

SPECIAL PUBLICATION 5-B

**ATLAS OF SAND, GRAVEL, AND
QUARRY AGGREGATE RESOURCES
COLORADO FRONT RANGE COUNTIES**

by

S. D. Schwochow, R. R. Shroba, and P. C. Wicklein

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**COLORADO GEOLOGICAL SURVEY
DEPARTMENT OF NATURAL RESOURCES
STATE OF COLORADO
DENVER, COLORADO**

1974

STATE OF COLORADO

John D. Vanderhoof, *Governor*

DEPARTMENT OF NATURAL RESOURCES

Thomas W. Ten Eyck, *Executive Director*

COLORADO GEOLOGICAL SURVEY

John W. Rold, *Director and State Geologist*

MISSION OF THE COLORADO GEOLOGICAL SURVEY

The Colorado Geological Survey was legislatively re-established in February 1969 to meet the geologic needs of the citizens, governmental agencies and mineral industries of Colorado. This modern legislation is aimed at applying geologic knowledge toward the solution of today's and tomorrow's problems of an expanding population, mounting environmental concern and the growing demand for mineral resources.

SPECIFIC LEGISLATIVE CHARGES ARE

- "Assist, consult with and advise state and local governmental agencies on geologic problems."
- "Promote economic development of mineral resources."
- "Evaluate the physical features of Colorado with reference to present and potential human and animal use."
- "Conduct studies to develop geological information."
- "Inventory the state's mineral resources."
- "Collect, preserve and distribute geologic information."
- "Determine areas of geologic hazard that could affect the safety of or economic loss to the citizens of Colorado."
- "Prepare, publish and distribute geologic reports, maps and bulletins."

Post Office Box 2645
Denver, Colorado 80201
June 30, 1974

LETTER OF TRANSMITTAL

Mr. John W. Rold
State Geologist and Director
Colorado Geological Survey
1845 Sherman Street
Denver, Colorado 80203

Subject: Completion of the "ATLAS OF SAND, GRAVEL, AND QUARRY AGGREGATE
RESOURCES, COLORADO FRONT RANGE COUNTIES."

Dear Mr. Rold:

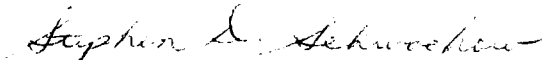
This atlas of 212 preliminary 1:75,000-scale resource maps was prepared by Stephen D. Schwochow, Ralph R. Shroba, and Phillip C. Wicklein under contract to the Colorado Geological Survey as authorized by the 1973 Colorado House Bill 1529. The contract was administered by Mr. A. L. Hornbaker, the Colorado Geological Survey Mineral Deposits Geologist. The maps were prepared utilizing photogeologic methods and published data. All photogeologic maps were prepared and field checked during the fall and winter of 1973-1974. Maps and data prepared by the U. S. Geological Survey staff for the Front Range Urban Corridor study were utilized in preparing 74 of the quadrangles in this atlas.

Individual revised 1:24,000-scale copies of these maps have been sent to the appropriate city, county, and regional planning agencies. These maps are available from the appropriate counties or the Colorado Geological Survey. This atlas was prepared as a convenient reference document and should be a valuable aid to your geologic staff, sand and gravel producers, geologic consultants, contractors, realtors, and government agencies. The atlas should be used in conjunction with "Sand, Gravel and Quarry Aggregate Resources of the Colorado Front Range Counties", Colorado Geological Survey Special Publication 5-A.

Sincerely,



Phillip C. Wicklein
Project Consultant



Stephen D. Schwochow
Consultant



Ralph R. Shroba
Consultant

PREFACE

Last year House Bill 1529 charged the Colorado Geological Survey to

"contract for a study of the commercial mineral deposits in the populous counties of the state in order to identify and locate such deposits. Such study shall be of sand, gravel, and quarry aggregate, and shall be completed on or before July 1, 1974, and shall include a map or maps of the state showing such commercial mineral deposits, copies of which may be generally circulated. Any commercial mineral deposits discovered subsequent to July 1, 1974, may be, upon discovery, included in such study."

Carrying out this contract required the comprehensive photogeologic and field geologic evaluation of 271 quadrangles in Larimer, Weld, Boulder, Jefferson, Adams, Denver, Arapahoe, El Paso and Pueblo Counties. Douglas County was not included in the statutory charge, but because of its nearness to and relationship to the sand and gravel supply and demand problems of the area, it was included in the project.

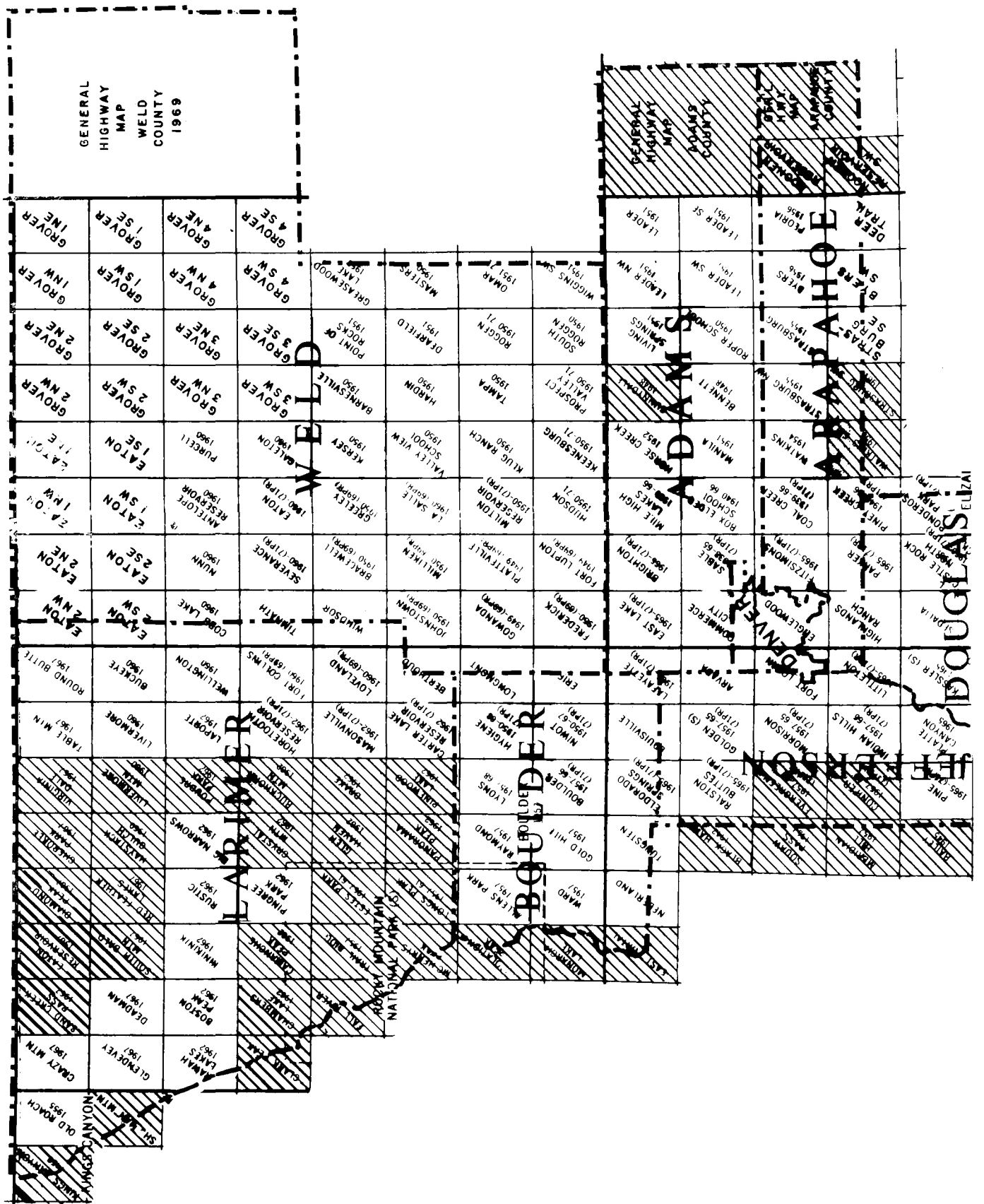
Results of this study are being distributed in three different ways:

First, a text and 3 1:250,000-scale regional maps have been completed by the consultants for publication by the Colorado Geological Survey as Special Publication 5-A.

Second, detailed 1:24,000-scale quadrangle maps have been prepared and distributed to the appropriate counties and cities within the project area. Copies of these detailed resource maps are held on open file in the Colorado Geological Survey offices, and may be purchased there or acquired from the appropriate county planning offices.

Third, this atlas, which is a compilation of reduced-scale preliminary maps, is intended to provide a convenient substitute for the more expensive and bulky detailed maps. It is available through the Colorado Geological Survey as Special Publication 5-B. The 1:75,000-scale preliminary maps presented in this atlas were produced during the step reduction of 1:24,000-scale field maps to 1:250,000-scale composite regional maps. Quadrangles in the atlas appear in alphabetical order by name. Because of the size of these 1:75,000-scale maps, the authors believe this atlas will be a convenient and valuable reference for the Colorado Geological Survey staff, sand and gravel producers, geologic consultants, contractors, realtors, and governmental agencies. An explanatory text and detailed acknowledgments to the geologists, governmental agencies and gravel producers, without whose help this project would have been impossible, appear in Colorado Geological Survey Special Publication 5-A, SAND, GRAVEL, AND QUARRY AGGREGATE RESOURCES OF THE COLORADO FRONT RANGE COUNTIES by S. D. Schwochow, R. R. Shroba, and P. C. Wicklein, 1974.

GENERAL
HIGHWAY
MAP
WELD
COUNTY
1969



WELDFIELD

BOULDER

JEFFERSON

DUNSMITH

HOOVER

DOUGLASS

SH. 101
CROWLEY
DEAN
GALT
HARRIS
LAWSON
MAY
MORRISON
RICHARDSON
WELLS

BOSTON
DEANMAN
GALT
GLADNEY
HARRIS
LAWSON
MAY
MORRISON
RICHARDSON
WELLS

BOULDER
JEFFERSON
LANSFORD
MORRISON
RICHARDSON
WELLS

BOULDER
JEFFERSON
LANSFORD
MORRISON
RICHARDSON
WELLS

BOULDER
JEFFERSON
LANSFORD
MORRISON
RICHARDSON
WELLS

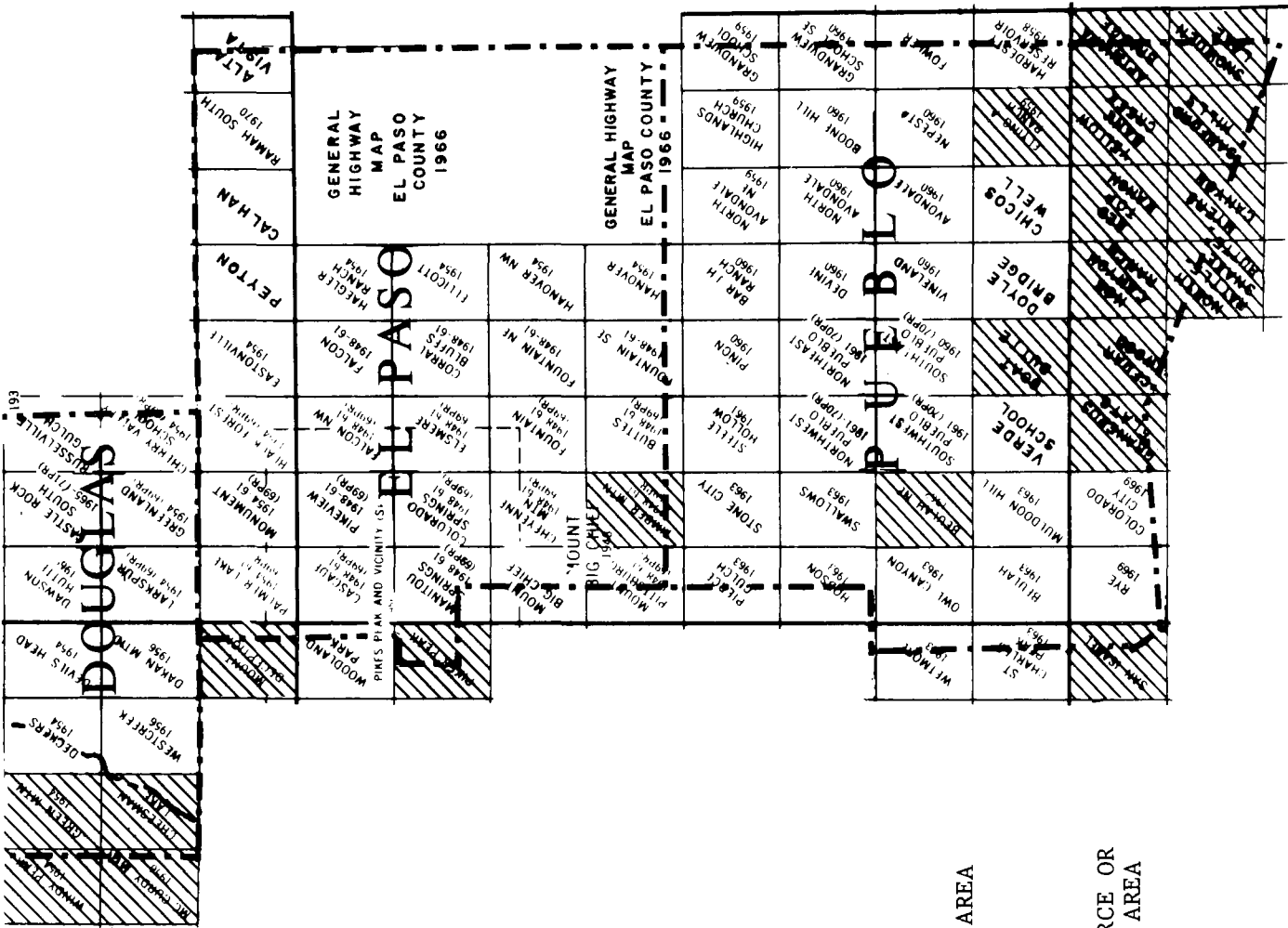
BOULDER
JEFFERSON
LANSFORD
MORRISON
RICHARDSON
WELLS

BOULDER
JEFFERSON
LANSFORD
MORRISON
RICHARDSON
WELLS

BOULDER
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WELLS

BOULDER
JEFFERSON
LANSFORD
MORRISON
RICHARDSON
WELLS

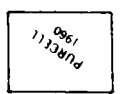
BOULDER
JEFFERSON
LANSFORD
MORRISON
RICHARDSON
WELLS



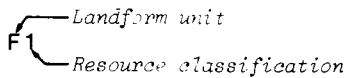
INDEX MAP

RESOURCE AREA

NON-RESOURCE OR WITHDRAWN AREA



EXPLANATION *



LANDFORM UNITS

- F Floodplain deposit
- T Stream terrace deposit
- V Valley fill (F & T)

- U Upland deposits
- A Alluvial fan
- E Wind-deposited sand (eolian)

- M Man-made deposits
(slag, tailings, spoils....)

RESOURCE CLASSIFICATION

Coarse Aggregate
(at least 30% retained on #4 screen,
visual estimation)

- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock,
calcium carbonate.

Fine Aggregate
(greater than 70% passing #4 screen, 60%
retained on #200 screen, visual estimation)

- 3 Sand

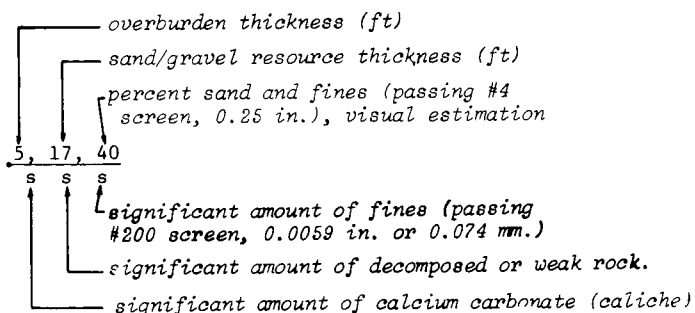
Unevaluated Resource

- 4 Probable aggregate resource

MAP SYMBOLS

- Operating gravel and/or sand pit
- ▲ Abandoned gravel and/or sand pit
- ⊗ Operating stone quarry
- ⊗ Abandoned stone quarry
- ▨ Potential quarry aggregate resource area
- $\frac{2}{17}$ Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
"g" indicates gravel; "s" indicates sand
"x" in symbol denotes unevaluated or unknown property.
"wg" denotes Colorado Geological Survey Windsor/Sand and Gravel projects' drill hole
- Landform boundary, solid where known or observed; dashed where approximate or inferred.

STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT



"x" in symbol denotes unevaluated or unknown property

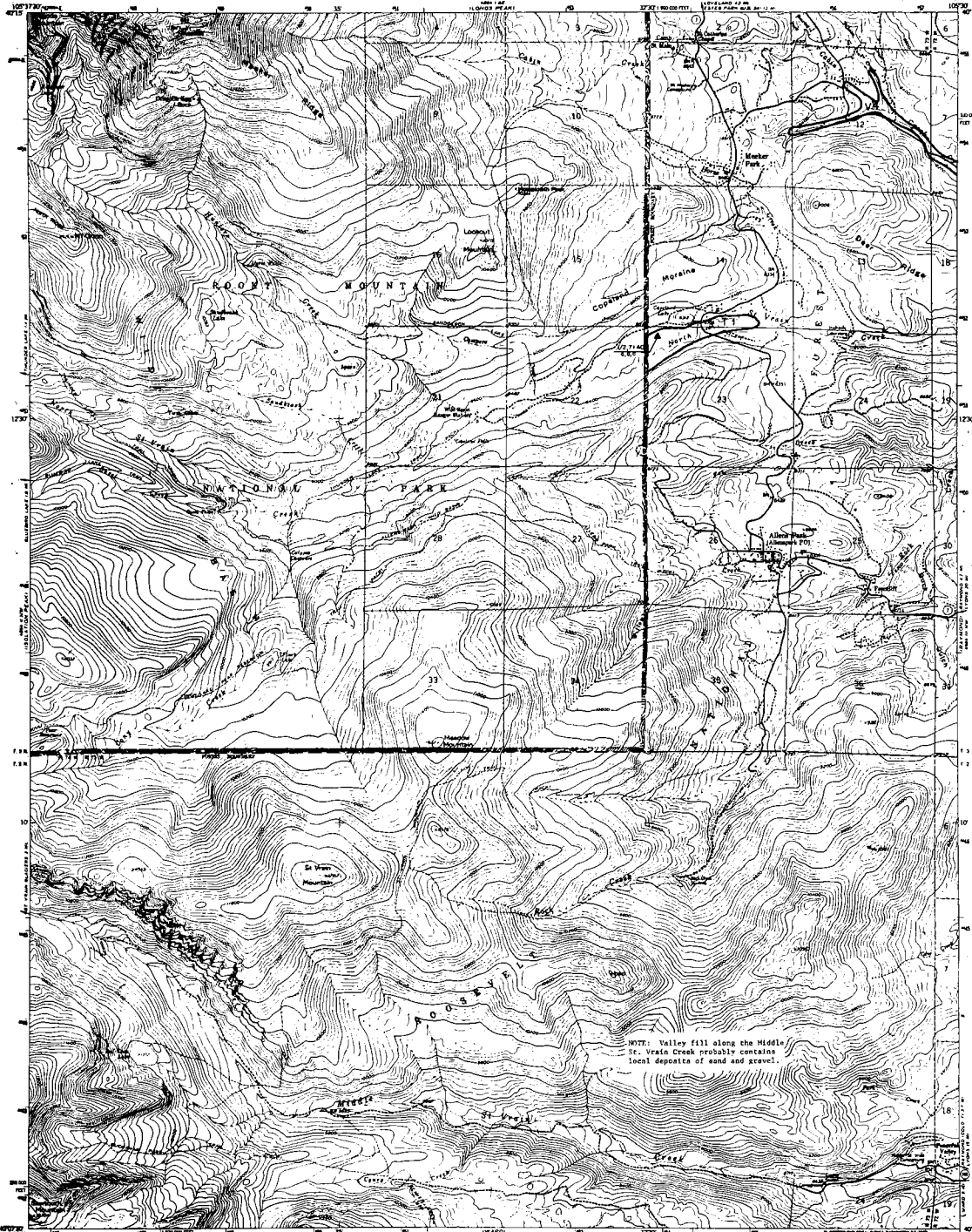
"a" in symbol denotes property absent or insignificant

* Definition and derivation of terms and map units, explanation of field methods, explanatory text and regional maps are contained in the companion volume, Colorado Geological Survey Special Publication 5-A.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

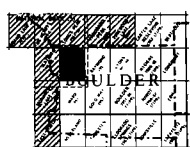
ALLEN'S PARK QUADRANGLE
COLORADO-BUILDERS CO.
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR



EXPLANATION

- Landform unit**
 Resource classification
- LAYERED DEPOSITS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Moraine deposits (along crevasses, etc.)
- RESOURCE CLASSIFICATION**
- CONCRETE GRAVELS**
 (all gravel 50% passing on #4 screen, visual estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, medium carbonates
- FINE SAND/GRAVEL**
 (gravel 20% passing #4 screen, 60% passing on #20 screen, visual estimation)
- 3 Sand
- Unutilized Resources**
- 4 Probable aggregate resource
- WELL SYMBOLS**
- W Operating gravel and/or sand pit
 - A Abandoned gravel and/or sand pit
 - Q Operating stone quarry
 - Q Abandoned stone quarry
 - P Potential quarry aggregate resource or a related well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "I" indicates gravel; "S" indicates sand.
 - "C" in symbol denotes unutilized or unknown property.
 - "W" denotes Colorado Geological Survey Water Use and Control project.
 - "L" indicates landform boundary, solid where known or inferred; dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (passing #4 screen, 0.25 in. or 0.076 cm.)
 - significant amount of fines (passing #20 screen, 0.0075 in. or 0.191 mm.)
 - significant amount of decomposed or weak rock
 - significant amount of soluble carbonate (calcite)
 - "*": in symbol denotes unutilized or unknown property
 - "W" in symbol denotes property owned or controlled
 - "L" in symbol denotes property owned or controlled



QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

NOTE: Valley fill along the Middle St. Vrain Creek probably contains local deposits of sand and gravel.

See from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

Medium-duty _____ Light-duty _____
 Unimproved dirt _____
 State Route

ALLEN'S PARK, COLO.

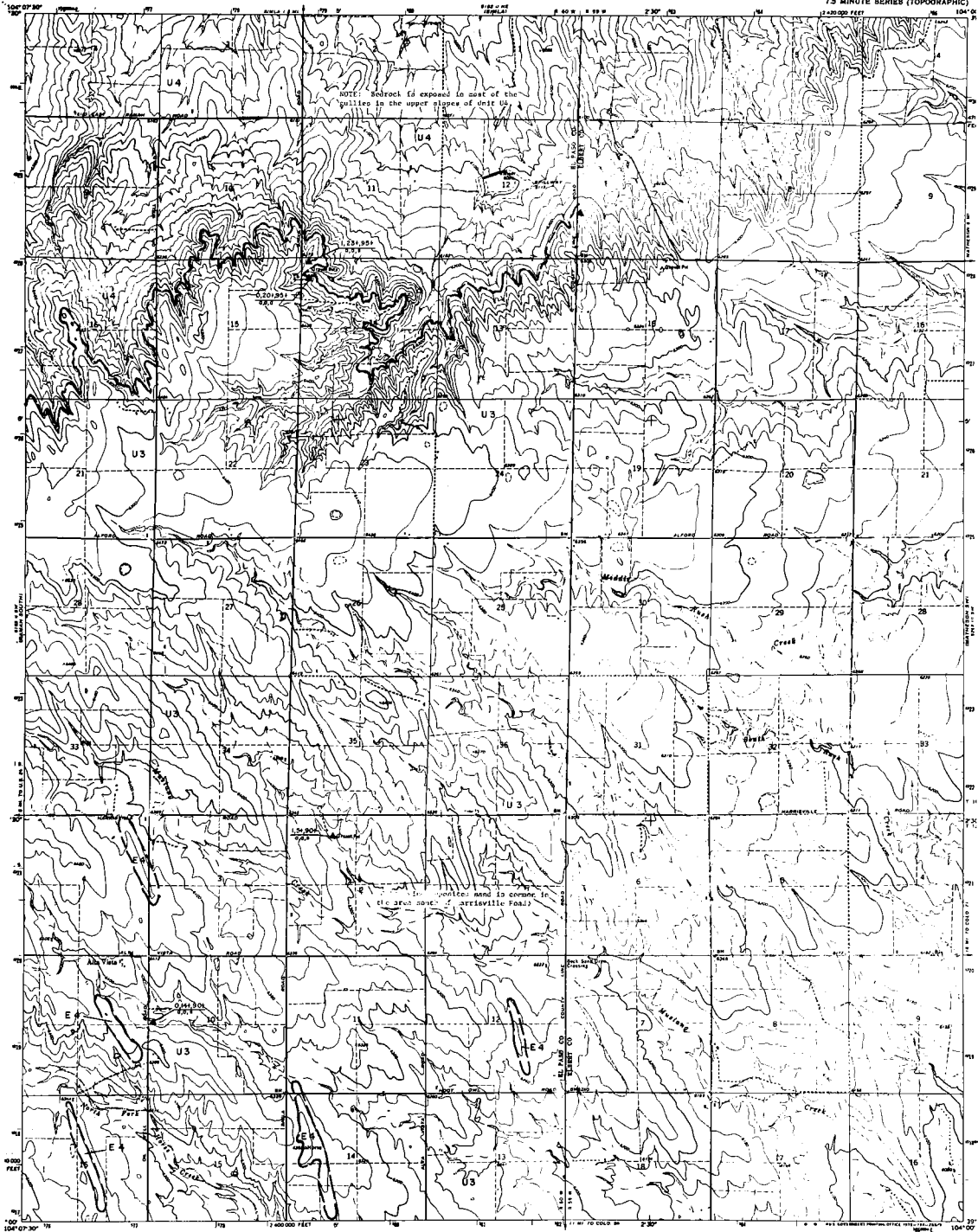
Mapped by: Ralph R. Shroba
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

ALTA VISTA QUADRANGLE
COLORADO

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLS, DIRECTOR

7.5 MINUTE SERIES (TOPOGRAPHIC)
1:25,000 FEET



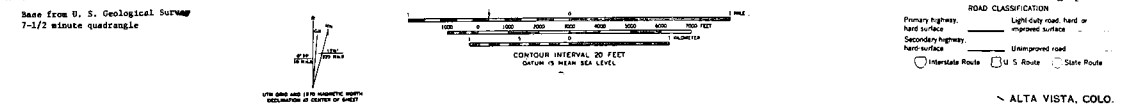
EXPLANATION

- Resource Classification**
- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-mine deposits (clay, silt, loess, etc.)
- RESOURCE CLASSIFICATION**
- COARSE SANDS**
(as determined by sieve analysis on 40 screen, actual extraction)
- 1 Coarse: relatively clean and well sorted
 - 2 Coarse: significant fines, unconsolidated, calcareous
- FINE SANDS**
(determined from 100 passing 40 screen, 40% retained on 200 screen, actual extraction)
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with average thickness (ft) and estimated resource thickness (ft), obtained from well logs.
 - "L" indicates land: "U" indicates undeveloped or unknown property.
 - "M" denotes Colorado Geological Survey "Masterfiled and Crowned" projects.
 - "S" in symbol denotes sandstone or sedimentary rock where known or inferred.
- STATION, LOCATION AND GEOLOGICAL IDENTIFICATION OF SYMBOLS**
- Numbered circles (ft)
 - Numbered squares (ft)
 - Numbered triangles (ft)
 - Numbered diamonds (ft)
 - Numbered stars (ft)
 - Numbered hexagons (ft)
 - Numbered octagons (ft)
 - Numbered circles (ft)
 - Numbered squares (ft)
 - Numbered triangles (ft)
 - Numbered diamonds (ft)
 - Numbered stars (ft)
 - Numbered hexagons (ft)
 - Numbered octagons (ft)



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WETLAND AREA

Mapped by: Ralph S. Shroba
Date: June 30, 1974



ROAD CLASSIFICATION

- Primary highway
- Hard surface
- Secondary highway
- Hard surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route
- Light duty road, hard or improved surface

ALTA VISTA, COLO.

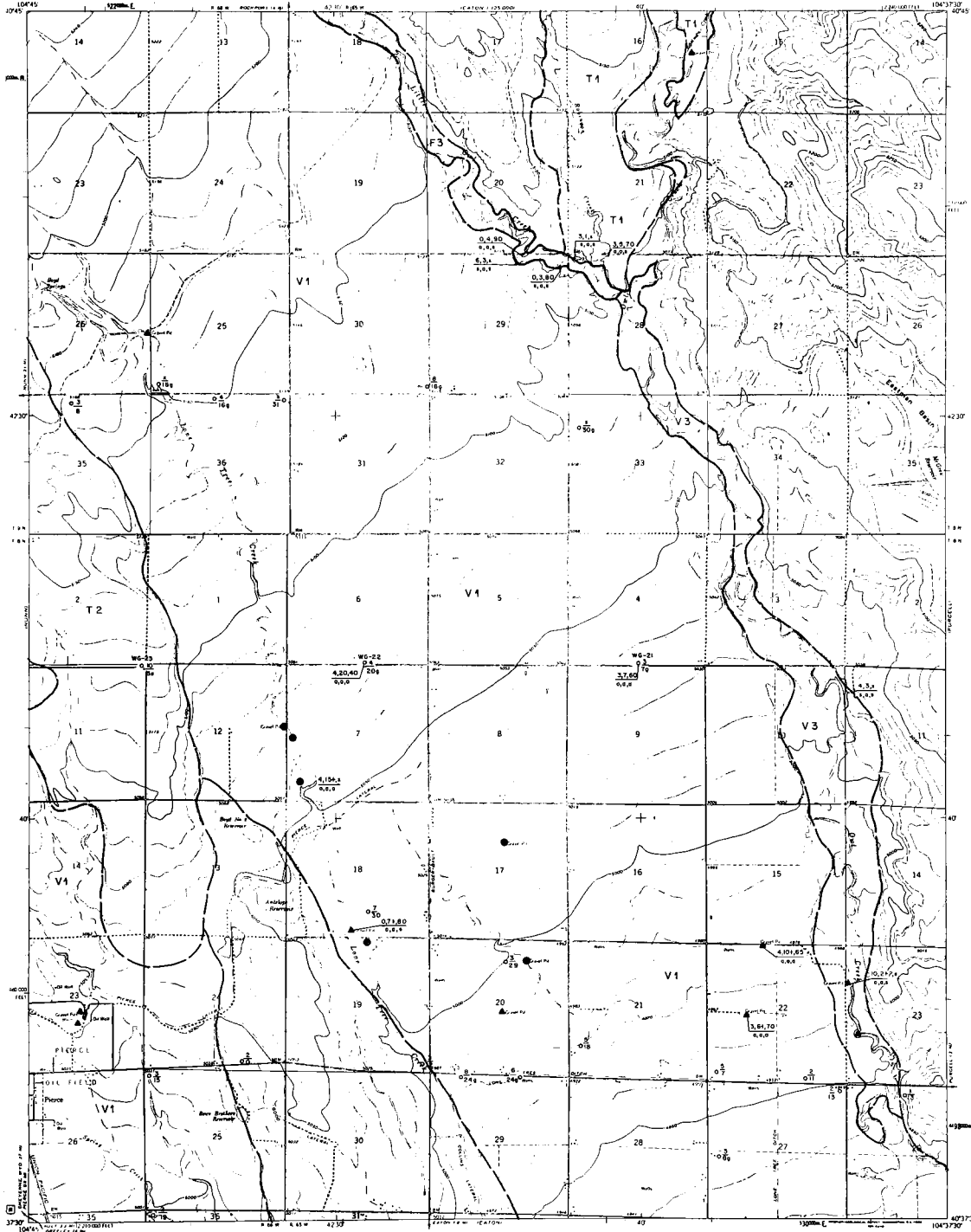
Base from U. S. Geological Survey
7-1/2 minute quadrangle

THIS MAP AND ALL INFORMATION THEREON ARE THE PROPERTY OF THE COLORADO GEOLOGICAL SURVEY

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

ANTELOPE RESERVOIR QUADRANGLE
COLORADO-WELD CO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLS, DIRECTOR



EXPLANATION

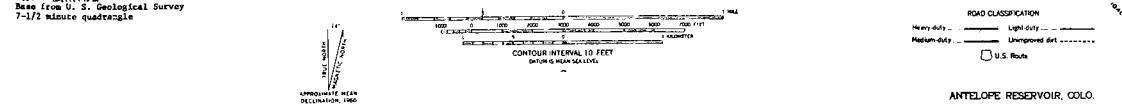
- CONTOUR INTERVAL**
Assume classification
- LANDFORMS**
F Floodplain deposit
T Stream terrace deposit
V Valley fill (F & T)
U Upland deposits
A Alluvial fan
E Wind-deposited sand (eolian)
M Man-made deposits (slag, tailings, spoil...)
- RESOURCE CLASSIFICATION**
COARSE SANDS
Cal. finer 30% retained on #4 screen, usual estimation
1 Gravel: relatively clean and sand
2 Gravel: significant fines, decomposed rock, calcareous concrete
FINE SANDS
Fines: finer than #40 screen, 60% retained on #20 screen, usual estimation
3 Sand
Overvalued Resources
4 Probable aggregate resource
- MAP SYMBOLS**
● Operating gravel and/or sand pit
○ abandoned gravel and/or sand pit
○ Operating stone quarry
○ Abandoned stone quarry
○ Potential quarry aggregate resource area
○ Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
"u" indicates gravel; "s" indicates sand
"u" in symbol denotes unvaluated or unknown property
"w" denotes Colorado Geological Survey "wilderness and scenic protection" still held
Landform boundary, solid where known or dashed; dashed where approximate or inferred
- WELL, LOCATION AND GEOLOGICAL DESCRIPTION OF SPWELL**
— overburden thickness (ft)
— sand/gravel resource thickness (ft)
— percent sand and fines (using #4 screen, 0.25 in.), usual estimation
— significant amount of fines (using #60 screen, 0.25 in. or 0.075 mm)
— significant amount of decomposed or weak rock
"u" in symbol denotes unvaluated or unknown property
"w" in symbol denotes property absent or designated



- QUADRANGLE LOCATION
▨ NON-RESOURCE OR WYDRAIN AREA

REFERENCE:
Hatchey, L.A., and Schneider, P.A., Jr., 1972, Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-687.

Mapped by: Stephen D. Schwabach
Date: June 30, 1974

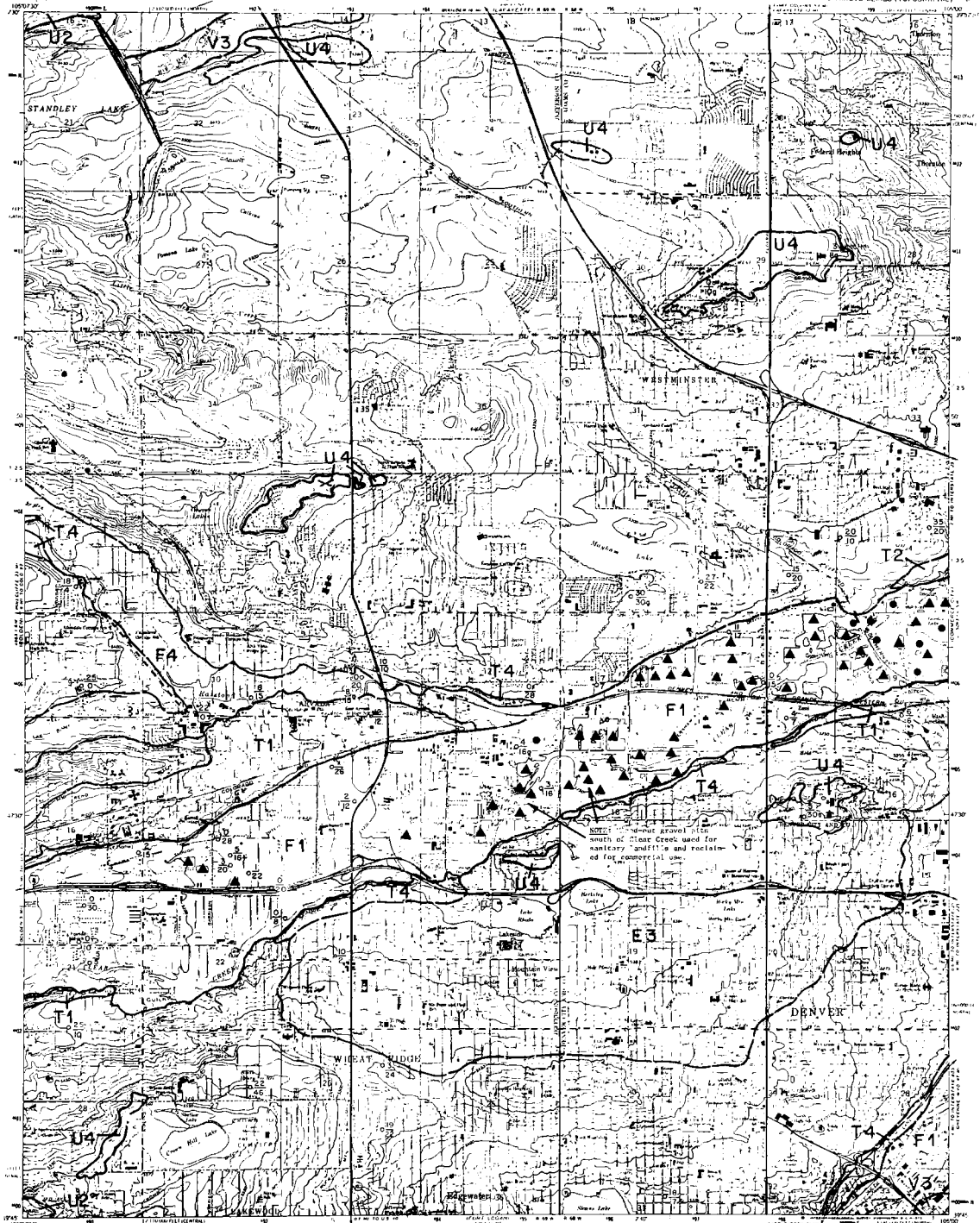


ANTELOPE RESERVOIR, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

ARVADA QUADRANGLE
COLORADO
7 1/2 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYAN, DIRECTOR



EXPLANATION

- Geologic units**
Geologic classification
- LITHOLOGIC UNITS**
- F Fluvialite deposit
 - T Trench terrace deposit
 - V Valley fill (F&T)
 - U Unconsolidated
 - A Alluvial fan
 - E Eolian-deposited sand (terrace)
 - M Mined deposits (slag-tailings, waste...)
- RESOURCE CLASSIFICATION**
- Gravel Resource**
1 Gravel: relatively clean and smooth
2 Gravel: significant fines, decomposed rock, calcine cementation
- Sand Resource**
3 Sand
4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operative stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Retained well or vertical location with over-burden thickness (ft) over sand/gravel resource
 - Shaded area (ft) over sand/gravel resource
 - "x" indicates gravel; "s" indicates sand
 - "in symbol denotes unmineralized or unknown grade"
 - "in symbol denotes Colorado Geological Survey "Underground and Gravel" project's data
 - Land use boundary, solid where known or dashed where shown representative or inferred

- STATION LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOL**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and "fine" (percent of entire 0-20 ft interval)
 - significant amount of decomposed or weak rock
 - significant amount of siliceous aggregate (calcine)
 - "in symbol denotes unmineralized or unknown grade"
 - "in symbol denotes property shown or designated"



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:
Lindvall, R.N., 1972, Geologic map of the Arvada quadrangle, Adams, Denver, and Jefferson Counties, Colorado; U.S. Geol. Survey Misc. Field Studies Map MF-348.
and
Hunt, C.B., 1954, Plateaus and Recent deposits in the Denver area, Colorado; U.S. Geol. Survey Bull. 998-C, pl. 3.

Reference:
Chase, C.H., and McConaghy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado; U.S. Geol. Survey Misc. Geol. Inv. Map I-731.

Inter-County Regional Planning Commission, 1961, Drainage courses plan for the Denver region - Part 1, sand and gravel resources; Denver, Colo., Inter-County Reg. Plan. Comm. pl. 1.

Hamilton, J.L., and Owens, W.G., 1972, Geologic aspects, soils and related foundation problems, Denver metropolitan area, Colorado; Colorado Geol. Survey Environmental Geology Rept. 1, pl. 1.

Trumble, D.E., and Fitch, H.A., 1974, Map showing potential sources of gravel and crushed-rock aggregates in the Greater Denver Area, Front Range Urban Corridor, Colo.; U.S. Geol. Survey Misc. Geol. Inv. Map I-850-A.

Mapped by: Stephen D. Schwochow
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



U.S. GEOLOGICAL SURVEY
WASHINGTON, D.C. 20508

ROAD CLASSIFICATION

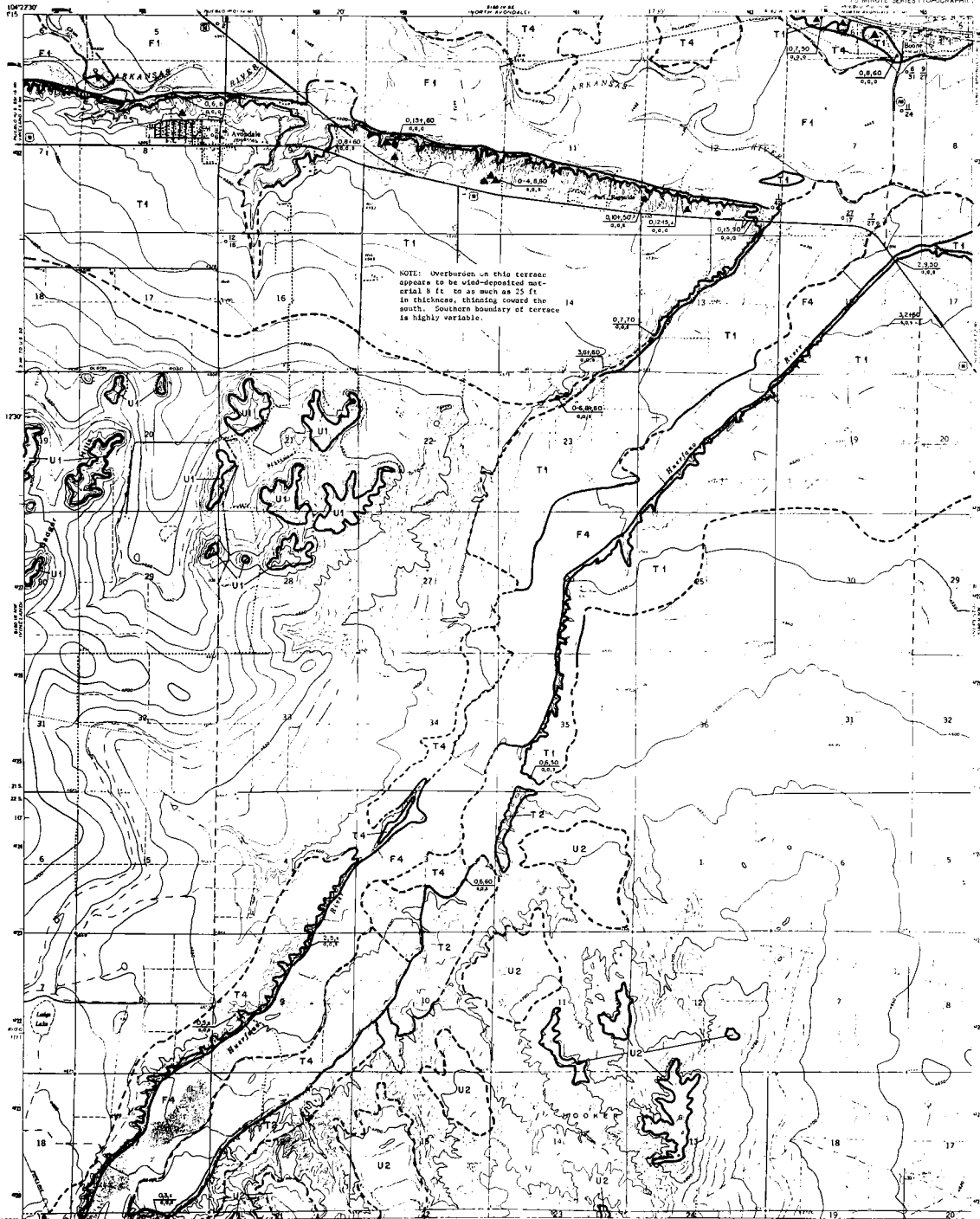
- Heavy-duty
- Medium-duty
- Unimproved dirt
- Unimproved gravel
- Unimproved sand
- U.S. Route
- State Route

ARVADA COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

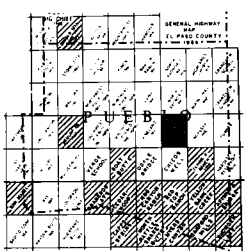
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR

AVONDALE QUADRANGLE
COLORADO-PUEBLO CO.
15 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

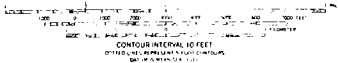
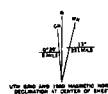
- LEGEND**
- Road classification
 - AGGREGATE RESOURCES**
 - F1 Fluvial deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-sand deposits (slag, tailings, spalls, etc.)
 - RESOURCE CLASSIFICATION**
 - 1 Crown: relatively clean and sound
 - 2 Crown: significant fines, decomposed rock, local outcrops
 - 3 Sand
 - 4 Potential Resource
 - 5 Feasible aggregate resource
 - WELL SYMBOLS**
 - A Operating gravel and/or sand pit
 - B Abandoned gravel and/or sand pit
 - C Operating stone quarry
 - D Abandoned stone quarry
 - E Potential quarry aggregate resource area
 - F Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs. "n" indicates gravel, "s" indicates sand.
 - G "n" symbol denotes unconsolidated or alluvial property.
 - H "s" symbol denotes Colorado Geological Survey stratigraphic and Crown project.
 - I Drill hole
 - J Landform boundary, solid where known or observed, dashed where approximate or inferred.
 - STATION, LOCATION AND GEOMORPHIC DESCRIPTION OF DEPOSIT**
 - Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Percent sand and gravel (percent of crown, 0-25 ft), gravel (percent of crown, 0-25 ft), gravel (percent of crown, 0-25 ft)
 - Significant amount of fines (passing #20 screen, 0.850 mm)
 - Significant amount of decomposed or weak rock
 - "n" symbol denotes unconsolidated or alluvial property
 - "s" symbol denotes property absent or insignificant



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schwetsov
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

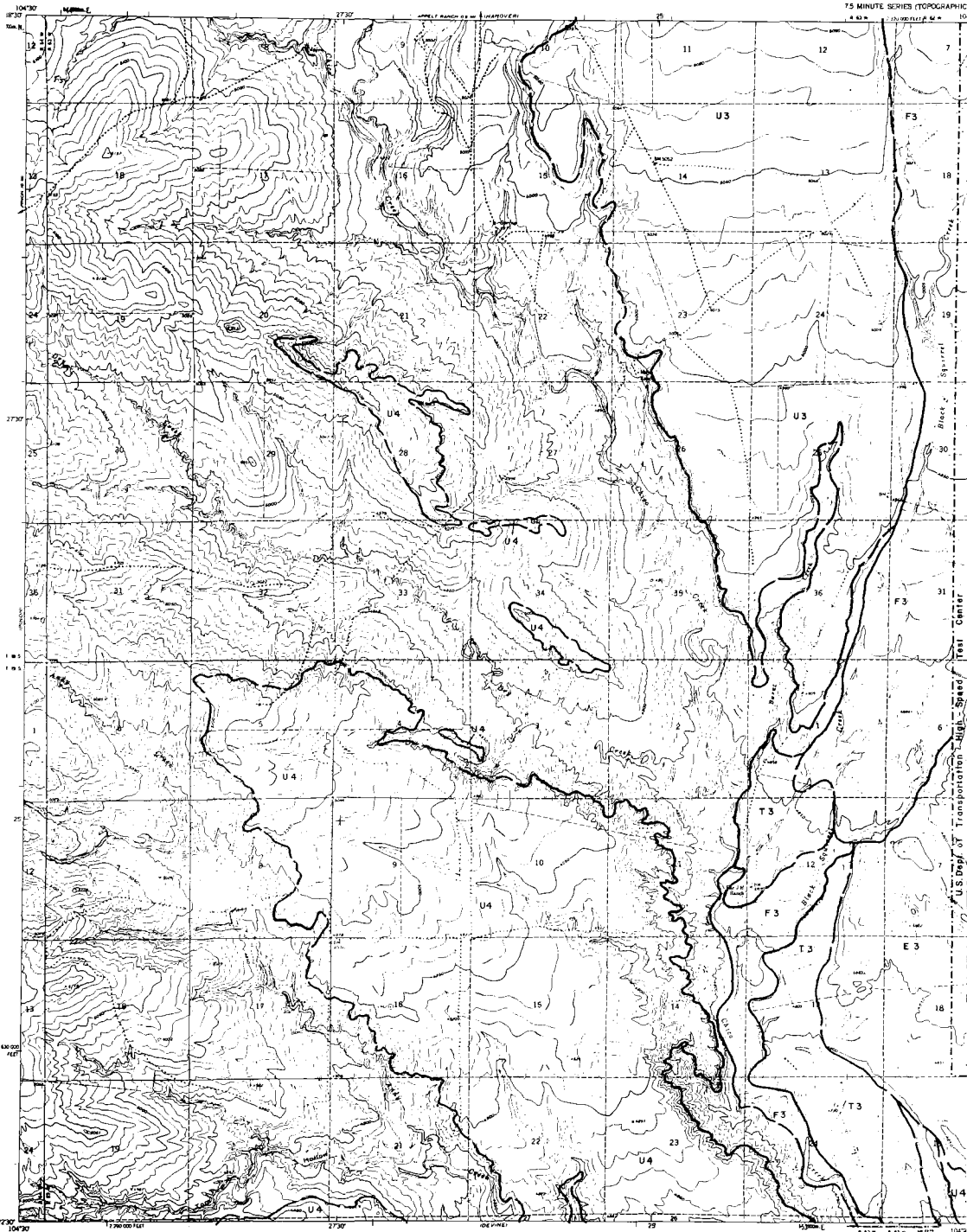
Heavy duty Light duty
Medium duty Unimproved dirt
U.S. Road State Road

AVONDALE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

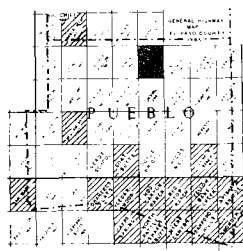
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLLIDAY, DIRECTOR

BAR JH RANCH QUADRANGLE
COLORADO-PUEBLO CO
7 1/2 MINUTE SERIES (TOPOGRAPHIC)
4 1/2" x 6 1/2" (1:50,000)



EXPLANATION

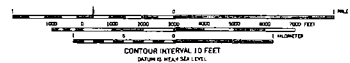
- Landform unit
- Alluvium classification
- LANDFORM UNIT**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (landfill, spoil, ...)
- AGGREGATE CLASSIFICATION**
 - Gravel Aggregate**
 - 1 Gravel, calcareous class and sand
 - 2 Gravel, argillaceous fines, decomposed rock, calcareous carbonate
 - Fine Aggregate**
 - 3 Igniferous fines (filling) 40 screen, 40S retained on 200 screen, actual retention
 - 4 Sand
- Unutilized Resource**
 - 1 Probable aggregate resource
- USE SYMBOL**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with owner, horizon thickness (ft), gravel and/or sand/gravel resource thickness (ft), obtained from well logs
 - "T" indicates gravel "U" indicates sand
 - "*" is symbol denotes unutilized or unknown property
 - "M" denotes Colorado Geological Survey Mineral Land and Gravel projects
 - "B" indicates boundary, wild where known or observed; shaded where approximate or inferred
- STATION LOCATION AND ORIENTAL DESCRIPTION OF SYMBOL**
 - riverbank thickness (ft)
 - sand/gravel resource thickness (ft)
 - ▭ gravel and/or sand (spacing 40 screen, 200, 40S, actual retention)
 - ▭ significant amount of fines (spacing 200 screen, 40S, 40, 20, 10, 5, 2.5, 1.25, 0.75, 0.5, 0.25, 0.125)
 - ▭ significant amount of siliceous carbonate (calcite)
 - "*" is symbol denotes unutilized or unknown property
 - "M" is symbol denotes properly situated or designated



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WETLAND AREA

Mapped by: Stephen D. Schowchow
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



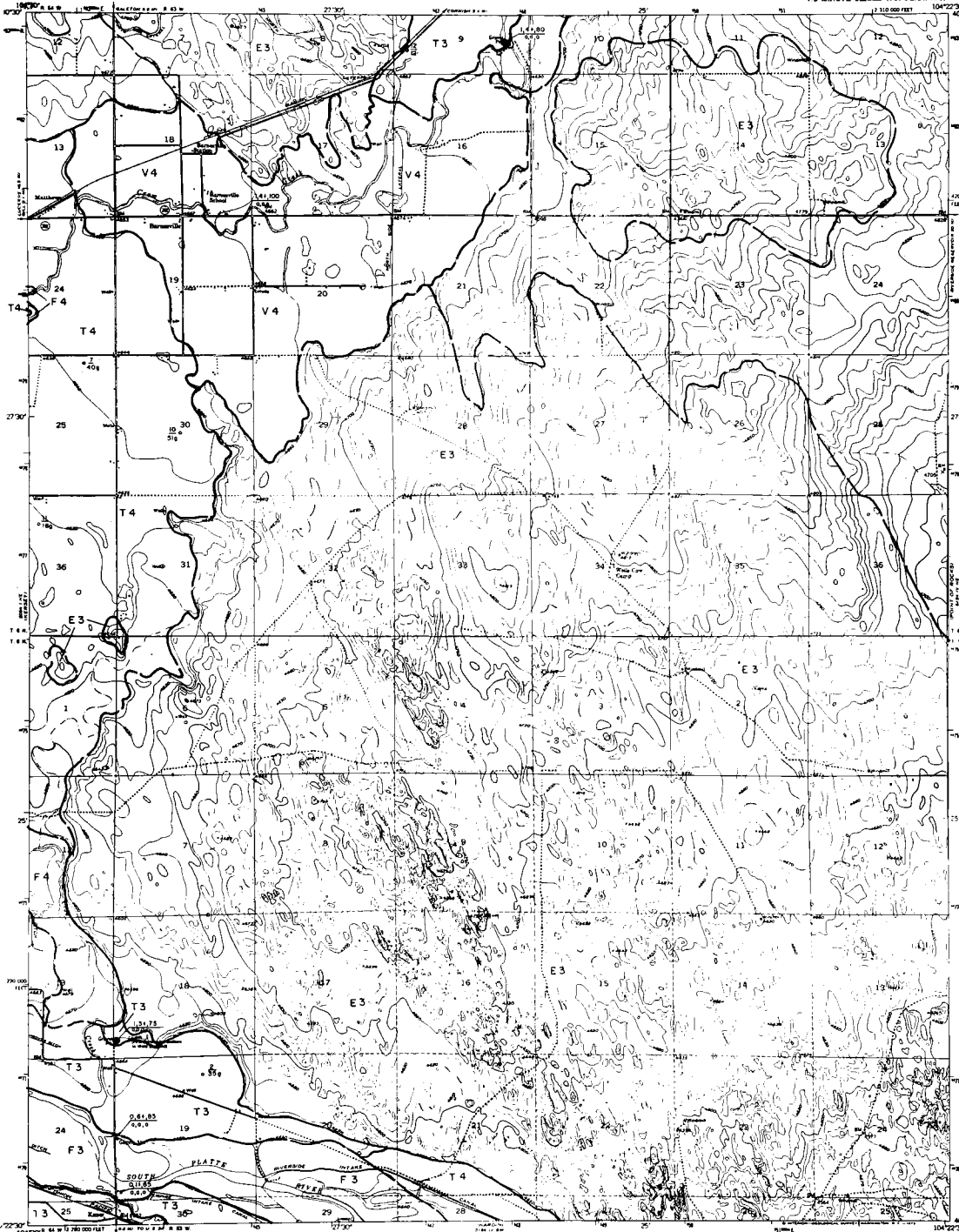
APPROXIMATE MEAN
 DECLINATION, 1960

BAR JH RANCH, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

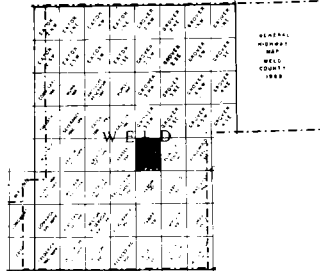
BARNESVILLE QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
1:100,000 (FEET)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR



EXPLANATION

- CONTOUR UNIT
--- Resource Classification
- LITHOLOGICAL UNITS**
- F Floodplain deposit
 - T River terrace deposit
 - W Water table (F or T)
 - U Alluvial deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Humidate deposits (sand, siltstone, shale, ...)
- RESOURCE CLASSIFICATION**
- GRAVEL RESOURCES**
See Code 305 on Chart on 44 screen, "Sand and Gravel"
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- SAND RESOURCES**
See Code 306 on Chart on 44 screen, "Sand and Gravel"
- 1 Sand: relatively clean and sound
 - 2 Sand: significant fines, decomposed rock, calcium carbonate
- Other Symbols**
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Related well or drill-hole location with overburden thickness (ft) and gravel resource thickness (ft), obtained from well logs.
 - "T" indicates gravel, "S" indicates sand
 - In symbol: distance overburden or within property
 - "W" denotes Colorado Geological Survey "Roadstead and Gravel" project's drill hole
 - Land-use boundary, which shows where no observed data were available on land-use.
- STATION, LOCATION AND GEOLOGICAL INFORMATION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (spacing of screen, 2.0 in.), actual determination
 - significant amount of fines (spacing 100 screen, 0.080 in. or 0.075 mm)
 - significant amount of decomposed or weak rock
 - significant amount of calcium carbonate (calcite)
 - "W" on symbol denotes unmineralized or within property
 - "S" in symbol denotes property absent or decomposed



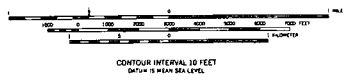
- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Bjorklund, L.J., and Brown, R.P., 1957. Geology and ground-water resources of the lower South Platte River valley between Garden, Colorado, and Paxton, Nebraska; U. S. Geol. Survey Water-Supply Paper 1378, pl. 1.

Mapped by: Phillip C. Wicklen
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle

FOR SAND AND GRAVEL RESOURCE MAPS
CONTOUR INTERVAL 10 FEET
DATA IS MEAN SEA LEVEL



- ROAD CLASSIFICATION**
- Heavy-duty
 - Medium-duty
 - Light-duty
 - Unimproved dirt
 - U.S. Route
 - State Route

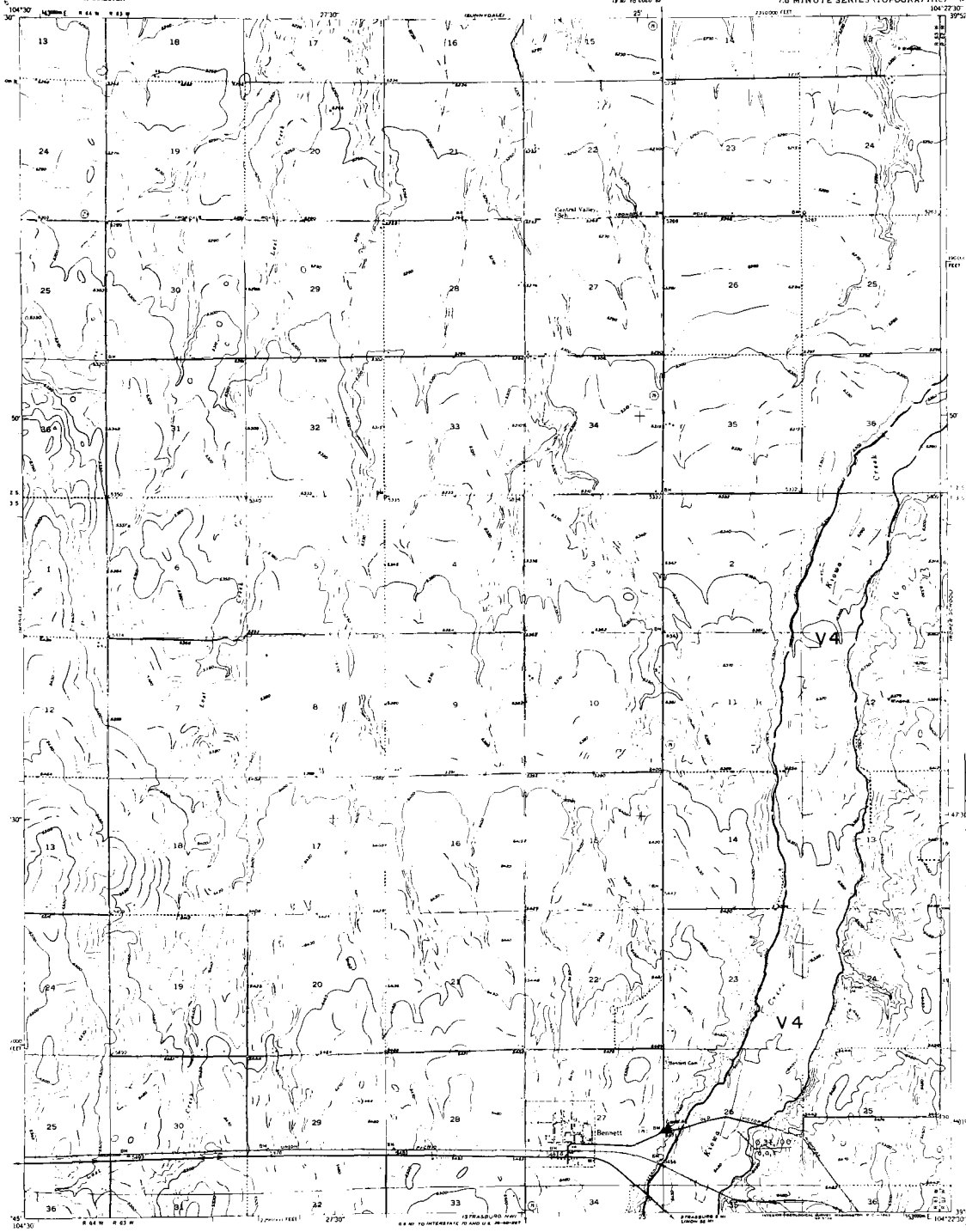
BARNESVILLE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

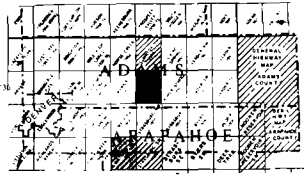
BENNETT QUADRANGLE
COLORADO-ADAMS CO
7.6 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

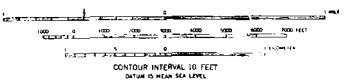
- LANDFORMS**
- Uniform soil
 - Resource classification
- LANDFORMS**
- F Floodplain deposit
 - T Terrace deposit
 - W Water (1/2" & 3/4")
 - A Alluvial deposit
 - A Alluvial fan
 - E Erosional deposit
 - M Mountain deposit
 - W Water (1/2" & 3/4")
- RESOURCE CLASSIFICATION**
- 1 Level, relatively clean and sound
 - 2 Level, significant fines, decomposed rock, cation enrichment
 - 3 Sand
 - 4 Probable aggregate resource
- ROAD CLASSIFICATION**
- Major road
 - Minor road
- STATUS, LOCATION AND GEOLOGICAL CLASSIFICATION OF DEPOSIT**
- Abundant gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with over-burden thickness (1/4" - 3/4") and (1/4") resource thickness (1/4")
 - "L" indicates gravel, "S" indicates sand
 - "I" in symbol denotes unconsolidated or unknown resource
 - "W" in symbol denotes Geological Survey Withdrawn Sand and Gravel projects
 - "X" in symbol denotes unobserved or inferred



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Wicklen
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



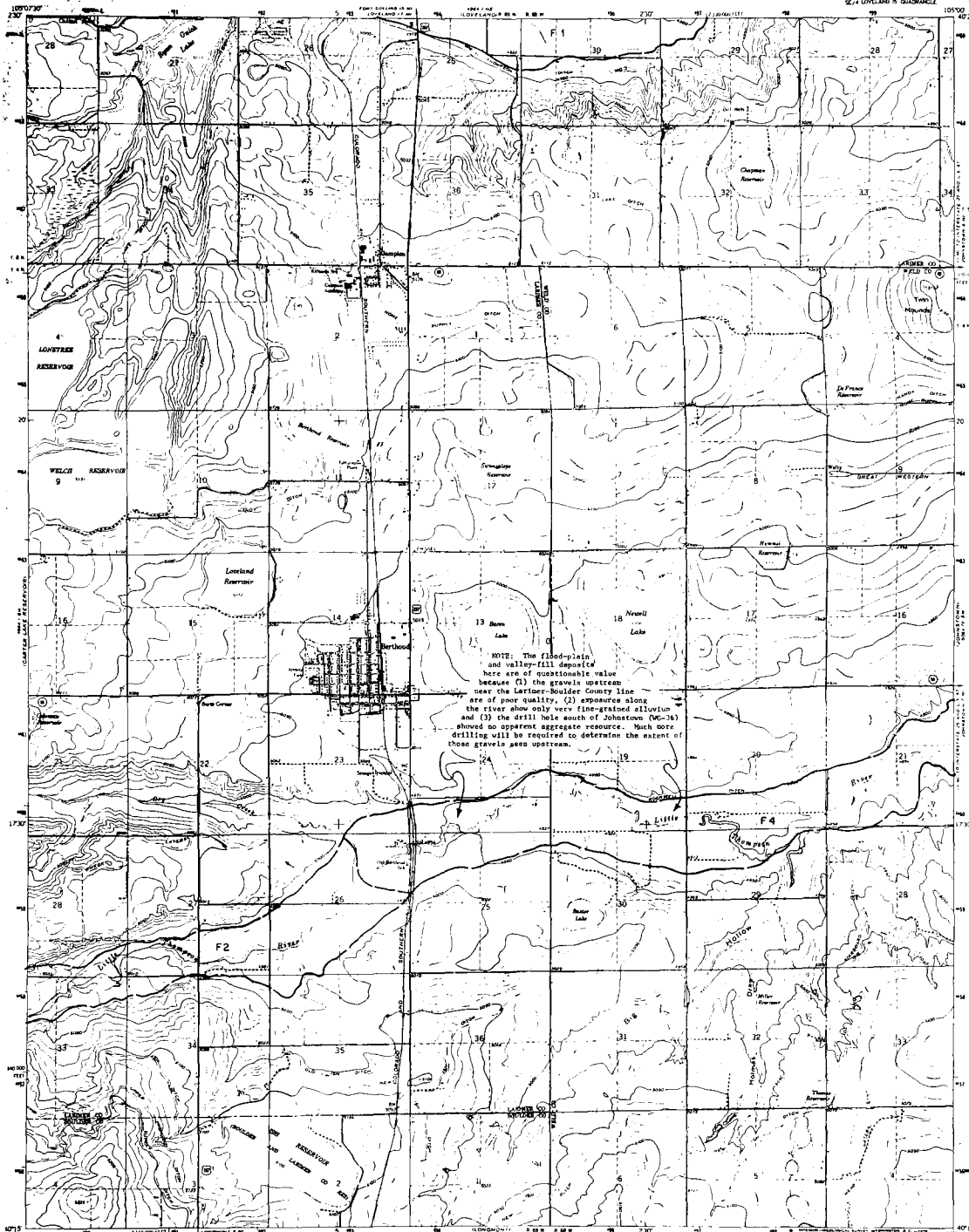
ROAD CLASSIFICATION
Major-Duty
Light-Duty
Unimproved dirt road
State Route

BENNETT, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

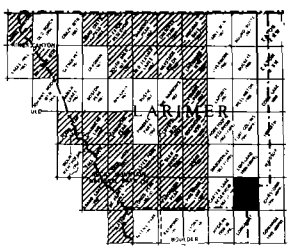
BERTHOUD QUADRANGLE
COLORADO
15 MINUTE SERIES (TOPOGRAPHIC)
SCALE UTM/LAND 1:50,000

DEPARTMENT OF NATURAL RESOURCE
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR



EXPLANATION

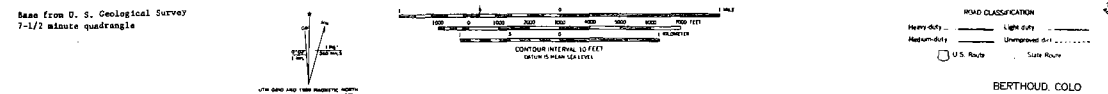
- Geologic units**
 F Flood-plain deposit
 T Tertiary terrace deposit
 W Alluvial fan (F & T)
 A Alluvial fan
 U Unconformity
 E Erosion-deposited sand (alluvial)
 M Magma deposits
 (See also: symbols...)
- RESOURCE CLASSIFICATION**
 1 Gravel: relatively clean and sound
 2 Gravel: significant fines, decomposed rock, salt and carbonates
 3 Sand
 4 Probable aggregate resource
- MAP SYMBOLS**
 Operating gravel and/or sand pit
 Abandoned gravel and/or sand pit
 Operating stone quarry
 Abandoned stone quarry
 Potential quarry aggregate resource area
 Selected well of drill-hole location with open-bottom thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 "G" indicates gravel, "S" indicates sand
 "R" is symbol denoting mineralized or abandoned prospect
 "W" denotes Colorado Geological Survey Water/land and Gravel project
 Drill hole
 Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
 Station number (e.g., F1)
 Location (e.g., F1)
 Geological description (e.g., F1)
 Significant amount of fines (containing 10% or more of fines) in sand
 Significant amount of decomposed or weak rock
 Significant amount of decomposed material
 "R" is symbol denoting mineralized or abandoned prospect
 "W" is symbol denoting property abandoned or unapproved



- QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after: Colton, R.H., and Mitch, R.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fore Collins-Doreley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-653 D.

