## MUNICIPAL DISTRICT OF YELLOWHEAD NO. 94 BYLAW NO. 27.95

## BEING A BYLAW TO ADOPT AN AREA STRUCTURE PLAN

WHEREAS, the Planning Act, Being Chapter P-9, R.S.A., 1980, and amendments thereto, authorize a Council, after holding a public hearing to proceed to pass a bylaw adopting an area structure plan;

AND WHEREAS, a public hearing was held in respect to the proposed area structure plan on the date written below;

NOW THEREFORE, the Council for the Municipal District of Yellowhead No. 94, in the Province of Alberta, duly assembled, hereby enacts as follows:

- 1) That the Sundance Recreations Area Structure Plan dated June, 1995 and attached hereto as Schedule "A" for land described as part of the Southeast Quarter, Section Seven (7), Township Fifty-Three (53), Range Nineteen (19), West of the Fifth (5th) Meridian is hereby adopted.
- 2) This bylaw comes into force at the beginning of the day that it is passed in accordance with Section 189 of the Municipal Government Act, R.S.A., 1994.

1.491 .	READ a first time this 11th day of Guly	, A.D., 1995.
	PUBLIC HEARING held this 25th day of Chily	, A.D., 1995.
	READ a second time this 25th day of	, A.D., 1995.
	READ a third time this 25th day of	_, A.D., 1995.
7,	SIGNED this 25th day of Quly	, A.D., 1995.
	Reeve	
	May Nowhoo Municipal Georetary	dt.

# SUNDANCE RECREATIONS AREA STRUCTURE PLAN

**JULY 1995** 

## Prepared by:

Walker Consulting Group Ltd.
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Edmonton, Alberta
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The Sundance Recreations Area Structure Plan (ASP) is an overall development strategy for the lands within the SE¼ of Section 7-53-19-W5. The intent of the plan, as provided for in Section 64 of the Planning Act of Alberta, is to put forth a framework that describes the preferred and appropriate land uses for this area.

The policies of the Yellowhead Regional Plan, the Municipal District of Yellowhead No. 94 General Municipal Plan, and the Municipal District of Yellowhead No. 94 Land Use Bylaw guide the Sundance Recreations concept. These documents focus on different levels of detail to ensure that the development strategy considers both general and specific interests . . . for the immediate and longer time frames. Ultimately, the many dependent variables of the marketplace (including surrounding developments and local government initiatives) will influence the type, style, and pace of development within the Sundance Recreations ASP.

This report presents the Sundance Recreations Area Structure Plan. The Plan prepares the subject lands for development and provides an outline for future growth.

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## INTRODUCTION

## 1. SUBJECT AREA

The area of the Sundance Recreations ASP lies within the SE¼ of Sec. 7-53-19-W5 and encompasses approximately 65 hectares (160 acres). Highway 16 (Yellowhead Highway) is less than 300 metres to the south and excepting a few areas of improvement, there is an expanse of undeveloped land to the north. Marlboro - 23 kilometres west of Edson - is located a few hundred metres to the southwest with Black Mud Lake immediately west of Marlboro. To the east, across what is locally known as "Ranger Road," is a country residential district surrounding Millers Lake.

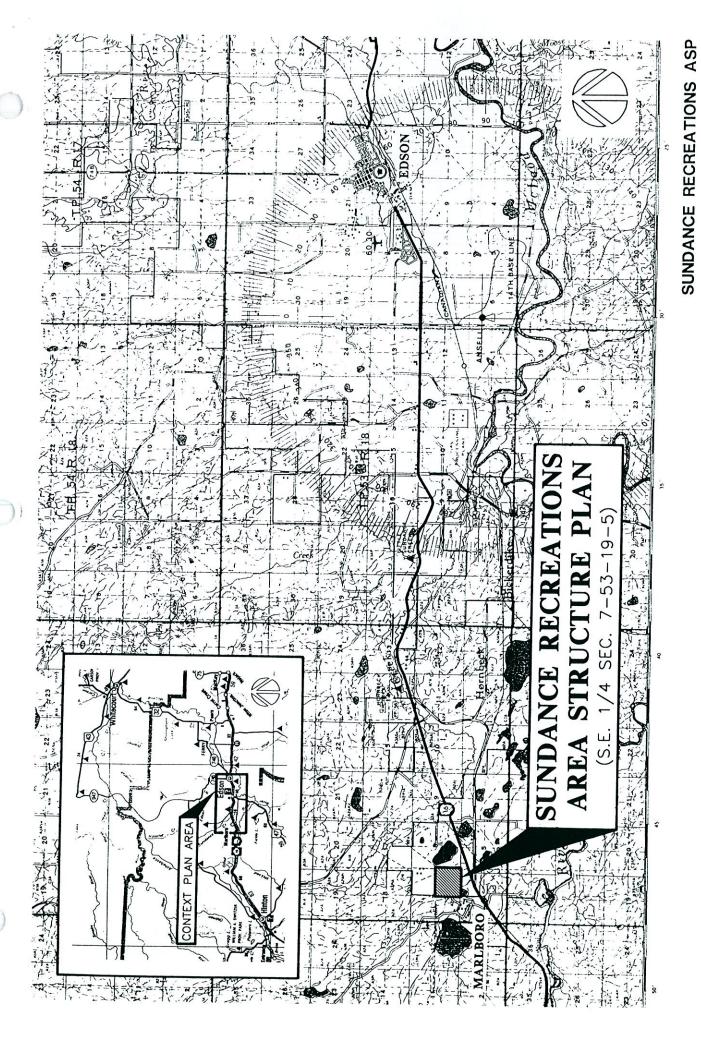
The context of the ASP to Edson and surrounding areas is shown in Figure 1.

## 2. PURPOSE OF THE AREA STRUCTURE PLAN

The intent of the Sundance Recreations ASP is to set out a framework for development. Its mandate is to describe the land uses, densities, transportation routes, public utilities, and sequencing of development. Other aspects are included to produce a more comprehensive document.

The principal aim of the ASP is to create a development concept for country residential homes. With two connections out to Ranger Road, a circular crescent will collect traffic from within the development. The layout is designed to locate homes within the higher concentrations of coniferous trees while maintaining the creek and low-lying wet area in the southwest part of the plan.

Figure 2 is an aerial photograph showing the immediate ASP area.



Context Plan



Aerial Photograph

## 3. POLICY BACKGROUND

## Yellowhead Regional Plan

The Yellowhead Regional Plan was prepared as a guide to facilitate compatible developments within its boundaries. For the most part, the Regional Plan (RP) provides advice to municipalities and other agencies on how significant issues should be considered.

One goal of the RP is "to accommodate <u>rural residential land use</u> in the most suitable locations." Situated between Marlboro and the residential area at Millers Lake, the area of the ASP will take advantage of existing facilities and essentially create infill development.

Considering all objectives, the Sundance Recreations ASP conforms to the Yellowhead RP.

## Municipal District of Yellowhead No. 94 General Municipal Plan

The purpose of the MD 94 General Municipal Plan (GMP) is to provide broad and general land use policies in assisting orderly, future development.

The document helps to ensure that there is a consistent approach to the many policy areas covered in the GMP. Existing agricultural lands, for example, are to be protected while minimizing the loss of better agricultural land. The area of the ASP, according to the "Soil Capability for Agriculture" prepared by Environment Canada, is not suitable for agricultural uses. (Soil classes are described in the next section under Existing Features.)

The ASP complies with the MD 94 GMP with regard to settlements, transportation and utilities, the natural environment, and all other relevant aspects.

## Municipal District of Yellowhead No. 94 Land Use Bylaw

The Municipal District of Yellowhead No. 94 Land Use Bylaw (*LUB*) deals with specific items more applicable to plans of subdivision. However, in designing the general layout for the ASP the LUB has been used to ensure that subdivisions will incorporate or exceed minimum standards.

## **DEVELOPMENT CONCEPT**

## 4. **DEVELOPMENT STRATEGY**

The development strategy for the Sundance Recreations ASP is to develop an area for country residential homes. As part of this strategy, the concept focuses on three basic objectives:

- to design an area appropriate for country residential development,
- to provide for utility and community services that enhance the value and safety of the community, and
- to maintain the creek and open water (including the 1:100 year floodplain) as a natural amenity.

These objectives are intended to create the Sundance Recreations ASP as a viable and successful area.

## 5. EXISTING FEATURES

The subject area includes both natural and developed features. In the northeast part of the plan there are two existing homes that are incorporated into the design, while the remainder of the quarter section is undeveloped.

The northern most residence (Lot 1, Block 1, Plan 922-3471) is accessed from Ranger Road and does not connect with the internal ASP collector loop. The southern residence, although it presently accesses Ranger Road, will form part of the central block of homes and have access from the internal roadway. There are also two existing cut lines running northeast and northwest that cross in the south area of the plan.

The undeveloped areas are characterized largely by Lodgepole Pine trees in the east and a mixture of Black and White Spruce and deciduous trees in the west. In addition, there is a creek in the southwest that flows into a body of water extending into the quarter section below. Elevations range from about 1,000 metres in the southeast down to the level of the water at about 977 metres. The rest of the land slopes gradually to the north and west.

