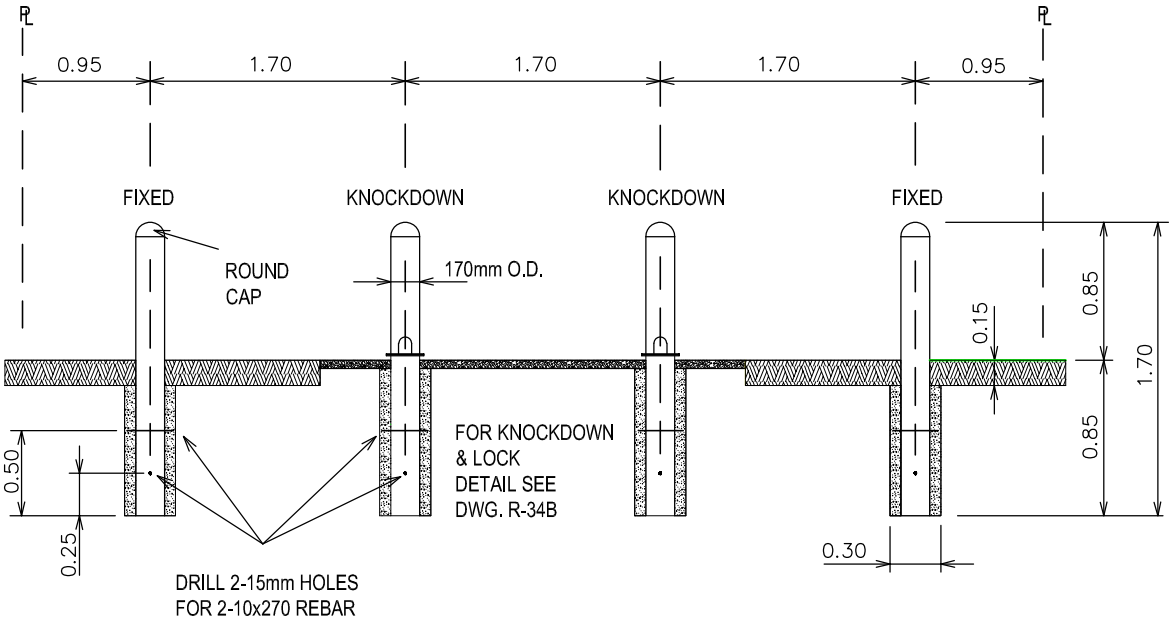
NOTE :
OFFSET NOT TO BE LESS THAN 1:1 SEPARATION FROM THE INVERT OF THE NEAREST UTILITY MAIN TO GROUND ELEVATION, OR A MINIMUM OF 3.0m FROM NEAREST DEEP UTILITY.



OPTION 2

			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS SIGNAGE AND PAVEMENT MARKING	APPROVED BY:
			DATE: 19-04-2017	SUBDIVISION ENTRANCE SIGN LOCATIONS	ENGINEER
1			SCALE: N.T.S.		DRAWING NO. 6.03
NO.	DATE	REVISION			



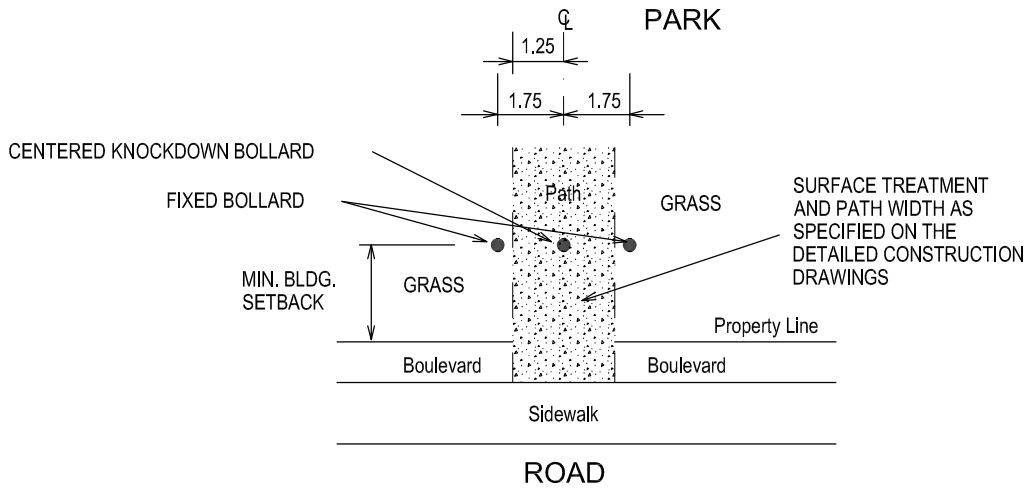


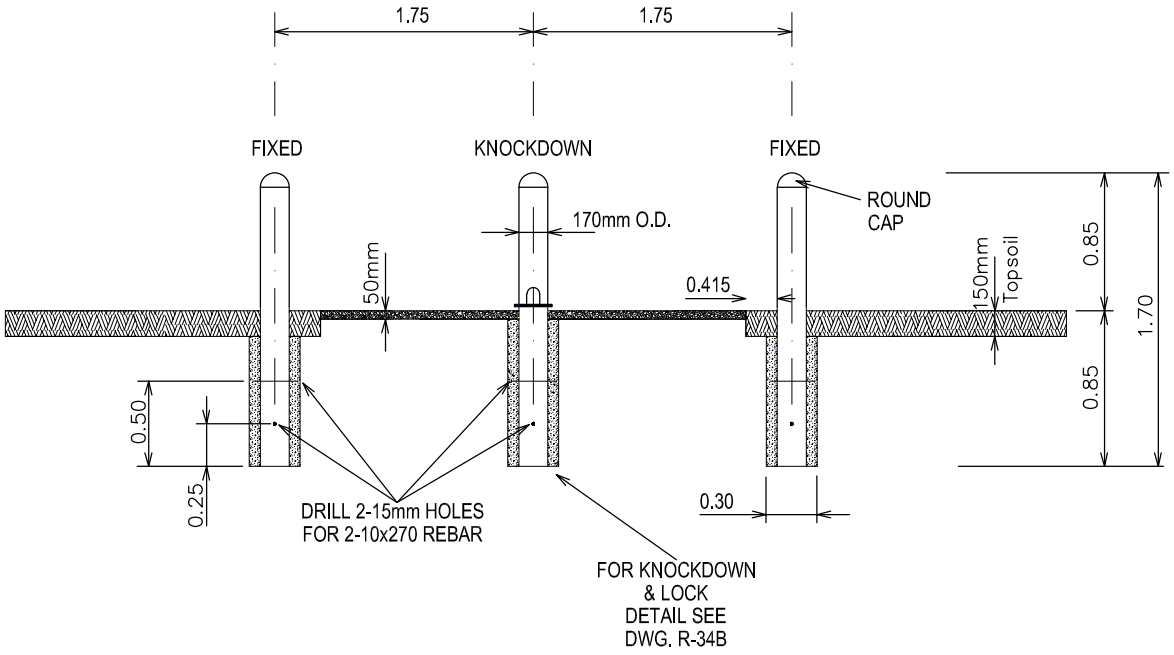
NOTE: DIMENSIONS IN METRES UNLESS OTHERWISE NOTED

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PARKS STANDARD DESIGN**	APPROVED BY: ENGINEER
DATE: 27-04-2017	**FIXED & KNOCKDOWN 4-BOLLARD SYSTEM**	
SCALE: N.T.S.		DRAWING NO. **7.01**





NOTES:

1. DIMENSIONS IN METRES UNLESS OTHERWISE NOTED.
2. WORKSITE TO BE MAINTAINED IN A SAFE CONDITION AT ALL TIMES.
3. CONCRETE TO HAVE 25mm AGGREGATE, MINIMUM 3,000 P.S.I., INSTALLATION TO BE INSPECTED BY PARKS DEPARTMENT PROJECT MANAGER PRIOR TO CONCRETE POUR.
4. BOLLARD SPACING TO BE PRECISE (+/_ 25mm). ALL BOLLARDS INSTALLED PLUMB.
5. ALL ASPHALT REMOVAL TO BE SAWCUT.
6. LANDSCAPING TO BE RESTORED TO ORIGINAL CONDITION.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
PARKS DESIGN

APPROVED BY:

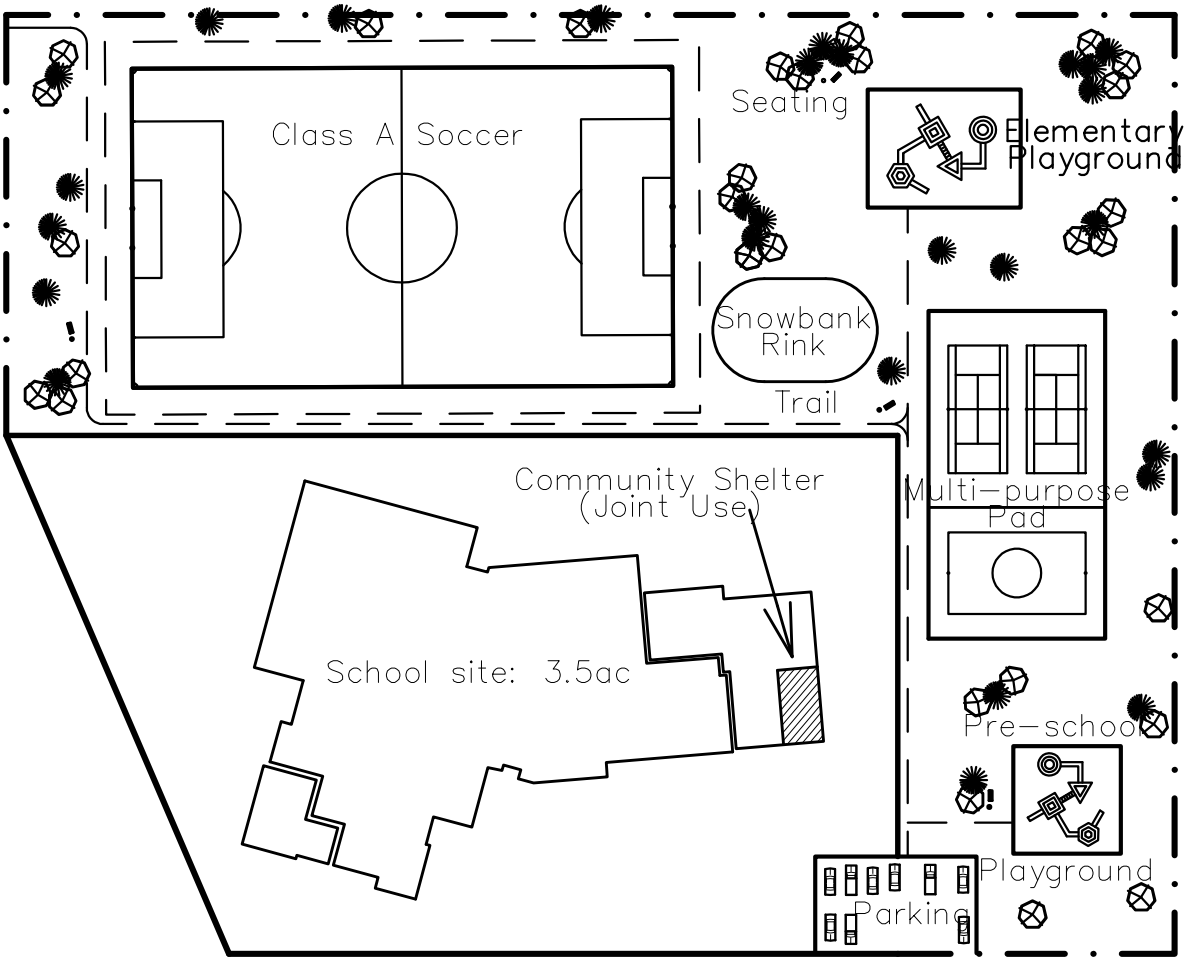
ENGINEER

DATE: 27-04-2017

FIXED & KNOCKDOWN 3-BOLLARD SYSTEM

SCALE: N.T.S.

DRAWING NO. **7.02**



NEIGHBORHOOD SCHOOL & PARK SITE CONCEPT PLAN

EXAMPLE

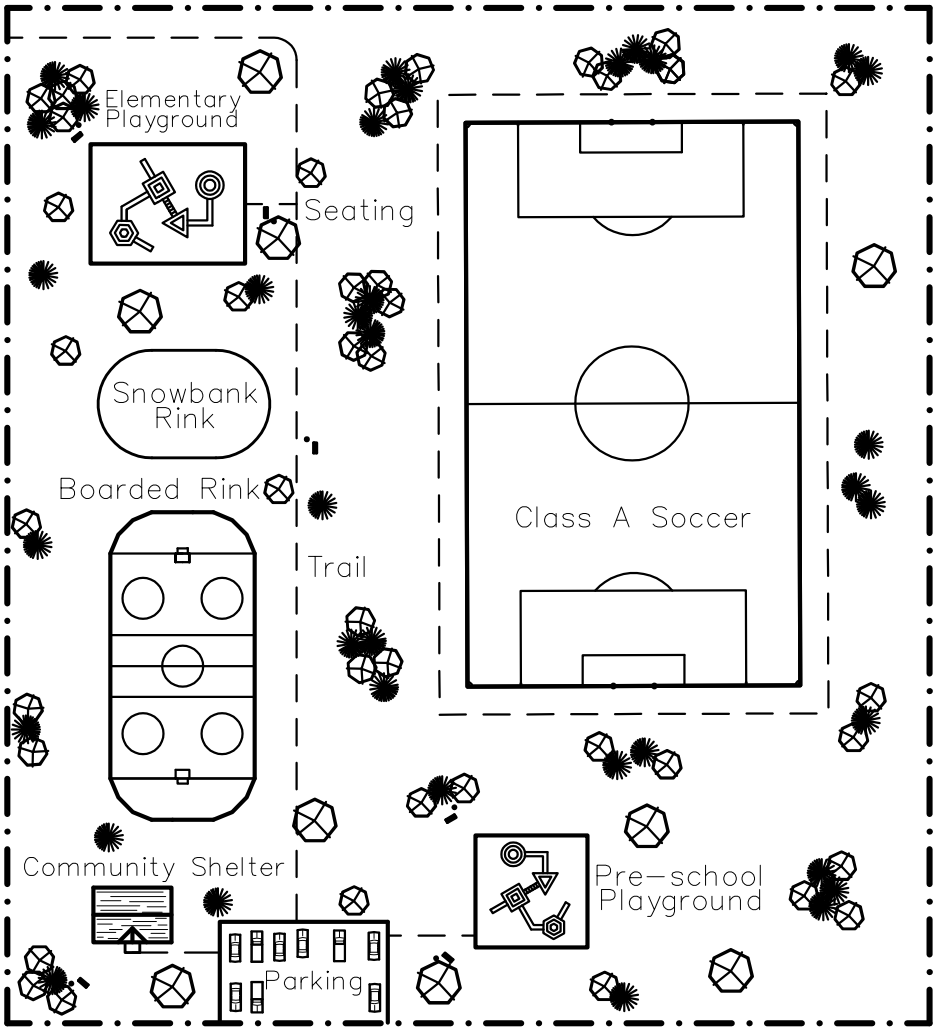
NOTES:

- Site area to be calculated as detailed in the design guidelines, (Section #2).
- The site will be functional and regular-shaped configuration; necessary to accommodate the required recreational facilities and services; +/- 50% of the site perimeter should have street frontage.
- Neighborhood school & park sites will have a minimum of 1-Class A soccer field.
- Trail alignments will be determined in consultation with the community, after site development and site use.
- A clearance zone of no less than 20 meters will be maintained between all facilities and lanes (back of curb).
- A buffer strip of no less than 5.0m wide will be maintained, surrounding the soccer and ball fields.
- For sports field grading patterns, refer to the Recreation, Parks & Culture Department Standards Manual.
- Where possible, established native tree clusters will be preserved as part of the Ecological Preservation Process.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PARKS DESIGN**	APPROVED BY: ENGINEER
DATE: 26-04-2017	**NEIGHBORHOOD PARK SITE**	
SCALE: N.T.S.		DRAWING NO. **7.03**



NEIGHBORHOOD PARK SITE CONCEPT PLAN

EXAMPLE

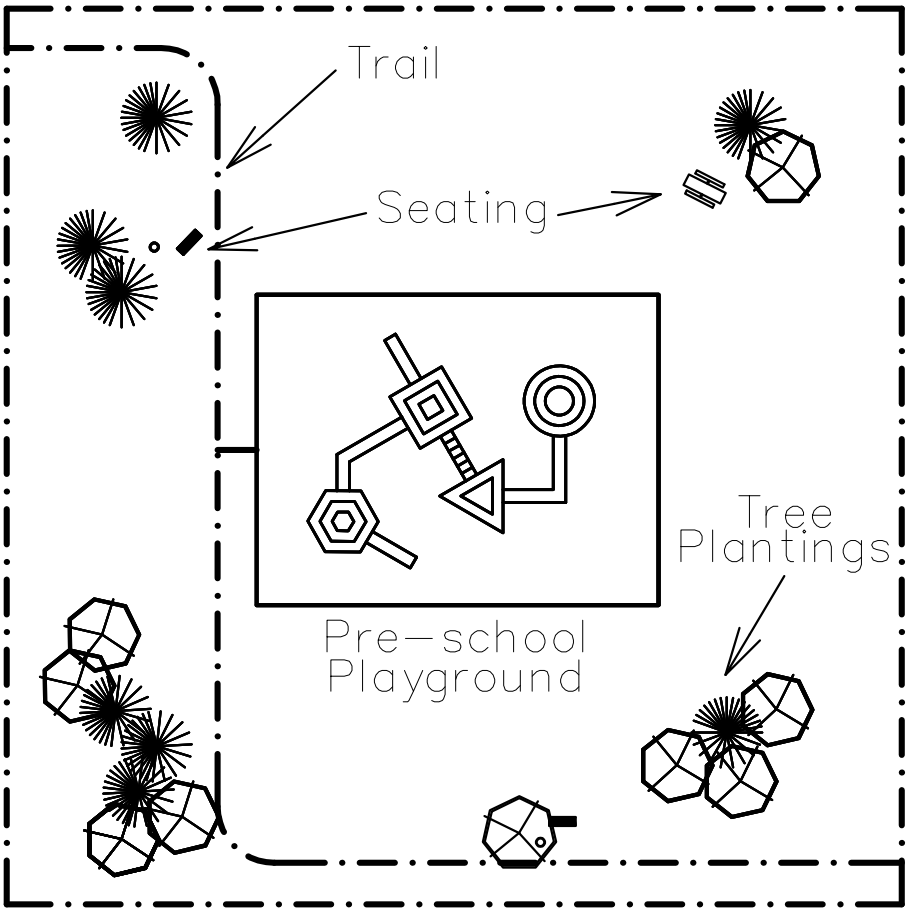
NOTES:

- Site area to be calculated as detailed in the design guidelines, (Section #2).
- The site will be functional and regular-shaped configuration; necessary to accommodate the required recreational facilities and services; +/- 50% of the site perimeter should have street frontage.
- Neighborhood park sites will have a minimum of 1-Class A soccer field.
- Trail alignments will be determined in consultation with the community, after site development and site use.
- A clearance zone of no less than 20 meters will be maintained between all facilities and lanes (back of curb).
- A buffer strip of no less than 5.0m wide will be maintained, surrounding the soccer and ball fields.
- For sports field grading patterns, refer to the Recreation, Parks & Culture Department Standards Manual.
- Where possible, established native tree clusters will be preserved as part of the Ecological Preservation Process.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PARKS DESIGN**	APPROVED BY: ENGINEER
DATE: 27-04-2017	**PARK SITE EXAMPLE**	
SCALE: N.T.S.		DRAWING NO. **7.04**



TYPICAL 0.4ha SITE PARKETTE CONCEPT PLAN

EXAMPLE

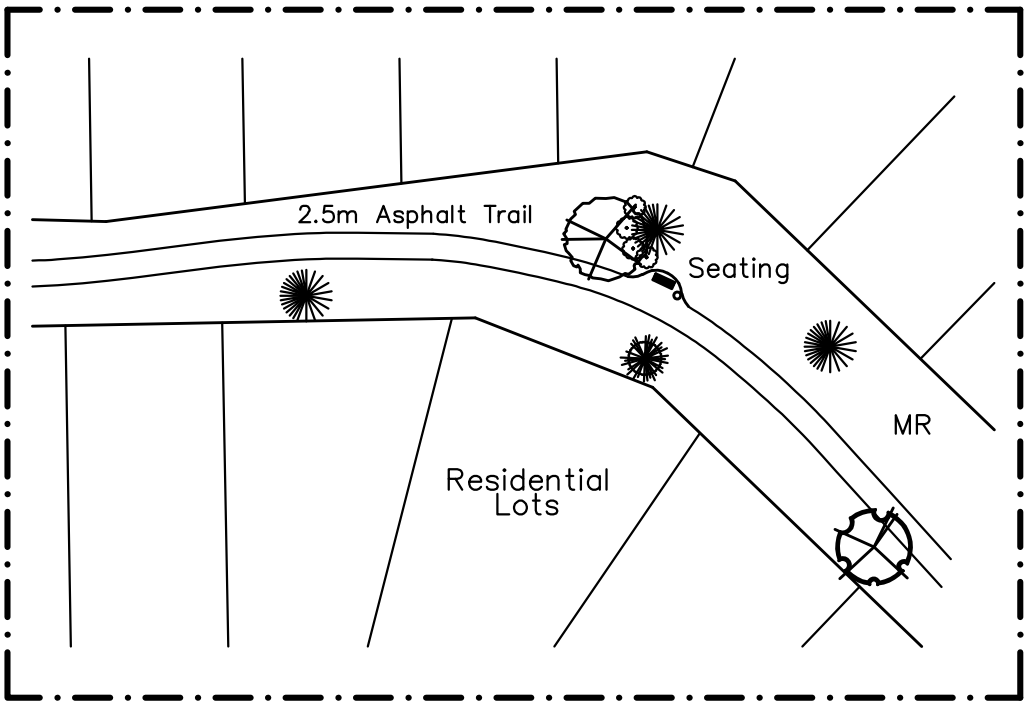
NOTES:

- Site area to be calculated as detailed in the design guidelines, (Section #14).
- The site will be functional and regular-shaped configuration; necessary to accommodate the required recreational facilities and services; +/- 50% of the site perimeter should have street frontage.
- Parkette sites may contain a Tot-lot, active and/or passive recreational components and trail systems.
- Trail alignments will be determined in consultation with the community, after site development and site use.
- A clearance zone of no less than 20 meters will be maintained between all facilities and lanes (back of curb).
- Where possible, established native tree clusters will be preserved as part of the Ecological Preservation Process.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PARKS DESIGN**	APPROVED BY: ENGINEER
DATE: 27-04-2017	**PARKETTE PARK SITE**	
SCALE: N.T.S.		DRAWING NO. **7.05**



LINEAR PARK CONCEPT PLAN

JANUARY 2004

NOTES:

- Site area to be calculated as detailed in the design guidelines, (Section #14).
- A linear parcel of land with a minimum width of 10.0 meters, that may contain active and/or passive recreation components, and trail systems.

