CORED DRILL HOLE LOG

HOLE NO : BH11

PROJECT : WATTLE VALE QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY SITE 5
FILE / JOB NO : 30012451
SHEET : 2 OF 7

POSITION : E: 365316.000, N: 6710604.000 (56 MGA94) SURFACE ELEVATION : 1181.324 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : P160 MOUNTING : Track CONTRACTOR : NCD HOLE DIA : 96mm

DATE STARTED : 7/4/16 DATE COMPLETED : 7/4/16 DATE LOGGED : 7/4/16 LOGGED BY : BD CHECKED BY : SB

CASING DIAMETER : HQ BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING					MATERIAL			ROCK MASS		
PROGRESS: DRILLING & CASING	PROGRESS: (WATER RETURN %)	(CORE LOSS RUN %) DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral EL 0.03 VL 0.1 L 0.3 M 1 H 3 VH 10 EH	RQD (%)	DEFECT SPACING (mm) 20 40 100 300 1000	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
				0.0 1181.0 0.5 1180.5 1.0 1180.0 1.5 1179.5 2.0 1179.0 2.5 1178.5 3.0							
NMLC	100 %RETURN	0%LOSS 3.85 0%LOSS		1178.0 3.5 1177.5 4.0 1177.0 4.5 1176.5 5.0		3.20m START CORING AT 3.20m BASALT fine grained, dark grey some orange staining, frequent amygdales, some clay in fractures 5.00m	SW to MW		15 0		3.20-3.35: FZ, Fe Sn, 0-10mm 3.35-3.78: FZ, Fe Sn, 20-40mm 3.89-4.45: FC, Fe Sn, partially open healed fractures 4.45: JT, 50°, PR, S, Clay Ct, 6 mm 4.48: JT, 50°, Un, RF, Clay Vr 4.50-5.00: FZ, Fe Sn, 20-40

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

10 Oct., 73 Water Level on Date shown
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH11

PROJECT : WATTLE VALE QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY SITE 5
FILE / JOB NO : 30012451
SHEET : 3 OF 7

POSITION : E: 365316.000, N: 6710604.000 (56 MGA94) SURFACE ELEVATION : 1181.324 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : P160 MOUNTING : Track CONTRACTOR : NCD HOLE DIA : 96mm

DATE STARTED : 7/4/16 DATE COMPLETED : 7/4/16 DATE LOGGED : 7/4/16 LOGGED BY : BD CHECKED BY : SB

CASING DIAMETER : HQ BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING

PROGRESS: DRILLING & CASING; (WATER RETURN %); (CORE LOSS RUN %) DRILL DEPTH

SAMPLES & FIELD TESTS

ELEVATION (RL) / DEPTH (m)

GRAPHIC LOG

MATERIAL

DESCRIPTION
ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)

Weathering

ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral: EL, VL (-0.03), L (-0.1), M (-0.3), H (-1), VH (-3), EH (-10)

ROCK MASS

RQD (%)

DEFECT SPACING (mm): 20, 40, 100, 300, 1000

DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other

Depth	Elevation	Description	Weathering	RQD	Defects
5.0	1176.0	BASALT fine grained, dark grey *(continued)* frequent iron stained healed fractures	SW to MW	0	5.01: JT, 50-60°, St, S, Fe Sn 5.11: JT, 30°, PR, S, Fe Sn 5.17-5.20: SM, EW FILLED 5.26: JT, 10°, PR, RF, Fe Sn 5.33: JT, 65°, PR, S, Fe Sn
5.35					
5.5					5.42-5.57: JT, 10-30°, PR, RF, Fe Sn, 40-100mm spacing
5.77m		massive	SW		5.71: JT, 15°, PR, RF, Fe Sn 5.75: JT, 15°, PR, RF, Fe Sn
6.0	1175.5				5.93: JT, 15°, PR, RF, Fe Sn
6.5	1175.0			55	6.08-6.75: JT, 10-40°, PR, RF, Fe Sn, 100-300mm spacing
7.00	1174.5				6.61-7.00: JT, 80-90°, Un, RF, Fe Sn
7.0					
7.10m		stained pale grey-brown in parts	SW to MW		7.00-7.65: JT, 40-60°, PR, RF, Fe Sn, 20-40mm spacing
7.5	1174.0				
7.60m		dark grey, occasional healed fractures	FR		
8.0	1173.5			18	7.90-8.07: JT, 75°, IR, RF, Fe Sn
8.5	1173.0				
8.80m Is(50) d=2.32 MPa					8.60-8.93: JT, 20-40°, PR, S, Cn, 40-100mm spacing
9.0	1172.5				9.00: JT, 10°, PR, S, Clay Vr
9.30m Is(50) d=5.06 MPa					9.22: JT, 75°, PR, S, Fe Sn
9.45	1172.0				9.42: JT, 10°, PR, S, Fe Sn
9.5					9.59: JT, 15-20°, PR, Sl-Sm, Fe Sn
	1171.5				9.80-10.11: JT, 20°, Un, RF,
10.0					

NMLC; 100 %RETURN; 0%LOSS

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

10 Oct., 73 Water Level on Date shown
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH11

PROJECT : WATTLE VALE QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY SITE 5
FILE / JOB NO : 30012451
SHEET : 4 OF 7

POSITION : E: 365316.000, N: 6710604.000 (56 MGA94) SURFACE ELEVATION : 1181.324 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : P160 MOUNTING : Track CONTRACTOR : NCD HOLE DIA : 96mm

DATE STARTED : 7/4/16 DATE COMPLETED : 7/4/16 DATE LOGGED : 7/4/16 LOGGED BY : BD CHECKED BY : SB

CASING DIAMETER : HQ BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING | MATERIAL | ROCK MASS

DRILLING & CASING	PROGRESS (WATER RETURN %)	(CORE LOSS RUN %) / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral (EL, VL, L, M, H, VH, EH)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC	100 %RETURN	0%LOSS 11.35	10.35m Is(50) d=6 MPa	10.0 / 1171.0 / 10.5		BASALT fine grained, dark grey *(continued)* dark grey, occasional healed fractures	FR		60		Fe Sn 10.20: JT, 20°, PR, RF, Fe Sn 10.40: JT, 10°, PR, RF, Cn 10.46: JT, 15°, PR, RF, Cn 10.55: FC, 80-90°, Un, RF, Fe Sn 10.60-11.25: JT, 20-30°, PR, RF, Cn, 300mm spacing
			11.55m Is(50) d=6.13 MPa	11.0 / 1170.5 / 1170.0 / 11.5							11.38: JT, 65°, PR, RF, Cn 11.44: JT, 20°, PR, RF, Cn 11.49: JT, 20-30°, EW FILLED, 9 mm 11.61: JT, 20°, PR, RF, Fe Sn 11.70: JT, 25°, PR, RF, Fe Sn
		0%LOSS		1169.5 / 12.0 / 1169.0 / 12.5							12.11: JT, 55°, PR, S, Clay Ct, 3 mm 11.95-12.35: JT, 25-30°, PR, RF, Cn, 40-100mm spacing
			12.90m Is(50) a=0.88 MPa 13.10m Is(50) d=0.2 MPa	1168.5 / 13.0 / 1168.0 / 13.5		12.80m AGGLOMERATE grey brown fine grained basalt clasts in pale orange matrix, clasts 5-200mm, matrix supported	HW		90		12.70-12.75: JT, 30-65°, PR, S, Fe Sn 12.97: JT, 10°, PR, RF, Fe Sn
		13.95		1167.5 / 14.0		13.70m matrix becoming white 14.05m					
		0%LOSS	14.30m Is(50) d=2.13 MPa	1167.0 / 14.5		BASALT fine grained, grey some thin calcite veins	MW				14.16: JT, 10°, IR, RF, Cn 14.21: JT, 10°, IR, RF, Cn 14.41-14.56: FZ, Cn, 20-40mm spacing
				1166.5 / 15.0		14.65m dark grey, some thin calcite veins	FR		70		14.64: JT, 25-30°, PR, RF, Cn, 300 mm

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

10 Oct., 73 Water Level on Date shown
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH11

PROJECT : WATTLE VALE QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY SITE 5
FILE / JOB NO : 30012451

POSITION : E: 365316.000, N: 6710604.000 (56 MGA94) SURFACE ELEVATION : 1181.324 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : P160 MOUNTING : Track CONTRACTOR : NCD HOLE DIA : 96mm

DATE STARTED : 7/4/16 DATE COMPLETED : 7/4/16 DATE LOGGED : 7/4/16 LOGGED BY : BD CHECKED BY : SB

CASING DIAMETER : HQ BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING: PROGRESS (DRILLING & CASING; WATER RETURN %; CORE LOSS RUN % / DRILL DEPTH); SAMPLES & FIELD TESTS; ELEVATION (RL) / DEPTH (m)
MATERIAL: GRAPHIC LOG; DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable); Weathering; ESTIMATED STRENGTH Is(50) (● - Axial, ○ - Diametral; EL 0.03 VL 0.1 L 0.3 M 1 H 3 VH 10 EH)
ROCK MASS: RQD (%); DEFECT SPACING (mm) (20, 40, 100, 300, 1000); DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other

Depth (m)	Elevation (RL)	Drilling / Progress	Core loss / Drill depth	Samples & Field Tests	Description	Weathering	RQD (%)	Defects
15.0		NMLC	0%LOSS		BASALT fine grained, grey *(continued)* dark grey, some thin calcite veins	FR	70	
15.40	1166.0		15.40					
15.5				15.50m Is(50) d=5.59 MPa				15.53: JT, 10°, PR, RF, Cn
16.0	1165.5		0%LOSS				100	
16.5	1165.0			16.60m Is(50) d=6.82 MPa				16.40: JT, 70°, PR, RF, CA Vr
16.80					16.80m frequent infiled vughs and vesicles up to 30mm			16.80-17.40: HB
17.0	1164.5		17.05					17.36: JT, 10°, PR, RF, Cn
17.45	1164.0	100 %RETURN			17.45m occasional infilled vesicles			
17.5								17.90: JT, 10°, PR, S, CA Ct
18.0	1163.5			18.10m Is(50) d=3.18 MPa				18.15: JT, 5°, PR, RF, Cn 18.25: JT, 10°, PR, RF, Fe Sn
18.5	1163.0		0%LOSS				89	18.89: JT, 0-10°, Un, S, CA Ct
19.0	1162.5							19.21: JT, 10°, PR, RF, Cn 19.23: JT, 10°, PR, RF, Cn 19.38: SM, 10°, MU FILLED, 6 mm
19.5	1162.0			19.80m Is(50) d=2.84 MPa				19.88: JT, 10°, PR, RF, Fe Sn 19.96: JT, 10-20°, PR, RF, Fe
20.0	1161.5							

DRILLING
AD/T Auger Drilling with TC Bit
AD/V Auger Drilling with V Bit
AS Auger Screwing
DB Washbore with Drag Bit
DT Diatube
HMLC HMLC Core Barrel
HQ3 HQ3 Core Barrel
NMLC NMLC Core Barrel
NQ3 NQ3 Core Barrel
PQ3 PQ3 Core Barrel
R Rock Roller

