



## **CHURCHILL MEADOW**

Outline Plan

S½ of NW 32-50-24-W4

within the

East Vistas Local Area Structure Plan

Leduc County

**March 16, 2015**

**File #11110100**

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## 1 Background Information

### 1.1 Introduction

With the limited availability of land and rising housing costs in Edmonton, Leduc County is expected to experience significant growth over the next 30 years. The *Churchill Meadow Outline Plan* is prepared in support of a staged residential development within the East Vistas Local Area Structure Plan (EV LASP) in Leduc County. A range of housing forms from single family to multi-family development will be offered within this eighty acre plan area situated between the Town of Beaumont and Nisku Business Industrial Park.

### 1.2 Purpose

This Outline Plan has been prepared to provide a detailed framework for the future residential development of lands described as *part of NW 32-50-24-4* in Leduc County. It will provide an overview of the land use concept and describes the subject area, services, transportation and servicing requirements needed to support the proposed development.

This Plan supports the submitted redistricting application for the subject lands and to provide guidance for future subdivision applications.

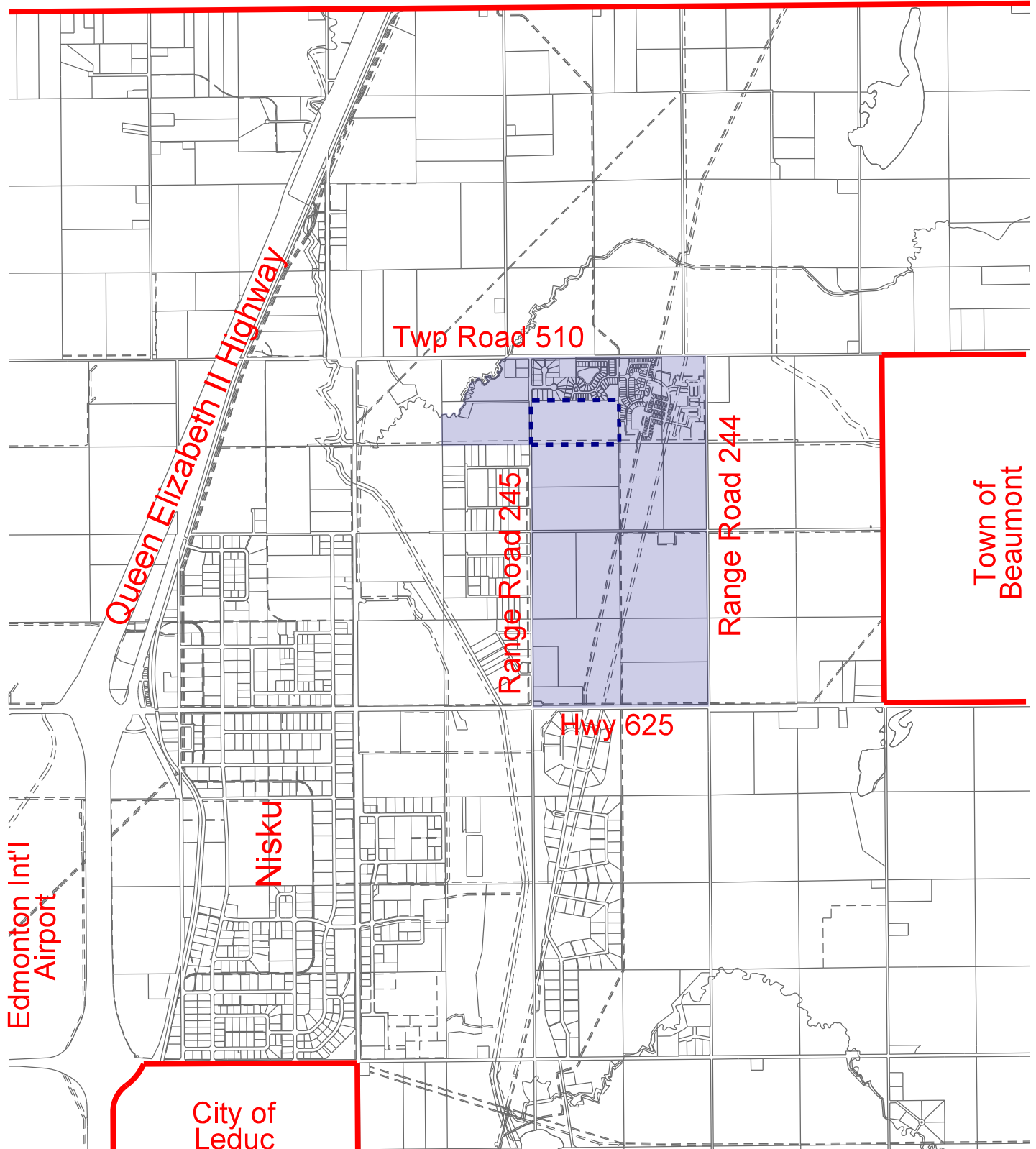
### 1.3 Plan Area and Location

The subject land is located east of Range Road 245 and the north boundary of the parcel is approximately 400m south of Township Road 510 within Leduc County. It is contained within the northwest portion of the East Vistas Local Area Structure Plan and located within the Capital Region Board Priority Growth Area “C<sub>E</sub>”. The location of the parcel relative to the East Vistas LASP boundary and in context to the region is shown in **Figure 1 Location Plan**.

### 1.4 Ownership

The registered owner of this subject parcel is the *Goldman Group (Alberta) Ltd.* The parcel is registered with one title and has an area of 31.9 hectares (78.8 acres). There are two rights of way adjacent to the south boundary of the parcel area, one containing the regional sanitary sewer trunk line and the second for a storm water management line totalling 32.0m in width.

# City of Edmonton



--- CHURCHILL MEADOW Outline Plan Boundary  
East Vistas Local Area Structure Plan

## Figure 1 LOCATION PLAN

### CHURCHILL MEADOW OUTLINE PLAN

South 1/2 of NW 1/4 Sec 32 - 50 - 24 - W4  
Leduc County



## 2 Policy Context

### 2.1 Municipal Development Plan

The proposed Outline Plan is consistent with *Leduc County Municipal Development Plan Bylaw 35-99* which was adopted by Council in October 1999. This Plan recognizes that urban growth areas in the Leduc-Beaumont-Devon sub-region are a major growth driver in the Edmonton capital region. That these growth areas will occur where ready access to municipal servicing and high order transportation corridors exist and be developed utilizing Smart Growth principles. The outline plan area is identified as being within an Urban growth area.

### 2.2 North Major Area Structure Plan

The *North Major Area Structure Plan (ASP) Bylaw No. 25-05* was adopted by Council in November 2006 and further amended to support the adoption of the East Vistas Local Area Structure plan and its plan area as an Urban Service area. The proposed Outline Plan is consistent with this ASP and as it proposes urban style development utilizing Smart Growth principles and municipal services.

### 2.3 East Vistas Local Area Structure Plan

This Outline Plan is located in the northern portion of the *East Vistas Local Area Structure Plan Bylaw No. 15-09*, which was first adopted by Council in September 2010. The proposed densities, uses, servicing and development concept of the Outline Plan is consistent with this LASP. The Outline Plan is being prepared as a requirement for redistricting and subdivision as per the LASP which was approved in fall 2010 by the Capital Region Board and Leduc County. The proposed plan will meet the design requirements articulated in this plan including a walkable community, green space and municipal servicing.

### 2.4 Land Use Bylaw

This Outline Plan is to support an amendment to the *Leduc County Land Use Bylaw No. 7-08* for redistricting of the subject parcel into districts. The proposed delineation of the proposed districts is consistent, in principle, with the proposed *Development Concept* in the East Vistas LASP. The land is currently designated A - Agricultural. A redistricting application has been submitted to the County to designate the lands to RU1 - Residential Urban 1 District, RU2 - Residential Urban 2 District and RM1 - Residential Multi Family District.

### 2.5 Capital Region Board

The Outline Plan area falls within the Priority Growth Area C<sub>e</sub> of the Capital Region Plan. Target densities for this growth area are 25 to 35 units/net hectare. Target densities is applied to the East Vistas Local Area Structure Plan area, not to individual parcels within the plan due to transition of density of districts from lower density on the west side to higher densities on the east side of the LASP.

### 3 Site Features

#### 3.1 Site Description

The parcel contains two residences with associated accessory outbuildings utilizing approximately 3 acres of the site on the west side of the parcel. A home based business for marble and tile had previously been based on the site. The balance of the lands is open and has been utilized for agricultural purposes. The site topography is slightly rolling with an elevation change of approximately 2.0m and has no discernible surface drainage pattern. An aerial view of the site dated June 2013 is shown in **Figure 2 Air Photo** and the contours of the land are depicted in **Figure 3 Topography**. It is anticipated that all existing improvements from previous use will be removed at the time of development of those lands.

#### 3.2 Adjacent Land Use

The north half of the quarter section is developed into estate residential lots. The *Lukas Estates* subdivision is fully developed on the west portion, with lot sizes in the range of 0.5 ha. The east half contains the *Diamond Estates* subdivision with lot sizes in the range of 0.15 ha. This subdivision is actively being built upon, houses are either recently completed, under construction and there are vacant lots. East of the plan area is the Royal Oaks Estates Outline Plan area where the first stage of development has been completed and almost fully built out. Additional stages north and south of the first stage have been conditionally approved and are anticipated to be constructed in the next few years. West and south of the parcel are agricultural parcels. All of the adjacent lands are proposed to be developed for urban style development as per the East Vistas LASP. Kitty corner of the site to the south west are existing country residential subdivisions with a minimum lot size of 0.8 ha.

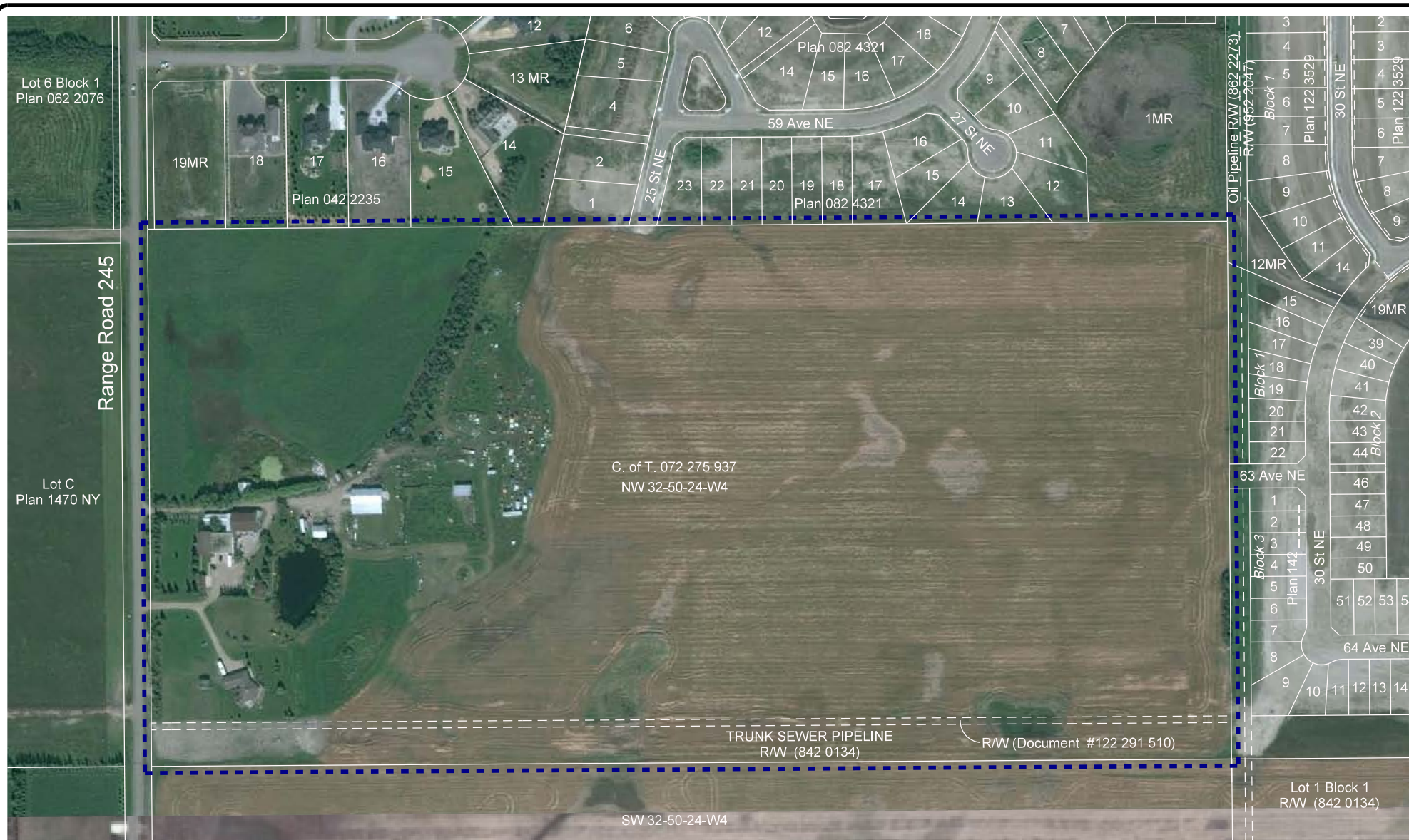
#### 3.3 Historical Resources Impact Assessment

The *Historic Resources Act Clearance* letter from Government of Alberta Historic Resources Management was received May 4, 2007 indicating that clearance for the East Vistas LASP was granted and that a Historical Resources Impact Assessment is not required for any development within the plan area. This document is included in the Appendices of the East Vistas LASP.

#### 3.4 Biophysical Assessment

A **Biophysical Assessment** was prepared for the East Vistas LASP by Bruce Thompson and Associates Inc. in September 2007 and updated in October 2012. No recognized key vegetation areas within the site were identified, however, there are two Class 3 wetlands delineated (Stewart and Katrud classification system). The first wetland (waypoint 372) is described as slough grass only, and occupying a total of 0.21 hectares. The second wetland (waypoint 387), with a total area of 0.06 hectares, is described as slough grass dominant with marsh reed grass, dock, and foxtail barley. These wetlands are to be removed as residential development occurs. An application was made and granted by Alberta Environment and Sustainable Resource Development on January 14, 2014 under the Water Act, R.S.A. 2000, c.W-3 to infill these wetlands for the purpose of residential development.





--- Plan Boundary

# Figure 2 AERIAL PHOTO CHURCHILL MEADOW OUTLINE PLAN

South 1/2 of NW 1/4 Sec 32 - 50 - 24 - W4  
Leduc County

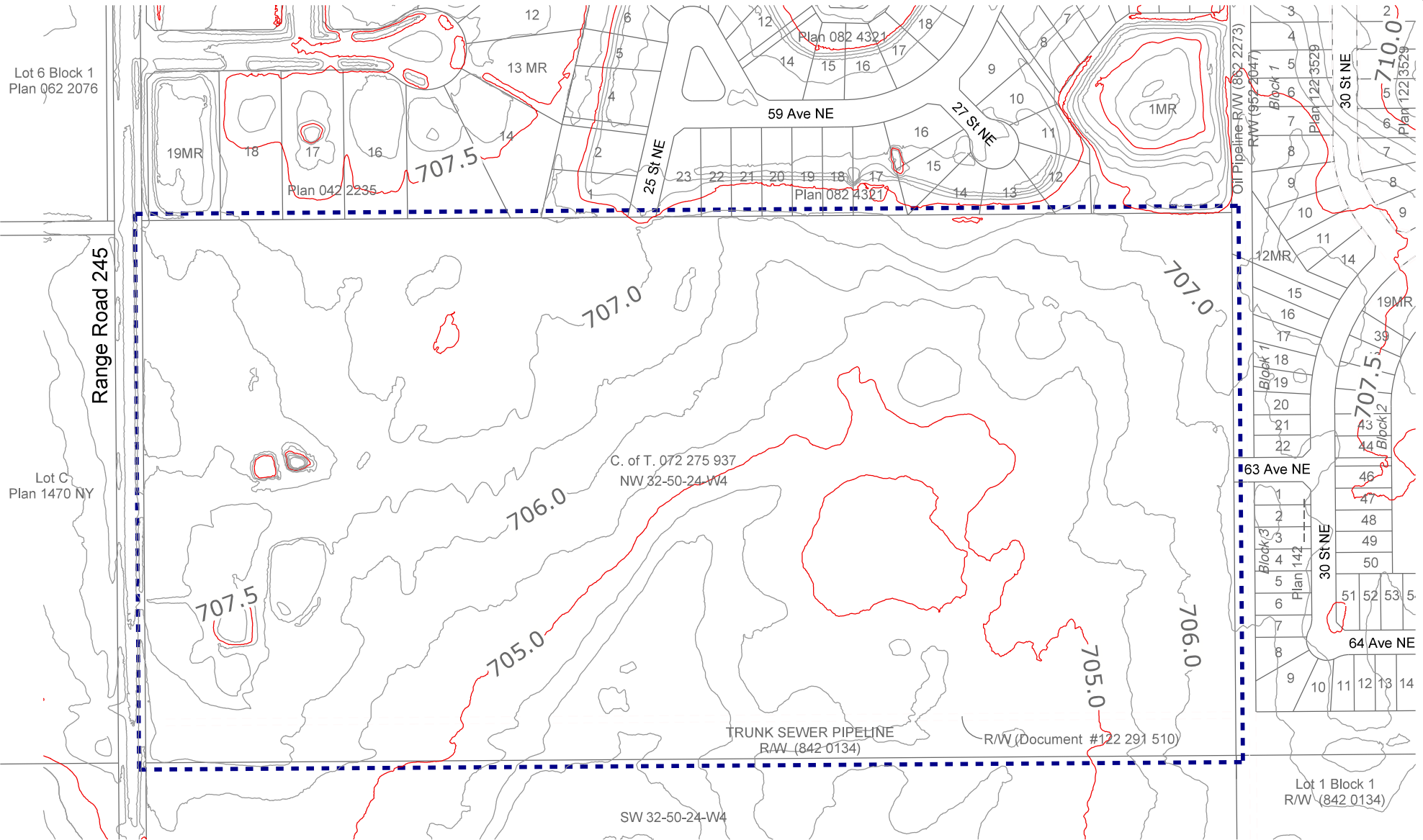


Figure 3  
**TOPOGRAPHY**  
 CHURCHILL MEADOW  
 OUTLINE PLAN

South 1/2 of NW 1/4 Sec 32 - 50 - 24 - W4  
 Leduc County

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### 3.5 Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) was prepared by exp Services Inc. in October 2012. Based on the findings, there were environmental concerns surrounding the three identified aboveground storage tanks (AST) and numerous containers of waste oil north of the tile and stone shop; and fuel containers, vehicles and machinery in the equipment storage area in the eastern portion of the shop. As a result, exp recommended a Phase II ESA in the vicinity of these areas.

In December 2012, exp prepared a Phase II ESA. Six boreholes were advanced at the site with monitoring wells installed in three of the boreholes. Based on the results of the investigation, the soil and groundwater at the site does not exceed the Alberta Tier 1 Guidelines for residential property use and, as a result, no further investigation is warranted at this time. The report notes that there is a natural occurrence of coal at the site which could affect the planned redevelopment of the site for residential purposes (i.e. methane or geotechnical issues). Copies of the **Phase I and Phase II ESA reports** prepared by exp Services Inc. will be submitted under separate cover.

### 3.6 Geotechnical Assessment

A site specific geotechnical investigation was conducted by J. R. Paine and Associates Ltd. in February 2008. The subsurface soil conditions are considered good for supporting single family dwellings and underground utilities. The reports, **Geotechnical Investigation Proposed Residential Subdivision South half of NW 32-50-24-4** dated April 2008, and **Geotechnical Review Letter** dated May 15, 2013 will be submitted under separate cover.

### 3.7 Constraints to Development

According to the Alberta Energy Regulator (previously the Energy Resources Conservation Board (ERCB)), the land development package received for the subject lands indicates that there are no activities by the oil and gas sector including sour gas facilities on or near the parcel that would constrain the proposed development. As well, an online assessment via the abandoned wells viewer site indicates that there are no abandoned wells in close proximity to the plan area that will affect the proposed development. A copy of the **Alberta Abandoned Well Locations Map** dated March 31, 2014 is included in **Appendix A**. There are two utility rights of way containing high pressure pipelines adjacent to the east common property line on the adjacent parcel. As per the Alberta Energy Regulator, no additional setback is required from the boundary of the utility rights of way for residential development. On the south boundary of the parcel, there are two utility rights of way totaling 32.0m in width. The north 5.0m right of way contains pipe infrastructure for storm water which has been sized to accommodate flows from the subject area. The south 27.0m contains the regional sanitary sewer line (SERTS line).

