ESKOM HOLDINGS LIMITED

PANEL B CONSULTANTS JOINT VENTURE

KUSILE POWER STATION

No.1 ASH DUMP

PROPOSED AMENDED LAYOUT AND CONSTRUCTION SEQUENCE

REPORT 30200098-16-001: APRIL 2012

Type of Report:

Task Order Number:

Date: April 2012

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ATTACHMENTS:

Drawings: K303-00098-16-SK1
K303-00098-16-SK2
Kusile Ash Dump – Wetland Extant

1 INTRODUCTION AND GENERAL

Construction of the Kusile Ash Dump has been identified as a critical activity both from the perspective of wetland protection/environmental concerns and support of Kusile Power Station commercial operation date.

The Kusile Project submitted a Section 21 (c) and (i) water use license application to the DWA regional department on 13 May 2011 (Ref. # 16/2/7/B100/B174) due to the pan and associated wetlands present on the footprint. After many discussions and meetings with various DWA officials, it has been their recommendation that Kusile reduce the footprint to exclude the pan/wetlands area.

Based on this recommendation, Kusile Project has developed a conceptual ash dump layout and modified construction sequence as described in this report. It should be noted that these revisions to the original design will result in reduced ash dump storage capacity and additional engineering and construction costs.

Note that commencement of all activities listed below is contingent on approval from the relevant permitting authorities. Timelines and schedule dates have been included to indicate sequence and are based on the Project Master Plan which supports the Kusile power station commercial operation date.

1.1 Wetland Protection:

The initial activity shall be to survey and clearly mark the extents of the wetland pan and adjacent wetland. Next, a 50 meter buffer zone around the wetland pan and adjacent wetland will be established to demarcate the protected area where no construction activities shall take place. Refer to attached sketches K303-00098-16-SK1 and K303-00098-16-SK2.

- Catchment areas east and north of the wetlands have been preserved as much as possible under the Phase One footprint, while still allowing sufficient area for ash disposal.
- Note that while the Phase Two footprint encroaches on the wetland catchment area to the east, the Phase One footprint will be rehabilitated at that stage, allowing clean storm water to feed the wetlands from the north.
- Impacts on the wetlands west of the ash dump have been mitigated by revising the construction sequence and ash dump layout.
- Dirty water pipeline for Phase Two has been relocated to minimize impact on wetlands.

1.2 Site Establishment:

Activities include construction of the contractor's yard, fencing of the works, establishment of topsoil/bulk material storage areas, and storm water/erosion control measures associated with said activities.

1.3 Storm water/Erosion Control:

Erosion control facilities shall be installed to support construction of the areas outside the ash dump footprint, including the Ash Dump Dirty Water Dam, Radial Stacker Terrace, Workshop Terrace and roads.

1.4 Earthworks/Terracing:

Construction shall begin with supporting facilities outside of the ash dump footprint including the Ash Dump Dirty Water Dam, Radial Stacker Terrace, Workshop Terrace, and roads.

- Mitigation measures noted in Section 1.1 will be adequate to prevent wetland impacts.
- Analysis of alternate locations for the Ash Dump Dirty Dam determined that only the current location is feasible considering drainage requirements and topography.
- Construction planned during the 2012 dry season.
- Ash Dump Dirty Water Dam to become operational July 2013. Critical item as no material can be deposited into the dump prior to completion of the dam.

2 ASH DUMP PHASE ONE CONSTRUCTION:

2.1 Ash Dump Phase One Storm water / Erosion Control:

Facilities shall be installed to support construction of the revised Phase One footprint. Refer to attached sketch K303-00098-16-SK1.

- Mitigation measures noted in Section 1.1 will be adequate to prevent wetland impacts.
- Phasing of the overall ash dump footprint has been revised in order to avoid the wetland pan area.
- Clean water (i.e., groundwater drainage under the liner system in areas where the natural water table is shallow, Construction Phase storm water, and Operational Phase storm water from rehabilitated areas) shall be directed

around the north edge of the ash dump and discharged through silt retention dams into the natural stream course.

- Dirty water during operations shall be channelled around the ash dump perimeter to the Dirty Water Dam as shown on the attached sketch K303-00098-16-SK1. Route has been optimized to avoid wetland impacts.

2.2 Ash Dump Phase One Earthworks/Terracing:

Construction activities begin in 2012 within the revised Phase One footprint. Refer to attached sketch K303-00098-16-SK1.