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

WEATHERING
FR Fresh
SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
EW Extremely Weathered

STRENGTH
EH Extremely High
VH Very High
H High
M Medium
L Low
VL Very Low
EL Extremely Low

ROUGHNESS
POL Polished
RF Rough
S Smooth
SL Slickensided
VR Very Rough

DEFECT TYPE
BP Bedding Plane
CL Cleavage
CS Crushed Seam
CZ Crushed Zone
DB Drilling Break
FC Fracture
HB Handling Break
IS Infilled Seam
JT Joint
SM Seam
SS Shear Seam
SZ Shear Zone
VN Vein
VO Void
FA Fault

COATING
CN Clean
CT Coating (>= 1.0m)
FILLED Filled
SN Stained
VR Veneer (< 1.0mm)

PLANARITY
CU Curved
DIS Discontinuous
IR Irregular
PR Planar
ST Stepped
UN Undulose

INFILL
CA Calcite
CLAY Clay
FE Iron Oxide
FE CLAY Iron Oxide Clay
KT Chlorite
MS Secondary Mineral
MU Unidentified Mineral
QZ Quartz
X Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH11

PROJECT : WATTLE VALE QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY SITE 5
FILE / JOB NO : 30012451
SHEET : 6 OF 7

POSITION : E: 365316.000, N: 6710604.000 (56 MGA94) SURFACE ELEVATION : 1181.324 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : P160 MOUNTING : Track CONTRACTOR : NCD HOLE DIA : 96mm

DATE STARTED : 7/4/16 DATE COMPLETED : 7/4/16 DATE LOGGED : 7/4/16 LOGGED BY : BD CHECKED BY : SB

CASING DIAMETER : HQ BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING

PROGRESS: DRILLING & CASING; (WATER RETURN %); (CORE LOSS RUN %); DRILL DEPTH

SAMPLES & FIELD TESTS

ELEVATION (RL) / DEPTH (m)

GRAPHIC LOG

MATERIAL

DESCRIPTION
ROCK TYPE : Colour, Grain size, Structure
(texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)

Weathering

ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral
EL 0.03 | VL 0.1 | L 0.3 | M 1 | H 3 | VH 10 | EH

ROCK MASS

RQD (%)

DEFECT SPACING (mm): 20 | 40 | 100 | 300 | 1000

DEFECTS
(joints, partings, seams, zones, etc)
Description, orientation, infilling or coating, shape, roughness, thickness, other

Depth	RL	Description	Weathering	RQD	Defects
20.0	1161.0	BASALT fine grained, grey *(continued)*	FR	89	Sn 20.20: JT, 20°, PR, RF, Fe Sn
20.5					20.50: JT, 10°, Un, RF, Fe Sn 20.63: JT, 5°, PR, RF, Fe Sn
20.70m		dark grey to dark red			
21.0	1160.5				20.90: JT, 10-15°, PR, RF, Fe Sn
21.20m					
	1160.0	AGGLOMERATE purple grey high strength basalt clasts in yellow brow low strength matrix	HW		
21.5				93	
	1159.5				
22.0					
	1159.0				
22.50m					
22.5		LAPILLI TUFF purple grey basalt clasts <20mm in white grey and yellow brwon matrix			
	1158.5				
23.0					
23.20m					
	1158.0	BASALT fine grained, dark grey brown	MW FR		23.27-23.30: JT, 10-40°, 100-300mm spacing
23.5					
23.80m		dark grey, occasional calcite veins			
	1157.5				
24.0				100	
	1157.0				24.13-24.65: JT, 25-30°, PR, S, CA Vr, 100-300mm spacing
24.5					
	1156.5				
25.0					

0%LOSS 20.13
0%LOSS
0%LOSS 23.15
0%LOSS
100 %RETURN

20.80m Is(50) d=1.81 MPa
21.45m Is(50) d=0.18 MPa
22.50m Is(50) d=0.15 MPa
23.90m Is(50) d=4.21 MPa
Is(50) a=7.01 MPa

DRILLING

AD/T	Auger Drilling with TC Bit
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AS	Auger Screwing
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DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

▽	10 Oct., 73 Water Level on Date shown
▶	water inflow
◀	water outflow

WEATHERING

FR	Fresh
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STRENGTH

EH	Extremely High
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ROUGHNESS

POL	Polished
RF	Rough
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DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
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MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
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See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH11

PROJECT : WATTLE VALE QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY SITE 5
FILE / JOB NO : 30012451
SHEET : 7 OF 7

POSITION : E: 365316.000, N: 6710604.000 (56 MGA94) SURFACE ELEVATION : 1181.324 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : P160 MOUNTING : Track CONTRACTOR : NCD HOLE DIA : 96mm

DATE STARTED : 7/4/16 DATE COMPLETED : 7/4/16 DATE LOGGED : 7/4/16 LOGGED BY : BD CHECKED BY : SB

CASING DIAMETER : HQ BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING				MATERIAL			ROCK MASS		
PROGRESS: DRILLING & CASING	PROGRESS: (WATER RETURN %)	PROGRESS: (CORE LOSS RUN %) / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral EL 0.03 VL 0.1 L 0.3 M 1 H 3 VH 10 EH	RQD (%)	DEFECT SPACING (mm) 20 40 100 300 1000	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
	100 %RETURN 25.35	0%LOSS 25.35	25.05m Is(50) d=3.62 MPa	25.0		BASALT fine grained, dark grey brown *(continued)*	FR	○	100		25.04: JT, 30°, PR, RF, Cn 25.15: JT, 30°, PR, RF, Cn
				1156.0 25.5		25.35m BOREHOLE BH11 TERMINATED AT 25.35 m Target depth					
				1155.5 26.0							
				1155.0 26.5							
				1154.5 27.0							
				1154.0 27.5							
				1153.5 28.0							
				1153.0 28.5							
				1152.5 29.0							
				1152.0 29.5							
				1151.5 30.0							

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

▽	10 Oct., 73 Water Level on Date shown
▶	water inflow
◀	water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

SMEC	TITLE: **Wattle Valley Quarry**			
	PROJECT NO: **30012451**	TEST DATE: **7/4/2016**	INCLINATION: **-90°**	CORED LENGTH: **3.2m – 25.35m**
	DRILL RIG: **P160**	CONTRACTOR: **NCD**	LOGGED BY: **BD**	CHECKED BY: **NP**

BH11

BH11 – Page 2/3

BH11 – Page 3/3

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : BH12

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 1 OF 5

POSITION : E: 365270.900, N: 6710626.600 (56 WGS84) SURFACE ELEVATION : 1179.582 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER DRILLER : MARK

DATE STARTED : 14/10/16 DATE COMPLETED : 18/10/16 DATE LOGGED : 18/10/16 LOGGED BY : BD CHECKED BY : BD

DRILLING | MATERIAL

METHOD & SUPPORT	PENETRATION	WATER	SAMPLES	FIELD TESTS	ELEVATION (RL)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
AD/T					1179.582	0.0		CI-CH	Silty CLAY: firm, medium to high plasticity, dark brown, moist		F	TOPSOIL
						0.20m						
		HOLE COLLAPSED			1179.0	1.0		CI-CH	Silty CLAY: stiff, medium to high plasticity, grey-brown, moist	M	St	RESIDUAL SOIL
				1.00m SPT 9, 10, 15 N=25 1.45m								
NW Casing						1.20m			BASALT: extremely weathered, extremely low strength, grey-brown stained orange and dark orange-brown, some moderately weathered fragments			BEDROCK
NMLC		HOLE COLLAPSED		2.50m SPT N=30/140mm N*=64 2.64m	1178.0	2.0						
					1177.0	3.0						
						3.20m			Continued as Cored Drill Hole			
					1176.0	4.0						
					1175.0	5.0						
					1174.0	6.0						
					1173.0	7.0						
					1172.0	8.0						

METHOD
HA Hand auger
AS Auger screwing
ADV Auger drilling with V bit
ADT Auger drilling with TC bit
WB Wash-bore drilling
RR Rock Roller
NQ NQ core barrel (42mm diameter)
NMLC NMLC core barrel (52mm diameter)
HQ HQ Core Barrel (62mm diameter)

SUPPORT
T Timbering
C Casing
M Mud

PENETRATION
VE E F H VH — No Resistance

WATER
dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

SAMPLES & FIELD TESTS
B Bulk Disturbed Sample
D Disturbed Sample
E Environmental Sample
EW Water Sample
HM Hammer Bouncing
HP Hand Penetrometer (UCS kPa)
Nc SPT with solid cone
SS Split Spoon Sample
R Refusal
SPT Standard Penetration Test
U50 Undisturbed Sample (50mm dia)
U75 Undisturbed Sample (75mm dia)
VS Vane Shear; peak/remouded(kPa)

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D Dry
M Moist
W Wet
PL Plastic limit
LL Liquid limit

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
Fb	- Friable
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH12

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 2 OF 5

POSITION : E: 365270.900, N: 6710626.600 (56 WGS84) SURFACE ELEVATION : 1179.582 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 14/10/16 DATE COMPLETED : 18/10/16 DATE LOGGED : 18/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00/3.00 m BIT : DIAMOND IMPREG S6-10/DIAMOND IMPREG S6-10 CORE CONDITION : GOOD/GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS RUN % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION — ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral (EL, VL, L, M, H, VH, EH)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
				0.0 / 1179.0							
				1.0 / 1178.0							
				2.0 / 1177.0							
				3.0		3.20m START CORING AT 3.20m					
NMLC		0% LOSS		1176.0		BASALT: dark grey-black becoming grey-brown,fine grained, with sub vertical fractures, some calcite in fractures, highly fractured	MW to HW		0		3.25: JT, 15-20°, IR, VR, Fe Sn, 10 mm 3.30: JT, 30°, CU, Ro, Fe Sn 3.31-3.44: FC, 70-80°, Un, Ro, CA Vr 3.56-3.86: FC, 80-90°, Un, Ro, CA Vr
				4.0		3.90m dark grey-black with iron staining, some pale yellow-grey mineral inclusions, fragmented	MW				3.89-4.15: FZ, Fe Sn, 0-20mm
		4.15							0		
VR		0% LOSS 4.27									4.15-4.27: Rock Roller
NMLC		0% LOSS		1175.0					0		
		5.30		5.0		5.20m grey with pale orange iron staining, some healed fractures, fragmented					5.40: JT, 15°, PR, Ro, Fe Sn
				6.0		5.95m 6.07m CORE LOSS 0.12m (5.95-6.07)					5.65: JT, 15°, PR, Ro, MU Ct, 3 mm 4.27-7.30: FZ, Fe Sn, 0-20mm (partially open)
				1174.0		BASALT: grey with pale orange iron staining, some healed fractures, fragmented	MW to SW				
				1173.0							6.58: JT, 30°, PR, Ro, Fe Sn 6.68: JT, 20°, PR, Ro, MU Ct, 5 mm
		5% LOSS		7.0							7.05-7.08: CS, Fe Sn
						7.25m becoming slightly less fractured			5		
	26/10/16			1172.0 / 8.0							7.25-8.24: FZ, Fe Sn, 20-40mm (partially open)