Two Class III wetlands have been identified on the subject land. Removal of these wetlands was assumed as part of the future development, and as such, Water Act clearance has been received for that proposed removal. A copy of the Water Act approval will be submitted under separate cover. **Figure 4** depicts the **Constraints to Development** to the plan area.

Lot 6 Block 1  
Plan 062 2076

Lot C  
Plan 1470 NY

Range Road 245



- Plan Boundary
- Regional Sewer Line
- Oil Pipeline Right of Way
- Wetland Boundary

## Figure 4 CONSTRAINTS

### CHURCHILL MEADOW OUTLINE PLAN

South 1/2 of NW 1/4 Sec 32 - 50 - 24 - W4  
Leduc County

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## 4 Development Concept

### 4.1 Parcel Usage

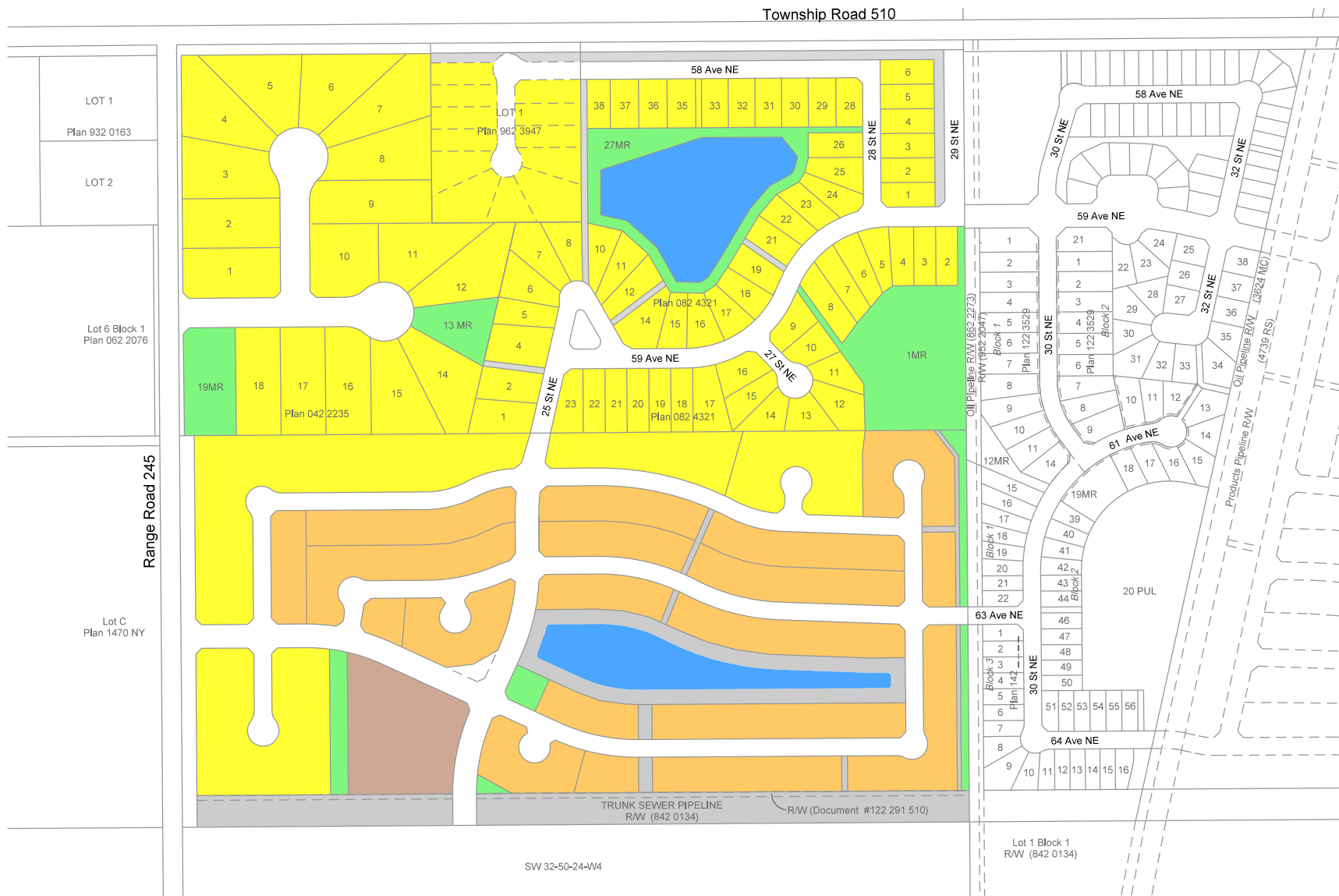
The proposed development concept for the *Churchill Meadow Outline Plan* is depicted in **Figure 5 Development Concept**. This concept is based on the spatial distribution of densities depicted in the development concept figure within the East Vistas LASP. The low density residential district has been utilized as a buffer and transition from existing development to the north and kitty corner to the southwest of the plan area. The higher density development is proposed east and south of this buffer zone surrounding the focal point of the neighborhood, the central open space containing the walkways and storm water management facility. Due to topographical constraints regarding the placement of the storm water management facility, the multi family site was relocated from the originally proposed location in the EV plan which was the east side of the proposed north south collector road to the south west corner of the collector intersection. This transitioning of lot width to the east is consistent with the principals of the East Vistas LASP of providing a range of housing sizes, price points and spatial separation from existing lower density developments. The placement of open space will be discussed in the Section 4.2.

The lots, as proposed in the Outline Plan, are compliant with the approved Land Use Bylaw for the respective districts. In conjunction with the submission of this outline plan, a proposed plan of subdivision for the initial stages of subdivision will be submitted for review by the municipality. It is noted that a conditional subdivision approval may contain multiple stages or phases which may be registered singularly or in plural over time, dependent on market conditions.

It is noted that the East Vistas LASP targets a density of *27.3 units/net residential ha* for the total local plan area. It is recognized that each parcel/outline plan may not meet the targeted density dependent upon its spatial location within the plan area and proposed land use. We note that the overall density of the full buildout of the EV LASP will need to meet this target to fulfill the requirements of this Priority Growth Area.

The Outline Plan statistics for capacity projections for the land use concept in the Outline Plan area and for the full quarter section are shown in **Table 1: Land Use Statistics**. This table also indicates population generation based upon approved maximum density in the LUB and actual density based upon calculated land use areas within the proposed outline plan area and existing development in the north half of the quarter section. A proposed layout for the remaining acreage on the north half is also depicted to provide a yield of low density development for when this parcel is further subdivided. Land use distribution is also shown. **Figure 5A Existing and Proposed Land Use** depicts actual and proposed development for the quarter section.





- Single Family Residential (Low Density Residential) - RE & RU1 Districts
- Single Family Residential (Medium Density Residential) - RU2 District
- Multi Family Residential - RM1 District
- Municipal Reserve
- Storm Water Management Facility (Public Utility Lot)
- Public Utility Lot

## Figure 5A

# EXISTING AND PROPOSED LAND USE

## CHURCHILL MEADOW OUTLINE PLAN

NW 1/4 Sec 32 - 50 - 24 - W4  
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Table 1: Land Use Statistics

Land Use Distribution in Outline Plan						
	Area (ha)					
Total Plan area	31.9					
Environmental Reserve	0.0					
Gross Developable Area	31.9		Net			
		Area (ha)	%GDA			
Municipal Reserve		0.7	2.3%			
Public Utility Lots		5.2	16.3%			
Circulation		6.9	21.4%			
Infrastructure and Parks Area		12.8				
Lower Density Residential		6.2	19.6%			
Medium Density Residential		11.5	36.0%			
Multi Dwelling Residential		1.4	4.4%			
Residential Developable Area		19.1				
Total		31.9	100.0%			
Land Use – Maximum as per LUB In Outline Plan Area (OP)	Area (ha)	%	Maximum DU/ ha	Maximum DU	PPDU	Maximum Pop’n
Lower Density Residential (RU1)	6.2	32.7%	5.0	32	2.6	84
Medium Density Residential (RU2)	11.5	60.0%	12.0	138	2.6	359
Multi Dwelling Residential (RM1)	1.4	7.3%	95.0	133	2.6	346
Total	19.1	100%		297		789
Maximum Allowable Density		15.5	units / net residential ha			
Land Use – As Proposed and Existing in Quarter Section	Area (ha)			DU	PPDU	Proposed Pop’n
OP -Lower Density Residential (RU1)	6.2			42	2.6	109
OP -Medium Density Residential (RU2)	11.5			223	2.6	580
OP - Multi Dwelling Residential (RM1)	1.4			133	2.6	346
North ½ - proposed lower density (RU1)	2.2			12	2.6	31
Sub Total	21.3 ha			410		1066
Existing lower density development in North ½ (RE) (Lukas Estates and Diamond Estates)	17.9 ha			77	2.6	200
TOTAL	39.2 ha			487		1266
Proposed Density for quarter section		12.4	units /net	residential	ha	

## 4.2 Open Space

All Municipal Reserve owing shall be in accordance with the East Vistas LASP and the Municipal Government Act. **Figure 6** depicts the **Open Space Concept** for the subject parcel. At the discretion of the Subdivision Authority, municipal reserve credit may be granted for trail development within public utility lots. Open space will be a combination of Municipal Reserve and Public Utility Lots. As per the EV LASP, this neighborhood is proposed to be developed as a walkable community with linkages between neighborhoods, natural areas and surrounding park spaces. The emphasis of the open space in this plan area is for “movement”. In addition to the sidewalks on the collector road and one side of the local roads, a east west trail corridor on the south boundary and a north-south corridor on the east boundary will promote use and connections to adjacent development trail networks. Other trail connections are to provide internal linkages to the central open space containing the storm water management facility where a trail will partially circumscribe the water feature.

The developer is proposing a “parcourse” exercise trail network in their development. It is intended to provide intermittent “fitness trail stations” or “obstacles” along this fitness trail network. This will allow users additional ways of improving their health thru utilizing stations for improving upper and lower body strength, balance and coordination via outdoor exercise equipment and obstacles. For example, stationary equipment can include chin-up and climbing bars, stepping posts, jungle gyms and equipment with moving parts ie. stationary bicycles.

All open space will be developed in accordance with Leduc County Park Development standards and a Landscaping Plan for the open space will be submitted in the detailed engineering set.

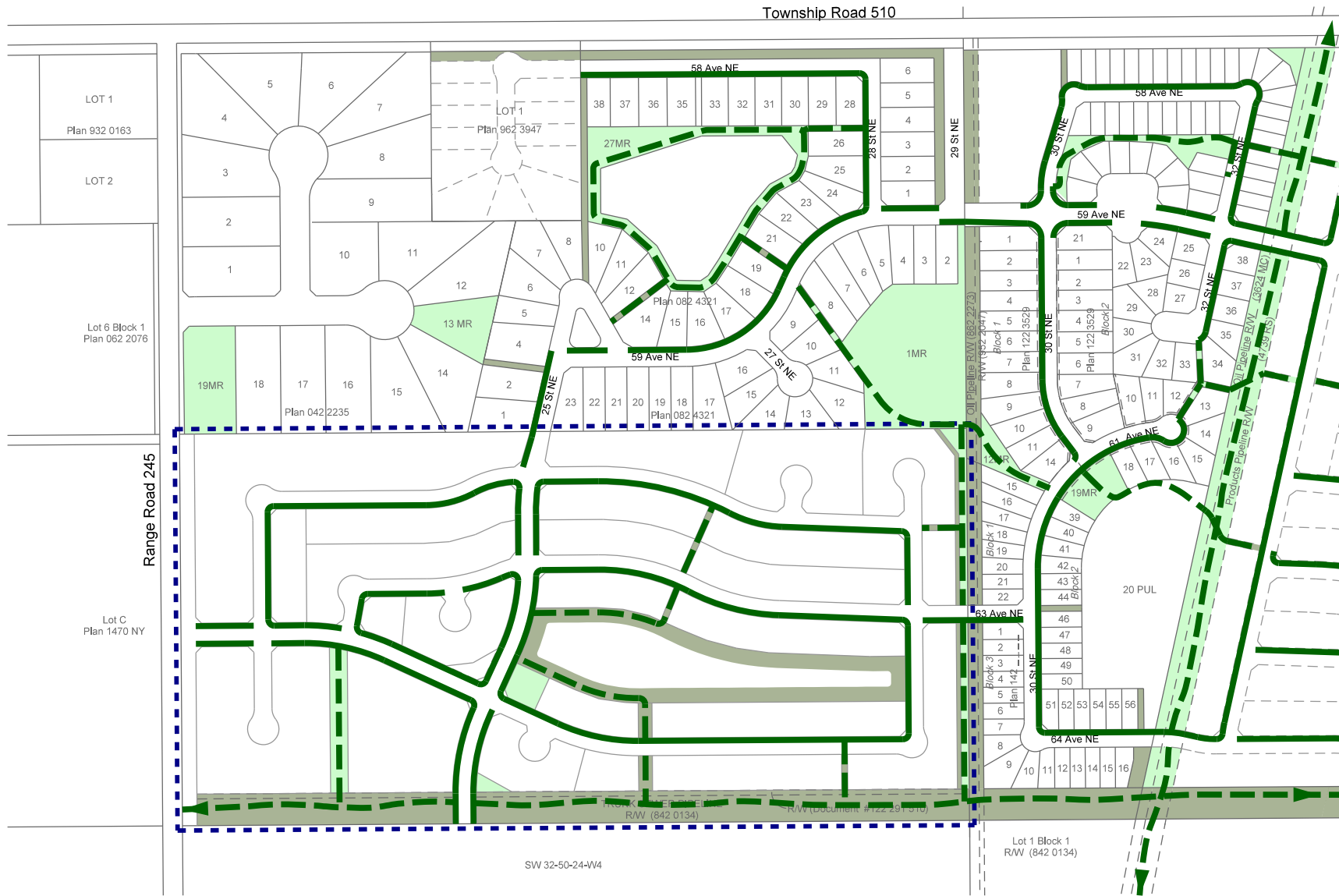


Figure 6  
**PARKS & OPEN SPACE CONCEPT**  
 CHURCHILL MEADOW  
 OUTLINE PLAN

South 1/2 of NW 1/4 Sec 32 - 50 - 24 - W4  
 Leduc County

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## 5 Public Input

Prior to plan submission, an open house was held on July 23, 2013 to garner feedback from adjacent landowners with respect to the proposed development. A draft conceptual drawing was presented. **Appendix B Open House Summary** summarizes the feedback from the first open house where there were 24 attendees and six comment sheets received. In response to concerns, the distribution of the estate residential lots was revised so that they were backing onto the existing Lukas I development as per the approved East Vistas LASP.

On May 21, 2014 a second open house was held at the Nisku Recreation Center to obtain comments from interested parties with respect to the proposed outline plan, rezoning and Land Use Bylaw amendments submitted to Leduc County for consideration. Revisions from the initial open house include redesign so no lots fronting onto collector road, RU1 residential Urban I (low density) lots backing onto the Lukas I development and all Municipal Reserve owing provided as land. The sign in sheet indicated that there were 23 attendees and 12 comment sheets were received. **Appendix B Open House Summary** includes a summary of comments from this open house.

## 6 Implementation

### 6.1 Development Sequence

Proposed staging is indicated in **Figure 7 Development Sequence**. All stages may be developed concurrently or in singular or plural as the market demands. A conditional subdivision approval may contain multiple phases which may be registered singularly or in plural over time. Legal road access must be provided to each stage in order to proceed.

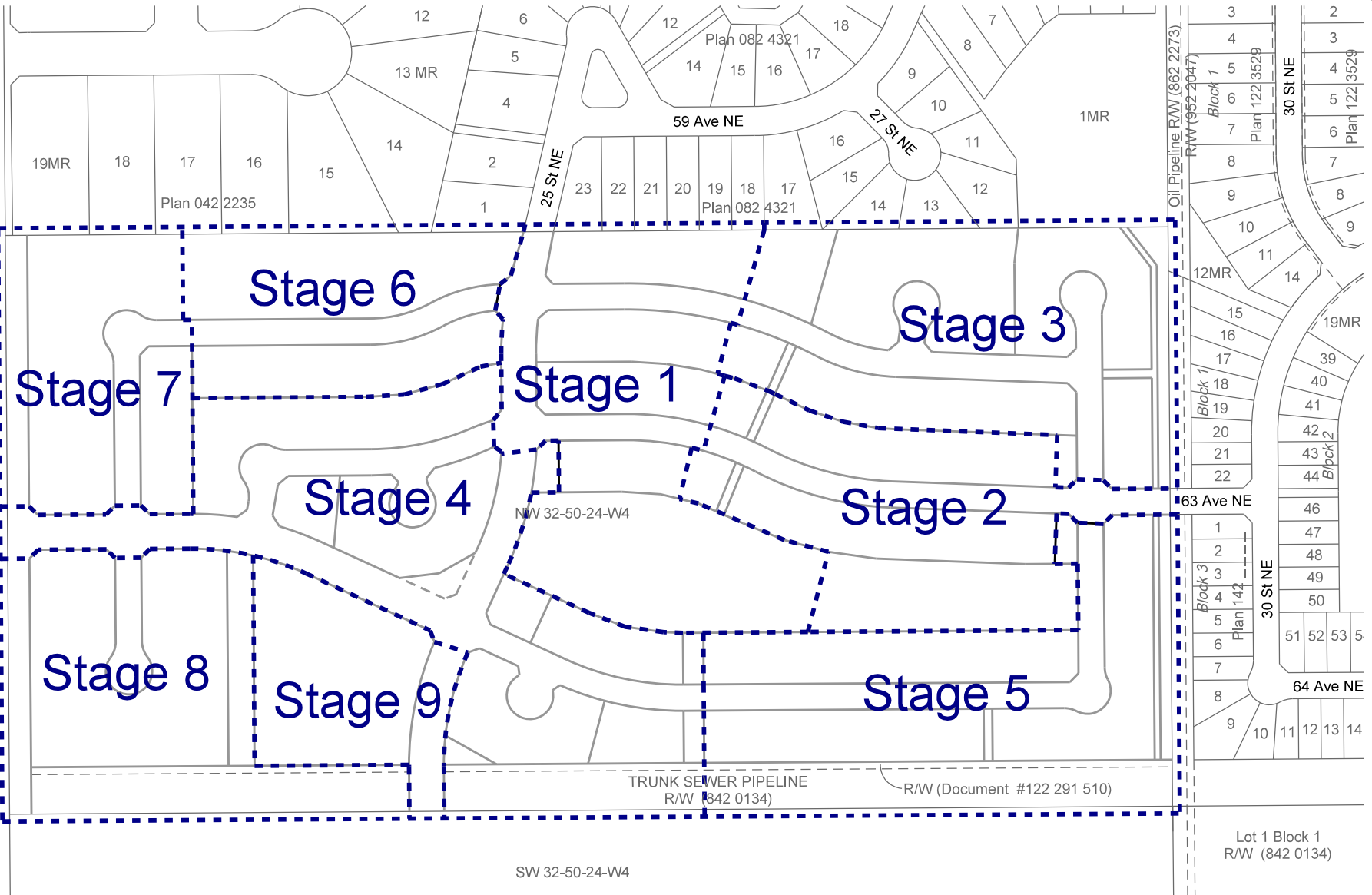
### 6.2 Approval Process

Amendments to the *Churchill Meadow Outline Plan* may be brought forward to Leduc County by the developer for the County's consideration.

Lot 6 Block 1  
Plan 062 2076

Lot C  
Plan 1470 NY

Range Road 245



--- Staging Boundary

## Figure 7 DEVELOPMENT SEQUENCE

### CHURCHILL MEADOW OUTLINE PLAN

South 1/2 of NW 1/4 Sec 32 - 50 - 24 - W4  
Leduc County



## 7 Infrastructure

### 7.1 Circulation and Access

The **Transportation Network** plan is shown on **Figure 8**.

