

## ENCHARIS COMMUNITY HOUSING & SERVICES

PRINCE OF PEACE – MASTER SITE DEVELOPMENT PLAN  
2000 LUTHER ROSE BLVD., NORTHEAST CALGARY, AB

### 4.4.3 School Development

#### 4.4.3.1 Project Description

At present, the Rocky View School District is contemplating schools in the northeast corner of the site. These schools will accommodate K-6 and a high school as determined in collaboration with the District. The Public-Service zoning will accommodate the school facilities.

#### 4.4.3.2 Project Location

In order to have the school environment accessible to the Rocky View County possible, it was deemed to maintain the school environment in the northeast quadrant of the site. This will ensure that the school and bus impacts the site and the residents in the development to a minimum and will contribute to a safe and protected environment for the senior population while still allowing for the desired interaction without crossing traffic paths.

#### 4.4.3.3 Proposed Geometry

The building geometry is similar in approach the existing school facility so that classrooms will be on either side of double loaded corridors to maximize the amount of daylight entering classrooms. To some extent the geometry of the new addition has been influenced by the proposed layout of the remainder of the site, influences related to the existing wetlands and water-bodies located in and around the site, together with the anticipated major circulation routes within the immediate area.

#### 4.4.3.4 Proposed Form and Character

It is envisioned the architectural design and features of the school shall be appropriate to the existing architectural styles in order to create a cohesive architectural environment in relation to building form, materials and scale.

### 4.4.4 Private Assisted Living (PAL)

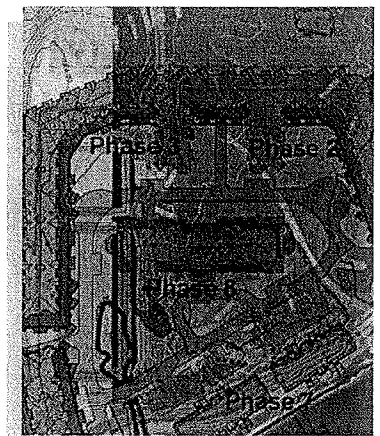
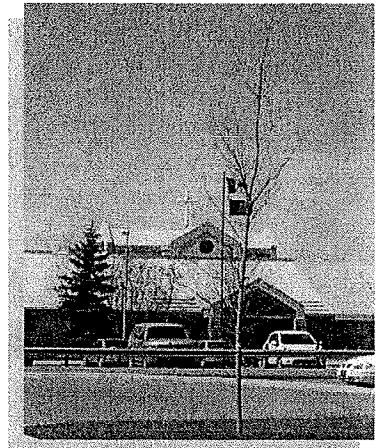
#### 4.4.4.1 Project Description

Within the Prince of Peace site a wide range of residential care has provided for various ages with varying degrees of medical requirements, as well as a mix of lifestyle preferences based on the aging population. It is the intent of Prince of Peace to provide and continue to foster an atmosphere of community belonging even to the later days into seniors' lives. Therefore, space has been allocated to accommodate for a Private Assisted Living (PAL) Facility to aid with future demand within the community when time deems it appropriate.

The proposed PAL Facility would be located on a site with an area of approximately 14,326 square meters/1.43 hectares (3.54 acres) with a proposed building area of 213,862 square feet (19,868 square meters).

#### 4.4.4.2 Project Location

The location of the PAL is adjacent to residential condominiums for seniors, and adjacent to the village center commercial area providing access to support facilities and the adjacent lake providing visual interest and variety.



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**4.4.4.3 Proposed Geometry**

It is proposed that the building will be a six-storey building, providing approximately 210 PAL suites. The PAL will be designed with a home-like environment with adjoining suites so that family members can stay and provide close companionship to their relatives. Spaces for visiting palliative care physicians, counseling services, and bereavement services to support the hospice program will also be provided.

**4.4.4.4 Proposed Form and Character**

The architectural theme relating to the building would be continued from the themes in the immediate environment. The scale and proportions of the building would be residential in nature in order to be complimentary to the local area.

**4.4.5 Mixed Use Development**

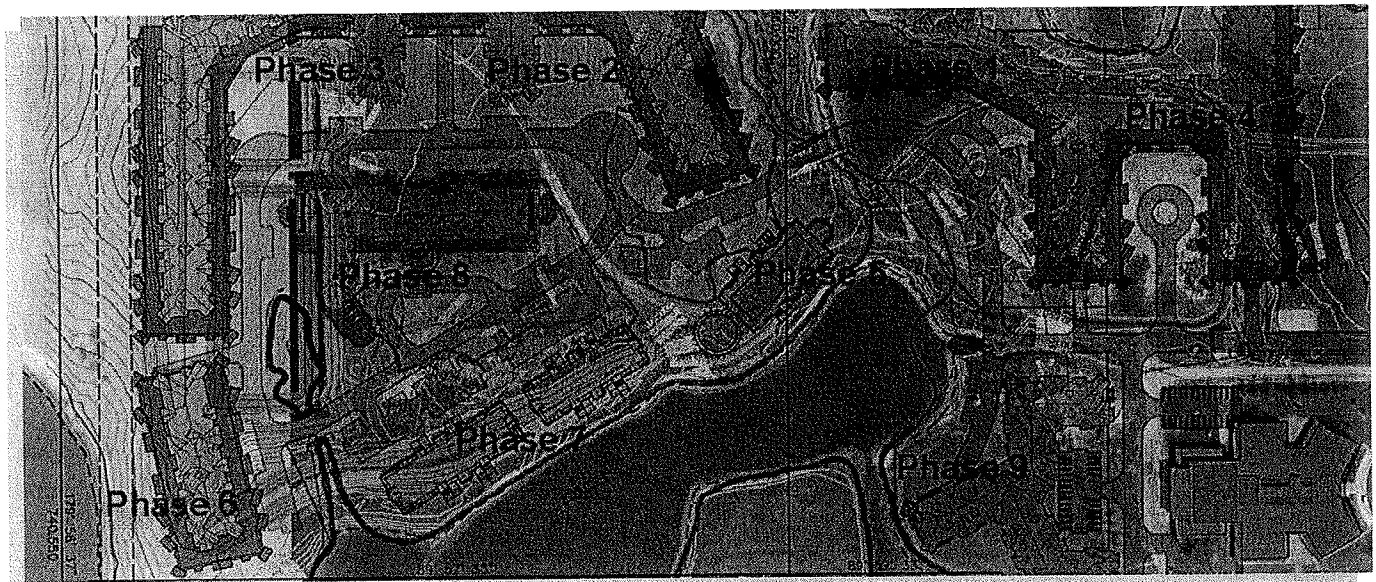
**4.4.5.1 Project Description**

The mixed use development is intended to provide an opportunity for small scale commercial endeavors that are specifically intended to augment the seniors and comprehensive housing environment. The small scale amenity can provide the much needed amenities that provide for quality of life. Located above the main level commercial development a variety of uses will be accommodated including opportunities for professionals who can contribute to the quality of life for the community. In addition upper level residential opportunities will be accommodated at this level.



**4.4.5.2 Project Location**

Centrally located and immediately north of the main water feature on the site, the Mixed-Use development provides an excellent buffer between the village development and the Multi-Family Condominium development fronting the Trans-Canada Highway and the intervening Hospice. It is designed to take advantage of the on-site amenities, allowing for ready access to the waterfront promenade at the main floor and being centrally located, optimally serves the residential development on all sides.



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**4.4.5.3 Proposed Geometry**

The proposed building geometry draws on existing buildings at the Prince of Peace site heading to a cohesive overall aesthetic. The upper reaches of the roof are defined with a mansard allowing for a flat roof environment which will serve also as a roof garden amenity. The main floor will be accessible from grade at multiple locations accommodating small business and support services. The upper levels will accommodate professional practice and some residential components.

**4.4.5.4 Proposed Form and Character**

The proposed form and character is demonstrated in the attached rendering. The intent is to create an appropriately scaled mixed-use development that will be accessible at the main level and interface via terraces and plazas that will accommodate an effective transition from the landscape environment to the building. The upper areas of the Mixed-Use development is designed to augment the village concept characterized by gables and dormers providing a residential scale.



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 PRINCE OF PRINCE - MASTER SITE DEVELOPMENT PLAN  
 285330 LUTHER ROSE BLVD., NORTHEAST CALGARY, AB

**4.5 POPULATION & DENSITY**

The following table below indicates the estimated population for the new development. Occupant loads for the Condominiums, Supportive Housing and Mixed Use developments have been based on suite numbers, suite size and suite mix. PAL, Designated Assisted Living and the proposed Harbour expansion have been based on suite numbers.

The number of occupants for the Mixed Use portions are based on gross floor area (at main floor) allowing for one staff member per 100 square meters. As mentioned in the notes below the table the estimates are maximums based on the full capacity of all buildings.

Based on the Overall Total Site Area: 86.91 acres (35.17 ha)  
 Estimated New Additional Population: 3045 \*Refer to Appendix A2  
 Approximate Unit density based on total site area: 55.24 units / Ha (22 upa)  
 Approximate Total Site Population Density (3507) 40 persons / Ha (16 ppa)

Unit Type	Number of Units	Avg. Number Of Residents Per Unit	Total Residents
Duplex/Fourplex	174	1.4	250
Assisted Living (incl. kitchen)	159	1.1	180
School/Church	N/A	N/A	300*
Harbour	32	1	32
<b>Total</b>	<b>365</b>		<b>462</b>

\*Church and school members, not residents

Note: Existing population of 462 total residents as indicated on the table above (based on 365 existing units) is for reference only and a larger copy can be found in Appendix A2

EnCharis Master Planning

**Schedule of Accommodation (Preliminary)**

Existing Site Area = 86.91 AC (Parcel A - 55.08 & Parcel B - 31.83)

Building Type	Phase	Parcel Area (Assumed)	Developable Area - Acres (Assumed)	*Non-Developable Area - Acres (Assumed)	Building Gross Floor Area - SF	FAR	Stories	Suites	Bays	Suite Breakout				Mix per floor	
										1 Bed (varies)	(% varies)	2 Bed (varies)	(% varies)		
Condominium Suites	1 & 4	14.88	11.41	3.47	617,034	0.95	6	346			50%	173	50%	173	6 Floors Residential
Condominium Suites	2 & 3	17.14	10.9	6.24	834,255	1.12	6	502			40%	201	60%	301	6 Floors Residential
Condominium Suites	6	2.82	1.83	0.99	137,542	1.12	6	78			33%	26	67%	52	6 Floors Residential
Condominium Suites	0	0	0	0	0	0	0	0							Floors Residential
Condominium Suites	0	0	0	0	0	0	0	0							Floors Residential
<b>Sub Total</b>		<b>34.84</b>	<b>24.14</b>	<b>10.7</b>	<b>1,588,831</b>	<b>3.19</b>		<b>926</b>							
Mixed Use - Suites above	5	2.74	1.62	1.12	51,237	0.43	3	16	8		25%	4	75%	12	2 Res' and 1 Commercial
Mixed Use - Suites above	7a	3.06	1.37	1.69	25,312	0.19	2	8	8		25%	2	75%	6	1 Res' and 1 Commercial
Mixed Use - Suites above	7b	2.92	1.43	1.49	29,408	0.23	2	12	8		33%	4	67%	8	1 Res' and 1 Commercial
Mixed Use - Suites above	9	4.62	3.03	1.59	123,461	0.61	3	64	21		46%	30	54%	34	2 Res' and 1 Commercial
<b>Sub Total</b>		<b>13.34</b>	<b>7.45</b>	<b>5.89</b>	<b>229,418</b>	<b>1.46</b>		<b>100</b>	<b>45</b>						
Supplemental Accommodation		1.79	1.79	0	135,997	1.74	4	60			44%	27	56%	33	4 Floors Residential
Designated Assisted Living		7.08	6.62	0.46	164039	1.04	4	178							4 Floors Residential
Harbour Addition		7.89	5.33	2.56	83,651	0.39	2 & 3	104							2 & 3 Floor Residential
<b>Sub Total</b>		<b>16.76</b>	<b>13.74</b>	<b>3.02</b>	<b>383,687</b>	<b>3.17</b>		<b>342</b>							
New Chapel		1.43	0.54	0.89	939	0.02	1								
New 6 Storey DAL	8	3.54	2.99	0.55	213,862	1.39	6	210			100%	210			6 Floors Residential
New Elementary School		5.73	2.88	2.85	36,371	0.15	1								
New High School		6.28	4.64	1.64	60,439	0.22	1								
Existing Church		4.99	4.99	0	47,501	0.22	1								
<b>Sub Total</b>		<b>21.97</b>	<b>16.04</b>	<b>5.93</b>	<b>359112</b>	<b>1.99</b>		<b>210</b>							
<b>Grand Total</b>		<b>86.91</b>	<b>61.37</b>	<b>25.54</b>	<b>2,561,048</b>	<b>9.81</b>		<b>1578</b>	<b>45</b>						
Total Care Suites for Entire Site								492							
Total Suites for Entire Site								1086							
Total Commercial Bays for Entire Site									45						

Grand Total of Proposed New Suites only for Development 1578



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## 5.0 PROJECT UNDERSTANDING & APPROACH

### 5.1 PHILOSOPHIC APPROACH TO SENIORS ACCOMMODATION

At Prince of Peace the welfare and wellbeing of the residents is paramount and there is a clear mandate to provide Eldercare to the highest possible standard. Numerous factors impact on resident health and ARFAi is working closely with Prince of Peace to ensure that the geometry of the proposed buildings effectively accommodate these needs and that the future geometry will augment and facilitate these requirements.

The building design is based on recent experience with Alberta Health and the cluster concept which allows residents with cognitive challenges to enjoy a more intimate and holistic environment without having to be exposed to a large scale institutional setting. An individual can, for example, enjoy meals with a limited number of residents instead of a dining room that can seat 200. In spite of this attention to the needs of the frail and elderly, the staffing model, which allows for a free flow of staff through back-of-house circulation, can ensure the viability of this level of care for many years to come.

One of the most exciting contributions to eldercare is the emerging philosophy of the Eden Alternative. The Eden Alternative engages the resident in their living environment and allows them to interact and be a part of their own caregiving which is greatly superior to conventional eldercare which will often see the resident only as a patient rather than an active participant with a free will to impact their living experience. The impact on the respective space is that it is now designed as a living environment without long institutional hallways and this space can now instead augment the living environment and contribute to activity space. Prince of Peace has committed to the Eden Alternative and the design is specific to the concept.

This commitment to the well-being of seniors carries also into all aspects of Universal Design and the design of the site which will result in a seniors environment that will best address the needs of the residents at Prince of Peace.

### 5.2 BIOPHILIA

#### 5.2.1 The Love of Living Systems

The term "biophilia" which literally means "love of life or living systems" was coined by Erich Fromm to describe a psychological orientation of being attracted to all that is alive and vital. Humans subconsciously seek connections with the rest of nature. We are attracted and have positive feelings towards natural habitat and objects in their natural surroundings. Studies at both Harvard and Yale have provided empirical evidence that when humans have access to nature their systems perform better. Patients in hospitals with courtyard environments can statistically be shown to heal faster than patients who have no ability to be outdoors. The same is true for students, with all else being equal; those with access to the outdoors will achieve higher grades. From this we can know with confidence that seniors who have access to the outdoors will age more graciously than those who do not.



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**5.2.2 Prince of Peace – Natural Environment**

The grounds at Prince of Peace have been developed to maximize access to the outdoors. Extensive walking trails cross the site linking natural wetlands harboring a variety of bird and mammal species. It is the intention of this design to augment and embellish the natural environment preserving and maintaining the healthy habitat that exists in providing additional new areas for these animals to coexist with the residents of the site.



**5.2.3 Proposed Benefits**

The benefits of the natural environment are already evident at Prince of Peace. The health of our present residents exceeds that of other accommodations. It is anticipated that some seniors who make their way into the Prince of Peace environment may actually have improved health as they are exposed to the serene natural surroundings in the context of the site.

**5.3 SUSTAINABILITY**

Sustainability plays a vital role in any contemporary development and it has been identified as a primary criterion for the Prince of Peace. A characteristic that has set Prince of Peace apart is its conscientious commitment to integrity and morality and the desire to exercise effective stewardship over the natural environment. The following are opportunities that will be realized in the design of the facilities and buildings on this site.

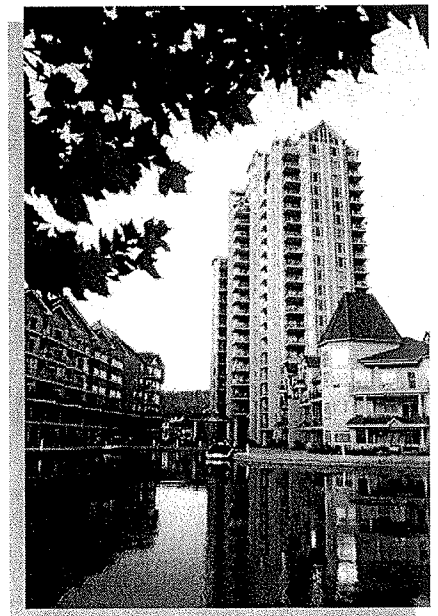


**5.3.1 Geothermal Exchange System**

A geothermal exchange system utilizes the thermal mass capacity of the earth to store energy for future consumption. The temperature of the upper 6 m of the surface maintains a nearly constant temperature between 10 and 16°. This temperature is augmented by heat that is rejected during the cooling season and is later harvested during the heating season. The ground source thermal mass is accessed by boreholes 220 feet deep which house 3/4 inch diameter pipes containing a solution of water and 25% glycol. The lines are then sized up to 1-1/2 inches and ultimately 2 inch (inside dimension) lines which feed into the building. The system will be designed to accommodate two modes:

1. An ability to reject heat into the ground and
2. An ability to access and absorb heat that is stored in the ground.

ARFAi has recently designed a successful Geothermal Exchange System at Heritage Heights located Medicine Hat. The geometry of the building users similar to that which is proposed at Prince of Peace as is the geography and climate. In light of this consideration it is anticipated that the implementation of the Geothermal Exchange System will also be successful at the Prince of Peace site. In order to ensure that we system functions effectively the first season of operation will be the cooling season so that the ground source can be supercharged prior to a subsequent drawdown in the ensuing winter. The heat that is rejected into the thermal mass of the ground will be harvested in this next cold season. The system will be implemented with deep ground loops.



Energy modeling will be undertaken at regular intervals throughout all of the heating season as it commences and as demand on the system occurs. This modeling will ensure that the system is operating at peak performance and that the ground source thermal mass is taxed at optimized rates.



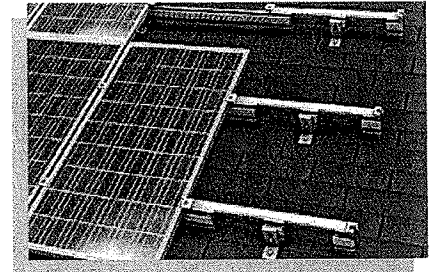
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**5.3.2 Photovoltaic System**

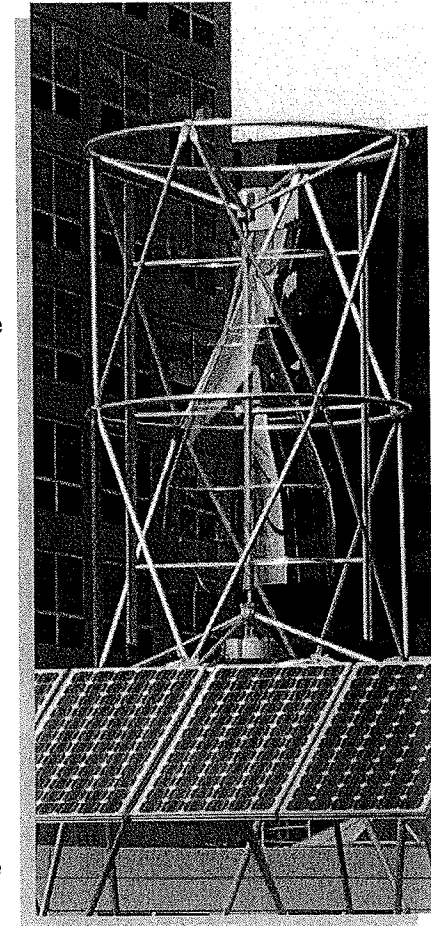
A Photovoltaic System (PV system) uses solar panels to convert sunlight into electricity. The solar photovoltaic panels collect the energy from the sun and an inverter subsequently takes the DC power that is collected and converts it to AC power. The system proposed for Prince of Peace is the micro inverter system which allows each panel to operate independently of the rest of the photovoltaic panels. Historically if solar shading occurred on a number of panels the system would decrease in efficiency however through the micro inverter system if solar shading occurs; the balance of the panels receiving sunlight continue to generate electricity efficiently. It is anticipated that the power produced by the system will be consumed by the building directly although it will have the potential, and will be wired to, contribute back to the grid. It is expected that the power produced by the photovoltaic array will continue to be the first utilized in perpetuity as it is on site produced and as such will be the first engaged. Photovoltaic systems have been proven to be economically viable through lifecycle costing analysis.



Coupled with the geothermal exchange system a photovoltaic system becomes dramatically more efficient. The photovoltaic system will assist in creating 25% COP on the geo-exchange having exponential results.

**5.3.3 Graywater Recycling**

ARFAi has been playing a leadership role in graywater recycling in Alberta. In a recent project in Medicine Hat the plumbing was triple piped to allow for the graywater from vanities and showers to be utilized for the flushing toilets. This results in a savings of one third of the water consumption within the facility. It also results in a reduction of one third of the sewer since his graywater is normally shed directly to the sanitary sewer lines of the municipality. A similar concept of graywater recycling is planned for the development on the Prince of Peace site.



**5.3.4 Storm Water Management**

The City of Calgary demands that the storm water during construction be managed to LEED standards. On the Prince of Peace site the same rigorous specifications for erosion and sedimentation control will be implemented. In order to ensure that minimal storm water needs to be managed on the site some of the road and parking environments will be finished in concrete grid pavers allowing storm water to percolate into the ground rather than contributing to runoff which needs to be managed in storm drains. In addition many of the water bodies designed to provide for storm water management will allow for the rainwater to be retained on-site and in turn irrigated to create the required free board for the next rainwater event.

