

YUKON ECONOMIC DEVELOPMENT AGREEMENT

WHITEHORSE

YUKON

AGREEMENT ON MINERAL RESOURCES

MATERIAL HANDLING TECHNOLOGY
CONTRACT: YEDA-07

REPORT ON
MATERIALS HANDLING METHODS
APPENDICES

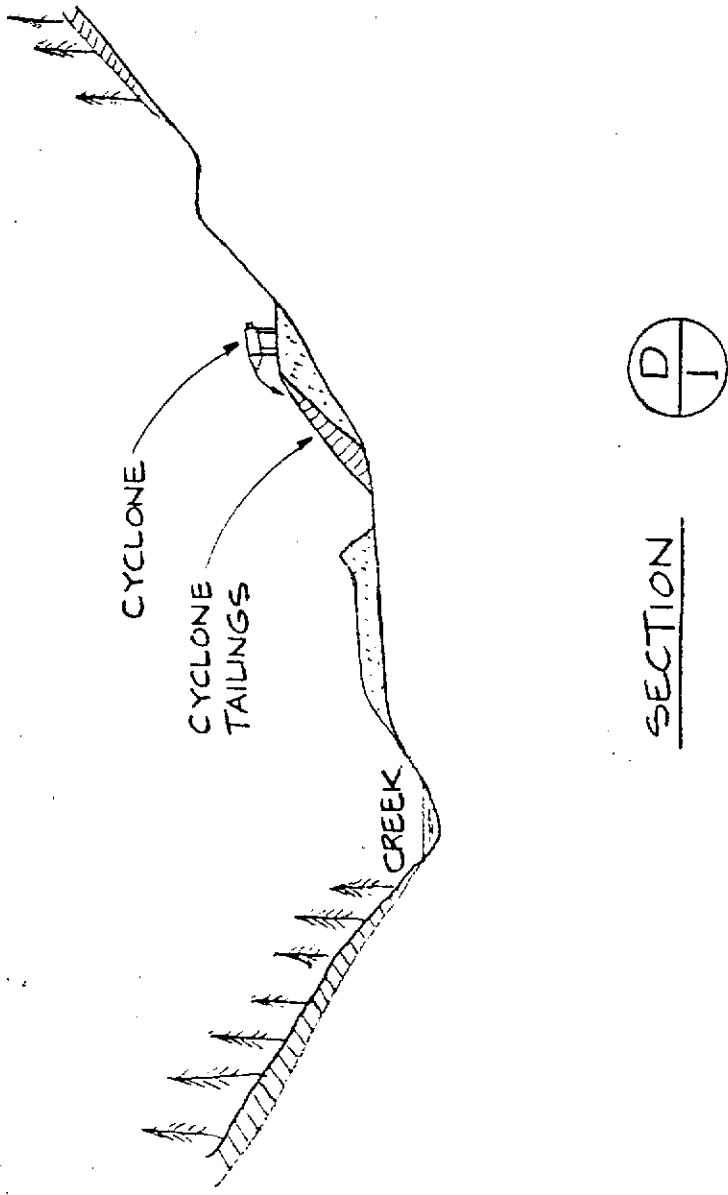
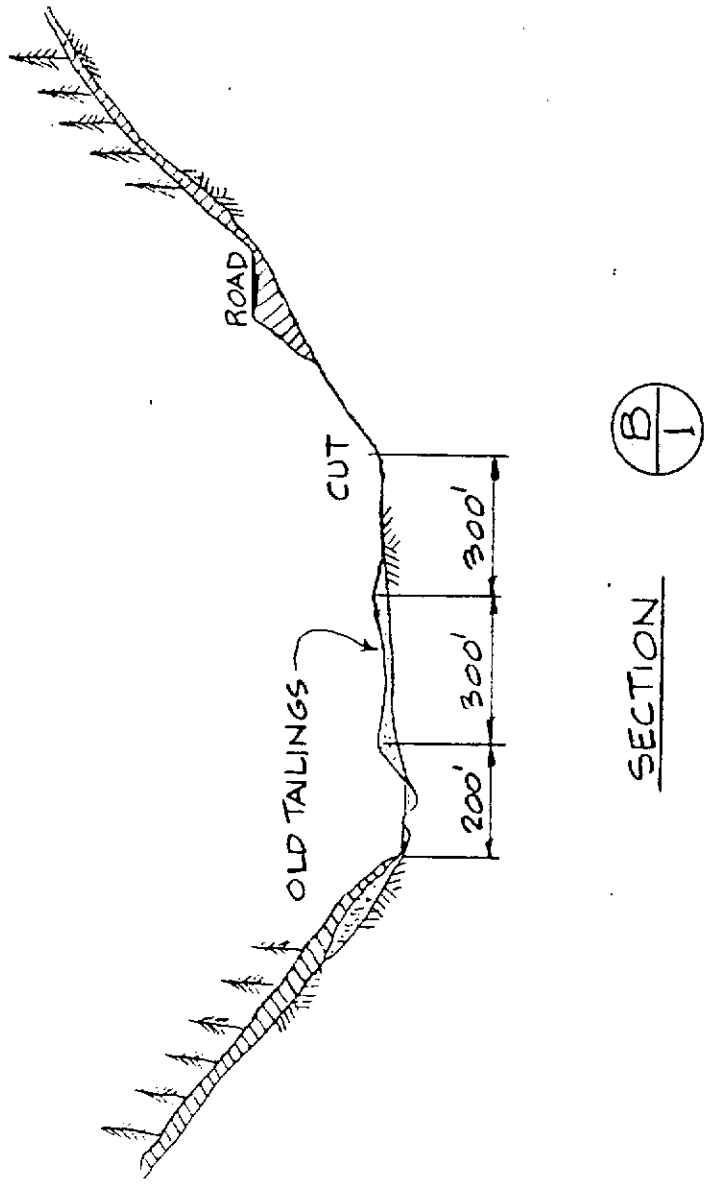
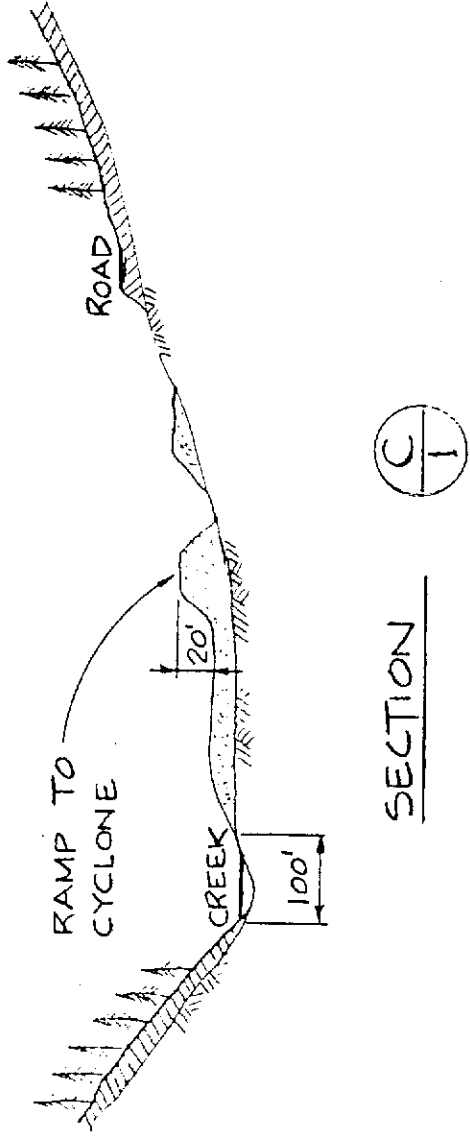
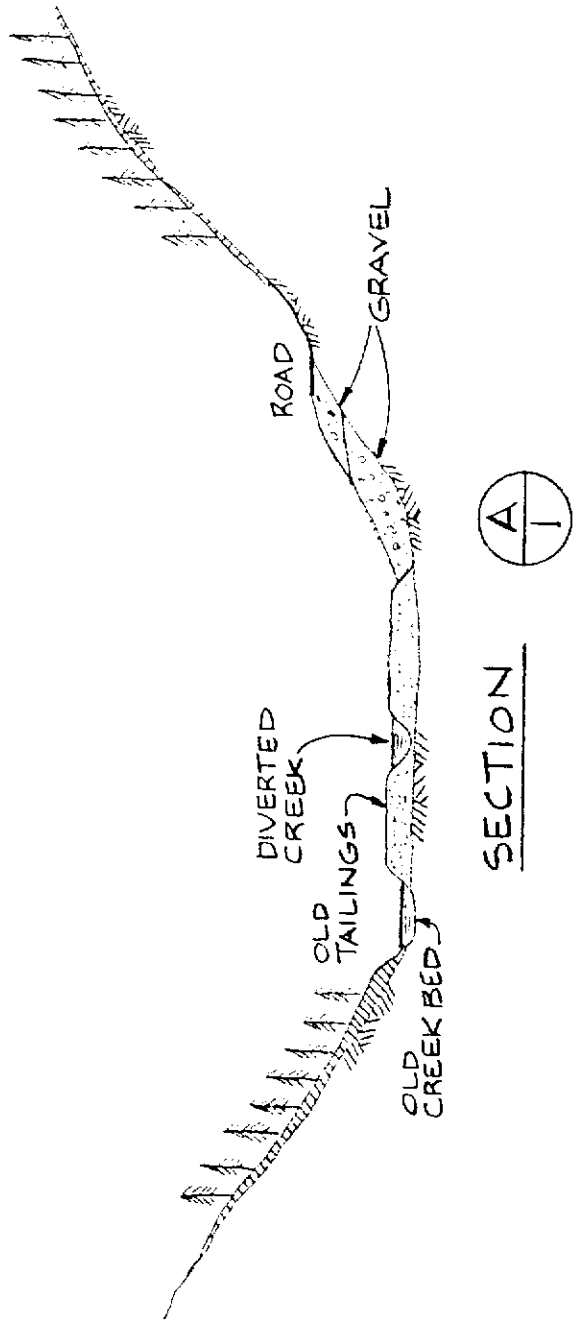
PROJECT 1401

JUNE 1986



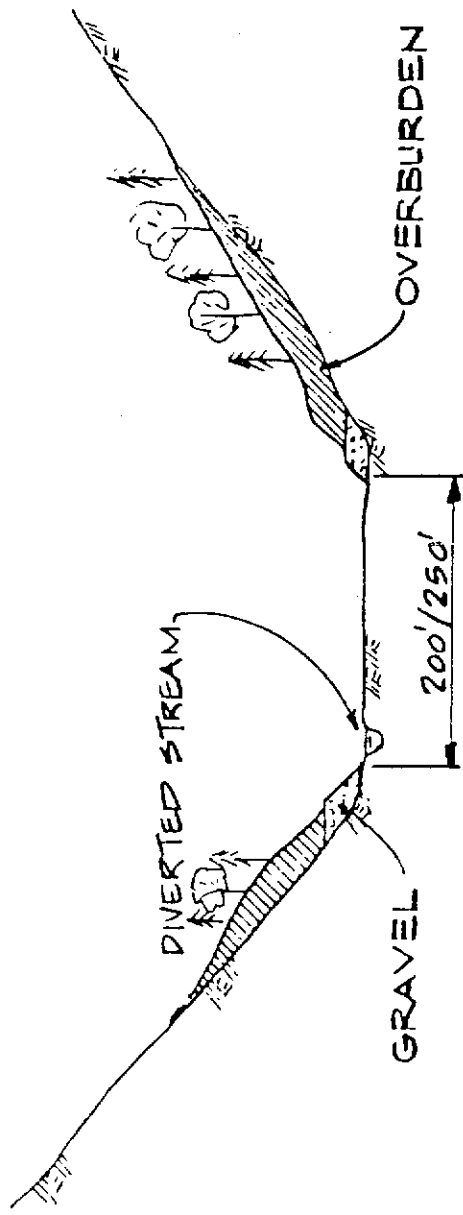
WRIGHT ENGINEERS LIMITED
Vancouver Canada

APPENDIX I
DRAWINGS AND FLOWSHEETS

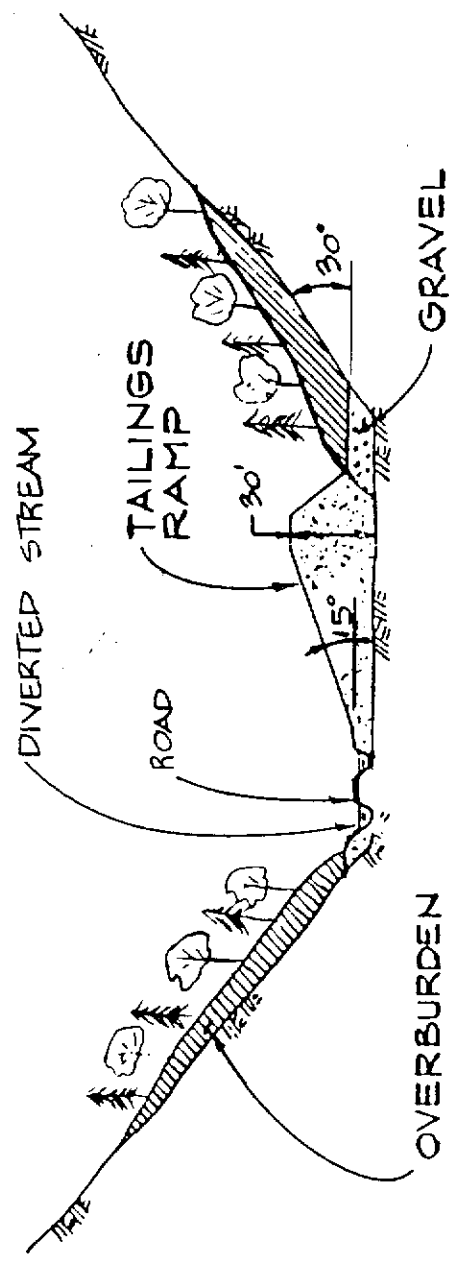


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WRIGHT ENGINEERS LIMITED VANCOUVER CANADA							
SCALE: N.T.S.							
DRAWING No. B 1209 210 1202							
REV.							

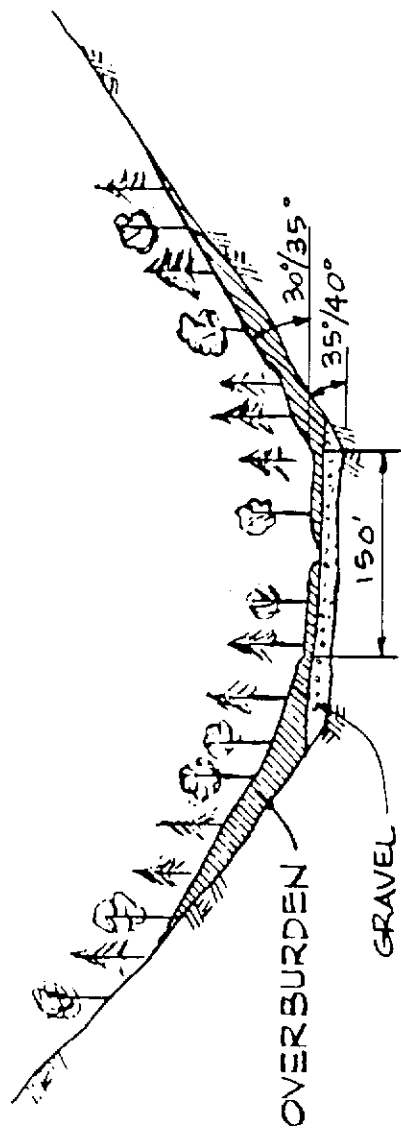
NARROW VALLEY DEPOSIT SITE LAYOUT
 EXAMPLE "A" WITH TAILINGS PUMPING, SHT. 2 OF 2.



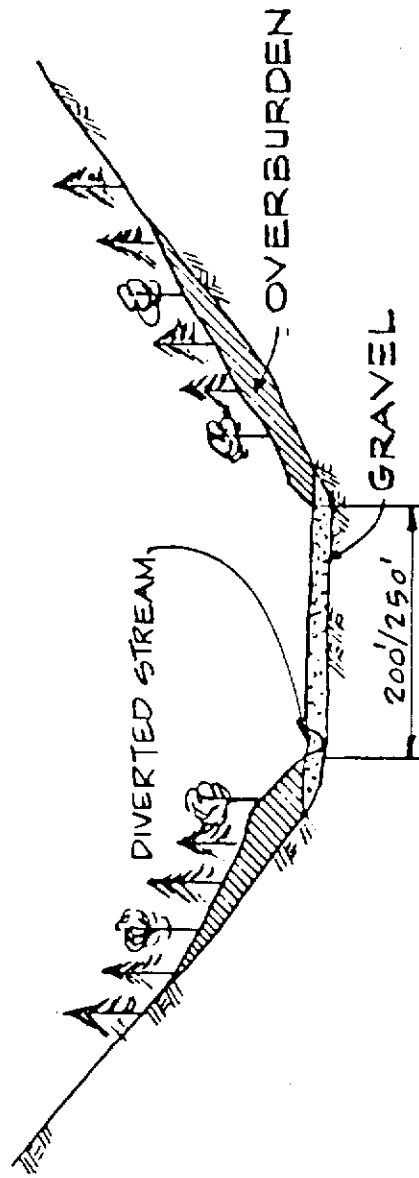
SECTION C
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SECTION D
1



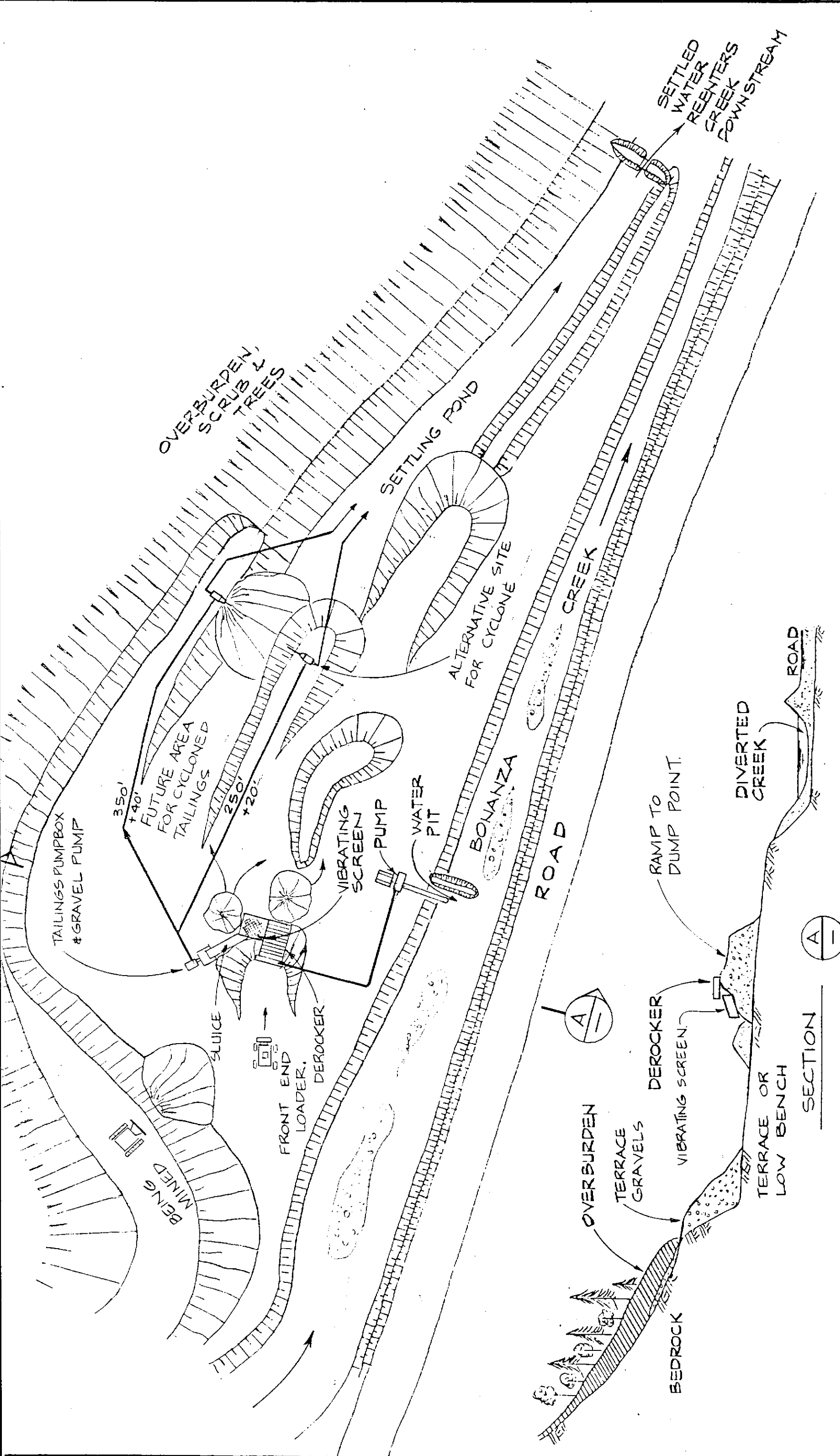
SECTION A
1



SECTION B
1

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	JLB		JZ	PRELIMINARY (REF ONLY)	MAR/81		

NARROW VALLEY DEPOSIT SITE LAYOUT EXAMPLE "B" WITH TAILINGS PUMPING. SHT. 2 OF 2		SCALE:	N.T.S.	DRAWING No.	B1401210	REV.	1203
WRIGHT ENGINEERS LIMITED VANCOUVER		CANADA					



DSGN.	DRAWN/CHECK	APPR.	ISSUED FOR	DATE	REV	DESCRIPTION OF REVISION
	hba.	JZ	PRELIMINARY (REF ONLY)	MAR 1986		

WRIGHT ENGINEERS LIMITED VANCOUVER CANADA		SCALE: N.T.S.	DRAWING No. B1401210 1204	REV.
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LOW BENCH DEPOSIT SITE LAYOUT WITH TAILINGS PUMPING

SECTION A-A



VALLEY SIDE

ROAD BUILT ON VALLEY SIDE & DREDGE TAILINGS
THIS SIDE OF VALLEY PREVIOUSLY MINED BY DREDGE

OLD DREDGE TAILINGS

DIVERSION DITCH
VIBRATING SCREEN
GRIZZLY

SLUICE

DRAINAGE

OLD TAILINGS RAMP

FOR OLD CUTS USED FOR SETTLING POND

NEW CUT

PUMP

DAM

PUMP

DAM

CHANNEL FOR SEDIMENTS

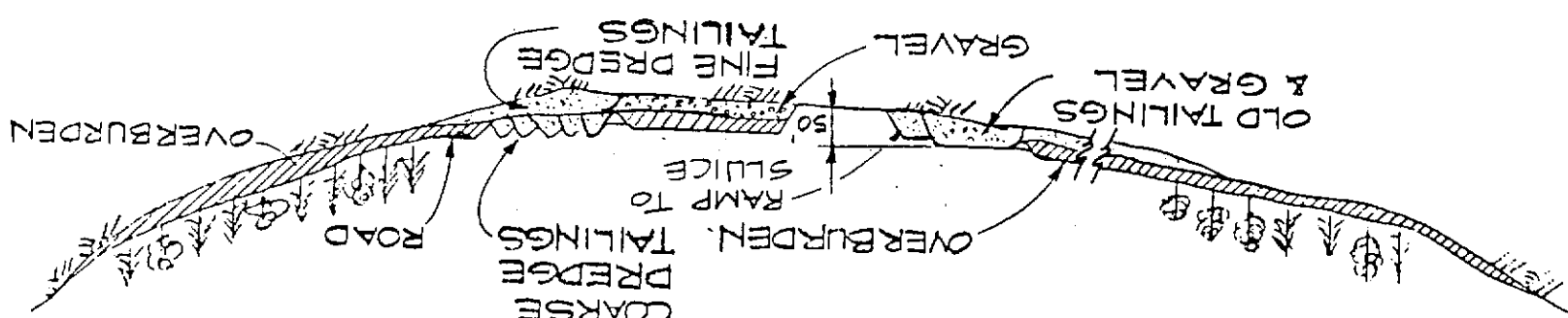
OVERFLOW

VALLEY SIDE

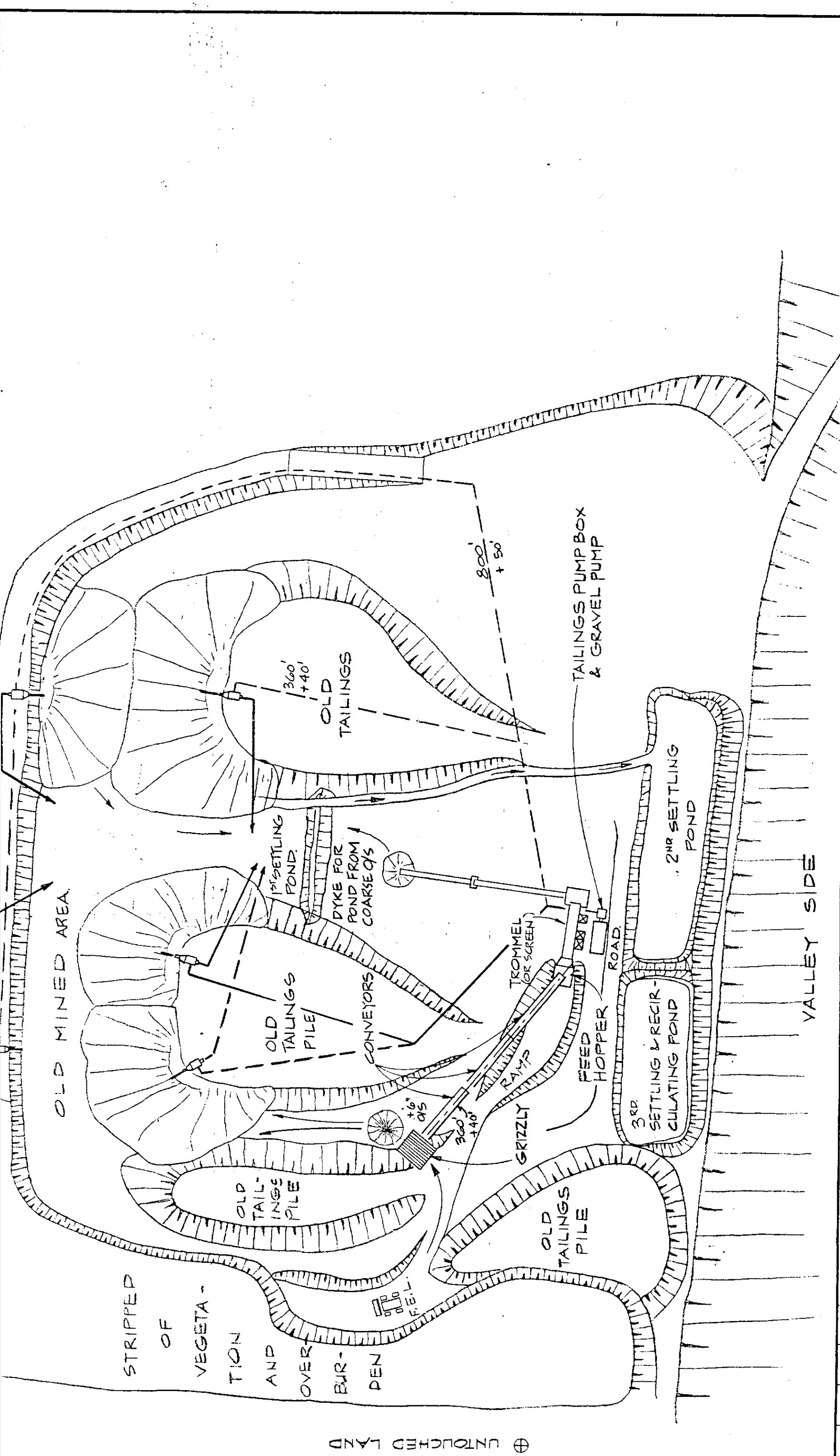
CREEK PATH BEFORE DAM

DAM

SECTION 11

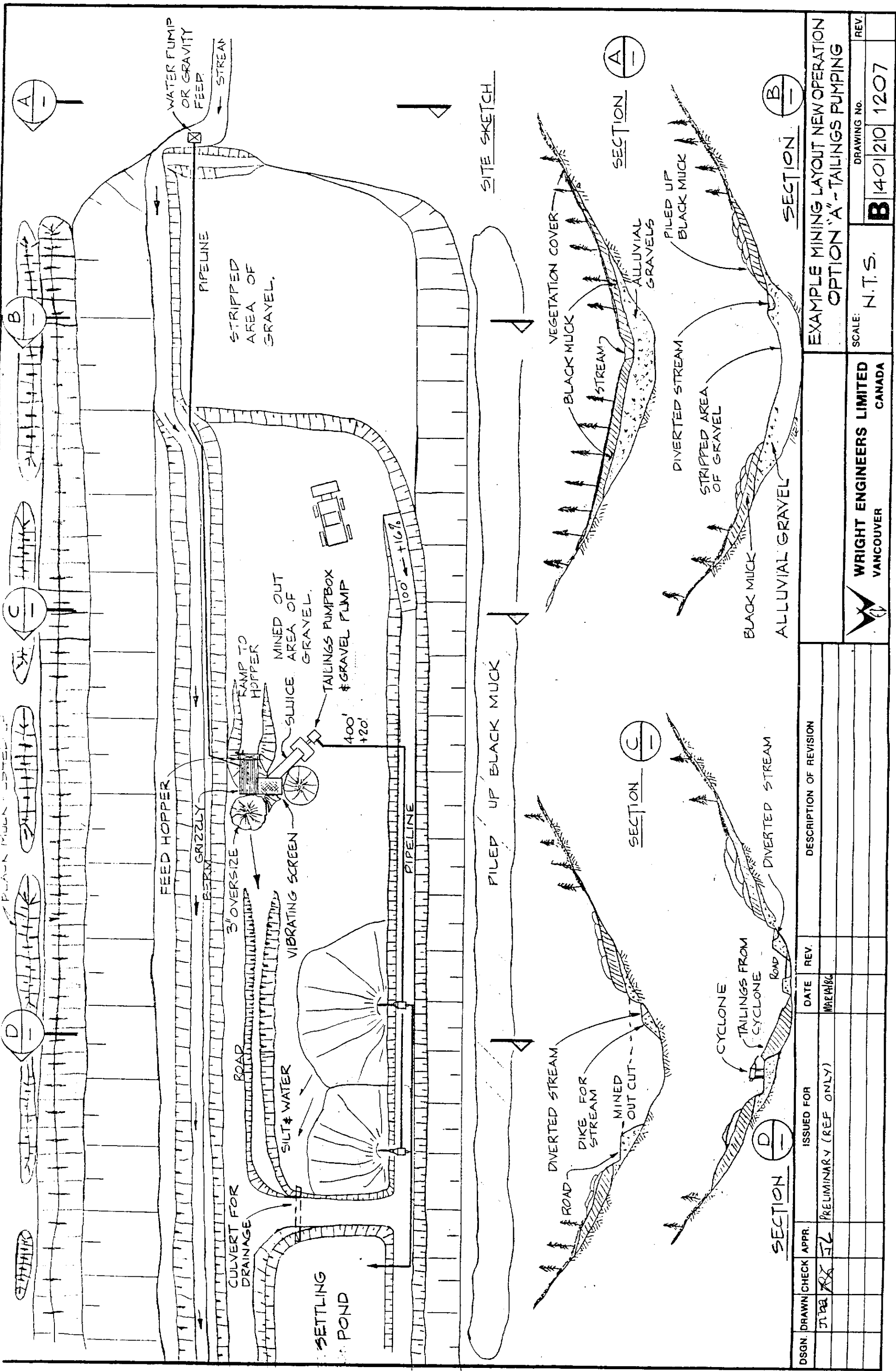


DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	PLB	JK	JK	PRELIMINARY (REF ONLY)	WAR/ABC		
<p>WRIGHT ENGINEERS LIMITED VANCOUVER CANADA</p> <p>SCALE: N.T.S.</p> <p>DRAWING No. B1401210 1205</p>							
<p>BROAD VALLEY DEPOSIT SITE LAYOUT WITH FEED GRAVEL PUMPING, SH110F2.</p>							
<p>REV.</p>							

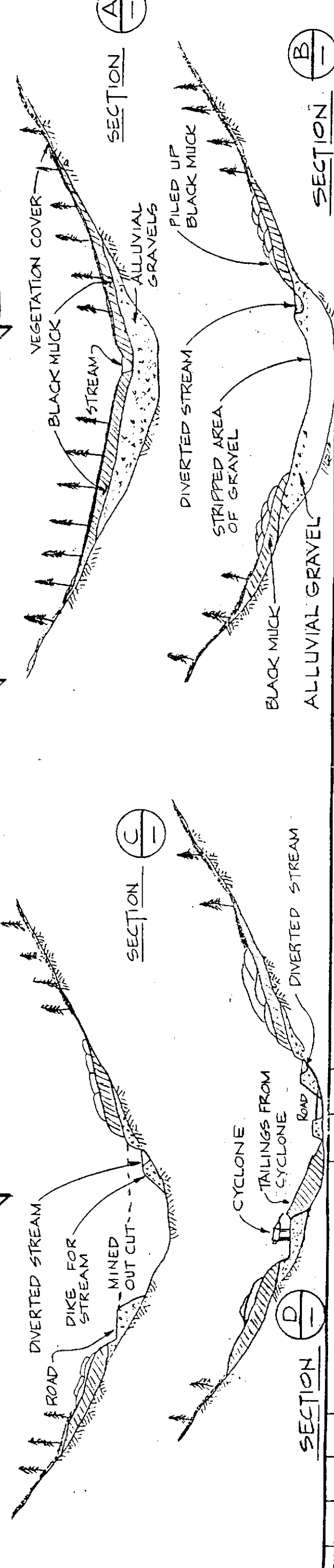


DSGN	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	J.P.A.			PRELIMINARY (REF ONLY)	MAR/84		

HIGH BENCH DEPOSIT SITE LAYOUT WITH CONVEYING & TAILINGS PUMPING		SCALE: N.T.S.	DRAWING No. B1401 210 1206
WRIGHT ENGINEERS LIMITED VANCOUVER		CANADA	