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PARKS DESIGN**	APPROVED BY: ENGINEER
DATE: 27-04-2017	**TYPICAL LINEAR PARK SITE**	
SCALE: N.T.S.		DRAWING NO. **7.06**

LANDSCAPING LEGEND

Common Name / Botanical Name	Min Size	Quantity
Fallgold Black Ash, 60mm Fraxinus nigra 'Fallgold'	Cal.	9
American Mountain Ash Sorbus americana	60mm Cal.	5
Savin Juniper Juniperus sabina	#2 Cont.	16

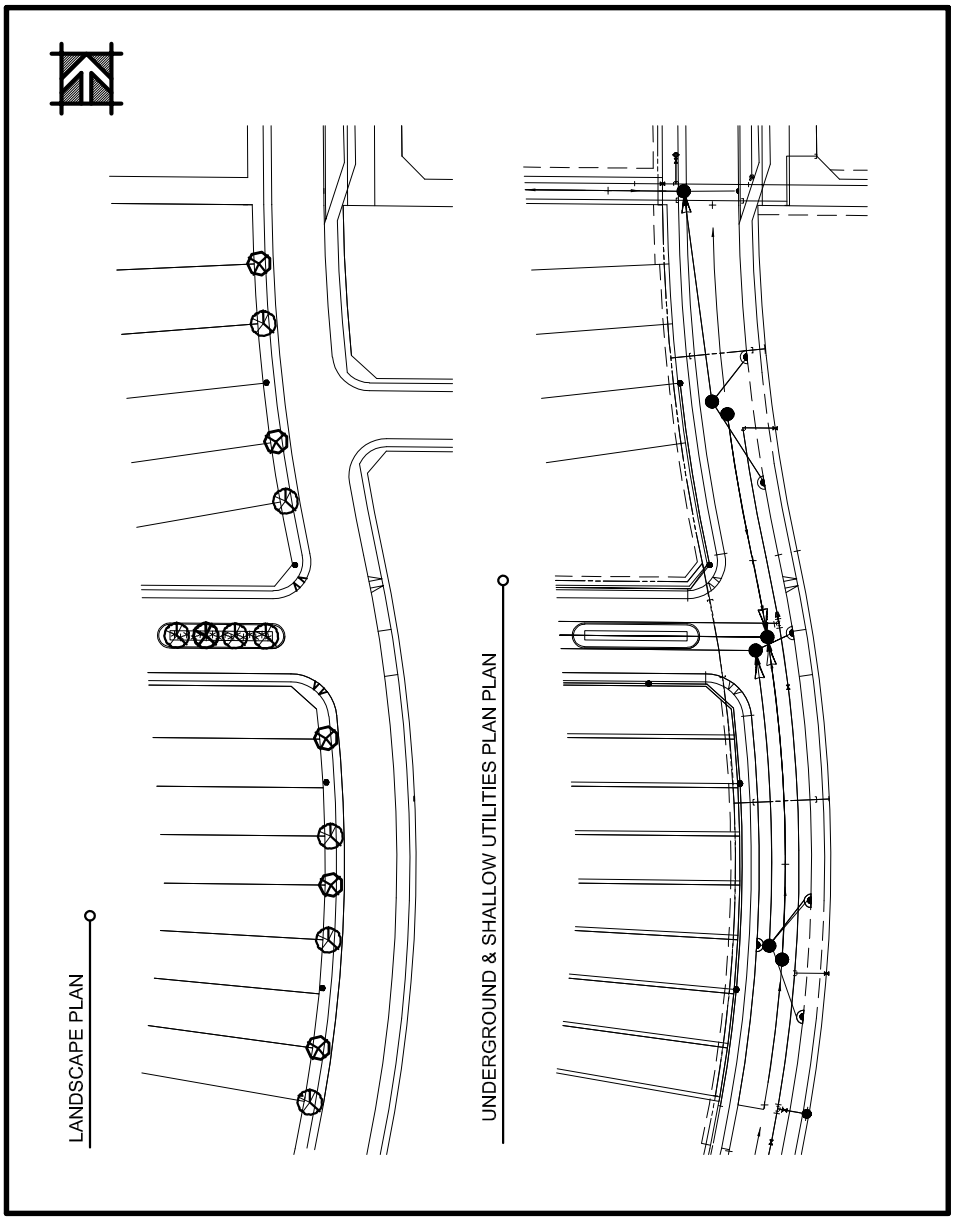
COMPANY NAME

PROJECT:
PLAN NAME - PHASE
LANDSCAPE
UNDERGROUND & SHALLOW UTILITIES PLAN

NO.	DATE	BY	SUBJECT
REVISIONS:			

DESIGNED:
DRAWN:
CHECKED:
APPROVED:

SHEET
REV.
DRAWING NUMBER



NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DESIGN GUIDELINE DRAWINGS
PARKS DESIGN

APPROVED BY:

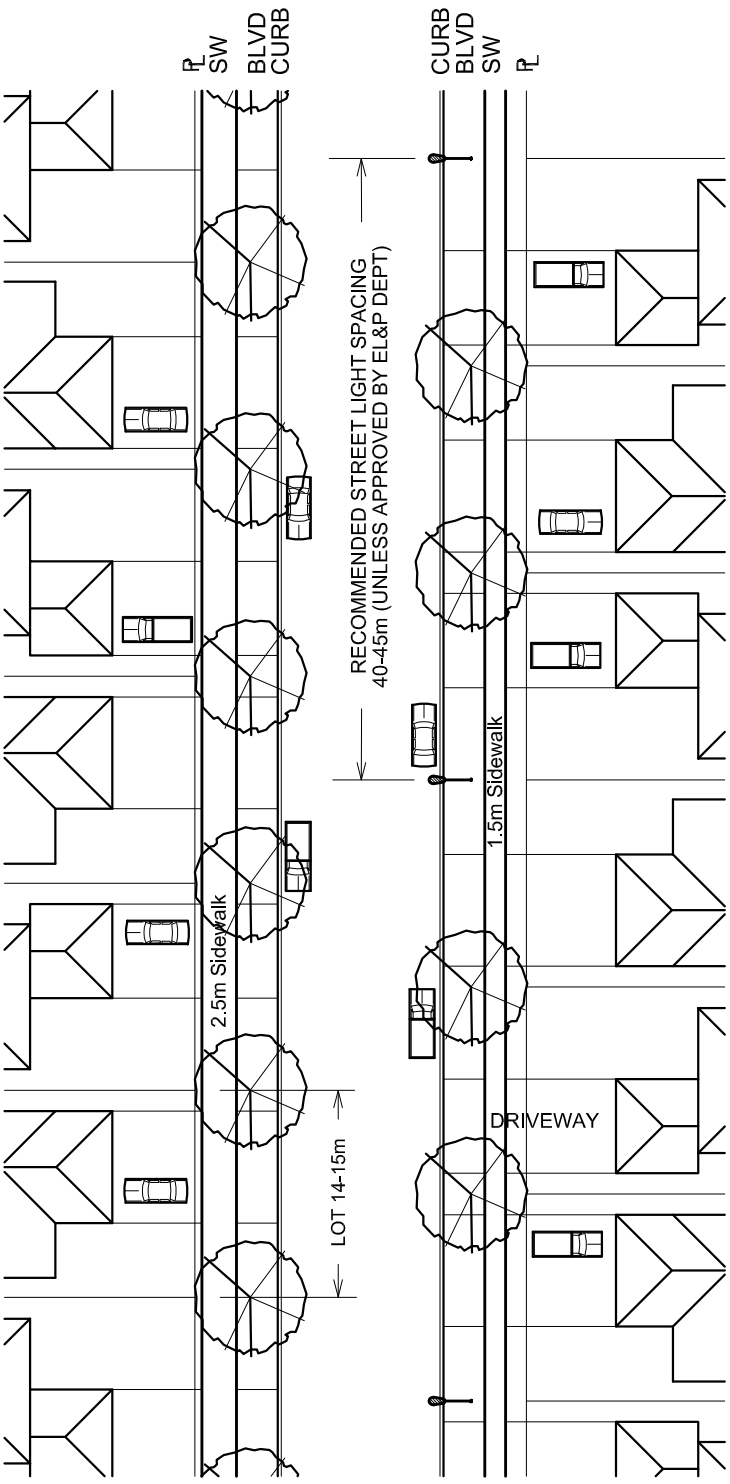
ENGINEER

DATE: 27-04-2017

TYPICAL LANDSCAPE & UTILITY LAYOUT PLAN

SCALE: N.T.S.

DRAWING NO.
7.07

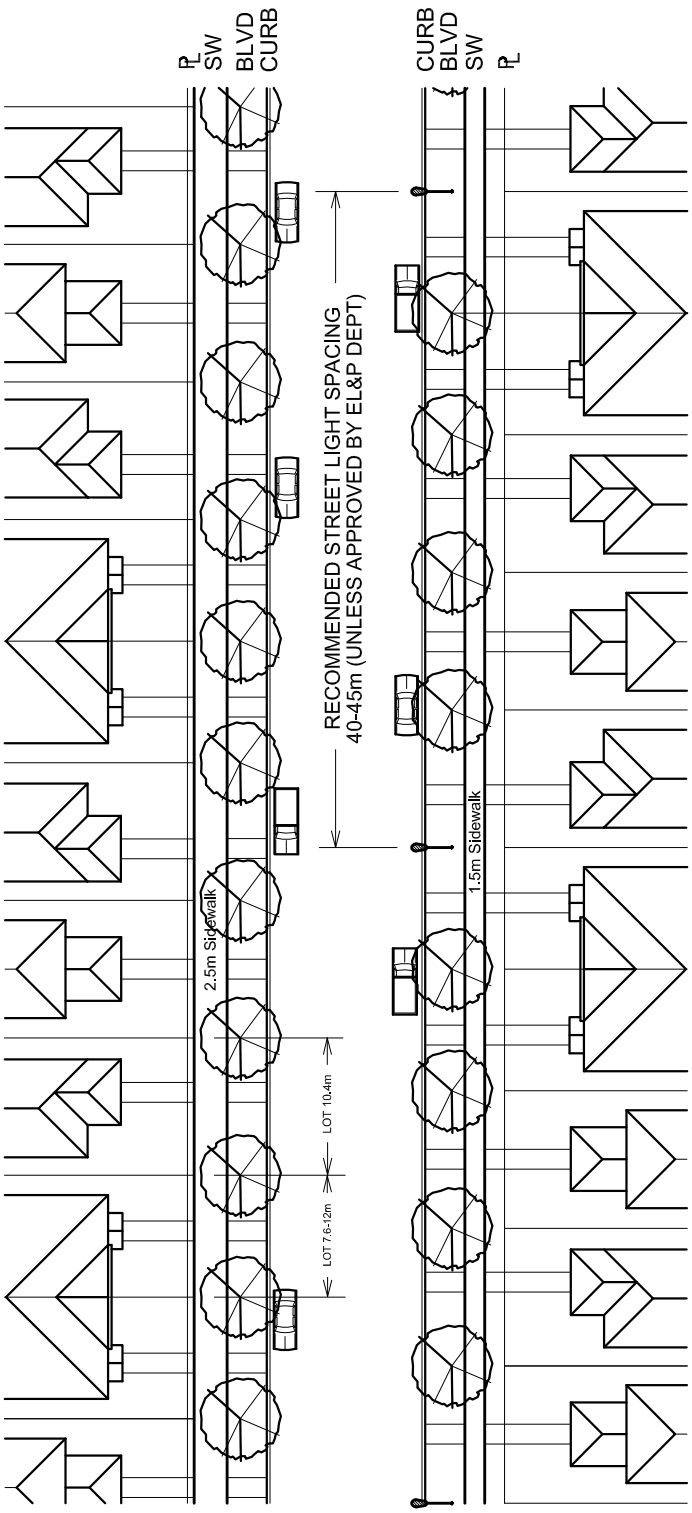


COLLECTOR ROADWAY WITH SEPARATE SIDEWALK

NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

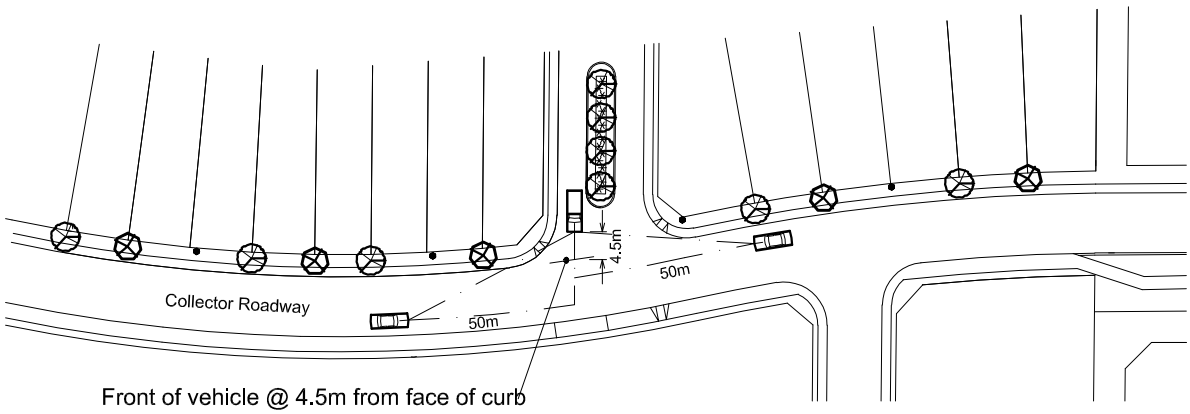
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PARKS DESIGN**	APPROVED BY: ENGINEER
DATE: 27-04-2017	**TYPICAL COLLECTOR ROADWAY TREE PLANTING & STREET LIGHT LAYOUT (R-1 ZONING)**	
SCALE: N.T.S.		DRAWING NO. **7.08**



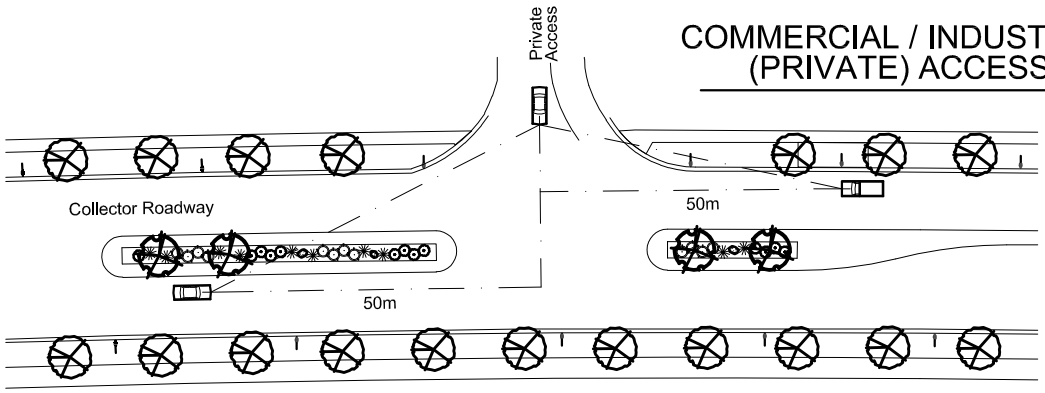
COLLECTOR ROADWAY WITH SEPARATE SIDEWALK

			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PARKS DESIGN	APPROVED BY: ENGINEER
			DATE: 27-04-2017	TYPICAL COLLECTOR ROADWAY TREE PLANTING & STREET LIGHT LAYOUT (R-2 TO R-3 ZONING)	
1			SCALE: N.T.S.		DRAWING NO. 7.09
NO.	DATE	REVISION			

LOCAL TO COLLECTOR ROADWAY

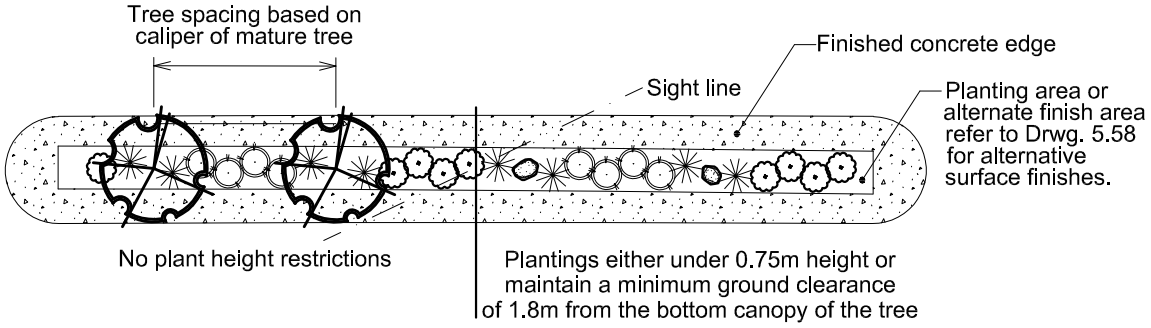


COMMERCIAL / INDUSTRIAL (PRIVATE) ACCESS



- TAC's urban supplement table U.D.6.2. for specific sightline determination.
- For arterial sightline restrictions see drwg. 5.37.
- Sightlines have been standardized from TAC manual; the distance represents the oncoming vehicle travelling @ 60 km/h.

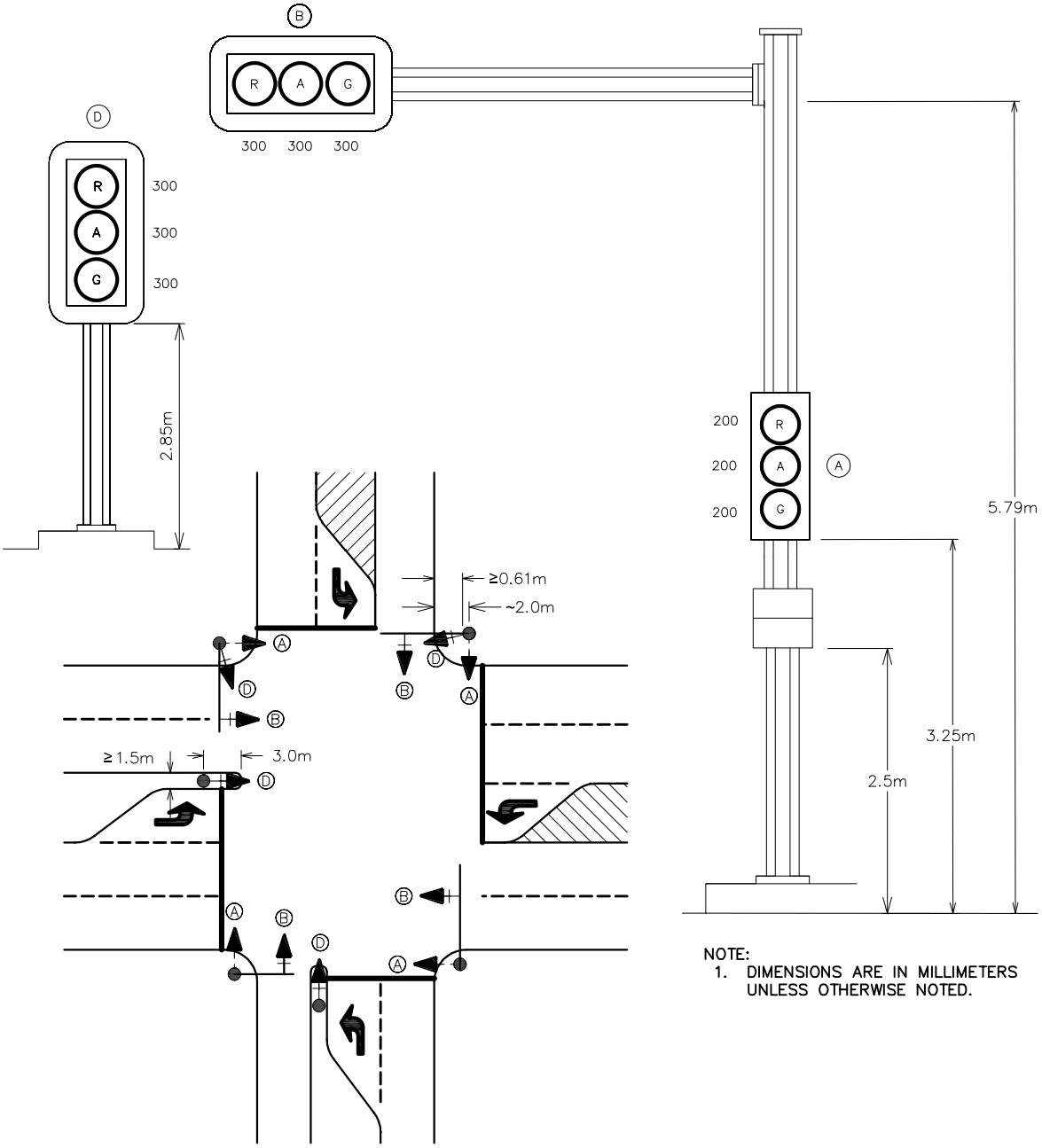
TYPICAL PLANTING ARRANGEMENT



NO.	DATE	REVISION
1		

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PARKS DESIGN**	APPROVED BY: ENGINEER
DATE: 27-04-2017	**TYPICAL MEDIAN LANDSCAPING**	
SCALE: N.T.S.		DRAWING NO. **7.10**

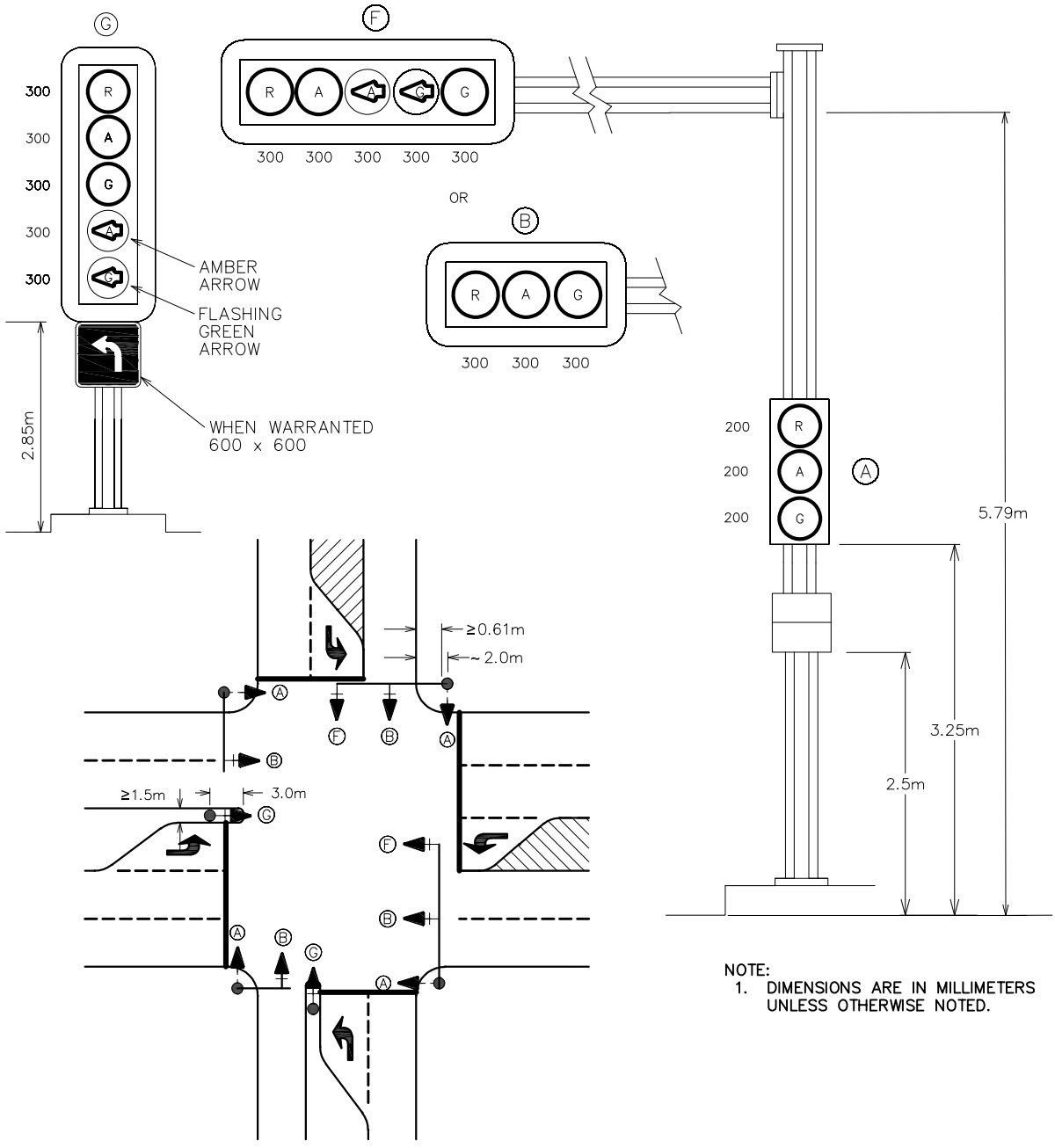


NOTE:
1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**STANDARD SIGNAL LAYOUT NO LEFT TURN PHASE**	
SCALE: N.T.S.		DRAWING NO. **8.01**

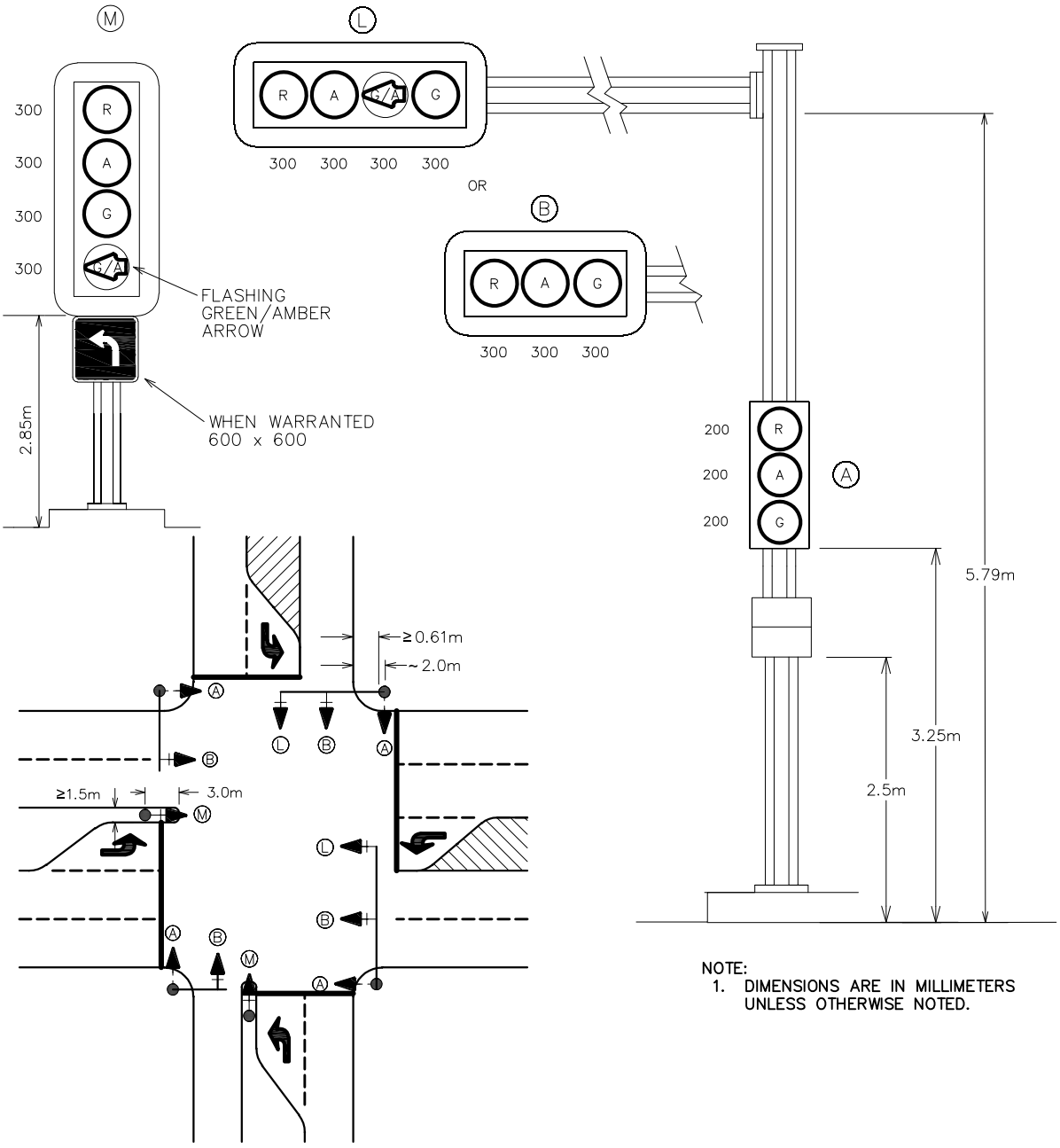


NOTE:
1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINES DRAWINGS TRAFFIC SIGNALS**	APPROVED BY:
DATE: 21-04-2017	**STANDARD SIGNAL LAYOUT PROTECTED-PERMISSIVE LEADING SIMULTANEOUS LEFT TURN PHASING (5-SECTION INCANDESCENT)**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.02**

