

**RIVER VALLEY AREA REDEVELOPMENT PLAN**

**FOR  
THE CITY OF LETHBRIDGE**

**By  
LOMBARD NORTH GROUP LIMITED  
REID CROWTHER & PARTNERS LIMITED**

**City of Lethbridge Bylaw 5277**

**Adopted July 26, 2004**



## TABLE OF CONTENTS

	<u>Page No.</u>
<b>TABLE OF CONTENTS</b>	<b>3</b>
<b>LIST OF FIGURES</b>	<b>5</b>
<b>1.0     <u>INTRODUCTION</u></b>	<b>7</b>
1.1       Definitions	7
1.2       Purpose of the Area Redevelopment Plan	13
1.3       Relationship to Existing Statutory Plans and Land Use By-laws	14
1.4       ARP Boundaries	15
<b>2.0     <u>INVENTORY AND ANALYSIS</u></b>	<b>16</b>
2.1       Existing Land Ownership and Use	16
2.1.1     Land Ownership	16
2.1.2     Land Use	17
2.2       Transportation and Utility Services	22
2.2.1     Transportation	22
2.2.2     Services	24
2.3       Policy Background and Development History	26
2.4       Development Issues	28
2.5       Overview of Proposed Land Use	31
2.5.1     Biophysical Inventory	31
2.5.2     Physical Constraints	37
2.5.3     Land Use Capability	38
2.5.4     External Influences	40
<b>3.0     <u>DEVELOPMENT SETBACKS FROM VALLEY WALLS             AND COULEES</u></b>	<b>41</b>
3.1       The 2004 Amendments	42
3.2       Top-of-Bank Setback Development Policies	43
3.3       1986 Development Setback Calculations	46
3.3.1     Top-of-Bank	46
3.3.2     Bottom-of-Slope	48
3.4       The AMEC Findings	50
3.4.1     Translational Slides	50
3.4.2     Bedrock Slides	51
3.5       The New Setback Recommendations	51
3.5.1     New Slope Categories	51
3.5.2     Changes to the ARP Setback Line	52

<b>4.0</b>	<b><u>REDEVELOPMENT PLAN GOALS &amp; OBJECTIVES</u></b>	<b>54</b>
4.1	Goals	54
4.1.1	Public Protection	54
4.1.2	Resource Protection and Enhancement	54
4.1.3	Land Use Management	54
4.2	Objectives	54
4.2.1	Public Protection	54
4.2.2	Resource Protection and Enhancement	55
4.2.3	Land Use Management	55
<b>5.0</b>	<b><u>IMPLEMENTATION</u></b>	<b>56</b>
5.1	Development Control Policies	56
5.1.1	General Policies	56
5.1.2	Public Protection	56
5.1.3	Resource Protection and Enhancement	58
5.1.4	Land Use Management	60
5.1.5	Subdivision	62
5.1.6	Property Development Standards	63
5.2	Redevelopment Levies	66
5.3	Land Acquisition Policy	67
5.4	Development Review Procedure	68
5.5	Land Use Districts	70
5.5.1	C-R Commercial Recreation District	71
5.5.2	DC-V Direct Control Valley District	73
5.5.3	H-L Hazard Lands District	74
5.5.4	P-B Public Building District	77
5.5.5	P-R Park and Recreation District	79
5.5.6	P-T Public Transportation District	80
5.5.7	P-U Public Utilities District	82
5.5.8	UR Urban Reserve District	83
5.6	Consequential Amendments	85
5.6.1	Land Use By-law	85
5.6.2	Statutory Plans	85

## LIST OF FIGURES

<u>Map Number</u>	<u>Following Page Number</u>
1. Study Area	86
2. Land Ownership	86
3. Existing Land Use	86
4. Roads and Utilities	86
5. Vegetation	86
6. Physical Constraints	86
7. Mined Areas	86
8. Land Use Potential	86
9. Land Use Designations	86
10. River Valley Development Setback	52



## **RIVER VALLEY AREA REDEVELOPMENT PLAN**

### **1.0 INTRODUCTION**

#### **1.1 Definitions**

- (1) “Amenity” means an aesthetic or other physical characteristic which enhances the desirability of any natural or man-made environment, and may include such things as landscaping, views or recreational facilities.
- (2) “Approving Authority or Development Approving Authority” means the Municipal Planning Commission of the City of Lethbridge, or the Development Officer, the Planning Director, or City Council as the context requires.
- (3) “Average Annual High Waterline” means a line established based on the mean of past records of the annual high water line.
- (4) “Bottom of Slope” means a point (line) where the general trend of the slope changes from greater than 15 percent to less than 15 percent and remains at less than 15 percent., as determined by airphoto interpretation and/or field survey. The bottom of slope may, but does not necessarily, coincide with the lowermost break-line or topographic discontinuity between the valley wall or coulee slope and the valley bottom.
- (5) “Bottom of Slope Setback Line” means a line, approved by the City of Lethbridge, defining the minimum setback in metres on the valley or coulee floor from the bottom of slope line, providing for property integrity and public safety concerns along the bottom of slope. All development except as specifically allowable pursuant to the policies of this Plan is prohibited between the bottom of slope and setback lines. The distance of the line from the bottom of slope will vary in accordance with approved geotechnical study recommendations.

- (6) “Buffer Strip” means a parcel of land located between two land uses deemed incompatible by the Approving Authority. The buffer strip shall be designed to effectively separate and/or protect one type of land use or development from the other.
- (7) “Coulee” means a water-carved channel, natural drainage course or gully which feeds into a major drainage area.
- (8) “Critical Habitat” means a place which provides a particularly important environment for an organism; for example, coulees are a critical habitat for many plant species.
- (9) “Depth of Valley or Coulee” means the vertical distance between the elevation of the top of bank and the bottom of slope as defined.
- (10) “Design Flood” means the predicted one in one hundred year flood.
- (11) “Designated Flood Risk Area” means that area within a river or stream’s floodplain that is inundated by the design flood.
- (12) “Development” means modifications to the landscape, building modifications, change in use of or intensity of use of land or building as defined in the City of Lethbridge Land Use By-law. However, minor furniture such as benches and picnic tables, and limited landscaping (with no re-grading and no permanent watering required) are exceptions and are not considered to be development.
- (13) “Development Lot Line” means a line, normally established by survey at the applicant’s expense, and acceptable to the Development Approving Authority, which subsequently is registered on a plan of subdivision which determines the extent of development in relation to a top of bank and/or bottom of slope setback line. The development line may coincide with the bottom of slope or the top of bank setback line. The development line except as specifically allowable pursuant to the policies of this Plan shall never lie between the setback line and the top of bank or bottom of slope.
- (14) “Environmental Assessment Analysis” (hereinafter referred to as EAA) means the procedure leading to the detailed statement that:



- (a) identifies the substantive impacts of a development on the natural environment;
  - (b) measures the potential impacts of the development on natural environment; and,
  - (c) evaluates the potential impacts of development on the natural environment.
- (15) “Environmentally Sensitive Land” means those lands upon which development is likely to be subjected to/or cause one or more of the following impacts:
- (a) hazardous land conditions;
  - (b) major cumulative impacts resultant from the occurrence or recurrence of harmful action;
  - (c) degradation of the environment and reduction in natural and ecological diversity; and
  - (d) destruction or severe damage to biotic communities such as tree stands, wetlands, nesting and breeding areas.
- (16) “Erosion Control” means those measures taken to reduce the effects of wind, rain, rivers, ground water, surface water and temperature on soil and rock.
- (17) “Factor of Safety” means the ratio between forces causing slope movement and the forces resisting slope movement. Generally, a Factor of Safety (F.S.) of 1.5 is acceptable for buildings.
- (18) “Flood Control” means the elimination or reduction of the probability and/or extent of flood damage by the construction of flood channels, storage reservoirs, channel improvements, dikes and levees, bypass channels, or other engineering works.
- (19) “Flood Plain Lands” means lands located adjacent to rivers or streams that are subject to floodwater inundation but where the designated flood risk area is undefined.
- (20) “Geotechnical Report on Slope Stability” refers to a special geotechnical study entitled: Geotechnical Report on Slope Stability Aspects of Land Use in Direct Control Zones, Urban Parks Project, Lethbridge, Alberta, as carried out by Hardy Associates in May, 1985 through the City Urban Parks Project Program to determine the minimum top of bank and bottom of slope setback lines required.

- (21) “Hazard Lands” means those lands identified by this Plan as having physical or environmental hazards, including: lands within the designated flood risk area; lands with slopes over 15% and lands characterized by extensive slumping, drainage or erosion problems. Undermined areas are potential hazard lands.
- (22) “High Intensity Recreation Use” means major recreation uses. These major recreation uses are situated on non-environmentally sensitive areas which can accommodate active park use. Development of these lands may include major structures such as sports clubs and interpretive centres.
- (23) “Intensive Land Use” means that either major modification and/or substantial utilization is made of the landscape. Examples would include commercial facilities and major structures such as a golf course clubhouse.
- (24) “Intensive Recreation Facilities” means buildings that are major structural facilities used for recreation purposes, for example sports clubs or interpretive centres.
- (25) “Land in its Natural State” means that the surface cover of the area has retained its basic characteristics and has received little or no modification by man.
- (26) “Low Intensity Agriculture” means the practice of cultivating or seeding the soil for the production of crops or pasture.
- (27) “Low Intensity Recreation Uses” means those recreation uses of limited intensity. Specific use will depend on site characteristics but may include such uses as small shelters, lawn bowling greens, botanical gardens, archery and shooting ranges, sportsfields, tennis courts, nurseries, garden plots, warm-up huts, picnic facilities and ancillary retail.
- (28) “Major Structural Facilities” means those large, non-habitable structures such as restaurants or interpretive centres.
- (29) “Minor Structural Facilities” means those small non-habitable structures such as warm-up huts or small picnic shelters.

- (30) “Overall Slope” means the slope of a straight hypothetical line, running from the bottom of slope to the top of bank.
- (31) “Public Utilities” means a system, works, plant, equipment or service owned and operated by the City or a corporation, under agreement with or franchised from the City or by a corporation licensed under a federal or provincial statute and which furnishes services and facilities to the public and includes but is not limited to:
- (a) production, transmission, delivery of furnishing of water, gas, or electricity to the public at large and includes but is not limited to water reservoirs, water pumping stations, water intake works, electricity transformer stations, or substations, natural gas pump stations, and natural gas exchange stations.
  - (b) communication by way of telephone, television or other means.
  - (c) collection and disposal of sewage, garbage and other wastes and includes but is not limited to sewage lift stations, water treatment plants, storm water detention ponds, storm water pumping stations.
- (32) “Redevelopment Area” refers to all the land contained within the boundaries of the River Valley Area Redevelopment Plan.
- (33) “Resource Extraction” means the development of a site for the purpose of extracting materials such as sand or gravel. Resource extraction shall also include restoration of the site following extraction of the resource material.
- (34) “Restricted Development Area” means those lands within the City of Lethbridge, that the Province of Alberta has placed under legislative protection through Order-in-Council 1371/77, as amended from time to time.
- (35) “River Valley” means the natural channel/s which has/have been formed by a river and its tributaries. This encompasses the river banks or coulees, river terraces of flat alluvial areas deposited by the river, flood plain lands, the river and islands present.

- (36) “Runoff” means that part of precipitation which reaches a stream, drain, sewer or other channel as:
- (a) direct runoff (the total amount of surface runoff and subsurface storm runoff which reaches stream channels) or,
  - (b) indirect runoff.
- (37) “Significant Views” means those locations that offer an opportunity to view an outstanding natural or man-made feature.
- (38) “Steep Slope Segment” means a slope segment of 2 metres or more in vertical height, which exceeds 33 percent, located within an overall slope greater than 15 percent and less than or equal to 33 percent. This definition identifies, for geotechnical purposes, steep sections, which otherwise would be hidden in shallower overall slopes.
- (39) “Storm Drainage System” means those facilities used for conducting storm water through and from a drainage area to the point of final discharge and may include the following features: retention ponds, canals, channels, ditches, streams, ravines, gullies, sloughs, culverts, swales, gutters and pump stations.
- (40) “Survey Monument” means a post, marker, monument, pit or trench or any other thing representing a boundary line, as established by an Alberta Land Surveyor.
- (41) “Top of the Bank” means the point (line) where the general trend of the slope changes from greater than 15 percent to less than 15 percent and remains at less than 15 percent as determined by airphoto interpretation and/or field survey. It may (but does not necessarily) coincide with the uppermost valley break-line or the slope edge defining the most distinct break or topographic discontinuity in the slope between the upper plateau and valley wall or coulee slope.
- (42) “Top of Bank Setback Line” means a line, approved by the Development Approving Authority, defining the minimum setback in metres from the top of the bank line, providing for property integrity and public safety concerns along the top of bank. All development except as specifically allowable pursuant to the policies of this Plan is

- prohibited between the top of bank and the setback lines. The distance of the setback line from the top of bank will vary in accordance with approved geotechnical study recommendations.
- (43) “Trails” means equestrian, bicycle, fitness, hiking and/or walking paths.

## **1.2 Purpose of the Area Redevelopment Plan**

The River Valley Area Redevelopment Plan is intended to provide direction to guide the development of the Oldman River Valley area within the City of Lethbridge. This Area Redevelopment Plan has a unique function in that it does not propose a set land use pattern for the redevelopment area, but rather establishes parameters within which various options may occur. Within this broad framework it is intended that the Plan will provide adequate protection for the river valley and its users. Protection of the river valley resource will be achieved through the development of land use control measures, land use by-law and development guidelines.

The merit in preparing land use controls for that portion of the river valley within the City of Lethbridge is predicated primarily on public safety. In addition, the river valley’s value is recognized both as a significant landform which merits protection and as an area which has some potential for varied intensities of development.

Management of land for future uses in the river valley is a complex issue. As a dominant part of the landscape of Lethbridge, the river valley presents opportunities and imposes constraints that strongly influence development potential.

The existence of an Area Redevelopment Plan (A.R.P) should provide the level of detail necessary to meet the river valley’s particular needs within the framework of the City’s general policies and overall objectives. Clear guidelines will be provided by the A.R.P. concerning land use in the river valley.

### 1.3 Relationship to Existing Statutory Plans and Land Use By-laws

The legislative authority to adopt an Area Redevelopment Plan is embodied in the Planning Act. The Act permits municipalities to designate an area as a redevelopment area for the purposes of all or any of the following:<sup>1</sup>

- Preserving or improving land and buildings in the area;
- Rehabilitating buildings in the area;
- Removing buildings from the area;
- Establishing, improving or relocating public roadways, public utilities or other services in the area;
- Any other development in the area; and

Municipal Councils may also adopt a plan for the redevelopment area to be known as the “name – Area Redevelopment Plan.”

An Area Redevelopment Plan must conform with any statutory plan affecting the area including the General Municipal Plan, any existing Area Structure Plans or Area Redevelopment Plans and the Land Use By-law. If the ARP, as a result of detailed planning, proposes changes inconsistent with the statutory plans, the statutory plans must be amended prior to adoption of the ARP.

City Council’s direction, as stated in the 1980 City of Lethbridge General Municipal Plan policies, is clear:

P-40 “That the City reconfirm its intention, stated previously, to develop the river valley for recreational purposes.”

P-41 “That a review of the policies of the River Valley Development Scheme By-law take the form of an Area Redevelopment Plan or Area Structure Plan, in accordance with the Planning Act of 1977.”

The Area Redevelopment Plan is intended to replace the land use control measures put in place when the River Valley Development Scheme By-law was repealed by City of Lethbridge Land Use By-law 3574. Prior to the repeal of the River Valley Development Scheme By-law, the Province, at the request of the City, established a Restricted Development Area within the river valley. Under R.D.A. regulations, land use changes require final approval by the Minister of the

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<sup>1</sup> R.S.A. 1980 Chapter P.9, Section 65 (a) and (b).

Environment. The Minister may endorse, reject or amend the local approving authority's decision.

The A.R.P., once adopted, is intended to provide sufficient direction and control similar to that now effected by the R.D.A. regulations. As a result the continued need for the R.D.A. legislation in Lethbridge will require careful review.

The 1980 Land Use By-law No. 3574 places most of the river valley in a "Direct Control" district which gives City Council the authority to deal with development applications on their individual merits. Council may also impose such conditions as it deems necessary.

The ARP. is intended to replace the former river valley controls (notably the Direct Control District and the M-3 District of Land Use By-law 3574) with more specific land use districts and, in addition, provide a detailed policy framework for the Approving Authority and in some cases for Council's decision making.

#### **1.4 ARP Boundaries**

The area redevelopment plan applies to those lands within the City boundaries as shown by Figure 1. For interpretation purposes, larger maps (for all of the maps contained in this document) at a scale of 1: 25,000 are available for inspection at the City Planning Department. The area affected by the ARP will be designated as a "redevelopment area." In total, the ownership titles which encompass this area contain approximately 3,700 hectares.

The redevelopment area boundaries include all of the river valley area plus lands extending to the development setback line. The ARP boundaries coincide with the development setback line. Methods of determining the development setback line for new subdivisions or developments are outlined in Sections 3.3, 3.4 and 3.5. These methods were developed either by Hardy Associates in 1985<sup>2</sup> or AMEC Earth & Environmental Limited in 2002.<sup>3</sup>

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<sup>2</sup> The geotechnical overview study results were prepared by Hardy Associates (1978) Ltd. Their report, Geotechnical Report on Slope Stability Aspects of Land Use was submitted in May, 1985.

<sup>3</sup> AMEC Earth & Environmental Limited (2002): City of Lethbridge Phase II Development Setback Assessment, Oldman River Valley Slopes

Existing neighbourhoods in the city contain many properties that would not meet the development setbacks distances recommended by Hardy or AMEC. In these areas the existing rear property line will be considered to be the development setback line.

In addition, future detailed geotechnical studies carried out pursuant to the policies of this plan may modify the redevelopment area boundaries. In those instances where City Council considers it appropriate to modify the boundaries in accordance with an approved site specific geotechnical study, the ARP boundary will be moved to reflect the findings of the said study. The developable area will be deleted from the redevelopment area, or additional non-developable area added to the redevelopment area, by amendment to this Plan.

## **2.0 INVENTORY AND ANALYSIS**

### **2.1 Existing Land Ownership and Use**

#### **2.1.1 Land Ownership**

Ownership of river valley land within City limits is identified by Figure 2 (Existing Ownership). The land has not undergone substantial subdivision except in the areas south of Highway 3 (west of the river) and in Six Mile Coulee.

The types of land ownership within the river valley are summarized in Chart 1. It should be noted that many of the acreages of land titles included in this Plan extend outside of the ARP boundaries.



## CHART 1

### River Valley Land Ownership Within City Boundaries<sup>4</sup>

OWNER	HECTARES	% OF TOTAL
City of Lethbridge	1494.33	40.4
County of Lethbridge	3.50	0.1
Institutional	237.26	6.4
Private	1850.40	50.1
Province	<u>110.05</u>	<u>3.0</u>
	3695.54	100.0

City land ownership dominates the east side of the river valley. Private ownership of land (50 percent of total) is evident on both sides of the river valley. Of special significance for policy development within the redevelopment area are the land parcels which encompass river valley bottom lands, coulees and potentially developable lands adjacent to the top of the bank. These parcels are primarily located on the west side of the river valley. Lethbridge Community College and the University of Lethbridge form the institutional component representing about 6 percent of the lands under review. One 3.5 hectare parcel of land owned by the County of Lethbridge is located on the southern edge of the City boundary. This parcel of land is a dedicated reserve parcel which will be transferred to the City at some time in the future. The final category represented is provincial lands with a large parcel of provincial land on the west side of the river held by Alberta Housing Corporation. It is land banked for the City.

### **2.1.2 Land Use**

A variety of land uses currently exists within the redevelopment area. The location of general land uses is shown by Figure 3 (Existing Land Use). Delineation of specific areas (by legal

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<sup>4</sup> Data is based on the information tabulated in June, 1985. The total hectares shown within the Provincial category do not incorporate the river or island areas. The total hectares shown for each owner are based on ownership boundary lines rather than the ARP boundary.

description) is outlined below. The land use and ownership information identified is based on June, 1985 information. The predominant land uses are recreation and agriculture.