Churchill Meadow is proposed to have four roadway connections: a direct link to Range Road 245, connection to Diamond Estates and Royal Oaks Stage 3, and one tie-in to the future collector road south of the Churchill Meadow plan area. Range Road 245 will lead to Township Road 510 which is considered to be a major arterial roadway by Leduc County that provides a link between Nisku Business Industrial Park and Highway 814 and Beaumont.

With the first three stages subdivision, the proposed north-south collector road will connect to the existing 25<sup>th</sup> Street NE at the south boundary of Diamond Estates and travel midway down south and connect with a local road running east-west connecting to 63<sup>rd</sup> Ave at Royal Oaks Stage 3 (63<sup>rd</sup> Ave construction anticipated in 2014 within Royal Oaks). In the event that Royal Oaks Stage 3 road construction does not commence before Churchill Meadow Stage 1, the east-west local road tie-in to Royal Oaks Stage 3 will be blocked off with T-bollards at the east property line and an emergency access road will be required through Royal Oaks to connect to 30<sup>th</sup> Street NE at Royal Oaks Stage 1. Alternatively, an emergency access could be provided from Collector (a) to Range Road 245.

A **Traffic Impact Assessment (TIA)** report for Churchill Meadow was prepared by Scheffer Andrew Ltd. will be submitted to the County under separate cover.

Based on the findings of the TIA, the following roadway improvements and mitigations are expected to be necessary into the future based on projected background traffic growth and development in the East Vista's neighbourhood:

#### *Short Term (2014 – 2019):*

- No intersection improvement is required for the Churchill Meadow development.

#### *Mid Term (2019 – 2024):*

- Township Road 510 could remain a rural two-lane arterial roadway before 2023. However, widening Township Road 510 to four lanes should be considered shortly after that year.
- The existing intersection of Township Road 510 & Range Road 245 /244N should be realigned to eliminate the intersection offset no later than Township Road 510's twinning or the installation of a traffic control signal. The traffic control signal is warranted before 2019 however, it is not recommended to install signalization before above mentioned improvements to the Township Road 510.

- The existing intersection of Township Road 510 & Range Road 244/243N should be realigned to eliminate the intersection offset if the development north of Township Road 510 occurs or when the intersection improvements are required. The traffic control signal is not warranted before 2024 at this intersection.
- A traffic signal control will be warranted at the intersection of the Secondary Highway 625 and Range Road 245 before 2019. The intersection should be upgraded to Type IV intersection with an exclusive eastbound left turn lane with additional storage length of 55m and westbound right turn lane.
- Partial Intersection lighting will be warranted at the intersections of :
  - Secondary Highway 625 and Range Road 245
  - Township Road 510 and Range Road 245

*Long Term (2024 – 2034)*

- Township Road 510 should be widened to a four lane arterial roadway before 2034. The road cross-section of Township Road 510 should follow the recommended cross section in the Township Road 510 Functional Planning Study.
- The intersection offset at the intersection of Township Road 510 and Range Road 245/244N should be rectified no later than Township Road 510's twinning or the installation of a traffic control signal. An exclusive right turn should be provided at the eastbound; and an exclusive left turn should be provide at the westbound.
- The intersection offset at the intersection of Township Road 510 and Range Road 244/243N should be rectified when the intersection improvements are required. A traffic control signal is warranted before 2030. The intersection will act a transition from two-lane to four-lane divided arterial roadway before 2034.
- A traffic control signal will be warranted before 2034 at the intersection of Township Road 510 and Collector A.

The concept plan has been developed so as to provide driveway access to internal local roads with side yards flanking onto the collector road. Lots have been sited when possible so that they are backing onto green spaces. At the intersection of the collector roads, enhanced boulevard planting will be in northwest corner of the intersection. If lots are double fronting access to the lot will not be allowed from the collector road.

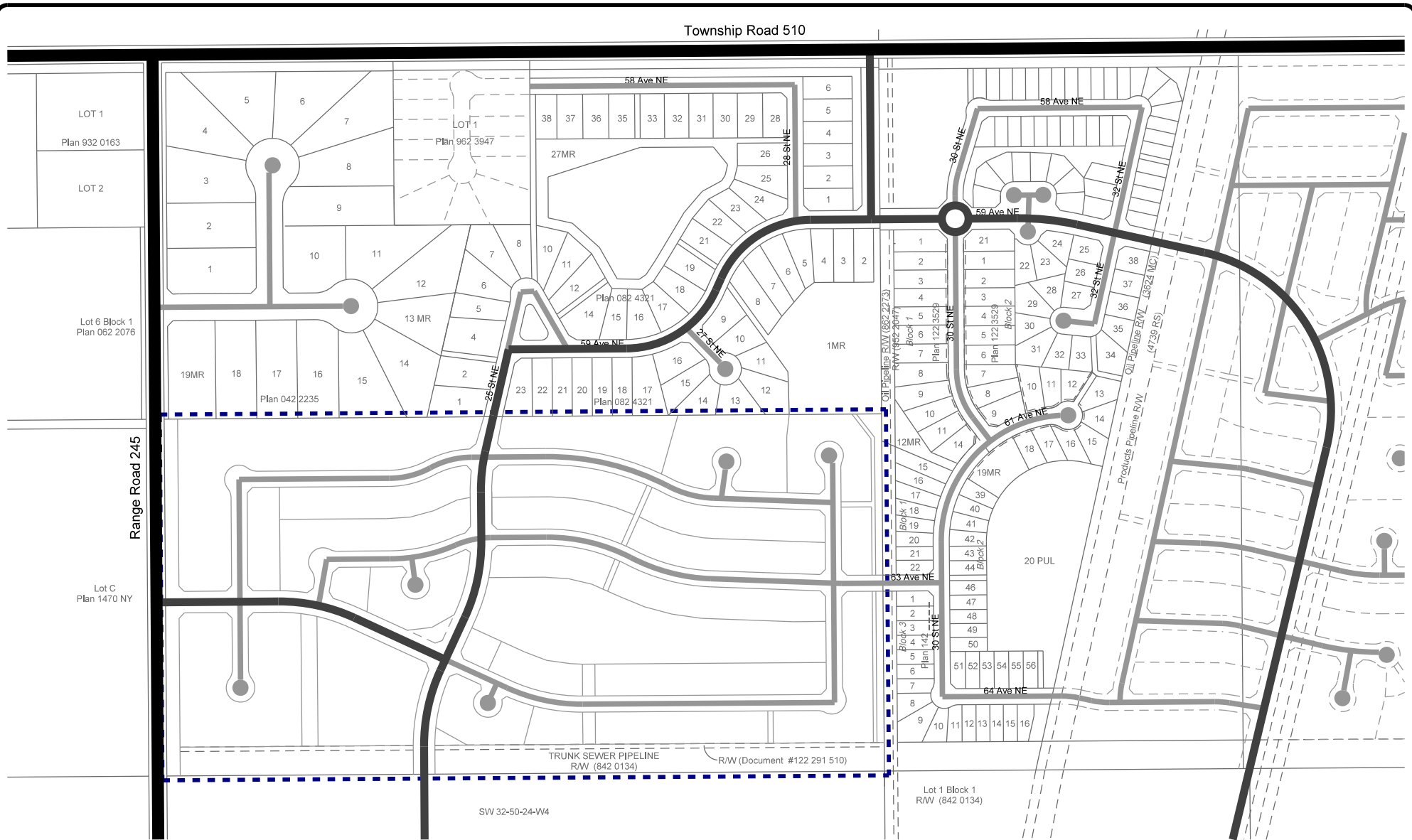
The plan area provides a good local circulation by dispersing local traffic quickly onto the collector road. All local roads serving more than twenty five lots are connected by at least two accesses, which results in all annual average daily traffic (AADT) of the proposed local roads being under 1000 trips per day. The local and collector roads will be developed as per the proposed cross sections in the East Vistas LASP. Sidewalk will be one side of the local roads and on both sides of

the collector road. The collector roads are sized to accommodate future public transit infrastructure.

## 7.2 Noise Impact Assessment

A **Noise Impact Assessment (NIA)** report for Churchill Meadow was prepared by Scheffer Andrew Ltd. will be submitted to the County under separate cover. Based on the findings of the NIA, the following improvements and mitigations are expected to be necessary into the future:

- A 1.80 m double-board noise attenuation fence should be constructed along the west property line of the Churchill Meadow plan area to ensure adequate noise mitigation from Range Road 245.
- The 1.80 m double-board noise attenuation fence should be continued approximately 100m running east along the north and south property lines of the site to provide an adequate degree of noise attenuation from Range Road 245.



- Plan Boundary
- Arterial Roadway
- Collector Roadway
- Local Roadway

Figure 8  
**TRANSPORTATION NETWORK**  
 CHURCHILL MEADOW  
 OUTLINE PLAN

South 1/2 of NW 1/4 Sec 32 - 50 - 24 - W4  
 Leduc County

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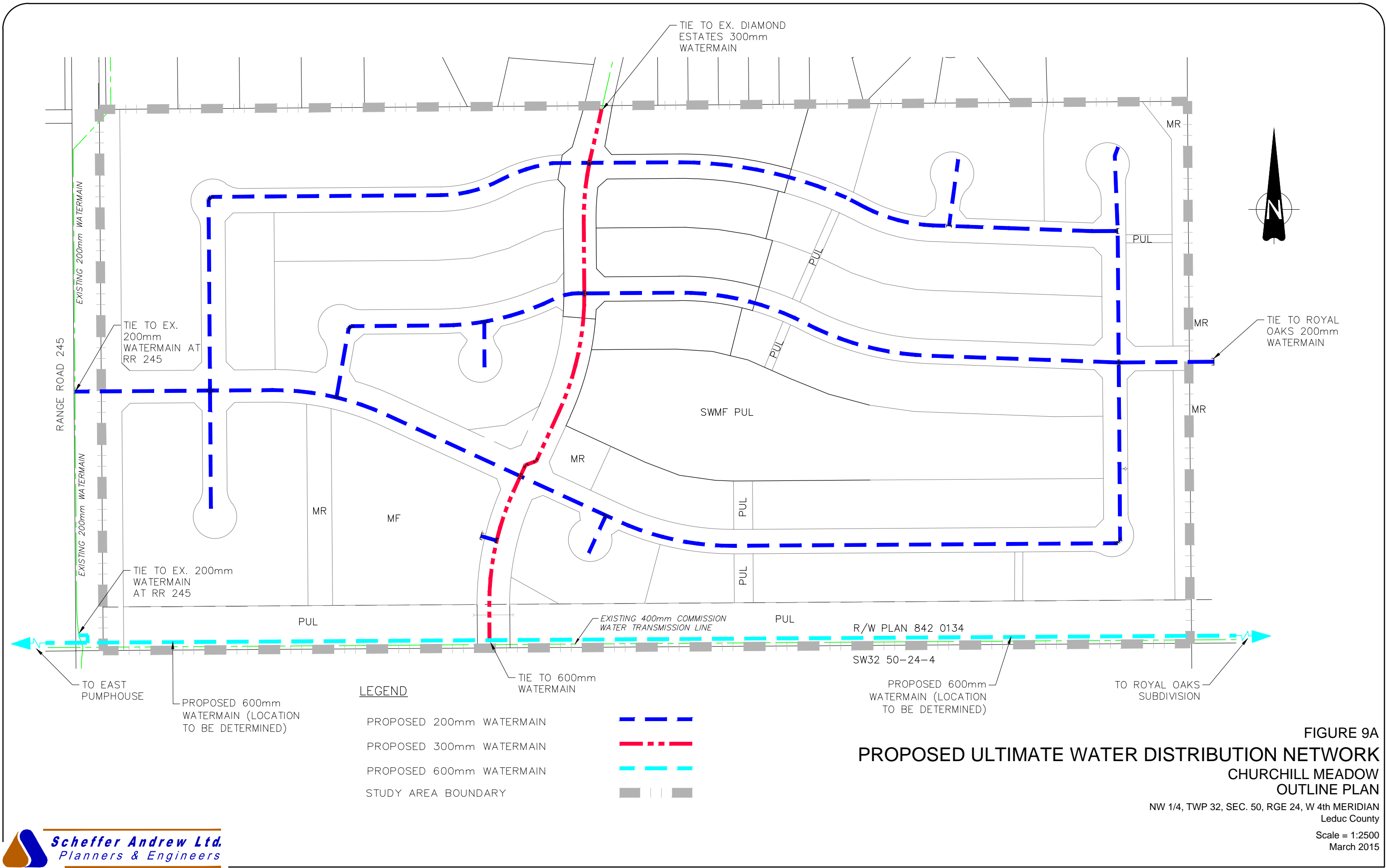
### 7.3 Water Servicing

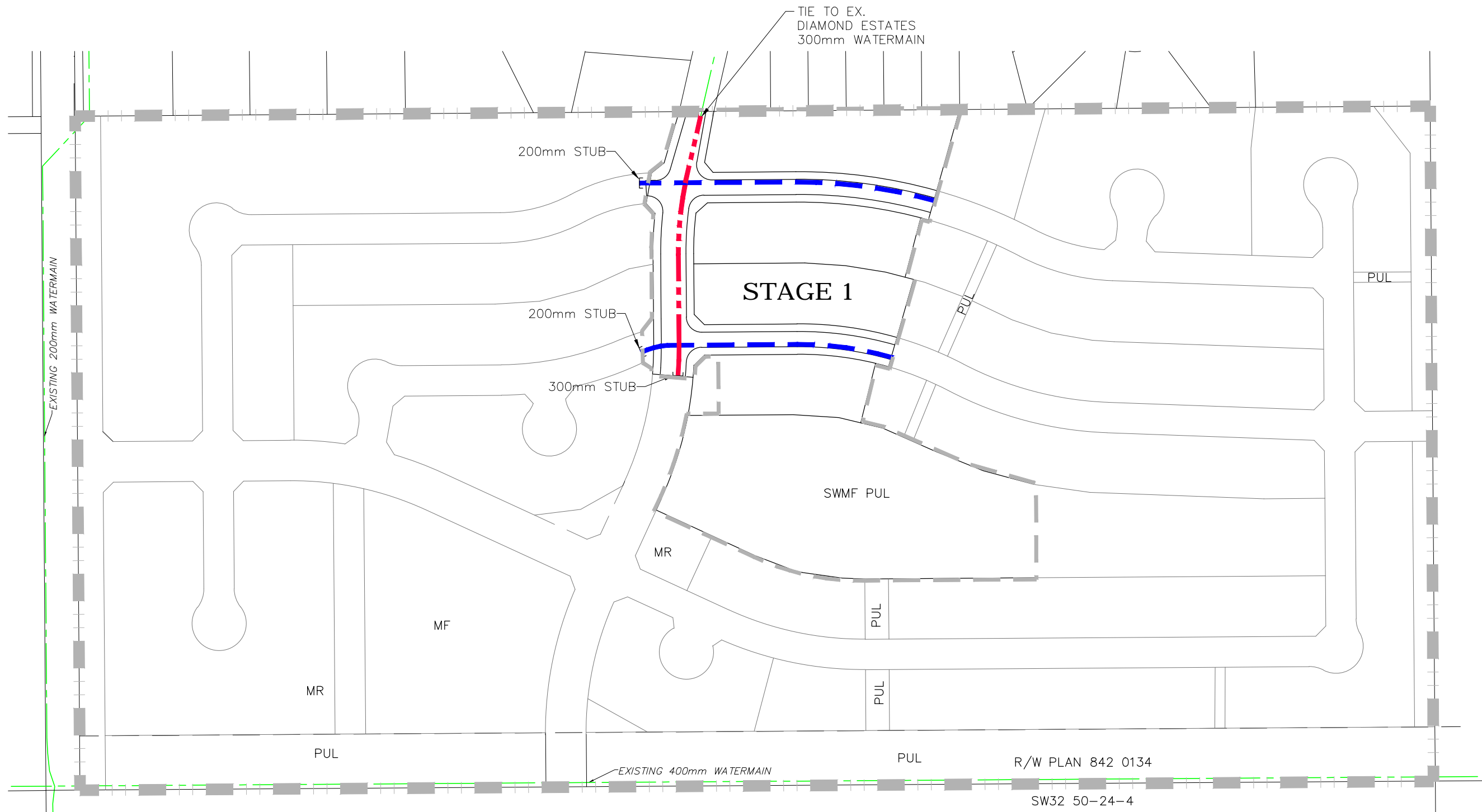
A **Water Network Analysis** (WNA) was conducted for the Churchill Meadow subdivision by Urban Systems Ltd in 2013. A copy of the WNA report is enclosed in **Appendix C**.

The proposed water distribution network is shown on **Figure 9A Proposed Ultimate Water Distribution Network**. In the short-term, the main water supply to Churchill Meadow plan area will be from the existing 300mm municipal water main located at the south boundary of Diamond Estates subdivision (25<sup>th</sup> Street NE). The existing watermain will be extended south to service the Churchill Meadow subdivision. In addition, a connection will be made to the planned 200mm water main stub located in the Royal Oaks Estates Stage 3 (63<sup>rd</sup> Ave) to the east of the plan area (anticipated 2015 stub construction). A watermain connection will also be made to the existing 200mm line located at Range Road 245, and a tie-in will be made to a future 600mm watermain located either in the south portion of the plan area or adjacent quarter section. The water network shall be verified at each stage of subdivision to determine that the water requirements for each stage are adequate.

Churchill Meadow Stage 1 subdivision will be serviced by extending the existing 300mm watermain from Diamond Estates, without offsite upgrades as noted in the WNA. The **Proposed Interim Stage 1 Water Distribution Water Network** is shown on **Figure 9B**.

Single family residential development areas within the Churchill Meadow plan area will be serviced via watermain connections to the Diamond Estates, Royal Oaks Stage 3, and a tie-in to the existing watermain at Range Road 245. The 600mm off-site watermain is not required for servicing of the single family residential development in the plan area. However, development of the proposed multi-family site in the plan area will require a connection to the future 600mm off-site watermain as shown on **Figure 9A Proposed Ultimate Water Distribution Network**. The future 600mm watermain is proposed to extend from the East Vistas Area Structure Plan area to the existing Leduc County East Pumphouse. The 600mm off-site watermain is necessary for water and fire flow servicing of the East Vistas neighbourhood, including Churchill Meadow multi-family site, as described in the East Vistas Municipal Servicing Study prepared by Challenger Engineering, dated January 2010. This major water trunk is needed to support the East Vistas area. The right of way required will be reviewed at each phase of subdivision.





# LEGEND

PROPOSED 200mm WATERMAIN

PROPOSED 300mm WATERMAIN

STUDY AREA BOUNDARY

STAGE BOUNDARY



## FIGURE 9B PROPOSED INTERIM STAGE 1 WATER DISTRIBUTION NETWORK CHURCHILL MEADOW OUTLINE PLAN

NW 1/4, TWP 32, SEC. 50, RGE 24, W 4th MERIDIAN  
Leduc County

Scale = 1:2500  
March 2015

## 7.4 Sanitary Servicing

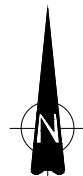
The **Proposed sanitary Basin Plan** is shown on **Figure 10A**.

All residential development within the plan area will be serviced by gravity flow sewers. The Churchill Meadow sanitary basin (approx. 29.3 ha) is proposed to discharge sewage flows directly to the existing 525mm Beaumont sewer trunk operated by Alberta Capital Region Wastewater Commission (ACRWC). The trunk runs within R/W Plan 842 0134 and has been designed by ACRWC to accommodate the proposed flows from the Churchill Meadow plan area. The proposed tie-in location and the calculated design flows are shown on **Figure 10A Proposed Sanitary Basin Plan**. The preliminary location of sanitary system catchments, pipe alignments and pipe sizes are illustrated on **Figure 10B Proposed Sanitary System**. Supporting sanitary sewer design calculations are enclosed in **Appendix D**.

The proposed Churchill Meadow Stage 1 sanitary sewer network is shown on **Figure 10C Stage 1 Sanitary System Connection**. It is noted that Stage 1 can be serviced by constructing the ultimate sewer connection to the existing ACRWC's 525mm trunk at two locations as shown in the sanitary figures.







### LEGEND

PROPOSED SANITARY SEWER & MANHOLE NO.

EXISTING SANITARY SEWER & MANHOLE NO.

FUTURE SANITARY SEWER & MANHOLE NO.