**5.3.5 Electrical Wind Generation**

Current technology exists for aesthetically pleasing small-scale wind generators which can effectively be incorporated into the site at Prince of Peace. These technologies will be explored to see if they can effectively augment the photovoltaics planned for the development.



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## ISSUED FOR APPROVAL

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sworn before me at \_\_\_\_\_  
this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_

\_\_\_\_\_  
A Commissioner for taking Affidavits  
within British Columbia

## Staged Master Drainage Plan

for

## Prince of Peace Village

Prepared for:

**EnCharis**

**C/O**

**Alvin Fritz Reinhard Architects Inc.**

Prepared by:

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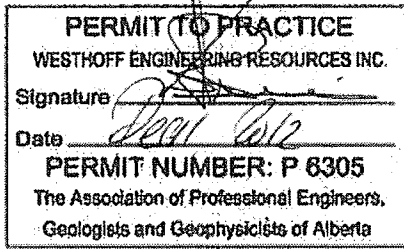


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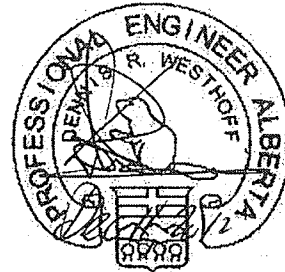
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**APPENDICES**

Appendix A	SWMHYMO Input and Output
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## 1.0 INTRODUCTION

The Prince of Peace Village (Project Area) is located within the quarter-section NE 19-24-28-W4M, Rocky View County. The existing Prince of Peace Village is a mixed use development with a maximum developable area of approximately 49 hectares, with over half of the area covered by existing development. The Project Area is bounded by the TransCanada Highway to the north, Garden Road to the east, with undeveloped agricultural land to the west and south. Figure 1 shows the location of the project area within Rocky View County (RVC).

### 1.1 Objectives

The objective of the SMDP is to develop a drainage strategy for the expansion of the Prince of Peace Village. The Project Area is located within the Shepard Regional Drainage Plan. The Shepard Regional Drainage Plan (SRDP) incorporates stormwater volume and release rates for developed area. The SRDP has yet to be approved by the governing bodies within the Greater Calgary Region. Until such a time as the plan is approved and the funding of required infrastructure has been established, there remains years of planning and construction to service the area within SRDP. As such, the timing and execution of the SRDP is years and potentially decades into the future. Developments within this region are required to operate under zero discharge conditions until such a time as the infrastructure becomes available to discharge off site.

Specifically, the drainage system shall incorporate design elements for stormwater runoff capture. Enhanced evaporation and reuse of stormwater form the basis for managing stormwater in a sustainable manner under zero discharge conditions.

#### 1.1.1 Previous Reports

Relevant studies reviewed for the purpose of this report:

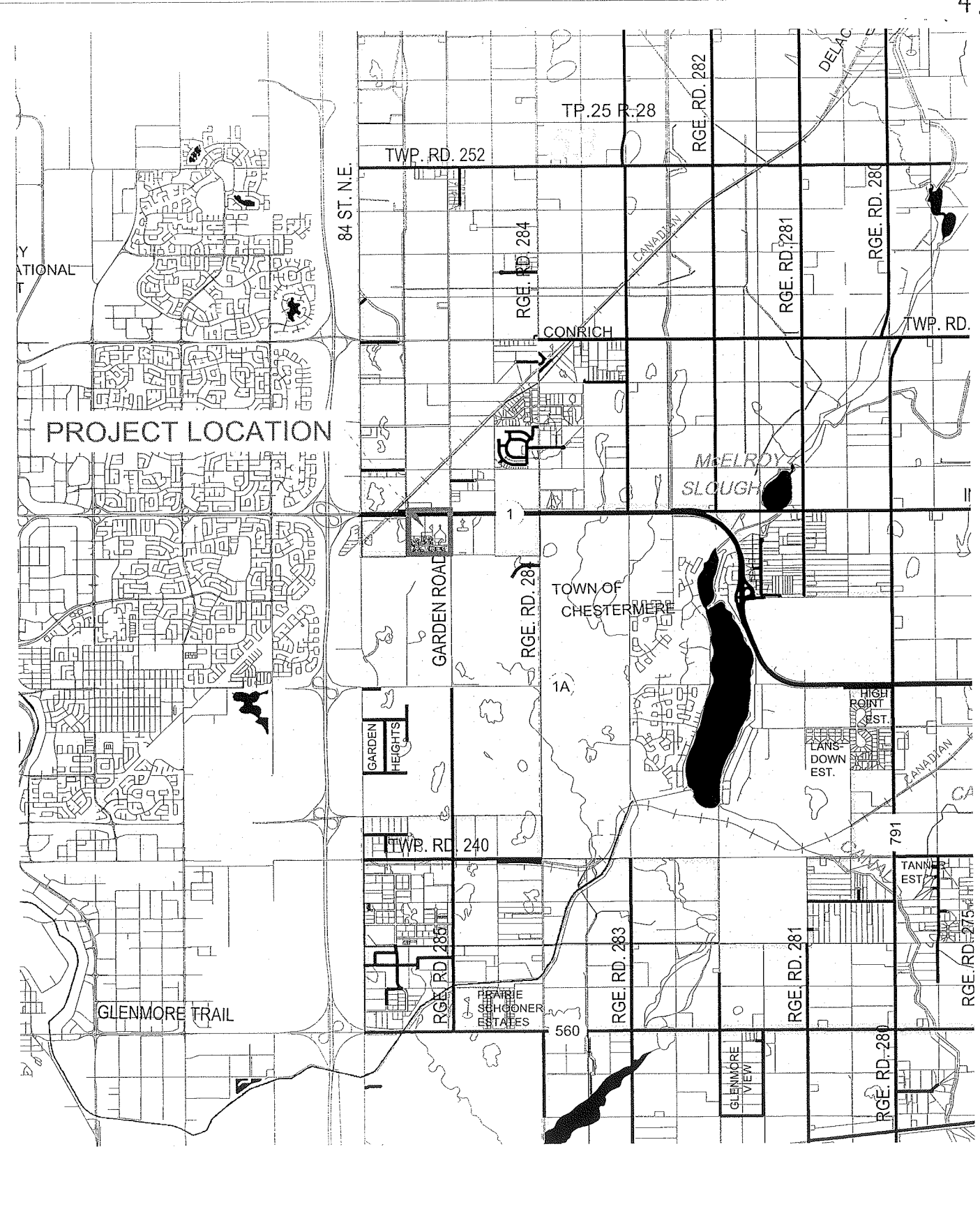
- Shepard Regional Drainage Plan (Draft), AECOM, November 2011
- Stormwater Management Report, Jubilee Engineering Consultants Ltd, January 2009
- Stormwater Management Report, Jubilee Engineering Consultants Ltd, September 2007
- Stormwater Management Report, Jubilee Engineering Consultants Ltd, January 2002
- Stormwater Management Report, Jubilee Engineering Consultants Ltd, October 1996
- Geotechnical Evaluation, McIntosh Lalani Engineering Ltd., November 2008
- Geotechnical Evaluation, McIntosh Lalani Engineering Ltd., April 2007
- Geotechnical Evaluation, EBA Engineering Consultants Ltd., October 2001
- Geotechnical Investigation, Curtis Engineering Associates, December 1996

## 1.2 Methodology

The following methodology was used to conduct the study:

- Collect all relevant information, including topographic mapping, concept development plans, land use drawings;
- Conduct a field reconnaissance to confirm key aspects of the existing drainage characteristics, locate existing drainage courses, culvert crossings, spill location, evaluate the potential for external run-on from adjacent land;
- Delineate the pre and post development catchment and catchment areas based on existing contour information and proposed land use information. Additional contour data covering areas surrounding the project site was provided by the client.
- Determine the extent of external catchment area contribution to the site, evaluate strategies to mitigate the influence from external run-on;
- Identify drainage constraints, evaluate drainage courses, low lying areas, natural depressional storage and capacity;
- Review associated Biophysical Impact Assessment and groundwater reports;
- Determine the existing storage capacity in the main pond through bathymetry survey. Locate strategic locations for stormwater management facilities while allowing for the retention of significant wetlands within environmentally significant areas ;
- Determine land use planning characteristics;
- Assess storage requirements based on land use planning;
- Determine the overland flow path and direction of flow from private lots to stormwater facilities;
- Determine criteria and operational procedures to manage stormwater under zero-discharge conditions;
- Provide recommendations for compliance with SRDP, water quality requirements, identify right-of-way dedication for future conveyance routes, release rates; and
- Develop a WaterBalance model to generate continuous simulation results based on the unique characteristics of the development.

Original Size: 5" x 11"



DRAWN BY: JENT:



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PROJECT: PRINCE OF PEACE VILLAGE EXPANSION

TITLE: FIGURE 1: PROJECT LOCATION

DATE:	PROJECT No:	SCALE:	CAD FILE:	FIGURE No:	REV:
18-10-2012	WER112-25	N.T.S.	11225FG01	FG01	0

## 2.0 EXISTING DRAINAGE CONDITIONS

The existing development manages stormwater through three (3) stormwater facilities. Currently the Project Area operates under zero-discharge conditions, retaining 100% of the runoff within the site. Stormwater flows are directed predominately by overland drainage through grassed swales, ditches and via several culvert crossings toward the stormwater facilities. Implementation of irrigation programs for landscaped areas has already been introduced within the development to reduce pond volumes. Existing development shall maintain the level of service as per the previous Stormwater Management Reports prepared by Jubilee Engineering Consultants Ltd (Jubilee).

### 2.1 Existing Catchment Areas

The existing development within the Project Area is comprised of several catchment areas, previously determined by Jubilee for the initial phased development. The existing catchment areas described in the Stormwater Management (SWM) Report are given in Table 1. The 2002 SWM Report presented the pre-development and post development analysis for all six post development catchments identified in the report (Jubilee, 2002).

Table 1 Existing Catchment Areas

Catchment	1996 Pre Development Areas (ha)	2002 Post Development Areas (ha)
A	31.20	25.20
B	18.23	12.24
C	9.36	6.81
D	2.28	6.59
E	-	5.03
F	-	1.55
<b>Total</b>	<b>61.07</b>	<b>57.42</b>

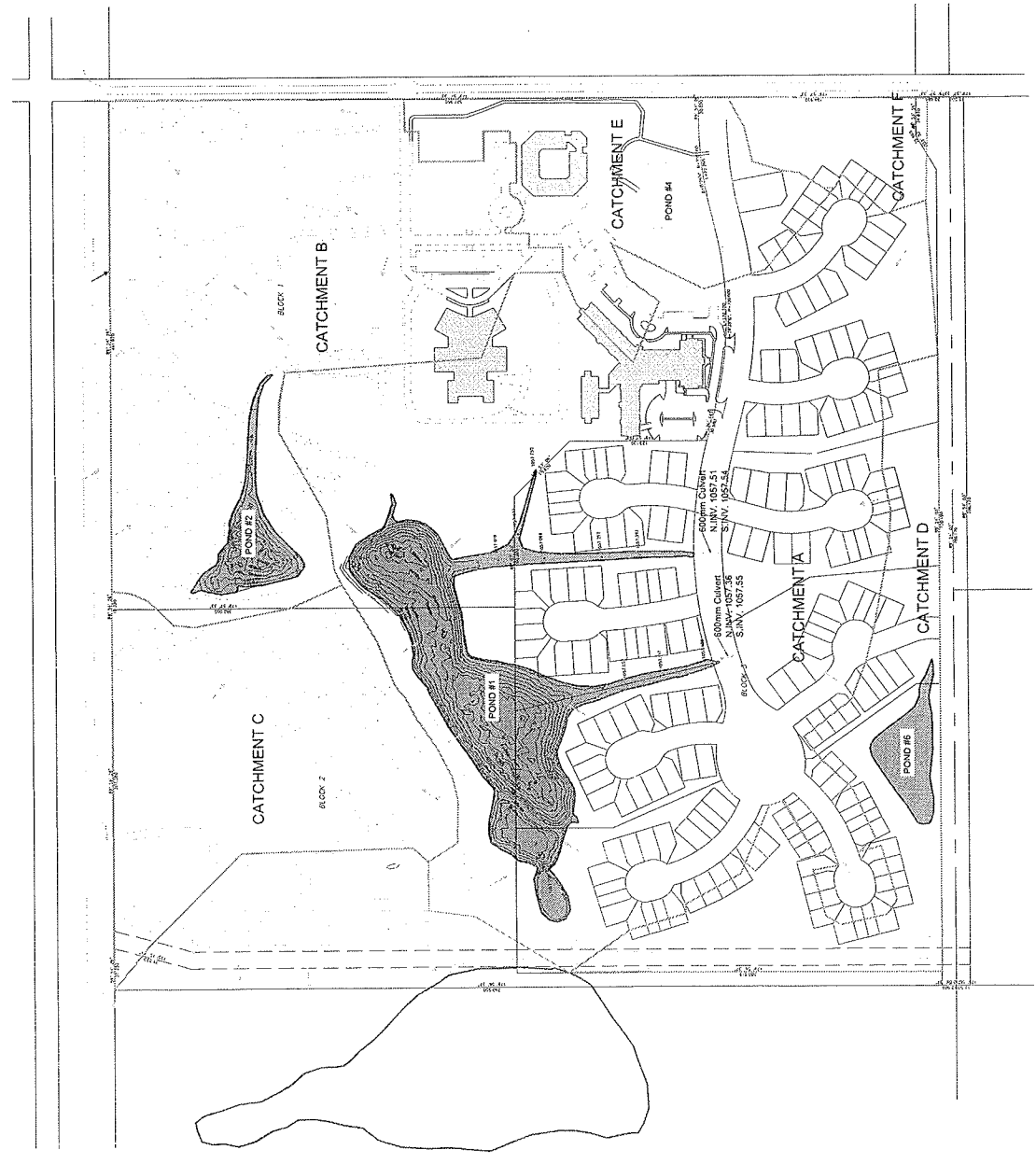
The existing drainage conditions for the Project Area include three stormwater facilities (Pond #1, #2, #6) and an existing wetland feature (labeled Pond #4). Figure 2 shows the existing post development stormwater management plan along with catchment areas from the most recent SWM Report (Jubilee, 2009).

*Note: Figure 2 was created by combining existing stormwater reports with field observations, and represents the best interpretation of existing conditions.*

- EXISTING STORMWATER POND
- EXISTING WETLAND
- EXISTING CATCHMENT BOUNDARY (JUBILEE)
- CONTOUR LINES GENERATED FROM BATHYMETRY SURVEY
- FLOW DIRECTION
- SURVEY POINT



POND #1:  
WATER SURFACE  
ELEVATION ON THE DAY  
OF SURVEY: 1057.80m



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PROJECT:	PRINCE OF PEACE VILLAGE EXPANSION
TITLE:	FIGURE 2: EXISTING DEVELOPMENT STORMWATER MANAGEMENT
DATE:	18-10-2012
PROJECT No.:	WER112-25
SCALE:	1:4000
CAD FILE:	11225FG02
FIGURE No.:	FG02
REV.:	0

NOTE: THIS FIGURE WAS GENERATED BY INTERPRETATION OF PREVIOUS STORMWATER MANAGEMENT REPORTS ALONG WITH FIELD INVESTIGATIONS AND REPRESENTS THE BEST INTERPRETATION OF EXISTING CONDITIONS.



### 2.1.1 Existing Development within Catchment Areas

The majority of the existing development is contained within the catchment area for the main pond, Pond 1. As such, there are no proposed changes to the drainage regime for the residential development, the Harbour or the Church/School. All new development, or changes to existing development will be required to adhere to the recommendations outlined in Section 5.0.

The stormwater facility at the southern extent of the development (Pond #6) will remain as it exists, as there are no changes to the development in this catchment area (Catchment C). Pond #6 currently manages the stormwater runoff from the back of lots within the residential complex, and may receive additional run-on from external areas during extreme storm events.

### 2.2 Existing Stormwater Facility Storage

The two existing stormwater facilities (Pond #1 and 2, Figure 2) were surveyed to determine the depth of the pond and available storage within the facilities. Golder & Associates was retained to perform a bathymetry survey for both ponds. The survey data was used to determine the available storage within the facilities for existing conditions. The resulting storage tables are presented in Table 2 and Table 3.

**Table 2 Existing Pond #1 Stage – Area – Volume Data**

Elevation (m)	Area (m <sup>2</sup> )	Total Volume (m <sup>3</sup> )
1053.5	1548	0
1054.0	3578	1247
1054.5	6844	3808
1055.0	9251	7817
1055.5	11937	13100
1056.0	15604	19965
1056.5	18261	28422
1057.0	20562	38122
1057.5	24294	49323
1057.8	29166	62670

**Table 3 Existing Pond #2 Stage – Area – Volume Data**

Elevation (m)	Area (m <sup>2</sup> )	Total Volume (m <sup>3</sup> )
1055.5	58	0
1056.0	335	89
1056.5	932	393
1057.0	1798	1064
1057.5	2658	2171
1058.0	3681	3749
1058.5	5051	5922

The total storage in Pond #1 and #2 was approximately 63,262m<sup>3</sup> on the day of the survey with a water surface elevation in the pond #1 and #2, 1057.8m and 1058.5 respectively. Total constructed capacity of the existing ponds is unknown, as design details for the pond were not provided. Based on observed conditions, it is assumed that the HWL of the pond is approximately 1057.5.

Existing culverts crossing Luther Rose Boulevard on the south side of the pond have invert elevations of 1057.36 and 1057.51. The invert elevations of these culverts govern the elevations for the proposed stormwater facility.

### 2.3 External Catchment Areas

The Project Area has limited influence of run-on from external catchment areas. The TransCanada Highway acts as a barrier for runoff from the north to enter the site. Runoff generated from the TransCanada highway itself is either conveyed through the roadside ditch to adjacent properties or contained within the numerous wetland features contained within the TransCanada expansion area bordering the north boundary of the Project Area.

The large wetland to the west of the Project Area is expected to be largely self-contained; however, upon review of aerial photographs it appears that there is an established conveyance route which follows an existing utility corridor on the west property line. A defined swale would intercept these flows directing them toward the stormwater pond at the south end of the project area.

### 2.4 Soil and Groundwater

Geotechnical Investigations and Evaluations have been performed at each phase of development; 1996, 2001, 2007, 2008. The presence of an elevated groundwater table in each of the investigations has led the development group to limit the development to at grade development, without below grade occupancies. The 1996 Geotechnical Investigation describes subsoil conditions as:

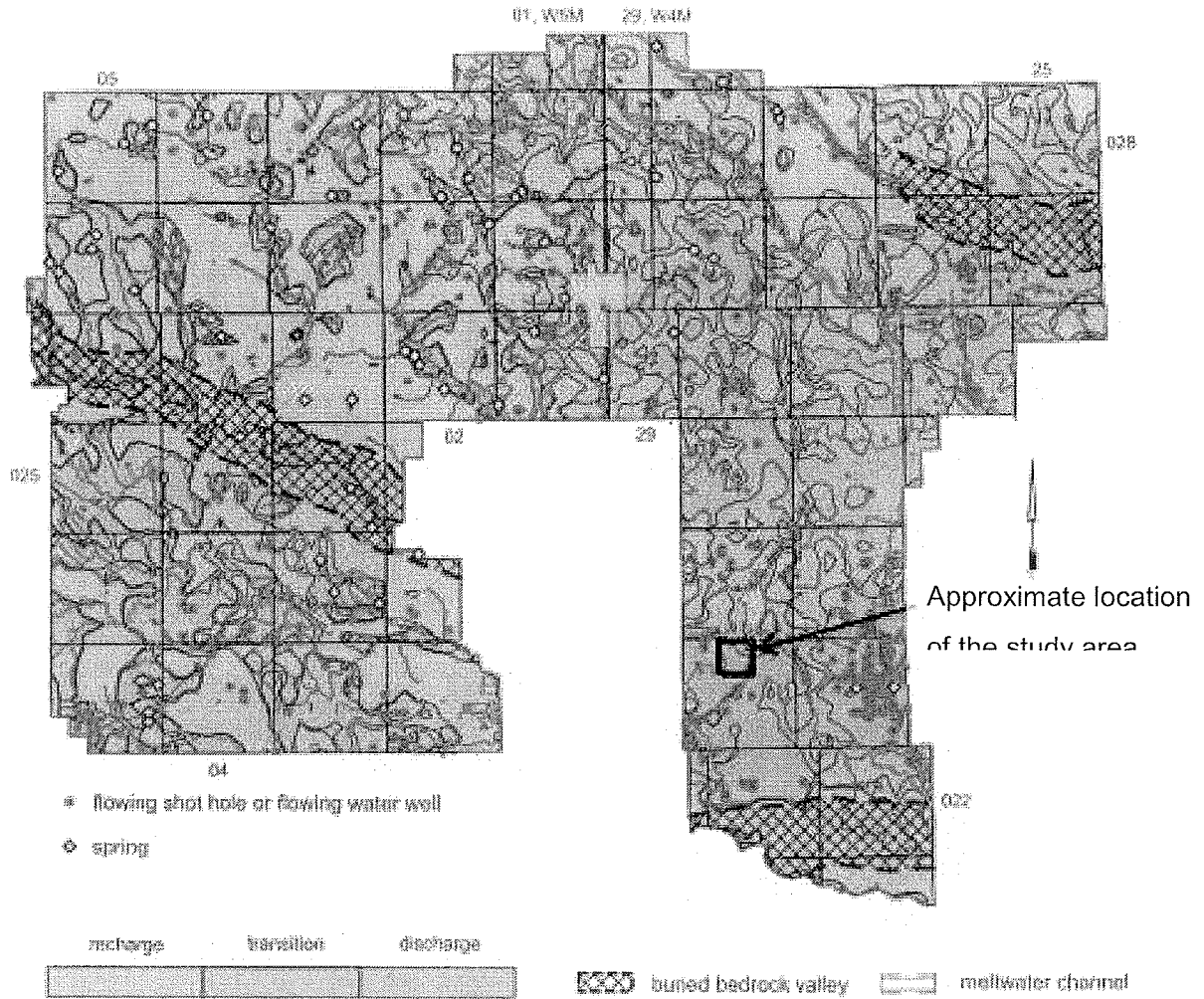
- Thin top soil layer varying from 0.6 to 2.13m,
- Clay till strata underlain by shale bedrock to test hole penetration (5.18m);
- Sand layers at three test hole locations (TH-3, TH-9 and TH-11) at varying depths ranging from 0.76 to 5.18m.
- Clay strata are very stiff to hard consistency.

