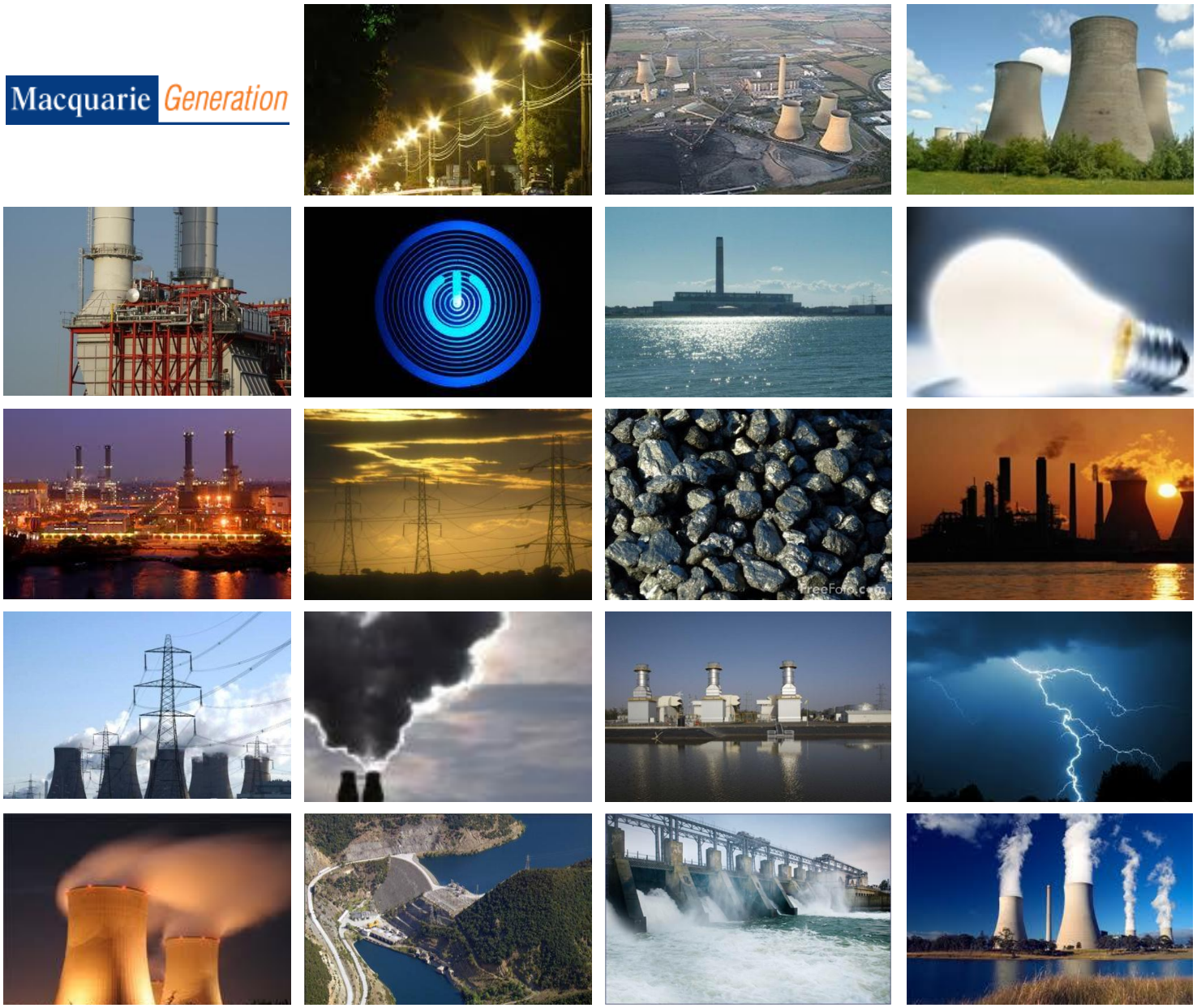
Macquarie Generation



COMMERCIAL IN CONFIDENCE

Macquarie Generation – Project Symphony

Bayswater Power Station

Preliminary Environmental Site Assessment

Ref: 0213879RP01_DRAFTRev02

October 2013

The world's leading sustainability consultancy

ERM

COMMERCIAL IN CONFIDENCE

Bayswater Power Station

Preliminary Environmental Site Assessment

Macquarie Generation - Project Symphony

October 2013

Approved by:	Joseph Ferring
Position:	*Project Manager*
Signed:	*DRAFT*
Date:	18 October 2013
Approved by:	Matthew Klein
Position:	*Managing Partner – Asia Pacific Transaction Services*
Signed:	*DRAFT*
Date:	18 October 2013

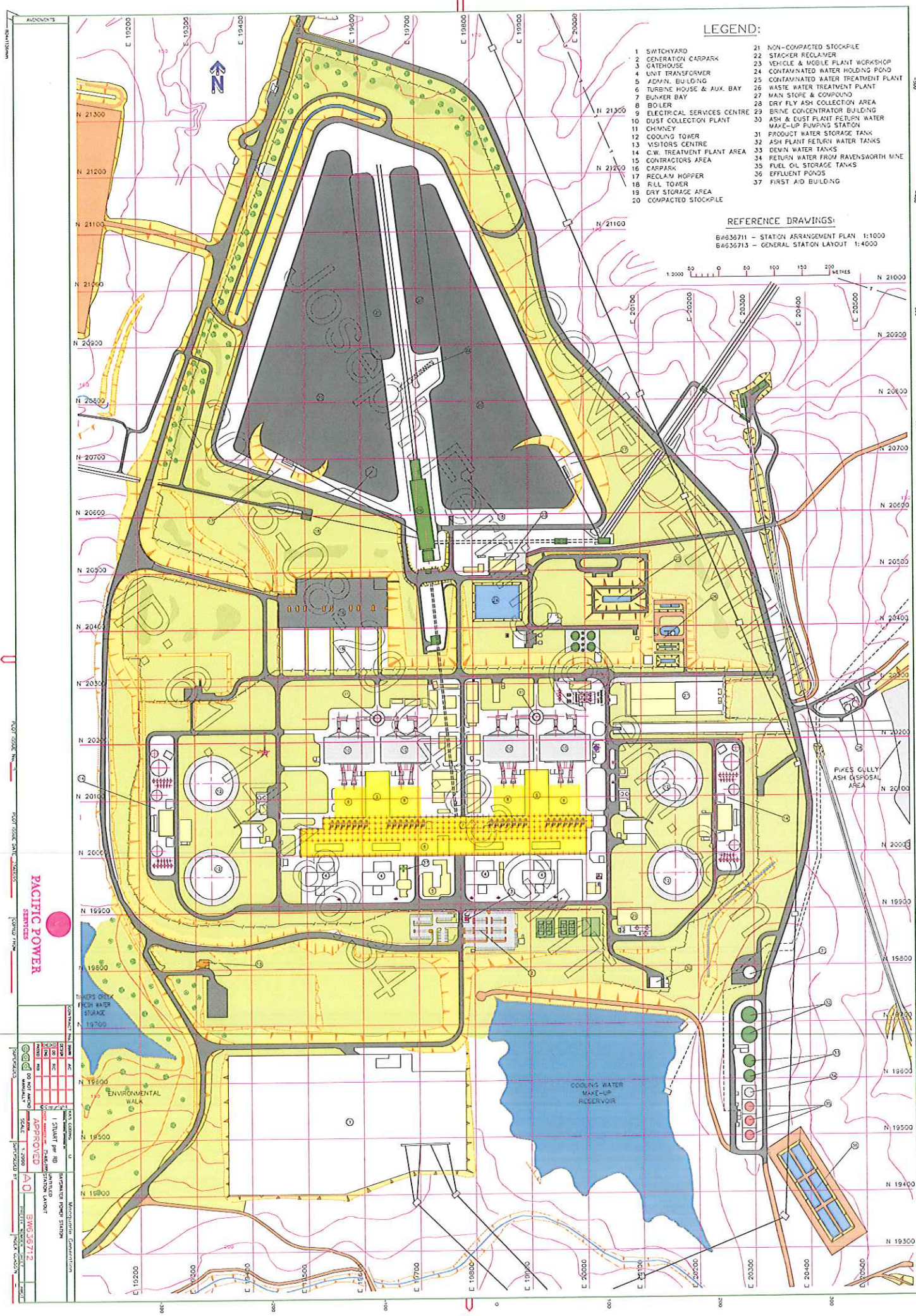
Environmental Resources Management Australia Pty Ltd Quality System

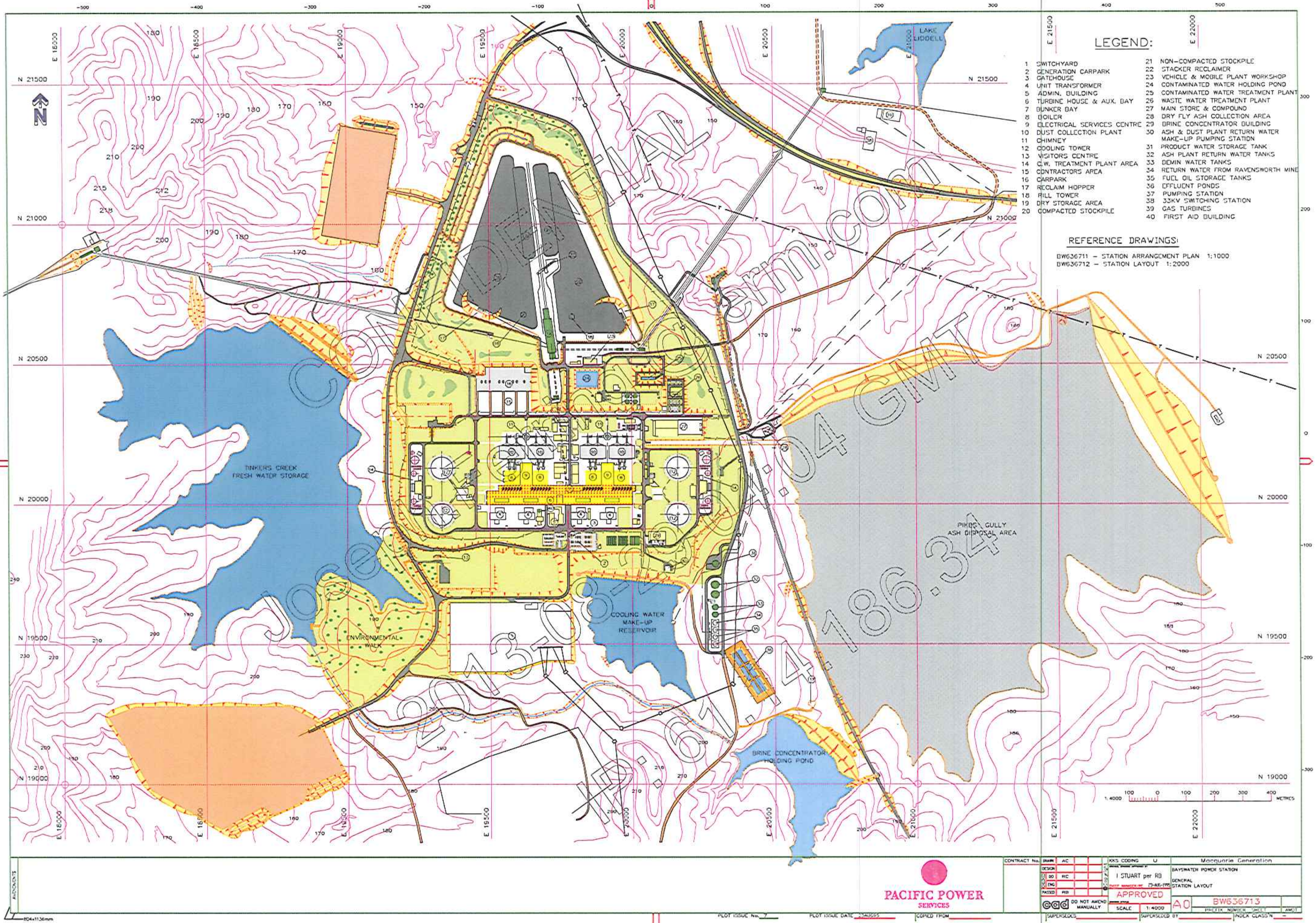
0213879RP01_DRAFT Rev02

www.erm.com

Annex E

Dataroom Documentation


LEGEND:
1 SWITCHYARD
2 GENERATION CARPARK
3 GATEHOUSE
4 UNIT TRANSFORMER
5 ADMIN. BUILDING
6 TURBINE HOUSE & AUX. BAY
7 BUNKER BAY
8 BOILER
9 ELECTRICAL SERVICES CENTRE
10 DUST COLLECTION PLANT
11 CHIMNEY
12 COOLING TOWER
13 VISITORS CENTRE
14 C.W. TREATMENT PLANT AREA
15 CONTRACTORS AREA
16 CARPARK
17 RECLAIM HOPPER
18 R.L.L. TOWER
19 DRY STORAGE AREA
20 COMPACTED STOCKPILE
21 NON-COMPACTED STOCKPILE
22 STACKER RECLAIMER
23 VEHICLE & MOBILE PLANT WORKSHOP
24 CONTAMINATED WATER HOLDING POND
25 CONTAMINATED WATER TREATMENT PLANT
26 WASTE WATER TREATMENT PLANT
27 MAIN STORE & COMPOUND
28 DRY FLY ASH COLLECTION AREA
29 BRINE CONCENTRATOR BUILDING
30 ASH & DUST PLANT RETURN WATER MAKE-UP PUMPING STATION
31 PRODUCT WATER STORAGE TANK
32 ASH PLANT RETURN WATER TANKS
33 DEMIN WATER TANKS
34 RETURN WATER FROM RAVENSWORTH MINE
35 FUEL OIL STORAGE TANKS
36 EFFLUENT PONDS
37 FIRST AID BUILDING
REFERENCE DRAWINGS:
BW636711 – STATION ARRANGEMENT PLAN 1:1000
BW636713 – GENERAL STATION LAYOUT 1:4000
1:2000 50 0 50 100 150 200 METRES
N
TOWERS CREEK RAW WATER STORAGE
ENVIRONMENTAL WALK
COOLING WATER MAKE-UP RESERVOIR
PIKES GULLY ASH DISPOSAL AREA
E 19200
E 19300
E 19400
E 19500
E 19600
E 19700
E 19800
E 19900
E 20000
E 20100
E 20200
E 20300
E 20400
E 20500
N 21300
N 21200
N 21100
N 21000
N 20900
N 20800
N 20700
N 20600
N 20500
N 20400
N 20300
N 20200
N 20100
N 20000
N 19900
N 19800
N 19700
N 19600
N 19500
N 19400
N 19300
PACIFIC POWER
SERVICES
APPROVED
A0
BW636712
BAYSWATER POWER STATION
STATION LAYOUT
Muswellbrook Communities
BW.EQP.01.03 Original Design\Drawings > BW.EQP.01.03.017 - Station Layout Drawing.pdf


