

# Providence Area

## Objection to Proposed Bylaws

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**Bylaw 8P2019 Providence ASP MDP Requirement**

**Bylaw 31D2019 Dream Outline Plan Redesignation  
Application**

**Feb 4, 2019- Combined Council Meeting and Public Hearing Item  
#8.2.2**

**LOC2017-0308, CPC2018-1359**



Source: "Dream Developments Consultant, EXP Providence Sanitary Sewer Servicing Study, 2016-05-12

# Bylaw Objection:

## Draft MDP and Approved SMDP

### Predict Extensive Flooding to Our Property

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- Providence Master Drainage Plan (Regional Drainage Plan)
  - Not Completed, Approved, Draft is seriously flawed
  - Draft has Bad Data, Bad Model Results
  - Data/Model so Flawed, it was Rejected for Years by City Water Resources Dept.
- The Staged Master Drainage Plan (Portion OF Master Drainage Plan)
  - Not separate, Isolated study area, it is derived from the MDP
  - Contains same Input Data Errors and Modelling Contradictions as the MDP
  - Should be more detailed and rigorous
  - Is inter-connected to drainage across Brodylo-Qualico-Dream Lands



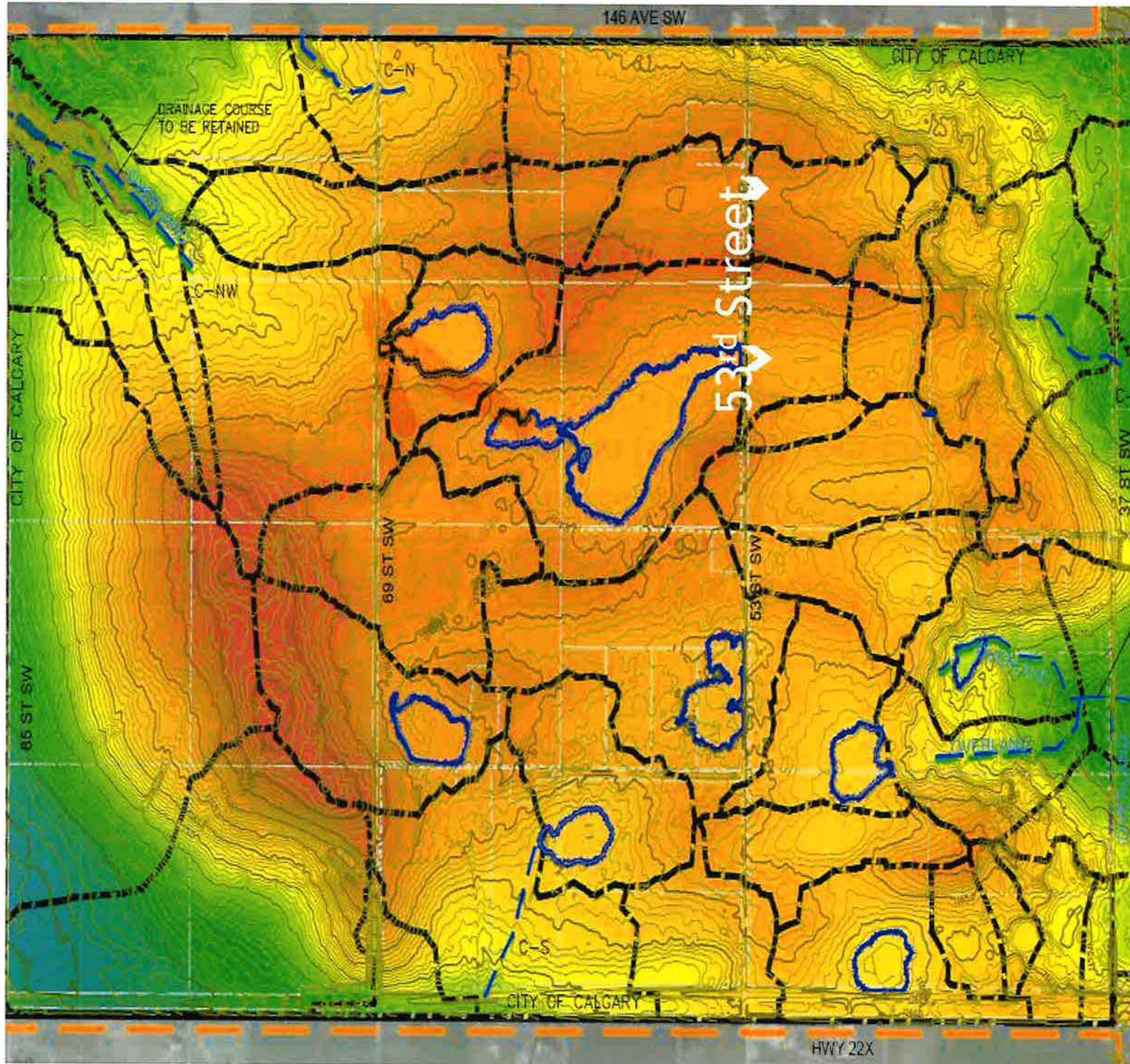


# Providence Area Annexed in 1989



- City of Calgary Imposed a 30 year Moratorium on Subdivision
  - Prevent Acreage Development
  - Financial Cost Born by Original Farmland owners
- Allow City to Plan For and Implement Proper Drainage that follows natural topography unimpeded by patchwork development
- Provides the City a Blank Slate, Huge Opportunity to 'Do It Right'
  - To Approve patchwork developments that chop up drainage, impound water and flood offsetting landowners is contrary to City of Calgary Storm Water Management and Design Manual Policy, Planning Policy, Roads Policy, Provincial Policy and Best Practices.