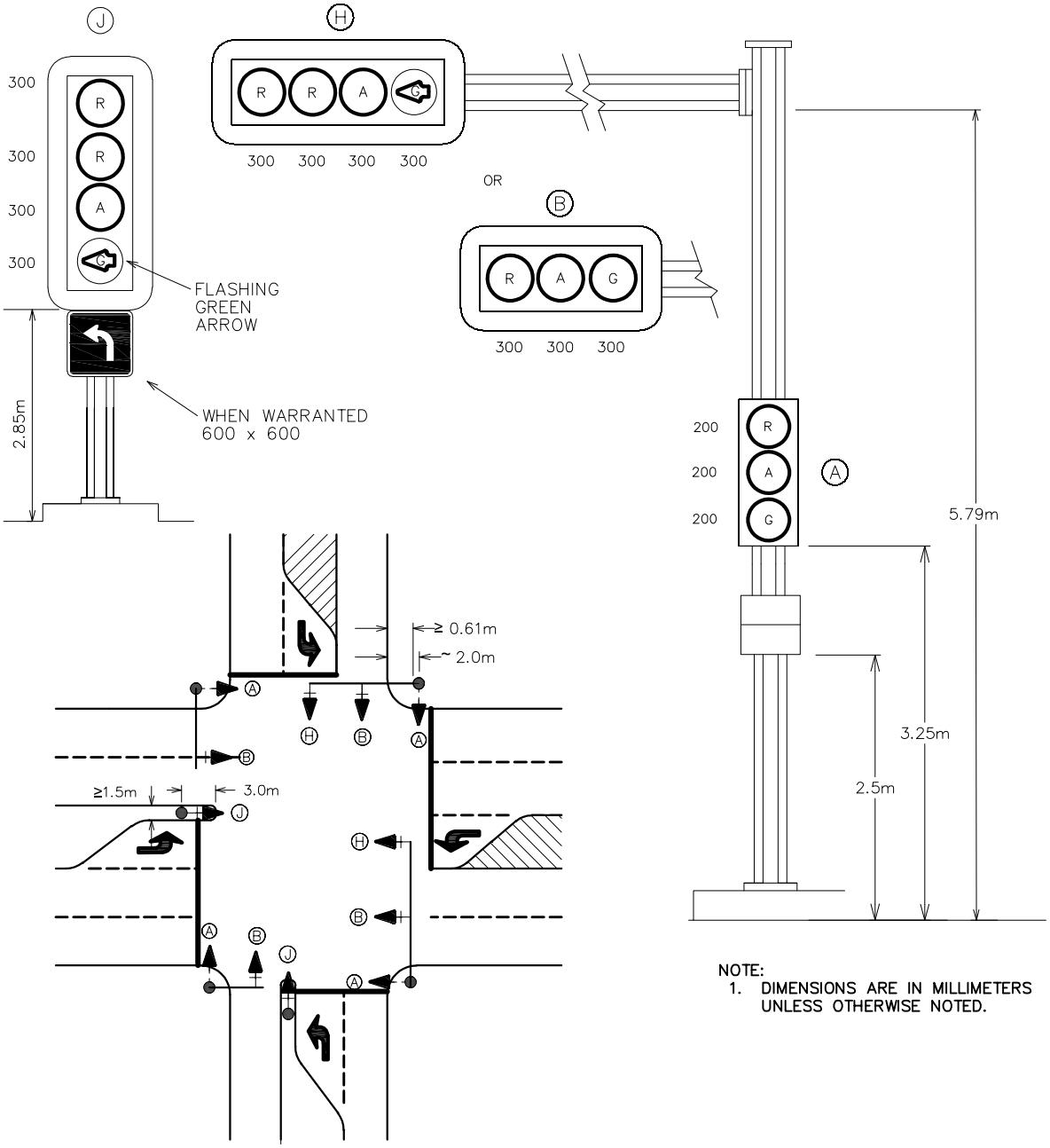


NOTE:
1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY:
DATE: 21-04-2017	**STANDARD SIGNAL LAYOUT TRAFFIC SIGNALS LEADING SIMULTANEOUS LEFT TURN PHASING (4- SECTION BIMODAL LED)**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.03**

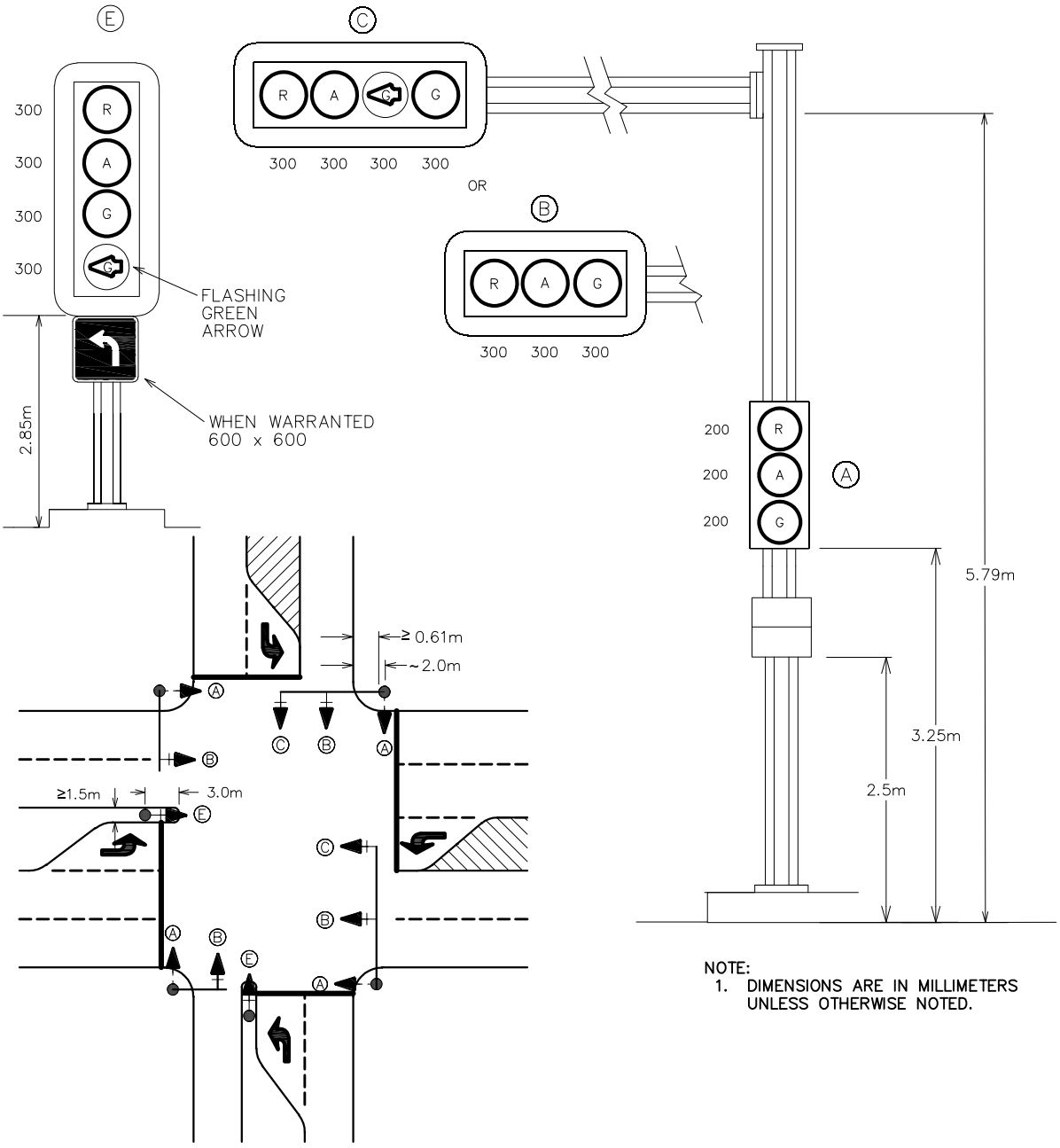


NOTE:
1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**STANDARD SIGNAL LAYOUT PROTECTED-PROHIBITED LEFT TURN PHASING**	
SCALE: N.T.S.		DRAWING NO. **8.04**

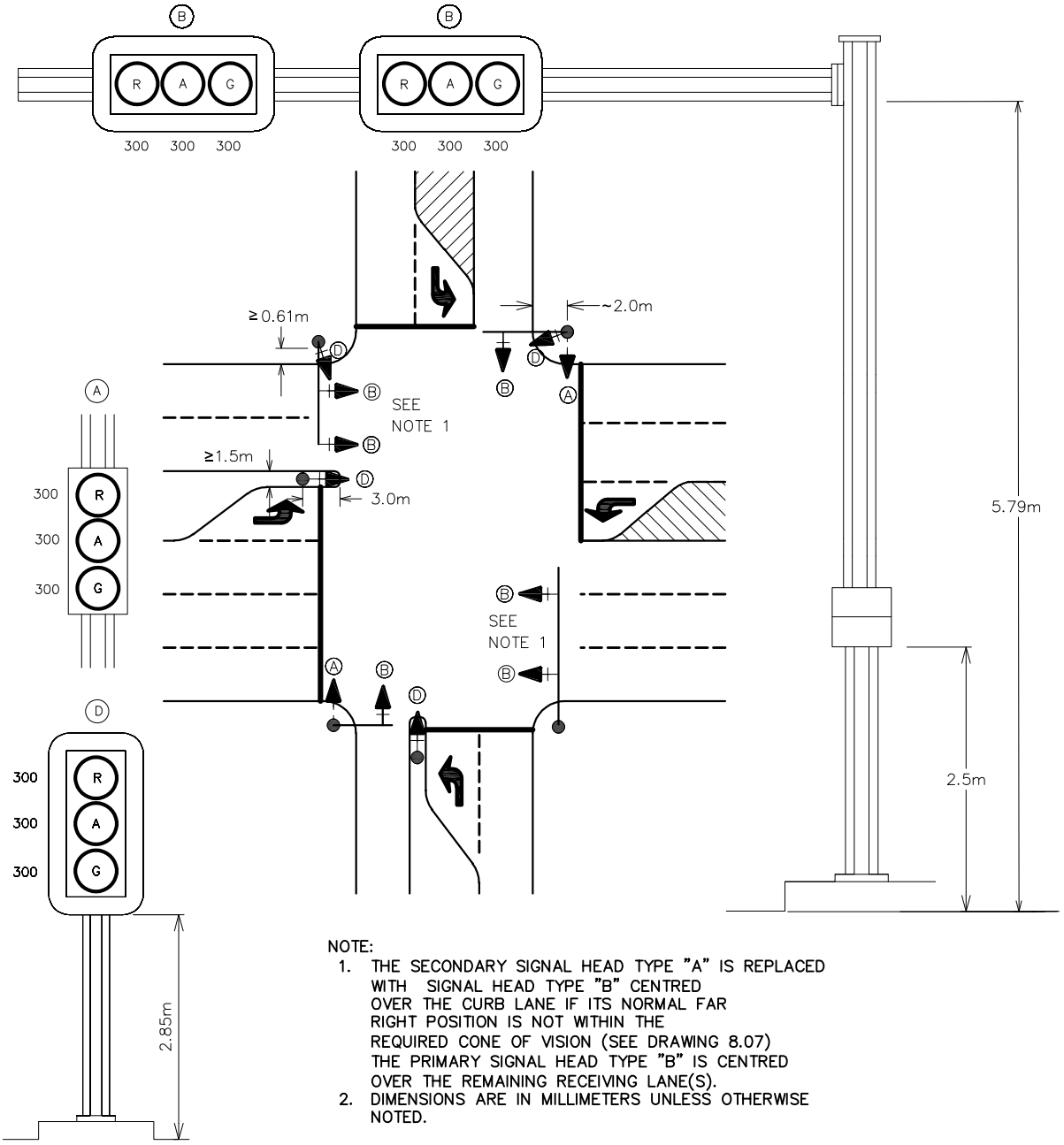


NOTE:
1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**STANDARD SIGNAL LAYOUT SEPARATE-PROHIBITED LEFT TURN PHASING**	
SCALE: N.T.S.		DRAWING NO. **8.05**

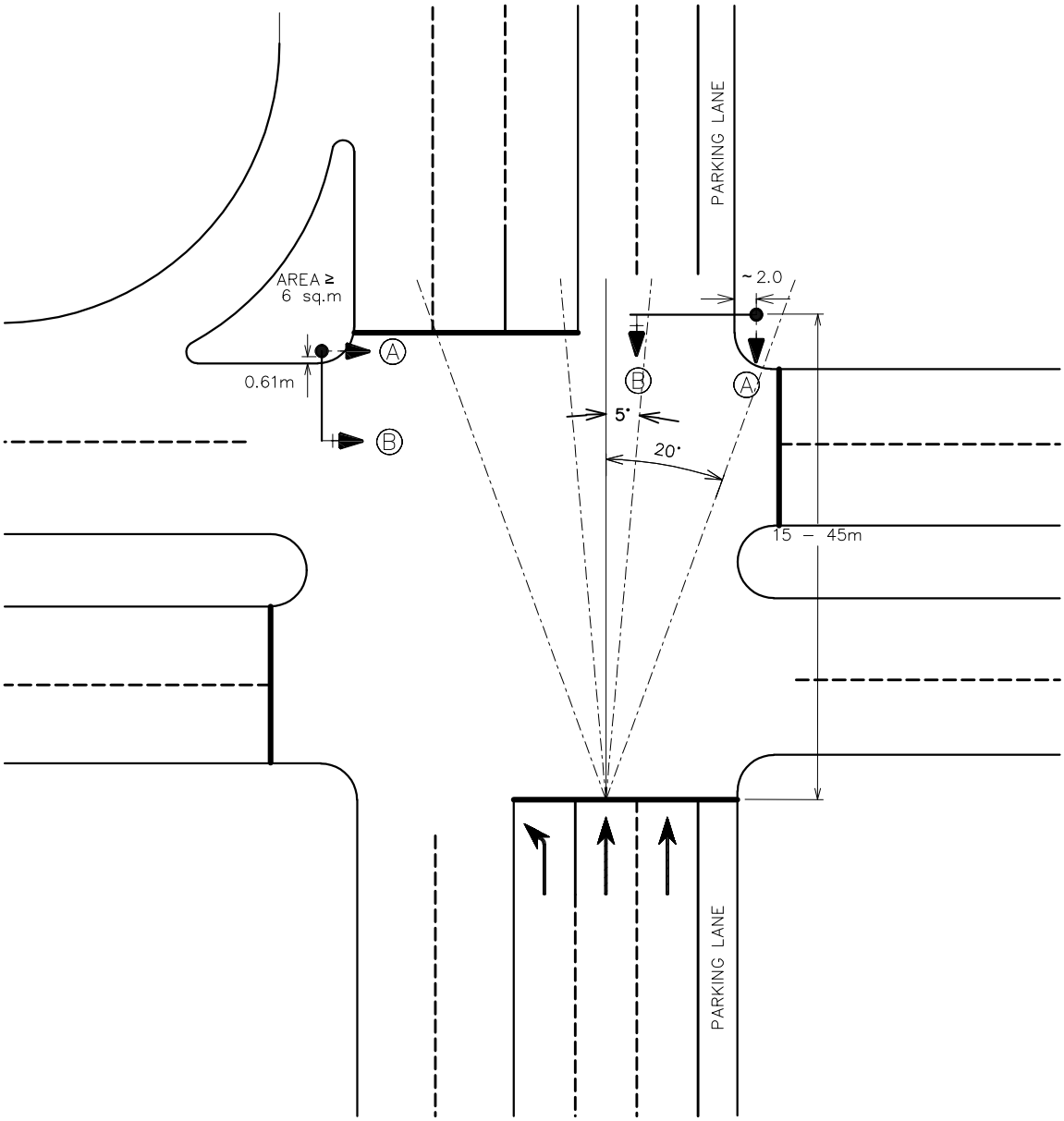


NOTE:
1. THE SECONDARY SIGNAL HEAD TYPE "A" IS REPLACED WITH SIGNAL HEAD TYPE "B" CENTRED OVER THE CURB LANE IF ITS NORMAL FAR RIGHT POSITION IS NOT WITHIN THE REQUIRED CONE OF VISION (SEE DRAWING 8.07) THE PRIMARY SIGNAL HEAD TYPE "B" IS CENTRED OVER THE REMAINING RECEIVING LANE(S).
2. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

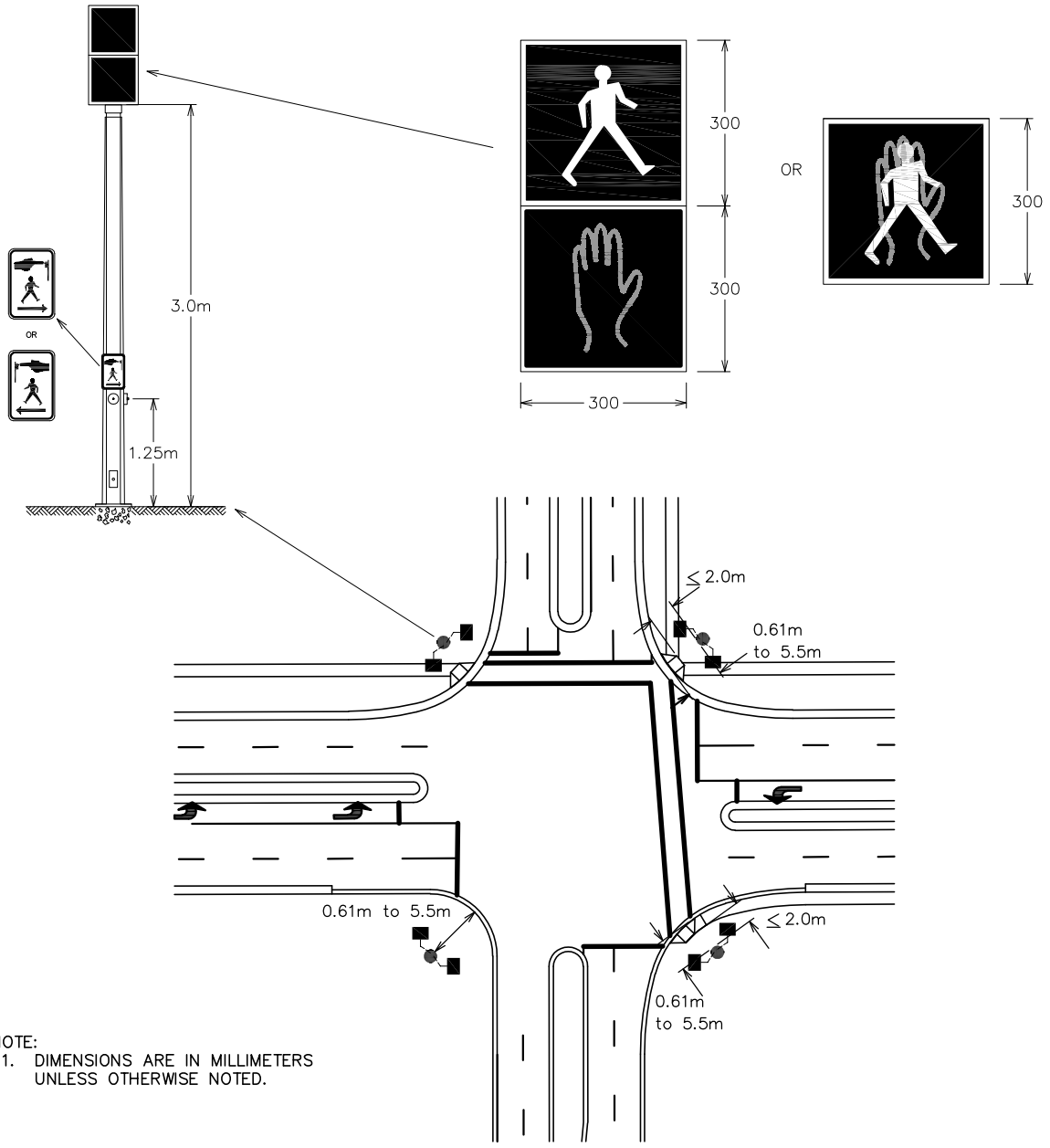
NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**MODIFIED SIGNAL LAYOUT ALTERNATE SECONDARY HEAD LOCATION**	
SCALE: N.T.S.		DRAWING NO. **8.06**

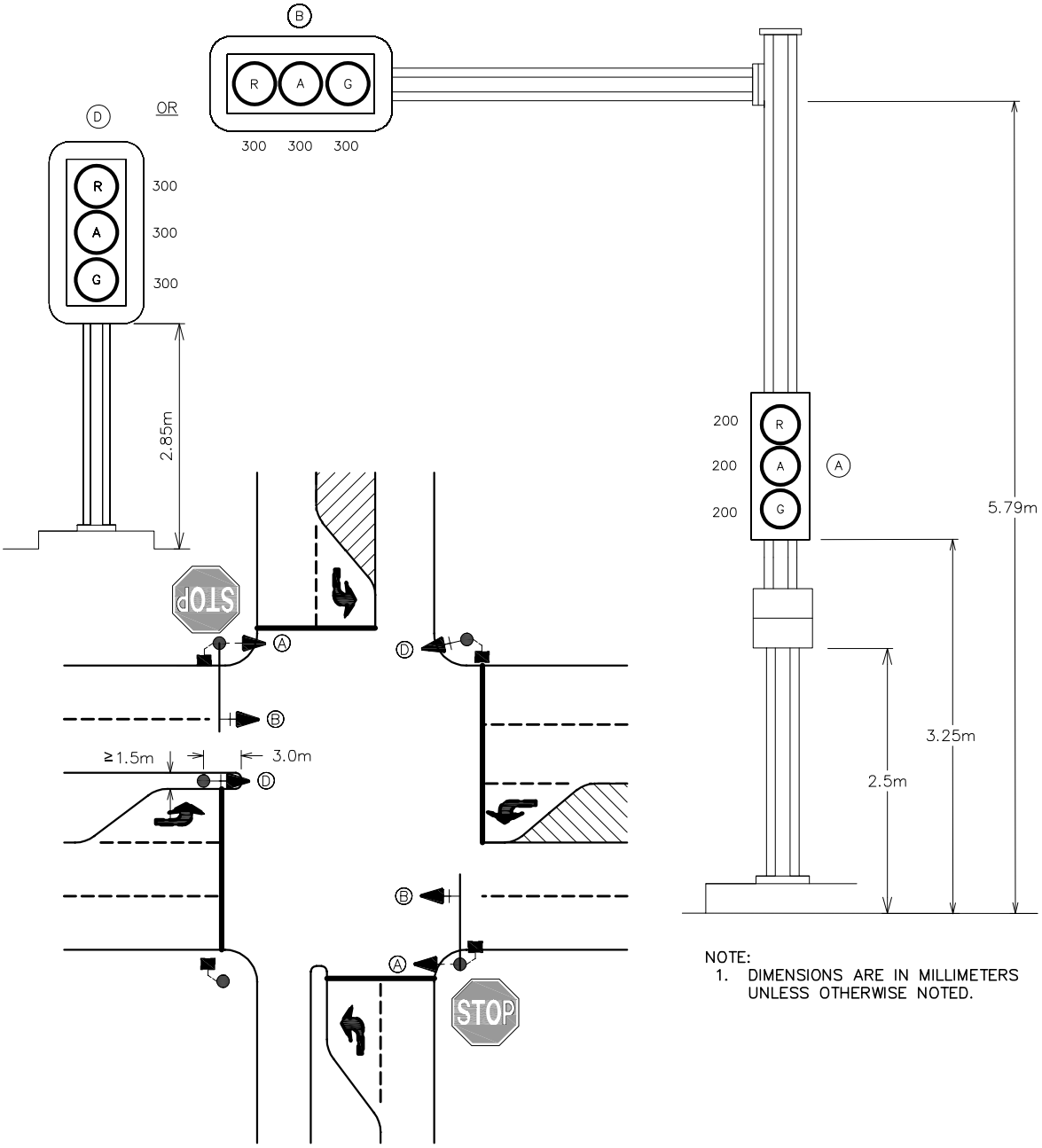


NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	CONES OF VISION	DRAWING NO. 8.07
			SCALE: N.T.S.		



NOTE:
1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNAL	APPROVED BY: ENGINEER
			DATE: 21-04-2017	STANDARD PEDESTRIAN SIGNAL DISPLAY, CONFIGURATION AND LOCATION	DRAWING NO. 8.08
			SCALE: N.T.S.		

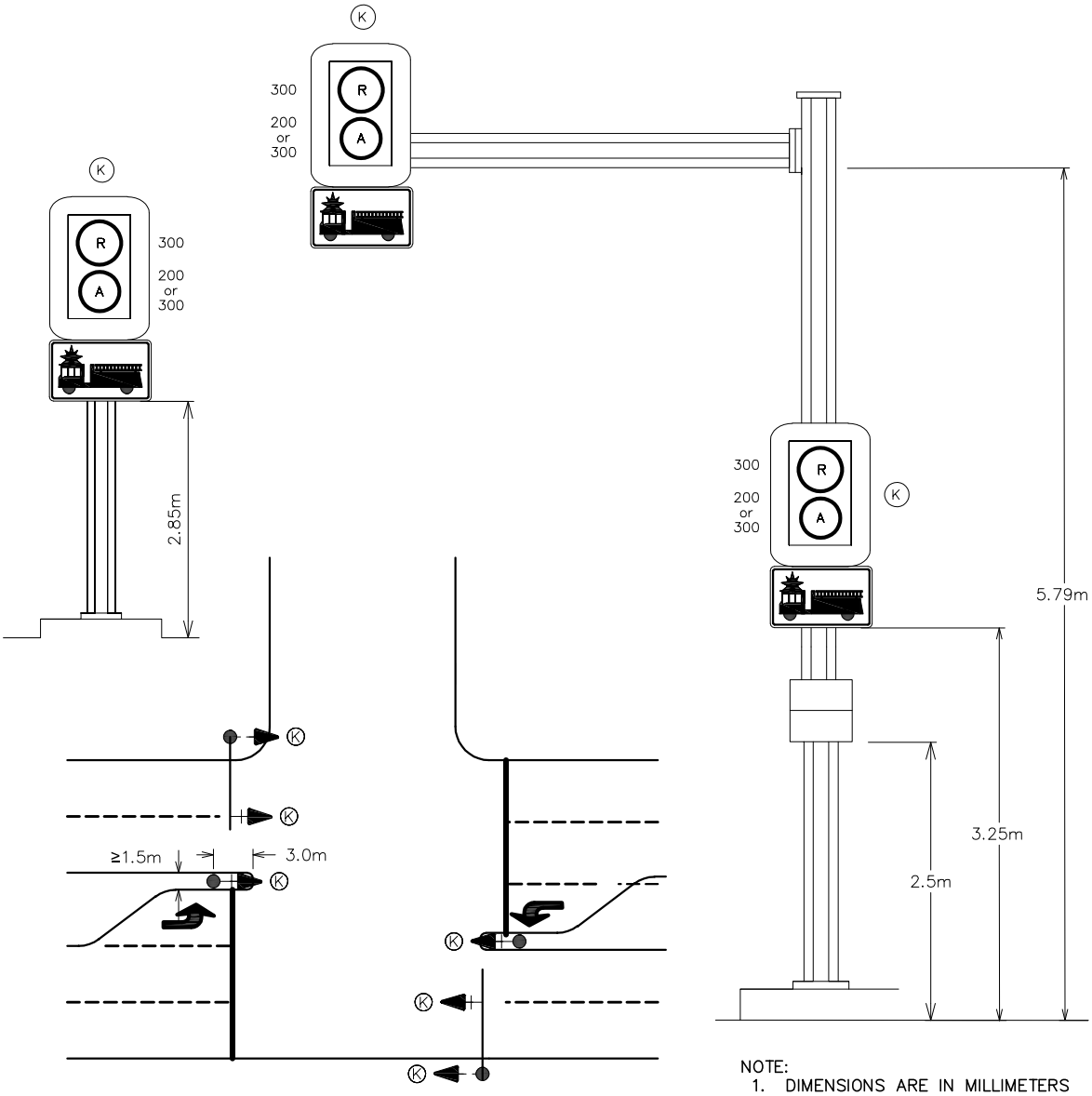


NOTE:
1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**PEDESTRIAN HALF SIGNAL LAYOUT**	
SCALE: N.T.S.		DRAWING NO. **8.09**



NOTE:
1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**STANDARD SIGNAL LAYOUT AT FIRE TRUCK ENTRANCES**	
SCALE: N.T.S.		DRAWING NO. **8.10**

EXISTING	*PROPOSED*	
		TRAFFIC SENSOR LOOP
		(URD) BOX
		CONTROLLER
		SIGNAL STRUCTURE BASE
		ROTATABLE SIGNAL STRUCTURE BASE
		SECONDARY SIGNAL – NO BACK PLATE (3 SECTION HEAD) Red–Amber–Green
		PRIMARY SIGNAL w/ BACK PLATE (3 SECTION HEAD) Red–Amber–Green
		PRIMARY SIGNAL w/ BACK PLATE (4 SECTION HEAD) Red–Amber–Green Arrow–Green
		MEDIAN SIGNAL w/ BACK PLATE (3 SECTION HEAD) Red–Amber–Green
		MEDIAN SIGNAL w/ BACK PLATE (4 SECTION HEAD) Red–Amber–Green–Green Arrow
		PRIMARY SIGNAL w/ BACK PLATE (5 SECTION HEAD, INCANDESCENT) Red–Amber–Amber Arrow –Green Arrow–Green
		MEDIAN SIGNAL w/ BACK PLATE (5 SECTION HEAD, INCANDESCENT) Red–Amber–Green–Amber Arrow–Green Arrow
		PRIMARY SIGNAL w/ BACK PLATE (4 SECTION BIMODAL HEAD, LED) Red–Amber–Amber/Green Arrow–Green
		MEDIAN SIGNAL w/ BACK PLATE (4 SECTION BIMODAL HEAD, LED) Red–Amber–Green–Amber/Green Arrow
		PRIMARY SIGNAL w/ BACK PLATE (4 SECTION HEAD) Red–Red–Amber–Green Arrow
		MEDIAN SIGNAL w/ BACK PLATE (4 SECTION HEAD) Red–Red–Amber–Green Arrow
		FIRE TRUCK SIGNAL w/ BACK PLATE (2 SECTION HEAD) Red–Amber
		PEDESTRIAN SIGNAL

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DATE: 21-04-2017

SCALE: N.T.S.

