SECTION 1: SUBDIVISION AND DEVELOPMENT SERVICING: PRELIMINARY ENGINEERING, APPROVALS AND ACCEPTANCE; PROCESS AND SUBMISSION REQUIREMENTS

Before an application, requesting municipal services to be extended to a site development, redevelopment or subdivision can be approved, the typical hierarchy of local plans and processes required to be followed within the City of Medicine Hat, includes the following:

- Municipal Development Plan (MDP), which must provide for a proposed development to be contained within the current approved planning and service area of municipal infrastructure and services;
- Area Structure Plan (ASP) & associated Functional Servicing Report (FSR) for approved areas within the scope of the MDP, outlining the nature, intensity and layout of a proposed development and the associated preliminary engineering to establish the required servicing must receive municipal approval;
- Conceptual Scheme (if required by Municipal Planning Process Manual);
- Preliminary Engineering Studies where an approved FSR does not exist or is not deemed to be required due to the scale, intensity or location of a subdivision or development;
- Subdivision Approval
  - Detailed Engineering Design / Service or Development Agreement / Regulatory & Final Approvals;
  - Plan Registration;

Depending on the complexity of the proposed development, certain steps within the process may be combined or omitted, as deemed expedient by the City, and the developer advised accordingly.

This Section focuses on the process and Engineering requirements of the FSR or Preliminary Engineering Studies. The planning documents (Municipal Development Plan, Area Structure Plan, and Conceptual Scheme) are explained in other documents.

1.1 FUNCTIONAL SERVICING REPORTS (FSR) AND PRELIMINARY ENGINEERING STUDIES.

1.1.1 INTRODUCTION

Unless approved otherwise, a developer will be required to complete an FSR (or Preliminary Engineering Studies) to complement the accompanying planning documents when making application for the approval of an Area Structure Plan (ASP) or Conceptual Scheme.

When making application for the approval of a subdivision or development where an approved FSR does not exist or the scale, intensity or location of such a subdivision or development is deemed by the city, to not warrant an FSR, but to warrant specific preliminary engineering studies the developer will be required to complete and submit such studies with his application.

The FSR or Engineering Studies are to be submitted concurrently with an ASP, Conceptual Scheme, Subdivision or Development Permit as deemed appropriate by the city. The reports are intended to identify all servicing requirements for the stages of the development and to summarize the following information as the basis for the detailed design of each phase of development:

- Area and Lot Grading
- Roadways and Transportation System
- Water Distribution System
- Sanitary Sewage Collection System
- Storm Sewer & Major Drainage System
- Electric Distribution System
- Gas Distribution System
- Parks and Outdoor Recreation System

1.1.2 REPORTS, STUDIES AND DRAWINGS

The base plans for the reports should conform to the tentative legal plan or to the conceptual layout of lots, blocks or blocks and parcels, depending upon the level of detail deemed appropriate by the city for the nature of submission. The plans should be at a scale of sufficient visibility to identify important details.

The following plans shall be submitted as part of the Functional Servicing Report:

- Site Grading Plan
- Traffic Assessment and Access Plans, Functional Roadways Plans, Transit Stops and Traffic Control Devices Plan
- Water Network System Plan
- Sanitary Sewer System Plan
- Storm Sewer System Plan incorporating catchment areas, hydrologic characteristics, storm sewers of significance and appurtenances
- Major Drainage System Plans incorporating catchment areas, hydrologic characteristics, major drainage conveyances and hydraulic characteristics, Functional SWMF Plans and Functional Outfall Plan
- Gas Distribution System Plan
- Electrical Distribution System Plan
- Conceptual Landscaping Plan
- Geotechnical Test-Hole Location Plan

1.1.3 GEOTECHNICAL INVESTIGATION,

Geotechnical subsurface investigation will be required as part of the FSR or Preliminary Engineering Studies and shall conform to the following criteria:

1. Bore hole drilling (150 meter maximum spacing grid) program to identify and characterize subsoil stratigraphy;
2. Field and laboratory investigation program, with supplementary field and laboratory testing as required. The report shall include:
    - Description of the area, site geomorphology and soil stratigraphy;
    - at each bore-hole (depth = 2 metres below lowest depth of excavation, minimum depth = 10 metres); soil moisture at 1 metre intervals, Atterberg limits, Standard Proctor MDD/OMC for predominant soil types and classification, standard penetration tests/in-situ relative densities and consistency, soil bearing capacities, shear strength tests where necessary; ground water elevations;
    - Pavement structure design for all roadway functional classifications in the proposed subdivision or development;
    - Classification of each predominant soil type;
    - soil sulphate test results representative of the soils in contact with Portland cement concrete;

- bore-hole location plan, soil logs, water table contour map based on seasonal high with contours at 0.5 m. intervals if projected seasonal high is within 4.0 metres of original ground, field test results, laboratory test results;
- recommendations for site grading, stockpiling soil, utility trenching and trench backfill, pavement structure and materials design for roadways (subject to the city's minimum pavement structure), foundation design criteria for buildings (Part 9 Alberta Building Code), confirm soil suitability for City underground utility thrust blocks, general design criteria for residential retaining walls;
- ground water influence and seepage control measures on utility trenches, slope stability, foundation and other excavations (such as SWMF), road base stability and associated recommendations for design criteria and construction methods.
- Report to include statement that weeping tile drains for foundations and Type 50 SRC cement for concrete in contact with soil are a standard city requirement, applicable to all areas;

1.1.3.1 SPECIAL GEOTECHNICAL INVESTIGATIONS

Some development specific conditions may result in a requirement for the preparation and submission of special Geotechnical investigations, prepared in conformance with recognized current best practices:

- Slope Stability Study – 15% and steeper slopes,
- Counter-measures against slope failure – signs of incipient failure of an existing slope,
- Deep fill report (embankments 2.0 metres and deeper),
- Hydro-geological study – seasonal groundwater high within 1.0 metres of original ground surface.

1.1.3.2 PAVEMENT DESIGN PROCEDURES

The AASHTO method of pavement design (most current edition), outlined in the Alberta Transportation's "Pavement Design Manual" methodology, is to be followed and documented in a pavement design report, for the submission of design proposals for flexible pavement applied to streets in the City of Medicine Hat, unless otherwise accepted by the City.

Input/output files from the use of the software program DARWin (or approved equal) is required to be included with the pavement design report.

The pavement design report, as a portion of the project's geotechnical report, shall also incorporate the procedures, parameters and criteria used to arrive at the recommended design as follows:

1.1.3.2.1 Environmental Capacities of roadways by Functional Class:

- Local Residential =.....3,000 vpd
- Local Industrial/Commercial =.....5,000 vpd
- Minor Residential Collector = ...8,000 vpd
- Major Residential & Industrial/Commercial Collector =.....12,000 vpd
- Minor Arterial, 4-lane (divided or undivided) =.....20,000 vpd
- Principal Arterial, 4-lane divided =.....30,000 vpd
- A 10 % increase in environmental capacity may be allowed where a 2WLTL (2 Way Left Turn Lane) is proposed or included in the analysis of an undivided section.

1.1.3.2.2 Traffic and ESAL Loading:

1. AADT estimates shall be based upon:

- Environmental capacity of the functional classification of roadway under consideration; or
- 20 year travel demand forecast with an annual compounded growth rate of 7% for all Arterial traffic, 5% for all Collector traffic and 3% for Local traffic, if starting with current traffic volumes based on field counts; or
- 20-year travel demand forecasts at area build-out conditions using approved methodology, procedures, current Traffic Impact report excerpts or AADT estimates provided by the City;
- If the travel demand forecast derived as described above is less than 75% of the roadway environmental capacity, use TDF Volumes times X 1.25.
- If the travel demand forecast derived as described above is greater than 75% of the roadway environmental capacity, use the environmental capacity as the basic traffic volume input into the pavement design procedure.

