

Appendix H – WorleyParsons borehole logs

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-01**

SHEET: 1 OF 5

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
DATE COMPLETED: **31.8.2018**
LOGGED BY: **ACE**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306988.5 Surface R.L.: 4.66mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184675.6 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER	HWT	NA		4.5	FILL		FILL: Inferred as granular; ballast, gravel, sand and slag.	Uc	MD	20	NA	NA	NA		
				60											
				200											
				600											
				2000											
				0.5			FILL: Sandy GRAVEL: Fine to medium grained, angular to sub-angular, lithics, grey and pale grey; sand, fine to coarse grained, angular to sub-angular, quartz and lithics; with silt (non-plastic).								
				4.0			FILL: Sandy GRAVEL: Fine to coarse grained, angular to sub-angular, slag, grey; sand, fine to coarse grained, angular to sub-angular, slag, lithics and quartz; with silt (non-plastic).								
				1.0			FILL: Gravelly SAND: Fine to coarse grained, angular to rounded, quartz and lithics, pale-brown; gravel, fine to coarse grained, angular to sub-angular, lithics and slag; with fines; trace clay nodules (<10 mm).								
				3.5											
				1.5											
				3.0			FILL: SAND: Medium to coarse grained, angular to sub-rounded, quartz, lithics, coal, minor shell fragments, pale brown, speckled orange; trace gravel, fine to medium grained, sub-angular, cemented clayey sand nodules and lithics; trace fines; trace clayey nodules (<5 mm).								
				2.0											
				2.5											
				2.0											
				3.0											
				1.5											
				3.5			...with shell fragments								
				1.0											
4.0															
0.5															
4.5															
0.0															
5.0															

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-01**

SHEET: 2 OF 5

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
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WASH BORE	HWT	NA		-0.5	FILL		FILL: SAND: As above.	Uc	MD						
				5.5	1A		SAND (SP): Medium to coarse grained, sub-angular to sub-rounded, quartz, lithics and calcareous fragments, pale orange-brown; trace coal fines; trace fines. ...fine to medium grained, angular to sub-rounded, quartz, shells ~125-250 mm, black; with gravel, fine to coarse grained, sub-angular to rounded, lithics and coal; with clay to 5.45 m							SPT 1,3,9 N=12	SPT: Recovered 450 mm Slight H2S odour
				-1.0											
				-1.5											
				-2.0			...pale-brown; with fine gravel, angular, of calcareous fragments							SPT 6,10,12 N=22	SPT: Recovered 400 mm
				-2.5	1B				L						
				-3.0											
				-3.5			...with cemented sandy clay inclusions, brown; trace fine to medium gravel, angular to sub-rounded, lithics and shells							SPT 3,6,3 N=9	
				-4.0			SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, dark brown; with fines; trace grey patches; trace fine gravel, sub-rounded to rounded, lithics.								
				-4.5											
				-5.0			...no grey patches		MD					SPT 4,5,9 N=14	SPT: Recovered 450 mm
				10.0											

BOREHOLE: **BH-01**

SHEET: 3 OF 5

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Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184675.6	Ref. System:	GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE				-5.5	1B		SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, dark brown; with fines; trace grey patches; trace fine gravel, sub-rounded to rounded, lithics.	Uc	MD	20					
				60											
				200											
				600											
				2000											
				10.5											
				-6.0											
				11.0	..trace black inclusions (5-10 mm diameter), organic silt / coal fines?										
				-6.5	..grey; no black inclusions; trace coal fines; trace fines										
				11.5											
-7.0															
12.0															
-7.5	3		Sandy CLAY (Cl): Medium plasticity, brown mottled grey; sand (about 30%), fine grained; trace fine gravel, angular to sub-rounded, quartz, lithics. ...grey mottled black (coal fragments, non silt); sand content ~40% ...brown, sand content ~60%; low to medium plasticity	RS	St	NA	NA	NA	SPT 7,10,11 N=21	SPT: Recovered 450 mm					
12.5							SPT 3,5,6 N=11	SPT: Recovered 450 mm							
-8.0															
13.0															
-8.5															
13.5															
-9.0															
14.0															
-9.5															
14.5						U75									
-10.0								SPT 7,9,11 N=20	SPT (14.60-15.05m): Recovered 300 mm						
15.0															

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-01**

SHEET: 4 OF 5

CLIENT: **Australian Industrial Energy**
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WASH BORE	OPEN HOLE	NA	3	-10.5	3		Sandy CLAY: Medium plasticity, banded pale grey and brown; sand, fine grained; trace fine gravel, angular to sub-rounded, quartz and lithics; brown layers have high sand content (~60%), grey (~40-50%).	RS	VSt		NA	NA	NA		16.0 to 17.5 m: Driller notes hard drilling conditions SPT: Recovered 450 mm
				-11.0											
HQ3	15		4	-11.5	4		Sandy SILTSTONE: Fine grained, pale brown, streaked orange-brown, grey and dark grey; laminated and lenticular; with bands of gravel, fine to medium grained, angular to sub-angular, dark grey; with soil beds (XW rock). ...from 19.64 m, grey streaked and irregular undulating dark grey lamination and lenses with frequent fine to medium grained, angular to sub-angular, gravel inclusions (mudstone?)	HW	VL		1	100 / 79	0	SPT 42/120mm N=R	SPT: Recovered 120 mm
				-12.0											
				-12.5											
				-13.0											
				-13.5											
				-14.0											
				-14.5											
				-15.0				MW							
				-15.5				XW	VD						
				-16.0											
				-16.5											
				-17.0											
				-17.5											
				-18.0											
				-18.5											
				-19.0											
				-19.5											
				-20.0											

BOREHOLE LOG



WorleyParsons

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HQ3	OPEN HOLE						Sandy SILTSTONE: Fine grained, pale brown, streaked orange-brown, grey and dark grey; laminated and lenticular; with bands of gravel, fine to medium grained, angular to sub-angular, dark grey; with soil beds (XW rock).	MW	L						J, 15°, Un, R, SI, Co
				15.5											
				20.5											M
				16.0											M
				21.0											
				16.5											
		20		21.5							2	100 / 100	87		M
				17.0			...at 21.75m: XW seam (~10 mm)								XW seam
				22.0			...from 22.03 m, no dark grey wavy lamination								J, 0°, Ir, VR, SI, Co
				17.5											J, 50°, Un, R, SI, Co
				22.5					L-M						J, 5°, Un, R, SI, Co
				18.0											J, 5°, Un, R, SI, Co
				23.0			...from 23.01 to 23.14 m, band of dark grey wavy lamination with gravel inclusions								M
				18.5											M
		30		23.5			...from 23.34 to 23.46 m, XW zone, soil properties.	XW	Hd						
							...from 23.46 m to 23.55 m, XW soil zone.	MW	L						
							...from 23.58 to 24.0 m, intersecting joints, calcite filled ~ perpendicular	XW	Hd						
				19.0			...from 23.5 m, with fine gravel, angular to sub-rounded, lithics	MW	L						
								MW-SW	M						23.58 to 24.0 m: J, 90°, Pl, R, Ca, Co
				24.0							3	100 / 86	46		J, 90°, Pl, R, Cal Co, infill
							End of BH-01 at 24m								
				19.5											
				24.5											
				20.0											
				25.0											

CORE PHOTOGRAPHS



WorleyParsons

BOREHOLE: **BH-01**

SHEET: 1 OF 1

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19.06 to 23.01 m



23.01 to 24.00 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-02**

SHEET: 1 OF 6

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
 DATE COMPLETED: **28.8.2018**
 LOGGED BY: **BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307002.6 Surface R.L.: 5.70mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184742.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
SOLID AUGER	HWT	NA		5.5	FILL		FILL: SAND: Fine to medium grained, sub-angular to sub-rounded, quartz, pale brown, mottled dark grey (coal?); trace gravel, fine to medium grained, lithics; trace shell fragments.	Uc	MD	20	NA	NA	NA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-02**

SHEET: 2 OF 6

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
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 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307002.6 Surface R.L.: 5.70mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184742.0 Ref. System: GDA94 / MGA56

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SOLID AUGER																					
	HWT	NA		0.5	1A		SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, pale brown-grey; trace to with shell fragments, trace fines.	Uc	MD	20	NA	NA	NA								
			5.5							60											
			6.0							200											
			6.5							600											
			7.0						2000												
			7.5																		
			8.0																		
			8.5																		
			9.0																		
			9.5																		
			10.0																		
WASH BORE																					
										D											
							...increased gravel content														
							...reduced gravel, pale yellow to pale brown in colour, trace shell fragments														
							SAND (SP): Fine grained, sub-angular to rounded, quartz, dark brown; trace fines, clay nodules?; trace gravel, fine to medium grained, lithics.														
					1B									SPT 10,17,23 N=40	SPT: Recovered 300 mm						

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-02**

SHEET: 3 OF 6

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WASH BORE	HWT	NA		4.5	1B		SAND (SP): Fine to medium grained, sub-angular to rounded, quartz, dark brown, speckled pale brown; trace fines; trace shell fragments; iron stained.	Uc	VD		NA	NA	NA		Casing advanced to 8.2 m Possibly very weakly cemented								
				10.5																			
				5.0											SPT 21,37,42 N=79	SPT: Recovered 300 mm							
				11.0																			
				5.5																			
				11.5			SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, trace mafics, pale grey to pale brown, trace clay.																
				6.0																			
				12.0																			
				6.5			SPT 25,33,38 N=71								SPT: Recovered 300 mm								
				12.5																			
				7.0																			
				13.0																			
				7.5																			
				13.5			... trace to with fines																
				8.0																			
				14.0											SPT 18,29,40 N=69	SPT: Recovered 300 mm							
				8.5																			
				14.5																			
				9.0																			
				15.0											Casing advanced to 13.1 m								

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-02**

SHEET: 4 OF 6

CLIENT: **Australian Industrial Energy**
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WASH BORE	HWT	NA	-9.5		1B		SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, trace mafics, pale brown-yellow-brown; with fines, clay nodules.	Uc	D	20 60 200 600 2000	NA	NA	NA	SPT 29,37,44 N=81	SPT: Recovered 350 mm
			15.5											Yellow-orange-brown at bottom of SPT	
			-10.0		2		CLAY (CH): High plasticity, dark grey; with sand, fine grained, sub-angular to rounded, quartz.		St					U75	U75: Recovered 400 mm PP at 16.50 and 16.70 m: ~ 0.6 kg/cm^2 HSV at 16.64 m: ~18 (Pk) / 12 (res)
			16.0											Casing advanced to 17.5m	
			-10.5											Sandy CLAY (CI-CH): Medium to high plasticity, dark grey speckled white; fine to medium grained sand, sub-angular to rounded, quartz, lithics (mafic); trace shell fragments, angular; trace fibrous material (rootlets?).	RS
	16.5														
	-11.0		3		Sandy CLAY (CI-CH): high plasticity, pale green-grey mottled orange-brown; fine to medium grained sand, sub-angular to rounded, quartz, trace fibrous rootlets.	RS	Hd	SPT 11,14,18 N=32	SPT: Recovered 400 mm						
	17.0									Rock fabric visible					
	-11.5									Sandy CLAY (CI-CH): high plasticity, pale green-grey mottled orange-brown; fine to medium grained sand, sub-angular to rounded, quartz, trace fibrous rootlets.	RS	Hd	SPT 11,14,18 N=32	SPT: Recovered 400 mm	
	17.5														
-12.0															
-12.5		3		Sandy CLAY (CI-CH): high plasticity, pale green-grey mottled orange-brown; fine to medium grained sand, sub-angular to rounded, quartz, trace fibrous rootlets.	RS	Hd	SPT 11,14,18 N=32	SPT: Recovered 400 mm							
18.0															
-13.0															
18.5															
-13.5															
19.0		3		Sandy CLAY (CI-CH): high plasticity, pale green-grey mottled orange-brown; fine to medium grained sand, sub-angular to rounded, quartz, trace fibrous rootlets.	RS	Hd	SPT 11,14,18 N=32	SPT: Recovered 400 mm							
-14.0															
19.5															
-14.0															
20.0															

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-02**

SHEET: 5 OF 6

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
DATE COMPLETED: **28.8.2018**
LOGGED BY: **BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307002.6 Surface R.L.: 5.70mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184742.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description																				
WASH BORE		NA	-14.5	20.5	3		Sandy CLAY (CL-CI): Low to medium plasticity, pale grey-green mottled orange-brown; fine to medium grained sand, sub-angular to sub-rounded, mafic.	RS	Hd	20 60 200 600 2000	NA	NA	NA																						
							...with silty pockets																												
HQ3	OPEN HOLE	NR	-15.0	21.0	4		SANDSTONE: Fine grained, massive, pale grey mottled orange-brown, iron staining possible, predominantly silt matrix?.	MW	L-M		1	100 / 81	23	SPT 27/50mm N=R	SPT: HB; Recovered 80 mm																				
							...30mm thick clay seam											M																	
		NR	-16.0	22.0			SILTSTONE: Massive, pale grey, with slight dark grey laminations.	FR-SW	M-H			2	100 / 100		93	M M M M																			
							...increase in dark grey laminations																												
							NR	-17.0	23.0									...23.85-24.12m: highly fractured, iron staining, possible calcite fluid interaction in seams, XW joints	MW	L-M		3	100 / 100	93	J, ~50°, Un, R, Cl, Co J, 0°, Ir, St, R, Un, calcite infill, 2-5 mm? J, 55°, Un, R, silt infill (XW calcite) and clay onfill, Cl J, 55°, Un, R, Co, 1 mm										
																			FR	H															
																			NR	-17.5							23.5								B, Pl, R-S, Cl, 1 mm
							NR	-18.5	24.5																										
																									NR	-19.0	25.0								

BOREHOLE LOG



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BOREHOLE: **BH-02**

SHEET: 6 OF 6

CLIENT: **Australian Industrial Energy**
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Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	NR		19.5 25.5 20.0	4		SILTSTONE: Massive, blue-grey. ...30mm thick clay seam	FR MW-SW	H L		4	100 / 93	74		B, Pl, R-S, Cl, 1 mm B, Pl, R-S, Cl, 1 mm B 25.52-25.77m: M/B, 0°, R, Cl, Fi, 1-2mm
				26.0 20.5 26.5 21.0 27.0 21.5 27.5 22.0 28.0 22.5 28.5 23.0 29.0 23.5 29.5 24.0 30.0			End of BH-02 at 25.9m								

