

SYMBOL LEGEND

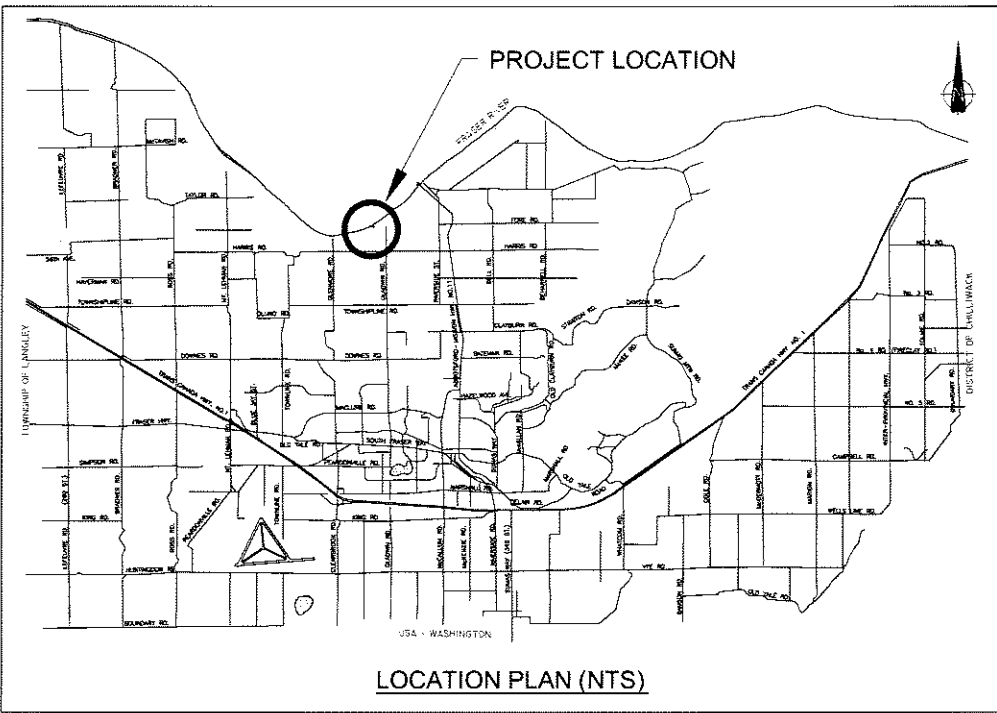
LINEWEIGHTS (EXCEPT AS NOTED)	EXISTING 0.130	PROPOSED 0.400
BARRIER		
BUILDING		
BUS STOP		
CULVERT		
CONCRETE HATCHING		
CATCH BASIN		
DRAIN CLEANOUT		
DRAINAGE MANHOLE		
DRAIN WELL		
GAS VALVE		
GRAVEL HATCHING		
ORNAMENTAL LIGHT		
HYDRO GUY WIRE		
HYDRO JUNCTION BOX		
HYDRO MANHOLE		
HYDRO POLE		
HYDRO POLE WITH LIGHT		
IRON PIN		
LAMP STANDARD		
KIOSK		
MAILBOX		
PARK BENCH		
SANITARY CLEANOUT		
SANITARY MANHOLE		
SPOT ELEV.		
STAIRS		
TEST HOLE		
TRAFFIC SIGN		
SURVEY HUB		
SURVEY MONUMENT		
SURVEY LEAD PLUG		
TEL GUY WIRE		
TEL MANHOLE		
TEL POLE		
TRAFFIC SIGNAL POLE		
TRAFFIC SIGNAL POST		
CONIFEROUS TREE		
DECIDUIOUS TREE		
GARDEN		
HEDGE		
LAWN		
SHRUB		
FIRE HYDRANT		
WATER AIR RELEASE VALVE		
WATER BLOWOFF		
WATER METER BOX		
WATER MANHOLE		
WATER STANDPIPE		
WATER VALVE		
WHEEL CHAIR DROP		
WALL		

LINETYPE LEGEND

LINEWEIGHTS (EXCEPT AS NOTED)	EXISTING 0.130	PROPOSED 0.500
BARRIER		
BREAK LINE		
TRAFFIC CONDUIT		
CREEK BOTTOM		
CREEK CENTERLINE		
CREEK TOP		
CROWN OF ROAD		
DITCH BOTTOM		
DITCH CENTERLINE		
DITCH TOP		
DRIVEWAY		
EASEMENT/R.O.W.		
FENCE CHAINLINK		
FENCE WOOD		
GAS MAIN		
GUTTERLINE		
HYDRO DUCT		
LANE MARKING		
STREET LIGHTING		
PAVEMENT EDGE		
PROPERTY LINE		
RAILWAY TRACKS		
ROAD R/W		
SANITARY MAIN		
SIDEWALK EDGE		
SLOPE BOTTOM		
SLOPE TOP		
STORM MAIN		
TEL DUCT		
WATER MAIN		

TEXT DETAILS
(PAPERSPACE LAYOUT SIZE)

HEIGHT (mm)	EXISTING LINEWEIGHT	PROPOSED LINEWEIGHT
SMALL	1.8	0.300
MEDIUM	2.5	0.400
LARGE	5.0	0.600



DRAWING INDEX

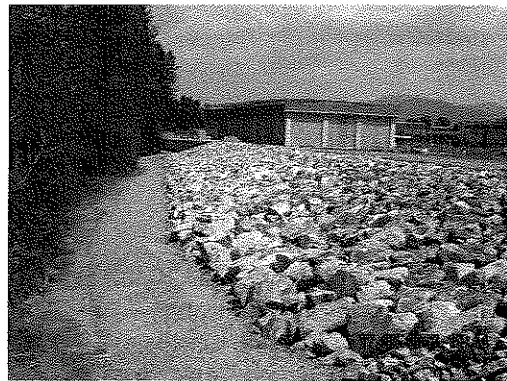
SHEET NO.	DRAWING NO.	DRAWING DISCIPLINE	DRAWING TITLE
1.	M-800	DYKING	KEY PLAN
2.	M-800	DYKING	PLAN & PROFILE
3.	M-800	DYKING	PLAN & PROFILE
4.	M-800	DYKING	PLAN & PROFILE
5.	M-800	DYKING	PLAN & PROFILE
6.	M-800	DYKING	PLAN & PROFILE
7.	M-800	DYKING	CROSS SECTION
8.	M-800	DYKING	CROSS SECTION
9.	M-800	DYKING	CROSS SECTION
10.	M-800	DYKING	CROSS SECTION
11.	M-800	DYKING	CROSS SECTION
12.	M-800	DYKING	CROSS SECTION
13.	M-800	DYKING	CROSS SECTION
14.	M-800	DYKING	CROSS SECTION

KEY PLAN (NTS)



ABBOTSFORD

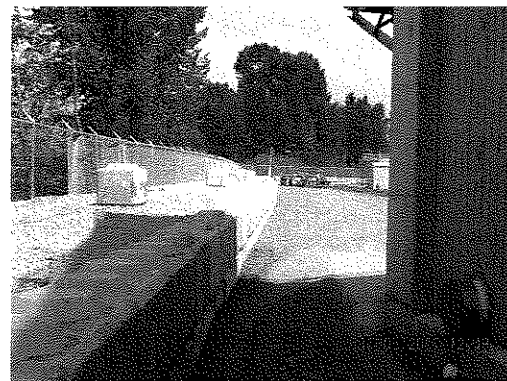
JAMES TREATMENT PLANT
DYKE CONSTRUCTION
5959 GLADWIN ROAD
CONTRACT: 07-06



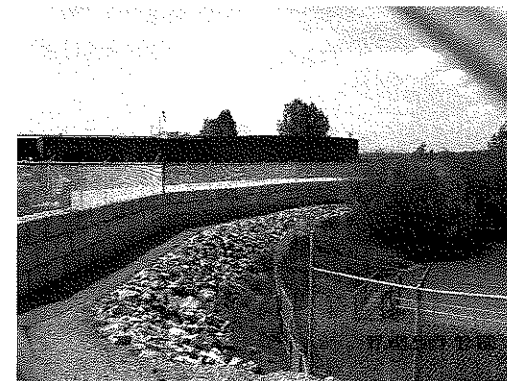
30+00 RIPRAP BANK



31+40 PATH, WALL & FENCE



31+80 WALL & FENCE



34+00 FENCE, WALL, PATH, & RIPRAP BANK

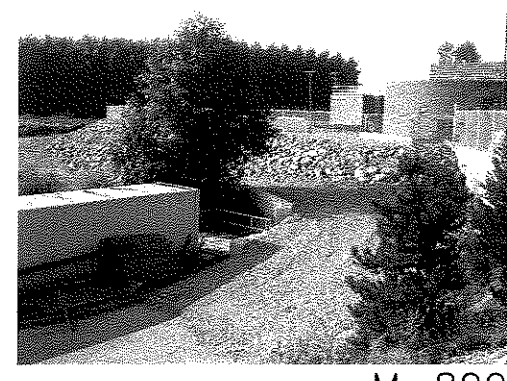
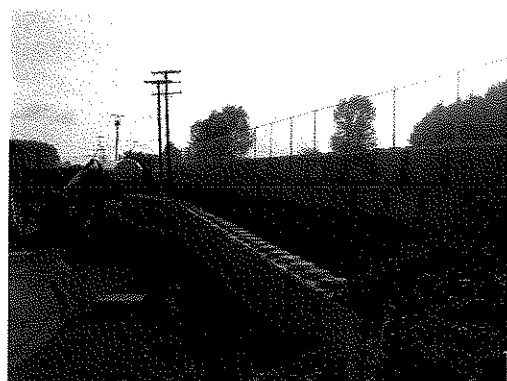


1+80 FENCE AND DYKE

4+20 DOUBLE WALLS & FENCE

5+00 FENCE, WALL & EXISTING TANK

5+80 RIPRAP BANK, GRAVEL DAMP & FENCE



GRID NO. H7 SHEET NO. 1 OF 14 DRWG. NO. M-800

AERIAL PHOTO FLOWN:
MAY 11, 2007

LOCATION FOR GAS, ELECTRICAL, TEL. & CABLE
UTILITIES TO BE VERIFIED

NO.	DATE	BY	REVISIONS	TECH ENG.
1.	JULY 2007	MR AS-BUILT		JL

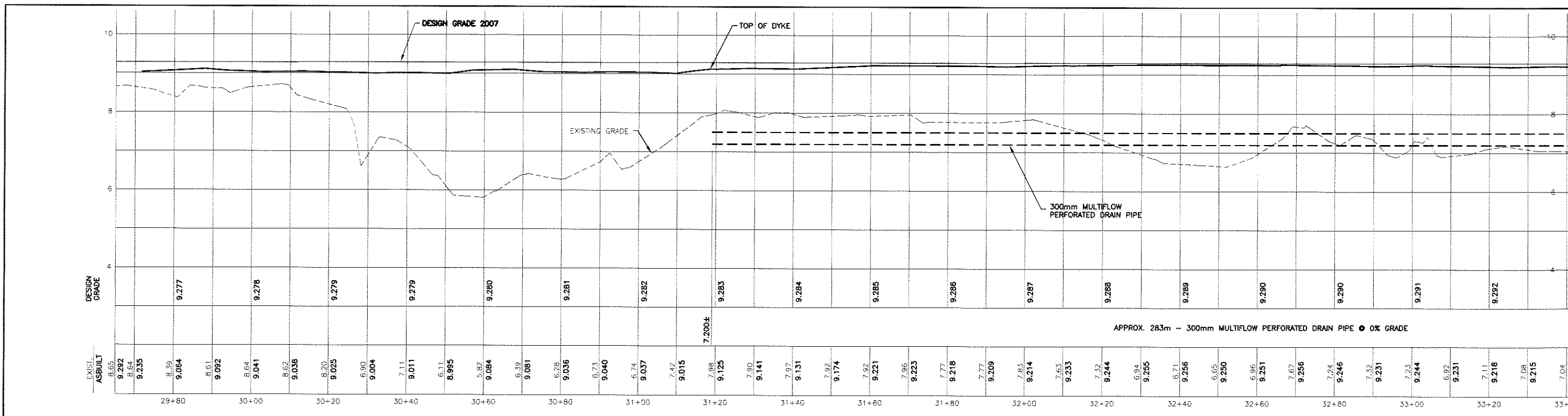
GOLDER ASSOCIATES LTD.
CITY OF ABBOTSFORD

DATE 2007 04 02
DRAWN MR
DESIGN JL
WORK ORDER NO.

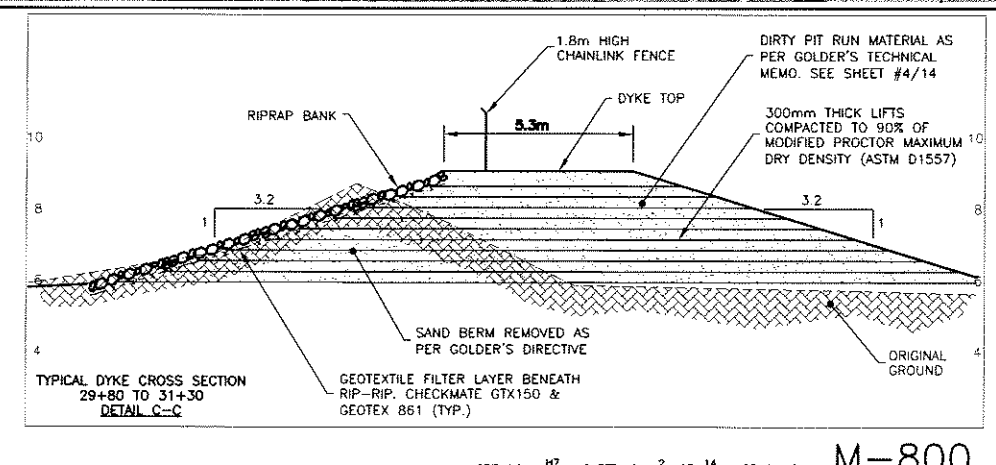
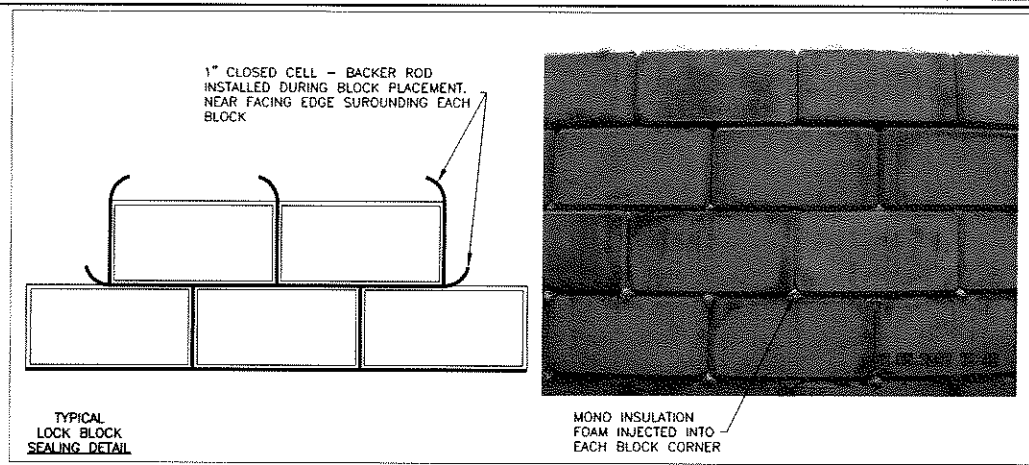
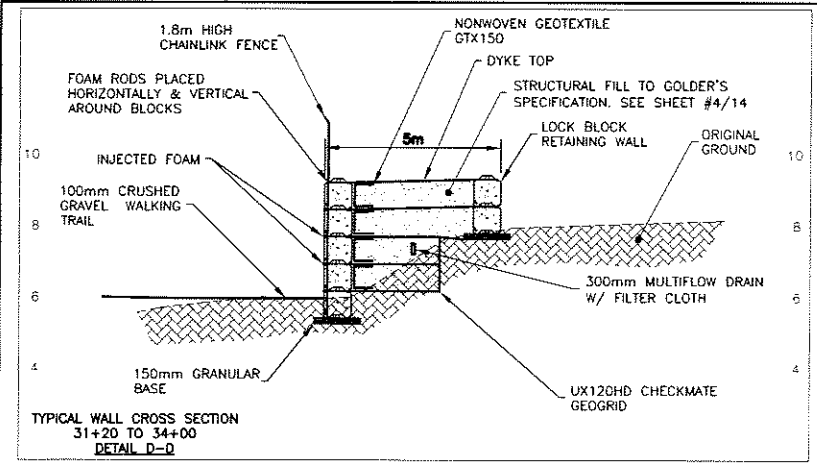
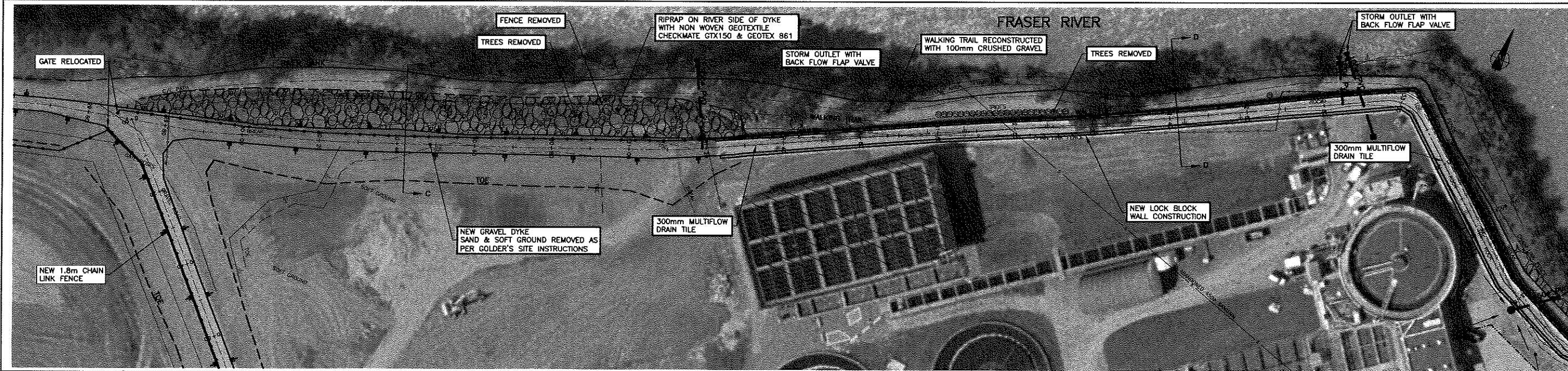
SURVEY JOB NO. 07-047
SURVEYCREW RB/RC
SCALE
HOR. 1 : 1250
VERT.



