Town of Carstairs

Functional Service Report

Technical Requirements

January 2010
April 2017 - Update

Introduction

Prior to subdivision application, the developer must obtain an approval on a complete Functional Service Report (FSR).

The FSR describes the features and gives the layout of the subdivision or site development together with the detailed engineering that demonstrates the feasibility of the services requiring approval from the Town of Carstairs.

The FSR is intended to ensure that the proposed development can be serviced for its intended use, and that all onsite and off-site servicing requirements are clearly identified. The FSR will incorporate all relative existing information including Town standards, reports, studies, record information in addition to site specific and staging information. The FSR will identify how the land will be serviced, focusing on the following:

- Geotechnical Investigation
- Area and Site Grading
- Transportation Network and Roadways
- Water Distribution System
- Sanitary Sewer System
- Storm Drainage System Major / Minor
- Utilities (Gas, Electrical, etc.)
- Public Open Space including trail networks and landscaping
- Sustainability

Report Submission Requirements

Plans

The base plans for the reports shall conform to the tentative legal plan or to the conceptual layout of the lots, blocks, or blocks and parcels, as deemed appropriate by the Town. They are to be a scale of sufficient size to clearly identify the important details.

All engineering drawings shall be prepared under the supervision of, and sealed by, a Professional Engineer registered in the Province of Alberta. At the FSR submission, the Developer is to submit a complete set of preliminary drawings that clearly identifies how the new development will connect to the existing and future development.

Unless otherwise approved, each figure for the FSR shall include:

- Existing structures and neighbouring subdivisions bordering the proposed subdivision.
- Adjacent street names
- North arrow
- Preliminary road layout
- Water courses
- Scale bar of sufficient visibility to identify important details
- Legend and definitions of any symbols, abbreviations and / or table headings used
- Any other information as required by the municipal engineer.

Under Seal

The FSR report shall be under seal of a professional engineer registered in the Province of Alberta. All supporting engineering studies shall also be under seal by a professional engineer as required by the Association of Professional Engineers, Geoscientists of Alberta (APEGA).

FSR Report Submission

Three complete copies of the FSR are to be submitted to the Town for review. Upon approval, three copies of the final reports are also required for distribution to the Town. The Town of Carstairs considers the FSR to be a single report, as such all pre submitted sub-reports including Traffic Impact Assessment, Storm Water Drainage Report, Geotechnical Investigation, etc. are to be included in the FSR submission. Any individual report not bound into the FSR will not be considered in the review of the FSR. The submitted FSR must, as a minimum, follow the table of contents shown below.

FSR Table of Contents

List of Figures

Appendices:

1. Background Information

1.1 General

This section will clearly address the following:

- The purpose of the Functional Servicing Report
- The key items to be discussed by the report.

1.2 Study Area

This section will clearly address the following:

- The legal description
- The names of adjacent developments and major landmarks i.e. Highway 2A, golf course, etc.
- Figure 010 – Site Location
  - Clearly showing the area of the FSR relative to the Town
  - Clearly identify the major roadway near the site
  - Using an air photo as the background.

1.3 Land Ownership

This section will clearly address the following:

- A detailed description of the landowner within the FSR boundary including a lands note owned by the developer.

1.4 Historical Investigations

This section will clearly address the following:

- Summarize the findings, if any, of the Historical Resource Overview (HRO)
- Notice of Historical Resource Clearance Letter
- All historical overviews, clearance letters, impact assessments, impact mitigation, construction monitoring, and post – impact assessments shall be attached in Appendix I.
- The Historical Resource Overview (HRO) shall be a comprehensive evaluation of the project area in relation to known and potential cultural resources. This evaluation determines the need for ground survey, or can result in a direct clearance for the project, pending approval from Alberta Culture and Community Spirit.
- Historical Resource Clearance (HRC) clearance for the site area from Alberta Culture and Community Spirit, demonstrates the low potential for impact to cultural resources. In cases where the potential for impact is ambiguous, an HRO may be required to validate an argument for clearance.
- Historical Resource Impact Assessment (HRIA) shall be included if required by Alberta Culture and Community Spirit, and shall include a ground survey of the project area conducted under permit by a qualified professional archaeologist. Through visual inspection and subsurface testing, determination of the location of known and previously unrecorded resources is made in relation to the project area.
- Historical Resource Impact Mitigation (HRIM) shall be included in the cases where avoidance of cultural resources is not possible; excavation of significant archaeological resources is required.

