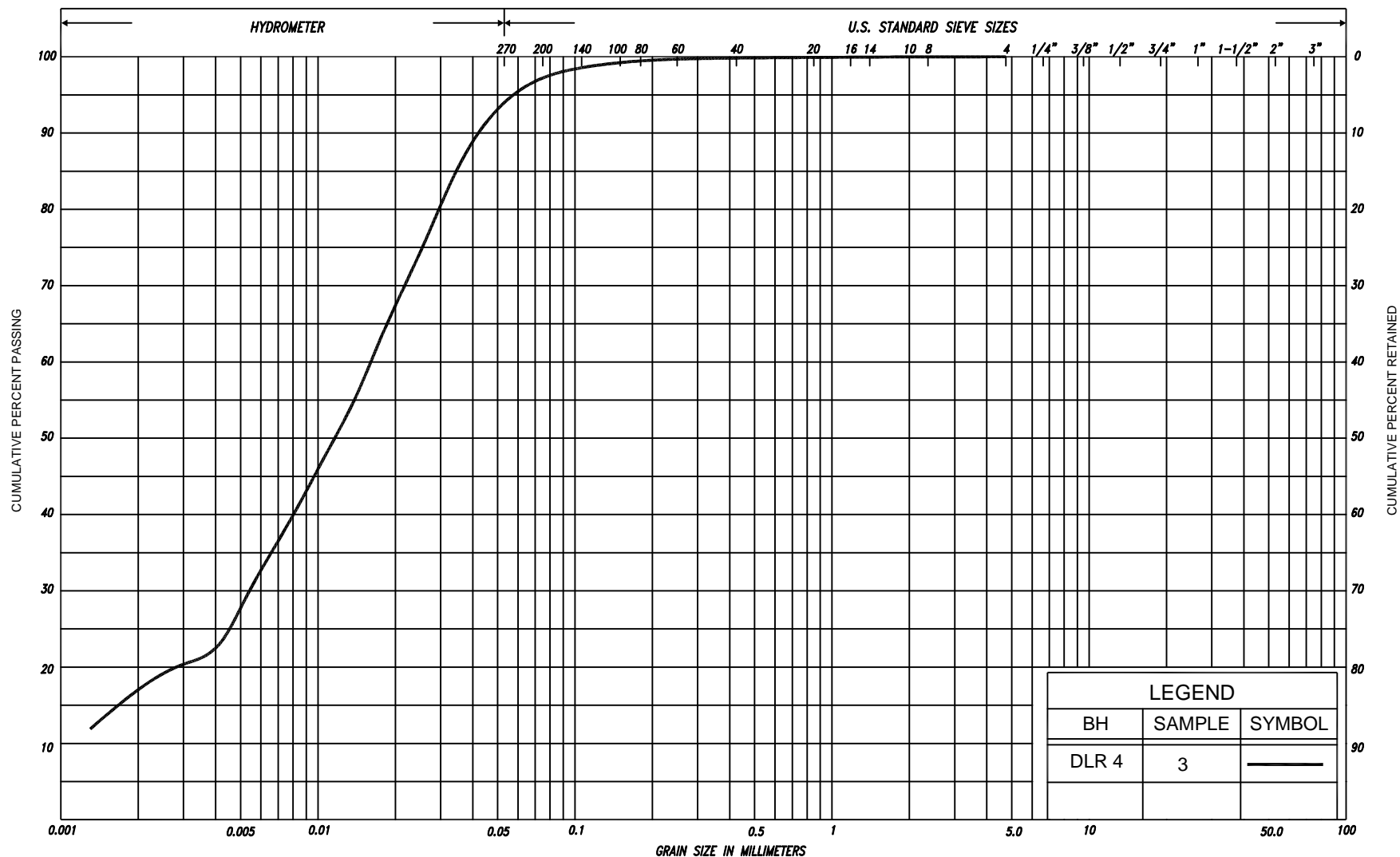


Ministry of
Transportation
Ontario

PLASTICITY CHART

CLAYEY SILT, trace sand

FIG No. PC-DLR-2
HWY: 17 (ROUTE 4)
G.W.P. No. 156-98-00



| | | | | | | | | | | | | | | | | |
|-------------|------|------|--------|------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|--------|-------------|
| SILT & CLAY | | | | FINE | | MEDIUM | | COARSE | | GRAVEL | | | COBBLES | UNIFIED | | |
| CLAY | FINE | | MEDIUM | | COARSE | | SAND | | GRAVEL | | | COBBLES | M.I.T. | | | |
| | SILT | | | | FINE | | MEDIUM | | COARSE | | GRAVEL | | | COBBLES | M.I.T. | |
| CLAY | | SILT | | | V. FINE | | FINE | | MED. | | COARSE | | GRAVEL | | | U.S. BUREAU |
| | | | | | SAND | | | | | | | | | | | |

