



**Ministry of Transportation and
Infrastructure**

Geotechnical and Materials Engineering

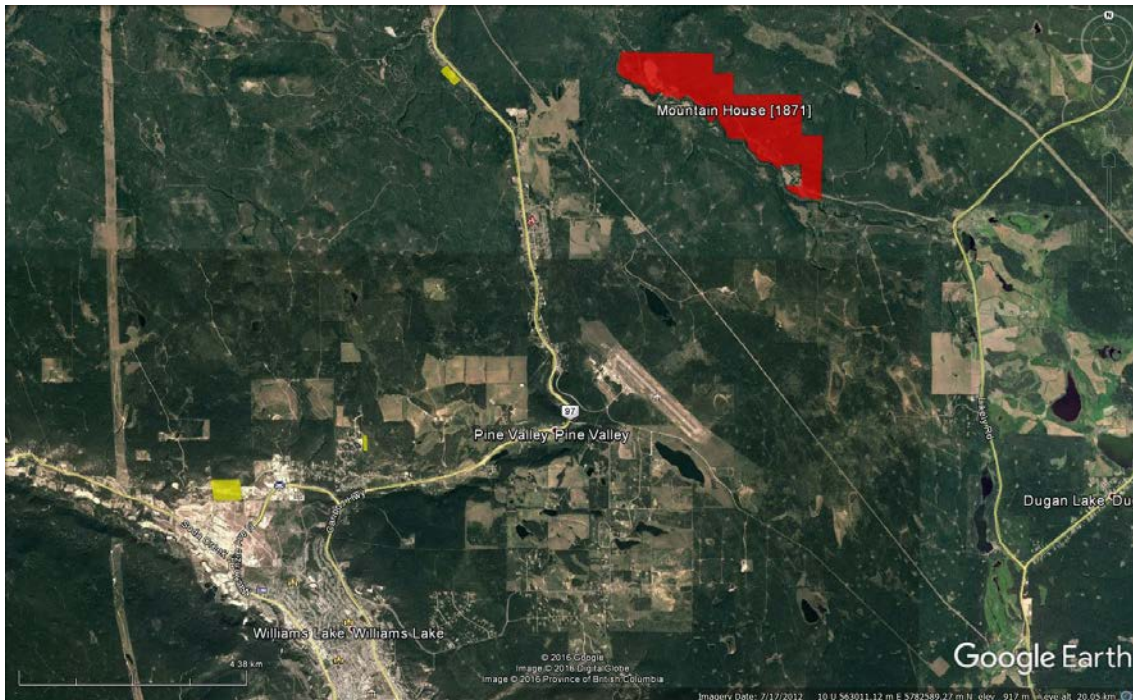
Southern Interior Region

231-447 Columbia Street
Kamloops, BC, V2C-2T3
Telephone: 250-371-3965
Fax: 250-828-4083

Mountain House Pit No. 1871

2017 Technical Information Report

Location: The pit is located approximately 14 km northeast of the Highway 20/97 intersection in Williams Lake on Highway 97 then approximately 5.5 km northeast on Westcoast and Mountain House roads.



Legal Description: Ministry of Transportation and Infrastructure Section 16 Map Reserve, legally described as that parcel or tract of land in the vicinity of District Lot 1920, Cariboo District, containing 404.43 hectares, more or less. UTM coordinates are Grid Zone 10, 5,788,100 Northing, 564,430 Easting.

Gradation: Two separate areas were identified during the 2016 testing program (Areas 'A' and 'B'). The average and range of laboratory samples as well as oversize rock field estimates for material from the 2016 testing program are as follows:

Laboratory Samples Area 'A'

Area 'A' Test pits include: 16-05 to 07, 16-10 to 13, and 16-15 to 17.

Classification:	Average (%)	Range (%)
Gravel (4.75-75mm)	65.6	52.5 – 72.0
Sand (0.075-4.75mm)	32.4	26.9 – 47.0
Fines (<0.075mm)	2.0	0.2 – 5.8

Oversize Field Estimates:

Classification:	Average (%)	Range (%)
Boulders (> 375 mm)	0	0
Large Cobbles(150 – 375 mm)	<1	0 - < 1
Small Cobbles (75 – 150 mm)	3.1	<1 – 5

The maximum size rock observed in Area A was 250 mm.

Laboratory Samples Area 'B'

Area 'B' Test pits include: 16-18 to 20 and 22.

