January 26, 2006 EBA File: 1100060.004

Tahera Diamond Corporation
Suite 803, 121 Richmond Street West
Toronto, Ontario M5H 2K1

Attention: Dan Johnson

Subject: Jericho Diamond Mine
Processed Kimberlite Containment Area
East and Southeast Dam – Reply to Acres and INAC Comments

1.0 INTRODUCTION

The following addresses technical questions raised in the letter to the Nunavut Water Board from Acres International Limited, dated October 20, 2005 regarding EBA's Jericho East and Southeast Dams Design Report.

In order to facilitate more efficient technical discussions, TDC and the INAC recommended direct communication amongst the technical parties and plan reviewers. EBA had discussions with Mr. R.A. Halim of Acres International Limited. The following addresses the issues raised by Mr. Halim.

2.0 STABILITY ANALYSES

- Material Properties
  - The upstream till zone is assumed to have the same properties as the ice-poor till
  - Coarse Tailings were assumed to have the following properties
    - Friction Angle 30°
    - Cohesion 0 kPa
    - Unit Weight 18.5 kN/m^3
  - The till foundation is a combination of ice poor and ice rich conditions. Stability analyses were carried out for both assumptions of ice rich, and ice poor strength parameters. The lowest factor of safety is reported. The ice contents in the foundation are expected to be relatively low based on the borehole information. It is not intended to excavate the till except in the key trench area; however if ice rich soils are observed during construction, additional excavation may be carried out.
- Graphical representations of the stability analysis are attached in memo describing the stability analysis.

EBA Engineering Consultants Ltd.
p. 780.451.2121 • f. 780.454.5688
14940 - 123 Avenue • Edmonton, Alberta T5V 1B4 • CANADA

- No excess pore pressures were assumed for the end of construction case. The dam will be constructed during the winter. Thaw consolidation is not expected to result in excess pore pressures due to the relatively slow thaw, and the coarse nature of the till.
- The rapid drawdown case assumed the water level as shown in Figure A.2 of the attached stability analyses memo.

3.0 GEOMEMBRANE LINER SYSTEM

The Jericho East and Southeast Dams are proposed to contain a single geomembrane, protected by geotextile. Acres is questioning the use of a single liner as opposed to a double liner system as used at the EKATI Diamond Mine in some of the dams.

The largest difference between the Jericho East and Southeast Dams compared to the EKATI dams is that the Jericho East and Southeast Dams are designed to retain fine processed kimberlite (fine PK) whereas the EKATI Dams were designed to contain water. Water maybe temporarily impounded above the fine PK in the early life of the facility; however eventually the upstream shell of the dam will be covered with a thick layer of coarse tailings and fine PK.

The Jericho East and Southeast Dams also differ from the dams at the EKATI Diamond Mine in that the EKATI dam liners are covered by bedding layers and run of mine rock. The Jericho East and Southeast Dam liners are covered by bedding layers and sand and gravel till with some, to a trace of fines and also are covered with a thick layer of coarse tailings. A portion of the till and coarse tailings is predicted to become permafrost.

There is precedent for using a single geomembrane for water retaining structures. It is our opinion that a secondary liner is not deemed necessary for this situation.

4.0 CONSTRUCTION QUALITY CONTROL

EBA Engineering Ltd. has been retained by Tahera to carry out the quality control of the dam construction. All aspects listed by Acres will be addressed.

5.0 DAM MONITORING

Acres is suggesting that a routine field survey of the dam crest be carried out in addition to installation and monitoring of survey monitoring points. It is expected that there will be inherent “noise” in a topographic survey of the dam surface but it will indicate if there are any large settlements. Tahera has agreed to carry out topographic surveys of the dam crest as suggested by Acres in conjunction with the dam monitoring program.

6.0 LINER BEDDING MATERIALS

Section 7.5 of the report indicated that the bedding material for the liner could be a natural material with maximum of 40 mm diameter or a crush material with a maximum of 20 mm size. It is our opinion that either material would be suitable given the thick geotextile of the liner; nevertheless due to the timing of construction the 20 mm crush will be used.

7.0 SEEPAGE ANALYSIS

Seepage through the dam is designed to be minimal through the use of a geomembrane liner frozen into frozen ground.

A seepage analyses would indicate minimal seepage through the dam due to normally assumed liner defects. The upstream till layer will eventually saturate and freeze thereby reducing or eliminating water flow through the dam. No seepage analyses have been carried out for the dams; however, a thermal analysis has been carried out to illustrate that the foundation materials and a portion of the dam structure will remain frozen. The thermal analysis is attached.

It is recognized that there is a risk of seepage from the dam. If excessive seepage was observed, a collection system can be constructed downstream of the dam, and the seepage returned to the PKCA. An unexpected amount of significant seepage flow through the dam would not be expected to have an impact on the dam structural integrity as the rockfill structure would remain stable.

We trust this addresses the questions posed. Please contact the undersigned if you have any questions.

Yours truly,
EBA Engineering Consultants Ltd.

W.T. Horne

W.T. Horne, P.Eng.
Senior Project Engineer, Circumpolar Regions
Direct Line: 780.451.2130 x276
bhorne@eba.ca

/ln

Appendix A: Stability Analyses Memo
Appendix B: Thermal Analyses Memo
Appendix C: Revised Construction Drawings

APPENDIX

APPENDIX A   STABILITY ANALYSES MEMO

TO:	File	DATE:	January 26, 2006
FROM:	Bill Horne	FILE:	1100060.004
SUBJECT:	**Stability Analysis of East and South Dams Jericho Diamond Mine, Nunavut**		

1.0 INTRODUCTION

This memo describes an update to the stability analysis EBA's report "Jericho Project East and Southeast Dam Design Report" dated August 2005. An update was required as the liner material for the dam was changed from a polypropylene liner to an HDPE liner. Additional analyses are also presented as requested by INAC 2005.

2.0 ANALYSES METHODOLOGY

Limit equilibrium analyses have been carried out to determine the factors of safety for slope stability during construction and operation of the East and Southeast Dams.

All analyses were conducted using the commercial, two-dimensional, slope stability computer program, SLOPE-W. The factors of safety have been computed using the Morgenstern - Price Method.

The dams are designed to meet Canadian Dam Association guidelines (CDA, 1999). The design criteria for computed minimum factors of safety are given in Table 1.

TABLE 1: SLOPE STABILITY DESIGN CRITERIA

Loading Conditions	Minimum Factor of Safety	Slope
Static Loading, full reservoir	1.5	Downstream and Upstream
Full or partial rapid drawdown	1.2 to 1.3	Upstream
Earthquake, full reservoir	1.1	Downstream and Upstream

The stability analyses were carried out for the deepest dyke cross-section, which is considered to be the worst cases in evaluating intermediate dyke stability.

3.0 MATERIAL PROPERTIES

The material properties chosen for the embankment and foundation materials in the stability analysis are presented in Table 2. The properties for granular materials were selected based on experience with similar materials used and encountered by EBA in dam designs at other sites across the Arctic.

TABLE 2: MATERIAL PROPERTIES USED IN STABILITY ANALYSES			
Material	Angle of Internal Friction (º)	Cohesion (kPa)	Unit Weight (kN/m³)
Run-of-Mine	42	--	20
200 mm Material	35	--	21
20 mm Material	32	--	20
Composite Liner System (Interface)	8	--	18
Ice-Poor Till Foundation	30	--	18.5
Ice-Rich Till Foundation	0	75	16.5
Upstream Till Fill	30	0	18.5
Coarse Processed Kimberlite	30	--	18.5
Fine Processed Kimberlite	0	0	15.0

The friction angle presented in Table 2 for the run-of-mine material is conservative for shallow depths where confining stresses are low (Jansen, 1988). The friction angle presented in Table 2 for rockfill is applicable for higher confining stresses that would be found at depth below the dam crest. The friction angle for similar rockfill under low confining stresses may approach 55º. The interface friction angle between the HDPE geomembrane and the nonwoven geotextile was based on published test results (Koerner, 1990).

3.1 PORE WATER PRESSURE CONDITIONS

Pore water conditions for individual analyses are shown on the attached analyses schematics (Figures A.1 through A.17). The following further describes the assumed pore water conditions.

3.1.1 Coarse Tailings

The pore pressures assigned to the coarse tailings on the upstream face of the dam correspond to the pool level. It was assumed that phreatic surface would drop approximately 0.5 m from the dam face during rapid drawdown.

3.1.2 Till

The pore water pressures assigned to the till on the upstream side of the liner corresponded to the pond elevation for the static and seismic full reservoir stability analyses. Intermediate water levels were also analyzed to determine the minimum factor of safety for the upstream analyses. Pore pressures were conservatively assumed to remain approximately at the original level during rapid drawdown situations.

3.1.3 Rockfill

Pore water pressures assigned to the downstream rockfill equalled the original ground elevation. The liner is not expected to leak significant volumes of water and, furthermore, the rockfill is free draining and will not sustain a rising water level within it.

3.1.4 Liner System

The pore water pressures assigned to the nonwoven geotextile/HDPE interfaces corresponded to the maximum pond levels for the static, seismic, and rapid drawdown stability analyses.

3.1.5 Foundation Till

It was assumed that negligible excess pore water pressures would be generated due to thaw of the till under the upstream or downstream portions of the dams. This is considered to be appropriate for the following reasons:

- thaw progresses relatively slowly into the foundation, and
- the till is non-plastic and has a significant sand and gravel content, which increases permeability.

Given these conditions, the thaw consolidation parameter (Morgenstern and Nixon, 1971) will be low, indicating that excess pore water pressures generated in the till during thaw will be negligible. Furthermore, the permeability of the coarse-grained till is expected to prevent the build-up of excess pore water pressures during rapid drawdown.

3.2 SEISMICITY

The project area lies in a region of low seismicity, but magnitude 4+ earthquakes have recently occurred within a similar part of the shield. NRCan (NRCan 2003a and NRCan 2003b) recommends that a probabilistic approach should be adopted to estimate the peak ground accelerations (PGA).

The CDA indicates that the usual minimum criterion for the design earthquake for a dam, which coincides with the "low" consequence category, would be an earthquake with an annual exceedance with return periods of 100 to 1,000 years. NRCan (2003a and 2003b) indicates that the 1,000-year event has a peak acceleration of 0.016 g. However, in conjunction with proposed changes to the NBCC, NRCan indicates that performance of the Jericho dams be designed for an earthquake with a 2,475 year return period which has a peak ground acceleration of 0.06 g. This has been adopted as the design earthquake.

3.3 ANALYSES RESULTS

Table 3 summarizes the factors of safety under static, rapid drawdown and seismic conditions for different failure surfaces on the upstream and downstream slopes.

TABLE 3: SUMMARY OF STABILITY ANALYSIS RESULTS					
Slip Surface	Location	Factor Safety			
		Static	Static, Rapid Drawdown of Reservoir	Seismic	End of Construction (No Coarse Tailings or Water)
1	Upstream, rotational	1.5	1.2	1.2	1.9
2	Upstream, along liner	2.0	1.4	1.5	1.4
3	Downstream rotational	1.6	1.6	1.4	1.6
4	Downstream along the liner	2.1	2.1	1.6	2.9
5	Downstream Overall Stability – Full Tailings Level	2.7	-	-	-

The computed minimum factors of safety exceed the design criteria of 1.5, 1.2 and 1.1 for static, rapid drawdown and seismic loading conditions, respectively, in accordance with the CDA, Dam Safety Guidelines (CDA 1999).