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH12

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 3 OF 5

POSITION : E: 365270.900, N: 6710626.600 (56 WGS84) SURFACE ELEVATION : 1179.582 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 14/10/16 DATE COMPLETED : 18/10/16 DATE LOGGED : 18/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00/3.00 BIT : DIAMOND IMPREG S6-10/DIAMOND IMPREG S6-10 CORE CONDITION : GOOD/GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION — ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) (Axial / Diametral)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) — Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC		5% LOSS		8.0		becoming slightly less fractured *(continued)*			5		
				8.30m							
		5% LOSS				grey, occasional laths, slightly fractured, rare healed fractures	SW to FR				8.28: JT, 5°, PR, Ro, Fe Sn 8.40: JT, 5°, PR, Ro, Fe Sn, 5 mm 8.48-8.91: JT, 5-20°, PR, Ro, Fe Sn, 20-100mm 8.91: JT, 20°, PR, Ro, Fe Ct, 8 mm 9.06: JT, 10°, PR, Ro, Cn
		8.70		1171.0							
				9.0							
		0% LOSS		1170.0					55		
				10.0							10.02-10.44: JT, 80-90°, Ro, Fe Ct, <5 mm 10.54: JT, 70°, PR, Ro, Fe Sn 10.57-10.63: JT, 5-10°, PR, Ro, Fe Sn, 20-40mm spacing 10.77: JT, 30°, PR, Ro, Fe Sn
		10.70		1169.0							
		0% LOSS 10.94					HW				
				10.87m 10.94m 11.00m		LAPILLI TUFF: dark brown clasts in brown matrix			40		
				11.0		CORE LOSS 0.06m (10.94-11.00)	HW				
				1168.0		LAPILLI TUFF: less matrix visible clast size increasing					11.03-12.15: DB, 100-200mm spacing
		5% LOSS		12.0					70		
				12.15m		generally dark-brown	HW to MW				12.51: FC, 0-25°, IR, Ro, Cn 12.86: JT, 15-30°, PR, Ro, Cn
				1167.0							
				13.0							13.10: JT, 20°, PR, Ro, MU Vr 13.20: JT, 20°, PR, Ro, CA Vr
		13.20		13.10m		BASALT: grey-brown, fine grained iron stained throughout, slightly fractured	MW				
				13.40m		grey, trace thin calcite veins, blotches of calcite between 13.6-14.15m	FR				
				1166.0							
				14.0							
				14.15m		blotches of dark-green mineral , predominantly massive					
		0% LOSS		1165.0					80		14.40: JT, 15°, PR, Ro, Cn 14.84: JT, 0°, PR, Ro, Cn 14.97: JT, 5°, PR, Ro, CA Vr 15.09: JT, 5°, PR, Ro, CA Vr 15.30: JT, 5°, PR, Ro, CA Vr 15.40: FC, 25°, IR, Ro, Fe Cn 15.59: JT, 5°, PR, Ro, Cn
				15.0							
				1164.0							
		16.00		16.0		16.00m					15.87: JT, 10°, PR, Ro, CA Ct, 2 mm

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH12

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 4 OF 5

POSITION : E: 365270.900, N: 6710626.600 (56 WGS84) SURFACE ELEVATION : 1179.582 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 14/10/16 DATE COMPLETED : 18/10/16 DATE LOGGED : 18/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00/3.00 BIT : DIAMOND IMPREG S6-10/DIAMOND IMPREG S6-10 CONDITION : GOOD/GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS % (RUN / DRILL. DEPTH)	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION — ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) (Axial / Diametral)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) — Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC		0% LOSS (18.90)		16.0 / 1163.0 / 17.0 / 1162.0 / 18.0		vugs up to 20mm infilled with green clay mineral between 16-17.35m	FR				15.93: JT, 5°, PR, Ro, CA Vr 16.10: DB
						16.60m — some thin calcite veins					16.35: DB 16.45: DB 16.78: DB 16.91: VN, 5-20°, Un, Ro, CA Vr 17.05: DB
									95		17.42: JT, 20°, PR, Ro, Fe Sn 17.60-17.94: JT, 5-20°, PR, S, MU Vr, 20-120mm spacing
						18.40m	MW				18.08: JT, 15°, PR, Ro, MU Ct, 6 mm 18.28: JT, 30°, Ro, MU Cn 18.40: JT, 15°, PR, Ro, Cn
				1161.0 / 19.0		AGGLOMERATE: dark brown clasts in brown matrix appears clast supported.	HW				18.76: DB
				1160.0 / 20.0							19.07-19.48: FZ, 0-20mm possible drill breaks 19.67-20.23: FZ, 0-20mm possible drill breaks
		0% LOSS (21.82)				20.40m					20.27: Drill Spin
				1159.0 / 21.0		20.60m BASALT: fine grained, dark grey-black, slightly fractured	MW		40		20.51: JT, 10°, PR, Ro, Cn 20.65: JT, 5°, PR, S, Cn
						grey, with fine green clay mineral inclusions	SW to FR				20.96: JT, 5°, IR, Ro, MU Vr 21.13: JT, 30°, CU, S, MU Vr 21.21: JT, 15°, CU, S, MU Vr
				1158.0 / 22.0							21.52: JT, 25°, CU, S, MU Ct, 3 mm 21.60: JT, 25°, IR, Ro, MU Vr 21.82: JT, 10°, IR, Ro, Cn
						22.13m — some dark grey-black, more fractured increased size of green clay mineral inclusions some healed fractures					22.13: JT, 10°, PR, Ro, Cn 22.20: JT, 10°, IR, Ro, Cn 22.25: JT, 20-25°, CU, Ro, MU Ct, <10 mm 22.42: IR, Ro, Fe Cn
		0% LOSS		1157.0							22.70: JT, 15°, PR, Ro, MU Vr
				23.0 / 1156.0 / 24.0		24.00m			70		23.12: JT, 15°, CU, Ro, Cn

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

- dd/mm/yy Water Level on Date shown
- Drilling water level
- water inflow
- water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH12

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 5 OF 5

POSITION : E: 365270.900, N: 6710626.600 (56 WGS84) SURFACE ELEVATION : 1179.582 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 14/10/16 DATE COMPLETED : 18/10/16 DATE LOGGED : 18/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00/3.00 m BIT : DIAMOND IMPREG S6-10/DIAMOND IMPREG S6-10 CORE CONDITION : GOOD/GOOD

DRILLING					MATERIAL				ROCK MASS		
METHOD & CASING	WATER RETURN %	CORE LOSS % (DRILL RUN DEPTH)	SAMPLES & FIELD TESTS	ELEVATION (RL) DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral (EL, VL, L, M, H, VH, EH)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC		0% LOSS 25.24		24.0 1155.0 25.0 1154.0 26.0 1153.0 27.0 1152.0 28.0 1151.0 29.0 1150.0 30.0 1149.0 31.0 1148.0 32.0		healed fractures 25-75° 24.75m red-brown streaked yellow-brown 25.24m BOREHOLE BH12 TERMINATED AT 25.24 m Target depth	SW to FR MW to HW		70	20 40 100 300 1000	24.51-24.67: FZ, 45-80°, CU, Ro, MU Vr

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE CLAY	Iron Oxide Clay
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

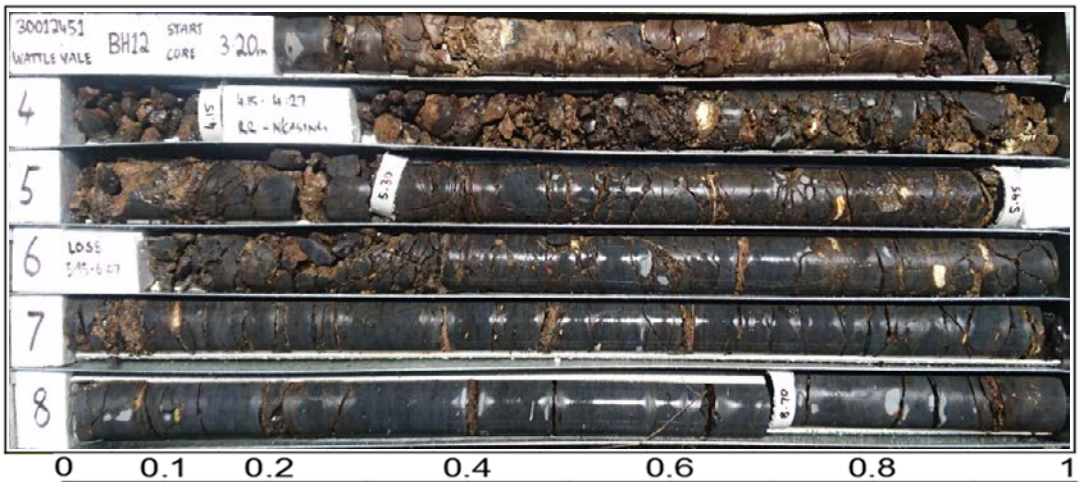
SMEC AUSTRALIA

Grey Scale

Colour Scale

Borehole Number			BH-12
Box	1	of	4
Depth	3.20m	to	9.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



Grey Scale

Colour Scale

Borehole Number			BH-12
Box	2	of	4
Depth	9.00m	to	15.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council

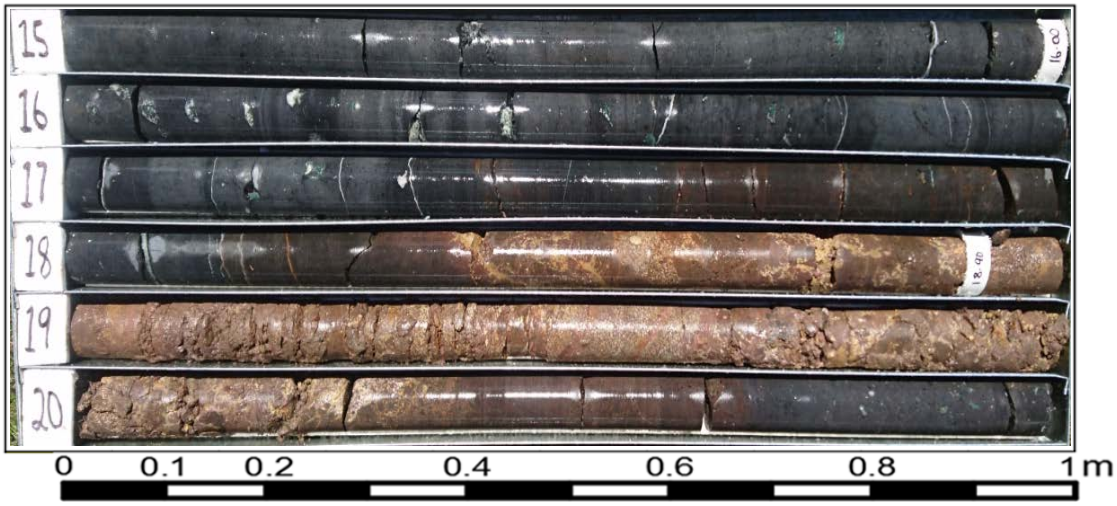
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-12
Box	3	of	4
Depth	15.00m	to	21.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