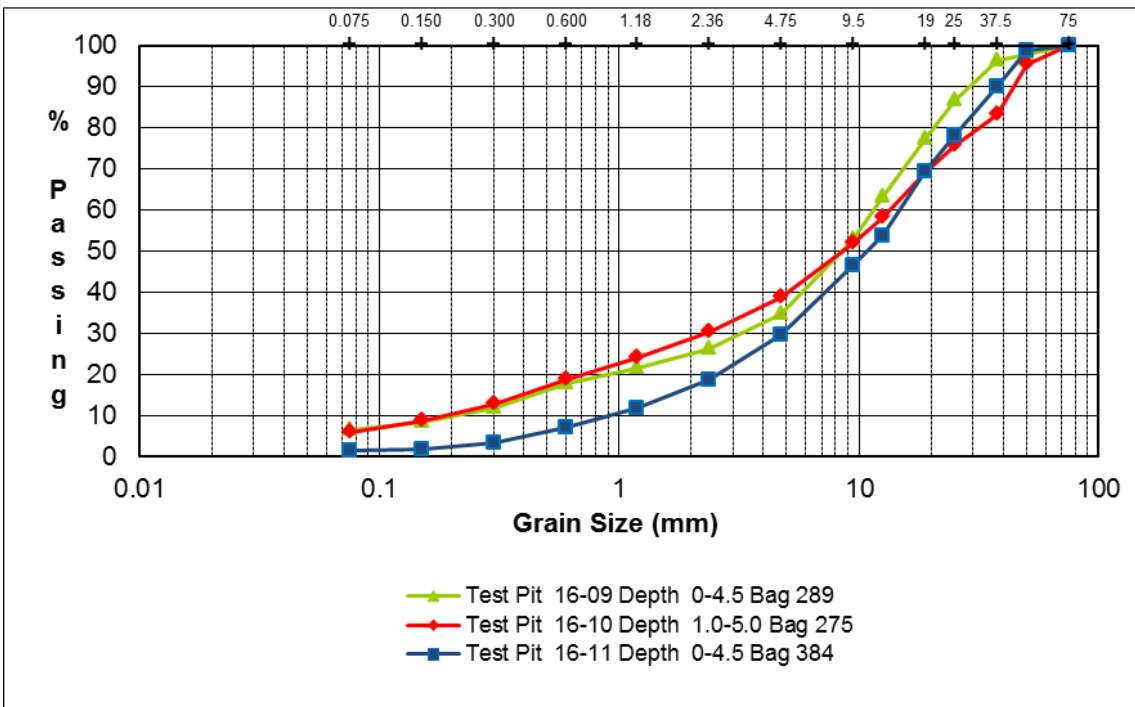
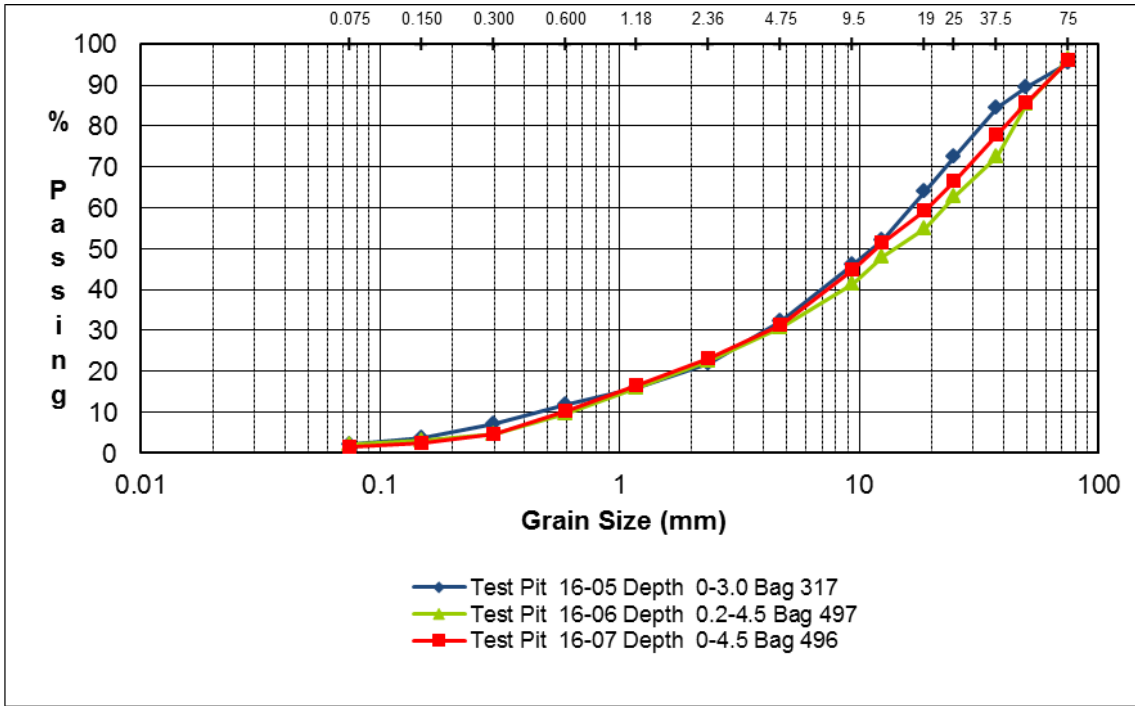
Classification:	Average (%)	Range (%)
Gravel (4.75-75mm)	62.4	55.0 – 66.8
Sand (0.075-4.75mm)	35.3	33.1 – 40.4
Fines (<0.075mm)	2.3	0.9 – 4.6