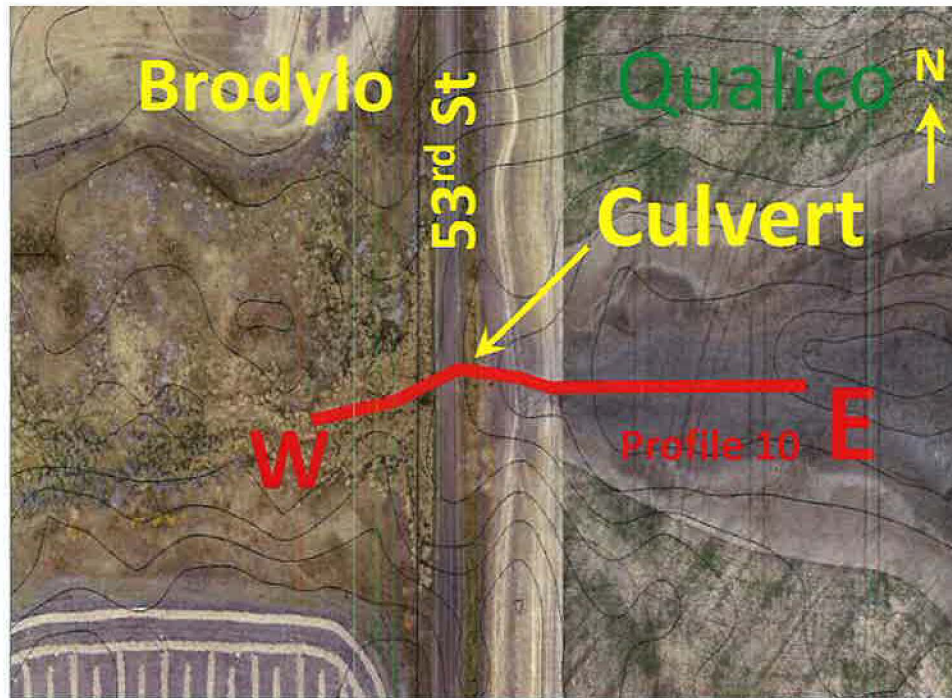


**CATCHMENT  
AREAS FROM  
EXP DRAFT  
MASTER  
DRAINAGE  
PLAN:**

**NOTE 53<sup>RD</sup>  
STREET USED  
AS A BOUNDARY**

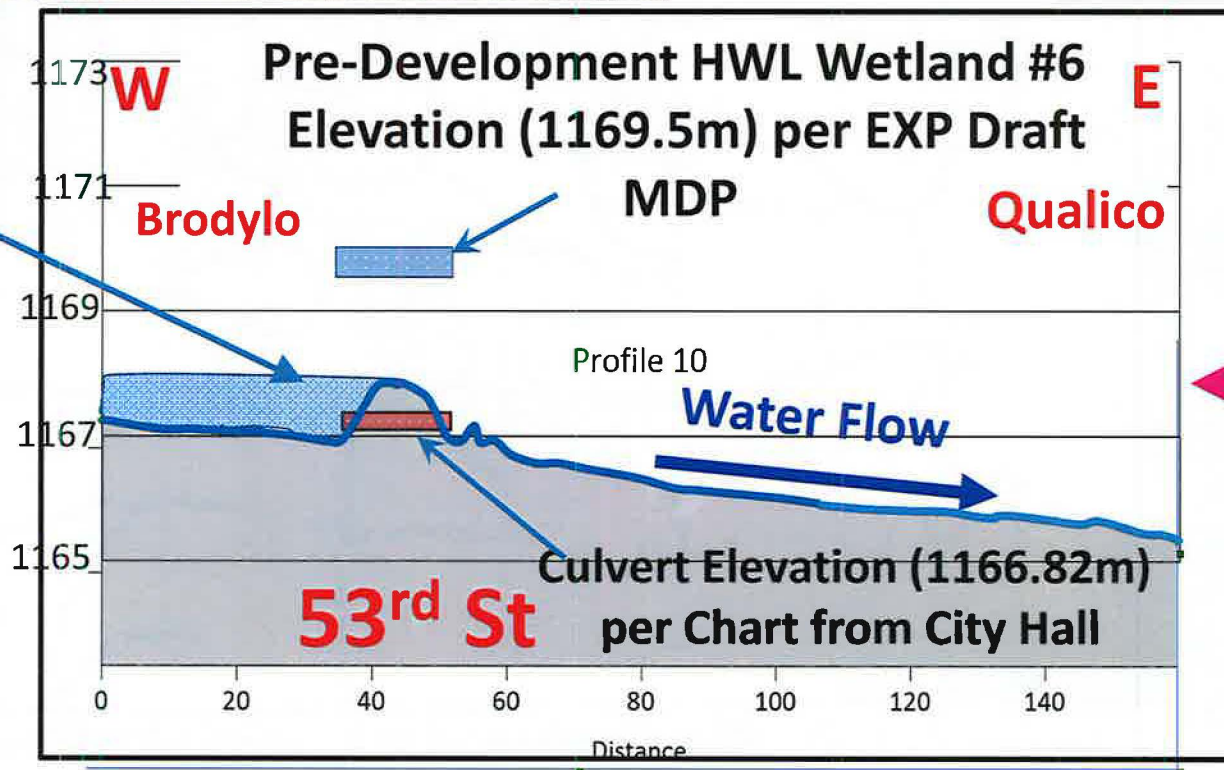
**CONTRARY TO  
CITY, PROVINCIAL  
REGULATION,  
POLICY AND BEST  
PRACTICES**





**Culvert Profile  
at 53<sup>rd</sup> Street  
SW Between  
Brodylo  
Wetland (#6)  
and Lake  
Qualico**

**Water Was  
Impounded by  
Blocked and  
Partially  
Blocked  
Culvert During  
Piezometric  
Water  
Measurment  
for Draft MDP**