CORE PHOTOGRAPHS



WorleyParsons

BOREHOLE: **BH-02**

SHEET: 1 OF 1

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
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JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
DATE COMPLETED: **28.8.2018**
LOGGED BY: **BO**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	307002.6	Surface R.L.:	5.70mPKHD
Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184742.0	Ref. System:	GDA94 / MGA56



21.10 to 25.20 m



25.20 to 25.90 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-03**

SHEET: 1 OF 5

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
DATE COMPLETED: **29.8.2018**
LOGGED BY: **ACE**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307045.1 Surface R.L.: 6.17mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184756.6 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER	HWT	NA	6.0	0.5	FILL		FILL: Silty SAND: Fine to coarse grained, angular to sub-angular, coal fragments, quartz and rubble, black; silt, non-plastic; with gravel, (up to 30%), fine to medium grained, angular to sub-rounded; coal fragments, rubble and cemented sand.	Uc-Wk	VD	20 60 200 600 2000	NA	NA	NA	SPT 17,26,33 N=59	SPT: Recovered 450 mm
				1.0											
				1.5											
				2.0											
SOLID AUGER	HWT	NA	4.5	4.0	FILL		FILL: SAND: Fine to coarse grained, angular to sub-angular, quartz, minor lithics and coal, pale brown; trace brown sandy clay nodules, high plasticity; trace gravel, fine to medium grained, angular to sub-angular; coal and iron cemented sand nodules; trace fines; trace calcareous fragments.	Uc	MD	20 60 200 600 2000	NA	NA	NA	SPT 4,6,11 N=17	SPT: Recovered 450 mm
				2.5											
				3.0											
				3.5											
SOLID AUGER	HWT	NA	3.0	2.5	FILL		...from 3.5 m, medium to coarse grained, sub-angular to sub-rounded, pale orange-brown; no gravel; no clay nodules				NA	NA	NA	SPT 2,4,7 N=11	SPT: Recovered 450 mm
				2.0			...at 3.8 m, thin (3-5 mm) coal laminations; with gravel, fine grained, sub-angular; with clayey fines								
				1.5											
				1.0											
SOLID AUGER	HWT	NA	1.5	1.0	1A		SAND (SP): Medium to coarse grained, sub-angular to rounded, quartz, lithics and minor calcareous fragments, pale orange-brown; trace fine gravel, coal fragments and lithics; trace fines.				NA	NA	NA		
				0.5											
				0.0											
				0.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-03**

SHEET: 2 OF 5

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **ACE**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307045.1 Surface R.L.: 6.17mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184756.6 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER				1.0			SAND (SP): Medium to coarse grained, sub-angular to rounded, quartz, lithics and minor calcareous fragments, pale orange-brown; trace fine gravel, coal fragments and lithics; trace fines.	Uc	D	20				SPT 8,21,23 N=44	SPT: Recovered 450 mm
				5.5						60					Approximately ground water level, bottom of SPT wet
				0.5						200					
				6.0						600					
				0.0						2000					
				6.5			...from 6.5 m, angular to sub-rounded, pale brown, with calcareous fragments		MD						
				-0.5										SPT 2,3,12 N=15	Low N value assumed to be because of cave-in / blowing sands
				7.0											SPT: Recovered 150 mm
				-1.0											
				7.5	1A						NA	NA	NA		
				-1.5											
				8.0										SPT 2,6,16 N=22	No recovery from SPT, advised drilling to use sample catcher in sand
				-2.0											SPT: No Recovery
				8.5											Driller notes problem with drill mud circulation
				-2.5											
				9.0											
				-3.0											
				9.5			...from 9.5 m, overall coarser grain size; with gravel, fine to medium grained, angular to rounded							SPT 4,9,9 N=18	SPT: Recovered 300 mm
				-3.5			...from 9.65-9.75 m, Gravelly Sand layer; coarse grained, angular to rounded, quartz, lithics and calcareous fragments, pale brown; gravel, fine to medium grained, angular to rounded, quartz, lithics and calcareous fragments, trace fines								
				10.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-03**

SHEET: 3 OF 5

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
DATE COMPLETED: **29.8.2018**
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Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184756.6 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
WASH BORE	HWT	NA		4.0	1A		SAND (SP): Medium to coarse grained, sub-angular to rounded, quartz, lithics and minor calcareous fragments, pale orange-brown; trace fine gravel, coal fragments and lithics; trace fines.	Uc	MD	20 60 200 600 2000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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				11.0	1B		SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, minor lithics, pale brown; trace fines.		VD							20 60 200 600 2000							SPT 6,20,50 N=70	Contact between calcareous sand and underlying quartz sand uncertain																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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				12.5			SAND (SP): Medium to coarse grained, angular to rounded, lithics, calcareous fragments, pale brown; trace grey mottles, with gravel, fine to medium grained, angular to rounded, lithics & calcareous fragments (bivalves and brachiopods); trace fines.		D															20 60 200 600 2000							SPT 5,10,20 N=30	SPT performed at 12.5m: invalid result (N=0) inferred as cave-in, low confidence in drilling; redo SPT at 13.0 m																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-03**

SHEET: 4 OF 5

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
DATE COMPLETED: **29.8.2018**
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Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307045.1 Surface R.L.: 6.17mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184756.6 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description		
WASH BORE	NA	NA	-9.0		1B		SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, minor lithics, orange-brown; with clay.	Uc	MD	20					U75	U75: unable to push, used SPT hammer to advance; full recovery SAND	
			15.5			...from 15.5 m, trace fine gravel, angular to rounded, lithics and quartz											
			-9.5														
			16.0	2		CLAY (CI-CH): Medium to high plasticity, green-grey; with sand, fine to medium grained, angular to sub-rounded, quartz and calcareous fragments; trace orange-brown mottling.		F						SPT 4.4.3 N=7	SPT: Recovered 420 mm		
HQ3	NR	20	-10.0				Sandy CLAY (CI-CH): Medium to high plasticity, green-grey, mottled brown (iron oxide), speckled white; sand, fine to medium grained, angular to sub-rounded, quartz and other (white, soft, calcite?); rock fabric visible in parts.	RS	Vst-Hd							Driller noted harder wash boring, recovered residual clay on wash boring bit	
			16.5														
			-10.5														
			17.0														
			-11.0		CL				CL						SPT 30/50 N=R	SPT: Recovered 50 mm Switched to coring	
			17.5				Silty SANDSTONE: Fine grained, quartz, brown streaked pale brown, orange-brown-grey, bedded and laminated; fractured along bedding planes and joints, with silt (up to 50%).	HW-MW	L							B, 10°, St/Pl, S/R, Cl, 1-2 mm	
			-11.5														M
			18.0														B, 10°, Pl/St, R, Cl, >1 mm
			-12.0														M
			18.5														B, 20°, Pl/Un, S-R, Co
			-12.5														18.2-18.44 m: Intersecting joints and parting, SH, 25°, St-Pl, S-R, (o/clay)
OPEN HOLE	NR	80	19.0		4											M	
			-13.0													M	
			19.5				SILTSTONE: Fine grained, brown, pale brown, grey to orange-brown (streaked), bedded and laminated; fractured along joints and bedding planes; with sand; fine gravel, sub-angular to sub-rounded, quartz.								Gradual transition from sandstone to siltstone		
			-13.5													B, 0°, Un, R, Co	
			20.0													B, 0°, Un, R, Co	
																B, 0°, St, Un, S, Fe, Co	
																B, St/Un, R, Co, iron stain	
																B, St/Un, R, Co, iron stain	
																B, St/Un, R, Co, iron stain	
																B, St/Un, R, Co, iron stain	
														J, 50°, Pl/St, S/R, Co			
														19.71-19.76 m: XW seam, SH, gravel infill			
														J, Sv, Pl/St, R, Co (oxidised), intersects J at 19.98m			
														J, Sv, Pl/St, R, Co (oxidised)			

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-03**

SHEET: 5 OF 5

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

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REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307045.1 Surface R.L.: 6.17mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184756.6 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	80	-14.0	20.5	4		SILTSTONE: Fine grained, brown, pale brown, grey to orange-brown (streaked), bedded and laminated; fractured along joints and bedding planes; with sand; fine gravel, sub-angular to sub-rounded, quartz.	HW-MW	M	20 60 200 600 2000	3	100 / 91	28		intersects J at 19.85m 20.0-20.2 m: Sv, 45°, Pl/St, S, R, Co (iron oxide) B, 0°, Un/St, R, Fe, Fi, 1-2 mm B, 0°, Un/St, R, Fe, Fi, 1-2 mm B, 0°, Un/St, R, Fe, Fi, 1-2 mm J, 45°, Un, R, Co, 1 mm B, 0°, Un/St, R, Fe, Co 20.7-20.87 m: XW
		20	-14.5	21.0			...XW gravelly infill; fragmented core and high plasticity clay	XW-HW	VL-L						M
			-15.0	21.5				HW	M-H						M
			-15.5	22.0				MW			4	100 / 100	70		J, 0°, Pl/St, S, Cl, 1 mm J, 20°, St, St/Un, R, Co, 1 mm J, 50°, St, R, Co, 1 mm J, 0°, Pl, R, Cl, 1 mm J, 40°, Ir, R, Co, 1 mm; intersecting J, Un/St, 55°, R, Co, Cl, 1 mm J, 0°, St/Ir, R, Un, 1 mm J, 20°, Pl, S/R, Co, 1 mm J, 15°, Pl, S/R, Co, 1 mm J, 15°, Pl, S/R, Co, 1 mm M J, 0°, Pl/St, Sd, Co, 1-2 mm B, 10°, Ir, Co-Co, 1 mm
			-16.0				End of BH-03 at 22.15m								
			-16.5	22.5											
			-17.0	23.0											
			-17.5	23.5											
			-18.0	24.0											
			-18.5	24.5											
			-19.0	25.0											

CORE PHOTOGRAPHS



WorleyParsons

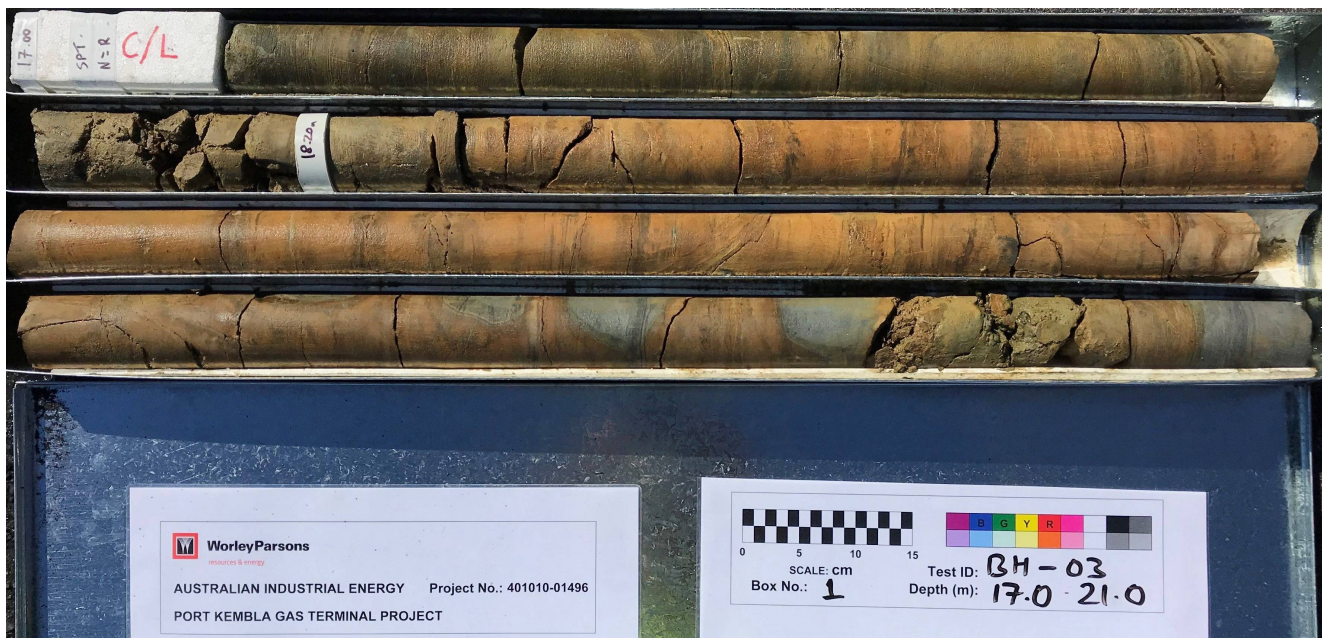
BOREHOLE: **BH-03**

SHEET: 1 OF 1

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **27.8.2018**
DATE COMPLETED: **29.8.2018**
LOGGED BY: **ACE**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	307045.1	Surface R.L.:	6.17mPKHD
Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184756.6	Ref. System:	GDA94 / MGA56



17.00 to 21.00 m



21.00 to 22.15 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-04**

SHEET: 1 OF 6

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
 DATE COMPLETED: **31.8.2018**
 LOGGED BY: **BO/DO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306960.9 Surface R.L.: 4.74mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184780.4 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER	HWT	NA	NA	4.5	FILL		FILL: Gravelly SAND: Fine to medium grained, sub-angular to rounded, quartz, lithic fragments, coal fines, slag; fine to coarse gravel, sub-angular to angular, slag, lithic fragments (mafic).	Uc	D	20	NA	NA	NA		
				0.5			...becoming less gravelly, trace shell fragments			60					
				4.0			FILL: SAND: Fine to medium grained, sub-angular to rounded, quartz, dark brown; trace gravel, lithic fragments, angular, up to 30 mm.		MD	200					
				1.0			FILL: SAND: Fine to medium grained, sub-angular to rounded, quartz, pale brown, pale grey; trace gravel, fine to medium grained, angular lithics (mafic); trace shell fragments.			600					
				3.5					VL	2000					
				1.5											
				3.0											
				2.0			FILL: SAND: Fine to medium grained, sub-angular to rounded, quartz, some lithics (mafic), pale brown to pale grey; trace gravel, fine to coarse grained, sub-angular to angular, slag.								
				2.5											
				2.0											
				3.0											
				1.5											
				3.5											
				1.0			FILL: SAND: Fine to medium grained, sub-angular to rounded, quartz, some coal fragments and carbonate, pale to dark grey mottled pale orange-brown; trace gravel of coal up to 10 mm; trace silt.								
				4.0											
				0.5											
				4.5											
				0.0											
				5.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-04**