FIGURES

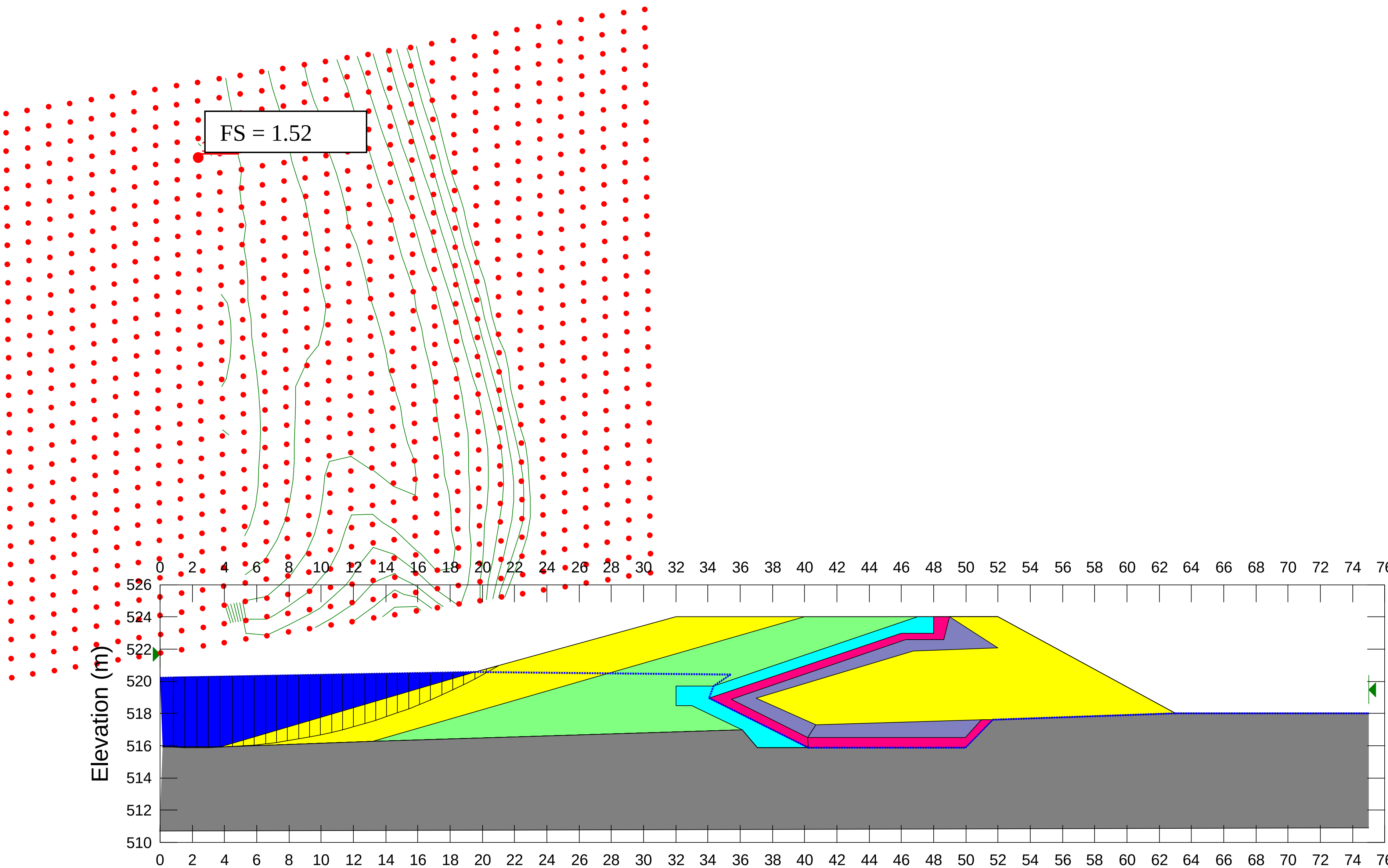


Figure A1
Stability Analysis - Upstream, Static – Rotational Slip Surface

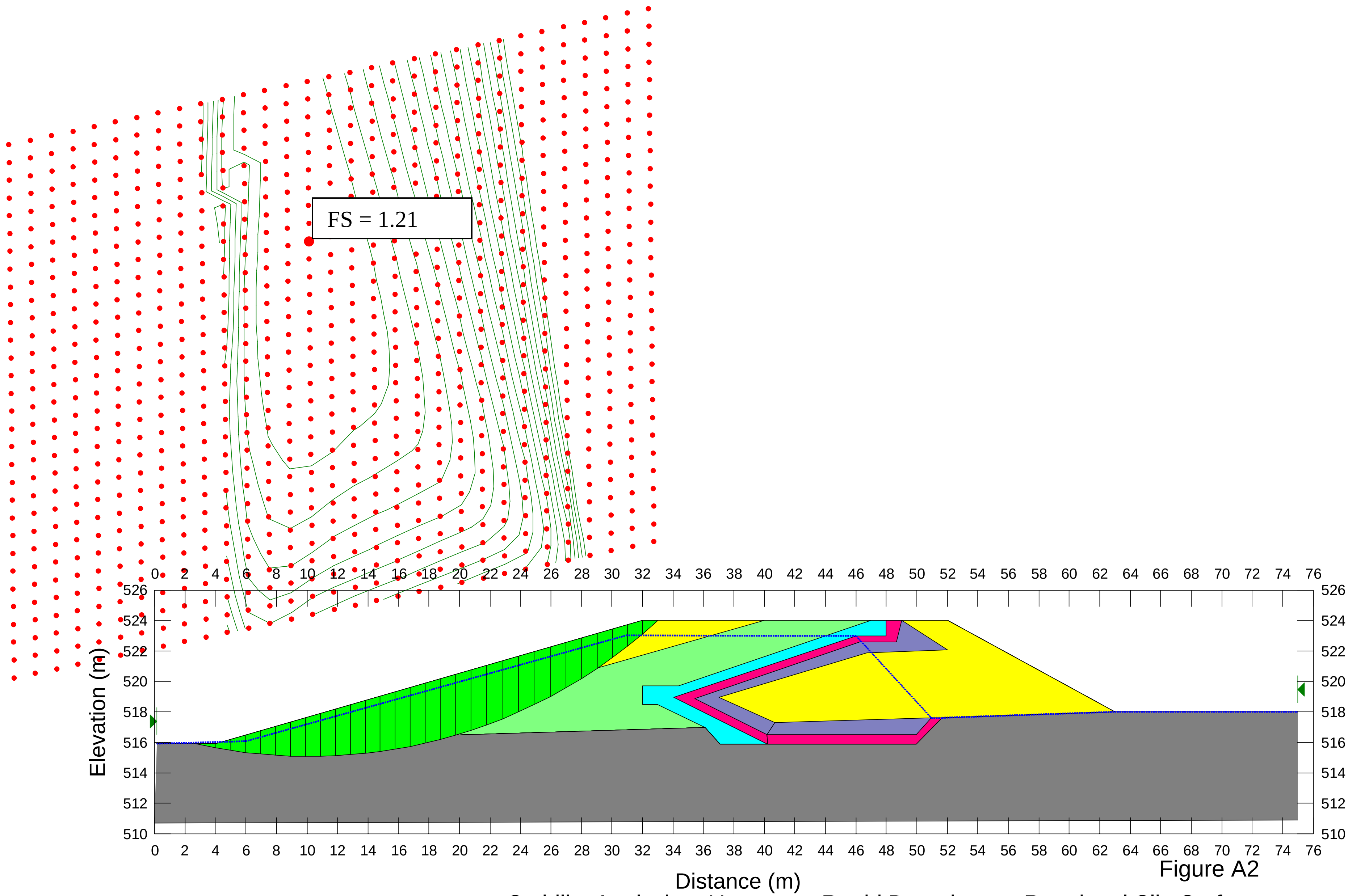


Figure A2

Stability Analysis - Upstream, Rapid Drawdown – Rotational Slip Surface

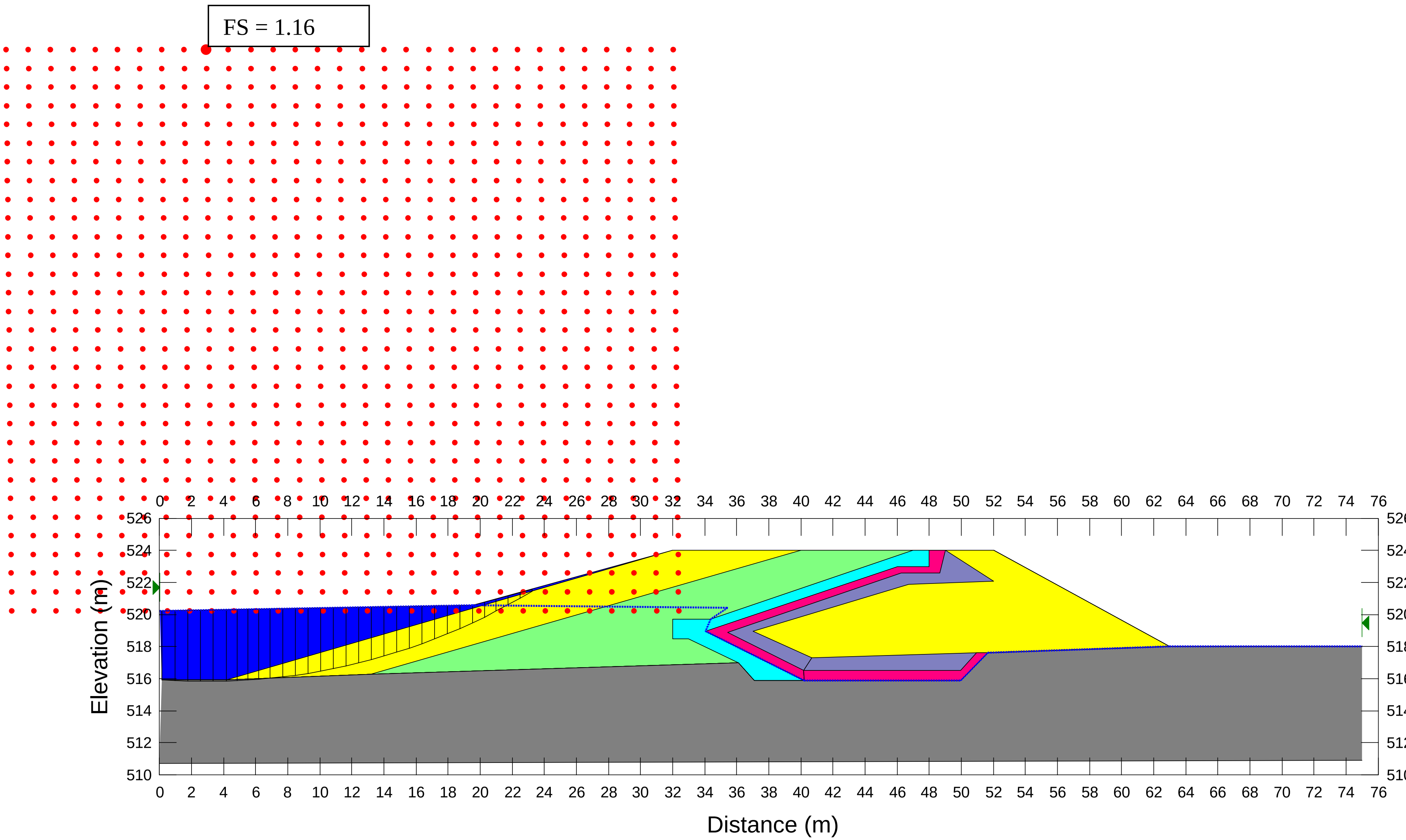


Figure A3

Stability Analysis - Upstream, Seismic Analysis – Rotational Slip Surface

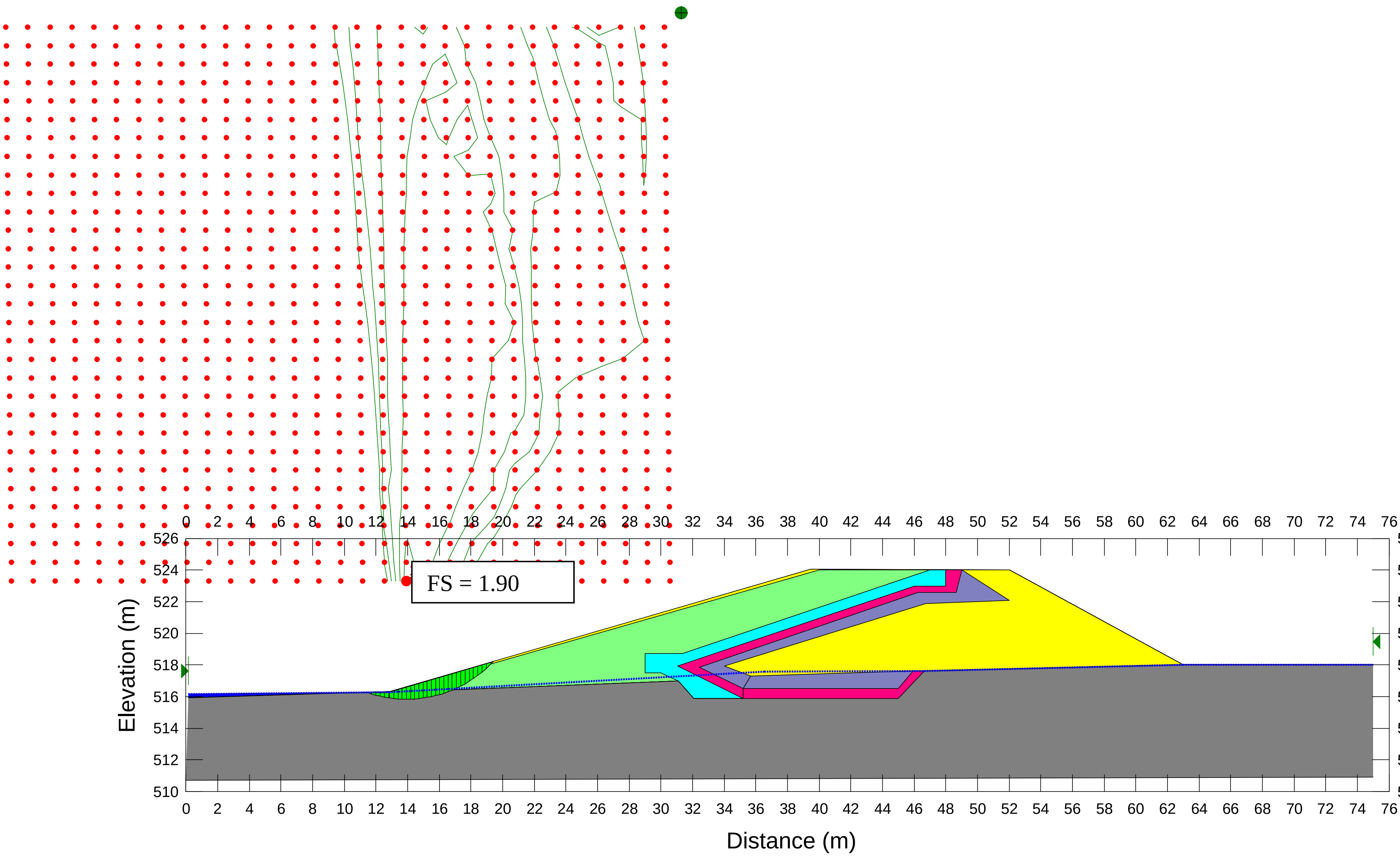


Figure A4

Stability Analysis - Upstream End of Construction – Rotational Slip Surface

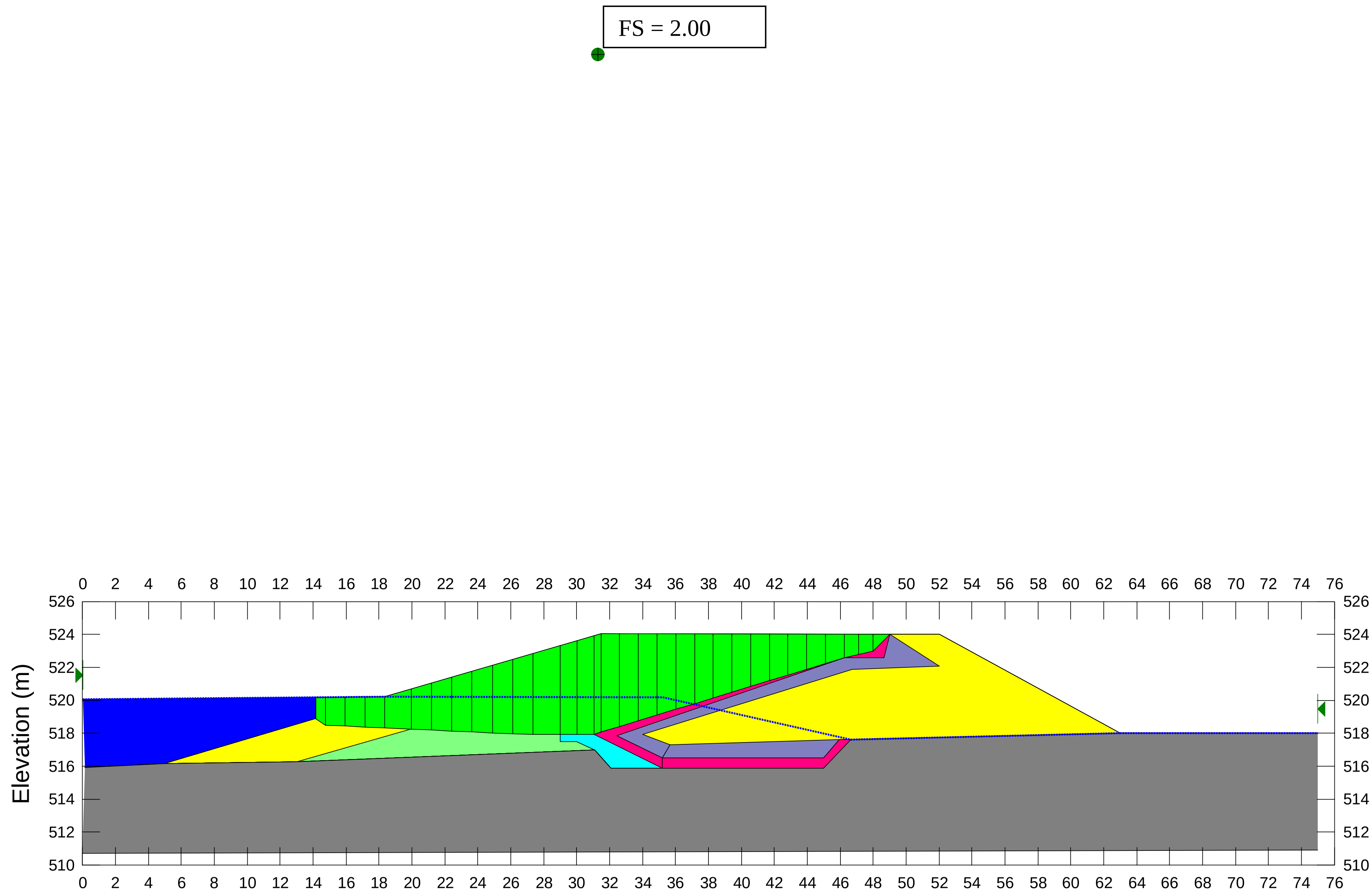


Figure A5

Stability Analysis - Upstream, Static – Slip Surface Along Liner

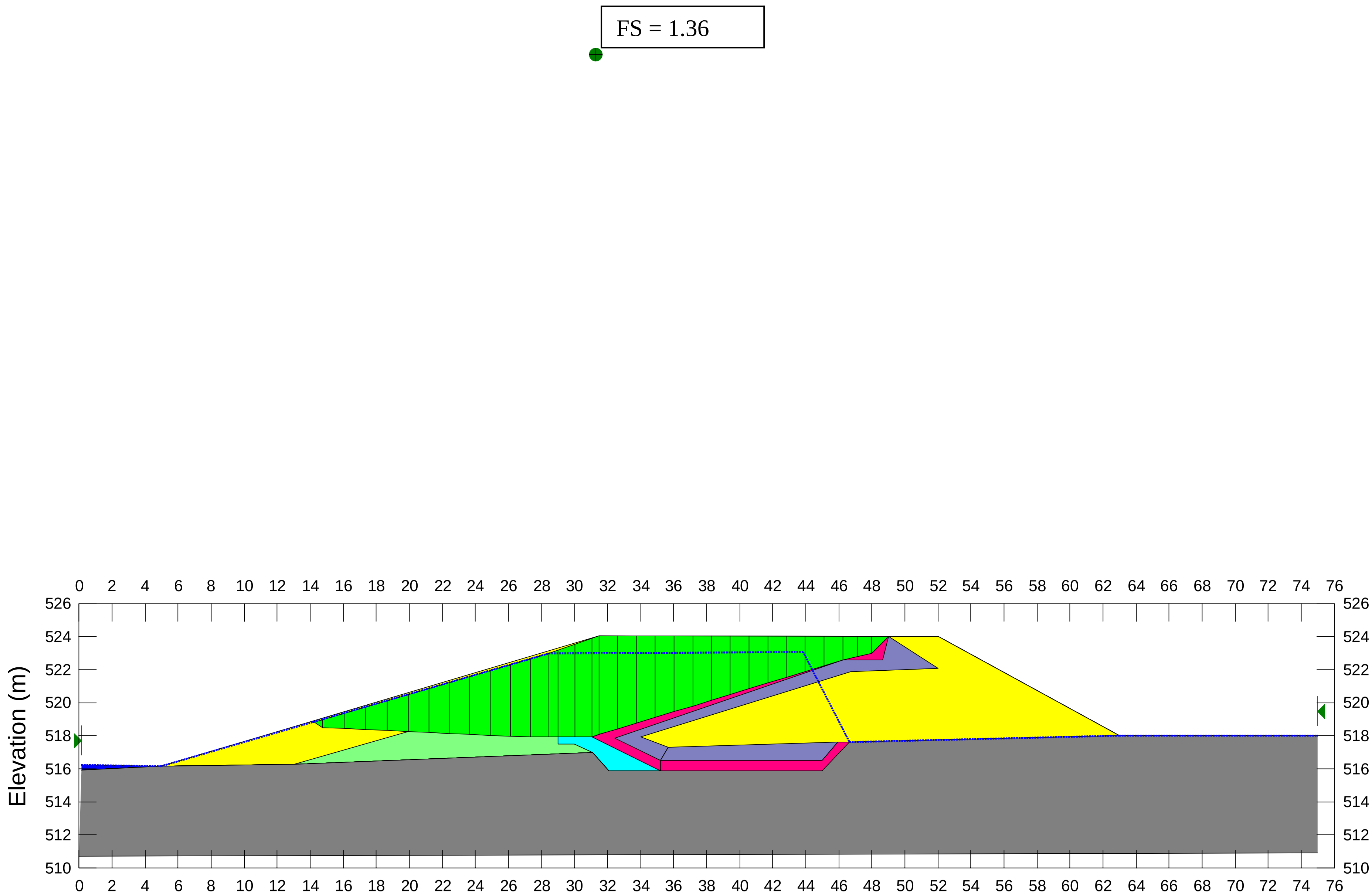


Figure A6

Stability Analysis - Upstream, Rapid Drawdown – Slip Surface Along Liner

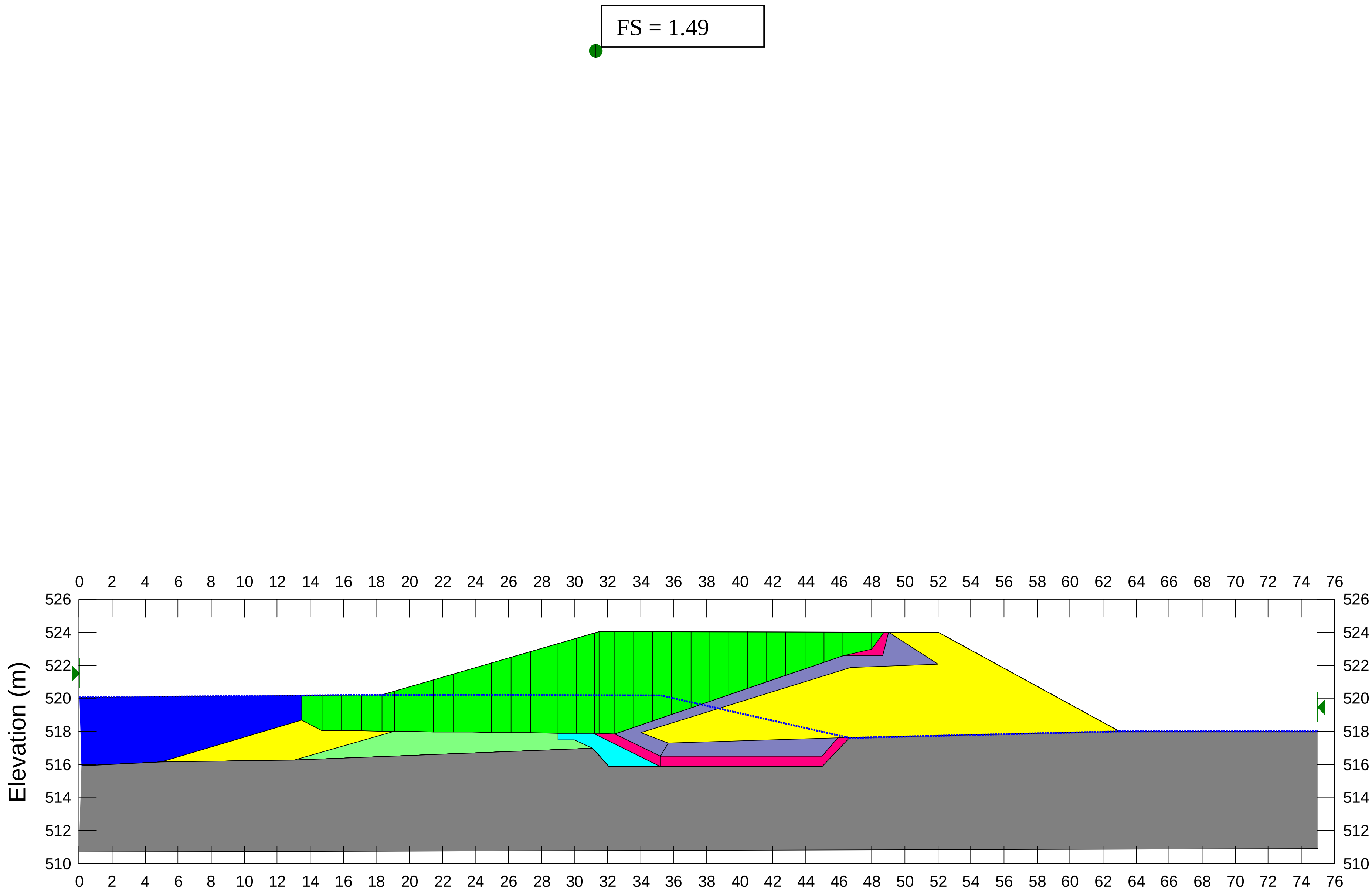


Figure A7
Stability Analysis - Upstream, Seismic Analysis – Slip Surface Along Liner