SITE SKETCH

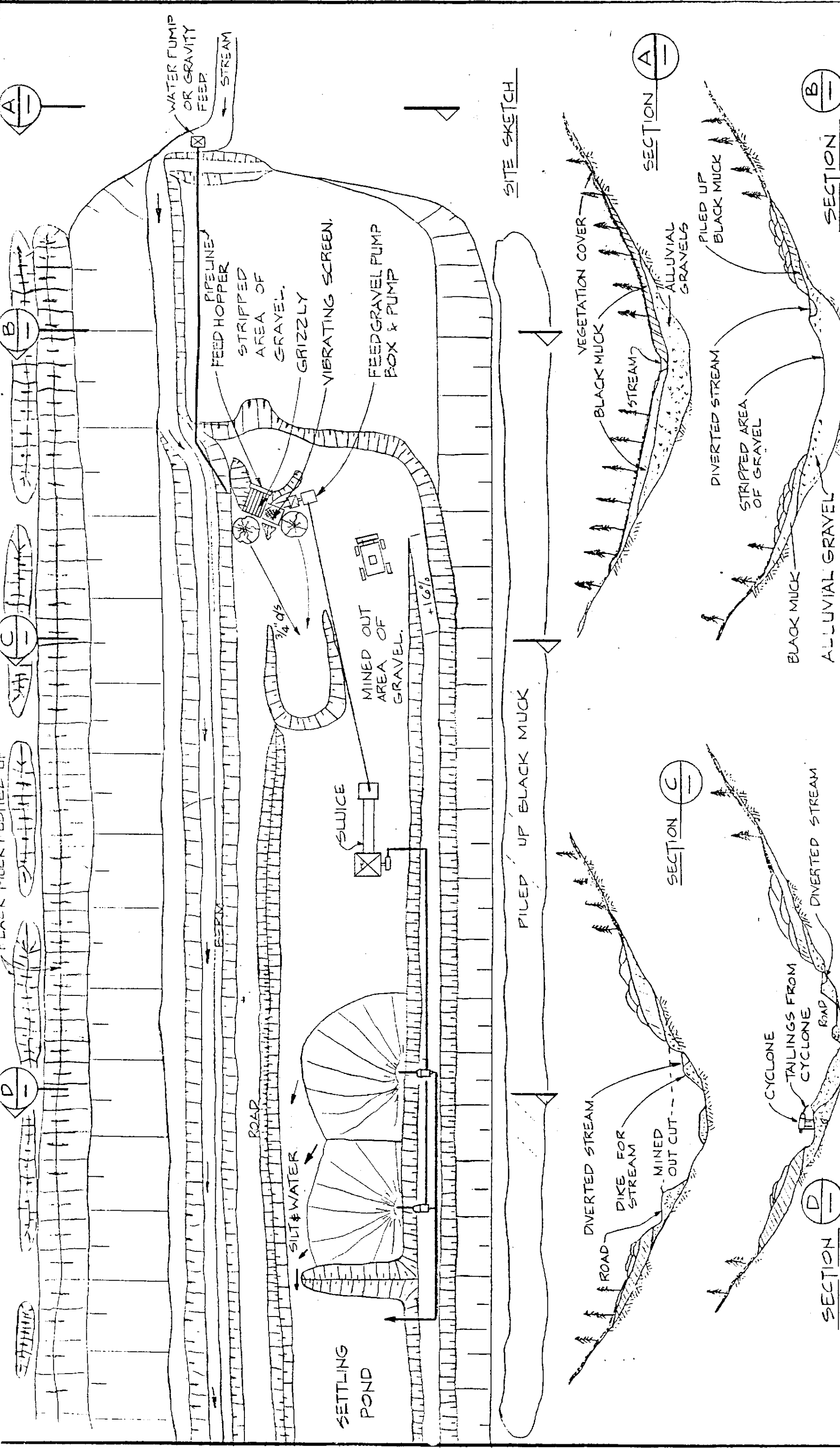


DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	JTB	XX	JL	PRELIMINARY (REF ONLY)	MAR 1968		

EXAMPLE MINING LAYOUT NEW OPERATION
 OPTION "A" - TAILINGS PUMPING

SCALE: N.T.S.
 WRIGHT ENGINEERS LIMITED
 VANCOUVER CANADA

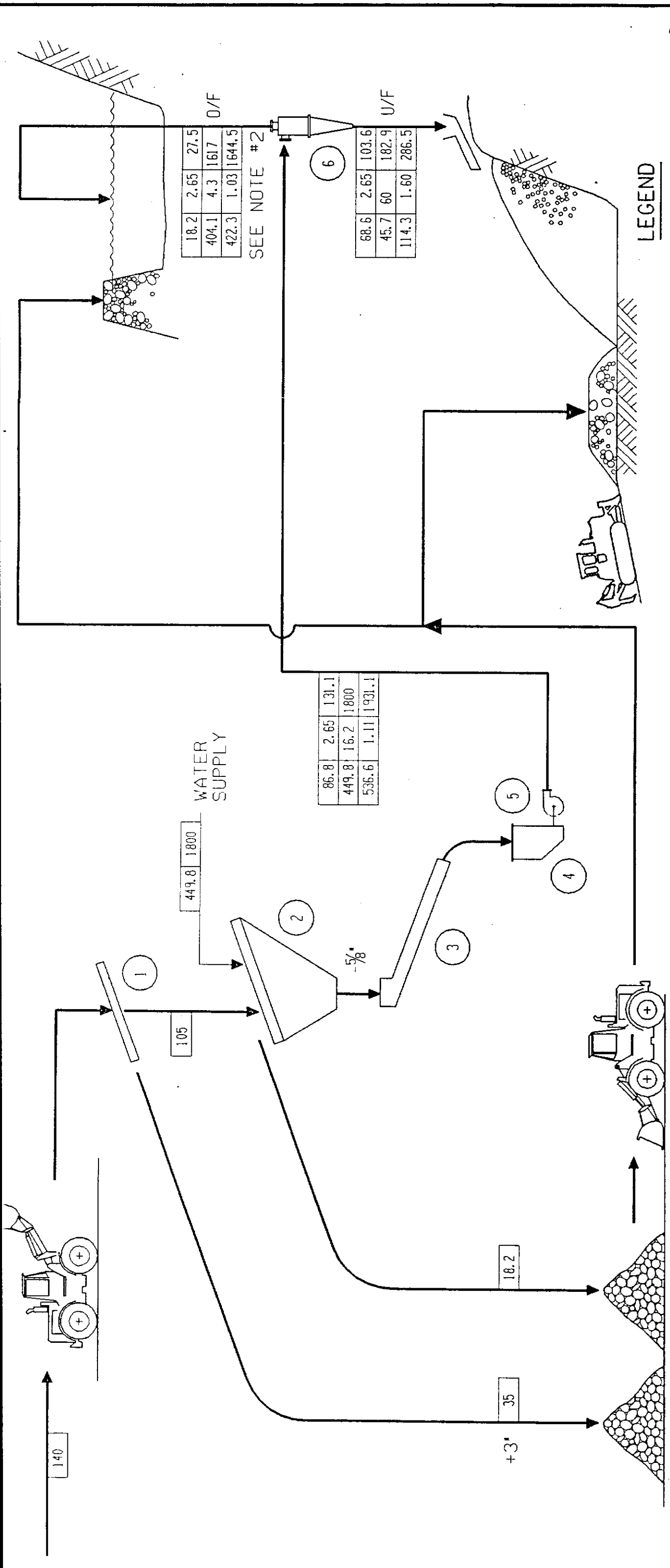
DRAWING No. B 401210 1207
 REV.



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	J.P.	X	J.L.	PRELIMINARY (REF ONLY)	MAR/82		

SCALE: N.T.S.		DRAWING No. B 1401210		REV. 1208
WRIGHT ENGINEERS LIMITED VANCOUVER		CANADA		

EXAMPLE MINING LAYOUT NEW OPERATION
 OPTION "B" - FEED GRAVEL & TAILINGS PUMPING



18.2	2.65	27.5
404.1	4.3	1617
422.3	1.03	1644.5

SEE NOTE #2

68.6	2.65	103.6
45.7	60	182.9
114.3	1.60	286.5

86.8	2.65	131.1
449.8	16.2	1800
536.6	1.11	1931.1

LEGEND

S.T.P.H. SOLIDS	SP/GR SOLIDS	USGPM SOLIDS
S.T.P.H. SOL/N	% SOLIDS	USGPM SOL/N
S.T.P.H. SLURRY	SP/GR SLURRY	USGPM SLURRY

S.T.P.H. SOL/N	USGPM SOL/N
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S.T.P.H. SOLIDS

NOTES:

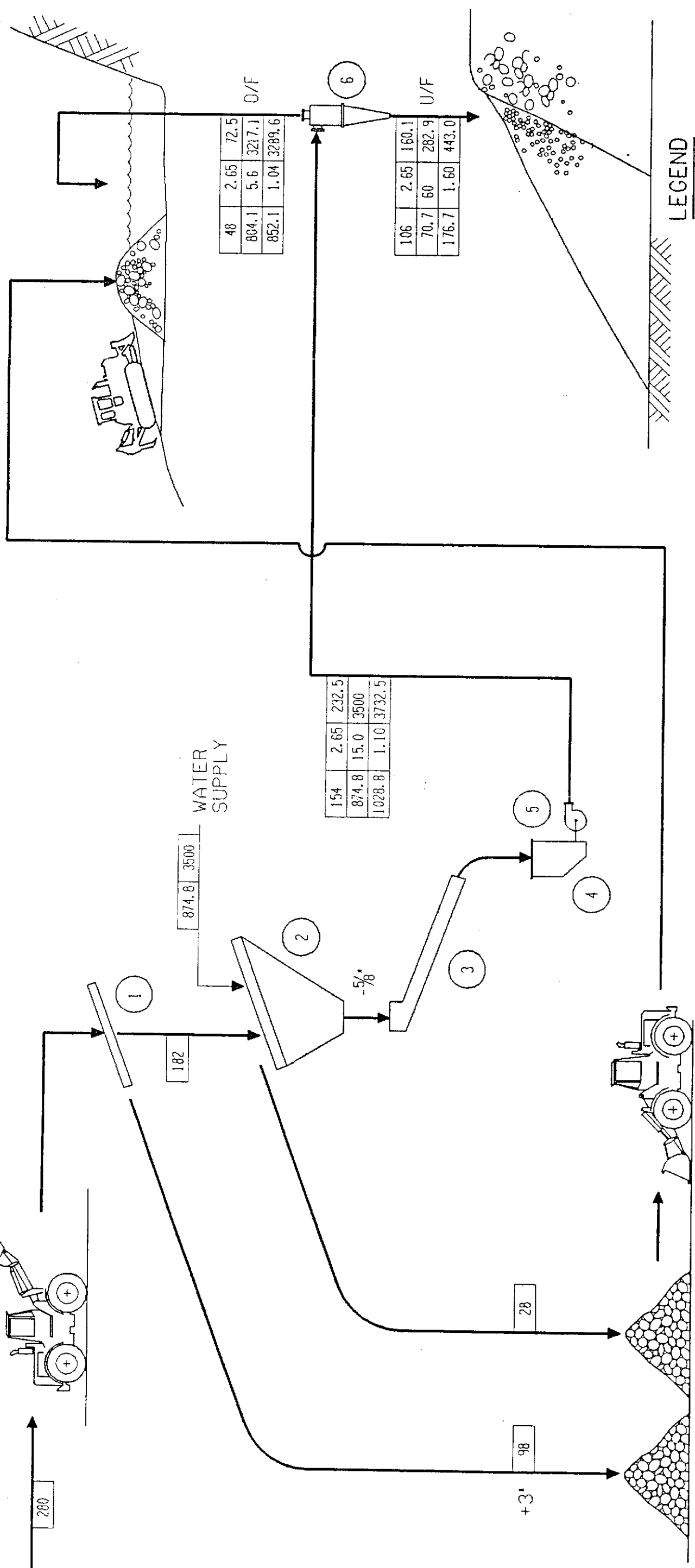
- 1) FLOWSHEET BASED ON AN ASSUMED PLANT FEED RATE OF 100 YD³/HR, AT 103.7#/FT³ & S.G. SOLIDS OF 2.65
- 2) CYCLONE OVERFLOW SOLIDS BASED ON 200 MESH CUT POINT, ALL SOLIDS ARE LESS THAN 200 MESH.
- 3) BASED ON A RATIO OF 9:1 WATER:FEED GRAVEL (BY VOLUME).

ITEM No.	No. REQ'D	DESCRIPTION	TOTAL H.P.
1	1	GRIZZLY	3
2	1	4' x 8' HORIZONTAL SINGLE DECK VIB. SCREEN	
3	1	SLUDGE BOX	
4	1	TAILINGS PUMP BOX	
5	1	TAILINGS PUMP (8" x 8") c/w DIESEL DRIVE	70
6	1	TAILINGS CYCLONE	
7			

DSGN	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
RL	GOT		EL	INFORMATION	DEC 85		
				PRELIMINARY - REF. ONLY			

WRIGHT ENGINEERS LIMITED		VANCOUVER		CANADA	
SCALE:	DRAWING No.	CAD No.:	FLOW3.DGN	REV.	
	B1401210				
					1211

**FLOWSHEET No. 1
GULCH DEPOSIT**



48	2.65	72.5
804.1	5.6	3217.1
852.1	1.04	3289.6

154	2.65	232.5
874.8	15.0	3500
1028.8	1.10	3732.5

106	2.65	160.1
70.7	60	282.9
176.7	1.60	443.0

LEGEND

S.T.P.H. SOLIDS	SP/GR SOLIDS	USGPM SOLIDS
S.T.P.H. SOL/N	% SOLIDS	USGPM SOL/N
S.T.P.H. SLURRY	SP/GR SLURRY	USGPM SLURRY

S.T.P.H. SOL/N	USGPM SOL/N
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S.T.P.H. SOLIDS

NOTES:

- 1) FLOWSHEET BASED ON AN ASSUMED PLANT FEED RATE OF 200 YD³/HR. AT 103.7#/FT³ & S.G. SOLIDS OF 2.65
- 2) CYCLONE OVERFLOW SOLIDS BASED ON 200 MESH CUT POINT. ALL SOLIDS ARE LESS THAN 200 MESH.
- 3) BASED ON A RATIO OF 10:1 WATER:FEED GRAVEL (BY VOLUME).

ITEM No.	No. REQ'D	DESCRIPTION	TOTAL H.P.
1	1	GRIZZLY	
2	1	5' x 12' HORIZONTAL SINGLE DECK VIB. SCREEN	5
3	1	SLUICE BOX	
4	1	TAILINGS PUMP BOX	
5	1	TAILINGS PUMP (10" x 8" or 12" x 10") c/w DIESEL DRIVE	125
6	1	TAILINGS CYCLONE	
7			

DSGN	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
RL	GOT		JZ	INFORMATION	DEC 85		
				PRELIMINARY - REF. ONLY			

FLWSHEET No. 2
NARROW VALLEY 'A' DEPOSIT

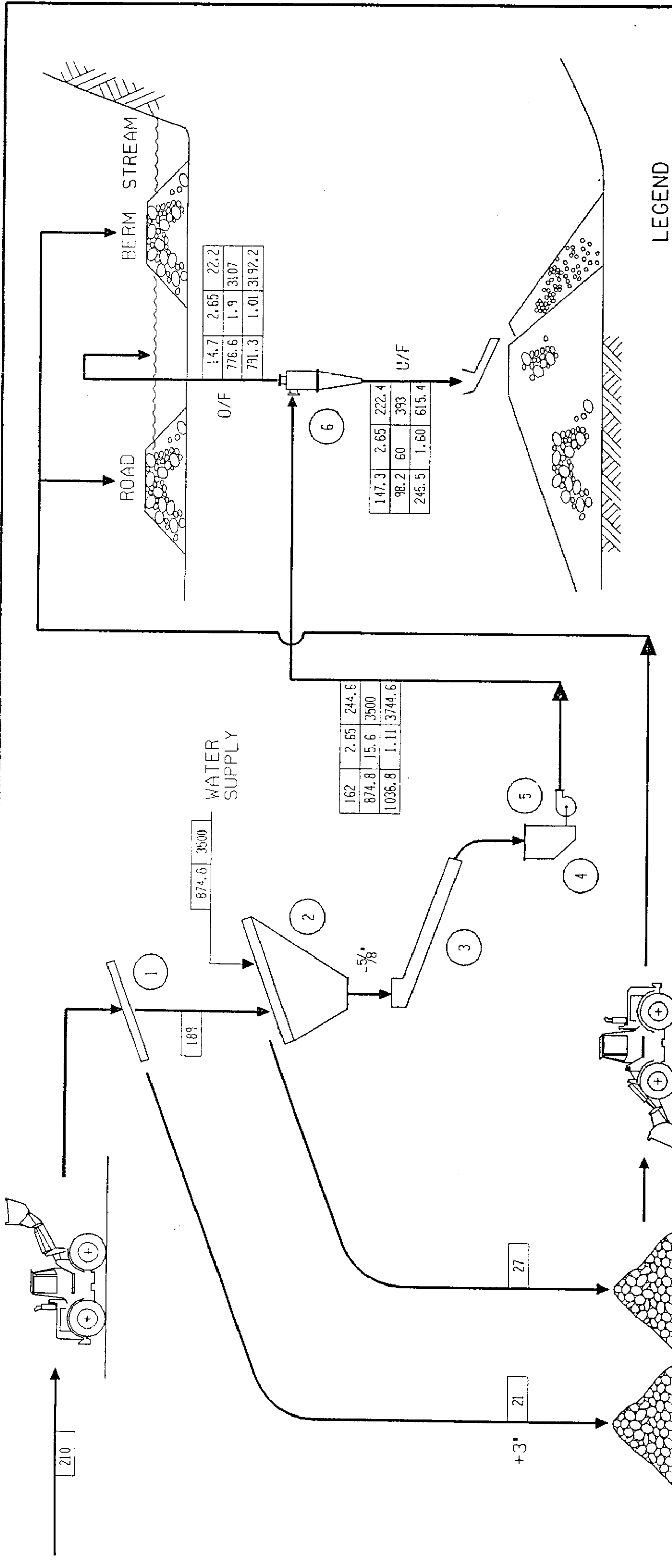
WRIGHT ENGINEERS LIMITED
 VANCOUVER CANADA



DRAWING No. **B1401210**

SCALE: _____
 CAD No.: FLOW4.DGN

REV. **1212**



ITEM No.	No. REQ'D	DESCRIPTION	TOTAL H.P.
1	1	GRIZZLY	
2	1	5' x 12' HORIZONTAL SINGLE DECK VIB. SCREEN	5
3	1	SLUDGE BOX	
4	1	TAILINGS PUMP BOX	
5	1	TAILINGS PUMP (10" x 8" or 12" x 10") c/w DIESEL DRIVE	125
6	1	TAILINGS CYCLONE	
7			

NOTES:

- 1) FLOWSHEET BASED ON AN ASSUMED PLANT FEED RATE OF 150 YD³/HR, AT 103.7#/FT³ & S.G. SOLIDS OF 2.65
- 2) CYCLONE OVERFLOW SOLIDS BASED ON 200 MESH CUT POINT, ALL SOLIDS ARE LESS THAN 200 MESH.
- 3) BASED ON A RATIO OF 6.2:1 WATER:FEED GRAVEL (BY VOLUME).

S.T.P.H. SOLIDS	SP/GR SOLIDS	USGPM SOLIDS
S.T.P.H. SOL/N	% SOLIDS	USGPM SOL/N
S.T.P.H. SLURRY	SP/GR SLURRY	USGPM SLURRY

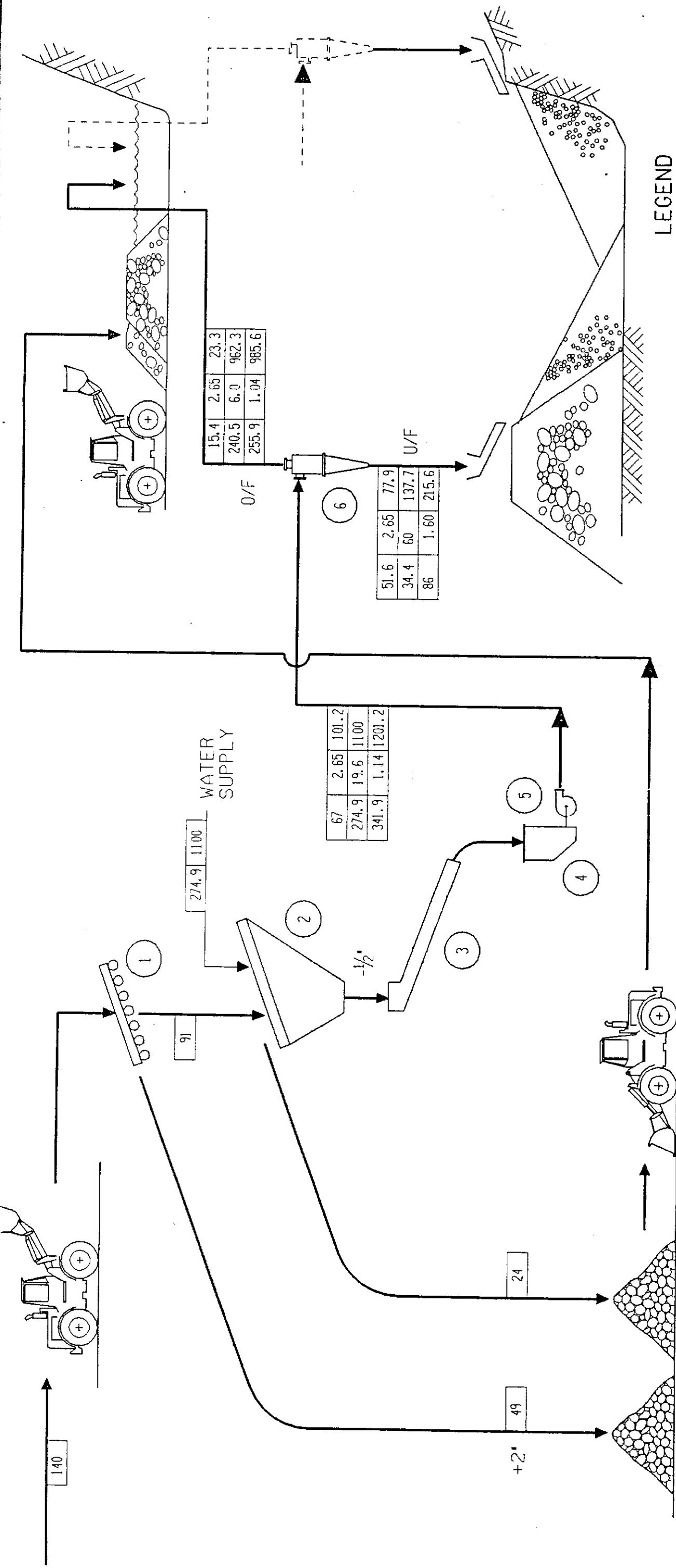
S.T.P.H. SOL/N	USGPM SOL/N
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S.T.P.H. SOLIDS

LEGEND

DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
RL	GOT			INFORMATION	DEC 85		
				PRELIMINARY - REF. ONLY			

FLOW SHEET No. 3	
NARROW VALLEY 'B' DEPOSIT	
SCALE:	DRAWING No.
CAD No.: FLOW5.DGN	REV.
WRIGHT ENGINEERS LIMITED VANCOUVER CANADA	B1401210 1213



15.4	2.65	23.3
240.5	6.0	962.3
255.9	1.04	985.6

51.6	2.65	77.9
34.4	60	137.7
86	1.60	215.6

67	2.65	101.2
274.9	19.6	1100
341.9	1.14	1201.2

LEGEND

S.T.P.H. SOLIDS	SP/GR SOLIDS	USGPM SOLIDS
S.T.P.H. SOL'N	% SOLIDS	USGPM SOL'N
S.T.P.H. SLURRY	SP/GR SLURRY	USGPM SLURRY

S.T.P.H. SOL'N	USGPM SOL'N
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S.T.P.H. SOLIDS

NOTES:

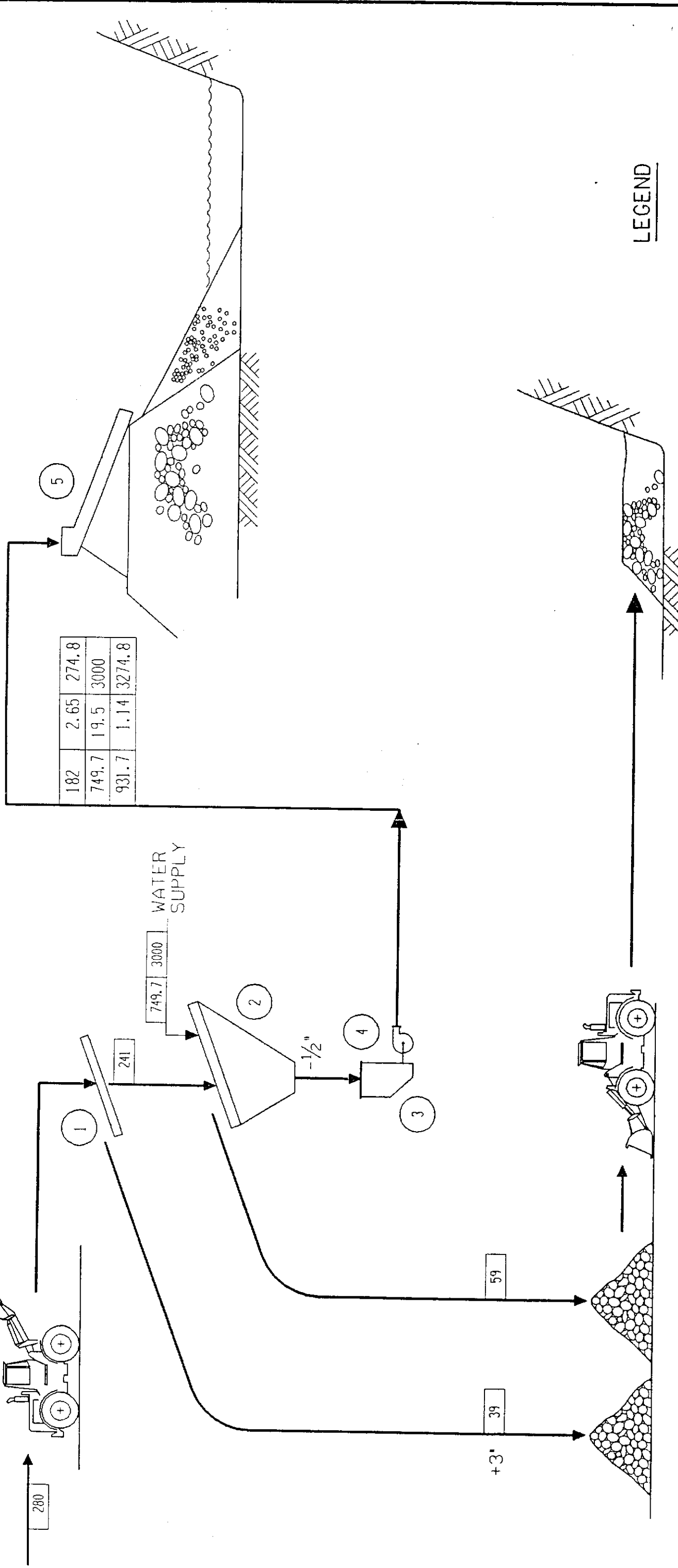
- 1) FLOWSHEET BASED ON AN ASSUMED PLANT FEED RATE OF 100 YD³/HR. AT 103.7#/FT³ & S.G. SOLIDS OF 2.65
- 2) CYCLONE OVERFLOW SOLIDS BASED ON 200 MESH CUT POINT. ALL SOLIDS ARE LESS THAN 200 MESH.
- 3) BASED ON A RATIO OF 7:1 WATER:FEED GRAVEL (BY VOLUME).

ITEM No.	No. REQD	DESCRIPTION	TOTAL H.P.
1	1	DEROCKER	1
2	1	4' x 8' HORIZONTAL SINGLE DECK VIB. SCREEN	3
3	1	SLUICE BOX	
4	1	TAILINGS PUMP BOX	
5	1	TAILINGS PUMP (8' x 6") c/w DIESEL DRIVE	50
6	1	TAILINGS CYCLONE	
7			

DSGN	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
RL				INFORMATION	DEC 85		
				PRELIMINARY - REF. ONLY			

**FLWSHEET No. 4
LOW BENCH DEPOSIT**

WRIGHT ENGINEERS LIMITED VANCOUVER	CANADA	SCALE:	DRAWING No.	REV.
			B1401210	1214
		CAD No.:	FLOW7.DGN	



182	2.65	274.8
749.7	19.5	3000
931.7	1.14	3274.8

ITEM No.	No. REQD	DESCRIPTION	TOTAL H.P.
1	1	GRIZZLY	
2	1	5' x 12' HORIZONTAL SINGLE DECK VIB. SCREEN	5
3	1	FEED GRAVEL PUMP BOX	
4	1	FEED GRAVEL PUMP (8' x 10") c/w DIESEL DRIVE	150
5	1	SLUCE	
6			
7			

DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
RL	60T		JK	INFORMATION	DEC 85		
				PRELIMINARY - REF. ONLY			

NOTES:
 1) FLOWSHEET BASED ON AN ASSUMED PLANT FEED RATE OF 200 YD³/HR. AT 103.7#/FT³ & S.G. SOLIDS OF 2.65
 2) BASED ON A RATIO OF 7:1 WATER:FEED GRAVEL (BY VOLUME).

LEGEND

S.T.P.H. SOLIDS	SP/GR SOLIDS	USGPM SOLIDS
S.T.P.H. SOL/N	% SOLIDS	USGPM SOL/N
S.T.P.H. SLURRY	SP/GR SLURRY	USGPM SLURRY

S.T.P.H. SOL/N	USGPM SOL/N
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S.T.P.H. SOLIDS

WRIGHT ENGINEERS LIMITED VANCOUVER CANADA

SCALE: _____

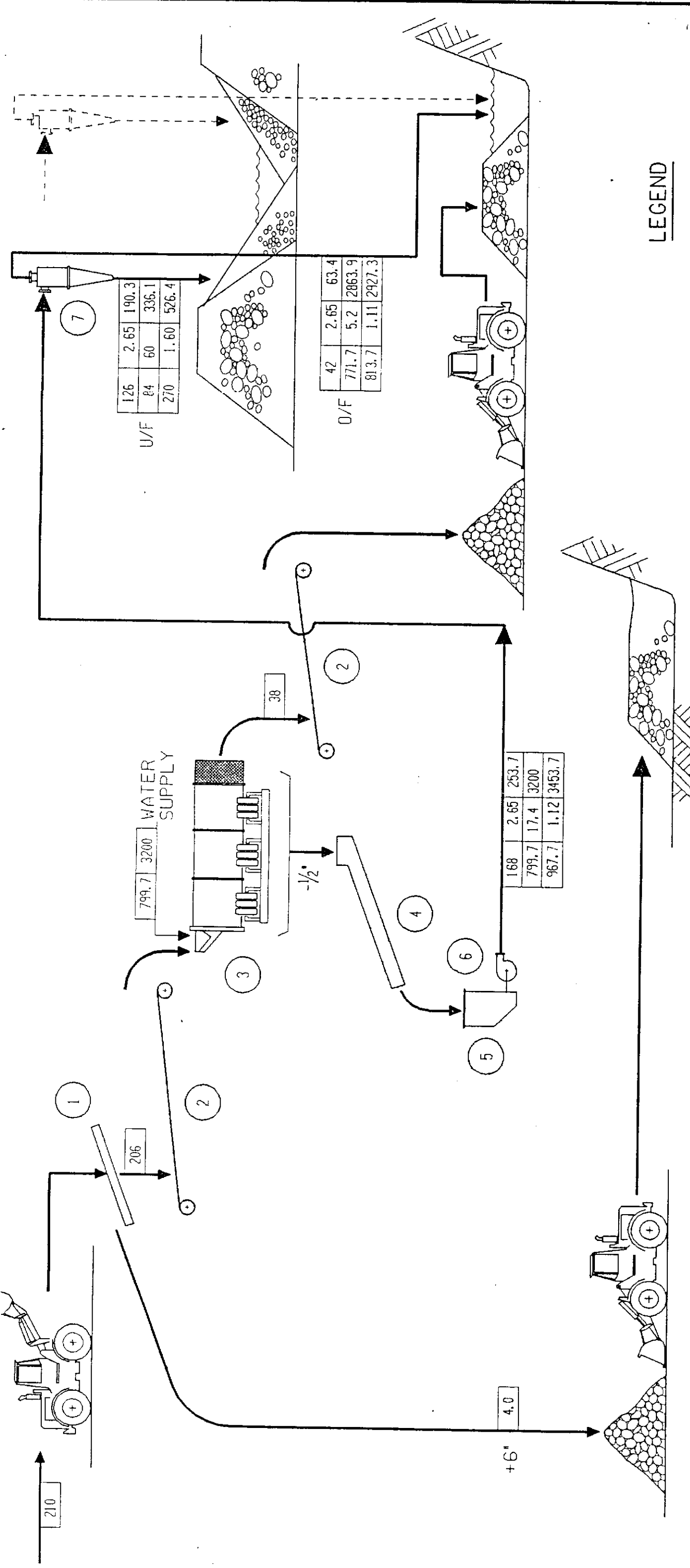
CAD No.: FLOW9.DGN

DRAWING No. B1401210

REV. 1215

FLWSHEET No. 5

BROAD VALLEY DEPOSIT



LEGEND

S.T.P.H. SOLIDS	SP/GR SOLIDS	USGPM SOLIDS
S.T.P.H. SOL'N	% SOLIDS	USGPM SOL'N
S.T.P.H. SLURRY	SP/GR SLURRY	USGPM SLURRY

S.T.P.H. SOL'N	USGPM SOL'N
----------------	-------------

S.T.P.H. SOLIDS

NOTES:

- 1) FLOWSHEET BASED ON AN ASSUMED PLANT FEED RATE OF 150 YD³/HR, AT 103.7#/FT³ & S.G. SOLIDS OF 2.65
- 2) CYCLONE OVERFLOW SOLIDS BASED ON 200 MESH CUT POINT, ALL SOLIDS ARE LESS THAN 200 MESH.
- 3) BASED ON A RATIO OF 8:1 WATER:FEED GRAVEL (BY VOLUME).