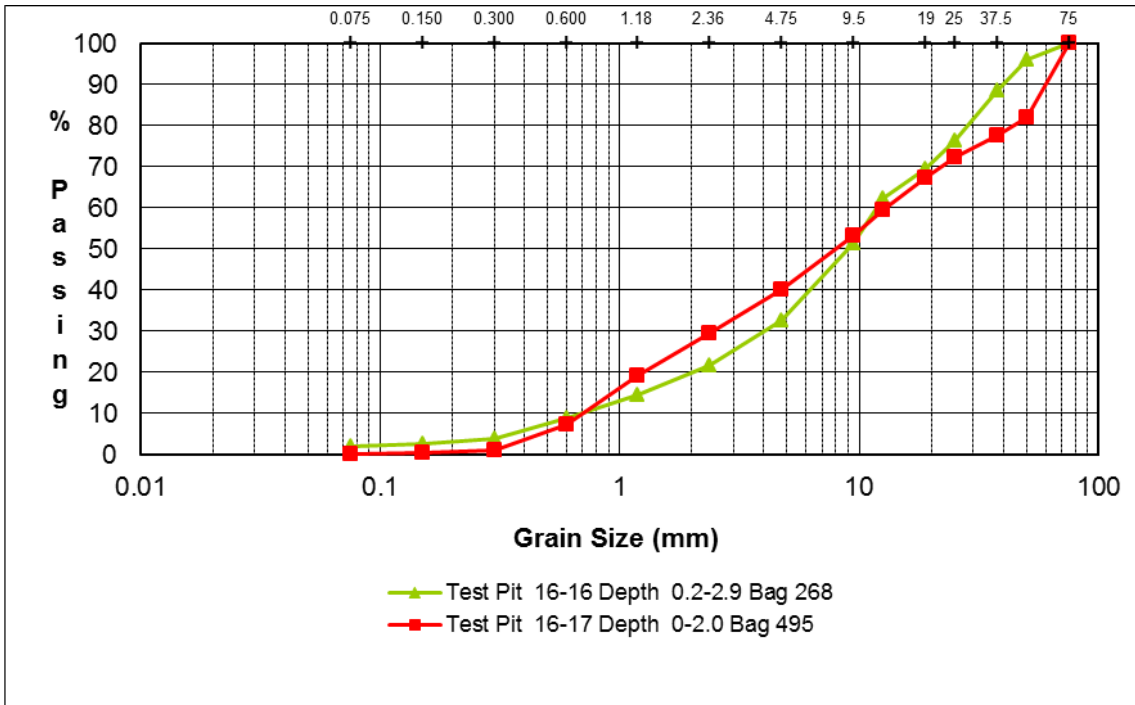
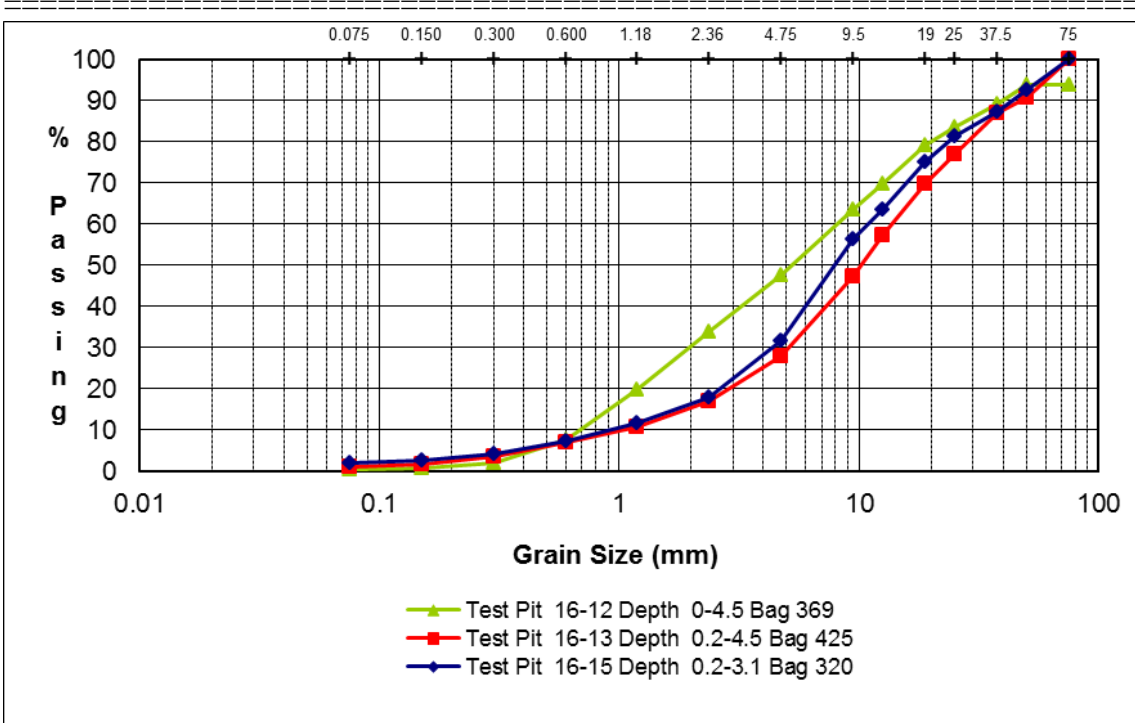
Oversize Field Estimates:

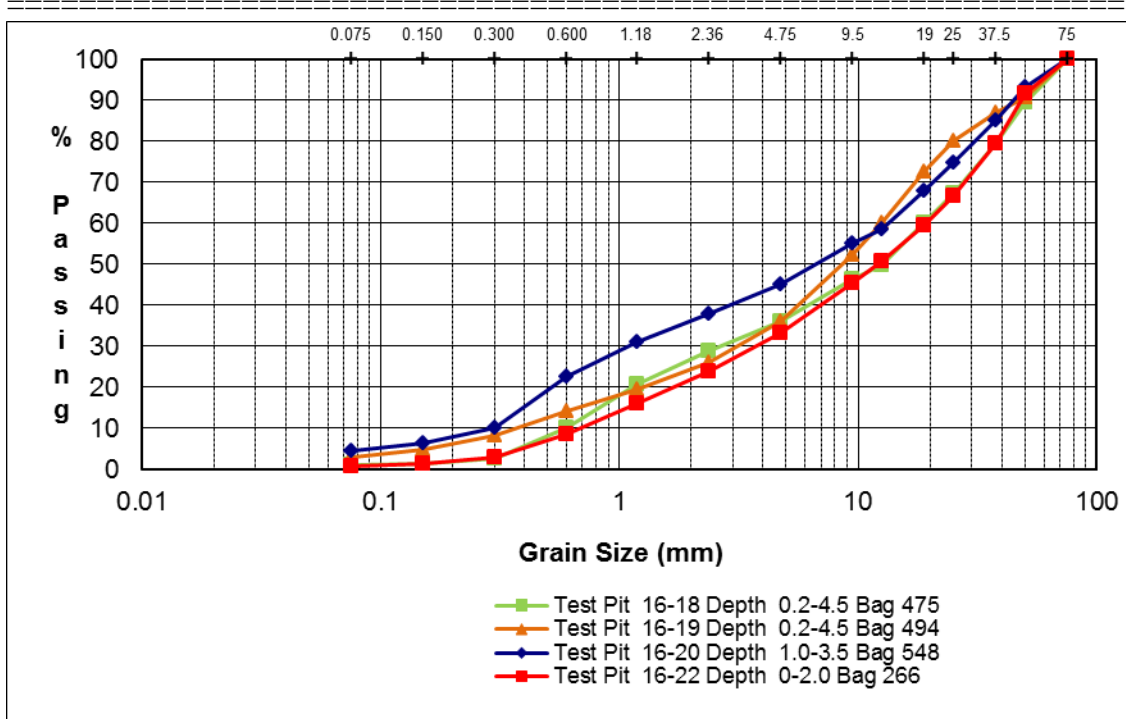
Classification:	Average (%)	Range (%)
Boulders (> 375 mm)	0	1
Large Cobbles(150 – 375 mm)	<1	0 - <1
Small Cobbles (75 – 150 mm)	3.3	<1 – 5

The maximum size rock observed in Area B was 300 mm.