Mapped by: Stephen D. Schwochow
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey

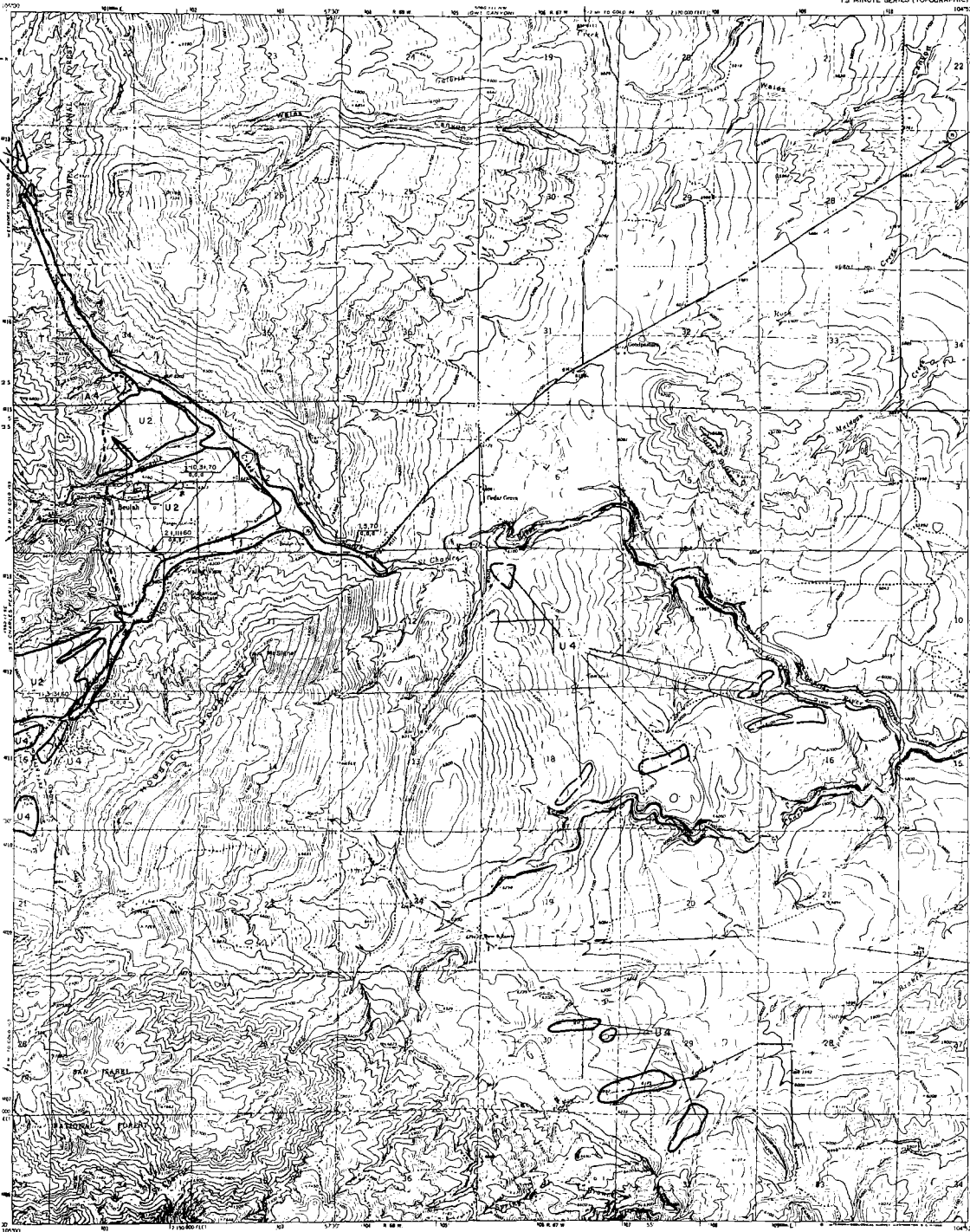


BERTHOUD, COLO

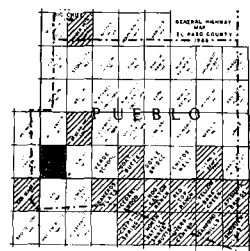
SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

BEULAH QUADRANGLE
COLORADO-RUEBLO CO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLS, DIRECTOR



- MAPPING UNIT**
L - Local classification
- MAPPING UNIT**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Erosion-deposited sand (colluv)
 - M Man-made deposits (colluviation, spalls, ...)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 100 mesh on 48 screen, usual distribution)
- 1 Gravel, relatively clean and sound
 - 2 Gravel, significant fines, decomposed rock calcareous
- Fine Aggregate**
(passing 100 mesh, 48 screen, 48 mesh retained, 200 screen, usual distribution)
- 3 Sand
 - 4 Probable aggregate resource
- NOT SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Proposed quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel, hammer thickness (ft), obtained from well logs
 - "I" indicates gravel; "S" indicates sand
 - "*" in symbol denotes unclassified or unknown property
 - "W" denotes Colorado Geological Survey Wellhead/Seal and Crown products
 - Landform boundary, solid where known or inferred; dashed where approximate or inferred
- STATION, LOCATION AND ORIGINICAL CLASSIFICATION OF DEPOSIT**
- overburden thickness (ft)
 - undrilled resource thickness (ft)
 - percent sand and fines (passing 48 screen, 0.25 in. or 6.35 mm.)
 - significant amount of fines (passing 200 screen, 0.075 in. or 1.91 mm.)
 - significant amount of decomposed or weak rock
 - significant amount of siliceous calcareous material
 - "*" in symbol denotes unclassified or unknown property
 - "W" in symbol denotes property shown on the map

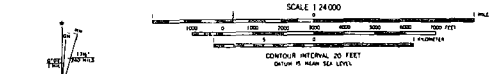


■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR VETERINARY AREA

Geology modified after Scott, G. R., and Taylor, R. S., 1973, U. S. Geological Survey, Map H-631.

Mapped by: Ralph R. Shrobs
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

Medium-duty Light-duty

Unimproved dirt

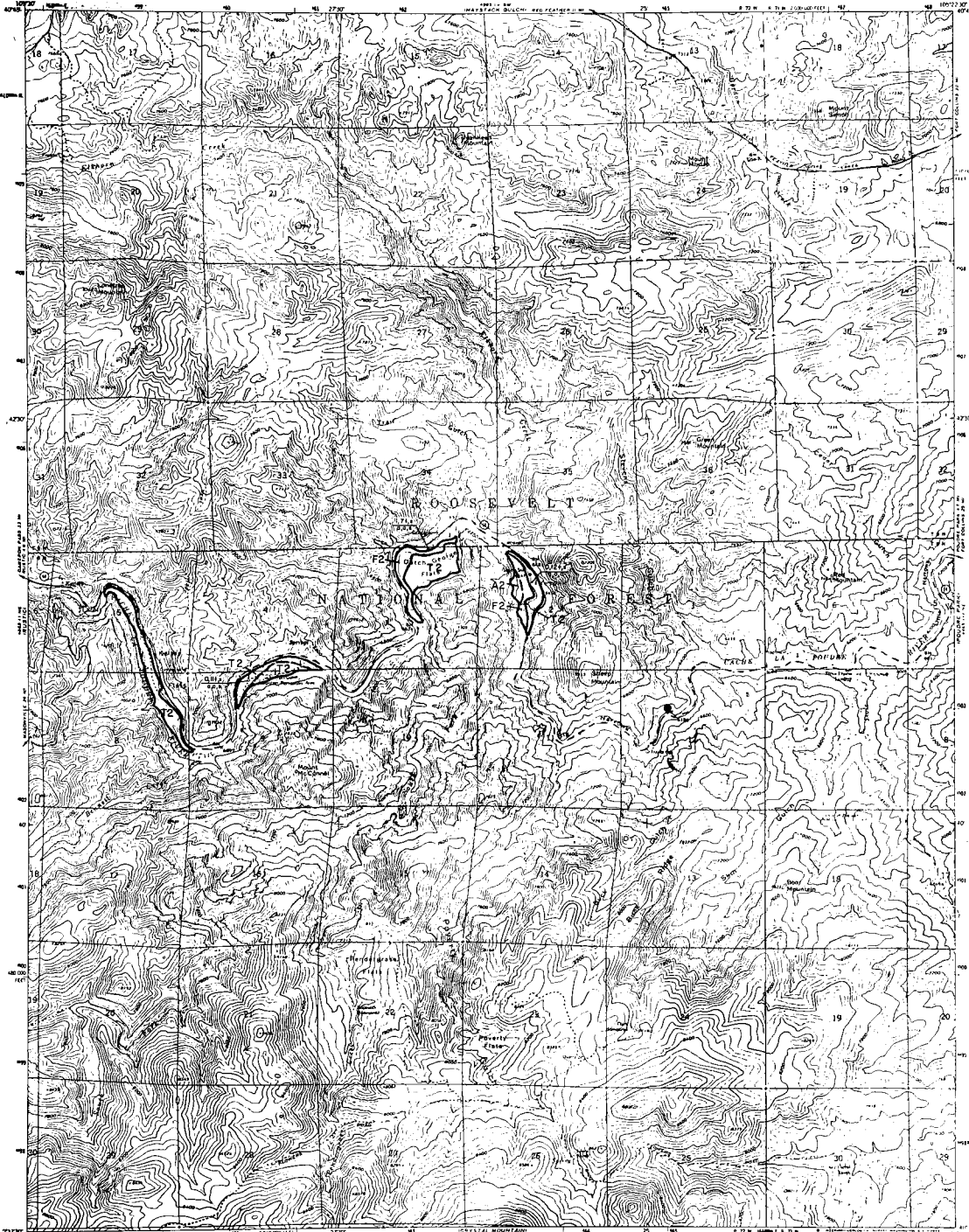
State Road

BEULAH, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR

BIG NARROWS QUADRANGLE
COLORADO-LARIMER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

Longitude unit
Elevation classification

LAPIDATION UNITS

- F Fluvialite deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Man-deposited sand (natural)
- M Man-made deposits (slag, tailings, spoils, ...)

RESOURCE CLASSIFICATION

- Coarse Sand/Gravel**
(at least 20% retained on #4 screen, visual estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significantly fines, decomposed rock, surface calcareous

- Fine Sand/Gravel**
(between 20% passing #4 screen, 80% retained on #200 screen, visual estimation)
- 3 Sand

- Unutilized Resource**
- 4 Probable aggregate resource

MAP SYMBOLS

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Reclaimed quarry aggregate resource area
- Selected well or drill-hole location with overburden thickness (fill over road/gravel resource thickness (ft), shaded from well logs, "n" indicates gravel, "m" indicates sand)
- "n" in symbol denotes unutilized or unknown property
- "m" denotes Colorado Geological Survey "Discontinued and Canceled Projects"
- Well location
- Landform boundary, solid where known or observed, dashed where approximate or inferred

STATION, LOCATION AND GEOLOGICAL SIGNIFICANCE OF DEPOSIT

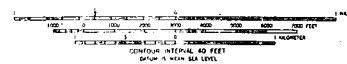
- overburden thickness (ft)
- undisturbed resource thickness (ft)
- percent sand and fines (percent of screen, 0.25 in., or 0.075 mm.)
- significant amount of fines (passing #100 screen, 0.0075 in. or 0.191 mm.)
- significant amount of decomposed or weak rock
- significant amount of silica surface material
- "n" in symbol denotes unutilized or unknown property
- "m" in symbol denotes property absent or insignificant



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR VETERINARY AREA

Mapped by: Stephen D. Schwechow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



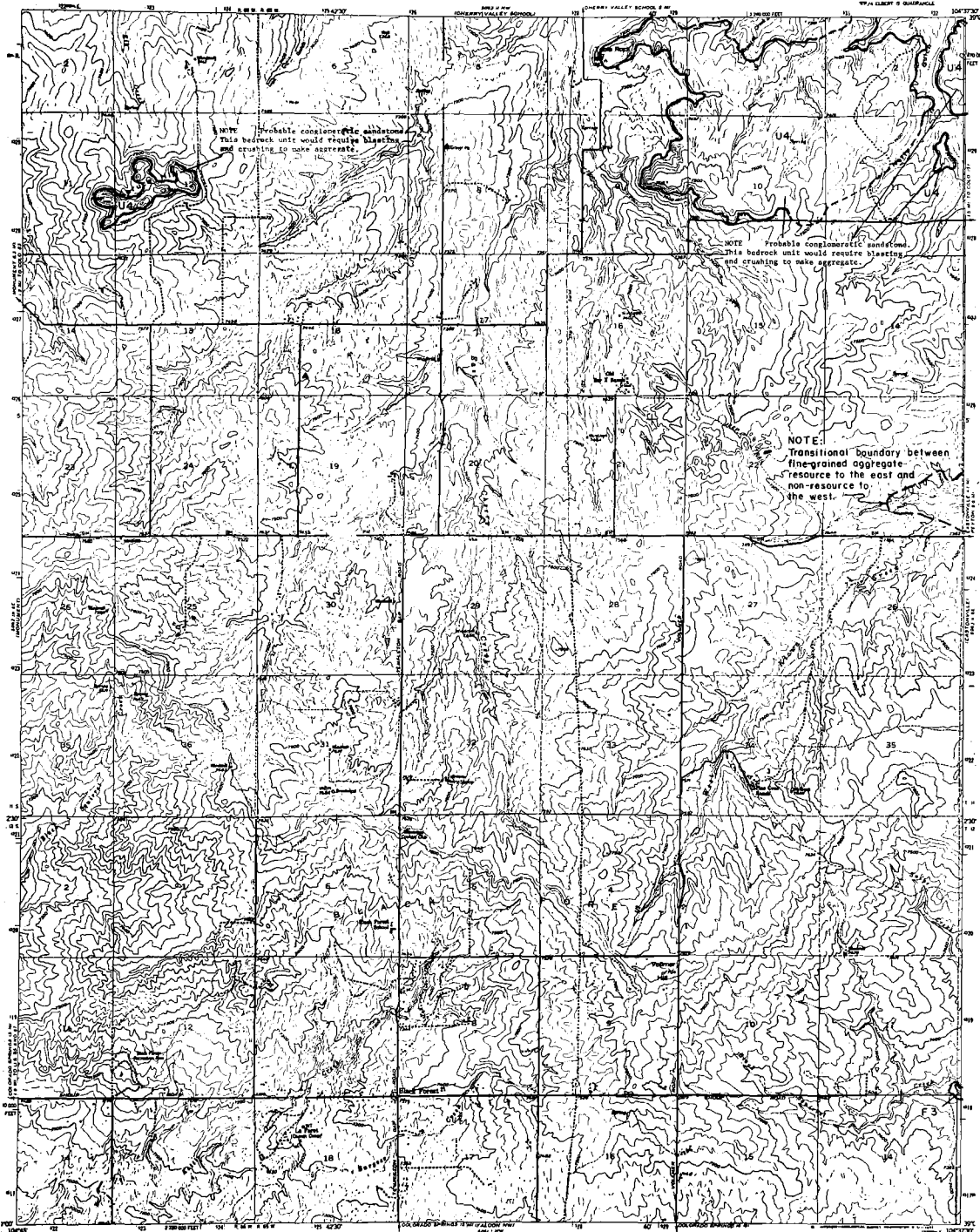
- ROAD CLASSIFICATION**
- Medium duty
 - Light duty
 - Unimproved dirt
 - State Route

BIG NARROWS, COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

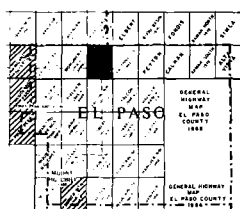
BLACK FOREST QUADRANGLE
COLORADO-EL PASO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
1974 EDITION'S QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR



EXPLANATION

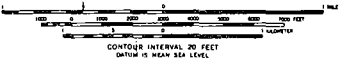
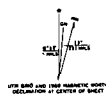
- Legend**
- LAPODOL UNIT**
- F Fluvial deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-erosion sand (soil)
 - M Hummock deposits (slag, tailings, spalls...)
- AGGREGATE CLASSIFICATION**
- 1 Coarse aggregate
"A" unit 20' section on 4' screen, 100% retention
 - 2 Coarse: relatively clean and sand
3 Coarse: significant fines, decomposed rock, calcine enrichment
 - 4 Fine aggregate
"B" unit 20' section on 4' screen, 40% retained on 425 screen, 100% retention
 - 5 Sand
 - 6 Unutilized Resource
 - 7 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - ⊙ Abandoned gravel and/or sand pit
 - ⊕ Operating stone quarry
 - ⊙ Abandoned stone quarry
 - ⊙ Potential quarry aggregate resource area
 - ⊙ Indicated pit or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs
 - "u" indicates gravel; "s" indicates sand
 - "*" in symbol denotes unutilized or unknown property
 - "m" denotes Colorado Geological Survey Member (land and gravel structure) drill hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- SYMBOLS, LOCATIONS AND GEOLOGICAL DESCRIPTIONS OF SYMBOLS**
- overburden thickness (ft)
 - ⊙ sand/gravel resource thickness (ft)
 - ⊙ percent sand and fines (percent of screen, 0.075 in. or 3/16 in.)
 - ⊙ significant amount of decomposed or weak rock
 - ⊙ significant amount of calcine enrichment or other property
 - "*" in symbol denotes unutilized or unknown property
 - "u" in symbol denotes properly placed or impure/loose



Geology modified after:
Trimble, D.E., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Gaste Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-857 A.

Mapped by: Phillip C. Wickles
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

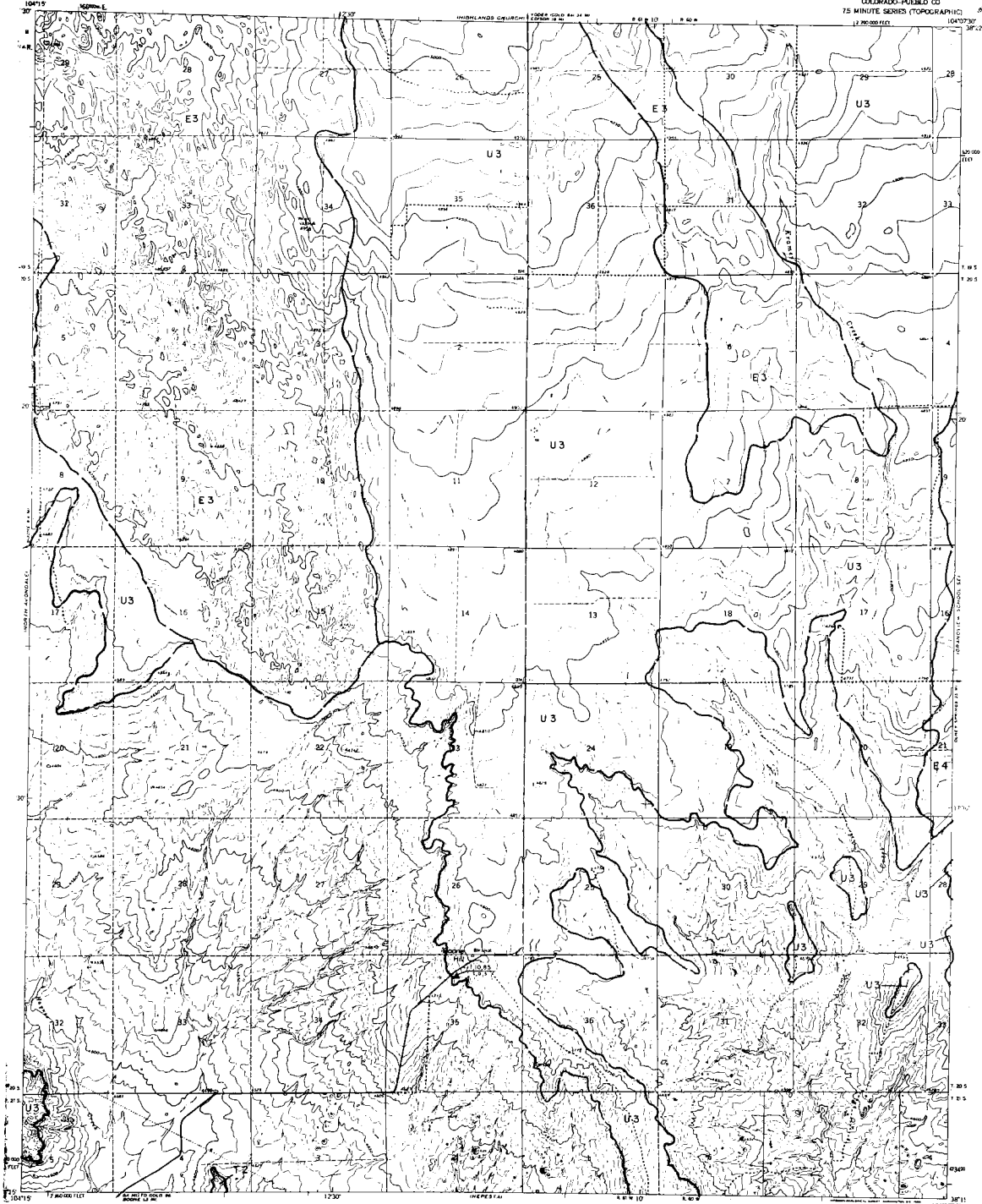
ROAD CLASSIFICATION
Light duty — Unimproved dirt,

BLACK FOREST, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

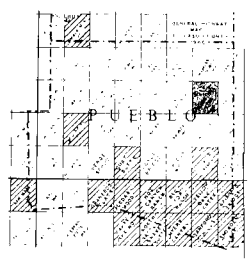
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLZ, DIRECTOR

BOONE HILL QUADRANGLE
COLORADO-PUEBLO CO
15 MINUTE SERIES (TOPOGRAPHIC)
1:250,000 SCALE



EXPLANATION

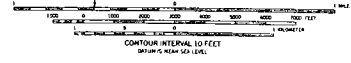
- Legend:**
 - Contour lines
 - Resource classification
- RESOURCE CLASSIFICATION**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated sand
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Marine deposits (beach, dune, etc.)
- RESOURCE CLASSIFICATION**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, solution cavities
 - 3 Sand
 - 4 Probable aggregate resource
- USE SYMBOLS**
- * Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Potential well or well-like location with water
 - Potential sand and gravel resource
 - Potential gravel, "M" indicates sand
 - In symbol: resource unclassified or unknown property
 - "M" indicates Colorado Geological Survey resource and gravel projects' title held
 - Landform boundary, solid lines show or contour, dashed lines approximate or inferred
- STATION LOCATION AND CHARACTERIZATION OF BENCH**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Gravel sand and fines opening at screen, 0.25 in. to 0.25 mm
 - Significant amount of fines (opening 150 screen, 0.25 in. to 0.25 mm)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcium hydroxide (mud)
 - "M" symbol: resource unclassified or unknown property
 - "M" symbol: resource property absent or ungravelled



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WILDERNESS AREA

Maped by: Stephen D. Schwochow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION
 Medium duty ————
 Light duty ————
 Unimproved dirt ————

BOONE HILL, COLO.

APPROXIMATE MEAN
DECLINATION 1980

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

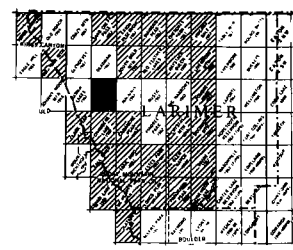
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR
T 4

BOSTON PEAK QUADRANGLE
COLORADO-LARIMER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

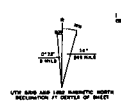
- LANDFORM UNITS**
- F Fluvial deposit
 - T Siliceous terrace deposits
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mudslope deposits (clay, siltstone, silt...)
- MINERAL CLASSIFICATION**
- Gravel Aggregate**
For least size material on 40 screen, visual inspection
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, surface carbonate
- Sand Aggregate**
For 20-40 mesh on 40 screen, 60% retained on 100 screen, visual inspection
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Indicated well or drill-hole location with overburden thickness (ft) over sand/gravel resource
 - Thickness (ft) obtained from well logs
 - "s" indicates gravel; "a" indicates sand
 - "s" in symbol denotes unconsolidated or unknown property
 - "w" denotes Colorado Geological Survey well from sand and gravel project
 - Well hole
 - Landform boundary, solid where known or dashed where approximate as inferred
- STATION, LOCATION AND COORDINATE INDICATION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - potential well hole (spacing of 100, 200, 300, 400, or 500 ft)
 - significant amount of decomposed or soft rock
 - significant amount of relative nonuniformity or unknown property
 - "s" to symbol denotes unconsolidated or unknown property
 - "w" to symbol denotes property absent or unexplored



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schwach
Date: June 30, 1974

See from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL: 40 FEET
DATUM: U.S. MEAN SEA LEVEL

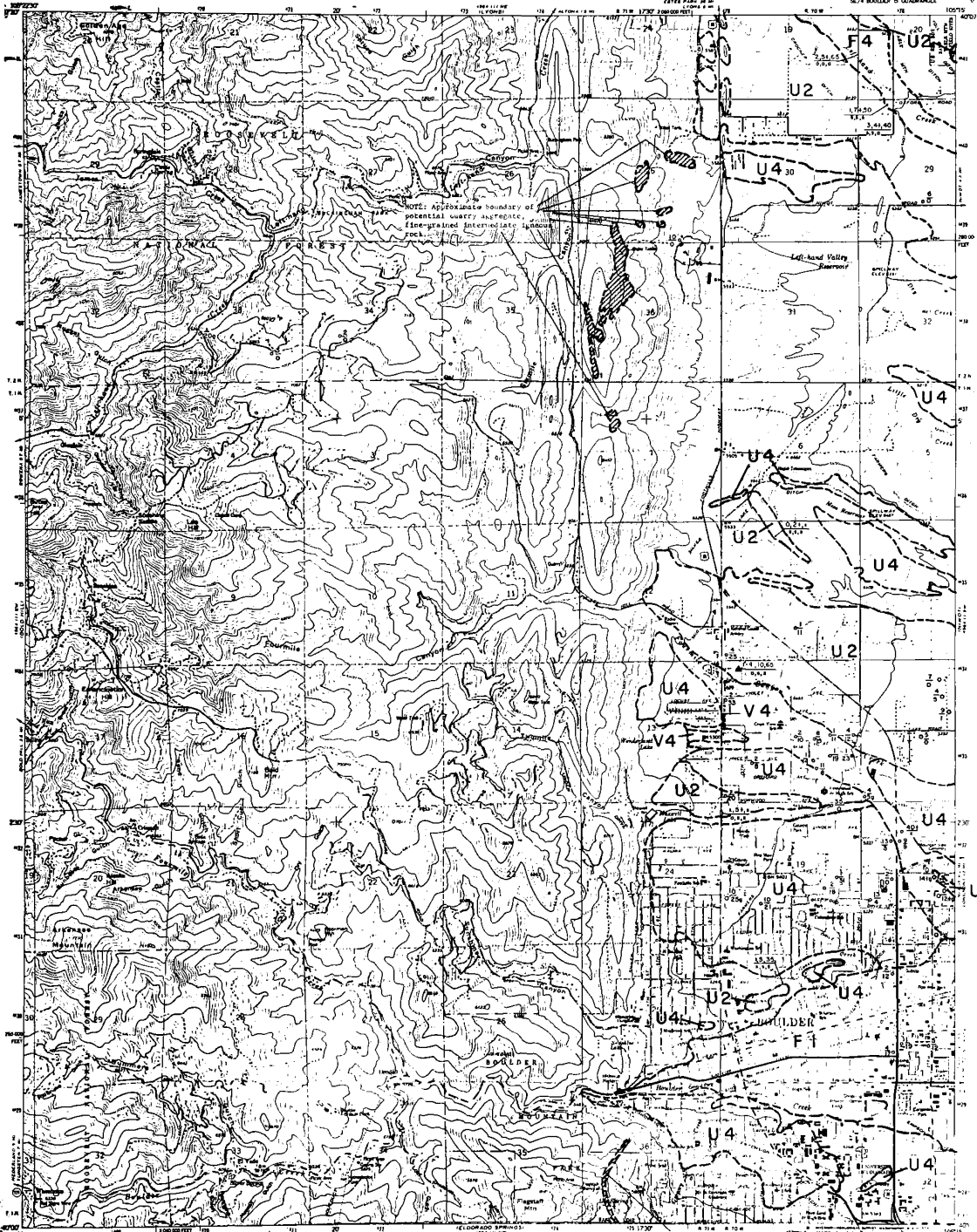
ROAD CLASSIFICATION
Light-duty Unimproved dirt
() State Road

BOSTON PEAK, COLO.

**SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP**

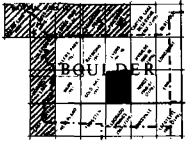
BOULDER QUADRANGLE
COLORADO-BOULDER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
12 1/2' BOULDER QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYAN, DIRECTOR



EXPLANATION

- Landform units
Resource classification
- LANDFORM UNITS**
 - F Fluvial deposit
 - V Stream terrace deposit
 - V Valley fill (F & V)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Manmade deposits (dike, levee, spoil, ...)
- RESOURCE CLASSIFICATION**
 - 1 Coarse Aggregate (at least 200 particles on #4 screen, 5% or more retained)
 - 2 Gravel: relative to clean and sound, natural occurrence
 - 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Indicated well or drill-hole location with mean bottom thickness (ft) and sand/gravel resources thickness (ft) (indicated from well logs)
 - "S" indicates sand
 - "G" indicates gravel
 - "U" in symbol denotes unutilized or unknown quantity
 - "C" denotes Colorado Geological Survey "Crown Road and Crown Project" drill hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- POSITION, LOCATION AND TYPICAL DIMENSIONS OF SYMBOLS**
 - Symbol: resource thickness (ft)
 - Symbol: sand and fine (spacing of screen, 0.25 ft., typical definition)
 - Symbol: significant amount of fine (spacing 1/8 in. screen, 0.0028 in. or 0.07 mm.)
 - Symbol: significant amount of decomposed or weak rock
 - "C" in symbol denotes unutilized or unknown property
 - "U" in symbol denotes property absent or insignificant

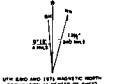


QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA
Geology modified after:

Colton, R.B., and Pritch, W.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Creeley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-855 D.
Gardner, W.H., 1958. Engineering Geologic Map of the Boulder Quadrangle, Boulder County, Colorado: U. S. Geol. Survey Open-File Report.

Mapped by: Ralph R. Shroba
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

NOTE: Approximate boundary of potential quarry aggregate, fine-grained intermediate igneous rock.



Base from U. S. Geological Survey 7-1/2 minute quadrangle

ROAD CLASSIFICATION
Heavy-duty
Medium-duty
Light-duty
Unimproved dirt
U.S. Road
State Road

BOULDER COLO.

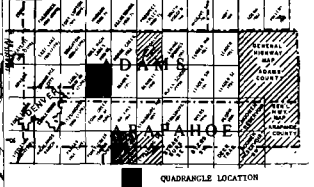
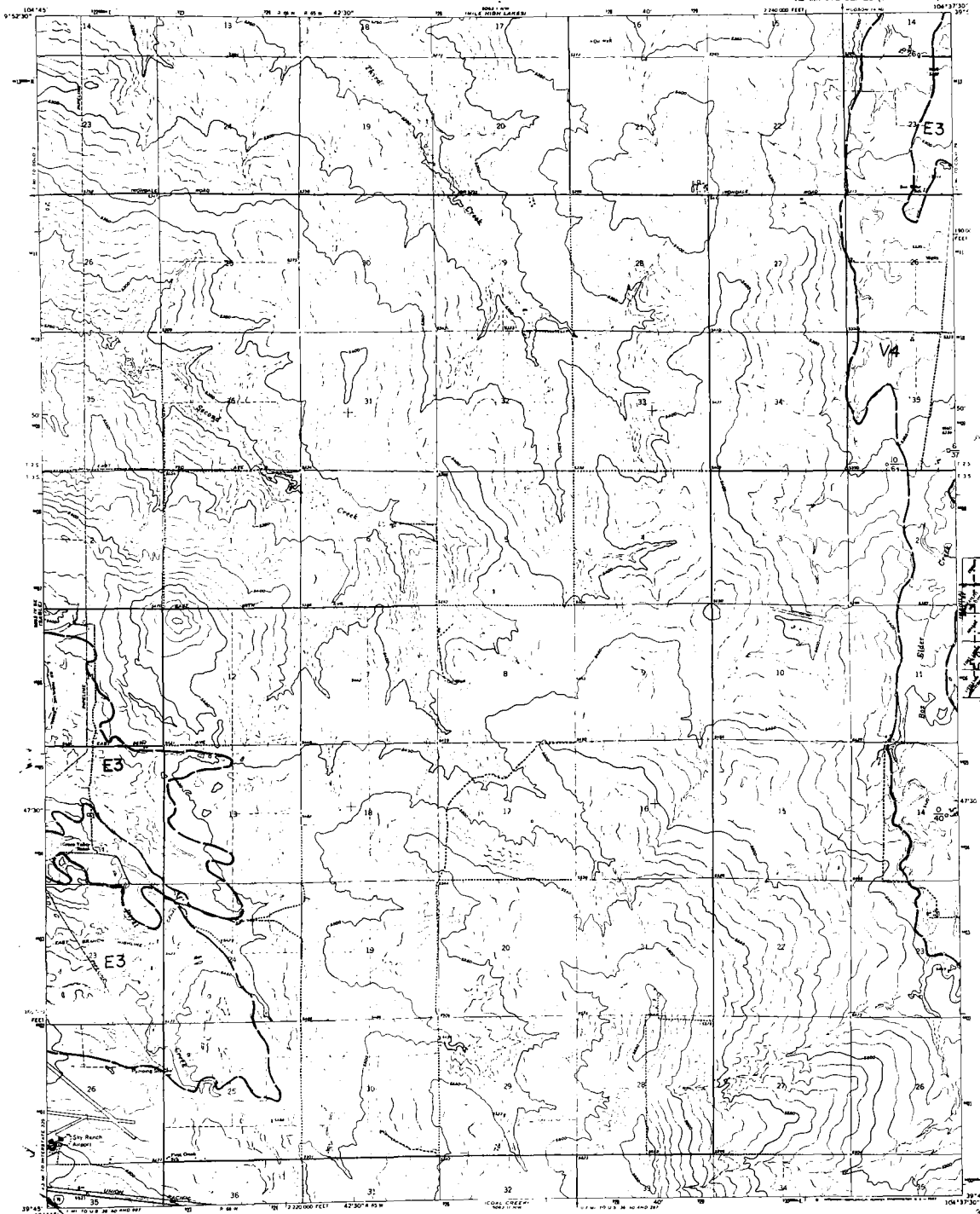
SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLD, DIRECTOR

BOX ELDER SCHOOL QUADRANGLE
COLORADO-ADAMS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

- SYMBOLS**
- Sand
 - Gravel
 - Quarry aggregate
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Potential stone quarry resource area
 - Potential gravel resource area
 - Potential sand resource area
 - Potential quarry aggregate resource area
 - Potential stone quarry resource area
 - Potential gravel resource area
 - Potential sand resource area
- ROAD CLASSIFICATION**
- Heavy-duty
 - Medium-duty
 - Light-duty
 - Unimproved off
 - Highway Right-of-Way
- STATION, LOCATION AND ORIGIN**
- Station
 - Location
 - Origin
- QUADRANGLE LOCATION**
- NON-RESOURCE OR WITHDRAWN AREA**



References:

Chase, G.H., and McCombs, J.A., 1972. Generalized surficial geologic map of the Denver area, Colorado. U.S. Geol. Survey Misc. Geol. Inv. Map I-731.

Smith, R.D., Schneider, P.A., Jr., and Farris, L.R., 1964. Ground-water resources of the South Platte River basin in western Adams and southwestern Weld Counties, Colorado. U.S. Geol. Survey Water-Supply Paper 1656, pl. 1.

Trumble, D.E., and Fitch, R.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo. U.S. Geol. Survey Misc. Geol. Inv. Map I-856-A.

Mapped by: Stephen D. Schwachow
Date: June 30, 1976
Prepared in cooperation with the U. S. Geological Survey.

ROAD CLASSIFICATION

Heavy-duty Light-duty

Medium-duty Unimproved off

Highway Right-of-Way

BOX ELDER SCHOOL, COLO.

Scale from U. S. Geological Survey 7.5 minute quadrangle

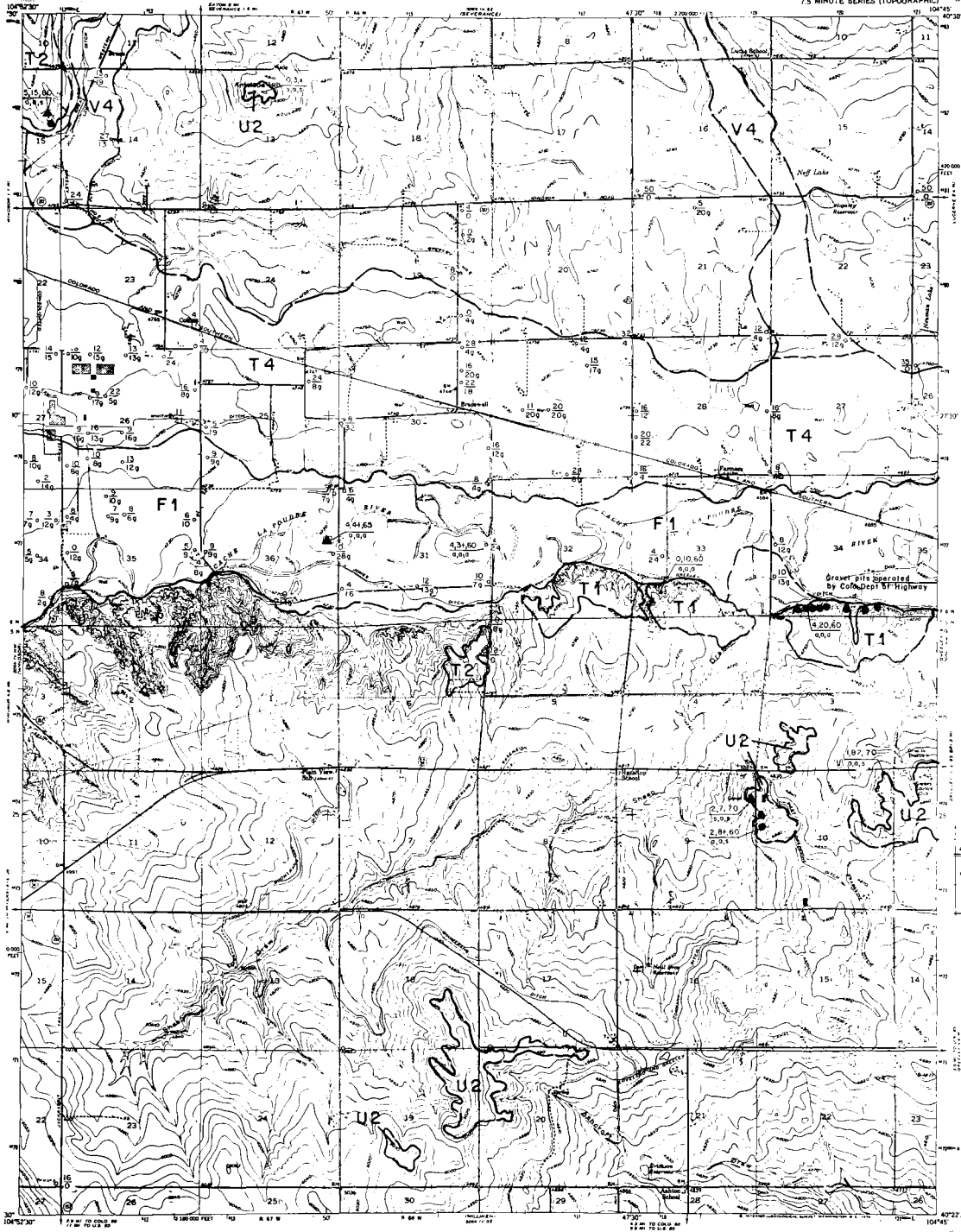
CONTOUR INTERVAL: 10 FEET
DATUM: 3 METERS SEA LEVEL

U.S. AND U.S. GEOLOGICAL SURVEY
DECLINATION AT CENTER OF SHEET

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

BRACEWELL QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



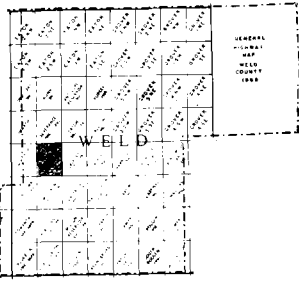
EXPLANATION

- MAP SYMBOLS**
- T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Non-deposited sand (limited)
 - M Non-graded aggregate (e.g., talus, gravel, etc.)

- RESOURCE CLASSIFICATION**
- 1 Gravel: relatively clean and medium
 - 2 Gravel: significant fines, decomposed rock, calcareous sediment
 - 3 Sand
 - 4 Probable aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Selected quarry aggregate resource area
 - Selected well or well-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), indicated from well logs.
 - "I" indicates gravel "S" indicates sand
 - "*" in symbol denotes unutilized or unmined property
 - "**" denotes Colorado Geological Survey (C.G.S.) and/or Colorado Department of Transportation (CDOT) fill hole
 - Land-use boundary, solid where known or observed, dashed where approximate or inferred

- STATION LOCATION AND IDENTIFICATION**
- Overburden thickness (ft)
- Percent sand and fines (using 40 mesh, 0.075 in., sieve) extraction
- Significant amount of fines (using 20 mesh, 0.0075 in. or 0.075 mm.)
- Significant amount of decomposed or weak rock
- Significant amount of calcareous sediment factor
- "*" in symbol denotes unutilized or unmined property
- ** in symbol denotes property shared or unutilized



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

Shaw, F. H., III, 1972, Map of surficial geology of the Bracewell quadrangle; Recon. mapping for Colorado Geol. Survey Window Environmental Geology Project, open-file map.

Berkey, L.A., and Schoelder, P.A., Jr., 1972, Geologic map of the lower Cache La Poudre River basin, north-central Colorado; U. S. Geol. Survey Misc. Geol. Inv. Map 1-687.

Shelton, D.C., 1974, personal communication.

Ching, P.W., 1972, Economic gravel deposits of the lower Cache La Poudre River; Colorado State Univ. Unpub. Master Sci. Thesis.

Geology modified after:

Colton, R.B., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Dreeley Area, Front Range (Urban Corridor), Colo.; U. S. Geol. Survey Misc. Geol. Inv. Map 1-855-0.

Mapped by: Stephen D. Schwobach
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET
SHOWS IN MEAN SEA LEVEL

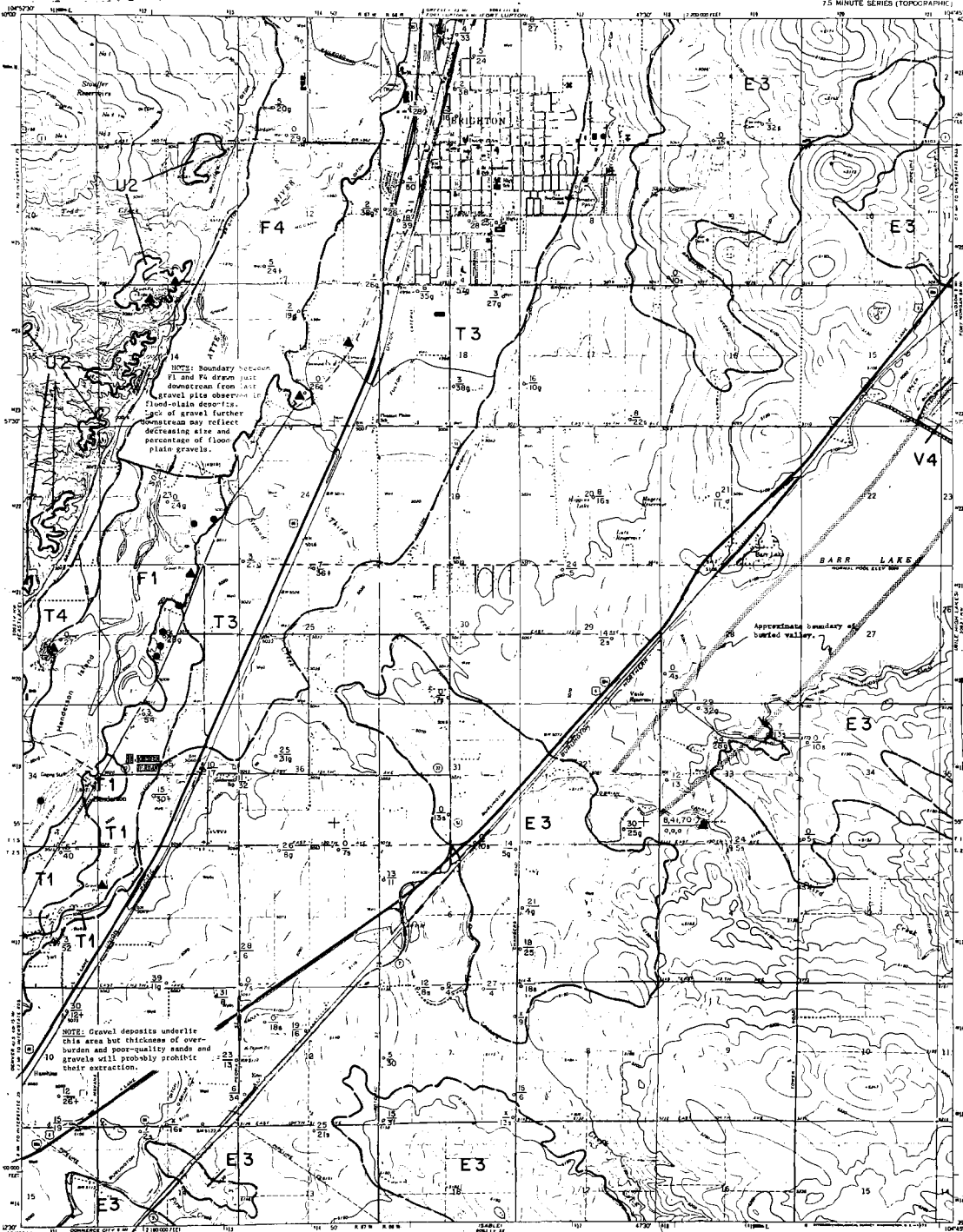
- ROAD CLASSIFICATION**
- Heavy-duty
 - Lightly
 - Unimproved d.r.
 - U.S. Route
 - State Route

BRACEWELL COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

BRIGHTON QUADRANGLE
COLORADO-ADAMS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYLAND, DIRECTOR



EXPLANATION

- Contour interval
Maximum slope (percent)
- RESOURCE ZONES**
- F Floodplain deposits
- T Stream terrace deposits
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Wind-deposited sand (millions of years old)
- M Man-made deposits (slag, tailings, spilla...)
- RESOURCE CLASSIFICATION**
- CLASS 1 (GRAVEL)**
At least 20% retained on #4 screen, visual estimation
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, calcine overburden
- CLASS 2 (SAND)**
Greater than 75% passing #4 screen, 65% retained on #20 screen, visual estimation
- 3 Sand
- Designated Resource**
- 4 Probable aggregate resource
- MAP SYMBOLS**
- Open-pit gravel surface and pit
- Abandoned gravel surface and pit
- Operating stone quarry
- Abandoned stone quarry
- Estimated quarry aggregate resource area
- Selected well or drill-hole location with overburden thickness (ft) and sand/gravel resources (percent sand and fines) (from well logs)
- "m" indicates gravel; "s" indicates sand
- "*" to symbol denotes unmineralized or calcine overburden
- "m" denotes Colorado Geological Survey identified and gravel product
- "|||||" boundary, solid where known or observed; dashed where approximate or inferred
- STATION LOCATION AND GEOLOGICAL ASSOCIATION OF SEDIMENT**
- overburden thickness (ft)
- percent sand and fines (percent #4 screen, 0.75 in., visual estimation)
- significant amount of fines (exceeding 25% screen, 0.075 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- significant amount of calcine overburden (indicated)
- "*" to symbol denotes unmineralized or calcine overburden
- "m" to symbol denotes gravel or sand



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR VETERANS AREA

References:
De Wit, L.M., 1928, *Quadrangle history of Leadville National Monument and environs*, Adams County, Colorado; Colorado School Miner Quar. v. 65, no. 1, p. 2.

Harrison, G.L., and Owen, W.S., 1972, *Geologic aspects, origin and related stratigraphic problems, Denver metropolitan area, Colorado*; Colorado Geol. Survey Earth Resources Geology Report 1, p. 4.

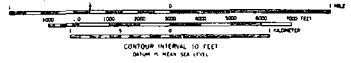
Chase, G.H., and McCaughey, S.A., 1992, *Geological and hydrogeological map of the Boulder area, Colorado*; U.S. Geol. Survey Misc. Geol. Map 1-731.

Smith, R.A., Schneider, P.A., Jr., and Ford, L.K., 1984, *Ground-water resources of the South Platte River basin in western Adams and southeastern Weld Counties, Colorado*; U.S. Geol. Survey Water-Supply Paper 1638, p. 1.

Inter-County Regional Planning Commission, 1961, *Final master plan for the Denver region - Part I, Sand and gravel resources*; Denver, Colo.; Inter-County Reg. Plan. Comm., p. 2.

Triebel, D.H., and Petch, S.H., 1974, *Map showing potential sources of gravel and sand-and-gravel aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.*; U.S. Geol. Survey Misc. Geol. Map 1-689-4.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



- ROAD CLASSIFICATION**
- Heavy-duty
 - Light-duty
 - Unimproved dirt
 - Interstate Route
 - U.S. Route
 - State Route

BRIGHTON COLO.

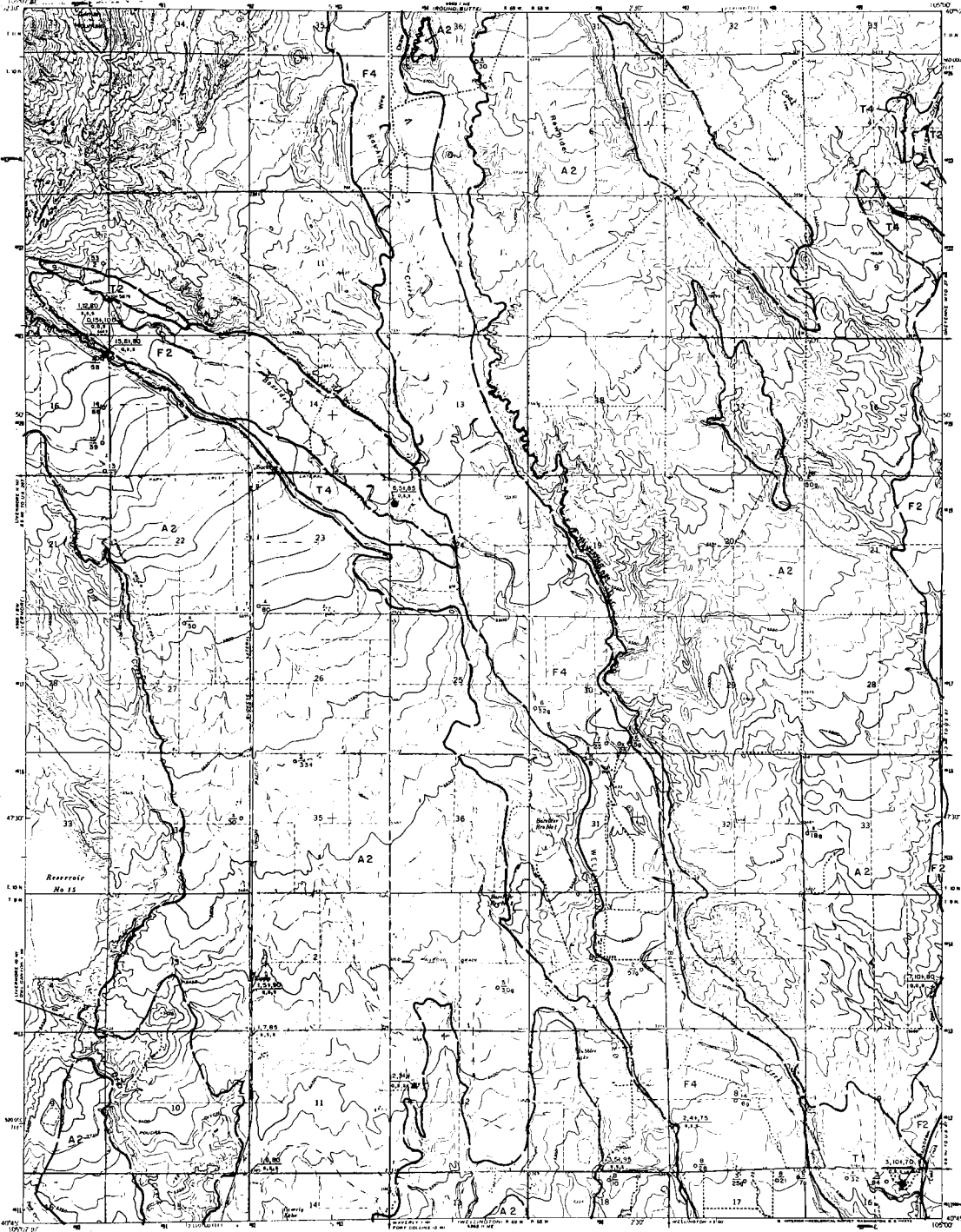
Mapped by: Stephen D. Schwabach
Date: June 30, 1974

Prepared in cooperation with the
U. S. Geological Survey.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

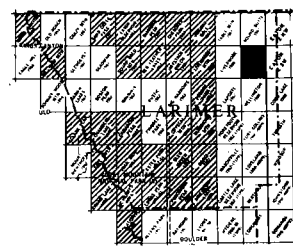
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN G. HOLS, DIRECTOR

BUCKEYE QUADRANGLE
COLORADO-LARIMER CO
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- LANDFORMS**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Erosion-deposited sand (talus)
 - M Man-made deposits (slag, tailings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 10% retained on #4 screen, official estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, sodium sulfate
- Fine Aggregate**
(greater than 75 passing #4 screen, 475 retained on #200 screen, official estimation)
- 3 Sand
 - 4 Probable aggregate resource
- QUARRY SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "s" indicates gravel; "m" indicates sand
 - "u" to other sources mentioned or unknown properties
 - "cu" denotes Colorado Geological Survey "Controlled and Stream Protected" (CSP) sites
 - Leafline boundary, solid where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND CHRONOLOGICAL SIGNIFICANCE OF DEPOSITS**
- overburden thickness (ft)
 - unconformity between thickness (ft)
 - percent sand and fines (percent of screen, 0.25 in., official estimation)
 - significant amount of fines (greater than 200 screen, 0.075 in. or 2.974 mm.)
 - significant amount of decomposed or weak rock
 - significant amount of sodium sulfate (indicator)
 - "u" in symbol denotes unmineralized or unknown
 - "cu" in symbol denotes property absent or incomplete



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWAL AREA

REFERENCE:
Hartley, T.A., and Schofield, P.A., Jr., 1972,
Geologic map of the Inner Cache La Poudre River
basin, north-central Colorado: U. S. Geol. Survey
Misc. Geol. Inv. Map I-587.

Mapped by: Stephen D. Schwachow
Date: June 30, 1974

Data from U. S. Geological Survey
7.5-minute quadrangle



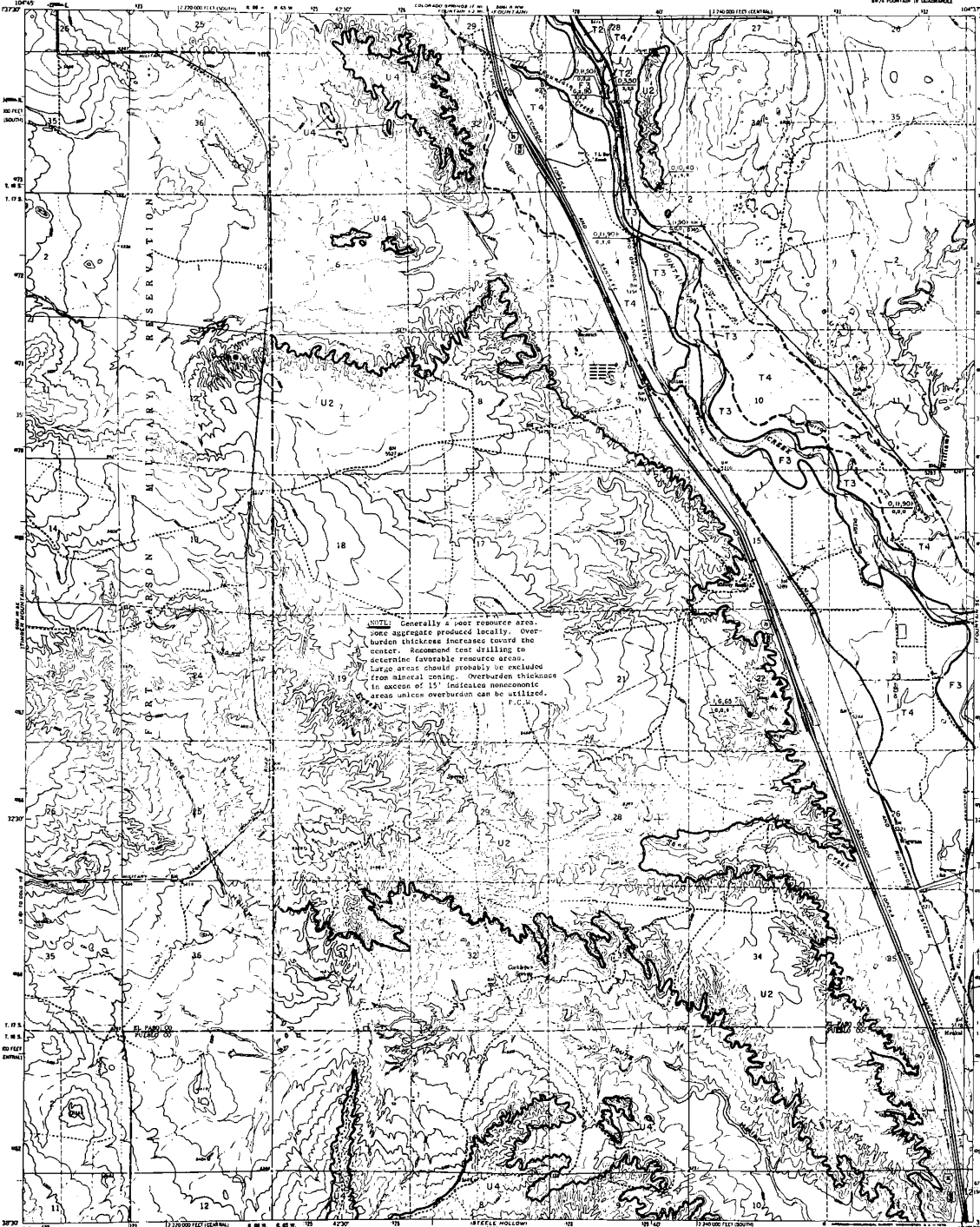
ROAD CLASSIFICATION
Medium duty ——— Light duty ———
Unimproved dirt - - - - -

BUCKEYE COLO
NAD45-W1900775
1960
AIR 4941 1 64-82008 7577

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

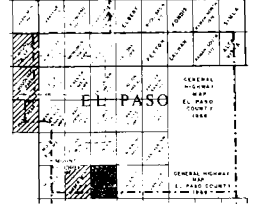
BUTTES QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
BY A POINT IN QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



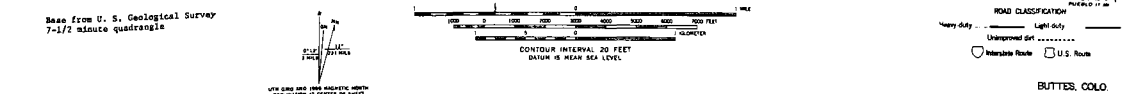
EXPLANATION

- Contour units
Resource classification
- LANDFORM BELTS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposit (slag, tailings, spoils, ...)
- RESOURCE CLASSIFICATION**
- Coarse Materials**
(at least 50% passing 48 screen, visual estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- Fine Materials**
(greater than 100 passing 48 screen, 80% retained on 200 screen, visual estimation)
- 3 Sand
 - 4 Privately aggregated resource
- NOT SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Isolated well or 4013-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - T¹ (alluvial gravel); T² (alluvial sand)
 - * in symbol denotes unutilized or unknown property
 - ** denotes Colorado Geological Survey Mineral/Lead and Gravel projects
 - 4013 hole
 - Location boundary, well where known or estimated; shaded where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL CLASSIFICATION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (percent, to screen, 100 to 100%); visual estimation
 - significant amount of decomposed or sand rock
 - significant amount of calcium carbonate (calciferous)
 - * in symbol denotes unutilized or unknown property
 - ** in symbol denotes property absent or insignificant



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Wickliffe
Date: June 30, 1974



ROAD CLASSIFICATION

- Very duty
- Light duty
- Unimproved dirt
- Interstate Route
- U.S. Route

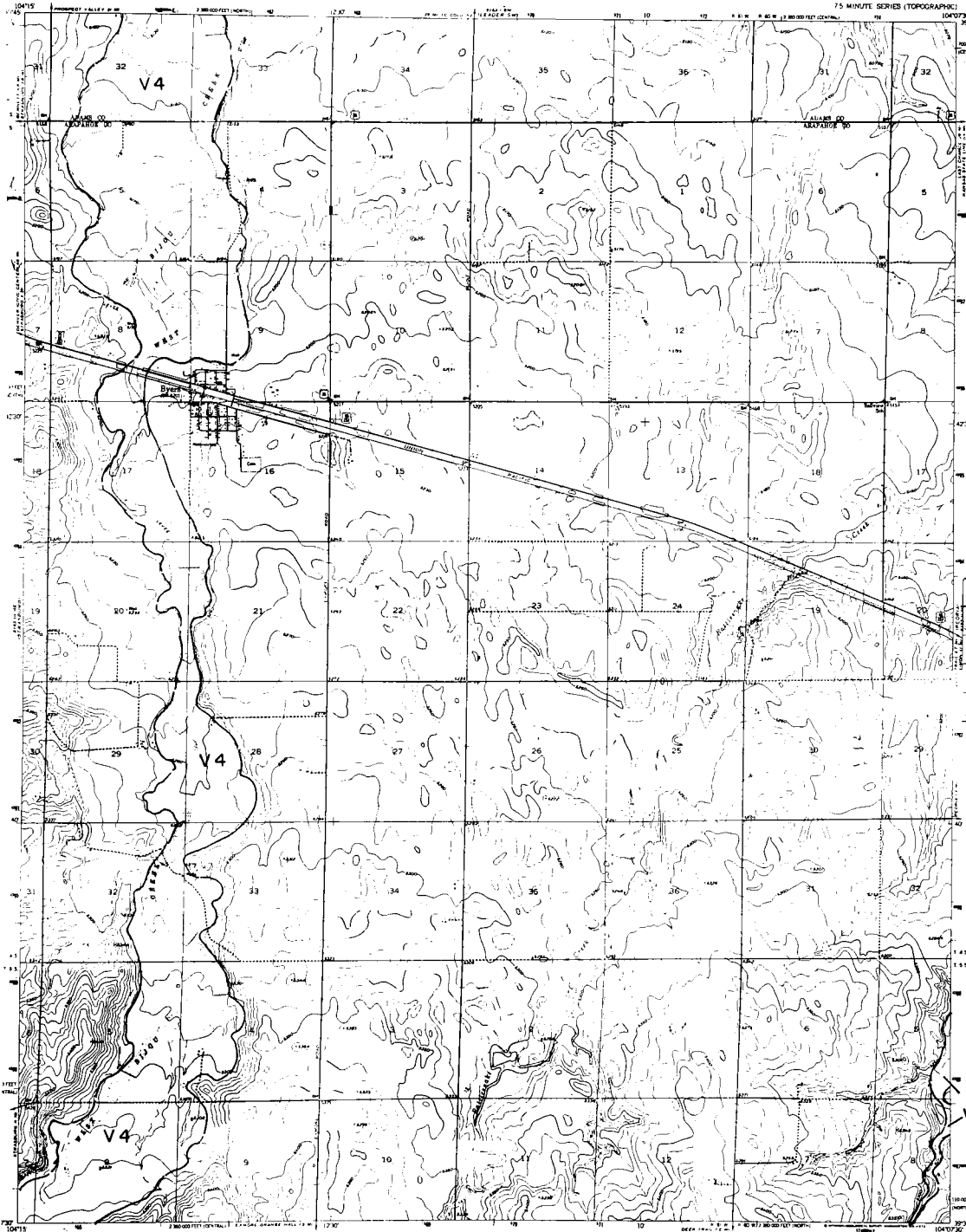
BUTTES, COLO.

**SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP**

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROSS, DIRECTOR

BYERS QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION



- LANDFORMS**
- Landform unit
 - Resource status/function
- LANDFORM UNITS**
- F Floodplain deposit
 - T Trazas terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Erosion-deposited sand (alluvial)
 - M Man-made deposits (sand, gravel, waste, ...)
- RESOURCE QUALIFICATION**
- GRAVEL RESOURCES**
- 1 Gravel: substantial class and amount
 - 2 Gravel: significant class, decreased fac. calc. low carbonate
- SAND RESOURCES**
- 3 Sand
 - 4 Potential aggregate resource
- NOT SYMBOLIZED**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with water-bearing thickness (ft) over sand/gravel; resource thickness (ft); obtained from well log
 - "G" indicates gravel; "S" indicates sand
 - "U" in symbol denotes unutilized or unknown property
 - "L" in symbol denotes Geological Survey Window (Sand and Gravel) project
 - "R" in symbol denotes resource
 - Landform boundary, solid where known or inferred; dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL INFORMATION OF SYMBOLS**
- 1/4 section thickness (ft)
 - 1/4 section resource thickness (ft)
 - Resource sand and fines (including limestone, etc.) in 1/4 section
 - Significant amount of fines (greater than 200 mesh, 0.075 in. or 0.075 mm)
 - Significant amount of limestone or wash rock
 - Significant amount of natural aggregate material
 - "U" in symbol denotes unutilized or unknown property
 - "R" in symbol denotes resource property status or classification

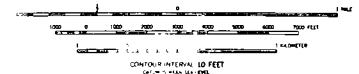


QUADRANGLE LOCATION

NON-RESOURCE OF VITRODAM AREA

Reference:
Shad, J.A., 1971. The Bijou Creek Damites and Reservoirs of Adams and Arapahoe Counties Colorado. Colo. Sch. Mines: EK-133

See from U. S. Geological Survey
7-1/2 minute quadrangle



- ROAD CLASSIFICATION**
- Heavy duty
 - Light duty
 - Medium duty
 - Unimproved dirt
 - U.S. Road



BYERS COLO
N39375-W104075/75
1956

Mapped by: Phillip C. Wickless
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

BYERS SW QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

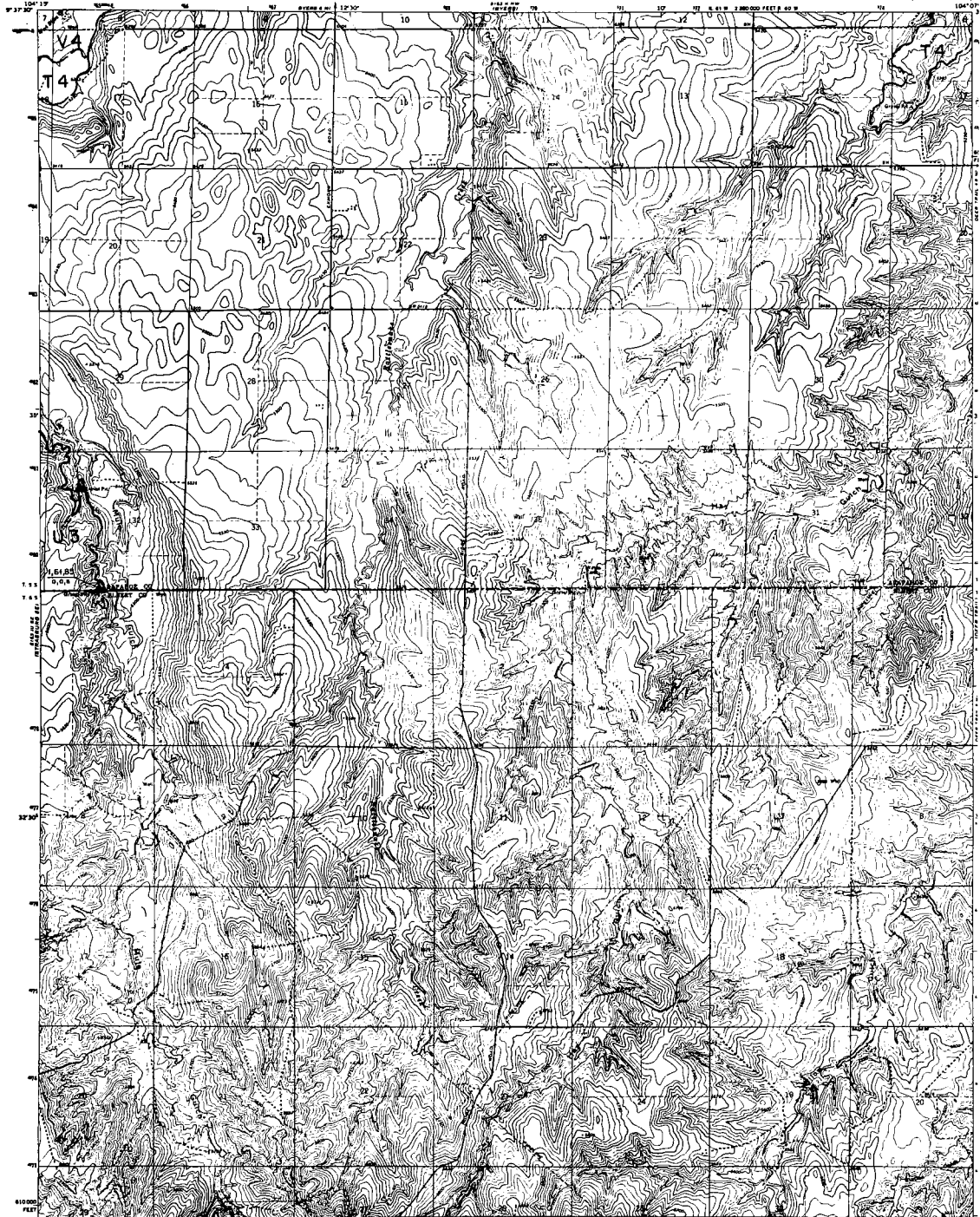
EXPLANATION

- LEGEND**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, spoils, ...)

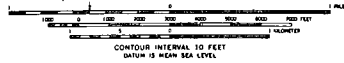
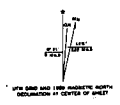
- RESOURCE CLASSIFICATION**
- CORR. SANDS**
(at least 10% sandstone or 40% gravel, read) (units in %)
- 1 Gravel: relatively clean and well-sorted
 - 2 Gravel: silty/clayey fines, decomposed rock, calcareous
- FINE SANDS**
(greater than 75% passing 40 screen, 0.75 retained on 200 screen, read) (units in %)
- 3 Sand
 - 4 Probable aggregate resource

- NON-RESOURCE**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Remnant quarry aggregate resource area
 - Selected unit or strata-like location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs:
 - "1" indicates gravel; "2" indicates sand
 - "*" in symbol indicates unventilated or unknown property
 - "M" denotes Colorado Geological Survey boundary and gravel resource
 - "L" indicates landowner boundary, hold where known or unknown; dashed where approximate or inferred.

- SYMBOL LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOL**
- rectangle (1000 ft)
 - circle (1000 ft)
 - square (1000 ft)
 - triangle (1000 ft)
 - pentagon (1000 ft)
 - hexagon (1000 ft)
 - heptagon (1000 ft)
 - octagon (1000 ft)
 - nonagon (1000 ft)
 - decagon (1000 ft)
 - undecagon (1000 ft)
 - dodecagon (1000 ft)
 - tridecagon (1000 ft)
 - tetradecagon (1000 ft)
 - pentadecagon (1000 ft)
 - hexadecagon (1000 ft)
 - heptadecagon (1000 ft)
 - octadecagon (1000 ft)
 - enneadecagon (1000 ft)
 - icosagon (1000 ft)
 - hexas (1000 ft)
 - heptas (1000 ft)
 - octas (1000 ft)
 - nonas (1000 ft)
 - decas (1000 ft)
 - hendecadecas (1000 ft)
 - duodecadecas (1000 ft)
 - tridecadecas (1000 ft)
 - tetradecadecas (1000 ft)
 - pentadecadecas (1000 ft)
 - hexadecadecas (1000 ft)
 - heptadecadecas (1000 ft)
 - octadecadecas (1000 ft)
 - enneadecadecas (1000 ft)
 - icosadecadecas (1000 ft)



Base from U. S. Geological Survey
7-1/2 minute quadrangle



- ROAD CLASSIFICATION**
- Primary highway: hard surface
 - Secondary highway: hard surface
 - Unimproved road
 - Interstate Route
 - U.S. Route
 - State Route

Mapped by: Phillip C. Wickless
Date: June 30, 1974

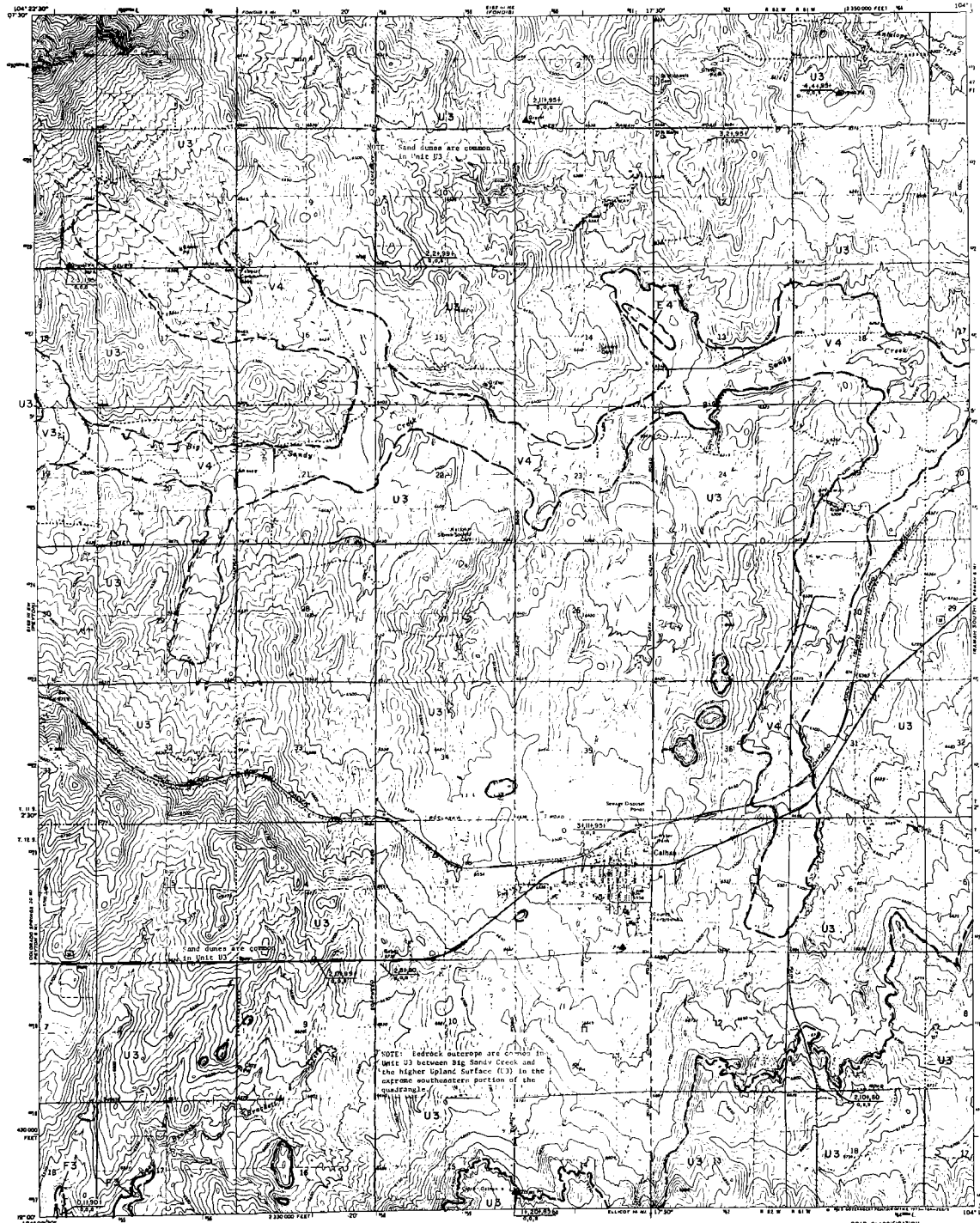
BYERS SW, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

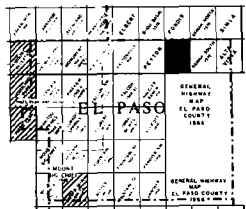
CALHAN QUADRANGLE
 COLORADO-EL PASO CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. ROLD, DIRECTOR



EXPLANATION

- Landform with
 unknown classification
- LANDFORM TYPE**
- F Floodplain deposit
 - T River terrace deposit
 - V Villes (U3 & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mudslope deposit (sand, siltstone, siltstone...)
- AGGREGATE CLASSIFICATION**
- Coarse Aggregate**
 (at least 50% passing #4 screen, 10% retained on #20 screen)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, siliceous substratum
- Fine Aggregate**
 (greater than 75% passing #4 screen, 10% retained on #20 screen, 10% retained on #100 screen, 10% retained on #400 screen)
- 3 Sand
- Unutilized Resource**
- 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Indicated well or drill-hole location with known thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs:
 - " " indicates gravel; " " indicates sand
 - " " in symbol denotes unutilized or unknown property
 - " " denotes Colorado Geological Survey investigation and Crown project's well logs
 - Landform boundary, with known limits of observed; dashed where approximate or inferred
- STATION, LOCATION AND COORDINATE IDENTIFICATION OF SYMBOLS**
- Coordinates (elevation (ft))
 - Sand/gravel resource (thickness (ft))
 - Percent sand and fines (passing #4 screen, 0.075 in.), (total accumulation)
 - Significant amount of fines (passing #20 screen, 0.850 in. or 0.075 in.)
 - Significant amount of decomposed or vein rock
 - Significant amount of siliceous substratum (siltstone)
 - " " or symbol denotes unutilized or unknown property
 - " " in symbol denotes property absent or unexplored



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Ralph R. Shroba
 Date: June 20, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle

CONTOUR INTERVAL 10 FEET
 DATUM: U.S. MEAN SEA LEVEL

ROAD CLASSIFICATION

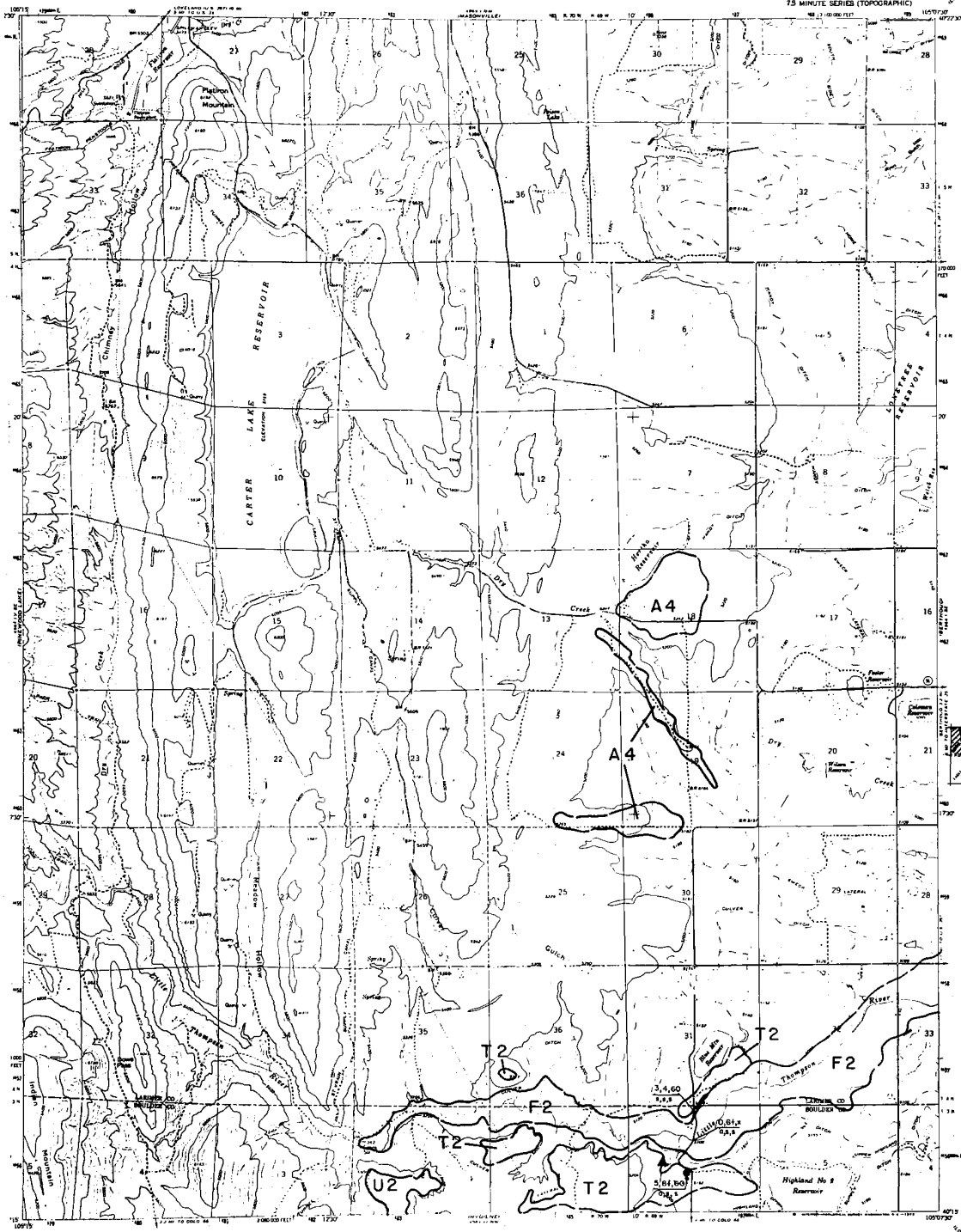
- Primary highway: Light-duty road, hard or improved surface
- Hard surface: Secondary highway, Unimproved road
- Secondary highway: Interstate Route, U 5 Route, State Route

CALHAN, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

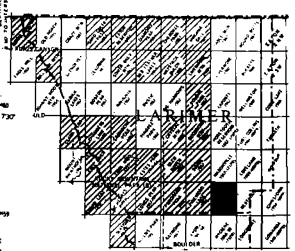
CARTER LAKE RESERVOIR
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR



EXPLANATION

- Landform and Resource Classification
- LANDFORMS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-mine deposits (slag, tailings, spalls, ...)
- RESOURCE CLASSIFICATION**
 - COARSE MATERIALS**
 - 1 Gravel: subangular to sub-round
 - 2 Gravel: significant fines, decomposed rock, calcareous
 - 3 Sand
 - FINER MATERIALS**
 - 4 Fossiliferous aggregate resource
- USE SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Isolated well or drill-hole location with open-bore thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "A" indicates gravel; "T" indicates sand
 - "*" in symbol denotes unmineralized or unknown property
 - "**" denotes Colorado Geological Survey Window (Sand and Gravel) project
 - Well hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL CHARACTER OF BOREHOLE**
 - open-hole thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (passing #20 screen, 0.85 mm), visual estimate
 - significant amount of fines (passing #100 screen, 0.15 mm or 0.075 mm)
 - significant amount of decomposed or well-sorted
 - significant amount of calcareous carbonate (caliche)
 - "*" in symbol denotes unmineralized or unknown property
 - "**" in symbol denotes property absent or doubtful



Geology modified after: Calton, R.B., and Fitch, R.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Denver Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-535 D.

Mapped by: Stephen D. Schwochow
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey



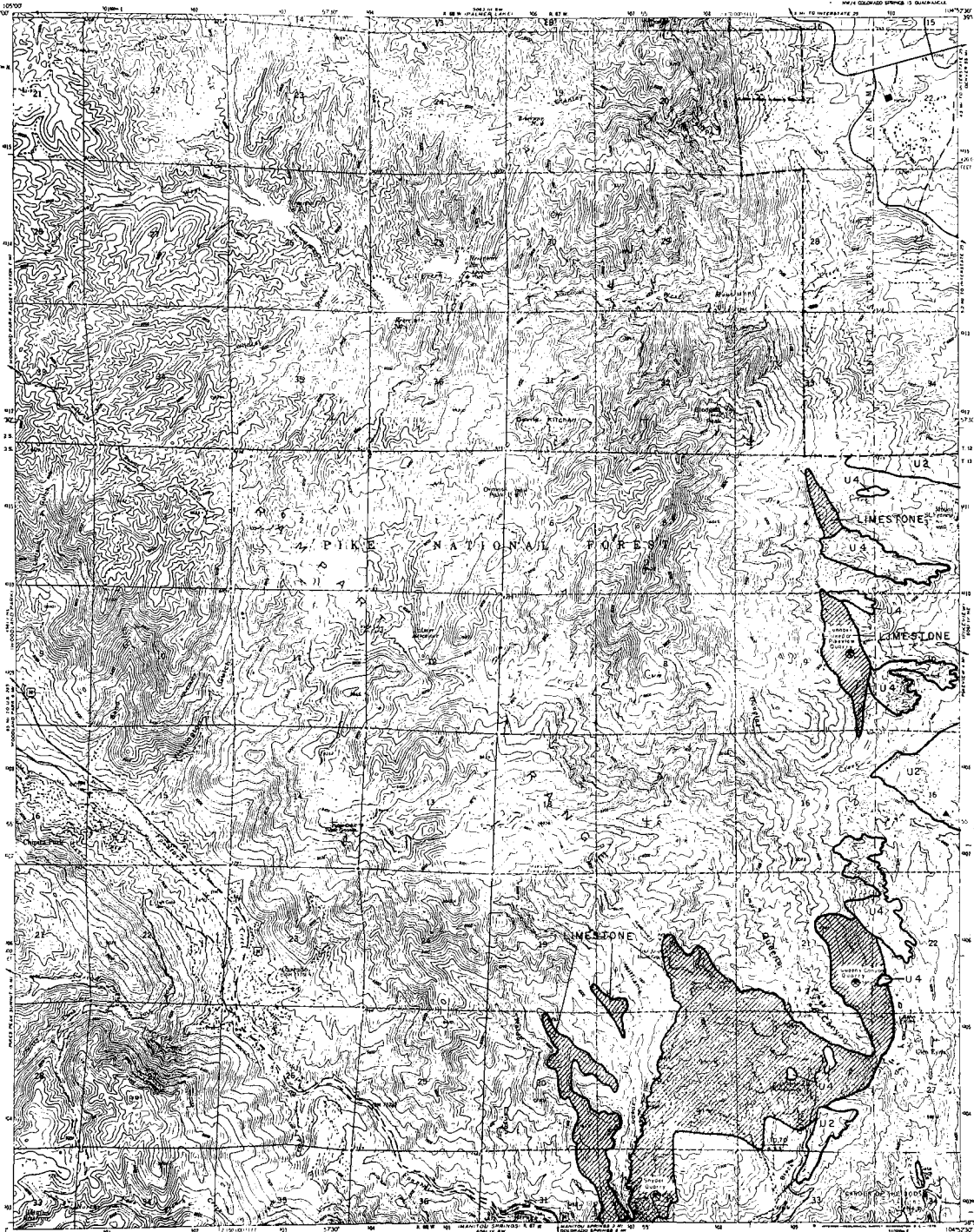
ROAD CLASSIFICATION
Main-dy ... 1/4" dia.
Unimproved dirt ...
Date Road

CARTER LAKE RESERVOIR, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

CASCADE QUADRANGLE
COLORADO-EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
U.S. GEOLOGICAL SURVEY

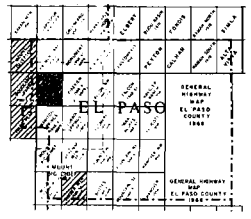
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



EXPLANATION

- Source: USGS
www.usgs.gov
- LITHOLOGY**
- F Floodplain deposit
 - T Tertiary terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated
 - A Alluvial fan
 - E Wind-deposited sand (collina)
 - M Man-made deposits (slag, tailings, spilla...)
- RESOURCE CLASSIFICATION**
1. Gravel: relatively clean and sound
2. Gravel: significant fines, decomposed congl., calcium carbonate
3. Sand
4. Probable aggregate resource
- POP SYMBOLS**
- a Operating gravel and/or sand pit
 - b Abandoned gravel and/or sand pit
 - c Operating stone quarry
 - d Abandoned stone quarry
 - e Potential quarry aggregate resource area
 - f Selected well or drill-hole location with associated thickness (ft); obtained from well logs
 - g Indicated source of indicator sand
 - h In symbol denotes unutilized or unknown property
 - i Source: Colorado Geological Survey, Mineralized and Gravel projects' drill logs
 - j Land-use boundary, solid white when not shown; dashed white approximate or inferred

- STATION, LOCATION AND CHEMICAL DESCRIPTION OF SANDS**
- 1. Sandstone thickness (ft)
 - 2. Sandstone thickness (ft)
 - 3. Percent sand and fine (fine) (percent)
 - 4. Significant amount of decomposed or weak rock
 - 5. Significant amount of inorganic carbonate (in place)
 - 6. In symbol denotes unutilized or unknown property
 - 7. In symbol denotes properly absent or insignificant



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WINDROW AREA

Geology modified after:

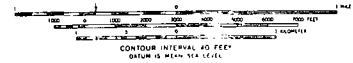
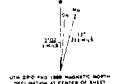
Scott, C.R., & Mober, R. A. 1979, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado; U. S. Geological Survey Map, MW-482.

Tribble, D.E., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado; U. S. Geol. Survey Map I-857 A.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

Main duty ————

Minor duty - - - - -

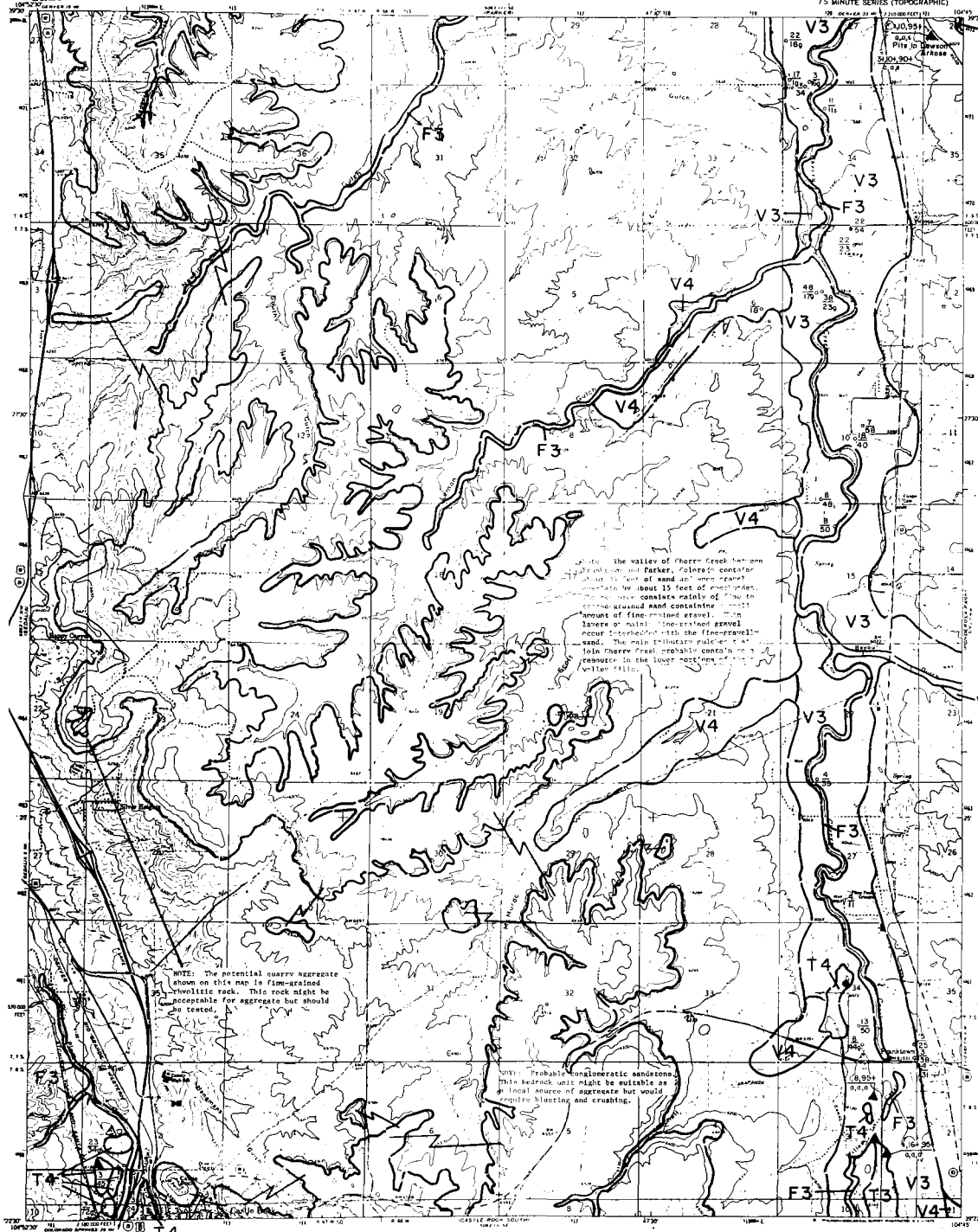
U.S. Route □

CASCADE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

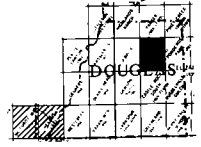
CASTLE ROCK NORTH QUADRANGLE
COLORADO-DOUGLAS CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR



EXPLANATION

- LANDFORM UNIT**
Resource class/function
- MAP SYMBOLS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-sand deposit (slag, tephra, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 20% retained on #4 screen, 0.075 in.)
- 1 Gravel: well-sorted clean and sound
 - 2 Gravel: slightly finer, decomposed rock, additional cements
- Fine Aggregate**
(passing #20 screen, #200 retained on #40 screen, 0.075 in.)
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential sand or aggregate resource area
 - Indicated well or aggregate location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "I" indicates gravel; "S" indicates sand
 - "L" symbol denotes unutilized or unknown aggregate
 - "M" denotes Colorado Geological Survey Mineral and Geology Project drill hole
 - Location boundary, solid where known or observed; dashed where approximate or inferred
- POSITION LOCATION AND GEOLOGICAL DESCRIPTION OF AREAS**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Percent sand and fines (passing #4 screen, 0.075 in.), based on analysis
 - Significant amount of fines (passing #20 screen, 0.075 in. or finer) on a significant amount of sand/gravel resource
 - "L" symbol denotes unutilized or unknown property
 - "M" in symbol denotes property owned by Mineral Resources



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:
Tribble, D.E., and Pich, U.S. 1974 *Map showing potential sources of gravel and crushed rock aggregate in the Oyster Dunes Area, Front Range Urban Corridor, Colo.* U.S. Geol. Survey Misc. Geol. Inv. Map 3-856-A.

Reference:
Chase, G.B., and McCaskey, J.L., 1973. Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map 1-731.

Mapped by: Ralph E. Shrobe
Date: June 30, 1974

Prepared in cooperation with the
U. S. Geological Survey

Base from U. S. Geological Survey
7-1/2 minute quadrangle



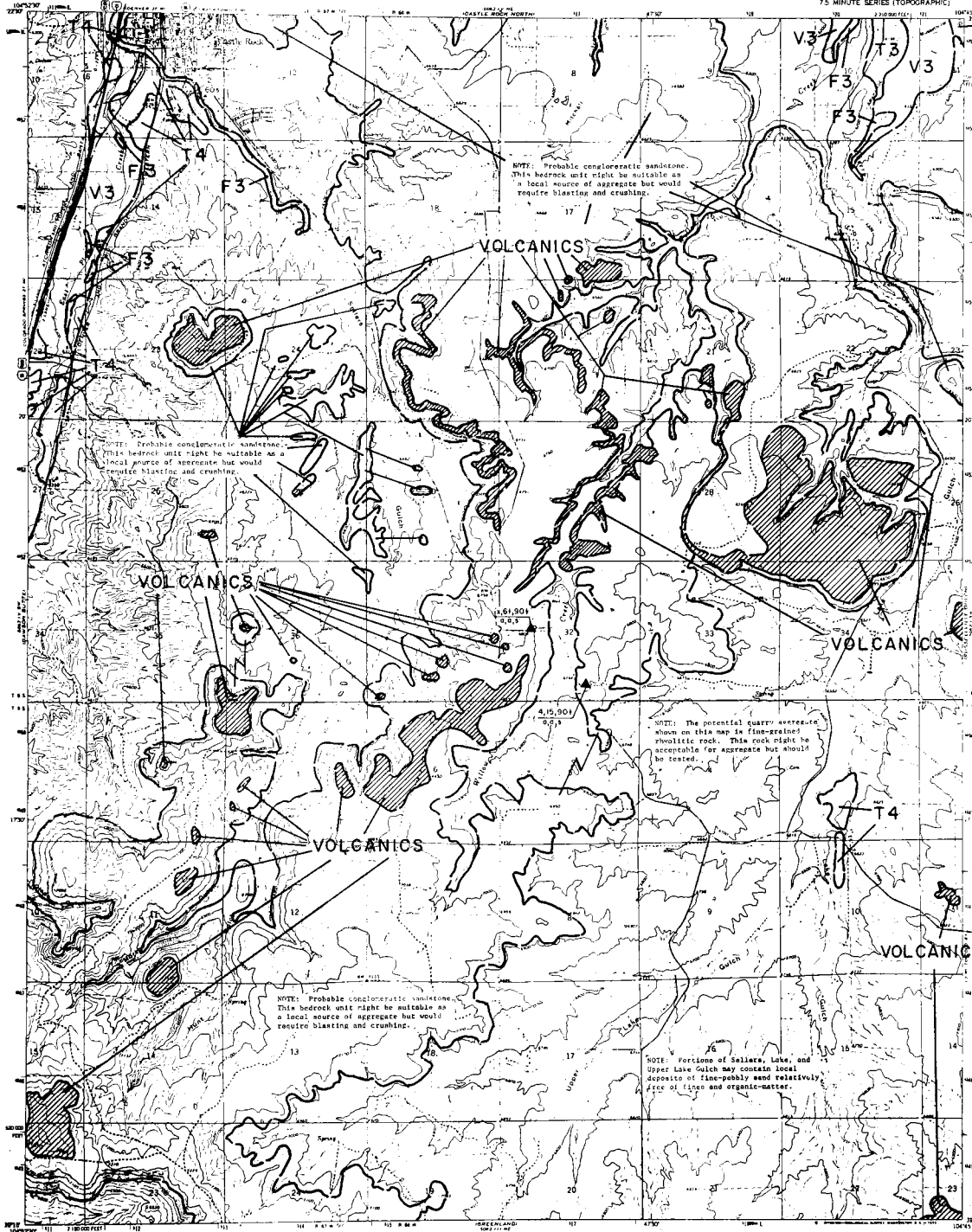
- ROAD CLASSIFICATION**
- Heavy duty
 - Light duty
 - Medium duty
 - Unimproved dirt
 - Mountain Road
 - U.S. Route
 - State Route

CASTLE ROCK NORTH, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

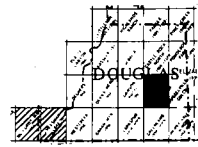
CASTLE ROCK SOUTH QUADRANGLE
COLORADO—DOUGLAS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (fills, collars, spoils, ...)
- RESOURCE CLASSIFICATION**
- GRAVEL**
- Gravel: relatively clean and sound
 - Gravel: significant fines, decomposed rock, calcium carbonate
- SAND**
- Coarse sand: greater than 75 percent #20 screen, 40% retained on #100 screen, strand retention
 - Medium sand
 - Fine sand
- AGGREGATE**
- Probable aggregate resource
- ROAD CLASSIFICATION**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- STATION, LOCATION AND CHRONOLOGICAL SIGNIFICANCE OF DEPOSIT**
- ✓ = maximum thickness (ft)
 - = sand/gravel resource thickness (ft)
 - = percent sand and fines (based on #20 screen, 0.85 to 1.0, visual estimation)
 - △ = significant amount of fines (based on #20 screen, 0.004 in. or 0.074 mm)
 - ◇ = significant amount of decomposed or soft rock
 - ☆ = significant amount of eolian sandstone (refuse)
 - ⊙ = in symbol denotes "unclassified" or "unknown property"
 - ⊙ = in symbol denotes "unclassified" or "unknown property"
 - ⊙ = in symbol denotes "unclassified" or "unknown property"
 - ⊙ = in symbol denotes "unclassified" or "unknown property"



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
Chase, G.H., and McCaughey, J.A., 1992. Overview of surficial geologic map of the Denver area, Colorado. U.S. Geol. Survey Misc. Geol. Map T-931.

Geology and field notes:
Whitely, D.S., and Fitch, H.B., 1978. Map showing potential sources of gravel and crushed-stone aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado. U.S. Geol. Survey Map T-857 A.

Mapped by: Ralph R. Shroba
Date: June 30, 1974
Prepared in cooperation with the U.S. Geological Survey.

ROAD CLASSIFICATION

- Highway
- Highway
- Interstate Route
- U.S. Route
- State Route

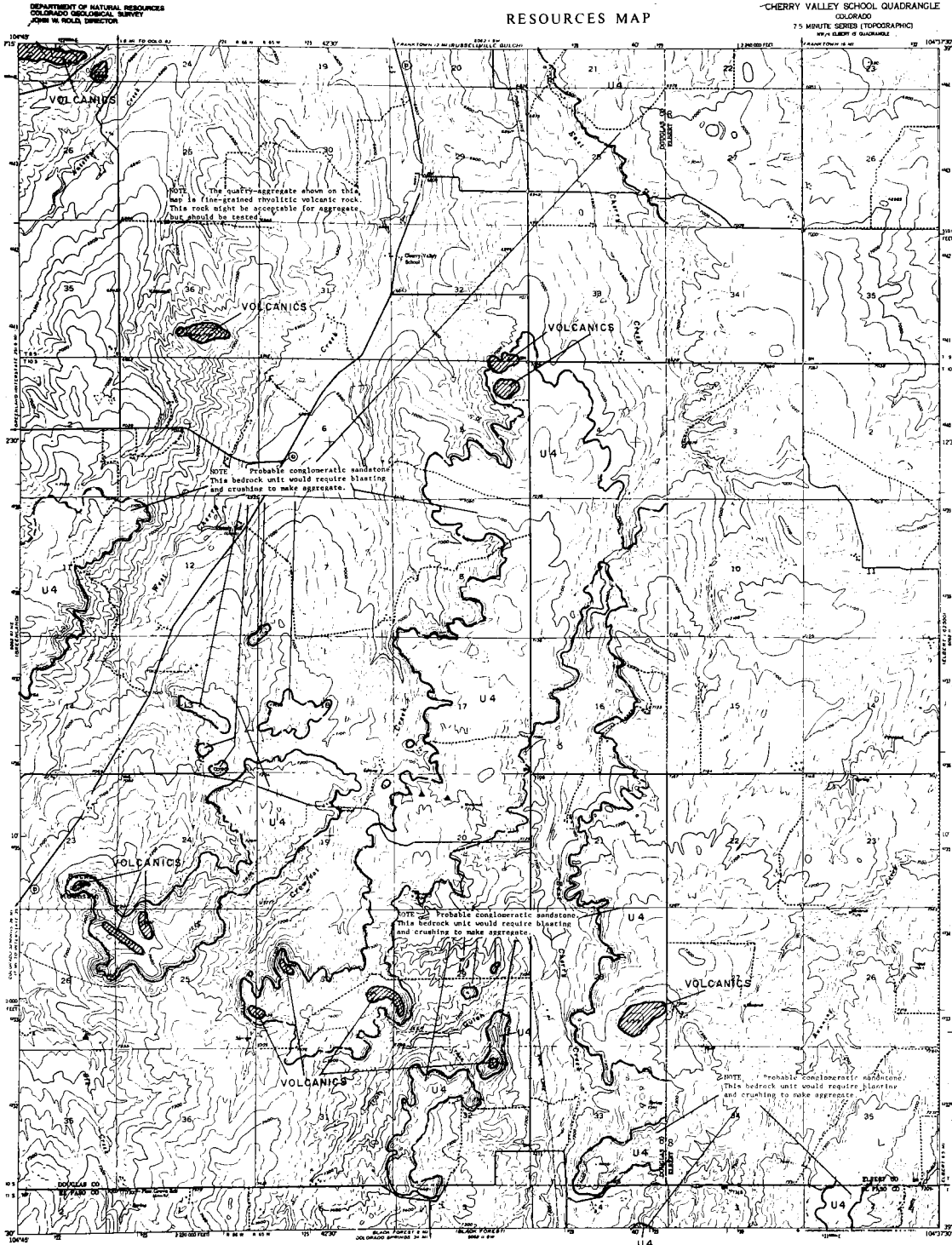
CASTLE ROCK SOUTH, COLO.

Base from U.S. Geological Survey
7-1/2 minute quadrangle



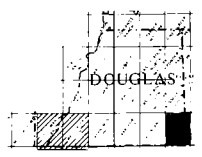
SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

CHERRY VALLEY SCHOOL QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Landform unit:
Resource classification
- LANDFORM UNIT**
- F Floodplain deposit
 - F Stream terrace deposit
 - V Valley fill (F & V)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Marine deposit (see coastline, etc.)
- RESOURCE CLASSIFICATION**
- GRAVEL RESOURCES**
for Aggregates obtained on the screen, 4.75 mm (No. 40)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, shallow occurrence
- FINE SANDS**
greater than 75 meshing # 20 screen, 2.0 mm retained on 75 mesh, usual occurrence
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Estimated width of drill-hole location with overburden thickness (ft) and gravel resource thickness (ft) obtained from well logs
 - "*" indicates gravel; "s" indicates sand
 - "*" in symbol denotes unmineralized or unknown prospect
 - "s" denotes Colorado Geological Survey shallow sand and gravel projects' drill hole
 - Landform boundary, solid short lines or dashed; dashed lines approximate or inferred
- STATION LOCATION AND GEOLOGICAL IDENTIFICATION OF SYMBOLS**
- overburden thickness (ft)
 - rock/gravel resource thickness (ft)
 - screen opening and fine (passing #20 screen, 2.0 mm), or 75 mesh
 - significant amount of fine (passing #20 screen, 2.0 mm, or 75 mesh)
 - significant amount of decomposed or sand rock
 - significant amount of shallow occurrence (eolian)
 - "*" in symbol denotes unmineralized or unknown prospect
 - "*" in symbol denotes appropriate amount of classification



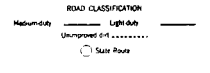
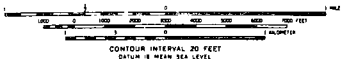
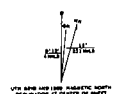
- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:
Trotter, D.E., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado; U. S. Geol. Survey Map 1-857 A.

REFERENCE: Trimble, Donald, 1974, U.S.G.S.; Personal Communication

Mapped by: Phillip C. Wicklein
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

Based on U. S. Geological Survey
7-1/2 minute quadrangle



CHERRY VALLEY SCHOOL COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

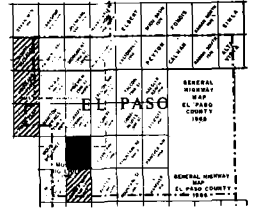
CHEYENNE MOUNTAIN QUADRANGLE
COLORADO-EL PASO CO.
7.5 MINUTE SERVICE TOPOGRAPHIC
U.S. GEOL. SURV. CHAP. 4 QUADRANGLE
1:250,000 (1967)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR



EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-sand deposits (clay, siltstone, shale, ...)
- AGGREGATE CLASSIFICATION**
- Gravel aggregate**
(at least 10% passing 48 screen, 50% retained on 200 screen, 0.075 mm. or finer)
- 1 Gravel, well-sorted, clean and sound
 - 2 Gravel, significant fines, decomposed rock, calcareous
- Fill aggregate**
(greater than 10% passing 48 screen, 60% retained on 200 screen, 0.075 mm. or finer)
- 3 Sand
 - 4 Probable aggregate resource
- NO SYMBOL**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with owner, address, telephone (if any) and gravel resource thickness (ft.) obtained from mill logs:
 - * indicates gravel, ** indicates sand
 - * is symbol source unventilated or
 - ** is symbol source ventilated
 - See general Colorado Geological Survey "Sand, Gravel and Crushed Rock" Bulletin
 - State boundary, solid where known or observed; dashed where approximate or inferred.
- STATION, LOCATION AND THEORETICAL THICKNESS OF DEPOSIT**
- thickness thickness (ft.)
 - sand/gravel resource thickness (ft.)
 - gravel and fines (greater than 200 screen, 0.075 mm., or finer) thickness
 - gravel/fines amount of fines (greater than 200 screen, 0.075 mm., or finer)
 - gravel/fines amount of decomposed or sand rock
 - gravel/fines amount of calcareous material
 - * is symbol source unventilated or
 - ** is symbol source ventilated
 - * is symbol source property abstract
 - ** is symbol source property abstract



QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Geology Modified after:
Harris, J.C., 1951, Structural geology of the eastern flank of the southern Front Range, Colorado; University of Colorado Ph.D. Thesis, 111 p., 3 pls.
Scott, G.R., & Moberg, R. A., 1973, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado; U. S. Geological Survey Map, MP-482.
Trimble, D.E., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado; U. S. Geol. Survey Map 1-857 A.

REFERENCE:
McLaughlin, R.F., 1947, Pennsylvanian stratigraphy of Colorado Springs quadrangle; Am. Assoc. Petroleum Geol. Bull. v. 31, p. 1936-1981.
Finley, C.J., 1916, Colorado Springs Folio, Colorado; U.S. Geol. Survey Folio no. 203.

Base from U. S. Geological Survey
7-1/2 minute quadrangle

Scale: 1:250,000
Contour Interval: 20 Feet
Datum: Mean Sea Level

ROAD CLASSIFICATION

- Heavy-duty
- Medium-duty
- Light-duty
- Unimproved dirt
- Waterway
- U.S. Road
- State Road

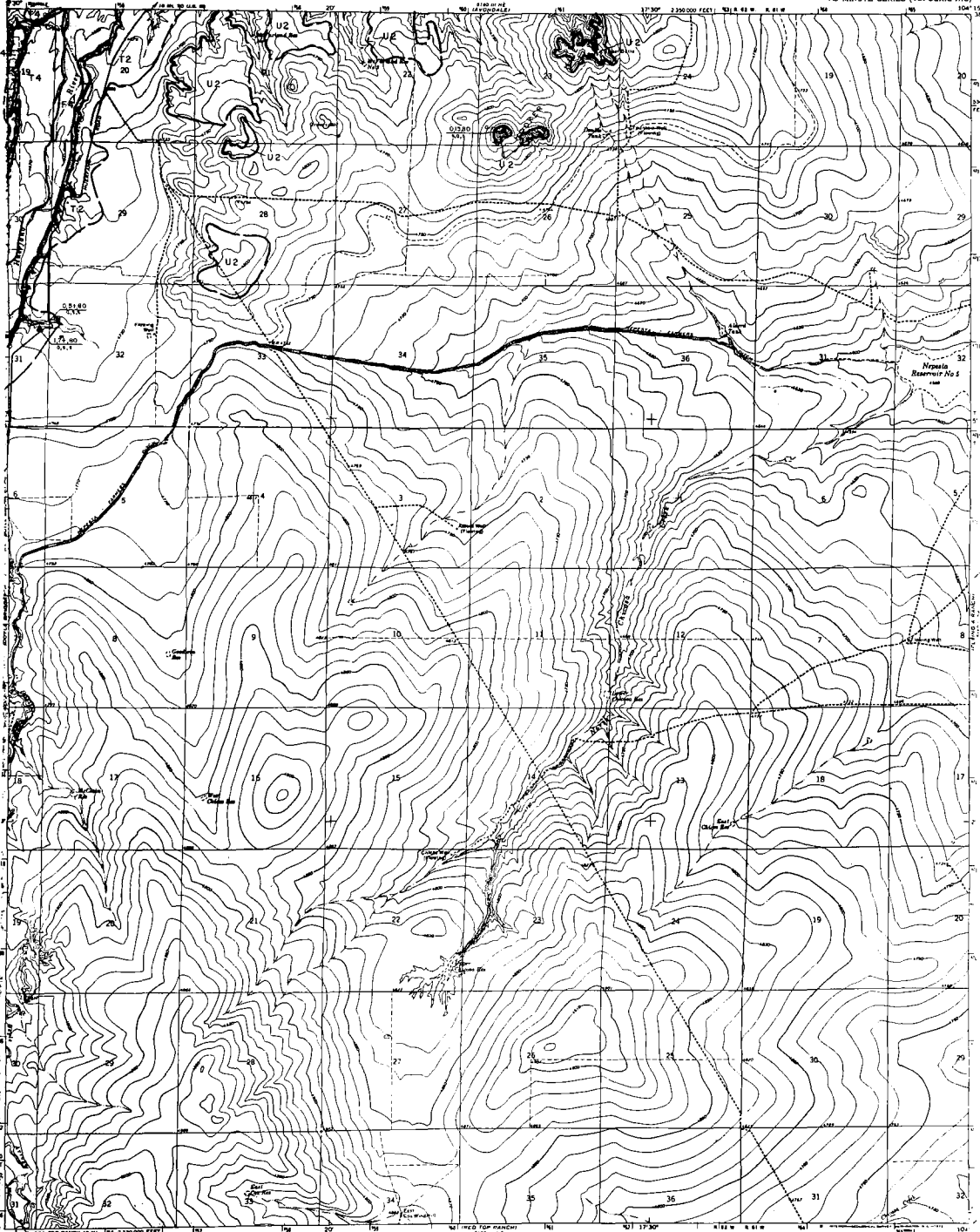
CHEYENNE MOUNTAIN, COLO.

Mapped by: Phillip C. Wickham
Date: June 30, 1974
Prepared in cooperation with the
U. S. Geological Survey.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

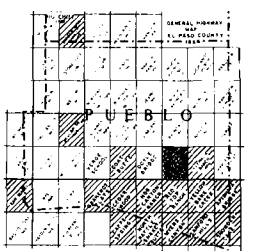
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLA, DIRECTOR

CHICOS WELL QUADRANGLE
COLORADO—PUEBLO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

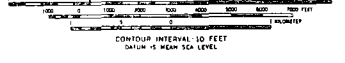
- CONTOUR LINES**
 Solid line = Contour
 Dashed line = Contour (Estimated)
- MAP SYMBOLS**
 F Floodplain deposit
 T Stream terrace deposit
 V Valley fill (F & T)
 U Upland deposit
 A Alluvial fan
 E Wind-deposited sand (eolian)
 M Manganese deposit (slag, tailings, spilla...)
- RESOURCE CLASSIFICATION**
GRAVEL RESOURCES
 (a) Gravel pits situated on 40 acres, visual extraction
 1 Gravel pit (small) (less than 5000 cu yd)
 2 Gravel pit (medium) (5000 to 10000 cu yd)
SAND RESOURCES
 (b) Sand pits situated on 40 acres, visual extraction
 3 Sand pit (small) (less than 5000 cu yd)
 4 Sand pit (medium) (5000 to 10000 cu yd)
- AGGREGATE RESOURCES**
 Operating gravel and/or sand pit
 Abandoned gravel and/or sand pit
 Operating stone quarry
 Abandoned stone quarry
 Potential quarry aggregate resource area
 Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 "S" indicates gravel; "T" indicates sand
 "U" in symbol denotes unmineralized or unknown property
 "M" denotes Colorado Geological Survey Westwood/Lead and Gravel project's drill hole
 Landform boundary, solid where known or observed, dashed where approximate or inferred.
- SYMBOL, LOCATION AND GEOLOGICAL DESCRIPTION OF SANDS**
 Sand/gravel resource thickness (ft)
 Gravel resource thickness (ft)
 Sand resource thickness (ft)
 Significant amount of decomposed or weak rock
 Significant amount of fines (greater than 200 mesh, 0.075 in. or 0.0075 mm)
 Significant amount of volcanic sandstone (eolian)
 "M" in symbol denotes unmineralized or unknown property
 "U" in symbol denotes property absent or insignificant



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schwuchow
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



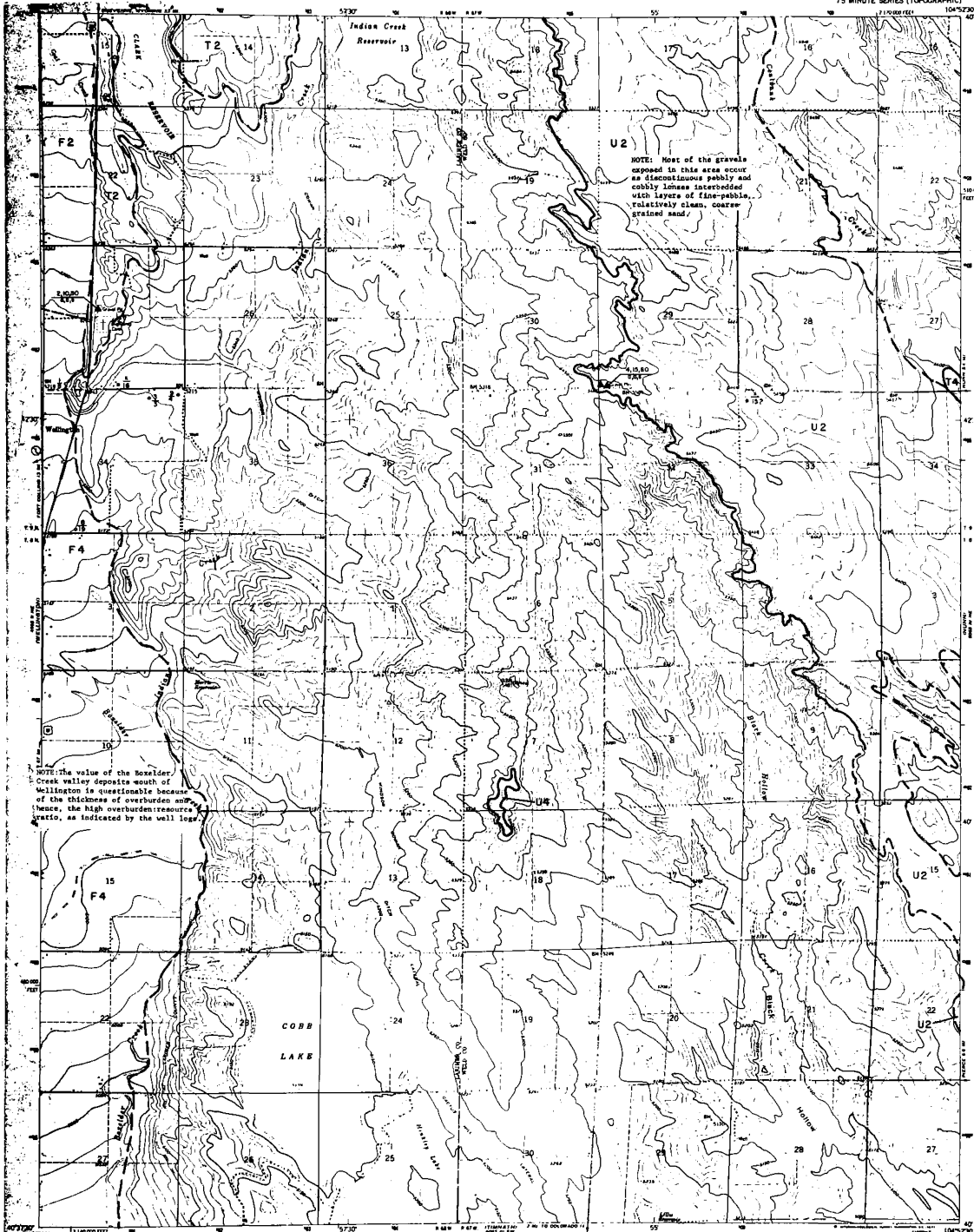
- ROAD CLASSIFICATION**
 Primary highway: ———
 Hard surface: ———
 Secondary highway: ———
 Hard surface: ———
 Unimproved road: - - - - -
 Interstate Route: □ U.S. Route: ○ State Route

CHICOS WELL, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

COBB LAKE QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR



EXPLANATION

- Landform units**
Resource class/location
- LANDFORM UNITS**
- F Floodplain deposits
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Manmade deposits (slag, tailings, spolia, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 75% retained on #4 screen, 25% or more on #10 screen)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, surface subsurface
- Fine Aggregate**
(greater than 75% passing #4 screen, 60% retained on #10 screen, usual definition)
- 3 Sand
 - 4 Probable aggregate resource
- WELL SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "G" indicates gravel; "S" indicates sand
 - "U" in symbol denotes unconsolidated or unknown property.
 - "W" denotes Colorado Geological Survey "Unconsolidated and Gravel products" drill hole
 - Landform boundary, solid lines shown on (shaded) sketch show approximate or inferred.
- SYMBOL, LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOL**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - gravel and sand fines (passing #4 screen, 2.0 to 4.75 mm.)
 - significant amount of fines (passing #10 screen, 0.075 to 0.425 mm.)
 - significant amount of decomposed or weak rock.
 - significant amount of material unconsolidated or unknown property.
 - in symbol denotes property shown on Geologic Maps.



REFERENCE:
Hershey, L.A., and Schneider, P.A., Jr., 1972,
Geologic map of the Lower Cache La Poudre River
basin, north-central Colorado: U. S. Geol. Survey
Misc. Geol. Inv. Map T-687.

Mapped by: Stephen D. Schwochow
Date: June 30, 1974

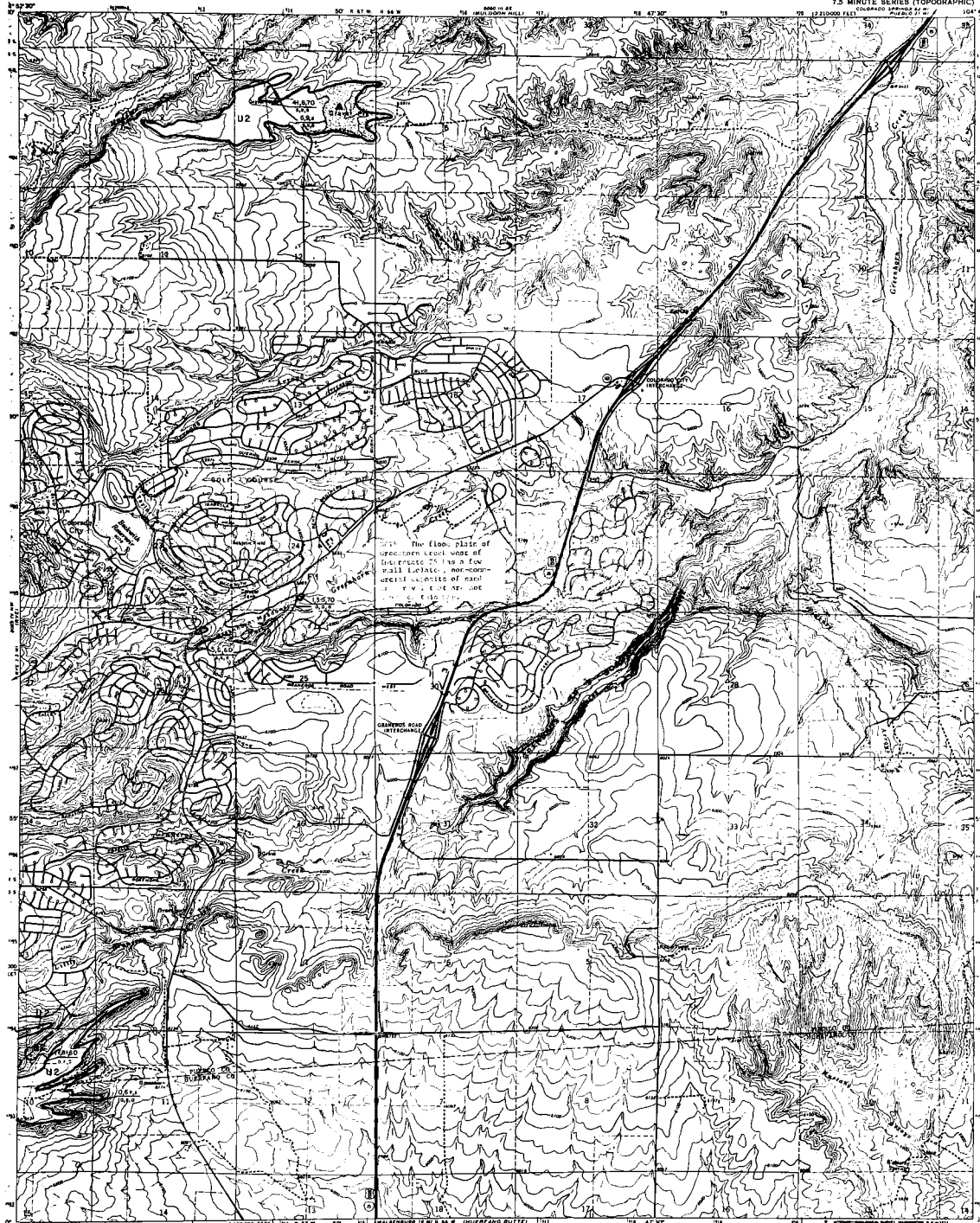


COBB LAKE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

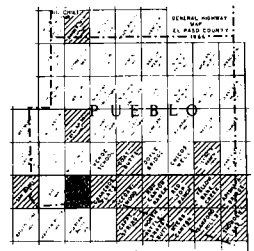
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLA, DIRECTOR

COLORADO CITY QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - Vs Viscid-terrestrial sand (inclined)
 - M Man-made deposits (slag, tailings, spoils...)
- RESOURCE CLASSIFICATION**
- Gravel**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, certain cements
- Sand**
- 3 Sand
 - 4 Probable aggregate resource
- ROAD SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs
 - "T" indicates gravel; "S" indicates sand
 - "C" is symbol denoting consolidated or unknown property
 - "M" denotes Colorado Geological Survey Viscid-Terrestrial and Gravel projects' drill hole
 - Landform boundary, well where known or inferred. Label where appropriate or inferred.
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- Gravel: thickness (ft)
 - Sand/gravel: thickness (ft)
 - Percent sand and fines (based on screen, 0.075 in.), visual estimation
 - Significant amount of fines (greater than 200 mesh, 0.0075 in. or 0.075 mm)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcium carbonate (lignite)
 - "C" is symbol denoting consolidated or unknown property
 - "M" is symbol denoting property absent or unexplored



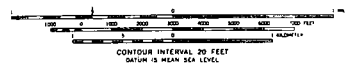
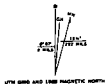
- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

Blanco, Stephen, 1971. Geologic Map of the Rio-Colorado City Area, Pueblo and Huerfano Counties, Colorado. Colorado School of Mines, M.S. Thesis T 1360, Plate 1.

Mapped by: Ralph R. Shroba
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



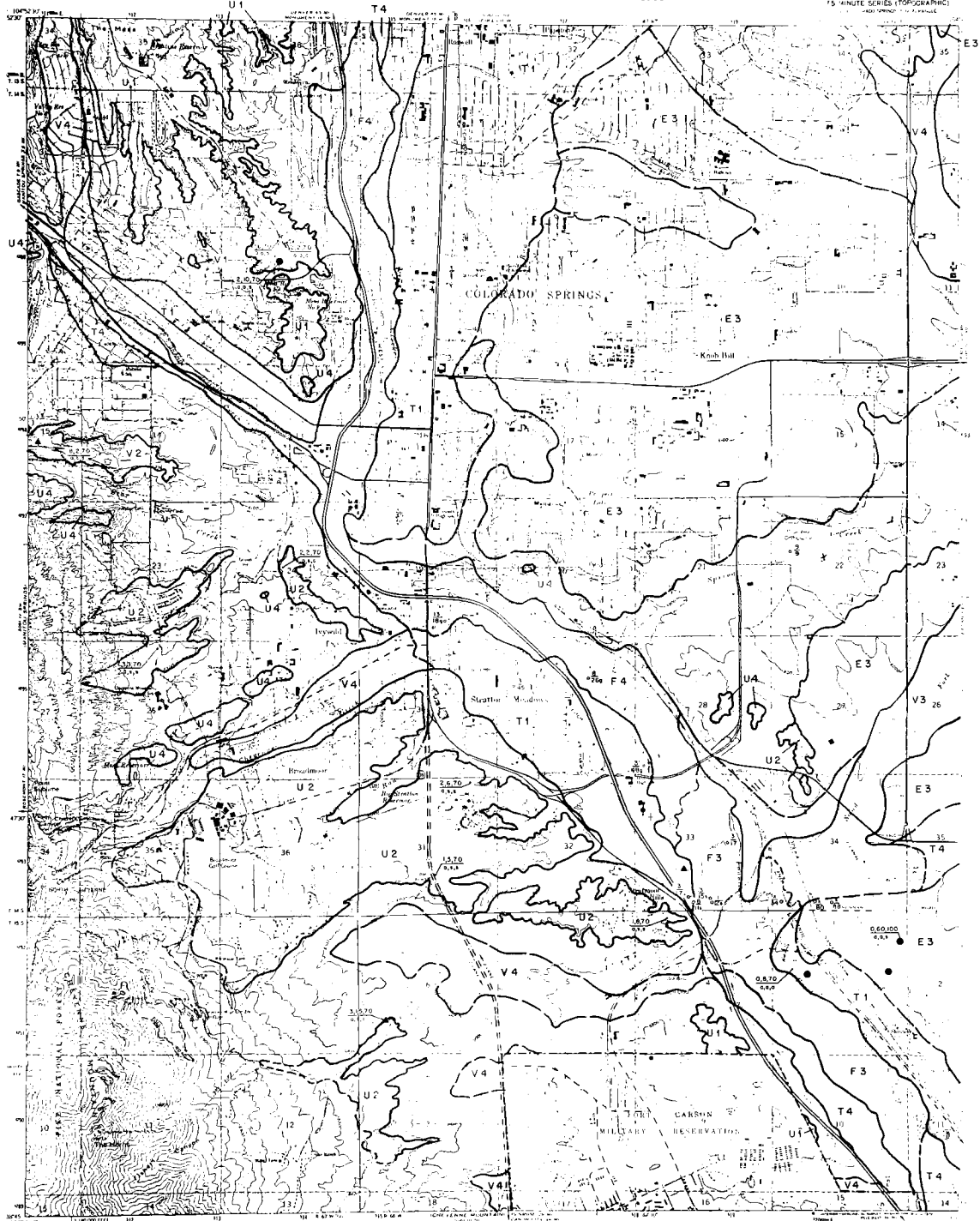
- ROAD CLASSIFICATION**
- Primary highway: Solid line
 - Secondary highway: Dashed line
 - Hard surface: Solid line with dashes
 - Unimproved road: Dotted line
 - Interstate Route: Double line with red and blue
 - U.S. Route: Line with 'U.S.' shield
 - State Route: Line with 'S' shield
 - Light duty road, hard or unimproved surface: Thin solid line

COLORADO CITY, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

COLORADO SPRINGS QUADRANGLE
COLORADO-EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
HORIZONTAL CONTROL

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



EXPLANATION

- SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Quarrying stone quarry
 - Quarried stone quarry
 - Quarried quarry aggregate resource area
 - Selected well or well-stone location with overburden (includes 100' over sand gravel resource area)
 - "G" indicates gravel; "S" indicates sand
 - "U" symbol denotes unevaluated or unknown property
 - "W" denotes Colorado Geological Survey unclassified and Crown protected well hole
 - Landmark boundary, solid where shown or observed; dashed where approximate or inferred
- ROAD CLASSIFICATION**
- Interstate
 - Federal Road
 - U.S. Road
 - State Road
- QUADRANGLE LOCATION**
- NON-RESOURCE OR WITHDRAWN AREA**

Geology modified after Scott, G.R., & Moberg, R. A. 1973, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, M-482.