**Elevation of  
the Top of  
the Road  
53<sup>rd</sup> Street SW  
= 1168m**



146 AVE SW

**DRAFT MDP MODEL  
STATES**

**NORMAL HIGH WATER  
LEVEL FOR OUR  
WETLAND = 1169.5M  
ELEVATION**

**SPILL POINT =  
TOP OF ROAD AT 53<sup>RD</sup>  
STREET  
1168M ELEVATION**

**CULVERT SPILL POINT  
= 1166.8M ELEVATION  
1.5 M ABOVE ROAD  
2.7 M ABOVE CULVERT**

DRAINAGE COURSE  
TO BE RETAINED

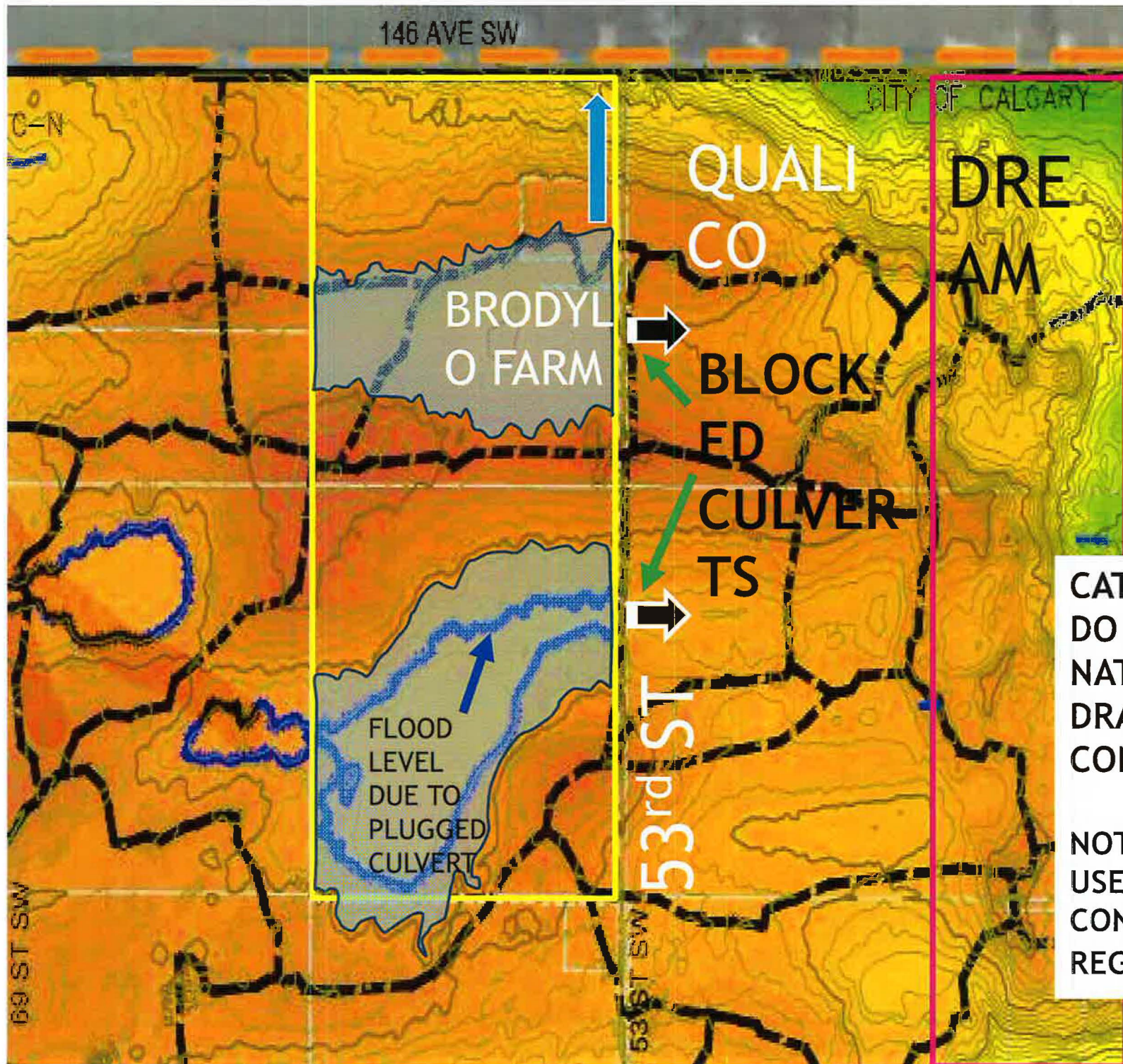
69 ST SW

53 ST SW

CITY OF CALGARY

HWY 22X



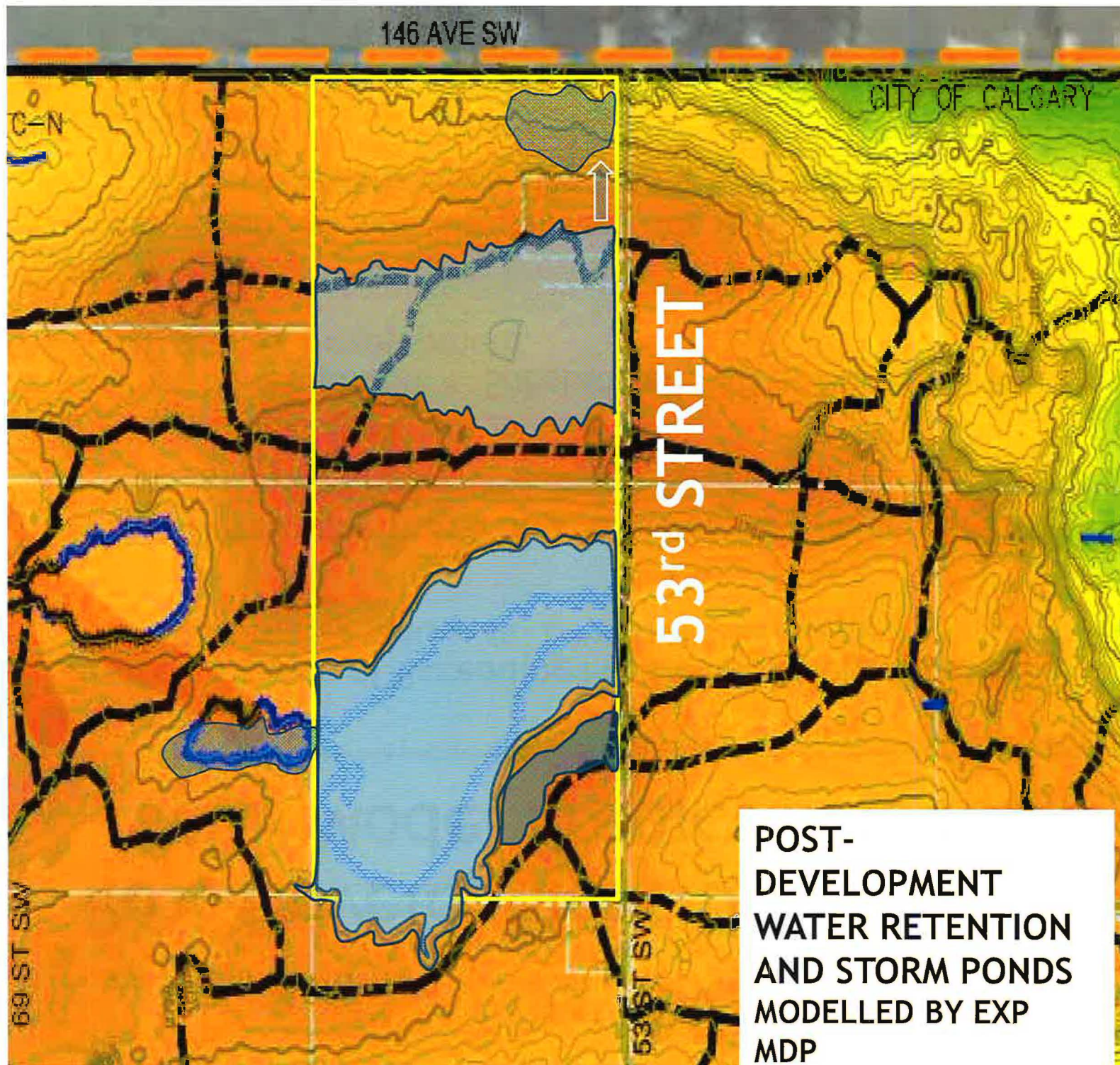


**PRE-  
DEVELOPMENT  
WATER LEVELS**  
-AS MODELLED  
BY EXP DRAFT  
MDP  
- DOES NOT  
MATCH  
CURRENT WATER  
LEVELS

**CATCHMENT AREAS  
DO NOT FOLLOW  
NATURAL  
DRAINAGE  
CONTOURS**

**NOTE 53<sup>RD</sup> STREET  
USED AS A BOUNDARY  
CONTRARY TO  
REGULATION**





**FUTURE DRAINAGE  
DESIGN:  
CATCHMENT AREAS  
= 53<sup>RD</sup> STREET =  
DAM,**

**CULVERTS  
REMOVED,  
PERMANENT  
IMPOUNDMENT OF  
OUTFLOW,**

**RESULT: EXTENSIVE  
FLOODING TO OUR  
FARM,**

**STORM POND  
DIRECTING WATER  
FROM OFFSETTING  
LANDOWNERS/ROADS**

**POST-  
DEVELOPMENT  
WATER RETENTION  
AND STORM PONDS  
MODELLED BY EXP  
MDP**



# Post-Development Draft MDP and SMDP Model Predict Flooding:



- 100% Chance of Exceeding Pre-Development Conditions in our Wetlands, (See Wetland #6 - EXP 2018 MDP Graph page 32)\*
- Pre-Development Starting Point for MDP Model = Flooded Conditions
  - Calculated for wetlands on our property
- Post-Development = Substantially All of our Farm will be Flooded by Offsetting Development
- Compounded Modelling Errors Not in our Favour
  - Decrease the offsetting landowners requirement to retain Storm Water

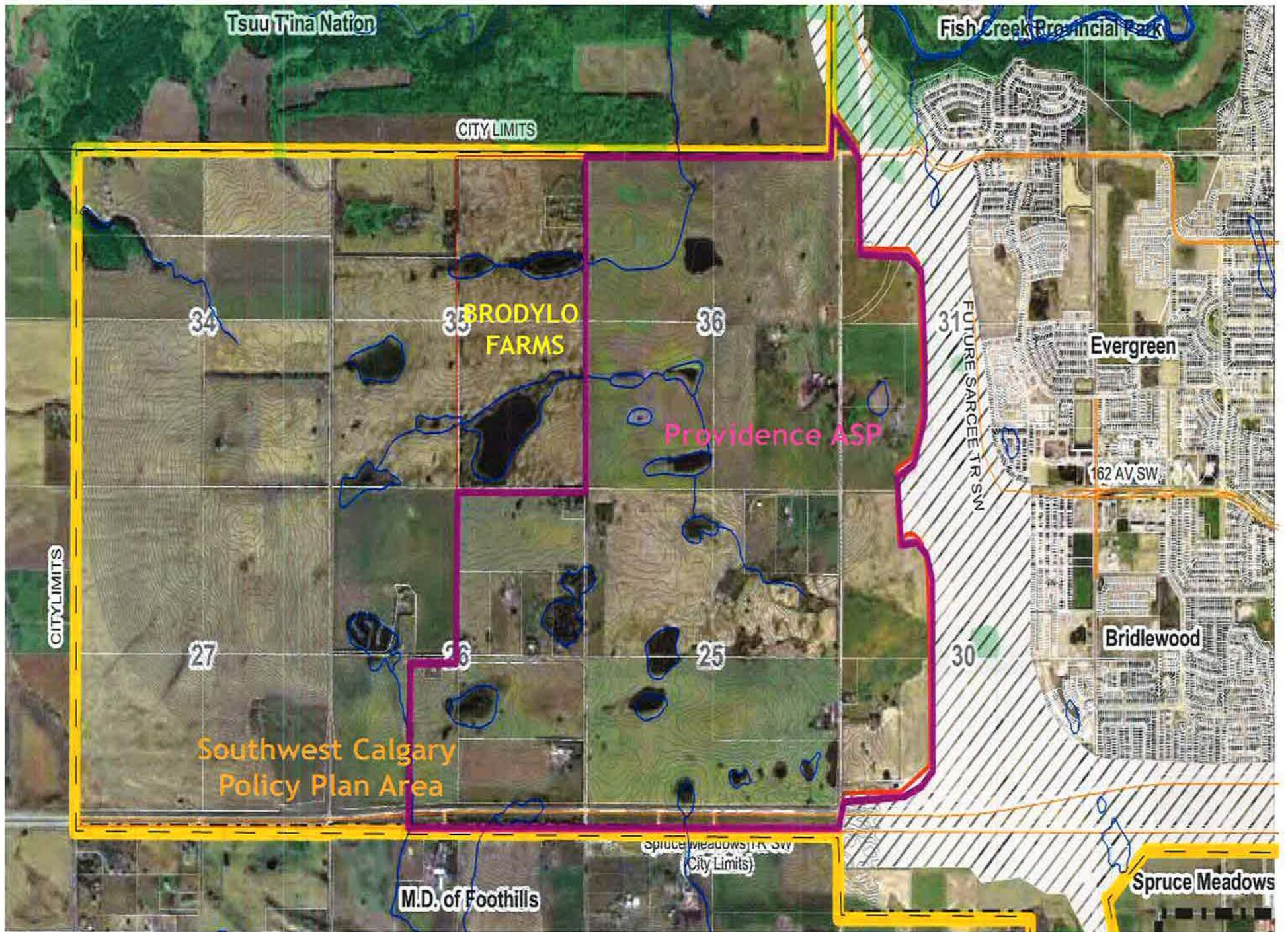


Thank You For Listening:  
Do You Have Any QUESTIONS?