SHEET: 2 OF 6

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
 DATE COMPLETED: **31.8.2018**
 LOGGED BY: **BO/DO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306960.9 Surface R.L.: 4.74mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184780.4 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description		
WASH BORE	HWT	NA		-0.5	1A		SAND (SW): Fine to coarse grained, sub-angular to rounded, quartz, some carbonate and lithic fragments, yellow-pale brown; trace fine gravel of shell fragments.	Uc	MD	20	NA	NA	NA		Casing at 5.0 m		
			60														
			200														
			600														
			2000														
				5.5	...becoming pale brown-orange												
				-1.0													
				6.0													
				-1.5											SPT 6,10,11 N=21	SPT: Recovered 350 mm	
				6.5													
				-2.0													
				7.0													
				-2.5												SPT 3,8,9 N=17	SPT: Recovered 350 mm
				7.5													
				-3.0													
				8.0													
				-3.5													
				8.5													
				-4.0													
				9.0													
	-4.5																
	9.5																
	-5.0																
	10.0																

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-04**

SHEET: 3 OF 6

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
 DATE COMPLETED: **31.8.2018**
 LOGGED BY: **BO/DO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306960.9 Surface R.L.: 4.74mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184780.4 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description									
WASH BORE	HWT	NA	-5.5		1B		SAND (SP): Fine to medium grained, sub-rounded to rounded; quartz, trace carbonate / feldspar and lithic fragments, pale grey-yellow, trace silt.	Uc	MD	20					SPT 7,10,16 N=26	SPT: Recovered 330 mm								
			60																					
			200																					
			600																					
			2000																					
			10.5																					
			-6.0																					
			11.0				...pale grey																	
			-6.5																					
			11.5																					
-7.0																								
12.0		...at 11.85 m, silt pocket, 10 mm in diameter											SPT 10,20,25 N=45	SPT: Recovered 400 mm										
-7.5																								
12.5																								
-8.0																								
13.0																								
-8.5																								
13.5														SPT 15,23,30 N=53										
-9.0																								
14.0																								
-9.5							Clayey SAND (SC): Fine to medium grained, sub-rounded to rounded, quartz, orange-brown; low plasticity clay.																	
14.5															SPT: Advanced from 14.50 to 15.15m with single blow									
-10.0							Sandy CLAY (CI): Medium plasticity, dark grey, fine to medium grained sand, sub-rounded, quartz.		VS															
15.0				2			...at 14.85 m, 20 mm thick silty sand seam								SPT 1,0,0 N=0	SPT: Recovered 650 mm								

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-04**

SHEET: 4 OF 6

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
DATE COMPLETED: **31.8.2018**
LOGGED BY: **BO/DO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306960.9 Surface R.L.: 4.74mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184780.4 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description						
WASH BORE	HWT	NA		-10.5	2		CLAY (CI-CH): Medium to high plasticity, dark grey; trace fine grained sand.	Uc	VS						Casing advanced to 15.2 m						
				15.5											U75: Recovered 400mm PP at 15.7m: ~0.6, 0.5, 0.4 kg/cm^2						
				-11.0											HSV: ~29 (Pk)						
				16.0																	
				-11.5			Sandy CLAY (CI): Medium plasticity, dark grey, fine to medium grained sand, sub-rounded, quartz; trace decomposing rootlets to ~10 mm diameter, locally tending to low to medium plasticity sandy clay and increase in sand content in lenses up to ~150 mm thick.		F												
				16.5																	
				-12.0											SPT 2,2,5 N=7						
				17.0																	
				-12.5																	
				17.5																	
				-13.0											SPT 3,4,7 N=11						
				18.0																	
				-13.5																	
				18.5																	
HQ3	7			-14.0	3		Sandy CLAY (CI): Medium plasticity, pale grey-green mottled brown; fine to medium grained sand, sub-angular to sub-rounded, quartz.	RS	VSt												
				19.0																	
				-14.5											SPT 11,13,15/60 N=R						
				19.5											SPT: HB						
				-15.0			Silty SANDSTONE: Fine grained sand, sub-angular to sub-rounded, quartz, brown, silty matrix; with elongate calcite? crystals to ~20 mm length; with pale grey sandy clay seam to 15 mm thick to 19.5 m.		HW						Change to HQ3 coring						
HQ3	7				4		Sandy CLAY (CI): Medium plasticity, brown, some pale grey lenses; fine grained sand, sub-angular to sub-rounded, quartz.	HW-MW	L												
HQ3	7				4		Silty SANDSTONE: See below.	XW	Vst												
HQ3	7				4		Silty SANDSTONE: See below.	HW-MW	L												

BOREHOLE LOG



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BOREHOLE: **BH-04**

SHEET: 5 OF 6

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
DATE COMPLETED: **31.8.2018**
LOGGED BY: **BO/DO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306960.9 Surface R.L.: 4.74mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184780.4 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description									
HQ3	OPEN HOLE	7	-15.5	20.5	CL		Silty SANDSTONE: Fine grained, sub-angular to sub-rounded, quartz, brown, silty matrix; with elongated calcite? crystals to ~20 mm length; potentially with cross cutting sandy clay seams up to ~50 mm thick below 20.05 m.	HW-MW	L	20	1	61 / 31	13		J, 10°, Un, SR, Cl, Sd, Fi, 2 mm									
							CL	CL																
							XW-HW	Hd-VL																
							12	-16.0	21.0						Silty SANDSTONE: Fine grained sand, some medium grained, sub-angular to sub-rounded, quartz, brown, trace pale grey lenses; silty matrix, with frequent seams of silty sand with clay to ~70 mm (low plasticity) to 21.35 m.	HW-MW	VL-L		2	100 / 37	10	J, 35°, Un, R, Fe, Sd, Cl, Co		
															MW	L						B, 5-15°, Un, SR-R, Fe, Sd, Co		
															HW	VL-L						B, 5-15°, Un, SR-R, Fe, Sd, Co		
															MW	L						B, 5-15°, Un, SR-R, Fe, Sd, Co		
															XW	St						B, 5-15°, Un, SR-R, Fe, Sd, Co		
		HW	VL-L																					
		MW-SW	M			B, 5-15°, Un, R, Fe, Sd, Co																		
		MW	L			B, 5-15°, Un, R, Fe, Sd, Co																		
		HW	VL			B, 5-15°, Un, R, Fe, Sd, Co																		
		MW-SW	M																					
		25	-17.5	22.5		SANDSTONE: Fine to medium grained, sub-angular to sub-rounded, quartz, some lithics, grey; with some subhorizontal lenticular dark grey mudstone bands to ~1mm thick. ...22.3-22.4m, 22.6-22.7m, 22.85-22.95m and 23.25-23.35m: Brown, iron-stained, with frequent soil seams to ~15 mm thick, highly fractured	HW	VL-L		3	100 / 83	53	B, 5, Un, SR, Fe, Sd, Cl, Co, stained brown 15mm either side of defect											
						MW-SW	M																	
						MW	L																	
						HW	VL																	
						MW-SW	M																	
						HW	VL																	
						MW	L-M																	
						HW	VL																	
						SW	M-H																	
						HW	VL																	
		NR	-18.5	23.5		...22.95-23.15 m: Fine to coarse grained sand, quartz and some lithic	HW	VL		4	100 / 98	93	J, 30°, Un, SR, Sd, Si, Fi, 20mm											
						SW	M-H						J, 0°, Un, R, Sd, Si, Co											
						HW	VL						J, 30°, Un, R, Su											
						SW	M						All defects below 24.42 m are mechanical, caused when core was broken to fit in tray											
						SW-FR	H																	
		</																						

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-04**

SHEET: 6 OF 6

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
DATE COMPLETED: **31.8.2018**
LOGGED BY: **BO/DO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306960.9 Surface R.L.: 4.74mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184780.4 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	NR	-20.5	25.5	4		SANDSTONE: Fine to medium grained sand, sub-angular to sub-rounded, quartz, some lithics, grey, with some dark grey subhorizontal lenticular bands of mudstone up to ~1 mm thick, locally trace to with fine gravel in seams up to 50 mm thick.	SW-FR	H	20 60 200 600 2000	4	100 / 98	93		
			-21.0	26.0			End of BH-04 at 25.6m								
			-21.5	26.5											
			-22.0	27.0											
			-22.5	27.5											
			-23.0	28.0											
			-23.5	28.5											
			-24.0	29.0											
			-24.5	29.5											
			-25.0	30.0											

CORE PHOTOGRAPHS



WorleyParsons

BOREHOLE: **BH-04**

SHEET: 1 OF 1

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
DATE COMPLETED: **31.8.2018**
LOGGED BY: **BO/DO**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	306960.9	Surface R.L.:	4.74mPKHD
Drill Model:	Hydrapower Scout 300	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184780.4	Ref. System:	GDA94 / MGA56



19.36 to 23.35 m



23.35 to 25.60 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-05**

SHEET: 1 OF 6

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **RG/ACE**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306982.4 Surface R.L.: 6.06mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184841.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER	HWT	NA	6.0		FILL		FILL: Sandy GRAVEL: Fine to coarse grained, sub-angular to angular, basalt/dolerite, grey; sand, fine to medium grained, sub-angular to angular, lithics; with silt.	Uc	VD						Roadbase material from surface to 0.65m
			5.5	0.5			FILL: Sandy GRAVEL: Fine to coarse grained, sub-angular to angular, slag/coal, dark grey; sand, fine to coarse grained, sub-angular to angular, slag; with silt.							SPT 28,25/60 N=R	SPT: HB; Recovered 210 mm
			5.0	1.0			FILL: SAND: Fine to medium grained, sub-rounded to sub-angular, quartz, grey-brown; trace gravel, fine grained, sub-angular to angular, slag; trace clay lumps (10 mm), yellow-brown, grey.		MD						- boundary inferred from drilling conditions
			4.5	1.5											
			4.0	2.0											
			3.5	2.5							NA	NA	NA	SPT 1,3,7 N=10	SPT: Recovered 450 mm
			3.0	3.0					L						
			2.5	3.5			...with fine to medium gravel; trace shell fragments								
			2.0	4.0										SPT 1,2,6 N=8	SPT: Recovered 450 mm
			1.5	4.5											

BOREHOLE: **BH-05**

SHEET: 2 OF 6

CLIENT:	<i>Australian Industrial Energy</i>
PROJECT:	<i>Port Kembla Gas Terminal Project</i>
LOCATION:	<i>Port Kembla, NSW</i>
JOB NUMBER:	<i>401010-01496</i>

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **RG/ACE**
REVISION: **0**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	306982.4	Surface R.L.:	6.06mPKHD
Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184841.2	Ref. System:	GDA94 / MGA56

[illegible]

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-05**

SHEET: 3 OF 6

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
 DATE COMPLETED: **24.8.2018**
 LOGGED BY: **RG/ACE**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306982.4 Surface R.L.: 6.06mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184841.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description				
WASH BORE	OPEN HOLE	NA	-4.0		1B		SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, dark brown, with fines.	Uc	D-VD	20	NA	NA	NA		P75	SPT: Recovered 450 mm			
			60																
			200																
			600																
			2000																
			-4.5	10.5															
			-5.0	11.0															
			-5.5	11.5														SPT 16,23,27 N=50	
			-6.0	12.0															
			-6.5	12.5							SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, minor lithics, pale grey-brown; trace fines; trace fine gravel, lithics.	VD							
-7.0	13.0																		
-7.5	13.5														SPT 6,21,39 N=60				
-8.0	14.0																		
-8.5	14.5															SPT 3,14,42 N=56			
-9.0						...with dark green-grey streaks of clayey sand (up to 50 mm thick zone)													
-9.5						...pale-brown, trace black speckles, lithics													
-10.0																			
-10.5																			
-11.0																			
-11.5																			
-12.0																			
-12.5																			
-13.0																			
-13.5																			
-14.0																			
-14.5																			
-15.0																			

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-05**

SHEET: 4 OF 6

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **RG/ACE**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306982.4 Surface R.L.: 6.06mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184841.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
WASH BORE OPEN HOLE		NA		-9.0	1B		SAND (SP): Fine to medium grained, sub-angular to sub-rounded, quartz, minor lithics, pale brown to pale orange-brown; with clay; trace fine gravel, lithics.	Uc	MD	20 60 200 600 2000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-05**