JAMES TREATMENT PLANT
5959 GLADWIN ROAD
2007 MATSQUI DYKE UPGRADE- KEY PLAN



APPROX. 283m - 300mm MULTIFLOW PERFORATED DRAIN PIPE @ 0% GRADE



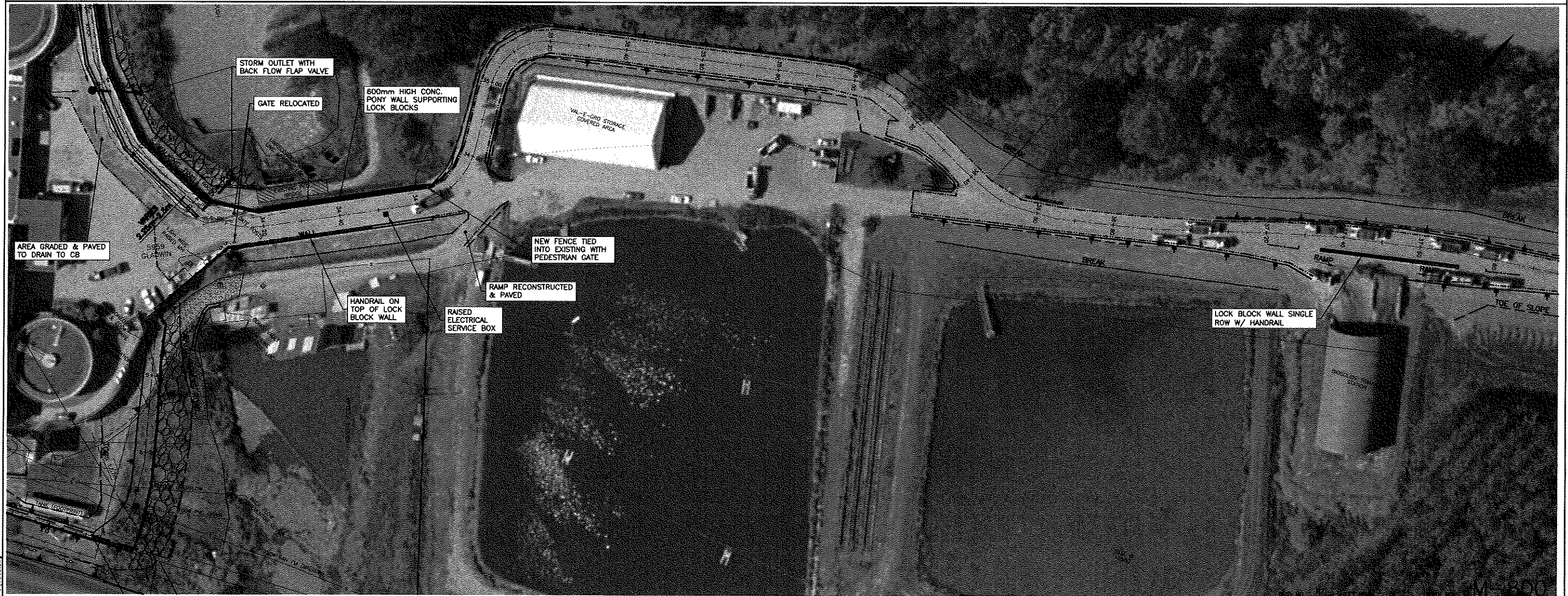
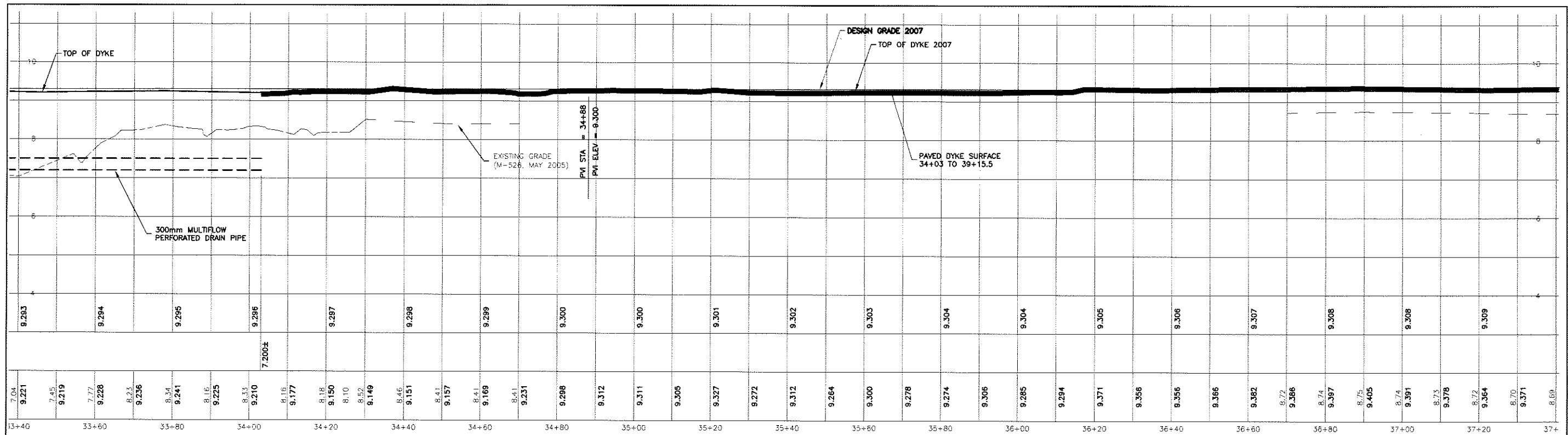
AERIAL PHOTO FLOWN: MAY 11, 2007
 LOCATION FOR GAS, ELECTRICAL, TEL, & CABLE UTILITIES TO BE VERIFIED

NO.	DATE	BY	REVISIONS	TECH. ENG.
1.	JULY 2007	MR AS-BUILT		JL

GOLDER ASSOCIATES LTD. CITY OF ABBOTSFORD
 DATE: 2007 04 02
 SURVEY JOB NO. 07-047
 SURVEYCREW RB/RG/D&K
 DRAWN MR
 DESIGN JL
 WORK ORDER NO.
 SCALE: HOR. 1:500, VERT. 1:50



GRID NO. H7 SHEET NO. 2 OF 14 DRWG. NO. M-800
 JAMES TREATMENT PLANT
 5959 GLADWIN ROAD
 2007 MATSQUI DYKE UPGRADE



AERIAL PHOTO FLOWN:
MAY 11, 2007

LOCATION FOR GAS, ELECTRICAL, TEL, & CABLE UTILITIES TO BE VERIFIED

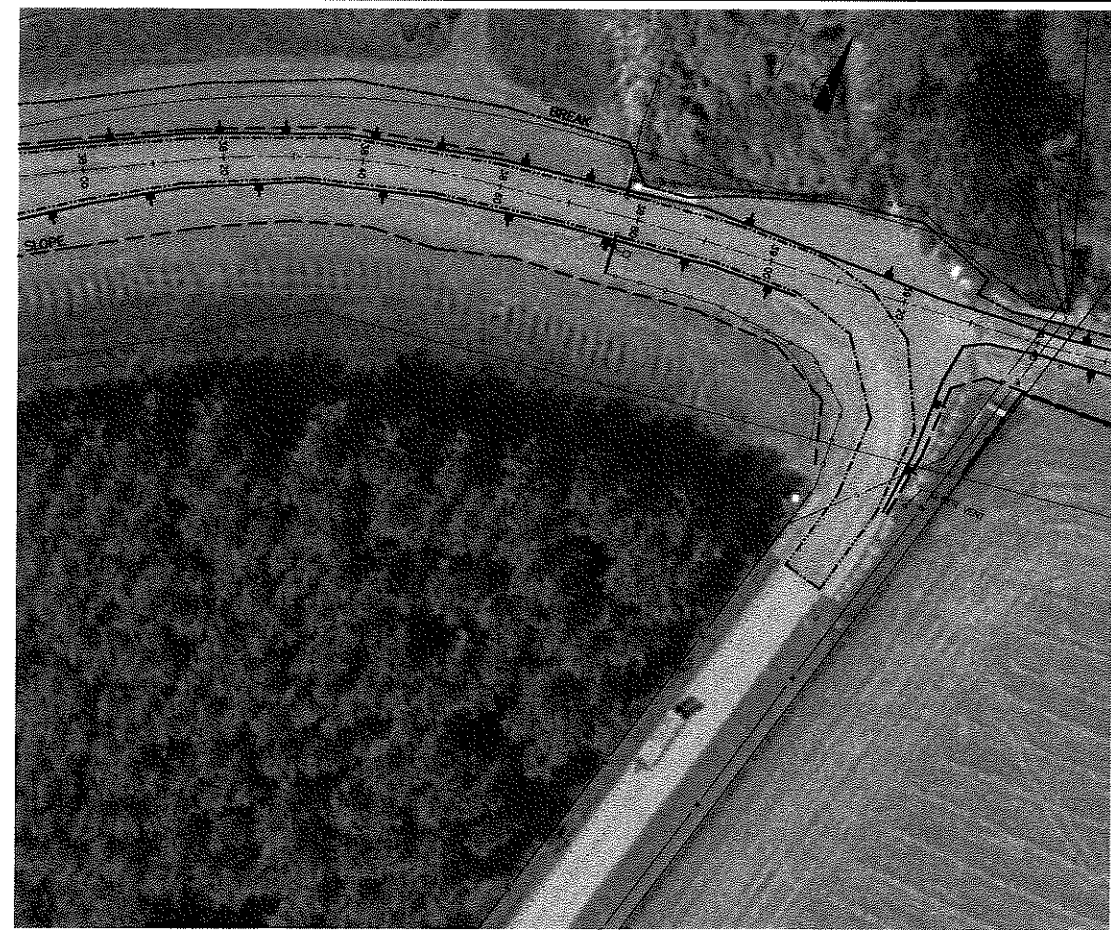
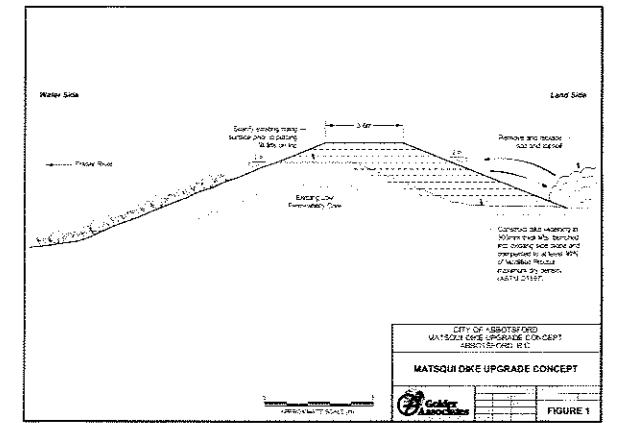
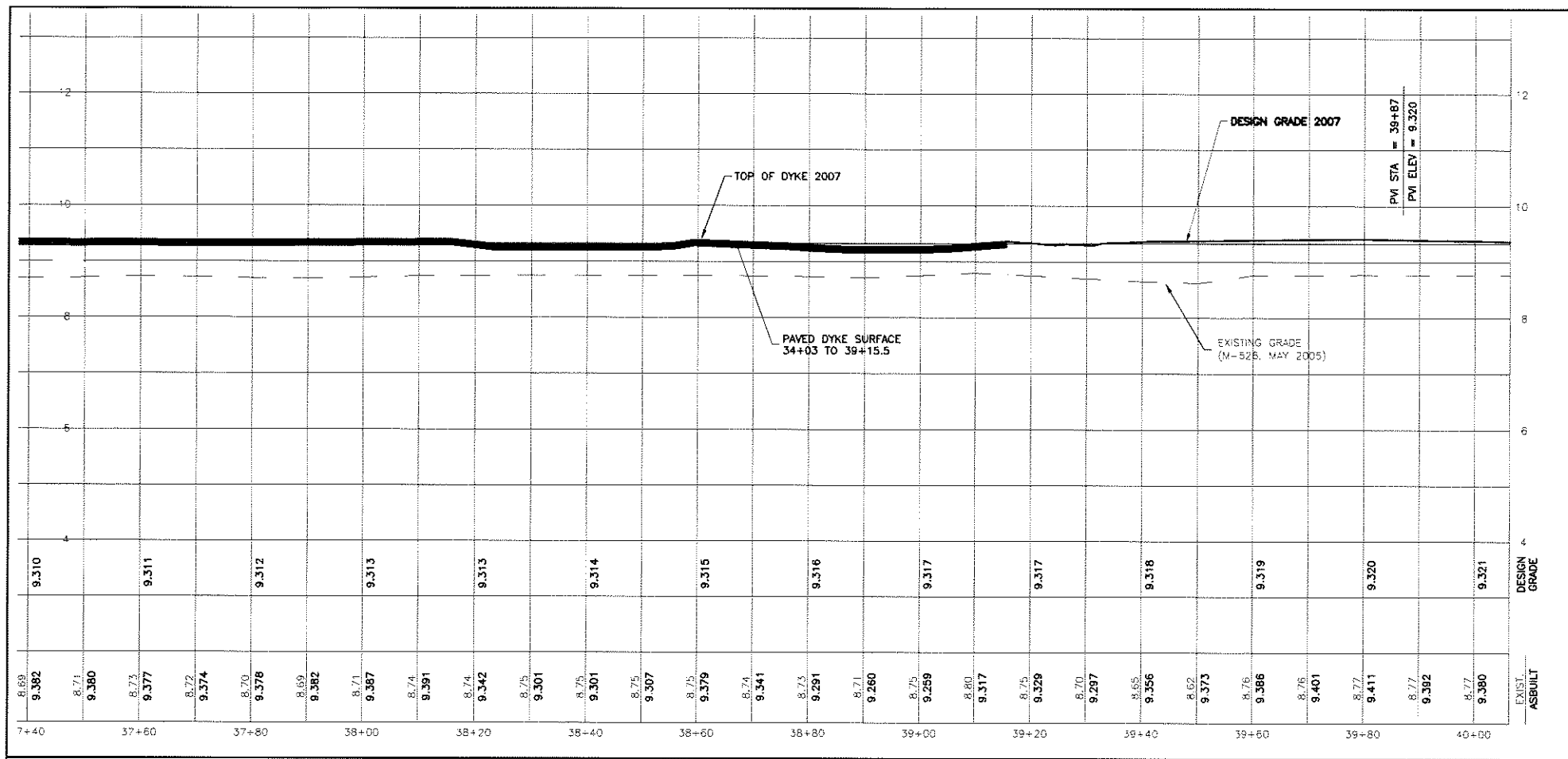
NO.	DATE	BY	REVISIONS	TECH/ENG.
1	JULY 2007	MR	AS-BUILT	JL

GOLDER ASSOCIATES LTD.	CITY OF ABBOTSFORD	DATE 2007 04 02	SURVEY JOB NO. 07-047
		DRAWN MR	SURVEYCREW RB/RG/D&K
		DESIGN JL	SCALE
		WORK ORDER NO.	HOR. 1 : 500
			VERT. 1 : 50



JAMES TREATMENT PLANT
5959 GLADWIN ROAD
2007 MATSQUI DYKE UPGRADE

X:\DDPROJ\WSE07\DWG\WSE07.dwg



TECHNICAL MEMORANDUM

Golden Associates Ltd.
 2102 - 2760 Hudson Road
 Abbotsford, B.C., Canada V2T 4S8
 Telephone: 604-854-8776
 Fax: 604-854-8778
 Website: www.goldenassoc.com

TO: Phil Baker, P.Eng., City of Abbotsford
DATE: April 11, 2007

FROM: Brian McDevitt, P.Eng.
JOB NO.: 07-1455-0019-1000

EMAIL: bmcdevitt@golder.com

RE: PROPOSED DESIGN AND CONSTRUCTION METHODOLOGY FOR BIKE UPGRADES FOR 2007 FRESHET ABBOTSFORD, BC

This Technical Memorandum outlines the proposed design and construction methodology for the upgrade to the existing Abbotsford dike in anticipation of the 2007 Freshet on the Fraser River.

1.0 DESIGN CONSIDERATIONS

It is understood that the existing dikes need to be upgraded and raised to meet the new flood elevation in anticipation of the 2007 Freshet on the Fraser River. It is also understood that the existing dikes were originally constructed with a low permeability core. A review of survey information contained in the City of Abbotsford's Drawing No. MS26-026 (1 to 12) indicates that the dike crest elevation will need to be raised between about 300 mm and 1200 mm. A visual inspection of the existing dikes was carried out on April 4, 2007.

Due to the urgency of this project and the compressed timeline in which it may be completed, no provision has been made for any site-specific geotechnical investigations including test holes nor detailed analysis unless field observations warrant more detailed assessments in specific locations.

Given the compressed timeline available when asked to complete the dike upgrade, it is proposed to implement the dike upgrades widening the base and raising the crest elevation on the land side of the existing dikes. This will minimize impacts to existing vegetated slopes that reduce the need for further engineering and provision of newly placed fill slopes of the dike upgrade were carried out on the water side and minimize the potential for impacts to the adjacent sensitive riparian areas.

A boat will be used to carry out a visual inspection of the existing apron/face in areas where the existing dikes are in proximity of the edge of the Fraser River to assess if any additional armour rock needs to be placed to protect vulnerable areas.

Mr. Phil Baker, P.Eng.
 City of Abbotsford
 April 11, 2007
 07-1455-0019

The gradation specification for the proposed fill materials to be used in the dike upgrade is as follows:

Sieve Designation	Percent Passing
75 mm	100
50 mm	70 - 100
25 mm	50 - 100
4.75 mm	22 - 100
2.50 mm	10 - 85
0.075 mm	5 - 10

The gradation specification outlined above was modified from the Master Municipal Specifications for Pit Run Gravel with an allowance for some additional fines. A fill material could be specified containing significantly more fines; however, compaction would be difficult to achieve in wet weather conditions which typically occur in early spring.

It is proposed to upgrade the existing dikes such that the crest width is maintained at 3.0 m and the side slopes are developed not steeper than 2.5 Horizontal to 1 Vertical on the land side of the dike where the widening upgrade will occur.

The attached Figure 1 illustrates the proposed dike upgrade concept. Floodwalls and/or similar Lock Block retaining walls or reinforced fill structures may be required in areas where upgrades to the existing dikes or proposed new dikes will be in proximity of existing structures (e.g. JAMES Pollution Control Centre, other facilities and/or areas of fruit space). Specific details for these floodwalls are in the process of being developed.

2.0 SITE PREPARATION

Site preparation will include the select removal of existing large cottonwood or other trees that could impact the existing dike structure should they be toppled and root balls pulled from the dike during freshet high water conditions. It is recommended that these trees be cut out and the root ball left in place until after the flood waters have receded and then they can be removed and the surrounding areas reseeded with fill material and re-vegetated.

Mr. Phil Baker, P.Eng.
 City of Abbotsford
 April 11, 2007
 07-1455-0019

Site preparation will also include temporary removal and reinstatement of all fences, gates and the like.

The sod and topsoil cover will be removed along the land side slopes of the existing dike and stockpiled adjacent to the work area for reinstatement following the dike upgrade work.

3.0 CONSTRUCTION CONSIDERATIONS

Low height horizontal benches shall be cut into the existing side slopes to key the new fill widening into the existing fill side slopes. Excavations for the benches must not penetrate into the existing low permeability core material.