The "Canada Land Inventory - Soil Capability for Agriculture" prepared by Environment Canada (*Edson 83 F map*) describes the agricultural capabilities for the lands within the Sundance Recreations ASP. This area is described as having Class 0 soils on the west side and Class 6 (80%) and 5 (20%) on the east. Class 0 consists of organic soils that are not placed in capability classes. The other two are limited in their capabilities for agricultural uses and do not fall within the Class 4 rating (*or better*) as defined for BETTER AGRICULTURAL LAND in the MD 94 GMP.

Existing features are presented in Figure 3.

## 6. LAND USE

The ASP consists primarily of residential land. An internal collector roadway provides public access to all of the residential except for the existing home in the northeast (accessed off Ranger Road). The southwest area, including the creek and open water, is provided as environmental reserve.

Land use statistics for the ASP are shown in Table 1 below.

TABLE 1

# SUNDANCE RECREATIONS AREA STRUCTURE PLAN LAND USE STATISTICS

TOTAL ASP AREA	64.71 ha	159,90 ac	100%
Lot 1, Block 1, Plan 922-3471	4.05 ha	10.01 ac	6.3%
Ranger Road Widening	0.32 ha	0.79 ac	0.5%
Environmental Reserve	6.41 ha	15.83 ac	9.9%
NET DEVELOPABLE AREA	53.93 ha	133.27 ac	83.3%
Remaining Residential	50.43 ha	124.61 ac	77.9%
Internal Road	3.50 ha	8.66 ac	5.4%

SUNDANCE RECREATIONS ASP

# Existing Features

8

## 7. SPECIAL SEWAGE DISPOSAL REQUIREMENTS

A geotechnical investigation within the developable areas was conducted by J.R. Paine & Associates in June of 1995 (provided as the Appendix of this report). This report determined that the general groundwater table remains more than 3.0 metres below ground surface and dissipitation rates are higher than the minimum standards of Alberta Environmental Protection interim guidelines for residential subdivision. An additional environmental study will be required if a standard weeping lateral sewage disposal system is utilized or alternatively an approved installation by a professional engineer licensed to practice in the Province of Alberta or alternatively an approved installation by Alberta Labour for the soil conditions encountered in the geotechnical investigation. The developer will register an instrument on the title of each parcel to ensure compliance with this provision.

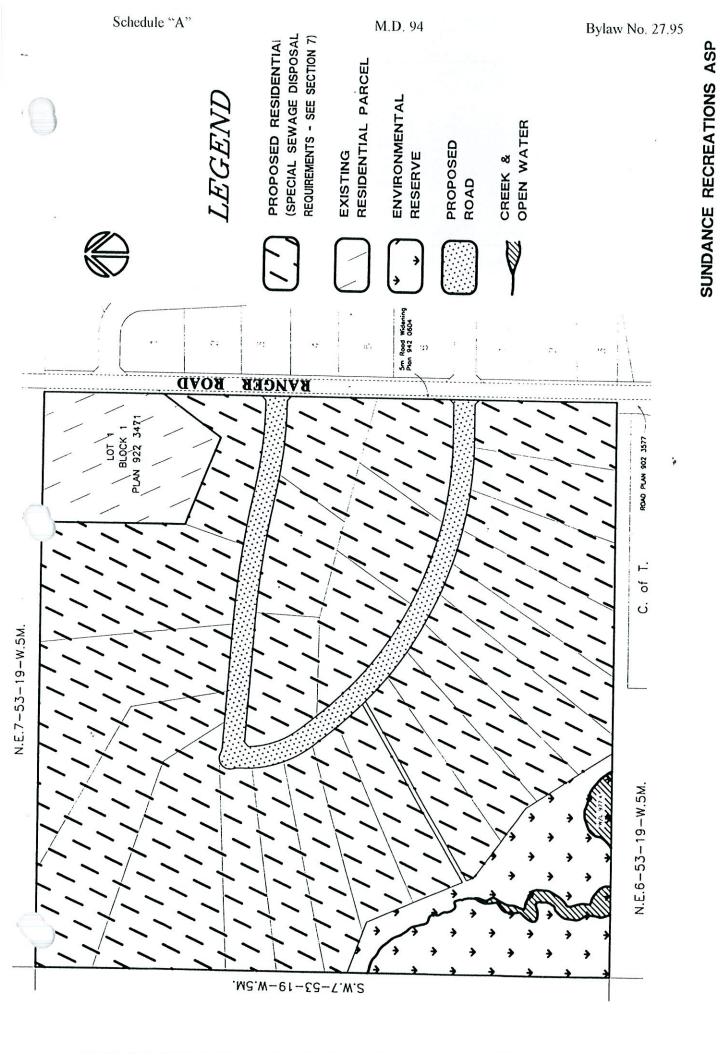
## 8. **RESERVE AREA**

1

The southwest of the ASP is shown as environmental reserve. This portion of the plan is set aside to preserve the natural character of the creek and open water. Its boundary is above the 980 contour to maintain a 2 metre drop to the water level.

There is no municipal reserve planned for the Sundance Recreations ASP.

Figure 4 shows the Development Concept for the Sundance Recreations ASP.



# Development Concept

WALKER CONSULTING GROUP LTD.

## **SERVICING**

## 8. TRAFFIC CIRCULATION

Lot 1, Block 1, of Plan 922-3471 (existing north residence) and the land immediately south are the only residential areas with direct access to Ranger Road. All other residential parcels will have access to the internal collector road which in turn will discharge traffic out to Ranger Road. The south entrance to the ASP is directly across from an entrance into the residential at Millers Lake with the other located approximately 230 metres to the north.

## 9. COMMUNITY SERVICES

## **Police**

Police services for the ASP will be conducted through the Edson Rural Detachment of the RCMP. Presently, the detachment serves a population of about 5,300 and has an officer/population ratio of 1:1043. With an average provincial ratio of 1:1041, the Edson Rural Detachment rates 88th out of 107 provincial detachments and is adequately staffed. The total number of residents anticipated for the Sundance Recreations ASP will not, of itself, require additional RCMP officers.

## Health

The Alberta West Central Health Unit provides medical services to Edson and surrounding areas. With the Local Board of Health being replaced in March of 1995 by the Westview Regional Health Authority, it is anticipated that the level of medical services provided by the unit will increase over the next five years. Consequently, development within the Sundance Recreations ASP will not significantly impact upon the region's medical services and will be well served.

The Yellowhead Ambulance Service covers an area of nearly 10,000 square kilometres for a population of 12,000. (All areas are within 1½ hours.) The service uses two ambulances one of which is a rescue vehicle - and receives between 45 and 50 calls per month. The Sundance Recreations ASP is not expected to affect current ambulance services.

### Fire

Marlboro has its own volunteer fire department with one pumper truck and one water truck. The Sundance Recreations ASP will receive fire services from the Marlboro volunteer force.

## Education

School aged children in Marlboro and surrounding areas are educated in Edson via an existing school buses service. Edson has four public elementary schools (a total of 1,200 - 1,300 students), one public junior high school (500 students), and one public senior high school (500 students). The Separate School Board provides education for only those students living in Edson. Each of the public schools has plenty of available capacity - particularly the elementary schools - and the relatively few number of students that may live in the Sundance Recreations ASP will not significantly reduce this capacity.

## 10. UTILITY SERVICES

TransAlta Utilities, Yellowhead Gas Co-op and Alberta Government Telephones have facilities within the road allowance on the east boundary of the structure plan area which have the capacity to provide service to the proposed development. The proposed alignment of the utilities within the development is shown on *Figure 5*. Mains would be installed within the ditch around the outside of the crescent, with individual connections being made as required by customers.

Yellowhead Gas Co-op and Alberta Government Telephones will install buried facilities, while TransAlta Utilities' facilities will be overhead.

Natural drainage is predominately from the east central portion adjacent to the road allowance radiating north, west, and southwest to the existing drainage course. Construction of the internal road will interrupt the natural drainage pattern to some extent but the overall drainage pattern will be maintained by the grading of road-side ditches and installation of culverts where required. Roadside drainage, where it is necessary to direct it along the side of lots to a suitable drainage course, will be accommodated within a registered right-of-way.

# SUNDANCE RECREATIONS ASP

WALKER CONSULTING GROUP LTD. FIGURE 5

Servicing Concept

## **DENSITY AND STAGING**

## 11. POPULATION AND HOUSING

The 1991 census compiled by Statistics Canada shows a population increase of 1.2% (8,590 to 8,692) for ID No. 14 (MD 94) from 1986. (The enumeration area for Marlboro had 186 people in 1991.) Average number of persons per household remained unchanged at 2.9.

For the purposes of this report, and with lot sizes ranging from 4.0 acres to 10.0 acres, the ASP is estimated to include 26 residential lots at an overall density of 0.40 units per hectare (0.16 units per acre). Projected population estimates are calculated in *Table 2* below.

