TOWN OF PONOKA

ENGINEERING AND DEVELOPMENT DEPARTMENT

DESIGN GUIDELINES

2013 EDITION

Engineering & Development Department

Design Guidelines - 2013 Edition

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The Design Guidelines Manual provides information regarding The Town of Ponoka's Standards governing the subdivision design, servicing standards, the design and construction approval process, and the as-constructed drawing submission requirements. The Engineering Department's requirements alone do not constitute the only conditions of Development in The Town of Ponoka., Inspections and Licensing Department, and other Town Departments should be contacted to determine pertinent Development requirements.

The primary focus of this document is to aid the Consulting Engineer in the preparation of Construction Drawings. 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 from Town Standards have been made.

The purpose of The Town's review of Construction Drawings is to ensure that the Development is designed and constructed in general conformance with Town Standards, such that upon acceptance of the Development by The Town, the future public responsibilities for maintenance fall within normal and reasonable levels.

This Manual does not attempt to set rigid policies, but rather provides the Developer with a guide outlining The Town's requirements. Where unusual or complicated design situations arise, good engineering judgement should prevail. The Town reserves the right to require a deviation from these Guidelines where conditions warrant same.

The Design Guidelines are predominately for use in new areas. Slight modifications may be required in older areas (e.g. soft conversions of the imperial line assignments, right of way restrictions, etc.).

This Manual will be updated from time to time.

The following is an overview of the contents of each Section of this document:

SECTION 1: GENERAL INFORMATION

Definitions, general Development Agreement information, community mailbox request information, Alberta Environmental Protection Act permits and approvals, information regarding Crossing, Proximity, Ground Disturbance and/or Encroachment Agreements, and information regarding subdivision signs.

SECTION 2: CONSTRUCTION DRAWING STANDARDS

Requirements for the preparation and submission of construction drawings, as-constructed drawings, and building grade certificates. This section also includes the requirements for the preparation and submission of Digital As-constructed Plan Drawings.

SECTION 3: ENGINEERING SERVICES

General requirements with respect to the services to be provided by a Consulting Engineer on behalf of the Developer, including sample Construction Completion Certificate (CCC) and Final Acceptance Certificate (FAC) inspection reports.

SECTION 4: AREA STRUCTURE PLAN

General requirements for the preparation of a Area Structure plan with respect to street classification and layout, noise study guidelines, traffic study guidelines, servicing boundaries and constraints, utility corridors, criteria for determining the area of a (Central) School/Park site, transit routes, etc.

SECTION 5: SERVICING STUDY

Requirements for the preparation and approval of site grading, servicing and roadway design for the Area Structure Plan, and geotechnical report requirements.

SECTION 6: EROSION AND SEDIMENT CONTROL GUIDELINES

Specific requirements for the implementation of erosion and sediment control measures to be implemented in conjunction with site clearing and grading.

SECTION 7: SITE CLEARING AND GRADING GUIDELINES

Specific requirements for the design and implementation of the site clearing and grading.

SECTION 8: WATER DESIGN STANDARDS

Specific requirements for the design of the water system, including fire protection requirements.

SECTION 9: SANITARY DESIGN STANDARDS

Specific requirements for the design of the sanitary sewer system.

SECTION 10: STORMWATER MANAGEMENT STANDARDS

Specific requirements for the design of the stormwater system, including major drainage, minor drainage and detention/retention ponds.

SECTION 11: SERVICE CONNECTIONS STANDARDS

Specific requirements for the design of the water, sanitary and storm service connections.

SECTION 12: GAS, POWER, TELEPHONE AND CABLE TELEVISION STANDARDS

Basic information with respect to gas, telephone, and cable television services. Detailed information is available from each of the Utility Companies.

SECTION 13: ROADWAY DESIGN STANDARDS

Specific information for the design of roadways and lanes, pavement marking and traffic control signs, post and cable fencing, emergency access, roadway landscaping, and driveways.

SECTION 14: LANDSCAPING STANDARDS

Recreation, Parks and Culture Department requirements with respect to development and landscaping of Municipal Reserves, Park Sites, and Detention Ponds.

SECTION 15: TRAFFIC SIGNAL INSTALLATION STANDARDS

Specific information for the design of traffic control signals including cantilever and median pole locations, and signal head configurations.

SECTION 16: DESIGN DRAWINGS

The Design Drawings are supplemental to the various Sections and illustrate the design criteria/concepts noted in text form.

1. DEFINITIONS

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

.1 **Town** shall mean the Corporation of The Town of Ponoka in the Province of Alberta.

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

.3 **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.

.4 **Construction Drawings** shall mean those Engineering Plans and Profiles 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.

.5 **Construction Specifications** shall be the documents prepared by the Consulting Engineer specifying the legal, administrative, and technical aspects of the Municipal Improvements, all of which shall conform to the minimum requirements as outlined in The Town's Design Guidelines and The Town's Detailed Contract Specifications.

.6 **Consulting Engineer** shall mean a Professional Engineer who is an authorized officer of a Consulting Engineering firm, retained by the Developer/Town of Ponoka, who has designed the Municipal Improvements and/or supervised the installation of the same within the Development according to the approved plans and specifications. May also be referred to as the Town's Consulting Engineer.

.7 **Developer** shall mean the registered and equitable owner of the Development lands including, but not restricted to, the Consulting Engineers, contractors, and/or subcontractors acting for or on behalf of the owner.

.8 **Development** shall mean the area to be serviced, as determined by the Developer.

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

.10 **Ecological Profile** means a report prepared by the Town which identifies all natural features (treed and wetland areas) located on undeveloped land in the Town and rates them for preservation purposes.

.11 **Ponoka Power, Electrical Line Foreman** shall mean The Town's Electric, Light, and Power Manager or his authorized Representative.

.12 **Electrical Approval** the Developer shall satisfy Ponoka Power, to which the power and lighting portions of the Municipal Improvements must conform.

.13 **Engineer** shall mean the Director of Engineering and Planning or his authorized Representative.

.14 **Level One Landscaping** means the work included in preparing the site to specified grades, placing and levelling topsoil, seeding to grass, and establishing turf; all in accordance with The Town's current Design Guidelines and Standard Specifications.

.15 **Level Two Landscaping** means the work included in planting shrubs, trees, or other plant amenities, all in accordance with The Town's current Design Guidelines and Standard Specifications.

.16 **Level Three Landscaping** means the work included in 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.), all in accordance with The Town's current Design Guidelines and Standards Specifications.

.17 **Level Four Landscaping** means the work included in supplying and installing optional/enhanced amenities (e.g. Ornamental structures, sculptures, feature walls, water features, fountains, spray pools, enhanced plantings, etc.) all in accordance with The Town's current Design Guidelines.

.18 **Municipal Improvements** shall mean all improvements within the Development, including, but not restricted to:

.1 paved roadways, including pavement marking;

.2 sidewalk, curb and gutter;

.3 paved or gravel lanes;

.4 water, sanitary, and storm sewer mains;

.5 water, sanitary, or storm service connections;

.6 shallow utilities, including electrical distribution (excluding service leads), street lighting, natural gas, telephone, and cable television;

.7 landscaped boulevards, medians, municipal reserves, and public utility

lots;

.8 paved, concrete, and/or shale walkways;

.9 park and recreation amenities (e.g. playground equipment, benches, etc.); and;

.10 traffic control, street name, subdivision information (including updates) signs.

.19 **Professional Engineer** shall mean a licensed member of The Association of Professional Engineers, Geologists, and Geophysicists of Alberta;

.20 **TAC** refers to the Transportation Association of Canada.

.21 **Land Use Bylaw** shall mean a bylaw passed by Council to provide for the development and use of buildings and land in the Town of Ponoka.

.23 **Municipal Government Act** shall mean an Act passed by legislation in the Province of Alberta to regulate the governing of municipalities throughout the province.

2. DEVELOPMENT AGREEMENTS

2.1 General

The construction of Municipal Improvements within a subdivision is subject to the terms and conditions of a Development Agreement, together with the schedules, including all financial, construction, maintenance, and security requirements of the Developer.

Following the approval of the preliminary Construction Drawings, the Developer shall request, in writing, that the Town proceed with the preparation of the Development Agreement. Included at the end of this Section, as Figure 1, is a flow chart that illustrates the Development Agreement process.

Note: Development Agreements will not be issued until all Servicing Study issues, including clearing, topsoil stripping, site grading, erosion control measures and sediment control measures have been approved by the Engineer and copies of all relevant drawings and reports as listed in "Section 5 – Servicing Study and Associated Reports" have been provided to The Town.

See Section 6 – Erosion and Sediment Control Measures and 7 – Site Clearing and Grading Guidelines for additional requirements.

Revisions to the Servicing Study must be provided when the Area Structure Plan

revisions (i.e. roadway realignment, land use revision, etc.) are approved. Further Development Agreements will not be issued until the revised Servicing Study drawings and/or reports are submitted and approved.

2.2 Development Agreement Processing Schedule

The time required to process a Development Agreement varies, depending on the number of approvals required, complexity of the Development, timely submission of documentation required for the calculation of costs, and other factors. Included at the end of this Section, as Figure 2, is a bar chart that illustrates the average time required to process a Development Agreement.

2.3 Power, Gas, Telephone and Cable TV Alignment and Utility Right of Way Approvals

The Developer is responsible for coordinating the location of the power, gas, telephone and cable TV, including obtaining alignment and utility right of way approvals. The location of the shallow utilities must be confirmed to ensure that all of the required utility right of ways are shown on the Utility Right of Way Plan before it is submitted to Land Titles for registration. The Legal Plan and the Utility Right of Way Plan, together with the Utility Right of Way Agreements, are released for registration when the Development Agreement has been signed by Developer and the Town.

Shallow Utility drawing requirements are included in Section 2 - Clause 3.10. The procedure for the preparation, submission and approval of shallow utility alignments is included in Section 12. It is the consultant's responsibility to provide the required digital base plans and Ponoka Power alignments to the other utility companies.

The Consultant should prepare a form letter, similar to the Sample Letter included as Appendix D at the end of this Section that could be signed by the Utility company representative.

2.4 Submissions

.1 Construction Drawings and Specifications

The Developer shall provide the following information to The Town for review prior to the request for a development agreement.

.1 Construction Drawings conforming to the requirements of Section 2. The drawing review set shall include the Shallow Utilities Drawing showing all approved shallow utility alignments.

.2 Construction Specifications meeting or exceeding the requirements

of The Town of Ponoka's Contract Specifications.

.3 Geotechnical Report (three copies) providing the information listed in Section 5.

The initial review of the construction drawings will identify such cost items as cost recoveries for area, boundary and/or oversize improvements, revisions to drawings affecting pavement marking and signage costs, connections to existing mains, future cost recoveries, etc.

.2 Initial Development Agreement Submissions

The Developer shall provide the following information to the Town, along with their initial request for preparation of the Development Agreement.

.1 Name and address of Developer,

.2 Off-site Levy Payment Option as follows:

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

.2 The Developer has elected to pay 25% of the Off-site Levy Payment amount on signing the Development Agreement, and to defer payment of the remaining 75% for one year.

Note: Interest at the rate noted in the current Development Agreement will be applied to the Deferred Payment Amount.

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

.1 Total subdivision area,

.2 Legal description and area for each MR parcel,

.3 Legal description and area of any non-developable lands (i.e. addition to any expressway and/or arterial road right of ways, high pressure gas main right of way, power transmission right of way, environmental reserve parcels, etc.).

.4 Letter from the Town outlining the Conditions of Subdivision set by the Subdivision Authority, including any money due in place of reserve dedication. The land value for money in place of reserve

dedication will be determined by the Town of Ponoka's Finance Department.

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

.1 Power distribution and streetlighting costs from an independent Electrical engineer to be reviewed by Ponoka Power,

.2 Cost estimate for Pavement Marking and Signage from the Engineer or his representative,

.3 Municipal Improvement 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.

.4 Cost estimate to construct Subdivision Entrance Sign(s),

.5 Wall Surface Area and Estimated Construction Cost of any Sound Attenuation Walls,

.6 Cost estimate to construct Level Four Landscaping – Enhanced Amenities (i.e. decorative cairns, fencing on Town Lands, etc.),

.7 The following information that will be used to calculate Stormwater Retention (Wet) Pond maintenance costs:

.1 Permanent water surface area,

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

.3 Source of make-up water.

.8 Cost estimates for the construction of Trunk Main Facilities and/or Expressways and Arterial roadways by the Developer on behalf of The Town. Separate estimates for expressway and arterial roadway streetlighting and pavement marking are to be provided, if applicable.

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

.10 Cost estimates for the construction of all Municipal Improvements to be constructed by the Developer as listed in the schedules of the Development Agreement. All estimates are to include an allowance for Engineering and Contingencies. Release of the Construction Completion Certificates will be based on the cost breakdown provide by the Developer. (i.e. Separate C.C.C.'s will be issued for detention pond landscaping if the costs are separated from any other landscaping costs.)

.3 Final Development Agreement Submissions

Following the review of the Draft Development Agreement, the Developer shall return the Draft Development Agreement with comments regarding errors and/or omissions, if any, and provide the following information to the Town.

.1 Letters from the Shallow Utility Companies approving the proposed alignments and utility right of way plan(s).

.2 Letter from the Director of Protective Services, approving proposed hydrant locations, fire flows, and fire access.

.3 Proposed Development Schedule,

Note: The proposed schedule should allow a minimum of 3 weeks following final development agreement submissions to allow for final document preparation, printing, submission of document to developer for signing, and return of documents by Developer. (See Clause 2.5)

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

.5 Copy of the approved land use (zoning) plan,

.6 Copy of the tentative legal plan,

.7 Copy of each utility right of way plan,

.8 Copy of the approved setback plan (footprint),

.11 Copies of the following Alberta Environmental Protection Act

documents:

.1 Copy of "Written Notification for Extension to a Waterworks, Wastewater, or Storm Drainage System" (includes copy of Town Confirmation Letter, copy of Consultant Application Letter and copy of signed "Notice".

.2 Copy of "Letter of Authorization for Storm Drainage Treatment Facilities", and /or

.3 A copy of "Amendment to The Town of Ponoka's Wastewater and Strom Drainage Permit".

(See Clause 5 for additional information regarding the noted EPEA Documents)

.12 Copies of applicable approved Crossing, Proximity, Ground Disturbance and/or Encroachment Agreements.

.13 Water Distribution System Flushing Drawing approved and signed by the Engineer or his representative

.14 Electrical Servicing Plans (where servicing is to be completed by a private Contractor) conforming to the requirements of Section 12 approved and signed by Ponoka Power,

.17 Provide computer graphic files for tentative legal plans and approved overall construction drawings. The Drawing Submission Standards are outlined in Section 2.

2.4 Performance and Maintenance Security

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

2.5 Notice to Proceed with the Construction of Municipal Improvements

The Engineer will issue a preliminary "Notice to Proceed" once The Town has approved all applicable documents prior to signing of the Development Agreement. **Approval to start construction is not permitted prior to the issuance of a "Notice to Proceed".**

The "Notice to Proceed" will not be issued until the Developer has arranged to do the following:

.1 Sign, seal, and return the Development Agreement.

.2 Pay the Developer's net initial payment amount, if applicable.

.3 Provide an Original Irrevocable Letter of Credit in accordance with the conditions of the Development Agreement.

.4 Provide an Original Certificate of Insurance in accordance with the conditions of the Development Agreement.

.5 Provide photocopies of the following Developer/Contractor documents for all construction contracts:

.1 Labour and Materials Payment Bond,

.2 Performance Bond,

.3 Certificate of Insurance with The Town of Ponoka and its representatives named as Certificate Holder and additional insured.

.6 Two copies of the Development Agreement and the official "Notice to Proceed" will be sent to the Consultant once the Development Agreement has been signed by The Town of Ponoka.

3. COMMUNITY MAILBOXES

3.1 General

The Consulting Engineer shall submit a copy of the 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

3.2 Location Criteria

Canada Post has prepared a document entitled "Postal Delivery Standards Manual, Planning for Postal Service" which is available at the following address:

Manager, Delivery Planning and Postal Code Management
Address Management
Suite N0813 – 2701 Riverside Drive
Ottawa, Ontario K1A 0B1

Canada Post will determine the final location of community mailboxes based on various criteria, including the affect upon the ratepayer who is immediately adjacent to the scheduled community mailbox location.

Upon receipt of the mailbox location plan from Canada Post, the Consulting Engineer shall ensure that the community mailbox locations conform to the requirements noted in the Postal Delivery Standards Manual and the following Town of Ponoka criteria, wherever possible.

.1 Along the flankage (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 sideyard of a lot at these locations to allow for the encroachment of the community mailbox onto private property. Note: Canada Post will confirm the final location of the mailbox pad with the Developer and/or property owner prior to installation.

.2 Next to an open space or playground.

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

.4 On The Town boulevard, close to the sidewalk, to avoid creating grass areas that are difficult to cut.

.5 Not along Town major thoroughfares, since no parking is allowed on these roads.

.6 Not closer than 10 m from a fire hydrant or bus stop.

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

.8 Not too close to streetlight standards, street name poles or any raised utility boxes such as a transformer.

.9 The location of the boxes shall not impede the pedestrian and vehicular sight distances.

.10 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.

The Consulting Engineer shall advise Canada Post of the acceptability of the locations or suggest a revised location for consideration by Canada Post.

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 the Delivery Planning Manager at the above noted address.

The community mailbox locations must also be shown on all applicable drawings and sales brochures.

4. ALBERTA ENVIRONMENTAL PROTECTION - STANDARDS AND GUIDELINES FOR MUNICIPAL WATERWORKS, WASTEWATER, AND STORM DRAINAGE SYSTEMS IN ALBERTA

The purpose of this publication is to provide Standards and Guidelines for Municipal Water Supply, Wastewater, and Stormwater Drainage Systems in Alberta. Under the Environmental Protection Enhancement Act (EPEA), municipal water supply, wastewater, and stormwater drainage systems must be designed to meet these Standards or to a standard required by the Director of Standards and Approvals.

The current edition of the above noted Standards is to be used in conjunction with the Town's Design Guidelines, and the minimum requirements of each must be met.

5. ALBERTA ENVIRONMENT APPROVALS

5.1 General

Construction of water distribution systems, wastewater collection systems and storm drainage systems, including major components; such as water pumping stations, water reservoirs, sewage lift stations, storm ponds, storm outfall structures, etc. require approval from Alberta Environmental Protection.

The following Acts govern construction activities: (www.environment.alberta.ca)

.1 Environmental Protection and Enhancement Act - Chapter E-12,

.2 Water Act - Chapter W-3.

Effective October 2003, Alberta Environment has introduced Codes of Practice for the operation of water, sanitary sewer and stormwater systems. Alberta Environment has also revised the notifications and approval procedures as noted in Clauses 5.2 and 5.3.

Effective August 2, 2005, the following documents are to be submitted to Alberta Environment by the Town on behalf of the Consultant:

.1 Written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System for extension to a waterworks, wastewater or storm drainage system,

.2 A Letter of Authorization for an amendment to The Town of Ponoka's Wastewater and Storm Drainage Permit.

.3 Submission details are included in Clause 5.4 of this Section.

Effective February 2007, Alberta Environment introduced a revised edition of their "Provincial wetland Restoration/Compensation Guide", which outlines how applications will be reviewed under the ***Water Act*** when loss of wetland area occurs. It explains "wetland compensation"; a process to help reduce loss of wetland area by restoring drained or altered naturally occurring wetlands.

Developers and Consultants are advised to contact Alberta Environment if proposed developments contain existing wetlands and if there are changes proposed to those wetlands.

Effective February 2007, Alberta Environment introduced a revised addition of their "Provincial Wetland Restoration/compensation Guide", which outlines how applications will be reviewed under the Water Act when loss of wetland area occurs. It explains "wetland compensation"; a process to help reduce loss of wetland area by restoring drained or altered naturally occurring wetlands.

Developers and Consultants are advised to contact Alberta Environment if proposed developments contain existing wetlands and if there are changes proposed to those wetlands.

5.2 Wastewater and Storm Drainage Regulations 119/93

Wastewater and Storm Drainage Regulations 119/93 apply to 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 stormwater treatment units installed upstream of a stormwater storage facility as these units are included in the Code of Practice for Wastewater (*Sanitary Sewer and Storm*) Collection Systems.

As specified in the Regulations, the Developer shall apply for a "**Letter of Authorization**" for the design and construction of storm drainage treatment facilities. A copy of the "Application for a Letter of Authorization for Storm Drainage Treatment Facilities" is appended to this Section.

The Town of Ponoka will not allow construction to proceed until the required EPEA and/or Water Act approvals have been received.

5.3 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:

.1 For 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.

.2 For 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.

.3 Water, Sanitary and Storm Code Submission Requirements

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 the "Written Notification for Extension to a Waterworks, Wastewater, or Storm Drainage System" is appended to this Section.

Detailed submission procedures are included in Clause 5.4 of this Section.

.4 Miscellaneous Codes of Practice

The following Codes of Practice have specific submission and approval requirements. Copies of the Application Forms are appended to this Section.

.1 Code of Practice for Outfall Structures on Water Bodies [made under the Water Act and the Water (Ministerial) Regulation],

.2 Code of Practice for Watercourse Crossings [made under the Water Act and Water (Ministerial) Regulation],

.3 Code of Practice for Pipelines and Telecommunications Lines Crossing Water Bodies [made under the Water Act and the Water (Ministerial) Regulation].

The Town of Ponoka will not allow construction to proceed until copies of the required Code notices have been received and forwarded to Alberta Environment.

5.4 Submission of Applicable Letters and Forms

.1 As noted in Clause 5.1, the Town is now responsible for submitting the following documentation to Alberta Environment of behalf of a Consultant:

.1 Written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System;

.2 A Letter of Authorization for an amendment to The Town of Ponoka's Wastewater and Storm Drainage Permit.

Note that the Wastewater and Storm Drainage Permit amendment must be posted for a 30-day appeal period. The permit amendment will be issued following the appeal period.

.2 The following procedure is to be followed in this regard:

.1 Submit a complete set of construction drawings to The Town for review;

Note: The Town will not approve any construction drawings until all Servicing Study issues have been approved by the Engineer and copies of all relevant drawings and reports as listed in Section 5 have been provided to The Town.

.2 Revise drawings, as required;

.3 Resubmit revised "Issued For Construction" drawings;

Note: Place a signature block similar to the following example on the Cover Sheet of the Construction Drawing Set.

Town of Ponoka **Construction Drawing Approval**
These Construction Drawing have been reviewed and approved for construction of the noted Municipal Improvements.
_____ _____ Engineer / Town Consulting Engineer Date:

.4 Complete and submit the application letter (See Appendix A1 – Sample Application Letter) to The Town; and

.5 Submit the applicable "Written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System" and/or "Letter of Authorization" form(s) to the Town.

.6 Provide an 11" x 17" (50% reduction) copy of the approved construction drawing set for submission to Alberta Environment.

.3 The following action will be taken by the Town and Alberta Environment:

.1 The Town will forward the application letter, applicable Alberta Environment forms and approved construction drawings, together with The Town of Ponoka confirmation letter (See Appendix A2 – Sample Confirmation Letter) to Alberta Environment.

.2 No further action will be taken by Alberta Environment in regards to a "Written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System" application. Submission of the application, notice and confirmation letter by The Town is APEA's approval of the Work.

.3 In regards to a "Letter of Authorization for an amendment to The Town of Ponoka's Wastewater and Storm Drainage Permit" application, Alberta Environment will issue a "Letter of Authorization", including Registration Number following the 30-day appeal period.

.4 All of the above noted documentation must be included in the Development Agreement.

6. CROSSING, PROXIMITY, GROUND DISTURBANCE AND/OR ENCROACHMENT AGREEMENTS

6.1 General

A Crossing, Proximity, Ground Disturbance and/or Encroachment Agreement may be required if the Developer's proposed work includes crossings of and/or construction activity adjacent to the following:

.1 oil or gas pipelines,

.2 overhead or underground telecommunications lines,

.3 overhead or underground power lines,

.4 creeks and rivers,

.5 streets or highways,

.6 railways, and/or

.7 other registered rights of way.

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.

6.2 Application Preparation and Submission

The Developer shall be fully responsible for the preparation and submission of plans and application for a permit to the owners and/or proper authorities to obtain the necessary permission to enter upon, cross over, or construct under said facility or right of way.

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.

He shall also submit documentary evidence that such permits/approvals have been applied for at the time of his initial drawing submission to The Town of Ponoka.

Applications shall be prepared as specified by the various approving agencies. The applications shall be accompanied by the following:

.1 A covering letter outlining the type of Agreement required (crossing,

proximity, ground disturbance, and/or encroachment).

.2 All applications will be made on behalf of The Town of Ponoka by the Developer.

.3 Three copies of drawings (11" x 17" or 8 1/2" x 11") clearly marking in **RED** the location of the proposed crossing, proximity, ground disturbance, and/or encroachment. Plan/profile drawings are required for all crossings.

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

6.3 High Pressure Gas Main Crossing

Where a permanent or temporary roadway or lane, water main, sanitary sewer main, and/or storm sewer main will cross a high pressure gas main right of way, the Developer will be required to obtain a Crossing Agreement prior to the start of construction.
Appendix C, appended to this Section, illustrates the application format.

7. ROAD CLOSURES AND DETOURS

7.1 General

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

The Developer will not be allowed to proceed with hauling across a roadway or the construction of any Municipal Improvement across a roadway until all approvals, if required, have been received.

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 Three copies of drawings (11" x 17" or 8 1/2" x 11") clearly marking in

RED the location of the proposed crossing or detour.

8. DEVELOPER'S SUBDIVISION SIGNS

8.1 General Information Signs

General Information Signs shall be installed near the entrance to each new phase of Development, indicating where the public may obtain information related to:

.1 the existing and proposed subdivision development,

.2 information regarding proposed school location and construction,

.3 information regarding the Park Site, and

.4 any other amenities that would be of interest to perspective homeowners.

The signs shall be similar in design to the sample "Subdivision Information Signs" included in Section 17 - Drawings.

8.2 School/Park Site Signs

Park Site Information Signs shall be installed near the boundary of the Park Site indicating where the public may obtain information related to the Park Site development. The sign shall be similar in design to the sample "Subdivision Information Signs" included in Section 17 - Drawings.

Future school site indicating where the public may obtain information related to the future construction of a school. The sign shall be similar in design to the sample "Subdivision Information Signs" included in Section 17 - Drawings.

8.3 Detention Pond Warning Signs

Detention Pond Warning Signs shall be installed near the boundary of the detention pond site indicating where the public may obtain information related to the detention pond operation. The sign shall be similar in design to the sample "Detention Pond Warning Signs" included in Section 17 - Drawings.

Sign locations shall be shown on the Engineering Drawings.

8.4 Street Name Signs

Streets name signs shall conform to Public Works Department's standards.

8.5 Subdivision Entrance Signs

When a Developer proposes to construct entrance signs to identify the new community, the following design criteria is to be used:

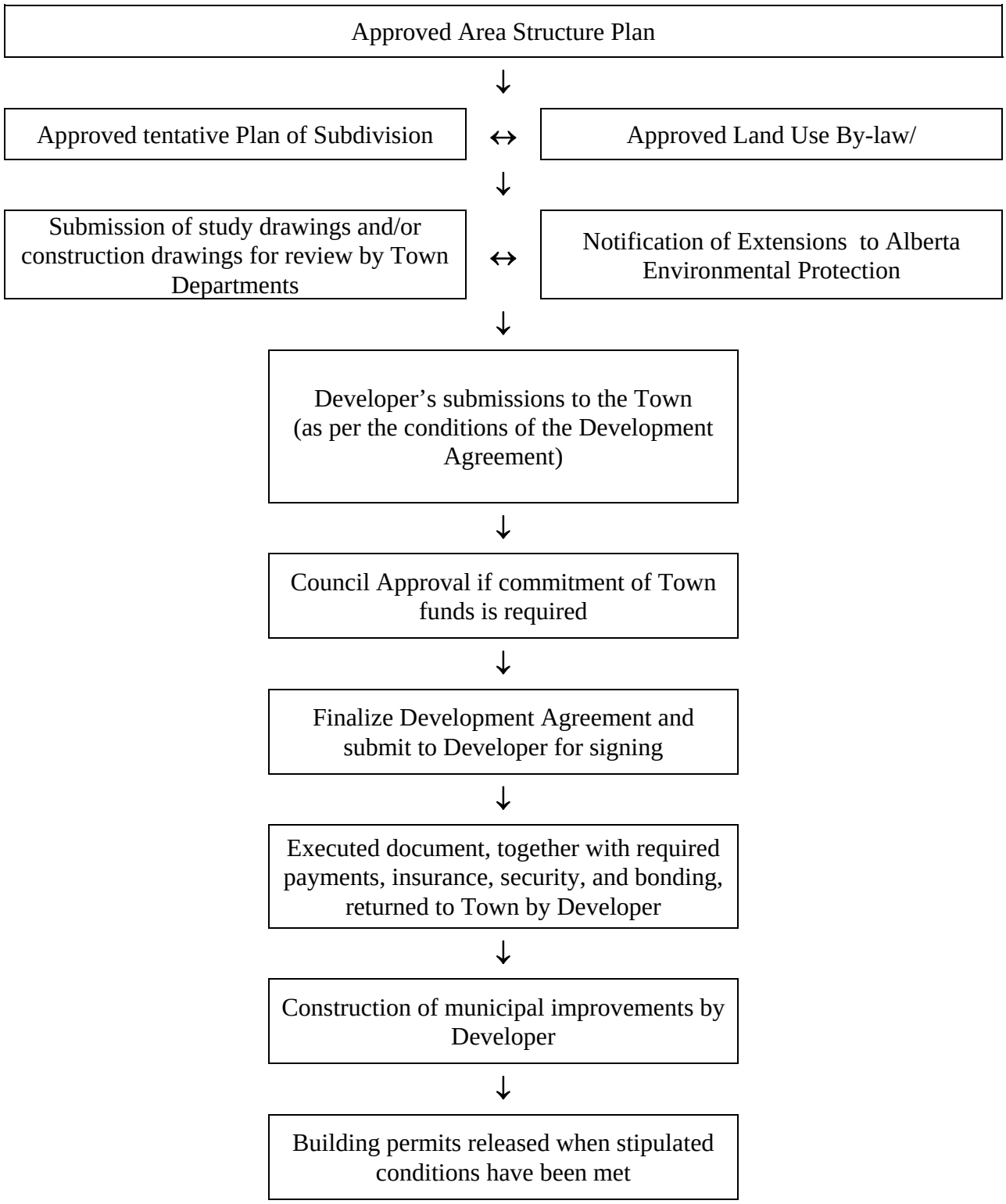
.1 The proposed entrance sign should be located on public property (e.g. municipal reserve, roadway boulevard, etc.).

.2 The sign should be located as shown in Section 17 – Drawing 6.05.

.3 A Development Permit **is not** required for the construction of any entrance signs. The location of any entrance sign must be reviewed and approved by the Engineer.

.4 Drawings showing the proposed sign location(s) shall be forwarded to the Town and the Ponoka Power for review and approval.

DEVELOPMENT AGREEMENT PROCESS



DEVELOPMENT AGREEMENT SCHEDULE

Note: Council approval is not required if the Standard Development Agreement is used and expenditure of Town funds has been approved in the current budget.
. Council approval is required if the estimated cost or contract cost exceeds the approved budget amount.

SAMPLE APPLICATION LETTER

Date

Town of Ponoka
Engineering and Planning Department
5102 - 48 Ave.
Ponoka, Alberta
T4J 1P7

Dear Sir:

Re: Application for Letter of Authorization for the Stormwater Drainage Treatment Facilities or Storm Outfall – Permit Number 1091,

AND/OR

Notification For Extension to a Waterworks, Wastewater, or Storm Drainage System – Permit Numbers 1091 and 1092
For [Name of Developer]
[Name of Subdivision] Phase [00]
In [NE] ¼ Section [18] - 38 - 27 - W4 in The Town of Ponoka

Please accept this letter on behalf of [Name of Consultant] for the above noted project. The following outlines the requested project information.

1.	Owner's Name:	"Name of Developer"
2.	Project Name:	"Subdivision Name and Phase Number"
3.	Project Type:	Construction of water mains, sanitary sewer mains, storm sewer mains, and service connections.
4.	Confirmation by Professional Engineer regarding increased flows and/or treatment capacity:	Confirmation to be provided by the Town of Ponoka.
5.	Construction Schedule:	Construction on this project is proposed to start on _____ and to be complete by _____.

Enclosed please find approved plans for the proposed construction and signed originals of the "Application for Letter of Authorization for the Stormwater Drainage Treatment Facilities or Storm Outfall" and/or "Notification For Extension to a Waterworks, Wastewater, or Storm Drainage System".

If applicable, add the following sentence:

Please note that this project does not comply with all of the Standards and Guidelines. Attached to the application is a detailed description of the deviation and, in our opinion, why the deviation is necessary.

Yours truly,

[Consultant], P. Eng.

XX/yy

Encl.

SAMPLE TOWN CONFIRMATION LETTER

Date

_____, P. Eng. Regional Engineer
Alberta Environmental Protection
Environnemental Protection Services
Parkland Region
3rd Floor, Provincial Building
4920-51 Street
Red Deer, AB T4N 6K8

Dear Sir:

Re: Submission of Written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System – Permit Numbers 1091 and 1092, AND/OR
Application for Letter of Authorization for the Stormwater Drainage Treatment Facilities and/or Storm Outfall – Permit Number 1091
For [Name of Developer]
[Name of Consultant]
[Name of Subdivision] Phase [00]
In [NE] ¼ Section [18] - 38 - 27 - W4 in The Town of Ponoka

Please accept this letter on behalf of The Town of Ponoka for the above noted project.

A. Submission of Written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System – Permit Numbers 1091 and 1092

The Town has reviewed and approved the attached construction drawing for the above noted project. We hereby confirm that the related water distribution system, wastewater (sanitary sewer) collection system and/or the stormwater drainage system construction will not exceed the design capacity of the distribution and collection systems or the capacity of the treatment facilities.

B. Application for Letter of Authorization for the Stormwater Drainage Treatment Facilities and/or Storm Outfall – Permit Number 1091

The Town has reviewed and approved the attached construction drawing for the above noted project. We hereby confirm that the related stormwater management storage facility construction will not exceed the design capacity of the downstream stormwater minor system and receiving water body.

C. Summary

Enclosed please find the following:

a. Copy of submission letter to The Town of Ponoka prepared by the above noted Consultant;

b. Copy of "Written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System" signed by the above noted Consultant.

c. Copy of "Application for a Letter of Authorization for Storm Drainage Treatment Facilities" signed by the above noted Consultant.

d. Plans of the proposed construction approved by The Town of Ponoka.

Yours truly,

_____
The Town of Ponoka, Engineering and Development Officer
XX/yy
Encl.

c. Consultant

Alberta Environment Fact Sheets and Application Forms

The following listings have been provided to assist the Consultant in applying for and receiving timely approval for the construction of Municipal Improvements in a development.

- Extending Water Distribution an Wastewater Collection System Information Requirements
- Water Act

  2.6 Approvals – www.environment.alberta.ca/1632.html

  2.7 Licences - www.environment.alberta.ca/1633.html

  2.8 Application - www.environment.alberta.ca/1594.html

  2.9 Notification for the placement, construction, installation, maintenance, replacement or removal of a watercourse crossing or Pipeline or Telecommunications Line Crossings
  www.environment.alberta.ca/1398.html

- Written Notification for Extension to a Waterworks, Wastewater or Storm Drainage System
- Application for a Letter of Authorization for Storm Drainage Treatment Facilities
- Application for Shoreline/Water body Modification Under the Public Lands Act and the Water Act

  www.srd.gov.ab.ca/lands/usingpublicland/shorelands/pdf/LS_102_APPLICATION_FOR_SHORE_LINE_WATER_BODY_MODIFICATION.pdf

  (Includes Application for Aquatic Vegetation Control, Bank Stabilization, Beach Construction, Domestic Waterline, Erosion Protection, Outfall Construction, Permanent Boat Launch, Permanent Pier Site, Reservoir Construction, and/or Other Noted Work)

Extending water distribution and wastewater collection systems

Information requirements

October 2003

Approval or Registration Holders, or their authorized agents (such as developers or consultants) must provide certain information to Alberta Environment, **prior to construction**, as part of the written notice required when extending or replacing watermains, sanitary sewers and/or storm sewers.

INFORMATION THAT MUST BE PROVIDED

- The Approval or Registration number for the facility/facilities
- The location of the project (i.e. name of the municipality/development, subdivision name, street, etc)
- The type of project (i.e. water, sanitary sewer, storm sewer, etc.)
- Confirmation by a professional engineer that the increased flows associated with the extension are within the design capacity of the existing distribution or collection system
- Confirmation by a professional engineer that the additional loading as a result of the extension is within the design capacity of the system supplying treatment
- Confirmation that all aspects of the design meet Alberta Environment's *Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems*
- Any other pertinent information

The Approval or Registration Holder must also meet the specific requirements of their Approval.

The Director (at Alberta Environment) must authorize any waterworks system being extended to a new development that is not serviced by a wastewater system authorized under the *Environmental Protection and Enhancement Act* (EPEA).

The Director must be satisfied that the wastewater produced as a result of supplying water can be satisfactorily handled by other means.

Construction may proceed on projects where the Director or inspector has requested to review the plans and specifications.

IF THE DESIGN DOES NOT MEET STANDARDS

If all aspects of the design do not meet Alberta Environment's *Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems*, the project **cannot proceed** until the Director has issued written authorization.

The Approval or Registration Holder must indicate why the standards cannot be met and justify the alternative proposed design.

For projects that include new storm water ponds and/or outfall(s) to a water body or drainage course, the Approval or Registration Holder must also obtain an additional authorization or registration as required by EPEA and its associated regulations.

A separate application under the *Water Act* may also be required for projects involving storm water pond(s) and/or outfall(s). Check with your regional district office of Alberta Environment.

RANDOM COMPLIANCE INSPECTIONS

As part of an ongoing compliance inspection program, Alberta Environment may conduct random, unannounced inspections of construction activity.

Extensions to water distribution and wastewater collection and storm drainage systems that do not meet Alberta Environment's *Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems* may be subject to enforcement action.

For more information, contact your regional district Alberta Environment office.

Alberta Environment Regional Offices

Northern Region
Grande Prairie
Box 24, Room 1701
Provincial Building
10320 - 99 Street
Grande Prairie AB T8V 6J4
Ph: (780) 538-5351
Fax: (780) 538-5336

Edmonton
Twin Atria
111, 4999 - 98 Avenue
Edmonton, AB T6B 2X3
Ph: (780) 427-5296
Fax: (780) 427-7824

Central Region
Stony Plain
52322 Golf Course Road
Stony Plain, AB T7Z 2K9
Ph: (780) 963-6131
Fax: (780) 963-4651

Red Deer
304, Provincial Building
4920 - 51 Street
Red Deer, AB T4N 6K8
Ph: (403) 340-7052
Fax: (403) 340-5022

Southern Region
Calgary
200, 3115 - 12 Street NE
Calgary, AB T2E 7J2
Ph: (403) 297-6582
Fax: (403) 297-5944

Lethbridge
2nd Flr, Provincial Building
200 - 5 Avenue South
Lethbridge, AB T1J 4L1
Ph: (403) 382-4254
Fax: (403) 381-5337

Alberta
GOVERNMENT OF ALBERTA

For more information, please visit Alberta Environment's website at www.gov.ab.ca/env or phone (780) 427-6267 (dial 310-0000 first to connect toll-free).

NOTIFICATION
For
EXTENSION TO A WATERWORKS, WASTEWATER, OR STORM DRAINAGE SYSTEM

Project Name _____

Location _____

Municipality _____

I acknowledge that I have reviewed the *Alberta Environment Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems*, January 2006, and certify that the design of the above noted project complies with all of the requirements specified for the construction of the water distribution, wastewater collection and storm drainage systems.

SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER.
NAME
COMPANY

Designs that are found to not be in accordance with the Standards and Guidelines may result in enforcement action and/or referral to APEGGA.
For projects that do not comply with all of the Standards and Guidelines please submit a detailed explanation of the deficiency and why it is, in your professional opinion, necessary. Note that projects that do not comply with all of the Standards and Guidelines will require a Letter of Authorization.

APPLICATION FOR A
LETTER OF AUTHORIZATION
For
STORM DRAINAGE TREATMENT FACILITIES

Project Name _____

Location _____

Municipality _____

I acknowledge that I have reviewed the *Alberta Environment Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems*, January 2006, as well as the *Stormwater Management Guidelines for the Province of Alberta*, January 1999 and certify that the design of the above noted project complies with all of the requirements specified for the construction of the stormwater management facilities.

SIGNED AND STAMPED by a professional engineer.
NAME
COMPANY

Designs that are found to not be in accordance with the Standards and Guidelines may result in enforcement action and/or referral to APEGGA.
For projects that do not comply with all of the Standards and Guidelines please submit a detailed explanation of the deficiency and why it is, in your professional opinion, necessary.

HIGH PRESSURE GAS MAIN CROSSING APPLICATION

Date

Land and Permits, Crossings
ATCO Gas Limited
10035-105 Street
Edmonton, AB T5J 2V6

Dear Sir:

Re: Permit to Cross High Pressure Gas Main
Location Description
Quarter Section Legal Description in The Town of Ponoka, Alberta

In accordance with the conditions of Master Facility Crossing Agreement MA109, we are hereby forwarding on behalf of The Town of Ponoka for your approval, plans and profiles for crossing and/or working adjacent to the high pressure gas main at the location shown on the attached drawings.

We propose to start construction in the vicinity of the high pressure gas main on or about "Date".

If any additional information is required regarding this application, please call "_____ _____ " at (___) ____-_____.

Yours truly,

Project Engineer

Encl.

SAMPLE UTILITY ALIGNMENT
AND
UTILITY RIGHT OF WAY APPROVAL LETTER

Company Address

Attention: Name of Company Representative

Re: Approval of Natural Gas, Cable Television and/or Telephone Alignments and Utility Right of Ways For "Name of Development"

Attached is a copy of the Shallow Utility Drawing No. ___ showing the power distribution, streetlighting, gas, telephone and cable television alignments and utility right of ways for the above noted development. Please review the drawing for any errors and/or omissions. Please contact _____ at (___) _____ at your earliest convenience if you have any questions or comments in regards to the information provided.

Please sign a copy of this letter in the space provided if the alignments and utility right of ways for your facilities are shown correctly. If we have not received a reply to this letter by _____ (*4 weeks from date of letter*), we will assume that the alignments and utility right of ways are correctly shown on the Drawings and advise The Town of Ponoka accordingly.

Thank you.

_____, P. Eng.

XX/yy

Att.

We have reviewed the drawing and hereby approve the alignments and utility right of ways provided for "Name of Company".

Name of Company Representative: (Please Print)	Signed by:	Date

1. GENERAL

This Section lists the requirements for the preparation and submission of Construction Drawings, As-constructed Drawings, Building Grade Certificates and Digital As-constructed Drawing Standards.

All drawings shall conform to the general standards noted in this Section. The Construction Drawings shall generally illustrate the information listed in Clauses 2, 3 and 4 of this Section. Specific design standards and requirements are provided in the following Sections:

Section 6 - Erosion and Sediment Control Measures

Section 7 - Site Clearing and Grading Guidelines

Section 8 - Water Design Standards

Section 9 - Sanitary Design Standards

Section 10 - Stormwater Management Drainage Systems

Section 11 - Service Connections Standards

Section 12 - Gas, Power, Telephone, and Cable Television Standards

Section 13 - Roadway Design Standards

Section 14 - Landscaping Standards

Section 15 - Traffic Signal Installation Standards

Section 16 - Detector Loop Installation Standards

Section 17 - Design Drawings

2. GENERAL CONSTRUCTION DRAWING REQUIREMENTS

2.1. General

.1 Individual Plan Drawings are to be prepared for each Municipal Improvement being constructed. The preparation of individual drawings is a requirement for the submission of “As-constructed” Drawings as noted in Clause 8 of this Section.

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

.3 The “Limits of Construction” shall be shown on all Plan Drawings.

.4 All drawings submitted shall be set to actual 3TM Geodetic Coordinates

2.2. Sheet Size

Drawing sheet sizes to be as follows:

.1 610 mm x 914 mm (24” x 36”) will be used

2.3. Sheet Material

Construction drawings are to be submitted using bond or vellum media. Originals shall be prepared in ink on Mylar base.

2.4. Title Block

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

2.5. North Arrow

Place the north arrow in the upper right-hand corner of sheet. The drawing should be oriented such that north faces the upper, right quadrant of the sheet.

2.6. Dimensions

All dimensions on plans and profiles are to be in SI metric units.

2.7. Lettering

The lettering is to be an engineering style font. Vertical lettering should represent existing information and slanted lettering for proposed information. Discretion is to be used in selection of lettering size and line weight. Plotted lettering size should be readable at a scale of 1:1000. Line weight should differentiate between existing and proposed construction.

2.8. Legend

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

2.9. 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 maximum scale of 1:1000 should be used for all Plan Drawings,

.2 A drawing scale of 1:500 should be used for all Plan/Profile Drawings.

3. PLAN CONSTRUCTION DRAWING REQUIREMENTS

3.1. Cover Sheet(s)

.1 Name of subdivision or project,

.2 Names of Developer and Consulting Engineer (Logos optional),

.3 Town map showing project location; scale 1:25,000,

.4 Index plan showing street names and limits of each Plan/Profile Drawing,

.5 List of drawings.

3.2. Clearing and Grading Drawing(s)

.1 General Drawing Requirements

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

.2 Identify intended clearing 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 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,

.4 Any unusual site conditions,

.5 Existing utility rights of way (easements),

.6 Existing survey control stations and markers,

.7 Existing ground contours,

.8 Proposed ground contours,

.9 Test hole locations and original ground elevations at test hole location,

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

.11 Details of topsoil stockpiles; include height, width, length and volumes,

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

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

.1 How drainage from its natural route(s) will be controlled.

.2 What erosion and sediment control measures are to be installed.

.2 Cut/Fill Plans

.1 Cut/Fill Plans showing cut/fill design elevations and depth of cut or fill are required for all clearing and grading projects. Recommended grid spacing is 15 m x 15 m, maximum grid is 20 m x 20 m.

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

3.3. Roads, Lanes, and Walkways Drawing

.1 Street and/or Lane Name (e.g. Lane “A”),

.2 Cross-section designation (e.g. 15-10 Local Roadway),

.3 Carriageway widths (FOC to FOC),

.4 Sidewalk and/or curb type and width,

.5 Boulevard widths,

.6 Roadway P.I. elevations,

.7 Roadway centre line distance and grade between P.I.’s,

.8 Direction of flow along roadways,

.9 Vertical curve information (length and mid-ordinate difference in elevation),

.10 Centre line and Face of curb curve data (radius, length of curve, tangent length and deflection angle),

.11 Face of curb radii for all curb returns (general note acceptable),

.12 Lane and Public Utility Lot P.I. elevations,

.13 Lane and Public Utility Lot distance and property line grade between P.I.'s,

.14 Direction of flow along lanes and utility lots,

.15 Catch basin manholes and catch basins, including type and identification number,

.16 Erosion and sedimentation control measures,

.17 Reinforced lane and/or driveway crossings,

.18 Paraplegic ramps,

.19 Berms complete with top of berm grades,

.20 Temporary access roads and/or turnarounds,

.21 Walkways, including bollard locations,

.22 Typical cross sections for all roadway designations,

.23 Community Mailboxes, and

.24 Subdivision Entrance Signs,

3.4. Water Distribution Drawing

.1 Invert elevation at all 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, showing coverage.

.5 Valves and valve identification numbers,

.6 Fittings.

.7 FOC

3.5. Water Distribution Disinfection and Flushing Drawing

.1 Show civic address for all lots.

.2 Show proposed sequence of flushing, including valve opening and closing sequence.

.3 Show receiving sanitary sewer manholes (see Town of Ponoka Contract Specifications – Section 33 11 17).

Note: Place a signature block similar to the following example on the Disinfection and Flushing drawing.

Town of Ponoka **Disinfection and Flushing Drawing Approval**	
_____	_____
Public Works Department	Date

3.6. Sanitary Sewer Drawing

.1 Invert elevation at all manholes,

.2 Distance, pipe size, pipe material (general note acceptable), and grade between manholes,

.3 Main alignments,

.4 Direction of pipe flow,

.5 Manholes and manhole identification numbers,

.6 Identify Drop Manholes (interior/exterior).

.7 FOC

3.7. Storm Sewer Drawing A – Major/Minor System

This drawing should be prepared at a scale of 1:2000 (copy of Servicing Study Storm Drawing) and show the entire drainage area, not just the immediate development phase.

.1 Phase/Project boundary,

.2 Major drainage routes,

.3 Location of trapped lows,

.4 Minor drainage catchment areas,

.5 Minor drainage main alignments,

.6 Direction of minor drainage pipe flow,

.7 FOC

.8 If applicable, a Stage, Area, Volume and Discharge Table as described in Section 5 - Clause 3.6.6.

3.8. Storm Sewer Drawing B – Minor System

.1 Invert elevation at all manholes,

.2 Distance, pipe size, pipe material (general note acceptable), and grade between manholes,

.3 Main alignments,

.4 Direction of pipe flow,

.5 Manholes, catchbasin manholes, and manhole identification numbers,

.6 Catchbasin type and identification numbers,

.7 Catchbasin leads,

.8 Detention Ponds, including contours, perimeter drainage facilities, outline of playing field (if applicable), etc.

.9 Erosion and sedimentation control measures.

3.9. Shallow Utilities Drawing

.1 Alignments for all shallow utilities including power, telephone, cable television, and gas,

.2 Location of transformers, switch gear, URD boxes, and streetlights, telephone facilities and cable television facilities (e.g. pedestals, cabinets, etc.),

.3 Location of Community mailboxes,

.4 All utility rights of way (easements).

3.10. Building Grade Drawing

.1 The Building Grade Drawing shall be drawn at a scale of 1:500 or 1:750 to better illustrate all of the requested information,

.2 Legal description (Lot and block number) for each parcel of land,

.3 Civic (Municipal) Address,

.4 Back of walk elevations at lot lines,

.5 Lane/public utility lot elevations at lot lines,

.6 Service locations and invert elevations,

.7 Recommended lowest top of footing elevation,

.8 Recommended ground (landscape) elevation at house,

.9 Lot drainage pattern,

.10 Location of power, telephone, and television service,

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

.12 Location of community mailboxes,

.13 Indication of areas where depth of fill exceeds 1.2 m (bearing certificates required).

3.11. Landscape Drawing

.1 Show all municipal reserves, berms, parks, roadway boulevards, utility lots, and buffers, including grades where appropriate,

2. Show all existing and proposed Municipal Improvements located within and/or adjacent to the site,

.3 Show existing vegetation to be retained, topography, and encumbrances,

.4 Show adjacent land uses and roads,

.5 Show proposed layout of park, school and recreational facilities including playgrounds, baseball diamonds, sports fields, buildings, pathways, rinks, tennis courts, etc., including appropriate grades,

.6 Show conceptual tree and shrub planting.

.7 Streetlights, mailboxes, and other street furniture, etc.

4. PLAN PROFILE CONSTRUCTION DRAWING REQUIREMENTS

4.1. General

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

4.2. 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 Cross-section designation (e.g. 15-10 Local Roadway),

.3 Carriageway widths (Face of Curb to Face of Curb),

.4 Sidewalk and/or curb type and width,

.5 Boulevard widths,

.6 Roadway P.I. elevations,

.7 Roadway centre line distance and grade between P.I.’s,

.8 Direction of flow along roadways,

.9 Vertical curve information (length and mid-ordinate difference in elevation),

.10 Centreline curve data (radius, length of curve, tangent length and deflection angle),

.11 Face of curb radii, including all curb returns,

.12 Lip of Gutter (L.O.G.)/Edge of Pavement (E.O.P.) at the following locations:

.1 Vertical Points of Intersection (V.P.I.'s),

.2 Beginning of Vertical Curves (B.V.C.'s) and End of Vertical Curves (E.V.C.'s),

.3 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),

.4 Beginning (B.V.C.), Midpoint (M.P.) and End (E.V.C.) for all curb returns,

.5 Location and rim elevation of any catch basins.

.13 L.O.G. grades for all curves,

.14 Curb return grades,

.15 Lane and Public Utility Lot P.I. elevations,

.16 Lane and Public Utility Lot distance and property line grade between P.I.'s,

.17 Direction of flow along lanes and utility lots,

.18 Catchbasin manholes and catchbasins, including type and identification number,

.19 Reinforced lane and/or driveway crossings,

.20 Paraplegic ramps,

.21 Berms complete with top of berm grades,

.22 Temporary access roads and/or turnarounds,

.23 Walkways, including bollard locations,

.24 Reference drawing number(s) for adjacent sheets.

4.3. 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,

.3 Hydrant locations and identification numbers,

.4 Valve locations and identification numbers,

.5 Fitting sizes and locations,

.6 Manhole and catch basin locations and identification numbers,

.7 Catch basin lead sizes, lengths, and alignment,

.8 Direction of flow (storm and sanitary mains).

4.4. Profile View

The profile view should illustrate the following road and utility information:

.1 Stationing for road, lane and/or utility lot centre lines,

.2 Vertical and horizontal point of intersection (P.I.) elevations for utility mains and surface improvements,

.3 Length and grade between P.I.'s for utility mains and surface improvements,

.4 Vertical curve information, if applicable,

.5 Vertical alignments of manholes, valves, and hydrants,

.6 Hydrant flange elevations,

.7 Manhole rim and invert elevations,

.8 Utility main lengths, sizes, materials, and gradients.

5. SUBMISSION OF PROPOSED CONSTRUCTION DRAWINGS

5.1. General

One complete set of Construction Drawings, including the Shallow Utility and Building Grade Drawings, shall be submitted to each of the following Departments for review and approval:

.1 Town of Ponoka

.2 Town Consultant Engineer (two sets),

One copy of the Water Distribution Disinfection and Flushing Drawing shall be submitted to the Public Works Department, for review and approval.

Upon receiving approval of the preliminary Construction Drawings, the Consulting Engineer shall submit the following:

.4 One set of the corrected Construction Drawings marked “Issued for Construction”.

.5 Digital copy of the following Plan View Construction Drawings submitted in current AutoCAD formats:

.1 Roads, Lanes, and Walkways Drawing,

.2 Pavement Marking and Signage Drawing,

.3 Water Distribution Drawing,

.4 Sanitary Sewer Drawing,

.5 Storm Sewer Drawing B – Minor System,

.6 Electrical System, if installed by a private contractor,

.7 Landscape Drawings.

.8 Plan / Profiles

5.2. Power, Gas, Telephone and Cable TV Alignment Approvals

A copy of the detailed Shallow Utility Plan is to be forwarded to each utility company for approval of their alignments. Following a review of their alignments, each utility company is required to submit an approval letter for inclusion in the Development Agreement. See Section 12 for additional information.

6. CHANGES (REVISIONS) TO APPROVED CONSTRUCTION DRAWINGS

The Approved Construction Drawings form an integral part of the Development Agreement between the Developer and The Town.

The Consulting Engineer shall submit revised Construction Drawings (bond or vellum media) if significant design changes are made following approval and submission of the Construction Drawings and execution of the Development Agreement. Changes include revisions to drainage boundaries, pipe sizes, pipe or roadway grades, roadway cross-sections, pavement structures and/or other significant changes. All changes shall be identified on the original Approved Construction Drawings by crossing out the original information and adding the revised information (similar to the method used for preparing "As-constructed" Drawings). A new drawing may be submitted if significant changes are being made.

The Engineer and/or the Town Consulting Engineer must approve any significant changes to the Approved Construction Drawing.

7. AS-CONSTRUCTED SUBMISSIONS

7.1. General Requirements for As-constructed Submissions

The Developer shall submit hard copy, digital and PDF as-constructed drawings and information as outlined in this clause.

Digital files of As-constructed Plan View Drawings must be submitted AutoCAD DWG formats. The digital data must conform to the "Digital As-constructed Drawings Standards" as outlined in Clause 8 of this Section.

.1 As-constructed Submission Timelines

.1 As-constructed information for each applicable Municipal Improvement shall be submitted within 3 months of the submission date of the applicable C.C.C.

2. As-constructed files for paved roadways may be submitted with the Construction Completion Certificate for curb, gutter, and sidewalk (see Clause 7.3.1) as the grades and cross section dimensions will have been established at this stage of construction allowing for the calculation of the as-constructed centre line grades, P.I. elevations and vertical curves.

3. As-constructed information for all Municipal Improvements must be received prior to the submission of the final F.A.C.

.2 C.C.C. As-constructed Digital Submissions

Submission of as-constructed information at the time of major C.C.C. applications will include, but not be limited to, the following:

.1 Digital files (current AutoCad format) of As-constructed Plan View Drawings for:

.1 Water, sanitary and storm utility,

.2 Digital locations of curb stops to be recorded but not submitted to The Town unless requested.

.3 Concrete work and gravel/paved roadways,

.4 Pavement Marking and traffic control signage,

.5 Paved lanes,

.2 Hard copies of all plan view as-constructed drawings for the associated utility and road / lane C.C.C. application. These drawings (Mylar and two sets of prints) are to be submitted to the Town Engineer within 2 months of the installations.

.3 F.A.C. As-constructed Digital Submissions

Submission of as-constructed information at the time of F.A.C. application will include, but not be limited to, the following:

.1 Digital files of As-constructed Plan View Drawings for:

.1 Paved roadways,

.2 Paved laneways,

If As-constructed files for paved roadways and paved laneways have been submitted previously with the Construction Completion Certificate and accepted they will not be required for re-submission at this stage.

.4 Hard Copy As-constructed Submissions

3 mil Mylar as-constructed drawings for all improvements, to form a complete drawing set, must be submitted at this time. If 3 mil Mylar hardcopy drawings have been previously submitted and accepted they will not be required for re-submission at this stage.

The hardcopy drawings should be professionally stamped, signed, and dated to indicate as-constructed information. All original information shall

be crossed out and the as-constructed data written adjacent to the original information (a.k.a: red lining).

.5 PDF As-constructed Submissions

As-constructed digital files of the complete drawing set (i.e. title page, index page, overall plans, plan / profile pages, details, and sections etc.) equivalent to the hardcopy set are to be submitted in a "PDF" format.

The Town will not process or release any further C.C.C's or F.A.C's and/or security reductions if any of the above staged conditions have not been meet.

7.2. Site Clearing and Grading

.1 Extent of encroachment into adjacent lands for back sloping or other purposes, if applicable,

.2 Existing ground contours prior to topsoil stripping,

.3 Test hole locations and original ground elevations,

.4 As-constructed ground contours,

.5 Details of topsoil stockpiles; include location, height, width, length and volumes,

.6 Cut/Fill as-constructed elevations and depth of cut or fill,

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

7.3. Roadways

.1 As noted in Clause 7.1.1.2, Roadway As-constructed Drawings are to be submitted on completion of all concrete work. As-constructed elevations are to be provided at the Lip of Gutter (L.O.G.)/Edge of Pavement (E.O.P.) at the following locations and shown on the **Plan/Profile** as-constructed drawings (red lining) to confirm the as-constructed centreline grade as shown on the **Plan Drawings**:

.1 Vertical Points of Intersection (V.P.I.'s).
(The as-constructed elevation at a vertical point of intersection on a vertical curve is to be the existing pavement elevation plus or minus mid-ordinate distance (M) to theoretical vertical point of intersection),

.2 Beginning of Vertical Curves (B.V.C.'s) and End of Vertical

Curves (E.V.C.'s),

.3 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),

.4 Beginning (B.V.C.), Midpoint (M.P.) and End (E.V.C.) for all curb returns,

.5 Location and rim elevation of any catch basins.

Grade and elevation changes must be noted if the difference from design to as-constructed is greater than 10 mm.

C.C.C.'s for gravel roads will not be issued until all concrete work is complete.

.2 Spot elevation checks should be completed following paving to verify grades, V.P.I. elevations and slope.

.3 Confirm all centreline and face of curb (F.O.C.) radii.

.4 Revisions to type of sidewalk and/or curb and gutter installed.

.5 Revisions to pavement cross-section, including location of filter fabric.

.6 Revisions to pavement markings.

.7 If the Developer installs the traffic, street name, and information signs utilizing the services of a Private Contractor, the Developer shall complete the Sign Survey Sheet forms and procedures available from The Town's Traffic Engineer. The Town will complete the Sign Survey Sheet if the Developer retains Town Forces to install the traffic, street, and information signs.

7.4. Lanes and Public Utility Lots

.1 Spot elevation checks should be completed following lane construction to verify grades, V.P.I. elevations and slope.

7.5. Utilities

.1 Revisions to lengths, grades, invert elevations, alignments, and locations of vertical points of intersection for sanitary, storm, and water mains.

.2 All hydrants, valves, fittings, manholes, catch basins, and other appurtenances shall be noted and dimensioned in two directions. Also note rim and invert elevations of manholes and catch basins and flange

elevations of hydrants.

.3 As-constructed invert of water, sanitary, and storm service stubs at property/easement line.

.4 Location of water, sanitary, storm services, and curb stops dimensioned in two directions. Digitally locate curb stops after installation. When curb stops are inspected at FAC time, curb stops not found can be easily located by the survey information.

7.6. Building Grade Plan

.1 Revised lowest top of footing elevation (based on the higher of as-constructed sanitary or storm inverts, plus 0.85 m for lane/utility lot servicing or 0.70 m for street servicing).

.2 Revise Back of Walk (B.O.W.) and Lane/PUL elevations if variance from design is greater than 10mm as determined in Clauses 3.2.1. and 3.2.2.

.3 Complete a Service Location Report for each serviced lot. Included at the end of this Section, as Appendix B, is a sample report.

7.7. Subdivision Entrance Signs

.1 Detailed Construction Drawings of the sign(s) are to be provided. Include list of materials, suppliers, colours and all necessary details on plans. These drawing will be used for the future maintenance and repair of the Entrance Signs.

.2 The footprint of the Subdivision Entrance Signs is to be shown on all as-constructed plan drawings to identify any conflicts with underground utilities and roadway site triangles.

7.8. Sound Fences

Detailed Construction Drawings of the fence to be provided. These drawings are to be used for future maintenance and repair of the fence. Supplier, colour, material list and necessary details to be provided on plans.

7.9. Building Grade Certificates/Building Permits

.1 General

Prior to the issuance of a Construction Completion Certificate for service connections (water, sanitary and/or storm), the Developer shall provide to The Town the relevant Building Grade Certificates for each lot in the Development.

As outlined in Part Three of the Development Agreement, Building Permits will not be released until all of the conditions outlined in the Development Agreement are met.

.2 Building Grade Information

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

.1 Water, sanitary, and/or storm services location and inverts,

.2 Power, telephone, and cable television service location,

.3 Sidewalk and boulevard width,

.4 Utility rights of way (easements),

.5 Lot corner surface elevations,

.6 Landscape elevation at front and rear of house,

.7 Lot drainage pattern,

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

This information shall be provided in the form as shown on the sample drawing included in Section 17, Drawing 4.11 - New Residential Building Grade Certificate.

7.10. Completion Date

.1 The month and year of completion of construction shall be shown on each Plan for both underground utilities and surface improvements.

8. DIGITAL AS-CONSTRUCTED DRAWING STANDARDS

8.1. Overview

The Town has developed an Geographic Information System (GIS) to manage the recording and distribution of road, sanitary, storm, traffic, and water as-constructed information. The GIS is comprised of digital record drawings, associated database records. The system is being used is ESRI ArcGIS.

Digital files of As-constructed Plan View Drawings must be submitted in ESRI SHP, or AutoCAD DWG format. These standards are based on AutoCAD Layer format, and AutoCAD Map Object Data.

These standards will be updated and modified as engineering practices change. Any changes will be noted in this document.

8.2. Submitting Files

The following illustrates the basic steps for preparing an as-constructed file for submission.

.1 Place the as-built data into separate files for each improvement (road, sanitary, storm, traffic, and water). Each file can only contain as-constructed information. Note any changes to the existing infrastructure (i.e. hydrant removed, main replaced, internal drop installed in manhole, etc.) on the miscellaneous level or layer. Rename the files according to the contract and improvement.

.2 As-constructed data must conform to NAD’83 3TM coordinates or be drawn in ground units with the legal base information provided in each file on the specified layer. Ensure the data is represented in ground units or at a 1:1 relationship in model space. Paper space drawings will not be accepted.

.3 Organize the data within each file to conform to the standards listed in Appendix A appended at the end of this Section.

.4 The underground utilities require the attachment of object data to various features. The tag or attribute fields must be defined and contain the required values, with no units, for the various features as specified in Appendix A.

.5 Submit a transmittal form that shows the following:

- Project Name
- Consultant
- Contract Number
- Graphic File Format (DWG or SHP)
- Version (e.g. AutoCAD 2012)
- Projection (NAD83 3TM or Ground Units)

8.3. Drawing Standards

In order to ensure a smooth integration of the as-constructed data into the GIS, the following standards must be followed. Failure to do so will result in the rejection of the file and will require the consultant to resubmit the digital as-constructed data.

Appendix A contains The Digital As-constructed Drawing Standards that specify the AutoCAD Layer, Element Type, Block Name, the Object Data Attribute Field information, placement notes and illustrations for each improvement (road, sanitary, storm, traffic, and water).

The exact look of the AutoCAD blocks is not of high importance; although they should closely resemble the symbols shown in Appendix A and have a n insertion point in the centre of the block, the only exception being the flow arrow which would be at the terminating end of the arrow.

The following specifications must be used for the preparation of digital as-constructed drawings:

.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). Polylines 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 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 back 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 not broken at the insertion point of the valve, but a vertex needs to be inserted at that location in the polyline.

.4 Tags Object 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%)

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

.6 All dimensions are to be SI metric units and to 2 decimal units.

8.4. Attribute or Tag Data

The underground utilities require the attachment of Object Data to various features. The features that require these attachments are listed in Appendix A

The required field names for each Object Data set are shown on the Digital As-constructed Drawing Standards in Appendix A for each feature. Only the required values with no units are to be entered into the appropriate fields, as specified in the standards. Approved pipe material and class abbreviations for each improvement are listed on the bottom of the standards sheets.

Example: A sanitary 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
Material	PVC
Class	DR 35
Diameter	200
Length	45.23
Encasement	No
Insulated	No
Radius	112
Upperz	880.15
Lowerz	880.08
Slope	0.15
Year of Install	2008

8.5. Additional Information

If you have any questions about the Digital As-constructed Drawing Standards please contact the Graphics Administrator.

APPENDIX A

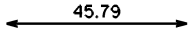
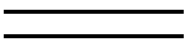
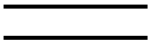
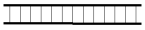
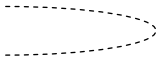
Digital As-constructed

Drawing Standards

ROADWAYS

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

ROADWAYS

Item/ Symbol	AutoCad Layer	Element Type	Cell/Wblock Name
ROAD INFORMATION			
Turning Bay Dimension 	R1-turnbay_dim	text & cell/wblock	DIMA
Vertical Curve 	R1-vertical_curv	text	-
SIDEWALKS AND TRAILS			
Back of Walk	R2-back_of_walk	line	-
Bike Trail 	R2-trail	line	-
Bike Trail Text	R2-trail_text	text & cell/wblock	DIMA
Curb Ramp 	R2-ramp	cell/wblock	RPARA
Separate Sidewalk 	R2-sep_sidewalk	line	-
Sidewalk - Brick Inlay 	R2-sidewalk_bric	pattern/hatch	-
Sidewalk Text	R2-sidewalk_text	text & cell/wblock	DIMA
BARRIERS			
Barrier Text	R3-barrier_text	text	-
Berm 	R3-berm	line	-
Berm Text	R3-berm_text	text	-
Concrete Barrier	R3-barrier_con	cell/wblock	CBARR

ROADWAYS			
Item/ Symbol	**AutoCad Layer**	**Element Type**	**Cell/Wblock Name**
BARRIERS			
Fence —x———x———x—	R3-fence	line & cell	X
Guard Rail	R3-guard_rail	line	-
Guard Rail Post	R3-guard_post	cell/wblock	GRP
Guard Rail End Post	R3-guard_endpost	cell/wblock	GRE
Retaining Wall	R3-retain_wall	line	-
DITCH			
Culvert	R4-culvert	line & cell	CUL
Ditch and Swale	R4-ditch	cell/wblock	DIT
9. **DITCH, SWALE AND CULVERT TEXT**	R4-ditch_text	text	-
MISCELLANEOUS			
Miscellaneous Graphics	R5-misc_line	line	-
Miscellaneous Text	R5-misc_text	text	-
Property Lines	X-base	line	-
	Registered and proposed lot lines		

Ensure:
- only 2 decimal places are used.
- text is upper case, centre bottom justified and not italicized.

Water					
Item	Symbol	Layer Name	Element Type	Block Name	Tag/Attribute Field
Main		W_MAIN	Line or Pline	N/A	Main
Bend, Tee, & Cross		W_NODE	Block	Node	Node
Hydrant		W_HYD	Block	Hydrant	Hydrant
Hydrant Valve		W_HYD_VALVE	Block	Valve	Valve
Main Valve		W_MAIN_VALVE	Block	Valve	Valve
Air Release Valve		W_VALVE_AIR	Block	Valve	Valve
Check Valve		W_VALVE_CHECK	Block	Valve	Valve
Valve In Manhole		W_MHV	Block	Valve	Valve
Park Service		W_PRK_SVC	Block	Hydrant	Hydrant
Plug		W_PLUG	Block	Node	Node
Reducer		W_RED	Block	Node	Node
Misc. Graphics		W_MISC_GRAPHICS	Any	Any	N/A
Misc. Text		W_MISC_TEXT	Text	N/A	N/A
Misc. Dimension	1.40	W_MISC_DIM	Line & Text	N/A	N/A
Property Lines		BASE	Line or Pline	N/A	N/A

Main	
FIELD NAME	VALUE
Material	PVC
Class	DR-18
Use	
Length	100.12
Diameter	200
Encasement	No
Insulated	No
Radius	112
UpperZ	900.54
LowerZ	900.25
Slope	0.29
Year of Install	2008

Main
Lead

Node	
Field Name	Value
Type	Cross
Rim Elev	N/A
Year of Install	2008

Cross
Tee
Bend
Plug

Hydrant	
Field Name	Value
ID	V-10
Type	Hydrant
Rim Elev	815.35
Year of Install	2008

Park Service
Hydrant

Valve	
Field Name	Value
ID	H-10
Type	
Rim Elev	815.35
In Manhole?	No
Year of Install	2008

Hydrant
Main
Air Release
Check

Sanitary					
Item	Symbol	Layer Name	Element Type	Block Name	Tag/Attribute Field
Gravity Main		S_MAIN_G	Line or Pline	N/A	Main
Pressure Main		S_MAIN_P	Line or Pline	N/A	Main
Manhole		S_MANHOLE	Block	MH	MH
Vault		S_VAULT	Block	MHV	MH
Valve		S_VALVE	Block	Valve	Valve
Flow Arrow		S_FLOW	Block	Flow	
Grade Deflection		S_GRADE	Block	Node	Node
Plug		S_PLUG	Block	Node	Node
Reducer		S_RED	Block	Red	Node
Lift Station		S_LIFT	Block	LS	LS
Misc. Dimension		S_MISC_DIM	Line & Text	N/A	N/A
Misc. Graphics		S_MISC_GRAPHICS	Line	N/A	N/A
Misc. Text		S_MISC_TEXT	Text	N/A	N/A
Property Lines		BASE	Line or Pline	N/A	N/A

Main	
FIELD NAME	VALUE
Material	PVC
Class	DR-35
Length	100.12
Diameter	200
Type	Gravity
Encasement	No
Insulated	No
UpperZ	900.54
LowerZ	900.25
Slope	0.29
Year of Install	2008

Pressure
Gravity

Node	
Field Name	Value
Type	Cross
Note	
Year of Install	2008

Cross
Tee
Bend
Plug

Valve	
Field Name	Value
ID	V-1
Type	
Rim Elev	815.35
In Manhole?	No
Year of Install	2008

Main
Air Release
Check

Manhole	
Field Name	Value
ID	MH1
Type	
Rim Elev	815.35
Year of Install	2008
Material	

Standard
Vault

Concrete
HDPE

Storm					
Item	Symbol	Layer Name	Element Type	Block Name	Tag/Attribute Field
Gravity Main		ST_MAIN_G	Line or Pline	N/A	Main
Pressure Main		ST_MAIN_P	Line or Pline	N/A	Main
CB Lead		ST_LEAD	Line or Pline	N/A	Lead
Manhole		ST_MANHOLE	Block	MH	MH
Vault		ST_VAULT	Block	MHV	MH
CB Rolled		ST_CBR	Block	CBR	CB
CB Standard		ST_CBS	Block	CBS	CB
CB Manhole		ST_CBMH	Block	CBMH	CB
Flow Arrow		ST_FLOW	Block	Flow	
Valve		ST_VALVE	Block	Valve	Valve
Grade Deflection		ST_GRADE	Block	Node	Node
Plug		ST_PLUG	Block	Node	Node
Reducer		ST_RED	Block	Red	Node
Lift Station	LS	ST_LIFT	Block	LS	LS
Misc. Dimension	1.40	S_MISC_DIM	Line & Text	N/A	N/A
Misc. Graphics		ST_MISC_GRAPHICS	Line	N/A	N/A
Misc. Text		ST_MISC_TEXT	Text	N/A	N/A
Property Lines		BASE	Line or Pline	N/A	N/A

Main	
FIELD NAME	VALUE
Material	PVC
Class	UR
Use	
Length	100.12
Diameter	250
Type	Gravity
Encasement	No
Insulated	No
UpperZ	900.54
LowerZ	900.25
Slope	0.29
Year of Install	2008

Main
Lead

Pressure
Gravity

Node	
Field Name	Value
Type	Plug
Note	
Year of Install	2008

Plug
Cleanout

CB	
Field Name	Value
ID	CB-1
Type	
Rim Elev	815.35
Year of Install	2008
Side Inlet	

ROLLED
STANDARD
CBMH

Yes
No

Manhole	
Field Name	Value
ID	MH1
Type	
Rim Elev	815.35
Year of Install	2008
Material	

Standard
Vault

Concrete
HDPE

TRAFFIC MARKING AND SIGNAGE

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

TRAFFIC MARKING AND SIGNAGE

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

TRAFFIC MARKING AND SIGNAGE

Item/ Symbol	AutoCad Layer	Element Type	Cell/Wblock Name
REGULATORY SIGNS			
Sign Location	T9-sign_location	cell/wblock	SIGN
Stop Sign 	T9-stop_sign	cell/wblock	STOP
Yield Sign 	T9-yield_sign	cell/wblock	YIELD
MISCELLANEOUS			
Property Lines	X-base	line	-
	Registered and proposed lot lines		

Ensure:
· broken lines are to be drawn to scale.

SERVICE LOCATION REPORT

Subdivision			
Civic Address			
Legal Description	Lot	Block	Plan
Consulting Engineer			
Contractor			
Service Completion Date			

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 Service Box/Curb Stop		*1.72m*		
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 Service Box location (m)			*887.93*	*887.88*
9.1. Service Information				
a. Saddle	(Y/N)	*N*	*Y*	*Y*
b. Killed	(Y/N)	*N*	*N*	*N*
c. Main Stop	(Y/N)	*Y*	N/A	N/A
d. Insulated	(Y/N)	*N*	*N*	*N*
e. Riser	(Y/N)	N/A	*Y*	*Y*
f. Service into Manhole	(Y/N)	N/A	*N*	*N*
g. Inspection Chamber	(Y/N)	N/A	*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.)	*Roadway*	*Roadway*	*Roadway*
Main Size	*200 mm*	*200 mm*	*375 mm*
Main Material (e.g. DR18, DR35, Ultra-rib, etc.)	**D R 18**	*DR 35*	*Ultra-Rib*

Report Prepared By *John Doe, P.Eng.* (Consulting Engineer) *Month dd, yyyy* (Date)

1. GENERAL

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 and in an Engineering Agreement for Town Projects.

The Consulting Engineer is expected to provide a professional level of inspection services culminating with the signing of the certification statement in the Construction Completion Certificate and Final Acceptance Certificate.

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.

2. CONSULTING ENGINEER/TOWN OF PONOKA RELATIONSHIP

2.1. 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 – Part Two, General Conditions, 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. In order to complete the obligations of the Development Agreement, the Town recognizes the advantages of utilizing the same Consulting Engineer and may, at its option, give priority to the said Consulting Engineer where practical.

2.2. Town Developments/Projects

For Town Developments and Projects, there is a direct contractual relationship between the Towns 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 Contract Specifications – Section 00 72 13.

3. DOCUMENTS AND SCHEDULES

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

.1 The Town of Ponoka Design Guidelines.

.2 The Town of Ponoka Contract Specifications.

.3 The Development Agreement for the Project.

.4 The Engineering Agreement (for Town Projects).

.2 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.

.3 Notification by the Consulting Engineer shall be by letter, or e-mail (town@ponoka.org) 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

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

.2 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.

.3 The Consulting Engineer shall supply the following documentation to the Engineer in a timely manner:

.1 Minutes of the pre-construction site meeting.

.2 Minutes of the site meetings.

.3 A copy of the Contractor's proposed schedule.

.4 Copies of change orders as applicable.

5. DOCUMENTATION

5.1. 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 Developments

Construction Completion and Final Acceptance Certificates for private developments are to be submitted as detailed in the Development Agreement in the form appended at the end of Part Six. Copies of the Certificates are available at the Town.

.2 Town Developments/Projects

Seasonal Completion Certificates, Substantial Completion Certificates, Construction Completion Certificates, and Final Acceptance Certificates for Town developments and Projects are to be submitted as detailed in the Contract Specifications in the form included in Section 00 6 00. Copies of the Certificates are available at the Town.

5.2. Reporting of Deficiencies by the Engineer

Any deficiencies observed by the Engineer during construction are to be brought to the attention of the Developer and 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.

5.3. Materials Compliance

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

If the Contractor proposes to use materials not approved in the current 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.

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

5.4. Testing Frequencies

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

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/minimum 1 per day
Cores	1 core per 1000 m^2

6. CONSTRUCTION INSPECTION

6.1. General

Inspections shall be carried out by the Consulting Engineer to ensure conformance with the Contract Specifications and Drawings.

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.

6.2. 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

7.1. Activity Prior To Issuance of a Construction Completion Certificate

.1 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 and/or the Towns Consulting Engineer. Prior to forwarding any Construction Completion Certificates to the Engineer, all related outstanding change orders are to be resolved and any omissions to be approved by the Engineer. Construction Completion Certificates for Landscaping (Levels One – Four and Collector Roadway tree planting) must also be approved by the Recreation, Parks and Culture Manager or his Representative.

.2 The Construction Completion Certificate application shall be accompanied by the following documentation:

.1 Underground Utilities

.1 Letter documenting completion of successful water pressure testing, flushing, and disinfections (copy of Bacteriological Water Sample Report to be submitted with Construction Completion Certificate).

.2 As-constructed drawing.

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

.2 Surface Improvements

.1 As-constructed drawing.

.2 Letter of compliance covering compaction and materials testing.

.3 Documentation of any deficiencies, which will have payment reductions as per the Contract Specifications.

7.2. Activity Subsequent to Issuance of a Construction Completion Certificate

The Consulting Engineer shall conduct periodic checks of the subdivision during the maintenance period and note any failures, settlements, or other deficiencies in the Work, as well as respond to any "complaint" calls forwarded by The Town.

7.3. Activity Prior to Issuance of a Final Acceptance Certificate

Prior to the submission of the Final Acceptance Certificate, the Consulting Engineer and the Contractor shall conduct an inspection of the Work, 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, 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 for only the inspection of deficient items.

Clearing and Grubbing 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.	
Determine what structures, trees and other improvements 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 Grubbing 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 the 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 de-silting 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 Town 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 Hydrovacing or other approved means?	
Have Crossing, Proximity, Ground Disturbance and/or Encroachment Agreement(s) been received? Field copies available?	
Is construction surveying complete? Off-set distance sufficient for protection of hubs? Grade sheets on job-site?	
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, may require additional excavation and backfill with select material. If located above pipe invert, 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 along 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?	

Tunneling and Jacking 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 tunneling or jacking 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 jacking 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 Town 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 Hydrovacing or other approved means?	
Is construction surveying complete? Off-set distance sufficient for protection of hubs? Grade sheets on job-site?	
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 laying? 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	

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?	
Sidewalks 2.5 m or wider have been saw cut at centerline of walk?	
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; disced 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?	
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?	

Landscaping - General Check List	
Item	Completed Or Not Applicable
Site Preparation and Topsoil Placement	
Has the area been graded to the approved grades?	
Have all ponding areas been repaired?	
Has any erosion damage been repaired?	
Does the new landscape areas blend into existing landscaping?	
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?	
	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?	
If required, is tree well 100 mm pipe drain installed to proper elevation, with proper amount of rock?	
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?	
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	
Item	Completed Or Not Applicable
General	
Have special amenities been approved by Engineering Department?	
Have special amenities been approved by Public Works Department?	
Have special amenities been approved by Recreation, Parks and Culture Department?	
Have maintenance agreements been negotiated?	

1. GENERAL

Developers are responsible for preparing a detailed Area Structure Plan as a pre-condition for subdivisions of larger land areas (i.e. quarter section).

The following matters must be considered when preparing the Area Structure Plan:

.1 Major Area Structure Plan.

.2 Natural, historical, and constructed features.

.3 Lane versus lane less subdivision.

.4 Street classification and layout.

.5 Oil wells, gas wells and pipelines.

.6 Traffic, rail, industrial, and/or commercial noise.

.7 Traffic volume, capacity, and control.

.8 Servicing boundaries, capacities, and constraints.

.9 Drainage routing and detention.

.10 Erosion and sediment control.

.11 Municipal Reserve parcels.

.12 Transit System.

.13 Development phasing.

.14 Community mailboxes.

.15 Subdivision entrance signs.

.16 Enhanced subdivision amenities.

2. MAJOR AREA STRUCTURE PLAN

The Major Area Structure Plan is a generalized plan covering several quarter sections of land. Identified on the plan are some of the following features:

.1 Numbered Highway, arterial and collector roadways.

.2 General land uses, proposed subdivision and area commercial sites, industrial land uses, etc.

.3 Proposed Public and Separate Schools (K - 9, middle school, high school, etc.)

.4 Subdivision park sites, environment reserves, natural features, linear parks, and walkways connecting subdivisions, etc.

3. PHYSICAL FEATURES OF THE SITE

When preparing the Area Structure Plan, careful consideration should be given to the following:

.1 Soil and groundwater conditions.

.2 Topography and major drainage routes.

.3 Natural features such as rivers, creeks, wooded areas, wetlands, etc. that are to be preserved and incorporated in the design. The Recreation, Parks, and Culture Department has prepared Ecological Profiles for all undeveloped land in the Town. The profiles have identified and rated the natural features that should be considered when preparing the Area Structure Plan.

.4 Man-made features such as highways, railways, major power lines and substations, high pressure gas mains and regulating stations, telecommunications facilities (e.g. fibre optics alignments), etc.

.5 Environmental concerns such as contaminated soil or well sites.

4. LANE VERSUS LANELESS SUBDIVISIONS

Lane less subdivisions are acceptable for areas backing onto park, recreation or school sites, or backing onto major arterial roadways. There may also be small areas of land where a subdivision with lanes is not practical or feasible. A lane less subdivision is not recommended where the lots are narrow or where lots are placed back to back. As per the Land Use By-law, the side yard on one side of the dwelling unit may have to be increased in width to allow for vehicle access to the rear yard in lane less subdivisions.

5. STREET CLASSIFICATION AND LAYOUT

5.1. General

Street systems incorporate several types of roadways, each with its own particular design standards. This section will provide alignment information for the following road classifications:

.1 Numbered Highways

.2 Urban Arterial Roadways,

.3 Residential Collector Streets,

.4 Residential Local Streets,

.5 Industrial Roadways,

.6 Lanes.

Classification of the street system must be undertaken during subdivision design (commencing with the area structure plan), in order that the necessary right of way requirements can be established and approved by The Town. Geometric design standards are summarized in Section 13 – Appendix A and described in the following Clauses.

5.2. Road Characteristics

.1 General

In an ideal road system, lanes and locals connect with collectors, collectors with arterial roadways, and arterial roadways with Numbered Highways and freeways.

It is preferable to minimize the interconnection of lanes and locals with arterial roadways, and of collector roadways with Numbered Highways and freeways. Local roadways rarely, if ever, connect with freeways. Such applications are strongly discouraged.

Connections by classification are summarized in the following Table:

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

Roadway	Roadway
Arterial Roadway	Collector Roadway, Arterial Roadway, Numbered Highway
Numbered Highway	Arterial Roadway, Collector Roadway

.2 Numbered Highways

Numbered Highways 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 double left turn bays is a typical design consideration.

Direct access to adjacent developments from Numbered Highways is prohibited to provide a high level of service for through traffic.

.3 Urban Arterial Roadways

Urban arterial roadways carry large volumes of all types of traffic moving at medium to high speeds. These roadways serve the major traffic flows between the principle 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, frontage roads, or auxiliary lanes.