The new dike fill materials shall be placed in loose lifts not exceeding 300 mm in thickness and composed to at least 90 per cent of Modified Proctor maximum dry density (ASTM D1557). The thickness of the initial lift of fill placed near the toe of the side slope of the dike on the land side may need to be increased for compaction/trafficability purposes. Periodic field density testing will be carried out by Golden Associates Ltd. to confirm that the density specification is achieved. The top surface of the existing dike shall be scanned to a depth of 150 mm prior to placement of the initial lift of fill on top of the existing dike crest.

The side slopes of the new fill placed on the land side of the dike shall be developed not steeper than 2.5 Horizontal to 1 Vertical. The top of the dike shall be provided with a 2 per cent cross fall down toward the water side of the dike to prevent ponding of water on top of the dike crest.

The stockpiled sod and topsoil material shall be reinstated on the newly constructed side slopes along the land side of the dike and these slopes shall be re-vegetated with hydroseed or similar methods.

Armour rock will be placed in areas where visual inspections indicate that the existing over bank, in proximity of the existing dikes, have been significantly impacted by erosion.

Attachment RM-515.16
 (SEE ATTACHMENT FOR FURTHER INFORMATION)

AERIAL PHOTO FLOWN:
 MAY 11, 2007

LOCATION FOR GAS, ELECTRICAL, TEL, & CABLE UTILITIES TO BE VERIFIED

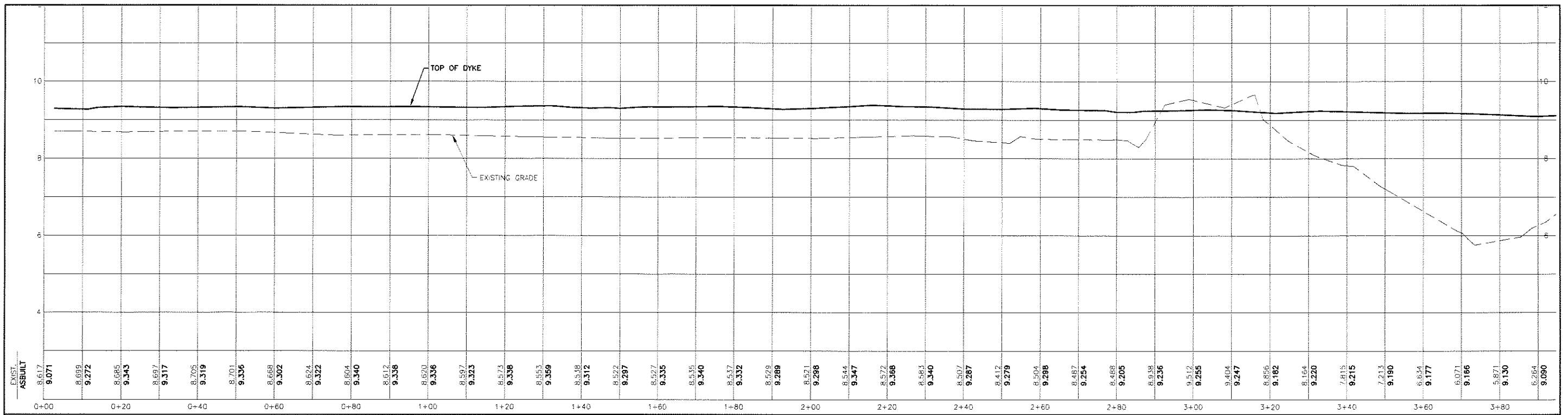
NO.	DATE	BY	REVISIONS	TECH. ENG.
1.	JULY 2007	MR	AS-BUILT	JL

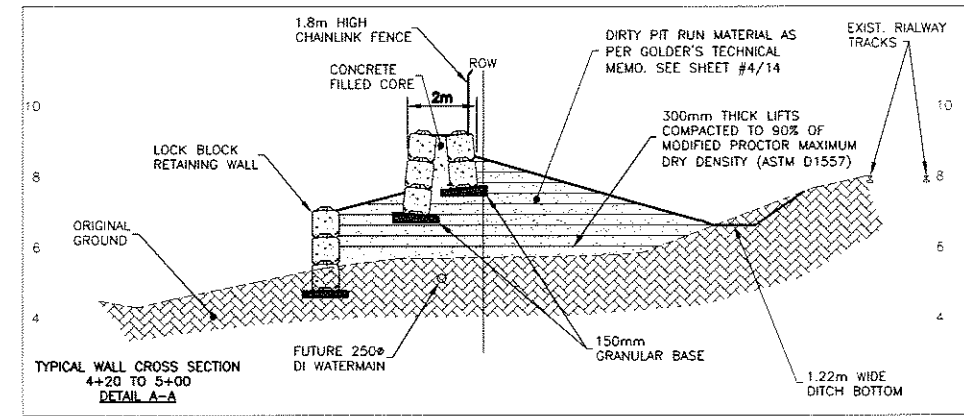
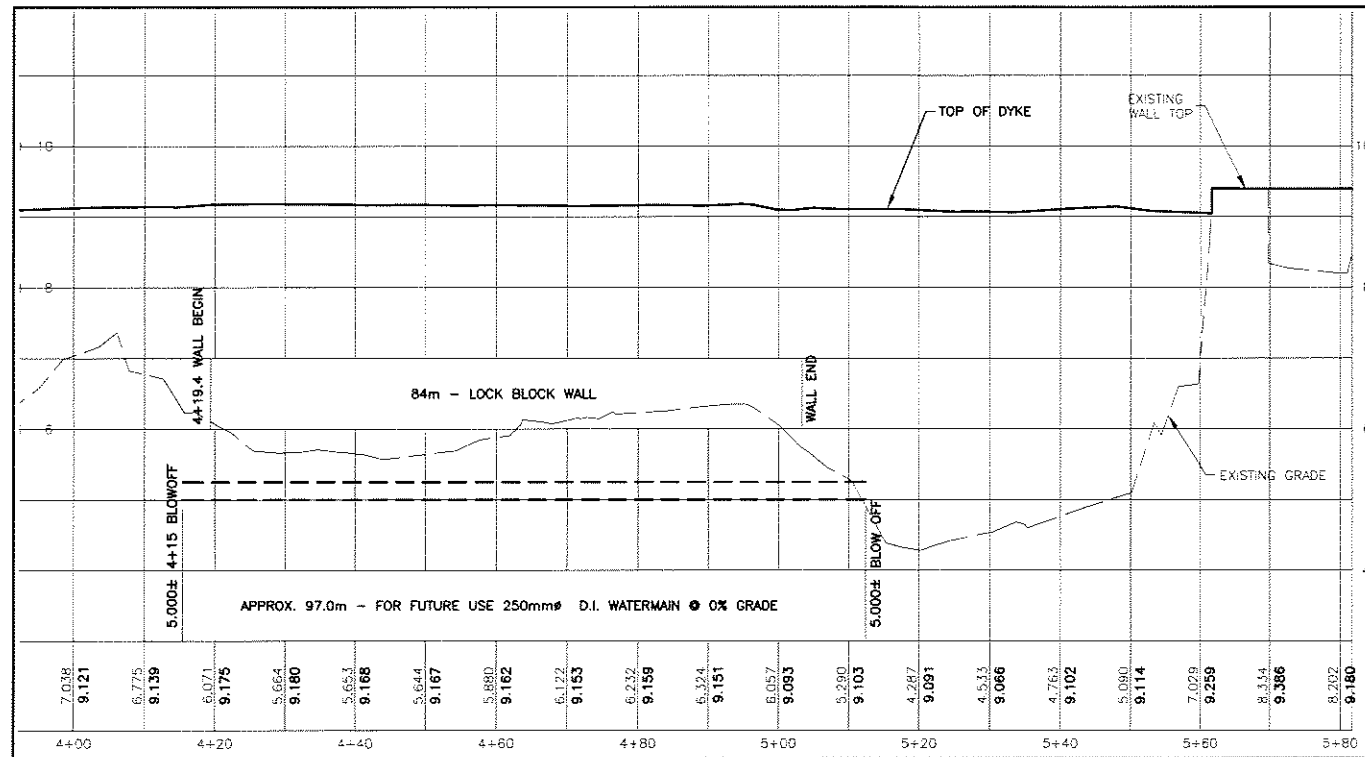
GOLDER ASSOCIATES LTD.	CITY OF ABBOTSFORD	DATE	2007 04 02	SURVEY JOB NO.	07-047
		DRAWN	MR	SURVEYCREW	RB/RG/D&K
		DESIGN	JL	SCALE	
		WORK ORDER NO.		HOR.	1 : 500
				VERT.	1 : 50



GRID NO. M7 SHEET NO. 4 OF 14 DRWG. NO. **M-800**

JAMES TREATMENT PLANT
 5959 GLADWIN ROAD
 2007 MATSQUI DYKE UPGRADE





T:\LUDPROJ\5803\DWG\M800.dwg

AERIAL PHOTO FLOWN:
MAY 11, 2007

LOCATION FOR GAS, ELECTRICAL, TEL. & CABLE
UTILITIES TO BE VERIFIED

NO.	DATE	BY	REVISIONS	TECH. ENG.
1.	JULY 2007	MR	AS-BUILT	JL

GOLDER ASSOCIATES
LTD.
CITY OF ABBOTSFORD

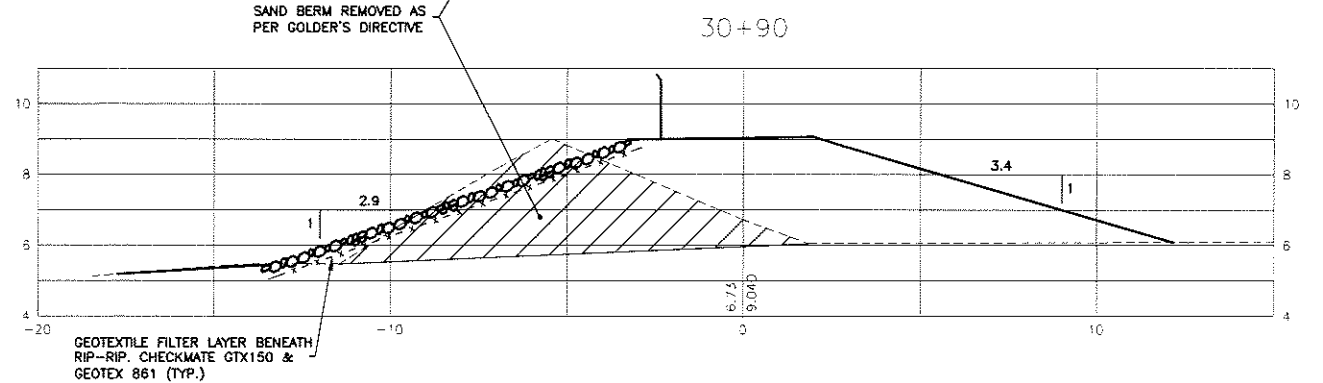
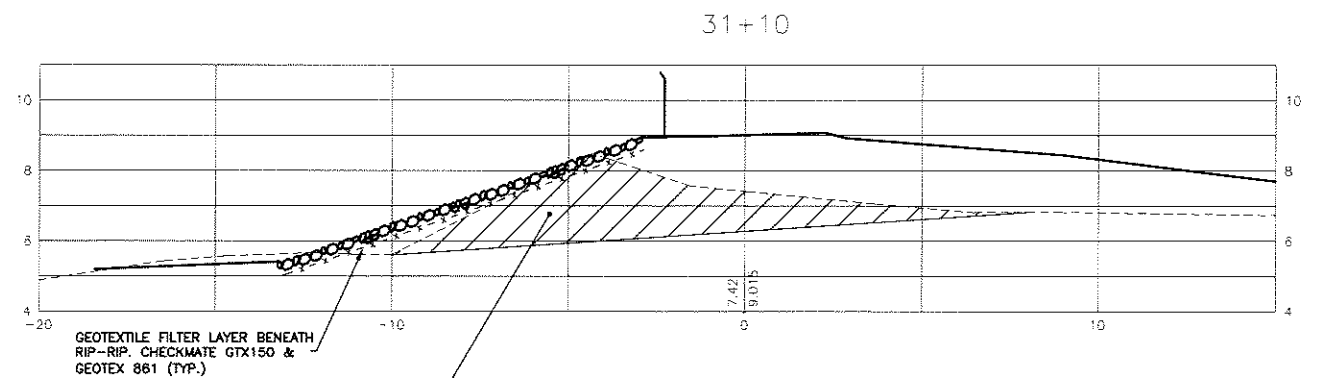
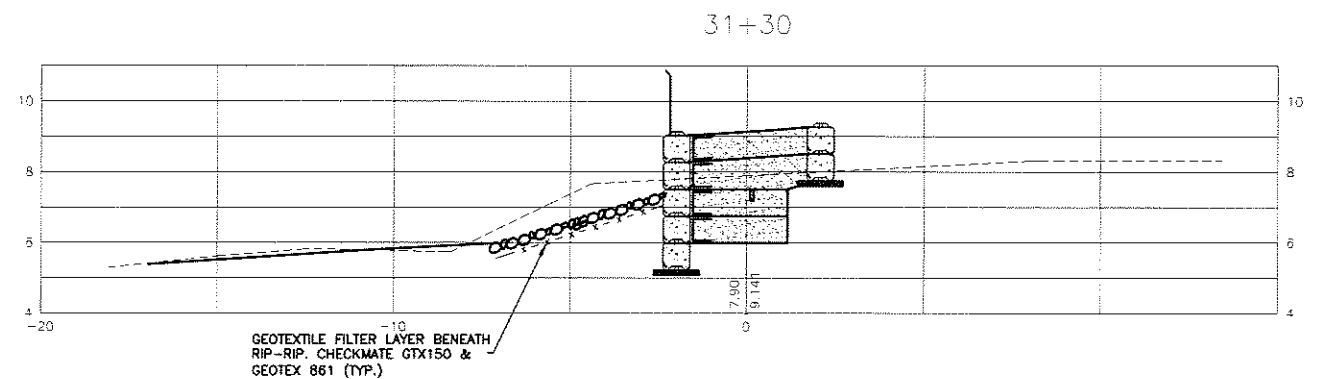
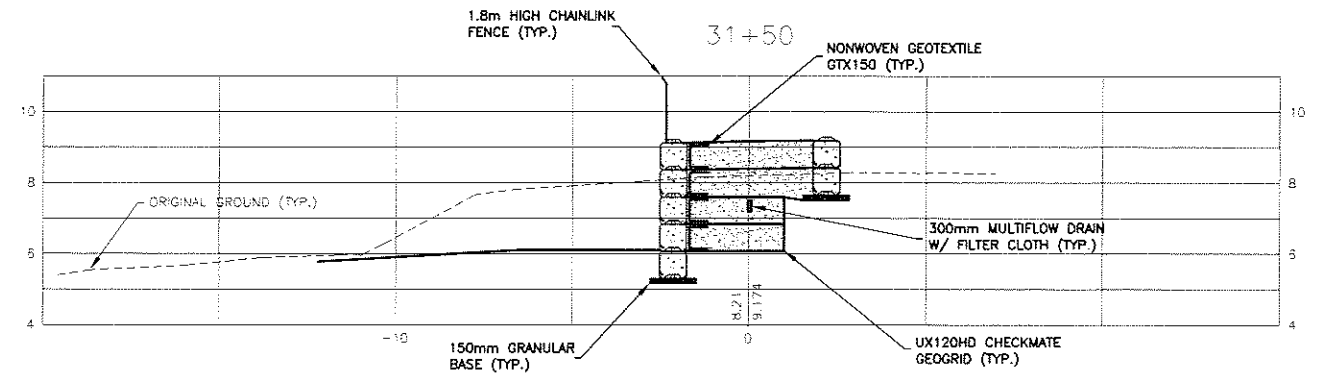
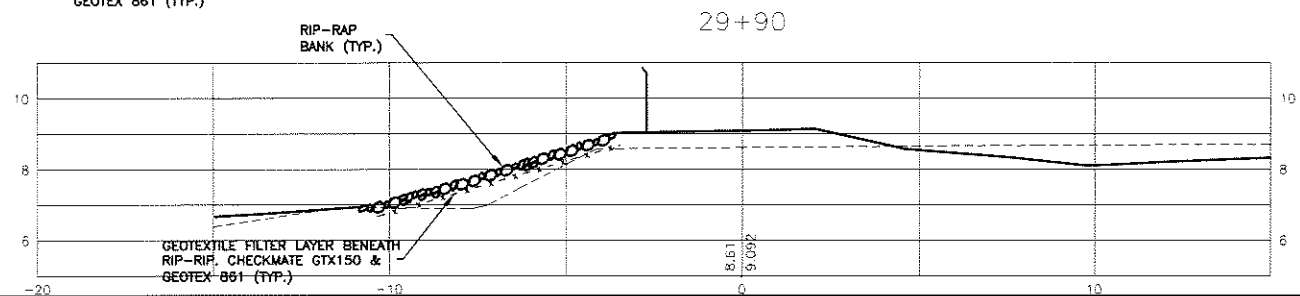
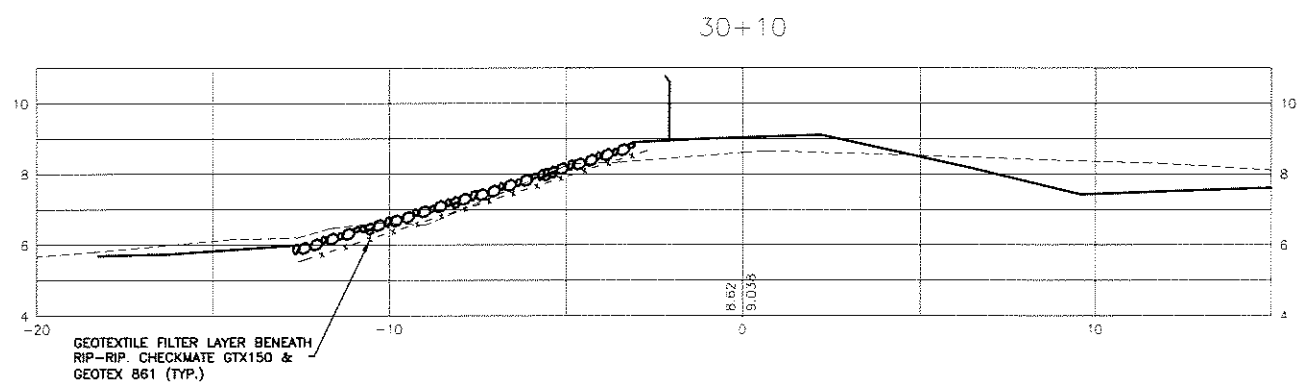
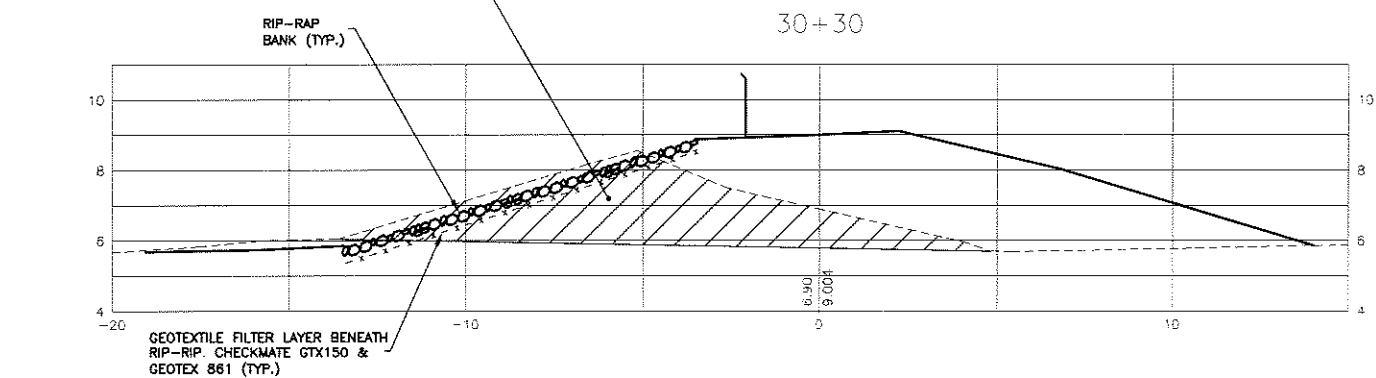
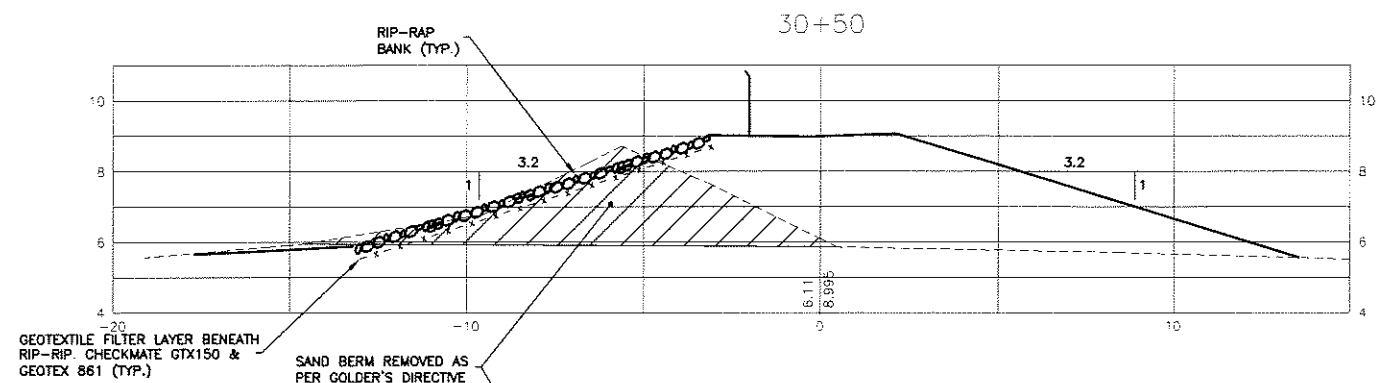
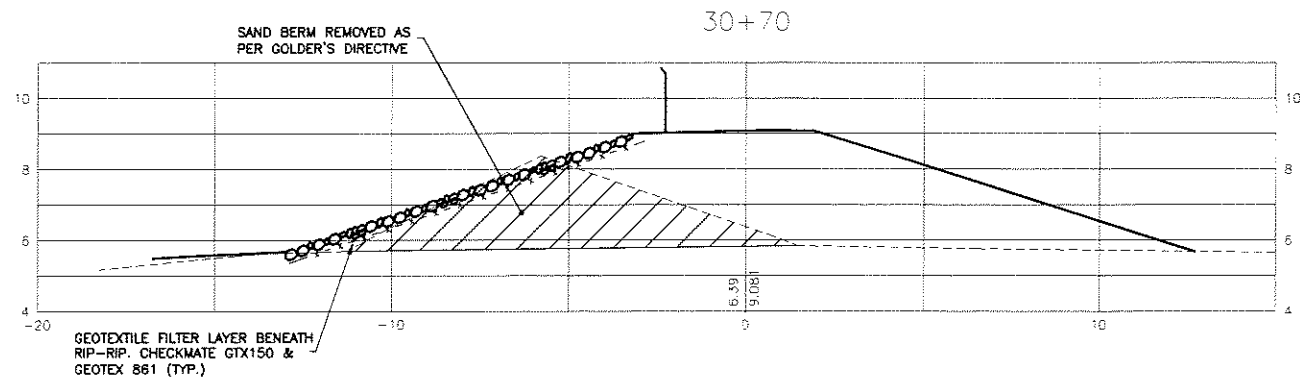
DATE 2007 04 02
DRAWN MR
DESIGN JL
WORK ORDER NO.