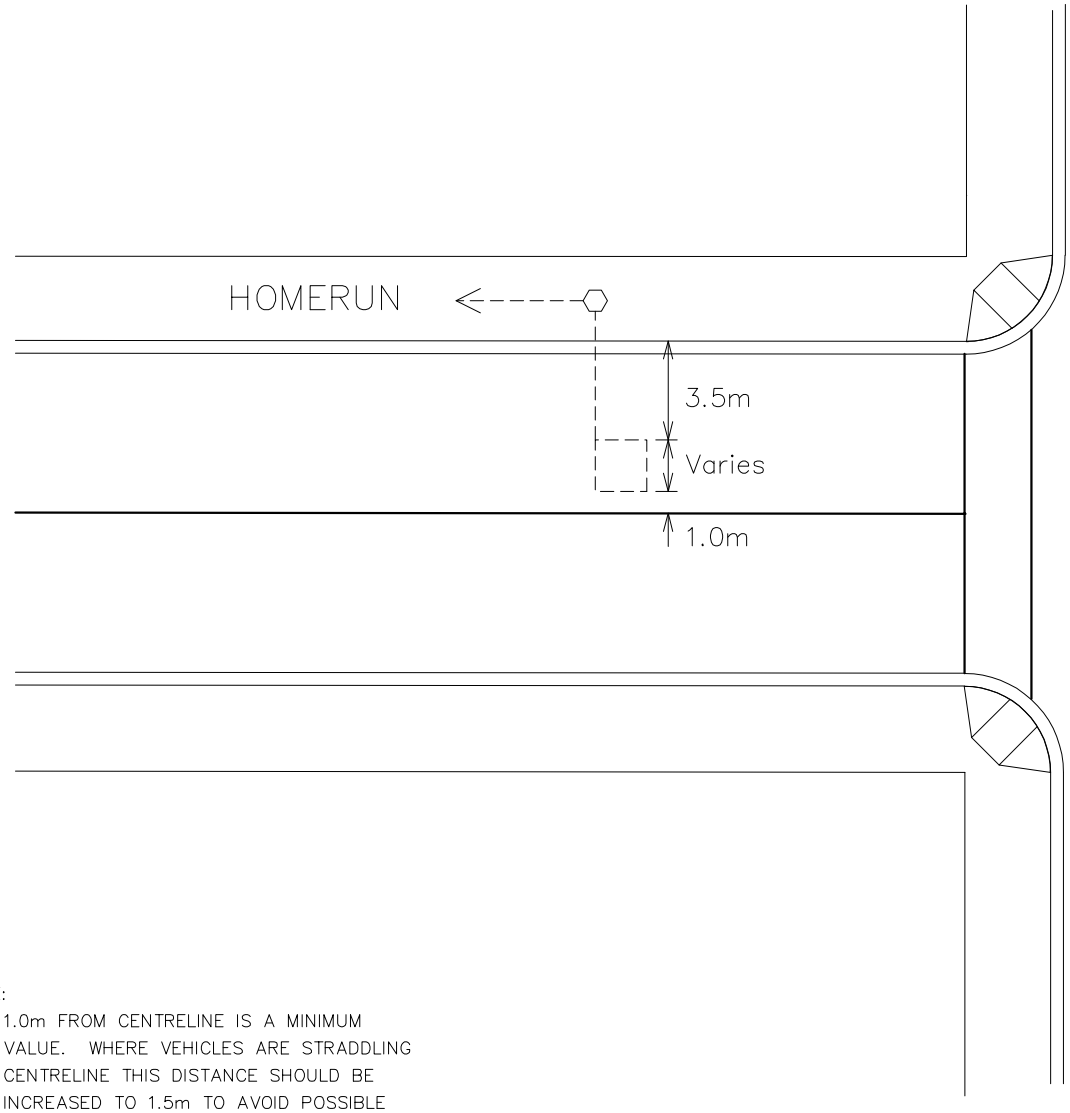
DESIGN GUIDELINE DRAWINGS
TRAFFIC SIGNALS

TRAFFIC SIGNAL LEGEND

APPROVED BY:

ENGINEER

DRAWING NO. **8.11**



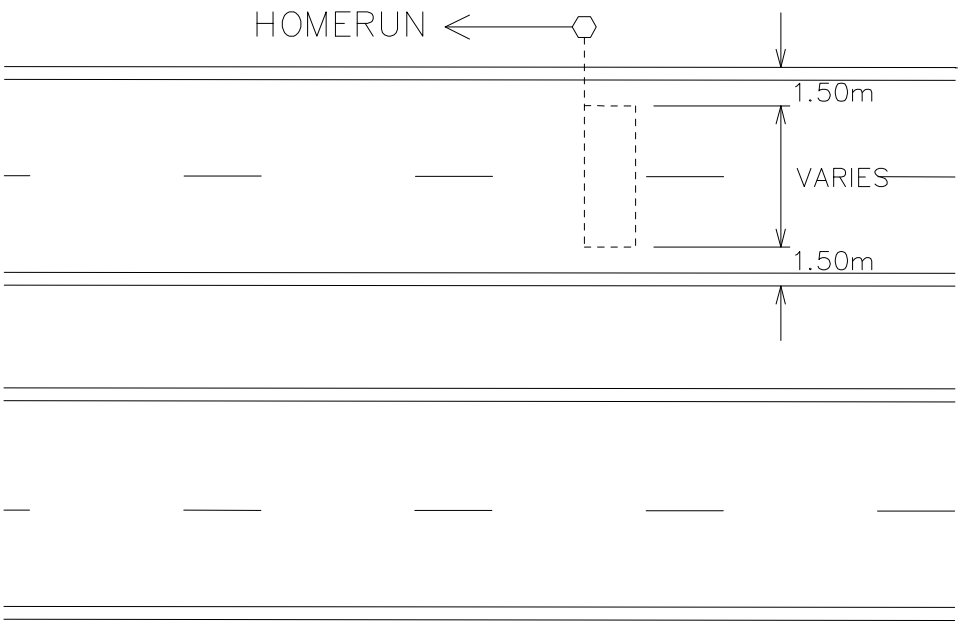
NOTE:

1. 1.0m FROM CENTRELINE IS A MINIMUM VALUE. WHERE VEHICLES ARE STRADDLING CENTRELINE THIS DISTANCE SHOULD BE INCREASED TO 1.5m TO AVOID POSSIBLE OVER COUNTING.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**SINGLE LANE SCOOT LOOP INSTALLATION WITH ON STREET PARKING**	
SCALE: N.T.S.		DRAWING NO. **8.12**



NOTE:
SCOOT LOOP IS 1.5m FROM F.O.C.
TO PROVIDE CLEARANCE FOR
THE GUTTER (0.5), SNOW (0.5), AND MILLING
DURING CROWN PAVING (0.5).

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M

DATE: 21-04-2017

SCALE: N.T.S.

DESIGN GUIDELINE DRAWINGS
TRAFFIC SIGNALS

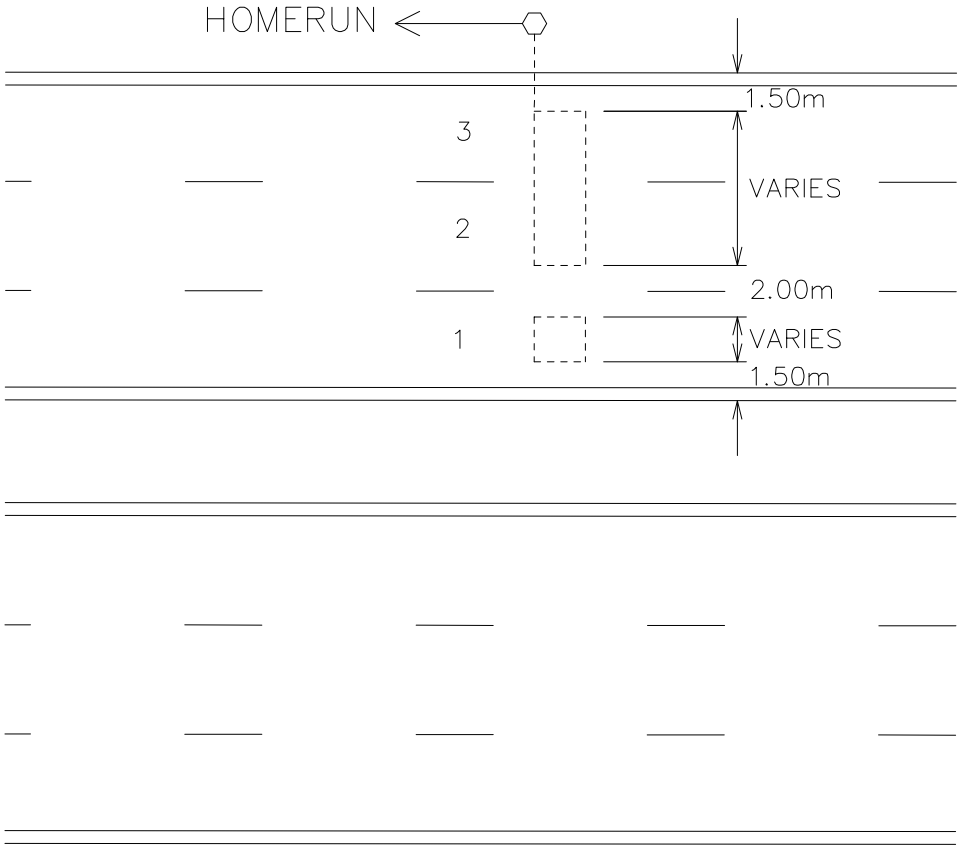
TWO LANE SCOOT LOOP INSTALLATION

APPROVED BY:

ENGINEER

DRAWING NO.

8.13



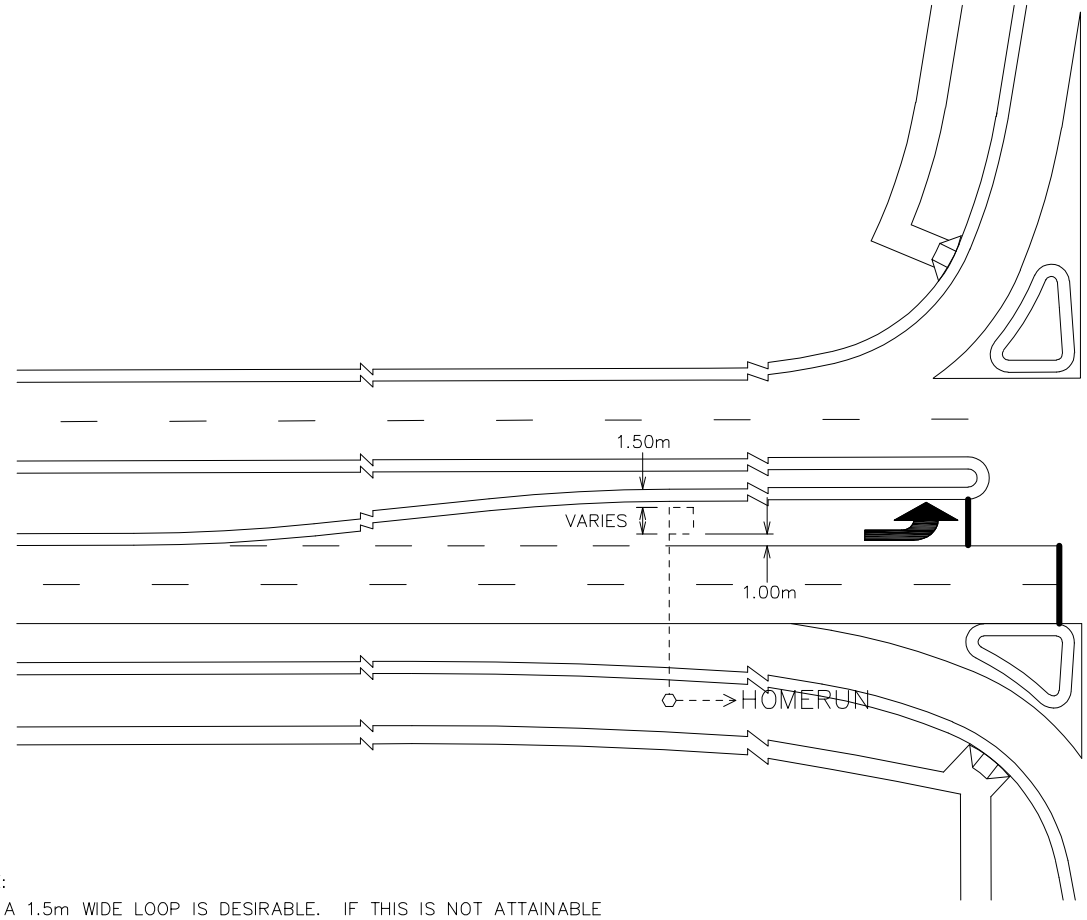
NOTE:

1. SCOOT LOOP IS 1.5m FROM F.O.C TO PROVIDE CLEARANCE FOR THE GUTTER (0.5m), SNOW (0.5m), AND MILLING DURING CROWN PAVING (0.5m).
2. IF LANE 3 HAS A HIGHER TRAFFIC VOLUME THAN LANE 1, INSTALL THE SINGLE LOOP IN LANE 3 AND THE DOUBLE LOOP ACROSS LANES 1 AND 2.
3. IF LANE 1 HAS A HIGHER TRAFFIC VOLUME THAN LANE 3, INSTALL THE SINGLE LOOP IN LANE 1 AND THE DOUBLE LOOP ACROSS LANES 2 AND 3.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**THREE LANE SCOOT LOOP INSTALLATION**	
SCALE: N.T.S.		DRAWING NO. **8.14**



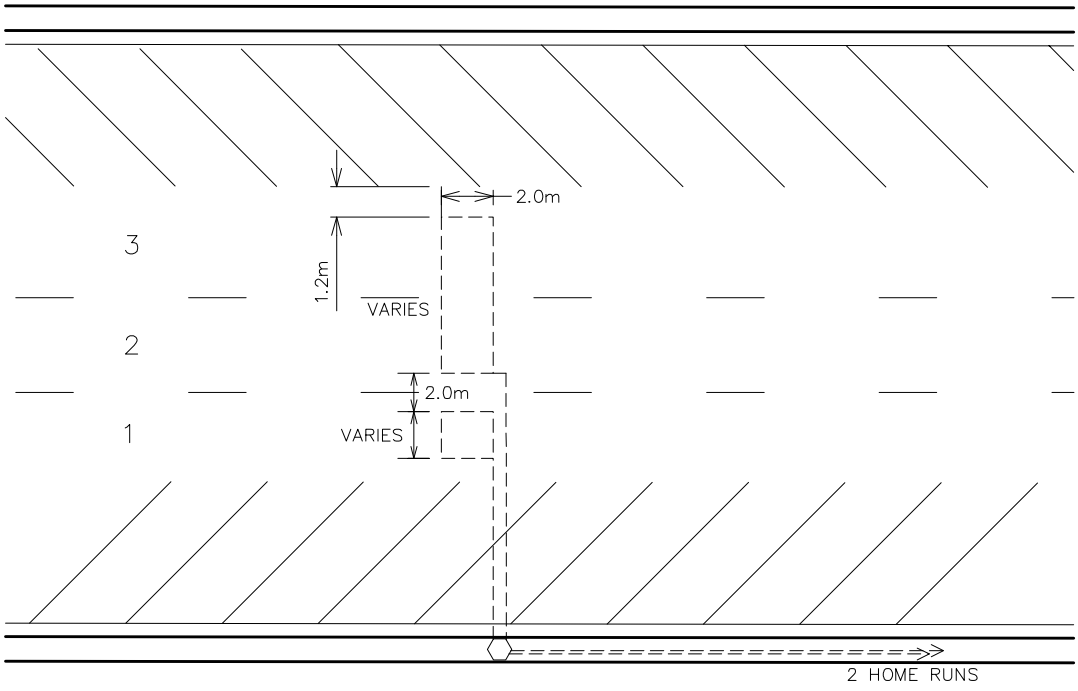
NOTE:

1. A 1.5m WIDE LOOP IS DESIRABLE. IF THIS IS NOT ATTAINABLE DUE TO THE WIDTH OF THE TURN BAY, MAINTAIN THE SPACING FROM THE LANE LINE AND FACE OF CURB AND ADJUST THE LOOP WIDTH ACCORDINGLY.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

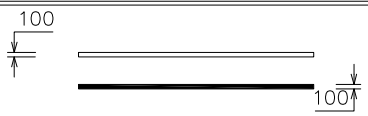
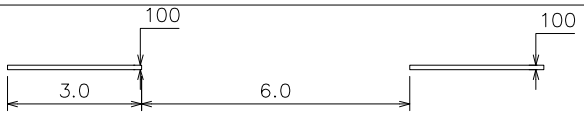
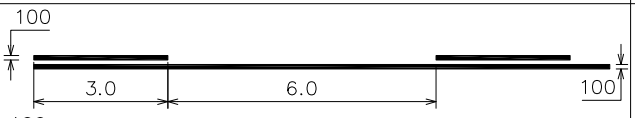
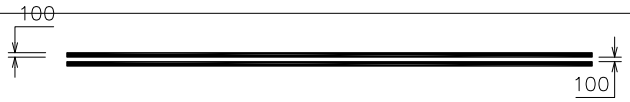
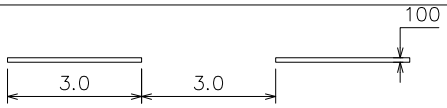
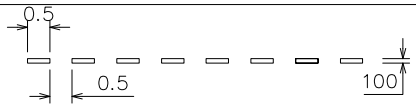
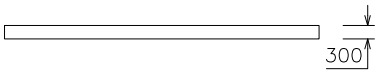
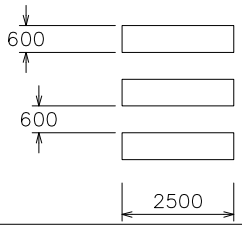
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS SECTION_TITLE**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**LEFT TURN BAY SCOOT LOOP INSTALLATION**	
SCALE: N.T.S.		DRAWING NO. **8.15**



NOTE:

1. IF LANE 1 HAS A HIGHER TRAFFIC VOLUME THAN LANE 3, INSTALL THE SINGLE LOOP IN LANE 1 AND THE DOUBLE LOOP ACROSS LANES 2 AND 3.
2. IF LANE 3 HAS A HIGHER TRAFFIC VOLUME THAN LANE 1, INSTALL THE SINGLE LOOP IN LANE 3 AND THE DOUBLE LOOP ACROSS LANES 1 AND 2.

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS TRAFFIC SIGNALS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	SCOOT LOOP INSTALLATION FOR ANGLE PARKING	
			SCALE: N.T.S.		DRAWING NO. 8.16

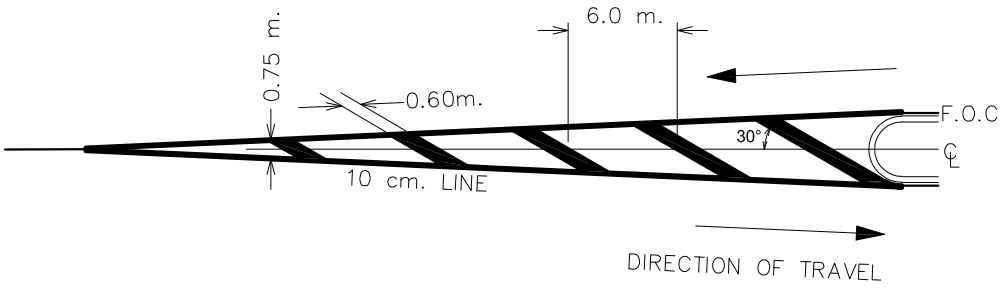
NAME	DIMENSIONS	USE OF LINES
SOLID		–EDGELINES (WHITE OR YELLOW) –DIRECTIONAL DIVIDING LINES (YELLOW) –LANE LINES PROHIBITING LANE CHANGES (WHITE)
BROKEN		–DIRECTIONAL DIVIDING LINES (YELLOW) –LANE LINES (WHITE)
SIMULTANEOUS SOLID AND BROKEN		–DIRECTIONAL DIVIDING LINES (YELLOW)
DOUBLE SOLID		–DIRECTIONAL DIVIDING LINES (YELLOW)
DASHED		–CONTINUITY LINES FOR TURN BAYS AND LANE DROPS (WHITE)
DASHED		–BUS BAY (WHITE)
DASHED		–GUIDING LINES FOR INTERSECTION MOVEMENTS (YELLOW OR WHITE DEPENDING ON DIRECTIONS)
STOP		–INTERSECTION STOPLINES (WHITE)
CROSSWALK		–CROSSWALK LINES (WHITE)
ZEBRA CROSSWALK		– MINIMUM 2.5 m

Refer to MUTCDC Figures C1–1 and C1–2

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

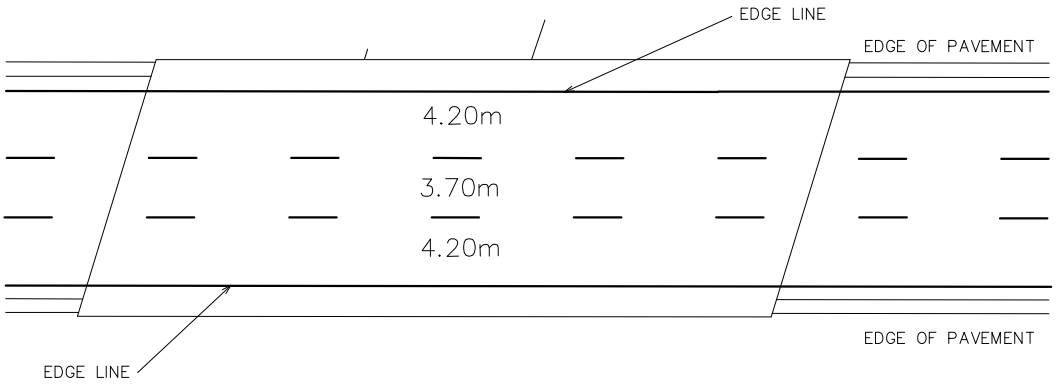
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**PATTERNS OF LINES**	
SCALE: N.T.S.		DRAWING NO. **8.17**



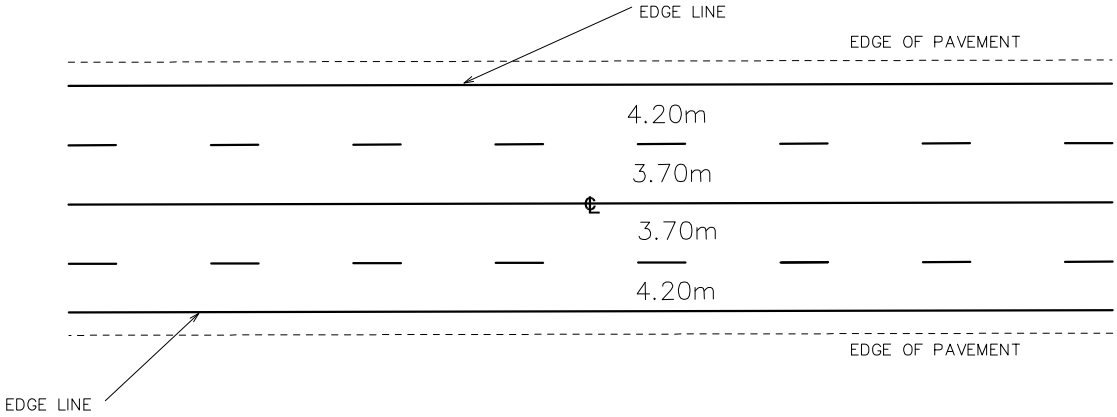
			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	CROSSHATCH WITHIN GORE AREAS	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.18
NO.	DATE	REVISION			

ONE–WAY ARTERIAL ROAD WITH CURB AND GUTTER

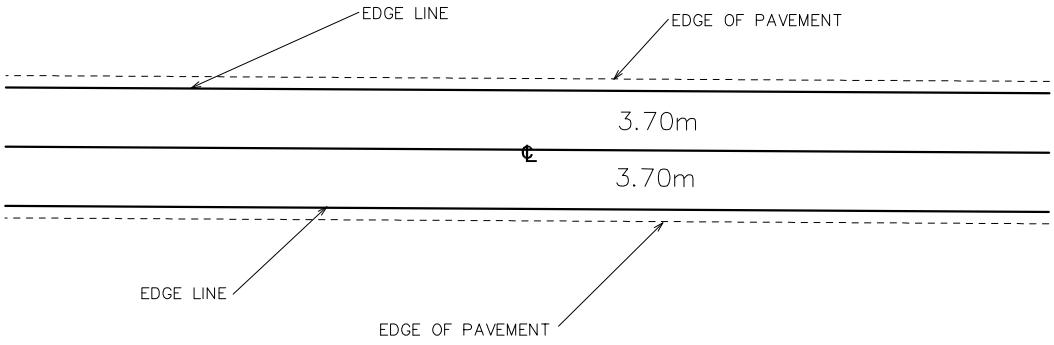
Outermost paved surface wider than 4.2 m