LEGEND:
1 SWITCHYARD
2 GENERATION CARPARK
3 GATEHOUSE
4 UNIT TRANSFORMER
5 ADMIN. BUILDING
6 TURBINE HOUSE & AUX. BAY
7 BUNKER BAY
8 BOILER
9 ELECTRICAL SERVICES CENTRE
10 DUST COLLECTION PLANT
11 CHIMNEY
12 COOLING TOWER
13 VISITORS CENTRE
14 C.W. TREATMENT PLANT AREA
15 CONTRACTORS AREA
16 CARPARK
17 RECLAIM HOPPER
18 RILL TOWER
19 DRY STORAGE AREA
20 COMPACTED STOCKPILE
21 NON-COMPACTED STOCKPILE
22 STACKER RECLAIMER
23 VEHICLE & MOBILE PLANT WORKSHOP
24 CONTAMINATED WATER HOLDING POND
25 CONTAMINATED WATER TREATMENT PLANT
26 WASTE WATER TREATMENT PLANT
27 MAIN STORE & COMPOUND
28 DRY FLY ASH COLLECTION AREA
29 BRINE CONCENTRATOR BUILDING
30 ASH & DUST PLANT RETURN WATER MAKE-UP PUMPING STATION
31 PRODUCT WATER STORAGE TANK
32 ASH PLANT RETURN WATER TANKS
33 DEMIN WATER TANKS
34 RETURN WATER FROM RAVENSWORTH MINE
35 FUEL OIL STORAGE TANKS
36 EFFLUENT PONDS
37 PUMPING STATION
38 33KV SWITCHING STATION
39 GAS TURBINES
40 FIRST AID BUILDING
REFERENCE DRAWINGS:
BW636711 - STATION ARRANGEMENT PLAN 1:1000
BW636712 - STATION LAYOUT 1:2000
LAKE LIDDELL
TINKERS CREEK FRESH WATER STORAGE
PIKES GULLY ASH DISPOSAL AREA
COOLING WATER MAKE-UP RESERVOIR
ENVIRONMENTAL WALK
BRINE CONCENTRATOR HOLDING POND
N 21500
N 21000
N 20500
N 20000
N 19500
N 19000
E 18500
E 18500
E 19000
E 19500
E 20000
E 20500
E 21000
E 21500
E 22000
1:4000
METRES
PACIFIC POWER SERVICES
CONTRACT No.
DRAWN AC
DESIGN
DO RC
ENG
PASSED RB
cad DO NOT AMEND MANUALLY
KKS CODING U
I STUART per RB
APPROVED
SCALE 1:4000
Macquarie Generation
BAYSWATER POWER STATION
GENERAL STATION LAYOUT
A0
BW636713
PREFIX NUMBER SHEET
AMDT
SUPERSEDES
SUPERSEDED BY
INDEX CLASS'N -
PLOT ISSUE No. 7
PLOT ISSUE DATE
COPIED FROM
AMENDMENTS

Bayswater Contaminated Land Sites

Site **Bayswater Asbestos Dump**

Location E296101.4 - N1418743.6 **Area:** 0 **Ha**

Contaminant Asbestos

Comment Storage of asbestos from the old Muswellbrook Power Station.

Site **Bayswater Rubbish Dump**

Location E293600 - N1414010 **Area:** 0 **Ha**

Contaminant

Comment General station domestic and light industrial waste

Site **BC Decant Basin**

Location E293600 - N1413400 **Area:** 0 **Ha**

Contaminant Salinity, Trace Elements, Calcium Sulphate.

Comment

Site **BC Holding Pond**

Location E295000 - N1413500 **Area:** 0 **Ha**

Contaminant Salinity, Trace Elements.

Comment

Site **BC Holding Pond Pond Caustic Storage Tank Bund**

Location E295000 - N1413500 **Area:** 0 **Ha**

Contaminant Sodium Hydroxide

Comment

Site **Lime Softening Plant Sludge Lagoons**

Location E293900 - N1412700 **Area:** 0 **Ha**

Contaminant Calcium Carbonate, High pH

Comment

Bayswater Contaminated Land Sites

Site **Pikes Gully Ash Dam**

Locatior E295900 - N1414200 **Area:** 0 **Ha**

Contaminan Boiler Bottom Ash, Boiler Fly Ash, Trace Elements, High pH.

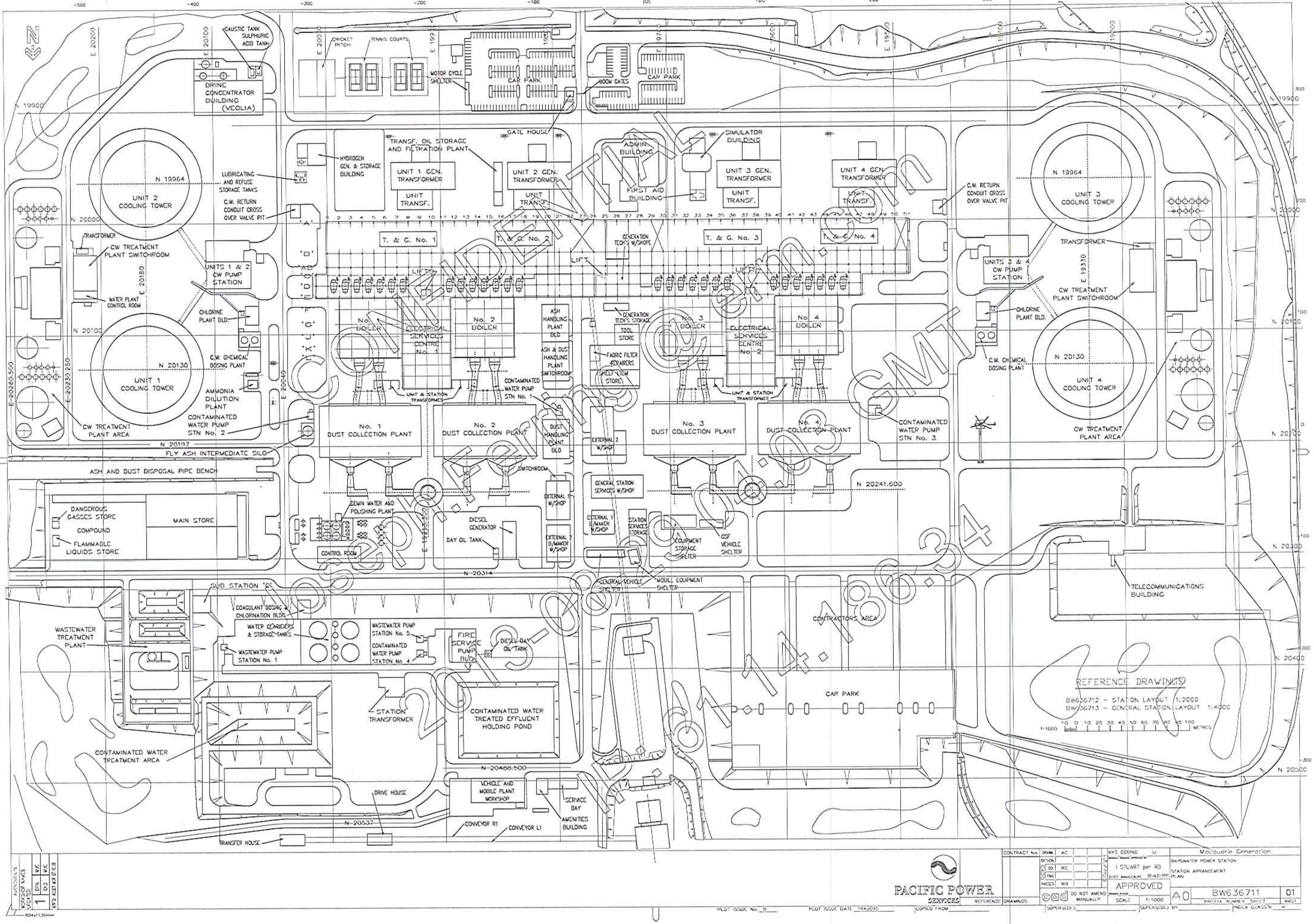
Comment

Site **Ravensworth Voids**

Locatior E304100 - N1409800 **Area:** 0 **Ha**

Contaminan Boiler Fly Ash, Trace Elements.

Comment



WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Acknowledgement Number NDG023009

7 May 2013

Howard Richards
MACQUARIE GENERATION
T/A BAYSWATER POWER STN
PRIVATE BAG 2
MUSWELLBROOK NSW 2333

Dear Sir / Madam

RE: Notification of Dangerous Goods on Premises

PREMISES: New England Hwy, Muswellbrook NSW 2333, AUSTRALIA

Please find enclosed your Acknowledgement of Notification that relates to the storage and handling of dangerous goods at the above premises. Only storage locations on this site that are above placarding quantity are recorded on this Acknowledgement of Notification.

Occupiers of premises on which dangerous goods are stored or handled in notifiable quantities are reminded that, at this point in time, they must notify WorkCover NSW annually of the dangerous goods on those premises.

You are required to advise WorkCover within 14 days of any changes occurring in your details including changes to the type or quantity of dangerous goods stored or handled, or if you no longer occupy the site.

Requirements relating to the storage and handling of dangerous goods on premises are contained in the Occupational Health and Safety Act 2000 and the Occupational Health and Safety Regulation 2001. To support this legislation WorkCover has developed the 'Notification of dangerous goods on premises guide' (publication catalogue number WC01385) which is available on WorkCover NSW's website.

Further information on dangerous goods legislation may be obtained at the Workcover website *www.workcover.nsw.gov.au* or by calling WorkCover on 13 10 50.

Yours sincerely,

Fiona Hayman
Operations Manager
Customer Service Centre

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Dangerous Goods Notification Team
Ph: (02) 4321 5500 Fax (02) 9287 5500

7 May 2013

MACQUARIE GENERATION
T/A BAYSWATER POWER STN
PRIVATE BAG 2
MUSWELLBROOK NSW 2333

ACKNOWLEDGEMENT OF NOTIFICATION OF DANGEROUS GOODS ON PREMISES

ISSUED UNDER AND SUBJECT TO THE PROVISIONS OF
THE OCCUPATIONAL HEALTH & SAFETY ACT 2000 AND REGULATIONS THEREUNDER

Acknowledgement Number NDG023009 **Expiry Date** 21/04/2014

Occupier Contact Howard Richards **Ph.** 02 6542 0723 **Fax** 02 6542 0618

Issued To MACQUARIE GENERATION

Premises where Notified Dangerous Goods are stored/handled

New England Hwy, Muswellbrook NSW 2333, AUSTRALIA

Nature of Site Electricity Distribution

Emergency Contact for this Site Seth Pathiyil **Ph.** 02 6542 3628

Site Staffing Site Hours: 24 HRS 7 DAYS 290 STAFF

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WORK SAFE HOME SAFE

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
1	Above Ground Tank	1200000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	DIESEL	C1	1200000L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
2	Above Ground Tank	1200000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	DIESEL	C1	1200000L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
3	Above Ground Tank	1200000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	DIESEL	C1	1200000L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
5	Process Vessel	80000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
6	Process Vessel	80000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
7	Process Vessel	80000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
8	Process Vessel	80000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WORK SAFE HOME SAFE

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
9	Process Vessel	80000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
10	Process Vessel	80000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
11	Process Vessel	90000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
12	Process Vessel	90000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
13	Process Vessel	80000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	78920L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
14	Above Ground Tank	50000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1005	AMMONIA, ANHYDROUS	2.3	50000L	

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
17	Cylinder Store	58272		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1049	HYDROGEN, COMPRESSED	2.1	58272L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
18	Cylinder Store	3900		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1017	CHLORINE	2.3	3900L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
21	Roofed Store	295		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1017	CHLORINE	2.3	295L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
22	Cylinder Store	3900		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1017	CHLORINE	2.3	3900L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
23	Above Ground Tank	30000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2582	FERRIC CHLORIDE SOLUTION	8	29000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
24	Above Ground Tank	30000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2582	FERRIC CHLORIDE SOLUTION	8	29000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
25	Above Ground Tank	30000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2582	FERRIC CHLORIDE SOLUTION	8	29000L	III

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
26	Above Ground Tank	30000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2582	FERRIC CHLORIDE SOLUTION	8	29000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
27	Above Ground Tank	18000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2582	FERRIC CHLORIDE SOLUTION	8	18000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
28	Above Ground Tank	18000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2582	FERRIC CHLORIDE SOLUTION	8	18000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
29	Above Ground Tank	27000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2582	FERRIC CHLORIDE SOLUTION	8	26000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
30	Above Ground Tank	27000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2582	FERRIC CHLORIDE SOLUTION	8	26000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
31	Above Ground Tank	93000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	93000L	III

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WORK SAFE HOME SAFE

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
32	Above Ground Tank	93000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	93000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
33	Above Ground Tank	46000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	46000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
34	Above Ground Tank	60000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	49000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
35	Above Ground Tank	20000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	2000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
36	Above Ground Tank	1000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	1000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
37	Above Ground Tank	1000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	1000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
38	Above Ground Tank	1000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	1000L	III

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WORK SAFE HOME SAFE

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
39	Above Ground Tank	1000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	1000L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
40	Above Ground Tank	68000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	68000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
41	Above Ground Tank	68000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	68000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
42	Above Ground Tank	68000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	68000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
43	Above Ground Tank	68000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	68000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
44	Above Ground Tank	68000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	68000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
45	Above Ground Tank	68000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	68000L	II

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
46	Above Ground Tank	280000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	254000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
47	Above Ground Tank	280000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	254000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
48	Above Ground Tank	22710		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1830	SULFURIC ACID	8	20710L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
50	Roofed Store	5000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1090	ACETONE	3	20L	II
1300	WHITE SPIRIT [AUST.]	3	20L	II
1299	TURPENTINE	3	40L	III
1223	KEROSENE	3	200L	III

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
51	Roofed Store	15000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2014	HYDROGEN PEROXIDE, AQUEOUS SOLUTION	5.1	60L	II
1791	HYPOCHLORITE SOLUTION	8	160L	III
2209	FORMALDEHYDE SOLUTION	8	160L	III
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	200L	II
1824	SODIUM HYDROXIDE SOLUTION	8	400L	II
1823	SODIUM HYDROXIDE, SOLID	8	1000L	II
2672	AMMONIA SOLUTION	8	2600L	III
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	3000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
52	Underground Tank	36000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	DIESEL	C1	30000L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
53	Underground Tank	20000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1203	PETROL	3	20000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
54	Above Ground Tank	22000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	9868L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
55	Above Ground Tank	16447		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1824	SODIUM HYDROXIDE SOLUTION	8	9868L	II

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WC03116 0611

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Issued To MACQUARIE GENERATION
Acknowledgement Number NDG023009

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
56	Above Ground Tank	5000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2014	HYDROGEN PEROXIDE, AQUEOUS SOLUTION	5.1	5000L	II

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
57	Process Vessel	3069		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
1977	NITROGEN, REFRIGERATED LIQUID	2.2	3069L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
58	Above Ground Tank	35000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
2672	AMMONIA SOLUTION	8	18310L	III

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
59	Process Vessel	90000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	90000L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
60	Process Vessel	80000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	COMBUSTIBLE LIQUIDS C1	C1	80000L	

Storage ID	Storage Type	Max Storage Capacity (Kg/L)		
61	Above Ground Tank	70000		
UN Number	Product Name	Class/Division	Typical Quantity	Packing Group
00C1	DIESEL	C1	70000L	

This acknowledgement must be retained as PROOF OF NOTIFICATON
You must notify WorkCover annually of the Dangerous Goods stored on these premises.