2. Traffic Composition and ESAL Factors shall be based upon:

Vehicle Category	%Vehicle Category by Functional Class/ESAL Factors									
	Principal Arterial		Minor Arterial		Collector			Local		
					Residential	Commercial/ Industrial		Residential	Commercial/ Industrial	
	%	ESAL	%	ESAL	%	%	ESAL	%	%	ESAL
Passenger Cars	90.5	0.0008	94.4	0.0008	96	90	0.0008	98	94	0.0008
SU Trucks	3.2	0.09	2.4	0.04	3.5	4.0	0.16	1.5	2.5	0.16
Multi Unit Trucks	6.3	0.91	3.2	0.67	0.5	6.0	0.53	0.5	3.5	0.53

3. Traffic volumes are to be equally distributed among all through lanes with no adjustment, allowance for, or distribution to, auxiliary or turning lanes.
4. An approximate method of ESAL load computations involving the use of Cope's equations, as indicated in TAC publications, is acceptable provided that the higher ESAL load from the above procedure or Cope's equation are utilized.

   Cope's Equation:

   For 1 Lane:

   $$ESAL = 182.5 * AADT * Tp * Tf$$

   For 2 Lanes or more:

   $$ESAL = 182.5 * AADT * Tp * Tf * Lf$$

   Where: Lf =[1.567-0.0826*loge(AADT/2)-0.12368*Lv]
   Lv =0 if # of lanes in one direction =2
   Lv =1 if # of lanes in one direction =3 or more
   Tp =trucks expressed as a % of total traffic
   Tf =0.76 for flexible pavements

5. Overloads, the ESAL loads obtained above are to be multiplied by 1.15 to account for overloaded axles.

1.1.3.2.3 Serviceability

Initial Index = 4.2

Terminal Index = 2.5 for all Arterials
= 2.0 for Collectors and Local Roads.

1.1.3.2.4 Reliability

ESAL x 10**6	Reliability %
>10.0	95.0
5 - 10	90.0
0.1 - 5	85.0
<0.1	75.0

1.1.3.2.5 Equivalence of constituent pavement layers:

Asphaltic concrete equivalency:

1.00mm	Asphaltic concrete
2.25mm	of crushed gravel
1.75mm	of soil cement
1.25mm	of asphalt treated, processed gravel base

Granular Base equivalency (component layer material ratio)

1.00mm	crushed gravel
1.30mm	soil cement
1.80mm	asphalt treated gravel base

1.1.3.2.6 Design Life.

A pavement life of 20 years is to be assumed for design and analysis.

1.1.3.2.7 Other Design Procedures and Factors.

The Alberta Transportation's Pavement Design Manual and AASHTO guide are to be used for guidance in the selection and use of other design factors, such as drainage, frost susceptibility etc.

1.1.3.2.8 2.1.3.2.8 Minimum Pavement Structure

The design of a pavement structure for any functional classification of roadway is site or development specific to the extent that subsurface conditions and traffic loading are considered variables which are site or development specific and can have a major influence on the serviceability of that pavement, as can frost susceptibility of sub-soils, ground water conditions or climatic and other environmental factors.

To provide for the development and occupancy of housing or properties within a subdivision development, while still maintaining continuous vehicular access to such housing and properties which is dust free and trafficable by the type and mix of heavy construction and operational traffic, as well as to provide for the commencement of municipal services (including the operation of dedicated utilities and works) prior to the full completion and occupancy of the subdivision, the City has established a minimum pavement structure to be provided on roadways.

This minimum pavement structure also helps prevent permanent deformation of the roadway sub-grade or complete loss of serviceability during the first phase of staged construction due to loading from heavy construction and operational traffic like garbage trucks etc.

The minimum required pavement structure is comprised of:

50 mm Asphaltic Concrete wearing course

75 mm Asphaltic Concrete base course
75 mm Processed, Crushed, Untreated Gravel Base
150 mm. Processed or Unprocessed, Untreated Gravel Sub-Base

This minimum pavement structure applies to all functional classifications of roadways up to and including Collectors (The City will determine, on a case by case basis, the minimum pavement structure required for higher Functional Classifications such as Arterials).

This minimum pavement structure is not to be confused with that which is to be provided as a result of analysis. *The pavement structure derived as a result of analysis is the requirement, provided that it is not less than the minimum structure above, otherwise the minimum structure is deemed to govern.*

This analysis (covering all functional classifications of roadways in the subdivision or development) is required to be submitted with the pavement design and geo-technical report for the subdivision or development.

1.1.4 SITE GRADING PLAN (S)

The Site Grading Plan is to indicate:

- Major drainage system routing to Storm Water Management Facilities and receiving Watercourses,
- The coordination of depth, cover, and grades among grade dependent utilities,
- The existing and proposed contours and proposed fills or cuts 2.0 metres or over,
- Geotechnical test hole locations,
- Existing natural or special site features,
- Groundwater contours if within 4.0 metres of original ground surface.

1.1.5 TRAFFIC AND ROADWAYS:

1.1.5.1 TRAFFIC IMPACT ASSESSMENT (TIA)

A Traffic Impact Assessment will be required in accordance with Section 6 of this manual. In addition, the TIA is to:

- Analyze the location and design of roadway access points at adjoining roadways in accordance with the City's standards for all collector/arterial intersections complete with the requisite spacing of intersections, capacity analysis and traffic control devices;
- Analyze and assess the provision of noise abatement measures consistent with City Standards for residential areas adjacent to arterial and higher classification roadways;

All conceptual design, analysis and assessment information is to be accompanied with explanatory narrative, tabulations and functional drawings that describe the transportation-planning concept for the development area and high volume traffic generators.

1.1.5.2 ROADWAY PLAN (S)

The Roadway Plan is to:

- Conform to the road hierarchy and include cross-section geometry, road width, traveling lanes, parking lanes, overland drainage conveyances, intersection design, significant traffic control devices and right-of-way widths consistent with the TIA and functional detail as required.
- Confirm transportation routing consistent with the Area Structure Plan.

- Propose and detail pedestrian related infrastructure including sidewalks, trails, and walkways.
- Provide and detail the proposed vertical alignment road, lane, walkway, and public utility lot (PUL) grades, at intersections and point of intersecting (P.I.) grade elevations.
- Show the location of special entrance features.
- Show Transit stop locations and shelters or bays where applicable
- Detail Screening measures and design criteria where required.
- Detail Temporary facilities required to support proposed phasing (if required),
- Show access management provisions for projected high volume driveways.

The detailed design criteria are included in Section 6 of this document.

1.1.6 WATER SUPPLY SYSTEM REQUIREMENTS:

Submission requirements include:

- Network analysis to establish the size of grid mains required to service the development area, based upon boundary conditions established in accordance with EU requirements to include:
  - maximum hourly flows
  - average daily flows
  - maximum day plus fire flows at locations identified by EU with criteria as outlined by the Fire Underwriters Association
  - pressures
  - elevations and
  - pipe sizes
  - Location of irrigation service(s) connections
- Distribution system grid mains, valving and hydrant coverage.
- PRV vaults and other special installations as required.
- All design and analysis information is to be accompanied with sufficient explanatory notes, descriptions, summaries and drawings that describe the overall servicing concept and details for the development area.
- Other design criteria and submission requirements specific to the development as identified by the EU Department.

1.1.6.1 WATER SYSTEM NETWORK PLAN (S)

The Water System Network Plan is to:

- Indicate water main sizes and alignments
- Indicate preliminary hydrant, water valve, and PRV locations.
- Water line pressures at key locations within the development and near high water usage areas.
- Temporary facilities required to support proposed phasing (if required).

The design criteria are included in Section 3 of this document.

1.1.7 SANITARY SEWER SYSTEM REQUIREMENTS:

Submission Requirements include:

- Collection system trunks and mains, pump stations and force mains (if applicable), any special structures and appurtenances to include peak hour sewage flows for trunk lines.
- All design and analysis information is to be accompanied with sufficient explanatory notes, descriptions, summaries and drawings that describe the overall servicing

concept and details for the development area as well as over sizing requirements for the upstream portion of the basin and projected flows into the connection point(s) to the existing system.

- Other design criteria and submission requirements specific to the development as identified by the EU Department.