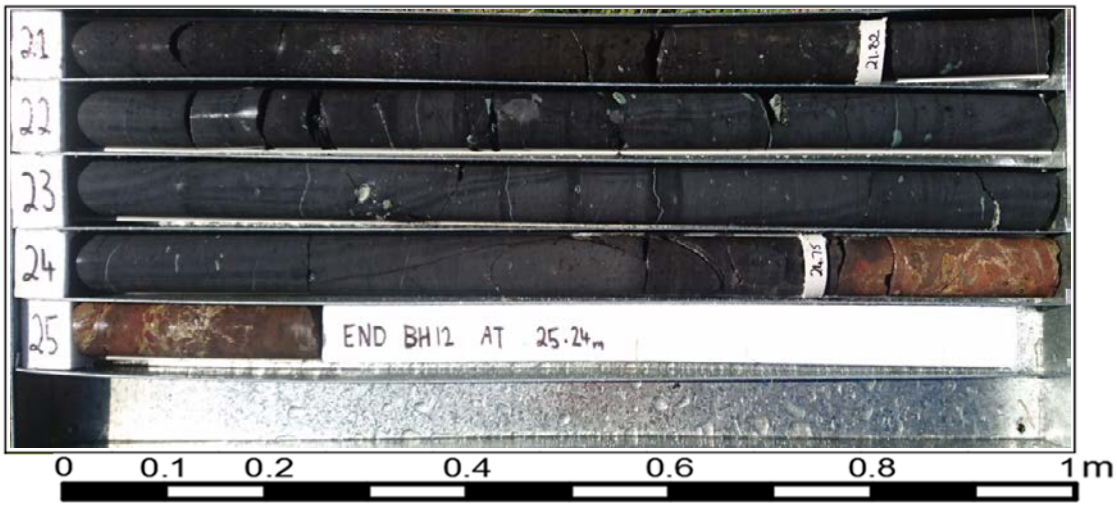
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-12
Box	4	of	4
Depth	21.00m	to	25.24m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : BH13

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 1 OF 4

POSITION : E: 365244.200, N: 6710668.200 (56 WGS84) SURFACE ELEVATION : 1176.240 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER DRILLER : MARK

DATE STARTED : 19/10/16 DATE COMPLETED : 20/10/16 DATE LOGGED : 20/10/16 LOGGED BY : BD CHECKED BY : BD

DRILLING							MATERIAL					
METHOD & SUPPORT	PENETRATION (VE E F H VH)	WATER	SAMPLES	FIELD TESTS	ELEVATION (RL)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
					1176.0	0.0		CI-CH	0.20m Silty CLAY: firm, medium to high plasticity, dark brown, moist		F	TOPSOIL 0.01: Boulders in surface material
AD/T NW Casing				0.70m SPT 10, 17, 10 N=27 1.15m		1.0		CI-CH	Silty CLAY: stiff, medium to high plasticity, brown with cobbles, moist	M	St	RESIDUAL SOIL 0.70: partial auger refusal
WR				1.50m SPT 9, 29, 30/60mm N*=104 1.86m	1175.0				1.70m			1.50: auger refusal
						2.0			BASALT: extremely weathered, extremely low strength, brown-grey streaked brown with moderately weathered fragments 2.00m			BEDROCK
					1174.0				Continued as Cored Drill Hole			
						3.0						
					1173.0							
						4.0						
					1172.0							
						5.0						
					1171.0							
						6.0						
					1170.0							
						7.0						
					1169.0							
						8.0						

METHOD
HA Hand auger
AS Auger screwing
ADV Auger drilling with V bit
ADT Auger drilling with TC bit
WB Wash-bore drilling
RR Rock Roller
NQ NQ core barrel (42mm diameter)
NMLC NMLC core barrel (52mm diameter)
HQ HQ Core Barrel (62mm diameter)

SUPPORT
T Timbering
C Casing
M Mud

PENETRATION
VE E F H VH — No Resistance

WATER
dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

SAMPLES & FIELD TESTS
B Bulk Disturbed Sample
D Disturbed Sample
E Environmental Sample
EW Water Sample
HM Hammer Bouncing
HP Hand Penetrometer (UCS kPa)
Nc SPT with solid cone
SS Split Spoon Sample
R Refusal
SPT Standard Penetration Test
U50 Undisturbed Sample (50mm dia)
U75 Undisturbed Sample (75mm dia)
VS Vane Shear; peak/remouded(kPa)

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D Dry
M Moist
W Wet
PL Plastic limit
LL Liquid limit

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
Fb	- Friable
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH13

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 2 OF 4

POSITION : E: 365244.200, N: 6710668.200 (56 WGS84) SURFACE ELEVATION : 1176.240 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 19/10/16 DATE COMPLETED : 20/10/16 DATE LOGGED : 20/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S6-10 BIT CONDITION : GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS RUN % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION — ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral (EL, VL, L, M, H, VH, EH)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
				0.0 / 1176.0							
				1.0 / 1175.0							
				2.0		2.00m START CORING AT 2.00m					
NW Casing		0% LOSS		2.0 / 1174.0		BASALT: grey, fine grained, occasional amygdales, iron stained on fractures, some clay in fractures, highly fractured	SW		0		2.00-2.06: SM, Clay FILLED 2.26-2.38: SM, 70°, Clay FILLED 2.47-2.68: FZ, Fe Sn, 20-40mm
		2.60	Is(50) d=9.14 MPa								
		0% LOSS		3.0 / 1173.0					20		2.90-3.00: JT, 75°, Un, Ro, Fe Sn 3.00-3.10: FZ, Fe Sn, 10-20mm 3.18: JT, 40°, PR, Ro, Clay Ct, 5 mm 3.27: JT, 75°, PR, S, Vr 3.28-4.00: FZ, Fe Sn, 20-40mm
		3.35									
		0% LOSS		4.0 / 1172.0		4.17m fragmented			0		4.00-4.03: SM, weathered rock 4.06: JT, 10°, IR, Ro, CA FILLED
		4.65									
	100 %RETURN	0% LOSS		5.0 / 1171.0							4.17-6.00: FZ, 5-20°, Fe Sn, 0-20mm 5.21-5.22: SM, 5°, FILLED, highly weathered rock
		0% LOSS		6.0 / 1170.0		5.65m grey to grey-brown, some sub vertical healed fractures	SW to MW		0		5.62-5.67: SM, FILLED, highly weathered to extremely weathered rock 5.65-5.90: JT, 80-90°, Un, Ro, Fe Ct, 3 mm
		6.80				6.80m grey, less fractured	SW				6.29-6.41: JT, 75°, PR, Ro, Fe Sn 6.00-6.80: FZ, Fe Sn, 20-40mm partially open 6.50-6.80: JT, 80-90°, Un, Ro, Fe Ct, 5 mm 6.80-7.00: FZ, Cn, 10-40mm
		0% LOSS	Is(50) d=6.03 MPa	7.0 / 1169.0					15		7.00-7.22: FZ, Fe Sn, 40-60mm 7.15: JT, 45°, PR, Ro, Fe Sn 7.42: JT, 70-80°, IR, Ro, Fe Sn
		7.60				7.50m brown to dark brown-grey	MW to HW				7.55-7.60: weathered seam
		0% LOSS		8.0		8.00m					7.60-8.20: JT, 15-20°, PR, Ro,

NMLC

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE CLAY	Iron Oxide Clay
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH13

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 3 OF 4

POSITION : E: 365244.200, N: 6710668.200 (56 WGS84) SURFACE ELEVATION : 1176.240 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 19/10/16 DATE COMPLETED : 20/10/16 DATE LOGGED : 20/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S6-10 BIT CONDITION : GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS RUN % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION — ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral (EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	RQD (%)	DEFECT SPACING (mm) (20, 40, 100, 300, 1000)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC	100 %RETURN	0% LOSS 8.55	Is(50) d=1.98 MPa	8.0 / 1168.0		dark grey-black, highly fractured	MW to HW		25		Cn, 30-120mm spacing 8.36: FC, 30°, IR, Ro, Cn
						8.55m dark brown					8.45-8.71: JT, 5-20°, IR, Ro, Fe Sn, 10-40mm spacing
						8.90m some sub vertical fractures coated with iron					8.81: CS 8.85-8.89: CS
				9.0							8.89-9.25: JT, 80-90°, Un, Ro, Fe Sn
		0% LOSS		1167.0		9.25m dark grey-black, generally fragmented			5		
			Is(50) d=1.98 MPa			9.90m sub vertical fractures coated with iron, frequent open and healed fractures					9.49-9.95: JT, 80-90°, Un, Ro, Fe Sn
		10.30		10.0							
		0% LOSS		1166.0							9.25-12.50: FZ, 5-30°, Fe Sn, 10-20mm spacing (partially open)
		11.60	Is(50) d=1.57 MPa	11.0 / 1165.0					0		
				12.0 / 1164.0		12.50m dark grey-brown, some fracturing with pale brown mineral veneers					11.60-11.90: JT, 80-90°, Un, Ro, Fe Sn
						12.85m AGGLOMERATE: dark brown clasts in pale brown matrix clast supported	HW				12.60-12.87: FZ, 40-60mm (drill break)
		0% LOSS	Is(50) d=0.42 MPa	13.0					30		13.00-13.33: FZ, 10-20mm (drill break)
			Is(50) d=1.07 MPa	1163.0							
						13.80m more matrix visible, matrix supported					13.33-14.25: FC, 40-200mm spacing (drill break)
				14.0							
		14.40		1162.0							
		0% LOSS	Is(50) d=0.64 MPa						40		15.00-15.14: FZ, 0-20mm (drill break)
		15.05		15.0							15.23-15.40: FC, Fe, 20-60mm spacing (drill break)
		10% LOSS		1161.0							
			Is(50) d=0.11 MPa			15.86m					15.87: JT, 30°, PR, Ro, Fe Sn
				16.0							15.96: JT, 10°, PR, Ro, Fe Sn

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH13

PROJECT : WATTLE VALLEY QUARRY	CLIENT : GLEN INNES SEVERN COUNCIL
LOCATION : MATHESON NSW	FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451	SHEET : 4 OF 4

POSITION : E: 365244.200, N: 6710668.200 (56 WGS84) SURFACE ELEVATION : 1176.240 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 19/10/16 DATE COMPLETED : 20/10/16 DATE LOGGED : 20/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S6-10 BIT CONDITION : GOOD

DRILLING

Method & Casing: NMLC (to 20.00 m)

(Water Return %)	(Core Loss Run %) Drill Depth	Samples & Field Tests	Elevation (RL)	Depth (m)
100 %RETURN (to 16.58)		Is(50) d=2.39 MPa	1160.0	16.0
0 %RETURN (16.58–16.86)	10% LOSS			
30 %RETURN (16.86–20.00)	17.75	Is(50) d=1.16 MPa	1159.0	17.0
	0% LOSS	Is(50) d=2.13 MPa	1158.0	18.0
		Is(50) d=1.94 MPa	1157.0	19.0
20.00	20.00		1156.0	20.0
			1155.0	21.0
			1154.0	22.0
			1153.0	23.0
				24.0