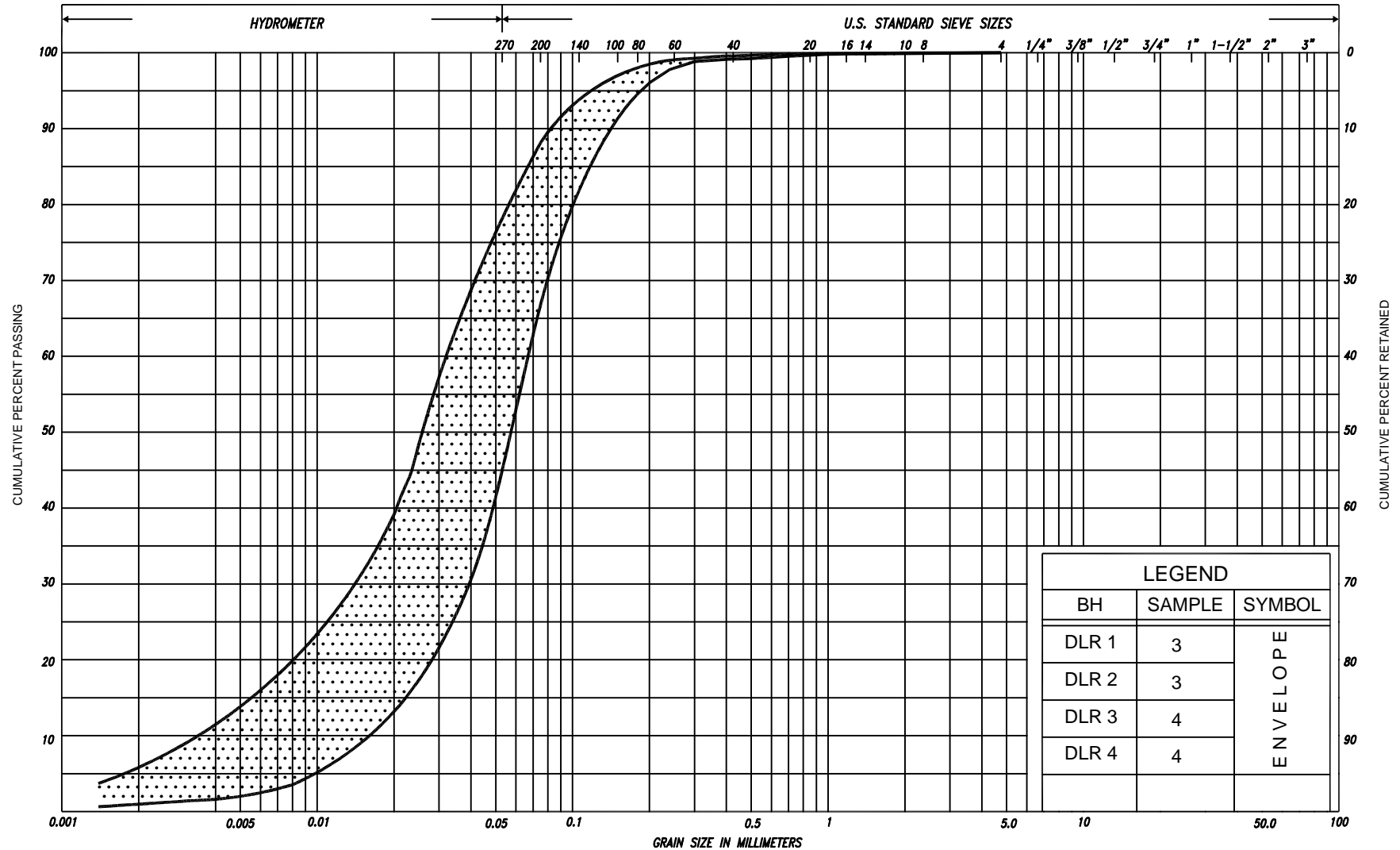
GRAIN SIZE DISTRIBUTION

CLAYEY SILT, trace sand

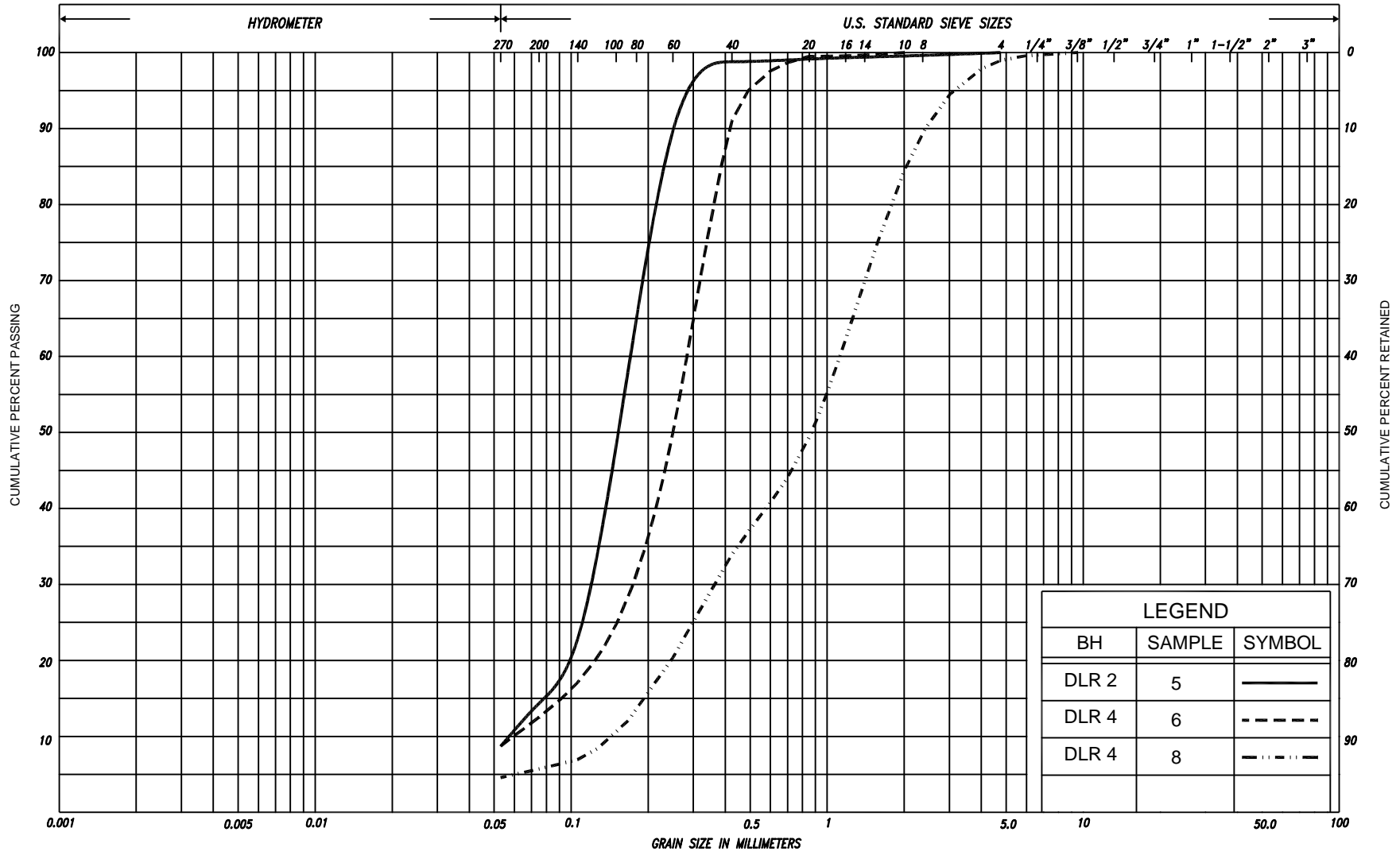


Ministry of
Transportation
Ontario

FIG No. GS-DLR-2
HWY: 17 (ROUTE 4)
G.W.P. No. 156-98-00



| | | | | | | | | | | | | | | | |
|-------------|------|------|--------|--|---------|------|--------|--------|--------|--------|--------|--|-------------|---------|-------------|
| SILT & CLAY | | | | | FINE | | MEDIUM | | COARSE | GRAVEL | | | COB BLES | UNIFIED | |
| | | | | | SAND | | | | | | | | | | |
| CLAY | FINE | | MEDIUM | | COARSE | FINE | | MEDIUM | | COARSE | GRAVEL | | | COBBLES | M.I.T. |
| | SILT | | | | | | | SAND | | | | | | | |
| CLAY | | SILT | | | V. FINE | FINE | MED. | COARSE | GRAVEL | | | | | | U.S. BUREAU |
| | | | | | SAND | | | | | | | | | | |



| | | | | | | | | | | | | |
|-------------|------|--|--|---------|--|--------|--|--------|--------|--------|---------|-------------|
| SILT & CLAY | | | | FINE | | MEDIUM | | COARSE | GRAVEL | | COBBLES | UNIFIED |
| CLAY | SAND | | | FINE | | MEDIUM | | COARSE | GRAVEL | | COBBLES | M.I.T. |
| | SILT | | | V. FINE | | FINE | | MED. | COARSE | GRAVEL | | U.S. BUREAU |

GRAIN SIZE DISTRIBUTION

SAND, trace to some silt, trace gravel

EXPLANATION OF TERMS USED IN REPORT

N VALUE: THE STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D. SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED THUS \bar{N} .

DYNAMIC CONE PENETRATION TEST: CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475 J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH (c_u) AS FOLLOWS:

| c_u (kPa) | 0 - 12 | 12 - 25 | 25 - 50 | 50 - 100 | 100 - 200 | > 200 |
|-------------|-----------|---------|---------|----------|------------|-------|
| | VERY SOFT | SOFT | FIRM | STIFF | VERY STIFF | HARD |

