SHEAR DIAMONDS (NUNAVUT) CORP.

2011 PIT DEWATERING ADDENDUM TO PROCESSED KIMBERLITE MANAGEMENT PLAN JERICHO DIAMOND MINE, NUNAVUT

REPORT

MAY 2011
ISSUED FOR USE
EBA FILE: E14101118.002

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LIMITATIONS OF REPORT

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ACRONYMS & ABBREVIATIONS

AEMP	Aquatic Effects Monitoring Plan
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CALA	Canadian Association for Laboratory Accreditation
CAMP	Care and Maintenance Plan
CPK	Coarse Processed Kimberlite
DO	Dissolved Oxygen
EC	Electrical Conductivity
FPK	Fine Processed Kimberlite
GMP	General Monitoring Plan
INAC	Indian and Northern Affairs Canada
NWB	Nunavut Water Board
PHC	Petroleum Hydrocarbons
PKCA	Processed Kimberlite Containment Area
PKMP	PKCA Management Plan
Shear	Shear Diamonds (Nunavut) Corp.
SWMP	Site Water Management Plan
TDC	Tahera Diamonds Corporation
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
WTMP	Wastewater Treatment Management Plan
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

1.1 General

The Jericho Diamond Mine Pit Dewatering Addendum (PDA), described herein, has been developed to provide a methodology and schedule for the monitoring and discharge of water from the open pit and the Processed Kimberlite Containment Area (PKCA) in the receiving environment.

This addendum fulfills a commitment made in the Jericho Mine Processed Kimberlite Management Plan (PKMP) (EBA 2011h), which stated that a pit dewatering schedule will be submitted to the Nunavut Water Board (NWB) 30 days prior to commencing discharge of pit water. The PDA has been developed based on existing records including the Site Water Management Plan (SWMP)(EBA 2011i), Processed Kimberlite Management Plan (PKMP) (EBA 2011h), General Monitoring Plan (EBA 2011d), regulator comments, and recent site information.

1.2 Background Information

The Jericho Diamond Mine is located approximately 260 km southeast of Kugluktuk, NU, and 30 km north of Lupin Mine. The Jericho Mine was constructed and operated by Tahera Diamond Corporation (TDC) between 2004 and 2008. In January 2008, mining operations were suspended by TDC and the site was placed under care and maintenance. Shortly thereafter, Indian and Northern Affairs Canada (INAC) assumed control of the care and maintenance activities for the site. In August 2010, Shear Diamonds (Nunavut) Corp. (Shear) purchased the Jericho Mine and its assets and assumed the responsibility for the site. Presently, the mine remains under care and maintenance as Shear evaluates the mineral resource.

1.3 Objective of Pit Dewatering Management Plan

The purpose of this PDA is to describe the process whereby the pit water can be pumped and discharged, and then diluted within the PKCA. This will allow the pit water to be incorporated and discharged as part of the PKCA discharge while still meeting the water licence discharge criteria for the PKCA as established by the NWB (Water Licence No. 2AM-JER0410).

The PDA document includes:

- A description of Jericho's current site water conditions;
- A description of Jericho's current site water management equipment;
- Pit dewatering and PKCA discharge schedule;
- Water flow and water quality monitoring; and
- Associative contingency measures.

1.4 Linkage to Other Management Plans

The PDA has used information from both the SWMP and the PKMP to develop the pit dewatering and PKCA discharge schedule. Additional documents that were used for developing this schedule include:

- Aquatic Effects Monitoring Plan (AEMP);
- General Monitoring Plan (GMP);
- Wastewater Treatment Management Plan (WTMP); and
- Care and Maintenance Plan (CAMP).

2.0 CURRENT SITE WATER CONDITIONS

2.1 General

The general site layout including catchment boundaries is presented in Figure 1. The two major water containment areas are the PKCA, which was constructed to impound Fine Processed Kimberlite (FPK) and water, and the open pit, which has been naturally filled since the cessation of mining operations in 2008. Both areas are described in more detail in the following sections.

2.2 PKCA Facility

The PKCA is situated within the former Long Lake and is bound by natural high ground and a series of dams. For planning purposes, the PKCA area has been divided into three cells: Cell A, Cell B, and Cell C. As shown on Figure 2, Divider Dyke A divides Cell A and Cell B; Cell B and Cell C are currently not separated and comprise a single cell. FPK, process water, and water from other site water management facilities were historically discharged into Cell A. Supernatant water in the cell drains toward the permeable Divider Dyke A, and suspended solids in the water are retained as the water passes through the structure into the combined Cell B/C. The water in Cell B/C was then pumped over the West Dam and released into the receiving environment in Stream C3.

Previous years' care and maintenance activities have demonstrated that it is necessary to discharge water from the PKCA to maximize the storage volume in preparation for freshet. In 2010, before Shear acquired the project, only a limited amount of water was discharged from the PKCA. After the acquisition, Shear discharged water from the PKCA for approximately one month until weather conditions prohibited continuing. The final elevation of the impounded water was 516.08 m as measured during the annual formal geotechnical inspection on September 30, 2010 (EBA 2010).

The proposed location of the North Dam is in a low area at the north side of Cell B/C. The natural ground at the saddle of the North Dam is approximately 518.2 m and will restrict pond elevations in the PKCA to 517.2 m until the North Dam has been completed. Based on Cell B/C stage storage curve in Figure 3, Cell B/C contains (September 30, 2010 level) approximately 160,000 m^3 of water, and the remaining storage capacity is approximately 70,000 m^3.

During the PKCA discharge in September 2010, the water quality monitoring results showed no parameters are above the water licence discharge criteria. .

2.3 Open Pit

The open pit mining operations ceased in February 2008. The pit is approximately 85 m deep (elevation 405 m above sea mean level) and at the original ground surface the pit is approximately 550 m wide (north-south) and 450 m wide (east-west). Figure 4 shows the general configuration of the open pit.

Spring meltwater and rain water has been accumulating in the pit since cessation of mining operations. Based on an elevation survey conducted by Shear in April 2011, the elevation of the ice surface in the pit was approximately 429 m, which based on the pit stage storage curve, equates to a volume of approximately 250,000 m^3. Figure 5 shows the pit stage storage curve and the respective water volume for an ice elevation of 429 m.

During February 2011, Shear collected 16 water samples from 3 locations within the pit. Sample depths ranged between 1.5 m and 17.5 m below the ice surface. The water samples were submitted to the laboratory for the analysis of total and dissolved metals, BTEX and petroleum hydrocarbons fractions F1 through F4, routine water chemistry, nutrients, and total organic and inorganic carbons. All analyzed parameters are below the water licence discharge criteria (Water Licence No. 2AM-JER0410), with exception of nitrate in two water samples. Nitrate concentrations in water collected at 13.5 m and 17.5 m are 36.2 mg/L and 36.6 mg/L, respectively. The average nitrate concentration in the pit water is estimated to be 27.5 mg/L, less than the water licence discharge criteria of 28 mg/L.

2.4 Precipitation and Surface Runoff to Open Pit

There are two approaches for estimating the surface runoff into the pit:

- **Method 1:** In the Water Management Plan (EBA 2011i), the runoff was estimated based on the average precipitation in the area, runoff coefficient, calculated catchment area, and average monthly precipitation distribution.
- **Method 2:** The monthly monitoring reports in 2006 contain records of water pumped from the pit sump to the East Sump and thereafter to the PKCA. The recorded daily pumping rate is assumed to reflect the daily runoff entering the pit sump.

Table 2.1 compares the estimated runoff (Method 1) and 2006 pit water pumping records (Method 2).

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Table 2.1 Estimated Inflow into Pit

Month	Method 1		Method 2	
	Estimated Monthly Runoff to Pit (1)	Estimated Monthly Runoff Percentage	Monthly Discharged Pit Water in 2006	Monthly Pumping Percentage in 2006
	m^3	%	m^3	%
April	0	0.0%	0	0.0%
May	3,023	3.0%	34,848	33.5%
June	57,438	57.0%	22,492	21.6%
July	16,123	16.0%	22,641	21.8%
August	10,077	10.0%	13,768	13.2%
September	13,100	13.0%	10,337	9.9%
October	1,008	1.0%	0	0.0%
Total	**100,768**	**100%**	**104,086**	**100%**

Note:

1. Calculated runoff based on estimated site hydrology parameters, assuming runoff from Open Pit Catchment and Catchment Area B flow into the pit.

These two estimations have similar total annual runoff. The monthly distributions in the first method showed the peak runoff flow occurs in June, whereas in the second method the peak runoff flow started in May. This is likely due to the warmer winter in 2006, which led the freshet to start early. The current weather conditions at Jericho suggest that freshet may occur in May this year and could be similar to the 2006 freshet. Accordingly, the monthly runoff distribution in 2006 is used to develop the water balance model.

3.0 WATER MANAGEMENT EQUIPMENT

3.1 Pumps

Four pumps (two Godwin HL6M and two Godwin CD103M) are available for pit dewatering and PKCA discharge. Specifications and discharge curves are included in Appendix A of this document.

The proposed pit dewatering schedule in Section 4.0 requires the pit water to be discharged into Cell B/C of the PKCA. The associated maximum pumping elevation head will be approximately 120 m with a pumping distance of approximately 1.5 km. The scheduled pumping rate from the pit to the PKCA is 3,500 m^3/day.

The scheduled discharge rate from the PKCA over the West Dam in to Stream C3 will be approximately 5,500 m^3/day. The associated maximum pumping elevation head will be approximately 10 m with a pumping distance of approximately 150 m.

Equipment suitable to achieve these pumping rates and discharge location will be supplied by Shear for the duration of the proposed pumping schedule.

4.0 PIT DEWATERING AND PKCA DISCHARGE SCHEDULE

4.1 General Considerations

4.1.1 Pit Dewatering

As described in Section 2.0, approximately 250,000 m^3 of water is currently impounded in the open pit. In addition, approximately 100,000 m^3 of runoff water will flow into the open pit during the upcoming summer season.

Based on the designed capacities of the pumps, the scheduled pumping rate from the open pit to the PKCA is 3,500 m3/day. The pit dewatering is expected to last for approximately 100 days from mid-June to late September.

4.1.2 PKCA Discharge

While pit water is pumped into the PKCA, water in the PKCA will be discharged into the receiving environment (Stream C3) to release the continuous inflow from the pit and natural runoff. By the end of the summer season in 2011, the water in the PKCA Cell B/C should be lowered to the level that the PKCA has sufficient holding capacity for the freshet runoff in 2012.

The scheduled pumping rate from the PKCA to the Stream C3 is 5,500 m^3/day. The PKCA discharge is expected to last for approximately 100 days from mid-June to late September.

Prior to discharging from the PKCA, water samples from the west side of PKCA Cell B/C (Sample Station: JER-SWQ-4) will be collected and submitted to a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA). To comply with Part G of the Jericho water licence (Licence No. 2AM-JER0410), the analysis will include total and dissolved metals, routine water chemistry, nutrients, biological parameters, and acute toxicities. Detailed descriptions of the analytical packages are included in Appendix B. A written PKCA discharge notice with the analytical results will be submitted to the NWB, 10 days prior to the scheduled PKCA discharge.