- Construction Monitoring & Post-Impact Assessments shall be attached in cases where development is likely to impact cultural resources which cannot be located through traditional survey and mitigation. Construction monitoring may serve as a solution for meeting Historical Resource Act requirements. If construction monitoring is logistically impractical, a post-impact assessment might be made to investigate both the disturbed and intact portions of cultural resources uncovered by development.

1.5 Environmental Investigations

This section will clearly address the following:

- Approval from under Alberta Environment Water Act and or Alberta Environment EPEA
- Summarize the findings, if any, of the Phase I Environmental Investigations
- Summarize the findings of any follow up environmental investigations
- Summarize the findings of wetland if any
- As a minimum, an Environmental Investigation Phase I will be attached in Appendix II. If other environmental reports are required after the screening of Phase 1 because of environmentally sensitive area (wetlands) on the land in question, or required by the Canadian Environmental Assessment Act, the associated environmental investigation assessments shall also be included in Appendix II. The information will also include a summary of why these reports were completed, and provide the outcomes as they relate to the development of the site.
- As a minimum, Environmental Investigation Phase I shall include:
    - An onsite visual inspection of the property and surrounding properties to assess the general land use and occupants of the area
    - A review of the data regarding the local geology and hydrology
    - An assessment of current land use and practices of the property with particular attention given to assessing if any hazardous material or waste management activities have occurred at the site
    - An assessment of the historic land use and development of the property through an interpretation of fire insurance maps, city directories, and/or aerial photographs of the site and interviews with persons knowledgeable of the site history
    - A review of owner/operator provided documents and records
    - A review of local, provincial, and federal regulatory agency records maintained for the site
    - A written report of all findings including Recognized Environmental Concerns, recommendations, and conclusions.

1.6 Development Constraints

This section will clearly address the following:

- Any man made constraints
- Natural constraints
- Topographical constraints
- Servicing constraints.
- Figure 020 – Study Area
    - clearly show the site boundary
    - clearly identify the major roadway near the site
    - Using an air photo as the background
    - Existing ground contour with a 0.5 m interval
    - Any major constraints such as wetland, treed area, existing building

- Major drainage breaks on the site
- Legal description of the property and the adjacent property.

1.7 Development Approval Currently in Place

This section will clearly address the following:

- Describe the existing zone, existing ASP, etc.

1.8 Approvals

This section will clearly address all the current approvals and required approvals from other regulatory bodies required for development of the land. Including but not limited to the following as required:

- **Alberta Environment Water Act**
- **Alberta Environment EPEA**
- **Alberta transportation Approval**
- **Department of Fisheries and Oceans**
- **NAV Canada**
- **Alberta Culture and Community Spirit**

1.9 Supplemental Reports

This section will clearly address all the supplemental reports developed for the FSR that are attached to the appendices.

1.10 Land Use Plan

This section will clearly address the following:

- The planned land use for the FSR
- Description of the areas and location of single family, multifamily, commercial, and industrial lands
- Figure 030 – Land Use Plan
  - Clearly identify the major roadway near the site
  - Colour blocks identifying different land uses
  - Road network
  - Area of MR, ER and PULs.

1.11 Development Phasing

This section will clearly address the following:

- General description of the developing phasing
- Figure 040 – Development Phasing Plan
  - Clearly identify the major roadway near the site
  - Outline of each phase with the phase number
  - New road network
  - Temporary access if required.

2. Site Grading

2.1 Design Parameters

This section will clearly address the following:

- Natural break point of drainage
- What standard to which grading will be complete
- General description of limits of earth work
- General description of dust and erosion and sediment control measure and standard to be followed.

2.2 Preliminary Earth Balance

This section will clearly address the following:

- Identify any significant earth balance issue
- Staging of earth balance
- Changes in drainage direction.