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

| N (BLOWS/0.3m) | 0 - 5 | 5 - 10 | 10 - 30 | 30 - 50 | > 50 |
|----------------|------------|--------|---------|---------|------------|
| | VERY LOOSE | LOOSE | COMPACT | DENSE | VERY DENSE |

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND / OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (R Q D), FOR MODIFIED RECOVERY, IS:

| R Q D (%) | 0 - 25 | 25 - 50 | 50 - 75 | 75 - 90 | 90 - 100 |
|-----------|-----------|---------|---------|---------|-----------|
| | VERY POOR | POOR | FAIR | GOOD | EXCELLENT |

JOINTING AND BEDDING:

| SPACING | 50mm | 50 - 300mm | 0.3m - 1m | 1m - 3m | > 3m |
|----------|------------|------------|------------|---------|------------|
| JOINTING | VERY CLOSE | CLOSE | MOD. CLOSE | WIDE | VERY WIDE |
| BEDDING | VERY THIN | THIN | MEDIUM | THICK | VERY THICK |

ABBREVIATIONS AND SYMBOLS

FIELD SAMPLING

| | | | |
|-----|---------------------|-----|----------------------------|
| S S | SPLIT SPOON | T P | THINWALL PISTON |
| W S | WASH SAMPLE | O S | OSTERBERG SAMPLE |
| S T | SLOTTED TUBE SAMPLE | R C | ROCK CORE |
| B S | BLOCK SAMPLE | P H | T W ADVANCED HYDRAULICALLY |
| C S | CHUNK SAMPLE | P M | T W ADVANCED MANUALLY |
| T W | THINWALL OPEN | F S | FOIL SAMPLE |
| F V | FIELD VANE | | |

STRESS AND STRAIN

| | | |
|--------------------------------------|-----|-------------------------------|
| u_w | kPa | PORE WATER PRESSURE |
| u | 1 | PORE PRESSURE RATIO |
| σ | kPa | TOTAL NORMAL STRESS |
| σ' | kPa | EFFECTIVE NORMAL STRESS |
| τ | kPa | SHEAR STRESS |
| $\sigma_1, \sigma_2, \sigma_3$ | kPa | PRINCIPAL STRESSES |
| ϵ | % | LINEAR STRAIN |
| $\epsilon_1, \epsilon_2, \epsilon_3$ | % | PRINCIPAL STRAINS |
| E | kPa | MODULUS OF LINEAR DEFORMATION |
| G | kPa | MODULUS OF SHEAR DEFORMATION |
| μ | 1 | COEFFICIENT OF FRICTION |