To avoid the potential for suspension of settled FPK in Cell A, the pit water should be directly discharged into the east side of Cell B/C. To reduce the suspension of any sediment on the bottom of Cell B/C, rip-rap may be placed at the discharge area to dissipate the energy of the pumped water. In addition, the turbidity barriers, such as silt curtains, should be placed in the Cell B/C to filter any suspended solids flowing towards the west side of Cell B/C. The discharge location may be moved to Cell A if the pit water TSS levels rise. This will result in water flowing through Divider Dyke A.

As a PKCA water quality control measure, daily on-site water chemistry analysis will be conducted at the west and middle of the PKCA (Sampling station: JER-SWQ-04 and SWQ-04A). The on-site analysis will consist of measuring field parameters (including pH, electrical conductivity, dissolved oxygen, and temperature) and analyzing nitrate and total suspended solids (TSS).

If the daily on-site analysis shows the nitrate or TSS concentration at the middle of Cell B/C (Sampling station: JER-SWQ-04A) exceeds water licence discharge criteria, the pit dewatering will be suspended immediately. Water samples from west and middle of the PKCA (Sampling station: JER-SWQ-04 and SWQ-

04A) will be collected and submitted to an accredited laboratory for analysis. If the laboratory analysis confirms the on-site analysis, the pit dewatering will be suspended for 2011. If the laboratory analysis shows an acceptable nitrate or TSS concentration, depending on the analytical results, the dewatering may resume on a case-by-case basis.

If the daily on-site analysis shows that the nitrate or TSS concentration at the west of Cell B/C (Sampling station: JER-SWQ-04) exceeds water licence discharge criteria, the PKCA discharge pumping will be suspended immediately. Water samples from the west side of the PKCA (JER-SWQ-04) will be collected and submitted to an accredited laboratory for analysis. If the laboratory analysis confirms the on-site analysis, the PKCA discharge will be suspended for 2011. If the laboratory analysis shows an acceptable nitrate or TSS concentration, depending on the analytical results, the discharge may resume on a case-by-case basis.

4.2 Estimated Pumping Schedules

Table 4.1 and Figure 6 present pit dewatering and PKCA discharge schedule. Figure 7 shows the variation in water volumes in the pit and PKCA. Figures 8 and 9 show the variation in water levels in the pit and PKCA. Figure 10 presents the projected nitrate concentration in the PKCA.

Table 4.1: Estimated Pumping Schedule and Action Triggers

Estimated Schedule	Description	Actions
May 18, 2011	▪ Submit this PDA	▪ Submit this PDA.
May 18 – Jun 17, 2011	▪ Within 30 days of submitting this PDA	▪ Routinely monitor water quality in the Pit and the PKCA; ▪ Prepare and inspect pumps and pipelines; ▪ Implement erosion control measures in PKCA Cell B/C and east end of Stream C3; ▪ Visually inspect integrity of dams and filter dyke in the PKCA.
Jun 18 – Sep 27, 2011	▪ 30 days after submitting this PDA	▪ Pump 3,500 m^3/day water from the Pit to PKCA Cell B/C; ▪ Pump 5,500 m^3/day water from PKCA to Stream C3 over West Dam.
During pit dewatering	▪ Daily onsite monitoring at the middle of Cell B/C (Sample Station: JER-SWQ-4A) shows nitrate or TSS exceed the water licence discharge criteria	▪ Suspend pumping for pit dewatering; ▪ Collect the water sample at the middle of Cell B/C (Sample Station: JER-SWQ-4A), and submit the sample to a CALA accredited laboratory for analysis; ▪ If laboratory analysis confirms the onsite analysis, suspend the pit dewatering for 2011.
During PKCA discharge	▪ Daily onsite monitoring at the west side of Cell B/C (Sample Station: JER-SWQ-4) shows nitrate or TSS exceed the water licence discharge criteria	▪ Suspend discharge from the PKCA to Stream C3; ▪ Collect the water sample at the west side of Cell B/C (Sample Station: JER-SWQ-4), and submit the sample to a CALA accredited laboratory for analysis; ▪ If laboratory analysis confirms the onsite analysis, suspend the PKCA discharge for 2011.

5.0 MONITORING

5.1 Water Flow

Table 5.1 presents the proposed water flow monitoring stations, which are shown in Figure 1, in the General Monitoring Plan (EBA 2011d) and current status of the monitoring stations. In addition, during the pit dewatering and PKCA discharge period, the water level in the pit and PKCA Cell B/C will be continually monitored.

Table 5.1: Water Flow and Level Monitoring

Station	Location	Method	Frequency	Comment
JER-SWF-01	Freshwater intake pump	Totalizer	-	▪ Currently, fresh water is transported by water truck
JER-SWF-02	PKCA discharge pump at east side of West Dam	Totalizer	Minimum Daily during pumping	▪ To monitor water flow from PKCA to Stream C3
JER-SWF-03	Pump for discharging pit water to PKCA	Totalizer	Minimum Daily during pumping	▪ To monitor water flow from pit to PKCA
JER-SWF-04	Pump for discharging Wastewater Treatment Plant (WWTP) effluent	Totalizer	Minimum Daily during pumping	▪ To monitor effluent flow from WWTP to PKCA
JER-SWF-05	Pump for Processing Plant freshwater Intake	Totalizer	-	▪ No water is expected to be pumped to the Processing Plant
JER-SWF-06	Pump for discharging Processing Plant Water to PKCA	Totalizer	-	▪ No water is expected to be pumped from the Processing Plant
JER-SWF-07	Pump for reclaim PKCA water to Processing Plant	Totalizer	-	▪ No water is expected to be pumped to the Processing Plant
JER-SWF-08	C1 Diversion	TBD	Daily during freshet	▪ To monitor water flow in C1 diversion
JER-SWF-09	Area A collection discharge	Totalizer or TBD	-	▪ No collector ditch was found
JER-SWF-10	Area B collection discharge	Totalizer or TBD	-	▪ No collector ditch was found
JER-SWF-11	Plant Site Area collection discharge	Totalizer or TBD	-	▪ No collector ditch was found

5.2 Water Quality

Detailed water quality monitoring stations and sampling methods are described in the Jericho Mine General Monitoring Plan (EBA 2011d). During the pit dewatering period, additional water quality monitoring stations are proposed. These monitoring stations are summarized in Table 5.2.

Table 5.2: Site Water Quality Monitoring Program

Station	Location	Analysis [1]	Frequency	Comment
JER-SWQ-01	Wastewater Treatment Effluent	**Lab:** R, ICP-T, ICP-D, N, B	Weekly	▪ To monitor water quality of wastewater treatment plant effluent
JER-SWQ-02	Open Pit near Pump Inlet	**Onsite:** Field parameters [2], Nitrate and TSS	Daily	▪ To monitor average water quality variation in the pit water
		Lab: R, ICP-T, ICP-D, N	Weekly during pit dewatering	
JER-SWQ-03	Process Plant Supernatant	**Lab:** R, ICP-T, ICP-D, N,	-	▪ No discharge expected for 2011
JER-SWQ-04	West Side of PKCA Cell B/C	**Onsite:** Field parameters, Nitrate and TSS	Daily	▪ To monitor water quality discharged from PKCA
		Lab: R, ICP-T, ICP-D, N, B, Toxicity [3]	Weekly, and when daily onsite analysis at this station shows nitrate or TSS above discharge criteria	
JER-SWQ-04A	Middle Side of PKCA Cell B/C	**Onsite:** Field parameters, Nitrate and TSS	Daily	▪ Additional water quality monitoring station; ▪ To monitor water quality at the middle of the PKCA
		Lab: R, ICP-T, ICP-D, N	When daily onsite analysis at this station shows nitrate or TSS above discharge criteria	
JER-SWQ-05	Collector Ditch for Area A or Potential Pond A	**Lab:** R, ICP-T, ICP-D, N,	-	▪ Pond A is not constructed, no sampling required
JER-SWQ-06	Collector Ditch for Area B or Potential Pond B	**Lab:** R, ICP-T, ICP-D, N,	-	▪ Pond A is not constructed, no sampling required
JER-SWQ-07	East Sump or Potential Pond C	**Lab:** R, ICP-T, ICP-D, N,	Monthly until freeze-up	▪ Currently collected from East Sump

Note:

1. R – Routine water chemistry, ICP-T – Total metals, ICP-D – Dissolved metals, - N – Nutrients, B – Biological; Detailed analysis packages are included in Appendix B.
2. Field parameters included pH, electrical conductivity, dissolved oxygen, temperature, and may include turbidity.
3. Prior to the PKCA discharge, acute toxicity tests should be conducted at Monitoring Station JER-SWQ-04. During PKCA

Table 5.2: Site Water Quality Monitoring Program

Station	Location	Analysis [1]	Frequency	Comment
discharge, acute toxicity tests should be monthly conducted in Stream C3 (Monitoring Station: JER-AEM-04).				

5.3 On-site Analysis

5.3.1 Nitrate

Photometer analysis is specified to provide accurate on-site measurements of the nitrate in water. When the chemical reagent is mixed with the water sample, it reacts with nitrate and changes the light transmission property of the water. The concentration of nitrate can be estimated by measuring the change in water photometry.

Shear is currently in a process of purchasing a photometer and required chemical reagents. Prior to conducting the pit dewatering, a photometer with the associative chemical reagents will be chosen and used for on-site nitrate monitoring.

5.3.2 Total Suspended Solids

Shear is in the process of purchasing the required laboratory apparatus for analyzing TSS on site. The apparatus setup and the analysis procedures will follow the *Standard Methods for the Examination of Water and Wastewater* (Method No. 2540D) (Eaton & Franson 2005). The analysis apparatus will be installed before the pit dewatering is conducted.

5.4 Laboratory Analysis

Water samples will be routinely submitted to an accredited laboratory for routine water chemistry, total metal, dissolved metal, and nutrients. Before shipping the samples, dissolved metal samples will be filtered through a 0.45 µm millipore filter and preserved with AA grade nitric acid. Similarly, samples for total metal analysis will also be preserved with AA grade nitric acid. Nutrients samples will be preserved with AA grade sulphuric acid. The routine water sample will not be preserved. Water bottles containing samples from the same station will be placed in a clean plastic bag to avoid cross-contamination between samples, and stored in coolers to keep the samples below 4°C prior to shipment. Chain of custody forms will be used to track samples.

6.0 RISK PREVENTION AND MITIGATION

6.1 Nitrate Exceeding Discharge Criteria in PKCA

The PKCA water with low nitrate concentration will be used to dilute the relatively higher nitrate content in the pit water during the pit dewatering period. As described in Section 4.1.2:

- If the on-site analysis and off-site laboratory analysis indicate the nitrate at the middle of Cell B/C exceeds water licence discharge criteria, the pit dewatering will be suspended; and
- If the on-site analysis and off-site laboratory analysis indicate the nitrate at the west side of Cell B/C exceeds water licence discharge criteria, the PKCA discharge will be suspended. Depending on the

water level in the PKCA at that time, water may be pumped from the PKCA back to the pit to maintain a sufficient capacity for the next year's freshet inflow.

