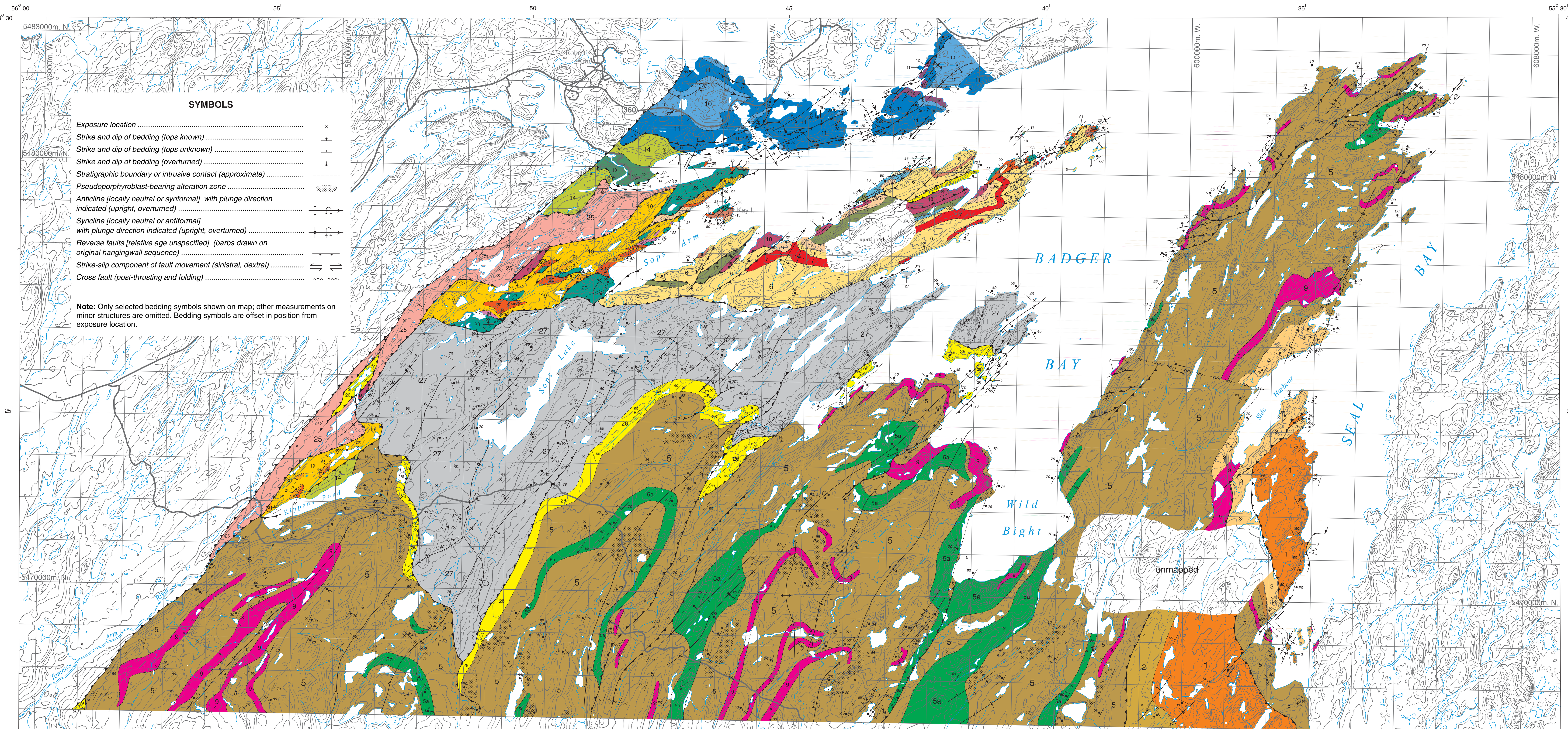
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
Department of Mines and Energy
Geological Survey



SYMBOLS

- *Exposure location*
- *Strike and dip of bedding (tops known)*
- *Strike and dip of bedding (tops unknown)*
- *Strike and dip of bedding (overturned)*
- *Stratigraphic boundary or intrusive contact (approximate)*
- *Pseudoporphyroblast-bearing alteration zone*
- *Anticline [locally neutral or synformal] with plunge direction indicated (upright, overturned)*
- *Syncline [locally neutral or antiformal] with plunge direction indicated (upright, overturned)*
- *Reverse faults [relative age unspecified] (barbs drawn on original hangingwall sequence)*
- *Strike-slip component of fault movement (sinistral, dextral)*
- *Cross fault (post-thrusting and folding)*

Note: Only selected bedding symbols shown on map; other measurements on minor structures are omitted. Bedding symbols are offset in position from exposure location.