REFERENCES:

Tribble, D.E., and Pritch, R.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-837 A.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

Scale from U. S. Geological Survey 1:250,000 quadrangle

U.S. GEOLOGICAL SURVEY
COLORADO SPRINGS, COLORADO

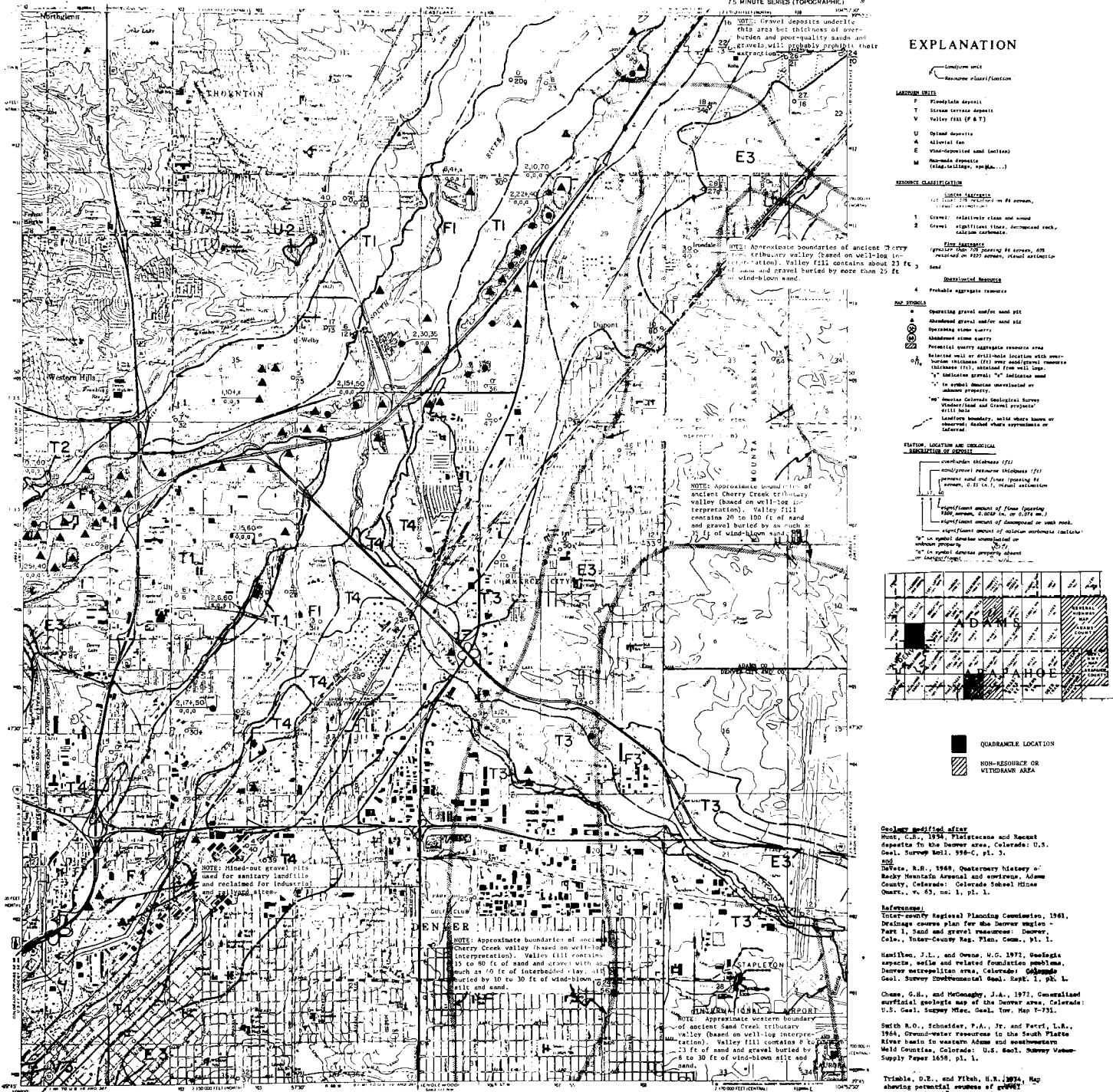
ROAD CLASSIFICATION
Interstate
Federal Road
U.S. Road
State Road

COLORADO SPRINGS, COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

COMMERCE CITY QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)
COLORADO



EXPLANATION

- UNIFORM UNIT**
- Resource classification
- LANDFORM UNIT**
- F Foothill deposit
 - T Tertiary terrace deposit
 - W Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mesquite deposit (alluvial fan, dune, ...)
- RESOURCE CLASSIFICATION**
- GRAVEL**
- 1 Green: relatively clean and smooth
 - 2 Green: significant fines, increased rock, calcium carbonate
- SAND**
- NOTE:** Approximate boundaries of ancient Cherry Creek tributary valley (based on well-log interpretation). Valley fill contains about 23 ft of sand and gravel buried by more than 25 ft of wind-blown sand.
- PROBABLE RESOURCES**
- 4 Probable aggregate resources
- WELL SYMBOLS**
- △ Open-pit gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Open-pit stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with water-bearing thickness (ft) and/or sand/gravel resource thickness (ft), obtained from well logs
 - * Indicate gravel; ** indicate sand
 - * In symbol denotes unclassified or surficial geologic map
 - ** In symbol denotes unclassified or surficial geologic map
 - * In symbol denotes property owned by ...
 - ** In symbol denotes property owned by ...

SYMBOL	DESCRIPTION
△	Open-pit gravel and/or sand pit
○	Abandoned gravel and/or sand pit
□	Open-pit stone quarry
○	Abandoned stone quarry
○	Potential quarry aggregate resource area
○	Selected well or drill-hole location with water-bearing thickness (ft) and/or sand/gravel resource thickness (ft), obtained from well logs
○	* Indicate gravel; ** indicate sand
○	* In symbol denotes unclassified or surficial geologic map
○	** In symbol denotes unclassified or surficial geologic map
○	* In symbol denotes property owned by ...
○	** In symbol denotes property owned by ...

QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:

Hunt, C.R., 1954, Pleistocene and Recent deposits in the Denver area, Colorado; U.S. Geol. Survey Bull. 936-C, pl. 2.

and

McVey, R.R., 1968, Quaternary history of Barkly Mountain Arsenal and westward, Adams County, Colorado; Colorado School Mines Quar., v. 43, no. 1, p. 1.

References:

Texas county Regional Planning Commission, 1961, Drainage course plan for the Denver region - Part I, sand and gravel resources; Denver, Colo., Inter-County Reg. Plan. Com., 91, 1.

Hamilton, J.L., and Owen, W.C., 1972, Geologic aspects, soils and related foundation problems, Denver metropolitan area, Colorado; Colorado Geol. Survey Environmental Geol. Rept. 1, 92, 1.

Chase, G.H., and McConagy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado; U.S. Geol. Survey Misc. Geol. Inv. Map T-731.

Smith R.O., Schneider, P.A., Jr. and Perci, L.L., 1964, Ground-water resources in the South Platte River basin in western Adams and southeastern Weld Counties, Colorado; U.S. Geol. Survey Water-Supply Paper 1658, pl. 1.

Trimble, D.E., and Pihl, H.R., 1974, Map showing potential resources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor; Colo. U. S. Geol. Survey Misc. Geol. Inv. Map T-816-A.

Base from U. S. Geological Survey 7-1/2 minute quadrangle

Scale: 1 inch = 1 mile

DATE: ...

ROAD CLASSIFICATION

- Highway
- Unimproved rd
- Interstate Road
- U.S. Road
- State Road

COMMERCE CITY COLO

Prepared in cooperation with the U. S. Geological Survey.

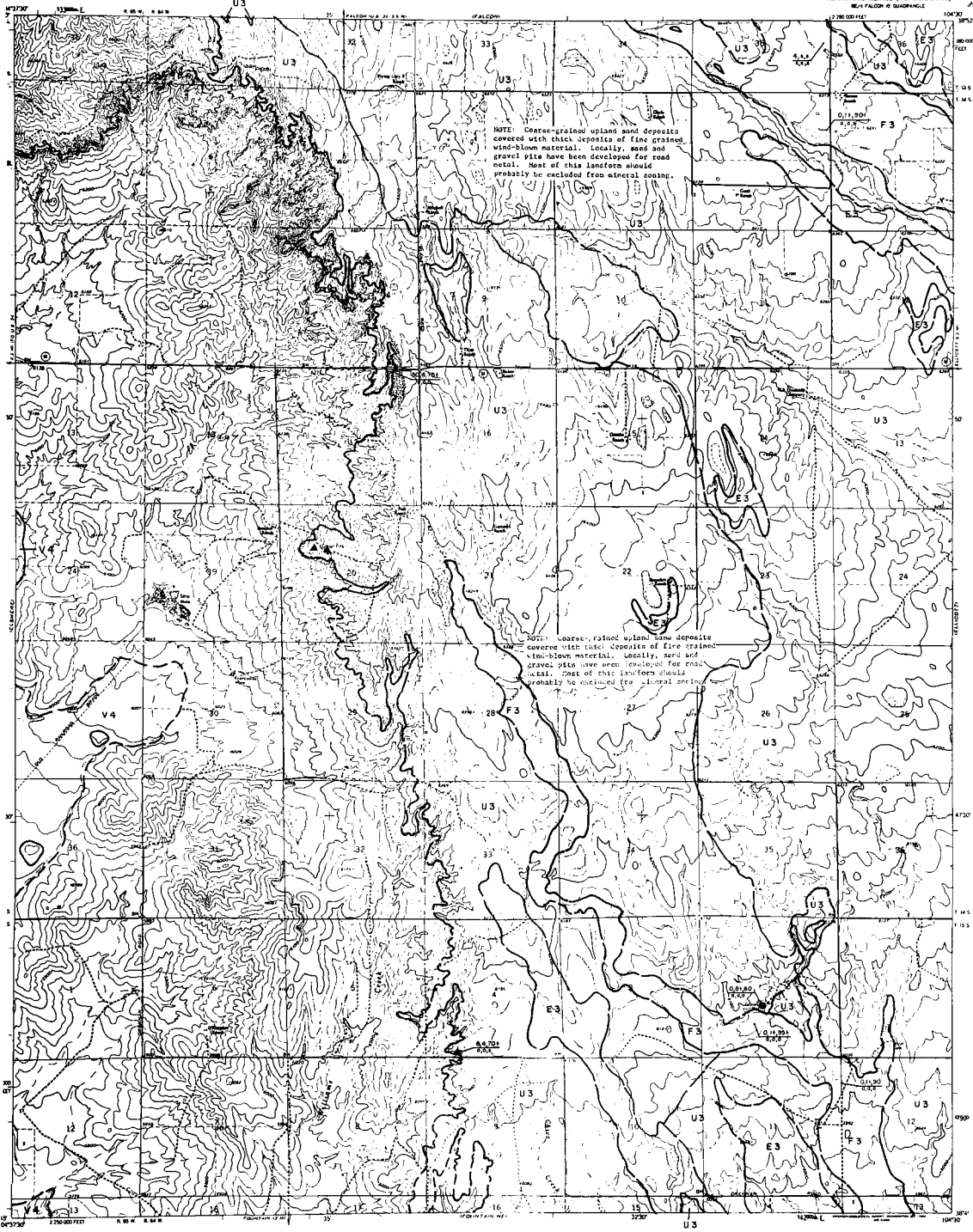
Map by: Stephen D. Schwechow

Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

CORRAL BLUFFS QUADRANGLE
COLORADO - EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
M-1 FALCON 6 QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR

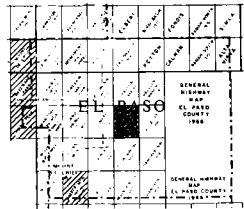


NOTE: Coarse-grained upland sand deposits covered with thick deposits of fine grained wind-blown material. Locally, sand and gravel pits have been developed for road metal. Most of this landform should probably be excluded from mineral zoning.

NOTE: Coarse, rymed upland sand deposits covered with thick deposits of fine grained wind-blown material. Locally, sand and gravel pits have been developed for road metal. Most of this landform should probably be excluded from mineral zoning.

EXPLANATION

- APPROXIMATE**
- F Floodplain deposit
 - T Slope terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Eolian deposit (sand)
 - M Man-made deposits (slag, tailings, spoils...)
- RESOURCE CLASSIFICATION**
- Gravel Resources**
See chart on back of screen, of soil restriction
- 1 Gravel: relatively clean and round
 - 2 Gravel: significant fines, decomposed rock, sodium carbonate
- Sand Resources**
See chart on back of screen, of soil restriction
- 3 Sand
 - 4 Probable aggregate resource
- QUARRY**
- A Operating gravel and/or sand pit
 - B Abandoned gravel and/or sand pit
 - C Operating stone quarry
 - D Abandoned stone quarry
 - E Potential quarry aggregate resource area
- Other Symbols**
- Selected well or fault-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); distance from well logs
 - "r" indicates gravel; "s" indicates sand
 - "u" in symbol denotes unutilized or unknown property
 - "m" denotes Colorado Geological Survey Mineral Land and Gravel project
 - NOTE: Landform boundary, solid where known or observed, dashed where approximate or inferred.
- STATION, LOCATION AND DIMENSIONAL COMPARISON OF DEPOSITS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (using as shown, 0 to 100, visual estimation)
 - significant amount of fines (using 100 screen, 0.075 in. or 0.075 mm.)
 - significant amount of decomposed or soil rock
 - significant amount of calcium carbonate (limestone)
 - "u" in symbol denotes unutilized or unknown property
 - "m" in symbol denotes property absent or indistinguishable

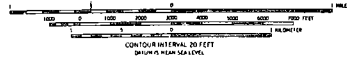


- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Stetser, P. E., 1968, U. S. Geological Survey, Map GQ-783.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

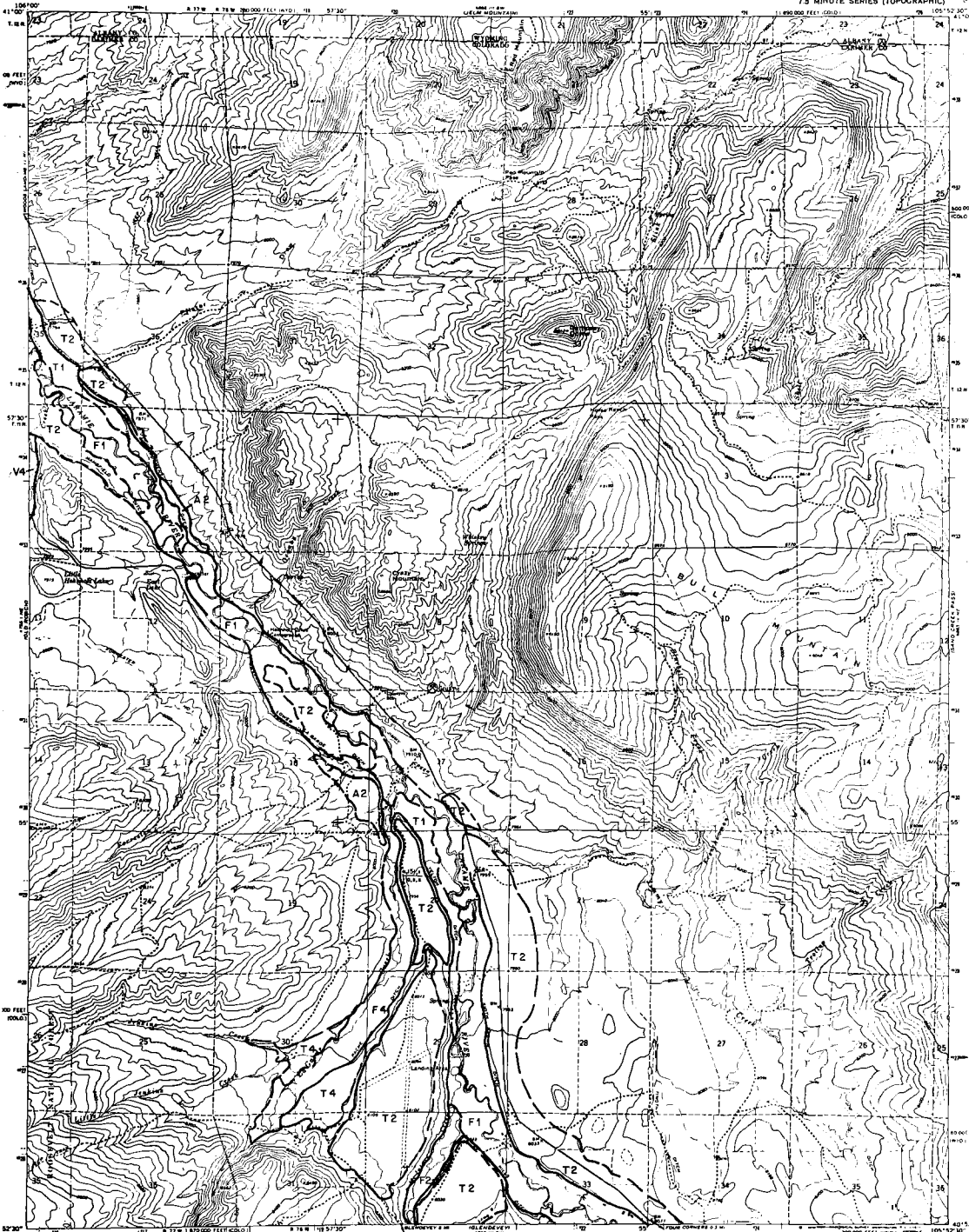
- Light duty
- Medium duty
- Unimproved dirt
- State Road

CORRAL BLUFFS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

CRAZY MOUNTAIN QUADRANGLE
COLORADO - WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN H. ROLD, DIRECTOR



EXPLANATION

- Landform unit
- Stream/river/valley/flatland
- LITHOLOGICAL UNIT**
- F Fluvial deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Unconsolidated deposit
- A Alluvial fan
- E Eolian deposit (sand dunes)
- M Manganese deposit (slag, tailings, spalls, etc.)
- RESOURCE CLASSIFICATION**
- CLASS 1** (for areas 200' or more in size)
- 1 Good: relatively clean and sound
- 2 Good: significant fines, abundant rock, calcium carbonate
- CLASS 2** (for areas 100' or more in size)
- 3 Fair
- 4 Marginal Resource
- 5 Probable aggregate resource
- NOT SYMBOLS**
- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Related well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- "r" indicates gravel; "s" indicates sand
- "r" in symbol denotes unconsolidated or unknown property
- "w" denotes Colorado Geological Survey Water Table and Groundwater Drill Hole
- Landform boundary, solid where known or inferred, dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATION**
- Overburden thickness (ft)
- Resource sand and fines (massing of gravel, 2.25 in.), visual estimation
- Significant amount of fines (massing 200' screen, 0.075 in. or 0.075 mm)
- Significant amount of decomposed or sand rock
- Significant amount of calcareous carbonate (calcium)
- "r" in symbol denotes unconsolidated or unknown property
- "s" in symbol denotes primarily sand or sand/gravel



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WETLAND AREA

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION
Light duty ————— Unimproved dirt

CRAZY MOUNTAIN, COLO. - WYO.

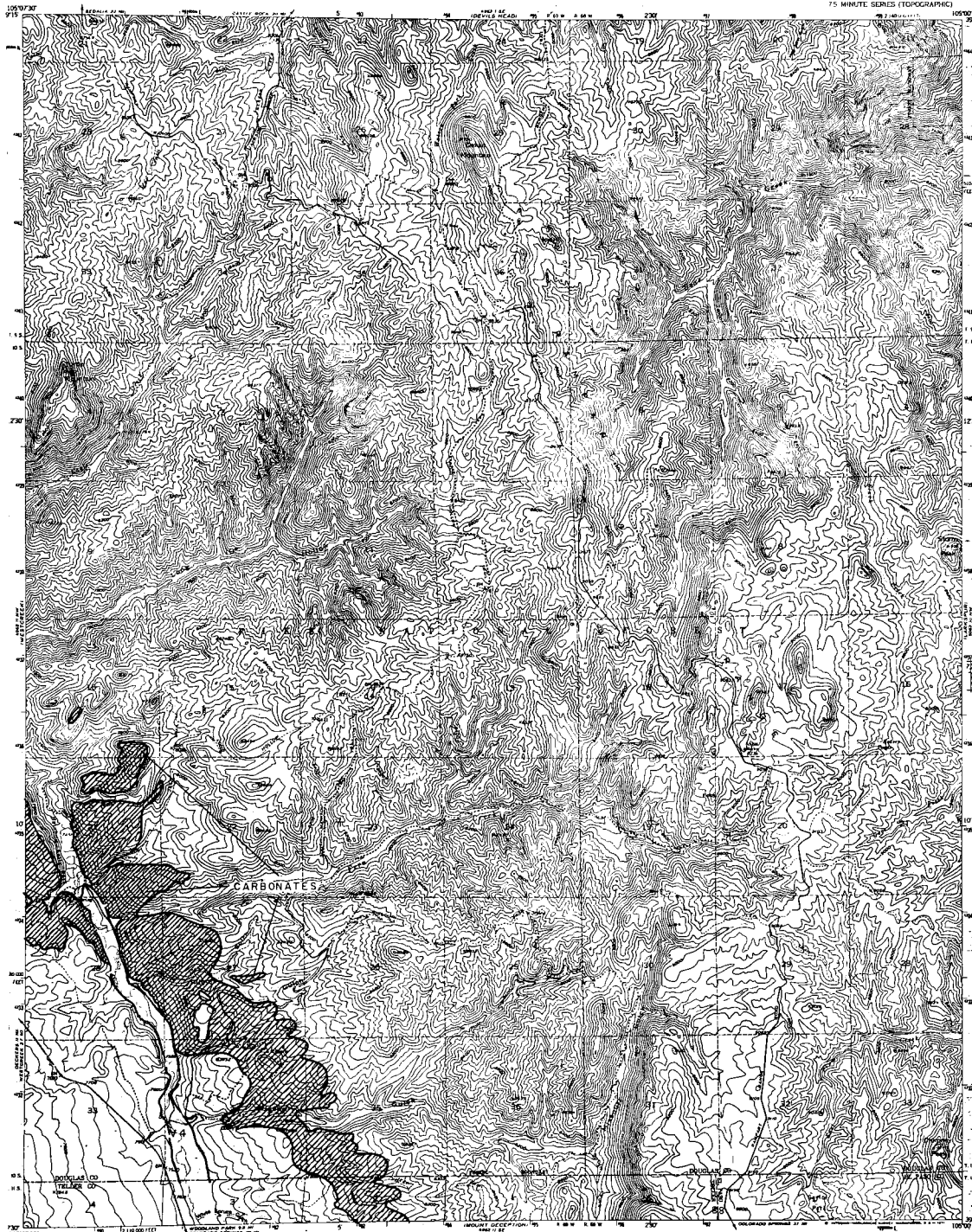
Mapped by: Stephen D. Schochow
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

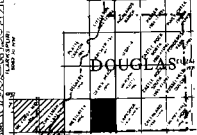
DAKAN MOUNTAIN QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYAN, DIRECTOR



- LANDFORMS**
- F Floodplain deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-igneous deposits (slag-tailings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 1/4 inch on 48 screen, mixed aggregate)
- 1 Gravel: selectively clean and smooth
 - 2 Gravel: significant fines, decomposed rock, calcareous carbonate
- Fine Aggregate**
(greater than 20 mesh passing 48 screen, 60% retained on 400 screen, mixed aggregate)
- 3 Sand
 - 4 Probable aggregate resource
- QUARRIES**
- Q Operating gravel and/or sand pit
 - A Abandoned gravel and/or sand pit
 - Q Abandoned stone quarry
- Potential quarry aggregate resource area indicated with an irregular location with minimum thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs. "A" indicates gravel; "S" indicates sand. "U" in symbol denotes unevaluated or unknown property.
- "M" denotes Colorado Geological Survey abandoned sand and gravel projects.
- Lead line boundary, will show down or resulting shaded where appropriate or relevant.
- STATION, LOCATION AND DIMENSIONAL INDICATION OF QUARRY**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Quarry area and area (spacing by survey, 0-25 in. 1/4 mile distance)
 - Approximate amount of fines (passing 200 screen, 0.075 in. or 0.075 mm.)
 - Significant amount of decomposed or weak rock
 - Significant amount of relation to surface fault
 - "U" in symbol denotes unevaluated or unknown property
 - "M" in symbol denotes property absent or in development

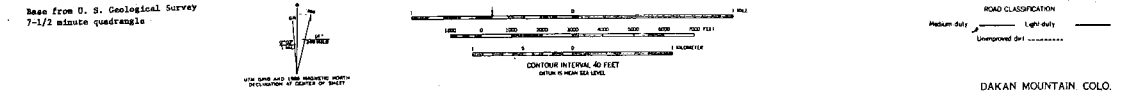


QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Geology Modified after:
Harris, J.C., 1951, Structural geology of the eastern flank of the southern Front Range, Colorado: University of Colorado Ph.D. Thesis, 121 p., 3 pls.

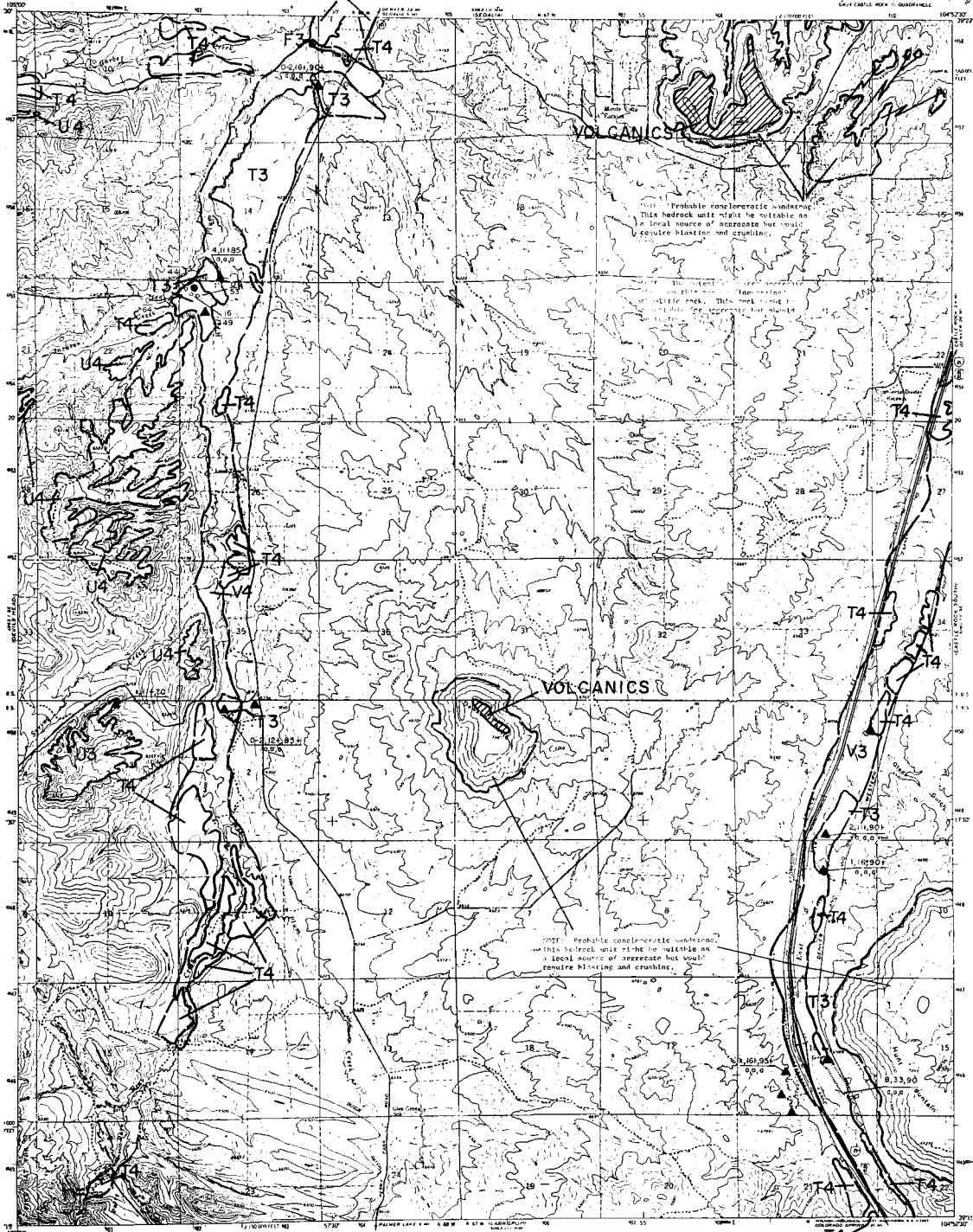
Mapped by: Phillip C. Wicklein
Date: June 30, 1974



SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

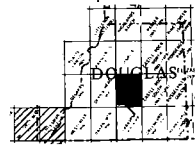
DAWSON BUTTE QUADRANGLE
COLORADO - DOUGLAS CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
L.S. / CABLE 5004 - QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLS, DIRECTOR



EXPLANATION

- Landform unit
Resource classification
- LANDFORM UNITS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Mid-deposits and (colline)
 - M Non-made deposits (clay, siltstone, shale, ...)
- RESOURCE CLASSIFICATION**
 - 1 Gravel: relatively clean and round
 - 2 Gravel: significant fines, decomposed rock, calcareous
 - 3 Sand
 - 4 Probable aggregate resource
- ROAD SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft), elevation from well top, "x" indicates gravel; "o" indicates sand; "u" symbol denotes unmineralized or unknown property
 - "u" denotes Colorado Geological Survey Material/Use and Gravel projects
 - 100-foot boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL SIGNIFICANCE OF SPURTS**
 - Overburden thickness (ft)
 - Horizontal distance (ft)
 - Vertical distance (ft)
 - Significant amount of fines (greater than 20% by weight)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcareous material
 - "u" or symbol denotes unmineralized or unknown property
 - "x" or "o" symbol denotes property status or composition



QUADRANGLE LOCATION
NON-RESOURCE OR VETERINARY AREA

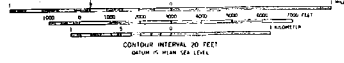
Geology Modified after:
Tisdale, D.R., and Pritch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado; U.S. Geol. Survey Map T-557-A.

Reference:
Chase, C.H., and McCook, J.A., 1973, Generalized surficial geologic map of the Denver area, Colorado; U.S. Geol. Survey Misc. Geol. Inv. Map I-733.

Mapped by: Ralph B. Shrobs, Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey 7-1/2 minute quadrangle



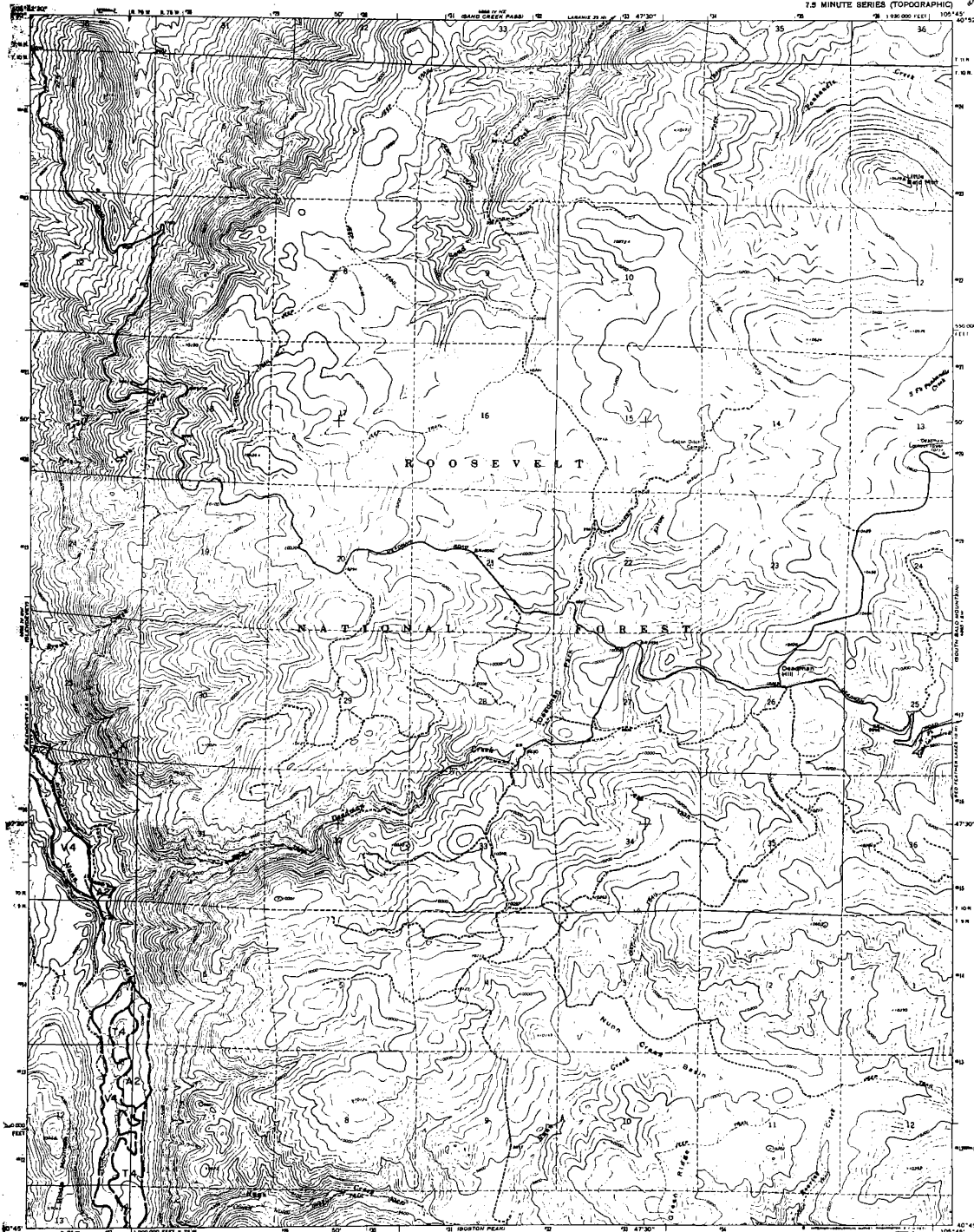
ROAD CLASSIFICATION
Heavy-duty Light-duty
Medium-duty Unimproved dirt
Interstate Route U.S. Route State Route

DAWSON BUTTE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

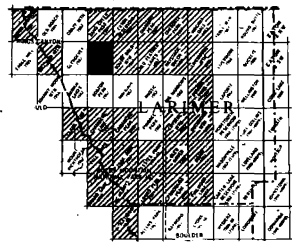
DEADMAN QUADRANGLE
COLORADO-LARIMER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR



EXPLANATION

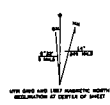
- Landform unit**
Resource class/function
- LANDFORM UNIT**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unid. deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Hummock deposits (slag, tailings, spoils, ...)
- RESOURCE CLASSIFICATION**
- CLASSIFICATION**
(as used on 25' contour, 10' interval)
- 1 Open: relatively clean and sound
 - 2 Open: significant fines, decomposed rock, latent carbonates
 - 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel quarry and pit
 - Abandoned gravel quarry and pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Historical quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); shaded from well log
 - "m" indicates sand
 - "u" in round denotes unutilized or unknown property
 - "m" denotes Colorado Geological Survey "underground and gravel" project
 - Drill hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- STATION LOCATION AND CONTIGUOUS QUADRANGLE IDENTIFICATION**
- overburden thickness (ft)
 - significant resource thickness (ft)
 - percent sand and fines (open to 25' contour, 0.25 in. / 1' interval estimation)
 - significant amount of fines (open to 25' contour, 0.25 in. / 1' interval)
 - significant amount of decomposed or weak rock
 - significant amount of mineral carbonates (include)
 - "u" in symbol denotes unutilized or unknown property
 - "m" in symbol denotes property subject to C&G/S/MS



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schowchow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



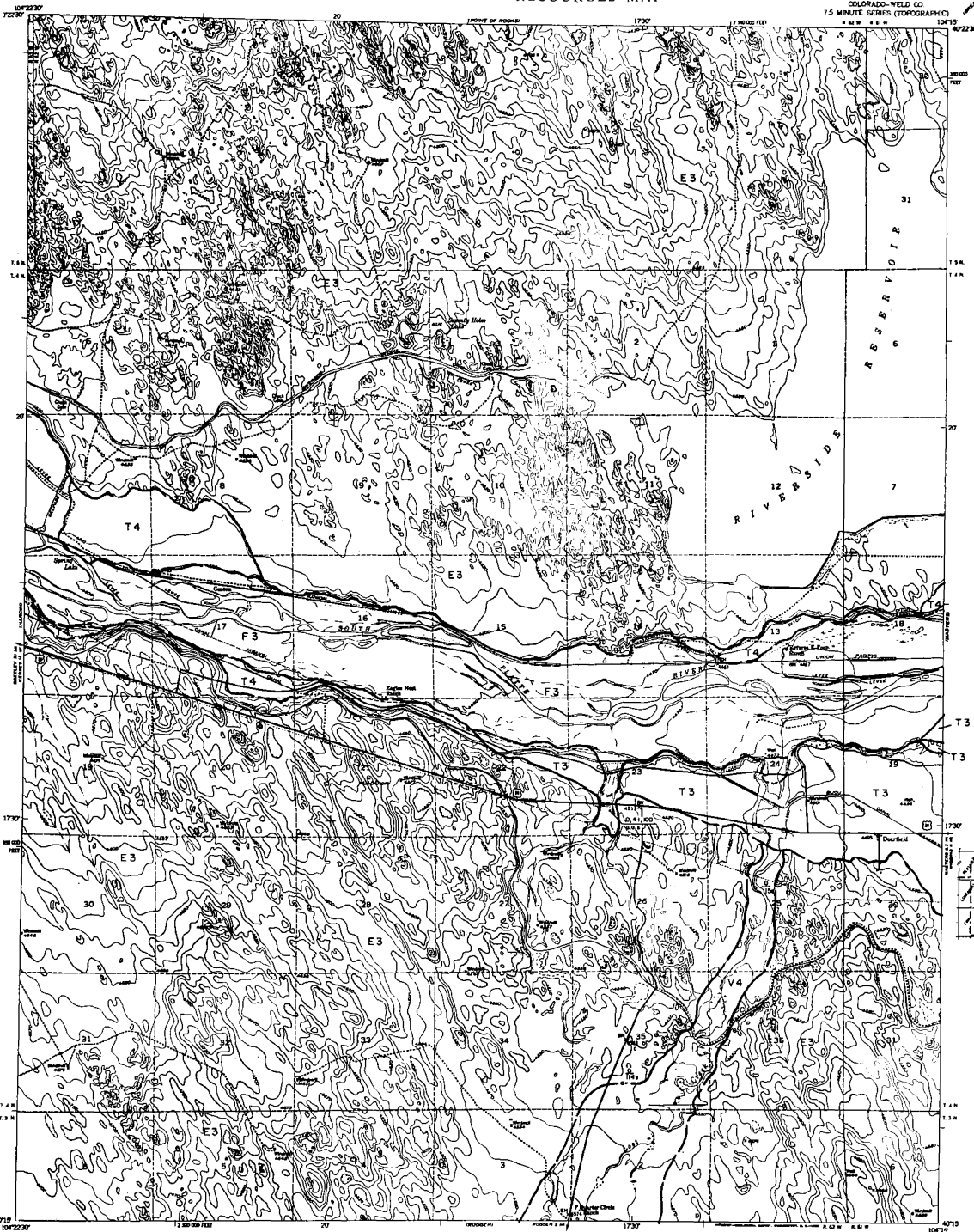
ROAD CLASSIFICATION
Legend: — Unimproved dirt

DEADMAN, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

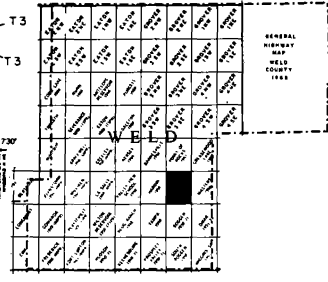
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

DEARFIELD QUADRANGLE
COLORADO-WELD CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1:62,500



EXPLANATION

- LANDFORMS**
 Contour interval 10 feet
 Landform classification
- LAYERED UNIT**
 F Fluvial deposit
 T Terrace deposit
 V Valley fill (F & T)
 U Upland deposit
 A Alluvial fan
 E Wind-deposited sand (eolian)
 M Non-uvic deposits (lacustrine, etc.)
- MINOR CLASSIFICATION**
GRAVEL DEPOSIT
 1 Gravel: relatively clean and well sorted
 2 Gravel: silty/clayey fine, decomposed rock, calcareous
SAND DEPOSIT
 1 Sand: fine to medium, well sorted
 2 Sand: medium to coarse, well sorted
PROBABLE AGGREGATE RESERVE
 4
- WELL TYPES**
 a Operating gravel and/or sand pit
 b Abandoned gravel and/or sand pit
 c Operating stone quarry
 d Abandoned stone quarry
 e Potential quarry aggregate resource area
 f Selected well of drill-hole location with overburden thickness (ft) over unconsolidated resource thickness (ft), obtained from well logs
 g Indicates gravel, "s" indicates sand
 h Is symbol denotes unconsolidated or unmineralized
 i An asterisk indicates Geological Survey Waterflood and Gravel projects
 j Well hole
 k Landform boundary, solid where known or dashed where approximate or inferred
- STATUS, LOCATION AND COLOGICAL SIGNIFICANCE OF SPECIAL**
 - contour interval (ft)
 - unconsolidated resource thickness (ft)
 - unconsolidated resource thickness (ft) percent sand and fines (ignoring its texture, 0.075 to 0.075 mm.)
 - significant amount of decomposed or weak rock
 - significant amount of eolian carbonate (caliche)
 - in gravel devices unconsolidated or unmineralized
 - in gravel devices properly placed or unconsolidated



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WINDMANN AREA

REFERENCE: Bjorklund, L.J., and Brown, R.F., 1957, Geology and ground-water resources of the lower South Platte River valley between Hardisty, Colorado, and Paxton, Nebraska; U. S. Geol. Survey Water-Supply Paper 1376, pl. 1.

Mapped by: Phillip C. Wickless
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



ROAD CLASSIFICATION
 Heavy-duty _____ Light-duty _____
 Medium-duty _____ Unimproved dirt _____
 U.S. Route _____ State Route _____

DEARFIELD, COLO.

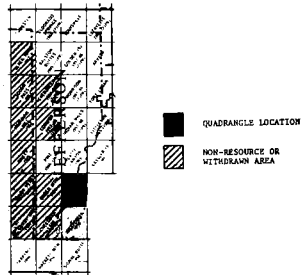
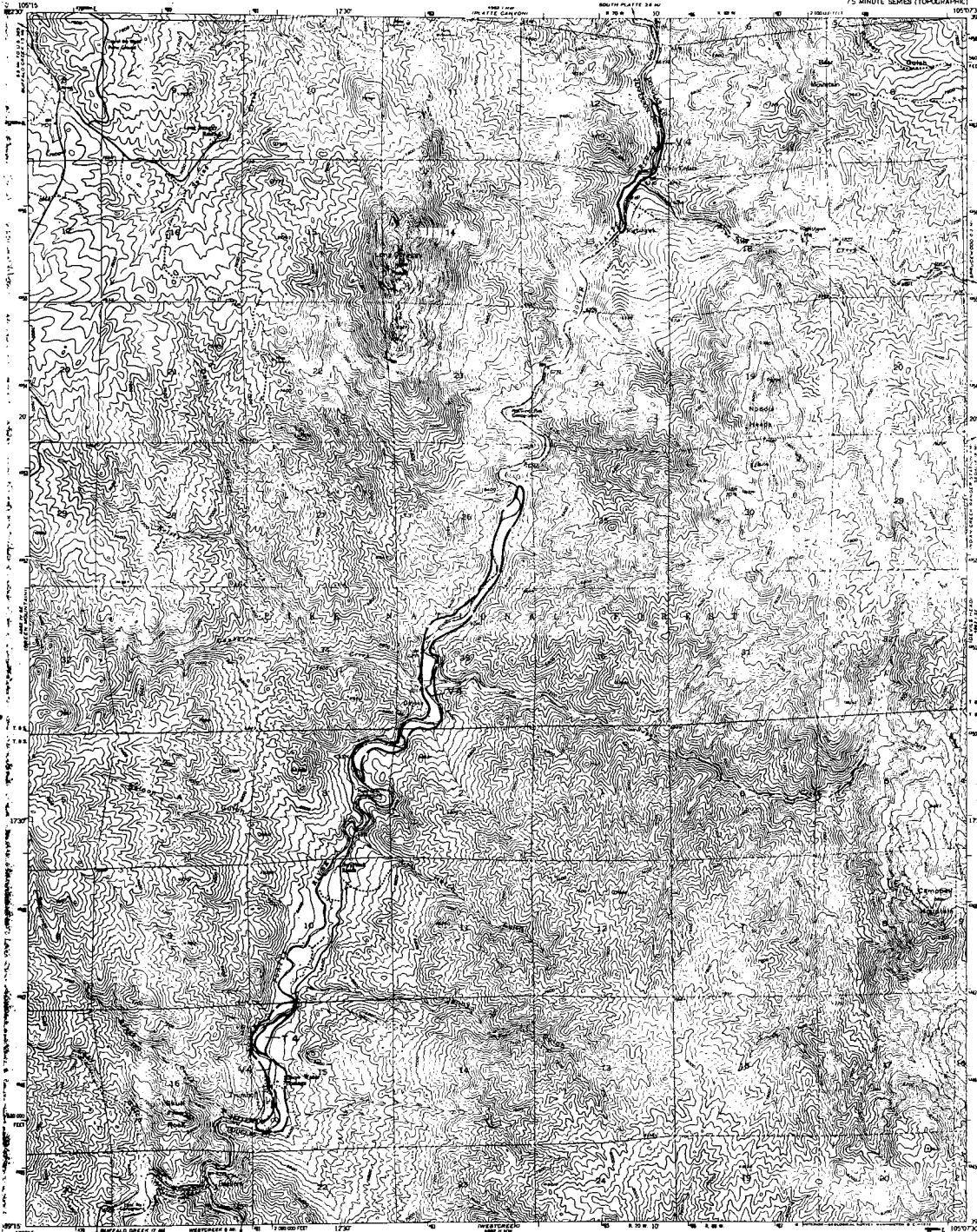
SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DECKERS QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYAN, DIRECTOR

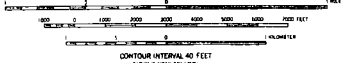
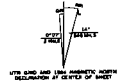
EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (colluvial)
 - M Non-mine deposits (sand, silt, clay, pebbles, ...)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 20% retained on #4 screen, 0.75" retention)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous carbonates
- Fine Aggregate**
(greater than 75% passing #4 screen, 80% retained on #20 screen, visual estimation)
- 3 Sand
 - 4 Probable aggregate resources
- NO MINES**
- * Operating gravel and/or sand pit
 - ⊗ Abandoned gravel and/or sand pit
 - ⊙ Abandoned stone quarry
 - ⊕ Potential quarry aggregate resource sites
- Wells**
- ⊕ Indicated well or drill-hole location with screen thickness (ft), over sand/gravel resource thickness (ft), obtained from well logs.
 - "s" indicates gravel; "f" indicates sand.
 - "*" in symbol denotes unretained or unknown property.
 - "w" denotes Colorado Geological Survey "Water/Lean and Gravel projects" drill hole.
 - Landform boundary, solid where known or inferred; dashed where approximate or inferred.
- STATION LOCATION AND IDEOLOGICAL INDICATION OF RESULTS**
- resource thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (passing #4 screen, 0.75 in.), visual estimation
 - significant amount of fines (passing #20 screen, 0.848 in. or 0.075 mm)
 - significant amount of decomposed or weak sand
 - significant amount of calcareous carbonate (calcite)
 - "*" in symbol denotes unretained or unknown property.
 - "w" in symbol denotes projects shown.



Maped by: Phillip C. Wicklein
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

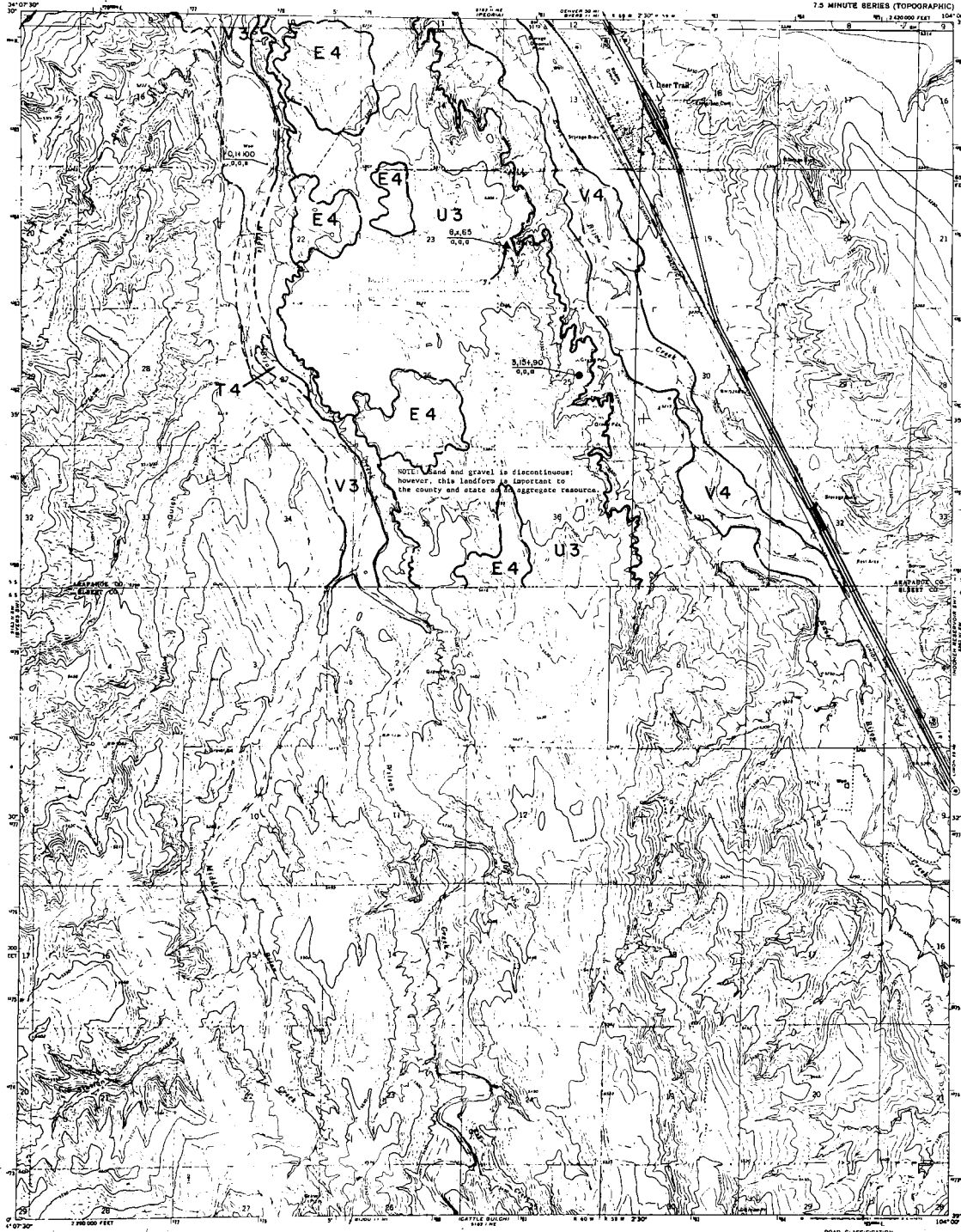
Medium-duty ——— Light-duty ———
Unimproved dirt - - - - -

DECKERS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEER-TRAIL QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - S Stream terrace deposit
 - V Valley fill (E & T)
 - U Upland alluvium
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (like ballgame, apron, ...)

- MINING CLASSIFICATION**
- CLAYE AGGREGATE**
(a) (200' to 250' contour) - 84 acres,
(b) (200' to 250' contour) - 84 acres
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcine subbase
- FINE SANDS**
(200' to 250' contour) - 84 acres, 67%
recovered on 40' screen, visual estimation
- 3 Sand
 - 4 Probable aggregate resource

- MIN SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Relieved well or drill-hole location with resource (shaded) (E) over sand/gravel resource
 - Wellhead (E), shaded from well log
 - "E" in symbol denotes unconsolidated or column property
 - "M" denotes Colorado Geological Survey Mineral Land and Gravel project
 - 1955 hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred.

- SYMBOL, LOCATION AND DIMENSIONAL INDICATION OF AGGREGATE**
- unconsolidated (shaded) (E)
 - sand/gravel resource thickness (E)
 - column sand and fines (shaded) (E)
 - column, 10' to 100' visual estimation
 - significant amount of fines (appearing 100' screen, 0.004" to 0.075" size)
 - significant amount of decomposed or weak rock
 - significant amount of material not suitable for aggregate
 - "E" in symbol denotes unconsolidated or column property
 - "M" in symbol denotes properly shown



- ROAD CLASSIFICATION**
- Primary highway: solid line
 - Secondary highway: dashed line
 - Interstate Route: double line with red border
 - U.S. Route: line with 'M' shield
 - State Route: line with 'S' shield
 - Light-duty road, hard or improved surface: solid line with dashes
 - Unimproved road: dotted line

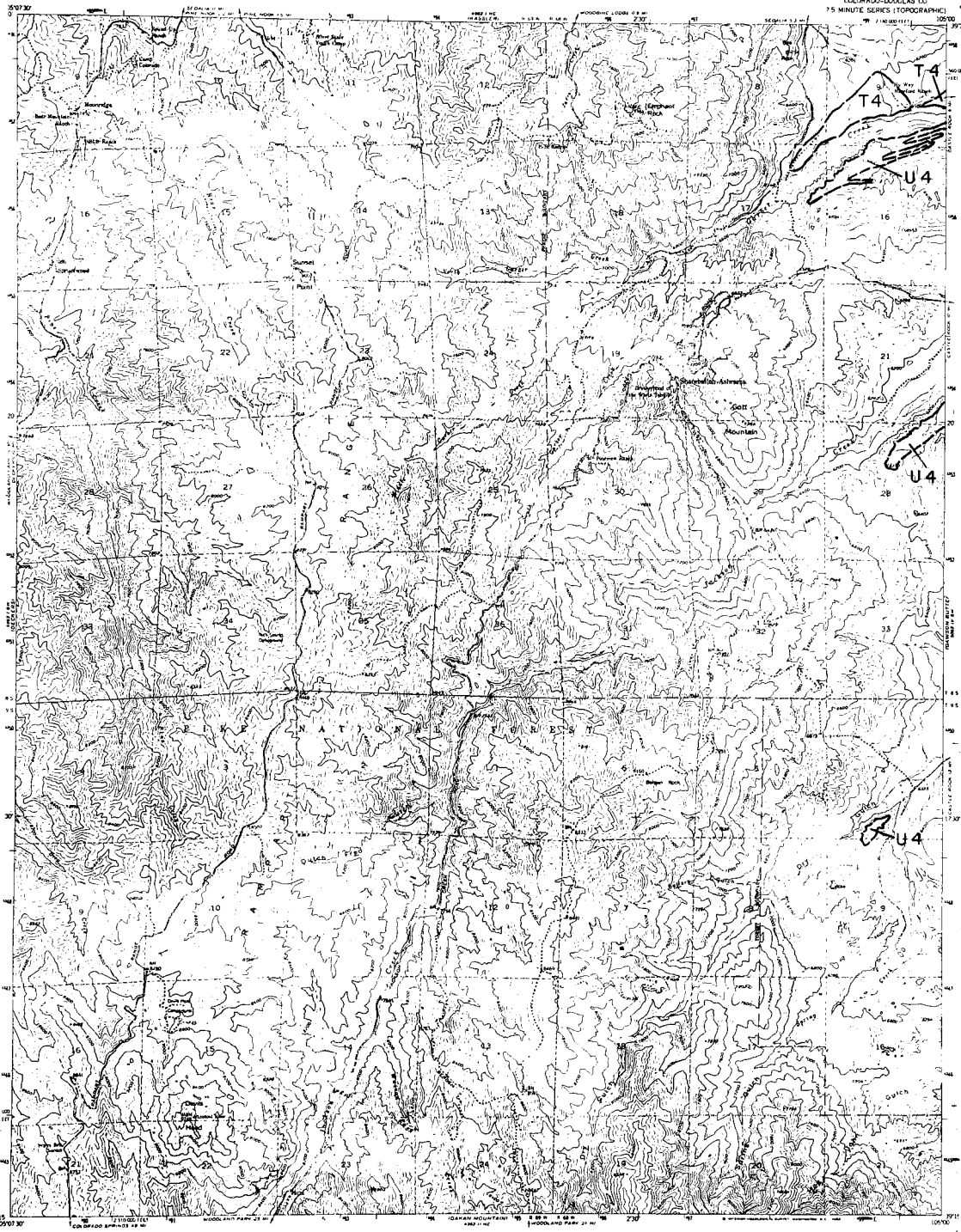
DEER TRAIL, COLO.
N3830-W10400/7.5
1969
AUG 1110 © 68 - SERIES 7077

Mapped by: Phillip C. Wickham
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

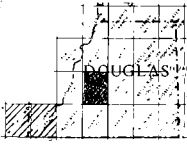
DEVILS HEAD QUADRANGLE
COLORADO-DOUGLAS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

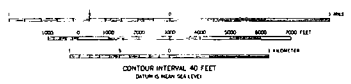
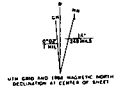
- LAZARUS CODES**
- F Floodplain deposit
 - T Trench (erosion channel)
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-road materials (slag/tailings, opaline...)
- RESOURCE CLASSIFICATION**
- CLASS 1
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcine contained
- CLASS 2
- 3 Sand
 - 4 Unevaluated resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Indicates unit or deposit location with overburden thickness (ft) over underlying resource thickness (ft), obtained from well logs
 - "G" indicates gravel, "S" indicates sand
 - "U" in symbol denotes unevaluated or unknown resource
 - "M" denotes Colorado Geological Survey Material and Core Project drill hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATION**
- INDICATION OF SYMBOLS**
- overburden thickness (ft)
 - and gravel resource thickness (ft)
 - resource and overburden (spacing of arrows, 0.125 in., or 0.075 in.)
 - Significant amount of fines (spacing of 1/8 in. arrows, 0.075 in., or 0.075 in.)
 - Significant amount of decomposed or unit rock
 - "U" in symbol denotes unevaluated or unknown resource
 - "M" in symbol denotes material or unknown property
 - "M" in symbol denotes material or unknown property
- QUADRANGLE LOCATION**
- NON-RESOURCE OR WITHDRAWN AREA**



REFERENCE:
Tribble, D.E., and Hitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-857 A.

Mapped by: Ralph R. Shroba
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



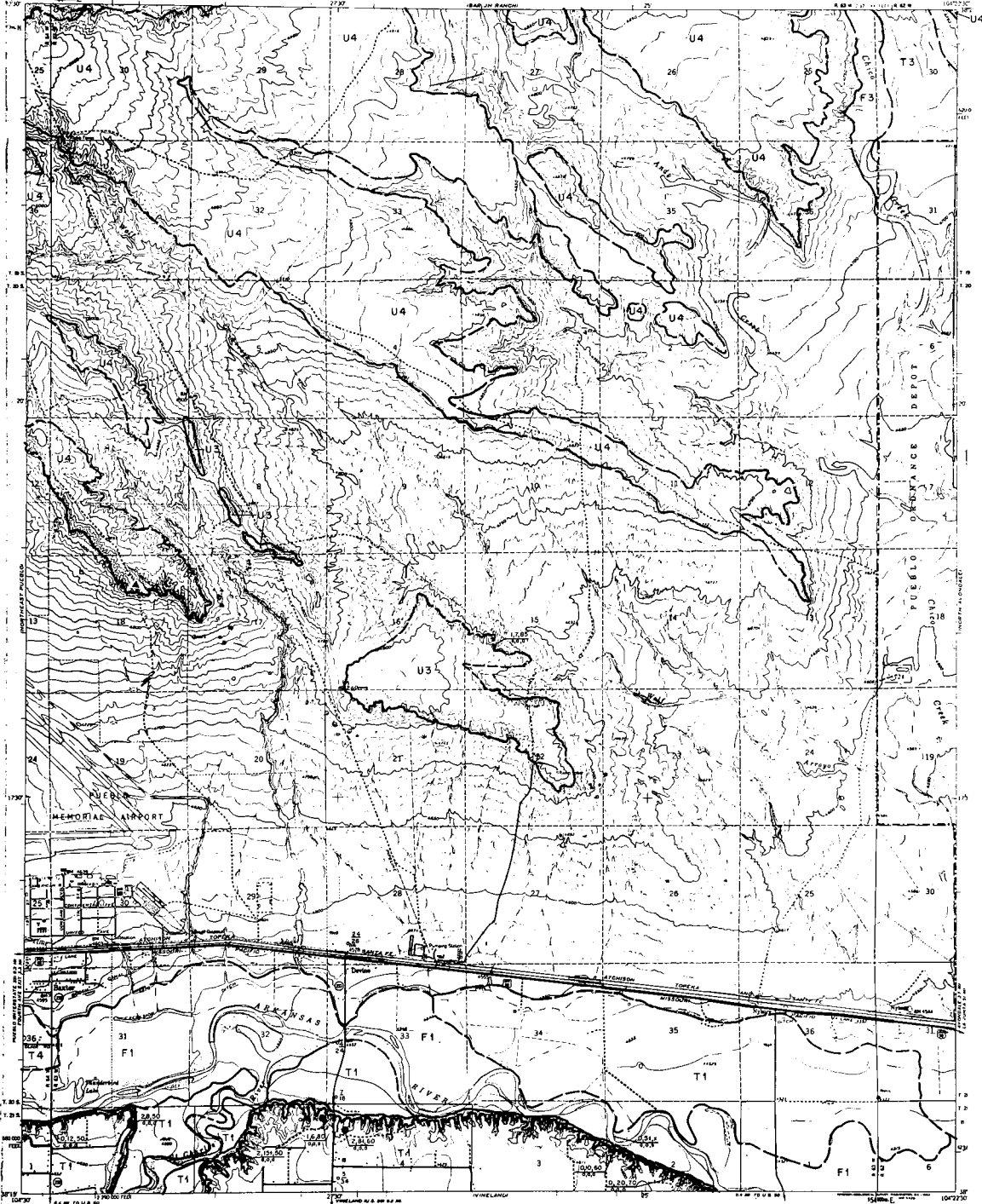
ROAD CLASSIFICATION
Lightly Unimproved dirt

DEVILS HEAD, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

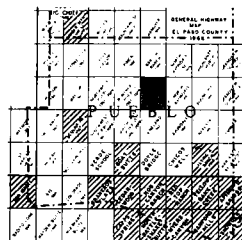
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. MOSE, DIRECTOR

DEVINE QUADRANGLE
COCONA-PUEBLO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



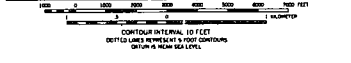
EXPLANATION

- Landform unit
- Resource classification
- LANDFORM UNITS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Erosion-resistant sand (colluv.)
 - W Hard-rock deposits (slag, talus, spalls, etc.)
- RESOURCE CLASSIFICATION**
 - GRAVEL (AGGREGATE)**
(see foot-note regarding use of survey, special restrictions)
 - 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, unconsolidated, calcareous carbonate.
 - SAND (AGGREGATE)**
(see foot-note regarding use of survey, special restrictions)
 - 3 Sand
 - Probable aggregate resources**
 - 4 Probable aggregate resources
- AGGREGATE**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource area
 - Selected well or drill-hole location with estimated thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "s" indicates gravel; "g" indicates sand
 - "c" in symbol denotes unconsolidated or unknown property.
 - "w" denotes Colorado Geological Survey Water/Soil and Gravel projects well logs.
 - Landform boundary, well where known or shown, shaded where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
 - Numbered thickness (ft)
 - Estimated resource thickness (ft)
 - Percent sand and fines (applying to gravel, 0-20 in., visual estimation)
 - Significant amount of fines (applying 1000 screen, 0.075 in. or 2.074 mm)
 - Significant amount of unconsolidated or weak rock.
 - Significant amount of calcareous carbonate (caliche)
 - "w" in symbol denotes unconsolidated or unknown property.
 - "s" in symbol denotes properly sorted or unsorted.



