SECTION 2: GRADING REQUIREMENTS

2.1 REFERENCE STANDARDS

Design details or procedures not specified in this section shall be determined in accordance with the following Reference Standards or as otherwise found applicable and approved by the City of Medicine Hat.

Current editions of:

- City of Medicine Hat Standard Drawings and Standard Specifications
- Alberta Transportation Erosion and Sediment control manual
- City of Calgary Erosion and Sediment control manual
- US Army Corps of Engineers
    - Manuals on erosion and sediment control (HEC series).

In general, the provisions of this section shall govern over the Reference Standards, where there are conflicts. The City may, at it's discretion and in special cases only, issue requirements specific to such special cases derived from other accredited technical resources and published best practices.

2.2 DETAILED DESIGN SUBMISSIONS

2.2.1 GRADING AND EROSION CONTROL PLAN

A detailed erosion control and sediment control plan conforming to the best practices cited above shall be submitted for approval along with any application for the authorization of stripping and grading.

This information may be submitted on separate plans or may be included on the subdivision drainage plan, Subdivision Lot Grading Plan and or an erosion/ sediment control plan.

2.2.2 SUBDIVISION LOT GRADING PLAN

A Subdivision Lot Grading Plan is to be submitted as part of the detailed design drawings set for every development. The requirements for information listed below, are only necessary for residential lots with R-1 and R-2 designation.

All other lots and parcels shall require a site-specific grading plan.

2.2.2.1 GENERAL PLAN INFORMATION

The following information is required on a Subdivision Lot Grading Plan:

- Drawing to a scale of 1:1000,
- Lot numbers, block numbers, street names,
- North arrow,
- Legend and definitions of any symbols, abbreviations and or table headings used,
- Limits of development/ construction,
- Trapped low or depression storage ponding area footprints and top of ponding elevation on streets, lanes, lots and parcels,

- Fully dimensioned extent of flow path of major event runoff along roadways and other overland conveyances where they abut lots and parcels. This flow path is required wherever the runoff depth exceeds the elevation at the abutting property line, and encroaches onto abutting property for the purposes of encumbrance registration.
- Original ground contours and elevations (0.5m intervals),
- Borehole locations and elevation of groundwater,
- Design details for any earth berms proposed within the development,
- Geotechnical report slope setback lines from steep slopes,
- Locations and heights of any retaining walls that may be required or proposed,
- In addition to other requirements the following notes shall be included in bold text:
  - If the bearing surface of any excavation for a building foundation or part thereof is founded on fill, a bearing certificate conforming to City standards, shall be prepared and submitted to the City prior to the construction of such foundation.
  - All Portland cement concrete in contact with soil shall be a Sulphate Resistant type 50 mix with a minimum 56 day compressive strength of XX MPa, as specified in the geotechnical report or deemed adequate for the intended purpose by the design engineer.
  - All foundations shall be provided with weeping tile drain connected to the sanitary sewer, unless a sump pump system or connection to the storm sewer has been approved by the City.
  - A lot grading certificate will be required in all cases for each and every lot.
- Tabulation of Lot & Parcel information,

2.2.2.2 SPECIFIC LOT & PARCEL INFORMATION

The following information is required for every lot & parcel:

- Finished ground elevations at all lot corners and at proposed changes of surface slope along property boundaries,
- Elevations at front and back setbacks on common boundary property lines between adjacent parcels or lots,
- Lot classification by grading/ drainage type in conformance with Section 2.3.1.4,
- Lot drainage direction arrows indicating the direction of surface drainage, particularly along lot flankages and at common boundaries between adjacent parcels or lots,
- Retaining wall requirements due to grade differential between adjacent parcels or lots,
- Symbolic designation (shading or hatching) showing the extent of steep slopes (in excess of 4:1) on lots and parcels, and top of slope and bottom of slope setbacks from these slopes,
- Minimum Building Opening Elevation (MBOE, applies where lots abut trapped lows, depression storage and major event flow paths where the runoff depth exceeds the elevation at the abutting property line). The Minimum Building Opening Elevation shall be a minimum of 300 mm above the higher of:
  - the top of ponding elevation for trapped lows or depression storage, or

- the elevation of the runoff at the highest property corner where runoff depth exceeds the elevation at the abutting property line,

- Lowest Top of Footing elevation (LTF, based upon service inverts),
- Sanitary invert at property line,
- Water pressure reducing valve (if required),
- Water service size (if other than minimum size),
- Water and sanitary sewer services location,
- Proposed driveway location,
- Building envelopes (shading of building envelope will suffice),
- Top of Footing elevation (TF-BC), based upon the lowest undisturbed ground contour within the building envelope, above which elevation a bearing certificate will be required,
- Top of footing elevation, (TF-DF) above which foundation requirements related to deep fills, shall apply. This top of footing elevation will be based upon the lowest undisturbed ground contour within the building envelope and the recommendations and requirements of the subdivision geotechnical report.
- Markings or symbols clearly identifying all lots and parcels that require restrictive covenants or encumbrances regarding:
  - drainage,
  - trapped lows (depression storage),
  - major event flood levels and overland flow pathways,
  - restrictions and prohibitions related to slope stability or

  other such lot-related conditions requiring the registration of such instruments,
- Any other information that may be pertinent to the specific subdivision.