.4 Residential Collector Roadways

Residential collector roadways provide both traffic service and land service (access to front yards, park sites, school sites, playgrounds, etc.). The road service 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 street should generally not collect traffic from more than 600 dwelling units before connecting to an arterial roadway.

.5 Residential Local Roadways

Residential local roadways 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 street should generally not collect traffic from more than 100 dwelling units before connecting to a collector roadway.

.6 Industrial Collector Roadways

Industrial collector roadways provide both traffic service and land service. The service 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.

.7 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.

.8 Frontage Roadways

Frontage roadways are normally located adjacent to arterial roadways. They may be used to control access to the arterial, to provide direct access to adjoining property, and to provide circulation of traffic on each side of the arterial roadway. Frontage roadways are to be designed to urban industrial local roadway standards.

.9 Lanes

Lanes provide access to the rear yard of residential, commercial, and/or industrial lots. Lanes are not intended to carry through traffic. The maximum length of lane before connecting to a street should not exceed 350 m. Based on an average of 280 m of lane at the rear of the lots and the minimum lot width for each type of dwelling unit, the maximum number of units on each side of a lane would be as follows:

.1 R1 = 19 lots,

.2 R1A = 28 lots,

.3 R1B = 22 lots

.3 R1C = 34 lots and,

.4 R2 = 45 lots.

The lane layout should not encourage shortcutting between streets.

The Planning Guidelines and Standards include a guideline that a cluster of any one of R1A, R1N and R2 housing should not be larger than 60 dwelling units. Where the number of units will exceed 60 dwelling units, the developer will be required to provide a paved lane.

5.3. Horizontal Layout of Streets

.1 General

The horizontal alignment of streets typically consists of a series of tangents and circular curves (simple, compound, and reverse curves). Transition or spiral curves may also be incorporated in the design. Other street pattern designs may also be considered.

.2 Minimum Curve Radius

Minimum radii are to be as listed in TAC Geometric Design Guide for Canadian Roads (1999 Edition), Chapter 2.1 - Alignments and Lane Configuration. These are summarized in Section 13 – Appendix A.

.3 Curvilinear Designs

Curvilinear designs are used effectively to integrate the street infrastructure with the existing topography and other subdivision features to promote slower traffic speeds, and to enhance aesthetics.

.4 Broken Back Curves

Broken back curves (two curves in the same direction connected by a short tangent) are to be avoided in a 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).

.5 Intersection Angle

For curve linear 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.

Intersection angles less than 75^{o} are not acceptable.

.6 Lane/Street Intersections

Where a lane forms the 4^{th} 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.

5.4. Street Intersection Spacing

.1 Numbered Highways

The desirable intersection spacing along Numbered Highways is 800 m to 1600 m.

.2 Arterial Roadways

The desirable intersection spacing along divided arterials is 400 m to 800 m. For minor, undivided arterials, intersection spacing may be reduced to 200 m if traffic signals are not anticipated. (i.e. signalized intersections must be spaced at least 400 m apart.)

.3 Collector and Local Roadways

The minimum distance between opposing 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 80 m should be avoided, if possible.

.4 Lanes

The minimum offset distance from a lane to a street intersection along collector or local roadways in residential or industrial subdivisions is 45 m, measured from centre to centre of the respective intersections.

5.5. Cul-de-Sacs

The maximum length of a cul-de-sac shall be 200 m; measured along the road centerline, from the property line of the intersecting roadway to the end of the bulb. No more than 40 dwelling units may be developed on a cul-de-sac.

An emergency access is required within 90 m of the end of the cul-de-sac if the lots within the cul-de-sac are serviced from the street, 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.

5.6. 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.

5.7. Dead-end Lanes

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 SU-9 vehicle (e.g. garbage truck). See Section 17 for standard details.

5.8. Curved Lanes and Public Utility Lots

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

5.9. Interim Access

Interim secondary access shall be provided for traffic on dead-end streets serving more than 85 dwelling units, or as required by the Engineer and Emergency Services Department. A gravel surface turnaround suitable for SU-9 vehicles shall be provided at the end of any temporary dead-end street or lane.

5.10. Expanded Bulb Corners

Expanded bulb corners, as illustrated in Section 17, may be used on local streets in lieu of the minimum radius of curvature noted in Section 13 – Appendix A.

5.11. Medians

Medians should not generally 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. Medians should be at least 5 m wide if tree planting is to be included (see Sections 13 and 14). Medians should be predominantly hard surfaced to reduce maintenance requirements.

Avoid lots fronting onto divided sections of local or collector roadways, as front driveways will not be permitted in these areas. Where frontage cannot be avoided along divided roadways, rear access to the lots must be provided.

5.12. Provision of Waste Management Collection Services

Under the Town's Utility By-Law, property owners are required to place their garbage as near as practical to the lane for collection, unless no lane exists or there is some other impracticality. The Developer shall provide lanes where practical to accommodate waste management.

When lane construction is delayed in new subdivisions, waste collection will be from the street on an interim basis until the lanes have been constructed. Property owners must be made aware of the interim and permanent waste collection routes.

6. OIL WELLS, GAS WELLS AND PIPELINES

There are a number of active, suspended and abandoned oil and gas wells, including associated pipelines, compressor stations, etc., located in future development areas. See Appendix A - Figures 1 to 4, appended at the end of this Section. These drawings provide a general overview of the oil and gas infrastructure in and around the Town. The Energy Resources Conservation Board (ERCB – formerly EUB) has established minimum development setbacks for the wells and pipelines. These setbacks or buffer widths are based on the type of well or pipeline, the content of the well or of the material being conveyed in the pipeline. (i.e. sweet gas, sour gas (H_2S), etc.). The specific buffer widths are determined by ERCB following discussions with the well and/or pipeline licensee at the time of development. Based on the well or pipeline content, the setbacks may range from strictly the pipeline right of way width to 800 m.

For abandoned wells, setbacks ranging from 5 m to 15 m are applicable. The minimum setback for abandoned pipelines is the edge to the pipeline right of way. A 100 m development setback is required from all active oil wells and all active sweet or Level 1 sour gas wells. Typically no development setback, other than the right of way width, is required for pipelines carrying oil, sweet gas or Level 1 sour gas. Any wells or pipelines approved at a higher level than Level 1 may be required to have larger setbacks such as 100 m, 400 m, or 800 m.

Additional information regarding development setbacks in the vicinity of wells and/or

pipelines can be found in ERCB General Bulletin GB 99-4, (ERCB Website – Archive Bulletins and General Bulletins), ERCB Directive 026, the Pipeline Act (ERCB - Industry Zone - Rules, Regulations - Acts & Regulations - Pipeline Act, particularly clause 42 but not limited to), Municipal Affairs ("Advisory Land Use Planning, notes on Abandon Well sites -Municipal Affairs - Municipalities & Communities - Services for Municipalities - Planning and Development - Abandon Well sites)

Accordingly, the developer shall use the following offsets for adjacent development.

.1 A minimum separation width of 2 metres shall be provided between the property line of the pipeline right of way and adjacent the lane/public utility lot where a pipeline right of way is located parallel to a lane and/or public utility lot, as illustrated on Drawing 4.01. A 1:1 slope from the right of way property line to the invert of the adjacent main shall be maintained at all times. The width of the separation shall be increased as the depth of the adjacent utility main increases.

.2 An easement with a minimum width of 2 metres must be provided between the pipeline right of way and a building where a pipeline right of way is located parallel to the side yard of a parcel of land, as illustrated on Drawing 4.01.

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

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

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

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

.4 Copies of any reclamation certificates.

7. NOISE STUDY

A Noise Study is required where a proposed Subdivision is located adjacent to Provincial primary and secondary highways, Numbered Highways, arterial roadways, railways, industrial development, commercial development, and/or other potential noise generator.

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.

Earth berms and/or development setbacks are the preferred measures for noise attenuation, although other types of sound barriers will be considered (e.g. wall or combination of wall and berm).

The report must contain the following information:

.1 Scaled drawing(s) of the site, including the following:

.1 building location(s),

.2 receiver location(s),

.3 road alignment,

.4 proposed noise barrier(s),

.5 coordinate grid (for FHWA method).

.2 Scaled cross-section at each receiver location showing roadway, receiver, and ground elevation as required.

.3 Traffic volumes and percentage trucks.

.4 Detailed calculations used to determine noise levels and barrier heights.

.5 A table with receiver noise levels with and without a barrier is required.

8. TRAFFIC STUDY

A Traffic Study may be required where a proposed Subdivision is located adjacent to Provincial primary and secondary highways, arterial roadways, established subdivisions, industrial development, commercial development, and/or other potential traffic generators.

8.1. Study Objective

The objective of the Traffic Study is to:

.1 Document the existing and projected traffic flows on adjacent arterial and/or collector roadways as a result of the proposed Area Structure Plan.

.2 Recommend the access points, intersection/road geometry, and internal road layout required to meet the demand of the proposed development, and minimizing the traffic and parking impact to the neighboring subdivisions and roads.

8.2. Required Traffic Impact Information

.1 The following information is required for the noon and p.m. peak hours on all impacted arterial and collector intersections:

.1 The development generated traffic volumes.

.2 A drawing showing the development trip distribution pattern.

.3 A drawing showing the turning movement volumes of proposed intersections, as well as other impacted intersections and roadways.

.2 The traffic volumes should be detailed as follows:

.1 Existing traffic.

.2 Projected fifth year background traffic.

.3 Additional development generated traffic.

.4 Through traffic that shortcuts through adjacent residential roads.

.5 Total traffic.

.3 Analysis showing the volume/capacity ratio of all affected roadways/intersections with and without the recommended improvements.

.4 A drawing showing the internal and external road improvements required to accommodate the projected traffic pattern. Among other items, the drawing should identify the following:

.1 The internal collector street layout.

.2 The external access points and intersection locations.

.3 The number of lanes and the length of any turn bays required for each arterial and collector street intersection.

.4 The length of the controlled accesses inside the development area and around each major intersection.

.5 Any traffic control device addition, deletion, or revision required. This includes parking, pavement markings, signs, traffic signals and/or phasing, and timing revisions.

.5 The year or development level in which the above recommended improvements are required.

8.3. Issues That May Affect the Traffic Study

The Developer should meet with the Town to obtain background information that may have an impact on the Traffic Study.

8.4. Review Time

The Town of Ponoka requires a minimum of three weeks for the review of traffic studies submitted.

9. SERVICING BOUNDARIES AND CONSTRAINTS

As detailed in the Planning and Subdivision Guidelines, the Developer is required to provide a conceptual servicing design in the Area Structure Plan Report. Drawings and preliminary analyses are to be included in the report supporting the following:

.1 The routing of water, sanitary sewer, and storm sewer mains,

.2 Location, depth, and size of detention ponds,

.3 Major drainage routes,

.4 Erosion and sedimentation control,

.5 Power, telephone, cable, and natural gas systems,

.6 Assessment of system capacities relative to the proposed development.

This conceptual servicing study is intended to demonstrate the viability of the proposed Area Structure Plan.

Following approval of the Area Structure Plan, the Developer must provide a more detailed servicing report for the quarter section. Detailed servicing study criteria are included in Section 5 of this document.

10. UTILITY CORRIDORS

In planning development servicing, corridors may be required for routing of utility mains, secondary emergency access, walkways, and major drainage outside of the lane or roadway rights of way.

11. MUNICIPAL RESERVE/PARKS

11.1. Municipal Reserve/Detention Pond Joint Use Sites

.1 At the discretion of the Town, a parcel no more than 1.0 ha within a storm pond may be credited towards the 10% Municipal Reserve requirement if the area is to be developed as usable sports fields. The need for storm management facilities shall not result in an inconvenient location for school/park sites or limit the capacity of the municipality to preserve natural areas.

.2 Subdivision parks (with no school development) shall be ±2.5 hectares (single subdivision) to ±5.0 hectares (two subdivisions). Subdivision parks may include an activity centre (based on one activity centre for two quarter sections), detention/retention ponds and/or constructed wetlands, and natural preservation areas.

.3 The land requirements for the various types of parks are as follows:

.1 Multi-subdivision (High School) Park Sites

These sites are designed to accommodate High School(s), are consolidated on two or more quarter sections, and are approximately +/-24 hectares (60 acres) in size. Note: The Town is responsible for the development of these parks.

.2 School/Park Sites

These sites are designed to accommodate a K-9 or Elementary School Site, are consolidated on one or two quarter sections, and are between +/_3.6 hectares (+/_9 acres) for a single subdivision, and 8.1 hectares (20 acres) for two subdivisions.

.3 Subdivision Park Sites

These sites are designed **not** to accommodate a school facility, are consolidated on one or two quarter sections, and are between +/_2.5 (6 acres) for a single subdivision, and 5.0 hectares (12.5 acres) for two subdivisions.

.4 Linear Parks

These sites are designed to accommodate active or passive recreation components, and trail systems. A linear parcel of land shall have a minimum width of 10.0 meters.

.4 Drawings illustrating the amenities to be incorporated in the design of the School and/or Park sites and Linear Parks are included in Section 17.

Detailed design criteria for the development of the School/Park sites is included in Section 14 of this document.

11.2. Site Financing and Construction

Construction and financing responsibility for the Subdivision Park site and/or Detention Pond is included in Section 14.

12. DEVELOPMENT PHASING

The purpose of the development phasing plan is to establish the proposed sequence of development. The proposed sequence of development should be based on the logical extension of deep utilities, shallow utilities, and roadway access. The need for construction traffic to travel through established development areas to access a new phase of development should be avoided. Construction of temporary access roadways may be required for interim access to a proposed development.

13. COMMUNITY MAILBOXES

The Developer shall forward copies of the proposed Area Structure Plan to Canada Post for comments and the tentative location of community mailboxes for the provision of postal service in the new subdivision. The criterion to be used to determine the mailbox locations is included in Section 1.

14. ENHANCED/OPTIONAL SUBDIVISION AMENITIES

14.1. General

The following Enhanced/Optional Subdivision Amenities have been approved for use in proposed Subdivisions:

.1 Sound attenuation walls,

.2 Subdivision Entrance Signs,

.3 Decorative pillars at roadway intersections,

.4 Storm retention (wet) ponds,

.5 Enhanced municipal/environmental reserve landscaping (i.e. walking paths, benches, additional tree and shrub planting, water features, viewing platforms, etc.) in additional to the minimum specified by the Recreation, Parks and Culture Department,

.6 Painted streetlight poles, and/or

.7 Distinctive “Street Name” sign blades.

Any other proposed enhanced/optional features must be approved by various Town Departments.

Developers will be responsible for all associated construction costs. Where applicable, maintenance costs will be as calculated in the Development Agreement. The Developer shall provide a perpetual maintenance fund that can be drawn down over the term specified in the Development Agreement to cover annual operating and/or maintenance costs.

All proposed enhanced subdivisions amenities should be identified in the Area Structure Plan.

14.2. Specific Design Criteria

Special conditions are applicable for some of the Enhanced/Optional Subdivision Amenities, as follows:

.1 Sound Attenuation Walls

The Developer will be required to construct sound attenuation walls when berms cannot be constructed to the recommended height as determined in the Noise Study or to the height shown on the typical cross-sections for Numbered Highways and arterial roadways (see Drawings 5.02 and 5.03). Additional design information is included in Section 13.

.2 Subdivision Entrance Signs

If the Developer wishes to construct a Subdivision Entrance Sign at the entrance to a subdivision, the sign shall be located within the road right of way as shown on Drawings in Section 17. Additional sign location design criteria is included in Section 1.

Additional Subdivision Signs will not be permitted within the subdivision without the approval of the Town.

.3 Decorative Pillars at Roadway Intersections

If the Developer wishes to construct Decorative Pillars at various locations throughout the subdivision, they shall be located within the road right of way. To be in conformance with Land Use Bylaw, the height of the pillars cannot exceed 0.9 m in height. The pillars may be stand alone items or may be used as the base of Street Name sign posts.

.4 Painted Streetlight Poles

Galvanized streetlight poles are the current standard in subdivisions. The capital cost of painted streetlight poles is lower then galvanized, but the maintenance cost is higher. If the developer chooses to install painted streetlight poles, the Developer will be required to include the cost for repainting of the poles three times in 50 years. Acceptable colours include galvanized (standard), green or black. In general, there should be one colour theme of streetlight poles for the full neighborhood.

.5 Distinctive "Street Name" Sign Blades

The existing blade and two optional blade shapes will be allowed in subdivision. The same blade design is to be used throughout the Subdivision Plan area. The background colour of green (std.), black, white and blue are acceptable. The lettering will follow the current standard for font and size. Lettering type will be black or silver (standard). The Developer will be required to submit a copy of the logo, if applicable, for inclusion of the logo on the sign blade, to the Town, Traffic section for approval. The developer agrees to pay for all costs over and above that of the current standard costs for sign blades and maintenance.

1. GENERAL

The Developer has provided a conceptual servicing design in the Area Structure Plan Report. Before proceeding with a phase of development, the Developer must provide a more detailed servicing report, together with servicing drawings for the quarter section.

2. SERVICING STUDY

The report is intended to establish the site development and servicing requirements for the staged development of the subdivision. The report will ultimately form the basis for detailed design of each phase of development.

The report should compile and summarize relevant information with respect to site grading, proposed water distribution, sanitary sewage collection, storm drainage system, shallow utilities, and public roadways. The report should include discussion pertaining to the systems, such as

.1 Existing conditions (e.g. vegetation, soils groundwater, structures, contaminants, topographic feature, erosion and sediment control measures, etc.),

.2 Site grading, major drainage routing, permanent and/or temporary erosion and sediment control measures and detention,

.3 Description and results of analyses and modelling completed,

.4 Identification and description of issues/constraints related to capacity, depth, grade, operations, or other unique conditions or features.

The details of individual studies (e.g. geotechnical, ecological profile, noise, traffic, water modelling, sanitary sewer system modelling, stormwater management, erosion and sediment control) may be contained in separate reports, but should be coordinated, referenced, and summarized in the Servicing Study Report.

Specific requirements for the Geotechnical Report is detailed in Clause 4 of this Section.

Specific requirements for the Erosion and Sediment Control Report is detailed in Clause 7 of this Section.

The Clearing and Grading Permit (Section 7, Appendix A), must be approved by the Town prior to any clearing, stripping and grading work being undertaken. In addition, Development Agreements will not be issued until the Engineer has approved all Servicing Study issues.

Revisions to the Servicing Study must be provided when the Area Structure Plan revisions (i.e. roadway realignment, land use revision) are approved. Further Development Agreements will not be issued until revised Servicing Study drawings and/or reports are submitted and approved.

3. SERVICING STUDY DRAWINGS

3.1 General

The base plans for the Servicing Study should be in the form of a tentative legal plan at a scale of 1:4000 on 11" x 17" bond paper conforming to the approved Area Structure Plan. The following preliminary design plans are to be submitted as part of the servicing report:

.1 Original Ground contours,

.2 Cut/ Fill contours

.3 Roadway grading plan,

.4 Water distribution network,

.5 Sanitary sewer system,

.6 Major drainage system, including any stormwater management features,

.7 Minor storm sewer system,

.8 Conceptual landscaping plan (upon request of the Town),

Note: Proposed phase boundaries and phasing are to be shown on all of the above noted plans.

3.2 Site Grading Plan

The purpose of the Site Grading Plan is to provide a preliminary earth balance for the quarter section, establish the major drainage routing, establish erosion and sediment control measures and coordinate the utility and site grading designs with respect to depth of cover and grades. The following information should be shown on one or more drawings:

.1 Existing Contours

Existing elevation contours of the site at a sufficient interval to determine drainage patterns.

.2 Cut / Fill Contours

.1 Proposed changes in existing contours for each stage of grading.

.2 A cut/fill plan showing existing and proposed contours. Plan

should show earth balance calculations.

.3 *Natural Features*

Locate and identify trees, shrubs, grass, water bodies, streams and other natural features that are to be retained, removed and/or altered. Identify any future variances in natural grade adjacent to these areas which would either impact drainage or root systems.

.4 *Geotechnical Information*

.1 Test hole locations,

.2 Boundaries of different soil types within the development,

.3 Areas within or near the proposed development with potential for serious erosion or sediment problems.

.5 *Existing Drainage Patterns*

Show the dividing lines flow direction for the different drainage basins prior to development.

.6 *Limits of Clearing and Grading*

Add lines defining the boundary of the area to be disturbed.

.7 *Existing Storm Water Management System*

.1 Location of permanent storm drain inlets (catch basins), pipes, outlets, detention/retention pond, etc.

.2 Cross-section of swales and/or channels, including depth of flow,

.3 Volume, depth, overflow rates and the routes the flow will follow after overtopping the sediment basins.

3.3 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 should show the following:

.1 Proposed P.I. elevations,

.2 Tentative road and lane centre line grades,

.3 Typical roadway cross-sections,

Detailed roadway design criteria are included in Section 13 of this document.

3.4 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 should show the following:

.1 Proposed main sizes,

.2 Hydrant locations, showing the coverage, and

.3 Location of valves.

Valve locations should be established in conjunction with proposed development phasing and the flushing sequence for each phase.

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

Detailed water system design criteria are included in Section 8 of this document.

3.5 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 Outline Plan 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 should show the following:

.1 Proposed main sizes,

.2 Manhole locations,

.3 Manhole invert elevations,

.4 Grades between manholes, and

.5 Proposed manhole depth.

The sanitary sewer system design submission should include a copy of the computer modelling analysis.

Detailed sanitary sewer design criteria are included in Section 9 of this document.

3.6 Major Drainage System

Generally, the Outline 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 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. This plan shall include a "Best Management Practice" report, detailing storm water runoff quality.

The major drainage plan should show the following:

.1 Major drainage area boundaries,

.2 Major drainage routes,

.3 Detention pond locations and shapes (e.g. volume, depth, area, elevations),

.4 The minor storm sewer system, including manhole locations, catchment areas for the minor system, and

.5 The plan should also identify 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.

The major storm sewer system design submission should include a copy of the computer modelling analysis.

Detailed major drainage design criteria are included in Section 10 of this document.

3.7 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 Area Structure Plan 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 should show the following:

.1 Minor storm sewer system, including proposed main sizes,

.2 Manhole locations,

.3 Manhole invert elevations,

.4 Grades between manholes, and

.5 Proposed manhole depth.

The minor storm sewer system design submission should include a copy of the computer and/or rational method modelling analysis.

Detailed storm sewer design criteria are included in Section 10 of this document.

3.8 Conceptual Landscaping Plan (Upon Request)

A Conceptual Landscape Plan is to be provided to illustrate how the municipal reserve parcels will be developed, in particular the Park Site(s) identified in the Area Structure Plan.

The plan should show the following:

.1 Areas of existing wetlands, trees, and vegetation to be removed or retained, as identified in the Ecological Profile prepared by the Recreation, Parks, and Culture Department,

.2 Identify topographic features and drainage patterns for all municipal reserve parcels,

.3 Proposed trail system, including connection to the trail system in adjacent developments,

.4 Proposed tree/shrub bed locations along arterial roadways,

.5 Roadways where collector tree planting is required,

.6 Proposed development plan for the Park site(s), including site amenities (e.g. school parcel, sports fields, playground apparatus, etc.), detention pond, water levels and structures, trails, site grading, etc.

.7 Special landscaping features that are being considered for incorporation in the development area.

.8 All existing and proposed easements.

.9 Proposed site grading and slope evaluation

Detailed landscaping design criteria are included in Section 14 of this document.

3.9 Submission of Servicing Study Report and Drawings

One complete set of servicing Drawings shall be submitted to each of the following for review and approval:

.1 Town of Ponoka,

.2 Towns Consulting Engineer.

One copy of the draft report, including individual studies (e.g. geotechnical, ecological profile, noise, traffic, water modelling, sanitary sewer system modelling, stormwater management, erosion and sediment control) shall be submitted to the Town for review and comments.

Following approval of the drawings and the report, submit three copies of the report and one complete set of reproducible drawings to the Town.

Provide one complete set of reproducible drawings to the Recreation, Parks and Culture Department.

Provide one copy of the Shallow Utilities Plan to the Electric, Light, and Power Department, Gas Company, Telephone Company, and Cable Television Company.

4. GEOTECHNICAL REPORT

4.1 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.

4.2 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 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, 1 month after drilling, and once a month thereafter for 5 additional months.

4.3 Final Report

Three copies of the report shall be submitted to the Town, including the following information:

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

.2 Results of the tests noted above,

.3 Water table contour map with seasonably adjusted water table shown at 0.50 m intervals,

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

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

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

5. SLOPE STABILITY GEOTECHNICAL REPORTS

5.1 General

.1 A Slope Stability Geotechnical Report is required for all sites where, in the opinion of the Engineer, slope stability is a concern.

.2 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.

.2 The assessment of a safe set-back or buffer zone back from the crest or away from the toe of the slope.

.3 If the Fs for a slope or 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 affect on adjacent man-made and natural features and be approved by the Engineer.

4. 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.

.3 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.

5.2 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 ground 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.

.1 Property lines and setbacks as per the Zoning By-law.

.2 Stability limit, established with respect to most probable adverse groundwater and loading conditions.

.3 Top of embankment or escarpment.

.4 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).

.5 Erosion control and other mitigation measures (e.g. drainage works, grading, etc.) close to the slope crest.

.6 Appropriate recommendations pertaining to revegetation, dewatering, and slope reconfiguration (e.g. cutting, filling, regrading, retaining walls, etc.).

.7 Building location and foundation design.

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

5.3 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 Geotechnical Slope Stability 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 Geotechnical Report.

6. ENVIRONMENTAL ASSESSMENT REPORTS

.1 An Environmental Site Assessment or Environmental Impact Assessment is required for all sites where environmental issues are of concern.

.2 An Environmental Site Assessment (ESA) 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 as follows:

.1 Phase 1 ESA – Site Reconnaissance and Historical Review.

.2 Phase 2 ESA – Site Investigation and Assessment.

.3 Phase 3 ESA –Planning and Implementation of Remediation.

.3 The Environmental Report for development of a site shall include but not be limited to the following:

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

.2 A detailed discussion of the site assessment, including a review of the chemical or biophysical data with respect to the assessment criteria.

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

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

.5 A statement of limitations for the report.

.4 Environmental Reports will be reviewed to the satisfaction of The Town and its appointed review agencies which may include Alberta Environment or other approved agents. The level of work required will be dependent on the situation and findings. In general:

.1 Phase 1 ESA's are 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 (1993) titled "Phase 1 Environmental Site Assessment - Z768-94".

.2 If the Phase 1 ESA indicates an environmental issue, a Phase 2 ESA shall be prepared to detail the existence, type, concentration, and extent of on and off-site contamination. This report shall 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 (1998) titled "Phase 2 Environmental Site Assessment - Z769-00".

.3 If the Phase 2 ESA indicates that there is a requirement for remediation or risk management, then a Phase 3 ESA program and documentation will be

required. The report(s) shall document how the site will be remedied or risk managed to a level suitable for the intended development. Final confirmation testing and reporting will be required to verify remediation has taken place.

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 watercourse 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 stormwater 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 approved 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 stormwater 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 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

Erosion from land surfaces can contribute large quantities of sediment to watercourses. 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.

3.1. Federal Legislation

.1 Navigable Water Protection Act
(http://laws.justice.gc.ca/en/showdoc/cs/n-22)

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. Particular reference to section 22, but not limited to, may affect municipal development.

.2 Fisheries Act
(http://laws.justice.gc.ca/en/showdoc/cs/F-14)

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.

Particular reference to the following sections: 34, 35, 36, 38 and 42, but not limited to, may affect municipal development.

.3 Migratory Birds Convention Act
(http://laws.justice.gc.ca/en/showdoc/cs/M-7.01)

Migratory Birds Regulations
(http://laws.justice.gc.ca/en/showtdm/cr/C.R.C.-c.1035)

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:

.1 Migratory game birds, including ducks, geese, swan, cranes, shorebirds and pigeons,

.2 Migratory insectivorous birds, including chickadees, hummingbirds, robins, swallows and woodpeckers,

.3 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.

.4 Canadian Environmental Protection Act
(http://laws.justice.gc.ca/en/showtdm/cs/C-15.31)

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.

Particular reference to the following sections 64 and 95 to 99, but not limited to, may affect municipal development.

3.2. Provincial Legislation

.1 Environmental Protection and Enhancement Act (EPEA)
(http://www.environment.alberta.ca/3.html)

The Environmental Protection and Enhancement Act, Chapter E-12 exists to support and promote the protection, enhancement and wise use of the environment.

Particular reference to the following sections: 108 to 112 and 118, but not limited to, may affect municipal development.

.2 Water Act
(http://www.environment.alberta.ca/3.html)

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).

Particular reference to Section 36, but not limited to, may affect municipal development.

The Water (Ministerial) Regulation, A.R. 205/98, Schedule 1, lists the activities that are exempt from the approval requirement.

.3 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.

Particular reference to Section 3, but not limited to, may 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.

Approval is required prior to developing or modifying the beds, shores or banks of a water body.

.4 Soil Conservation Act

The Soil Conservation Act, R.S.A. 2000, c. S-15 applies to all land within the Province of Alberta.

Particular reference to Section 3, but not limited to, may 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.

4. PENALTIES FOR CONTRAVENTION OF ENVIRONMENTAL LEGISLATION

4.1. Continuation of a Contravention

Where a contravention is committed or continued on more than one day, each day is considered a separate offence.

4.2. 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 whom 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 **Environmental Service Response Centre** as follows:

.1 Verbal Reports can be phoned to **780-422-4505** or **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 faxed to **780-427-3178**; or mailed to Environmental Service Response Centre, Alberta Environment, 6th floor, Oxbridge Place, 9820-106 Street, Edmonton, Alberta T5K 2J6.

4.3. 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.

5. INTRODUCTION OF AN EROSION AND SEDIMENT CONTROL (ESC) PLAN

5.1. Goals and Objectives

The main objective of erosion and sediment control is to protect our watercourses from pollution, primarily sediment pollution.

5.2. Responsibilities

Erosion and sediment control is the responsibility of the Developer.

5.3. Elements of an Effective ESC Plan

The following elements are to be considered in the preparation of an effective ESC plan:

.1 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.

.2 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.

.3 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.

.4 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.

.5 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.

.6 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.

.7 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.

.8 Ensure Contractors Are Trained On ESC Plan Implementation, Inspection, Maintenance and Repairs.

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.

.9 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.

.10 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.

5.4. Design of an Erosion and Sediment Control Plan

An Erosion and Sediment Control Plan must be prepared for all construction projects. Best Management Practices 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 should be incorporated when possible. Adequate buffers should be used to protect areas where flows enter the drainage system. Keep clean water clean.

.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.

5.5. Erosion and Sediment Concerns and Practices

1. 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 Wind blown dust.

2. 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. **All temporary and permanent detention facilities must be constructed prior to the installation of any services to the site 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:

.1 Vegetate, hydro seed, or mulch areas that won't receive vehicular traffic,

.2 Construct windbreaks or screens,

.3 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

.4 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) FOR EROSION AND SEDIMENTATION CONTROL

6.1. 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 Impondment BMP's

It is the Consultant's responsibility to ensure that BMP's are appropriate for the site conditions.

6.2. Erosion and Sediment Control BMP's

This clause provides general information on BMP's that may be used in The Town of Ponoka. 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 Ponoka. The Consultant is to use flexibility and good judgment to select BMP's appropriate for the site and situation.

.1 Permanent Best Management Practices

Permanent BMP's to be incorporated in the final site stormwater plan may include:

.1 Stormwater ponds,

.2 Armouring,

.3 Vegetation,

.4 Constructed wetlands,

.5 Sediment (Grit) Separation Stormwater Treatment Units.

For permanent ESC installations:

.1 Make sure the proper vegetation is being used in each situation.

.2 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.

.2 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.

.1 Preservation of existing vegetation,

.2 Construction sequence scheduling,

.3 Just-in-time grading,

.4 Slope treatments,

.5 Seeding,

.6 Mulches,

.7 Hydroseeding and hydromulching,

.8 Erosion control netting,

.9 Erosion control blankets, and

.10 Rip-rap

.3 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.

.1 Sediment basins,

.2 Sediment traps,

.3 Sediment barriers,

.4 Inlet protection measures,

.5 Stabilized construction entrance,

.6 Dust control,

.7 Brush/rock filter berms,

.8 Dewatering.

6.3. 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 alterative 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 mid June to early August),

.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,

.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 (ESC) REPORT AND PLAN

7.1. Introduction

As noted in Section 7 – Clause 1, the Land Use Bylaw has been amended to include requirements for a Clearing and Grading Permit as a condition of a Development Permit. A requirement of the Clearing and Grading Permit is the requirement for an approved Erosion and Sediment Control Plan. The ESC Plan must be submitted to the Town for review of the Plan. **It is not the responsibility of the Town to ensure that the ESC plan is appropriate for the level of work suggested by the proposed project.** Ultimately the Developer, who is entitled to be the registered and equitable owner of development lands, is responsible for all aspects of the ESC Plan, including compliance with all applicable legislation. Town staff will review the plan only to determine if it meets the minimum standards set out in these Guidelines.

The NASP Erosion and Sediment Control Report provides a brief description of the overall strategy for ESC. In conjunction with the Servicing Study, the Developer will be required to prepare a detailed Erosion and Sediment Control Report. The Erosion and Sediment Control Report is a description of the overall strategy for ESC. It should summarize the aspects of the project that are important for erosion and sediment control and should include:

.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.

7.2. 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:

.1 General topography (slope and slope lengths within the site).

.2 Vegetation

.3 Soil types (particle sizes, erodibility).

.4 Extent and nature of development.

.5 Drainage patterns.

.6 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 effected by the land disturbance.

7.3. 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 stormwater management system and the use of these facilities during the construction period.

7.4. 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 6.5. Stabilization of soils should be the first line of defense.

.3 Identify permanent and temporary control methods for each phase of development.

.4 Indicate good “housekeeping” practices.

.5 Show the location, height and volume of stockpiles. Indicate erosion control measures to control sediment runoff from the stockpiles.

.6 Indicate the types and scheduling of individual erosion control measures, including interim or short-term measures (Less than 45 days duration).

.7 Clearly indicate the measures to control sediment export off the development site.

.8 Describe how the site will be stabilized after construction (site grading and servicing) is completed.

7.5. 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. (See Section 10 – Clause 4.4 for Alberta Environment guidelines for stormwater treatment unit design),

.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 manual.

.3 Seeding and vegetative specifications.

.4 Inspection and maintenance notes.

7.6. 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.

7.7. 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.

7.8. 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.

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**		
7.1. 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), catch basin 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**		
7.2. 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

The Developer shall not do any fieldwork, including site clearing, stripping and/or grading prior to execution a Development Agreement that includes previsions for clearing, stripping and grading construction activities.

The Clearing and Grading Plan(s) for a development phase must conform to the grading plan prepared for the Servicing Study, as detailed in Section 5. Specifications for a detailed Clearing and Grading Plan is included in Section 2.

The Town must approve the Clearing and Grading Plan, including the location of topsoil stockpiles, prior to any work being undertaken.

The Developer must implement erosion and sediment control measures in the Clearing and Grading Plan as outlined in Section 6.

2. REGULATORY REQUIREMENTS

Federal, Provincial and Municipal regulatory requirements for clearing and grading are included in Section 6 – Erosion and Sediment Control Measures; Clause 3.

3. SUBMISSIONS

The Developer shall identify the owners of all lands adjacent to the clearing and grading area that may be affected by the clearing and grading operations.

The Developer shall provide written documentation (letters and/or agreements) from the affected property owners giving permission to access such lands, including Town owned lands, used for backsloping, drainage or other purposes.

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.

4. SPECIAL CONDITIONS

4.1 Restrictions, Notices and Site Preparation

After approval has been given 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 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 – Clause 6).

.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 – Clause 7.

.6 When possible, clearing and grading 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 should be noted in the Contract Specifications.

4.2 Plant Protection

.1 The Developer shall protect trees and plants on site and on adjacent properties where indicated on the Drawings.

4.3 Weed and Vegetative Growth Control

The Developer shall be responsible for controlling noxious weeds and excessive vegetative growth within the clearing and grading area.

5. TOPSOIL STOCKPILES AND DISPOSAL

5.1 General

The Developer shall strip and stockpile topsoil within the Development as necessary to facilitate development of the lands.

Where a Development is located adjacent to an Expressway and/or Arterial Roadway, the Developer shall construct or complete the construction of the sound attenuation berm to the design cross sections illustrated in Section 17, utilizing waste excavation material and/or surplus topsoil.

The Developer shall dispose of all topsoil that is surplus to the requirements of the Developer's Lands.

5.2 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 2:1 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 area as approved by the Parks Manager.

.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 School/Park site(s), must be removed prior to the last phase of development of the Developer’s Lands.

6. STORMWATER MANAGEMENT FACILITIES

6.1 General

Construction of stormwater management storage facilities (detention ponds, retention ponds and/or constructed wetlands), including any storm sewer mains required to drain the stormwater management storage facilities, require Alberta Environmental Protection Act approvals. If a stormwater management storage facility is to be constructed as part of the clearing, stripping and grading work, Alberta Environmental Protection Act approval must be received prior to any grading work proceeding. The approved Servicing Study Drawings can be used for the submission to Alberta Environment for the permit application.

6.2 Control of Drainage

The Developer shall, at no expense to the Town, before, during and after the

clearing and grading of the area, implement the drainage control measures for the control and disposal of all stormwater (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.

7. EROSION AND SEDIMENT CONTROL MEASURES

7.1 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.

7.2 Erosion and Sediment Control 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.

8. REHABILITATION OF ADJACENT LANDS

Where clearing 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 and grading operation.

9. DEEP FILLS GEOTECHNICAL REPORT

A “Deep Fills” report, completed by a Professional Engineer, is required when the constructed depth of fill is ≥ 1.2 metre. The report shall make general recommendations for different types of building foundations.

10. CONSTRUCTION COMPLETION AND FINAL ACCEPTANCE

10.1 General

Issuance of Construction Completion Certificates (C.C.C.'s) and Final Acceptance Certificates (F.A.C.'s) shall be subject to the following conditions being met. Failure to implement and comply with the ESC plan can result in legal action as outlined in the Navigable Water Protection Act, Fisheries Act, Environmental Protection and Enhancement Act and the Water Act.

10.2 Maintenance

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.

10.3 Maintenance Period

.1 The Developer shall maintain temporary erosion and sediment control measures until the graded area is fully serviced and developed. Construction Completion Certificates and Final Acceptance Certificates will not be issued for temporary erosion and sediment control measures.

.2 The Developer shall maintain permanent erosion and sediment control measures for a period of at least two years after the issuance of the Construction Completion Certificate and until a Final Acceptance Certificate is issued by the Engineer.

1. GENERAL

The water system consists of reservoirs, booster stations, trunk water mains, distribution mains, and appurtenances.

Water mains 150 mm - 250 mm will be designated "Distribution Mains".

The design of the water system shall conform to Sections 4.7 and 4.8 of the Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems in Alberta, as published by Alberta Environmental Protection Services and as amended by these guidelines.

2. PRESSURE ZONES

The water system is divided into two pressure zones as illustrated on Drawing 1.01. The distribution system must be designed with consideration to the current pressure zones.

3. DESIGN FACTORS

3.1 Hydraulic Analysis Requirements

The Developer shall perform a hydraulic network analysis using a method acceptable to the Town for all developments to ensure both domestic and fire flow requirements are met. A report outlining the results of the analysis shall be submitted to the Town with the subdivision design drawings. It is preferable that the Developer utilizes a current copy of the Town's WaterCAD model for his analysis.

3.2 Design Parameters

The following parameters shall be used in the design or evaluation of the water distribution system:

.1 Hazen-Williams Coefficient (C)

.1	Polyvinyl Chloride (PVC)	140
.2	Asbestos Cement (AC)	130
.3	Ductile Iron (DI) or Cast Iron (CI)	80 to 100

.2 Distribution Main Sizes

The minimum size of Distribution Mains shall be as follows:

.1 Residential = 150/200 mm diameter for single family development

.2 Residential = 200mm diameter for multifamily development

.3 Industrial/Commercial = 250 mm diameter

Where two hydrants are to be installed on an unlooped Distribution Main the minimum size of the main shall be 200 mm diameter.

.3 Consumption Rates

.1 Residential per capita consumption rates:

.1 Average Daily Demand: 454 litres per capita per day.

.1 Maximum Day Demand: 1.8 x Average Demand.

.2 Peak Hour Demand: 3.0 x Average Demand.

.2 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 are listed as:

.1	Single family residential	3,640 litres/minute (800 igpm).
.2	Town Houses	5,450 litres/minute (1200 igpm).
.3	Apartments (walk-up)	9,100 litres/minute (2000 igpm).
.4	Schools	5,450 litres/minute (1200 igpm).
.5	Commercial	11,400 litres/minute (2500 igpm).

.6 Industrial 13,640 litres/minute (3000 igpm).

.6 Pressure

.1 Minimum residual line pressure under maximum day plus fire flow conditions shall be 140 kPa at ground level of any point in the system. Minimum residual line pressure under peak hour flow conditions shall be 275 kPa.

.2 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 plus fire flow conditions.

4. DISTRIBUTION MAINS

4.1 General

The standard grid main network required within residential subdivisions is as shown on 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 unlooped (dead end) section of water main. 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.

4.2 Alignments

Water mains shall be located on the standard alignment shown on Drawing 4.07 for streets and Drawings 4.08 and 4.09 for lanes and public utility lots. A minimum separation of 3.0 m 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.

4.3 Depth of Cover

Water mains shall be installed with a minimum depth of cover of 2.75 m from the road/lane/utility lot surface grade to the top of the main. Where existing conditions dictate that the depth of buries be less than 2.75 m, the main/service is to be insulated as specified in Drawing 1.03 of the Construction Specifications.

4.4 Oversize

Oversize will not apply to distribution water mains installed in accordance with the standard grid.

5. HYDRANTS

5.1 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.

5.2 Approvals

A plan showing all proposed hydrant locations within the Development, must be submitted to the Town, for approval of locations and spacing prior to finalizing the design of the water distribution system.

5.3 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. Hydrants should be located on the side of the street closest to the water main to minimize the length of hydrant lead. Where a hydrant is installed at the corner of an intersection, it shall be installed at the beginning or end of the curb return.

Fire hydrants shall be located at an alignment of 2 m back of face of curb for areas with no sidewalk or 0.75 m back of walk for areas with monolithic sidewalk. Hydrants should be placed no less than 1.0m and no more than 1.8m from the back of curb, for separate sidewalks. Hydrants shall be placed, no closer than 0.3m from property lines.

5.4 Hydrant Type

Hydrants shall be Canada Valve as presently used in the Town of Ponoka.

Hydrants shall conform to AWWA Specification C502, latest revision thereof, and shall include the following supplementary requirements:

.1 Four section breakaway flange.

.2 Stainless steel trim (nuts and bolts).

.3 Compression type shut off.

.4 Designed for working pressure of 1035 kpa.

.5 Two 63mm hose nozzles with Alberta Mutual Aid Thread.

.6 One 100mm pumper connection with Alberta Mutual Aid Thread.

.7 Triangular operating nut and caps.

.8 Draining hydrants, except where directed by the Town.

.9 A gravel drainage pit (min 0.5m^3) shall be provided at the base of the hydrant.

.10 All hydrants shall be painted lime green of durable and waterproof composition (equal to CIL #3486).

.11 Tops and nozzle caps painted in accordance with the colour coding system currently used by the Town (blue – Zone 2 Riverside; black – 150mm; orange – 200mm & red – 250+ mm).

5.5 Depth of Bury

.1 Minimum depth of bury is 2.75m. Depth of bury is defined as the distance from the invert of the suction elbow to the underside of the grade line flange.

.2 Dirt Flange to be no less than 100 mm and no more than 200 mm above final grade.

.3 Minimum 0.5 m^3 washed gravel drainage sump adjacent to hydrant base. Top of sump to be 150 mm above hydrant drain holes and covered with 2 mm polyethylene sheet or filter fabric to prevent intrusion of clay or silt into the gravel.

.4 Cathodically protect with an 11 kg zinc anode.

.5 Paint top and nozzle caps in accordance with colour coding used by the Town.

.6 Paint hydrant number in 100 mm high block lettering.

.7 Hydrant valve and barrel to be supported with concrete thrust blocks (concrete to be sulphate resistant with 28 day strength of 25 kPa).

6. VALVES AND FITTINGS

6.1 Materials

Gate valves shall conform to AWWA Specifications C500, latest revision thereof, and shall include the following supplementary requirements:

.1 Iron body.

.2 Bronze mounted with grade of bronze used completely resistant to de-zincification by water having a pH of 9.0.

.3 Operating pressure of 1,200 kPa.

.4 51 mm square operating nut complete with stone catcher flange located no more than 600 mm below finished grade.

.5 25 mm solid square stock extension spindle.

.6 Type 304 stainless steel stem for valves 250 mm and larger. 150mm and 200 mm valves may be supplied with either bronze or type 304 stainless steel stems.

.7 "O" – ring stem seal

.8 To open by turning counter clockwise direction.

.9 Non-rising stem.

.10 Double-disc or solid wedge type.

.11 Resilient seated.

.12 External epoxy coating.

.13 Stainless steel rims (nuts and bolts).

.14 Cathodic protection.

6.2 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 four valves are required to shut down any section of line.

The design standard shall be two valves at a tee and three valves at a cross, unless approved otherwise by the Engineer. A valve and one length of pipe shall be installed at interim limits of construction. See Section 17 for typical valve locations. Valves on the distribution mains shall be installed:

.1 At the projection of property lines at mid-block.

.2 At the projection of property lines at intersections.

.3 Hydrant valves shall be located 1 m from the centreline of the hydrant and shall not be placed in the sidewalk.

Distribution main valves shall be located such that during a shutdown:

.1 No more than 1 hydrant is taken out of service.

.2 No more than 3 valves are required to effect a shutdown.

.3 No more than one standard Town block is taken out of service by a shutdown.

.4 Isolated section shall not exceed 300 m.

6.3 Valve Boxes

Valve Boxes shall be a 2 section, bituminous coated, sliding type, cast iron adjustable type complete with a cast iron lid Type A. An internal operating rod is also required.

Valve boxes shall be of sufficient length to provide for adjustment of 300 mm in up or down direction.

Valve box extensions shall be cast iron suitable for use with the valve boxes to be installed.

Lids shall be solid with coped handholds.

6.4 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.

6.5 Operation of Boundary Valves During Construction

The Consulting Engineer shall clearly identify boundary valves on the engineering design drawings.

7. WATER MAIN FLUSHING AND DISINFECTION PROCEDURES

7.1 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".

Note: The Consultant must collect all water samples.

.2 The Town shall be notified at least 24 prior to testing so they may witness the residual chlorine test and the sampling for the bacteriological test.

.3 Minimum residual chlorine after 24 hours shall be 25 mg/L.

.4 The line shall be flushed and the chlorine residual of the water being disposed neutralized prior to discharge.

.5 The bacteria test results must be reviewed and approved by the Town Engineer prior to the waterline being placed into services.

7.2 Testing

All water mains shall be tested in accordance with AWWA C603, latest revision thereof.

Hydrostatic test pressure shall be 1035 kPa (150 psi) or 1.5 times the normal operating pressure based upon the elevation of the lowest point in the main and corrected to elevation of the test gauge, for a period of 2 hours. For PVC pipe, the overall leakage for the section of line tested shall not exceed the rate of leakage specified in Table 7.2.1

Table 7.2.1 Maximum Allowable leakage (L/100 Joints/Hour) for P.V.C. Pipe

	TEST PRESSURE

	345	515	690	860	1035	1380	1550	1724	Kpa
Pipe Dia.	50	75	100	125	150	200	225	250	psi
100mm (4")	1.46	1.77	2.00	2.28	2.46	2.90	3.07	3.28	
150mm (6")	2.17	2.65	3.07	3.43	3.76	4.34	4.60	4.82	
200mm (8")	2.90	3.54	4.09	4.57	5.02	5.79	6.14	6.46	
250mm (10")	3.62	4.42	5.12	5.71	6.27	7.34	7.67	8.10	
300mm (12")	4.34	5.30	6.14	6.86	7.52	8.69	9.20	9.70	
350mm (14")	5.07	6.19	7.16	8.00	8.77	10.13	10.74		
400mm (16")	5.79	7.07	8.19	9.14	10.03	11.58	12.27		
450mm (18")	6.51	7.96	9.21	10.28	11.28	13.03	13.80		

Allowable Leakage is based upon the following formula:

$$\text{PVC Pipe } L = \frac{ND(p^{0.5})}{128{,}320}$$

L - Allowable leakage in litres per hour

N - Number of joints

D - Nominal diameter (mm)

P - Test pressure (kPa) (1.0 PSI = 6.9 kPa)

1. GENERAL

The sanitary system must be designed with consideration for the service area boundaries established by the Town for each sanitary trunk system. The minimum size for sanitary sewer mains shall be 200 mm diameter for residential and 250 mm for industrial/commercial areas.

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 Mains", and the cost of these mains are included in the current Sanitary Off-site Levy Rate. The current Trunk Sanitary Mains are identified in the most recent Council approved Off-site Levy Report.

The design of the sanitary sewer system should conform to Sections 5.1 and 7.1 of the Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems in Alberta, as published by Alberta Environmental Protection Services and as amended by these guidelines.

2. DESIGN FLOWS

2.1 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)

Pf = Harmon's Peaking Factor = $1 + 14/(4 + P^{0.5})$

2.2 Non-residential

For detailed system design, the average wastewater flow from non-residential land use areas are to be estimated as outlined in Section 7 of the Standards and Guidelines for Municipal Water Supply, Wastewater, and Storm Drainage.

Large non-residential developments should be evaluated based on site specific service requirements. The lower limit for average dry weather flow is:
Q_{AVE} = 0.15 litres/sec/ha

Peak dry weather flows are to be determined as follows:

Peaking Factor, Pf = 10 ($Q_{AVE}^{-0.45}$), but not less than 2.5 or greater than 25.

Peak Dry Weather Flow, Q_{PDW} = Pf x Q_{AVE}

2.3 Extraneous Flow Allowances - All Land Uses

For The Town of Ponoka, 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 sag points.

3. SANITARY SEWER MAINS

3.1 General

Sanitary sewers shall be designed for gravity flow unless approved otherwise by the Engineer.

3.2 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	0.10 %
600 mm	0.08 %

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 0.61 m/s for self-cleaning purposes.

3.3 Pipe Material

All 200 mm sanitary sewer pipes and fittings shall be PVC to ASTM D3034- minimum Class DR 35. See Section 11 for additional information.

3.4 Pipe Strength

The strength of the pipe shall be sufficient to carry the loads due to trench backfill and due to wheel loads. The strength of pipe shall be calculated on the basis of the external loads, trench conditions, and class of bedding provided. Class B sand bedding is the minimum bedding requirement.

3.5 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 90 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 in Clause 3.2 of this Section.

.5 Inverts in manholes shall have at least 50mm fall across the manhole.

3.6 Alignment

Sanitary mains shall be located on the standard alignment shown on Drawing 4.07 for streets and Drawings 4.08 and 4.09 for lanes and public utility lots. A minimum separation of 3.0 m 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.

3.7 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, Clause 4; but not shallower than 2.7 m, unless otherwise approved by the Engineer. Where existing conditions dictate that the depth of buries be less than 2.7 m, the main/service is to be insulated as specified in Drawing 1.03 of the Construction Specifications.

All manholes greater than 6.0 m in depth shall have an approved safety platform, at intervals of not more than 6.5 m and shall be aluminum grates MSU Mississauga Ltd. or approved equal.

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 120 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 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. Inverts straight through manholes shall have at least 25mm fall across manhole.

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.

Manhole bases may be cast-in-place or pre-cast complete with flow channel, benching, and pipe stubs. See manhole details in The Town's Contract Specifications.

4.1 Materials

.1 Manhole section shall be precast reinforced concrete sections conforming to ASTM C478, latest revision thereof.

.2 All manholes shall be 1200 mm inside diameter for all pipe 900mm diameter and less. For pipe exceeding 900 mm diameter, manhole diameter shall be same as pipe diameter.

.3 Manhole frame and covers shall be cast iron conforming to Class 20 ASTM A48, latest revision thereof. Manhole frames and covers to be equal to Norwood F39. The cover shall have no more than 4 vent holes.

.4 Manhole steps shall be standard safety type, of hot dipped galvanized iron or epoxy coated extruded aluminium or approved equal, at 300 mm vertical spacing. Steps shall be orientated at 90° from the direction of the flow.

.5 Each manhole shall have a minimum of 1-100 mm extension ring to a maximum of 300 mm. No more than 2 rings shall be permitted.

.6 Manhole components shall be precast.

5. OVERSIZE

Sanitary sewers may have to be oversized to conform to the Town's Master Sanitary Sewer Plan. Oversize costs will be determined as outlined in the Development Agreement.

6. INSPECTION AND TESTING

6.1 General

Prior to initial and final acceptance of the project, all sanitary sewer mains shall be tested as follows:

.1 Leakage Test

The Town may require each section of sewer main and service connections to be tested for water tightness by an ex-filtration test and/or infiltration test.

Infiltration of ex-filtration shall not exceed following limits in litres per hour per 100 m of pipe, including service connections.

Nominal Pipe Diameter (mm)	Allowable Leakage in Plastic Pipe
100	3.88
125	4.62
150	5.51
200	7.45
250	9.39
300	11.33
350	13.27
400	14.91
450	16.84
500	18.78
550	20.72
600	22.80

Values shown in Column 2 are in litres per hour per 100 meters of pipe.

.2 Light Test

Each section of storm and sanitary sewer shall be subjected to a light test where a light is shone into the pipe at one manhole and the light itself is visible at the other end. If a light test is unsuccessful, then the section shall be subjected to a "pill test" where a ball or similar object, of a diameter 50 mm less than the diameter of pipe shall be successfully pulled through encountering no obstructions.

.3 Closed Circuit Television Inspection

All sections of sanitary sewer shall be inspected with closed circuit television camera equipment. A written report and video tape in DVD format shall be submitted to the Town for their approval and records.

All reports submitted shall include the town's approved sanitary manhole numbering system.

1. STORMWATER DESIGN STANDARDS

1.1. General

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 subdivision should be discussed with the Engineer prior to design proceeding.

In general, storm mains 1200 mm or greater, as well as stormwater storage facilities and associated outlet piping, will be designated "Trunk Storm Mains", and the cost of these mains are included in the Storm Off-site Levy Rate. The current Trunk Storm Mains are identified in the most recent Council approved Off-site Levy Report.

The design of the storm sewer system should conform to Section 8.0 of the Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems in Alberta, as published by Alberta Environmental Protection Services and as amended by these Guidelines. Detailed stormwater management standards and guidelines are described in the Alberta Environmental Protection publication entitled “Stormwater Management Guidelines for The Province of Alberta”.

This Section provides a brief summary of the design standards and guidelines for storm drainage systems in The Town of Ponoka.

1.2. Stormwater Management

These Guidelines have been established pursuant to Town Council's Stormwater Management Policy and are the basis for stormwater management in all developable land, including land upstream of existing pipe systems.

The main objectives of stormwater 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, stormwater management is to be implemented for all developable land unless approved otherwise by the Engineer.

1.3. 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, stormwater 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, stormwater 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.

1.4. Rainfall Intensity-Duration-Frequency

The following formulas define the Intensity-Duration-Frequency Curves (IDF Curves) developed for The Town of Ponoka.

Intensity Duration Frequency Rainfall Calculations		
Return period	**Average Intensity (mm/hr.)**	
	Average Intensity (mm/hr)	**Coefficient (E)**
2 year	228 (t + 1.1)	-0.677
5 year	346 (t - 0.5)	-0.695
10 year	424 (t - 1.1)	-0.702
25 year	523 (t - 1.3)	-0.650
50 year	597 (t - 1.5)	-0.650
100 year	670 (t - 1.6)	-0.713

t = time of concentration

1.5. 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 up to 65 ha (160 ac) in area. Alternatively, computer modelling may be used (see Clause 1.6 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 (C)

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	10 Year	100 Year
Residential	0.35	0.40	0.60
Apartments	0.70	0.70	0.80
Downtown Commercial	0.85	0.85	0.90
Commercial	0.65	0.65	0.80
Lawns, Parks, Playgrounds	0.20	0.65	0.30
Undeveloped Land (Farmland)	0.10	0.15	0.20
Paved Streets	0.90	0.90	0.95
Gravel Streets	0.25	0.35	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.

The weighted average of pervious and impervious area runoff coefficients shall be estimated from the following equation:

$$C = \frac{C_P A_P + C_I A_I}{A_P + A_I}$$

Where the subscripts P and I are pervious and impervious surfaces, respectively. In these standards $C_P = 0.15$ and $C_I = 0.90$.

.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 taken 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.

1.6. Computer Modelling

.1 Computer models shall be used to determine design flow conditions in sewer systems with drainage areas larger than 65 ha (160 ac). They may be used for smaller systems as an alternative to the Rational Method.

.2 Computer models shall be used to determine design flows and the sizing of systems that contain non-pipe stormwater management facilities (e.g. detention ponds) or systems that include a significant amount of undeveloped land.

.3 When large parcels (quarter section or larger) are being developed and will connect to the existing stormwater facilities, the Consulting Engineer shall prepare a stormwater model that simulates both major and minor systems. As a general rule, this model will have sub-basins no larger than 5 ha. The modelling shall be generated utilizing software that is input/output compatible with XP-SWMM.

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. Acceptable computer models are USEPA SWMM, OTTSWM, XP-SWMM, EXTRAN, HYDROCAD and OTTHYMO.

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.

The design storm hyetograph shall be developed using the Chicago Method, unless otherwise approved by the Engineer.

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.

Historical, continuous rainfall data in one-hour increments, over the past 25 or more years, may be routed through the storm run-off model to provide statistical frequency analysis of various flow and storage characteristics of the catchment in question.

1.7. Service Connections

Effluent from sanitary sewers or surface drainage from industrial, agricultural, or commercial operations that may be contaminated shall not be discharged to the storm sewer. Direct connections between roof leaders and the Town's storm sewer system are not permitted. Roof leaders may be connected to private storm sewers, provided a grit separator and onsite control manhole are provided.

Connections from roof leaders shall not be made to the storm sewer system. Roof drainage from residential housing units, apartments, commercial, and industrial buildings shall discharge to grassed or pervious areas except where building density makes this impractical (e.g. central business district).
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 Drawing 4.04.

.1 Site Drainage and Storm Sewer Service Restrictions

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 property and the site is larger than 0.2 ha (0.5 acres) in size, 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 Town.

Calculations for storm sewer and detention sizing must be provided for sites larger than 0.4 ha.

No storm service area's shall be designed to discharge to the rear of the lot.

.2 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

Where the new service is being connected to an existing main in an older area of the Town, the allowable capacity for the development will be based on the following formula:

$$\text{Allowable Capacity} = \frac{\text{Development Area x Capacity of Main}}{\text{Upstream Catchment Area}}$$

The calculated capacity of the service will likely be less than a 1:5 year storm discharge, but the allowable discharge shall not be greater than the 1:5 year 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 service, the allowable capacity for the development will be determined using the 1:5 year rainfall IDF curve and the appropriate run-off coefficient.

.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 storm must be detained on site if an emergency route cannot be provided.

Information regarding the Intensity-Duration-Frequency Curves (IDF Curves), Run-off Coefficients (C), and design methods to be used to determine the storm service size is included in The Town of Ponoka Design Guidelines.

1.8. Length of Run

Surface water should not be permitted to run a distance greater than 120 m in streets or 250 m in lanes and swales without interception by a catch basin.

1.9. Back of Lot Drainage

The following will apply to back of lot drainage in laneless subdivisions:

.1 For back-to-back lots, a 3.0 metre rear lot, drainage right of way will be required on all of the adjoining properties.

.2 For lots backing onto a park or reserve area, a grass swale is to be provided within the park or reserve area adjacent to the rear lot line. Grass swales are to be constructed with continuous grade lines with a minimum 0.8% slope to convey rear lot drainage to a catch basin located in a street or utility right of way.

The flow from rear lot swales should not be allowed to cross a sidewalk in order to prevent ice build-up and dirt accumulation on the sidewalk. A catch basin may be required at back of walk to intercept these flows.

2. STORM SEWER MAINS (MINOR SYSTEM)

2.1. General

Storm sewer mains shall be designed for gravity flow unless approved otherwise by the Engineer.

2.2. Flow Capacity

Sewer hydraulics shall be calculated using Manning's equation. Manning's n value shall be 0.009 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 0.009.

2.3. Pipe Material

All 200 mm storm sewer pipe shall be PVC SDR 35. See Section 11 for additional information.

2.4. 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. Class B sand bedding is the minimum bedding requirement.

2.5. 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, Clause 4, but not shallower than 1.2 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 Drawing 1.03 of the Construction Specifications.

Safety platforms at intermediate levels not exceeding 5.5m are required for manholes greater than 5.0 m in depth.

2.6. 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%.

2.7. Minimum Slopes

Sewer velocities shall not be less than 0.90 m/sec. 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 (Table 8.1) in Alberta Environmental Protection's publication titled “Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems in Alberta”.

2.8. 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 90 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.

.5 Inverts in manholes shall have at least 50 mm fall across the manhole.

2.9. Alignment

Storm sewers shall be located on the standard alignment shown on Drawing 4.07 for streets and Drawings 4.08 and 4.09 for lanes and public utility lots. A minimum separation of 3.0 m from water mains shall be provided. Consistent

alignments shall be used along the entire length of a street, lane, or public utility lot.

Manhole spacing on storm sewers greater than 750 mm in diameter may exceed 120 m if approved by Town Engineer.

2.10. 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 120 m along the length of the sewer.

Manhole spacing on storm sewers greater than 750 mm in diameter may exceed 120 m if approved by Town Engineer.

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 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 900 mm in diameter and larger, providing there is no deflection in alignment or grade. For safety reasons, all precast manholes shall be spigot-up.

2.11. Catch Basins and Catch Basin Manholes

.1 General

Catch basins at street intersections shall normally be located at beginning or end of the curb return. Catch basins are not to be located within the limits of a curb ramp. Invert crossings of streets (swales) are not permitted.

.2 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.

.3 Design Capacity

For design purposes, catch basin capacities in litres/second are approximately as follows:

Catch Basin	**Flow Condition**	
	Continuous Slope	**Sag Condition**
F-35A	10	23
F-38, F-39	20	38
F51 (base and curb inlet)	40	80

Capacities can be considered to be double those shown in the table when assessing the 100 year event.

.4 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. Catch basins and catch basin manholes shall be built with a 250 mm deep sump.

The type of inlet assembly, as illustrated in the Contract Specifications, 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. The capacity of this catch basin is 0.070 m^3/s.

.2 Type K-2 catch basin assembly is to be used in conjunction with rolled curb and gutter, and rolled monolithic sidewalk construction. The capacity of this catch basin is 0.046 m^3/s.

.3 Type K-3 catch basin assembly is to be used in conjunction with lane construction. The capacity of this catch basin is 0.055 m^3/s.

2.12. 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 400mm.

3. MAJOR DRAINAGE SYSTEM

3.1. 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 Arterials should have at least two lanes which are not inundated parallel with the direction of flow. Where the major system crosses an arterial, the depth of flow should be less than 0.05m.

.4 Collectors should have at least one lane which is not inundated parallel with the direction of flow. Where the major system crosses a collector; this depth of flow should be less than 0.10m.

.5 Local roads should have a depth of water no more than 0.05 m above the crown of the road. Where the major system crosses a local road, the depth of flow should be less than 0.15 m.

.6 The depth of water at curb side should be less than 0.50 m for all roadways.

.7 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)

0.80	0.5
0.32	1.0
0.21	2.0
0.09	3.0

4. STORMWATER MANAGEMENT (SWM) FACILITIES

4.1. Design Requirements Common to Stormwater Management Storage Facilities

.1 General

The use of stormwater storage facilities 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 the Subdivision Outline Plan 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 detention facility shall be undertaken to determine the soil's permeability and salinity (or other potential contaminants), and the height of the groundwater table. Where the facility is sited above a shallow aquifer the potential for groundwater contamination must be minimized. Where the pond bottom is below the water table, weeping tile systems may be required to keep the pond bottom dry enough to support grass growth and maintenance equipment traffic.

.3 Minimum Stormwater Quality Standards

The following is an excerpt from the Wastewater and Storm Drainage Regulations published by Alberta Environment:

Storm outfalls without due consideration for water quality will not be allowed. Stormwater management techniques to improve water quality shall be included to effect a minimum of 85% removal of sediments of particle size 75 microns or greater. Additional quality measures shall be required, based on site-specific conditions.

Based on the preceding statement, the Developer shall incorporate stormwater treatment measures (i.e. installation of stormwater treatment units) in the design of any stormwater storage facility.

.4 Erosion and Sediment Control

An erosion and sediment control plan, as detailed in Section 6 is required as part of the Stormwater Management Study to define measures which must be undertaken for the control of sediment into the stormwater storage facility and into the receiving stream.

.5 Storage Alternates

.1 General

The review of the stormwater management alternatives for application to a specific area should consider the storage methods listed.

.2 Dry Pond (Detention) Storage

Dry pond (detention) storage is the stormwater 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.

.3 Wet Pond (Retention) Storage

Wet pond (retention) storage functions the same as dry pond detention except that a portion of the storm water is permanently retained.

.6 Outflow Control

The outlet from a stormwater management storage system 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. These release rates have been determined based on preliminary studies and are as shown on the Drawing 3.01. 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.

.7 Emergency Spillway Provisions

The feasibility of an emergency overflow spillway is to be evaluated for each storage facility (wet or dry) design, and where feasible, such provisions are to be incorporated in 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 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 the 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.

.8 Land Dedication for Stormwater Management Facilities

The requirements for dedication of land on which a stormwater management facility is to be situated will be in accordance with Council Policy 4310.

.9 Landscaping Requirements

Detention pond landscaping requirements are detailed in Section 14.

.10 Detention Pond Development Costs

Detention pond financing and construction responsibility is detailed in Section 14.

.11 Signage for Safety

The design of stormwater 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.

Dry Detention Ponds

.1 General

Dry ponds should have gentle side slopes and be aesthetically contoured and landscaped to provide an attractive feature for the subdivision. Where possible, and as agreed by the Town, they should be associated with municipal reserve areas to take advantage of the joint use ability of the facilities (e.g. extension of sports fields into the detention pond). Active 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). The Recreation, Parks, and Culture Department should be contacted to provide input to the design of detention facilities from the concept stage through to detailed design and construction. A typical joint use detention pond/park site is illustrated in Section 17.

.2 Safety Provisions at Inlets and Outlets

All inlet and outlet structures associated with dry ponds 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. Further, the velocity of the flow passing through the grating should not exceed 1.0 m/sec. Appropriate fencing and guardrails are to be provided to restrict access and reduce the hazard presented by the structure head and wingwalls.

.3 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 retention storage depth of 1.5 m. The maximum water level should be below adjacent house basement footings (a greater freeboard may be required if an emergency overflow route cannot be provided).

.4 Maximum interior side slopes of 7:1.

.5 Minimum freeboard of 0.6 m above 1:100 year high water levels.

.6 Provision of an emergency overland flow route. If an emergency overland route cannot be provided, the minimum freeboard shall

be raised to the higher water level generated by the 1:100 year storm under a plugged outlet scenario.

.7 Maximum 4:1 ratio of effective length to effective width measured at 100-year high water level.

.8 Dimensions must be acceptable to Town Engineer.

.9 Minimum lateral slope in the bottom of the pond of 1.0% and minimum longitudinal slope of 1.0%.

.10 Low flow bypass for flows from minor events to be provided.

.11 French drains where longitudinal slopes are less than 2.0%.

.12 Address all safety issues (particularly during operation).

.13 Sediment (Grit) Separation Stormwater Treatment Units, as specified in Item 4.4.

4.2. Wet Detention Ponds (Residential Subdivision)

Design of a wet pond is to be in accordance with the Alberta Environmental Protection publication entitled "Stormwater Management Guidelines for The Province of Alberta". Some general design parameters to consider are:

.1 2.0 ha minimum water surface area.

.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.

.4 Maximum 1:100 year storage depth of 1.5 m.

.5 Sediment forebays required at each inlet.

.6 Hardedge treatment required along lake perimeter.

.7 Minimum freeboard depth of 0.6 m. House footings must be above freeboard elevation.

.8 Water recirculation and make-up system required.

.9 Provide access for maintenance and emergency equipment.

.10 Design of outlet control structure to be capable of maintaining permanent pool depth and capable of draining the permanent pool for maintenance purposes.

.11 When possible, preserve existing wetlands by incorporating them into the stormwater management plan.

4.3. Sediment (Grit) Separation Stormwater Treatment Units

.1 Purpose

Sediment separators are a variation of traditional settling tanks. They are designed to capture sediment suspended in stormwater runoff as the runoff is conveyed through a storm sewer system. The separator is a belowground structure that takes the place of a conventional manhole or catch basin in a storm sewer system. The separator uses a permanent pool of water in the removal of sediment from stormwater run-off before discharging into the receiving water body.

.2 Design Criteria

Alberta Environment Protection guidelines state “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.”

.3 Suppliers

The following oil/grit separator units are acceptable for use in The Town of Ponoka.

Stormwater Treatment System	Supplier
CDS™ Technologies	Inland Pipe Limited (Calgary) 1-403-279-5531
Stormceptor®	Lafarge Canada Inc. (Calgary) 1-800-LAFARGE (523-2743)
Vortechnics™	Proform Concrete Services Inc. (Red Deer) 363-6099

The Town is prepared to consider other systems that may be available for this application; however, detailed engineering information must be provided to support use of the proposed product.

5. MISCELLANEOUS DESIGN CONCERNS

5.1. 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 to avoid damage from moving ice during break-up. Drop structures and energy dissipaters shall be used where necessary to prevent erosion. Trash bars shall be installed which will prevent entry or access by children.

Inlet/outlet structures in detention ponds are to be aesthetically blended into the landscape design, include adequate erosion protection, require low maintenance, and have trash bars to preclude access by children. Outlet velocities should be kept below those noted in Clause 3.1 of this Section.

5.2. Temporary Drainage System

Temporary drainage systems to intercept agricultural drainage and snowmelt shall be provided adjacent to new development. The temporary system may involve berming and/or ditching to detain or redirect the run-off to the storm system.

5.3. Receiving Waters

Measures such as detention ponds 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.

5.4. 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

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 plastic
Water	19 mm copper
Sanitary	150 mm
Storm	100 mm

The sanitary service shall have a 150 mm plug installed at property/easement line. The storm service shall have a plug installed at property/easement line.

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 17.

The sizes and locations of services to non-residential buildings shall be subject to the approval of the Engineer.

Sanitary service pipe shall be PVC SDR 28 building service pipe conforming to CSA specifications B182.1, latest revision thereof.

Water service pipe shall be copper pipe Type K soft copper, with compression type standard brass couplings or HDPE series 160 Municipal tubing with compression fittings and inserts.

Sewer and water services shall be extended 4.0 m into property or easement line.

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 28 Pipe. This will also allow for the use of service saddles for future service connection installation.

4. DEPTH OF BURY

Water services inverts 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 set at an elevation at least 2.75 m below finished grade 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 17.

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 Drawing 1.03 of the Contract Specifications.

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 (see Section 14), unless otherwise approved by the Engineer.

The curb stop and standpipe shall be located 0.3 metres into the road, lane or public utility right of ways.

To aid in locating the service, blue painted stakes of size 50 mm x 100 mm shall be installed at the end of the service stub as shown on Contract Specification Drawing 50 04 01.

6. WATER CURB STOP AND SERVICE BOX

Corporation Cocks should be Compression type, Ford, Mueller or approved equal, AWWA thread. Curb stops should be Ford, Mueller, or approved equal, copper to copper, ball valve without a drain. Curb stops 38mm or larger shall be ball bearing type. Service Boxes should be epoxy coated extension type for a maximum of 3.5 m c/w stainless steel operating rod, brass clevis and key. Service box to be supported on a cast iron foot piece nailed to a pressure treated preserved wood plank. Service clamps should be brass double strap conforming to Smith-Blair 323 or approved stainless steel AWWA Boss (areas affected to be determined by Town Engineer).

7. RISERS

Where the sewer services are required to connect to mains in excess of 4.50 m deep, risers shall be installed to within 3.60 m of finished surface. Vertical risers shall not be used unless otherwise approved by the Engineer.

8. SERVICE CONNECTION RESTRICTIONS

Large sanitary and storm service connections may require the installation of a manhole at the main; refer to the manhole requirement chart in Section 17.

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.

Where a copper service is installed, there shall be a horizontal bend near the corporation stop. Water service is NOT to be goose necked. Service shall be snaked in the trench to allow for thermal contraction.

1. GENERAL

2.1 Detailed Design Drawings

The Developer is required to prepare a detailed Shallow Utility Plan for each phase of development. The Developer shall make arrangements for the provision of natural gas, power, telephone, and cable television service for each phase of development as follows:

.1 The Developer shall make arrangements with ATCO Gas Ltd. for the supply of natural gas by contacting the District Engineer in the Ponoka at the following address:

ATCO Gas
1-4213 Highway 2A
Ponoka, Alberta T4J 1J8

.2 The Developer shall make arrangements with Telus Communication Inc. for the supply of telephone service by contacting Telus at the following address:

TELUS Communications Inc.
National Access Network Design
Floor 12
411 - 1 Street S.E.
Calgary, Alberta T2G 4Y5

Alternate Contacts:
Rogers Telecom Inc
Rogers Business
333 Bloor Street East, 7th Floor
Toronto, Ontario M4W 1G9

MTS Allstream Inc.
MTS Customer Relations Manager
Rm. CC11B PO Box 6666
Winnipeg, Manitoba R3C 3V6

.3 The Developer shall make arrangements with Shaw Cable for the supply of cable television service by contacting Technical Manager at the Red Deer office at the following address:

Shaw Cable Systems Ltd.
4761 62 Street
Red Deer, Alberta
T4N 2R4

.4 Ponoka Power Department, Telus Communication Inc. and Shaw Cable services are generally installed in a common trench; however, each utility company should be contacted to review their alignments and prepare their design.

2.2 Review and Approval of Detailed Shallow Utilities Plan

As noted in Section One – Clause 2.3, the Developer is responsible for coordinating the location of the power, gas, telephone and cable TV, including obtaining alignment approvals.

The Developer shall forward the following information to ATCO Gas, Shaw Cable Systems and Telus Communications following EL&P Department approval of the power distribution and street lighting design.

.1 Copies 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 will also be provided.

Note: The Developer is also responsible for any costs related to the provision of power, gas, telephone and cable TV to service a subdivision, including the cost of installing ducts for road crossing.

2. ELECTRIC SYSTEM

2.3 Design and Construction Options

As detailed in the Development Agreement, the Developer may arrange for the installation of street and walkway lighting, and power distribution in accordance with the following:

.1 Have an Electrical Consulting Engineer prepare the design in accordance with Clause 2.5 of these Guidelines and have a qualified contractor complete all electrical installations in accordance with the following:

.1 The Town of Ponoka's Contract Specifications,

.2 Town of Ponoka's Construction Standards, and

.3 Town of Ponoka's Material Specifications.

The design of the power system must be approved by the Town of Ponoka prior to installation. The installation must also be inspected by the Ponoka Power Line Forman. Energization of the system will be done by Ponoka Power once they have accepted the system.

2.4 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 Ponoka Power to confirm the proposed alignments. Standard utility alignments are included in Section 17.

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 Ponoka Power's specifications.

The following requirements are to aid the Developer in the design of his distribution system, but shall not limit the Ponoka Power Line Forman from withholding approval of the Developer's plans where, in the opinion of the Ponoka Power Line Forman, circumstances warrant deviation from these Guidelines.

.1 Trench Locations

Where cables are installed along a street, walkway, or 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 basements. Transformers shall be no closer to a corner cut than 6.0 m. Two transformer sizes are used for the residential distribution:, 50 kVa and 75 kVa50 kVa transformers may be loaded to a maximum of 10 services and 75 kVa transformers to a maximum of 15 services..

.3 Switching Cubicles

Dead-front switching cubicles are mounted on precast basements located on centre line of 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). The Ponoka Power Line Forman 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 the Ponoka Power Line Forman requirements of the adjacent Developments. The Developer shall provide a detailed transformer connected-load-per-phase schedule to the Ponoka Power Line Forman for approval with the preliminary drawings, including proposed multiple family site and commercial site loadings.

The Ponoka Power Line Forman 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 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 Ponoka Power.

.6 Street Lighting

Residential roadway lighting shall be as follows:

.1 Local roadways - 100 watt mounted on 9.1 m (30’) poles,

.2 Collector roadways - 150 watt mounted on 9.1 m (30’) poles,

All lights shall be cobra style, flat glass with pressure sodium lamps. The pole will be mounted on a steel augured base.

Decorative lighting must be coordinated with the Town before materials are ordered or final plans are submitted.

Each luminaries 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 Ponoka Powers 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 the Ponoka Power Line Forman. The Developer shall not substitute any materials without prior written approval of the Ponoka Power Line Forman. Material specifications are available from Ponoka Power.

2.5 Electric System Drawings

.1 General Drawing Specifications

The electrical servicing plan shall conform to the current Ponoka Power standards.

.2 Electrical Layout

The electrical layout plan shall be at a scale of 1:1000 and shall show the following:

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

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

.3 Telephone and cable television alignments.

.4 URD pull boxes and service stub outs.

.5 Transformers.

.6 Streetlights.

.3 Preliminary Switching Plan

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 Ponoka Power's standards.

.4 Submission of Drawings

The Developer shall submit to the Ponoka Power Line Forman two copies of all detailed Engineering drawings that are complete, accurate, and in accordance with current construction standards. The plans shall be sealed by a Professional Engineer and indicate his proposal for the power distribution system. The Ponoka Power Line Forman 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.

Four prints of final approved detailed power, telephone, and cable television drawings, and two prints of all other utility drawings shall be provided to Ponoka Power seven days prior to commencement of

construction. No construction will be permitted to proceed prior to receipt of such final drawings.

.5 Telephone and Cable Television

As noted in Clause 1.3 of this Section, the Developer shall coordinate, obtain approval, and provide joint use facilities for all telephone and cable television requirements. Telus "approval" print to be submitted to the Ponoka Power Line Forman.

.6 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 the Ponoka Power Line Forman, one copy will be signed and returned, accompanied by a letter authorizing the changes. Four prints of the revision of the affected drawing shall be submitted to the Ponoka Power Line Forman. No changes are to be made to any original approved drawings without following this procedure.

.7 As-built Drawings and Other Records

The Developer shall, after satisfactory completion of the work, and prior to energization, submit to the Ponoka Power Line Forman four copies of as-built drawings, indicating all changes made to the original or revised approved Engineering drawings. The Developer shall, within 90 days after receipt of the Construction Completion Certificate, submit to the Ponoka Power Line Forman a set of as-built layout plans dimensioning all alignments and/or offsets. These drawings shall be signed and sealed by a Professional Engineer.

1. ROAD AND STREET CLASSIFICATION

Street systems incorporate several types of roadways, each with its own particular design standards. This Section will provide design information for the following road classifications:

Urban Expressways
Arterial Roadways
Frontage Roads and Auxiliary Lanes
Residential Collector Streets
Residential Local Streets
Industrial Roadways
Lanes

2. REFERENCE MATERIAL

The following reference materials (current editions) have been used in preparing these Design Guidelines and should be referred to for further detail:

Geometric Design Guide for Canadian Roads, TAC
(www.TAC-ATC.ca)

Metric Curve Tables, TAC

A Policy on Geometric Design of Highways and Streets, AASHTO

Turning Vehicle Templates, TAC

Manual of Uniform Traffic Control Devices for Canada, TAC

Roadside Design Guide, AASHTO
(www.transportation.org)

TAC/ITE Canadian Guide to Neighbourhood Traffic Calming, TAC/ITE

The TAC Manual and TAC Urban Supplement noted above must be adhered to unless otherwise specified in these Design Guidelines or by the Engineer.

3. DESIGN INFORMATION

The following standards will apply to roadways listed in Section 4 - Area Structure Guidelines. These standards are summarized in Appendix A and Appendix B appended to this Section.

3.1. Auxiliary Lanes on Divided Arterial Roadways

An auxiliary lane providing right turn in/out access to adjacent properties may be considered as an alternative to a Frontage Road, subject to the approval of the Engineer. The auxiliary lane must be designed in accordance with TAC Geometric Design Guide for Canadian Roads, and shall have a minimum lane width of 3.7m.

3.2. Minimum Grades

.1 *Roadways*

The minimum longitudinal surface grade for all road classifications is 0.5%. For curved roadways, cul-de-sacs, and expanded bulb corners, centre line grades should be increased to provide a minimum gutter grade of 0.6%. At intersections the curb return minimum gutter grade shall be 1.0%. It is desirable to use slightly steeper grade where possible.

.2 *Lanes and Public Utility Lots*

The minimum longitudinal surface grade for gravel lanes, paved lanes, and public utility lots in new subdivisions is 0.8%. Grades <0.80% are acceptable in older subdivisions where a grade ≥0.80% cannot be established due to adjacent development restrictions (e.g. existing concrete or paved driveways, garages, etc.). Grades <0.50% are not to be used unless approved by the Engineer.

3.3. Vertical Curves

Vertical curves shall be provided at points 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

.1 $SSD = 0.278tV + d$ (TAC Formula 2.1.5)

Where $d = V^2/254f$ (TAC Formula 1.2.4)

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

.2 $K_{(Crest)} = SSD^2 / 200 (h_1^{-0.5} + h_2^{-0.5})^2$ (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

$K_{(Sag)} = V^2 / 395$ (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 Street	L < 20 m
Collector Street	L < 30 m
Arterial Street	L < 40 m
Expressway Street	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 V.P.I. 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 17.

3.4. 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 rideability 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 crossfall = 2.00%
Tangent Runout Length = 10.5 x 0.02 x 200 = 42.0 m

3.5. 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.

3.6. Design Vehicles

Based on recommendations included in the 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 (WB19)

.6 WB-20 Tractor Semitrailers (WB20)**,

.7 A-Train Doubles (ATD),

.8 B-Train Doubles (BTD),

.9 Standard Single-Unit Buses (B-12)**,

.10 Articulated Buses (A-BUS),

.11 Intercity Buses (I-BUS)

** Designates design vehicles selected as being representative of vehicles operating in The Town of Ponoka. The Engineer may specify the use of smaller WB design vehicles in special circumstances.

Note: The minimum travel way designs for the HSU design vehicle will accommodate both the single-unit truck, fire truck, garbage truck and other vehicles with a similar wheelbase.

Additional information on design vehicles is included in Geometric Design Guide for Canadian Roads – Chapter 1.2 and A Policy on Geometric Design of Highways and Streets (AASHTO).

3.7. 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 appropriate breakaway device.

.5 Shield the object with a longitudinal traffic barrier designed for redirection or use a crash cushion.

.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 traveled 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 (FoC) or the shoulder (edge) line.

.2 Divided Collector and Local roadways - measured from the Face of Curb (FoC)

.3 Undivided Collector and Local roadways – measured from the edge of the parking lane (generally 2.25 m or 2.5 m from FoC.

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.

3.8. Pedestrian Accessibility/Safety

Pedestrian environments which are designed to be used by the general public, including those with disabilities, should be accessible to all persons, as well as being safe, functional and attractive. The design elements to be addressed are identified in the Geometric Design Guide for Canadian Roads manual – Chapter 3.3.

Included in Section 17 are drawings illustrating typical boulevard widening at intersections and crosswalk locations.

3.9. Roadway Narrowing for Traffic Calming

Roadway narrowing at intersections and/or midblock locations will be determined on a case-by-case basis. Any proposed roadway narrowing measures must be identified and approved as part of the Area Structure Plan approval process.

3.10. 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"

Traffic calming measures will be determined on a case-by-case basis. Any proposed traffic calming measures must be identified and approved as part of the Area Structure Plan approval process.

The design of traffic calming measures should the following factors:

.1 Weather, particularly winter conditions,

.2 Topography,

.3 Existing roadway design standards, especially widths,

.4 On-street parking conditions,

.5 Driveway locations near intersections,

.6 Transit, truck, service and emergency vehicle requirements,

.7 Designated cycling routes,

.8 Classification and characteristics of vehicles travelling in the community, and

.9 Legislation and legal precedents.

Typical traffic calming measures are illustrated in the Canadian Guide to Neighbourhood Traffic Calming manual.

4. CURB, GUTTER, AND SIDEWALKS

4.1. General

Curb and gutter will be required on all roadways with the exception of industrial roadways that may be constructed to a rural cross section. A 0.5 m wide concrete gutter shall be provided on expressways and arterial roadways. A 0.25 m gutter width shall be provided on all other road classifications. In addition to gutters, a shoulder may be required on expressways and arterial roadways.

The Consultant is required to provide written recommendations and/or confirmation of the cross-section for all expressways and arterial (divided and undivided) roadways within their project limits.

Reverse gutter may be used where the road cross slopes away from the curb such as on superelevation and for median curbs.

Standard curb without gutter may be used for medians and islands where the pavement cross-section directs drainage away from the median or island curb along its full length.