The report assumes a subsoil hydraulic conductivity (permeability) of  $1.1 \times 10^{-8}$  cm/s. The report states that clay strata soils are suitable for use as a liner material. Open standpipes were installed in test holes (TH-3, TH-11, and TH-16 to 18) to allow for the monitoring of groundwater conditions (Curtis, 1996).

Figure 3 shows an excerpt from the Rocky View Groundwater Assessment Report (AECOM, 2011) showing the groundwater discharge and recharge areas within the County. The Project Area is located in a groundwater discharge area.

For the detailed design of stormwater facilities, more detailed groundwater and geotechnical analysis should be carried out.

**Figure 3 Rocky View Regional Groundwater Conditions**



Source: AECOM, 2011/ taken from Hydrological Consultants Ltd., 2002

**2.5 Environmental Regulatory Framework**

To meet Rocky View County requirements, Westhoff has been retained to prepare a Biophysical Impact Assessment (BIA) as per the draft Servicing Standards, Appendix 900A, Biophysical Assessment Requirements (Rocky View County, 2011). The report is submitted, under separate cover, to the County for review and approval. The BIA document is being created concurrently with the SMDP (Westhoff, 2012). The divisions of Westhoff work closely to determine the holistic approach to watershed management and while addressing environmental impacts of urban development.

Thirteen (13) wetlands have been identified on the Project Area, ranging from Class II Temporary to Class V Permanent (Figure 4). As a result of the proposed Prince of Peace Village expansion, wetlands may be lost or partially impacted. On the provincial level, both AESRD (Water Approvals team) and a separate division called Public Lands (Water Boundaries team) had a managerial and regulatory interest in wetlands. Both have separate evaluation and approval processes for determining whether the loss of a wetland is deemed acceptable.

A submission has been made to Public Lands to confirm if any of the Project Site's wetlands will be claimed by the Province. If any wetlands to be lost are claimed by the Province, discussions will be pursued with both the Prince of Peace project team and the Water Boundaries Team to determine next steps.

Once the wetlands that will be lost or impacted are identified, Westhoff will submit a *Water Act* application to the Water Approvals Team. The associated Provincial Wetland Restoration/Compensation Guide provides direction in regarding the approach to mitigating loss of wetlands. Options for mitigation measures to reduce wetland loss include:

- avoiding impacts to the wetlands;
- minimizing impacts and requiring applicable compensation; and
- compensating for impacts that cannot be avoided or minimized (Alberta Environment, 2007).

The proposed approach to managing impacts to wetlands or wetland loss as a result of the Prince of Peace expansion is to compensate either financially to an eligible compensation organization or through on-site compensation and the construction of wetlands. Any wetlands that will to be integrated into the development will require a scientifically developed setback distance from the wetland boundary as detailed in Rocky View County's Wetland Conservation and Management Policy (Rocky View County, 2010).



TRANSCANADA HIGHWAY

GARDEN ROAD



EXISTING WETLAND DELINEATION - SEPTEMBER 2012



EXISTING STORMWATER FACILITIES

Original Size: 11.5" x 11"

CLIENT:



**Westhoff Engineering Resources, Inc.**

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PROJECT:

PRINCE OF PEACE VILLAGE EXPANSION

TITLE:

FIGURE 4: PROJECT SITE EXISTING WETLANDS

DATE:	PROJECT No:	SCALE:	CAD FILE:	FIGURE No:	REV:
03-10-2012	WER112-25	1:5000	11225FG04	FG04	0

### 3.0 DEVELOPMENT CONSIDERATIONS

#### 3.1 TransCanada Expansion Corridor

Future expansion of the transportation network in the vicinity of the project identifies a required setback of 60m from the existing TransCanada right-of-way (ROW). This limits the extent of development within the northern portion of the Project Area. As such, no permanent structures or stormwater facilities are to be constructed in this location.

#### 3.2 Shepard Regional Drainage Plan

From a review of the SRDP the following constraints are identified:

- Maximum allowable release rate of 0.8 L/s/ha;
  - Of note, until such time as the downstream conveyance system is constructed the development must contain stormwater within the site without discharging off site.
  - Zero discharge conditions may have adverse effects on wetlands beyond the Project Area boundary. As these wetlands are expected to receive predevelopment flow from the Project Area, the alteration of the naturally occurring range of water available to these wetlands may cause them to receive less water, and constitute an impact to the wetlands.
- Preference given to wider, naturalized channels;
  - The SRDP identifies a proposed preliminary alignment for a primary conveyance channel to carry stormwater runoff south towards the Shepard Slough complex. A Primary conveyance channel has been identified in the adjacent land to the west of the Project Area. Once this conveyance channel has been established a connection may be established to provide an outlet for stormwater. Figure 5 shows a portion of the proposed alignments for primary and secondary conveyance channels as it relates to the Project Area.
- Intensive implementation of Best Management Practices (BMPs) and Low Impact Development (LID) strategies in the development to achieve rate and quantity objectives.
  - These measures could include the integration of bio-swales and bio-retention areas, water conservation strategies including water reuse for irrigation and other non-potable demand, and the inclusion of constructed and natural wetlands. Water features form the fundamental framework of the development plan providing both a resource and an amenity.

#### 3.3 Operational Systems – Enhanced Evaporation, Irrigation and Water Reuse



Developments of this nature increase the imperviousness of the land, resulting in a higher peak flow and volume of stormwater runoff. In order to manage stormwater under a zero discharge condition, the implementation of Low Impact Development (LID) strategies and Best Management Practices (BMPs) to manage the stormwater runoff volumes on an annual basis is essential.

It cannot be stressed enough that introducing strategic operations of stormwater facilities along

with consumptive uses for stormwater including; rainwater harvesting, water reuse and enhanced evaporation is paramount to manage stormwater volumes and maintain efficient use of the developable area.

Figure 5 SRDP Primary and Secondary Channel



-  Primary Conveyance Channel
-  Secondary Conveyance Channel

Source: Figure 6.1, Shepard Regional Drainage Plan, November 2011

**4.0 STORMWATER MANAGEMENT PLAN**

The proposed development site plan identifies the facilities to be incorporated in the latest phase of development. The proposed development incorporates higher density condominium development, mixed use facilities with commercial space and, extensions to existing facilities. The footprint of these structures and the expansion of the local transportation network will result in significant increases to the overall imperviousness of the Project Area. The conceptual layout forms the framework for determining; stormwater management strategies, stormwater runoff volume, and the sizing of stormwater facilities.

**4.1 Stormwater Facilities**

Stormwater ponds are constructed with armored side slopes in the operating zones with vegetation closer to the surface. Vegetation acts as a filter strip enhancing water quality as it enters the pond, however, should require limited maintenance as pruning and trimming of landscaping introduces additional debris and nutrients which are not desired in a stormwater pond. Stormwater ponds are designed to retain stormwater, provide treated stormwater to retained wetlands, provide irrigation to the surrounding landscaped and pervious areas within the Project Area, as well as service enhanced evaporation where necessary.

The existing stormwater pond (Pond 1)<sup>1</sup> requires additional capacity to accommodate increased runoff from the proposed development; as such the pond has been redesigned as part of the SMDP. The north boundary of the existing Pond 1 is modified to increase capacity; along with additional "arms", similar to those on the south side of the pond, extending into the proposed layout and function as naturalized swales/channels directing stormwater toward the main pond. The Pond 1 is redesigned based on the parameters identified in Table 4 to provide increased capacity for the proposed and existing development.

**Table 4 Pond Parameters**

Total Storage Depth	4.5 m
Permanent Water Depth	2.5 m
Active Storage Depth	1.5 m
Freeboard	0.5 m
Maximum Side Slope	3:1

*1 Note: The naming convention for the labeling of Ponds within the previous studies did not differentiate between ponds and wetlands. As such, Westhoff is proposing that a new naming convention be adopted moving forward for the proposed development. Ponds are labeled with letters (Pond A) and wetlands with numbers (Wetland 1). Section 5 uses the proposed naming convention for stormwater ponds.*



## 4.2 Overland Drainage

Stormwater runoff from the proposed development will be conveyed at the surface through grassed swales and ditches toward Pond 1, eliminating the need for storm sewers wherever possible. The intent of the stormwater management plan is to provide a treatment train approach to integrate multifunctional components for the overland drainage system. Through incorporating vegetated swales to accommodate overland conveyance the swales will improve the overall water quality prior to stormwater entering the stormwater ponds.

## 4.3 Low Impact Development and Best Management Practices

The proposed development expands on existing LID strategies and BMPs to manage stormwater volumes on an annual basis. Introducing strategic operations and consumptive uses for stormwater including; rainwater harvesting for toilet flushing where applicable, water reuse and enhanced evaporation is a critical to managing stormwater within the facilities.

## 4.4 Emergency Escape Route

Although the site is to operate as a zero discharge site, it is necessary to identify an emergency escape route in the event of extreme precipitation events beyond the 1:100 year 24 hour storm event. Proposed Emergency escape route would route stormwater south toward Pond C.

## 4.5 Environmental Considerations

The management plan for stormwater respects the natural landscape and wherever possible, wetlands are retained and the impacts to wetland function are avoided. Detailed impacts to the Project Area's wetlands are presented in the BIA (Westhoff, 2012). Impacts to wetlands must be approved under the *Water Act* and *Public Lands Act* as detailed in Section 2.5.

Several large wetlands exist at the north boundary of the Project Area, mostly contained within the TransCanada setback requirements. Impacts to these wetlands will be minimized or avoided. These wetlands are within a self-contained catchment area, which is preserved through the development plan. Measures, such as introducing vegetated buffers and berms along catchment boundaries, will ensure that runoff from development does not enter the wetland catchment area. The width of the vegetated buffers will be based on a scientifically determined wetland setback distance. At no time shall the setback distance be less than 6 meters.

A pre-development analysis should be completed on the retained wetlands to determine if their hydrologic signature will be maintained after development. If this analysis determines that the retained wetlands will not receive sufficient water to maintain their hydrologic signature, they *may be* fed treated stormwater. The rate should replicate the pre-development hydrologic signature of the wetlands. A *Water Act* approval will be required should this be needed.

An existing wetland (Wetland 11) has been incorporated within the existing development and receives limited stormwater runoff from the adjacent development. The intent of the SMDP is to ensure that the proposed development adjacent to this wetland does not introduce additional runoff to this facility. Instead, the additional runoff is directed toward the main stormwater facility (Pond 1).

#### **4.5.1 Benefits of Incorporating Wetlands within Urban Development**

The SMDP incorporates naturalized stormwater elements within the urbanized landscape. Retained and avoided wetlands provide both ecological benefits in addition to recreation amenity for the residents of Prince of Peace Village. Retained wetlands consume a significant volume of stormwater throughout the year, assisting in the overall balance of water of the landscape. The multi-purpose functions form the basis for the sustainable development of the Village, enhancing the value for the residents and local community.

## 5.0 PROPOSED DRAINAGE CONDITIONS

To accommodate the increase in runoff associated with the proposed development, the SMDP analyzes the development at full build-out conditions for catchment areas with changes to the land use. The drainage conditions for the stormwater management plan are shown in Figure 6.

### 5.1 Proposed Catchment Areas

The proposed catchments areas for the development have been adjusted to reflect the landuse provided by AFRA. Catchment areas are modified to reflect the most current information available with respect to survey data and biophysical information. Revised catchment boundaries incorporate current Provincial policy for the integration of wetlands within the development area by avoiding the introduction of additional runoff from development areas into wetland areas currently receiving stormwater runoff.

Development within existing catchment area not currently draining to Pond A will have the catchment boundary changed to include the proposed development within the main catchment area (Catchment A) and routed to the main pond (Pond A). Catchment A is the only catchment where proposed development is to occur. The remaining catchments do not warrant analysis, as they are to function as determined in previous SWM reports. The proposed catchment areas and their associated stormwater facilities or wetlands are provided in Table 5.

**Table 5 Proposed Catchment Areas**

Catchment ID	Area (ha)	Stormwater Facility/Wetland
A	41.94	Pond A
B	2.87	Wetland 11 (Pond B)
C	5.95	Pond C
D	1.28	No pond/wetland
E	6.06	Wetland 1, 2, 3, 7, 14*
F	2.27	Wetland 9**
<b>Total</b>	<b>59.28</b>	

\*Self-contained catchment area, does not receive runoff from development

\*\*Catchment F is land which is undevelopable, presently drains off-site into wetland 9

### 5.2 Land Use Assumptions

Land Use Assumptions were developed by isolating particular details of both existing and proposed development within Catchment A. Determining the extent of impervious area within the development was extrapolated from the proposed development layout, existing drawings and approximated by aerial photographs.

The details surrounding the proposed pervious and landscaped areas within the development, along with the level of irrigation of pervious and landscaped areas, are not available at this stage in the development. However, these parameters are essential to the creation of the Stormwater Management Strategies for the development. The areas of pervious and landscaped area within the proposed development are approximated as: 80% pervious area and 20% absorbent landscape. It is assumed at this time that 50% of all pervious areas and 100% of all landscaped area are irrigated. The areas associated with the various land use

assumptions are presented in Table 6.

**Table 6 Catchment A – Land Use Assumptions**

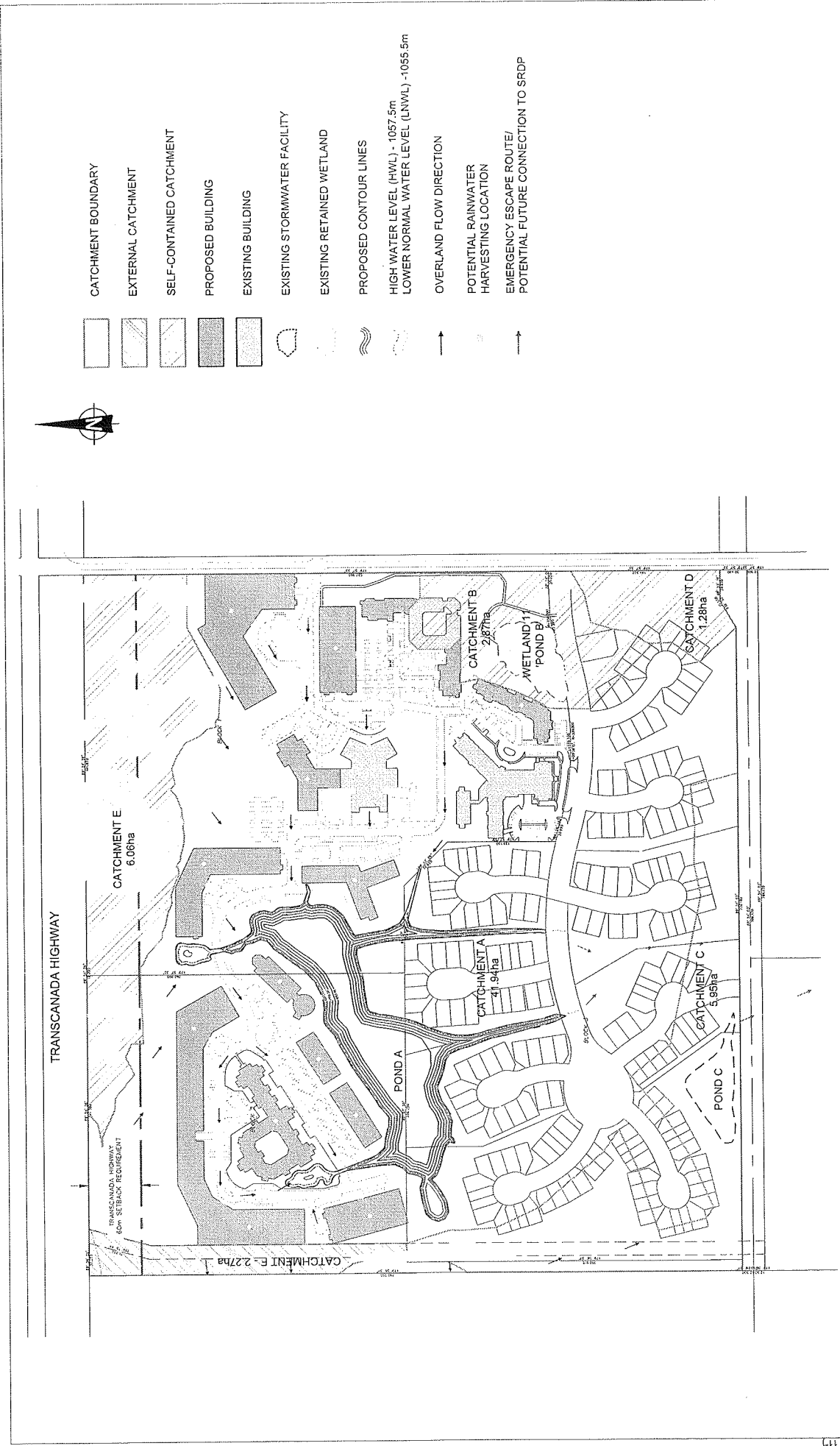
<b>Catchment A</b>	<b>41.94 ha</b>	<b>A</b>
Proposed Buildings	5.40 ha	
Proposed Pavement	5.82 ha	
Existing Buildings	1.24 ha	
Existing Residential	2.07 ha	
Existing Pavement	2.82 ha	
Stormwater Pond A	3.32 ha	
<b>Total Developed Area</b>	<b>20.67 ha</b>	<b>B</b>
<b>Pervious Area</b>	<b>17.02 ha</b>	(A-B)x80%
Irrigated Pervious Area	8.51 ha	50% of pervious Areas are irrigated
Non-Irrigated Pervious Area	8.51 ha	50% of pervious areas are not irrigated
<b>Absorbent Landscaping</b>	<b>4.25 ha</b>	(A-B)x20%
Irrigated Landscaping	4.25 ha	100% of Absorbent Areas are irrigated


### 5.3 Stormwater Facility Storage Characteristics

The proposed stormwater facility has an overall depth of 5 meters from bottom to spill elevation. The lower normal water level (LNWL) and upper normal water level (UNWL) define the active storage volume. At the LNWL the pond has 2.5 meters of permanent storage. An active storage depth of 2 meters supplies irrigation water to the surrounding development. Table 7 presents the stage-area-volume characteristics for the proposed pond.

**Table 7 Stage - Area - Volume Characteristics**

	<b>Elevation (m)</b>	<b>Area (m<sup>2</sup>)</b>	<b>Capacity (m<sup>3</sup>)</b>	<b>Active Volume (m<sup>3</sup>)</b>
Bottom	1053.0	12602	0	-
	1054.0	15261	13910	-
	1055.0	17466	30261	-
LNWL	1055.5	19187	39421	-
	1056.0	21215	49518	10096
	1057.0	25510	72847	33426
UNWL	1057.5	29278	86533	47112
Spill	1058.0	33206	102144	62723



CLIENT:	 <b>Westhoff Engineering Resources, Inc.</b> Land & Water Resources Management Consultants 1000 West 10th Street, Suite 200 Winnipeg, MB R2T 2E2 Phone: (204) 784-5744 Fax: (204) 244-8744 Email: westhoff@westhoff.com
PROJECT:	PRINCE OF PEACE VILLAGE EXPANSION
TITLE:	FIGURE 6: PROPOSED STORMWATER MANAGEMENT PLAN
DATE:	13-11-2012
PROJECT No.:	WER112-25
SCALE:	1:4000
FIGURE No.:	F.006
REV.:	0

### 6.0 HYDROLOGY AND CONTINUOUS SIMULATION MODELING

The precipitation-runoff simulation within urban areas may be analyzed with single event and/or continuous simulation techniques. Preliminary pond sizing for instantaneous peak runoff has been analyzed using SWMHYMO. The performance of various source control practices and stormwater management facilities is analyzed with the GoldSim WaterBalance (WB) Model.

The set-up of the computer models was accomplished by determining model parameters for catchment including size, imperviousness ratios, and infiltration characteristics.

#### 6.1 Single Event Analysis

The most common method of analysis used for stormwater management is based on a single storm event; either a real historic storm or a theoretical design storm. Single event analysis and design is an accepted procedure as outlined in the *Guidelines for Stormwater Management in the Province of Alberta* (1999). Therefore, this method is used in this study.

The aforementioned guidelines require that the major drainage system, including storage facilities, shall be designed to accommodate the runoff resulting from a 1:100 year return period storm event. Accordingly, the 24 hour duration, 1:100 year design storm event of the *Chicago* distribution was used for this study. The distribution represents two important design criteria:

- The total precipitation of the *Chicago* storm, for any duration, is the same as the total precipitation defined for the 1:100 year event.
- The peak intensity of the *Chicago* storm, for any time increment, is the same as the peak intensity defined for the 1:100 year event.

A total storm duration of 24 hours with 5 minute rainfall increments was used, based on the *Intensity-Duration-Frequency* (IDF) relationship for the City of Calgary and as provided by Atmospheric Environmental Services (AES).

Rainfall intensities for the *Chicago* distribution are determined from the IDF relationship and described as:

$$i = \frac{a}{(t+b)^c} \tag{1}$$

where *i* is intensity (mm/h), *a*, *b* and *c* are IDF parameters and *t* is the time duration (minutes). The time to storm peak is determined by:

$$t_p = r(t_d) \tag{2}$$

where *t<sub>p</sub>* is the time to peak and *r* is the ratio of time to peak versus storm duration, *t<sub>d</sub>*.