WC03116 0611

LEGEND

No.	DESCRIPTION	GRID REF.
1.	FUEL OIL TANK FARM (DIESEL)	K-2
2.	FUEL OIL TANK FARM (DIESEL)	K-2
3.	FUEL OIL TANK FARM (DIESEL)	K-2
4.	NOT USED	
5.	1A GENERATOR TRANSFORMER (TX OIL)	H-4
6.	1B GENERATOR TRANSFORMER (TX OIL)	H-4
7.	2A GENERATOR TRANSFORMER (TX OIL)	H-4
8.	2B GENERATOR TRANSFORMER (TX OIL)	H-5
9.	3A GENERATOR TRANSFORMER (TX OIL)	H-5
10.	3B GENERATOR TRANSFORMER (TX OIL)	H-5
11.	4A GENERATOR TRANSFORMER (TX OIL)	H-6
12.	4B GENERATOR TRANSFORMER (TX OIL)	H-6
13.	SPARE TRANSFORMER (TX OIL)	H-4
14.	ANHYDROUS NH_3 TANK (NH_3)	G-3
15.	CO_2 REFRIGERANT (CO_2)	H-4
16.	CO_2 REFRIGERANT (CO_2)	H-4
17.	HYDROGEN PLANT (H_2)	H-3
18.	1/2 Cl_2 DOSING PLANT (Cl_2)	G-3
19.	1/2 CWTP Cl_2 DOSING PLANT (Cl_2)	G-2
20.	3/4 CWTP Cl_2 DOSING PLANT (Cl_2)	G-7
21.	DOM. WATER Cl_2 DOSING (Cl_2)	F-3
22.	3/4 Cl_2 DOSING PLANT (Cl_2)	G-6
23.	1 COOLING WATER TREATMENT PLANT (FERRIC CHLORIDE)	G-2
24.	2 COOLING WATER TREATMENT PLANT (FERRIC CHLORIDE)	G-2
25.	3 COOLING WATER TREATMENT PLANT (FERRIC CHLORIDE)	G-7
26.	4 COOLING WATER TREATMENT PLANT (FERRIC CHLORIDE)	G-7
27.	DEMIN. PRETREATMENT (FERRIC CHLORIDE)	F-3
28.	DEMIN. PRETREATMENT (FERRIC CHLORIDE)	F-3

No.	DESCRIPTION	GRID REF.
29.	LIME SOFTENING PLANT (FERRIC CHLORIDE)	Q-2
30.	LIME SOFTENING PLANT (FERRIC CHLORIDE)	Q-2
31.	DEMIN. PLANT (CAUSTIC SODA)	F-4
32.	DEMIN. PLANT (CAUSTIC SODA)	F-4
33.	BRINE CONCENTRATOR (CAUSTIC SODA)	H-3
34.	BRINE CONCENTRATOR HOLDING POND (SULPHURIC ACID)	N-1
35.	HYDROGEN PLANT (CAUSTIC SODA)	H-3
36.	1/2 Cl_2 DOSING PLANT (CAUSTIC SODA)	G-3
37.	1/2 Cl_2 DOSING PLANT (CAUSTIC SODA)	G-3
38.	3/4 Cl_2 DOSING PLANT (CAUSTIC SODA)	G-6
39.	3/4 Cl_2 DOSING PLANT (CAUSTIC SODA)	G-6
40.	1 COOLING WATER TREATMENT PLANT (SULPHURIC ACID)	G-2
41.	2 COOLING WATER TREATMENT PLANT (SULPHURIC ACID)	G-2
42.	3 COOLING WATER TREATMENT PLANT (SULPHURIC ACID)	G-7
43.	4 COOLING WATER TREATMENT PLANT (SULPHURIC ACID)	G-7
44.	DEMIN. PLANT (SULPHURIC ACID)	F-3
45.	DEMIN. PLANT (SULPHURIC ACID)	F-3
46.	1/2 ACID DOSING (SULPHURIC ACID)	G-3
47.	3/4 ACID DOSING (SULPHURIC ACID)	G-6
48.	BRINE CONCENTRATOR (SULPHURIC ACID)	H-3
49.	MAIN STORE COMPOUND (FLAMMABLE GASES)	F-2
50.	MAIN STORE COMPOUND (FLAMMABLE LIQUIDS)	F-2
51.	MAIN STORE COMPOUND	F-3
52.	UNDERGROUND TANK (FLAMMABLE LIQUID)	F-3
53.	UNDERGROUND TANK (FLAMMABLE LIQUID)	F-3
54.	1/2 CW TREATMENT PLANT (SODIUM HYDROXIDE)	G-2
55.	3/4 CW TREATMENT PLANT (SODIUM HYDROXIDE)	G-7

☐ DENOTES DANGEROUS GOODS LICENCED AREAS

1:2000 — 50 0 50 100 150 200 METRES

AMDT	DESCRIPTION	DRN	CKD	DATE
01	DRAINAGE AMENDED LOCAL TO GENERATOR TRANSFORMERS.	DM	PG	06-DEC-95
02	DRAINAGE AMENDED LOCAL TO OIL & GREASE STORE.	DM	PG	11-DEC-95
03	ITEM 34 RELOCATED, ITEMS 54 & 55 ADDED.	MJC	PB	30-OCT-08

AMENDMENTS

COLOURS OF DRAINAGE SYSTEMS CHANGED. TWO PITS & PIPES ADDED (30,110).

804x1136mm

PACIFIC POWER
SERVICES

CONTRACT No.		KKS CODING U	Macquarie Generation
DRAWN: DM	DESIGN	ORIGINAL DRAWING APPROVED BY: I STUART per PS, CHIEF MANAGER/PE 17-NOV-1995	BAYSWATER POWER STATION CIVIL WORKS DANGEROUS GOODS LICENCED AREAS LAYOUT
CHECKED DO: RT	CHECKED ENG	DRAWING STATUS: APPROVED	A0 BW639018 03
PASSED: PS	cad DO NOT AMEND MANUALLY	SCALE 1:2000	PREFIX NUMBER SHEET AMDT

©Copyright

REFERENCE DRAWINGS

PLOT ISSUE No. 15 PLOT ISSUE DATE 11DEC95 COPIED FROM SUPERSEDES SUPERSEDED BY INDEX CLASS'N –

Annex F

Asbestos Register

Bayswater Power Station Asbestos Register

Plant	**4A Generator Transformer**				
Description	Tap Changer Diverter Switch resistor				
Exposure	Sealed in Gasket. Oil filled		**Surface Area**		
Installed by	Ex Vales Pt - Parsons		**Responsible person:**	TL/Pwr Sys	
Action	Ex Vales Pt Transformer. Gaskets & insulation on resistors to be replaced when maintenance requirements permit. All oil immersed. Details improved 14/11/03 20/10/04 No changes to status				
Complete	No	**Date Replaced:**	**Last Updated**	20/10/2004	**By whom:** Env Off M.Rothe

Plant	**Elec Services Center 1/2**				
Description	Internal door insulation				
Exposure	Composite bonded sheet Sealed in door		**Surface Area**		
Installed by	Contract 3121 Leighton		**Responsible person:**	TL/Stat Serv	
Action	Doors are to be tested for asbestos and those identified as having asbestos contents are to be replaced. 7/2/05 Single doors tested by Connell Wagner. Approximately 70% have been identifed as containing asbestos. These have been labelled. Budgetting being sought for Wormalds to remove and replace affected doors. TL/Station Services confirming budget available to complete work.				
Complete	No	**Date Replaced:**	**Last Updated**	7/02/2005	**By whom:** Env Off M.Rothe

Plant	**SFP1's**				
Description	Gaskets, small various				
Exposure	Sealed in Gasket		**Surface Area**		
Installed by	Contract 3001 Toshiba		**Responsible person:**	TL/Turb	
Action	Gaskets on LP Stop & Control valves to be replaced as work is carried out. 21/10/04; 3 of 4 have been replaced.				
Complete	No	**Date Replaced:**	**Last Updated**	21/10/2004	**By whom:** Env Off M.Rothe

Plant **Generators**

Description Stator Winding Insulation
Asbestos is present in the following areas:
a) Connection between top and bottom coils: Asbestos paper is used between the top and bottom copper connections as heat insulation to prevent effects from brazing.
b) Coil ends: Asbestos tape is used at the coil end to absorb electrical potential and prevent corona.
c) Coil in stator slot: Asbestos tape (one layer) is used between layers of paint to protect the insulation for the straight portion of the coil (I.e. portion of the stator slot).
d) Within the terminal box: A compound containing asbestos is used for parts where there are fasteners for smoothing.
Faxes dated 22 June 1998 and 24 Sept 1998 from Toshiba (held by TL/Electrical) provides a diagram of the Generator showing areas where asbestos is located.

Exposure Epoxy Sealed **Surface Area**

Installed by Contract 3001 Toshiba **Responsible person:** TL/Pwr Sys

Action Replace as plant maintenance requirements permit. Epoxy sealed.

20/10/04 No changes to status

Complete No **Date Replaced:** **Last Updated** 16/11/2004 **By whom:** P&P Engineer

---

Plant **Dust & Return Water Piping**

Description Pikes Gully Return Water Pipelines

Exposure Bonded in pipe material **Surface Area** 6300m in length m

Installed by Contract 3046 John Thomson **Responsible person:** TL/Coal Plant

Action Sections of pipelines identified. PPI engaged to assess extent of leakage of asbestos into environment. Report received Dec 2000. Based on report and assessment of recommendations by Station Environmental Officer, warning signs to be placed on pipes and environmental monitoring carried out on a regular 5 yearly basis. Spare lengths of pieline stored in Main Stores Compound. Spare lengths have been coated in poly paint and covered in plastic.
No further action planned at this time due to assessment as low risk. March 2001

Complete No **Date Replaced:** **Last Updated** 25/12/2000 **By whom:**

Plant **23/330 KV Transformers 10 of**

Description All valves
The stuffing gland packing is Bestobell P422/P422 PTFE coated asbestos or SERCO ML 225 PTFE coated asbestos.

Exposure Sealed in packing (PTFE coated asbestos) **Surface Area** 0.25 Sq Meters

Installed by Tyree **Responsible person:** TL/Pwr Sys

Action The above information has been obtained from maintenance manuals, and the material has not been confirmed to contain asbestos. Material type is to be tested by sampling of top packing ring. If asbestos is confirmed, then packing is to be progressively replaced as maintenance work permits. Replacement would require transformer being taken out of service and tank being drained.
20/10/04 No changes to status

Complete No **Date Replaced:** **Last Updated** 17/11/2004 **By whom:** P&P Engineer

Plant	**33/11 KV Station Transformer**
Description	Valves V01 to V28, V42 & V43 Valves V01 to V14 have a teflonised asbestos packing; Valves V15 to V28 have graphited asbestos cord packing; V42 graphite asbestos packing; V43 graphite plasticed asbestos packing.
Exposure	Sealed in packing **Surface Area**
Installed by	Tyree **Responsible person:** Comm & Ext Elec Eng
Action	The above information has been obtained from maintenance manuals, and the material has not been confirmed to contain asbestos. Material type is to be tested by sampling of top packing ring. If asbestos is confirmed, then packing is to be progressively replaced as maintenance work permits. Replacement would require transformer being taken out of service and tank being drained. 20/10/04 No changes to status
Complete	No **Date Replaced:** **Last Updated** 17/11/2004 **By whom:** P&P Engineer

Plant	**11/3.3 KV Transformers 10 of**
Description	Valves V01 to V28, V42 & V43 Valves V01 to V14 have a teflonised asbestos packing; Valves V15 to V28 have graphited asbestos cord packing; V42 graphite asbestos packing; V43 graphite plasticed asbestos packing.
Exposure	Sealed in packing **Surface Area**
Installed by	Tyree **Responsible person:** TL/Pwr Sys
Action	The above information has been obtained from maintenance manuals, and the material has not been confirmed to contain asbestos. Material type is to be tested by sampling of top packing ring. If asbestos is confirmed, then packing is to be progressively replaced as maintenance work permits. Replacement would require transformer being taken out of service and tank being drained. 20/10/04 No changes to status
Complete	No **Date Replaced:** **Last Updated** 17/11/2004 **By whom:** P&P Engineer

Plant	**23/11 KV Transformers 8 of**
Description	Valves V01 to V28, V42 & V43 Valves V01 to V14 have a teflonised asbestos packing; Valves V15 to V28 have graphited asbestos cord packing; V42 graphite asbestos packing; V43 graphite plasticed asbestos packing.
Exposure	Sealed in packing **Surface Area**
Installed by	Tyree **Responsible person:** TL/Pwr Sys
Action	The above information has been obtained from maintenance manuals, and the material has not been confirmed to contain asbestos. Material type is to be tested by sampling of top packing ring. If asbestos is confirmed, then packing is to be progressively replaced as maintenance work permits. Replacement would require transformer being taken out of service and tank being drained. 20/10/04 No changes to status
Complete	No **Date Replaced:** **Last Updated** 17/11/2004 **By whom:** P&P Engineer

Plant	**HP Pumping Station Building**				
Description	Cladding				
Exposure	Sealed in coating		**Surface Area**	Est. 1400 sq metres	
Installed by	SMEG		**Responsible person:**	TL/Station Services	
Action	Cladding to be tested to confirm content of coating. If confirmed, then remedial action to be proposed. 14/12/04 Testing of 4 external cladding coating samples and 1 internal sample has confirmed that the coating material contains chrysotile asbestos. Testing report held by Environment Officer. Investigations are being carried out on removal options in the 05/06 year. 7/2/05 Specification placed on market and closes 8/2/05. Removal and replacement of HPPS walls and roof and removal and replacement of ceilings in mealroom and amenities rooms. TL/Station Services confirming budget available to complete work. 15/4/05; Contract for removal let to Insultech. Expected to commence beginning May 2005.				
Complete	No	**Date Replaced:**	**Last Updated**	23/02/2007	**By whom:** Env. Off.