Standard curb and gutter shall be used on arterial roadway medians, urban industrial roadways, frontage roads, adjacent to school and park areas, and along divided sections of residential roadways unless otherwise required by the Engineer. Mountable and semi-mountable curb and gutter shall be used along arterial roadways as outlined in TAC Geometric Design Guide for Canadian Roads.

Requirements for sidewalk along the various road classifications are generally as follows. Specific requirements are subject to review by the Engineer and the Parks Department.

4.2. Arterial Roadways

A 3.0 m wide separate pedestrian access shall be constructed on one side of the roadway to form part of the Town Bicycle Path System.

4.3. Residential Collector Roadways

Residential Collector Roadways require a 2.5m separate sidewalk on the opposite side.

Curb and gutter to be standard or rolled with a 0.25m gutter. Standard curb and gutter is to be used on Collector Roadways that restrict front access.

Boulevard tree planting is required on Residential Collector Roadways.

4.4. Residential Local Roadways

A 1.5m monolithic or separate sidewalk with standard or rolled curb, and 0.25 m gutter is normally required along both sides of residential local roadways. The requirement for sidewalk may be waived by the Engineer where pedestrian traffic is expected to be low (e.g. no frontage areas, cul-de-sacs).

4.5. Industrial, Commercial, and Institutional Roadways

Sidewalks are generally not required for industrial areas, but should be provided in commercial or institutional areas. Specific requirements will depend on the anticipated pedestrian volumes and desirable walking routes.

4.6. Frontage Roads

A 1.5m monolithic or separate sidewalk is generally required along the private property side of the frontage road.

5. 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. An additional curb ramp shall also 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.

6. ROADWAY DRAINAGE

Requirements for stormwater management, major drainage design standards, minor storm sewer design criteria, catch basin locations, length of drainage run, etc. are included in Section 10.

It is suggested that weeping tile drains be installed at sag points in the roadway to drain the subgrade during construction.

7. ROADWAY CONSTRUCTION

7.1. Existing Soil Conditions

As discussed in numerous geotechnical reports, construction problems related to high groundwater tables and fine-grained silty soils are very common in the Town of Ponoka. The silty soils are highly frost susceptible and sensitive to disturbance. This condition may impact roadbed construction depending on seasonal groundwater and weather at the time of construction. In these cases, it is recommended that all design roadway grades be established as high above the groundwater table as possible.

7.2. 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	Design Loading (kg)	Asphaltic Concrete Depth (mm)	Granular Base Depth (mm)	Granular Subbase Depth (mm)	Total Depth (mm)
Industrial Arterial	10,886	100	150	350	600
Residential Arterial	10,886	100	150	350	600
Industrial Collector	10,886	100	150	350	600
Residential Collector	10,886	75	150	300	525
Industrial Local	8,165	100	150	300	550
Residential Local	8,165	75	150	250	465
Paved Lanes	8,165	65	250		315

The pavement structures shown in Table 13.3 provide for the minimum allowable thickness for asphalt, granular base, and granular subbase. These pavement structures are founded on a prepared subgrade having a California Bearing Ratio (CBR) of at least 4.0 in a soaked condition, that the granular base has a CBR of at least 80, and that granular subbase has a CBR of at least 20. These conditions are considered representative of the typical level of subgrade support for the site during spring thaw when the subgrade soils will exist in a weakened condition. Where soils of lower stability are used, an increase in the pavement structure will be required. Any reduction of the pavement standards must be substantiated by a geotechnical report and approved by the Engineer.

7.3. Subgrade Preparation and Improvement

Based on experience, the level of subgrade support available after site grading and intermixing of surficial soils is expected to be equivalent to a soaked CBR value in the order of 2 to 5. Subgrade support at this level will be slightly below the design levels. In areas where the water levels are close to the existing surface grades, there will be the potential for groundwater to be pumped up into the subgrade soils by surface vibrations from construction traffic.

Typical local practice for road base construction for sensitive subgrades is to thicken the granular sub-base layer of the pavement section (i.e. construct a working platform of free draining course gravel). Placement of this thickened granular subbase will support construction traffic and will improve the level of subgrade support for the design pavement section. The required thickness of the sub-base gravel will vary across the site depending on actual subgrade conditions. A geotechnical firm should be contacted to determine acceptable depths of granular subbase required to provide the required support.

Construction procedures should be designed to minimize disturbance to the sensitive subgrades and to protect the integrity of the granular working mats. If the subgrade has failed during construction, the weakened material may have to be subcut and replaced with an approved fill material on top of a filter fabric.

Required granular thickness, initial lift thickness and the need for any special construction procedures are best determined based on observations at the time of construction.

8. 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 shall be 40 mm.

For 100 mm thickness of asphaltic concrete, the final 25 mm lift shall be placed in the second year of the maintenance period.
Alternate pavement designs, such as soil cement base, may be approved by the Town Engineer. Approval of alternate pavement designs must be obtained in writing from the Town Engineer prior to submission of design drawings.

9. STAGED CONSTRUCTION OF LANES

9.1. Gravel Lanes

Gravel lanes shall be constructed to their final design cross section within one year of completion of underground utilities. After one year of initial lane construction, the lane shall be rehabilitated by removing contaminated material and soft spots, scarifying and recompacting the remaining base course gravel, and finally placing and compacting additional base course gravel to the design cross section.

Gravel surfacing is permitted on rear lanes (alleys). Aggregate base material shall be used to a minimum depth of 250 mm, 150 mm placed during initial constructi8on, and 100 mm placed during second year of maintenance period.

9.2. Paved Street and Lanes

Staged construction of paved lanes shall be undertaken where underground utilities have been constructed within one year. Initial construction shall be to a gravel lane standard section. After one year of the initial construction, the lane should be rehabilitated as outlined under Clause 9.1 above, shaped to the proper cross section, and then paved. All paved lanes shall be paved in two mats.

10. STANDARD ROAD CROSS SECTIONS

Standard roadway cross-section drawings are included in Section 17.

11. PAVEMENT MARKING AND TRAFFIC CONTROL SIGNS

11.1. Pavement Marking Materials

Pavement markings for the various roadway classifications are as follows:

Table 13.4
Acceptable Pavement Marking Materials

Item	Type of Material
Expressways and Arterial Roadways [1]	
1. Centre Lines	Type 1
2. Edge Lines	Type 1
3. Lane Lines	Type 1
4. Stop Bars	Type 1
5. Crosswalk Lines	Type 1
6. Guide Lines	Type 1
7. Arrows	Type 1
8. Concrete Bridge Decks	Paint
9. Asphalt Bridge Decks	Type 1
Collector Roadways	
1. Centre Lines	Type 1
2. Lane Lines	Type 1
3. Stop Bars	Type 1
4. Crosswalk Lines	Type 1
Local Roadways	
1. Centre Lines	Paint
2. Stop Bars	Paint
3. Crosswalk Lines	Paint

Notes:

1. Expressway and Arterial roadways include any portion of a Collector or Local roadway within 50 m of an intersecting expressway or arterial roadway.
2. Type 1 permanent pavement marking material - Thermoplastic “Hot In-Laid” material.

Pavement marking and traffic control signs shall conform to the Manual of Uniform Traffic Control Devices and The Town of Ponoka Traffic Design Guidelines.

11.2. Pavement Marking and Signage Drawing Approval Process

The Traffic Engineer shall approve pavement markings and traffic control signs. The approval process is as follows:

1. Consultant submits traffic signing and pavement marking drawings to the Traffic Engineer for review. Consultant to revise the drawings in accordance with the Traffic Engineer's comments and resubmit for final review.

2. Upon approval in principle, the Consultant submits reproducible original traffic drawings for stamping and signing by Traffic Engineer. The Traffic Engineer will issue a Manager's Order for sign installation.

.3 Consultant to arrange for the installation of traffic signs and pavement markings through the use of a private contractor or by Town Forces as noted in the Development Agreement.

12. POST AND CABLE FENCING

Post and cable fencing is required along all lanes adjacent to public utility lots, municipal reserves, environmental reserves, and public open space areas as specified by the Engineer and/or the Director. The Recreation, Parks and Culture Department may, at their discretion, exclude the requirement for post and cable around a park site.

13. 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 3.0 m driving surface. The driving surface may be concrete, asphalt, paving stone, or turf stone on a properly constructed base.

The emergency access shall be structurally and geometrically designed (e.g. width, turning radii, structure) to safely carry fire-fighting equipment loading to a connecting street or lane.

Avoid placing an emergency access in line with a road segment, so that it does not appear to be an extension of the road.

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 bollards must be installed at each street or lane intersection to limit access to traffic other than emergency vehicles. Reflectorized strips must be installed on the bollards so that they are visible to cyclists and pedestrians at night.

14. LANDSCAPING

14.1. Expressway and Arterial Roadways

Level One Landscaping of medians and boulevards within expressway and arterial roadway rights of way will normally be completed at the time of roadway construction. The adjacent Developer shall supplement the Level One Landscaping by providing Level Two Landscaping as required by the Recreation, Parks and Culture Department.

The boulevard from back-of-walk/streetlight alignment to the curb shall be graded to drain to the curb at 2.0%. A berm shall be constructed from the back-of-walk/streetlight alignment to the edge of the right of way. Berms shall have maximum side slopes of 3.5:1 and be constructed to the specified height. A typical berm cross section is illustrated in Section 17.
No drainage should be allowed to run from the right of way onto private property. If private property abuts the right of way, a swale should be provided within the boulevard to intercept drainage from the right of way and convey it to the storm sewer system.

14.2. Collector and Local Roadways

The Developer will be responsible for Level One Landscaping of boulevards and medians on collector and local roadways that are not directly adjacent to the frontage or flankage of a residential or industrial lot.

The Developer will also be required to provide collector roadway boulevard tree planting.

Level Two Landscaping may be provided in the medians of divided collector and local roadways. All tree and shrub planting shall be in accordance with Section 14.

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%.

14.3. Medians

In general, the surface treatment for medians shall be as follows:

.1 Expressways and Arterial Roadways

.1 The median shall be capped with concrete where the median width is 3.0 m or less. For stamped concrete, the colour shall be red and the pattern shall be Belgian Cobblestone.

.2 The median shall be finished to Level One Landscaping standards where the median width is greater than 3.0 m.

.3 No trees shall be planted in an expressway or arterial roadway median area where the median width is less than 6.0 m.

.4 The median cross section shall conform to the cross section shown in the Construction Specifications.

.2 Divided Collector and Local Roadways

.1 The median shall be capped with concrete, stamped concrete, or paving stone if the median width is 3.0 m or less. For stamped concrete, the colour shall be red and the pattern shall be Belgian Cobblestone.

.2 The median shall be capped with concrete, stamped concrete, paving stone, or finished to Level One Landscaping standards where the median width is greater than 3.0 m.

.3 No trees shall be planted in collector and/or local roadway median areas where the median width is less than 5.0 m.

.4 The median cross section shall conform to the cross section shown in the Construction Specifications.

15. DRIVEWAYS

Direct access from private property to arterial roadways is not permitted without provision of an auxiliary deceleration/acceleration lane and the approval of the Engineer.

Driveways entering onto collectors shall be set back from intersections in accordance with TAC Standards. Front driveways will not be permitted on divided sections of collector and local roadways. Rear access is to be provided for these lots.

The minimum setback from the nearest face of curb in the intersection to the nearest edge of driveway shall be 30 m. See Section 17 for standard details.

A culvert (minimum diameter of 400mm) and an earth embankment must be installed where a proposed driveway crosses an existing ditch.

ROADWAY GEOMETRIC DESIGN ELEMENTS

Roadway Designation	Design Elements							
	Design Speed[a] (km/hr)	Daily Service Volume (vpd)	Right Of Way Width[bd] (m)	Pavement Width (m)	Travel Lanes[c] (m)	Parking Lanes	Maximum Gradients (%)	Maximum Super elevation (m/m)
Undivided Arterial	60-70	5,000-12,000	30	14.5	4.0	No outside lanes	5	.06
Residential Collector	60	Up to 5,000	24	12	3.7	N/A	6	.04
Local Residential	60	Up to 5,000	20	10.5	N/A	N/A	6	.04
Lanes	60	N/A	6	5.5	N/A	N/A	6	.025
Lanes with Deep Utilities	60	N/A	10	8.0	N/A	N/A	6	.025
Commercial & Industrial	60	N/A	20	12.2	N/A	Optional	6	.025
Special Cases			As Required	As Required				

ROADWAY GEOMETRIC DESIGN ELEMENTS							
Roadway Designation	Design Elements						
	Minimum Radius of Curvature (m)	Minimum Intersection Spacing (m)	Minimum Corner Cuts at Intersections	Sidewalks	Lighting Poles and Other Obstructions	Parking	Access
Undivided Arterial	170	150	30 m Radius	Separate, 1 or 2 sides	2.5m min. from face of curb	Restricted	Restricted
Minor and Major Residential Collectors	150	60	10 m	Separate or Mono, 1 or 2 sides	2.0m min. from face of curb	Permitted	Permitted
Local Residential	90	60	6 m	Separate or Mono, 1 or 2 sides	2.2m min. from face of curb	Permitted	Permitted
Local Industrial	90	60	6 m	Optional	1.65m min. from face of curb	Optional	Permitted
Industrial Collector	150	60	10 m	Optional	2.25 m min. from face of curb	Optional	Some Restrictions

Notes:

a. Posted Speed to be 10km/h less than design speed.
b. Land for noise attenuation will be in addition to the road right-of-way requirement.
c. Additional travel lane width may be required to accommodate cyclists, e.g. on arterials the outside lands are 4.2 m wide.
d. Additional right-of-way required where rural roadway cross section is used for initial stage.
e. Prohibited for residential land uses.
f. Rear lane (alley) access preferred.
g. Narrower ROW may be allowed for short cul-de-sacs or restricted access areas.

ROADWAY DESIGN ELEMENTS

Roadway Designation	Design Elements									
	TAC Design Classification	Horizontal Alignment		Minimum "K" for Vertical Curves	Vertical Alignment			Intersections		
		Rate of Super elevation (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 5.20		
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

1. GENERAL

The Developer and The Town shall jointly be responsible for the design and development of the Park Site(s), School Site, and Detention Ponds. The Developer shall be solely responsible for the design and development of all remaining public open space (e.g. parkettes, linear parks, natural parks, boulevards, medians, utility lots, buffer areas, roadway berms), including all amenities falling within these open spaces (e.g. plantings, walkways, furniture, playgrounds, buildings, structures) as noted by the Town and as may be specified in the Development Agreement.

The areas to be landscaped are identified in the following documents:

.1 Area Structure Plan,

.2 Area Structure Plan Servicing Study,

.3 Development Agreement.

Detailed landscape drawings shall be prepared for each phase of Development in accordance with the conceptual landscape plans prepared as part of the Area Structure Plan Servicing Study. The plans shall incorporate design information for the following landscape features:

.1 Level One Landscaping,

.2 Level Two Landscaping,

.3 Level Three Landscaping,

.4 Level Four Landscaping,

.5 Collector Roadway Tree Planting,

.6 Development of the all municipal reserves (open space), and/or

.7 Detention Ponds

2. LEVEL ONE LANDSCAPING

.1 The Developer is required to provide Level One Landscaping for all public open space areas (e.g. parkettes, linear parks, natural parks, boulevards, medians, utility lots, buffer areas, roadway berms, walkways), etc., as specified by the Town. The Developer is **not** responsible for providing Level One Landscaping for designated School and Park site(s).

.2 The Developer shall provide Level One Landscaping for all boulevards located between the curb and separate sidewalk. The property owner shall landscape the boulevard area located between the back of walk and the property line.

.3 Level One Landscaping requirements and cost recoveries for detention pond facilities are included in Clause 8.

3. LEVEL TWO LANDSCAPING

3.1 General

.1 The Developer is required to provide Level Two Landscaping for all public open space areas, ornamental parks, playgrounds, natural parks, boulevards, utility lots, walkways, buffer areas, roadway berms, medians, and/or utility lots, as specified by the Town.

.2 The Developer is **not** responsible for providing Level Two Landscaping for designated Park site(s).

.3 Level Two Landscaping requirements and cost recoveries for detention pond facilities are included in Clause 8.

3.2 Planting Guidelines

.1 Deep rooting trees, such as poplars and willows, shall not be planted within 8 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, or other surface utility equipment.

.4 Trees and shrubs shall be set back at least 2.0 m from the edge of any collector road (boulevard or median), local road (boulevard or median), or lane.

.5 Trees and shrubs shall be set back at least 3.0 m from the edge of any arterial roadway (boulevard or median).

.6 Hedge plants shall be spaced 1.0 m apart.

.7 The offset shall be measured horizontally from the center of the tree to the face of curb for roads, or to the edge of gravel/pavement for lanes.

.8 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:

.1 Trees: 2.0 m wide x 2.0 m long x 1.5 m deep

.2 Shrubs: 1.0 m wide x 1.0 m long x 250 mm deep

The excavated areas shall be backfilled with topsoil and prepared for tree and shrub planting as detailed in the current Contract Specifications.

3.3 Berms

.1 Berms shall have a side slope not steeper than 3.5:1, have a horizontal crest not less than 1.0 m wide, and be graded to the approved grades and cross sections. The bottom of all berms shall transition into adjacent elevations. A retaining wall will be required if the berm side slope is steeper than 3.5:1. The height of the wall will be determined using a 3.5:1 slope on either the fore slope or the back slope while maintaining a constant alignment for the centre of the berm. Included in Section 17 is a drawing showing 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 bed or a combination 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 drawing in Section 17.

3.4 Recommended Tree Species

.1 The Town of Ponoka is located in Hardiness Zone 3 with an overlap of Zones 1 and 2. Appendix A, appended at the end of this Section, identifies trees and shrubs recommended for planting in these zones.

.1 Appendix A identifies tree species that are suitable for planting in this area.

.2 Appendix B identifies shrubs suitable for planting in this area.

.3 Appendix C identifies trees listed in Table A that are suitable for arterial roadway, collector roadway boulevards and median tree planting.

.2 The Developer shall identify all proposed tree and shrub species on the landscape drawing.

.3 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 by the Town.

.4 The Developer shall provide trees and shrubs to the minimum standards included in Section 02906 of the Contract Specifications. The minimum size of deciduous trees suitable for arterial roadway, collector roadway, and median tree planting shall be 60 mm (2½ in.) calliper.

4. LEVEL THREE LANDSCAPING

4.1 General

The Developer is required to supply and install Level Three facilities and amenities in various locations throughout the Development, as identified in the Area Structure Plan Servicing Study. Some of the standard Level Three Landscaping facilities and/or amenities to be provided are as follows:

.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, and/or

.6 Trail signage.

4.2 Post and Cable

.1 Post and cable fences are to be provided at the following locations:

.1 Separating a public roadway from a lane or Public Utility Lot.

.2 Separating a lane from a park or other open space. Unless excluded as a requirement by the Town.

.3 At other location that may be specified by the Town

4.3 Bollards

.1 Bollards are to be placed on Public Utility Lots to allow for pedestrian and/or emergency vehicle access. The front yard bollards should be located at the building setback while the rear yard bollards should be located on the easement line unless approved otherwise.

4.4 Site Furnishings

.1 The Developer shall supply and install site furnishing at locations specified by the Town. All furnishings shall conform to Town's Standard Detail Specifications.

4.5 Trails

.1 The minimum width for walkways shall be 1.5 m wide and constructed of 12 mm crushed gravel or other approved surface. Construction details shall conform to the Town's Standard Detail Specifications.

.2 Where the ecological profile has identified a unique or sensitive natural area which is to be incorporated in the Development, wood mulch may be used as the walkway surface material when approved by the Town.

5. LEVEL FOUR LANDSCAPING

Level Four Landscaping (supplying and installing optional/enhanced amenities (e.g. Ornamental structures, gazeboes, sculptures, feature walls, water features, fountains, spray pools, etc.)) 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 plan approval stage and agreements are established prior to Development Agreement approval. The Developer will be responsible for any and all capital cost of any permitted optional amenities

6. COLLECTOR ROADWAY TREE PLANTING

6.1 Collector Roadway Tree Planting Policy

The requirements for Collector Roadway tree planting shall be in accordance with the Town's Policy 1.11., which states as follows:

The Developer is required to provide one tree per single family residential lot (i.e. R1 Zoning). All other land fronting onto collector roadway (i.e., park sites, commercial, public service, and all other residential zoning) shall require tree

spacing of between 11 m and 15 m, ensuring spacing remains consistent with adjacent single family residential planting. Exceptions of one tree per lot may be considered in unique circumstances for duplex lots or lots with narrow frontage.

6.2 Collector Roadway Tree Planting Standards

The following standards will apply:

.1 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.

.2 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 17.

.3 Maintenance of trees planted within the road right of way (boulevard) will be the responsibility of The Town.

.4 All boulevard trees planted in a single development shall be of the same variety or a combination of varieties as determined by the Town, but may vary from neighbourhood to neighbourhood.

7. MUNICIPAL RESERVE/PARK SITE(S)

7.1 General

As noted in Section 4, the Developer is to provide municipal reserve land that may be used for various purposes. The land area required for the parks and or school site(s) will be determined as outlined in Section 4.

The cost of developing these lands is the responsibility of the Developer and The Town, as follows:

.1 Multi-developments (High School) Park Sites

The Town of Ponoka

.2 School and Park site(s)

Developer/Town of Ponoka as noted in Clause 7.2

.3 Park Sites

Developer/Town of Ponoka as noted in Clause 7.2

.4 Parkette Sites

Developer

.5 Linear Parks

Developer

.6 Miscellaneous Reserve Parcels

Developer

7.2 Park Financing and Construction

Construction of the School and Park site(s) and Park Sites will be the responsibility of the Developer and The Town as follows:

.1 The Developer will be responsible for completing the following work at his cost within the first year of the approved Development Agreement unless otherwise approved, in writing, by the Town:

.1 Topsoil stripping.

.2 Site grading.

.3 Topsoil replacement to rough finished grades, to be approved by the Parks section, complete with As-Built site grade drawings.

.2 The Town will be responsible for completing the following work:

.1 Grading topsoil to final grades.

.2 Level One, Two, and Three Landscaping.

.3 Constructing playground facilities, playing fields, multi-purpose pad, parking lot, etc.

.4 Construction of the Activity Shelter.

.3 Site Financing and Construction responsibility for a detention pond located in the Park site(s) will be the responsibility of the Developer and/or The Town as noted in Clause 8.

7.3 Site Facilities and Amenities Funded by Recreation Amenity Fund

Recreation Amenity funds are collected for the design and construction of a variety of park facilities and amenities in the Park/School Sites and the Park Sites. The following list identifies facilities that may be constructed on the School and Park site(s) and Park Site(s).

.1 Site concept plan, and working drawings

Includes development of site concept plans, surveying, as-builts, and any consultant services. Design requirements are listed in Clause 7.4.

.2 Site Preparation

Includes final grading and seeding, including survey of finished grade by Developer.

Note: Developer is responsible for clearing, stripping and grading the site.

.1 Park Furniture

Installation of bollards, posts and cable fence, chain link fence, tables, waste receptacles, park benches, etc.

.2 Playground Equipment

One set of elementary (5 to 12 year age group) playground equipment, one set of pre-school (18 months to 5 years old age) playground equipment and a tot lot are required on the site. The playground equipment must comply with current CSA standards and be obtained from a bona fide Canadian playground equipment manufacturer 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

Site design to include the following:

.1 Class A ball diamond complete with shale infield.

.2 Class A soccer pitch/football field.

.4 Multi-purpose Asphalt Pad/Outdoor Rink

.1 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).

.2 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

.1 Paved parking lot complete with post and cable fence around perimeter.

.2 The parking lot shall be located in close proximity to the Community Shelter.

.3 The parking lot shall be designed to accommodate 20 vehicles.

.6 Activity Centre

A Level One Activity Centre, totalling approximately 100 m^2 to 112 m^2 (1100 ft^2 to 1200 ft^2) is planned for every two ¼ sections, with preference given to School and Park site(s). For School and Park sites, 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

.1 Sliding hill and run out must be smooth and free of any fixed, collidable hazards. A single sled run-out landing must be a minimum of six metres wide.

.2 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.

.3 The maximum allowable slope angle is 16 degrees or 3.5:1, with a maximum slope length of 15 metres.

.4 If slope angle is reduced, slope length can be increased. The run out length shall be a minimum of two times the slope length.

.5 The directional slope should not be directed towards any natural or constructed amenities (e.g. sports field standards, detention pond inlet/outlet structures).

.6 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).

7.4 School/Park and Park Design

The Developer shall be responsible for the preparation of detailed design drawings for the development of the School and Park site(s) and Park Sites. The design shall conform to standards established by the Town. The design shall include:

.1 Establishing site grades, including grades for a detention pond (if required).

.2 Establishing the area required for an elementary or middle school.

.3 Development of public open space areas.

.4 Construction of play areas and sports fields.

.5 Tree planting.

.6 Preservation of natural features.

Drawings of similar existing facilities may be available from the Town.

7.5 General Municipal Reserve/Park Development Standards

Table A, included in Appendix B at the end of this Section, provides a summary of the various park facility and amenity requirements to be provided in School and Park site(s), Park Sites, and Linear Parks, and their minimum and maximum level of development, as it pertains to a single subdivision or quarter section.

The minimum and maximum quantities of various site amenities for the following municipal reserve designations are included in the noted Tables, included in Appendix B at the end of this Section.

.1 Multi-development (High School) Park Sites – Table B

.2 School and Park site(s) – Table C

.3 Park Sites – Table D

.4 Linear Parks – Table F

As noted in Clause 7.1, the Town is responsible for providing the amenities in the Multi-neighbourhood (High School) Park Sites, School and Park site(s) and Park Sites. The Developer is responsible to provide these amenities for the Parkettes and Linear Parks to the satisfaction of the Town.

If the Developer wishes to develop parks exceeding the maximum standards, they must apply to the Town for approval and enter into a maintenance agreement prior to commencing construction. Also see Clause 5 - Level Four Landscaping.

8. DETENTION PONDS

The Developer may be required to construct detention pond facilities in one or more locations in the Development. A detention pond may be located within the Park Sites; however, every effort should be made to exclude detention ponds from Park Sites containing school sites.

8.1 Detention Pond Financing Responsibility

.1 Financing responsibility options for construction of a detention pond are as follows:

Option 1:

If the proposed detention pond has been designated a trunk storm off-site levy facility, the Off-site Fund, subject to Council approval, will be used to finance the construction of the detention pond. Responsibility for construction of the detention pond and recovery of the Developer's costs will be included in the Development Agreement.

Option 2:

If the proposed detention pond has not been designated a trunk storm facility, the Developer will be required to finance the construction of the detention pond. Recovery of the Developer's costs will not be applicable.

Responsibility for detention pond costs should be identified in the Area Structure Plan Servicing Study.

8.2 Detention Pond Construction Responsibility

Construction of a detention pond will be the responsibility of the Developer and The Town as follows:

.1 The Developer will be responsible for completing the following work:

.1 Topsoil stripping.

.2 Site grading.

.3 Topsoil replacement to rough finished grades.

.4 Grading topsoil to final grades.

.5 Level One landscaping (except in the case of playing fields being constructed in the bottom of detention ponds, in which case The Town will be responsible for the cost of constructing the playing fields).

.2 In the case of playing fields being constructed in the bottom of detention ponds, The Town will be responsible for he construction of the playing fields, including Level One Landscaping.

9. LANDSCAPE DRAWING REQUIREMENTS

9.1 General

General Landscape Drawing requirements are listed in Section 2.

9.2 Detailed General Landscape Drawing

Detailed drawings at a scale of 1:500 shall be submitted showing the following:

.1 Specific site location for all proposed plantings.

.2 Size (height and calliper), botanical name, and specie names of all plant material and intended number of plants form 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. (Included in Section 17 is a drawing showing a typical landscape and utility plan).

.5 Existing and proposed grades.

9.3 Detailed Municipal Reserve Construction Drawings

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

.1 Detailed grading plan showing drainage patterns, the tie-in to grading on adjacent land uses, and existing site elevations.

.2 Detailed detention pond grading plan, if applicable.

.3 Existing vegetation to be retained.

.4 Existing and proposed utilities and easements, including storm sewer and catch basins for site drainage.

.5 Detailed design of baseball diamonds and sports fields.

.6 Detailed design of park furniture and playground structures indicating manufacturer and model number, log, boundaries, and sand areas.

.7 Detailed design and specifications for the parking lot and hard-surface play area/tennis courts.

.8 Detailed design and specifications for all trails.

.9 Detailed design and specifications for the Community Shelter.

.10 Tree and shrub planting details.

9.4 Detailed Detention Pond Construction Drawings

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

.1 Detailed grading plan showing sideslope grades, drainage swale grades, the tie-in to grading on adjacent land uses, and existing site elevations.

.2 Detailed design of any baseball diamond or soccer pitch/football field, if applicable.

.3 Existing and proposed utilities and easements, including storm sewer mains, weeping tile drains and catch basins for site drainage.

.4 Detailed design and specifications for any trails.

.5 Tree and shrub planting details.

9.5 Drawing Review

The Developer shall submit landscape drawings, as detailed in Section 2 of this document, for review and approval.

9.6 Design Revisions

The Town must approve all revisions to the approved design drawings.

9.7 As-Constructed Drawings

As-constructed drawings will be submitted to the Town for review and approval prior to Construction Completion Certificate inspection.

TREE SPECIES

5. COMMON NAME	6. 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'
Cutleaf Weeping Birch	Betula pendula 'Gracilis'	15 m/8 m	49'/26'
Fallgold Black Ash	Fraxinus nigra 'Fallgold'	10 m/5 m	33'/16'
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'
Little-leaf Linden	Tilia cordata	12 m/6 m	40'/20'
Manchurian Ash	Fraxinus mandshurica	8 m/5 m	26'/16'
Mayday	Prunus padus commutata	10 m/10 m	33'/33'
Mountain Ash	Sorbus americana	10 m/6 m	33'/20'
Northwest Poplar	Populus x 'Northwest'	20 m/15 m	65'/49'
Ohio Buckeye	Aesculus glabra	12 m/10 m	40'/33'
Paper Birch	Betula papyrifera	12 m/6 m	40'/20'
Patmore Green Ash	Fraxinus pennsylvanica 'Patmore'	12 m/8 m	40'/26'
Schubert Chokecherry	Prunus virginiana 'Schubert'	5 m/5 m	16'/16'
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'

SHRUB SPECIES

COMMON NAME	BOTANICAL NAME	SIZE AT MATURITY HEIGHT/SPREAD (METRIC)	SIZE AT MATURITY HEIGHT/SPREAD (IMPERIAL)
Adelaide-Hoodless Rose	Rosa species	1 m/1.5 m	3’/5’
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 Caragana	Caragana arborescens	3 m/3 m	10’/10’
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’
Peking Cotoneaster	Cotoneaster acutifolius	2 m/2 m	6 ½’/6 ½'
Persian Yellow Rose	Rosa species	1.5 m/1.5 m	5’/5’
Potentilla (Shrubby Cinquefoil)	Potentilla fruticosa	1 m/1 m	3’/3’
Purple-Leaved Sandcherry	Prunus x cistena	1.5 m/1.5 m	5’/5’
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’
Sea Buckthorn	Hippophae rhamnoides	5m/3m	16’/10’
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	Linden	Schubert Chokecherry
Amur Cherry	Manchurian Ash	Spruce
Brandon Elm	Mayday	Swedish Columnar Aspen
Bur Oak	Mountain Ash	Tower Poplar
Fallgold Black Ash	Ornamental Crabs	Ussurian Pear
Hawthorn	Patmore Green Ash	
Larch	Pine	

SUBDIVISION PARK DEVELOPMENT STANDARDS

ITEM	QUANTITY		DETAILS
	Minimum	Maximum	
Site Preparation	Developer	Developer	Town approved
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	Town approved
Elementary Play Structure	1 per neighbourhood	1 per neighbourhood	Town approved
Tot Lot	1 per neighbourhood	2 per neighbourhood	Town approved
Class A Soccer Field	1 per neighbourhood	1 per neighbourhood	Town approved
Class B Ball Diamond	1 per neighbourhood	1 per neighbourhood	Town approved
Multi Use Pad	1 per 2 neighbourhoods	1 per neighbourhood	Town approved
Activity Center	1 per 2 neighbourhoods	1 per neighbourhood	Subject to School/Town approval
Boarded Rink/Power/Lights	1 per neighbourhood	1 per neighbourhood	Town approved
Snow Bank Rink	1 per neighbourhood	1 per neighbourhood	Town approved
Sliding Hill	1 per neighbourhood	1 per neighbourhood	Town approved
Power to Site	1 per neighbourhood park site	1 per neighbourhood park site	Town approved
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
Picnic Tables	5 per neighbourhood	8 per neighbourhood	Town approved
Pedestal Park Benches	10 per neighbourhood	14 per neighbourhood	Town approved
Pedestal Garbage Receptacles	15 per neighbourhood	22 per neighbourhood	Town approved
Park Signage	1 per neighbourhood park site	1 per neighbourhood park site	Town approved

MULTI-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	Town discretion	Town discretion	Town approved
Elementary Play Structure	1 per site	1 per site	Town approved
Class A Soccer Field	1 per site	1 per site	Town approved
Class B Ball Diamonds	2 per site	2 per site	Town approved
Multi Use Pad	1 per site	1 per site	Town approved
Activity Center	As required	1 per site	Subject to School/Town approval
Boarded Rink/Power/Lights	1 per site	1 per site	Town approved
Snow Bank Rink	1 per site	1 per site	Town approved
On-Site Asphalt Parking Pad	1 per site	1 per site	18 parking stalls/sports field
Trails	1.5m aggregate	2.5m asphalt	Town approved
Picnic Tables	4 per site	6 per site	Town approved
Pedestal Park Benches	6 per site	10 per site	Town approved
Pedestal Garbage Receptacles	10 per site	16 per site	Town approved
Park Signage	2 per site	2 per site	Town approved

SCHOOL 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	As required/school type	1 per site	Town approved
Elementary Play Structure	1 per site	1 per site	Town approved
Class A Sports Field	1 per site	1 per site	Town approved
Multi-Use Pad	1 per site	1 per site	Town approved
Activity Center	As required	1 per site	Subject to school/Town approval
Boarded Rink/Power/Lights	1 per site	1 per site	Town approved
Snow Bank Rink	1 per site	1 per site	Town approved
On-Site Asphalt Parking Pad	1 per site	1 per site	Lot shared with school
Trails	1.5m aggregate	2.5m asphalt	Town approved
Picnic Tables	2 per site	3 per site	Town approved
Pedestal Park Benches	3 per site	5 per site	Town approved
Pedestal Garbage Receptacles	5 per site	8 per site	Town approved
Park Signage	1 per site	1 per site	Town approved

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	Town approved
Class A Soccer Field	1 per site	1 per site	Town approved
Boarded Rink/Power/Lights	1 per site	1 per site	Town approved
Snow Bank Rink	1 per site	1 per site	Town approved
On-Site Asphalt Parking Pad	1 per site	1 per site	18 parking stalls/sports field
Trails	1.5m aggregate	1.5m aggregate	Town approved
Picnic Tables	1 per site	2 per site	Town approved
Pedestal Park Benches	2 per site	4 per site	Town approved
Pedestal Garbage Receptacles	3 per site	6 per site	Town approved
Park Signage	1 per site	1 per site	Town approved
Trails	1.5m aggregate	2.5m Asphalt	Town approved
Pedestal Park Benches	1/acre	1/acre	Town approved
Pedestal Garbage Receptacles	1/acre	1/acre	Town approved
Bollards	1 set/trail opening	1 set/trail opening	Town approved
Park Signage	1 per site	1 per site	Town approved

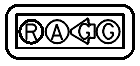
LINEAR PARK STANDARDS

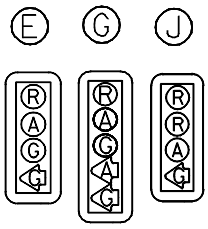
ITEM	QUANTITY		DETAILS
	Minimum	Maximum	
Site Preparation	Entire site	Entire site	As per Contract Specifications
Final Grading/Seeding		Entire site	As per Contract Specifications
Tree Planting	10 trees/acre	15 trees/acre	Approved species
Shrub Planting	30 m^2/ha	70 m^2/ha	Approved species
Trails	1.5m aggregate	2.5m Asphalt	Town approved
Pedestal Park Benches	1/acre	1/acre	Town approved
Pedestal Garbage Receptacles	1/acre	1/acre	Town approved
Bollards	1 set/trail opening	1 set/trail opening	Town approved
Park Signage	1 per site	1 per site	Town approved

1. NUMBER, SIZE, POSITION AND DISPLAY OF TRAFFIC SIGNAL HEADS

1.1 Nine standard signal types shall be used for different intersection configurations as outlined in the following tables:

SIGNAL TYPE				
Median ≥1.2m?		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-Prohibited	A, B, H	A, B, J	8.03
	Separate Protected	A, B, C	A, B, E	8.04

Signal Head Type	Lens Dimension	Signal Head Position
Ⓐ 	200mm	Vertically aligned on the far right side of all intersection approaches.
Ⓢ 	300mm	Horizontally aligned overhead on the far side of the intersection centred over the curb lane.
Ⓑ 	300mm	Horizontally aligned overhead on the far side of the intersection, centred over the receiving lane(s).
Ⓒ  Ⓕ  Ⓗ 	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
Ⓓ 	300mm	Vertically aligned on the median or far left side of all intersection approaches that do not display left turn phasing. See Clause 1.5.

	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.

1.2 If the Overhead signals (Types B, C, F or H) 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.

1.3 If the Far Right signals (Type A) cannot practically be installed within the 20^{o} Cone of Vision, or are otherwise obscured, the Far Right signal shall be replaced with a Type S signal head as described in Section 1.1. The Overhead signal (Type B) shall be cantered over the remaining receiving lanes. (See Drawing 8.05).

1.4 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.

1.5 Either Far Left or Median signals shall be installed at signalised 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.

1.6 Additional auxiliary signal heads shall be installed where signal heads stipulated in Clauses 1.1, 1.2, 1.3 and 1.4 are not visible for a distance as follows:

Speed Limit (km/h)	**Distance (m)**
50	85
60	110
70	135
80	165

2. TRAFFIC SIGNAL STRUCTURE LOCATIONS

2.1 Traffic Signal heads shall be placed on the far side of an intersection and shall be located:

2.1.1 Within the range of 15 – 45m from the near side stop line (see Clause 1.2 exceptions).

2.1.2 Within 20^{o} from either side of a line originating at the near side stop line, and centred on the approaching lanes excluding any parking lane(s) (See Drawing 8.06).

2.2 Traffic signal structures shall be placed at a distance of 2.0m or as close to 2.0m as possible from the face of the curb. The minimum clearance from the traffic signal structure to the face of curb must equal or exceed 0.61m.

2.3 Signal structures shall not be placed on islands with areas less than 6-sq. m.

2.4 On islands, structures are to be placed at the corner of the island closest to the centre of the intersection, centred 2.0m from the face of curb or as close to 2.0m as possible. The minimum clearance from the traffic signal structure to the face of curb must equal or exceed 0.61m.

2.5 Signal posts shall not be placed on medians narrower than 1.2m.

2.6 On medians, signal posts shall be placed at a distance of 3.0m back from the bull nose.

3. PEDESTRIAN CONTROL EQUIPMENT

3.1 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. (See Section 2, 5.0 Warrant for Prohibiting Pedestrians). Pedestrian pushbuttons shall be installed only where actuation is required.

3.2 An “orange hand” on top of a “white walking person” symbol (300mm x 600mm) 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 0.61m. This post shall not be located further than 5.5m from the face of curb or 2.0m from the back of the sidewalk, whichever is greater (see Drawing 8.07).

3.2.1 The “orange hand” on top of a “white walking person” symbol (300mm x 600mm) may be replaced with a combined display (300mm x 300mm).

3.3 The post shall be in line or as close as possible to the crosswalk line adjacent to the stop bar.

3.4 Pedestrian pushbuttons shall be located 1.25m above the sidewalk on the same post as specified in Clause 3.1. 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.

3.5 If installed, pedestrian half signals shall comply 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.

4. VISORS AND BACKBOARDS

4.1 "Cowl" or "cut away" type visors shall be used on all traffic signal head lenses except Far Left signal heads.

4.2 "Tunnel" type visors shall be used on all Far Left heads installed in 2003 or later.

4.3 "Tunnel" type visors shall be used on all pedestrian head lenses.

4.4 Backboards shall be used on all traffic signal heads except the Far Right secondary signal head (Type A).

5. EQUIPMENT AND COLOURS

Controller Cabinets:	Gray
Signal Structures and Median Posts	Galvanized
Backboards:	Yellow
Signal Heads:	Dark Green

6. 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	5.79m
Secondary Signal Head	3.25m
Median Signal Head (measured from near edge of the nearest traffic lane)	2.85m
Pedestrian Head – Regular Mount	2.50m
Pedestrian Head – Pedestal Mount	3.00m
Pedestrian Pushbutton	1.25m
Median Left Turn Control Sign (measured from near edge of	2.25m

nearest traffic lane)	

7. 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 2.25m above the traffic lane immediately below the traffic signal (see Drawing 8.02).

8. TRAFFIC SIGNAL START-UP PROCEDURES

8.1 Newly installed traffic or pedestrian signals shall commence full operation on Wednesdays or Thursdays off peak hours only.

8.2 Newly installed traffic or pedestrian signals shall be placed on flash 48 hours before being put into normal operation.

8.3 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.

8.4 Before newly installed traffic or pedestrian signals are placed on flash, a News Release should be issued.

8.5 Malfunctioning traffic signals may be placed on flash.

9. TRAFFIC SIGNAL INSTALLATION DRAWINGS

Drawings 8.01 to 8.08 depict typical signal layouts. Drawing 8.09 depicts the standard symbols that shall be used for signal layout drawings.

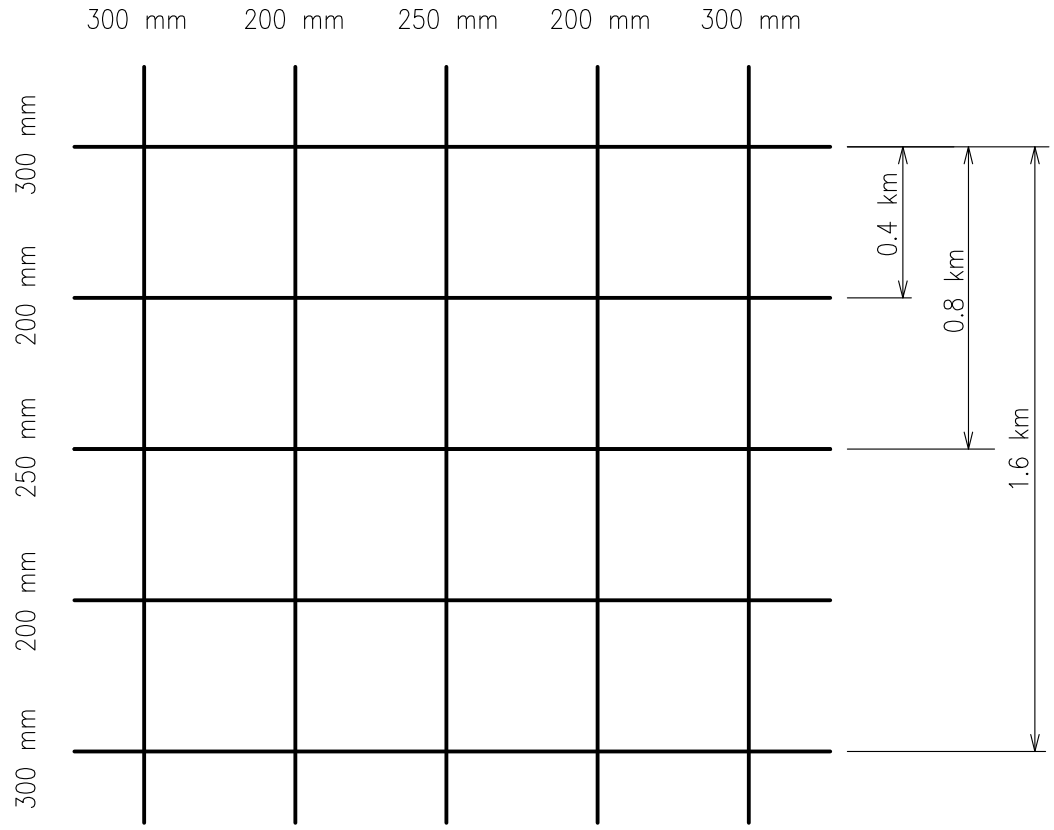
1. WATER DESIGN

2. SANITARY DESIGN

3. STORMWATER MANAGEMENT DESIGN

4. SERVICE CONNECTIONS

5. ROADWAY DESIGN



NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Water Design

BASIC WATER MAIN GRID

DRAWN BY: D.W.K.

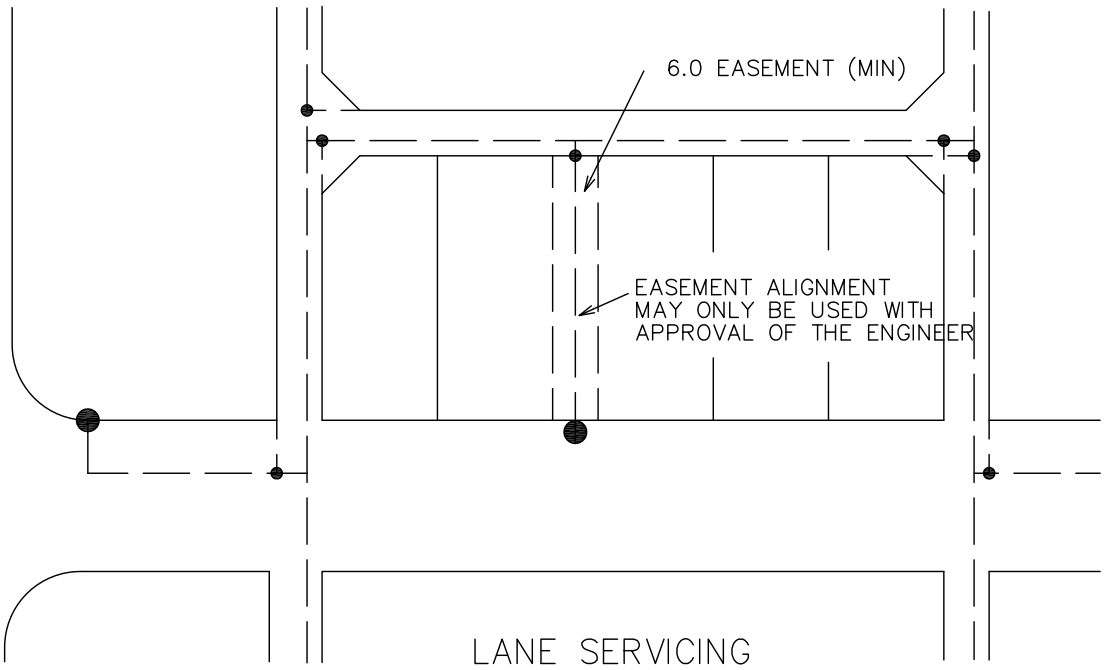
DATE: MAR/10

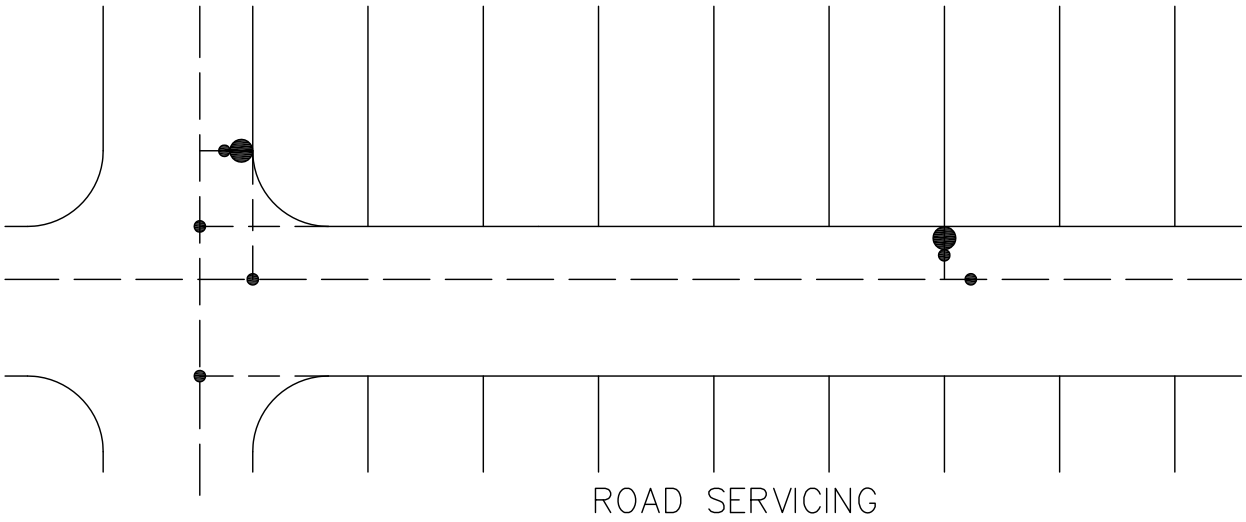
SCALE: N.T.S.

APPROVED BY:

STREETS–UTILITIES ENGINEER

DRAWING NO. 1.02





- 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.

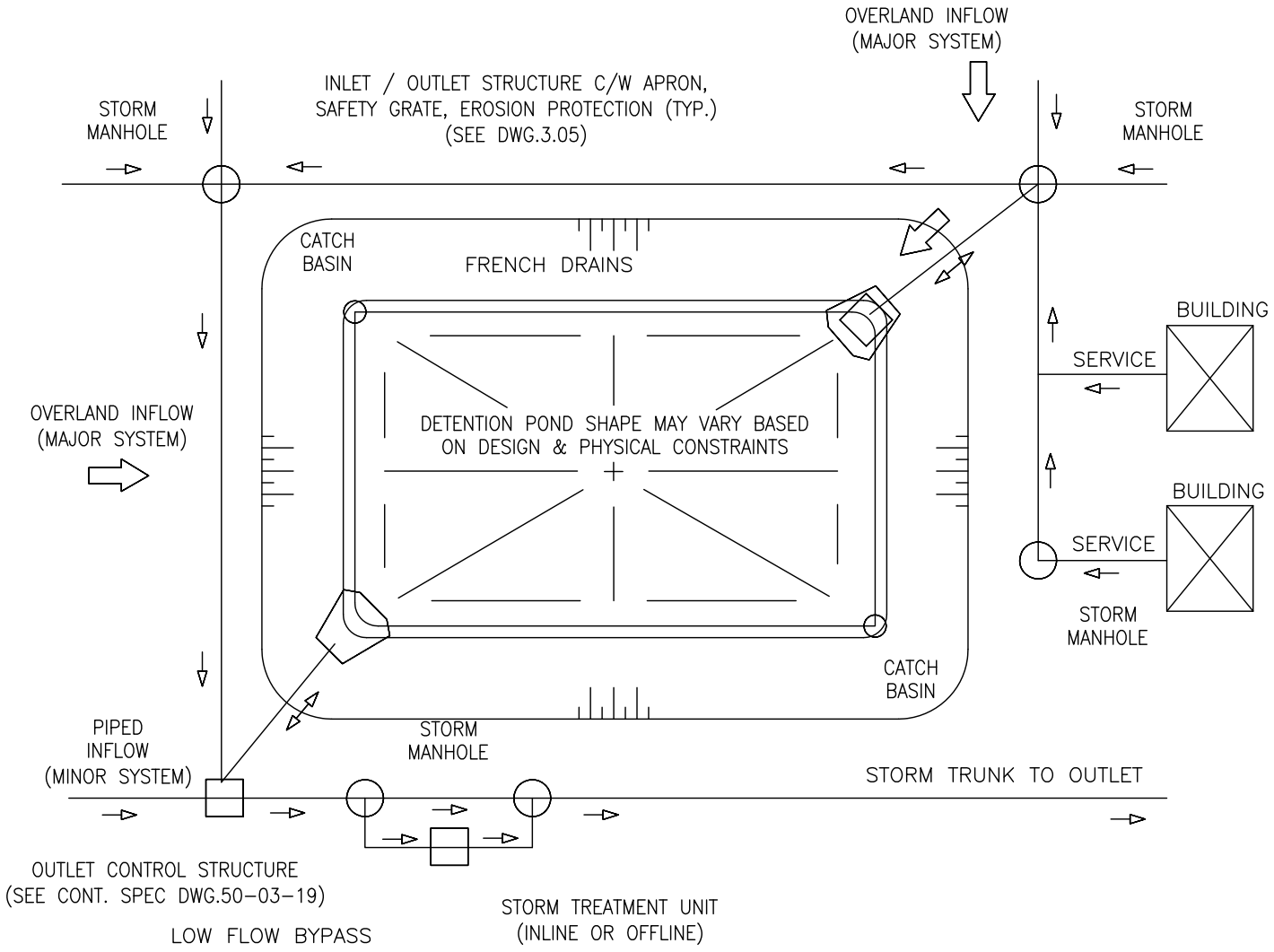
NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Water Design

TYPICAL VALVE & HYDRANT LOCATIONS

DRAWN BY: N.M.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY:
DRAWING NO. 1.03



NO.	DATE	REVISION
1	Mar 8, 2006	REVISED

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Stormwater Management Design

DRY STORMWATER STORAGE FACILITY

DRAWN BY: D.W.K.

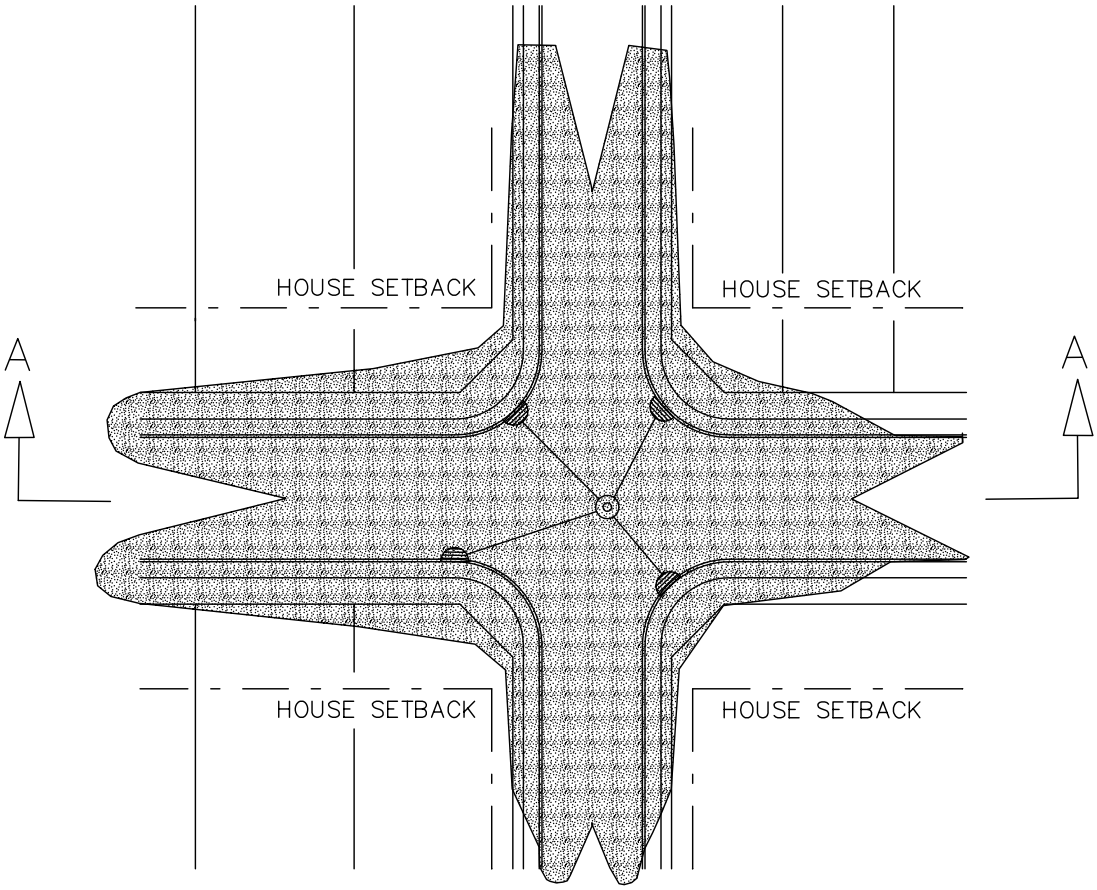
DATE: MAR/10

SCALE: N.T.S.

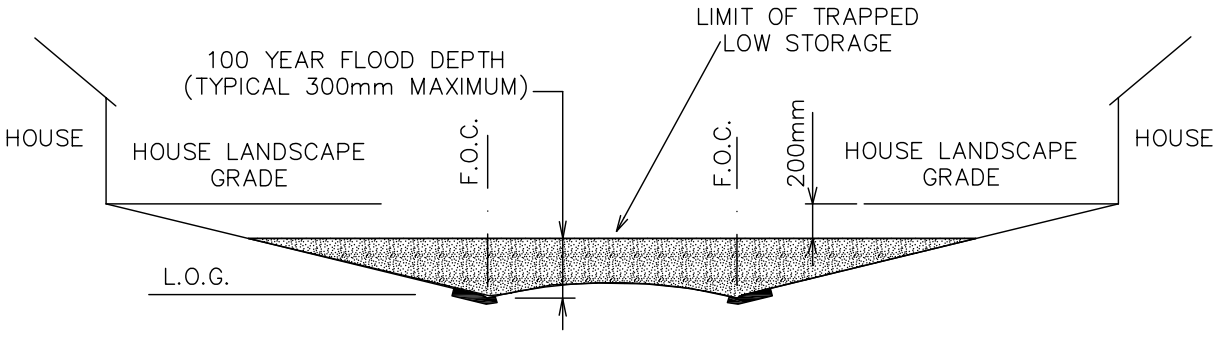
APPROVED BY:

STREETS–UTILITIES ENGINEER

DRAWING NO. 3.03

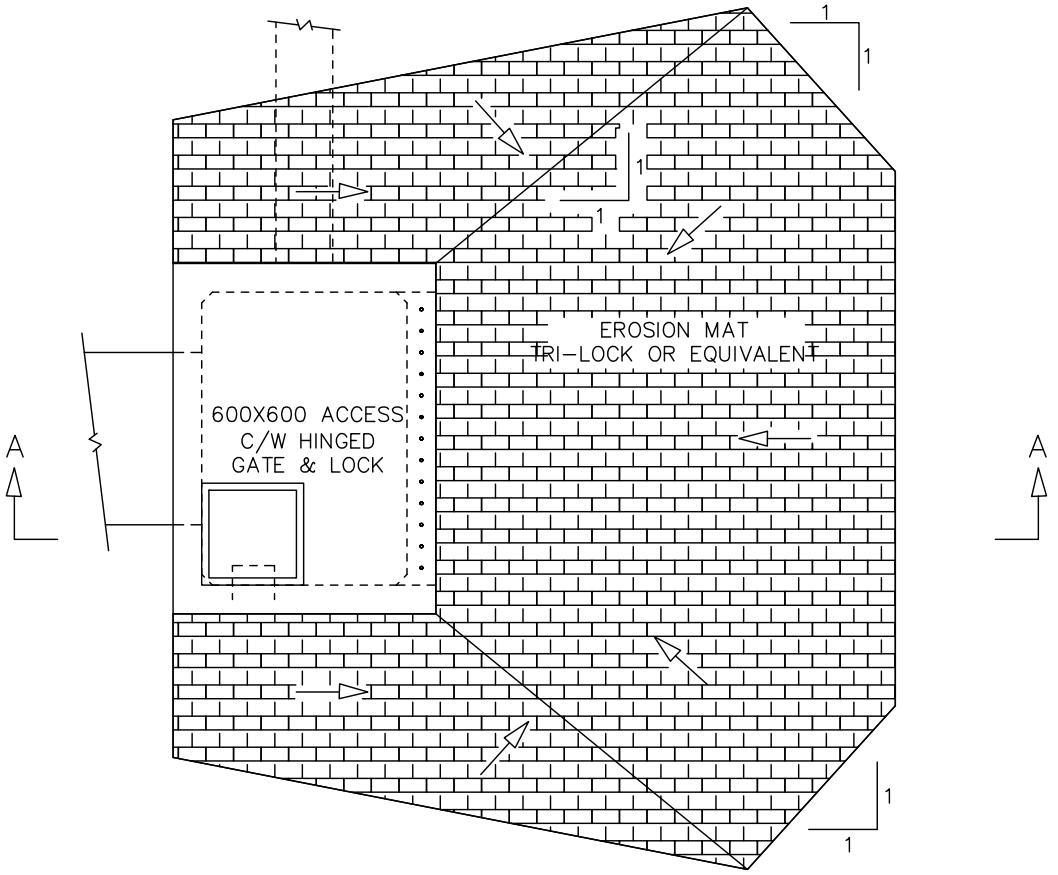


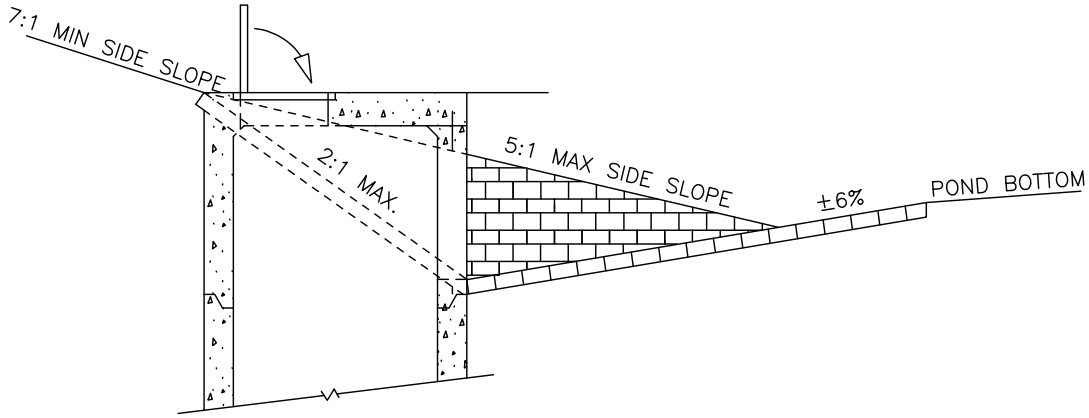
PLAN



SECTION 'A – A'

NO.	DATE	REVISION	TOWN OF PONOKA		
			DRAWN BY: N.M.	DESIGN GUIDELINE DRAWINGS Stormwater Management Design	APPROVED BY:
			DATE: MAR/10	TYPICAL TRAPPED LOW STORAGE AREA	
			SCALE: N.T.S.		DRAWING NO. 3.04





SECTION 'A – A'

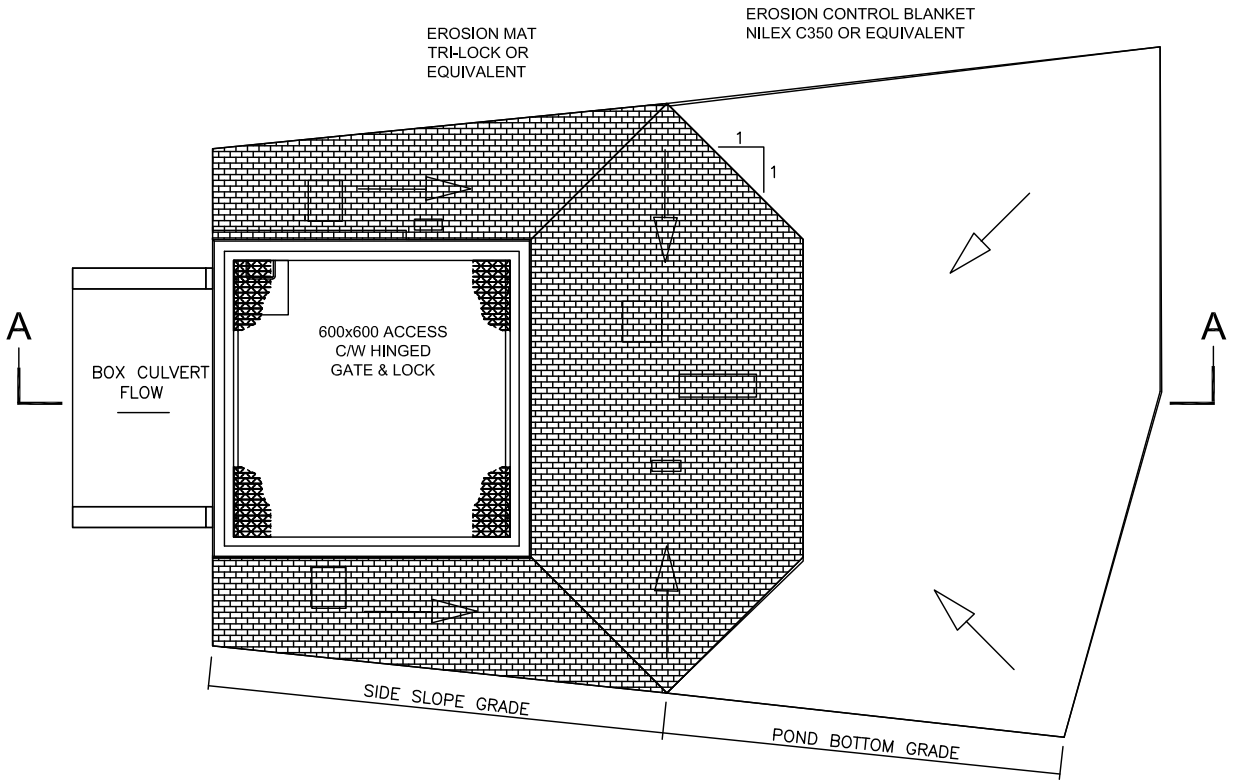
NO.	DATE	REVISION
1	Jan 30, 2008	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

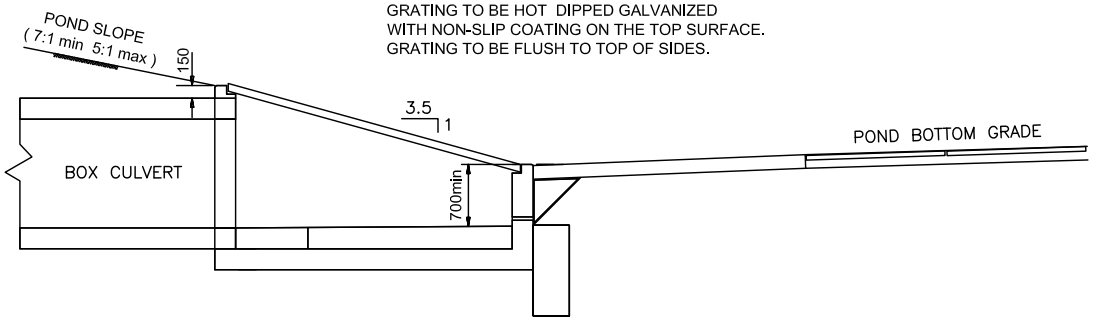
DESIGN GUIDELINE DRAWINGS
Stormwater Management Design

INLET / OUTLET STRUCTURE APRON

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 3.05

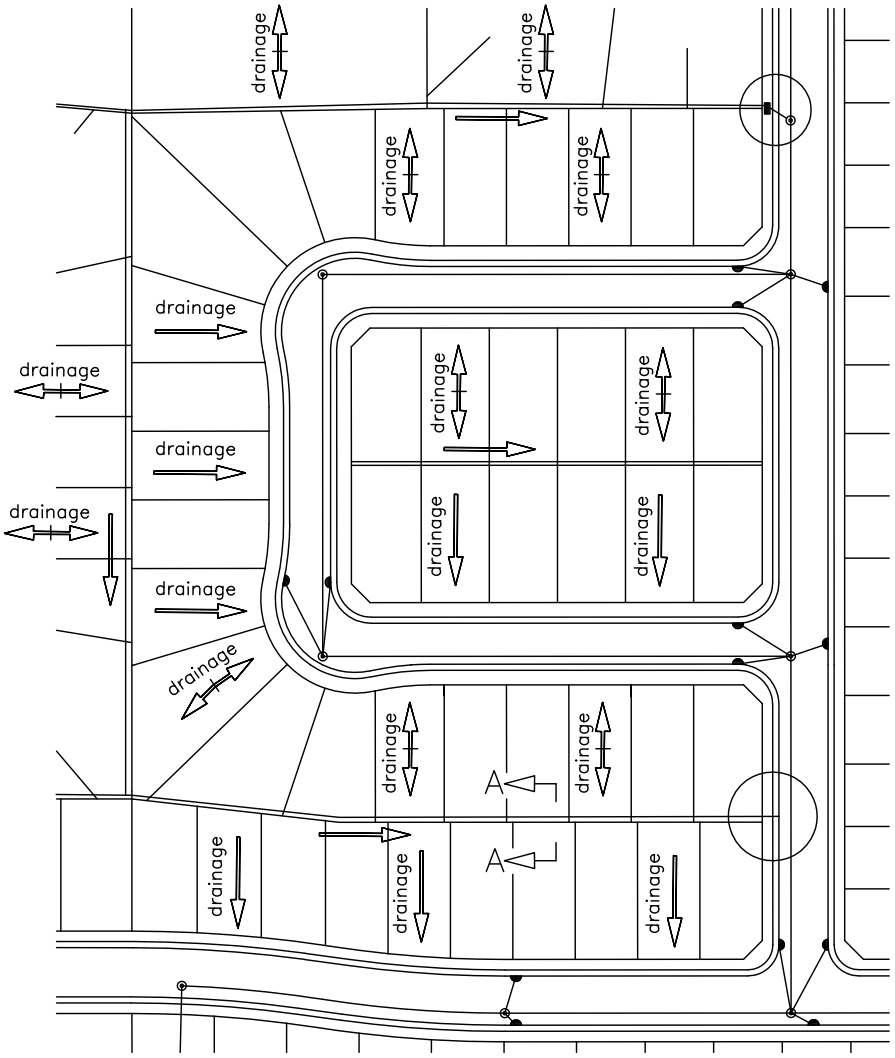


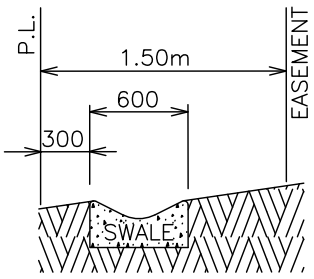
NOTE:
OVERALL COVERAGE AREA FOR EROSION MAT &
EROSION CONTROL BLANKET BASED UPON WATER
VELOCITIES TO BE HANDLED BY THE STRUCTURE.



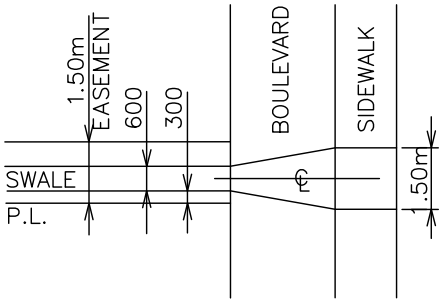
SECTION "A – A"

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Stormwater Management Design	APPROVED BY:
			DATE: MAR/10	LOW PROFILE INLET / OUTLET STRUCTURE APRON	DEPARTMENT MANAGER
			SCALE: N.T.S.		DRAWING NO. 3.06

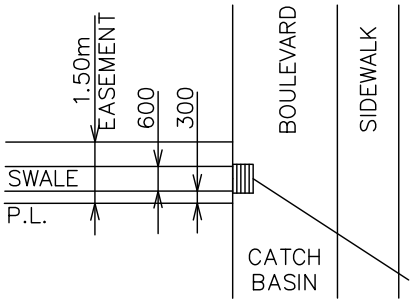




SECTION 'A – A'

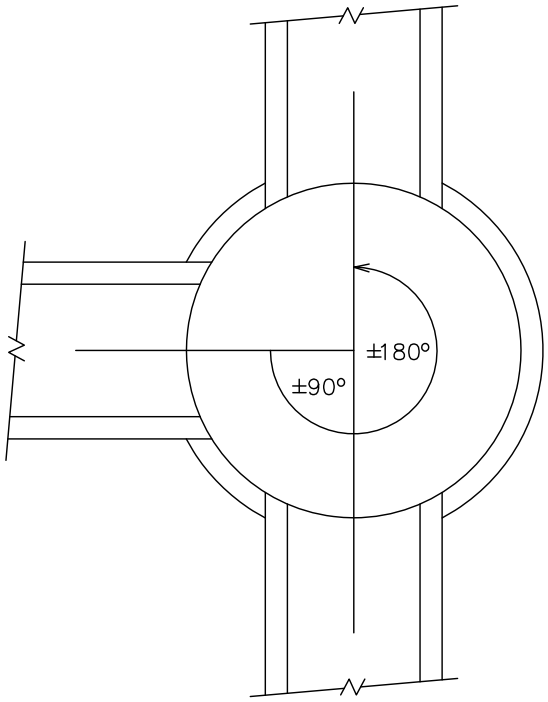


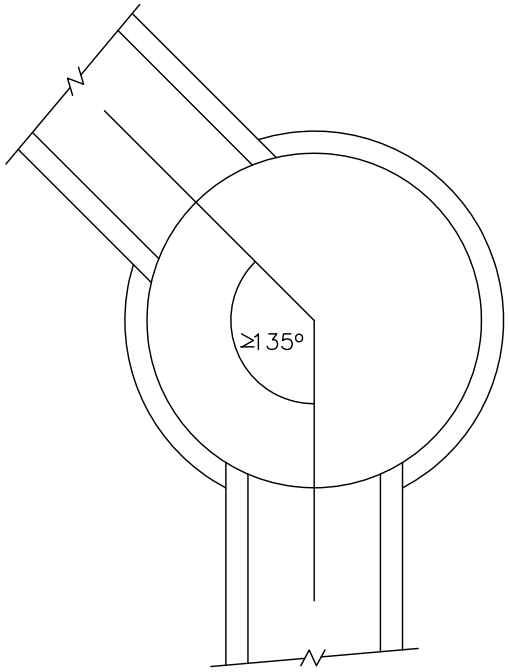
DETAIL A



DETAIL B

			TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Stormwater Management Design	APPROVED BY:
			DATE: MAR/10	LANELESS SUBDIVISION DRAINAGE SWALE	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 3.07
1	Feb 21, 2008	Revised drawing number			
NO.	DATE	REVISION			





MANHOLE NOMINAL INSIDE DIAMETER	INLET / OUTLET PIPE SIZE		
	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.)

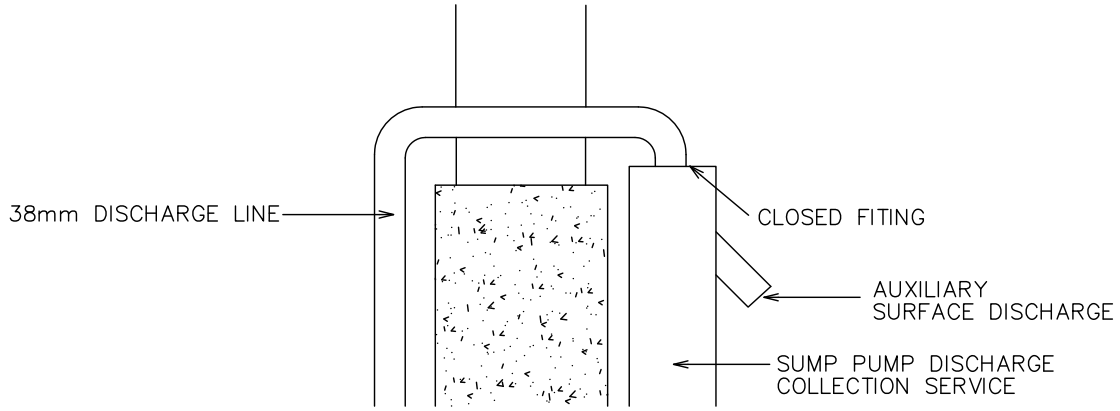
NO.	DATE	REVISION
1	Feb 21, 2008	Revised drawing number

TOWN OF PONOKA ENGINEERING DEPARTMENT

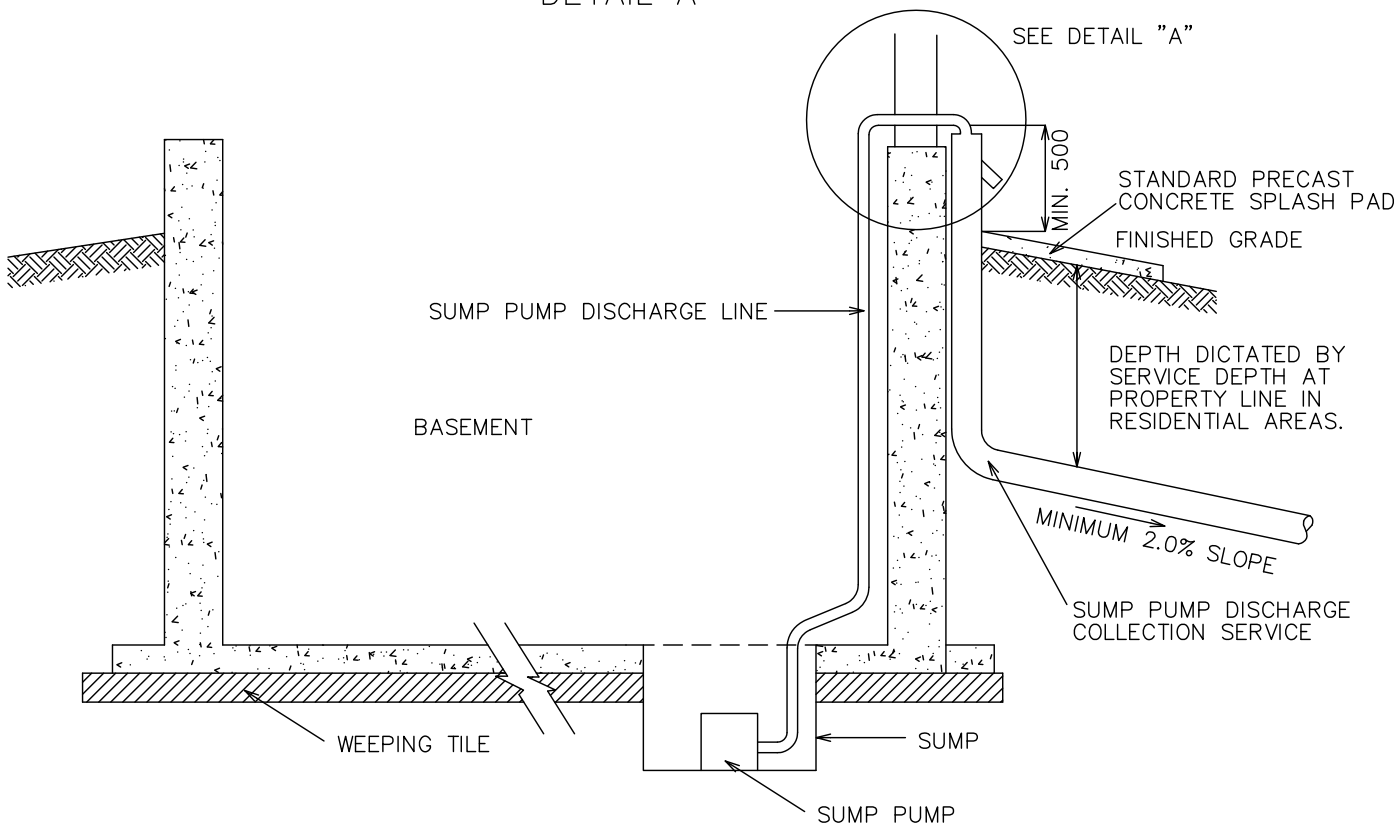
DESIGN GUIDELINE DRAWINGS
Stormwater Management Design

MANHOLE INLET / OUTLET PIPE DESIGN CONSIDERATIONS

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 3.08



DETAIL A



NOTES:

- ROOF LEADERS (DOWNSPOUTS) OR ANY OTHER STORM WATER SOURCE MUST NOT BE CONNECTED TO SUMP DISCHARGE COLLECTION SERVICE LINE.
- THE AUXILIARY SURFACE DISCHARGE MUST BE INSTALLED TO PROVIDE AN OVERFLOW IN THE STORM DRAINAGE SYSTEM CANNOT ACCOMMODATE FLOWS DUE TO CAPACITY, FREEZING OR OTHER PROBLEMS.

NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Service Connections

TYPICAL SUMP PUMP DISCHARGE CONNECTION

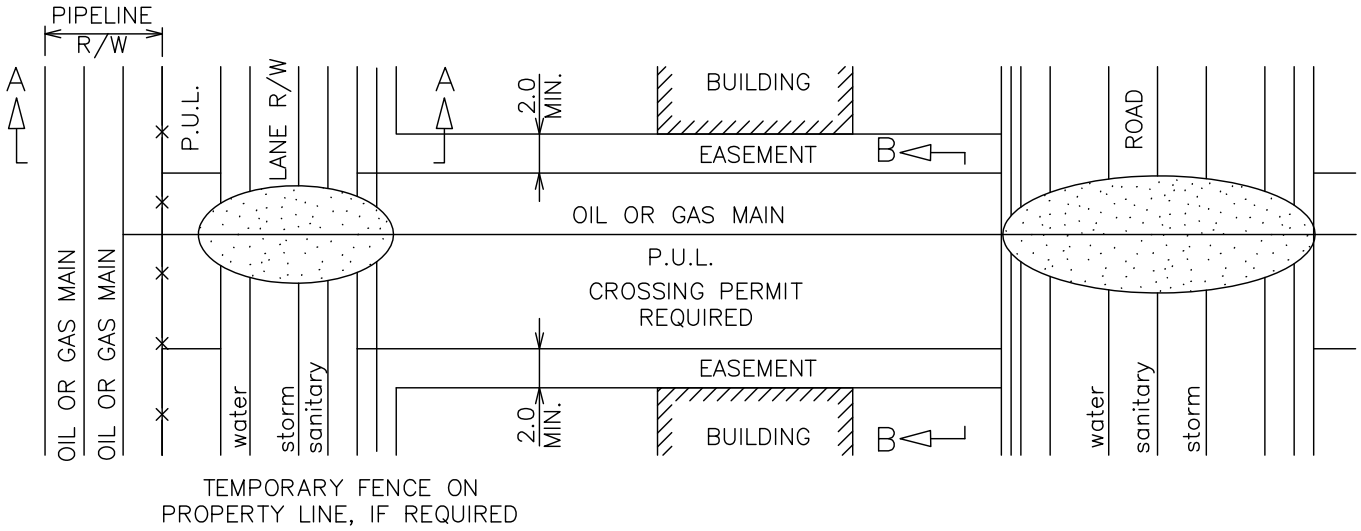
DRAWN BY: N.M.

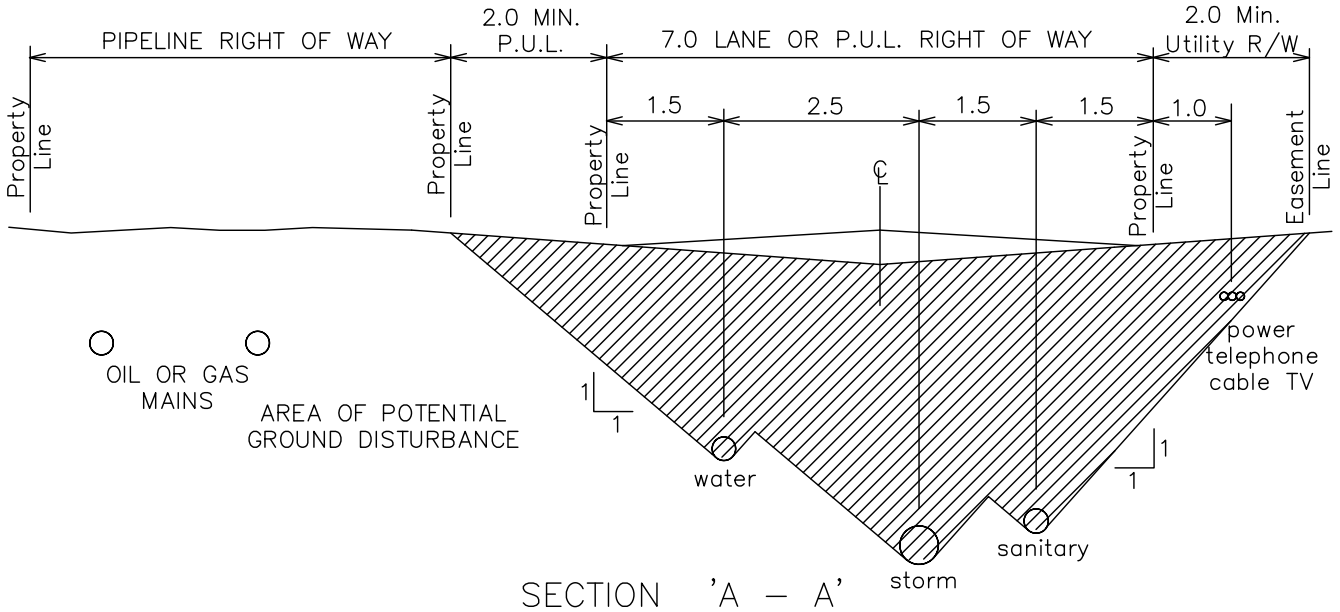
DATE: MAR/10

SCALE: N.T.S.