- Revised Phase One area will accommodate 4 years of ash/gypsum co-disposal from the Kusile Power Station (23,309,000 m^3). Note that this is a reduction from the original plan to accommodate 5 years of co-disposal. Project schedule will be impacted.
- Excavate and construct the dirty water concrete channels in 1000m lengths at a time. Backfill trenches after completion of each section.
- Construct perimeter road bed and balance of culvert crossings over 1000m lengths at a time.
- Excavate and form clean water drains in 1000 m sections together with culverts and culvert discharge trenches to silt retention dams.
- Topsoil removal and foundation preparation in 0.25 km squared sections of the phase one footprint to receive the liner sandwich installation (also installed in 0.25 km squared sections).
- Deliver, spread and tip the 300 mm G5 protection layer over the installed liner as soon as each 0.25 km squared section is complete.
- Form toe wall to each liner panel section, including drainage pipes at 75 m intervals for storm water discharge to the silt retention dams.

3 ASH DUMP FUTURE PHASE TWO CONSTRUCTION

3.1 Future Ash Dump Phase Two Storm water/Erosion Control:

Facilities shall be installed to support construction of the revised future Phase Two gypsum disposal area footprint. Refer to attached sketch K303-00098-16-SK2. This construction activity will be scheduled to commence 3 years after Kusile initial commissioning, namely by 2017.

- Mitigation measures noted in Section 1.1 will be adequate to prevent wetland impacts.
- Phasing of the overall ash dump footprint has been revised in order to avoid the wetland pan area.
- Clean water (groundwater drainage under the liner system in areas where the natural water table is shallow, Construction Phase storm water & Operational

Phase storm water from rehabilitated areas) shall be directed around the south edge of the ash dump and discharged through silt retention dams into the natural stream course.

- Dirty water during operations shall be channelled around the ash dump perimeter to the Dirty Water Dam as shown on the attached sketch K303-00098-16-SK2. Route has been optimized to avoid wetland impacts.

3.2 Future Ash Dump Phase Two Earthworks/Terracing:

Construction activities begin within the revised Phase Two footprint for the future storage of gypsum. Refer to attached sketch K303-00098-16-SK2.

- Revised Phase Two area will accommodate 55 years of future gypsum waste disposal from the Kusile Power Station (33,524,000 m^3).
- Sequence of activities to match Phase One (refer to Section 2.2 above).

Ash Dump Boundary Coordinates

Ash Dump Dirty Water Dam (refer to attached sketch, Kusile Ash Dump – Wetland Extant):

ID	X_COORD	Y_COORD	Latitude	Longitude
1	-10134.2	-2868959.0	-25.9288800	28.8988400
2	-10046.5	-2869073.3	-25.9299100	28.8997100
3	-10326.1	-2869642.7	-25.9350500	28.8969200
4	-10176.7	-2869603.1	-25.9346900	28.8984100

Phase One Footprint (refer to attached sketch, Kusile Ash Dump – Wetland Extant):

