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**260**

**DA5**

Projet minier aurifère Canadian Malartic

MRC La Vallée-de-l'Or

6211-08-005

## **Review Report**

### **Plan de Déposition – Parc à Résidus**

### **Osisko Canadian Malartic Project**

**November 2008**

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Osisko Exploration  
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November 24, 2008

**Attn:** Paul Johnson, Ing.  
Manager, Mining

**Re — Peer Review – Canadian Malartic Project  
Plan de Déposition – Parc à Résidus**

Dear Mr. Johnson.

**1.0 Introduction**

Further to your request I have reviewed the report "Plan de Déposition, Parc à Résidus de la Mine Canadian Malartic, Revision 1," by Golder Associates. I was also provided with four figures from an earlier Golder Report – figures X-1, X-2, X-3 and X-4, which are attached.

**2.0 Design Concept by Golder**

The preliminary plan envisions depositing tailings thickened to 68% solids. At this thickness the tailings flow to a steeper angle than typical tailings.

To develop an overall downstream slope of 10% it is proposed to construct intermediate dikes of waste rock. See figure X-4. The waste rock dikes of non-acid-generating waste rock will be 4 metres high with a 5.0m wide berm. Thickened tailings will be deposited from several different discharge locations,

Collection and diversion ditches for the overflow water and seepage will be developed outside the lowest waste rock dikes.

The design has been developed using Wallace Software from the Wruffware Company as well as the Surpac program as a visualization tool. The topography and volumes have been provided by Osisko. The surface topography is based on a grid of 20 x 20m. The height of the waste rock retaining dikes will be 4m.

The waste rock dump will be raised in advance of the tailings pile. The tailing storage will encroach on the original tailings pond and sedimentation basin. At this time no geotechnical evaluation to assess the shear strength, stability or consolidation characteristics has been performed to assess foundation conditions for the proposed tailings storage. This is required.

Water displaced by the tailings storage will be deposited in the new polishing pond. Water freed from the tailings and run-off water will be collected in a system of collector ditches. A peripheral ditch will be constructed and will drain into the polishing pond.

On mine closure, the surface of the exposed tailings will be progressively covered with 5m of mine waste rock from the waste dump.

### **3.0 Confirmation of Design Hypothesis**

During active mining the following stages can be carried out to confirm the design hypothesis:

- Develop a test program on site at the start-up of the plant to verify the hypothesis of development – slopes, density in place, performance of the deposition system and other parameters as well as developing the model to reality. The verification is usually done by performing detailed field surveys to compare the results with the model. Necessary adjustments are then made to the model and the performance of site drainage can be verified if required.
- The stability of the entire pile must be verified to conform to the numerical model and the hypotheses that have been used in the preliminary design.

### **4.0 Further Geotechnical and Design Considerations**

There are several important design and construction issues that need to be addressed to confirm the proposed design model. These include the following:

#### **4.1 Tailings Properties**

- a) Determination of the gradation and engineering properties of the tailings. Engineering properties to include moisture-density relationship, shear strength and consolidation characteristics.
- b) Permeability and drainage characteristics. Consideration of dump under-drainage. Will the tailings flow into voids of the waste rock pile?

- c) Surface slope angle of the tailings for various flow rates.
- d) Trafficability for various types of construction equipment.

#### 4.2 Stability of the tailings pile

- a) Adequacy of the old tailings pond and sedimentation ponds as foundations.
- b) Seismic stability – earthquake and blasting.

#### 4.3 Waste rock dike

- a) Compatibility of tailing gradation with dike rock gradation. Require a filter cloth?
- b) Constructability - equipment and procedure.

#### 4.4 Influence of Climate

- a) Summer conditions – heavy rainfall, high winds (dust)
- b) Winter conditions – frost heave, spring thaw effects.

### 5.0 Review

When the design reaches a final draft I would be available to provide a report review.