eba

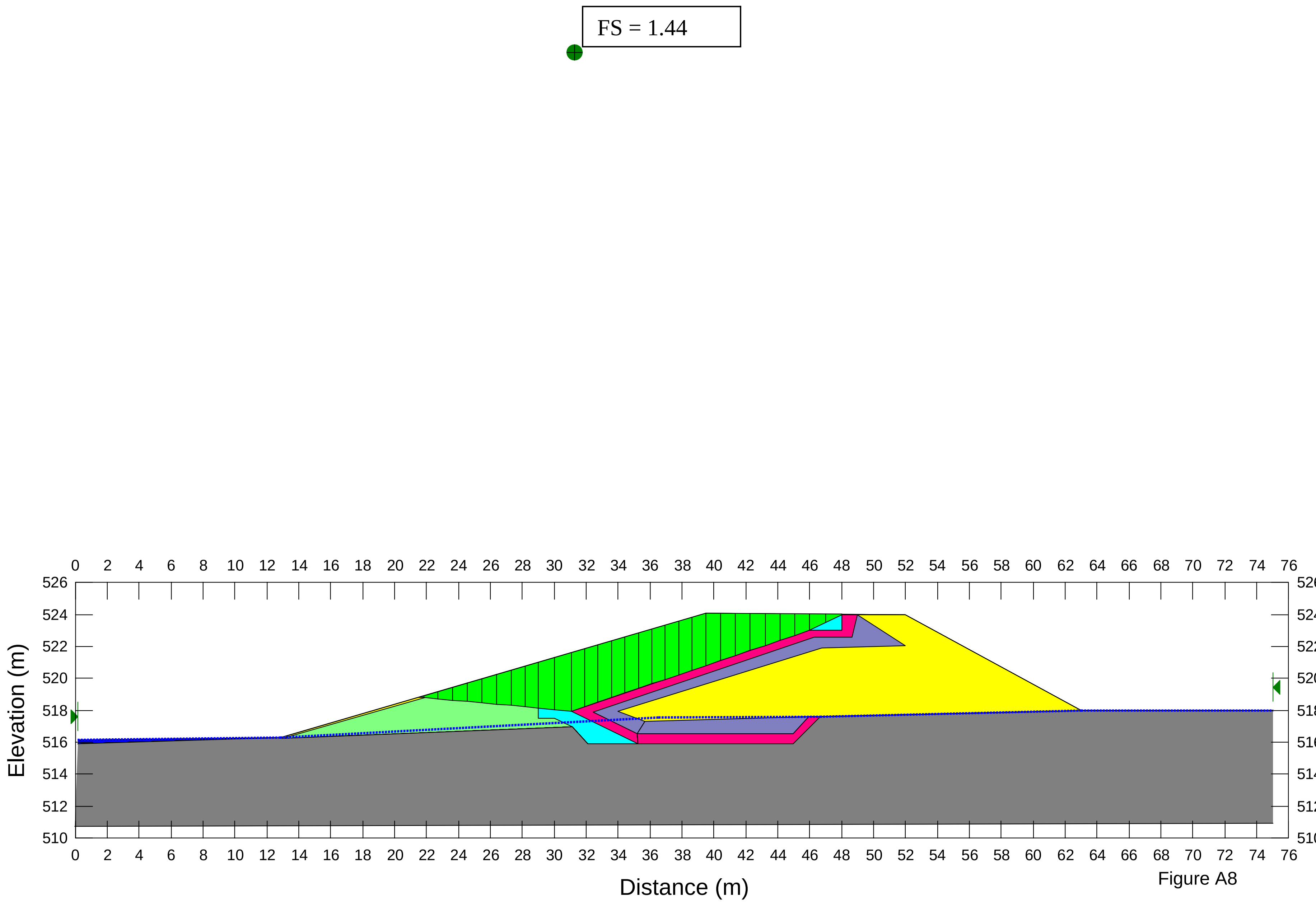


Figure A8

Stability Analysis - Upstream, Static, End of Construction – no coarse tailings

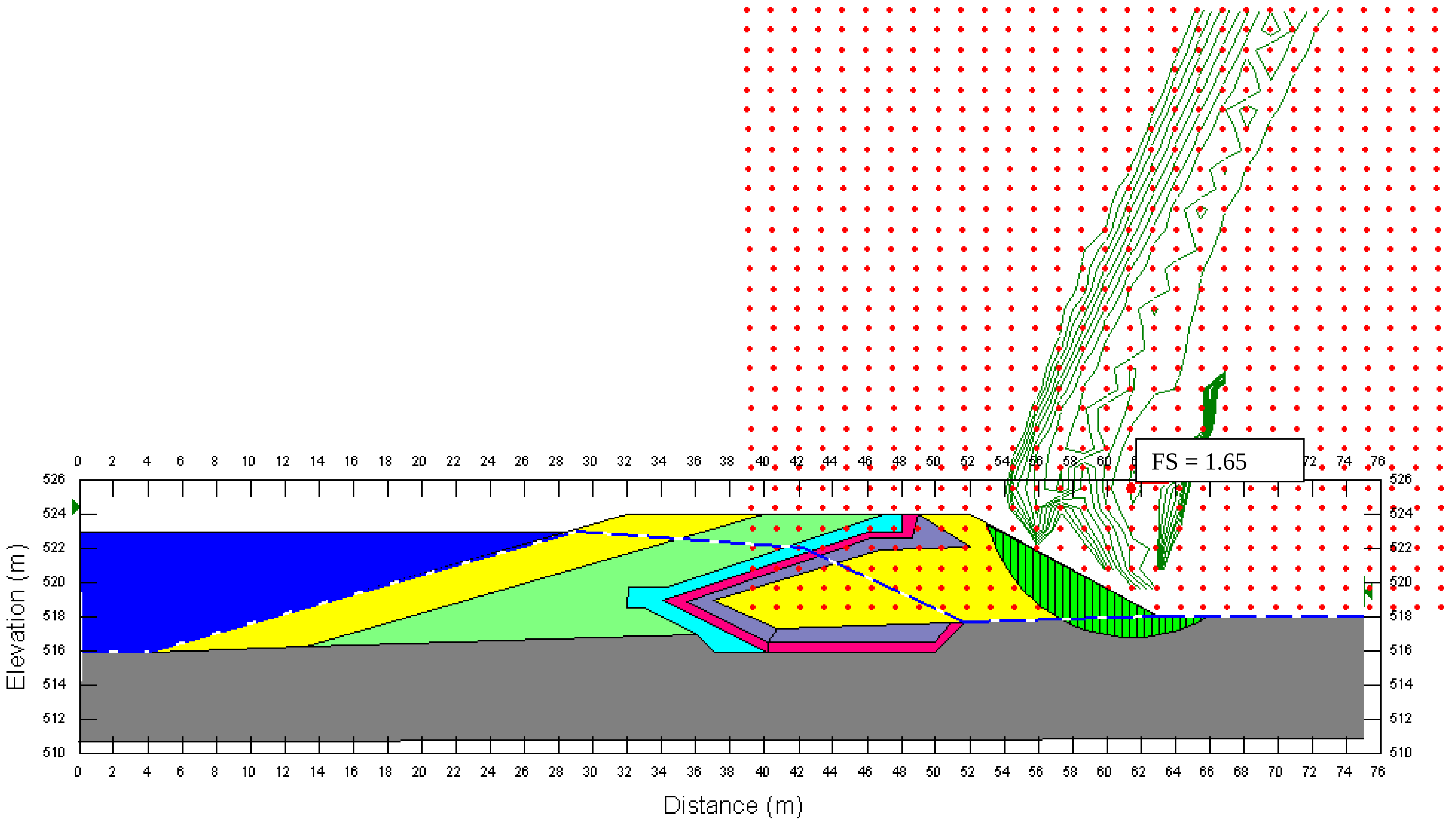


Figure A9

Stability Analysis - Downstream, Static – Rotational Slip Surface

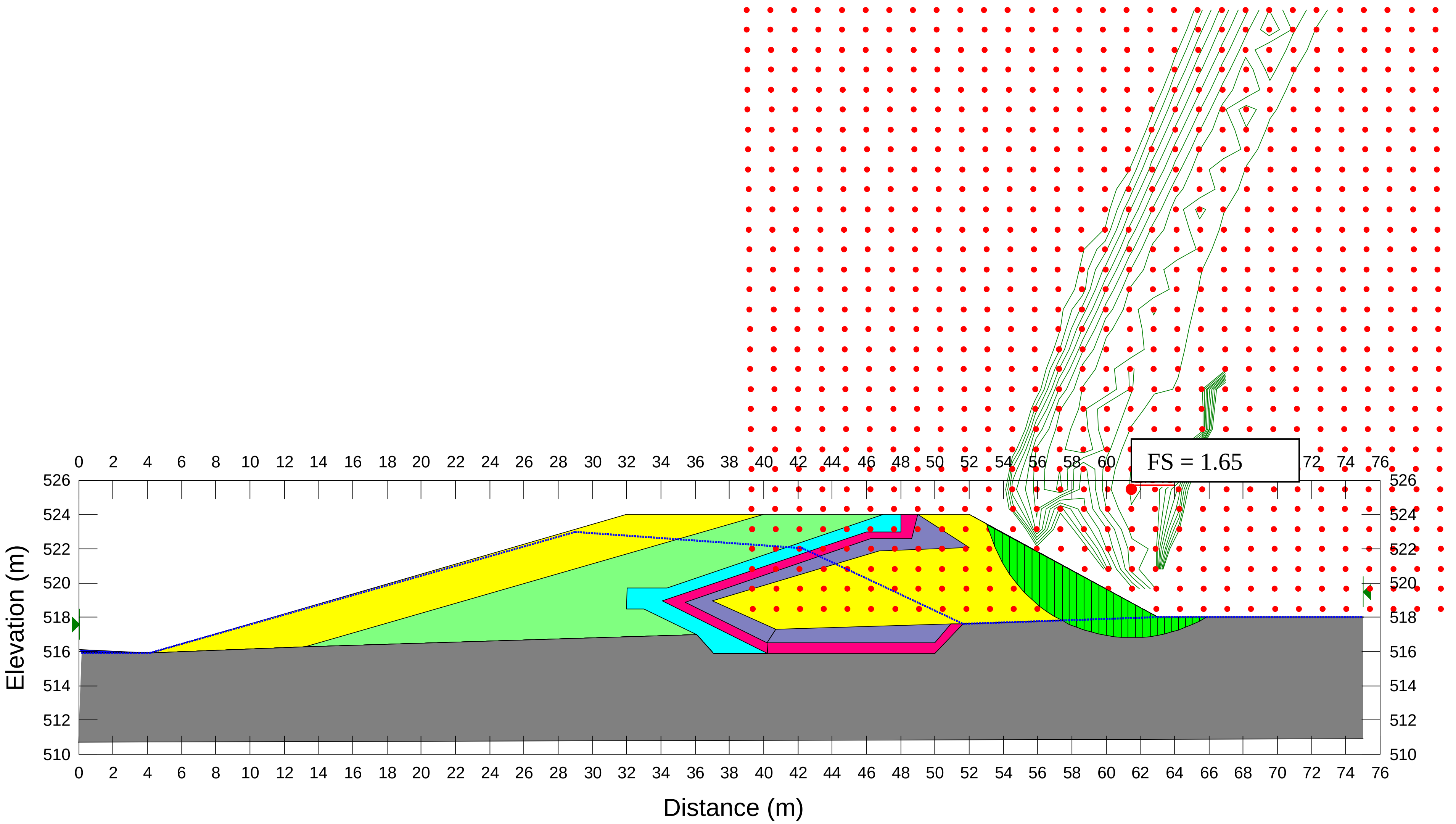


Figure A10

Stability Analysis - Downstream, Rapid Drawdown – Rotational Slip Surface

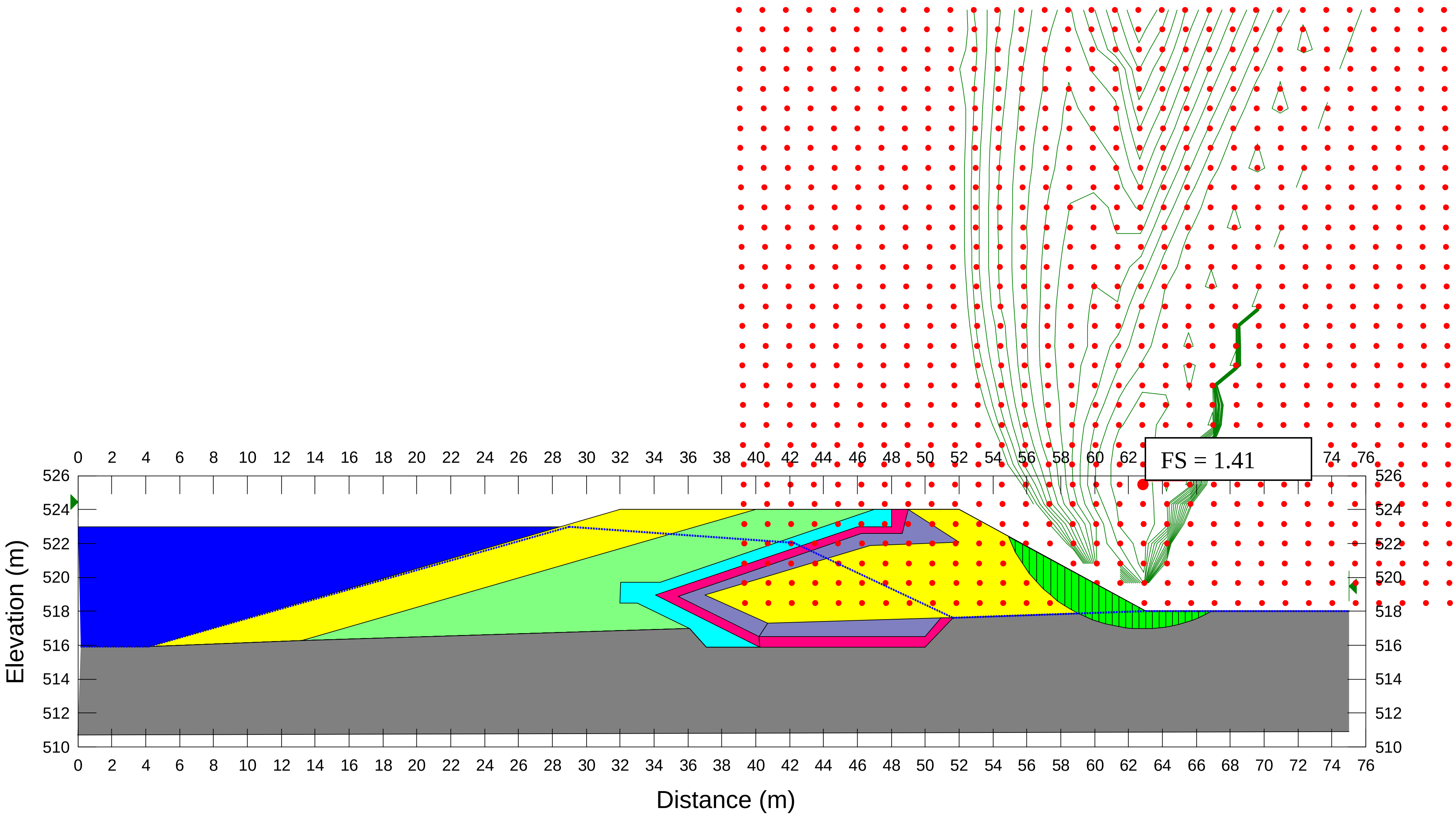


Figure A11

Stability Analysis - Downstream, Siesmic – Rotational Slip Surface

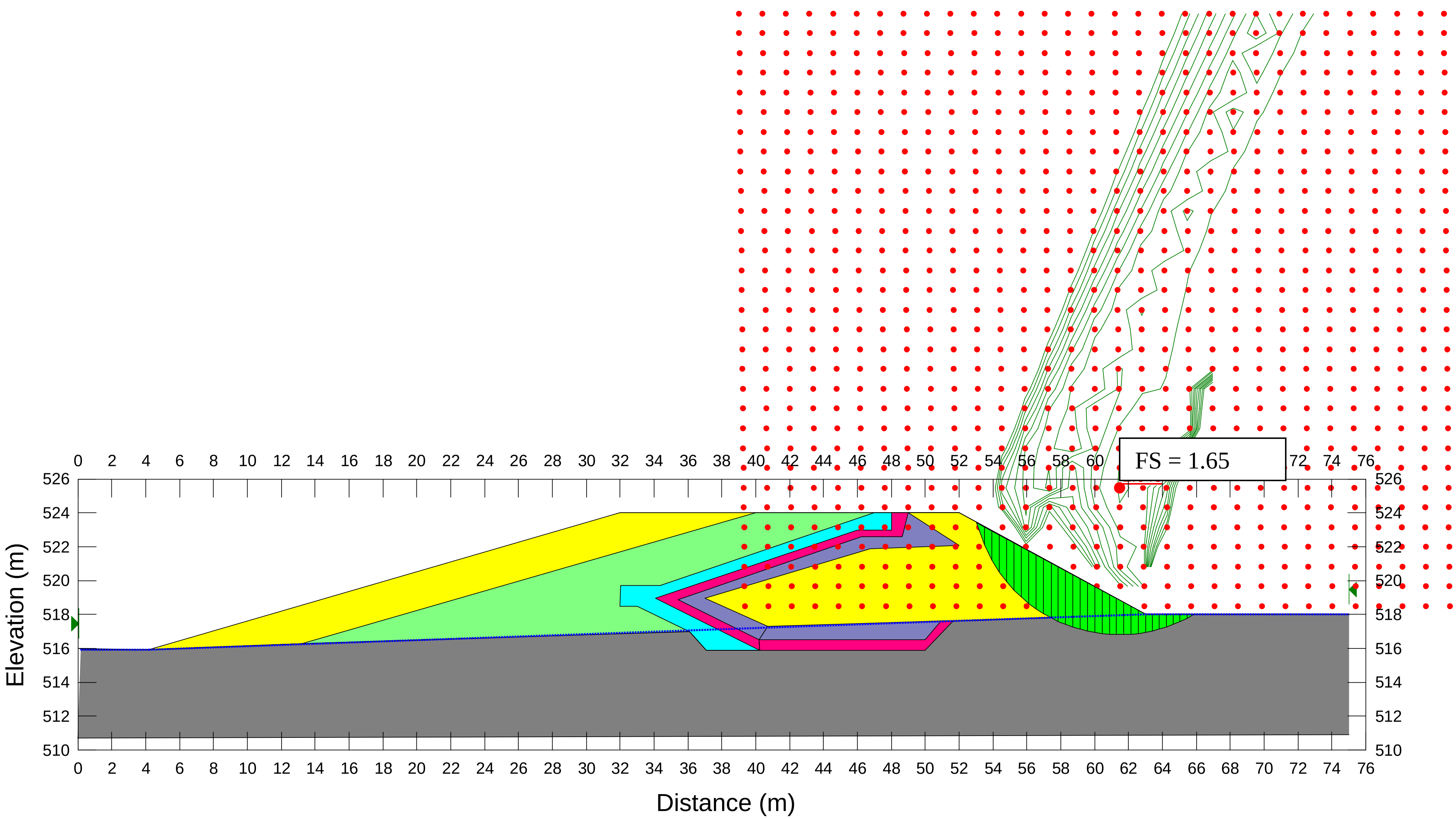


Figure A12

Stability Analysis - Downstream, End of Construction – Rotational Slip Surface

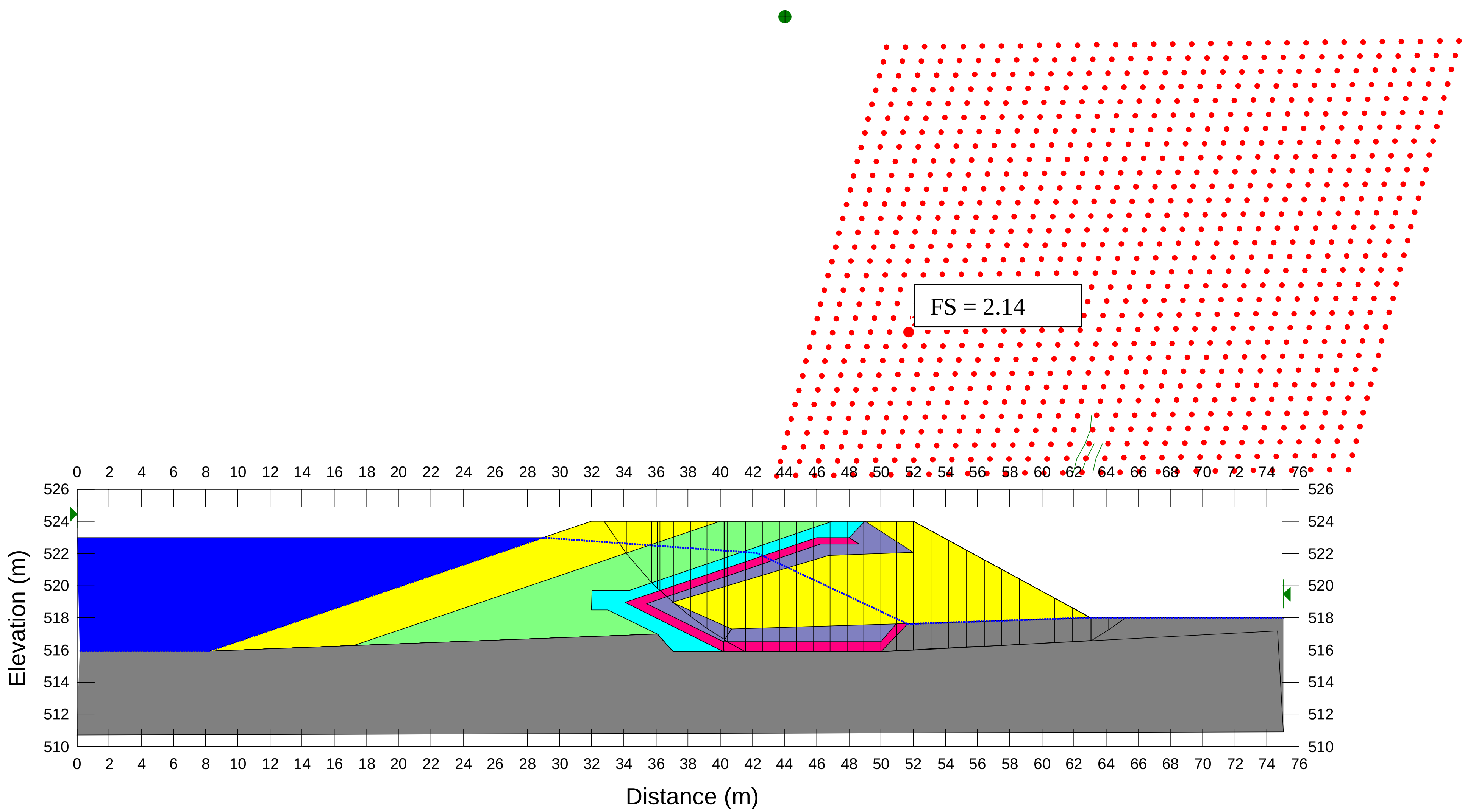


Figure A13

Stability Analysis - Downstream, Static Analysis –Slip Surface along Liner

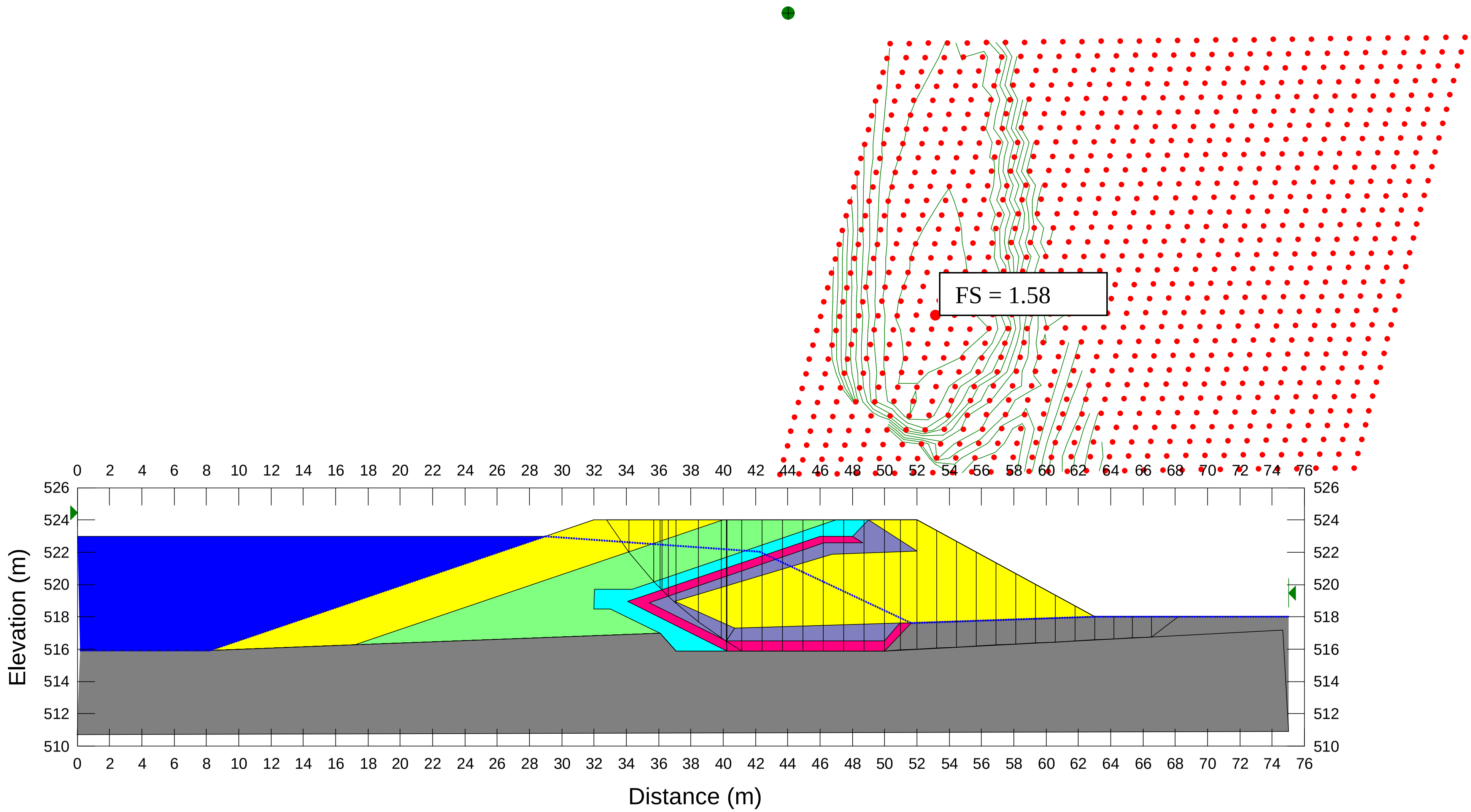


Figure A14

Stability Analysis - Downstream, Seismic Analysis –Slip Surface along Liner