Agricultural Land Use

- Alberta Ltd. 224717 SE ¼ of 21-8-22-W4M
- Carter & Davis Portion of north ½ of LSD 11 and 12 in NW ¼ of 2-9-22-W4M
- City (former Green lands) North ½ of 12-8-22-W4M
- Denecky Bros. All of Section 13-8-22-W4M lying west and north of the Oldman River
- Fekete Portion of NW ¼ of 11-8-22-W4M
- Filatoff LSD 15 and 16 in the NE ¼ of 17-8-21-W4M excepting out of LSD 16 the roadway on Plan 3092 AZ
- Gwatkin Farms Ltd. Portion of LSD 13 in the NW ¼ of 15-8-21-W4M lying south and west of the roadway on Plan 3187K
- Hubbard Section 10-8-22-W4M, that portion of Section 9-8-22-W4M lying east of the Oldman River and that portion of Section 16-8-22-W4M lying east of the Oldman River
- Lethbridge Northern Irrigation District Portion of NW ¼ and NE ¼ of 3-8-22-W4M lying north of the Oldman River
- Melcor Development Ltd. Plan 6439 AA, Blocks A, B, C, D, E excepting those portions of transmission right-of-way within Blocks
- O'Neill Portion of NW ¼ of 16-8-21-W4M
- Sakon Block B, Plan 7810090
- Stasiuk That portion of Section 18-8-21-W4M lying west of the Oldman River
- Stewart Game Farms Ltd. Portion of NE ¼ of 16-8-21-W4M and portion of road allowance in LSD 16
- West Portion of LSD's 3 and 6 in the SW ¼ of 15-8-21-W4M
- Whitney Sand & Gravel Ltd. North ½ of NW ¼ of 17-8-21-W4M

### Industrial and Utility Land Use

- City Sewage Treatment Plant No. 1      Block 2, Plan 197 JK, being in the SE1/4 of 36-8-22-W4M
- City Sewage Treatment Plant No. 2      Being in the south ½ of the SE ¼ of 12-9-22-W4M
- City Power House and Water Treatment Plant      Plan 1120 T, being in the SE ¼ of 36-8-22-W4M
- City Landfill Site      NW ¼ of 7-9-21-W4M
- Lethbridge Cedar Lumber      NW ¼ of 16-8-21-W4M. In addition to the existing manufacturing and warehousing uses, a residence is situated here.
- Lethbridge Concrete Products      Block 4, Plan 3998 HT excepting thereout Street Plan 1474 LK street widening on Plan 3471 JK and Plan 8510728
- Montan Holdings      Lot 1, Block 1, Plan 8310633
- Nord Precast Concrete Ltd.      Portion of SW and SE ¼ of 2-9-22-W4M
- Molson's Companies Ltd.      Lots 2-6, Plan 5786 EM and Part Plan 5597 JK and Part Plan 4353 S

### Sand and Gravel Processing and Extraction of Gravel

- Tollestrup Sand and Gravel Ltd.      Being in the SE ¼ of 11-9-22-W4M

### Institutional Land Use

- German Canadian Club of Lethbridge      Block A, Plan 2821 JK
- Lethbridge Community College      Blocks 1 and 2, Plan 8410811, being in the E½ of 20-8-21-W4M
- University of Lethbridge      Block U, Plan 6927 JK
- Province of Alberta      Portion of Parcel E, Plan 8243 JK, Part of NW ¼ of 6-9-21-W4M
- Province of Alberta      Portion of Block 9, Plan 5374 IC, Part of SW ¼ 6-9-21-W4M
- Green Acres Foundation      Portion of Block H, Plan 8642 HU, Part of NW¼ 31-8-21-W4M

- Sisters of St. Martha           Block 27, Plan 4947 JK, Part of NW ¼ 30-8-21-W4M

Recreational Types of Land Use

- City Galt Museum           Parcel K, Plan 961 JK, being in the NE ¼ of 36-8-22-W4M
- City Indian Battle Park       NW ¼ of 39-8-22-W4M
- City (leased to KOA  
Campground)           W ½ of NE ¼ of 2-9-22-W4M
- City (leased to Lethbridge  
Fish & Game Association)   Portion of SE ¼ of 13-9-22-W4M
- City Nature Reserve &  
Interpretive Centre       Parcel A, Plan 6652 JK, Block H, Plan 53/2, SW ¼ of 1-9-22-  
W4M
- County of Lethbridge       Reserve Parcel 5-R, Plan 766 LK
- Lethbridge Country Club   Portion of SW ¼ of 30-8-21-W4M  
Portion of NE ¼ and SE ¼ of 25-8-22-W4M
- Livingstone Par 3  
Golf Course           Lot A, Plan 410 JK, SE ¼ of 2-9-22-W4M

Lands with Residential Land Use

- Adams                   Portion of the NE ¼ of 16-8-21-W4M
- Asplund               Country residence Block 2, Plan 766 LK included in the NE ¼ of  
11-8-22-W4M
- City (former Gray  
Property)           Has a house on Parcel C, Plan 2596 JK being in the north ½  
of Section 12-9-22-W4M  
A small house straddles the boundary on Parcel C  
5 acre parcel
- Guccione              Country residence Block 4, Plan 766 LK included in the NE ¼ of  
11-8-22-W4M
- Jubber               Portion of LSD's 4, 5 and 12 in NW and SW ¼ of 15-8-22-W4M
- Murray               Block A, Plan 5171, EW
- O'Neill               Portion of LSD 11 in the NW ¼ of 16-8-21-W4M lying east of

Highway 5 on Plan 5510 HX, 6331 JK and north of the road on Plan 7541 JK

- Petherbridge                      Portion of SW ¼ of 21-8-21-W4M lying southwest of the roadway on Plan 4328 JK and east of the roadway on Plan 3092 AZ
- Sherman                            Country residence Block 1, Plan 766 LK included in the NE ¼ of 11-8-22-W4M
- Stasiuk                              Portion of the NW ¼, SE ¼ and SW ¼ of 19-8-21-W4M lying west of the Oldman River includes residence
- Thomson                            Country residence Block 3, Plan 766 LK included in the NE ¼ of 11-8-22-W4M
- Vaselenak                         Portion of NW ¼ and SW ¼ of 11-8-22-W4M residence included

Other Land Use

- Alberta Housing Corp.        E1/2 of Section 24-8-22-W4M
- Bickman                            NE ¼ of 2-9-22-W4M (portion of)
- Trans Alta Utilities Ltd.      Portion of S ½ of 18-9-21-W4M
- City (former City/  
Westview Dev.)                Blocks 22 & 23, Plan 8510052
- City (former Crawford  
Lands)                            Portions of 39-8-22-W4M including North 1/2 of Legal Subdivisions 2 & 3; the NE ¼ of Legal Subdivision 4; those portions of E ½ of 5 and the S ½ of 6 which lie south of the river. Portion of S ½ of S of S ½ of SW ¼ of Legal Subdivision 4
- City (former Pavan)            NW of 19-9-21-W4M  
Portion of NE ¼ of 24-9-22-W4M lying east of Oldman River
- City (former Valley  
Feeders Ltd.)                    NE ¼ of 12 and portion of the North ½ of the SE ¼ of 12-9-22-W4M
- CPR c/o Marathon Realty  
Co. Ltd.                          Portion of NE ¼ of 35-8-22-W4M  
Portion of NW ¼ of 35-8-22-W4M
- Frache                              Portion of SW ¼ of 19-9-21-W4M  
East 1171.5 feet of the North 1864.5 feet
- Guccione                          Block 4, Plan 766 LK included in the NE ¼ of 11-8-22-W4M

- Mackenzie NW ¼ of 20-8-21-W4M
- Michelson Portion of Parcel A, Plan 4353 S
- Nu-Mode Homes Ltd. Portion of S ½ of 7-9-21-W4M
- Rothe Block D in the NE ¼ of 2-9-22-W4M  
Block E in the NW ¼ of 1-9-22-W4M. All in Plan 552 JK.
- Schlicter Lots 18-23, Plan 189 E, Part of SW ¼ 7-9-21-W4M
- Cambridge Western Leasholds Ltd. Block X, Plan 7510750, Part of NE ¼ 36-8-22-W4M and NW ¼ 31-8-21-W4M
- 105960 Enterprises Ltd. Block Z, Plan 7810657, Part of NE ¼ 36-8-22-W4M and NW ¼ 36-8-22-W4M and NW ¼ 29-8-21-W4M
- Henry Gretzinger Holdings Ltd. Lots 12 and 13, Plan 3698 HS Part of SW ¼ 29-8-21-W4M
- Kuijt Lot 4, Block 14, Plan 4847 JK, Part of SW ¼ 29-8-21-W4M
- Seitz Lot 3, Block 14, Plan 4847 JK, Part of SW ¼ of 29-8-21-W4M
- Yean/Yee Portion of Legal Subdivision 12 of 20-8-21-W4M  
Portion of Legal Subdivision 13 of 20-8-21-W4M

## **2.2 Transportation and Utility Services**

### **2.2.1 Transportation**

#### **A. Existing Transportation Routes**

Figure 4 outlines the existing road network in Lethbridge. Highway 3 is the principal access route from areas north, west and east of the City of Lethbridge. It crosses the river valley with a four lane bridge. Whoop-up Drive links West Lethbridge to the downtown by means of a four lane roadway. Scenic Drive is a two-lane bypass route (expanding to four lanes in some locations) which follows the eastern edge of the river valley. Highway 3A links Highways 3

and 25 on the west side of Lethbridge. The extension of 3<sup>rd</sup> Avenue South forms the new main access to Indian Battle Park.

The CPR trestle bridge crosses the river.

Two existing bicycle routes are present. The first route links Henderson Lake to Whoop-up Drive. While this route provides views of the river valley from Whoop-up Drive, no access to the river flood plain area is provided. Secondly, the recent extension of 3<sup>rd</sup> Avenue South into the river valley incorporates a bicycle route to Indian Battle Park and links to West Lethbridge.

#### B. Proposed Transportation Routes

Proposed major roads are outlined by Figure 4.

Crowsnest Trail (Hwy. 3) Construction is now underway for Crowsnest Trail. This four lane route will provide an east-west corridor for traffic through the City as well as supply access to downtown.

North Scenic Drive The section of this route which is south of 9<sup>th</sup> Avenue North will be constructed by late 1985. The section north of 9<sup>th</sup> Avenue is not expected to be constructed as a four lane roadway until the population of the City reaches 100,000.

Chinook Trail The third major river crossing within the City is not expected to be constructed until the population of the city reaches between 76,000+ and 100,000. When constructed, the Chinook Trail will link 24<sup>th</sup> Avenue South to an extension to University Drive.

Railway Relocation The railway relocation scheme, now underway, has diverted two CPR main line tracks north of the existing lines between 13 Street and the trestle bridge. In addition the CPR marshalling yards have been relocated near Coalhurst.

One bicycle route is proposed for access to the Oldman River flood plain area. The route proposed to follow 5<sup>th</sup> Avenue North into the river flood plain area.<sup>5</sup>

Other proposed bicycle routes will link Henderson Lake to Scenic and Whoop-up Drive and finally to Nicholas Sheran Park. The routes noted will form part of an extensive pathway system throughout the city.

### **2.2.2 Services**

Major existing and proposed utilities and utility corridors have been reviewed as to their potential for the redevelopment area. Major service line locations of watermains, sanitary sewer lines and storm sewers are shown on Figure 4. These and other services are described in the text below.

#### **A. Electrical**

Both City Electric and TransAlta Utilities have facilities within the boundaries of the redevelopment area. The major transmission lines will place constraints upon land use. The number and location of power lines indicate that they will pose a particular constraint as they extend laterally along and traverse across the river valley.

The proposed future crossing of Highway 3 by City Electric in the next couple of years should not pose any serious problems, particularly as the new line will be incorporated in the bridge. As well, future feeds from the existing TransAlta Utilities north-south line will be required at some point in the future.

#### **B. Natural Gas**

The high pressure mains are owned by Canadian Western Natural Gas. Gas mains service the water and sewage treatment plants and West Lethbridge. They should not be a major constraint.

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<sup>5</sup> Engineering Directorate, City of Lethbridge, Report on Bicycle Routes in the City of Lethbridge, Feb. 1980



#### C. Telephone

Alberta Government Telephone main lines are generally located beside the roadways, crossing the river at bridges. One main line runs within the valley past Indian Battle Park.

#### D. Watermains

The City of Lethbridge's major water mains include: the recently installed main to North Lethbridge; several connections to the City grid up the coulees; and a river crossing at the water treatment plant. A future water main is planned to cross the river near the Highway 3 bridge. The servicing route in SE Lethbridge lying south of 24<sup>th</sup> Avenue South has not been determined at this time.

#### E. Sanitary Sewer Lines

Main sanitary trunks follow the coulees down to the sewage treatment plants. As well, there is a connection between the two plants and a siphon from North Lethbridge along the same alignment as the water main.

The two main trunks from West Lethbridge join and lead down the coulees crossing the river near the water main.

Future servicing to areas in SE Lethbridge lying south of 24<sup>th</sup> Avenue South will require a sewer parallel to the proposed water main. Other future sewers will be required: along Highway 3 at the river bridge; as a twinning to the West Lethbridge trunk; and as an interconnection between the plants.

#### F. Storm Sewers

There are presently six storm sewers from East Lethbridge and four from West Lethbridge which lead down the coulee and discharge into the river. The twinning of the sewer along Highway 3 is currently underway.

A sewer will be required in the Six Mile Coulee Area. Additional sewers will also be required in West Lethbridge.

### **2.3 Policy Background and Development History**

With development of West Lethbridge, the city grew rapidly in the '70's and this growth generated public interest and support for a comprehensive plan for the river valley, which had become geographically more central to the city.

In 1970 the "River Valley Corridor Recreational Development Plan" was prepared by N.J. Andrew. This study confirmed the potential of the area and the need for a comprehensive approach to planning and development of the river valley. This report formed the basis of the subsequent River Valley Development Scheme By-law.

The "Lethbridge River Valley Development Scheme" (By-law #3255), enacted in 1975, provided the necessary development control procedures to restrict development where necessary and encourage recreation and development.

The 1974 Preliminary Regional Plan and 1964 City of Lethbridge General Plan were reinforced by the Development Scheme By-law #3255. In 1977 the new Planning Act made provisions for the continuation of "development schemes" for a period after the new Planning Act was brought into effect. However, the Development Scheme By-law was repealed in 1980 with the adoption of the new Land Use By-law. Prior to the repeal of the River Valley Development Scheme By-law and to maintain the degree of land use control necessary for public safety and the protection of the river valley resources, the City of Lethbridge requested the Province of Alberta to establish a Restricted Development Area (RDA) under the Department of the Environment Act. The legislation provides for a form of control, administered by the Department of Environment, restricting land use changes in the river valley. The RDA has been in place since 1977. The Oldman River Regional Plan was approved in March, 1985. This ARP complies with the policies of the Regional Plan dealing with river valleys and shorelines.

The need for a River Valley Area Redevelopment Plan was identified in the 1980 General Municipal Plan. The General Municipal Plan also proposed that the City continue to support the development of the river valley as a regional recreation resource.

The 1983 Urban Parks Master Plan outlined a long range plan for the development of recreation activities for the City of Lethbridge. A major portion of the master plan area focused on the Oldman River Valley. While the master plan was not intended to provide the land use protection

and control mechanisms of an Area Redevelopment Plan, important findings of the master plan which are relevant to the area redevelopment plan included the following information:

- The severe geotechnical and flood hazard constraints to development in the river valley;
- The extent and diversity of natural and historic resources in the river valley;
- The fact that only a portion of river valley lands are identified for public park development;
- With the nodal park development proposed for the valley, the critical need for access to recreation facilities and linkages within and to the river valley; and
- The importance of situating only compatible land uses in close proximity to the river valley.

Development within the river valley has remained quite static over the past few years. While existing private land uses remain, pressure for redevelopment has not been as evident as in other cities. The most contentious applications have related to residential development. Residential development proposals have included the Lethbridge Country Club lands and the Stasiuk property. In both situations City Council acted decisively and opposed the residential development proposals.

The most common concerns with respect to development of the toplands and coulees relate to bank stability and the need for a development setback. Natural erosion, potential subsidence from early coal mining, alterations to natural runoff and groundwater patterns, and infilling of the coulees affect bank stability.

Because of the types of soils present, fluctuations in the water table play a significant role in determining bank stability. Since the issue is complex, geotechnical studies are commonly required prior to subdivision approval. The policy of relating subdivision approval to a positive geotechnical study has been generally accepted.

The City has, in recent years, used the Alberta Land Conservation Guidelines as an initial reference for determining appropriate setbacks from the top of the bank and associated coulees in the situation where a site specific geotechnical study has not been performed. In addition, Alberta Environment is involved in the consideration of approvals for applications for development in the

flood plain or near the top of bank areas. Alberta Environment's position with respect to flood plains is on record as:

“strongly advocating that no development of a permanent or intensive nature be allowed on those portions of undeveloped flood plains that have a probability of one or more floods every one hundred years.”<sup>6</sup>

The Province does recognize that in flood plain areas where development has occurred, prohibition of additional development may not be feasible. Consequently “flood plain management is pursued in order to minimize potential flood plain damages.”<sup>7</sup>

Most Alberta planning jurisdictions support the concept that intensive development should be discouraged below the 1:100 year flood line.

#### **2.4 Development Issues**

Much of the river valley has no or limited potential for urban development due to flooding, poor access, constraints on servicing, or steep and unstable valley walls. There are, however, pockets of developable land which generally coincide with the best sites for a variety of land uses.

Major questions arise as to the appropriate type, intensity and extent of development, the need for boundary definition between areas capable of sustaining development and those which cannot, and the determination of appropriate management policies for land use activities.

Access and utility infrastructure will inevitably continue to encroach on the river valley. This will occur through existing facilities such as the water and sewage treatment facilities and the extension of services and facilities both within and across the river valley.

The Oldman River valley, because of its size and depth, dominates the city form. The river valley has three environmentally distinct zones which include the top of bank area, the valley and coulee

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<sup>6</sup> Alberta Environment Water Resource Management Principles for Alberta, October, 1979

<sup>7</sup> Ibid.

slopes, and the base of the river valley, including the flood plain. The vegetative environment varies with exposure and orientation and this in turn affects bank stability, erosion and habitat productivity for wildlife.

The cultural history of the river valley is quite significant in the redevelopment area. Evidence of man's early use can be found at a number of prominent viewpoints along the top of the valley wall as well as in the bottom land below. The original European settlement occurred next to the river itself while most of the early mines evolved as drift mines to work exposed coal seams.<sup>8</sup>

While heritage resources (encompassing any archaeological evidence representing the time period prior to the entry of white men plus any historical evidence representing the time period after the entry of white men) are an extremely important consideration in this river valley, they are not specifically considered within this statutory planning document. Protection of heritage resources must be reviewed under the jurisdiction of the Heritage Resources Act.

There is no doubt that there has been both public support and political will to protect the river valley environment. As outlined earlier, passage of the River Valley Development Scheme By-law in 1975 and imposition of the stricter R.D.A. controls in 1977, at the request of the City, confirm historical support.

Following announcement of the Urban Parks Project three surveys were undertaken to ascertain the views of local citizens towards river valley development. The surveys yielded indications of the public's views regarding appropriate intensities and types of land use. The survey dealt mainly with recreational land use. The general trend in public response indicated the following:

- Support for a variety of limited year round recreational development within the context of a need to preserve and protect the river valley resource.
- Limited opportunities for general commercial development and uses perceived as potentially detrimental to the environment (i.e. motorcycles, all-terrain vehicles).

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<sup>8</sup> Coal mining undermines significant portions of both west and east Lethbridge which may affect the development potential of the lands above. Areas of subsidence, slumps and tailing dumps can be found in various locations.

- Opposition to residential land use.
- Support for improved access into and through the river valley (pedestrian, bicycle trails, facilities for the handicapped, etc.).

Political boundaries do not necessarily respect river valleys so that inter-municipal co-operation becomes an essential component in managing the river valley. The City of Lethbridge and County of Lethbridge are aware of the need for co-operation in managing the river valley resource particularly since each municipality has jurisdiction over opposite banks for substantial portions of the redevelopment area. A Joint General Municipal Plan has been adopted and is applicable to areas of the river valley adjacent to the boundaries of this redevelopment area. As a result, consultation between the two municipalities is ensured when plans for areas included in the Joint General Municipal Plan are considered. Thus an opportunity is provided for the development of compatible land use control policies.

New development will occur on the uplands overlooking the river valley. The issues to be addressed include determination of the appropriate setback (discussed in Chapter 3) and interface with the river valley. Maintaining appropriate access to the valley, ensuring slope stability and the effective handling of stormwater runoff are also concerns.

Considerable erosion damage due to irrigation water run-off from the Lethbridge Northern Irrigation District (LNID) is evident within the southern part of the redevelopment area. Substantial physical and visual impacts have been created by this ongoing problem.

The last major issue to be addressed involves incompatibility between both existing and potential future land uses. Current land uses include existing residences, recreation functions, a gravel processing operation, and the City sewage treatment plants.

## 2.5 Overview of Proposed Land Use<sup>9</sup>

### 2.5.1 **Biophysical Inventory**

The biophysical resources of the study area offer unique natural environment conditions which present both opportunities and constraints for use and development. The biological portion of the inventory primarily considered vegetative cover types, areas of disturbance and the occurrence of wildlife. The inventory of the physical environment included an overview of terrain and geotechnical considerations and the identification of flood plain, river and stream channel locations.

#### Biological Resources

The flood plain and coulee lands support a rich ecological complex that has regional significance in comparison to the surrounding urban and agricultural areas. The study area provides habitat for extensive populations of wildlife including deer, small mammals, waterfowl and other birds.<sup>10</sup> The river valley also provides an important corridor for the movement of wildlife in the region.

#### i) Vegetation

Figure 5, “Vegetation,” illustrates the occurrence of tree cover, tall trees, shrubs, grasslands, cultivated, landscaped or disturbed areas. The major vegetative cover types include:

- a) Cottonwood/Balsam Poplar Community            The Cottonwood/Balsam/Poplar Community is representative of the floodplain zones and creek valleys. Cottonwood also occurs on some of the stable islands in the river channel. These species represent the first stage of plant succession in the valley.

Stands do not regenerate themselves but are replaced by new stands on gravel bars along the river and by stands developing after human disturbance of the soils. The stands are generally healthy, occur in the flood plain, and the understory is dense and well developed. Willows are common along the shore zone where they can become the dominant species.

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<sup>9</sup> Lombard North Group (1980) Urban Parks Master Plan, April, 1983. The Master Plan provided the basis for information concerning the bio-physical resources present in the redevelopment area.

<sup>10</sup> Ibid.

At locations where the canopy is dense, Saskatoon, Snowberry, Buffaloberry, Wildrose, Chokecherry, Silverberry and Red Osier Dogwood occur as the most common shrubs. On open, dry and sunny locations Wild Licorice, Milkweed, Aster and Goldenrod occur. Wild rose and Star-flowered Solomon's Seal are also common within this community.

- b) Open grassland community                      The grassland communities of the south and west facing valley and coulee slopes are different from those of the north and east facing slopes. The south and west facing coulee slopes experience drier conditions and a slightly different community structure than the north and east facing slopes. The most common grasses typical to all slopes include: June Grass, Blue Grama Grass and Spear Grass. On the south and west facing slopes Prickly Pear Cactus and sage occur. Flowering plants including early Yellow Locoweed, Milk Vetches, Moss Phlox, Yellow Umbrella Plant and Butte Marigold are also typical of these slopes. In addition to the aforementioned grasses, isolated patches of Saskatoon, Snowberry, Buffaloberry and Silverberry occur on north and east facing slopes where soil moisture levels and shading are greater. The grasses on the north and east facing slopes also tend to be higher and form a denser ground cover.
- c) Tall shrub community                      Patches of tall, dense shrubbery occur in the coulee drainage areas. In these sites soil moisture levels are higher and soil structure is often better developed than on the upper slopes. All of the above mentioned shrubs occur in these locations.
- d) Wetland community                      The wetland community occurs in zones along the flood plain where standing water prevails throughout most of the year and along the shore. The standing water may be the result of high groundwater, surface runoff, or precipitation collecting in a natural or man-made basin. The zones surrounding the open water are also classified as supporting a wetland community because surface soils are generally saturated through most of the year.
- The zone of open water supports submerged aquatic plants with Cattails, Bulrushes, Sedges and Reeds forming a dense band along the periphery. Willows and young Cottonwood comprise the dominant species along the shallow shore zones. Seasonal



fluctuations in the water level affect the progression of plant material from open water to the tall shrub/cottonwood zone.

- e) Cropland/pasture/landscaped land                      These areas on the flood plain include irrigated cropland, improved pasture, developed parks, golf courses and other landscaped areas. Generally, native vegetation has been removed and replaced with domestic plantings.
- f) Disturbed/developed land                      These areas support little or no vegetation and have been disturbed. Gravel processing areas would be examples under this category.

ii) Wildlife

- a) Ungulates                      Both White-tailed and Mule Deer utilize the Oldman River Corridor extensively within the study area boundaries. The diverse vegetative cover along the flood plain affords good open browse zones in close proximity to heavy tree cover.

Lands are classified by the Canada Land Inventory (which ranks the capability of lands to support wildlife) to be Class 3, i.e. lands having slight limitations to the production of ungulates. The southern part of the study area, following the westerly bend in the river is rated Class 2W or land recognized as important winter range for deer. The Alberta Fish and Wildlife Division recognizes this area as critical habitat for wintering deer populations.

- b) Furbearers and other small mammals                      A number of furbearing animals including the American Badger, Canada Beaver, Great Plains Muskrat, Long-tailed Weasel, Northern Plains Fox, Northern Plains Skunk, Pallid-barred Bobcat and Prairie Coyote, reportedly utilize the study area to varying degrees. Evidence of the Muskrat and Beaver is common along the river banks.

Some of the smaller mammals known to inhabit the study area include: Richardson Ground Squirrel, Richardson Pocket Gopher, White-tailed Prairie Hare, Porcupine, Golden Mantled Marmot, White-footed Mouse, Prairie Harvest Mouse, Gopher and

Drummond Meadow Vole. The dense ground cover along the open upland grass zones provides excellent feeding habitat and cover for many of these species.