STUDY AREA BOUNDARY

SANITARY CATCHMENT BOUNDARY

CATCHMENT NO. & AREA  
**B**  
**1.92ha**

ALL SANITARY MAINS ARE 200mm UNLESS OTHERWISE NOTED

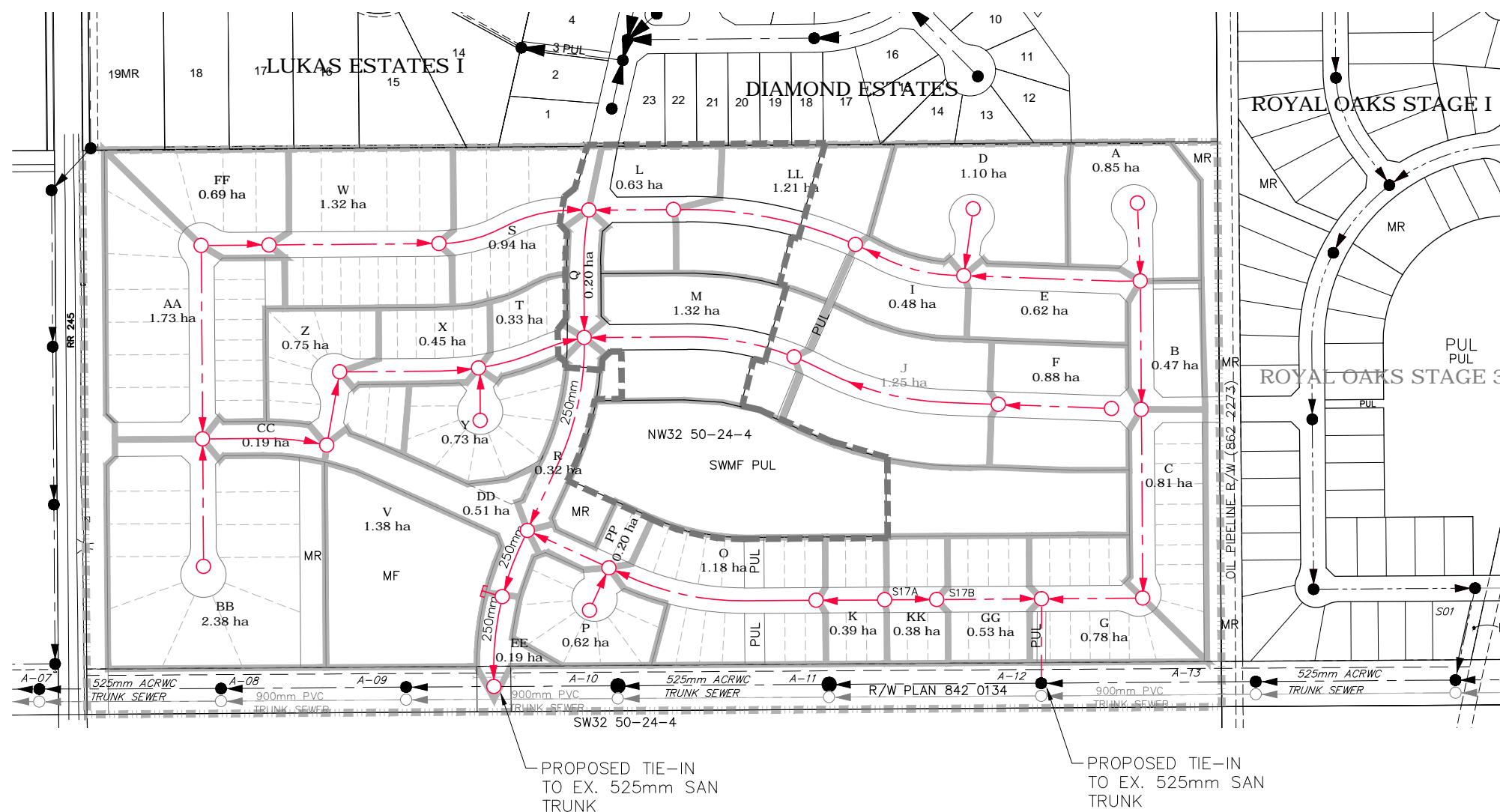


FIGURE 10B  
PROPOSED SANITARY SYSTEM  
CHURCHILL MEADOW  
OUTLINE PLAN

NW 1/4, TWP 32, SEC. 50, RGE 24, W 4th MERIDIAN  
Leduc County

Scale = 1:4000

March 2015

111101-FIG 10B.dwg

LEGEND

STAGE BOUNDARY



PROPOSED SANITARY SEWER &amp; MANHOLE NO.



EXISTING SANITARY SEWER & MANHOLE NO.



FUTURE SANITARY SEWER &amp; MANHOLE NO.



SANITARY CATCHMENT BOUNDARY

CATCHMENT NO. &amp; AREA

B  
1.92ha

FUTURE CATCHMENT NO. &amp; AREA

B  
1.92ha

ALL SANITARY MAINS ARE 200mm UNLESS OTHERWISE NOTED

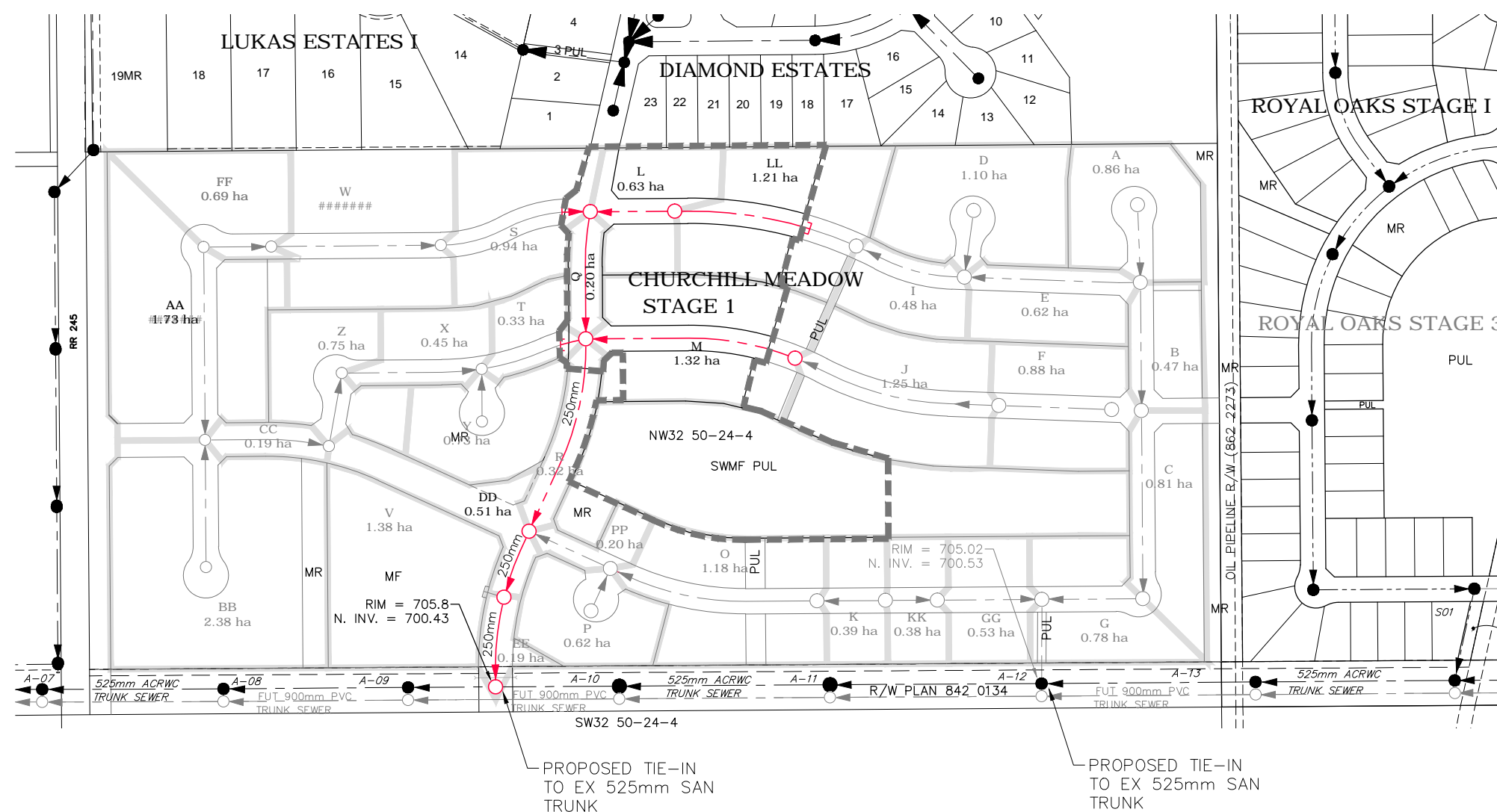


FIGURE 10C  
STAGE 1 SANITARY SYSTEM CONNECTION  
CHURCHILL MEADOW  
OUTLINE PLAN

NW 1/4, TWP 32, SEC. 50, RGE 24, W 4th MERIDIAN  
Leduc County

Scale = 1:4000

March 2015

111101-FIG 10C.dwg

## 7.5 Storm water Management

The proposed drainage system for the plan area consists of storm pipes, catch basins, ditches, roadside gutters, and a constructed storm water management facility (SWMF). The proposed SWMF is designed to store the post-development runoff from the plan area (30.8 ha) during critical storm events with a maximum controlled discharge flow rate of 3.3 L/s/ha into the downstream system. **Figure 11A Proposed Storm System** shows the proposed SWMF catchment area.

During a 1-in-5 year storm, the storm pipes will collect and direct the flows to the four inlets at the SWMF. The proposed post-development catchment areas are shown on **Figure 11B Proposed Minor Storm System**. Storm pipes have been sized to accommodate minor flows from all residential and multi-family lots. Supporting calculations are attached in **Appendix E**.

Flows exceeding the 1-in-5 year storm intensity (major flows) will be drained by the roadway system. Major flows will be routed via ditches and roads to the pond at the same location of the inlet points. **Figure 11 Proposed Grading Plan** shows the major drainage flow routing.

The SWMF is proposed to discharge storm water at a controlled flow rate to the existing 675mm trunk located within R/W Plan 842 0134 at the south boundary of the plan area. The discharge of the pond will be at a controlled rate of 3.3 L/s/ha. The proposed SWMF will provide the necessary water storage and flood control measures for the entire Churchill Meadow plan area.

The proposed SWMF has been designed to accommodate the 1-in-100 year storm event in accordance with the Leduc County Design Guidelines and Construction Standards for Developments dated May 2005 and Alberta Environment regulations. The 1-in-100 year SWMF storage requirements are summarized in the table below.

**Table 2: Stormwater Management Requirements for 1-in-100 Year, 24-Hour Storm Event**

Facility	Storage Function	Allotted Area (ha)	HWL Elev. (m)	NWL Elev. (m)	Bottom Elev. (m)	Active Storage Vol. (m <sup>3</sup> )	Drainage Area (ha)	Controlled Release Rate (L/s)
SWMF	Retention	2.5	703.80*	702.15	700.15	22,141	30.8	101 (3.3 L/s/ha)

\*at 1978 City of Edmonton storm event.

It is anticipated that Stage 1 subdivision will construct a portion of the SWM facility as shown conceptually via the staging plan on Figure 7. The size of Stage 1 pond construction will be confirmed with detailed design of Stage 1. Appropriate inlets and outlets, and the outfall infrastructure, will be constructed with the SWM facility as determined through detailed design process.

#### 7.5.1 Block Grading Plan

Preliminary roadway elevations and block-by-block lot grades are shown on **Figure 11 Proposed Grading Plan**. Roadway grades were calculated such that all major flows are directed to the SWMF. As per City of Edmonton standards and best engineering practice, the proposed roadway grades prevent ponding in the roadway in excess of 0.35 m during a major storm event.

#### 7.6 Shallow Utilities

Underground natural gas, telephone, and power will be provided to the residential lots in the plan area by extending existing services from Diamond Estates to the north and future development of Royal Oaks Stage 3 to the east. Roadway lighting will be provided in the plan area.





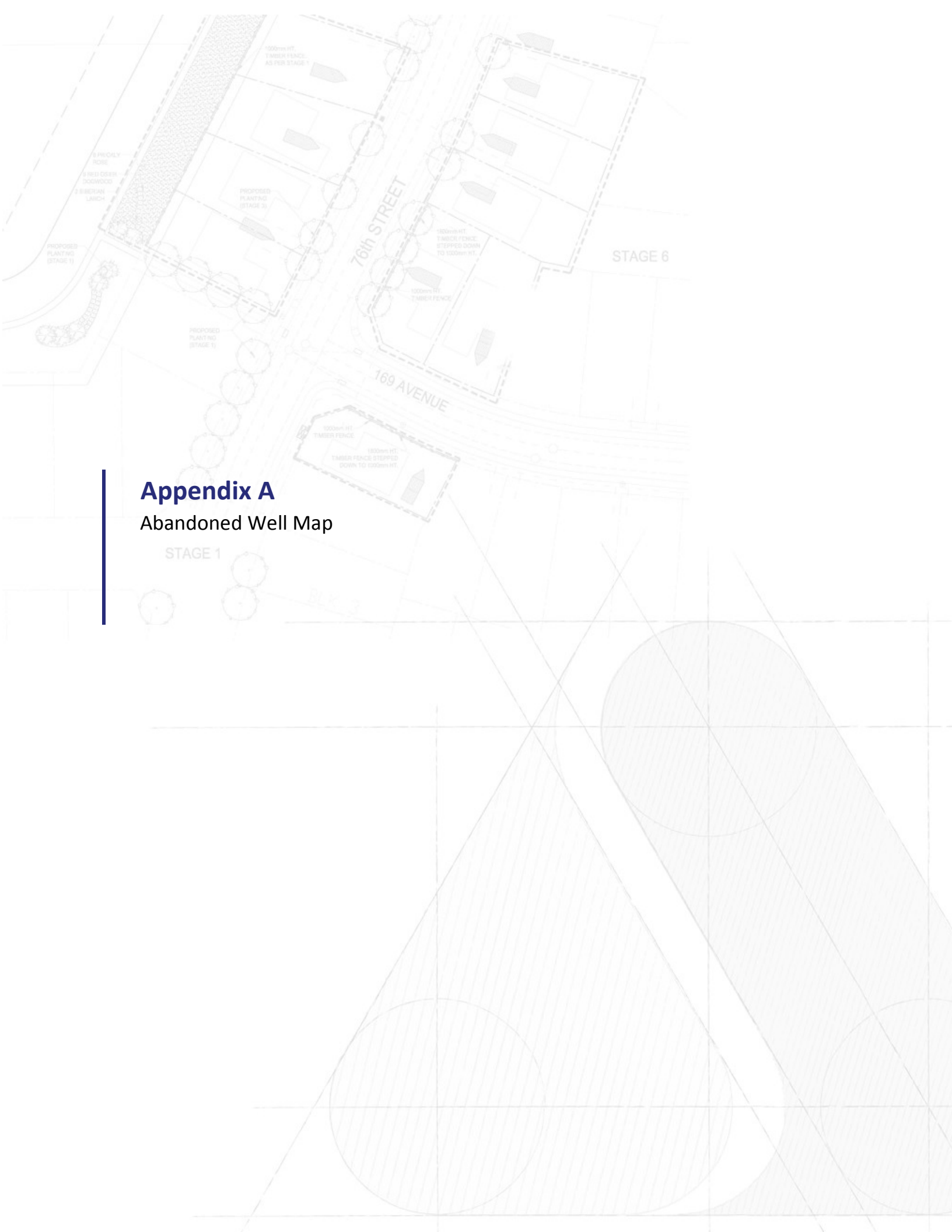


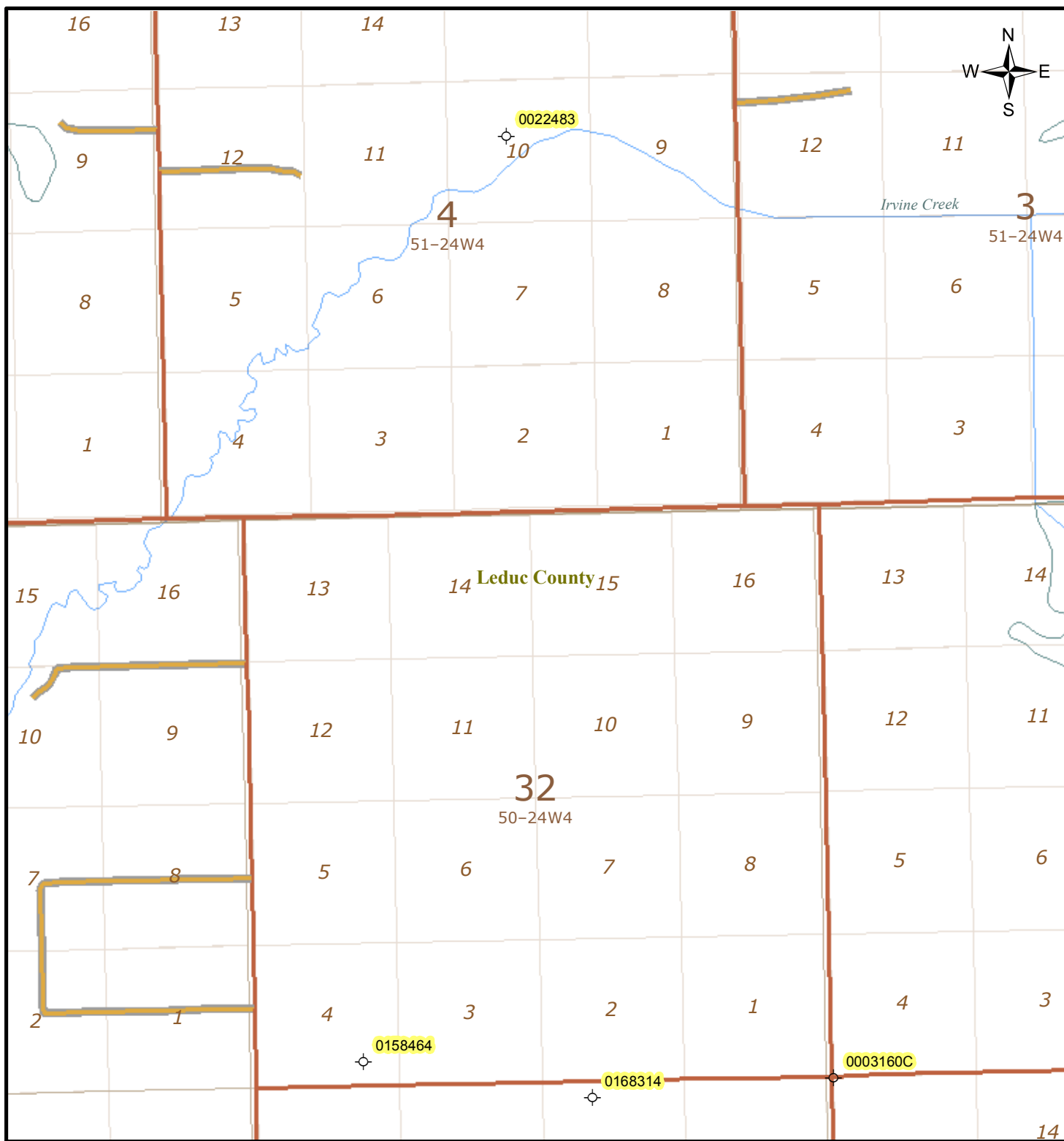




## Appendix A

### Abandoned Well Map





## Alberta Abandoned Well Locations

**Disclaimer:** The ERCB makes no representations, warranties, or guarantees, expressed or implied, that the data will be suitable for any use, including the intended use even if the intended use is known by the ERCB. The ERCB accepts no responsibility whatsoever for any inaccuracies, errors, or omissions in the data and the ERCB shall not be responsible for any losses or costs incurred as a result of you or anyone else using the data.