ITEM No.	No. REQ'D	DESCRIPTION	TOTAL H.P.
1	1	GRIZZLY	
2	1	CONVEYING SYSTEM	80
3	1	TROMMEL	20
4	1	SLUICE BOX OR JIGS	
5	1	TAILINGS PUMP BOX	
6	1	TAILINGS PUMP (10" x 8" or 12" x 10") c/w DIESEL DRIVE	125
7	1	TAILINGS CYCLONE	

DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	RL		JZ	INFORMATION PRELIMINARY - REF. ONLY	DEC 85		

**FLWSHEET No. 6
HIGH BENCH DEPOSIT**

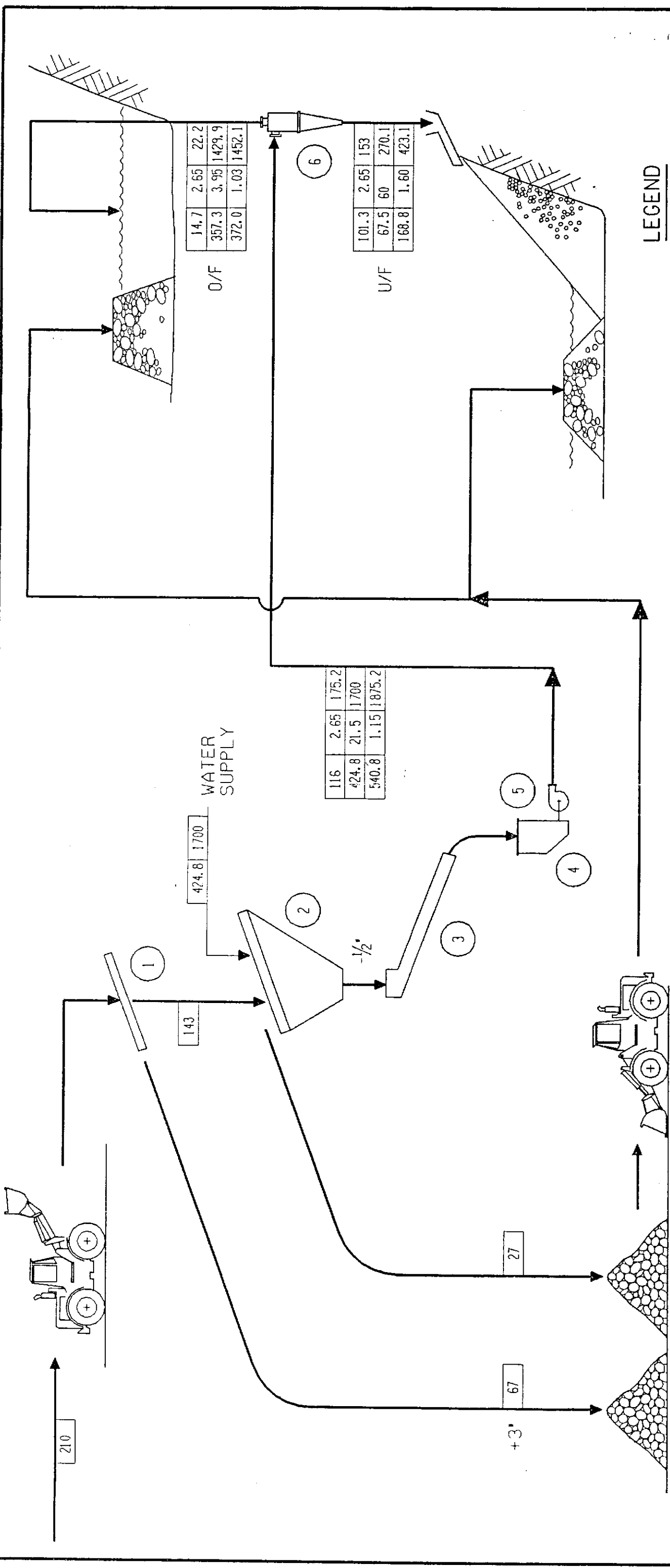
WRIGHT ENGINEERS LIMITED
VANCOUVER CANADA

CAD No.: FL088.DGN

SCALE: _____

DRAWING No. **B1401210**

REV. **1216**



ITEM No.	No. REQ'D	DESCRIPTION	TOTAL H.P.
1	1	GRIZZLY	5
2	1	5' x 12' HORIZONTAL SINGLE DECK VIB. SCREEN	
3	1	SLUICE BOX	
4	1	TAILINGS PUMP BOX	
5	1	TAILINGS PUMP (8" x 8")	60
6	1	TAILINGS CYCLONE	
7			

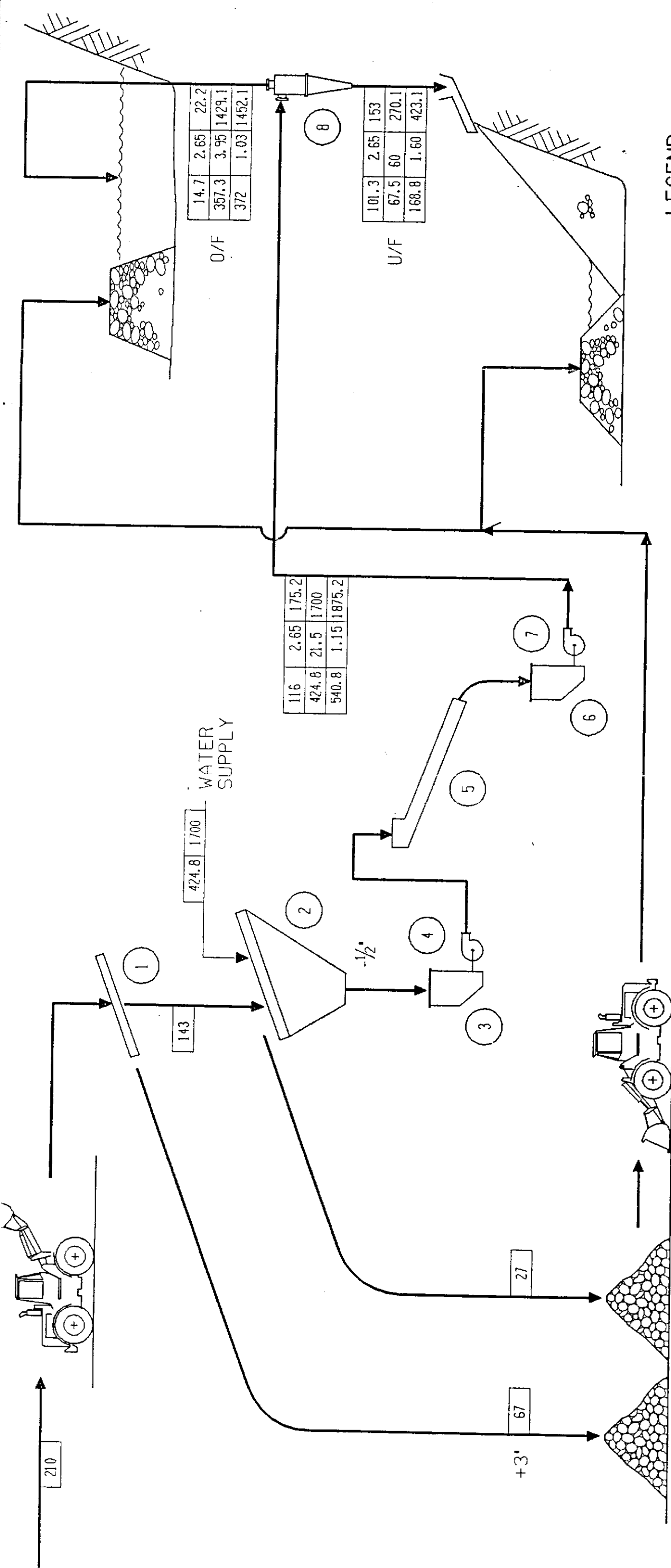
NOTES:

- 1) FLOWSHEET BASED ON AN ASSUMED PLANT FEED RATE OF 150 YD³/HR, AT 103.7#/FT³ & S.G. SOLIDS OF 2.65
- 2) CYCLONE OVERFLOW SOLIDS BASED ON 200 MESH CUT POINT, ALL SOLIDS ARE LESS THAN 200 MESH.
- 3) BASED ON A RATIO OF 6:1 WATER:FEED GRAVEL (BY VOLUME).

LEGEND

S.T.P.H. SOLIDS	SP/GR SOLIDS	USGPM SOLIDS
S.T.P.H. SOL/N	% SOLIDS	USGPM SOL/N
S.T.P.H. SLURRY	SP/GR SLURRY	USGPM SLURRY
S.T.P.H. SOL/N	USGPM SOL/N	
S.T.P.H. SOLIDS		

DSGN. DRAWN		CHECK APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
RL	GDI		INFORMATION	DEC 85		
			PRELIMINARY - REF. ONLY			
			SCALE:	DRAWING No.		
			CAD No.:	REV.		
			210	B1401 210 1217		
			WRIGHT ENGINEERS LIMITED VANCOUVER CANADA	FLOWSHEET No. 7 NEW OPERATION OPTION 'A'		



LEGEND

S.T.P.H. SOLIDS	SP/GR SOLIDS	USGPM SOLIDS
S.T.P.H. SOL'N	% SOLIDS	USGPM SOL'N
S.T.P.H. SLURRY	SP/GR SLURRY	USGPM SLURRY

S.T.P.H. SOL'N	USGPM SOL'N
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S.T.P.H. SOLIDS

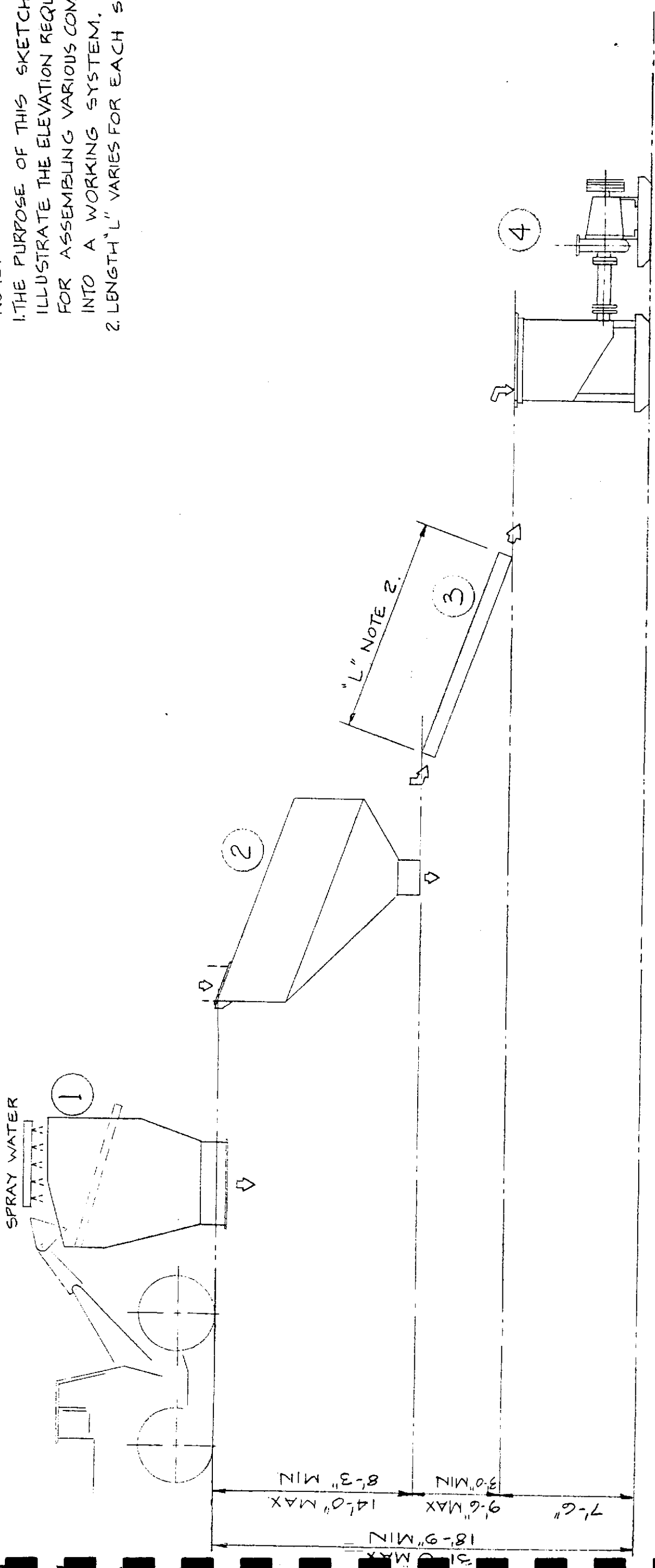
- NOTES:**
- 1) FLOWSHEET BASED ON AN ASSUMED PLANT FEED RATE OF 150 YD³/HR, AT 103.7#/FT³ & S.G. SOLIDS OF 2.65
 - 2) CYCLONE OVERFLOW SOLIDS BASED ON 200 MESH CUT POINT, ALL SOLIDS ARE LESS THAN 200 MESH.
 - 3) BASED ON A RATIO OF 9:1 WATER:FEED GRAVEL (BY VOLUME).

ITEM No.	No. REQ'D	DESCRIPTION	TOTAL H.P.
1	1	GRIZZLY	
2	1	5' x 12' HORIZONTAL SINGLE DECK VIB. SCREEN	5
3	1	PAY GRAVEL PUMP BOX	
4	1	PAY GRAVEL TRANSFER PUMP	25
5	1	SLUICE BOX	
6	1	TAILINGS PUMP BOX	
7	1	TAILINGS PUMP	60
8	1	TAILINGS CYCLONE	

DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
RL	GOT			INFORMATION PRELIMINARY - REF. ONLY	DEC 85		
WRIGHT ENGINEERS LIMITED VANCOUVER CANADA							
FLWSHEET No. 8 NEW OPERATION OPTION 'B'							DRAWING No.
SCALE: _____							REV.
CAD No.: FLOW2.DGN							B1401210
1218							REV.

NOTE:

1. THE PURPOSE OF THIS SKETCH IS TO ILLUSTRATE THE ELEVATION REQUIREMENTS FOR ASSEMBLING VARIOUS COMPONENTS INTO A WORKING SYSTEM.
2. LENGTH "L" VARIES FOR EACH SITE



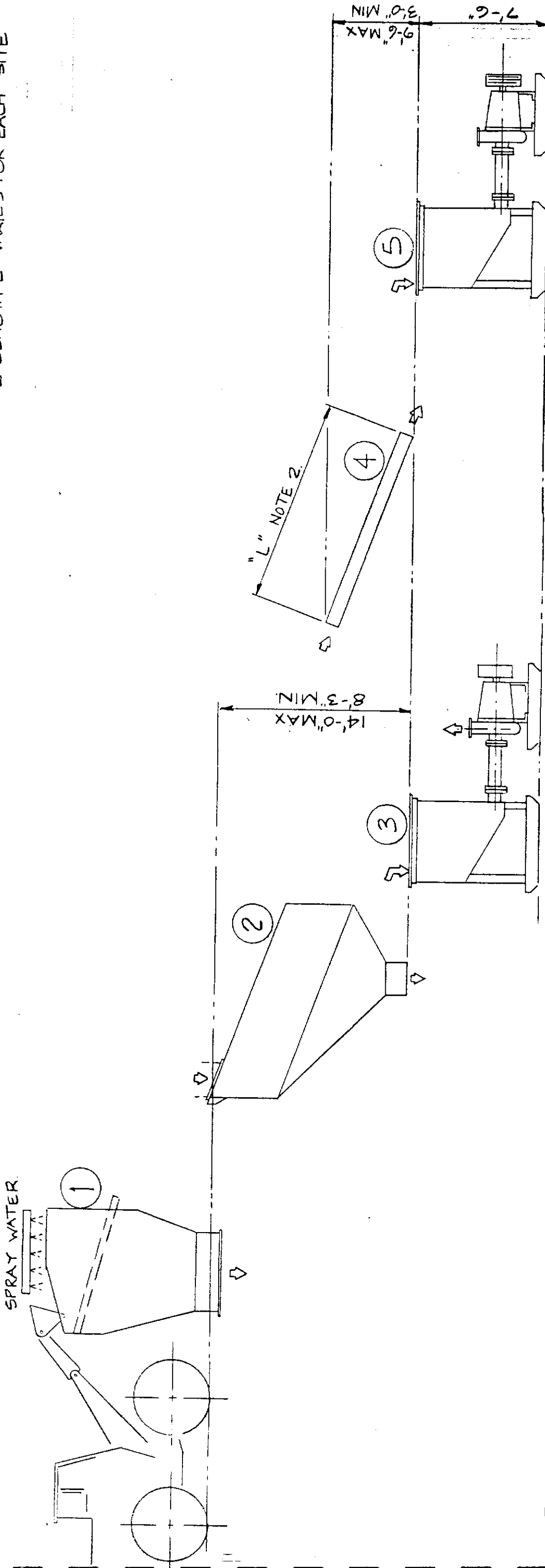
- ① GRIZZLY AND UNDERSIZE CHUTE
- ② VIBRATORY SCREEN AND UNDERSIZE CHUTE
- ③ SLUICE BOX
- ④ PUMP BOX AND PUMP ASSEMBLY

DSGN	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	MM		JL	PRELIMINARY (REF ONLY)	MARCH 82		
							LINEAR ELEVATION, ARRANGEMENT "A"
							SCALE: N.T.S.
							DRAWING No. B/4012101221
							REV.

WRIGHT ENGINEERS LIMITED
VANCOUVER CANADA

NOTES:-

1. THE PURPOSE OF THIS SKETCH IS TO ILLUSTRATE THE ELEVATION REQUIREMENTS FOR ASSEMBLING VARIOUS COMPONENTS INTO A WORKING SYSTEM
2. LENGTH "L" VARIES FOR EACH SITE

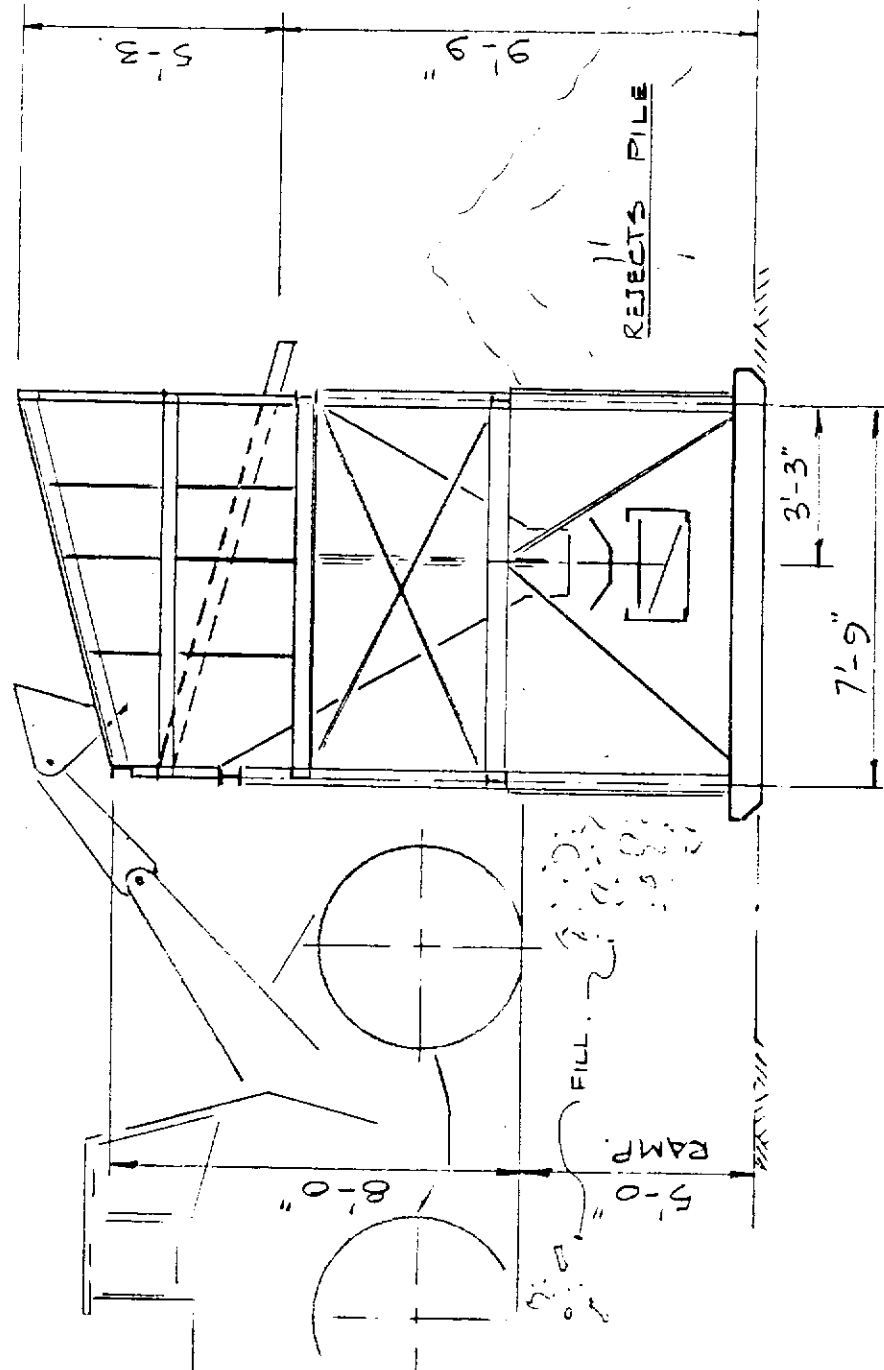
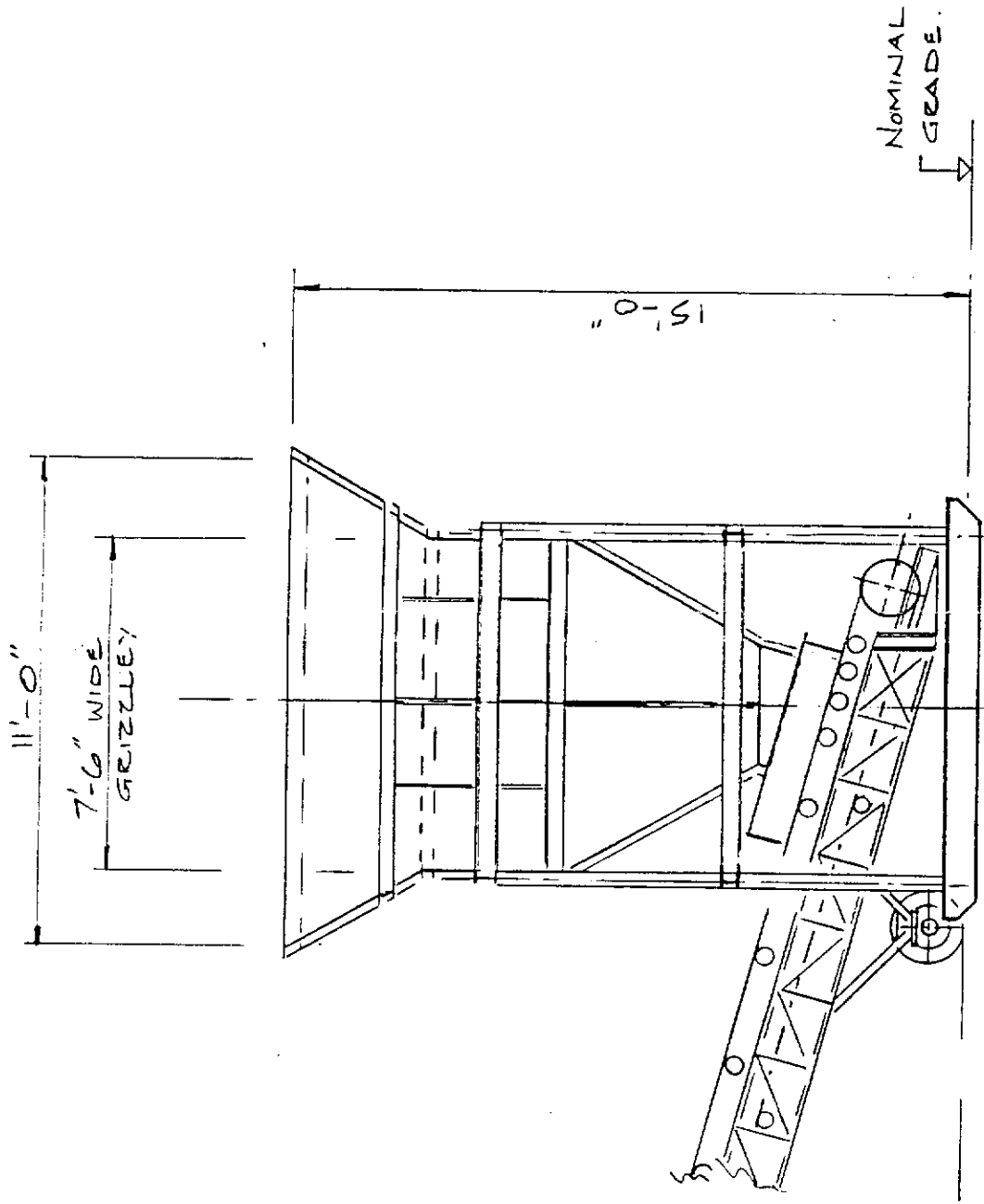


- ① GRIZZLY AND UNDERSIZE CHUTES
- ② VIBRATORY SCREEN AND UNDERSIZE CHUTES
- ③ FEED GRAVEL PUMPBOX AND PUMP ASSEMBLY
- ④ SLUICE
- ⑤ TAILINGS PUMPBOX AND PUMP ASSEMBLY

NO.	DATE	REV.	DESCRIPTION OF REVISION
1	MAR 14/82		
2			
3			
4			
5			

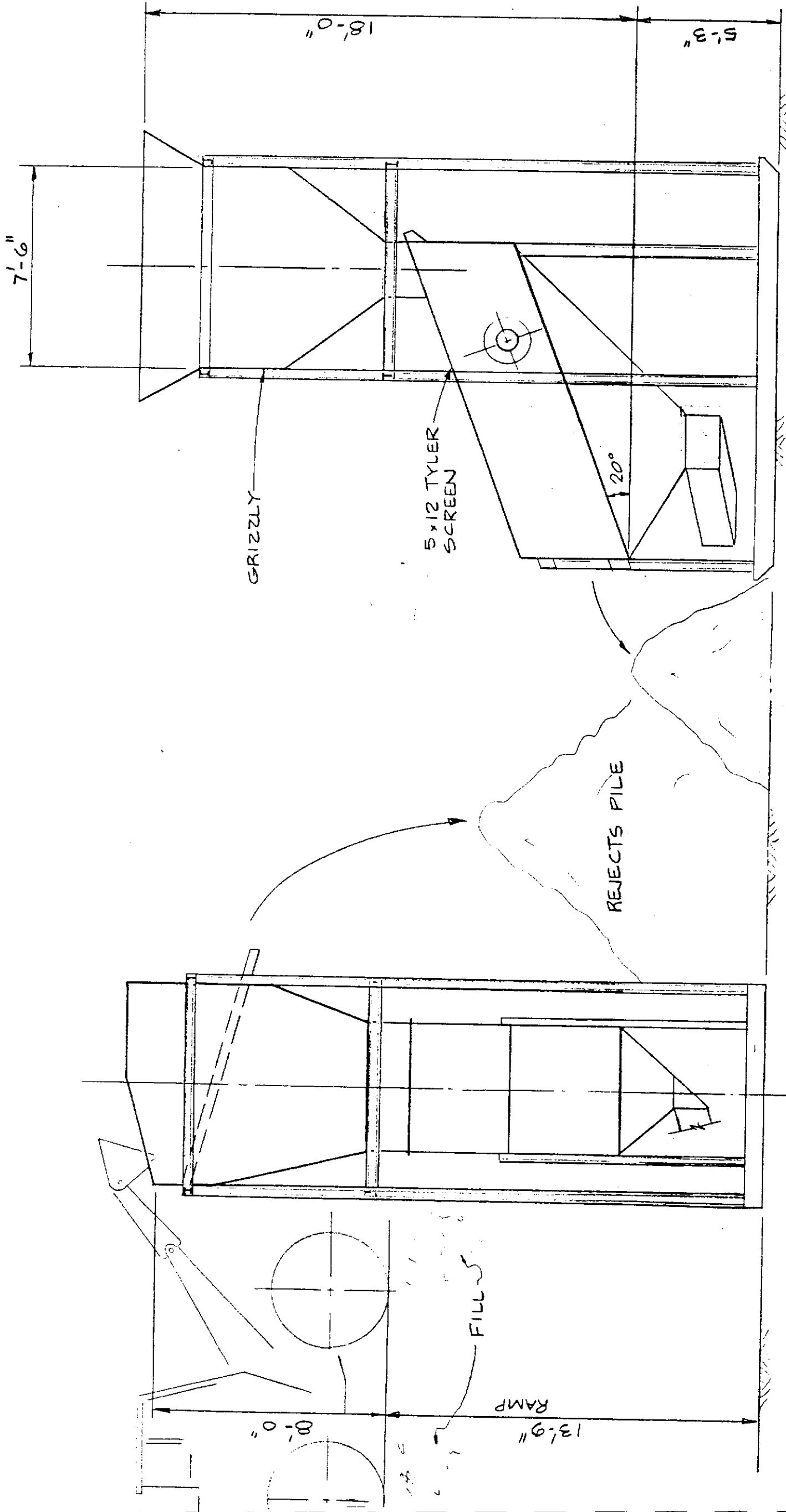
ISS. DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
MP	JZ	JZ	PRELIMINARY (REF ONLY)	MAR 14/82		

WRIGHT ENGINEERS LIMITED VANCOUVER		SCALE: N.T.S.	DRAWING No. B1401 210 1223
		LINEAR ELEVATION ARRANGEMENT "C"	
		REV.	

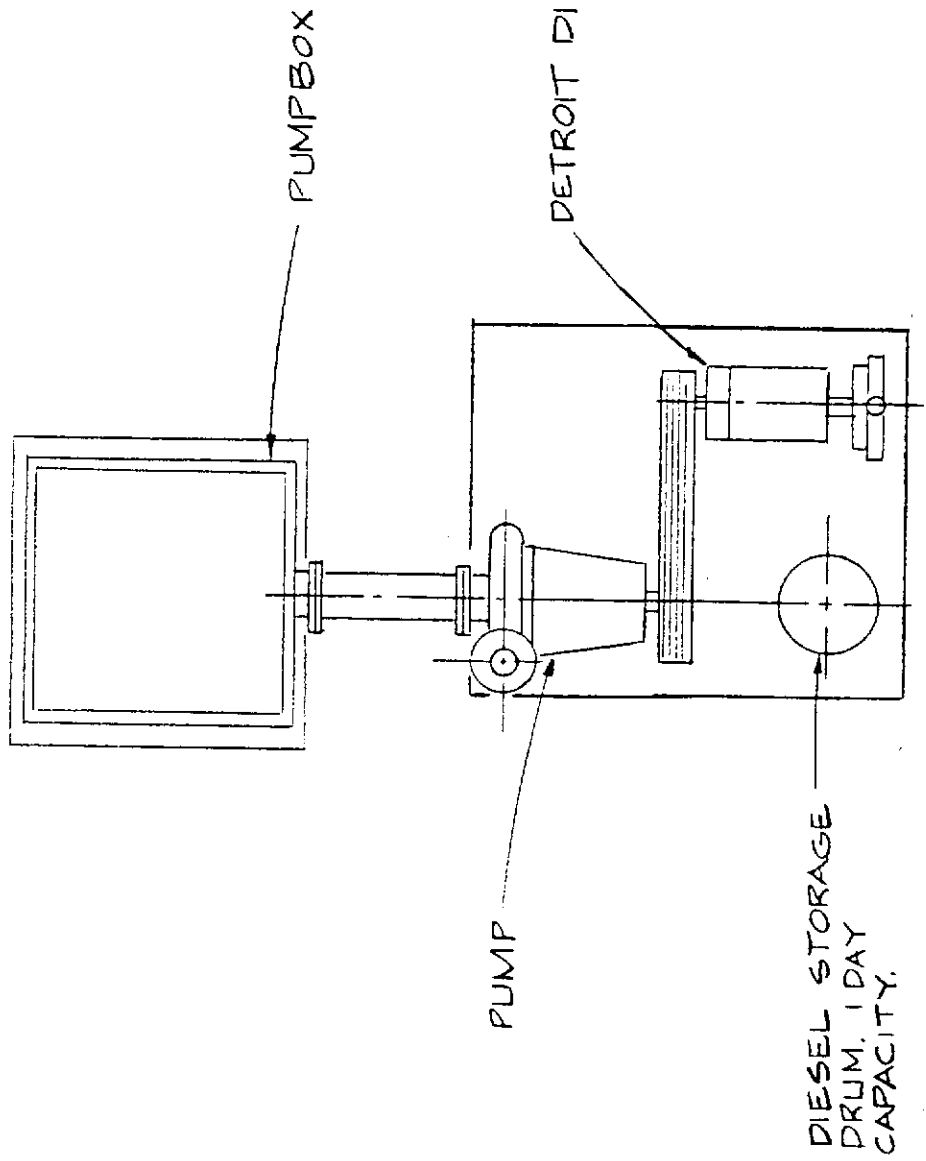


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	MP		JL	PRELIMINARY (REF ONLY)	MAR 18/84		

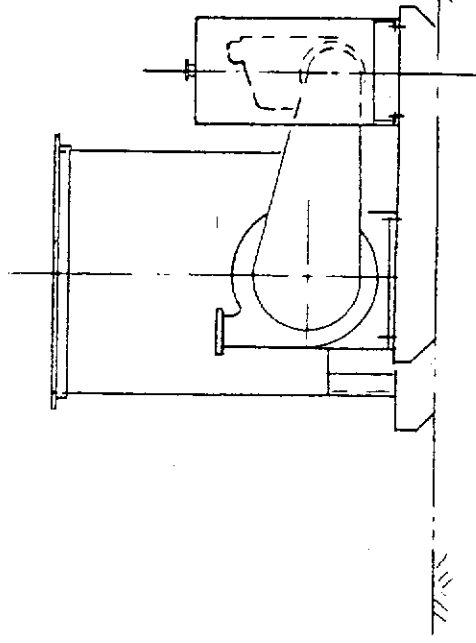
GRIZZLY WITH CONVEYOR	
SCALE: 1/4" = 1'	DRAWING No. B1401 210 224
WRIGHT ENGINEERS LIMITED VANCOUVER CANADA	
REV.	