1.1.7.1 SANITARY SEWER SYSTEM PLAN (S)

The Sanitary Sewer System Plan is to:

- Indicate the contributing sanitary service areas based on topographical considerations and downstream main capacities.
- Indicate line sizes considering future growth areas beyond (upstream) of the ASP limits (e.g. over sizing requirements through the development area).
- Identify proposed system capacities based on projected flows.
- Proposed sanitary manhole locations, manhole inverts, and grades between manholes.
- Location of the sanitary lift station, Force main size and alignment (if required).
- Temporary facilities required to support proposed phasing (if required).

The design criteria are included in Section 4 of this document.

1.1.8 STORM DRAINAGE SYSTEM REQUIREMENTS:

- Storm Drainage planning is to be consistent with any existing or current area drainage planning.
- Storm Drainage Trunk Sewer (Minor) system designed for 1:5 year return frequency event, taking into account all tributary areas. Rational method is acceptable. Trapped lows shall be minimized but clearly identified. Analyze over sizing requirements for the upstream portion of the basin and projected flows into the connection point(s) to the existing system.
- Major System conveyances (roadways, channels) designed to convey and detain-store runoff from 1:100 year return frequency event. Computer simulation of runoff and system response to design storm events, may be submitted, although is not essential if a modified rational method has been used to develop runoff rates and check of capacity/flow depth/flow velocity at critical locations for roadways and channels is required with the servicing report.
- Accompanying support computations, to verify that the design conforms to city requirements.
- Storm Water Management Facilities (SWMF) designed to detain-store runoff from 1:100 year return frequency event prior to its release at an attenuated peak rate equal to or less than the runoff from a 1:5 year return frequency event, at pre-developed hydrologic condition of tributary catchment, to designated conveyances and outfalls at receiving watercourses.
    - Storm Water Management Facilities (SWMF) shall consist of Hybrid Ponds incorporating standard submerged inlet structures, sediment forebays complete with liner and overflow weir; a detention-storage/wetland zone complete with vegetation complexes and flow channels; a standard outlet structure, maintenance access, public amenity and access features;
    - other design requirements and covered in Section 5.

- A drainage system treatment wetland proposed separately from dry detention storage ponds shall be designed as provided for in Section 5 and which may be accepted on a case-by-case basis.

- Erosion and sediment control measures as required
- MR dedication credit in respect of Storm Water Management Facilities (SWMF) of the Hybrid type depending upon degree of public access and public amenity value provided.
- Approved landscaping and recreational areas developed within the pond footprint, as approved by the Parks and Outdoor Recreation department.
- Drainage outfalls into receiving watercourses.
- The submission shall also include:
  - an explanatory narrative of the planned system;
  - modelling analysis in hard copy and digital format with input/output program files including a description of computational methodology for major system design and summary tabulation,
  - SWMF design and summary tabulation,
  - Outfall design,
  - Minor system trunk sewer design and tabulation.

1.1.8.1 STORM DRAINAGE SYSTEM PLANS

All storm drainage plans are to indicate the following at a functional level only, except where indicated otherwise:

- All associated land control requirements

1. Minor System Plan(s)

- The key hydrologic and hydraulic assumptions and results such as catchment areas at pre and post development and at any interim or staged conditions & hydrologic characteristics, associated times of concentration, slopes,
- Indicate future storm sewer system, line sizes, hydrology and hydraulics,
- Identify bottleneck locations, alternative routing possibilities, and solutions,
- Functional design of outfall including its hydraulics and operations,
- Identify temporary facilities required to support proposed phasing (if required),
- The design criteria are included in Section 5.

2. Major System Plan(s)

- The key hydrologic and hydraulic assumptions and results such as catchment areas at pre and post development and at any interim or staged conditions & hydrologic characteristics, associated times of concentration, slopes,
- Overland conveyance geometry and associated hydraulic characteristics,
- Indicate functional major drainage routing along proposed streets, lanes, and PUL's for the area contained within the ASP, including the hydraulic, capacities and velocities for overland conveyances at key points (downstream of confluences and significant inflows) within the drainage basin area.
- Functional design of outfall including its hydraulics and operations,
- Identify bottleneck locations, alternative routing possibilities, and solutions,
- Identify temporary facilities required to support proposed phasing (if required),
- The design criteria are included in Section 5,

3. SWMF Plan(s)

- The summary hydrology, hydraulics, operating characteristics, freeboard, distance to building foundations & openings, cross-section geometry of SWMFs and associated control structures,
- Detention pond locations and sizes including volume, depth, area, and elevations, hydrology and hydraulics,
- Functional design of outfall including its hydraulics and operations,
- Forecast sediment quantities, removal frequency,
- SWMF maintenance access, alignment and cross-section geometry,
- SWMF access control features,
- Identify temporary facilities required to support proposed phasing (if required),
- Temporary pumping and associated forcemain hydraulics and operating requirements,
- The design criteria are included in Section 5.

1.1.9 SHALLOW UTILITIES

Confirm from the respective shallow utilities that the area is serviceable and a functional servicing layout.

Existing and proposed, infrastructure locations to be confirmed.

Copies of the deep utility and roadway drawings should be provided to each shallow utility department or company prior to completion of the Shallow Utilities Plan to assist them in the placement of their surface and subsurface enclosures.

1.1.9.1 ELECTRIC UTILITY PLAN (S)

The Electric Utility Plan is to show:

- Existing plant and infrastructure locations including:
  - Underground and overhead electrical distribution lines
- Proposed plant and distribution infrastructure locations if available including major utility corridors, easements, ROW.
- Identify temporary facilities required to support proposed phasing (if required).

1.1.9.2 GAS UTILITY PLAN (S)

The Shallow Utilities Plan is to show:

- Existing plant and infrastructure locations including:
  - Gas wells
  - High pressure lines
  - Production and collection lines and plant
- Proposed plant and distribution infrastructure locations if available including major utility corridors, easements, ROW.
- Identify temporary facilities required to support proposed phasing (if required).

1.1.10 PUBLIC OPEN SPACE DESIGN, PARKS, BUFFERS, BOULEVARDS, BERMS, TRAILS

- Identification of significant natural spaces/ ER areas
- Preliminary trail layout and grades;
- Preliminary parks and landscaping concept;
- Indication of landscape standard, (manicured or non-manicured)
- Location of irrigation service(s) connections
- Extent of Plantings
- Location of Playground equipment furniture etc.

- Access Control at boundaries
- Preliminary drainage patterns

1.1.10.1 CONCEPTUAL LANDSCAPING PLAN (S)

The Conceptual Landscaping Plan is to include:

- the items noted above.
- Preliminary landscaping design for, MR, ER, Berms, PULs, SWMFs & Detention Ponds and major UROWs.

The design criteria are included in Section 7.

1.1.11 COST SHARING

The Functional Servicing Report is to include a section on approximate costs and proposed cost sharing formulas for any oversized/ cost-shared improvements (excluding shallow utilities), identify the benefiting areas and the degree of benefit thus derived. Maps and tabulations are required to illustrate and document the approach and results.

1.1.12 REPORT & DRAWING SUBMISSIONS

10 Copies of the Functional Servicing Report or Preliminary Engineering Studies (Draft and Final) are to be submitted to Municipal Engineering for review and approval. Upon approval 10 copies of the final reports with digital copies and input/output files are also required for distribution to all City Departments and two (2) copies to Alberta Environment.

1.2 SUBDIVISION AND DEVELOPMENT APPROVAL

1.2.1 GENERAL

- The detailed design drawing submission shall be consistent with the overall design concept as identified in an approved Functional Servicing Report and/ or Preliminary Engineering Reports and Studies and shall recognize and incorporate any special requirements (e.g. utility over sizing).
- These Standards do not include the detailed design requirements (other than alignment) for the street lighting, power, gas, telephone, or cable television servicing. The Engineering Consultant is responsible to coordinate their design with each of the individual utilities. The plans are to be included in the detail design set.
- The location of Canada Post community mailboxes shall be coordinated with Canada Post by the Developer, be shown on the Roadways Plan.

1.2.2 SUBMISSION OF DETAILED DESIGN DRAWINGS

The Engineering Consultant shall submit 11 copies of the Detailed Design Drawings, clearly marked “Submission # - Issued for Approval”, to the Municipal Engineering Department.