MECHANICAL PROPERTIES OF SOIL

| | | |
|----------------|------------|--------------------------------------|
| m_v | kPa^{-1} | COEFFICIENT OF VOLUME CHANGE |
| C_c | 1 | COMPRESSION INDEX |
| C_s | 1 | SWELLING INDEX |
| C_α | 1 | RATE OF SECONDARY CONSOLIDATION |
| c_v | m^2/s | COEFFICIENT OF CONSOLIDATION |
| H | m | DRAINAGE PATH |
| T_v | 1 | TIME FACTOR |
| U | % | DEGREE OF CONSOLIDATION |
| σ'_{vo} | kPa | EFFECTIVE OVERBURDEN PRESSURE |
| σ'_p | kPa | PRECONSOLIDATION PRESSURE |
| τ_f | kPa | SHEAR STRENGTH |
| c' | kPa | EFFECTIVE COHESION INTERCEPT |
| ϕ' | -° | EFFECTIVE ANGLE OF INTERNAL FRICTION |
| c_u | kPa | APPARENT COHESION INTERCEPT |
| ϕ_u | -° | APPARENT ANGLE OF INTERNAL FRICTION |
| τ_R | kPa | RESIDUAL SHEAR STRENGTH |
| τ_r | kPa | REMOULDED SHEAR STRENGTH |
| S_t | 1 | SENSITIVITY = $\frac{c_u}{\tau_r}$ |

PHYSICAL PROPERTIES OF SOIL

| | | | | | | | | |
|----------------|----------|--------------------------------|-------|------|---|-----------|----------|---|
| ρ_s | kg/m^3 | DENSITY OF SOLID PARTICLES | n | 1, % | POROSITY | e_{max} | 1, % | VOID RATIO IN LOOSEST STATE |
| γ_s | kN/m^3 | UNIT WEIGHT OF SOLID PARTICLES | w | 1, % | WATER CONTENT | e_{min} | 1, % | VOID RATIO IN DENSEST STATE |
| ρ_w | kg/m^3 | DENSITY OF WATER | S_r | % | DEGREE OF SATURATION | I_D | 1 | DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$ |
| γ_w | kN/m^3 | UNIT WEIGHT OF WATER | w_L | % | LIQUID LIMIT | D | mm | GRAIN DIAMETER |
| ρ | kg/m^3 | DENSITY OF SOIL | w_p | % | PLASTIC LIMIT | D_n | mm | n PERCENT - DIAMETER |
| γ | kN/m^3 | UNIT WEIGHT OF SOIL | w_s | % | SHRINKAGE LIMIT | C_u | 1 | UNIFORMITY COEFFICIENT |
| ρ_d | kg/m^3 | DENSITY OF DRY SOIL | I_p | % | PLASTICITY INDEX = $w_L - w_p$ | h | m | HYDRAULIC HEAD OR POTENTIAL |
| γ_d | kN/m^3 | UNIT WEIGHT OF DRY SOIL | I_L | 1 | LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$ | q | m^3/s | RATE OF DISCHARGE |
| ρ_{sat} | kg/m^3 | DENSITY OF SATURATED SOIL | I_C | 1 | CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$ | v | m/s | DISCHARGE VELOCITY |
| γ_{sat} | kN/m^3 | UNIT WEIGHT OF SATURATED SOIL | DTPL | | DRIER THAN PLASTIC LIMIT | i | 1 | HYDRAULIC GRADIENT |
| ρ' | kg/m^3 | DENSITY OF SUBMERGED SOIL | APL | | ABOUT PLASTIC LIMIT | k | m/s | HYDRAULIC CONDUCTIVITY |
| γ' | kN/m^3 | UNIT WEIGHT OF SUBMERGED SOIL | WTPL | | WETTER THAN PLASTIC LIMIT | j | kN/m^3 | SEEPAGE FORCE |
| e | 1, % | VOID RATIO | | | | | | |

RECORD OF BOREHOLE No DLR-1

1 of 1

METRIC

G.W.P. 156-98-00 LOCATION Co-ords 5 136 617 N; 276 294 E ORIGINATED BY F.P.
 DIST Sudbury HWY 17 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY F.P.
 DATUM Geodetic DATE April 19, 2007 CHECKED BY C.N.