Plant	**Boiler House lifts (Boiler1, 2, 3 & 4 and Bunker Bay)**				
Description	Brake shoe linings may contain asbestos.				
Exposure	Dust from brake shoes		**Surface Area**		
Installed by	Johns Perry Lift Company		**Responsible person:**	TL/Station Services	
Action	10/11/04 If confirmed, brake linings to be replaced with non-asbestos containing material. 7/2/05 Proposal received from Otis Elevators for replacement of all linings. TL/Station Services confirming budget available to complete work.				
Complete	No	**Date Replaced:**	**Last Updated**	7/02/2005	**By whom:** P&P Engineer

Plant	**Coal Plant lifts**				
Description	Brake linings may contain asbestos				
Exposure	Dust from brake shoes		**Surface Area**		
Installed by	Johns Perry Lift Company		**Responsible person:**	TL/Station Services	
Action	If confirmed, brake linings to be replaced with non-asbestos containing material. 7/2/05 Proposal received from Otis Elevators for replacement of all linings. TL/Station Services confirming budget available to complete work.				
Complete	No	**Date Replaced:**	**Last Updated**	10/11/2004	**By whom:** P&P Engineer

Plant	**Admin Building Lift**				
Description	Brake lining may contain asbestos				
Exposure	Dust from bake shoes		**Surface Area**		
Installed by	Johns Perry Lift Company		**Responsible person:**	TL/Station Services	
Action	If confirmed, brake linings to be replaced with non-asbestos containing material. 7/2/05 Proposal received from Otis Elevators for replacement of all linings. TL/Station Services confirming budget available to complete work.				
Complete	No	**Date Replaced:**	**Last Updated**	10/11/2004	**By whom:** P&P Engineer

Plant	**Fabric Filer Lifts (1/2 & 3/4)**						
Description	Brake lining may contain asbestos						
Exposure	Dust from bake shoes			**Surface Area**			
Installed by	Johns Perry Lift Company			**Responsible person:**	TL/Station Services		
Action	If confirmed, brake linings to be replaced with non-asbestos containing material. 7/2/05 Proposal received from Otis Elevators for replacement of all linings. TL/Station Services confirming budget available to complete work.						
Complete	No	**Date Replaced:**		**Last Updated**	10/11/2004	**By whom:**	P&P Engineer

Plant	**PF burners (Boilers 1 - 4)**						
Description	Some gaskets may contain asbestos It is suspected that some of the pf burners may have been assembled with an Inner Sleeve Cover Gasket (Item A20 on drawing BW568804) using gasket material that contains asbestos. Some installed replacement gaskets may be made of pink Klingerite. Original burners did not contain asbestos.						
Exposure	gasket material			**Surface Area**	122,462 mm2		
Installed by	IHI			**Responsible person:**	TL/Boilers		
Action	Whenever a burner is mismantled for maintenance, any asbestos material is to be replaced. Only asbestos-free material is to be used during re-assembly and the burner noted as "asbestos-free" and this register updated.						
Complete	No	**Date Replaced:**		**Last Updated**	12/11/2004	**By whom:**	P&P Engineer

Plant	**Elec Services Center 3/4**						
Description	Internal door insulation						
Exposure	Composite bonded sheet Sealed in door			**Surface Area**			
Installed by	Contract 3121 Leighton			**Responsible person:**	TL/Stat Serv		
Action	Doors are to be tested for asbestos and those identified as having asbestos contents are to be replaced. 7/2/05 Single doors tested by Connell Wagner. Approximately 70% have been identifed as containing asbestos. These have been labelled. Budgetting being sought for Wormalds to remove and replace affected doors. TL/Station Services confirming budget available to complete work.						
Complete	No	**Date Replaced:**		**Last Updated**	20/10/2004	**By whom:**	Env Off M.Rothe

Plant	**Station Buildings Stormwater External Drain Pipes entry to Underground Stormwater Drainage System**						
Description	Connections between Stormwater Drain Pipes on sides of buildings and underground drainage system have been identifiesd as containig asbestos.						
Exposure				**Surface Area**			
Installed by				**Responsible person:**	TL/Stat Serv.		
Action	4/1/05 TL/Stat Serv. Investigating options of either replacing or covering small sections of exposed asbestos material. 7/2/05 Sealing of exposed asbestos by installation of concrete hounchings around base of downpipes approx 25% complete. Hounchings beings done by J&J Robinson.						
Complete	No	**Date Replaced:**		**Last Updated**	7/02/2005	**By whom:**	Env Off.

Plant	**HP Surge Tower Plinth Base**						
Description	Material under base of Surge Tower.						
Exposure				**Surface Area**			
Installed by	SMEC			**Responsible person:**		TL/Stat Serv.	
Action	7/2/05. Material sampled by Insultech for testing. 9/2/05 Report ex Connell Wagner confirming material is Chrysotile Asbestos. TL/SS to proceed to remove and/or encapsulate material.						
Complete	No	**Date Replaced:**	**Last Updated**	7/02/2005	**By whom:**	Env Off	

Plant	**Internal Turbine and Boiler Areas** **Stormwater Drain Bases**						
Description							
Exposure				**Surface Area**			
Installed by				**Responsible person:**			
Action	7/2/05 South wall of turbine building completed.						
Complete	No	**Date Replaced:**	**Last Updated**	7/02/2005	**By whom:**		

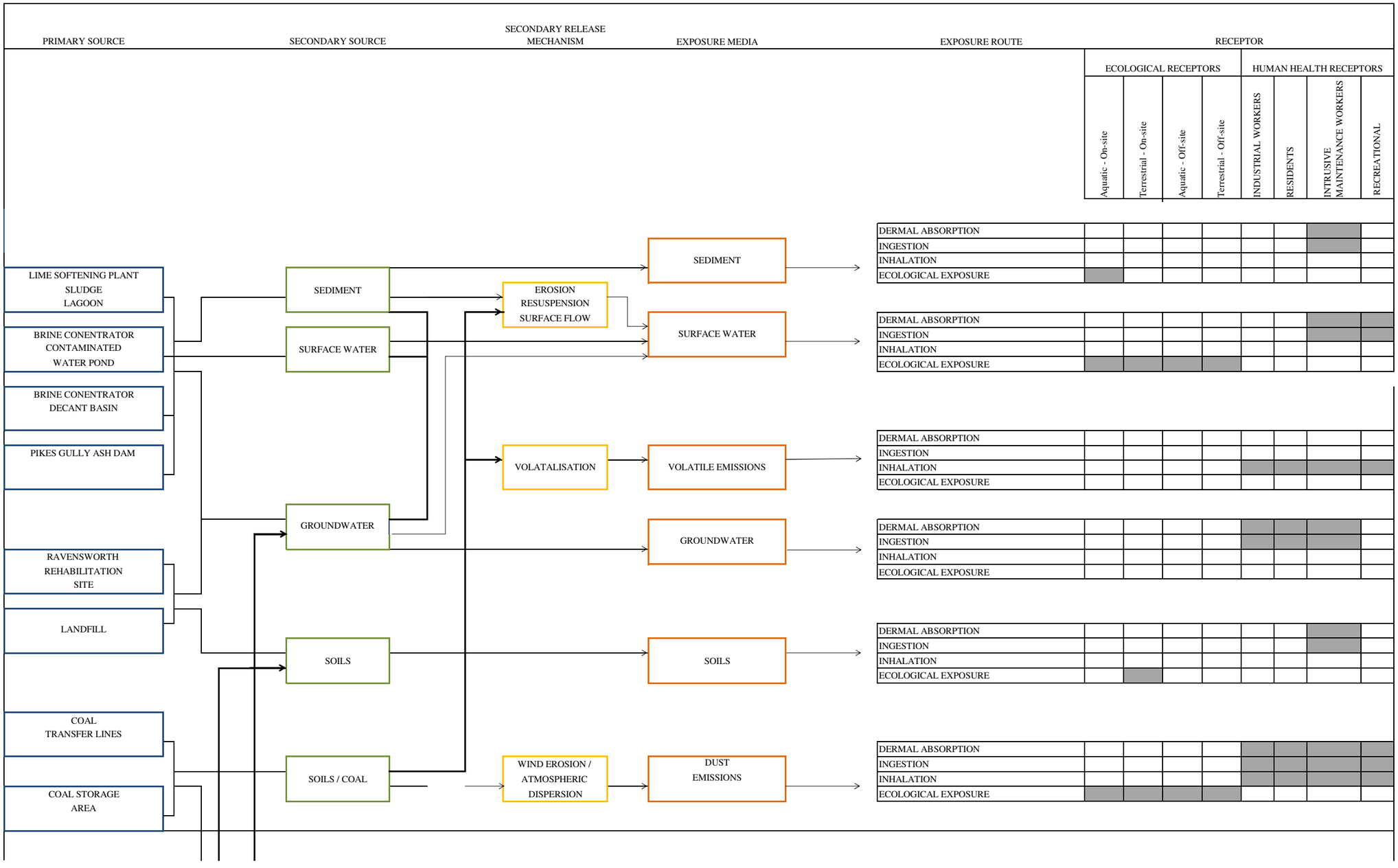
Plant	**Demin Plant**						
Description	Gaskets Top & Bottom, A/B and C/D Acid and Caustic Measuring Tank Level Indicators. 8 gaskets in all.						
Exposure				**Surface Area**			
Installed by	Permutit			**Responsible person:**		TL/Water Supplies	
Action	Replace during maintenance						
Complete	No	**Date Replaced:**	**Last Updated**	17/05/2007	**By whom:**	M.Rothe	

Plant	**Polisher Regen Plants**						
Description	Gaskets Top & Bottom, 1/2 and 3/4 Acid and Caustic Measuring Tank Level Indicators. 8 gaskets in all.						
Exposure				**Surface Area**			
Installed by	Permutit			**Responsible person:**		TL/Water Supplies	
Action	Replace during maintenance. 17/5/07: 1/2 Regen Gaskets inspected and found to be elephant hide material.						
Complete	No	**Date Replaced:**	**Last Updated**	17/05/2007	**By whom:**	M.Rothe	

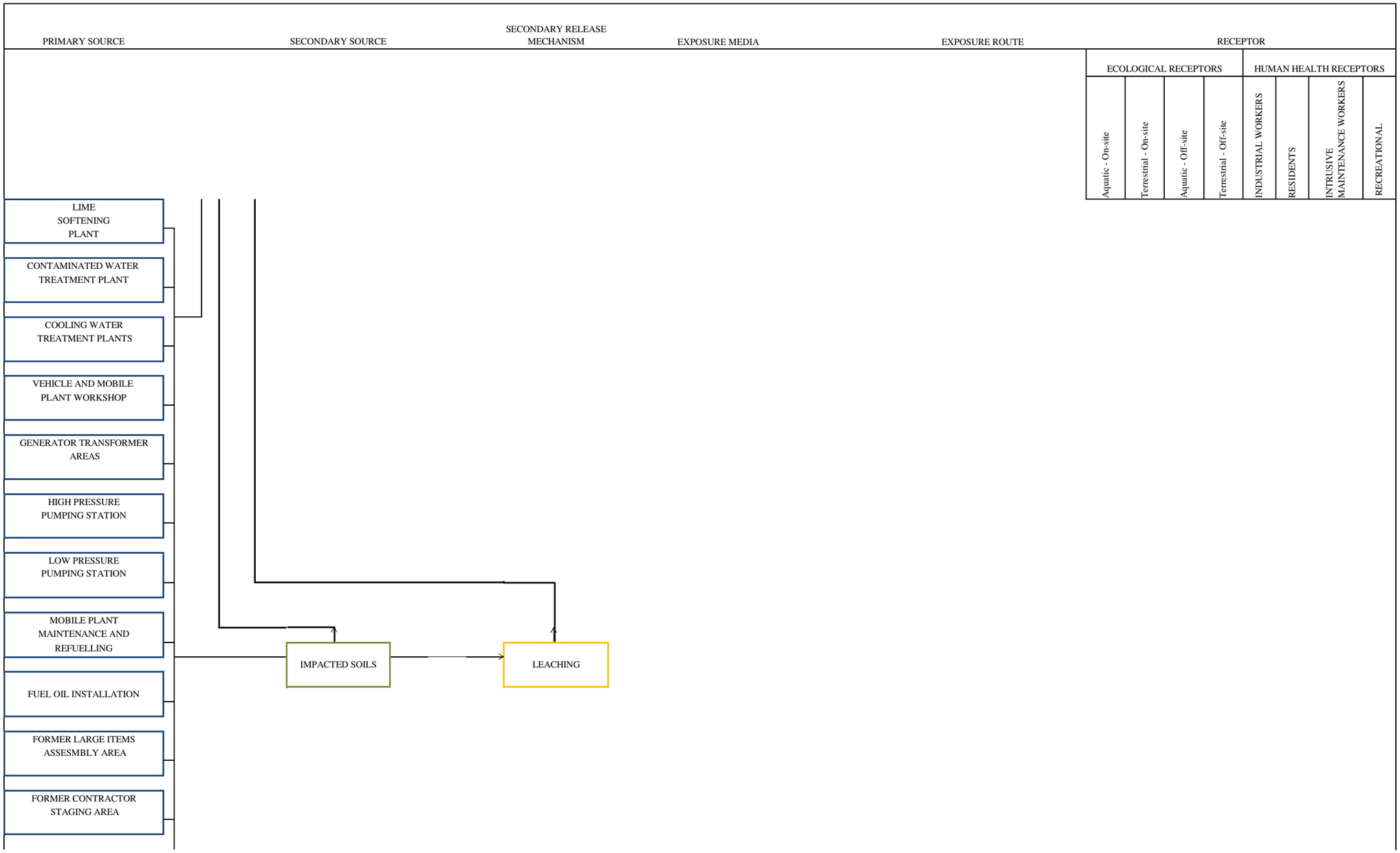
Annex G

Preliminary Conceptual Site Model

Generalized Conceptual Site Model - Bayswater Power Station



Generalized Conceptual Site Model - Bayswater Power Station



Generalized Conceptual Site Model - Bayswater Power Station

PRIMARY SOURCE	SECONDARY SOURCE	SECONDARY RELEASE MECHANISM	EXPOSURE MEDIA	EXPOSURE ROUTE	RECEPTOR							
					ECOLOGICAL RECEPTORS				HUMAN HEALTH RECEPTORS			
					Aquatic - On-site	Terrestrial - On-site	Aquatic - Off-site	Terrestrial - Off-site	INDUSTRIAL WORKERS	RESIDENTS	INTRUSIVE MAINTENANCE WORKERS	RECREATIONAL
DEMINERALISER PLANT												
MAIN STORE - DANGEROUS GOODS STORAGE AREA												
POWER BLOCK												

LEGEND

- Primary Source
- Secondary Source
- Release Mechanism
- Exposure Media
- Potentially Complete Pathway
- Incomplete Pathway

Annex H

Data Quality Objectives and Detailed Investigation Methodology

H.1 DATA QUALITY OBJECTIVES

H.1.1 Step 1: State the Problem

Objectives

The objectives of the Preliminary ESA are as stated in *Section 1.2*.