SURVEY JOB NO. 07-047
SURVEYCREW RB/RG/D&K
SCALE
HOR. 1 : 500
VERT. 1 : 50



GRID NO. H7 SHEET NO. 6 OF 14 DRWG. NO. M-800

JAMES TREATMENT PLANT
5959 GLADWIN ROAD
2007 DYKE UPGRADE - SECONDARY DYKE



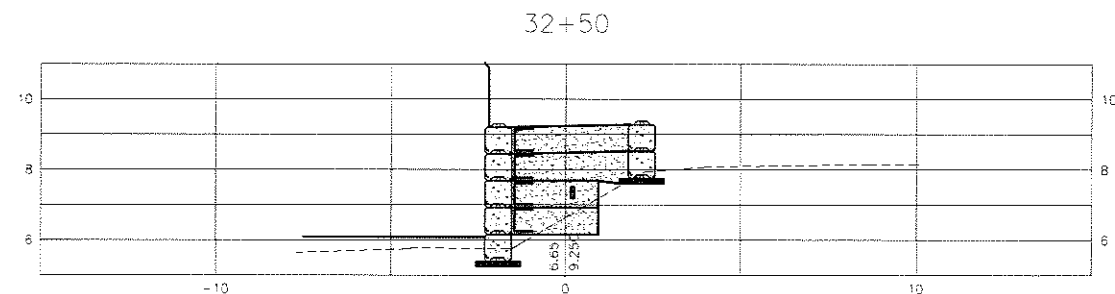
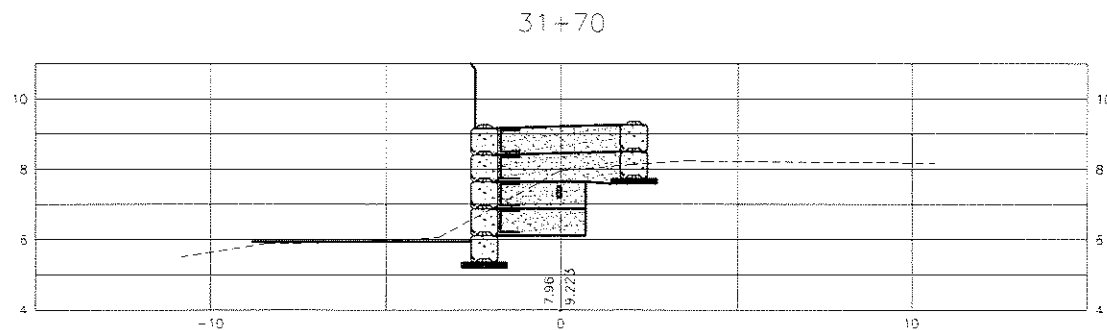
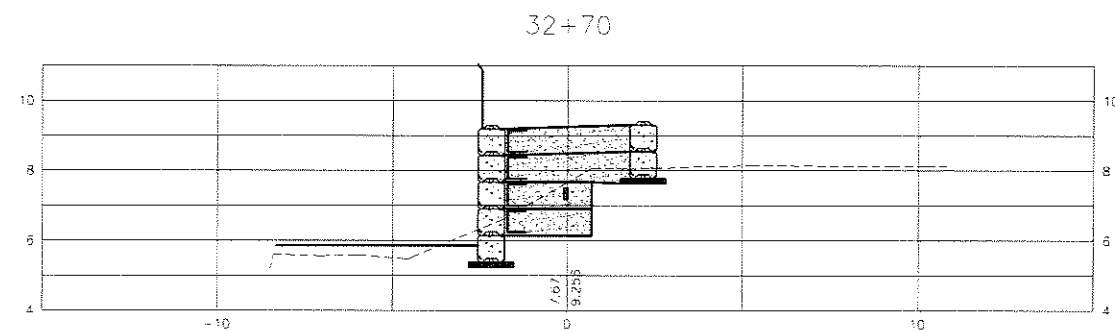
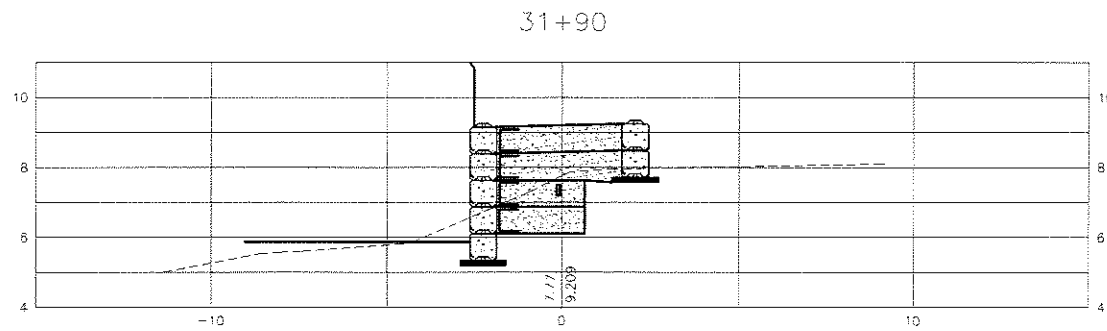
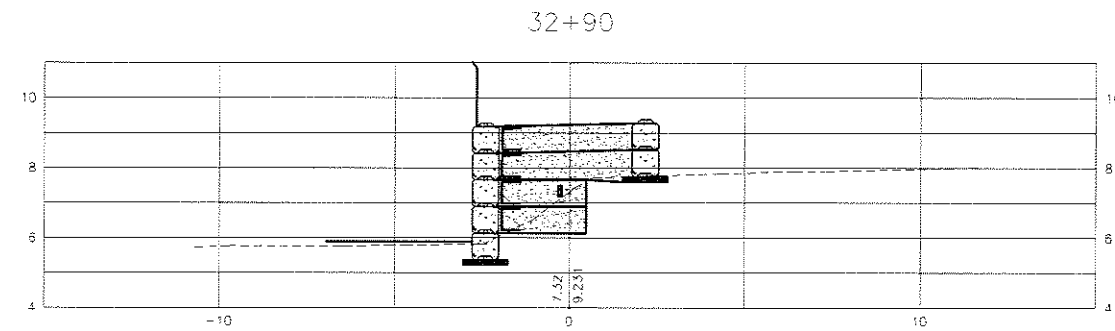
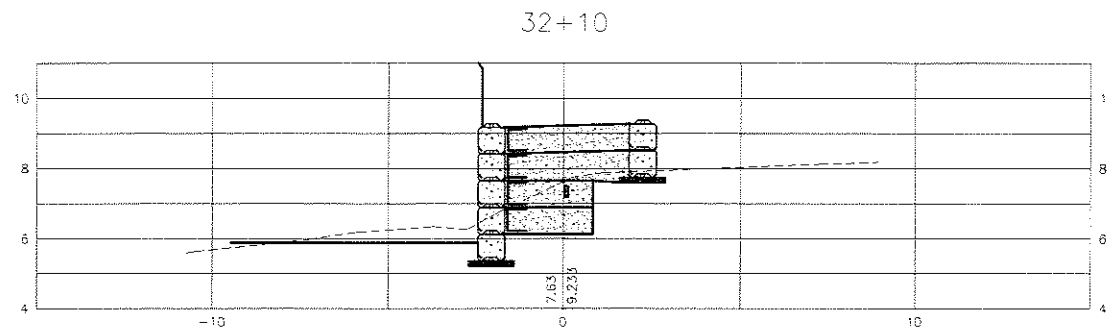
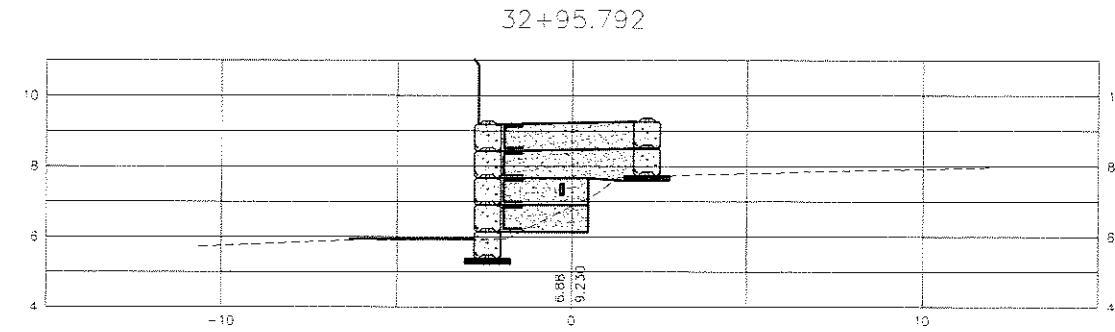
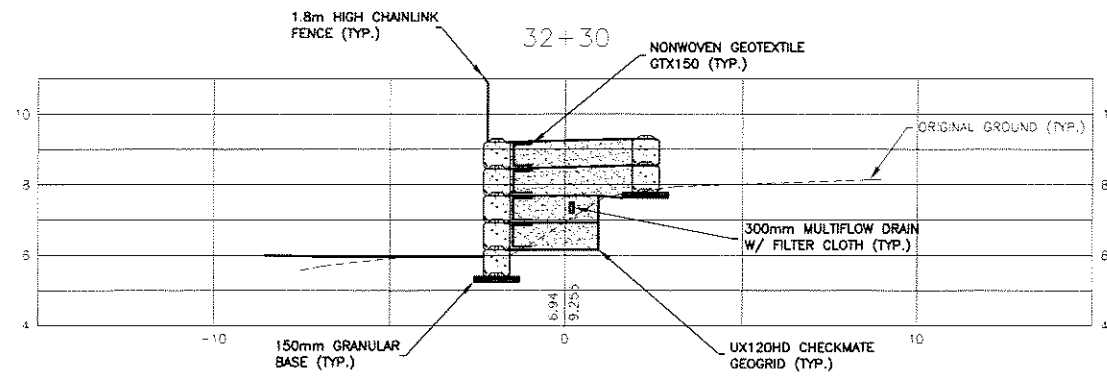
LOCATION FOR GAS, ELECTRICAL, TEL. & CABLE UTILITIES TO BE VERIFIED

NO.	DATE	BY	REVISIONS	TECH. ENG.
1.	JULY 2007	MR AS-BUILT		JL

DATE	2007 04 02	SURVEY JOB NO.	07-047
DRAWN	MR	SURVEYCREW	RB/RO/D&K
DESIGN	JL	HOR. SCALE	1 : 100
WORK ORDER NO.		VERT. SCALE	1 : 100



GRID NO. H7 SHEET NO. 7 OF 14 DRWG. NO. M-800
 JAMES TREATMENT PLANT
 5959 GLADWIN ROAD
 2007 MATSQUI DYKE UPGRADE - CROSS SECTIONS



T:\ddp\proj\4800\dwg\4800.dwg

LOCATION FOR GAS, ELECTRICAL, TEL. & CABLE UTILITIES TO BE VERIFIED

NO.	DATE	BY	REVISIONS	TECH. ENG.
1	JULY 2007	MR	AS-BUILT	JL

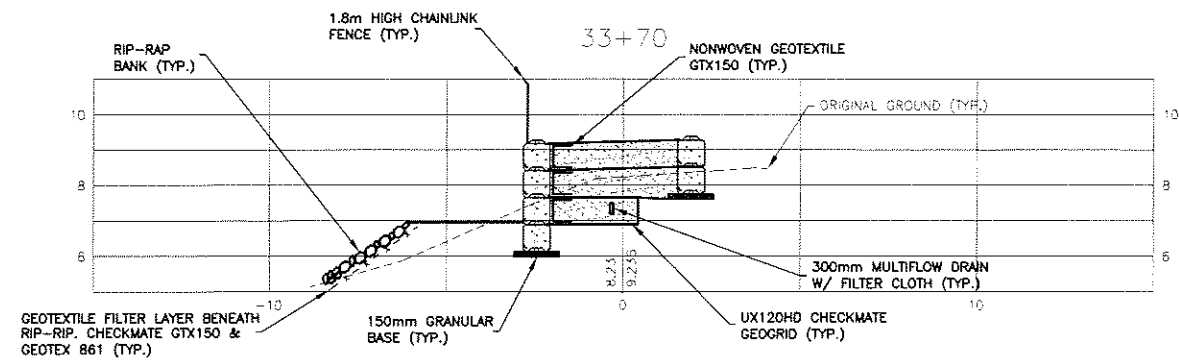
GOLDER ASSOCIATES LTD.
CITY OF ABBOTSFORD

DATE 2007 04 02
DRAWN MR
DESIGN JL
WORK ORDER NO.