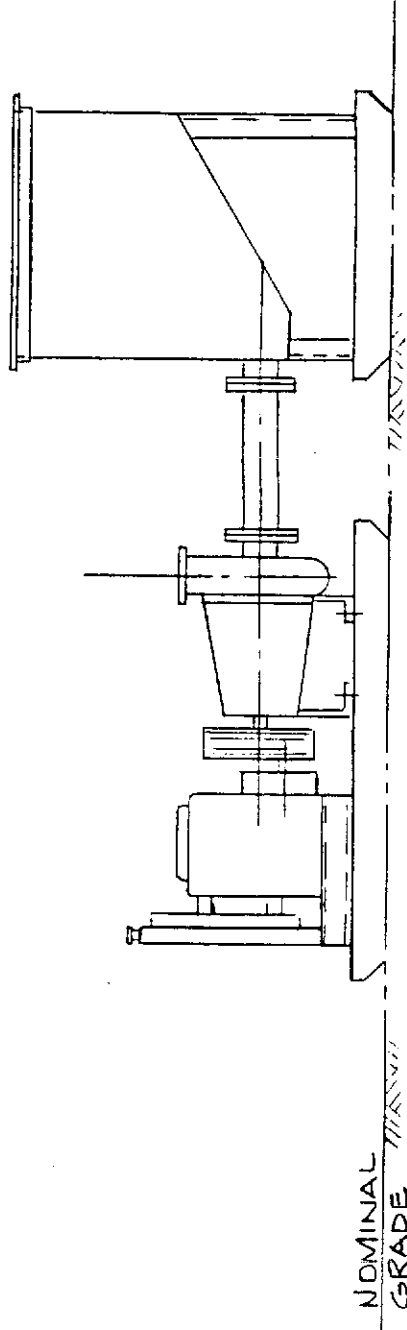
NO.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
1	JL	JL		PRELIMINARY (REF ONLY)	MAR 14 1982		
WRIGHT ENGINEERS LIMITED VANCOUVER CANADA							
GRIZZLY WITH TYLER TY-ROCKET 330 5'x12' SCREEN							SCALE: $1/4" = 1'-0"$
DRAWING NO. B12092101225							REV.



PLAN.



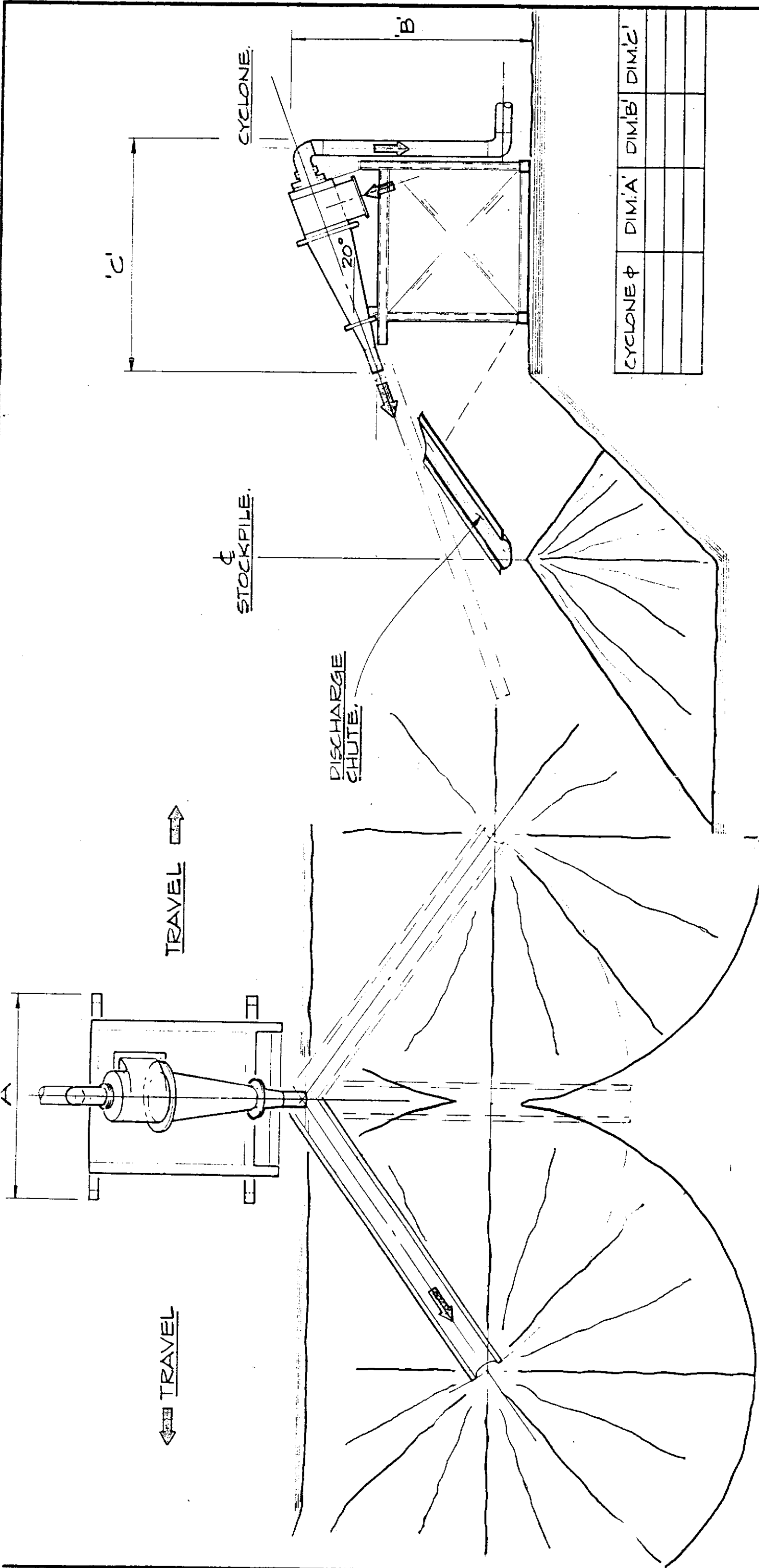
ELEVATION



ELEVATION

GN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	MP		JK	PRELIMINARY (REF ONLY)	MAR 19/82		
							PUMP & PUMPBOX ASSEMBLY
							SCALE: 1/4" = 1'-0"
							DRAWING No. B14-01201226
							REV.


WRIGHT ENGINEERS LIMITED
 VANCOUVER CANADA



CYCLONE ϕ	DIM. A'	DIM. B'	DIM. C'

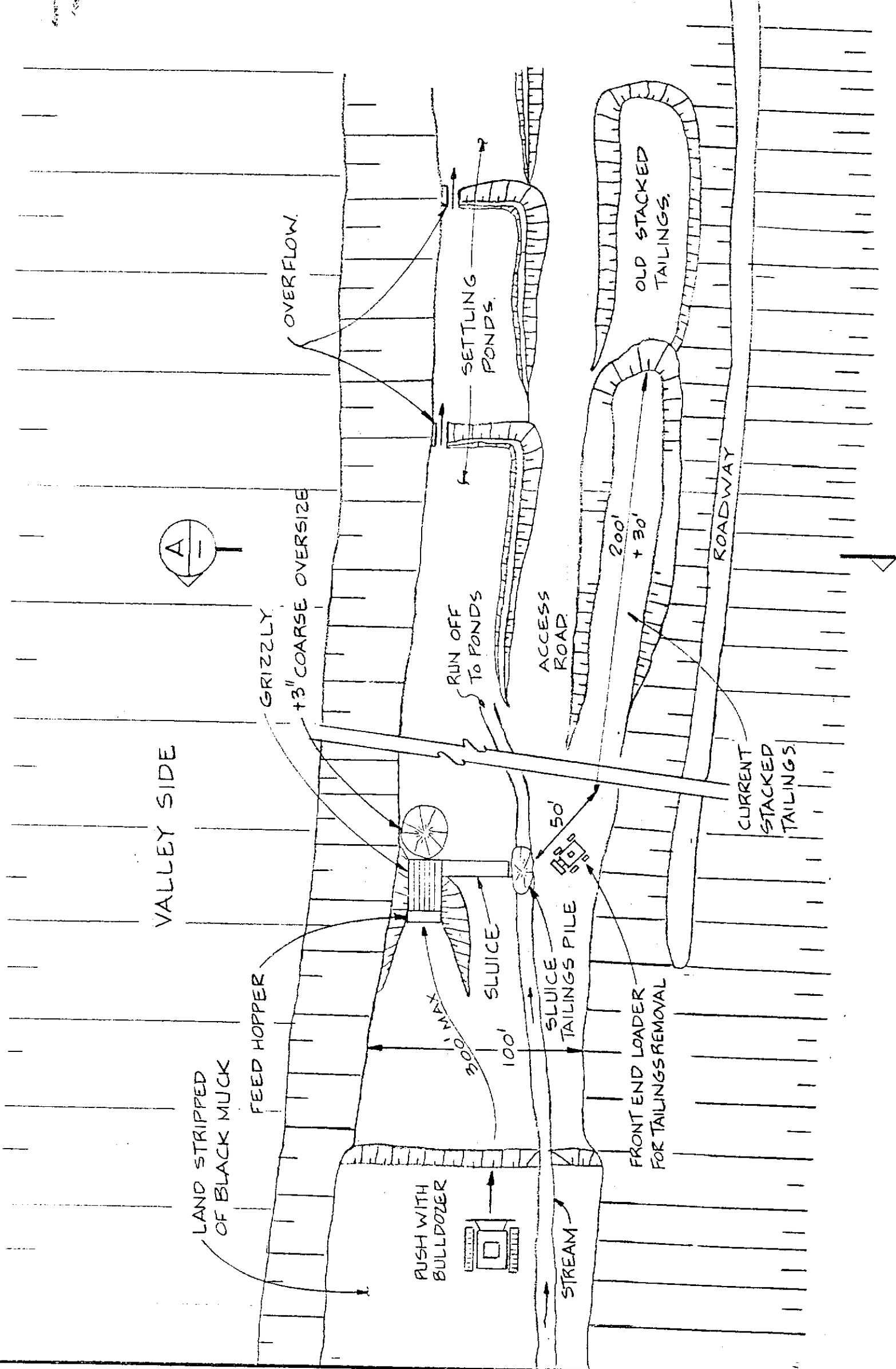
PLAN

ELEVATION

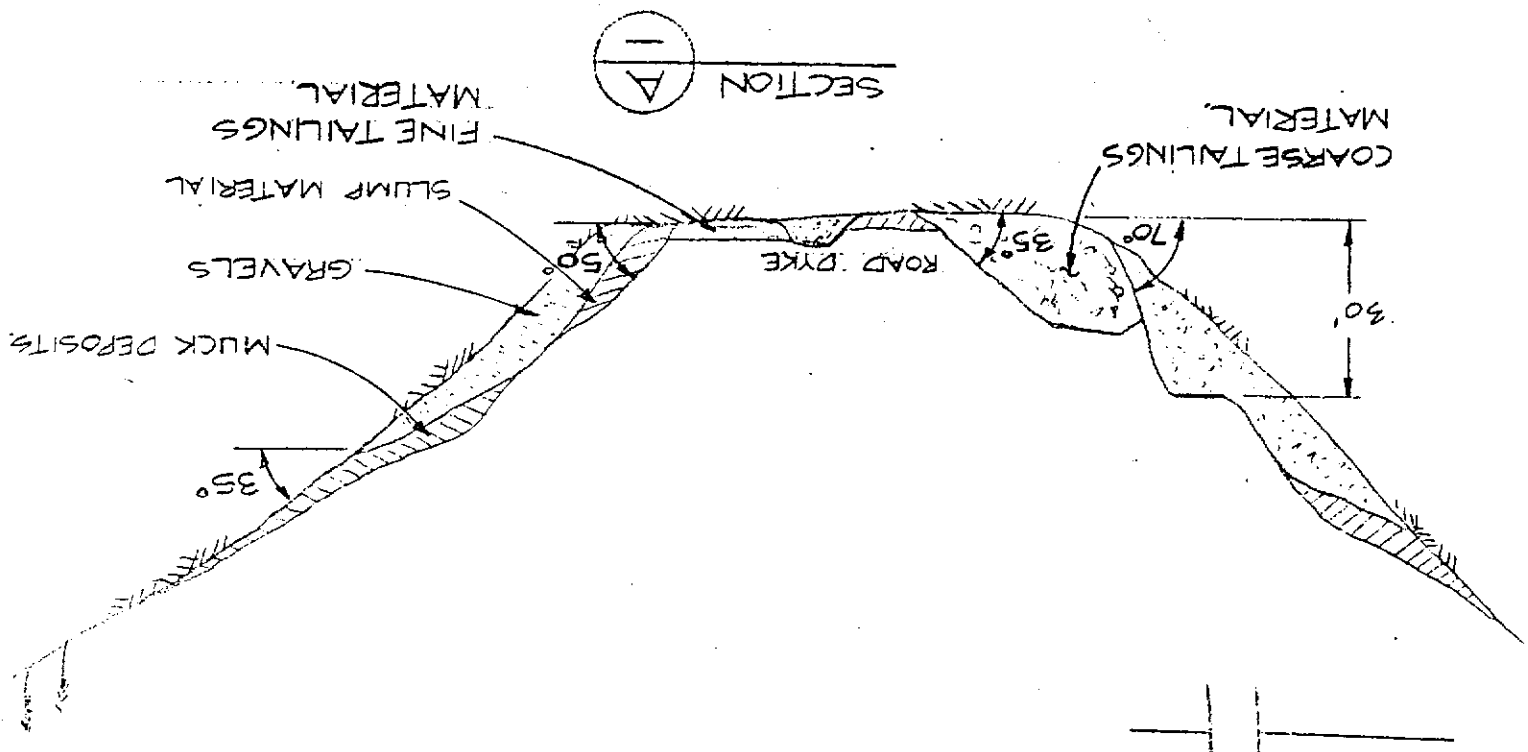
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	ABA			PRELIMINARY (REF ONLY)	MAR 19/62		

CYCLONE ASS'Y		SCALE: 3/16" = 1'-0"	DRAWING No. B1401	210	1227

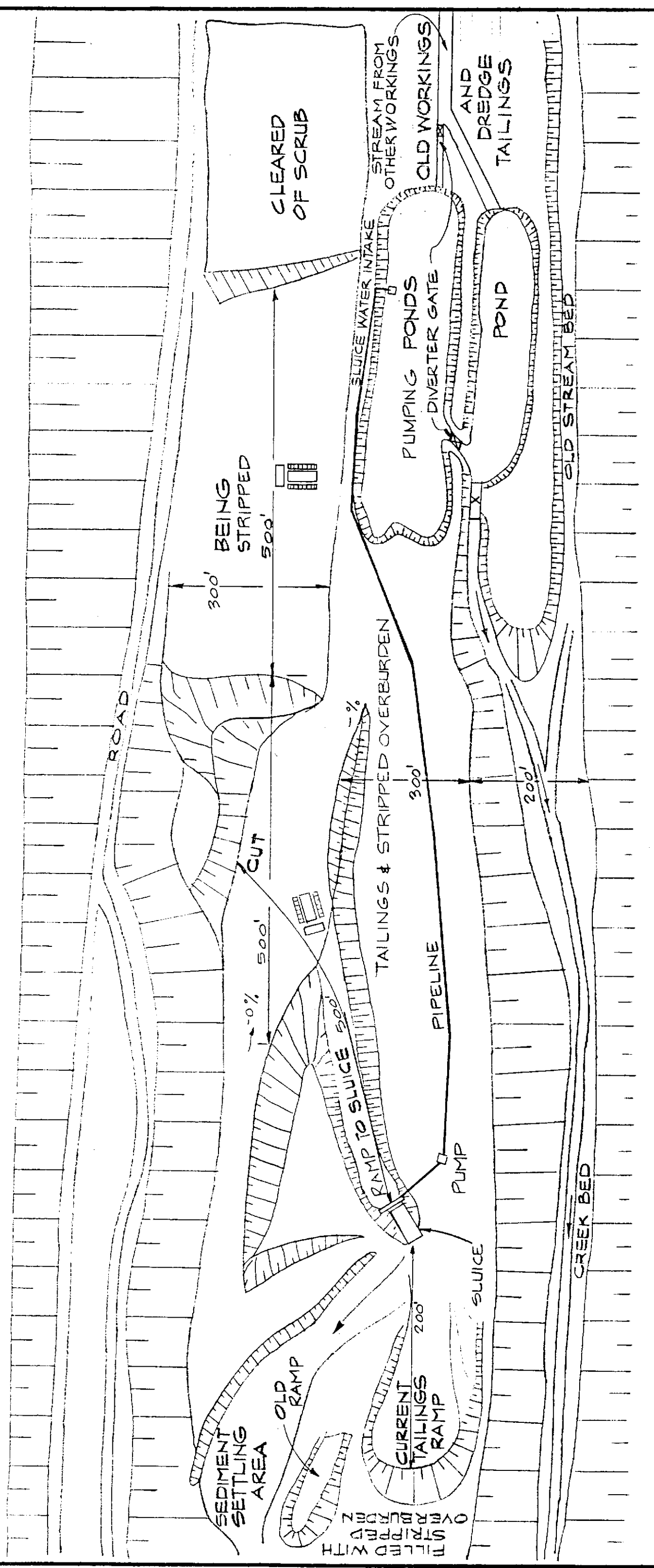
WRIGHT ENGINEERS LIMITED VANCOUVER	CANADA
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SITE SKETCH

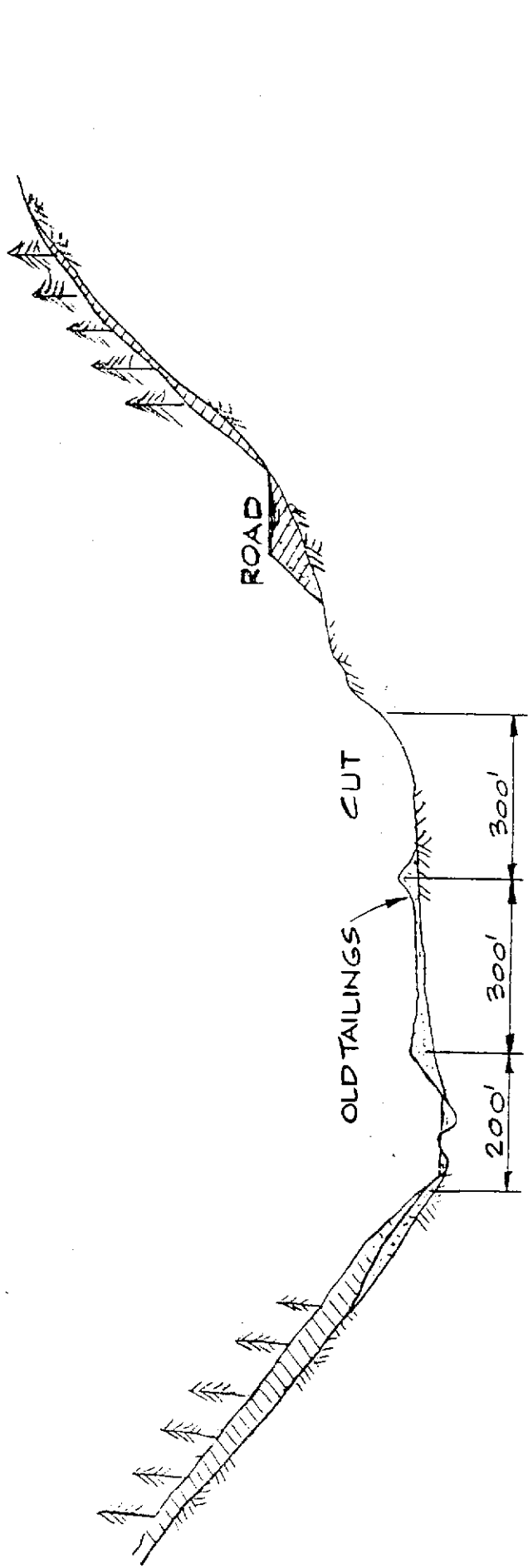


GULCH DEPOSIT SITE LAYOUT		SCALE: N.T.S.		DRAWING NO. B14011301201	
DSGN.	DRAWN CHECK APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
		PRELIMINARY (REF ONLY)	MAR 14/82		
<p>WRIGHT ENGINEERS LIMITED VANCOUVER CANADA</p>					

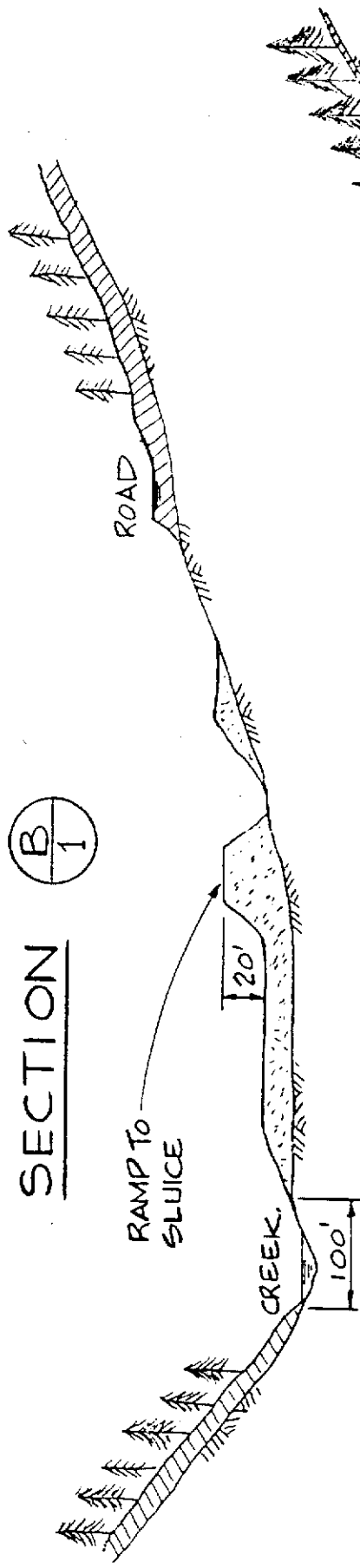


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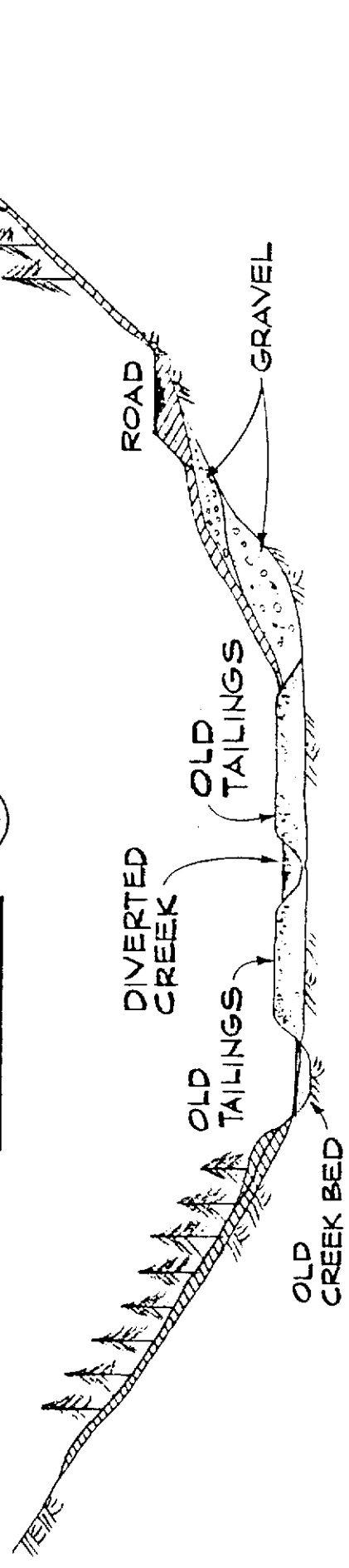
VALLEY OPERATIONS WITH PREVIOUS WORKINGS		NARROW VALLEY DEPOSIT SITE LAYOUT	
WRIGHT ENGINEERS LIMITED VANCOUVER		EXAMPLE 'A', SH. 1 OF 2	
SCALE: N.T.S.		DRAWING No. B1401130 1202	
		REV.	



SECTION **B**/₁

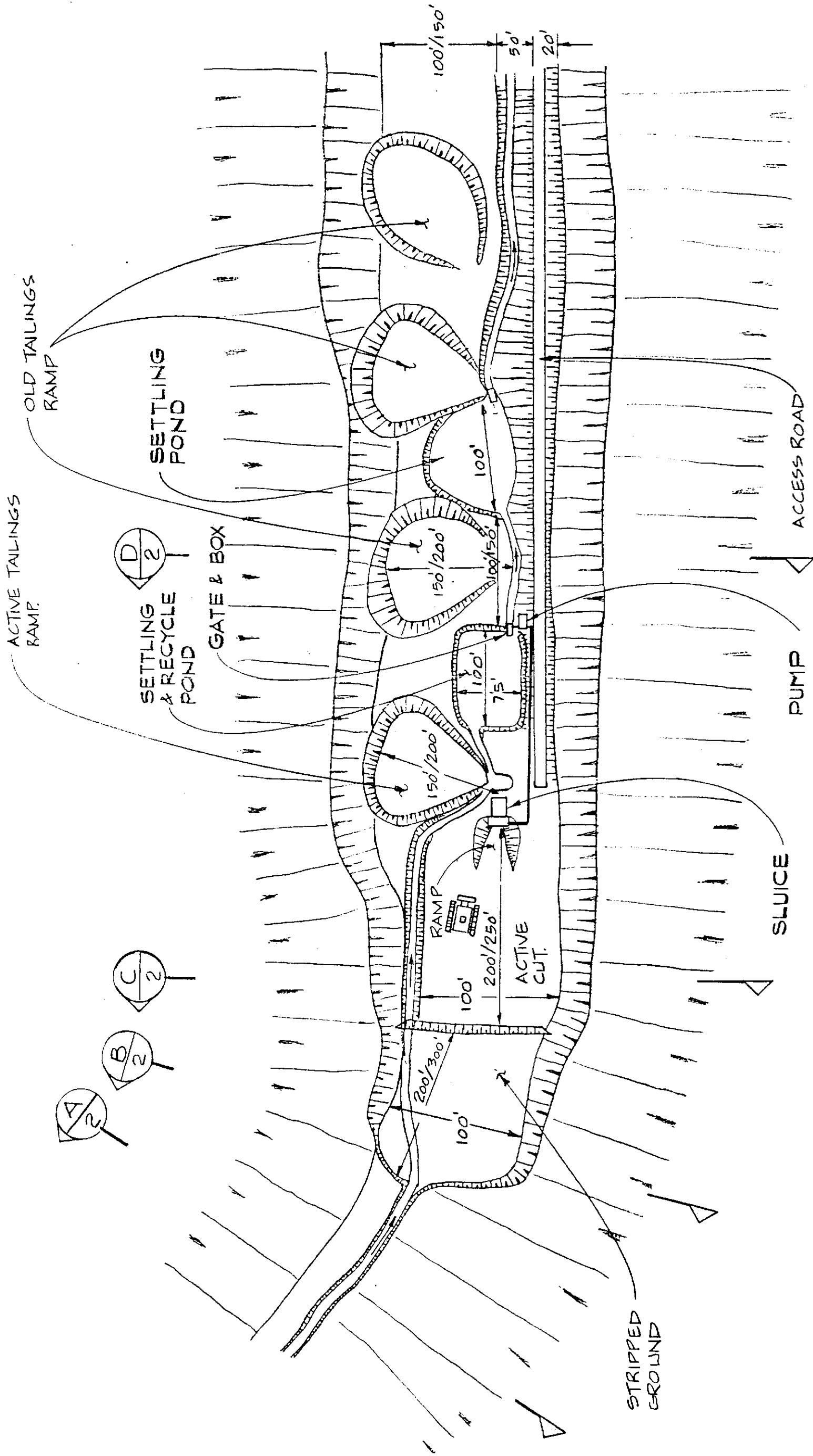


SECTION **C**/₁



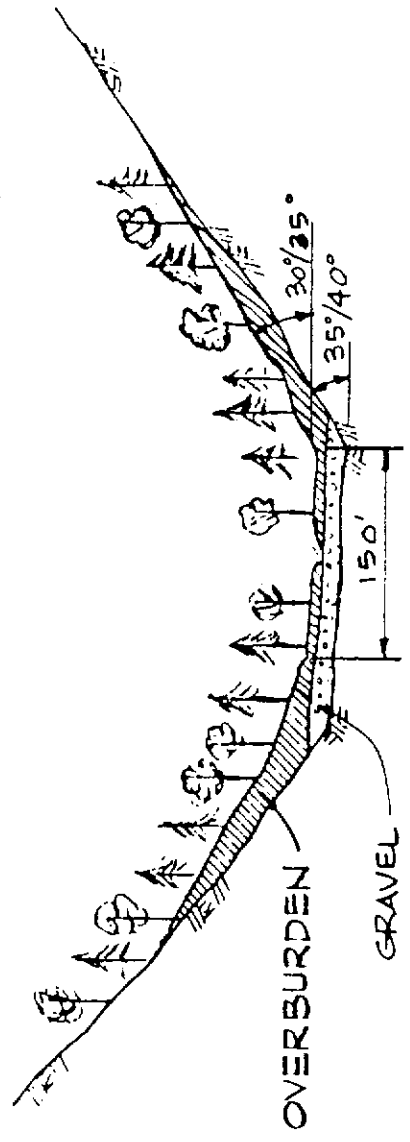
SECTION **A**/₁

DSGN.		DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
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NARROW VALLEY DEPOSIT SITE LAYOUT EXAMPLE "A", SH. 2 OF 2								
SCALE: N.T.S.								
DRAWING No. B 1401130 1202								
REV.								
WRIGHT ENGINEERS LIMITED VANCOUVER					CANADA			

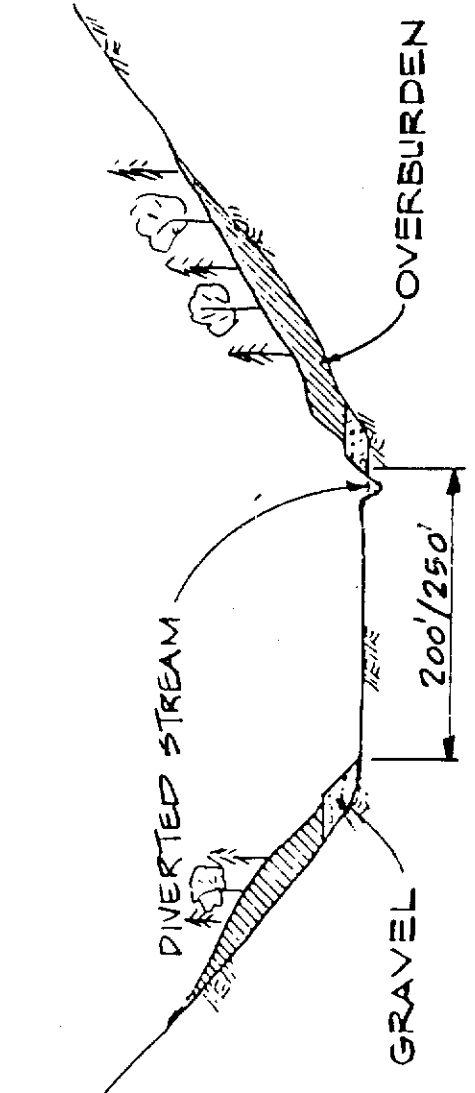


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	inba		JZ	PRELIMINARY (REF ONLY)	MAR/98		

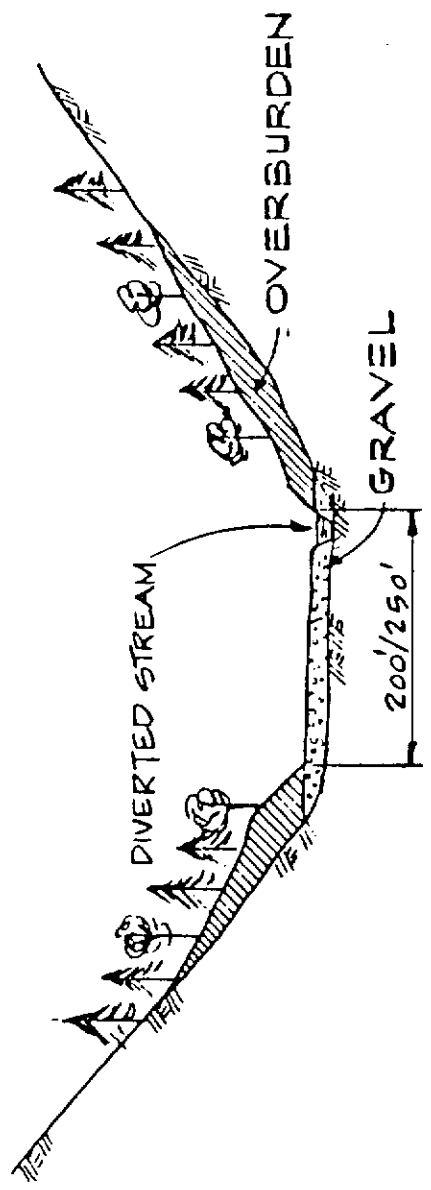
VALLEY OPERATION MINING NEW GROUND		NARROW VALLEY DEPOSIT SITE LAYOUT EXAMPLE "B", SH. 1 OF 2	
WRIGHT ENGINEERS LIMITED VANCOUVER		SCALE: N.T.S.	
DRAWING NO. B1401 130 1203		REV.	