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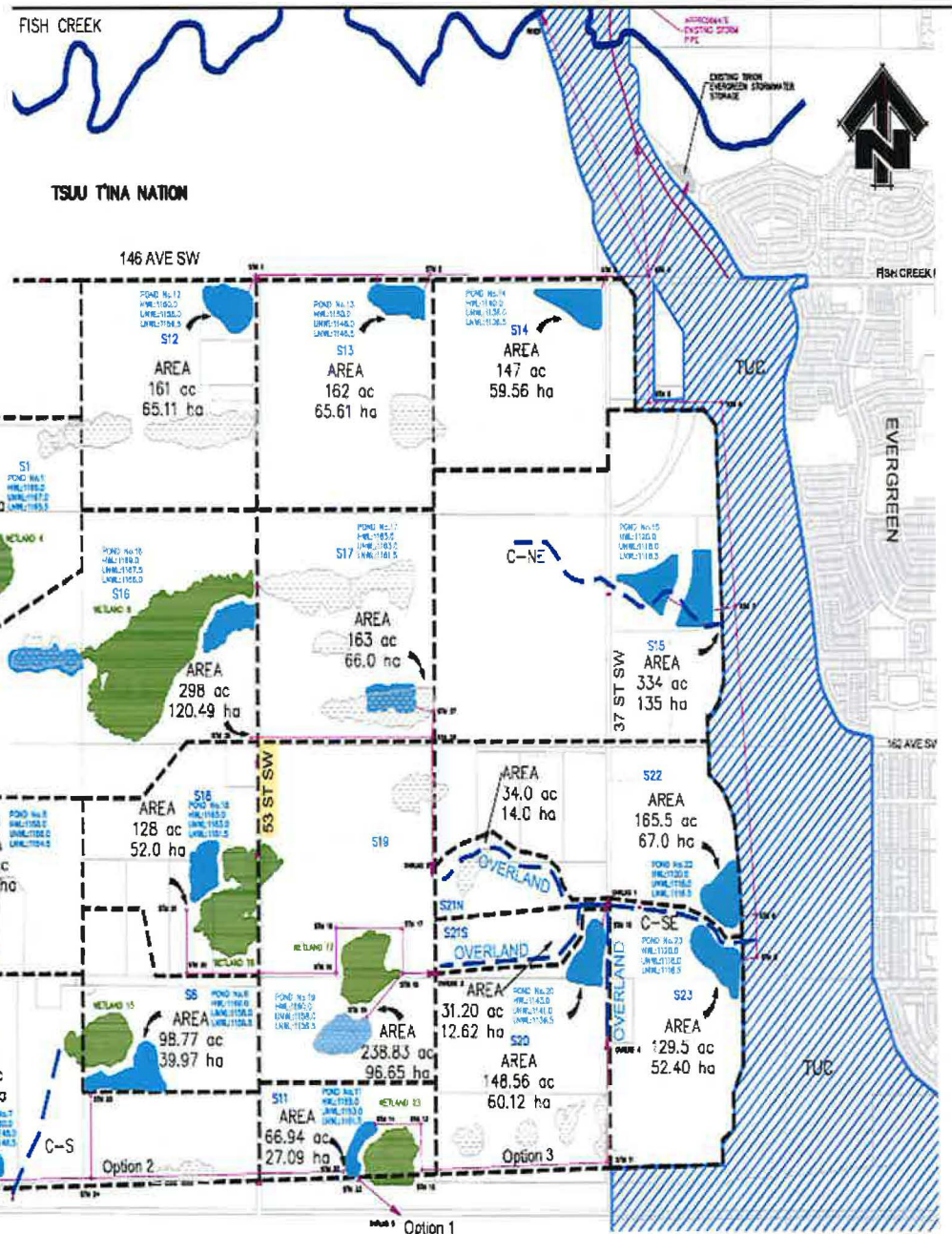








# EXP DRAFT MASTER DRAINAGE PLAN MAP #8, POST-DEVELOPMENT SERVICE CONCEPT



MD OF FOOTHILLS  
No. 31

## LEGEND:

- |  |   |  |                     |
|--|---|--|---------------------|
|  | STORM MANHOLE NO.                       |  | PROPOSED STORM POND |
|  | STORM SEWER                             |  | RETAINED WETLAND    |
|  | SUBCATCHMENT BOUNDARY AND REFERENCE NO. |  | EXISTING STORM POND |
|  | EXISTING DRAINAGE COURSE                |  | EXISTING WETLAND    |

## NOTES:

- The locations and configurations of SWMPs (ponds and sewer pipes) as well as water providers shown, are conceptual and are subject to change during Stages Master Drainage Plan and Pond Design.
- Sub-catchment boundaries are subject to change at Staged Master Drainage Plan.
- Existing wetland classifications and their full extent, needs to be confirmed at the time of Outline Plan.
- Wetlands to be retained or removed require confirmation from Parks at the time of Outline Plan.

PROJECT NAME:

**PROVIDENCE**

**MASTER DRAINAGE PLAN**

PROJECT NO.: CGY-0084700-1-001

DATE: 2016.11.23

SCALE: NTS

FIGURE NO.:

TITLE:

**POST-DEVELOPMENT SERVICING**

**CONCEPT**

**MDP.08**



# What is a Master Drainage Plan?

## Hydrology Model of Natural Water Systems

- Hydrology Model is Calculated
  - Mathematical Model Designed to Mirror Pre-Development Water -
    - Drainage and Retention in Wetlands
- Formula Simplified:
  - $\text{Area} \times (\text{Volume In}) - (\text{Volume Out}) = (\text{Volume Left})$
  - $\text{Catchment Area} \times (\text{Rainfall} - \text{Evaporation}) - \text{Net Drainage} (\text{Ground water, overland Inflow} - \text{Outflow}) = \text{Water in Wetlands}$

# Input Data Errors in MDP Model

## Example Wetland #6 on Our Property:

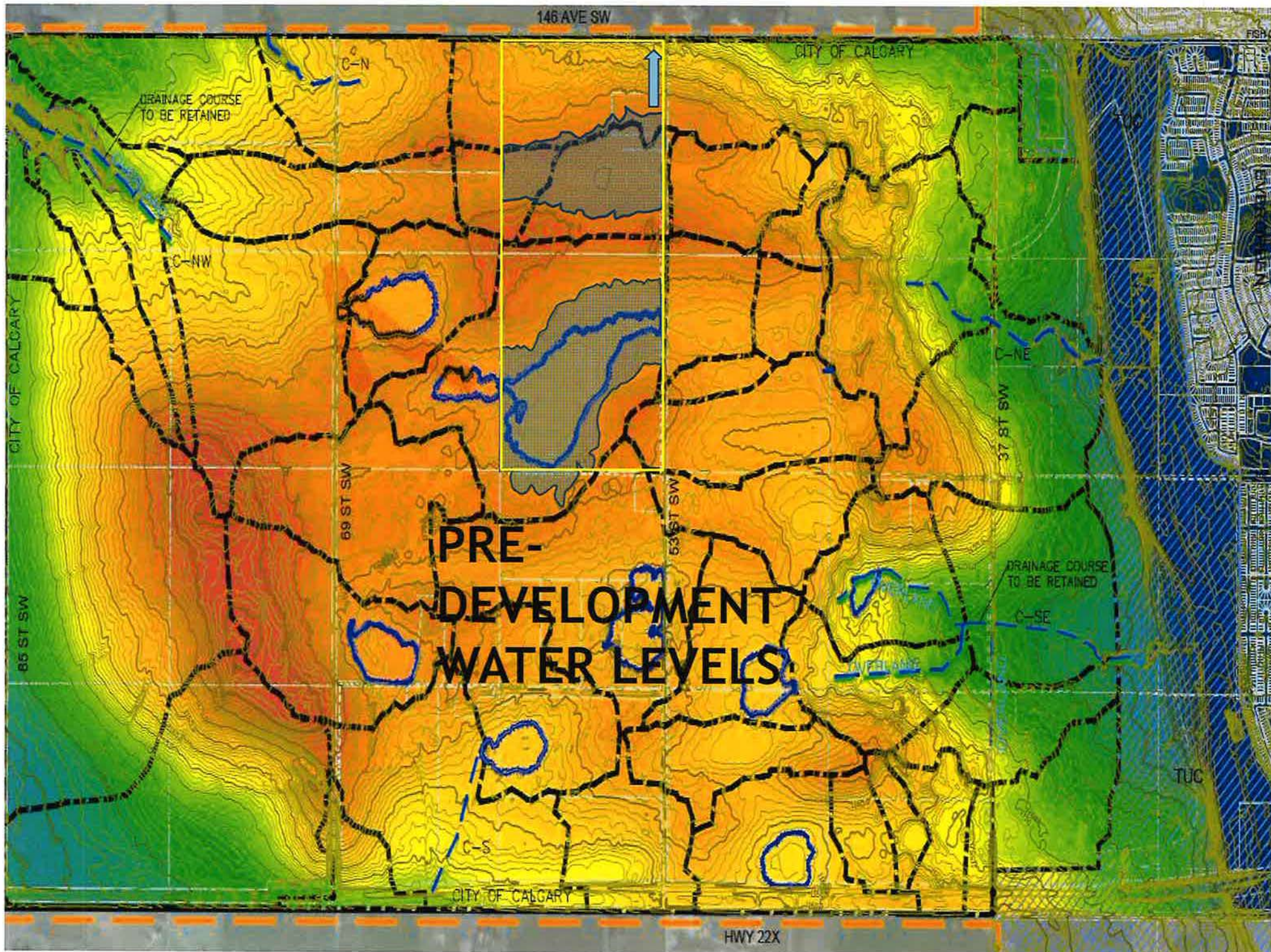
- Catchment Areas Incorrect
  - Do not match natural drainage area, cut across topographic contours
  - Area used in calculation is far larger than the area that naturally drains toward our property
  - Catchment boundaries based on ownership boundaries and other manmade features, roads, culverts etc.
- Bathymetry Incorrect - Lidar used instead = the water surface not ground elevation
- Rainfall, Temperature data derived from differing and inconsistent sources
- Ground Water Flow Volume Incorrectly Measured:
  - Peizometer data collected in artificial dry spots down dip of blocked and partially blocked culverts
    - Data so flawed that Water Resources demanded another year of data
- Overland Flow Volume Incorrect
  - Incorrect culvert data:
    - Blocked, Dented and partially blocked culverts = little or no flow
    - Culvert Manning number wrong (friction coefficient higher than modelled)