- c) Birds            The open grassland areas along the north-facing coulee slopes and upland provide ideal habitat for some ground-nesting birds. Avian predators have been sighted in this zone and hunt over the open grasslands. The low shrubs along the coulee bottoms and in the open areas of the flood plain provide good nesting sites for the Clay Colored Sparrow, Cedar Waxwing, Eastern Kingbird, American Robin and others. Cliff and Bank Swallows are also abundant along the valley walls and coulee slopes where the number of nesting sites is dense and easily recognized. The Cottonwood and Balsam Poplar stands of the flood plain support the most diverse bird life within the study area. The Canada Land Inventory for Waterfowl has rated the river valley as Class 5, or “lands having moderately severe limitations to the production of waterfowl.” The limiting factors identified include a poor distribution of marshes or wetland basins and adverse topography that affects the permanency of wetland basins. The Mallard nests in the area and is found year round. The Canada Goose, Common Tern, Spotted Sandpiper and Ring-billed Gull are noted as being common summer residents. The Canada Goose and Common Merganser also occasionally overwinter in the area.
- d) Fisheries            The stretch of the Oldman River within the study area is a transitional zone for both warm and cold water varieties of fish. The most common cold water sport fish include: Cut-throat Trout, Rainbow Trout, Dolly Varden and Mountain Whitefish. The three major warm water sport fish are: Northern Pike, Walleye and Goldeye. Other species observed include the White Sucker, Longnose Sucker, Sauger, Brook Stickleback, Spoonhead Sculpin, Northern Redhorse, Longnose Dace, Trout Perch and Chub.

## Physical Environment

- i) Relief and Topography

The study area is situated within the Eastern Alberta Plain physiographic division of the Interior Plains (Atlas of Alberta [1969]). The Oldman River Valley is the dominant topographic feature within the study area. The valley is up to 90 m deep and ranges in

width (top of bank to top of bank) from about 1500 m to 2000 m. Slopes are similarly variable, ranging from less than 5 degrees (in the valley bottom and on the prairie), to greater than 40 degrees on the river valley walls.

The coulees are a secondary feature along the river valley slopes. These linear features are up to 2000 m long and 300 m wide. They are generally up to 40 m deep and have slideslopes exceeding 40 degrees in specific locations.

## ii) Bed Geology

Two upper Cretaceous formations, the Oldman and the Bearspaw, are present within the study area. The Bearspaw Formation consists dominantly of marine shales and is the Oldman River Valley walls throughout much of the study area. The Oldman Formation occurs in outcrops along the river valley walls in the southern section of the city. It comprises a sequence of non-marine shales and sandstone, with the presence of coal seams and carbonaceous shales.

## iii) Surficial Geology

The prairie uplands are underlain by glaciolacustrine silts, clays and ground moraine (till), the valley and coulee slopes are discontinuously veneered by colluvium, and alluvial sands with gravels occur in the river valley bottom.

## iv) Surface Drainage and Groundwater

Surficially, the study area is well drained. In general, run-off is either directed, via the coulees, into the Oldman River and its main tributary, Six Mile Coulee, or seeps directly into the ground and recharges the groundwater system.

Hydrogeologically, two apparently distinct groundwater systems are present:

- deep regional flows, occurring within the bedrock, that discharge into the Oldman River valley.
- small, shallow and localized flows, associated within glaciolacustrine and glaciofluvial deposits and pervious zones within the till sequence.

v) Oldman River Flood Plain

The source of the Oldman River is in the Rocky Mountains, west of Lethbridge. The total drainage area is 17,351 square kilometers and includes the Waterton, Belly and St. Mary Rivers. The Oldman River flows south and east to Lethbridge and continues eastward to the confluence of the Bow River northeast of Bow Island. The mean annual total discharge for the Oldman River, calculated over a 66 year period, is 2,860,000 cubic decameters. Maximum discharges generally occur during the month of June and are related to periods of increased precipitation and snowmelt at higher elevations. The monthly mean discharge rate for June is 350 cubic metres per second (m<sup>3</sup>/sec.).

The design flood area has been delineated by Alberta Environment and is shown on Figure 6 for a portion of the area within the Lethbridge City limits. Flood information for the remaining study area is under preparation by Alberta Environment.

The bankfull discharge of the Oldman River is estimated to be approximately 1727 m<sup>3</sup>/sec. through Lethbridge. Annual flooding is more extensive on the western flood plain lands. The recorded floods along the Oldman River are: June 1942 (2,797 m<sup>3</sup>/sec); June 10, 1953 (3,058.2 m<sup>3</sup>/sec), to June 12, 1953 (2,828.8 m<sup>3</sup>/sec); June 1964 (2,089.7 m<sup>3</sup>/sec), and June 1975 (2,823.2 m<sup>3</sup>/sec). Large, historic floods prior to record reportedly occurred in 1897, 1899, 1902, and 1908. Based on these recorded dates, flooding occurs on average during the first week in June. This is concurrent with spring precipitation peaks, snowmelt and runoff.

The course of the river is constantly shifting and bank erosion is very common in the study area.

## 2.5.2 Physical Constraints

The previously discussed terrain and hydrological conditions associated with the Oldman River valley and Six Mile Coulee within the study area present significant hazards to land use and development.

Figure 6, “Physical Constraints” combines data related to flood plain limits, topographic conditions and major slump areas. The steep coulee topography and active flood plain of the Oldman River valley provide hazards that result in significant constraints to conventional urban development. Major slumps are common along the valley walls and development on or near the top or bottom of slopes can cause instability.

The “constraint” zones delineated include the perceived flood plain based on the designated flood risk area. The coulees and associated slopes are also included due to the steepness of slope (15 percent and above), potential instability and relative sensitivity to increased activity. These geotechnical and flood plain constraints are discussed in more detail in Chapter 3.

### Flood Plain Constraints

The “Constraint” zones delineated on Figure 6 include the designated flood risk area as defined by Alberta Environment in 1978. These lands are limited in development potential due to flood hazard. It should be noted that a substantial area of design flood area has not yet been determined by Alberta Environment.

The limits of the design flood area as shown on Figure 6 will be revised when Alberta Environment completes a flood plain study for the study area. Residential, industrial or commercial uses involving structural development and human occupancy would not be consistent with good land use planning practices although these lands in the perceived flood risk area may be suitable for low intensity agriculture or some types of seasonal and/or low intensity recreation land use.

### Undermined Areas

There are locations where old coal workings occur beneath the bank and can cover wide areas. Figure 7 identifies historic areas of old coal workings within the City of Lethbridge. Mining of the coal seams was very important in the past and has significance from a geotechnical point of view. There is abundant evidence in the Lethbridge area that development of geotechnical instabilities may be related to previous mining activity. Several sets of major cracks and at least two slide areas appear to be associated with mining related subsidence.<sup>11</sup>

In determining setbacks, the proponent may be required to determine whether such underground workings exist or not, by reviewing coal mining records, which may be supported by drilling and/or seismic surveys, etc. If the developable area (as defined previously) lies outside the area of old coal workings, the proponent may be required to undertake further geotechnical investigations to determine whether the developable areas should be further restricted as a result of potential future ground subsidence and/or subsidence-related instabilities.

If the proponent wishes to bring the setback closer to the top of bank, the mandatory geotechnical investigation shall take into account the old coal workings and potential problems associated with said workings. Mitigative measures should be taken, where the geotechnical investigation so indicates, to prevent damage by subsidence.

The area of potential subsidence is equal to the neat dimensions of the old workings plus a distance of 0.25 of the depth of mine on all sides of this area.

### **2.5.3 Land Use Capability**

The capability of the redevelopment area to support a variety of land uses is dependent on a number of factors:

- the extent of 1:100 year designated flood risk area,
- topography,

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<sup>11</sup> Hardy Associates (1978) Ltd. Geotechnical Report on Slope Stability, Lethbridge, May, 1985, p.9

- the ability to access and service specific developable areas, and
- the occurrence of existing land uses that present constraints or conflicts to future development.

Figure 8, “Land Use Potential,” illustrates the location of “Potential Development Cells” and other areas with limited or no capability for development. The analysis utilized the above noted factors to determine the relative developability. These potential development cells include existing facilities such as the Fort Whoop-up replica in Indian Battle Park, the Helen Schuler Coulee Centre in the Nature Reserve, and the City Water Treatment Plant. The potential development cells are outside the designated flood risk area and the terrain hazard and setback zone. In addition, the potential development cells could be accessed by road. These areas are recognized as being capable of supporting relatively intensive land uses with associated major structural facilities. Figure 8 identifies the boundaries of certain of the Potential Development Cells as being subject to revision when flood plain studies are completed.

Lands within the “Limited Development Potential” zones may support only limited or seasonal use. Insufficient means of potential access presents a major obstacle to development. Terrain and flood hazards will, for the most part, limit structural development. Agriculture or parks are possible uses for lands in the active flood plain. Consideration may be given to land use classifications allowing for moderate levels of development and use where good access and services are available and other considerations related to hazards can be met. Steep coulee terrain will only support the most limited uses.

The Area Redevelopment Plan policies for the River Valley will be further influenced by:

- the ability to provide services to specific areas,
- the size of individual development units and their potential viability for a given land use, and
- the relationship to surrounding development and growth areas.

#### **2.5.4 External Influences**

Adjacent land can have a significant impact on the river valley. Generally the high proportion of residential development above the river bank provides a complementary land use particularly to the recreation areas in the river valley. The institutional uses, including the University of Lethbridge and Lethbridge Community College, extend beyond the top of bank area. Most of their land now remains as open space.

The Central Business District and Railway Redevelopment Area are key linkages to the river valley. Proposed uses within the former railway yards include commercial and high density residential.

A substantial amount of land located above the west bank has not yet been developed for urban uses. Developable lands will potentially be used for residential and industrial purposes. This includes land held by Alberta Housing, private owners and the City of Lethbridge.

Developed industrial land uses adjacent to the redevelopment area are located east of the river valley. The industrial sites located near the edge of the river valley create a visual impact on adjacent areas within the river valley.



### **3. DEVELOPMENT SETBACKS FROM VALLEY WALLS AND COULEES**

Development is not allowed on the river valley walls or on coulee slopes that may be at risk of failing. Certain types of development are allowed on the river valley bottom, but must be set back from the bottom of the slopes to ensure that they are not affected by possible slope failures. Likewise, development above the river valley must be set back specified distances. Development setbacks are intended to prevent development-induced slope failures and to protect development from slope failures, natural or otherwise.

The Geotechnical Report on Slope Stability prepared for the City by Hardy Associates in 1985 recommended that development setback policies and standards be adopted to reduce or eliminate the following triggering mechanisms that tend to initiate new and/or renew unstable slope conditions.

- i) a rise in groundwater levels (and associated increase in pore pressure), due to watering of lawns, leakage from services, and irrigation;
- ii) placement of fill along the top-of-bank
- iii) discharge of runoff or irrigation water directly onto the slope (frequently into coulees).

Setbacks from the top or bottom of a potentially unstable slope would also provide passive protection for properties in the developed zone, as well as a means of access if corrective or remedial works are required.

The recommendations from the Hardy report led to the development setback requirements established in the 1986 River Valley Area Redevelopment Plan (discussed in Section 3.3). The setback policies and distance calculation methods laid out in the 1986 plan remained intact until 2004, when they were expanded upon and revised in an amendment to the plan.

In the past development setback distances tried to ensure a certain “Factor of Safety.” This Factor of Safety was expressed as a ratio between the forces causing slope movement and the forces resisting slope movement. The policies in the 1986 plan tried to ensure a Factory of Safety (FS) of 1.5 at the property line. In other words, at the property line the forces resisting slope failure had to be 1.5 times as great as those that would cause slope failure.

A development setback line from the top-of-bank was plotted for the entire city, based on the calculations described in Section 3.3. Development could not occur below this line unless an approved site-specific geotechnical investigation could demonstrate that the entire slope below the property was stable, and that the Factor of Safety from both shallow and deep-seated failures was greater than 1.5.

### **3.1 The 2004 Amendments**

The 1986 plan outlined setback distance requirements based on the vertical height and angle of the slopes above or below a proposed development. These setbacks were designed to protect against a specific type of slope failure – *rotational failure in the clay strata above bedrock*. Geotechnical work done up until that time had identified rotational failures, when triggered by groundwater seepage associated with upland development, as the predominant failure mode presenting a risk to development.

Significant slope failures occurred in the 1990's in Stafford Coulee and behind Tudor Estates. Investigations and stability assessments done between 1996 and 2000 by EBA Engineering concluded that these failures were of a different type. These failures were identified as *translational (block) movements along a horizontal plane in a thin clay layer*. This thin clay layer is located at the top of an inter-till deposit called the "Lenzie silts." This discovery led to concern that low shear strength could be mobilized along this clay layer, resulting in slope failures extending beyond the RVARP development limits.

This concern led to an extensive two-part slope stability study by the consulting firm AMEC Earth & Environmental Limited. Phase 1 of the AMEC study indicated that Lenzie deposits might be widespread throughout the city, and that indeed slope failures along the inter-till clay could ultimately lead to failures beyond the RVARP limits. The Phase 1 report recommended that the setback guidelines be revised to account for this type of slope failure. Phase 2 of the AMEC report, submitted to the City in November 2002, identified three slope categories and outlined policies and calculation methods for safe setback distances from both shallow failures above the Lenzie deposits and deep-seated failures caused by bedrock instability. The AMEC report recommended that both the old methods from the 1986 ARP and the new methods be used to calculate setback distances, and the larger or more conservative setback applied. AMEC also

replotted the top-of-bank setback line for the entire 113 kilometres of top-of-bank in the city, using a combination of the two methods.

This entire section of the ARP was revised in 2004 to recognize the new setback line, to include AMEC's policy and setback distance calculation recommendations, and to help implement top-of-bank setback policies from the Municipal Development Plan, adopted by Council in 1995. Some of the policies from the 1986 plan have been revised, others remain intact, and several new ones have been added. Bottom-of-slope setbacks will continue to be governed by the 1986 policies.

The new setback calculations provide greater protection than simply meeting the 1.5 Factor of Safety. The 1.5 FS tries to protect against a single failure. The AMEC study however found that failures can occur progressively, leading to a loss of property greater than that which might be calculated on a single failure basis. The new calculations and setback lines are designed to protect against progressive failures and ultimate slope regression.

The new top-of-bank development setback policies are outlined in Section 3.2. Section 3.3 outlines both the top-of-bank and bottom-of-slope calculation methods and policies from the 1986 plan. The AMEC study findings are discussed in Section 3.4, and Section 3.5 outlines the new calculation assumptions and methods and discusses how these affect the setback line established in the 1986 plan.

## **3.2 Top-of- Bank Development Setback Policies**

### ***Setback Requirements***

- 1) Development must be set back from the river valley walls and coulees, to protect against all types of possible slope failures. Sections 3.3, 3.4 and 3.5 outline setback calculation methods for the different types of slope failures that have occurred in Lethbridge. Depending on the type of possible slope failure, and thus the setback calculation method used, a setback could be from bedrock, from the Lenzie deposit, or from the surveyed top-of-bank. (The top-of-bank is defined as the point where the general trend of a slope changes from greater than 15 percent to less than 15 percent and remains at less than 15 percent.)

- 2) Setback distances for new developments will be established by geotechnical evaluation which takes into account the setback recommendations outlined in Sections 3.3, 3.4 and 3.5 below.

***Development Setback and Rear Property Lines in New Areas***

- 3) On lands that are the subject of a subdivision application, the safe development setback line, established by a geotechnical evaluation, will become the rear property line.

***Establishing the Development Setback Line for Individual Properties***

- 4) There may be situations where a developer feels the setbacks recommended in Sections 3.3, 3.4 and 3.5 are excessive, and wishes to develop closer to the river valley. The City may approve development closer to the river valley on the condition that the developer submit, at his cost, an acceptable site-specific geotechnical analysis which demonstrates that the setback requirements outlined in Sections 3.3, 3.4 and 3.5 are not applicable to that particular piece of land.
- 5) A preliminary assessment and/or map outlining the geotechnical top-of-bank, setback and development lot lines will be required at the time of application for approval of tentative plan of subdivision. These lines shall be defined by legal survey, at the developer's cost, prior to final endorsement of the plan of subdivision.

***Environmental and Municipal Reserve***

- 6) All land below the rear property/development setback line will be dedicated to the City as ER (Environmental Reserve) as a condition of subdivision approval.
- 7) A four metre wide strip will be required for provision of continuous trails along the top of the bank. (These top-of-bank trails will also provide access to trails which descend into the valley). If the land is deemed to be flat enough this four metre strip can be within the setback zone, on ER lands.
- 8) If the setback zone is not flat enough for trail development, part or all of the land required for the top-of-bank trails will come from land above the setback zone. Any lands required

for trails above the ER lands will be purchased by the City or dedicated as part of the subdivision approval's 10% MR (Municipal Reserve) requirement.

***Access to Top-of-Bank Trails***

- 9) Outline plans for lands adjacent to the river valley must show access points to the top-of-bank trails from public roadways and other trails in the neighbourhood. Access to these trails must be considered sufficient before the City will approve the outline plan.

***Development Not Requiring a Subdivision***

- 10) In situations where a development or rezoning application adjacent to the river valley does not involve a subdivision of the property, a geotechnical evaluation is required to establish top-of-bank and safe setback lines.

***Easements for Trails***

- 11) Where ER has not been taken a four metre easement will be registered against the property title to allow for construction of a top-of-bank trail.

***Land Acquisitions other than Environmental Reserve***

- 12) There may be situations where the City will acquire lands at risk by means other than the dedication of Environmental Reserve through the subdivision process.

***Minimum Top-of-Bank Setback***

- 13) The minimum setback above slopes greater than 15 percent is 6 metres from the top-of-bank. This is to protect the crest from shallow failures, and to help provide land for trail construction. This requirement will not be waived by the City.

***Development in the Setback Zone***

- 14) In areas where the setback is a specified distance from the top-of-bank development will not be allowed within the setback zone. Trails, benches, storm drainage swales and minor landscaping (i.e. minor fills less than 0.5m) may be permitted. Corrective or remedial works can occur within the setback zone.

### ***The Development Setback Line in Existing Neighbourhoods***

- 15) Existing neighbourhoods in the city contain many properties that would not meet the development setback distance requirements for new areas. In these areas the existing rear property line will be considered to be the development setback line.

### **3.3 1986 Development Setback Calculations**

The setback distance calculations in the 1986 plan are based on the angle and vertical height of a slope. Generally the steeper the slope and greater the vertical height the greater the setback distance required. The 1986 plan established three slope categories based on angle and established setback criteria for each. Slopes under 15 percent require no setback, while slopes greater than 33 percent are considered to be steep slopes, posing risk of both deep and shallow-seated failures. Where steep slope segments intercept gentler slopes the segment is treated as a steep slope.

The top-of-bank and bottom-of-slope policies and calculations for each of the three slope categories are outlined below.

#### ***3.3.1 Top-of-Bank***

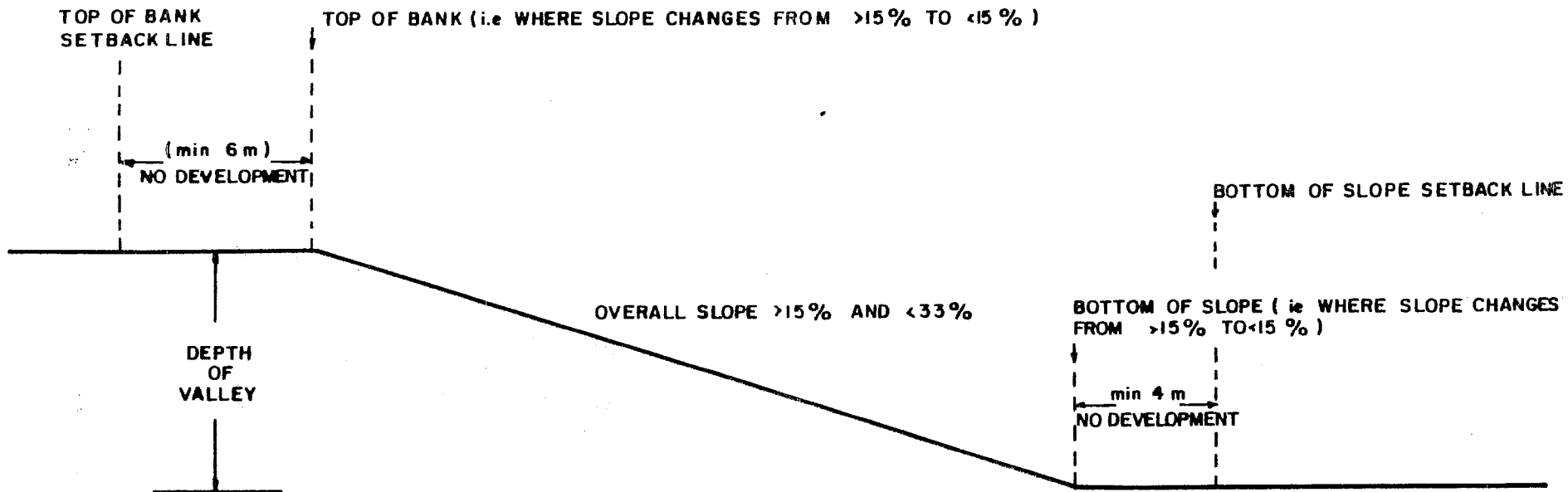
##### *a) Slope less than 15 percent*

Where the overall slope is less than or equal to 15 percent (8.5 degrees), and where no slope segment greater than 15 percent and over 2m in vertical height exists, there shall be no requirements for a top-of-bank setback.

Where a slope segment exists greater than 15 percent and greater than 2m in vertical height, it shall be treated as a separate slope and the relevant parameters applied accordingly.

##### *b) Slope between 15 and 33 percent (see Chart 2)*

Both shallow and deep-seated failures are possible on slopes between 15 and 33 percent (18 degrees) with no steep (greater than 33 percent) segments of over 2m in vertical heights. The setback policy for these slopes tries to protect against both shallow and deep-seated failures.