The following parameters were used to derive the rainfall intensities for this design storm, which are based on the IDF data for the City of Calgary.

$$a = 663.1 \quad b = 1.87 \quad c = 0.712 \quad r = 0.3$$

### 6.1.1 SWMHYMO Input Parameters

The SWMHYMO model was used to verify that active storage is available based on the NWL in proposed stormwater facilities. For this model the following parameters were input for the computation of maximum volume requirements for the 1:100 year 24 hour storm event:

- Total Catchment Area: 41.94 ha
- Impervious Ratio: 41%
- Curve number (CN): 84
- Average Slope: 0.5%
- Initial Abstraction ( $I_a$ ): 1.6

### 6.2 WaterBalance Analysis – Continuous Simulation

A WaterBalance (WB) Analysis was performed to evaluate the performance of the proposed site conditions over a continuous time frame. Westhoff has developed a tool using GoldSim Software to incorporate the WB spreadsheets within a continuous precipitation-runoff model which accounts for numerous environmental and operational conditions to adequately evaluate stormwater facilities. Westhoff has developed a model to simulate proposed site conditions based on a historical precipitation record over a 51 year time frame, 1960 – 2010. The analysis includes the irrigation of green spaces and the wetting or irrigating of other areas to enhance evaporative losses. The latter may be required to balance the runoff generated from the site given that releases off site are, in the interim, not permitted.

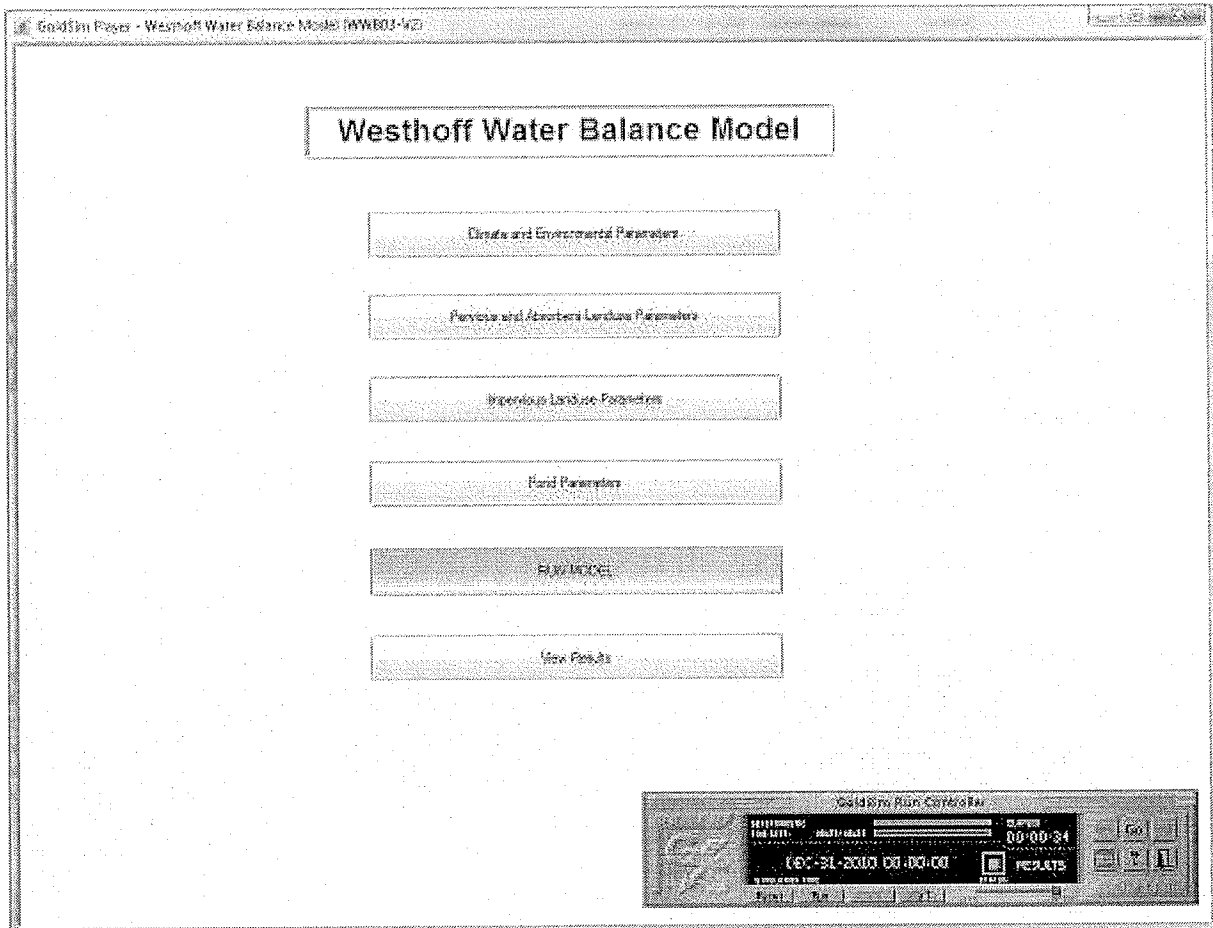
The WB Analysis utilizes a daily time step. Average monthly lake evaporation data published by Alberta Environment was used to represent the evaporation losses from the stormwater ponds and wetted areas. Sublimation losses related to snowpack are conservatively to be equal to 10% of precipitation over the winter months.

GoldSim allows for programming of complex systems for a variety of operational procedures introduced to model individual developments based on the unique characteristics of the development. Due to the flexibility of the program, Prince of Peace development has been modeled to replicate how the system is intended to function by incorporating LID initiatives and BMP. Creating and testing the ultimate configuration at the SMDP level will assist in the planning and engineering of phased development as the project proceeds.

#### 6.2.1 GoldSim Model Functional Description

The model for the Project Area based on a single catchment area and the associated stormwater facility. The catchment areas account for the runoff associated within the development. The model operates in two parts; a user defined system input page which interface with the model engine in the background. Input data is defined through the a series of pages as shown in Figure 7. Each button represents the data required to run the model. Appendix B provides the details for each input parameter.

Figure 7 GoldSim Model Input Page



### 6.2.2 Input Parameters

The GoldSim model is composed of several layers of user defined input parameters which account for variations within the surface types, vegetation and subsurface conditions. Appendix B shows the input parameters within the GoldSim input page.

Catchment areas are defined based on the lands contributing to the main stormwater facilities. The proposed development is contained within the main catchment routed toward the main stormwater

The various parameters associated with the catchment area are either impervious (IMP) or pervious (PV) or absorbent (AB). These parameters are further broken down to account for operational procedures of irrigation and enhanced evaporation. Table 8 provides a description of this breakdown.



**Table 8 Input Parameter Description**

Parameter	Description	Operational
PV-1	Pervious areas within the development. Rear lots and side yards	Scheduled Irrigation
PV-2	Roadside ditches 40% of the ROW assignment	No Irrigation
AB-1	Landscaped areas (25% of all landscaped areas)	Scheduled Irrigation
AB-2	Remaining landscaped areas	No Irrigation
IMP-1	Roof area of both existing and proposed buildings	No Wetting
IMP-2	Transportation corridor and parking surfaces	No Wetting

The Catchment A input characteristics are given in Table 9.

**Table 9 Catchment Input**

	Catchment A	Operational
PV-1	8.51	Irrigation, Schedule 1
PV-2	8.51	No Irrigation
AB-1	4.25	Irrigation, Schedule 1
AB-2	0.00	No Irrigation
IMP-1	8.71	Wetting, optional
IMP-2	8.64	No wetting

### 6.2.2.1 Soil Depth and Composition

The soil depth and material composition is a user defined input parameter within the pervious and absorbent land within the catchment area. These definitions are typically based on data extracted from a geotechnical analysis of the dominant, unaltered soil stratum. Specific parameters can be input to account for customized soils, such as bioswales and bioretention area. The subsurface soil is conservatively considered a hard stratum which has a subsurface hydraulic conductivity of 0 m/s.

The soil parameters are:

- Percent composition of Sand, Silt, and Clay
- Soil depth
- Porosity
- Field Capacity
- Wilting Point
- Sat. Hydraulic Conductivity (m/s)
- Sub soil hydraulic conductivity (m/s)

The model calculates the moisture content within the soil mass accounting for increases from precipitation and irrigation, as well as, reductions by vegetation and evaporation on a daily

basis. When precipitation or irrigation levels exceed the point of saturation, runoff volumes are generated.

**6.2.2.2 Irrigation Schedule/Wetting Schedule and Recycle Flows**

Pervious and Absorbent areas can be irrigated according to a schedule during the months of May through September. Schedules can be modified to suit the particular application or to supply a crop type with their particular water needs. All applicable landscaped areas within the model are irrigated according to Schedule 1. The watering requirements of Schedule 1 are presented in Table 10. In order to account for precipitation occurring within the irrigation season, the user can define the precipitation threshold which is a sum of the three previous day's precipitation. When the threshold is exceeded, irrigation is not required as per the schedule. Irrigation and Wetting operations only occur within the active zone of the pond. This is the volume of stormwater available within the UNWL and the LNWL. Should the water surface elevation go below the LNWL, irrigation will not be supplied.

**Table 10 Schedule 1 Irrigation**

Month	Depth of Irrigation mm/day						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
May						10	
June			10			15	
July		10		10		15	
August		10		10		15	
September			10			15	

The wetting of impervious surfaces is an option introduced into the model to enhance evaporation on impervious surfaces. This is an optional procedure which can be turned on and off depending on the requirements. For this analysis, the wetting option has not been used. The preferred action for reducing pond volumes is to introduce recycle flows to supply non-potable water to the development. Rainwater harvesting for toilet flushing may be required to manage water levels within the facilities.

**6.2.2.3 Groundwater Seepage and Inflow**

Groundwater seepage and inflow rates represent water losses (outflow) or water gain (inflow) from the pond bottom and sides through subsurface interaction with the adjacent soils. The same can be said for the interaction between foundations of the structures within the development. These parameters are highly sensitive as it is dependent on the seasonal variation of the groundwater table, snow melt and precipitation. As outlined in previous geotechnical reports, monitoring of groundwater table is recommended to provide up to date information on the presence and fluctuation of groundwater. The inclusion of field verified data aids in the refinement of subsurface interactions. At this time, a conservative 1mm/day groundwater seepage and inflow rate is assumed.

## 7.0 ANALYSIS AND RESULTS

### 7.1 SWMHYMO Results

The results of the SWMHYMO model provide the required storage volume to contain the 1:100 year 24 hour storm event. The total volume of runoff from the single event analysis for the entire development area within Catchment A is 28,863m<sup>3</sup>. The total active storage provided in the stormwater facilities is 55,438m<sup>3</sup> when the pond is at the LNWL on the day preceding the storm event. Due to the zero discharge constraint for this development, assuming that the stormwater facilities are at LNWL at the time of major storm events is not realistic. Therefore, the sizing of stormwater facilities from the GoldSim analysis governs under zero discharge conditions.

### 7.2 Results of GoldSim Analysis

The results of the GoldSim Analysis are imbedded within the model itself. Select parameters and functions are written to an output Excel file as defined by the modeler. The calculations within the model are used to generate time history curves to show the water surface elevation in the stormwater facility over the time period. Overflow volumes are closely monitored and the system is optimized to result in no overflow events throughout the record. Several iterations are required to fully utilize the operational components within the model.

The output file monitors total inflows and outflows from the system tracking each component to ensure that the system balances. Particular items monitored are:

- Maximum Volume
- Minimum Volume
- Catchment Inflow
- Groundwater Inflow
- Direct Precipitation
- Evaporation
- Seepage
- Irrigation
- Overflow
- Irrigation Deficit

The total irrigation volumes are calculated with deficits recorded. Deficits indicate an inability to supply the required demand. Deficits are reduced through system optimization and can be further reduced as the model reflects refinements to the design of the development. As the current model does not incorporate wetting or recycle volumes to manage stormwater within the pond, these components are not displayed in the results.

#### 7.2.1 WaterBalance Summary

The results of the water surface elevation over the time period are presented graphically in Figure 8, along with the specific pond characteristics used to model stormwater facilities. The results of the water balance annual summary are given in Table 11.

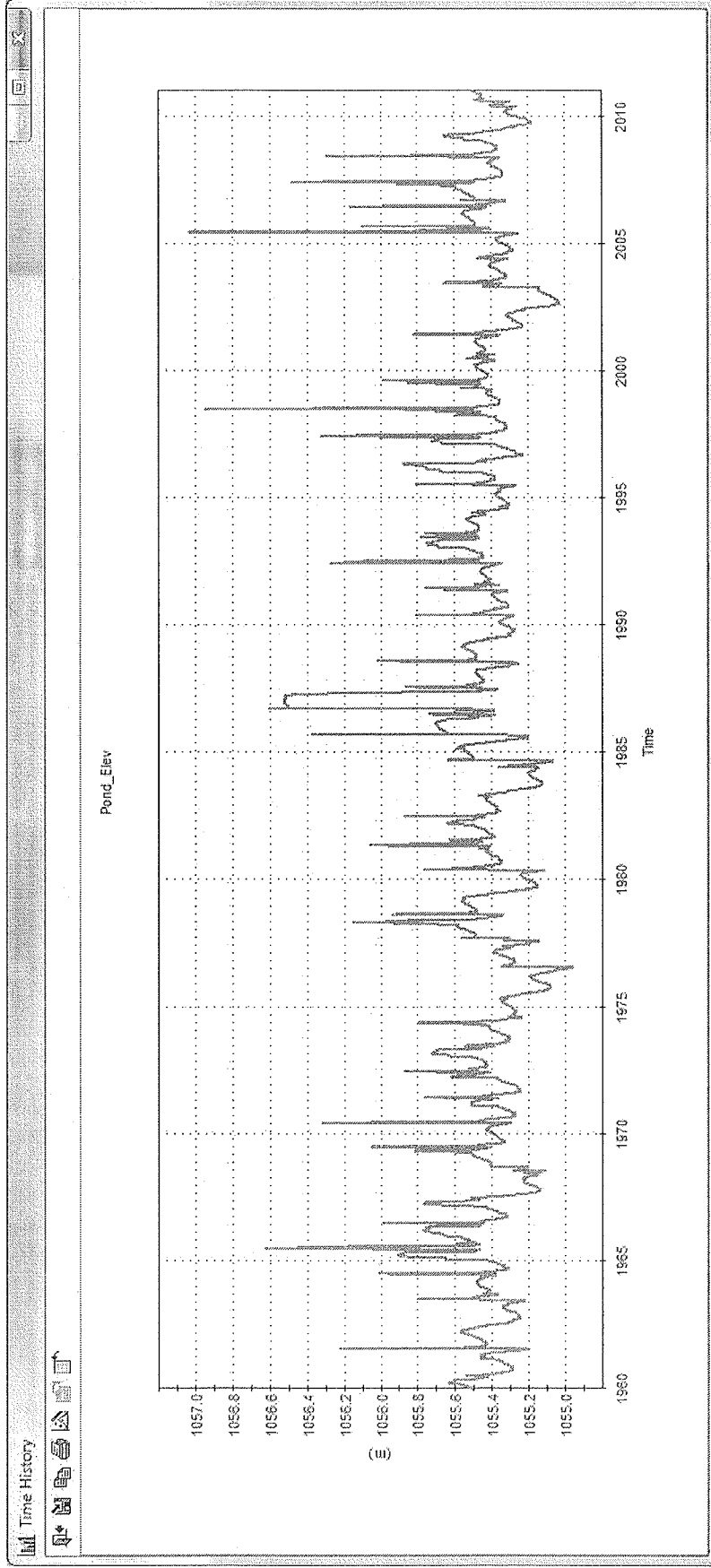
The maximum volume at any time during the analysis was computed to be 73,645m<sup>3</sup> correlating to a water surface elevation of 1057.32m. The HWL or UNWL for the stormwater pond is 1057.5 and therefore no overflow occurs. The minimum volume at any time during the analysis was computed to be 29,457m<sup>3</sup> correlating to a water surface elevation of 1054.95m. The

minimum water surface elevation observed is below the LNWL, the result is limited irrigation supply during years with low precipitation. On average the stormwater pond volume was computed to be 47,277m<sup>3</sup> correlating to a water surface elevation of 1055.89.

The WaterBalance Analysis shows that for the data analyzed, the pond maintains adequate volume to retain all surface runoff resulting from precipitation events under the conditions modeled. The model uses a conservative approach to the modeling of continuous precipitation events.

The model is unable to account for the effects of the groundwater table within the development itself. Weeping tile and perimeter drains which discharge to the surface will introduce additional volume to stormwater facilities. These effects may be accounted for with refined data included in subsequent reports. However, it is noted that until such time as the data becomes available the model will not account for subsurface interactions due to a fluctuating groundwater table.

Figure 8 Pond Elevation Results



EnCharis c/o Alvin Fritz Reinhard Architects Inc.  
 Staged Master Drainage Plan  
 Prince of Peace Village

Table 11 Annual Water Balance Analysis Summary

Year	Maximum Volume m <sup>3</sup>	Minimum Volume m <sup>3</sup>	Average Volume m <sup>3</sup>	Median Volume m <sup>3</sup>	Catchment Inflow m <sup>3</sup>	Inflow Groundwater m <sup>3</sup>	Direct Precipitation m <sup>3</sup>	Evaporation m <sup>3</sup>	Seepage m <sup>3</sup>	Irrigation Supply m <sup>3</sup>	Overflow m <sup>3</sup> /day	Irrigation Deficit m <sup>3</sup> /day
1960	42731	35896	38655	38792	3369	10760	6888	14367	6942	2677	0	188723
1961	55251	34246	38647	38667	20809	10731	7246	14552	6915	14484	0	159660
1962	41474	35338	38139	38078	719	10731	5290	13424	6888	267	0	194941
1963	46705	34661	37742	37796	12761	10731	7843	14622	6869	6469	0	179169
1964	50422	36477	38734	38711	20269	10760	7314	13776	6936	18417	0	176811
1965	64624	38567	44008	42528	63969	10731	11491	13114	7194	61334	0	84130
1966	49946	36574	40567	39422	17300	10731	7564	13823	7007	19884	0	163850
1967	45451	37931	37931	37931	7073	10731	4702	14185	6878	5151	0	190077
1968	38924	32536	35500	34859	6851	10760	6470	12648	6778	0	0	187572
1969	51321	36851	39281	39040	20936	10731	8100	14362	6944	19461	0	156627
1970	57430	35634	37980	37870	19774	10731	7330	15395	6883	16604	0	170968
1971	45356	35197	37579	37442	9435	10731	7201	15726	6861	5194	0	178550
1972	47642	39288	39288	39084	17774	10760	8960	14026	6963	12836	0	165699
1973	44610	36277	39441	38490	6752	10731	6699	15391	6952	4447	0	165699
1974	46108	34971	37466	37372	9443	10731	6648	14440	6855	6574	0	169574
1975	37304	32029	34814	35533	310	10760	7224	14781	6700	0	0	170346
1976	36895	29673	33916	33945	6657	10731	7066	14767	6838	1335	0	153699
1977	40873	32994	37117	36922	8580	10731	7006	13871	7037	35155	0	140933
1978	45740	36985	41545	40409	95121	10731	10154	14309	6853	891	0	184767
1979	37558	33443	37416	37558	0	10731	5223	14309	6853	10995	0	170835
1980	45268	32711	36634	37236	17504	10760	8208	14637	6843	21176	0	151084
1981	51526	37116	39573	38679	23192	10731	9682	14908	6959	8959	0	157816
1982	47655	37173	39461	39212	10617	10731	7875	14316	6953	8702	0	157816
1983	39472	32994	36115	36567	487	10731	5383	14084	6769	0	0	191400
1984	42574	31678	35880	34281	12657	10760	6650	13851	6797	2557	0	175445
1985	58784	34466	40478	40992	26351	10731	7229	14577	7008	19716	0	144888
1986	64216	37671	46877	43806	36390	10731	8848	14574	7422	17478	0	149040
1987	62319	37441	47877	40018	16219	10731	6837	16326	7505	32825	0	129865
1988	50439	35261	39150	39664	27710	10760	7564	15327	6957	22932	0	147414
1989	41185	35809	38334	38192	9085	10731	7178	14159	6898	189	0	164435
1990	48157	35928	37470	37152	9085	10731	7392	13957	6856	5802	0	160716
1991	45190	36595	38601	38424	14201	10731	7601	14633	6911	9472	0	168530
1992	56547	37022	40204	39178	31908	10760	9447	13685	7014	29823	0	127128
1993	45655	39236	41296	39947	22772	10731	8538	13437	7042	22293	0	134655
1994	40765	36237	38451	38741	1805	10731	6587	14745	6903	0	0	174174
1995	46255	35584	37935	37755	11326	10731	7714	13553	6878	7653	0	172263
1996	47628	35044	39798	38750	8421	10760	6916	13534	6988	7568	0	170444
1997	57726	36464	39903	37663	36395	10731	8071	14838	6974	35361	0	136909
1998	37085	37085	39903	37846	48487	10731	10256	13269	6994	44184	0	120450
1999	49912	37918	39364	38745	26945	10731	8683	13736	6948	24850	0	130184
2000	40731	37650	39082	39096	4532	10760	7681	15099	6953	494	0	173680
2001	46606	34934	38265	38265	8409	10731	5917	15570	6876	6150	0	156540
2002	36637	31034	33820	33700	153	10731	6113	13833	6671	2588	0	173028
2003	42903	32340	36154	36002	10283	10731	7816	14205	6791	0	0	176088
2004	42903	35972	35972	37248	2573	10760	7113	14231	6867	0	0	168432
2005	74111	35304	40917	38988	50171	10731	10619	15017	7084	53343	0	111261
2006	53988	36709	40279	40285	14506	10731	7891	14506	6995	14609	0	157651
2007	61368	36820	40553	39875	14718	10731	9750	14718	7018	33565	0	144437
2008	56958	37129	38918	38093	20712	10760	9416	14501	6950	18285	0	142511
2009	43192	34129	37798	37079	3255	10731	5978	14244	6872	2224	0	189176
2010	39916	35306	37613	36929	6334	10731	8425	14206	6863	0	0	143550

WER112-25-APPENDIX B - STAGED MASTER DRAINAGE PLAN - PRINCE OF PEACE VILLAGE - 12/12/12

## **8.0 CONCLUSIONS AND RECOMMENDATIONS**

### **8.1 Conclusions**

1. The stormwater management system as presented in this report can handle the runoff from the drainage areas for the development, including the 1:100 year storm runoff event;
2. The continuous simulation analysis show adequacy of storage capacity in the proposed facility when operational procedures are implemented;
3. The Prince of Peace Village can be serviced by a comprehensive, integrated stormwater management system.
4. Reduction of the total annual runoff volumes is accomplished by incorporating LID initiatives and BMP throughout the development. Encouraging the uptake of stormwater by routing overland drainage from the impervious areas through pervious conveyance routes, integrating irrigation or landscaping and supplying water to retained wetlands. Introducing rainwater harvesting for toilet flushing is encouraged. If necessary enhanced evaporation techniques can be pursued;
5. The system, as designed, accommodates some variability within the design. The assumptions and parameters for design are to be refined at the Development Permit stage;
6. The site is self-contained with all drainage from development routed to Pond A. An adequate escape route has been identified in the event of emergency situations;
7. Any revision to the landuse assignments within the Master Site Development Plan affects the assumptions made within this report (e.g., imperviousness ratio) and warrants a reevaluation of the analysis within this report.