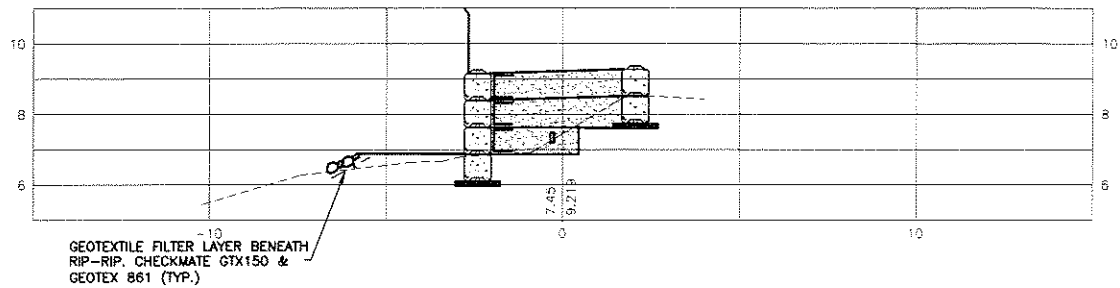
SURVEY JOB NO. 07-047
SURVEY CREW RB/RG/D&K
SCALE
HOR. 1 : 100
VERT. 1 : 100



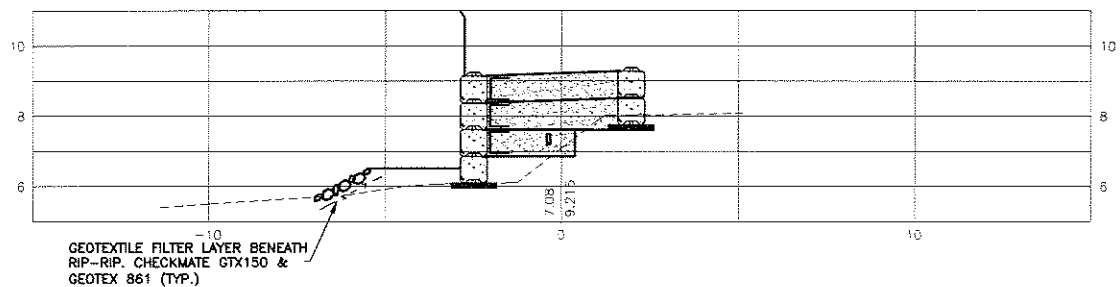
GRID NO. H7 SHEET NO. 8 OF 14 BRWG. NO. M-800
JAMES TREATMENT PLANT
5959 GLADWIN ROAD
2007 MATSQUI DYKE UPGRADE - CROSS SECTION



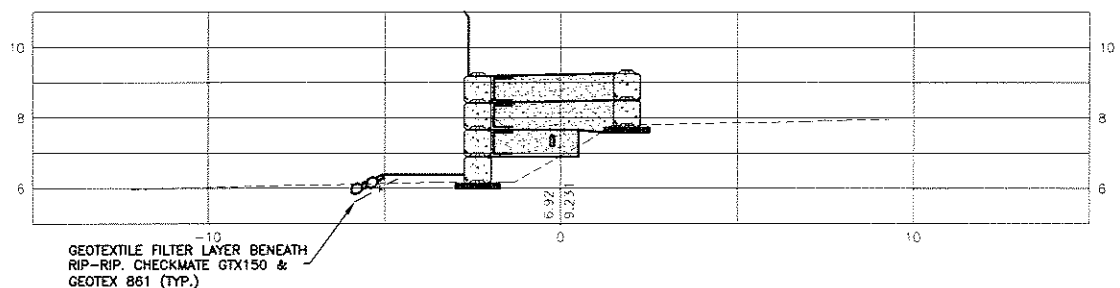
33+50



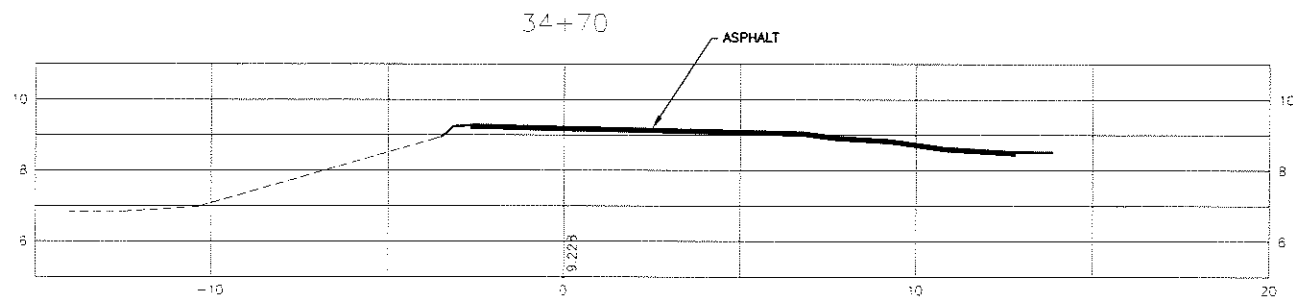
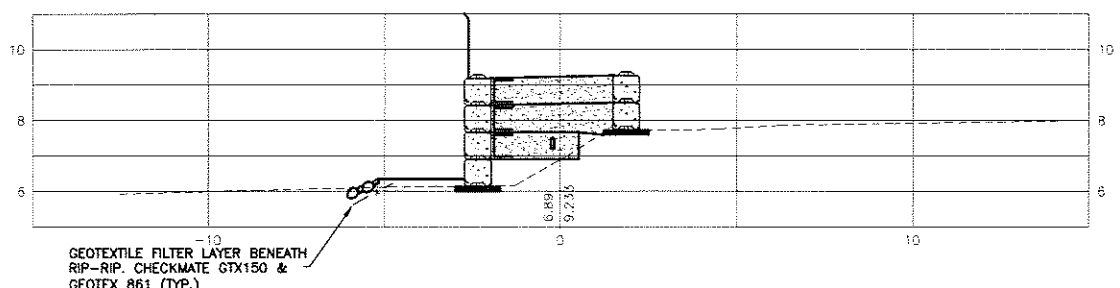
33+30



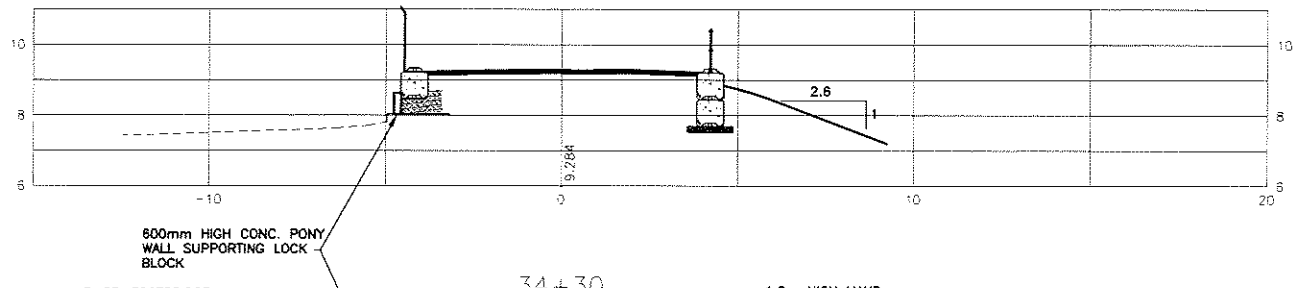
33+10



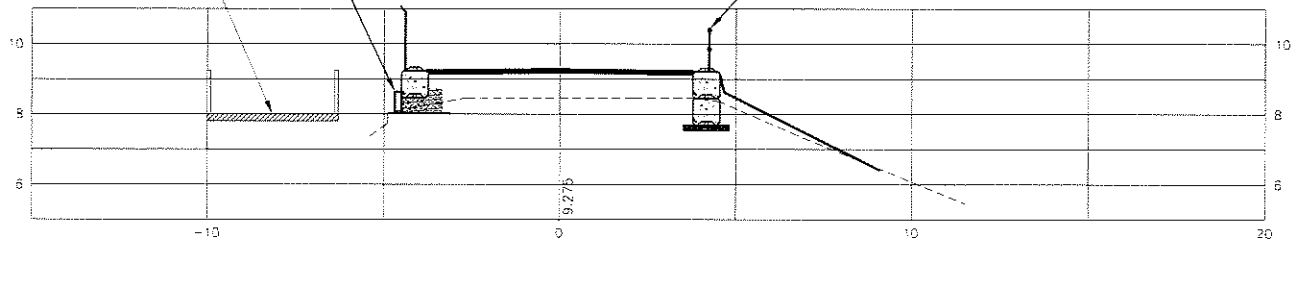
33+07.591



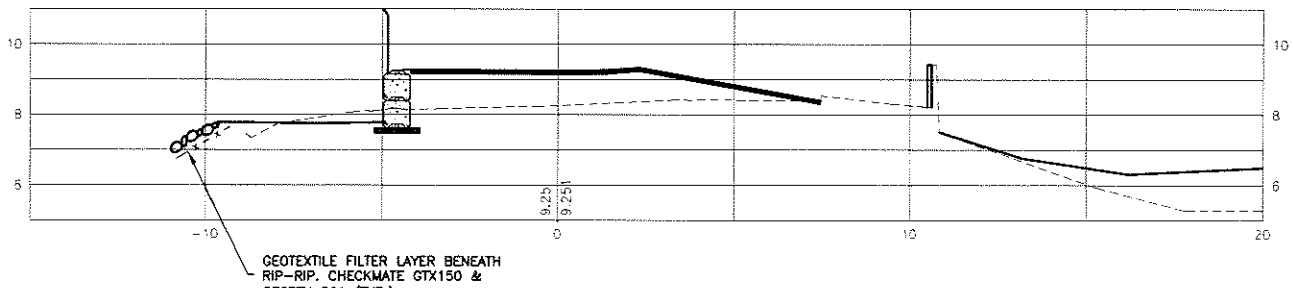
34+50



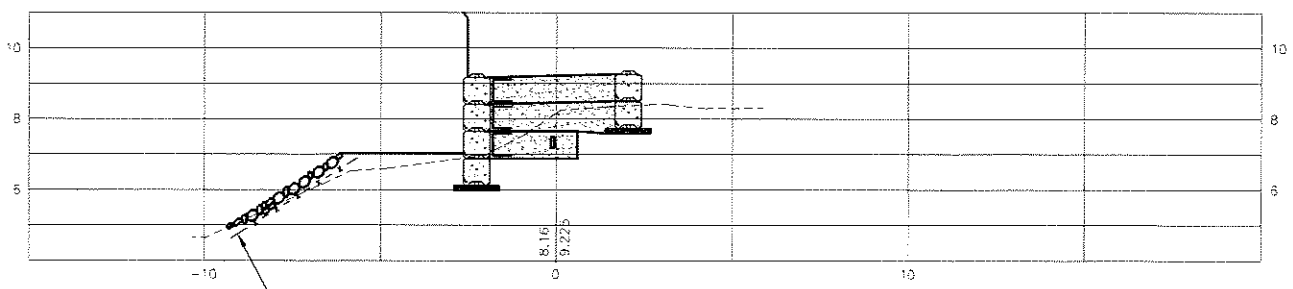
34+30



34+10



33+90



LOCATION FOR GAS, ELECTRICAL, TEL. & CABLE UTILITIES TO BE VERIFIED

NO.	DATE	BY	AS-BUILT	REVISIONS	TECH. ENG.
1	JULY 2007	MR	AS-BUILT		JL

GOLDER ASSOCIATES LTD.

CITY OF ABBOTSFORD

DATE 2007 04 02

SURVEY JOB NO. 07-047

DRAWN MR

SURVEYCREW RB/RG/D&K

DESIGN JL

SCALE

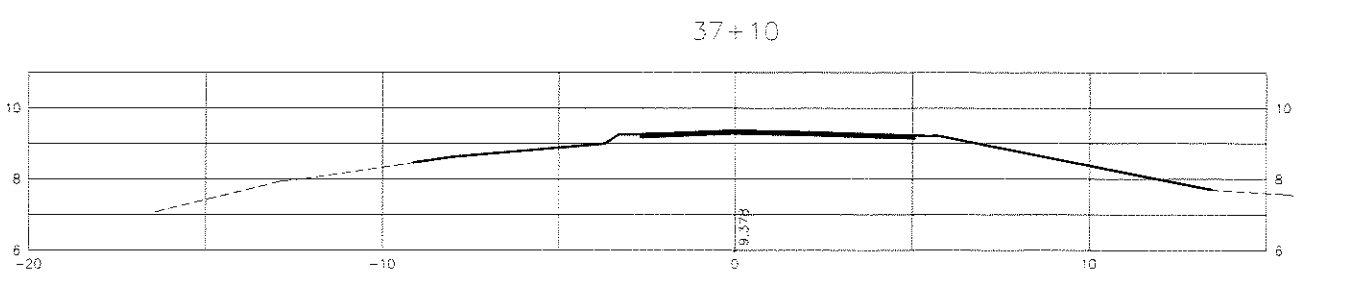
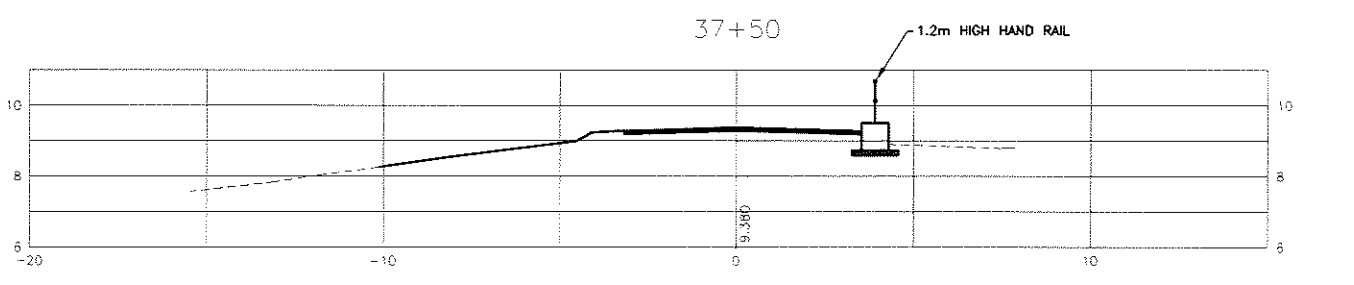
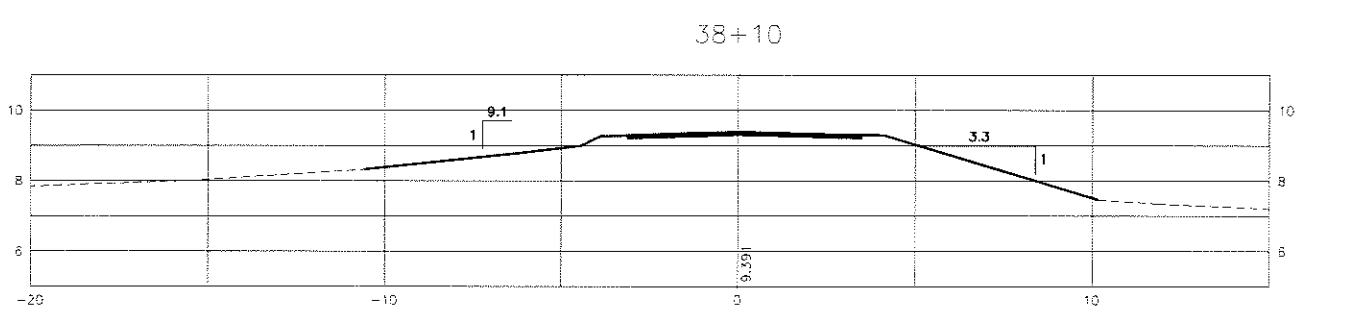
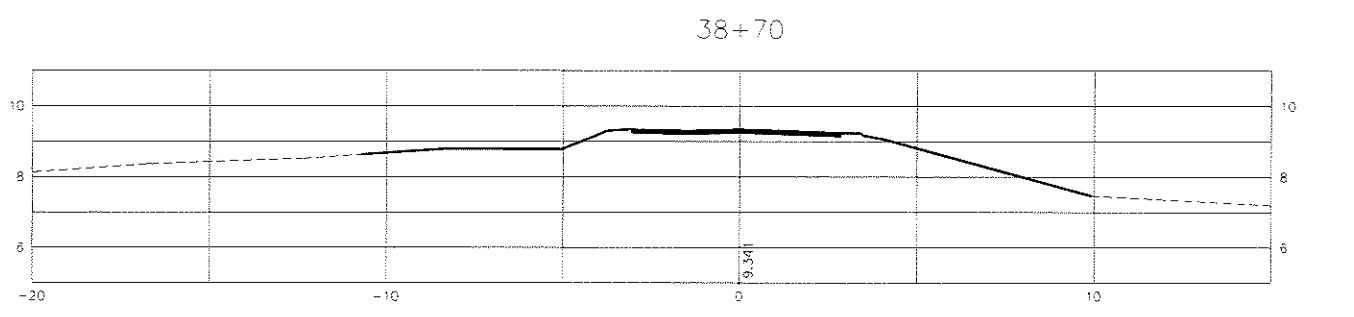
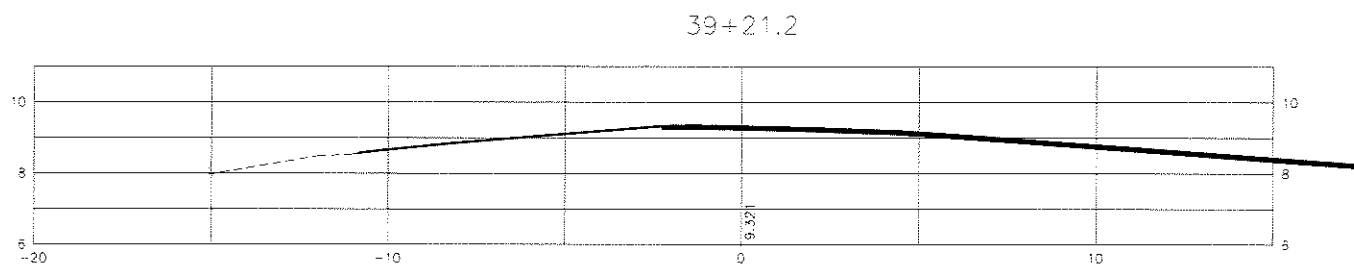
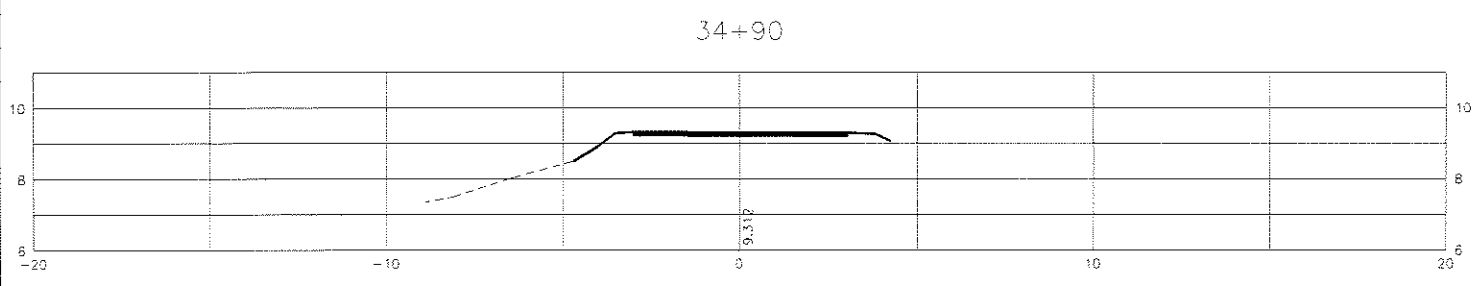
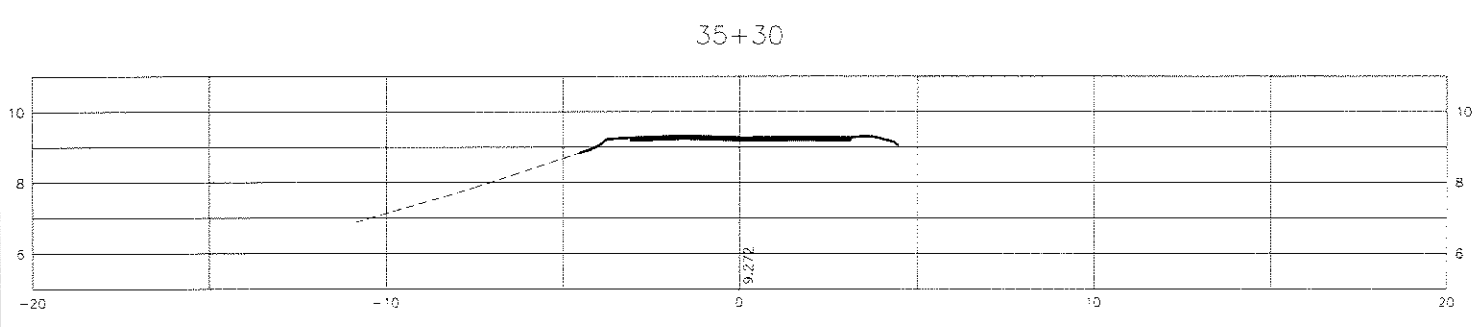
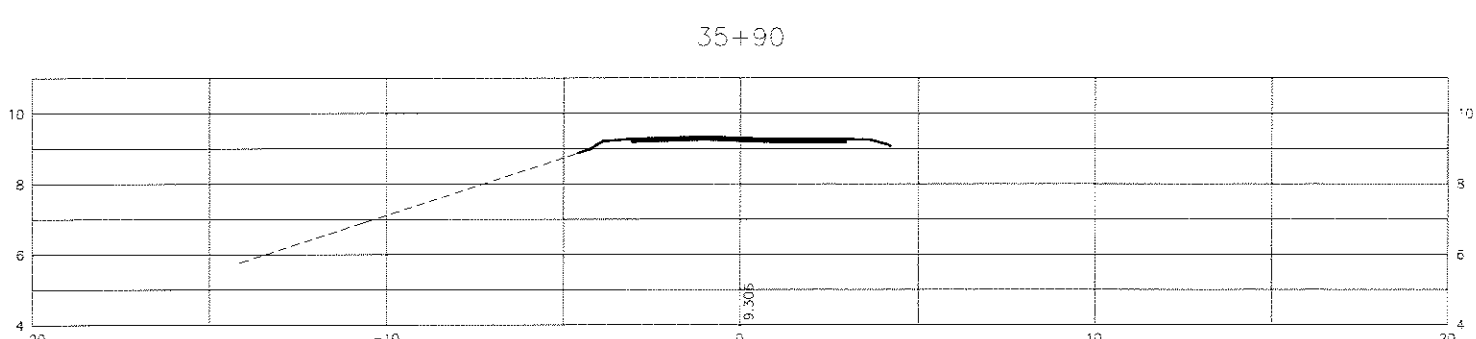
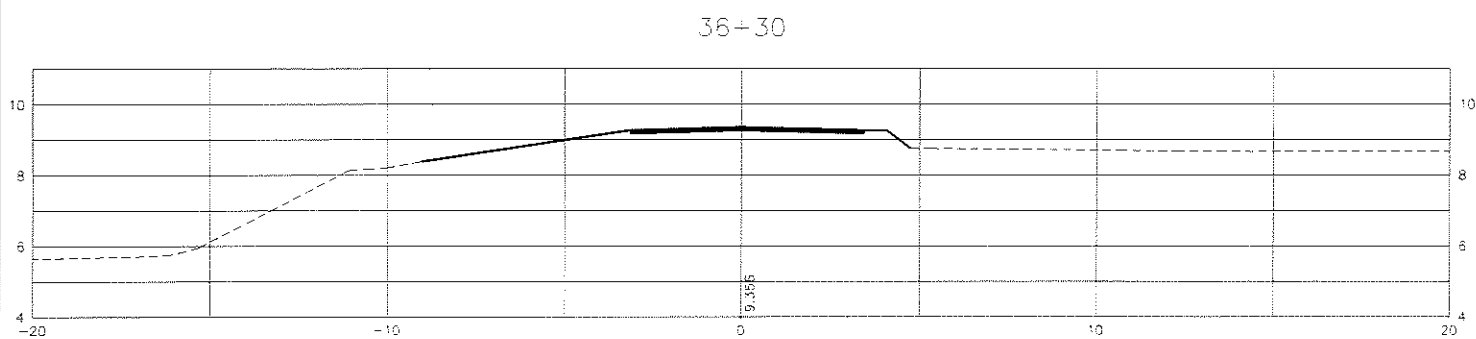
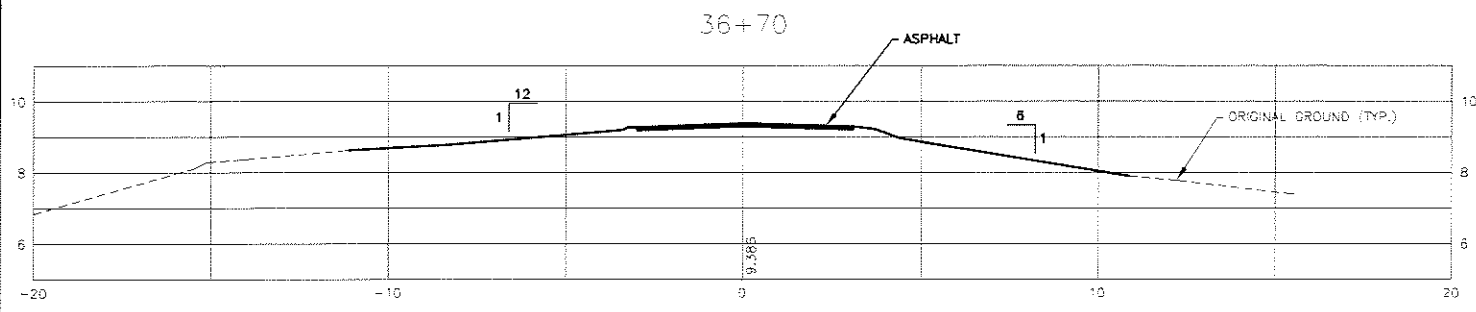
WORK ORDER NO.