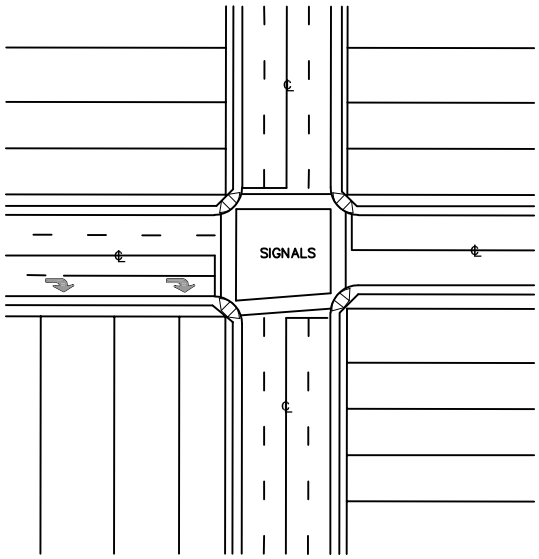
TWO–WAY



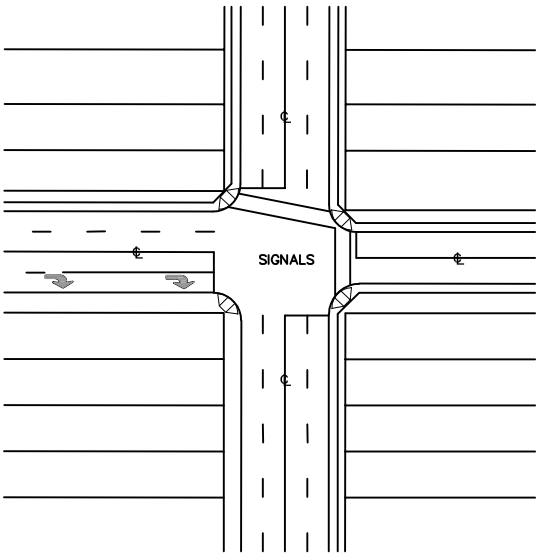
ARTERIAL ROAD WITH NO CURB AND GUTTER



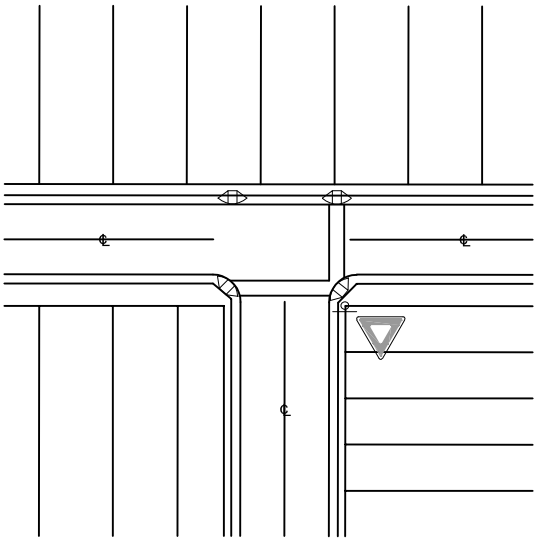
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	TYPICAL EDGE LINE APPLICATIONS	
			SCALE: N.T.S.		DRAWING NO. 8.19



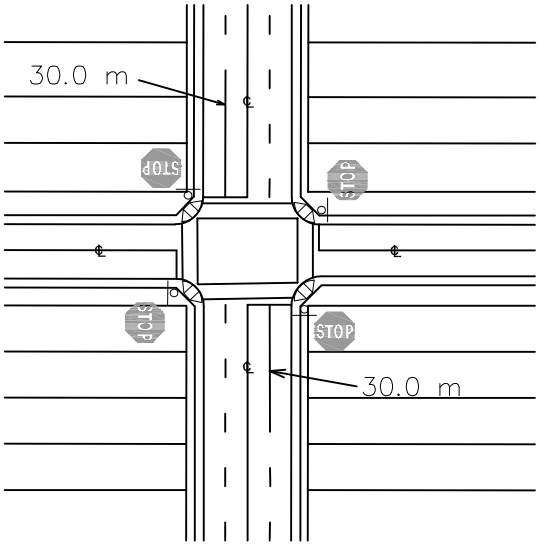
Signalized Intersection With Connecting Sidewalks on all Legs



Signalized Intersection Without Connecting Sidewalks on all Legs

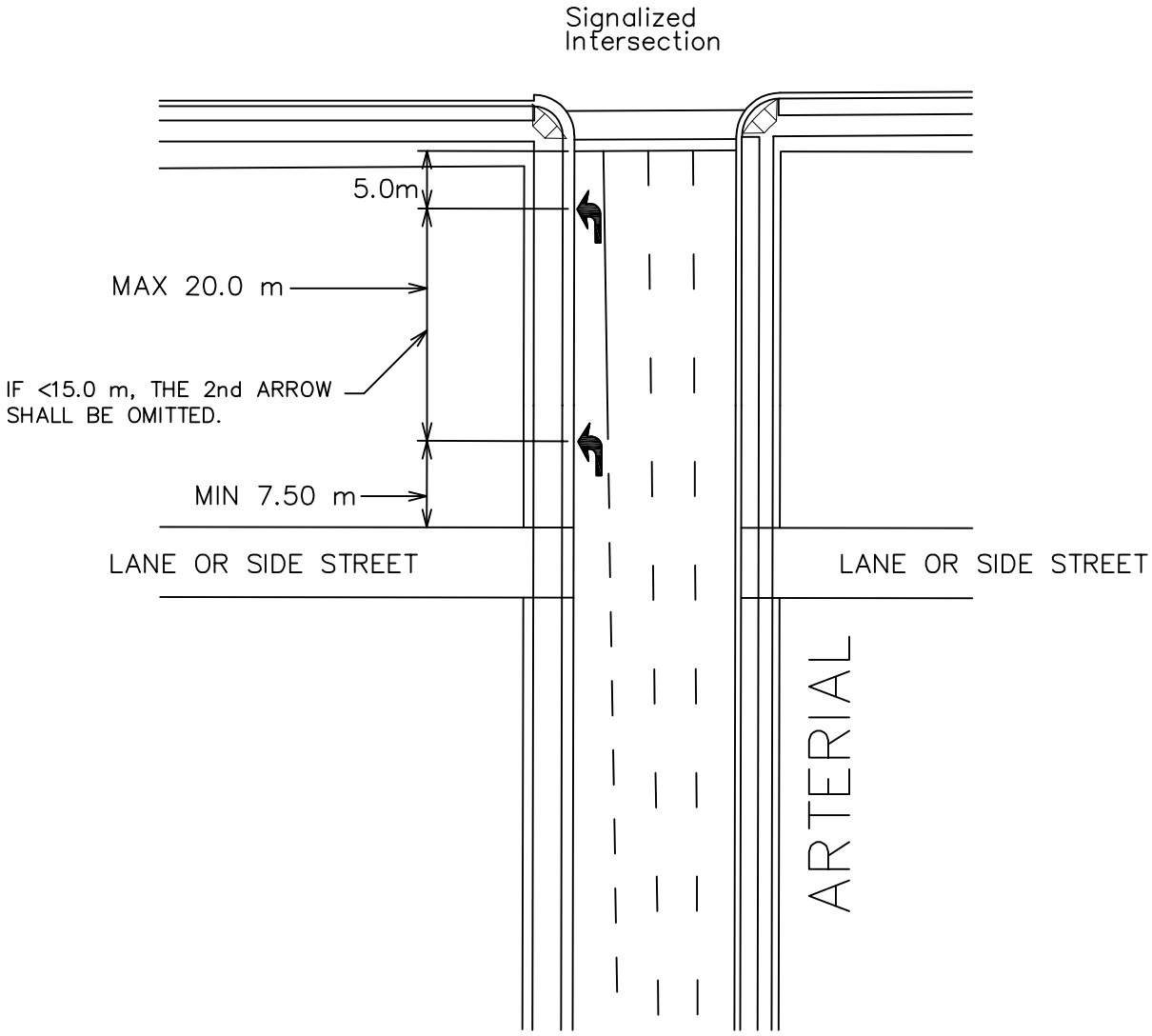


T–Intersections Require Two Paraplegic Ramps on the Through Leg of the Intersection.

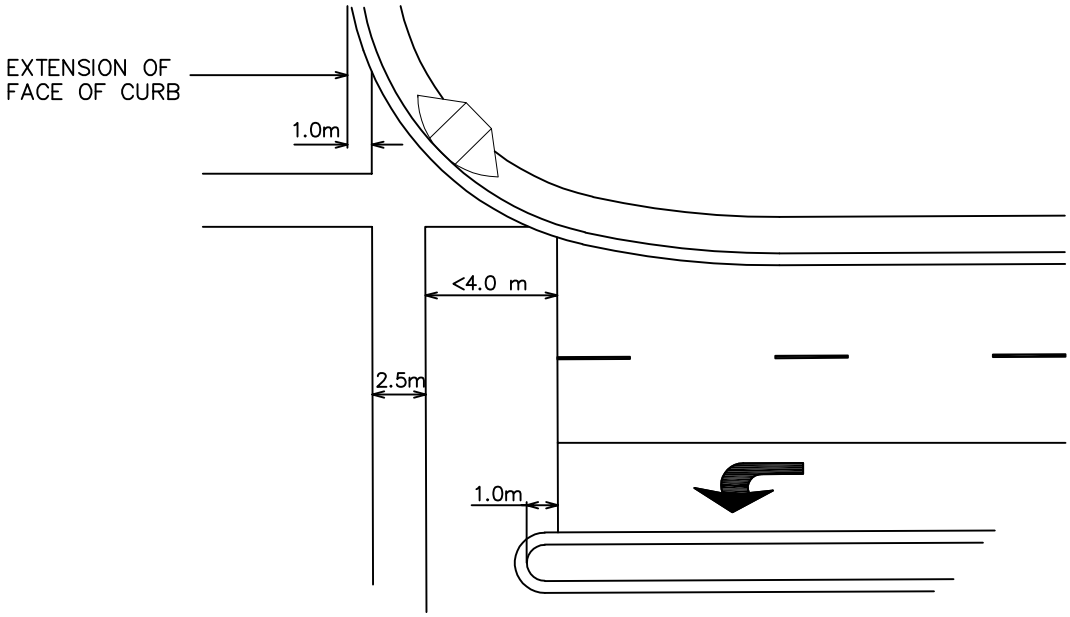


Four–Way Stop Intersections With Connecting Sidewalks on all Legs

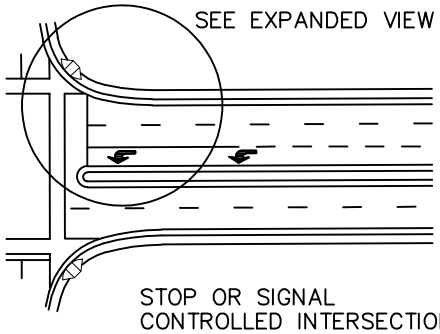
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	INTERSECTIONS WITH CROSSWALK	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.20



NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	TURN ARROWS WITH INTERSECTING LANE OR SIDE STREET	DRAWING NO. 8.21
			SCALE: N.T.S.		



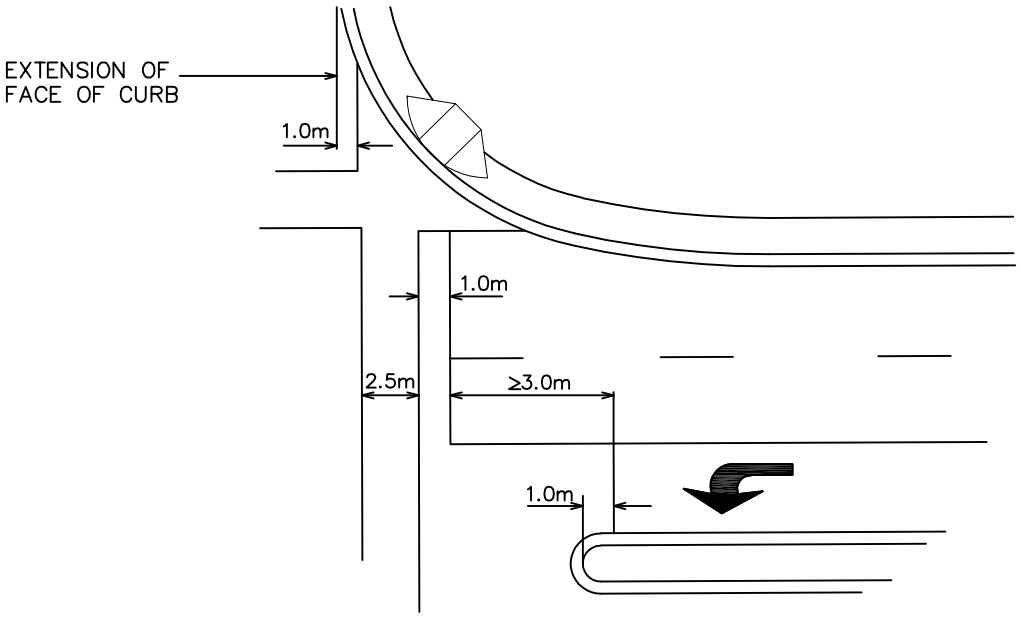
EXPANDED VIEW



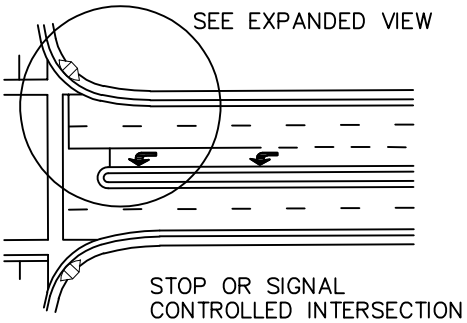
STOP OR SIGNAL
CONTROLLED INTERSECTION

NOTE:
1. STOP BARS AND CROSSWALKS ON THE MAIN STREET ARE TO BE INSTALLED PERPENDICULAR TO THE FURTHEST FACE OF CURB FROM THE INTERSECTION.
2. SKEWED STOP BARS ARE ONLY TO BE INSTALLED UNDER SPECIAL CIRCUMSTANCES AS DETERMINED BY THE TRAFFIC ENGINEER OR HIS/HER REPRESENTATIVE.

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	**STOP BAR PLACEMENT (INLINE)**	DRAWING NO. **8.22**
			SCALE: N.T.S.		



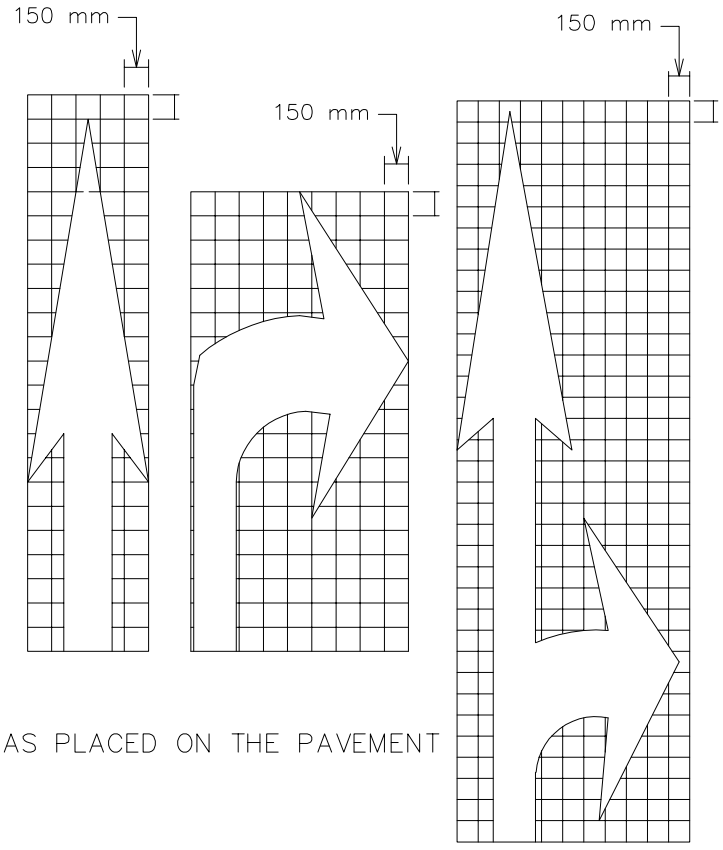
EXPANDED VIEW



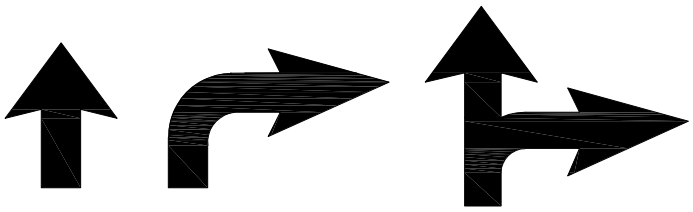
NOTE:
1. STOP BARS AND CROSSWALKS ON THE MAIN STREET ARE TO BE INSTALLED PERPENDICULAR TO THE FURTHEST FACE OF CURB FROM THE INTERSECTION.
2. SKEWED STOP BARS ARE ONLY TO BE INSTALLED UNDER SPECIAL CIRCUMSTANCES AS DETERMINED BY THE TRAFFIC ENGINEER OR HIS/HER REPRESENTATIVE.

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	**STOP BAR PLACEMENT (OFFSET)**	
			SCALE: N.T.S.		DRAWING NO. **8.23**

PAVEMENT ARROWS



AS PLACED ON THE PAVEMENT

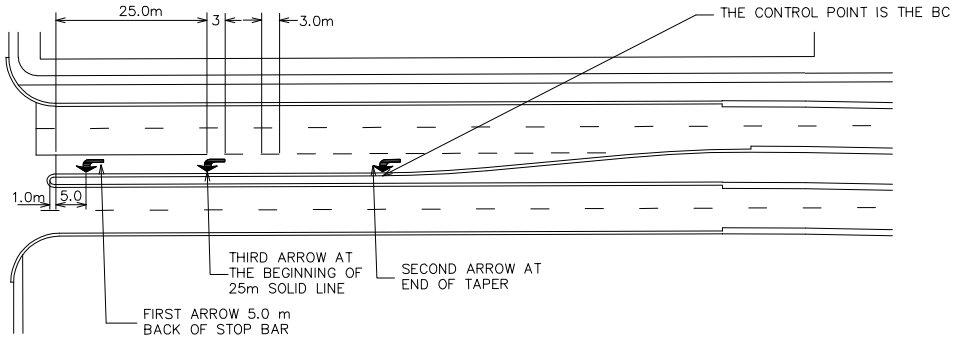


AS SEEN BY THE DRIVER

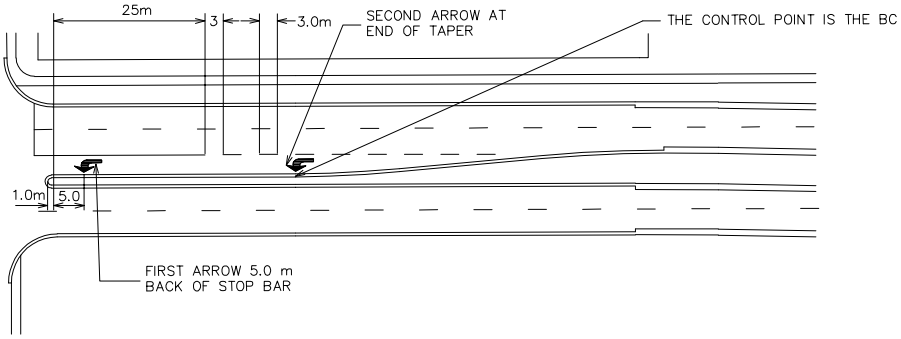
NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

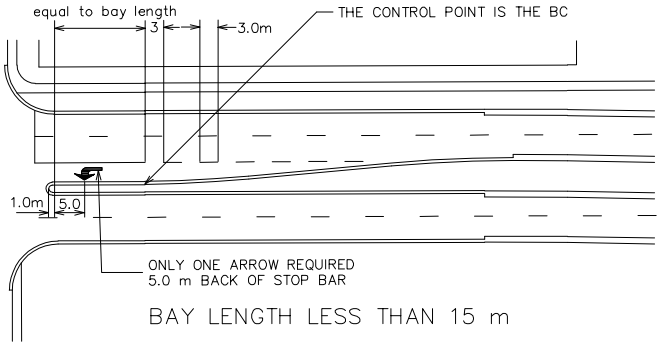
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY:
DATE: 21-04-2017	**PAVEMENT ARROWS**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.24**



BAY LENGTH GREATER THAN 50 m



BAY LENGTH GREATER THAN 15 m, LESS THAN 50 m



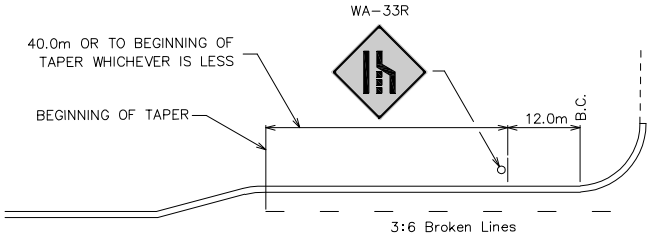
BAY LENGTH LESS THAN 15 m

NOTE: ALL ARROW DIMENSIONS ARE TO THE CENTRE OF THE ARROW HEAD.

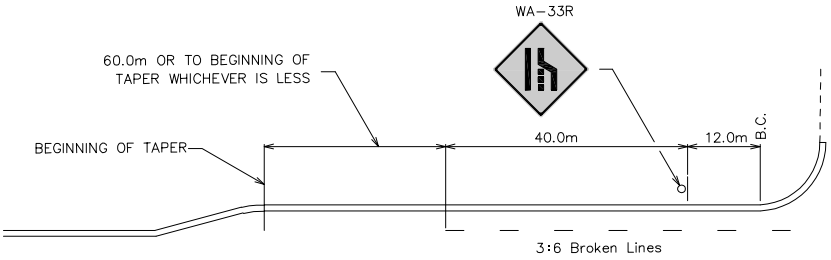
NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

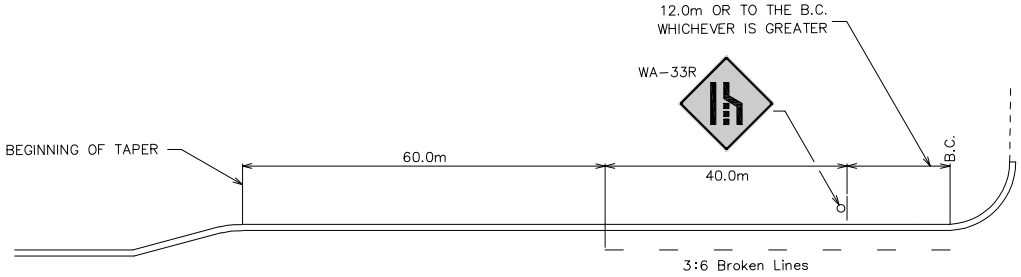
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY:
DATE: 21-04-2017	**LEFT TURN STORAGE BAYS**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.25**



BAY LENGTH < 52.0m

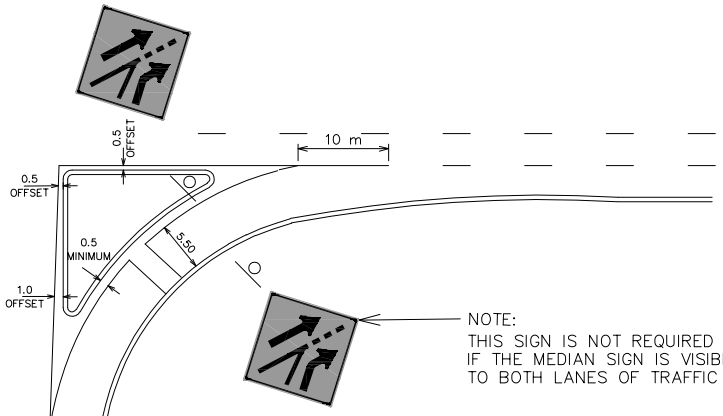


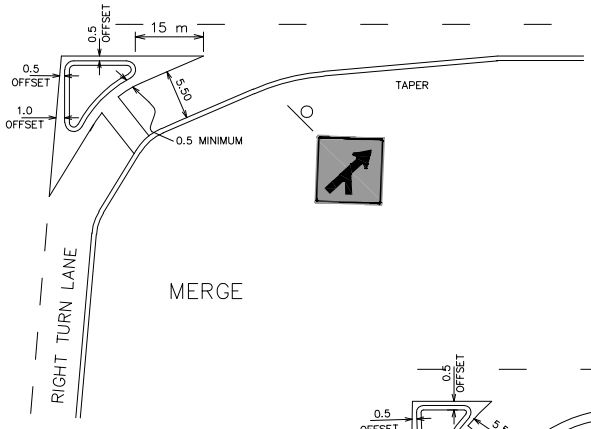
BAY LENGTH >52.0m AND <112.0m

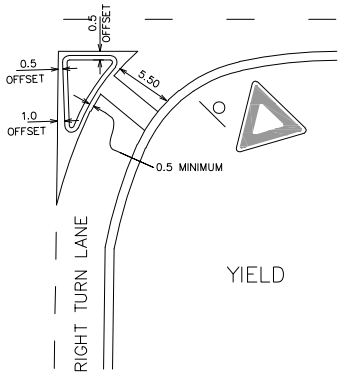


BAY LENGTH > 112.0m

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	SIGNING AND MARKING FOR LANE ENDS	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.26