### **8.2 Recommendations**

1. The GoldSim WB model will form the basis for the analysis of the development through the detailed design phase;
2. At the detailed design stage, details should be provided on the entire stormwater management system, the conveyance system that includes all overland drainage conveyance systems and the roadside ditches, the irrigation network and recirculation system;
3. Details of the ponds, including control structures, geotechnical consideration and lining requirements and associated operations are to be submitted as part of the detailed design and pond report;
4. Additional geotechnical studies shall provide information on the seasonal fluctuation of the groundwater table within the development. At a minimum conduct one season of groundwater data collection for the proposed development from piezometers. The geotechnical engineer shall determine the number of sample locations required to give a representative profile of subsurface conditions.
5. Further investigation of the existing irrigation system and the implementation of the

proposed irrigation and operational programs.

6. Rainwater harvesting water reuse provides significant volume reductions within the stormwater facilities, further investigation into the viability of this concept shall be pursued by the development team. Further investigation into the viability of incorporating rainwater harvesting for toilet flushing into the design of proposed facilities.
7. At the Development Approvals phase, environmental controls and aggressive erosion and sediment control (ESC) practices will be introduced to ensure avoided wetlands are not impacted by construction activities.



## 9.0 REFERENCES

- Stormwater Guidelines for the Province of Alberta, Alberta Environmental Protection, 1999.
- Stormwater Management & Design Manual, City of Calgary, Wastewater & Drainage, 2011.
- Shepard Regional Drainage Plan (Draft), AECOM, November 2011
- Belvedere ASP (Proposed), City of Calgary Land Use Planning & Policy, August 2012
- Stormwater Management Report, Jubilee Engineering Consultants Ltd, January 2009
- Stormwater Management Report, Jubilee Engineering Consultants Ltd, September 2007
- Stormwater Management Report, Jubilee Engineering Consultants Ltd, January 2002
- Stormwater Management Report, Jubilee Engineering Consultants Ltd, October 1996
- Geotechnical Evaluation, McIntosh Lalani Engineering Ltd., November 2008
- Geotechnical Evaluation, McIntosh Lalani Engineering Ltd., April 2007
- Geotechnical Evaluation, EBA Engineering Consultants Ltd., October 2001
- Geotechnical Investigation, Curtis Engineering Associates, December 1996
- Biophysical Impact Assessment for the Prince of Peace Village, Westhoff, September 2012
- Servicing Standards, Section 700 – Stormwater Management, Rocky View County, June 1999
- Servicing Standards, Appendix 900A, Biophysical Assessment Requirements, Rocky View County, 2011

This is Exhibit " "referred to in the Affidavit of \_\_\_\_\_ sworn before me at \_\_\_\_\_ this \_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

Δ Commissioner for taking Affidavits  
within British Columbia

**WATER MANAGEMENT STRATEGY**  
**FOR THE**  
**PHASED DEVELOPMENT**  
**OF THE**  
**PRINCE OF PEACE COMMUNITY**

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September 25, 2012

Revisions February 3, 2014 for 1.2 Potable Water Supply for Proposed Development

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## 1.0 WATER SUPPLY AND DISTRIBUTION

Canadian Clean Water Technologies Inc. (CCWTI) has been retained to determine the quantity of potable water required for the expansion of the Harbour facilities, the designated assisted living area and the new supplemental living building, and for each of the nine phases of the proposed new development. The potable water use projections for the new development are based on the community's current consumption rates, aggressive water conservation consumption projections, and aggressive water conservation with greywater collection, treatment and reuse. The basis for the aggressive water conservation calculations are presented in Appendix A, a "Residential and Commercial Water Consumption Report" based on a water consumption survey conducted by the City of Calgary.

### 1.1 CURRENT POTABLE WATER DISTRIBUTION SYSTEM

Currently the Prince of Peace Development is comprised of three different dwelling types; duplexes/fourplexes, assisted living units, and the Harbour (single person units). When the property was initially developed, all of the units contained water efficient fixtures (toilets, shower heads, faucets, washing machines, etc). Table 1 shows the current water consumption for each of the three dwelling units and the school/church.

**Table 1: Current Potable Water Consumption**

Unit Type	Number of Units	Avg. Number of Residents per Unit	Total Residents	Water Usage per Unit (L/d)	Water Usage per Person Per day (L)	Total Water Usage(m <sup>3</sup> /d)
Duplex/Fourplex	174	1.4	250	218.21	151.9	<b>38.0</b>
Assisted living (incl. kitchen)	159	1.1	180	220.05	194.4	<b>35.0</b>
School/Church	N/A	N/A	300*	N/A	N/A	<b>7.3</b>
Harbour	32	1.0	32	154.8	154.8	<b>4.9</b>
<b>Total</b>	<b>365</b>	-	<b>462</b>	-	-	<b>85.2</b>

\*Church and school members, not residents

Considering the average Calgarian uses greater than 250 litres per capita day (lpcd) and the national average is approximately 325 lpcd, the current water usage at the Prince of Peace is already much lower than any other community in the province. This low consumption rate is in line with consumption rates in many European countries.

Currently, the County of Rocky View is developing a water supply for the area to the east of Calgary; however, the distribution system is as yet not available. Because the Prince of Peace development is located within the County of Rocky View, the development is not permitted to connect into the City of Calgary's potable water distribution system. However, the City will sell bulk water and thus, the water is being trucked to the site from the City of Calgary at a cost of approximately \$9.75/m<sup>3</sup>. This is an extremely costly method of obtaining water considering Calgarians pay approximately \$1.50/m<sup>3</sup> for water piped into their homes. Five days per week, approximately 110 m<sup>3</sup> of City of Calgary water is delivered to a 475.2 m<sup>3</sup> cement potable water reservoir. With the current development, using an average of 85.2 m<sup>3</sup>/day, water costs for the

development average \$831/day or \$24,921/month.

Two 25 hp pumps are used for potable water distribution to the development which can pump up to 1,125 L/min. There is also a Pulsatron (0 to 2.3 l/h) E series (West Coast Water Systems Inc.) chemical feed chlorine injection system on-site but it is currently not used because the water trucked in from Calgary has an acceptable chlorine residual. There was a reverse osmosis water treatment plant on-site; however, the equipment is out dated and no longer usable.

## 1.2 POTABLE WATER SUPPLY FOR THE NEW DEVELOPMENT

By utilizing aggressive water conservation techniques and technologies as well as greywater reuse and water metering, the development's water demand at the completion of project build-out should not exceed 300 m<sup>3</sup>/day. The projected water consumption, broken down for each of the nine phases of development for the project, is presented in Table 2 and shown graphically in Figure 1 below. The property has already been approved for the expansion of the designated assisted living facility, the Harbour, and a new supplemental living facility. At the completion of the approved expansion, assuming water conservation and greywater reuse are implemented, the water consumption will increase from the present 85.2 m<sup>3</sup>/day to 133.6 m<sup>3</sup>/day.

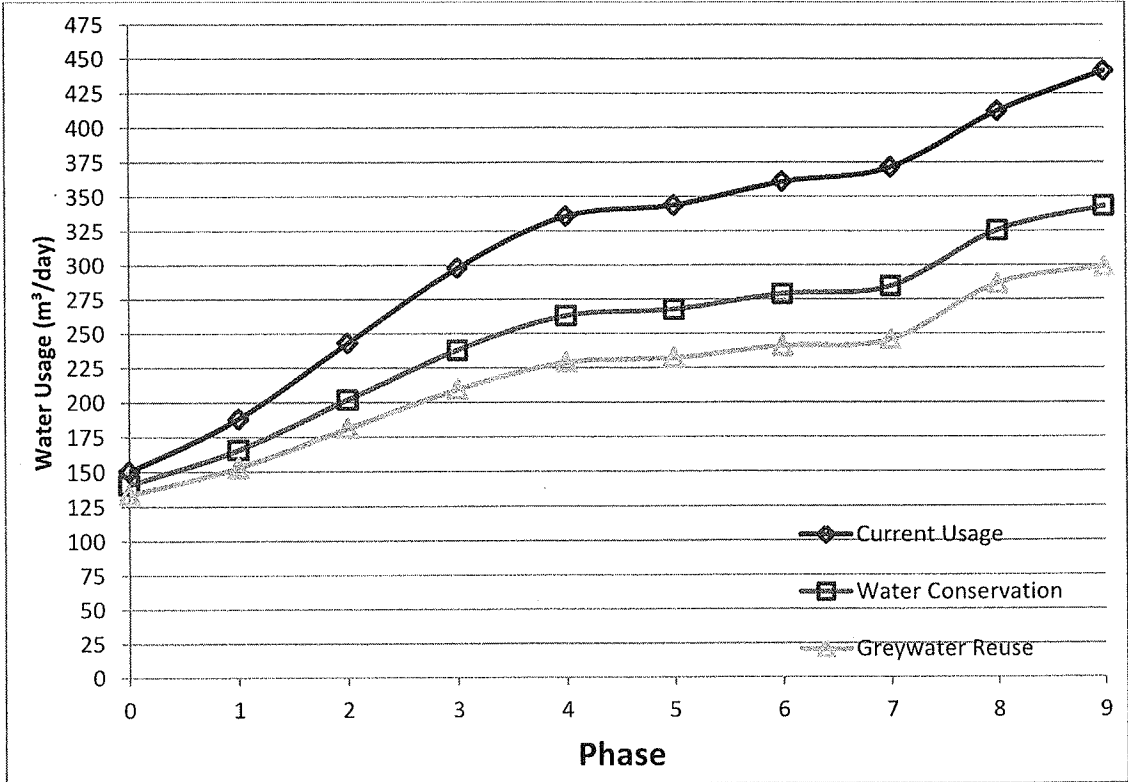
**Table 2: Potable Water Consumption Projections for Each Phase of Development**

Phase	Current Water Usage	Conservation (100 lpcd)	Water Savings	Greywater Reuse (78 lpcd)	Water Savings (m <sup>3</sup> /day)
Current*	93.5	88.6	4.9	83.2	10.3
Approved Expansion** (m <sup>3</sup> /day)	56.8	52.3	4.5	50.4	6.4
Phase 1 (m <sup>3</sup> /day)	37.8	24.9	12.9	19.4	18.4
Phase 2 (m <sup>3</sup> /day)	54.9	36.1	18.8	28.2	26.7
Phase 3 (m <sup>3</sup> /day)	54.9	36.1	18.8	28.2	26.7
Phase 4 (m <sup>3</sup> /day)	37.8	24.9	12.9	19.4	18.4
Phase 5 (m <sup>3</sup> /day)	8.0	4.7	3.3	3.4	4.6
Phase 6 (m <sup>3</sup> /day)	17.1	11.2	5.9	8.8	8.3
Phase 7 (m <sup>3</sup> /day)	10.6	5.7	4.9	4.7	5.9
Phase 8 (m <sup>3</sup> /day)	40.9	40.9	-	40.9	-
Phase 9 (m <sup>3</sup> /day)	29.1	17.5	11.6	12.3	16.8
<b>Total (m<sup>3</sup>/day)</b>	<b>441.4</b>	<b>343.0</b>	<b>98.5</b>	<b>298.8</b>	<b>142.5</b>

\*Current includes the new elementary and secondary schools with water usage based on present consumption rates, water conservation and then water conservation with greywater reuse.

\*\*Approved Expansion includes the Harbour and the designated assisted living expansions as well as the new supplemental living building.

The detailed calculations for the water consumption for each phase of the new development are presented in Appendix B. The calculations were made using present water consumption rates; an aggressive water conservation strategy for those units where it would be feasible; and an aggressive water conservation strategy with greywater treatment and reuse for those units where it would be feasible. For each of the phases, the unit type, number of units, average number of residents per unit, total number of residents, water usage per person, water usage per unit and the total water usage per phase, has been tabulated and then presented graphically. The water consumption per phase along with the water savings are summarized above in Table 2 and the results for the three options for each phase are presented graphically in Figure 1.



**Figure 1: Projected Water Consumption for Each of the Project Phases**  
 \*Phase 0 indicates the current development plus water consumption for the approved development.

The aggressive water conservation calculations were based on consumption rates for all of the activities within the home, calculated from results of a survey of water consumers in the City of Calgary. The amount of time allocated to each activity was multiplied by the consumption rates for high efficiency water saving techniques and technologies. The results for each activity are presented in the water consumption table in Appendix A.

There will be no use of potable water for outdoor watering of plants and gardens. The Prince of Peace development had been using untreated water from the stormwater pond for utility water outside the home and this practice will continue. The Prince of Peace development’s current water consumption is already very low when compared to that of the average Canadian home; however, as seen in Table 2, there is still potential to reduce it by a significant quantity.

Since the current water supply for the development is not considered to be economically feasible for the proposed new development, the property will be connected into the potable water supply from the new Conrich Regional Water System. The connection to the new piping infrastructure would be adjacent to Conrich near the railway tracks. The Prince of Peace management team is currently in discussions with the County of Rocky View to purchase an allocation of 300 m<sup>3</sup>/day. The off-site levies for this purchase would be approximately \$3.2 million. The cost of piping to connect existing infrastructure to the Regional water line would be approximately \$4 million and potable water would be purchased from Conrich Regional Water System at \$2.82/m<sup>3</sup> based on metered consumption. Cost sharing of a portion of the connecting pipeline infrastructure cost will need to be discussed with the adjacent developers that could potentially connect into this new water line.

The potable water transfer piping, connecting the development to the Conrich Regional Water System, will be placed within public road or utility right-of-ways. When constructed within the County's Utility Right-of-Way (URW), the County shall be provided with an accompanying URW Agreement that establishes rights for access and maintenance for all on-site potable water distribution infrastructure situated within the Municipal Servicing Development Plan (MSDP) area and intervening portions of the Prince of Peace property, to the satisfaction of the County. On-site potable water infrastructure shall be owned and operated by the Prince of Peace. The exact size, utility line assignments, and point of connection to the Regional Water System will be included in a detailed potable water servicing design completed by Scheffer Andrew Ltd. for the proposed development.

### **1.3 IRRIGATION SYSTEM**

Currently the irrigation system is only utilized by the 174 units in the village complex. The water supply comes directly from an intake located in the property's largest stormwater pond with a storage capacity of approximately 270 m<sup>3</sup>. The intake line from the stormwater pond is a 25.4 cm pipe that fills an 11.25 m<sup>3</sup> cement vault which is then pumped to the village's irrigation piping using a 5 hp pump. There are no restrictions on outdoor watering although; when the intake pipe, which is approximately 1 m above the bottom of the pond, is no longer submerged in the pond, the irrigation pump is immediately shut off.

For the new development the large stormwater pond in the centre of the property will be utilized as the water irrigation source for all phases of the development. This untreated water will be used for the sole purpose of outdoor watering for lawns, gardens, potted plants and shrubbery. A detailed utility water design will be completed by Scheffer Andrews Ltd. including pipe location and size as well as pump sizing.

### **1.4 FIRE PROTECTION SYSTEM**

Presently the potable water reservoir is the source of water for the fire protection system. The present fire protection system has a 40 hp (2,250 L/min) pump that automatically powers on when the pressure in the fire protection line drops. The potable water reservoir must always maintain a minimum volume of 158.4 m<sup>3</sup> of water to make certain that there is sufficient water to suppress a potential fire.

The new development will use the water supply line from the Conrich Regional Water System as

its water source for the fire protection system. A detailed layout of the fire protection system will be completed by Scheffer Andrews Ltd. including the size and location of the piping and the location of the fire hydrants.

## **2.0 WASTEWATER MANAGEMENT STRATEGY**

CCWTI has also been retained to provide an analysis of the current wastewater system as well as the required upgrades and volumes for the wastewater collection system and lift station for the new development based on current and/or aggressive conservation water usage.

### **2.1 CURRENT WASTEWATER COLLECTION AND LIFT STATION**

Presently, wastewater from the site is pumped into the County's East Rocky View Wastewater Treatment System sewage collection system using the existing on-site lift station and transfer pipeline constructed and financed by the Prince of Peace. The off-site levy fee for the use of the East Rocky View wastewater collection system and treatment plant, and the cost of the pipeline connecting the Prince of Peace lift station to an existing lift station in Conrich, have already been paid for by the Prince of Peace. The off-site levy fee paid applies to their entire property, i.e., including the area in Phases 1 to 9 of this application.

The wastewater lift station, located on the west side of the school, presently is operating at full capacity. However, there is a significant accumulation of runoff in an area adjacent to the school/church during heavy rainfall events. The building was constructed at a low point on the property and water collects behind the building requiring stormwater sump pumps to prevent flooding of the school. The sump pumps discharge the excess water into the existing wastewater lift station. This results in an increase in the wastewater flows to the collection system. The increase in the wastewater flow has been estimated to cost an additional \$1000/month for the wastewater treatment services.

### **2.2 NEW WASTEWATER COLLECTION AND LIFT STATION**

Since the present lift station is operating at full capacity, it must be upgraded immediately to handle the increased flows from the approved phase of development. The new lift station replacing the existing lift station should be sized to accommodate the average daily flow of 300 m<sup>3</sup>/day at project build-out. Materials of construction have improved significantly and there should be no requirement to provide a safety factor to accommodate for inflow and infiltration from the new piping.

When the new lift station is being constructed, the sump pump draining the area adjacent to the school will be relocated to one of the stormwater ponds to eliminate the increased flows to the wastewater collection system.

The current on-site sanitary collection system is sufficient for the existing community; however, detailed engineered drawings will be required for the new development on the property. The wastewater collection infrastructure will be owned and operated by the Prince of Peace. The size, utility line assignments, and lift station specifications will be included in the detailed wastewater servicing design to be completed by Scheffer Andrew Ltd. for the proposed new development.



**ENCHARIS COMMUNITY HOUSING & SERVICES**

PRINCE OF PEACE - CONFIDENTIAL SCHEME PLAN  
284054 LUTHER ROSE BLVD. NORTHEAST CALGARY, AB

**9.0 SANITARY COLLECTION – CANADIAN CLEAN  
WATER TECHNOLOGIES INC.**

**Consultant's report attached as separate file**

This is Exhibit "referred to in the  
Affidavit of \_\_\_\_\_  
sworn before me at \_\_\_\_\_  
this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

\_\_\_\_\_  
A Commissioner for taking Affidavits  
within British Columbia

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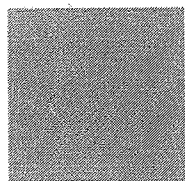
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This is Exhibit "B" <sup>84</sup> referred to in the  
Affidavit of Randy Nelson  
sworn before me at Vancouver  
this 25 day of June 2016

[Signature]  
A Commissioner for taking Affidavits  
within British Columbia

APPROVED DECEMBER 8, 2015

Bylaw C-7468-2015



Area Structure Plan  
**CONRICH**



ROCKY VIEW COUNTY  
Cultivating Communities

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## PART I. INTRODUCTION

### 1. PLAN PURPOSE

#### What is an Area Structure Plan?

An area structure plan is a statutory document approved by Council and adopted by Bylaw. An area structure plan outlines the vision for the future physical development of an area with regard to such things as land use, transportation, protection of the natural environment, emergency services, general design, and utility service requirements.

An area structure plan provides Council with a road map when considering land use changes, subdivision, and development. When making decisions regarding development within an area structure plan, Council must consider the plan and a wide range of other factors such as the economic goals of the County, County-wide growth, and the ability to provide servicing.

An area structure plan does not predict the rate of development within the plan area; ultimately growth is determined by market demand which reflects the overall economic climate of the region.

Through the process of preparing an area structure plan, citizens are provided with opportunities, at various stages in the process, to have input into the development of policy. It is important that the vision, goals, and policies contained in the plan address the interests of residents and stakeholders in the plan area, as well as the interests of those in other parts of the County.

The Alberta Municipal Government Act states an area structure plan must describe:

- proposed land uses;
- density of population and sequence of development;
- general location of major transportation routes and public utilities; and
- any other matters Council considers necessary.

The policies in an area structure plan form a bridge between the general planning policies contained in the County Plan and the more detailed planning and design direction contained in a *Conceptual Scheme* or a *Master Site Development Plan*. Area structure plan policies must align with the County Plan and applicable County policies. The area structure plan must be based on sound planning principles and respond to the particular natural and built form of the plan area.

#### Local Plans

For brevity, this document uses the term *local plan* to refer to a *conceptual scheme* or *master site development plan*. The County anticipates the majority of *local plans* within the area structure plan boundary will be submitted as *conceptual schemes*.

*Local plans* are developed within the framework provided by an area structure plan. Based on this framework, the *local plan* must demonstrate how development in the local area will retain the integrity of the overall area structure plan planning concept and how development will be

connected and integrated with adjacent areas. Policy sections in the area structure plan identify the unique requirements that must be addressed in the *local plan* due to the location and specific development conditions of the area. The standard technical requirements of a *conceptual scheme* or *master site development plan* are identified in the Rocky View County Plan (Section 29 and Appendix C).

**Local plan** is a term that refers to a *conceptual scheme* or *master site development plan*. A *local plan* will have unique planning requirements based on the planning direction provided in the area structure plan. *Local plans* must also address the general requirements for preparing a *conceptual scheme* or *master site development plan* identified in the County Plan (Section 29 and Appendix C).