Case A Where overall slope exceeds 15% but is less than 33% (No steep slope segments exceeding 33% exist)

Top of Bank Setback = (linear scale factor based on overall slope) × (Depth of Valley)

Bottom of Slope Setback = 50% of Top of Bank Setback or 4 metres whichever is greater

NOT TO SCALE



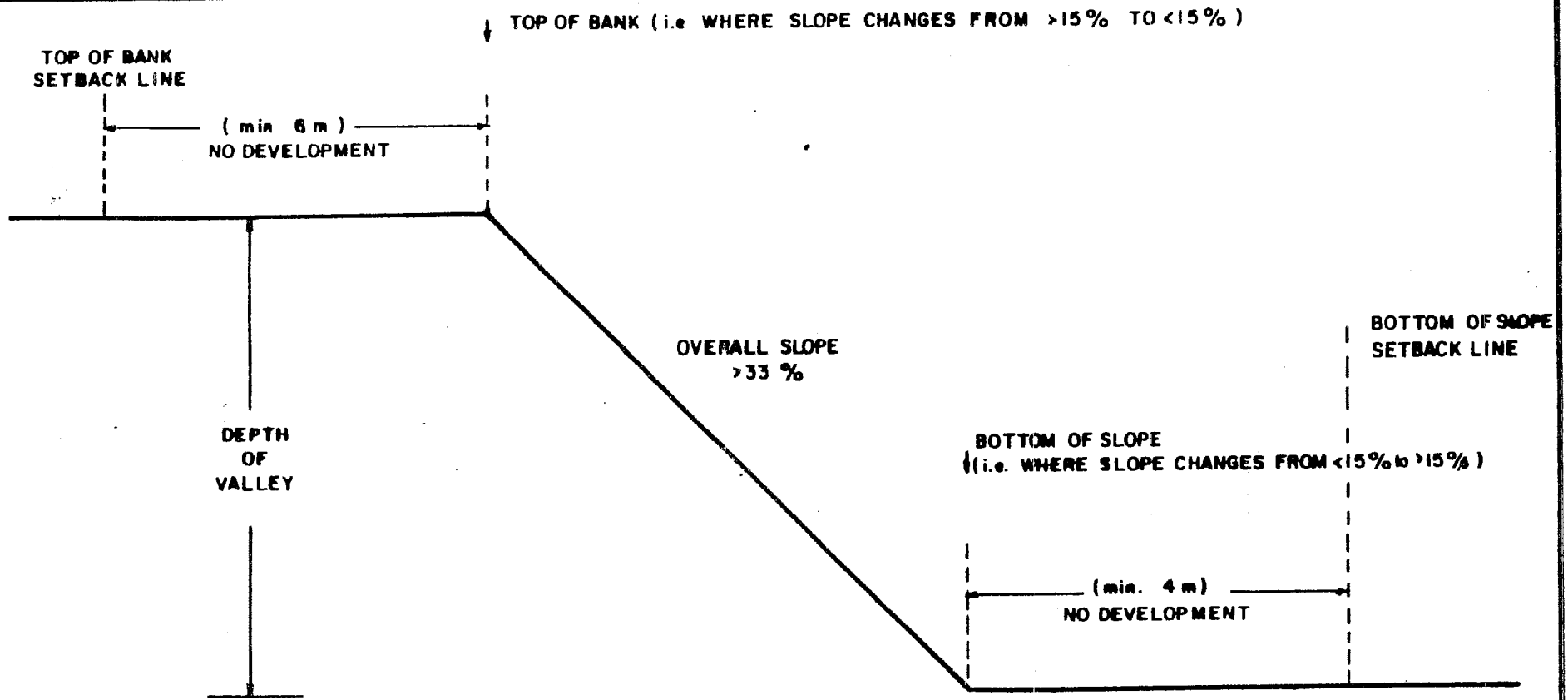
**HARDY ASSOCIATES (1978) LTD.**  
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

**URBAN PARK PROJECT  
SETBACK POLICY (CASE A)**

CG10190

CHART 2

HT84-8203



Case D Where overall slope exceeds 33%

Top of Bank Set back =  $(1.25) \times (\text{Depth of Valley})$

Bottom of Slope Set back = Top of Bank Setback (excluding the minimum setback criteria)

NOT TO SCALE



**HARDY ASSOCIATES (1978) LTD.**  
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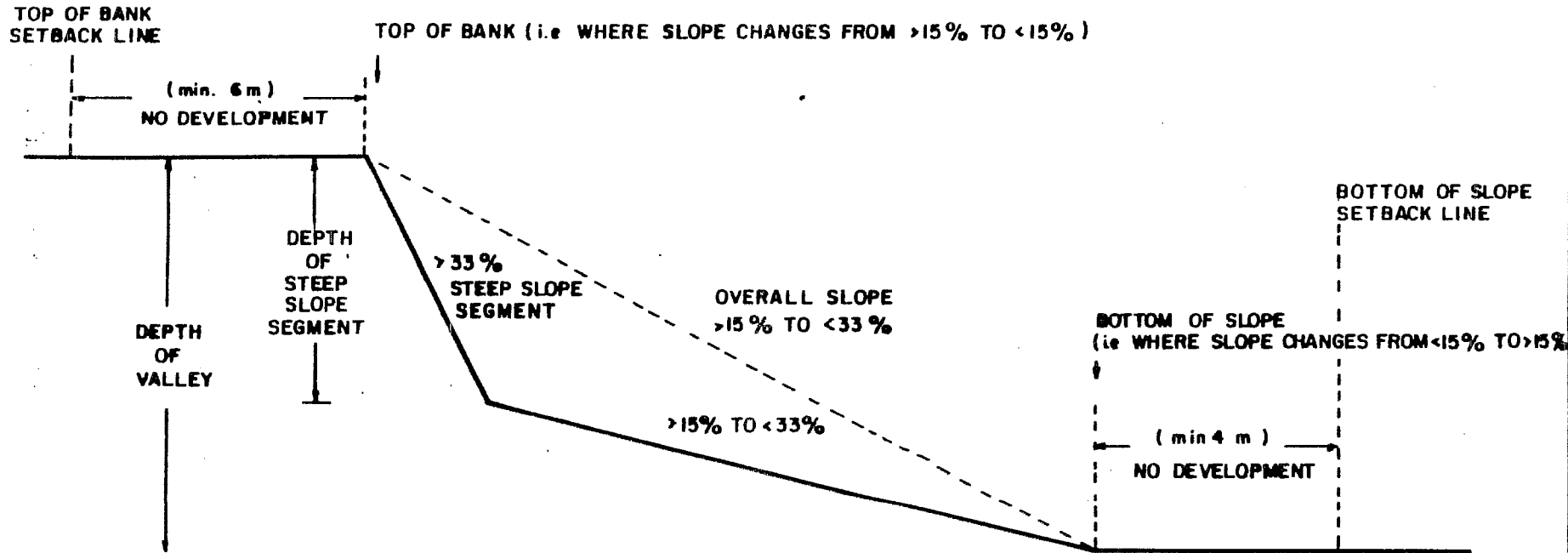
**URBAN PARK PROJECT  
SETBACK POLICY (CASE D)**

CG10190

CHART 3

HT84-8203





Case B Where overall slope is >15% and <33% but a steep slope segment exceeds 33% and intercepts overall slope

Top of Bank Set back =  $(1.25) \times (\text{Depth of Slope Segment})$

Or.

$(\text{Linear scale factor based on Overall Slope}) \times (\text{Depth of Valley}).$

Whichever is greater.

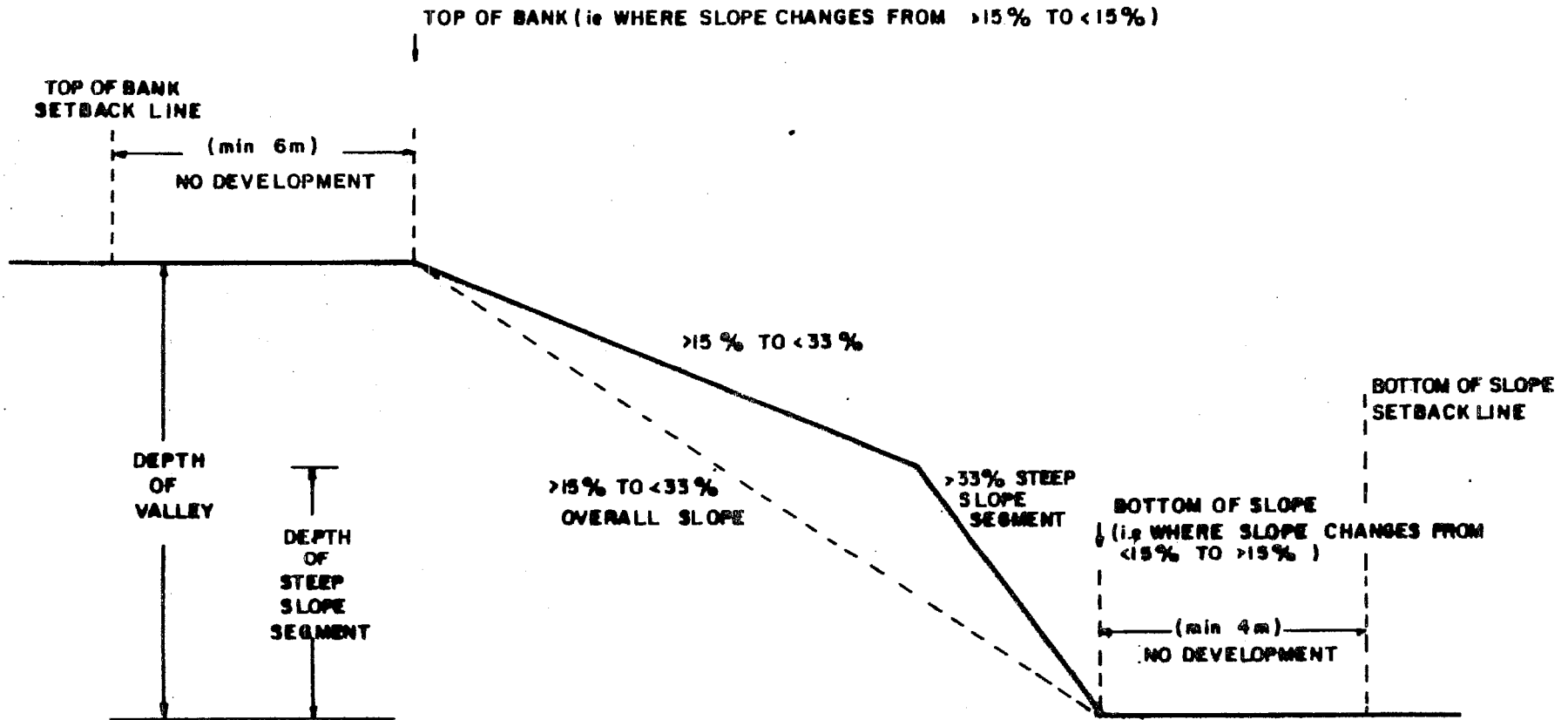
Bottom of Slope Set back = 50% at Top of Bank Set back or 4 metres whichever is greater

NOT TO SCALE



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CONSULTING ENGINEERING & PROFESSIONAL SERVICES

**URBAN PARK PROJECT  
SETBACK POLICY (CASE B)**



Case C Where overall slope is  $> 15\%$  and  $< 33\%$  but a steep slope segment exceeds  $33\%$  and intercepts the overall slope

Top of Bank Set back = (linear scale factor based on overall slope)  $\times$  (Depth of Valley)

Bottom of Slope Set back =  $(1.25) \times$  (Depth of steep Slope Segment)

Or

(50% of Top of Bank Set back)

Whichever is greater.

NOT TO SCALE



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**URBAN PARK PROJECT  
SETBACK POLICY (CASE C)**

CG10190

CHART 5

Setback distances increase as the overall slope increases. A slope of 30%, for example, would require a setback distance greater than the depth of the valley, while a slope of 20% would require a setback of just over one-third of the valley depth.

The setback is determined by multiplying the depth of valley or coulee by a setback factor. The setback factor is based on the angle of the slope. It ranges from 0 for a 15 percent slope to 1.25 for a slope 33 percent or greater. Thus if the valley was 90m deep, and the overall slope was 33%, the setback would be  $90 * 1.25 = 112.5$  metres.

The setback factor is calculated by subtracting 15 percent from the overall slope angle and multiplying by 1.25/18 (or .07). Assuming again a 90 m depth, calculations for 20% and 30% slopes would be as follows.

Overall slope of 20%

Slope calculation	$20\% - 15\% = 5\%$
Setback factor	$5 * .07 = .35$
Setback distance	$\text{Depth} * \text{Setback Factor} = 90 * .35 = 31.5$ metres

Overall slope of 30%

Slope calculation	$30\% - 15\% = 15\%$
Setback factor	$15 * .07 = 1.05$
Setback distance	$\text{Depth} * \text{Setback Factor} = 90 * 1.05 = 94.5$ metres

c) *Slope Greater than 33 Percent* (see Charts 3 & 4)

Where the overall slope or a slope segment of 2m or more in vertical height exceeds 33 percent (18 degrees), the possibility exists for deep-seated failures to occur. Where the slope exceeds 33 percent, the required setback shall be 1.25 times the depth of the valley or coulee.

Where an overall slope of between 15 and 33 percent is intercepted by a steep slope segment over 2m in vertical height, the required setback is the greater of:

- 1.25 times the depth of the steep slope segment, or
- the setback factor for the overall slope times the depth of the valley or coulee

### *Minimum Setback*

The minimum setback on slopes over 15 percent is 6m. This is to protect the crest from shallow failures. If however an approved site-specific geotechnical investigation indicates that the entire slope is stable (i.e.  $FS > 1.5$ ), the setback can be waived by the City. Geotechnical investigations must take into account both existing conditions and how they might be affected by future development.

### *Corrective Engineering Work*

A proponent may bring the setback to the 6m minimum line if the FS is less than 1.5, provided he has corrective engineering work done as specified by a qualified geotechnical engineer. The corrective work shall bring the FS to 1.5 or greater. Then a geotechnical engineer will certify that all the mitigative measures have taken place and were properly carried out before development begins, unless the mitigation measures are a component of the building process, in which case mitigative measures will be certified during construction.

### **3.3.2 Bottom-of-Slope**

Bottom-of-slope setbacks are required to protect development in the river bottom and to ensure access in case corrective or remedial works are required.

The bottom-of-slope policies and calculations are similar to and in some cases based on the top-of-bank policies and setbacks. The same three slope categories are used. Generally the bottom-of-slope setback distances are less than those for top-of-bank. In cases where the top-of-bank setback is used to determine the bottom-of-slope setback, the top-of-bank setback used will be that determined before any changes to the line resulting from geotechnical investigations or remedial work.

Bottom-of-slope is also defined as the point where the general trend of the slope changes from greater than 15 percent to less than 15 percent and remains less than 15 percent.

a) *Slope less than 15 percent*

As with the top-of-bank, where the overall slope is less than or equal to 15 percent and there are no slope segments greater than 15 percent and over 2m in vertical height, there is no requirement for a bottom-of-slope setback. Any slope segment greater than 15 percent and over 2m in height is treated as a separate slope and the relevant parameters applied accordingly.

b) *Slope greater than 15 percent but less than 33 percent*

On an overall slope between 15 and 33 percent that is not intercepted by a steep slope segment with a vertical height of 2m or more, the bottom-of-slope setback will be equal to 50 percent of the top-of-bank setback or 4m, whichever is greater.

c) *Slope greater than 33 percent* (see Chart 5)

Where the overall slope exceeds 33 percent the bottom-of-slope setback is equal to the top-of-bank setback before any modifications resulting from geotechnical investigation or remedial work.

Where an overall slope between 15 and 33 percent is intercepted by a steep slope segment over 2m in vertical height, the bottom-of-slope setback shall be either:

- 1.25 times the depth of the steep slope segment, or
- 50% of the top-of-bank setback, whichever is greater

*Minimum Setback*

The bottom-of-slope setback will always be a minimum of 4m to permit access for maintenance of the slope. This requirement can be waived by the City however if a geotechnical analysis proves the factor of safety for the overall slope and any slope segment is 1.5 or greater for both shallow and deep-seated failures. Geotechnical investigations must take into account both existing conditions and how they might be affected by future development.

### **3.4 The AMEC Findings**

#### ***3.4.1 Translational Slides***

Phase 2 of the AMEC study confirmed that translational block slides along a horizontal plane in a clay layer at the top of the Lenzie Silts do indeed pose a widespread risk. AMEC found 179 translational slides as large or larger than the Stafford Coulee and Tudor Estates slides within the city or 5 kilometres of the city. AMEC also concluded that this threat is not completely mitigated by the setback guidelines in the 1986 River Valley ARP.

Translational slides above the Lenzie deposits are triggered by elevated soil moisture – from upland irrigation, urban development or natural sources. The coulee slopes have steep natural inclines because subsoil conditions are relatively dry. When wet the clay layers in the Lenzie unit lose strength, and failures occur.

Translational slides occur in a series of episodes over time, with the coulee slope gradually falling back to its ultimate long term angle. Examination of older slopes that have already been through this process of slope evolution (approximately half of those identified) and reached their long term angle helped in establishing a framework for setbacks.

Slope inclinations of older failure features ranged from 2.5 Horizontal:1 Vertical (2.5H:1V) to as flat as 4H:1V. 4H:1V was determined to be an appropriate conservative inclination for long term evolution of the coulee slopes along the Lenzie unit. The lower-bound slope inclination of 4H:1V was therefore incorporated into the setback guidelines for coulee slopes.

The amount of top-of-bank land lost during a translational slope failure is determined by the slope angle and the vertical location of the Lenzie layer. A steeper slope and a lower Lenzie unit will each contribute to a greater slide and to more top-of-bank land being eroded. Thus the lower down the slope the Lenzie unit is located, the greater the development setback distance required. The recommended setback mechanism ensures an adequate setback distance by drawing a line from the Lenzie layer to the table land at a 4H:1V slope.

### 3.4.2 *Bedrock Slides*

AMEC also found 72 larger scale landslides based in the clay shale bedrock in the lower part of the valley. This bedrock contact is generally below the level of most coulees, so bedrock instability is generally only a factor in the deeper slopes of the main river valley and the western portion of Six Mile Coulee.

Many of the bedrock slides are very old features that have been inactive for thousands of years. Six of the large slides are actively moving however, especially at the outside bends of the river, where the river is eroding the toe.

The ultimate failure angles for the mature bedrock slides covered a large range, but had a lower-bound angle of about 5H:1V, projected back from the bedrock contact. This is considered to be a conservative limit to use as initial screening criteria for development. However, given the depth of the bedrock contact, these criteria could lead to excessively large setback distances that should be evaluated with site-specific geotechnical studies.

## 3.5 **The New Setback Recommendations**

### 3.5.1 *New Slope Categories*

The detailed assessments of the failure mechanisms done in Phase 2 of the AMEC report provided a basis for recommended revisions to the 1986 RVARP development setback guidelines. To assist in creating effective development setback distances, AMEC identified three slope categories based on the nature of the slope and the types of failures most likely to occur there.

1. ***Altered Slopes*** Altered slopes are those which have been graded or otherwise altered on or near the slope. *Development setback criteria are not applicable* on altered slopes. In these zones site specific studies are required to create a safe development setback. Many of the slopes that fall into the “altered” category are in areas of the city that are already developed, where the revised development setback criteria are not relevant anyway.

2. **Valley Slopes Exposed to possible Bedrock Failure Risk** Those slopes that extend down to bedrock should be governed by criteria that consider the potential impact of deeper bedrock-based slides. AMEC’s proposed new method would establish a setback line in these areas where a *5H:1V projected line from the exposed bedrock surface* in the valley intersects the upland area. However, the height (up to 90m) from bedrock to slope crest could lead to overly conservative setbacks using either the height- and slope-based RVARP calculations or the 5H:1V setback. As such it is anticipated that actual setbacks from these types of slopes might be modified by site-specific geotechnical studies.

3. **Coulee Slopes without Bedrock Failure Risk** Most of the natural coulee slopes in the city do not extend down to bedrock and thus have no bedrock failure risk. The proposed new method, a *4H:1V projected offset from the Lenzie surface*,\* has been applied along with the 1986 RVARP calculation to establish a new development setback line above these slopes. The 1986 criteria are tied to slope height and inclination, but not the position of the Lenzie unit.