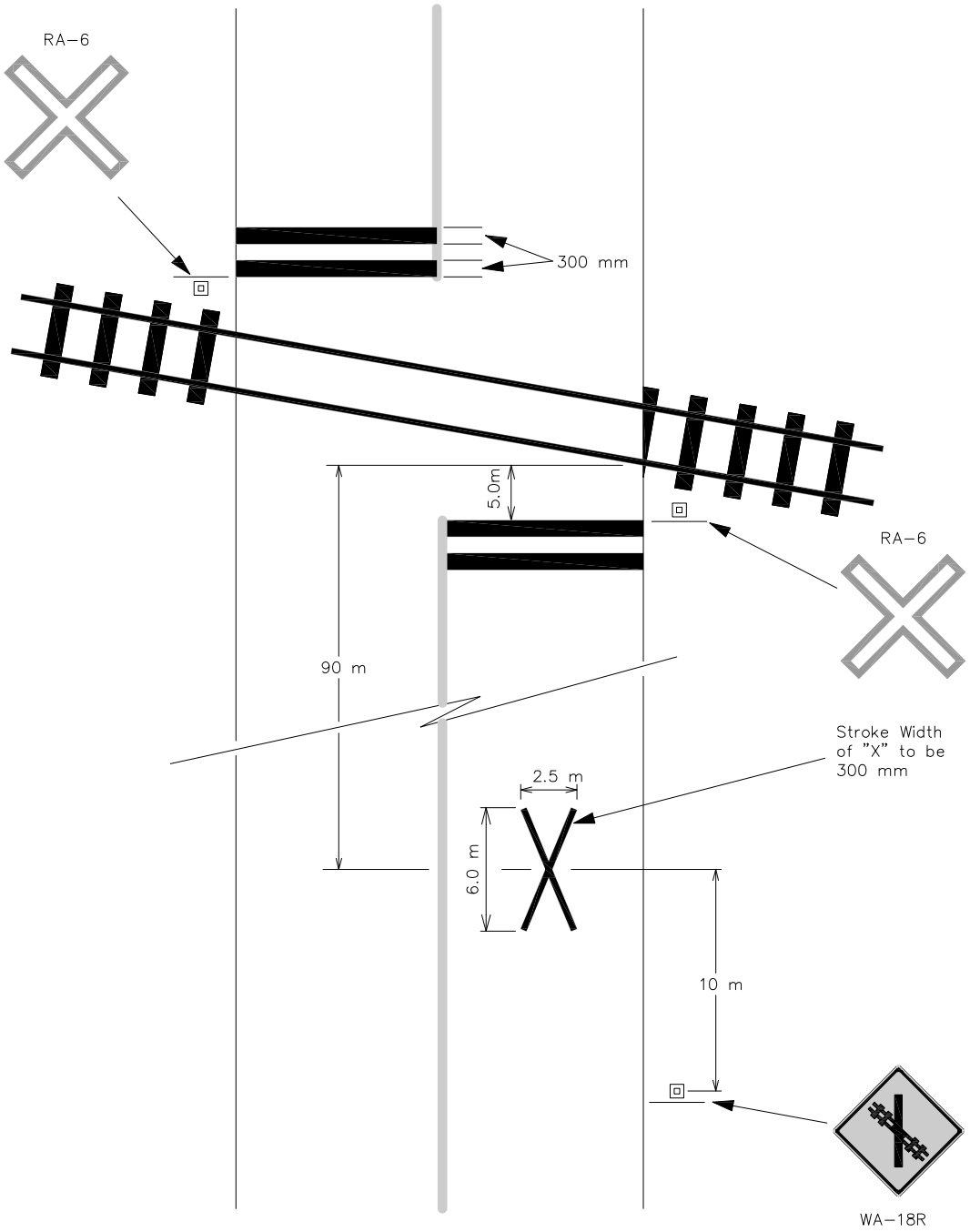


NOTES:
1. CROSSWALKS TO BE CENTRED ON PARAPLEGIC RAMPS
2. CROSSWALK LINES TO BE EXTENDED TO FOC IF EDGE LINE IS > 1.0m FROM ISLAND. IF < 1.0m FROM ISLAND CROSSWALK LINES ARE TO END AT EDGE LINES. BREAK EDGE LINE FOR CROSSWALK
3. MAINTAIN 5.5m TURN LANE WHENEVER POSSIBLE

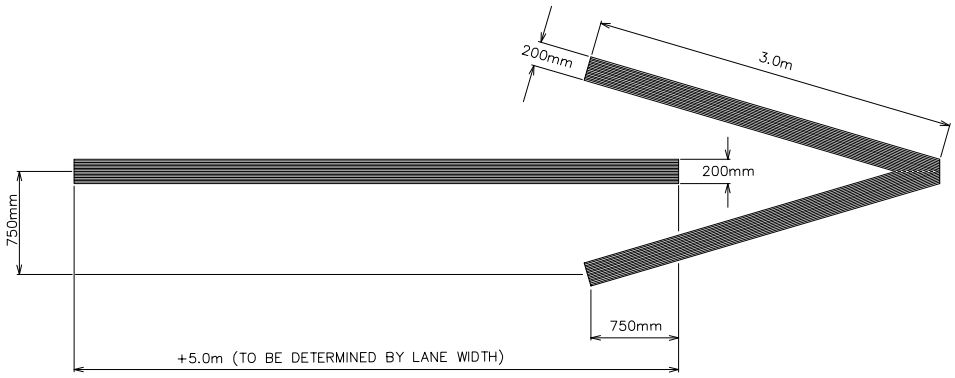
NO.	DATE	REVISION

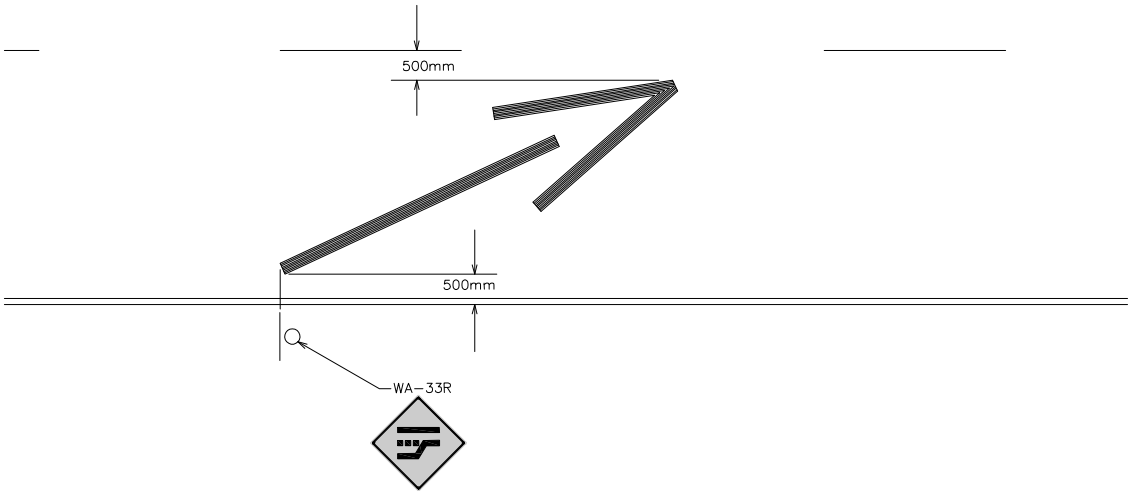
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**MAJOR INTERSECTION TURNING LANES**	
SCALE: N.T.S.		DRAWING NO. **8.27**



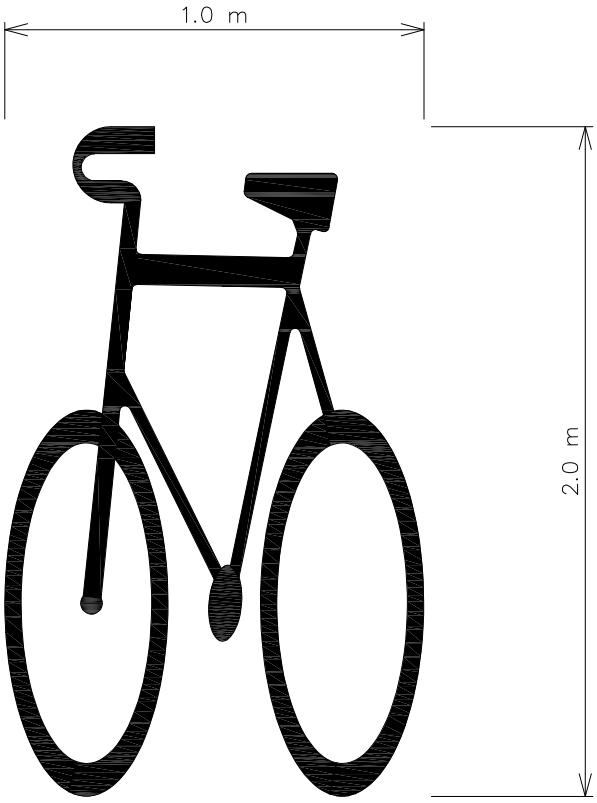
			THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	RAILWAY CROSSING	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.28
NO.	DATE	REVISION			



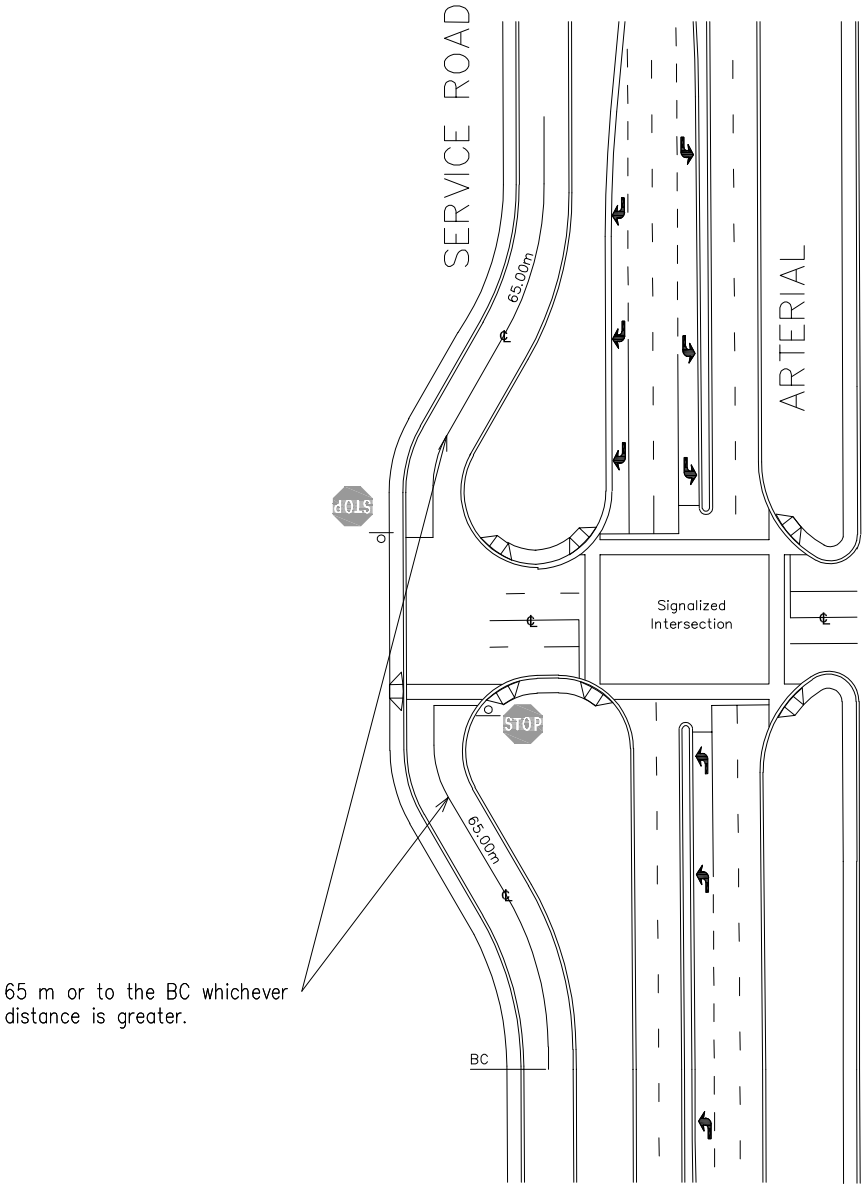


NOTE:
The location of the arrow is adjacent to the WA-33R Sign.
Refer to Signing and Marking for Lane Ends drawing 8.26.

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	MANDATORY LANE CHANGE ARROWS	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.29

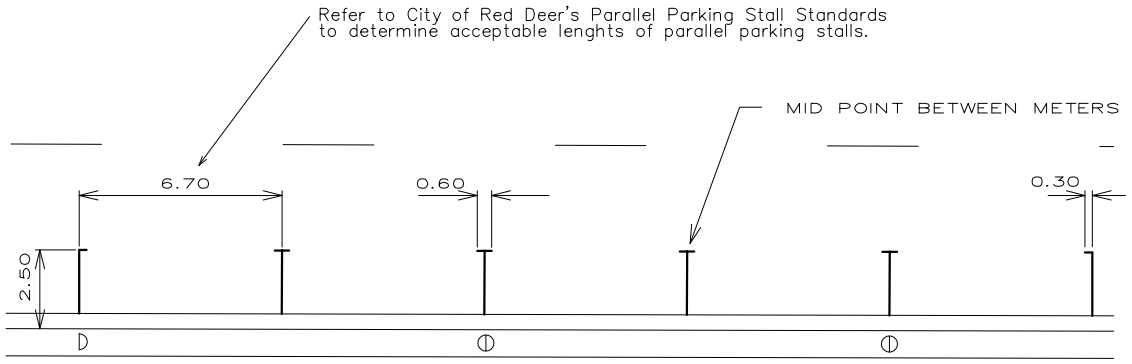


NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	BIKE LANE OR ROUTE PAVEMENT MARKING	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.30

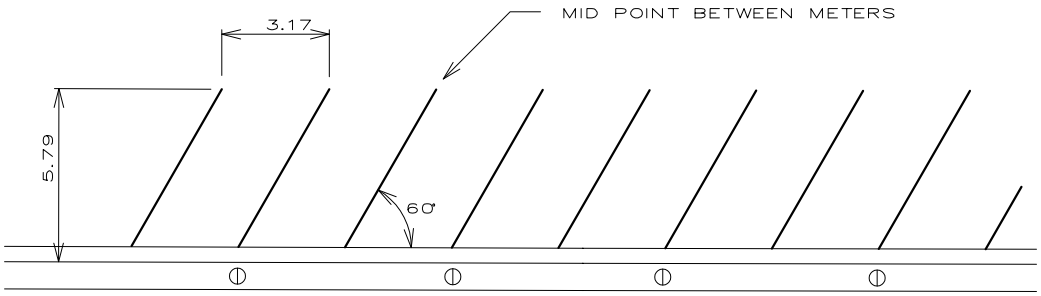


NOTE:
This intersection has been included as an example only.

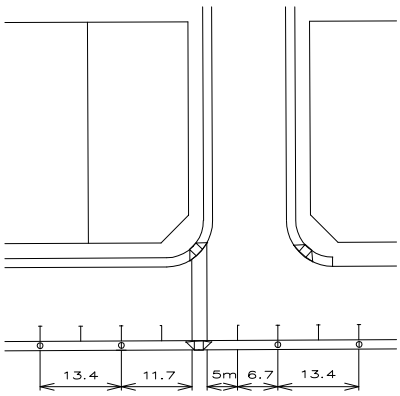
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	SERVICE ROAD BULBING	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.31



TYPICAL MARKING FOR PARALLEL PARKING STALLS

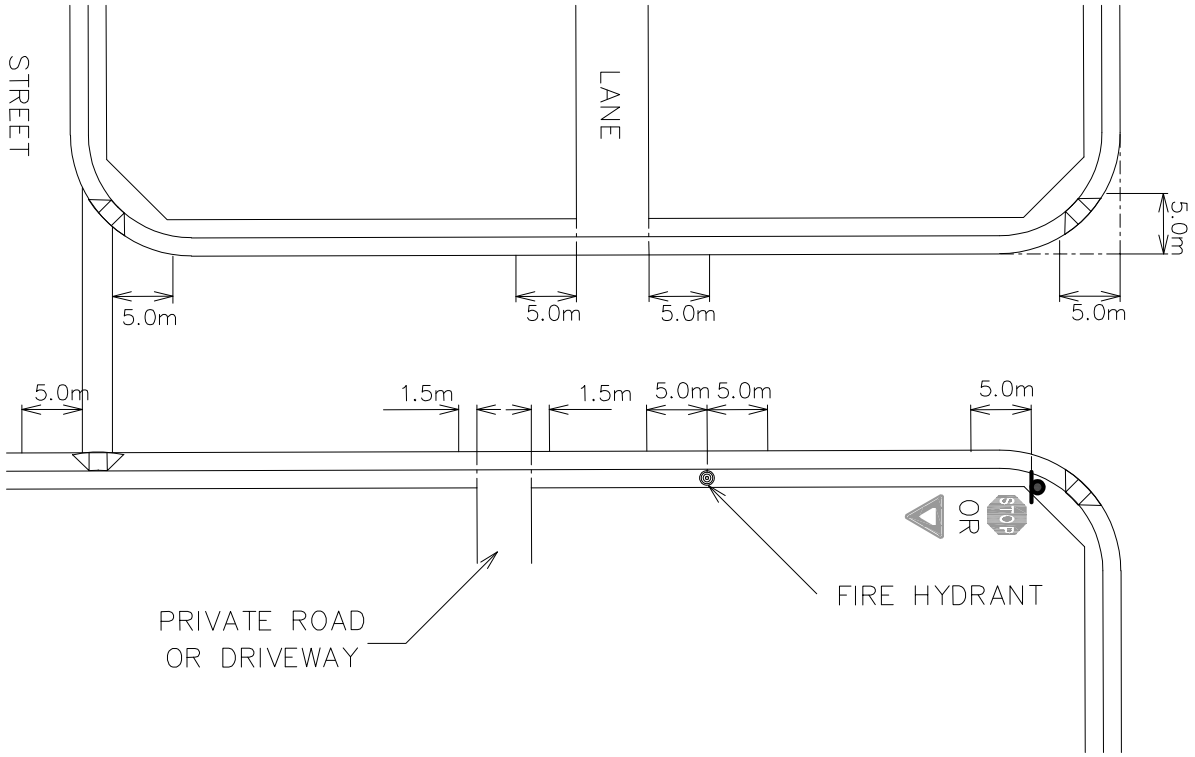


TYPICAL MARKING FOR ANGLE PARKING STALLS



PARKING METER LOCATIONS AT T–INTERSECTIONS

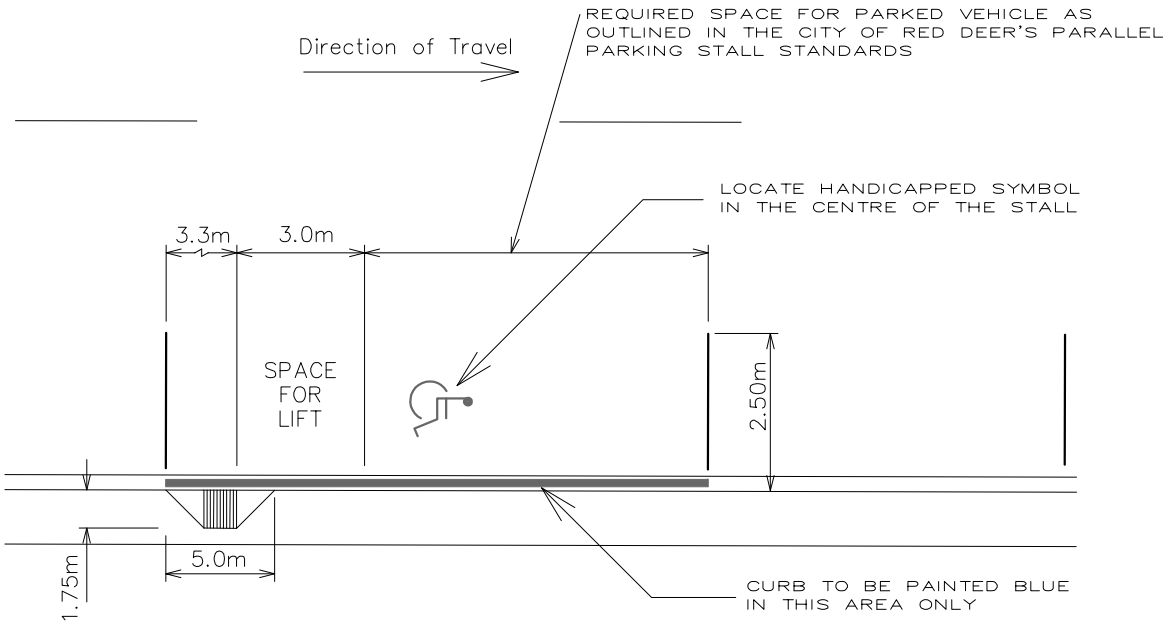
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	MARKINGS FOR PARKING STALLS	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.32

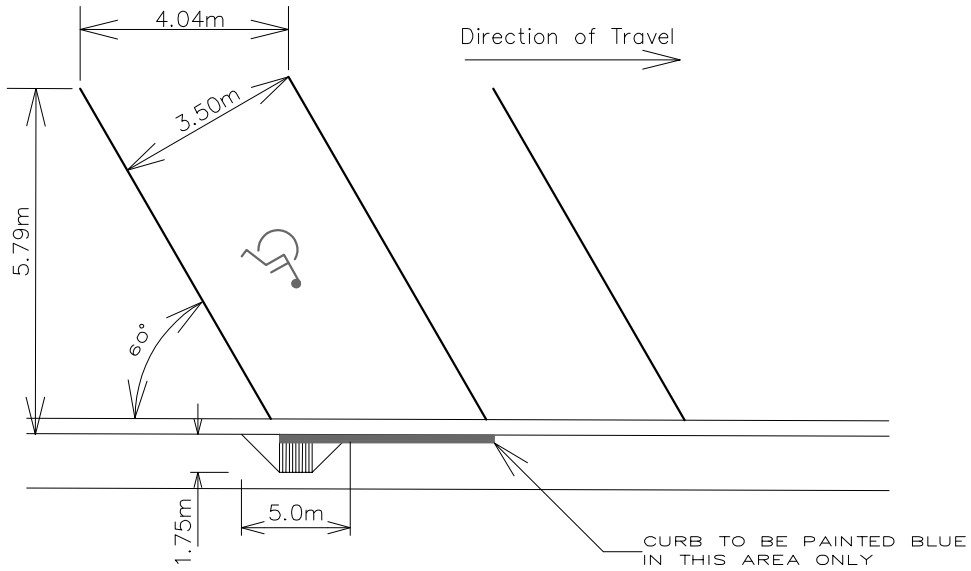


NO.	DATE	REVISION

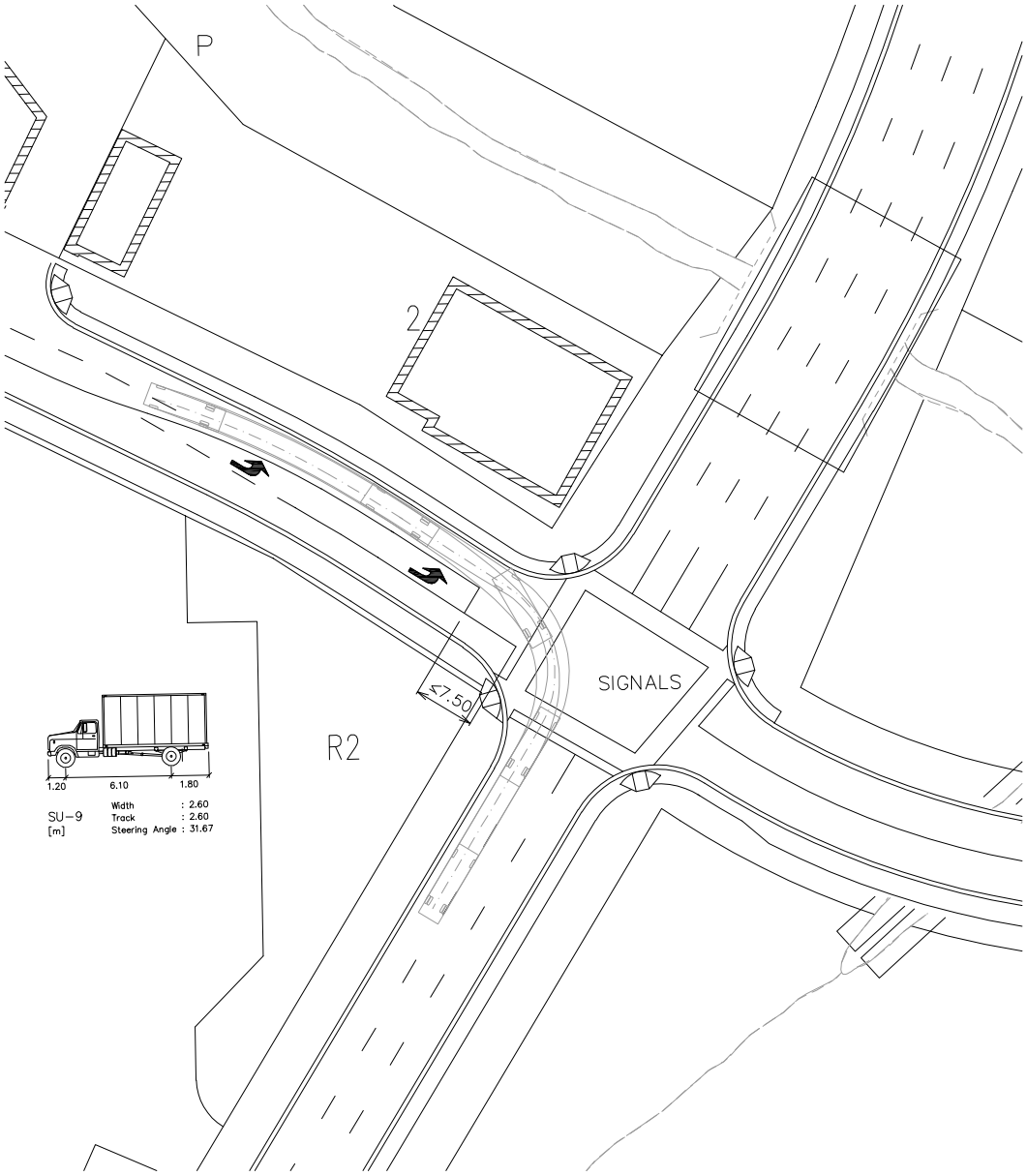
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**TRAFFIC SAFETY ACT PARKING RESTRICTIONS**	
SCALE: N.T.S.		DRAWING NO. **8.33**





NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	CENTRAL BUSINESS DISTRICT HANDICAPPED PARKING STALL LAYOUT	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.34

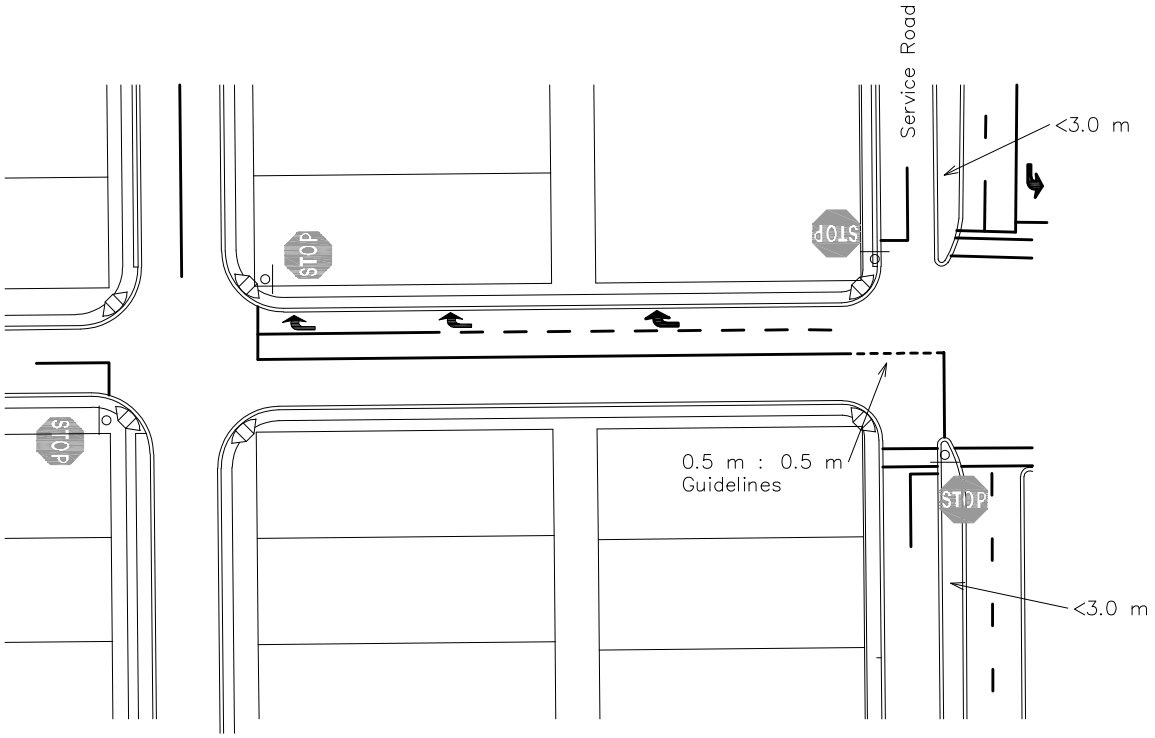


NOTE
Stop Bar Setback and pavement marking design requirements for each intersection will vary. For roadways with no centre medians, turning templates must be used to determine the Stop Bar Setback. Length of setback shall not exceed 7.5 m.