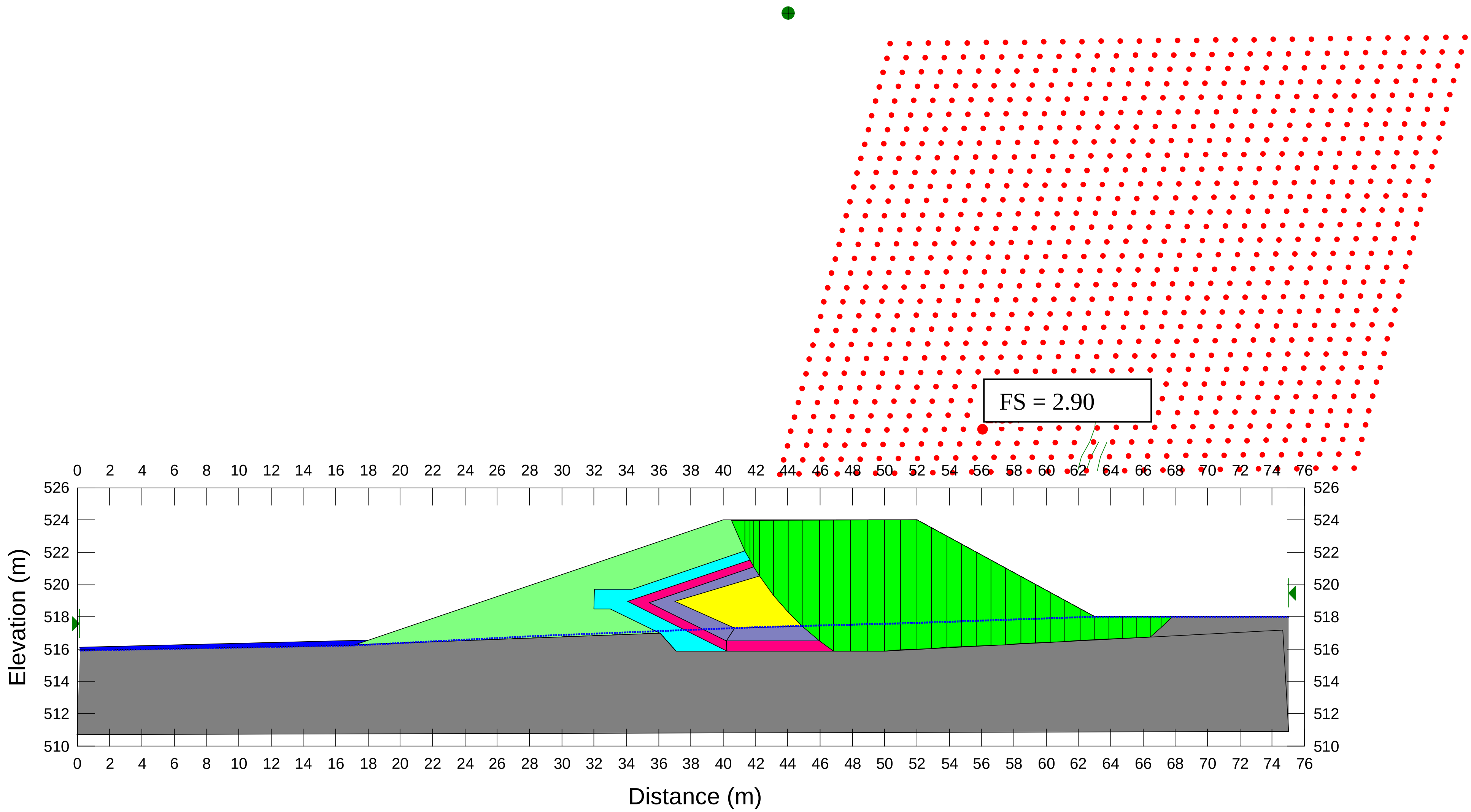


Figure A15

Stability Analysis - Downstream, End of Construction –Slip Surface along Liner

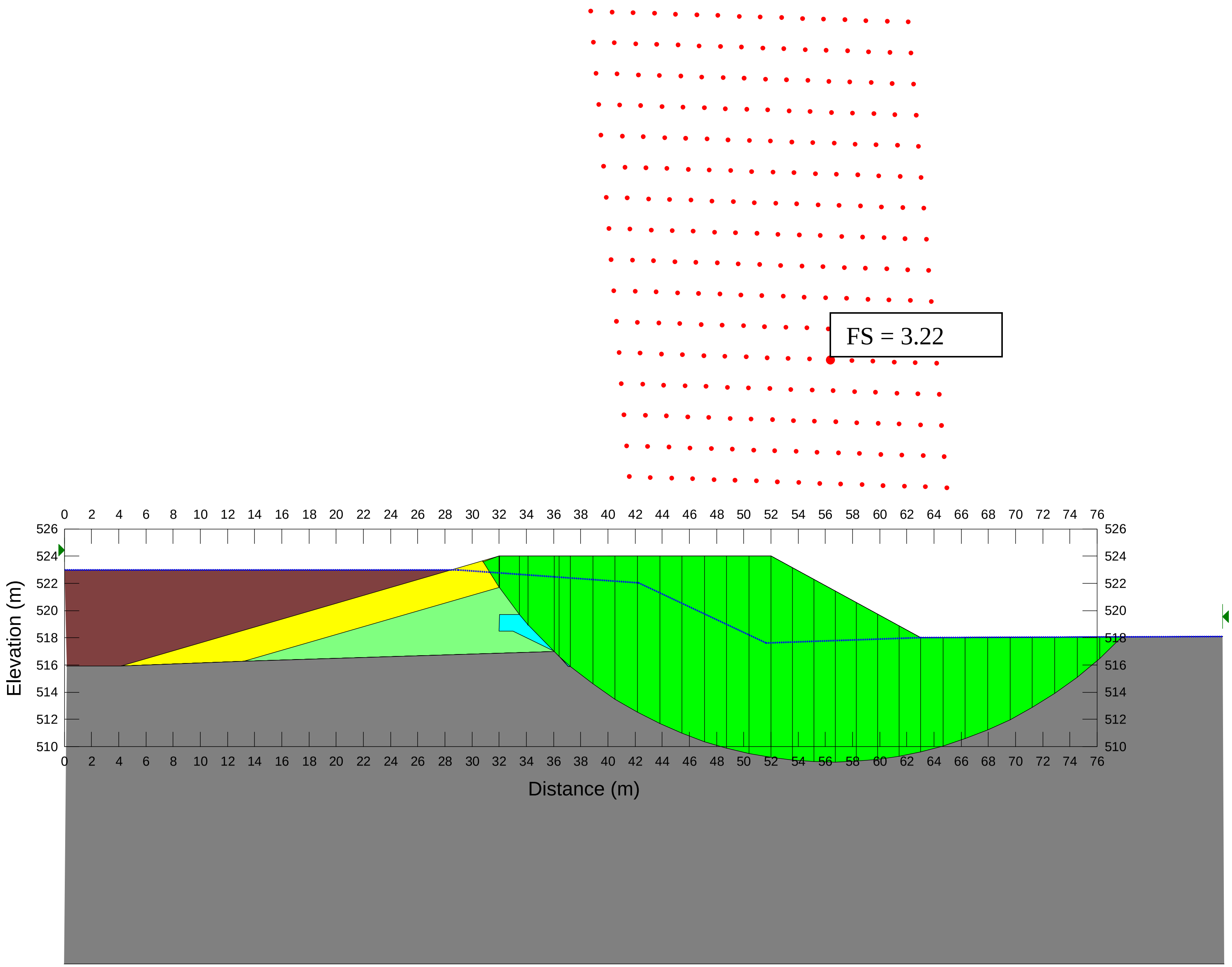


Figure A16

Stability Analysis - Full Tailings – Overalll Stability – Ice Rich Foundation

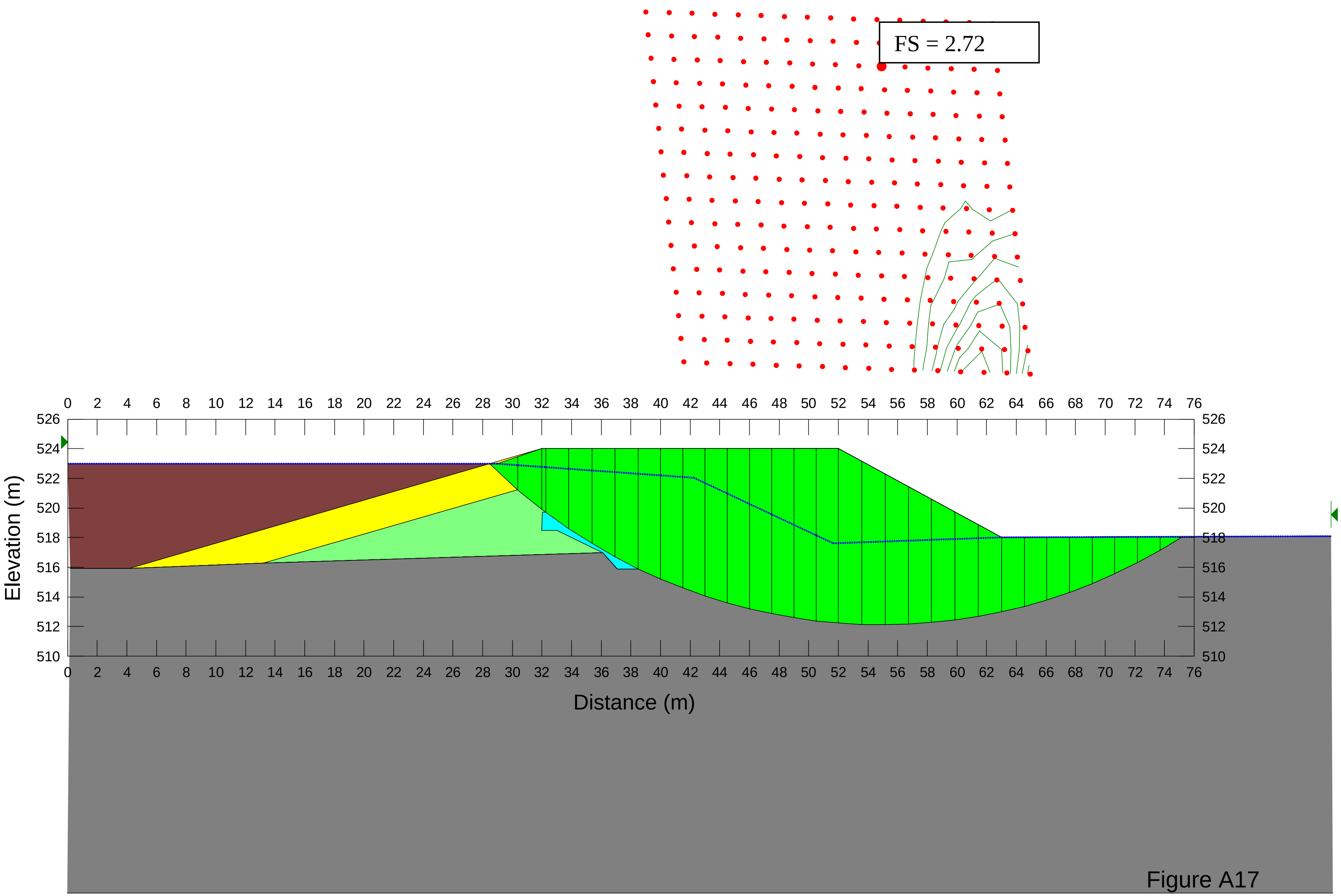


Figure A17

Stability Analysis - Downstream, Full Tailings –Overall Stability – Ice Poor Foundation

APPENDIX

APPENDIX B THERMAL ANALYSES MEMO

TO:	Bill Horne	DATE:	January 24, 2006
FROM:	Gordon Zhang	FILE:	1100060.004
SUBJECT:	**Thermal Analysis of East and South Dams Jericho Diamond Mine, Nunavut**		

1.0 INTRODUCTION

The Jericho East and South East Dams were designed as zoned dams with a geomembrane liner anchored within a frozen fill key trench (EBA, 2005). The design intent is to maintain the geomembrane liner anchor in the key trench in a frozen condition over the mine life.