2.2.2.3 TABULATION

LTF, Sanitary invert, finished ground elevations, MBOE, TF-BC, TF-DF, restrictive covenant and encumbrances information shall be presented in a tabular form, as shown below:

Block No.	Lot No.	LTF	Sanitary Invert at property line	MBOE	TF-BC	TF-DF	Required Restrictive Covenant & Encumbrances

2.2.3 APPROVALS

Stripping and grading of the subdivision or site cannot proceed until the developer obtains a written letter of authorization from the Manager Of Engineering Services. A letter of authorization for stripping and grading will not be issued unless a subdivision approval has

first been obtained and an approved functional servicing report or approved preliminary engineering report/plan is in place. A development permit will not be required for such a letter of authorization. A checklist of requirements is as follows:

- Copies of any restrictive covenants, easements, City encumbrances, restrictions and caveats registered on the title,
- A letter of authorization from the registered owner of the land,
- A completed site environmental disclosure statement (standard City form),
- Five (5) copies of a lot grading plan, drainage plan, and or erosion/ sediment control plan incorporating the following, if required:
  - Existing survey control monuments,
  - Loam and dirt stock piles, and dust control provisions
  - Overhead utility lines,
  - Any natural drainage diversions,
  - Stripping and grading on adjacent lands,
  - Plans for the restoration of disturbed areas,
  - Mitigation measures for unstable areas and deep fills,
  - Areas with significant vegetation that is to be removed or protected and retained,
  - An erosion control and sedimentation control report,
  - Litter control and snow fencing provisions.

2.2.4 PLACEMENT AND COMPACTION

Excavation and embankment construction shall be carried out in general conformance with the geotechnical report and the drainage requirements of the Functional Servicing Report. Compaction shall be carried out in a manner that minimizes voids and consolidation settlement by the use of mechanical equipment and adequate watering. Minimum compaction standards shall be:

- Within roadways and under foundation bearing surfaces – minimum of 98% of the maximum Standard Procter Dry Density (MDD) placed at moisture content $\pm$2.0% of optimum.
- Elsewhere - minimum of 95% of the maximum Standard Procter Dry Density (MDD) placed at moisture content $\pm$2.0% of optimum.

Shaping and trimming shall be similarly performed and surfaces finished true to rough grading or finished grading tolerances as applicable.

All surplus materials, free of deleterious materials, litter, garbage (with reusable organic materials stockpiled separately), shall be placed in stockpiles at approved locations, shaped and trimmed to neat lines and be finished with topsoil and seeded to native grass.

All deleterious materials, litter, garbage, waste organics and other waste materials shall be removed offsite for disposal.

All areas requiring restoration shall be finished with topsoil and seeded to native grass.

2.2.5 CONSTRUCTION VERIFICATION

On completion of site grading work the City will require a letter from a qualified Professional Geotechnical Engineer (registered in the Province of Alberta) certifying that the site grading work was completed in accordance with the approved detailed design plans prior to the issuance of a Construction Completion Certificate for stripping and grading.

2.3 LOT GRADING CERTIFICATE

This section outlines the requirements and considerations that apply to the detailed design of grading on individual lots and parcels and the requirements for obtaining approval for a Lot Grading Certificate.

2.3.1.1 LOT GRADING APPROVAL PROCESS FLOWCHART

In accordance with the requirements of the Planning & Building Department.

2.3.1.2 LOT GRADING CERTIFICATION REQUIREMENTS

In accordance with the requirements of the Planning & Building Department.

2.3.1.3 LOT GRADING CERTIFICATION FORMS

In accordance with the requirements of the Planning & Building Department.

2.3.1.4 LOT GRADING CLASSIFICATION

All lots shall be designated with one or two of the following classifications on the Subdivision Lot Grading Plan:

Lot Designation	Description
A	Back to Front Drainage 2 to 3% overall slope
B	Back to Front Drainage 3 to 6% overall slope
C	Back to Front Drainage >6% overall slope
D	Split Drainage
R	Reverse Walkout
S	Bi-level Walkout
W	Full Walkout

These classifications identify each individual lots drainage patterns. Where a lot exhibits a different drainage pattern on each side of the lot, the lot shall be identified as combination lot with a different drainage pattern on each side (i.e. Split drainage / Walkout: e.g. D/W).

2.3.1.5 LOT GRADING DESIGN

The grading design must for the interior portions of a lot conform to the following requirements:

a. A minimum 100mm drop or 5.0% grade over the first 2.0m away from the foundation wall. If the distance between the foundation wall and the nearest lot boundary is

less than 2.0m, the finish grade elevation must be a minimum of 100mm above the design elevation at the lot boundary.

b. Beyond the first 2.0m, the lot is to slope at a 1% minimum and 10% maximum grade to the front, back or sides of the lot.

c. A minimum 1.0% longitudinal slope along sod lined or grassed swales located on the common property line between lots,

A minimum 0.5% longitudinal slope along asphalt and concrete swales or surfaces located on lots.