| SOIL PROFILE | | | SAMPLES | | | GROUND WATER CONDITIONS | ELEVATION SCALE | DYNAMIC CONE PENETRATION RESISTANCE PLOT | | | | | PLASTIC LIMIT w _p | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w _L | UNIT WEIGHT γ kN/m ³ | REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL | | | |
|---------------|--|------------|---------|------|------------|----------------------------|-----------------|---|----|-----|----|----|------------------------------------|-------------------------------------|-----------------------------------|--|--|-------------------|--|--|
| ELEV DEPTH | DESCRIPTION | STRAT PLOT | NUMBER | TYPE | "N" VALUES | | | SHEAR STRENGTH kPa | | | | | | | | | | WATER CONTENT (%) | | |
| | | | | | | | | ○ UNCONFINED + FIELD VANE | | | | | | | | | | | | |
| | | | | | | | | ● QUICK TRIAXIAL × LAB VANE | | | | | | | | | | | | |
| 267.2 | Ground Surface | | | | | 20 | 40 | 60 | 80 | 100 | 20 | 40 | 60 | | | | | | | |
| 0.0 | Asphalt (50mm) over Sand and gravel | | | | | | | | | | | | | | | | | | | |
| 0.3 | Compact Brown (PAVEMENT FILL) | | 1 | SS | 17 | | | | | | | ○ | | | | | | | | |
| 266.0 | Clayey silt trace sand, organics | | 2 | SS | 25 | | | | | | | ○ | | | | | | | | |
| 1.2 | Very stiff Brown Moist Silt some sand, trace clay thin layers of sandy silt | | 3 | SS | 22 | | | | | | | ○ | Non-plastic | | 0 12 82 6 | | | | | |
| | Compact Brown Moist | | | | | | | | | | | | | | | | | | | |
| | | | 4 | SS | 18 | | | | | | | ○ | | | | | | | | |
| 263.2 | | | | | | | | | | | | | | | | | | | | |
| 4.0 | Sand, trace silt Compact Brown Damp | | 5 | SS | 23 | | | | | | | ○ | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | trace gravel | | 6 | SS | 44/23cm | | | | | | | ○ | | | | | | | | |
| 260.6 | Moist Gravelly sand, trace silt cobbles | | | | | | | | | | | | | | | | | | | |
| 6.6 | Very dense Grey Wet | | 7 | SS | 20/2cm | | | | | | | | | | | | | | | |
| 259.5 | | | | | | | | | | | | | | | | | | | | |
| 7.7 | End of borehole Refusal on probable bedrock | | | | | | | | | | | | | | | | | | | |
| | Samples 6 and 7: Sampler bouncing | | | | | | | | | | | | | | | | | | | |
| | * 2007 04 19 | | | | | | | | | | | | | | | | | | | |
| | ▽ Water level observed during drilling | | | | | | | | | | | | | | | | | | | |
| | ▼ Water level measured after drilling | | | | | | | | | | | | | | | | | | | |

METRIC

ON_MOT VER3 05TF059-DLR.GPJ ON_MOT.GDT 7/3/2008 4:12:07 PM

+⁷, ×⁵: Numbers refer to Sensitivity

20
15 — ○ — 5
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No DLR-2

2 of 2

METRIC

G.W.P. 156-98-00 LOCATION Co-ords 5 136 637 N; 276 291 E ORIGINATED BY F.P.
 DIST Sudbury HWY 17 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY F.P.
 DATUM Geodetic DATE April 20, 2007 CHECKED BY C.N.

| SOIL PROFILE | | | SAMPLES | | | GROUND WATER CONDITIONS | ELEVATION SCALE | DYNAMIC CONE PENETRATION RESISTANCE PLOT | | | | | PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT | | | UNIT WEIGHT γ kN/m ³ | REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL |
|---------------|--|------------|---------|----------|------------|----------------------------|-----------------|---|----|----|----|-----|---|---|----------------|---|--|
| ELEV DEPTH | DESCRIPTION | STRAT PLOT | NUMBER | TYPE | "N" VALUES | | | 20 | 40 | 60 | 80 | 100 | W _p | W | W _L | | |
| 251.8 | | | 8 | RC NQ | REC 100% | | | | | | | | | | | | RQD = 100% |
| 250.8 16.0 | End of borehole Borehole advanced by coring from 5.9m depth. * 2007 4 20 ▽ Water level observed during drilling | | | | | | | | | | | | | | | | |

RECORD OF BOREHOLE No DLR-3

1 of 1

METRIC

G.W.P. 156-98-00 LOCATION Co-ords 5 136 678 N; 276 292 E ORIGINATED BY F.P.
DIST Sudbury HWY 17 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY F.P.
DATUM Geodetic DATE April 21, 2007 CHECKED BY C.N.

| SOIL PROFILE | | | SAMPLES | | | GROUND WATER | CONDITIONS | ELEVATION SCALE | DYNAMIC CONE PENETRATION RESISTANCE PLOT | | | | | PLASTIC LIMIT w _p | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w _L | UNIT WEIGHT γ kN/m ³ | REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL | | | |
|---------------|---|------------|---------|-------|------------|--------------|------------|-----------------|--|----|--------------|-----|--|---------------------------------|-------------------------------|--------------------------------|---------------------------------------|--|-------------------|--|--|
| ELEV DEPTH | DESCRIPTION | STRAT PLOT | NUMBER | TYPE | "N" VALUES | | | | SHEAR STRENGTH kPa | | | | | | | | | | WATER CONTENT (%) | | |
| | | | | | | | | | ○ UNCONFINED | | + FIELD VANE | | | | | | | | ○ | | |
| | | | | | | | | 20 | 40 | 60 | 80 | 100 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 265.7 | Ground Surface | | | | | | | | | | | | | | | | | | | | |
| 0.0 | Topsoil (150mm) | | | | | | | | | | | | | | | | | | | | |
| 0.2 | Gravelly sand | | 1 | SS | 5 | | | | | | | | | o | | | | | | | |
| 0.3 | Brown (FILL) Wet | | | | | | | | | | | | | | | | | | | | |
| | Silty clay, trace sand | | 2 | SS | 17 | | | | | | | | | o | | | 0 2 56 42 | | | | |
| | Very stiff Brown Moist | | | | | | | | | | | | | | | | | | | | |
| 264.3 | | | | | | | | | | | | | | | | | | | | | |
| 1.4 | Silt with sand, trace clay | | 3 | SS | 22 | | | | | | | | | o | | | | | | | |
| | Compact Brown Wet | | | | | | | | | | | | | | | | | | | | |
| | layers of sandy silt | | | | | | | | | | | | | | | | | | | | |
| | | | 3A | SS | 20 | | | | | | | | | o | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | 4 | SS | 18 | | | | | | | | | o | | | 0 27 69 4 | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | trace gravel cobbles and boulders | | 5 | SS | 20/8cm | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 260.4 | | | | | | | | | | | | | | | | | | | | | |
| 5.3 | Bedrock | | | | | | | | | | | | | | | | | | | | |
| | Argillite | | 6 | RC NQ | REC 100% | | | | | | | | | | | | RQD = 100% | | | | |
| | Dark grey to black | | | | | | | | | | | | | | | | | | | | |
| | High strength, becoming very high strength | | | | | | | | | | | | | | | | | | | | |
| | Excellent to very poor quality | | 7 | RC NQ | REC 100% | | | | | | | | | | | | RQD = 100% | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | 8 | RC NQ | REC 40% | | | | | | | | | | | | RQD = 0% | | | | |
| 257.2 | End of borehole | | | | | | | | | | | | | | | | | | | | |
| 8.5 | | | | | | | | | | | | | | | | | | | | | |
| | Sample 5: Sampler bouncing | | | | | | | | | | | | | | | | | | | | |
| | RC 8 : Bottom 0.4m of core could not be retrieved | | | | | | | | | | | | | | | | | | | | |
| | * 2007 04 21 | | | | | | | | | | | | | | | | | | | | |
| | ▽ Water level observed during drilling | | | | | | | | | | | | | | | | | | | | |