SHEET: 5 OF 6

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **RG/ACE**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306982.4 Surface R.L.: 6.06mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184841.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	NA	NA	-14.0		2		CLAY (CH): High plasticity, grey mottled orange-brown; trace sand, fine grained. ...from 20.15 to 20.23 m, softer consistency	Uc	St		NA	NA	NA	SPT 6,5,7 N=12	SPT: Recovered 450 mm
			-14.5				...from 20.4 m, Sandy CLAY; high plasticity, grey mottled orange-brown; sand, fine to medium grained, sub-angular to sub-rounded, quartz								
			-15.0												
			-15.5												
OPEN HOLE	NA	NA	-16.0		3		Sandy CLAY (Cl): Medium plasticity, brown mottled grey and orange-brown, sand, fine to medium grained, angular to sub-rounded, quartz, trace weakly cemented clay.	RS	Hd		NA	NA	NA	U75	U75: Recovered 400 mm Bottom of U75 appeared of higher consistency, brown to orange-brown colour
			-16.5												
			-17.0												
			-17.5												
HQ3	7	50	-18.0		4		SILTSTONE: Fine grained, brown, stained orange-brown and pale brown-grey, laminated; with sand, fine to medium grained, angular to sub-angular, quartz. ...at 23.9 m: lenticular inclusion, pale grey-brown ...from 24.1 m: green-grey, streaked dark green-grey ...from 24.38 to 24.4 m, XW band, Sandy SILT, low to medium plasticity, grey mottled brown; sand, fine grained; trace gravel, fine to medium grained, angular to sub-angular, XW siltstone ...from 24.7-24.95 m: healed joints, iron oxide staining ...from 24.8 m, with fine to medium grained inclusions, rounded, cemented sand, lithics	CL	CL		NA	NA	NA	SPT 40,30/70mm N=R	Driller noted hard drilling SPT attempted at 23.0m. Refused at 23.22 - no sample retrieved Switched to HQ-3 - no core recovered during first run to 23.7m
			-18.5												
			-19.0												
			-19.5												
HQ3	50	50	-20.0		4			MW	M-H		2	67 / 67	20		B, 0°, Un & St, VR, Fi, 3-10 mm B, 0°, Pl/St, S, Co, 0-1 mm, platy B, 10°, Un, VR, Fi, 2-3 mm B, 30°, Un, VR, Fi, 1-3 mm B, 10°, Pl, S, XW S, closed B, 10°, Pl, S, XW S, closed M B B, 10°, Un, VR, Fi, 1-2 mm
			-20.5												
			-21.0												
			-21.5												
HQ3	50	50	-22.0		4			SW	H		3	100 / 85	78		
			-22.5												
			-23.0												
			-23.5												
HQ3	50	50	-24.0		4			HW	L-M						
			-24.5												
			-25.0												
			-25.5												

BOREHOLE: **BH-05**

SHEET: 6 OF 6

CLIENT:	<i>Australian Industrial Energy</i>
PROJECT:	<i>Port Kembla Gas Terminal Project</i>
LOCATION:	<i>Port Kembla, NSW</i>
JOB NUMBER:	<i>401010-01496</i>

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **RG/ACE**
REVISION: **0**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	306982.4	Surface R.L.:	6.06mPKHD
Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184841.2	Ref. System:	GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	50	-19.0	25.5	4		SILTSTONE: Fine grained, brown, stained orange-brown and pale brown-grey, laminated; with sand, fine to medium grained, angular to sub-angular, quartz. ...from 25.4-25.5 m: healed joints, iron stained ...from 25.55-25.84 m, calcite infilled joint ...at 26.25 m, coarse gravel inclusion (20 mm diameter), rounded, granite ...from 27.08 m: increased fine to medium-gravel sized inclusions ...from 28.2 m, increased sand content, fine sandstone to siltstone ...from 28.45 m, healed joint, calcite filled ...target depth; backfilled	SW-FR	H-VH	20 60 200 600 2000	3	100 / 85	78		B, 0°, St, VR, Fi, 1-3 mm B, 0°, St, VR, Fi, 1-3 mm J, 90°, Pl & St, S, Ca, Fi(1-5 mm) M J, 65°, Pl & St, S, Ca, Fi(1-5 mm) M M M M M J, 10°, Pl, R, Co, 2 mm M Note: Coreloss associated with core barrel seating issues. Core was re-drilled numerous times to attempt recovery. In the process, core was broken and lost. Only 1.2 m/2.2 m core recovered. uncertainty where recovered core is from.
			-19.5					-20.0	-20.5	-21.0	-21.5	-22.0	-22.5		
		NA	27.0	27.5	28.0	28.5	29.0	CL	CL		NA	NA	NR		
		NA	29.5	30.0			End of BH-05 at 29.4m	FR	H-VH						

CORE PHOTOGRAPHS



WorleyParsons

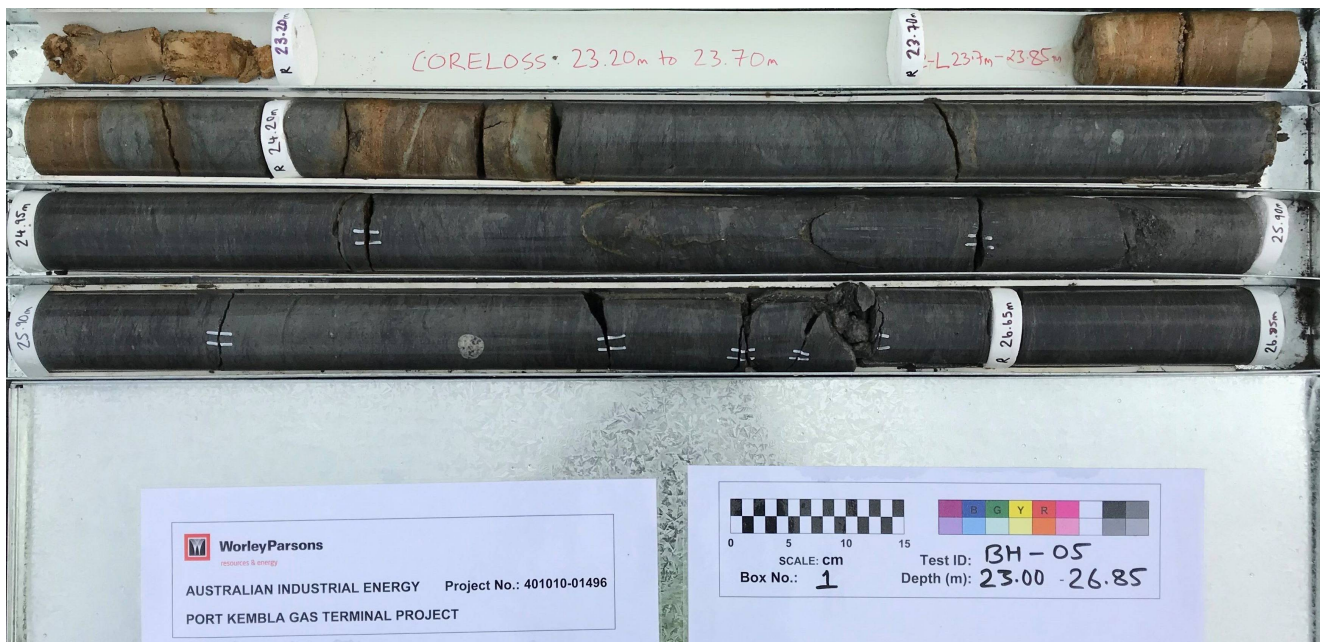
BOREHOLE: **BH-05**

SHEET: 1 OF 1

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **RG/ACE**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	306982.4	Surface R.L.:	6.06mPKHD
Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184841.2	Ref. System:	GDA94 / MGA56



23.00 to 26.85 m



26.85 to 29.40 m

BOREHOLE LOG



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BOREHOLE: **BH-06**

SHEET: 1 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **20.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307018.7 Surface R.L.: 5.98mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184958.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER	HWT	NA	5.5	0.5	FILL		FILL: Sandy GRAVEL: Fine to coarse grained, sub-angular to angular, basalt, grey; sand, fine to coarse grained, sub-angular to angular, basalt; with silt.	Uc	VD		NA	NA	NA	SPT 15/150mm N=R	SPT: Recovered 150mm SPT: HB
				1.0			FILL: Sandy GRAVEL: Fine to coarse grained, sub-angular to angular, slag, coal, dark grey; sand, fine to coarse grained, sub-angular to angular, slag, coal; with silt.								
				1.5			FILL: SAND: Fine to medium grained, sub-rounded to sub-angular, quartz, pale brown; trace gravel, fine to coarse grained, sub-rounded to sub-angular, slag, coal.								
			2.0	2.0	FILL			MD			NA	NA	NA	SPT 9,10,11 N=21	SPT: Recovered 450mm
WASH BORE	HWT	NA	2.5	2.5											
			3.0	3.0											
			3.5	3.5										SPT 4,6,10 N=16	SPT: Recovered 350mm
			4.0	4.0	1A			D							
			4.5	4.5			SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, shell fragments, pale orange-brown.								
			5.0	5.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-06**

SHEET: 2 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **20.8.2018**
DATE COMPLETED: **22.8.2018**
LOGGED BY: **BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307018.7 Surface R.L.: 5.98mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184958.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	HWT	NA		5.5	1A		SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, shell fragments, pale orange-brown.	Uc	D					SPT 6,16,21 N=37	SPT: Recovered 400mm
			0.5	6.0			...from 6.0m to 6.15m trace shell fragments							P75	P75: Recovered 600mm
			0.0	6.5			... sand becoming fine to coarse grained, sub-rounded to sub-angular, quartz, shell fragments; trace gravel, fine to medium grained, sub-rounded to sub-angular, quartz, shells							SPT 3,5,9 N=14	SPT: Recovered 450mm; Casing advanced to 6.7m after SPT
			-0.5	7.0			Gravelly SAND (SW): Fine to coarse grained, sub-rounded to sub-angular, quartz, lithics, pale orange-brown mottled pale grey; gravel, fine to medium grained, sub-rounded to sub-angular, quartz, lithics, shells (up to 8mm).								Casing advanced to 6.0m
			-1.0	7.5											
			-1.5	8.0			SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, lithics, pale brown mottled pale grey (shell fragments); trace gravel, fine to medium grained, sub-rounded, quartz.								
			-2.0	8.5										SPT 9,20,22 N=42	SPT: Recovered 320mm; Casing advanced to 8.0m after SPT
			-2.5	9.0											
			-3.0	9.5											Casing advanced to 9.3m
			-3.5	10.0										SPT 10,14,19 N=33	SPT: Recovered 400mm
				10.0	1B		SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, trace lithics, pale grey to pale yellow-brown.								

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-06**

SHEET: 3 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **20.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307018.7 Surface R.L.: 5.98mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184958.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	HWT	NA	-4.5	10.5	1B		SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, trace lithics, pale grey to pale yellow-brown.	Uc	D	20	NA	NA	NA		
			-5.0	11.0						60					
			-5.5	11.5			...trace dark grey speckling			200					
			-6.0	12.0						600					
			-6.5	12.5						2000					
			-7.0	13.0											
			-7.5	13.5			...from 13.0m, trace fines								
			-8.0	14.0											
			-8.5	14.5											
			-9.0	15.0											
							Sandy CLAY (CI): Medium to high plasticity, pale to dark grey mottled brown; sand, fine to medium grained, sub-rounded to sub-angular, quartz; trace organic rootlets.		St-VSt						

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-06**

SHEET: 4 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **20.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307018.7 Surface R.L.: 5.98mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184958.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description					
WASH BORE	HWT	NA	-9.5	15.5	2		Sandy CLAY (Cl): Medium to high plasticity, pale to dark grey mottled brown; sand, fine to medium grained, sub-rounded to sub-angular, quartz; trace organic rootlets.	Uc	St-VSt	20 60 200 600 2000					Casing advanced to 10m					
			-10.0	16.0																
	OPEN HOLE		-10.5	16.5			CLAY (CH): High plasticity, pale grey mottled dark brown; trace sand, fine grained, sub-rounded to sub-angular, quartz.	VSt	-11.0							17.0	SPT 3.6, 10 N=16	SPT: Recovered 450mm; Casing advanced to 15.5m after SPT		
			-11.5	17.5			SPT 5.8, 12 N=20													
			-12.0	18.0			Sandy CLAY (Cl): Medium plasticity, pale grey; sand, fine to medium grained, sub-rounded to sub-angular, quartz.		-12.5							18.5	SPT 0.8, 13 N=21		SPT: Recovered 450mm	
			-13.0	19.0			Sandy CLAY (Cl): Low to medium plasticity, pale brown; sand, fine to medium grained, sub-rounded to sub-angular, quartz.		-13.5							19.5				
			-14.0	20.0																
									3											RS

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-06**

SHEET: 5 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **20.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307018.7 Surface R.L.: 5.98mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184958.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE OPEN HOLE	NA	NA		-14.5	3		Sandy CLAY (CL-CI): Low to medium plasticity, grey; sand, fine to medium grained, sub-rounded to sub-angular, quartz.	RS	St-VSt	20 60 200 600 2000	NA	NA	NA	SPT 4,6,9 N=15	SPT: Recovered 400mm
				-15.0			20.5							Clayey SAND (SC): fine to medium grained, sub-rounded to sub-angular, quartz, yellow-brown; clay, medium plasticity; trace gravel, fine grained, quartz, lithics.	
				-15.5			21.0							Sandy CLAY (CL-CI): Low to medium plasticity, grey; sand, fine to medium grained, sub-rounded to sub-angular, quartz.	
				-16.0			21.5							...grey streaked yellow-brown patches (possible weathered lithics), no gravel	
				-16.5			22.0								
				-17.0			22.5								
				-17.5			23.0							...from 23.0m, medium plasticity, pale grey with yellow-brown mottled; trace inclusions of weathered lithics	
				-18.0			23.5								
				-18.5			24.0								
				-19.0			24.5							... pale grey to brown	
-19.0	25.0														

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-06**

SHEET: 6 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **20.8.2018**
DATE COMPLETED: **22.8.2018**
LOGGED BY: **BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307018.7 Surface R.L.: 5.98mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184958.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE															
OPEN HOLE															
					NA		Sandy CLAY (CL-CI): Low to medium plasticity, grey; sand, fine to medium grained, sub-rounded to sub-angular, quartz.	RS	VSt	20 60 200 600 2000				SPT 5,8,10 N=18	SPT: Recovered 400mm
							...from 26.5m, with gravel, fine to medium grained, sub-angular, lithics; pale grey mottled red-brown								
														SPT 6,11,10 N=21	SPT: Recovered 450mm
														SPT 12,18,29 N=47	SPT: Recovered 450mm
														SPT 32/110mm N=R	SPT: HB, Recovered 0.11m
															J,45°,Pl,R,Co (1mm)
														M	
														M	
														J,45°,Un,R,Co	
														J, 45°,St,R,Co (1mm)	
														M	
														M	
														M	
HQ3					NR		SILTSTONE: Fine grained, orange-brown mottled grey, laminated; with sand, quartz and mica.	HW	VL-L						
							...100mm band Sandy SILT, low to medium plasticity, brown mottled pale blue-grey; sand, fine to medium grained, sub-rounded to angular, quartz and minor mica; trace fine to medium gravel, sub-angular to angular, XW siltstone ...from 29.7m, pale grey streaked pale brown	RS	St						
								MW	M						
								CL	CL						
								MW	M						