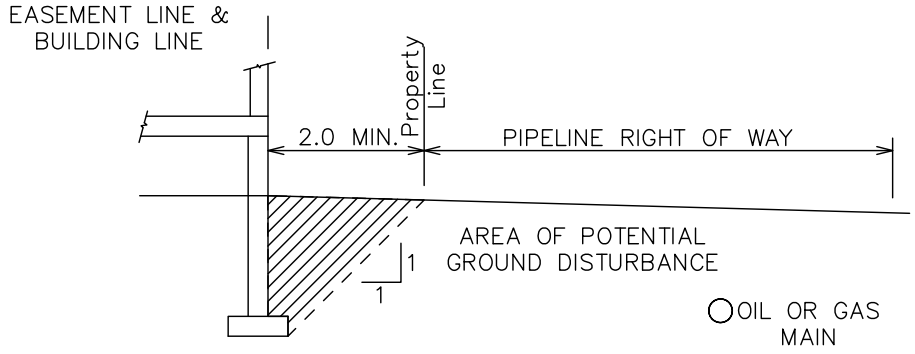
APPROVED BY:

DRAWING NO. 3.09





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
2	Feb 24, 2005	Added the References to Oil and Gas Mains
1	Mar 5, 2003	Revision

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Service Connections

APPROVED BY:

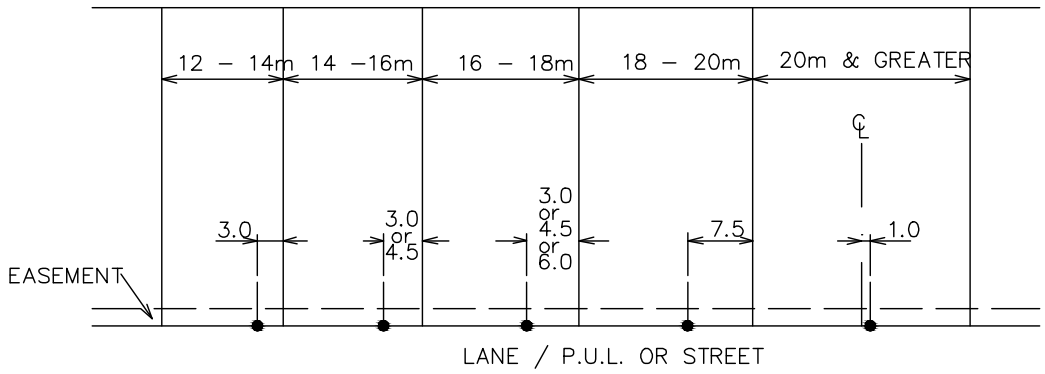
STREETS–UTILITIES ENGINEER

DATE: MAR/10

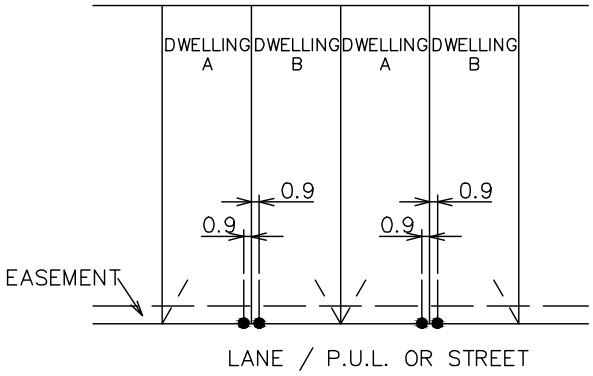
OIL AND OR GAS RIGHT OF WAY CLEARANCES

SCALE: N.T.S.

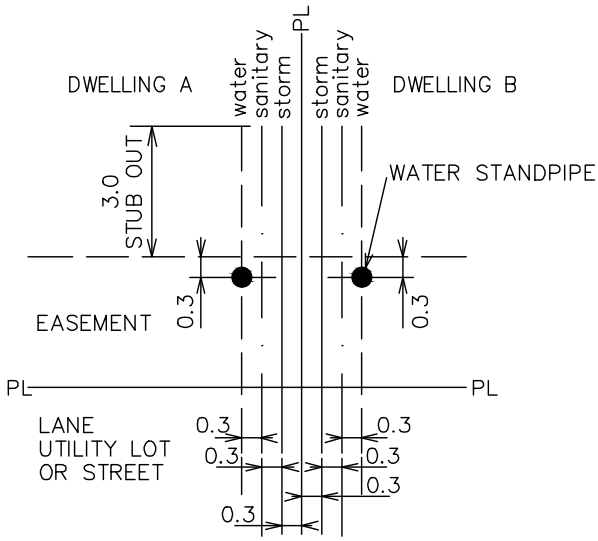
DRAWING NO. 4.01



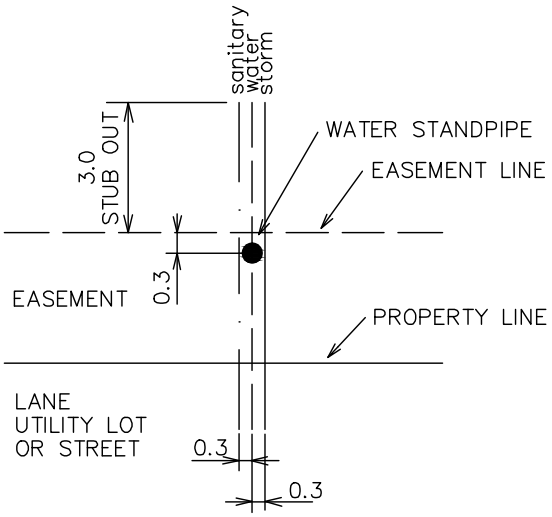
SINGLE FAMILY DWELLING



MULTI FAMILY DWELLING



MULTI FAMILY DWELLING
SERVICE DETAIL



SINGLE FAMILY DWELLING
SERVICE DETAIL

LEGEND

SANITARY SEWER, STORM SEWER & WATER SERVICE

ELECTRICAL SERVICE

NOTE :

1. STANDPIPE & CURB STOP TO BE LOCATED 300mm FROM PROPERTY LINE (OR ON EASEMENT LINE).
2. MINIMUM CLEARANCE FROM EDGE OF ELECTRICAL TRANSFORMER TO CENTRE OF WATER SHALL BE 3.30m.
3. EASEMENT WIDTH AS REQUIRED.

NO.	DATE	REVISION
2	JUN 2014	REV. MULTI FAMILY SERVICE DETAIL
1	APR 2013	APPROVED

TOWN OF PONOKA

N.M.

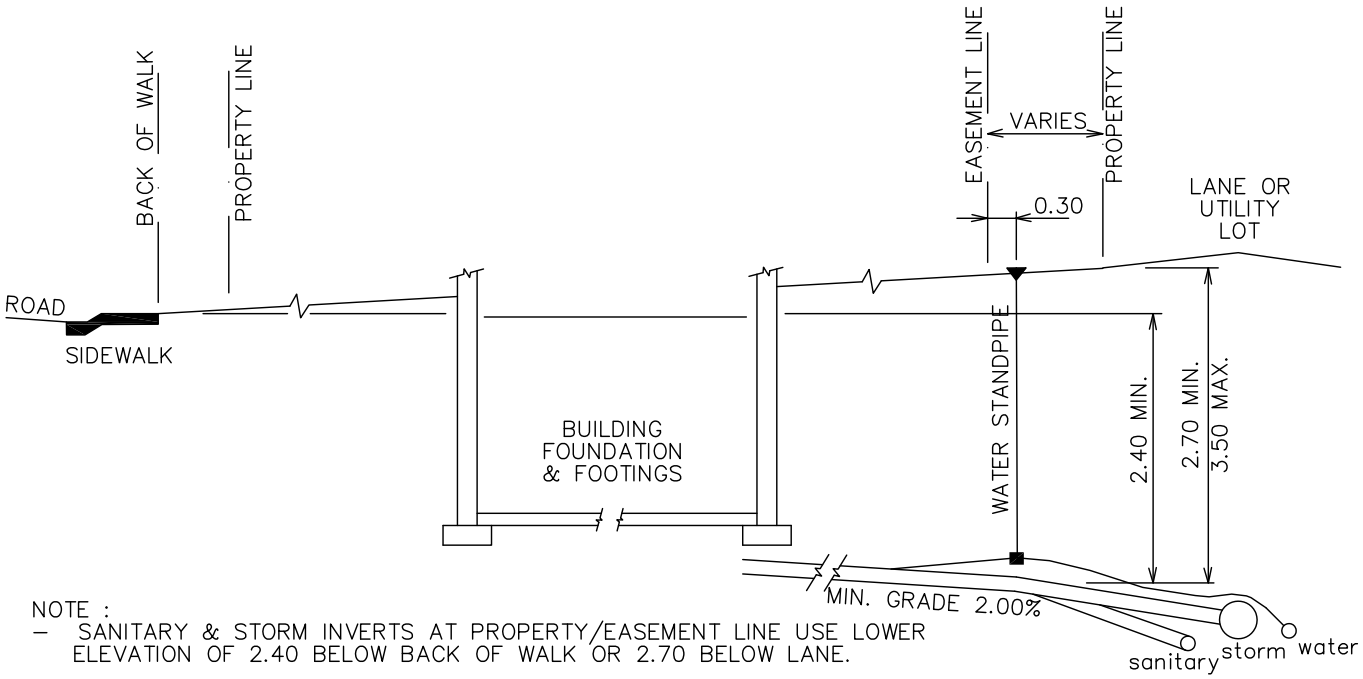
DESIGN GUIDELINE DRAWINGS
Service Connections

MAR/10

SERVICE LOCATIONS

N.T.S.

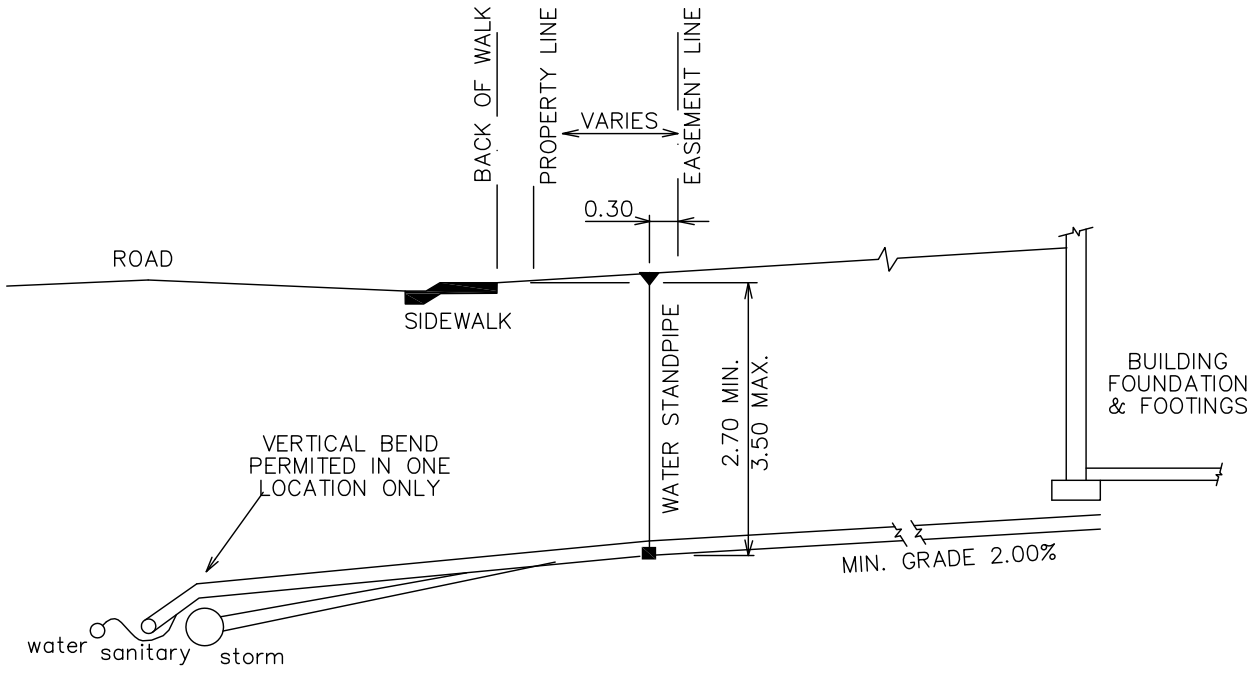
4.02



NOTE :

- SANITARY & STORM INVERTS AT PROPERTY/EASEMENT LINE USE LOWER ELEVATION OF 2.40 BELOW BACK OF WALK OR 2.70 BELOW LANE.
- 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
1	2/10/2009	WATER STANDPIPE SHIFTED

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Service Connections

TYPICAL SERVICE
CROSS CONNECTIONS

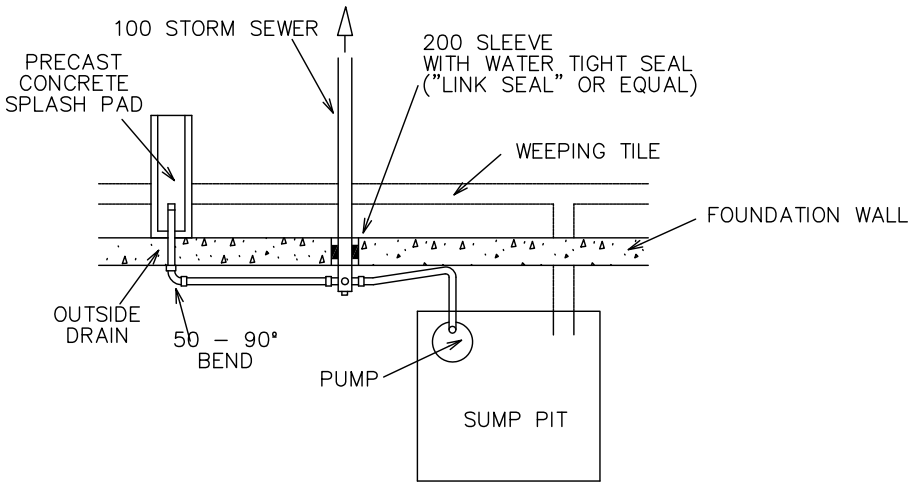
DRAWN BY: N.M.

DATE: MAR/10

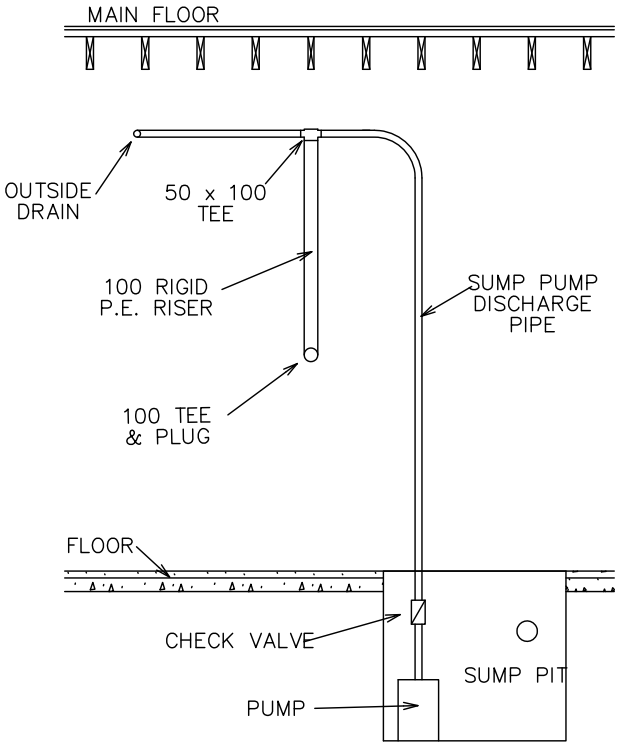
SCALE: N.T.S.

APPROVED BY:

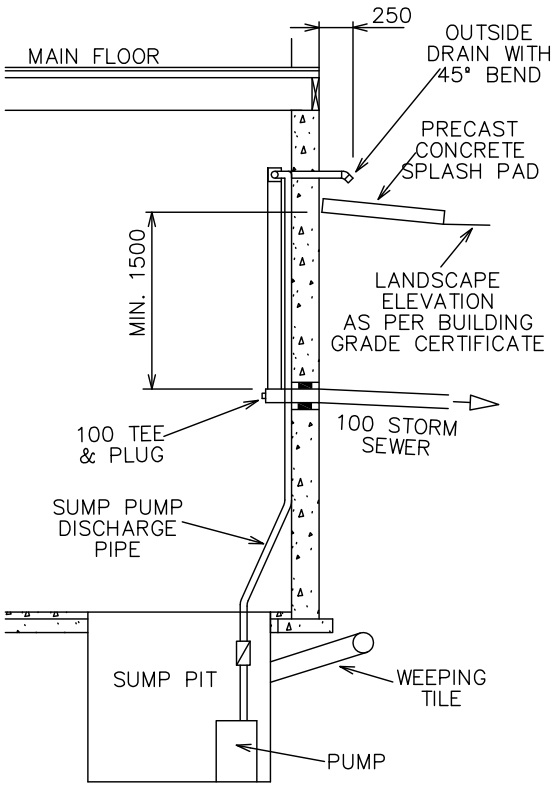
DRAWING NO. 4.03



TOP VIEW

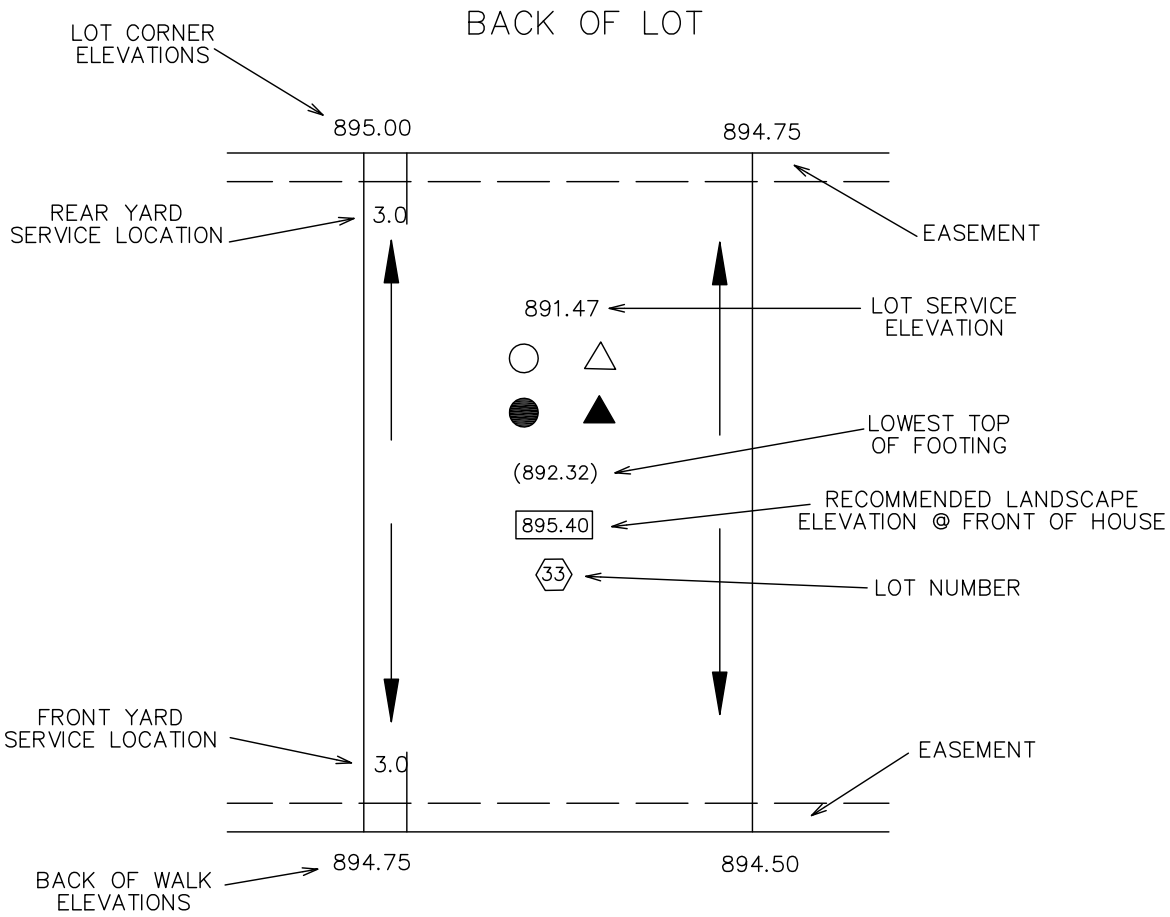


FRONT VIEW



SIDE VIEW

NO.	DATE	REVISION	TOWN OF PONOKA		
			DRAWN BY: N.M.	DESIGN GUIDELINE DRAWINGS Service Connections	APPROVED BY:
			DATE: MAR/10	SHALLOW STORM SEWER SERVICE CONNECTION	
			SCALE: N.T.S.		DRAWING NO. 4.04



LEGEND :

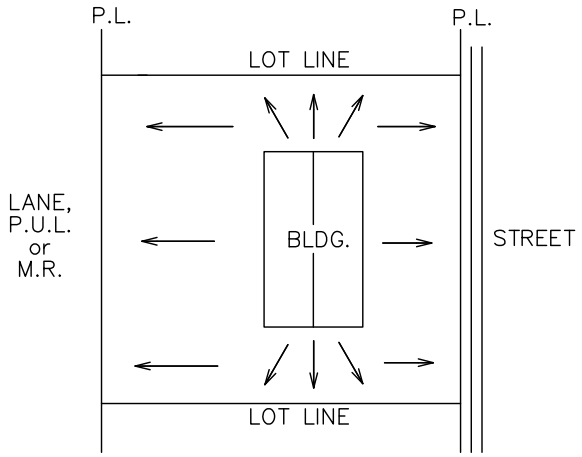
- ○ SINGLE WATER & SANITARY SERVICE
- ● DUAL WATER & SANITARY SERVICE
- △ SINGLE WATER, SANITARY & STORM SERVICE
- ▲ DUAL WATER, SANITARY & STORM SERVICE
- ← DRAINAGE PATTERN

NOTE :
- EASEMENT WIDTHS VARY
- SERVICE LOCATION DIMENSIONS VARY (SEE DWG. 4.02)

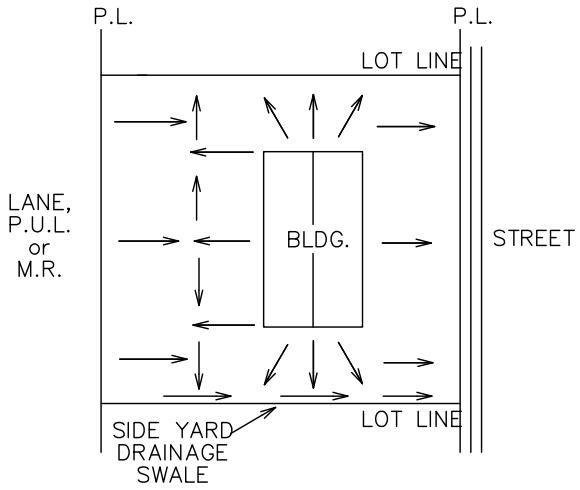
NO.	DATE	REVISION

TOWN OF PONOKA

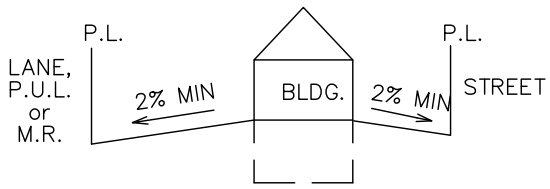
DRAWN BY: N.M.	DESIGN GUIDELINE DRAWINGS Service Connections	APPROVED BY:
DATE: MAR/10	TYPICAL LOT SERVICE REQUIREMENTS	
SCALE: N.T.S.		DRAWING NO. 4.05

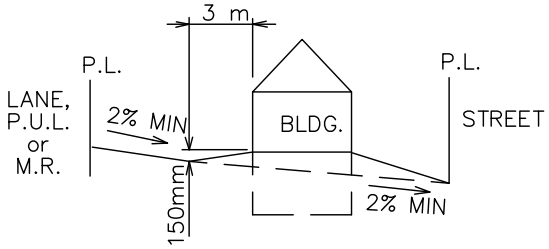


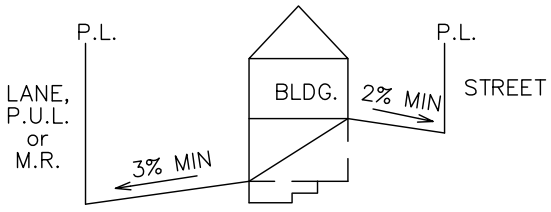
SPLIT DRAINAGE



BACK TO FRONT DRAINAGE

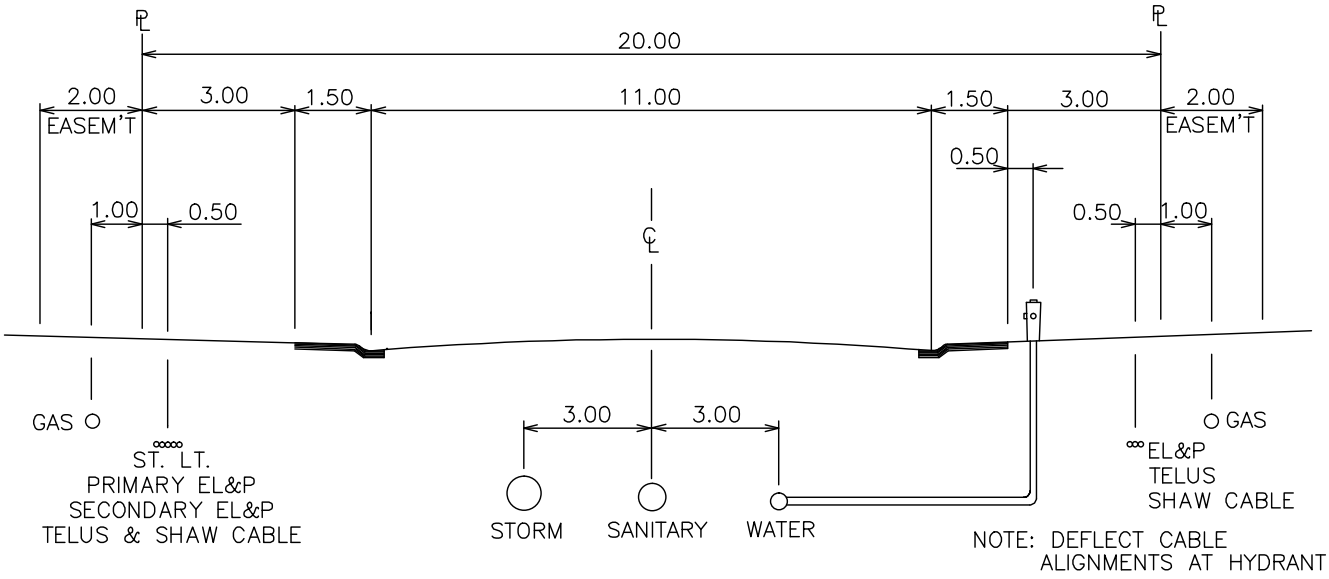




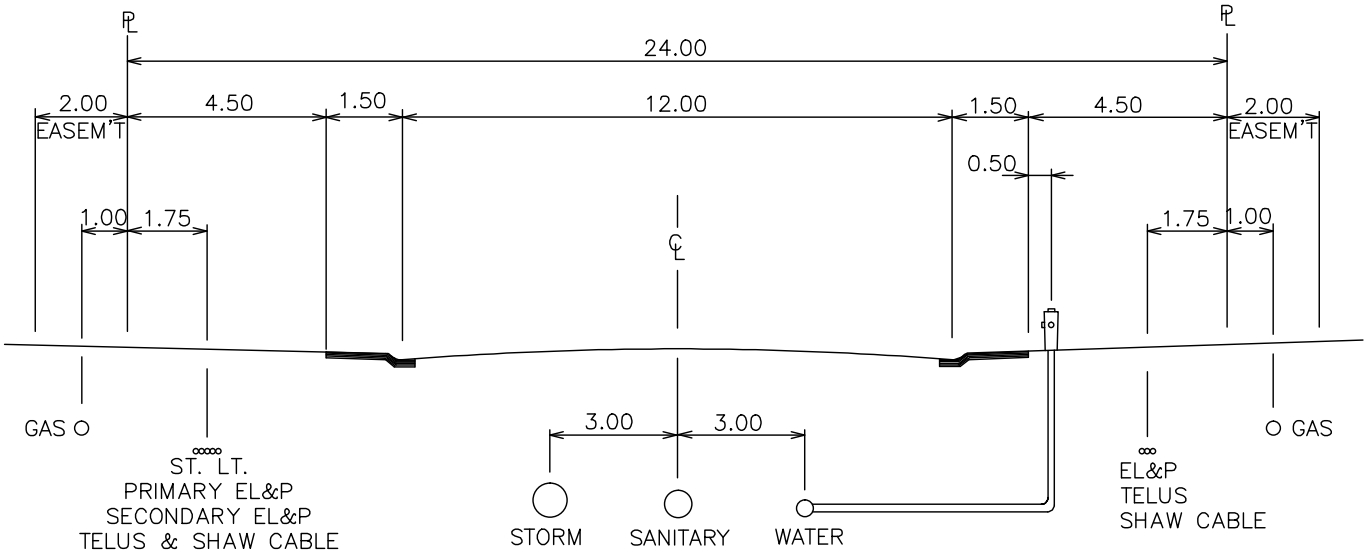


REARYARD BASEMENT WALKOUT
SPLIT DRAINAGE

NO.	DATE	REVISION			
			TOWN OF PONOKA		
			DRAWN BY: N.M.	DESIGN GUIDELINE DRAWINGS Service Connections	APPROVED BY:
			DATE: MAR/10	TYPICAL LOT GRADING	
			SCALE: N.T.S.		DRAWING NO. 4.06



RESIDENTIAL LOCAL ROAD



RESIDENTIAL COLLECTOR ROAD

NO.	DATE	REVISION
2	JUN 2014	
1	APR 2013	APPROVED

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Service Connections

APPROVED BY:

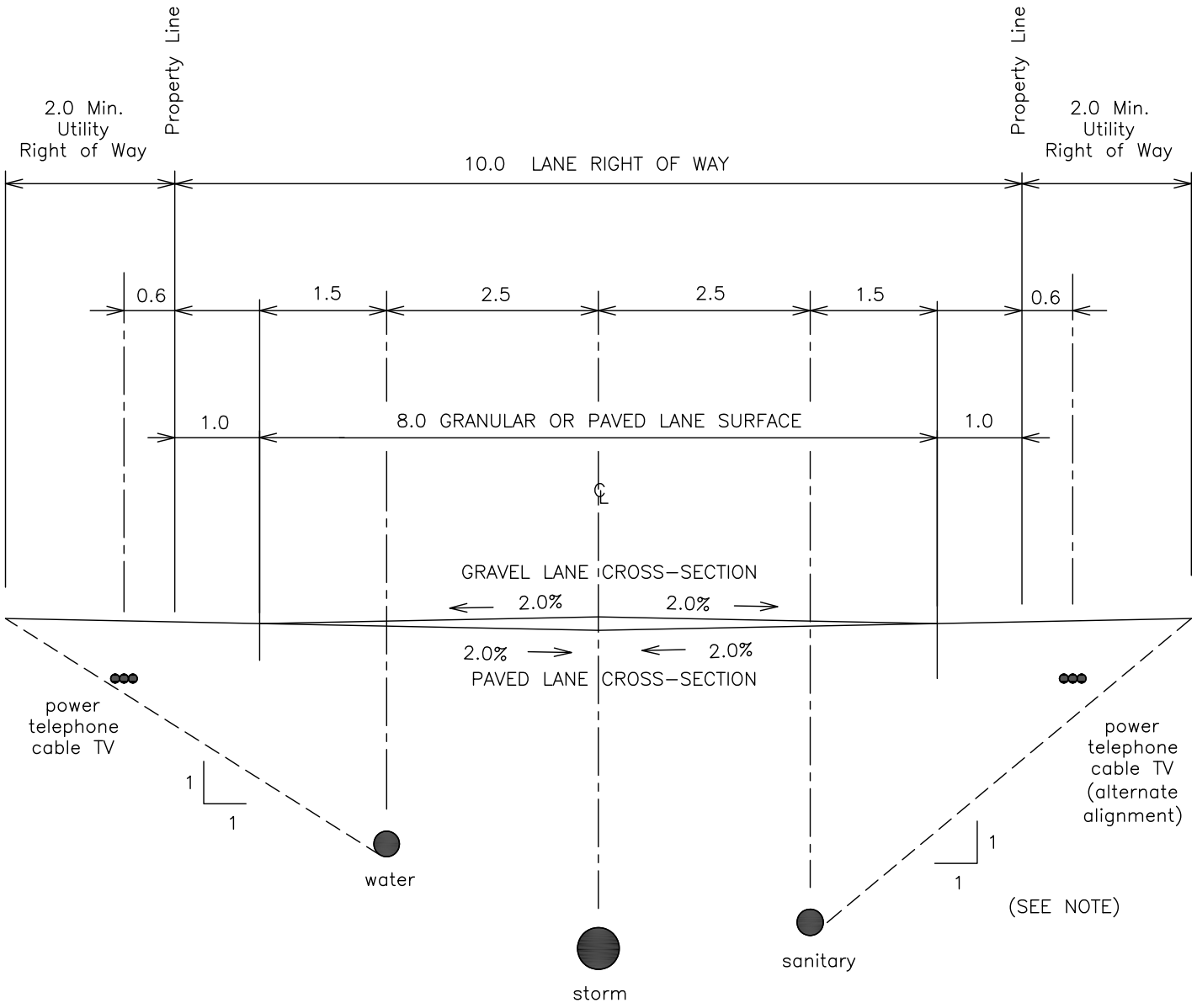
STREETS–UTILITIES ENGINEER

DATE: MAR/10

TYPICAL FRONT SERVICING ALIGNMENTS

SCALE: N.T.S.

DRAWING NO. 4.07



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 1.01)

NO.	DATE	REVISION	APP.
1	Jan9,2002	Revised dimensions	

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Service Connections

APPROVED BY:

DATE: MAR/10

LANE SERVICING ALIGNMENTS

STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

DRAWING NO. 4.09

SIZE OF MAIN	SIZE OF SANITARY SERVICE							
	150 mm	200 mm	250 mm	300 mm	375 mm	450 mm	525 mm	600 mm
200 mm	MANHOLE NOT REQUIRED			MANHOLE REQUIRED		SERVICE LARGER THAN MAIN NOT PERMITTED		
250 mm								
300 mm								
375 mm								
450 mm								
525 mm								
600 mm								
675 mm								
750 mm								
825 mm								
900 mm								
1050 mm								
1200 mm								
1350 mm								

SIZE OF MAIN	SIZE OF STORM SERVICE								
	100 mm	150 mm	200 mm	250 mm	300 mm	375 mm	450 mm	525 mm	600 mm
200 mm	MANHOLE NOT REQUIRED						MANHOLE REQUIRED		SERVICE LARGER THAN MAIN NOT PERMITTED
250 mm									
300 mm									
375 mm									
450 mm									
525 mm									
600 mm									
675 mm									
750 mm									
825 mm									
900 mm									
1050 mm									
1200 mm									
1350 mm									

NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Service Connections

APPROVED BY:

DATE: MAR/10

SANITARY & STORM MANHOLE REQUIREMENTS FOR SERVICE CONNECTIONS

STREETS–UTILITIES ENGINEER

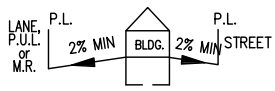
SCALE: N.T.S.

DRAWING NO. 4.10

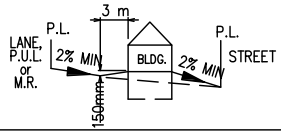
BUILDING GRADE CERTIFICATE

Town of Ponoka
Issued by: No. 2002-000

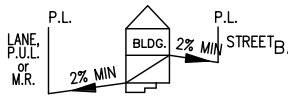
1. WHEN EXCAVATING IN A RIGHT OF WAY (EASEMENT), CHECK FOR UTILITIES.
2. STANDING AT THE WATER SHUTOFF AND FACING THE BUILDING, THE SANITARY SERVICE (PAINTED RED) IS ON THE LEFT SIDE OF THE WATER SERVICE: STORM SERVICE (PAINTED GREEN) IS ON THE RIGHT SIDE OF THE WATER SERVICE.
3. ALL DIMENSIONS ARE IN METRES AND DECIMALS THEROF. THE ELEVATIONS ARE IN METRES ABOVE GOEDETIC MEAN SEA LEVEL.
4. ELEVATIONS NOTED ON THE CERTIFICATE ARE WITHIN 100mm OF ACTUAL.
5. THE BUILDER MUST CONSTRUCT WITHIN 100mm OF THE DESIGN LANDSCAPE ELEVATION & ILLUSTRATED DRAINAGE PATTERNS UNLESS OTHERWISE APPROVED BY THE DEVELOPMENT OFFICER.
6. IF THE INFORMATION ON THIS CERTIFICATE HAS BEEN PREPARED BY A PRIVATE DEVELOPER OR THEIR AGENT, RED DEER COUNTY ACCEPTS NO RESPONSIBILITY FOR ITS ACCURACY.



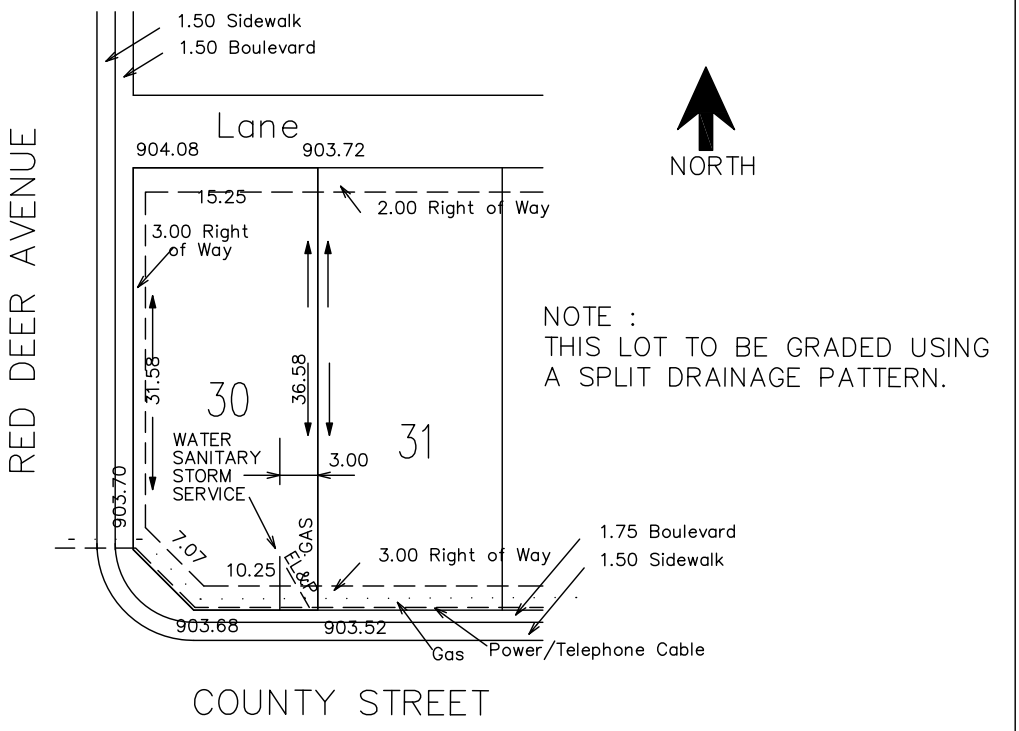
SPLIT DRAINAGE



BACK TO FRONT DRAINAGE



REARYARD BASEMENT WALKOUT SPLIT DRAINAGE



NOTE :
THIS LOT TO BE GRADED USING A SPLIT DRAINAGE PATTERN.

TOP OF FOOTING:
MAX. DEPTH BELOW AVERAGE SIDEWALK = 1.92
LOWEST ELEVATION = 901.68

AS-BUILT SEWER INVERT ELEVATIONS:
SANITARY AT RIGHT OF WAY LINE = 900.77
STORM AT RIGHT OF WAY LINE = 900.78

DESIGN LANDSCAPE ELEVATIONS
ELEV. AT FRONT OF HOUSE = 903.95
ELEV. AT REAR OF HOUSE = 903.95

CIVIC ADDRESS: 75 Ponoka Street
LOT: 30 BLOCK: 11 PLAN No.: 972 9999
DEVELOPER: ABC Developments Ltd. SCALE: 1:500
DRAWN BY: XYZ Consulting Ltd. DATE: June 28, 2000
APPROVED BY: DATE:
RECEIVED BY: DATE:

NO.	DATE	REVISION

TOWN OF PONOKA

DRAWN BY: N.M.

DESIGN GUIDELINE DRAWINGS
Service Connections

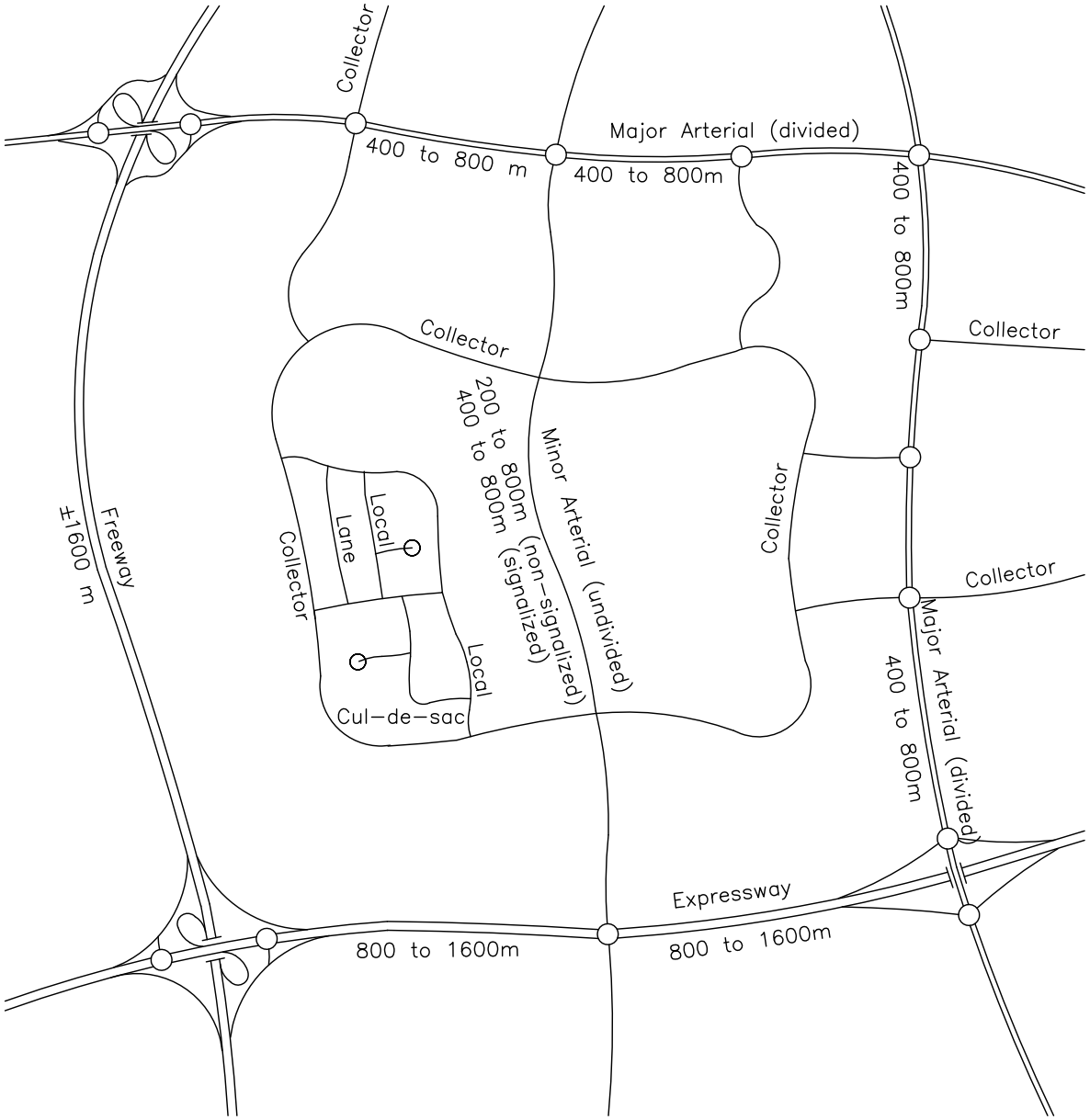
APPROVED BY:

DATE: MAR/10

NEW RESIDENTIAL
BUILDING GRADE CERTIFICATE

SCALE: N.T.S.

DRAWING NO. 4.11



LEGEND

- FREEWAY
- EXPRESSWAY
- MAJOR ARTERIAL
- MINOR ARTERIAL
- COLLECTOR
- LOCAL
- PUBLIC LANE
- SIGNALIZED INTERSECTION
- CUL-DE-SAC

NO.	DATE	REVISION
2	Jan 31, 2008	Revised Roadway sizes
1	Feb 22, 2005	Revised Roadway sizes

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Roadway Design

DRAWN BY: D.W.K.

DATE: MAR/10

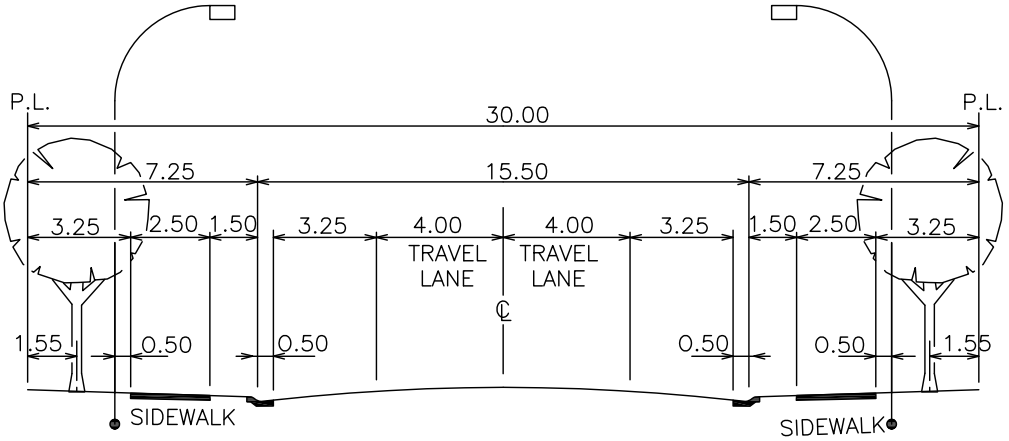
SCALE: N.T.S.

RELATIONSHIP OF STREET CLASSIFICATIONS

APPROVED BY:

STREETS-UTILITIES ENGINEER

DRAWING NO. 5.01



NO.	DATE	REVISION
1	FEB 11, 2004	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

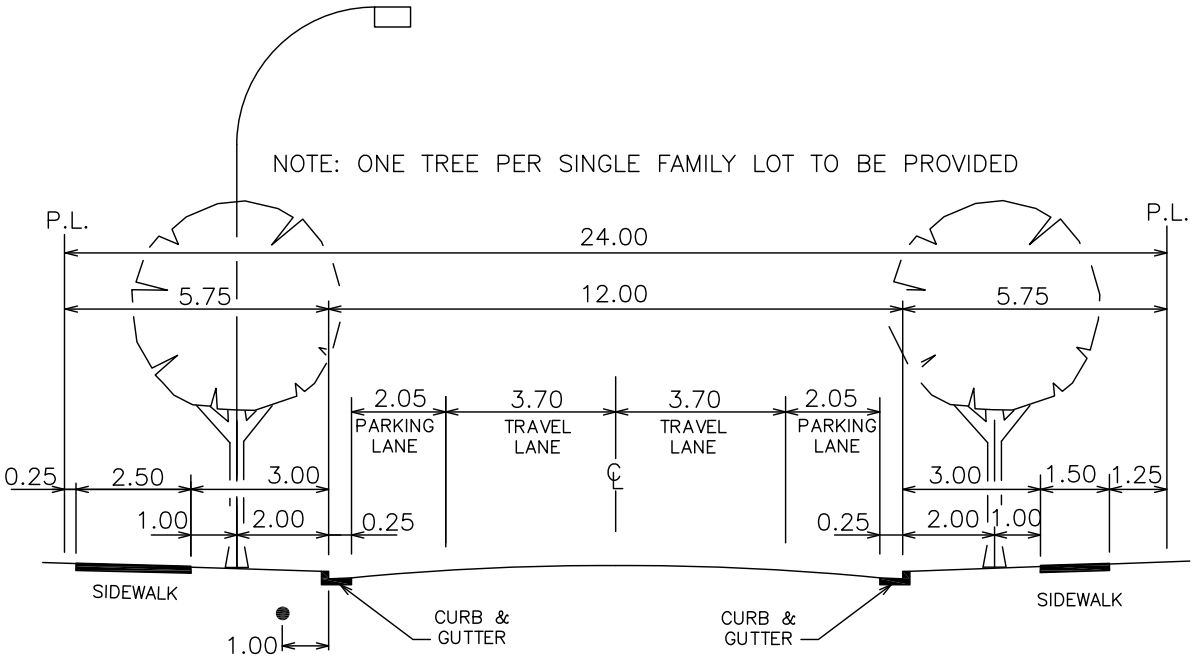
STREETS–UTILITIES ENGINEER

DATE: MAR/10

UNDIVIDED ARTERIAL ROADWAY

SCALE: N.T.S.

DRAWING NO. 5.05



COLLECTOR ROADWAY
WITH SEPARATE SIDEWALK

NOTE:

– ROLLED CURB AND GUTTER TO BE INSTALLED ON ROADWAYS WITH FRONT DRIVEWAYS, OTHERWISE STANDARD CURB AND GUTTER IS REQUIRED.

NO.	DATE	REVISION
4	Feb 1, 2008	Revised
3	July 10, 2007	Revised
2	Feb 24, 2005	Revised Sidewalk dimensions
1	Mar 22, 2004	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Roadway Design

DRAWN BY: D.W.K.

DATE: MAR/10

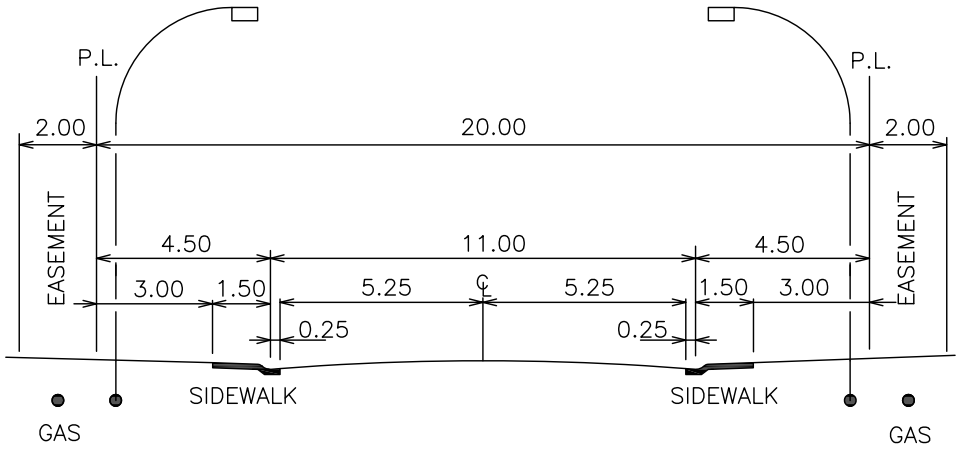
SCALE: N.T.S.

RESIDENTIAL UNDIVIDED COLLECTOR ROADWAY

APPROVED BY:

STREETS–UTILITIES ENGINEER

DRAWING NO. 5.07



NO.	DATE	REVISION
1	Mar 22, 2004	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

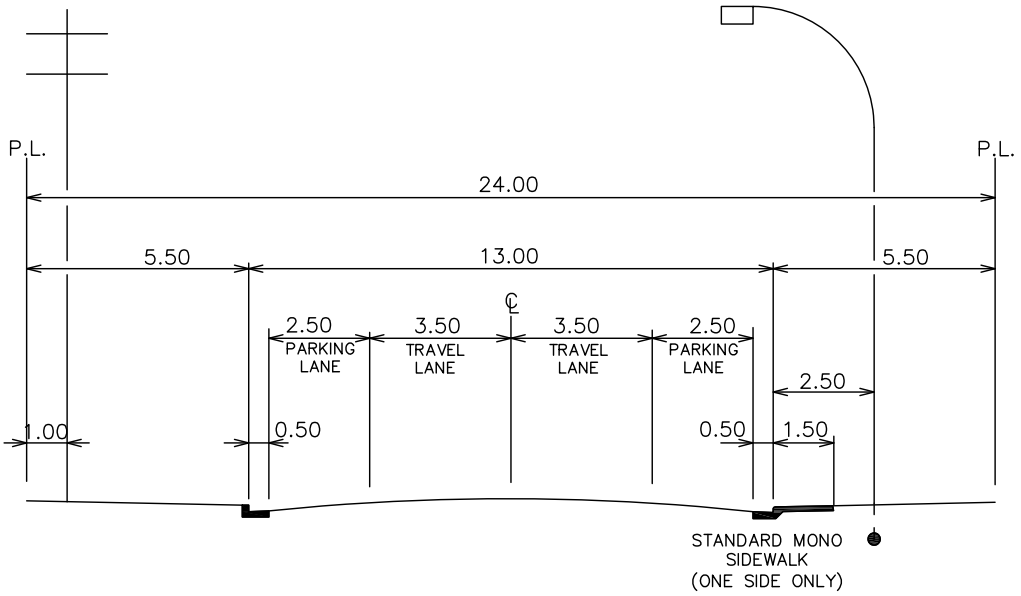
STREETS–UTILITIES ENGINEER

DATE: MAR/10

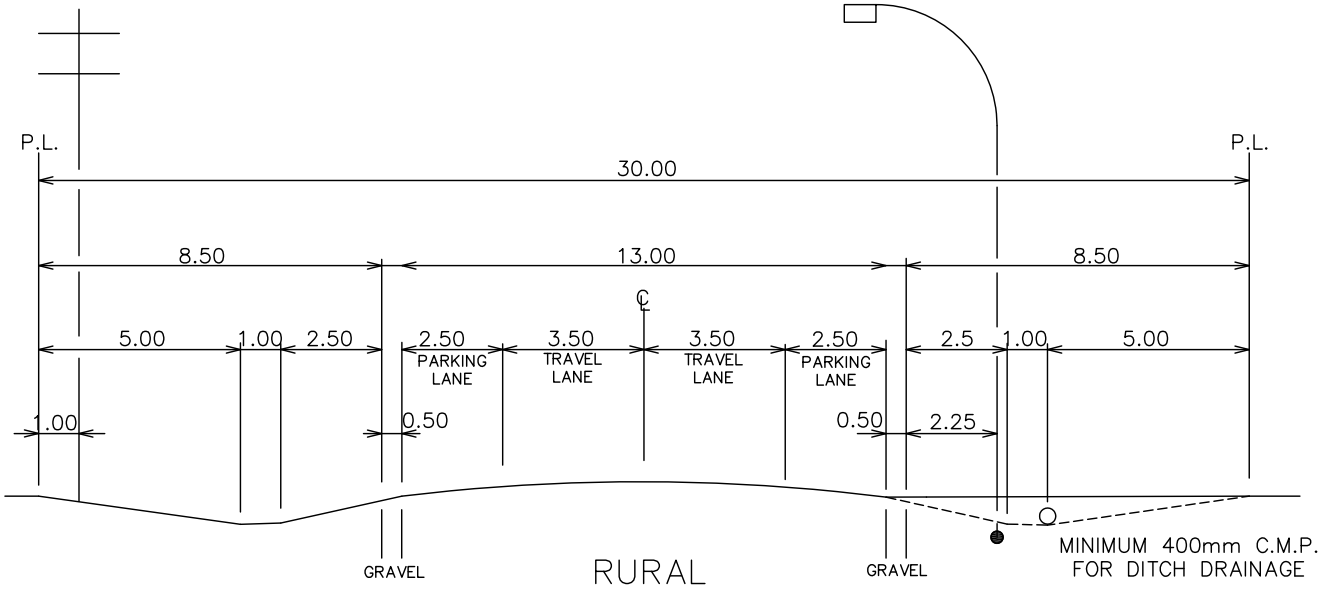
11.0m UNDIVIDED LOCAL ROADWAY

SCALE: N.T.S.

DRAWING NO. 5.09



URBAN
UNDIVIDED INDUSTRIAL
COLLECTOR ROADWAY



RURAL
UNDIVIDED INDUSTRIAL
COLLECTOR ROADWAY

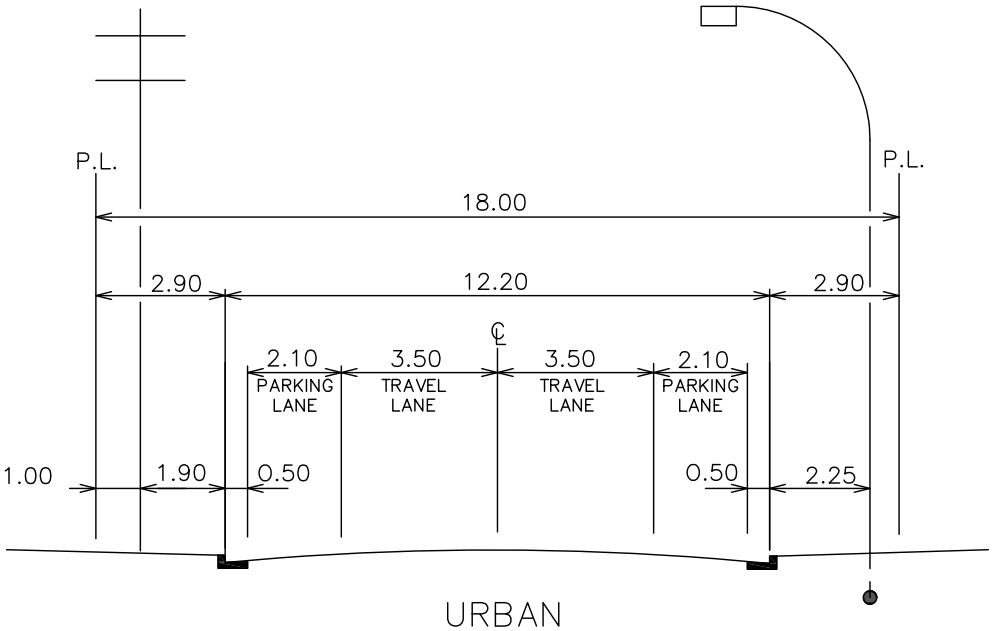
NO.	DATE	REVISION
2	Mar 4, 2009	Revised
1	Feb 1, 2008	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

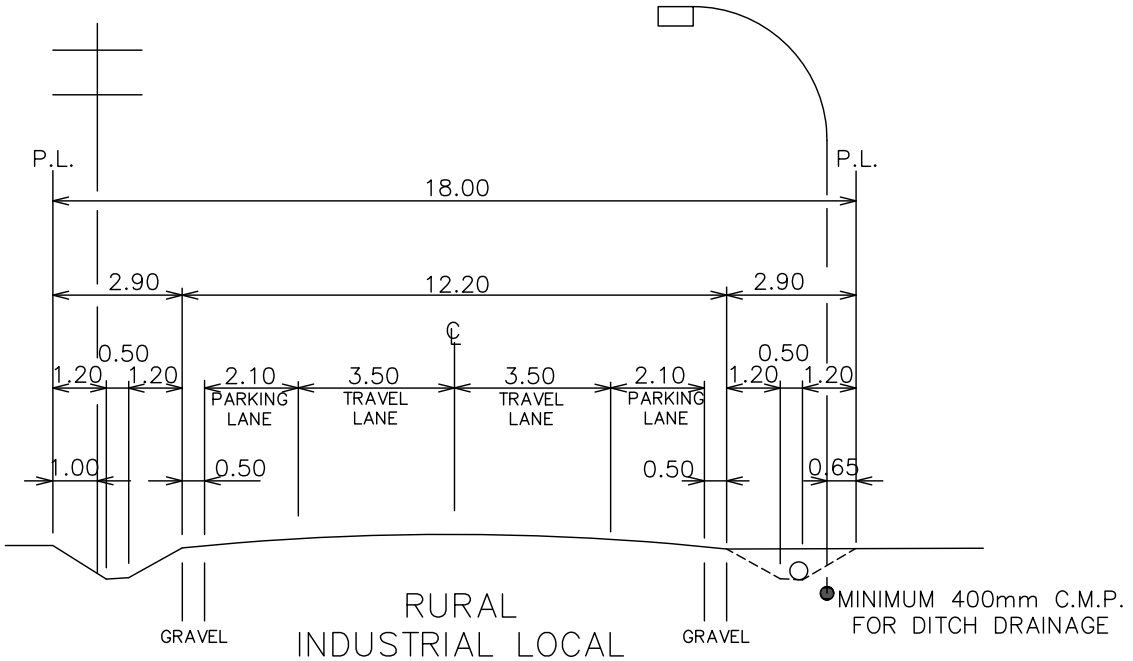
DESIGN GUIDELINE DRAWINGS
Roadway Design

RURAL & URBAN UNDIVIDED INDUSTRIAL COLLECTOR ROADWAY

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.11



URBAN
INDUSTRIAL LOCAL
ROADWAY



RURAL
INDUSTRIAL LOCAL
ROADWAY

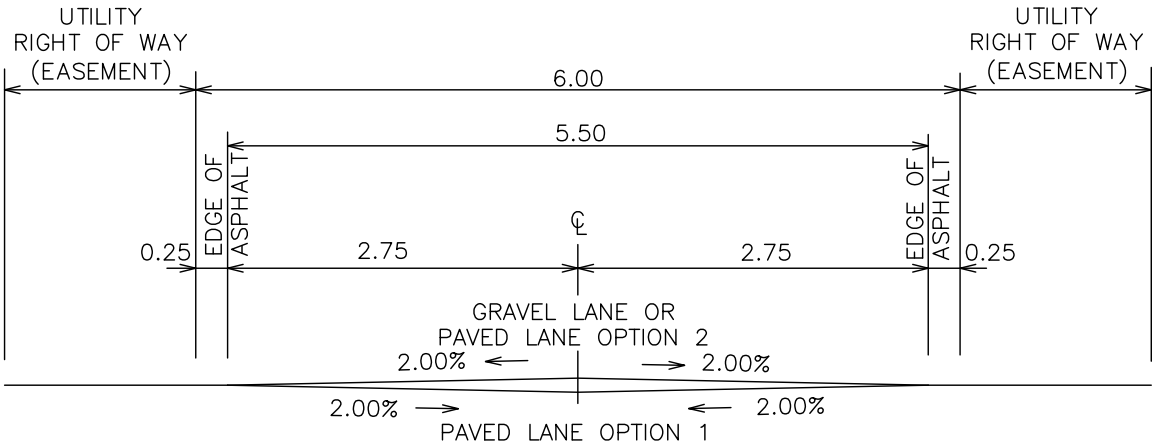
NO.	DATE	REVISION
1	Mar 26/09	Revised measurements

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Roadway Design

RURAL & URBAN INDUSTRIAL LOCAL ROADWAY

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.12



LANE

NOTE:

- MINIMUM 2.00m WIDE EASEMENT REQUIRED ON BOTH SIDES OF LANE FOR REAR SERVICING.
- LANE TO BE PAVED ADJACENT TO MULTI–FAMILY AND COMMERCIAL DEVELOPMENTS WHERE LANE ACCESS IS PROVIDED.
- LANE R/W WIDTH MAY VARY IN ESTABLISHED SUBDIVISION, CROSS–SECTION DIMENSIONS TO BE ADJUSTED ACCORDINGLY.
- ALL LANES ARE TO BE PAVED IN 2 MATS.

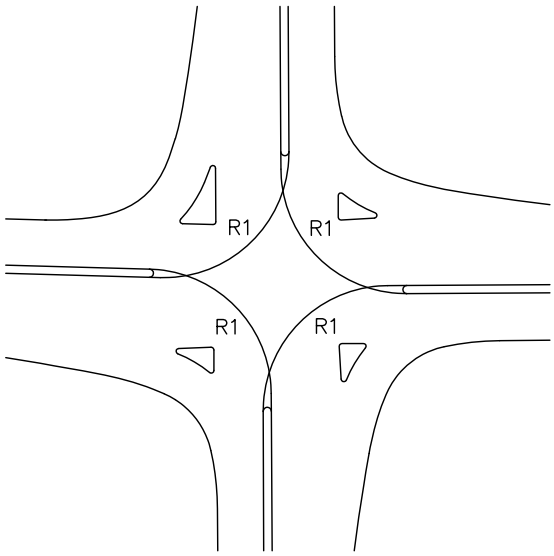
NO.	DATE	REVISION
2	June 25, 2007	Added to the Note.
1	Mar 6, 2003	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

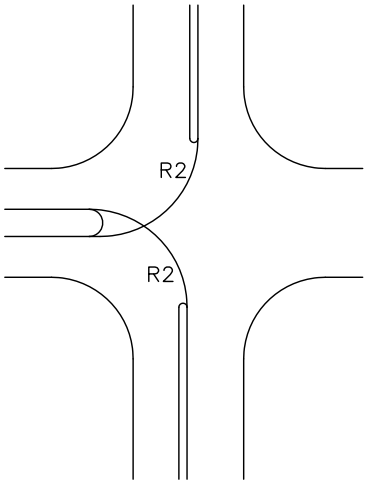
DESIGN GUIDELINE DRAWINGS
Roadway Design

LANES

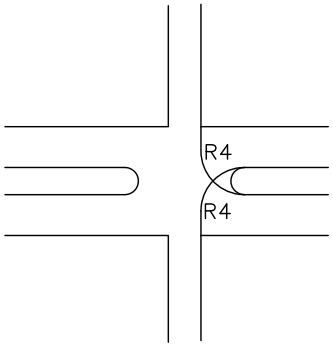
DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.14



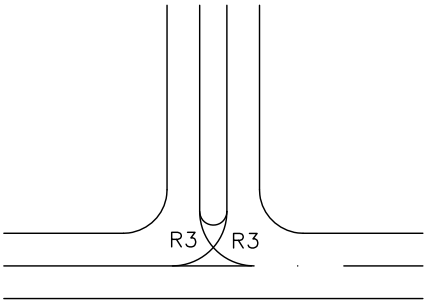
ARTERIAL TO ARTERIAL



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

TOWN OF PONOKA

DRAWN BY: N.M.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

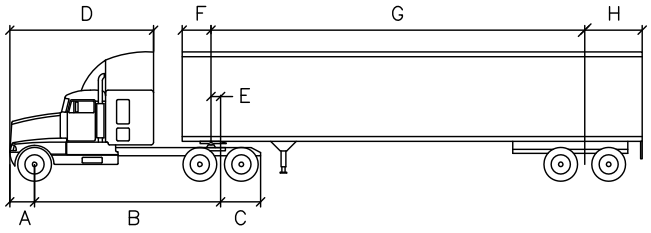
DATE: MAR/10

INTERSECTION CENTRE LINE
CONTROL RADII

SCALE: N.T.S.

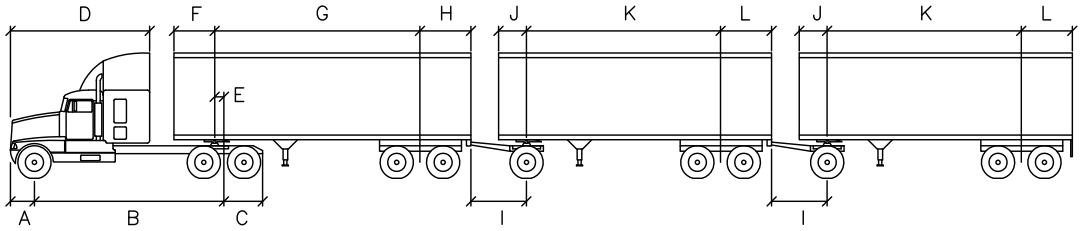
DRAWING NO. 5.20

WB–15, 17 & 20



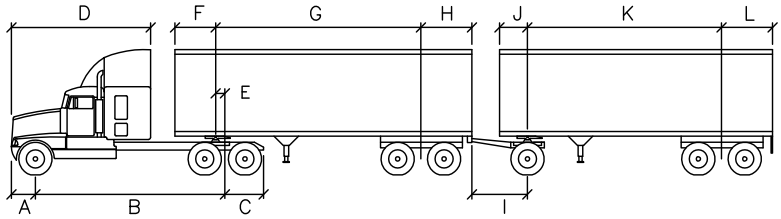
Tractor Width: 2.60 Trailer Track : 2.60
Trailer Width: 2.60 Steering Angle : 26.22
Tractor Track: 2.60 Tractor/Trailer Angle : 48.24

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–29	WB–35
TRACTOR					
A Tractor Front	1.0	1.0	1.0	1.0	1.0
B Tractor Wheelbase	5.5	5.5	5.5	5.5	5.5
C Tractor Rear	1.3	1.3	1.3	1.3	1.3
D Cab Length	3.5	3.5	3.0	3.0	3.0
E Axle to Kingpin	0.0	0.0	0.0	0.0	0.0
FIRST TRAILER					
F Trailor Front	1.3	1.3	1.3	1.3	1.3
G Pin to Trailor Axle	9.1	11.5	14.3	6.3	12.2
H Trailor Rear	1.5	1.5	1.5	1.0	1.0
SECOND AND / OR THIRD TRAILER					
I Towbar	N/A	N/A	N/A	1.8	2.4
J Trailor Front	N/A	N/A	N/A	0.9	1.2
K Pin to Trailor Axle	N/A	N/A	N/A	6.6	12.2
L Trailor Rear	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.

SEE DWG. 5.22 FOR VEHICLE TURNING RADII.

NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

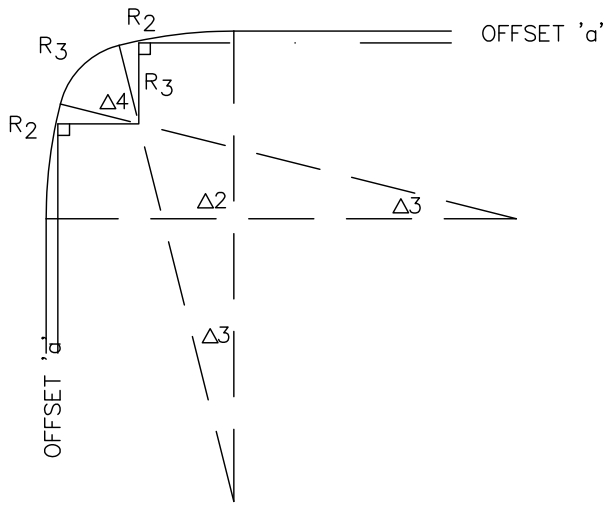
STREETS–UTILITIES ENGINEER

DATE: MAR/10

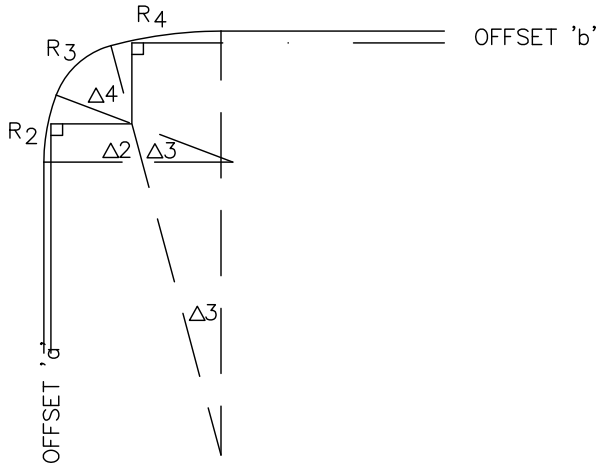
W.B. DESIGN VEHICLES

SCALE: N.T.S.

DRAWING NO. 5.21



3 – CENTRED SYMETRICAL COMPOUND CURVE



3 – CENTRED ASYMETRICAL COMPOUND CURVE

NOTE :
Δ3 AND Δ4 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 5.22)	Angle of Turn (degrees)	3 – Centered Symetrical Compound Curve				3 – Centered Asymetrical Compound Curve				
		Minimum Curve Radii (meters)			Symetric Off–set (meters)	Minimum Curve Radii (meters)			Asymetric 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	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

NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Roadway Design

W.B. VEHICLE COMPOUND CURVE TURN DESIGN

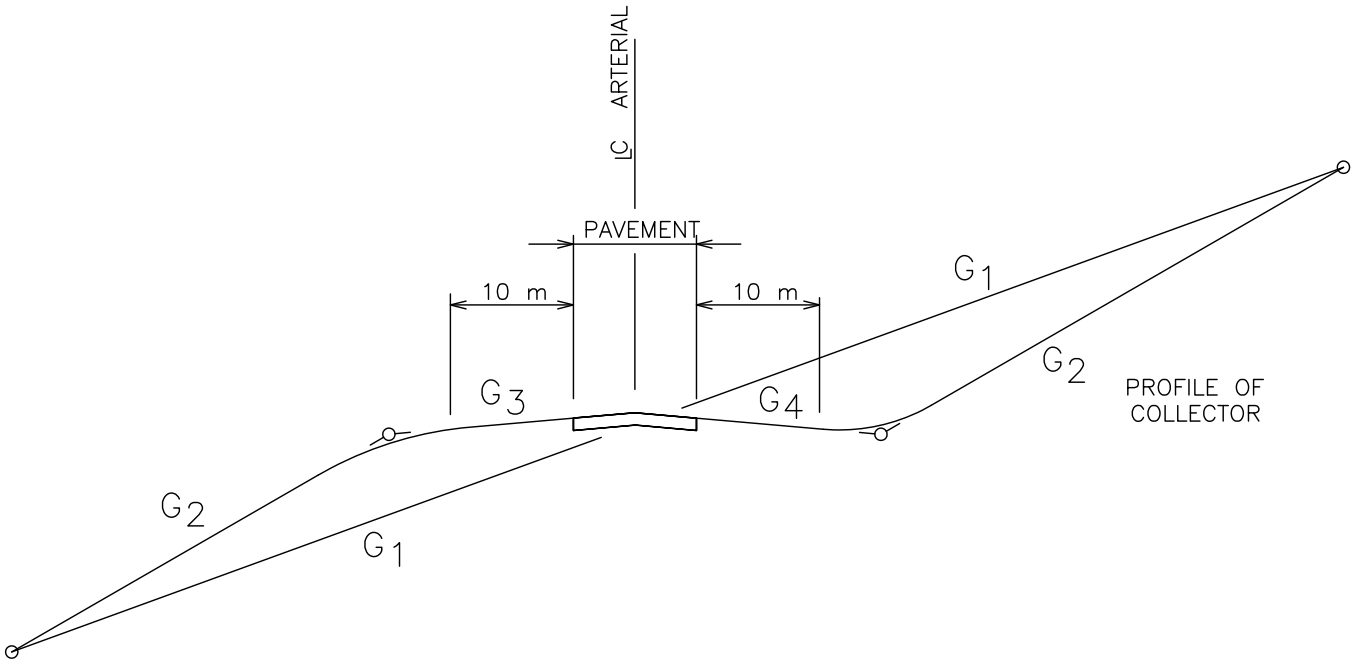
DRAWN BY: N.M.

DATE: MAR/10

SCALE: N.T.S.

APPROVED BY:

DRAWING NO. 5.22



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

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

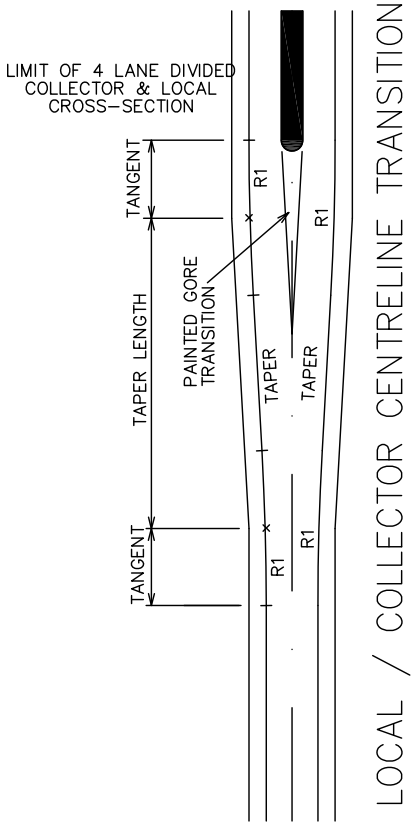
DATE: MAR/10

INTERSECTION GRADE ADJUSTMENT

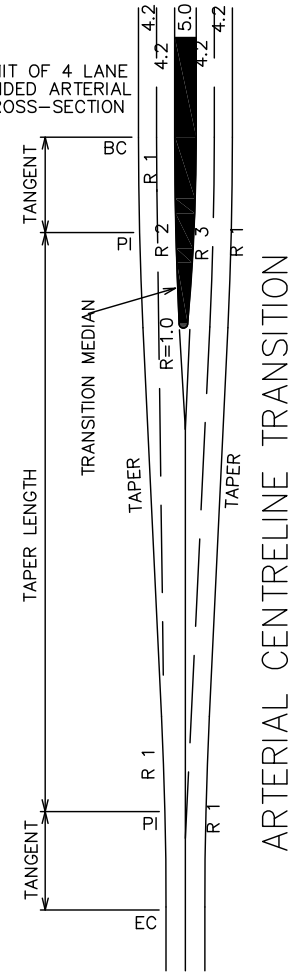
STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

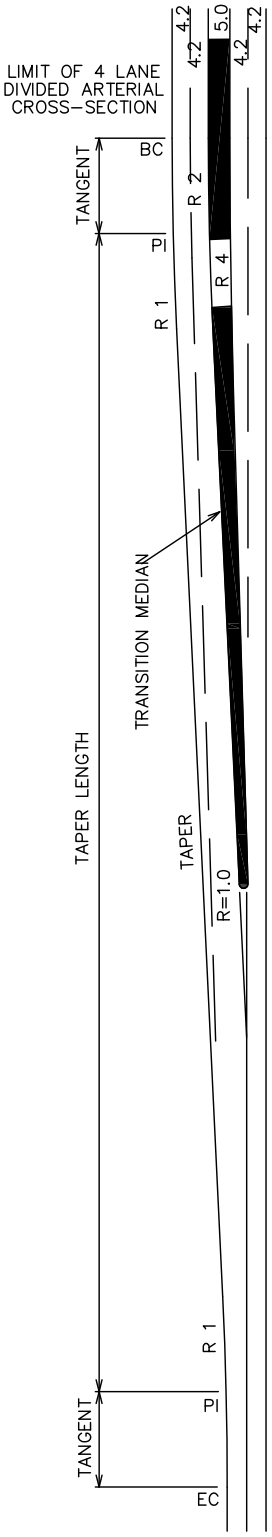
DRAWING NO. 5.23



LOCAL / COLLECTOR CENTRELINE TRANSITION



ARTERIAL CENTRELINE TRANSITION



ARTERIAL OFFSET TRANSITION

OVERALL APPROACH OR DEPARTURE TAPER LENGTHS						
ROADWAY	DESIGN SPEED KM/H	TAPER RATIO	TRANSITION RADII (m)			
			R 1	R 2	R 3	R 4
LOCAL	50	15:1	500	---	---	---
COLLECTOR	60	18:1	700	---	---	---
ARTERIAL	70	21:1	930	921.6	475	2000
ARTERIAL	80	24:1	1200	1191.6	475	2000

INFORMATION SHOWN FOR ARTERIAL ROADWAY TRANSITIONSARE BASED ON 70 fm/hr DESIGN SPEED.

NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Roadway Design

DRAWN BY: N.M.

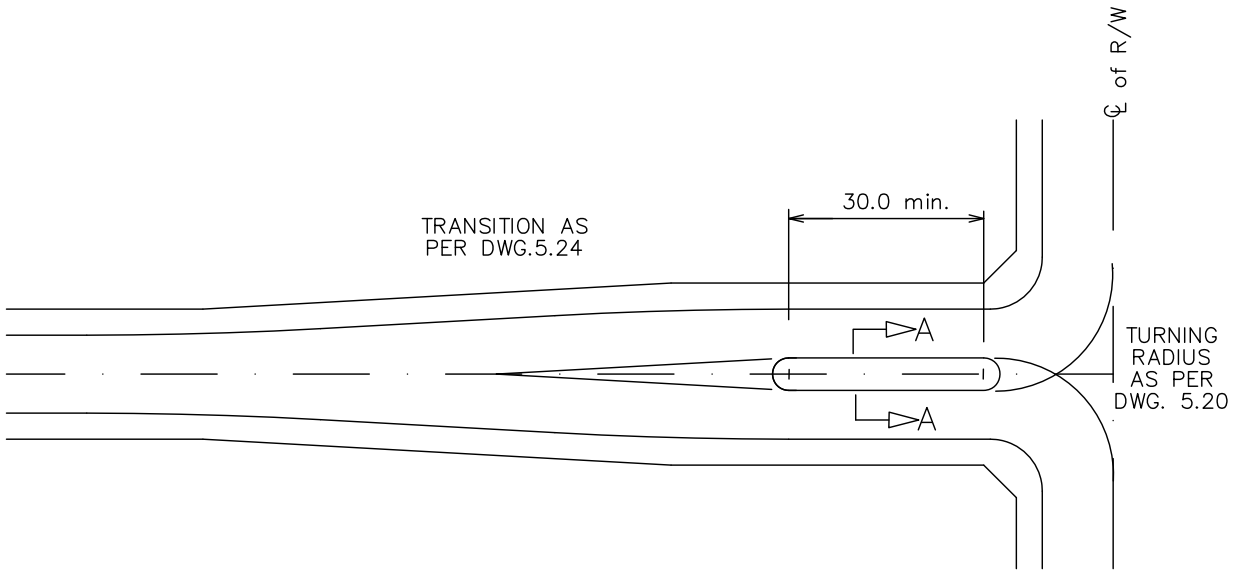
DATE: MAR/10

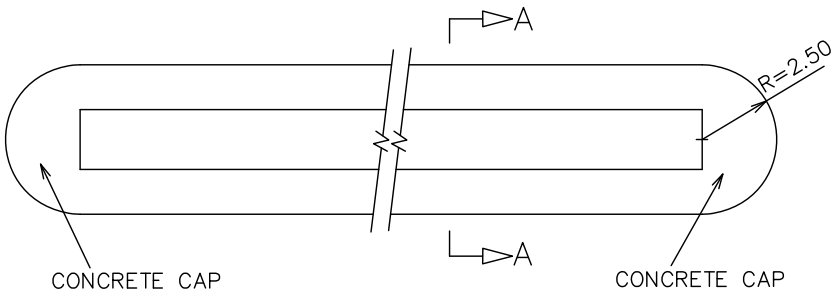
SCALE: N.T.S.