All Detailed Design Drawings shall conform to the general specifications identified in Section 8 of these Standards. Specific design standards are provided in the following Sections:

- Section 2: Grading
- Section 3: Water Distribution System
- Section 4: Sanitary Sewer System
- Section 5: Storm Drainage Systems

- Section 6: Roadways
- Section 7: Parks and Open Space Development

1.2.2.1 SUPPLEMENTARY INFORMATION

An accompanying report shall be submitted specifically addressing any and all deviations from the Standards and any site-specific conditions that may warrant special attention to the development.

1.2.2.2 DETAILED DESIGN DRAWING REVIEW AND APPROVAL

Formal comments and requirements on the Detailed Design Drawings will be provided to the Engineering Consultant on completion of every plans review. Following approval from Alberta Environment, Submission of 11 copies of Detailed Design Drawings revised to reflect all the requirements and comments and marked "for construction" is required prior to receiving approval from the Municipal Engineering Department on behalf of the City. Execution of a service agreement and authorization to begin construction will authorized after City approval has been given.

1.3 SERVICE AGREEMENTS AND DEVELOPMENT AGREEMENTS

1.3.1 GENERAL

A Developer, prior to registration of a subdivision with Alberta Land Titles or prior to commencing construction upon receiving plans approval following subdivision or development approval, will typically be required to enter into a Service or Development Agreement. A Service or Development Agreement outlines a Developers obligation to construct improvements to City Standards, addresses the scope of improvements, special development requirements, and includes financial, cost sharing, maintenance, and performance security. A service or development agreement also outlines the City's obligations to review plans, inspect construction, assume ownership and maintenance responsibilities after construction.

Preparation of the Service Agreement by the Municipal Engineering Department will typically take place concurrently with the Detailed Design Drawing review and approval of other related reports required prior to development (e.g. Geotechnical, Historical Resources, etc.). Service Agreements are prepared and approved by the General Manager of Municipal Engineering and the City Solicitor, and endorsed by the Mayor and City Clerk of Medicine Hat and cannot be completed unless all required information has been received and approved.

A Service Agreement cannot be completed unless notification, approval or registration of the improvements as required by Alberta Environment have been processed as the case may require, following issuance of the City's Approval.

The steps, process and timing of plans review, approvals and Service Agreement preparation is time, complexity and workload sensitive. The most current steps, process and timing can be obtained from the Municipal Engineering Department upon request and upon receipt of the scope and description of the project.

Standard "Boiler Plate" Templates are available form Municipal Engineering, upon request for the following documents used in a service or development agreement:

a. Service Agreements:
   - Fee-Simple Subdivisions,
   - Bareland Condominiums

b. Development Agreements for:
   - Site Developments

c. Lot restrictions and registerable instruments such as:
   - Drainage
   - Slope Stability
   - Joint Access
   - Joint Drainage
   - Joint use of works
   - Joint Access and Drainage

   In the case that such standard instrument templates are not available, it is expected that the developer will retain the services of a solicitor to draft the required instruments and obtain approval from the City Solicitors office prior to their use.

These documents have been reviewed by representatives of the development industry and adopted by the City for these purposes.

1.3.2 COST SHARING

At the FSR or Preliminary Engineering Study stage the basis for the establishment of oversize, boundary and other measures of benefit accruing to any benefiting lands will have been set out.
At the detail design stage the costs associated with the benefits derived from the improvements must established and payment secured in the service agreement. These cost sharing calculations are required with the first submission of the detailed engineering drawings. Failure to do so will delay processing of a service agreement.

Cost sharing calculations must be submitted to the City in a prescribed format including all tabulations and plans.

All cost sharing transactions must be preformed and concluded upon execution of a service or development agreement.

1.3.3 PREFORMANCE SECURITY

Letters of Credit to secure the Developers performance are required with each service or development agreement in accordance with the criteria outlined in the standard development or service agreements.

Detailed cost calculations for the purposes of determining the appropriate level of performance security shall be submitted to the City along with the first submission of the detailed engineering drawings. Failure to do so will delay processing of a service agreement.

Letters of Credit in the correct amount are to be submitted upon execution of a service agreement and partial releases will not be allowed until the final CCC has been issued.

1.3.4 INTERIM WORKS

The design of works or improvements of an interim nature may only be accepted at the City's sole discretion. Complete design for both the final and interim conditions are required and must receive approval from the City. Special provisions with respect to acceptable triggers for initiating the construction of permanent facilities and improvements such as, timing, capacity constraints, intensity of development, etc must also be established and approved by the City at the time of initial approval.

It should be recognized that any interim facilities in Public Right-of-Ways and or Utility Right-of-Ways and requiring registration with Alberta Environment must be operated and maintained by the City at the Developers cost until the final system is completed, dedicated and accepted by the City as represented by the issuance of Final Acceptance Certificate executed by the City.

1.4 ALBERTA ENVIRONMENT APPROVALS

Alberta Environment requirements include:

- Notification of Extensions to Sanitary Sewerage Systems, Water Distribution Systems, Storm Drainage Systems. Notification will be forwarded to Alberta Environment by the City following the City's Approval of the detailed design drawings.
- Approvals of major conveyances and facilities. Application to Alberta Environment for approvals will be made by the City following the City's Approval of the detailed design drawings.
- Registration of new outfalls. Application to Alberta Environment for registration will be made by the City following the City's Approval of the detailed design drawings.

Provincial regulations, the terms of the City's licence to operate its utilities and drainage systems and these standards require the submission of:

- Complete Drawings
- Design information including all engineering computations
- Description of Methodology and Assumptions
- Responsible Engineers Declaration (Attached form is required)
- Project Timing

To Alberta Environment by the City. In order to meet this requirement the City must first approve all submissions and then forward them to Alberta Environment for further processing.

1.4.1 BARELAND CONDOMINUMS

Bareland Condominium projects are a special case. Every Bareland Condominium project requires registration with Alberta Environment and must receive approval of the City prior to submission for registration.

The City requires the same information for Bareland Condominium projects as for fee simple subdivision projects.

Bareland condominium submissions are to be made directly to Alberta Environment by the consultant after City aapproval is received for the project.

ENGINEER'S DECLARATION FOR APPROVAL AND/OR REGISTRATION STORM DRAINAGE SYSTEM

Project: ..... **;**

Location: ..... , Medicine Hat, Alberta;

Section..... Twp: ..... Rge:..... West of the 4th Meridian

I, the undersigned, Professional Engineer of record for the above works, hereby acknowledge that I have reviewed the latest edition of the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems,* as published by Alberta Environment and certify that the design of the above noted project complies with all of the requirements specified for the construction of storm drainage systems.

I further certify that:

- The design of the storm drainage system is fully in accordance with the Municipal Servicing Standards of the City of Medicine Hat and drawings and specifications thereof submitted to the City;
- The storm drainage system treatment facility and outfall are designed to function under all normal and foreseeable operating conditions without causing flow surcharge in storm sewers in excess of what is deemed acceptable by the City of Medicine Hat and with only such inundation of roadways, overland conveyances and properties, as is deemed acceptable by the City of Medicine Hat;
- The storm drainage system treatment facility and outfall are designed to achieve under all normal and foreseeable operating conditions all substance release requirements as specified in Alberta Regulation 119/1993, as amended, pursuant to the Environmental Protection and Enhancement Act;
- The City of Medicine Hat has reviewed an engineering design report, drawings and specifications for the proposed storm drainage treatment facility and outfall, as attached, which includes among other engineering design information:
  - Pre and post-development storm drainage flows from the service and tributary area;
  - Hydrologic analysis of the runoff flows indicating design parameters derived there-from including rainfall hyetographs, runoff hydrographs, flow routing tabulations & outflow hydrographs, storage and release hydrographs;
  - Design hydraulic capacity, rating curves, critical elevations, side slopes, structure details;
  - Location and design of ultimate system discharge point from the proposed treatment facility, outfall and erosion control measures;
  - Nature and extent of treatment of the storm drainage prior to discharge into the environment expressed as proportion of sediment removal and nutrient removal in the treatment facility.
- The increased runoff flows associated with the development of the land area tributary to the proposed system,*[to the interim extent shown on the plans and report[optional]]*, are within the design hydraulic capacity of the registered system or outfall and will not cause under all normal and foreseeable operating conditions flow surcharge in storm sewers or inundation of roadways, overland conveyances or properties, in excess of what is deemed acceptable to the City of Medicine Hat;
- The storm drainage system treatment facility and outfall are designed to service only those classes of property permitted pursuant to the said Regulation and Approval.