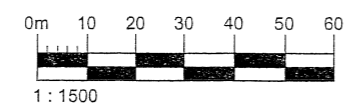
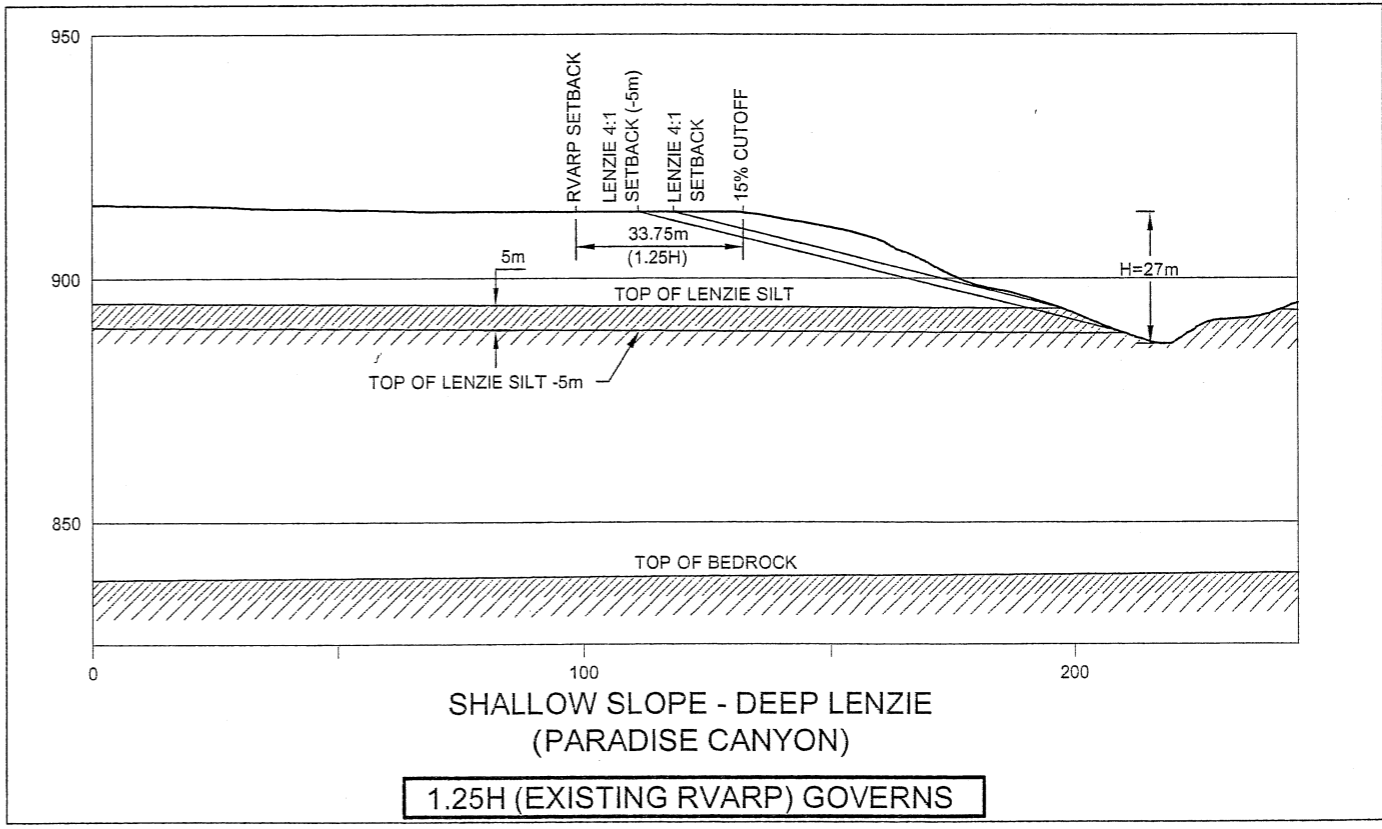
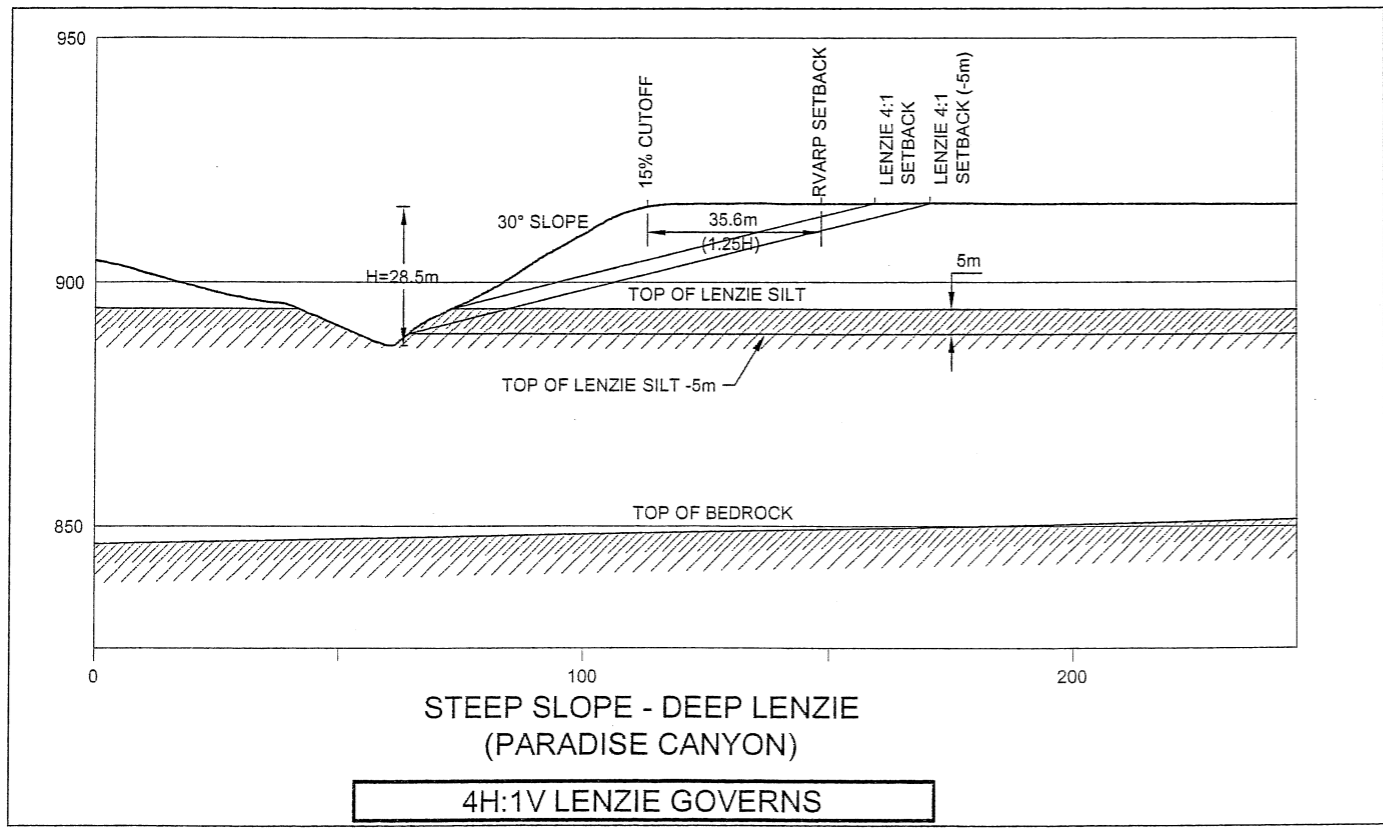
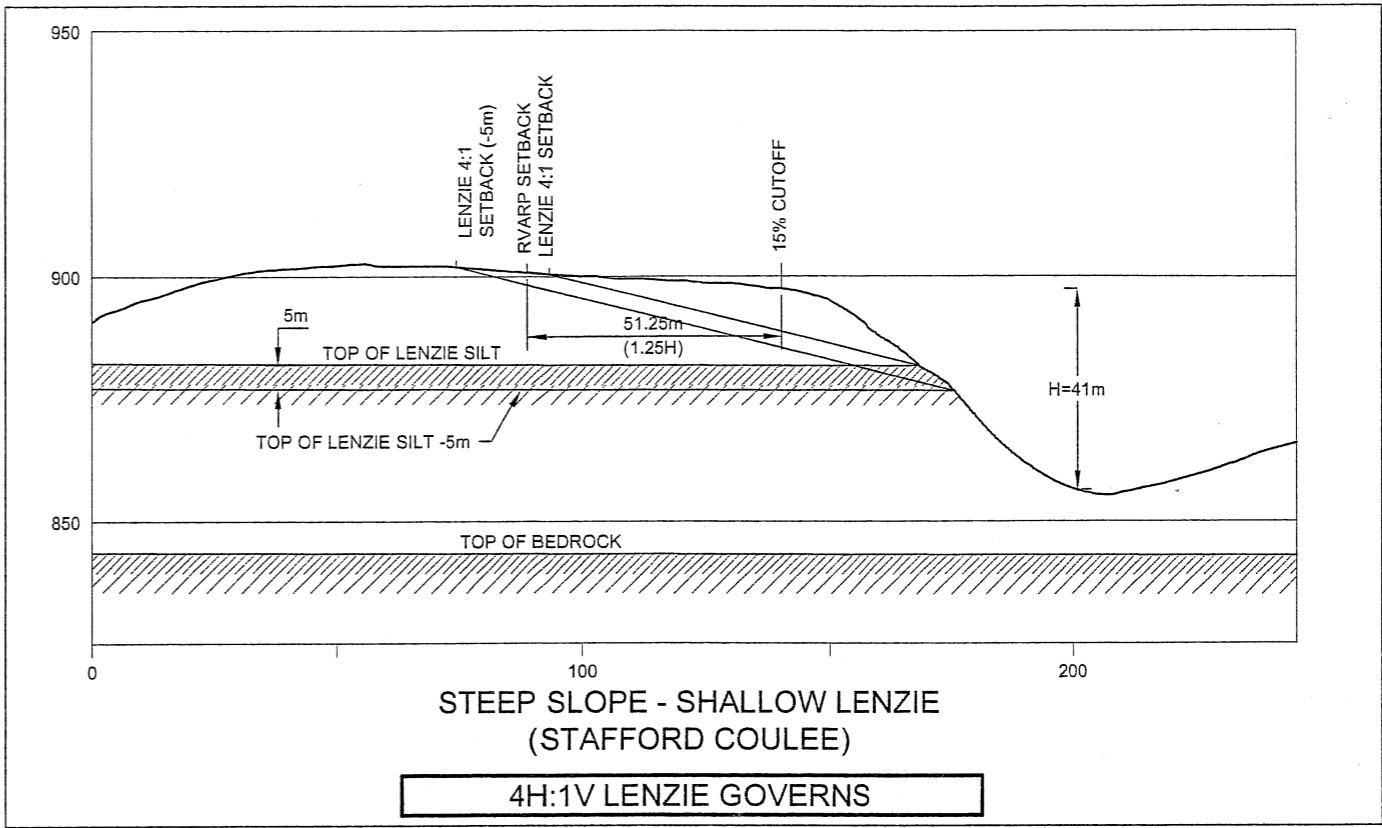
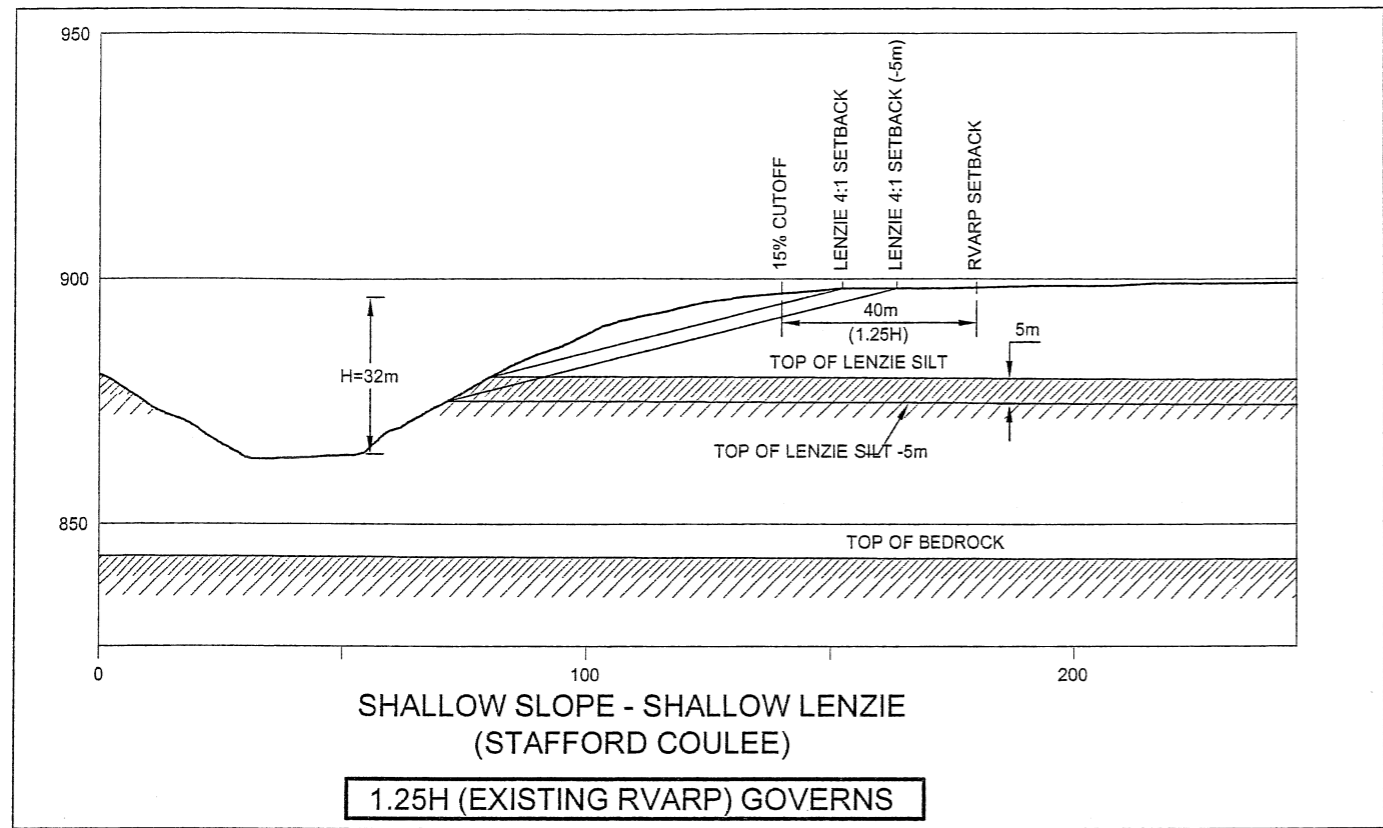
\* The 4H:1V line is drawn from a point 5 metres below what is assumed to be the top of the Lenzie layer, to allow for uncertainty in determining the actual top of the Lenzie. Drawing the line from the lower point provides a more conservative setback, as illustrated in Chart 6.

### 3.5.2 **Changes to the ARP Setback Line** (see Chart 6)

The most significant changes to the 1986 setback line relate to: 1) identification of slopes classified as “altered” and requiring site specific study; and 2) delineation of slopes that have some risk of deeper bedrock-based instability. The large setback distances above these slopes will likely result in site-specific geotechnical studies in these areas.

Less significant changes to the ARP were required for coulee slopes without bedrock failure risk. AMEC plotted top-of-bank setback lines using both the 1.25H from the slope crest calculation





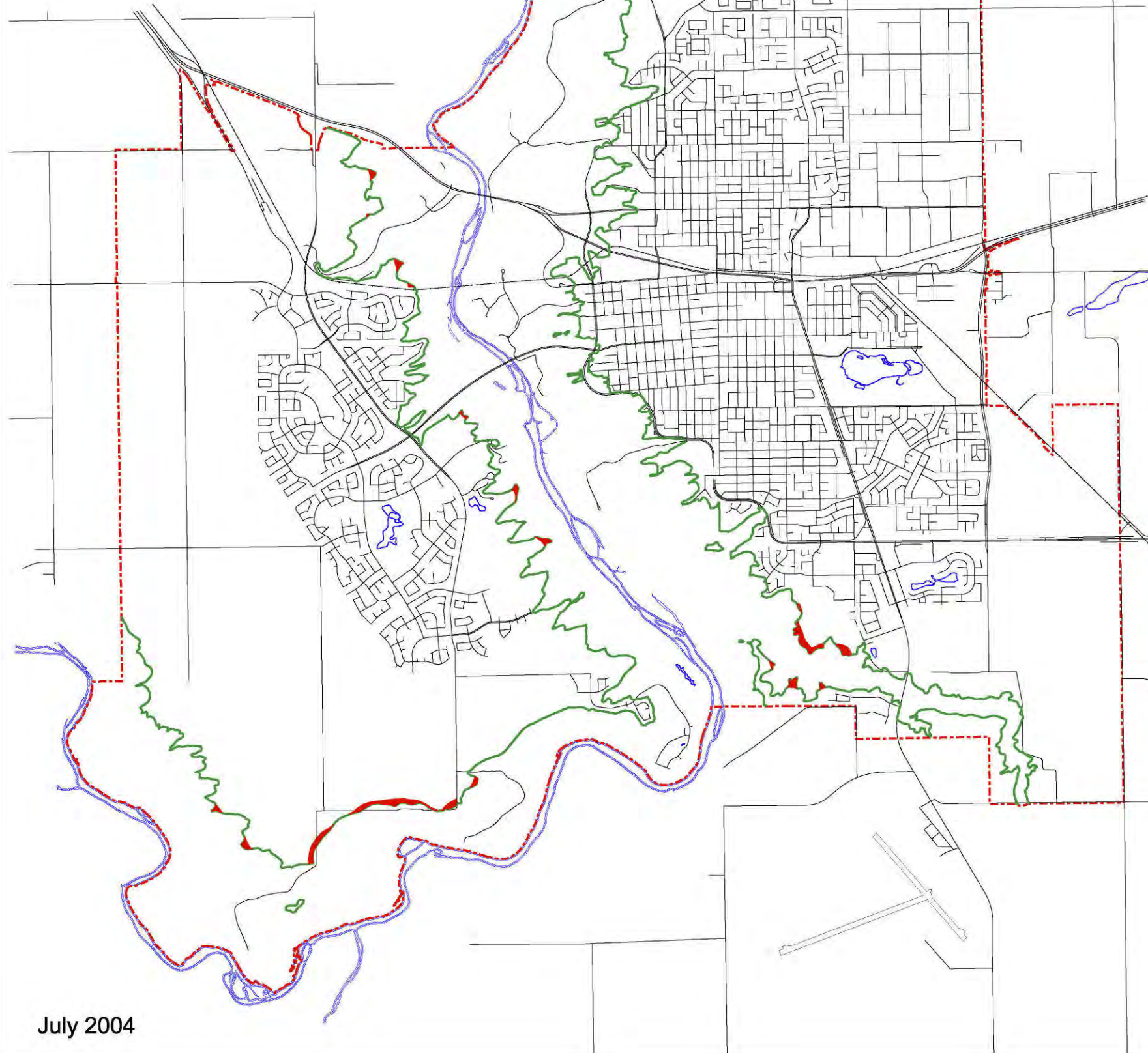
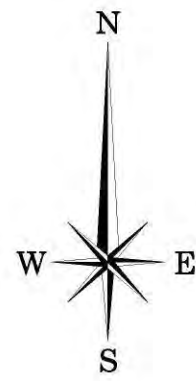
CLIENT: THE CITY OF LETHBRIDGE

AMEC Earth & Environmental Limited

DWN BY: RSW/OGS  
CHK'D BY: MJO  
SCALE: 1 : 1500  
DATE: OCT, 2002

COMPARISON OF EXISTING RVARP SETBACK CRITERIA AND 4H:1V ANGULAR OFFSET FROM LENZIE SURFACE & LENZIE SURFACE -5m

AMEC PROJECT NO: EG08757  
REV. NO.: -  
CHART 6



*City of Lethbridge*

# River Valley Development Setback

## LEGEND

- Development Setback Line
- Potential Bedrock Instability
- - - City Boundary

**River Valley  
Area Redevelopment Plan**

**By-law 5277**

**Map #10**

July 2004

outlined in the 1986 plan (using 1999 topographic data) and the new 4H:1V offset from the Lenzie unit, and recommend using the more conservative setback at any given location. Figure 11.1 provides examples of how each of the two methods are applied, and where each of the two methods should govern the setback.

Using this approach more than half the length of of the 113 k of top-of-bank are still governed by the original setback criteria. In many cases the new setback line is not significantly different than the existing line. At some points the new line comes closer to the top-of-bank than the old line, because it is based on more accurate topographic information.

The new 4H:1V offset from the surface of the Lenzie unit mainly governs the setback for the cases with *steeper coulee slopes* where the *Lenzie unit is outcropping in the lower part* of the coulee. In these cases it is common for the new setback line to be 10 to 20 metres further back than the *original line that did not account for the deeper failures along the Lenzie unit*.

The setback line above coulee slopes without bedrock failure risk can also be modified by site-specific geotechnical studies.

The new river valley development setback line is shown on **MAP #10**.

## **4.0 REDEVELOPMENT PLAN GOALS AND OBJECTIVES**

This section outlines the general framework of goals and objectives which will guide the formulation of specific policies in Section 4.0. In a hierarchical approach the goals determine the areas of primary significance which are then more specifically addressed by objectives. Specific objectives in turn direct the formulation of policies which are used to implement this plan.

### **4.1 Goals**

The three major goals of the ARP are:

#### **4.1.1 Public Protection**

- To protect the public from natural hazards associated with development in or adjacent to the river valley.

#### **4.1.2 Resource Protection and Enhancement**

- To protect and enhance the significant and unique natural development in or adjacent to the river valley.

#### **4.1.3 Land Use Management**

- To accommodate the use of the river valley for purposes compatible with the physical and biological characteristics of the valley and consistent with the goals of public protection, resource protection and enhancement.

### **4.2 Objectives**

#### **4.2.1 Public Protection**

- .1 To identify appropriate boundaries and development controls to prevent encroachment of inappropriate uses onto hazard lands.

#### **4.2.2 Resource Protection and Enhancement**

- .1 To identify the location of environmentally sensitive lands and significant or unique natural features and define the means to conserve and protect these lands and features.
- .2 To develop the land use controls necessary to ensure preservation, maintenance and enhancement of the diversity of flora and fauna present within the river valley.
- .3 To regulate all land use within the redevelopment area to protect the integrity of the area.

#### **4.2.3 Land Use Management**

- .1 To define a variety of land use opportunities in appropriate locations utilizing the river valley and adjoining coulees.
- .2 To define those land use opportunities compatible with the attributes and constraints of the natural environment.
- .3 To identify river valley lands required for public works.
- .4 To provide adequate public access to public open space areas.

## **5.0 IMPLEMENTATION**

### **5.1 Development Control Policies**

The following policies provide the means to meet the goals of public protection, resource protection and enhancement, and land use management and the more precise objectives of the ARP.

#### **5.1.1 General Policies**

- .1 In principle, no intensive land use shall be permitted in the river valley which can be located in another, more suitable area unless such use is consistent with the redevelopment area goals and objectives.
- .2 The City shall encourage the location of intensive land uses only in nodes within the river valley which are capable of supporting such intensive use. Where possible these nodes should be in close proximity to major road crossings and public transit to ensure accessibility and minimize the need for additional infrastructure.
- .3 In principle, a proposed improvement shall not be approved if it would be reasonably be expected to adversely affect or contribute to an adverse effect on the quality of land, water or air within the river valley unless such improvement is necessary for the general public good.

#### **5.1.2 Public Protection**

- .1 No new major structural facility will be permitted in the designated flood risk area. Major structural facilities include non-habitable facilities that could not be easily replaced in the case of a flood either financially or due to the nature of the contents contained. However, modifications to the existing topography or flood control works may effectively remove the facility from the designated flood risk area. In any case, a new major structural facility may not be located within a

minimum development setback of 60 metres from the average annual high waterline level. The applicant will be required to submit, at his cost, an acceptable definition of the average annual high waterline to the Approving Authority.

- .2 Major regrading or other major alterations of topography will be subject to an Environmental Assessment Analysis. Such alterations may effectively remove a site from the designated flood risk area. Between the top of bank and bottom of slope setback lines, cuts and fills in excess of 0.5 m are deemed “major.” Below the bottom of slope setback line the Approving Authority will have the discretion, based on a review of the proposed depth and area of the cut or fill, to determine whether an E.A.A. is required.
- .3 The City will require a minimum setback of 60 m from the average annual highwater level for minor structural facilities with the exception of boating facilities. Low intensity recreational uses that are non-obstructive to wildlife movement and trails may be allowed within the 60 m corridor. Trails may be allowed within the minimum development setback area.
- .4 No new development will be permitted on environmentally sensitive lands (as shown on Figure 6) where such development may pose a safety hazard to the public due to slope or bank stability, subsidence or erosion.
- .5 New development must be set back above the river valley and below the bottom of slope. Top-of-bank policies are outlined in Section 3.2. Top-of-bank setback distances will be established by geotechnical evaluation which takes into account the setback recommendations outlined in Sections 3.3, 3.4 and 3.5. Bottom of slope setback distance requirements are outlined in Section 3.3.2.
- .6 Additions and alterations to existing facilities may be allowed, subject to the discretion of the Approving Authority, provided the proponent accepts full financial liability for any damage caused by flooding.

- .7 The City may permit the natural biophysical processes of landscape modification to continue unrestricted unless such processes pose a major risk to public facilities or public safety. The City may develop and implement a management program to stabilize slump areas, reduce erosion and minimize hazard area impacts in order to permit limited use.
- .8 The City may restrict public access and use of hazard lands in the interests of public safety.
- .9 No subdivision or development in the flood plain will be considered until the designated flood risk area has been defined.
- .10 Lands above the top of bank setback line which are completely surrounded and isolated by lands below the top of bank setback line may not require a geotechnical analysis to demonstrate their suitability for development. However, accesses and utilities which cross lands subject to physical constraints to serve these sites will require a geotechnical study addressing slope stability. No subdivision or development of these isolated pockets will be considered unless it can be demonstrated that access and utilities can be provided in accordance with the policies of the Plan.

### **5.1.3 Resource Protection and Enhancement**

- .1 Only low intensity types of land use related to agriculture, recreation, environmental education, research and similar uses will be considered for environmentally sensitive lands.
- .2 Development in areas adjacent to environmentally sensitive lands must be compatible with any required conservation practices which may be occurring on those environmentally sensitive lands.
- .3 Proposals for subdivision and/or development which encroach upon or require access across environmentally sensitive lands and are considered likely to have



an impact on the environmentally sensitive lands shall prepare and submit an Environmental Assessment Analysis (E.A.A.) to the satisfaction of the Approving Authority, before such proposals will be considered for approval. However, if the environmentally sensitive lands are to become “environmental reserve” pursuant to the Planning Act, then the subdivision would not require an E.A.A.

- .4 The City may establish, by separate By-law,<sup>12</sup> regulations to restrict or regulate public access to environmentally sensitive lands in order to prevent environmental degradation.
- .5 The City will construct roads, bridges and essential public utilities in a manner which minimizes land requirements and environmental damage during and after construction.
- .6 The City shall, subject to statutory limitations, endeavour to identify, conserve and protect the integrity of natural landscapes, wildlife and vegetative features from adverse development impacts. To this end during the subdivision and development approval process, consideration will be given to means of:
  - (a) minimizing the alteration of natural drainage courses;
  - (b) restricting or controlling access to environmentally sensitive lands;
  - (c) preserving critical wildlife habitat on land and within the river;
  - (d) maintaining areas of vegetative cover which provide connective links for wildlife;
  - (e) maintaining the productivity and diversity of existing avifauna, fauna and flora;
  - (f) enhancing the productivity and ecological diversity of the river valley environment; and
  - (g) monitoring species composition, distribution patterns and populations by encouraging research.
- .7 The City may introduce, where appropriate, environmental restoration programs.