6.2 Total Suspended Solids Exceeding Discharge Criteria in PKCA

When pit water is discharged into Cell B/C, the TSS level in the PKCA may increase due to suspended solids in the pit water inflow and the disturbed sediment at the bottom of Cell B/C. A turbidity barrier will be placed in the PKCA to reduce the migration of the suspended solids.

If the TSS level continues to rise, additional silt curtains will be placed in the PKCA. If the on-site analysis indicates the TSS level at the middle or west side of Cell B/C exceeds the discharge criteria, the same mitigation strategies will be implemented as the nitrate exceedance, described in Section 6.1.

6.3 Erosion in Stream C3

The planned PKCA discharge rate is higher than the typical average freshet flows of the original Long Lake (SRK 2003a). The previous monthly monitoring reports from July 2006 to September 2009 showed the PKCA water discharge rates were over the average freshet flows for extended periods. The proposed discharge rates are not expected to induce additional erosion to the natural water course.

As part of the erosion prevention strategy, a geotechnical engineer will be on site before the dewatering to:

- Assess potential water erosion in Stream C3 caused by historical PKCA discharge,
- Select the proper water discharge locations in Stream C3, where erosion is less likely to occur, and
- Recommend erosion control measures, if required.

During the PKCA discharging period, Shear will conduct routine visual inspection to detect signs of water erosion in Steam C3. If any erosion occurs, water dissipation measures will be placed near the discharge outlet. If erosion continues, Shear will reduce the pumping rate to the level that water erosion does not progress.

7.0 CLOSURE

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2011 WATER LICENCE RENEWAL DOCUMENTS

Management Plans

EBA, A Tetra Tech Company (EBA), 2011a. Aquatic Effects Monitoring Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011b. Care and Maintenance Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011d. General Monitoring Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

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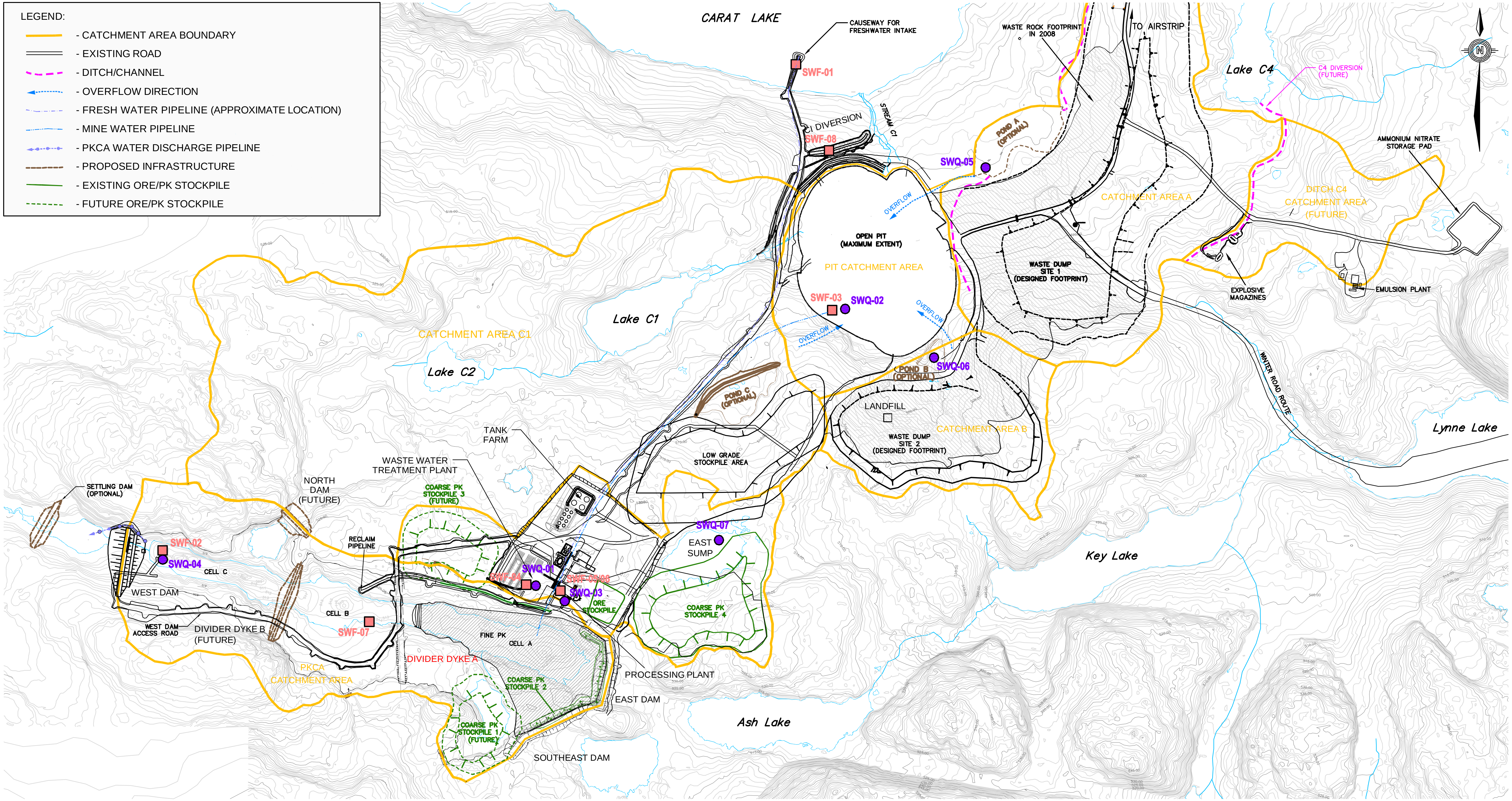
SRK Consulting Inc. (SRK), 2004b. Technical Memorandum Q: Post Closure Pit Lake Quality. Prepared for Tahera Corporation, May 6, 2004. (Presented as an appendix to: "Abandonment and Restoration Plan", AMEC 2004a).

SRK Consulting Inc. (SRK), 2004c. Technical Memorandum W: Site Water Management for the Jericho Project, Nunavut. Prepared for Tahera Corporation, August 2004.

FIGURES



NOTES:

1. LAYOUTS ARE APPROXIMATE, AND MAY NOT REFLECT ACTUAL SIZE AND LOCATIONS
2. LOCATIONS OF MONITORING STATIONS ARE CONCEPTUAL, ACTUAL LOCATIONS MAY VARY
3. FOOTPRINTS OF WASTE ROCK PILES, COARSE PK STOCKPILES, AND ORE STOCKPILES ARE SHOWN IN MAXIMUM LIMITS, ACTUAL FOOTPRINTS MAY VARY
4. LOCATIONS OF SWF-09, 10 AND 11 WILL BE DETERMINED ON-SITE IN 2011

MONITORING LOCATIONS:

- SWF, SITE WATER FLOW MONITORING LOCATION
- SWQ, SITE WATER QUALITY MONITORING LOCATION

STATUS
ISSUED FOR USE

CLIENT
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eba
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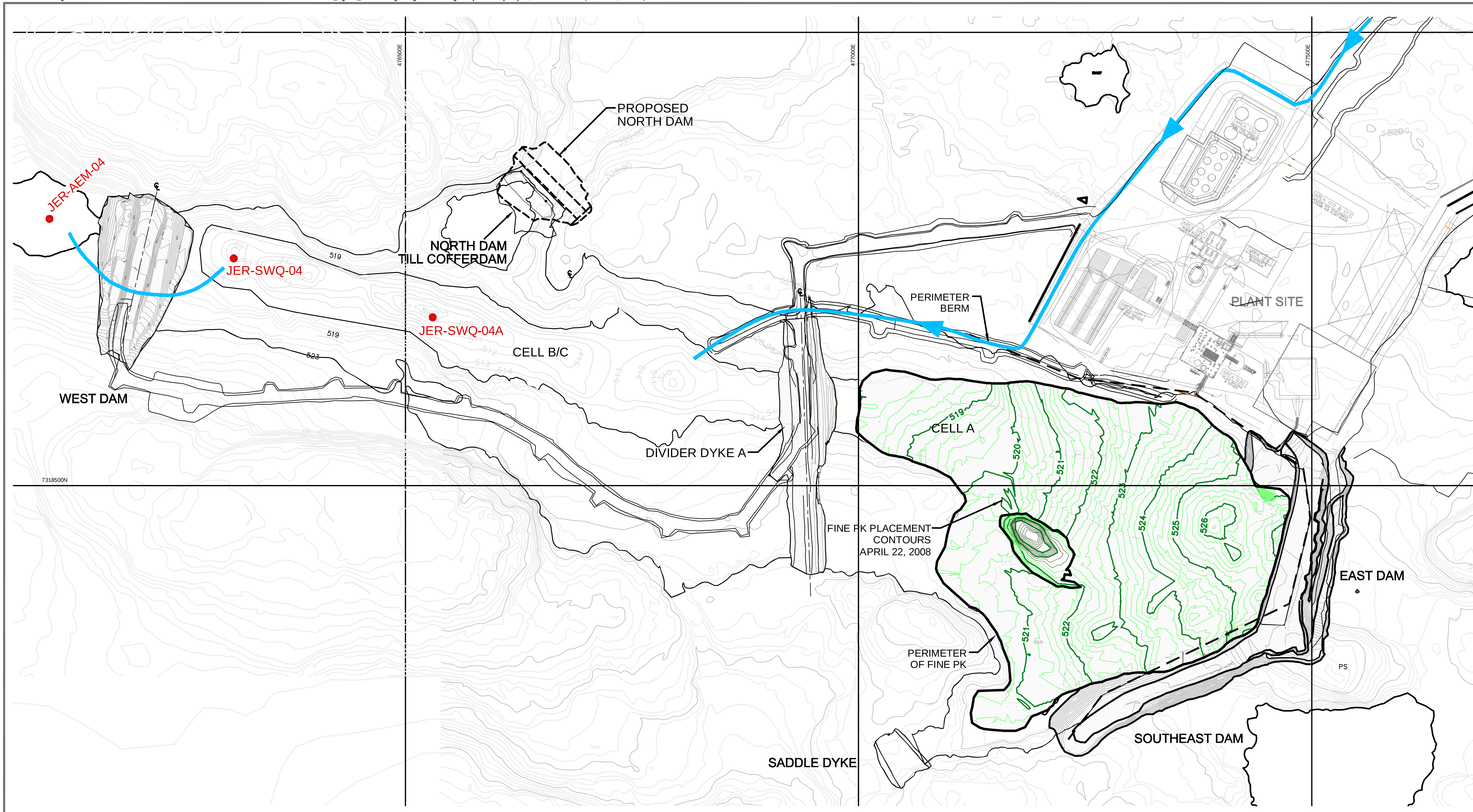
PIT DEWATERING MANAGEMENT PLAN
JERICHO DIAMOND MINE, NUNAVUT

GENERAL SITE PLAN AND CATCHMENT AREAS

PROJECT NO.	DWN	CKD	REV
E14101118.002	DBD/TK	WL	0

OFFICE	DATE
EBA-EDM	May 2011

Figure 1



NOTE:

PROCESSED KIMBERLITE CONTOURS EXTRAPOLATED FROM APRIL 22, 2008 SURVEY.