Aggregate Gradation Charts:







Summary of Test Pit Logs (including Laboratory Results –in RED) are located below:

1 OF 1		AGGREGATE LOG													
PROJECT:		Mountain House Pit					SAMPLED BY:		Bryan James						
PIT #:		1871					METHOD:		Excavator						
DISTRICT:		Cariboo					DATE:		Dec 19, 20, 2016						
TP	DEPTH		SAMPLE BAG No.	Material Description	ESTIMATED GRADATION LABORATORY GRADATION			ESTIMATED ROCK 75mm				SAND TYPE			REMARKS
	FROM	TO			G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	>375mm	F	M	C	
TP16-01	0.0	1.0		SPSM		93	7							F	
	1.0	4.5		SM3	10	60	30							F	Till
TP 16-02	0.0	0.1		GP	50	47	3							FM	
	0.1	4.0		SM3	10	60	30							F	Till/Some groundwater water at 3.0 metres
TP 16-03	0.0	5.0		SM3	20	50	30							F	Till
TP 16-04	0.0	1.0		GP	60	39	1	75						FM	Some roots
	1.0	5.0		SM3	10	60	30							F	Till
TP 15-05	0.0	3.0	317	GP	58	40	2	150	5	0	0			FM	Sluffing
				GP	67.6	30.3	2.1								
	3.0	4.0		SM3	10	60	30							F	Till

1 OF 1																
AGGREGATE LOG																
PROJECT:		Mountain House Pit					SAMPLED BY:		Bryan James							
PIT #:		1871					METHOD:		Excavator							
DISTRICT:		Cariboo					DATE:		Dec 19, 20, 2016							
TP	DEPTH		SAMPLE BAG No.	Material Description	ESTIMATED GRADATION LABORATORY GRADATION			ESTIMATED ROCK 75mm				SAND TYPE		REMARKS		
	FROM	TO			G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	>375mm	F	M		C	
TP 16-06	0.0	0.2		TS												
	0.2	4.5	497	GP	60	38	2	150	5	0	0	FM	Sluffing			
				GP	69.3	28.4	2.3									
TP 16-07	0.0	4.5	496	GP	55	41	4	100	5	0	0	FM	Sluffing			
				GP	68.5	30.0	1.5									
TP 16-08	0.0	1.2		Fill												
	1.2	2.5		GP	50	48	2	150	2	0	0	FM	Sluffing			
	2.5	4.0		SM3	10	60	30					F	Till			
TP 16-09	0.0	4.5	289	GPGM	50	43	7	100	5	0	0	FM	Some wood debris in Test Pit			
				GPGM	65.3	28.2	6.5									
TP 16-10	0.0	1.0		Fill												
	1.0	5.0	275	GP	51	45	4	150	2	0	0	FM	Sluffing			
				GPGM	61.4	32.7	5.9									
TP 16-11	0.0	4.5	384	GP	58	41	1	150	2	0	0	FM	Sluffing			
				GP	70.3	28.3	1.4									
TP 16-12	0.0	4.5	369	SP	40	58	2	150	2	0	0	FM	Sluffing			
				GP	52.5	47.0	0.5									
TP 16-13	0.0	0.2		TS												
	0.2	4.5	425	GP	58	40	2	100	<1	0	0	FM	Sluffing			
				GP	72.0	26.9	1.1									
TP 16-14	0.0	0.2		TS												
	0.2	5.0		SM3	10	60	30					F	Till			
TP 16-15	0.0	0.2		TS												
	0.2	3.1	320	GP	55	43	2	100	2	0	0	FM	Sluffing			
				GP	68.2	29.9	1.9									
	3.1	5.0		SM3	10	60	30					F	Till			
TP 16-16	0.0	0.2		TS												
	0.2	2.9	268	GP	58	40	2	250	5	<1	0	FM	Sluffing			
				GP	67.3	30.6	2.1									
	2.9	4.5		SM3	10	60	30					F	Till			