### Map Legend

- Abandoned Wells
- Well Licence Number
- ATS Grids
- Towns & Cities
- Municipal Boundaries
- Provincial Boundaries

0 0.2 0.4 0.8 Kilometres



## Appendix B

### Open House Summary

STAGE 1

## CHURCHILL MEADOWS

July 23, 2013 Open House

Summary of Comments and Responses

Number of Persons in Attendance (according to the sign-in sheet): 24

Number of Survey Responses: 6

### A) PROPOSED AMENDMENTS TO THE EAST VISTAS LOCAL AREA STRUCTURE PLAN & LEDUC COUNTY LAND USE BYLAW

- 1. Cash-in-lieu of municipal reserve dedication to allow Leduc County to purchase lands in order to assemble school sites or large municipal reserve sites within the East Vistas Local Area Structure Plan is acceptable.**

Agree	Neither Agree or Disagree	Disagree
1	1	4

If disagree, please explain why:

- Municipal reserves are important  
Municipal reserve for parks and open spaces are important to us
- I would like smaller green areas or walkways throughout the development
- The existing and approved East Vistas Local Area Structure Plan already includes 54.4 ha for Municipal Reserve for schools and parks of which 25 ha is specifically for school reserves. (Section 6.10 Community Services). This was calculated based on the projected population in conjunction with the rest of the approved plan. Provided the lot density remains as in the approved area Structure Plan layout, there is already sufficient allocation for schools. Municipal reserves for parks and open spaces are important to Leduc County residents.

- 2. The majority of lots will front onto collector roads to provide traffic calming and flexibility for site design due to constraints.**

Agree	Neither Agree or Disagree	Disagree
3	1	2

If disagree, please explain why:

- Good idea
- Please follow approved East Vista Local Area Structure Plan 6.7 – Transportation (page 31)
- There are methods for traffic calming as already described in the approved East Vistas Local Area Structure Plan (LASP), as seen in Section 6.7 Transportation on page 31. There is no need to amend this to 'majority,' it should remain as 'all.' Collector roads need to remain functional and safe, as well as be attractive and pedestrian friendly.

**3. The minimum lot width for the RU 1 - Residential Urban 1 District (low density residential district on the East Vistas Plan) is to be reduced to 18.0m from 20.0m, minimum area is to be decreased from 1350 sq. metres to 1000 sq. metres and the density is to be increased to allow the majority of the lots at this minimum width.**

Agree	Neither Agree or Disagree	Disagree
2		4

**If disagree, please explain why:**

- Absolutely not! Please call me
- This will cause a big disparity of lot sizes as compared to lots in Lukas Estates
- Would like to maintain a low density transition behind Lukas Estates
- This would almost double the density of the RU-1 (1.8 times), and make too drastic of a contrast against the adjacent lots in Lukas Estates which are 5018 sq. metres. The current approved minimum lot widths and lot area for RU-1 provides a better transition. The minimum area currently approved of 1350 sq. metres is already a significant contrast between lot sizes.

**4. The minimum lot width for the RU 2 (Residential Urban 2 District) is to be reduced to 10.6m from 12.0m and the density is to be increased allow the majority of the lots at this minimum width.**

Agree	Neither Agree or Disagree	Disagree
2		4

**If disagree, please explain why:**

- Absolutely not! Please call me
- The density would be doubled
- Would like to maintain a low density transition behind Lukas Estates
- This would almost double the density of the RU2 (1.75 times). The current approved minimum width of 12.0m is already narrow enough. This is narrower than the widths of the lots of our previous homes in the Town of Beaumont before moving here (13.7m and 14.0m). The current minimum lot width can still be proportioned at the optimum 3:1 ratio with the depth (which was part of the rationale for the proposed amendment).

**5. Religious facilities will be allowed as a discretionary use in the RM 1 –Residential Multi Family District.**

Agree	Neither Agree or Disagree	Disagree
2	1	3

**If disagree, please explain why:**

- Must be equally accessible by all
- Too much traffic on weekends
- The Leduc County Land Use Bylaw has already designated Religious Assemblies as Discretionary use under "Town Centre District" (Section 9.24.3) AND Urban Commercial 1 District (Section 9.25.3). In the East Vistas Local Area Structure Plan, Religious Assemblies is already included

under the Town Centre Area – it does not need to be added to residential areas.

**6. Development in RM 1 –Residential Multi Family District for non-condominium type of ownership will be developed under the RU 3 – Residential Urban 3 District (higher density development) district.**

Agree	Neither Agree or Disagree	Disagree
2	2	1

If disagree, please explain why:

- Higher density does not make sense in this location
- Question – What is the proposed amendment, is this in LUB or LASP? Not understanding what the implications are.

**7. The minimum lot size of the UC – Urban Commercial 2 District (commercial development for the region) will be reduced from 2.0 ha (4.99 acres) to 1.0 ha (2.45 acres).**

Agree	Neither Agree or Disagree	Disagree
1	3	2

If disagree, please explain why:

- Higher density does not make sense in this location
- 1 acre sites should be developed for commercial uses

**8. Please provide any additional comments that you have regarding the proposed amendments to the East Vistas Area Structure Plan and Leduc County Land Use Bylaw Urban Districts**

- The presentation could be misleading – particularly the first two images. Suggest much more clear information required.
- The original development concept (LASP) should remain as guidelines for any new development
- We are totally opposed to having your proposed size of lots behind our 1.25 acre lots in Lukas. The lots backing onto Lukas should all be the largest size lots available. We would like to have a better transition of lot sizes so that we would only have 2 or at the max 3 lots adjoining each existing lot.
- None of the proposed amendments are in the best interest of Leduc County or its residents. The original Development Concept for the East Vistas Local Area Structure Plan should remain as the guideline for development. The current Leduc County Land Use Bylaw has been thoughtfully developed and does not need any amendments at this point. There is also no need to make any amendments to the East Vistas Local Area Structure Plan at this very early stage of development.

## B) OUTLINE PLAN

<b>1. The Development Concept in the outline plan shows an appropriate future land use scenario that is consistent with the East Vistas Local Area Structure Plan (ASP)</b>		
Agree	Neither Agree or Disagree	Disagree
1		4
<b>If disagree, please explain why:</b>		
<ul style="list-style-type: none"> <li>• Lots are much too small</li> <li>• Original East Vista Area size. Plan shows RM-1 Low Density development south of Lukas Estates. This is reasonable.</li> <li>• I believe they were much larger sized lots that were previously approved.</li> <li>• The original East Vistas Area Structure Plan shows RU-1 Low Density development immediately south of, and the full width of, Lukas Estates, then transitions (going east) to RU-2 Medium Density south of Diamond Estates and over to Royal Oaks. This seems reasonable to me.</li> </ul>		
<b>2. There is an appropriate distribution of low and medium density residential uses in the concept.</b>		
Agree	Neither Agree or Disagree	Disagree
1		4
<b>If disagree, please explain why:</b>		
<ul style="list-style-type: none"> <li>• Lots are much too small</li> <li>• Too many medium density areas. This development should gradually transition to medium rather than suddenly.</li> <li>• The majority of lots are medium density which we are opposed to.</li> <li>• The proposed Churchill Meadow Development Concept shows RU-1 Low Density development as being reduced by almost half of the original planned area. The other half has been proposed as being majority RU-2 Medium Density Residential (adjacent to several Lukas Estates), as well as Multi Family Residential (high density). If the amendments are approved we would have 8 small town-size lots immediately behind our fence. This is not consistent with the original and approved East Vistas Local Area Structure Plan!</li> </ul>		
<b>3. The location of the multi family site in the concept plan is appropriate.</b>		
Agree	Neither Agree or Disagree	Disagree
1	1	3
<b>If disagree, please explain why:</b>		
<ul style="list-style-type: none"> <li>• Do not have sufficient amenities planned in local area to support multi-family</li> <li>• Strongly disagree; please follow East Vista Local Area Structure Plan</li> <li>• The concept is suggesting far too many medium density areas, and the Multi Family Residential does not belong in the Churchill Meadow development. This development has to be the 'transition' development from the large estate lots of Lukas Estates, with majority of lots being Low Density.</li> </ul>		

<b>4. Trails and greenways, linking parks and recreational areas are well located.</b>		
Agree	Neither Agree or Disagree	Disagree
2		2
If disagree, please explain why:		
<ul style="list-style-type: none"> <li>• More trails required; small parks and green space very important</li> <li>• There should be more trails and small park areas added – green space is important to Leduc County Residents</li> </ul>		
<b>5. Please indicate which one of the following most closely applies to you:</b>		
<ul style="list-style-type: none"> <li>a) Resident landowner within Outline plan area (1)</li> <li>b) Non-resident landowner within East Vistas ASP area</li> <li>c) Developer/Consultant representing lands in the East Vistas ASP area</li> <li>d) Local Resident outside of East Vistas ASP area (Adjacent - 3)</li> <li>e) Other: Live in Lukas Estates (1)</li> </ul>		
<b>6. Please provide any additional comments that you have regarding this Development Concept.</b>		
<ul style="list-style-type: none"> <li>• Happy to work with Murray</li> <li>• The development of Churchill Meadows should conform to existing Land Use Bylaws and Approved East Vista (LASP). This concept is not appropriate for the East Vistas in Leduc County.</li> <li>• Adamantly opposed to having medium density lots backing onto our estate lots</li> <li>• The development concept for Churchill Meadows needs to be redesigned with the existing Land Use Bylaws and the existing approved East Vistas Local Area Structure Plan. This concept is making the unwarranted assumption that the proposed amendments will be approved by Leduc County. This concept would be appropriate for any city, but is not appropriate for the East Vistas in Leduc County at this time.</li> </ul>		



## CHURCHILL MEADOWS

May 21, 2014 Open House

Summary of Comments and Responses

Number of Persons in Attendance (according to the sign-in sheet): 23

Number of Survey Responses: 12

### A) PROPOSED AMENDMENTS TO THE LEDUC COUNTY LAND USE BYLAW

- The minimum lot width for the RU 1 - Residential Urban 1 District (low density residential district on the East Vistas Plan) is to be reduced to 18.0m from 20.0m and minimum area is to be decreased from 1350 sq. metres to 1000 sq. metres.**

Agree	Neither Agree or Disagree	Disagree
4	1	7

If disagree, please explain why:

- Not safe (i.e.) fire, no parking or inaccessible parking
- Too dense results in poorer quality development
- Too many lots in small area
- The lots should be wider to match those they are backing on to
- The minimum lot width should remain as 20.0m and the minimum area should remain as 1350 sq. m. These support the Smart Growth target of 27.3 units / net residential ha for the East Vistas Priority Growth Area. By reducing the RU1 minimum lot width and area in the LUB, would result in a higher density for the future developments within the East Vistas – disregarding the target.
- Width should be reduced to 12m.

- The density of the RU1, RU2 and RU3 district is to be increased to match the prescribed maximum number of allowable lots per NET quarter section as per the approved East Vistas Local Area Structure Plan which will allow the majority of the lots at the minimum width/area.**

Agree	Neither Agree or Disagree	Disagree
4	2	6

If disagree, please explain why:

- Not a good rule – people are trying to move “out” of the city and they will have no lot space
- Too many lots in small area
- As long as it was proposed in the original plan
- Correction: The approved East Vistas LASP does NOT have a prescribed maximum # of allowable lots “per NET quarter section”. The LASP specifies units “per quarter section” (see East Vistas Local Area Structure Plan, section 6.1.1), which is also consistent with the North Major Area Structure Plan (see section 6.6.2 Policies).
- The target density of 27.3 units / net residential ha is for the ENTIRE East Vistas, and the portion of land that Churchill Meadow is on has been pre-approved to consist of low and medium density districts ONLY.



- By increasing densities in the Land Use Bylaw for RU1, RU2 and RU3 districts, the overall density of the East Vistas as it develops out would be closer to 36.9 units / net residential ha, which is unacceptable and far exceeds the target density for the East Vistas.
- See East Vistas Local Area Structure Plan, Table 1: Area Structure Plan Statistics. Using your proposed DU/ha for RU1, RU2 & RU3, results in a Total DU of 11,732 (from the current approved 8,673) - resulting in 36.95 units / net residential ha.

**3. Current wording within the RM1–Residential Multi Family District is not clear regarding what district to utilize if the site is developed as a fee simple residential development (non-condominium type of ownership). The following will be added to the General Purpose statement: “If developed as a fee simple development, utilize the RU 3 district regulations.**

Agree	Neither Agree or Disagree	Disagree
6	2	4

If disagree, please explain why:

- Since there SHOULD NOT be an RM1 district in this part of the East Vistas based on the approved East Vistas LASP, it seems inappropriate for any amendments to the LUB with regards to RM1 - Residential Multi-Family District.

**4. The minimum lot size of the UC – Urban Commercial 2 District (commercial development for the region) will be reduced from 2.0 ha (4.99 acres) to 1.0 ha (2.45 acres).**

Agree	Neither Agree or Disagree	Disagree
5	3	4

If disagree, please explain why:

- Since there SHOULD NOT be an UC - Urban Commercial 2 District in this area of the East Vistas based on the LASP, and no indicated reason for reducing the minimum lot size in half, this amendment should not be made.

**5. The maximum height of the RU2 and RU3 district will be revised to 11.0m to be consistent with the RU1 district.**

Agree	Neither Agree or Disagree	Disagree
5	3	4

If disagree, please explain why:

- Is that what the original plan called for?
- The maximum height of the RU2 and RU3 districts should remain as 10.0 meters. Narrower lot widths of the RU2 and RU3 districts should NOT have taller buildings - it would detract from the aesthetics of the neighborhood. If consistency is the goal, the maximum height of RU1 districts should be reduced to match the 10.0m height of the RU2 and RU3 districts.

**6. Site coverage for the RU1 district will be increased from 40 to 45%, RU2 district from 40 to 55% and RU3 district from 50 to 55%.**

Agree	Neither Agree or Disagree	Disagree
5	3	4

If disagree, please explain why:

- Too dense
- The attraction of living in Leduc County is for the ability to have a larger lot, with a lower site coverage. Increasing the RU1, RU2 and RU3 site coverage would devalue and detract from the neighborhoods in the East Vistas.

**7. Please provide any additional comments that you have regarding the proposed amendments to the Leduc County Land Use Bylaw Urban Districts**

- The proposed increase density will not be good for the current and future residents of the area. I disagree with increased density.
- Consider or watch out speed on 245 can be very dangerous.
- The increased density of the yellow lots (RU1) is appropriate and a good buffer to Lucas Estates and the North Vista without compromising the size of the inner lots – everybody wants room to live in the country.
- The Leduc County LUB has already set the appropriate guidelines for the East Vistas developments, and the East Vistas Local Area Structure Plan has also set the appropriate guidelines to properly develop to the Smart Growth target density of 27.3 units / net residential ha.
- Churchill Meadow development must be designed using the approved guidelines - no changes are appropriate to the Land Use Bylaw now.
- Re: “Proposed Maximum Setback” proposed LUB amendment. There is currently no MAXIMUM Setback in the LUB for RU1, RU2 & RU3 districts (LUB Sections 9.20.4, 9.21.4 & 9.22.4 Minimum Building Setback Requirements). If your intention is to remove the clause for the MINIMUM Setback - this should NOT be removed. The minimum setback ensures the aesthetics of each of the neighborhoods.

**B) OUTLINE PLAN**

**1. The Development Concept in the outline plan shows an appropriate future land use scenario that is consistent with the East Vistas Local Area Structure Plan (ASP)**

Agree	Neither Agree or Disagree	Disagree
4	2	5

If disagree, please explain why:

- Density or higher than on East Vistas LASP
- Minimal changes to try and appease landowners in the area
- This area within the East Vistas is intended to be ONLY Low and Medium Density districts. There SHOULD NOT be any RM1 Multi-Family Residential districts.
- There is a total lack of transition from the Lukas Estates lots (5,000 sq. m.) to the proposed Low Density lots. THE LOTS THAT BACK ONTO LUKAS ESTATES LOTS MUST BE AT LEAST 2,700 sq. m. (30m wide, 90m deep) to provide a more acceptable transition.

**2. There is an appropriate distribution of low and medium density residential uses in the concept.**

Agree	Neither Agree or Disagree	Disagree
-------	---------------------------	----------

4	2	5
<b>If disagree, please explain why:</b>		
<ul style="list-style-type: none"> <li>I don't believe that there is equal distribution of density</li> <li>Does not match the LASP density map</li> <li>There are too many medium density units</li> <li>There should be more low density lots, and fewer medium density lots as indicated on the East Vistas Local Area Structure Plan, East Vistas Development Concept map.</li> </ul>		
<b>3. The location of the multi family site in the concept plan is appropriate.</b>		
Agree	Neither Agree or Disagree	Disagree
5	2	4
<b>If disagree, please explain why:</b>		
<ul style="list-style-type: none"> <li>Should only be single family units for people who want to maintain single family residential lifestyle.</li> <li>It is supposed to be east of the collector road</li> <li>No, the multi family site should not be in this development. This development needs to be developed as the East Vistas Local Area Structure Plan had originally laid out with ONLY Low and Medium density districts.</li> </ul>		
<b>4. Trails and greenways, linking parks and recreational areas are well located.</b>		
Agree	Neither Agree or Disagree	Disagree
6	1	5
<b>If disagree, please explain why:</b>		
<ul style="list-style-type: none"> <li>Should be more green space instead of trying to maximize the number of lots in the area</li> <li>There should be more paths, trails and small park areas added.</li> </ul>		
<b>5. Please indicate which one of the following most closely applies to you:</b>		
<ul style="list-style-type: none"> <li>a) Resident landowner within Outline plan area (4)</li> <li>b) Non-resident landowner within East Vistas ASP area (2)</li> <li>c) Developer/Consultant representing lands in the East Vistas ASP area (2)</li> <li>d) Local Resident outside of East Vistas ASP area (4)</li> <li>e) Other: Live in Lukas Estates</li> </ul>		
<b>6. Please provide any additional comments that you have regarding this Development Concept.</b>		
<ul style="list-style-type: none"> <li>This development is not up to the same standards of other developments in this area.</li> <li>There should be a berm on the west side of the property to reduce noise from RRd 245</li> <li>This development is not up to the quality of other housing developments in the area</li> <li>The storm pond is not located in the low section of the property. The low point of the property is on the south border.</li> <li>Please watch that the lot north of Irvine Creek is being proposed. For rezoning from DC – Business Park to Industrial General more outdoor storage would be allowed and there would be</li> </ul>		

less restrictions on noise, odours, dust and light all which are less than a buffer zone of 5 miles which were proposed in the North Major ASP as a principle to protect residents from the industrial park

- It didn't seem very "open" nor were you really interested in my feedback or answering questions. No acknowledgement when I arrived. Just a money making venture to maximize the number of lots without any consideration for the residents in the area.
- The development concept for Churchill Meadows needs to be redesigned with the existing Land Use Bylaws and the approved East Vistas Local Area Structure Plan.



## Appendix C

### Water Network Analysis

# MEMORANDUM



Date: April 29, 2013  
To: Lorne Stadnick, P. Eng., Senior Municipal Engineer, Leduc County  
cc: Andrew Lytovchenko, P. Eng., Project Engineer, Scheffer Andrew Ltd.  
From: Mohammed Elenany, Andrea McKenzie  
File: 2599.0058.01  
Subject: Goldman and Royal Oaks Development Hydraulic Network Assessment

## 1.0 PROJECT DESCRIPTION

Urban Systems Ltd. has completed a hydraulic network analysis of the proposed water servicing to the Goldman subdivision and remaining development of Royal Oaks, as requested by Leduc County on behalf of Scheffer Andrew Ltd. The Goldman and Royal Oaks subdivisions are located on Section 32-50-24-4, south of Township Road 510 and east of Range Road 245. Goldman is located on the southern half of the NW quarter section and Royal Oaks is located on the west half of the NE quarter section. The proposed land uses are single family residential and multi-family residential in both developments. See Figure 1.

The objectives of this analysis are to determine:

- What fire flow is reasonable for multi-family residential sites?
- Does the proposed water network meet the design criteria?
- At what stage of development is connection to the proposed 600 mm water main necessary to meet the design criteria?
- What are the boundary conditions for each development?