0 200

Scale: 1: 4 000 (metres)

MONITORING LOCATIONS:

- WATER QUALITY MONITORING LOCATIONS

- PROPOSED WATER PIPELINE ROUTE

STATUS
ISSUED FOR USE

CLIENT
shear diamonds

eba A TETRA TECH COMPANY

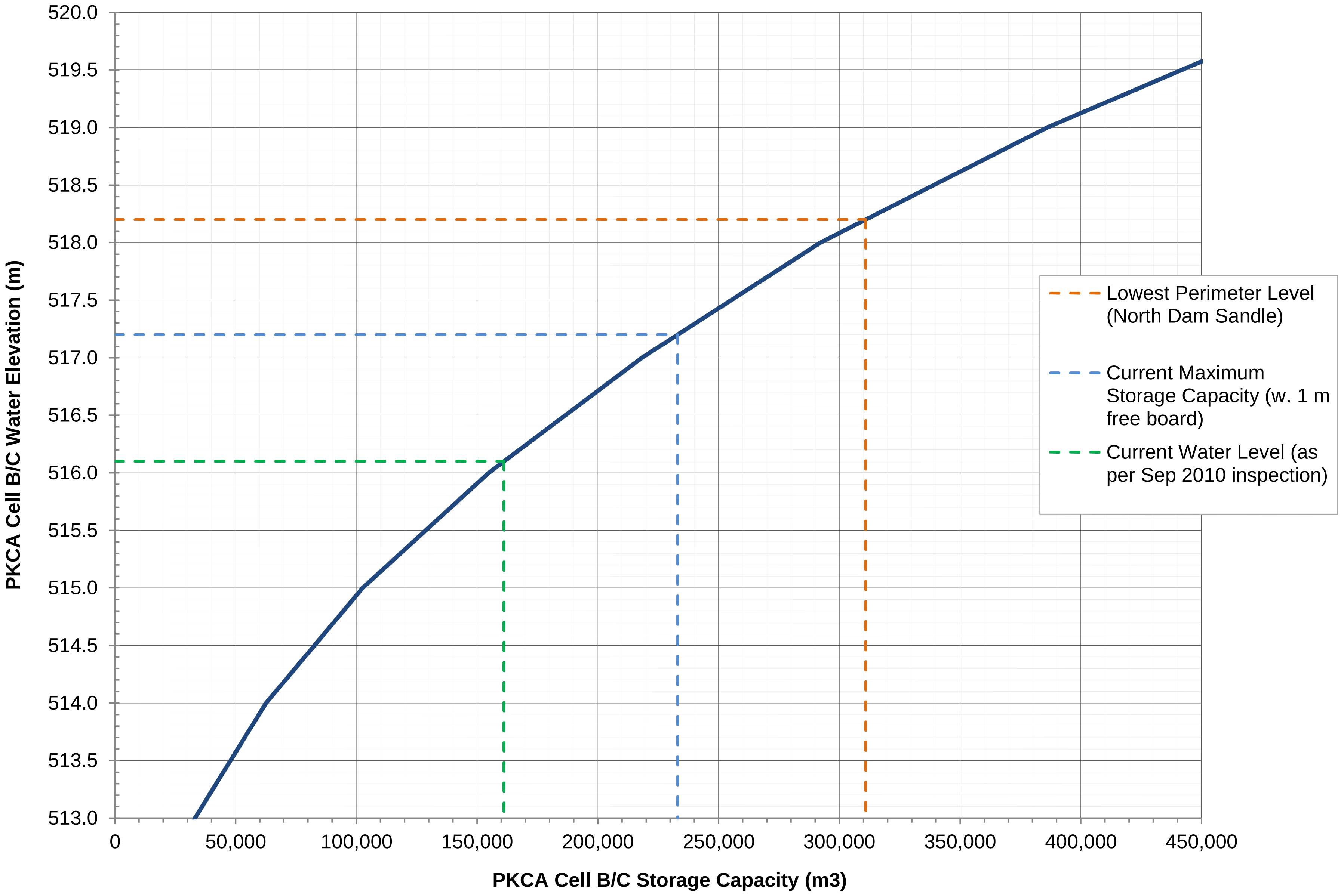
PIT DEWATERING MANAGEMENT PLAN
JERICHO DIAMOND MINE, NUNAVUT

EXISTING PKCA PLAN

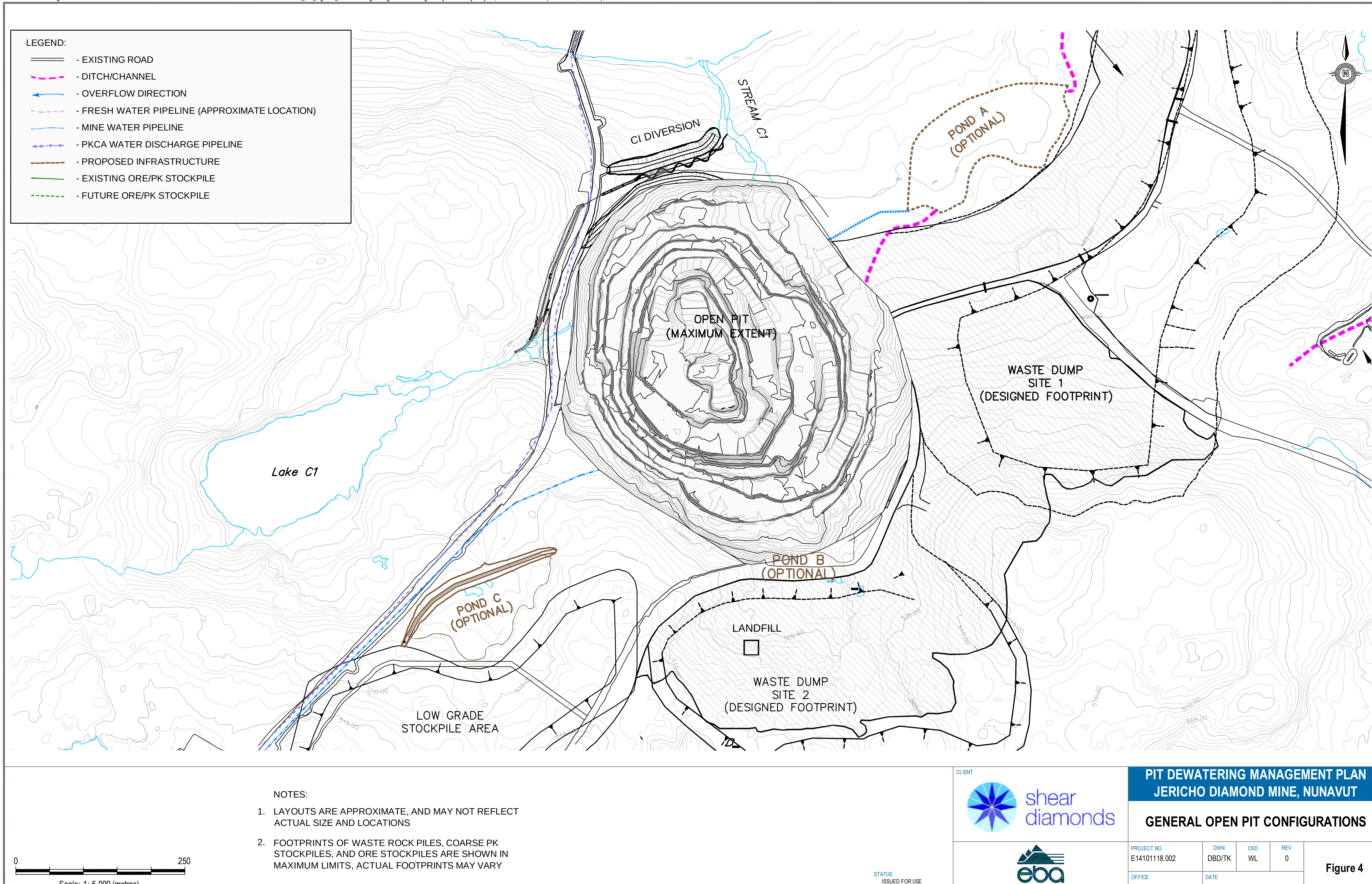
PROJECT NO.	DWN	CKD	REV
E14101118.002	DBD/TK	WL	0
OFFICE	DATE		
EBA-EDM	May 2011		

Figure 2

Figure 3: PKCA Cell B/C Stage Storage Curve



Q:\Edmonton\Drafting\CIVIL3D\E141\E14101118\002\PIT DEWATERING MANAGEMENT PLAN\ACAD\E14101118_002_Figure 4_Pit Dewatering Management Plan.dwg [FIGURE 4] May 18, 2011 - 8:35:01 am (BY: KIROS, TIGISTI)



NOTES:

1. LAYOUTS ARE APPROXIMATE, AND MAY NOT REFLECT ACTUAL SIZE AND LOCATIONS
2. FOOTPRINTS OF WASTE ROCK PILES, COARSE PK STOCKPILES, AND ORE STOCKPILES ARE SHOWN IN MAXIMUM LIMITS, ACTUAL FOOTPRINTS MAY VARY