LEGEND

LATE ORDOVICIAN
BADGER GROUP (Unit 27)
Gull Island Formation

27 — *Early Late Ordovician:* predominantly thin- and thick-bedded, light-grey sandstone turbidites; minor dark-grey siltstone interbeds (near base of unit); rare beds of cobble conglomerate(with fossiliferous limestone clasts) and pebbly wacke (along part of western flank of Badger Group synclinorium)

MIDDLE AND LATE ORDOVICIAN
Shoal Arm Formation

26 — *Late Middle Ordovician to Early Late Ordovician (?):* red radiolarian chert, red laminated argillite and red siliceous siltstone with slump-folded nodules; red and green siltstone rhythmites (containing pyrolusite-bearing horizons) interbedded with turquoise chert; light-grey, thin-bedded to laminated, silicified wacke interbedded with green siliceous argillite; light-green, coticule-bearing, argillaceous laminites and irregularly mottled manganiferous sandstone; light-grey bioturbated chert with rare black shale partings; black graptolitic slate interstratified with very thin beds of pyritic carbonaceous siltstone and dark-grey siliceous argillite

MIDDLE ORDOVICIAN (?)
SOPS HEAD COMPLEX
TECTONIZED BLOCK-IN-MATRIX MELANGE UNIT

25 — *Middle Ordovician to Late Silurian (?):* dark-grey melange dominated by small polylithic blocks with internal foliations or internal folds; platey, pyrite-rich, black phyllite or pelitic schist (locally forming the matrix of the melange belt or representing an original mudstone-bearing map unit); minor porphyroclastic schist derived from semi-psammite and metabasite; minor red-matrix melange derived from hematitic basalt and protomylonite; minor green-matrix melange derived from chloritic basalt and cataclastite

BROKEN OLISTOSTROMAL UNITS

24 — Sparry Limestone: *Middle Ordovician:* conodont-bearing limestone in stratigraphic contact with various basalt types in discrete volcanic blocks; limestone beds forming solitary carbonate megablocks and smaller olistoliths in melange; limestone clasts resedimented along with monolithic basalt clasts in alternating muddy and calcareous debrites; banded marble interstratified or tectonically interlayered with pyritic black argillite. Similar lithodemes within large limestone clasts in Unit 8. Also in the basal Moores Cove Formation of the Cottrells Cove Group, the Hummock Island Limestone of the Exploits Group, and the Cutwell Group on Long Island.

23 — Basalt Flows: *Early to Middle Ordovician (?):* internally fractured, marginally shattered epidotized basalt (injected by green epiclastic wacke - itself impregnated with black mudstone); massive, light-green, fine-grained, silicified basalt (in depositional contact with siliciclastic and calcareous sedimentary strata within map-scale blocks); pillow breccia and hematized basalt (resedimented with jasper and chert in red siliceous debrite); minor olistoliths of basalt breccia (chilled against mudstone) in a matrix of fractured volcaniclastic wacke; the above rock types are seen in the dominantly sand-matrix debrite belts. The dominantly mud-matrix debrite belts display light-green and dark-grey aphanitic basalt (injected by black mudstone) and porphyritic vesicular basalt (augened by featureless black mudstone, or wrapped by partially broken interbeds of pyritic black argillite and dark-grey laminated siltstone, or partly enclosed by black pebbly mudstone). Similar lithodemes in Unit 17. Also in the Pennys Brook Formation of the Wild Bight Group and the Crescent Lake Formation of the Roberts Arm Group.

22 — Mottled Turbidite and Variegated Chert: *Early to Middle Ordovician (?):* green and grey, parallel- and crosslaminated, rhythmically interbedded, siliceous turbidites with mottled and nodular texture (forming mottled olistoliths within unmottled pebbly mudstone). Minor red, green and grey chert interbedded with laminated siliceous argillite. Similar lithodemes in Unit 15 and Unit 18.

21 — Polymictic Conglomerate: *Early to Middle Ordovician (?):* thickly stratified, poorly sorted, graded conglomerate beds with distinctive basalt, limestone and granite boulders (partly or completely enclosed by chaotically deformed sandy debrite); small, massive, buff-weathered conglomerate blocks (within muddy debrites); conglomeratic turbidite lenticles (preserving erosive bases above black pyritic argillite and channels within interstratified sandstone turbidites). Similar unbroken lithodemes in Unit 8.

20 — Black Argillite - Pebbly Mudstone: *Early to Middle Ordovician (?):* sulphidic pebbly mudstone (showing in-situ fragmentation of slumped grey siltstone and black argillite beds); basalt block-in-argillite within conglomerate block-in-argillite within pebbly mudstone or sandy debrite; stratiform intervals of coherently-bedded black argillite (forming a substrate, devoid of chert, to basalt or conglomerate sequences). Similar unbroken lithodemes in Unit 7.