## TABLE 2

## SUNDANCE RECREATIONS AREA STRUCTURE PLAN POPULATION STATISTICS

Total Plan Area	64.71 ha/159.9 ac
Estimated Number of Units	26
Overall Density	0.40 U.P.H./0.160 P.A.
*Persons per Household	2.9

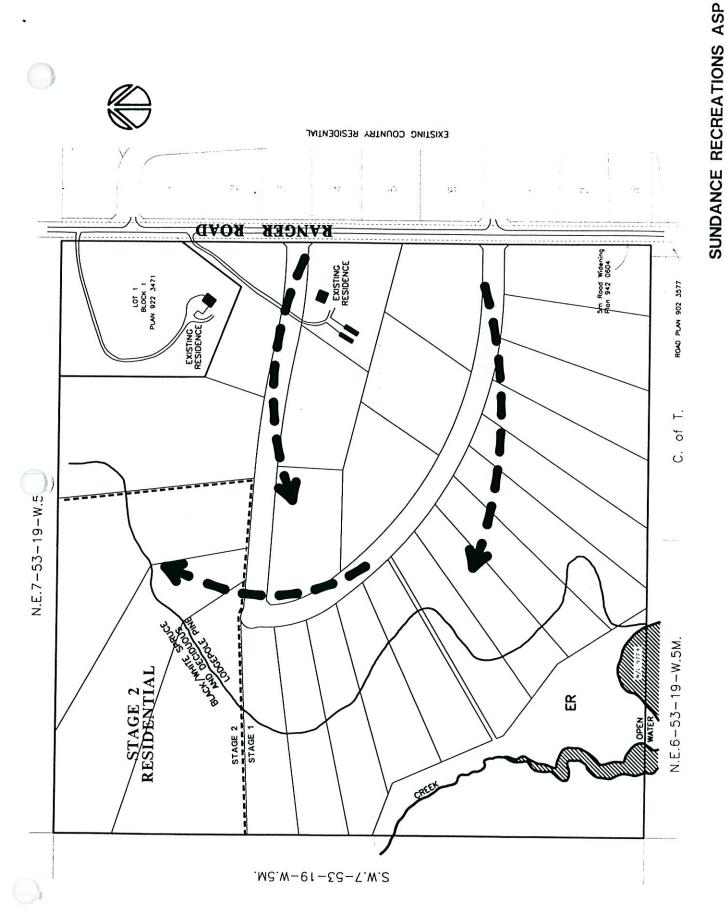
## TOTAL ESTIMATED POPULATION 76

## 12. SEQUENCE OF DEVELOPMENT

The sequence of development for the ASP will follow the logical extension of roads and services. The subdivision plan will likely be staged in order to accommodate an increase in demand. The first stage will construct all of the internal collector road with the exception of the cul-de-sac at the north end of the plan. This area - Stage 2 - incorporates an additional 40 acres of residential land. Each stage is proposed to have its own Servicing Agreement.

The sequence of development is shown in Figure 6.

<sup>\*</sup>Carried forward from 1991 census.



# Sequence of Development

# **APPENDIX**



## J. R. Paine & Associates Ltd.

**CONSULTING AND TESTING ENGINEERS** 

EDMONTON • GRANDE PRAIRIE

WHITEHORSE

PEACE RIVER

## GEOTECHNICAL INVESTIGATION PROPOSED ACREAGE SUBDIVISION SE 7-53-19-5 NEAR MARLBORO, ALBERTA

## FILE NO: 2949-1

GEOTECHNICAL INVESTIGATION PROPOSED ACREAGE SUBDIVISION SE 7-53-19-5 NEAR MARLBORO, ALBERTA

JUNE, 1995

J.R. PAINE & ASSOCIATES LTD. 3051 Parsons Road EDMONTON, Alberta T6N 1C8

Phone: 462-1288 Fax: 450-1664

## FILE NO: 2949-1

GEOTECHNICAL INVESTIGATION PROPOSED ACREAGE SUBDIVISION SE 7-53-19-5 NEAR MARLBORO, ALBERTA

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- Site Plan, Testhole Logs, Data Sheets		

## GEOTECHNICAL INVESTIGATION

PROJECT:

Proposed Acreage Subdivision

LOCATION:

SE 1/4 of Sec 7, Twp 53, Range 19, W5

Near Marlboro West of Edson

CLIENT:

SUNDANCE RECREATIONS

P.O. Box 6422 EDSON, Alberta

T7E 1T8

## <u>INTRODUCTION</u>

This report presents the results of the subsurface investigation conducted at the site of the proposed acreage subdivision located in the Southeast quarter of Section 7, Township 53, Range 19, West of the Fifth Meridian near Edson, Alberta. The objectives of the investigation were to establish the subsoil data necessary for use in the design and construction aspects of the proposed subdivision.

Authorization to proceed was received from Mr. Pat Barker of Walker Consulting Group. Fieldwork was completed during May of 1995.

## SITE DESCRIPTION

The proposed residential development is situated in SE 7-53-19-5, approximately 24 km west of Edson, Alberta. The study areas encompasses 150 acres. It is understood that this site will be subdivided into 21 acreage lots and serviced from the existing N-S road allowance by a single road loop. The subject property lies immediately west of the existing Miller Lakes acreage subdivision. Highway 16 is located approximately 1/2 km south of the site.

The eastern 3/4 portion of the subject property lies within a slightly undulating landscape inhabited by a moderate cover of native poplar and spruce forest. The surfacial drainage is not well defined although it does appear that overall topographic relief falls gently in a northwesterly direction. Of note is the presence of a localized depression at approximately the midpoint of the property N-S, centered on the east boundary. The depression lies an estimated 4 meters in elevation below the surrounding ground surface. Up to 3 meters of vertical relief can be observed throughout the remainder of the slightly irregular poplar/spruce forested area.

Muskeg occupies the western 1/4 portion of the proposed subdivision. The transition from the forest to the muskeg areas is clearly defined in the field by a sharp ledge descending sharply an estimated 4 to 5 meters in elevation. The muskeg is inherently wet with areas of open bog. A number of proposed lots within the southwest quadrant of the development extend beyond the eastern limit of the muskeg. Several lots adjoin an environmental reserve situated at the southwest corner of the noted quarter section.

## FIELD INVESTIGATION

The field investigation for this project was performed on May 24, 1995. A testhole drilling program was implemented utilizing a 250 diameter continuous flight, solid stem auger mounted on a rubber tired backhoe excavator. The drilling depth of each testhole was limited to 3.0 meters. The testhole drilling program was supplemented by percolation testing. Percolation holes were placed adjacent to each testhole. These holes were hand augered to diameters and depths of 200mm and 900mm respectively.

A total of 10 locations were drilled and tested for percolation rates. The test locations are illustrated on the attached site plan. The locations were chosen on the basis of site access and where disturbance to the area would be limited. Testholes 95-1, 95-2, 95-6, and 95-7

located within existing cutline clearings. Testhole 95-6 was purposely placed at the low point of a local depression. Recognizing (from earlier drilling) that water tables were more than 3.0 meters below the ground surface), it was felt that a testhole at this location would help determine the depth of watertable throughout the study area. Testholes 95-4 and 95-9 were located within a trail which parallels the noted muskeg ledge. All remaining testholes were accessed by winding through less density populated portions of forest.

A continuous visual log of the soils encountered was maintained in the field during the Noted was organic cover, soil classifications, changes in soil profile, drilling operation. moisture conditions, relative grainsize, color, and any other pertinent observations. Soil samples were removed from the auger at depth intervals of 0.6m, 1.2m, 1.8m and 3.0m. Each sample was tested for moisture content. Selected samples were further tested for grainsize distribution using the hydrometer and mechanical sieve methods. Atterberg limit tests were performed on one sample removed from Testhole 95-6 where soil conditions appeared cohesive. Due to granular conditions throughout, no other Atterberg limit testing was performed. It was originally intended to cover each testhole (once drilled) for future water table measuring. Due to the nature of the soils encountered, it was deemed that water levels would have stabilized almost immediately upon drilling. The driller was, therefore, authorized to backfill the testholes on the day following drilling. Percolation testing was performed following the testhole drilling program. Land Use Branch, Alberta Environmental Protection, "Interim Guidelines of the Evaluation of Water Table Conditions and Percolation Rate for Unserviced Residential Subdivisions" was used as a reference for percolation testing. All percolation holes were hand augered to depths of approximately 900 mm although sloughing during the soaking and testing periods resulted in a slightly shallower hole. It is noted that rapid dissipation of the initial soak enabled percolation testing to proceed shortly after the drilling program.

## SUBSURFACE SOIL CONDITIONS

Refer to the individual testhole logs and grainsize distribution plots for information specific to each test location. In general, a surface mantle of fibrous organic cover was

encountered at each testhole location. Depths of organic varied from 75mm to 150mm with an average depth of 100mm.

The native inorganic soil deposits encountered to termination depth at all locations (excluding testhole 95-6) were predominately fine to medium grained sands. The mode of deposition is uncertain at this time. Given the proximity to an existing creek to the west and transitional soil profile encountered, it is speculated that the land form may be associated with a terrace of fluvial outwash deposits. The sands, in all testholes where encountered, exhibited some silt to silty conditions throughout the upper 1.2 to 1.8 meters. Fines contents of 15 to 30 percent were noted. The soils below this depth were notably cleaner, exhibiting fines contents of less than 5 percent. It was also noted that grainsize distribution was coarsest closest to the muskeg where some small gravel sizes were encountered. Sand sizes were typically uniform with the majority of grainsizes ranging from 0.63mm to 0.16mm in nominal size. As such, the sands are of fine to medium grainsize and of poor gradation. In all cases, the sands were damp to moist and in a medium dense state.