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION
Heavy-duty Light-duty
Medium-duty Unimproved dirt
U.S. Route State Route

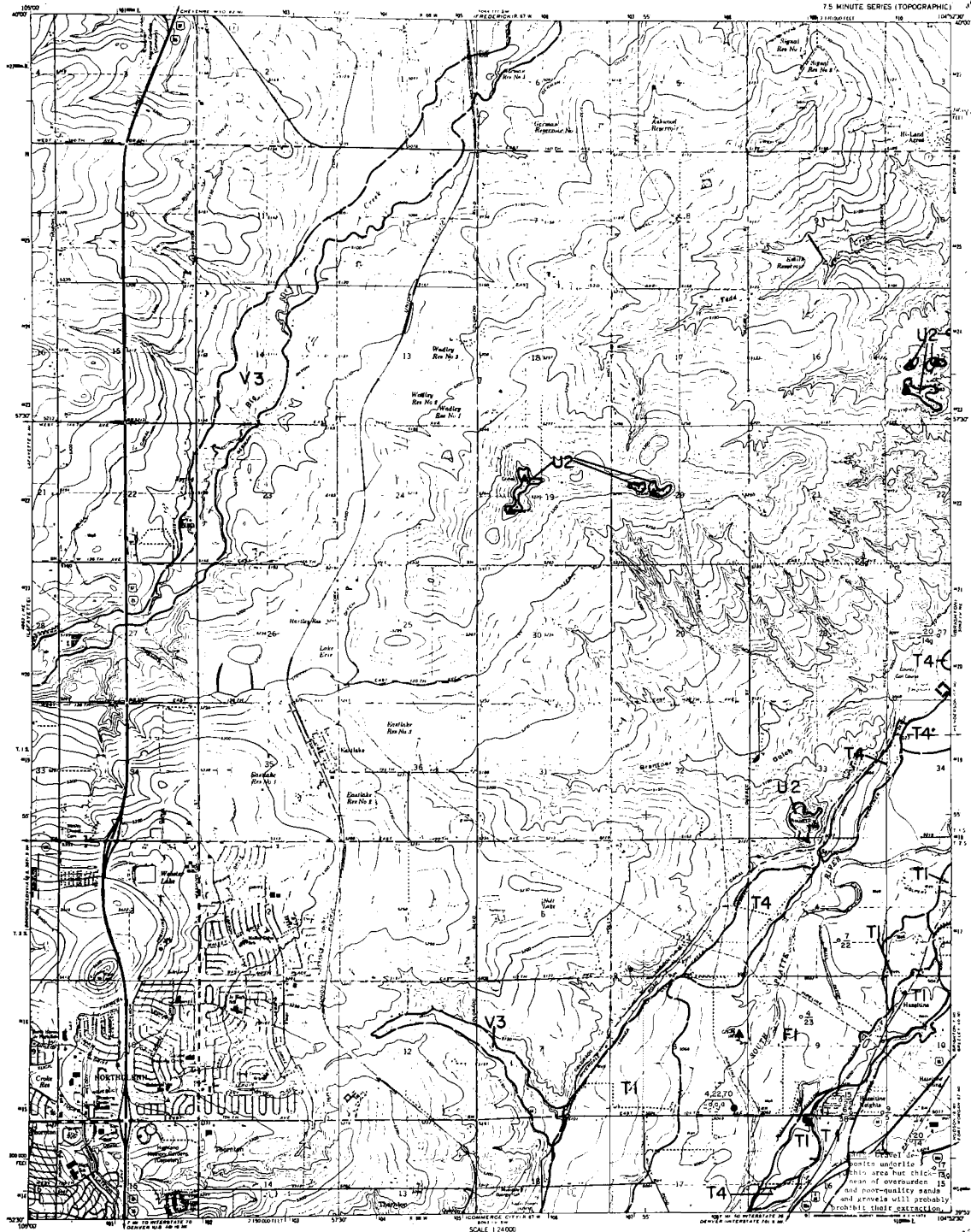
DEVINE, COLO.

Mapped by: Stephen D. Schwechow
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

EASTLAKE QUADRANGLE
COLORADO-ADAMS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Legend for symbols and line types:
- Contour interval
 - Contour classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Tertiary terrace deposit
 - V Valley fill (F & T)
 - U Unconformity
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Recent deposits (fill, talus, colluvium, etc.)

- ROAD CLASSIFICATION**
- 1 County Highway
 - 2 State Highway
 - 3 Road
 - 4 Unimproved Roadway

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with water-bearing thickness (ft) over sand (gravel) resource thickness (ft), obtained from well logs
 - "*" indicates gravel or sandstone sand
 - "x" in symbol denotes unavailability or unknown property
 - "**" denotes Colorado Geological Survey Unidentified Sand and Gravel projects
 - Landform boundary, solid where known or dashed where approximate or inferred

- STATION, LOCATION AND GEOLOGICAL CLASSIFICATION OF SANDS**
- sand/gravel thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (topping to gravel, 0.3) (in %), visual estimation
 - significant amount of fines (topping to gravel, 0.3) (in % or 0.074 mm)
 - significant amount of decomposed or weak rock
 - significant amount of siltstone or shale (outside)
 - "x" in symbol denotes unavailability or unknown property
 - "*" in symbol denotes property absent or doubtful



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR MITHRAMM AREA

References:

Edwards, S.D., 1972, Surficial geology of the Hamblin quadrangles, Adams County, Colorado; Colorado School Mines University, Master's Thesis 7-1465, pl. 2.

De Vete, R.H., 1968, Quaternary history of the Hamblin area and western Adams County, Colorado; Colorado School Mines Quarterly, v. 63, no. 1, pl. 1.

Hamilton, J.L., and Owens, W.C., 1973, Neotectonic aspects, soils and related foundation problems, Denver metropolitan area, Colorado; Colorado Geol. Survey Environmental Geology Report 1, pl. 1.

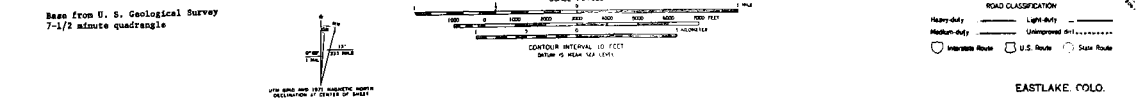
Inter-County Regional Planning Commission, 1961, Drainage course plan for the Denver region - Part 1, Sand and gravel resources; Denver, Colo., Inter-County Reg. Plan. Comm., pl. 3.

Chase, C.H., and McGroarty, R.M., 1972, Generalized surficial geologic map of the Denver area, Colorado; U.S. Geol. Survey Misc. Geol. Inv. Map I-731.

Smith, R.O., Schneider, F.A., Jr., and Patric, L.B., 1964, Ground-water resources of the San Platte River basin in western Adams and southwestern Weld Counties, Colorado; U.S. Geol. Survey Water-Supply Paper 1658, pl. 1.

Trimbale, D.Z., and Fitch, W.A., 1974, Map showing potential sources of gravel and (fine-to-medium) aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.; U.S. Geol. Survey Misc. Geol. Inv. Map I-857a.

Map by: Stephen D. Schowchov
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

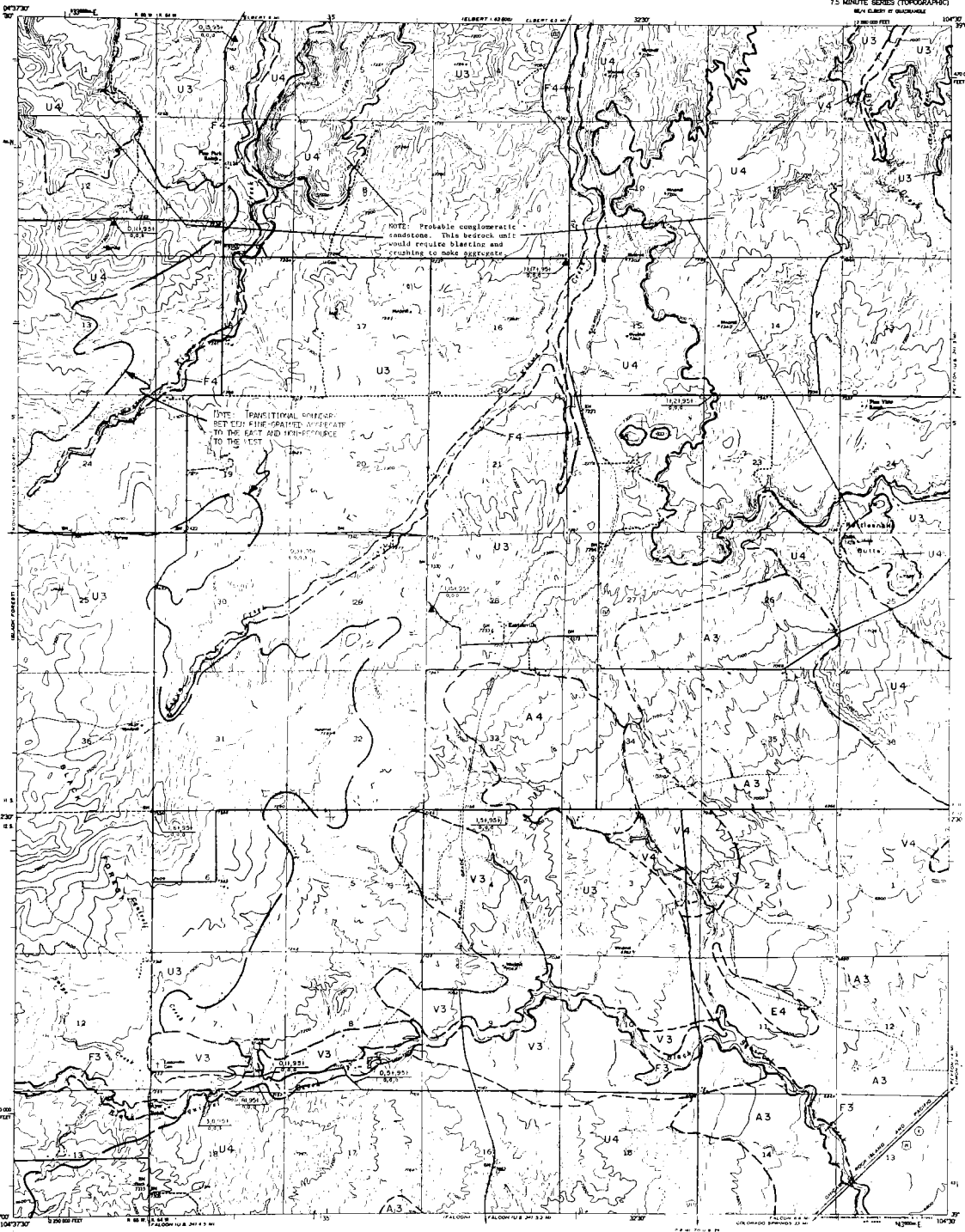


EASTLAKE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

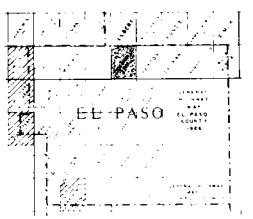
EASTONVILLE QUADRANGLE
COLORADO-EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
BASE MAP OF RECORD

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR



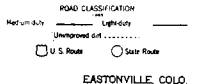
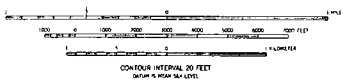
EXPLANATION

- SYMBOLS**
- Boundary line
 - Resource area
- AGGREGATE UNITS**
- U Unclassified aggregate
 - A Approved aggregate
 - V Potential aggregate
 - F Filler (F & F)
 - U Unfilled aggregate
 - A Alluvial fan
 - E Well-sorted sand (facies)
 - M Medium deposit (sandstone, siltstone, etc.)
- AGGREGATE CLASSIFICATION**
- Gravel aggregate**
(at least 20% of aggregate is of size 1/16" to 3/8")
- 1 Gravel: relative clean and sound
 - 2 Gravel: significant fines, decomposed rock, soil in aggregate
- Fill aggregate**
(at least 20% of aggregate is of size 1/16" to 3/8")
- 3 Sand
 - 4 Unclassified Resource
 - 5 Probable aggregate resource
- AGGREGATE**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with over-burden thickness (ft) and underground resource thickness (ft), obtained from well logs
 - Indicator gravel
 - In-situ aggregate available or within prospect
 - U.S. Geological Survey hydrographic and/or other features
 - Boundary boundary, solid where known or observed, dashed where approximate or inferred
- SECTION LOCATION AND TOPOGRAPHIC DESCRIPTION OF SECTION**
- Diagram showing section location and topographic description. Includes symbols for section location (e.g., U3, U4, A3, V3) and topographic features (e.g., contour lines, roads, water features).



Mapped by: Ralph S. Shroba
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



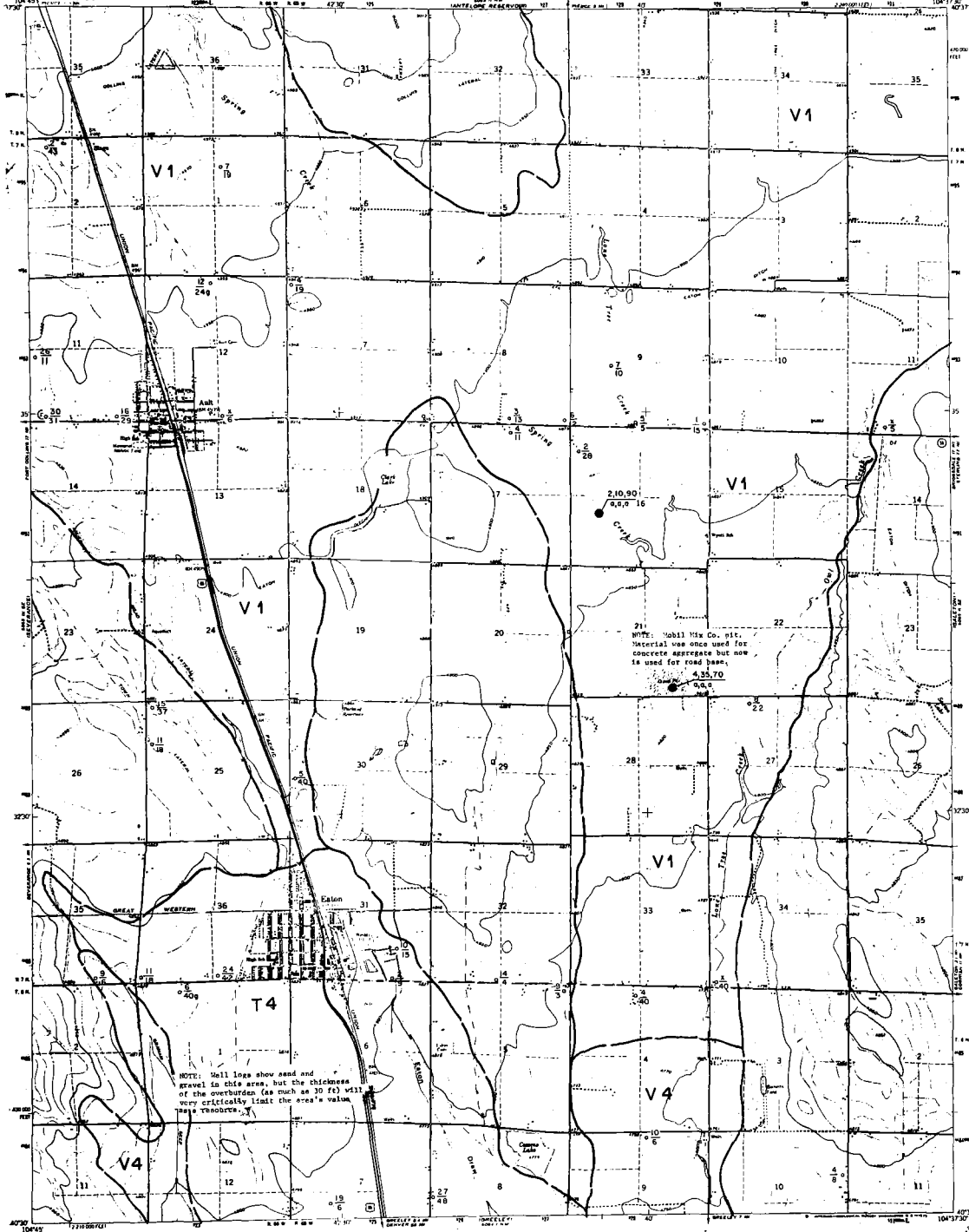
EASTONVILLE COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

EATON QUADRANGLE
 COLORADO-WELD CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. HALL, DIRECTOR



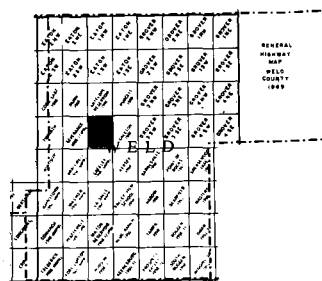
EXPLANATION

- Contour lines
 - Road classification
 - Sand/gravel resources
- AGGREGATE TYPES**
- F Fluvial deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Eolian deposited sand (colluvial)
 - M Man-made deposits (slag, tailings, spoils...)

- AGGREGATE QUANTITIES**
- Color (intensity)*
 (at least 100' indicated on 40' contour, interval 100')
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
 - 3 Sand
 - 4 Probably aggregate resources

- NOT SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) and gravel content (percent) (if) obtained from well logs
 - "*": indicates gravel; "F": indicates sand
 - "x": in symbol denotes unexcavated or unknown property
 - "W": denotes Geotechnological Survey Window/Load and Gravel projects
 - "D": in symbol denotes potential or inferred
 - Location boundary, solid above name or dashed where appropriate or inferred

- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- overburden thickness (ft)
 - undecomposed resource thickness (ft)
 - percent sand and fines (spacing 40' interval, 0.10 U.S. interval estimation)
 - significant amount of fines (spacing 200' interval, 0.010 U.S. or 1.00% interval)
 - significant amount of decomposed or sand rock
 - significant amount of calcium carbonate (indicator)
 - "x" in symbol denotes unexcavated or unknown property
 - "D" in symbol denotes property absent or unexcavated



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

Harshbarger, L.A., and Schneider, F.A., Jr., 1972, Geologic map of the Lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-687.

Went, R. S., 1972, Map of surficial geology of some of the Eaton quadrangles: Reconnaissance map for Colorado Geol. Survey Window Environmental Geology Project, open-file map.

Shelton, D.C., 1994, personal communication.

Geology modified after: Colton, R.S., and Pritch, R.H., 1976, Map showing potential sources of gravel and crushed-rock aggregates in the Boulder-Fort Collins-Orealey Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-655-D.

Mapped by: Stephen D. Schochov
 Date: June 30, 1976

Prepared in cooperation with the
 U. S. Geological Survey

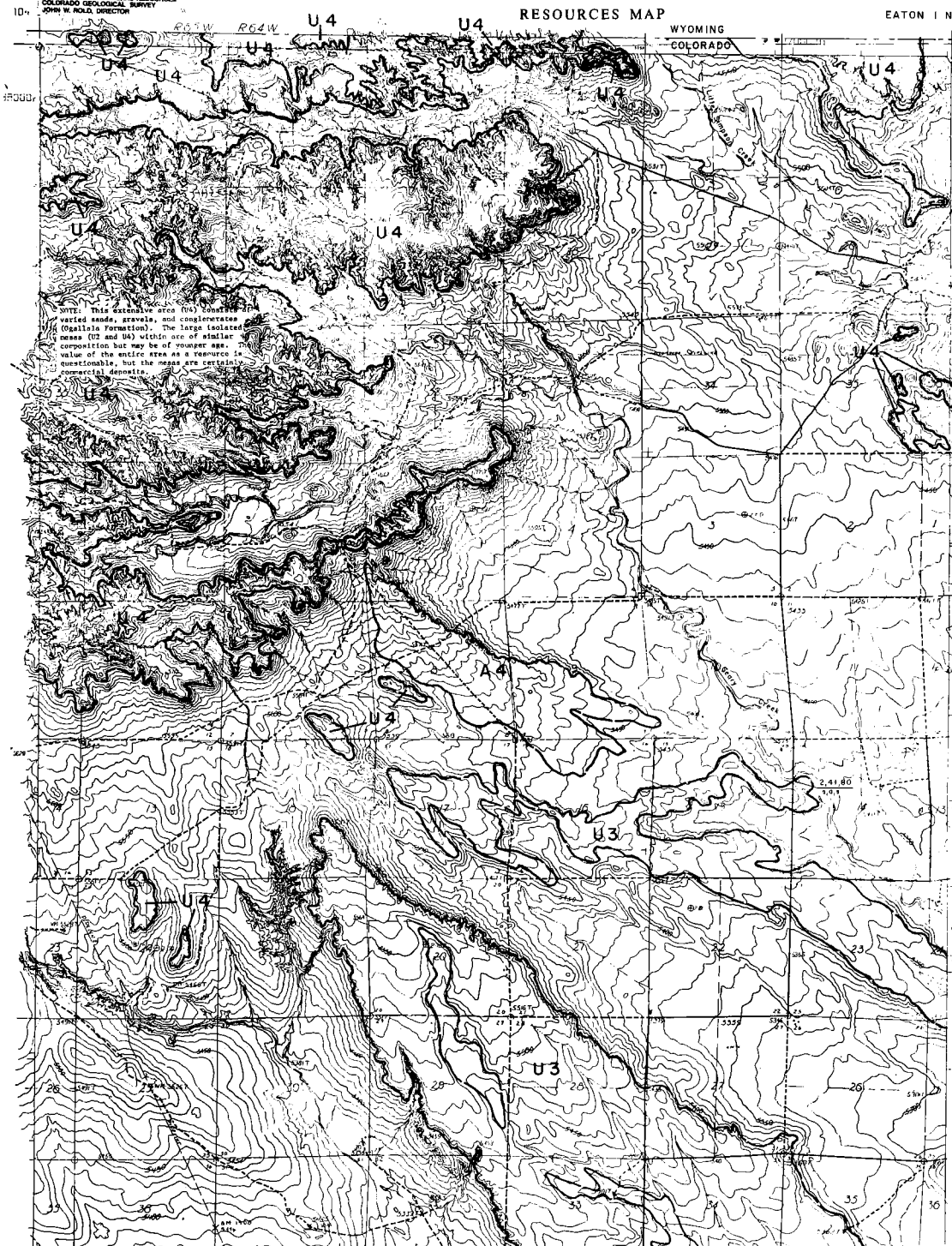
EATON, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. WOLD, DIRECTOR

EATON 1 NE



EXPLANATION

- Landform
- Resource classification
- AGGREGATE TYPES**
 - T Sandstone deposit
 - V Valley fill (F.A.T.)
 - U Unsorted deposits
 - A Alluvial fan
 - E High-impaction sand (medium)
 - M Marine deposits (shale, calcilite, opaline...)
- RESOURCE CLASSIFICATION**
 - Coarse Aggregate** (as listed on schedule on 24 screen, visual estimation)
 - 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcite nodules
 - Fine Aggregate** (screened from No. 20 to No. 40 screen, 100 retained on 100 screen, visual estimation)
 - 3 Sand
 - 4 Possible aggregate resource
- NOT SYMBOLS**
 - Operating sand and/or gravel pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Reconnaissance quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log.
 - "s" indicates gravel; "u" indicates sand
 - "u" in symbol denotes unclassified or abandoned property
 - "m" denotes Colorado Geological Survey hydrographic and cross-section (H.C.S.) hole
 - Leads to boundary, solid where known or dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
 - Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Percent sand and fines (based on screen, 0.075 in., visual estimation)
 - Significant amount of fines (based on 100 screen, 0.075 in. or 0.075 mm.)
 - Significant amount of decomposed or weak rock
 - Significant amount of siliceous materials (silica)
 - "u" in symbol denotes unclassified or abandoned property
 - "s" in symbol denotes properly sorted or calcite-free



QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
 Loney, H.E., and Crist, W.A., 1967, Geology and ground-water resources of Larimer County, Wyoming; U.S. Geol. Survey Water-Supply Paper 1834, pl. 1.
 Matz, W.C., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgwick, and Weld Counties, Colo.; U.S. Geol. Survey Water-Supply Paper 1809-A, pl. 1.
 Denoon, H.M., 1974, personal communication.
 Mapped by: Stephen D. Schuchow
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle R65W
 T84N11E

ROAD CLASSIFICATION
 Primary highways: Light-duty road, hard or hard surface
 Secondary highways: Improved surface
 Unimproved road
 Interstate Route U.S. Route State Route

FOUR INTERVAL 10 FEET

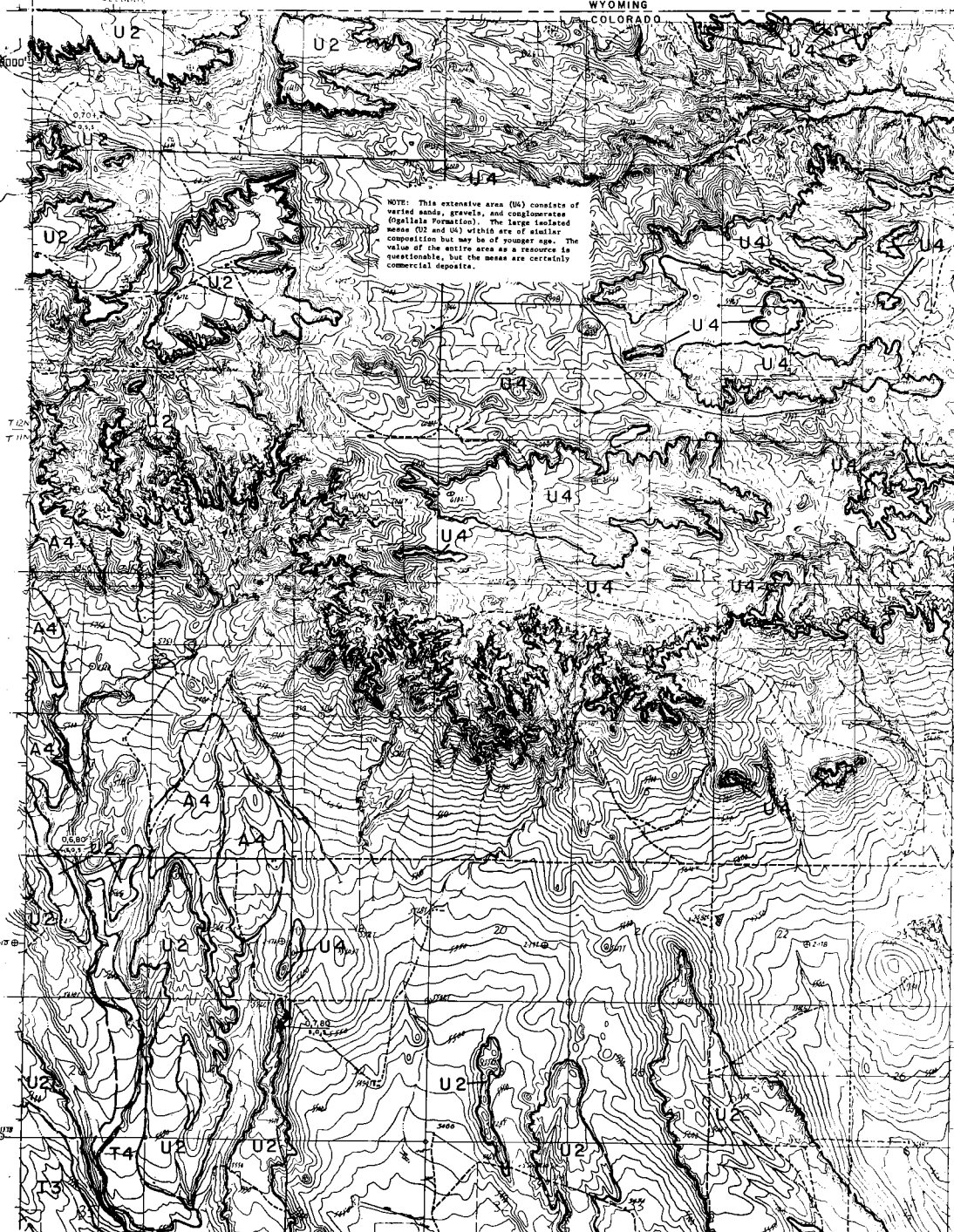
SAND, GRAVEL AND QUARRY AGGREGATE

EATON 1 NW

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. ROLD, DIRECTOR

R 66 W R 65 N

RESOURCES MAP
 WYOMING
 COLORADO



NOTE: This extensive area (U4) consists of varied sands, gravels, and conglomerates (Opalilla Formation). The large isolated mesas (U2 and U4) within are of similar composition but may be of younger age. The value of the entire area as a resource is questionable, but the mesas are certainly commercial deposits.

EXPLANATION

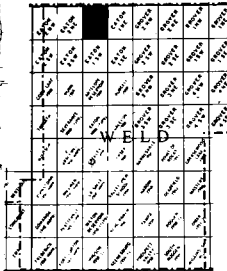
Landform units
 Resource class/location

- LANDFORM UNITS**
- F Fluvial/terrace deposit
 - T Stream terrace deposit
 - V Valley fills (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Manmade deposits (slag, tailings, spoils, ...)

- RESOURCE CLASSIFICATION**
- Gravel Aggregate**
 (at least 20% retained on #4 screen, 100% retention)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, tabular carbonate
- Fill Aggregate**
 (greater than 75% passing #4 screen, 100% retained on #10 screen, usual definition)
- 3 Sand
 - 4 Probable aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource area
 - Selected well or stratigraphic location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - " " indicates gravel; " " indicates sand
 - " " in symbol denotes unevaluated or unknown gravel
 - " " denotes Colorado Geological Survey landward and stream-ward drill hole
 - Landform boundary, solid where known or dashed where approximate or inferred

- UNIT, LOCATION AND GEOLOGICAL CLASSIFICATION OF REPORT**
- overburden thickness (ft)
 - underground resource thickness (ft)
 - gravel and fines (passing #4 screen, # 20 to 1, usual definition)
 - significant amount of fines (passing #100 screen, # 20 to 1, or # 100 mesh)
 - significant amount of decomposed or weak rock
 - " " in symbol denotes unevaluated or unknown gravel
 - " " in symbol denotes property absent or unexplored



QUADRANGLE LOCATION
 NON-RESOURCE OR WYTHDRAWN AREA

REFERENCE:

Lowry, H.E., and Crist, H.A., 1967, Geology and ground-water resources of Larimer County, Wyoming; U. S. Geol. Survey Water-Supply Paper 1834, pl. 1.

Denagy, H.W., 1974, personal communication.

Wiest, W.G., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgewick, and Weld Counties, Colo.; U. S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

Mapped by: Stephen D. Schuchow
 Date: June 30, 1974

- ROAD CLASSIFICATION**
- Primary highway: hard surface
 - Secondary highway: hard surface
 - Light-duty road: hard or improved surface
 - Unimproved road
 - Interstate Route
 - U. S. Route
 - State Route

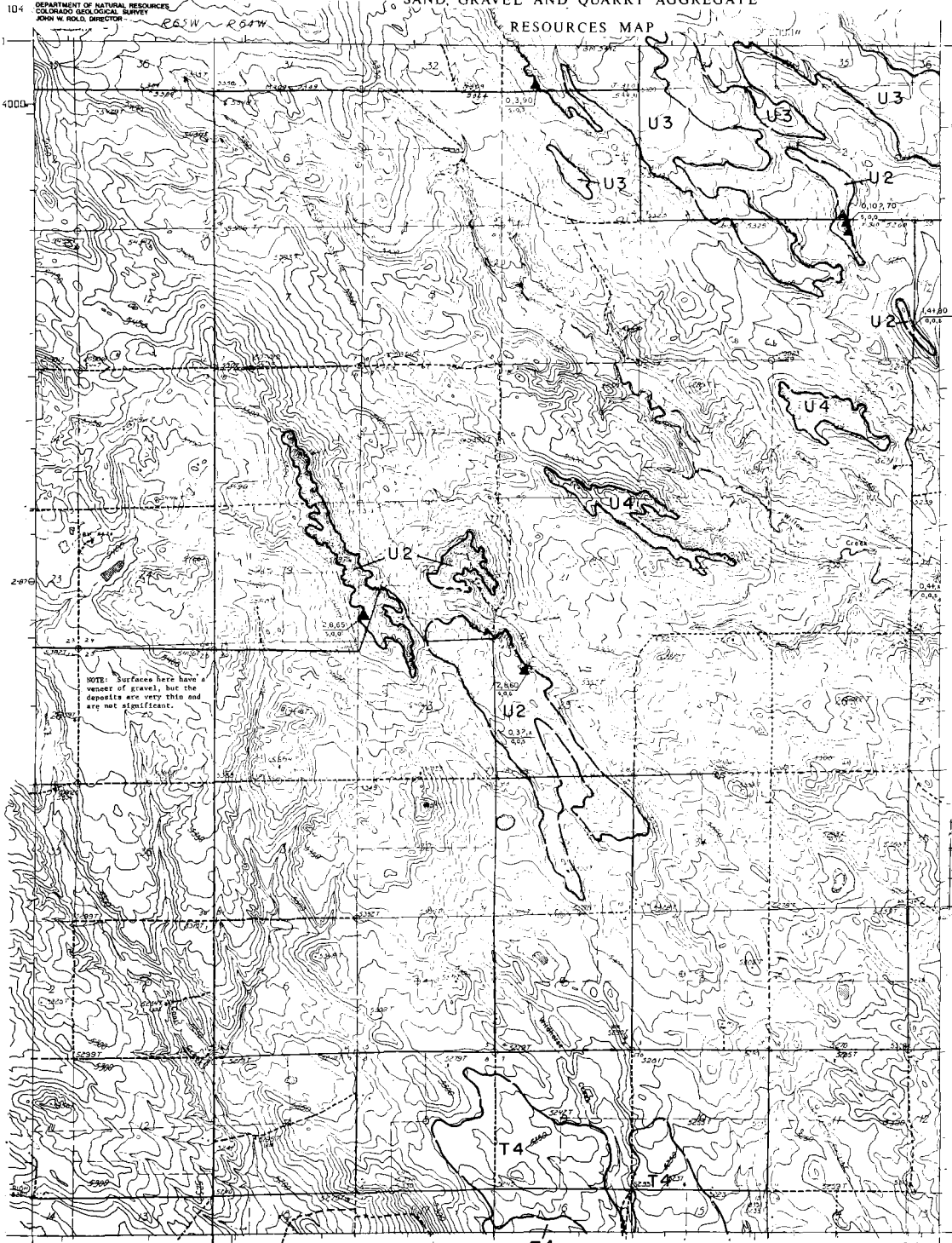
CONTOUR INTERVAL 10 FEET

27100001
 Base from U. S. Geological Survey
 7-1/2 minute quadrangle

EATON 1 NW (03) (01)

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

EATON 15E



EXPLANATION

- Location well
Landscape/Stream/Fluvium
- LITHOLOGIC UNIT**
- T Tertiary deposit
 - T Terrace terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Sand-deposit and faulted
 - M Non-mine deposits (slag, tailings, opels...)

- RESOURCE CLASSIFICATION**
- Class 1 Aggregate**
1. 100% to 100% sand, 0 to 40% gravel, 0 to 10% fines
(Small aggregate)
- 1 Gravel: relatively clean and round
 - 2 Gravel: angular, fine, decomposed rock, calcium carbonate
- Class 2 Aggregate**
1. 100% to 100% sand, 0 to 40% gravel, 0 to 10% fines
(Medium aggregate)
- 3 Sand

PROBABLE RESOURCES

- 4 Probable aggregate resource

MAP SYMBOLS

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Selected well or drill-hole location with measured thickness (ft) over sand/gravel resource thickness (ft), distance from well legs
- "*" indicates gravel; "o" indicates sand
- "?" in symbol denotes unclassified or unknown property
- "W" indicates geological survey underway and/or project
- "WELL" indicates well
- Landscape boundary, solid where known or inferred
- Stream, dashed where approximate or inferred

STATUS, LOCATION AND GEOLOGICAL DESCRIPTION OF RESOURCES

Resource ID	Resource Name	Resource Type	Resource Status	Location	Geological Description
U2-1	Upland deposit	Gravel	Operating
U3-1	Upland deposit	Gravel	Operating
U4-1	Upland deposit	Gravel	Operating
T4-1	Tertiary deposit	Sand	Operating

- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WETLAND AREA

Mapped by: Stephen D. Schwabach
Date: June 30, 1974

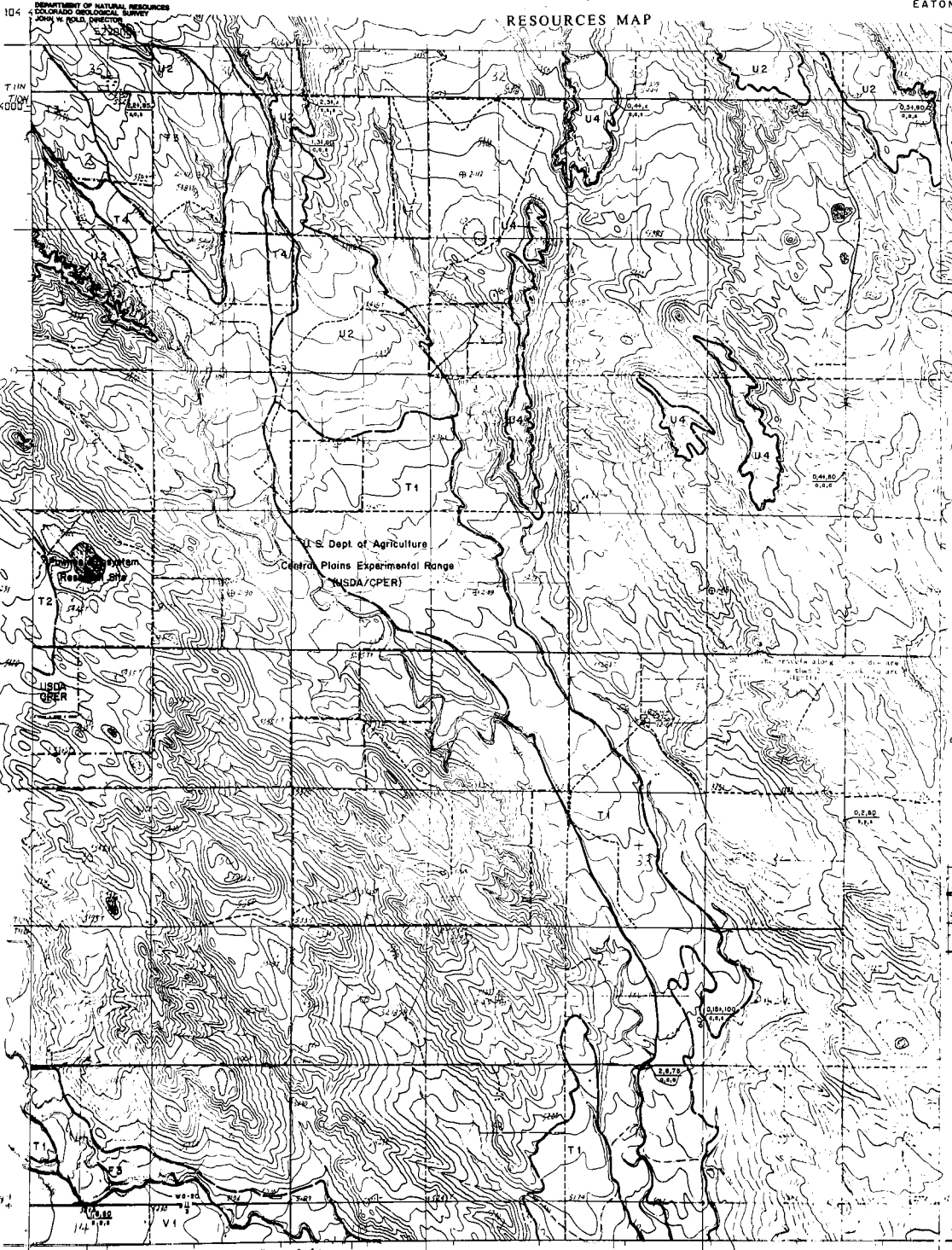
Base from U. S. Geological Survey
7-1/2 minute quadrangle

- ROAD CLASSIFICATION**
- Primary highway
 - Hard surface
 - Secondary highway
 - Hard surface
 - Unimproved road
 - Interstate Route
 - U. S. Route
 - State Route
 - Light duty road, hard or improved surface

EATON 15E (08) COLO

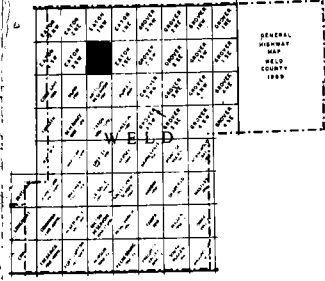
SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

EATON 1 SW



EXPLANATION

- LANDFORMS**
- # Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Erosional land (alluvial)
 - M Marine deposits (e.g., caliche, spalls...)
- ROCK CLASSIFICATION**
- Gravel deposits**
(as defined on 1:50,000 scale, unless otherwise noted)
- 1 Gravel: relatively clean and round
 - 2 Gravel: significant fines, decomposed rock, matrix of sand
- Fine aggregate**
(as defined on 1:50,000 scale, unless otherwise noted)
- 3 Sand
 - 4 Probable aggregate resource
- UNCLASSIFIED RESOURCE**
- 5
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Remnant quarry aggregate resource area
 - Detected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "I" indicates gravel; "S" indicates sand
 - "*" in symbol denotes unclassified or unknown property
 - "**" denotes Colorado Geological Survey (Colorado State and Great projects) drill hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- EXTENT, LOCATION AND ORIENTATIONAL DIRECTION OF REPORT**
- overburden thickness (ft)
 - unclassified resource thickness (ft)
 - percent sand and fines (spacing of percent, 0.25 in., usual estimation)
 - unclassified amount of fines (spacing 100 percent, 0.25 in., or 0.075 in.)
 - significant amount of decomposed or weak rock
 - significant amount of alluvium (normally includes)
 - "*" in symbol denotes unclassified or unknown property
 - "**" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
Bavister, L.A., and Schneider, F.A., Jr., 1972, Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Inv. Map T-487.

U.S.D.A., Patuxent Site
Ecosystem Research Headquarters, Map

Mapped by: Stephen D. Schwachow
Date: June 30, 1974

Base from U. S. Geological Survey
7 1/2 minute quadrangle

CONTOUR INTERVAL 10 FEET

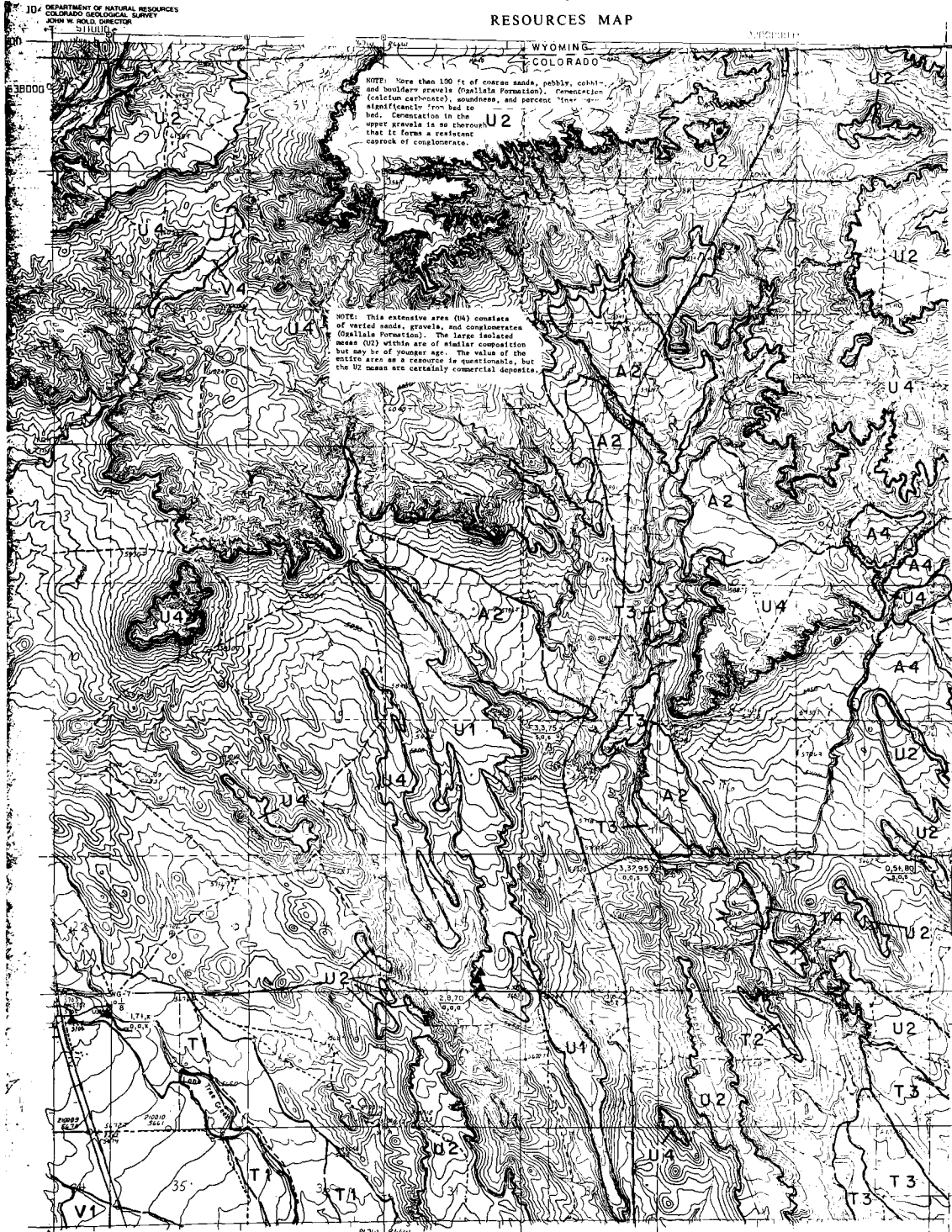
ROAD CLASSIFICATION

- Primary highway, hard surface
- Light duty road, hard or improved surface
- Secondary highway, hard surface
- Unimproved road
- Interstate Route
- U. S. Route
- State Route

EATON 1 SW 10/1

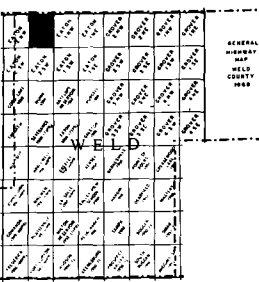
SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

EATON 2 NE



EXPLANATION

- LEGEND**
- Flowline deposit
 - Stream terrace deposit
 - Valley fill (P & T)
 - U Unal deposits
 - A Alluvial fan
 - E Sand-silted sand (colluvial)
 - M Man-made deposits (land-castings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- Gravel resources**
(at least 100 feet on 40 acres, usual aggregate)
- 1 Gravel: relatively clean and sand
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- Fine aggregate**
(at least 100 feet on 40 acres, 20% retained on #200 sieve, usual aggregate)
- 3 Sand
 - 4 Probable aggregate resource
- ROAD SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- Selected well or drill-hole location with measured thickness (ft) over sand/gravel thickness (ft); obtained from well logs. "U" indicates "U" in symbol denotes unmineralized or unknown property. "M" symbol denotes biological survey material and Great projects. Well logs. Landform boundary, solid where known or inferred, dashed where approximate or inferred.
- STATION, LOCATION AND ORIENTAL SPECIFICATION OF BOREHOLE**
- Numbered thickness (ft)
 - measured thickness (ft)
 - percent sand and fines (using #200 sieve, at 10 in. visual estimate)
- Significant amount of fines (using #200 sieve, at 10 in. or 0.075 mm.)
- Significant amount of medium sandstone (species)
- "U" symbol denotes unmineralized or unknown property.
- "M" symbol denotes biological survey material and Great projects.



QUADRANGLE LOCATION

NON-RESOURCE OR WITHHELD AREA

REFERENCE:
Lowry, R.E., and Crist, N.A., 1967, Geology and ground-water resources of Larade County, Wyoming. U. S. Geol. Survey Water-Supply Paper 1634, pl. 1.
Damon, N.M., 1974, personal communication.
Weist, V.G., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgewick, and Weld Counties, Colorado. U. S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

Mapped by: Stephen D. Schwachow
Date: June 30, 1974

- ROAD CLASSIFICATION**
- Primary highway: light gray road, hard or improved surface
 - Secondary highway: light gray road, hard surface
 - Unimproved road: dashed line
 - Interstate Route: double line with red and blue
 - U.S. Route: line with red and blue
 - State Route: line with red and blue

U.S. DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLS, DIRECTOR

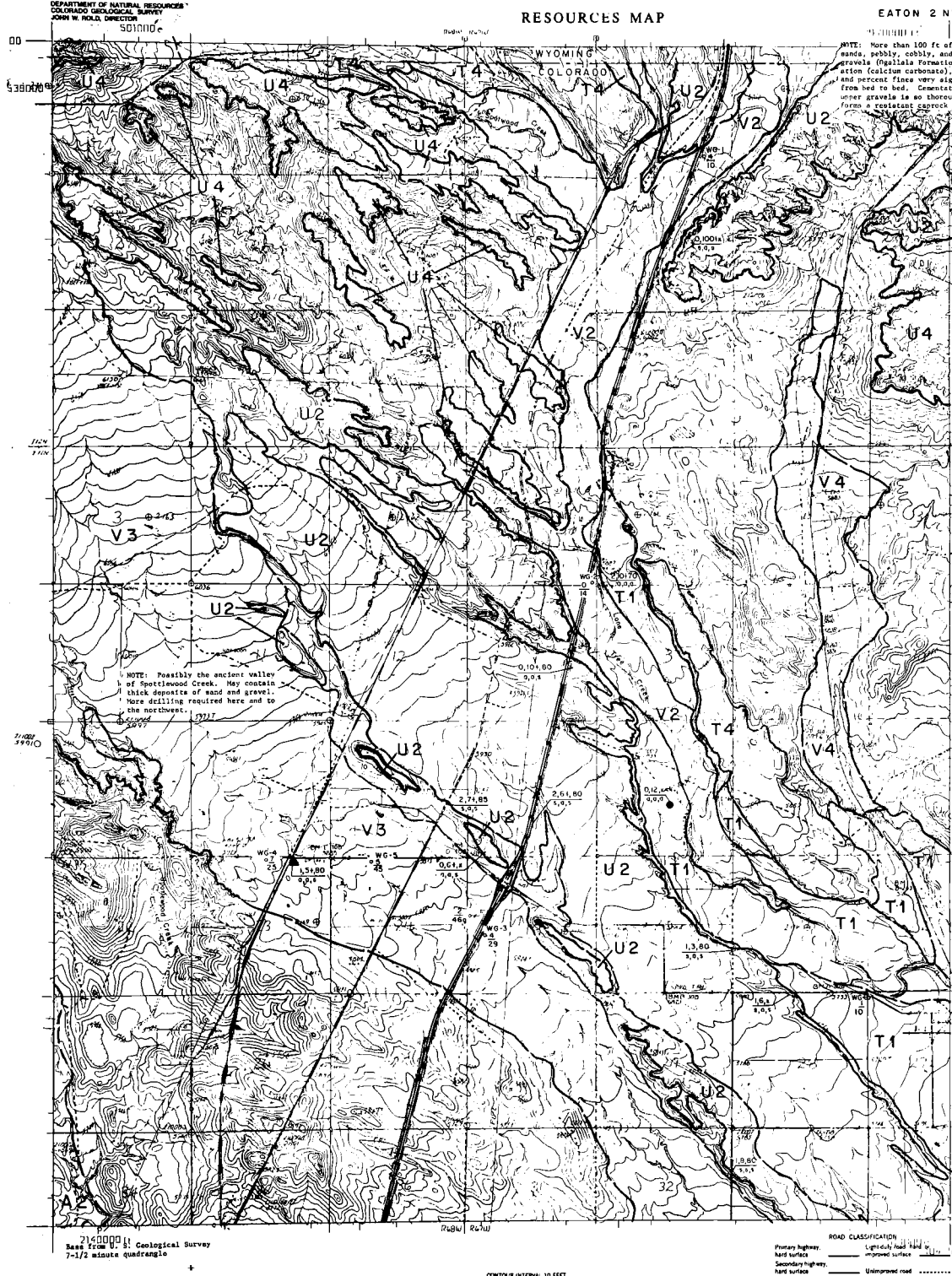
Base from U. S. Geological Survey 2180000 1:1
7-1/2 minute quadrangle

CONTOUR INTERVAL 10 FEET

EATON 2NE 102 COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

EATON 2 NW



NOTE: More than 100 ft of coarse sand, pebbly, tabular, and bouldery gravels (Gallala Formation), cementation (calcium carbonate), roundedness, and percent fines vary significantly from bed to bed. Cementation in the upper gravels is so thorough that it forms a resistant caprock of conglomerate.

EXPLANATION

- Floodplain deposit
- Stream terrace deposit
- Valley fill (F & T)
- Alluvium
- Alluvial fan
- Wind-deposited sand (eolian)
- Non-sand deposits (silts, shales, etc.)

- RESOURCE CLASSIFICATION**
- 1** Gravel: relatively clean and sand, calcium carbonate.
 - 2** Gravel: significant fines, decomposed rock.
 - 3** Sand
 - 4** Probable aggregate resource
- HP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating coniques quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- Location well or drill-hole location with upper-lithology thickness (ft) and gravel resource thickness (ft), obtained from well logs:**
- "U" indicates gravel, "T" indicates sand
 - "I" in symbol denotes unclassified or unknown gravels
 - "C" denotes Colorado Geological Survey "Detailed and Core" projects
 - "B" indicates location of boundary, solid where known or dashed where approximate or inferred

LOCATION, LOCATOR AND GEOLOGICAL SYMBOLS OF BORES:

- Overburden thickness (ft)
- Sandstone thickness (ft)
- Percent sand and fines (percent) and fines spacing (ft)
- Percent gravel, sandstone reduction
- Significant amount of fines (percent)
- Significant amount of decomposed or weak rock
- Significant amount of vesicular carbonaceous facies
- Non-sandstone unclassified or unknown gravels
- Non-sandstone property, absent or unknown

GENERAL HIGHWAY MAP																																																																																																																																																																																																																																																	
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <table border="1" style="width: 100%; height: 150px; font-size: 8px;"> <tr><td>U4</td><td>U3</td><td>U2</td><td>U1</td><td>U0</td></tr> <tr><td>V4</td><td>V3</td><td>V2</td><td>V1</td><td>V0</td></tr> <tr><td>T4</td><td>T3</td><td>T2</td><td>T1</td><td>T0</td></tr> <tr><td>S4</td><td>S3</td><td>S2</td><td>S1</td><td>S0</td></tr> <tr><td>R4</td><td>R3</td><td>R2</td><td>R1</td><td>R0</td></tr> <tr><td>Q4</td><td>Q3</td><td>Q2</td><td>Q1</td><td>Q0</td></tr> <tr><td>P4</td><td>P3</td><td>P2</td><td>P1</td><td>P0</td></tr> <tr><td>O4</td><td>O3</td><td>O2</td><td>O1</td><td>O0</td></tr> <tr><td>N4</td><td>N3</td><td>N2</td><td>N1</td><td>N0</td></tr> <tr><td>M4</td><td>M3</td><td>M2</td><td>M1</td><td>M0</td></tr> <tr><td>L4</td><td>L3</td><td>L2</td><td>L1</td><td>L0</td></tr> <tr><td>K4</td><td>K3</td><td>K2</td><td>K1</td><td>K0</td></tr> <tr><td>J4</td><td>J3</td><td>J2</td><td>J1</td><td>J0</td></tr> <tr><td>I4</td><td>I3</td><td>I2</td><td>I1</td><td>I0</td></tr> <tr><td>H4</td><td>H3</td><td>H2</td><td>H1</td><td>H0</td></tr> <tr><td>G4</td><td>G3</td><td>G2</td><td>G1</td><td>G0</td></tr> <tr><td>F4</td><td>F3</td><td>F2</td><td>F1</td><td>F0</td></tr> <tr><td>E4</td><td>E3</td><td>E2</td><td>E1</td><td>E0</td></tr> <tr><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr> <tr><td>C4</td><td>C3</td><td>C2</td><td>C1</td><td>C0</td></tr> <tr><td>B4</td><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr> <tr><td>A4</td><td>A3</td><td>A2</td><td>A1</td><td>A0</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table> </div> <div style="width: 45%;"> <table border="1" style="width: 100%; height: 150px; font-size: 8px;"> <tr><td>U4</td><td>U3</td><td>U2</td><td>U1</td><td>U0</td></tr> <tr><td>V4</td><td>V3</td><td>V2</td><td>V1</td><td>V0</td></tr> <tr><td>T4</td><td>T3</td><td>T2</td><td>T1</td><td>T0</td></tr> <tr><td>S4</td><td>S3</td><td>S2</td><td>S1</td><td>S0</td></tr> <tr><td>R4</td><td>R3</td><td>R2</td><td>R1</td><td>R0</td></tr> <tr><td>Q4</td><td>Q3</td><td>Q2</td><td>Q1</td><td>Q0</td></tr> <tr><td>P4</td><td>P3</td><td>P2</td><td>P1</td><td>P0</td></tr> <tr><td>O4</td><td>O3</td><td>O2</td><td>O1</td><td>O0</td></tr> <tr><td>N4</td><td>N3</td><td>N2</td><td>N1</td><td>N0</td></tr> <tr><td>M4</td><td>M3</td><td>M2</td><td>M1</td><td>M0</td></tr> <tr><td>L4</td><td>L3</td><td>L2</td><td>L1</td><td>L0</td></tr> <tr><td>K4</td><td>K3</td><td>K2</td><td>K1</td><td>K0</td></tr> <tr><td>J4</td><td>J3</td><td>J2</td><td>J1</td><td>J0</td></tr> <tr><td>I4</td><td>I3</td><td>I2</td><td>I1</td><td>I0</td></tr> <tr><td>H4</td><td>H3</td><td>H2</td><td>H1</td><td>H0</td></tr> <tr><td>G4</td><td>G3</td><td>G2</td><td>G1</td><td>G0</td></tr> <tr><td>F4</td><td>F3</td><td>F2</td><td>F1</td><td>F0</td></tr> <tr><td>E4</td><td>E3</td><td>E2</td><td>E1</td><td>E0</td></tr> <tr><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr> <tr><td>C4</td><td>C3</td><td>C2</td><td>C1</td><td>C0</td></tr> <tr><td>B4</td><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr> <tr><td>A4</td><td>A3</td><td>A2</td><td>A1</td><td>A0</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table> </div> </div>		U4	U3	U2	U1	U0	V4	V3	V2	V1	V0	T4	T3	T2	T1	T0	S4	S3	S2	S1	S0	R4	R3	R2	R1	R0	Q4	Q3	Q2	Q1	Q0	P4	P3	P2	P1	P0	O4	O3	O2	O1	O0	N4	N3	N2	N1	N0	M4	M3	M2	M1	M0	L4	L3	L2	L1	L0	K4	K3	K2	K1	K0	J4	J3	J2	J1	J0	I4	I3	I2	I1	I0	H4	H3	H2	H1	H0	G4	G3	G2	G1	G0	F4	F3	F2	F1	F0	E4	E3	E2	E1	E0	D4	D3	D2	D1	D0	C4	C3	C2	C1	C0	B4	B3	B2	B1	B0	A4	A3	A2	A1	A0											U4	U3	U2	U1	U0	V4	V3	V2	V1	V0	T4	T3	T2	T1	T0	S4	S3	S2	S1	S0	R4	R3	R2	R1	R0	Q4	Q3	Q2	Q1	Q0	P4	P3	P2	P1	P0	O4	O3	O2	O1	O0	N4	N3	N2	N1	N0	M4	M3	M2	M1	M0	L4	L3	L2	L1	L0	K4	K3	K2	K1	K0	J4	J3	J2	J1	J0	I4	I3	I2	I1	I0	H4	H3	H2	H1	H0	G4	G3	G2	G1	G0	F4	F3	F2	F1	F0	E4	E3	E2	E1	E0	D4	D3	D2	D1	D0	C4	C3	C2	C1	C0	B4	B3	B2	B1	B0	A4	A3	A2	A1	A0										
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QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

- Lowry, M.E., and Crist, M.A., 1967. Geology and ground-water resources of Larimer County, Wyoming; U. S. Geol. Survey Water-Supply Paper 1634, pl. 1.
- Noore, P.E., 1959. Geographic evolution of the east flank of the Larimer Range, Colorado and Wyoming; Univ. Wyoming Pub. Ph. D. Thesis, pl. 4.
- Denson, H.M., 1974. personal communication.
- Weist, H.C., Jr., 1965. Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedwick, and Walz Counties, Colo.; U. S. Geol. Survey Water-Supply Paper 1809-I, pl. 1.

Mapped by: Stephen D. Schochow
Date: June 30, 1974

714,000 Scale from U. S. Geological Survey 7-1/2 minute quadrangle

CONTOUR INTERVAL, 10 FEET

ROAD CLASSIFICATION

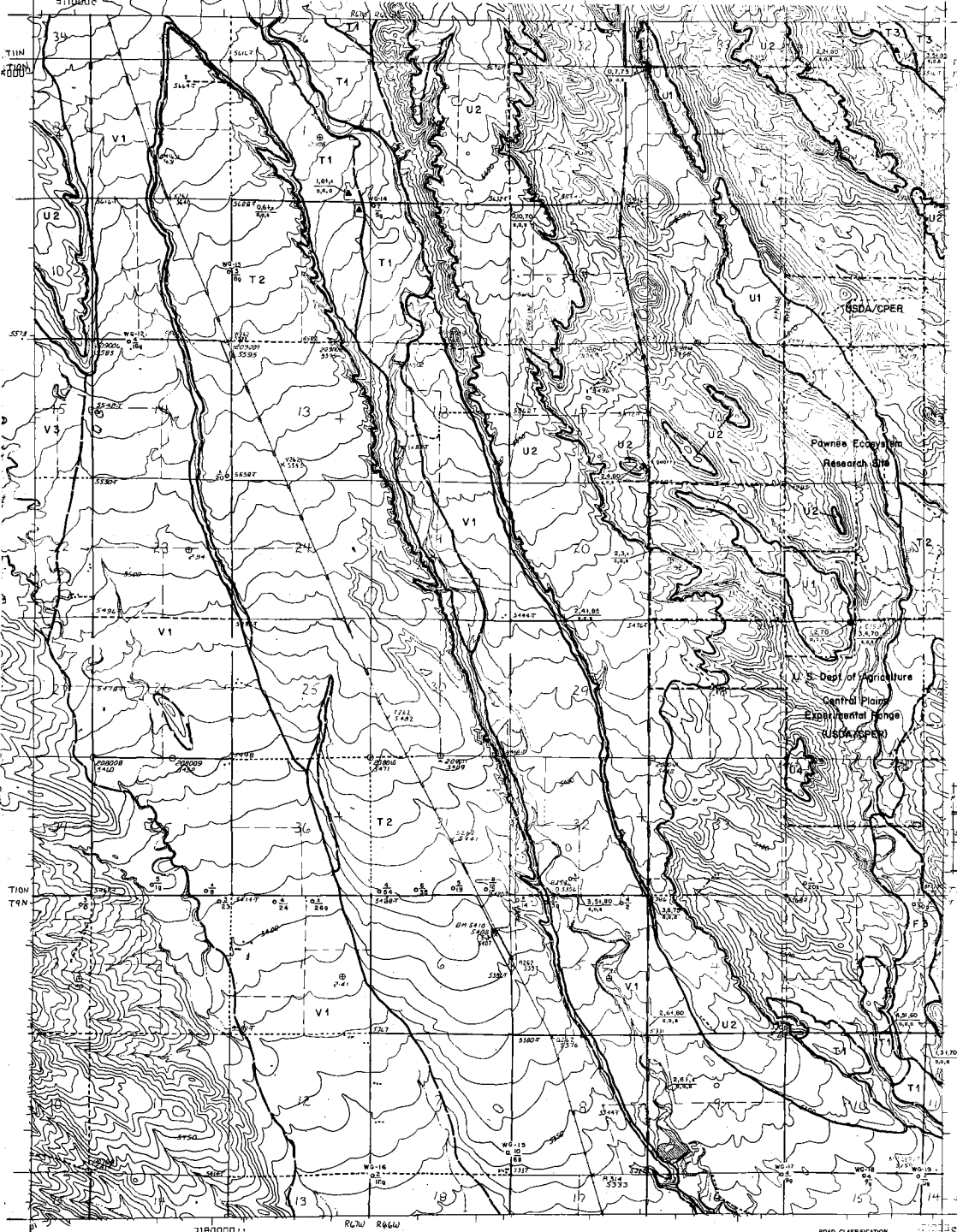
- Primary highway, hard surface
- Light duty road, hard or improved surface
- Secondary highway, hard surface
- Unimproved road
- Interstate Route
- U. S. Route
- State Route

EATON 2 NW (04) COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

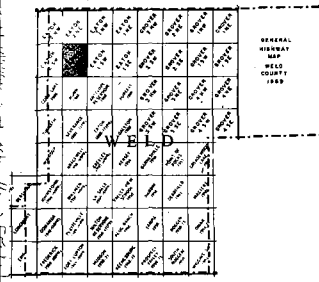
EATON 2 SE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOGG, DIRECTOR
5119DC



EXPLANATION

- Landform units**
Resource classification
- ROADS**
- F Fossilized deposit
 - T Screen surface deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E High-dispersal sand (swell)
 - M Marginal deposits (slag, tailings, spalls...)
- RESOURCE CLASSIFICATION**
- Conglomerate**
For sand and gravel on 84 acres, visual estimation
- 1 Gravel: relatively clean and good
 - 2 Gravel: significant fines, decomposed rock, calcite cementation
- Fill aggregate**
Types: 100% sand; 84 acres, 80% retained on 200 screen, visual estimation
- 3 Sand
 - 4 Probable aggregate resource
- Quarry Symbols**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Resource or potential resource area
 - Selected well or desirable location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "T" indicates gravel; "S" indicates sand
 - "*" in symbol denotes unutilized or unknown property
 - "**" denotes Colorado Geological Survey Vitrinite and gravel analysis of soil
 - Landform boundary, mild where shown or observed; dashed where approximate or inferred
- FLUORIDE LOCATION AND BIOLOGICAL RESERVATION SYMBOLS**
- overburden thickness (ft)
 - potential resource thickness (ft)
 - potential sand and fines spacing at screen, 2.00 in., visual estimation
 - ft/ft (ft/ft) amount of fines (spacing 2.00 screen, 2.00 in., or 0.875 in.)
 - ft/ft (ft/ft) amount of material suitable (in situ)
 - "*" in symbol denotes unutilized or unknown property
 - ** in symbol denotes property owned or leased/leased



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

Berkey, L.A., and Schneider, P.A., Jr., 1972. Geologic map of the Lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-687.