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-06**

SHEET: 7 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **20.8.2018**
DATE COMPLETED: **22.8.2018**
LOGGED BY: **BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 307018.7 Surface R.L.: 5.98mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184958.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	NR	-24.5	30.5	4		SILTSTONE: Fine grained, pale grey streaked pale brown, laminated; with sand sized grains, quartz and mica. ...from 30.26m, with pale grey speckles; with dark grey laminations ...at 30.4m, orange-brown weathered joint	MW	M	20 60 200 600 2000	2	100 / 84	55		M B, 0°, Un, VR, Fi (1-10mm) B, 0°, Un, VR, Fi (1-10mm) B, 0°, Un, VR, Fi (1-10mm) B, 0°, Un, VR, Fi (1-10mm) J, 40°, Un, Sil/Pl, Fe, Fi (1-3mm) B, 20°, Un, VR, Co-Fi (0-2mm)
			-25.0	31.0			...at 30.65m, XW seam, orange-brown	SW-FR	H						M B, 20°, Sh, Vr, Fi (up to 20mm) infill XW rock Fe Staining
HQ3	OPEN HOLE	NR	-25.5	31.5	4		... with iron sulphide nodules				3	100 / 93	90		M J, 55°, St, R, Cl (1mm)
			-26.0	32.0			...increase in dark grey wavy laminations								M M
HQ3	OPEN HOLE	NR	-26.5	32.5	4										
			-27.0	33.0			End of BH-06 at 33m								
HQ3	OPEN HOLE	NR	-27.5	33.5	4										
			-28.0	34.0											
HQ3	OPEN HOLE	NR	-28.5	34.5	4										
			-29.0	35.0											

CORE PHOTOGRAPHS



WorleyParsons

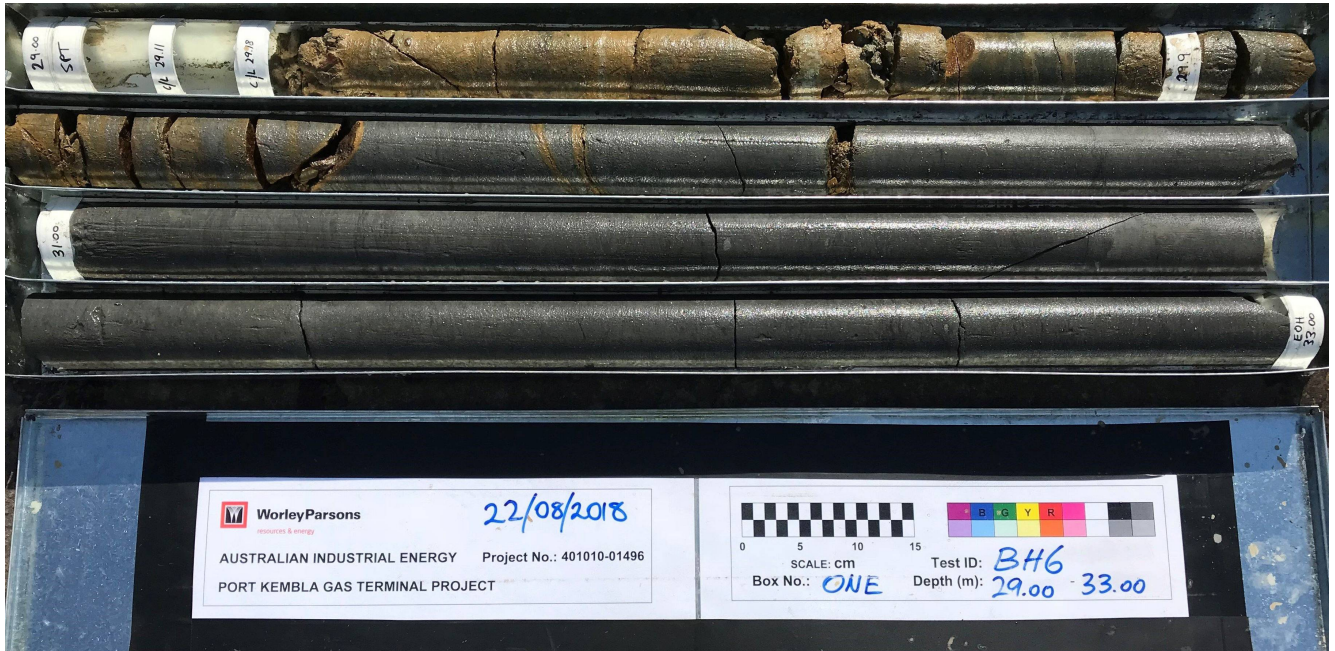
BOREHOLE: **BH-06**

SHEET: 1 OF 1

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **20.8.2018**
DATE COMPLETED: **22.8.2018**
LOGGED BY: **BO**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	307018.7	Surface R.L.:	5.98mPKHD
Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184958.1	Ref. System:	GDA94 / MGA56



29.00 to 33.00 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-08**

SHEET: 1 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **24.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **AK/ACE**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306972.5 Surface R.L.: 6.19mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184912.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description								
SOLID AUGER	HWT	NA		6.0	FILL		FILL: SAND: Fine to medium grained, sub-angular to sub-rounded, quartz; dark brown to brown, with lumps of clay up to 10 mm; trace fine to medium grained, angular to sub-angular gravel.	Uc	MD-D	20	NA	NA	NA		Bitumen/hard stand at surface								
				60																			
				200																			
				600																			
				2000																			
				0.5																			
				5.5																			
				1.0																			
				5.0			SPT 9,13,19 N=32		SPT: Recovered 350 mm														
				1.5																			
				4.5																			
				2.0			FILL: SAND: Fine to medium grained, sub-angular to sub-rounded, quartz, grey-brown; trace lumps of white high plasticity clay to 10 mm; trace shell fragments to 3mm; trace fine to medium sub-angular gravel.			MD													
				4.0																			
				2.5																			
				3.5																			
				3.0					SPT 5,7,8 N=15	SPT: Recovered 400 mm													
				3.0																			
				3.5																			
				2.5																			
				4.0																			
2.0	SPT 4,8,9 N=17	SPT: Recovered 400 mm																					
4.5																							
1.5																							
5.0	...brown and pale brown; trace fines (clay lumps no longer present)																						

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-08**

SHEET: 2 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **24.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **AK/ACE**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306972.5 Surface R.L.: 6.19mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184912.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER				1.0	FILL		FILL: SAND: Fine to medium grained, sub-angular to sub-rounded, quartz, grey-brown; with silt/clay; with shell fragments to 8 mm; trace fine grained, sub-angular lithic gravel; slight sulfurous odour.	Uc	L	20 60 200 600 2000					
				5.5											
				0.5										SPT 1,2,4 N=6	SPT: Recovered 350 mm
				6.0			SAND (SP): Fine to medium (predominantly medium), sub-rounded, quartz, minor mafics; pale brown; with shell fragments to 5 mm, trace fine sub-angular lithic gravel; trace fines.								Casing advanced to 5.5m
				0.0											
				6.5					D						
				-0.5											
				7.0											
				-1.0										SPT 10,16,20 N=36	SPT: Recovered 280 mm
				7.5							NA	NA	NA		
				-1.5											
				8.0	1A										
				-2.0											
				8.5											
				-2.5										SPT 10,16,26 N=42	SPT: Recovered 450 mm
				9.0											
				-3.0											
				9.5					MD						
				-3.5			SAND (SP): Fine to medium grained, sub-rounded, quartz, brown, trace/with silt; trace fines, sub-rounded quartz gravel; trace shell fragments up to 2 mm.								
				10.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-08**

SHEET: 3 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **24.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **AK/ACE**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306972.5 Surface R.L.: 6.19mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184912.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	HWT	NA		4.0	1A		SAND (SP): Fine to medium grained, sub-rounded, quartz, brown, trace/with silt; trace fines, sub-rounded quartz gravel; trace shell fragments up to 2 mm.	Uc	MD					SPT 7,11,11 N=22	SPT: Recovered 400 mm
				10.5											Casing advanced to 8.5 m
				4.5											
				11.0											
				5.0											
				11.5											1B
				5.5											
				12.0											
				6.0											
				12.5											
				6.5	SPT: Recovered 450 mm										
				13.0											
				7.0											
				13.5			...gravel is fine to coarse grained; trace shell fragments up to 8 mm	VD					SPT 1,2,9 N=11	SPT: Recovered 450 mm	
				7.5											
				14.0											
				8.0											
				14.5			...becoming yellow-brown						SPT 10,28,29 N=57	SPT: Recovered 450 mm	
				8.5											
				15.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-08**

SHEET: 4 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **24.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **AK/ACE**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306972.5 Surface R.L.: 6.19mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184912.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
										20 60 200 600 2000					
WASH BORE	HWT		-9.0		1B		SAND (SP): Fine to medium grained, sub-rounded, quartz, yellow-brown; trace fine to medium sub-angular to sub-rounded lithic gravel; trace shell fragments up to 2 mm, trace fines.	Uc	VD						Casing advanced to 11.0 m
			15.5												
			-9.5				CLAY (CH): High plasticity; dark grey; trace fine grained sand.		St						Casing advanced to 13.0 m
			16.0												
			-10.0											SPT 4,6,6 N=12	SPT: Recovered 450 mm
	NA		16.5												Casing advanced to 13.5 m
			-10.5											U75	U75: Recovered 400 mm HSV: 84 (Pk) / 54 (Res) PP: 2.2-2.4 kg/cm2
			17.0												
			-11.0				...grey to green-grey								
			17.5											SPT 4,6,7 N=13	SPT: Recovered 450 mm
OPEN HOLE			-11.5		2										Casing advanced to 17.0 m
			18.0												
			-12.0												
			18.5				CLAY (CI-CH): Medium to high plasticity; grey to green-grey, with fine grained, sub-angular to sub-rounded quartz sand.								
			-12.5											SPT 3,5,5 N=10	SPT: Recovered 450 mm
			19.0												
			-13.0												
			19.5												
			-13.5												
			20.0												

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-08**

SHEET: 5 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **24.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **AK/ACE**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306972.5 Surface R.L.: 6.19mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184912.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description						
WASH BORE OPEN HOLE NA			-14.0		3		CLAY (CI-CH): Medium to high plasticity, grey to green-grey with brown patches (iron oxide); trace fine grained, sub-angular to sub-rounded quartz sand; trace medium grained, sub-angular white sand (calcite).	RS	St	20											
			60																		
			200																		
			600																		
			2000																		
			20.5																		
			-14.5																		
			21.0																		
			-15.0																		
			21.5																		
-15.5																					
22.0																					
-16.0																					
22.5																					
-16.5																					
23.0																					
-17.0																					
23.5																					
-17.5																					
24.0																					
-18.0																					
24.5							...grey; with fine grained sand; rock fabric no longer evident		Hd												
-18.5																					
25.0																					

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-08**

SHEET: 6 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **24.8.2018**
DATE COMPLETED: **29.8.2018**
LOGGED BY: **AK/ACE**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306972.5 Surface R.L.: 6.19mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184912.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE		NA		-19.0	3		Silty CLAY (CI): Medium plasticity; grey; with fine grained sand.	RS	Hd	20	NA	NA	NA	SPT 8,10,14 N=24	SPT: Recovered 450 mm
				60			200			600				2000	
OPEN HOLE		NA		-19.5	3		...green-grey and brown; clayey gravel in places; gravel is fine to coarse (up to 40 mm), sub-rounded lithics, and XW sandstone								Driller notes harder ground from approximately 27.7 m
				-20.0											
				-20.5	3		Sandy SILT/CLAY (ML-CL): Low to medium plasticity, green-grey and brown (iron staining); fine grained, sub-rounded quartz sand; rock fabric evident in places.								
				-21.0											
				-21.5	3										
				-27.0											
				-27.5	3										
				-28.0											
HQ3		13		-22.0	4		SANDSTONE: Fine grained, pale grey to grey, streaked brown and orange-brown; bedded and laminated slightly fractured with iron oxide defects; with silt (~50%).	HW-MW	M		1	96 / 74	56	SPT 15/25mm N=R	SPT: HB; Recovered 25 mm B, 10°, Un/St, R, Fi, 1-2 mm
				-22.5											
				-23.0	4		...from 28.61 m, predominantly dark green-grey, speckled white, less iron oxide staining, fine to medium grained	MW	M-H						29.0-29.12 m: Crushed seam, SH, Un, R, clay fill, 12-18 mm B, 0°, Ir, R, Cl, Fi, 4-8mm
				-29.0											B, 0°, Ir, R, Cl, Fi, 4-8mm M
				-29.5	4			CL	CL						29.41-29.44 m: Broken during drilling
				-23.5											
				30.0	4			FR	H						

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-08**

SHEET: 7 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **24.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **AK/ACE**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306972.5 Surface R.L.: 6.19mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184912.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	26	-24.0	30.5	4		SILTSTONE: Fine grained, dark green-grey; very closely laminated, wavy; with sand, fine grained; trace gravel size inclusions, fine gravel size, sub-rounded to rounded, lithics.	FR	H	20 60 200 600 2000	2	100 / 100	100		M
		30	-24.5	31.0											
			-25.0	31.5											
			-25.5	32.0											
			-26.0	32.5											M
			-26.5								3	100 / 100	100		M
				33.0			End of BH-08 at 32.9m								
			-27.0	33.5											
			-27.5	34.0											
			-28.0	34.5											
			-28.5	35.0											