MATERIAL

Depth	Description	Weathering
16.10m	BASALT: dark brown-black, fine grained, iron stained healed fractures *(continued)*	HW
	grey with vesicles up to 15mm infilled with green clay minerals	
16.58m	drill string dropped 0.28m (16.58m to 16.86m)	
16.86m	dark grey-brown, some calcite at base of void	HW
17.07m	grey with vesicles up to 15mm infilled with green clay mineral	SW
17.60m	some thin calcite veins	
18.80m	calcite vein 20°, 6mm thick	
19.50m	calcite vein 10°, 12mm thick	
20.00m	BOREHOLE BH13 TERMINATED AT 20.00 m Target depth	

ROCK MASS

RQD (%): 35 (16.0–17.75), 30 (17.75–20.0)

DEFECTS

- 17.04: JT, 5-20°, Un, Ro, Fe Sn
- 17.25-17.47: FZ, Fe Sn, 10-70mm spacing (partially open)
- 17.53: JT, 40°, PR, Ro, Fe Sn
- 17.60: JT, 5°, IR, Ro, Fe Sn
- 17.75-17.93: JT, 10-20°, PR, Ro, Fe Sn, 40-60mm spacing
- 18.01-18.16: FZ, IR, Ro, Cn, 40-80mm spacing
- 18.23: VN, 5°, CA FILLED, 2 mm
- 18.27-18.41: FZ, Cn, 20-60mm
- 18.60-18.90: JT, 10-35°, PR, Ro, Cn, 20-60mm spacing
- 18.87: VN, 20°, CA FILLED, 6 mm
- 19.10-19.45: JT, 5-40°, PR, Ro, 20-40mm spacing
- 19.50: VN, 10°, CA FILLED, 12 mm
- 19.70: JT, 5°, PR, Ro, Cn
- 19.83: JT, 25°, PR, Ro, CA Vr

LEGEND

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

- dd/mm/yy Water Level on Date shown
- Drilling water level
- water inflow
- water outflow

WEATHERING

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STRENGTH

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VH	Very High
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VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE CLAY	Iron Oxide Clay
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

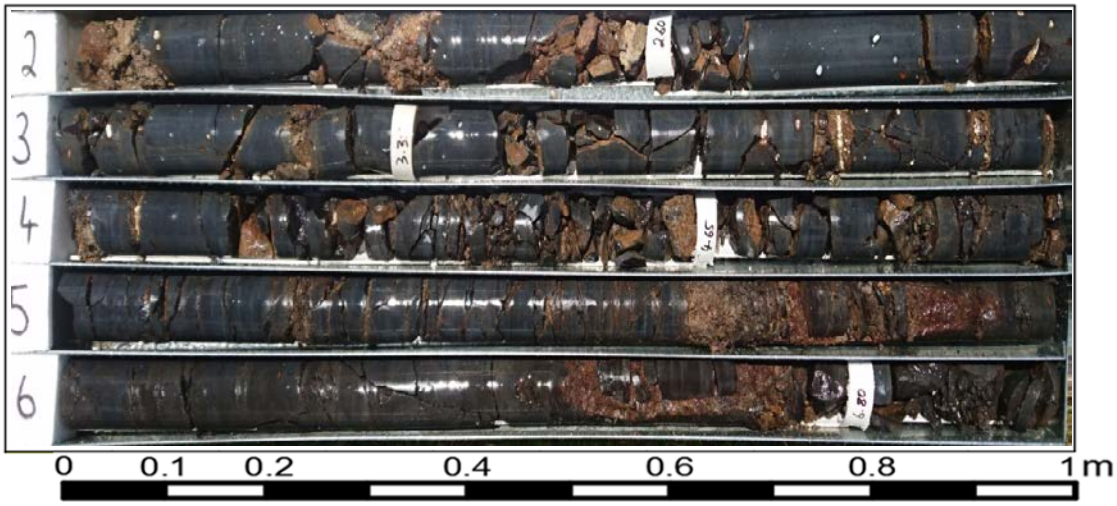
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-13
Box	1	of	4
Depth	2.00m	to	7.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



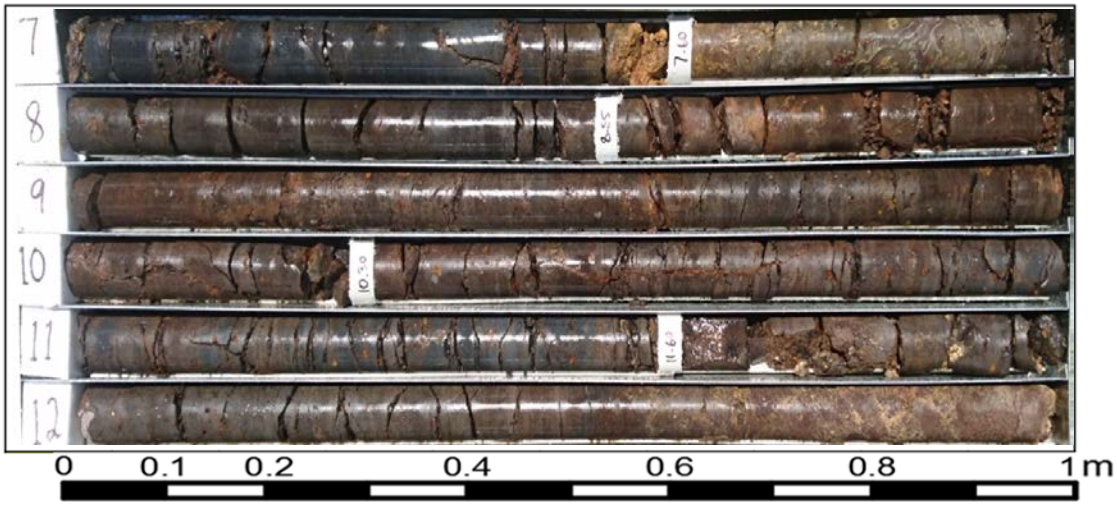
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-13
Box	2	of	4
Depth	7.00m	to	13.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



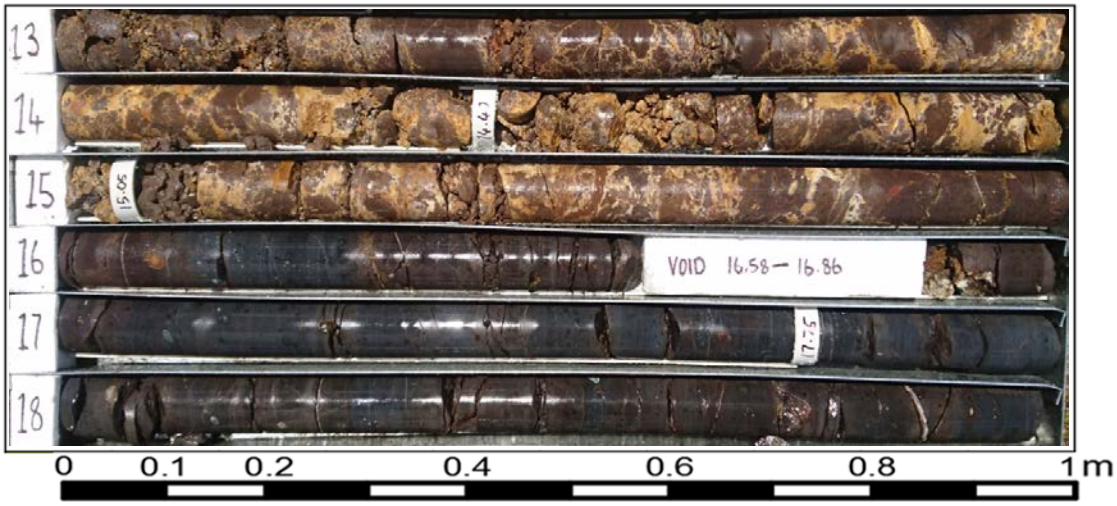
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-13
Box	3	of	4
Depth	13.00m	to	19.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



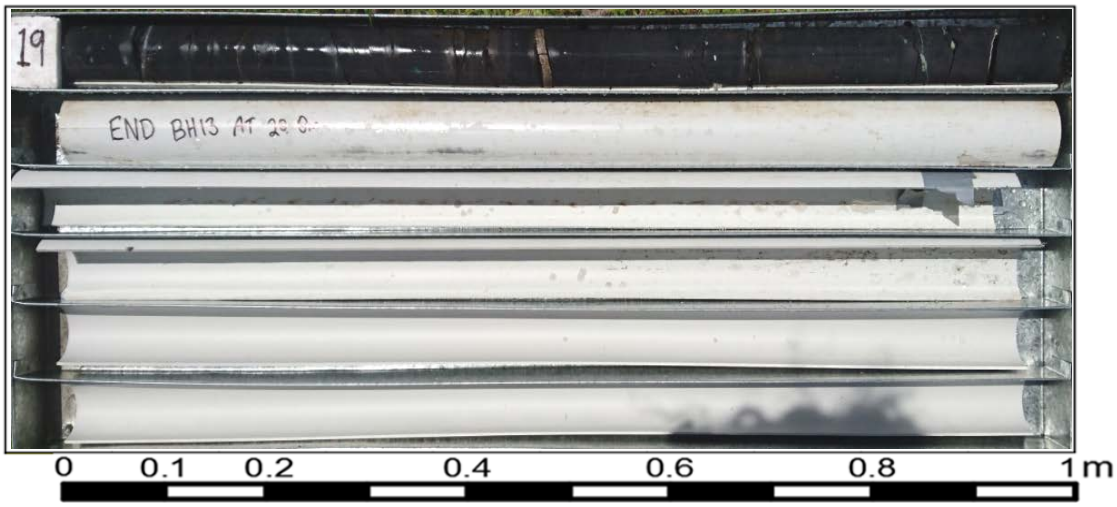
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-13
Box	4	of	4
Depth	19.00m	to	20.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : BH14

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 1 OF 4

POSITION : E: 365286.600, N: 6710750.100 (56 WGS84) SURFACE ELEVATION : 1175.224 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER DRILLER : MARK

DATE STARTED : 24/10/16 DATE COMPLETED : 25/10/16 DATE LOGGED : 25/10/16 LOGGED BY : BD CHECKED BY : BD

DRILLING								MATERIAL					
METHOD & SUPPORT	PENETRATION VE E F H VH	WATER	SAMPLES	FIELD TESTS	ELEVATION (RL)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
AD/T					1175.0	0.0		CI-CH	Silty CLAY: firm, medium to high plasticity, dark brown, moist 0.20m	M	F	TOPSOIL
								CI-CH	Silty CLAY: stiff, medium to high plasticity, red-brown, moist		St	RESIDUAL SOIL
				1.00m SPT 30/130mm HB N*=69 1.13m	1174.0	1.0			1.00m BASALT: moderately weathered to slightly weathered, very high strength fragments, grey, fragmented			BEDROCK 1.01: slightly weathered basalt chips in SPT
NW Casing					1173.0	2.0			1.60m Continued as Cored Drill Hole			1.59: Auger refusal
					1172.0	3.0						
					1171.0	4.0						
					1170.0	5.0						
					1169.0	6.0						
					1168.0	7.0						
						8.0						

METHOD
HA Hand auger
AS Auger screwing
ADV Auger drilling with V bit
ADT Auger drilling with TC bit
WB Wash-bore drilling
RR Rock Roller
NQ NQ core barrel (42mm diameter)
NMLC NMLC core barrel (52mm diameter)
HQ HQ Core Barrel (62mm diameter)