H.1.2 Step 2: Identify the Decisions

Decision Statements

Overall, the principal decision to be made is whether there are actual or potential material contamination issues related to the proposed sale of the power generation assets. Additional decisions to be made include:

- Is there sufficient data to provide an environmental baseline at the time of the transaction?
- What is the nature and extent of soil, sediment and/or groundwater impact on / beneath the Site?
- Does the impact at the Site represent a risk to human health, based on the current and continued use of the site?
- Is the impact at the Site likely to warrant regulation under the *Contaminated Land Management Act 1997* and remediation?
- Is material remediation likely to be required?

Assessment Criteria

The proposed sources of site assessment criteria are presented in *Section H.1.5*.

Waste Classification for Off-Site Disposal

Any excess soil or groundwater generated during the Stage II program will be classified in accordance with the NSW Department of Environment, Climate Change and Water (2009) *Waste Classification Guidelines, Part 1: Classifying Waste* and relevant associated Chemical Control Orders.

H.1.3 Step 3: Identify Inputs to Decision

The inputs required to make the above decisions are as follows:

- existing relevant environmental data, taking into consideration the number and location of existing soil and groundwater sampling locations, the construction of existing groundwater monitoring wells and the date of the most recent groundwater monitoring event;

- direct measurement of environmental variables including soil type, soil gas concentrations, odours, staining, water strike and groundwater level and water quality parameters;
- laboratory measurement of soil and groundwater samples for one or more of the identified potential contaminants of concern;
- field and laboratory quality assurance/quality control data;
- the relevant soil and water quality criteria outlined previously; and
- assessment of whether the concentrations of the contaminants of concern are greater than or equal to or less than the adopted criteria.

H.1.4 Step 4: Define the Study Boundaries

Spatial Boundaries

The site location and description is provided in *Section 2*.

Constraints within the Study Boundaries

Constraints on the delivery of the Stage II program within the study boundaries may include:

- location of underground services or infrastructure;
- the condition of existing monitoring wells; and
- obtaining permission/access to enter and sample in off-site areas (where deemed necessary.

H.1.5 Step 5: Develop a Decision Rule

The DQOs have been designed to facilitate the collection of adequate soil and groundwater data to address the decisions in Step 2 of the DQO process. Some project constraints may impact on the implementation of the Stage 2 program, for example access to certain locations may be restricted by the presence of sub-surface services. Deviations from the Stage 2 program will be communicated to the relevant project stakeholders during the course of the assessment and discussed in the Stage 2 report, acknowledging the source of any available information and any limitations on the assessment.

Field and Laboratory QA/QC

The suitability of soil and groundwater data will be assessed based on acceptable limits for field and laboratory QA/QC results outlined in relevant guidelines made or endorsed under the *Contaminated Land Management Act 1997*.

In the event that acceptable limits are not met by laboratory analyses, the field observations relating to the nature of the samples will be reviewed and if no obvious source for the non-conformance is identified, such as an error in sampling, preservation of sample/s or heterogeneity of sample/s, liaison with the laboratories will be undertaken in an effort to identify the issue that had given rise to the non-conformance.

If the soil and groundwater data is deemed to be unsuitable, additional analyses may be undertaken on the original sample/s, on duplicate samples or on other samples, if required to meet the objectives of the assessment. If no explanation for the non-conformance is identified, the concentrations for the affected samples will be considered as an estimate.

Assessment Criteria

Individual soil, sediment, surface water and groundwater data, along with the maximum, minimum, mean, standard deviation and 95% Upper Confidence Limit (UCL) of the mean concentration (if required) will be compared to the relevant assessment criteria. Exceedence of the assessment criteria will not necessarily indicate the requirement for remediation or a risk to human health and / or the environment. If individual or 95% UCL concentrations exceed the assessment criteria, consideration of the extent of the impact, the potential for receptors to be exposed and regulatory compliance will be considered.

The adopted assessment criteria have generally been sourced from guidelines made or approved under the *Contaminated Land Management Act 1997*, which includes the NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)* and where alternative sources have been utilised appropriate justification has been provided.

Soil

Soil data will be assessed against investigation criteria published in the following documents:

- NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1),* Schedule B1 - Guideline on Investigation Levels for Soil and Groundwater. Health Investigation Level (HIL) 'D' – Commercial/Industrial HIL 'C' – Public Open Space and Ecological Investigation / Screening Levels (EILs/ESLs) (as applicable). It is noted that laboratory analysis for pH and CEC is required to establish site specific EILs/ESLs, and an assessment of background conditions may be necessary. The establishment of EILs/ESLs will be undertaken in preparation of the Stage 2 report, and sample locations in up-gradient non-operational areas may be utilised in establishing background conditions. Further, it is noted that whilst the HIL 'C' screening criteria are generally not applicable to undeveloped, urban bushlands and reserves, they will be adopted at sampling locations in non-operational areas considered to present a more sensitive land use category.

Application of the HILs will be considered on a case by case basis in accordance with the NEPM 2013 amendment to reflect local conditions encountered at the time of the intrusive works. Health Screening Levels for Vapour Intrusion and Direct Soil Contact (HSL) 'D' – Commercial/Industrial and Health Screening Levels for Vapour Intrusion and Direct Soil Contact Intrusive Maintenance Worker (Shallow Trench) will also be adopted; and

- Where no Australian-endorsed assessment criteria are available, reference to the National Institute of Public Health and the Environment (RIVM) (2001) *Technical Evaluation of the Intervention Values for Soil/sediment and Groundwater: Human and Ecotoxicological Risk Assessment and Derivation of Risk Limits for Soil, Aquatic Sediments and Groundwater* - Human Toxicological Serious Risk Concentrations in soil (SRC_{human} soil) will be made. It is noted that these guideline values have no regulatory standing in NSW and hence further assessment of any exceedences of these criteria may be required.

Water

Water data will be assessed against investigation criteria published in NEPC (1999) *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1),* Schedule B1 - Guideline on Investigation Levels for Soil and Groundwater, which references the following guidance:

- ANZECC and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Trigger values for marine water, level of protection 95% species and Trigger values for marine water, level of protection 99% species (for bioaccumulation of mercury and for locations intercepting groundwater potentially flowing toward the protected wetland to the west);

- National Health and Medical Research Council (NHMRC) and National Resource Management Ministerial Council (NRMMC) (2011) *Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy*;

- NHMRC (2008) *Guidelines for Managing Risks in Recreational Waters* (note that these will be applied with reference to NHMRC and NRMMC 2011 – referenced above); and

- Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) (2011) *Technical Report No. 10, Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater*. Health Screening Levels for Vapour Intrusion (HSL) 'D' – Commercial/Industrial and Health Screening Levels for Vapour Intrusion Intrusive Maintenance Worker (Shallow Trench).

Where no Australian-endorsed assessment criteria are available, reference to the National Institute of Public Health and the Environment (RIVM) (2001) *Technical Evaluation of the Intervention Values for Soil/sediment and Groundwater: Human and Ecotoxicological Risk Assessment and Derivation of Risk Limits for Soil, Aquatic Sediments and Groundwater*. Human Toxicological Serious Risk Concentrations in Groundwater (SRC_{human} groundwater). It is noted that these guideline values have no regulatory standing in NSW and hence further assessment of any exceedences of these criteria may be required.

Sediment

Sediment quality data will be assessed against investigation criteria published in:

ANZECC / ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* - Interim Sediment Quality Guidelines (ISQGs), or the equivalent Commonwealth of Australia (2009) *National Assessment Guidelines for Dredging*.

Appropriateness of LOR

Comparison of the laboratory Limit of Reporting (LOR) to the assessment criteria will be undertaken to confirm that the assessment criteria are less than the laboratory LOR, any exceptions to this will be appropriately noted and justified.

H.1.6 Step 6: Specify Limits on Decision Errors

The acceptable limits on decision errors applied during the review of the results will be based on the Data Quality Indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness (PARCC) in accordance with NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013*, Schedule B3 - Guideline on Laboratory Analysis of Potentially Contaminated Soils.

The potential for significant decision errors will be minimised by:

- completing a robust Quality Assurance/Quality Control (QA/QC) assessment of the validation data and application of the probability that 95% of data will satisfy the DQIs, therefore a limit on the decision error would be 5% that a conclusive statement may be incorrect;
- assessing whether appropriate sampling and analytical density has been achieved for the purposes of providing a baseline of soil, sediment and groundwater conditions at the point of transaction; and
- ensuring that the criteria set was appropriate for the ongoing use of the site as a power generation facility.

H.1.7 Step 7: Develop (Optimise) the Plan for Completing The Works

The DQOs have been developed based on a review of existing data, discussions with Macquarie Generation. If data gathered during the assessment indicates that the objectives of the assessment programme are not being met, the sampling design (including sampling pattern, type of samples and analytes) will be adjusted accordingly using feedback (where necessary) from project stakeholders.

H.2 DETAILED SOIL AND GROUNDWATER INVESTIGATION METHODOLOGY

H.2.1 Sub-Surface Clearance

All proposed drilling locations will be cleared of underground and above ground utilities in accordance with ERM's Sub-Surface Clearance (SSC) Procedure. The key steps involved in ERM's SSC procedure include:

- assigning a SSC Experienced Person (EP) who is responsible for all SSC activities;
- obtaining Dial Before You Dig Plans and marking out public utilities if required;
- obtaining site utility plans (where available) and obtaining approval from the site contact for the proposed drilling locations;
- conducting a site walkover to identify any visual clues of site services;
- checking all locations for the presence of underground services using a cable location tool;
- where possible soil bores will be located to avoid working in critical areas, defined as areas with 3 m of a subsurface obstruction; and
- each soil bore will be cleared using a hand auger or Non-Destructive Drilling (NDD) to a depth of 1.2 m bgl in non-critical zones or 2.3 m bgl in areas classed as critical zones.

H.2.2 Soil Bore Drilling

Soil bores will be drilled in accordance with ERM SOPs using the general methodology outlined below

- Where necessary, hardstand drilling locations will be penetrated using a concrete corer prior to physical borehole clearance and drilling;

- each soil bore will be cleared using a hand auger or Non-Destructive Drilling (NDD) techniques to the depth required by ERM's SSC Procedure;

- a drilling rig, incorporating direct push-tube methodology will be used to advance the boreholes to the target depth or until deemed refusal is encountered;

- prior to the commencement of drilling and between drilling locations, all down-hole drilling equipment will be decontaminated to minimise potential for cross contamination between the sampling locations.

H.2.3 Soil Sampling Protocol

Soil samples will be collected and logged in accordance with ERM SOPs. In summary the following work procedures will be followed:

- the soil will be logged by an appropriately trained and experienced scientist/engineer to record the following information: soil/rock type, colour, grain size, sorting, angularity, inclusions, moisture condition, structure, visual signs of contamination (including staining and fragments of fibre cement sheeting) and odour in general accordance with AS 1726-1993;

- soil samples will be collected from the surface and at 0.5 m intervals thereafter, or from each lithological unit (whichever is greater);

- suitable PPE including fresh disposable nitrile gloves will be used during sampling and equipment decontamination; and

- a duplicate of each soil sample collected for field screening will be placed in sealed zip lock bags and screened in accordance with ERM SOPs using a PID fitted with a 10.6 eV lamp, calibrated at the beginning of each working day. Where the presence of VOCs or other impact is suspected, additional laboratory analysis may be undertaken.

- A representative soil samples will be collected (to the extent practicable) in accordance with techniques described in Australian Standard AS4482 (Part 2) to maintain the representativeness and integrity of the samples. The samples will be placed in pre-treated laboratory supplied sample containers. The containers will be filled, where practical, to minimise headspace, before being sealed and appropriately labelled. Labels will include the following information:

    - sample identification number;

    - job number; and

    - Date of collection.

- field quality control/quality assurance (QA/QC) samples will be collected including field duplicates, inter-laboratory duplicates, rinsate blanks, trip blanks and trip spikes (as required).

- Sample jars will be sealed and immediately placed in a cooler on ice to minimise potential degradation of organic compounds.

H.2.4 Soil Bore and Test Pit Reinstatement

Upon completion soil bores will be backfilled and the surface covering reinstated to match existing.

H.2.5 Waste Materials Generated During Drilling

All non-liquid waste materials generated during drilling works will be stored on-site in drums or other appropriate sealed containers at a designated staging area. If evidence of significant contamination is observed during drilling (e.g. staining or odour) an attempt will be made to store any potentially impacted wastes separately. All wastes will be disposed off-site to an appropriately licenced landfill by an approved and appropriately licensed waste removal contractor

H.3 GROUNDWATER INVESTIGATION

H.3.1 Groundwater Well Installation

Selected boreholes will be converted to groundwater monitoring wells in accordance with ERM SOPs. The following methodology will be implemented to install the new monitoring wells.

- the wells will be constructed of 50 mm diameter factory slotted screen (0.4 mm slots) and blank uPVC well materials. The wells will be screened within groundwater bearing strata and constructed to allow the ingress of non-aqueous phase liquids (NAPLs) which may be present;

- the well casing and screen will be inserted into the borehole. Washed and graded filter sand will be poured into the annulus between the well screen and borehole wall, ensuring that the sand covers the entire screened level and extends at least 0.5 metres above the top of the screen;

- bentonite pellets will then poured on top of the sand at a minimum thickness of one metre and hydrated to effectively seal off the well from surface water or perched / shallow groundwater inflows; and

- each well will be grouted using cement /bentonite grout to within 0.5 m of the surface and the final 0.5 m reinstated with concrete and a heavy duty cover, well casing will be sealed with air-tight, lockable 'envirocaps';

- the well cap will be labelled with the groundwater monitoring well I.D.;

- following monitoring well installation, each well will be developed to remove any fine materials or contaminants potentially introduced during drilling. Wells will be considered developed when either a minimum of 10 well volumes had been removed, or when water quality parameters stabilise or if the well is pumped dry prior to this. Where sufficient well volumes cannot be obtained, attempts will be made to remove fines and construction material by purging the well over several days to allow for recharge.

H.3.2 Groundwater Purging and Sampling Protocol

Where new monitoring wells are installed, groundwater purging and sampling will occur at least one week after well installation and development to allow subsurface conditions to stabilise.

The well cap will be partially removed to allow the headspace to be screened using a calibrated PID over a period of one minute. The presence of odours will also be noted following removal of the well cap and described by reference to their intensity and character. Following a period of no pumping (as a minimum 24 hours) all wells will be dipped to gauge the depth of groundwater and if necessary the presence and depths of NAPLs. Wells will be purged using a thoroughly decontaminated peristaltic pump under low flow conditions until sufficient water has been removed to obtain stabilised readings of pH, conductivity, redox potential, temperature and dissolved oxygen which was calibrated prior to use. The stabilisation criteria are as described in *Table H.1* below.