CORE PHOTOGRAPHS



WorleyParsons

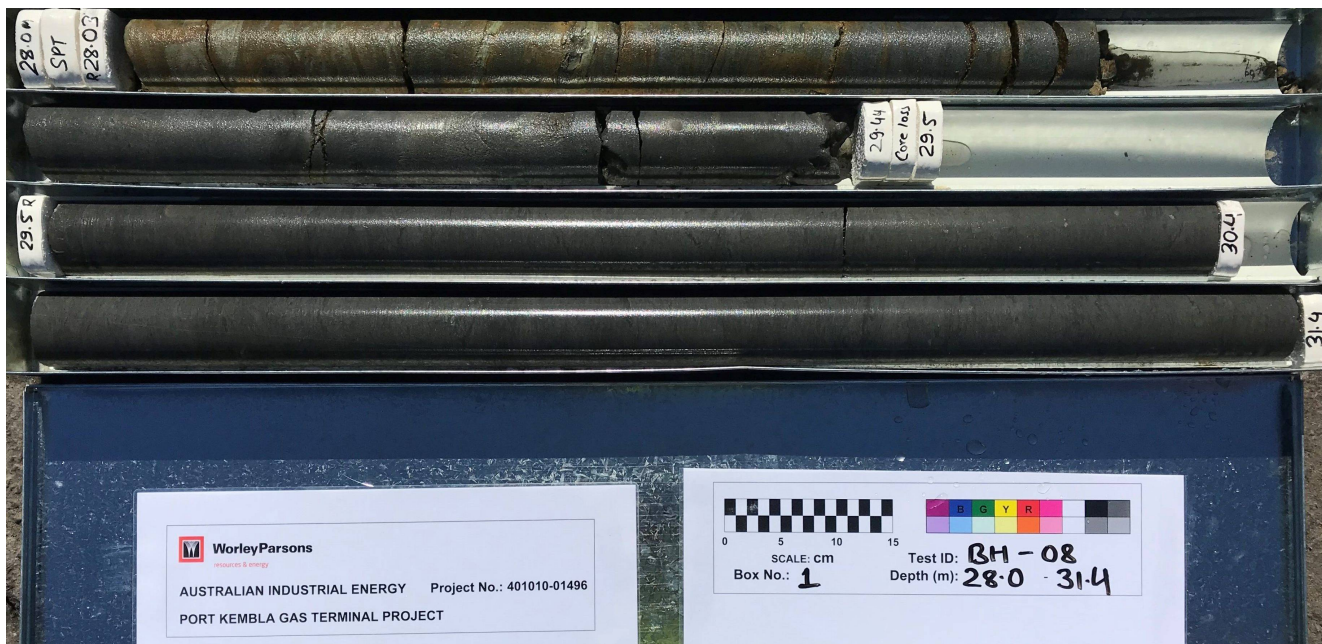
BOREHOLE: **BH-08**

SHEET: 1 OF 1

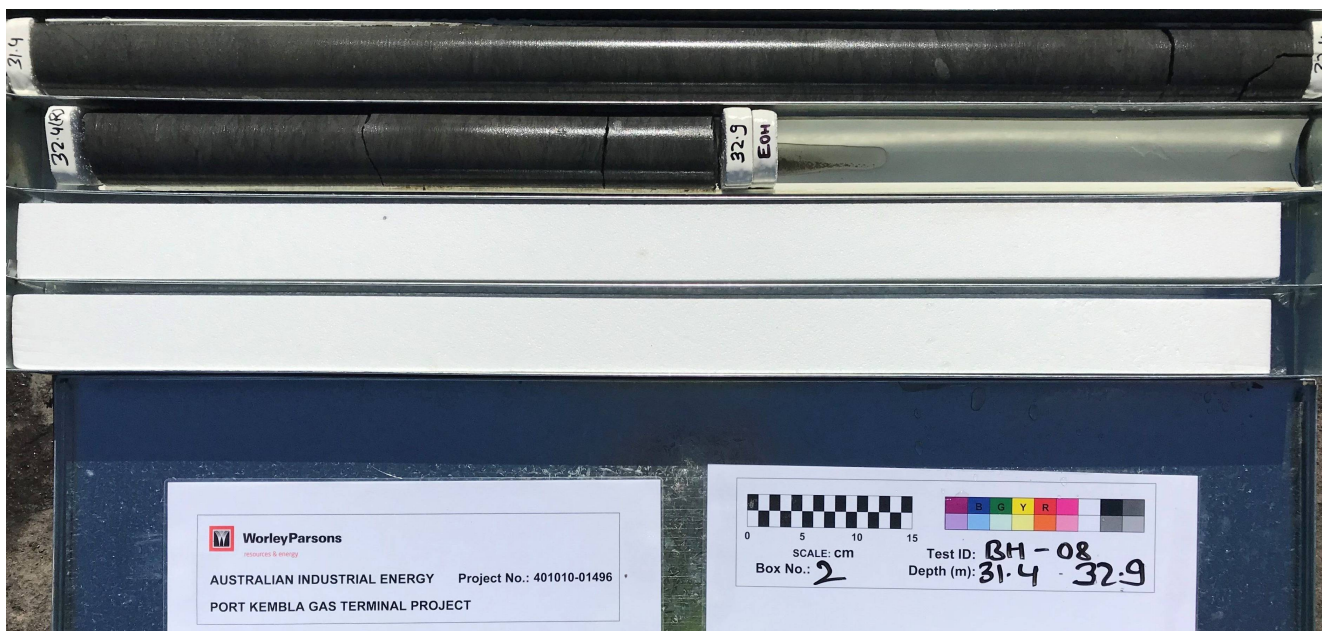
CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **24.8.2018**
DATE COMPLETED: **29.8.2018**
LOGGED BY: **AK/ACE**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	306972.5	Surface R.L.:	6.19mPKHD
Drill Model:	Hydrapower Scout 300	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184912.2	Ref. System:	GDA94 / MGA56



28.00 to 31.40 m



31.40 to 32.90 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-09**

SHEET: 1 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **ACE/BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306966.8 Surface R.L.: 5.99mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184953.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description		
SOLID AUGER	HWT	NA	5.5	0.5	FILL		FILL: SAND: Fine to medium grained, sub-angular to rounded, quartz, minor lithics, brown; with clay nodules, dark grey, medium to high plasticity; with gravel, fine to medium grained, sub-angular, construction rubble, minor shells; trace fines.	Uc	MD	20	NA	NA	NA	SPT 7,9,10 N=19	SPT: Recovered 450 mm		
			5.0	1.0			60										
			4.5	1.5			100										
			4.0	2.0			FILL: SAND: Fine to medium grained, sub-angular to sub-rounded, quartz and lithics, pale yellow-brown, speckled orange; with fines.			200				SPT 6,13,13 N=26	SPT: Recovered 450 mm		
			3.5	2.5						300							
			3.0	3.0						400							
			2.5	3.5						500							
			2.0	4.0						600				SPT 2,4,7 N=11	SPT: Recovered 450 mm		
			1.5	4.5						700							
			1.0	5.0			...pale brown with black speckling; with gravel, fine to medium grained, angular to sub-angular, shells; with black fines (organics/coal)			800							
										900							
										1000							
										1100							

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-09**

SHEET: 2 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **ACE/BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306966.8 Surface R.L.: 5.99mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184953.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER	HWT	NA	0.5	5.5	1A		SAND (SP): Medium to coarse grained, sub-angular to sub-rounded, quartz, lithics, minor shells, pale-brown; trace fines.	Uc	MD	20	NA	NA	NA	SPT 3,5,10 N=15	Casing advanced to 5.0 m
			0.0	6.0											
			-0.5	6.5											
			-1.0	7.0			...with shell fragments								
			-1.5	7.5											
			-2.0	8.0											
			-2.5	8.5											
			-3.0	9.0			SAND: Fine to medium grained, sub-rounded to sub-angular, quartz, minor lithics, dark brown; with gravel, medium to coarse grained, sub-rounded to rounded, up to 20 mm; angular; trace shells; possible iron oxide, slight clumping; very weakly cemented.		VD					SPT 12,22,24 N=46	SPT: Recovered 450 mm
			-3.5	9.5			1B							MD	
			-4.0	10.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-09**

SHEET: 3 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **ACE/BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306966.8 Surface R.L.: 5.99mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184953.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	OPEN HOLE	NA			1B		SAND (SP): Fine to medium grained, sub-angular to rounded, quartz, minor lithics, pale brown to pale grey; trace shell fragments, angular.	Uc	MD		NA	NA	NA	SPT 9,13,15 N=28	SPT: Recovered 400 mm
			-4.5	10.5										P75	P75: O Ring not put in tube, push not able to be recovered the full length, approximate sample from 10.5-10.8 m
			-5.0	11.0											
			-5.5	11.5			...trace dark grey speckling							SPT 3,6,8 N=14	SPT: Recovered 450 mm
			-6.0	12.0											Casing advanced to 11.2 m
			-6.5	12.5			SAND (SP): Fine to medium grained, sub-rounded to rounded quartz, minor lithics, pale grey-brown speckled dark green; with fines.								
			-7.0	13.0										SPT 3,6,7 N=13	SPT: Recovered 450 mm
			-7.5	13.5			...from 13.4m to 13.45m, Sandy CLAY layer								Casing advanced to 13.7 m
			-8.0	14.0											
			-8.5	14.5			...at 14.6 m, lens of sandy clay, medium plasticity, pale grey mottled, pale brown-orange, with black streaking (coal fines?)							SPT 8,13,15 N=28	SPT: Recovered 350 mm
			-9.0	15.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-09**

SHEET: 4 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
 DATE COMPLETED: **24.8.2018**
 LOGGED BY: **ACE/BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306966.8 Surface R.L.: 5.99mPKHD
 Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184953.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE OPEN HOLE	NA				1B		SAND (SP): Fine to medium grained, sub-rounded to rounded quartz, minor lithics, pale grey-brown speckled dark green; with fines.	Uc	MD	20	NA	NA	NA		
			-9.5	15.5						60					
							Sandy CLAY (CI-CH): medium plasticity, dark grey; sand, fine to medium grained, sub-angular to sub-rounded, quartz.			100					
			-10.0	16.0						200					
							...pale brown to dark grey			600					
			-10.5	16.5						2000					
														SPT 0.4,6 N=10	SPT: Recovered 450 mm
			-11.0	17.0											Casing advanced to 16.5 m
			-11.5	17.5			...low to medium plasticity; trace gravel.							U75	
			-12.0	18.0	2										
			-12.5	18.5											
			-13.0	19.0			...high plasticity, dark grey mottled orange-brown; trace sand, rounded to sub-rounded, pale orange-brown; trace organics (rootlets)							SPT 3,6,6 N=12	SPT: Recovered 450 mm
			-13.5	19.5											
			-14.0	20.0											

BOREHOLE LOG



WorleyParsons

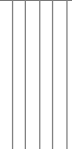
BOREHOLE: **BH-09**

SHEET: 5 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **ACE/BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306966.8 Surface R.L.: 5.99mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184953.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE OPEN HOLE	NA	NA	-14.5	20.5	3		CLAY (CL-CI): Low to medium plasticity, pale grey mottled orange-brown; with sand, fine to medium grained, sub-angular to sub-rounded, quartz, trace lithics or XW rock.	RS	St		NA	NA	NA	SPT 3,4,5 N=9	SPT: Recovered 450 mm
			-15.0	21.0											
			-15.5	21.5											
			-16.0	22.0											
			-16.5	22.5											
			-17.0	23.0											
			-17.5	23.5											
			-18.0	24.0											
			-18.5	24.5											
			-19.0	25.0											
						Sandy CLAY (SC): Low to medium plasticity, dark grey speckled pale grey; sand, fine to medium grained, angular to sub-rounded, quartz, pale in colour; trace organics (coal?).		S-F				SPT 2,4,5 N=9	SPT: Recovered 450 mm		
					...medium to high plasticity, dark grey speckled pale brown-grey; trace gravel, fine to medium grained, sub-rounded						SPT 2,1,3 N=4	SPT: Recovered 450 mm			

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-09**

SHEET: 6 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **ACE/BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306966.8 Surface R.L.: 5.99mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184953.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE															

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-09**

SHEET: 7 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **ACE/BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306966.8 Surface R.L.: 5.99mPKHD
Drill Model: Hydrapower Scout 300 Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6184953.2 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	10	-24.5	30.5	4		SILTSTONE: Fine grained, brown mottled grey and orange-brown, massive; with sand, fine grained, green-grey streaked dark green-grey.	MW	M	20 60 200 600 2000	2	100 / 94	70		J J M J J M
		10	-25.0	31.0			...from 30.9 m, increased sand content, fine to medium grained, angular to sub-angular, white, quartz	SW-FR	H						M
			-25.5	31.5				FR							J, 50°, St, R, Fi, 1-2 mm
			-26.0	32.0			...from 31.9-32.08 m, with white streaking, calcite				3	100 / 100	93		M M M
			-26.5	32.5											
			-27.0	33.0											M
			-27.5	33.5			End of BH-09 at 33.3m								M
			-28.0	34.0											
			-28.5	34.5											
			-29.0	35.0											