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<sup>12</sup> R.S.A. 1980 Chapter M-26, Section 153 (Municipal Government Act)

- .8 The City shall prohibit the disposal of refuse and strictly control any stripping of surface cover and/or cuts and fills in the river valley and coulees. Any major alteration of topography will be subject to an Environmental Assessment Analysis. Between the top of bank and bottom of slope setback lines, cuts and fills in excess of 0.5m are deemed “major.” Below the bottom of slope setback line the Approving Authority will have the discretion, based on a review of the proposed depth and area of the cut or fill, to determine whether an E.A.A. is required.
- .9 The City shall cooperate with the Province and adjoining municipalities whenever possible to encourage the adoption and application of effective conservation policies.

#### **5.1.4 Land Use Management**

- .1 Existing land uses compatible with the objectives of this Plan will be allowed to continue.
- .2 Non-conforming land uses will be allowed to continue subject to the requirements of the Planning Act.
- .3 Compatible new land uses may be approved in the redevelopment area in the locations designated in this Plan provided such uses are developed in a manner consistent with the Plan.
- .4 The Approving Authority may allow natural resource extraction within the river valley provided that such development does not conflict with the Plan’s goals and objectives and is a discretionary land use in the appropriate land use district in the redevelopment area. While the extraction of these resources may be appropriate, it is the intention of this plan that extractive activity be phased out over the long term, in favour of other uses allowable in that district.

- .5 The City shall approve public and private utility uses in the redevelopment area only when the redevelopment area location is deemed essential.
- .6 All proposals for new or expanded utilities and transportation developments shall provide the following to the satisfaction of the Approving Authority, and in cases where no development permit is required, to City Council:
  - (a) a statement justifying the necessity for a river valley area location; and
  - (b) an Environmental Assessment Analysis identifying the extent of impacts anticipated (including odor and noise), an outline of proposed mitigative measures and a schedule for compliance. The level of detail of an Environmental Assessment Analysis must relate to the complexity of the project proposed. The Approving Authority has the authority to determine appropriate E.A.A. contents. The E.A.A. must be completed to the satisfaction of the Approving Authority.
- .7 Transportation and utility corridors should not be constructed along the valley bottom lands parallel to the river valley unless such a location is deemed essential.
- .8 Cross valley transportation and utility corridors will be minimized by following existing routings where possible and integrating facility needs in parallel alignments.
9. If consideration is given to the acquisition of additional public parks land, the Urban Parks River Valley Master Plan recommendations should be utilized for identification of such lands.
10. The Engineering Services Manager and or Approving Authority shall ensure that due consideration is given to the following factors in the design of access roads and cross-river connections:
  - (a) the minimization of environmental impact;

- (b) provision of adequate pedestrian and bicycle passage across, under or over roads and bridges;
  - (c) protection of wildlife movement corridors;
  - (d) the provision of adequate off-street parking at major park access points, and viewpoints along scenic drives;
  - (e) minimization of the number of cross-river thoroughfares; and
  - (f) provision of adequate cross-river pedestrian bridges to connect major facility nodes as required.
- .11 The City should make provision for access to the river valley by public transportation.
- .12 The City should make provision for access to the river valley by the disabled.
- .13 The City will endeavour to establish a top of bank path or road to connect adjacent areas of the river valley where erosion, bank instability or slope restrict access along the river's edge or bottom of slope.
- .14 The City will endeavour to encourage public access and exposure to the edge of the river valley at prominent view points in a manner consistent with the objective of protecting environmentally sensitive land.

### **5.1.5 Subdivision**

- .1 The Approving Authority will review subdivision applications within the river valley in the context of ARP policies.
- .2 The policies outlined in Section 3.2 will apply.
- .3 Pockets of residual developable land isolated by the establishment of the setback lines related to the top of bank and bottom of slopes or created as a result of the subdivision design may, at the discretion of the Approving Authority, be credited as Municipal Reserve if:

- (a) the land is required as a public access to the river valley, or
  - (b) the land forms a prominent scenic overlook, or
  - (c) the land area is sufficiently large to function as useable open space.
- .4 The Approving Authority may require the submission of a geotechnical study for any application for the subdivision of lands located above areas where subsidence has occurred or may be anticipated to occur due to resource extraction. The geotechnical study must address both the potential for subsidence, and the effects of potential subsidence on the proposed land use and the associated infrastructure. An outline of proposed mitigative measures and a schedule for compliance would also be required, should the study conclude mitigative measures were warranted.
- .5 Lands above the top of bank setback line which are completely surrounded and isolated by lands below the top of bank setback line may not require a geotechnical analysis to demonstrate their suitability for development. However, accesses and utilities which cross lands subject to physical constraints to serve these sites will require a geotechnical study addressing slope stability. No subdivision or development of these isolated pockets will be considered unless it can be demonstrated that access and utilities can be provided in accordance with the policies of the Plan.

#### **5.1.6 Property Development Standards**

- .1 As a part of the process of building design, siting, servicing, construction, landscaping or redevelopment or removal of structures, consideration must be shown for the following concerns: designated flood risk area and related building requirements; natural resource protection in the sensitive riverine environment; slope stability; potential subsidence; surrounding land uses; relationship to vehicular and pedestrian access; aspect; and wind. The development must comply with the policies of this plan regarding these concerns.

- .2 At the request of the Approving Authority, a condition of development approval may include a development agreement which requires the dedication by the proponent of an appropriate right-of-way in a suitable location near the river or at the top of bank or between the valley and upland for a trail to be developed by the City.
- .3 The City should revise and enforce its Minimum Property Standards By-law to ensure unsightly land uses are adequately screened and secured.
- .4 The City will develop and implement a maintenance program for river valley lands under its jurisdiction to ensure public lands are maintained in a manner appropriate to their location and role.
- .5 Existing land uses whose location, method of operation or type of activity are inconsistent with the objectives of this plan will not be allowed to expand, with the exception of essential public utilities.
- .6 The Approving Authority shall prohibit major alterations or the expansion of existing major structural facilities within the designated flood risk areas until both an adequate flood defence and the environmental impact of flood defence measures are undertaken to the satisfaction of the Engineering Services Manager. Subject to the discretion of the Approving Authority, additions and alterations are allowed provided the proponent accepts full financial liability for any damage caused by flooding.
- .7 New minor structural facilities may be situated above the 60 metre setback from the average annual high water line if they are non-obstructive to the free flow of flood waters, wildlife corridors or critical habitat and meet Approving Authority requirements. In addition, the proponent of such development must accept the risk of occasionally suffering flood damage. The title must be encumbered with a notice of this risk.
- .8 The Approving Authority may require the proponent of a proposed improvement which is deemed by the Approving Authority as likely to impact upon the river

valley to submit an Environmental Assessment Analysis report. The report must be to the satisfaction of the Approving Authority.

- .9 Any development permit application to the Approving Authority for resource extraction shall be accompanied by an E.A.A., site grading, landscaping and restoration plans for future uses consistent with this plan.
- .10 The Approving Authority shall impose restrictions concerning the length of time permitted for resource extraction and related reclamation processes.
- .11 The City may impose such conditions (e.g. a performance bond) as are deemed necessary to ensure extraction operations are undertaken in a safe, efficient manner with minimal impact on neighbouring land uses and further to ensure that restoration is carried out in accordance with reclamation plans or agreements.
- .12 The City will not permit the dumping of waste, fill, debris or other foreign materials in the river valley except where fill is necessary for construction or protection of structures, public utilities (including transportation corridors, or access routes), recreation facilities or any other use allowed within the river valley. The City will strictly control any stripping of surface cover and/or cuts and fills in the river valley and coulees and no such stripping or filling shall be permitted without development approval. Any major alteration of topography will be subject to an Environmental Assessment Analysis. Between the top of bank and bottom of slope setback lines, cuts and fills in excess of 0.5m are deemed "major." Below the bottom of slope setback line the Approving Authority will have the discretion, based on a review of the proposed depth and area of the cut or fill, to determine whether an E.A.A. is required.
- .13 The City shall undertake to provide adequate visual and physical barriers to screen from other land uses new, existing or proposed expansions to public utilities and major roads within the river valley through facility location, landscaping and site grading. In addition, acoustical impact should be minimized.

- .14 The City shall undertake to strictly control signage in the river valley. Only signs for land uses actually located in the river valley will be permitted and then only if deemed necessary. The Approving Authority will ensure that permitted signs will be built from appropriate materials and at a suitable size. Billboards will not be permitted in the redevelopment area.
- .15 The Approving Authority may require the submission of a geotechnical study for any application for development of lands located above areas where subsidence has occurred or may be anticipated to occur due to resource extraction. The geotechnical study must address both the potential for subsidence, and the effects of potential subsidence on the proposed land use and the associated infrastructure. An outline of proposed mitigative measures and a schedule for compliance would also be required should the study conclude that mitigation measures were warranted.
- .16 No development in the flood plain will be considered until the designated flood risk area has been defined.
- .17 Lands above the top of bank setback line which are completely surrounded and isolated by lands below the top of bank setback line may not require a geotechnical analysis to demonstrate their suitability for development. However, accesses and utilities which cross lands subject to physical constraints to serve these sites will require a geotechnical study addressing slope stability. No subdivision or development of these isolated pockets will be considered unless it can be demonstrated that access and utilities can be provided in accordance with the policies of this Plan.

## **5.2 Redevelopment Levies**

The Planning Act permits City Council to designate a redevelopment area by By-law.<sup>13</sup>

The By-law adopting an area redevelopment plan may,

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<sup>13</sup> R.S.A. 1980 Chapter P.9, Section 65(a)



- a) in accordance with Section 66 and Section 75 of the Planning Act, provide for the imposition and collection of a levy known as a redevelopment levy.<sup>14</sup>

A redevelopment levy imposed and collected is used to provide, in respect of the redevelopment area,

- a) land for a park or land for school buildings designed for the instruction or accommodation of students, or
- b) land for new or expanded recreation facilities, or both<sup>15</sup>

However, a redevelopment levy is not required to implement the objectives of this ARP for three reasons. First, the river valley as it exists is largely in its natural state with little of the development which generates demand for park or school facilities. Second, it is not likely, considering the policies of this plan and the existing physical constraints, that sufficient development/redevelopment would occur to warrant the collection of such levies. Third, the imposition of a levy could be counter-productive by discouraging non-conforming land uses from relocation or redevelopment to a use which is compatible with the objectives of this plan.

### **5.3 Land Acquisition Policy**

It is not the intention of the City of Lethbridge to acquire all private land within or abutting the river valley and coulees. Rather the City intends to attempt to acquire only those lands necessary to implement the objectives of the ARP.

- .1 The City may acquire river valley lands for the following purposes:
  - (a) public safety;
  - (b) resource protection and enhancement;
  - (c) public access;
  - (d) the development of public open space;
  - (e) the elimination of non-conforming land uses.

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<sup>14</sup> R.S.A. 1980 Chapter P.9, Section 65 (a)

<sup>15</sup> R.S.A. 1980 Chapter p.9, Section 75(2)

## 5.4 Development Review Procedure

- .1 The ARP as proposed will not require adjustments to the normal process of reviewing development permits. Rather, the requirements, for example, of the Property Development Standards of this plan, may necessitate the inclusion of additional information in the development permit application. As an example, more detailed information will be needed to accurately determine the extent of the flood plain, or top-of-bank.

If by the policies outlined in Section 5 a geotechnical slope stability report is required to be submitted, the following information shall be provided:

- a) a plan, determined by field survey, showing the top of bank and bottom of slope.
- b) information on subsoil and groundwater conditions.
- c) a plan of the proposed development including:
  - o Lot lines
  - o A property outline and provisions for support on soils with FS greater than 1.5 under highest expected moisture conditions.
  - o For special land uses and large structures (such as lagoons, industrial and high rise developments, etc.), building locations and foundation designs, developed from structural working drawings and providing for support on soils with FS greater than 1.5 under highest expected moisture conditions; the effects of the subdrains shall be considered.
- d) A plan showing the top of bank and bottom of slope setback lines, using a minimum slope stability Factor of Safety of 1.5. The effect of subdrains may be included if these are included in the design recommendations.
- e) Information as to the effect of the development on other and adjacent properties and protection of same.
- f) Evidence that coal mining records have been reviewed, to determine whether old workings occur beneath the property and, if so, information where applicable on whether subsidence is anticipated and if so, how it is proposed

to mitigate any problems due to subsidence or subsidence-related instabilities.

- g) Evidence that provision has been made for disposal of storm water runoff and excess irrigation water in a manner that is acceptable to the City of Lethbridge.
- h) Where relevant, the applicant will be required to submit, at his cost, an acceptable definition of the average annual high waterline to the Approving Authority.

If the report indicates that no corrective engineering work is required for the site to conform to the City of Lethbridge Slope Stability Policy, a Development Permit may be issued. Development approvals are required for cuts and fills.

If the report indicates that the site will conform following corrective engineering work, then a Development Permit may be issued subject to the following:

- o During development on the site, all recommendations of the geotechnical engineering report must be adhered to;
- o Upon completion, the geotechnical engineer shall certify to the City of Lethbridge that all report recommendations have been adhered to;
- o The City of Lethbridge will consider means of saving itself harmless from any claims related to soils movement or erosion damage, such as a caveat to advise subsequent owners of the necessity of continued adherence to the geotechnical report recommendations.
- o The City of Lethbridge shall be saved harmless from any claims related to soils movement or erosion damage.

An amendment to the Land Use By-law is necessary to place the lands within the redevelopment area into a new district to effect the goals, objectives and policies of this Plan. The general provisions of the Land Use By-law shall apply except where contradictory definitions and policies of this Plan shall supersede the Land Use By-law.

## 5.5 Land Use Districts

As outlined by parts 3 and 4 of this document, goals, objectives and policies distinct from those applied to other lands within the City of Lethbridge are appropriate in the riverine setting of the redevelopment area. In order to acknowledge the distinctiveness of this area and the nature of consideration which should be given to decisions regarding land use and land development in the river valley, the Land Use By-law Land Use Districts Map will refer to the entire redevelopment area as the Valley District. The Land Use By-law will indicate that the River Valley Area Redevelopment Plan establishes the specific land use districts and controls for lands within the Valley District.

The specific land use districts encompassed in the redevelopment area are outlined below:

Commercial Recreation	C-R
Direct Control – Valley	DC-V
Hazard Lands	H-L
Public Building	P-B
Park and Recreation	P-R
Transportation	P-T
Public Utilities	P-U
Urban Reserve	UR

While many of these districts are included in Land Use By-law 4100, characteristics unique to the river valley require special application of the districts to the river valley redevelopment area.

The location of the specific districts outlined is shown by Figure 9, the Land Use Designations.

All district boundaries with the exception of P-B, P-T and P-U will be adjusted to reflect the designated flood risk area, when the review of the flood plain area is concluded by Alberta Environment. At that time any additional lands within the designated flood risk area will be made H-L.

### 5.5.1 C-R Commercial Recreation District

#### Purpose

The purpose of the C-R district is to provide for recreation-oriented commercial land uses in appropriate areas.

#### Description

A new commercial district is proposed which would be suitable within the river valley. The Commercial Recreation District (C-R) is located on the west side of the River Valley surrounding the Highway #3 valley entrance. This district would encompass the existing KOA campground, the Par 3 Golf Course and adjoining vacant lands which are not subject to development constraints.

#### General Applicability of the Land Use By-law

In areas noted as C-R on Figure 9 of this Plan all relevant general provisions of the Land Use By-law shall apply.

#### Permitted and Discretionary Uses

In those areas shown as C-R on Figure 9 of this Plan

(a) the following are PERMITTED uses:

Campgrounds

Golf courses

Miniature golf

(b) the following are DISCRETIONARY uses:

Accessory buildings and signs

Eating and drinking establishments

Hotels and motels

Intensive recreation facilities

Low intensity recreation uses

Parking lots ancillary to other allowable uses

Public utilities

Retail stores

Service stations

Trails

Zoos

Minimum Lot Sizes

USES	WIDTH (m)	LENGTH (m)	AREA (m)
Hotels & Motels	40	50	4046
Eating and Drinking Establishments	20	35	1500
All permitted uses	As required by the Development Officer		
All other discretionary uses	As required by the Commission		

Maximum Floor Area Ratio

The maximum floor area ratio for all uses shall be 1.5.

Maximum Site Coverage

The maximum site coverage for all permitted and discretionary uses shall be 50 percent.

Minimum Yard Dimensions

The front, side, and rear yard setbacks for a development shall be established by the Approving Authority.

Building Height

The height of any building shall not exceed an overall height of 12m with a maximum of three storeys.

Landscaping

The landscaping requirements of Section 56 of the Land Use By-law shall apply to this district.

Rules and Policies

.1 All approvals must be based on compliance with the goals, objectives and policies of this plan. While all policies shall apply, the following are particularly relevant to the C-R District:

5.1.2.1	5.1.2.2	5.1.2.3	5.1.2.5	5.1.3.2
5.1.3.3	5.1.3.8	5.1.4.5	5.1.4.6	51.5.2
5.1.5.3	5.1.5.4	5.1.5.7	5.1.6.1	5.1.6.2
5.1.6.8	5.1.6.8	5.1.6.12	5.1.6.14	5.1.6.15

**5..5.2 DC-V Direct Control Valley District**

Purpose

The purpose of this district is to enable Council to exercise particular, detailed and sensitive control over the use and development of the land and buildings within this district in the river valley.

Description

The Direct Control Valley District (DC-V) will remain in areas of the river valley to ensure the realization of appropriate policy guidelines.

These lands have been identified due to their potential for urban development. Land uses appropriate for these settings may include recreational uses, with or without related accommodation facilities, or other innovative land use treatments of the river valley.

General Applicability of the Land Use By-law

In the area noted as DC-V on Figure 9 of this plan, all relevant general provisions of the Land Use By-law shall apply except where specific provisions are set out below.

Rules and Policies

- .1 All applications for any form of development in this district shall be referred to Council and Council shall make a decision thereon. The Municipal Planning Commission shall be asked for a recommendation before City Council makes a decision on the application.
  
- .2 Subdivision of land in this district is prohibited unless the applicant for subdivision has first obtained the approval of Council for the use for which the subdivision is to be effected.
  
- .3 All approvals must be based on compliance with the goals, objectives and policies of this plan. While all policies shall apply, the following are particularly relevant to the DC-V District:

5.1.2.2	5.1.2.3	5.1.2.5	5.1.3.2	5.1.3.3
5.1.3.8	5.1.4.5	5.1.4.6	5.1.5.2	5.1.5.3
5.1.5.4	5.1.6.1	5.1.6.2	5.1.6.5	5.1.6.7
5.1.6.8	5.1.6.9	5.1.6.10	5.1.6.11	5.1.6.12
5.1.6.14				

Council may, by resolution, establish additional rules and policies to govern the use and development of land and buildings in any Direct Control District.

**5..5.3 H-L Hazard Lands District**

Purpose

The purpose of the H-L district is to allow limited impact uses that are consistent with the goals of maintaining public safety and protecting sensitive environments.



### Description

The Hazard Lands District (H-L) is a new district proposed to be incorporated within the ARP. The Hazard Lands District is proposed for a large portion of the undeveloped area. It covers the following areas:

The Hazard Lands District includes all of the coulee lands with the exception of the P-B and P-T District. In addition, all of the designated flood risk area is included except in the P-B and P-T districts. Enforcement of the requirements of this Plan on the P-B and P-T lands is not within the jurisdiction of this plan. The Hazard Lands District will extend from the bottom of slope setback line to the top of bank setback line of the river valley following the coulee configuration established by the geotechnical overview study (or the property boundaries where approved geotechnical studies have been completed). The location of the top of bank and bottom of slope setback lines may be refined based on findings of subsequent detailed geotechnical studies.

### General Applicability of the Land Use By-law

In areas noted as H-L on Figure 9 of this Plan, all relevant general provisions of the Land Use By-law shall apply.

### Permitted and Discretionary Uses

In those areas shown as H-L on Figure 9 of this Plan.

- (a) the following are PERMITTED uses:
- (b) the following are DISCRETIONARY uses:

Accessory buildings and signs

Additions and alterations to structures existing at the date of passage of this

By-law and on the same site only

Ancillary retail

Boating facilities (such as boat and canoe launches)  
 Campgrounds  
 Environmental testplots  
 Golf courses  
 Historical or natural interpretive facilities  
 Low intensity agriculture including pasture and crops  
 Low intensity recreation uses  
 Parking lots ancillary to other allowable uses  
 Public utilities  
 Resource extraction as an interim use  
 Trails

Rules and Policies

- .1 Development approval for any use within the Hazard Lands District must be considered in view of maintaining public protection and the integrity of the natural river valley.
- .2 All approvals must be based on compliance with the goals, objectives and policies of this plan. While all policies shall apply, the following are particularly relevant to the H-L District:

5.1.2.1	5.1.2.2	5.1.2.3	5.1.2.4	5.1.2.5
5.1.2.6	5.1.2.7	5.1.2.8	5.1.2.9	5.1.3.1
5.1.3.2	5.1.3.3	5.1.3.4	5.1.3.6	5.1.3.8
5.1.4.4	5.1.4.5	5.1.4.6	5.1.4.7	5.1.4.10
5.1.4.11	5.1.4.14	5.1.4.15	5.1.5.2	5.1.5.3
5.1.5.4	5.1.5.5	5.1.5.6	5.1.5.7	5.1.5.8
5.1.5.10	5.1.6.1	5.1.6.2	5.1.6.6	5.1.6.7
5.1.6.8	5.1.6.9	5.1.6.10	5.1.6.11	5.1.6.12
5.1.6.13	5.1.6.15	5.1.6.16		

- .3 Single detached dwellings which existed at the date of passing of this By-law may, as a discretionary use, be permitted to be rebuilt, if such action is required. However, the owner must demonstrate that the development will not be a hazard to the safety of either the inhabitants or the general public. Additions to single detached dwellings will be subject to the same requirement.
- .4 Additional development controls for permitted or discretionary development within the river valley may be established as required to implement the policies of this plan, by the Development Officer or the Municipal Planning Commission, as the case may be. Notwithstanding the other requirements of this Section, where land has been dedicated as Environmental Reserve, the provisions of the Planning Act shall apply.

#### **5..5.4 P-B Public Building District**

##### Purpose

The purpose of the P-B District is to provide areas for the development of buildings and uses that provide social, educational or other public services to the community.

##### Description

The Public Building District (P-B) encompasses that part of the University of Lethbridge area located within the redevelopment area.

##### General Applicability of the Land Use By-law

In areas noted as P-B on Figure 9 of this Plan, all relevant provisions of the P-B District of the Land Use By-law shall apply except where specific provisions are set out below.