U.S.D.A. Pawnee Site Ecosystem Research Headquarters, map.

Maped by: Stephen D. Schwachow
Date: June 30, 1974

- ROAD CLASSIFICATION**
- Primary highway, hard surface
 - Light-duty road, hard or improved surface
 - Secondary highway, hard surface
 - Unimproved road
 - Interstate Route
 - U.S. Route
 - State Route

EATON 2SE (06) COLO

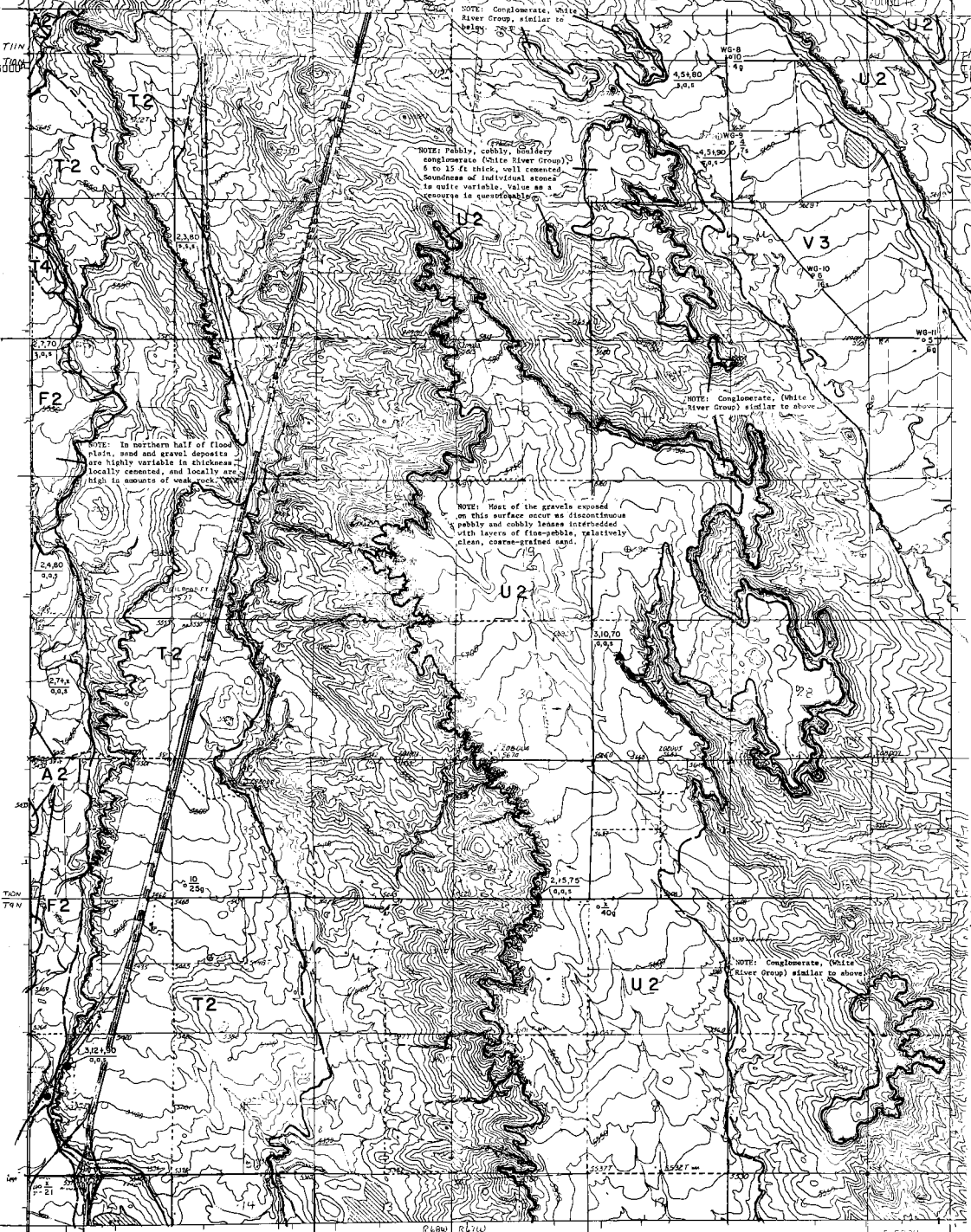
Base from U. S. Geological Survey
7-1/2 minute quadrangle

CONTOUR INTERVAL 10 FEET

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

EATON 25W

105 DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- CONTOUR UNIT
Resource Classification
- LANDFORMS**
- F Floodplain deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M (slag, tailings, spilla...)
- RESOURCE CLASSIFICATION**
- Gravel Aggregate**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- Fill Deposits**
- 1 "Poor" fill: 75% passing #10 screen, 0% or more on #20 screen, visual estimation
 - 2 Sand
- Overvalued Resource**
- 4 Possible aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or discharge location with overburden thickness (ft) over underlying resource thickness (ft) obtained from well logs
 - "g" indicates gravel; "s" indicates sand
 - "*" in symbol denotes unvaluated or unknown property
 - "w" denotes Colorado Geological Survey unvaluated and gravel producer's drill hole
 - Landform boundary, with name or elevation, listed where appropriate or indicated.
- SYMBOL, LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - selected well and flow (passing #10 screen, 0-20 ft., visual estimation)
 - significant amount of fines (passing #10 screen, 0-20 ft., visual estimation)
 - significant amount of calcium carbonate (eolian)
 - significant amount of decomposed or used rock
 - significant amount of calcium carbonate (eolian) without property
 - "*" in symbol denotes property absent or Unval./Unkn.



QUADRANGLE LOCATION

NON-RESOURCE OR WILDERNESS AREA

REFERENCE:

Areas of conglomerate outcrop depicted in part from Newberry, L.H., and Schneider, P.J., Jr., 1974, Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-487.

Mapped by: Stephen D. Schwachow
Date: June 30, 1974

ROAD CLASSIFICATION

Primary highway, hard surface

Lightly used hard surface

Secondary highway, hard surface

Unimproved road

Interstate Route

U.S. Route

State Road

Published by: Colorado Geological Survey
Base from U. S. Geological Survey
7 1/2 minute quadrangle

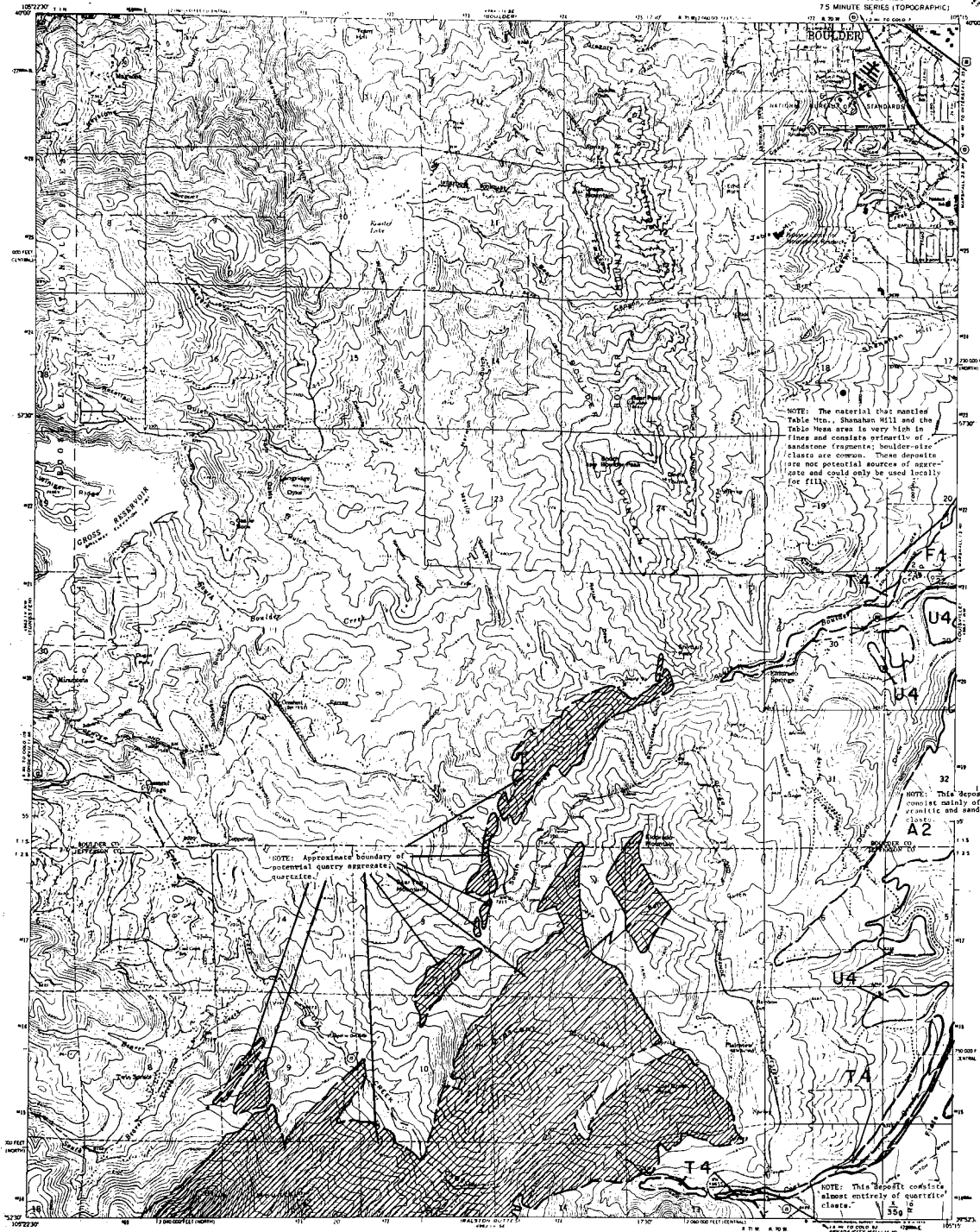
CONTOUR INTERVAL 10 FEET

EATON 25W 1051 COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

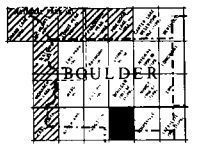
ELDORADO SPRINGS QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
7 1/2 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYLAND, DIRECTOR



EXPLANATION

- CONTOUR INTERVAL**
— Contour interval, 40 feet
- LANDFORM UNITS**
- F Floodplain deposit
 - T Terrace terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Non-deposited sand (alluvial)
 - M Non-made deposits (slag, tailings, spalls, etc.)
- AGGREGATE CLASSIFICATION**
- GRAVEL AGGREGATE**
(See map for percentage of gravel content, based on actual analysis)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, accompanied sand, calcareous carbonate
- FINE AGGREGATE**
(Percentage of fines based on actual analysis, 2% retained on #20 screen, 100% retained on #100 screen, 100% retained on #200 screen, 100% retained on #400 screen, 100% retained on #600 screen, 100% retained on #800 screen, 100% retained on #1000 screen)
- 3 Sand
 - 4 Probable aggregate resource
- QUARRY TYPES**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- NOTE:** Material that mantled Table Mtn., Shanahan Hill and the Table Mountain area is very rich in fines and consists primarily of sandstone fragments; boulder-size clasts are common. These deposits are not potential sources of aggregate and could only be used locally for fill.
- NOTE:** This deposit consists mainly of quartzitic and sandstone clasts.
- NOTE:** This deposit consists almost entirely of quartzitic clasts.
- RELATION, LOCATION AND CHARACTERIZATION OF AGGREGATE**
- indicates existence (if)
 - indicates resource thickness (if)
 - indicates sand and fines (grading as shown, 0-25 in.), actual collection
 - indicates amount of fines (grading as shown, 0-25 in., or 0-25 in.)
 - indicates amount of sandstone or sand rock
 - indicates amount of calcareous sandstone (inches)
 - "x" in symbol denotes unsuitable or unknown property
 - "o" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

REFERENCES:

Cham, C.E., and McGonaghy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-721.

Trumble, D.E., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range-South Colorado, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map 1-756-A.

Geology modified after:

Wells, J.D., 1965, Preliminary Geologic Map of the Eldorado Springs Quadrangle, Boulder and Jefferson Counties, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-383.

Geology modified after:

Carthur, M.E., 1969, Preliminary report on the engineering geology of the Eldorado Springs Quadrangle, Boulder and Jefferson Counties, Colorado: U. S. Geol. Survey Open-File Report.

Mapped by: Ralph R. Shroba
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.



ROAD CLASSIFICATION

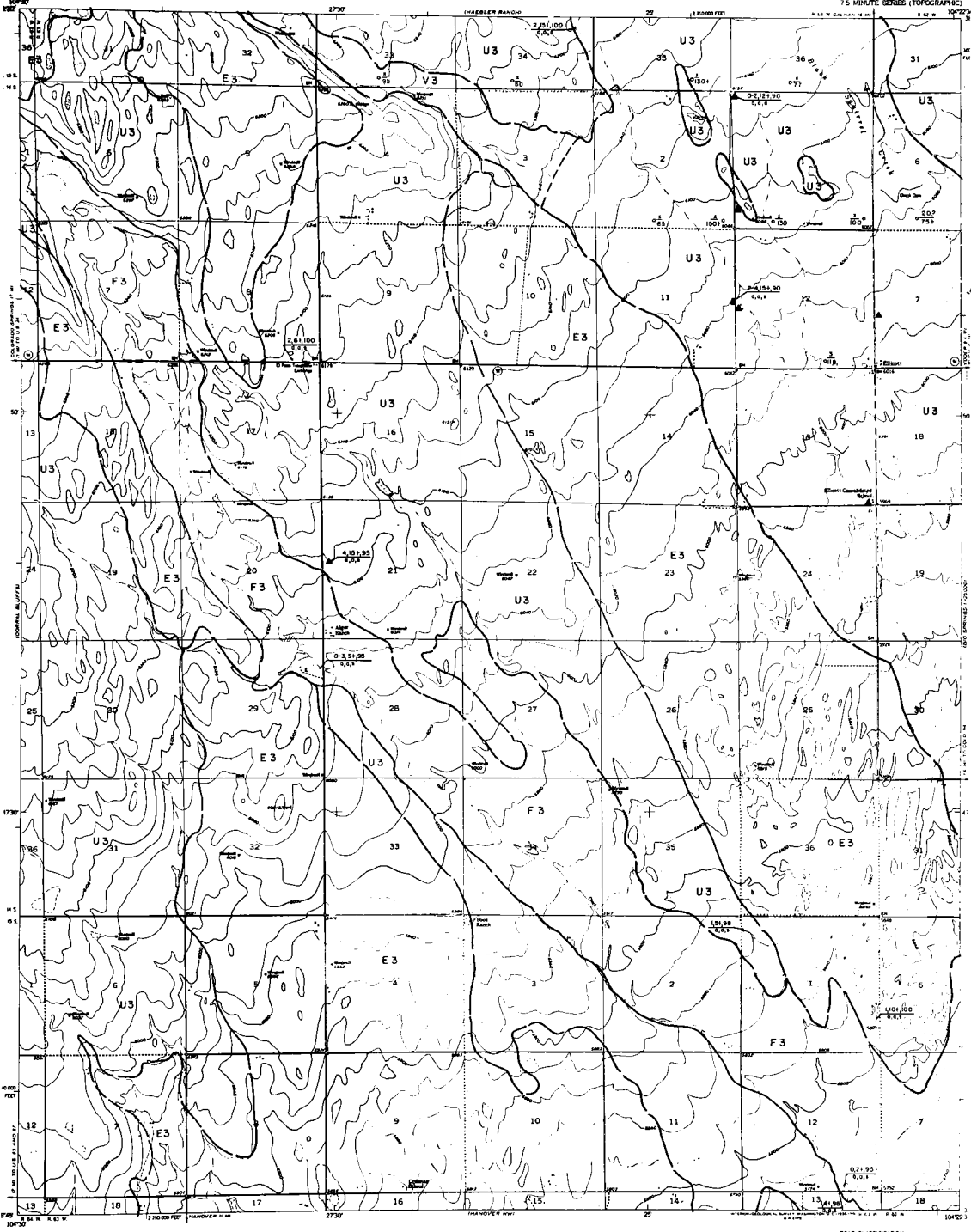
- Heavy-duty
- Medium-duty
- Light-duty
- Unimproved dirt
- U.S. Route
- State Route

ELDORADO SPRINGS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

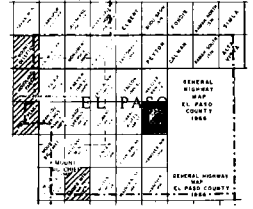
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. FROD, DIRECTOR

ELLIOTT QUADRANGLE
COLORADO-G. P. 800 00
7.5 MINUTE SERIES (TOPOGRAPHIC)
1:50,000



EXPLANATION

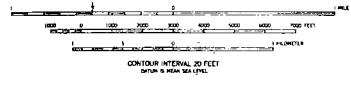
- Landform units**
Resource classification
- LANDFORM UNITS**
- F Fluvial deposit
 - T Area terrace deposit
 - V V-shaped fill (V & T)
 - U Unconsolidated sand
 - A Alluvial fan
 - E Wind-swept sand (colluvial)
 - M Manganese deposits (slag, shales, etc.)
- RESOURCE CLASSIFICATION**
- CLASSIFICATION**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
 - 3 Sand: greater than 75 passing #4 screen, 60% retained on #20 screen, usual distribution
 - 4 Fractional aggregate
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Abandoned well or drill-hole location with maximum thickness (ft) over assigned resource thickness (ft); obtained from well logs
 - "L" indicates gravel; "S" indicates sand
 - "U" in symbol denotes unconsolidated or unknown property
 - "M" denotes Colorado Geological Survey Manganese/Lead and/or Zinc project drill hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- SYMBOL LOCATION AND ORIENTATIONAL INFORMATION**
- Resource thickness (ft)
 - Resource sand and fines (passing #4 screen, 0.25 in.), usual distribution
 - Significant amount of fines (passing #20 screen, 0.075 in. or 0.075 mm)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcium carbonate (calcite)
 - "U" in symbol denotes unconsolidated or unknown property
 - "M" in symbol denotes property absent or insignificant



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schwochov
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



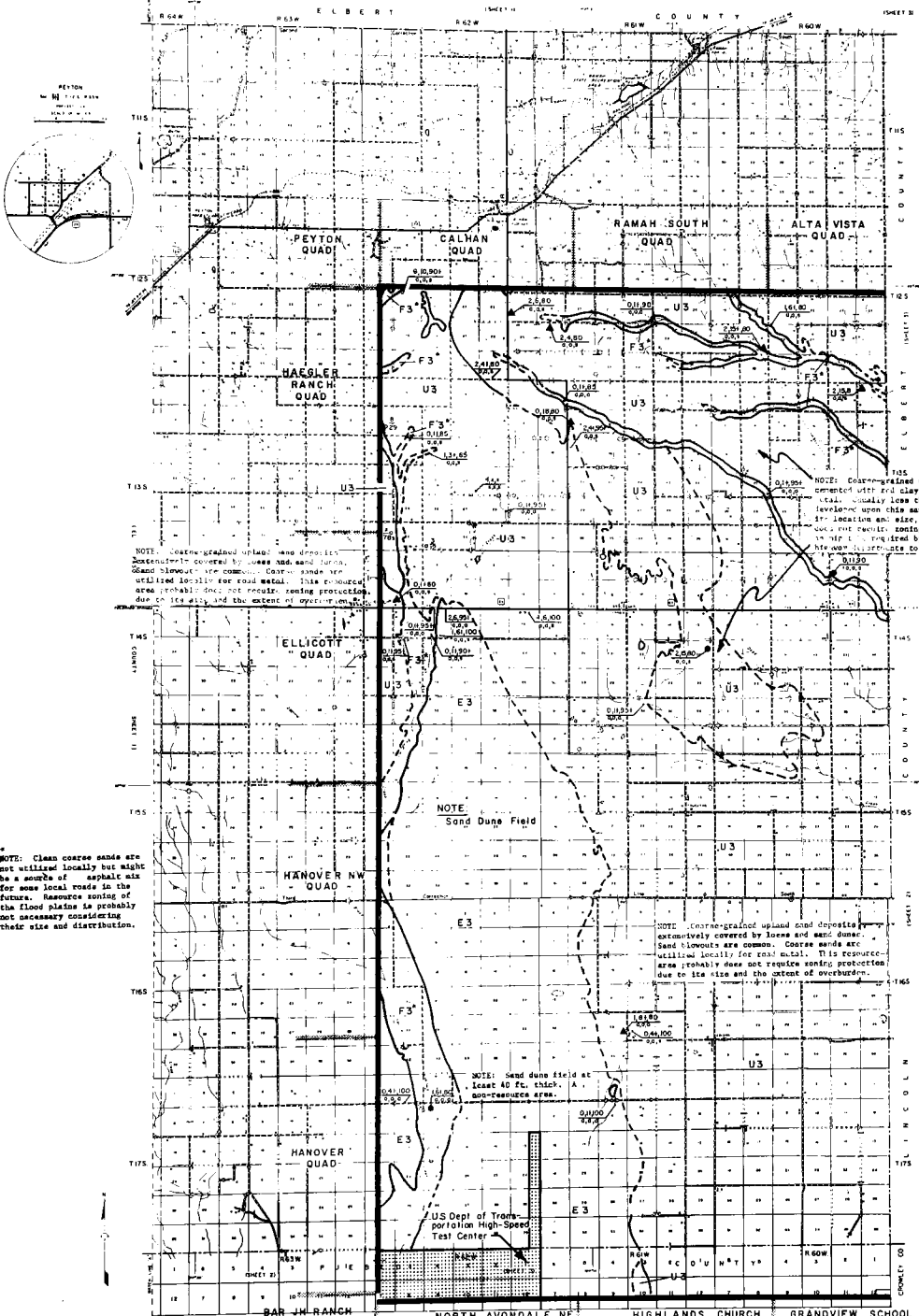
ROAD CLASSIFICATION

- Heavy-duty
- Medium-duty
- Light-duty
- Unimproved or
- U.S. Route
- State Route

ELLIOTT, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

EXPLANATION



- SYMBOLS**
- Bounded deposit
 - Unbounded deposit
- LARGER QUANTITIES**
- F Fine-grained upland
 - T Lenses and sand dunes
 - U Unbound deposits
 - A Alluvial fan
 - E Extensive sand dunes
 - M Marine deposits (shells, mollusks, etc.)
- RESOURCE CLASSIFICATION**
- 1 Good
 - 2 Fair
 - 3 Marginal
 - 4 Probable aggregate resource
- SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Active stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drillhole location with associated thickness (ft.) obtained from well logs
 - "I" indicates gravel; "S" indicates sand
 - "I" in symbol denotes unproven or untested aggregate
 - Well name Colorado Geological Survey
 - Well depth in feet
 - Location boundary, solid where known or inferred, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL INFORMATION OF QUANTITIES**
- Station location (T. 13S, R. 64E, S. 12) and symbol code (F3)
- Significant amount of sand (approximately 500,000 cu yd.)
- Significant amount of gravel (approximately 500,000 cu yd.)
- Significant amount of sand and gravel (approximately 500,000 cu yd.)
- "I" in symbol denotes unproven or untested aggregate
- Well name Colorado Geological Survey
- Well depth in feet
- Location boundary, solid where known or inferred, dashed where approximate or inferred

NOTE: Coarse-grained upland sand deposits extensively covered by loess and sand dunes. Sand blowouts are common. Coarse sand is utilized locally for road metal. This resource area probably does not require zoning protection due to its size and the extent of occurrence.

NOTE: Coarse-grained upland sand deposits extensively covered by loess and sand dunes. Sand blowouts are common. Coarse sand is utilized locally for road metal. This resource area probably does not require zoning protection due to its size and the extent of occurrence.

NOTE: Sand dune field at least 40 ft. thick. A non-resource area.

NOTE: Coarse-grained upland sand deposits extensively covered by loess and sand dunes. Sand blowouts are common. Coarse sand is utilized locally for road metal. This resource area probably does not require zoning protection due to its size and the extent of occurrence.

NOTE: Clean coarse sands are not utilized locally but might be a source of asphalt mix for some local roads in the future. Resource zoning of the flood plains is probably not necessary considering their size and distribution.



GENERAL LEGEND

Symbol	Description
	Intersecting Section Line
	Section Line
	Township and Range Line
	Boundary Line
	Alluvial Fan
	Sand Dune
	Road
	US Dept. of Transportation High-Speed Test Center
	River
	Contour Line
	Property Line
	Well Location
	Quarry
	Sand Pit

GENERAL HIGHWAY MAP EL PASO COUNTY COLORADO

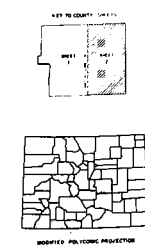
PREPARED BY THE
 STATE DEPARTMENT OF HIGHWAYS
 DIVISION OF HIGHWAYS-STATE OF COLORADO
 PLANNING AND RESEARCH DIVISION

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION



1956

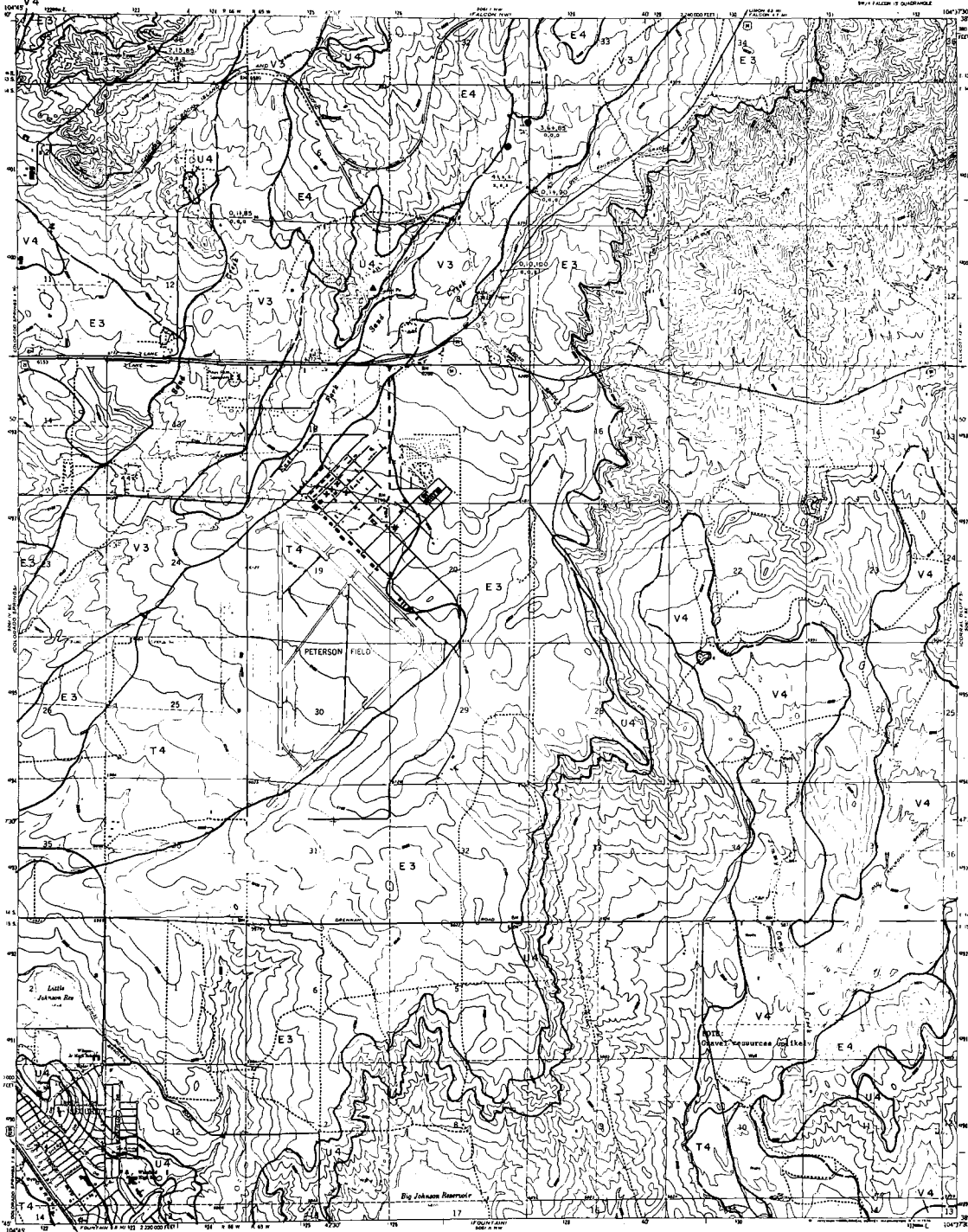
Mapped by: Phillip C. Wicklett
 Date: June 30, 1954



SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

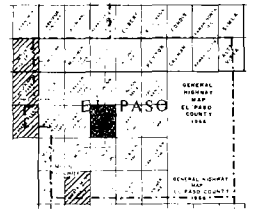
ELSMERE QUADRANGLE
COLORADO - EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
MAP SCALE IS QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLS, DIRECTOR



EXPLANATION

- Longform unit
Number classification
- LANDFORM UNIT**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (E & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (colluv)
 - M Man-made deposits (dike, talus, spalls, ...)
- RESOURCE CLASSIFICATION**
- GRAVEL RESOURCES**
(at least 30% gravel in 40 sieve, 40% sand)
- 1 Good: relatively clean and well-sorted
 - 2 Good: significant fines, occasional coal, calcium carbonate
- SAND RESOURCES**
(greater than 75% passing #4 screen, 80% retained on #100 screen, visual estimation)
- 3 Good
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Overlain gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selective well or drill-hole location with overburden thickness (ft) over sand/gravel resource
 - Shallow (ft), shallow flow well log
 - "G" indicates gravel, "S" indicates sand
 - "U" in symbol denotes unclassified or unknown aggregate
 - "M" denotes Colorado Geological Survey window/road and gravel projects
 - Drill hole
 - Landform boundary, solid where known or dashed, dashed where approximate or inferred
- STATION, LOCATION AND DIMENSIONAL INFORMATION OF SYMBOLS**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Current sand and fines spacing (ft)
 - Current, 0.25 in. to visual estimation
 - Significant amount of fines (passing 100 sieve, 0.075 in. or 0.0075 mm)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcium carbonate (calcite)
 - "U" in symbol denotes unclassified or unknown property
 - "M" in symbol denotes property absent or insignificant



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

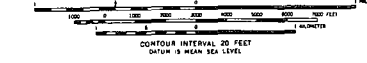
Geology modified after Scott, G.N., & Mabus, R.A., 1973, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado, U. S. Geological Survey Map, MP-482.

Trumble, D.E., and Pritch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado, U. S. Geol. Survey Map G-857 A.

Mapped by: Phillip G. Wicklein
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle

USE AND COPY QUALITY CONTROL
REQUIREMENTS OF OFFICE OF SURVEY



- ROAD CLASSIFICATION**
- Heavy duty
 - Light duty
 - Medium-duty
 - Unimproved dirt
 - U.S. Route
 - State Route

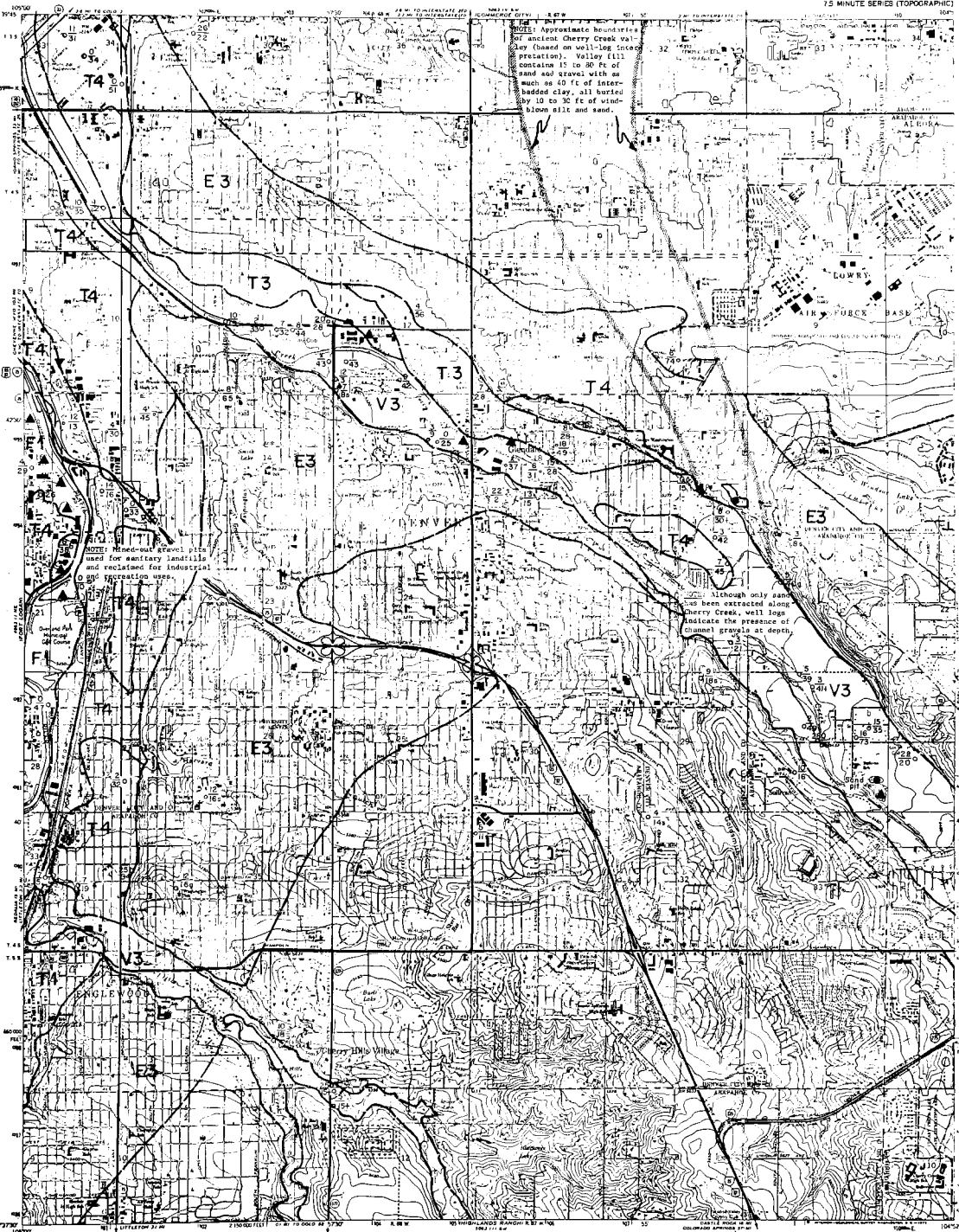
ELSMERE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

ENGLEWOOD QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYAN, DIRECTOR

EXPLANATION



- SYMBOLS**
- F Floodplain deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Unclad deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M (slag, tailings, spilla...)
- AGGREGATE CLASSIFICATION**
- 1 Coarse Aggregate
 - 2 Gravel: relatively clean and smooth
 - 3 Gravel: significant fines, decomposed rock, calcareous carbonate
 - 4 Fine Aggregate
 - 5 Sand
 - 6 Potential Aggregate Resource
- ROAD CLASSIFICATION**
- 1 Abandoned gravel and/or sand pit
 - 2 Operating stone quarry
 - 3 Abandoned stone quarry
- AGGREGATE RESOURCE AREAS**
- 1 Potential quarry aggregate resource area
 - 2 Potential quarry aggregate resource area
 - 3 Potential quarry aggregate resource area
 - 4 Potential quarry aggregate resource area
 - 5 Potential quarry aggregate resource area
 - 6 Potential quarry aggregate resource area
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 - 94 Potential quarry aggregate resource area
 - 95 Potential quarry aggregate resource area
 - 96 Potential quarry aggregate resource area
 - 97 Potential quarry aggregate resource area
 - 98 Potential quarry aggregate resource area
 - 99 Potential quarry aggregate resource area
 - 100 Potential quarry aggregate resource area
- STATION, LOCATION AND ORIENTAL**
- 1 Station
 - 2 Location
 - 3 Oriental



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:
Hunt, C.B., 1934, Pleistocene and Recent deposits in the Denver area, Colorado: U.S. Geol. Survey Bull. 956-C, pl. 3.

References:
Inter-County Regional Planning Commission, 1961, Drainage course plan for the Denver region - Part 1, Sand and gravel resources: Denver, Colo., Inter-County Reg. Plan. Comm., pl. 1.
Hamilton, J.L., and Owens, W.C., 1972, Geologic aspects, soils and related foundation problems, Denver metropolitan area, Colorado: Geol. Survey Environmental Geology Rept. 1, pl. 1.
Chase, G.H., and McComaghy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map I-731.
Trumble, D.R., and Pritch, H.A., 1974, Map showing potential sources of gravel and crushed-rock aggregates in the Greater Denver Area, Front Range Urban Corridor, Colo.: U.S. Geol. Survey Misc. Geol. Inv. Map I-856-A.

Mapped by: Stephen D. Schwachow
Date: June 30, 1974

Prepared in cooperation with the
U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



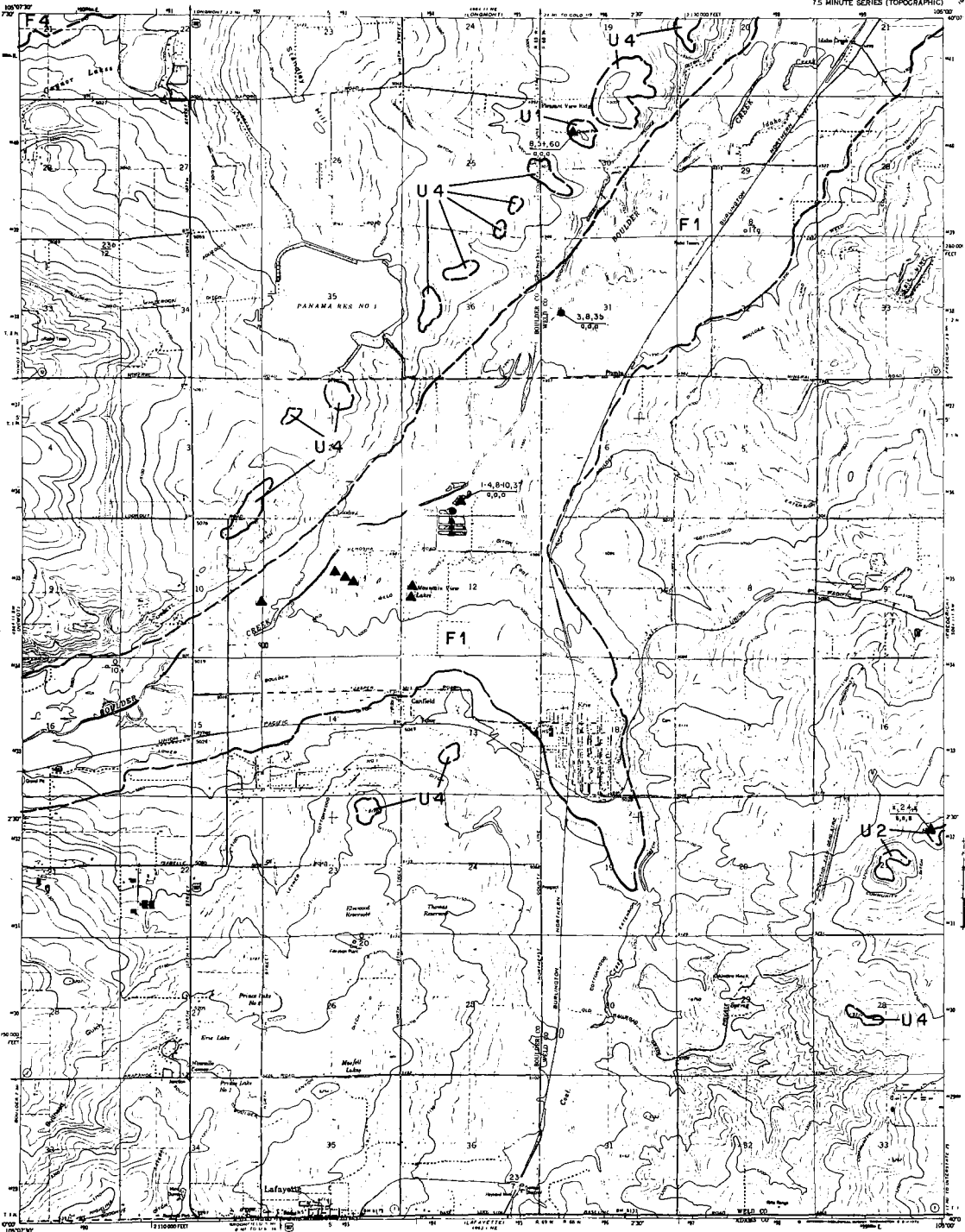
- ROAD CLASSIFICATION**
- 1 Major Hwy
 - 2 Minor Hwy
 - 3 Interstate Route
 - 4 U.S. Road
 - 5 State Rd.
 - 6 Unimproved PI
 - 7 Unimproved PI
 - 8 U.S. Road
 - 9 State Rd.

ENGLEWOOD, COLO.
NAD 83 5-10000 3/15
1963
PHOTOREPROD 1971
AND 5000 1/1 UN-REVISED 1971

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

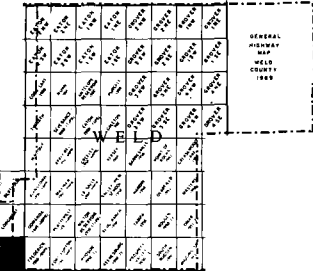
ERIE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLS, DIRECTOR



EXPLANATION

- 1/4 mile unit
 Resource class/location
- LEGEND**
- # Triangular deposit
 T Stream terrace deposit
 V Valley fill (F & T)
 U Upland deposits
 A Alluvial fan
 E High-mountain sand (colluvial)
 M Man-made deposits (slag, tailings, spalls, etc.)
- RESOURCE CLASSIFICATION**
- Class 1 Aggregate**
 (a) Sand and gravel on 25 acres, 1/4 mile radius
 1 Class 1: relatively clean and sound
 2 Class 2: significant fines, decomposed rock, certain silts/clays
 3 Sand
- Class 2 Aggregate**
 (a) Sand and gravel on 25 acres, 1/4 mile radius
 4 Probable aggregate resource
- NON-RESOURCE**
- A Operating gravel and/or sand pit
 B Abandoned gravel and/or sand pit
 C Operating stone quarry
 D Abandoned stone quarry
 E Potential quarry aggregate resource area
 F Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 "Y" indicates gravel, "S" indicates sand
 "X" in front numbers unclassified or unknown property
 "M" denotes Colorado Geological Survey Miscellaneous and Corel projects
 "H" in front numbers unclassified or unknown property
 "O" in front numbers property absent or unclassified
- STATION LOCATION AND COLLISION DESCRIPTION AT STATION**
- overburden thickness (ft)
 sand/gravel resource thickness (ft)
 percent sand and fines (passing #10 screen, 0.075 mm, or 0.075 mm)
 significant amount of fines (passing #100 screen, 0.0025 mm, or 0.0025 mm)
 significant amount of decomposed or weak rock
 significant amount of silts and clays (includes "X" in front numbers unclassified or unknown property)
 "O" in front numbers property absent or unclassified



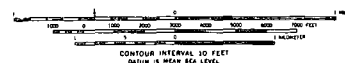
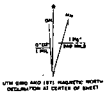
QUADRANGLE LOCATION
NON-RESOURCE OR VITREOUS AREA

Geology modified after:
 Colton, R.B., and Fitch, H.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Port Collins-Oreoley Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map I-855-D.

Mapped by: Ralph S. Shroba
 Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey 7.5 minute quadrangle



ROAD CLASSIFICATION

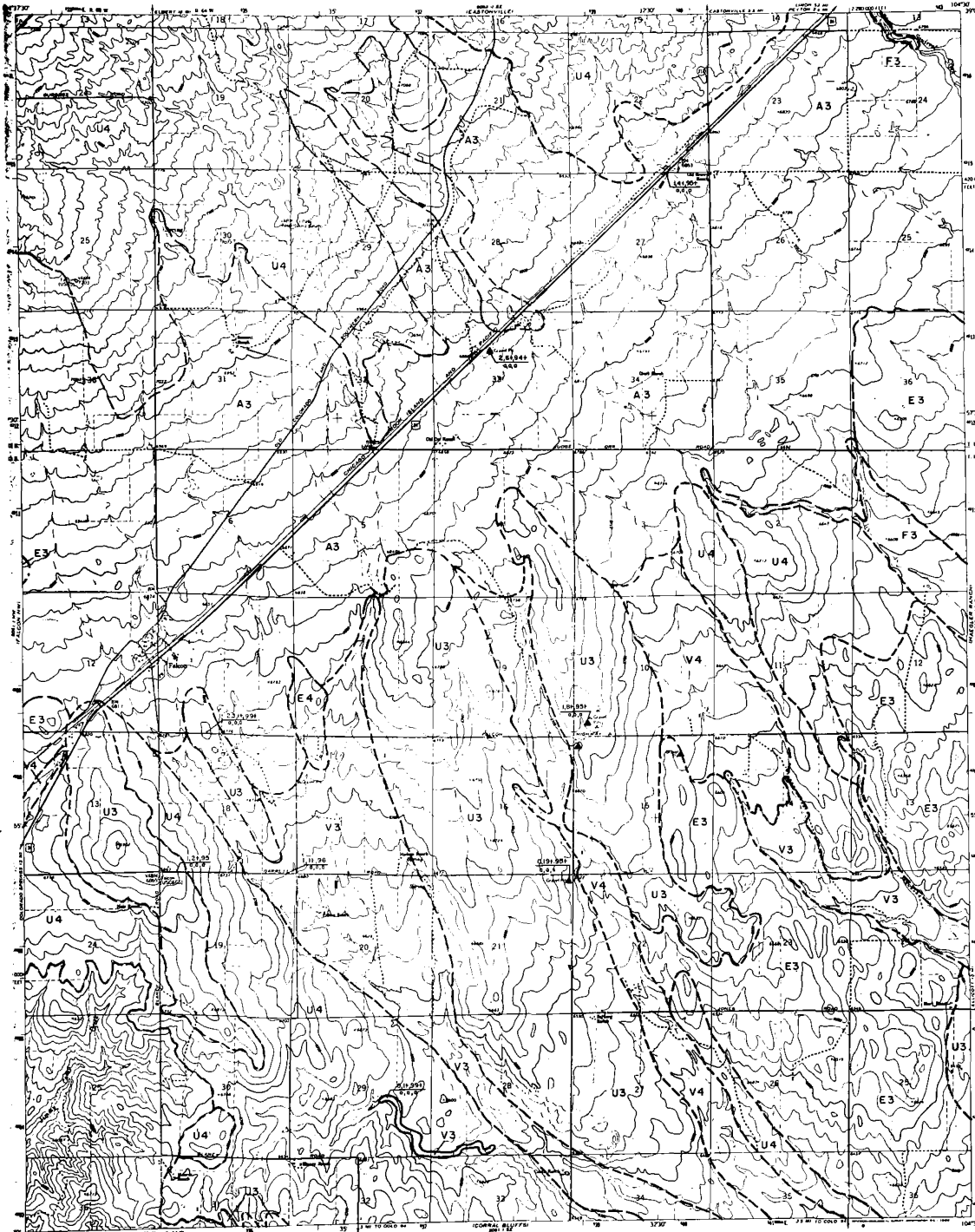
Heavy-duty ——— Light-duty ———
 Medium-duty - - - - - Unimproved dirt - - - - -
 U.S. Route State Route

ERIE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. KOLA, DIRECTOR

FALCON QUADRANGLE
COLORADO-EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
SCALE 1:50,000



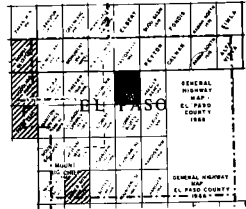
EXPLANATION

- LANDFORM UNITS**
 - boundary classification
- LANDFORM UNITS**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Alluvial fan (F&T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mined deposit (lake, alluvial, etc.)

- RESOURCE CLASSIFICATION**
- CLASSIFICATION**
1. Excellent
 2. Good
 3. Fair
 4. Marginal
 5. Poor

- MAP SYMBOLS**
- Operating quarry and/or sand pit
 - Abandoned quarry and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with resource thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "G" indicates gravel, "S" indicates sand
 - "M" in symbol denotes unmineralized or marginal resource
 - "W" denotes Colorado Geological Survey Water/Find and Gravel projects
 - Well
 - Landform boundary, solid where known or observed, dashed where approximate or inferred

- SYMBOL LOCATION AND GEOLOGICAL QUALITIES OF SYMBOLS**
- Resource thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Percent sand and fines (percent of coarse, 0.075 to 0.425 mm)
 - Significant amount of fines (percent 0.075 to 0.425 mm)
 - Significant amount of decomposed or sand rock
 - Significant amount of siliceous carbonate (calcite)
 - "M" in symbol denotes unmineralized or marginal resource
 - "W" in symbol denotes properly absent or insignificant



QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Ralph R. Shroba
Date: June 30, 1974



ROAD CLASSIFICATION

Heavy duty Light duty

Unimproved dirt State Road

U.S. Road

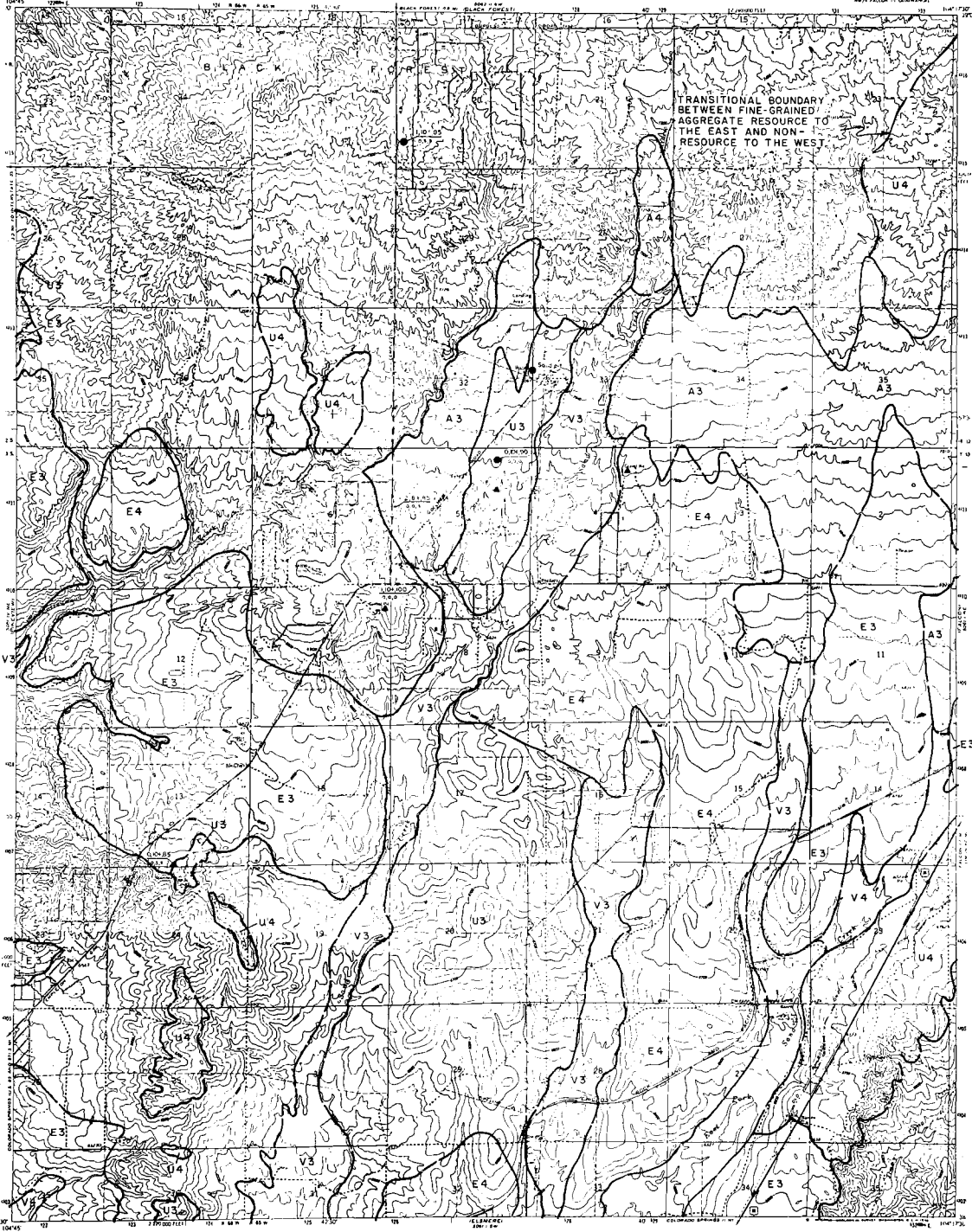
FALCON, COLO.

Base from U. S. Geological Survey
7-1/2 minute quadrangle

UTM GRID AND 1983 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

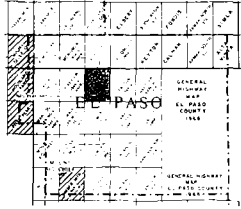
SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

FALCON NW QUADRANGLE
 COLORADO-EL PASO CO
 7.5 MINUTE SERIES (TOPOGRAPHIC)
 WITH FALCON 15 QUADRANGLE



EXPLANATION

- Landform Unit
 Resource + Landform Unit
- LANDFORM UNITS**
 - F Floodplain deposits
 - T Tertiary terrace deposits
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - W Wind-deposited sand (aeolian)
 - M Mountain deposits (sand, talus, debris, etc.)
- MINORITY CLASSIFICATION**
 - 1 Gravel: relatively clean and well sorted
 - 2 Gravel: slightly finer, decomposed rock, coarse sandstone
 - 3 Fine aggregate (properly sorted, 20-25% of gravel, 75% retained on #20 screen, 100% on #100)
 - 4 Sand
- UNDEVELOPED RESOURCE**
 - 4 Probable aggregate resource
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Quarry well or drift hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) indicated from well logs
 - "L" indicates gravel; "S" indicates sand
 - "L" in symbol denotes unutilized or abandoned resource
 - "W" denotes Colorado Geological Survey (pre-1974) and gravel projects' drill hole
 - Location boundary, well where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL EXPLANATION OF SYMBOLS**
 - overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - quarry well and drift location as observed; 10-15 ft, 20-25 ft, 30-35 ft
 - significant amount of fines (greater than 200 mesh, 0.075 in. or 0.075 in.)
 - significant amount of decomposed or weak rock
 - "L" in symbol denotes unutilized or abandoned resource
 - "S" in symbol denotes property owned or unutilized



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, G.R., & Mabus, R. A. 1973. Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, 100-482.

REFERENCE:
 Trimble, D.E., and Petch, R.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-637 A.

Mapped by: Phillip C. Wicklein
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey 7.5-minute quadrangle



- ROAD CLASSIFICATION**
- Heavy-duty
- Medium-duty
- Light-duty
- Unimproved dirt
- U.S. Route

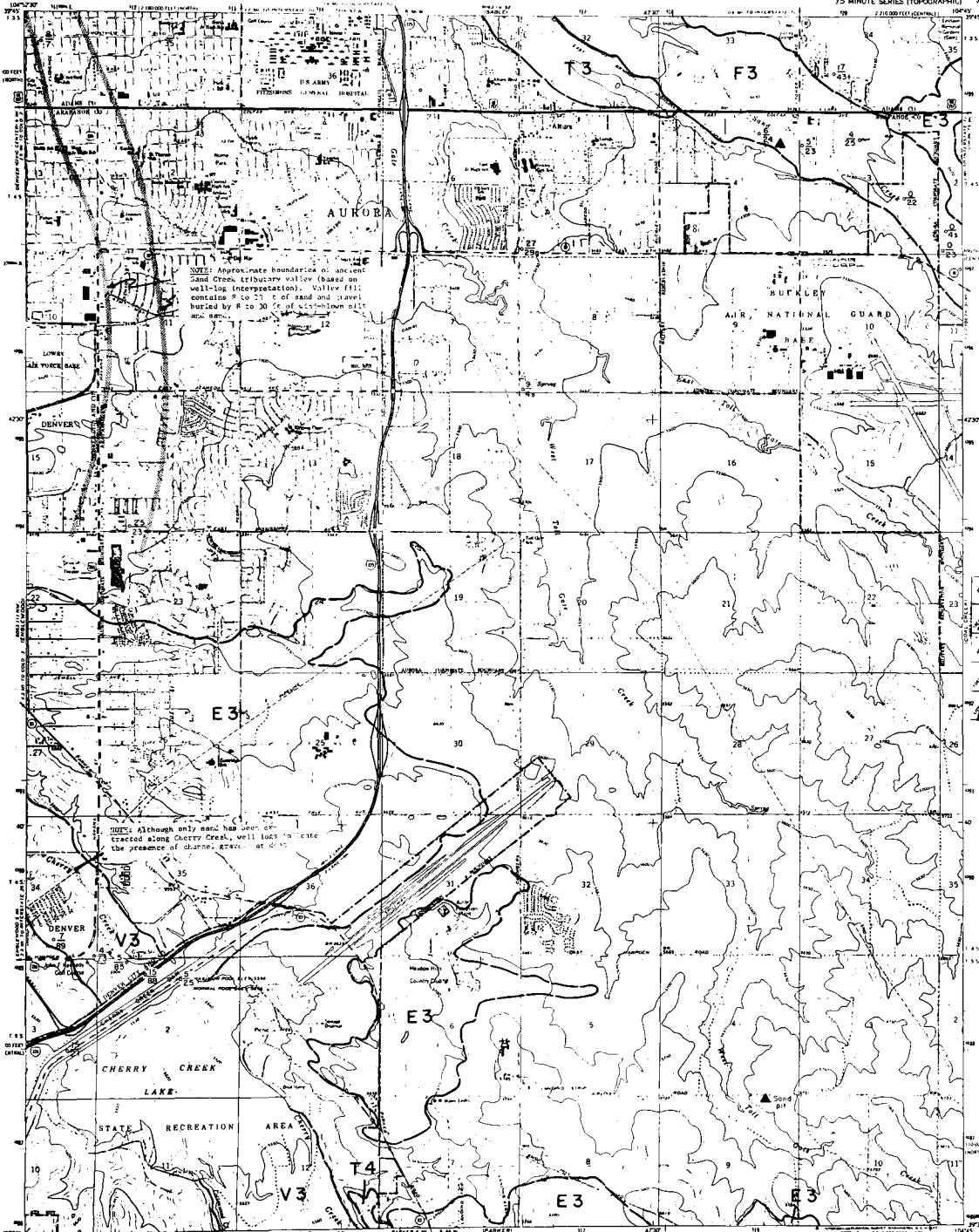
FALCON NW, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLDS, DIRECTOR

FITZSIMONS QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION



- 1/4" = 1 mile
Scale classification
- LANDFORM UNITS**
- F Fluvial deposits
 - T Trench surface deposits
 - V Valley fill (S & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-mud deposits (colluvial, talus, etc.)
- SUBSTRATE CLASSIFICATION**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous cements
 - 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry suitable resource area
 - Intersected well or drill-hole location with number (includes (F) for sand/gravel resource, (M) for mudstone, (S) for siltstone, (T) for tuffaceous gravel, (U) for unconsolidated sand)
 - In symbol device overlain or within property
 - Under Colorado Geological Survey (Sand and Gravel projects) (S.G.P.)
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATUS, LOCATION AND GEOLOGICAL DESCRIPTION OF RESOURCES**
- Symbol in thickness (ft)
 - Symbol in width (ft)
 - Symbol in length (ft)
 - Symbol in area (sq. ft)
 - Symbol in volume (cu. ft)
 - Symbol in weight (tons)
 - Symbol in value (\$)
 - Symbol in quality (grade)
 - Symbol in quantity (tons)
 - Symbol in location (lat/long)
 - Symbol in status (operating/abandoned)
 - Symbol in location (city/county)
 - Symbol in location (road/highway)
 - Symbol in location (water body)
 - Symbol in location (landmark)
 - Symbol in location (elevation)
 - Symbol in location (direction)
 - Symbol in location (distance)
 - Symbol in location (time)
 - Symbol in location (temperature)
 - Symbol in location (humidity)
 - Symbol in location (wind speed)
 - Symbol in location (precipitation)
 - Symbol in location (soil type)
 - Symbol in location (vegetation)
 - Symbol in location (population)
 - Symbol in location (economy)
 - Symbol in location (culture)
 - Symbol in location (religion)
 - Symbol in location (politics)
 - Symbol in location (education)
 - Symbol in location (healthcare)
 - Symbol in location (transportation)
 - Symbol in location (communication)
 - Symbol in location (energy)
 - Symbol in location (environment)
 - Symbol in location (science)
 - Symbol in location (technology)
 - Symbol in location (innovation)
 - Symbol in location (entrepreneurship)
 - Symbol in location (social justice)
 - Symbol in location (human rights)
 - Symbol in location (peace and conflict resolution)
 - Symbol in location (globalization)
 - Symbol in location (multiculturalism)
 - Symbol in location (diversity)
 - Symbol in location (sustainability)
 - Symbol in location (resilience)
 - Symbol in location (adaptation)
 - Symbol in location (mitigation)
 - Symbol in location (prevention)
 - Symbol in location (preparedness)
 - Symbol in location (response)
 - Symbol in location (recovery)
 - Symbol in location (reconstruction)
 - Symbol in location (rehabilitation)
 - Symbol in location (restoration)
 - Symbol in location (conservation)
 - Symbol in location (protection)
 - Symbol in location (management)
 - Symbol in location (governance)
 - Symbol in location (policy)
 - Symbol in location (law)
 - Symbol in location (ethics)
 - Symbol in location (morals)
 - Symbol in location (values)
 - Symbol in location (beliefs)
 - Symbol in location (attitudes)
 - Symbol in location (behaviors)
 - Symbol in location (habits)
 - Symbol in location (preferences)
 - Symbol in location (interests)
 - Symbol in location (needs)
 - Symbol in location (wants)
 - Symbol in location (desires)
 - Symbol in location (aspirations)
 - Symbol in location (dreams)
 - Symbol in location (hopes)
 - Symbol in location (faith)
 - Symbol in location (trust)
 - Symbol in location (respect)
 - Symbol in location (compassion)
 - Symbol in location (kindness)
 - Symbol in location (generosity)
 - Symbol in location (humility)
 - Symbol in location (patience)
 - Symbol in location (perseverance)
 - Symbol in location (courage)
 - Symbol in location (strength)
 - Symbol in location (wisdom)
 - Symbol in location (knowledge)
 - Symbol in location (understanding)
 - Symbol in location (empathy)
 - Symbol in location (sympathy)
 - Symbol in location (compassion)
 - Symbol in location (mercy)
 - Symbol in location (grace)
 - Symbol in location (forgiveness)
 - Symbol in location (peace)
 - Symbol in location (harmony)
 - Symbol in location (unity)
 - Symbol in location (cooperation)
 - Symbol in location (collaboration)
 - Symbol in location (partnership)
 - Symbol in location (alliance)
 - Symbol in location (coalition)
 - Symbol in location (consensus)
 - Symbol in location (agreement)
 - Symbol in location (contract)
 - Symbol in location (treaty)
 - Symbol in location (covenant)
 - Symbol in location (pact)
 - Symbol in location (compact)
 - Symbol in location (accord)
 - Symbol in location (understanding)
 - Symbol in location (agreement)
 - Symbol in location (contract)
 - Symbol in location (treaty)
 - Symbol in location (covenant)
 - Symbol in location (pact)
 - Symbol in location (compact)
 - Symbol in location (accord)
 - Symbol in location (understanding)
 - Symbol in location (agreement)
 - Symbol in location (contract)
 - Symbol in location (treaty)
 - Symbol in location (covenant)
 - Symbol in location (pact)
 - Symbol in location (compact)
 - Symbol in location (accord)



Base from U. S. Geological Survey
7-1/2 minute quadrangle

ROAD CLASSIFICATION

- Heavy duty
- Medium duty
- Light duty
- Unimproved dirt
- Interstate Route
- U.S. Route
- State Route

CONTOUR INTERVAL: 10 FEET
DATA AT 1000 FT LEVEL

FITZSIMONS, COLO.

REFERENCE:

Trumble, D.E., and Petch, R.R. 1974. Map showing potential sources of gravel and crushed-rock aggregates in the Greater Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map T-450A.

Chase, C.H., and McComaghy, J.A., 1972. Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map T-731.

Hamilton, J.L., and Owens, W.C., 1972. Geologic aspects, soils and related foundation problems: Denver metropolitan area, Colorado: Colorado Geol. Survey Environmental Geology Rept. 1, pl. 1.

Inter-County Regional Planning Commission, 1961. Drainage course plan for the Denver region: Part 1. Sand and gravel resources: Denver, Colo., Inter-County Reg. Plan. Comm., pl. 1.