Table H.1 Water quality parameter stabilisation criteria

Parameter	Stabilisation criteria
pH	± 0.1 pH units
Electric Conductivity (EC)	± 3% (µS/cm or mS/cm)
Temperature	± 0.5°C
Oxidation Reduction Potential (ORP)	± 10 mV
Dissolved Oxygen (DO)	± 0.3 mg/L

It is noted that both ORP and DO are typically slower to stabilise than the other parameters, and may be particularly unstable when not using a closed flow through cell. In this case, greater weight will be given to pH and EC as the 'stabilising' parameters.

Low-flow sampling techniques will be used to obtain samples that are representative of the local groundwater environment at the Site. The inlet of the low-flow pump will be placed approximately 50 cm from the base of the well in order to obtain a representative sample of the aquifer. Water samples will be collected using equipment dedicated to each monitoring well to eliminate the potential for cross-contamination between sample locations.

The following order of sampling will be adopted:

- samples to be analysed for volatile compounds placed into 40 mL amber vials;
- samples to be analysed for semi-volatile compounds placed in 250 mL solvent washed amber bottles; and
- samples to be analysed for metals filtered through disposable cartridges containing 0.45 µm filters and placed in 125 mL plastic bottles preserved with nitric acid.

If NAPL is observed in any groundwater wells, attempts will be made to collect a representative sample of the NAPL for characterisation using a dedicated disposable bailer.

The containers will be filled, where practical, to minimise headspace, before being sealed and appropriately labelled. Labels will include the following information:

- sample identification number;
- job number; and
- date of collection.

Sample jars will be sealed and placed in a cooler on ice immediately to minimise potential for degradation of the sample.

H.3.3 Waste Materials Generated During Groundwater Development/Purging

Water from development of the wells will be collected and stored in appropriately labelled dedicated drums or an intermediary bulk container (IBC) within the designated staging area. The water will be classified and disposed off-site in accordance with relevant NSW Waste Classification Guidelines.

H.4 SEDIMENT INVESTIGATION

Sediment samples will be collected in general accordance with the methodologies outlined in CSIRO (2005) *Handbook for Sediment Quality Assessment* via the use of either a stainless steel grab sampler or via direct push coring utilising polycarbonate sampling tubes (dependent on water depth and site specific conditions). Sample handling, labelling and decontamination procedures will be aligned with those adopted for soil sampling and those outlined in CSIRO (2005).

H.5 SURFACE WATER INVESTIGATION

Surface water samples will be collected from Tinkers Creek and the unnamed creek to the north of the Pikes Gully Ash Dam spillway which discharges into Chilcotts Gully. Surface water samples will be collected by hand using a swing sampler placed at least 100 mm below the surface of the water. Samples will be collected beneath the surface of the water with the container facing upstream, while avoiding disturbing substrate.

Sample containers will be sealed and immediately placed in a cooler on ice to minimise potential degradation of organic compounds. The samples will be transported under chain of custody documentation to a NATA accredited laboratory at the end of each day, and analysed for the analytical suite presented in *Table I.1, Annex I*. A calibrated water quality meter will be used to analyse this subsample for field parameters including pH, conductivity, redox potential, temperature and dissolved oxygen. Observations of the general condition of the surface water and its surrounds will also be recorded during sampling.

H.6 SURVEY

All groundwater wells (excluding existing groundwater monitoring wells) will be surveyed to Australian Height Datum (AHD) for elevation and Map Grid of Australia (MGA) coordinates for location. For groundwater monitoring wells, the elevation of the highest point of the top of the PVC casing will be measured. A notch will be embedded in the casing to indicate the location surveyed. This mark will be the measuring point for future groundwater elevation measurements. This will allow for the appropriate groundwater elevations calculations and groundwater flow direction interpretations.

H.7 LABORATORY ANALYSIS

H.7.1 Sample Handling

Primary samples will be couriered under chain of custody documentation to ALS Environmental Pty Ltd (ALS), a NATA accredited analytical laboratory. Inter-laboratory duplicate samples will be couriered under chain of custody documentation to Envirolab Services Pty Ltd (Envirolab) also a NATA accredited analytical laboratory. Soil and groundwater samples will be analysed for a suite of potential contaminants of concern listed below with some samples in specific areas being scheduled for additional analysis as outlined in *Tables I.2 and I.3, Annex I*.

- metals and metalloids (arsenic, cadmium, chromium, copper, nickel, lead, mercury, selenium and zinc);

- Total Recoverable Hydrocarbons (TRH);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Volatile Organic Compounds (including benzene, toluene, ethylbenzene and xylenes -BTEX); and
- asbestos (presence / absence – soil only).

Additional contaminants of concern may be analysed to target specific contaminants of concern or if required based on observations made in the field. These contaminants can include (though are not limited to):

- Polychlorinated Biphenyls (PCBs) – related to use of PCB-containing transformer oil on site;
- Total Organic Carbon (TOC); and
- Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) – to target areas where fire retardants may have been used or stored.

H.7.2 Analytical Methodology

A summary of the laboratory analytical methodologies are provided herein. Based on discussions with the laboratories, it was understood that these methodologies are currently being updated to comply with the recent changes to the NEPM (as amended in 2013). Hence the methodologies herein are subject to change, though these changes will be outlined in the quality control reports submitted by the laboratory at the time of receipt of the results.

Volatile TRH C6-C10/BTEX

ALS (soil): USEPA SW 846 - 8260B; Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501).

ALS (water): USEPA SW 846 - 8260B**;** Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

ALS (sediments): Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501).

Envirolab (soil): Analysed via purge and trap, gas chromatography-mass spectrometer (method reference USEPA 8260 method; USEPA5030 (P/T)).

Envirolab (water): VOC vial analysed directly. Determination is completed by PT-GC/FID. PT internal system standard injected into sample to monitor system performance (reference modified "in house" USEPA 8015, 8020 or 8260 method).

Semi-volatile TRH

ALS (soil): USEPA SW 846 - 8015A; Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (1999) Schedule B(3) (Method 506.1).

ALS (water): USEPA SW 846 - 8015A; The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2).

ALS (sediments): Ultra trace including sum of C10-C40: (USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504).

Envirolab (soil): Solid samples are extracted with dichloromethane/acetone (1:1) and extracts are injected into capillary Gas Chromatograph equipped with Flame Ionisation Detector (reference method USEPA 3500 and USEPA 3510.

Envirolab (water): Water samples are double/triple extracted with dichloromethane and extracts are injected into capillary Gas Chromatograph equipped with Flame Ionisation Detector (reference method USEPA 8000.

Selected Inorganics (As, Hg, Cd, Cr, Cu, Pb, Ni, Se, Zn)

ALS (soil): Total Metals by ICP-AES: (APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES). Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3).

Total Mercury by FIMS: AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3).

ALS (water): APHA 20th ed., 3125; USEPA SW846 – 6020. The ICPMS technique utilizes highly efficient argon plasma to ionise selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Quantification is achieved by measuring the intensity of the element in the sample against an established calibration curve for that element. Mercury: AS 3550. Flow Injection Mercury – Atomic Absorption Spectrometry (FIM-AAS) is a flameless atomic absorption technique. Water samples are analysed in their 'as received' nitric acid preserved state. For the determination of total mercury a further oxidation using a bromate/bromide reagent is employed to oxidise organic mercury compounds. The ionic mercury is reduced to atomic mercury vapour by a reducing agent (SnCl2). Atomic mercury vapour is then purged into a heated quartz cell. Quantification is achieved using an established absorbance versus concentration calibration curve.

Metals in Saline Water: APHA 21st ed., 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

ALS (sediments): (APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NADG.

Total Mercury by FIMS (Low Level): AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids is determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)

Envirolab (soil): Solid samples are digested with mineral acids (Hydrochloric and Nitric Acid) before analysis with Inductively Coupled Plasma – Optical Emission Spectrometry (ICP-OES) (reference method USEPA 6010C). Determination of mercury is by cold vapour AAS. Solid samples are digested with mineral acids (Hydrochloric and Nitric Acid) before analysis (reference method USEPA 7471A).

Envirolab (water): Determination via ORC-ICP-MS (reference method USEPA 200.8, USEPA 3005A (prep), USEPA 6020A or USEPA 7010/APHA 3113). Water samples are further acidified on receipt (Nitric Acid) before analysis with Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) and Inductively Coupled Plasma – Optical Emission Spectrometry (ICP-OES). Water samples are digested with strong oxidants (Hydrochloric Acid, Bromine Monochloride, Nitric Acid and Potassium Permanganate) before analysis. Mercury determination is via cold vapour AAS. Filtered water samples are digested with strong oxidants (Hydrochloric Acid, Bromine Monochloride, Nitric Acid and Potassium Permanganate) before analysis

PAH

ALS (soil): (USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 502 and 507).

ALS (water): USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2).

ALS (sediments): Super ultratrace PAH by USEPA 3640. Extracts are analysed by 8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.

Envirolab (soil): Solid samples are extracted with dichloromethane/acetone (1:1) and the extracts are injected into capillary Gas Chromatograph equipped with a Mass Selective Detector (MSD) in SIM mode (reference method USEPA 8270).

Envirolab (water): Water samples undergo double/triple extraction with dichloromethane and analysis by capillary Gas Chromatograph equipped with Mass Selective Detector (MSD) in SIM mode (reference method 8310 and USEPA 8270).

Volatile Organic Compounds

ALS (soil): (USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501).

ALS (water): Volatile Organic Compounds: USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2).

Envirolab (soil): Determination by Purge and Trap GC-MS (reference method 8260).

Envirolab (water): Determination by Purge and Trap GC-MS (reference method USEPA 8260B).

Asbestos Fibres in Soil

ALS (soil): AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples.

Envirolab (soil): Asbestos fibres are qualitatively identified in soil using polarized light microscopy (PLM) in accordance with Australian Standard AS 4964-2004. It is noted in AS 4964-2004 that this method is not necessarily suitable to quantify asbestos in soil however an estimate of the %w/w of asbestos fibres and fragments in soil will be made for assessment against the soil asbestos investigation criteria reported in the Western Australian Department of Health (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. This will involve manually separating any visible asbestos fragments and fibres from the soil matrix and weighing the resulting material. It is considered that the %w/w results will be an estimate only and will be dependent on the soil matrix.

Cation Exchange Capacity

ALS (soil): Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301).

Envirolab (soil): Solids are washed with Ethanol and Glycerine to remove soluble salts such as NaCl. The solid is then exchanged (by default) with a solution of 1M Ammonium Chloride. The solution is then analysed for Cations using Inductively Coupled Plasma – Optical Emission Spectrometry (ICP-OES). Alternative exchange solutions can be used on request.

pH

ALS (soil): (APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103).

Envirolab (soil): Solids are extracted with Ultra High Purity (UHP) water at a ratio of 1:5 soil:water. Analysis is by a pH selective electrode. Waters are analysed directly using a pH selective electrode Determination by electrode (reference method USEPA 9045).

PCBs

ALS (soil): (USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504).

ALS (water): USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2).

ALS (sediments): USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504).

Envirolab (soil and water): Sample extracts are analysed by injecting a measured aliquot into a gas chromatograph equipped with either a narrow- or wide-bore fused-silica capillary column and either an electron capture detector (GC/ECD) or an electrolytic conductivity detector (GC/ELCD).

Total Organic Carbon

ALS (soil): Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.

ALS (water): APHA 21st ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2).

PFOS/PFOA

ALS (soil): A portion of soil is soaked in sodium hydroxide followed by extraction with methanol. The extract is neutralised with HCl and an aliquot taken to dryness, made up in mobile phase. Analysis is by LC/MSMS, ESI Negative Mode using MRM. This is an in-house method in general accordance with EP231.

ALS (groundwater): Direct injection analysis of linear and branched pefluorooctyl sulfonates and acids by LC-Electrospray-MS-MS, Negative Mode using MRM. This is an in-house method.

Particle Size Distribution

ALS (soil and sediment): Analysis of the particle size of soils in accordance with Australian Standards AS 1289.3.6.1 and/or AS 1289.3.6.2 by sieving, with analysis of clays and fine particles by sedimentation and hydrometer analysis (based on the AS 1289.3.6.3).

H.8 QUALITY ASSURANCE/QUALITY CONTROL

QA/QC procedures for this project will be aligned with the requirements of both NEPM (1999 – as amended 2013) and NSW DEC (2006) *Guidelines for the NSW Site Auditor Scheme (2nd edition)* and can be summarised as follows:

H.8.1 Calibration Procedures

All equipment used in the field will be used under the appropriate technical procedures and calibrated prior to use in accordance with the manufacturer's specifications. The PID will be calibrated at the beginning of each working day in accordance with ERM's SOPs. Water quality meters will be calibrated by the hire company prior to use and relevant calibration certificates retained by ERM. Water quality meters will also be calibrated at the beginning of each day in accordance with the manufacturer specifications. All of the relevant calibration records will be provided as an annex in the investigation reports.

H.8.2 Decontamination Procedures

All sampling equipment will be decontaminated between sampling locations where designated disposable materials are not used.

All non-dedicated equipment will be decontaminated as follows:

- all loose soil removed with a wire brush;
- washed in potable (tap) water and brush scrubbing using tap water and a non-phosphate detergent (Decon 90);
- rinsed with water; and
- air dried.

During push tube drilling the soil samples will be collected in single use plastic tubes minimising the potential to cross-contaminate soil samples. Between sampling locations the cutting shoe and rod containing the single use shoes will be decontaminated as listed above. Any visible soil material will be removed from the drill rig equipment using a wire brush and water (if required).

H.8.3 Sample Containers, Preparation and Preservation

All samples for laboratory analysis will be placed in appropriate containers as required by the laboratory. Groundwater samples will also be pre-treated (e.g. filtering, preservative) where required by the laboratory. A list of the appropriate sample containers from ALS and Envirolab to use during soil, sediment, surface water and groundwater investigation works is presented in later sections within this annex.

It is noted that suitable glass and/or plastic containers (with Teflon liners removed) will be used for collection of soil, sediment, groundwater and surface water samples scheduled for analysis of PFOS and PFOA. These containers are provided by the laboratory specifically for analysis for PFOS and PFOA. Soil and sediment samples will be collected from push-tube cores and placed in laboratory prepared containers as listed in *Table H.2* below. Groundwater samples will be collected using low-density polyethylene (LDPE) tubing. Surface water samples will be collected in appropriate containers and decanted into laboratory prepared containers as listed in *Table H.3* below. Where samples are collected from equipment which is not single use (i.e. hand auger), equipment will be appropriately decontaminated and a rinsate sample collected.

A summary of the sample containers required for the standard suite of analytes is presented below.