##### Permitted and Discretionary Uses

In those areas shown on P-B on Figure 9 of this Plan

- (a) the following are PERMITTED uses;
  - Minor outdoor facilities related to education
  - Parks

(b) the following are DISCRETIONARY uses:

- Accessory buildings and signs
- Educational facilities
- Environmental test plots
- Green houses
- Intensive recreation facilities
- Low intensity recreation uses
- Parking lots ancillary to other allowable uses
- Public utilities
- Trails

Rules and Policies

.1 All approvals must be based on compliance with the goals, objectives and policies of this plan. While all policies shall apply, the following are particularly relevant to the P-B District:

- |          |          |          |         |         |
|----------|----------|----------|---------|---------|
| 5.1.2.1  | 5.1.2.2  | 5.1.2.3  | 5.1.2.4 | 5.1.2.5 |
| 5.1.2.6  | 5.1.2.8  | 5.1.3.2  | 5.1.3.3 | 5.1.3.8 |
| 5.1.4.5  | 5.1.4.6  | 5.1.4.14 | 5.1.5.2 | 5.1.5.3 |
| 5.1.5.4  | 5.1.6.1  | 5.1.6.2  | 5.1.6.7 | 5.1.6.8 |
| 5.1.6.12 | 5.1.6.14 |          |         |         |

.2 Additional development controls for discretionary or permitted development within the river valley may be established as required to implement the policies of this plan, by the Development Officer or the Municipal Planning Commission, as the case may be.

### 5..5.5 P-R Park and Recreation District

#### Purpose

The purpose of this district is to accommodate recreation or park uses on lands where such uses are compatible with the natural environment.

#### Description

The Park and Recreation District (P-R) is proposed to encompass developable portions of existing and future park lands.

#### General Applicability of the Land Use By-law

In areas noted as P-R on Figure 9 of this Plan all relevant provisions of the P-R District of the Land Use By-law shall apply except where specific provisions are set out below.

#### Permitted and Discretionary Uses

In those areas shown as P-R on Figure 9 of this Plan

- (a) the following are PERMITTED uses:
  - Boating facilities
  - Golf courses
  - Historic or natural interpretive facilities
  - Low intensity recreation uses
  - Parks
  - Pedestrian, bicycle and fitness trails
  
- (b) the following are DISCRETIONARY uses:
  - Accessory buildings and signs
  - Ancillary retail
  - Bandshells
  - Campgrounds
  - Equestrian trails
  - Greenhouses

Intensive recreation facilities  
 Parking lots ancillary to other allowable uses  
 Public utilities  
 Resource extraction as an interim use  
 Sports clubs  
 Zoos

Rules and Policies

.1 All approvals must be based on compliance with the goals, objectives and policies of this Plan. While all policies shall apply, the following are particularly relevant to the P-R District:

5.1.2.2	5.1.2.3	5.1.2.5	5.1.3.2	5.1.3.3
5.1.3.6	5.1.3.8	5.1.4.4	5.1.4.5	5.1.4.6
5.1.5.2	5.1.5.3	5.1.5.4	5.1.5.7	5.1.6.1
5.1.6.2	5.1.6.7	5.1.6.8	5.1.6.9	5.1.6.10
5.1.6.11	5.1.6.13	5.1.6.14	5.1.6.15	5.1.6.16

.2 Additional development controls for discretionary or permitted development within the river valley may be established as required to implement the policies of this plan, by the Development Officer or the Municipal Planning Commission, as the case may be.

**5..5.6 P-T Transportation District**

The purpose of this district is to provide land for the operation of the railway system.

Description

The Transportation District (P-T) surrounds the high level trestle bridge as it crosses the river valley.

General Applicability of the Land Use By-law

In the area noted as P-T on Figure 9 of this plan, all provisions of the P-T District of the Land Use By-law shall apply except where specific provisions are set out below.

Permitted and Discretionary Uses

In those areas shown as P-T on Figure 9 of this Plan:

- (a) the following are PERMITTED uses:  
Any uses connected with the direct operation of a railway system
  
- (b) the following are DISCRETIONARY uses:  
Accessory buildings and signs  
Parking lots ancillary to other allowable uses  
Public utilities  
Trails

Rules and Policies

- .1 All approvals must be based on compliance with the goals, objectives and policies of this plan. While all policies shall apply, the following are particularly relevant to the P-T district:  

5.1.2.2	5.1.2.3	5.1.2.4	5.1.2.5	5.1.3.2
5.1.3.3	5.1.3.8	5.1.4.5	5.1.4.6	5.1.5.2
5.1.5.3	5.1.5.4	5.1.5.7	5.1.6.1	5.1.6.8
5.1.6.12	5.1.6.14	5.1.6.15		
  
- .2 Additional development controls for permitted or discretionary development within the river valley may be established as required to implement the policies of this plan, by the Development Office or the Municipal Planning Commission, as the case may be.

### **5..5.7 P-U Public Utilities District**

#### Purpose

The purpose of this district is to provide areas for the location of public utilities.

#### Description

The Public Utilities District is proposed for several areas within the redevelopment area on developable lands which is or is proposed to provide public utility services to the public.

#### General Applicability of the Land Use By-law

In areas noted as P-U on Figure 9 of this Plan all relevant general provisions of the Land Use By-law shall apply except where specific provisions are set out below.

#### Permitted and Discretionary Uses

In those areas shown as P-U on Figure 9 of this Plan

- (a) the following are PERMITTED uses:  
Essential public utilities
  
- (b) the following are DISCRETIONARY uses:  
Accessory buildings and signs  
Low intensity recreation uses  
Trails  
Parking lots ancillary to other allowable uses  
Public utilities

#### Rules and Policies

- .1 All approvals must be based on compliance with the goals, objectives and policies of this plan. While all policies shall apply, the following are particularly relevant to the M-2 district:



5.1.2.1	5.1.2.2	5.1.2.3	5.1.2.5	5.1.3.2
5.1.3.3	5.1.3.8	5.1.4.6	5.1.4.7	5.1.5.2
5.1.5.3	5.1.5.4	5.1.5.7	5.1.6.1	5.1.6.8
5.1.6.12	5.1.6.13	5.1.6.14	5.1.6.15	

.2 Additional development controls for permitted or discretionary development within the river valley may be established as required to implement the policies of this plan, by the Development Officer or the Municipal Planning Commission, as the case may be.

### **5..5.8 UR Urban Reserve District**

#### Purpose

The purpose of this zone is to prevent premature subdivision and development until such time as appropriate land use plans are approved and more detailed districts are applied. Changes to more detailed districts shall be in compliance with the intent and policies of this Plan.

#### Description

Since development of some river valley lands is a considerable length of time away given unavailability of municipal services, the urban reserve district is the most appropriate present land use district for river valley lands in the extreme south-west portion of the City. No area structure plans are in place for the surrounding lands to the southwest. The U-R District has also been applied to those isolated pockets of land which are above the top of bank setback line but which are completely surrounded by lands below the top of bank setback line.

#### General Applicability of the Land Use By-law

In the area noted as U-R on Figure 9 of this Plan; all relevant provisions of the U-R District of the Land Use By-law shall apply except where specific provisions are set out below.

Permitted and Discretionary Uses

In those areas shown as UR on Figure 9 of this Plan.

- (a) the following are PERMITTED uses:
  - Land in its natural state
  - Low intensity agriculture including pasture and crops
  
- (b) the following are DISCRETIONARY uses:
  - Accessory buildings and signs
  - Low intensity recreation uses
  - Parking lots ancillary to other allowable uses
  - Parks
  - Public utilities
  - Resource extraction as an interim use
  - Trails

Rules and Policies

.1 All approvals must be based on compliance with the goals, objectives and policies of this plan. While all policies shall apply, the following are particularly relevant to the UR District:

- |          |          |          |          |          |
|----------|----------|----------|----------|----------|
| 5.1.2.1  | 5.1.2.2  | 5.1.2.3  | 5.1.2.5  | 5.1.2.11 |
| 5.1.3.2  | 5.1.3.3  | 5.1.3.6  | 5.1.3.8  | 5.1.4.4  |
| 5.1.4.5  | 5.1.4.6  | 5.1.5.2  | 5.1.5.3  | 5.1.5.4  |
| 5.1.5.9  | 5.1.6.1  | 5.1.6.2  | 5.1.6.7  | 5.1.6.8  |
| 5.1.6.9  | 5.1.6.10 | 5.1.6.11 | 5.1.6.12 | 5.1.6.14 |
| 5.1.6.16 | 5.1.6.17 |          |          |          |

.2 Additional development controls for permitted and discretionary development within the river valley may be established as required to implement the policies of the plan, by the Development Officer or the Municipal Planning Commission, as the case may be.

## **5.6 Consequential Amendments**

Prior to the adoption of the River Valley Area Redevelopment Plan, amendments will be required for the appropriate statutory documents as outlined below.

### **5.6.1 Land Use By-law**

The Land Use By-law shall be amended such that the Land Use Districts Map of the By-law indicates that the redevelopment area is the Valley District. The Land Use By-law text will indicate that the provisions contained within the River Valley Area Redevelopment Plan will apply to the Valley District.

#### Statutory Plan Overlay

The Land Use Districts Map of the Land Use By-law shall indicate the area governed by this Area Redevelopment Plan by the designation of a general Valley District.

For information concerning the goals, objectives, policies and specific requirements of land use districts contained within the Valley District, reference will be made to this Area Redevelopment Plan. The River Valley Area Redevelopment Plan shall be complied with when interpreting and applying land use planning and development controls.

### **5.6.2 Statutory Plans**

#### Valleyview/Uplands Area Structure Plan

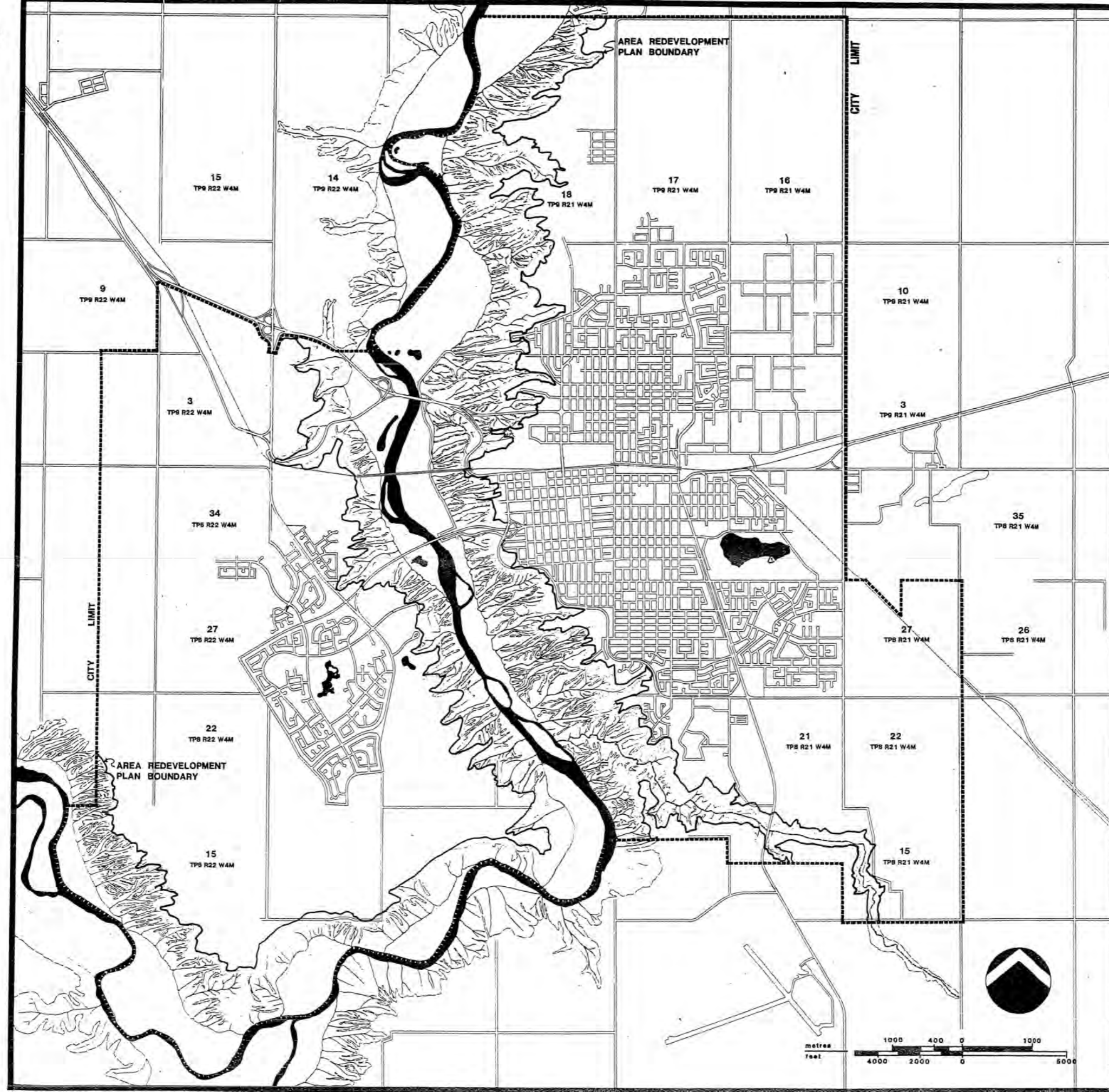
Modifications to the Valleyview/Uplands ASP would include a redefinition of the western boundary using the top of bank setback line determined for the eastern boundary of the River Valley Area Redevelopment Plan so that the two planning areas are coterminous.

### Downtown Phase II Area Redevelopment Plan




Modification to the Downtown Phase II Area Redevelopment Plan would include a re-  
definition of the western boundary using the top of bank setback line determined for the  
eastern boundary of the River Valley Area Redevelopment Plan so that the two planning  
areas are coterminous.

### Railway Relocation Lands Area Redevelopment Plan



Modification to the Railway Relocation Lands Area Redevelopment Plan would include a  
redefinition of the western boundary using the top of bank setback line determined for the  
eastern boundary of the River Valley Area Redevelopment Plan so that the two planning  
areas are coterminous.



**LEGEND :**


-  STREAM
-  RIVER / POND
-  COULEE

## RIVER VALLEY AREA REDEVELOPMENT PLAN






**CITY OF LETHBRIDGE**

**CONSULTANTS :**



**LOMBARD NORTH GROUP**  
301, 219-10 AVENUE SE, CALGARY, ALBERTA T2C 0V9



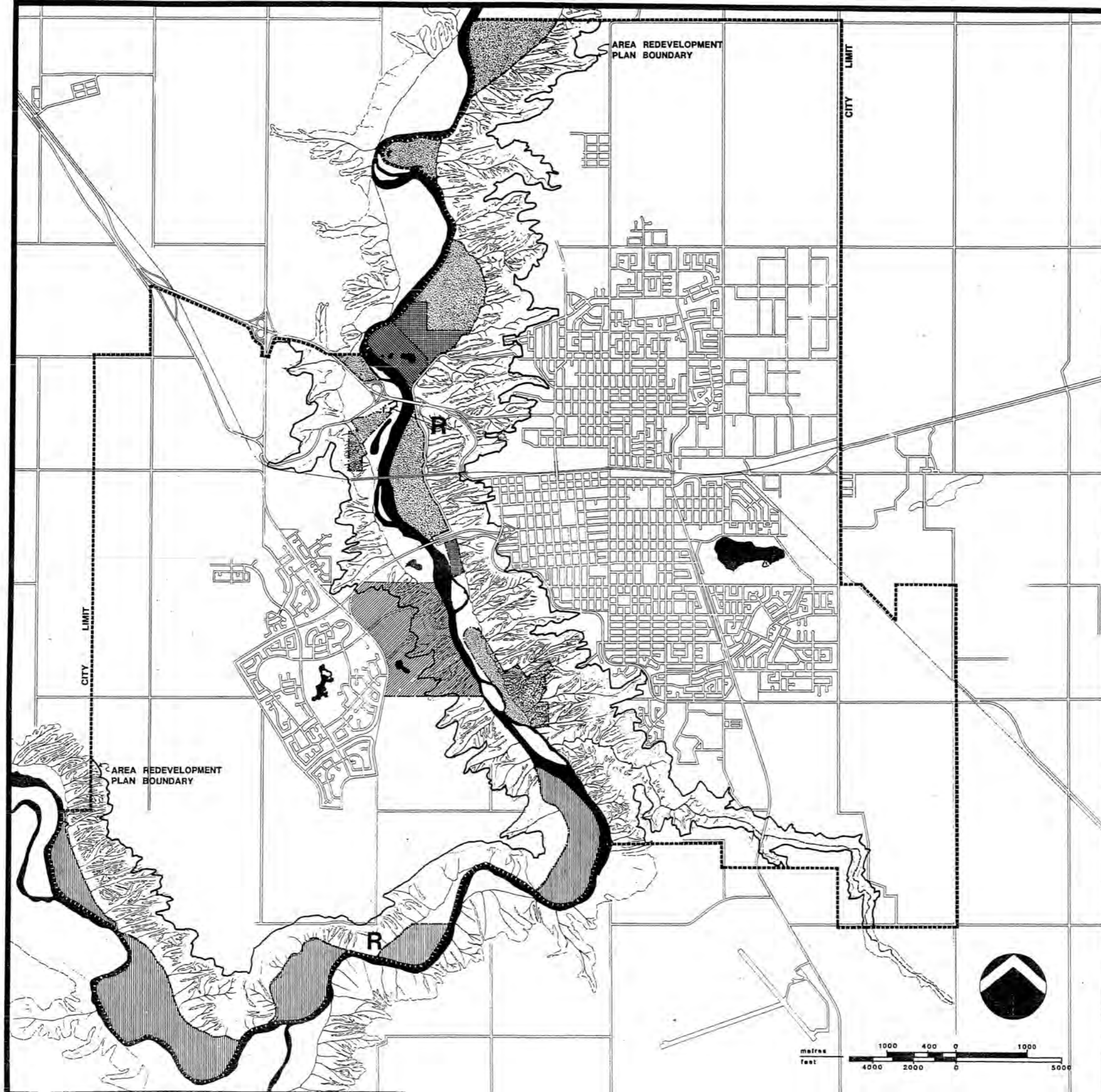
**Reid Crowther**  
Reid Crowther & Partners Ltd.  
Engineers, Planners, Scientists







**TITLE :**  
**STUDY AREA**

1

EFFECTIVE NOVEMBER 7, 1985





- LEGEND :**
-  INDUSTRIAL + UTILITY
  -  GRAVEL EXTRACTION / PROCESSING
  -  AGRICULTURAL
  -  INSTITUTIONAL
  -  RECREATIONAL
  - R** RESIDENTIAL
  -  UNDEVELOPED LAND OR LAND IN NATURAL STATE

# RIVER VALLEY AREA REDEVELOPMENT PLAN



CITY OF LETHBRIDGE

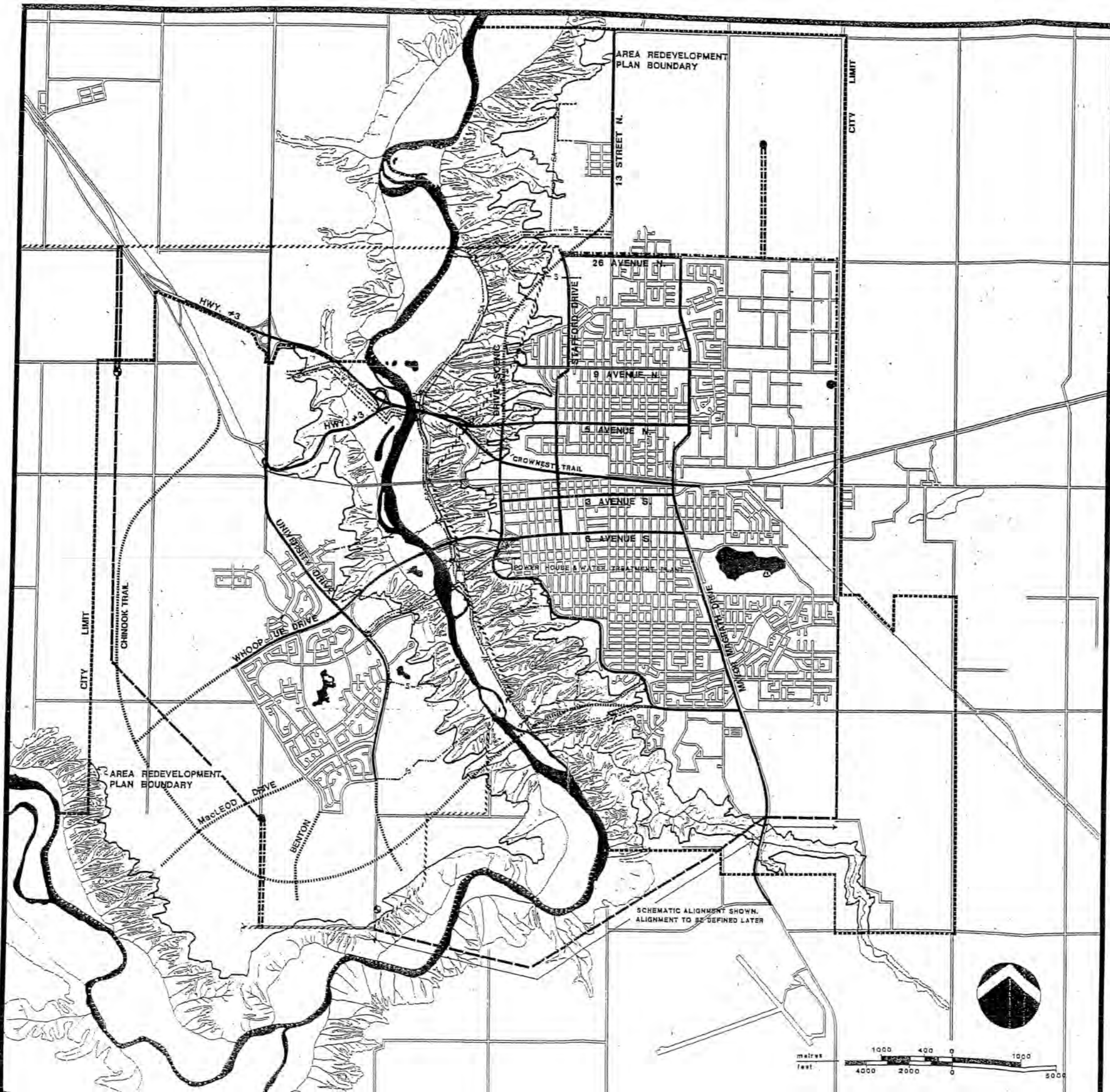
CONSULTANTS :  
 **LOMBARD NORTH GROUP**  
 301 2ND AVENUE SE, CALGARY, ALBERTA T2G 0V4

**Reid Crowther**  
 Reid Crowther & Partners Ltd.  
 Engineers Planners Scientists

TITLE :  
**EXISTING LAND USE**

**3**


EFFECTIVE NOVEMBER 7, 1985



**LEGEND :**

- MAJOR ROAD
- PROPOSED ROAD
- W— EXISTING WATER
- SA--- EXISTING SANITARY
- S--- EXISTING STORM
- W--- PROPOSED WATER
- SA--- PROPOSED SANITARY
- S--- PROPOSED STORM
- PROPOSED 138KV LINE (1990)
- EXISTING 138KV LINE CITY OF LETHBRIDGE
- TRANS ALTA 138KV LINE
- PROPOSED SUBSTATION
- EXISTING SUBSTATION