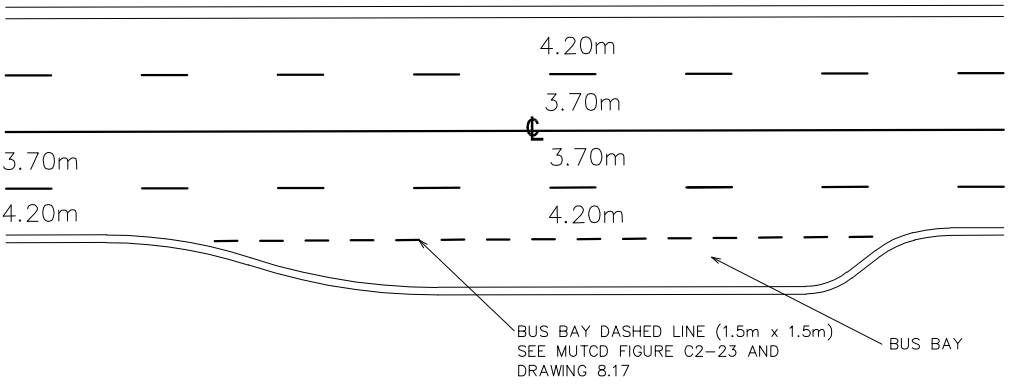
NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**SET BACK OF STOP BARS (ONE-WAY TO TWO-WAY STREETS)**	
SCALE: N.T.S.		DRAWING NO. **8.35**

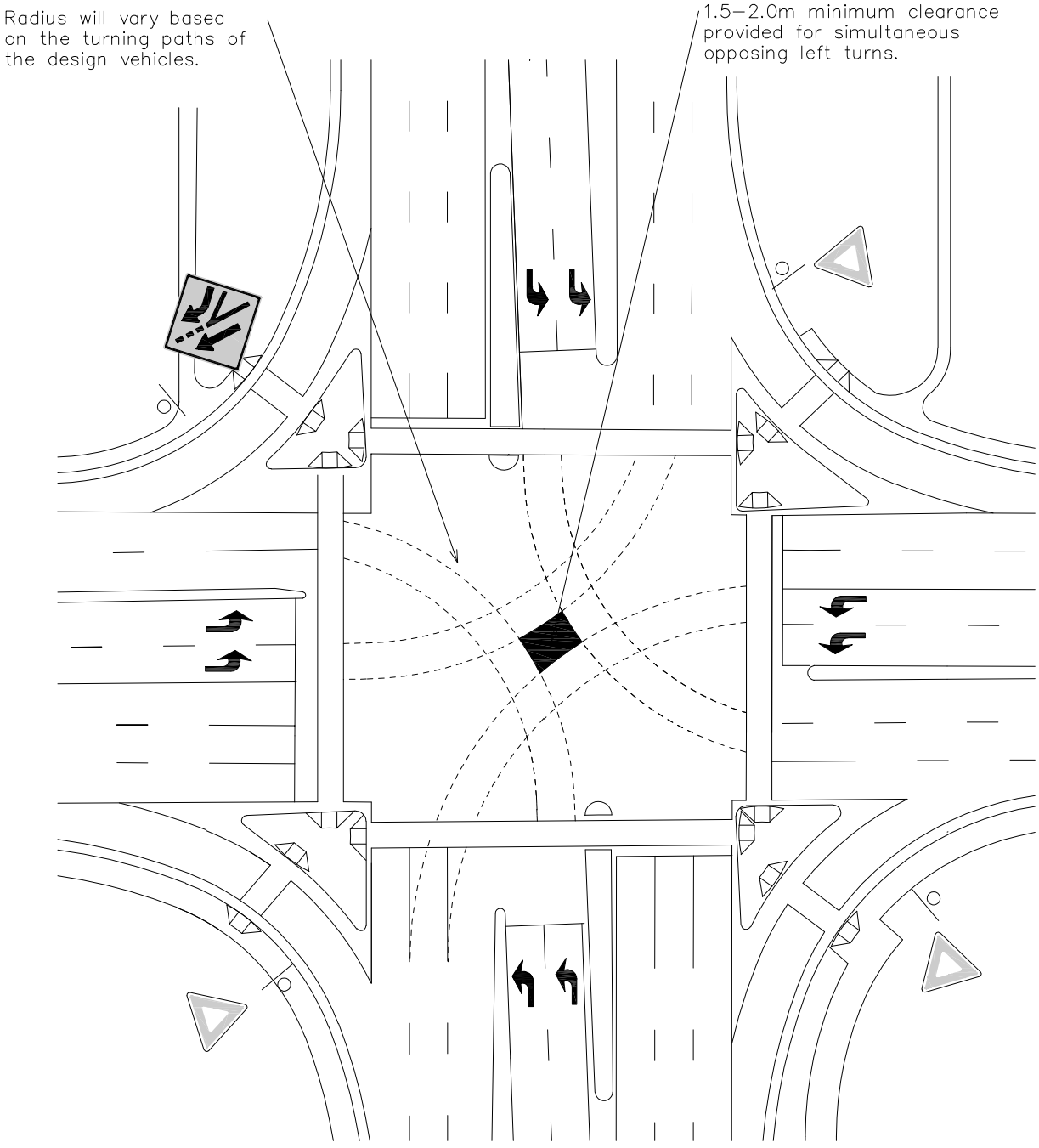


NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	GUIDE LINES ACROSS SERVICE ROAD INTERSECTIONS	
			SCALE: N.T.S.		DRAWING NO. 8.36



BUS BAY DASHED LINE MARKINGS

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	TYPICAL BUS BAY DASHED LINE APPLICATIONS	
			SCALE: N.T.S.		DRAWING NO. 8.37

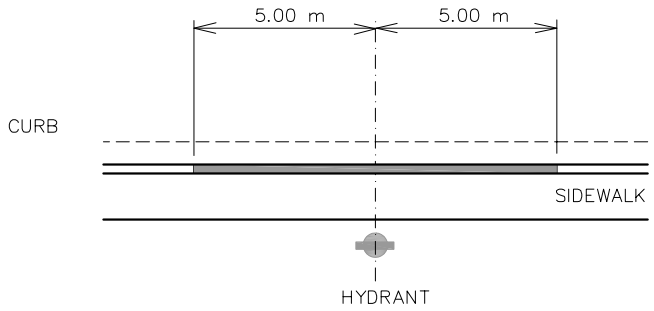


NOTE:
See TAC Geometric Design Guide for Canadian Roads
Figure 2.3.8.13 Turning Paths of Double Left–Turn Lanes

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

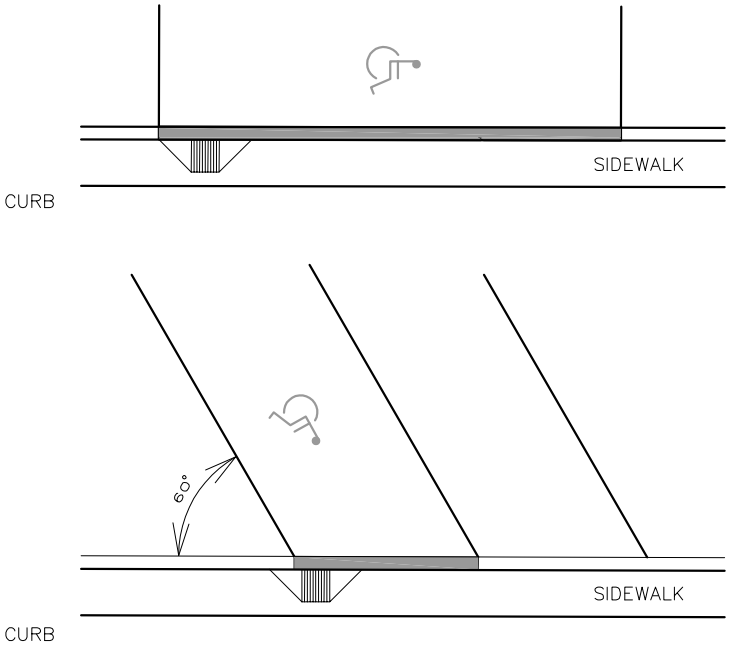
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY:
DATE: 21-04-2017	**DUAL LEFT TURN INTERSECTION GUIDE LINES**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.38**



HYDRANT

TOP OF CURB AND FACE OF CURB SHALL BE PAINTED YELLOW ON TRAFFIC CALMING AND TRAFFIC ISLANDS FOR A DISTANCE OF :

- 1 METER AT ALL MEDIAN BULL NOSES WHERE NO SIGNS EXISTS
- 5 METERS BEFORE AND AFTER ALL HYDRANTS



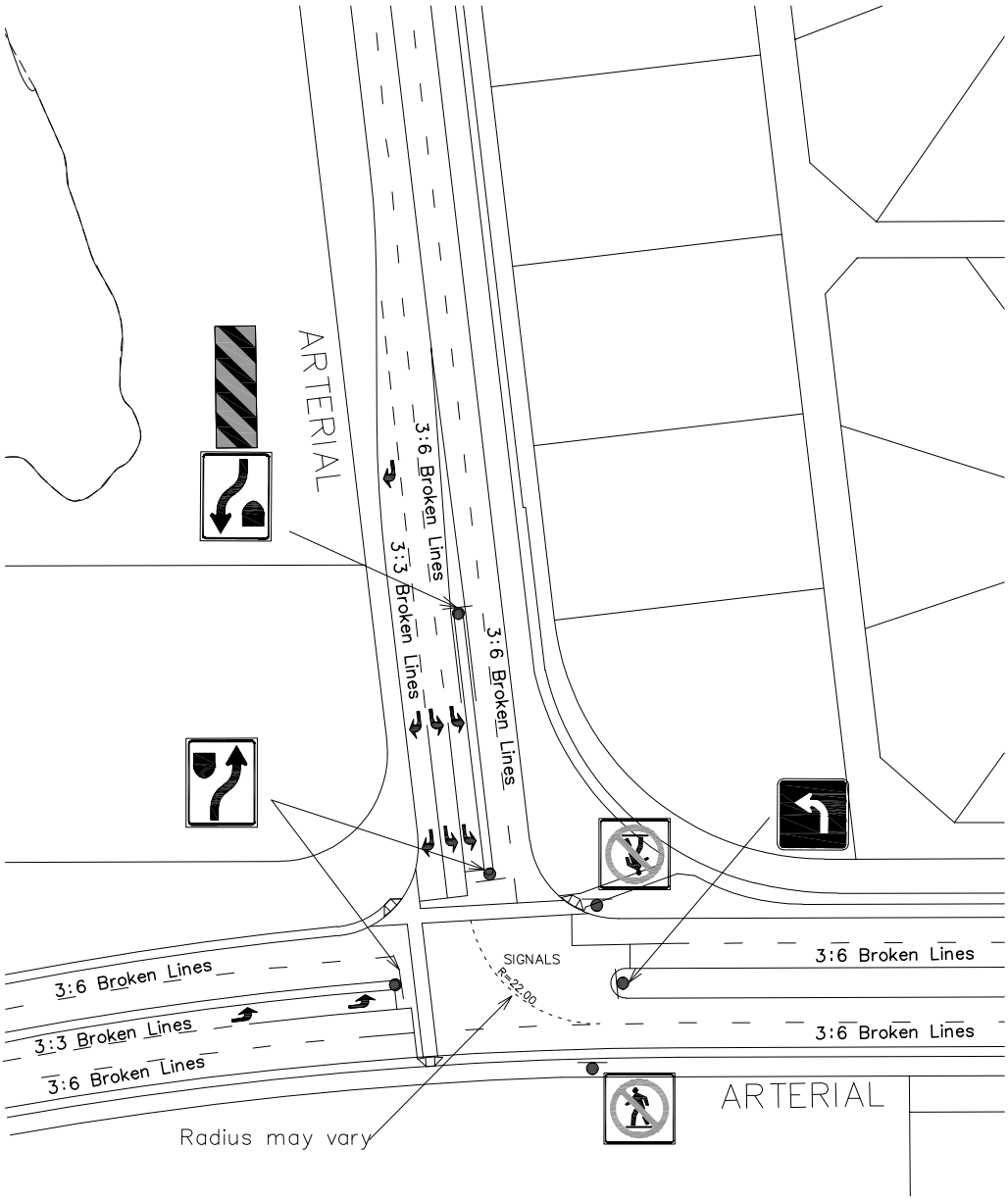
HANDICAPPED PARKING STALLS

TOP OF CURB AND FACE OF CURB SHALL BE PAINTED BLUE WITHIN HANDICAPPED PARKING STALLS IN THE CENTRAL BUSINESS DISTRICT ONLY.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

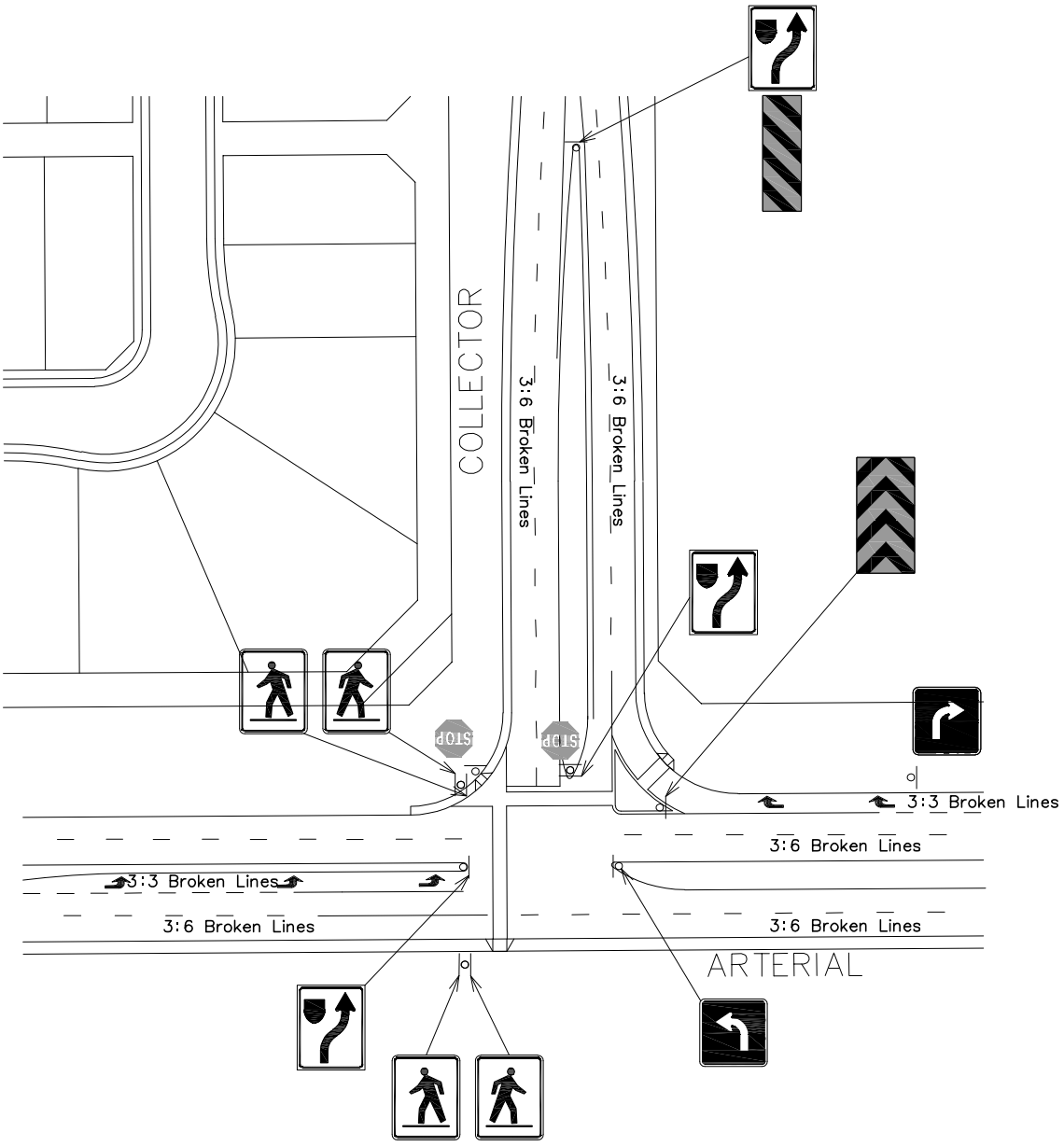
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**CURB PAINTING**	
SCALE: N.T.S.		DRAWING NO. **8.39**



NO.	DATE	REVISION

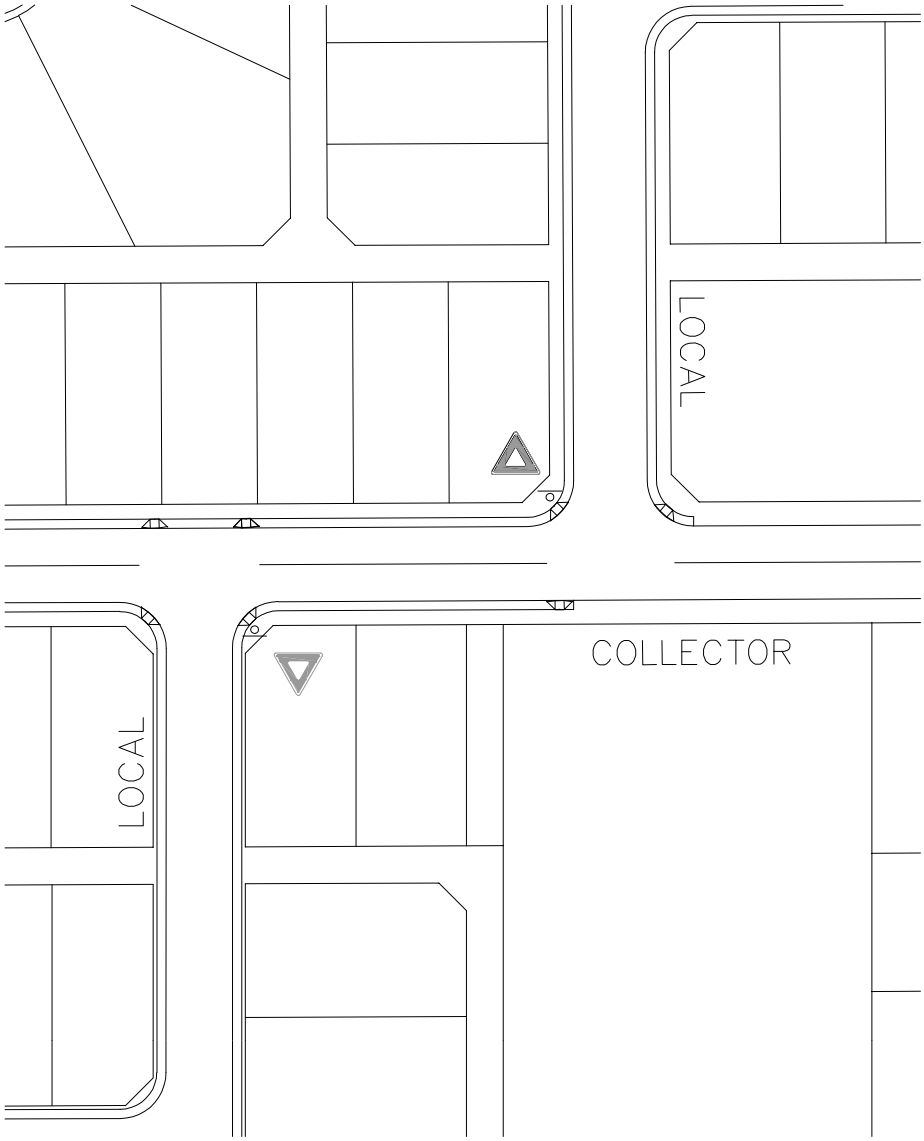
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**TYPICAL T-INTERSECTION PAVEMENT MARKING DETAIL (ARTERIAL TO ARTERIAL)**	
SCALE: N.T.S.		DRAWING NO. **8.40**



NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY: ENGINEER
			DATE: 21-04-2017	TYPICAL T-INTERSECTION PAVEMENT MARKING DETAIL (COLLECTOR TO ARTERIAL)	DRAWING NO. 8.41
			SCALE: N.T.S.		

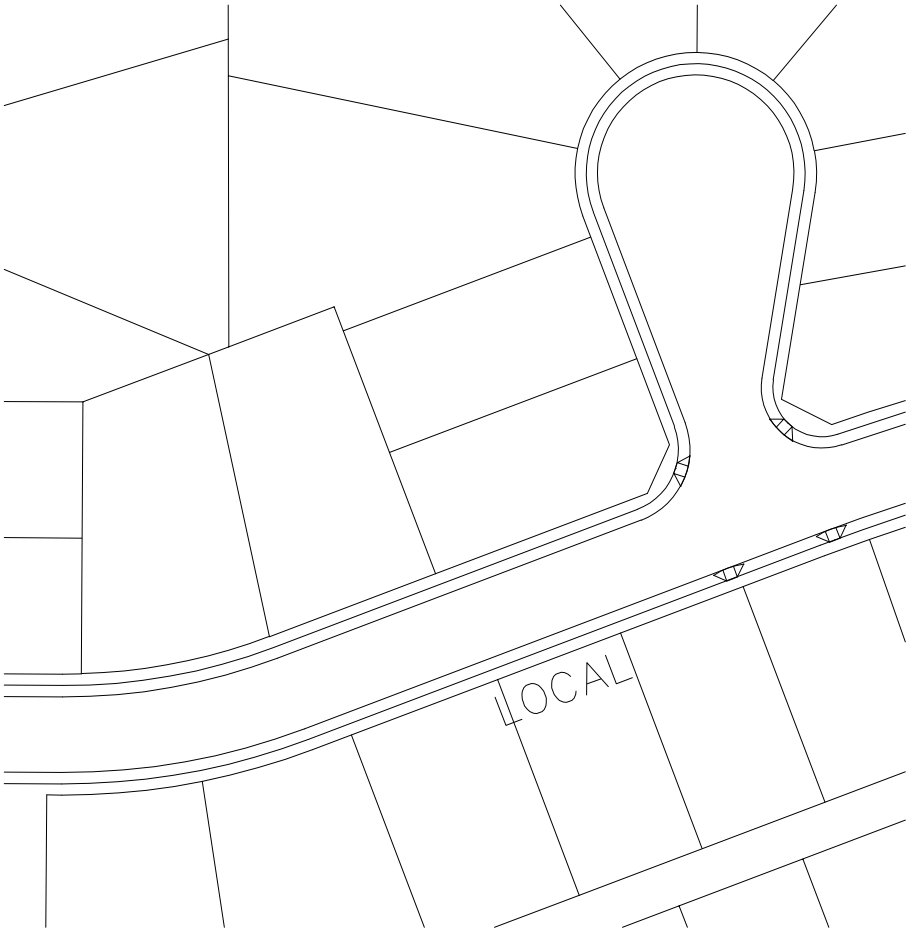
NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	TYPICAL T-INTERSECTION (COLLECTOR TO COLLECTOR)	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.42



NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

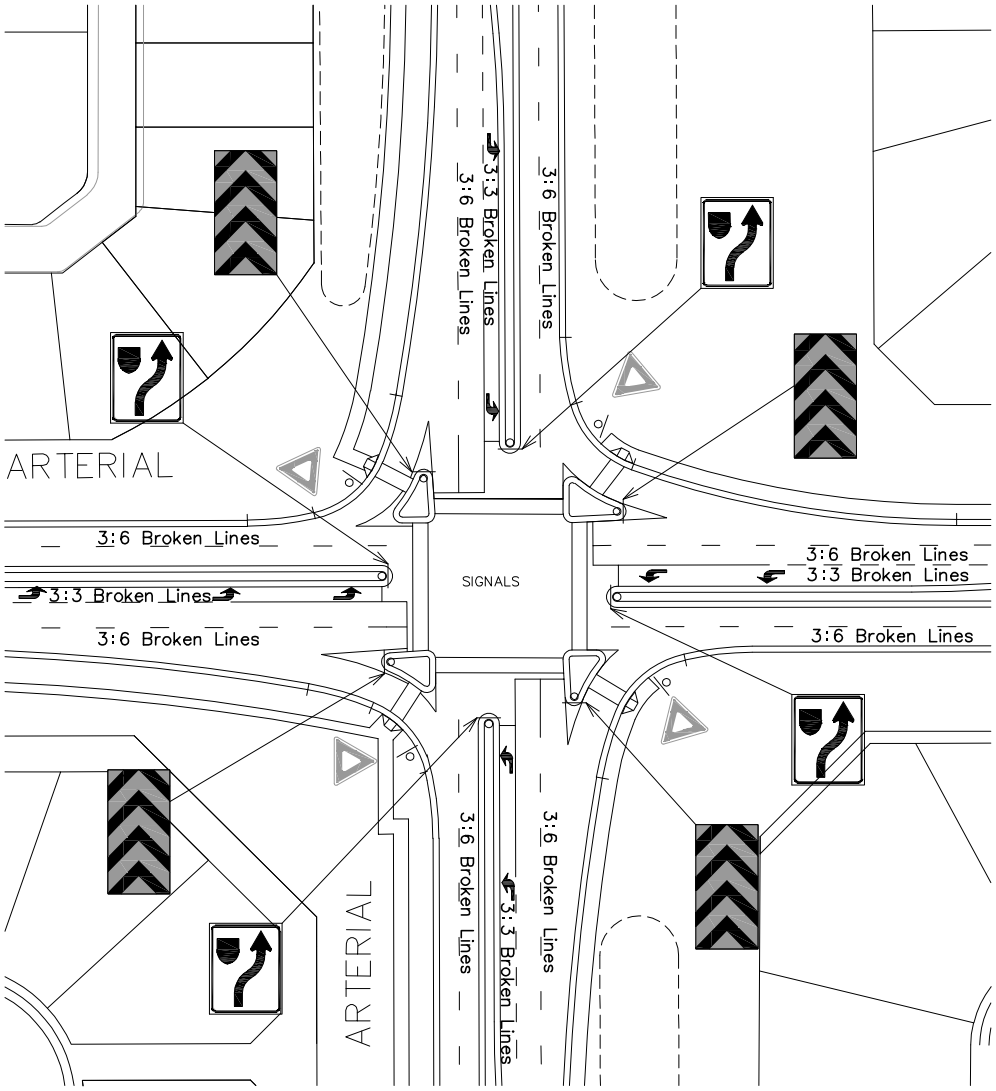
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY:
DATE: 21-04-2017	**TYPICAL T-INTERSECTION (LOCAL TO COLLECTOR)**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.43**



NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

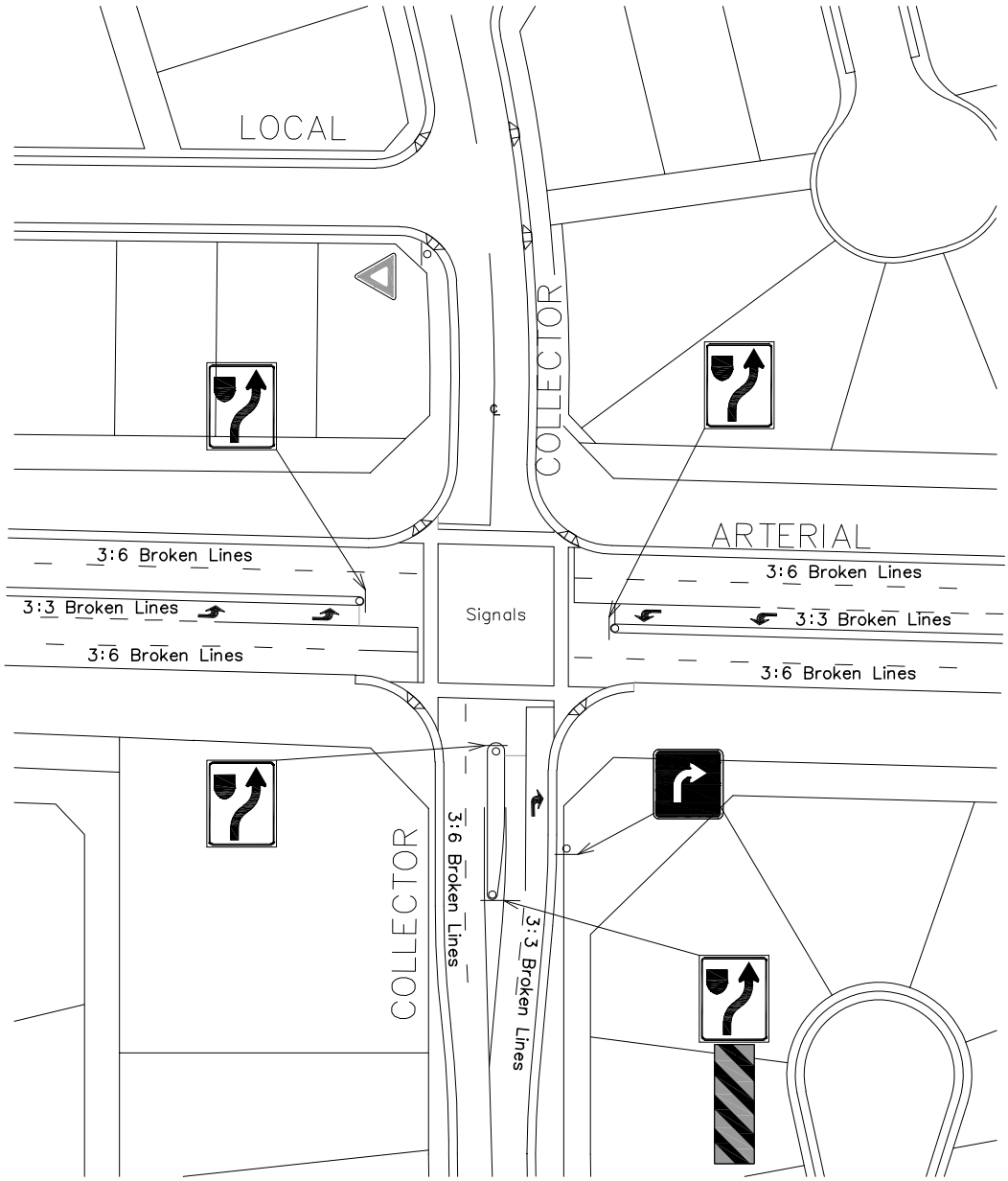
DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY:
DATE: 21-04-2017	**TYPICAL T-INTERSECTION (LOCAL TO LOCAL)**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.44**



NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**TYPICAL 4-LEG INTERSECTION (ARTERIAL TO ARTERIAL)**	
SCALE: N.T.S.		DRAWING NO. **8.45**

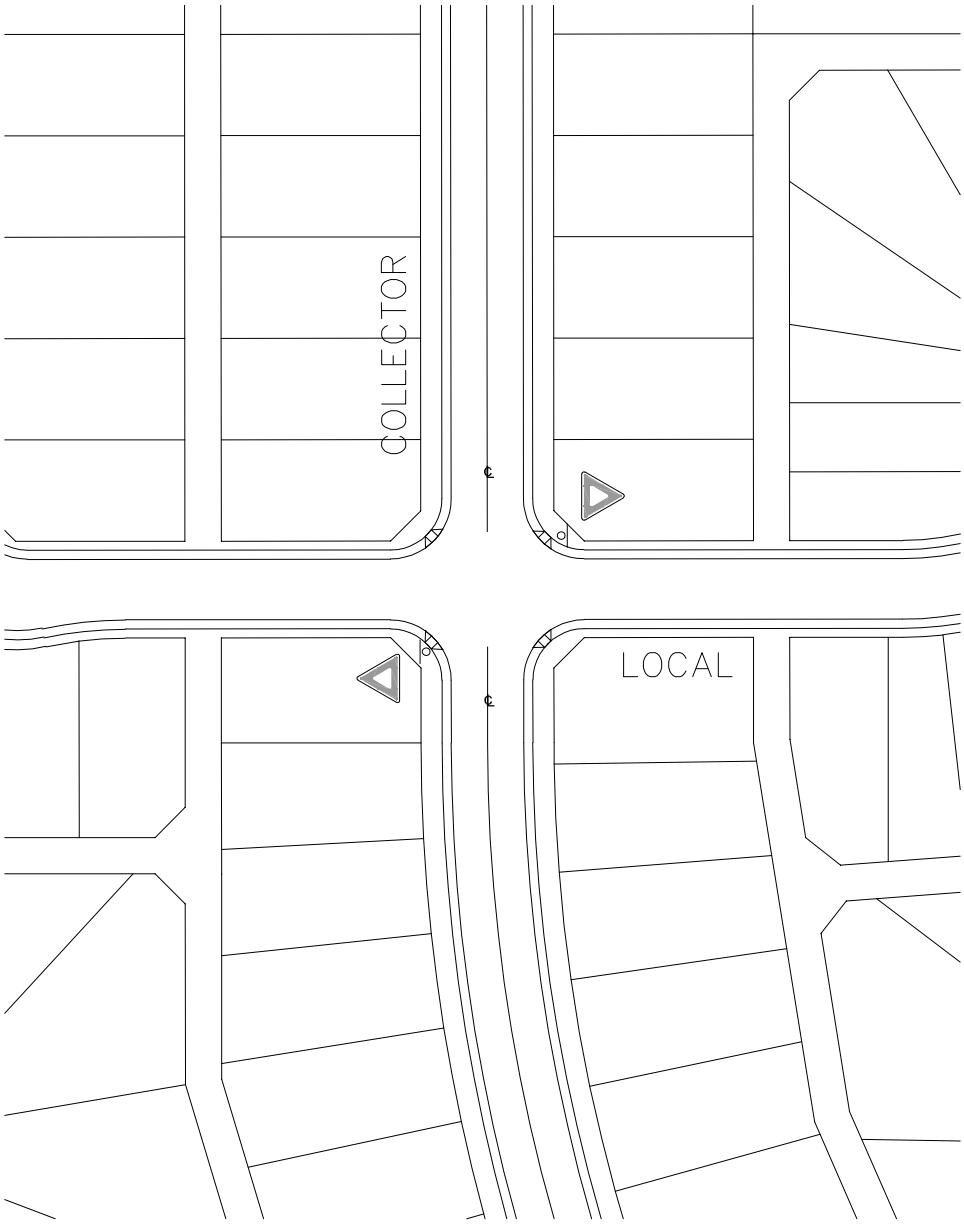


NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**TYPICAL 4-LEG INTERSECTION (COLLECTOR TO ARTERIAL)**	
SCALE: N.T.S.		DRAWING NO. **8.46**

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS	APPROVED BY:
			DATE: 21-04-2017	TYPICAL 4-LEG INTERSECTION (COLLECTOR TO COLLECTOR)	ENGINEER
			SCALE: N.T.S.		DRAWING NO. 8.47



NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**TYPICAL 4-LEG INTERSECTION (LOCAL TO COLLECTOR)**	
SCALE: N.T.S.		DRAWING NO. **8.48**

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY:
DATE: 21-04-2017	**TYPICAL 4-LEG INTERSECTION (LOCAL TO LOCAL)**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.49**

NO.	DATE	REVISION

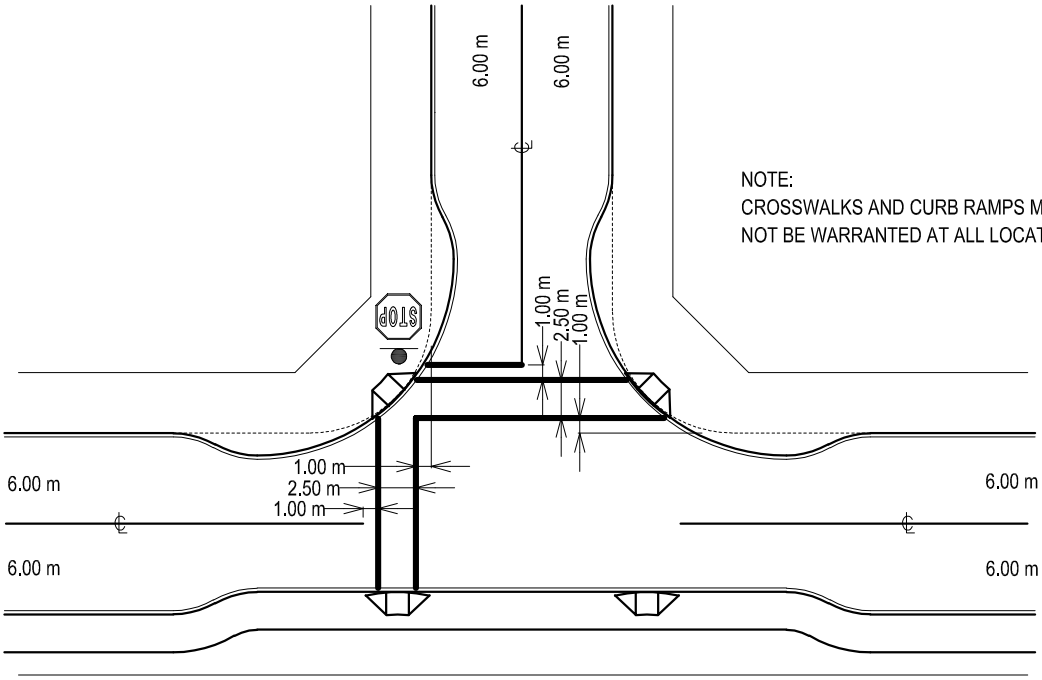
THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY:
DATE: 21-04-2017	**NO BICYCLE SYMBOL**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.50**

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**NO SKATEBOARD SYMBOL**	
SCALE: N.T.S.		DRAWING NO. **8.51**

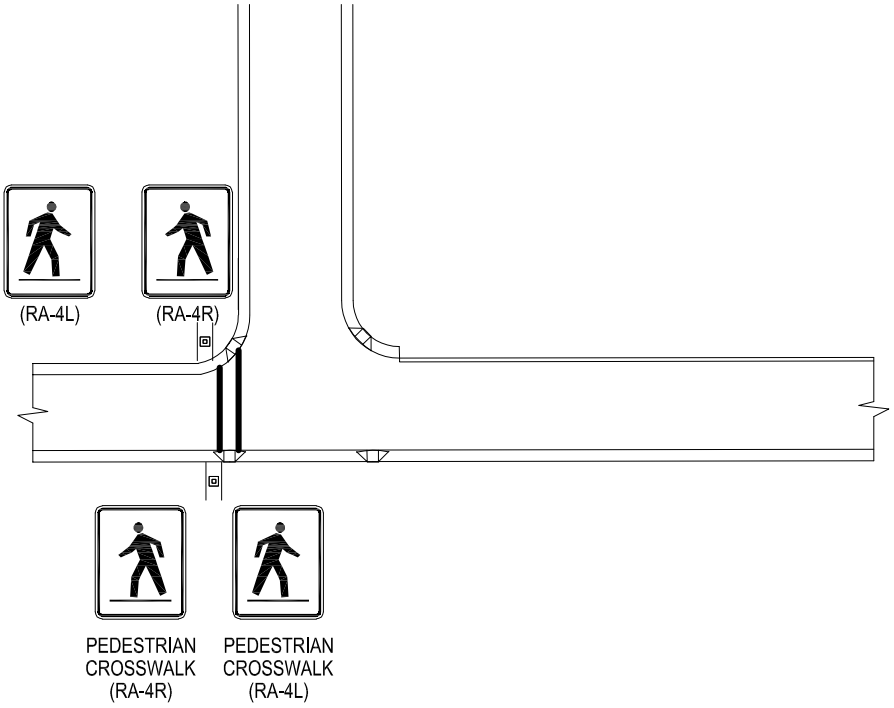


NOTE:
CROSSWALKS AND CURB RAMPS MAY
NOT BE WARRANTED AT ALL LOCATIONS.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS PAVEMENT MARKINGS**	APPROVED BY:
DATE: 21-04-2017	**TRAFFIC CALMING TYPICAL PAVEMENT MARKINGS**	ENGINEER
SCALE: N.T.S.		DRAWING NO. **8.52**



RA-4 Sign Placement Priority:

1. Mount RA-4R just in advance of the ramp for the nearest lane of approaching motorists, with RA-4L facing the opposite direction.
2. Mount RA-4R just after the ramp when required to minimize offset and improve visibility, with RA-4L facing the opposite direction.

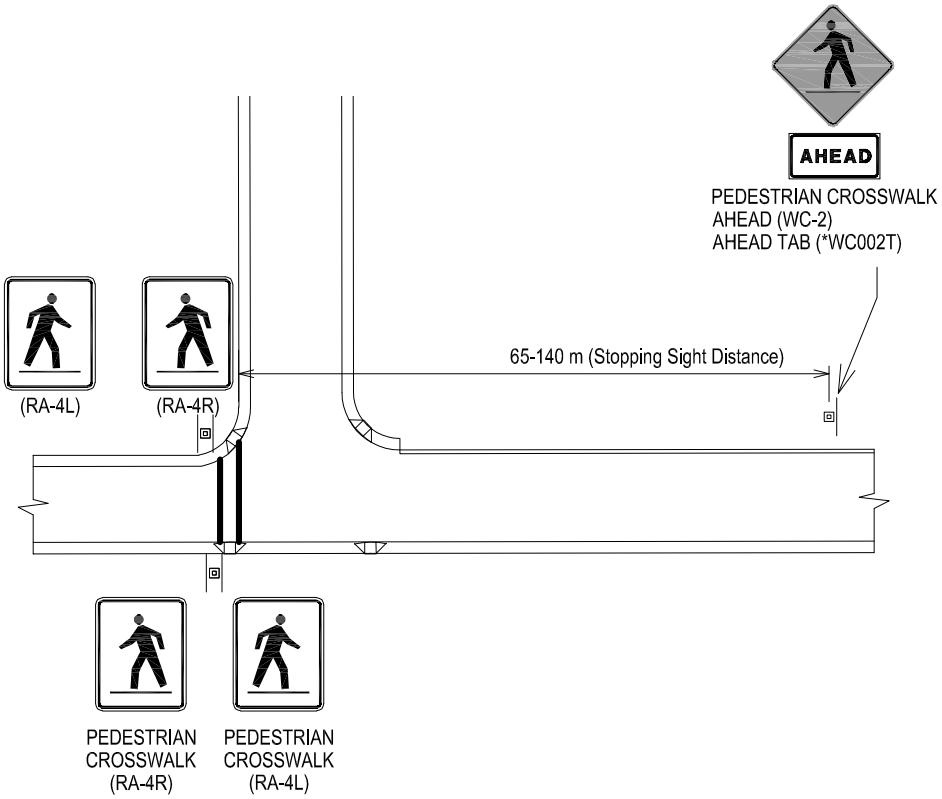
Height:

1. Lowest sign should be at least 2.0 m high. 2.0 m to 3.0 m is the ideal sign height.

Offset:

1. Lateral placement should be 0.3 m to 2.0 m from face of curb.

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS SIGN PLACEMENT	APPROVED BY: ENGINEER
			DATE: 21-04-2017	PEDESTRIAN CROSSWALK SIGN PLACEMENT	
			SCALE: N.T.S.		DRAWING NO. 8.53



RA-4 Sign Placement Priority:

1. Mount RA-4R just in advance of the ramp for the nearest lane of approaching motorists, with RA-4L facing the opposite direction.
2. Mount RA-4R just after the ramp when required to minimize offset and improve visibility, with RA-4L facing the opposite direction.

WC-2 Sign and Ahead Tab Placement:

1. Mount at stopping sight distance from the nearest crosswalk line, if the RA-4 signs are not visible at that distance.

Height:

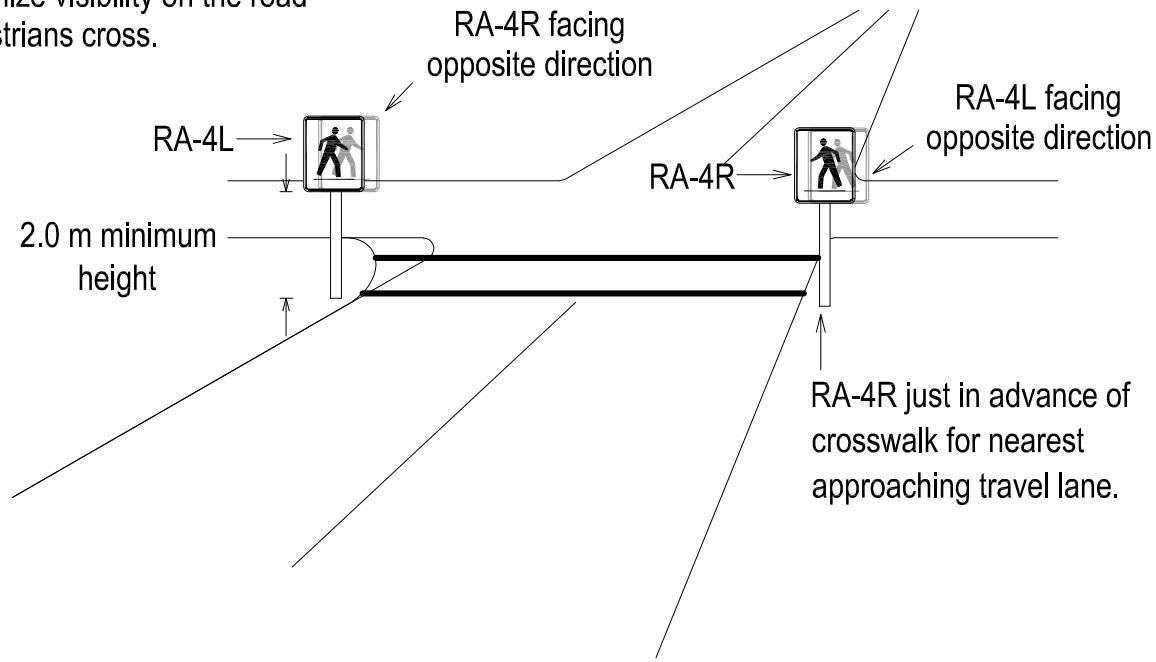
1. Lowest sign should be at least 2.0 m high. 2.0 m to 3.0 m is the ideal sign height.

Offset:

1. Lateral placement should be 0.3 m to 2.0 m from face of curb.

NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS SIGN PLACEMENT	APPROVED BY: ENGINEER
			DATE: 21-04-2017	PEDESTRIAN CROSSWALK WARNING SIGN PLACEMENT	
			SCALE: N.T.S.		DRAWING NO. 8.54

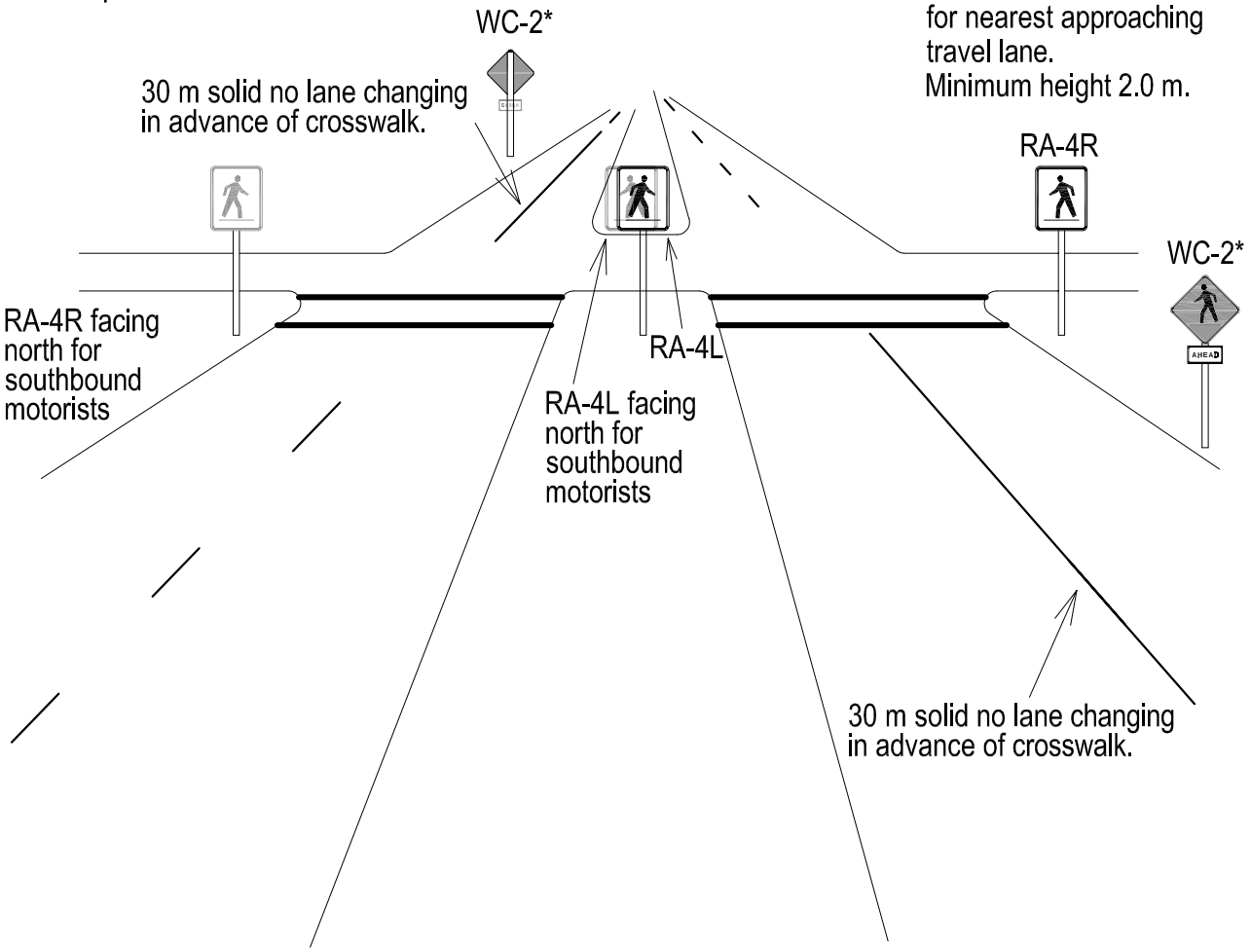
If the offset from the face of curb is too large before the crosswalk, place signs just after the crosswalk. Target offset 0.3 m to 2.0 m to maximize visibility on the road pedestrians cross.



NO.	DATE	REVISION	THE TOWN OF OLDS ENGINEERING DEPARTMENT		
			DRAWN BY: B.M	DESIGN GUIDELINE DRAWINGS SIGN PLACEMENT	APPROVED BY: ENGINEER
			DATE: 21-04-2017	PEDESTRIAN CROSSWALK SIGNS FOR LOCAL AND COLLECTOR (UNDIVIDED) ROADS	
			SCALE: N.T.S.		DRAWING NO. 8.55

If the offset from the face of curb is too large before the crosswalk, place signs just after the crosswalk. Target offset 0.3 m to 2.0 m to maximize visibility on the road pedestrians cross.

RA-4R installed just in advance of crosswalk for nearest approaching travel lane. Minimum height 2.0 m.



*If RA-4 signs or pedestrians standing on the ramp are not visible at stopping sight distance (SSD), install WC-2 Crosswalk Ahead signs and Ahead tabs at SSD from the crosswalk.

NO.	DATE	REVISION

THE TOWN OF OLDS ENGINEERING DEPARTMENT

DRAWN BY: B.M	**DESIGN GUIDELINE DRAWINGS SIGN PLACEMENT**	APPROVED BY: ENGINEER
DATE: 21-04-2017	**PEDESTRIAN CROSSWALK SIGNS FOR DIVIDED ROADS**	
SCALE: N.T.S.		DRAWING NO. **8.56**