STATUS: ISSUED FOR USE

CLIENT: shear diamonds

eba A TETRA TECH COMPANY

PIT DEWATERING MANAGEMENT PLAN
JERICHO DIAMOND MINE, NUNAVUT

GENERAL OPEN PIT CONFIGURATIONS

PROJECT NO.	DWN	CKD	REV	
E14101118.002	DBD/TK	WL	0	Figure 4
OFFICE: EBA-EDM	DATE: May 2011			

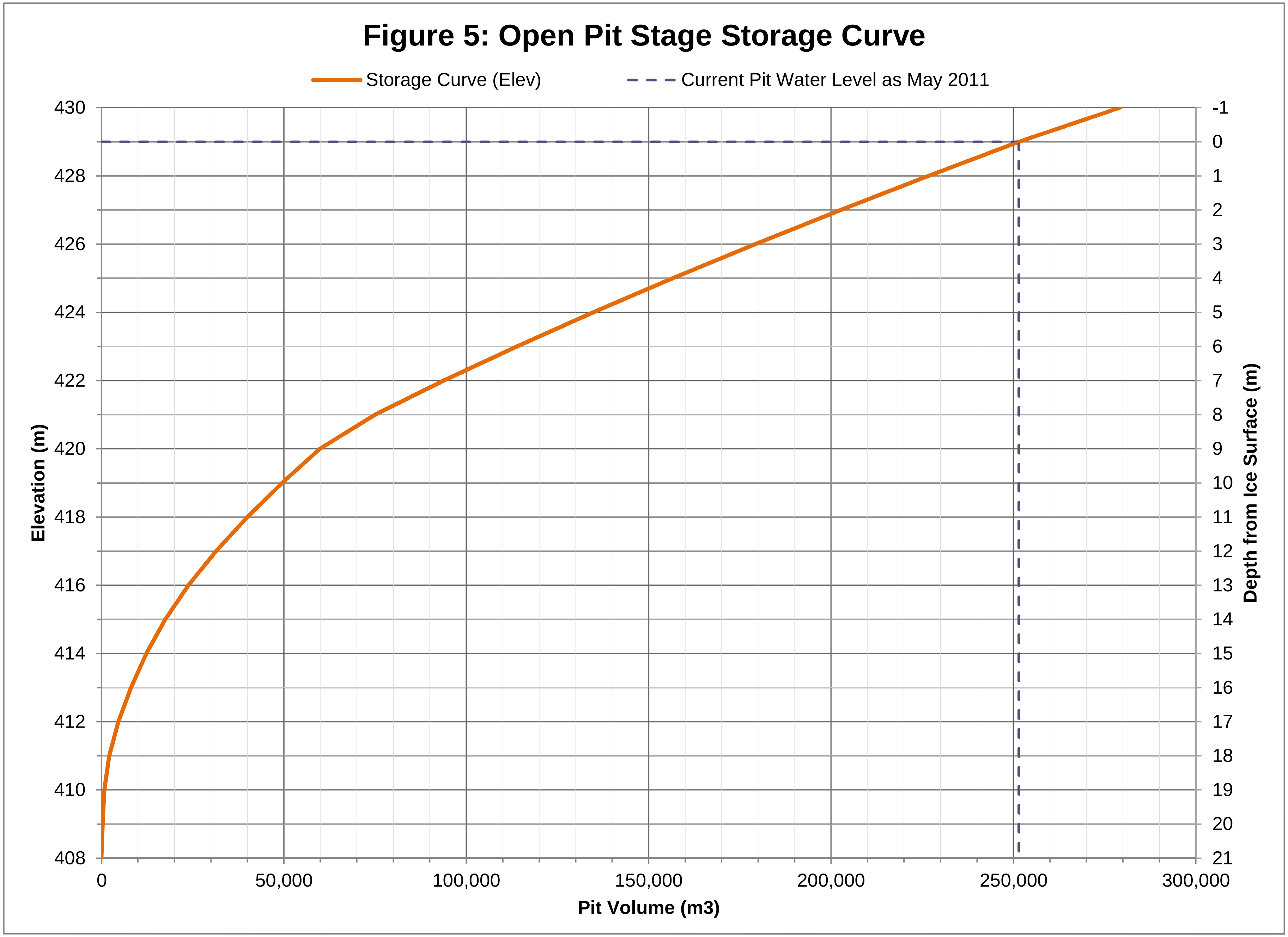


Figure 5: Open Pit Stage Storage Curve
Storage Curve (Elev)
Current Pit Water Level as May 2011
Elevation (m)
430
428
426
424
422
420
418
416
414
412
410
408
Depth from Ice Surface (m)
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
0
50,000
100,000
150,000
200,000
250,000
300,000
Pit Volume (m3)

Figure 6: Pit Dewatering and PKCA Discharge Schedule

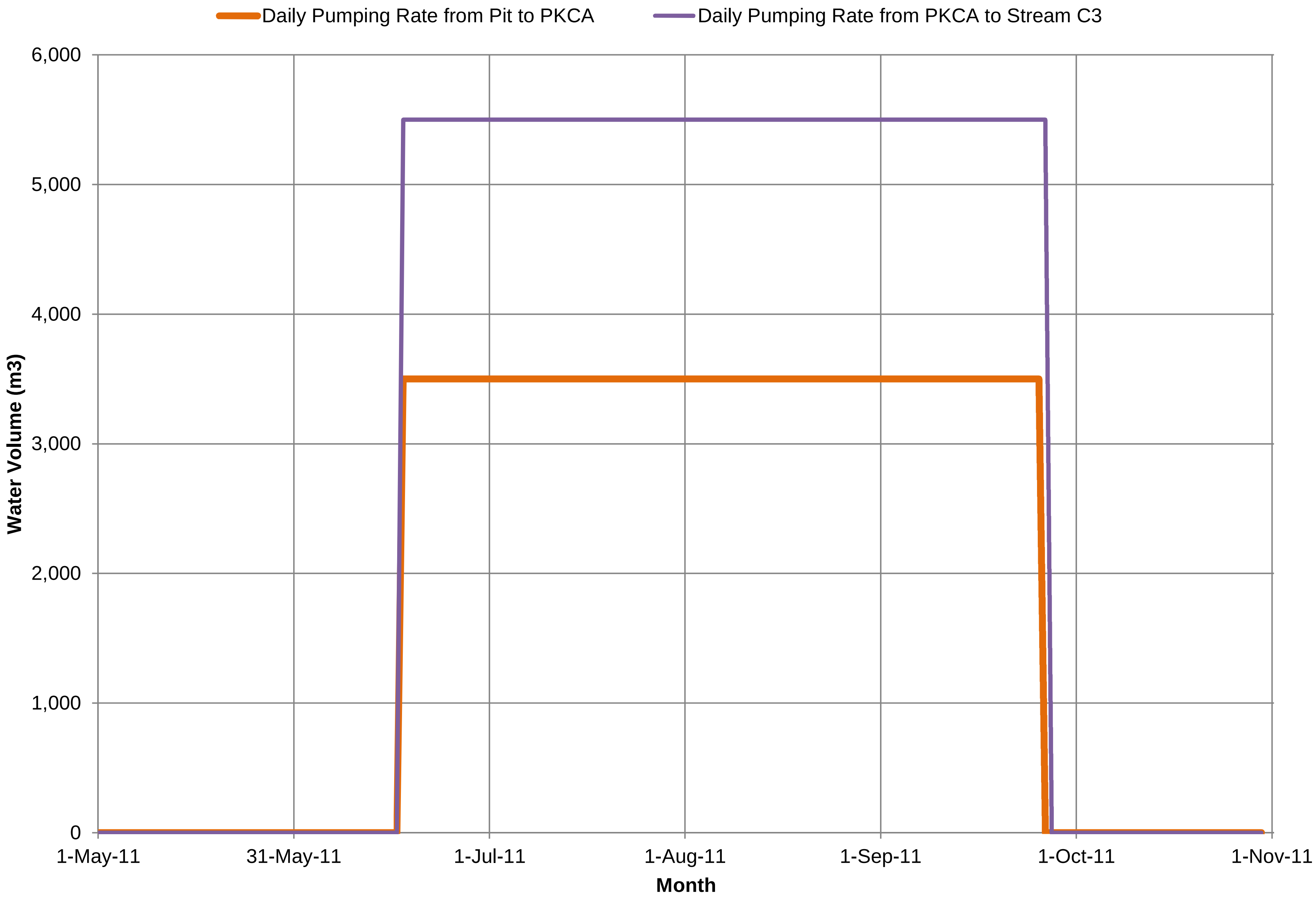
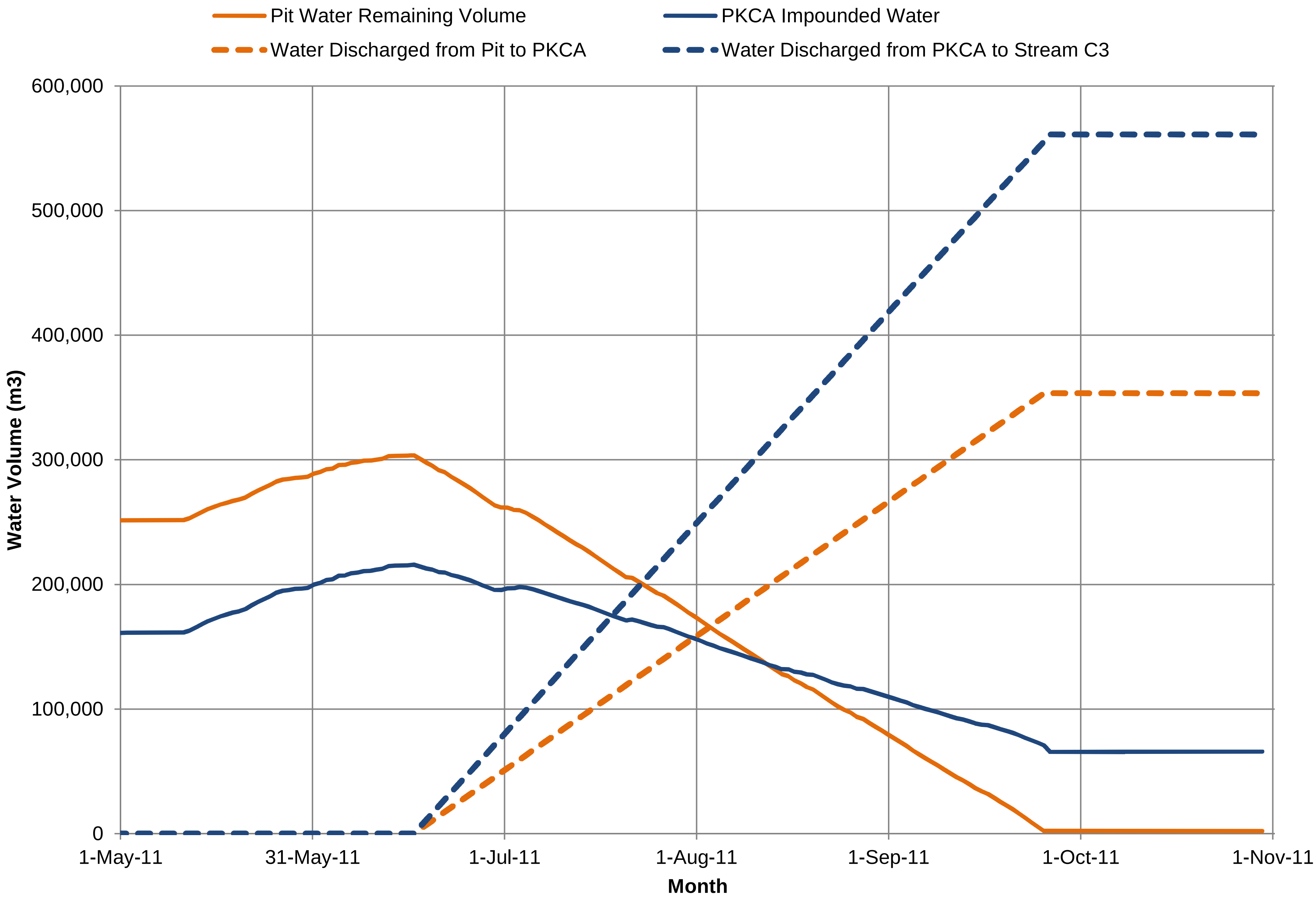