RECORD OF BOREHOLE No DLR-4

1 of 2

METRIC

G.W.P. 156-98-00 LOCATION Co-ords 5 136 719 N; 276 291 E ORIGINATED BY F.P.
 DIST Sudbury HWY 17 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY F.P.
 DATUM Geodetic DATE April 22, 2007 CHECKED BY C.N.

| SOIL PROFILE | | | SAMPLES | | | GROUND WATER CONDITIONS | ELEVATION SCALE | DYNAMIC CONE PENETRATION RESISTANCE PLOT | | | | | PLASTIC LIMIT w _p | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w _L | UNIT WEIGHT γ kN/m ³ | REMARKS & GRAIN SIZE DISTRIBUTION (%) | | | |
|---------------|---|------------|---------|-------|-----------|----------------------------|-----------------|---|----|--------------|-----|--|------------------------------------|-------------------------------------|-----------------------------------|--|---|-------------------|--|--|
| ELEV DEPTH | DESCRIPTION | STRAT PLOT | NUMBER | TYPE | *N VALUES | | | SHEAR STRENGTH kPa | | | | | | | | | | WATER CONTENT (%) | | |
| | | | | | | | | ○ UNCONFINED | | + FIELD VANE | | | | | | | | ○ | | |
| | | | | | | | 20 | 40 | 60 | 80 | 100 | | | | | | | | | |
| 264.7 | Ground Surface | | | | | | | | | | | | | | | | | | | |
| 0.0 | Sand and gravel, silty clay | | | | | | | | | | | | | | | | | | | |
| 0.2 | Loose Brown Moist (FILL) | | 1 | SS | 4 | | | | | | | | ○ | | | | | | | |
| | Silty clay, trace sand | | | | | | | | | | | | | | | | | | | |
| 263.5 | Very stiff Brown Moist | | 2 | SS | 18 | | | | | | | | ○ | | | | | | | |
| 1.2 | Clayey silt, trace sand layers of sandy silt | | | | | | | | | | | | | | | | | | | |
| 262.8 | Very stiff Brown Moist | | 3 | SS | 20 | | | | | | | | ○ | | | 0 3 80 17 | | | | |
| 1.9 | Silt with sand, trace clay layers of silty sand | | | | | | | | | | | | | | | | | | | |
| | Compact Brown Moist to wet | | 3A | SS | 16 | | | | | | | | ○ | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | 4 | SS | 17 | | | | | | | | ○ | | | 0 25 71 4 | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | 261 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | 5 | SS | 19 | | 260 | | | | | | ○ | | | | | | | |
| 259.5 | | | | | | | | | | | | | | | | | | | | |
| 5.2 | Sand, some silt thin layers of sandy silt | | | | | | 259 | | | | | | | | | | | | | |
| | Compact Brown Damp | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | 6 | SS | 19 | | | | | | | | ○ | | | 0 87 (13) | | | | |
| | | | | | | | 258 | | | | | | | | | | | | | |
| | trace silt | | | | | | | | | | | | | | | | | | | |
| | Dense | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | 7 | SS | 32 | | 257 | | | | | | ○ | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | trace gravel | | | | | | | | | | | | | | | | | | | |
| | Compact Wet | | | | | | 256 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | 8 | SS | 20 | | | | | | | | ○ | | | 1 92 (7) | | | | |
| | | | | | | | 255 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | 9 | SS | 50/4cm | | 254 | | | | | | | | | | | | | |
| | cobbles, boulders | | | | | | | | | | | | | | | | | | | |
| | | | | | | | 253 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 252.5 | | | | | | | | | | | | | | | | | | | | |
| 12.2 | Bedrock | | | | | | | | | | | | | | | | | | | |
| | Argillite | | 10 | RC NQ | REC 93% | | 252 | | | | | | | | | RQD = 73% | | | | |
| | Dark grey to black | | | | | | | | | | | | | | | | | | | |
| | High strength to very high strength | | | | | | | | | | | | | | | | | | | |
| | Unweathered | | 11 | RC NQ | REC 94% | | 251 | | | | | | | | | RQD = 67% | | | | |
| | Fair to good quality | | | | | | | | | | | | | | | | | | | |
| | | | | | | | 250 | | | | | | | | | | | | | |