The following scenarios were modeled and evaluated (see Figures 2 to 9):

- **Scenario 1a** – Stage I of Goldman; with a single connection point to Diamond Estates
- **Scenario 1b** – Stage I of Goldman; with connection points to Diamond Estates and Stage I of Royal Oaks
- **Scenario 1c** – Stage I of Goldman; with connection points to Diamond Estates, Stage I of Royal Oaks and the proposed 600 mm water main
- **Scenario 2a** – Stage I of Goldman and ultimate development of Royal Oaks; without connecting to the proposed 600 mm water main
- **Scenario 2b** – Stage I of Goldman and ultimate development of Royal Oaks; with connection points on the proposed 600 mm water main
- **Scenario 3a** – Ultimate development of Goldman and Royal Oaks; without connecting to the proposed 600 mm water main
- **Scenario 3b** – Ultimate development of Goldman and Royal Oaks; with connection points on the proposed 600 mm water main



## MEMORANDUM

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- **Scenario 3c** – Ultimate development of Goldman and Royals Oaks; with connection points on the proposed 600 mm water main (where 600 mm water main is extended to East Pumphouse)

## 2.0 SELECTION OF FIRE FLOWS

The fire flows selected for single family residential and multi-family residential sites are greater than what is specified by the Leduc County Design Guidelines (2005). Through discussion with the County, it was determined that the fire flows listed by the County's Design Guidelines are out of date and have therefore been increased to complete this water network analysis.

The fire flow for single family residential developments was taken as 100 l/s as per the East Vistas Servicing Study (Challenger Engineering, 2010). As advised by Leduc County, this fire flow has been reviewed by the Leduc County Deputy Fire Chief and is considered suitable for single family residential development.

The East Vistas Servicing Study does not identify a fire flow requirement for multi-family residential developments. An appropriate multi-family residential fire flow was selected by calculating the fire flow as outlined to the Fire Underwriter's Survey (FUS) – Water Supply for Public Fire Protection (1999), and by comparing the Leduc County Land Use Bylaw and Leduc County Design Guidelines municipalities. These calculations and comparisons are described below.

### 2.1 Fire Underwriter's Survey – Calculation 1

The East Vistas Area Structure Plan (Scheffer Andrew Ltd., 2010) identifies the land use designation for multi-family dwelling sites as RM1 (Residential Multi Family District) in the Leduc County Land Use Bylaw (LUB). The largest allowable building according to the LUB was determined, and the corresponding fire flow was calculated according to the method outlined by the FUS. The maximum lot size allowed for an RM1 development is 1.4 hectares and the maximum allowable site coverage is 50%. If we assume that the building occupies the maximum allowable site coverage, it would have a footprint of 7000 m<sup>2</sup>. Note that it is possible for a building with this footprint to meet the minimum building setbacks. The maximum number of storeys allowed is 3.5 storeys. The following assumptions were used to calculate the fire flow for a building this size:

- Total building area = 7000 m<sup>2</sup> x 4 storeys = 28,000 m<sup>2</sup>
- Type of construction is wood frame (C = 1.5)
- Occupancies are combustible/medium fire hazard (no reduction or increase to calculated flow)
- Sprinkler system is adequately designed and conforms to NFPA 13 and other NFPA sprinkler standards (calculated flow reduced by 30%)
- Adjacent structures are separated from the building by at least 45 m (no reduction or increase to calculated flow)

These assumptions yield a calculated fire flow of 645 l/s. This is considered to be an unrealistically large value for the fire flow, due to the extremely large building footprint assumed.

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## 2.2 Comparison with City of Edmonton

A comparison of the Leduc County RM1 land use designation with similar land uses described in the City of Edmonton Zoning Bylaw 12800 is presented in Table 1.

**Table 1: Land Use Bylaw Comparison**

Parameter*	Leduc County Land Use Bylaw	City of Edmonton Zoning Bylaw		
Land Use Designation	RM1 – Residential Multi Family District	RF5 – Row Housing Zone	RF6 – Medium Density Multiple Family Zone	RA7 – Low Rise Apartment Zone
Permitted Uses**	Dwelling, Apartment; Dwelling, Semi-detached; Dwelling, Townhouse; Home Occupation Type 1	Limited Group Homes; Minor Home Based Business; Row Housing; Semi-detached Housing	Limited Group Homes; Minor Home Based Business; Stacked Row Housing	Apartment Housing; Group Homes; Minor Home Based Business; Row Housing; Stacked Row Housing
Maximum Lot Size/Site Area	1.4 ha	1.4 ha	1.4 ha	1.4 ha
Maximum Density	95 dwelling units/ha	54 dwelling units/ha	105 dwelling units/ha	125 dwelling units/ha
Maximum Principal Building Height	Greater of 11.0 m or 3½ storeys	10.0 m or 2½ storeys	14.0 m or 4 storeys	14.0 m or 4 storeys
Maximum Site Coverage	50% of lot area (0.7 ha)	40% of lot area (0.56 ha)	40% of lot area (0.56 ha)	Not specified
Minimum Building Setbacks (for Principal Building)				
Road, Municipal Grid or Internal – Front/Side/Rear	6.0 m/ 3.0 m/ 6.0 m	5.5 m/ 4.5 m/ 7.5 m	6.0 m/ 4.5 m/ 7.5 m	6.0 m/ 4.5 m/ 7.5 m
Other lot – Side/Rear	3.0 m/ 6.0 m	1.2 m/ 7.5 m	2.0 m/ 7.5 m	2.0 m/ 7.5 m

\* Parameter values are listed generally for comparison and do not include all exceptions and conditions. Refer to the individual bylaws for complete descriptions of each land use/zoning designation.

\*\* Not all permitted uses have been listed

The City of Edmonton Design and Construction Standards (2008) lists a fire flow of 180 l/s for the RF5 land use designation and 300 l/s for the RF6 and RA7 land use designations. As shown by the comparison in Table 1, the Leduc County RM1 designation falls between these designations in terms of maximum dwelling units/hectare, building height and lot size. The multi-family residential fire flow required for the Goldman and Royal Oaks developments can reasonably be expected fall between 180 l/s and 300 l/s.

## 2.3 Comparison with Other Municipalities

Nearby municipalities list the following values as the required fire flow for multi-family residential sites or medium/high density residential sites in their respective design standards and guidelines documents:

- Town of Morinville – 115 l/s
- City of Leduc – 227 l/s
- Town of Beaumont – 180 l/s
- City of Fort Saskatchewan – 114 to 227 l/s

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The current Design Standards for Leduc County list 115 l/s as the fire flow for walk-up apartments. Since it has already been advised that this is too low for the intended development, we can disregard this value. The remaining fire flows range from 180 l/s to 227 l/s.

## **2.4 Fire Underwriter's Survey – Calculation 2**

A fire flow of 200 l/s was chosen as the approximate mean of the range of fire flows listed above. This fire flow would be adequate for a max floor area of 2800 m<sup>2</sup> (E.g. a 4 storey building with a 700 m<sup>2</sup> footprint, or a 3 storey building with a 933 m<sup>2</sup> footprint), based on the method outlined by the 1999 Fire Underwriter's Survey – Water Supply for Public Fire Protection and the following assumptions:

- Type of construction is wood frame
- Occupancies are combustible/medium fire hazard
- Sprinkler system is adequately designed and conforms to NFPA 13 and other NFPA sprinkler standards
- Adjacent structures are separated from the building by at least 45 m

Based on this review, a fire flow of 200 l/s was selected for the multi-family sites in Goldman and Royal Oaks to complete the hydraulic network analysis. If this fire flow is adopted for the multi-family sites, please be advised that the recommended max total floor area is 2800 square meters, with the assumptions listed above.

## **3.0 DESIGN CRITERIA**

Unless otherwise noted, all design criteria are taken from the Leduc County Design Guidelines and Construction Standards for Developments (2003). Design criteria are as follows:

### **3.1 Population**

- Number of single family residential lots provided by Scheffer Andrew Ltd.
- Number of multi-family residential dwelling units provided by Scheffer Andrew Ltd. (95 dwelling units/hectare)

### **3.2 Demand**

All demands taken from the Leduc County Utilities Master Plan (LCUMP) (Sameng Inc, 2009).

- Average Daily Demand (ADD) - Residential = 340 L/cap/day
- Maximum Daily Demand (MDD) = 680 L/cap/day
- Peak Hourly Demand (PHD) = 1360 L/cap/day

### **3.3 System Operation**

- Minimum residual pressure for MDD + fire flow = 22 psi
- Minimum residual pressure for PHD = 40 psi

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### 3.4 Fire Flows

Fire flows chosen as outlined above in "Selection of Fire Flows."

- Single family residential developments = 100 l/s
- Multi-family residential developments = 200 l/s

## 4.0 HYDRAULIC ANALYSIS AND MODEL RESULTS

The existing condition model as outlined in the LCUMP was adapted as a base model for this analysis. The proposed water servicing networks and demands for the following developments have been added to the existing model:

- WAM development sub-division and proposed Spine Road water main
- QE II sub-division
- Goldman and Royal Oaks developments

All scenarios were modeled and run in WaterCAD under the normal pump sequence operation mode (all pump are in service). See Table 2 for a summary of the results in the Goldman and Royal Oaks developments.

**Table 2: Summary of WaterCAD Model Results**

Scenario	MDD	Fire Flow		PHD
	Range of Residual Pressures (psi)	Meets Fire Flow Criteria?	Range of Fire Flows Available (l/s)	Range of Residual Pressures (psi)
1a	75.9 – 81.6	Yes	136.2 – 182.9	73.8 – 79.4
1b	75.9 – 81.6	Yes	156.8 – 190.5	73.8 – 79.4
1c	75.8 – 84.3	Yes	158.9 – 194.5	73.6 – 82.1
2a	72.1 – 80.6	No	83.0 – 180.7	70.5 – 79.0
2b	72.1 – 83.4	No	99.7 – 186.9	70.4 – 81.7
3a	71.5 – 81.4	No	81.8 – 178.2	66.1 – 75.8
3b	71.5 – 82.8	No	97.5 – 182.5	66.0 – 77.2
3c	74.7 – 86.3	Yes	136.8 – 401.4	74.2 – 86.2

## 5.0 DISCUSSION OF RESULTS

### 5.1 Goldman Stage I (Scenario 1a, 1b and 1c)

Scenario 1a, Scenario 1b and 1c met the minimum residual pressure design criteria for both MDD and PHD and provided the necessary fire flows. Therefore, in order to service Stage I of the Goldman subdivision connections can be made to the existing water mains in Diamond Estates to the north only. It will not be necessary to provide connections to Stage I of Royal Oaks to the east and to the proposed 600 mm water main south of the Goldman subdivision for the development of Goldman Stage I.

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## 5.2 Goldman Stage I plus Royal Oaks Ultimate Development (Scenario 2a and 2b)

Both Scenario 2a and 2b met the MDD and PHD minimum residual pressure criteria, but several junctions in Royal Oaks did not meet the fire flow criteria, with or without connection to the proposed 600 mm water main. Most of the junctions that do not meet the fire flow criteria are located on dead ends.

## 5.3 Ultimate Development of Goldman and Royal Oaks (Scenario 3a, 3b and 3c)

Both Scenario 3a and 3b met the MDD and PHD minimum residual pressure criteria, but junctions in both Goldman and Royal Oaks did not meet the fire flow criteria, with or without connection to the proposed 600 mm water main. Like Scenario 2, most of the junctions that do not meet the fire flow criteria are located on dead ends.

As shown on Figures 5 to 8, there are several junctions where the required fire flow is not available. The main reason for the discrepancy between required and available fire flow is the PRV installed in the West Reservoir with a setup point of 100 psi. In order to meet the required fire flow, the PRV setup point needs to be re-adjusted to a higher value. However, this will increase the residual pressure in the County's entire water network significantly. Alternatively providing looping at dead ends in the proposed network in the future, increasing the pipe diameters within Diamond Estates subdivision (the diameter of part of the main line is 150 mm) and/or adding a booster station within the subdivisions might allow for the required fire flows.

Scenario 3c met the minimum residual pressure design criteria for both MDD and PHD and provided the necessary fire flows.

## 6.0 BOUNDARY CONDITIONS

The boundary conditions for the Goldman and Royal Oaks developments for each scenario are summarized in Table 3.

**Table 3: Boundary Conditions**

Existing Junction	LII-35	Goldman J-5	Goldman J-9	Goldman J-10	Royal Oaks J-23	Royal Oaks J-31	Royal Oaks J-32	Royals Oaks J-34
<b>Scenario 1a</b>								
Hydraulic Grade Line, MDD + Fire Flow (m)	764.48	764.03	764.00	n/a	n/a	764.51	764.51	764.51
Hydraulic Grade Line, PHD (m)	762.93	761.83	761.76	n/a	n/a	763.00	763.00	763.00
<b>Scenario 1b</b>								
Hydraulic Grade Line, MDD + Fire Flow (m)	764.49	764.03	764.00	n/a	n/a	764.50	764.50	764.51
Hydraulic Grade Line, PHD (m)	762.95	761.85	761.78	n/a	n/a	762.99	762.99	762.99
<b>Scenario 1c</b>								
Hydraulic Grade Line, MDD + Fire Flow (m)	764.45	764.43	764.43	764.43	n/a	764.46	764.46	764.46
Hydraulic Grade Line, PHD (m)	762.85	762.81	762.81	762.81	n/a	762.88	762.88	762.89

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Existing Junction	LII-35	Goldman J-5	Goldman J-9	Goldman J-10	Royal Oaks J-23	Royal Oaks J-31	Royal Oaks J-32	Royals Oaks J-34
Scenario 2a								
Hydraulic Grade Line, MDD + Fire Flow (m)	763.84	763.54	763.52	n/a	n/a	763.85	763.85	763.85
Hydraulic Grade Line, PHD (m)	762.67	762.53	762.52	n/a	n/a	762.65	762.65	762.66
Scenario 2b								
Hydraulic Grade Line, MDD + Fire Flow (m)	763.79	763.77	763.77	763.77	763.77	763.80	763.80	763.80
Hydraulic Grade Line, PHD (m)	762.62	762.59	762.59	762.59	762.59	762.63	762.63	762.63
Scenario 3a								
Hydraulic Grade Line, MDD + Fire Flow (m)	763.37	763.33	763.34	n/a	n/a	763.39	763.39	763.40
Hydraulic Grade Line, PHD (m)	759.47	759.39	759.38	n/a	n/a	759.53	759.53	759.55
Scenario 3b								
Hydraulic Grade Line, MDD + Fire Flow (m)	763.36	763.34	763.34	763.34	763.34	763.39	763.39	763.39
Hydraulic Grade Line, PHD (m)	759.46	759.39	759.39	759.39	759.39	759.53	759.53	759.54
Scenario 3c								
Hydraulic Grade Line, MDD + Fire Flow (m)	765.74	765.81	765.85	765.85	765.84	765.67	765.67	765.66
Hydraulic Grade Line, PHD (m)	765.46	765.62	765.72	765.70	765.70	765.29	765.29	765.28

**URBAN SYSTEMS LTD.**


Mohammed Elenany, Ph.D., P.Eng.  
 Project Manager



April 29, 2013



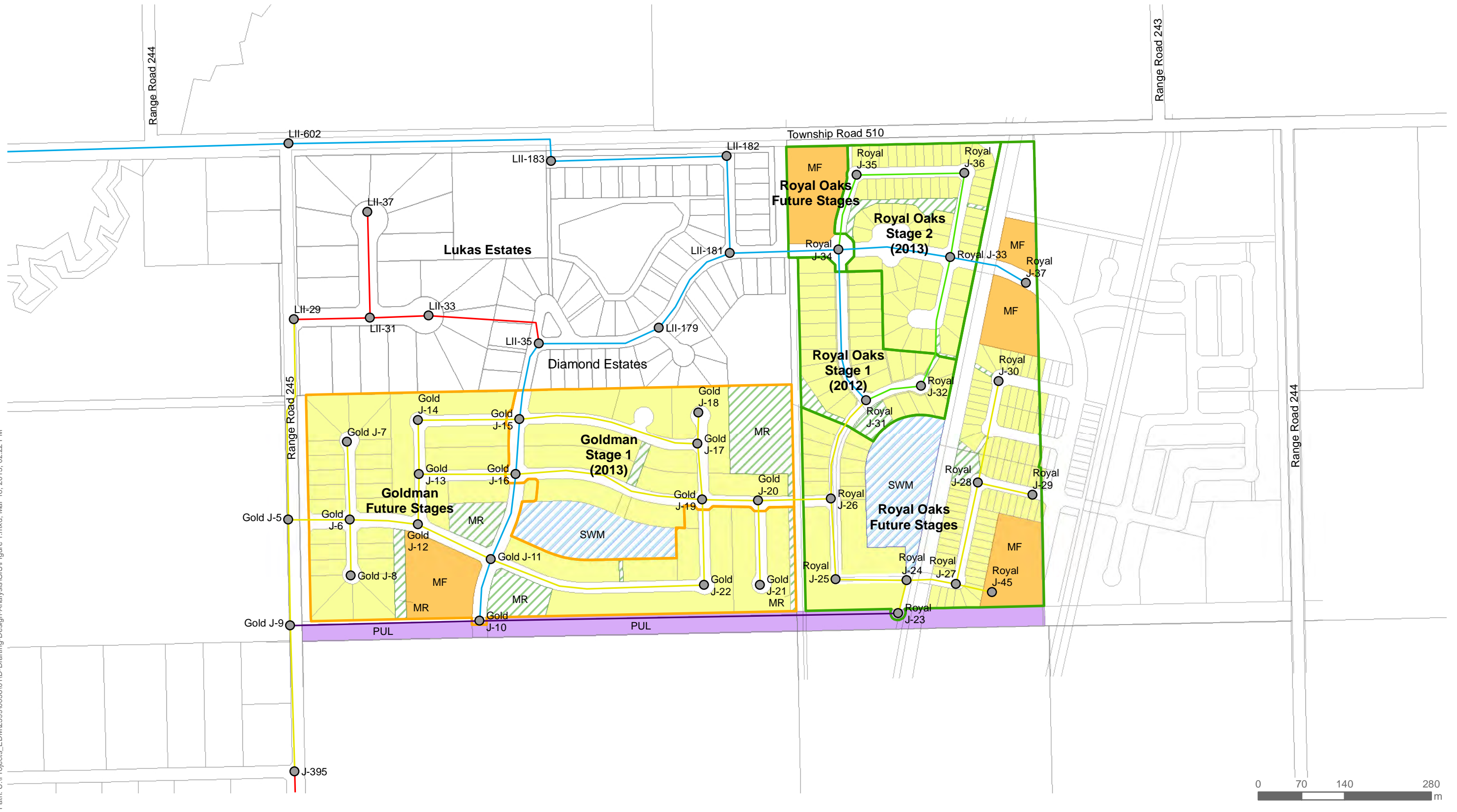
Andrea McKenzie, EIT  
 Project Engineer

/am, me

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#### Key

##### Pipes by Diameter (mm)

- 150
- 200
- 250
- 300
- 600

##### Nodes

- Development Stages
  - Goldman
  - Royal Oaks

##### Land Uses

- Multi-family Residential
- Municipal Reserve
- Public Utility Lot
- Single Family Residential
- Stormwater Management