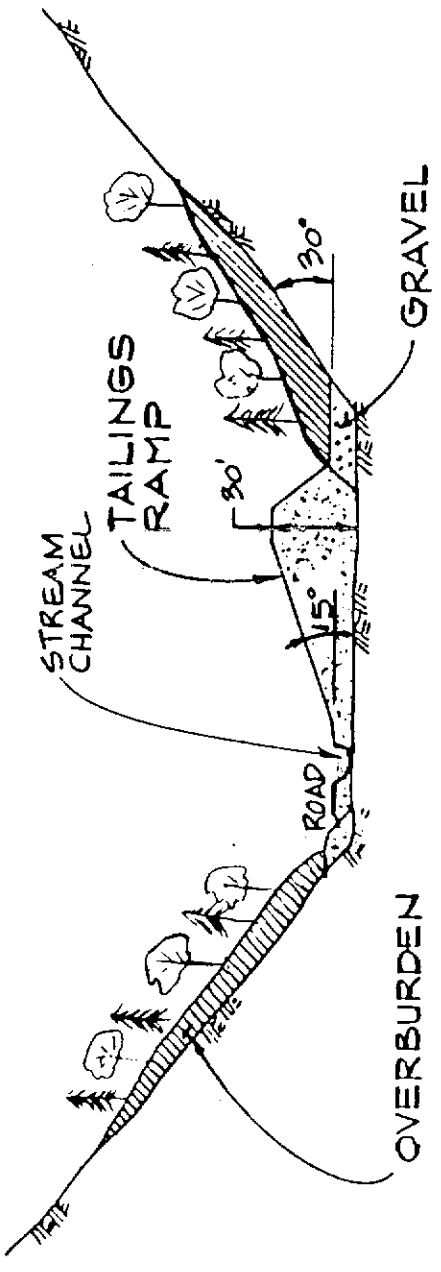
SECTION A
1



SECTION C
1

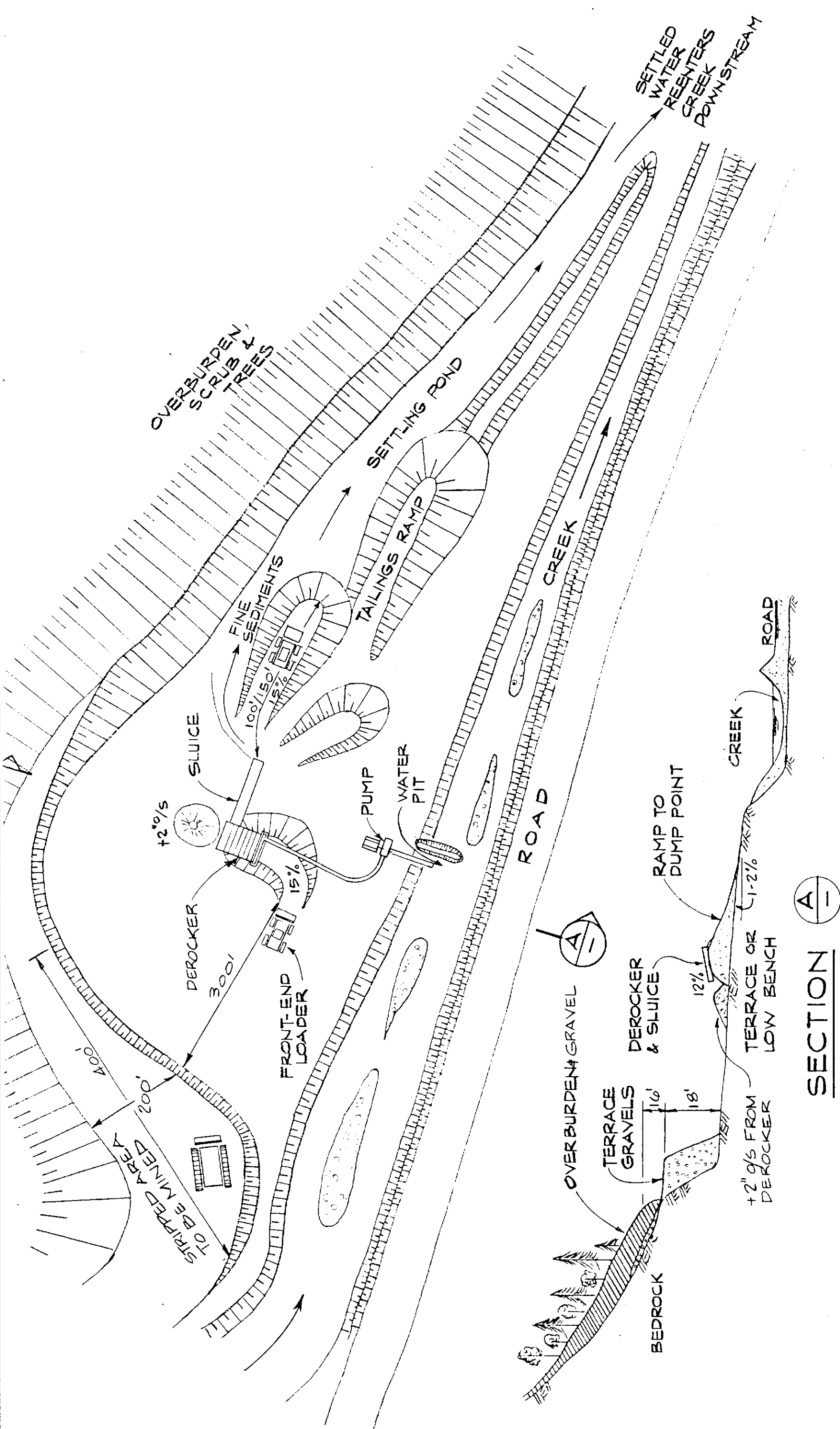


SECTION B
1



SECTION D
1

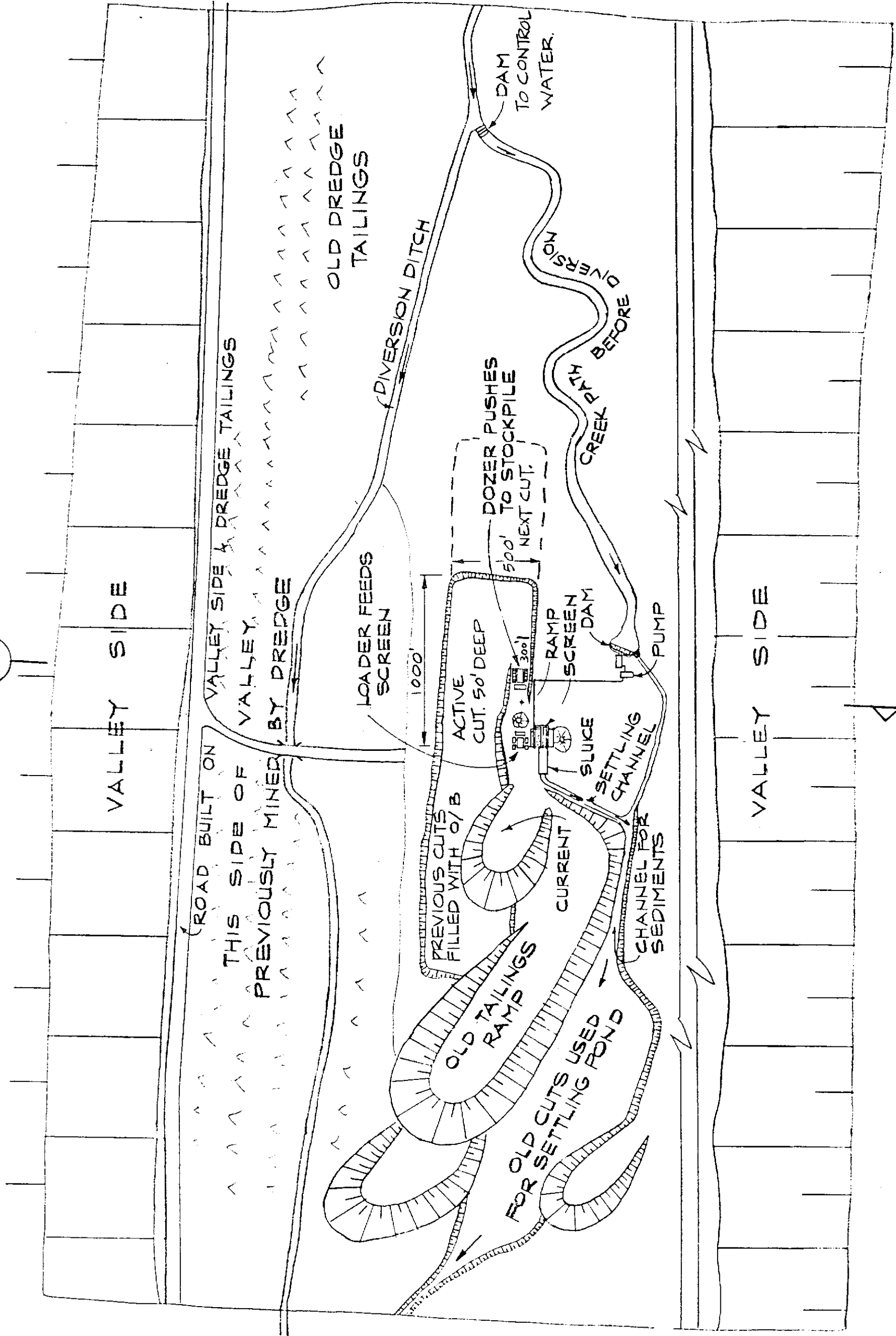
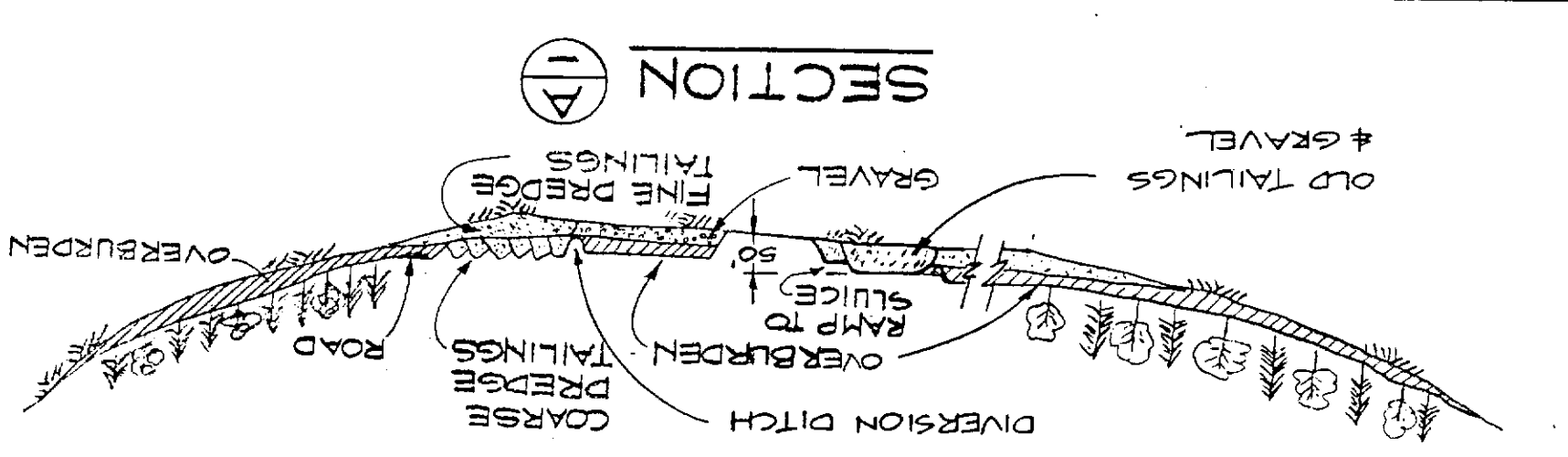
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							SCALE: N.T.S.
							DRAWING No. B1401130
							REV. 1203
							WRIGHT ENGINEERS LIMITED VANCOUVER CANADA
							NARROW VALLEY DEPOSIT SITE LAYOUT EXAMPLE "B", SH. 2 OF 2



SECTION A

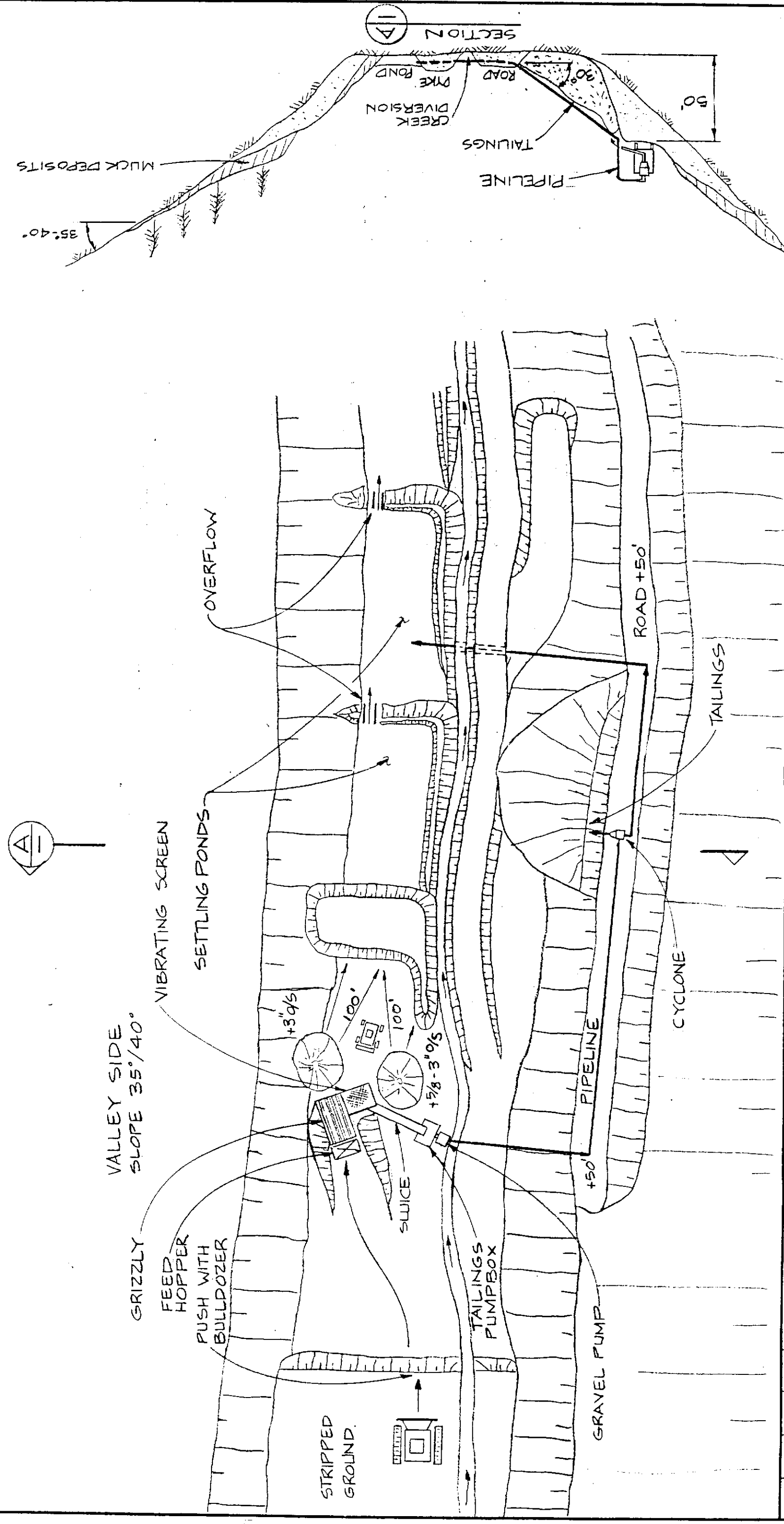
DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	T.D.B.	R.S.	J.Z.	PRELIMINARY (REF ONLY)	MARCH 66		

<p>WRIGHT ENGINEERS LIMITED VANCOUVER CANADA</p>	<p>SCALE: N.T.S.</p>	<p>LOW BENCH DEPOSIT SITE LAYOUT</p>
<p>DRAWING No. B1401130</p>	<p>REV. 1204</p>	<p>REV.</p>



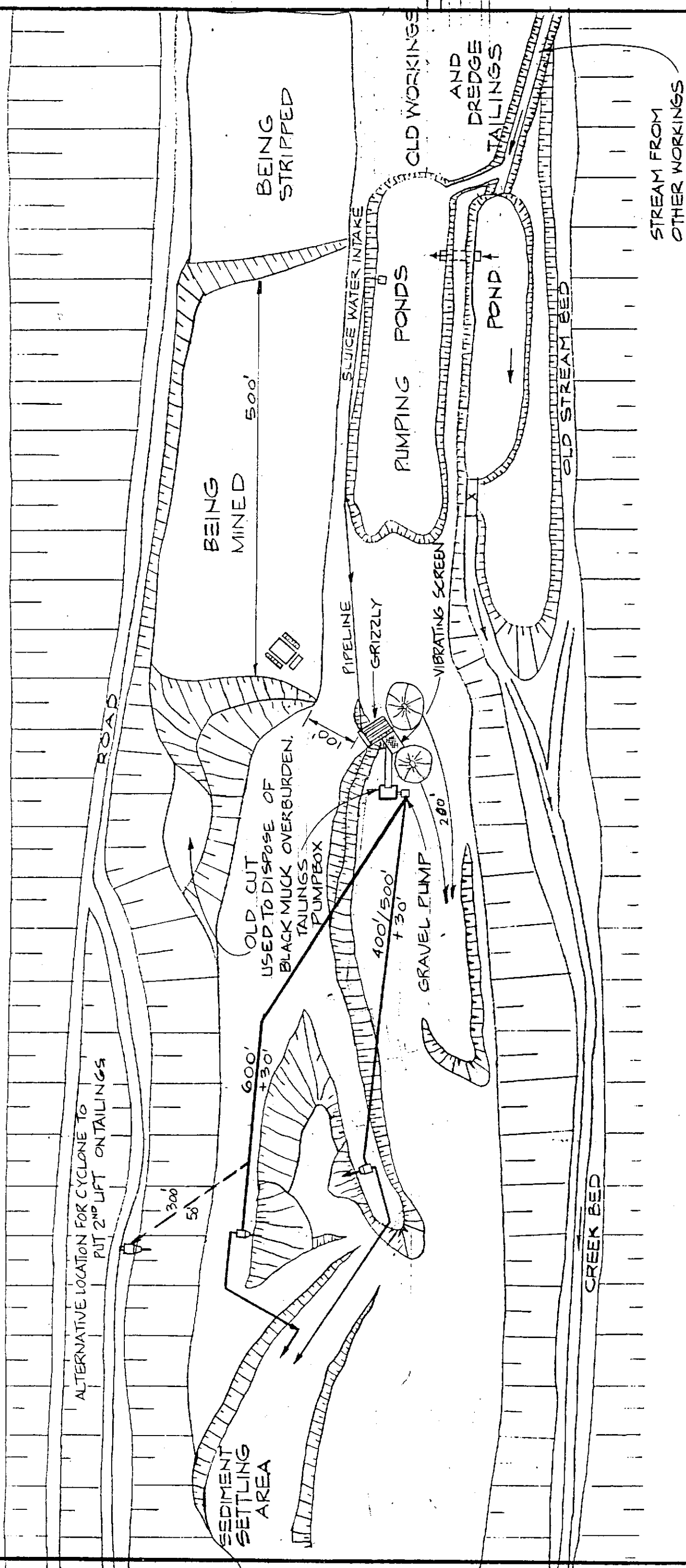
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	JTB		SL	PRELIMINARY (REF ONLY)	MARCH		
PREVIOUSLY MINED BY DREDGE							
WRIGHT ENGINEERS LIMITED VANCOUVER CANADA							
SCALE: N.T.S.							
DRAWING No. B1401130 1205							
REV.							

BROAD VALLEY DEPOSIT SITE LAYOUT



DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
				PRELIMINARY (REF ONLY)	MARCH 84		

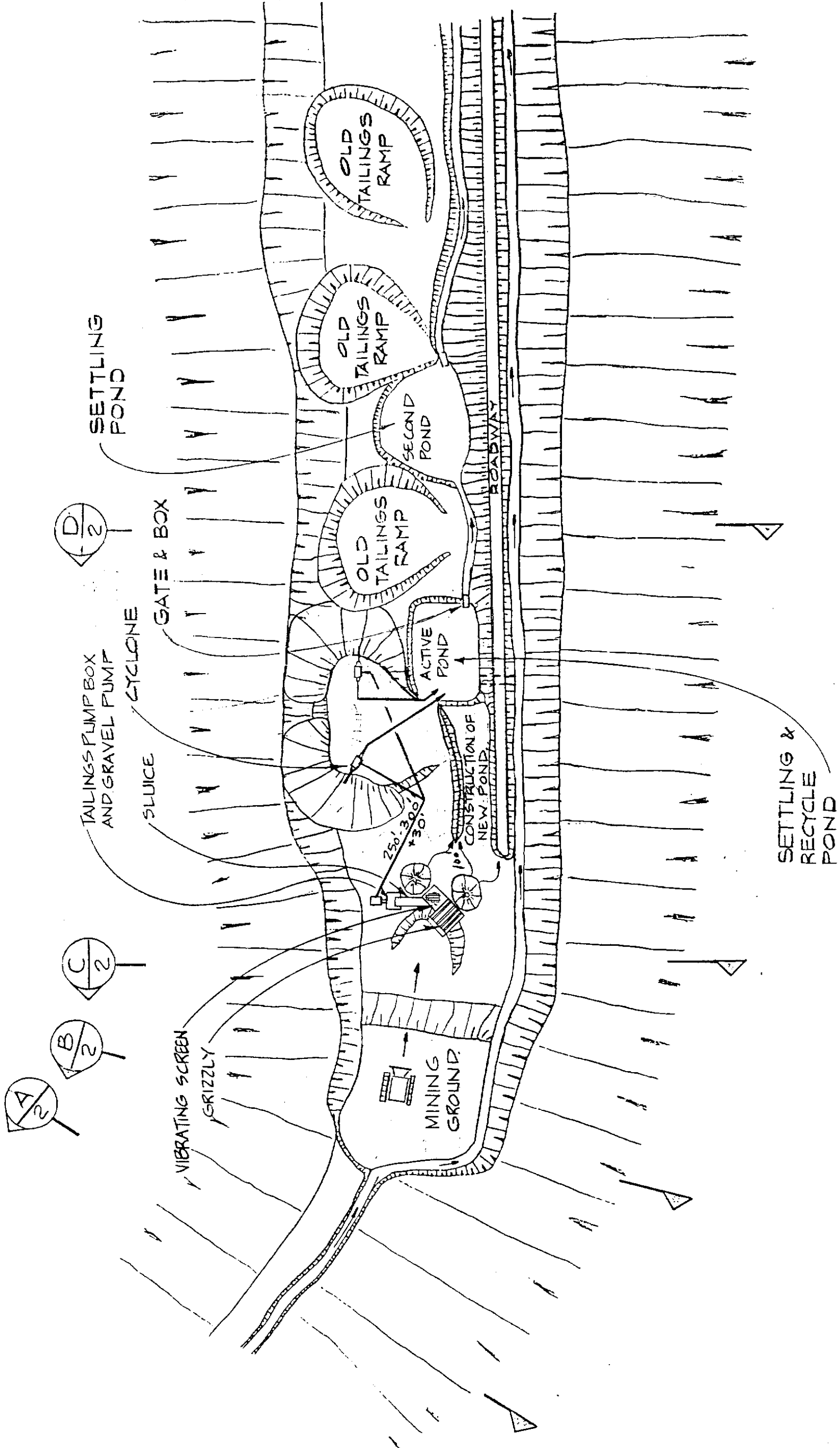
GULCH DEPOSIT SITE LAYOUT WITH TAILINGS PUMPING		SCALE: N.T.S	DRAWING No. B 1401 210 1201
WRIGHT ENGINEERS LIMITED VANCOUVER CANADA			
			REV.



NOTE: - CYCLONE ALTERNATIVE LOCATION UP HILLSIDE WOULD REQUIRE HIGHER HEAD PUMP.

DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	TRB		JZ	PRELIMINARY (REF ONLY)	MARCH 86		

NARROW VALLEY DEPOSIT SITE LAYOUT EXAMPLE "A" WITH TAILINGS PUMPING, SHT. 1 OF 2		SCALE:	N.T.S.	DRAWING No.	B 1401210	REV.	1202
WRIGHT ENGINEERS LIMITED VANCOUVER		CANADA					



DSGN.	DRAWN	CHECK	APPR.	ISSUED FOR	DATE	REV.	DESCRIPTION OF REVISION
	JDB			PRELIMINARY (REF ONLY)	MAR 1986		
<p style="text-align: center;">NARROW VALLEY DEPOSIT SITE LAYOUT EXAMPLE 'B' WITH TAILINGS PUMPING, SHT 1 OF 2</p>							
<p style="text-align: center;">SCALE: N.T.S.</p>							
<p style="text-align: center;">DRAWING No. B1401210 1203</p>							
<p style="text-align: center;">REV.</p>							
<p>WRIGHT ENGINEERS LIMITED VANCOUVER</p>				<p>WRIGHT ENGINEERS LIMITED CANADA</p>			

APPENDIX II
SCREEN ANALYSES GRAPHS

The Tyler Standard Screen Scale

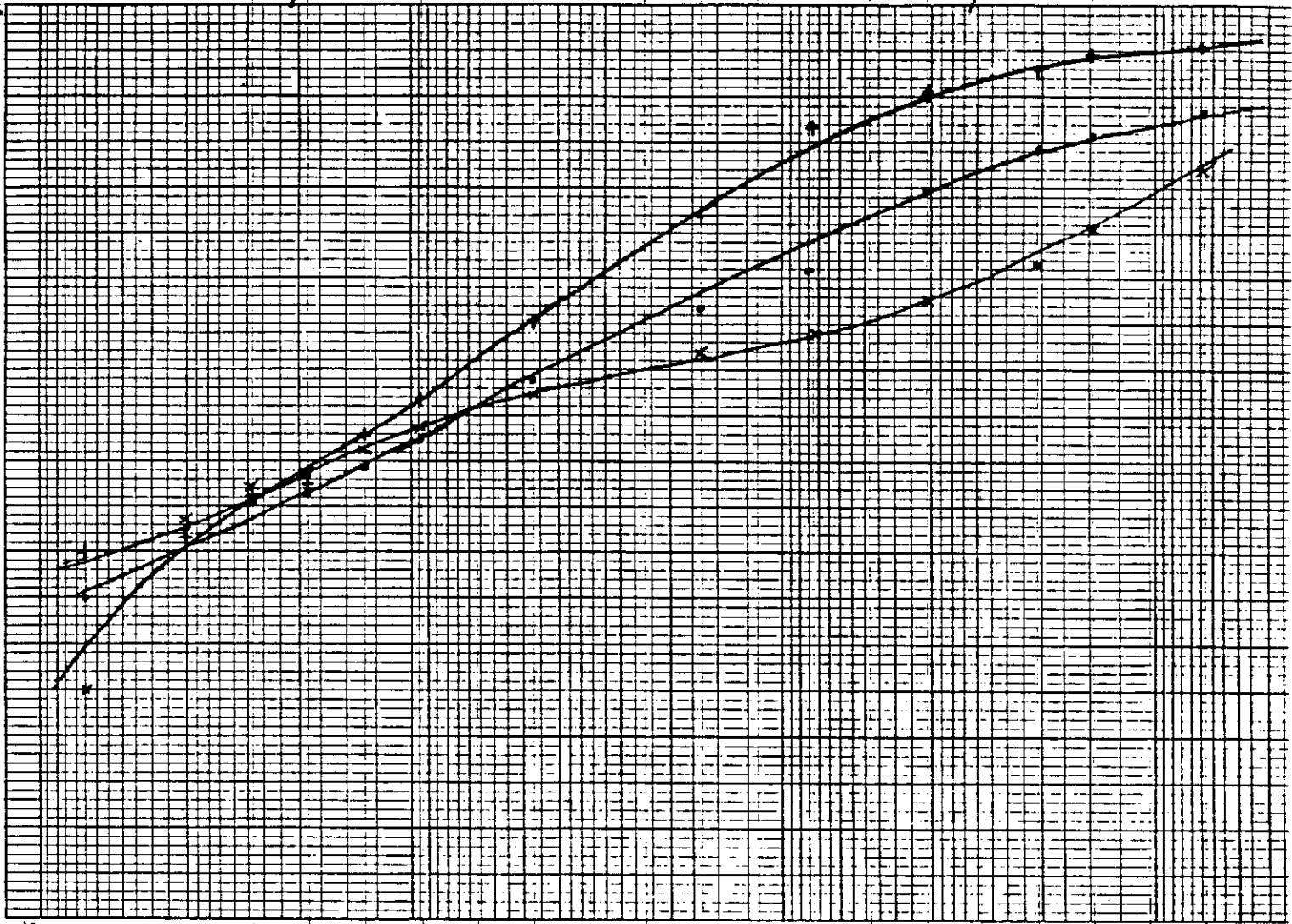
Form No. L-4
Please mention above when ordering

Cumulative Logarithmic Diagram of Screen Analysis on Sample of GULCH DEPOSIT

Name Reid Crockett / E.R.A.

Date PAY GRAVEL

CUMULATIVE PER CENT WEIGHTS RETAINED



100%	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	.9	.8	.7	.6	.5	.4	.3	.2	.1	.09	.08	.07	.06	.05
								26.67%	18.85%	13.33%	9.423%	6.680%	4.699%	3.327%	2.362%	1.651%	1.168%	.833%	.589%	.417%	.295%	.208%	.147%	.104%	.074%							

SCREEN SCALE RATIO 1.414				U. S. No.	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights
Openings		Tyler Mesh											
Milli-meters	Inches												
26.67	1.050												
18.85	.742												
13.33	.525												
9.423	.371												
6.680	.263	3											
4.699	.185	4	4										
3.327	.131	6	6										
2.362	.093	8	8										
1.651	.065	10	12										
1.168	.046	14	16										
.833	.0328	20	20										
.589	.0232	28	30										
.417	.0164	35	40										
.295	.0116	48	50										
.208	.0082	65	70										
.147	.0058	100	100										
.104	.0041	150	140										
.074	.0029	200	200										
.074	.0029	200	200										

• *Mustast Kumpus*
+ *Grand Mailak*
* *Linnas Linnas*

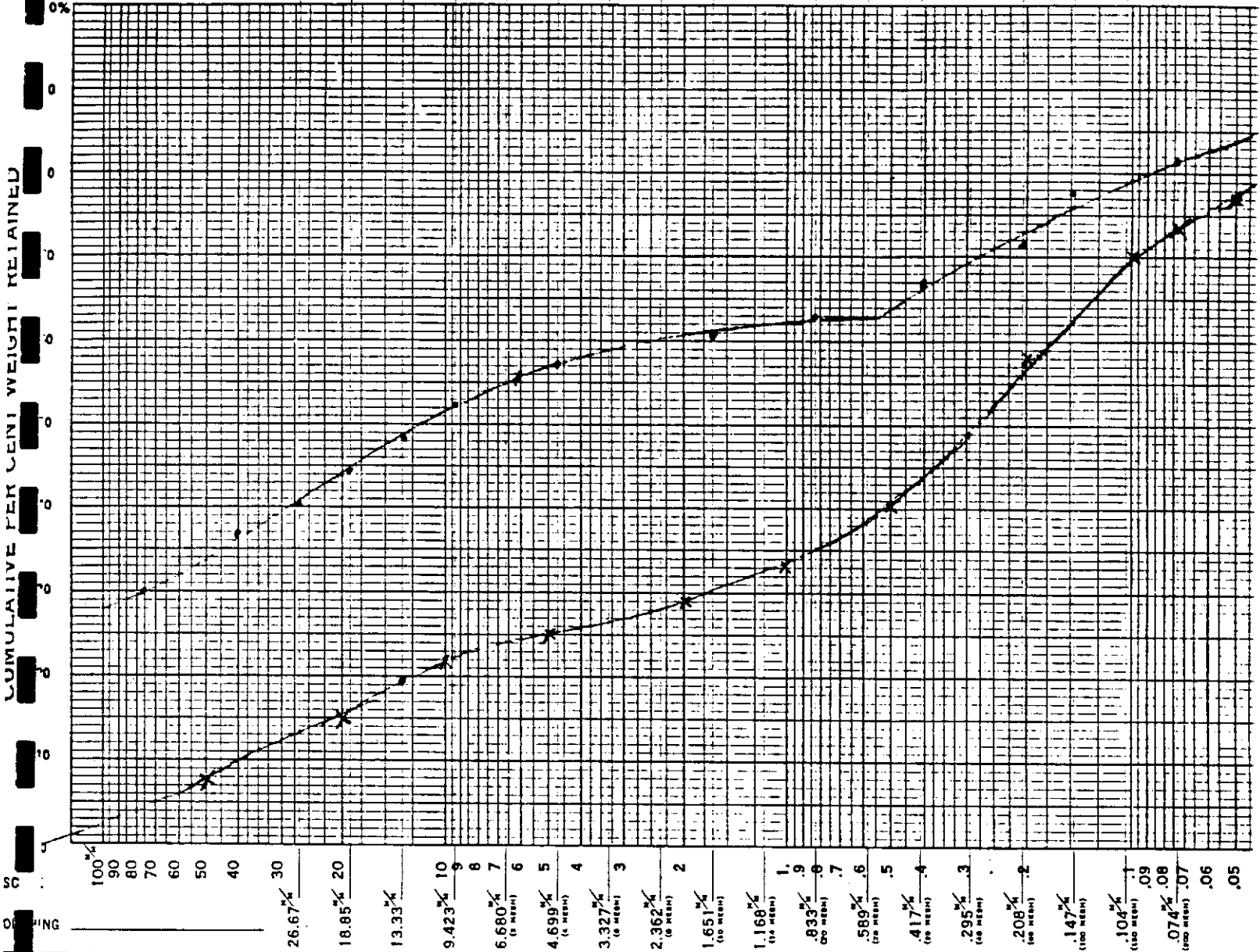
The Tyler Standard Screen Scale

Form No. L-6
Please mention above
when ordering

Cumulative Logarithmic Diagram of Screen Analysis on Sample of HIGH BENCH

Name EBA Reid Crawley

Date PAY GRAVEL



SCREEN SCALE RATIO 1.414												
Openings		Tyler Mesh	U.S. No.	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights
Milli-meters	Inches											
26.67	1.050											
18.85	.742											
13.33	.525											
9.423	.371											
6.680	.263	3										
4.699	.185	4	4									
3.327	.131	6	6									
2.362	.093	8	8									
1.651	.065	10	12									
1.168	.046	14	16									
.833	.0328	20	20									
.589	.0232	28	30									
.417	.0164	35	40									
.295	.0116	48	50									
.208	.0082	65	70									
.147	.0058	100	100									
.104	.0041	150	140									
.074	.0029	200	200									
.074	.0029	200	200									
Totals												