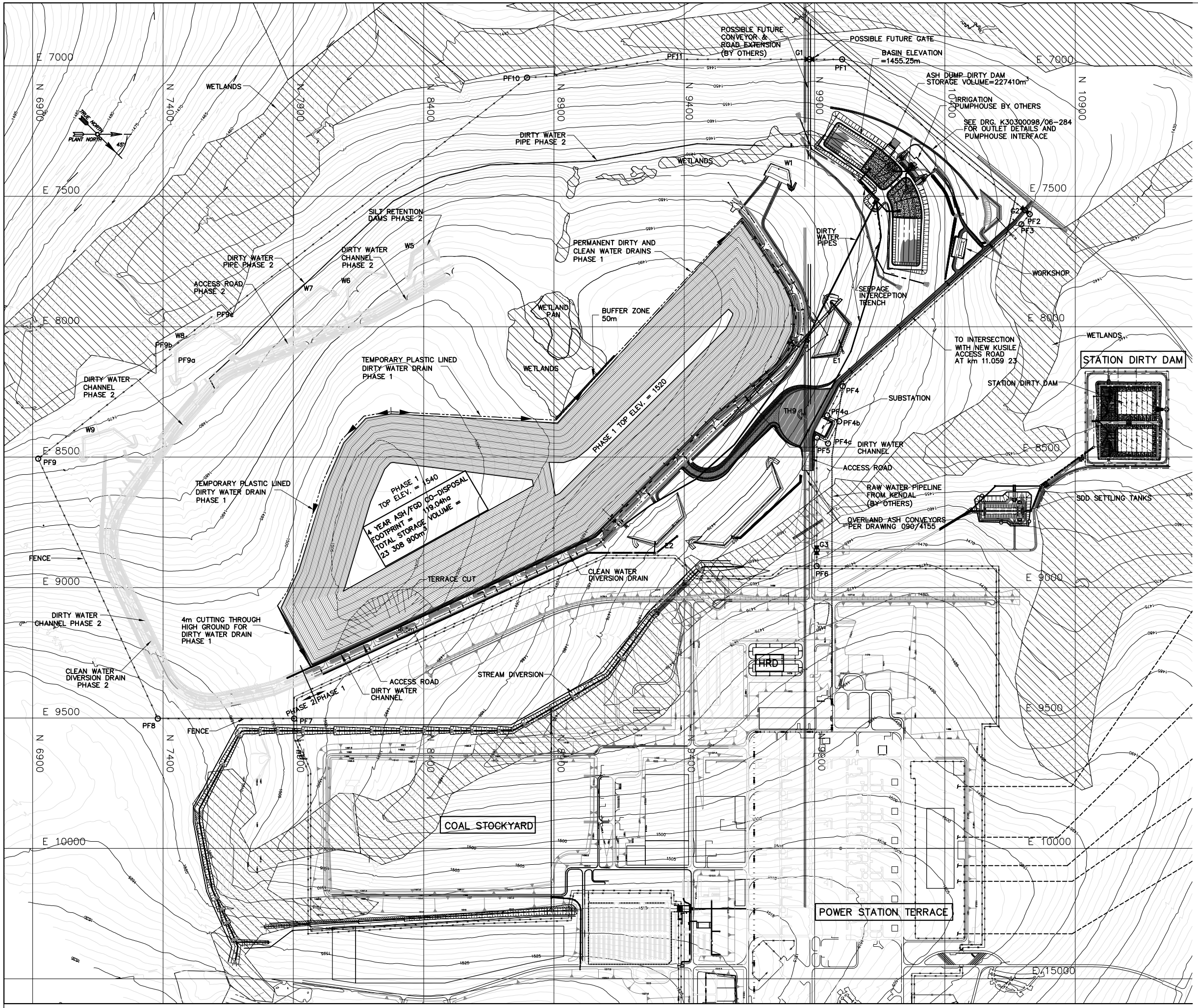
ID	X_COORD	Y_COORD	Latitude	Longitude
5	-9618.2	-2869081.6	-25.9299900	28.9039900
6	-8523.8	-2869094.4	-25.9301100	28.9149100
7	-7399.0	-2869506.3	-25.9338300	28.9261400
12	-8726.3	-2869592.6	-25.9346100	28.9128900
13	-9793.4	-2869607.6	-25.9347300	28.9022400
17	-8226.1	-2870087.0	-25.9390700	28.9178800
18	-7483.9	-2869800.3	-25.9364900	28.9252900

Phase Two Footprint (refer to attached sketch, Kusile Ash Dump – Wetland Extant):

ID	X_COORD	Y_COORD	Latitude	Longitude
7	-7399.0	-2869506.3	-25.9338300	28.9261400
8	-6978.1	-2869755.7	-25.9360900	28.9303400
9	-7170.4	-2870483.7	-25.9426600	28.9284200
10	-7922.5	-2870621.3	-25.9439000	28.9209100
11	-8894.3	-2870238.5	-25.9404300	28.9112100
12	-8726.3	-2869592.6	-25.9346100	28.9128900

Drawings:

K303-00098-16-SK1
K303-00098-16-SK2
Kusile Ash Dump – Wetland Extant



NOTE:- ORIGINAL PHASE 1
5 YEAR ASH/FGD CO-DISPOSAL FOOTPRINT = 106.26ha
TOTAL STORAGE VOLUME = 32 284 000m³

KEY

- DIRTY WATER COLLECTION DRAIN AND JUNCTION BOX
- DIRTY WATER PIPELINE
- GRAVEL SURFACED ACCESS ROAD TO PUMP STATION
- ASPHALT SURFACED ACCESS ROAD No. 3
- PERIMETER ACCESS ROAD/ACCESS ROAD FROM ASH DUMP TO RADIAL STACKER
- CLEAN WATER DIVERSION DRAIN
- CLEAN WATER DIVERSION CHANNEL
- ASH DUMP FENCE ALIGNMENT
- GATE AT ASH DUMP FENCE
- TH9 TRANSFER HOUSE/ RADIAL STACKER
- WETLANDS

PLAN
SCALE 1:5000

D.O. REV	DATE	** REVISION **	REV BY	CHKD BY	AUTH BY	KKS APP	REFERENCE DRAWINGS
ORIG REGISTR		INDEX REFERENCE :					
DESIGN APPROVED			JPW				
KKS APP							
DG AUTH			DO				
CHKD BY			JPW				
DRAWN BY	04/04/12		DO				
SCALE							