1 OF 1														
AGGREGATE LOG														
PROJECT: Mountain House Pit				SAMPLED BY: Bryan James										
PIT #: 1871				METHOD: Excavator										
DISTRICT: Cariboo				DATE: Dec 19, 20, 2016										
TP	DEPTH		SAMPLE BAG No.	Material Description	ESTIMATED GRADATION LABORATORY GRADATION			ESTIMATED ROCK 75mm				SAND TYPE		REMARKS
	FROM	TO			G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	>375mm	F	M	
TP 16-17	0.0	2.0	495	GP	55	44	1	150	2	0	0	FM		
				GP	59.8	40.0	0.2							
	2.0	3.0		GPGM	55	38	7	150	2	0	0	FM		
	3.0	5.0		GP	55	44	1	150	2	0	0	FM		
TP 16-18	0.0	0.2		TS										
	0.2	4.5	475	GP	55	43	2	300	5	<1	0	FM	Sluffing	
				GP	63.8	35.2	1.0							
TP 16-19	0.0	0.2		TS										
	0.2	4.5	494	GP	58	39	3	150	2	0	0	FM	Sluffing	
				GP	64.0	33.0	3.0							
TP 16-20	0.0	1.0		TS										
	1.0	3.5	548	GP	52	45	3	100	<1	0	0	FM	Sluffing	
	3.5	5.0		SM3	10	60	30					F	Till	
TP 16-21	0.0	0.2		TS										
	0.2	1.8		GP	55	43	2	100	2	0	0	FM	Sluffing	
	1.8	4.0		SM3	10	60	30					F	Till	
TP 16-22	0.0	2.0	266	GP	60	38	2	200	5	<1	0	FM	Sluffing	
				GP	55	40.4	4.6							
	2.0	4.0		SM3	60	10	30	30				F	Till	
TP 16-23	0.0	1.8		GP	55	43	2	100	2	0	0	FM	Sluffing	
	1.8	3.5		SM3	10	60	30					F	Till	

Aggregate Quality: A summary of aggregate quality tests performed on pit run samples from the tested area are as follows:

Location	Micro Deval	Sand Equivalent	Bulk Relative Density	Absorption
TP 16-05			2.714 C 2.661 F	1.26% C 1.86% F
TP 16-07	10.4% C 12.4% F	52		

TP 16-12			2.653 C 2.619 F	1.88% C 2.17% F
TP 16-17	9.1% C 11.2% F	64		
TP 16-18			2.659 C 2.628 F	1.59% C 2.00% F
TP 16-19	9.2% C 11.9% F	44		

Granular Volumes:

Estimated Volume Area 'A' 110,000 m³

The Estimated Volume has been determined by mining the suitability area to an average depth of 4.5 metres for TP 16-06, 07, 10 to 13 and 17, to a limited depth of approximately 2.5 metres for TP16-15 and 16 and 1.3 metres for TP16-08.

Estimated Volume Area 'B' 50,000 m³

The Estimated Volume has been determined by mining the suitability area to an average depth of 4.5 metres for TP 16-18 and 19, and to a limited depth of approximately 1.6 metres near TP16-20 to 23.

Pit Development and Recommendations:

- The crusher is to be set up on the existing pit floor near Test Pit 16-01 with mining commencing at the base of slope at Test Pit 16-02 and continuing in northern and northeastern directions. An additional crusher set up area is available on a bench located in the vicinity of Test Pits 16-04 and 05. If used as a crusher set up site a haul road from the bench to the aggregate stockpile area will require construction.
- The pit floor area has several existing processed aggregate stockpiles throughout. Stockpile space may be limited.
- The pit has been developed previously by the Ministry. If additional development is required it shall conform to the requirements of the Pit Development Plan or be completed as directed by the Ministry Representative.
- At the completion of mining, all slopes shall be trimmed to a consistent, minimum slope of 1 ½:1 with native granular material.
- **All reject materials resulting from aggregate production are to be placed in separate stockpiles free from deleterious material and in an easily accessible location. No stockpiling against the pit face is permitted without the permission from the Aggregate Resource Manager.**

Photographs:



Crusher location at base of slope to right of pickup, mining area to left and foreground, with aggregate stockpile area on right.



TP16-05 spoil



TP16-17

Al Mitchell
Aggregate Resource Manager