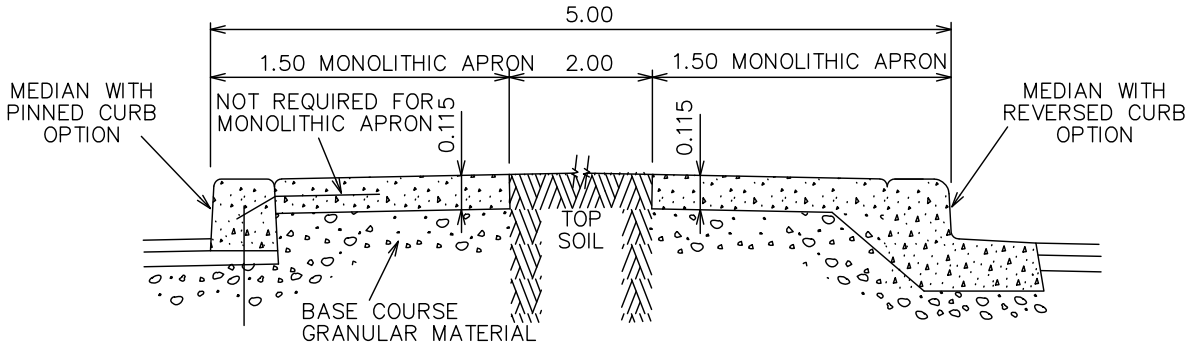
DIVIDED TO UNDIVIDED ROADWAY TRANSITION

APPROVED BY:

DRAWING NO. 5.24







NOTE :
PATTERNED CONCRETE OR PAVING STONES FOR APRON ARE PERMITTED

SECTION 'A – A'
(AS PER CONTRACT SPECIFICATION)

NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Roadway Design

COLLECTOR AND LOCAL
ROADWAY CENTRE ISLAND

DRAWN BY: N.M.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY:
DRAWING NO. 5.25

SIX LANE CROSS-SECTION

FOUR LANE INTERIM CROSS-SECTION

NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

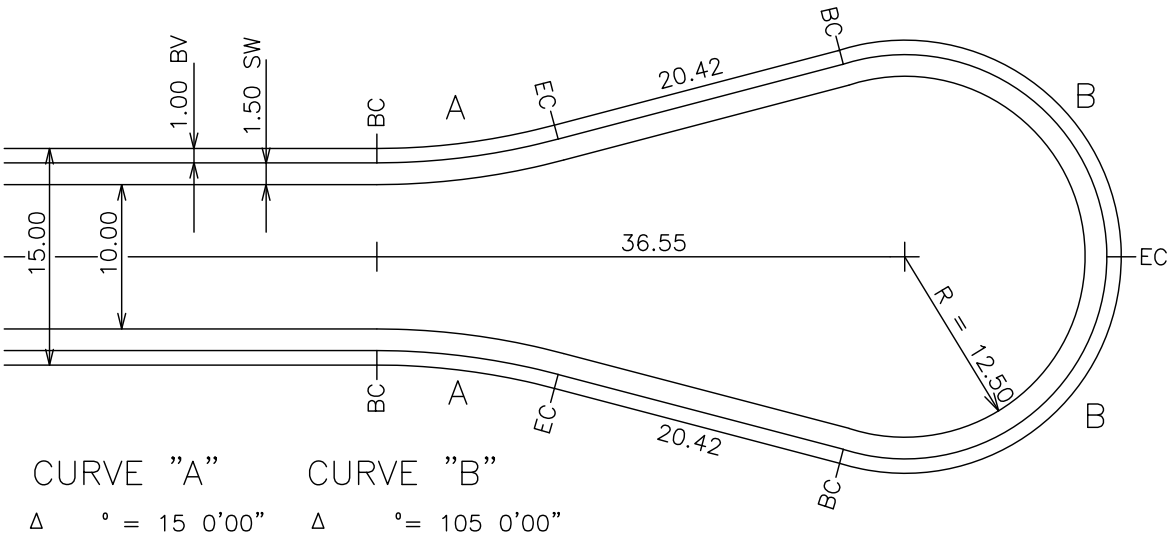
STREETS–UTILITIES ENGINEER

DATE: MAR/10

TYPICAL SLOT RIGHT TURN & LEFT TURN DESIGNS

SCALE: N.T.S.

DRAWING NO. 5.26

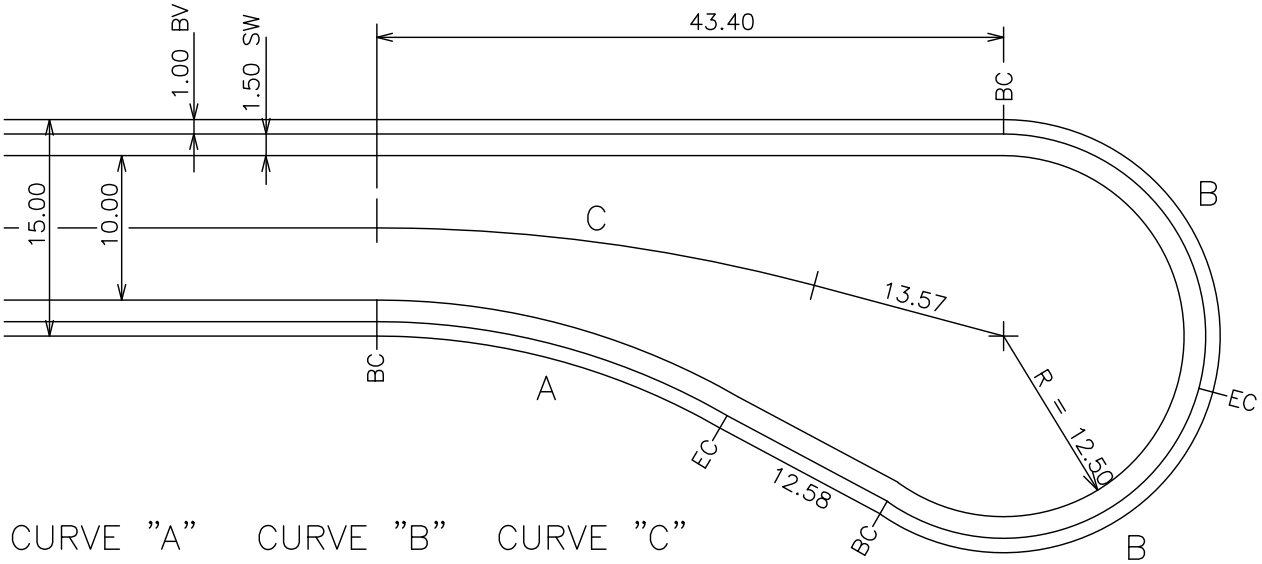


CURVE "A"

Δ ° = 15 0'00"
R = 50.00
ARC = 13.09
TAN = 6.58
(at property line)

CURVE "B"

Δ °= 105 0'00"
R = 15.00
ARC = 27.49
TAN = 19.55
(at property line)



CURVE "A"

Δ ° = 30 0'00"
R = 50.00
ARC = 26.18
TAN = 13.40
(at property line)

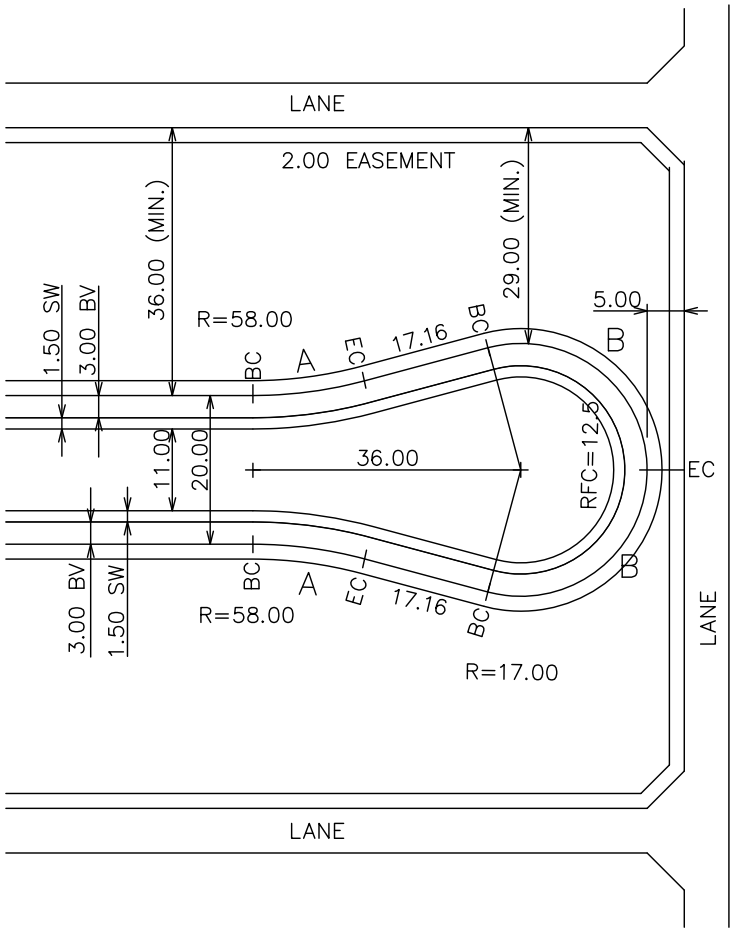
CURVE "B"

Δ °= 105 0'00"
R = 15.00
ARC = 27.49
TAN = 19.55
(at property line)

CURVE "C"

Δ ° = 15 0'00"
R = 117.03
ARC = 30.64
TAN = 15.41

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	15 / 10 LOCAL RESIDENTIAL CUL – DE – SAC	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.27

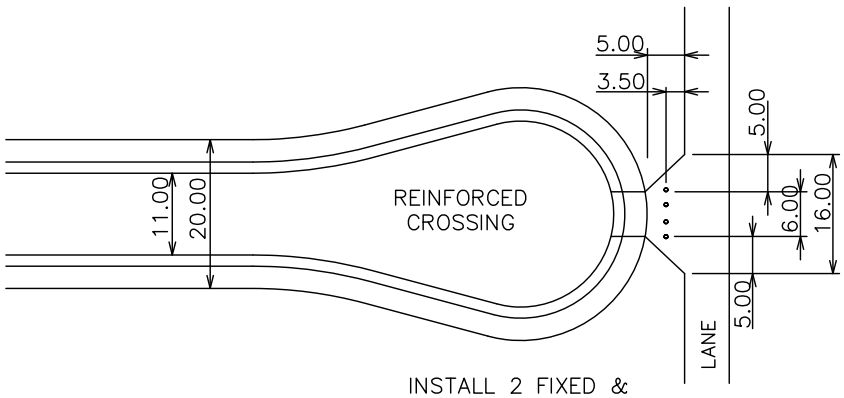


CURVE "A"

Δ °= 15 0'00"
R = 58.00
ARC = 15.18
TAN = 7.64

CURVE "B"

Δ ≒ 105 0'00"
R = 17.00
ARC = 31.17
TAN = 22.15



INSTALL 2 FIXED &
2 KNOCKDOWN BOLLARDS

LANE ACCESS

NOTE :
THIS DESIGN IS TO BE USED FOR DUPLEX, R1N AND ROW HOUSING DEVELOPMENTS.

NO.	DATE	REVISION
2	MAY 2014	
1	MAY 2013	APPROVED

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

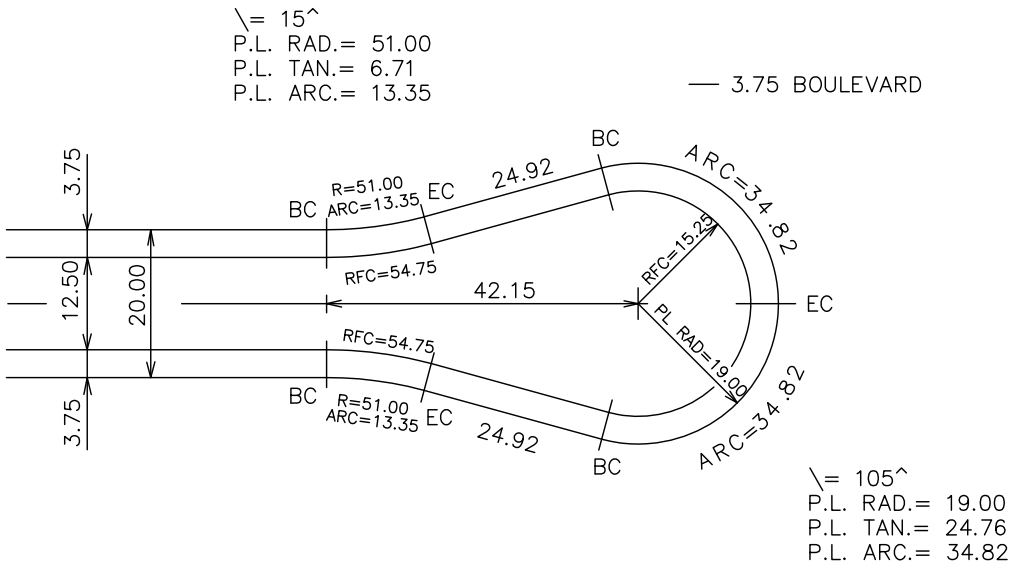
DATE: MAR/10

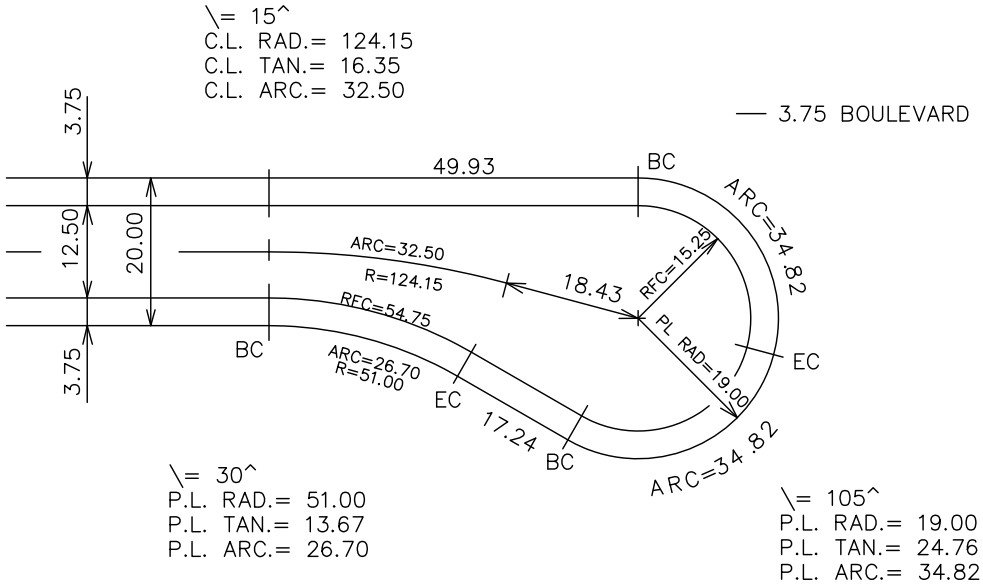
20 / 11 LOCAL RESIDENTIAL (MULTI-FAMILY) CUL - DE - SAC

STREETS-UTILITIES ENGINEER

SCALE: N.T.S.

DRAWING NO. 5.28





NO.	DATE	REVISION
2	MAY 2014	
1	MAY 2013	APPROVED

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

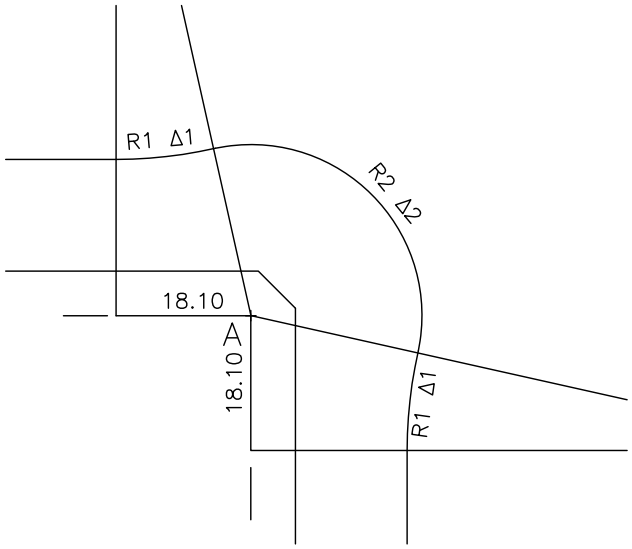
DATE: MAR/10

20 / 12.5 LOCAL INDUSTRIAL CUL – DE – SAC

STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

DRAWING NO. 5.29

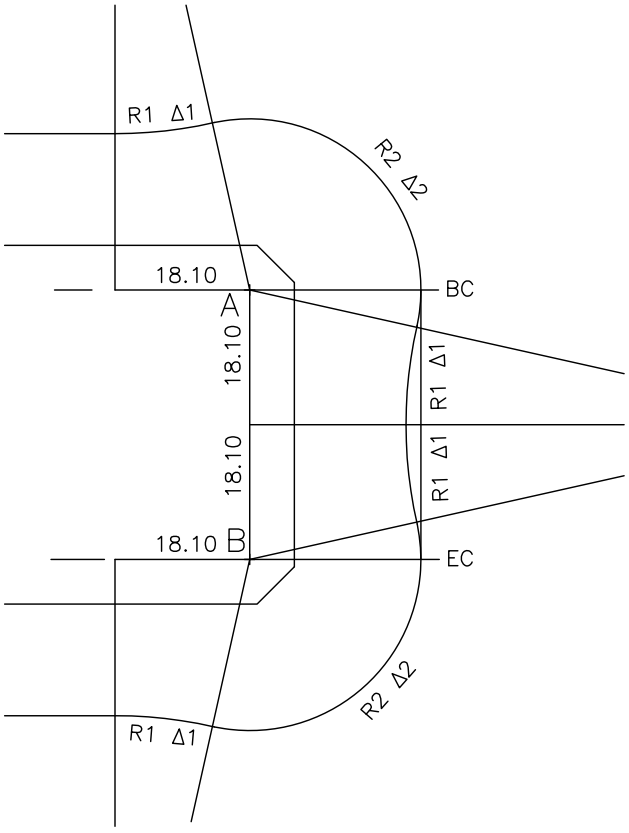


CURVE DATA

R1 = 60.00m
Δ1 = 12° 36' 12"
ARC = 13.20

R2 = 23.00m
Δ2 = VARIES
ARC = VARIES

ROAD RIGHT OF WAY WIDTH VARIES



NOTE:

IF THE DISTANCE BETWEEN A & 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

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

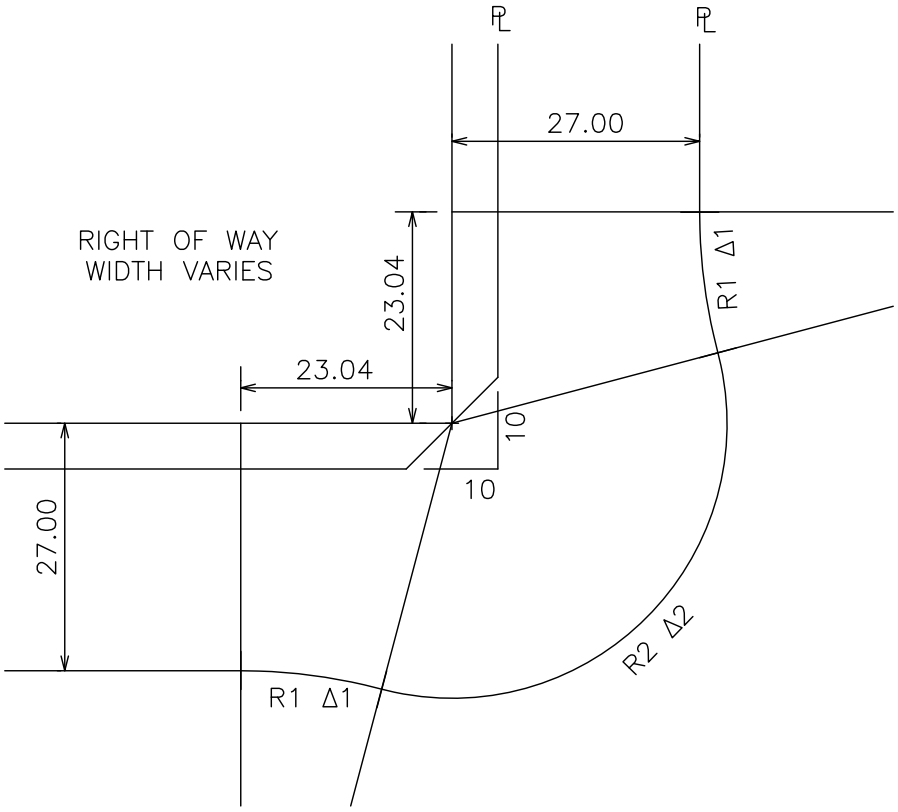
STREETS–UTILITIES ENGINEER

DATE: MAR/10

LOCAL RESIDENTIAL EXPANDED BULB CORNER

SCALE: N.T.S.

DRAWING NO. 5.30



CURVE DATA

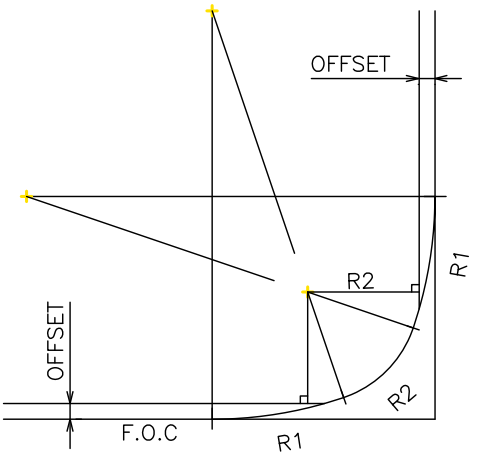
R1=	60.00m	Δ1=	14° 50' 05"
R2=	30.00m	Δ2=	VARIES

EXPANDED CORNER FOR INDUSTRIAL LOCAL

NO.	DATE	REVISION

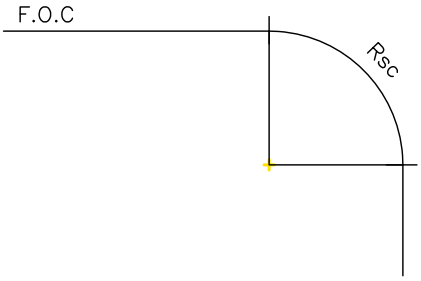
TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
DATE: MAR/10	INDUSTRIAL ROADWAY EXPANDED BULB CORNER	STREETS–UTILITIES ENGINEER
SCALE: N.T.S.		DRAWING NO. 5.31



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

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

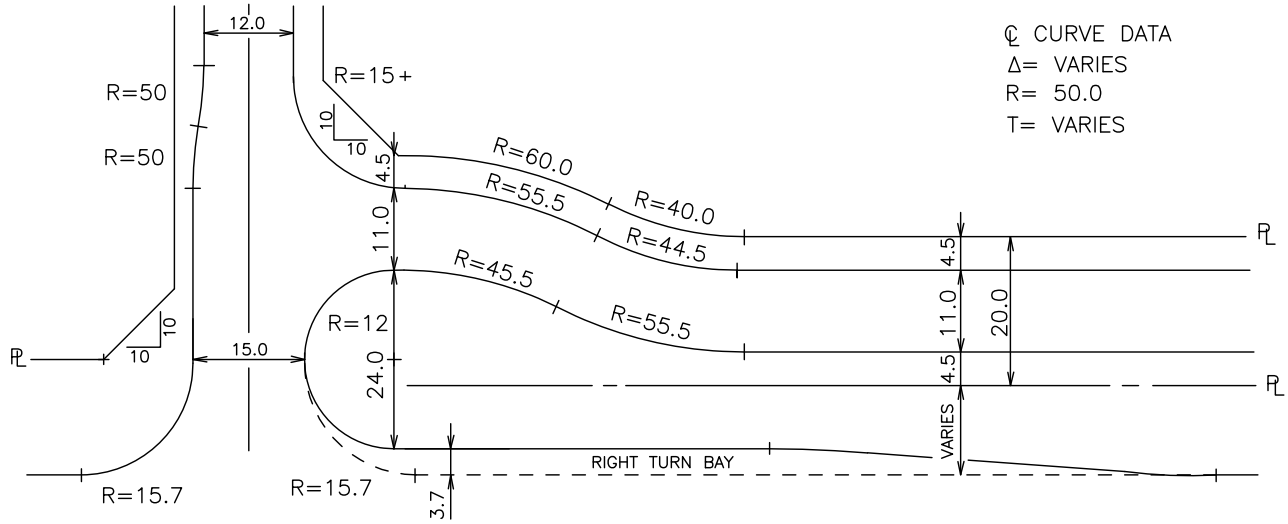
DATE: MAR/10

INDUSTRIAL ROADWAY
CURB RETURN RADII

STREETS–UTILITIES ENGINEER

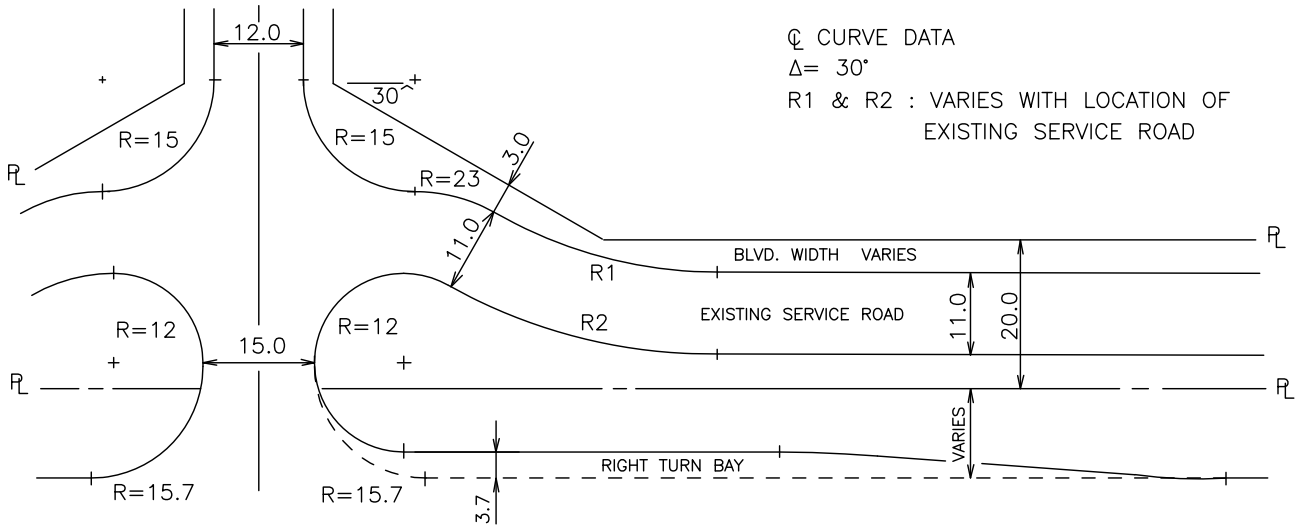
SCALE: N.T.S.

DRAWING NO. 5.32



NOTE: DESIGN BASED ON MINIMUM TURNING RADIUS OF WB–17 VEHICLE

ALTERNATE A



NOTE: DESIGN BASED ON MINIMUM TURNING RADIUS OF WB–17 VEHICLE

ALTERNATE B

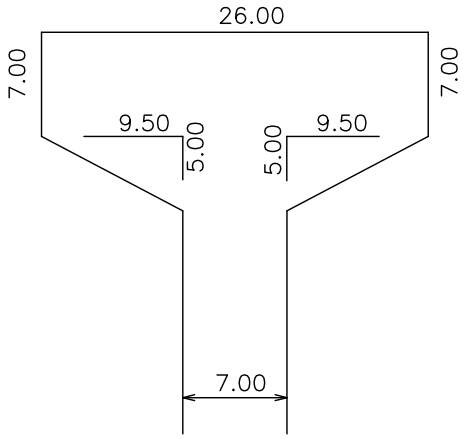
NOTE: 1. ALTERNATE A TO BE USED UNLESS EXISTING DEVELOPMENT RESTRICTS AMOUNT OF LAND AVAILABLE

2. ALTERNATE B IS THE MINIMUM REQUIREMENT IN DEVELOPED AREAS

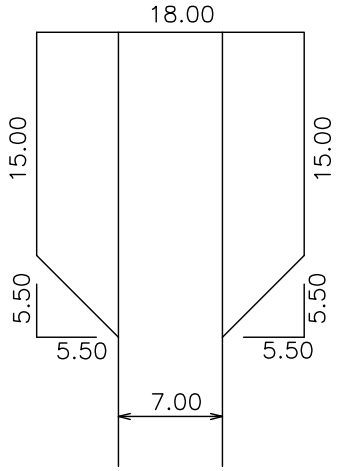
NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

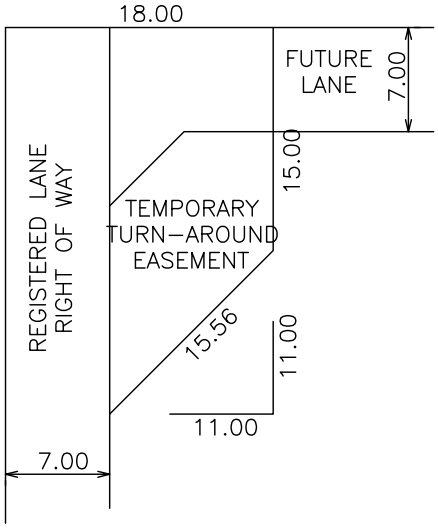
DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
DATE: MAR/10	SERVICE ROAD AND CROSS STREET INTERSECTION DESIGN	STREETS–UTILITIES ENGINEER
SCALE: N.T.S.		DRAWING NO. 5.33



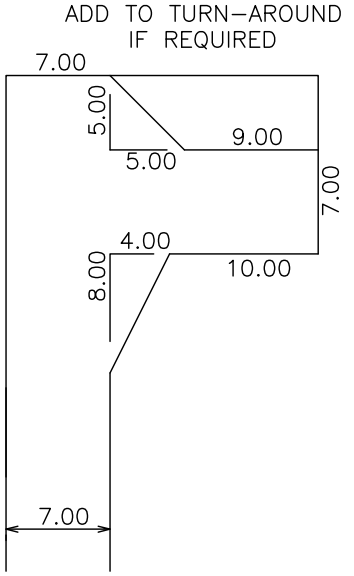
" T " TYPE



STANDARD TYPE



OFFSET TYPE



BRANCH TYPE

NO.	DATE	REVISION
1	Mar 5, 2003	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

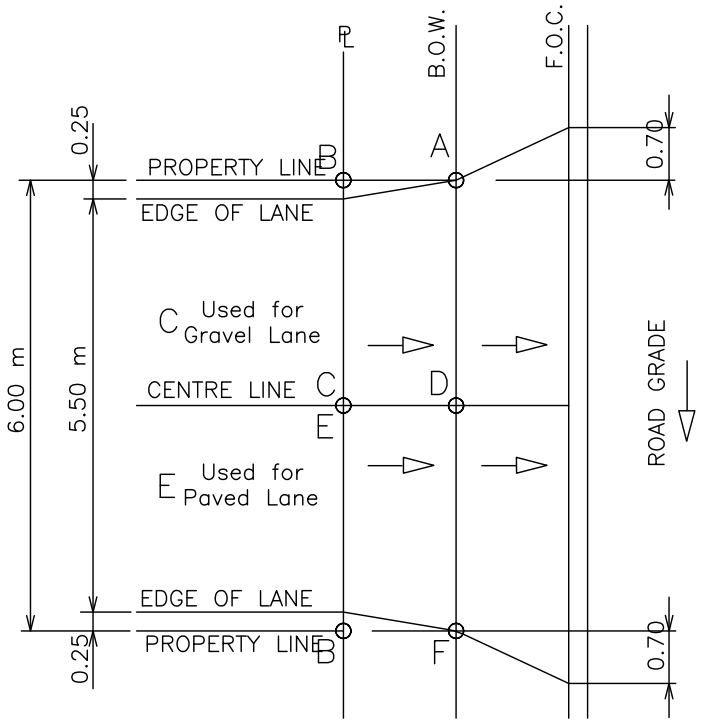
DATE: MAR/10

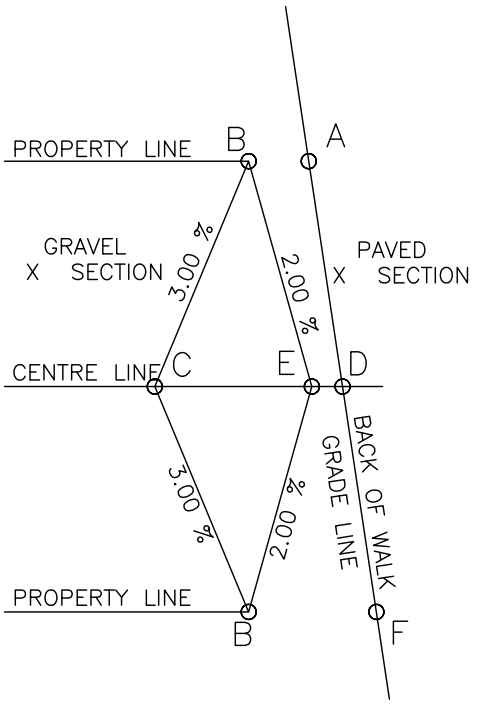
LANE TURN – AROUNDS

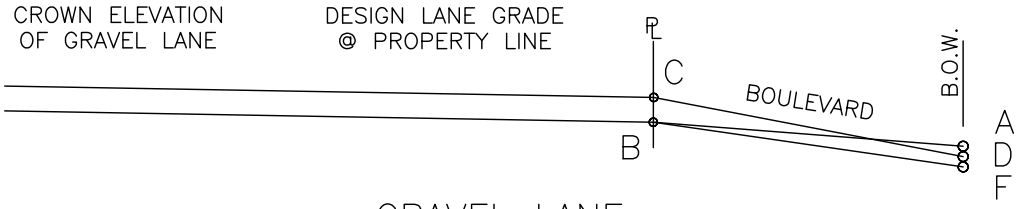
STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

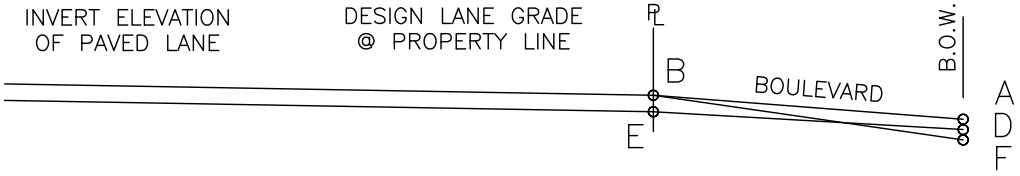
DRAWING NO. 5.34







GRAVEL LANE



PAVED LANE

NOTE :

IF LANE ELEVATION (E) IS LOWER THAN BACK OF WALK ELEVATION (D), A DEPRESSED CROSSING AS PER CONTRACT SPECIFICATION DWG. 6.11 MAY BE REQUIRED FOR DRAINAGE.

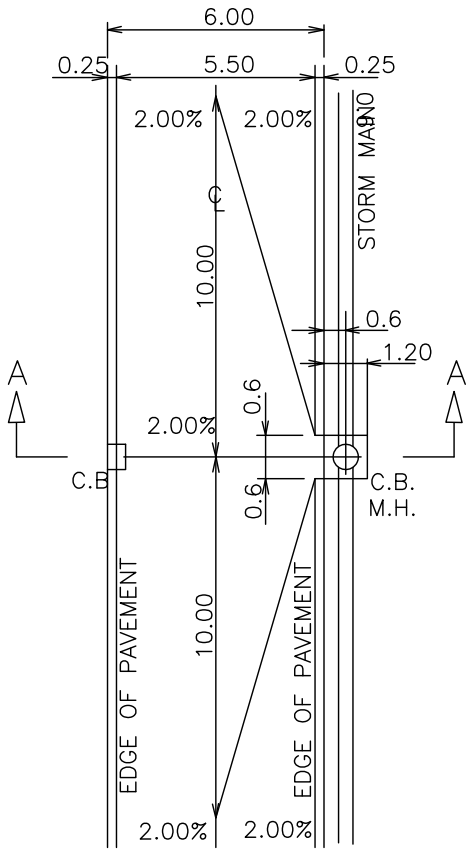
NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

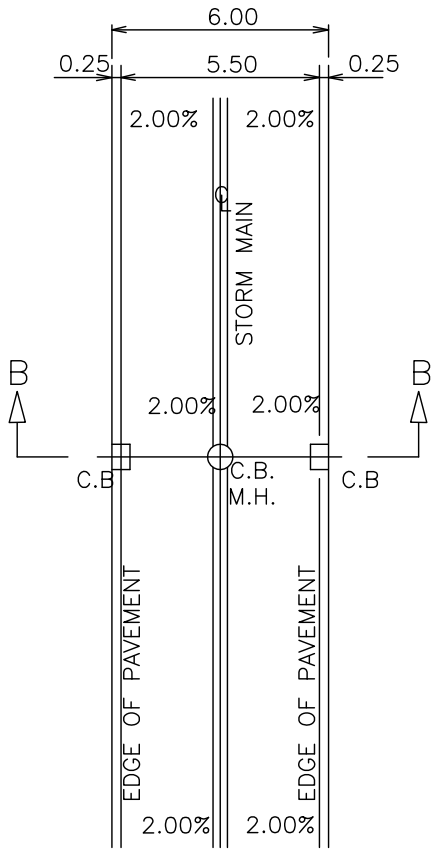
DESIGN GUIDELINE DRAWINGS
Roadway Design

LANE GRADE CALCULATIONS

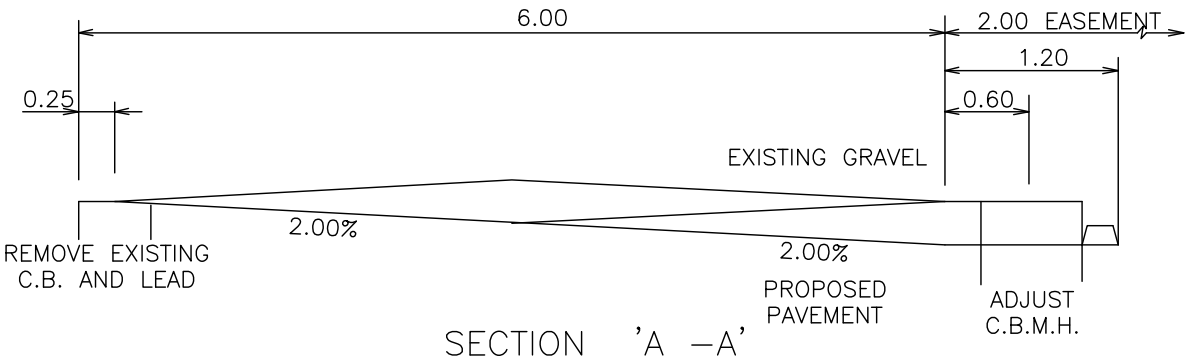
DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.35



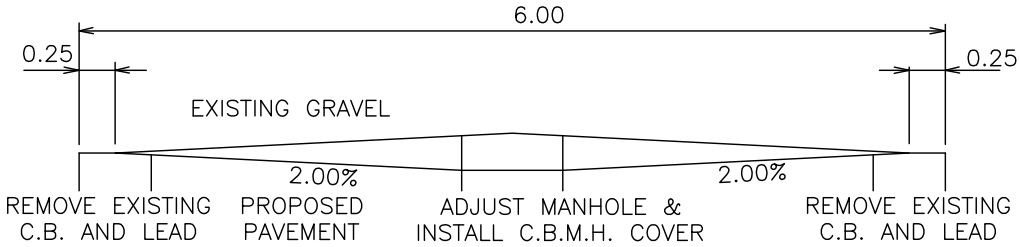
ALTERNATE A



ALTERNATE B

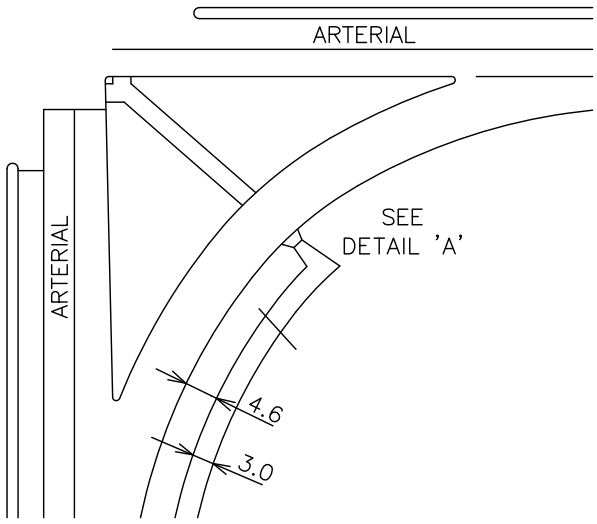


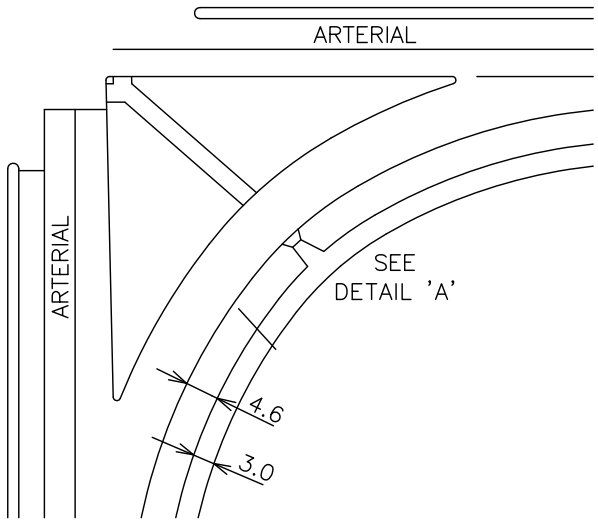
SECTION 'A –A'



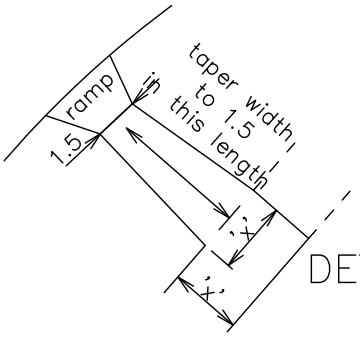
SECTION 'B – B'

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	STORM DRAINAGE REVISIONS FOR GRAVEL LANE TO PAVED LANE CONSTRUCTION	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.36

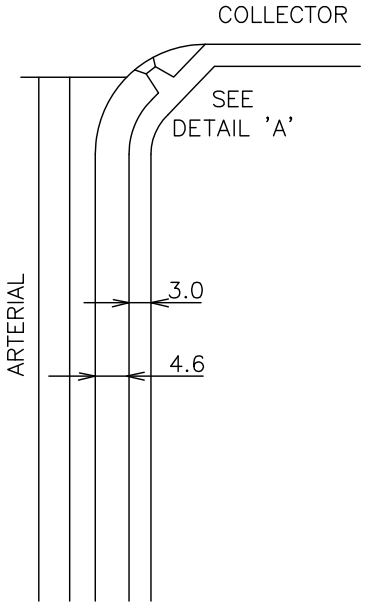


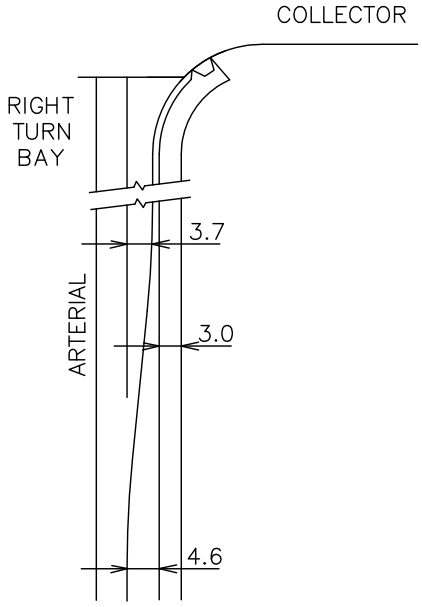


ARTERIAL TO ARTERIAL



DETAIL 'A'





ARTERIAL TO COLLECTOR

NO.	DATE	REVISION
2	Feb 11, 2008	Added Detail
1	Feb 15, 2005	Barriers removed

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

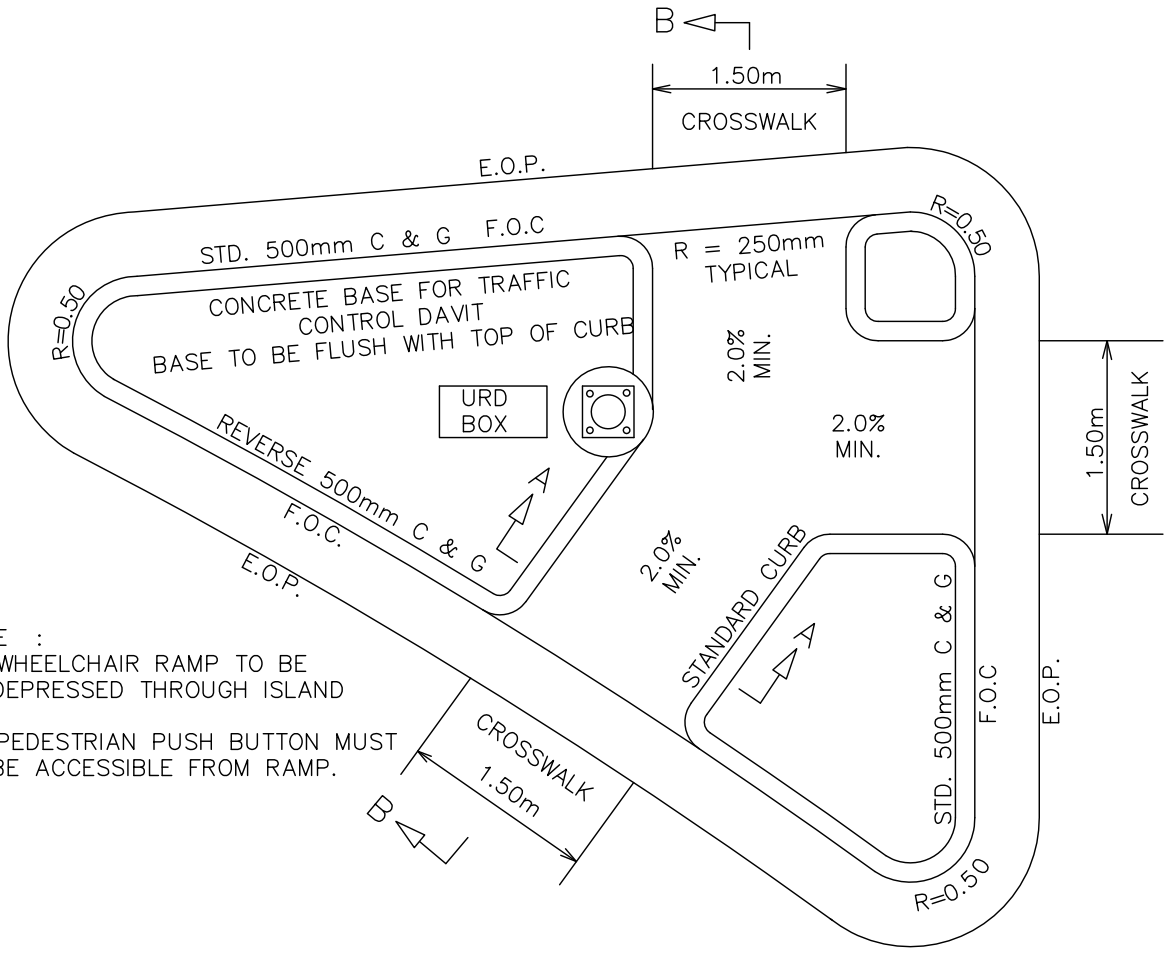
DATE: MAR/10

SIDEWALK ALIGNMENT AND PEDESTRIAN BARRIER LOCATION

STREETS–UTILITIES ENGINEER

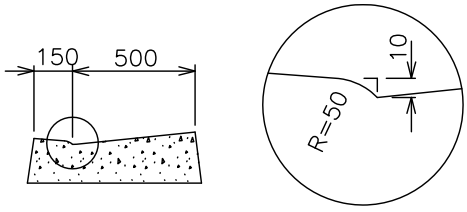
SCALE: N.T.S.

DRAWING NO. 5.37

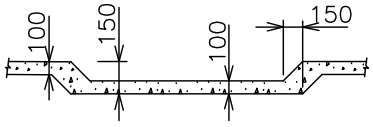


NOTE :

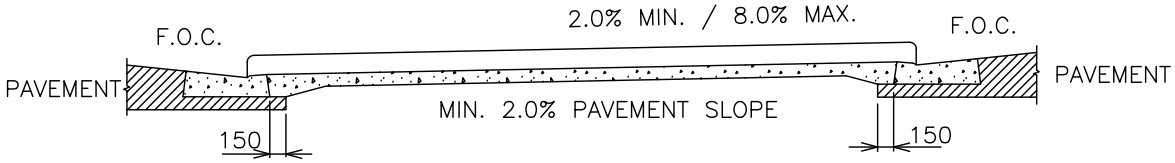
- WHEELCHAIR RAMP TO BE DEPRESSED THROUGH ISLAND
- PEDESTRIAN PUSH BUTTON MUST BE ACCESSIBLE FROM RAMP.



CROSSWALK CURB DETAIL

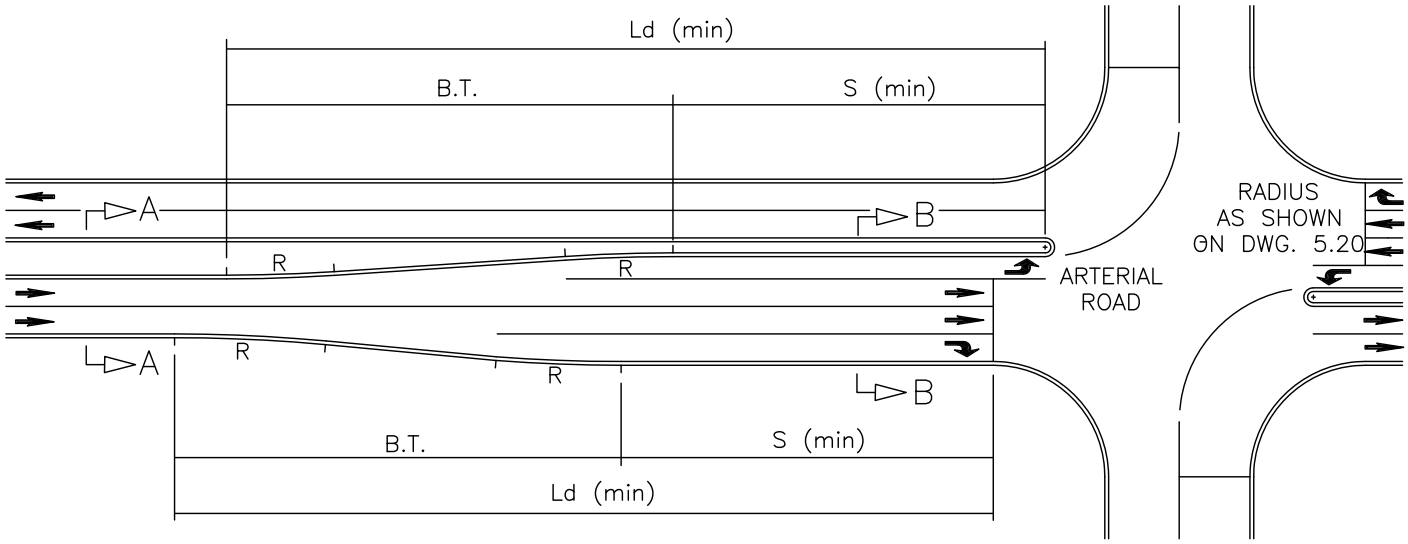


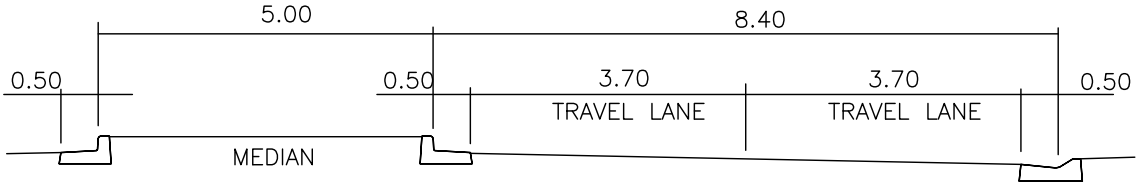
SECTION 'A – A'



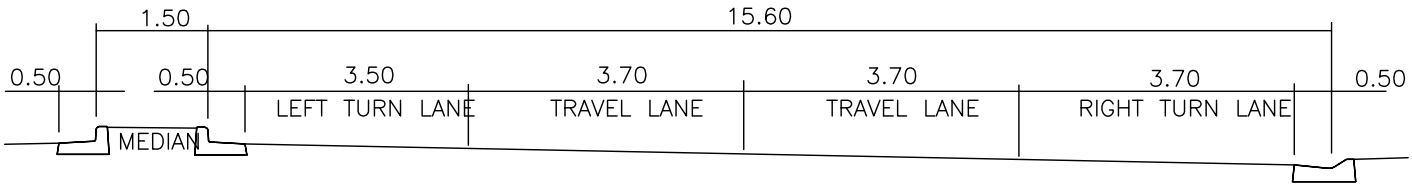
SECTION 'B – B'

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	STANDARD RIGHT– TURN ISLAND DETAIL	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.38





SECTION 'A – A'



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

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

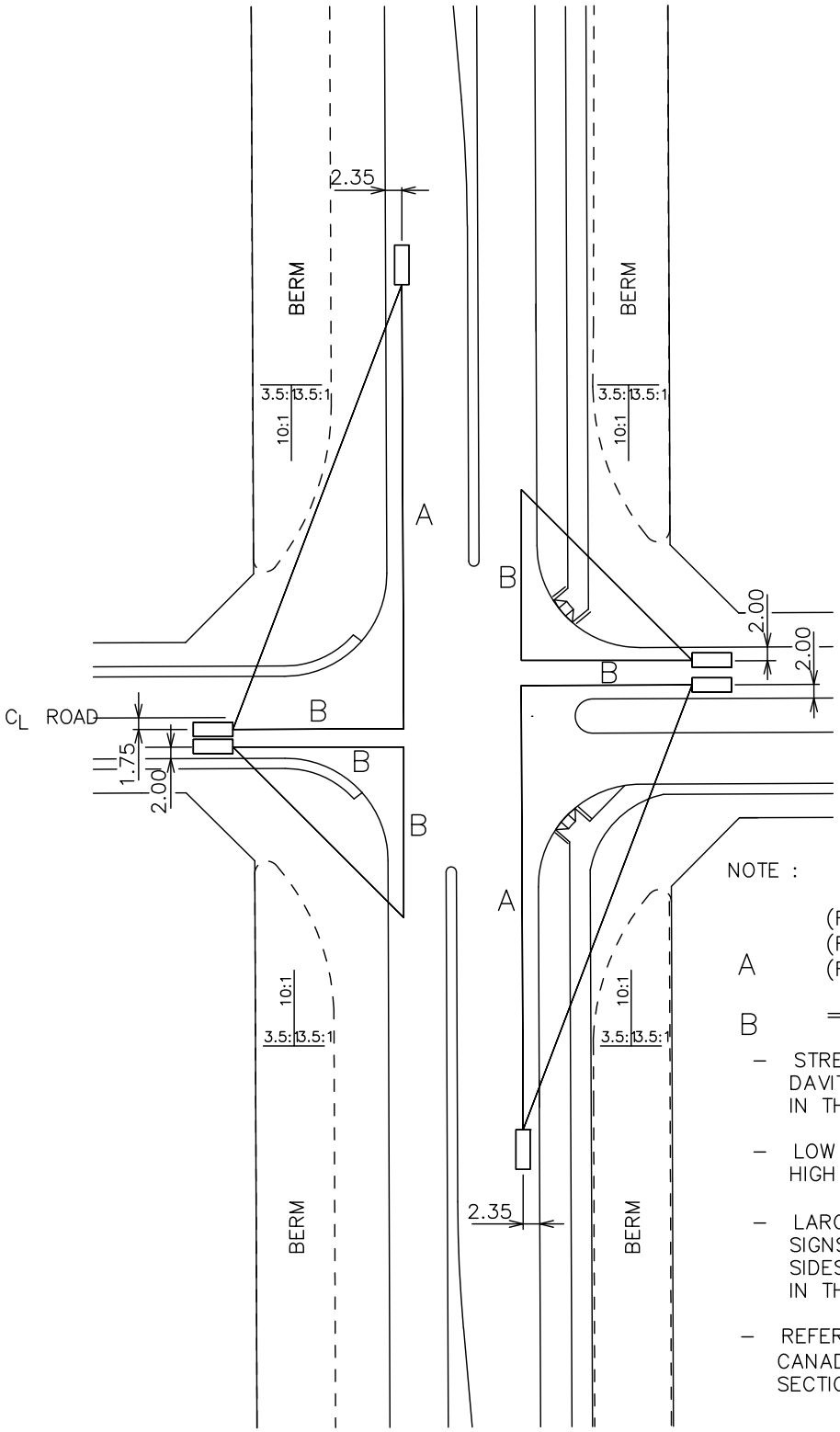
DATE: MAR/10

STREETS–UTILITIES ENGINEER

LEFT AND RIGHT TURN LANE DESIGN

SCALE: N.T.S.

DRAWING NO. 5.39



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 1.00 METER 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.

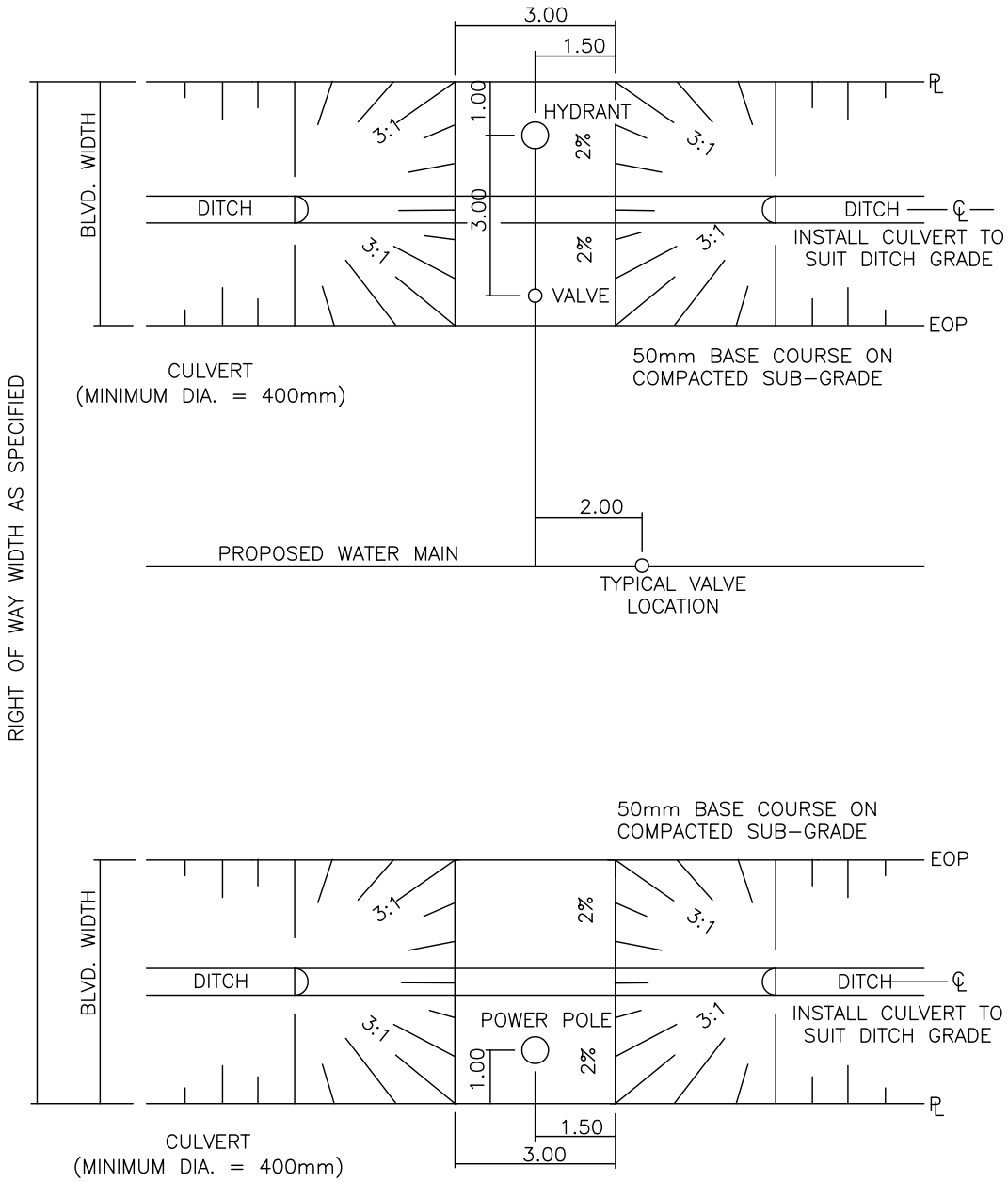
NO.	DATE	REVISION
3	Mar 26, 2009	Revised note
2	Feb 15, 2005	Revised note
1	Feb 10, 2004	Revised number

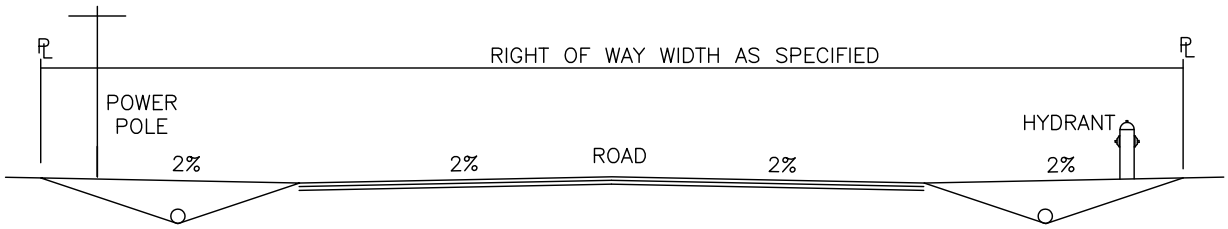
TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Roadway Design

ARTERIAL ROADWAY SIGHT TRIANGLE

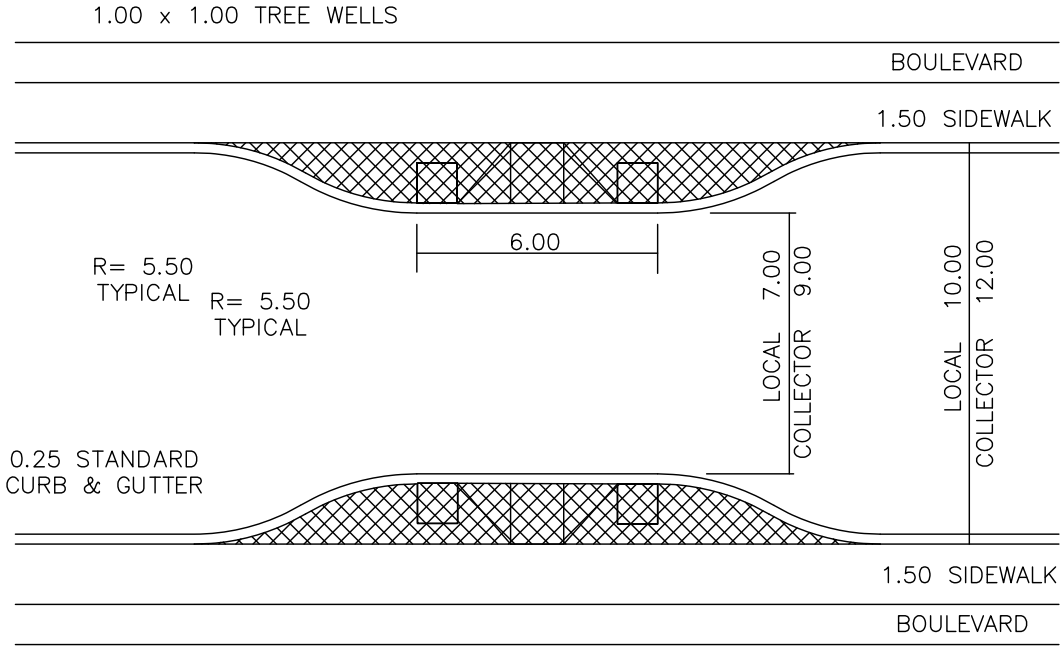
DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.40





CROSS – SECTION

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	RURAL CROSS–SECTION HYDRANT & POWER POLE ACCESS	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.41



NOTE: WRITTEN APPROVAL FROM THE ENGINEERING SERVICES MANAGER IS REQUIRED FOR ALL ROADWAY NARROWING.

NO.	DATE	REVISION
2	Feb 11, 2009	Revised pattern
1	June 25, 2007	Added note.

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

DATE: MAR/10

ROADWAY NARROWING FOR PEDESTRIAN ACCOMMODATION

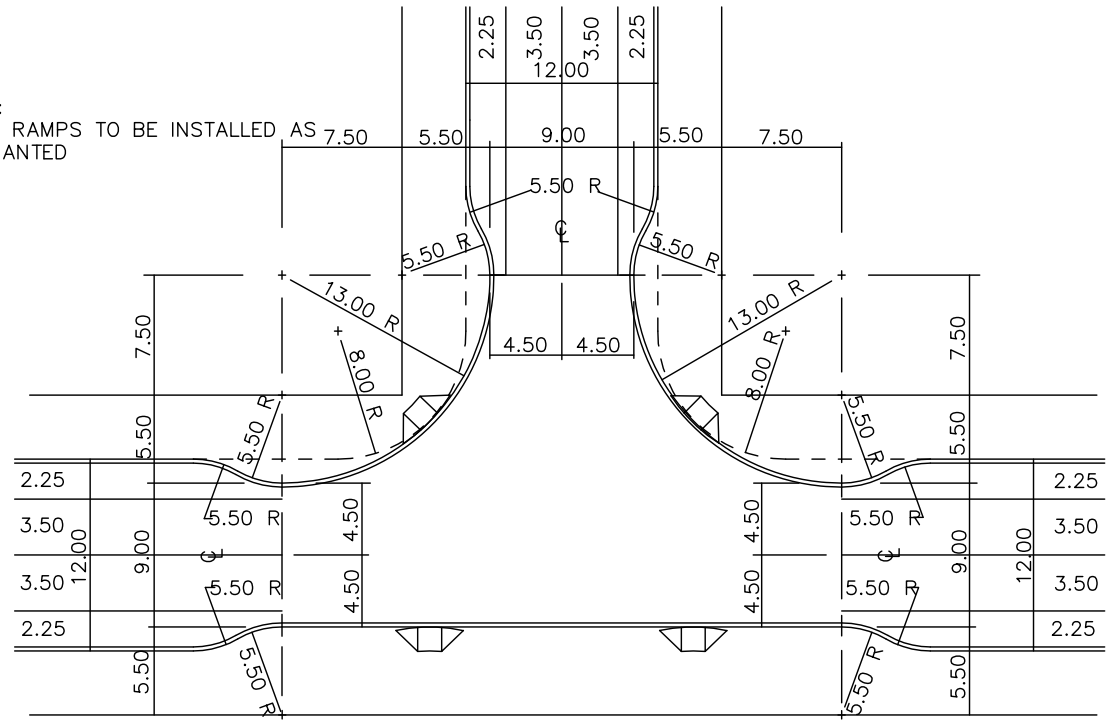
STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

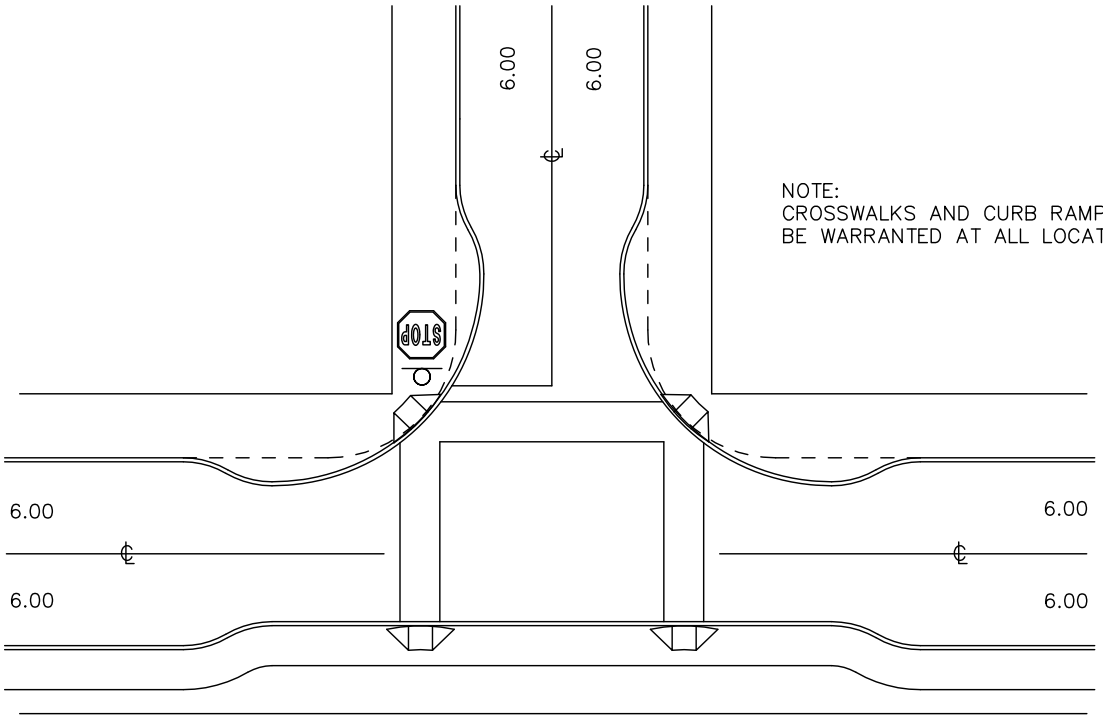
DRAWING NO. 5.42

COLLECTOR TO COLLECTOR CALMING

NOTE:
CURB RAMPS TO BE INSTALLED AS WARRANTED



TRAFFIC CALMING TYPICAL PAVEMENT MARKINGS



NOTE:
CROSSWALKS AND CURB RAMPS MAY NOT BE WARRANTED AT ALL LOCATIONS.

NO.	DATE	REVISION
1	Mar 26/09	Added Curb Ramps and Pavement Markings

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

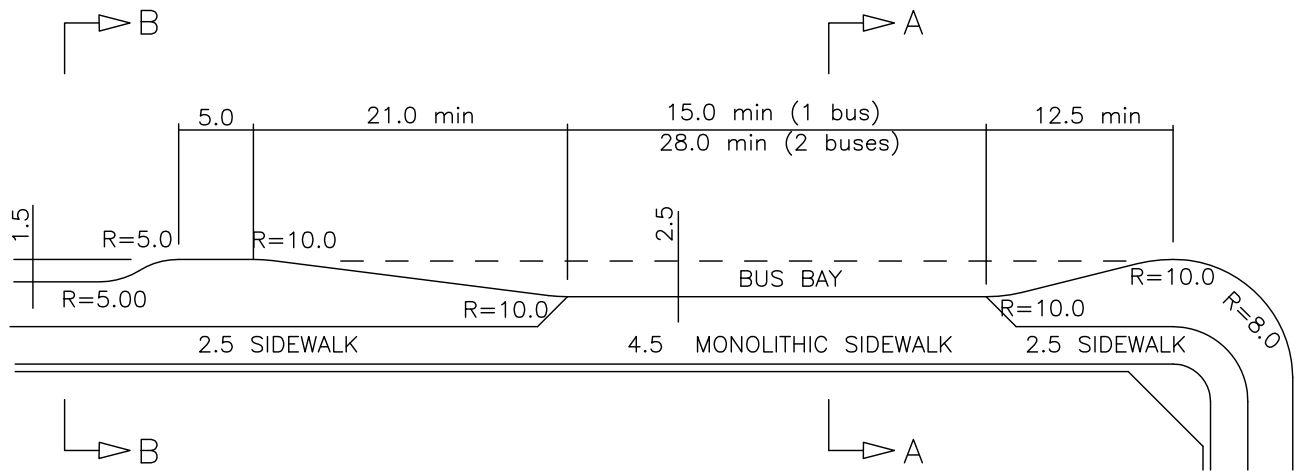
DATE: MAR/10

STREETS–UTILITIES ENGINEER

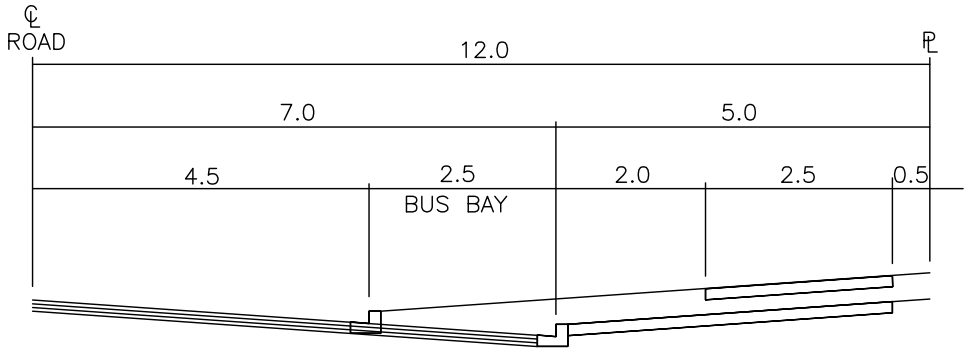
TRAFFIC CALMING

SCALE: 1:500

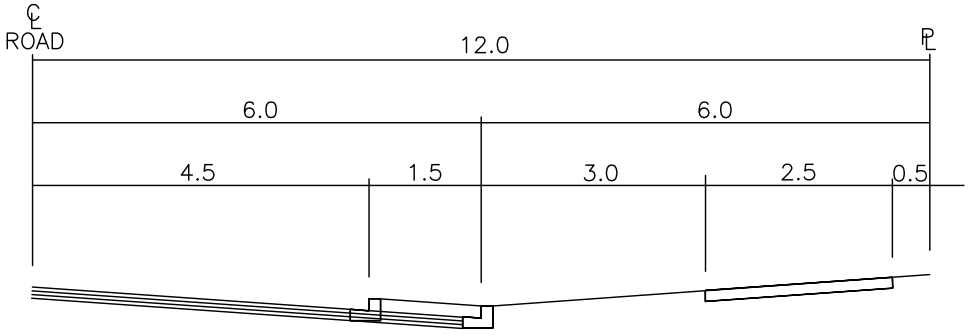
DRAWING NO. 5.43



PLAN VIEW



SECTION "A–A"



SECTION "B–B"

NO.	DATE	REVISION
1	Mar 26/09	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

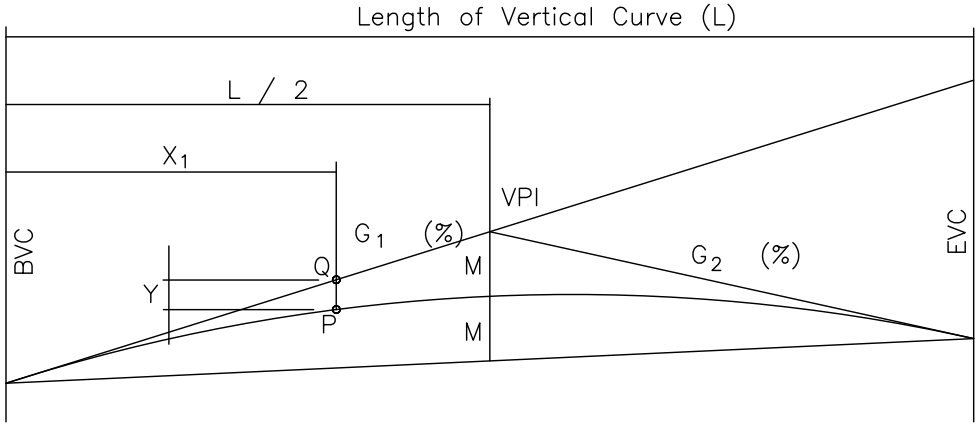
DATE: MAR/10

STREETS–UTILITIES ENGINEER

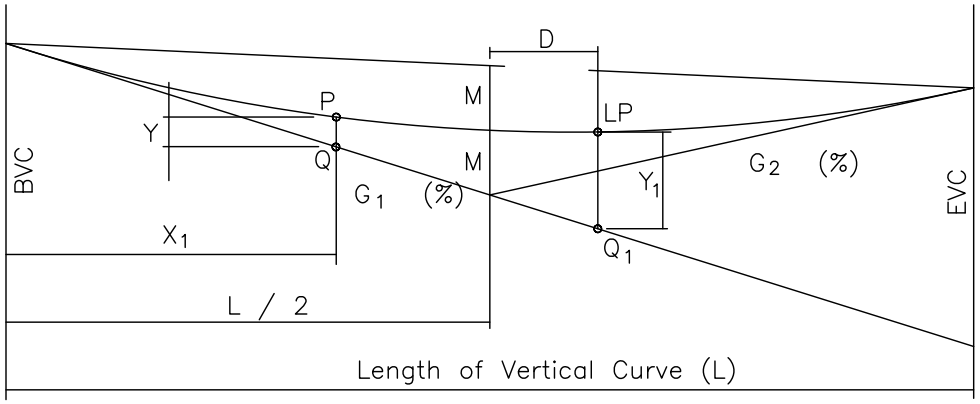
BUS BAY DESIGN

SCALE: N.T.S.

DRAWING NO. 5.44



CREST VERTICAL CURVE

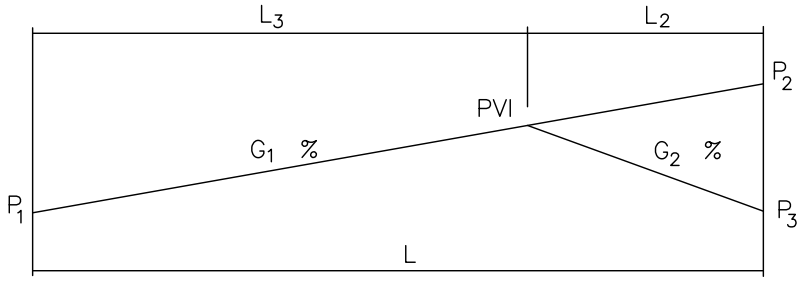


SAG VERTICAL CURVE

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 x A / 100) / (2 L)
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

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	VERTICAL CURVE CALCULATIONS	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.45

CASE 1



Calculate the location of VPI ;
where L, P_1 , P_3 , G_1 , and G_2 are known.

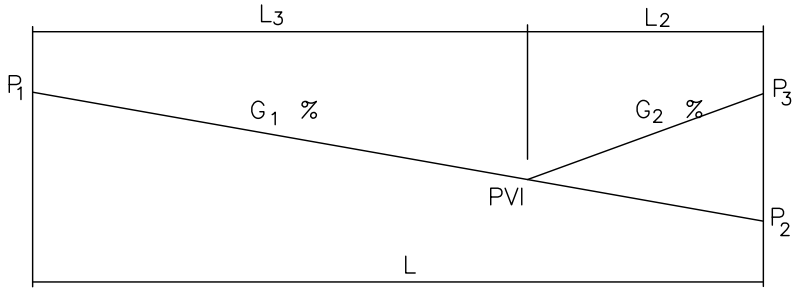
Elevation @ $P_2 = P_1 + (L \times G_1 / 100)$

Length of $L_2 = (P_2 - P_3) \times 100 / (G_1 + G_2)$

Elevation @ PVI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

CASE 2



Calculate the location of VPI ;
where L, P_1 , P_3 , G_1 , and G_2 are known.

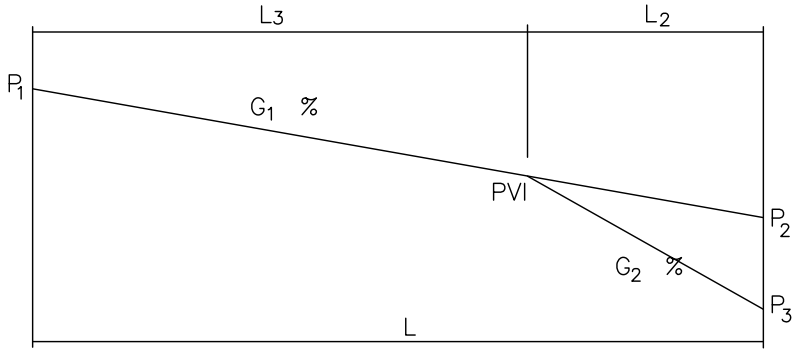
Elevation @ $P_2 = P_1 + (L \times G_1 / 100)$

Length of $L_2 = (P_3 - P_2) \times 100 / (G_1 + G_2)$

Elevation @ PVI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

CASE 3



Calculate the location of VPI ;
where L, P_1 , P_3 , G_1 , and G_2 are known.

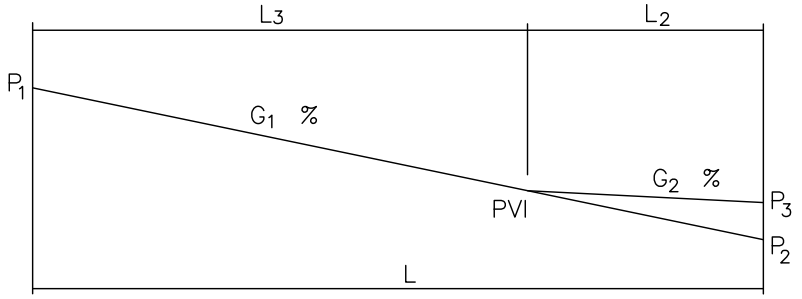
Elevation @ $P_2 = P_1 + (L \times G_1 / 100)$

Length of $L_2 = (P_2 - P_3) \times 100 / (G_2 - G_1)$

Elevation @ PVI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

CASE 4



Calculate the location of VPI ;
where L, P_1 , P_3 , G_1 , and G_2 are known.

Elevation @ $P_2 = P_1 + (L \times G_1 / 100)$

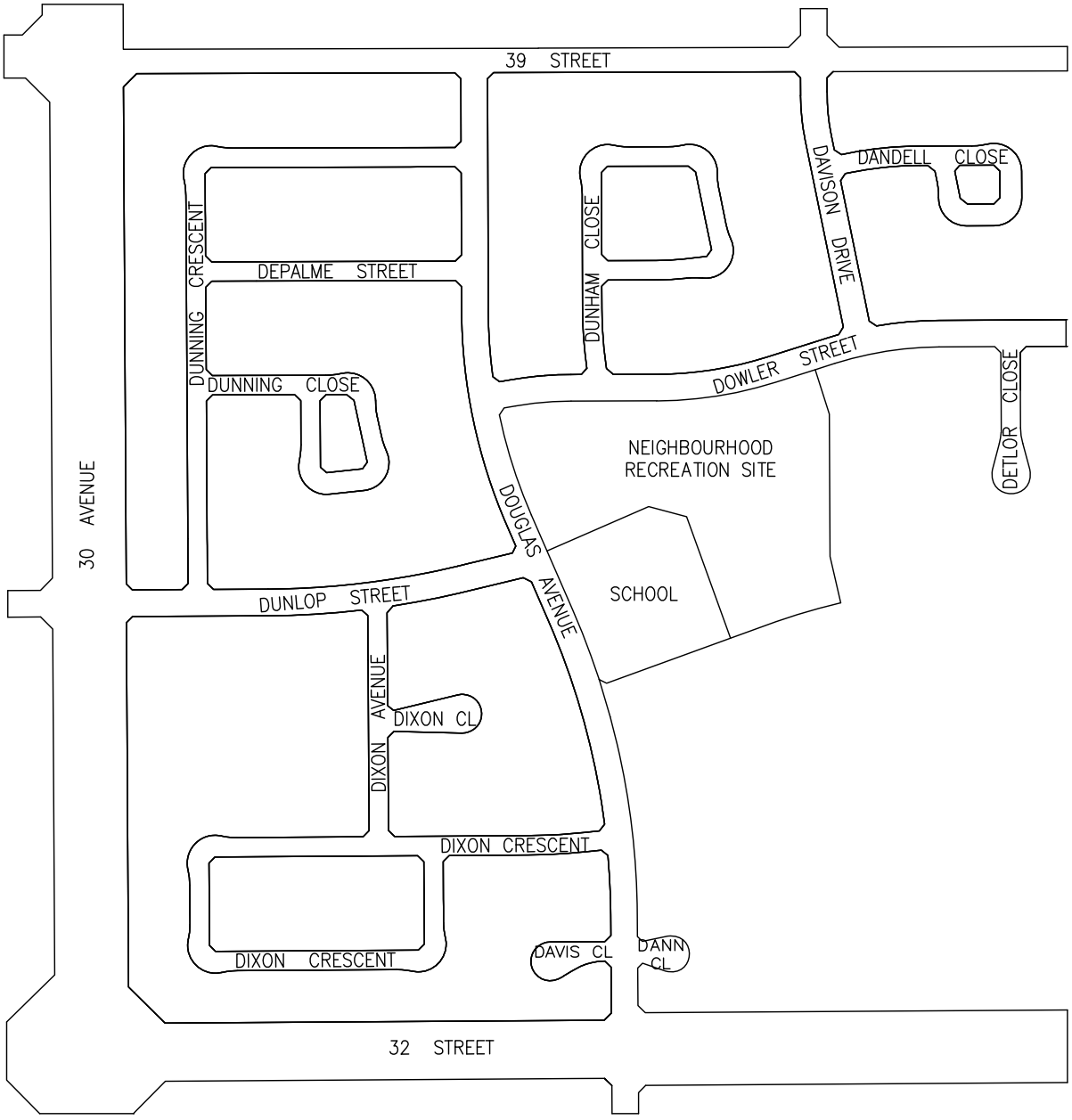
Length of $L_2 = (P_3 - P_2) \times 100 / (G_1 - G_2)$

Elevation @ PVI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	V.P.I. LOCATION CALCULATION	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.46

SUBDIVISION NAME



Developers shall place a full colour sign showing the Neighbourhood Area Structure Plan Development Concept including secondary suite locations at the entrance way of their development.

NO.	DATE	REVISION	APP.
2	Mar26,2009	Updated text	
1	Jan9,2002	Relocated subdivision name	

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Signage and Pavement Marking

APPROVED BY:

DATE: MAR/10

SCALE: N.T.S.