CORE PHOTOGRAPHS



WorleyParsons

BOREHOLE: **BH-09**

SHEET: 1 OF 1

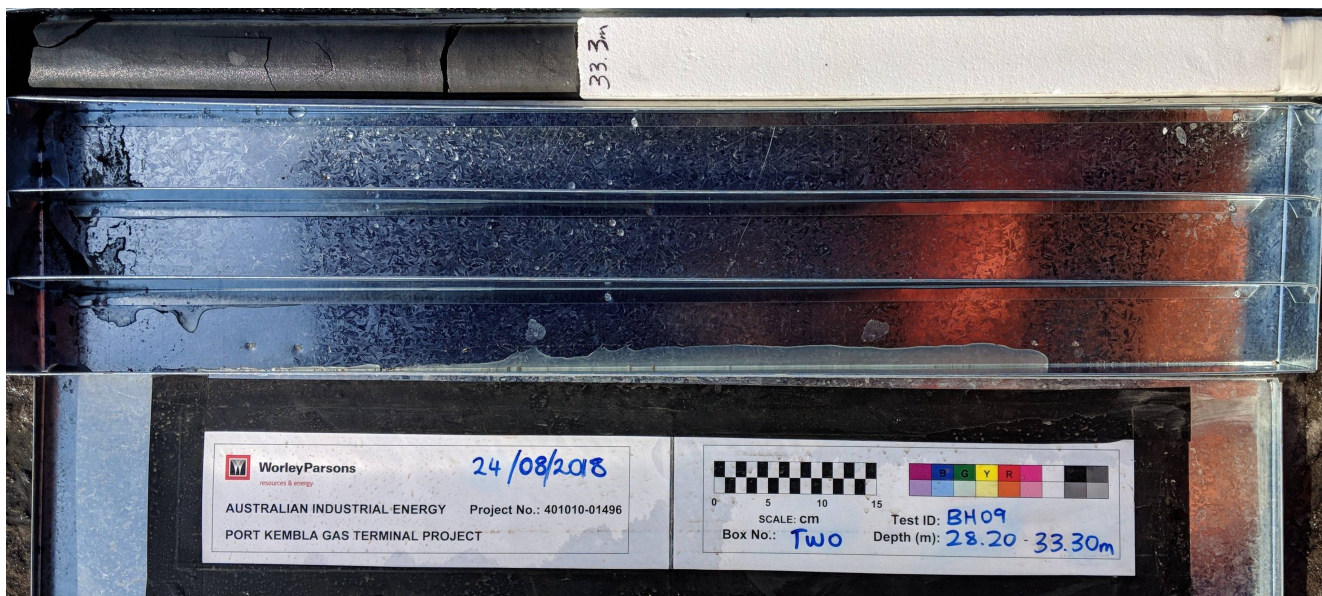
CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **22.8.2018**
DATE COMPLETED: **24.8.2018**
LOGGED BY: **ACE/BO**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	306966.8	Surface R.L.:	5.99mPKHD
Drill Model:	Hydrapower Scout 300	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6184953.2	Ref. System:	GDA94 / MGA56



28.20 to 32.90 m



32.90 to 33.30 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 1 OF 8

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306985.3 Surface R.L.: 6.08mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185030.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER				6.0	FILL		FILL: Sandy GRAVEL: Fine to coarse grained, sub-angular to angular, slag and coal; sand, fine to medium grained, sub-angular to angular, coal and slag; with silt; dark grey.	Uc	D	20 60 200 600 2000					
				0.5											
WASH BORE	HWT	NA		1.0	FILL				MD					SPT 8,15,16 N=31	SPT: No Recovery, shoe lost
				1.5											
WASH BORE				2.0	FILL		FILL: SAND: Fine to medium grained, sub-rounded to sub-angular, quartz, shell fragments, pale grey-brown.								
				2.5			... with gravel, fine to medium grained, sub-rounded, slag, dark brown ... becoming pale grey-brown, no gravel								
WASH BORE				3.0	FILL									SPT 6,9,10 N=19	Possible collapsed material SPT: Recovered 350mm. Sample split: 2.5m-2.7m and 2.7-2.85m
				3.5											
WASH BORE				4.0	FILL		FILL: Silty SAND: Fine to medium grained, sub-rounded to sub-angular, quartz, shell fragments; silt, low plasticity, grey to dark grey; trace organics.								
				4.5											
WASH BORE				5.0	1A		SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, shell fragments, pale orange-brown.							SPT 6,8,13 N=21	SPT: Recovered 350mm; Sample split: 4.0-4.15m and 4.15-4.35m
				5.5											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 2 OF 8

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306985.3 Surface R.L.: 6.08mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185030.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	HWT	NA	1.0		1A		SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, shell fragments, pale orange-brown.	Uc	D	20	NA	NA	NA		
			5.5	...fine to coarse grained			60								
			0.5				100								
			6.0				200								
			0.0				300								
			6.5				400								
			-0.5				500								
			7.0	...trace gravel, fine grained, sub-rounded, quartz			MD		600						
			-1.0						700						
			7.5						800						
-1.5		1B		SAND (SW-SM): Fine to medium grained, sub-rounded to sub-angular, quartz, trace shells, dark brown; with silt.	Uc-Vwk		NA	NA	NA	SPT 7,14,17 N=31	SPT: Recovered 450mm				
8.0										1000					
-2.0										1100					
8.5										1200					
-2.5										1300					
										9.0			1400	SPT 4,7,8 N=15	SPT: Recovered 450mm
										-3.0			1500		
										9.5			1600		
										-3.5			1700		
										10.0			1800	SPT 8,15,15 N=30	SPT: Recovered 450mm; Brown iron-oxide cementing

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 3 OF 8

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306985.3 Surface R.L.: 6.08mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185030.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description	
WASH BORE	HWT	NA	-4.0		1B		SAND (SW-SM): Fine to medium grained, sub-rounded to sub-angular, quartz, trace shells, dark brown to brown; trace silt.	Uc-Vwk	MD	20				SPT 10,6,5 N=11	SPT: Recovered 400mm	
			10.5													
			-4.5													
			11.0													
			-5.0													
	OPEN HOLE		-5.5					SAND (SW): Fine to coarse grained, sub-rounded to sub-angular, quartz, shell fragments, pale orange-brown, trace gravel, fine grained, sub-rounded, quartz.	Uc						SPT 2,6,12 N=18	SPT: Recovered 450mm
			11.5													
			-6.0					SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, pale grey.								
			12.0													
			-6.5					SAND (SW): Fine to coarse grained, sub-rounded to sub-angular, quartz, shell fragments, pale orange-brown, trace gravel, fine grained, sub-rounded, quartz.		L					P75	P75: Recovered 500mm
-7.0					SAND (SP): Fine to medium grained, sub-rounded to sub-angular, quartz, pale grey.											
12.5																
-7.5																
13.0																
-8.0																
13.5																
-7.5																
14.0									MD					SPT 1,3,5 N=8	SPT: Recovered 350mm	
-8.0																
14.5																
-8.5																
15.0									S-F					SPT 3,2,9 N=11	SPT: Recovered 450mm	
-9.0																
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BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 4 OF 8

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306985.3 Surface R.L.: 6.08mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185030.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	OPEN HOLE	NA	-9.0		2		Sandy CLAY (CI): Medium plasticity, dark grey mottled yellow-brown; sand, fine to medium grained, sub-rounded to sub-angular, quartz.	Uc	S-F						
									VSt					P75	P75: Recovered 800mm (possibly compressed)
			-9.5												
			-10.0											SPT 6,10,11 N=21	SPT: Recovered 450mm
			-10.5												
			-11.0												
			-11.5		2		Sandy CLAY (CI): Medium plasticity, dark brown mottled grey-green; sand, fine to medium grained, sub-rounded to sub-angular, quartz; trace gravel, fine grained, sub-rounded to sub-angular, quartz and lithics.								
			-12.0												
			-12.5												
			-13.0												
			-13.5												
			-14.0		2		Sandy CLAY (CI): Medium plasticity, dark brown mottled grey-green; sand, fine to medium grained, sub-rounded to sub-angular, quartz; trace gravel, fine grained, sub-rounded to sub-angular, quartz and lithics.								
			-14.5												
			-15.0												
			-15.5												
			-16.0												
			-16.5		2		Sandy CLAY (CI): Medium plasticity, dark brown mottled grey-green; sand, fine to medium grained, sub-rounded to sub-angular, quartz; trace gravel, fine grained, sub-rounded to sub-angular, quartz and lithics.								
			-17.0												
			-17.5												
			-18.0												
			-18.5												
			-19.0		2		Sandy CLAY (CI): Medium plasticity, dark brown mottled grey-green; sand, fine to medium grained, sub-rounded to sub-angular, quartz; trace gravel, fine grained, sub-rounded to sub-angular, quartz and lithics.								
			-19.5												
			-20.0												
			-20.5												
			-21.0												

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 5 OF 8

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
DATE COMPLETED: **22.8.2018**
LOGGED BY: **RG**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306985.3 Surface R.L.: 6.08mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185030.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description			
WASH BORE OPEN HOLE NA		NA	-14.0		2		Sandy CLAY (CI-CH): Medium to high plasticity, grey; sand, fine to medium grained, sub-rounded to sub-angular, quartz.	Uc	VSt	20	NA	NA	NA					
			60															
			200															
			600															
			2000															
			20.5	-14.5						SPT 10,12,13 N=25						SPT: Recovered 450mm; End of SPT sample noted to be stiff		
			21.0	-15.0														
			21.5	-15.5						CLAY (CH): High plasticity, grey; trace sand, fine grained, sub-rounded to sub-angular, quartz.								
			22.0	-16.0														
			22.5	-16.5													SPT 8,12,15 N=27	SPT: Recovered 450mm
			23.0	-17.0														
			23.5	-17.5												...with sand		
			24.0	-18.0													SPT 6,8,9 N=17	SPT: Recovered 270mm; Result appears low, possibly due to softening overnight
			24.5	-18.5														
			25.0	-19.0														

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 6 OF 8

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
DATE COMPLETED: **22.8.2018**
LOGGED BY: **RG**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306985.3 Surface R.L.: 6.08mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185030.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	NR	NA	-19.0		2		CLAY (CH): High plasticity, grey; trace sand, fine grained, sub-rounded to sub-angular, quartz.	Uc	VSt					SPT 15,17,19 N=36	SPT: Recovered 450mm
			25.5				Sandy CLAY (CL-CI): Low to medium plasticity, dark brown mottled yellow-brown; sand, fine to coarse grained, sub-rounded to sub-angular, quartz, coal; trace gravel, fine grained, sub-rounded to sub-angular, quartz, lithics, coal.	RS							
			-19.5												
			26.0												
			-20.0												
			26.5				... with gravel, fine to medium grained, grey-brown mottled orange-brown							SPT 11,13,18 N=31	SPT: Recovered 450mm
			-20.5												
			27.0												
			-21.0												
			27.5		3										
			-21.5				Silty SAND (SM): Fine to medium grained, sub-rounded to sub-angular, quartz, yellow-brown mottled and banded grey green; low plasticity.		VD						
			28.0												
			-22.0												
			28.5											SPT 26,33,29 N=62	SPT: Recovered 450mm
			-22.5												
			29.0												
			-23.0												
			29.5												
			-23.5											SPT 49,18/30mm N=R	SPT: HB, Recovered 0.13m
			30.0		4		SILTSTONE: Fine to medium grained, blue-grey to yellow-brown, sub horizontal laminations.	HW	L		1	42 / 21	14		Iron-oxide staining M M J, 20, Un, SR, Sd, Co

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 7 OF 8

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
DATE COMPLETED: **22.8.2018**
LOGGED BY: **RG**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306985.3 Surface R.L.: 6.08mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185030.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	NR	-24.0		CL		SILTSTONE: Fine to medium grained, blue-grey to yellow-brown, sub horizontal laminations.	CL	CL		1	42 / 21	14	M	
			30.5					CL	CL		2	55 / 18	0		
		31	-24.5		CL		SILTSTONE: Fine grained, grey to dark grey, sub horizontal laminations.	HW	L		3	100 / 92	56	B, 5, Un, SR, Si, Sd, Fe, Co J, 25, Un, R, Si, Sd, Fe, Co	J, 30, Un, SR, Si, Sd, Fe, Co M J, 20, Un, SR, Si, Sd, Fe, Co
		80	-25.0					MW							
		11	-25.5					SW	H		4	95 / 95	95	M Inclusion, Silty SAND with iron staining M Cavities, possibly washed out inclusions M M M 32.42-32.90m: Healed subvertical joint, calcite / silica, mechanical breaks along healed joint M M Cavities, possibly washed out inclusions M 33.3-33.9m: Mechanical break along sub vertical healed joint M Cavities, possibly washed out inclusions M 33.9-35.14m: Mechanical breaks along healed subvertical joint, J,90, Pl-Un (occasional St), SR, Sd, Co M M M	
			31.0												
			31.5												
			-26.0												
			32.0												
			-26.5												
			32.5												
			-27.0												
			33.0												
		NR	-27.5		CL			CL	CL		5	100 / 73	73		
			33.5					SW	H		6	100 / 100	100		
		15	-28.0												
			-28.5												
			34.0												
			-28.5												
			34.5												
			-28.5												
			35.0												

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 8 OF 8

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
 DATE COMPLETED: **22.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306985.3 Surface R.L.: 6.08mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185030.0 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HO3		15	-29.0		4		SILTSTONE: Fine grained, grey to dark grey, sub horizontal laminations. End of BH-10 at 35.14m	SW	H	20 60 200 600 2000	6		100		
				35.5											
				-29.5											
				36.0											
				-30.0											
				36.5											
				-30.5											
				37.0											
				-31.0											
				37.5											
				-31.5											
				38.0											
				-32.0											
				38.5											
				-32.5											
				39.0											
				-33.0											
				39.5											
				-33.5											
				40.0											

CORE PHOTOGRAPHS



WorleyParsons

BOREHOLE: **BH-10**

SHEET: 1 OF 1

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **17.8.2018**
DATE COMPLETED: **22.8.2018**
LOGGED BY: **RG**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	306985.3	Surface R.L.:	6.08mPKHD
Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6185030.0	Ref. System:	GDA94 / MGA56



29.68 to 34.03 m



34.03 to 35.14 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-11**

SHEET: 1 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **13.8.2018**
 DATE COMPLETED: **16.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306885.2 Surface R.L.: 4.82mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185024.8 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER	HWT	NA		4.5	FILL		FILL: Sandy GRAVEL: Fine to coarse grained, sub-angular to angular, basalt, grey; sand, fine to coarse grained, sub-angular to angular, basalt; with silt.	Uc	L						
				0.5			FILL: SAND: Fine to medium grained, sub-angular to sub-rounded, quartz, brown mottled grey and pale grey; with gravel, fine to medium grained, sub-rounded to sub-angular, slag; trace clay lumps (10mm), low plasticity, orange-brown; trace shell fragments.								
				4.0											
				1.0											
				3.5											
				1.5											
				3.0											
				2.0											
				2.5											
				2.0											
3.0															
1.5															
3.5															
WASH BORE				1.0	1A		SAND (SP): Fine to medium grained, sub-angular to angular, quartz, with shell fragments, orange-brown mottled grey; trace gravel.	MD							
				4.0											
				0.5											
				4.5											
				0.0											
				5.0											