A continuous deposit of silt was encountered at testhole 95-6. The silt was moist and of firm to soft consistency. Some moisture was emanating from a thin frozen zone approximately 1.4 meters below the ground surface. The testhole had filled to this level with water by the end of the drilling program.

No groundwater or evidence of groundwater was encountered within the sand subsoils. It is the writer's experience that groundwater accumulations will have materialized particularly where sand conditions are clean and free draining. Further, no evidence of increased moisture within the sand soils was noted as is normally the case where cyclic (or seasonal) high groundwater leave behind residual moisture. As such, it is the opinion of the writer that the general groundwater table is controlled by the muskeg and remains more than 3.0 meters below the ground surface (at all locations outside the localized depression).

Results of the percolation tests reveal rapid infiltration rates with exception to Testhole 95-6. All percolation rates were less than 5 min./2.5 cm and, in the locations of Testhole 95-1 and 95-4, less than 1 min/2.5 cm. These rapid draw down rates are as expected given the granular characteristics of the subsoils throughout this site. Exception was noted at Testhole location 95-6 where an average percolation rate of 27 min/2.5 mm was measured.

## **RECOMMENDATIONS**

It is understood that all acreage lots proposed for this development will contain an area of at least one acre of land above and beyond the muskeg terrain inhabiting the western portions of the subdivision. Outside the localized depression previously noted, the soil conditions encountered throughout the poplar/spruce forest inhabiting most of the site are favourable for standard house foundation construction. The site is considered geotechnically feasible for the intended subdivision. The granular nature of the soils do, however, yield rapid septic field sewage percolation rates and may require alternative disposal methods.

## A. House Foundations

The sand subsoils yield adequate bearing capacity for standard house footing foundations. An allowable bearing capacity of at least 150 kPa should be realized. Standard house footing sizes of 450mm width by 150mm depth should be adequate for most houses constructed throughout the site. All footings should be provided with a cover of at least 1.5 meters as measured from the bottom of footing to the top of the adjacent ground surface. This will provide adequate frost protection.

Due to the potential of sloughing conditions, basement excavations should be cut back, from the vertical, at least 45°. No loose, slough, or excessively disturbed soils should remain at footing elevation. It is advised that hand cleaning be performed where an acceptable surface not be prepared by mechanical equipment. Footing excavations should be protected from drying, rain, snow, freezing and the ingress of surface water. It is recommended that floor joists and basement slabs be placed prior to backfilling the excavation in order to minimize any detrimental effects on the foundation walls caused by backfilling operations. Positive drainage away from all house foundations should be provided. This will require a positive lot grading of at least 5 percent. A splash pad or permanent downspout extension should carry water from the roof leaders at least 1.5m away from the house.

## B. <u>Sewage Disposal</u>

Percolation tests performed throughout all developable portions of the subdivision exhibited rapid dissipation rates, all of which were less than 5 min/2.5 cm. it is noted that Alberta Environmental Protection suggests rates of between 5 min/2.5 cm and 60 min/2.5 cm for septic field percolation. Additional environmental study would be required if considering septic field discharge of domestic sewage. As an alternative, holding tanks or an evaporation mound system may be considered. The local branch of Alberta Labor, Gas and Plumbing Division, should be contacted for details regarding the design and installation details of an evaporation mound.

## C. Road Construction

The sand subsoils encountered throughout this site are considered to be good for the construction of the main access road. The sands do offer good subgrade drainage characteristics. All organic soils should be removed from the road area prior to construction. Where embankment fill is required, the native sands or an imported lean clay or gravel may be considered. All fill should be placed in lifts not exceeding 300mm and recompacted to a minimum of 97 percent of the standard proctor density. All embankment side slopes and backslopes should be maintained at grades not steeper than 4H:1V and vegetated as soon as possible to minimize erosion. The standard subgrade preparation will require scarification of the subgrade soils to a depth of 150mm and recompacted to a minimum of 100 percent of the standard proctor density at optimum moisture content. Pavement designs can be provided upon request.

## **CLOSURE**

This report has been prepared for the exclusive and confidential use of Sundance Recreations and Walker Consulting Group Ltd. Use of this report is limited to the noted residential subdivision only. The recommendations given are based on the subsurface soil conditions encountered during test boring, current construction techniques, and generally accepted engineering practices. No other warranty, expressed or implied, is made. Due to geological randomness of many soils formations, no interpolation of soil

conditions, other than those encountered has been made or implied. Soil conditions are known only at the test boring location. Should other soils be encountered during construction or other information pertinent become available, the recommendations may be altered or modified in writing by the undersigned.

We trust this information is satisfactory. If you should have any further questions, please contact our office.

APPROVED BY

RESPECTIVELY SUBMITTED, J.R. PAINE & ASSOCIATES LTD.

PERMIT TO PRACTICE
JR PAINE & ASSOCIATES LTD.

Signature R. Stefaniw

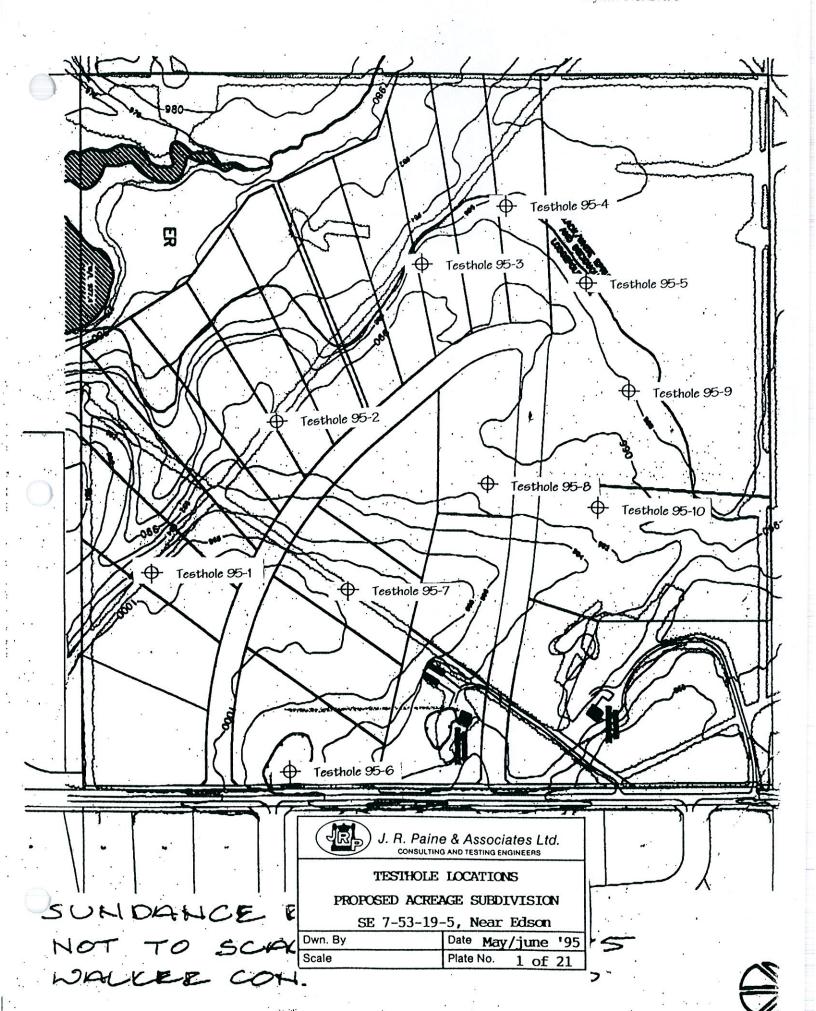
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The Association of Professional Engineers,
Geologists and Geophysicists of Alberta

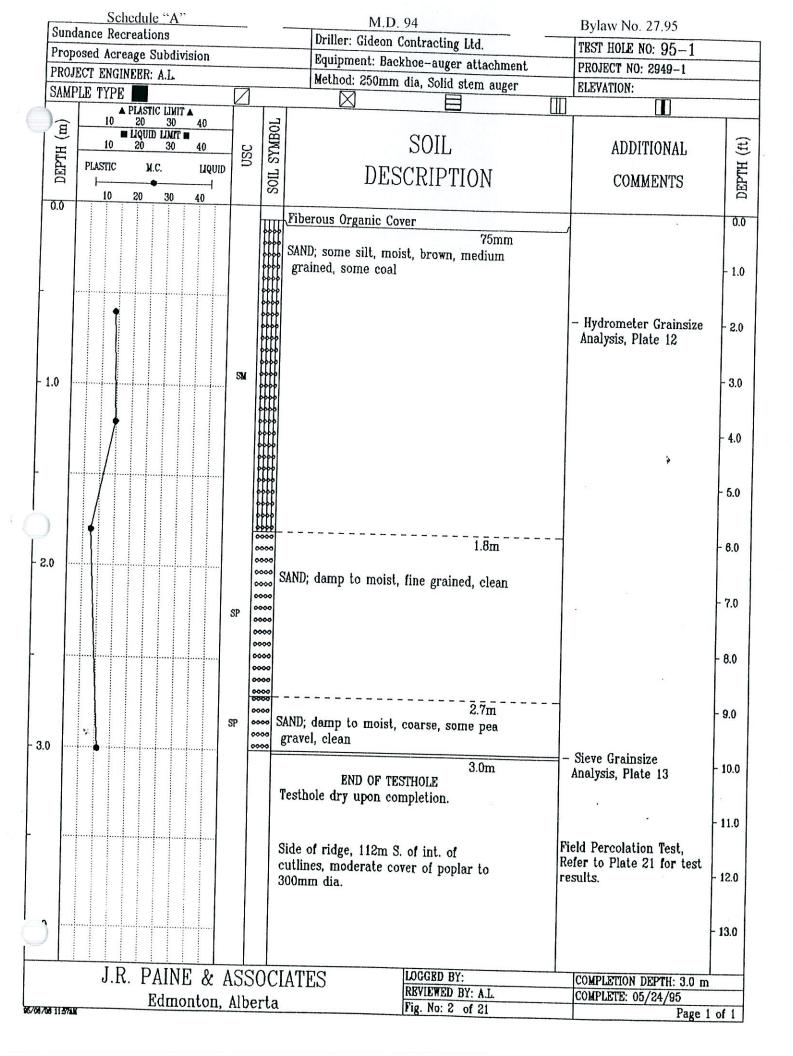
Roman Stefaniw, P. Eng.