HOR. 1 : 100
VERT. 1 : 100



GRID NO. H7 SHEET NO. 9 OF 14 DRWG. NO. M-800

JAMES TREATMENT PLANT
5959 GLADWIN ROAD
2007 MATSQUI DYKE UPGRADE - CROSS SECTION



T:\ADPROJ\140701\DWG\M800.dwg

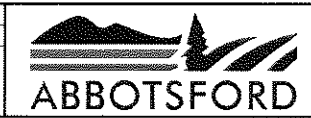
LOCATION FOR GAS, ELECTRICAL, TEL. & CABLE UTILITIES TO BE VERIFIED

NO.	DATE	BY	REVISIONS	TECH/ENGR
1.	JULY 2007	MR	AS-BUILT	JL

GOLDER ASSOCIATES LTD.
CITY OF ABBOTSFORD

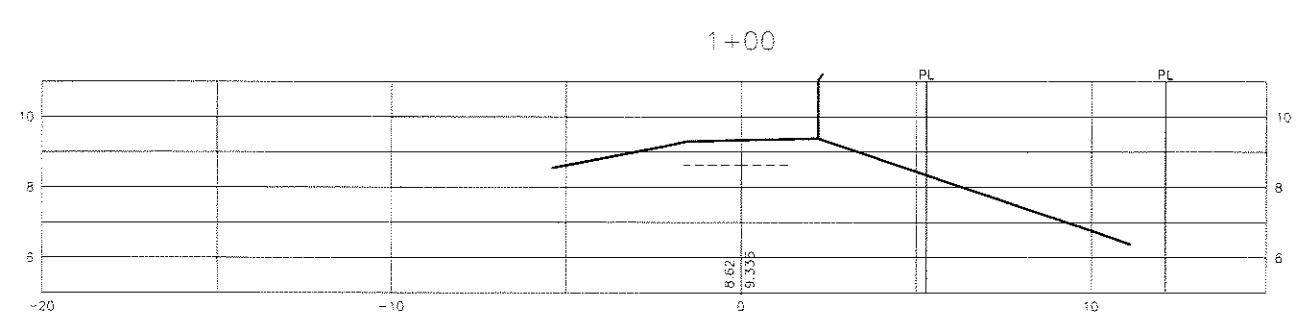
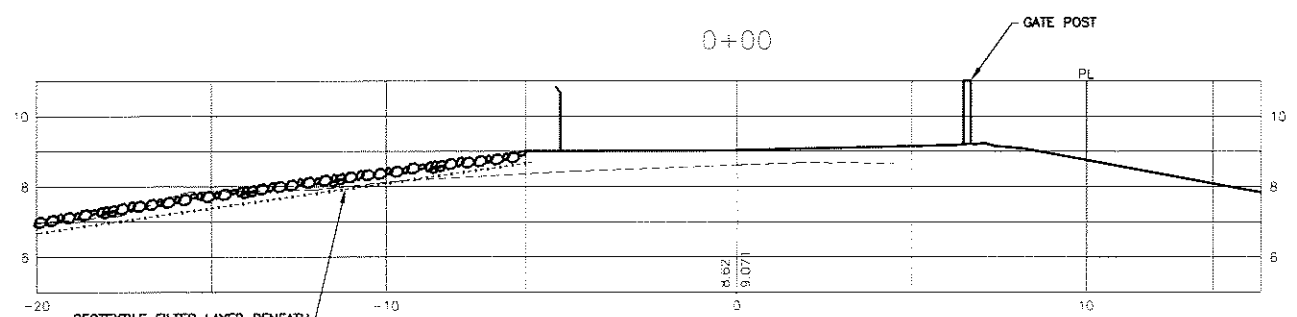
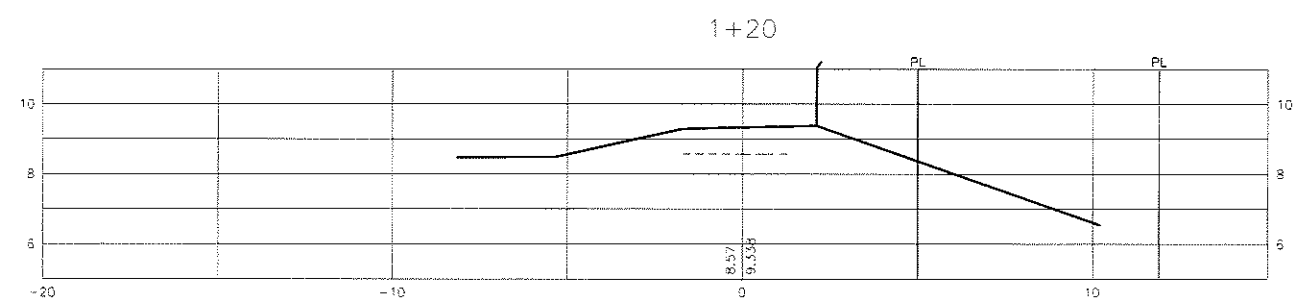
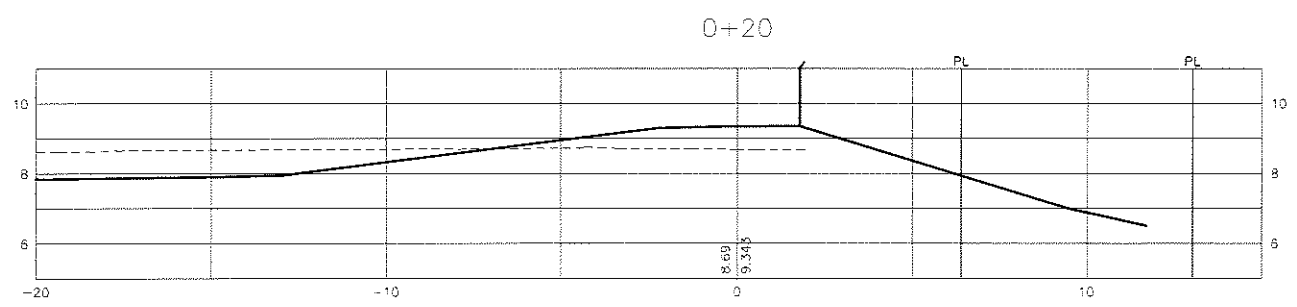
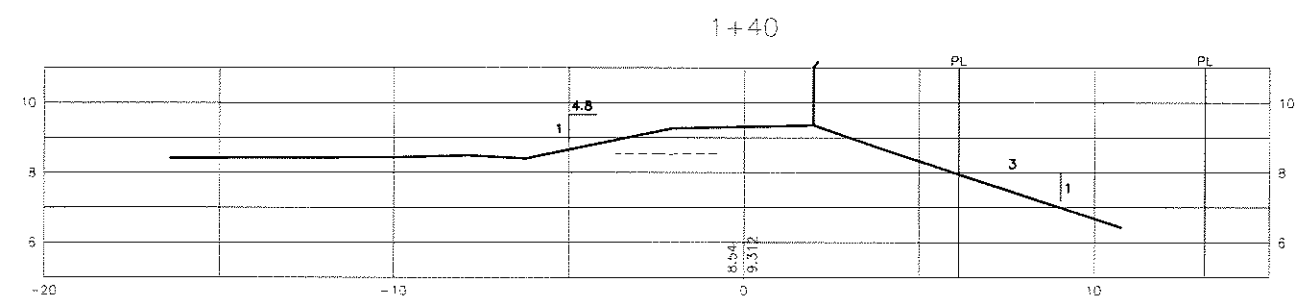
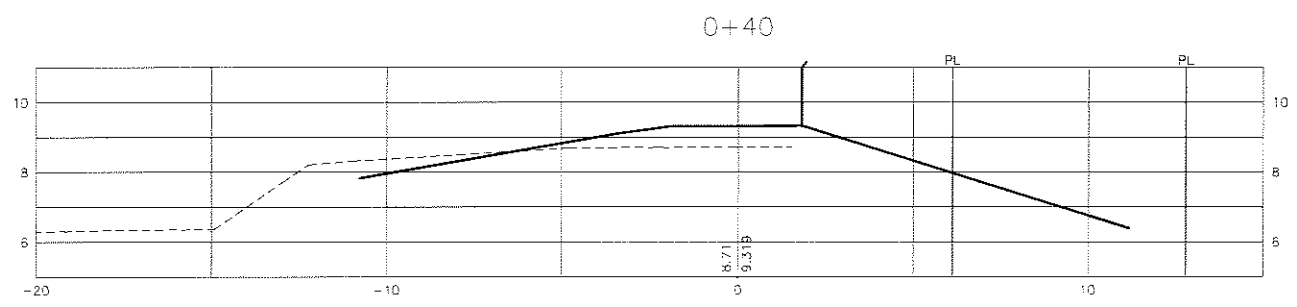
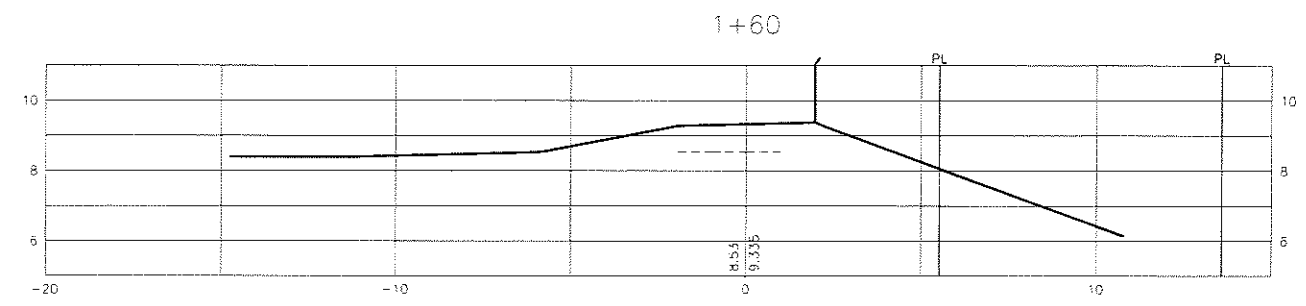
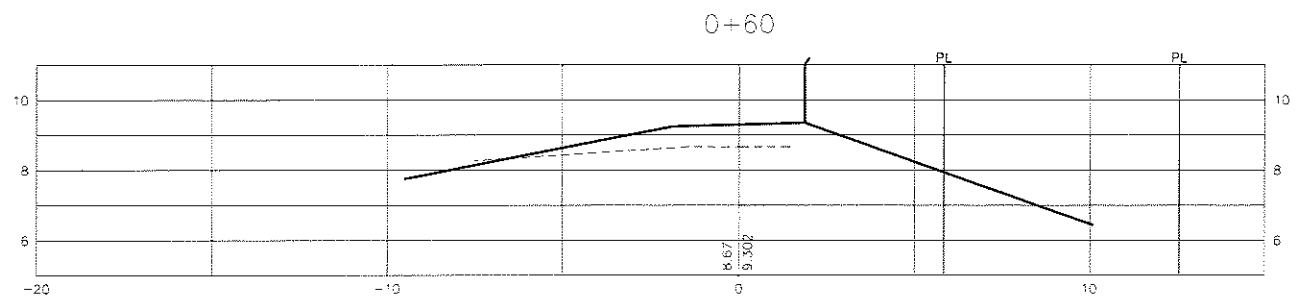
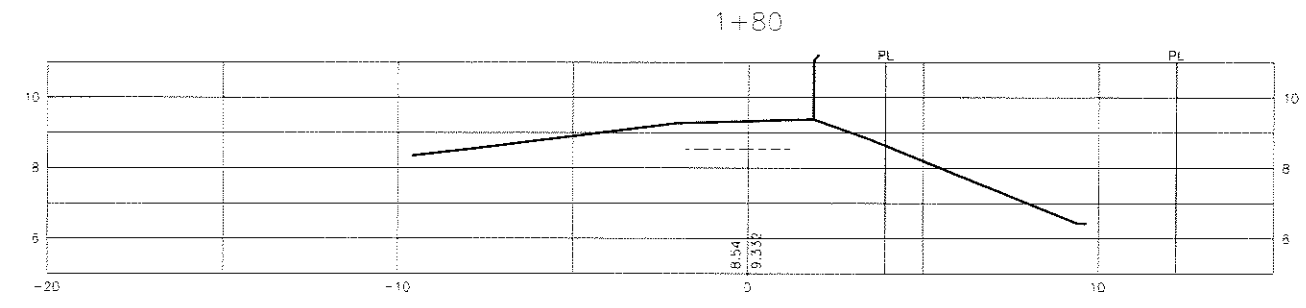
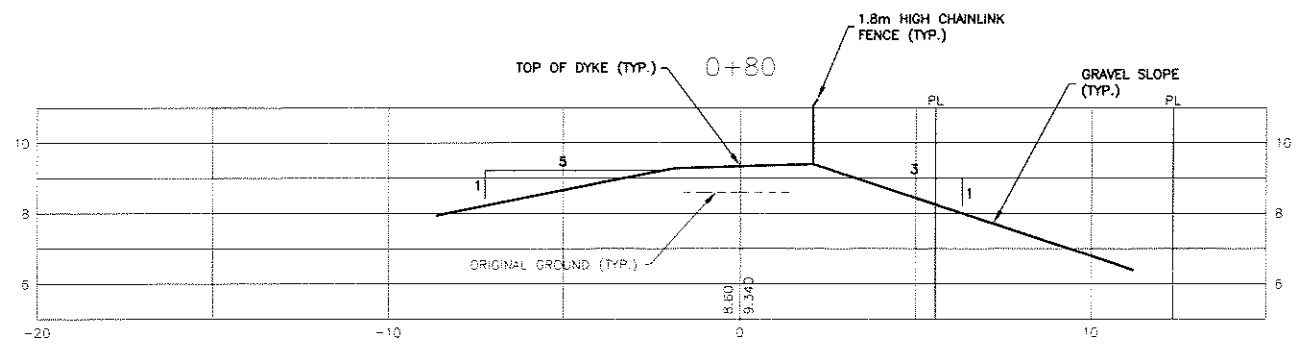
DATE 2007 04 02
DRAWN MR
DESIGN JL
WORK ORDER NO.