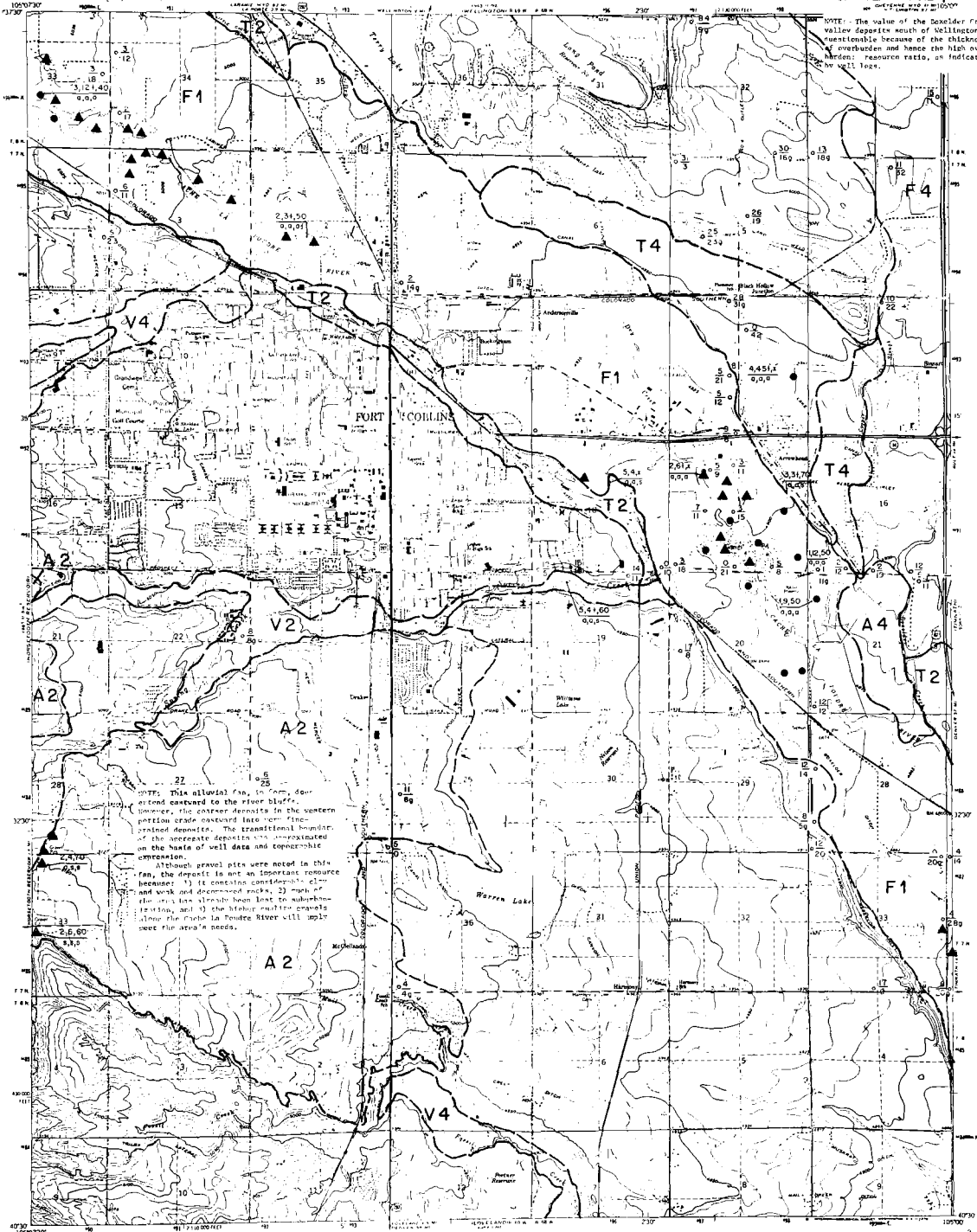
Mapped by: Stephen D. Schwochow
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

FORT COLLINS QUADRANGLE
COLORADO-LAPIMER CO.
75 MINUTE SERIES (TOPOGRAPHIC)
1844 FORT COLLINS QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

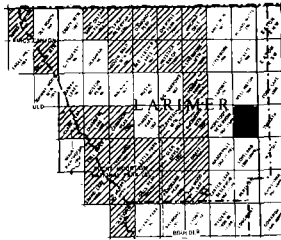
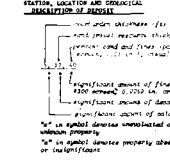


EXPLANATION

- WATER WELLS**
- Plainfield deposit
 - Seven terrace deposit
 - Valley fill (F&T)
 - Upland deposits
 - Alluvial fan
 - Well-located sand (unit)
 - Non-sand deposits (log-logging, etc.)

- RESOURCE CLASSIFICATION**
- CLASS 1 (BEST QUALITY)**
- 1 Gravel: relatively clean and round
 - 2 Gravel: originates from decomposed rock, calcine carbonate
- CLASS 2 (MEDIUM QUALITY)**
- 3 Sand
 - 4 Possible aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "X" indicates gravel.
 - "I" in small circles overlaid on well logs (see note)
 - "M" denotes Geological Engineer Windsor/Lead and Gravel projects
 - "H" in small circles overlaid on well logs (see note)
 - Landform boundary, solid where known or dashed where approximate or inferred.



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WETLAND AREA

REFERENCES:

Dunn, P. B., III, 1972, Map of surficial geology of the Fort Collins quadrangle: Recon. mapping for Colorado Geol. Survey Windsor Environmental Geology Project, openfile map.

Ching, P. A., 1972, Economic gravel deposits of the lower Cache La Poudre River, Colorado State Univ. Unpub. Master's Thesis.

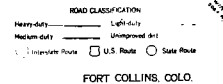
Shelton, D. C., 1974, personal communication.

Hershey, L. A. and Schaefer, P. A., 1972, Geological map of the lower Cache La Poudre River Basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-687.

Geology modified after: Colton, W. B. and Pritch, H. B., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Denver Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-855 B.

Mapped by: Stephen D. Schowchow
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey
7-1/2 minute quadrangle

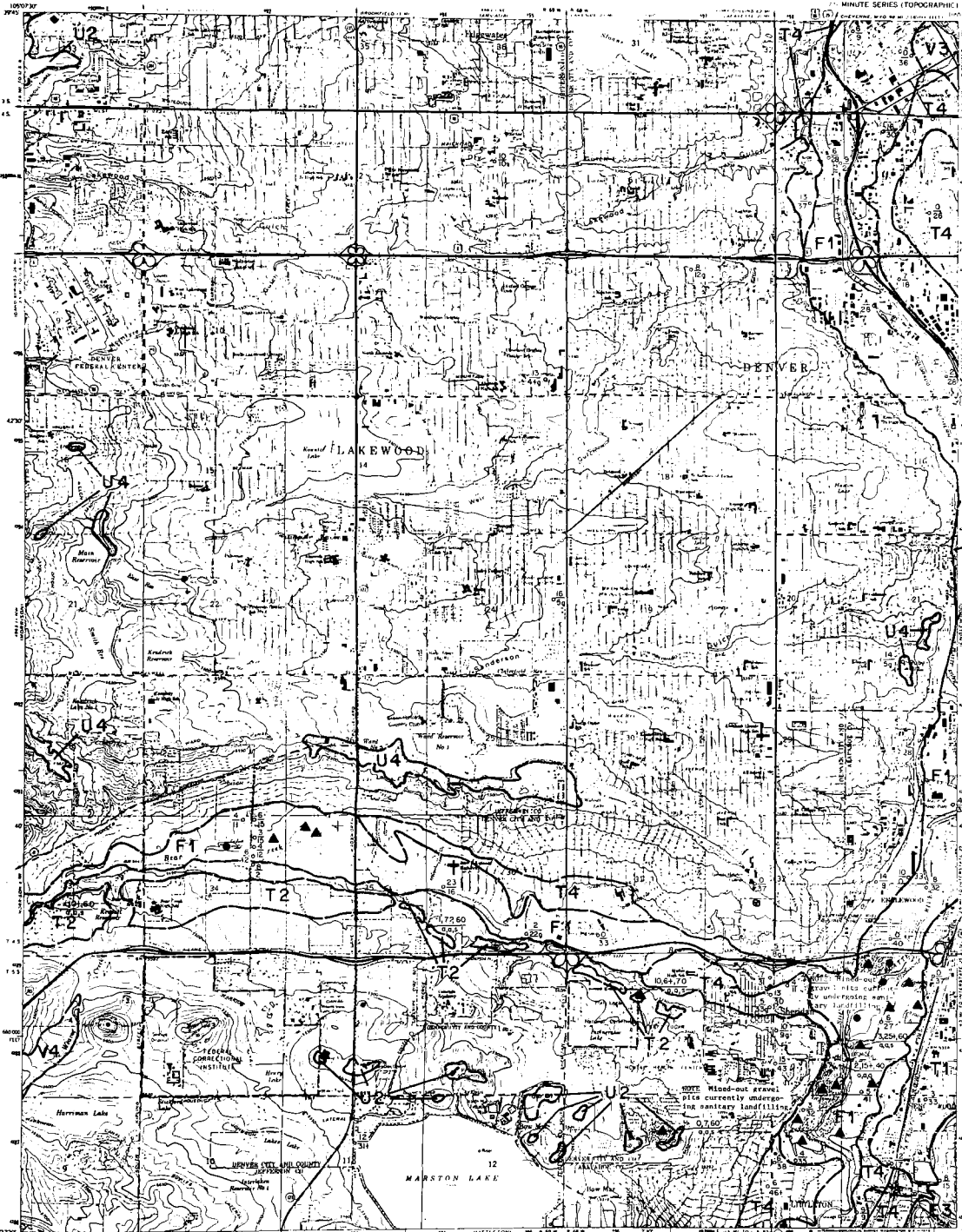


FORT COLLINS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

FORT LOGAN QUADRANGLE
 COLORADO
 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

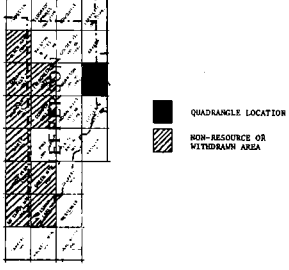


- LITHOLOGIC UNITS**
- F Floodplain deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated deposit
 - A Alluvial fan
 - E Eolian deposit (sand dunes)
 - M Nevada deposit (sand, silt, clay)

- RESOURCE CLASSIFICATION**
- Gravel*
- 1 Gravel: relative class and sand
 - 2 Gravel: aggregate class, unconsolidated rock
- Sand*
- 3 Sand
 - 4 Probable aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Proposed quarry aggregate resource area
 - Retrieved well or drill-hole location with owner's address (for owner modification problems)
 - Retrieved well or drill-hole location with "M" indicating gravel; "S" indicating sand
 - "*" in symbol denotes unclassified or unknown status
 - "**" denotes Colorado Geological Survey Modified Head and Gravel project
 - Landform boundary, solid where known or observed; dashed where approximate or inferred

- STATION LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOL**
- Retrieved well or drill-hole location with owner's address (for owner modification problems)
 - Retrieved well or drill-hole location with "M" indicating gravel; "S" indicating sand
 - "*" in symbol denotes unclassified or unknown status
 - "**" denotes Colorado Geological Survey Modified Head and Gravel project
 - Landform boundary, solid where known or observed; dashed where approximate or inferred



Geology modified after Hunt, C.B., 1954, Pleistocene Recent deposits in the Denver area, Colorado: U.S. Geol. Survey Bull. 990-C, pl. 3.

References:
 Inter-County Regional Planning Commission, 1961, Drainage course plan for the Denver region - Part 1, Sand and gravel resources: Denver Colo., Inter-County Reg. Plan. Comm., pl. 1.
 Hamilton, J.L., and Ouma, W.C., 1972, Geologic aspects, soils and related foundation problems, Denver metropolitan area, Colorado: Colorado Geol. Survey Environmental Geology Rept. 1, pl. 1.
 Chase, C.B., and McGowan, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map T-731.
 Trimble, D.E., and Pich, 1974, Map showing potential sources of gravel and crushed-rock aggregate to the Greater Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map I-836-A.

Base from U. S. Geological Survey
 7-1/2 minute quadrangle

1975 GEOID AND 1973 MAGNETIC NORTH
 DECLINATION AT CENTER OF SHEET

ROAD CLASSIFICATION

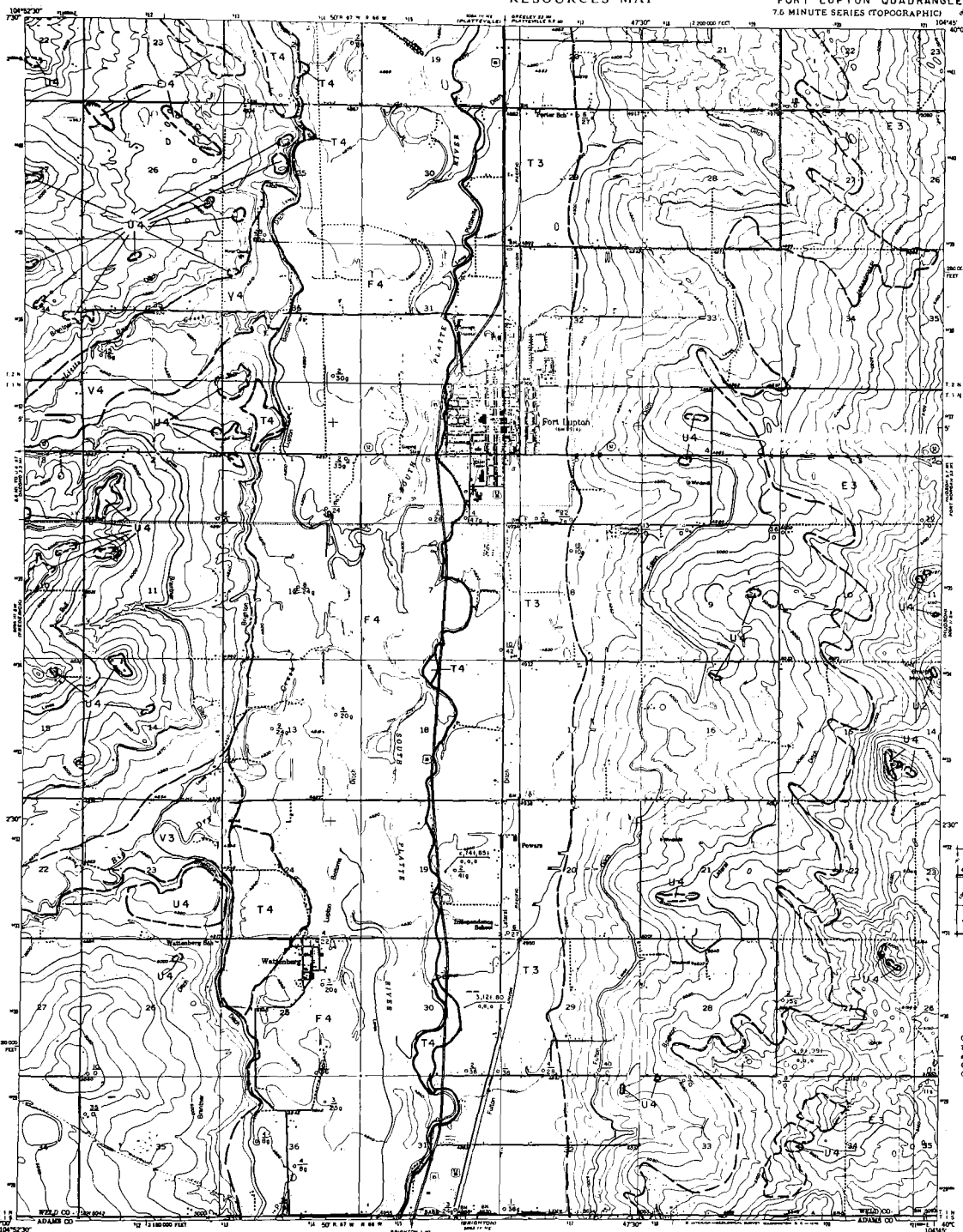
- Heavy duty
- Medium-duty
- Interstate Route
- Light duty
- Unimproved dirt
- U.S. Route
- State Route

CONTour INTERVAL 10 FEET
 (OTHER THAN 50 FEET)

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

FORT LUPTON QUADRANGLE
7.6 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR



EXPLANATION

- Legend**
 (Symbol) Name classification
- LAPORON (SIL)**
 F Floodplain deposit
 T Stream terrace deposit
 V Valley fill (F & T)
 U Unconformity
 A Alluvial fan
 E Wind-deposited sand (alluvial)
 M Non-made deposits (slag, tailings, spillover...)
- RESOURCE CLASSIFICATION**
 1 Gravel: well-sorted, 1/16" and around
 2 Gravel: significant fines, unsorted rock, calcium carbonate.
 3 Sand
 4 Unconsolidated aggregate
 5 Probable aggregate resource
- AGGREGATE**
 A Overburden gravel and/or sand pit
 B Overburden gravel and/or sand pit
 C Overburden gravel and/or sand pit
 D Potential quarry aggregate resource area
 E Selected well-sorted drill-hole location with overburden thickness (ft) over sand/gravel resource
 F Distance (ft) obtained from well logs
 G Sandstone gravel and/or sandstone sand
 H In special deposit unconsolidated or unknown property
 I Unknown thickness geological survey
 J Under/Over and Gravel project
 K Well
 L Landform boundary, solid where known or estimated, dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL CLASSIFICATION OF DEPOSIT**
 1 Overburden thickness (ft)
 2 Sand/gravel resource thickness (ft)
 3 Gravel and sand fines (ppm) as %
 4 Gravel, 0.15 to 0.25, visual estimation
 5 Significant amount of fines (opening 100 microns, 2.000 in. or 0.075 in.)
 6 Significant amount of decomposed or wet rock
 7 Significant amount of calcareous materials
 8 "x" in symbol denotes unconsolidated or unknown property
 9 "u" in symbol denotes property absent or insignificant



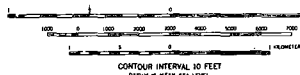
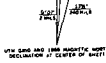
- QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WYLLIAMS AREA

Geology modified after:
 Colton, R.B., and Pritch, R.S., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Port Collins-Owley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-155 D.

Soister, P. E., 1965, U. S. Geological Survey Geological Quadrangle Top. CO-39.

Mapped by: Ralph R. Shroba
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



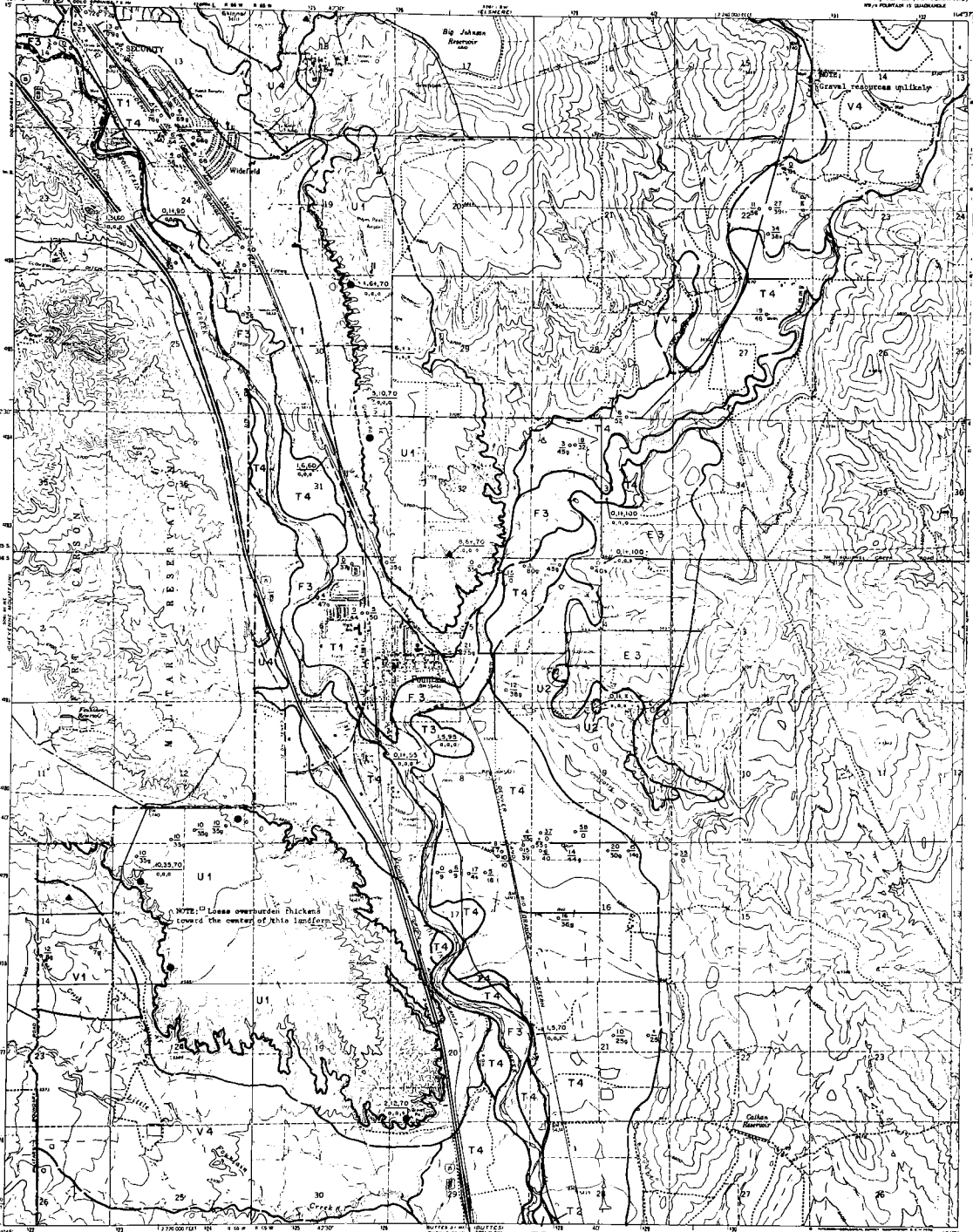
- ROAD CLASSIFICATION**
 Heavy-duty Light-duty
 Medium-duty Unimproved dirt
 U.S. Route State Route

FORT LUPTON, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

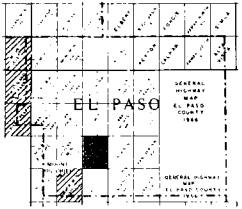
FOUNTAIN QUADRANGLE
COLORADO-EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
MAY 1954 (REVISED TO 1987)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR



EXPLANATION

- Contour units
- Resource classification
- RESOURCE TYPE**
 - F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unfilled deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-sand deposits (slag, tailings, waste, ...)
- RESOURCE CLASSIFICATION**
 - 1 Gravel: relatively clean and sorted
 - 2 Gravel: significant fines, unsorted rock, latitic carbonates
 - 3 Sand
 - 4 Fractional aggregate resources
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft), sand/gravel resource thickness (ft), obtained from well logs
 - "T" indicates gravel; "U" indicates sand
 - "*" in symbol denotes unvalued or unknown property
 - "m" denotes Colorado Geological Survey "Wider/Lead and Crustal projects" drill hole
 - Landform boundary, wild sheep home or observed; shaded where approximated or inferred
- STATION, LOCATION AND ORIOLOGICAL SIGNIFICANCE OF DEPOSIT**
 - overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (passing #4 screen, 0.075 in.), percent silt/clay
 - significant amount of fines (passing #20 screen, 0.0075 in., or 0.276 mm.)
 - significant amount of decomposed or soft rock
 - significant amount of siliceous carbonate facies
 - "*" in symbol denotes unvalued or unknown property
 - "m" in symbol denotes property absent or unapplicable



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WET/DRAIN AREA

Geology modified after Scott, G.R., & Hobbs, R.A. 1973. Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, MP-482.

Triebel, D.E., and Finch, H.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Trout Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-857 A.

Mapped by: Phillip C. Wickliffe
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey 7-1/2 minute quadrangle



CONTOUR INTERVAL 20 FEET
ELEVATION IN FEET MEAN SEA LEVEL

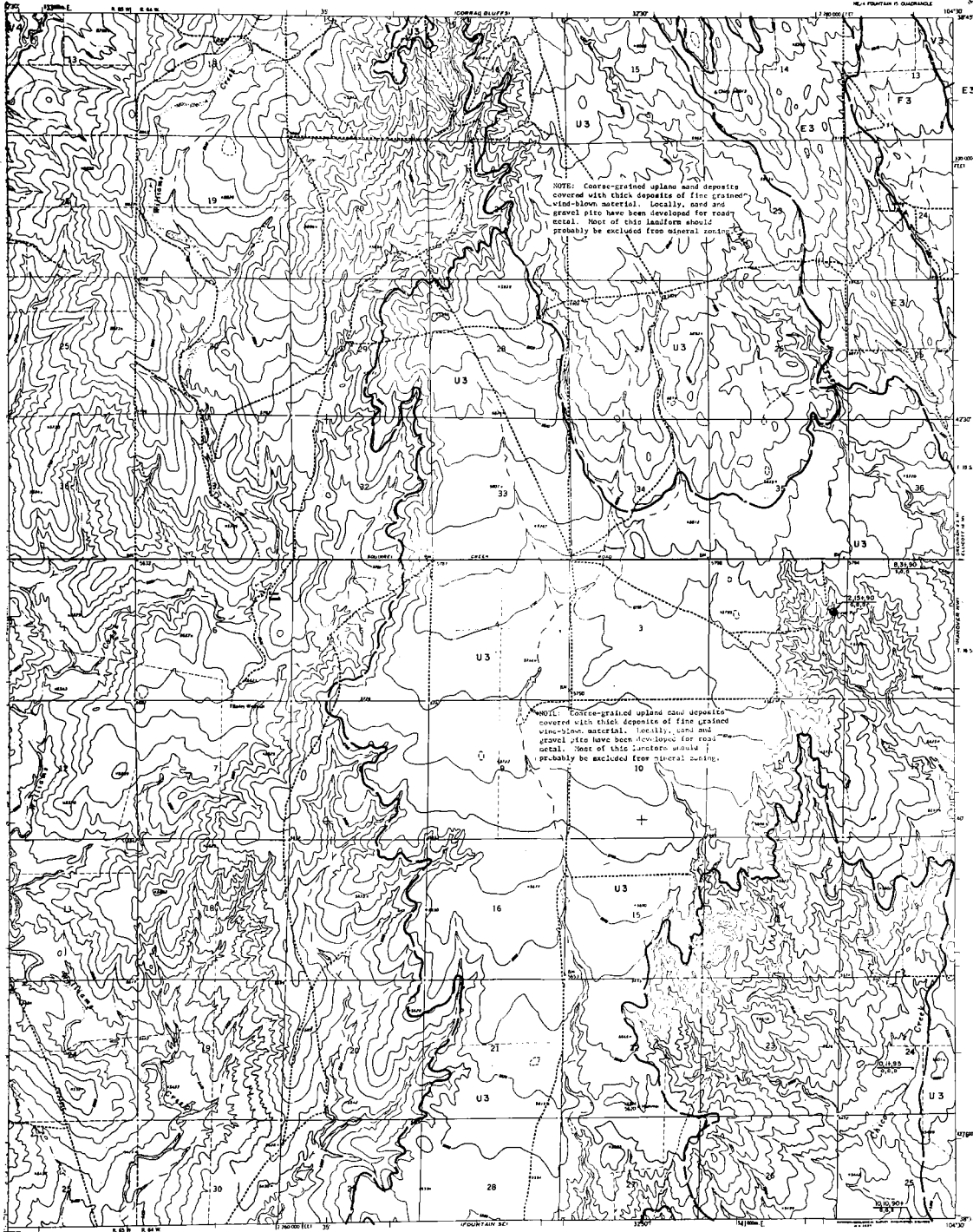
- ROAD CLASSIFICATION**
- Heavy-duty
 - Medium-duty
 - Light-duty
 - Unimproved dirt
 - Interstate Route
 - U.S. Route

FOUNTAIN, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

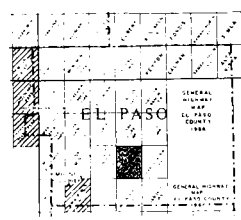
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR

FOUNTAIN NE QUADRANGLE
COLORADO-EL PASO CO
7 1/2 MINUTE SERIES (TOPOGRAPHIC)
U.S. DEPARTMENT OF GEOGRAPHY



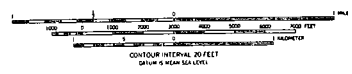
EXPLANATION

- SYMBOLS**
- Location well
 - Resource classification
- ROAD CLASSIFICATION**
- F Functional road
 - T State arterial
 - V Valley fill (F & T)
 - U Unimproved
 - A All-weather
 - E Wind-deposited sand (eroded)
 - M Non-made deposits (slag, tailings, etc.)
- RESOURCE CLASSIFICATION**
- CORTEX MATERIAL**
(as defined in § 26-101, C.R.S.)
- 1 Gravel: relatively clean and round
 - 2 Gravel: significant fines, uncombed rock, seldom estimated
- FINE MATERIAL**
(gravel less than 20 percent of screen, 425 retained on #200 screen, usual estimation)
- 3 Sand
- UNCLASSIFIED RESOURCES**
- 4 Possible aggregate resources
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential coarse aggregate resource area
- NOTES:**
- "d" in symbol denotes area with overburden thickness (ft) over sand/gravel resource
 - "t" in symbol denotes thickness (ft) of sand/gravel resource
 - "s" in symbol denotes sand
 - "u" in symbol denotes unimproved or unknown property
 - "w" symbol denotes Colorado Geological Survey well location
 - "L" in symbol denotes landform boundary, used where known or observed; shaded where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Percent sand and fines (usually 44 percent, 2 to 1, usual estimation)
 - Significant amount of fines (using 425 screen, 0.075 in. or 0.075 mm.)
 - Significant amount of decomposed or weak rock
 - Significant amount of mineral carbonate material
 - "u" in symbol denotes unimproved or unknown property
 - "s" in symbol denotes sandstone, siltstone or shale



Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Base from U. S. Geological Survey
7 1/2 minute quadrangle



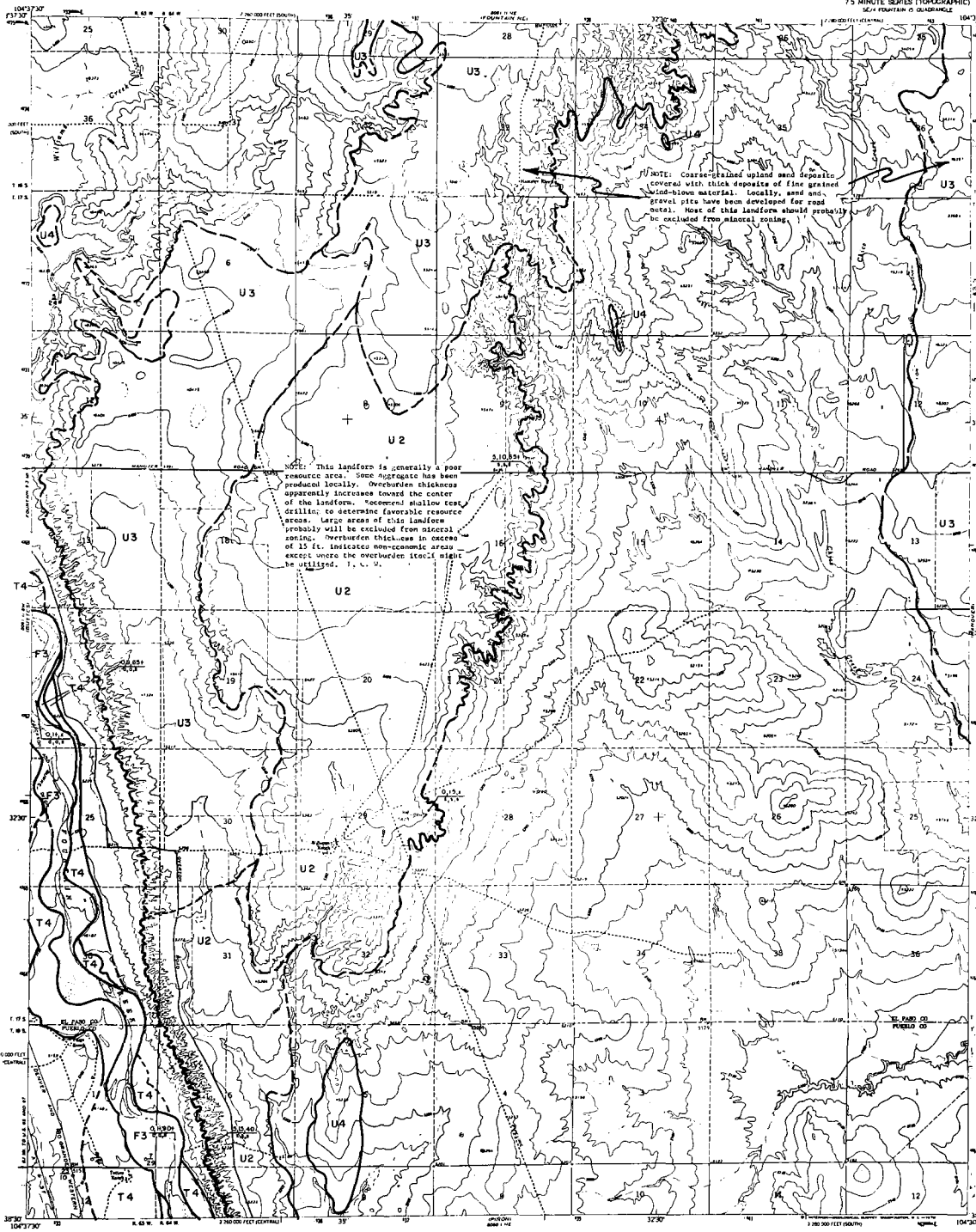
ROAD CLASSIFICATION
Unimproved 0-1

FOUNTAIN NE, COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

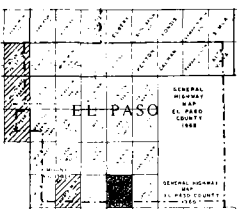
FOUNTAIN SE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
SCALE: 1:50,000

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLS, DIRECTOR



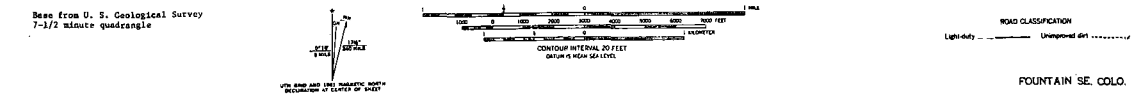
EXPLANATION

- Legend unit
Landform classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Hummock deposits (slag-tailings, spalls, ...)
- RESOURCE CLASSIFICATION**
- COARSE GRAVELS**
- 1 Gravel (abundant) clean and sound
 - 2 Gravel (abundant) fine, decomposed, calc. calcareous
- FINE GRAVELS**
- 3 Sand
 - 4 Probable aggregate resource
- AGGREGATE**
- 5 Operating gravel and/or sand pit
 - 6 Abandoned gravel and/or sand pit
 - 7 Operating stone quarry
 - 8 Abandoned stone quarry
 - 9 Potential quarry aggregate resource area
- OVERBURDEN THICKNESS (ft.)**
- 10 Selected well or drill-hole location with overburden thickness (ft.) over underlying resource thickness (ft.) obtained from well logs.
 - "a" indicates gravel, "s" indicates sand
 - "u" in symbol denotes unvaluated or unknown property.
 - "m" denotes Colorado Geological Survey landform and cover project #1111
 - "w" denotes landform, well where known or observed; shaded where approximate or inferred.
- STATUS, LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOLS**
- 10 Overburden thickness (ft.)
 - 11 Aggregate resource thickness (ft.)
 - 12 Percent sand and fines (spacing of screen, 0.25 in., or 0.075 mm.)
 - 13 Significant amount of fines (spacing 0.075 mm., 0.25 in., or 0.075 mm.)
 - 14 Significant amount of decomposed or soft rock.
 - 15 Significant amount of relative aggregate thickness.
 - 16 Unknown property.
 - 17 "u" in symbol denotes property status or insignificant.



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Wickless
Date: June 30, 1974



ROAD CLASSIFICATION
Light duty — Unimproved dirt

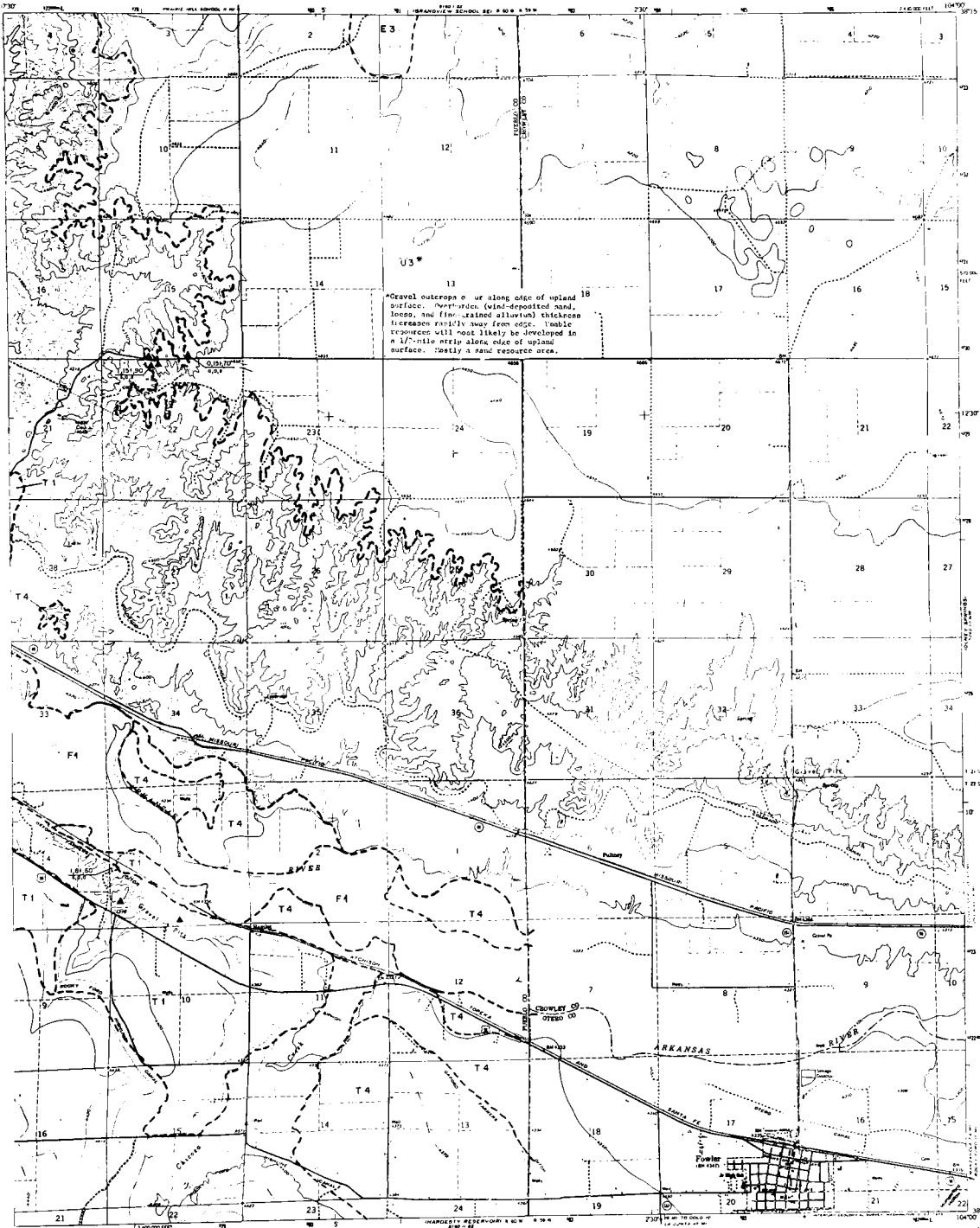
FOUNTAIN SE, COLO.

Base from U. S. Geological Survey
7-1/2 minute quadrangle

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

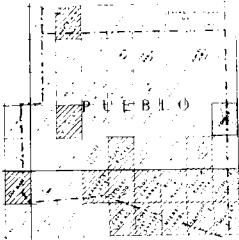
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. FOLD, DIRECTOR

FOWLER QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)
1:62,500 (1:62,500)



EXPLANATION

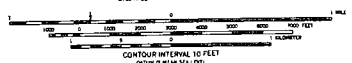
- LANDFORMS**
 - Contour lines
 - Stream channels
 - Drainage basins
- MINERAL RESOURCES**
 T Tertiary deposit
 Y Recent terrace deposit
 V Valley fill (F & T)
 U Upland deposits
 A Alluvial fan
 E Wind-deposited sand (loess)
 M Marine deposits (clay, siltstone, shale, etc.)
- AGGREGATE CLASSIFICATION**
 1 Gravel: relatively clean and sharp
 2 Gravel: significant fines, decomposed rock, calcium carbonates
 3 Sand
 4 Probable aggregate resource
- AGGREGATE STATUS**
 A Abandoned gravel and/or sand pit
 B Operating stone quarry
 C Abandoned stone quarry
 D Potential quarry aggregate resource area
 E Selected well or drill-hole location with overburden thickness (ft) over sand gravel resource thickness (ft), obtained from well logs
 F "Landscape gravel" (L) indicates sand
 G "In-situ aggregate" (I) indicates sand
 H Selected location indicated by survey which shows sand and gravel pit in 1:25,000 scale
 I Landform boundary, wild where shown or estimated. Partial where appropriate or inferred.
- STATION, LOCATION AND GEOMORPHIC CHARACTERISTICS OF PIT**
 - Overburden thickness (ft)
 - Sand-gravel resource thickness (ft)
 - Distance and dip from (bearing & distance) to 1:25,000 scale location
 - Elevation (feet) of base (topography)
 - Elevation (feet) of sand/gravel resource
 - Elevation (feet) of aggregate resource thickness
 - "L" in upper left corner of symbol indicates landscape gravel
 - "I" in upper right corner of symbol indicates in-situ aggregate
 - "S" in upper left corner of symbol indicates sand
 - "G" in upper right corner of symbol indicates gravel



■ QUADRANGLE LOCATION
 ▨ MINERAL-RESOURCE OR WETLAND AREA

Mapped by: Stephen D. Schuchow
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



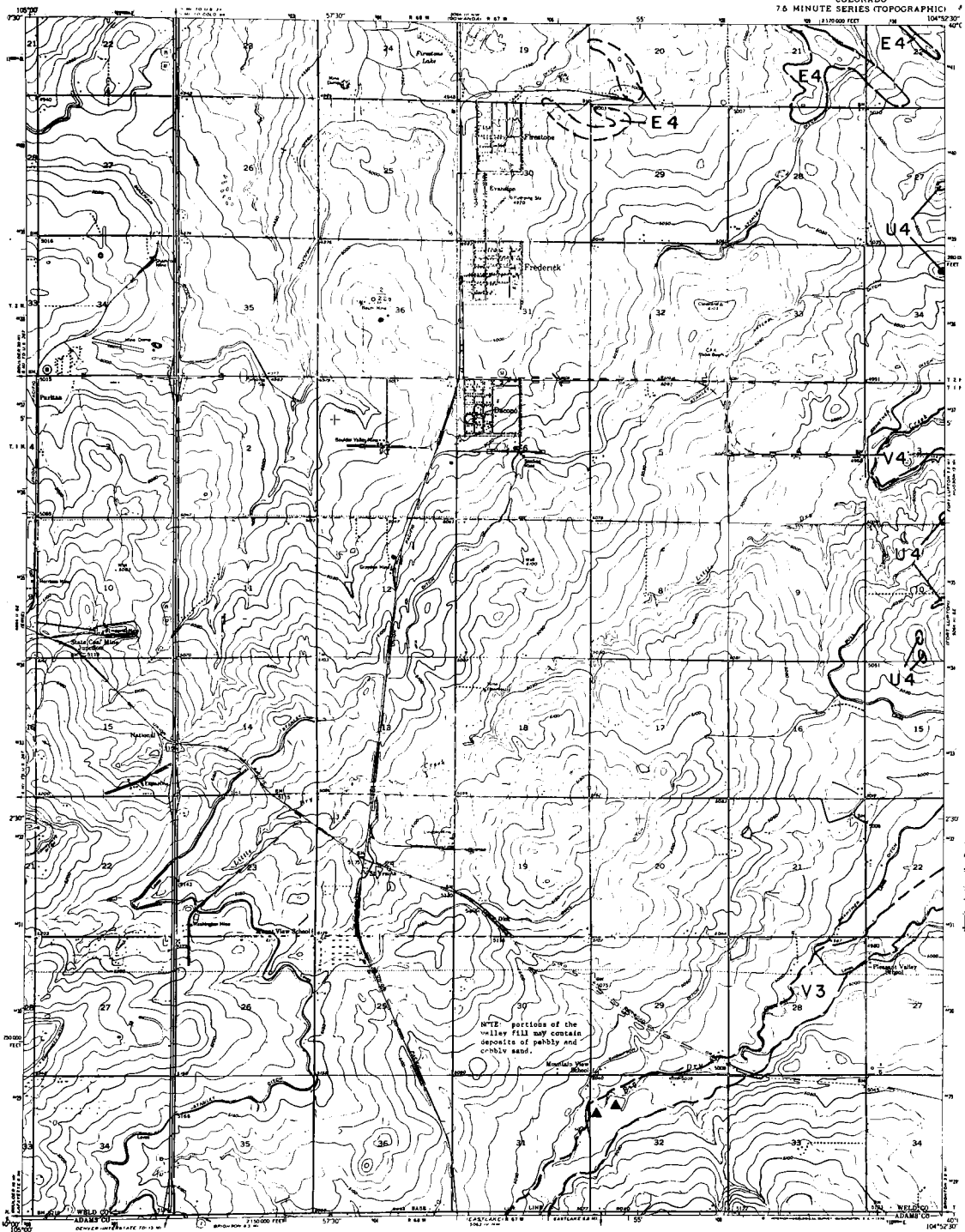
ROAD CLASSIFICATION
 Heavy duty Light duty
 Medium-duty Unimproved dirt
 U.S. Route State Route

FOWLER, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

FREDERICK QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR



EXPLANATION

- CONTOUR LINES**
See map classification
- LITHOLOGIC UNITS**
F Fluvial deposit
T Stream terrace deposit
V Valley fill (U & T)
U Upland deposit
A Alluvial fan
E Wind-deposited sand (eolian)
M Man-made deposits (data available, see...)
- MINERAL CLASSIFICATION**
Cement materials
1 Gravel: relatively clean and sound
2 Gravel: significant fines, decomposed rock, carbonaceous
3 Sand
4 Probable aggregate resource
- AGGREGATE RESOURCES**
Operating gravel and/or sand pit
Abandoned gravel and/or sand pit
Operating stone quarry
Abandoned stone quarry
Potential quarry aggregate resource area
Bounded well or well-like location with overburden thickness (ft) over sand/gravel resource thickness (ft); rounded (R) well-like location with overburden thickness (ft) over sand/gravel resource thickness (ft); " indicates gravel, "u" indicates sand
In symbol: numbers unventilated or unknown property
"u" denotes Colorado Geological Survey boundary, solid black areas known or observed; dashed lines approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF ROAD**
Overburden thickness (ft)
Sand/gravel resource thickness (ft)
Percent sand and fines (percent of
entire, 0-100%)
Significant amount of fines (percent
of sand, 0-100%)
Significant amount of decomposed or weak rock
"u" or symbol denotes unventilated or unknown property
"R" is symbol denotes properly about or changed/cont.

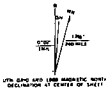


■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:
Colton, R.H., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Osageley Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map 1-55-D.

Mapped by: Ralph R. Shroba
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey 7.5-minute quadrangle



CONTOUR INTERVAL 10 FEET
DONTON 4 MEAN SEA LEVEL

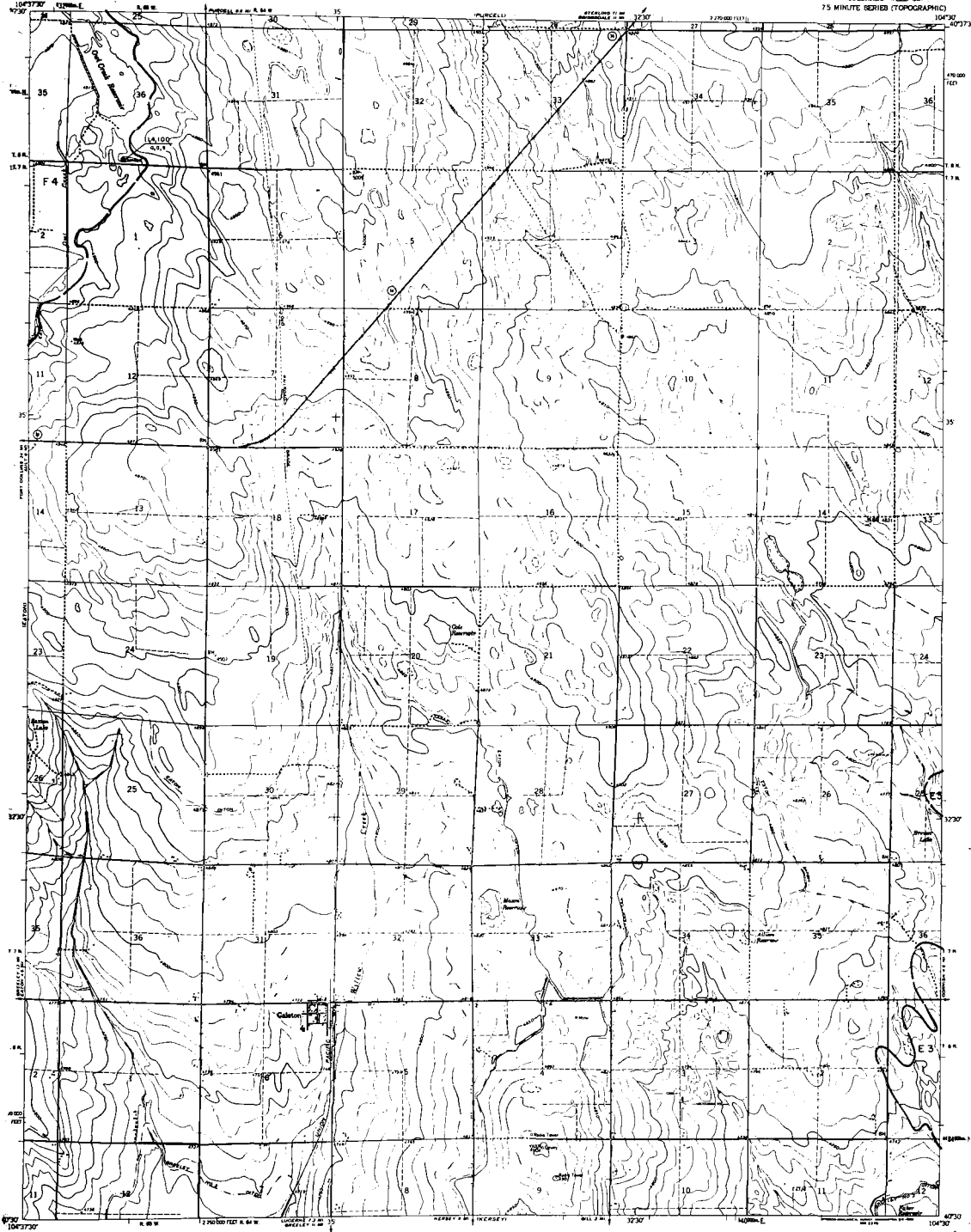
ROAD CLASSIFICATION
HARD SURFACE ALL WEATHER ROADS
HEAVY DUTY
MEDIUM DUTY
LOW SURFACE, GRADED, OR NARROW HARD SURFACE
Interstate Route
U.S. Route
State Route
OFF WEATHER ROADS
Unimproved dirt
Unimproved dirt

FREDERICK, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

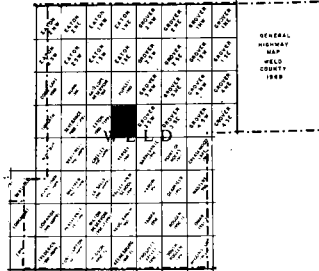
GALETON QUADRANGLE
COLORADO, WEST CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLA, DIRECTOR



EXPLANATION

- Landform units
 - Fluvial deposit
 - Stream terrace deposit
 - Valley fill (F & T)
 - Quaternary deposits
 - Alluvial fan
 - Man-made deposit (e.g., fill, spoil, etc.)
- RESOURCE CLASSIFICATION
 - Gravel
 - 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcine carbonate
 - Fill materials
 - 3 Sand
 - Reclaimed Resources
 - 4 Probable aggregate resources
- MAP SYMBOLS
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Reclaimed quarry aggregate resource area
 - Selected well or drill-hole location with preferred thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "g" indicates gravel; "s" indicates sand
 - "*" in symbol denotes unconsolidated or unknown property.
 - "M" denotes Colorado Geological Survey "Mineral Land and Claims Project" (MLC)
 - Landform boundary, solid where known or observed, dashed where approximate or inferred.
- SECTION, LOCATION AND GEOLOGICAL CHARACTERIZATION OF DEPOSIT
 - contourless thickness (ft)
 - development resource thickness (ft)
 - percent sand and fines (spacing 84 column, 0.25 in.), visual estimation
 - significant amount of fines (spacing 480 column, 0.004 in. or 0.024 mm.)
 - significant amount of decomposed or weak rock.
 - significant amount of calcine carbonate (asterisk)
 - "*" in symbol denotes unconsolidated or unknown property.
 - "M" in symbol denotes property absent or unclear/cont.

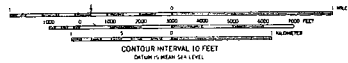


- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
Swan, R. H., III, 1972, Map of surficial geology of part of the Galeton quadrangle: Recon. mapping for Colorado Geol. Survey Window Environmental Geology Project, open-file map.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



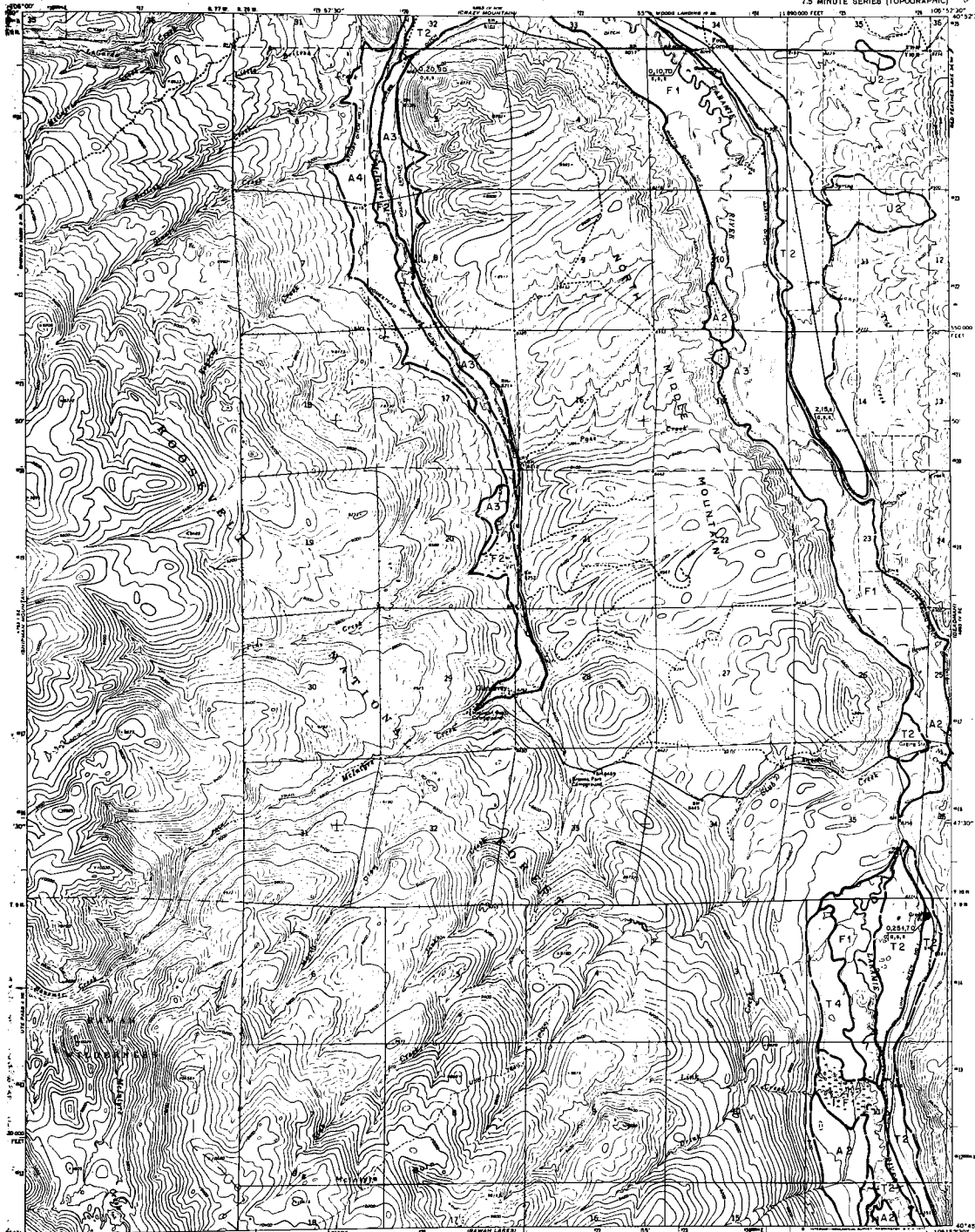
- ROAD CLASSIFICATION
 - Medium-duty
 - Light-duty
 - Unimproved dirt
 - State Route

GALETON, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

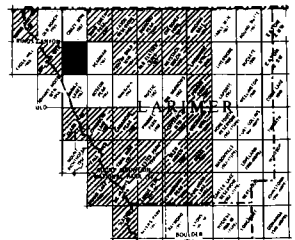
OLENDEVEY QUADRANGLE
COLORADO - LARIMER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. REED, DIRECTOR



EXPLANATION

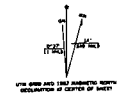
- Land-use units**
Resource class/function
- LANDFORMS**
F Fluvial deposit
T Stream terrace deposit
V Valley fill (F & T)
U Upland deposits
A Alluvial fan
E Wind-eroded sand (eolian)
M Hummock deposits (e.g., collins, spalls...)
- RESOURCE CLASSIFICATION**
- COARSE MATERIALS**
1st class: 20% or more on 20 screen, visual estimation
2 Cravel: relatively clean and good
3 Cravel: significant fines, decomposed rock, contain concretions
- FINE MATERIALS**
1st class: 20% or more on 20 screen, 60% retained on 200 screen, visual estimation
3 Sand
- Unutilized Resources**
4 Probable aggregate resources
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft.) over sand/gravel resource thickness (ft.), obtained from well logs
 - "u" indicates gravel; "a" indicates sand
 - "u" or "a" symbol denotes unutilized or unknown property.
 - "u" denotes Colorado Geological Survey "landfill and stream projects" drill hole
 - Land-use boundary, solid where known or observed; dashed where approximate or inferred.
- SYMBOLS AND CHARACTERISTICS OF SPILLS**
- overburden thickness (ft.)
 - percent sand and fines (passing #20 screen, 0.85 mm), visual estimation
 - Significant amount of fines (passing #200 screen, 0.075 mm) or 0.075 mm
 - Significant amount of decomposed or weak rock.
 - "u" or "a" symbol denotes unutilized or unknown property.
 - "u" or "a" symbol denotes property absent or changed/changed.



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schwchow
Date: June 30, 1974

Base from U. S. Geological Survey
7 1/2 minute quadrangle



CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 30-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

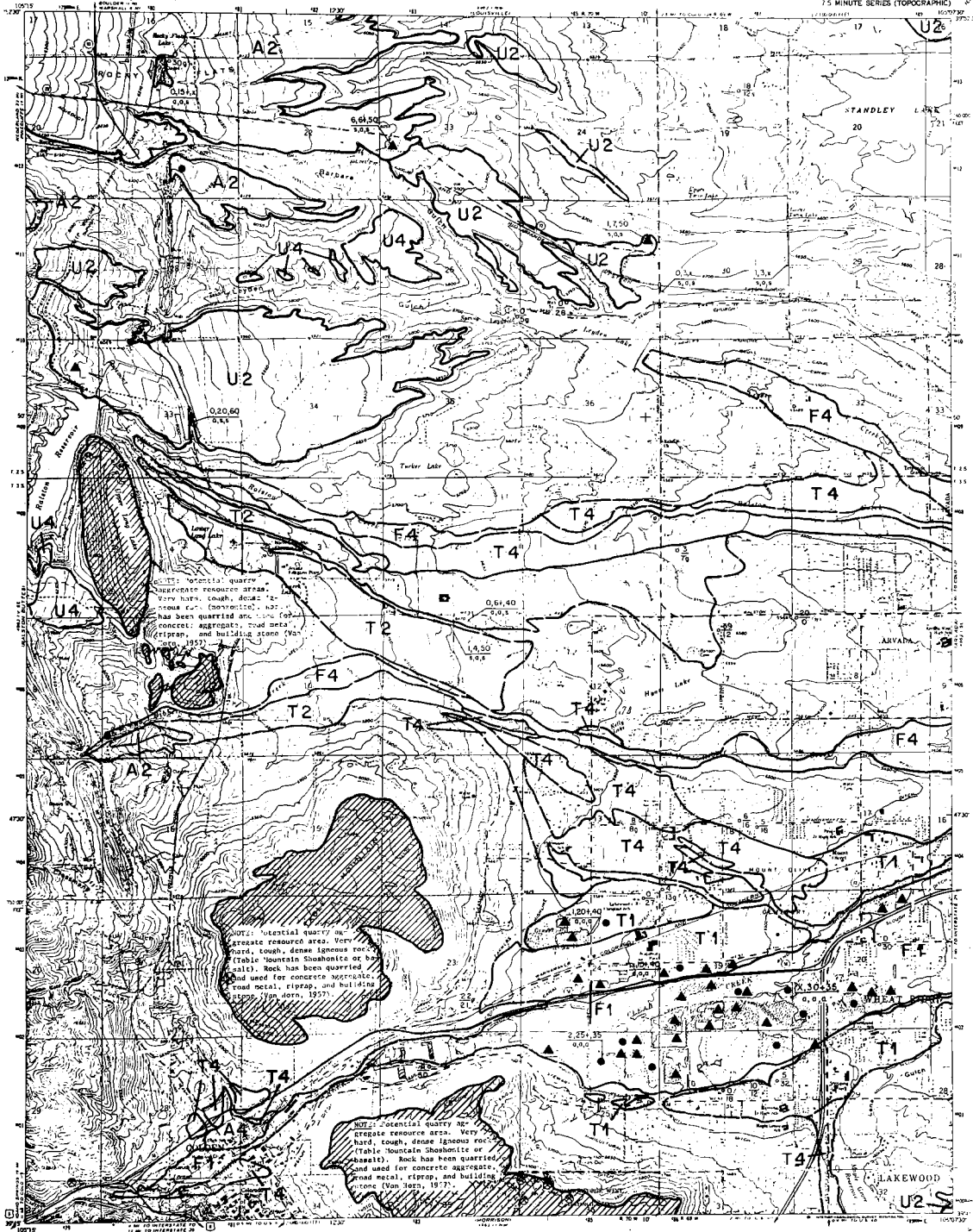
ROAD CLASSIFICATION
Lg+6-0 Unimproved dirt

OLENDEVEY, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

GOLDEN QUADRANGLE
COLORADO-JEFFERSON CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



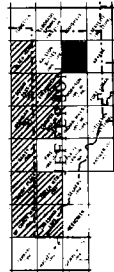
EXPLANATION

- Contour interval
- Lowest class fluvial
- MAJORED UNIT
- F Fluvial deposit
- T Tertiary deposit
- V Volcanic (T & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Metamorphic deposit (slates, shales, gneiss, ...)

- RESOURCE CLASSIFICATION
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous
 - 3 Sand
 - 4 Probable aggregate resource

- NOTES
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Gravel and/or sand only location with overburden thickness (ft) over sand/gravel resource
 - Gravel and/or sand only location with overburden thickness (ft) over sand/gravel resource
 - "a" indicates gravel, "s" indicates sand
 - "r" in symbol denotes unconsolidated or unknown resource
 - "m" denotes Colorado Geological Survey Method (sand and gravel) or Steel project's drill hole
 - Landform boundary, solid where known or inferred; dashed where approximate or inferred

- STATION, LOCATION AND QUANTITIES
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - gravel and/or sand only (ft) (ft)
 - significant amount of fines (ft)
 - significant amount of decomposed or weak rock
 - significant amount of calcareous material
 - significant amount of decomposed or weak rock
 - significant amount of calcareous material



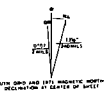
QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:
Gardner, W.C., Simpson, H.E., and Hart, S.S., 1971, Preliminary engineering geologic map of the Golden Quadrangle, Jefferson County, Colorado; U.S. Geol. Survey Misc. Field Studies Map MF-308.
Van Horn, Richard, 1972, Surficial and bedrock geologic map of the Golden Quadrangle, Jefferson County, Colorado; U.S. Geol. Survey Misc. Geol. Inv. Map T-761-A.

References:
Titterton, Regional Planning Commission, 1961, Drainage course plan for the Denver region - Part 1, Sand and gravel; Denver, Colo., Inter-County Reg. Plan. Comm., pl. 1.
Hamilton, J.L., and Owens, W.C., 1972, Geologic aspects, soils and related foundation problems, Denver metropolitan area, Colorado; Colorado Geol. Survey Environmental Geology Dept. 1, pl. 1.
Chase, C.H., and McConaghy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado; U.S. Geol. Survey Misc. Geol. Inv. Map T-731.
Van Horn, Richard, 1957, Bedrock geology of the Golden Quadrangle, Colorado; U.S. Geol. Survey Geol. Map T-703.

Trishla, D.E., and Pritch, H.A., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.; D. S. Geol. Survey Misc. Geol. Inv. Map T-856-A.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



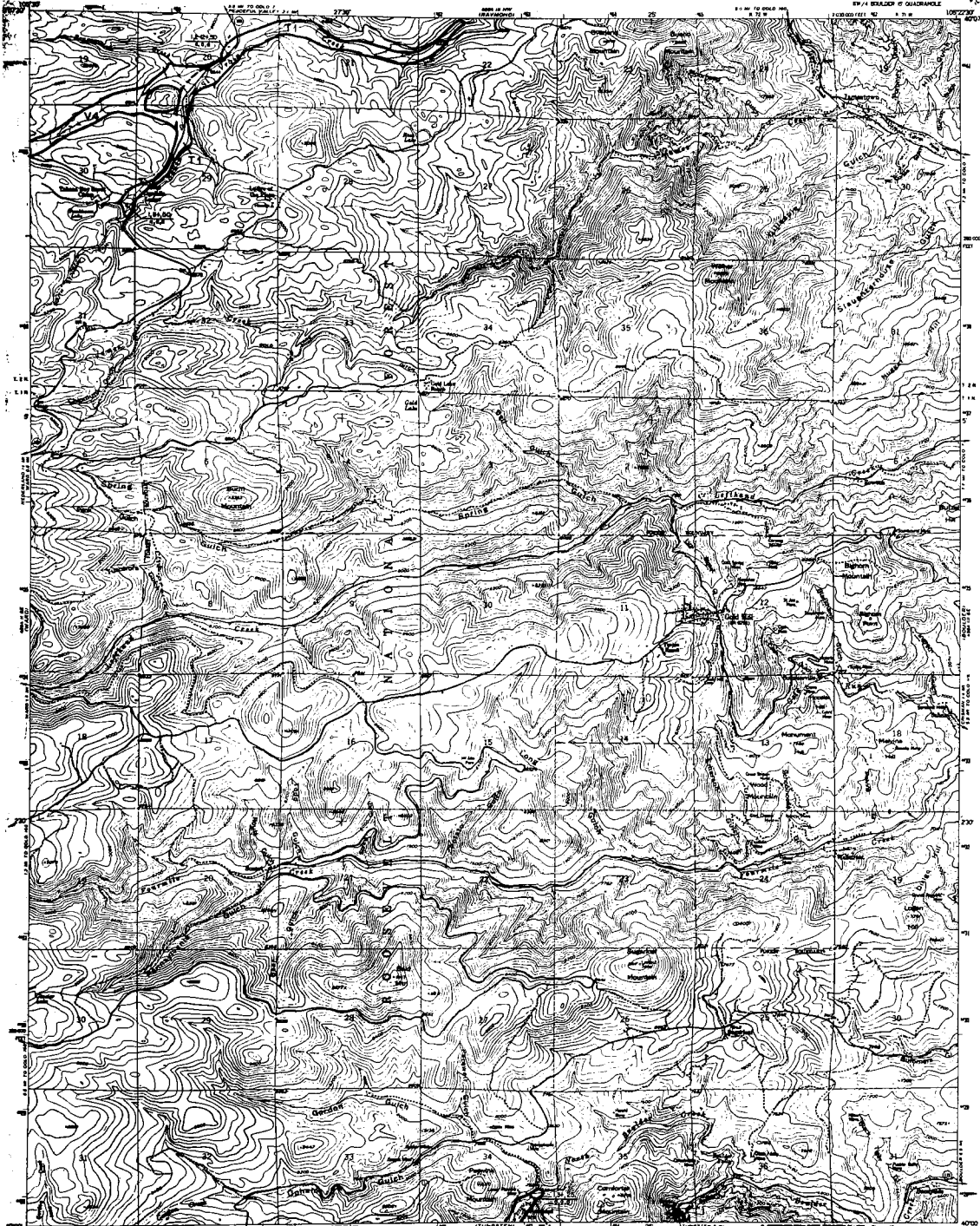
Mapped by: Stephen D. Schochov
Date: June 30, 1974
Prepared in cooperation with the
U. S. Geological Survey

ROAD CLASSIFICATION
Heavy-duty Light-duty
Medium-duty Unimproved dirt
U.S. Route State Route
Interstate Route

GOLDEN, COLO.