2.3 Geotechnical Investigation

The geotechnical investigations report shall include the following:

- Description of the subdivision or site development and details about its soil stratigraphy, soil classification including soil logs and geomorphology.
- Bore hole drilling (200 metre maximum spacing grid) program to identify and characterize subsoil stratigraphy.
- Field test results, laboratory test results and a borehole location plan which also includes standard borehole log information which extends to at least three meters below the anticipated foundation or excavation depth.
- For the areas in which the soils will be in contact with concrete, soil sulphate testing of these soils shall be conducted. Type 50 SRC cement shall be used for concrete in contact with the soil.
- In areas where the estimated water table seasonal high is less than 4 metres below the original ground level, a water table contour map showing groundwater elevations at 0.5 metre contour intervals shall be provided.
- In areas where the estimated water table seasonal high is less than 1 metre below original ground level, a hydrogeological study shall be conducted.
- Design criteria and construction methods with regards to groundwater influence on:
  - Slope stability
  - Road base stability
  - Foundations
  - Utility trenches
- Recommendations shall be provided for:
  - How the site shall be graded
  - How the soil shall be stockpiled
  - How the utilities shall be trenched and backfilled

- Roadway materials design and pavement structure for all roadway functional classifications in the proposed development

- Design criteria shall be given for:
  - Foundation design as per Alberta Building Code – Part 9
  - Residential retaining walls
- Where the development has slopes steeper than 15%, a slope stability study shall be conducted.
- Where signs of incipient failure are present in an existing slope, a study detailing the measures taken to stabilise the slope shall be conducted.
- Where embankments higher than 2 metres are to be constructed, a deep fill study shall be conducted.

2.4 Site and Preliminary Road Grades

This section will clearly address the following through Figure 050:

- Existing topographical contours at a minimum of 0.5 m intervals, including contour elevation descriptors
- Geotechnical bore hole location and identification
- Preliminary road layout
- Preliminary single elevation (e.g. 980.1) road grades at intersection, highpoints, and cul-de-sac
- Preliminary road slopes to the tenth of percentage between road points
- Boundary grades
- Locations and heights of any retaining walls that may be required or proposed
- Geotechnical or environmental report setback lines from steep slopes or environmentally sensitive areas
- Major braking point
- Natural existing features including features of interest
- Major drainage system routes
- Water courses
- Identify areas where fill exceed two meters from original strip elevation.

In the event that a ground water elevation is less than 4 metres below original ground levels, an additional Figure 051 will required with the following information:

- Geotechnical bore hole location and identification
- Preliminary road layout
- Geotechnical bore hole locations
- A water table contour map showing groundwater elevations if the water table is less than 4 metres below original ground level
- Natural existing features including features of interest
- Major drainage system routes
- Water courses.

3. Transportation

3.1 Traffic Impact Assessment

All roadway design will conform to the guidelines outlined in the current Geometric Design Standards for Canadian Roads, the Town's Construction and Infrastructure Design Standards, and the Town's Master Servicing Study. The designer shall use best management practices used by Transportation Association of Canada and the process followed by the City of Calgary for Traffic Impact Assessment (TIA) review.

This section will clearly address the following:

- Describe the primary access and roadway
- A summary of the findings of the TIA and recommendations.

The Traffic Impact Assessment plan attached in Appendix VII shall include:

- Project background, development description, study objectives
- Detail on existing surrounding area development, and anticipated area of development
- Existing infrastructure and conditions
- Future road network assumptions including discussion on relevant transportation planning reports, major roadway and site accesses
- Background traffic for current, full build out, and 20 year horizon
- Site traffic trip generation, distribution, and assignment
- Combined background and site traffic volumes
- Capacity analysis methodology including intersection analysis methodology, and synchro guidelines
- Capacity analysis findings for the current year, full build out, and 20 year horizon
- Site specific analysis requested by the Town
- Active modes including pedestrian and bike
- Parking requirements
- Provide a detailed analysis of proposed noise reduction measures for residential areas adjacent to high volume roadways according to the Town's standards.
- Provide a detailed analysis of the roadway access points at adjoining roadways for all arterial and collector intersections according to the Town's standards including traffic control devices, intersection spacing, and capacity analysis.
- Conclusions and recommendations
- Included synchro reports and traffic counts in the appendix of the TIA.