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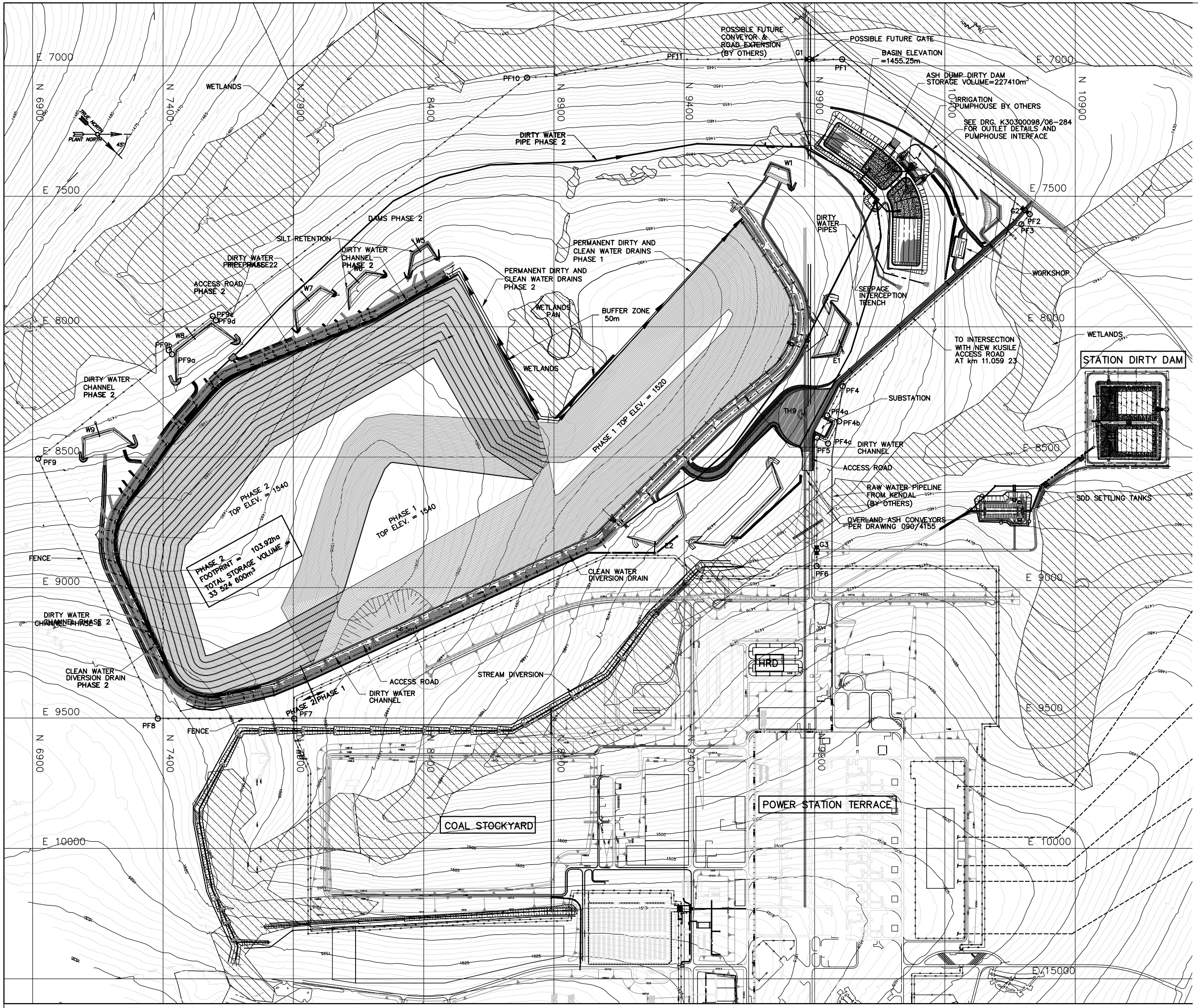
KUSILE POWER STATION
ASH DUMP No 1
PROPOSED PHASED DEVELOPMENT
Phase 1

DRG. No. K30300098/16-SK1 REV

0.90/***** SHEET A0 REV



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DESIGN APPROVED			JPW				
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DG AUTH			DO				
CHKD BY			JPW				
DRAWN BY	21/07/16		DO				
SCALE							