Al Lang, P. Eng.

AL/sc/R0211SUN

## APPENDIX A





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							, whom combletion.			
F										11.0
						Mo	derate spruce cover to 350mm dia., some	Fie	eld Percolation Test,	
						po	plar.	Ke	fer to Plate 21 for test sults.	- 12.0
								1.63	ouw.	10.0
<b>- 4</b> .	0									- 13.0
(										
		JR	PAINE	1 8,	1001	CIV	TES LOGGED BY:		COMPLETITION PROPERTY	
		0.16.					REVIEWED BY: A.L.		COMPLETION DEPTH: 3.0 m COMPLETE: 05/24/95	
95/04	/08 11 56LH		Edmoi	nion,	Albe	rta	Fig. No: 3 of 21		Page 1	of 1
									4-1	

Sunc	Schedule "A" dance Recreations			MD 94	Bylaw No. 27.95	
Prop	posed Acreage Subdivision			Driller: Gideon Contracting Ltd.  Equipment: Backhoe-auger attachment	TEST HOLE NO: 95-3	
PROJ	JECT ENGINEER: A.L.			Method: 250mm dia, Solid stem auger	PROJECT NO: 2949-1	
SAMI	PLE TYPE				ELEVATION:	
	▲ PLASTIC LIMIT ▲ 10 20 30 40					
H H	10 20 30 40 ■ LIQUID LIMIT ■ 10 20 30 40	USC	SYMBOL	SOIL	ADDITIONAL	(£)
DEPTH	PLASTIC N.C. LIQUID	US	SOIL S	DESCRIPTION	COMMENTS	DEPTH (ft)
0.0	10 20 30 40			erous Organic Cover	001431211110	
			110 (	100mm	-	0.0
			SAN	D; silty, moist, brown, fine grained		- 1.0
		SNI	>>>> >>>> >>>> >>>> >>>>		– Hydrometer Grainsize Analysis, Plate 14	- 2.0
- 1.0			<del>                                      </del>	eathered coal seam intermixed @ 0.9m	5	- 3.0
		SP	SIII	1.1m ; moist, med grained, brown, trace of	,	- 4.0
			0000	1.5m		- 5.0
- 2.0	<b>,</b>	0	SAND	damp to moist, med to coarse grained		- 6.0
		SP 0	000 000 000 000	* .	•	- 7.0
.		0.00	>>> >>> >>> >>>			- 8.0
3.0	N.	00	clean		,	- 9.0
8				3.0m END OF TESTHOLE ole dry upon completion.		- 10.0
						- 11.0
			Sparse	y to the north approx 4-5m in elev	Tield Percolation Test, defer to Plate 21 for test esults.	- 12.0
4 n						- 13.0
	J.R. PAINE & A	SSC	CIATI	LOGGED BY:	COMPLETION DEPTH: 3.0 m	
	Edmonton			REVIEWED BY: A.L.	COMPLETE: 05/24/95	
08/08 11:500	r Bamonton,	MUE.	ια	Fig. No: 4 of 21	Page 1	of 1

Sund	Schedule ance Recreations	Α			M.D. 94 Driller: Gideon Contracting Ltd.		Bylaw No. 27,95	
Propo	osed Acreage Sub	division			Equipment: Backhoe-auger attachment		TEST HOLE NO: 95-4	
	ECT ENGINEER: A.I	4			Method: 250mm dia, Solid stem auger		PROJECT NO: 2949-1	
SAMP	LE TYPE					ПП	ELEVATION:	
	▲ PLASTIC LI 10 20 3	IMIT ▲ 30 40	T					
(m)	■ LIQUID LI	TIV	-	SYMBOL	SOIL		1 D D I III C L L L	
DEPTH		30 40	USC	SYN			ADDITIONAL	3
B	PLASTIC M.C.	HOUIT		SOIL	DESCRIPTION		COMMENTS	
	10 20 3	0 40		SS			COMMENTS	
0.0				F	berous Organic Cover			-
				9999	100mm			-   `
				book SA	AND; silty, moist, brown, fine grained			
			SM	S S	ome coal			- 1
1								
	•			0000				
				0000	0.6m			- 8
				0000				
.0				0000				- 3
.0			SP-SM	0000				13
				0000 SA	ND; moist, med grained, brown, trace of			
				oooo Si	lt	-	- Sieve Grainsize	- 4
				0000			Analysis, Plate 15	
				0000			*	
				0000	1.5m			- 5.
			0 1	0000				
)	<b>†</b>			0000 SAI	ND; damp to moist, medium grained			
0			-	•••••	e, assip to moist, meatum grained			- B.
			- 1	0000				
				0000			2	7.
			SP c	000			*	"
				000				
			59 500	000				- 8.0
			٥	000				
			۰	ooo cle	an			
				000 CTE				9.0
	4			000 000				
			ř		3.0m	=		10.
				_	END OF TESTHOLE			10.
			l	Tes	thole dry upon completion.		· ·	
					•			- 11.
				Loc	eated at westown most maint 4	Fi	eld Percolation Test,	
				Mod	ated at western-most point of ridge. derate cover of spruce & poplar mix	Re	efer to Plate 21 for test	
					or optace a popular mix	re	sults.	- 12.
								- 13.0
)								13.
ــــــــــــــــــــــــــــــــــــــ	ID DAT	NIEL 0	100	0071	MING Hoggan au			
	J.R. PAI				TES LOGGED BY: REVIEWED BY: A.L.		COMPLETION DEPTH: 3.0 m	
	Edi	nonton,	Albe	rta	Fig. No: 5 of 21		COMPLETE: 05/24/95 Page 1	

	lance Rec						Driller: Gideon (	Contracting Ltd.		Bylaw No. 27.95 TEST HOLE NO: 95-5	
	osed Acre			on		•	Equipment: Back	choe-auger attac	chment	PROJECT NO: 2949-1	
							Method: 250mm	dia, Solid stem	auger	ELEVATION:	
SAMP	LE TYPE		VIII .				$\boxtimes$				
E	10	PLASTIC LI	0 4	10							
(m)	10	LIQUID LIN		10		SYMBOL		SOIL		ADDITIONAL	
DEPTH	PLASTIC	И.C.			SC	SY	DEG			TANDILIONAL	
DEI	- I I I I I	и.с.		TIÓNID		SOIL	DES	CRIPTION		COMMENTS	
	10	20 30	0 4	0		(X)				o o lamining	
0.0						F	berous Organic Co	/Pr			-
1						0000		100	Omm		`
						0000 S	ND; gravelly, trace	of silt, damp.			
						0000	ned, to coarse grai	ned, grey-brown	1		- 1
-					1	0000				1	
	•					0000					
						0000				- Hydrometer Grainsize	- 2
					SP-SM	0000				Analysis, Plate 16	
					0. 02	0000					
0						0000					- 3
						0000					
	•					0000					
	1					0000					- 4
						0000					
						0000				,	ı
1						0000		$\overline{1.5}$	m	*	- 5.
					- 1	0000					
	•					0000					
					- 1	ooo SAI	D; damp to moist,	medium graine	d		<u>-</u> β.
		<u> </u>			1	0000					
					- 1	2000					
					an I	>000					7.
						0000					
					0.0	000					
					21	000					- 8.0
						000				a	
					0	ooo ale	an, grey-brown				
						000	an, grey-brown				9.0
	. (					000					
					P	000					
				1			END OF TES	3.0n	n		10.
						Tes	thole dry upon cor	npletion.			
						Son	ne marginal frost	9 1.2-1.5m		<b>11</b>	
											11.
						Near	top edge of ridge	descending		Field Percolation Test,	
						mod	erately to the nort	h. Moderate cov		Refer to Plate 21 for test results.	- 12.
						spru	ce & poplar mix.		ľ	odito.	16.
											- 13.
1		Dir	ATT:		100			I. a = 22			
	J.K	. PAI					TES	LOGGED BY: REVIEWED BY: A.I		COMPLETION DEPTH: 3.0 m	
1K 1144	7	Edn	nont	on,	Albe	rta			<u> </u>	COMPLETE: 05/24/95	
12:00	7	EUL	поп	.UII,	ALDE	ria		Fig. No: 6 of 21		Page 1	of