Figure 7: Water Volume Variations in Pit and PKCA



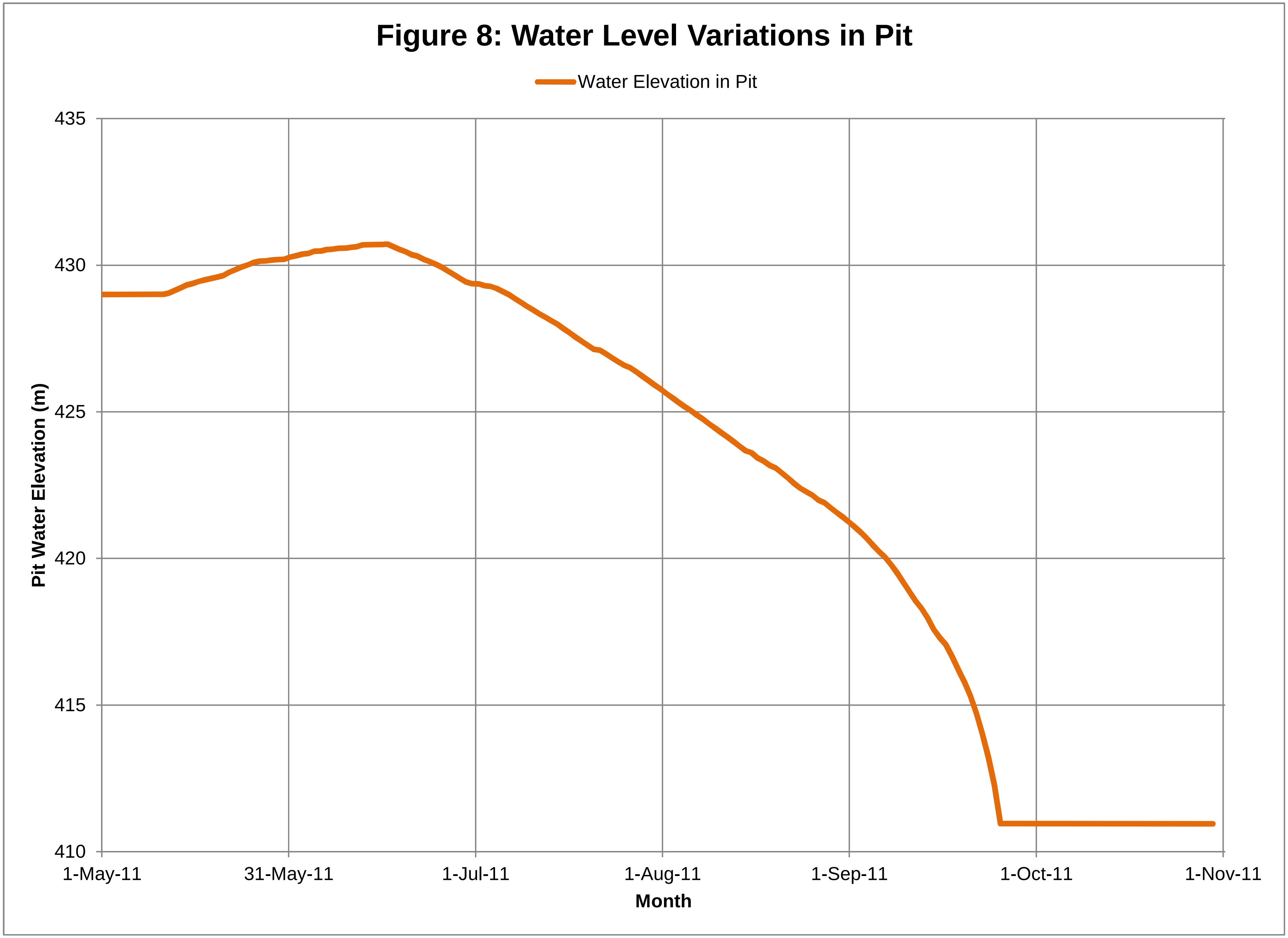


Figure 8: Water Level Variations in Pit
Water Elevation in Pit
435
430
425
420
415
410
Pit Water Elevation (m)
1-May-11
31-May-11
1-Jul-11
1-Aug-11
1-Sep-11
1-Oct-11
1-Nov-11
Month

Figure 9: Water Level Variations in PKCA

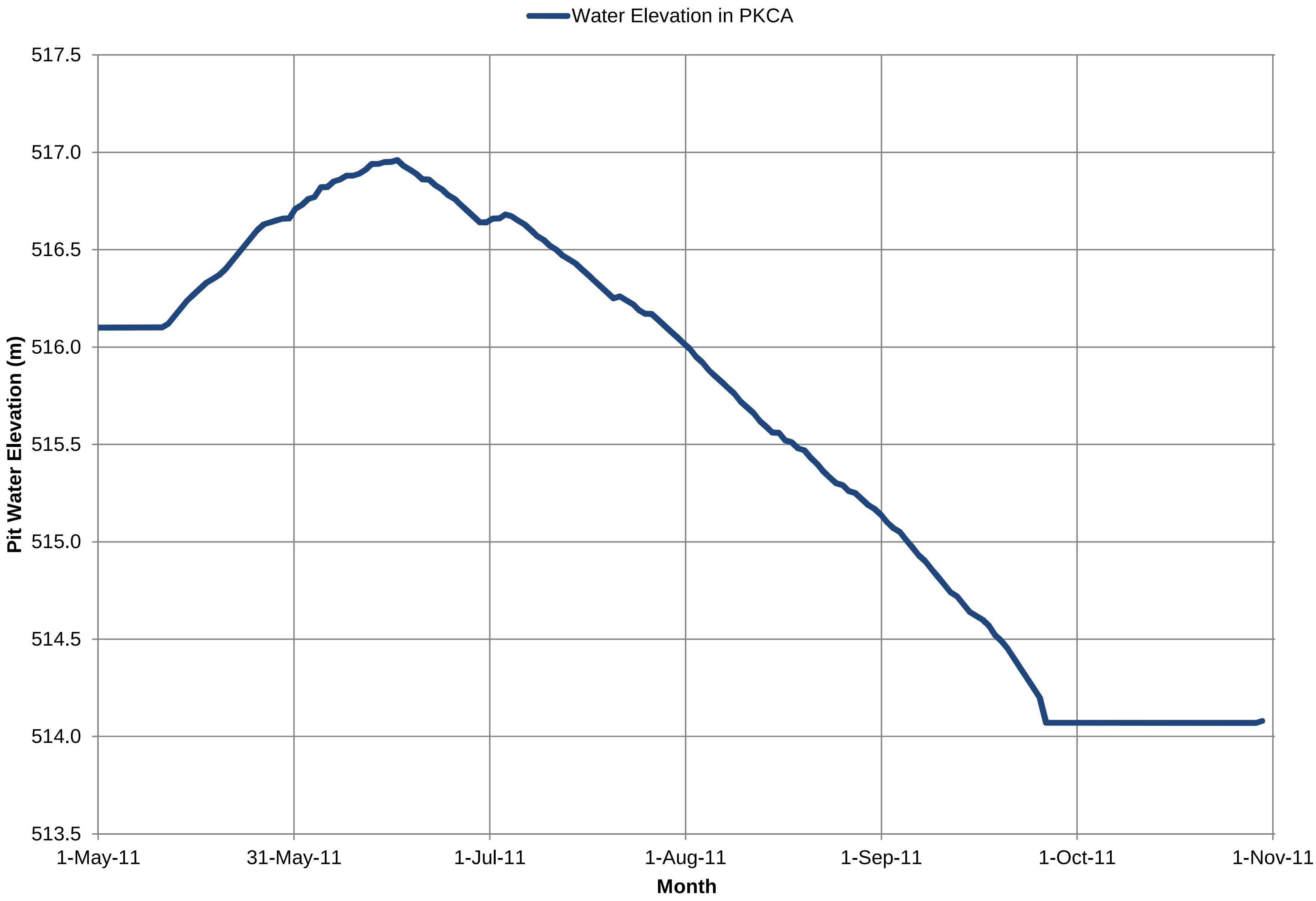
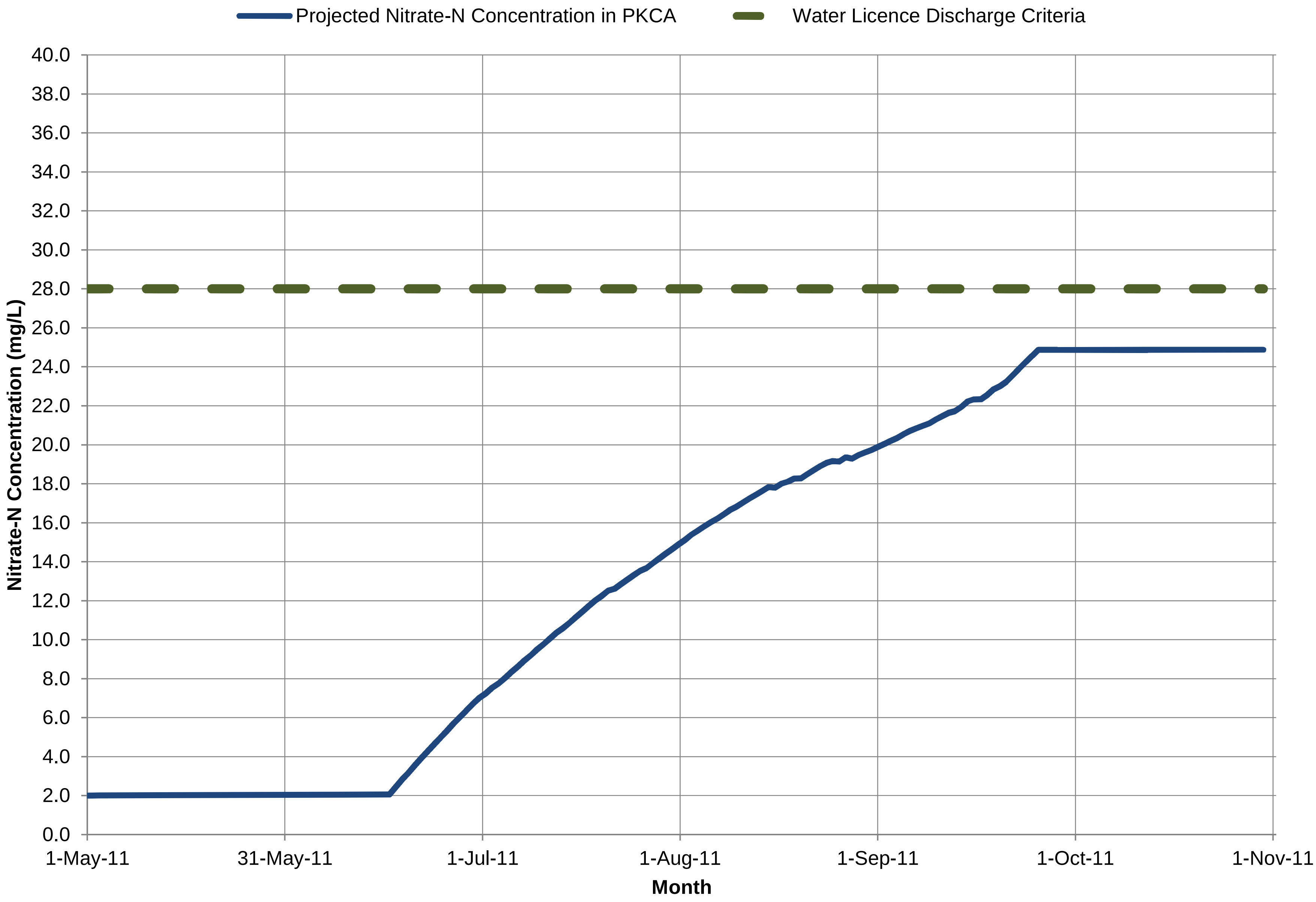