Cont'd

RECORD OF BOREHOLE No DLR-4

2 of 2

METRIC

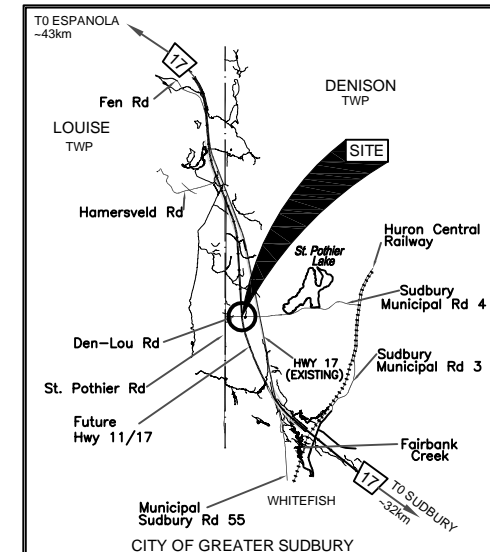
G.W.P. 156-98-00 LOCATION Co-ords 5 136 719 N; 276 291 E ORIGINATED BY F.P.
 DIST Sudbury HWY 17 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY F.P.
 DATUM Geodetic DATE April 22, 2007 CHECKED BY C.N.

| SOIL PROFILE | | | SAMPLES | | | GROUND WATER CONDITIONS | ELEVATION SCALE | DYNAMIC CONE PENETRATION RESISTANCE PLOT | | | | | PLASTIC LIMIT w _p | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w _L | UNIT WEIGHT γ kN/m ³ | REMARKS & GRAIN SIZE DISTRIBUTION (%) |
|--|---|------------|---------|----------|------------|----------------------------|-----------------|---|----|----|-----|--|------------------------------------|-------------------------------------|-----------------------------------|--|---|
| ELEV DEPTH | DESCRIPTION | STRAT PLOT | NUMBER | TYPE | "N" VALUES | | | SHEAR STRENGTH kPa | | | | | | | | | |
| ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE | | | | | | | | | | | | | | | | | |
| 249.7 | | | | | | | 20 | 40 | 60 | 80 | 100 | | 20 | 40 | 60 | | GR SA SI CL |
| 248.9 | | | 12 | RC NQ | REC 89% | | | | | | | | | | | | RQD = 84% |
| 15.8 | End of borehole | | | | | | | | | | | | | | | | |
| | Sample 9: Sampler bouncing | | | | | | | | | | | | | | | | |
| | * 2007 4 22 | | | | | | | | | | | | | | | | |
| | ▽ Water level observed during drilling | | | | | | | | | | | | | | | | |

METRIC

+⁷, ×⁵: Numbers refer to Sensitivity

15 — 20 — 5
|
10
(%) STRAIN AT FAILURE



KEY PLAN
SCALE
1 0 0.5 1 km

LEGEND

- Borehole
- Dynamic Cone Penetration Test (Cone)
- Borehole & Cone
- N Blows/0.3m (Std. Pen Test, 475 J / blow)
- CONE Blows/0.3m (60° Cone, 475 J / blow)
- W L at time of investigation April 2007
- Head
- ARTESIAN WATER Encountered
- PIEZOMETER

| BH No | ELEVATION | CO-ORDINATES | |
|-------|-----------|--------------|---------|
| | | NORTHING | EASTING |
| DLR-1 | 267.2 | 5 136 617 | 276 294 |
| DLR-2 | 266.8 | 5 136 637 | 276 291 |
| DLR-3 | 265.7 | 5 136 678 | 276 292 |
| DLR-4 | 264.7 | 5 136 719 | 276 291 |
| DLR-5 | 265.5 | 5 136 738 | 276 294 |

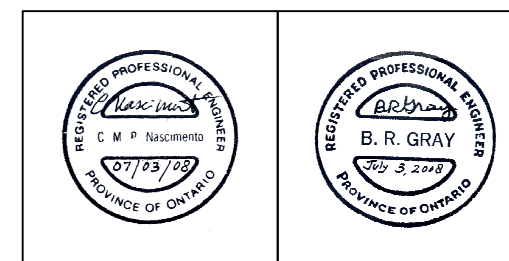
NOTE

The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.

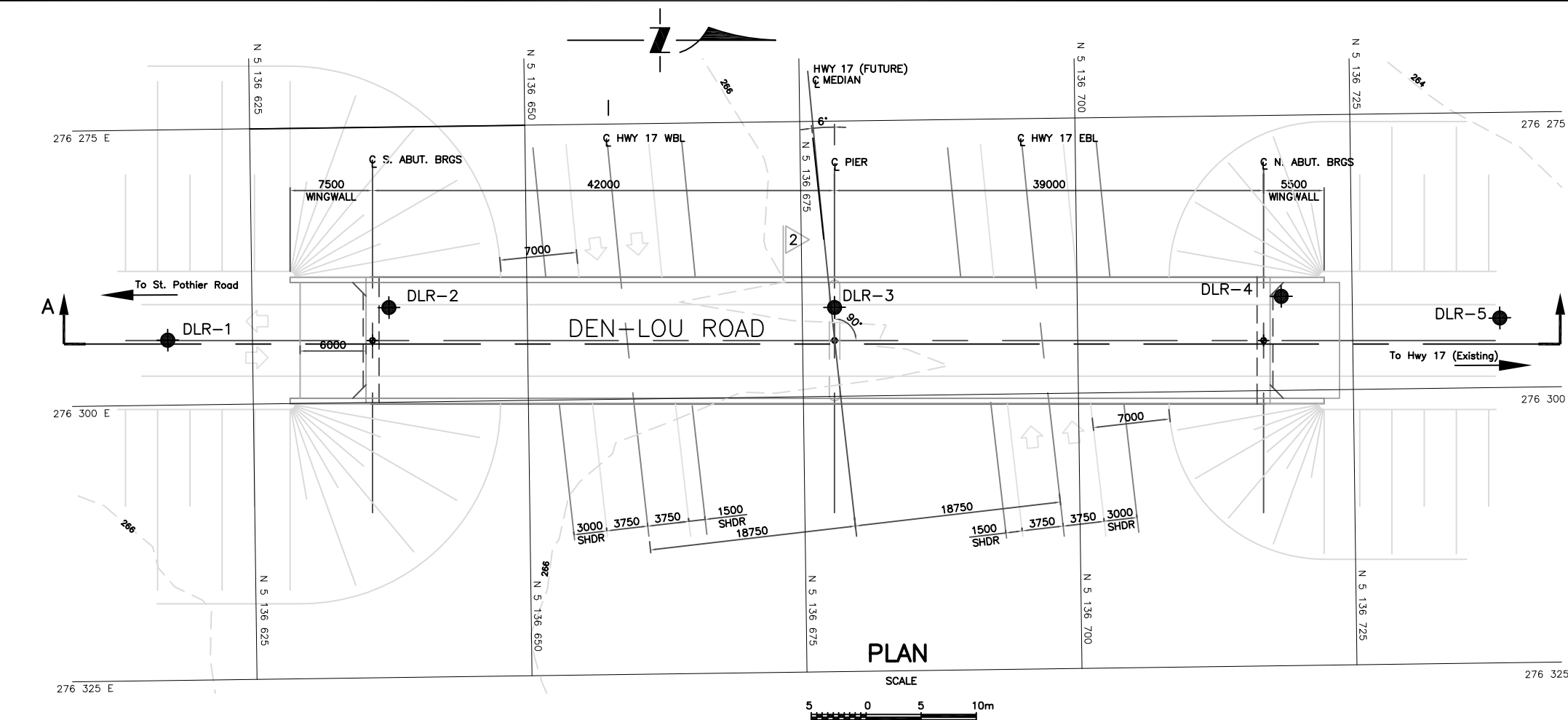
| REVISIONS | DATE | BY | DESCRIPTION |
|-----------|------|----|-------------|
| | | | |
| | | | |
| | | | |
| | | | |