*Discontinuation of
M: Ben Dogo*

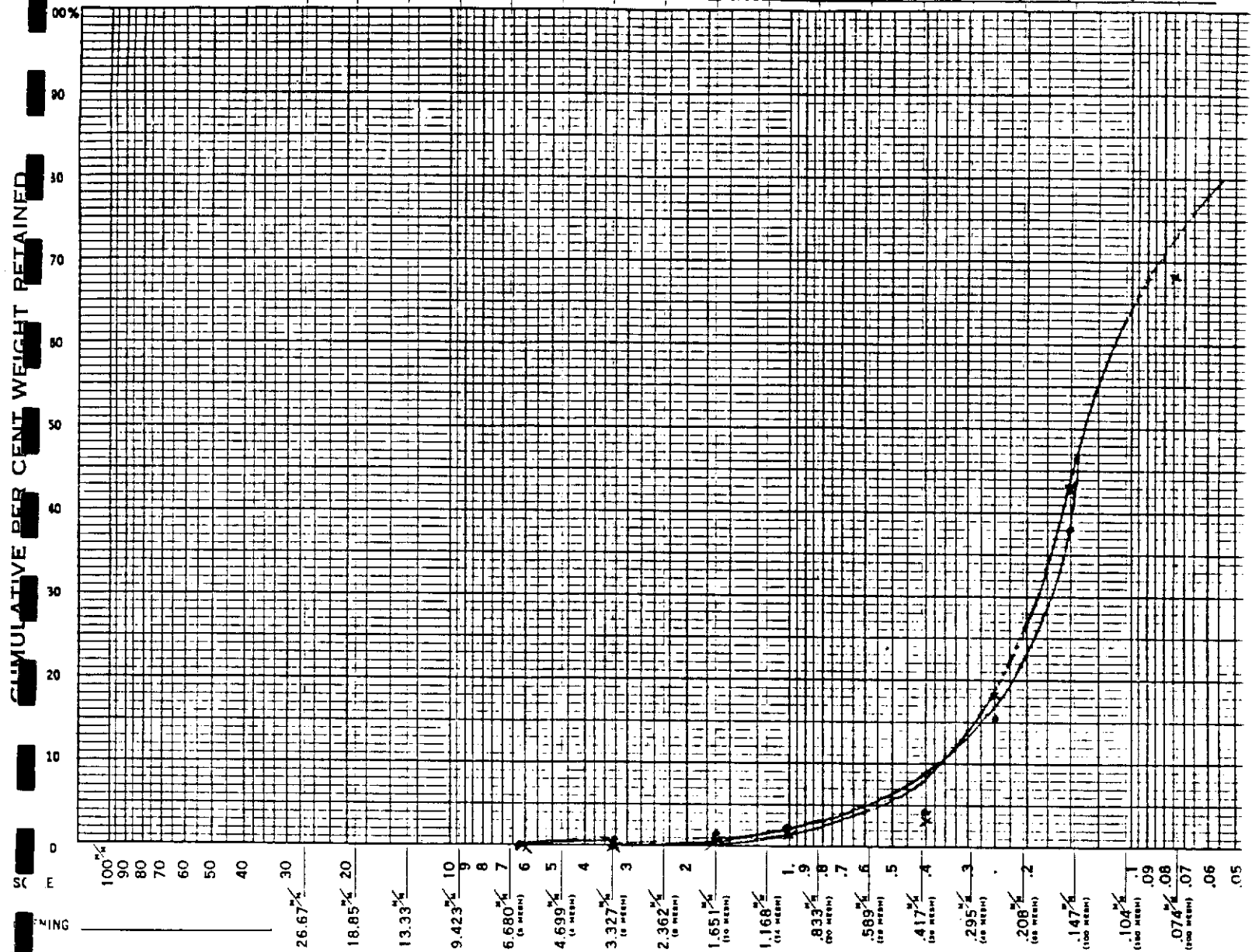
The Tyler Standard Screen Scale

Form No. L-6
Please mention abc
when ordering

Cumulative Logarithmic Diagram of Screen Analysis on Sample of NARROW VALLEY

Name WEL

Date SETTLING POND



SCREEN SCALE RATIO 1.414													
Openings		Tyler Mesh	U. S. No.	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights	
Milli-meters	Inches												
26.67	1.050												
18.85	.742												
13.33	.525												
9.423	.371												
6.680	.263	3											
4.699	.185	4	4										
3.327	.131	6	6										
2.362	.093	8	8										
1.651	.065	10	12										
1.168	.046	14	16										
.833	.0328	20	20										
.589	.0232	28	30										
.417	.0164	35	40										
.295	.0116	48	50										
.208	.0082	65	70										
.147	.0058	100	100										
.104	.0041	150	140										
.074	.0029	200	200										
.074	.0029	200	200										
Totals													

• Backon Lightening
X Control Damages

The Tyler Standard Screen Scale

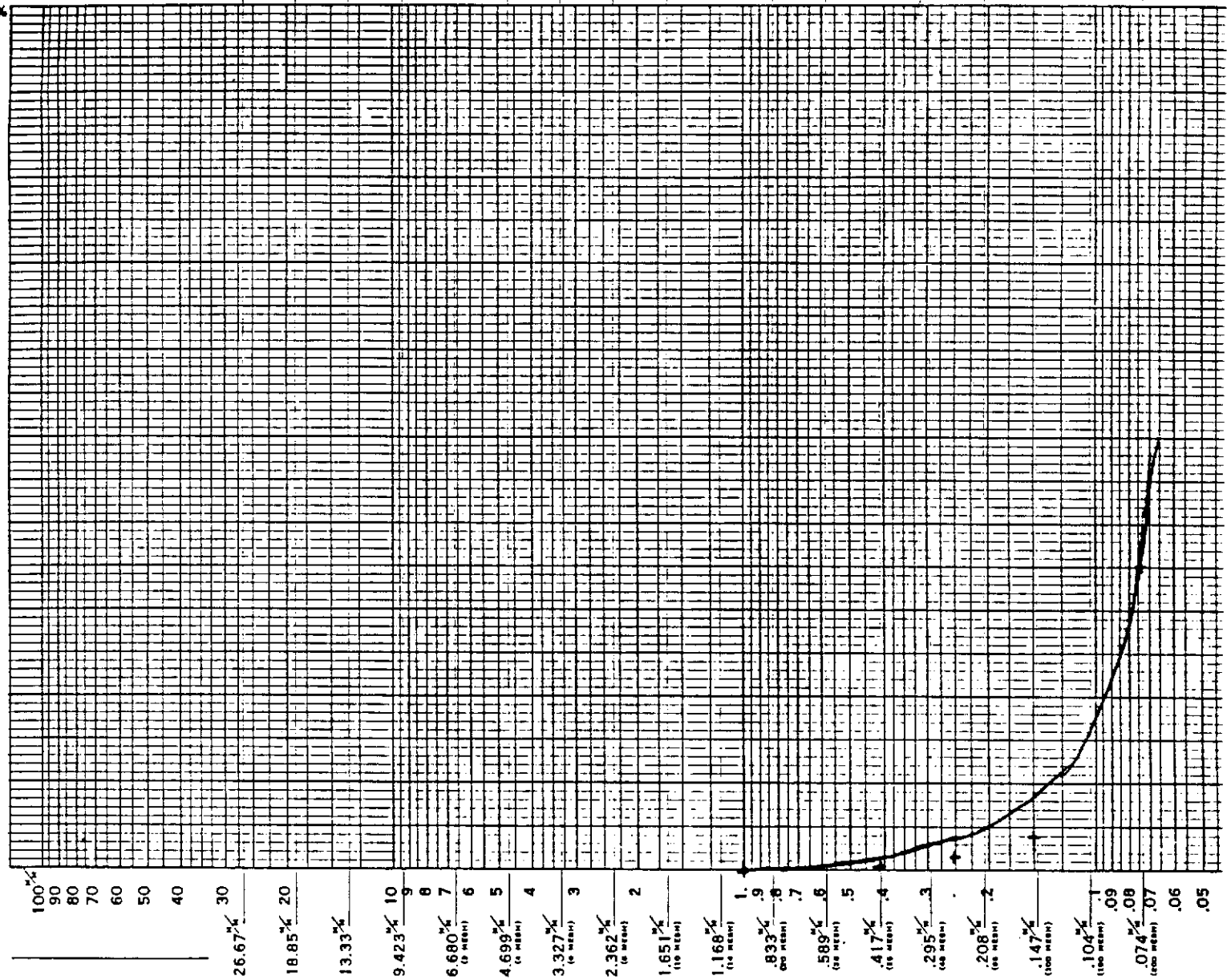
Form No. L-6
Please mention above
when ordering

Cumulative Logarithmic Diagram of Screen Analysis on Sample of BROAD VALLEY

Name W.E.L.

Date SETTLING POND

CUMULATIVE PER CENT WEIGHTS RETAINED



100%	90	80	70	60	50	40	30	26.67%	18.85%	13.33%	9.423%	8	7	6.680%	5	4.699%	3	3.327%	2	2.362%	1.651%	1.168%	.9	.833%	.7	.589%	.5	.417%	.3	.295%	.2	.208%	.1	.147%	.104%	.09	.074%	.07	.06	.05
------	----	----	----	----	----	----	----	--------	--------	--------	--------	---	---	--------	---	--------	---	--------	---	--------	--------	--------	----	-------	----	-------	----	-------	----	-------	----	-------	----	-------	-------	-----	-------	-----	-----	-----

SCREEN SCALE RATIO 1.414

Openings		Tyler Mesh	U. S. No.	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights
Milli-meters	Inches											
26.67	1.050											
18.85	.742											
13.33	.525											
9.423	.371											
6.680	.263	3										
4.699	.185	4	4									
3.327	.131	6	6									
2.362	.093	8	8									
1.651	.065	10	12									
1.168	.046	14	16									
.833	.0328	20	20									
.589	.0232	28	30									
.417	.0164	35	40									
.295	.0116	48	50									
.208	.0082	65	70									
.147	.0058	100	100									
.104	.0041	150	140									
.074	.0029	200	200									
.074	.0029	200	200									
Totals												

Brown Oxidation

The Tyler Standard Screen Scale

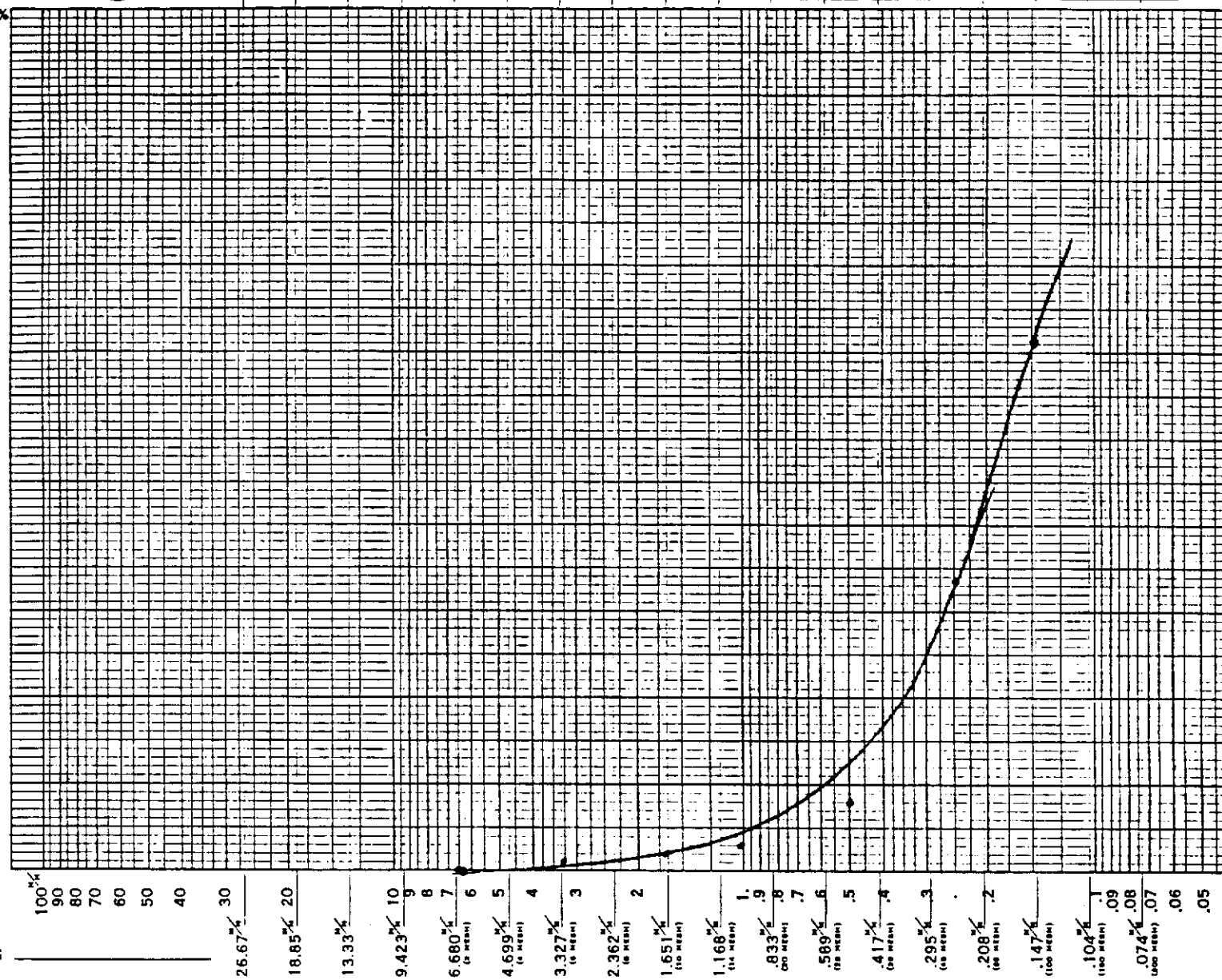
Form No. L-6
Please mention above
when ordering

Cumulative Logarithmic Diagram of Screen Analysis on Sample of HIGH BENCH

Name WEL - FROM PREIDHILL

Date NO 1 SETTLING POND

L-6



100% 90 80 70 60 50 40 30 20 10 9 8 7 6 5 4 3 2 1 1.651% (10 MESH) 1.168% (14 MESH) .833% (20 MESH) .589% (28 MESH) .417% (35 MESH) .295% (48 MESH) .208% (65 MESH) .147% (100 MESH) .104% (150 MESH) .074% (200 MESH) .06 .05

SCREEN SCALE RATIO 1.414

Openings		Tyler Mesh	U. S. No.	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights	Sample Weights	Per Cent	Per Cent Cumulative Weights
Milli-meters	Inches											
26.67	1.050											
18.85	.742											
13.33	.525											
9.423	.371											
6.680	.263	3										
4.699	.185	4	4									
3.327	.131	6	6									
2.362	.093	8	8									
1.651	.065	10	12									
1.168	.046	14	16									
.833	.0328	20	20									
.589	.0232	28	30									
.417	.0164	35	40									
.295	.0116	48	50									
.208	.0082	65	70									
.147	.0058	100	100									
.104	.0041	150	140									
.074	.0029	200	200									
.074	.0028	200	200									

Quartz Sands

APPENDIX III
OPERATING COST METHODOLOGY



APPENDIX III
OPERATING COST METHODOLOGY

METHOD USED TO CALCULATE ACTUAL MATERIALS
HANDLING COSTS (TABLE NO. 4-9)

Input Data from Placer Miners

Purchase Cost - included interest charges
 Number of seasons owned.
 Fuel oil consumed last season.
 Parts and maintenance last season.
 Labour cost per hour - fixed at \$25/hour (all incl.)
 Hours of operation for each task.
 Rate of moving materials in cu.yd./hour for each task.

Owning Costs

Owning cost/season = $\frac{\text{Purchase cost} - (.80 \text{ of dealer resale value})}{\text{Number of seasons owned}}$

- Notes: (1) Dealer resale value based on Finning Tractor value resale of used equipment in 1985, with 60 day warranty.
 (2) Owners resale price assumed to be 20% less than dealers.

Operating Costs

Operating cost/season = Fuel consumption plus parts and maintenance (including maintenance labour).

Operating labour cost/season = Hourly labour cost times hours of operation of machine.

Total machine cost/hour = Owning cost per seasons plus operating cost per season plus labour cost per season, divided by hours of operation per season.

Machine operating cost per task = $\frac{\text{Total machine cost per hour}}{\text{Rate of moving materials for task per hour.}}$



**METHOD USED TO CALCULATE AVERAGE HOURLY
OPERATING COSTS**

The owning and operating costs were calculated according to the Caterpillar estimating form (1) for the following four machines:

Cat D8K	Tracked-dozer
Cat 950B	Wheel-Loader
Cat 966D	Wheel-Loader
Cat 980C	Wheel-Loader

These operating costs were calculated using factors and prices applicable to the Yukon. These costs were used to compare diesel equipment versus pumping for feeding gravel to the sluice and removing tailings. The same method was used to calculate the hourly operating and ownership costs for the screening and pumping equipment. Worksheets are attached.

The average hourly operating costs presented in Table No. 4-10 were extracted from the Cost Reference Guide for Construction Equipment published by Equipment Guide-Book Company. The hourly costs were modified to reflect changes in equipment life which affected ownership and repair costs. Hourly operating labour costs at \$25 per hour were added. The costs were converted from U.S. to Canadian dollars at a 1.4 factor.

(1) Caterpillar Performance Handbook, Edition 16.



HOURLY OWNING AND OPERATING COST ESTIMATE

DATE _____

	(1)	(2)
Machine Designation	<u>CAT D8K</u>	<u>CAT 950B</u>
Estimated Ownership Period (Years)	<u>8</u>	<u>6</u>
Estimated Usage (Hours/Year)	<u>1400</u>	<u>1400</u>
Ownership Usage (Total Hours)	<u>9800</u>	<u>8400</u>
OWNING COSTS		
1. a. Delivered Price (including attachments)	<u>340,000</u>	<u>179,800</u>
b. Less Tire Replacement Cost if desired	<u>-</u>	<u>-</u>
c. Delivered Price Less Tires	<u>340,000</u>	<u>179,800</u>
2. Less Residual Value at Replacement	<u>(30%) 102,000</u>	<u>(30%) 51,510</u>
(See subsection 2A on back)		
3. a. Value to be recovered through work	<u>238,000</u>	<u>128,290</u>
(line 1c less line 2)		
b. Cost Per Hour:		
Value (1) <u>238,000</u> (2) <u>128,290</u>	<u>24.29</u>	<u>15.27</u>
Hours <u>9800</u> <u>8400</u>		
4. Interest Costs $\frac{N+1}{2N} \times \text{Del. Price} \times \frac{\text{Simple Int.}}{\% \text{ Rate}}$		
N = No. Yrs. Hours/Year =		
(1) $\frac{8+1}{16} \times 340,000 \times 12\%$ (2) $\frac{6+1}{12} \times 179,800 \times 12\%$	<u>24.59</u>	<u>13.45</u>
<u>1400 Hours/Yr.</u> <u>1400 Hours/Yr.</u>		
5. Insurance $\frac{N+1}{2N} \times \text{Del. Price} \times \frac{\text{Insurance}}{\% \text{ Rate}}$		
N = No. Yrs. Hours/Year =		
(1) $\frac{8+1}{16} \times 340,000 \times 2\%$ (2) $\frac{6+1}{12} \times 179,800 \times 2\%$	<u>2.73</u>	<u>1.49</u>
<u>1400 Hours/Yr.</u> <u>1400 Hours/Yr.</u>		
Or		
\$ _____ Per Yr. + _____ Hours/Yr. =		
6. Property Tax $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Tax Rate } \%$		
N = No. Yrs. Hours/Year =		
(1) $\frac{8+1}{16} \times 340,000 \times 1\%$ (2) $\frac{6+1}{12} \times 179,800 \times 1\%$	<u>1.37</u>	<u>0.75</u>
<u>1400 Hours/Yr.</u> <u>1400 Hours/Yr.</u>		
Or		
\$ _____ Per Yr. + _____ Hours/Yr. =		
7. TOTAL HOURLY OWNING COST	<u>52.98</u>	<u>30.77</u>
(add lines 3b, 4, 5, and 6)		
OPERATING COSTS		
8. Fuel: Unit Price x Consumption		
(1) <u>1.52</u> x <u>10.8</u> =	<u>19.64</u>	<u>9.15</u>
(2) <u>1.52</u> x <u>5.0</u> =		
9. Lube Oils, Filters, Grease:		
(See subsection 9A on back)	<u>4.11</u>	<u>2.04</u>
10. a. Tires: Replacement Cost + Life In Hours		
Cost (1) _____ (2) <u>8100</u>	<u>-</u>	<u>2.70</u>
Life <u>3000</u>		
b. Undercarriage		
(Impact + Abrasiveness + Z Factor) x Basic Factor		
(1) $(0.1 + 0.4 + .8) = 1.3 \times 14.50 =$	<u>18.85</u>	<u>-</u>
(2) $(\text{---} + \text{---} + \text{---}) = \text{---} \times \text{---} =$		
(Total) (Factor)		
11. Repair Reserve		
(Extended Use Multiplier x Basic Repair Factor)		
(1) _____ x _____ = (2) _____ x _____ =	<u>10.31</u>	<u>9.10</u>
	<u>2.60</u>	<u>1.18</u>
12. Special Wear Items: Cost - Life		
(See subsection 12A on back)		
13. TOTAL OPERATING COSTS	<u>55.53</u>	<u>24.12</u>
(add lines, 8, 9, 10a (or 10b), 11 and 12)		
14. MACHINE OWNING PLUS OPERATING		
(add lines 7 and 13)		
15. OPERATOR'S HOURLY WAGE (include fringes)	<u>25.00</u>	<u>25.00</u>
16. TOTAL OWNING AND OPERATING COST	<u>133.51</u>	<u>80.11</u>

HOURLY OWNING AND OPERATING COST ESTIMATE

DATE _____

Machine Designation
 Estimated Ownership Period (Years)
 Estimated Usage (Hours/Year)
 Ownership Usage (Total Hours)

(1)	(2)
CAT 966D	CAT 980C
<u>6</u>	<u>6</u>
<u>1400</u>	<u>1400</u>
<u>8400</u>	<u>8400</u>

OWNING COSTS

1. a. Delivered Price (including attachments)
 b. Less Tire Replacement Cost if desired
 c. Delivered Price Less Tires

2. Less Residual Value at Replacement
 (See subsection 2A on back)

3. a. Value to be recovered through work
 (line 1c less line 2)
 b. Cost Per Hour:
 Value (1) 177500 (2) 227500
 Hours 8400 8400

4. Interest Costs $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Simple Int. \% Rate}$ =
 N = No. Yrs. Hours/Year =
 (1) $\frac{+1}{2} \times \text{_____} \times \text{_____} \%$ (2) $\frac{+1}{2} \times \text{_____} \times \text{_____} \%$
 _____ Hours/Yr. = _____ Hours/Yr.

5. Insurance $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Insurance Rate \%}$ =
 N = No. Yrs. Hours/Year =
 (1) $\frac{+1}{2} \times \text{_____} \times \text{_____} \%$ (2) $\frac{+1}{2} \times \text{_____} \times \text{_____} \%$
 _____ Hours/Yr. = _____ Hours/Yr.

Or
 \$ _____ Per Yr. + _____ Hours/Yr. =

<u>254,000</u>	<u>325,000</u>
<u>-</u>	<u>-</u>
<u>177,800</u>	<u>227,500</u>
<u>21.16</u>	<u>27.08</u>
<u>19.05</u>	<u>24.37</u>
<u>2.12</u>	<u>2.71</u>

6. Property Tax $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Tax Rate \%}$ =
 N = No. Yrs. Hours/Year =
 (1) $\frac{+1}{2} \times \text{_____} \times \text{_____} \%$ (2) $\frac{+1}{2} \times \text{_____} \times \text{_____} \%$
 _____ Hours/Yr. = _____ Hours/Yr.

Or
 \$ _____ Per Yr. + _____ Hours/Yr. =

(1)	(2)
<u>1.06</u>	<u>1.35</u>

7. TOTAL HOURLY OWNING COST
 (add lines 3b, 4, 5, and 6)

<u>43.37</u>	<u>55.51</u>
--------------	--------------

OPERATING COSTS

8. Fuel: Unit Price x Consumption
 (1) 1.52 x 7.0 = 10.64
 (2) 1.52 x 7.0 = 10.64

9. Lube Oils, Filters, Grease:
 (See subsection 9A on back)

10. a. Tires: Replacement Cost + Life in Hours
 Cost (1) 13480 (2) 15200
 Life 3000 3000

b. Undercarriage
 (Impact + Abrasiveness + Z Factor) x Basic Factor
 (1) (_____ + _____ + _____) = _____ x _____ =
 (2) (_____ + _____ + _____) = _____ x _____ =
 (Total) (Factor)

11. Repair Reserve
 (Extended Use Multiplier x Basic Repair Factor)
 (1) _____ x _____ = (2) _____ x _____ =

12. Special Wear Items: Cost + Life
 (See subsection 12A on back)

13. TOTAL OPERATING COSTS
 (add lines 8, 9, 10a (or 10b), 11 and 12)

14. MACHINE OWNING PLUS OPERATING
 (add lines 7 and 13)

15. OPERATOR'S HOURLY WAGE (include fringes)

16. TOTAL OWNING AND OPERATING COST

<u>12.74</u>	<u>16.38</u>
<u>2.87</u>	<u>3.69</u>
<u>4.49</u>	<u>5.07</u>
<u>-</u>	<u>-</u>
<u>10.92</u>	<u>13.65</u>
<u>1.47</u>	<u>2.02</u>
<u>32.49</u>	<u>40.81</u>
<u>75.88</u>	<u>96.32</u>
<u>25.00</u>	<u>25.00</u>
<u>100.88</u>	<u>121.32</u>

HOURLY OWNING AND OPERATING COST ESTIMATE

DATE _____

Machine Designation	Screening and Pumping Equipment	(1) Beomo VALLEY	(2) GURCH
Estimated Ownership Period (Years)	7	7	7
Estimated Usage (Hours/Year)	1400	1400	1400
Ownership Usage (Total Hours)	9800	9800	9800

OWNING COSTS

1. a. Delivered Price (including attachments)	88,200	82,600
b. Less Tire Replacement Cost if desired	=	=
c. Delivered Price Less Tires	=	=
2. Less Residual Value at Replacement (See subsection 2A on back)	(30%) 26,460	(30%) 24,780
3. a. Value to be recovered through work (line 1c less line 2)	61,740	57,820
b. Cost Per Hour:		
Value (1) 61,740 (2) 57,820	6.30	5.90
Hours 9800 9800		

4. Interest Costs	$\frac{N+1}{2N} \times \text{Del. Price} \times \text{Simple Int. \% Rate} =$	
N = No. Yrs.	Hours/Year	
(1) $\frac{7+1}{14} \times 88,200 \times 18\%$	$\frac{7+1}{14} \times 82,600 \times 18\%$	6.48 6.07
1400 Hours/Yr.	1400 Hours/Yr.	

5. Insurance	$\frac{N+1}{2N} \times \text{Del. Price} \times \text{Insurance Rate \%} =$	
N = No. Yrs.	Hours/Year	
(1) $\frac{+1}{14} \times 88,200 \times 2\%$	$\frac{7+1}{14} \times 82,600 \times 2\%$.72 0.67
1400 Hours/Yr.	1400 Hours/Yr.	

Or
\$ _____ Per Yr. + _____ Hours/Yr. =

6. Property Tax	$\frac{N+1}{2N} \times \text{Del. Price} \times \text{Tax Rate \%} =$	(1)	(2)
N = No. Yrs.	Hours/Year		
(1) $\frac{+1}{14} \times 88,200 \times 1\%$	$\frac{7+1}{14} \times 82,600 \times 1\%$.36	0.54
1400 Hours/Yr.	1400 Hours/Yr.		

Or
\$ _____ Per Yr. + _____ Hours/Yr. =

7. TOTAL HOURLY OWNING COST (add lines 3b, 4, 5, and 6)	13.26	12.98
------------------------------------------------------------	-------	-------

OPERATING COSTS

8. Fuel: Unit Price x Consumption	#	
(1) 1.82 x 7.0 =	12.74	6.42
(2) 1.82 x 3.53 =		

9. Lube Oils, Filters, Grease: (See subsection 9A on back)	-	N/A
---------------------------------------------------------------	---	-----

10. a. Tires: Replacement Cost + Life in Hours		
Cost (1) _____ (2) _____	-	N/A
Life _____		
(Impact + Abrasiveness + Z Factor) x Basic Factor		
(1) (_____ + _____ + _____) = _____ x _____ =	-	N/A
(2) (_____ + _____ + _____) = _____ x _____ =		
(Total) (Factor)		

11. Repair Reserve (Extended Use Multiplier x Basic Repair Factor)		
(1) _____ x _____ = (2) _____ x _____ =	-	N/A

12. Special Wear Items: Cost + Life (See subsection 12A on back)	13.06	11.55
---------------------------------------------------------------------	-------	-------

13. TOTAL OPERATING COSTS (add lines 8, 9, 10a (or 10b), 11 and 12)	25.80	17.97
------------------------------------------------------------------------	-------	-------

14. MACHINE OWNING PLUS OPERATING (add lines 7 and 13)	39.66	30.95
-----------------------------------------------------------	-------	-------

15. OPERATOR'S HOURLY WAGE (include fringes)	5.00	5.00
----------------------------------------------	------	------

16. TOTAL OWNING AND OPERATING COST	44.66	35.95
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HOURLY OWNING AND OPERATING COST ESTIMATE

DATE _____

Machine Designation Screening and Pumping Equipment
 Estimated Ownership Period (Years)
 Estimated Usage (Hours/Year)
 Ownership Usage (Total Hours)

(1)	(2)
<u>LOW BELT</u>	<u>HIGH BELT</u>
<u>7</u>	<u>7</u>
<u>1400</u>	<u>1400</u>
<u>9800</u>	<u>9800</u>

OWNING COSTS

1. a. Delivered Price (including attachments)
 b. Less Tire Replacement Cost If desired
 c. Delivered Price Less Tires

<u>\$ 142,310</u>	<u>\$ 560,450</u>
<u>—</u>	<u>469,350</u>
<u>—</u>	<u>—</u>

2. Less Residual Value at Replacement (See subsection 2A on back)

<u>30%</u>	<u>42,963</u>	<u>30%</u>	<u>168,355</u>
------------	---------------	------------	----------------

3. a. Value to be recovered through work (line 1c less line 2)

<u>99,347</u>	<u>328,315</u>
---------------	----------------

b. Cost Per Hour:
 Value (1) 99,347 (2) 328,315
 Hours 9800 9800

<u>10.14</u>	<u>33.53</u>	<u>40.03</u>
--------------	--------------	--------------

4. Interest Costs $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Simple Int. \% Rate}$
 N = No. Yrs.

Hours/Year = 560,450
 (1) $\frac{7+1}{14} \times 142,310 \times 18\%$ (2) $\frac{7+1}{14} \times 469,350 \times 18\%$
 = 1400 Hours/Yr. = 1400 Hours/Yr.

<u>10.46</u>	<u>34.50</u>	<u>41.18</u>
--------------	--------------	--------------

5. Insurance $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Insurance Rate \%}$
 N = No. Yrs.

Hours/Year = 560,450
 (1) $\frac{7+1}{14} \times 142,310 \times 2\%$ (2) $\frac{7+1}{14} \times 469,350 \times 2\%$
 = 1400 Hours/Yr. = 1400 Hours/Yr.

<u>1.16</u>	<u>3.83</u>	<u>4.58</u>
-------------	-------------	-------------

Or
 \$ _____ Per Yr. + _____ Hours/Yr. =

6. Property Tax $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Tax Rate \%}$
 N = No. Yrs.

Hours/Year = _____
 (1) $\frac{7+1}{14} \times \text{_____} \times 1\%$ (2) $\frac{7+1}{14} \times \text{_____} \times 1\%$
 = 1400 Hours/Yr. = 1400 Hours/Yr.