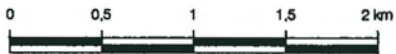


C. O. Brawner, P. Eng.  
FCAE, FEIC, FCIM



Date:	2008-10-08	Scale:	1 : 40 000
Drawn by:	R. Gravel	Planned by:	C. Pednault
Checked by:	M. Kissiova	Approved by:	M. R. Julien
Drawing no.:	0712210028-3600-01	Project no.:	07-1221-0028

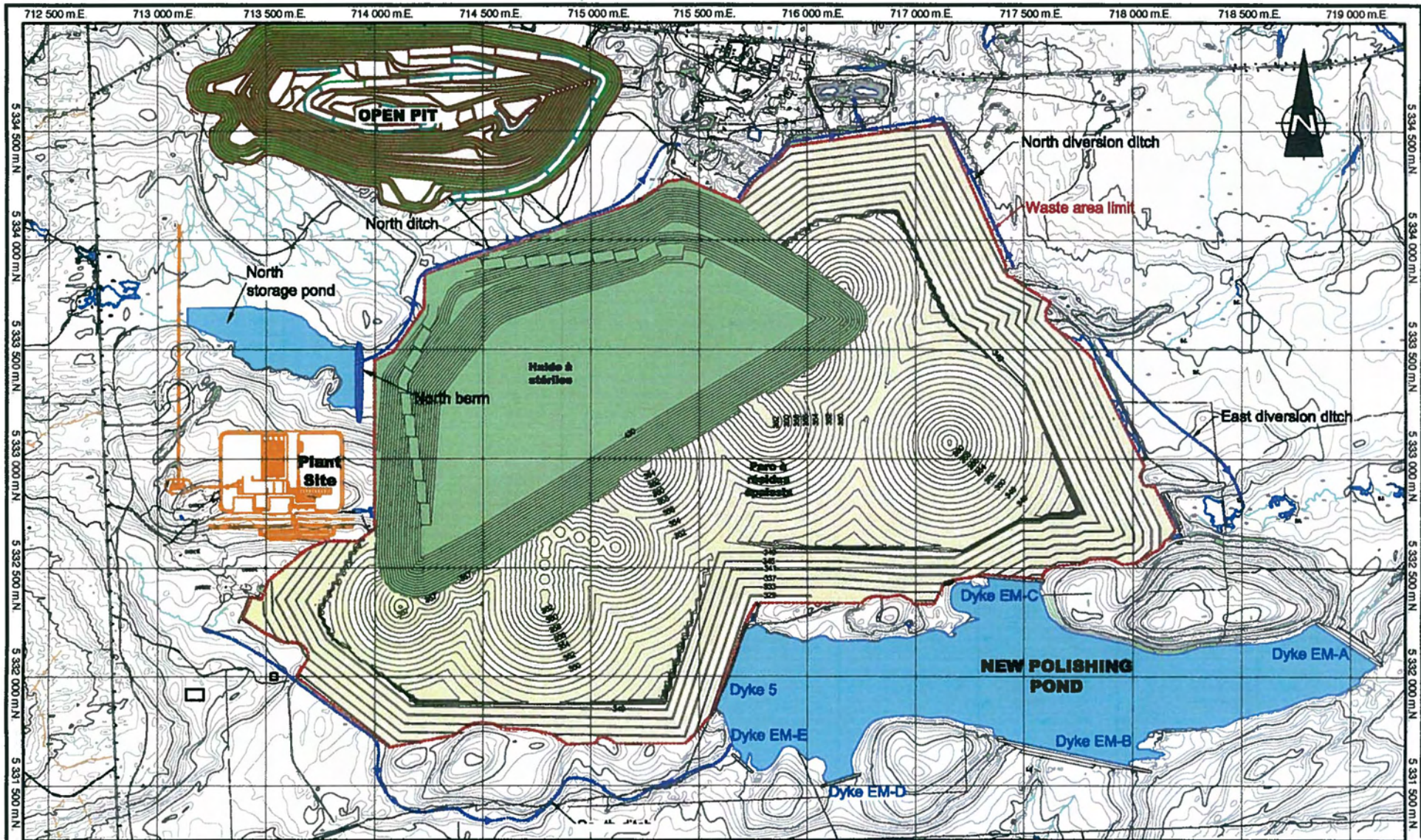

<b>FEASIBILITY STUDY</b> <b>CANADIAN MALARTIC PROJECT, MALARTIC, QUÉBEC</b>



	<b>Golder Associates</b> 9200, l'Acadie Blvd., Suite 10 Montréal (Québec) H4N 2T2 Tel.: (514) 383-0990 Fax: (514) 383-5332
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GENERAL VIEW

FIGURE  
**X.1**



Date:	2008-10-08	Scale:	1 : 25 000
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Checked by:	M. Kissiova	Approved by:	M. R. Julien
Drawing no:	0712210028-3600-02	Project no:	07-1221-0028