**Conceptual Scheme** is a non-statutory plan, subordinate to an area structure plan. It may be adopted either by bylaw or by a resolution of Council. A *conceptual scheme* is prepared for a smaller area within an area structure plan boundary and must conform to the policies of the area structure plan. *Conceptual schemes* provide detailed land use direction, subdivision design, and development guidance to Council, Administration, and the public.

If a *conceptual scheme* area is of sufficient size that further detail is required for specific areas and phases, the *conceptual scheme* may identify smaller sub-areas and provide detailed guidance at that level. These smaller sub-areas are referred to as 'development cells'.

**Master Site Development Plan** is a non-statutory plan that is adopted by Council resolution. A *master site development plan* accompanies a land use redesignation application and provides design guidance for the development of a large area of land with little or no anticipated subdivision. A *master site development plan* addresses building placement, landscaping, lighting, parking, and architectural treatment. The plan emphasis is on site design with the intent to provide Council and the public with a clear idea of the final appearance of the development.

### Plan Interpretation

The following describes the meaning of some of the key words that are contained in a policy:

**Shall:** a directive term that indicates the actions outlined are mandatory and therefore must be complied with, without discretion, by Administration, the developer, the Development Authority and Subdivision Authority.

**Should:** a directive term that indicates a strongly preferred course of action by Council, Administration, and/or the developer but one that is not mandatory.

**May:** a discretionary term, meaning the policy in question can be enforced by the County if it chooses to do so, dependent on the particular circumstances of the site and / or application.

## 2. PLAN ORGANIZATION

The Conrich Area Structure Plan is organized in three parts followed by four appendices.

Part I: Introduction: This Part outlines the Plan purpose, boundaries, policy terminology, relationship to other plans, the public engagement process, and key issues, opportunities, and design ideas that informed the plan preparation process. It also contains a description of the

development of the Conrich area from its early beginnings to today. Finally, it presents a vision of what Conrich could be like 30 plus years into the future and provides 10 broad goals that will guide the development of the area over this period.

**Part II: Plan Policies:** This Part is the core of the Plan, containing the policy direction to guide development in the Conrich area. This part contains 20 sections, each section dealing with a specific land use, services, or infrastructure subject area. Each of these sections contains an overall purpose statement, a list of objectives, introductory paragraphs, and a series of policies addressing the subject area. Where a purpose statement or introductory paragraph introduces a series of policies, it is provided for information to enhance the understanding of the policies.

**Part III: Implementation and Monitoring:** This Part presents the Plan implementation process, provides information on *local plan* areas, costs and levies, phasing, specifies requirements to ensure the Conrich Area Structure Plan policies and strategies are adhered to, and provides direction regarding the process for the review and amendment of the Plan. This Part also addresses the need and method for intermunicipal coordination and cooperation.

**Appendices:** Appendix A contains definitions of technical terms used in the Plan. Appendix B provides a list of design guidelines for commercial and industrial development. Appendix C provides a list of Key Alberta Energy Regulator documents that applicants should refer to when developing near oil and gas infrastructure.

### 3. PLAN AREA

The Conrich Area Structure Plan applies to the area within the defined boundary as shown on Map 1: Plan Area Location and Map 2: Plan Area Air Photo.

The Plan area is centered on the Hamlet of Conrich and encompasses 68 quarter sections (including road allowances) for a total of approximately 4,402 hectares (10,876 acres) (Table 2). The study area includes the following elements:

- the existing Hamlet of Conrich located at the intersection of Conrich Road and Township Road 250 (Map 1);
- developed or developing areas with approved *conceptual schemes* or *master site development plans*. These include Cambridge Park (South Conrich), CN Logistics Park, Buffalo Hills, and the Prince of Peace community;
- lands bordering the City of Calgary to the west and south, with the need to address transition, co-ordination, and compatibility;
- lands bordering the City of Chestermere to the south and southeast, with the need to address transition, co-ordination, and compatibility; and
- lands adjacent to expected regional transportation infrastructure (Highway 1, Stoney Trail, and the CN rail line).

A **Hamlet** is an unincorporated community, governed by the rules and regulations of the County with boundaries approved by Council.

The form of a Hamlet may vary from a small cluster of houses to a mixed use community with



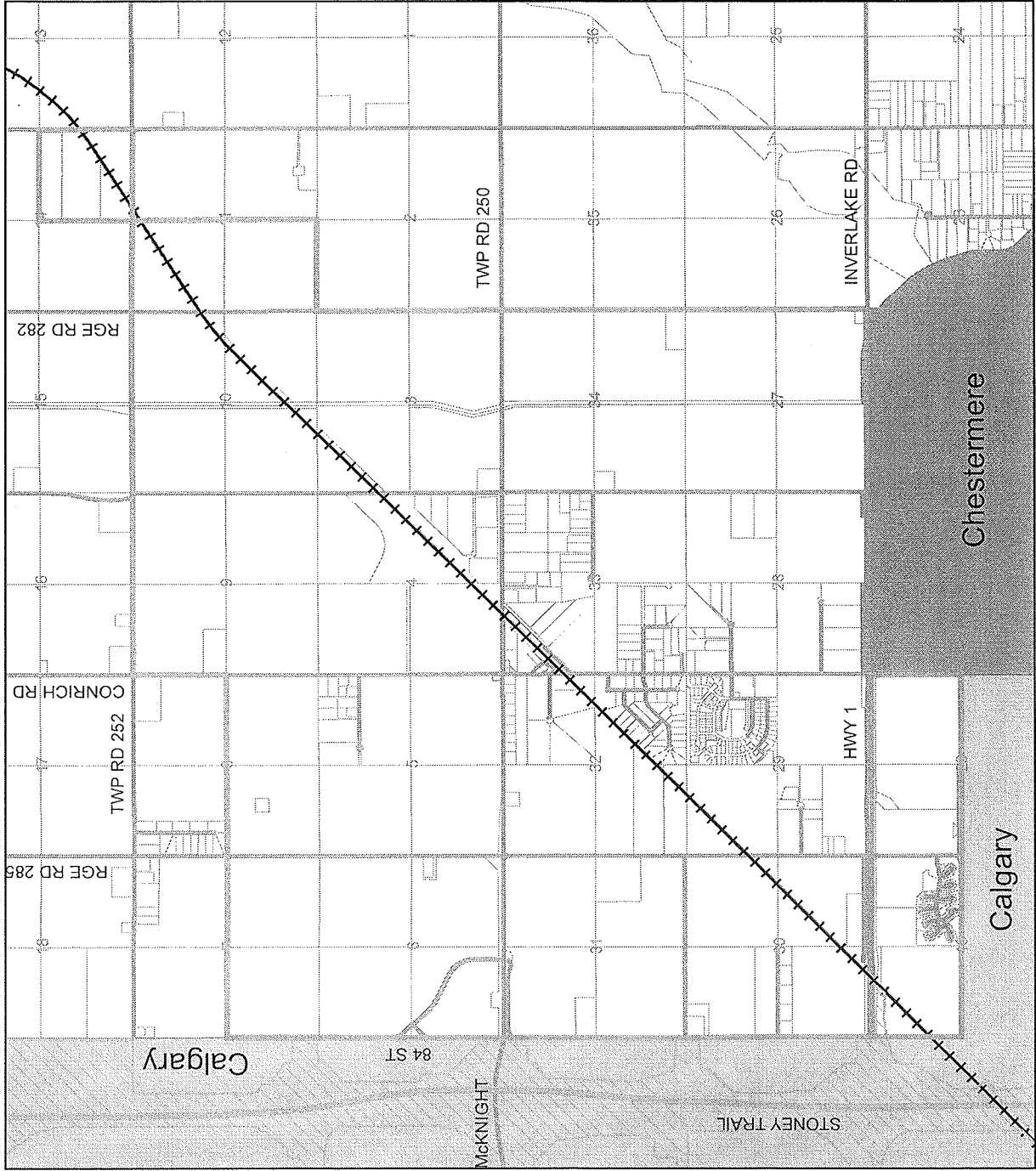
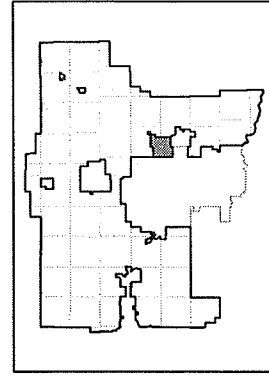
houses, a commercial main street, a central gathering area or park, and possibly a school or a place of worship. The County Plan identifies the Hamlet of Conrich as a full service rural community with a range of land uses, housing types, rural services, and associated businesses. Full service hamlets may have a population that ranges from 5,000 to 10,000 residents.

### **Plan Area Maps**

The boundaries and locations of areas shown on the maps within the Plan boundary are not intended to define exact areas except where they coincide with clearly recognizable features or fixed boundaries such as municipal boundaries, property lines, or road or utility rights-of-way. Furthermore, the locations of symbols depicting specific features on the maps are approximate only, not absolute, and should be interpreted as such. The precise location of these boundaries and areas will be determined by the County at the time of *local plan* consideration and approval.

# Map 1: Plan Area Location

-  ASP Boundary
-  Hamlet
-  Transportation and Utility Corridor
-  CN Railway

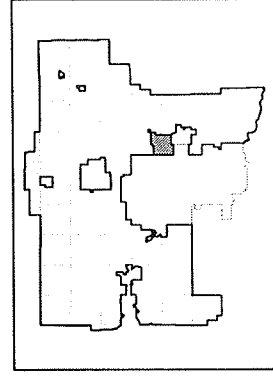


This map is conceptual in nature. No measurements or area calculations should be taken from this map.

# Map 2: Air Photo

-  ASP Boundary
-  Hamlet
-  Transportation and Utility Corridor
-  CN Railway

Air Photo Date: Spring 2014



This map is conceptual in nature. No measurements or area calculations should be taken from this map.

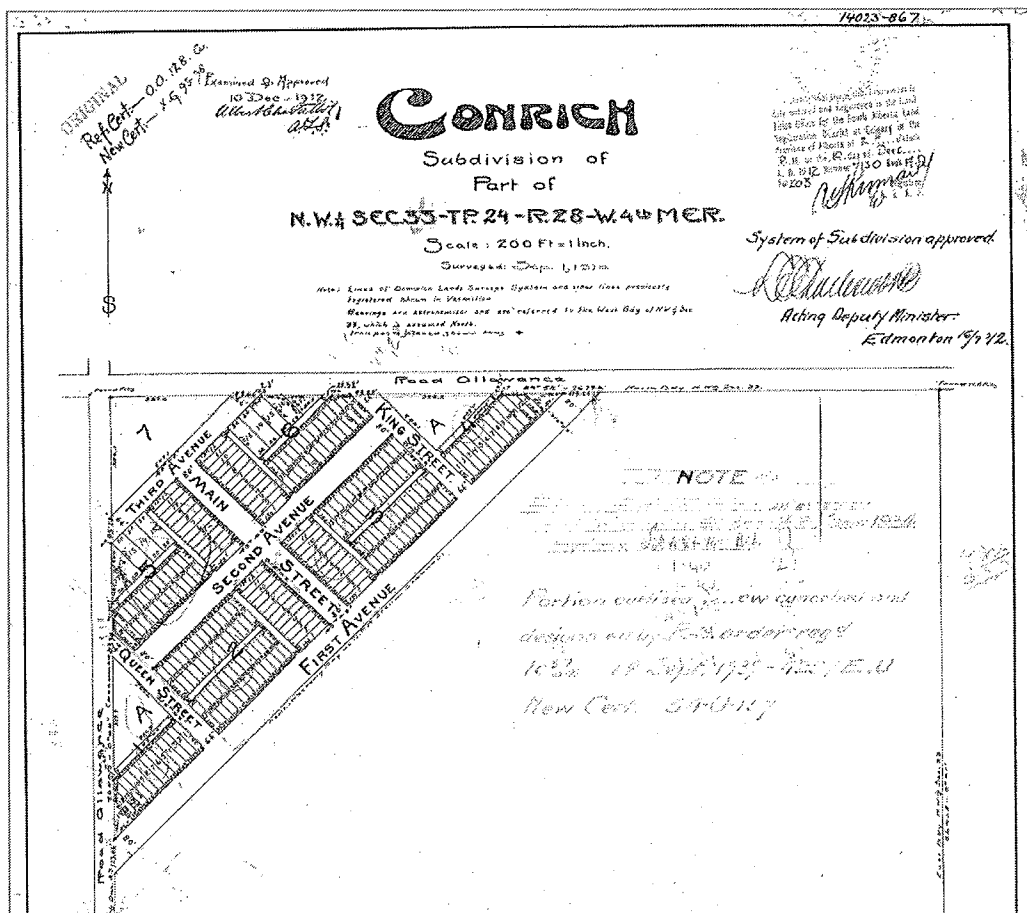
### 4. CONRICH TODAY

#### Early Beginnings

The Conrich area is located in the central east region of Rocky View County. It lies immediately to the east of the City of Calgary and north of the City of Chestermere. This settlement area was identified as a Hamlet in 1913 with the building of a grain loading platform for the Grand Trunk Pacific Railway. It was named after two real estate developers active in the area; Connacher and Richardson.

The initial plan of survey was registered with the Province in 1910. The original plan has the Hamlet adjacent to Conrich Road and Township Road 250 with a grid street network, a main street, and an industrial area centered on the rail line. The survey plan marks the current Hamlet boundary with Queen Street, the only existing street that corresponds to the survey. A gas station has been in the area since 1920 and a local school, constructed in 1955, is still in operation (Khalsa School). Until the late 1950s and early 1960s, the Conrich area remained a predominantly agricultural area with a few residential lots in the hamlet and scattered acreages in the wider area. At that time, the demand for acreages and smaller agriculture lots adjacent to the Hamlet began to occur.

Figure 1: Survey of the Conrich area circa 1910



## 1960s to Today

The existing land uses of the Conrich Plan area are illustrated on Map 3: Existing Land Use. Map 4: Existing Conditions identifies such elements as individual homes, institutions, the CN Rail Facility, Crown Land, and water bodies. A description of existing conditions in the Conrich area is provided below.

### *Agriculture and the Natural Environment*

Agriculture continues to be the dominant form of development in the Conrich area, although it is gradually transitioning to residential and industrial uses. Agriculture is characterized by large and small-scale operations interspersed with informal residential and small agricultural subdivisions.

Conrich, like much of east Rocky View County, is characterized by tilled soils, remnant prairie grasslands, wetland complexes, waterfowl migration routes, a high water table, and groundwater discharge areas. Relative to the western parts of the County, this region has decreased precipitation and a longer growing season; a change that results in fertile growing conditions for cereal crops, oil seeds, and hay production.

Topography is slightly rolling with the few defined drainage courses (Map 11) forming part of the Shepard sub-basin that flows south to the Bow River. Existing development has adopted rural stormwater management practices incorporating culverts, ditches, and natural conveyance systems. This site-specific form of development has resulted in stormwater flooding and conveyance problems. The preservation of wetlands and the regional management of stormwater are the primary natural challenges to the successful development of the Conrich area.

### *Residential*

At the time of Plan writing there are 442 homes within the Plan area boundaries. The majority of these homes have been built since the 1960s, with about half located in the vicinity of the original Hamlet. Many of the residents have a significant investment in their properties and a strong attachment to the area.

Residential development adjacent to the Hamlet has been ad-hoc in nature. Small acreages have developed along Township Road 250, with comprehensively planned acreage development south of Township Road 250 being approved and / or built in the last decade. Cambridge Park is the most significant smaller lot residential development in the area. In general, these neighbourhoods situated close to the Hamlet have not been well connected and there has been no focus on developing a cohesive community core and identity for the broader Hamlet area. Currently, the population in, or near, the original Hamlet is approximately 687 residents.

Another significant residential development in the Plan area is the Prince of Peace community (463 residents), located south of Highway 1. The community began with the creation of a school in 1995 and now includes a church, villas, a supportive living facility for seniors, and a dementia care facility. With the addition of other smaller residential developments such as Pleasant Place, the overall population in the Conrich Plan area was estimated to be 1,358 residents in 2013.

### *Industrial, Commercial, and Institutional Uses*

In 2012, Canadian National (CN) received federal approval to relocate its Railway Facility to the Conrich area. Situated adjacent to the railway, within CN's "Logistics Park" the Facility allows for loading of sea containers entering and leaving the Calgary region. The Facility provides easy access for CN's customers to retrieve their merchandise and is expected to result in a demand for a variety of warehouses and light industrial development in the Conrich area.

Prior to the building of the CN logistics park, non-agricultural business was limited to the Conrich Hog and Poultry farm (now closed), the Conrich gas station, Mountain View campground, and the Frankonia RV and Boat Storage yard. Within the City of Calgary, on the west boundary of the Plan area, are a number of temporary developments including recreational vehicle storage and heavy equipment sales.

The Conrich area is home to a number of regional institutional uses such as the Prince of Peace Care Facility and associated church and school, the Chestermere Christian Fellowship Church, the K to 9 Khalsa School (a Sikh faith private school with 375 students), and the Rocky View Garden of Peace Cemetery.

### *Transportation Network*

Transportation infrastructure frames the pattern of development in the Conrich area. The development of the CN line (Grand Trunk Pacific Railway), connecting Calgary to the CN mainline, triggered the Hamlet's residential development. The angled north-east orientation of the rail line and its numerous road crossings provides a challenge to the safe and efficient movement of local traffic. Recent development of the Stoney Trail ring road and its interchange connection to Highway 1 created a nearby high speed vehicular transportation network. These major network improvements acted as a catalyst for the relocation of the CN rail facility from Calgary to the Conrich area.

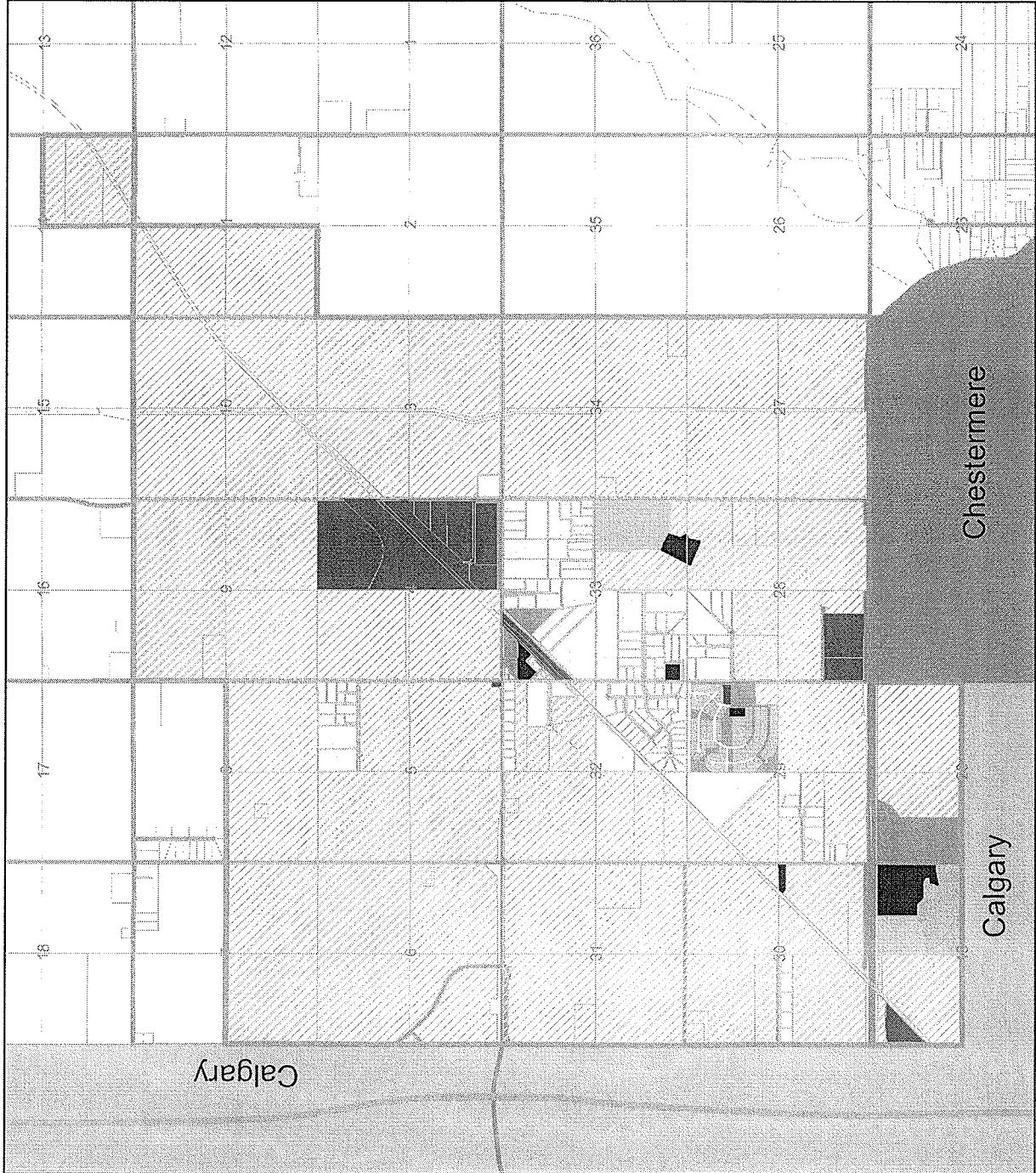
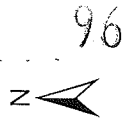
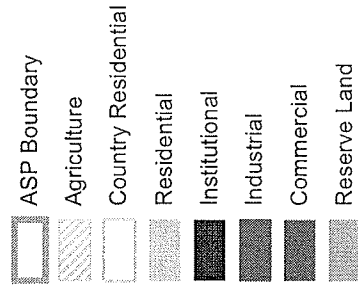
The successful development of an efficient transportation network that minimizes impacts on existing and future residential development is one of the main challenges to successful development in the Plan area.

Recent industrial development and the resultant increase in traffic has directly impacted existing residential areas along Township Road 250 and indirectly affected most residential areas through offsite impacts such as noise and lights.

### **SUMMARY**

In summary, the Conrich area is defined by both its natural and built environment. The greatest challenge to the future physical development of the Conrich area is to create and implement a comprehensive long-term plan that will result in an attractive, safe, and cohesive rural community.