Date  
2013.03.18

Project No.  
2599.0058.01



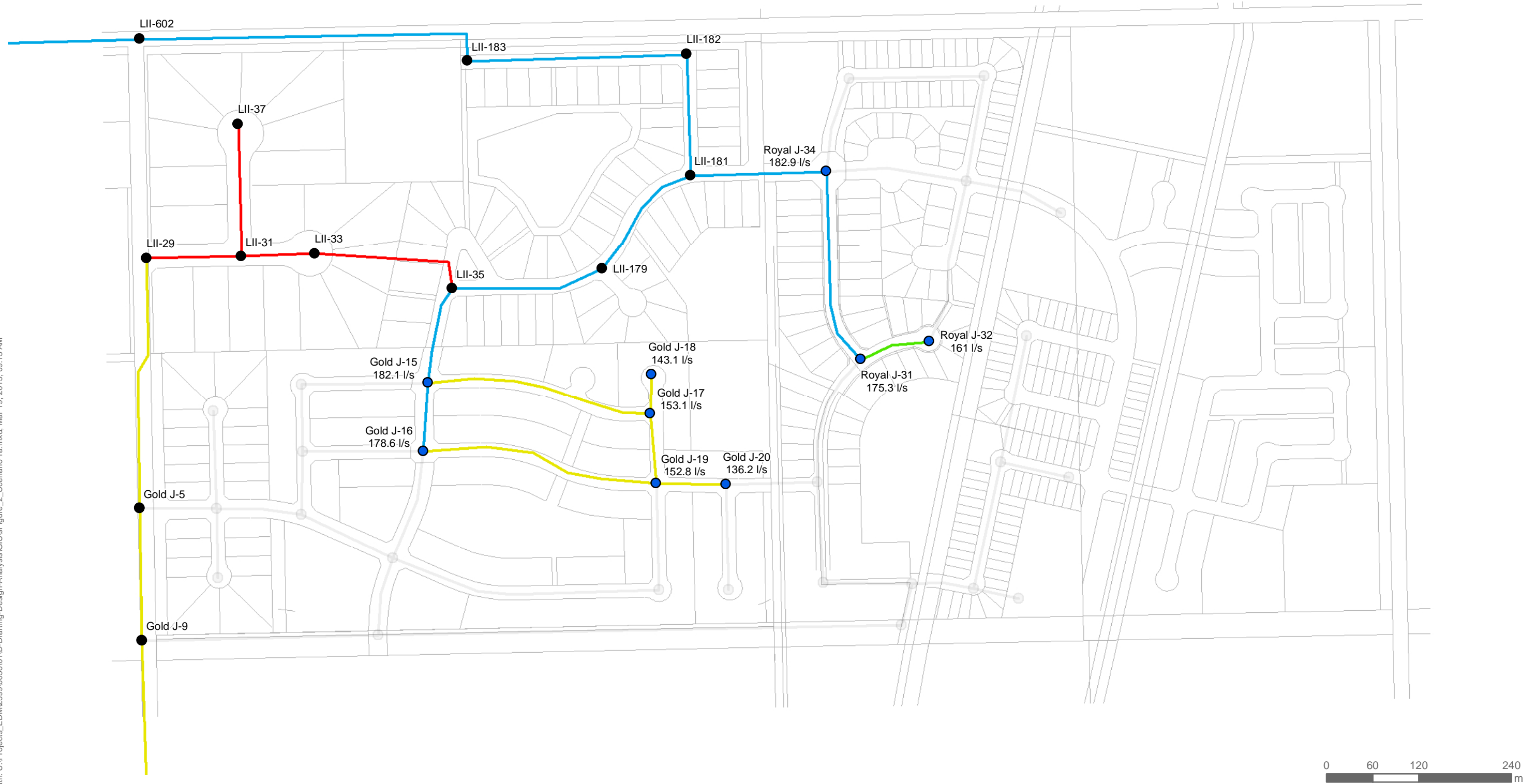
## Leduc County HNA Goldman and Royal Oak Development

### Area Map

Figure  
**1**



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Date  
2013.03.19  
Project No.  
2599.0058.01

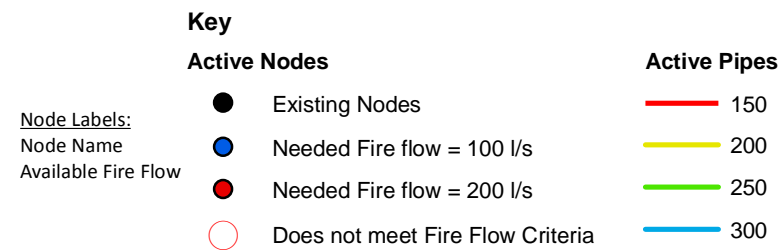
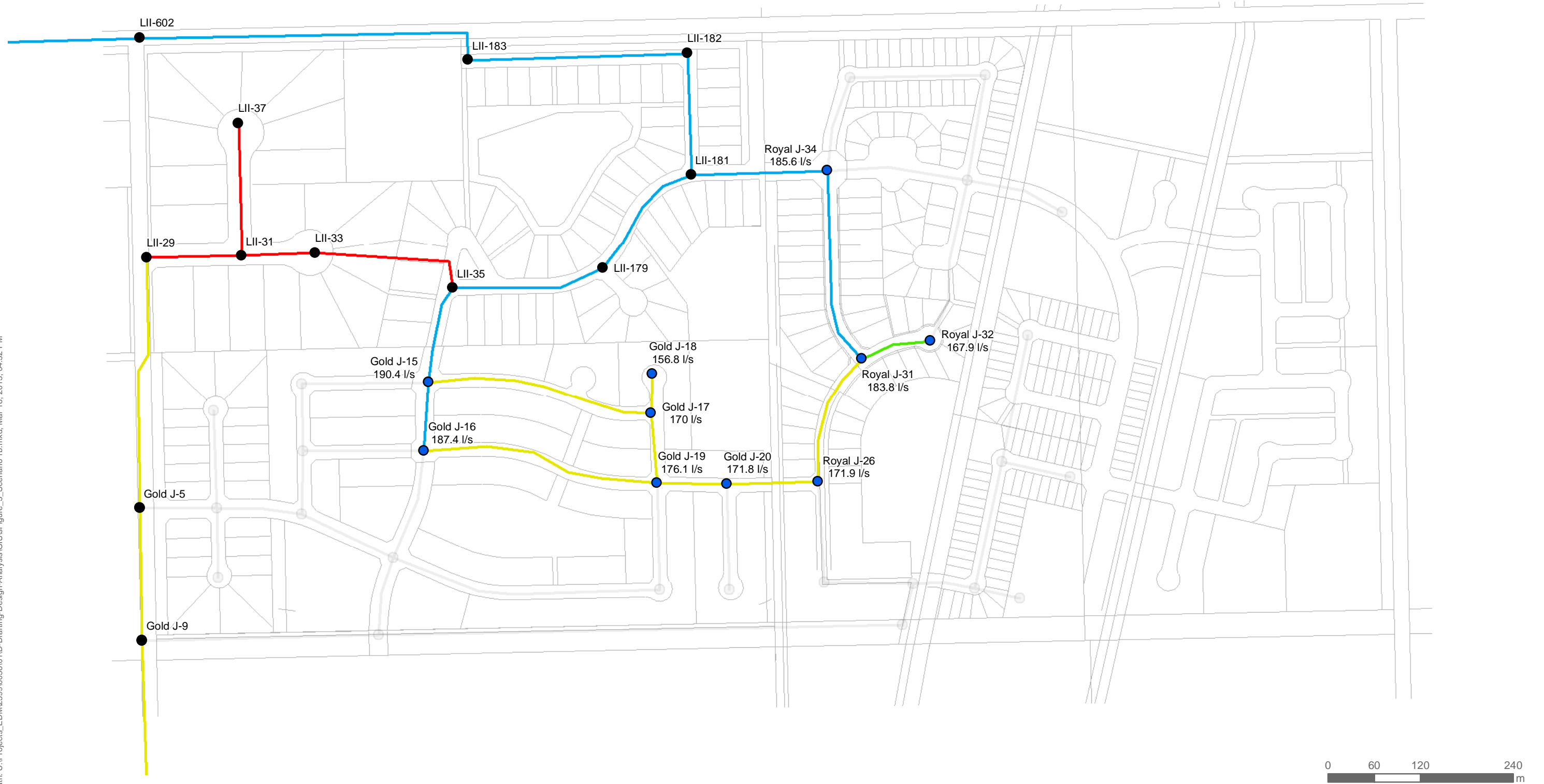


## Leduc County HNA Goldman and Royal Oak Development

Scenario 1a

Figure  
**2**

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Date  
2013.03.19

Project No.  
2599.0058.01

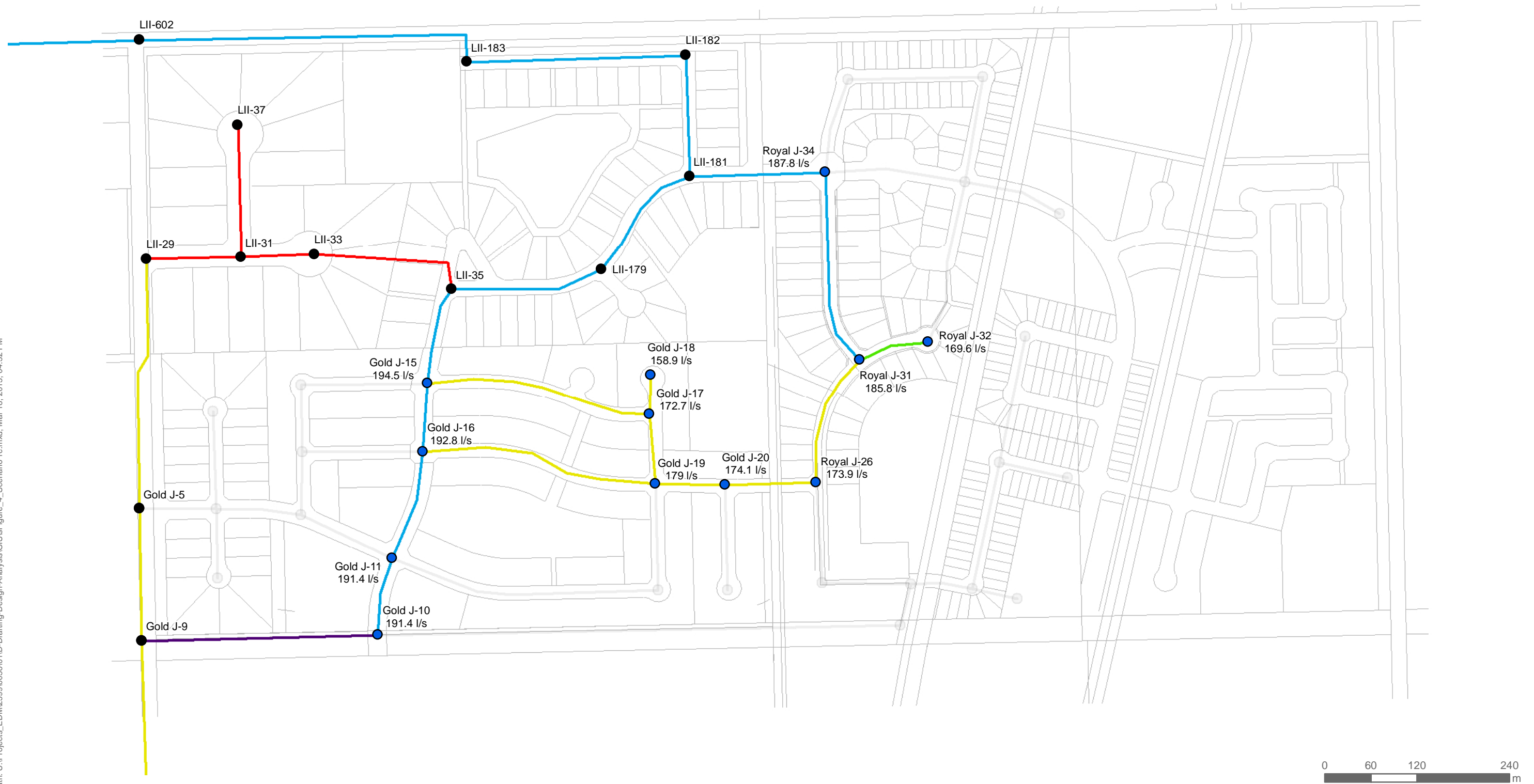


## Leduc County HNA Goldman and Royal Oak Development

Scenario 1b

Figure  
**3**

Path: U:\Projects\_EDM\2599\0058\01\1D-Drafting-Design-Analysis\GIS\Figure\_4\_Scenario 1c.mxd; Mar 18, 2013, 04:32 PM



Date  
2013.03.19

Project No.  
2599.0058.01

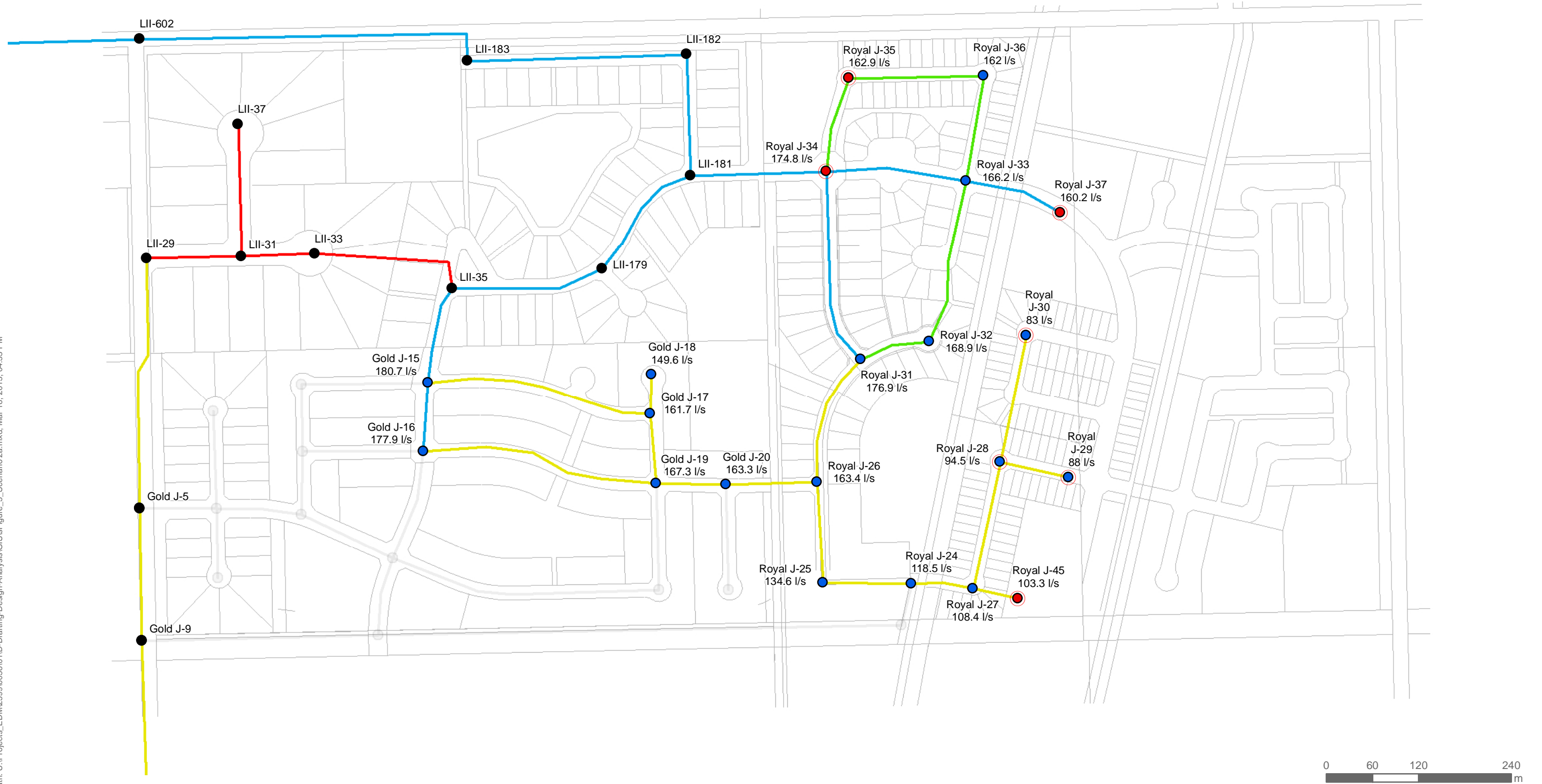


## Leduc County HNA Goldman and Royal Oak Development

Scenario 1c

Figure  
**4**

Path: U:\Projects\_EDM\2599\0058\01\1D-Drafting-Design-Analysis\GIS\Figure\_5\_Scenario 2a.mxd; Mar 18, 2013, 04:33 PM



Date  
2013.03.19  
Project No.  
2599.0058.01

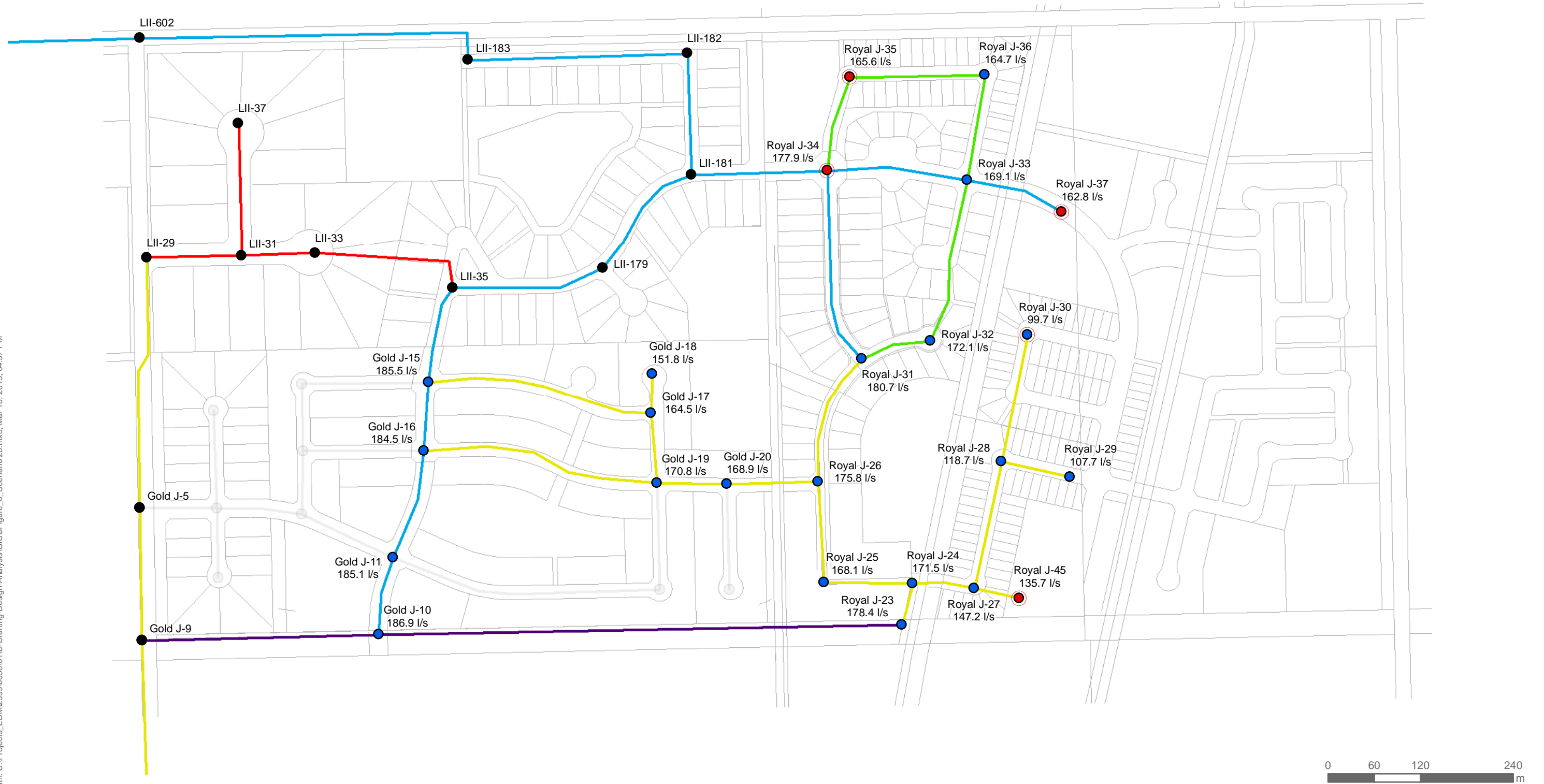


## Leduc County HNA Goldman and Royal Oak Development

Scenario 2a

Figure  
5

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**Key**

**Active Nodes**

- Existing Nodes
- Needed Fire flow = 100 l/s
- Needed Fire flow = 200 l/s
- Does not meet Fire Flow Criteria