SUPPORT
T Timbering
C Casing
M Mud

PENETRATION
VE E F H VH — No Resistance

WATER
dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

SAMPLES & FIELD TESTS
B Bulk Disturbed Sample
D Disturbed Sample
E Environmental Sample
EW Water Sample
HM Hammer Bouncing
HP Hand Penetrometer (UCS kPa)
Nc SPT with solid cone
SS Split Spoon Sample
R Refusal
SPT Standard Penetration Test
U50 Undisturbed Sample (50mm dia)
U75 Undisturbed Sample (75mm dia)
VS Vane Shear; peak/remouded(kPa)

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D Dry
M Moist
W Wet
PL Plastic limit
LL Liquid limit

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
Fb	- Friable
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH14

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 2 OF 4

POSITION : E: 365286.600, N: 6710750.100 (56 WGS84) SURFACE ELEVATION : 1175.224 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 24/10/16 DATE COMPLETED : 25/10/16 DATE LOGGED : 25/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S6-10 BIT CONDITION : GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS RUN % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION (ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable))	Weathering	ESTIMATED STRENGTH Is(50)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
				1175.0 / 0.0							
				1174.0 / 1.0							
						1.60m START CORING AT 1.60m					
NW Casing		0% LOSS 1.85				BASALT: grey, fine grained, frequent healed fractures, stained with iron on defects	SW		0		1.68: JT, 15°, IR, Ro, Fe Sn 1.60-1.83: JT, 85°, PR, Ro, Fe Sn
		0% LOSS 2.25	Is(50) d=2.71 MPa	1173.0 / 2.0					35		2.15: JT, 90°, Un, Ro, Fe Sn 2.00-2.32: FZ, 20-40mm
		0% LOSS 2.60							0		2.28: JT, 70°, PR, Ro, Fe Sn 2.35-2.44: CS, 5-70°, Fe Sn, 0-80mm 2.52: JT, 45°, Fe Sn 2.64: JT, 65°, PR, Ro, CA Vr 2.71: JT, 10°, PR, Ro, Fe Sn 2.73: JT, 80°, Un, Ro, Fe Sn 2.81: JT, 20-45°, PR, Ro, Fe Sn 2.92: FC, 10°, IR, Ro, Fe Sn 3.03: SM, 10°, Clay FILLED, 10mm thick 3.15: SM, 10°, Clay FILLED, 10mm thick 3.20: JT, 10°, PR, Ro, Clay Ct, 2 mm 3.29: FC, 10°, IR, Ro, Fe Sn 3.41: JT, 10°, PR, Ro, CA Ct, 3 mm 3.55-3.56: SM, 10°, Clay FILLED 3.57-3.77: FZ, Fe CA Sn-Vr, 20-40mm 3.83: CS, 10-30°, Fe Sn, 0-10mm 4.00: JT, 70°, PR, Ro, Fe Sn 4.09-4.27: FZ, Fe Sn, 20-40mm 4.53: JT, 30°, PR, Ro, CA Vr 4.56: JT, 10°, PR, Ro, Fe Sn 4.33-4.80: CS, 10-15°, 10-20mm thick, 80-200mm spacing 4.65: JT, 65°, PR, Ro, Fe Sn 4.69: JT, 20°, PR, Ro, Fe Sn 4.75-4.90: FZ, Fe Sn, 0-20mm (partially open) 5.05: JT, 10°, PR, Ro, Fe Sn 5.12-5.18: FZ, 10-40°, Fe Sn, 0-20mm spacing 5.31-5.48: JT, 15-60°, PR, Ro, Clay Vr, 40mm spacing 5.48-5.68: FZ, Fe Sn, 20-40mm 5.80-6.08: JT, 10-30°, PR, Ro, Fe Sn, 40-130mm spacing 6.38: JT, 45°, Un, Ro, Fe Sn 6.73: JT, 45°, Un, Ro, Fe Sn
		0% LOSS 4.15	Is(50) d=4.19 MPa	1172.0 / 3.0		3.55m occasional crush seams, more fractured			20		
NMLC	100 %RETURN	0% LOSS	Is(50) d=4.47 MPa	1171.0 / 4.0					5		
		5.55	Is(50) d=5.71 MPa	1170.0 / 5.0							
		0% LOSS 6.75	Is(50) d=4.97 MPa	1169.0 / 6.0		6.75m			10		
						LAPILLI TUFF: dark brown clasts <20mm in pale orange matrix, weathered to silty sand in parts, generally fragmented (possibly due to high water pressure when drilling)	XW to HW				6.75-7.36: FZ, 0-10mm (drill break)
		0% LOSS 8.00	Is(50) d=0.11 MPa	1168.0 / 7.0 / 8.0					15		7.55-8.00: weathered seam

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE CLAY	Iron Oxide Clay
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH14

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 3 OF 4

POSITION : E: 365286.600, N: 6710750.100 (56 WGS84) SURFACE ELEVATION : 1175.224 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 24/10/16 DATE COMPLETED : 25/10/16 DATE LOGGED : 25/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S6-10 BIT CONDITION : GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION — ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC	100 %RETURN	0% LOSS	Is(50) d=0.52 MPa	8.0 / 1167.0		LAPILLI TUFF: dark brown clasts <20mm in pale orange matrix, weathered to silty sand in parts, generally fragmented (possibly due to high water pressure when drilling) *(continued)*	XW to HW				
				8.52m							
				8.65m		BASALT: dark grey-brown, fine grained, highly fractured	MW				
						grey stained with iron on defects	SW				
				9.00m							
				9.0 / 1166.0		grey to grey-brown, less fractured	MW		45		8.66-9.03: JT, 10-20°, PR, Ro, Fe Sn, 40-80mm spacing 9.07: JT, 70°, PR, Ro, Fe Ct, 2 mm 9.18: JT, 50°, PR, Ro, Fe Sn 9.25: JT, 15°, PR, Ro, Fe Sn
	9.50										
	0 %RETURN		Is(50) d=1.83 MPa								9.86: JT, 30-70°, Un, Ro, Fe Sn 9.84-10.00: FZ, Fe Sn, 20-40mm 10.07: JT, 30-60°, PR, Ro, Fe Sn 10.15: JT, 15°, PR, Ro, Fe Sn 10.22: JT, 15°, PR, Ro, Fe Sn 10.25: JT, 15°, St, Ro, Fe Sn 10.34: JT, 10°, PR, Ro, Fe Sn
	10.10			10.0 / 1165.0							
				10.50m		grey stained with iron on defects	SW				
		0% LOSS	Is(50) d=5.81 MPa						40		10.62-11.00: JT, 10-40°, IR, Ro, Fe Sn, 40-100mm spacing
				11.0 / 1164.0		grey to grey-brown, remnants of amygdales up to 8mm, highly fractured	MW				11.19: JT, 20°, PR, Ro, Fe Sn 11.00-11.50: FZ, Fe Sn, 40-60mm
	11.50			11.50m		fragmented					
				12.0 / 1163.0							11.50-13.00: FZ, Fe Sn, 0-20mm 12.50: JT, 50°, PR, Ro, Fe Sn 12.80: JT, 45°, PR, Ro, Fe Sn
	100 %RETURN	0% LOSS		13.00m		less fractured, becoming grey at 13.25m, occasional calcite veins up to 8mm thick			35		13.07: JT, 40°, PR, Ro, Fe Sn 13.23: VN, CA FILLED, 5-8mm 13.34: JT, 10°, PR, Ro, CA Ct, 3 mm 13.52: JT, 5°, PR, Ro, CA Vr
			Is(50) d=2.32 MPa	13.0 / 1162.0							
				13.76m							13.67-13.85: JT, 10-30°, Fe Sn, 15-30mm spacing
				13.89m		grey to grey-brown					
				14.0 / 1161.0		LAPILLI TUFF: dark brown clasts in pale brown matrix	HW				
	14.50		Is(50) d=0.78 MPa								
		0% LOSS		15.0 / 1160.0							14.00-16.49: FC, IR, 100-300mm spacing (drill break)
			Is(50) d=0.42 MPa	16.0							

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH14

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 4 OF 4

POSITION : E: 365286.600, N: 6710750.100 (56 WGS84) SURFACE ELEVATION : 1175.224 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 24/10/16 DATE COMPLETED : 25/10/16 DATE LOGGED : 25/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : NW BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S6-10 BIT CONDITION : GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS / RUN % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION — ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) (● Axial ○ Diametral)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) — Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC	21/11/16			16.0		LAPILLI TUFF: dark brown clasts in pale brown matrix *(continued)*	HW		10		
				1159.0		16.48m					
						BASALT: dark grey-brown, fine grained, frequent iron stained healed fractures,	MW				16.71: JT, 40-60°, PR, Fe Sn, 5 mm 16.81: JT, 10°, PR, Ro, CA Vr 16.89: JT, 5°, PR, Ro, CA Vr
		0% LOSS				16.90m					
			Is(50) d=1.95 MPa	17.0		becoming grey, some green mineral inclusions, infilled vugs up to 30mm	MW to SW				17.15-17.42: FC, IR, Ro, Cn, 80-120mm spacing 17.50-17.53: FZ, 0-20mm
				1158.0							
	26/10/16	17.60	Is(50) d=2.5 MPa								17.74-17.91: FZ, Cn, 20-40mm
	100 %RETURN			18.0							18.17-18.21: FC, 5-30°, PR, Ro, Clay Ct, <2 mm 18.26: FC, 5°, PR, VR, Fe Sn 18.39: FC, 5°, PR, VR, Fe Sn 18.51: FC, 5°, PR, VR, Fe Sn 18.53-18.73: FZ, Fe Sn, 20-40mm (patially open)
			Is(50) d=2.73 MPa	1157.0							
		0% LOSS							55		18.87: FC, 30°, PR, Ro, CA Vr
				19.0		19.00m					
			Is(50) d=4.21 MPa	1156.0		grey, massive, iron stained on defects	SW				19.11: JT, 5°, IR, Ro, Fe Sn 19.15: JT, 10°, PR, Ro, CA Ct, 2 mm 19.28: JT, 5°, PR, Ro, CA Ct, 1 mm 19.30: JT, 30°, PR, Ro, Fe Sn 19.39: JT, 20°, PR, Ro, Fe Sn 19.42: JT, 70°, PR, S, CA Vr 19.54: JT, 5°, PR, Ro, CA Ct, 3 mm 19.75: JT, 5°, PR, Ro, Fe Sn 19.93: FC, IR, Ro, Cn
						19.90m					
	20.10	20.10		20.0		20.10m dark grey-brown, grading to lapilli tuff at 20.08m.	MW				
				1155.0		BOREHOLE BH14 TERMINATED AT 20.10 m Target depth	HW				
				21.0							
				1154.0							
				22.0							
				1153.0							
				23.0							
				1152.0							
				24.0							

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE CLAY	Iron Oxide Clay
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

SMEC

Grey Scale

Colour Scale

Borehole Number			BH-14
Box	1	of	4
Depth	1.60m	to	7.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council