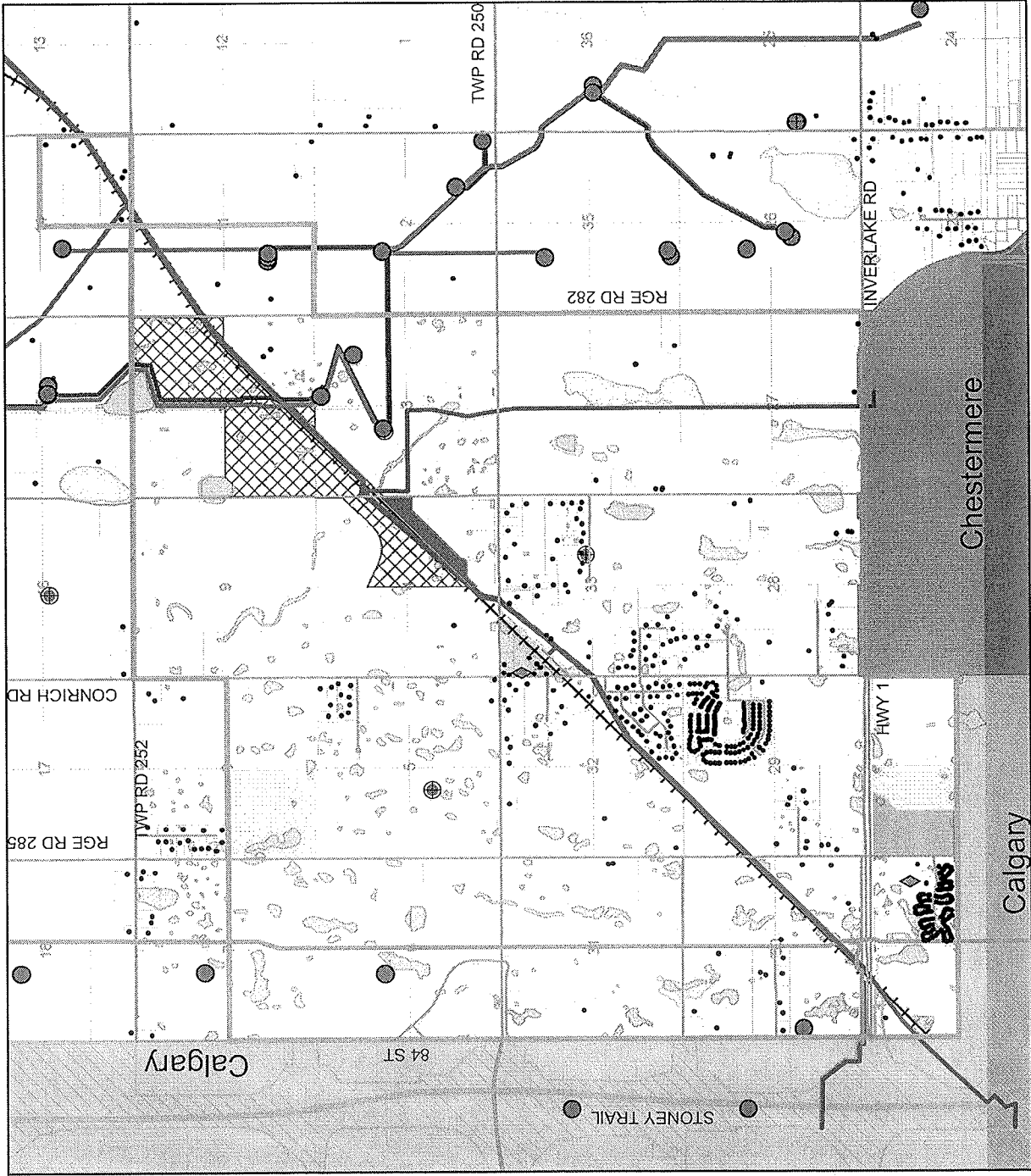
# Map 3: Existing Land Use



This map is conceptual in nature. No measurements or area calculations should be taken from this map.

# Map 4: Existing Conditions

- ASP Boundary
- Hamlet
- Cemetery
- Crown Land
- Waterbodies
- Federal Jurisdiction
- CN Rail Facility
- Homes
- Schools
- Oil/Gas Well
- Abandoned Well
- Fuel Gas
- LVP Products
- Natural Gas
- Sour Natural Gas
- Transportation and Utility Corridor
- CN Railway



This map is conceptual in nature. No measurements or area calculations should be taken from this map.



## 5. PLANNING FOR TOMORROW

The need for the Conrich Area Structure Plan has been determined based on a number of factors including; recent annexations, development pressure, public concern, changing conditions in adjacent municipalities, and the need for land use policy to align with the recently adopted County Plan and other County policies.

The preparation of the Conrich Area Structure Plan was a multi-faceted process that considered a number of elements including:

- strategic directions and policy of the County Plan and other applicable adopted County policies;
- ideas and input gathered throughout the public and stakeholder engagement process;
- key issues and opportunities identified by Administration residents, landowners, stakeholders, and municipal neighbours; and
- physical constraints and attributes of the area.

An overview of the first three key factors informing the preparation of the Conrich Area Structure Plan is outlined below, while physical constraints and attributes are discussed in Section 4 (Conrich Today).

### Policy Direction from Other Plans

#### *County Plan*

The Conrich Area Structure Plan takes its main policy direction from the Rocky View County Plan regarding its economic role in the region, its land use, its growth rate, and other high level policy directions. The County Plan provides the overall policy framework for development in the Conrich area on matters ranging from the development of residential, commercial, and industrial areas to the provision of emergency services and infrastructure.

The Conrich area is identified in the County Plan as a Hamlet and a Regional Business Centre. Being identified as a Hamlet means the County supports residential growth in the Conrich area and expects such development to occur through the expansion of the existing Hamlet. By classifying the Conrich area as a Regional Business Centre, it means the County supports the growth of the area from primarily agriculture to a mixed use industrial-commercial area.

The County Plan identifies Conrich as a **Regional Business Centre** having the following characteristics:

- a concentration of commercial and / or industrial businesses;
- an efficient road connection to the provincial highway network;
- significant scale and scope of operations; and
- infrastructure with the potential to service the proposed development.

### *Calgary-Chestermere Corridor Area Structure Plan*

Historically, detailed planning in the Conrich area was directed by the Calgary-Chestermere Corridor Area Structure Plan. The need for a new area structure plan for the Conrich area was recognized due to the City of Calgary's and City of Chestermere's annexations of large portions of the Calgary-Chestermere Corridor Area Structure Plan area, the approval of the relocation of the CN rail facility by the Canadian Transport Agency, and the introduction of piped services into the Conrich area.

### *Rocky View / Calgary Intermunicipal Development Plan*

Portions of the Conrich Area Structure Plan area are affected by the Rocky View / Calgary Intermunicipal Development Plan (IDP). Most significantly, the IDP identifies a Key Focus Area within the Conrich area adjacent to Highway 1 between the City of Chestermere and the City of Calgary. The objective of identifying Key Focus Areas in the IDP is to achieve a greater degree of intermunicipal collaboration and involvement in the identified area and to collaborate in creating attractive entranceways for the benefit of residents and the traveling public. In addition, the IDP identifies Residual Long-Term Growth Areas within the City of Calgary on the west boundary of the Conrich Area Structure Plan area. The IDP provides direction on the use and design of this area.

### *City of Chestermere*

A portion of the Conrich Plan area borders the City of Chestermere. Intermunicipal coordination with the City of Chestermere, in the absence of an Intermunicipal Development Plan, will address issues related to interface planning, land use compatibility, and joint infrastructure requirements affecting both municipalities. An Intermunicipal Development Plan may be adopted in the near future.

## **Public Engagement Process**

Rocky View County's commitment to an open, transparent, and inclusive process with respect to the preparation of the Conrich Area Structure Plan included the implementation of an engagement strategy that provided stakeholders, landowners, adjacent municipalities, and the general public with several opportunities for meaningful discussion and input. A summary of this engagement is described below:

### *Phase 1*

**Awareness, Issues, and Goals:** The initial start-up phase began in October 2013. The first engagement session was intended to raise awareness of the Plan preparation process. This phase included an online questionnaire and workshop to explore residents' ideas with respect to 'Hopes & Fears', 'Conrich Today', and the 'Future Conrich'; over 120 people attended the workshop.

### *Phase 2*

**Evaluating Options and Setting Direction:** This phase began in December 2013 with a workshop and online survey to help confirm the vision for the Plan and to explore areas where policy direction was still unclear. This workshop engaged participants in discussing (i) the vision and

goals generated from workshop 1, (ii) 'big ideas' such as land use, economic development, traffic and mobility, community, and *open space*, and (iii) ideas regarding the re-design of the Hamlet of Conrich and surrounding area; over 70 people attended this workshop.

### *Phase 3*

**Draft Policies and Actions:** In this phase, (January - April, 2014) key policy directions were developed and presented at an open house to over 100 participants, who were then invited to provide comment on the session online. Policy areas included:

- An overall land use strategy;
- A preferred concept for the Hamlet;
- Stormwater management;
- Transportation, including parks and pathways;
- Non-residential / Residential Interface.

### *Phase 4*

**Plan Completion and Adoption:** In this phase, the draft Plan was released. The draft Plan was refined through further public consultation, intermunicipal discussion, agency circulation, and technical review. Following these changes, a final open house and Public Hearing was held.

## **Key Issues, Opportunities, and Design Ideas**

A number of key issues, opportunities, and design ideas were identified during the public and stakeholder engagement and are summarized below.

### 1. Hamlet Development and Design

**Issue / Opportunity:** Incremental development of residential areas to the south and east of the historic Hamlet area has resulted in a disconnected community with no central focus.

**Plan Policy Direction:** The development of a new Area Structure Plan provides the opportunity to:

- Identify the Hamlet as a distinct community. Community identity may be achieved through signage, identifiable boundaries, and the development of a community core / main street.

### 2. Land Use

**Issue / Opportunity:** There was strong support for allowing lands to be converted to commercial and industrial land uses by landowners wishing to take advantage of opportunities presented by the development of the CN rail facility and highway transportation network. Conversely, residents who have been impacted by the traffic, noise, and lights were concerned about the prospects of additional development.

**Plan Policy Direction:** The development of a new area structure plan provides the opportunity to:

- address the Non-residential / Residential interface in a manner that mitigates the impact on residential areas;

- provide for the development of a Hamlet core that will strengthen the identity of Conrich and provide local commercial services to residents;
- arrange land uses that take advantage of commercial and industrial growth opportunities, while minimizing the impact on residential development; and
- provide for the development of a land use pattern that results in cost effective infrastructure systems, public facilities, and community services.

### 3. Stormwater Management

**Issue / Opportunity:** The Conrich area is generally flat and contains multiple wetlands. The need for comprehensive stormwater management was recognized in light of the local flooding issues experienced in the spring of 2013. Historically, the Conrich area discharged stormwater south to the Bow River. However, the development of homes and new roads south of the Hamlet has impeded drainage in the area and this has proved to be a major challenge to the successful development of an effective stormwater management system.

**Plan Policy Direction:** The development of a new area structure plan provides the opportunity to comprehensively and regionally address stormwater management and implement the provincial and County goals of wetland protection.

### 4. Transportation

**Issue / Opportunity:** Increased truck traffic associated with the operation of the CN rail facility was identified as a key issue; additional development will add significantly to the traffic volume.

**Plan Policy Direction:** The development of a new area structure plan provides the opportunity to identify transportation corridors and provide the planning to ensure increased traffic volumes, access, and costs are accounted for and impacts are minimized to the greatest extent possible.

### 5. Infrastructure Servicing

**Issue / Opportunity:** County water and wastewater services have been provided to the Plan area. However, there are utility service constraints that must be addressed before the development area reaches its full potential.

**Plan Policy Direction:** The Plan allows for the long range planning of utility upgrades, while ensuring adequate capacity is available before development is allowed to proceed.

## 6. CONRICH VISION AND GOALS

### Conrich Vision

The following vision statement provides an idea of what the Conrich area could look like 30 years into the future:

*The Conrich area is known as a dynamic residential-industrial-commercial hub within Rocky View County and is seen as an important contributor to the economic vitality of the County. The Hamlet is a well-planned, healthy community with diverse rural neighbourhoods existing in close harmony with a thriving industrial*

*hub centred on the CN Logistics Park. Bordering the Hamlet on the south, stretched out along Highway 1, is a major shopping destination serving the region.*

*The Hamlet of Conrich has grown into a distinct and vital residential community, with a variety of rural style neighbourhoods linked together by beautiful natural open spaces, parks, and pathways. The new Hamlet Core is an attractive, pedestrian oriented zone with tree-lined sidewalks and a number of different businesses and services including a hair salon, restaurant, bank, small grocery store, places of worship and a walk-in coffee shop. The local area businesses thrive because of the demand not only from local residents, but also from warehouse workers and other employees from the area who stop in at lunch and on their way home from work.*

*The attractiveness of locating near the CN rail facility, with its opportunities for co-locating warehouses near a distribution centre has drawn a large number of light industries into the area. In addition to the warehousing, a wide range of industries related to the manufacturing, storage, and oil field service sectors, have taken advantage of the area's large industrial lots. Access to a fully functional regional transportation network has resulted in a development that serves not only local markets, but businesses from Winnipeg to Vancouver.*

*There has been substantial Highway Business development on the western and southern boundaries of Conrich. Several large format retail stores have developed adjacent to Stoney Trail, and major businesses along Highway 1 are developing now that highway interchanges are in place.*

*Conrich residents have work opportunities within a short distance from their homes and all County residents benefit from the financial contribution the area makes to the County's economic sustainability. Although development has resulted in extensive changes to the landscape, the sensitive environmental areas have been protected and the presence of an above ground regional stormwater system has allowed the retention of many of the area's original wetlands.*

## **Goals**

There are 10 goals that guide the development of the Conrich Area Structure Plan. These goals are based on policy direction of the County Plan, the existing physical characteristics of the area, and the key issues, constraints, and opportunities identified during the planning process. The goals are as follows.

1. Facilitate the development of the Hamlet of Conrich as a vital and distinct community that retains its rural heritage and provides residents with:
  - a. a range of housing choices;
  - b. a community focal point with public gathering places, parks, schools, other institutional uses, and local commercial services;
  - c. attractive streets, pedestrian pathways, and linked *open spaces* that facilitate a physically connected community; and

- d. community facilities and services that promote a socially connected community.
2. Support the development of the Conrich area as a Regional Business Centre by providing opportunities for well-designed commercial and industrial areas and taking advantage of the inter-provincial transportation network (roads and rail).
3. Create a well-designed, safe, and interconnected transportation network that addresses the needs of residents, motorists, pedestrians, and cyclists.
4. Provide for attractive and high quality gateways along Highway 1 and Township Road 250.
5. Protect existing and future residential areas with appropriate land use transition and design measures.
6. Support the continuation of existing agricultural operations until development of those lands to another use is deemed desirable.
7. Provide for potable water, wastewater, and stormwater systems in the Plan area in a safe, cost effective, and fiscally sustainable manner.
8. Successfully manage stormwater through the development of a regional stormwater conveyance system and innovative stormwater management solutions.
9. Protect wetlands through the integration of wetlands as part of a sustainable stormwater solution.
10. Phase development in a manner that makes efficient use of road and utility infrastructure, while providing sufficient land to meet market demand.

## **PART II. PLAN POLICIES**

### **A. LAND USE**

#### **7. CONRICH DEVELOPMENT STRATEGY**

The Conrich Development Strategy is a holistic approach to implementing the Conrich Area Structure Plan's vision and goals. The Strategy identifies general land uses, the approximate boundaries of the land use areas, and policies that guide development. The Strategy is discussed in general terms below, shown on Map 5: Land Use Strategy, with related maps and policies in Sections 8 to 28.

The Strategy has four primary components:

1. The expansion of the Hamlet of Conrich and its evolution as a diverse, vital residential community. The Hamlet location and land use will be developed as a separate process following adoption of this Plan and amended into the Conrich Area Structure Plan at a later date.
2. The development of the Conrich area as a Regional Business Centre with more than half of the Plan area devoted to industrial and commercial uses.

- 3. The integration of residential and business uses in a manner that provides for the transition of land uses, promotes land use compatibility, and mitigates impacts on adjacent lands.
- 4. The identification of agricultural land that will remain in production until such time as it is required for other uses and the protection of the natural environment in the face of significant growth.

In addition, the strategy has a number of sub-components that address other residential areas within the Plan boundaries, transition areas (residential to business use), and phasing.

1. Hamlet of Conrich

The Strategy supports the expansion of the Hamlet of Conrich as an attractive residential community with a community core as a focal point that helps to provide a distinct community identity. There are a number of options for the location of a community core and hamlet residential development areas. The final land use plan for the Hamlet will be developed as a separate process and amended into this Plan. The study area for the Hamlet is referred to as a Future Policy Area and is shown on Map 5.

Future Policy Area

A Future Policy Area is identified on the lands south of Township Road 252 and north of the highway business zone (Map 5). The Future Policy will include a Hamlet boundary, a community core, and residential areas. It is not expected that all of the land within the Future Policy Area will form part of the Hamlet. Land not located within the final Hamlet boundary will be identified for other uses that are consistent with the Conrich Area Structure Plan.

**OBJECTIVES**

- Limit land use and development to agricultural redesignation, approved subdivisions, and allowed uses until the current land use districts, the Hamlet of Conrich boundaries, community core, residential development areas, and other land uses are determined.

**POLICIES**

- 7.1. *Local plans*, land use redesignation, and new subdivision shall not be supported within the Future Policy Area, as shown on Map 5.
- 7.2. Notwithstanding Policy 7.1, development consistent with Section 12: Agriculture of this Plan shall be allowed.
- 7.3. Subdivisions approved prior to the adoption of this Plan within the Future Policy Area may proceed.

Population

The approximate estimated population density for the Plan Area is shown in Table 1. Final densities will be determined with amendments to the Future Policy Area and preparation of *local plans*.

Table 1. Conrich area population and density at full build-out.

Development Area	Gross Area hectares (ac)	Gross Residential Area <sup>1</sup> hectares (ac)	Units <sup>2</sup> per hectare (ac)	Population	Population density <sup>2</sup> per hectare (ac)
Future Policy Area <sup>3</sup>	To be determined	To be determined	To be determined	To be determined	To be determined
Prince of Peace	59.5 (147)	40 (98.8)	48.6 (19.7)	3507	87.65 (35.5)
Pleasant Place	43 (106)	43 (106)	6.9 (2.8)	420	10 (4)

<sup>1</sup> Gross Residential Area = gross area - regional uses such as *open space*, commercial centres, institutional sites, business parks, express ways and environmental reserve.

<sup>2</sup> Units and population density per hectare are based on gross area.

<sup>3</sup> Population and density to be determined based on development within the Future Policy Area.

<sup>4</sup> Population and density is based on a portion of the area (106 acres) being developed as Hamlet Residential. Final numbers may be higher or lower, based on chosen residential form.

## 2. Regional Business Centre

The Strategy supports the development of the Conrich area as a Regional Business Centre with commercial and industrial land uses that take advantage of the regional transportation network and the development of the CN rail facility.

The majority of industrial uses are located to the north and west of the Hamlet. Expected uses are those that will not have significant offsite impacts such as noise, odour, and dust e.g. warehousing and transportation. An area to the north-east of the Hamlet may be used for development that results in offsite impacts. It is estimated that the amount of land dedicated to industrial uses will provide sufficient opportunities for industrial demand for 30 plus years.

The strategy identifies two Highway Business zones intended to serve the regional market. These are located along Highway 1 and at the intersection of Stoney Trail and Township Road 250 (McKnight Blvd.). Potential uses include regional grocery and retail stores, large format stores, shops, offices, business parks, entertainment, and accommodation.

This Plan supports the development of these business areas through such measures as:

- Requiring detailed *local plans* to address Non-residential / Residential interface issues related to development;
- Providing for cost effective improvements to the County's infrastructure;
- Providing for a transportation network that separates residential, commercial, and industrial traffic.



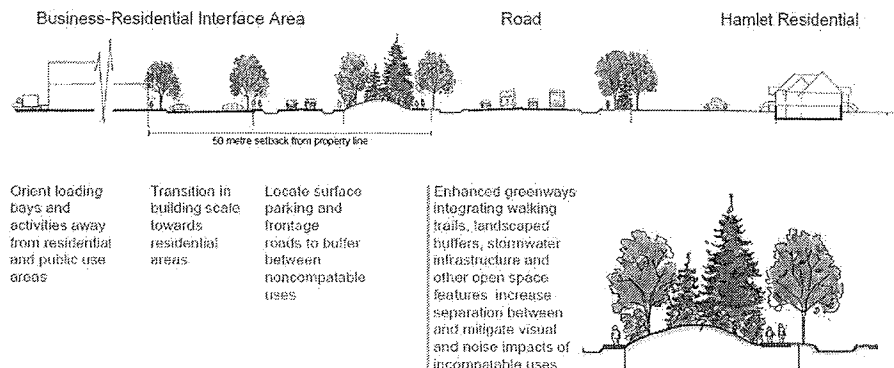
Table 2: Approximate gross areas of the land use types.

Land Use Type	Gross area hectares (ac)
Residential	215 (532)
Future Policy Area	1,100 (2,717)
Industrial	1,957 (4,836)
Highway Business/Industrial	131 (324)
Highway Business	574 (1,419)
Institutional	32 (78)
Long Term Development	393 (970)
<b>Total</b>	<b>4,402 (10,876)</b>

### 3. Residential and Business Interface

The emergence of Conrich as a Regional Business Centre provides a challenge to developing a vital and attractive community. The Strategy addresses this challenge by requiring the implementation of Non-residential / Residential Interface policies to mitigate the impact of commercial / industrial development through land use, building height, coverage, design, and landscaping.

Figure 2: Non-residential / Residential Interface Area



#### 4. Agriculture and the Natural Environment

Agriculture is supported within the Plan area until such time as alternative development is required. The Plan limits further fragmentation of these agriculture areas but allows for the development of a Farmstead, First Parcel Out, or other agricultural land uses. The Plan also supports the protection of wetlands and riparian areas, particularly those associated with natural stormwater conveyance systems.