Sundan	Schedule "A" nce Recreations		_	M.D. 94		Bylaw No. 27.95	
	ed Acreage Subdivi			Driller: Gideon Contracting Ltd.		TEST HOLE NO: 95-6	
PROJECT	T ENGINEER: A.L.			Equipment: Backhoe-auger attachment		PROJECT NO: 2949-1	
SAMPLE			7	Method: 250mm dia, Solid stem auger		ELEVATION:	
	A PLASTIC LIMIT		۲.				
田田	10 20 30 ■ LIQUID LIMIT ■ 10 20 30		USC	SOIL		ADDITIONAL	(#
DEPTH	PLASTIC N.C.	HQUID	USC	AND		LIDBITION	) H
0.0	10 20 30	40	Soll	DESCRIPTION		COMMENTS	) HTPTH (#)
0.0				Fiberous Organic Cover			0.0
			11111	150mm			
				SILT; brown, moist, some sand, trace of clay, firm to soft, slow seepage @ 1.2m			- 1.0
	•				-	- Hydrometer Grainsize Analysis, Plate 17	- 2.0
1.0							3.0
						<b>*</b>	- 4.0
		MI					- 5.0
2.0							6.0
							7.0
							- 8.0
0							- 9.0
			Т	3.0m END OF TESTHOLE esthole dry upon completion.			- 10.0
			L 1	ome marginal frost @ 1.2m. ocated in localized depression approx. Om in elevation below surrounding	Fiel	d Percolation Test,	- 11.0
			l la	ndscape. Willow, spruce, and poplar mix	Ref	er to Plate 21 for test ults.	- 12.0
							- 13.0
	J.R. PAINE	& AS	SOCI	ATES LOGGED BY:		COMPLETION DEPTH: 3.0 m	
		ton, All		REVIEWED BY: A.L.		COMPLETE: 05/24/95	
8 1231PM	numon	VUII, AIL	rei la	Fig. No: 7 of 21	-	Page 1	

PRODUCT ENUMERICAL Supposed Acreage Subdivision PRODUCT ENUMERICAL Supposed Acreage Subdivision PRODUCT ENUMERICAL Method: 250mm dia, Solid stem auger  SAMPLE TPE SUPPOSED W.C. 100m 200 40  PRODUCT W.			ndance Rec				٠.	Driller: Gideon Contracting Ltd.		Bylaw No. 27 95	
SAMPLE TIPE    A PASTIC LIBIT A   Fill   SOIL   SOIL   ADDITIONAL   COMMENTS   EXPANDOR:		Pro	posed Acre	eage Subdi	ivision			Equipment: Backhoe-auger attachment			
Solution								Method: 250mm dia, Solid stem auger			
SOIL ADDITIONAL  Separate Mc. Usquo  DESCRIPTION  DESCRIPTION  COMMENTS  Solution  DESCRIPTION  DESCRIPTION  COMMENTS  Solution  DESCRIPTION  DESCRIPTION  COMMENTS  Solution  Adaption  A		DAIL			IT A	K					
DESCRIPTION  COMMENTS  DESCRIPTION  DESCRIPTION  COMMENTS  DESCRIPTION  DES	(		10	20 30 LIQUID LIMIT	40	- -	MBOL	SOIL.			£
Fiberous Organic Cover    SAND; some silt, damp to moist, fine to medium grained, brown, some coal   SAND; some silt, damp to moist, fine to medium grained, brown, some coal   -1.0		PT	PLASTIC	M.C.	LIQUID	Sn	SY	DECODED		ADDITIONAL	H (f)
Fiberous Organic Cover    SAND; some silt, damp to moist, fine to medium grained, brown, some coal   SAND; some silt, damp to moist, fine to medium grained, brown, some coal   -1.0		D	10	20 00			SOI	DESCRIPTION		COMMENTS	FE
SAND; some silt, damp to moist, fine to medium grained, brown, some coal  - Hydrometer Grainsize Analysis, Plate 18  - Analysis, Pla		0.0	10	20 30	40		-	Et a			
AMD; some silt, damp to moist, fine to medium grained, brown, some coal  -1.0  -Hydrometer Crainsize Analysis, Plate 16  -3.0							<b>PPPP</b>				0.0
Analysis, Plate 18  1.2m  1.2m  4.0  3.0  5.0  SAND; damp to moist, fine grained  5.0  5.0  SAND; damp to moist, fine grained  6.0  6.0  6.0  6.0  Field Percolation Test, Refer to Plate 21 for test popular cover to 250mm dia. few spruce intermixed  1.2m  6.0  7.0  1.2m  7.0  8.0  1.2m  1								SAND; some silt, damp to moist fine to			- 1.0
- 3.0  - 3.0  SAND; damp to moist, fine grained  - 6.0  - 7.0  - 8.0  - 9.0  - 10.0  - 11.0						SMI				– Hydrometer Grainsize Analysis, Plate 18	- 2.0
SAND; damp to moist, fine grained  -8.0  -	-	1.0									- 3.0
SAND; damp to moist, fine grained  -5.0  -5.0  -5.0  -5.0  -6.0  -7.0  -							0000	1.2m			- 4.0
SAND; damp to moist, fine grained  - 8.0  - 7.0  - 8.0  -							0000				- 5.0
- 3.0    SP   0000   00	- 8	2.0					>>>> S	SAND; damp to moist, fine grained			- 6.0
Clean, brown, trace of coal  BND OF TESTHOLE Testhole dry upon completion.  Slightly uneven topography, moderate poplar cover to 250mm dia. few spruce intermixed  J.R. PAINE & ASSOCIATES Edmonton, Alberta  LOCGED BY:  REVIEWED BY: A.L.  COMPLETION DEPTH: 3.0 m  REVIEWED BY: A.L.  COMPLETE: 05/24/95						SP	000				7.0
clean, brown, trace of coal    Some   Substitute   Substi	-					0	000 000				- 8.0
Intermixed  3.0m  END OF TESTHOLE  Testhole dry upon completion.  Slightly uneven topography, moderate poplar cover to 250mm dia. few spruce intermixed  J.R. PAINE & ASSOCIATES  Edmonton, Alberta  Edmonton, Alberta  END OF TESTHOLE  Testhole dry upon completion.  -11.0  Field Percolation Test, Refer to Plate 21 for test results.  -12.0  -13.0	- 3.	0				64 64 64	>>> >>>>	clean, brown, trace of coal			9.0
Slightly uneven topography, moderate poplar cover to 250mm dia. few spruce intermixed  J.R. PAINE & ASSOCIATES  Edmonton, Alberta  Edmonton, Alberta  Edmonton, Alberta  Elicography, moderate poplar cover to 250mm dia. few spruce intermixed  Field Percolation Test, Refer to Plate 21 for test results.  12.0  13.0  COMPLETION DEPTH: 3.0 m  REVIEWED BY: ALL  COMPLETE: 05/24/95								END OF TESTHOLE			- 10.0
J.R. PAINE & ASSOCIATES  Edmonton, Alberta    Document of the property of the											- 11.0
J.R. PAINE & ASSOCIATES  Edmonton, Alberta  LOGGED BY:  REVIEWED BY: AL.  COMPLETION DEPTH: 3.0 m  REVIEWED BY: AL.  COMPLETE: 05/24/95							l po	plar cover to 250mm dia, few spruce	Re	fer to Plate 21 for test	- 12.0
J.R. PAINE & ASSOCIATES  Edmonton, Alberta  LOGGED BY:  REVIEWED BY: AL.  COMPLETION DEPTH: 3.0 m  REVIEWED BY: AL.  COMPLETE: 05/24/95										F	
Edmonton, Alberta REVIEWED BY: AL COMPLETE: 05/24/95	- 4.0										- 13.0
Edmonton, Alberta REVIEWED BY: AL COMPLETE: 05/24/95			JR	PAIN	E & A	550	CI	ATTS LOGGED BY:		CONDITION DELIVER OF	
								REVIEWED BY: A.L.		COMPLETE: 05/24/95	
	6/06/	08 02:20P	¥	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		III/C	u	Pig. No: 8 of 21			of 1

	ndance Rec					_	Driller: Gideon Contracting Ltd.  Bylaw No. 27.95 TEST HOLE NO. 95-8	
Pro	oposed Acre	eage S	Subdiv	rision			Equipment: Backhoe-auger attachment. PROJECT NO. 2010.	
	OJECT ENGI		A.L.				Method: 250mm dia, Solid stem auger ELEVATION:	
SAI	MPLE TYPE				$\overline{Z}$		X F TT	
	_ 10	PLASTI 20	IC LIMIT	`▲ 40		1		
		LIQUII	30 LIMIT	# TO		B0	COIL	
	10	20	30	40	- S	SYMBOL	SOIL ADDITIONAL	#
DEPTH	PLASTIC	N.	.C.	ΠÓΩ	ID   =		DECODIDMICM	표
"	10	20	30			SOIL	DESCRIPTION COMMENTS	DEPTH (ft)
0.0	1		30	40				1 1
						PPPP	Fiberous Organic Cover	0.0
							SAND: gorne sill 1	
- 1					1	1	SAND; some silt, damp, fine grained, brown	
							13.78.1	- 1.0
ſ						16666		
	1				ı	1000		
						bbbb		- 2.0
- 1.0								
1.0						1		3.0
ŀ					SM			
						1		
								4.0
L						1		
ſ					1			
						1		- 5.0
					1	1111		
	1							
- 2.0					l			- 6.0
2.0					1	1		
						0000		
						0000	2.1m	- 7.0
						0000	AND; damp to moist, fine to medium	
1						0000	, and to median	
					SP	0000		- 8.0
						9000	w w	
						0000	grained, clean, brown	
1 1						0000		9.0
- 3.0	· L					0000		
"					İ	-	0.0	
							BND OF TESTHOLE	10.0
						1	esthole dry upon completion.	
							,	
ļ.							. *	11.0
						l b	loderate cover of mature poplar, few Field Percolation Test,	
						s	pruce, gentle ascent westerly Refer to riate 21 for test	400
							results.	12.0
- 4.0								120
								13.0
	J.R	. P <i>i</i>	AINE	E &	ASS	SOCI	ATES LOGGED BY: COMPLETION DEPTH: 3.0 m	L
				nton			REVIEWED BY: A.L.   COMPLETE: 05/24/05	
6/06/08 12:00	24				, ,,,,,,,	or ou	Fig. No: 9 of 21 Page 1	of 1