SAMPLE SUBDIVISION MAP SIGN

STREETS–UTILITIES ENGINEER

DRAWING NO. 6.01

SUBDIVISION NAME
Developer's Corporate Name Telephone Number Subdivision Servicing and Lot Sales Information
Parkland Community Planning Services 403.xxx.xxxx Land Use and Transportation Network Information
Town Recreation, Parks, & Culture Department 403.xxx.xxxx Parks and Playgrounds Information
Town Engineering Services Department 403.xxx.xxxx Development Engineering Information
Town Inspections and Licensing Department 403.xxx.xxxx Zoning and Setbacks Information
Ponoka School District No. xxx 403.xxx.xxxx Information regarding Public Schools
Ponoka Catholic Board of Education 403.xxx.xxxx Information regarding Catholic Schools

GENERAL INFORMATION SIGN

SUBDIVISION NAME
In accordance with the approved Area Structure Plan, this site is proposed to be the site of a Public Elementary School or a Catholic Elementary School For additional information, please contact the Ponoka School District No. xxx 403.xxx.xxxx or Ponoka Catholic board of Education 403.xxx.xxxx

FUTURE SCHOOL SITE 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 Recreation, Parks & Culture Department 403.342.8159

NEIGHBOURHOOD RECREATION SIGN

DETENTION POND
This area contains a storm water detention 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 Ponoka Environmental Services 403.xxx.xxxx

STORM DETENTION POND WARNING SIGN

NO.	DATE	REVISION	DATE
2	Dec 16, 2009	Revised	
1	Jan 9, 2002	Revised Detention Pond sign.	

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Signage and Pavement Marking

APPROVED BY:

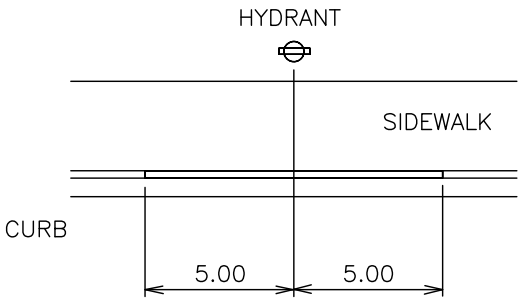
DATE: MAR/10

SAMPLE INFORMATION SIGNS

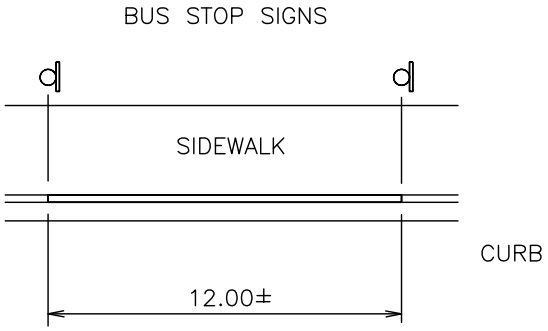
STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

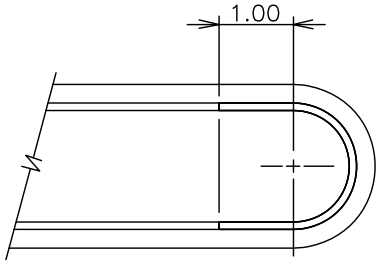
DRAWING NO. 6.02



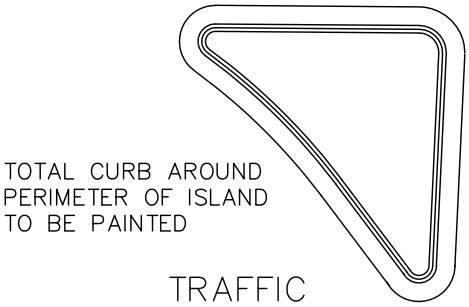
HYDRANT



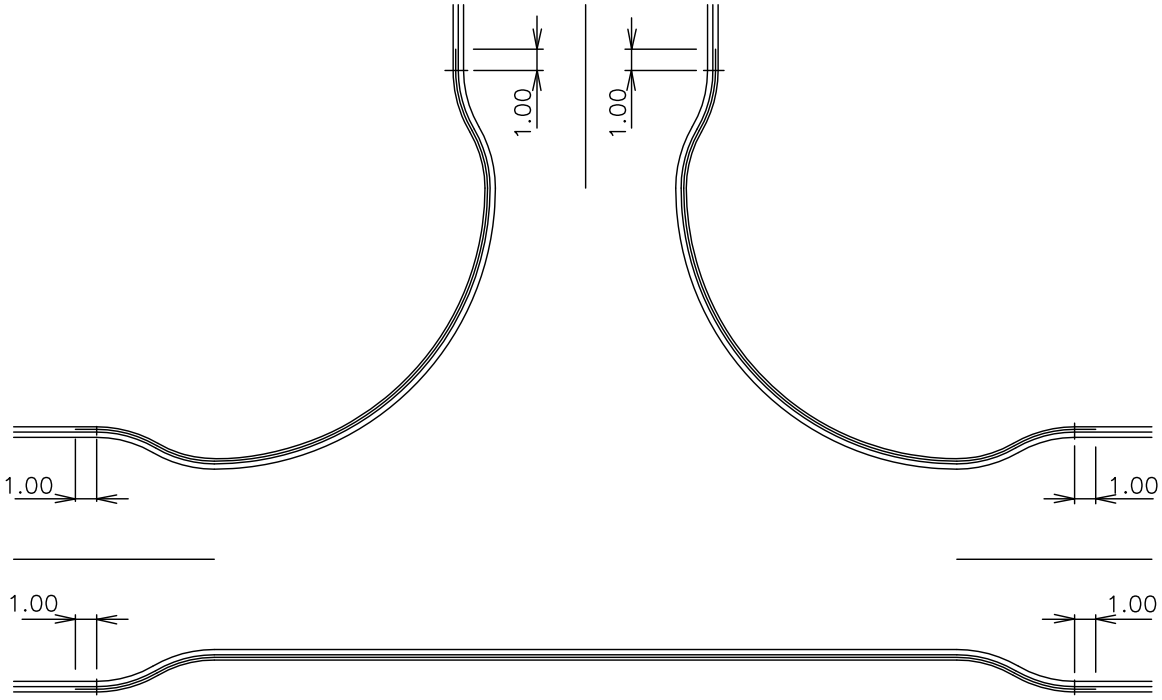
BUS STOP



MEDIAN



TRAFFIC ISLAND



TRAFFIC CALMING BULB

NO.	DATE	REVISION
1	Feb 1, 2008	Added traffic calming bulb

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Signage and Pavement Marking

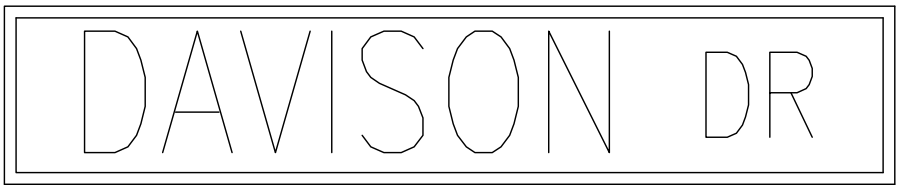
YELLOW CURB PAINTING

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.

APPROVED BY:
STREETS–UTILITIES ENGINEER

DRAWING NO. 6.03

EXISTING SIGNAGE



OPTION A

OPTION B

NO.	DATE	REVISION
1	Apr 07/09	Updated title

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Signage and Pavement Marking

APPROVED BY:

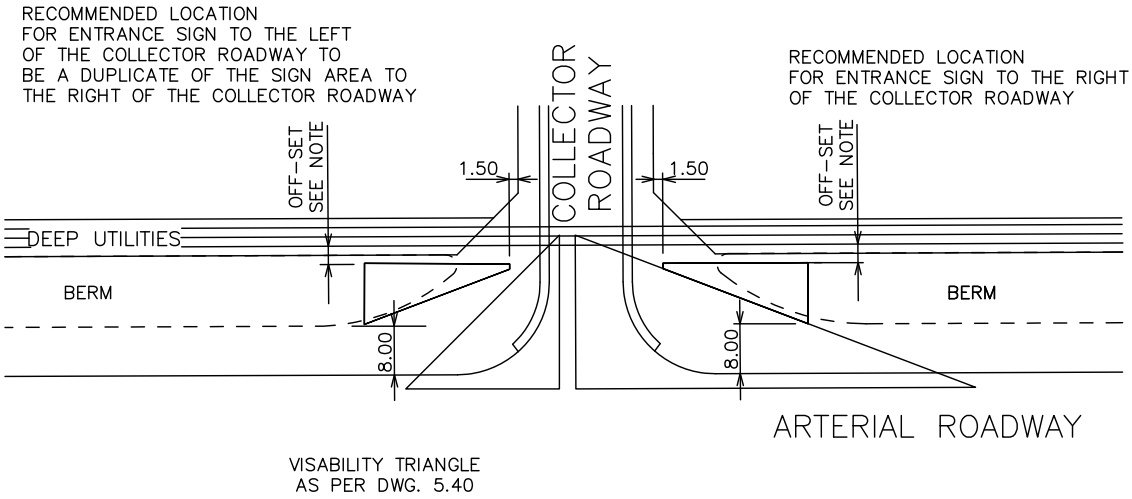
STREETS–UTILITIES ENGINEER

DATE: MAR/10

DECORATIVE STREET NAME MARKERS

SCALE: N.T.S.

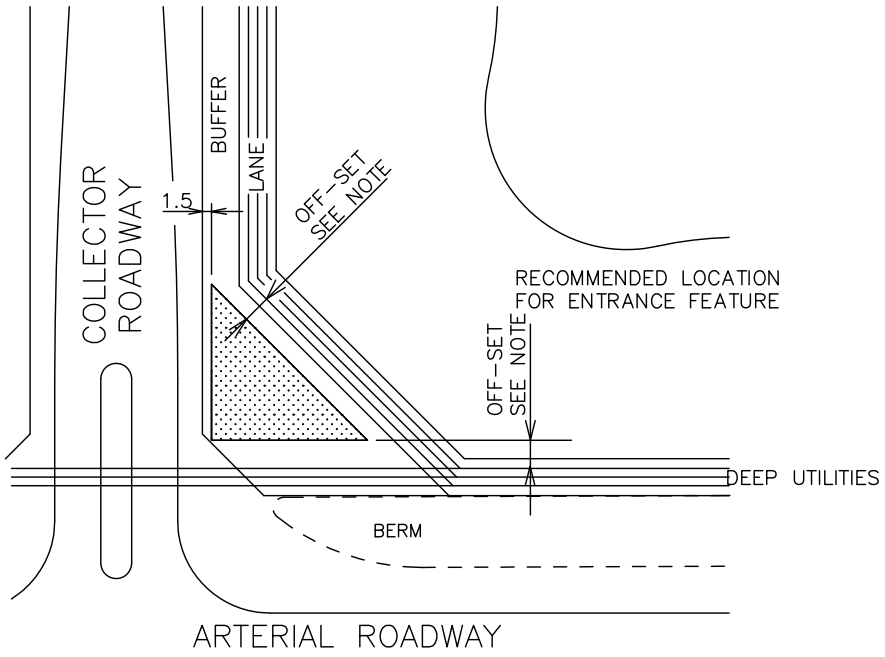
DRAWING NO. 6.04



OPTION 1

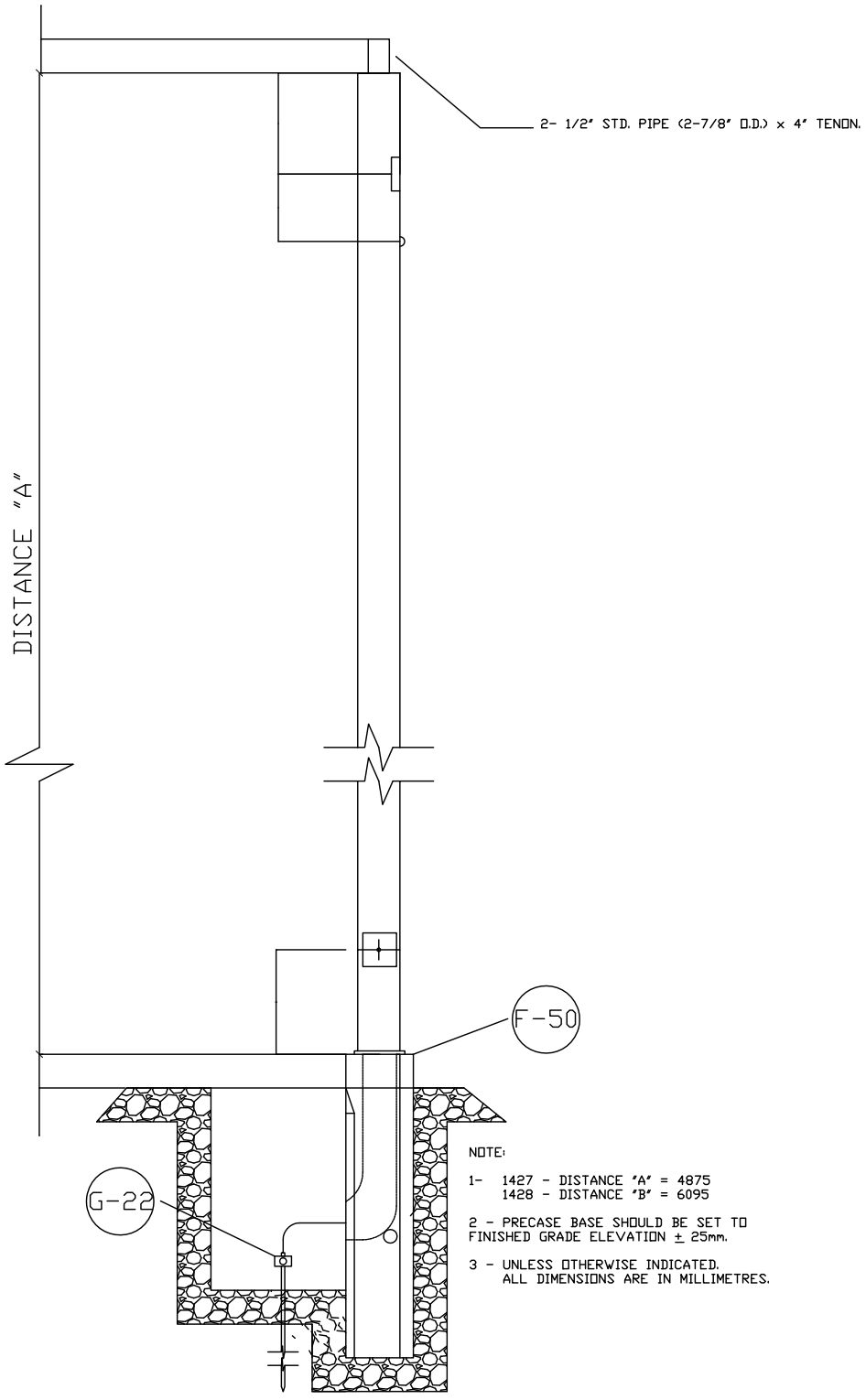
NOTE :

- 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.

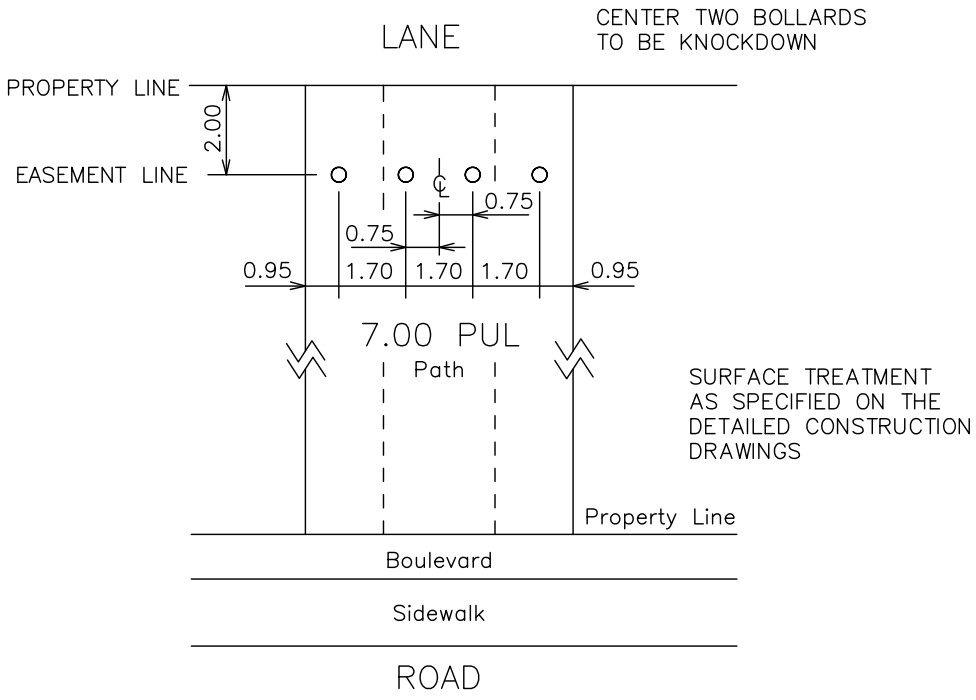


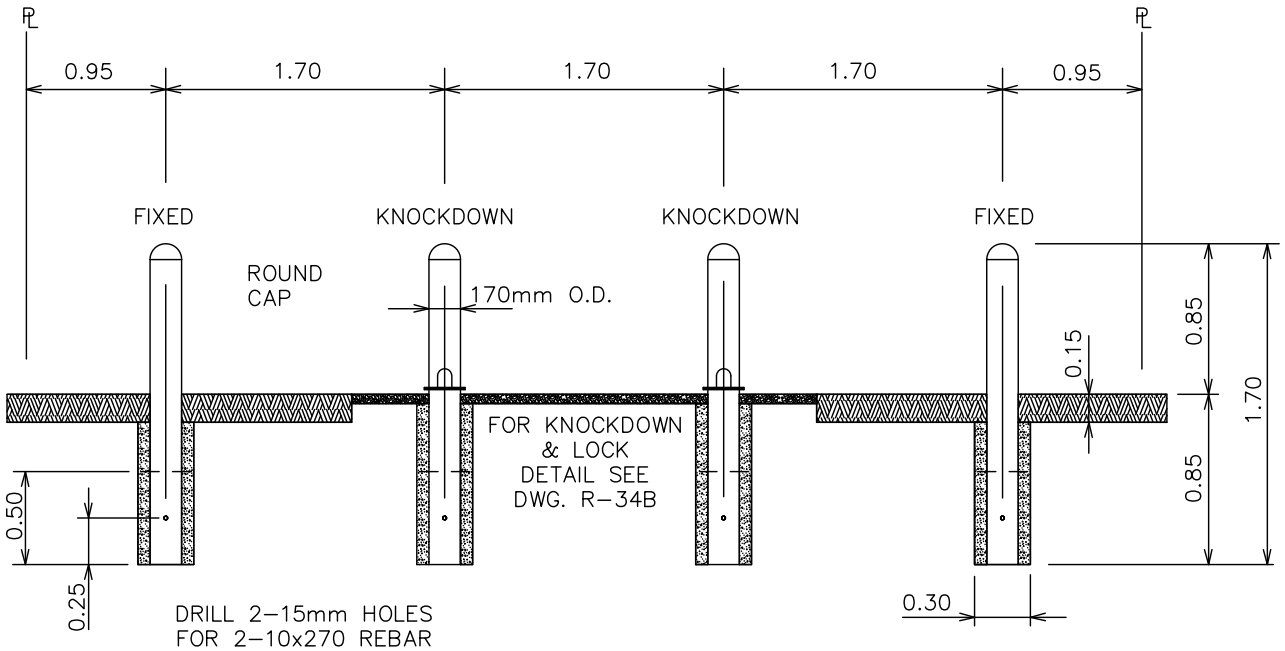
OPTION 2

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Signage and Pavement Marking	APPROVED BY:
			DATE: MAR/10	SUBDIVISION ENTRANCE SIGN LOCATIONS	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 6.05



NO.	DATE	REVISION	TOWN OF PONOKA		
			DRAWN BY:	DESIGN GUIDELINE DRAWINGS Lighting, Signage and Pavement...	APPROVED BY:
			DATE: MAR/10	STREET LIGHTING DECORATIVE ROUND STEEL POLE AND ANCHOR BASE	DRAWING NO. 6.07
			SCALE: N.T.S.		





NOTE: DIMENSIONS IN METRES UNLESS OTHERWISE NOTED

NO.	DATE	REVISION
2	Mar 15, 2005	Deleted the second set of bollards
1	Mar 6, 2003	Revised the PUL width & bollard spacing

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

PARKS STANDARD DRAWINGS
Landscaping Design

APPROVED BY:

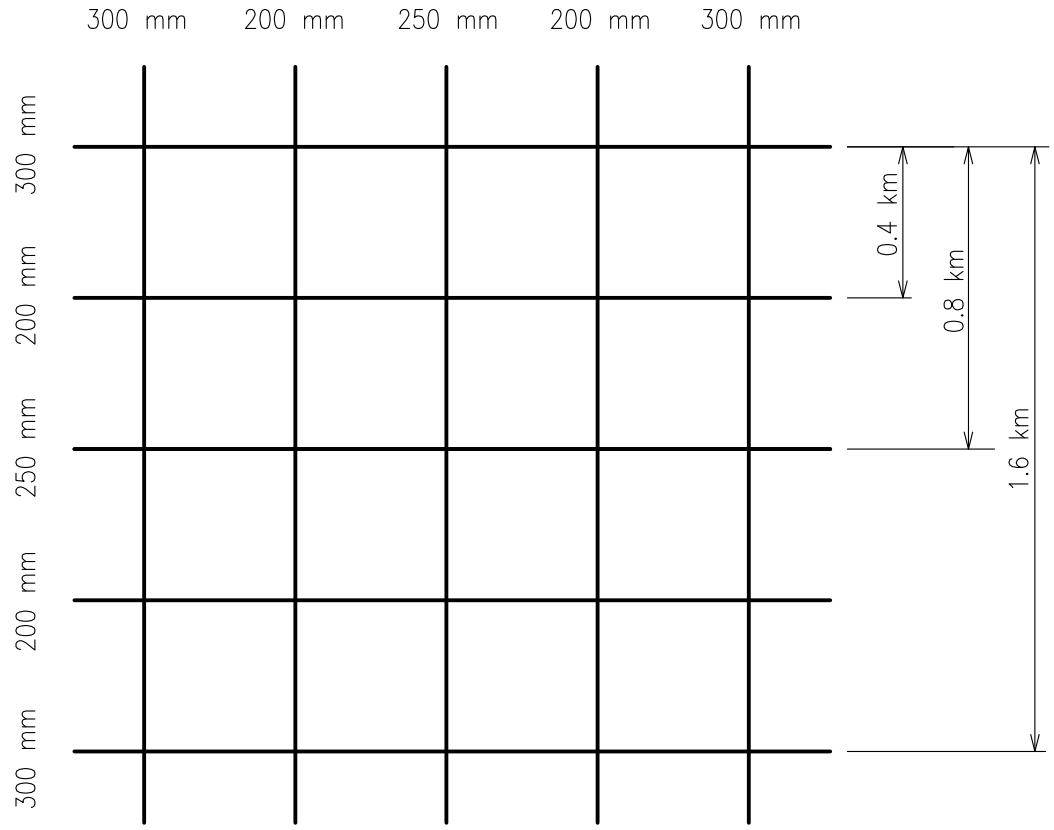
DEPARTMENT MANAGER

DATE: MAR/10

FIXED & KNOCKDOWN BOLLARD SYSTEM

SCALE: N.T.S.

DRAWING NO. 7.01



NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Water Design

BASIC WATER MAIN GRID

DRAWN BY: D.W.K.

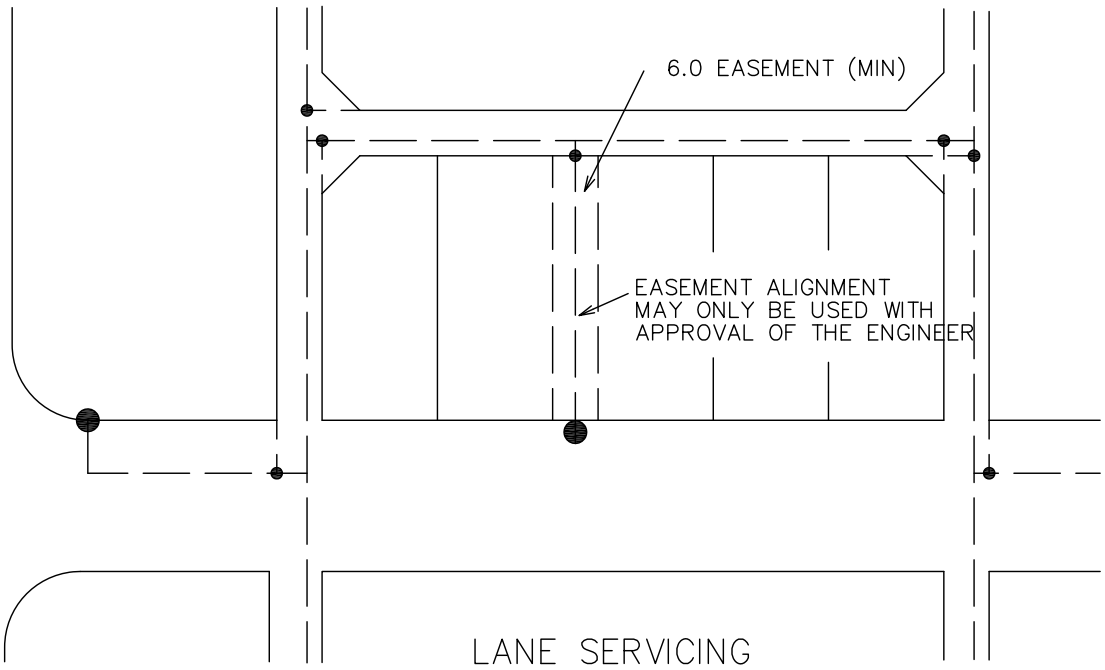
DATE: MAR/10

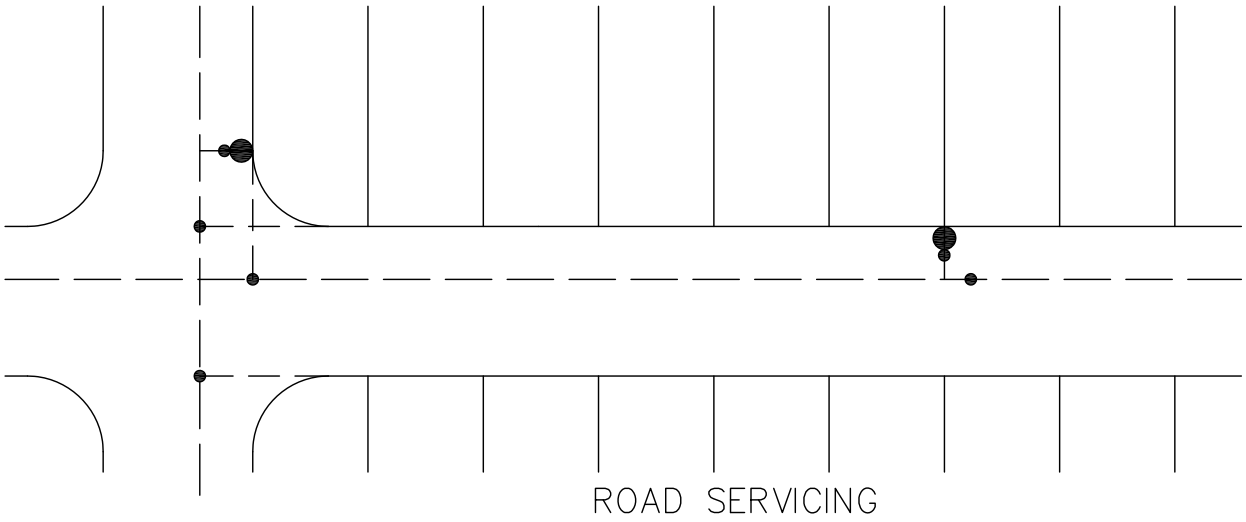
SCALE: N.T.S.

APPROVED BY:

STREETS–UTILITIES ENGINEER

DRAWING NO. 1.02





- 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.

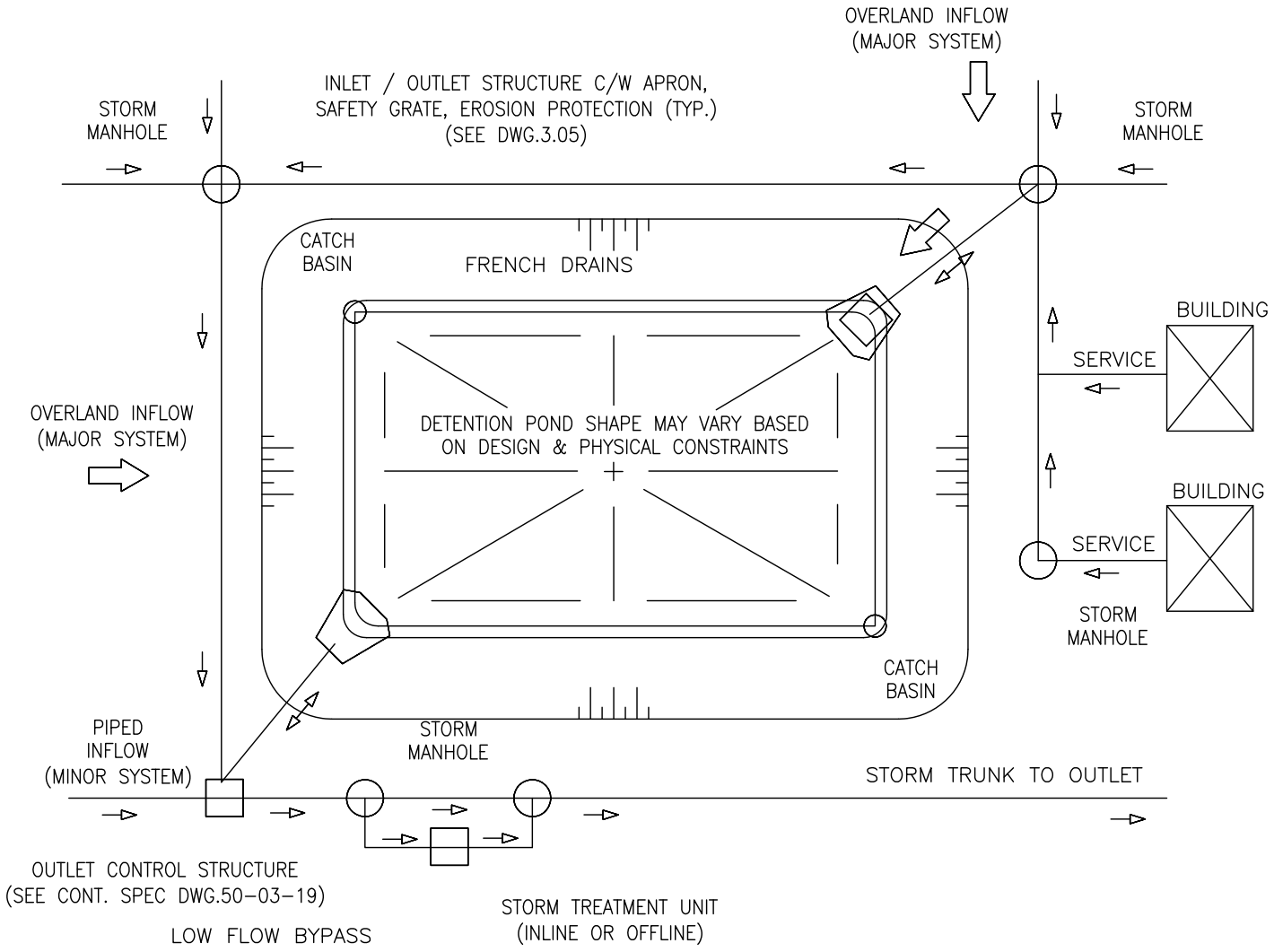
NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Water Design

TYPICAL VALVE & HYDRANT LOCATIONS

DRAWN BY: N.M.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY:
DRAWING NO. 1.03



NO.	DATE	REVISION
1	Mar 8, 2006	REVISED

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Stormwater Management Design

DRY STORMWATER STORAGE FACILITY

DRAWN BY: D.W.K.

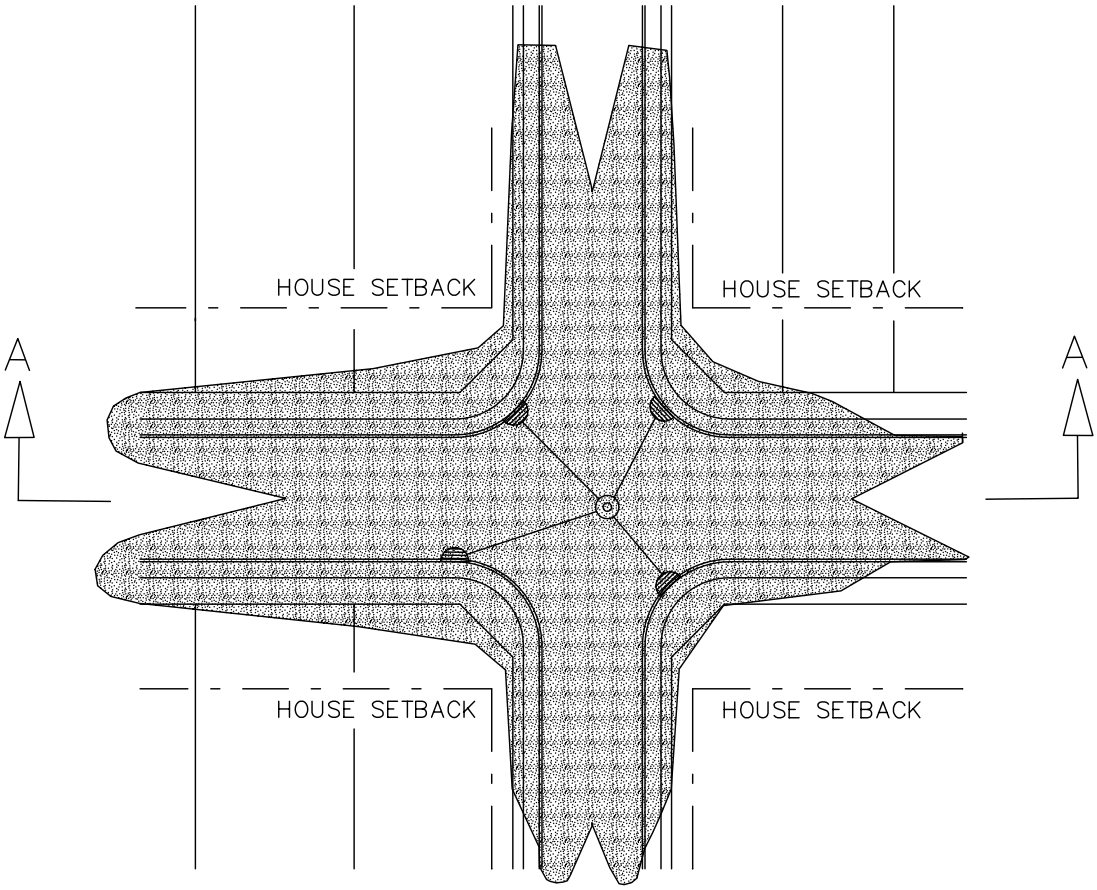
DATE: MAR/10

SCALE: N.T.S.

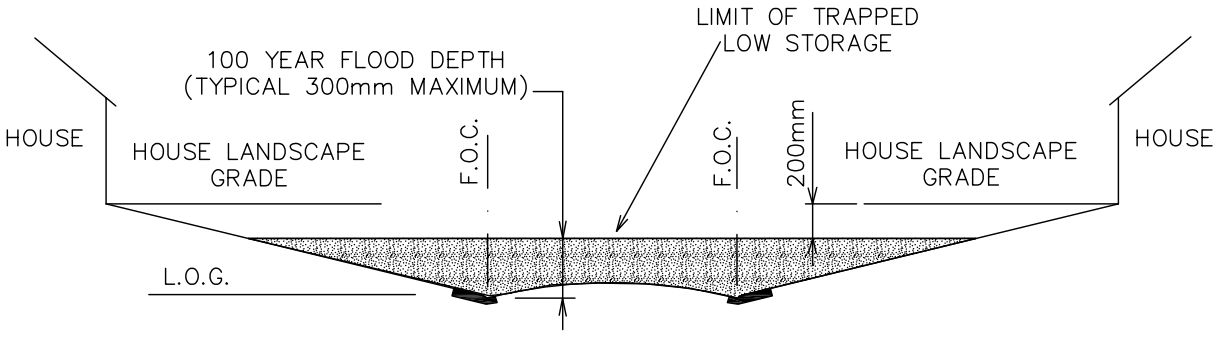
APPROVED BY:

STREETS–UTILITIES ENGINEER

DRAWING NO. 3.03

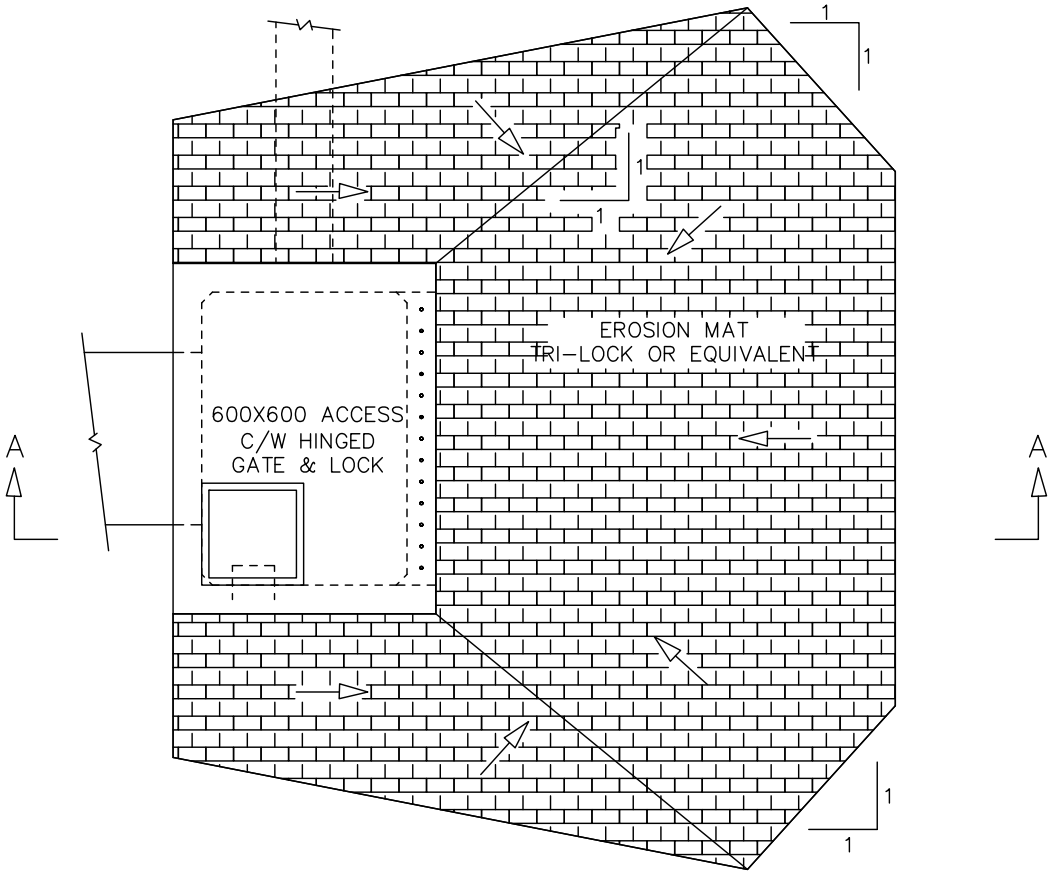


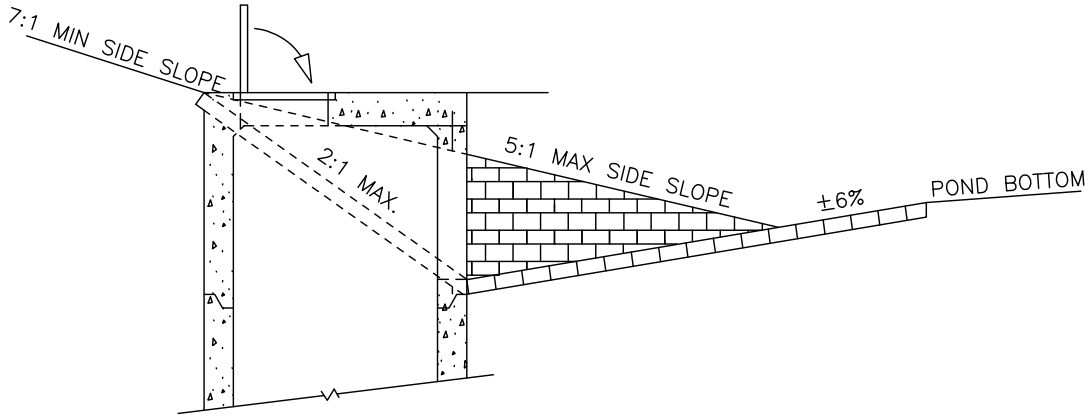
PLAN



SECTION 'A – A'

NO.	DATE	REVISION	TOWN OF PONOKA		
			DRAWN BY: N.M.	DESIGN GUIDELINE DRAWINGS Stormwater Management Design	APPROVED BY:
			DATE: MAR/10	TYPICAL TRAPPED LOW STORAGE AREA	
			SCALE: N.T.S.		DRAWING NO. 3.04





SECTION 'A – A'

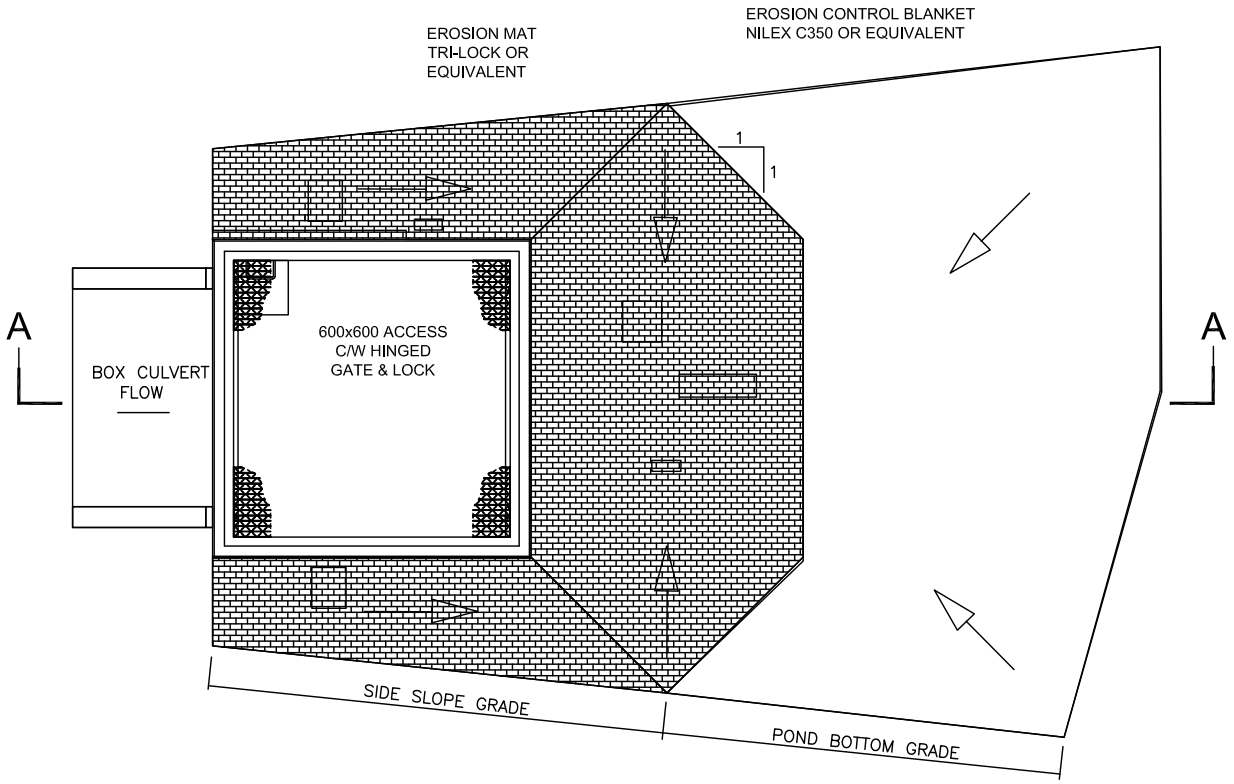
NO.	DATE	REVISION
1	Jan 30, 2008	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

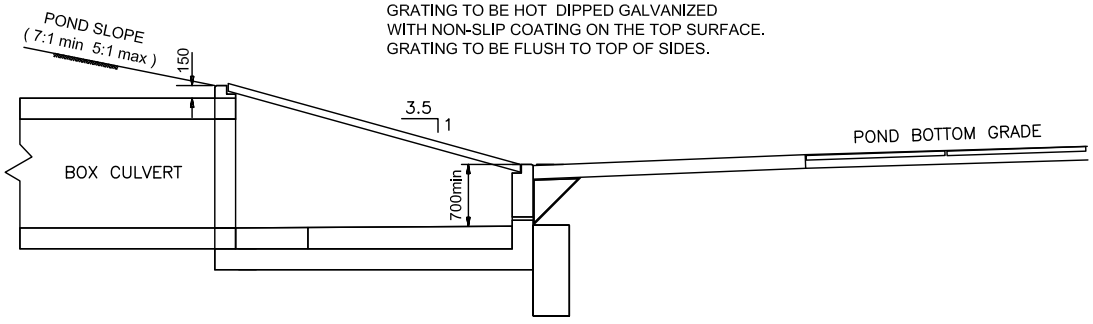
DESIGN GUIDELINE DRAWINGS
Stormwater Management Design

INLET / OUTLET STRUCTURE APRON

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 3.05

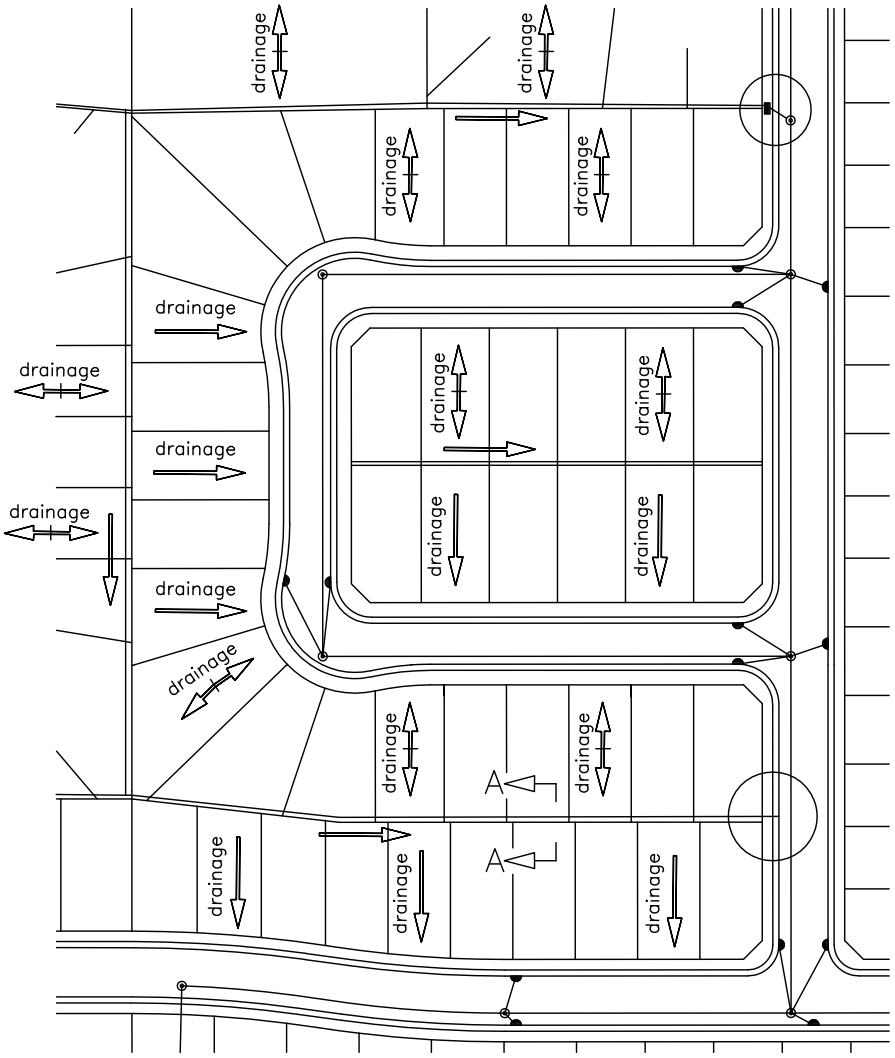


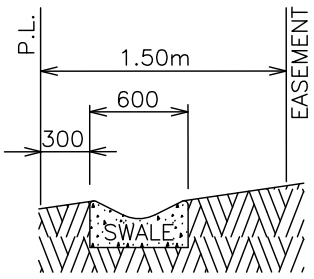
NOTE:
OVERALL COVERAGE AREA FOR EROSION MAT &
EROSION CONTROL BLANKET BASED UPON WATER
VELOCITIES TO BE HANDLED BY THE STRUCTURE.



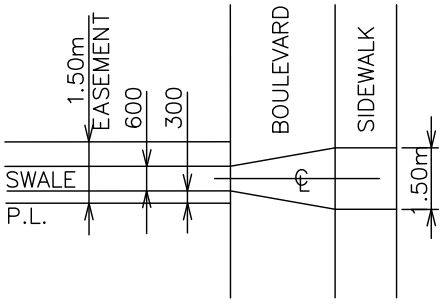
SECTION "A – A"

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Stormwater Management Design	APPROVED BY:
			DATE: MAR/10	LOW PROFILE INLET / OUTLET STRUCTURE APRON	DEPARTMENT MANAGER
			SCALE: N.T.S.		DRAWING NO. 3.06

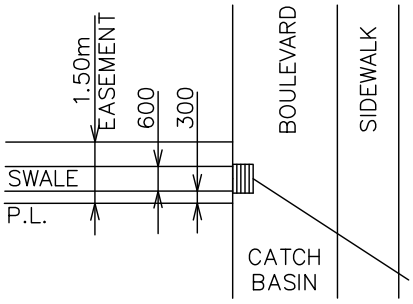




SECTION 'A – A'

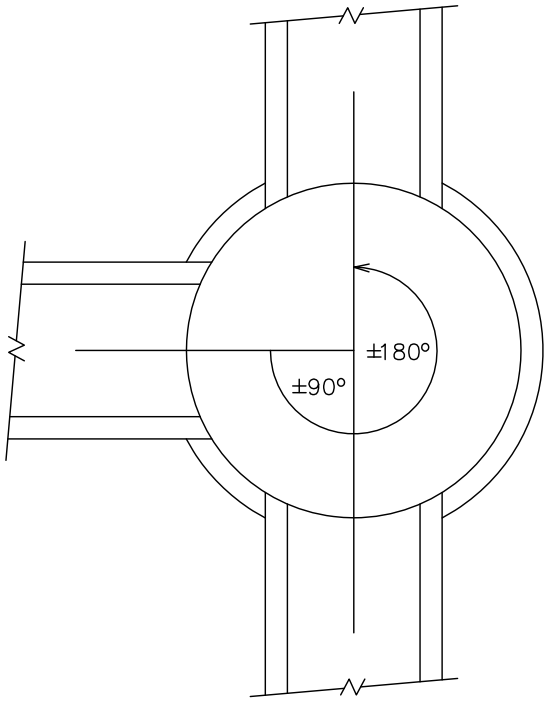


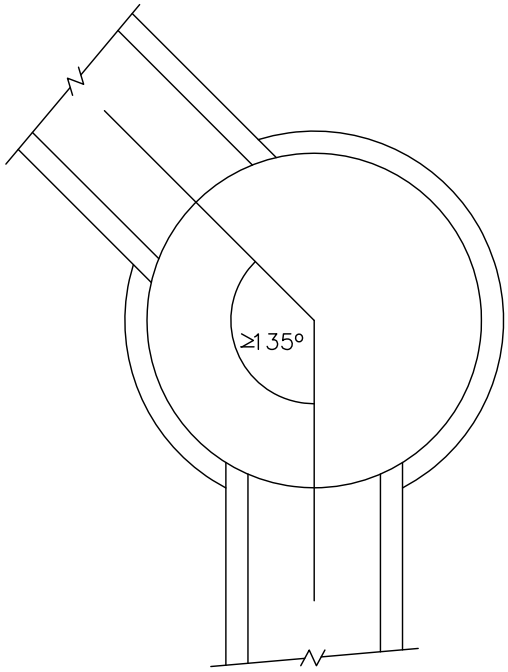
DETAIL A



DETAIL B

			TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Stormwater Management Design	APPROVED BY:
			DATE: MAR/10	LANELESS SUBDIVISION DRAINAGE SWALE	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 3.07
1	Feb 21, 2008	Revised drawing number			
NO.	DATE	REVISION			





MANHOLE NOMINAL INSIDE DIAMETER	INLET / OUTLET PIPE SIZE		
	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.)

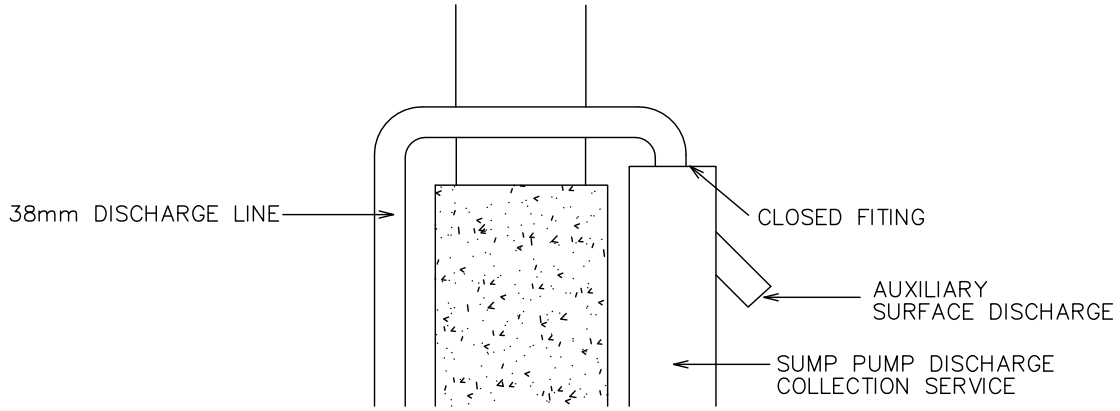
NO.	DATE	REVISION
1	Feb 21, 2008	Revised drawing number

TOWN OF PONOKA ENGINEERING DEPARTMENT

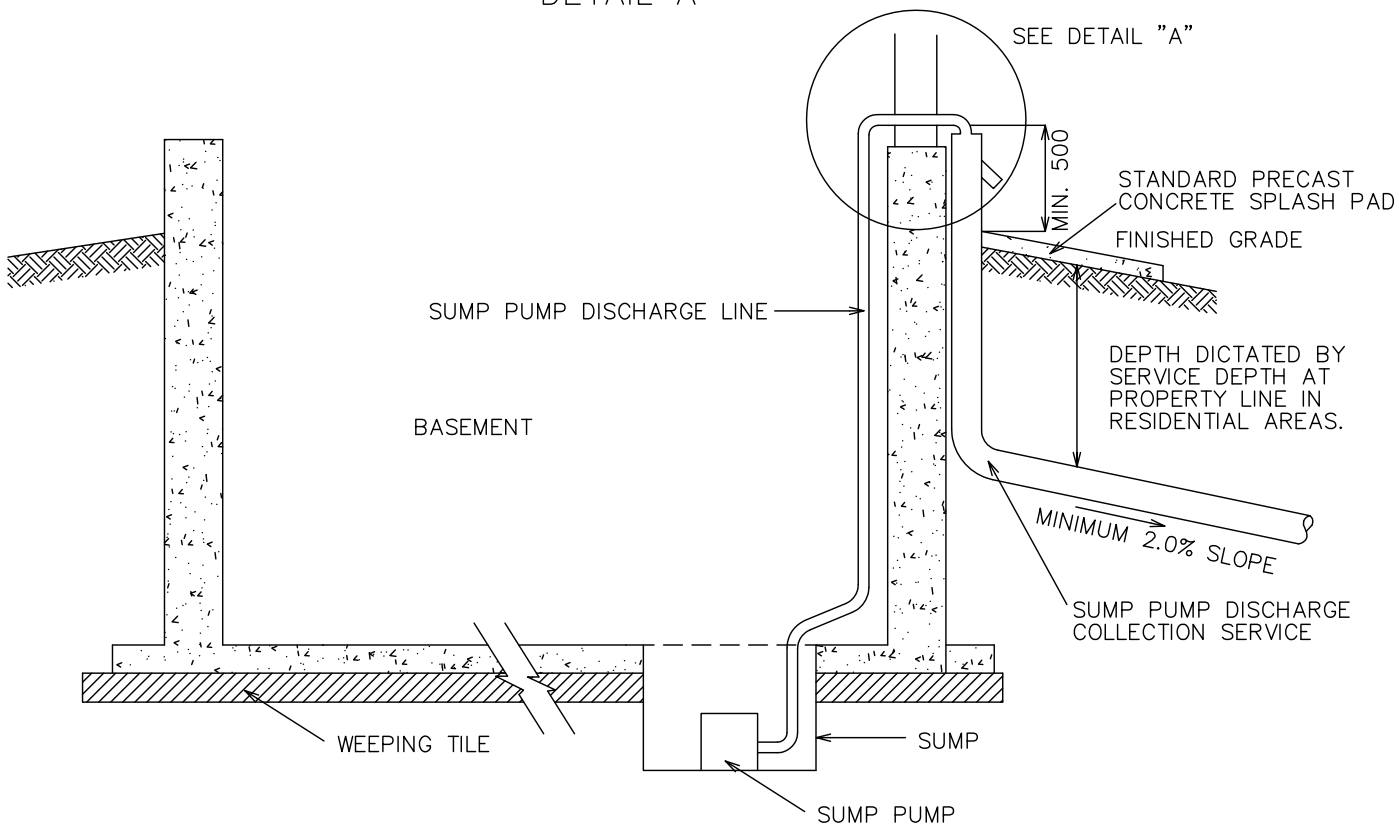
DESIGN GUIDELINE DRAWINGS
Stormwater Management Design

MANHOLE INLET / OUTLET PIPE DESIGN CONSIDERATIONS

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 3.08



DETAIL A



NOTES:

- ROOF LEADERS (DOWNSPOUTS) OR ANY OTHER STORM WATER SOURCE MUST NOT BE CONNECTED TO SUMP DISCHARGE COLLECTION SERVICE LINE.
- THE AUXILIARY SURFACE DISCHARGE MUST BE INSTALLED TO PROVIDE AN OVERFLOW IN THE STORM DRAINAGE SYSTEM CANNOT ACCOMMODATE FLOWS DUE TO CAPACITY, FREEZING OR OTHER PROBLEMS.

NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Service Connections

TYPICAL SUMP PUMP DISCHARGE CONNECTION

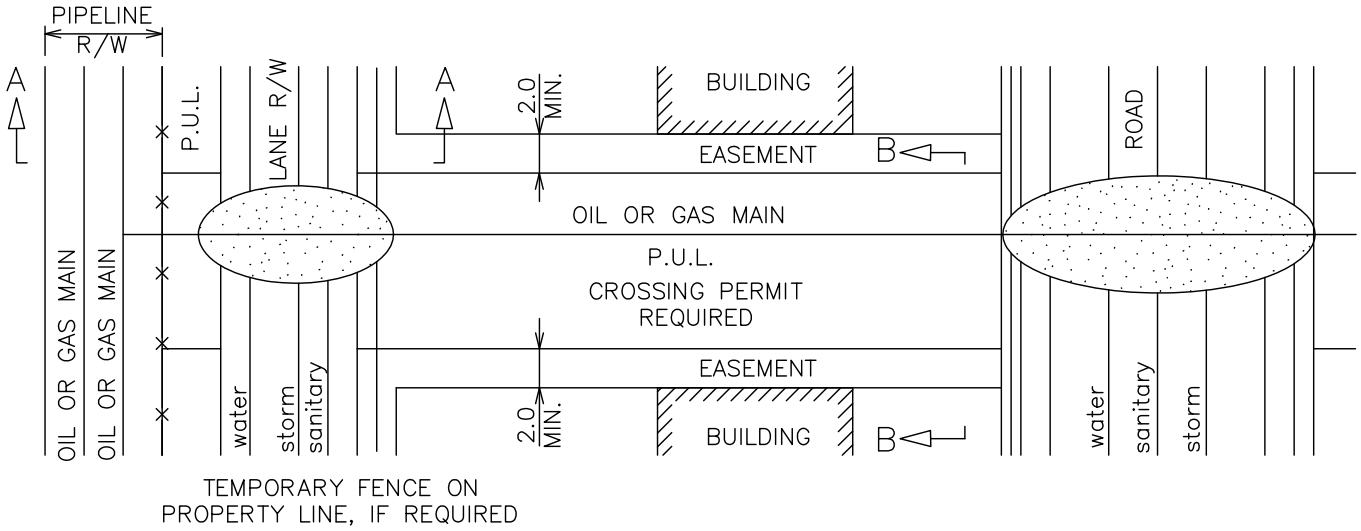
DRAWN BY: N.M.

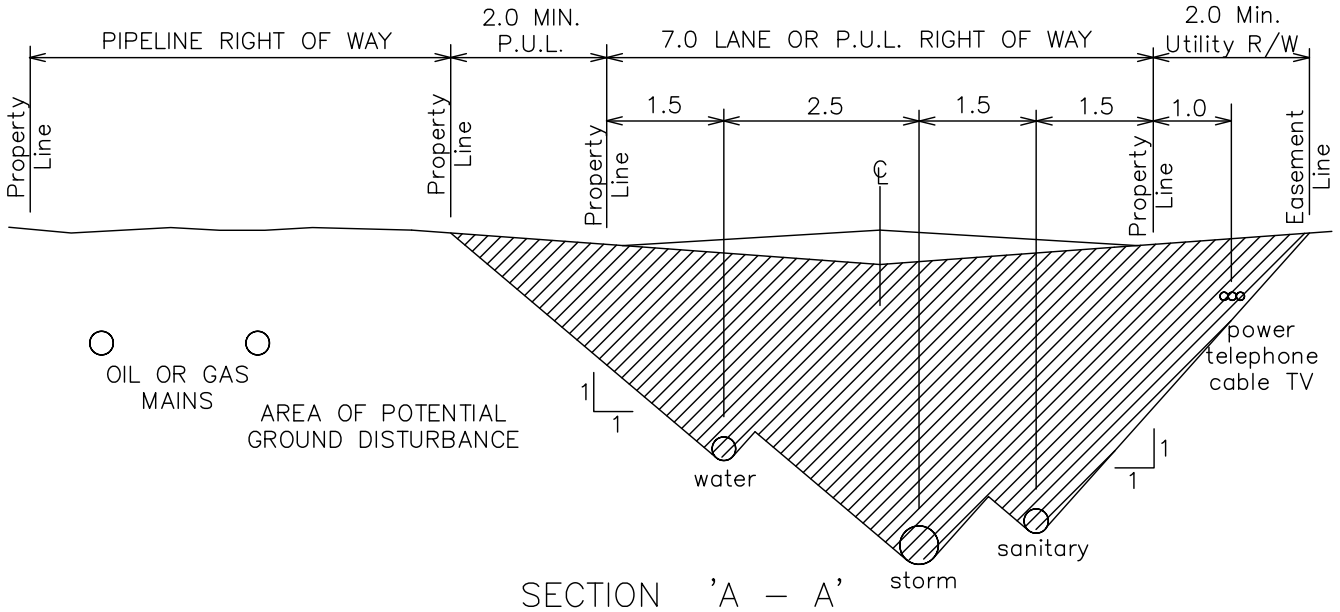
DATE: MAR/10

SCALE: N.T.S.

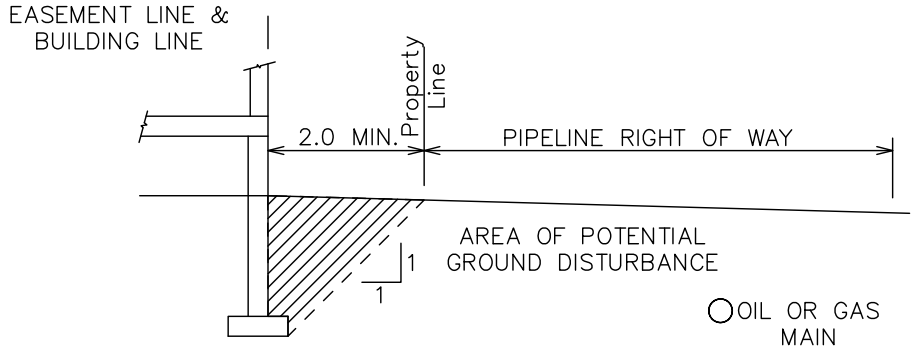
APPROVED BY:

DRAWING NO. 3.09





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
2	Feb 24, 2005	Added the References to Oil and Gas Mains
1	Mar 5, 2003	Revision

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Service Connections

APPROVED BY:

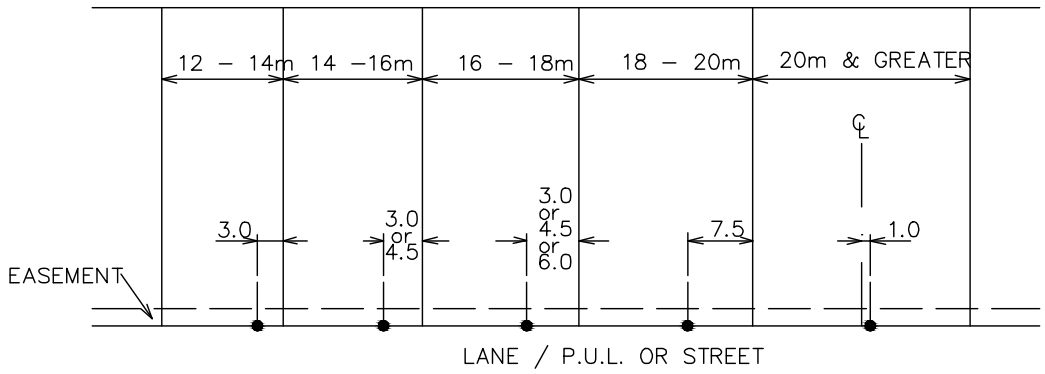
STREETS–UTILITIES ENGINEER

DATE: MAR/10

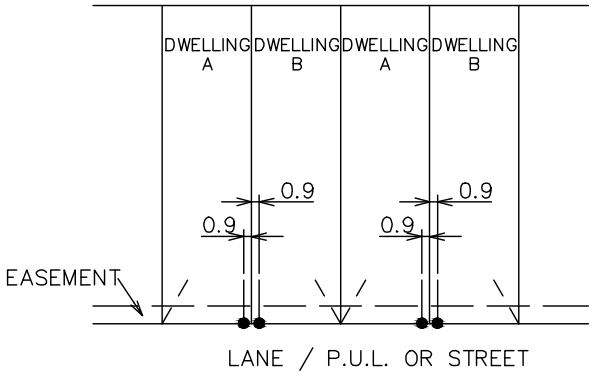
OIL AND OR GAS RIGHT OF WAY CLEARANCES

SCALE: N.T.S.

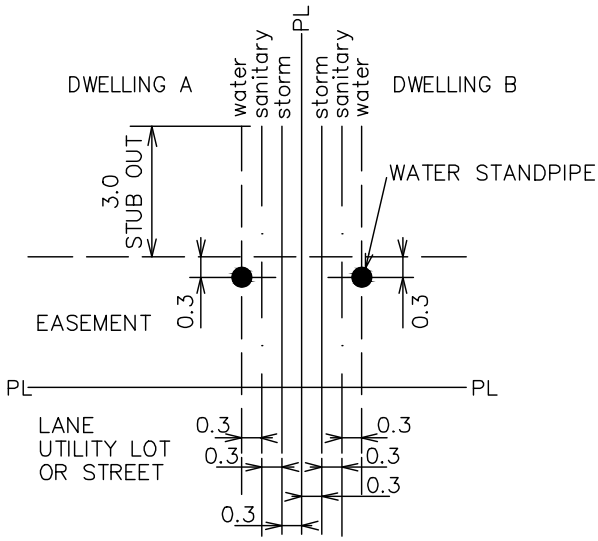
DRAWING NO. 4.01



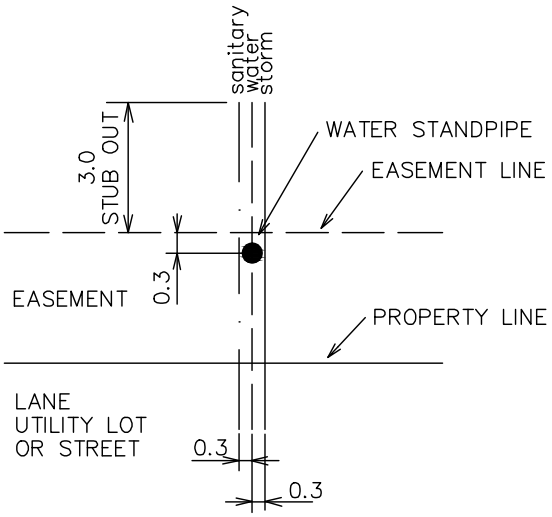
SINGLE FAMILY DWELLING



MULTI FAMILY DWELLING



MULTI FAMILY DWELLING
SERVICE DETAIL



SINGLE FAMILY DWELLING
SERVICE DETAIL

LEGEND

SANITARY SEWER, STORM SEWER & WATER SERVICE

ELECTRICAL SERVICE

NOTE :

1. STANDPIPE & CURB STOP TO BE LOCATED 300mm FROM PROPERTY LINE (OR ON EASEMENT LINE).
2. MINIMUM CLEARANCE FROM EDGE OF ELECTRICAL TRANSFORMER TO CENTRE OF WATER SHALL BE 3.30m.
3. EASEMENT WIDTH AS REQUIRED.

NO.	DATE	REVISION
2	JUN 2014	REV. MULTI FAMILY SERVICE DETAIL
1	APR 2013	APPROVED

TOWN OF PONOKA

N.M.

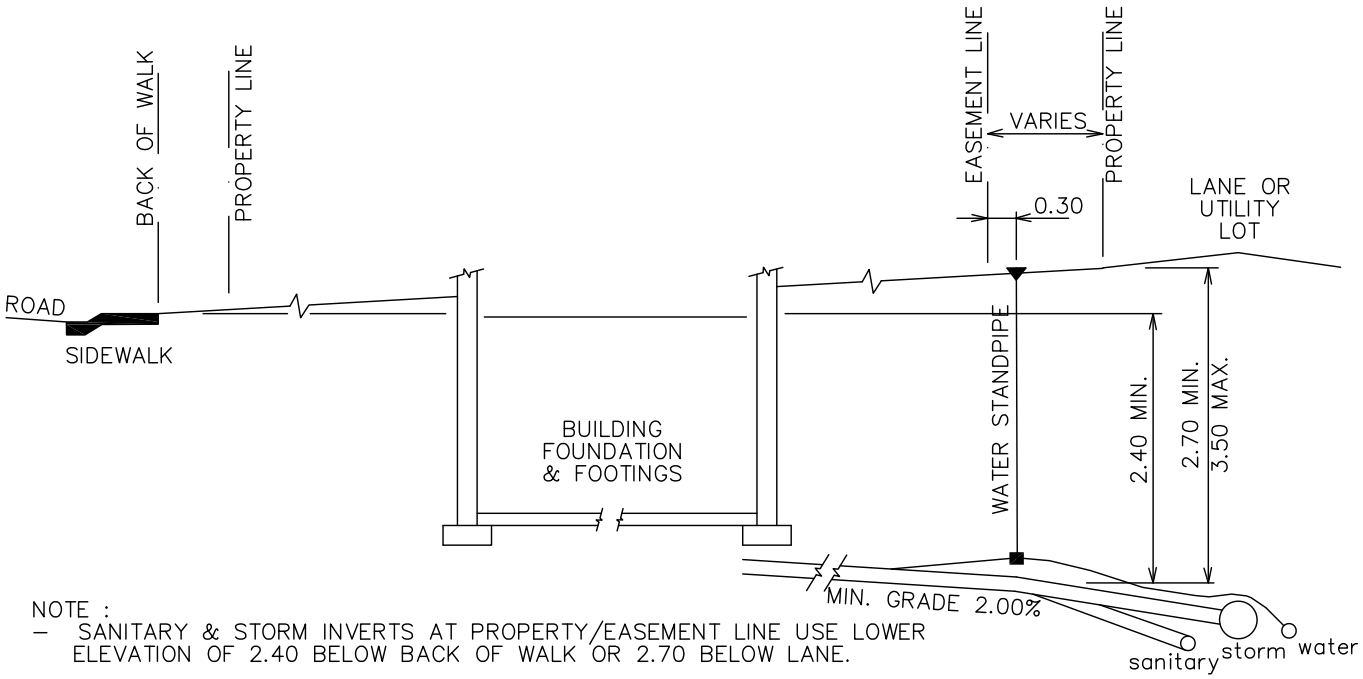
DESIGN GUIDELINE DRAWINGS
Service Connections

MAR/10

SERVICE LOCATIONS

N.T.S.

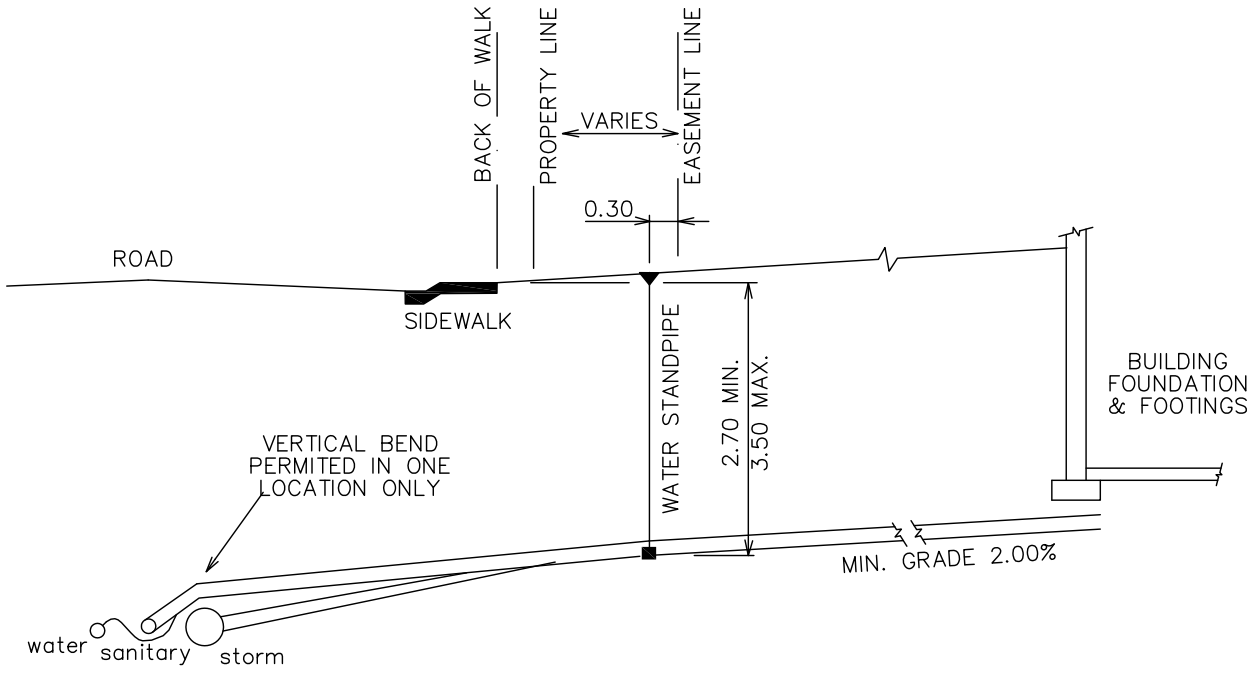
4.02



NOTE :

- SANITARY & STORM INVERTS AT PROPERTY/EASEMENT LINE USE LOWER ELEVATION OF 2.40 BELOW BACK OF WALK OR 2.70 BELOW LANE.
- 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
1	2/10/2009	WATER STANDPIPE SHIFTED

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Service Connections

TYPICAL SERVICE
CROSS CONNECTIONS

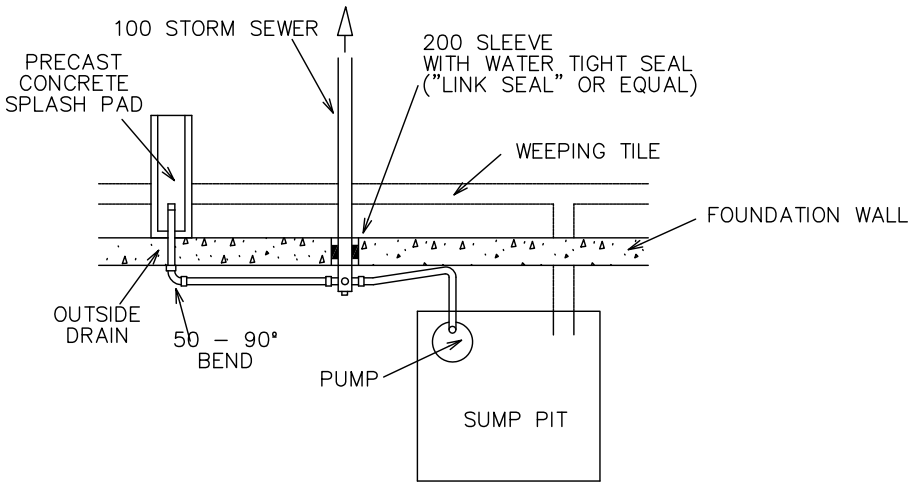
DRAWN BY: N.M.

DATE: MAR/10

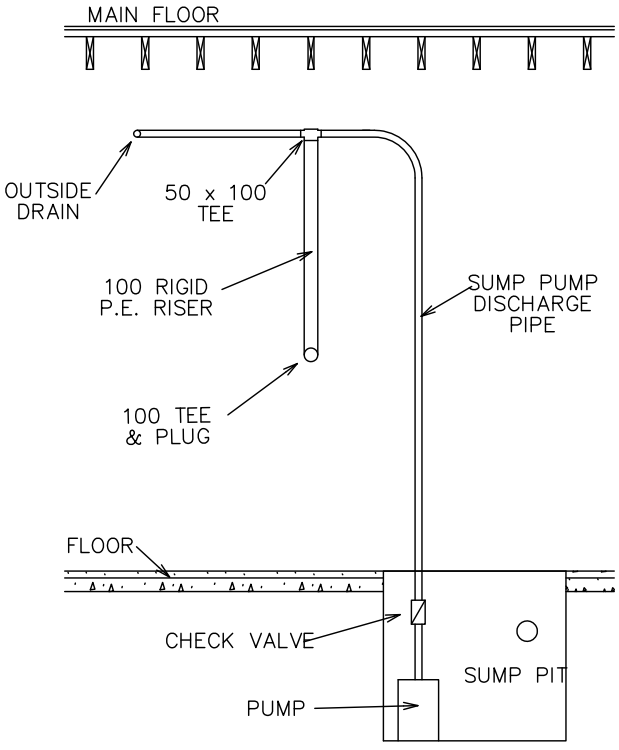
SCALE: N.T.S.