(1)	(2)
<u>.58</u>	<u>1.92</u>

Or
 \$ _____ Per Yr. + _____ Hours/Yr. =

7. TOTAL HOURLY OWNING COST (add lines 3b, 4, 5, and 6)

<u>22.34</u>	<u>73.79</u>	<u>88.08</u>
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OPERATING COSTS

8. Fuel: Unit Price x Consumption
 (1) $1.82 \times 2.1 =$
 (2) $1.82 \times 9.31 =$

<u>3.82</u>	<u>20.77</u>
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9. Lube Oils, Filters, Grease: (See subsection 9A on back)

<u>—</u>	<u>—</u>
----------	----------

10. a. Tires: Replacement Cost + Life in Hours
 Cost (1) _____ (2) _____
 Life

<u>—</u>	<u>—</u>
----------	----------

b. Undercarriage (Impact + Abrasiveness + Z Factor) x Basic Factor
 (1) (_____ + _____ + _____) = _____ x _____ =
 (2) (_____ + _____ + _____) = _____ x _____ =
 (Total) (Factor)

<u>—</u>	<u>—</u>
----------	----------

11. Repair Reserve (Extended Use Multiplier x Basic Repair Factor)
 (1) _____ x _____ = (2) _____ x _____ =

<u>31.30</u>	<u>40.41</u>
--------------	--------------

12. Special Wear Items: Cost + Life (See subsection 12A on back)

<u>35.12</u>	<u>61.18</u>
--------------	--------------

13. TOTAL OPERATING COSTS (add lines 8, 9, 10a (or 10b), 11 and 12)

<u>57.46</u>	<u>144.96</u>	<u>149.26</u>
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14. MACHINE OWNING PLUS OPERATING (add lines 7 and 13)

<u>5.00</u>	<u>5.00</u>	<u>154.26</u>
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15. OPERATOR'S HOURLY WAGE (include fringes) 25 x 20%

<u>62.46</u>	<u>149.96</u>	<u>154.26</u>
--------------	---------------	---------------

16. TOTAL OWNING AND OPERATING COST

NSA

HOURLY OWNING AND OPERATING COST ESTIMATE

DATE _____

Machine Designation Screening and Pumping Equipment
 Estimated Ownership Period (Years)
 Estimated Usage (Hours/Year)
 Ownership Usage (Total Hours)

(1)	(2)
<u>NARROW VALLEY</u>	<u>NARROW VALLEY</u>
<u>A</u>	<u>B</u>
<u>7</u>	<u>7</u>
<u>1400</u>	<u>1400</u>
<u>9800</u>	<u>9800</u>

OWNING COSTS

1. a. Delivered Price (including attachments)
 b. Less Tire Replacement Cost if desired
 c. Delivered Price Less Tires
 2. Less Residual Value at Replacement (See subsection 2A on back)
 3. a. Value to be recovered through work (line 1c less line 2)
 b. Cost Per Hour:
 Value (1) 20,220 (2) 20,630
 Hours 1500 9800
 4. Interest Costs $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Simple Int. \% Rate} =$
 N = No. Yrs. Hours/Year
 (1) $\frac{7+1}{14} \times 104,600 \times 18\%$ (2) $\frac{7+1}{14} \times 100,900 \times 18\%$
1400 Hours/Yr. 1400 Hours/Yr.
 5. Insurance $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Insurance Rate \%} =$
 N = No. Yrs. Hours/Year
 (1) $\frac{7+1}{14} \times 104,600 \times 2\%$ (2) $\frac{7+1}{14} \times 100,900 \times 2\%$
1400 Hours/Yr. 1400 Hours/Yr.
 Or
 \$ _____ Per Yr. + _____ Hours/Yr. =

<u>104,600</u>	<u>100,900</u>
<u>-</u>	<u>-</u>
<u>-</u>	<u>-</u>
<u>(30%) 34,380</u>	<u>(30%) 30,270</u>
<u>70,220</u>	<u>70,630</u>
<u>7.17</u>	<u>7.21</u>
<u>7.68</u>	<u>7.41</u>
<u>.85</u>	<u>.92</u>

6. Property Tax $\frac{N+1}{2N} \times \text{Del. Price} \times \text{Tax Rate \%} =$
 N = No. Yrs. Hours/Year
 (1) $\frac{7+1}{14} \times 104,600 \times 1\%$ (2) $\frac{7+1}{14} \times 100,900 \times 1\%$
1400 Hours/Yr. 1400 Hours/Yr.
 Or
 \$ _____ Per Yr. + _____ Hours/Yr. =

(1)	(2)
<u>.43</u>	<u>.41</u>

7. TOTAL HOURLY OWNING COST (add lines 3b, 4, 5, and 6)

<u>16.13</u>	<u>15.93</u>
--------------	--------------

OPERATING COSTS

8. Fuel: Unit Price x Consumption
 (1) $1.82 \times 6.2 =$
 (2) $1.52 \times 5.1 =$
 9. Lube Oils, Filters, Grease: (See subsection 9A on back)
 10. a. Tires: Replacement Cost + Life in Hours
 Cost (1) _____ (2) _____
 Life
 b. Undercarriage (Impact + Abrasiveness + Z Factor) x Basic Factor
 (1) (_____ + _____ + _____) = _____ x _____ =
 (2) (_____ + _____ + _____) = _____ x _____ =
 (Total) (Factor)
 11. Repair Reserve (Extended Use Multiplier x Basic Repair Factor)
 (1) _____ x _____ = (2) _____ x _____ =
 12. Special Wear Items: Cost + Life (See subsection 12A on back)
 13. TOTAL OPERATING COSTS (add lines 8, 9, 10a (or 10b), 11 and 12)
 14. MACHINE OWNING PLUS OPERATING (add lines 7 and 13)
 15. OPERATOR'S HOURLY WAGE (include Iringes) 25/40 = 20%
 16. TOTAL OWNING AND OPERATING COST

<u>\$ 11.28</u>	<u>\$ 9.28</u>
<u>n/a</u>	<u>n/a</u>
<u>n/a</u>	<u>n/a</u>
<u>n/a</u>	<u>n/a</u>
<u>n/a</u>	<u>n/a</u>
<u>\$ 15.71</u>	<u>\$ 14.89</u>
<u>26.99</u>	<u>24.17</u>
<u>43.12</u>	<u>40.02</u>
<u>5.00</u>	<u>5.00</u>
<u>48.12</u>	<u>45.02</u>

?

METHOD USED TO ESTIMATE MACHINE
PRODUCTIVITY AND PRO-RATE OPERATING COSTS

Theoretical machine productivities were estimated based on the example layouts given in Appendix I. For each example a type of machine was assumed and based on haul profiles and distances shown on the drawings, hourly production rates calculated using the Caterpillar Performance Handbook. Productivities were calculated for both the "all mobile equipment" layouts shown in the 1401-130 series of drawings and for the "mobile equipment plus pumping/conveying" scenarios shown in the 1401-210 series.

Hourly production rates were calculated on an activity basis using assumed operating conditions. A weighted average hourly output for the machine, based on a ratio of required production, was compared to the total required output for each machine for the assigned activities. The percentage of time each machine spent on a particular task (i.e. removing grizzly/screen oversize or sluice tailings) was calculated based on the theoretical versus required output. A total percentage of time each machine was used on tailings disposal and/or moving feed gravel was used to pro-rate the total machine operating costs. These pro-rated costs were used in the comparison of costs for each example layout in Section 6.6.

A basic assumption of this pro-rating was that if the machine was not fully utilized on the activity being compared (e.g. removal of oversize and sluice tailings) then it was usefully employed on other activities (e.g. sluice feeding, stripping, berm construction, etc.) to which part of the operating costs should be applied.

An example calculation sheet for a Gulch Deposit is attached to show the workings.



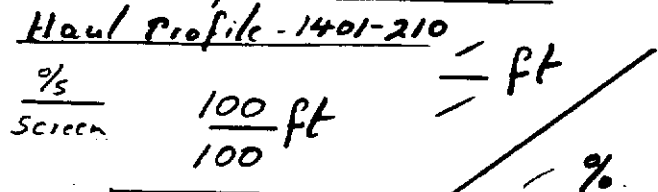
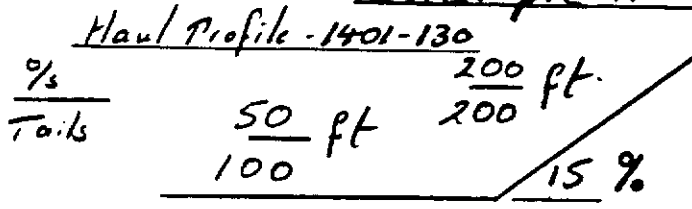


WRIGHT ENGINEERS LIMITED

Calculation Sheet

Project: 1401 Designed by: J.L. Date: _____
 Area: 210 Checked by: _____ Sheet | of |
 Subject: Machine Productivity Calculations.

Example 1. - Gulch Deposit.



ACTIVITY

WHEEL-LOADER

Load/Dump time (Mins)
 Haul time (Mins)
 Total cycle time (Mins)
 Cycles per hour
 Bucket Capacity (Cu.yd)
 Efficiency factor
 Theoretical Hourly Prods (L.C.Y/hr)
 Wt Avg Hourly Prods (L.C.Y/hr)

Required hourly Prods (L.C.Y/hr)
 Total Regd. Prods (L.C.Y/hr)
 % of time on each task.
 Total % of time on reqd tasks

MOBILE EQ ONLY		WITH PUMPING	
Coarse % 950B	Sluice Tls 950B	Coarse % 950B	Screen % 950B
.58	.56	.55	.53
1.25	1.15	.24	.24
1.83	1.71	.79	.78
33	35	76	77
3.5	3.0	3.5	3.5
.8	.8	.8	.8
92	84	212	216
	87		213
25	38	25	13
	63		38
27	45	12	6
	72		18

TRACKED DOZER

Maximum Production (L.C.Y/hr)
 Correction factor
 Theoretical Hourly Prods (L.C.Y/hr)
 Wt Avg Hourly Prods (L.C.Y/hr)

Required hourly Prods (L.C.Y/hr)
 Total Regd. Prods (L.C.Y/hr)
 % of time on each task.
 Total % of time on reqd tasks

APPENDIX IV
PHOTOGRAPHS





Photo. 1 - Aerial Photo of a Gulch Deposit



Photo. 2 - View up a Gulch Deposit



Photo. 3 - Aerial Photo of a Narrow Valley Deposit



Photo. 4 - Aerial Photo Showing Layout of Workings

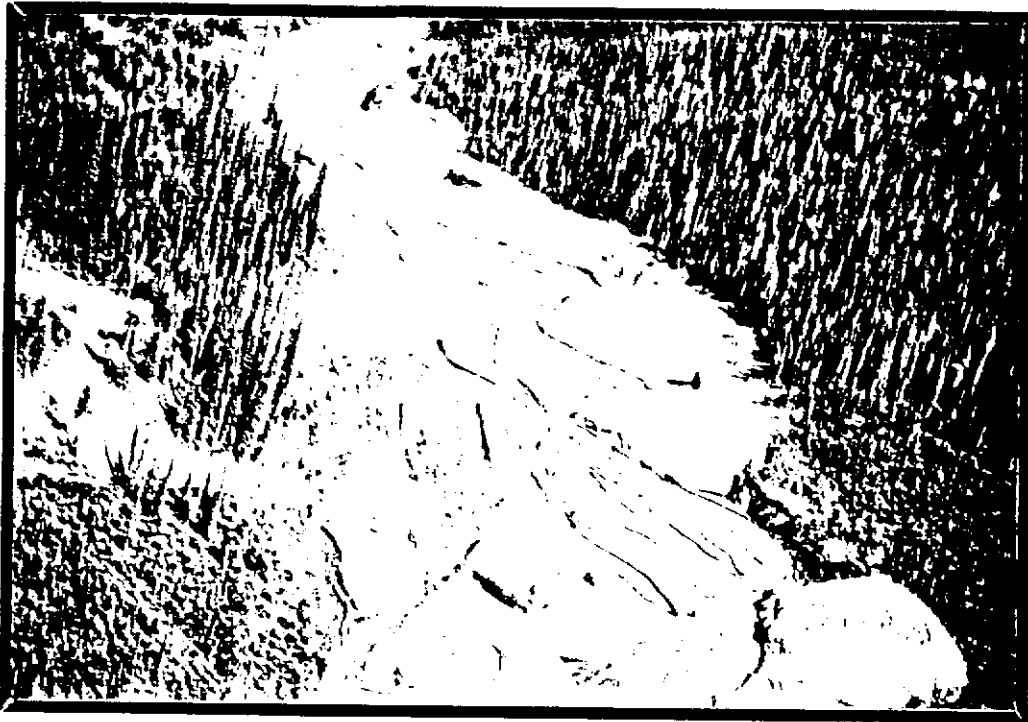


Photo. 5 - Aerial Photo of a Narrow Valley Deposit



Photo. 6 - Aerial Photo of a Low Bench Deposit



Photo. 7 - Aerial Photo of a High Bench Deposit



Photo. 8 - View Showing Layout of a High Bench Operation

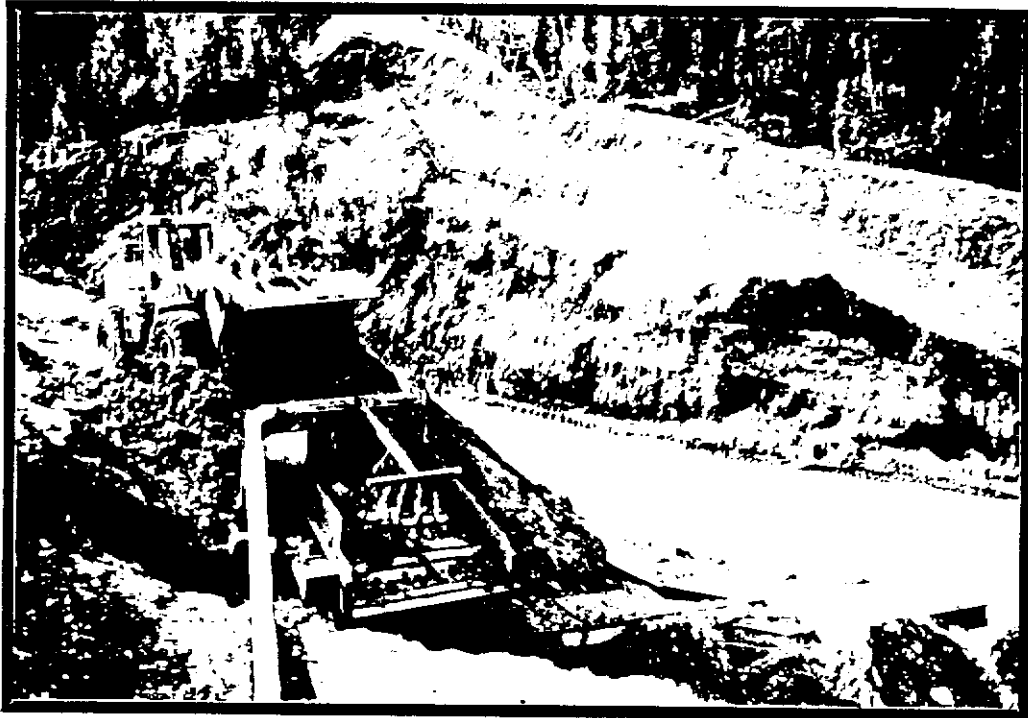


Photo. 9 - Showing Use of "Derocker" for Presizing Gravels

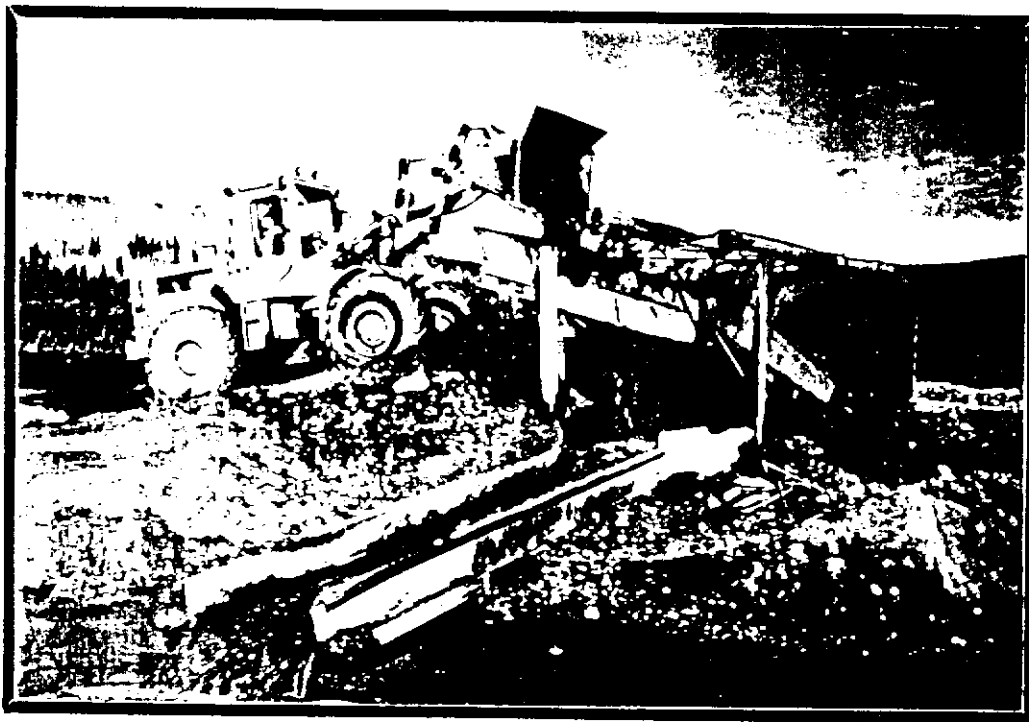


Photo. 10 - Showing Use of a Shaking Screen to
Presize Gravels



Photo. 11 - Showing Example of Movable Sluicing Plant

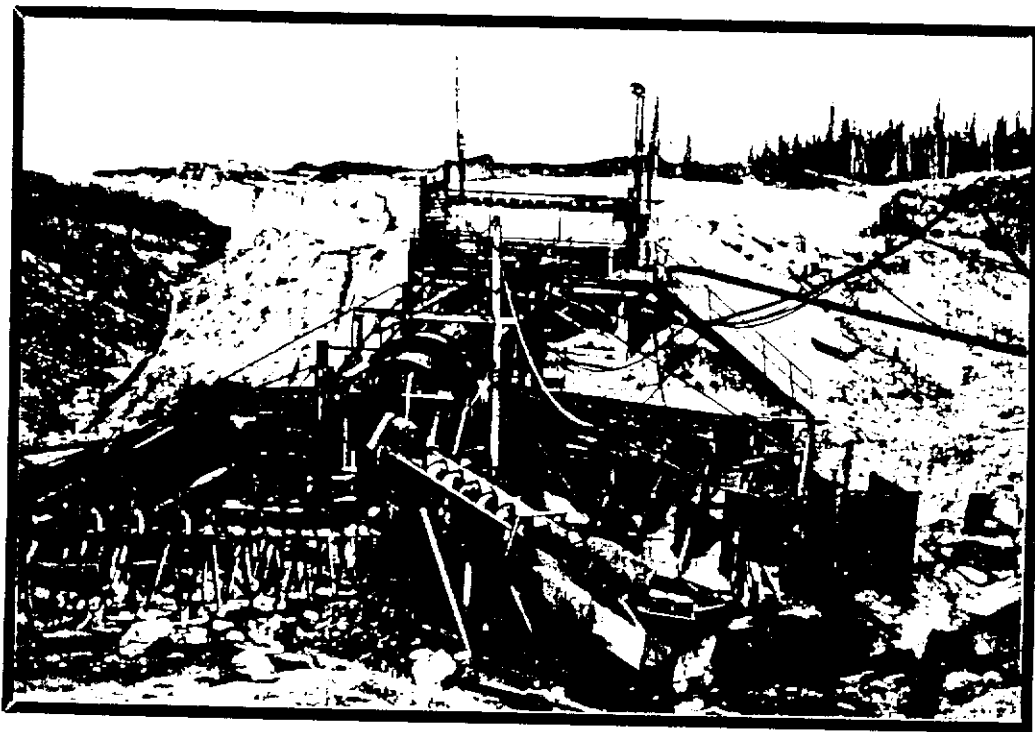


Photo. 12 - Showing Example of Fixed Sluicing Plant

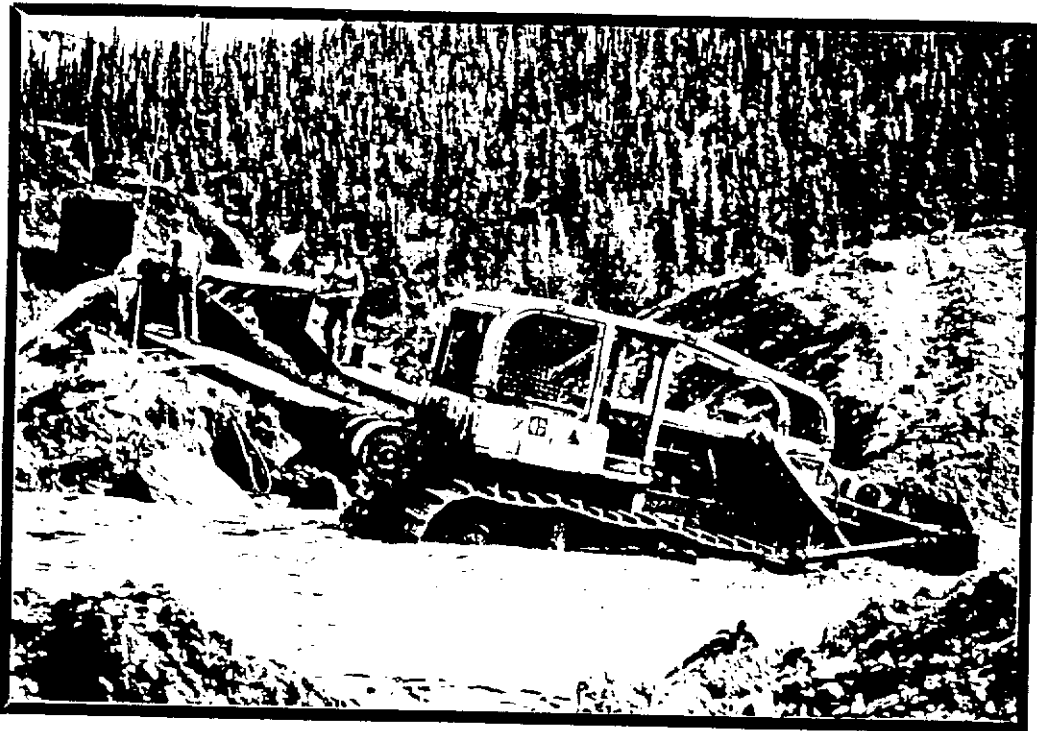


Photo. 13 - Showing Use of Dozer to Remove Tailings

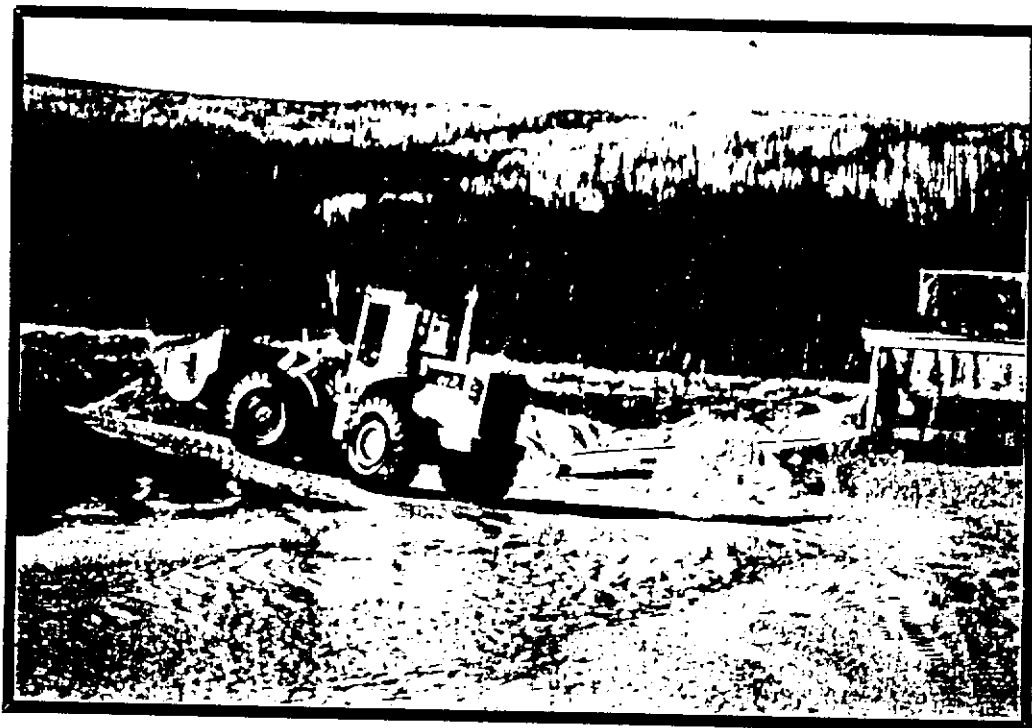


Photo. 14 - Showing Use of Loader to Remove Tailings

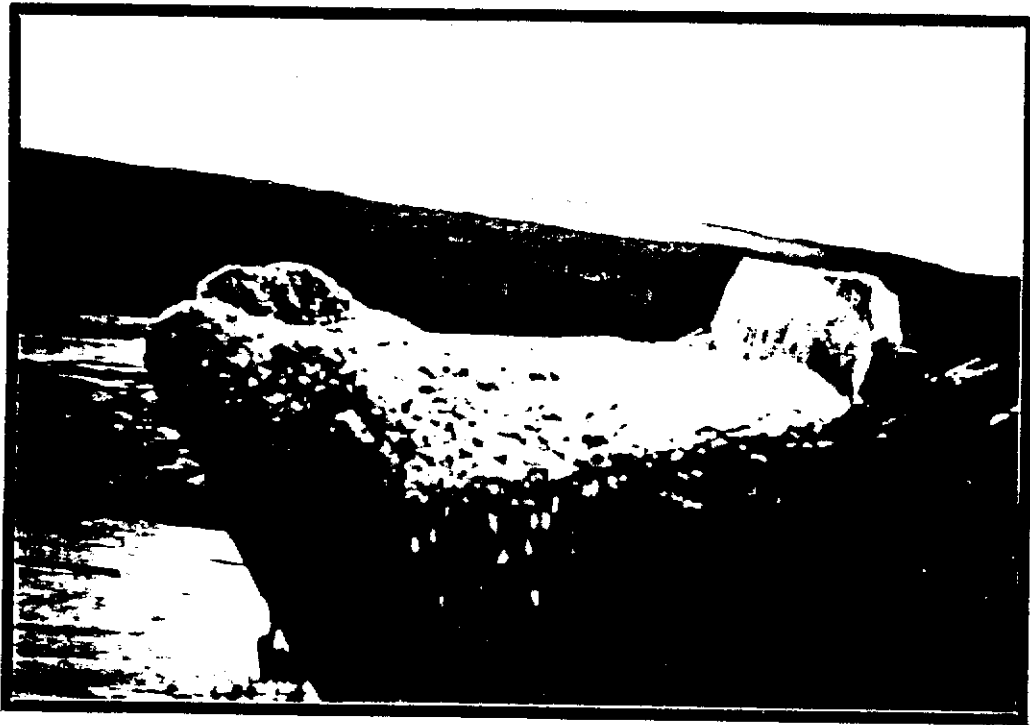


Photo. 15 - Showing Water Content and Consistency
of Tailings Material

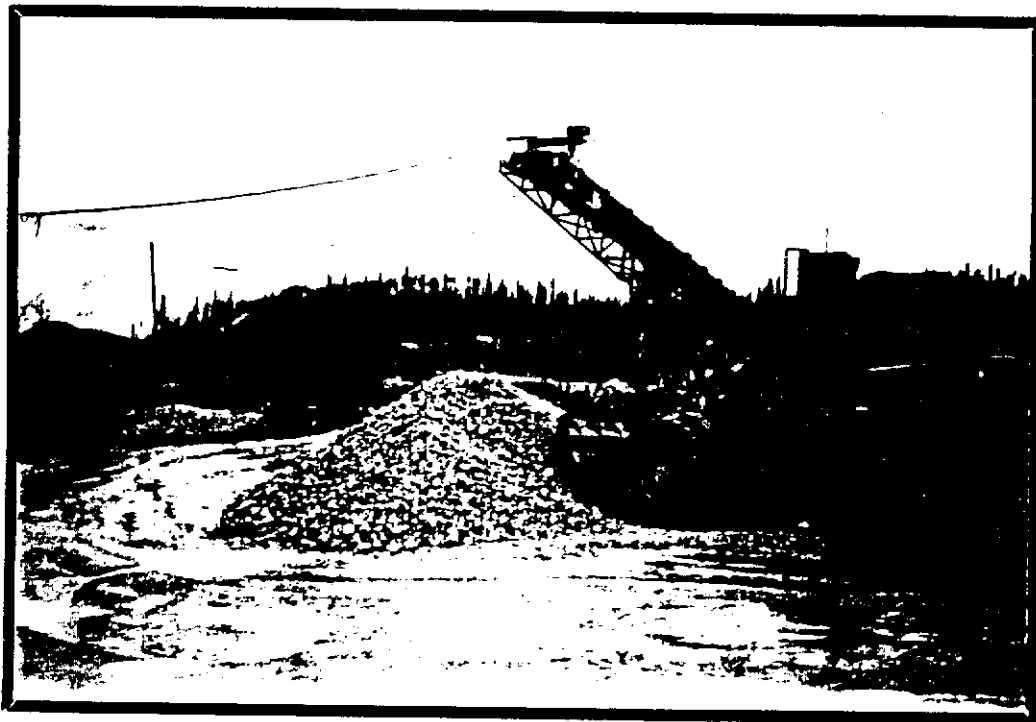


Photo. 16 - Showing Removal of Screen Oversize Material

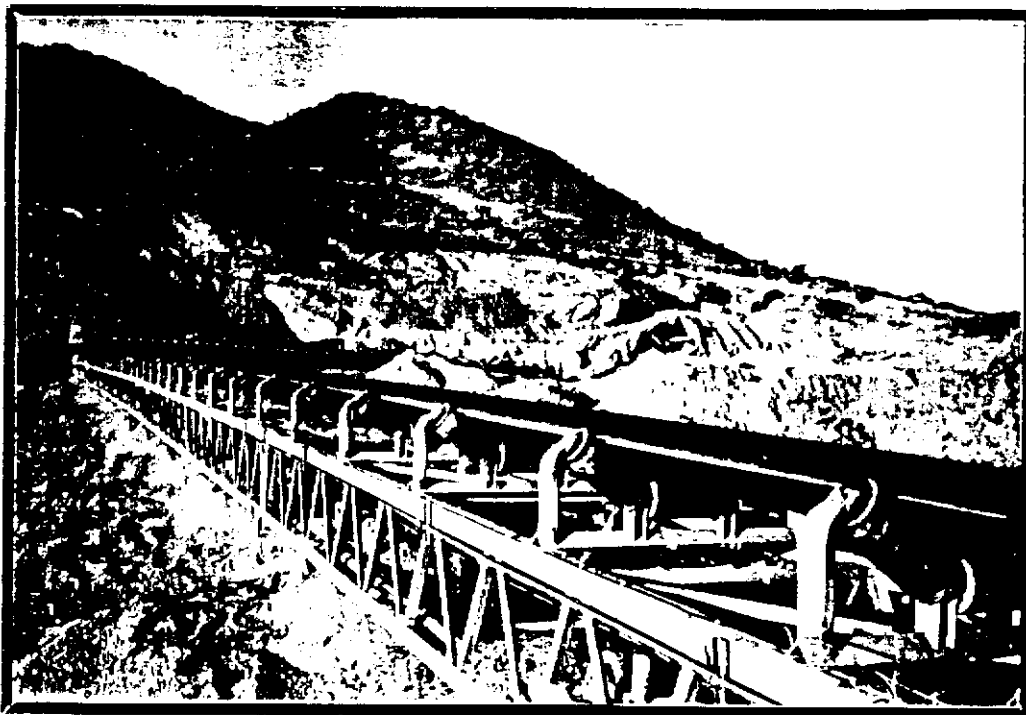


Photo. 17 - Showing Use of Conveyors to Transport Gravel to Recovery Plant

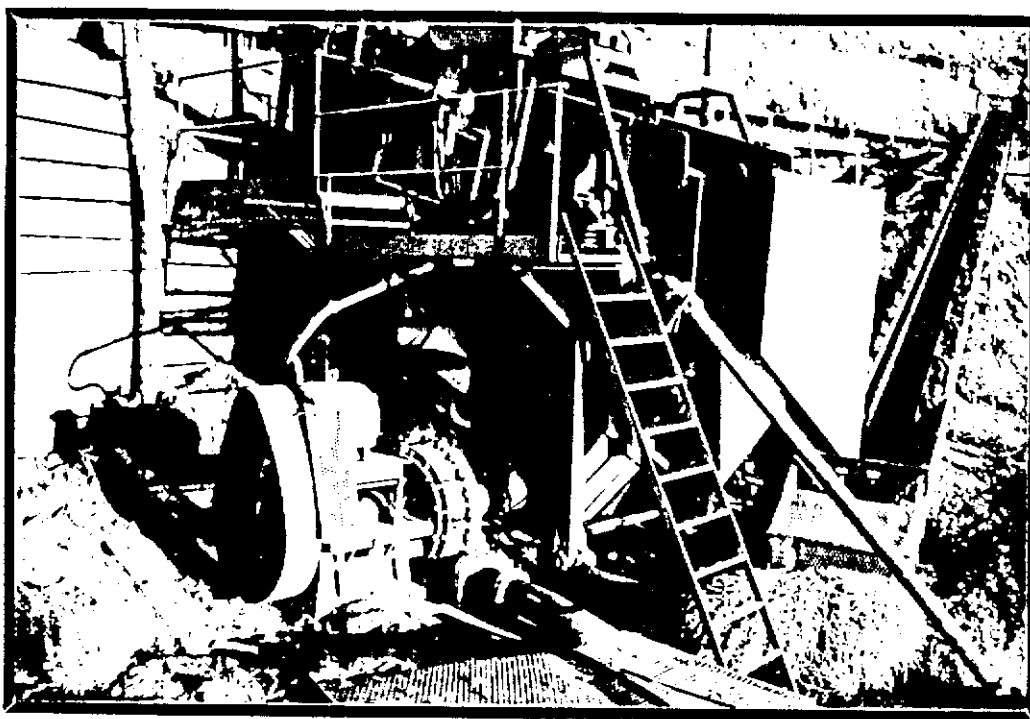


Photo 18. - Showing Use of Gravel Pump to Transport Screen Undersize to Recovery Plant

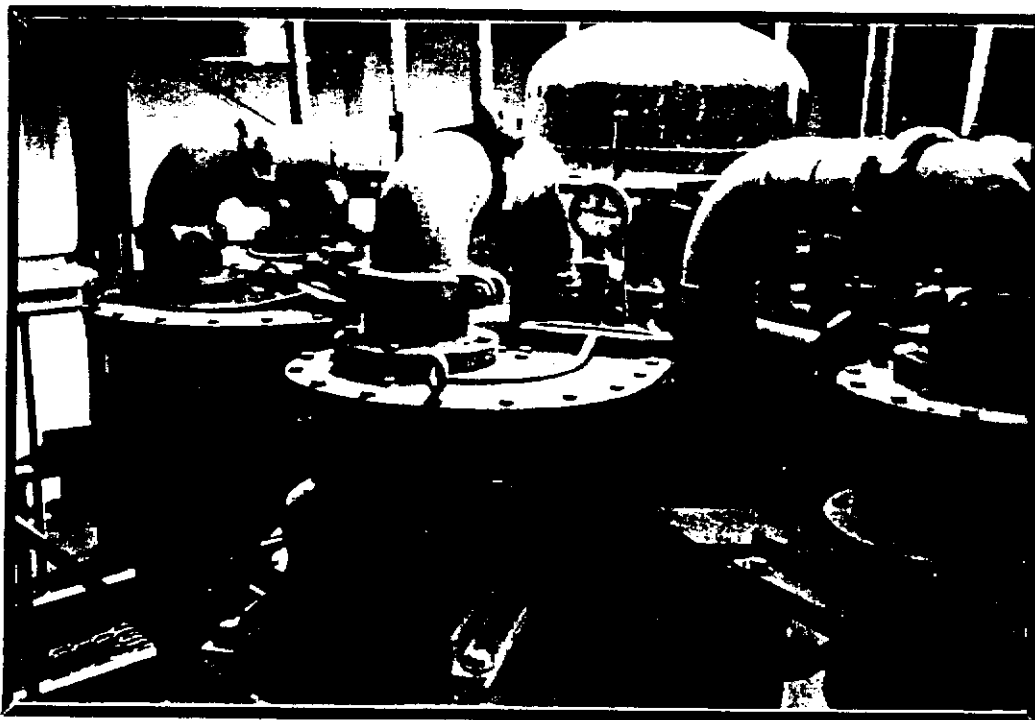


Photo. 19 - Showing Arrangement of Cyclones to
Dewater Feed Gravels from Screening Plant