3.2 Road Hierarchy

This section will clearly address the following:

- Describe how the hierarchy for the area was established
- Figure 060 – Road Hierarchy
  - Show outline of roadways
  - Names of boundary roads
  - Colour code road clarification to Town standards
  - Show temporary facilities that are required, if any, to support phasing

- Show access management features for high volume roadways
- Show pedestrian infrastructure such as sidewalks, walkways and trails.

3.3 Access

This section will clearly address the following:

- Describe how access will be accommodated through each phase of development
- Describe the time line of implementing upgrades found in the TIA relating to each phase
- Describe how the access to all commercial, institutional, industrial, multi-unit site and public utility will be accommodated.

3.4 Fencing and Noise Abatement

This section will clearly address the following:

- Any temporary or permanent screen fence
- Noise abatement
- Figure 070 – Proposed Fencing and Noise Abatement
- Clearly identify the major roadway near the site
- Road network
- Noise abatement berm / fence
- Where required, show details of the screening measures and design criteria
- Minor and major collector and arterial roadways
- Show locations of entrance features.

4. Water Distribution

4.1 Background

This section will clearly address the following:

- Description of the location and size of the water main tie in.

4.2 Design Parameters

This section will clearly address the following:

- The water distribution system shall be designed in accordance with recommended standards and the design manual of the American Water Works Association (AWWA), City of Calgary Standards, Town Construction and Infrastructure Design Standards and Alberta Environment requirements.
- All materials used in the development shall be new and in compliance with the most recent standards of AWWA, ASTM, CSA and City of Calgary Standard Specification for Waterworks Construction.
- Design data such as flow demands, peaking factors, friction factors, etc.

4.3 Water Supply

The submission detailing the water distribution system shall describe the design and analysis in sufficient detail using drawings and summaries explaining the overall servicing concept of the subdivision or site development. The submission shall include:

- The water distribution network system analysis shall be attached in Appendix V and shall include:
  - A water distribution network system analysis using WaterCAD® and a report detailing the findings. This analysis determines the pipe sizes required to service the subdivision or site development taking into consideration the following boundary conditions:
    - Pipe sizes
    - Average daily flows
    - Maximum day plus fire flows as per the Town's requirements
    - Maximum hourly flows
    - Pressures
    - Elevations
    - PRV locations

- A water distribution network system Figure 080 – Water Distribution System that shows:
  - The alignment and sizes of the water mains
  - Water valve locations
  - Approximate hydrant locations
  - PVR locations
  - Water pressures at the high water usage nodes
  - Temporary facilities that are required, if any, to support phasing.

4.4 Water Valve and Hydrant Locations

This section will clearly address the following:

- The maximum number of single family lots involved in shut down
- That no more than four valves are required to shut down any line
- Only one hydrant will be shut down with line shut down
- The maximum hydrant spacing does not exceed the latest version of the City of Calgary Standard Specifications Waterworks Construction and or Design Guidelines for Subdivision Servicing
- How the hydrant spacing is measured
- Location of any PRV.

5. Sanitary Sewer Collection

5.1 Background

This section will clearly address the following:

- General description of how the area will be serviced
- Identification of tie-in location and associated area that will flow to this
- Justification for any proposed lift stations.

5.2 Design Parameters

This section will clearly address the following:

- All materials used in the development shall be new and in compliance with most recent standards of AWWA, ASTM, CSA, City of Calgary Standard Specification for Waterworks Construction and Town Construction and Infrastructure Design Standards.
- The design of the sewage collection system for a subdivision shall conform to the Master Servicing Plan as adopted by the Town of Carstairs.
- Summary of key design parameters:
  - Ultimate design population based on ASP calculations
  - Per capita daily sewage flows
  - Commercial / Industrial sewage flows
  - Peaking factor used
  - Infiltration and Inflows
  - Upstream flows
  - Maximum spacing of manholes.