APPROVED BY:

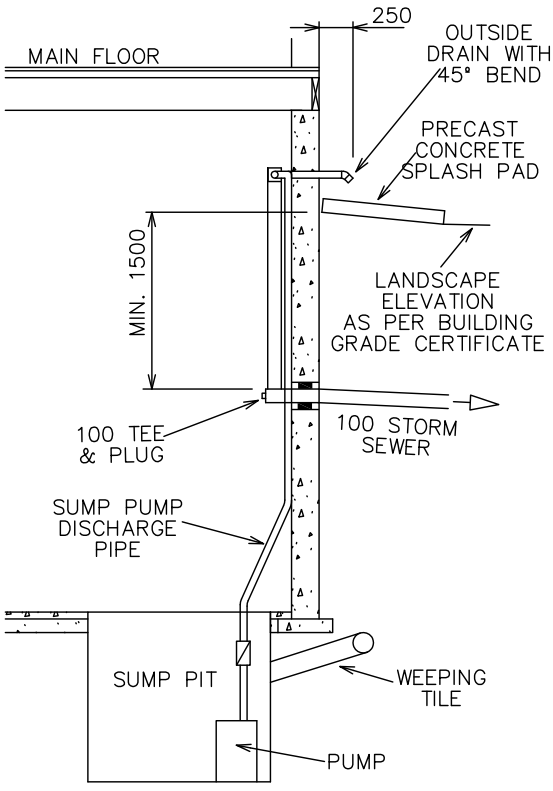
DRAWING NO. 4.03



TOP VIEW

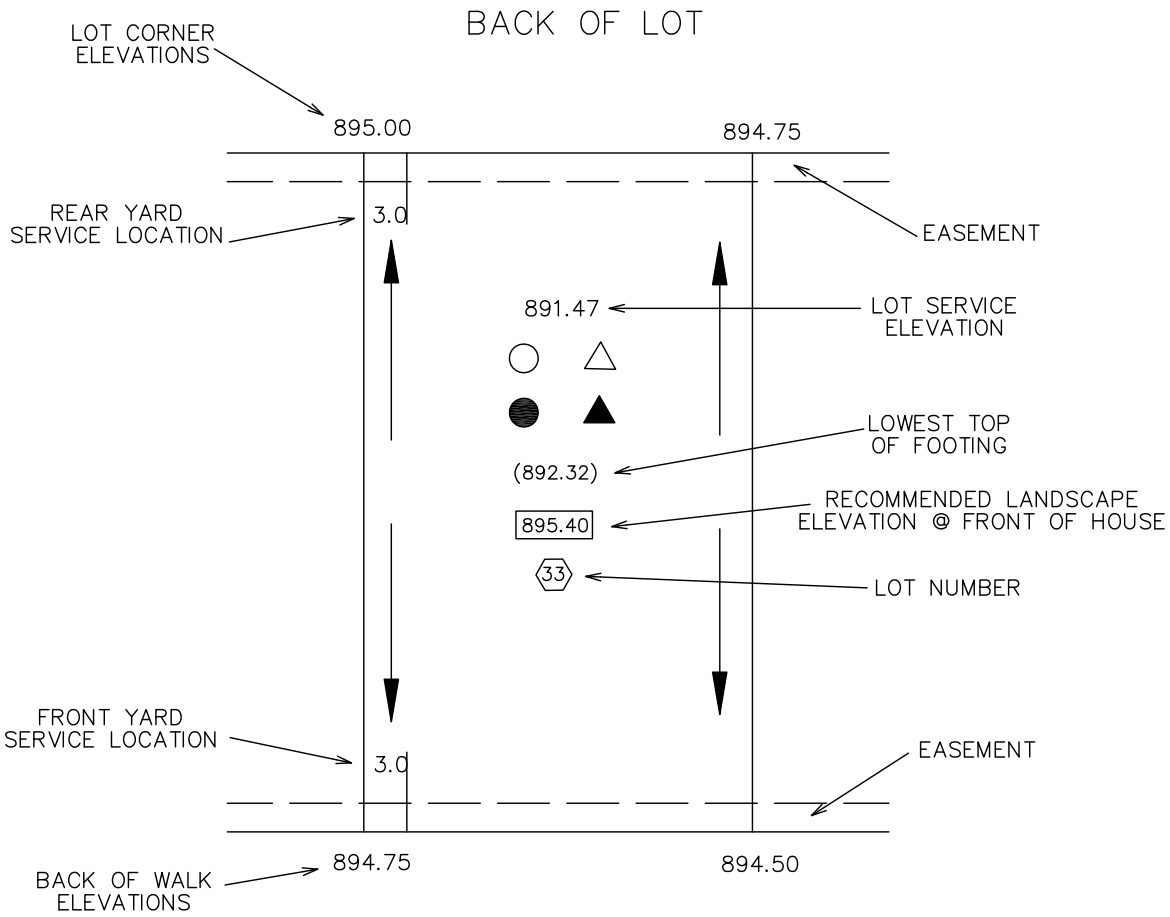


FRONT VIEW



SIDE VIEW

NO.	DATE	REVISION	TOWN OF PONOKA		
			DRAWN BY: N.M.	DESIGN GUIDELINE DRAWINGS Service Connections	APPROVED BY:
			DATE: MAR/10	SHALLOW STORM SEWER SERVICE CONNECTION	
			SCALE: N.T.S.		DRAWING NO. 4.04



LEGEND :

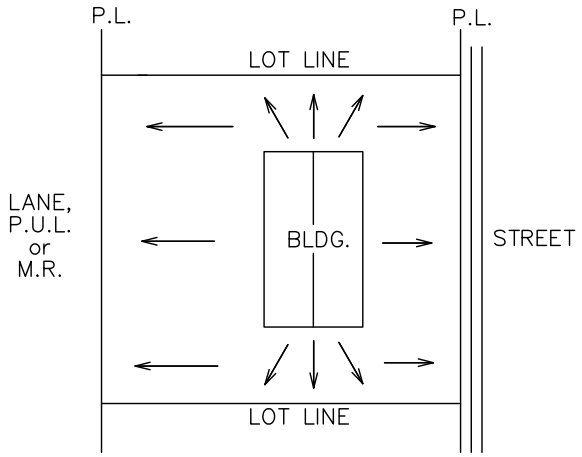
- ○ SINGLE WATER & SANITARY SERVICE
- ● DUAL WATER & SANITARY SERVICE
- △ SINGLE WATER, SANITARY & STORM SERVICE
- ▲ DUAL WATER, SANITARY & STORM SERVICE
- ← DRAINAGE PATTERN

NOTE :
- EASEMENT WIDTHS VARY
- SERVICE LOCATION DIMENSIONS VARY (SEE DWG. 4.02)

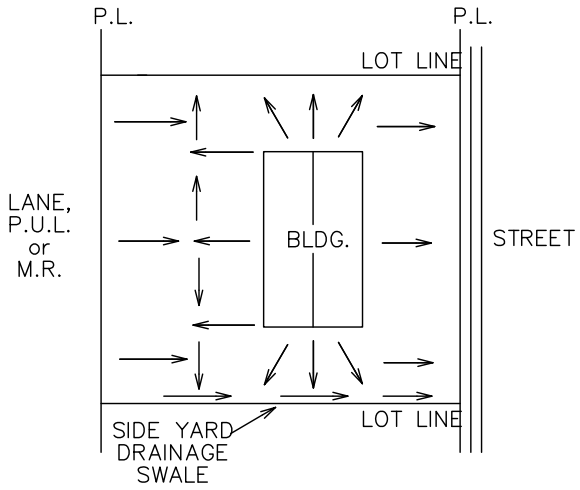
NO.	DATE	REVISION

TOWN OF PONOKA

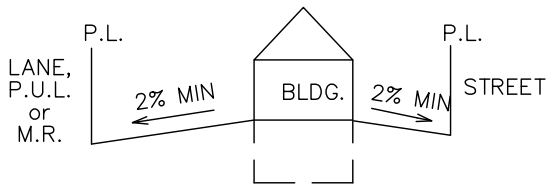
DRAWN BY: N.M.	DESIGN GUIDELINE DRAWINGS Service Connections	APPROVED BY:
DATE: MAR/10	TYPICAL LOT SERVICE REQUIREMENTS	
SCALE: N.T.S.		DRAWING NO. 4.05

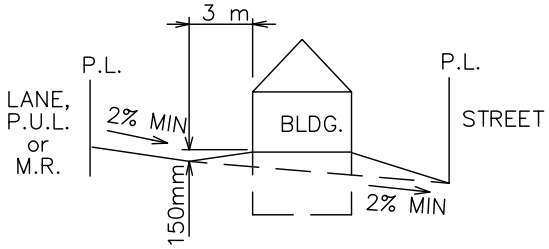


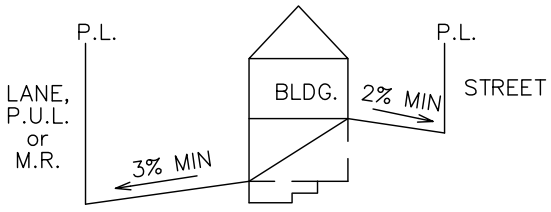
SPLIT DRAINAGE



BACK TO FRONT DRAINAGE

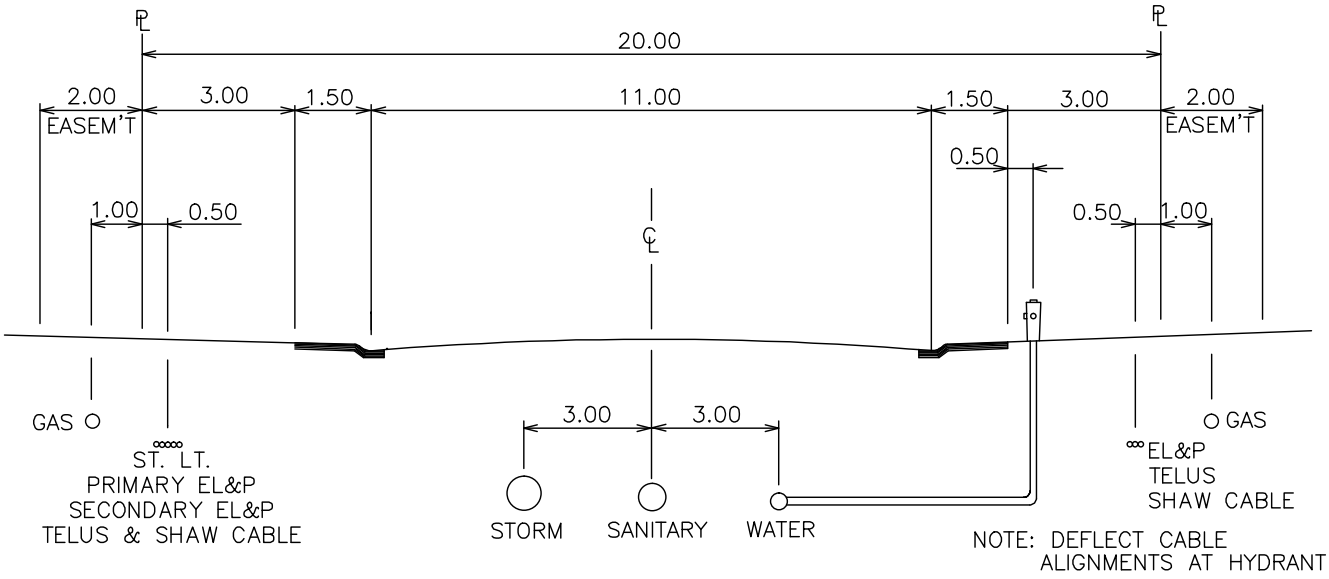




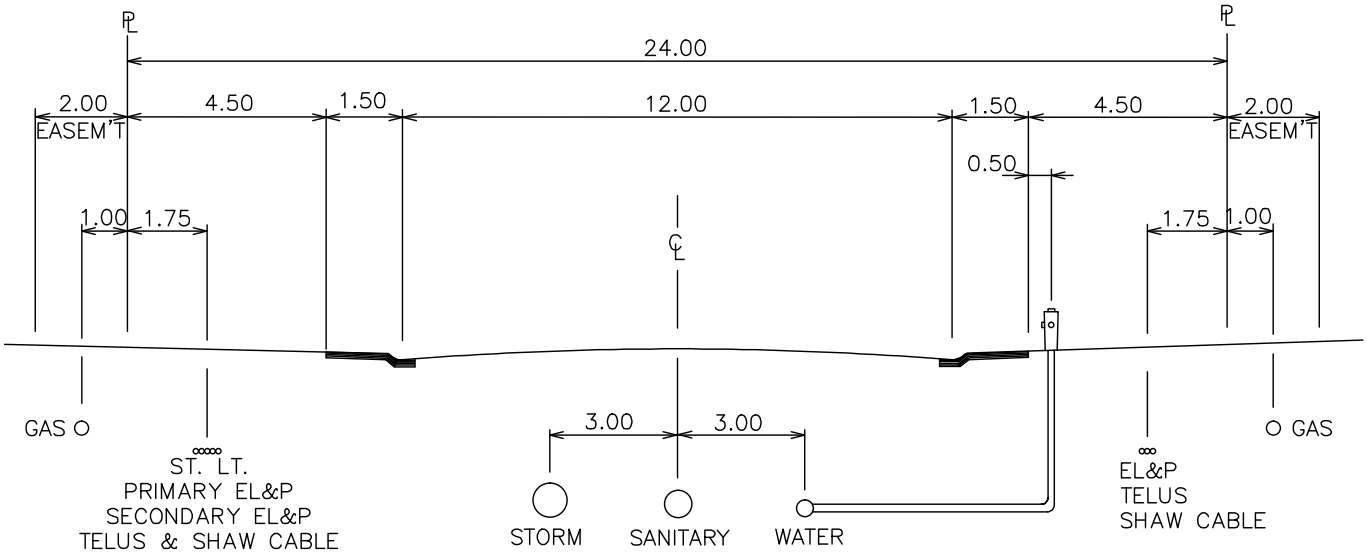


REARYARD BASEMENT WALKOUT
SPLIT DRAINAGE

NO.	DATE	REVISION			
			TOWN OF PONOKA		
			DRAWN BY: N.M.	DESIGN GUIDELINE DRAWINGS Service Connections	APPROVED BY:
			DATE: MAR/10	TYPICAL LOT GRADING	
			SCALE: N.T.S.		DRAWING NO. 4.06



RESIDENTIAL LOCAL ROAD



RESIDENTIAL COLLECTOR ROAD

NO.	DATE	REVISION
2	JUN 2014	
1	APR 2013	APPROVED

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Service Connections

APPROVED BY:

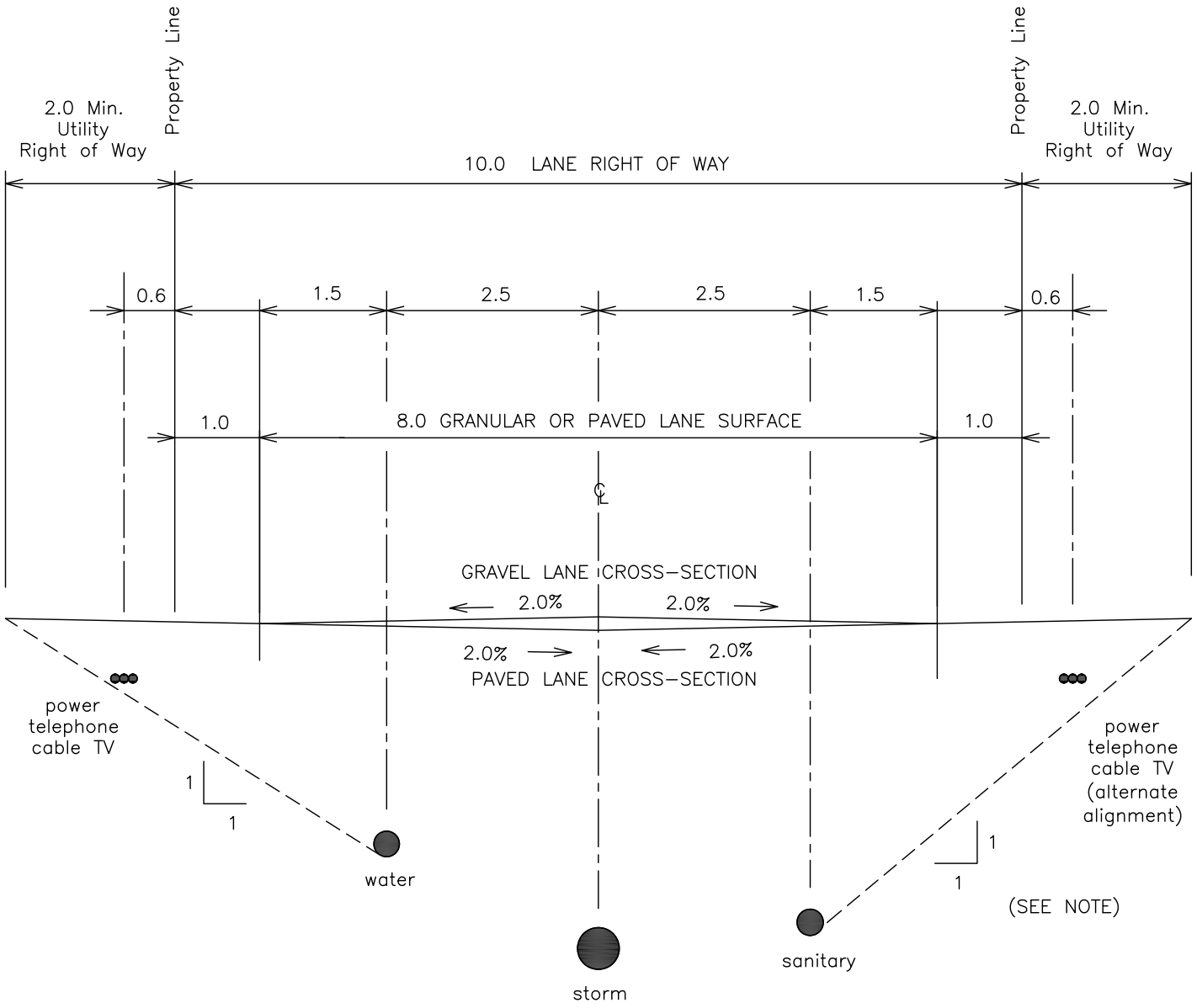
STREETS–UTILITIES ENGINEER

DATE: MAR/10

TYPICAL FRONT SERVICING ALIGNMENTS

SCALE: N.T.S.

DRAWING NO. 4.07



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 1.01)

NO.	DATE	REVISION	APP.
1	Jan9,2002	Revised dimensions	

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Service Connections

APPROVED BY:

DATE: MAR/10

LANE SERVICING ALIGNMENTS

STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

DRAWING NO. 4.09

SIZE OF MAIN	SIZE OF SANITARY SERVICE							
	150 mm	200 mm	250 mm	300 mm	375 mm	450 mm	525 mm	600 mm
200 mm	MANHOLE NOT REQUIRED			MANHOLE REQUIRED		SERVICE LARGER THAN MAIN NOT PERMITTED		
250 mm								
300 mm								
375 mm								
450 mm								
525 mm								
600 mm								
675 mm								
750 mm								
825 mm								
900 mm								
1050 mm								
1200 mm								
1350 mm								

SIZE OF MAIN	SIZE OF STORM SERVICE								
	100 mm	150 mm	200 mm	250 mm	300 mm	375 mm	450 mm	525 mm	600 mm
200 mm	MANHOLE NOT REQUIRED						MANHOLE REQUIRED		SERVICE LARGER THAN MAIN NOT PERMITTED
250 mm									
300 mm									
375 mm									
450 mm									
525 mm									
600 mm									
675 mm									
750 mm									
825 mm									
900 mm									
1050 mm									
1200 mm									
1350 mm									

NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Service Connections

APPROVED BY:

DATE: MAR/10

SANITARY & STORM MANHOLE REQUIREMENTS FOR SERVICE CONNECTIONS

STREETS–UTILITIES ENGINEER

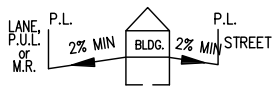
SCALE: N.T.S.

DRAWING NO. 4.10

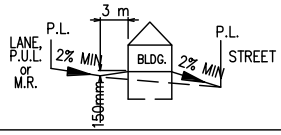
BUILDING GRADE CERTIFICATE

Town of Ponoka
Issued by: No. 2002-000

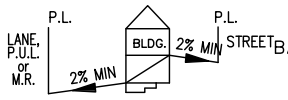
1. WHEN EXCAVATING IN A RIGHT OF WAY (EASEMENT), CHECK FOR UTILITIES.
2. STANDING AT THE WATER SHUTOFF AND FACING THE BUILDING, THE SANITARY SERVICE (PAINTED RED) IS ON THE LEFT SIDE OF THE WATER SERVICE: STORM SERVICE (PAINTED GREEN) IS ON THE RIGHT SIDE OF THE WATER SERVICE.
3. ALL DIMENSIONS ARE IN METRES AND DECIMALS THEROF. THE ELEVATIONS ARE IN METRES ABOVE GOEDETIC MEAN SEA LEVEL.
4. ELEVATIONS NOTED ON THE CERTIFICATE ARE WITHIN 100mm OF ACTUAL.
5. THE BUILDER MUST CONSTRUCT WITHIN 100mm OF THE DESIGN LANDSCAPE ELEVATION & ILLUSTRATED DRAINAGE PATTERNS UNLESS OTHERWISE APPROVED BY THE DEVELOPMENT OFFICER.
6. IF THE INFORMATION ON THIS CERTIFICATE HAS BEEN PREPARED BY A PRIVATE DEVELOPER OR THEIR AGENT, RED DEER COUNTY ACCEPTS NO RESPONSIBILITY FOR ITS ACCURACY.



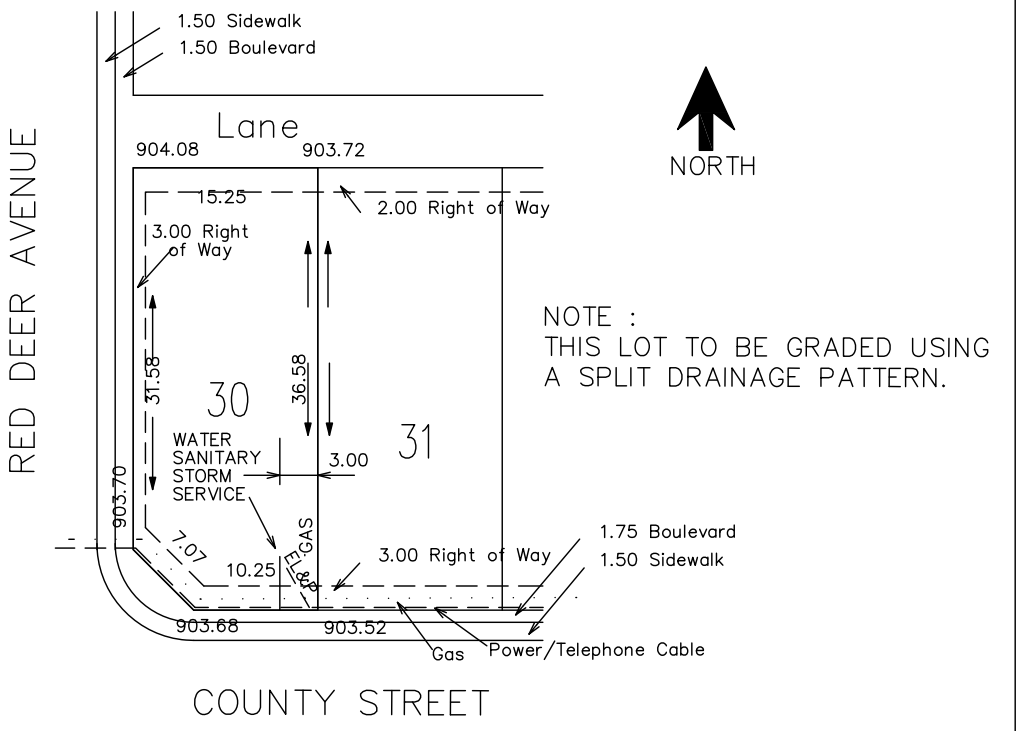
SPLIT DRAINAGE



BACK TO FRONT DRAINAGE



REARYARD BASEMENT WALKOUT SPLIT DRAINAGE



NOTE :
THIS LOT TO BE GRADED USING A SPLIT DRAINAGE PATTERN.

TOP OF FOOTING:
MAX. DEPTH BELOW AVERAGE SIDEWALK = 1.92
LOWEST ELEVATION = 901.68

AS-BUILT SEWER INVERT ELEVATIONS:
SANITARY AT RIGHT OF WAY LINE = 900.77
STORM AT RIGHT OF WAY LINE = 900.78

DESIGN LANDSCAPE ELEVATIONS
ELEV. AT FRONT OF HOUSE = 903.95
ELEV. AT REAR OF HOUSE = 903.95

CIVIC ADDRESS: 75 Ponoka Street
LOT: 30 BLOCK: 11 PLAN No.: 972 9999
DEVELOPER: ABC Developments Ltd. SCALE: 1:500
DRAWN BY: XYZ Consulting Ltd. DATE: June 28, 2000
APPROVED BY: DATE:
RECEIVED BY: DATE:

NO.	DATE	REVISION

TOWN OF PONOKA

DRAWN BY: N.M.

DESIGN GUIDELINE DRAWINGS
Service Connections

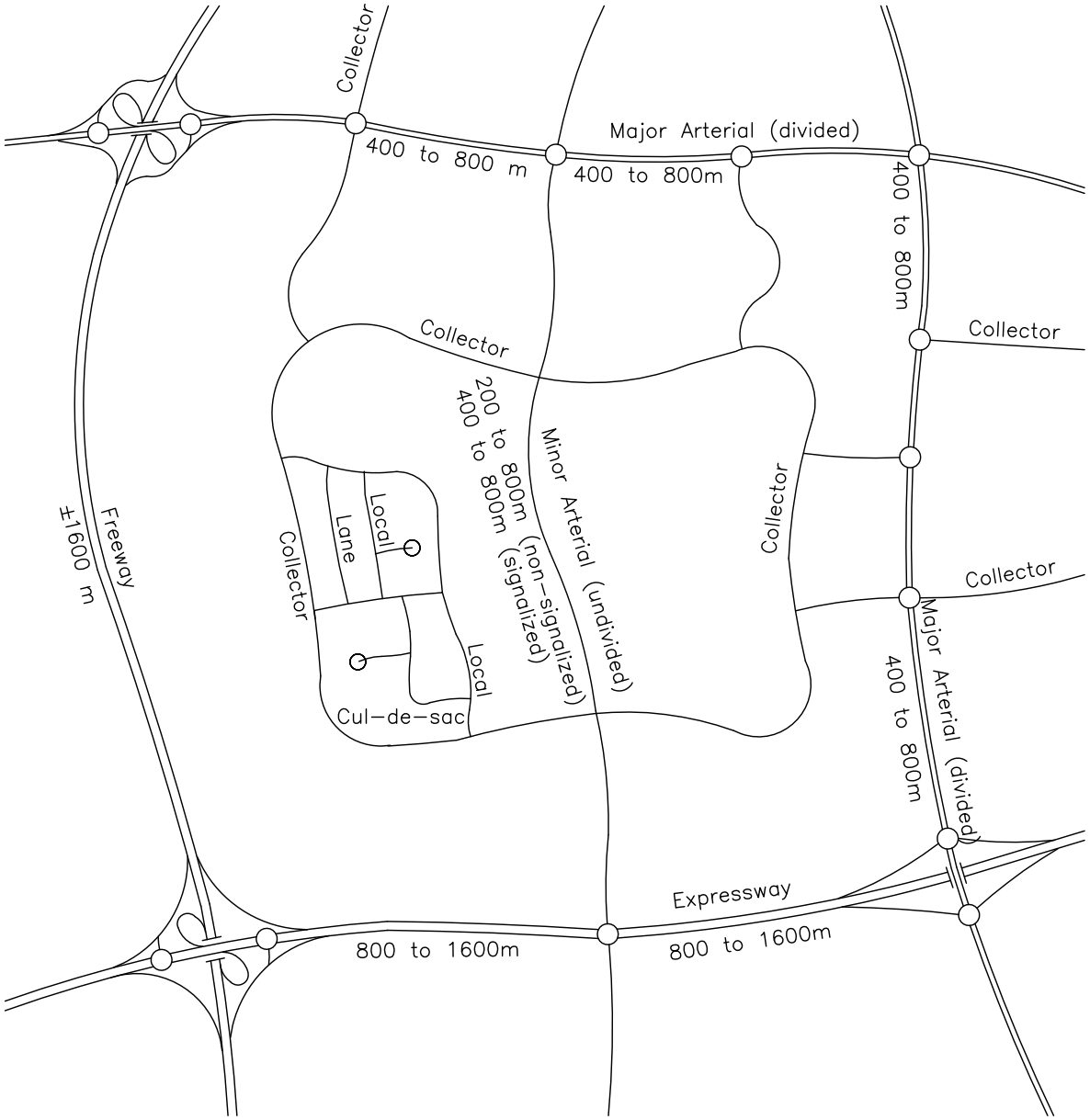
APPROVED BY:

DATE: MAR/10

NEW RESIDENTIAL
BUILDING GRADE CERTIFICATE

SCALE: N.T.S.

DRAWING NO. 4.11



LEGEND

- FREEWAY
- EXPRESSWAY
- MAJOR ARTERIAL
- MINOR ARTERIAL
- COLLECTOR
- LOCAL
- PUBLIC LANE
- SIGNALIZED INTERSECTION
- CUL-DE-SAC

NO.	DATE	REVISION
2	Jan 31, 2008	Revised Roadway sizes
1	Feb 22, 2005	Revised Roadway sizes

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Roadway Design

DRAWN BY: D.W.K.

DATE: MAR/10

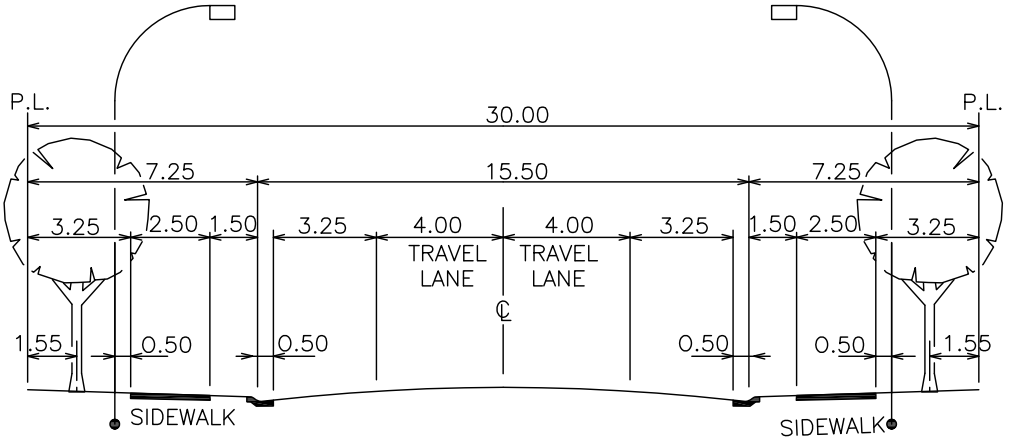
SCALE: N.T.S.

RELATIONSHIP OF STREET CLASSIFICATIONS

APPROVED BY:

STREETS-UTILITIES ENGINEER

DRAWING NO. 5.01



NO.	DATE	REVISION
1	FEB 11, 2004	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

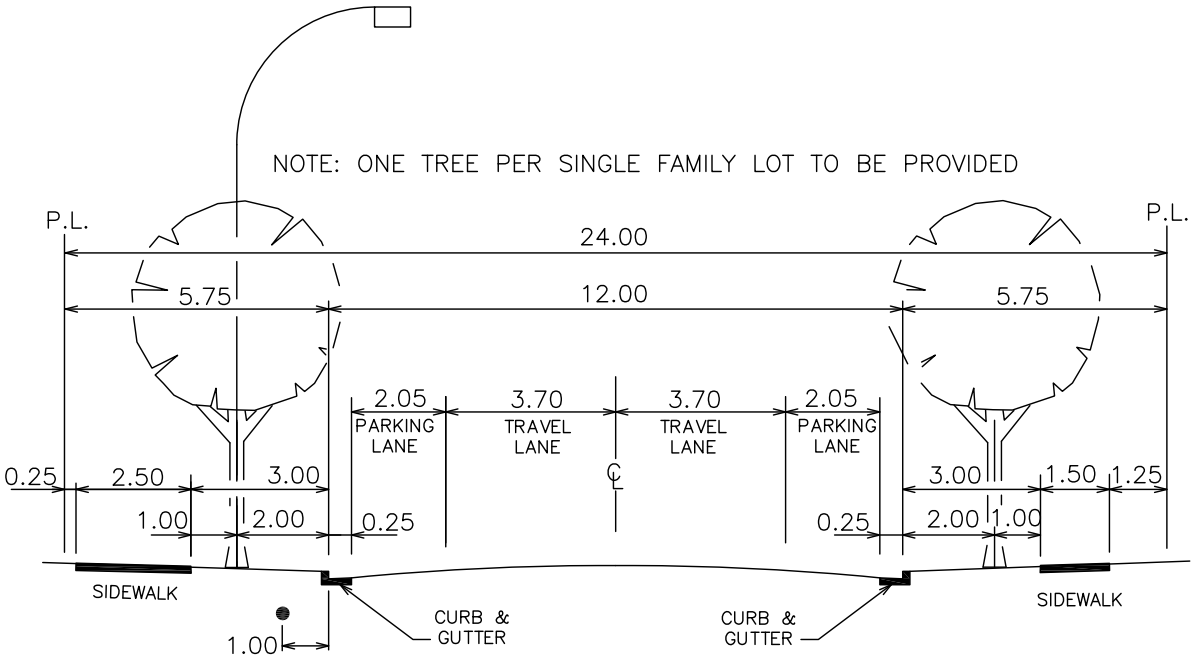
STREETS–UTILITIES ENGINEER

DATE: MAR/10

UNDIVIDED ARTERIAL ROADWAY

SCALE: N.T.S.

DRAWING NO. 5.05



COLLECTOR ROADWAY
WITH SEPARATE SIDEWALK

NOTE:

– ROLLED CURB AND GUTTER TO BE INSTALLED ON ROADWAYS WITH FRONT DRIVEWAYS, OTHERWISE STANDARD CURB AND GUTTER IS REQUIRED.

NO.	DATE	REVISION
4	Feb 1, 2008	Revised
3	July 10, 2007	Revised
2	Feb 24, 2005	Revised Sidewalk dimensions
1	Mar 22, 2004	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Roadway Design

DRAWN BY: D.W.K.

DATE: MAR/10

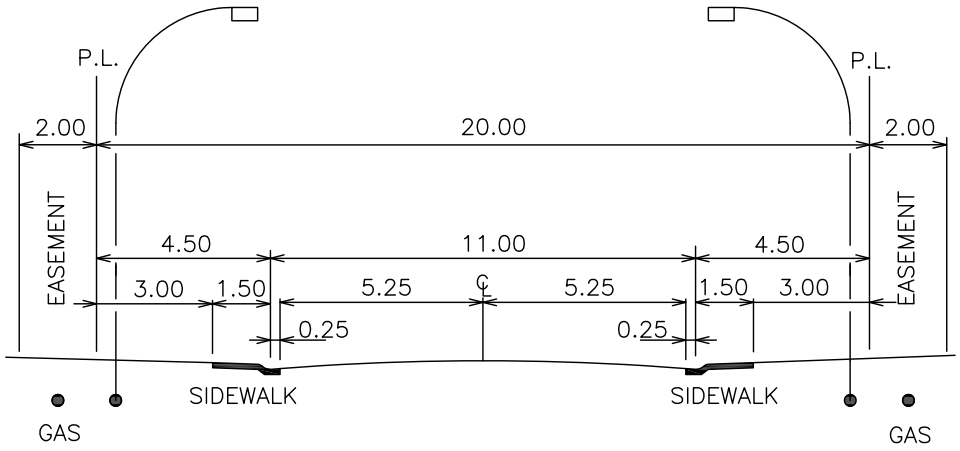
SCALE: N.T.S.

RESIDENTIAL UNDIVIDED COLLECTOR ROADWAY

APPROVED BY:

STREETS–UTILITIES ENGINEER

DRAWING NO. 5.07



NO.	DATE	REVISION
1	Mar 22, 2004	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

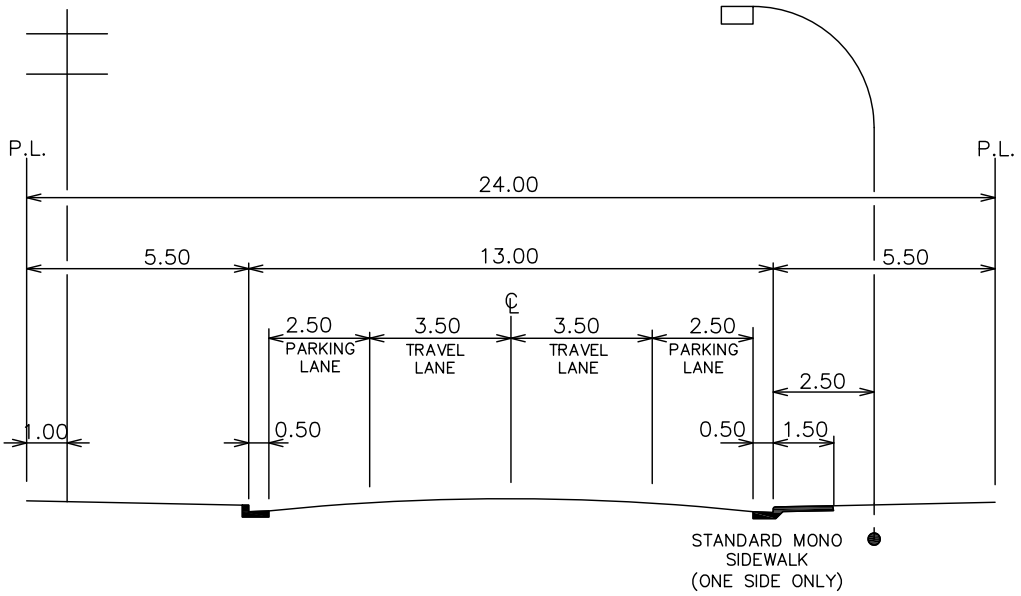
STREETS–UTILITIES ENGINEER

DATE: MAR/10

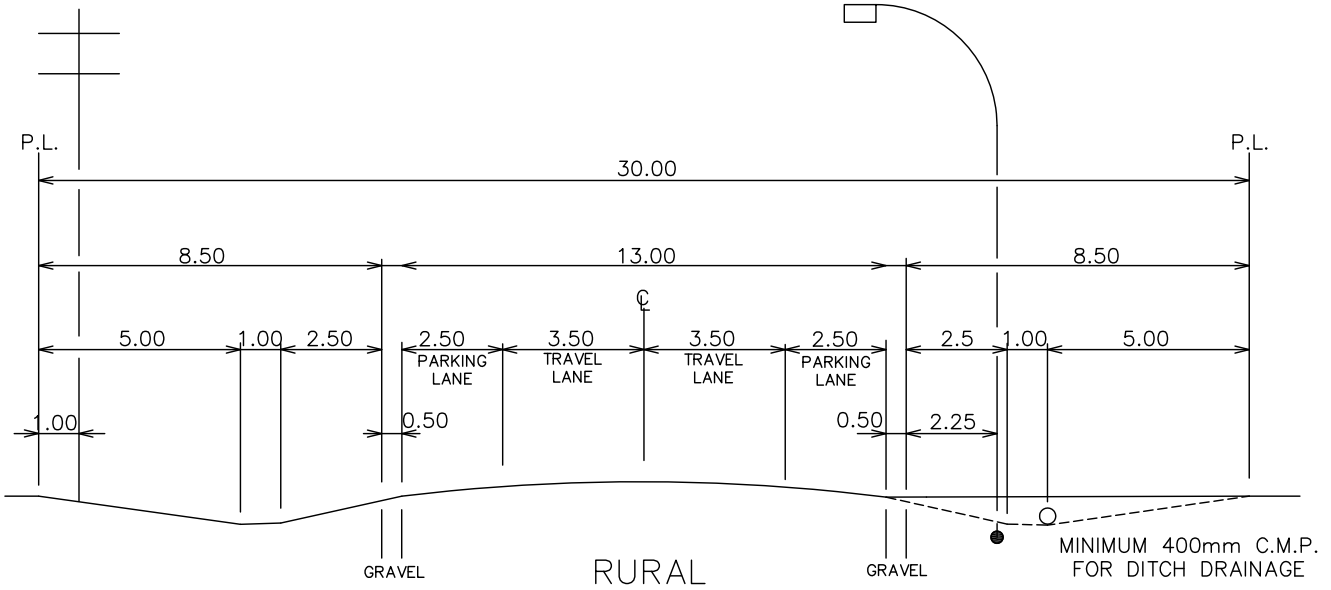
11.0m UNDIVIDED LOCAL ROADWAY

SCALE: N.T.S.

DRAWING NO. 5.09



URBAN
UNDIVIDED INDUSTRIAL
COLLECTOR ROADWAY



RURAL
UNDIVIDED INDUSTRIAL
COLLECTOR ROADWAY

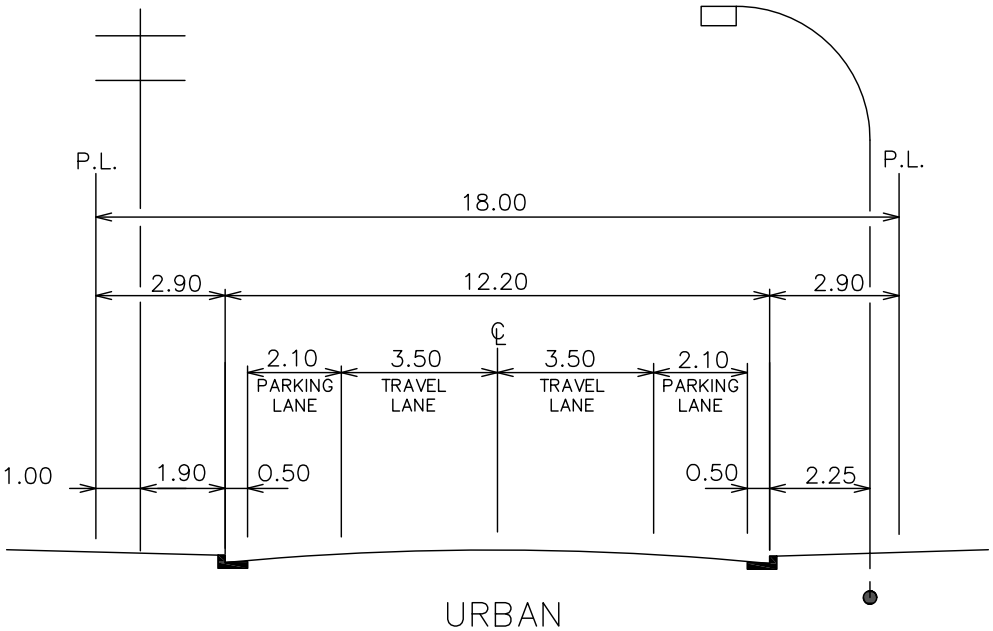
NO.	DATE	REVISION
2	Mar 4, 2009	Revised
1	Feb 1, 2008	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

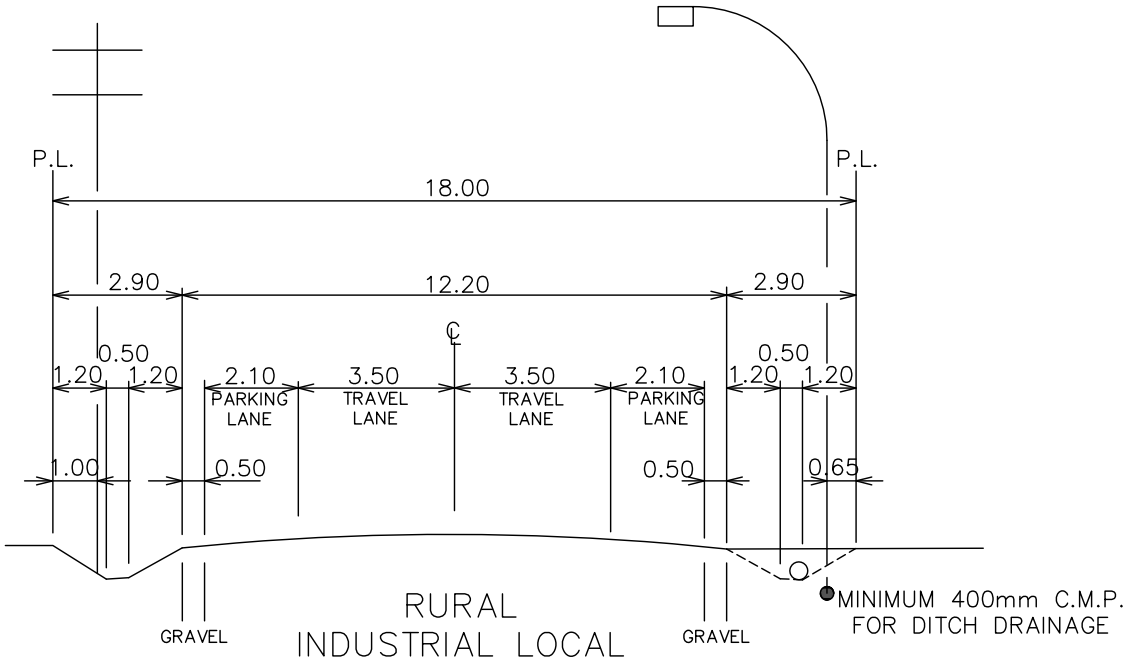
DESIGN GUIDELINE DRAWINGS
Roadway Design

RURAL & URBAN UNDIVIDED INDUSTRIAL COLLECTOR ROADWAY

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.11



URBAN
INDUSTRIAL LOCAL
ROADWAY



RURAL
INDUSTRIAL LOCAL
ROADWAY

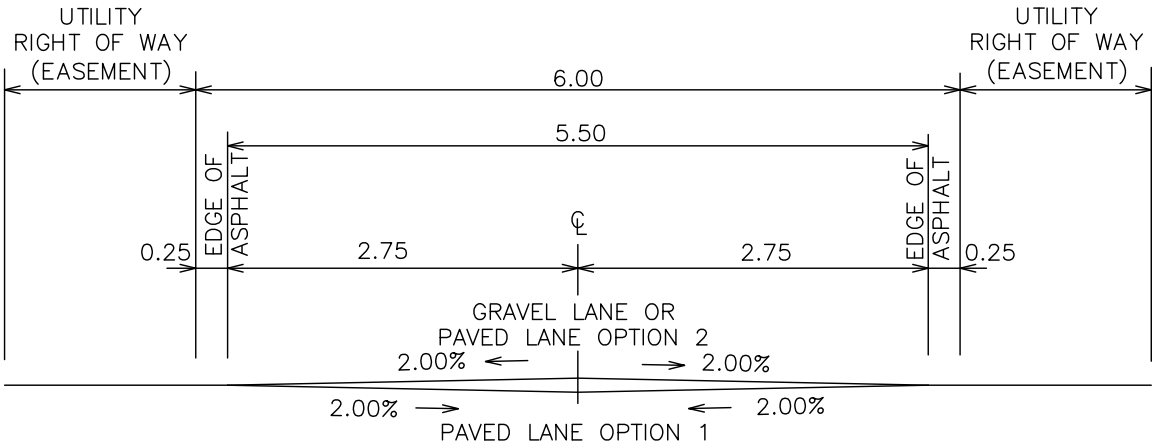
NO.	DATE	REVISION
1	Mar 26/09	Revised measurements

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Roadway Design

RURAL & URBAN INDUSTRIAL LOCAL ROADWAY

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.12



LANE

NOTE:

- MINIMUM 2.00m WIDE EASEMENT REQUIRED ON BOTH SIDES OF LANE FOR REAR SERVICING.
- LANE TO BE PAVED ADJACENT TO MULTI–FAMILY AND COMMERCIAL DEVELOPMENTS WHERE LANE ACCESS IS PROVIDED.
- LANE R/W WIDTH MAY VARY IN ESTABLISHED SUBDIVISION, CROSS–SECTION DIMENSIONS TO BE ADJUSTED ACCORDINGLY.
- ALL LANES ARE TO BE PAVED IN 2 MATS.

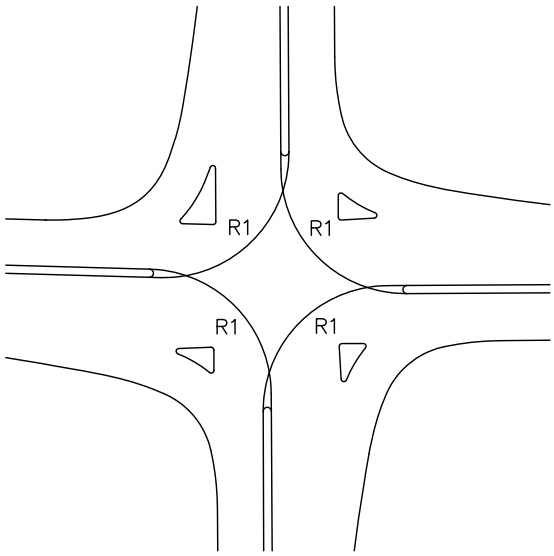
NO.	DATE	REVISION
2	June 25, 2007	Added to the Note.
1	Mar 6, 2003	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

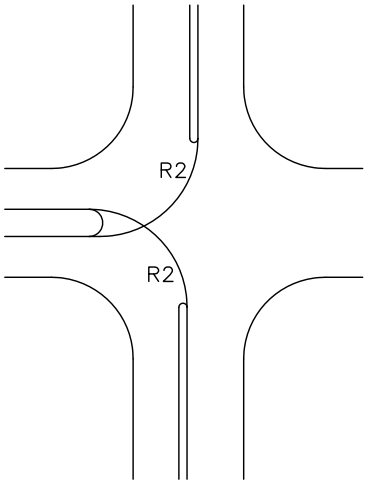
DESIGN GUIDELINE DRAWINGS
Roadway Design

LANES

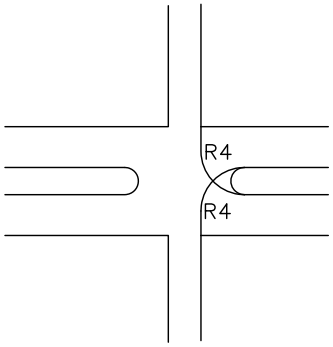
DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.14



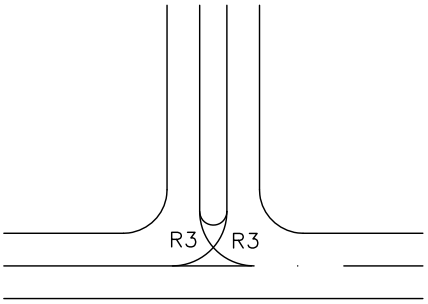
ARTERIAL TO ARTERIAL



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

TOWN OF PONOKA

DRAWN BY: N.M.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

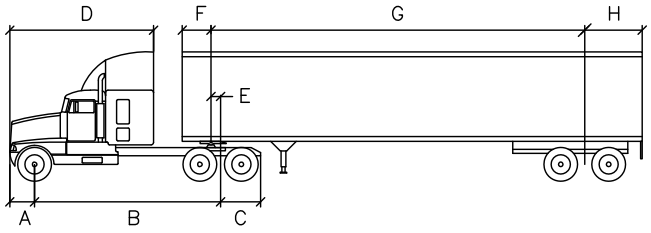
DATE: MAR/10

INTERSECTION CENTRE LINE
CONTROL RADII

SCALE: N.T.S.

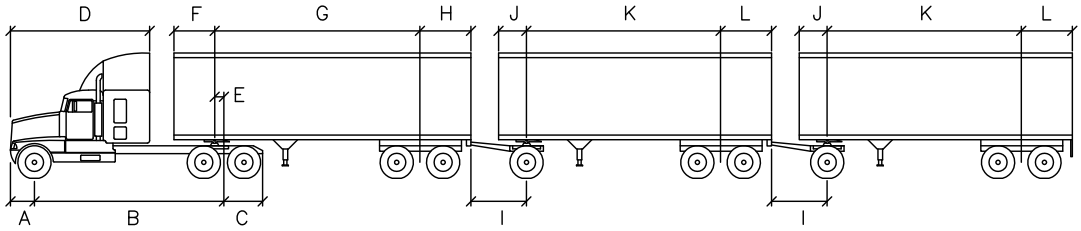
DRAWING NO. 5.20

WB–15, 17 & 20



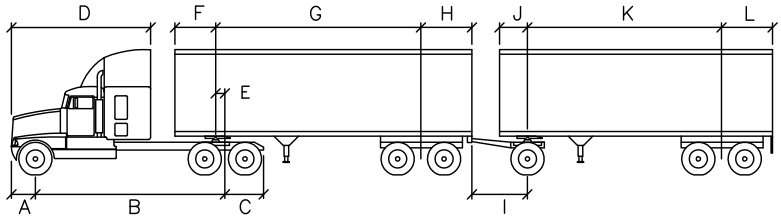
Tractor Width: 2.60 Trailer Track : 2.60
Trailer Width: 2.60 Steering Angle : 26.22
Tractor Track: 2.60 Tractor/Trailer Angle : 48.24

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–29	WB–35
TRACTOR					
A Tractor Front	1.0	1.0	1.0	1.0	1.0
B Tractor Wheelbase	5.5	5.5	5.5	5.5	5.5
C Tractor Rear	1.3	1.3	1.3	1.3	1.3
D Cab Length	3.5	3.5	3.0	3.0	3.0
E Axle to Kingpin	0.0	0.0	0.0	0.0	0.0
FIRST TRAILER					
F Trailor Front	1.3	1.3	1.3	1.3	1.3
G Pin to Trailor Axle	9.1	11.5	14.3	6.3	12.2
H Trailor Rear	1.5	1.5	1.5	1.0	1.0
SECOND AND / OR THIRD TRAILER					
I Towbar	N/A	N/A	N/A	1.8	2.4
J Trailor Front	N/A	N/A	N/A	0.9	1.2
K Pin to Trailor Axle	N/A	N/A	N/A	6.6	12.2
L Trailor Rear	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.

SEE DWG. 5.22 FOR VEHICLE TURNING RADII.

NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

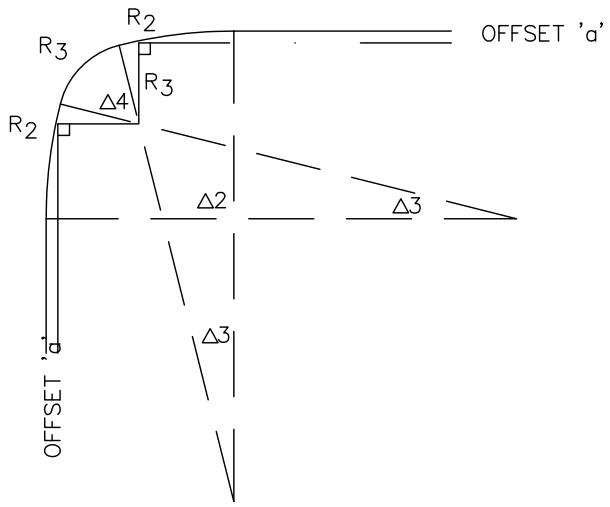
STREETS–UTILITIES ENGINEER

DATE: MAR/10

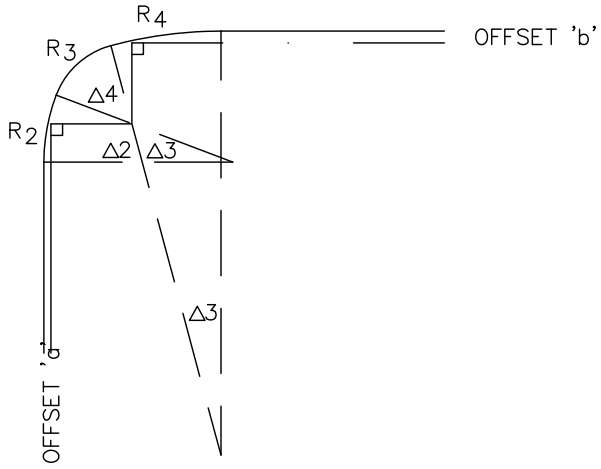
W.B. DESIGN VEHICLES

SCALE: N.T.S.

DRAWING NO. 5.21



3 – CENTRED SYMETRICAL COMPOUND CURVE



3 – CENTRED ASYMETRICAL COMPOUND CURVE

NOTE :
Δ3 AND Δ4 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 5.22)	Angle of Turn (degrees)	3 – Centered Symetrical Compound Curve				3 – Centered Asymetrical Compound Curve				
		Minimum Curve Radii (meters)			Symetric Off–set (meters)	Minimum Curve Radii (meters)			Asymetric 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	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

NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Roadway Design

W.B. VEHICLE COMPOUND CURVE TURN DESIGN

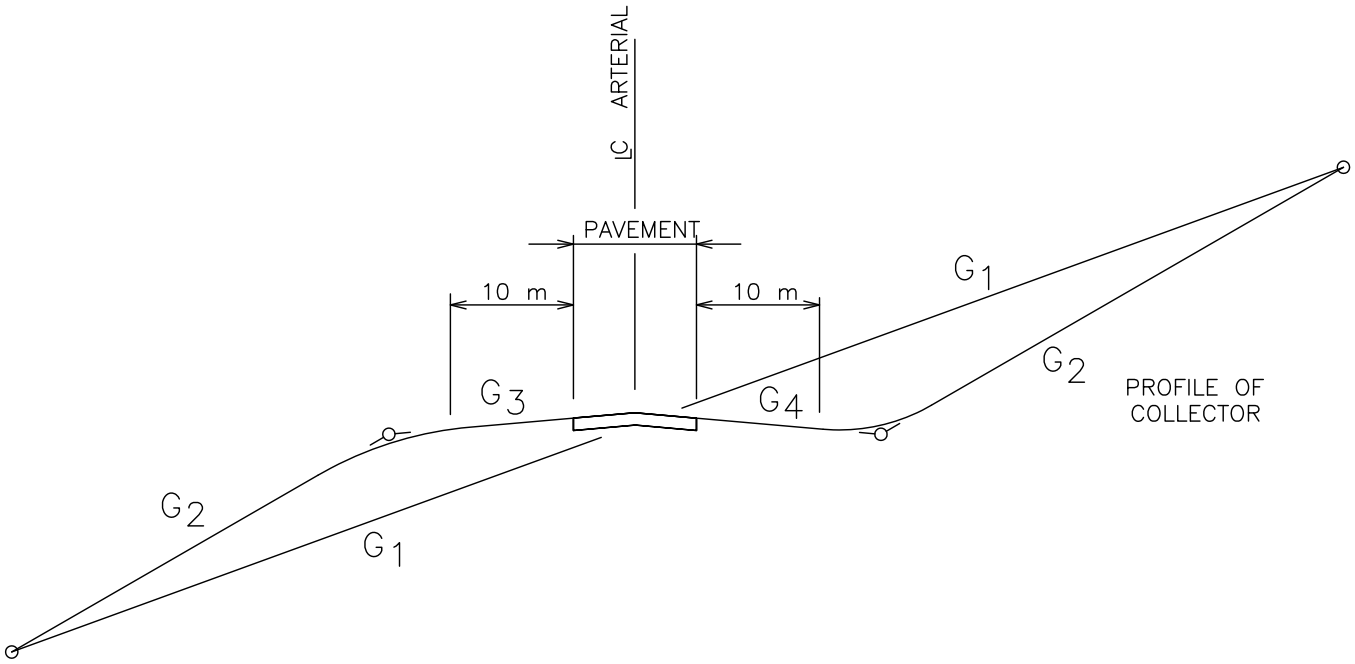
DRAWN BY: N.M.

DATE: MAR/10

SCALE: N.T.S.

APPROVED BY:

DRAWING NO. 5.22



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

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

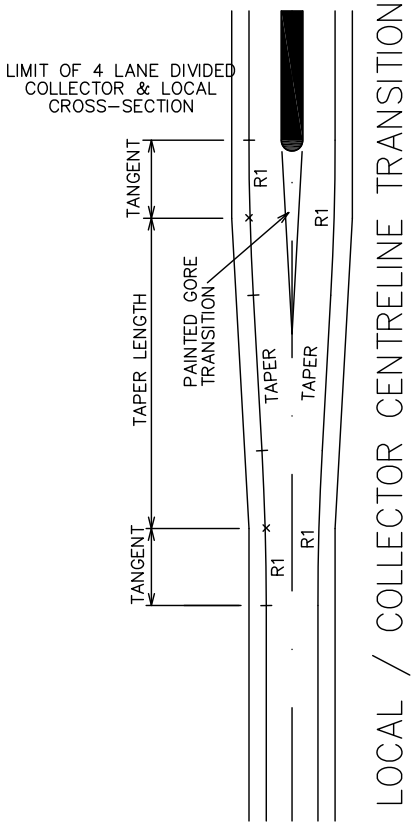
DATE: MAR/10

INTERSECTION GRADE ADJUSTMENT

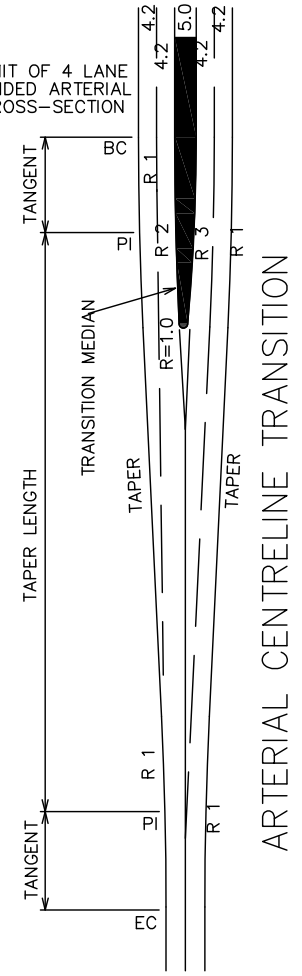
STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

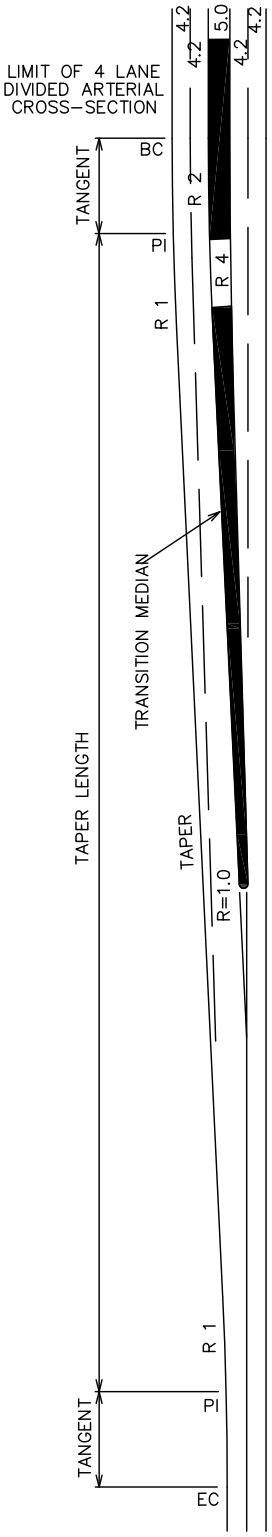
DRAWING NO. 5.23



LOCAL / COLLECTOR CENTRELINE TRANSITION



ARTERIAL CENTRELINE TRANSITION



ARTERIAL OFFSET TRANSITION

OVERALL APPROACH OR DEPARTURE TAPER LENGTHS						
ROADWAY	DESIGN SPEED KM/H	TAPER RATIO	TRANSITION RADII (m)			
			R 1	R 2	R 3	R 4
LOCAL	50	15:1	500	---	---	---
COLLECTOR	60	18:1	700	---	---	---
ARTERIAL	70	21:1	930	921.6	475	2000
ARTERIAL	80	24:1	1200	1191.6	475	2000

INFORMATION SHOWN FOR ARTERIAL ROADWAY TRANSITIONSARE BASED ON 70 fm/hr DESIGN SPEED.

NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Roadway Design

DRAWN BY: N.M.

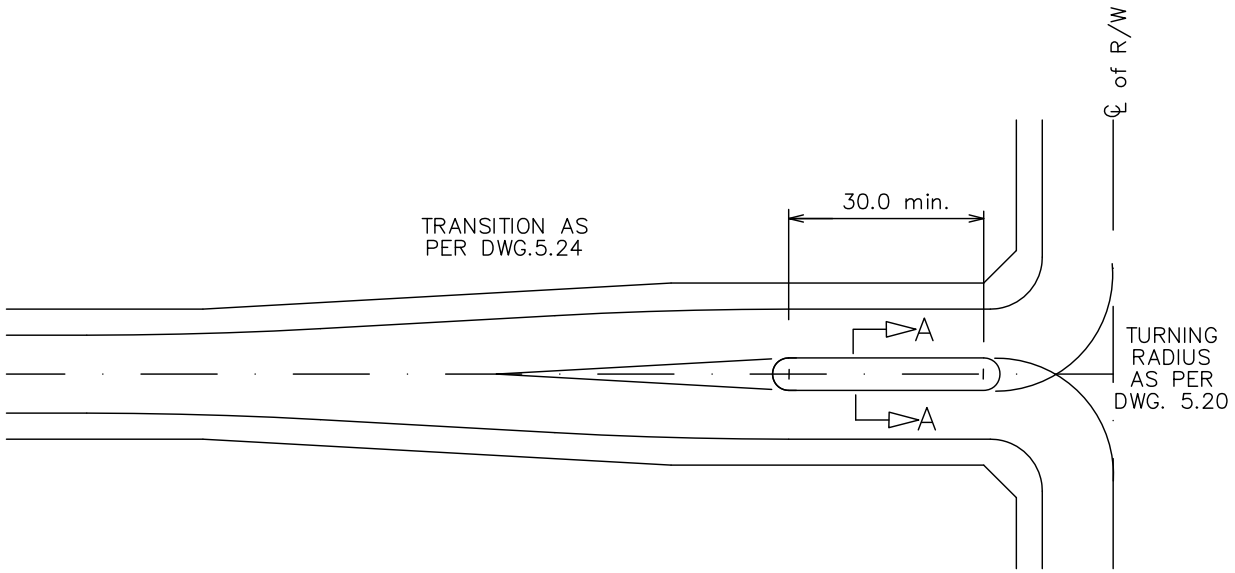
DATE: MAR/10

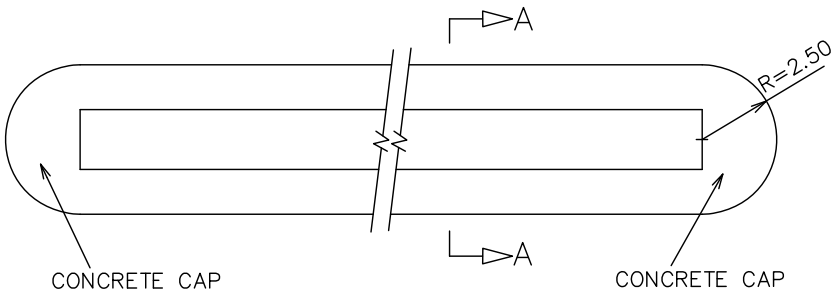
SCALE: N.T.S.

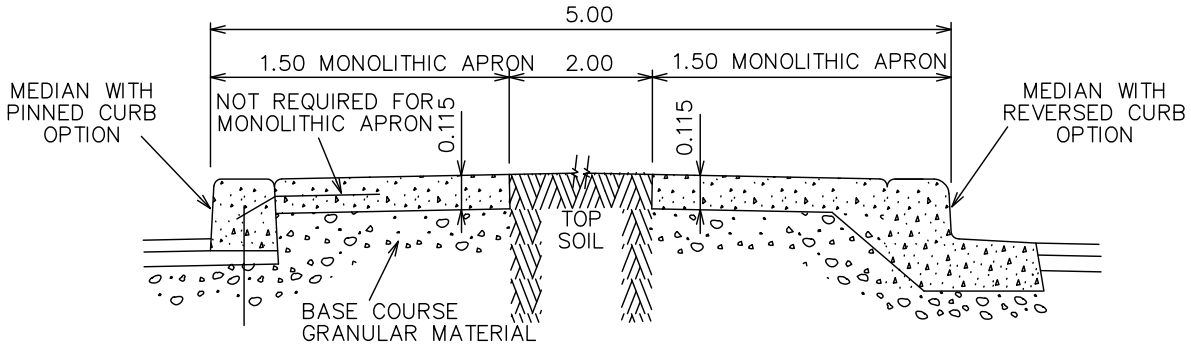
DIVIDED TO UNDIVIDED ROADWAY TRANSITION

APPROVED BY:

DRAWING NO. 5.24







NOTE :
PATTERNED CONCRETE OR PAVING STONES FOR APRON ARE PERMITTED

SECTION 'A – A'
(AS PER CONTRACT SPECIFICATION)

NO.	DATE	REVISION

TOWN OF PONOKA

DESIGN GUIDELINE DRAWINGS
Roadway Design

COLLECTOR AND LOCAL
ROADWAY CENTRE ISLAND

DRAWN BY: N.M.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY:
DRAWING NO. 5.25

SIX LANE CROSS-SECTION

FOUR LANE INTERIM CROSS-SECTION

NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

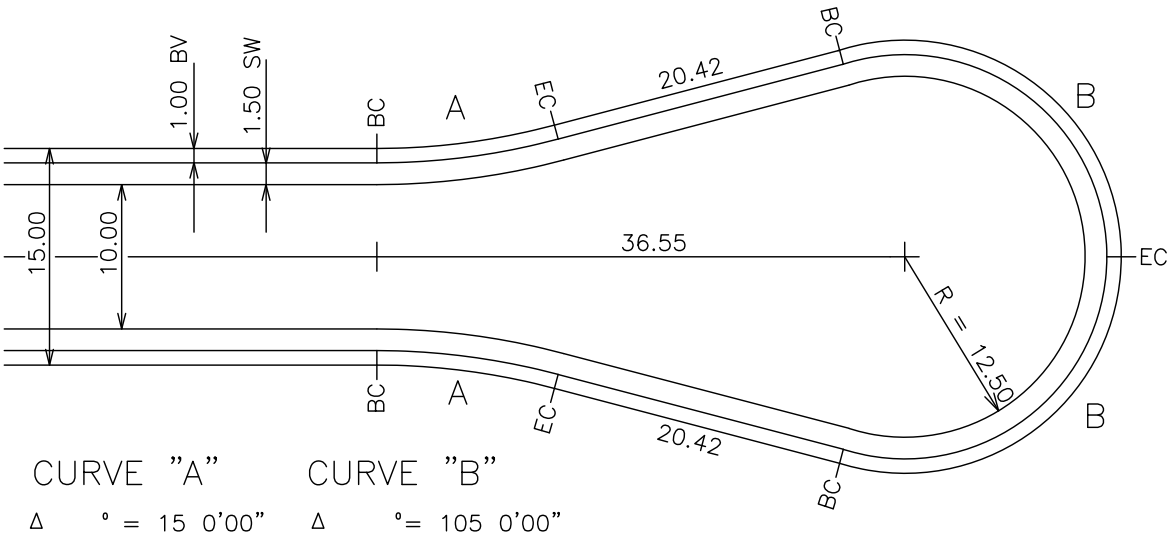
STREETS–UTILITIES ENGINEER

DATE: MAR/10

TYPICAL SLOT RIGHT TURN & LEFT TURN DESIGNS

SCALE: N.T.S.

DRAWING NO. 5.26

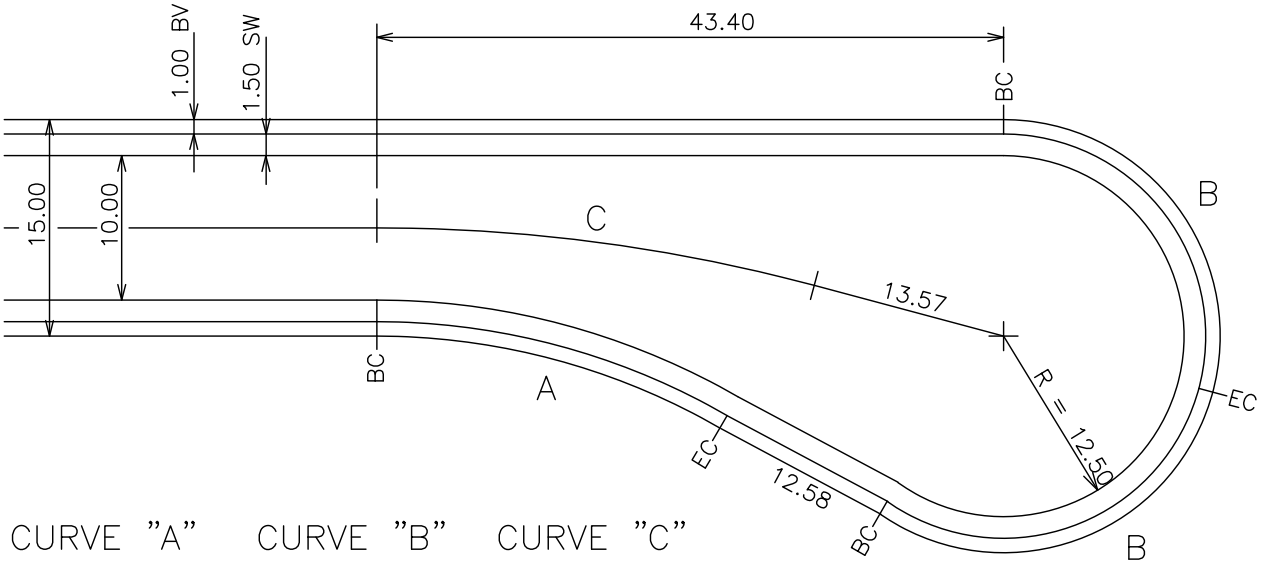


CURVE "A"

Δ ° = 15 0'00"
R = 50.00
ARC = 13.09
TAN = 6.58
(at property line)

CURVE "B"

Δ °= 105 0'00"
R = 15.00
ARC = 27.49
TAN = 19.55
(at property line)



CURVE "A"

Δ ° = 30 0'00"
R = 50.00
ARC = 26.18
TAN = 13.40
(at property line)

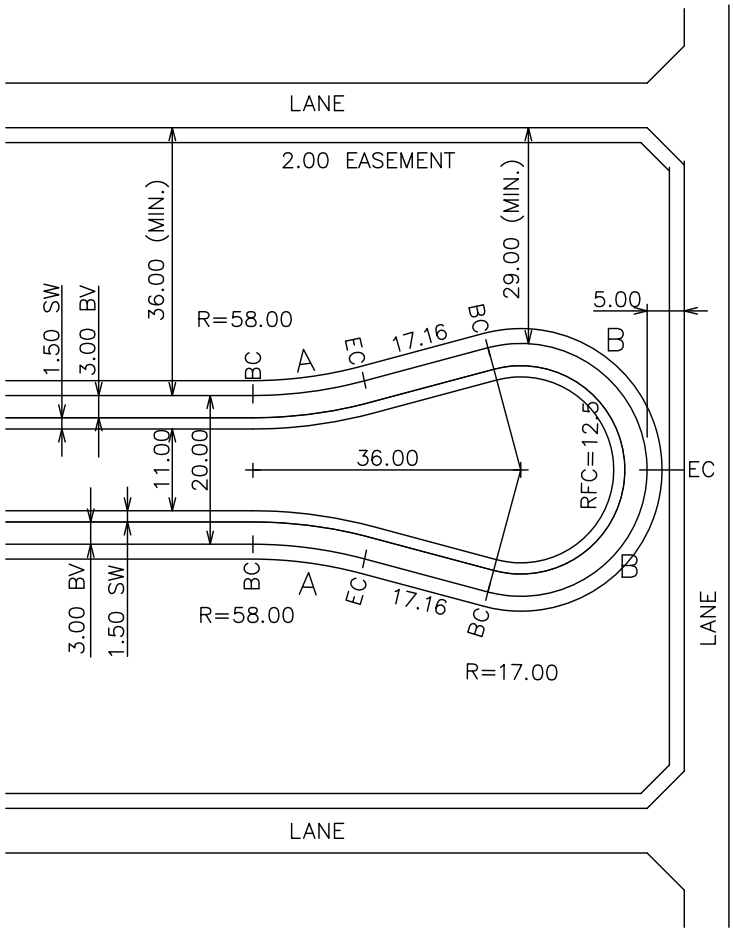
CURVE "B"

Δ °= 105 0'00"
R = 15.00
ARC = 27.49
TAN = 19.55
(at property line)

CURVE "C"

Δ ° = 15 0'00"
R = 117.03
ARC = 30.64
TAN = 15.41

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	15 / 10 LOCAL RESIDENTIAL CUL – DE – SAC	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.27

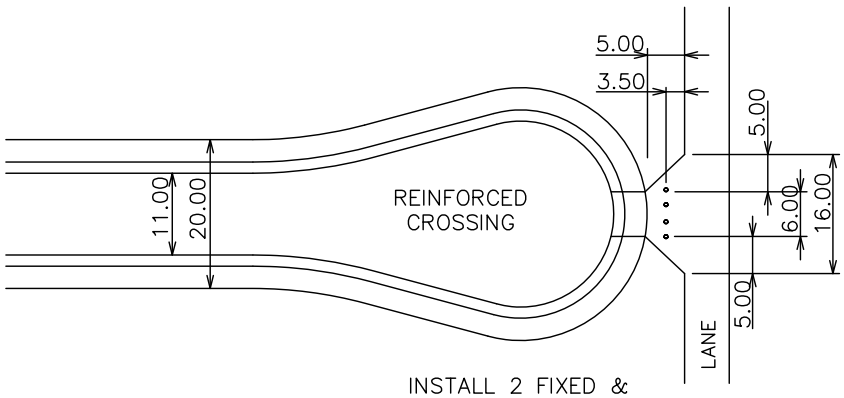


CURVE "A"

Δ °= 15 0'00"
R = 58.00
ARC = 15.18
TAN = 7.64

CURVE "B"

Δ ≒ 105 0'00"
R = 17.00
ARC = 31.17
TAN = 22.15



INSTALL 2 FIXED &
2 KNOCKDOWN BOLLARDS

LANE ACCESS

NOTE :
THIS DESIGN IS TO BE USED FOR DUPLEX, R1N AND ROW HOUSING DEVELOPMENTS.

NO.	DATE	REVISION
2	MAY 2014	
1	MAY 2013	APPROVED

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

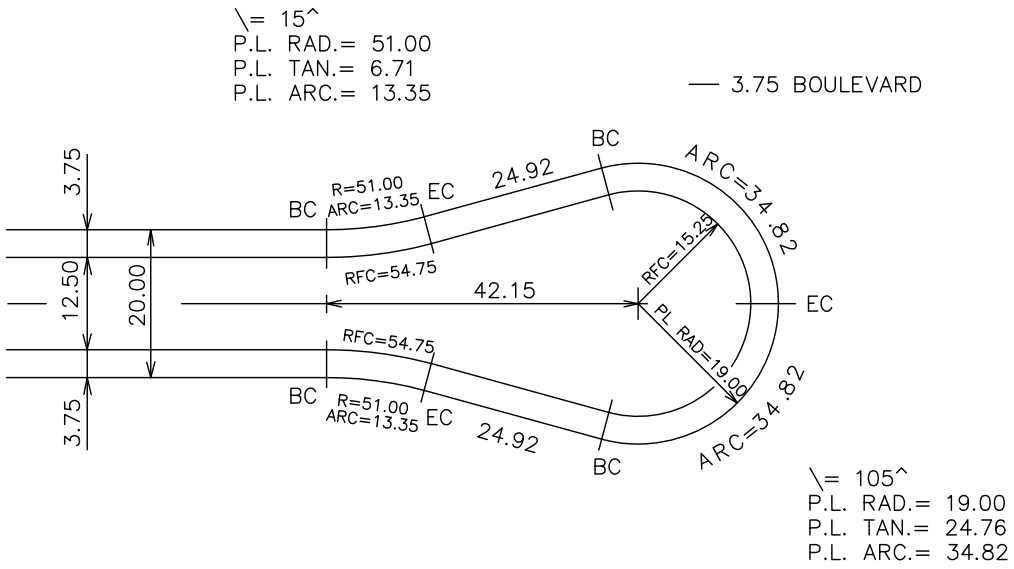
DATE: MAR/10

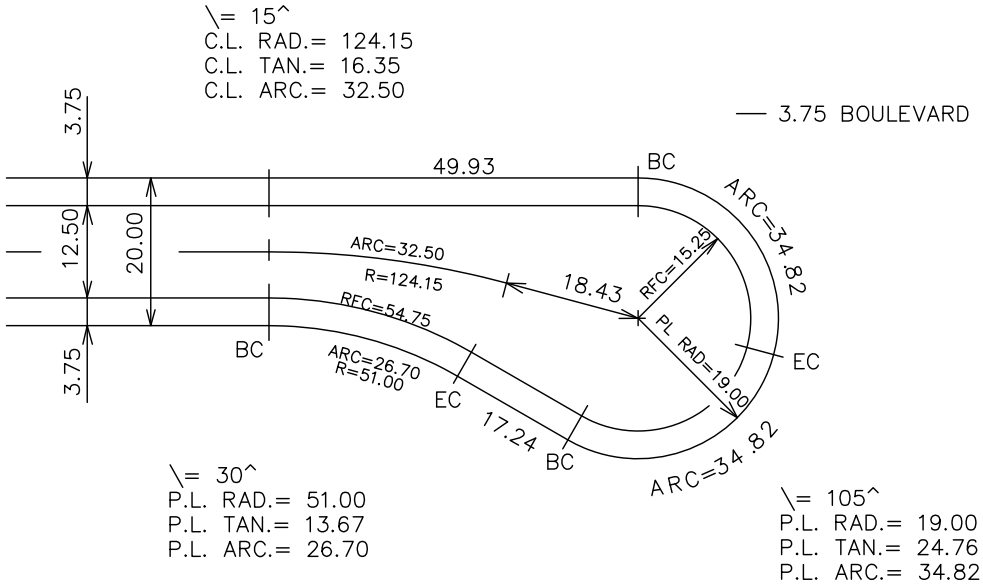
20 / 11 LOCAL RESIDENTIAL (MULTI-FAMILY) CUL - DE - SAC

STREETS-UTILITIES ENGINEER

SCALE: N.T.S.

DRAWING NO. 5.28





NO.	DATE	REVISION
2	MAY 2014	
1	MAY 2013	APPROVED

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

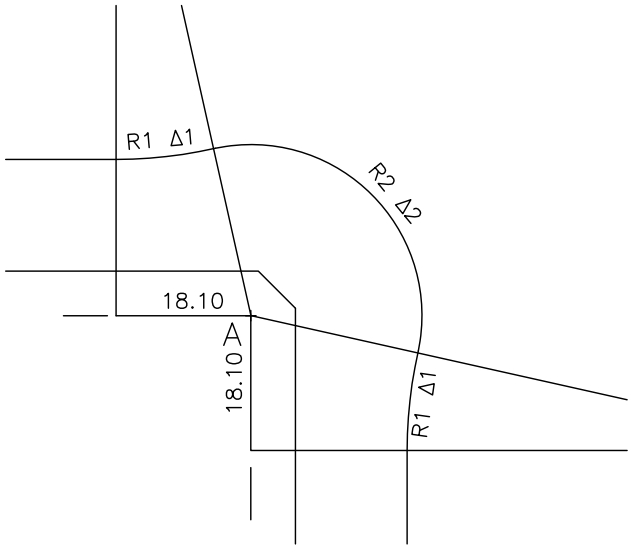
DATE: MAR/10

20 / 12.5 LOCAL INDUSTRIAL CUL – DE – SAC

STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

DRAWING NO. 5.29

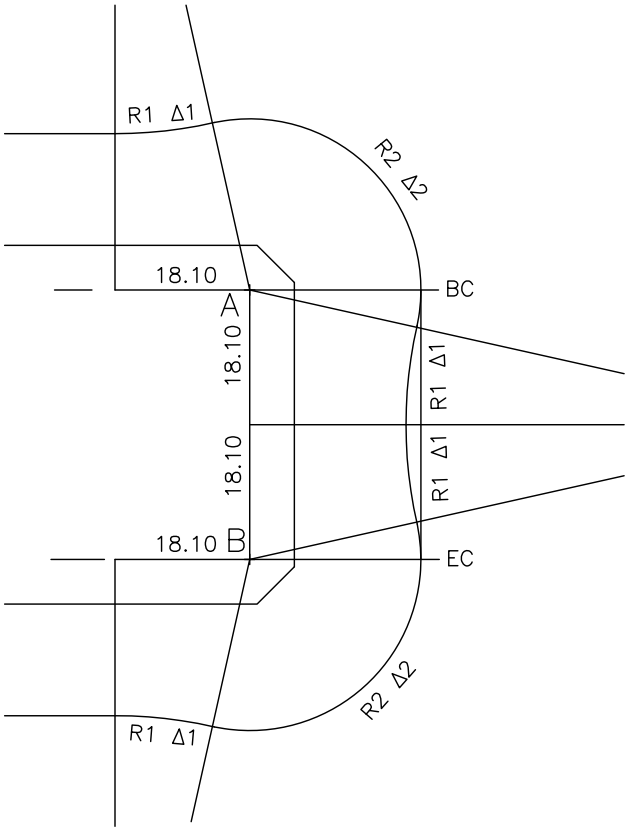


CURVE DATA

R1 = 60.00m
Δ1 = 12° 36' 12"
ARC = 13.20

R2 = 23.00m
Δ2 = VARIES
ARC = VARIES

ROAD RIGHT OF WAY WIDTH VARIES



NOTE:

IF THE DISTANCE BETWEEN A & 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

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

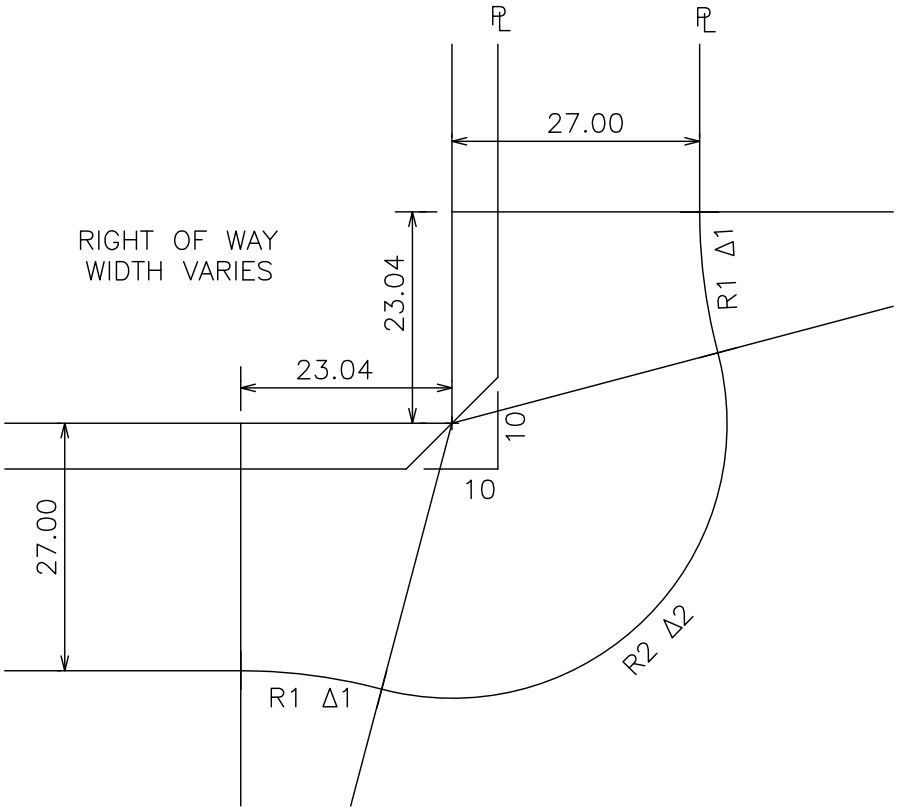
STREETS–UTILITIES ENGINEER

DATE: MAR/10

LOCAL RESIDENTIAL EXPANDED BULB CORNER

SCALE: N.T.S.