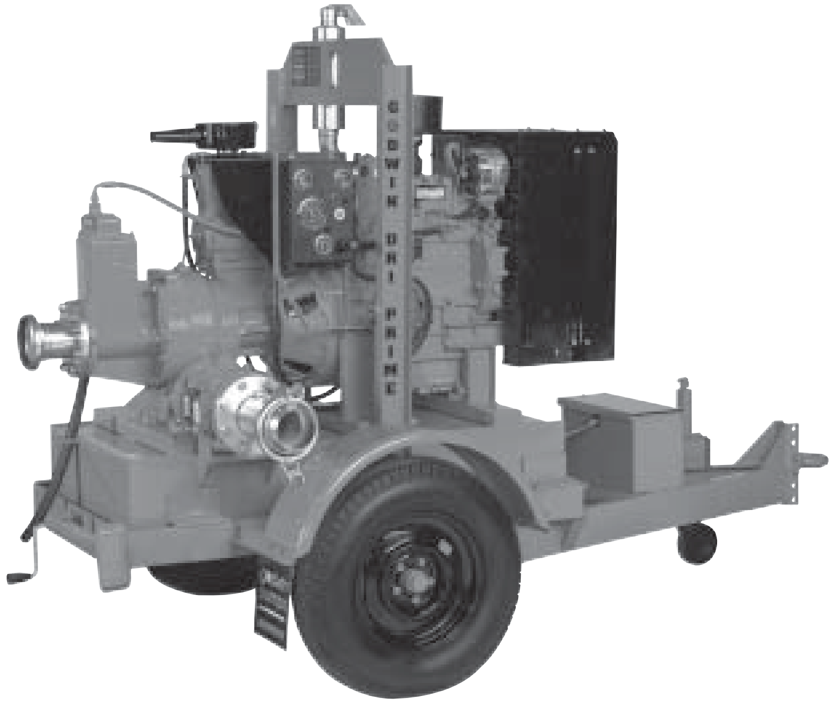
Figure 10: Projected Nitrate Concentration in PKCA



APPENDIX A

APPENDIX A SPECIFICATIONS OF ON-SITE PUMPS

CD103M Dri-Prime® Pumps



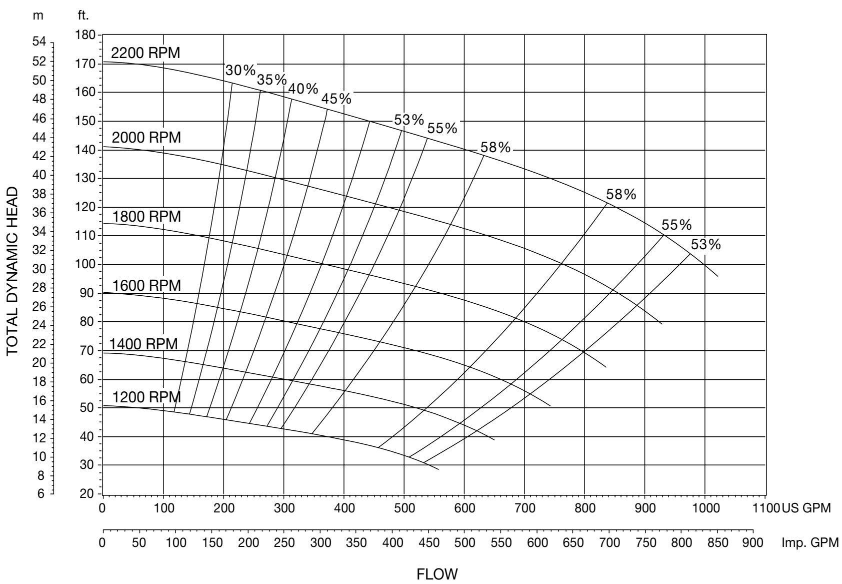
The Godwin Dri-Prime 4 inch (100mm) CD103M automatic priming centrifugal pump is a highly maneuverable portable trash pump with flow capabilities to 1,000 gallons per minute (833 Imperial GPM), total dynamic heads to 170 feet (52 meters) and solids handling to 3 inch (75mm) in diameter. The unique Godwin venturi air evacuation system allows the CD103M to prime from dry conditions with suction lifts up to 28 feet (8.5 meters). Perfect in intermittent flow situations, the CD103M can run dry indefinitely without damage due to the oil bath mechanical seal design. For sewage handling, dewatering, municipal usage, and many other applications, the Godwin CD103M with 4 inch (100mm) hoses is a powerful, yet versatile and portable pumping system.

Features

- Close coupled centrifugal pump with vacuum priming compressor mounted to a diesel engine. Also available in electric drive or as bare shaft pumpend.
- All cast iron construction with cast chromium steel impeller.
- Extensive application flexibility — will handle raw sewage, slurries and liquids with solids up to 3 inch (75mm) in diameter.
- Continuously operated “Godwin” air ejector priming device requiring no form of periodic adjustment or control.
- Dry running, high pressure oil bath mechanical seal with abrasion resistant solid Silicon Carbide interfaces.
- Compact unit mounted on skid base or two wheeled highway trailer both incorporating integral overnight running fuel tank.
- Simple maintenance — normally limited to checking engine and seal cavity oil levels.
- Standard engine — John Deere 4024T. Available with a variety of engines including Caterpillar, Hatz, Perkins and Deutz.
- A variety of silenced sets are available.

godwin pumps

CD103M Performance Curve



CD103M Performance Table

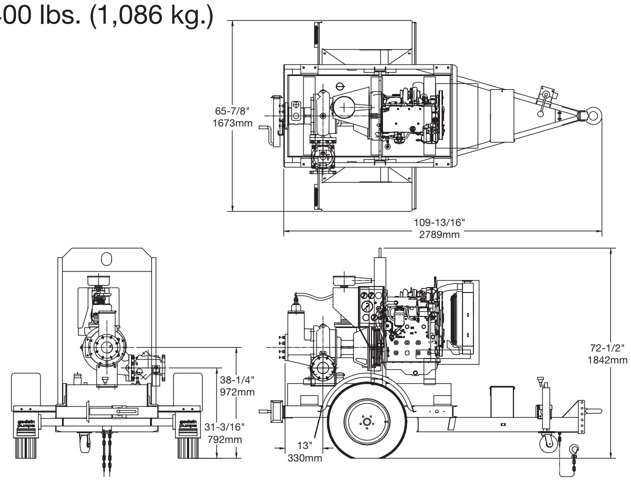
Diesel Set — John Deere 4024T, 41 hp @ 2200 rpm
Impeller Diameter — 10-7/16 in. (256 mm)

	Total Delivery Head — Feet				
Total Suction	60	80	100	120	140
Head - Feet	Output — GPM				
10	1030	1015	920	740	440
15	1010	960	880	680	360
20	890	860	785	600	270
25	800	760	720	520	180

Performance data listed in table and curves are based on water tests at sea level and 68˚ F (20˚ C). Larger diameter pipes may be required for maximum flows.

Dimensions

CD103M — John Deere 4024T, GP60 Highway Trailer
Weight: 2,400 lbs. (1,086 kg.)



Specifications

Maximum Operating Speed:
2200 rpm
Maximum Operating Temperature:
+176˚ F (80˚ C)
Maximum Working Pressure:
64 psi (4.4 BAR)
Maximum Suction Pressure:
73 psi (5.0 BAR)
Maximum Casing Pressure:
97 psi (6.7 BAR)
Fuel Tank Capacity:
60 gallons (227 liters)
Fuel Consumption (full load, max. speed):
2.3 gph (8.7 lph) @ 2200 rpm
Pipe Connections:
4" (100mm) ASA 150#
Solids Handling:
3" (75mm) dia. standard impeller

Materials

Pump Casing, Suction Cover, Separation Tank and Wearplates:
Close grained cast iron
Impeller:
Cast chromium steel – Minimum Brinell 220 HB
Shaft Sleeve and Shaft:
1-1/2% nickel/chromium steel
Non Return Valve Body:
Close grained cast iron
Non Return Valve Ball and Seat:
High nitrile rubber
Mechanical Seal Faces:
Solid Silicon Carbide

godwin pumps

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www.godwinpumps.com

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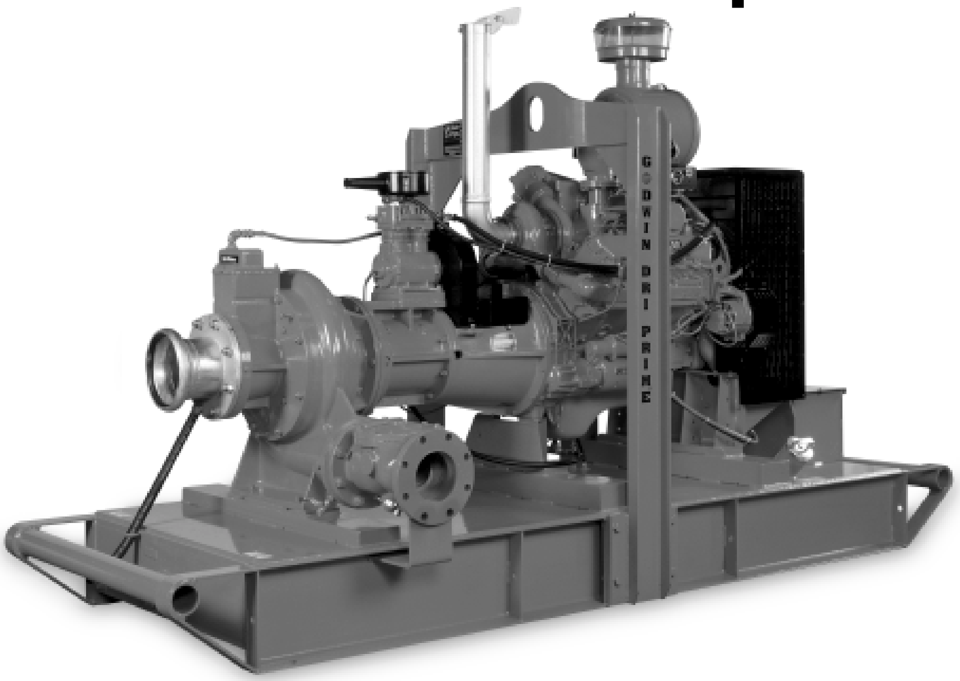
Illinois • Maryland • Virginia • West Virginia
Georgia • South Carolina • North Carolina
Florida • Texas • Montana • California • Washington