Thermal analyses were carried out to predict the short and long-term thermal conditions of the East and South Dams under various assumed conditions. The thermal model was calibrated using the measured ground temperatures at the site and considered the thermal impacts of a nearby lake on the initial ground temperatures within the dam footprint. This memo summarizes the input data and results of the thermal analyses.

2.0 THERMAL ANALYSES METHODOLOGY

Analyses were carried out using EBA's proprietary two-dimensional finite element computer model, GEOTHERM. The model simulates transient, two-dimensional heat conduction with change of phase for a variety of boundary conditions. The heat exchange at the ground surface is modelled with an energy balance equation considering air temperature, wind velocity, snow depth, and solar radiation. The model facilitates the inclusion of temperature phase change relationships for saline soils, such that any freezing depression and unfrozen water content variations can be explicitly modelled.

3.0 CLIMATIC DATA FOR THERMAL EVALUATIONS

3.1 MEAN CLIMATIC CONDITIONS

Climatic data required for the thermal analyses includes monthly air temperature, wind speed, solar radiation, and snow cover. There has been no meteorological station at the Jericho Diamond Mine site. The closest meteorological station is at Lupin/Contwoyto Lake, which is approximately 30 km south of the mine site. The climatic data for air temperature, snow cover, and wind speed were obtained from Environment Canada's meteorological station at Lupin/Contwoyto Lake, which has been operating since 1959. Mean monthly air temperatures for the thermal analyses were based on the 1971–2000 climatic normals at Lupin/Contwoyto Lake (data from Environment Canada's webpage). Monthly wind speed data were based on the 1951-1981 climatic normals at Contwoyto Lake (Environment Canada, 1982a). Month end snow cover data were based on the 1961-1991 climatic normals at Contwoyto Lake (Environment Canada, 1993). The solar radiation data were obtained from the meteorological station at Norman Wells, which is at a similar latitude as that for the Jericho mine site. The solar radiation data were based on the 1951-1980 climatic normals at Norman Wells (Environment Canada, 1982b). Table 1 summarizes the climatic conditions used for the thermal analyses.

TABLE 1: SUMMARY OF CLIMATIC DATA USED IN THERMAL ANALYSIS

Month	Monthly Air Temperature (°C)		Monthly Wind Speed (km/h)	Month-End Snow Cover (m)	Daily Solar Radiation (W/m²)
	Mean (1971-2000)	1 in 100 Warm			
January	-30.4	-25.2	20.2	0.44	5.4
February	-28.5	-23.6	13.3	0.52	31.6
March	-24.9	-20.6	13.8	0.60	97.3
April	-15.9	-13.2	14.3	0.65	179.2
May	-5.7	-4.7	16.5	0.30	233.1
June	6.5	9.2	14.6	0	267.2
July	11.5	16.3	16.8	0	234.5
August	8.8	12.5	18.8	0	166.8
September	1.8	2.5	23.0	0.02	93.9
October	-8.6	-7.1	19.8	0.15	32.5
November	-20.7	-17.1	16.9	0.28	9.6
December	-26.8	-22.2	16.3	0.37	2.0
Mean Annual	-11.1	-7.8			
Freezing Index (°C-days)	4884	4044			
Thawing Index (°C-days)	878	1243			

3.2 1 IN 100 WARM YEAR AIR TEMPERATURES

A probabilistic analysis was carried out to determine the mean monthly temperatures representative of a 1 in 100 warm year. The freezing index and thawing index for each year at Lupin/Contwoyto Lake from 1959 to 2004 were calculated. The freezing index for each winter was ranked in ascending order and plotted on probability paper. A "best-fit" line was drawn through the set of points to estimate the 1 in 100 warm year freezing index. A similar procedure was repeated for the summer temperatures to obtain the 1 in 100 warm year thawing index. Mean winter air temperatures were multiplied by the ratio of the 1 in 100 year freezing index to the mean freezing index to estimate the monthly winter air temperatures of a 1 in 100 warm year. Similarly, mean summer air temperatures were multiplied by the ratio of the 1 in 100 year thawing index to the mean thawing index to estimate the monthly summer air temperatures of a 1 in 100 warm year.

Monthly air temperatures for a 1 in 100 warm year are also listed in Table 1. As shown in Table 1, the 1 in 100 warm year annual air temperature is approximately 3.3°C warmer than the mean annual air temperature for the period of 1971 to 2000.

3.3 AIR TEMPERATURES CONSIDERING GLOBAL WARMING TRENDS

Measured air temperatures for the period of 1959 to 2004 indicate that there was generally a warming trend in the air temperatures at Lupin/Contwoyto Lake. Panel on Energy Research and Development (PERD) for Environment Canada (PERD, 1998) reported on estimates of temperature change due to global warming. The "best estimate" scenario and the pessimistic "high sensitivity" scenario were presented in the PERD (1998) report. The predicted temperature changes vary with month and latitude. Table 2 lists the estimated monthly air temperature increases per decade for the "best estimate" case and "high sensitivity" case at a latitude similar to that for the Jericho Diamond Mine site (N65.8°) based on the data from PERD (1998).

TABLE 2: PREDICTED AIR TEMPERATURE CHANGE BY SEASON PER DECADE AT N65.8° LATITUDE

Year	December January February	March April May	June July August	September October November
Best Estimate	0.51	0.38	0.12	0.10
High Sensitivity	0.89	0.63	0.19	0.17

4.0 CALIBRATION THERMAL ANALYSIS

4.1 MODELLED SOIL PROFILE AND PROPERTIES

A thermistor cable was installed in borehole BH-03-10 within the footprint of the East Dam during the 2003 geotechnical program conducted by SRK Consulting. The subsurface soil profile for BH-03-10 consists of a thin (0.1 m) organics layer overlying 23 m thick till and granite bedrock. The till is silty sand and gravel with cobbles and boulders. The index properties for the soils were estimated based on the geotechnical data from the site investigation and past experience. Thermal properties of the soils were determined indirectly from well-established correlations with soil index properties (Farouki 1986; Johnston 1981). Table 3 summarizes the material properties used in the calibration thermal analysis.

TABLE 3: MATERIAL PROPERTIES USED IN CALIBRATION THERMAL ANALYSIS							
Material	Water Content (%)	Bulk Density (Mg/m^3)	Thermal Conductivity (W/m-K)		Specific Heat (kJ/kg°C)		Latent Heat (MJ/m^3)
			Frozen	Unfrozen	Frozen	Unfrozen	
Moss/Organics	200	1.20	1.38	0.52	1.96	3.36	267
Till	9	2.33	2.65	2.08	0.85	1.02	64
Bedrock	1	2.53	3.00	3.00	0.75	0.77	8

4.2 THERMAL MODEL CALIBRATION AND ANALYSIS RESULTS

One-dimensional calibration thermal analyses were carried out to calibrate the thermal model with the measured ground temperature at BH-03-10. Input such as snow properties, ground surface conditions and evapotranspiration factor were modified to calibration thermal analyses to obtain a good agreement between the modelled and measured ground temperatures. Table 4 compares the calibrated ground temperatures with those measured on September 29, 2003 at BH-03-10.

TABLE 4: MEASURED AND MODELLED GROUND TEMPERATURES ON SEPTEMBER 29, 2003		
Depth below Ground Surface (m)	Measured at BH-03-10 (°C)	Model at BH-03-10 (°C)
2	-2.5	-0.6
5	-3.7	-3.7
9	-6.2	-5.8
15	-6.3	-6.0

Table 4 indicates that there is generally a good agreement between the measured and calibrated ground temperatures for BH-03-10 except for the depth of 2.0 at which the measured ground temperature was approximately 2 °C colder than the calibrated. However, warmer measured ground temperatures at a depth of 2.0 m below the ground surface at other borehole locations at the mine site suggest that the measured ground temperature at the depth of 2 m for BH-03-10 appears too cold for some unknown reasons. The measured ground temperature at a depth of 2 m was 0.5 °C on September 29, 2003, and -0.4°C on October 18, 2005 for BH-03-06. BH-03-06 was on a slightly higher ground surface on the west side of the West Dam. This borehole had a similar soil profile within top 6 m as that for BH-03-10.

In summary, the calibrated ground temperatures were generally consistent with the measured data and on the slightly conservative (warmer) side.

5.0 INITIAL GROUND TEMPERATURES BENEATH DAM FOOTPRINTS

A thermal analysis was carried out to evaluate the thermal influence of the nearby water bodies (lakes) on initial ground temperatures at the East and South East Dams locations. A lake with a diameter of 140 m was simulated in a two-dimensional axisymmetric thermal analysis to represent the presence of Long Lake upstream of the East Dam or the lake downstream of the South East Dam. The lake was simulated as temperature boundary with assumed lake water temperatures similar to those measured at northern lakes. The soil profile and properties used in the analysis were the same as listed in Table 3.

The thermal analyses results estimate that the ground temperatures are warmer closer towards the lake edge; however, the lake has little thermal influence greater than 30 m away from the lake edge. The majority of dam footprint is more than 50 m away from the closest nearby lake. Estimated ground temperatures at a location 50 m away from the lake edge were used as initial ground temperatures prior to the dam construction for the thermal analyses of the two dams. The estimated initial ground temperatures on January 30 were selected to represent the winter construction conditions of the two dams. The estimated initial ground temperature at a depth of 15 m from the ground surface was –5.6°C, which is 0.7°C warmer than the measured ground temperature at the same depth at BH-03-10.

6.0 THERMAL EVALUATION OF EAST DAM

6.1 SOIL INDEX AND THERMAL PROPERTIES

The soil index properties for the construction materials and native soils were estimated based on the geotechnical data from the site investigation and past experience. Thermal properties of the soils were determined indirectly from well-established correlations with soil index properties or based on past experience. Table 5 summarizes the material properties used in the thermal analyses.

TABLE 5: MATERIAL PROPERTIES USED IN THERMAL ANALYSES							
Material	Water Content (%)	Bulk Density (Mg/m³)	Thermal Conductivity (W/m-K)		Specific Heat (kJ/kg°C)		Latent Heat (MJ/m³)
			Frozen	Unfrozen	Frozen	Unfrozen	
Run-of-Mine	3	2.16	1.65	1.82	0.77	0.83	21
Till Fill (unsaturated)	7	2.14	1.69	1.66	0.82	0.96	47
200 mm Minus (unsaturated)	4	2.18	1.84	1.93	0.79	0.87	28
Bedding Sand (unsaturated)	5	2.15	1.83	1.87	0.80	0.90	34
Coarse Tailings (unsaturated)	6	2.01	1.44	1.51	0.81	0.93	38
Overburden Till	9	2.33	2.65	2.08	0.85	1.02	64
Bedrock	1	2.53	3.00	3.00	0.75	0.77	8
Till Fill (saturated)	13	2.26	2.77	1.94	0.89	1.13	87
Coarse Tailings (saturated)	15	2.18	2.76	1.88	0.91	1.18	95
Fine Tailings	162	1.31	2.32	0.77	1.58	2.87	269

6.2 CASES SIMULATED AND ASSOCIATED ASSUMPTIONS

The typical design cross-section for the East Dam is identical to that for the South East Dam. The lowest original ground surface elevation at the centreline of the East Dam is 517 m, and at the South East Dam is 518 m. A vertical cross-section perpendicular to the axis of the East Dam through its lowest original ground surface was simulated in the thermal analyses.

Three cases were simulated in the thermal analyses as listed in Table 6, to evaluate various climate scenarios. Individual thermal analysis runs were conducted to simulate gradual rises of the upstream water and fine tailings surface elevations with time. The fine tailings elevation rise with time was based on the data presented in SRK (2004) for fine tailings without entrained ice. All analyses assumed that the water level in the PKCA was maintained at highest possible level. This is a conservative assumption, as it results in warmer ground temperatures. The operation water levels are expected to be lower than that assumed.

Case 1 assumed mean climatic conditions. Case 2 was analyzed to evaluate the global warming impacts on the long-term thermal conditions of the dams. Air temperatures associated with the "high sensitivity" case of the global warming were used in the analyses. Case 3 was analyzed to estimate the maximum thaw depth after two consecutive 1 in 100 warm years.

TABLE 6: CASES SIMULATED AND ASSOCIATED ASSUMPTIONS					
Case	Run No.	Simulated Time Period	Upstream Water Elevation (m)	Upstream Fine Tailings Elevation (m)	Air Temperature Assumed
1	1	Jan. 30, 2006 to Jun. 1, 2006	< 517.0	< 517.0	Mean
	2	Jun. 1, 2006 to Jun.1, 2007	518.0	<517.0	
	3	Jun. 1, 2007 to Jun.1, 2008	521.0	517.0	
	4	Jun. 1, 2008 to Jun.1, 2009	523.0	518.0	
	5	Jun. 1, 2009 to Jun.1, 2010	523.0	520.0	
	6	Jun. 1, 2010 to Jun.1, 2012	523.0	521.0	
	7	Jun. 1, 2012 to Jun.1, 2022	523.0	523.0	
2	6a	Jun. 1, 2010 to Jun.1, 2012	523.0	521.0	"High Sensitivity" Global Warming
	7a	Jun. 1, 2012 to Jun.1, 2022	523.0	523.0	
3	6b	Jun. 1, 2010 to Jun.1, 2012	523.0	521.0	1 in 100 Warm

A water/ice temperature boundary was applied on the upstream side of the dam and fine tailings that are below the water level. The assumed water temperature was based on measured lake water temperatures in northern lakes and past experience in design some frozen core dams at EKATI Diamond Mine (EBA, 2003). Table 7 lists assumed water temperatures for shallow lakes (≤ 1.5 m deep) and deep lakes (> 1.5 m deep).

TABLE 7: ASSUMED WATER TEMPERATURES IN THERMAL ANALYSES												
Lake Depth	Mid-Month Lake Water Temperature (°C)											
	J	F	M	A	M	J	J	A	S	O	N	D
≤ 1.5 m	0	-1	-1	-1	1	3	15	14	5	2	1	0.5
> 1.5 m	2	2	2	2	2	4	10	14	7	3	2	2

Climatic conditions were applied at the surfaces exposed to air. The snow cover on the dam was assumed to be affected by wind. The assumed snow cover on the dam crest was 50% of the mean monthly snow cover and on the slopes increased linearly to four times the mean monthly snow depth at the downstream toe. It was assumed that there would be no ponding water on the original ground surface downstream of the dams. Climatic conditions with mean monthly snow depths were applied to the original ground surface 15 m from the downstream toe.

The initial temperatures of the dam construction materials on January 30, 2006 were assumed to be 2°C for the coarse tailings and -4°C for the other materials. Prior to impoundment, the upstream till is frozen; however, water will infiltrate the upstream dam shell as water rises against the dam. It was assumed that impounded water will seep through the coarse tailings and into the originally unsaturated till fill, thereby raising the temperature of the coarse tailings and till fill. The temperatures of the upstream till fill and coarse tailings upon initial submergence were assumed to be 0.5 ^{o}C on June 1. The initial temperature of the submerged fine tailings on June 1 was assumed to be 3 ^{o}C.

6.3 RESULTS AND DISCUSSION

The thermal analyses indicate that the ground temperatures adjacent to the key trench were the warmest in early December. Figures 1 to 4 present predicted temperature distributions under mean climatic conditions in early December 2006, 2008, 2010, and 2014, respectively. The analyses indicate that the ground beneath the dam generally warms with time; nevertheless, the ground temperatures within the key trench remain colder than -2^{o}C at the end of the mine life (2014).

The predicted temperature distribution in early December of 2014 under the "high sensitivity" global warming conditions is shown in Figure 5. The ground temperatures in global warming case are slightly warmer at depth for the mean climate case (Figure 4). The ground temperatures within the key trench area remain colder than -2^{o}C for the global warming case.

The water and fine tailings elevation assumptions in Table 6 are generally conservative. The actual upstream water elevation is expected to be lower than the assumed values; and the actual fine tailings elevation may be higher than the assumed values in Table 6 if ice is entrained in the fine tailings. As a result, the actual ground temperatures for the upstream portion of the dam would be colder than predicted, since the water body (as a heat source) in front of the dams would be pushed further away from the dams and key trenches.

The ground temperatures for the downstream portion of the dam could be warmer if water is ponded against the downstream slope of the dams. Should this happen, engineering measures, such as placing fill on the toe of the downstream slope or diverting the water away from the downstream toe, should be implemented to alleviate the negative thermal impacts of the ponding water.

Thermal analysis results indicate that the thaw depth below the dam crest will be deepest in early October. Table 8 summarizes the maximum thaw depths below the dam surface under the air temperatures of mean, "high sensitivity" global warming, and 1:100 warm year conditions. The predicted ground temperatures in early October of 2011 after two consecutive 1:100 warm years are shown in Figure 6. The dam design included a minimum cover of 5 m of fill over the liner to ensure 1.5 m of frozen fill above the liner.

TABLE 8: PREDICTED MAXIMUM THAW DEPTHS IN EARLY OCTOBER			
Air Temperature	Year	Thaw Depth below Dam Centerline	Thaw Depth below Crest of Downstream Slope
Mean	2014	2.8	3.7
"High Sensitivity" Global Warming	2014	3.1	4.0
Two Consecutive 1:100 Warm Years after June 1, 2010	2011	3.4	4.3

REFERENCES:

EBA Engineering Consultants Ltd., 2003. Two Rock Sedimentation Pond Final Design Report, Ekati Diamond Mine. EBA File No. 0101-94-11580.067. Submitted to BHP Billiton Diamonds Inc., July 2003.

EBA Engineering Consultants Ltd., 2005. Jericho Project East and SouthEast Dam Design Report. EBA File No. 0101-1100060.004. Submitted to Tahera Diamond Corporation, August 2005.

Environment Canada, 1982a. Canadian Climate Normals, Volume 5, Wind, 1951 - 1980, 283 pp.

Environment Canada, 1982b. Canadian Climate Normals, Volume 1, Solar Radiation, 1951 - 1980, 57 pp.

Environment Canada, 1993. Canadian Climate Normals, 1961-1990, Yukon and Northwest Territories, 58 pp.

Farouki, O.T., 1986. Thermal Properties of Soils. TransTech Publications, Germany, 136 p.

Johnston, G.H. (Editor), 1981. Permafrost, Engineering Design and Construction. Wiley & Sons Toronto, 540 p.

PERD, 1998. Climate Change Impacts on Permafrost Engineering Design, funded by Panel on Energy Research and Development, Environment Canada, 42 pp.

SRK Consulting, 2004. Technical Memorandum P. Design of Processed Kimberlite Containment Area, Jericho Project, Nunavut.