PRODUCT NO. INCHER AL.  SMPLE TYPE  Method: 250mm dia, Solid stem auger  SIEVATION:  SOIL  DESCRIPTION  COMMENTS  SAND; Some silt, damp, fine grained, brown  1.0  1.0  SAND; damp to moist, fine to medium  SAND; some silt, damp, brown  SAND; damp to moist, fine to medium  SAND; some silt, damp, brown  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.			ance Recreations				Driller: Gideon Contracting Ltd.	Bylaw No. 27.95	
SMPE TITE     Method: 250mm dia, Solid stem auger   SLEVATION:	.	Propo	sed Acreage Subdivi	ision			Equipment: Backhoe-auger attachment	TEST HOLE NO: 95-9	
IN PRINCE UNIT A PAINE & ASSOCIATES  IN A PAIN	L	PROJE	CT ENGINEER: A.L.				Method: 250mm dia. Solid stem augen		
SOIL ADDITIONAL  PURSTOR MAY 10  10 20 30 40  Fiberous Organic Cover  SAND; some silt, damp, fine grained, brown  10  10  10  10  10  10  10  10  10  1		SAMPI			0				
DESCRIPTION  DESCRIPTION  DESCRIPTION  DESCRIPTION  DESCRIPTION  DOMENTS  Fiberous Organic Cover  SAND; some silt, damp, fine grained, brown  1.0  -2.0  -2.0  SAND; damp to moist, fine to medium  grained, clean, brown  SAND; damp to moist, fine to medium  grained, clean, brown  BEND OF TESTHOLE  Testhole dry upon completion.  Dense cover of young spruce  Field Percolation Test, Refer to Plate 21 for test results.  13.0  J.R. PAINE & ASSOCIATES  REVIEWED BY: ALL COMPLETE 65/28/95 13.0 m  13.0	1		▲ PLASTIC LIMIT	A 40		1.3		<u> </u>	
DESCRIPTION  DESCR	9		■ LIQUID LIMIT ■ 10 20 30		SC	SYMBOI	SOIL	ADDITIONAL	(ft)
Fiberous Organic Cover    100mm   100mm   1.0   2.0   2.0   3.0   3.0   END OF TESTHOLE   Testhole dry upon completion.   11.0   Dense cover of young spruce   Pield Percolation Test, Refer to Plate 21 for test results.   12.0   1.0   J.R. PAINE & ASSOCIATES   LDGCED BY: REVIEWED BY: AL.   COMPLETE: 85/24/35 m   13.0 m   10.0   Complete: 85/24/35 m   13.0 m   13			<b>—</b>		Ω		DESCRIPTION	COMMENTS	DEPTH
SAND; some silt, damp, fine grained, brown  -1.0  -2.0  -2.0  -3.0  -3.0  SAND; damp to moist, fine to medium  grained, clean, brown  -3.0  END OF TESTHOLE  Testhole dry upon completion.  -11.0  -10.0  Field Percolation Test, Refer to Plate 21 for test results.  -13.0  J.R. PAINE & ASSOCIATES  ENDOGRO BY:  COMPLETION DEPTH: 3.0 m  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0  -13.0		0.0	30	40			Fiberess O		
2.4m -2.0  SAND; damp to moist, fine to medium grained, clean, brown -3.0  END OF TESTHOLE Testhole dry upon completion.  Pied Percolation Test, Refer to Plate 21 for test results.  J.R. PAINE & ASSOCIATES  Edward for All COMPLETIC 05/24/95							100mm		- 1.0
SAND; damp to moist, fine to medium  sp  SAND; damp to moist, fine to medium  grained, clean, brown  END OF TESTHOLE  Testhole dry upon completion.  Dense cover of young spruce  Field Percolation Test, Refer to Plate 21 for test results.  11.0  Dense cover of young spruce  Field Percolation Test, Refer to Plate 21 for test results.  12.0  13.0  J.R. PAINE & ASSOCIATES  Edward of All Automatics and Park an			1						- 2.0
2.4m  - 8.0  SAND; damp to moist, fine to medium  sp  END OF TESTHOLE Testhole dry upon completion.  Dense cover of young spruce  Field Percolation Test, Refer to Plate 21 for test results.  13.0  J.R. PAINE & ASSOCIATES  ENDOGED BY: REVIEWED BY: ALL COMPLETION DEPTH: 3.0 m  REVIEWED BY: ALL COMPLETION DEPTH: 3.0 m	- 1	1.0			SMI				
3.00  SAND: damp to moist, fine to medium  grained, clean, brown  END OF TESTHOLE Testhole dry upon completion.  J.R. PAINE & ASSOCIATES  LOGGED BY: REVIEWED BY: AL. COMPLETION DEPTH: 3.0 m  REVIEWED BY: ALL COMPLETE: 05/24/95								<b>*</b>	- 5.0
SAND; damp to moist, fine to medium  SAND; damp to moist, fine to medium  grained, clean, brown  END OF TESTHOLE Testhole dry upon completion.  Dense cover of young spruce  Field Percolation Test, Refer to Plate 21 for test results.  12.0  13.0  J.R. PAINE & ASSOCIATES  EXCEPTION DEPTH: 3.0 m  REVIEWED BY: AL. COMPLETION DEPTH: 3.0 m	- z.	0							
J.R. PAINE & ASSOCIATES    SP   00000   0000   0000   0000   0000   0000   0000   0000   0000   0000	-				00	000	2.4m AND; damp to moist, fine to medium		
J.R. PAINE & ASSOCIATES  LOGGED BY: REVIEWED BY: ALL COMPLETE: 05/24/95	- 3.0	,		s	SP 000	00			- 9.0
Dense cover of young spruce  Field Percolation Test, Refer to Plate 21 for test results.  - 13.0  J.R. PAINE & ASSOCIATES  LOGGED BY: REVIEWED BY: AL. COMPLETION DEPTH: 3.0 m REVIEWED BY: AL. COMPLETE: 05/24/95						Т	END OF TESTHOLE	¥	
J.R. PAINE & ASSOCIATES  LOGGED BY:  REVIEWED BY: AL.  COMPLETION DEPTH: 3.0 m  REVIEWED BY: AL.  COMPLETE: 05/24/95	-					D	) op. 400	Refer to Plate 21 for test	
Edmonton Alberta REVIEWED BY: AL. COMPLETE: 05/24/95	- 4.0	)							- 13.0
Edmonton Alberta REVIEWED BY: AL. COMPLETE: 05/24/95			JR PAINE	7 & A	220	ויור	ATES LOGGED BY:	CONDITION DEDONG OF	
Edmonton Alberta	1						REVIEWED BY: A.L.		
98/08/08 12:08/W Page 1 of 1	95/08/08	1203°W	ramo:	nton, A	Albei	rta	Fig. No: 10 of 21		of 1

Sundance Recreations  Driller: Gideon Contracting Ltd.  Bylaw No. 27  Proposed Acreage Subdivision  Proposed Acreage Subdivision	95
Proposed Acreage Subdivision Equipment: Backhoe-augus attacks at	95-10
Method: 250mm dia Solid gtom ourses	9-1
	7
A PLASTIC LIMIT A	
E TOTAL	711 E
PLASTIC M.C. LIQUID SO SO 40  PLASTIC M.C. LIQUID SO SO SO ADDITION  DESCRIPTION  COMMEN	VAL E
DESCRIPTION COMMEN	ITS HANGE
0.0	ED ED
Fiberous Organic Cover	0.0
75mm	
SAND; some silt, moist, brown, medium	
grained	- 1.0
- Hydrometer Gr	ainsize - 2.0
Analysis, Plate	19
- 1.0	- 3.0
Su loop	0.0
	- 4.0
	,
	- 5.0
- 2.0	- 6.0
2.1m	7.0
0000	""
SAND; damp to moist, medium grained, clean	
local Drown	- 8.0
SP 0000	
0000	
0000	9.0
0000	
Sieve Crainging	
RND OF TESTHOLE  3.0m Analysis, Plate 20	10.0
Testhole dry upon completion.	
	- 11.0
	Vacablesco
Relatively flat, young cover of willow Field Percolation To	est, or tost
and poplar growth Refer to Plate 21 for results.	- 12.0
4.0	
	13.0
J.R. PAINE & ASSOCIATES LOGGED BY: COMPLETION DEPT	H: 3.0 m
REVIEWED BY: A.L.   COMPLETE: 05/24	
Edificition, Alberta Fig. No. 11 of 21	Page 1 of 1

(	1		)		`A'' R. I	<sup>D</sup> air	ne	& ,	488	soc	iate	2.5	l to			. 94				_ (		SIZ	E CL			o. 27	.95	
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8	-																					+	7					
Silt Sizes	Medium			E	=	=	E	F		F	=		=	E									3 🗏	0.0				
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## J. R. Paine & Associates Ltd.