5.3 Sewage Mains

The submission detailing the sanitary sewer system shall describe the design and analysis in sufficient detail using drawings and summaries explaining the overall servicing concept of the subdivision or site development. The submission shall include:

- Summary of the computer model that will be attached in Appendix IV including:
  - Minimum slope of each pipe size
  - Size of pipe used
  - Ultimate capacity of system
  - Upsizing requirements to enable servicing of the area upstream the subdivision or site development
- Projected peak hourly flows of the sanitary sewer trunk mains into the connection points to the existing sanitary sewer system
- Sanitary sewer trunk mains, and if required, lift stations and their corresponding force mains
- The computer model shall be as a minimum a static spreadsheet model that includes to be attached in Appendix IV:
- Sanitary catchment service areas
- Sanitary trunk and main pipe sizes

- Projected system flow capacities per section of pipe
- Sanitary nodes including their inverts and grades between manholes
- I/I allowances used
- A sanitary sewer system Figure 090 that shows:
- Manhole number corresponding to the model
- Manhole locations including Invert elevation
- Pipeline sizes and direction of flow
- Upstream flow allowances
- If required, the lift stations and size of force main
- Temporary facilities that are required, if any, to support phasing
- Other submission requirements and specific design criteria as directed by the Town.

6. Storm Sewer Collection

6.1 Background

Stormwater treatment is a requirement of every development. Best management practices shall be used to reduce pollutants at the source and provide storm water treatment as necessary. Alberta Environmental Protection Storm Water Management Guidelines ~~and~~ , The City of Calgary Stormwater Management & Design Manual and the Town Construction and Infrastructure Design Guidelines shall be followed in all cases where practical.

This section will clearly address the following:

- What standard will be followed
- What model is been used.

6.2 Storm Drainage

This section will clearly address the following:

- General description of the major and minor stormwater systems
- The computer model for the minor pipe system shall be as a minimum a static spreadsheet model included in Appendix IV
    - Storm catchment service areas
    - Storm trunk and main pipe sizes
    - Projected system flow capacities per section of pipe
    - Storm nodes including their inverts and grades between manholes
- Figure 100 – Stormwater Collection System
    - Outline of road network
    - Catchment boundaries along with the area and area identification number used in the model
    - Storm manholes with manhole identification number used in the model
    - Proposed storm sewer and pipe sizes
    - Stormwater management facilities
    - Outlet and tie-in for storm system
    - Minor system table
    - Upstream Node Name
    - Downstream Node Name
    - Area Reference
    - Area (Ha)
    - Conduit Slope
    - Diameter (m)
    - Length (m)
    - Design Full Flow (m^3/s)
    - Max Flow (m^3/s)
    - Max Velocity (m/s)
    - Upstream Invert Elevation
    - Downstream Invert Elevation
    - Max Flow/Design Flow (fraction)

- Figure 110 – Drainage Patterns
  - Outline of Road Network
  - Catchment Boundaries
  - Proposed Storm Sewer
  - Storm Manholes with manhole identification number used in the model
  - Stormwater management facilities
  - Outline of Trap Low Area
  - Major Overland Flow Route
  - Emergency Escape Route
  - Outline of Study Area
  - Outlet and tie-in for storm system.

6.3 Design Parameters

The design of the storm sewer system shall be in accordance with the City of Calgary Stormwater Management and Design Manual, Town Construction and Infrastructure Design Standards and the Town of Carstairs Master Servicing Plan, except as modified herein.

All materials used in the development shall be new and in compliance with most recent standards of AWWA, ASTM, CSA, and City of Calgary Standard Specification for Waterworks Construction.

Planning of the storm drainage of the subdivision or site development shall be in harmony with the master storm drainage plan. Design of the storm drainage system shall consist of an underground conveyance system and an above-ground conveyance system that shall conform to the following:

- Underground storm drainage systems shall be designed to carry the peak flow from a 5-year storm event.
- Peak flow for the underground system shall be determined using the Rational Method Q=CIA where:
  Q = peak flow (m^3/s)
  C = runoff coefficient
  I = rainfall intensity (mm/hr)
  A = sub-catchment area (ha)