FIGURES

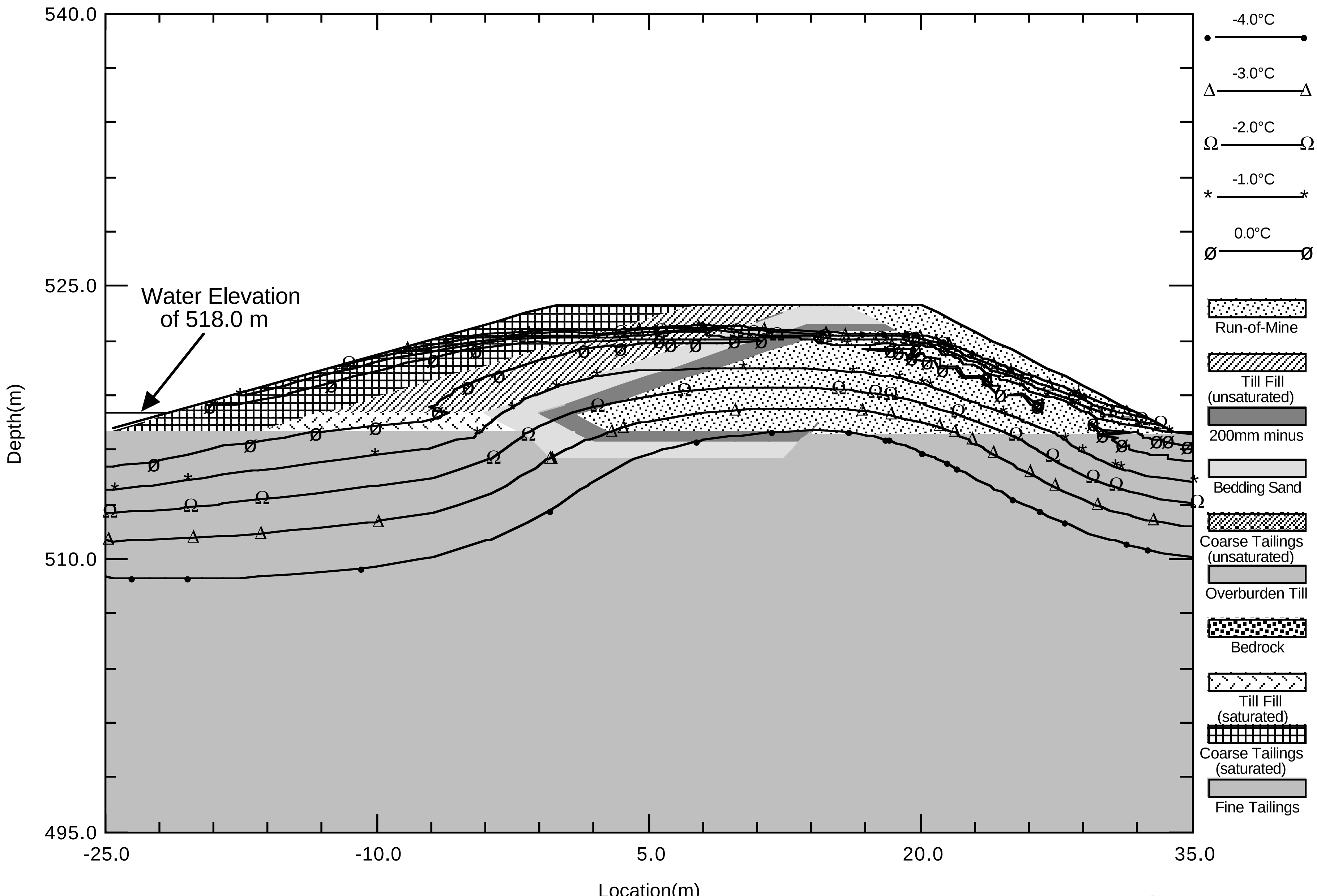


Figure 1

Predicted Isotherms in Early December of 2006 East Dam under Mean Climatic Conditions

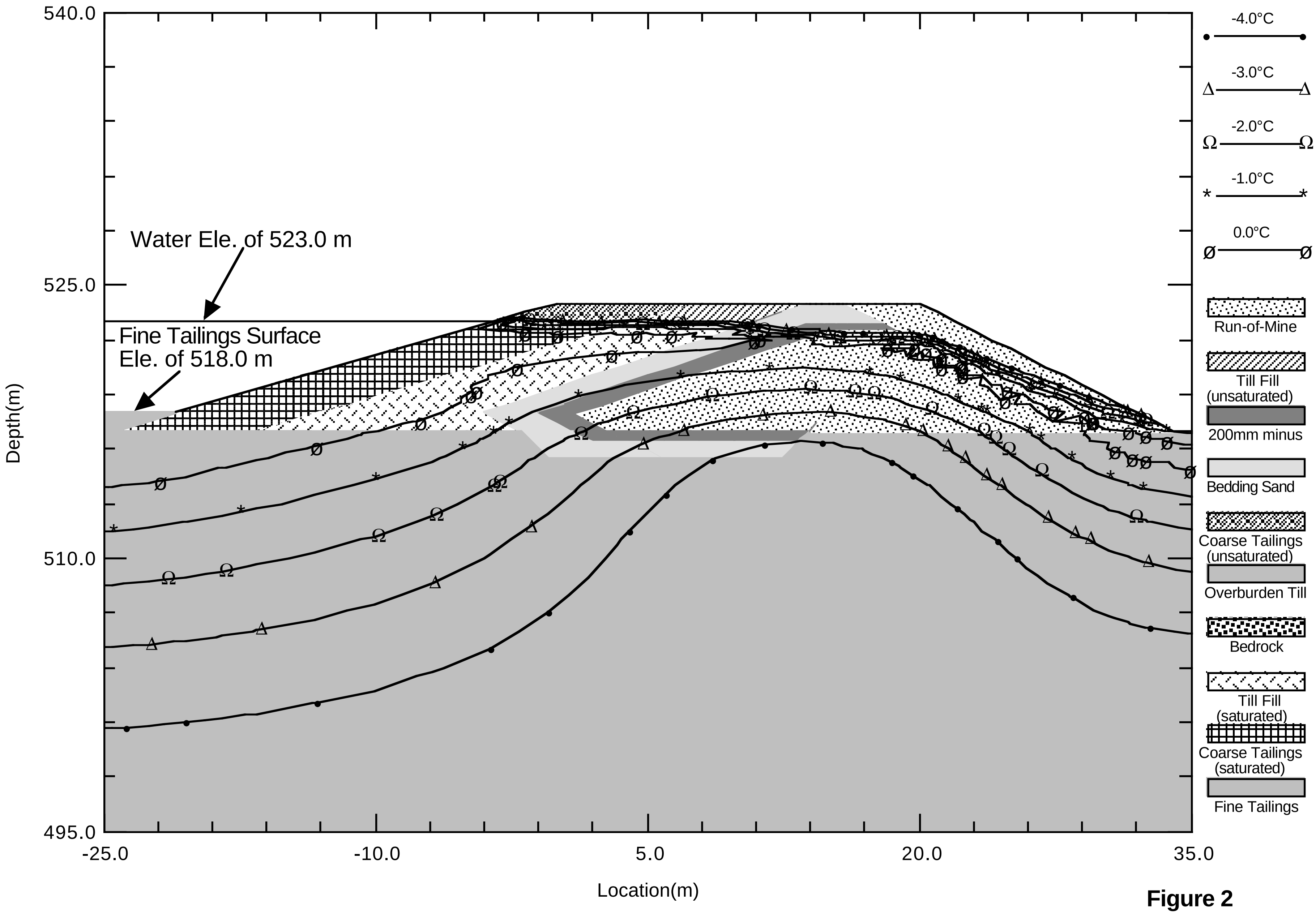


Figure 2

Predicted Isotherms in Early December of 2008 East Dam under Mean Climatic Conditions

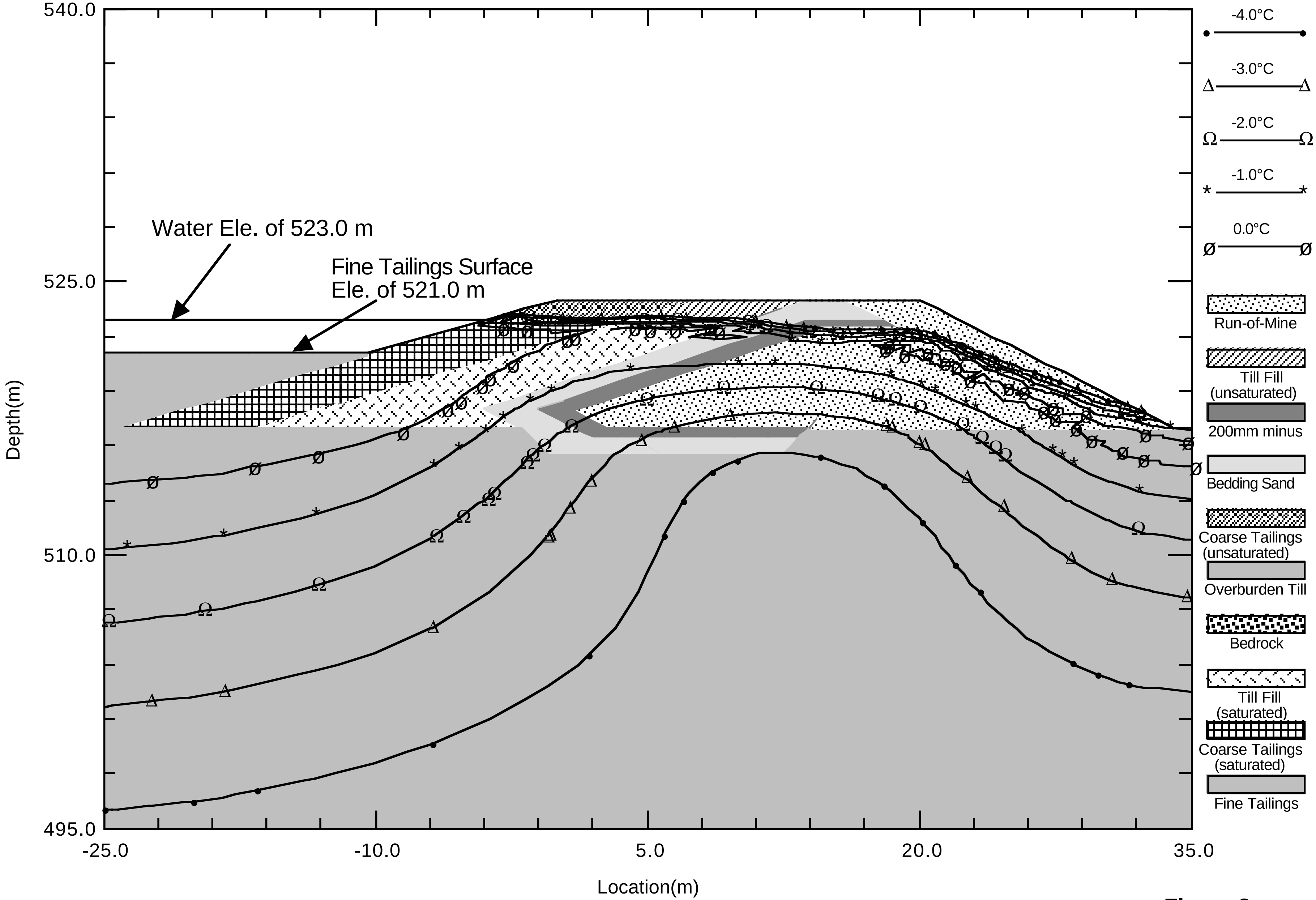


Figure 3

Predicted Isotherms in Early December of 2010
East Dam under Mean Climatic Conditions

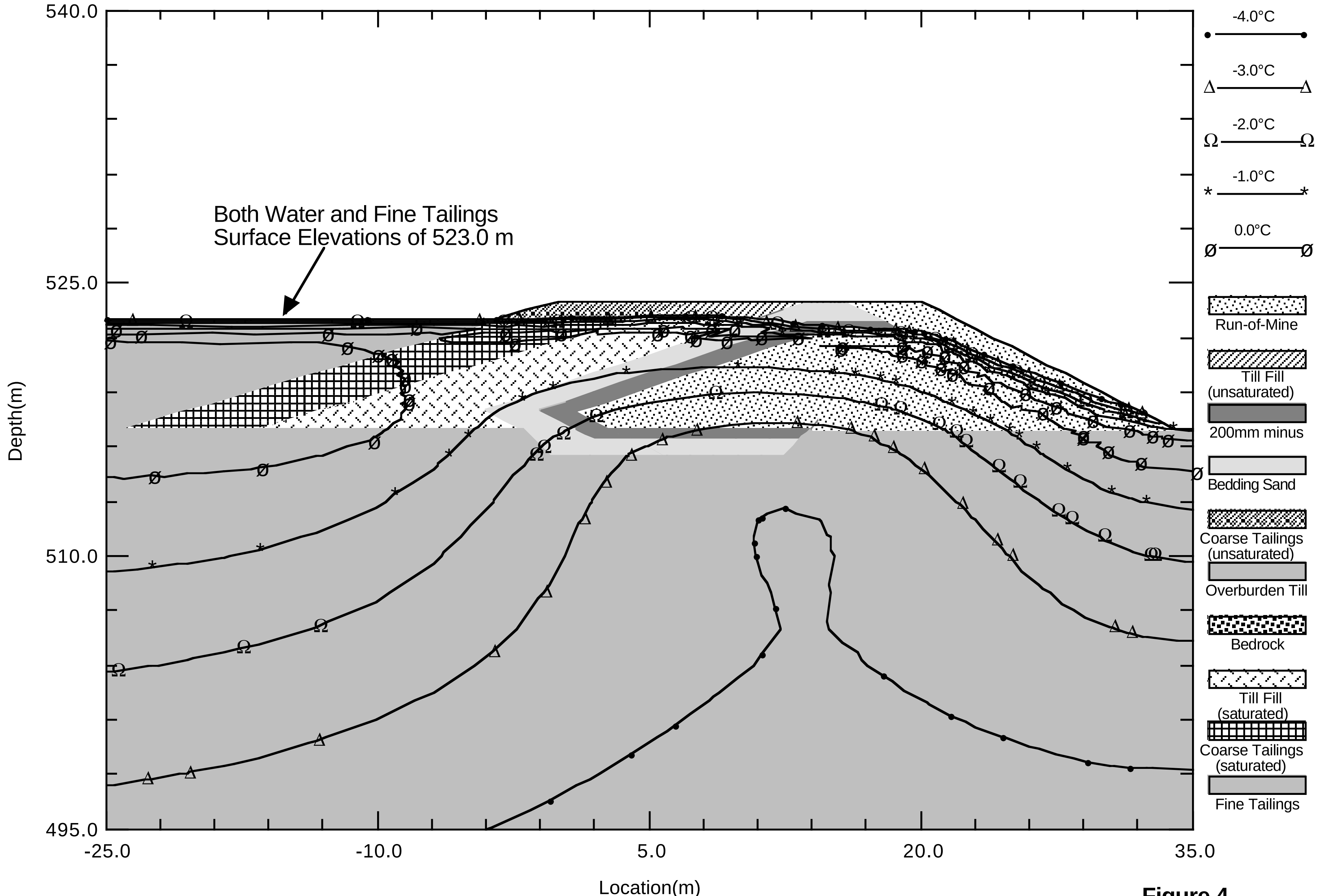


Figure 4

Predicted Isotherms in Early December of 2014
East Dam under Mean Climatic Conditions

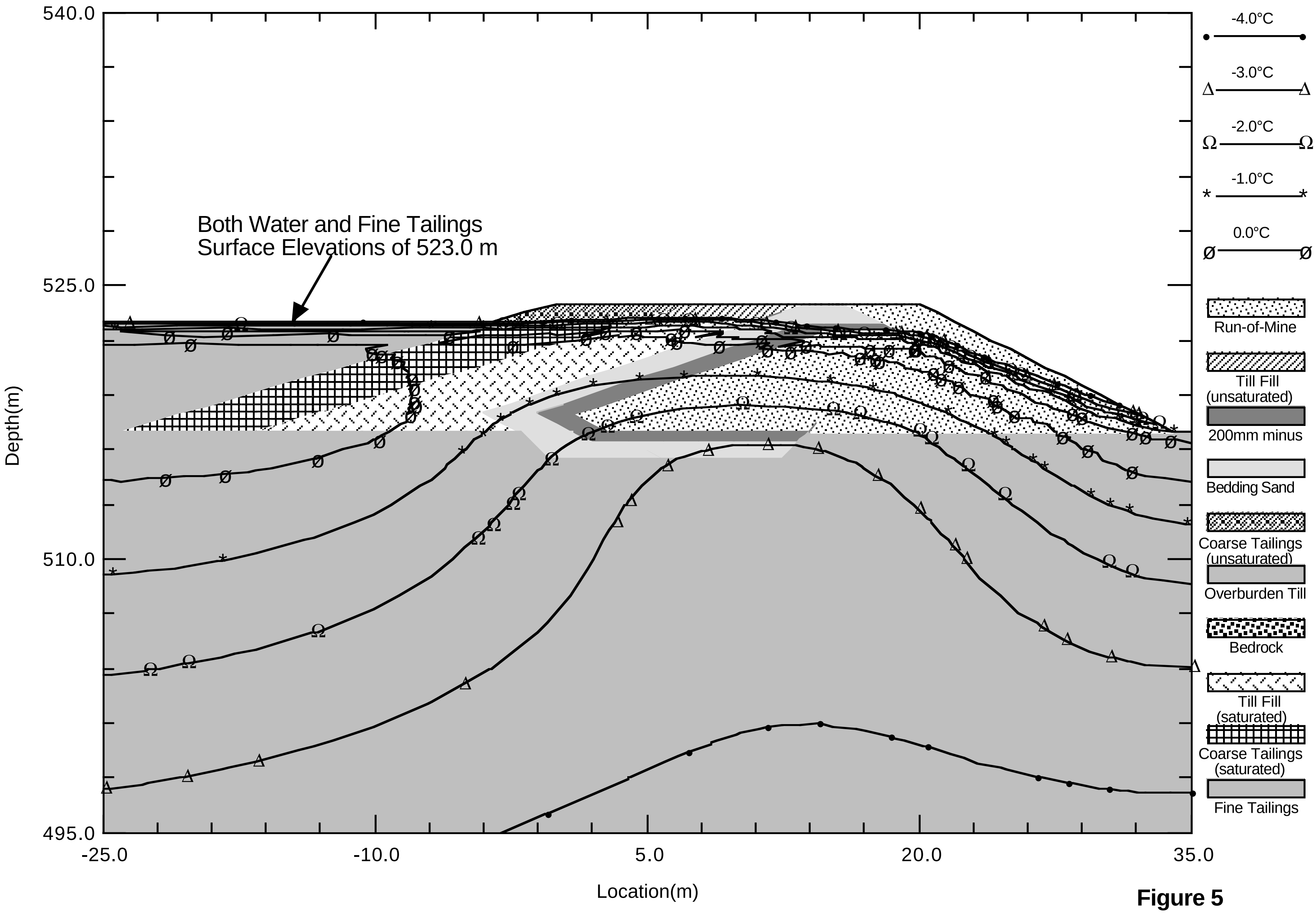


Figure 5

Predicted Isotherms in Early December of 2014
East Dam under "High Sensitivity" Global Warming Conditions