SURVEY JOB NO. 07-047
SURVEYCREW RB/RC/D&K
SCALE
HOR. 1 : 100
VERT. 1 : 100



GRID NO. H7 SHEET NO. 10 OF 14 DRWG. NO. M-800

JAMES TREATMENT PLANT
5959 GLADWIN ROAD
2007 MATSQUI DYKE UPGRADE - CROSS SECTION



GEOTEXTILE FILTER LAYER BENEATH
RIP-RIP, CHECKMATE GTX150 &
GEOTEX 861 (TYP.)

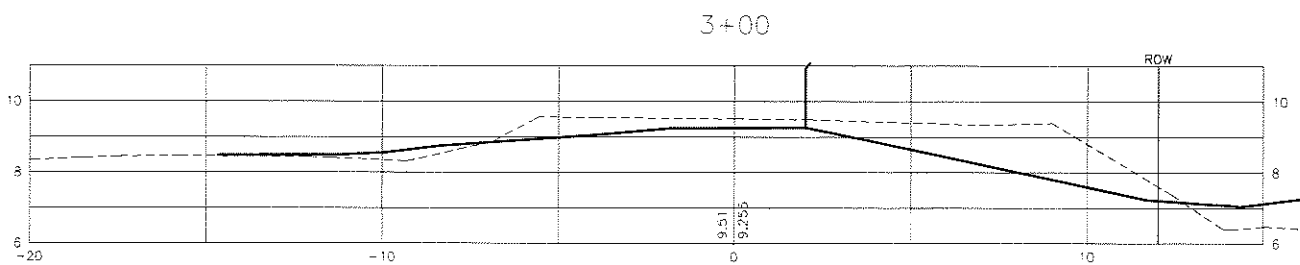
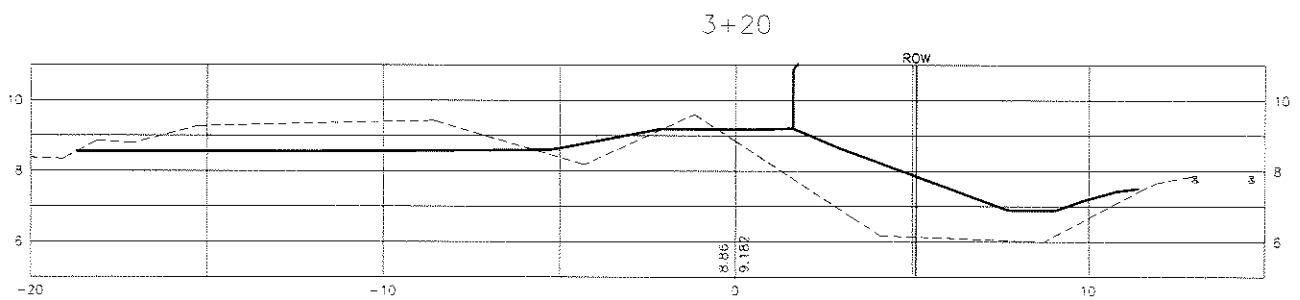
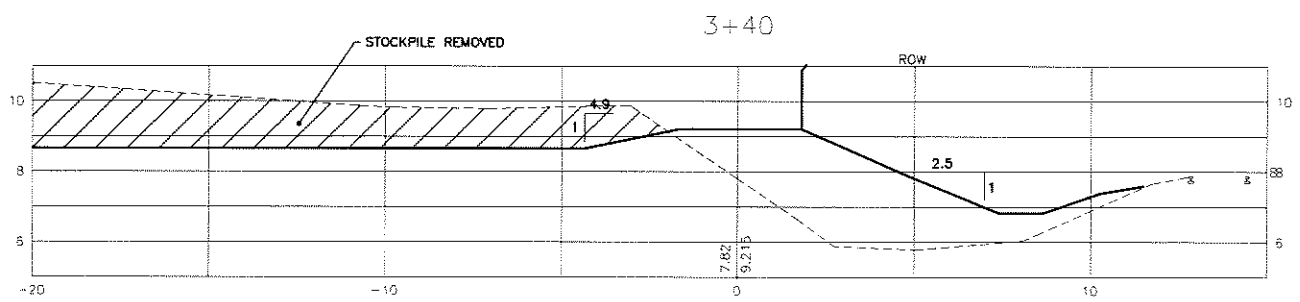
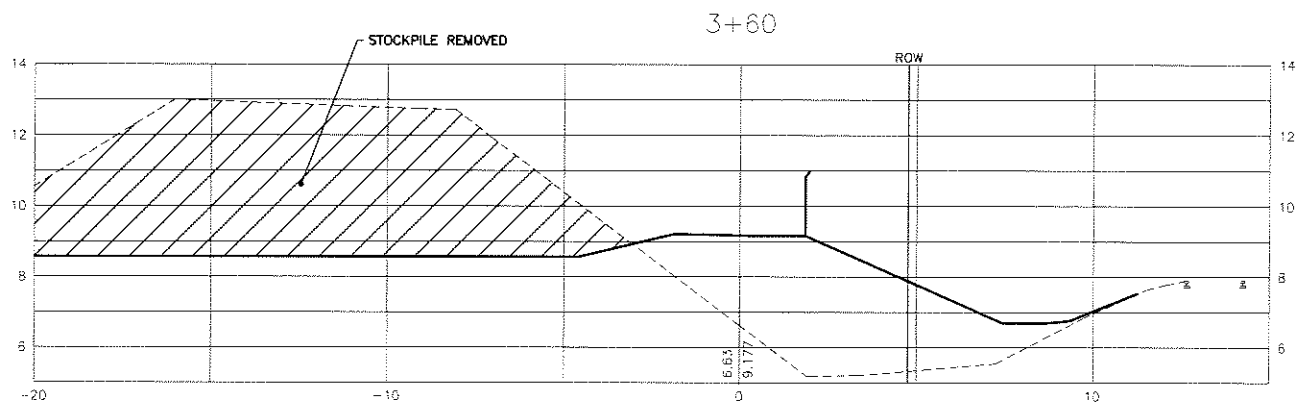
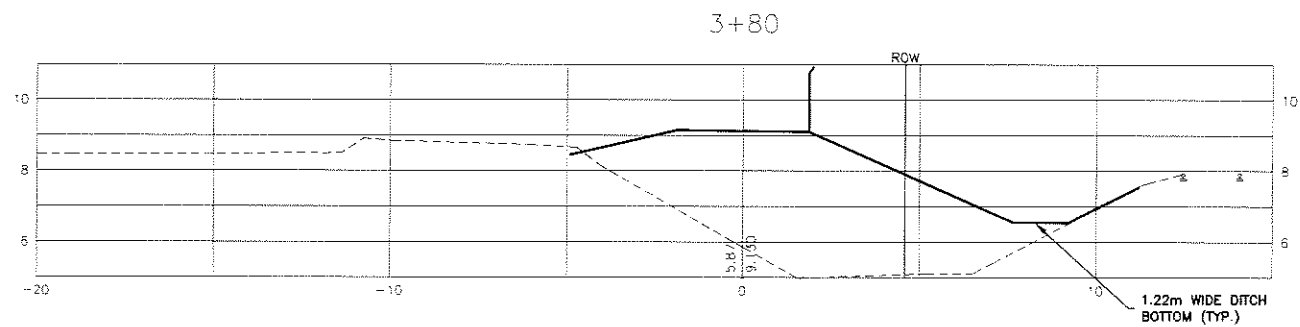
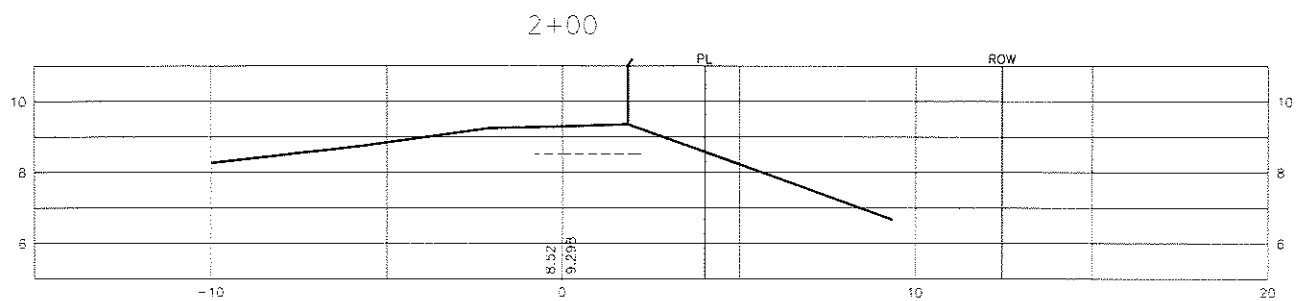
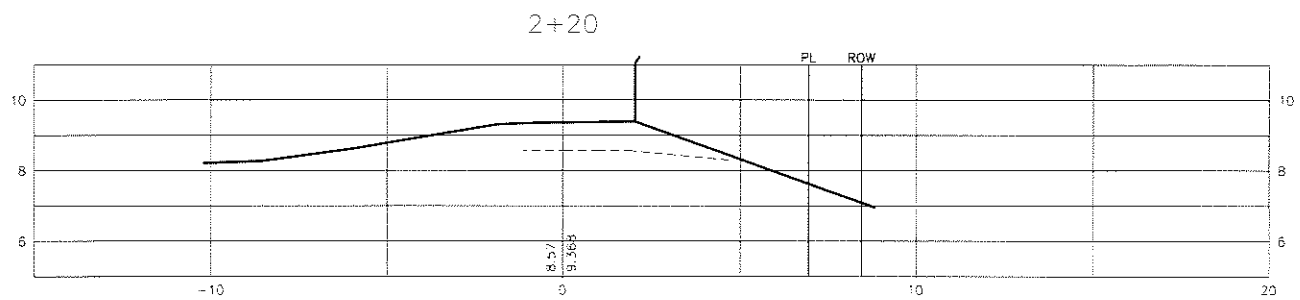
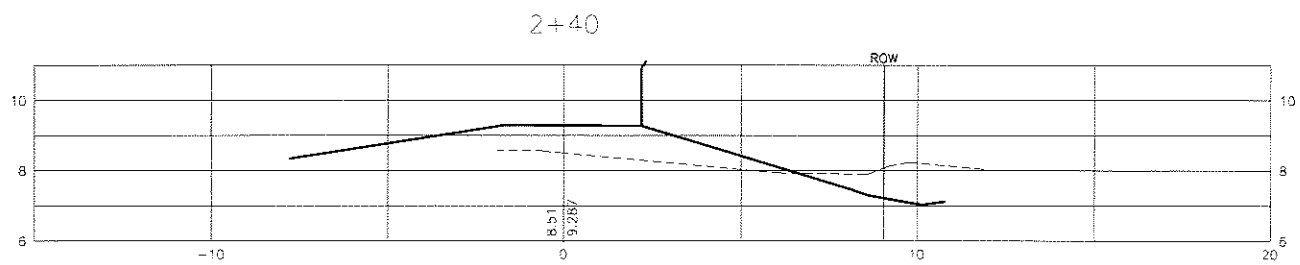
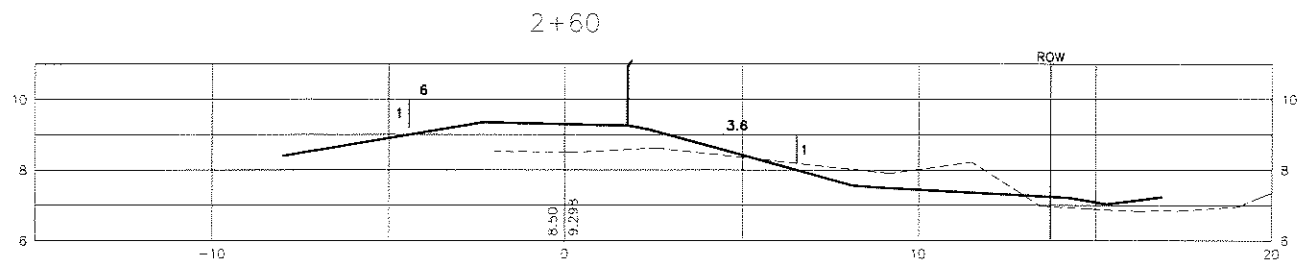
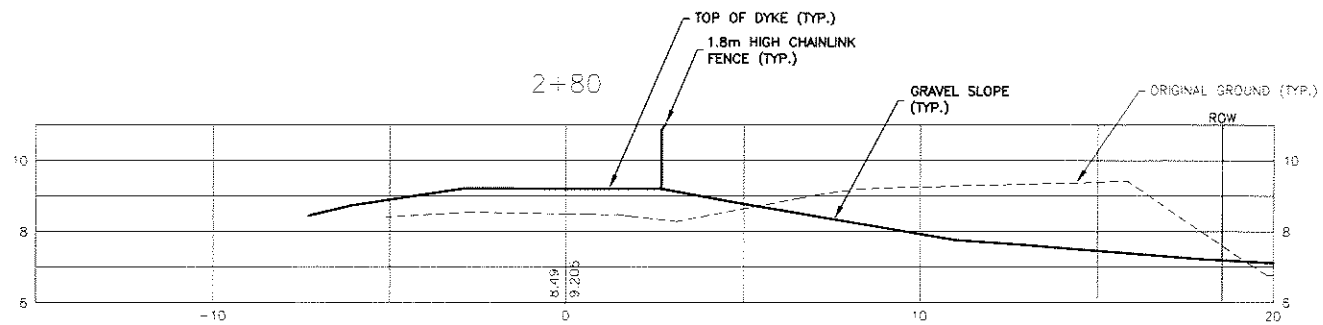
LOCATION FOR GAS, ELECTRICAL, TEL. & CABLE
UTILITIES TO BE VERIFIED

NO.	DATE	BY	REVISIONS	TECH. ENG.
1	JULY 2007	MR	AS-BUILT	JL

GOLDER ASSOCIATES LTD.	CITY OF ABBOTSFORD	DATE	2007 04 02	SURVEY JOB NO.	07-047
		DRAWN	MR	SURVEYCREW	RB/RG/D&K
		DESIGN	JL	SCALE	HOR. 1 : 100
		WORK ORDER NO.		VERT.	1 : 100



GRID NO. H7 SHEET NO. 11 OF 14 DRWG. NO. M-800
JAMES TREATMENT PLANT
 5959 GLADWIN ROAD
 2007 DYKE UPGRADE - SECONDARY DYKE