**Active Pipes**

- 150
- 200
- 250
- 300
- 600

Node Labels:  
Node Name  
Available Fire Flow

Date  
2013.03.19

Project No.  
2599.0058.01



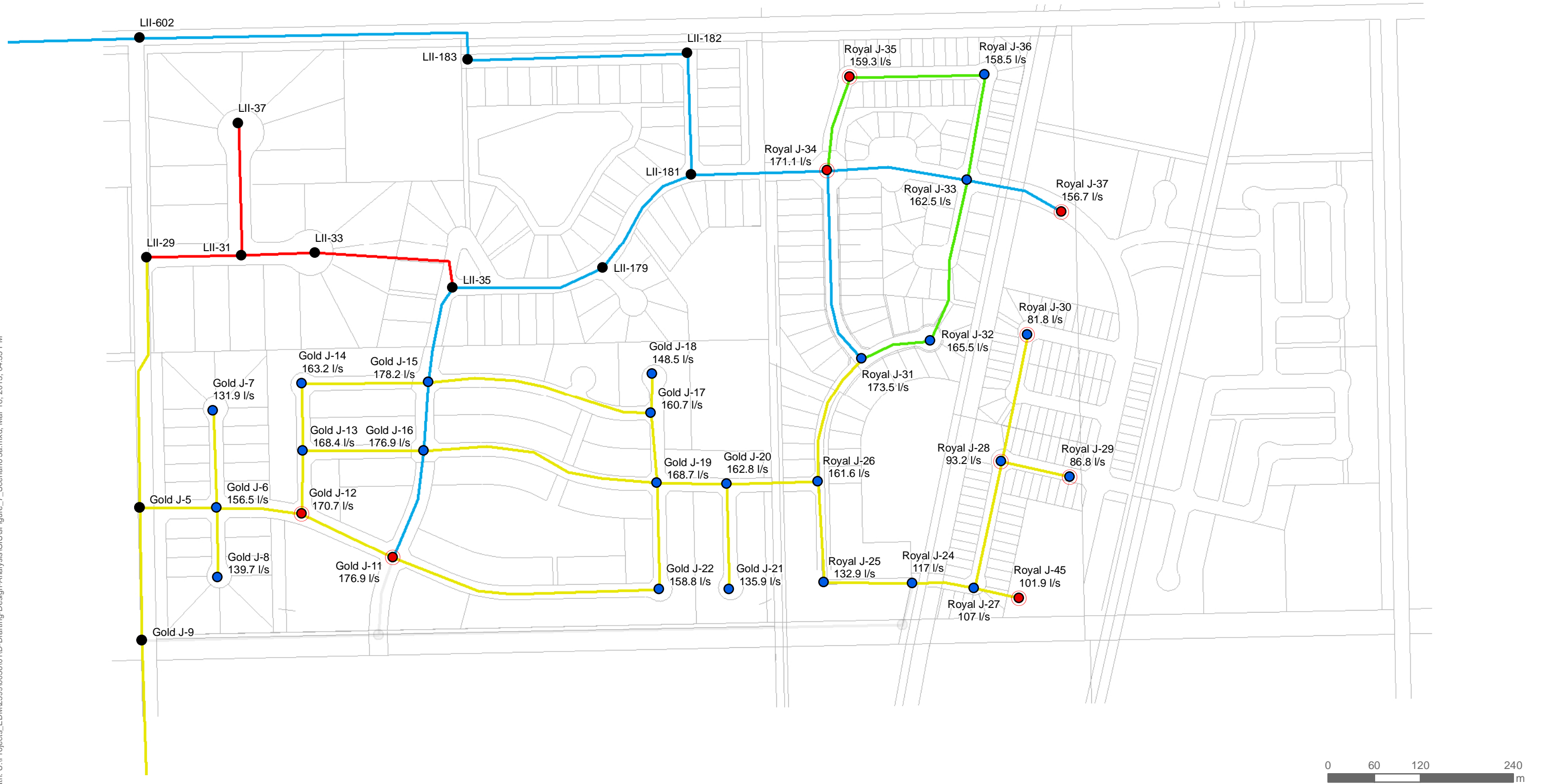
**Leduc County HNA  
Goldman and Royal Oak  
Development**

**Scenario 2b**

Figure  
**6**



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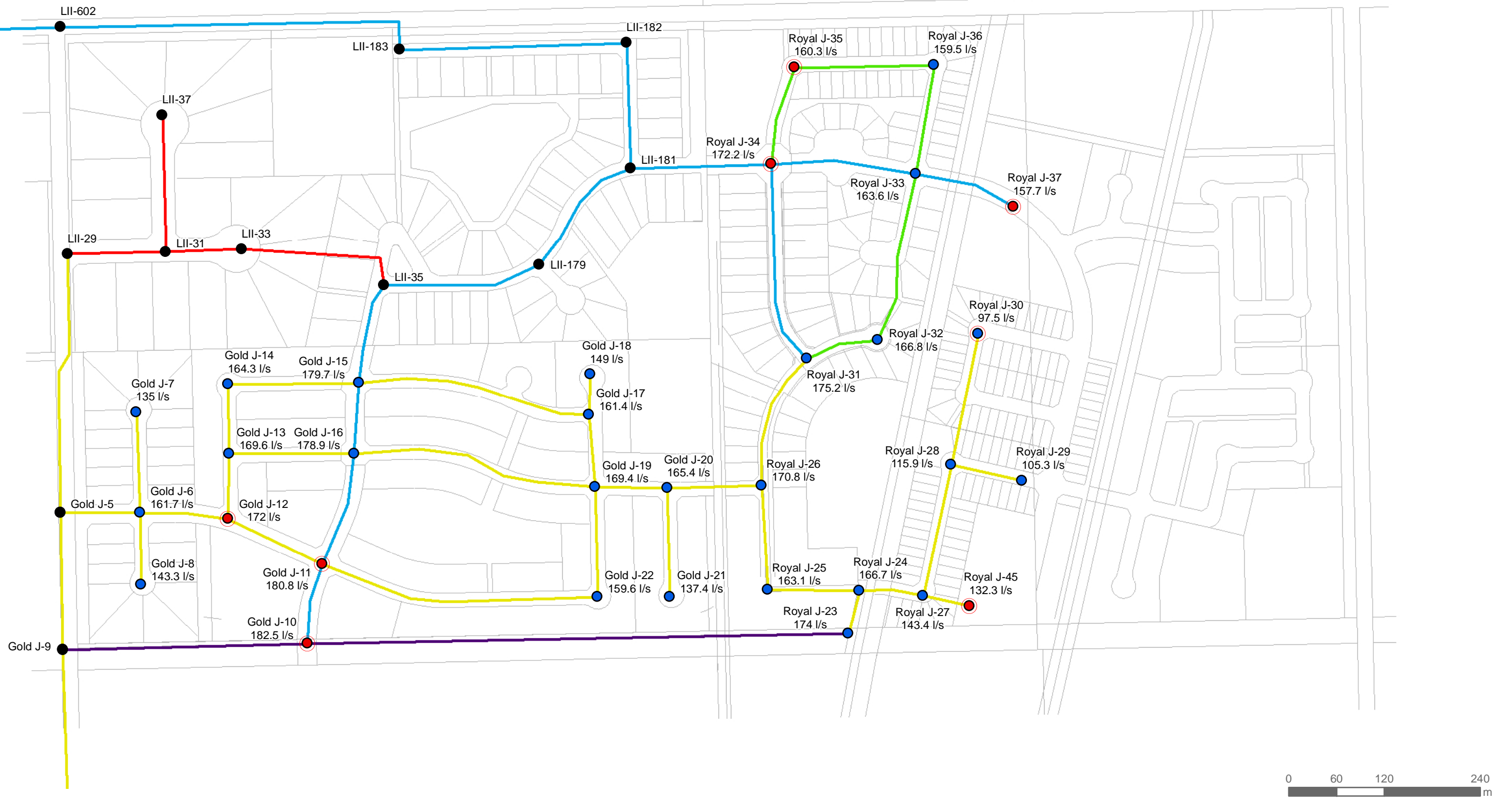
## Leduc County HNA Goldman and Royal Oak Development

Scenario 3a

Figure  
7



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#### Key

##### Active Nodes

- Existing Nodes
- Needed Fire flow = 100 l/s
- Needed Fire flow = 200 l/s
- Does not meet Fire Flow Criteria

##### Active Pipes

- 150
- 200
- 250
- 300
- 600

Node Labels:  
Node Name  
Available Fire Flow

Date  
2013.03.19

Project No.  
2599.0058.01



## Leduc County HNA Goldman and Royal Oak Development

Scenario 3b

Figure

8



## Appendix D

### Detailed Sanitary Sewer Calculations

STAGE 1







## Appendix E

### Detailed Storm Sewer Calculations

PRELIMINARY ON-SITE STORM SEWER DESIGN SHEET FOR 1:5 YEAR EVENT

PROJECT:  
JOB # :  
DATE:  
DESIGN BY:  
CHECKED BY:

Churchill Meadow - Outline Plan  
1111-01-2.1  
02-Apr-14  
EC  
AL

UPDATED:  
BY:  
CHECKED BY:

16-Mar-15  
CS  
CS

LAND USE    "C"  
S.F. 0.65  
Estate S.F. 0.50  
MF 0.65  
MR 0.20

Initial Time of Concentration = 8.0 min  
Mannings' 'n' = 0.013

All data/calculations subject to change, and is subject to detailed design and review at the time of engineering drawing submission(s) to Leduc County.

Location of Line	From MH	To MH	Incr. Area #	Added Area (ha)	Total Area Added (ha)	Runoff Factor "C"	Equiv. Area (ha)	Total Eq. Area (ha)	Conc. Time,Tc (min)	5 yr I (mm/h)	Design Flow,Q (L/s)	Trunk Safety Factor	Required Capacity (L/s)	Slope (%)	Dia. (mm)	Vel. (m/s)	Length (m)	Flow Time (min)	Pipe Capacity (L/s)	U/S Inv Elev	D/S Inv Elev	U/S Grnd Elev	U/S Cover To OBV (m)
Foundation Drain	D08B	D08		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	33.0	0.8	22	703.131	702.999	706.61	3.28
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
	D08A	D08	V	0.000	0.000	0.500	0.000	0.000	8.0	77.0	97	1.00	97	0.30	375	0.88	42.2	0.8	100	702.951	702.824	706.20	2.87
				0.000	0.000	0.200	0.000	0.000															
				0.700	0.700	0.650	0.455	0.455															
				0.700																			
	D08	D09		0.000	0.000	0.500	0.000	0.000	8.8	73.0	92	1.00	92	0.27	450	0.94	113.2	2.0	154	702.749	702.443	706.44	3.24
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.700	0.650	0.000	0.455															
				0.700																			
Foundation Drain	D11	D10		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	126.2	3.2	22	703.335	702.830	706.55	3.01
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
	D10	D09	F	0.000	0.000	0.500	0.000	0.000	11.2	63.0	88	1.00	88	0.20	450	0.81	140.0	2.9	133	702.580	702.300	706.13	3.10
				0.000	0.000	0.200	0.000	0.000															
				0.770	0.770	0.650	0.501	0.501															
				0.770																			
(1:100 Year Storm)	Ditch Inlet	D09	BB BB BB	1.500	1.500	0.625	0.938	0.938	27.4	70.0	563	1.25	704	1.25	600	2.46	35.0	0.2	717	702.280	701.842		
				2.980	2.980	0.250	0.745	0.745															
				1.490	1.490	0.813	1.211	1.211															
				5.970																			
	D09	Inlet #1	E	0.000	1.500	0.500	0.000	0.938	14.1	56.0	662	1.00	662	2.79	600	3.67	59.6	0.3	1072	701.812	700.150	705.78	3.37
				0.000	2.980	0.200	0.000	0.745															
				0.620	3.580	0.650	0.403	2.569															
				8.060																			
	D25	D23	CC2	0.000	0.000	0.500	0.000	0.000	8.0	77.0	27	1.00	27	1.00	300	1.38	51.0	0.6	101	703.860	703.350	707.20	3.04
				0.620	0.620	0.200	0.124	0.124															
				0.000	0.000	0.650	0.000	0.000															
				0.620																			
Foundation Drain	D24	D23		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	58.0	1.4	22	703.182	702.950	707.62	4.24
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
	D14	D13	CC1	0.000	0.000	0.500	0.000	0.000	8.0	77.0	7	1.00	7	0.80	300	1.24	53.0	0.7	90	703.455	703.031	707.43	3.67
				0.160	0.160	0.200	0.032	0.032															
				0.000	0.000	0.650	0.000	0.000															
				0.160																			
	D15	D13	K	0.000	0.000	0.500	0.000	0.000	8.0	77.0	131	1.00	131	0.20	450	0.81	95.1	2.0	133	702.721	702.531	706.29	3.12
				0.000	0.000	0.200	0.000	0.000															
				0.938	0.938	0.650	0.610	0.610															
				0.938																			
	D23	D13	J	0.000	0.000	0.500	0.000	0.000	9.4	70.0	122	1.00	122	0.20	450	0.81	84.6	1.7	133	702.700	702.531	707.30	4.15
				0.000	0.620	0.200	0.000	0.124															
				0.770	0.770	0.650	0.501	0.501															
				1.390																			
	D13	D12	I	0.000	0.000	0.500	0.000	0.000	11.1	64.0	299	1.00	299	0.25	600	1.10	68.4	1.0	321	702.381	702.210	706.74	3.76
				0.000	0.780	0.200	0.000	0.156															
				0.640	2.348	0.650	0.416	1.526															
				3.128																			
	D11	D12	G	0.000	0.000	0.500	0.000	0.000	8.0	77.0	54	1.00	54	0.20	375	0.72	65.0	1.5	82	702.505	702.375	706.55	3.67
				0.000	0.000	0.200	0.000	0.000															
				0.390	0.390	0.650	0.254	0.254															
				0.390																			
	D12	Inlet #2	H	0.000	0.000	0.500	0.000	0.000	12.1	61.0	393	1.00	393	7.75	600	6.11	21.6	0.1	1787	702.150	700.475	706.18	3.43
				0.000	0.780	0.200	0.384	0.156															
				0.590	3.328	0.650	0.384	2.163															
				4.108																			
Foundation Drain	D15	D16		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	143.9	3.6	22	703.341	702.765	706.29	2.75
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
Foundation Drain	D17	D18		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	75.8	1.9	22	703.169	702.866	706.23	2.86
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
Foundation Drain	D17	D16		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	88.1	2.2	22	703.117	702.765	706.23	2.91
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
Foundation Drain	D23	D22		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	98.2	2.5	22	704.428	704.035	707.30	2.67
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
Foundation Drain	D35	D22		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	51.1	1.3	22	704.239	704.035	706.81	2.37
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
	D22	D21/D20C	U	0.000	0.000	0.500	0.000	0.000	10.5	66.0	163	1.00	163	0.45	450	1.22	101.9	1.4	199	703.785	703.326	706.52	2.28
				0.000	0.000	0.200	0.000	0.000															
				1.370	1.370	0.650	0.891	0.891															
				1.370																			
Foundation Drain	D20	D20B		0.000	0.000	0.500	0.000	0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	60.0	1.5	22	703.698	703.458	706.51	2.61
				0.000	0.000	0.200	0.000	0.000															
				0.000	0.000	0.650	0.000	0.000															
				0.000																			
	D20B	D21/D20C	S	0.000	0.000	0.500	0.000	0.000	9.5	70.0	99	1.00	99	0.15	450	0.70	86.4	2.1	115	703.456	703.326	706.36	2.45
				0.000	0.000	0.200	0.000	0.000															
				0.780	0.780	0.650	0.507	0.507															
				0.780																			
	D21/D20C	D16	T	0.000	0.000	0.500	0.000	0.000	11.9	61.0	365	1.00	365	0.93	525	1.94	84.0	0.7	432	703.251	702.470	706.36	2.58
				0.000	0.000	0.200	0.000	0.000															
				1.160	3.310	0.650	0.754	2.152															
				3.310																			
	D16	Inlet #4	L	0.000	0.000	0.500	0.000	0.000	12.6	59.0	428	1.00	428	3.29	525	3.64	69.7	0.3	812	702.440	700.150	706.26	3.29
				0.000	0.000	0.200	0.000	0.000															
				0.707	4.017	0.650	0.460	2.611															
				4.017																			
Foundation Drain	D33	D32		0.000	0.000	0.500																	



PRELIMINARY ON-SITE STORM SEWER DESIGN SHEET FOR 1:5 YEAR EVENT

PROJECT: Churchill Meadow - Outline Plan

JOB #: 1111-01-2.1

DATE: 02-Apr-14

DESIGN BY: EC

CHECKED BY: AL

UPDATED: 16-Mar-15

BY: CS

CHECKED BY: CS

LAND USE "C"

S.F. 0.65

Estate S.F. 0.50

MF 0.65

MR 0.20

Initial Time of Concentration = 8.0 min

Mannings' 'n' = 0.013

All data/calculations subject to change, and is subject to detailed design and review at the time of engineering drawing submission(s) to Leduc County.

Location of Line	From MH	To MH	Incr. Area #	Added Area (ha)	Total Area Added (ha)	Runoff Factor "C"	Equiv. Area (ha)	Total Eq. Area (ha)	Conc. Time,Tc (min)	5 yr I (mm/h)	Design Flow,Q (L/s)	Trunk Safety Factor	Required Capacity (L/s)	Slope (%)	Dia. (mm)	Vel. (m/s)	Length (m)	Flow Time (min)	Pipe Capacity (L/s)	U/S Inv Elev	D/S Inv Elev	U/S Grnd Elev	U/S Cover To OBV (m)
Foundation Drain	D20	D19	R	0.000 0.000 0.540	0.000 0.000 0.540	0.500 0.200 0.650	0.000 0.000 0.351	0.000 0.000 0.351	8.0	77.0	75	1.00	75	0.20	375	0.72	51.1	1.2	82	703.283	703.181	706.51	2.85
	D33	D27		0.000 0.000 0.000	0.000 0.000 0.000	0.500 0.200 0.650	0.000 0.000 0.000	0.000 0.000 0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	92.7	2.3	22	703.835	703.464	707.60	3.56
	D27	D26	P	0.000 0.000 1.500	0.000 0.000 1.500	0.500 0.200 0.650	0.000 0.000 0.975	0.000 0.000 0.975	10.3	67.0	182	1.00	182	0.25	525	1.00	72.2	1.2	224	703.139	702.958	707.03	3.37
Foundation Drain	D26	D19	G	0.000 0.000 1.000	0.000 0.000 2.500	0.500 0.200 0.650	0.000 0.000 0.650	0.000 0.000 1.625	11.5	63.0	285	1.00	285	0.25	600	1.10	106.1	1.6	321	702.883	702.618	707.25	3.77
	D19	D18		0.000 0.000 0.000	0.000 0.000 3.040	0.500 0.200 0.650	0.000 0.000 0.000	0.000 0.000 1.976	13.1	58.0	319	1.00	319	0.18	675	1.01	84.3	1.4	372	702.543	702.391	707.15	3.93
	D30	D29		0.000 0.000 0.000	0.000 0.000 0.000	0.500 0.200 0.650	0.000 0.000 0.000	0.000 0.000 0.000	8.0	77.0	0	1.00	0	0.55	200	0.78	60.3	1.3	25	703.298	702.966	706.28	2.78
Foundation Drain	D29	D28	O	0.000 0.000 0.730	0.000 0.000 0.730	0.500 0.200 0.650	0.000 0.000 0.475	0.000 0.000 0.475	9.3	71.0	94	1.00	94	0.35	375	0.95	81.4	1.4	108	702.791	702.506	706.33	3.16
	D28A	D28		0.000 0.000 0.000	0.000 0.000 0.000	0.500 0.200 0.650	0.000 0.000 0.000	0.000 0.000 0.000	8.0	77.0	0	1.00	0	0.40	200	0.67	34.0	0.9	22	702.817	702.681	707.15	4.13
	D28	D18		0.000 0.000 0.000	0.000 0.000 0.730	0.500 0.200 0.650	0.000 0.000 0.000	0.000 0.000 0.475	10.7	65.0	86	1.00	86	0.15	450	0.70	72.9	1.7	115	702.431	702.322	706.93	4.05
Foundation Drain	D18	D06	M	0.000 0.000 1.780	0.000 0.000 5.550	0.500 0.200 0.650	0.000 0.000 1.157	0.000 0.000 3.608	16.6	50.0	501	1.00	501	0.31	750	1.42	48.3	0.6	647	702.316	702.166	705.85	2.78
	D06	Inlet #3	N	0.000 0.000 0.410	0.000 0.000 10.460	0.500 0.200 0.650	0.000 0.000 0.267	0.000 0.000 6.799	17.2	49.0	926	1.00	926	2.15	750	3.73	39.1	0.2	1702	702.150	701.311	705.53	2.63
Outlet #1		CS							1:100 yr 101 1.25 per County spec. 126					6.25 450 4.53 24.4 0.1 743					700.625 702.150				
		CS D03A							1:100 yr 101 1.25 per County spec. 126					0.25 450 0.91 37.0 0.7 149					701.988 701.895 706.05 3.61				
		D03A Trunk							1:100 yr 101 1.25 per County spec. 126					0.25 450 0.91 106.0 1.9 149					701.865 701.600 706.20 3.88				