I agree to provide the City and Director, immediately upon receipt of notice, any maps, engineering drawings, specifications, design data or information required in such notice.

I certify that the attached engineering report, a draft of which has previously been reviewed by the City of Medicine Hat and Alberta Environment, who have found it acceptable, provides a detailed explanation of any variances of the design from the Standards and Guidelines and City of Medicine Hat Servicing Standards. The report also provides technically supportable and justifiable reasons, consistent with industry best practices, why the variances are necessary and should be accepted.

SIGNED AND SEALED by:

Name:..... APEGGA Seal:

Company Name:.....

Address:.....

Telephone:..... APEGGA Permit to Practice:

I acknowledge that designs that are found not to be in accordance with the said Alberta Environments' Standards and Guidelines and the City of Medicine Hat's Municipal Servicing Standards, may result in enforcement action and/or referral to APEGGA.

ENGINEER'S DECLARATION: EXTENSION TO A WATERWORKS, WASTEWATER, OR STORM DRAINAGE SYSTEM

Project: Water Distribution System - Extension**;**

Location: ....., Medicine Hat, Alberta;

Section ..... Twp: .....Rge: .....West of the 4th Meridian

Approval #:....., 2004, as amended

I, the undersigned, the Professional Engineer of record for the above works, hereby acknowledge that I have reviewed the latest edition of the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems,* as published by Alberta Environment and certify that the design of the above noted project complies with all of the requirements specified for the construction of water distribution systems.

I further certify that:

- The design of the water distribution system extension is fully in accordance with the Servicing Standards of the City of Medicine Hat and drawings and specifications thereof submitted to the City;
- The City of Medicine Hat has reviewed and accepted the said design drawings and specifications and requires the attached conditions to their acceptance;
- The increased water flow associated with the extension is within the design capacity of the existing water distribution system;
- The increased water demand associated with the extension is within the design capacity of the authorized system providing potable water to the water distribution system;
- A minimum residual pressure of at least 150 kilo Pascals is designed to be achieved under all normal and foreseeable operating conditions;
- The extension is designed to service only those classes of property permitted pursuant to the said Regulation and Approval.

I agree to provide the City and Director, immediately upon receipt of notice, any maps, engineering drawings, specifications, design data or information required in such notice.

I certify that the attached engineering report, a draft of which has previously been reviewed by the City of Medicine Hat and Alberta Environment, who have found it acceptable, provides a detailed explanation of any variances of the design from the Standards and Guidelines and City of Medicine Hat Servicing Standards. The report also provides technically supportable and justifiable reasons, consistent with industry best practices, why the variances are necessary and should be accepted.

SIGNED AND SEALED by:

Name: ..... **APEGGA Seal:**

Company Name: .....

Address: .....

Telephone: ..... **APEGGA Permit to Practice:**

I acknowledge that designs that are found not to be in accordance with the said Alberta Environments' Standards and Guidelines and the City of Medicine Hat's Municipal Servicing Standards, may result in enforcement action and/or referral to APEGGA.

ENGINEER'S DECLARATION: EXTENSION TO A WATERWORKS, WASTEWATER, OR STORM DRAINAGE SYSTEM

Project: Sanitary Wastewater Collection System - Extension**;**

Location: ....., Medicine Hat, Alberta;

Section ..... Twp: .....Rge: .....West of the 4th Meridian

Approval #:....., 2004, as amended

I, the undersigned, the Professional Engineer of record for the above works, hereby acknowledge that I have reviewed the latest edition of the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems,* as published by Alberta Environment and certify that the design of the above noted project complies with all of the requirements specified for the construction of water distribution systems.

I further certify that:

- The design of the sanitary wastewater collection system extension is fully in accordance with the Servicing Standards of the City of Medicine Hat and drawings and specifications thereof submitted to the City;
- The wastewater collection system is designed to function under all normal and foreseeable operating conditions without flow surcharge unacceptable to the City of Medicine Hat;
- The wastewater collection system is designed to achieve under all normal and foreseeable operating conditions all substance release requirements as specified in Alberta Regulation 119/1993, as amended, pursuant to the Environmental Protection and Enhancement Act;
- *[The wastewater pumping station and forcemains are designed in conformance with the Standards and Guidelines above as well as the City of Medicine Hat's document entitled "Sewer Lift Station Design and Construction Standards and Procedures Manual" Optional]]*
- The City of Medicine Hat has reviewed and accepted the said design drawings and specifications subject to the attached conditions;
- The increased flow associated with the extension or replacement is within the design capacity of the existing wastewater collection system and does not cause any flow surcharge therein, in excess of what is deemed acceptable by the City of Medicine Hat;
- The increased flow associated with the extension or replacement is within the design capacity of the authorized wastewater system providing treatment of the collected wastewater;
- The extension or replacement is designed to service only those classes of property permitted pursuant to the said Regulation and Approval.

I agree to provide the City and Director, immediately upon receipt of notice, any maps, engineering drawings, specifications, design data or information required in such notice.

I certify that the attached engineering report, a draft of which has previously been reviewed by the City of Medicine Hat and Alberta Environment, who have found it acceptable, provides a detailed explanation of any variances of the design from the Standards and Guidelines and City of Medicine Hat Servicing Standards. The report also provides technically supportable and justifiable reasons, consistent with industry best practices, why the variances are necessary and should be accepted.

SIGNED AND SEALED by:

Name: ..... APEGGA Seal:

Company Name: .....

Address: .....

Telephone: ..... APEGGA Permit to Practice:

I acknowledge that designs that are found not to be in accordance with the said Alberta Environments' Standards and Guidelines and the City of Medicine Hat's Municipal Servicing Standards, may result in enforcement action and/or referral to APEGGA.

ENGINEER'S DECLARATION: EXTENSION TO A WATERWORKS, WASTEWATER, OR STORM DRAINAGE SYSTEM

Project: Storm Drainage System - Extension**;**

Location: ....., Medicine Hat, Alberta;

Section ..... Twp: .....Rge: .....West of the 4th Meridian

Approval #:....., 2004, as amended

I, the undersigned, Professional Engineer of record for the above works, hereby acknowledge that I have reviewed the latest edition of the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems,* as published by Alberta Environment and certify that the design of the above noted project complies with all of the requirements specified for the construction of storm drainage systems.

I further certify that:

- The design of the storm drainage system extension is fully in accordance with the Servicing Standards of the City of Medicine Hat and drawings and specifications thereof submitted to the City;
- The storm drainage system extension is designed to function under all normal and foreseeable operating conditions without causing flow surcharge in storm sewers in excess of what is deemed acceptable by the City of Medicine Hat and with only such inundation of roadways, overland conveyances and properties as is deemed acceptable by the City of Medicine Hat;
- The storm drainage system extension is designed to achieve under all normal and foreseeable operating conditions all substance release requirements as specified in Alberta Regulation 119/1993, as amended, pursuant to the Environmental Protection and Enhancement Act;
- The City of Medicine Hat has reviewed and accepted the said design drawings and specifications subject to the attached conditions;
- The increased flow associated with the extension or replacement is within the design capacity of the existing storm drainage system and does not cause any flow surcharge of storm sewers or inundation of roadways, overland conveyances or properties, in excess of what is deemed acceptable by the City of Medicine Hat;
- The increased flow associated with the extension or replacement is within the design capacity of the authorized storm drainage detention, retention, treatment or management facility providing storage of peak runoff flow from minor and major rainfall events and treatment of the storm drainage runoff;
- The increased flow associated with the extension or replacement is within the design capacity of the registered drainage system or outfall in a watercourse to safely convey, without exceeding its hydraulic capacity, peak runoff flow from minor and major rainfall events;
- The extension or replacement is designed to service only those classes of property permitted pursuant to the said Regulation and Approval.