##### **SUB-COMPONENTS**

###### *Other residential areas*

The Prince of Peace community intends to expand its long term care facility, increase its residential capacity, and provide local commercial services to its residents. The Conrich Development Strategy supports this direction and allows for residential development to the west of the Prince of Peace community.

###### *Transition*

The Strategy identifies three residential areas within the Plan area that may transition to regional Highway Business or industrial uses and provides policy to support this transition. The identified areas are: (i) Township Road 244A, (ii) McKervey Place, and (iii) Township Road 250 (Map 5).

###### *Phasing*

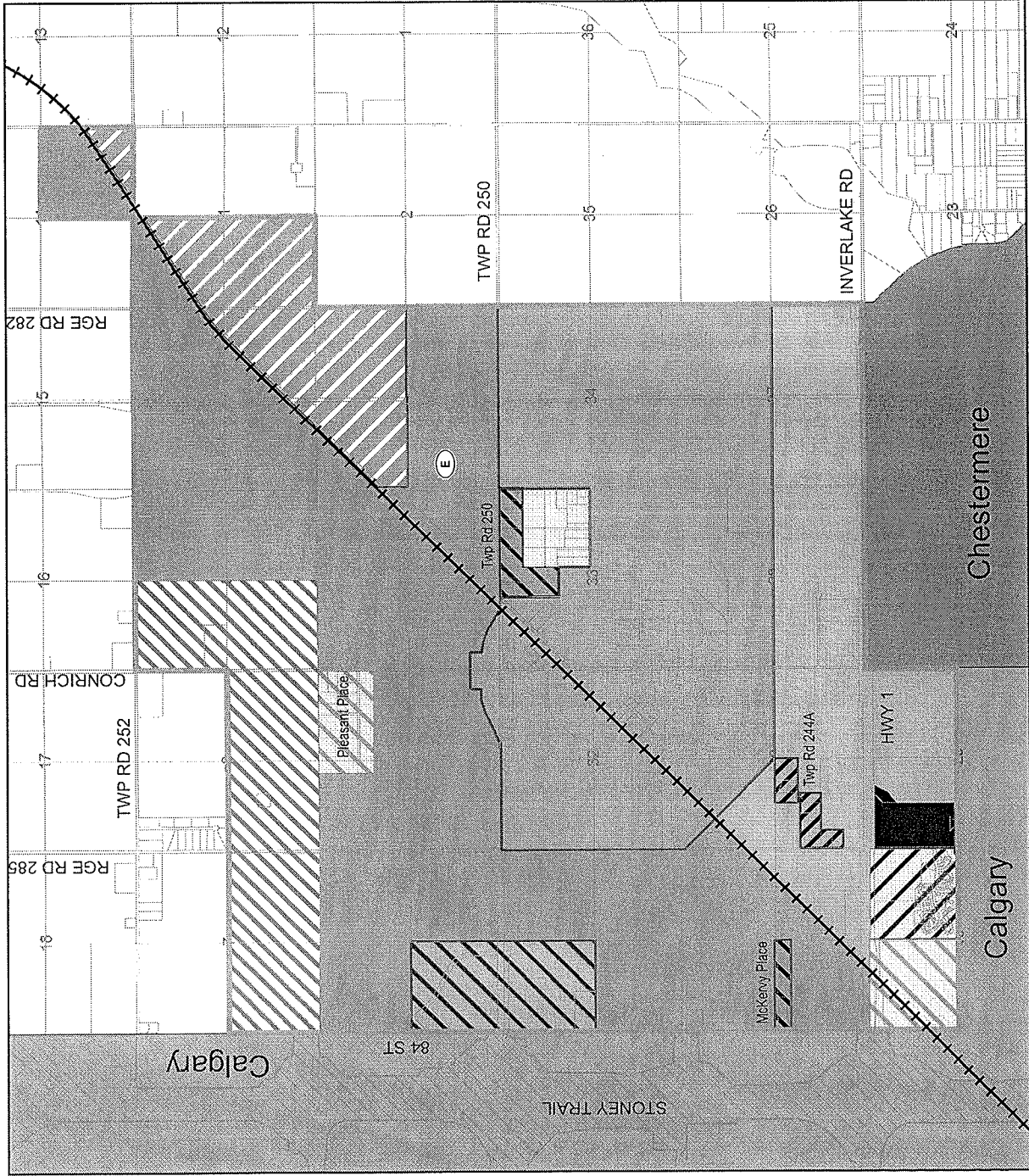
The Plan recognizes that development within the Plan area should progress in a logical and efficient manner. The phasing concept (Map 13: Phasing) identifies the following areas for the first phase of development:

- lands adjacent to Township Road 250;
- lands within the Hamlet;
- Prince of Peace; and
- lands within SE-14-25-28-W04M.

Development within all phases should be allowed to proceed when logical extensions of infrastructure are made available by Rocky View County or a developer, a market demand is identified, and a commitment is made to implement a regional stormwater conveyance system. The Plan identifies a Highway Business area along Highway 1, where the final business uses will be determined at the time of *local plan* preparation. Approval to proceed in this area will require, among other things, a Plan amendment and a market analysis to confirm demand. Finally, the phasing plan identifies Long Term Development areas. It is anticipated that there will not be a demand for the use of these for an extended period of time. Development of the Long Term Development area will require an amendment to this Plan.

# Map 5: Land Use Strategy

- ASP Boundary
- Future Policy Area
- Residential-Form to be determined
- Country Residential
- Institutional/Residential
- Institutional
- Industrial
- Heavy Industrial
- Industrial Transition
- Highway Business Transition
- Highway Business
- Highway Business/Industrial
- Long Term Development Area
- Emergency Services
- Transportation and Utility Corridor
- CN Railway



This map is conceptual in nature. No measurements or area calculations should be taken from this map.

## 8. HAMLET RESIDENTIAL

The purpose of Hamlet Residential is to accommodate and expand a form of residential development that has occurred in the Conrich area through the approval of Cambridge Park and Buffalo Hills Conceptual Schemes in 2007 and 2006 respectively (see Map 12: Local Plans).

These Hamlet Residential areas are compatible with adjacent Country Residential areas within the Hamlet, while providing an expanded range of housing choices for residents. *Local plans* will ensure consideration is given to providing compatible uses such as parks and pathways, as well as schools, where appropriate. While the predominant residential dwelling type will be single detached homes, all developments should include a range of residential options.

### OBJECTIVES

- Support the development of comprehensively designed residential neighbourhoods that promote interaction between residents.
- Require neighbourhoods to have an integrated parks, *open space*, and trail system that promotes walking and cycling and provides for a positive recreational and / or cultural experience for residents.
- Ensure Hamlet Residential areas within the Hamlet provide for an efficient internal transportation network, with connections to other neighbourhoods and the Hamlet's core area.
- Provide for a range of lot sizes and housing types to accommodate the varying needs and incomes of Rocky View County residents.
- Provide for human scale design and attractive Hamlet Residential areas through the use of architectural and community design guidelines.

### POLICIES

- 8.1. The predominant land use within the Hamlet Residential area shall be single detached residences; multi-family residences such as semi-detached homes, row houses, and townhouses shall also be allowed.
- 8.2. A comprehensive *local plan* shall be required to support applications for Hamlet Residential development.
- 8.3. The following uses in the Hamlet Residential area may be allowed where they are determined to be compatible and appropriate:
  - a) public, recreational, and institutional uses; and
  - b) local commercial uses.

#### Density

- 8.4. The gross residential density of the Hamlet Residential area should be 9.63 units per hectare (3.9 units per acre).

- 8.5. Medium density residential (townhomes, row houses, and multi-unit) land use should comprise at least 10 per cent of the net developable area within a Hamlet Residential area.

Gross residential density calculations include land for residential lots and local uses such as, Hamlet Commercial businesses, local parks, elementary schools, local roads, and small institutional sites such as daycares.

### Community Design

- 8.6. A Hamlet Residential area should provide:
- a) street oriented residential design;
  - b) a variety of lot widths and home sizes;
  - c) parks and pedestrian connections to adjacent areas;
  - d) sidewalks on at least one side of the roadway;
  - e) vehicular connections to other neighbourhoods within the Hamlet; and
  - f) dark sky friendly street lighting.

Street oriented design affects the character of the street and how neighbours interact with each other. A vital street with good design encourages activity by providing a safe and inviting pedestrian environment, a home design that encourages interaction, and a road design that calms traffic movement.

- 8.7. Medium density residential development should:
- a) be oriented to the public street with parking located in the rear or side;
  - b) be located in proximity to community amenity areas such as *open space*, a park, or the main street; and
  - c) provide landscaped open areas that are safe and secure for residents and integrate private outdoor living areas with public *open space*.
- 8.8. *Local plans* should provide architectural design guidelines that promote neighbourly interaction by:
- a) promoting front yard aesthetics;
  - b) providing street trees and street oriented porches or patios; and
  - c) requiring garages to be located in the rear of residences, contiguous, or recessed from the front façade.
- 8.9. *Local plans* should encourage rural identity through the use of:
- a) street names;
  - b) architectural controls that emphasize a rural look and feel; and

- c) landscaping that utilizes local / native plant species.
- 8.10. *Local plans* shall provide an analysis of *open space* and recreational needs and opportunities to determine the amount and location of land to be dedicated to parks and *open space* within a Hamlet Residential area.
- 8.11. *Local plans* shall provide a transportation analysis addressing the need for an efficient vehicular and pedestrian network within, and external to, the Hamlet Residential area.

**Prince of Peace Area**

The Prince of Peace community, identified on Map 12, is a low to medium density residential area that has been designed to accommodate the needs of seniors. The *Master Site Development Plan* and associated land use allows for semi-detached homes, medium density condominiums, assisted living accommodation, and dementia accommodation. Development of this area will comply with all relevant policies of this Plan.

- 8.12. Residential development within the Prince of Peace area shall be in accordance with the Prince of Peace Master Site Development Plan and relevant policies of this Plan.

**Other areas**

- 8.13. Map 5 identifies two areas referred to as 'Residential – Form to be determined' where the residential form is to be determined at the *local plan* stage. Options include Country Residential and / or residential densities equivalent to Hamlet Residential. Development in these areas shall be consistent with the relevant residential policies of this Plan.

**9. COUNTRY RESIDENTIAL**

Country Residential development within the Plan area has occurred from the mid-1960's to the present. These areas are identified as Country Residential on Map 3: Existing Land Use. This Plan supports the retention and build-out of certain existing Country Residential areas, while providing for the transition of other areas to new land uses.

**Country Residential** development refers to the traditional residential acreages that have been created throughout the County since the early 1960's. Typically acreages have the land use designation Residential One, Two, or Three District with a minimum of two (2), four (4) and ten (10) acre parcel size respectively. The lots may have been subdivided as part of a *local plan* or created on an individual basis. Wastewater is treated on site through the use of a private sewage treatment system, while water is provided by well or a local water co-op.

**OBJECTIVES**

- Support some existing Country Residential areas to remain as viable communities.
- Support the retention of existing Country Residential areas identified as transition areas until change to an industrial or commercial use is deemed desirable.

- Ensure that the impact of commercial and industrial development on Country Residential development is minimized through the implementation of appropriate interface policies and design guidelines.

## POLICIES

Map 5: Land Use Strategy shows the Country Residential areas within the Plan boundary that are expected to remain as Country Residential developments.

- 9.1. Country Residential development within the Hamlet of Conrich shall be supported in the areas identified as 'Country Residential' on Map 5.

### Pleasant Place

Pleasant Place is a residential area located outside of the Hamlet of Conrich that is intended to remain and expand as a residential area. The Pleasant Place community consists of 11 homes located 1 km north of Township Road 250 and west of Conrich Road. The Plan recognizes the desire of its residents to remain as a viable residential community.

- 9.2. The existing Country Residential area known as Pleasant Place is identified on Map 5 as 'Residential - form to be determined'. Expansion to the west and south of Pleasant Place is also identified as 'Residential - form to be determined' on Map 5. The new residential development form within this area shall be determined at the time of *local plan* preparation and shall be consistent with the policies of this Plan.
- 9.3. Industrial development adjacent to the existing or expanded Pleasant Place residential area shall be subject to the Non-residential / Residential Interface policies and design guidelines of this Plan (Map 6 and Section 14).
- 9.4. Development of land to the north of Pleasant Place, within the Long Term Development area, shall be compatible with the existing Pleasant Place land use.

### Residential Transition Areas

Residential transition areas are those areas currently designated for Country Residential use where future industrial or commercial development is supported. This Plan (Map 5) recognizes three transitional areas: (i) Township Road 244A (Highway Business Transition), (ii) McKervey Place (Industrial Transition), and (iii) Township Road 250 (Industrial Transition).

- 9.5. The Country Residential uses on lands identified for Industrial Transition or Highway Business Transition (Map 5) are allowed to continue until such time as a transition to industrial or Highway Business use is deemed desirable and a *local plan* has been prepared, in accordance with the policies of this Plan.
- 9.6. Applications for Highway Businesses or industrial uses adjacent to transition areas shall be subject to the Non-residential / Residential Interface policies of this Plan (Section 14), unless otherwise determined by a *local plan* to not be necessary.
- 9.7. Notwithstanding the intended Highway Business or industrial land uses for the transition area, the County may consider a 'work / live' land use without the preparation of a *local plan*.

- 9.8. Subdivision of an Industrial Transition or Highway Business Transition area into additional residential or additional 'work / live' lots shall not be supported.

A 'work / live' land use would allow a business to operate on the same property as a private residence. Creating this land use permits a greater intensity of business use than is currently contemplated under existing residential districts or home based businesses.

This land use may be of benefit to homeowners within a Transition Area that are impacted by business development but are unable to transition to a commercial or industrial land use because of a lack of market interest.

The County does not have a 'work / live' land use district as envisioned in this Plan but will consider the adoption of such as district as part of the Plan implementation (Section 27).

### **Township Road 250 Transition Area**

With the development of the CN rail facility, homes accessing Township Road 250 south of the CN Logistics Park have been impacted by increased truck traffic and facility operations. This Plan provides for the transition of this area to industrial land use, which in turn may impact adjacent Country Residential development to the south. Due to the complex land use and design issues in this transition area, the Plan recommends future design work to be carried out by the County.

- 9.9. Applications for industrial and residential development in the area identified on Map 12: Local Plans as Township Road 250, requires a *local plan*. Due to the fragmented nature of the area, the County shall prepare the *local plan*, following consultation with the landowners.

### **Other Transition Areas**

The Plan recognizes other transition areas as land:

- where future industrial or commercial development is supported;
  - contain a residence; and
  - have been impacted by the loading and shuttling of rail cars associated with the CN Rail facility.
- 9.10. Notwithstanding the intended commercial or industrial land uses for these lands, the County may consider a 'work / live' land use without the preparation of a *local plan*.
- 9.11. Subdivision of transition areas into additional 'work / live' lots shall not be supported.

## **10. COMMERCIAL**

Commercial areas provide a wide range of services to Rocky View residents and the region, while contributing to the fiscal sustainability of the County. This Plan envisions two different forms of commercial development for the Conrich area; regional highway business development and Hamlet Commercial.



**Highway Business**

Highway Business developments are moderate to large in size and primarily serve the needs of the:

- traveling public and tourists;
- regional population; and
- industrial and commercial employees from the region.

Uses may include a combination of grocery and retail stores, large format stores, shops, services to the public, offices, office parks, entertainment, and accommodation. Light industry may be considered if there are no nuisance factors outside of the enclosed building. Institutional uses are also appropriate in this area and may include schools, religious assemblies, campgrounds, medical treatment centres, and recreational uses. Highway Business areas are to be comprehensively-planned, attractively designed, landscaped, and include pedestrian-friendly parking areas. Where they are adjacent to existing or future residential areas, they must follow the Non-residential / Residential Interface area policies (Section 14).

**Hamlet Commercial**

The Hamlet Commercial area should form part of the community core and will be determined as part of the Future Policy Area review. Hamlet commercial contributes to the social aspect of the Hamlet and the development of a sense of community for the Conrich area. It will add visual interest to the community and provide local services, a pedestrian orientated main street development, and casual meeting places for area residents.

**OBJECTIVES**

- Provide for attractive and high quality Highway Business and Hamlet Commercial development.
- Provide for an attractive commercial core that adds to the social fabric of the Hamlet and provides a wide variety of services to residents.
- Promote the development of regional Highway Business development focused on Highway 1 and Stoney Trail that is of a high quality design and provides safe access and egress from adjacent highways.
- Provide guidance on development type and design.
- Ensure commercial uses are compatible with existing and future land uses.

**POLICIES**

**General**

- 10.1. Highway Business development shall be located in the areas identified on Maps 5.
- 10.2. Development areas should proceed in an orderly and efficient manner and be supported by cost effective and efficient changes to the County's existing infrastructure and transportation networks.

### Land Use - Highway Business

- 10.3. The primary regional Highway Business land uses should be large-format retail centres, shopping centres, outlet malls, office buildings, business parks, regional services, and tourist facilities that benefit from access to Highway 1 or Stoney Trail. Other acceptable uses include institutional uses, campgrounds, medical treatment centres, recreation facilities, and light industry where there are no nuisance factors outside of the enclosed building.
- 10.4. Highway Business uses should primarily be carried on within an enclosed building, where the operation does not generate any significant nuisance or environmental factors such as noise, appearance, or odour outside of the enclosed building.
- 10.5. Outdoor storage as a primary use should not be permitted. Outside storage incidental to the primary use of the site shall be screened and located to the side or rear of the primary building.
- 10.6. Outside display areas are permitted provided they are limited to examples of equipment, products, or items related to the site's use.
- 10.7. Highway Business areas shall be situated in a location that ensures safe and efficient access and egress from adjacent roadways.
- 10.8. Highway Business uses located adjacent to existing or future residential or agriculture areas shall address the Agriculture Interface and Non-residential / Residential area policies of this Plan (Sections 13, 14, and Map 6).

### Highway Business / Industrial - Stoney Trail

- 10.9. The land use for the area identified as Highway Business / Industrial on Map 5 will be determined as part of the *local plan* preparation. The determination of land use shall be done at the quarter section scale and the relevant commercial or industrial policies of this Plan shall apply.

### Land Use - Hamlet Commercial

- 10.10. Hamlet Commercial uses should be small scale businesses and services that serve the residents of the Hamlet and Plan area.
- 10.11. The Hamlet Commercial area shall provide a range of local services that support the Hamlet of Conrich and contribute to an attractive pedestrian environment and meeting places for residents.
- 10.12. While the majority of local area commercial shall should be located within the Hamlet core, other local neighbourhood commercial development may be allowed within the Hamlet's neighbourhoods.

### Design

- 10.13. Commercial development shall be attractively designed, fit with existing development, and address the County's Commercial, Office, and Industrial Design Guidelines and the design requirements of Appendix B.

- 10.14. Commercial development shall provide for convenient, attractive, and efficient pedestrian and bicycle linkages between building entrances, sites, and, where applicable, adjacent areas.
- 10.15. Buildings in the Hamlet Commercial area should be built close to the street with onsite parking located in the side and rear.
- 10.16. Wide sidewalks and angled parking are encouraged as design features consistent with rural prairie towns, in the Hamlet Commercial area.
- 10.17. All private lighting, including security and parking area lighting, shall be designed to respect the County's 'dark sky' Land Use Bylaw requirements, conserve energy, reduce glare, and minimize light trespass onto surrounding properties.
- 10.18. The use of fencing in commercial areas should not be permitted, other than for buffering adjacent lands in Non-residential / Residential Interface areas, screening of outside storage, screening of garbage bins, or for security purposes, provided the security area is adjacent to the side or rear of the primary building.

### Local Plans

- 10.19. A *local plan* shall be required to support applications (see Section 27) for Highway Business development. The *local plan* should:
  - a) provide detailed planning and design policies and guidelines;
  - b) address the County's Commercial, Office, and Industrial Design Guidelines and document how the *local plan* meets those guidelines;
  - c) provide architectural and site guidelines in order to provide a consistent, thematic design to the commercial area;
  - d) where applicable, coordinate with the adjacent Municipality to ensure effective transition across municipal boundaries;
  - e) where necessary, provide for current and future access requirements to Highway 1; and
  - f) where necessary, ensure vehicle and pedestrian connections are in general accordance with other *local plan* areas, and, with Maps 7 and 8 of this plan.

## 11. INDUSTRIAL

Over the next three decades, Rocky View County is expected to capture a greater share of the region's industrial development due to demand, a growing urban market and labour force, competitive land values, and good transportation access.

The Conrich area is identified in the Rocky View County Plan (Map 1: Managing Growth) as a Regional Business Centre and is expected to see strong industrial development in the distribution sectors over the next decade. The associated employment growth that will come with this development will contribute to the evolution of a well-rounded living environment in the Conrich area.

The industrial policies support the development of a Regional Business Centre that provides local and regional employment opportunities, increase the County’s business assessment base, and contribute to the long-term financial sustainability of the County.

**OBJECTIVES**

- Support the development of well-designed industrial areas.
- Provide for the growth of local and regional employment opportunities.
- Support the development of industries associated with the provincial and regional economic base such as construction, manufacturing, transportation, warehousing, distribution logistics, and oil and gas services.
- Promote financial sustainability by increasing the County’s business assessment base.

**POLICIES**

**General**

- 11.1. All industrial development shall be located in the areas identified on Map 5.
- 11.2. Development of industrial uses should proceed in an orderly manner and be supported by cost effective and efficient changes to the County’s existing infrastructure and transportation networks.

**Land Use**

- 11.3. Industrial uses such as distribution logistics, warehousing, transportation, industrial services, construction, manufacturing, services (business, petroleum, professional, scientific, and technical), and industrial storage that do not have significant offsite nuisance factors are appropriate within the industrial area.

The term **distribution logistics** refers to the business and activities associated with the management, handling, and movement of goods and finished products from their point of origin and manufacture to their point of consumption.

- 11.4. Commercial and other business uses that are compatible with industrial uses, and have minimal impact on the local infrastructure, may be appropriate within an industrial area.
- 11.5. Industrial uses with the potential for offsite impacts such as unsightly appearance, noise, odour, emission of contaminants, fire or explosive hazards, or dangerous goods may be located in the area identified as Heavy Industrial on Map 5.