## RIVER VALLEY AREA REDEVELOPMENT PLAN



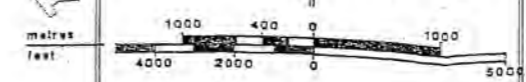


CITY OF LETHBRIDGE

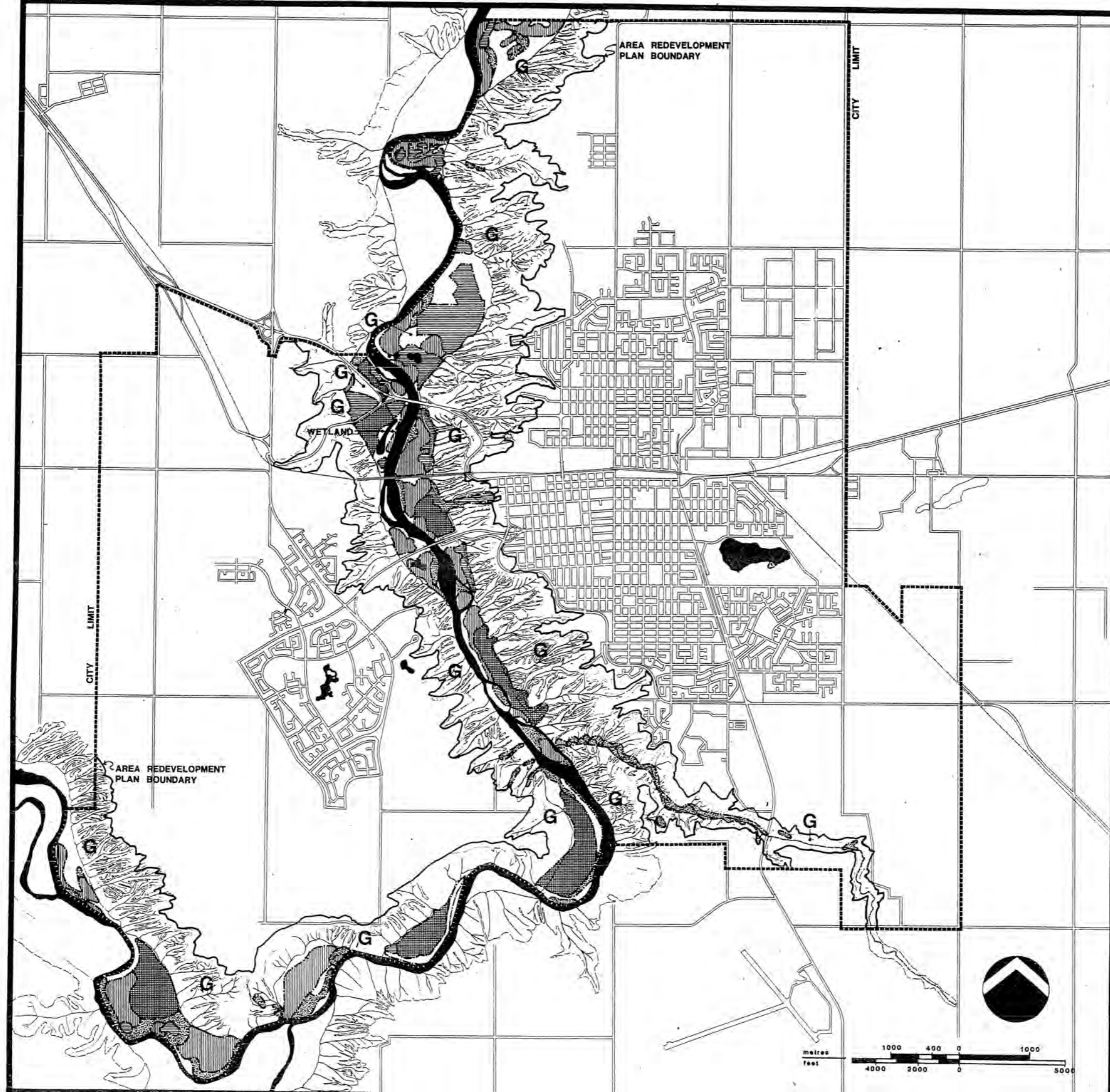
CONSULTANTS :

**LOMBARD NORTH GROUP**  
231, 139-10 AVENUE SE, CALGARY, ALBERTA, T1C 0V9

**Reid Crowther** Reid Crowther & Partners Ltd.  
Engineers, Planners, Geologists







- LEGEND :**
-  CROPLAND/PASTURE/LANDSCAPED
  -  TALL SHRUB
  -  TREES : COTTONWOOD/BALSAM POPLAR
  -  DISTURBED/DEVELOPED
  -  OPEN GRASSLAND

SOURCE : INTERPRETATION OF 1980 AIRPHOTOS  
SUPPLIED BY THE CITY OF LETHBRIDGE.

# RIVER VALLEY AREA REDEVELOPMENT PLAN



CITY OF LETHBRIDGE

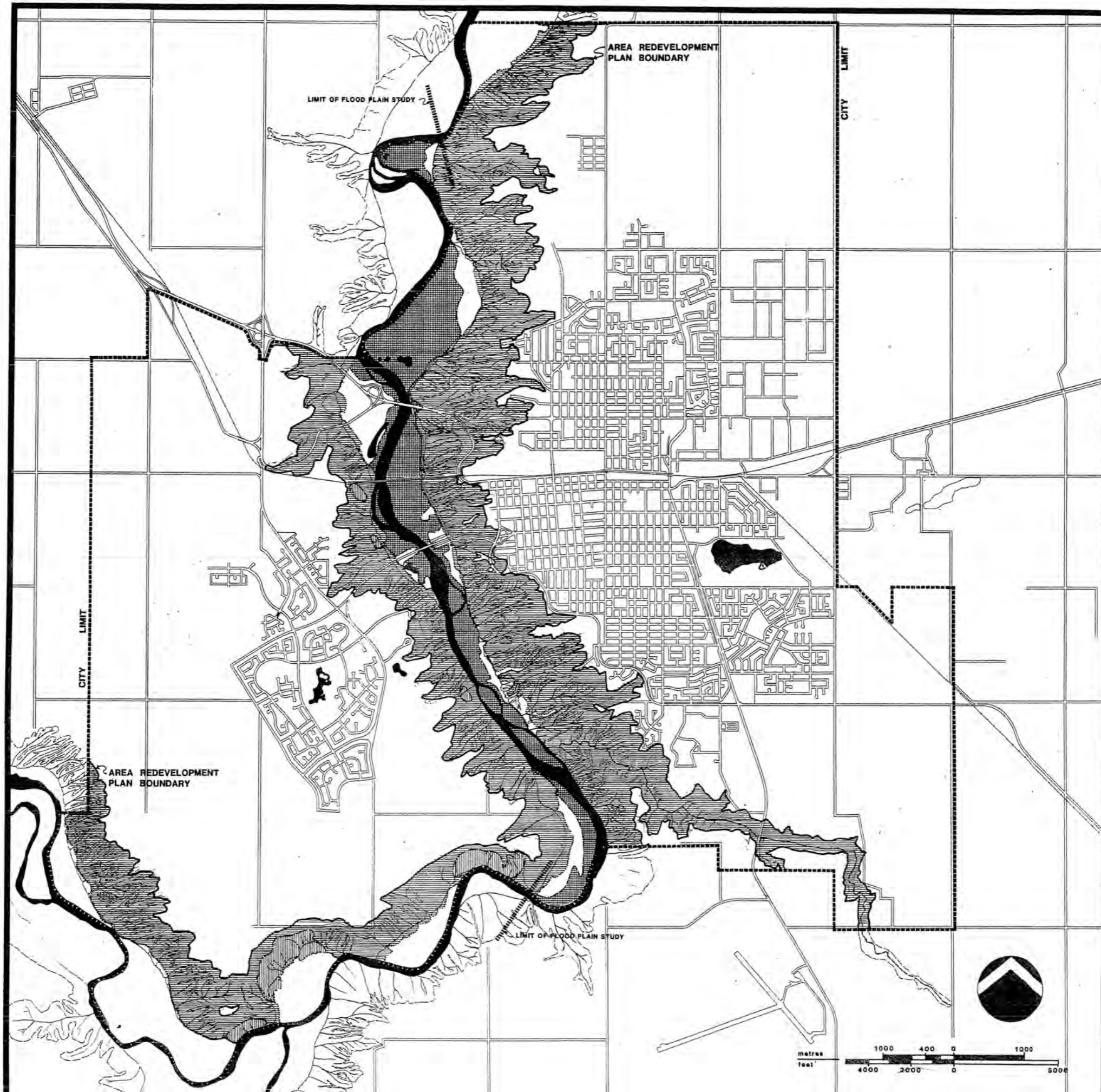
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**LOMBARD NORTH GROUP**  
201, 219-10 AVENUE SE, CALGARY, ALBERTA, T1G 0V9







**Reid Crowther**  
Reid Crowther & Partners Ltd.  
Engineers Planners Scientists

TITLE :  
**VEGETATION**

**5**

EFFECTIVE NOVEMBER 7, 1995



- LEGEND :**
-  COULEE TERRAIN
  -  MAJOR SLUMP AREAS
  -  1 IN 100 YEAR DESIGN FLOOD PLAN
  -  STREAM
  -  RIVER / POND
  -  BOTTOM OF SLOPE SETBACK

# RIVER VALLEY AREA REDEVELOPMENT PLAN

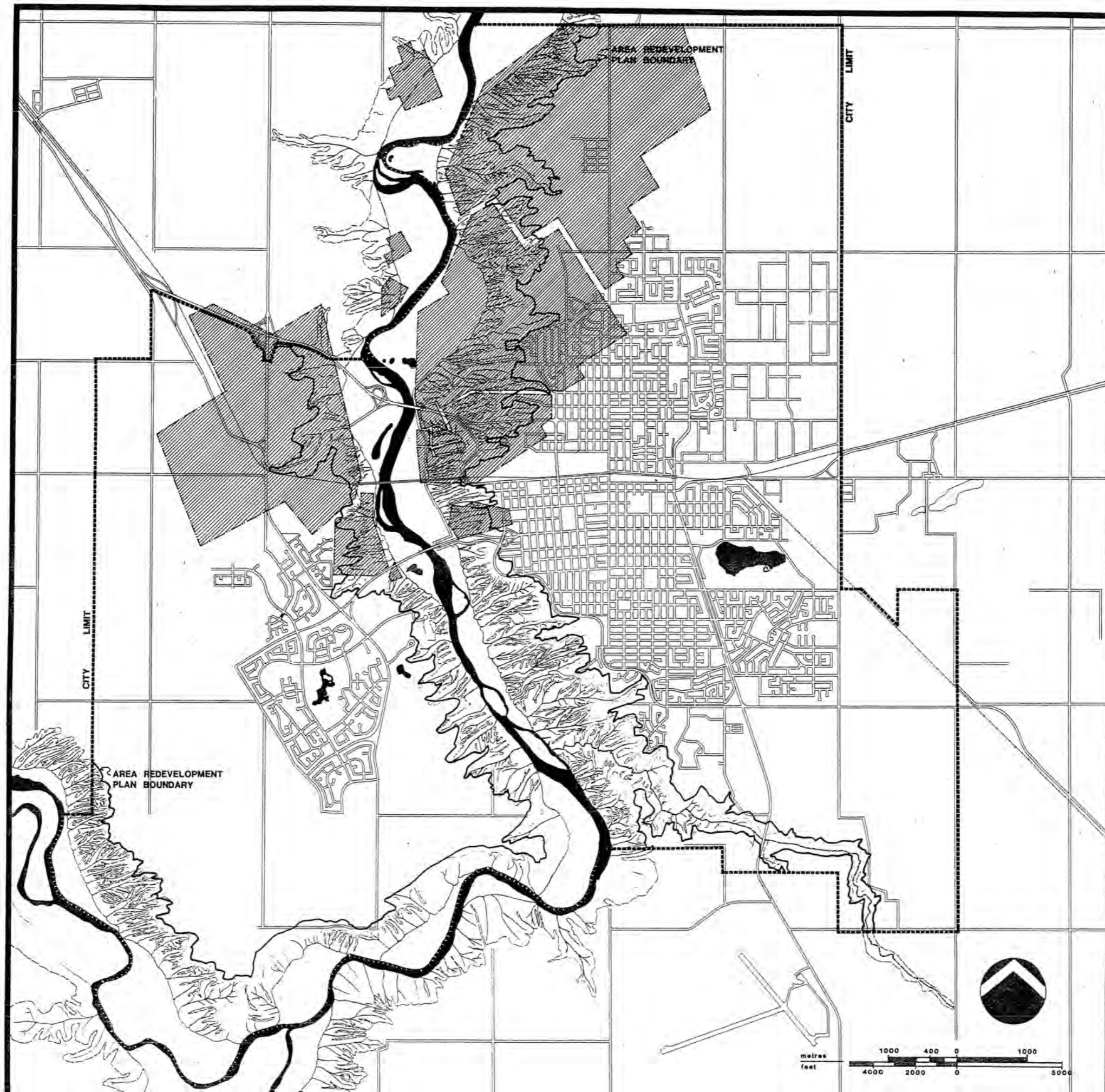


CITY OF LETHBRIDGE

CONSULTANTS :  
 **LOMBARD NORTH GROUP**  
 201, 219-10 AVENUE SE. CALGARY, ALBERTA. T2C 0W7

**Reid Crowther**  
 Reid Crowther & Partners Ltd.  
 Engineers Planners Scientists

TITLE :  
**PHYSICAL  
 CONSTRAINTS**  
 EFFECTIVE NOVEMBER 7, 1985



**LEGEND :**



**MINED AREAS**

NOTE : MAP BY ALBERTA TRANSPORTATION  
SURVEYS AND MAPPING BRANCH  
1:1000 CADASTRAL INVENTORY  
LETHBRIDGE AREA JAN. 12, 1980 R.E.

**RIVER VALLEY  
AREA  
REDEVELOPMENT  
PLAN**



**CITY OF LETHBRIDGE**

CONSULTANTS :



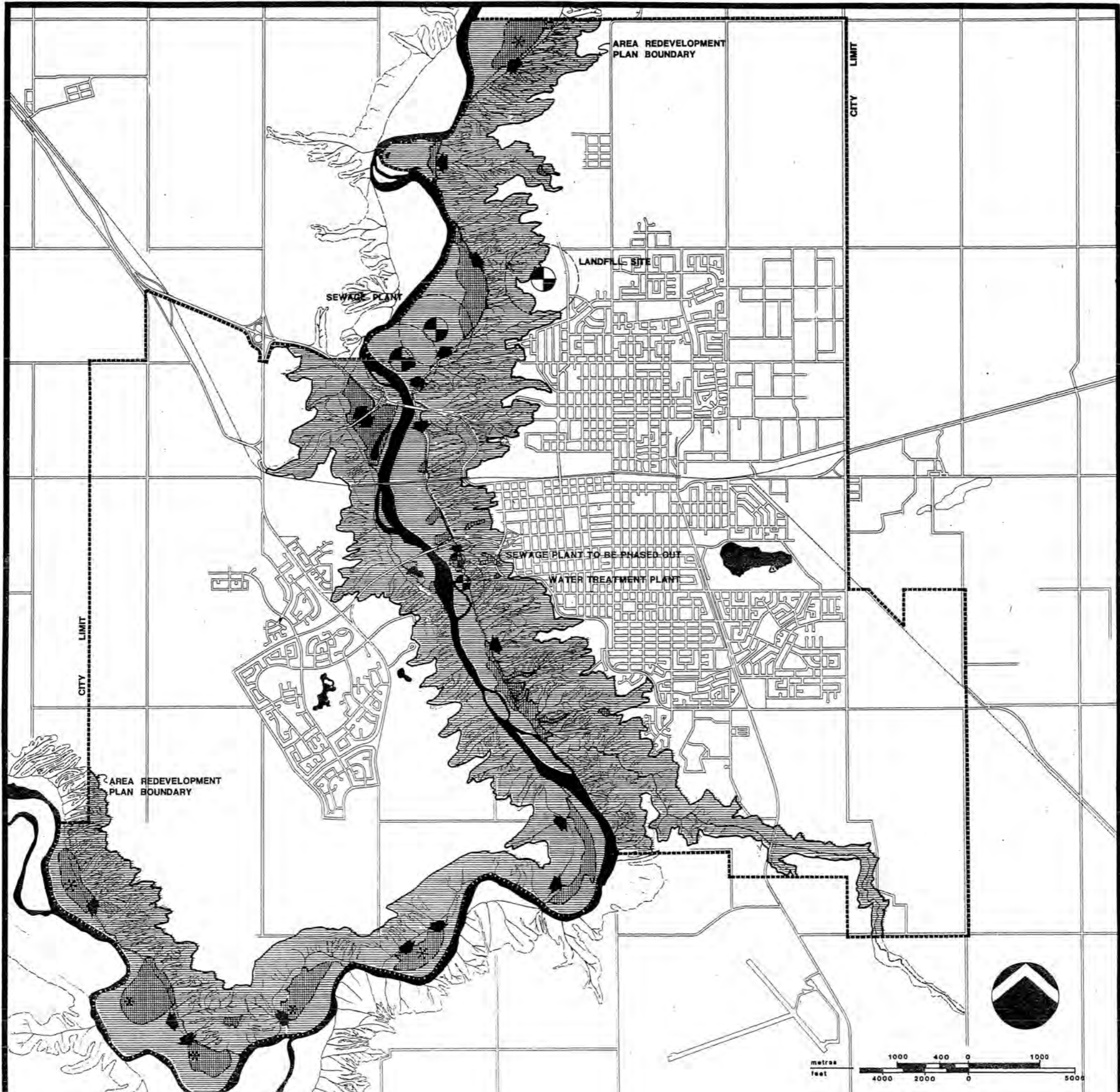
**LOMBARD NORTH GROUP**  
201 119-10 AVENUE SE CALGARY ALBERTA T1G 0V9








**Reid  
Crowther**

Reid Crowther & Partners Ltd.  
Engineers - Planners - Scientists




TITLE :

**MINED AREAS**




- LEGEND :**
-  POTENTIAL DEVELOPMENT CELL
  -  POTENTIAL DEVELOPMENT CELL (EXTENT OF AREA TO BE FURTHER DEFINED BY FLOOD STUDIES)
  -  LIMITED DEVELOPMENT POTENTIAL DUE TO LACK OF ACCESS
  -  LIMITED DEVELOPMENT POTENTIAL DUE TO PHYSICAL CONSTRAINTS & NATURAL HAZARD
  -  POTENTIAL VALLEY ACCESS POINT
  -  POTENTIAL LAND USE CONFLICT
  -  BOTTOM OF SLOPE SETBACK

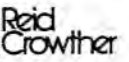
## RIVER VALLEY AREA REDEVELOPMENT PLAN

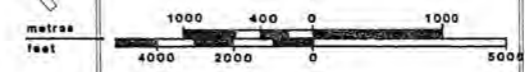
CITY OF LETHBRIDGE

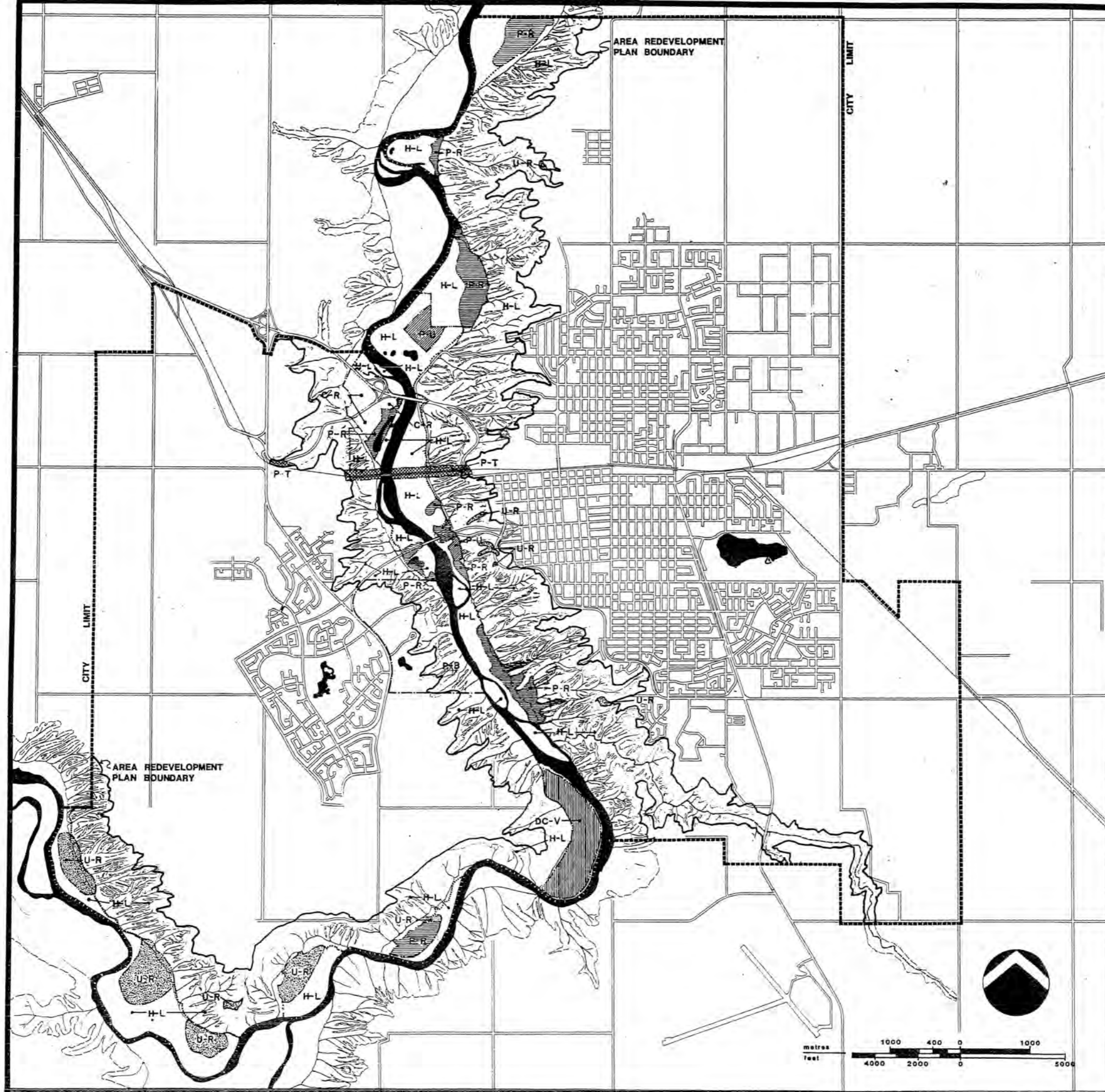
**CONSULTANTS :**

 **LOMBARD NORTH GROUP**  
201 236-10 AVENUE SE, CALGARY ALBERTA T2G 0V9

 **Reid Crowther**  
Reid Crowther & Partners Ltd.  
Engineers, Planners, Scientists

**TITLE :**  
**LAND USE POTENTIAL**








**LEGEND :**


	PARK AND RECREATION
	TRANSPORTATION
	PUBLIC UTILITIES
	URBAN RESERVE
	DIRECT CONTROL - VALLEY
	COMMERCIAL RECREATION
	HAZARD LANDS
	PUBLIC BUILDING
	BOTTOM OF SLOPE SETBACK

## RIVER VALLEY AREA REDEVELOPMENT PLAN

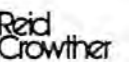




CITY OF LETHBRIDGE

CONSULTANTS :



**LOMBARD NORTH GROUP**  
201 219-10 AVENUE SE, CALGARY ALBERTA. T2C 0V9



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Engineers, Planners, Scientists