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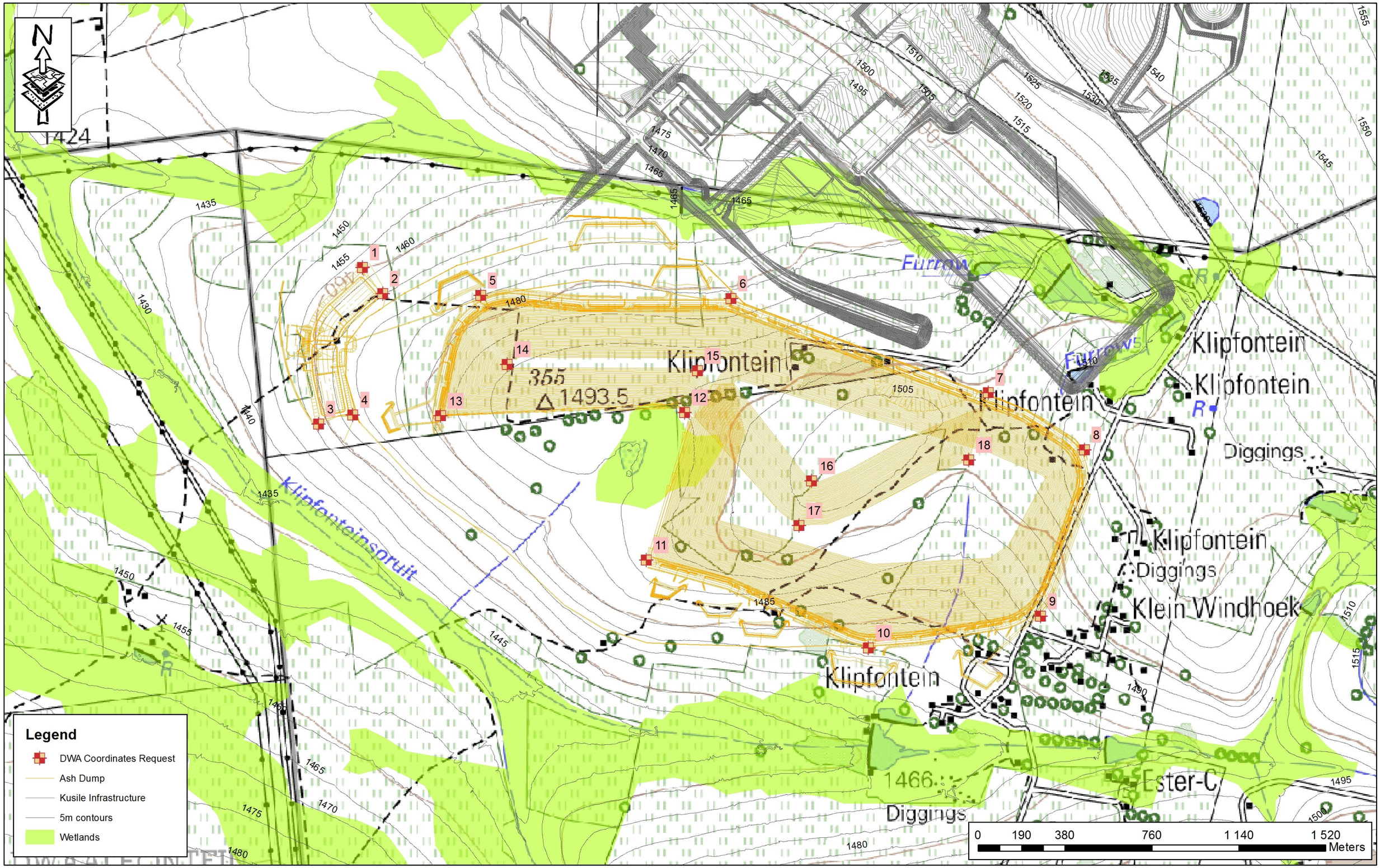
KUSILE POWER STATION
ASH DUMP No 1
PROPOSED PHASED DEVELOPMENT
Phase 2

DRG. No. K30300098/16-SK2 REV

0.90/***** SHEET A0 REV



Kusile Ash Dump - Wetland Extent

Knight Piésold
CONSULTING

DOCUMENT CONTROL SHEET

CLIENT : ESKOM HOLDINGS LIMITED

PROJECT : KUSILE POWER STATION **PROJECT No : 303-00098/16**

TITLE : NO. 1 ASH DUMP PHASE CONSTRUCTION

	Prepared by	Reviewed by	Approved by
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DATE	**SIGNATURE**	**SIGNATURE**	**SIGNATURE**

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