BOREHOLE: **BH-11**

SHEET: 2 OF 7

CLIENT:	<i>Australian Industrial Energy</i>
PROJECT:	<i>Port Kembla Gas Terminal Project</i>
LOCATION:	<i>Port Kembla, NSW</i>
JOB NUMBER:	<i>401010-01496</i>

DATE COMMENCED: **13.8.2018**
DATE COMPLETED: **16.8.2018**
LOGGED BY: **RG**
REVISION: **0**

Drill Contractor:	BG Drilling	Bore Size:	96 mm	Hole Angle:	-90°	Easting:	306885.2	Surface R.L.:	4.82mPKHD
Drill Model:	Hanjin D&B	Drill Fluid:	Pac L + CRP60	Bearing:	NA	Northing:	6185024.8	Ref. System:	GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	HWT	NA		-0.5	1A		SAND (SP): Fine to medium grained, sub-angular to angular, quartz, with shell fragments, orange-brown mottled grey; trace gravel, fine to medium grained, sub-angular to angular, dark grey to pale grey, cemented sand.	Uc	MD	20					
				60											
				200											
				600											
				2000											
				5.5											
				-1.0											
				6.0											
				-1.5											
				6.5											
				-2.0											
				7.0	1B		SAND (SP): Fine to medium grained, sub-angular to angular, quartz, trace shell fine fragments, pale grey; trace gravel, fine grained, sub-rounded to sub-angular, quartz, lithics.	L						SPT 3,7,13 N=20	SPT: Recovered 450mm
				6.0											
				P75										Circulation lost between 4.0m and 6.5m; Casing advanced from 4.0m to 5.7m	
				6.5											
				-2.0											
				7.0											
-2.5															
7.5															
-3.0	P75	Oily film / black specks on surface of muds in tank; Casing advanced from 5.7m to 6.8m													
8.0															
-3.5															
8.5															
-4.0															
9.0															
-4.5															
9.5															
-5.0															
10.0															

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-11**

SHEET: 3 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **13.8.2018**
 DATE COMPLETED: **16.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306885.2 Surface R.L.: 4.82mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185024.8 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description					
WASH BORE	HWT	NA		5.5	1B		SAND (SP): See above.	Uc	L	20 60 200 600 2000				SPT 1,2,4 N=6	SPT: Recovered 300mm					
				10.5			SAND (SM-SW): Fine to medium grained, sub-rounded to sub-angular, quartz, dark grey; with silt, trace wood fragments (10mm).								P75: attempted from 10.5-11.5m: sample lost					
				11.0			Clayey SAND (SC): Fine to medium grained, sub-rounded to sub-angular, quartz, pale grey; clay, low plasticity, pale grey.													
				11.5												...from 11.5m to 11.9m, mottled iron staining; trace sandy clay zones				
				12.0												Sandy CLAY (CI): Medium plasticity, orange-brown mottled pale grey; sand, fine to medium grained, sub-rounded to sub-angular, quartz.				
	OPEN HOLE				12.5	2		Clayey SAND (SC): Fine to medium grained, sub-rounded to sub-angular, quartz, pale grey; clay, low plasticity, pale grey.	MD						NA	NA	NA	P75	Casing advanced from 8.7m to 13.0m	
					13.0			SAND (SW-SC): Fine to medium grained, sub-rounded to sub-angular, quartz, shell fragments, grey to pale grey; with clay, low plasticity.											Loose / soft, no hammer needed for environmental sample	
					13.5			Sandy CLAY (CI): Medium plasticity, pale grey mottled orange-brown; sand, fine to medium grained, sub-rounded to sub-angular, quartz; trace clayey sand zones.												SPT: Recovered 550mm
					14.0															
					14.5															
15.0									U75	U75: Recovered 350mm HSV: 44 (Pk) / 12 (Res)										

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-11**

SHEET: 4 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **13.8.2018**
 DATE COMPLETED: **16.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306885.2 Surface R.L.: 4.82mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185024.8 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description				
WASH BORE	OPEN HOLE	NA		-10.5	2		Sandy CLAY (CI): Medium plasticity, pale grey mottled orange-brown; sand, fine to medium grained, sub-rounded to sub-angular, quartz; trace clayey sand zones.	Uc	St-VSt	20	NA	NA	NA	P75	SPT: Recovered 450mm				
			60																
			200																
			600																
			2000																

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-11**

SHEET: 5 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **13.8.2018**
 DATE COMPLETED: **16.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306885.2 Surface R.L.: 4.82mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185024.8 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description			
WASH BORE OPEN HOLE		NA		-15.5	2		CLAY (CI-CH): Medium to high plasticity, pale grey-brown; trace sand lenses, fine to medium grained, sub-rounded to sub-angular, orange-brown.	Uc	St-VSt	20	NA	NA	NA		SPT 6,8,12 N=20	SPT: Recovered 450mm		
				-16.0						60								
				-16.5	3		Sandy CLAY (CI): Medium plasticity, pale grey mottled orange-brown; sand, fine to medium grained, sub-rounded to sub-angular, quartz; with clasts of XW sandstone.	RS	St					SPT 0,2,8 N=10	SPT: Recovered 450mm			
				-17.0													200	
				-17.5												600		
				-18.0						2000								
				-18.5					Clayey SAND (SC): Fine to medium grained, sub-rounded to sub-angular, quartz, coal (?), brown-grey; clay, low to medium plasticity, brown; trace gravel, fine grained, sub-rounded to sub-angular, quartz.	MD					SPT 3,7,8 N=15	SPT: Recovered 450mm		
				-19.0														
				-19.5														
				-20.0														
				-20.5														
				-21.0														
				-21.5														
				-22.0														
				-22.5														
				-23.0														
				-23.5														
				-24.0														
				-24.5														
				-25.0														

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-11**

SHEET: 6 OF 7

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **13.8.2018**
DATE COMPLETED: **16.8.2018**
LOGGED BY: **RG**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306885.2 Surface R.L.: 4.82mPKHD
Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185024.8 Ref. System: GDA94 / MGA56

Method		Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description	
WASH BORE											20 60 200 600 2000						
			NA		25.5	3		Clayey SAND (SC): Fine to coarse grained, sub-rounded to sub-angular, quartz, mottled grey-brown / yellow-brown / blue-grey / dark grey; clay, low to medium plasticity, yellow-brown; with gravel, fine to medium grained, sub-rounded to sub-angular, sandstone and coal.	RS	MD						SPT 1,10,17 N=27	SPT: Recovered 450mm
									XW								
			100		26.5	3		...becoming clayey GRAVEL								SPT 19,50/150mm N=R	SPT: Recovered 300mm
									VD								
			25		27.0	4		SAND (SW-SC): Fine to medium grained, sub-rounded to sub-angular, quartz, orange-brown to pale grey; with clay, low to medium plasticity.				1	100 / NA	NA		J, unable to determine characteristics, disturbed from drilling	
			18		28.0	4		SILTSTONE: Massive; patchy grey-brown / yellow-brown.	MW	L		2	100 / 60	34		J, 50°, Ir, SR, Si, Sd, Co B, 15°, Ir, SR, Si, Sd, Co J, 40°, Un, SR, Si, Sd, Co B, 15°, Un, SR, Si, Sd, Co B, 10°, Un, SR, Si, Sd, Co J, 20°, Ir, SR, Si, Sd, Co J, 40°, St, SR, Si, Sd, Co	
									L-M								
			22		29.0	4		SILTSTONE: Grey, massive.				3	91 / 83	82		J, 70°, Un, SR, Cl, Fi (10mm) J, 45°, Un, SR, Si, Co Inclusion / partial joint with iron staining, slight cavity / pitting on edge J, 20°, Un, SR, Si, Co	
					29.5	4		...becoming pale blue-grey	CL	CL		4	100 / 100	100		Slightly drill disturbed at start of run B, 10°, Un, SR, Si, Co	
								MW	L-M								
					30.0				SW	M-H							

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-11**

SHEET: 7 OF 7

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **13.8.2018**
 DATE COMPLETED: **16.8.2018**
 LOGGED BY: **RG**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306885.2 Surface R.L.: 4.82mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185024.8 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
HQ3	OPEN HOLE	22			4		SILTSTONE: Grey, massive.	SW	M-H		4		100		Loss of drill fluids, possible significant defect
		NR		25.5							5	92 / 92	92		
				30.5											
				26.0											
				31.0											
				26.5											
				31.5							6	100 / 100	100		
				27.0											
				32.0											
				27.5											
				32.5			End of BH-11 at 32.6m								J, 75°, Ir, SR, Si, Co
				28.0											
				33.0											
				28.5											
				33.5											
				29.0											
				34.0											
				29.5											
				34.5											
				30.0											
				35.0											

CORE PHOTOGRAPHS



WorleyParsons

BOREHOLE: **BH-11**

SHEET: 1 OF 1

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **13.8.2018**
DATE COMPLETED: **16.8.2018**
LOGGED BY: **RG**

Drill Contractor: BG Drilling	Bore Size: 96 mm	Hole Angle: -90°	Easting: 306885.2	Surface R.L.: 4.82mPKHD
Drill Model: Hanjin D&B	Drill Fluid: Pac L + CRP60	Bearing: NA	Northing: 6185024.8	Ref. System: GDA94 / MGA56



26.50 to 30.20 m



30.20 to 32.60 m

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-12**

SHEET: 1 OF 4

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306947.5 Surface R.L.: 5.10mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185119.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
SOLID AUGER	HWT	NA		5.0	Fill		FILL: Gravelly SAND: Fine to medium grained, sub-angular to sub-rounded, quartz, lithic fragments, coal?, slag?; fine to coarse gravel, sub-angular, slag, coal.	Uc	D						Environmental bag samples taken from auger spoil at 0.5, 1.0 and 1.5m
				0.5			FILL: SAND: Fine to medium grained, sub-angular to sub-rounded, quartz, lithic fragments, pale grey-brown, trace gravel of slag and coal.		MD						
WASH BORE	HWT	NA		1.0			FILL: SAND: Fine to medium grained, sub-angular to sub-rounded, quartz, dark grey-dark brown; with fine to coarse gravel of slag and coal.								
				1.5											SPT 4,7,10 N=17 SPT: Recovered 400 mm
				2.0			SAND (SP): Fine to medium grained, sub-angular to rounded, quartz, trace mafics, pale brown-pale yellow.								
				2.5											SPT 5,8,12 N=20 SPT: Recovered 400 mm
				3.0											
				3.5											
				4.0											
				4.5											SPT 2,3,5 N=8
				5.0											

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-12**

SHEET: 2 OF 4

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306947.5 Surface R.L.: 5.10mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185119.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	HWT	NA	0.0		1A		SAND (SP): Fine to medium grained, sub-angular to rounded, quartz, trace mafics, pale brown-pale yellow, trace gravel of shell fragments.	Uc	L	20 60 200 600 2000	NA	NA	NA		
			5.5				SAND (SP): Fine to medium grained, sub-angular to rounded, quartz, mafics, pale brown mottled dark grey; with fine to medium gravel of shell fragments.		MD						
OPEN HOLE			6.0		1B		...reduced shell fragments, trace gravel to 10 mm	Vwk	D		NA	NA	NA	SPT 8,12,15 N=27	SPT: Recovered 450 mm
			6.5												
			7.0												
			7.5											SPT 10,17,24 N=41	SPT: Recovered 450 mm
			8.0				SAND (SP): Fine to medium grained, sub-angular to rounded, quartz, dark brown, iron-oxide stained; trace fines.	Vwk	D		NA	NA	NA		
			8.5												
			9.0												
			9.5											SPT 26,35,47 N=82	SPT: Recovered 400 mm
			10.0												

BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-12**

SHEET: 3 OF 4

CLIENT: **Australian Industrial Energy**
 PROJECT: **Port Kembla Gas Terminal Project**
 LOCATION: **Port Kembla, NSW**
 JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
 DATE COMPLETED: **29.8.2018**
 LOGGED BY: **BO**
 REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306947.5 Surface R.L.: 5.10mPKHD
 Drill Model: Hanjin D&B Drill Fluid: Pac L + CRP60 Bearing: NA Northing: 6185119.1 Ref. System: GDA94 / MGA56

Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
WASH BORE	OPEN HOLE	NA	-5.0		1B		SAND (SP-SM): Fine to medium grained, sub-angular to rounded, quartz, trace lithics, pale yellow speckled dark grey; trace to with fines; with dark brown weakly cemented inclusions.	Uc	MD							SPT: Recovered 450 mm																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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BOREHOLE LOG



WorleyParsons

BOREHOLE: **BH-12**

SHEET: 4 OF 4

CLIENT: **Australian Industrial Energy**
PROJECT: **Port Kembla Gas Terminal Project**
LOCATION: **Port Kembla, NSW**
JOB NUMBER: **401010-01496**

DATE COMMENCED: **29.8.2018**
DATE COMPLETED: **29.8.2018**
LOGGED BY: **BO**
REVISION: **0**

Drill Contractor: BG Drilling Bore Size: 96 mm Hole Angle: -90° Easting: 306947.5 Surface R.L.: 5.10mPKHD
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Method	Casing	Drill Rate (min/m)	RL (mPKHD)	Depth (m)	Geological Unit	Graphic Log	Material Description	Weathering / Cementation	Consistency / Strength	Defect Spacing (mm)	Core Run No.	TCR / SCR (%)	RQD (%)	Sample / Test	Field Records / Comments and Defect Description
WASH BORE	OPEN HOLE	NA	-10.0		2		Sandy CLAY (CL): Low plasticity, pale to dark grey mottled orange-brown; fine to medium grained sand (up to 65%), sub-angular to rounded, quartz.	Uc	Hd	20 60 200 600 2000	NA	NA	NA	SPT 11,18,24 N=42	SPT: Recovered 450 mm
			15.5				End of BH-12 at 15.45m								
			-10.5												
			16.0												
			-11.0												
			16.5												
			-11.5												
			17.0												
			-12.0												
			17.5												
			-12.5												
			18.0												
			-13.0												
			18.5												
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			19.0												
			-14.0												
			19.5												
			-14.5												
			20.0												