I agree to provide the City and Director, immediately upon receipt of notice, any maps, engineering drawings, specifications, design data or information required in such notice.

I certify that the attached engineering report, a draft of which has previously been reviewed by the City of Medicine Hat and Alberta Environment, who have found it acceptable, provides a detailed explanation of any variances of the design from the Standards and Guidelines and City of Medicine Hat Servicing Standards. The report also provides technically supportable and justifiable reasons, consistent with industry best practices, why the variances are necessary and should be accepted.

SIGNED AND SEALED by:

Name: ..... APEGGA Seal:

Company Name: .....

Address: .....

Telephone: ..... APEGGA Permit to Practice:

I acknowledge that designs that are found not to be in accordance with the said Alberta Environments' Standards and Guidelines and the City of Medicine Hat's Municipal Servicing Standards, may result in enforcement action and/or referral to APEGGA.

ENGINEER'S DECLARATION FOR APPROVAL AND/OR REGISTRATION ON-SITE WATERWORKS, WASTEWATER COLLECTION AND STORM DRAINAGE SYSTEM FOR A BARELAND CONDOMINIUM

Project: .....

Location: ....., Medicine Hat, Alberta;

Section ..... Twp: .....Rge: .....West of the 4th Meridian

I, the undersigned, Professional Engineer of record for the above works, hereby acknowledge that I have reviewed the latest edition of the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems,* as published by Alberta Environment and certify that the design of the above noted project complies with all of the requirements specified for the construction of on-site, waterworks, wastewater collection and storm drainage systems for a Bareland Condominium Development.

I further certify that:

- The design of the on-site waterworks, sanitary wastewater collection system and on-site storm drainage system is fully in accordance with the Municipal Servicing Standards of the City of Medicine Hat and the design, drawings and specifications thereof submitted to the City;
- The on-site waterworks, sanitary wastewater collection system and on-site storm drainage system are designed to function under all normal and foreseeable operating conditions without exceeding the design capacity of the publicly owned water supply system, sanitary wastewater collection system and the publicly owned storm drainage system and without causing flow surcharge in publicly owned sanitary wastewater and storm sewers in excess of what is deemed acceptable by the City of Medicine Hat and with only such inundation of roadways, overland conveyances, properties and receiving watercourses by storm runoff, as is deemed acceptable by the City of Medicine Hat;
- The on-site sanitary wastewater collection and storm drainage systems are designed to achieve under all normal and foreseeable operating conditions all substance release requirements as specified in Alberta Regulation 119/1993, as amended, pursuant to the Environmental Protection and Enhancement Act;
- The increased sanitary wastewater flows, runoff flows and water demands associated with the development and of the land area tributary to the proposed system,*[to the interim extent shown on the plans and report[optional]]*, are within the design hydraulic capacity of the associated publicly owned waterworks, sanitary wastewater system and off-site storm drainage system or outfall and will not cause under all normal and foreseeable operating conditions flow surcharge in the said sanitary wastewater system or storm sewers or cause the inundation of roadways, overland conveyances or properties, in excess of what is deemed acceptable to the City of Medicine Hat or to create a residual pressure in the publicly owned water system less than 150 kilo Pascals;
- The on-site waterworks, sanitary wastewater collection system and on-site storm drainage systems are designed to service only those classes of property permitted pursuant to the said Regulation and Approval.

I agree to provide the City and Director, immediately upon receipt of notice, any maps, engineering drawings, specifications, design data or information required in such notice.

I certify that the attached engineering design has previously been reviewed by the City of Medicine Hat and Alberta Environment, who have found it acceptable, and which provides a detailed explanation of any variances of the design from the Standards and Guidelines and City of Medicine Hat Servicing Standards. The report also provides technically supportable and justifiable reasons, consistent with industry best practices, why the variances are necessary and should be accepted.

SIGNED AND SEALED by:

Name: ..... **APEGGA Seal:**

Company Name: .....

Address: .....

Telephone: ..... **APEGGA Permit to Practice:**

I acknowledge that designs that are found not to be in accordance with the said Alberta Environments' Standards and Guidelines and the City of Medicine Hat's Municipal Servicing Standards, may result in enforcement action and/or referral to APEGGA.

1.5 INSPECTIONS AND CONSTRUCTION COMPLETION CERTIFICATE

Construction inspections are carried out by City Departments at their discretion. Following Construction each improvement, completed by a developer is inspected for the purposes of Certification and upon receipt of all the information and documents required.

If upon completion of an inspection the City is satisfied that the Developer Installed Utilities and Improvements have been completed and the conditions of completion met, as required under a service or development agreement, the General Manager of Municipal Engineering will sign and issue a Construction Completion Certificate.

If, however, upon carrying out an inspection, defects or deficiencies in the Developer Installed Utilities and Improvements are discovered, or if the conditions of completion have not been met in substance or form, the proposed Certificate will be returned to the Developer unsigned with a report of the defects and deficiencies attached. Upon rectification of the listed defects and deficiencies, the Developer is to resubmit the documents and reapply for a Construction Completion Certificate.

1.5.1 CONDITIONS OF CONSTRUCTION COMPLETION

Developer Installed Utilities and Improvements shall only be considered "complete" when the requirements of the Servicing Standards, the Detailed Plans and Specifications, the General Manager of Municipal Engineering and a service or development agreement have been fully satisfied and the following conditions met:

1.5.1.1 ADMINISTRATIVE REQUIREMENTS

The following administrative requirements shall be completed before construction completion certificates for the development can be issued:

a. Registration of all easements, encumbrances, restrictive covenants and right-of-way documents indicated in the service or development agreement or on the plan of subdivision, utility right-of-way plans and approved engineering drawings;

b. All dedicated land such as without limitation, Public Utility Lots, Public Rights-of-Way (roads, lanes, etc), Municipal Reserve, Environmental Reserve, Utility Rights-of-Way's, Easements, have been registered in title to the City at the Land Titles Office;

c. Written verification from the Developers legal representative or legal surveyor that all trust conditions regarding terms of the service agreement and 'a' and 'b' above have been fulfilled by the Developer;

d. Full and complete plans for any and all works associated with a service or development agreement have been approved by the City in conformance to the Municipal Servicing Standards and the City's standard specifications;

e. All Alberta Environment registrations, approvals, notifications and permits have been received by the City;

f. Written verification by the responsible Developer's Consulting Engineer, that all works associated with a service agreement have been completed in accordance with approved plans and specifications and that no field changes other than those pre-authorized in writing by the General Manager of Municipal Engineering and also conforming to the Municipal Servicing Standards and the City's standard specifications, have been made;

g. Written verification by the responsible Developer's Consulting Engineer, that all variations from the Municipal Servicing Standards and the City's standard specifications have a subsisting approval from the responsible Department's General Manager;

h. All postponements and discharges of instruments, leases and liens have been carried out by the developer, as required;

i. All insurance and performance security required by a service or development agreement have been submitted to the City, are current and remain in effect;

j. All offsite levies, cost sharing contributions, fees, charges have been paid to the City and other financial obligations have been fulfilled by the Developer;

k. Safety measures, litter control measures, access control measures, are installed and site clean up completed including without limitation litter, trash, sediment, weeds, surplus materials, damaged and defective materials, storage facilities, operation and maintenance supplies, inoperative tools and equipment etc. have been removed from the development area and the development area left in a clean and orderly condition;

l. Public information signs have been installed in approved locations;

m. Written certification that as-built plans and reports will be submitted to the City by March 1 of the year following the issuance of the Completion Certificate for Surface Works;

n. survey notes, video inspection records and reports have been submitted to the City;

o. All materials testing and reports and certifications have been submitted to the City as required;

p. All survey pins indicating property corners shall, if removed by anyone other than the City, have been replaced by the Developer; and

q. Any special conditions governing the acceptance of specialized materials or non-typical installation situations have been met.