Table H.2 Laboratory Sample Container Schedule – Soil and Sediments

Analytes	ALS Container	Envirolab Container
Metals, TRH, BTEX, PAH and VOCs, CEC, pH	150 mL glass jar	250 mL glass jar
PFOS/PFOA	150 mL glass jar with Teflon liner removed	250 mL glass jar with Teflon liner removed
Asbestos	100 g - 200g soil in zip lock bag (double bagged)	500 mL zip lock bag
Particle sizing	100 g - 200g soil in zip lock bag or jar	-

Table H.3 Laboratory Sample Container Schedule – Groundwater and Surface water

Analytes	ALS Container	Envirolab Container
Metals (via ORC-ICP-MS)	125 mL plastic bottle with red on white label.	50 mL plastic or glass
Volatile TRH, BTEX and VOC	2 40 mL amber glass vials with purple labels.	3 40 mL amber glass vials
PAH and semi-volatile TRH	2 x 500 mL and 1 x 100 mL amber glass bottle with orange label[1]	500 mL glass bottle
PFOS/PFOA	125 mL plastic bottle with grey label with Teflon lid liner removed	125 mL plastic bottle with grey label with Teflon lid liner removed

H.8.4 Sample Labelling, Transport & Chain of Custody

All sample containers will be labelled and placed on ice immediately after collection and shipped in insulated boxes under chain of custody documentation to the laboratory for analysis. Regular pick-ups from the Site have been pre-arranged with ALS. ALS will be responsible for sending samples to the secondary laboratory.

Separate chain of custody forms must be filled out for each laboratory (ALS and Envirolab). If there are samples from multiple sites a separate chain of custody form will be prepared for each site. The chain of custody forms must also include the analytical suite code and the quote number.

H.8.5 Field Quality Assurance Samples

Rinsate Blanks

A rinsate blank checks the effectiveness of the process of equipment decontamination. One rinsate blank sample will be obtained each day by each sampling team where sampling equipment that is not "single use" is employed (i.e. hand auger). The rinsate solution is collected by washing laboratory supplied distilled water over the equipment after decontamination and submitting the sample for laboratory analysis.

It is not anticipated that groundwater rinsate samples will be required given that disposable tubing will be used during groundwater sampling and the pump mechanism is not in direct contact with the groundwater during sampling. If decontamination of equipment is conducted, a rinsate sample will be collected at a rate of one per piece of equipment per day.

Field Duplicate Samples

A blind duplicate sample is obtained by splitting a primary sample in the field into two portions and sending the duplicate sample to the laboratory with a disguised identification. Intra-laboratory duplicate samples are used to check the repeatability of the laboratory results and to assess the heterogeneity of the analyte and will be collected at a rate of one in 20. Inter-laboratory samples are similar to blind duplicate samples however they are submitted to a secondary laboratory, to check upon the proficiency of the primary laboratory. Inter-laboratory samples will be collected at a minimum rate of one per 20 samples.

Trip Blank and Trip Spike

Trip blanks and trip spikes are prepared by the laboratory, and are designed to assess the potential for loss of volatiles and cross contamination resulting from the sampling storage and handling procedures. One of each will be taken to the field to accompany soil or water samples analysed for volatile contaminants to the primary laboratory. One trip blank and trip spike samples will be included with each group of samples transported to the laboratory.

H.8.6 Laboratory QA/QC Procedures

Laboratory Quality Assurance and Quality Control (QA/QC) procedures will be undertaken in accordance with NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1,* Schedule B3 - Guideline on Laboratory Analysis of Potentially Contaminated Soils and will comprise matrix spikes, method blanks and surrogate recoveries. The results of the quality control testing will be presented in the laboratory reports. Duplicate testing will also be undertaken by the laboratories to compare the results obtained in analysing samples.

ALS and Envirolab will provide the following quality assurance data:

- NATA approval for analyses undertaken;
- sample receipt confirmation;
- laboratory duplicates;
- instrument blank;
- detection limits;
- 10% matrix spike and matrix spike duplicates;
- 10% laboratory duplicates; and
- acceptable limits for spike recoveries.

Accuracy

Accuracy is defined as the proximity of an averaged result to the true value, where all random errors have been statistically removed. Unless the true value is known, accuracy may take on a meaning equivalent to the term bias due to the existence of systematic errors. Accuracy is measured by percent recovery, '%R'. Unless otherwise stated, accuracy data for matrix spike and matrix spike duplicates will be expected to vary within the following ranges:

Table H.4 Expected Matrix Spike Percentage Recovery

Analyte	Acceptable Percentage Recovery
General analytes	70-130 %R
Organophosphate pesticide analytes (if required)	60-130 %R
Chromium	62-120 %R

Accuracy of data is treated as an estimate where the data is below the lower recovery limit and above 10%R (i.e. 10-69%R for general analytes, 10-59%R for OPP and 10-61%R for chromium). In the event that the data value is below the 10%R the data value should be rejected. In the event that the data value is above the upper recovery limit, the data value will be treated as an estimate.

Precision

Precision is considered to be the degree to which data generated from replicate or repetitive measurements differ from one another due to random errors. Precision is measured using the standard deviation, 'SD', or Relative Percent Difference, '%RPD'. Replicate data existing in the %RPD range presented below shall be accepted as quality data, whereas data outside of the acceptance criteria will require further discussion.

%RPD Range: if result > 10 x EQL, the maximum of 30% RPD;

if result < 10 x EQL, the maximum of 50% RPD.

Blanks

Laboratory method blanks are designed to check for artefacts and interferences during the analysis stages, which may lead to the reporting of false positive results. In the event that a positive blank is reported for this project, the following remedies will proceed:

- laboratory to review data;
- positive blank results may not be subtracted from sample results;
- no further action necessary if sample results reported were less than laboratory reporting limit;
- analyse additional field blanks if taken and within holding times;
- positive sample results may be acceptable if analyte concentrations were significantly greater than the amount reported in the blank (ten times for laboratory reagents such as methylene chloride, chloroform, and acetone etc., and five times for all other analytes). Alternatively, the laboratory reporting limit may be raised to accommodate blank anomalies provided that regulatory guidelines were not compromised by any adjustment made to the laboratory reporting limit; and
- professional expertise would be used in all cases, which may include conducting additional testing.

Matrix Spikes

Environmental samples are spiked with laboratory grade standards to assess the interactive effects between the sample matrix and the analytes being measured. Matrix Spikes 'MS' are reported as a percent recovery %R, at a minimum rate of 1 in every 20 samples for this project.

Percent Recovery is expressed as: $\%R = \frac{(SSR-SR)}{SA} \times 100$

where: SSR = spiked sample result

SR = sample result (blank)

SA = spike added

Laboratory Duplicates

Laboratory duplicate samples measure precision, which is calculated as standard deviation SD or Relative Percent Difference %RPD. Duplicates are collected in a single sample container in the field and are analysed as two separate extractions.

Relative Percent Difference is expressed as: $\%\ RPD = \frac{(D1-D2)}{D1+D2)/2} \times 100$

where: D1=sample concentration

D2=duplicate sample concentration

Laboratory Surrogates

Surrogates are QC monitoring spikes, which are added at the beginning of the sample extraction process in the laboratory where applicable. Surrogates were measured as Percent Recovery %R.

Percent Recovery is expressed as: $\%R = \frac{(SSR)}{SA} \times 100$

where: SSR=spiked sample result

SA =spike added

Surrogate spike recoveries indicate the presence of sample specific interferences. In the event that the USEPA have not published a surrogate recovery limit, the range 70 – 130% recovery soil will be used. In the event that a surrogate recovery fails to comply with the documented or established limits, the sample will be re-extracted and reanalysed. Should the recovery breaches occur again, this will be regarded as an indication of matrix interference and a decision will be made to accept or reject the dataset.

H.8.7 Quality Assurance/Quality Control

Table H.5 Sampling & Analysis Methodology Assessment

Field Considerations	Laboratory Considerations
Precision Requirements	
The investigation will be conducted following ERM SOPs and any variations from these procedures will be documented and justified.	Analysis of the following will be reported: • Laboratory and inter-laboratory duplicates; • Field duplicates; • Laboratory prepared volatile trip spikes.
Accuracy Requirements	
The investigation will be conducted following ERM SOPs and any variations from these procedures will be documented.	Analysis of the following will be reported: • Field blanks; • Rinsate blanks; • Reagent blanks; • Method blanks; • Matrix spikes; • Matrix spike duplicates; • Surrogate spikes; • Reference materials; • Laboratory control samples; • Laboratory prepared spikes
Representativeness Requirements	
Appropriate media will be identified and sampled according to the SAQP.	All samples will be analysed according to the SAQP.
Comparability Requirements	
The same SOPs will be used during each sampling event.	Analytical methods suitable for the target media will be used.
All sampling will be conducted by an appropriately qualified and experienced sampler.	The PQLs used to report analyte concentrations will be less than the adopted investigation levels.
Impacts of climatic conditions on sample integrity will be minimised by immediately placing samples into insulated ice-filled containers. Trip spike samples will be collected to monitor potential loss of volatile analytes.	The same laboratories will be used to analyse all sample.
The types of samples collected will be consistent.	The same units will be used to report analyte concentrations.
Completeness Requirements	
All accessible proposed locations will be sampled.	All accessible proposed locations will be sampled. All analytes will be analysed according to the SAQP.
The investigation will be conducted following ERM SOPs and any variations from these procedures will be documented.	Appropriate analysis methods and PQLs will be used.
All sampling will be conducted by an appropriately qualified and experienced sampler.	Sample documentation will be provided.
	Sample holding times will be complied with.
Documentation of field works will be provided.	

H.9 CONTINGENCY PLANNING

Due to the uncertain nature of subsurface investigations, variations to the proposed scope of work may be necessary based on conditions encountered in the field. The most relevant potential uncertainties are described below, along with proposed contingency actions to address these issues:

Unexpected contaminants/unexpected high concentrations encountered: The analytical suite for soil and groundwater is based on the results of the historical investigations and knowledge of contaminants that are commonly associated with the former land use, such that identification of unexpected contaminants is unlikely. Should significant or unexpected contamination be encountered, additional sampling may be undertaken to attempt to further investigate and/or delineate the impact (to the extent practicable and subject to approval from Macquarie Generation).

LNAPL and/or DNAPL encountered: If LNAPL and/or DNAPL is observed at any groundwater wells, attempts will be made to collect a representative sample of the separate phase liquid for characterisation. The benefits and costs of this additional analysis would be discussed with Macquarie Generation prior to proceeding with additional works.

Difficult ground conditions encountered: If difficult ground conditions are encountered at an investigation location, an alternative adjacent location will be attempted to bypass potential subsurface obstacles encountered. In the unlikely event that laterally extensive difficult ground conditions prevent completion of the scope of work (i.e. achieving required depth), alternative investigation methods may be considered.

Insufficient sediment present for sampling: In the event that no sediment is encountered at the natural level at identified locations alternative locations will be identified based on conditions observed in the field. In the event that the volume of sediment is recovered from a single core is insufficient for laboratory analysis for particle size, an additional core will be taken immediately adjacent to the initial core.

Access to an area of potential concern is not feasible: If access to an area is not granted by Macquarie Generation within the required time frame ERM will target locations around the perimeter of that area where access can be made available safely.

Existing monitoring wells are damaged or unsuitable for sampling: It may be necessary to install replacement wells where existing wells are damaged or unsuitable.

Annex I

Preliminary SAQP Tables

Table I.1: Preliminary SAQP - Sampling Location Distribution and Rationale
Bayswater Power Station
Project Symphony - 0213879

Site	Area	Sampling Element	Rationale	Landuse Screening Criteria	SB	MW	SS	SW	Total Locations	Existing MWs	Total MWs
Bayswater	BA	Brine Concentrator Holding Pond	Seepage/leaching of brine to surrounding areas	Commercial/Industrial and Open space	0	3	0	0	3	0	3
Bayswater	BB	Brine Concentrator Decant Basin	Seepage/leaching of brine to surrounding areas	Commercial/Industrial and Open space	0	5	0	0	5	1	6
Bayswater	BC	Fuel Oil Installation	Contamination of soil and groundwater from loss of fuel and oil	Commercial/Industrial	4	5	0	0	9	0	5
Bayswater	BD	Vehicle Refueling Depot	Contamination of soil and groundwater from loss of fuel and oil (UPSS)	Commercial/Industrial	0	0	0	0	0	4	4
Bayswater	BE	Coal Storage Area	Potential leaching of contaminants from stockpiled coal and retention ponds	Commercial/Industrial	0	9	0	0	9	0	9
Bayswater	BF	Coal Unloaders, Rail Infrastructure and Coal Transfer Lines	Contamination of soil and groundwater from transfer line gearbox oil leaks, fugitive coal fines, current and historic fuel storage, locomotive maintenance, and rail infrastructure activity.	Commercial/Industrial and Open space	7	7	0	0	14	0	7
Bayswater	BG	Contaminated Water Treatment Plant	Contamination of soil and groundwater from contaminated water from operational areas	Commercial/Industrial	0	7	0	0	7	0	7
Bayswater	BH	Cooling Water Treatment Plants	Contamination of soil and groundwater use of chemicals in water treatment (sulphuric acid)	Commercial/Industrial	8	8	0	0	16	0	8
Bayswater	BI	Demineraliser Plant	Contamination of soil and groundwater from spills and leaks of chemicals used in demineraliser process	Commercial/Industrial	0	3	0	0	3	0	3
Bayswater	BJ	Former Contractor Staging Area	Contamination of soil and groundwater from spills and leaks of fuels and chemicals used during facility construction	Commercial/Industrial and Open space	19	5	0	0	24	0	5
Bayswater	BK	Former Large Items Assembly Area	Contamination of soil and groundwater from spills and leaks of fuels and chemicals used during facility construction	Commercial/Industrial and Open space	7	4	0	0	11	0	4
Bayswater	BL	Generator Transformer Areas	Contamination of soil and groundwater from transformer oil	Commercial/Industrial	7	6	0	0	13	0	6
Bayswater	BM	Landfill	Contamination of soil and groundwater from current and historical waste burial	Commercial/Industrial and Open space	9	6	0	0	15	1	7
Bayswater	BN	Lime Softening Plant	Contamination of soil and groundwater from chemicals used in softening (ferric chloride, sulphuric acid, lime)	Commercial/Industrial and Open space	0	3	0	0	3	0	3

Table I.1: Preliminary SAQP - Sampling Location Distribution and Rationale
Bayswater Power Station
Project Symphony - 0213879