- Above-ground storm drainage systems shall be designed to carry the peak flow from a 100-year storm event based on the City of Calgary Intensity-Duration-Frequency (IDF) curve
- Rainfall intensity shall be determined in accordance with the Town of Carstairs Master Servicing Study guidelines
- City of Calgary IDF curves for the 5-year and 100-year storm events
- Pipe sizing shall be determined by utilizing Manning's Formula with an "n" value of at least 0.013 for all pipe materials
- Minimum pipe slopes shall be in accordance with the City of Calgary Design Guidelines. The maximum slope for sanitary sewer will be based on limiting the velocity to 3.0 m/s
- Minimum pipe sizes shall be:
  - 300 mm diameter for storm sewers
  - 300 mm diameter for catch basin leads
- The Town may increase the size of sewer mains, as necessary
- Mains shall be located within the streets, lanes, or utility right-of-ways wherever possible

- Separation of water and sewer lines shall conform to the appropriate Town alignments
- Developers shall refer to the Town of Carstairs Master Servicing Plan to determine allowable storm water discharge rates
- Developers shall refer to the Town of Carstairs Master Servicing Plan to determine the area to which storm water shall be directed
- Surface drainage that may be contaminated from industrial, agricultural, or commercial operations shall not be discharged to the storm sewer
- Upsizing requirements to enable servicing of the area upstream the subdivision or site development.
- The occurrence of trapped lows shall be minimised but clearly identified.

The submission storm water management report shall be included in Appendix VI that addresses the following:

- A stormwater management report of the planned system using the current editions of:
- City of Calgary, "Stormwater Management & Design Manual," Wastewater & Drainage Department
- Alberta Environment:
  - Stormwater Management Guidelines for the Province of Alberta
  - Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems
- Alberta Transportation, Design Guidelines for Erosion and Sediment Control for Highways
- Water Environment Federation & American Society of Civil Engineers, *Design and Construction of Urban Storm Water Management Systems* (ASCE Manuals and Reports of Engineering Practice No. 77, WEF Manual of Practice FD-20)
- American Public Works Association, *Urban Storm Water Management*, Special Report No. 49 (APWA #49)
- Municipal Storm Water Management, Thomas N. Debo, Andrew J. Reese
- United States Department of Transportation:
  - FHWA "Design of Riprap Revetment" – Hydraulic Engineering Circular (HEC) 11
  - FHWA "Hydraulic Design of Energy Dissipators for Culverts and Channels" – Hydraulic Engineering Circular (HEC) 14
  - FHWA "Design of Roadside Channels with Flexible Lining" – Hydraulic Engineering Circular (HEC) 15
  - FHWA "Urban Drainage Design Manual" – Hydraulic Engineering Circular (HEC) 22
  - FHWA "Design Charts for Open-Channel Flow" – Hydraulic Design Series (HDS) 3
  - FHWA "Hydraulic Design of Highway Culverts" – Hydraulic Design Series (HDS) 5
- Standard Practice for the Design and Construction of Flexible Thermoplastic Pipe in the City of Edmonton, 2003.
- Roads and Transportation Association of Canada (RTAC), Drainage Manual, volumes 1 and 2
- American Society of Civil Engineers (ASCE), Standard Practice for Direct Design of Buried Precast Concrete Pipe Using Standard Installations (SIDD), ASCE 15
- Canadian Standards Association (CSA International), CAN/CSA-A257 Series-[M92(R1998)], Standards for Concrete Pipe
- American Society of Testing and Materials (ASTM), Poly Vinyl Chloride (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
- Canadian General Standards Boards, CAN/CGSB-34.9-94, Asbestos-Cement Sewer Pipe
- Model analysis report describing the major and minor system design methodology and summaries of the tables. Program files shall also be included for verification purposes.
- SWMF design.

This section within the report will clearly address the following:

- Minimum pipe size
- Minimum pipe slopes for each pipe size used
- Minimum cover for storm sewer
- Runoff co-efficient value used for the entire development
- Frequency of storm event accommodated by minor drainage system
- Maximum manhole spacing
- Head loss allowance through manholes.

6.4 Major Drainage Event

This section will clearly address the following:

- Summary of the findings of the stormwater master report
- A statement that the major drainage system can accommodate a 1:100 year event, and that emergency escape route and elevation.

6.5 Overall Stormwater Discharge

This section will clearly address the following:

- How the stormwater will be managed during each phase of the development
- Description of the ultimate system.