1.5.1.2 ROUGH GRADING, SLOPE MANAGEMENT, EROSION CONTROL MEASURES AND ENVIRONMENTAL MITIGATION OR CORRECTIVE MEASURES

All stripping, topsoil stockpiles, cuts, fills, embankments, berms, temporary fencing and disposal of deleterious materials have been carried out in accordance with the approved plans and specifications. A geotechnical report certifying that all slope management measures, rough grading, excavation, all embankment fills and compaction have been carried out in accordance with the approved plans and specifications. All erosion control measures shall also be in place including but not limited to vegetative covers, synthetic linings, mulches, rip-rap, concrete, silt barriers, overland flow routes and drainage facilities graded and protected in conformance to the approved plans and specifications.

A certification or declaration prepared by the responsible Developer's Consulting Engineer, will be required certifying that all requirements, conditions and stipulations of approved environmental plans and permits have been carried out, completely fulfilled and plans to evidence compliance with any such on-going regulatory requirements with respect to soils, sub-soils, waters, air and plant or animal life connected with the development and that the development area meets the terms and conditions of the approvals of such plans and permits.

1.5.1.3 UNDERGROUND UTILITIES

1.5.1.3.1 Deep Utilities

All deep utilities to be complete, installed in accordance with the approved plans using specified materials and within the specified installation tolerances stipulated in the City's standard specifications.
The Developer shall provide a trench compaction report from a qualified geotechnical engineer certifying that all trenches have been backfilled and compacted in accordance with the approved plans and specifications as part of the conditions for deep utilities being considered complete and in addition, the following stipulations be met:

a. SANITARY SEWERAGE SYSTEM

All sanitary sewerage system components including pipes, force mains, service connections and appurtenances have been completed and installed in accordance with the approved plans and specifications, all manholes have been completed with properly formed inverts, free from obstructions and foreign matter such as rocks, silt and gravel in accordance with the approved plans and specifications. All manhole rims and covers have been installed at the approved design grades and to suit staged construction of surface improvements. All pumping stations and associated appurtenances completed and accepted in accordance with Environmental Utilities Department Sewer Lift Station Design and Construction Standards and Procedures Manual.

All downstream sanitary sewerage systems receiving discharges from the development area are operational, publicly owned and duly registered with Alberta Environment.
A video inspection and report of underground piping has been submitted by the Developer with results satisfactory to the City.

b. WATER DISTRIBUTION SYSTEM

All water mains, service connections and appurtenances have been completed and installed in accordance with the approved plans and specifications, tested and inspected. Hydrostatic testing, leakage testing and disinfection have been carried out to the satisfaction of the General Manager of Environmental Utilities. All main valves, service valves, curb boxes, fire hydrants and other appurtenances are operable, undamaged and at the approved design elevations and to suit staged construction of surface improvements.

All water supply or distribution systems interconnected with, or adjacent to the development area system are operational, publicly owned and duly registered with Alberta Environment.

c. SEWER AND WATER SERVICE CONNECTIONS

All service connections are complete, installed true to line, location, size, alignment, grade, plumb, inspected, tested in accordance with the approved plans and specifications, free from defects in an operable condition complete with surface markers.

1.5.1.3.2 STORM DRAINAGE SYSTEM

a. STORM SEWERAGE

All underground and overland drainage system components including overland conveyances, inlets, service connections, storm sewers, manholes complete with properly formed inverts, catch basins, structures and appurtenances have been completed and installed in accordance with the approved plans and specifications and are free from obstructions and foreign matter such as rocks, silt and gravel, etc. Manhole and catch basin rims and covers have been installed at the approved design grades and to suit

staged construction of surface improvements. All storm water management facilities including storage and treatment systems, outfalls and associated appurtenances are completed in accordance with the approved plans and with an approved operation and maintenance manual.

All downstream storm drainage systems receiving discharges from the development area are operational, publicly owned and duly registered with Alberta Environment.

A video inspection and report of underground piping has been submitted by the Developer with results satisfactory to the City.

b. OVERLAND OR SURFACE DRAINAGE CONVEYANCES, STORM WATER MANAGEMENT FACILITIES, OUTFALLS

A CCC will be issued for overland or surface drainage conveyances provided that all overland or surface drainage conveyances in the development area, are fully complete to the approved plans and specifications, all work is free of defects and deficiencies in materials and workmanship and free from conditions deemed to be hazardous by the General Manager of Municipal Engineering of Engineering Services.

1.5.1.3.3 SHALLOW UTILITIES

No CCC will be issued for shallow utilities. The Developer shall provide the General Manager of Municipal Engineering with written confirmation from each shallow utility company installing improvements in the development area that the improvements have been installed in accordance with the plans and specifications and are ready for use.

1.5.1.4 SURFACE IMPROVEMENTS

All surface improvements have been completed and installed in accordance with the approved plans and within the specified material and installation tolerances stipulated in the City's standard specifications.

All deep utilities, appurtances and improvements whether surface or underground must be complete, free of defects, with as-built plans and reports approved and have a subsisting Construction Completion Certificate in order for the surface improvements for the development area to qualify for a surface improvement CCC. All surface improvements must be complete and installed in accordance to with the approved plans and specifications and in addition, the following stipulations be met:

1.5.1.4.1 SIDEWALKS, CURBS AND GUTTERS

All sidewalks, curbs and gutters in the development area, have been fully completed and installed in accordance with the approved plans and specifications, and all work is free of defects and deficiencies in materials and workmanship and free from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.5.1.4.2 ROADS PAVING - BASE LIFT

A CCC will be issued for road paving - base lift provided that all associated asphaltic concrete paving in the development area is fully complete to the approved plans and specifications, all work is free of defects and deficiencies in materials and workmanship and free from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.5.1.4.3 SAFETY, TRAFFIC CONTROL

All devices to control safety, access, vehicular traffic and pedestrian traffic including but not limited to fences, line painting, street signs, traffic control signage, guide rails and

traffic signalization equipment are installed as required on the approved plans and specifications for the development area, and all work is free of defects and deficiencies in materials and workmanship and free from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.5.1.4.4 STREET LIGHTING

The Developer shall provide copies of certification from the installer of the street lighting in the development area that the street lighting is complete, in accordance with the specifications and in conformance with the locations, lines and UROW's provided for in the approved plans and specifications.

1.5.1.4.5 ACCESS CONTROL AND SOUND FENCING

All access control and sound fencing are complete, installed true to line, location, size, alignment, grade, plumb, inspected, tested in accordance with the approved plans, and specifications, free from defects in an operable condition.

1.5.1.4.6 GRAVELLED LANES, LANE PAVING, ROADS PAVING - SURFACE WEARING COURSE

All lanes are complete, to alignment and grade, accordance with the approved plans, free from defects and in a useable condition.

All graveled lanes, lane paving, roads paving - surface wearing course are to be complete, prior to FAC inspections and shall be constructed true to line, cross section, structure, alignment, grade, inspected, tested in accordance with the approved plans and specifications, free from defects.

A CCC will not be required.

1.5.1.5 OPEN SPACE DEVELOPMENT AND TRAILS

All work has been carried out pursuant to the approved plans and specifications, inspected and conditions of completion as stipulated by the General Manager of Parks and Outdoor Recreation.

From the date of issuance of the Construction Completion Certificate, the City shall have the right and authority to operate and control all Developer Installed Utilities and Improvements constructed or installed on or in City owned lands or utility right-of-ways. The operation and control of Developer Installed Utilities and Improvements by the City shall not relieve the Developer of its duties and obligations pursuant to a service agreement.

1.6 MAINTENANCE

After the issuance of the Construction Completion Certificate, the Developer shall remain responsible for any and all maintenance, repairs or replacements, to the Developer Installed Utilities and Improvements which may become necessary from any cause whatsoever, up to the date of issuance of the Final Acceptance Certificate. Maintenance shall not include damage caused by the City arising from the discharge of its responsibilities.

Maintenance is a continuous operation, which must be carried on until the date of issuance of the Final Acceptance Certificate for the Developer Installed Utilities and Improvements. The Final Acceptance Certificate will not be issued until all Maintenance required by the General Manager of Municipal Engineering in his final inspection report has been carried out.

