5247 E

589

5 cm

ENGINEERING GEOLOGY
COMPILATION BLACKSTONE HEIGHTS SUBDIVISIONS

0 100 200 300 400 500m

Scale 1 : 5 000

Contour Interval 5m

Reconnaissance mapping only - no survey control.

F — Fault, downthrown side indicated.

TRAVERSE 1 — Magnetometer traverse

5 — Seismic spread - location & number (geoph. spacing 7·5m)

D1 — " " " " " (" " 2·5-3m)

W2 — Seismic spread - location & number (geoph. spacing 1-2m)

(D - Dalrymple subdivision. T - Trulls subdivision.)

●BH2 — Borehole - location & number

○ E 2 — Excavation - location & number

ϕ — Shear box sample - location

Old landslide

Subdivision Plan base map from Cohen & Associates Pty. Ltd.

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SUBDIVISION APPROVED PRIOR TO 1987-88 MINES DEPT. INVESTIGATION

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WESTBURY COUNCIL SEWERAGE RESERVE

TRAVELLERS REST SUBDIVISIONS

ENGINEERING PROPERTIES

- PI Plasticity Index.
- LL Liquid Limit.
- LS Linear Shrinkage.
- Av. Average results.
- Qu Unconfined compressive strength (pocket penetrometer).
- ϕ Angle of internal friction (shear box).
- e' Effective cohesion (shear box).
- V_0 Seismic velocity - Surface layer.
- V_1 Seismic velocity - Intermediate layer.
- V_2 Seismic velocity - Third layer.

UNIFIED SOIL CLASSIFICATION SYSTEM GROUP SYMBOLS AND DESCRIPTION

- GW Well-graded gravel and gravel-sand mixtures. Little or no fines.
- GM Silty gravel, gravel-sand-silt mixture.
- GC Clayey gravel, gravel-sand-clay mixture.
- SC Clayey sand, sand-clay mixtures.
- ML Inorganic silt and very fine sand, silty or clayey fine sand, or clayey silt with slight plasticity.
- CL Inorganic clay of low to medium plasticity, gravelly clay, sandy clay, silty clay.
- OL Organic silt and organic silty clay of low plasticity.
- MH Inorganic silt, micaceous fine sandy or silty soils, elastic silts.
- CH Inorganic clay of high plasticity.
- OH Organic clay of medium to high plasticity, organic silt.