Geocres No. 411-217

| HWY No | 17 | DIST | SUBURBY |
|--------|-------|------------|--------------------|
| SUBM'D | FP | CHECKED CN | DATE JULY 03, 2007 |
| DRAWN | NA | CHECKED CN | APPROVED BRG |
| DWG | DLR-1 | | |

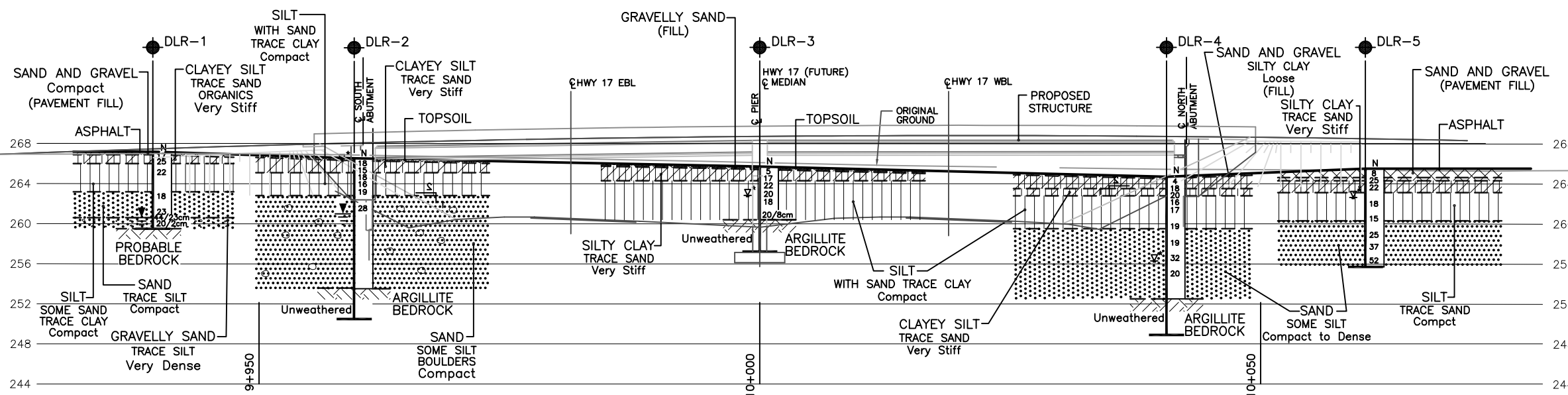


REF No.:
165000581_DenLouRd_GA.dwg; Dated June 05, 2007



PLAN

SCALE



PROFILE A-A

SCALE



NOTES:

- THIS DRAWING IS FOR SUBSURFACE INFORMATION ONLY. SURFACE DETAILS AND FEATURES ARE FOR CONCEPTUAL ILLUSTRATION.
- COORDINATES WERE INTERPRETED FROM THE PLAN DRAWING PROVIDED BY STANTEC CONSULTING LTD.



APPENDIX A

Site Photographs



Photograph 1: Proposed Den-Lou Road Underpass site. Looking south at proposed structure location. Drill rig on north approach borehole. Library is behind trees left of photograph. Note farmland to the right of the roadway. (April 19, 2007)



Photograph 2: Proposed Den-Lou Road Underpass site. Looking north at proposed structure location. Drill rig on north approach borehole. Note residences from former Town of Walden in background. (April 19, 2007)



APPENDIX B

Rock Core Photographs



Photograph C-1: Rock core from borehole DLR-2. Samples RC6 and RC7.



Photograph C-2: Rock core from borehole DLR-2. Sample RC8.



Photograph C-3: Rock core from borehole DLR-3. Samples RC6 and top of RC7.



Photograph C-4: Rock core from borehole DLR-3. Bottom of samples RC7 and RC8. Note that bottom 0.4 m of sample RC8 could not be retrieved from the borehole.



Photograph C-5: Rock core from borehole DLR-4. Samples RC10 and RC11.



Photograph C-6: Rock core from borehole DLR-4. Sample RC12.