T:\ALDERFORD\5959\5959_M800.dwg

LOCATION FOR GAS, ELECTRICAL, TEL. & CABLE UTILITIES TO BE VERIFIED

NO.	DATE	BY	AS-BUILT	REVISIONS	TECH/ENG.
1.	JULY 2007	MR	AS-BUILT		JL

GOLDER ASSOCIATES LTD. CITY OF ABBOTSFORD

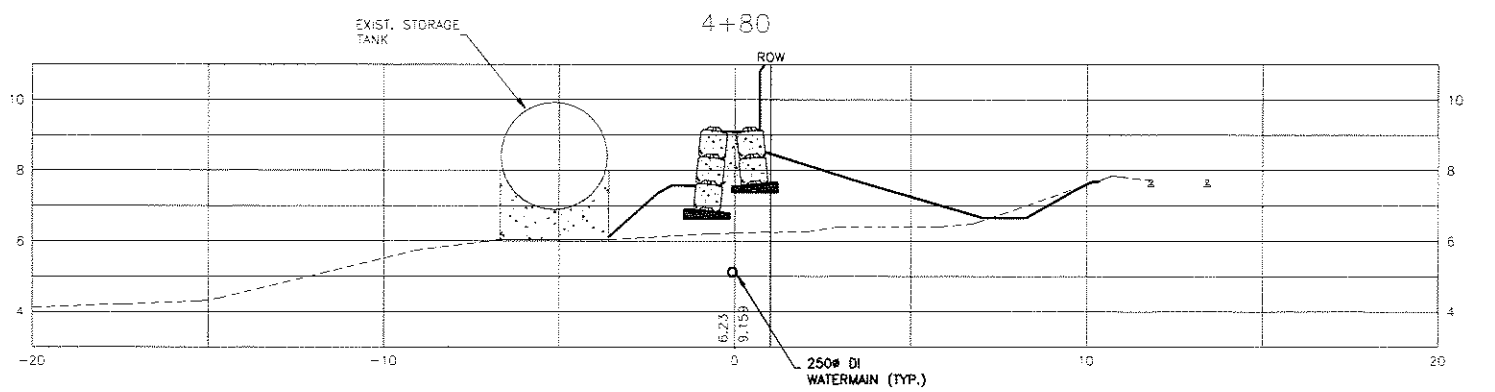
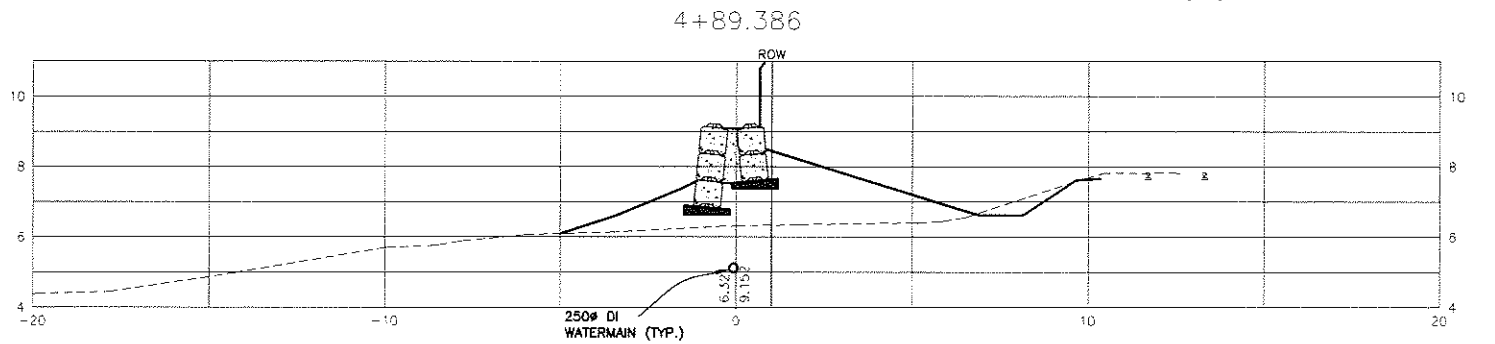
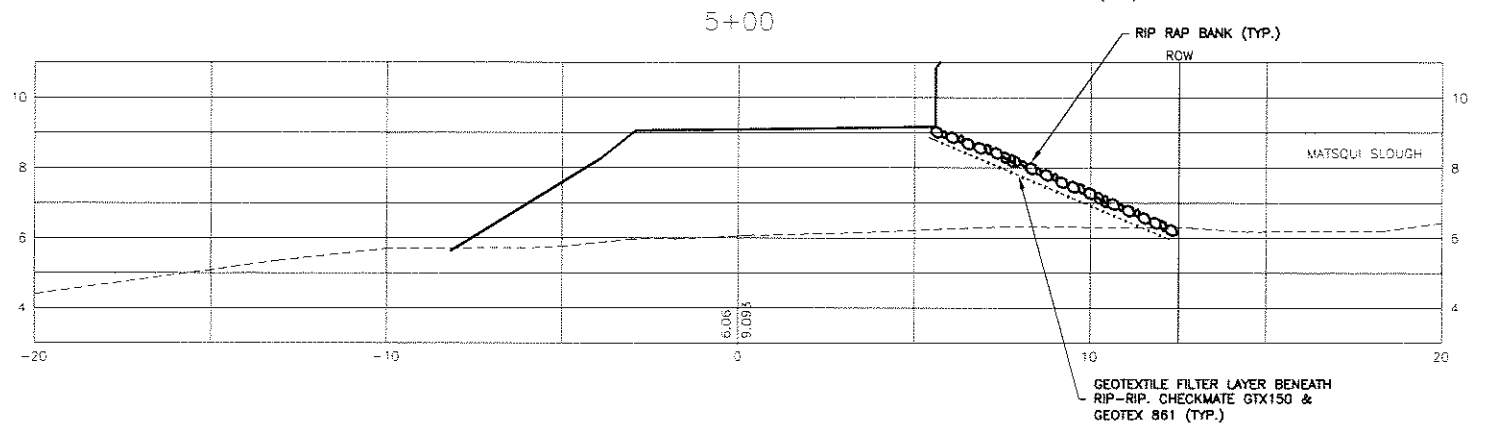
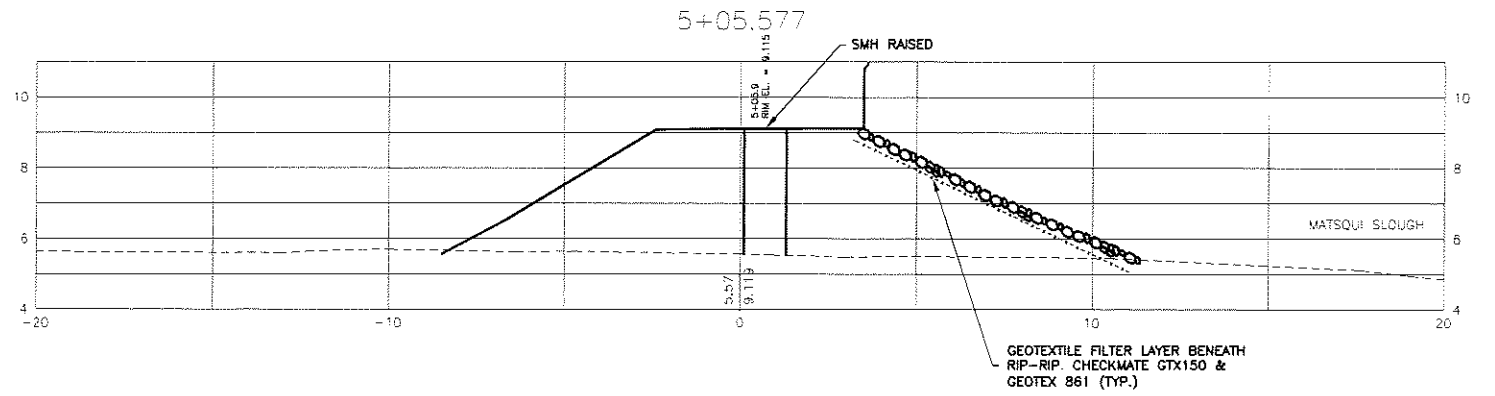
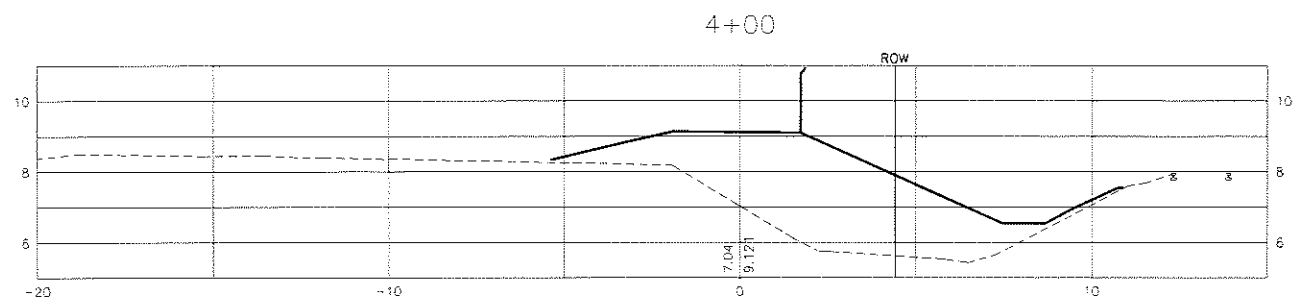
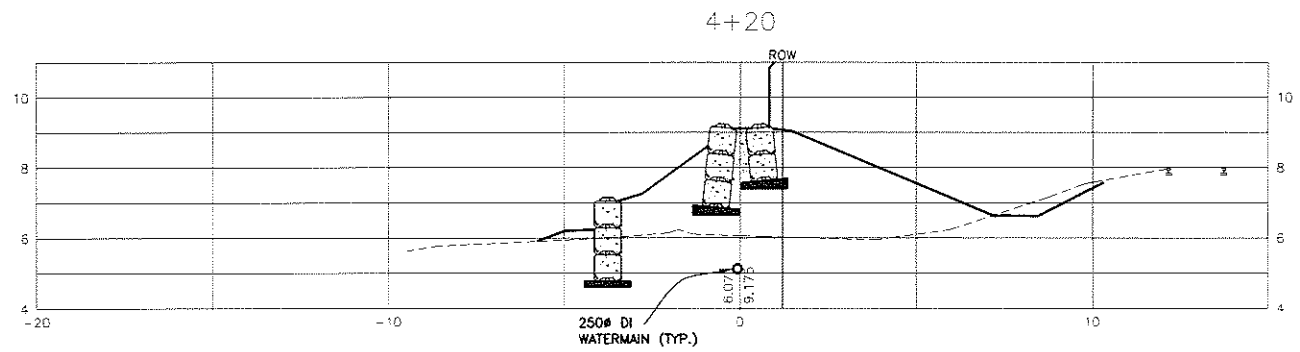
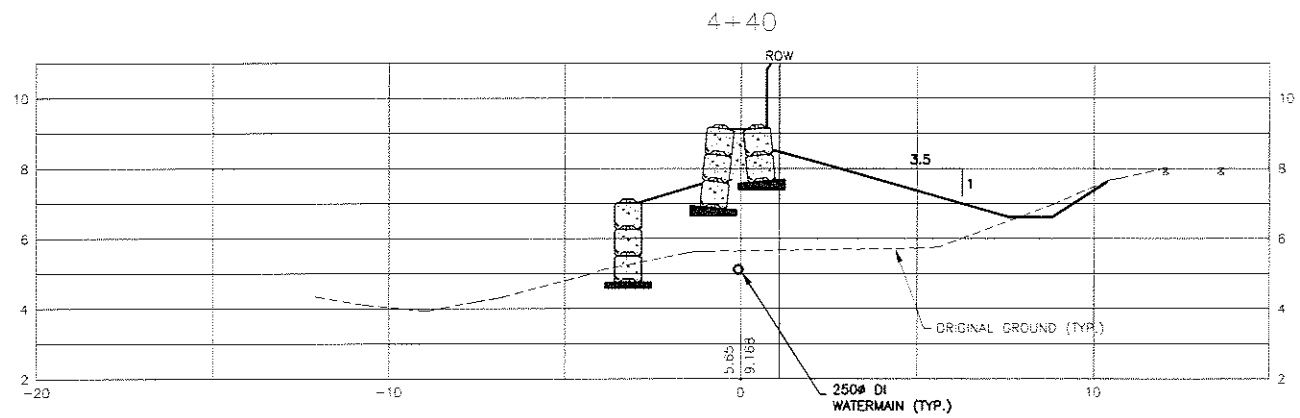
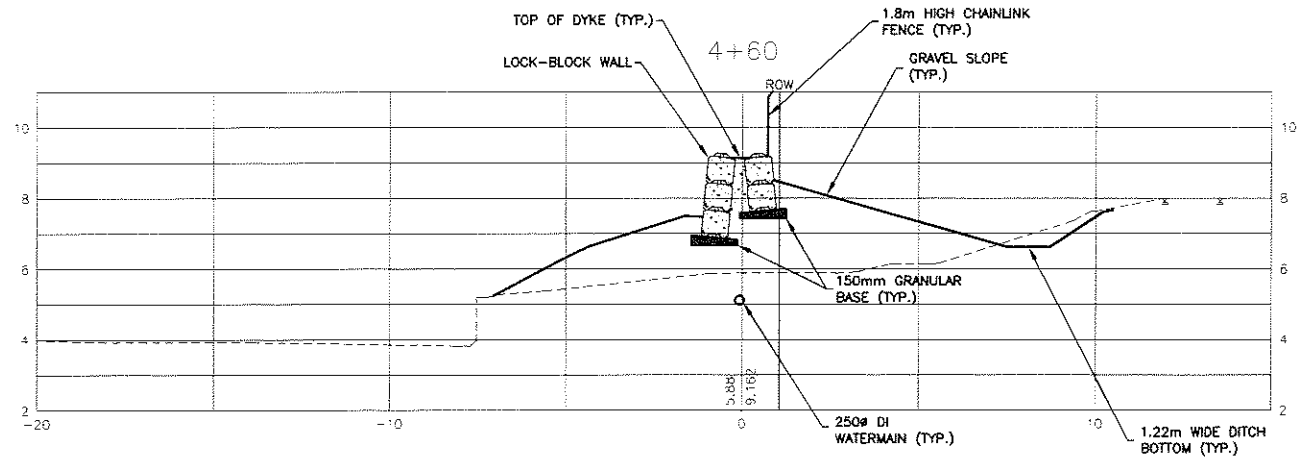
DATE 2007 04 02
 DRAWN MR
 DESIGN JL
 WORK ORDER NO.

SURVEY JOB NO. 07-047
 SURVEYCREW RB/RO/D&K
 SCALE
 HOR. 1 : 100
 VERT. 1 : 100



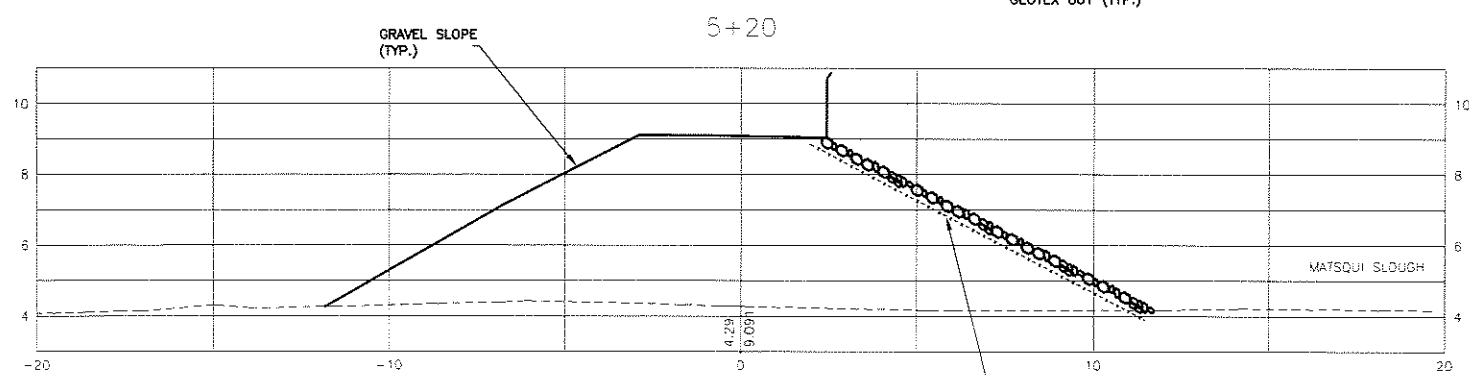
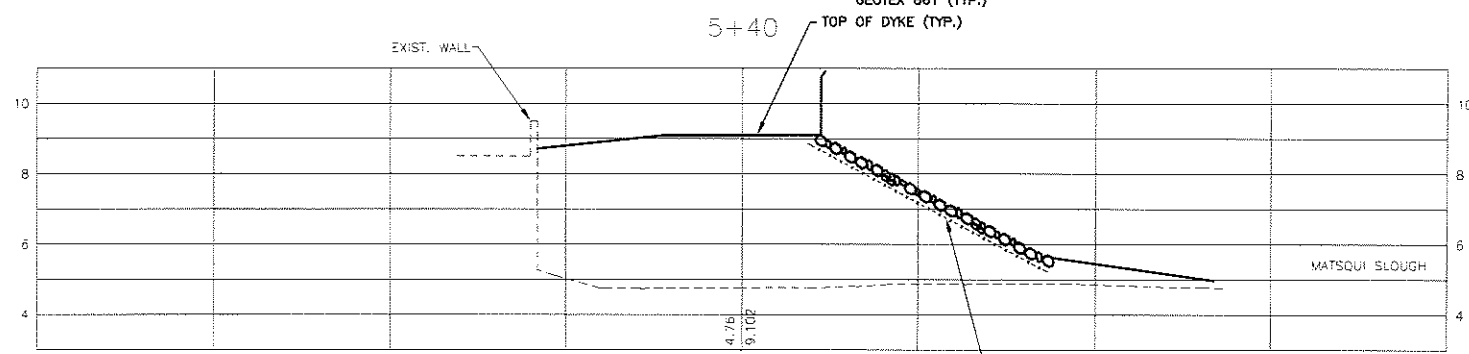
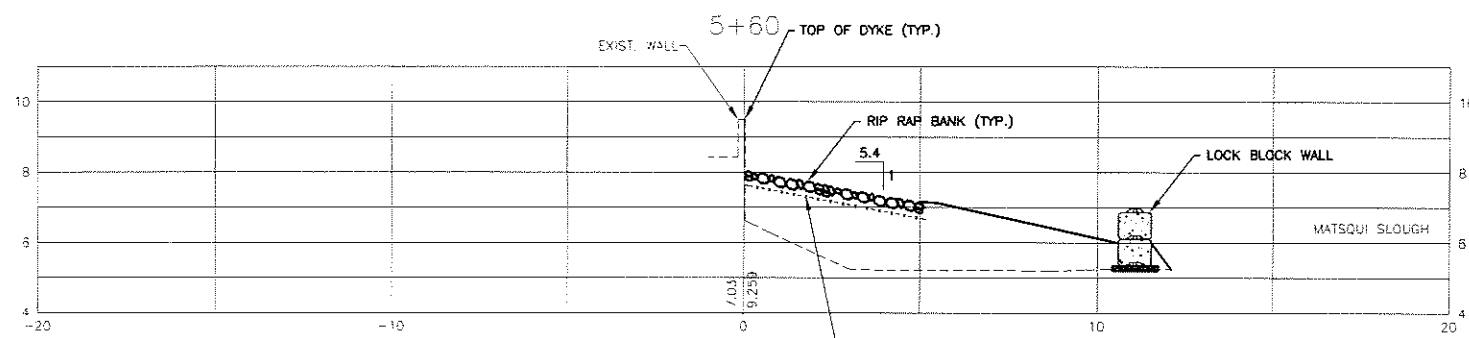
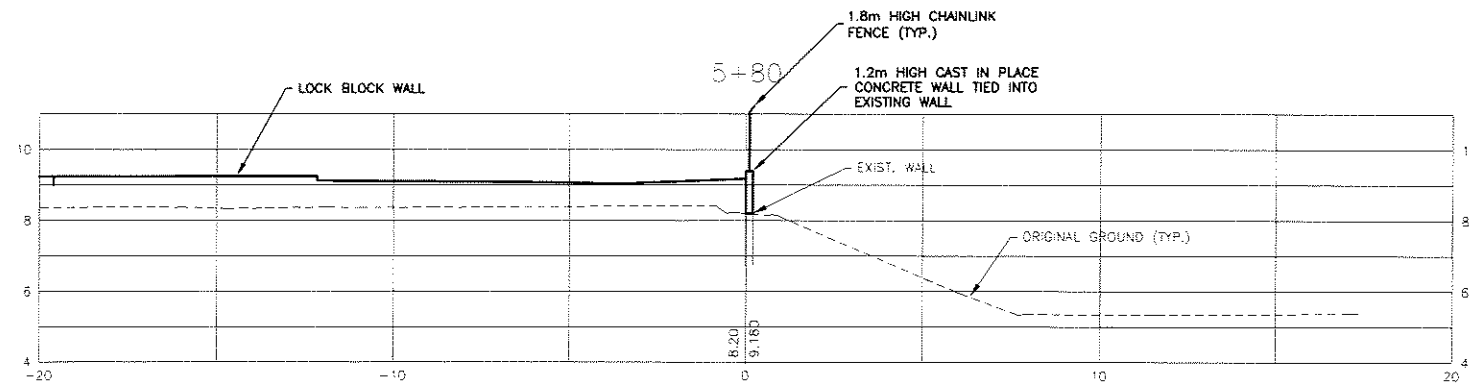
GRID NO. H7 SHEET NO. 12 OF 14 DRWG. NO. M-800

JAMES TREATMENT PLANT
 5959 GLADWIN ROAD
 2007 DYKE UPGRADE - SECONDARY DYKE



LOCATION FOR GAS, ELECTRICAL, TEL, & CABLE UTILITIES TO BE VERIFIED	1. JULY 2007 MR AS-BUILT		GOLDER ASSOCIATES LTD. CITY OF ABBOTSFORD	DATE 2007 04 02	SURVEY JOB NO. 07-047
	NO. DATE BY REVISIONS TECH. ENG.	DRAWN MR		SURVEYCREW RB/RG/D&K	SCALE
			HORIZONTAL SCALE 1 : 100		
			VERTICAL SCALE 1 : 100	JAMES TREATMENT PLANT 5959 GLADWIN ROAD 2007 DYKE UPGRADE - SECONDARY DYKE	

GRID NO. H7 SHEET NO. 13 OF 14 DRWG. NO. M-800



LOCATION FOR GAS, ELECTRICAL, TEL, & CABLE UTILITIES TO BE VERIFIED

NO.	DATE	BY	REVISIONS	TECH. ENG.
1.	JULY 2007	MR AS-BULT		JL

GOLDER ASSOCIATES LTD.
CITY OF ABBOTSFORD

DATE 2007 04 02
DRAWN MR
DESIGN JL
WORK ORDER NO.

SURVEY JOB NO. 07-047
SURVEYCREW RB/RG/D&K
SCALE
HOR. 1 : 100
VERT. 1 : 100



GRID NO. 77 SHEET NO. 14 OF 14 DRWG. NO. M-800

JAMES TREATMENT PLANT
5959 GLADWIN ROAD
2007 DYKE UPGRADE - SECONDARY DYKE