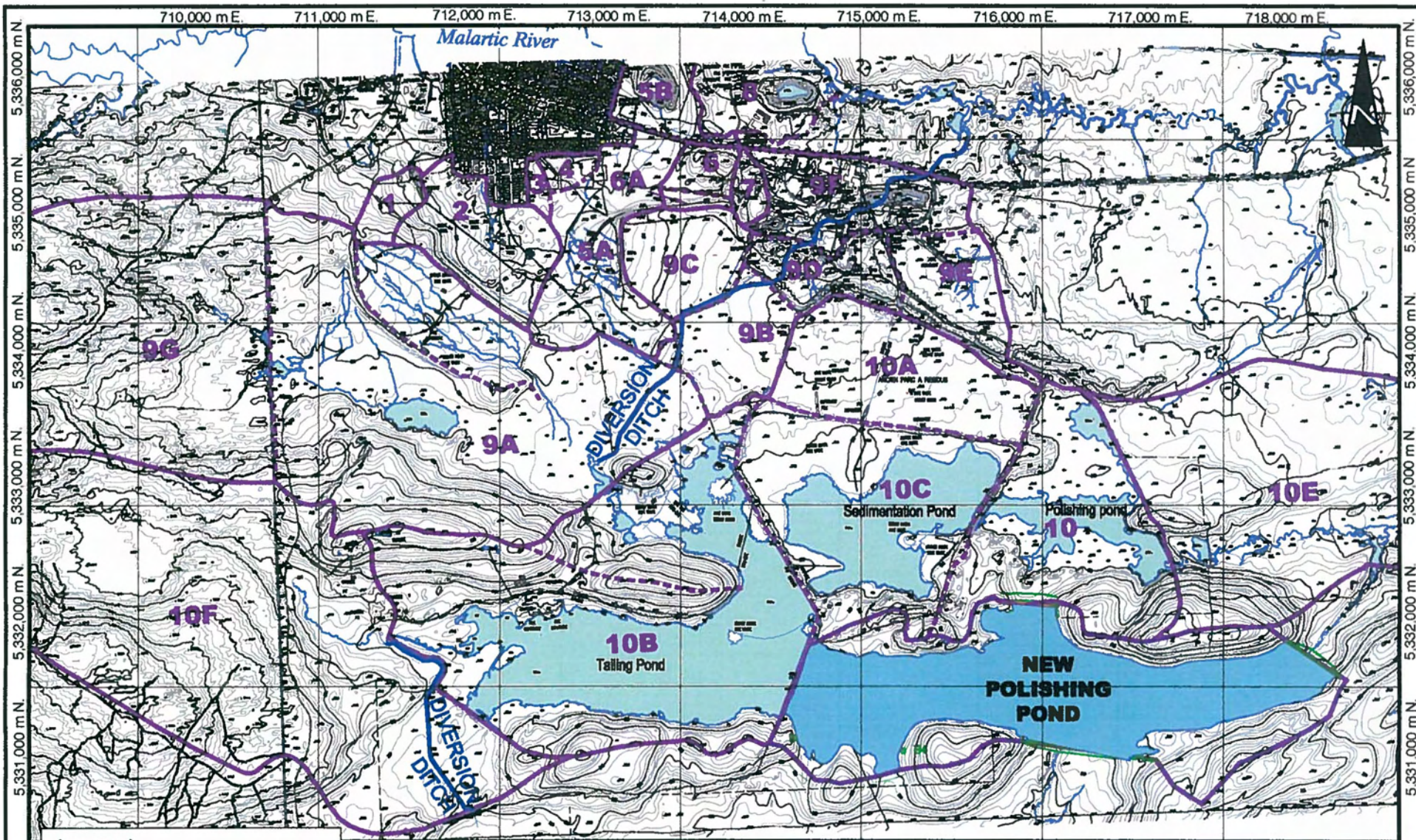
  
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**FINAL MODELLED CONFIGURATION  
 OF THE TAILINGS AREA**

FIGURE  
**X.2**



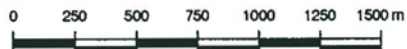
**Legend:**

- 1** Watershed identification
- Watershed limits

Date:	2008-10-08	Scale:	1 : 30 000
Drawn by:	S. Betnesky	Planned by:	C. Pednault
Checked by:	M. Kissiova	Approved by:	M. R. Julien
Drawing no:	0712210028-3600-03	Project no:	07-1221-0028