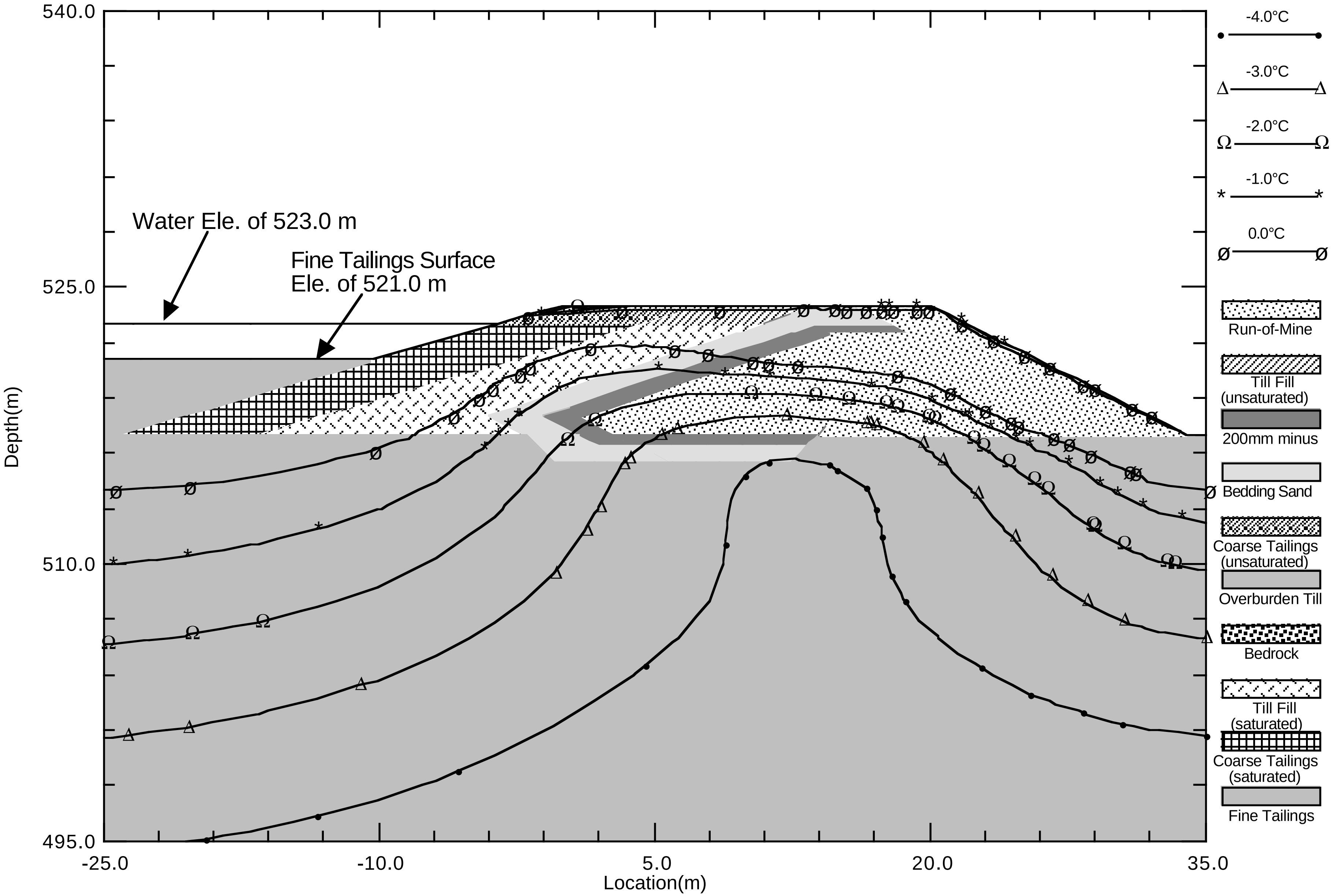


Figure 6

Predicted Isotherms and Maximum Thaw Depth in Early October of 2011 East Dam under Two Consecutive 1:100 Warm Years after June 1, 2010

APPENDIX

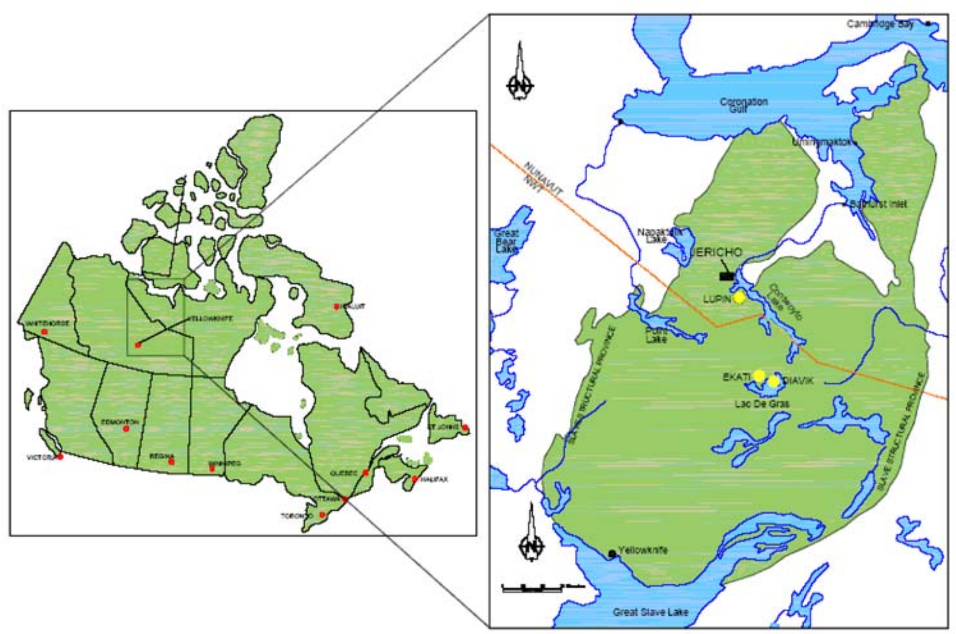
APPENDIX C REVISED CONSTRUCTION DRAWINGS

TAHERA Diamond Corporation

JERICHO PROJECT

EAST AND SOUTHEAST DAM

CONSTRUCTION DRAWINGS



LOCATION PLAN

DRAWING LIST

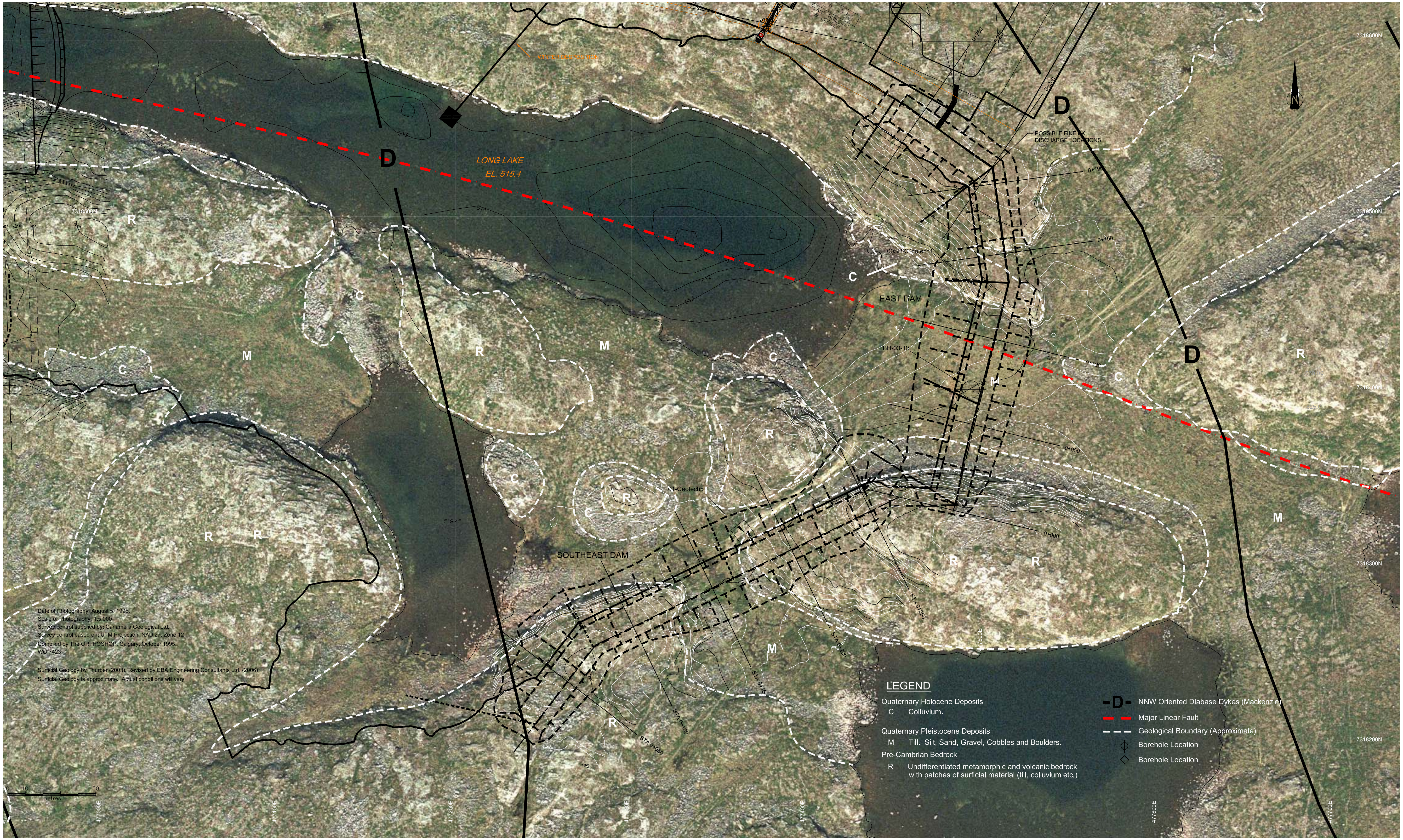
DRAWING	DRAWING TITLE
ED–2	EAST DAM AND SOUTHEAST DAM SURFICIAL GEOLOGY
ED–3	EAST DAM AND SOUTHEAST DAM LOCATION PLAN
ED–4	EAST DAM AND SOUTHEAST DAM TYPICAL CROSS SECTIONS
ED–5	EAST DAM AND SOUTHEAST DAM KEY TRENCH LAYOUT PLAN
ED–6	EAST DAM AND SOUTHEAST DAM LINER LAYOUT PLAN
ED–7	EAST DAM PROFILE AND CROSS SECTION
ED–8	SOUTHEAST DAM PROFILE AND CROSS SECTION

REVISION #1 JANUARY 2006

EBA ENGINEERING CONSULTANTS LTD.

CONSULTANTS REFERENCE NO.: 1100060.004

ACAD FILENAME: 1100060004R0_1.dwg



No.	DESCRIPTION	DATE	APPROVED
1	REVISED SURFICIAL GEOLOGY	JAN/06	WTH
0	ISSUED FOR CONSTRUCTION	AUG/05	WTH
A	ISSUED FOR REVIEW	AUG/05	WTH

REVISION

DRAWING No.	DRAWING TITLE	DATE	REV
–	–	DD/MM/YY	

REFERENCE DRAWINGS

EBA ENGINEERING CONSULTANTS LTD.

DESIGNED BY: WTH
DRAWN BY: RGR
DATE: 18/08/05
SCALE: AS SHOWN
PROJECT No.: 1100060.004
ACAD FILENAME: 1100060004R26A.dwg

ORIGINAL
SIGNED AND SEALED

Seal: William T. Horne, P.Eng.
Date: August 30, 2005

Permit: Derek C. Cathro, P.Eng.
Date: August 30, 2005

The signed Professional Seal and Permit to Practice stamps reside on the executed drawing which is held and controlled by EBA Engineering Consultants Ltd.

TAHERA
Diamond Corporation

JERICHO PROJECT

EAST AND SOUTHEAST DAM
SURFICIAL GEOLOGY

REVISION ISSUE: 1

DRAWING No.: ED–2

COORDINATE LAYOUT TABLE
EAST DAM

POINT	NORTHING	EASTING	ELEVATION
1	7 318 335.67	477 489.57	527
2	7 318 339.93	477 471.82	527
3	7 318 463.57	477 501.99	524.50
4	7 318 462.62	477 520.56	524.50
5	7 318 531.75	477 510.62	527
6	7 318 521.12	477 493.94	527
7	7 318 554.28	477 446.20	527
8	7 318 569.39	477 456.44	527
9	7 318 521.68	477 512.36	527
10	7 318 518.97	477 494.31	527
11	7 318 478.80	477 518.31	524.50
12	7 318 476.30	477 500.23	524.50
13	7 318 355.66	477 494.38	524.50
14	7 318 359.98	477 476.65	524.50
15	7 318 339.40	477 490.46	527
16	7 318 343.74	477 472.74	527

COORDINATE LAYOUT TABLE
SOUTHEAST DAM

POINT	NORTHING	EASTING	ELEVATION
1	7 318 206.85	477 248.71	527
2	7 318 217.91	477 234.20	527
3	7 318 266.52	477 271.46	526.43
4	7 318 251.99	477 283.32	526.43
5	7 318 328.33	477 439.90	527
6	7 318 344.74	477 431.91	527
7	7 318 323.56	477 430.05	527
8	7 318 339.97	477 422.05	527
9	7 318 313.69	477 409.89	524.50
10	7 318 330.18	477 402.06	524.50
11	7 318 268.20	477 316.62	524.50
12	7 318 284.61	477 308.63	524.50
13	7 318 239.41	477 273.70	527
14	7 318 250.65	477 259.29	527

REFERENCE DRAWINGS

DRAWING No.	DRAWING TITLE	DATE	REV
-	-	DD/MM/YY	

REVISION

No.	DESCRIPTION	DATE	APPROVED
1	REVISED CREST ELEVATION	JAN/06	WTH
0	ISSUED FOR CONSTRUCTION	AUG/05	WTH
A	ISSUED FOR REVIEW	AUG/05	WTH

EBA ENGINEERING CONSULTANTS LTD.

DESIGNED BY: WTH
DRAWN BY: RGR
DATE: 02/08/05
SCALE: AS SHOWN
PROJECT No.: 1100060.004
ACAD FILENAME: 1100060004R35A.dwg

ORIGINAL
SIGNED AND SEALED

Seal: William T. Horne, P.Eng.
Date: August 30, 2005

Permit: Derek C. Cathro, P.Eng.
Date: August 30, 2005

The signed Professional Seal and Permit to Practice stamps reside on the executed drawing which is held and controlled by EBA Engineering Consultants Ltd.

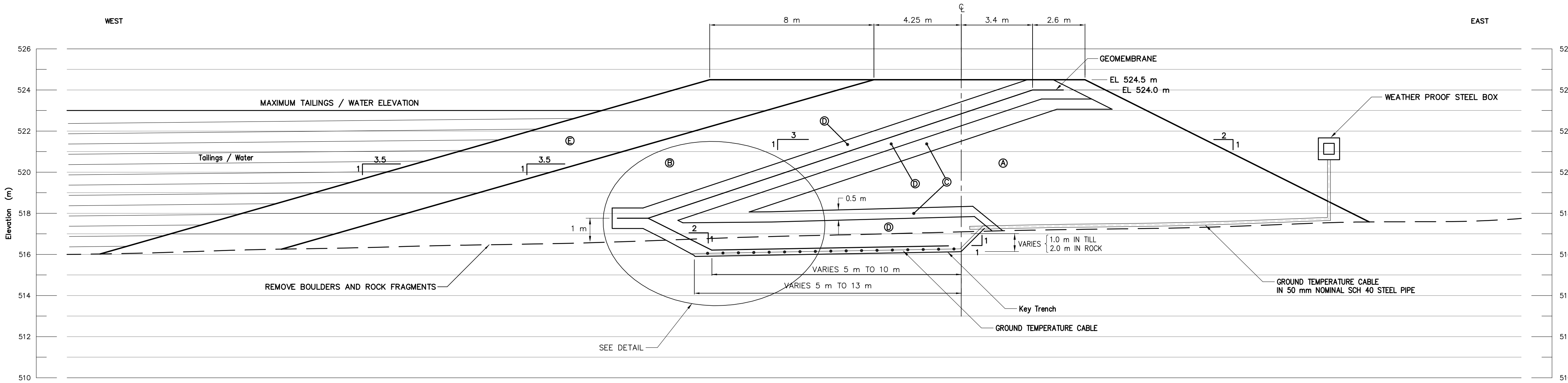
TAHERA
Diamond Corporation

JERICHO PROJECT

EAST DAM AND SOUTHEAST DAM
LOCATION PLAN

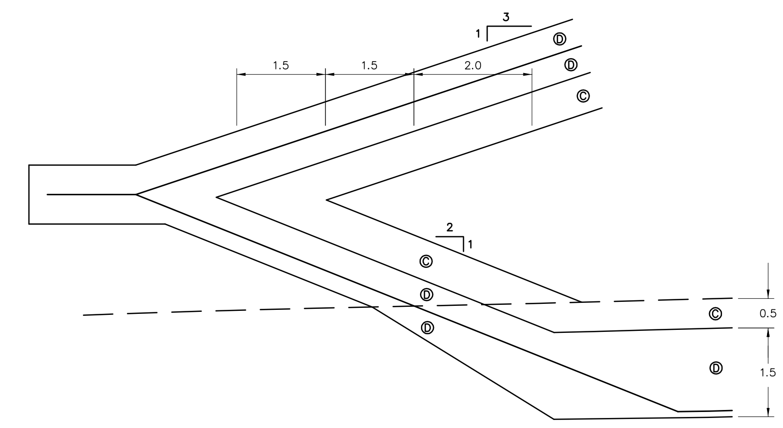
REVISION ISSUE: 1

DRAWING No.: ED-3

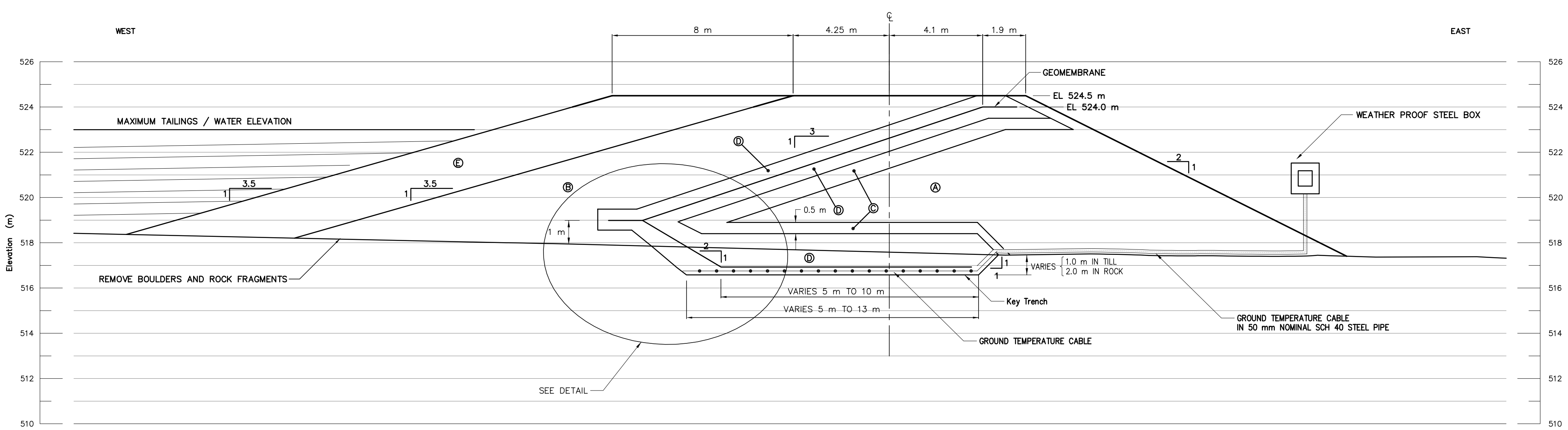


MATERIAL TYPES
- Ⓐ RUN–OF–MINE
- Ⓑ TILL
- Ⓒ 200 mm MINUS
- Ⓓ BEDDING (Screened Esker or 20 mm Minus)
- Ⓔ COARSE TAILINGS

EAST DAM – TYPICAL SECTION



DETAIL
N.T.S.



