CASE STUDY

Project:	**Structural Engineer:**	**Geotechnical Engineer:**	**Contractor:**
Huber Home West Vancouver, B.C.	Somerset Engineering Burnaby, B.C.	Geopacific Consultants Burnaby, B.C.	Vickars Construction Burnaby, B.C.

Project description:

35 year old wood post and beam constructed home founded on a mixture of spread footings, cantilevered grade beams and grade slabs on a bench formed on a steeply sloping lot. The bench was created by filling over rock outcroppings near the edge of a steep ravine. The house was exhibiting differential settlement of the adjoining garage and house over. The grade beam supports were failing along with the spread footings on the ravine side of the structure due to downhill movement along with some consolidation of the underlying fill on the rock slope.

Soils:

Variable sandy fills were encountered beneath the length of the involved foundation sections. At the north end soft sandy fill overlay granite bedrock between 5-8 feet in depth. The southern half of the foundation was found to be underlain by sandy fill to 8-10 foot depth, followed by increasingly dense sands with gravel. No rock was encountered in underpinning pits extending between 11-16 feet deep over the southern half of the building foundation elements.

Repair:

In view of the demonstrated downhill movement of the fill layers beneath the involved foundation elements an underpinning repair was instituted utilizing hand dug, shored pits extending either to rock or stable underlying dense sands and gravels. Reinforced concrete footings were placed on the gravel and reinforced concrete columns were brought up supporting new structural grade beams attached to the existing

foundations. The grade beam also extended under the cantilevered (existing) grade beams supporting the garage portion of the structure with the house over.

In those pits where rock was encountered reinforcing steel was dowelled into the underlying granite to resist overturning forces generated by the horizontally moving upper fill layers. The remainder had horizontally placed helical tension anchors placed into the upper column sections to resist the overturning.

Horizontal projections towards the ravine were cast in a monolithic fashion with the underpinning assemblies and the support grade beam allowing construction of a wood sundeck off the ravine side of the home. The whole structure thereby stabilized at depth on competent soils with no elements of the home relying on the moving fills.

Previous repairs to the home consisting of hydraulically placed pipe piles had failed due to ground movement with bending of the shafts and tearing of attachments to the existing cantilevered beams of the home.

Unlike that repair, the completed job done by Vickars Construction , under the direction and auspices of competent engineering consultants, comes complete with a 20 year transferable warranty. Another Vickars repaired foundation assembly, replacing the equity lost in the home, by an unfortunate series of circumstances befalling the homeowner.