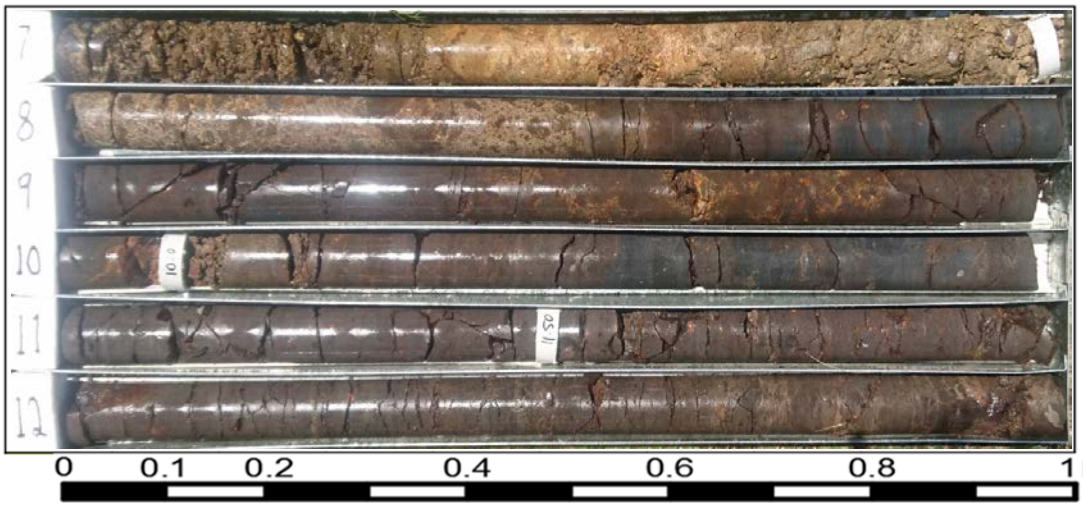
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-14
Box	2	of	4
Depth	7.00m	to	13.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



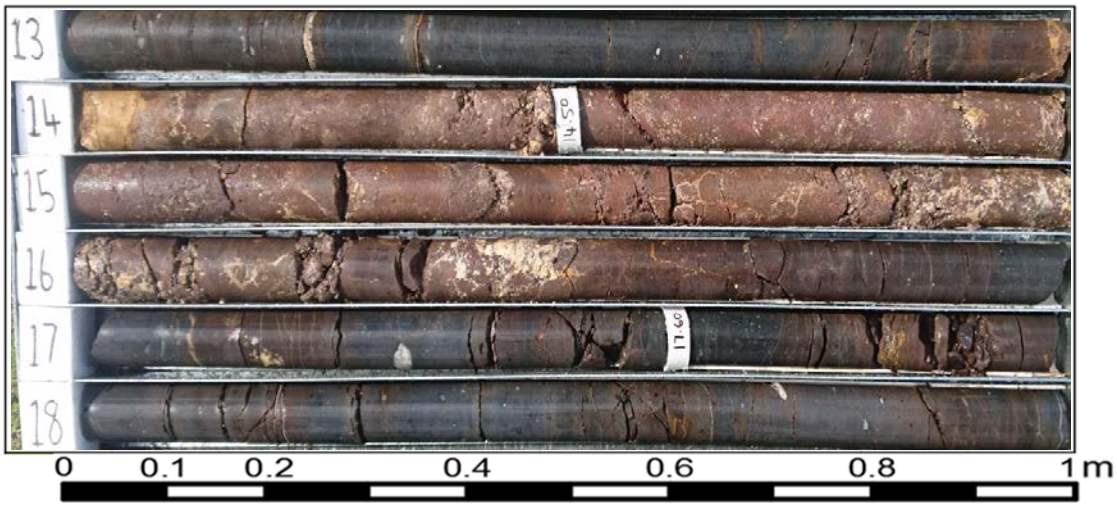
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-14
Box	3	of	4
Depth	13.00m	to	19.00m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



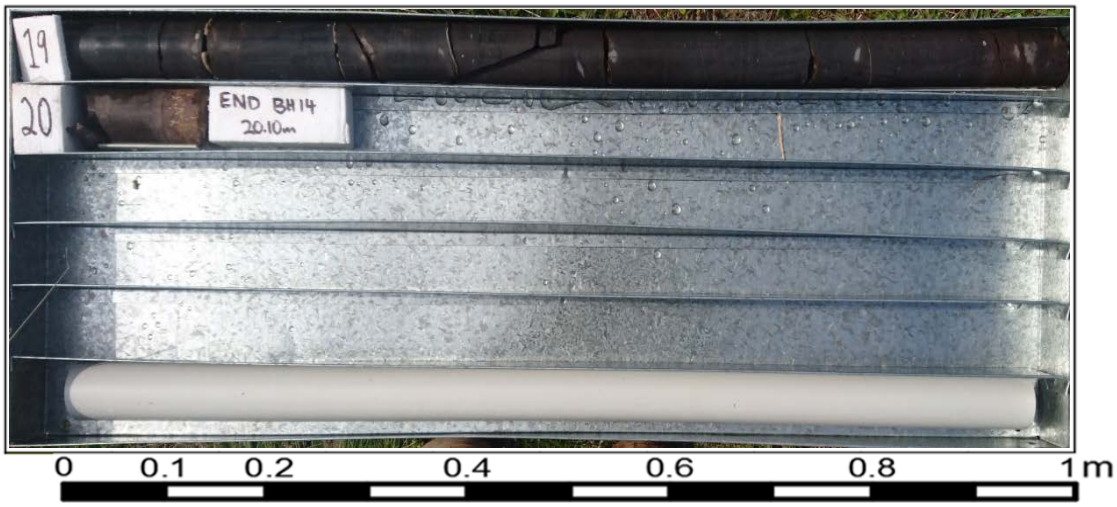
SMEC

Grey Scale

Colour Scale

Borehole Number			BH-14
Box	4	of	4
Depth	19.00m	to	21.10m

Project	Wattle Vale Quarry
Number	30012451
Client	Glen Innes Severn Council



NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : BH15

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 1 OF 5

POSITION : E: 365351.500, N: 6710694.600 (56 WGS84) SURFACE ELEVATION : 1180.250 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER DRILLER : MARK

DATE STARTED : 5/10/16 DATE COMPLETED : 7/10/16 DATE LOGGED : 7/10/16 LOGGED BY : BD CHECKED BY : BD

DRILLING | MATERIAL

METHOD & SUPPORT	PENETRATION	WATER	SAMPLES	FIELD TESTS	ELEVATION (RL)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
AD/T CASING					1180.0	0.0		CH	Silty CLAY: firm, high plasticity, dark brown, moist		F	TOPSOIL 0.01: occasional cobbles on surface
						0.50m						
				1.00m SPT 6, 13, 13 N=26 1.45m	1179.0	1.0		CH	Silty CLAY: very stiff, high plasticity, grey-brown mottled orange, moist	M	VSt	RESIDUAL SOIL
						2.00m			BASALT: extremely weathered, extremely low strength, grey-brown with highly weathered basalt fine gravel			BEDROCK
				2.50m SPT 28, 30/90mm N*=100 2.74m	1178.0	2.0						
						2.60m			slightly weathered basalt gravel is base of SPT			
						2.80m			extremely weathered to highly weathered, extremely low strength to very low strength			
				4.00m SPT 30/130mm N*=69 4.13m	1177.0	3.0						
					1176.0	4.0						
						4.30m			Continued as Cored Drill Hole			
					1175.0	5.0						
					1174.0	6.0						
					1173.0	7.0						
						8.0						

METHOD
HA Hand auger
AS Auger screwing
ADV Auger drilling with V bit
ADT Auger drilling with TC bit
WB Wash-bore drilling
RR Rock Roller
NQ NQ core barrel (42mm diameter)
NMLC NMLC core barrel (52mm diameter)
HQ HQ Core Barrel (62mm diameter)

SUPPORT
T Timbering
C Casing
M Mud

PENETRATION
VE E F H VH
No Resistance

WATER
dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

SAMPLES & FIELD TESTS
B Bulk Disturbed Sample
D Disturbed Sample
E Environmental Sample
EW Water Sample
HM Hammer Bouncing
HP Hand Penetrometer (UCS kPa)
Nc SPT with solid cone
SS Split Spoon Sample
R Refusal
SPT Standard Penetration Test
U50 Undisturbed Sample (50mm dia)
U75 Undisturbed Sample (75mm dia)
VS Vane Shear; peak/remouded(kPa)

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D Dry
M Moist
W Wet
PL Plastic limit
LL Liquid limit

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
Fb	- Friable
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH15

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 2 OF 5

POSITION : E: 365351.500, N: 6710694.600 (56 WGS84) SURFACE ELEVATION : 1180.250 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 5/10/16 DATE COMPLETED : 7/10/16 DATE LOGGED : 7/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : HWT BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS % (RUN / DRILL. DEPTH)	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION — ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) (● Axial ○ Diametral)	RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) — Description, orientation, infilling or coating, shape, roughness, thickness, other
				0.0 / 1180.0							
				1.0 / 1179.0							
				2.0 / 1178.0							
				3.0 / 1177.0							
				4.0 / 1176.0		4.30m START CORING AT 4.30m					
HQ3 CASING		0% LOSS 4.80				4.44m CORE LOSS 0.14m (4.30-4.44) CORE LOSS 0.14m (4.30m to 4.44m)	MW		0		4.44-5.00: recovered as medium course gravel, redrilled fragment some clay fines
RR		0% LOSS 5.00				BASALT: dark grey-black stained with iron, fine grained, some clay fragmented 5.00m			0		
HQ3		100% LOSS 5.52		5.0 / 1175.0		CORE LOSS 0.52m (5.00-5.52) CORE LOSS 0.52m (5.00m to 5.52m) 5.52m			0		5.52: switched to NMLC
NMLC	100 %RETURN	0% LOSS				BASALT: dark grey-black stained with iron, fine grained, some clay fragmented 5.82m	MW				5.52-5.82: recovered as medium course gravel, redrilled fragment some clay fines
				6.0 / 1174.0		highly fractured to fragmented clay coated defects 6.50m			0		5.82-6.40: FZ, Fe Sn, 20-40mm
						fragmented 6.77m					6.40: JT, 15°, PR, Ro, Clay Ct 6.41: JT, 15°, PR, Ro, Clay Ct 6.50-6.77: FZ, Fe Sn, 0-20mm
						highly fractured					6.77-6.86: FZ, Fe Sn, 20-40mm 6.87-7.05: FZ, Clay Cn, 20-40mm 7.10: JT, 20°, PR, Ro, Clay Ct, 3 mm 7.15-7.35: FZ, Fe Sn, 20-40mm 7.38: SM, 10-20°, PR, Ro, Clay FILLED
	14/10/16	7.28		7.0 / 1173.0		7.72m					
		0% LOSS	Is(50)	8.0		less fractured, occasional amygdales <5mm, occasional sub vertical healed fractures			25		7.37-7.72: JT, 15-40°, PR, Ro, Fe Sn, 20-40mm spacing

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE CLAY	Iron Oxide Clay
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH15

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 3 OF 5

POSITION : E: 365351.500, N: 6710694.600 (56 WGS84) SURFACE ELEVATION : 1180.250 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 5/10/16 DATE COMPLETED : 7/10/16 DATE LOGGED : 7/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : HWT BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING

METHOD & CASING	WATER RETURN %	CORE LOSS RUN % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL)	DEPTH (m)
NMLC	100 %RETURN	0% LOSS 8.38	d=0.52 MPa	1172.0	8.0
		0% LOSS 9.68	Is(50) d=8.26 MPa	1171.0	9.0
		0% LOSS 11.68	Is(50) d=5.37 MPa	1170.0	10.0
		0% LOSS 12.38	Is(50) d=1.28 MPa	1169.0	11.0
		0% LOSS 14.08	Is(50) d=0.37 MPa	1168.0	12.0
		0% LOSS 14.35	Is(50) d=2.53 MPa	1167.0	13.0
		0% LOSS	Is(50) d=7.56 MPa	1166.0	14.0
				1165.0	15.0
					16.0

MATERIAL

GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH
	less fractured, occasional amygdales <5mm, occasional sub vertical healed fractures *(continued)*	MW	
	8.35m highly fractured		
	8.85m grey, iron stained on joints, slightly fractured	SW	
	9.50m highly fractured		
	10.02m less fractured, occasional crush seams		
	10.44m unbroken, some sub vertical closed fractures		
	11.91m 12.01m brown	MW	
	LAPILLI TUFF: dark brown fine to medium gravel sized clasts in brown matrix, matrix supported, highly weathered, low strength	HW	
		EW to HW	
		HW	
	13.75m matrix becoming pale brown		
	14.23m BASALT: dark grey-brown appears altered, fine grained	MW	
	14.60m becoming grey, altered band at 14.60-14.80m	SW	
	15.67m some fine gravel sized clay mineral inclusions, sub vertical joint filled with clay mineral		

ROCK MASS

RQD (%)	DEFECT SPACING (mm)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
25		7.97: JT, 20°, PR, Ro, Fe Ct 8.00-8.35: JT, 15-20°, Un, Ro, Fe Sn, 40-60mm spacing
15		8.35-8.79: FZ, Fe Sn, 20-40mm (disturbed during handling) 8.79-8.89: JT, 5-70°, PR, Ro, Fe Sn, 20-40mm 9.05: JT, 20-30°, IR, Ro, Fe Sn 9.11: JT, 40°, IR, Ro, Cn 9.15: JT, 10°, PR, Sm, Fe Clay Vr
		9.34-10.02: JT, 10-15°, PR, Ro, Fe Sn, 40-60mm spacing 9.75: SM, 10°, Clay FILLED
60		10.13: JT, 10°, PR, Ro, Cn 10.20: JT, 20°, PR, Ro, Cn 10.28-10.39: CS, 5-10°, Clay Ct, 10mm thick 60mm spacing 10.44: JT, 20°, PR, Ro, Cn
		11.37: JT, 5°, PR, Ro, Fe Sn
30		11.81: JT, 5°, PR, Ro, Cn 11.91: JT, 25°, PR, Ro, Fe Sn 11.95: JT, 20°, PR, Ro, Fe Sn
0		12.00-12.68: FZ, 0-5°, 20-40mm spacing 12.82-12.95: FZ 13.02-13.33: extremely weather to highly weathered 13.43-13.52: CS 13.65-13.67: CS, 35-50° 13.86: JT, 50°, IR, Ro 13.92: JT, 5°, PR, Ro, Cn
0		14.05-14.43: JT, 5-20°, IR, Ro, Cn, 20-60mm spacing 14.75-14.78: FZ, 0-10,,
		15.20: JT, 5°, PR, Ro, MU Vr
95		15.63: JT, 15°, PR, Ro, Fe Sn 15.80: FC, 25°, Un, Ro, MU Vr, partially open

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
PQ3	PQ3 Core Barrel
R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

STRENGTH

EH	Extremely High
VH	Very High
H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
VR	Very Rough

DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
X	Carbonaceous

See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH15

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 4 OF 5

POSITION : E: 365351.500, N: 6710694.600 (56 WGS84) SURFACE ELEVATION : 1180.250 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 5/10/16 DATE COMPLETED : 7/10/16 DATE LOGGED : 7/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : HWT BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING | MATERIAL | ROCK MASS

METHOD & CASING	WATER RETURN %	CORE LOSS % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION (ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral (EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	RQD (%)	DEFECT SPACING (mm) (20, 40, 100, 300, 1000)	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC	100 %RETURN	0% LOSS / 17.35	Is(50) d=0.49 MPa; Is(50) d=5.59 MPa	16.0 (1164.0)		some fine gravel sized clay mineral inclusions, sub vertical joint filled with clay mineral *(continued)*	SW		95		15.93: JT, 75°, PR, MU Ct, 5 mm 16.57: FC, 25°, Un, Ro, MU Vr 16.67: JT, 5°, Un, Ro, MU Ct
				17.0 (1163.0)		17.06m some vesicles up to 20mm filled with green blue mineral					16.94: JT, 20°, PR, Ro, MU Vr 17.22: JT, 10-20°, PR, Ro, Fe Sn, 5 mm 17.35: JT, 5-20°, IR, Ro, 10 mm
				18.0 (1162.0)		17.50m frequent sub vertical and sub horizontal fractures with carbonaceous mineral veneers, 50-100mm spacing predominantly dark grey					17.48: JT, 35°, IR, Ro, Fe Sn 17.62: JT, 75°, Pl-St, X Vr, 5 mm 17.65: JT, 20°, PR, Ro, Clay Ct, 2 mm 17.93: JT, 75°, Pl-St, Ro, X Vr, 3 mm
		0% LOSS		19.0 (1161.0)		19.00m some grey-brown stains around defects	SW to MW		60		18.50: JT, 5°, PR, Ro, Fe Sn 18.62: JT, 5-15°, IR, Ro, Fe Sn 18.93: JT, 60°, PR, Ro, Fe Ct, 3 mm 19.05-19.34: JT, 10-15°, IR, Ro, Fe Sn, 40-100mm spacing 19.51: JT, 10°, PR, Ro, Fe Sn, 2 mm 19.67-19.74: JT, 10-20°, PR, Ro, Fe Sn, 10-30mm spacing 19.86: JT, 10°, PR, Ro, Cn
		20.45	Is(50) d=2.17 MPa	20.0 (1160.0)		20.40m	MW				20.12-20.30: FC, 20-30°, Fe Sn, 40-100mm spacing partially open
				21.0 (1159.0)		LAPILLI TUFF: brown fine to medium gravel sized clasts in pale brown matrix, matrix supported, highly weathered, low strength	HW				
		0% LOSS	Is(50) d=0.46 MPa	22.0 (1158.0)		22.23m clast size increasing appears more clast supported					22.45: JT, 10°, PR, Ro, Fe Sn
			Is(50) d=0.23 MPa	22.85m		BASALT: dark grey-brown becoming grey with fine to medium gravel sized green-blue inclusions	SW		35		22.86: JT, 20°, PR, S, Fe Sn, 5 mm 22.89: JT, 5°, PR, S, Fe Sn 23.04: JT, 30°, PR, Ro, Fe Sn 23.21: JT, 60°, PR, S, Cn 23.30: JT, 10°, PR, Ro, Cn
			Is(50) d=5.13 MPa	23.0 (1157.0)							
			Is(50) d=1.89 MPa	24.0							23.42-23.95: JT, 10-30°, PR, Ro, Cn, 50-150mm spacing

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
DT	Diatube
HMLC	HMLC Core Barrel
HQ3	HQ3 Core Barrel
NMLC	NMLC Core Barrel
NQ3	NQ3 Core Barrel
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R	Rock Roller

WATER

dd/mm/yy Water Level on Date shown
Drilling water level
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WEATHERING

FR	Fresh
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MW	Moderately Weathered
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STRENGTH

EH	Extremely High
VH	Very High
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L	Low
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ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
SL	Slickensided
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DEFECT TYPE

BP	Bedding Plane
CL	Cleavage
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void
FA	Fault

COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE	Iron Oxide Clay
CLAY	
KT	Chlorite
MS	Secondary Mineral
MU	Unidentified Mineral
QZ	Quartz
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See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA

CORED DRILL HOLE LOG

HOLE NO : BH15

PROJECT : WATTLE VALLEY QUARRY
LOCATION : MATHESON NSW
CLIENT : GLEN INNES SEVERN COUNCIL
FEATURE : PROPOSED QUARRY
FILE / JOB NO : 30012451
SHEET : 5 OF 5

POSITION : E: 365351.500, N: 6710694.600 (56 WGS84) SURFACE ELEVATION : 1180.250 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : HYDRAPOWER SCOUT MOUNTING : TRUCK CONTRACTOR : DRILL POWER HOLE DIA : mm

DATE STARTED : 5/10/16 DATE COMPLETED : 7/10/16 DATE LOGGED : 7/10/16 LOGGED BY : BD CHECKED BY : BD

CASING DIAMETER : HWT BARREL (Length) : 3.00 m BIT : DIAMOND IMPREG S10-S12 BIT CONDITION : GOOD

DRILLING					MATERIAL			ROCK MASS		
METHOD & CASING	WATER RETURN %	CORE LOSS RUN % / DRILL DEPTH	SAMPLES & FIELD TESTS	ELEVATION (RL) / DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral EL 0.03 VL 0.1 L 0.3 M 1 H 3 VH 10 EH	RQD (%)	DEFECT SPACING (mm) 20 40 100 300 1000	DEFECTS (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC	100 %RETURN 25.00	0% LOSS 25.00	Is(50) d=2.3 MPa	24.0 1156.0		BASALT: dark grey-brown becoming grey with fine to medium gravel sized green-blue inclusions *(continued)*	SW		35		24.40: JT, 10°, PR, Ro, Cn 24.60: JT, 0-15°, PR, Ro, Cn 24.85: JT, 10°, PR, Ro, Cn
				25.0		25.00m BOREHOLE BH15 TERMINATED AT 25.00 m Target depth					
				1155.0 26.0							
				1154.0 27.0							
				1153.0 28.0							
				1152.0 29.0							
				1151.0 30.0							
				1150.0 31.0							
				1149.0 32.0							

DRILLING

AD/T	Auger Drilling with TC Bit
AD/V	Auger Drilling with V Bit
AS	Auger Screwing
DB	Washbore with Drag Bit
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HMLC	HMLC Core Barrel
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WATER

dd/mm/yy Water Level on Date shown
Drilling water level
water inflow
water outflow

WEATHERING

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STRENGTH

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H	High
M	Medium
L	Low
VL	Very Low
EL	Extremely Low

ROUGHNESS

POL	Polished
RF	Rough
S	Smooth
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DEFECT TYPE

BP	Bedding Plane
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CZ	Crushed Zone
DB	Drilling Break
FC	Fracture
HB	Handling Break
IS	Infilled Seam
JT	Joint
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
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COATING

CN	Clean
CT	Coating (>= 1.0m)
FILLED	Filled
SN	Stained
VR	Veneer (< 1.0mm)

PLANARITY

CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
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INFILL

CA	Calcite
CLAY	Clay
FE	Iron Oxide
FE CLAY	Iron Oxide Clay
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QZ	Quartz
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See Explanatory Notes for details of abbreviations & basis of descriptions.

SMEC AUSTRALIA