UNITS	LITHOLOGIES	ENG. GEOL. PROPERTIES	POTENTIAL ENGINEERING PROBLEMS	INVESTIGATION METHODS
ALLUVIUM	Location: Flood plain & valley floors Dominantly organic clay (CH-OH) and silts (OL-ML) Some fine to medium ironstone and dolerite gravel (GW-GM) Minor occurence of clayey sands(Sc), silts(MH) and sandy clays(Cl)	Not tested Areas mainly non-building and recreational	EXPANSIVE SOILS: - Black clay soil - High plasticity and expansive - Ground cracking - Low bearing strength. DRAINAGE: - Clay - low permeability - Natural drainage poor - Swampy - Local flooding.	EXPANSIVE SOILS AUGER HOLES: - If clay is deep and expansive at house site the clay should be tested in soil lab. The foundations should then be designed in accordance with a foundation engineer.
CLAY	Location: Lower slopes and valley floors Dark brown clay (CH) underlain by yellow white clay (CH) often showing igneous texture. Widley scattered large unweathered dolerite boulders present.	Clay - (CH) P.I. 65-123 Av. 93 L.L. 90-149 Av. 121 L.S. 19-29 Av. 25 Qu 150-400+Kpa ϕ 12°-20° c' 1.9-6.0Kpa V_0 500-600m/sec	EXPANSIVE CLAY: - Outcrops and investigation indicate clays are of adequate thickness to create house cracking and even on low slopes, soil creep potential is high. Bearing strength as above. SLOPE STABILITY: - see Slope Stability Map. If slopes 12°+, combined with poor drainage, potential risk high. DRAINAGE: - Clay - low permeability - High storage - Effective drainage difficult in such clay.	EXPANSIVE SOILS AUGER HOLES and as above. - for expansive clays: - Soil lab. testing of clay. etc. SLOPE STABILITY TRENCH: - Clay shear-box tested - Slope stability analysis of entire slope length. - Followed by foundation inspection and site drainage.
CLAY & DOLERITE with small outcrops and boulders	Location: Middle slopes and low flat ridges of central area Brown clay(CH) and/or yellow white clay(CH) underlain sometimes by clay with some sand(CL-CH) Rapid changes common with gravelly clay (GC) and friable rubbly clay (CL-ML) mixed with large boulders of dolerite and concentric weathered dolerite.	Clay - (CH) P.I. 69-122 Av. 94 L.L. 89-154 Av. 123 L.S. 16-24 Av. 22 Qu 50-350+Kpa ϕ 9°-13° c' 5.0-6.0Kpa V_0 500-600m/sec	DIFFERENTIAL FOUNDATION MOVEMENT: - Clay and dolerite, and dolerite boulders interchange with in short distances and given certain conditions may cause house cracking. EXPANSIVE CLAY: - If house site is entirely on clay and it is deep (>1.5m) - House cracking likely. SLOPE STABILITY: - See Slope Stability Map - as above if slopes 12°+.	SLOPE STABILITY: - Short seismic spread followed by trench plus detailed examination of foundation trenches. If clay present and deep (>1.5m) - as above for slope stability. - If clay <1.5m to weathered rock, remove on cut and fill sites or foundations dug into weathered rock. DIFFERENTIAL MOVEMENT - TRENCH: Test clay, followed by house foundation inspection. EXPANSIVE SOIL - TRENCH: Test clay, followed by house foundation inspection for moisture and water.
TALUS	Location: Steep slopes, particularly slopes on Blackstone Hills and Mt. Leslie ridges. Dolerite boulders, often thick cover large areas of slopes. Lenses and pockets of clay on lower slope boulders are mixed with and overlie clay. In western section and South Esk Gorge boulder scree overlie dolerite benches.	Clay - (CH) if present as above CL -CH P.I. 15-21 Av. 17 L.L. 43-49 Av. 46 L.S. 3-10 Av. 8 Qu 350-500+Kpa V_0 600-900m/sec Weathered rock V_1 1200-1500m/sec	FOUNDATION PROBLEM: - (a) Of recognising if foundation is on dolerite or large dolerite boulders from concentric weathering. (b) When clay pockets or lenses, and concentrically weathered boulders present, differential foundation movements. - as above SLOPE STABILITY, BOULDER TOPPLING AND BOULDER AND DEBRIS SLIDES: - see Slope Stability Map. (a) Scree and rock bench areas - boulders toppling. (b) Talus areas - shallow transitional slides.	Careful house site selection - followed by seismic survey and trenching On steep slopes houses founded entirely on rock not fill. Consolidation and translational movements are possible on fill. After site selection - the house foundations when excavated require further inspection. Foundations on steeper and higher slopes - required to be keyed into rock.
DOLERITE outcrops and near outcrops	Location: Confined mainly to ridges and cliffs of Lake Trevallyn and South Esk Gorge. Outcrops: Flat or benched with intervening areas of dolerite boulders. Outcrops of moderate to slightly weathered and unweathered dolerite. Soil layer thin and patchy.	Rock completely stained by weathering & rippable V_2 2000-3000m/sec Slightly weathered & unweathered -explosives required. Not rippable V_2 4000m/sec+	LITTLE SOIL COVER AND HARD ROCK CLOSE TO SURFACE: - Ridge areas. - Digging of foundations and drains may require explosives. - High run off and little soakage. - Cliffed areas considered too steep for houses with conventional foundations.	Ridge and bench sites are costly for servicing and construction of subsurface work. Not suitable for septic tank, soakage pits etc. Steep Gorge and lake edge slopes have now been included in Council and HEC Reserves.