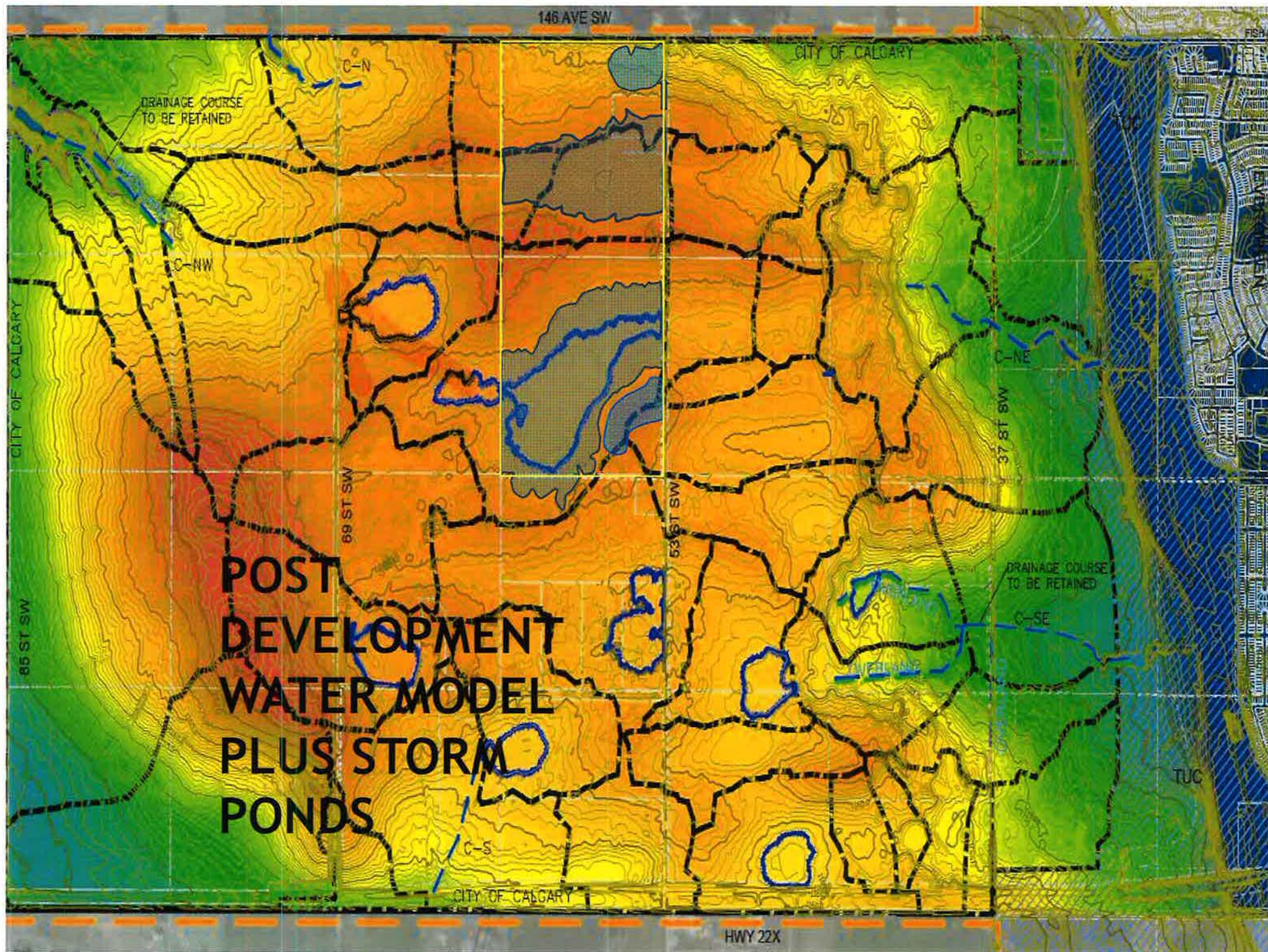
# How Do We Know The Model Is Wrong?

- Providence EXP MDP\* Model Should Match Observed Pre-Development Wetland Water Levels: [Water In - Water Out = Water in Wetlands]
- Pre-Development Calculated High Water Level for Wetland #6 = 1169.5m elevation
  - (1163.7m Storm Pond #16 invert + 5.8m Pond Depth, from chart on page 66)\*
  - Top of the Road = 1168m
- Dendrology, 50 year old Trees could never have grown, flooded due to plugged culvert, many now dead, future tree kills











# Master Drainage Plan Requirements



**DATE:** 2015 February 6

**FROM:** Pablo Lopez, P.Eng.  
Development Planning, Infrastructure Planning  
Water Resources

**SUBJECT:** Providence Master Drainage Plan  
Terms of Reference

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## Introduction

The Providence Master Drainage Plan (MDP) study area (the "study area") is comprised of approximately 1618 hectares (4000 acres) of land in south west Calgary. The study area is bound by:

- 146 Avenue SW (Tsuu T'ina border) to the north.



# City of Calgary Water Resources Requirements for Master Drainage Plan

- “Using an appropriate computer model (Water Resources currently accepts PC-SWMM or XPSWMM), undertake a continuous simulation analysis using precipitation data from 1960 through 2013 for the pre-development condition, to determine annual runoff volumes and unit area flow rates, evaporation and infiltration volumes, all representing existing conditions. “Calibrate” the model based on historical water levels in wetlands, regional runoff data and data collected as part of this study.”
- \*Providence Master Drainage Plan Terms of Reference 2015-02-06

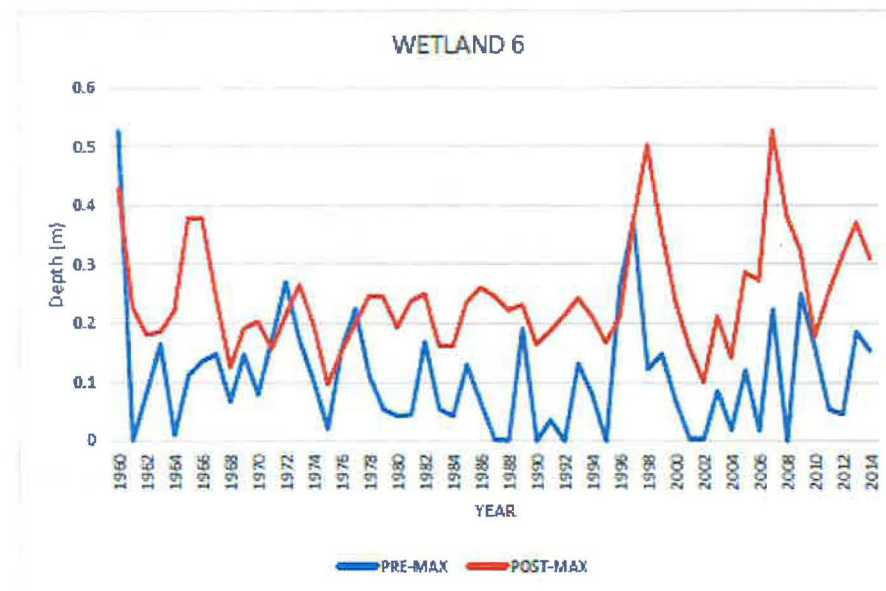
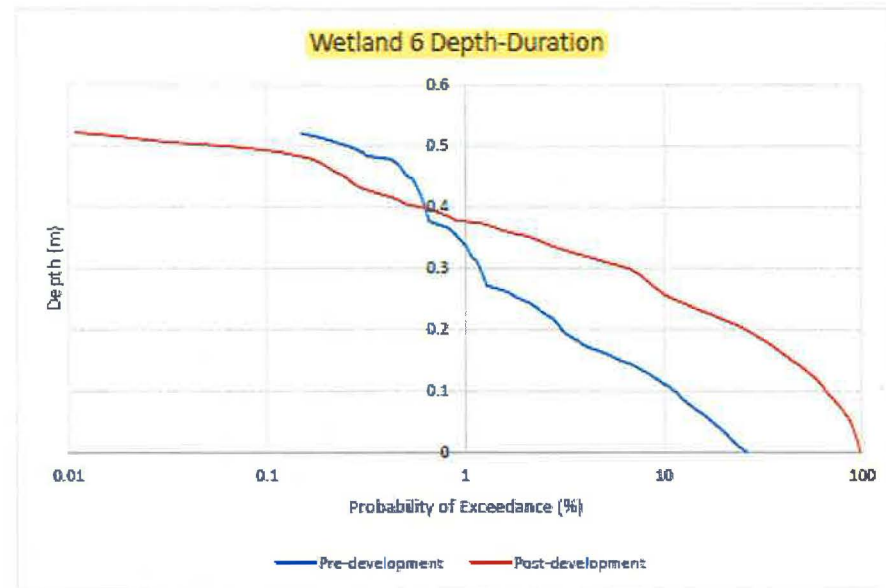


# EXP Draft MDP Modelling of Wetland Water Levels

## Pre & Post Development

## Probability of Exceedance (%) Pre vs. Post- Development Water Levels in Wetland #6, Located on Brodylo Farm Lands

Client: Dream Development  
Project Name: Providence ASP  
Project Number: CGY-00047001-00  
Date: May 28, 2018



Water Levels for Pond SU16—Wetland WL06



# Providence Area Culvert Input Data, (1166.8M)

CLV5 = Outlet for Wetland #6 on our  
Property

Client: Dream Development  
Project Name: Providence ASP  
Project Number: CGY-00047001-00  
Date: May 28, 2018