DRAWING NO. 5.30



CURVE DATA

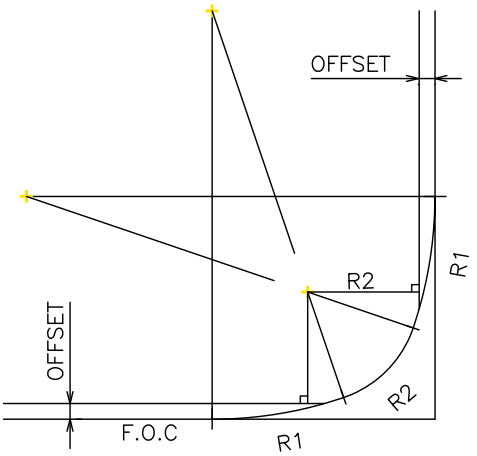
R1=	60.00m	Δ1=	14° 50' 05"
R2=	30.00m	Δ2=	VARIES

EXPANDED CORNER FOR INDUSTRIAL LOCAL

NO.	DATE	REVISION

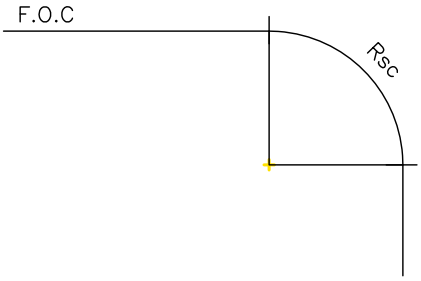
TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
DATE: MAR/10	INDUSTRIAL ROADWAY EXPANDED BULB CORNER	STREETS–UTILITIES ENGINEER
SCALE: N.T.S.		DRAWING NO. 5.31



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

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

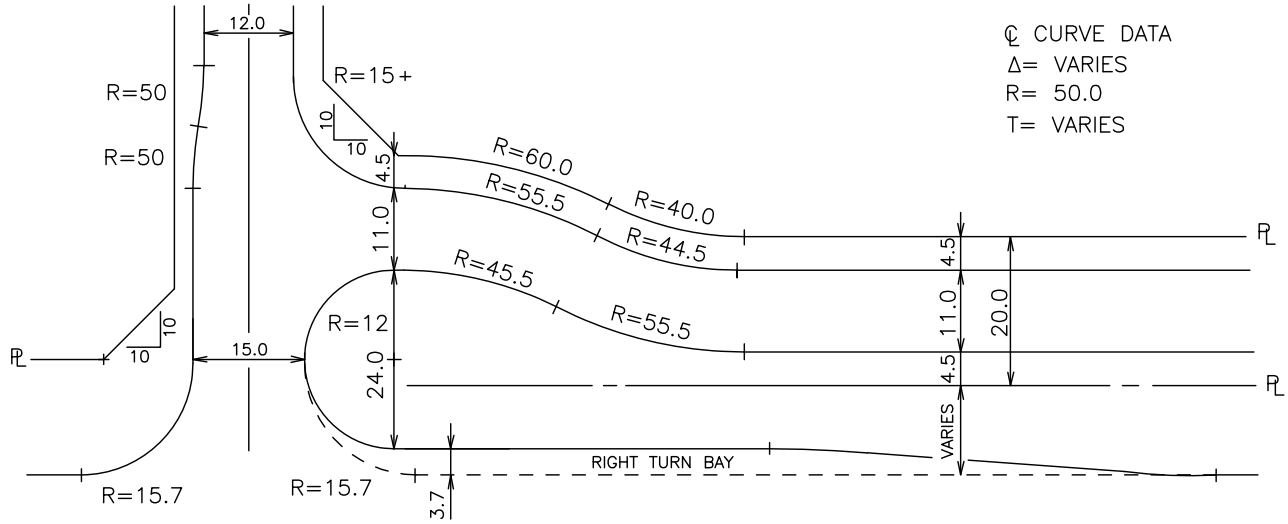
DATE: MAR/10

INDUSTRIAL ROADWAY
CURB RETURN RADII

STREETS–UTILITIES ENGINEER

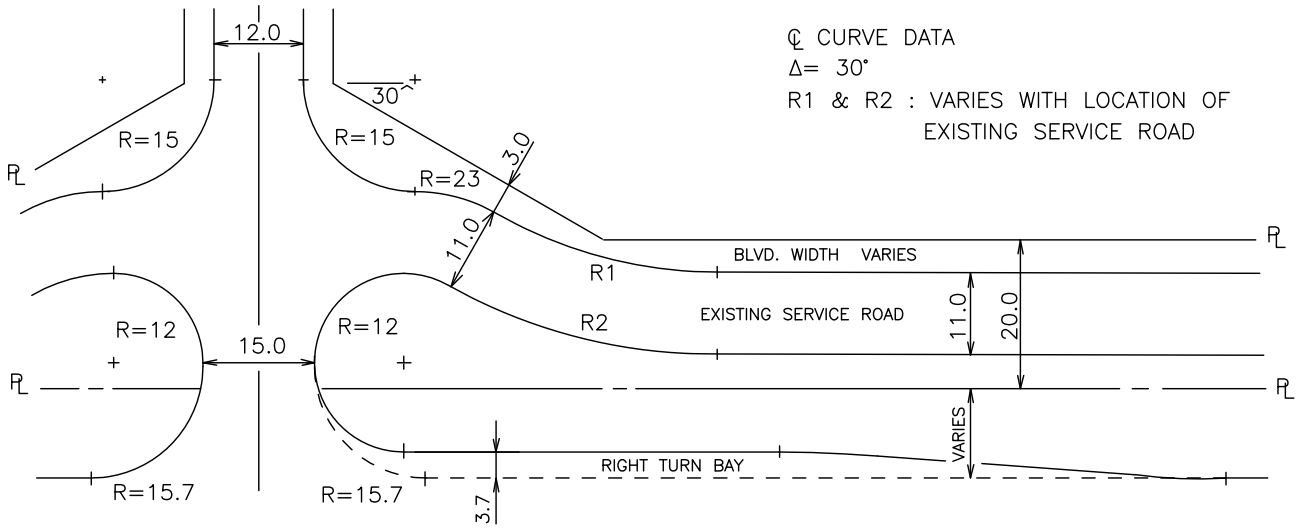
SCALE: N.T.S.

DRAWING NO. 5.32



NOTE: DESIGN BASED ON MINIMUM TURNING RADIUS OF WB–17 VEHICLE

ALTERNATE A



NOTE: DESIGN BASED ON MINIMUM TURNING RADIUS OF WB–17 VEHICLE

ALTERNATE B

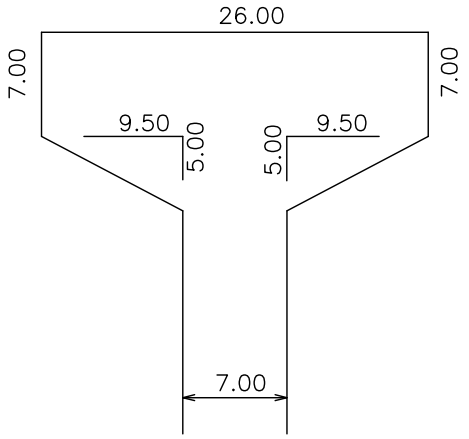
NOTE: 1. ALTERNATE A TO BE USED UNLESS EXISTING DEVELOPMENT RESTRICTS AMOUNT OF LAND AVAILABLE

2. ALTERNATE B IS THE MINIMUM REQUIREMENT IN DEVELOPED AREAS

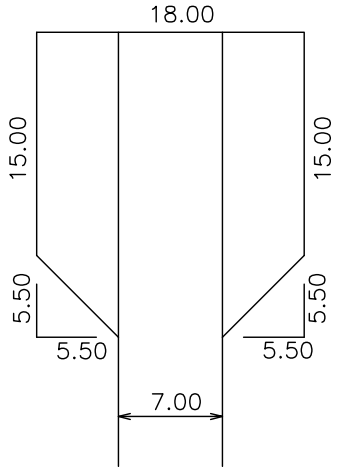
NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

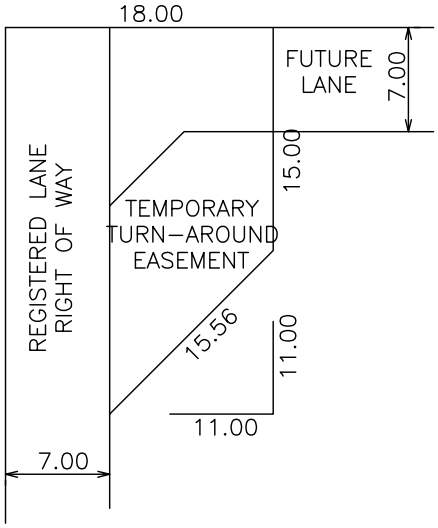
DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
DATE: MAR/10	SERVICE ROAD AND CROSS STREET INTERSECTION DESIGN	STREETS–UTILITIES ENGINEER
SCALE: N.T.S.		DRAWING NO. 5.33



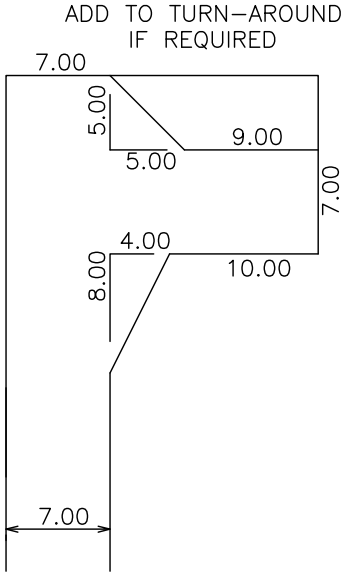
" T " TYPE



STANDARD TYPE



OFFSET TYPE



BRANCH TYPE

NO.	DATE	REVISION
1	Mar 5, 2003	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

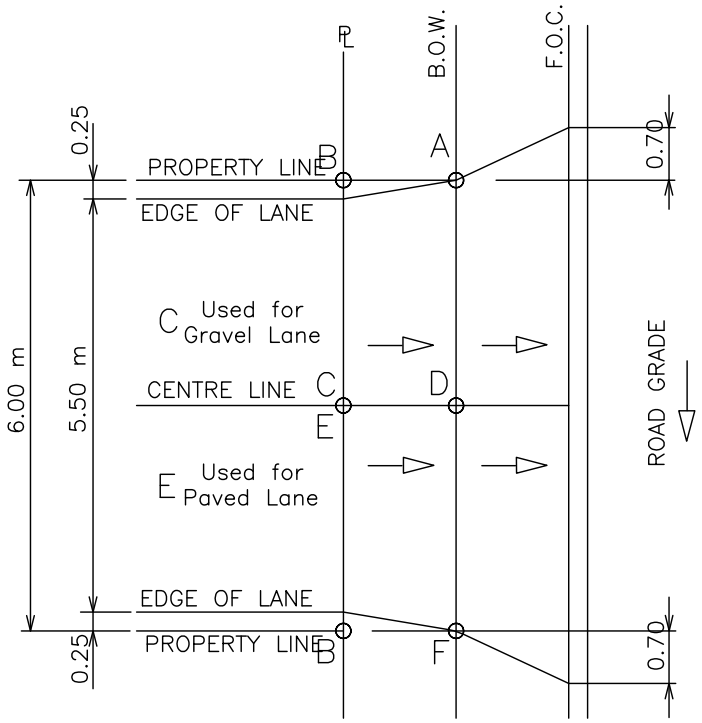
DATE: MAR/10

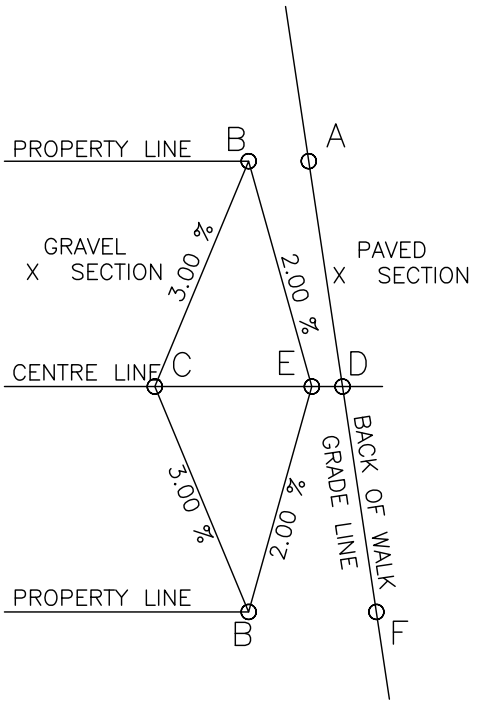
LANE TURN – AROUNDS

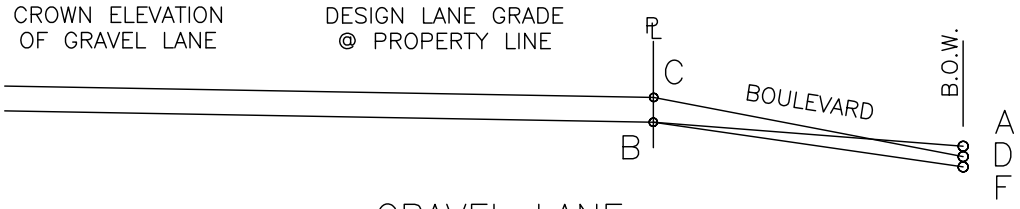
STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

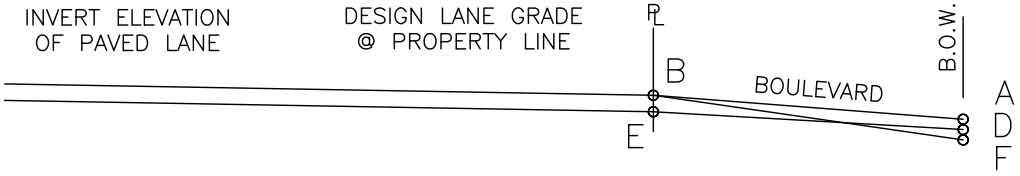
DRAWING NO. 5.34







GRAVEL LANE



PAVED LANE

NOTE :

IF LANE ELEVATION (E) IS LOWER THAN BACK OF WALK ELEVATION (D), A DEPRESSED CROSSING AS PER CONTRACT SPECIFICATION DWG. 6.11 MAY BE REQUIRED FOR DRAINAGE.

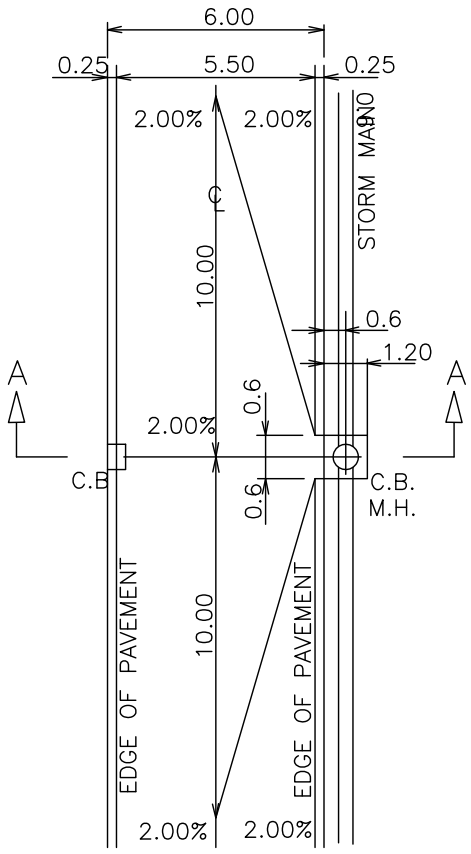
NO.	DATE	REVISION

TOWN OF PONOKA ENGINEERING DEPARTMENT

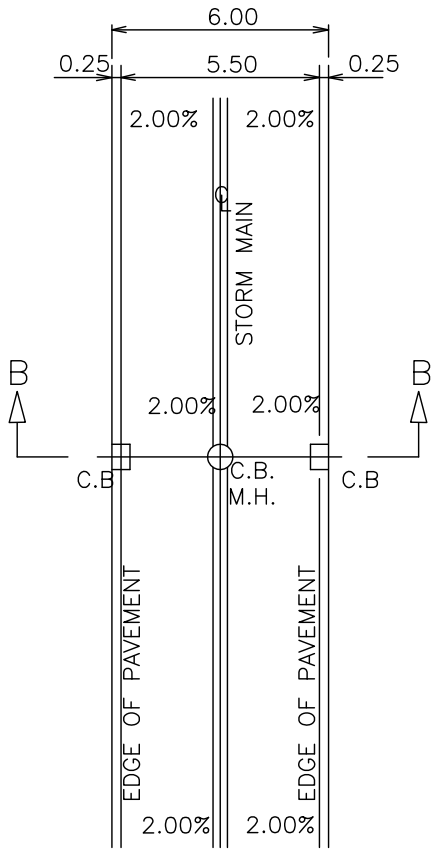
DESIGN GUIDELINE DRAWINGS
Roadway Design

LANE GRADE CALCULATIONS

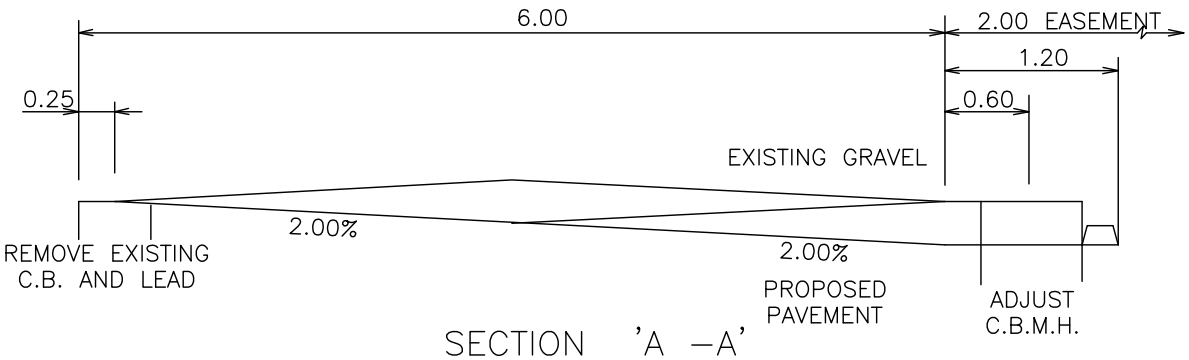
DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.35



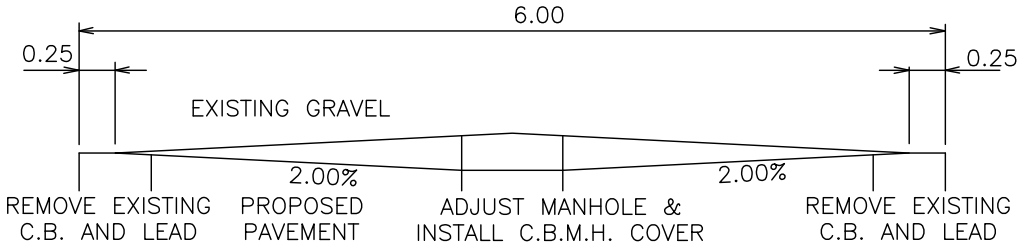
ALTERNATE A



ALTERNATE B

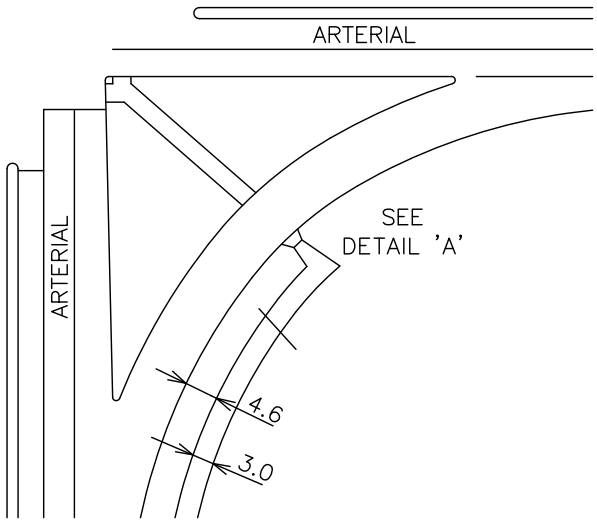


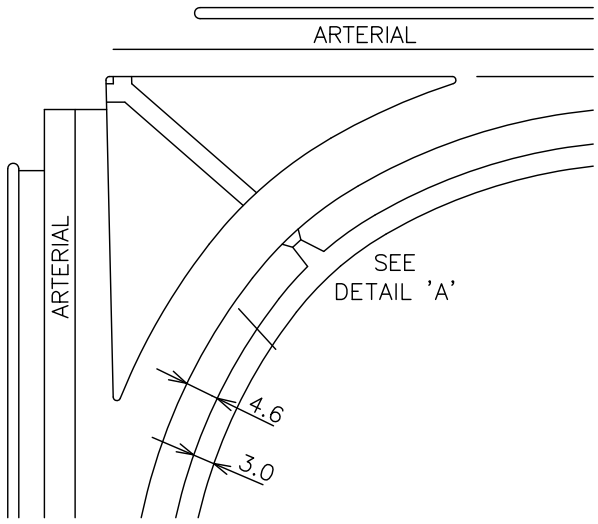
SECTION 'A –A'



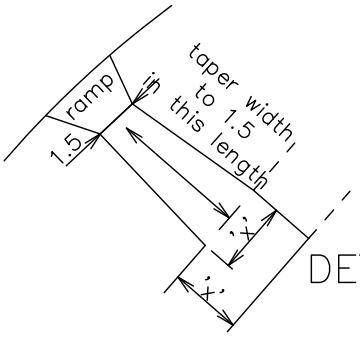
SECTION 'B – B'

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	STORM DRAINAGE REVISIONS FOR GRAVEL LANE TO PAVED LANE CONSTRUCTION	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.36

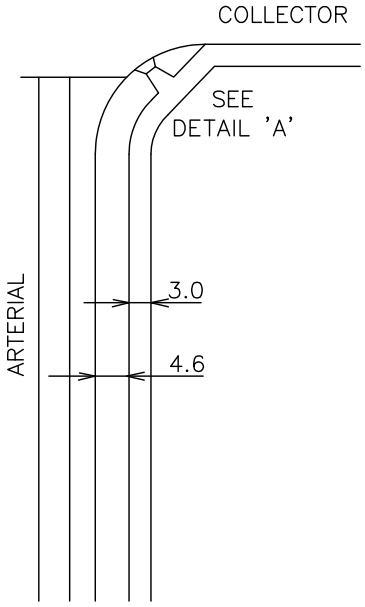


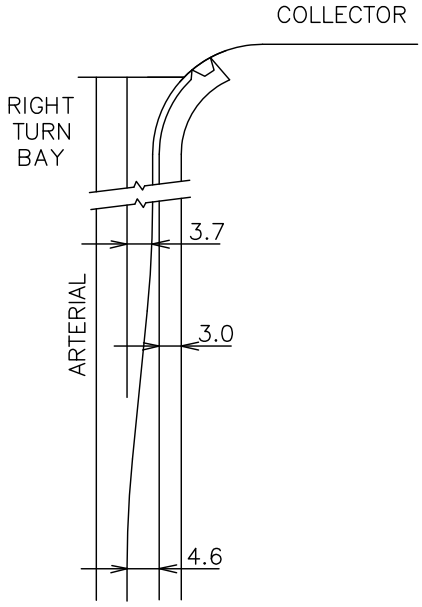


ARTERIAL TO ARTERIAL



DETAIL 'A'





ARTERIAL TO COLLECTOR

NO.	DATE	REVISION
2	Feb 11, 2008	Added Detail
1	Feb 15, 2005	Barriers removed

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

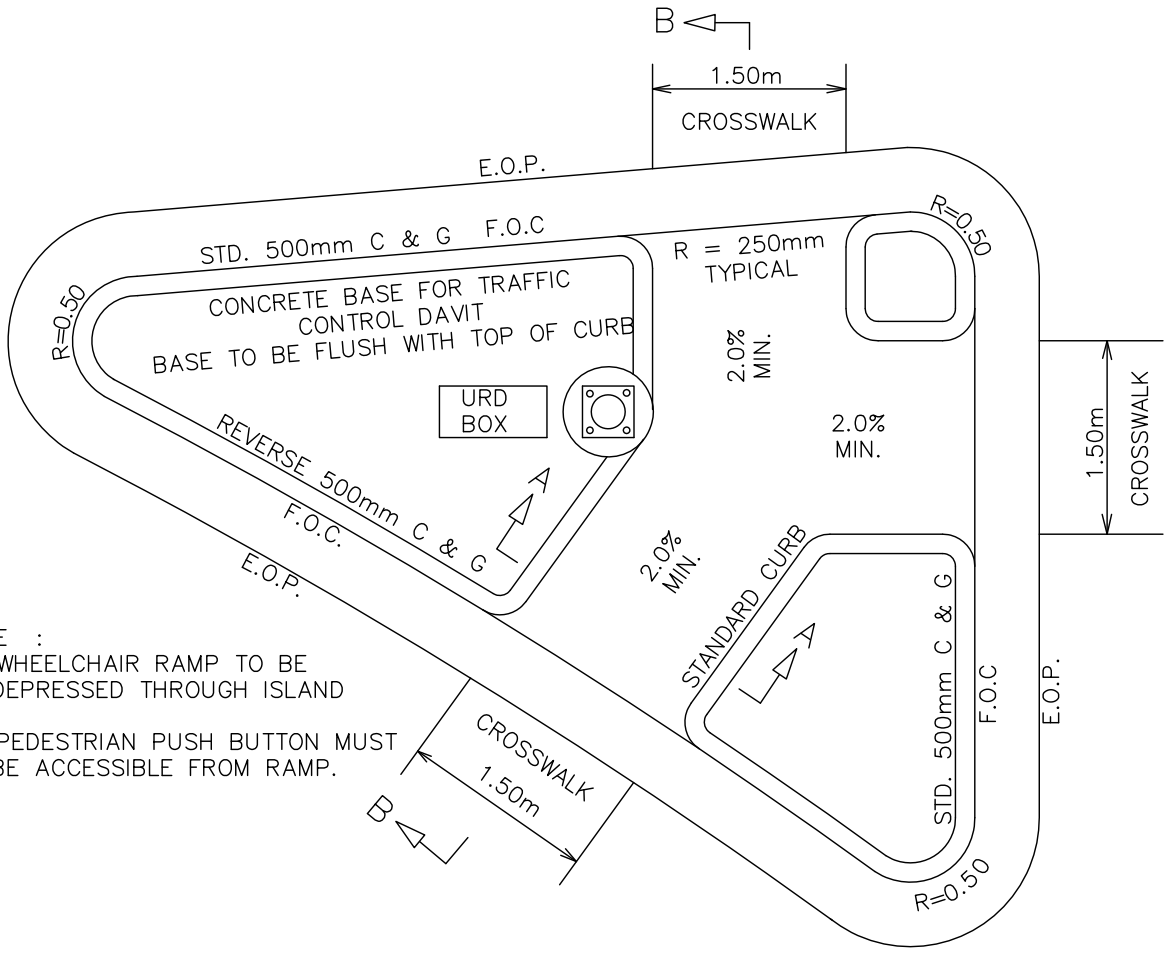
DATE: MAR/10

SIDEWALK ALIGNMENT AND PEDESTRIAN BARRIER LOCATION

STREETS–UTILITIES ENGINEER

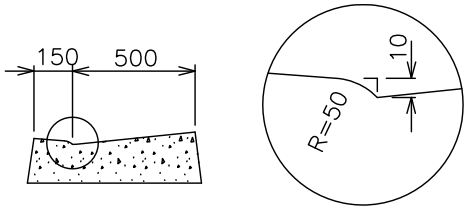
SCALE: N.T.S.

DRAWING NO. 5.37

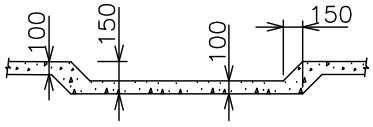


NOTE :

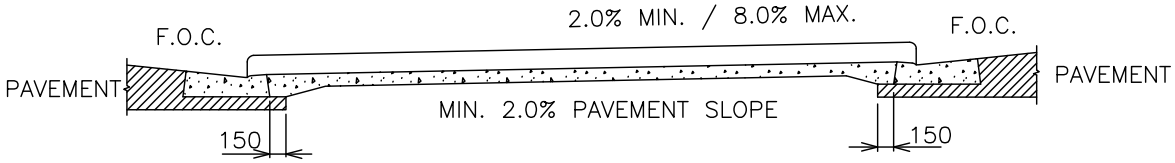
- WHEELCHAIR RAMP TO BE DEPRESSED THROUGH ISLAND
- PEDESTRIAN PUSH BUTTON MUST BE ACCESSIBLE FROM RAMP.



CROSSWALK CURB DETAIL

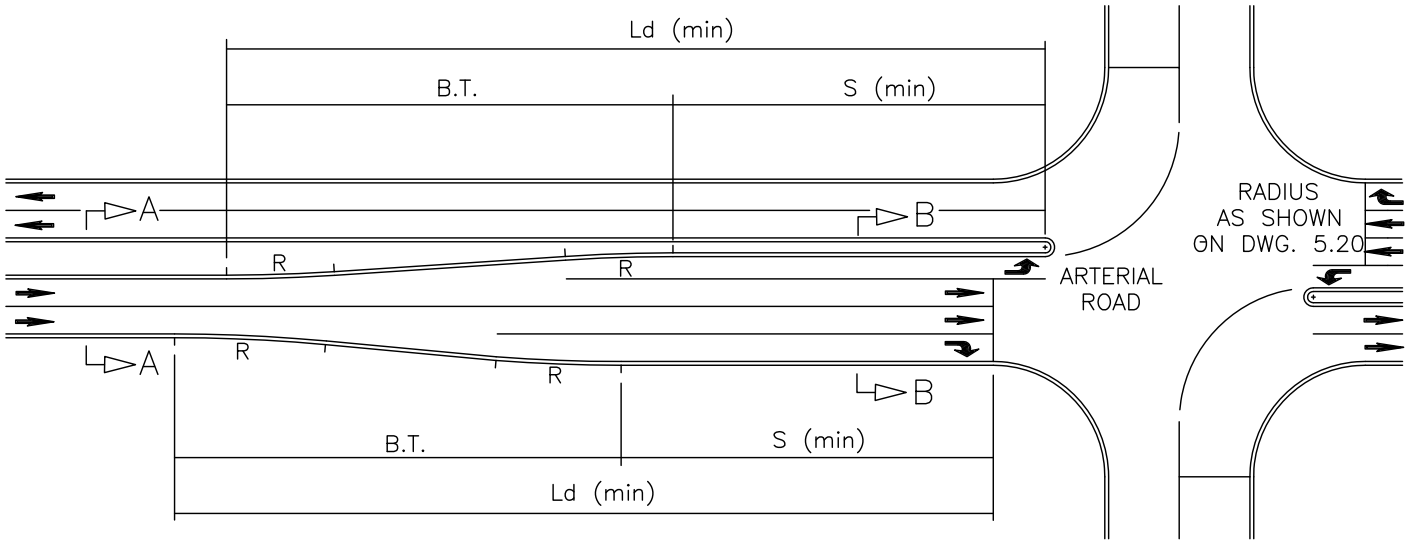


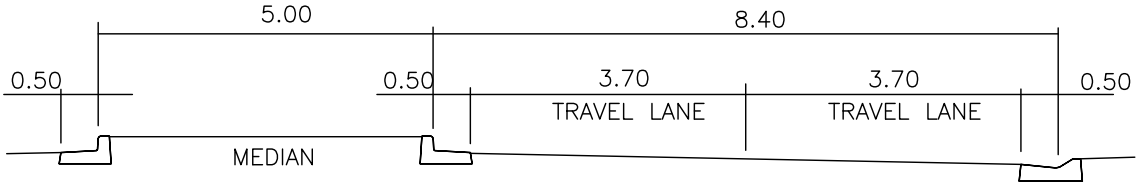
SECTION 'A – A'



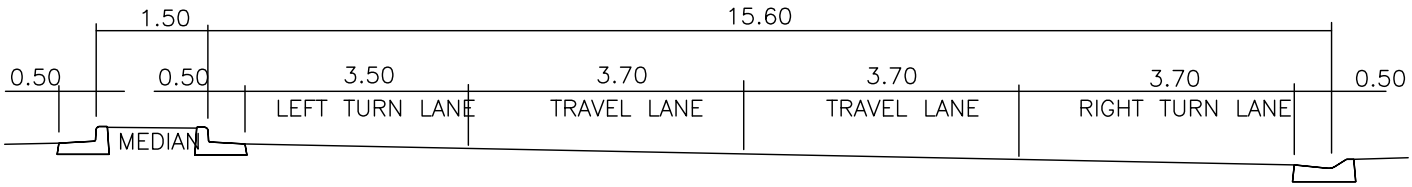
SECTION 'B – B'

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	STANDARD RIGHT– TURN ISLAND DETAIL	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.38





SECTION 'A – A'



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

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

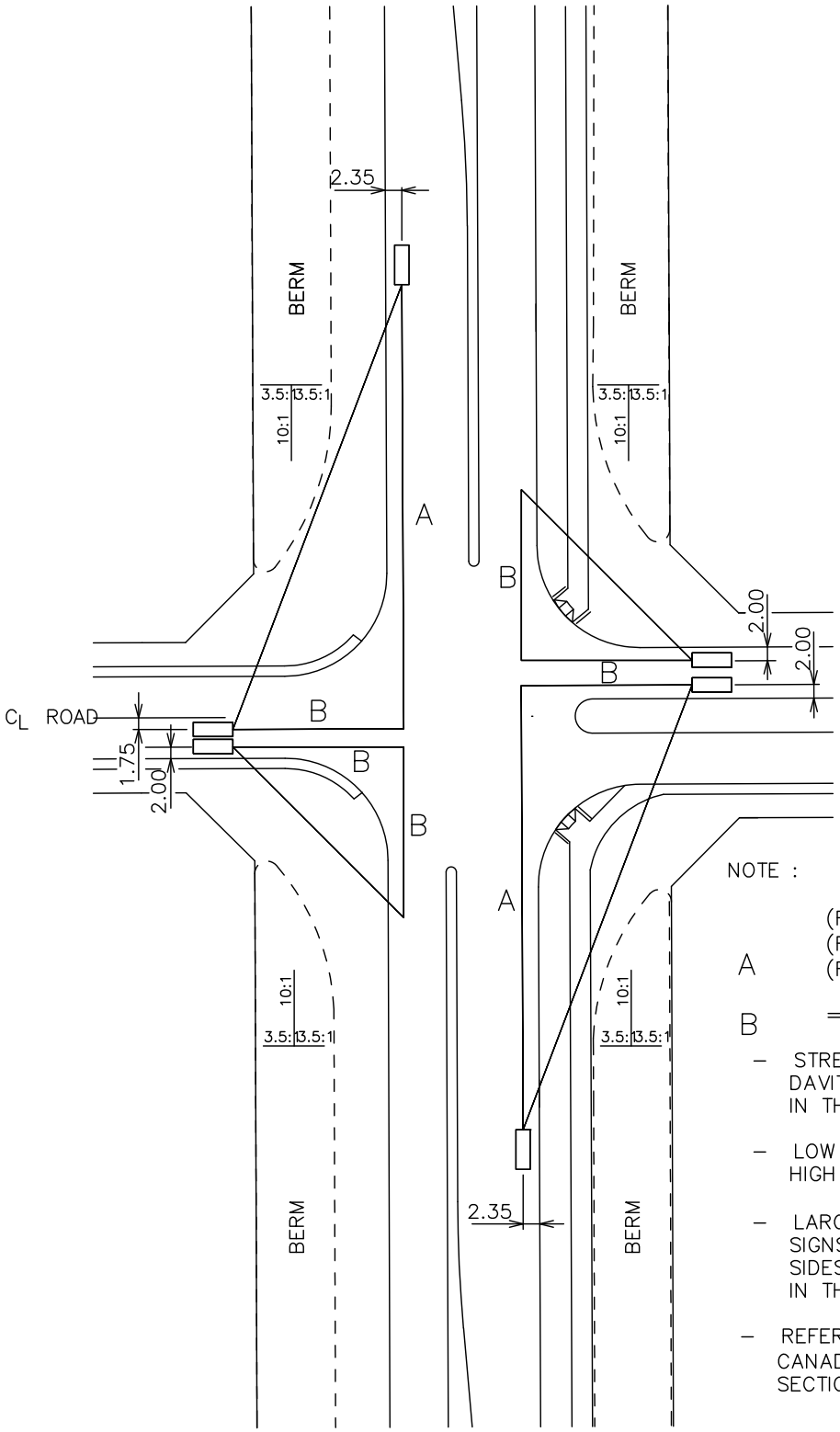
DATE: MAR/10

STREETS–UTILITIES ENGINEER

LEFT AND RIGHT TURN LANE DESIGN

SCALE: N.T.S.

DRAWING NO. 5.39



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 1.00 METER 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.

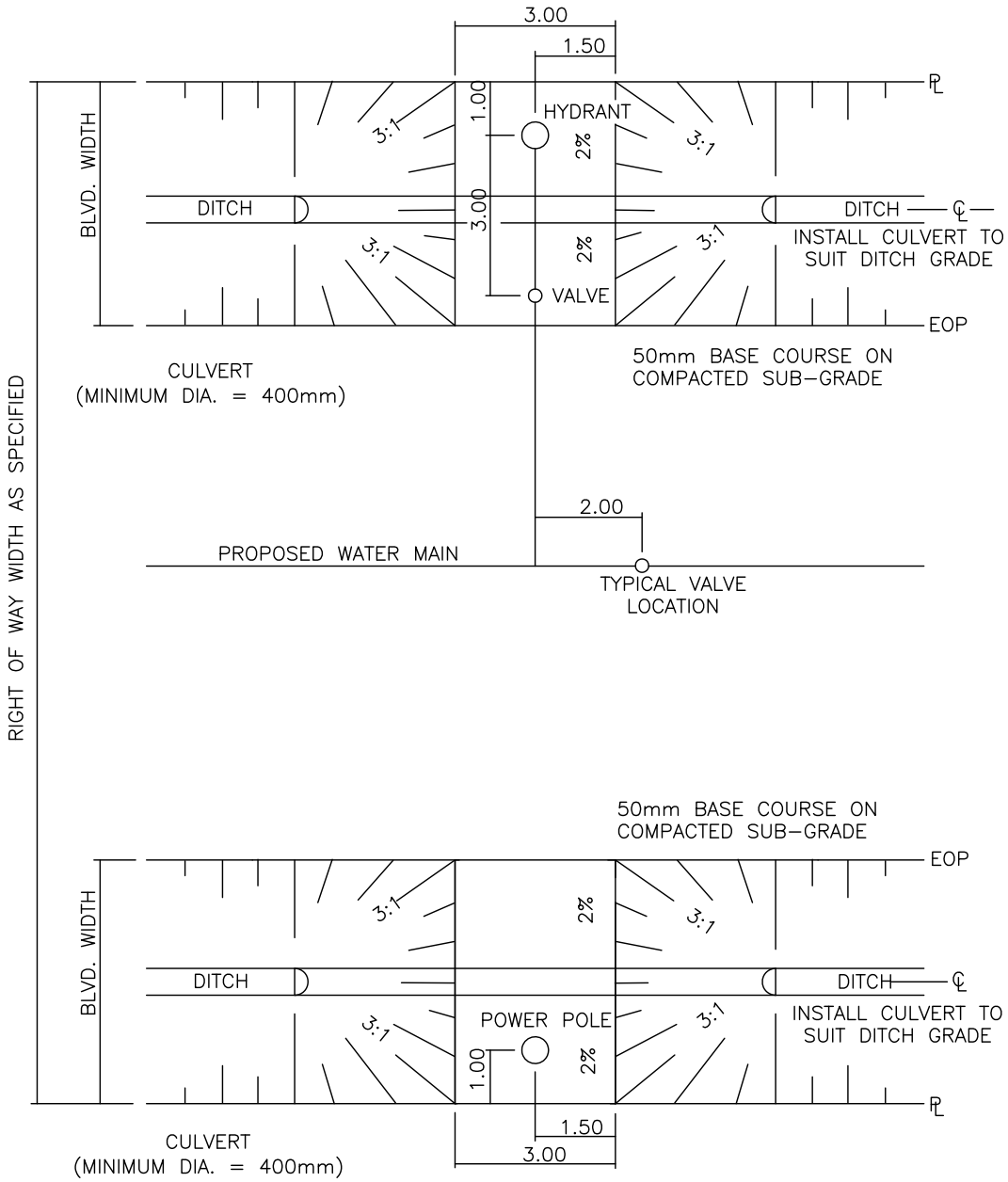
NO.	DATE	REVISION
3	Mar 26, 2009	Revised note
2	Feb 15, 2005	Revised note
1	Feb 10, 2004	Revised number

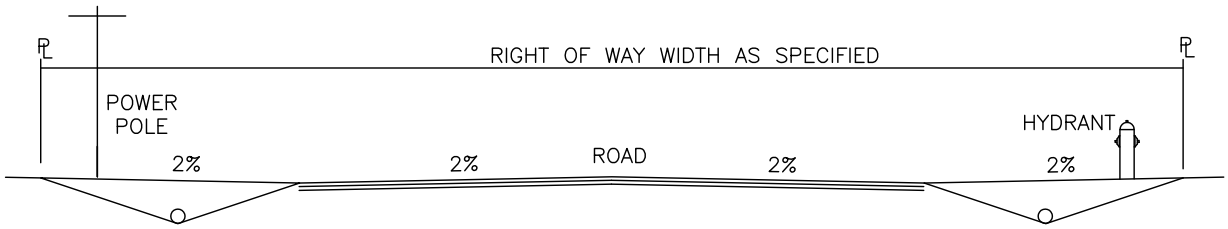
TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Roadway Design

ARTERIAL ROADWAY SIGHT TRIANGLE

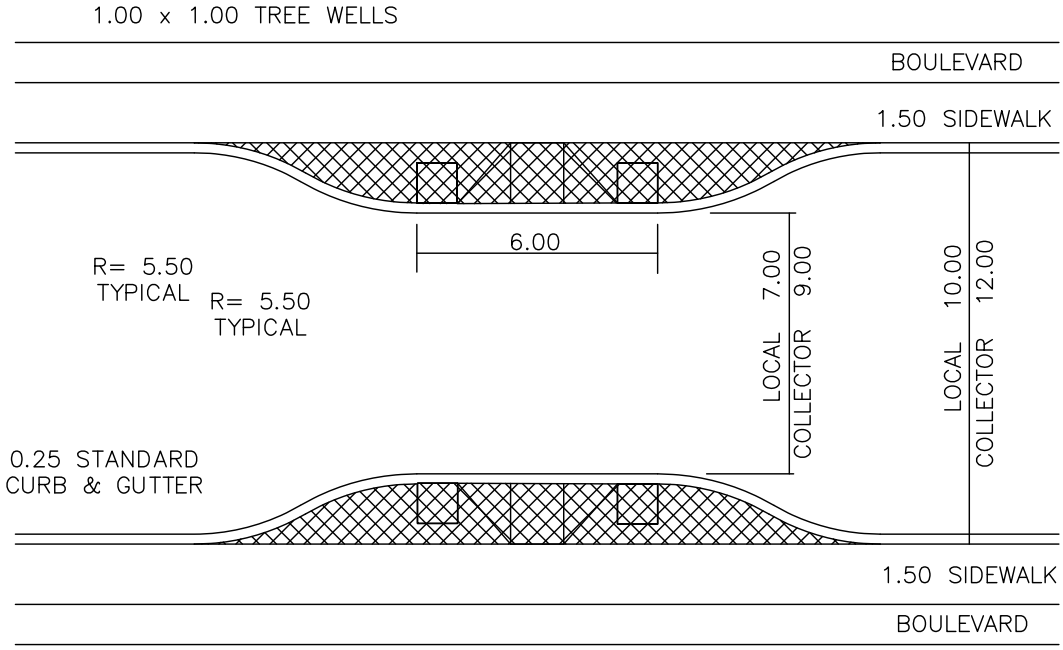
DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.
APPROVED BY: STREETS–UTILITIES ENGINEER
DRAWING NO. 5.40





CROSS – SECTION

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	RURAL CROSS–SECTION HYDRANT & POWER POLE ACCESS	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.41



NOTE: WRITTEN APPROVAL FROM THE ENGINEERING SERVICES MANAGER IS REQUIRED FOR ALL ROADWAY NARROWING.

NO.	DATE	REVISION
2	Feb 11, 2009	Revised pattern
1	June 25, 2007	Added note.

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

DATE: MAR/10

ROADWAY NARROWING FOR PEDESTRIAN ACCOMMODATION

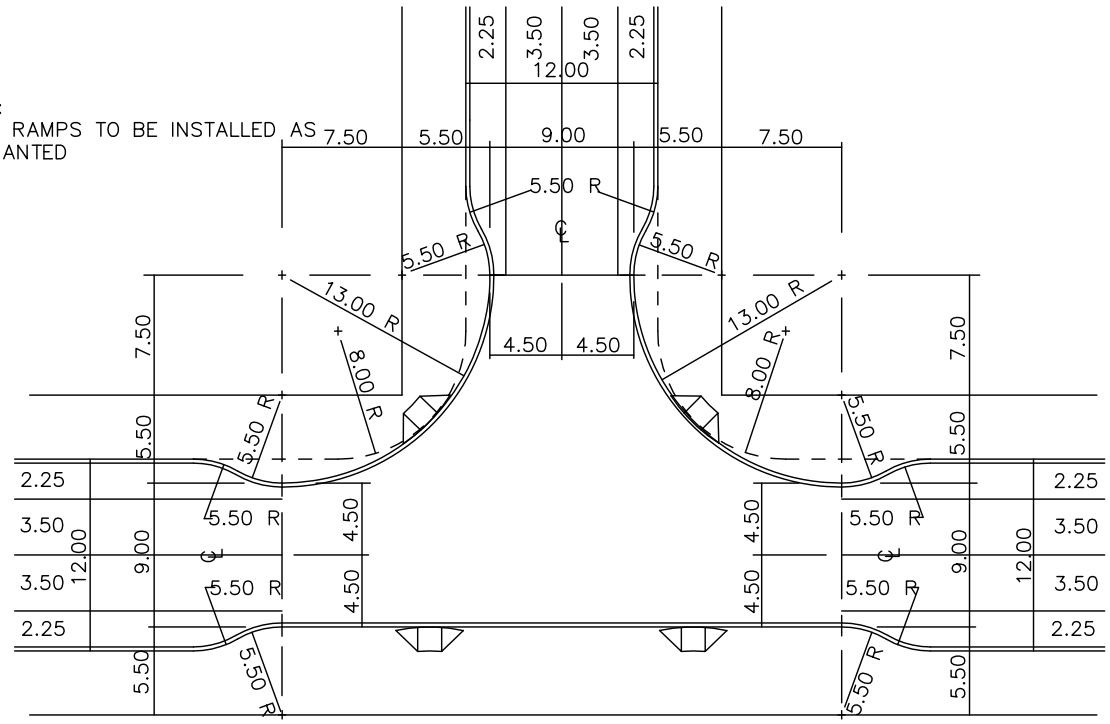
STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

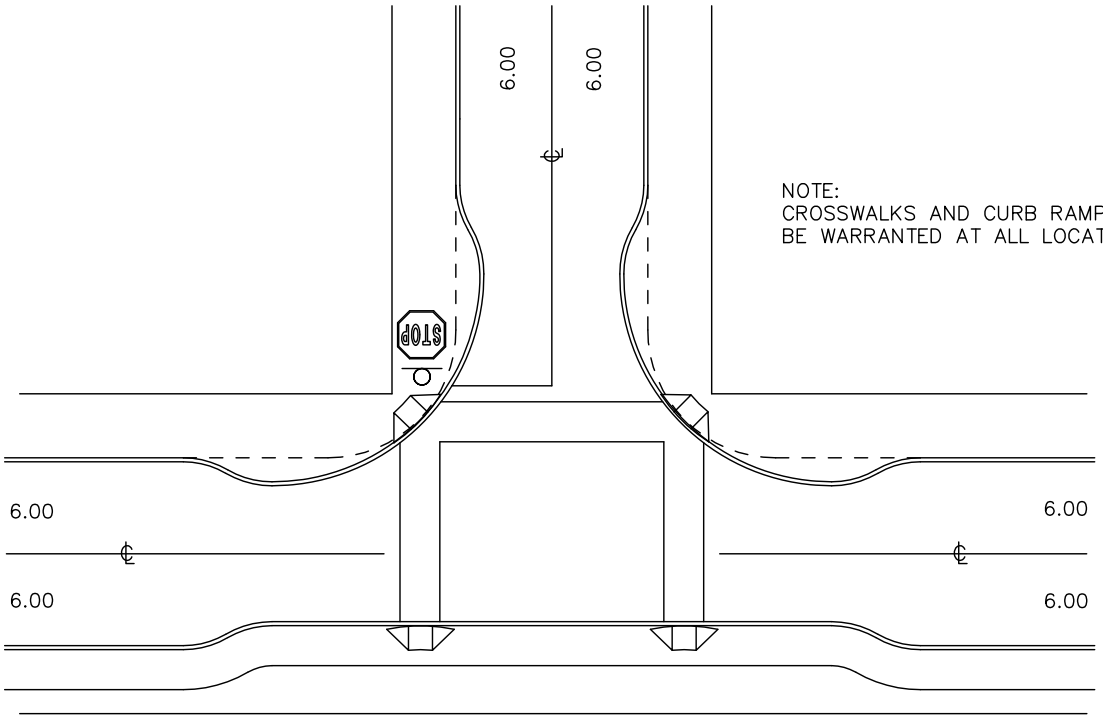
DRAWING NO. 5.42

COLLECTOR TO COLLECTOR CALMING

NOTE:
CURB RAMPS TO BE INSTALLED AS WARRANTED



TRAFFIC CALMING TYPICAL PAVEMENT MARKINGS



NOTE:
CROSSWALKS AND CURB RAMPS MAY NOT BE WARRANTED AT ALL LOCATIONS.

NO.	DATE	REVISION
1	Mar 26/09	Added Curb Ramps and Pavement Markings

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

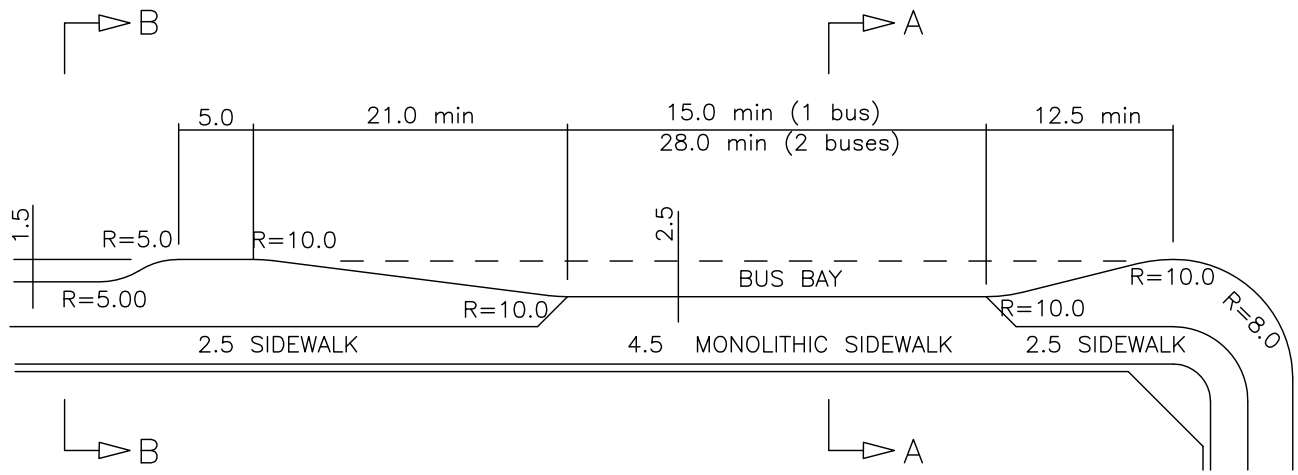
DATE: MAR/10

STREETS–UTILITIES ENGINEER

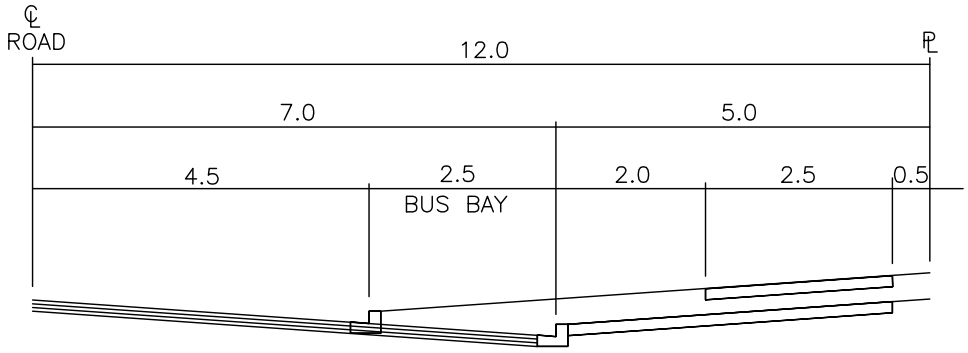
TRAFFIC CALMING

SCALE: 1:500

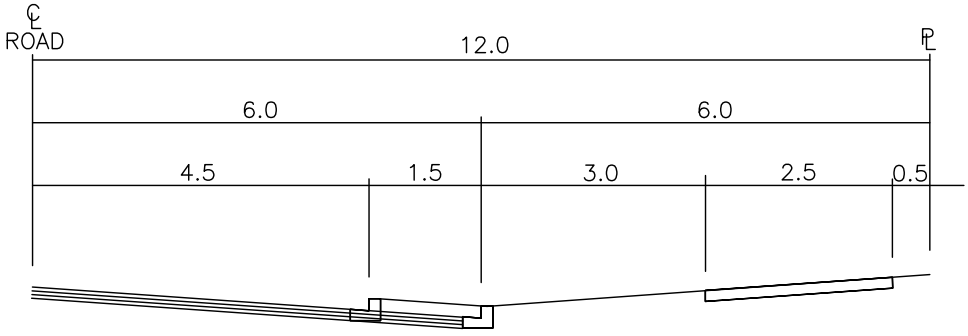
DRAWING NO. 5.43



PLAN VIEW



SECTION "A–A"



SECTION "B–B"

NO.	DATE	REVISION
1	Mar 26/09	Revised

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Roadway Design

APPROVED BY:

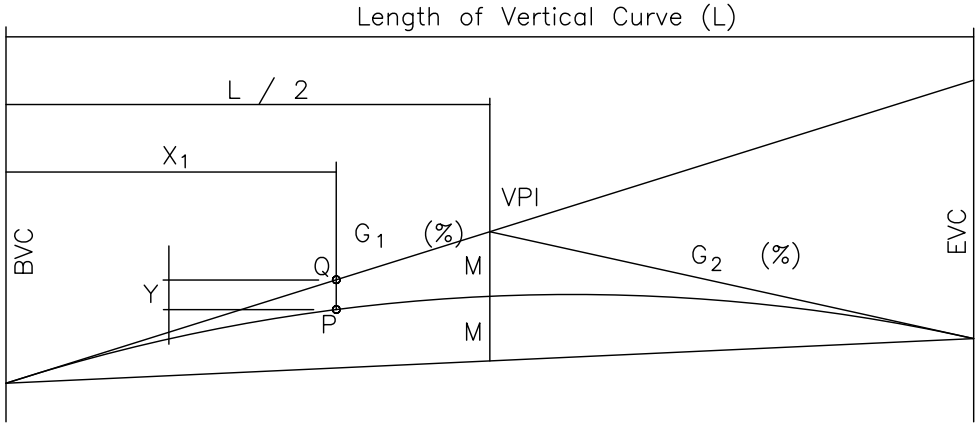
DATE: MAR/10

STREETS–UTILITIES ENGINEER

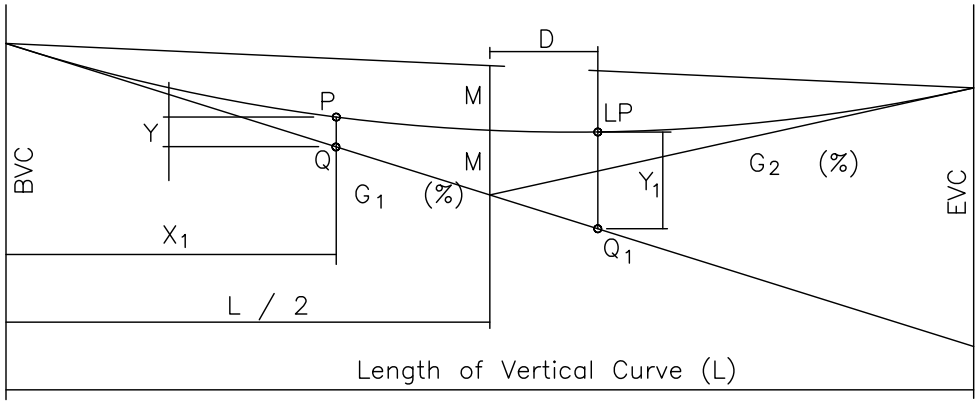
BUS BAY DESIGN

SCALE: N.T.S.

DRAWING NO. 5.44



CREST VERTICAL CURVE

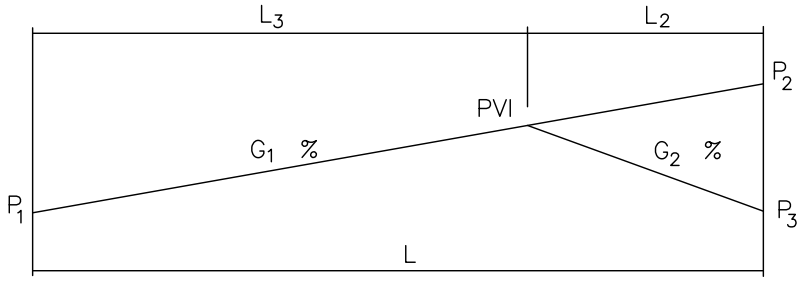


SAG VERTICAL CURVE

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 x A / 100) / (2 L)
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

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	VERTICAL CURVE CALCULATIONS	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.45

CASE 1



Calculate the location of VPI ;
where L, P_1 , P_3 , G_1 , and G_2 are known.

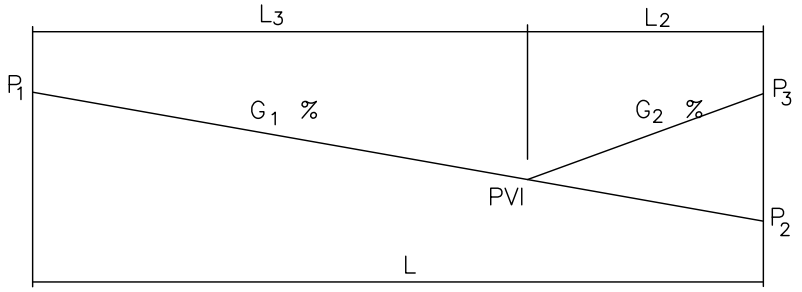
Elevation @ $P_2 = P_1 + (L \times G_1 / 100)$

Length of $L_2 = (P_2 - P_3) \times 100 / (G_1 + G_2)$

Elevation @ PVI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

CASE 2



Calculate the location of VPI ;
where L, P_1 , P_3 , G_1 , and G_2 are known.

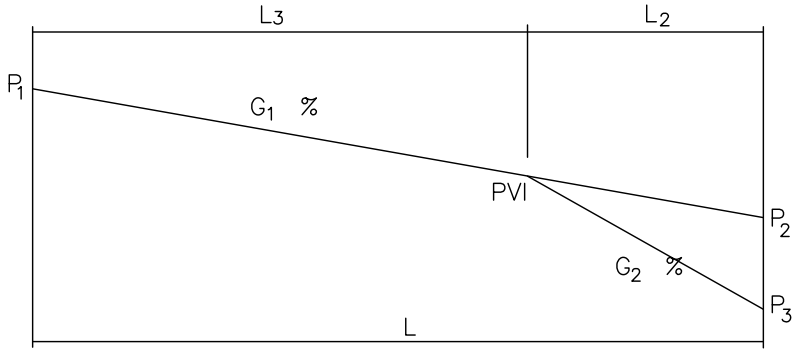
Elevation @ $P_2 = P_1 + (L \times G_1 / 100)$

Length of $L_2 = (P_3 - P_2) \times 100 / (G_1 + G_2)$

Elevation @ PVI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

CASE 3



Calculate the location of VPI ;
where L, P_1 , P_3 , G_1 , and G_2 are known.

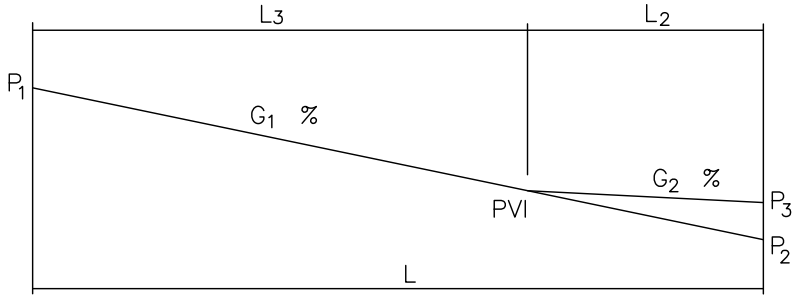
Elevation @ $P_2 = P_1 + (L \times G_1 / 100)$

Length of $L_2 = (P_2 - P_3) \times 100 / (G_2 - G_1)$

Elevation @ PVI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

CASE 4



Calculate the location of VPI ;
where L, P_1 , P_3 , G_1 , and G_2 are known.

Elevation @ $P_2 = P_1 + (L \times G_1 / 100)$

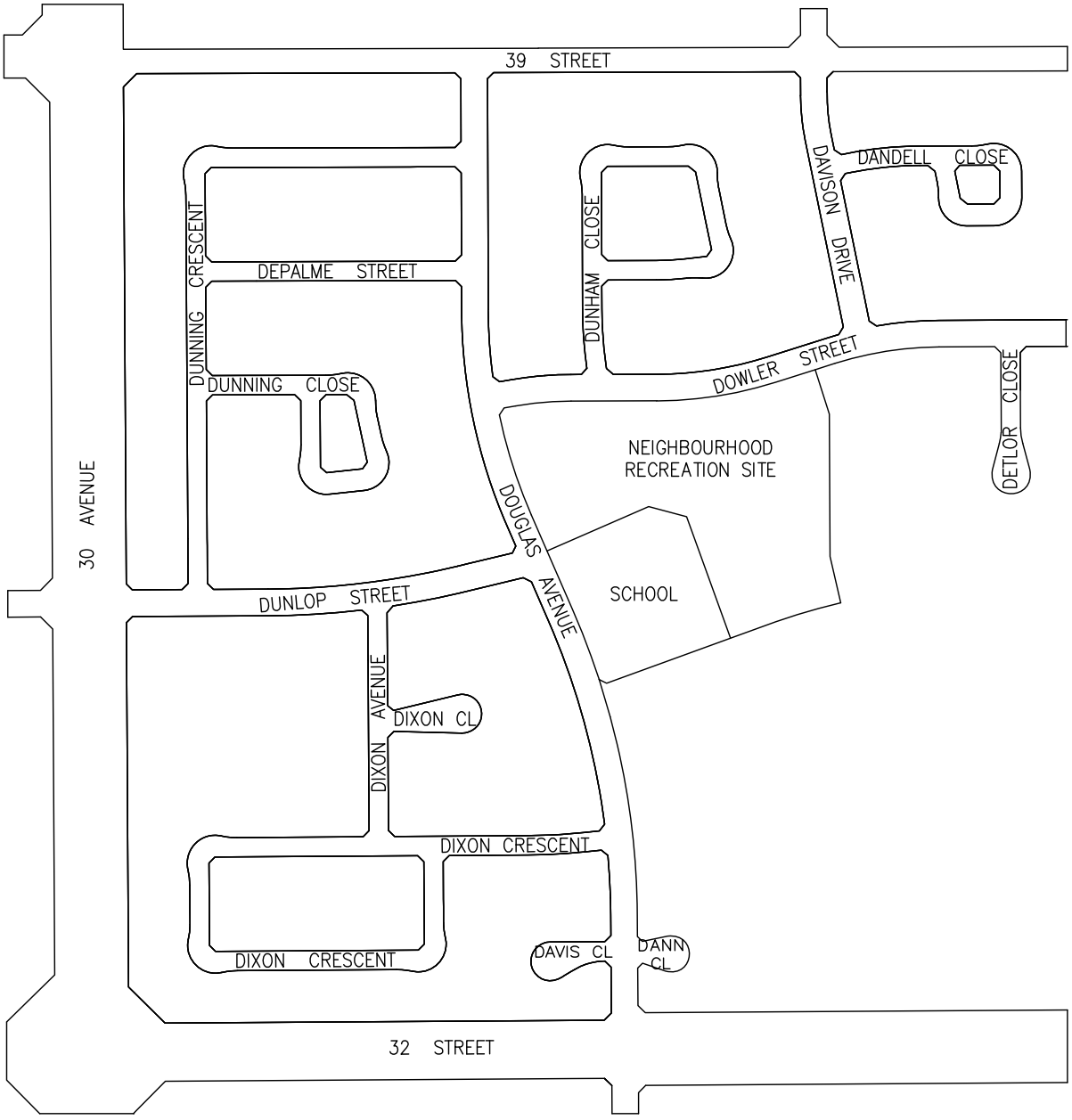
Length of $L_2 = (P_3 - P_2) \times 100 / (G_1 - G_2)$

Elevation @ PVI $= P_3 - (L_2 \times G_2 / 100)$

$L_3 = L - L_2$

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Roadway Design	APPROVED BY:
			DATE: MAR/10	V.P.I. LOCATION CALCULATION	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 5.46

SUBDIVISION NAME



Developers shall place a full colour sign showing the Neighbourhood Area Structure Plan Development Concept including secondary suite locations at the entrance way of their development.

NO.	DATE	REVISION	APP.
2	Mar26,2009	Updated text	
1	Jan9,2002	Relocated subdivision name	

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Signage and Pavement Marking

APPROVED BY:

DATE: MAR/10

SCALE: N.T.S.

SAMPLE SUBDIVISION MAP SIGN

STREETS–UTILITIES ENGINEER

DRAWING NO. 6.01

SUBDIVISION NAME
Developer's Corporate Name Telephone Number Subdivision Servicing and Lot Sales Information
Parkland Community Planning Services 403.xxx.xxxx Land Use and Transportation Network Information
Town Recreation, Parks, & Culture Department 403.xxx.xxxx Parks and Playgrounds Information
Town Engineering Services Department 403.xxx.xxxx Development Engineering Information
Town Inspections and Licensing Department 403.xxx.xxxx Zoning and Setbacks Information
Ponoka School District No. xxx 403.xxx.xxxx Information regarding Public Schools
Ponoka Catholic Board of Education 403.xxx.xxxx Information regarding Catholic Schools

GENERAL INFORMATION SIGN

SUBDIVISION NAME
In accordance with the approved Area Structure Plan, this site is proposed to be the site of a Public Elementary School or a Catholic Elementary School For additional information, please contact the Ponoka School District No. xxx 403.xxx.xxxx or Ponoka Catholic board of Education 403.xxx.xxxx

FUTURE SCHOOL SITE 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 Recreation, Parks & Culture Department 403.342.8159

NEIGHBOURHOOD RECREATION SIGN

DETENTION POND
This area contains a storm water detention 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 Ponoka Environmental Services 403.xxx.xxxx

STORM DETENTION POND WARNING SIGN

NO.	DATE	REVISION	DATE
2	Dec 16, 2009	Revised	
1	Jan 9, 2002	Revised Detention Pond sign.	

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Signage and Pavement Marking

APPROVED BY:

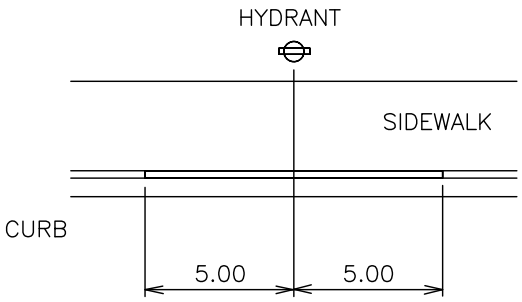
DATE: MAR/10

SAMPLE INFORMATION SIGNS

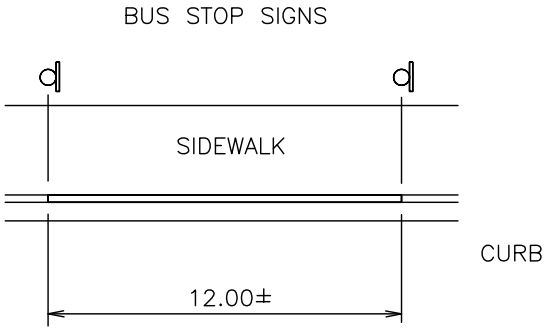
STREETS–UTILITIES ENGINEER

SCALE: N.T.S.

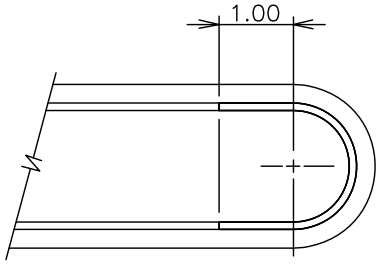
DRAWING NO. 6.02



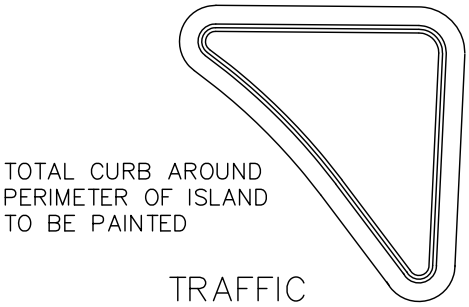
HYDRANT



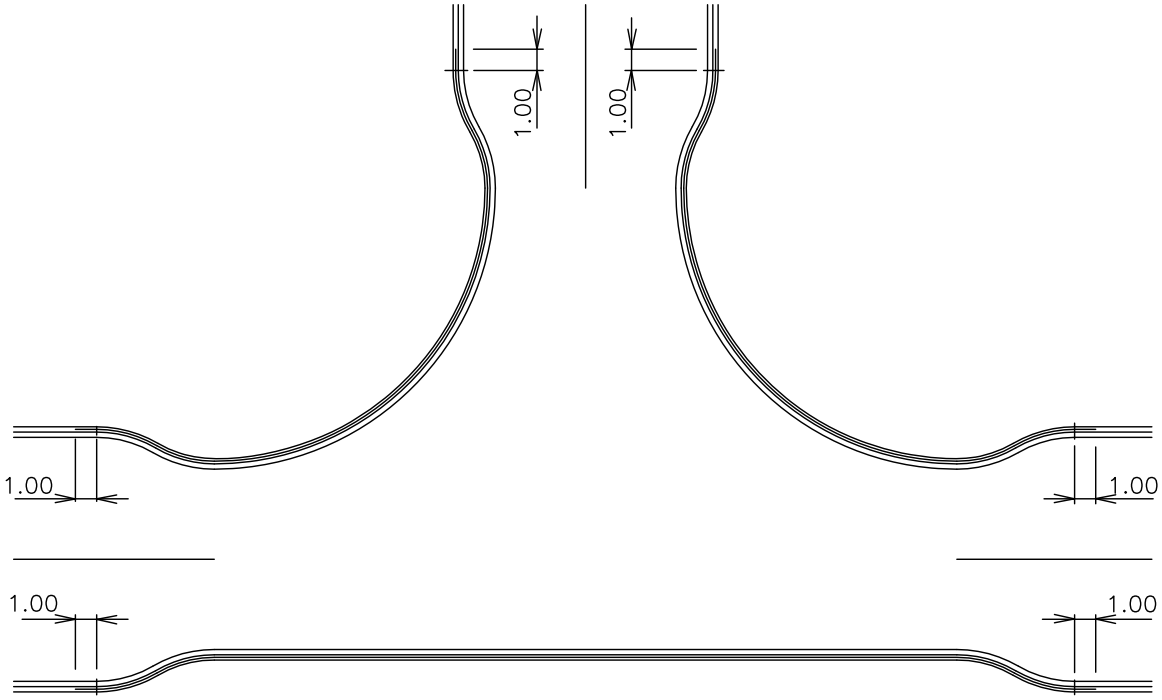
BUS STOP



MEDIAN



TRAFFIC ISLAND



TRAFFIC CALMING BULB

NO.	DATE	REVISION
1	Feb 1, 2008	Added traffic calming bulb

TOWN OF PONOKA ENGINEERING DEPARTMENT

DESIGN GUIDELINE DRAWINGS
Signage and Pavement Marking

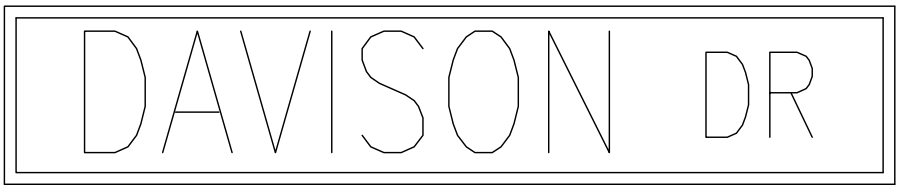
YELLOW CURB PAINTING

DRAWN BY: D.W.K.
DATE: MAR/10
SCALE: N.T.S.

APPROVED BY:
STREETS–UTILITIES ENGINEER

DRAWING NO. 6.03

EXISTING SIGNAGE



OPTION A

OPTION B

NO.	DATE	REVISION
1	Apr 07/09	Updated title

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

DESIGN GUIDELINE DRAWINGS
Signage and Pavement Marking

APPROVED BY:

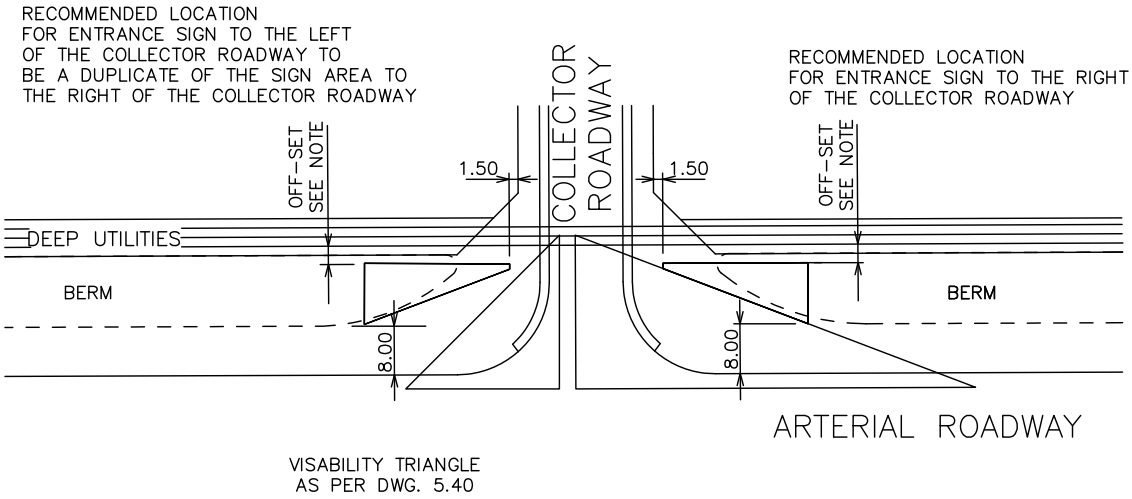
STREETS–UTILITIES ENGINEER

DATE: MAR/10

DECORATIVE STREET NAME MARKERS

SCALE: N.T.S.

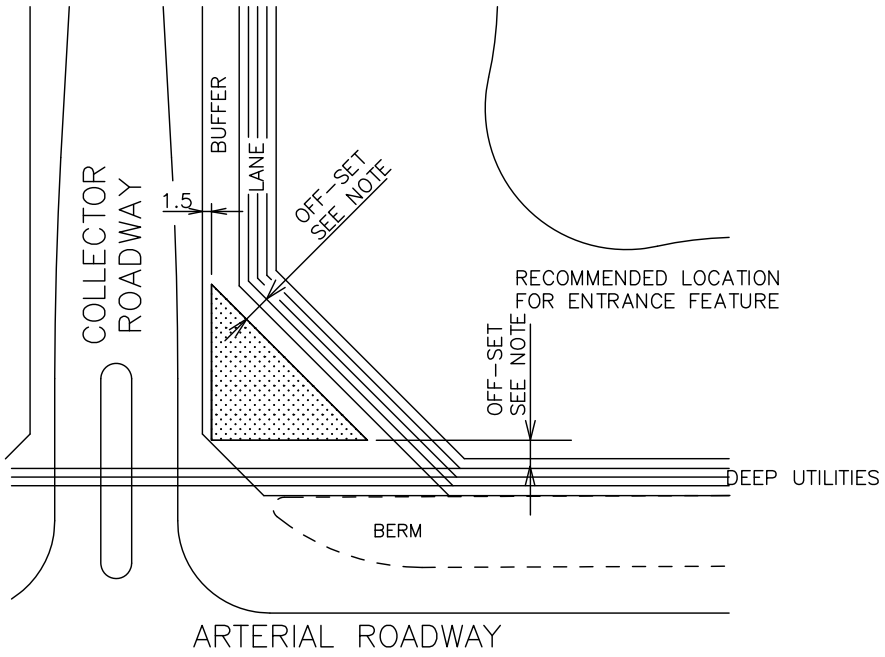
DRAWING NO. 6.04



OPTION 1

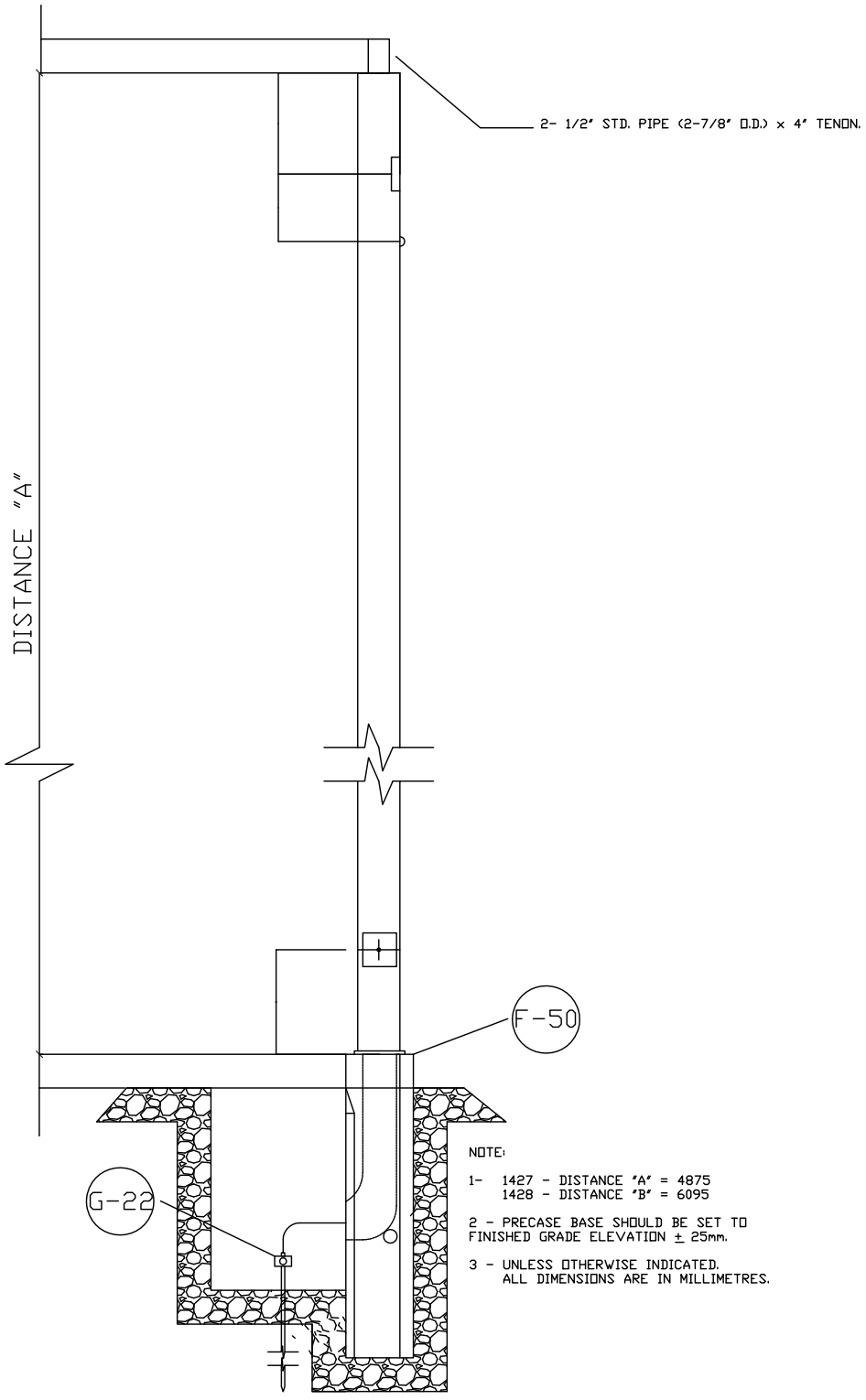
NOTE :

- 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.

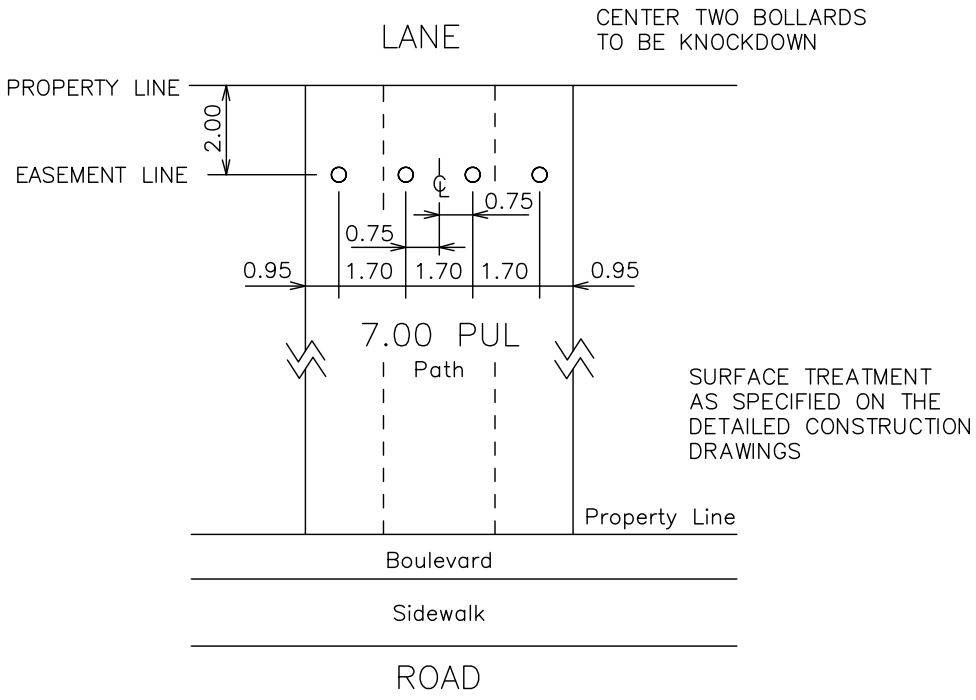


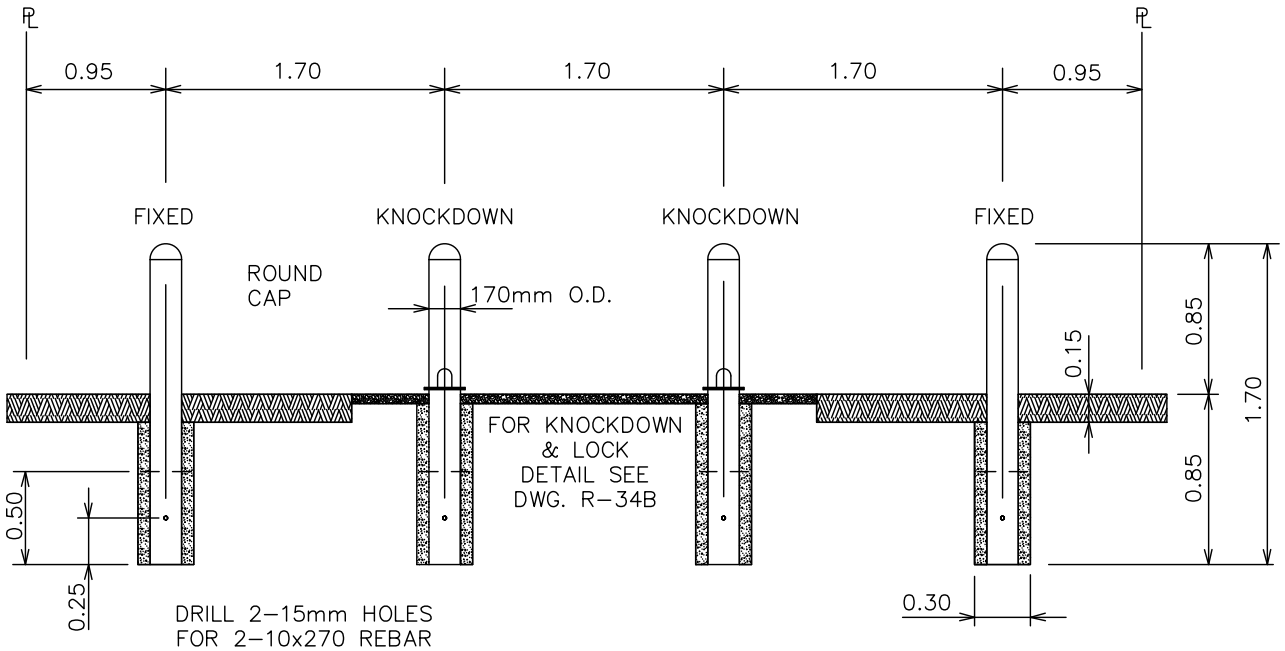
OPTION 2

NO.	DATE	REVISION	TOWN OF PONOKA ENGINEERING DEPARTMENT		
			DRAWN BY: D.W.K.	DESIGN GUIDELINE DRAWINGS Signage and Pavement Marking	APPROVED BY:
			DATE: MAR/10	SUBDIVISION ENTRANCE SIGN LOCATIONS	STREETS–UTILITIES ENGINEER
			SCALE: N.T.S.		DRAWING NO. 6.05



NO.	DATE	REVISION	TOWN OF PONOKA		
			DRAWN BY:	DESIGN GUIDELINE DRAWINGS Lighting, Signage and Pavement...	APPROVED BY:
			DATE: MAR/10	STREET LIGHTING DECORATIVE ROUND STEEL POLE AND ANCHOR BASE	DRAWING NO. 6.07
			SCALE: N.T.S.		





NOTE: DIMENSIONS IN METRES UNLESS OTHERWISE NOTED

NO.	DATE	REVISION
2	Mar 15, 2005	Deleted the second set of bollards
1	Mar 6, 2003	Revised the PUL width & bollard spacing

TOWN OF PONOKA ENGINEERING DEPARTMENT

DRAWN BY: D.W.K.

PARKS STANDARD DRAWINGS
Landscaping Design

APPROVED BY:

DEPARTMENT MANAGER

DATE: MAR/10

FIXED & KNOCKDOWN BOLLARD SYSTEM

SCALE: N.T.S.

DRAWING NO. 7.01