19 — Massive Wacke: *Early to Middle Ordovician (?):* buff-weathered, massive, granular wacke completely or partially surrounding polylithic blocks in debrites; minor, partially disaggregated interbeds of light-grey wacke and dark-grey argillite. Unbroken successions of similar wacke (interstratified with thin-bedded sandstone and siltstone) may occur in Unit 6.

UNBROKEN LITHOSTRATIGRAPHIC UNITS
[Wild Bight Group / Exploits Group / Roberts Arm Group / Cottrells Cove Group]

18 — *Middle Ordovician (?):* interbedded red and green chert; deep-red and bright-red, thin-bedded, laminated argillite; green and grey, medium-bedded, fine-grained, siliceous, sandstone turbidite. In places, Unit 18 is interlayered with Unit 17 or stratigraphically overlies Unit 17. Similar lithodemes occur in the lower Crescent Lake Formation of the Roberts Arm Group, the lower Moores Cove Formation of the Cottrells Cove Group, the lower Strong Island Chert of the Exploits Group, and the lower Shoal Arm Formation (as well as in Late Cambrian(?) to Middle Ordovician units such as the Omega Point Formation of the Wild Bight Group and the Saunders Cove Formation of the Exploits Group).

17 — *Middle Ordovician (?):* light-green, variably porphyritic, basalt flows; massive, poorly stratified and well-graded basalt breccias ; minor flow-foliated vesicular basalt; rare pillow breccia with epiclastic or calcareous cement; rare, grey aphanitic, mafic to intermediate, volcanic flows

16 — *Middle Ordovician (?):* thinly bedded, grey, banded, microcrystalline chert interstratified with sulphidic and siliceous, black argillite; minor, buff-weathered, light-grey, netveined and recrystallized chert; these rocks are interlayered with Unit 15 or stratigraphically overlie Unit 15

15 — *Middle Ordovician (?):* mottled, green and grey, parallel- and crosslaminated, siliceous turbidites; nodular, fine-grained, thin-bedded, graded sandstone with mud microflakes and sandstone dykelets; rhythmic interbeds of dark-green cherty siltstone and dark-grey banded argillite. Unit 15 underlies and but also overlies Unit 17 and is in depositional contact with Unit 7 and Unit 8; similar lithodemes are present in the upper Pennys Brook Formation of the Wild Bight Group, the lower Shoal Arm Formation, and the upper New Bay Formation of the Exploits Group

EARLY TO MIDDLE ORDOVICIAN
ROBERTS ARM GROUP
Crescent Lake Formation

14 — *Early Middle Ordovician (?):* interbedded bright-red and dark-red chert; maroon, thin-bedded siltstone and siliceous laminated argillite; light-green, medium-bedded, siliceous sandstone; grey-green, medium- to thick-bedded wacke with distinctive jasper, granite and basalt pebbles

13 — *Late Early Ordovician (?):* light-green, massive, aphanitic, vesicular basalt; dark-green, fine-grained, pyroxene-porphyritic basalt; minor, green and red, variably hematized, pillowed basalt with red chert veins (possible thrust slice of Unit 11); rare interstitial red chert and interflow red argillite

Unseparated terranes/formations

12 — *Early or Middle Ordovician (?):* gabbro sills; unseparated diorite sheets

11 — *Late Early Ordovician (?):* pillow lava and pillow breccia; dark-green, massive, vesicular, variably porphyritic, locally flow-foliated basalt; pillowed basalts with epidote-rich and hematite-rich zones in concentric bands and as veinlets; variably hematized basalt with minor interstitial and interflow red chert

10 — *Late Early Ordovician(?):* light-grey, massive, quartz-phyric felsite; buff to pink, felsic crystal tuff with eutaxitic quartz grains; variably chloritized, felsic lithic tuff (locally containing silicified rock fragments); felsic breccia with subordinate basalt blocks; minor quartz-feldspar porphyry

ORDOVICIAN INTRUSIVE ROCKS
Gummy Brook Gabbro

9 — *Middle Ordovician (?):* medium-grained equigranular gabbro sills; minor dark-grey diorite sheets; glomeracrystic gabbro and diabase (in places cutting epidotized and saussuritized gabbro)

LATE CAMBRIAN (?) TO MIDDLE ORDOVICIAN
EXPLOITS GROUP
New Bay Formation

8 — *Late Early Ordovician:* polymictic, cobble-to-boulder, clast-supported conglomerate with well-rounded siliciclastic, calcareous and magmatic clasts; massive, light-grey pebbly wacke; depositional contacts with Unit 6 and Unit 7. Similar lithodemes are also presently assigned to the upper Moores Cove Formation of the Cottrells Cove Group and the upper Crescent Lake Formation of the Roberts Arm Group