Table 2.1 — Existing Drainage Infrastructure

CULVERT LABEL	DESCRIPTION & FIELD NOTES	Upper Invert (m)	Lower Invert (m)	Pipe Run Length (m)	Pipe Slope (%)	Nominal Pipe Diameter (mm)	Manning n	Pipe Capacity (L/s)	Velocity (m/s)	Pipe Material
CLV1	800mm CSP	1150.12	1148.60	40.535	3.75%	825	0.024	1868.8	3.50	CSP
CLV2	800mm CSP	1145.78	1145.86	13.578	-0.59%	825	0.024	1244.3	2.63	CSP
CLV3	600mm CSP	1128.06	1128.18	11.164	-1.07%	600	0.024	1050.3	3.63	CSP
CLV4	500mm CSP	1139.66	1139.33	11.793	2.80%	450	0.024	374.7	2.40	CSP
CLV5	300mm CSP	1166.82	1166.94	13.922	-0.86%	300	0.013	157.2	2.21	CSP
CLV6	220mm STEEL PIPE	1141.39	1141.28	6.599	1.70%	225	0.013	48.5	1.64	Steel
CLV7	900mm CSP	1138.07	1137.75	25.625	1.25%	900	0.024	2564.4	3.98	CSP

Reference: Survey July 2015, EXP

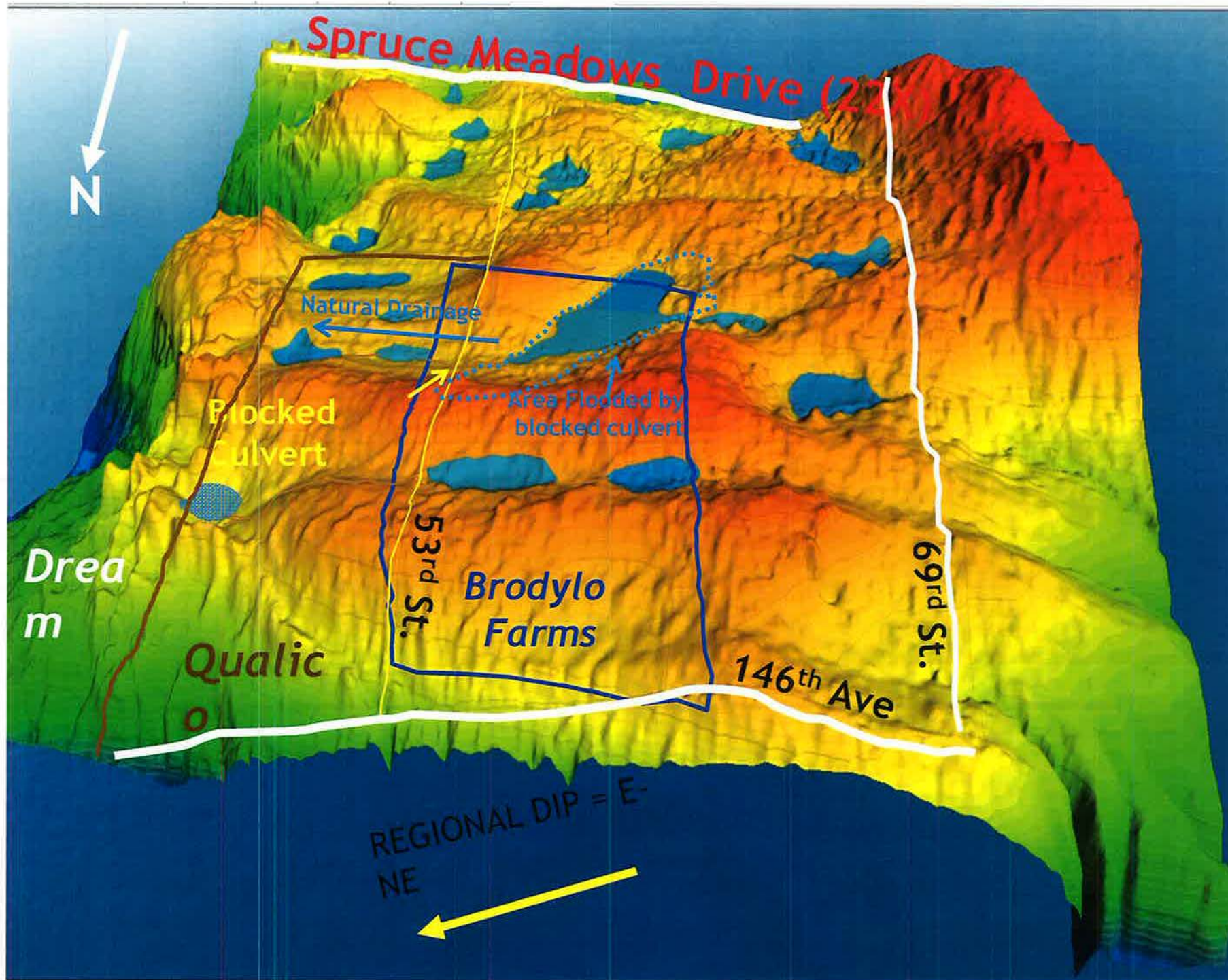


# Storm Pond #16 Calculated Data Related to Wetland #6 on Our Property

1163.8M +  
5.8M =  
1169.5M  
ELEVATION  
FOR  
SURFACE OF  
WATER IN  
WETLAND #6  
ON OUR  
PROPERTY

Pond 16		Pond 17		Pond 18		Pond 19	
Invert Elev.	1163.7	Invert Elev.	1159.0	Invert Elev.	1160.7	Invert Elev.	1157.2
Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0	39583	0	17143	0	11711	0	29113
1.25	45114	1.25	20874	1.25	14842	1.25	33894
2.5	50958	2.5	24918	2.5	18286	2.5	38988
3.24	51680	3.24	25424	3.24	18720	3.24	39620
3.26	52407	3.26	25935	3.26	19159	3.26	40257
3.5	52650	3.5	26106	3.5	19306	3.5	40470
4	53138	4	26450	4	19602	4	40898
5	58128	5	30000	5	22672	5	45288
5.5	60698	6	33750	6	25942	6	49878
5.8	62264	6.3	34914	6.3	26962	6.3	51294







# City of Calgary Storm Water Management Policy Manual States:

## 1.4.5 Master Drainage Plans (MDPs)

A Master Drainage Plan (MDP) is typically a stormwater drainage plan prepared for a large drainage area serviced by (usually) a single outfall. The drainage boundary area is usually determined by existing drainage boundaries or by watershed plans. The drainage area should not be based on jurisdictional or property boundaries, as this may not provide the best servicing concept for the area. The MDP generally covers a portion of the area served by the watershed plan.

The MDP should be developed through the evaluation of alternatives that provide an acceptable level of service while meeting the objectives of the WP and satisfying any constraints imposed by topography, land uses, and land ownership. The MDP should identify and locate major stormwater ponds, other BMPs, trunk sizes and servicing routes, overland drainage routes, water quality requirements, and land requirements. Preliminary designs of the major ponds and BMPs may be developed and included in the plan.

This level of planning is typically administered by The City of Calgary, while development of the MDP is normally undertaken by Water Resources. However, if the area is being developed ahead of the scheduled budget, the developer/consultant will undertake development of the MDP in consultation with The City (Water Resources) and the Province (Alberta Environment). Refer to CHAPTER 11: TECHNICAL REQUIREMENTS for more information.

## 1.4.6 Staged Master Drainage Plans (SMDPs)

A Staged Master Drainage Plan (SMDP) is essentially a stormwater drainage plan

Drainage boundary area is usually determined by drainage or watershed.

Drainage area should not be based on jurisdictional or property boundaries.