**SCREEN ANALYSIS** 

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## J. R. Paine & Associates L.td.

SCREEN ANALYSIS

	nple:						[	Dept	h: _		1.2	m			D.	ient: . oject:		DIE	200	OTT						TV	ST	JVI	
Loc	ation	):		Te	esth	ole	95	5-4							_ M	ade b	y: _	$GB_{\underline{}}$		_ Jol	o No	o.:		294	9-1				
															_ Cł	d by:	:	AL		_ Da	te: _	M	lay	/Ju	ine,	19	95		
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ime		Siev	ing	si	lt ———	(SF _ Mi	n	M)				-						Cu Cc	=_1	1.2	6 								
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ime	of S	Siev	ing	si	lt ———	(SF _ Mi	n	M)				-						Cu Cc	=_1	1.2	6 			250					
70 80 50 40 30	of S	Siev	ing	si	lt ———	(SF _ Mi	n	M)				-						Cu Cc	=_1	1.2	6 			250					

Sampl	le:			<i>J.</i> estl	R. F	" ]	Dept 95	th: . 5	TESTING	Q.	.6m			/. 	CI Pr	ojeo ade	: ct: .		PROJ GB	DAN POS	CE ED	REG ACE	CREA	ATI GE.	ON: SUI	\$ BDI:	/.I.S.	ION 1	 5
SoriS VelO	Ciay Sizes																							0.001 0.0001		mm .	D 60 =mm		
Silt Sizes	Coarse Medium Fine																							0.01	29% Gravel	57% Sand	10% silt	48 Clav	res
Sand Sizes	Coarse Medium Fine		1250 630 315 160																/					1.0 0.1		ally, same silt (SM)			Grain Size - Millimetres
Gravel Sizes		Sieve Sizes	40 20 10 5 2									1												10	.s:	SAND; gravelly	7 N		
			100 75		8	1	80	1	70		99 u		50	ĐUI-	8	9016	% %	_	20		10		0	9	Remarks:				



### J. R. Paine & Associates L.td.

#### SCREEN ANALYSIS

Sample	e: on:	Test	hole	De	pth	:		1.8	3m			Proje	oct.	SUN PRO	moc	CTD A	CDE	30	T7	CLIDD	IVI	SIC	N_	
			11016									Mad Ck'd	e by: bv:	G A	В r	_ Job	No.:			2949	-1		100	\
S	Sieve	Size	of Op	ening	1			-			Wei				tal W		, 							
	No.		ММ		_							ed gm	s	Finer			F		erce er T	ent 'han				Than Samp
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00 III 90									55000		250	00 2000	1	250 8		630	400 3	115	255	0	16	30	80	63
00 III 90									55000		250	00 20000	1	250 8	×	630	400 3	315	256	0	160	360 I	80	63
00 III 90									5000		250	00 2000	1	250 8		630	400 3	315	255	0	16	000	80	63
00 III 90									5000		250	00 2000	1	250 8		630	400 3	115	256	0	16	30	80	63
90 80									55000		2500	00 2000	1	250 8		630	400 3	315	250	0	166	000	80	63
00									55000		2500	00 2000	1	250 8	×	630	400 3	315	25	0 1	166	000	80	63
00									55000		2500	00 2000	1	250 8	×	630	400 3	115	255	0	166	000	80	63
00									55000		250	00 20000	1	250 8	×	630	400 3	315	250	0	160	500 T	80	63
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90									55000		250	00 20000	1	250 8	×	630	400 3	315	255	°	16	000 I	80	63

# PERCOLATIC FEST RESULTS Sundance Recreations May, 1995

	11	1ESTHULE NO. 95-1	1-06.00	
Time	Depth to	Elapsed	Drop of	Percolation
	water (cm)	(min.)	Water (cm)	Rate (min/2 5cm)
15:14	45			
		89	> 40	< 0.7
17:22	dry (0) 85			
		n/a	n/a	n/a
n/a	n/a			
		n/a	n/a	n/a
n/a	n/a			
		n/a	n/a	n/a
n/a	n/a			

	TE	TESTHOLE No. 95-3	Vo. 95-3	
Time	Depth to Water	Elapsed Time	Drop of Water	Percolation Rate
	(cm)	(min.)	(cm)	(min/2.5cm)
15:45	0+			
		43	19	6.0
16:28	65			
		22	5	1.8
16:50	64			
		n/a	n/a	n/a
17:30	Dry.@ 70			
		n/a	n/a	n/a
n/a	n/a			1 1 = 0.00

	Percolation Rate	(min/2.5cm)		1.1		n/a		n/a		n/a	avg. = 1,1	
No. 95-2	Drop of Water	(cm)		28		n/a		n/a		n/a		
TESTHOLE No. 95-2	Œ	(min.)		78		n/a		n/a		n/a		
TE	Depth to Water	(cm)	45		73		dry		n/a		n/a	
	Time		3:07		4:25		n/a		n/a		n/a	

	I	TESTHOLE No. 95-4	No. 95-4	
Time	Depth to Water	Elapsed Time	Drop of Water	Percolation Rate
	(cm)	(min.)	(cm)	(min/2.5cm)
15:36	40			
		53	> 36	9.0 >
16:29	Dry @ 76			
		n/a	n/a	n/a
n/a	n/a			
		n/a	n/a	n/a
n/a	n/a			
		n/a	n/a	n/a
n/a	n/a			

# PERCOLATION TEST RESULTS Sundance Recreations May, 1995

Time	Depth to	Elapsed	Drop of	Percolation
	Water	Time	Water	Rate
	(cm)	(min.)	(cm)	(min/2.5cm)
15:30	98			
		09	10	2.4
16:30	9†			
		23	4	2.3
16:53	50			
		39	8	2.0
17:32	58			
		n/a	n/a	n/a
n/a	n/a			CC = DAB

	TE	TESTHOLE No. 95-7	40. 95-7	
Time	Depth to Water	Elapsed Time	Drop of Water	Percolation Rate
	(cm)	(min.)	(cm)	(min/2.5cm)
15:03	9†			
		9/_	6	3.4
16:19	55			
		26	2	5.0
16:45	57			
		23	6.5	1.4
17:08	63.5			
		n/a	n/a	n/a
17:22	Dry			212 = 3.3

Time Depth to Water (cm) (cm) 15:20 39 16:13 43 17:16 45 17:54 46	ESTHOLE No. 95-6	No. 95-6  Drop of  Water (cm)  2  2  1	Percolation Rate (min/2.5cm) 5.3 5.3 12.6 13.2
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	TE	TESTHOLE No. 95-8	No. 95-8	
Time	Depth to Water	Elapsed Time	Drop of Water	Percolation Rate
	(cm)	(min.)	(cm)	(min/2.5cm)
16:03	7			
		38	17	0.0
16:41	61			
		21	4	2.1
17:02	65			
		0†	6	1.8
17:42	74			
		n/a	n/a	n/a
n/a	n/a			45C = 1.6

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# PERCOLATION TEST RESULTS Sundance Recreations

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May,

TESTHOLE No. 95-9   Percolation   Water   Time   Water   Time   Water   Rate   Cm)   (min.)   (cm)   (min/2.5cm)	15:50 41 44 F7 1.0	16:34     58       61     > 17       17:35     Dry @ 75	Time 15:50 16:34 17:35	Depth to Water (cm)  41  58  Dry @ 75	Elapsed Time (min.) 44 44 61 61 n/a	10. 95-9  Drop of  Water (cm)  F7  F7  > 17  > 17	Percolation Rate (min/2.5cm) 1.0 -1.4 -1.4 -1.4 -1.4
41 44 F7 58 61 >17 Dry @ 75	58 61 >17 Dry @ 75		n/a	n/a	n/a n/a	n/a n/a	n/a n/a
41 44 F7 58 61 >17 Dry @ 75 n/a n/a n/a n/a n/a	58 61 >17	n/a	n/a	n/a			816. m 1.6

	Percolation Rate	(min/2.5cm)		1.0		1.5		< 1.7		n/a	avg. = 1.3
. 95-10	Drop of Water	(cm)		15		9		6 <		n/a	
TESTHOLE No. 95-10	Elapsed Time	(min.)		39		23		39		n/a	
TE	Depth to Water	(cm)	35		50		56		Dry @ 65		n/a
	Time		15:58		16:37		17:00		17:39		n/a