HL6M Dri-Prime® Pumps



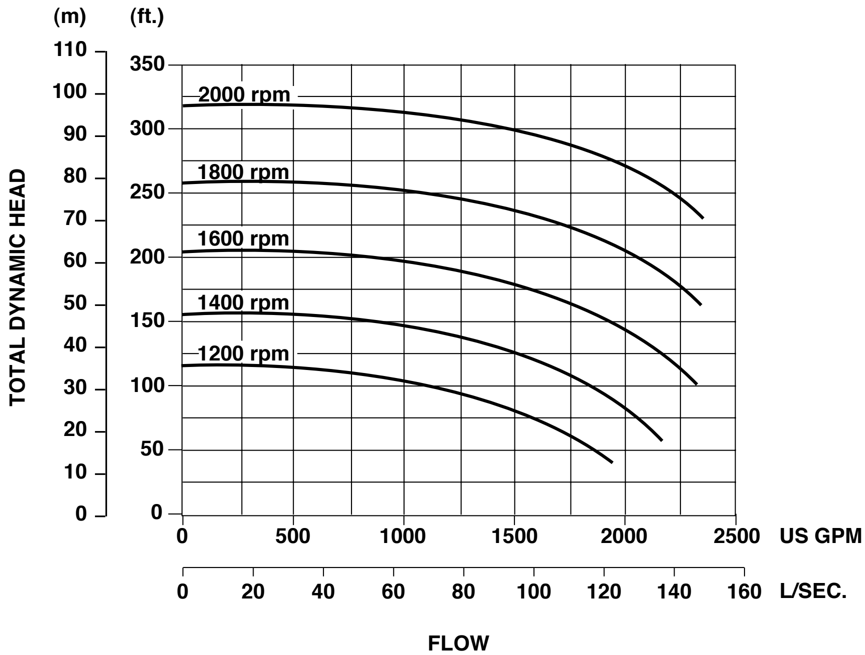
The Godwin Dri-Prime 8" x 6" (200mm x 150mm) HL6M automatic priming centrifugal pump is a high pressure discharge pump with maximum flows of 2300 gallons per minute (145 l/sec.) and discharge heads to 320 feet (97.5M) or 135 psi (9.3 BAR). At home in a wide variety of applications, the HL6M has been used in temporary fire service, quarry and mine dewatering, and as a temporary replacement for permanently installed transfer pumps. Like all Godwin Dri-Prime pumps, the HL6M can prime and reprime automatically from dry to 28 feet (8.5M) of suction lift.

Features

- Fully automatic priming from dry to 28 feet (8.5M) of suction lift. Maximum heads to 320 feet (97.5M), maximum flows to 2300 gpm (145 l/sec.).
- Pumpend available in cast iron, stainless steel and other hardened materials.
- Extensive application flexibility — will handle sludges and liquids with solids up to 1-1/2" (38mm) in diameter.
- Continuously operated “Godwin” venturi air ejector priming device featuring belt driven air compressor requiring no form of periodic adjustment or control.
- Solids handling flapper-type Non Return Valve with renewable flexible rubber seat.
- Double, high pressure mechanical seal with high abrasion resistant silicon carbide interfaces. Oil bath immersion for dry running.
- Compact unit mounted on a heavy-duty skid base or two-wheeled highway trailer both incorporating integral overnight running fuel tank and lifting frame.
- Simple maintenance — normally limited to checking engine and seal cavity oil levels.
- Standard engine — Caterpillar 3126. Available with a variety of engines including John Deere, Cummins and Deutz. Electric motor driven units are also available.
- A variety of silenced units are available

godwin pumps

HL6M Performance Curve



HL6M Performance Table

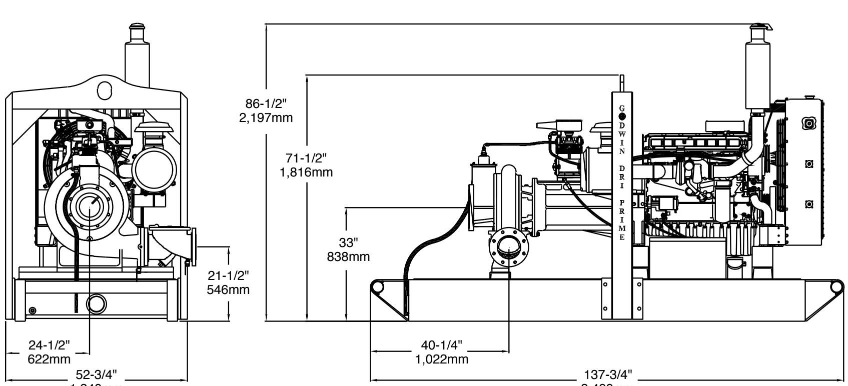
Diesel Set: Caterpillar 3126, 214 hp (160 kw) @ 2000 rpm
Impeller Diameter: 15-3/4 inches (400 mm)

	Total Delivery Head — Feet				
Total Suction	**200**	**225**	**250**	**275**	**300**
Head — Feet	**Output — GPM**				
15	2415	2310	2200	1898	1485
20	1903	1846	1710	1500	1155
25	1490	1360	1275	1155	905

Performance data listed in table and curves based on water tests at sea level and 68° F (20° C). Larger diameter pipes may be required for maximum flows.

Dimensions

HL6M — Caterpillar 3126, Skid Base
Weight: 7,000 lbs. (2,175 kg.)



Specifications

Maximum Operating Speed:
2000 rpm
Maximum Operating Temperature:
+212°F (100°C)
Maximum Working Pressure:
140 psi (9.7 BAR)
Maximum Suction Pressure:
88 psi (6.1 BAR)
Maximum Casing Pressure:
210 psi (14.5 BAR)
Fuel Tank Capacity:
150 gal. (568 liter), Trailer
175 gal. (662 liter), Skid
Fuel Consumption:
11.0 gph (41.6 lph), max.
Pipe Connections:
Suction: 8" (200mm) ASA 150#
Discharge: 6" (150mm) ASA 150#
Solids Handling:
1-1/2" (38mm) diameter

Materials

Pump Casing, Suction Cover, Separation Tank and Non Return Valve Casing:
Close-Grained Cast Iron
Impeller:
Cast Chromium Steel hardened to minimum 341 HB Brinell
Shaft:
1-1/2% Nickel/Chromium Steel
Wearplates:
25% Chromium Alloy Cast Iron hardened to minimum 600HB Brinell
Non Return Valve Flapper:
High Nitrile Rubber
Mechanical Seal Faces:
Solid Silicon Carbide

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APPENDIX B

APPENDIX B ANALYZED PARAMETERS AND DETECTION LIMITS

Appendix B - Analyzed Water Parameters and Detection Limits

Analytical Package	Parameters	Detection Limits	Unit
Total and Dissolved Metals (ICP-T, ICP-D)	Aluminum (Al)	0.0002	mg/L
	Antimony (Sb)	0.000005	mg/L
	Arsenic (As)	0.00002	mg/L
	Barium (Ba)	0.00002	mg/L
	Beryllium (Be)	0.000002	mg/L
	Bismuth (Bi)	0.000005	mg/L
	Boron (B)	0.005	mg/L
	Cadium (Cd)	0.000005	mg/L
	Calcium (Ca)	0.05	mg/L
	Chromium (Cr)	0.00005	mg/L
	Cobalt (Co)	0.00005	mg/L
	Copper (Cu)	0.00005	mg/L
	Iron (Fe)	0.01	mg/L
	Lead (Pb)	0.000005	mg/L
	Lithium (Li)	0.0002	mg/L
	Magnesium (Mg)	0.05	mg/L
	Manganese (Mn)	0.000005	mg/L
	Mercury (Hg)	0.00005	mg/L
	Molybdenum (Mo)	0.00005	mg/L
	Nickel (Ni)	0.00005	mg/L
	Phosphorus (P)	0.05	mg/L
	Potassium (K)	0.2	mg/L
	Selenium (Se)	0.00004	mg/L
	Silicon (Si)	0.05	mg/L
	Silver (Ag)	0.000005	mg/L
	Sodium (Na)	0.2	mg/L
	Strontium (Sr)	0.00001	mg/L
	Thallium (Tl)	0.000002	mg/L
	Tin (Sn)	0.00002	mg/L
	Titanium (Ti)	0.00005	mg/L
	Uranium (U)	0.000002	mg/L
	Vanadium (Va)	0.00001	mg/L
	Zinc (Zn)	0.0001	mg/L

Analytical Package	Parameters	Detection Limits	Unit
Routine Parameters (R)	Alkalinity ($CaCO_3$)	5	mg/L
	Acidity ($CaCO_3$)	5	mg/L
	Chloride	0.5	mg/L
	Carbonate (Co_3)	5	mg/L
	Bicarbonate (HCO_3)	5	mg/L
	Total Hardness ($CaC0_3$)	1	mg/L
	Hydroxide (OH)	5	mg/L
	Sulphate (SO_4)	0.05	mg/L
	Total Suspended Solids (TSS	3	mg/L
	Total Dissolved Solids (TDS)	5	mg/L
	Total Organic Carbon (TOC)	1	mg/L
	Total Inorganic (TIC)	1	mg/L
	pH	0.1	-
	Conductivity (uS/cm)	0.2	uS/cm
	Turbidity	0.1	NTU
Nutrients (N)	Nitrate (NO_3)	0.006	mg/L
	Nitrite (NO_2)	0.002	mg/L
	Ammonia (NH3)	0.005	mg/L
	Orthophosphate	0.001	mg/L
	Total Phosphorus	0.001	mg/L
Biological (B)	Biochem Oxygen Demand	5	mg/L
	Fecal Coliforms	1	CFU/100 mL
	Oil & Grease	1	mg/L
Petroleum Hydrocarbons (PHCs)	Benzene	0.0005	mg/L
	Ethylbenzene	0.0005	mg/L
	Toluene	0.0005	mg/L
	o-Xylene	0.0005	mg/L
	m+p-Xylene	0.0005	mg/L
	Xylenes	0.0005	mg/L
	F1(C6-C10)	0.1	mg/L
	F1-BTEX	0.1	mg/L
	F2 (>C10-C16)	0.25	mg/L
	F3 (C16-C34)	0.25	mg/L
	F4 (C34-C50)	0.25	mg/L

Note:
1. The detection limits are provided by ALS Laboratory Group.