# City of Calgary Storm Water Management Policy Manual States:

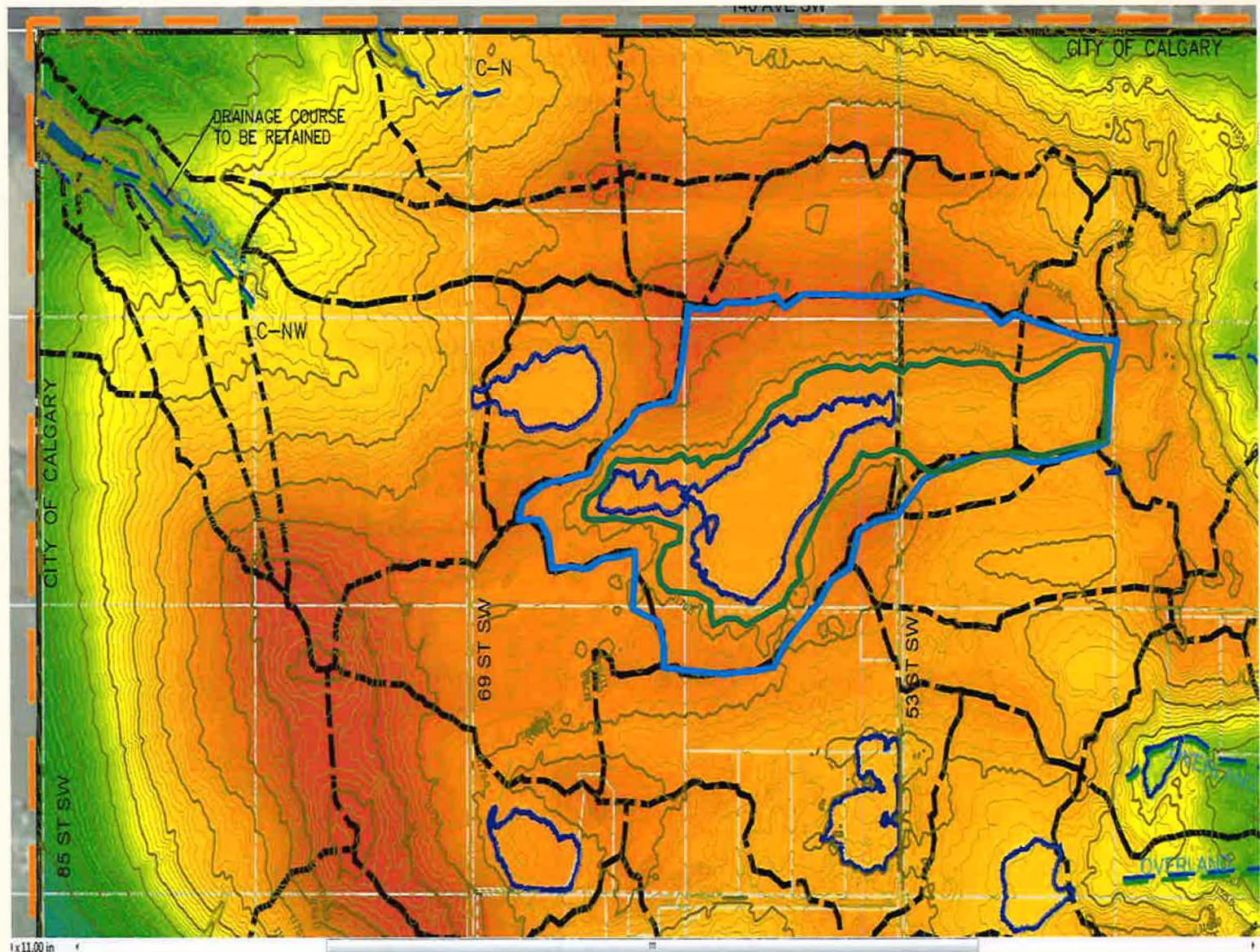
## 1.4.6 Staged Master Drainage Plans (SMDPs)

A Staged Master Drainage Plan (SMDP) is essentially a stormwater drainage plan prepared for a large area that may or may not be serviced by an outfall. The SMDP generally covers a portion of the area served by the MDP plan. An SMDP is not necessarily required in all circumstances. An MDP may be sufficient provided there is enough detail, the catchment boundaries have not significantly changed, or there is no significant deviation from the stormwater management system proposed. As with an MDP, the drainage area for an SMDP should not be based on jurisdictional or property boundaries, as this may not provide the best servicing concept for the area.

Similar to an MDP, the SMDP should be developed through the evaluation of alternatives that provide an acceptable level of service while meeting the objectives of the WP or MDP, and satisfying constraints imposed by topography, land uses, and land ownership. The SMDP should identify and locate major stormwater ponds, other BMPs, trunk sizes and servicing routes, overland drainage routes, water quality requirements, and land requirements. Preliminary designs of the major ponds and BMPs should be developed and included in the plan.

This level of planning is typically administered by The City of Calgary, with the development of the SMDP generally undertaken by the developer/consultant in support of a Land Use and Outline Plan (OP) application in consultation with The City (Water Resources) and the province (Alberta Environment). Refer to CHAPTER 11: TECHNICAL REQUIREMENTS for more information.





FISH CREEK DRAINAGE STUDY CATCHMENT AREA = LIGHT BLUE VS. BLACK DASH LINE CATCHMENT BOUNDARIES FROM EXP 2018 DRAFT MASTER DRAINAGE PLAN  
53<sup>RD</sup> STREET IS NOT CONSIDERED A CATCHMENT BOUNDARY BY ALL OTHER DRAINAGE STUDIES FOR THIS AREA

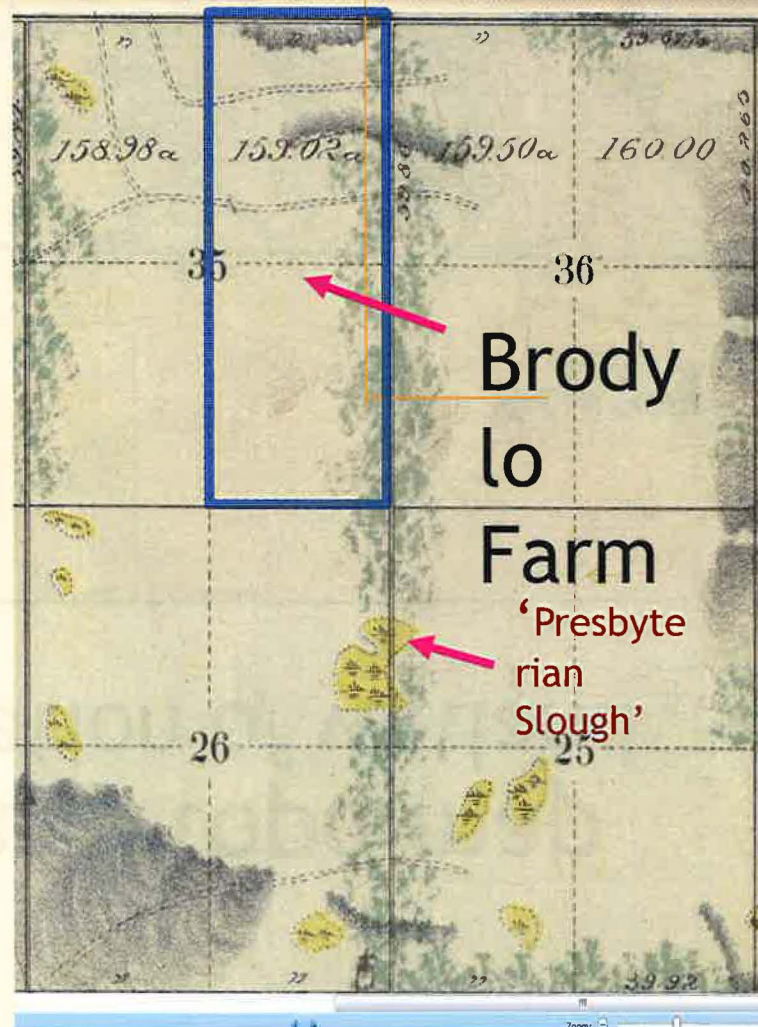






# CPR Arrives Map circa 1883

Note the Impact of 53<sup>rd</sup> Street on Damning Water on Brodylo Lands - No Road, No Water