Without limiting the generality of the foregoing, if, during the construction or prior to issuance of the Final Acceptance Certificate, any defects, deficiencies or malfunctions become apparent in any of the Developer Installed Utilities and Improvements and the General Manager of Municipal Engineering requires Maintenance to be carried out, the Developer shall within a reasonable time cause such Maintenance to be carried out, failing which or should an emergency exist, the City may carry out the Maintenance and recover the resulting costs from the Developer.

1.7 FINAL ACCEPTANCE CERTIFICATE

All utilities, appurtenances and improvements whether surface or underground must be complete, free of defects, with approved as-built plans and reports in place and with a subsisting Construction Completion Certificate in order for the improvements for the development area to qualify for an FAC (FINAL ACCEPTANCE CERTIFICATE).

The General Manager of Municipal Engineering will issue a Final Acceptance Certificate (FAC) provided that the following conditions of Final Acceptance have also been met:

- the maintenance period listed in Table 1.7 for each type of improvement following issuance of a construction completion certificate has expired;
- after confirmation that as-built plans have been received by the City and associated conditions met.
- completion of joint inspections between the Developer's Engineering Consultant and a representative from the City Department authorized by the General Manager of Municipal Engineering to carry out such inspections;
- the correction of any remaining deficiencies or defects identified by the inspections, and
- the following conditions have been met.

Table 1.7

	TYPE OF IMPROVEMENT	CCC	MAINTENANCE PERIOD	FAC
1.	Rough Grading, Slope Management, Erosion Control Measures and Environmental Mitigation or Corrective Measures	1 *	One (1) Year **	1
2.	Underground Utilities			
	a. Deep Utilities	2(a) *	One (1) Year	2(a)
	i. Sanitary Sewerage System			
	ii. Water Distribution System			
	iii. Sanitary Sewer and Water Service Connections			
	b. Storm Drainage System	2(b)	One (1) Year	2(b)
	c. Storm Sewerage			
	d. Overland or Surface Drainage Conveyances, Storm Water Management Facilities, Outfalls			
	e. Shallow Utilities	***	by others	N/A
3.	Surface Improvements			
	a. Sidewalks, Curbs And Gutters	3(a+b+c)	Two (2) Years	3(a+b+c)
	b. Roads Paving - Base Lift			
	c. Safety, Traffic Control,			
	d. Street Lighting	***	by others	N/A
	e. Access Control and Sound Fencing	3(e)	Two (2) Years	3(e)
	f. Gravelled Lanes, Lane Paving, Roads Paving - Surface Wearing Course	N/A	N/A	3(f)
4.	Open Space Development And Trails	4	One (1) year	4
	a. Landscaping, Parks, Irrigation, Fencing, Trails & Walkways			

* Compaction Certification required.

** Longer periods where a deep fill report stipulates additional maintenance period.

*** Certification is required from the utility companies that their plant has been installed in accordance with the plans.

1.7.1.1 ADMINISTRATIVE REQUIREMENTS

The following administrative requirements shall be completed before Final Acceptance Certificates for the development will be issued:

- The maintenance period has expired and all maintenance required by the City has been carried out and the City reimbursed for any maintenance costs incurred by it;

- All insurance and performance security required by a service agreement are in place and valid;
- Any special conditions governing the acceptance of specialized materials or non-typical installation situations have been met;
- All encumbrances registered, instruments discharged where required and all terms and conditions of the service agreement fulfilled;
- As built plans, laboratory test results, certifications, extended warranties have been provided.

1.7.1.2 ROUGH GRADING, SLOPE MANAGEMENT, EROSION CONTROL MEASURES AND ENVIRONMENTAL MITIGATION OR CORRECTIVE MEASURES

The Developer is to restore eroded areas to the approved grades, design and install additional erosion prevention measures as required and remove soils deposited by erosion from roads, lanes, walkways sidewalks, curbs and gutters, catch basins, stormwater management facilities and flushing of storm sewers. The Developer shall also repair or replace any Developer installed improvements that may have shifted, be out-of-plumb, malfunctioning, broken, cracked or otherwise deemed defective by the City as a result of settlement of any deep embankment fills or utility trench backfill or other such cause arising from subsurface consolidations.

1.7.1.3 UNDERGROUND UTILITIES

1.7.1.3.1 DEEP UTILITIES

All required maintenance, repair or replacement of any defects or deficiencies have been completed to the satisfaction of the General Manager of Municipal Engineering and in addition, the following stipulations met:

a. SANITARY SEWERAGE SYSTEM

All sanitary sewerage system components including pipes, force mains, service connections and appurtenances are free from obstructions and foreign matter such as rocks, silt and gravel. All manhole rims and covers have been adjusted to final grade. All pumping stations and associated appurtenances are accepted in accordance with Environmental Utilities Department Sewer Lift Station Design and Construction Standards and Procedures Manual.

b. WATER DISTRIBUTION SYSTEM

All main valves, service valves, curb boxes, fire hydrants and other appurtenances are operable, undamaged and adjusted to final grade.

c. SANITARY SEWER AND WATER SERVICE CONNECTIONS

All service connections are operable, connected and free of defects. Surface markers shall be present and in good condition on lots that may still be vacant.

1.7.1.3.2 STORM DRAINAGE SYSTEM

a. STORM SEWERAGE

All underground drainage system components including inlets, service connections, storm sewers, manholes, catch basins, structures and appurtenances are free from obstructions and foreign matter such as rocks, silt and gravel, etc. Manhole and catch basin rims and covers have been adjusted to final grades.

b. OVERLAND OR SURFACE DRAINAGE CONVEYANCES, STORM WATER MANAGEMENT FACILITIES, OUTFALLS

All overland drainage system components including overland conveyances, structures and appurtenances are free from obstructions and foreign matter such as rocks, silt and gravel, etc. All storm water management facilities including storage and treatment systems, outfalls and associated appurtenances operating satisfactorily.

1.7.1.3.3 SHALLOW UTILITIES

Not Applicable

1.7.1.4 SURFACE IMPROVEMENTS

All surface improvements to be complete, installed in accordance with the approved plans and the City's standard specifications using specified materials and within specified installation tolerances.
All utilities, appurtenances and improvements whether surface or underground must be complete, free of defects, with approved as-built plans and reports in place and with a subsisting Construction Completion Certificate in order for the improvements for the development area to qualify for an FAC (FINAL ACCEPTANCE CERTIFICATE). All surface improvements must be complete and installed in accordance to with the approved plans and specifications and in addition, the following stipulations must be met:

1.7.1.4.1 SIDEWALKS, CURBS AND GUTTERS

All sidewalks, curbs and gutters in the development area, free of defects and deficiencies in materials and workmanship and from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.7.1.4.2 LANE PAVING, ROADS PAVING - SURFACE WEARING COURSE

All lane paving and the surface wearing course for roads free of defects and deficiencies in materials and workmanship and from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.7.1.4.3 SAFETY, TRAFFIC CONTROL

All devices to control safety, vehicular traffic and pedestrian traffic including but not limited to fences, line painting, street signs, traffic control signage, guide rails and traffic signalization equipment are free of defects and deficiencies in materials and workmanship and from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.7.1.4.4 STREET LIGHTING

Not Applicable

1.7.1.4.5 ACCESS CONTROL and SOUND FENCING

All devices to control access, by vehicular and pedestrian traffic including but not limited to fences, are free of defects and deficiencies in materials and workmanship and from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.7.1.4.6 GRAVELLED LANES AND OVERLAND OR SURFACE DRAINAGE CONVEYANCES

All graveled lanes and overland or surface drainage conveyances free of defects and deficiencies in materials and workmanship and from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.7.1.4.7 OPEN SPACE DEVELOPMENT AND TRAILS

All work has been carried out pursuant to the Parks and Outdoor Recreation Department requirements in effect on the date of a service agreement.

a. WALKWAYS,

All walkway asphaltic surfacing free of defects and deficiencies in materials and workmanship and from conditions deemed to be hazardous by the General Manager of Municipal Engineering.

1.7.2 ISSUANCE OF THE FINAL ACCEPTANCE CERTIFICATE

Issuance of the Final Acceptance Certificate by the General Manager of Municipal Engineering ends the Maintenance obligation of the Developer, but does not relieve the Developer of any other obligations of a service or development agreement.