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CANADIAN MALARTIC PROJECT, MALARTIC, QUÉBEC**



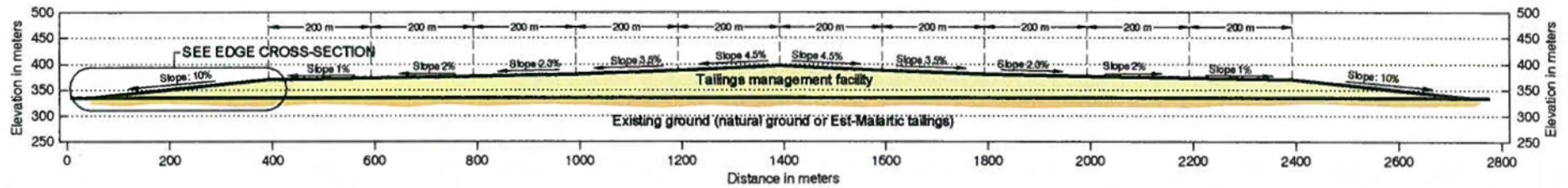
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WATERSHED LOCATIONS

FIGURE

X.3

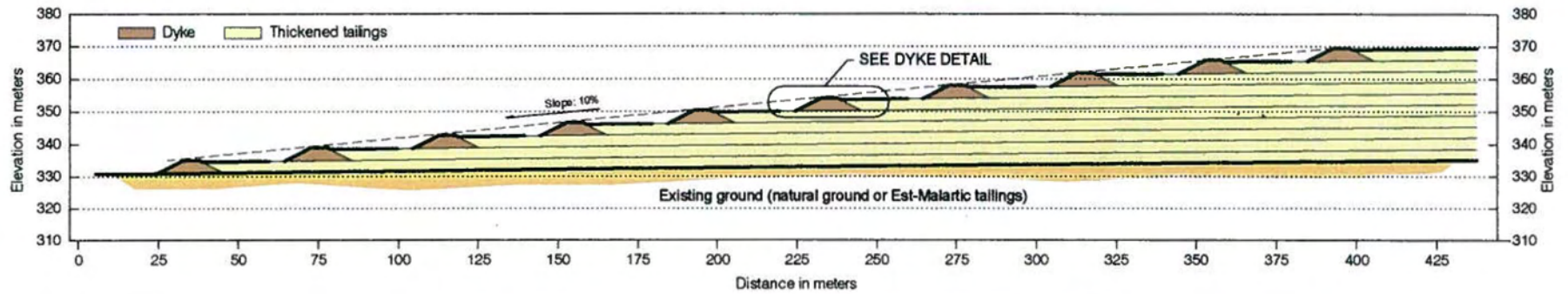




**GLOBAL TAILINGS MANAGEMENT FACILITY CROSS-SECTION**

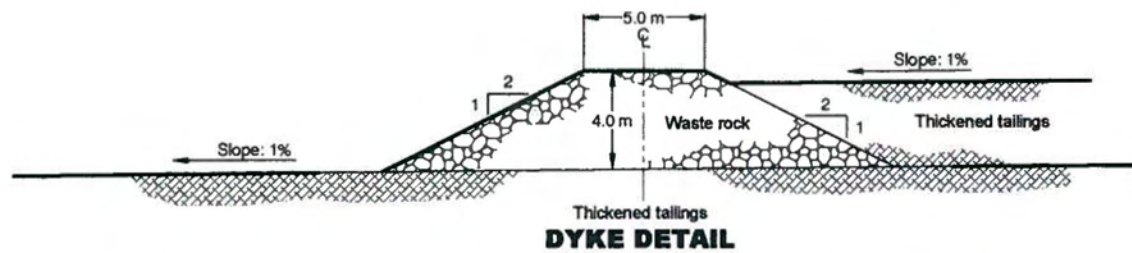
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TYPICAL SECTION FOR ILLUSTRATION PURPOSES ONLY



**CROSS SECTION AT THE EDGE OF THE TAILINGS MANAGEMENT FACILITY**

Scale: 1:2,000



**DYKE DETAIL**

Date:	2008-10-08	Scale:	As shown
Drawn by:	S. Betnesky	Planned by:	C. Pednaut
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Drawing no:	0712210028-3600-04	Project no:	07-1221-0028



FEASIBILITY STUDY  
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DYKE RAISE SCHEMATIC TYPICAL CROSS-SECTION

FIGURE

X.4