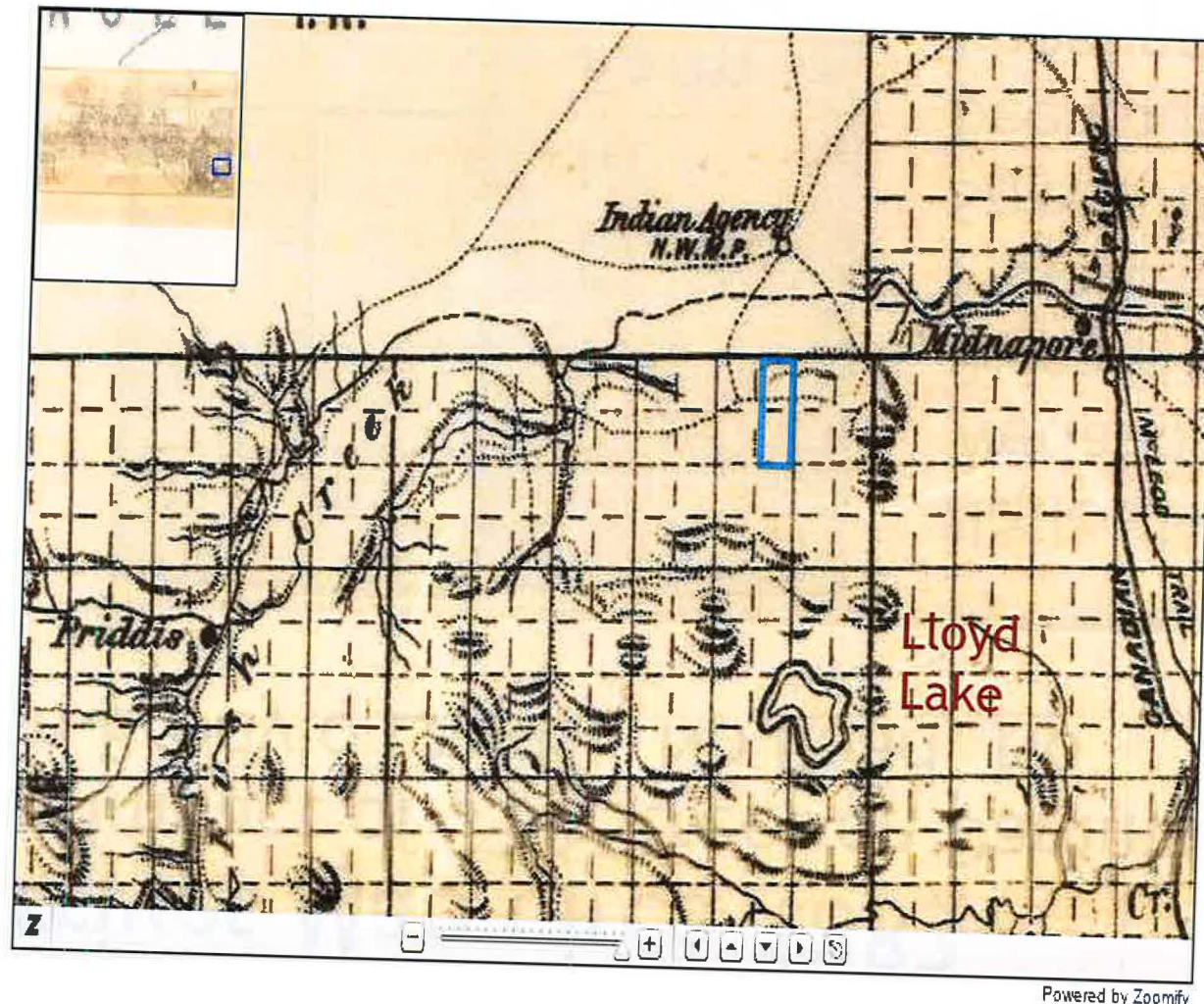


Notice No Wetlands are Present on Brodylo Farm Land as 53<sup>rd</sup> Street had not been built yet and Impoundment had not occurred at this time



# 1907 early topo map

No indication of wetland





# 1924 Air photo

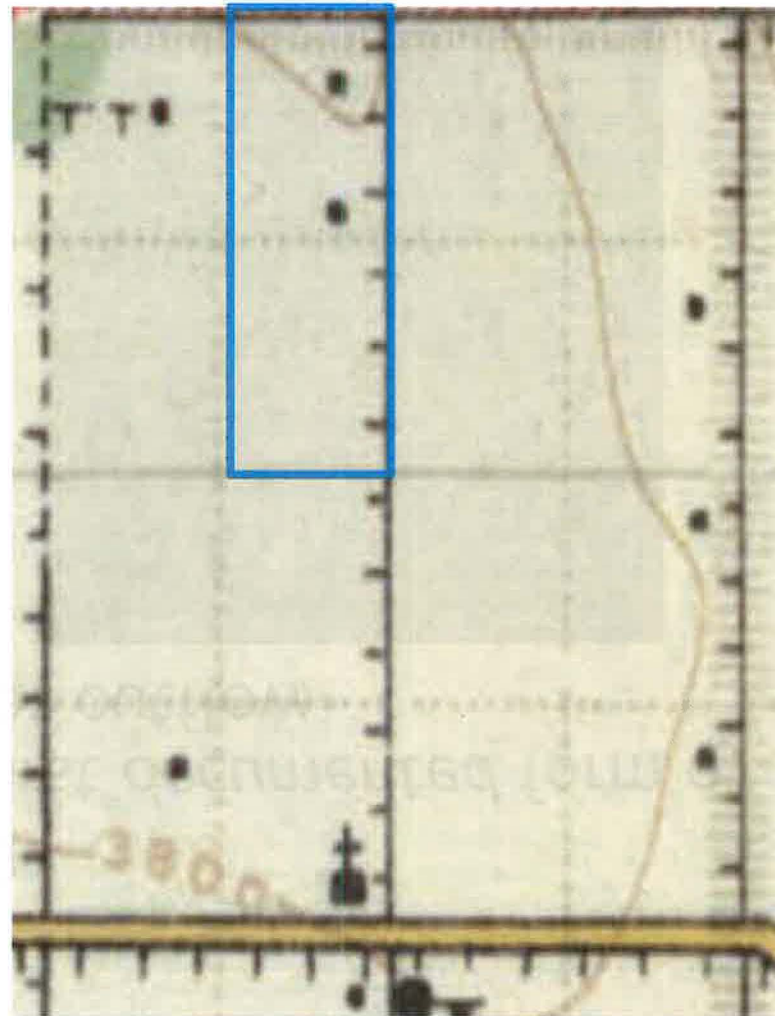
Road is evident. First *documented* form of drainage blocking at outflow





1926

Road ('*well travelled*'), Telephone lines shown on map.

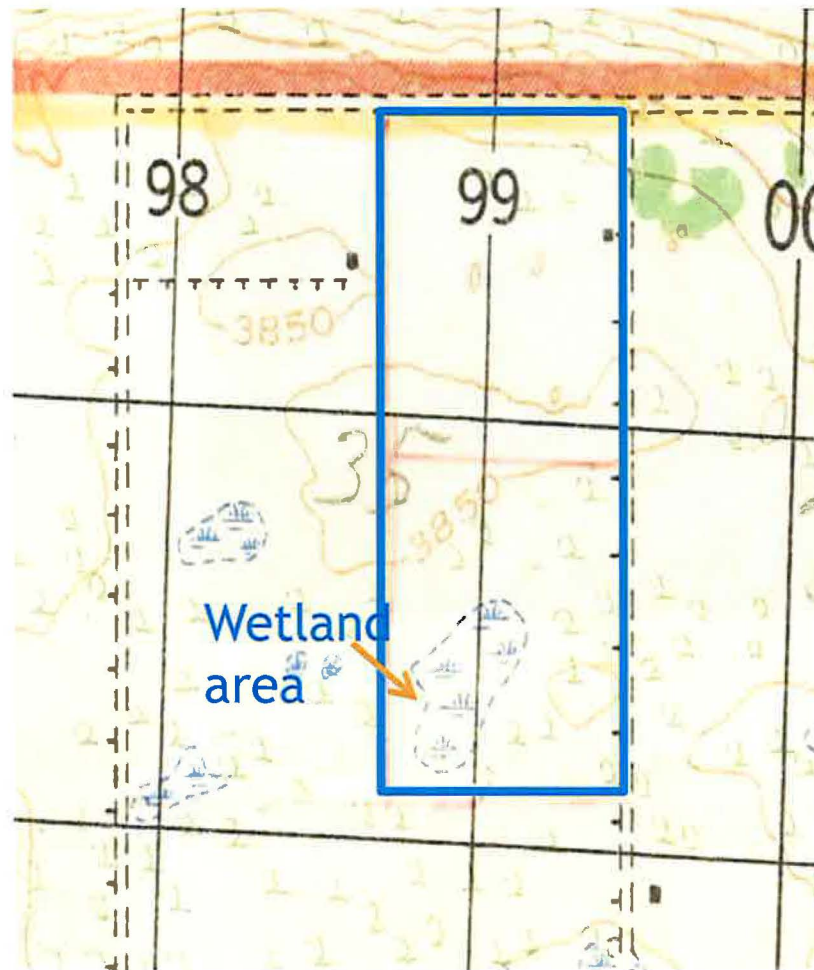




# 1931 Top

Culverts included on map but no culvert shown on 53<sup>rd</sup> St.

Wetland indicated as 'swamp or marsh' on legend in SE 35





2002

Cropping right to 53<sup>rd</sup> street,  
Approx 30 Acre wetland





2008

Evidence of flooding due to plugged culvert  
at outflow crossing of 53<sup>rd</sup> Street





# 2008 close up





Blocked drainage at 53<sup>rd</sup> street caused by intentionally blocked culvert leads to extensive flooding and wetland expansion right up to crest of 53<sup>rd</sup> street during spring run-off. Note fence under water.





Extensive tree killing due to flooded roots.





City 'instructed' in April 2015 to remove culvert plugging boulder by Brodylo family despite denial a culvert even existed. (FOIP obtained internal city email proves city knew one existed and conducted a search of it's exact location one year prior)





City Roads crew pull out 12" boulder from 12", 1950's era culvert. Estimated date of plugging circa 2005





Photo looking east of 53<sup>rd</sup> Street culvert shortly after boulder removed. City planning refers to it as 'Lake Qualico.





Soil erosion around entire wetland perimeter leading to sediment infilling of natural outfall drainage and loss of topsoil and cropland (60 Acres)





April 2017 boot-tromped clay pile on culvert inlet





East side of culvert is regularly cultivated and City of Calgary biologists have downgraded the class of wetland from 3-4 to 2 which allows for it to qualify for it to be in-filled and compensation paid elsewhere.





Presbyterian Slough ¼ mile south of Wetland  
Wetland Class 4 wetland is infilled and wiped out to create  
RV storage





CITY OF CALGARY  
**RECEIVED**  
IN COUNCIL CHAMBER

FEB - 4 2019

ITEM: CPC 2018-1357 8.2.2  
Distribution

CITY CLERK'S DEPARTMENT