6.6 Expected Release Rates for Non-Single Detached Sites

This section will clearly address the following:

- Release rate for post developed condition for intuitional area, Multi Family commercial and industrial in table format
- Description of uses
- Area (ha)
- Impermeability (%)
- Allowable release rate (L/s)
- 1:100 year on site storage required (m^3)
- Suggested area for storage.

7. Electrical, Gas and Telecommunications Utility Servicing

7.1 Background

Confirmation is required from all the utility providers that there are no issues that would prohibit the servicing of the subdivision or site development.

7.2 Design Parameters

This section will clearly address the following:

- General description on how electrical service will be provided to the development
- Design parameters to be used in street lighting
- Average illuminance, average minimum ratio, spacing for road type and pedestrian conflict area level
- Figure 120 – Electric Utility Plan(s)
  - Road new road network?
  - Existing plant and infrastructure locations including:
  - Underground electrical distribution lines
  - Overhead electrical distribution lines
  - Proposed plant and major distribution infrastructure locations including
  - Major utility corridors
  - Easement / ROW
  - Identify temporary facilities required to support proposed phasing (if required)
- Figure 130 – Gas Plan(s)
  - Road new road work
  - Existing plant and infrastructure locations including:
  - Oil / gas wells
  - High pressure lines
  - Production and collection lines and plants
  - Overhead electrical distribution lines
  - Proposed plant and distribution infrastructure locations including:
  - Major utility corridors
  - Easement / ROW
  - Identify temporary facilities required to support proposed phasing (if required).

8. Parks Conceptual Landscaping

8.1 Background

Landscape plans are a requirement of every development. The latest version of the City of Calgary Development and Standard Specifications: Landscape Construction shall be followed in all cases practical.

8.2 Site specific concerns

Site specific concerns shall be addressed at various levels of the planning process. From Area Structure Plans to submittal of the landscape drawings.

This section will clearly address the following:

- Proposed and existing trail systems
- Planting and special features
- Figure 140 – Landscaped Areas & Trail Alignment:
  - Road new work
  - Show the landscaping design for the MR, ER, berms, PULs, SWMFs, detention ponds and major UROWs
  - Identify all natural spaces
  - Identify trail layouts
  - Show the park areas and concept used for landscaping and whether the landscape is manicured or non-manicured
  - Show the locations of the irrigation service connections
  - Show the extent of the planting areas
  - Show the locations of the equipment furniture used in the playgrounds
  - Show how access is controlled at the boundaries
- Conceptual Landscaping Plans shall be attached in Appendix VIII.

9. 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, identify the benefiting areas and the degree of benefit thus derived. Maps and tabulations are required to illustrate and document the approach and results.

10. Sustainability

The sustainability section shall include brief descriptions of land use, housing and community design, public space and density.

10.1 Land Use

Does the proposed development add to the diversity of uses within the surrounding neighborhoods such as:

- Housing
- Retail
- Employment
- Civic
- Cultural
- Educational
- Recreational

10.2 Housing

Does the proposed development provide:

- Units with a wide range of pricing options?
- Mix of housing types and sizes?

10.3 Community

10.3.1 Design

How does the proposed development design:

- Demonstrate innovation?
- Incorporate enhanced durability/longevity of construction materials?
- Provide crime prevention through environmental design?

10.3.2 Public Space

How does the proposed development:

- Create or enhance community spaces, such as parks & streets?
- Provide strong connections to adjacent natural features, parks and open spaces?
- Build or improve pedestrian amenities, such as sidewalks and connections to civic, cultural, school and retail/service uses?

10.3.3 Density

How does the proposed development maximize on the number of units/acre?

10.4 Environmental Protection and Enhancement

10.4.1 Lands

How does the proposed development:

- Ensure the protection of designated environmentally sensitive areas?
- Provide for native species habitat restoration/improvement?

10.4.2 Construction/Design

- Does the proposed development utilize LEED for Neighbourhood Development standards or accepted green building best practices?

10.5 Social Equity

How does the proposed development:

- Contain elements of community pride and local character, such as public art?
- Provide affordable space for needed community services?