MATERIAL TYPES
- Ⓐ RUN–OF–MINE
- Ⓑ TILL
- Ⓒ 200 mm MINUS
- Ⓓ BEDDING (Screened Esker or 20 mm Minus)
- Ⓔ COARSE TAILINGS

SOUTHEAST DAM – TYPICAL SECTION

0 — 5 metres

DRAWING No.	DRAWING TITLE	DATE	REV
–	–	DD/MM/YY	

REFERENCE DRAWINGS

No.	DESCRIPTION	DATE	APPROVED
1	REVISED CREST ELEVATION	JAN/06	WTH
0	ISSUED FOR CONSTRUCTION	AUG/05	WTH
A	ISSUED FOR REVIEW	AUG/05	WTH

REVISION

EBA ENGINEERING CONSULTANTS LTD. eba

DESIGNED BY: WTH
DRAWN BY: RGR
DATE: 08/08/05
SCALE: AS SHOWN
PROJECT No.: 1100060.004
ACAD FILENAME: 1100060004R28A.dwg

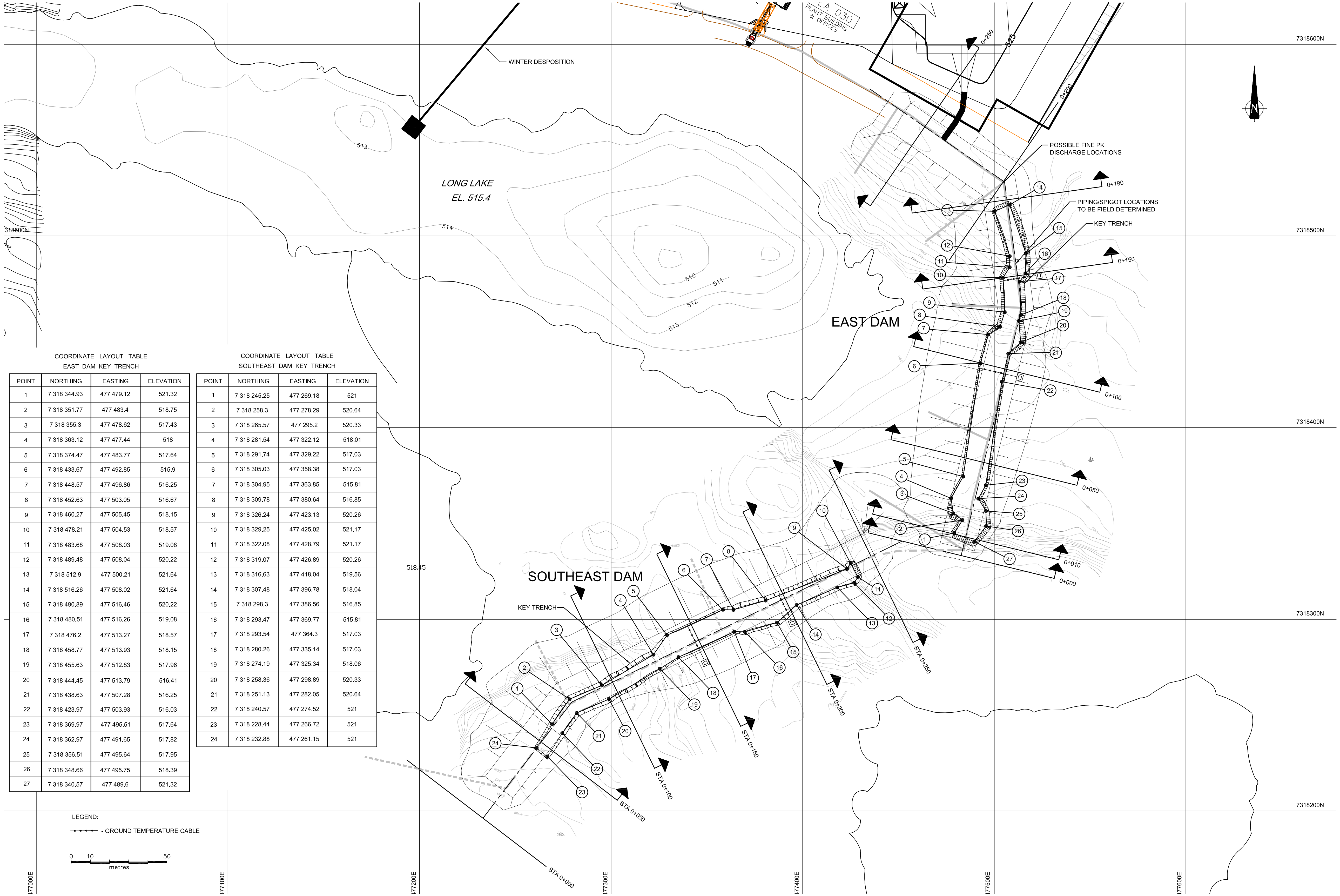
ORIGINAL
SIGNED AND SEALED
Seal: William T. Horne, P.Eng. Date: August 30, 2005
Permit: Derek C. Cathro, P.Eng. Date: August 30, 2005
The signed Professional Seal and Permit to Practice stamps reside on the executed drawing which is held and controlled by EBA Engineering Consultants Ltd.

TAHERA
Diamond Corporation

JERICHO PROJECT

EAST DAM AND SOUTHEAST DAM
TYPICAL CROSS–SECTIONS

REVISION ISSUE: 1
DRAWING No. ED–4



COORDINATE LAYOUT TABLE
EAST DAM KEY TRENCH

POINT	NORTHING	EASTING	ELEVATION
1	7 318 344.93	477 479.12	521.32
2	7 318 351.77	477 483.4	518.75
3	7 318 355.3	477 478.62	517.43
4	7 318 363.12	477 477.44	518
5	7 318 374.47	477 483.77	517.64
6	7 318 433.67	477 492.85	515.9
7	7 318 448.57	477 496.86	516.25
8	7 318 452.63	477 503.05	516.67
9	7 318 460.27	477 505.45	518.15
10	7 318 478.21	477 504.53	518.57
11	7 318 483.68	477 508.03	519.08
12	7 318 489.48	477 508.04	520.22
13	7 318 512.9	477 500.21	521.64
14	7 318 516.26	477 508.02	521.64
15	7 318 490.89	477 516.46	520.22
16	7 318 480.51	477 516.26	519.08
17	7 318 476.2	477 513.27	518.57
18	7 318 458.77	477 513.93	518.15
19	7 318 455.63	477 512.83	517.96
20	7 318 444.45	477 513.79	516.41
21	7 318 438.63	477 507.28	516.25
22	7 318 423.97	477 503.93	516.03
23	7 318 369.97	477 495.51	517.64
24	7 318 362.97	477 491.65	517.82
25	7 318 356.51	477 495.64	517.95
26	7 318 348.66	477 495.75	518.39
27	7 318 340.57	477 489.6	521.32

COORDINATE LAYOUT TABLE
SOUTHEAST DAM KEY TRENCH

POINT	NORTHING	EASTING	ELEVATION
1	7 318 245.25	477 269.18	521
2	7 318 258.3	477 278.29	520.64
3	7 318 265.57	477 295.2	520.33
4	7 318 281.54	477 322.12	518.01
5	7 318 291.74	477 329.22	517.03
6	7 318 305.03	477 358.38	517.03
7	7 318 304.95	477 363.85	515.81
8	7 318 309.78	477 380.64	516.85
9	7 318 326.24	477 423.13	520.26
10	7 318 329.25	477 425.02	521.17
11	7 318 322.08	477 428.79	521.17
12	7 318 319.07	477 426.89	520.26
13	7 318 316.63	477 418.04	519.56
14	7 318 307.48	477 396.78	518.04
15	7 318 298.3	477 386.56	516.85
16	7 318 293.47	477 369.77	515.81
17	7 318 293.54	477 364.3	517.03
18	7 318 280.26	477 335.14	517.03
19	7 318 274.19	477 325.34	518.06
20	7 318 258.36	477 298.89	520.33
21	7 318 251.13	477 282.05	520.64
22	7 318 240.57	477 274.52	521
23	7 318 228.44	477 266.72	521
24	7 318 232.88	477 261.15	521

DRAWING No.	DRAWING TITLE	DATE	REV	No.	DESCRIPTION	DATE	APPROVED
				1	REVISED LENGTH OF SOUTHEAST DAM KEY TRENCH	JAN/06	WTH
				0	ISSUED FOR CONSTRUCTION	AUG/05	WTH
–	–	DD/MM/YY		A	ISSUED FOR REVIEW	AUG/05	WTH

REFERENCE DRAWINGS — REVISION

EBA ENGINEERING CONSULTANTS LTD.

DESIGNED BY: WTH
DRAWN BY: RGR
DATE: 02/08/05
SCALE: AS SHOWN
PROJECT No.: 1100060.004
ACAD FILENAME: 1100060004R25A.dwg

ORIGINAL
SIGNED AND SEALED

Seal: William T. Horne, P.Eng.
Date: August 30, 2005

Permit: Derek C. Cathro, P.Eng.
Date: August 30, 2005

The signed Professional Seal and Permit to Practice stamps reside on the executed drawing which is held and controlled by EBA Engineering Consultants Ltd.

TAHERA
Diamond Corporation

JERICHO PROJECT

EAST DAM AND SOUTHEAST DAM
KEY TRENCH LAYOUT PLAN

REVISION ISSUE: 1

DRAWING No.: ED-5

COORDINATE LAYOUT TABLE
EAST DAM LINER

POINT	NORTHING	EASTING	ELEVATION
1	7 318 343.43	477 477.72	524.0
2	7 318 346.35	477 479.65	524.0
3	7 318 354.41	477 473.84	520.9
4	7 318 361.82	477 475.33	519.95
5	7 318 374.99	477 482.59	519.54
6	7 318 403.41	477 486.4	518.51
7	7 318 431.11	477 491.03	517.8
8	7 318 448.61	477 496.05	518.1
9	7 318 455.21	477 501.03	520
10	7 318 460.51	477 503.37	520.97
11	7 318 477.51	477 502.4	521.29
12	7 318 483.73	477 504.06	522.07
13	7 318 488.34	477 506.15	523
14	7 318 505.54	477 502.81	524.0
15	7 318 513.93	477 501.22	524.0
16	7 318 488.38	477 509.35	524.0
17	7 318 446.79	477 514.05	524.0
18	7 318 369.53	477 495.03	524.0

COORDINATE LAYOUT TABLE
SOUTHEAST DAM LINER

POINT	NORTHING	EASTING	ELEVATION
1	7 318 246.36	477 266.13	524.0
2	7 318 261.21	477 275.52	524.0
3	7 318 269.46	477 293.13	524.0
4	7 318 285.24	477 320.23	521.06
5	7 318 294.96	477 331.84	518.84
6	7 318 311.25	477 366.88	519.08
7	7 318 314.53	477 380.46	520.08
8	7 318 329.44	477 423.20	524.0
9	7 318 304.33	477 386.37	524.0
10	7 318 280.38	477 337.30	524.0
11	7 318 235.29	477 257.77	524.0

DRAWING No.	DRAWING TITLE	DATE	REV
–	–	DD/MM/YY	

REFERENCE DRAWINGS

No.	DESCRIPTION	DATE	APPROVED
1	REVISED CREST ELEVATION	JAN/06	WTH
0	ISSUED FOR CONSTRUCTION	AUG/05	WTH
A	ISSUED FOR REVIEW	AUG/05	WTH

REVISION

EBA ENGINEERING CONSULTANTS LTD.

DESIGNED BY: WTH
DRAWN BY: RGR
DATE: 02/08/05
SCALE: AS SHOWN
PROJECT No.: 1100060.004
ACAD FILENAME: 1100060004R31A.dwg

ORIGINAL
SIGNED AND SEALED

Seal: William T. Horne, P.Eng.
Date: August 30, 2005

Permit: Derek C. Cathro, P.Eng.
Date: August 30, 2005

The signed Professional Seal and Permit to Practice stamps reside on the executed drawing which is held and controlled by EBA Engineering Consultants Ltd.

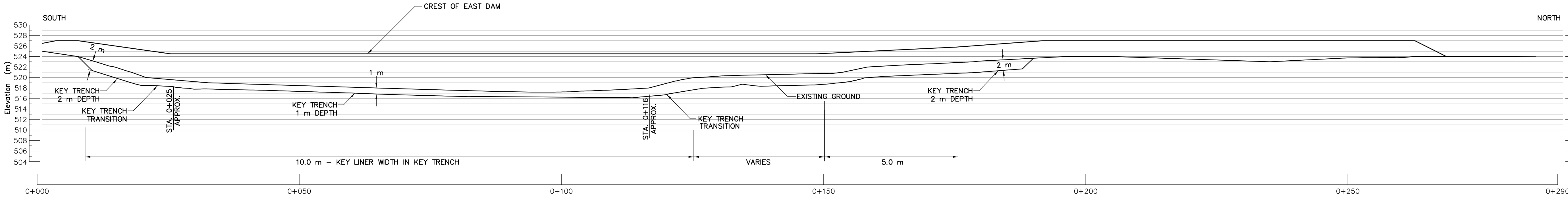
TAHERA
Diamond Corporation

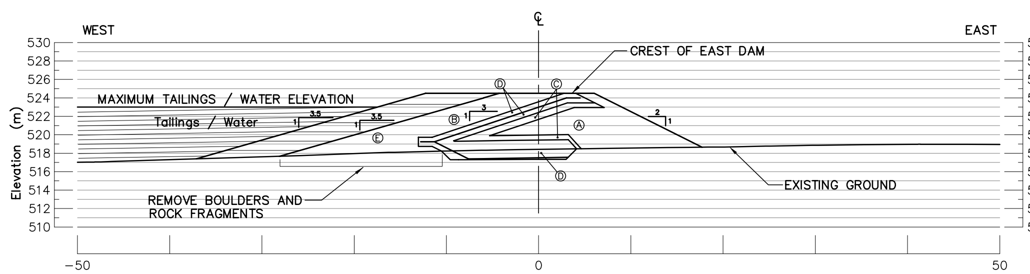
JERICHO PROJECT

EAST DAM AND SOUTHEAST DAM
LINER LAYOUT PLAN

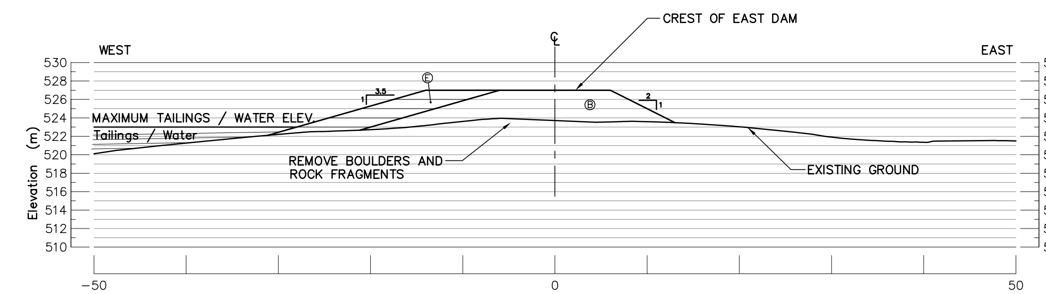
REVISION ISSUE
1

DRAWING No.
ED-6

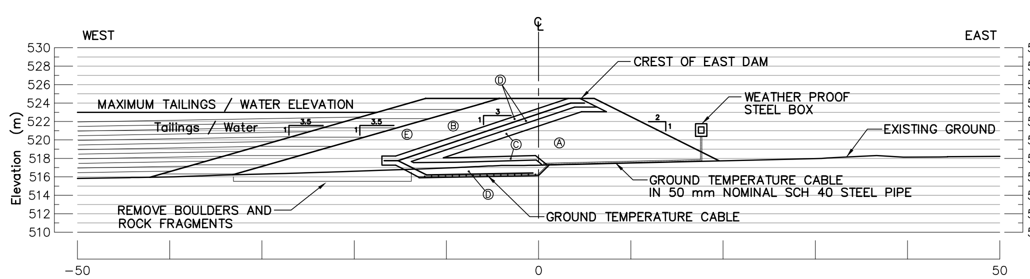




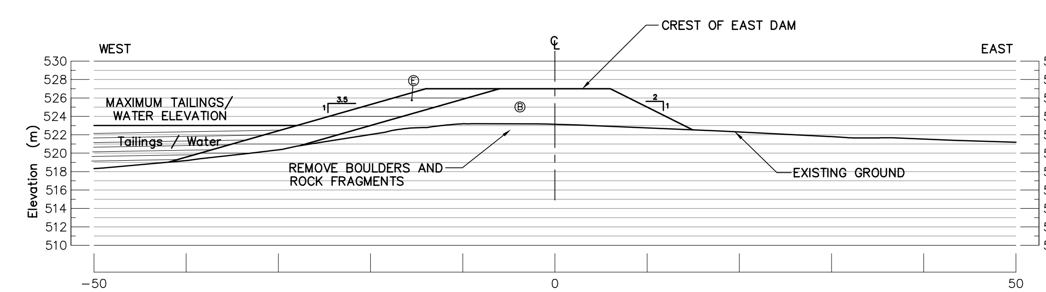
STATION 0+050



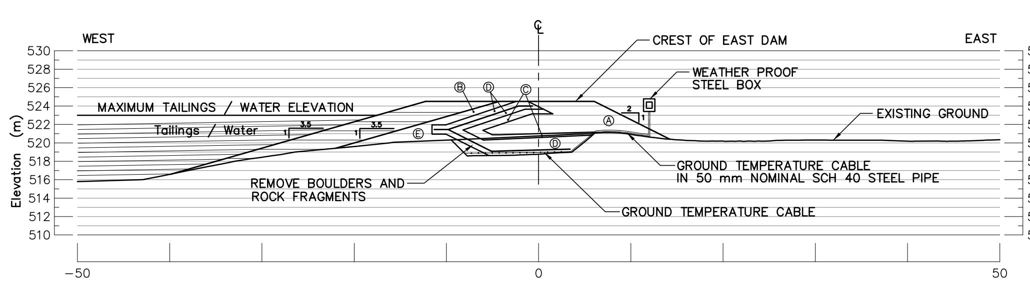
STATION 0+190



STATION 0+100



STATION 0+250



STATION 0+150

MATERIAL TYPES

- Ⓐ RUN-OF-MINE
- Ⓑ TILL
- Ⓒ 200 mm MINUS
- Ⓓ BEDDING (Screened Esker or 20 mm Minus)
- Ⓔ COARSE TAILINGS

NOTE: COARSE TAILINGS PLACED DURING MILL PRODUCTION. COARSE TAILING LEVEL TO REMAIN 2 m HIGHER THAN WATER LEVEL

0 20 metres

DRAWING No.	DRAWING TITLE	DATE	REV	No.	DESCRIPTION	DATE	APPROVED
				1	REVISED CREST ELEVATION	JAN/06	WTH
				0	ISSUED FOR CONSTRUCTION	AUG/05	WTH
–	–	DD/MM/YY		A	ISSUED FOR REVIEW	AUG/05	WTH
REFERENCE DRAWINGS				REVISION			

EBA ENGINEERING CONSULTANTS LTD.

DESIGNED BY: WTH
DRAWN BY: RGR
DATE: 08/08/05
SCALE: AS SHOWN
PROJECT No.: 1100060.004
ACAD FILENAME: 1100060004R33A.dwg

ORIGINAL SIGNED AND SEALED

Seal: William T. Horne, P.Eng. Date: August 30, 2005
Permit: Derek C. Cathro, P.Eng. Date: August 30, 2005

The signed Professional Seal and Permit to Practice stamps reside on the executed drawing which is held and controlled by EBA Engineering Consultants Ltd.

TAHERA Diamond Corporation

JERICHO PROJECT

EAST DAM
PROFILE and CROSS–SECTIONS

REVISION ISSUE: 1

DRAWING No.: ED–7