Site	Area	Sampling Element	Rationale	Landuse Screening Criteria	SB	MW	SS	SW	Total Locations	Existing MWs	Total MWs
Bayswater	BO	Lime Softening Plant Sludge Lagoons	Contamination of soil and groundwater from spent softening plant sludge	Commercial/Industrial and Open space	0	5	0	0	5	1	6
Bayswater	BP	Mobile Plant Workshop and Refuelling	Contamination of soil and groundwater from fuel storage/dispensing and waste oil sump	Commercial/Industrial	0	6	0	0	6	0	6
Bayswater	BQ	Pikes Gully Ash Dam	Contamination of soil and groundwater from ash leachate and waste disposal.	Commercial/Industrial and Open space	21	14	0	0	35	1	15
Bayswater	BR	Ravensworth Rehabilitation Area	Contamination of soil and groundwater from ash leachate.	Commercial/Industrial, Open Space and Residential	0	11	0	0	11	0	11
Bayswater	BS	Low Pressure Pumping Station	Contamination of soil and groundwater from transformer oil	Commercial/Industrial and Open space	2	1	0	0	3	0	1
Bayswater	BT	High Pressure Pumping Station	Contamination of soil and groundwater from transformer oil	Commercial/Industrial and Open space	2	1	0	0	3	0	1
Bayswater	BU	Main Store - Dangerous Goods Storage Area	Contamination of soil and groundwater from spills and leaks of various chemicals	Commercial/Industrial	2	3	0	0	5	0	3
Bayswater	BV	Power Block	Contamination of soil and groundwater from spills and leaks of various chemicals	Commercial/Industrial	9	13	0	0	22	0	13
Bayswater	BW	Sediments in Surrounding Waterways and Lake Liddell	Contamination of sediments in Cullens Gully and Tinkers Creek from discharges (drainage lines and groundwater seepage) related to Bayswater site operations. Contamination of sediments in Lake Liddell from discharges (drainage lines and groundwater seepage) related to Liddell Power Station operations.	Commercial/Industrial	0	0	54	54	54	0	0
Bayswater	BX	TransGrid Switchyard	Contamination of soil and groundwater from surface water and groundwater migrating from the TrasGrid switchyard onto land owned by Macquarie Generation	Commercial/Industrial and Open space	0	4	0	0	4	0	4
Bayswater	BY	Buffer Lands	Contamination of soil and groundwater from historical activities or use of impacted fill material and migration of contamination across Site boundaries.	Commercial/Industrial and Open space	0	36	0	0	36	0	36
	Totals				**97**	**165**	**54**	**54**	**316**	**8**	**173**

Notes:
SB = Soil Bore (not including bores converted to MW) / MW = Soil Bore converted to Groundwater Monitoring Well / Existing MWs = based on available reports and assumes wells are operational for sampling. Some SB locations may be completed as test pits using an excavator, where access allows.
SS = Sediment Sample / SW= Surface Water
Total Locations = SB + MW (or SS/SW)
Total MWs = proposed wells + existing wells

Depth of soil investigations will be assessed based on field conditions and will be tailored to target specific potential sources (eg pipelines / UST's etc.) where relevant, however for planning purposes it has been assumed that the average depth will be 3 m (with exception of noted shallow locations).
Monitoring wells will be screened within groundwater bearing strata and constructed to allow the ingress of non-aqueous phase liquids (NAPLs) which may be present, and will be tailored to target specific potential sources (eg pipelines / UST's etc.) where relevant, estimated average depth of 8 - 10 m. It is noted that depth of investigation may be significantly
Unless otherwise specific, sediment samples will be advanced to a maximum depth of 1m.
Buffer lands will be visually inspected for evidence of potentially contaminated activity. The assessment of the requirement for investigation of the buffer lands will be based on the results of inspection and discussion with Macquarie Generation.

N/A not applicable

Area	Sampling Element	Total Locations	Total number of samples	Sample Details	Metals (8)	Metals (13)+	TRH, BTEX, PAH, Phenol	Asbestos P/A	VOC	PCB	Cations/Anions	PFOS/PFOA	ph / CEC	PSD, TOC	Comments
BA	Brine Concentrator Holding Pond	3	6	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	0	6	6	0	0	0	6	0	6	1	Analytical suite includes general suite (metals, TRH, BTEX, PAH, phenols) to target incidental operations and fill materials. Additional analytes include PCBs to target transformer operation, VOCs to target solvent use in maintenance of plant. and asbestos (presence/absence) in shallow fill materials. Selected soil samples will also be analysed for pH, CEC, PSD and TOC to allow for adoption of appropriate HSLs and ecological criteria (where applicable). Sediment analysis includes TOC and PSD.
BB	Brine Concentrator Decant Basin	5	10	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	0	10	10	0	0	0	10	0	10	1	
BC	Fuel Oil Installation	9	18	Visual inspection - the fuel tranfer lines fromthe Fuel Oil Installation to the power block will be visually inspected to assess any evidence for leaks and spills which may have impacted the underlying soils/groundwater. The need for investigation locations will be assess based on the results of this inspection. Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	18	0	18	9	0	0	0	0	1	1	
BD	Vehicle Refueling Depot	0	0	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	0	0	0	0	0	0	0	0	0	0	
BE	Coal Storage Area	9	18	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	18	0	18	9	0	0	0	0	1	1	
BF	Coal Unloaders, Rail Infrastructure and Coal Transfer Lines	14	28	Visual inspection - the coal transfer lines will be visually inspected to assess any evidence for leaks and spills which may have impacted the underlying soils/groundwater. The need for investigation locations will be assess based on the results of this inspection. Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	28	0	28	14	0	0	0	0	1	1	
BG	Contaminated Water Treatment Plant	7	14	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	14	0	14	7	14	14	0	0	1	1	
BH	Cooling Water Treatment Plants	16	32	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	32	0	32	16	0	0	32	0	32	1	
BI	Demineraliser Plant	3	6	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	6	0	6	3	0	0	6	0	6	1	
BJ	Former Contractor Staging Area	24	48	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	48	0	48	24	8	0	0	0	1	1	
BK	Former Large Items Assembly Area	11	22	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	22	0	22	11	4	0	0	0	1	1	
BL	Generator Transformer Areas	13	26	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	26	0	26	13	4	13	0	13	1	1	

Area	Sampling Element	Total Locations	Total number of samples	Sample Details	Metals (8)	Metals (13)+	TRH, BTEX, PAH, Phenol	Asbestos P/A	VOC	PCB	Cations/Anions	PFOS/PFOA	ph / CEC	PSD, TOC	Comments
BM	Landfill	15	30	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	30	0	30	30	15	15	0	0	1	1	
BN	Lime Softening Plant	3	6	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	0	6	6	0	0	0	6	0	6	1	
BO	Lime Softening Plant Sludge Lagoons	5	10	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	0	10	10	0	0	0	10	0	10	1	
BP	Mobile Plant Workshop and Refuelling	6	12	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	12	0	12	6	12	0	0	0	1	1	
BQ	Pikes Gully Ash Dam	35	49	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	0	28	28	21	9	0	28	0	28	1	
BR	Ravensworth Rehabilitation Area	11	22	Visual inspection - the fly ash transfer lines from the power station will be visually inspected to assess any evidence for breaches which may have impacted the underlying soils/groundwater. The need for investigation locations will be assess based on the results of this inspection. Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	0	22	22	0	0	0	22	0	22	1	Analytical suite includes general suite (metals, TRH, BTEX, PAH, phenols) to target incidental operations and fill materials. Additional analytes include PCBs to target transformer operation, VOCs to target solvent use in maintenance of plant. and asbestos (presence/absence) in shallow fill materials. Selected soil samples will also be analysed for pH, CEC, PSD and TOC to allow for adoption of appropriate HSLs and ecological criteria (where applicable). Sediment analysis includes TOC and PSD.
BS	Low Pressure Pumping Station	3	6	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	6	0	6	3	0	3	0	0	1	1	
BT	High Pressure Pumping Station	3	6	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	6	0	6	3	0	3	0	0	1	1	
BU	Main Store - Dangerous Goods Storage Area	5	10	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	10	0	10	5	10	0	0	0	1	1	
BV	Power Block	22	44	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	44	0	44	22	22	22	0	0	1	1	
BW	Sediments in Surrounding Waterways and Lake Liddell	54	216	Four sediment samples will be collected at each location at intervals to a maximum depth of 1m. Sediment samples will be collected in general accordance with the methodologies outlined in CSIRO (2005) Handbook for Sediment Quality Assessment. Samples will be collected using push tube coring, utilising polycarbonate samplng tubes advanced from the creekline (Tinkers Creek, Cullens Gully) or using divers or boat-based samplers (Lake Liddell). Sample handling, labelling and decontamination procedures will be aligned with those adopted for soil sampling and those outlined in CSIRO (2005).	216	0	216	0	0	216	0	0	0	216	
BX	TransGrid Switchyard	4	8	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	8	0	8	4	2	8	0	8	1	1	

Area	Sampling Element	Total Locations	Total number of samples	Sample Details	Metals (8)	Metals (13)+	TRH, BTEX, PAH, Phenol	Asbestos P/A	VOC	PCB	Cations/Anions	PFOS/PFOA	ph / CEC	PSD, TOC	Comments
BY	Buffer Lands	36	72	Field screening - including PID measurements and visual/olfactory observations will be noted throughout the drilled profile; Sample Collection - samples will be collected at the surface and 0.5 m intervals for the first 2 m and every 1 m thereafter, or where changes in lithological units or significant contamination are noted; and Sample Analysis - one shallow sample targeting fill and the zone of surface impacts (0-1.5 m bgl) and one deeper sample targeting natural soil/geology between vadose zone and water bearing unit.	72	0	144	0	11	0	0	0	1	1	
Totals		**316**			**616**	**82**	**770**	**200**	**111**	**294**		**21**	**135**	**239**	

Analytical suite notes:

Metals (8)	Metals (arsenic, cadmium, chromium, copper, nickel, lead, mercury and zinc);	General Suite
Metals (13+B+Mb+Th+Se)	Metals (arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, manganese, nickel, lead, mercury, vanadium and zinc) plus boron, molybdenum, thallium and selenium	Additional metals target additional contaminants potentially present in ash.
TRH,BTEX,PAH,Phenol	Total Recoverable Hydrocarbons (TRH); Benzene, Toluene, Ethylbenzene, Xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs) and Phenols	General Suite
Asbestos P/A	Asbestos (presence / absence – soil only). Where is asbestos is detected, this will be quantified by calculating %W/W.	Targets asbestos in shallow fill materials or beneath pipework known or suspected to contain asbestos. Operational areas only.
VOC Suite	Volatile Organic Compounds (including chlorinated hydrocarbons)	Targeted to areas with known or suspected use of solvents including worksop areas or other
PCB	Polychlorinated biphenyls	Targeted to transformers and power block drainage areas.
PSD, TOC	TOC – Total Organic Carbon; PSD – Particle Size Distribution.	All sediments and selected soil samples to allow for adoption of appropriate HSLs.
pH / CEC	pH and cation exchange capacity.	Soils in non-operational area to determine appropriate ESLs / EILs.
PFOS/PFOA	Perfluorooctanesulfonic acid and Perfluorooctanoic acid	Targeted to areas known or suspected to have had transformer fires.

Asbestos analysis will generally be undertaken only on the upper (fill) sample, unless results from the upper sample or field screening / observations require that the deeper sample be analysed.
It is proposed that sediment samples from a range of depths be analysed for PCBs as PCB impacts are most likely to have been associated with historic activities and hence deeper sediments, however this may be undertaken in a staged manner with a proportion (>50%) of samples from each depth interval analysed initially and remaining samples analysed should detctions be noted.

Table I.3: Preliminary SAQP - Groundwater and Surfacewater
Bayswater Power Station
Project Symphony - 0213879

Area	Sampling Element	Total MWs	SW Samples	Metals (8)	Metals (13)+	TRH/BTEX/PAH/ Phenols	VOC Suite	PCB	Cations/ Anions	PFOS/PFOA	Field Parameters
BA	Brine Concentrator Holding Pond	3	0	0	3	3	3	0	3	0	3
BB	Brine Concentrator Decant Basin	6	0	0	6	6	6	0	6	0	6
BC	Fuel Oil Installation	5	0	5	0	5	5	0	0	0	5
BD	Vehicle Refueling Depot	4	0	4	0	4	4	0	0	0	4
BE	Coal Storage Area	9	0	9	0	9	9	0	0	0	9
BF	Coal Unloaders, Rail Infrastructure and Coal Transfer Lines	7	0	7	0	7	7	0	0	0	7
BG	Contaminated Water Treatment Plant	7	0	7	0	7	7	7	0	0	7
BH	Cooling Water Treatment Plants	8	0	8	0	8	8	0	8	0	8
BI	Demineraliser Plant	3	0	3	0	3	3	0	3	0	3
BJ	Former Contractor Staging Area	5	0	5	0	5	5	0	0	0	5
BK	Former Large Items Assembly Area	4	0	4	0	4	4	0	0	0	4
BL	Generator Transformer Areas	6	0	6	0	6	6	6	0	6	6
BM	Landfill	7	0	7	0	7	7	7	0	0	7
BN	Lime Softening Plant	3	0	0	3	3	3	0	3	0	3
BO	Lime Softening Plant Sludge Lagoons	6	0	0	6	6	6	0	6	0	6
BP	Mobile Plant Workshop and Refuelling	6	0	6	0	6	6	0	0	0	6
BQ	Pikes Gully Ash Dam	15	0	0	15	15	15	0	15	0	15
BR	Ravensworth Rehabilitation Area	11	0	0	11	11	11	0	11	0	11
BS	Low Pressure Pumping Station	1	0	1	0	1	1	1	0	0	1
BT	High Pressure Pumping Station	1	0	1	0	1	1	1	0	0	1
BU	Main Store - Dangerous Goods Storage Area	3	0	3	0	3	3	3	0	0	3
BV	Power Block	13	0	13	0	13	13	13	0	0	13
BW	Sediments in Surrounding Waterways and Lake Liddell	0	54	0	54	54	0	54	0	0	54
BX	TransGrid Switchyard	4	0	4	0	4	4	4	0	4	4
BY	Buffer Lands	36	0	36	0	36	36	0	0	0	36
Totals		**173**	**54**	**129**	**98**	**227**	**173**	**96**	**55**	**10**	**227**

Analytical suite notes:

Metals (8)	Metals (arsenic, cadmium, chromium, copper, nickel, lead, mercury and zinc);
Metals (13)+B+Mb+Th+Se)	Metals (arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, manganese, nickel, lead, mercury, vanadium and zinc) plus boron, molybdenum, thallium and selenium
TRH/BTEX/PAH/Phenol	Total Recoverable Hydrocarbons (TRH); Benzene, Toluene, Ethylbenzene, Xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs) and Phenols
VOC Suite	Volatile Organic Compounds (including chlorinated hydrocarbons)
PCB	Polychlorinated biphenyls
PFOS/PFOA	Perfluorooctanesulfonic acid and Perfluorooctanoic acid
Field parameters	pH, electrical conductivity, redox, temperature.

ERM has over 100 offices across the following countries worldwide

Australia
Argentina
Belgium
Brazil
China
France
Germany
Hong Kong
Hungary
India
Indonesia
Ireland
Italy
Japan
Korea
Malaysia
Mexico
Netherlands
Peru
Poland
Portugal
Puerto Rico
Singapore
Spain
Sri Lanka
Sweden
Taiwan
Thailand
UK
USA
Venezuela
Vietnam

Environmental Resources Management

Building C, 33 Saunders Street
Pyrmont NSW 2009
Locked Bag 24,
Broadway NSW 2007

T: 61 2 8584 8888
F: 61 2 8584 8800
www.erm.com

ERM