7 — *Late Early Ordovician (?):* dark-grey and black, laminated and siliceous, siltstone turbidites; black, pyritic argillite or pyritic slate; minor, light-green, slump-folded sandstone with interbedded or chaotically mixed mudstone

6 — *Late Early Ordovician (?):* thin interbeds of light green sandstone and dark grey siltstone; minor, light grey, medium-bedded granular wacke; rare, dark-grey and black sulphidic argillite; all the rocks are siliceous and highly indurated

WILD BIGHT GROUP
Pennys Brook Formation

5, 5a — *Early Middle to Late Middle Ordovician:* thin-bedded, green and grey, variably mottled, concretionary turbidites; thin- and thick-bedded, grey-green sandstone with imbricated rip-up clasts of slump-folded banded argillite grading to parallel-laminated sandstone; thickly-stratified, dark-green, tuffaceous wacke with predominant vesicular basalt and subordinate intermediate to felsic volcanic clasts; massive to thickly bedded epiclastic wacke with mixed sedimentary and volcanic clasts; minor pebbly wacke with distinctive jasper and red argillite clasts. 5a; laterally discontinuous lenticles of pillow lava, pillow breccia and massive vesicular basalt breccia; associated sand-matrix olistostromes and choatically slumped mixtites with various volcanic and sedimentary intraclasts

Sparrow Cove Formation

4 — *Early to Middle Ordovician (?):* dark-green, porphyritic pillow lava with some interstitial chert; minor, thin-bedded light-green, graded sandstone and light-grey, parallel-laminated argillite; rare gabbro sills; rare beds of mafic and possibly felsic tuff

Omega Point Formation

3 — *Early to Middle Ordovician (?):* red, massive to thickly stratified, poorly sorted gravel beds with sub-rounded cobbles and boulders of hematized volcanic and intrusive rocks; chaotically slumped debrite and red conglomeratic wacke; red chert, red siliceous argillite and hematitic banded iron formation; interbedded, red and green, parallel- and crosslaminated siltstone turbidites; dark grey shale; light grey, thickly stratified, polymictic, conglomeratic turbidite

Side Harbour Formation

2 — *Late Cambrian (?) to Early Ordovician:* Variably hematized vesicular basalt; red and green, pillow lava and pillow breccia; minor, mafic lithic tuff; rare, red, interpillow argillite; rare diorite sills

Seal Bay Brook Formation

1 — *Late Cambrian (?) to Early Ordovician:* buff-weathered, flow-banded rhyolite breccia; massive, pyritized and hematized rhyolite; dark-green pillow lava and basalt breccia; mixed mafic - felsic volcanic breccia; minor, chloritic lithic tuff; minor, light-green, quartz-phyric crystal tuff; rare, purplish-red rhyolite dykes; rare, light-grey, crosslaminated sandstone

Geology by B. H. O'Brien, Regional Geology Section, 1999.

Base map in digital format published by Surveys and Mapping Branch, Natural Resources Canada, Ottawa.

Approximate magnetic declination, 1980, at centre of map 26° 30' W, decreasing 11.6' annually.

Elevations in metres above sea level.

Universal Transverse Mercator Projection (UTM) Zone 21.

North American Datum (NAD) 1927.

Copies of this map may be obtained from the Geoscience Publications and Information Section, Geological Survey, Department of Mines and Energy, Government of Newfoundland and Labrador, P.O. Box 8700, St. John's, Newfoundland, Canada A1B 4J6 [http://www.geosurv.gov.nf.ca].

This map is subject to revision and modification.

Geological cartography by A. H. Paltanavage and L. Ryan.

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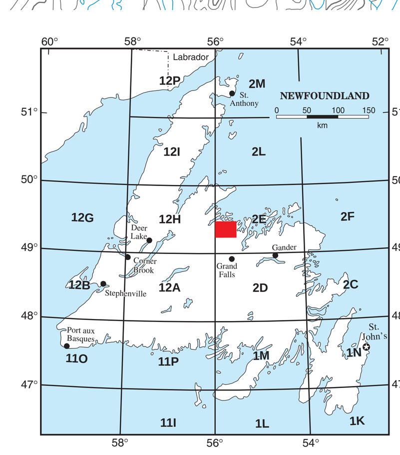

INDEX MAP

MAP 2000-06
OPEN FILE 002E/05/1073

GEOLOGY OF THE BADGER BAY REGION (NTS 2E/5), WESTERN NOTRE DAME BAY

Scale 1:50 000

0 1 2 3 4 5
kilometres