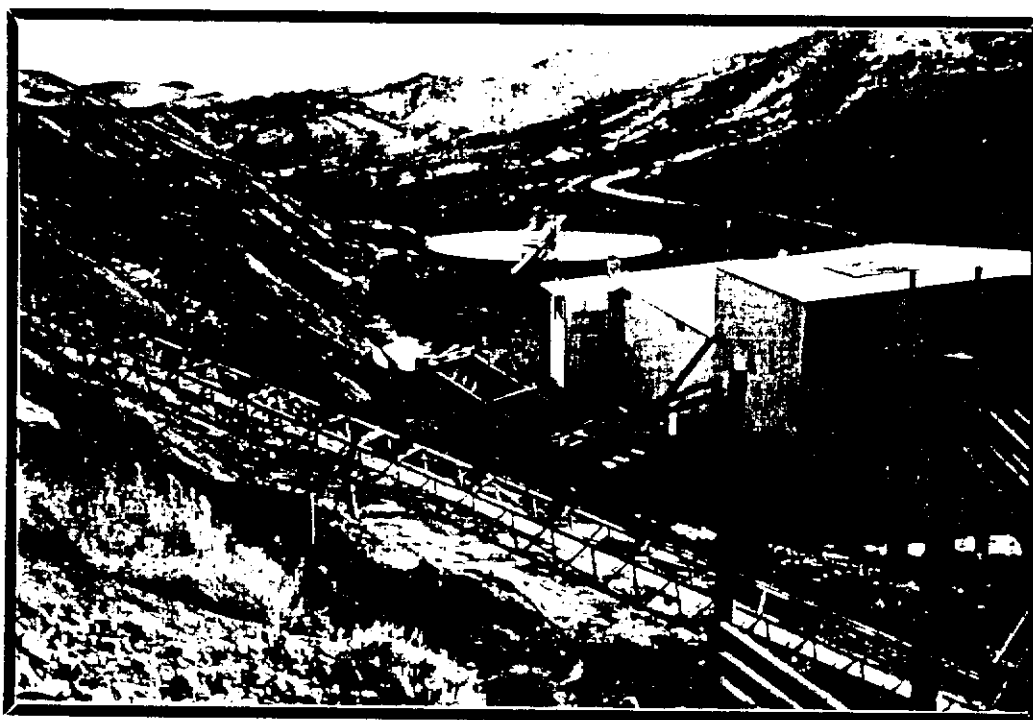


Photo. 20 - Showing Arrangements for Conveying Tailings
Including Use of Sandscrew

APPENDIX IV
PHOTOGRAPHS





Photo. 1 - Aerial Photo of a Gulch Deposit



Photo. 2 - View up a Gulch Deposit

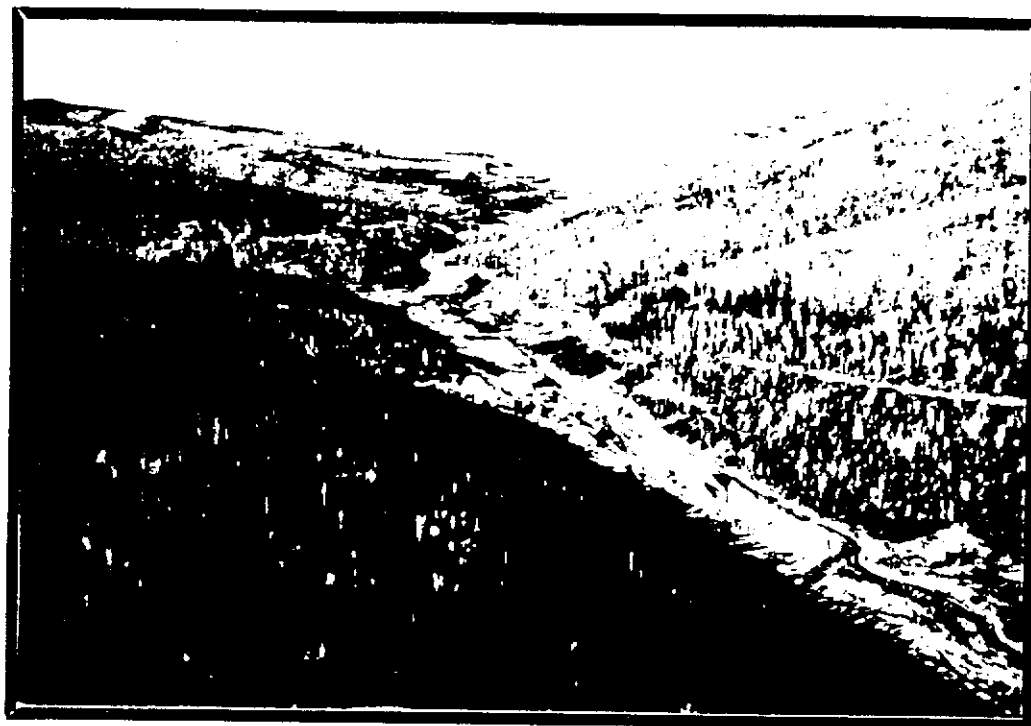


Photo. 3 - Aerial Photo of a Narrow Valley Deposit



Photo. 4 - Aerial Photo Showing Layout of Workings

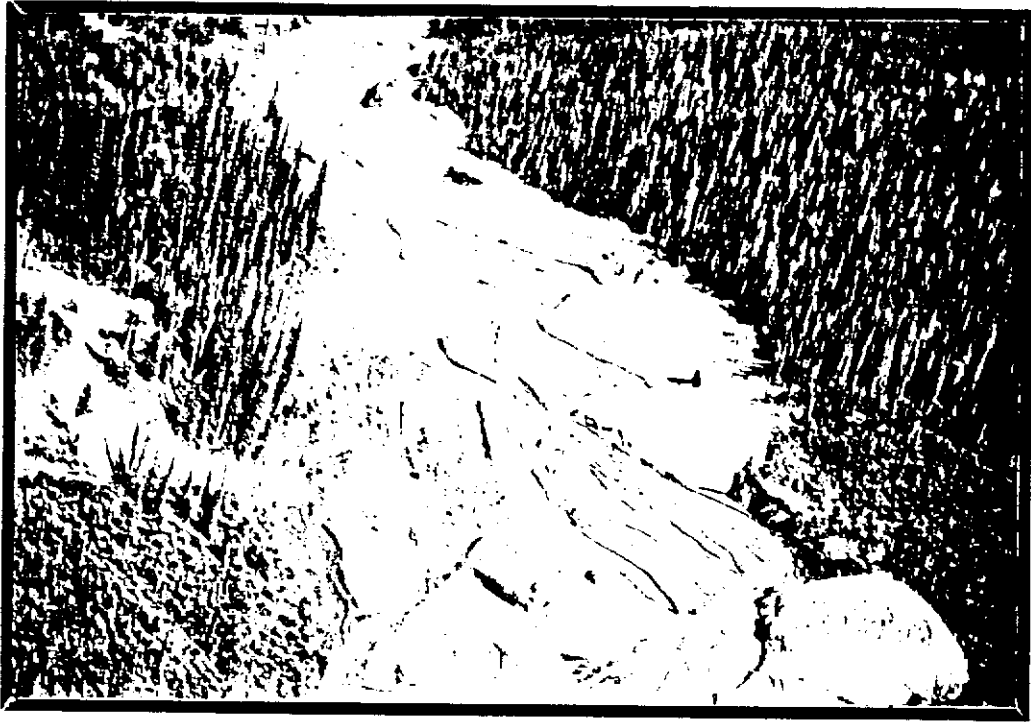


Photo. 5 - Aerial Photo of a Narrow Valley Deposit



Photo. 6 - Aerial Photo of a Low Bench Deposit



Photo. 7 - Aerial Photo of a High Bench Deposit

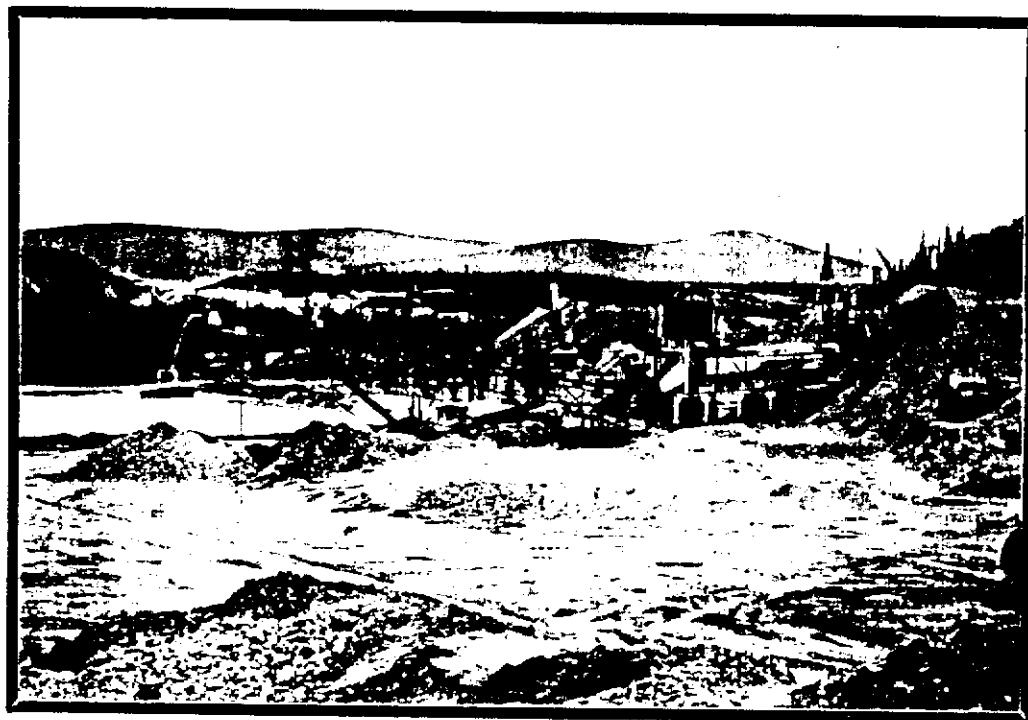


Photo. 8 - View Showing Layout of a High Bench Operation

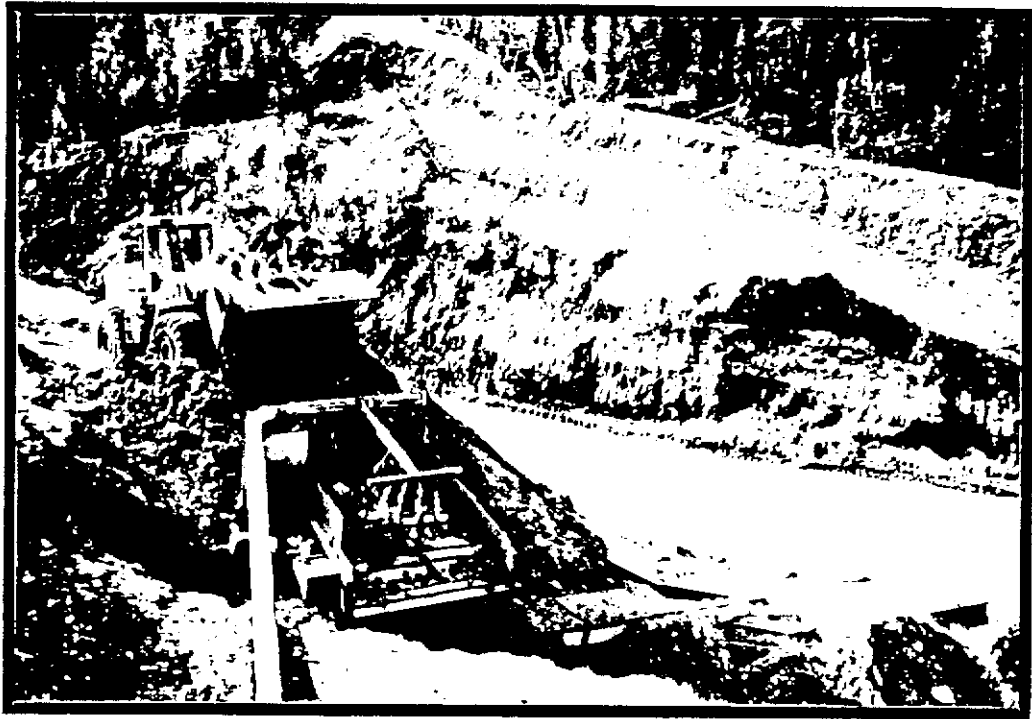


Photo. 9 - Showing Use of "Derocker" for Presizing Gravels

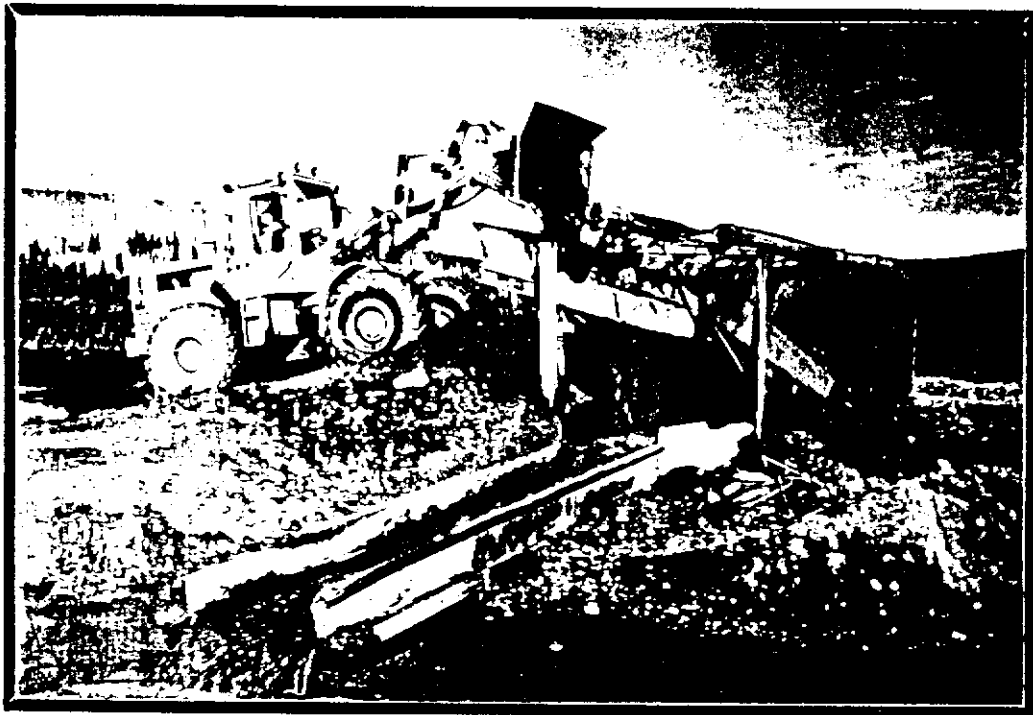


Photo. 10 - Showing Use of a Shaking Screen to Presize Gravels



Photo. 11 - Showing Example of Movable Sluicing Plant

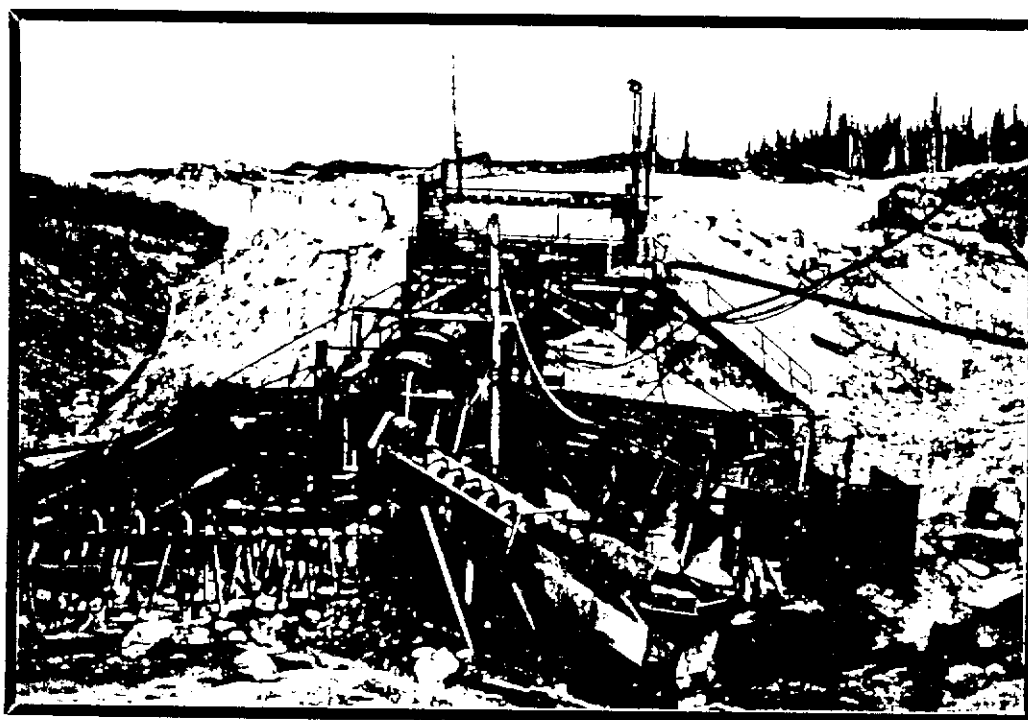


Photo. 12 - Showing Example of Fixed Sluicing Plant

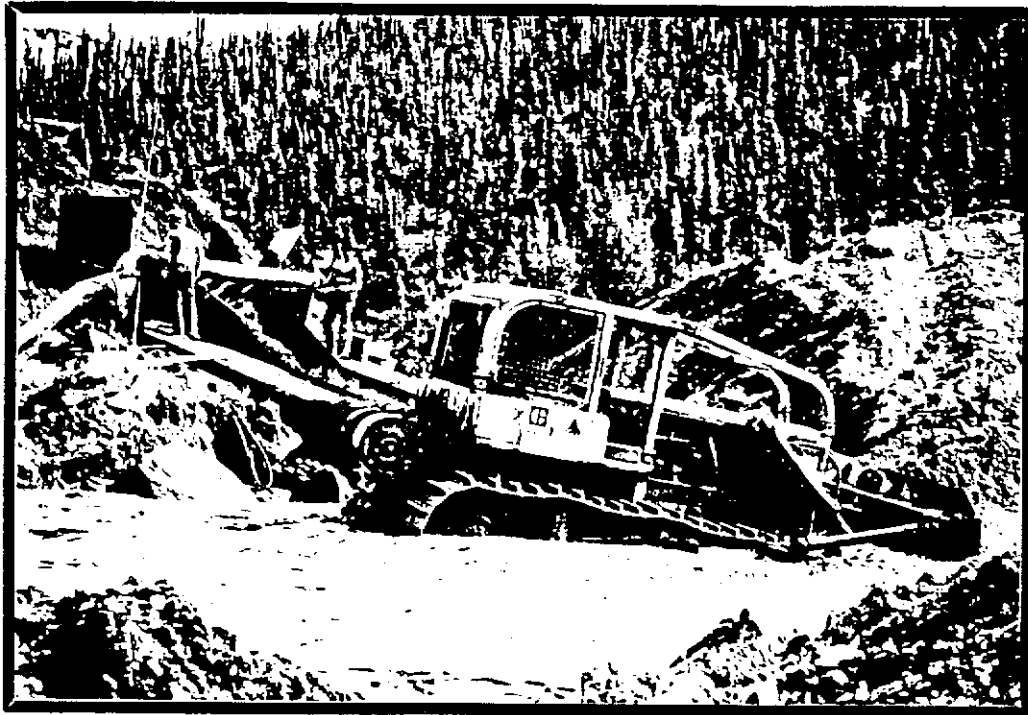


Photo. 13 - Showing Use of Dozer to Remove Tailings

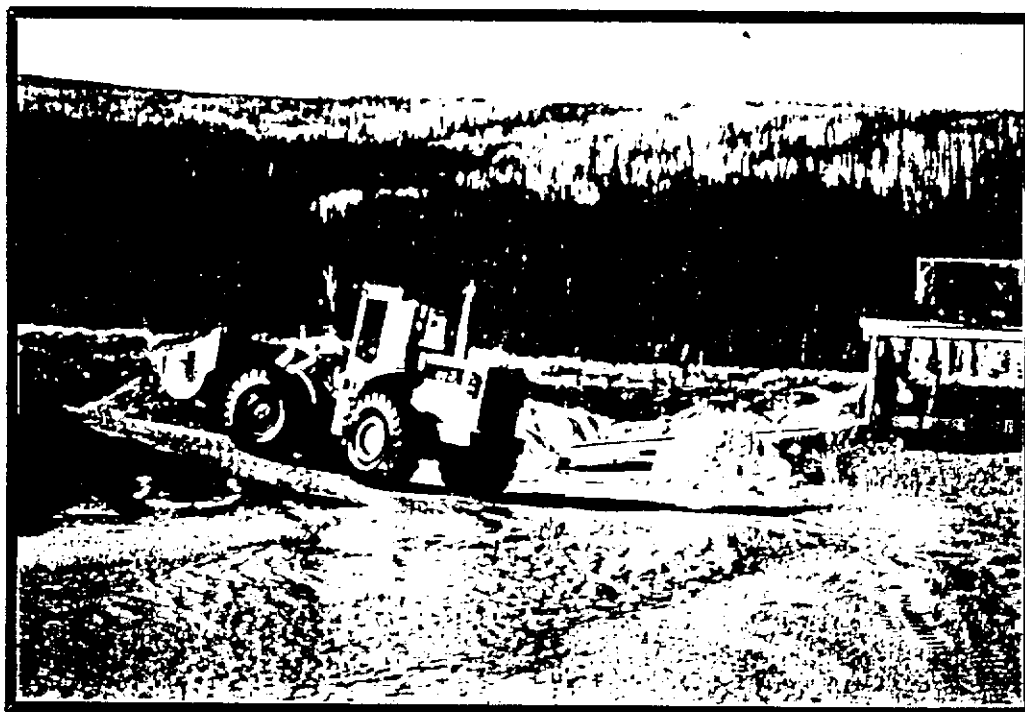


Photo. 14 - Showing Use of Loader to Remove Tailings

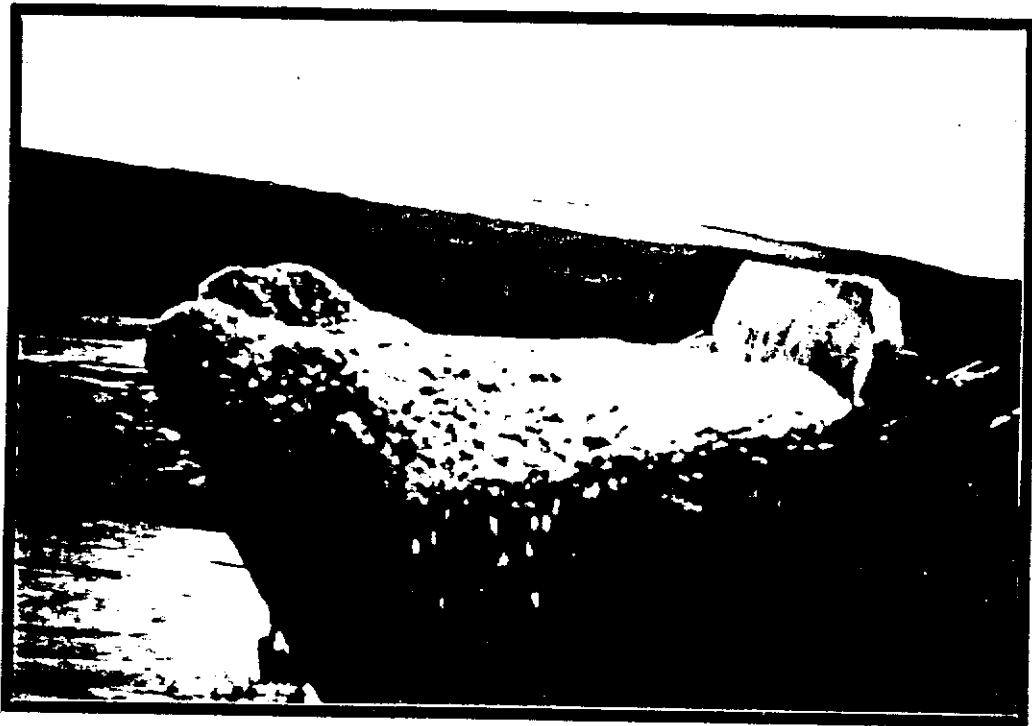


Photo. 15 - Showing Water Content and Consistency
of Tailings Material

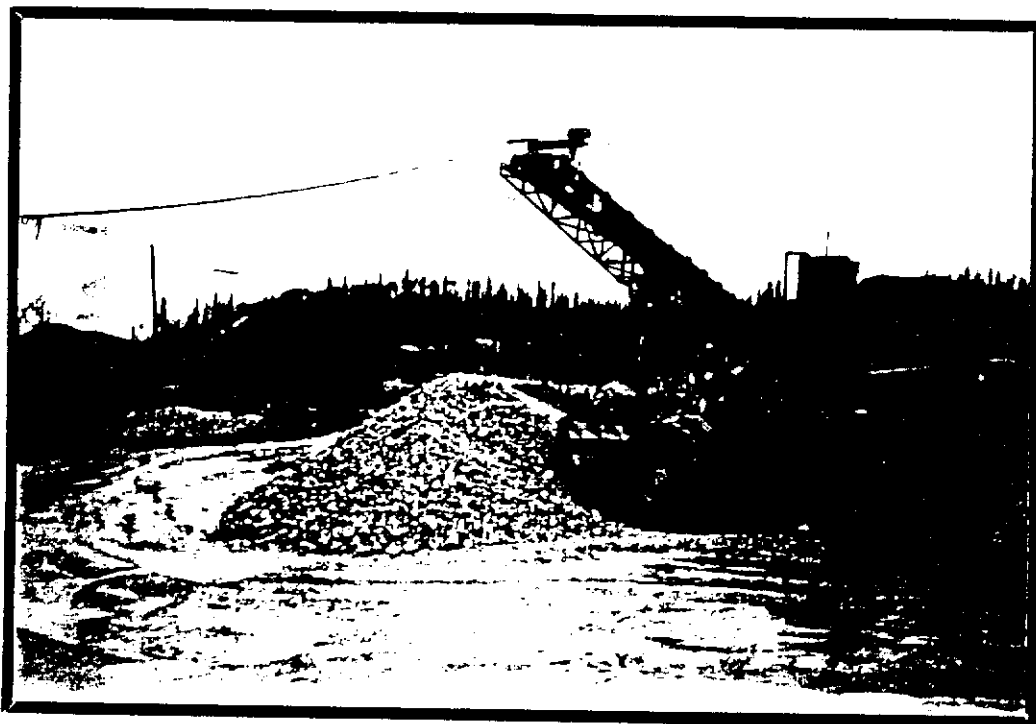


Photo. 16 - Showing Removal of Screen Oversize Material

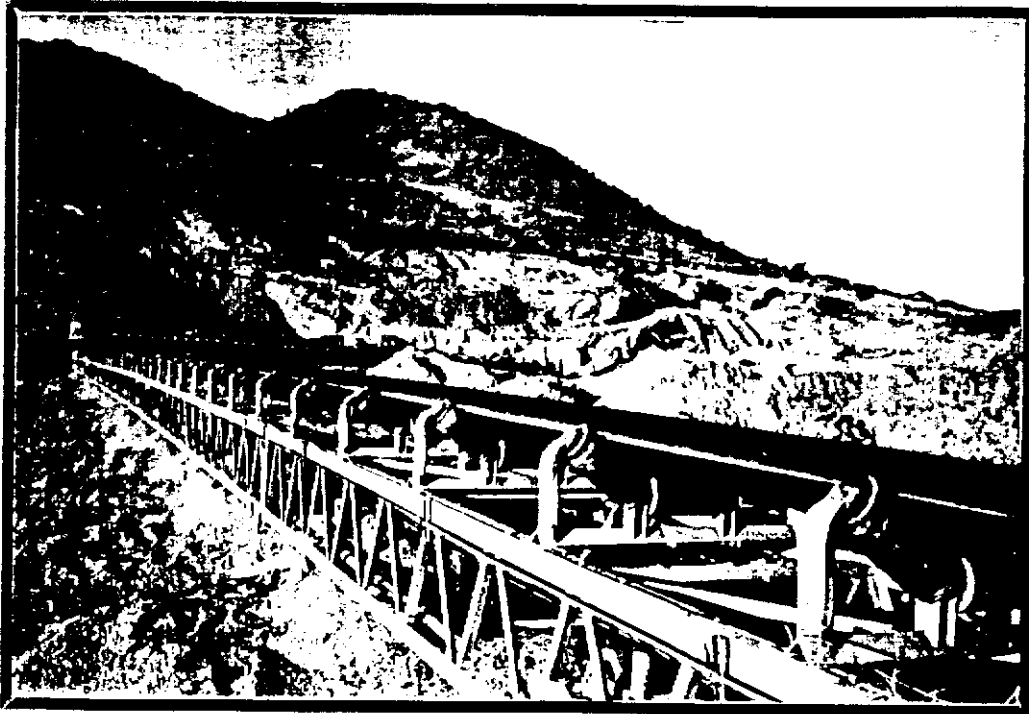


Photo. 17 - Showing Use of Conveyors to Transport
Gravel to Recovery Plant

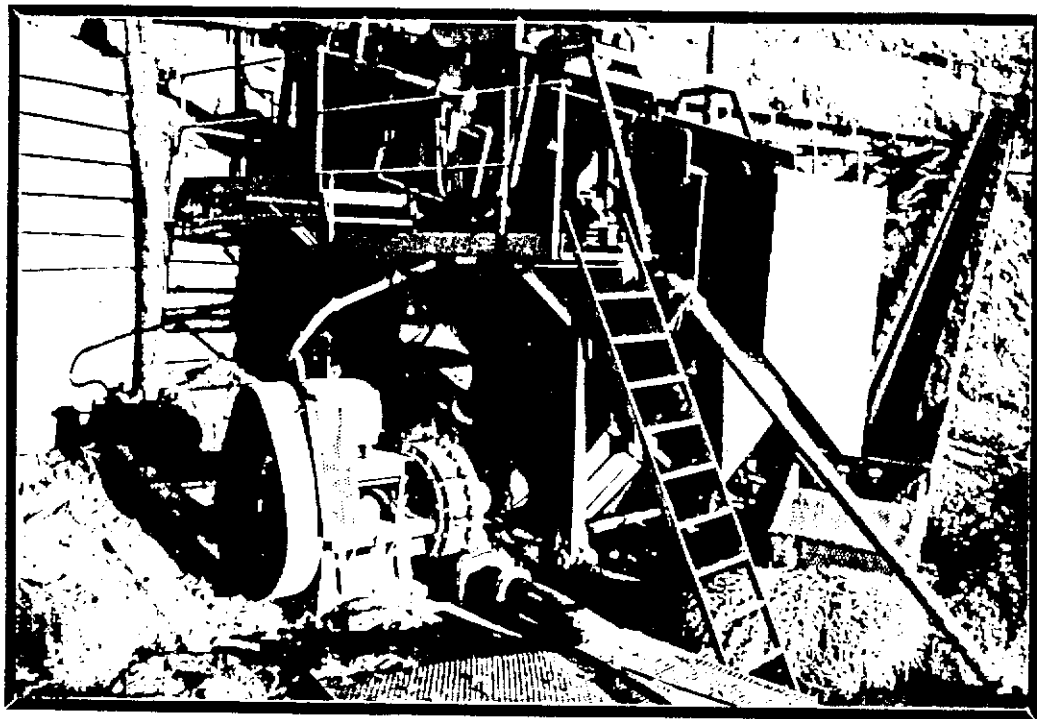


Photo 18. - Showing Use of Gravel Pump to Transport
Screen Undersize to Recovery Plant



Photo. 19 - Showing Arrangement of Cyclones to
Dewater Feed Gravels from Screening Plant

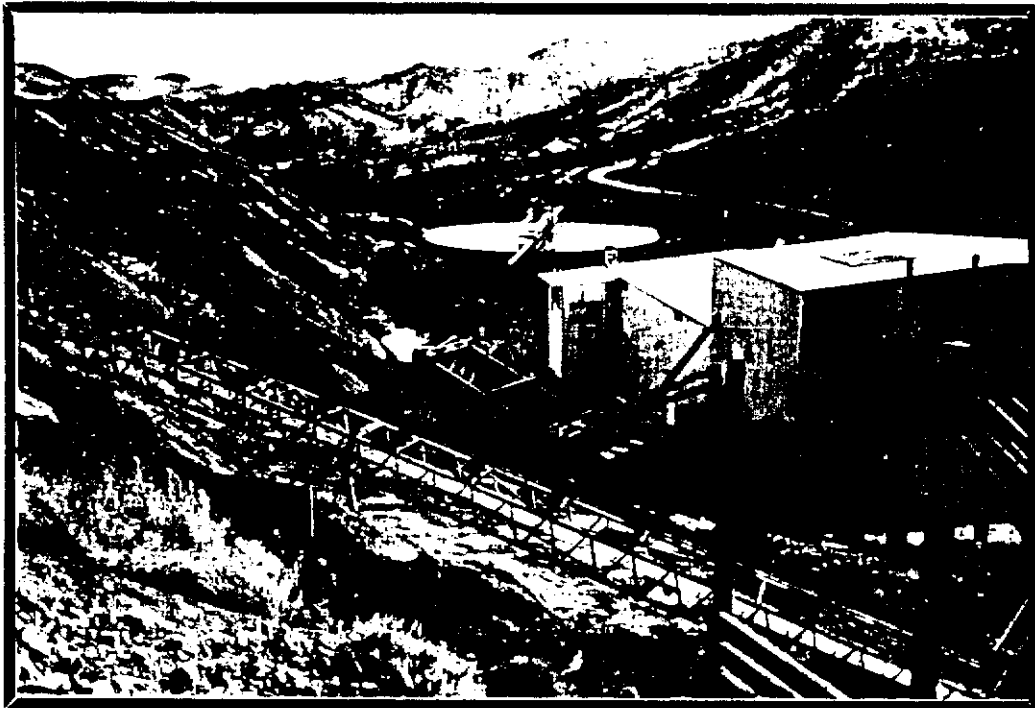


Photo. 20 - Showing Arrangements for Conveying Tailings
Including Use of Sandscrew