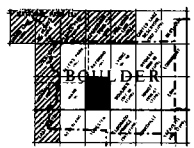
SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

GOLD HILL QUADRANGLE
COLORADO-Boulder CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
BY A BRANCH OF QUADRANGLE



EXPLANATION

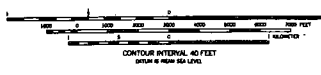
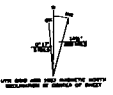
- Landform unit**
Removal class/foot/ton
- LANDFORM UNIT**
- F Floodplain deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Hummock deposits (shag, talus, spalls...)
- RESOURCE CLASSIFICATION**
- Crustal Aggregate**
 Not used on this map.
- 1** Gravel: Relatively clean and sound
2 Gravel: Significant fines, decomposed rock, talus, cobbles.
- Fill Aggregate**
3 Sand
4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); shaded from well logs.
 - "s" indicates gravel; "m" indicates sand
 - "a" in symbol denotes unconsolidated or unknown property.
 - "m" denotes Colorado Geological Survey "Minimum/Maximum and gravel statistics" drill hole
 - Landform boundary, solid where known, wavy where dashed where approximate or inferred.
- RELATION LOCATION AND TOPOGRAPHICAL DESCRIPTION OF SYMBOLS**
- Overburden thickness (ft)
 - Non-gravel resource thickness (ft)
 - Gravel and fines (spacing of symbol, 2.5 in. 1; usual extraction)
 - Significant amount of fines (spacing of symbol, 2.5 in. 1; usual extraction)
 - Significant amount of decomposed or weak rock.
 - "a" in symbol denotes unconsolidated or unknown property.
 - "m" in symbol denotes property absent or unperfected.



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Ralph S. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



ROAD CLASSIFICATION

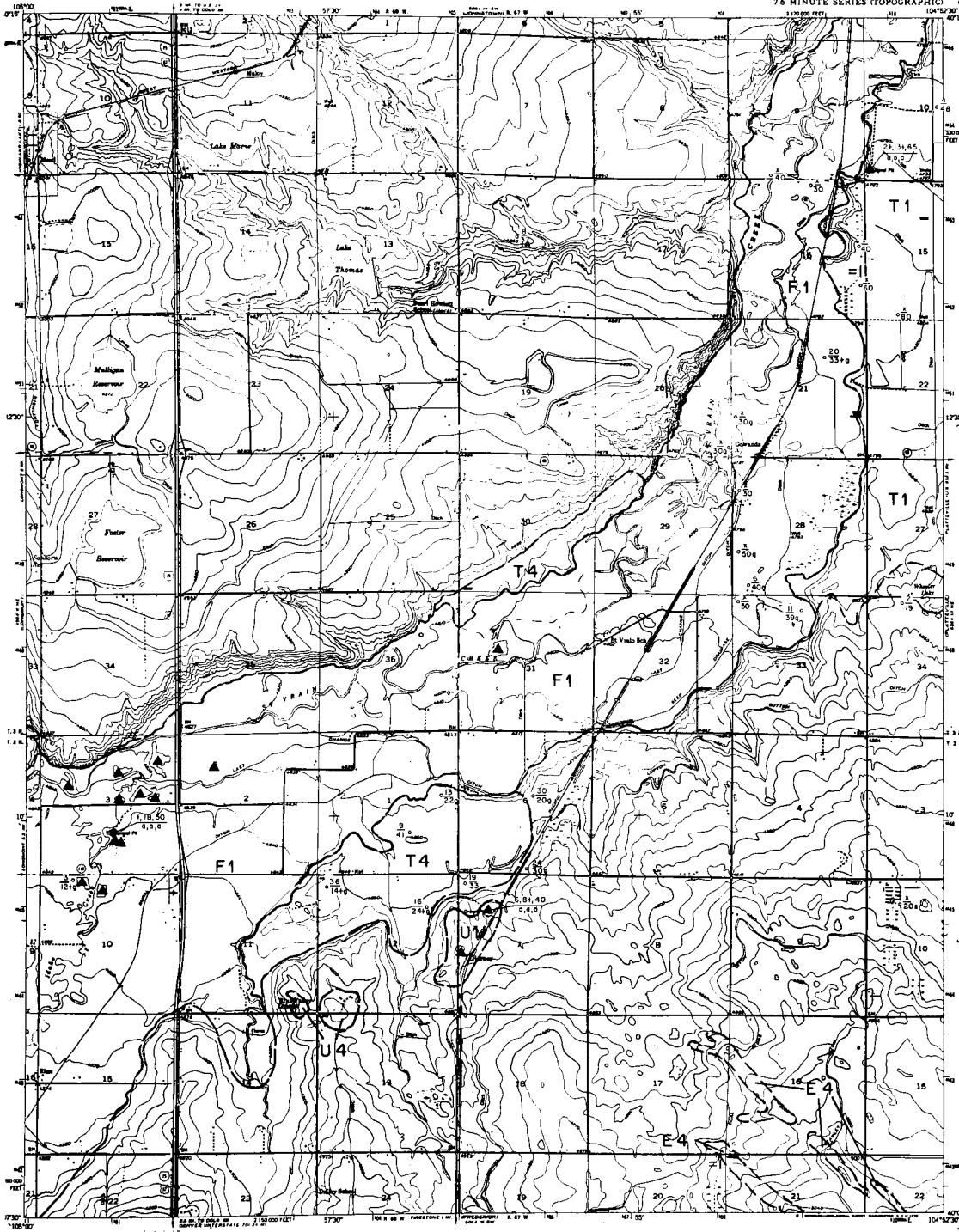
Multi-lane highway Light duty
 Unimproved dirt
 State Route

GOLD HILL, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

GOWANDA QUADRANGLE
COLORADO-WELD CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



EXPLANATION

- Landform unit**
Resource classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Erosion surface deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wash-deposited sand (alluvial)
 - M Mountain deposit (talus, talus, spalls...)
- RESOURCE CLASSIFICATION**
- Coarse aggregate**
- 1 Coarse: relatively clean and sound
 - 2 Coarse: significant fines, decomposed rock, calcite cementation
- Fine aggregate**
- 3 Sand
- Unconsolidated Resource**
- 4 Probable aggregate resource
- NO SYMBOL**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Reconnaissance quarry aggregate resource area
 - Historical well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "n" indicates gravel; "s" indicates sand
 - "u" in symbol denotes unconsolidated or unknown resource
 - "w" denotes Colorado Geological Survey boundary (open and closed symbols) drill hole
 - Landform boundary, solid lines shown as observed; dashed shows approximate or inferred
- SECTION QUALITY AND GEOLOGICAL DESCRIPTION SYMBOLS**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - percent sand and fines (spacing of symbol, 2.5 ft (ft.), stand estimation)
 - Significant amount of fines (spacing 100 spaces, 0.25 ft, or 0.10 ft)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcite cementation
 - "u" in symbol denotes unconsolidated or unknown resource
 - "w" in symbol denotes property above or insignificant



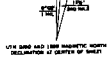
- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after: Colton, R.S., and Pritch, R.S., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Creeley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-655-D.

Mapped by: Ralph S. Shroba
Date: June 30, 1974

Prepared in cooperation with the
U. S. Geological Survey

Base from U. S. Geological Survey
7.5-minute quadrangle



CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

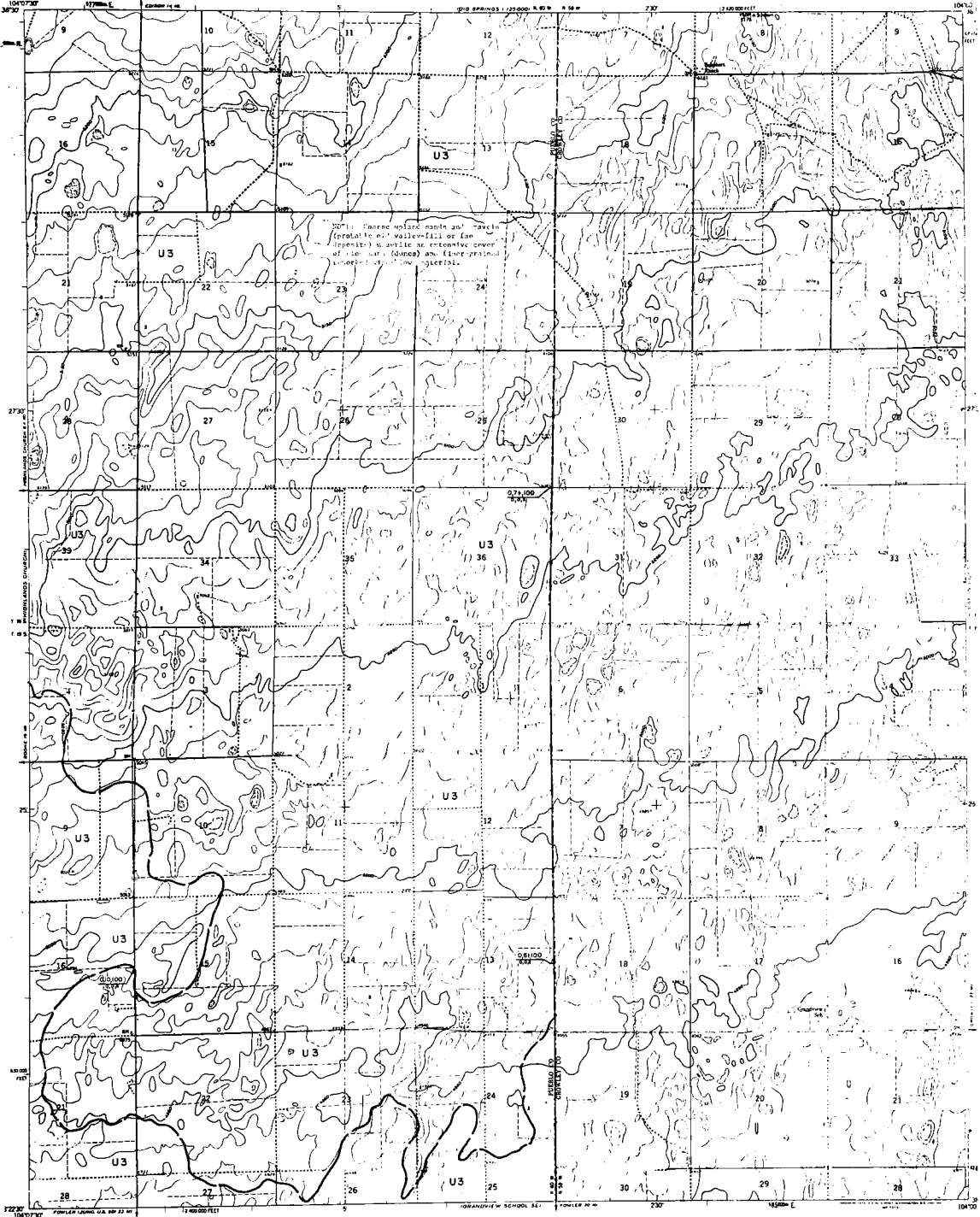
- ROAD CLASSIFICATION**
- HARD SURFACE ALL WEATHER ROADS
 - ON WEATHER ROADS
 - IMPROVED DET.
 - MEDIUM-DUTY
 - UNIMPROVED DET.
 - LOW-SURFACE, GRAVEL, OR SAND HARD-SURFACE
 - INTERSTATE ROUTE
 - U. S. ROUTE
 - STATE ROUTE

GOWANDA, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

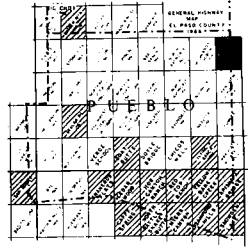
GRANDVIEW SCHOOL QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



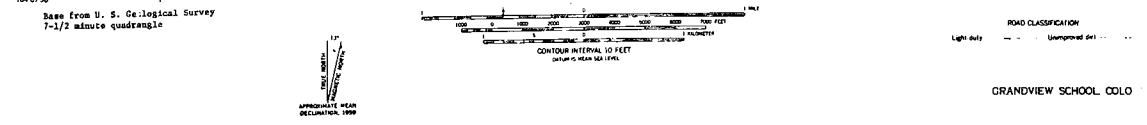
EXPLANATION

- Landform unit
Resource classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E High-dissected sand (alluvium)
 - M Mountain deposits (slag, tailings, spalls...)
- RESOURCE CLASSIFICATION**
- CONCRETE AGGREGATE**
(for 100' x 100' grid on 20' contour, 10' interval)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, increased rock, coarse aggregate
- FILL MATERIALS**
(based on 10' spacing of survey, 20' interval on 100' contour, 10' interval)
- 3 Sand
 - 4 Probable aggregate resources
- QUIRY SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs:
 - "0" indicates gravel; "0" indicates sand
 - "0" in symbol denotes unclassified or unknown property
 - "0" in symbol denotes Geological Survey Well/Drill Hole and Gravel Indicator
 - Drill hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- SECTION LOCATION AND TOPOGRAPHIC DESCRIPTION OF SYMBOL**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Percent sand and fines (spacing 20' contour, 0.25 in. / 10' interval)
 - 0.25
 - Significant amount of fines (spacing 100' contour, 0.25 in. or 0.25 in.)
 - Significant amount of decomposed or weak rock
 - Significant amount of selected aggregate indicator
 - "0" in symbol denotes unclassified or unknown property
 - "0" in symbol denotes properly placed or designed



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

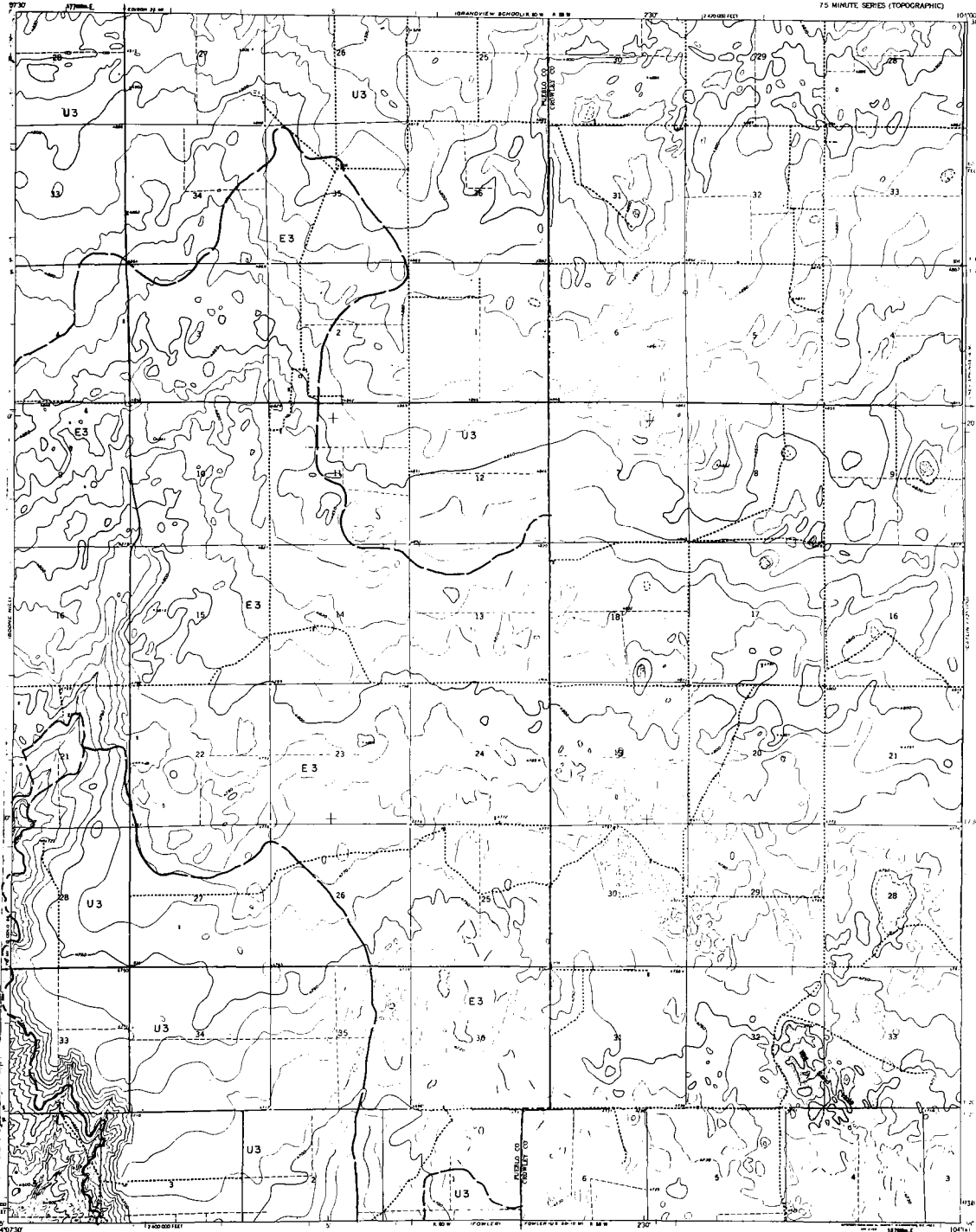
Mapped by: Stephen D. Schwabow
Date: June 30, 1974



GRANDVIEW SCHOOL COLO

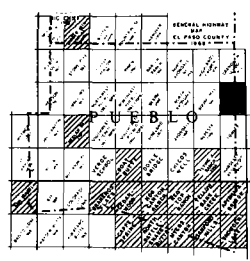
SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

GRANDVIEW SCHOOL SE QUADRANGLE
 COLORADO
 7 1/2 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Landform unit
- Resource classification
- LANDFORM UNITS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (dams, fillings, spalls...)
- RESOURCE CLASSIFICATION**
 - Class 1 Aggregate**
 (at least 25% prepared in 48 screen, visual estimation)
 - 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, unrounded rock, calcium carbonate
 - Class 2 Aggregate**
 (at least 25% passing 48 screen, 80% retained on 200 screen, visual estimation)
 - 3 Sand
 - 4 Unwashed aggregate resource
- NOTATIONS**
 - * Operating gravel and/or sand pit
 - ⊙ Abandoned gravel and/or sand pit
 - ⊙ Operating stone quarry
 - ⊙ Abandoned stone quarry
 - ⊙ Potential quarry aggregate resource area
 - Selected well or drill-hole location with over-borehole thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "C" indicates gravel; "S" indicates sand
 - "*" in symbol denotes unvestigated or unknown property.
 - "# denotes Colorado Geological Survey Hydrological and Gravel projects' drill hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION LOCATION AND CORRELATION SPECIFICATION OF SYMBOL**
 - over-borehole thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (passing 48 screen, 0.075 in.) or 0.075 mm.
 - significant amount of dumpings or wash rock.
 - significant amount of in-situ materials (caliche)
 - "*" in symbol denotes unvestigated or unknown property.
 - "# in symbol denotes property absent or insignificant



QUADRANGLE LOCATION
 NON-RESOURCE OR WITNESS AREA

Mapped by: Stephen D. Schwechow
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle

APPROXIMATE MEAN DECLINATION, 1980



CONTOUR INTERVAL, 10 FEET
 SHOWN WITH 10' LEVEL

ROAD CLASSIFICATION
 Light duty Unimproved dirt

GRANDVIEW SCHOOL SE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

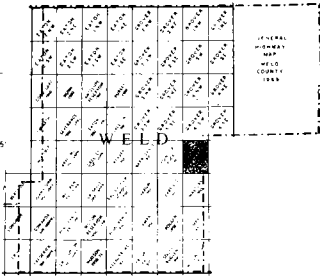
OREASWOOD LAKE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLA, DIRECTOR



EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Alluvial fan (F & T)
 - U Stream terrace
 - A Alluvial fan
 - E Sand-rippled sand (alluvial)
 - M Sandstone deposits (sand, siltstone, shale, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Resources**
(As classified according to 84 Comp., 84-100)
- 1 Gravel, abundant; clean and well sorted
 - 2 Gravel, abundant; clean and well sorted, some silty
 - 3 Sand
 - 4 Probable aggregate resource
- Sand Resources**
- 1 Operating gravel and/or sand pit
 - 2 Abandoned gravel and/or sand pit
 - 3 Operating stone quarry
 - 4 Abandoned stone quarry
 - 5 Potential quarry aggregate resource area
- Other Symbols**
- Selected well-sorted fine to medium sand
 - Selected well-sorted fine to medium sand (quartzite)
 - Selected well-sorted fine to medium sand (sandstone)
 - "S" symbol denotes sandstone or sandstone property
 - "W" symbol denotes well-sorted sandstone property
 - Landform boundary, mild where known or observed, dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL ANALYSIS OF SYMBOLS**
- 1-4 Station location
 - 5-8 Station location
 - 9-12 Station location
 - 13-16 Station location
 - 17-20 Station location
 - 21-24 Station location
 - 25-28 Station location
 - 29-32 Station location
 - 33-36 Station location
 - 37-40 Station location
 - 41-44 Station location
 - 45-48 Station location
 - 49-52 Station location
 - 53-56 Station location
 - 57-60 Station location
 - 61-64 Station location
 - 65-68 Station location
 - 69-72 Station location
 - 73-76 Station location
 - 77-80 Station location
 - 81-84 Station location
 - 85-88 Station location
 - 89-92 Station location
 - 93-96 Station location
 - 97-100 Station location

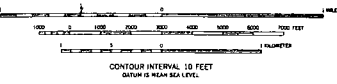


- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR INTERFERING AREA

REFERENCE: Bjorklund, L. J., and Brown, R. P., 1957, Geology and ground-water resources of the lower South Platte River valley between Hardin, Colorado, and Fort, Nebraska. U. S. Geol. Survey Water-Supply Paper 1378, pl. 1.

Mapped by: Phillip C. Wickless
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



- ROAD CLASSIFICATION**
- Heavy-duty road
 - Light-duty road
 - U.S. Road
 - State Road

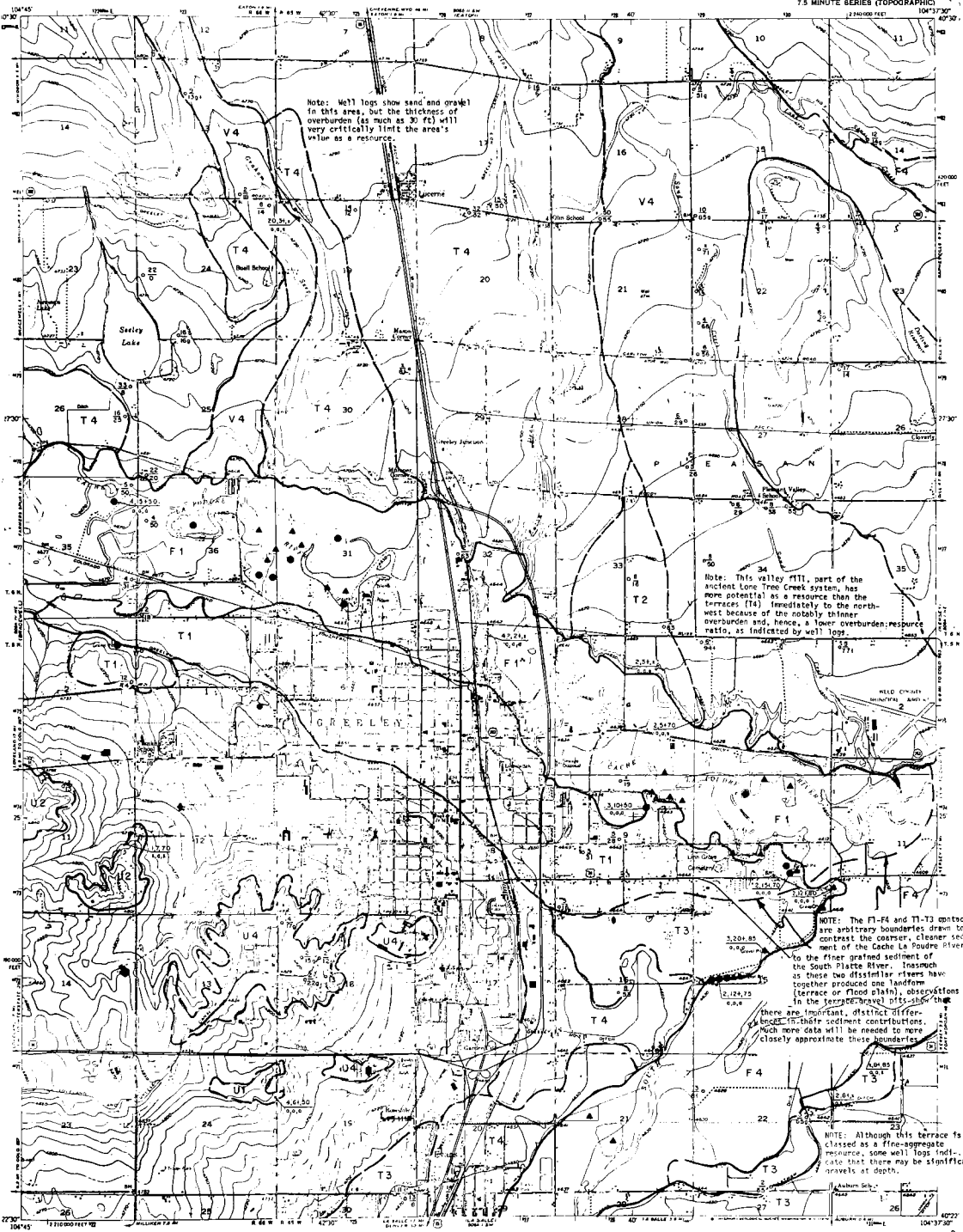
OREASWOOD LAKE, COLO.

APPROXIMATE MEAN
DECLINATION, 1990

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

GREELEY QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
2400000 FEET

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. AGOLD, DIRECTOR



Note: Well logs show sand and gravel in this area, but the thickness of overburden (as much as 30 ft) will very critically limit the area's value as a resource.

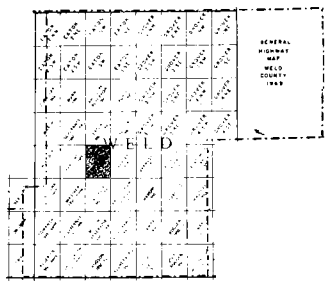
Note: This valley fill, part of the ancient Lone Tree Creek system, has more potential as a resource than the terraces (T4) immediately to the northwest because of the notably thinner overburden and, hence, a lower overburden:resource ratio, as indicated by well logs.

NOTE: The F1-F4 and T1-T3 contacts are arbitrary boundaries drawn to contrast the coarser, cleaner sediment of the Cache La Poudre River to the finer graded sediment of the South Platte River. Inasmuch as these two distasteful rivers have together produced one landform (terrace or flood plain), observations in the terrace gravel pits show there are important, distinct differences in their sediment contributions. Much more data will be needed to more closely approximate these boundaries.

NOTE: Although this terrace is classed as a fine-aggregate resource, some well logs indicate that there may be significant gravels at depth.

EXPLANATION

- SYMBOLS**
- Contour interval
 - Resource classification
- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley Fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (dike, tailings, waste, ...)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
- 1 Coarse aggregate (not less than 100 percent on 48 screen, usual restriction)
 - 2 Coarse aggregate (not less than 100 percent on 48 screen, but with 10-20 percent on 100 screen, usual restriction)
 - 3 Sand
 - 4 Probable aggregate resource
- Fine Aggregate**
- 1 Fine aggregate (not less than 100 percent on 20 screen, usual restriction)
 - 2 Fine aggregate (not less than 100 percent on 20 screen, but with 10-20 percent on 40 screen, usual restriction)
 - 3 Sand
 - 4 Probable aggregate resource
- WELL SYMBOLS**
- Abandoned gravel under sand pit
 - Operating gravel under sand pit
 - Abandoned stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Intersected with well-bore location with overburden thickness (ft) and overburden:resource ratio (O/R), obtained from well logs. "0" indicates overburden; "0" indicates sand.
 - "*" in symbol denotes unrelieved or unknown overburden.
 - "**" denotes Colorado Geological Survey Boulder/Lead and Great projects.
 - "L" indicates local boundary, although known or observed; dashed lines otherwise inferred.
- STATION, LOCATION AND GEOLOGICAL SIGNIFICANCE OF DEPOSIT**
- Overburden thickness (ft)
 - Aggregate resource thickness (ft)
 - Percent sand and fines (passing #100 screen, 0.075 in.)
 - Significant amount of fines (passing #200 screen, 0.075 in. or 0.075 mm.)
 - Significant amount of unrelieved or unknown overburden
 - Significant amount of action (unrelieved or unknown overburden)
 - "*" in symbol denotes unrelieved or unknown overburden
 - "**" in symbol denotes property owned or designated



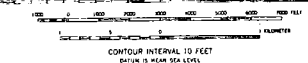
QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

- References:**
- Swan, F. H., III, 1972, Map of surficial geology of the Greeley quadrangle: Recon. Mapping for Colorado Geol. Survey Mendoc Environmental Geology Project, Open-File Map.
 - Hershey, L. A., and Schneider, P. R., Jr., 1972, Geologic map of the Lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-587.
 - Shelton, D. C., 1974, Personal communication.
 - Smith, R.O., Schneider, P.A., Jr., and Peck, L.B., 1964, Ground-water resources of the South Platte River basin in western Adams and southwestern Weld Counties, Colorado: U.S. Geol. Survey Water-Supply Paper 1458, p.11.
 - Geology modified after: Colton, T.B., and Fitch, S.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Greeley Area, Front Range Urban Corridor Colorado: U. S. Geol. Survey Map I-855-D.

Mapped by: Stephen D. Schwochow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle
Prepared in cooperation with the
U. S. Geological Survey.



ROAD CLASSIFICATION

ROADWAY TYPE

- Major
- Medium-duty
- Local surface, graded, or narrow hard surface
- U.S. Route
- State Route

OTHER FEATURES

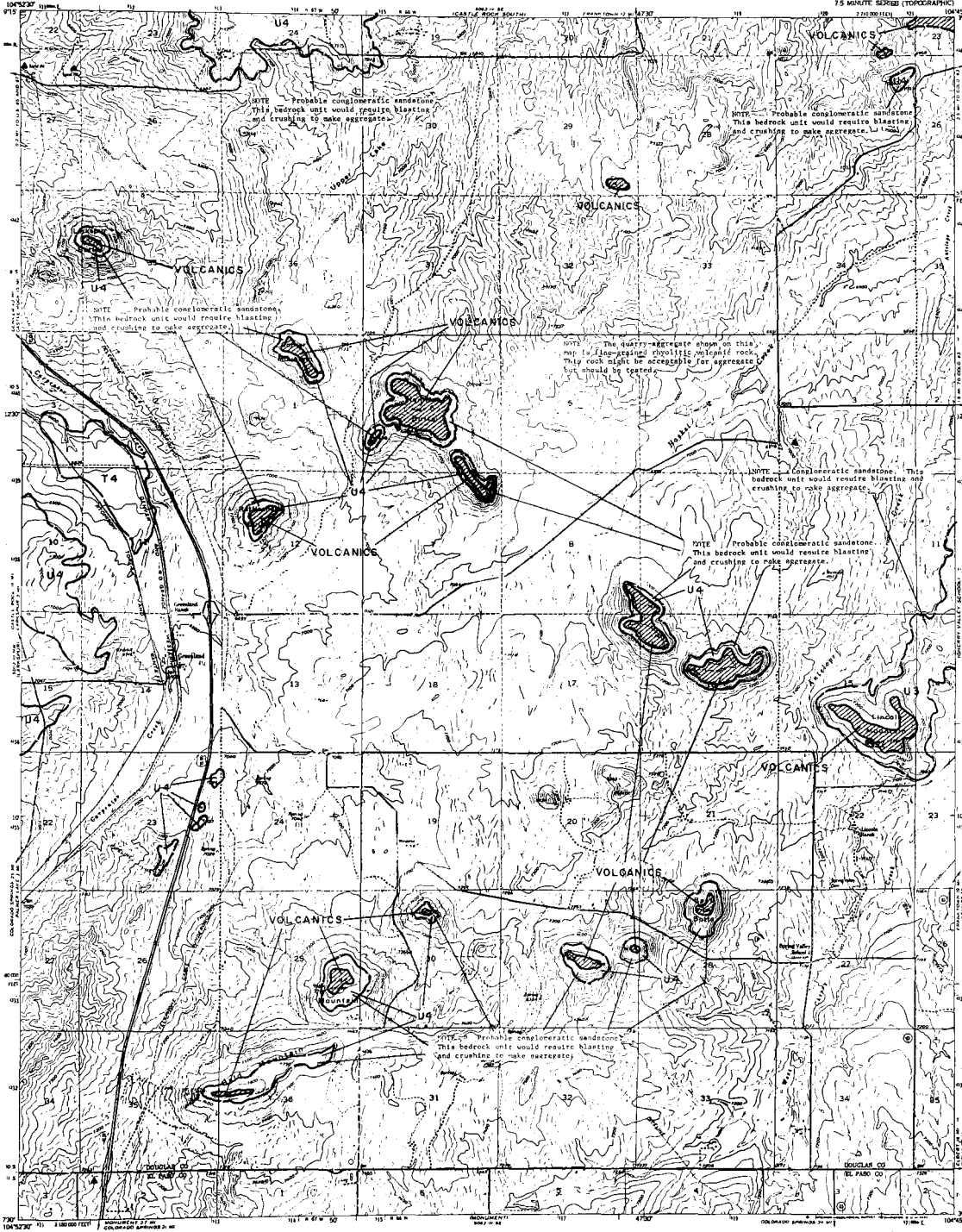
- Weather roads
- Improved dirt
- Unimproved dirt

GREELEY, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

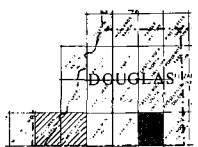
GREENLAND QUADRANGLE
COLORADO
7 1/2 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR

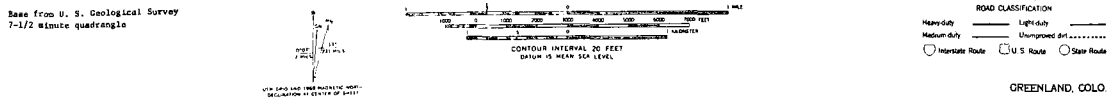


EXPLANATION

- Legend Unit**
Resource Classification
- LEGEND UNIT**
- F Floodable deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-mine aggregate (shale, siltstone, sandstone...)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
at least 275 material in 48 screen, usual retention
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous cementation
- Fine Aggregate**
greater than 750 passing 48 screen, 60% retained on 825 screen, usual retention
- 3 Sand
 - 4 Potential aggregate resource
- MAP SYMBOLS**
- * Operating gravel and/or sand pit
 - A Abandoned gravel and/or sand pit
 - Q Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drilled hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs: " indicates gravel; * indicates sand
 - " in symbol denotes unevaluated or unknown property
 - "m denotes Colorado Geological Survey "Mineral Land and Grant" project" drill hole
 - Landform boundary, solid where known or observed, dashed where approximated or inferred
- STATION LOCATION AND SYMBOLS**
- RESOURCES BY SYMBOL**
- resour. thickness (ft)
 - and/or gravel resource thickness (ft)
 - percent sand and fines (percent of screen, 0.075 in., or 2.0 mm.)
 - significant amount of fines (passing 100 screen, 0.075 in., or 2.0 mm.)
 - significant amount of decomposed or weak rock
 - " in symbol denotes unevaluated or unknown property
 - "* in symbol denotes property about or insignificant
- REFERENCE:**
- Tribble, D.E., and Fitch, H.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado. U.S. Geol. Survey Map 1-537 A.
- Tribble, Donald, 1974. U.S.G.S. Personal Communication
- Mapped by: Phillip C. Wicklein
Date: June 30, 1974
- Prepared in cooperation with the U. S. Geological Survey



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA



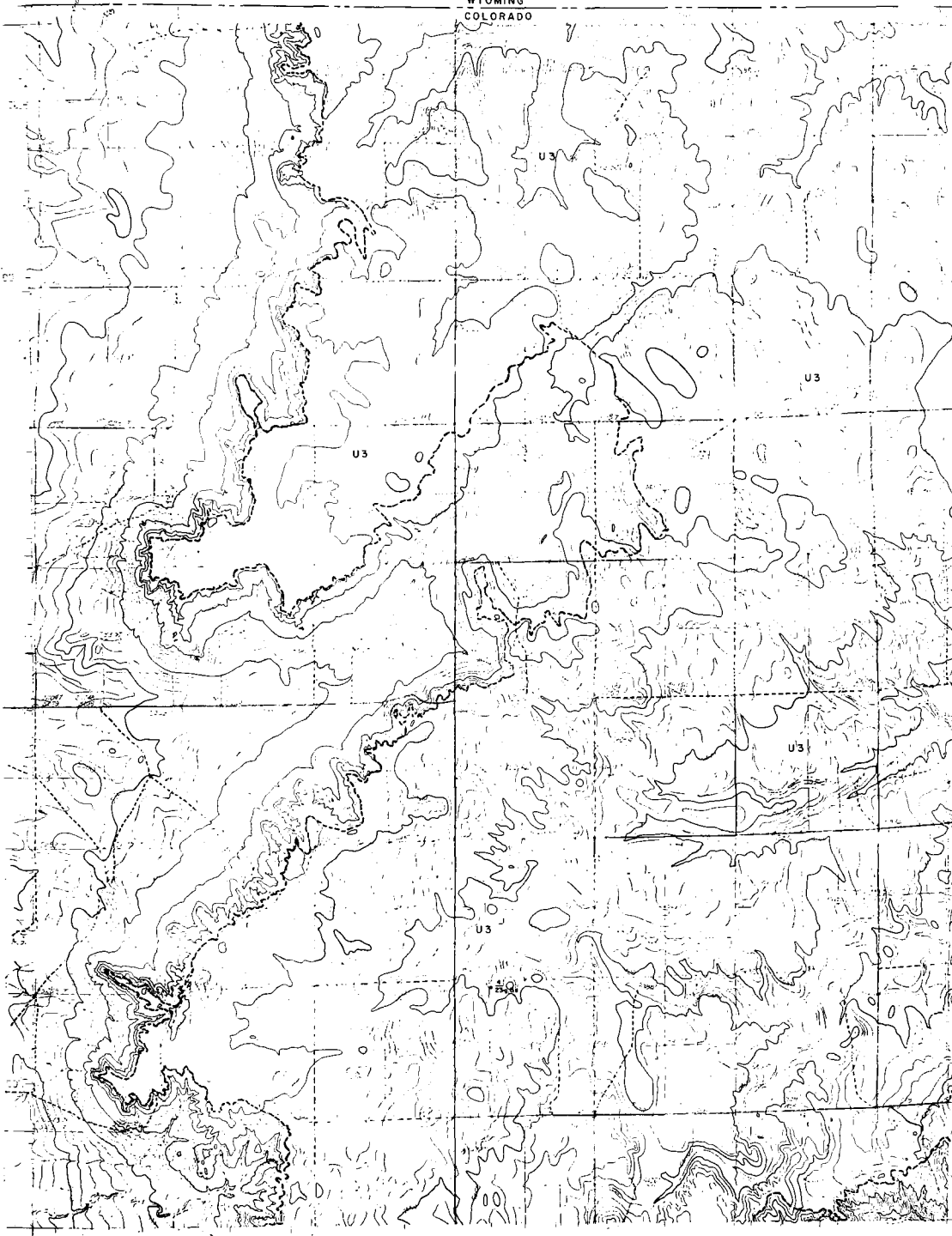
SAND, GRAVEL AND QUARRY AGGREGATE

GROVER 1NE

RESOURCES MAP

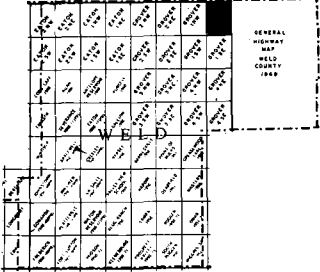
DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. HIGGINS, DIRECTOR

WYOMING
 COLORADO



EXPLANATION

- Contour interval
 - Resource classification
- LAYERS UNIT**
- F Fluvial deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Non-deposited sand (alluvial)
 - M Non-made deposits (slag, tailings, spilla...)
- RESOURCE CLASSIFICATION**
- Core Sample Analysis**
 (at least 20 particles in 25 screen, visual estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, surface softness
- Size Aggregate**
 (greater than 75% passing 48 screen, 25% retained in 42.5 screen, visual estimation)
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - ▲ Abandoned gravel and/or sand pit
 - Operating stone quarry
 - ⊙ Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); shaded area well logs
 - " " indicates gravel; " " indicates sand
 - " " in symbol denotes unconsolidated or unknown property
 - " " American Colorado Geological Survey "Underground and Ground Projects"
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- SECTION, LOCATION AND CHARACTERIZATION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and gravel (greater than 48 screen, 0.75 in.), visual estimation
 - largest/smallest amount of fines (passing 100 screen, 0.0075 in. or 0.075 mm)
 - largest/smallest amount of decomposed or weak rock
 - significant amount of material "nonresource" (alluvial)
 - " " or symbol denotes unconsolidated or unknown property
 - or largest/smallest



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCES: Weber, G.D., Jr., 1965. Reconnaissance of gravel-sand resources in parts of Larimer, Logan, Morgan, Sedgewick, and Weld Counties, Colorado. U. S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

Mapped by: Ralph R. Shroba
 Date: June 30, 1974

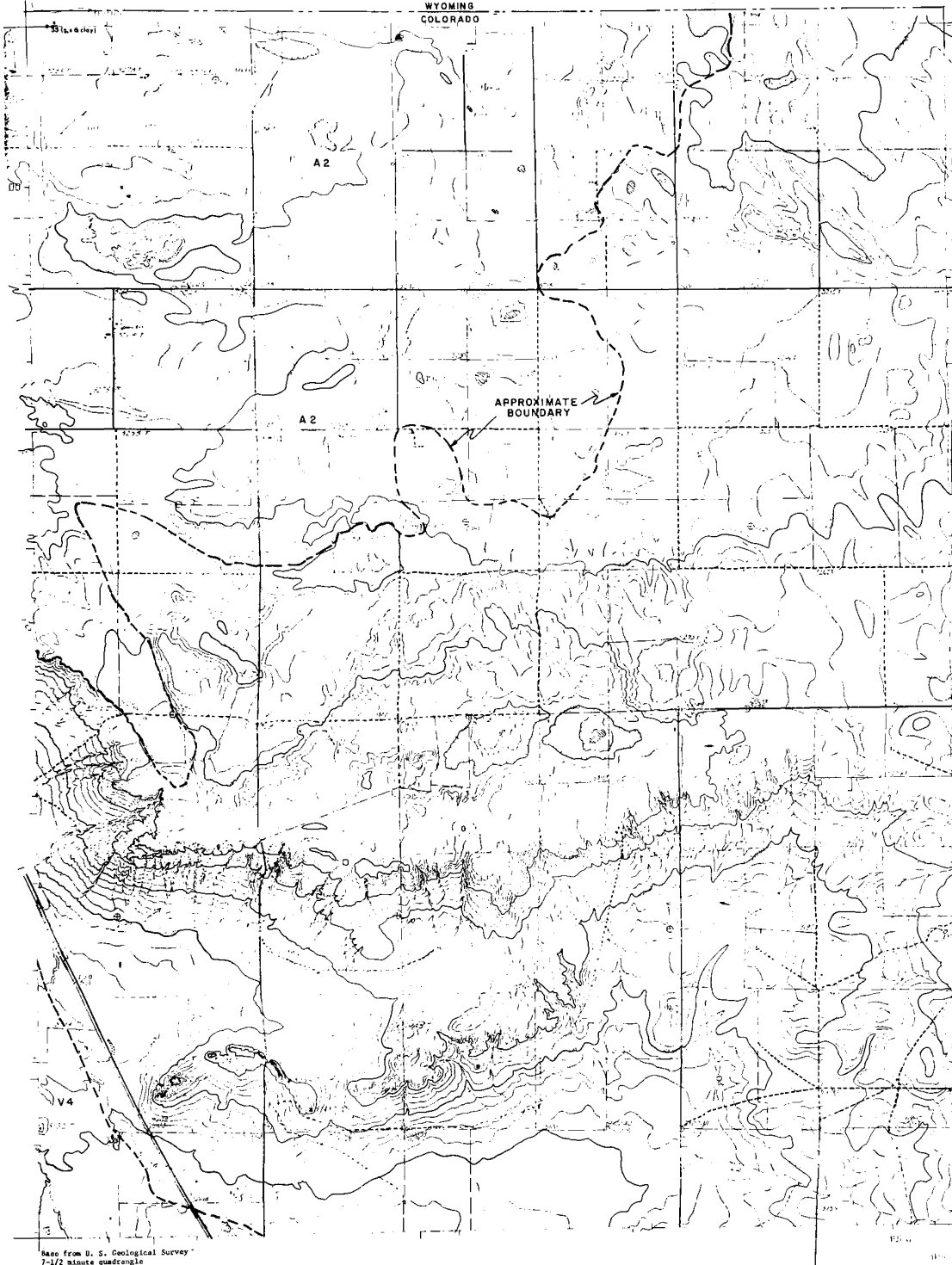
Base from U. S. Geological Survey 7-1/2 minute quadrangle

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

GROVER INW

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

WYOMING
COLORADO



EXPLANATION

— Contour line
— Resource classification

LAYERED DEPOSITS

- F Floodplain deposit
- V Stream terrace deposit
- V Valley fill (F & V)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Non-mine deposits (clay, siltstone, sandstone...)

RESOURCE CLASSIFICATION

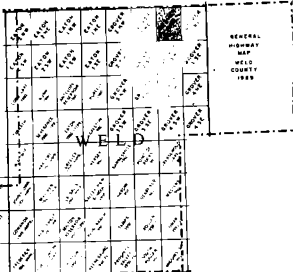
- 1 1st class aggregate resource area (see legend for details on #1 screen, sand retention)
- 2 2nd class: relatively clean and sound aggregate
- 3 3rd class: significant fines, decomposed rock, calcite cementation
- 4 4th class: significant fines, decomposed rock, calcite cementation, $D_{100} > 100\%$ (see legend for details)
- 5 Sand
- 6 Probable aggregate resource
- 7 Probable aggregate resource

MAP SYMBOLS

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Industrial mill or drill hole location with overburden thickness (ft) over sand/gravel resource
- Industrial mill (ft) obtained from mill logs
- "G" indicates gravel, "S" indicates sand
- "M" in symbol denotes unventilated or unknown property
- "M" denotes Colorado Geological Survey (C.G.S.) field and crews project
- Drill hole
- Landform boundary, solid where known or conjectured; dashed where approximate or inferred

SYMBOL LOCATION AND DIMENSIONAL DEFINITION OF SYMBOLS

- overburden thickness (ft)
- non/gravel resource thickness (ft)
- percent sand and fines (spacing of screen, 0.075 in., 0.150 in., 0.300 in.)
- significant amount of fines (spacing of screen, 0.075 in., 0.150 in., 0.300 in.)
- significant amount of decomposed or soft rock
- significant amount of eolian substrate (outline)
- "M" in symbol denotes unventilated or unknown property
- "M" in symbol denotes properly vented or significant



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

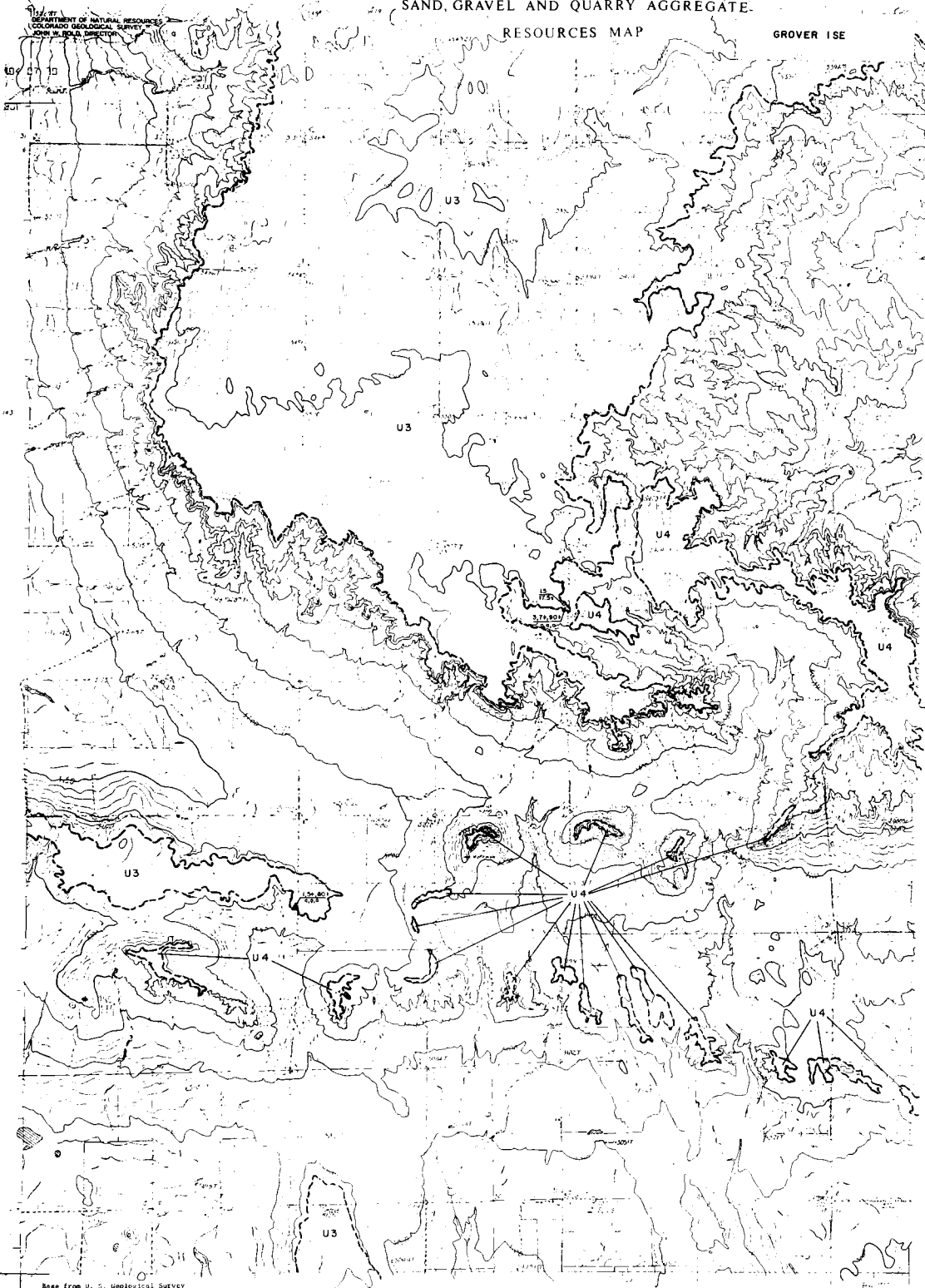
REFERENCE: Weist, M.C., Jr., 1965. Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgwick, and Weld Counties, Colo. U. S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

Mapped by: Ralph A. Shroba
Date: June 30, 1974

Base from U. S. Geological Survey 7-1/2 minute quadrangle

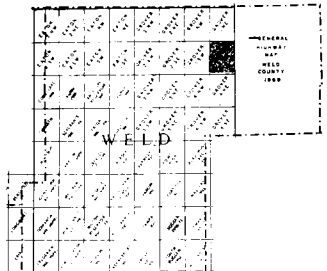
SAND, GRAVEL AND QUARRY AGGREGATE.
RESOURCES MAP

GROVER ISE



EXPLANATION

- (solid line) well
 - (dashed line) fault
- LANDFORMS**
- F Floodable deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, spoils...)
- RESOURCE CLASSIFICATION**
- CLASS 1**
 (1) gravel 75% or more, 10% or less sand
 (2) gravel 50% or more, 10% or less sand
- CLASS 2**
 (1) gravel: relatively clean and sound
 (2) gravel: significant fines, decomposed rock, tabular carbonate
- CLASS 3**
 (1) gravel: 75% or more, 10% or less sand, 25% retained on #200 screen, eolian sediment
 (2) sand
- CLASS 4**
 Potential aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Related well or drill-hole location with overburden thickness (ft) over sand/gravel resource
 - Thickness (ft) obtained from well logs
 - 1/2" indication gravel; 1/4" indicates sand
 - In symbol denotes unconsolidated or unknown gravity
 - "m" denotes minimum biological survey (mineral/land and Geology projects) drill hole
 - Landform boundary, width where known or observed, dashed where approximate or inferred
- STATES, LOCATIONS AND COORDINATES**
- DESCRIPTION OF SYMBOLS**
- (dashed line) boundary (ft)
 - (solid line) resource thickness (ft)
 - (dotted line) sand and fines (spacing 40 percent, 2 to 10 ft)
 - (dotted line) sand and fines (spacing 40 percent, 2 to 10 ft)
 - (dotted line) significant amount of material (thickness indicated)
 - (dotted line) significant amount of material (thickness indicated)
 - (dotted line) "m" in symbol denotes unconsolidated or unknown gravity
 - (dotted line) "m" in symbol denotes property absent or unexplored



REFERENCE: Metcalf, M.C., Jr., 1965. Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgewick, and Weld Counties, Colorado. U.S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

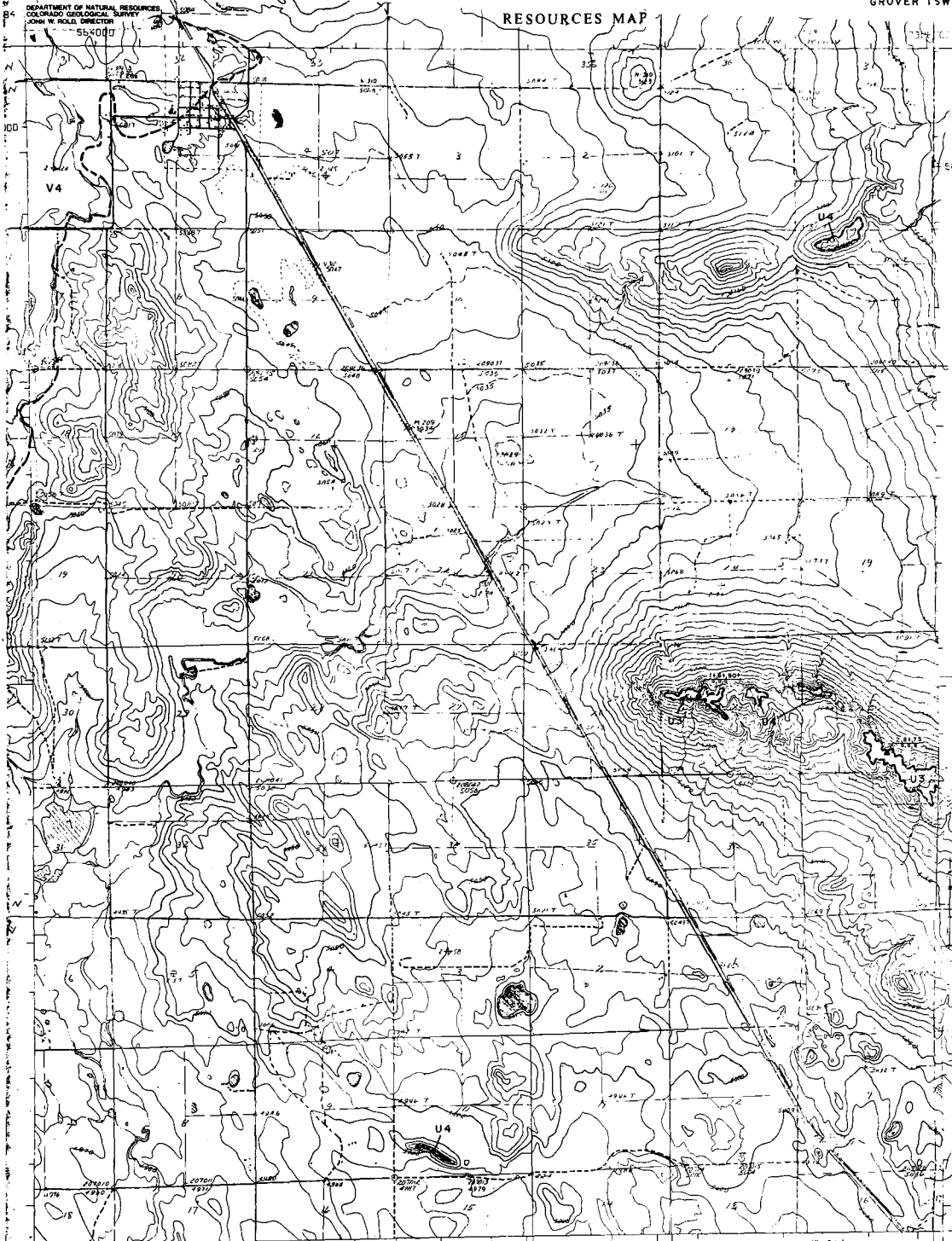
Mapped by: Ralph R. Skroba
Date: June 30, 1974

Base from U. S. Geological Survey 7-1/2 minute quadrangle

SAND, GRAVEL AND QUARRY AGGREGATE

GROVER 15W

RESOURCES MAP



EXPLANATION

- Legend unit
Resource class/location
- LANDFORMS**
- F Alluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made resource (slag, tailings, spoils, etc.)
- GROUND CLASSIFICATION**
- Class 1 Aggregate**
Not listed but available on 1:25,000 scale, visual estimation
- 1 Gravel: relatively clean and sound
 - 2 Gravel: slightly silty, decomposed rock, calcitic cementation
- Class 2 Aggregate**
Not listed but available on 1:25,000 scale, visual estimation
- 3 Sand
 - 4 Probable aggregate resource
- USE SYMBOLS**
- Operating gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Remotely owned aggregate resource area
 - Selected well of well-hole location with over-burden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log.
 - "G" indicates gravel; "S" indicates sand
 - "?" in symbol denotes unclassified or unknown resource
 - "M" denotes Colorado Geological Survey Method/level and cross section
 - Well hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- FAULTS, LOCATIONS AND GEOLOGICAL DESCRIPTIONS OF AREAS**
- Overburden thickness (ft)
 - Remotely owned resource thickness (ft)
 - Ground level and free spacing of overburden, 0.25 in. or 0.375 in.
 - Significant amount of fines (spacing 1/8 in. where 0.25 in. or 0.375 in.)
 - Significant amount of medium carbonate facies
 - "u" in symbol denotes unclassified or unknown resource
 - "s" in symbol denotes properly selected or classified



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Meier, H.C., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgwick, and Weld Counties, Colo.: U. S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

Mapped by: Ralph B. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle

ROAD CLASSIFICATION

- Primary highway: light-gray road, hard or hard surface
- Secondary highway: dark surface
- Unimproved road: dashed line
- Interstate Route: circle with number
- U. S. Route: square with number
- State Route: circle with number

CONTOUR INTERVAL: 10 FEET

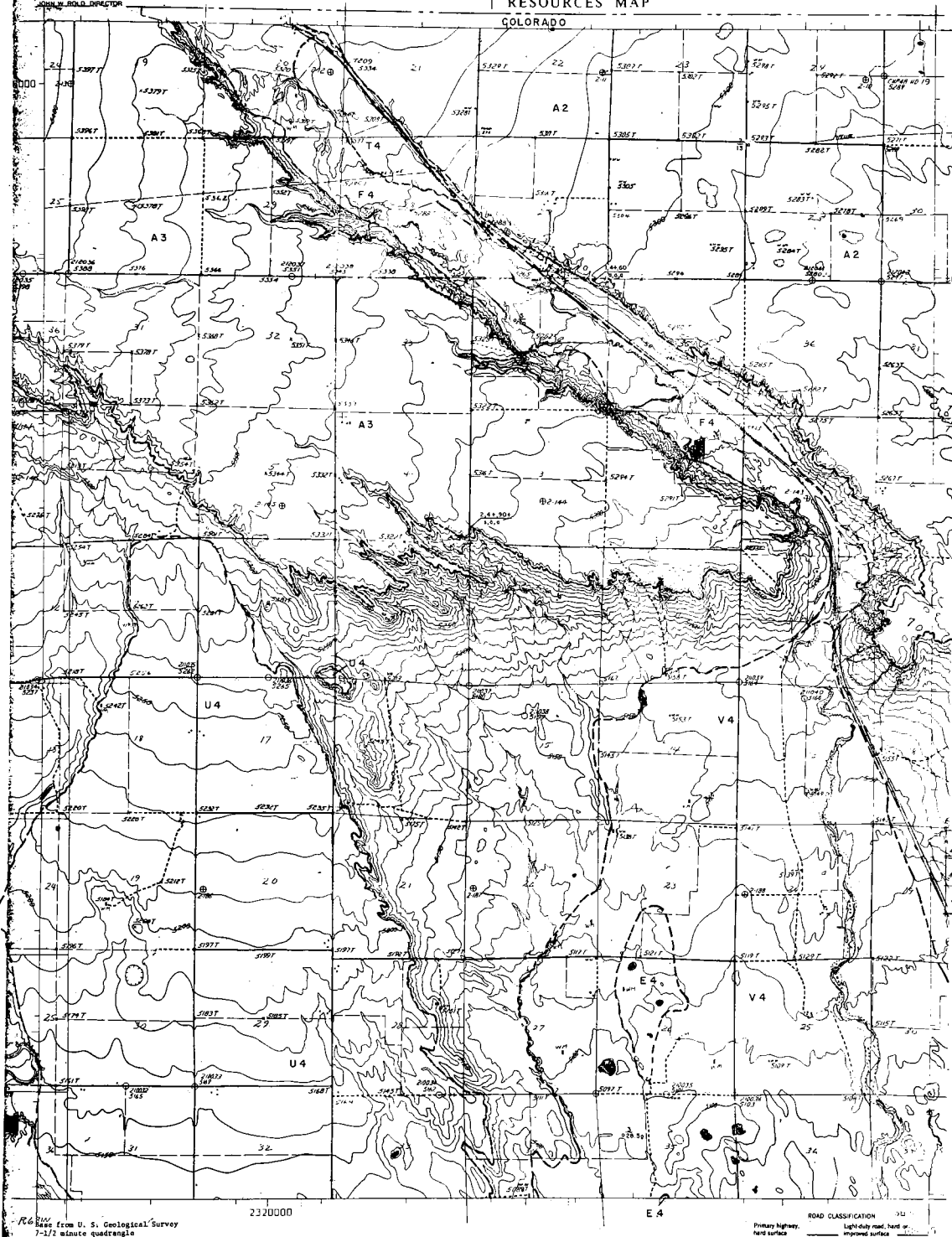
SAND, GRAVEL AND QUARRY AGGREGATE

GROVER 2NE

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. BOULDER DIRECTOR

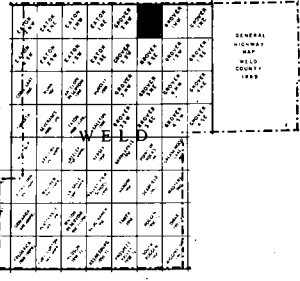
RESOURCES MAP

COLORADO



EXPLANATION

- Landform unit (Resource classification)
- LANDFORM UNIT**
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Eolian-deposited sand (colluvial)
 - M Marine deposits (beach, dune, spits, etc.)
- RESOURCE CLASSIFICATION**
 - 1 **CRUDE RESOURCES** (at least 100 acres, 100 ft. above, actual estimation)
 - 1 Cravly: relatively clean and sound
 - 2 Cravly: significant fines, decomposed rock, solution carbonates
 - 2 **FINE SANDS** (greater than 75 ft. above, 100 ft. retained on 200 screen, actual estimation)
 - 3 Sand
 - 4 **Probable aggregate resource**
- AGGREGATE RESOURCE**
 - Operable gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - ⊙ Operable stone quarry
 - ⊙ Abandoned stone quarry
- OTHER**
 - Potential quarry aggregate resource area
 - Isolated well or drill-hole location with overburden thickness (10' over sand/gravel, numbers indicate (ft), obtained from well logs.
 - "* indicates gravel, "m" indicates sand
 - "* in upper corner unmineralized or unknown property
 - "m" denotes Colorado Geological Survey Mineral Land and Gravel project
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- SECTION, LOCATION AND ORIGIN**
 - overburden thickness (ft)
 - underburden thickness (ft)
 - percent sand and fines (percent of screen, 0.075 in., actual estimation)
 - ⊙ Significant amount of flow (spacing 200' screen, 0.075 in., or 0.075 mm)
 - ⊙ Significant amount of decomposed or weak rock
 - ⊙ Significant amount of solution carbonates (calcium)
 - "* in upper corner unmineralized or unknown property
 - "* in upper corner property absent or large/lost



□ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Meist, W.C., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgwick, and Weld Counties, Colo.; U. S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

Mapped by: Ralph R. Stroba
 Date: June 30, 1974

ROAD CLASSIFICATION

- Primary highway, hard surface
- Light duty road, hard or improved surface
- Secondary highway, hard surface
- Unimproved road
- Interstate Route
- U. S. Route
- State Route

CONTOUR INTERVAL 10 FEET

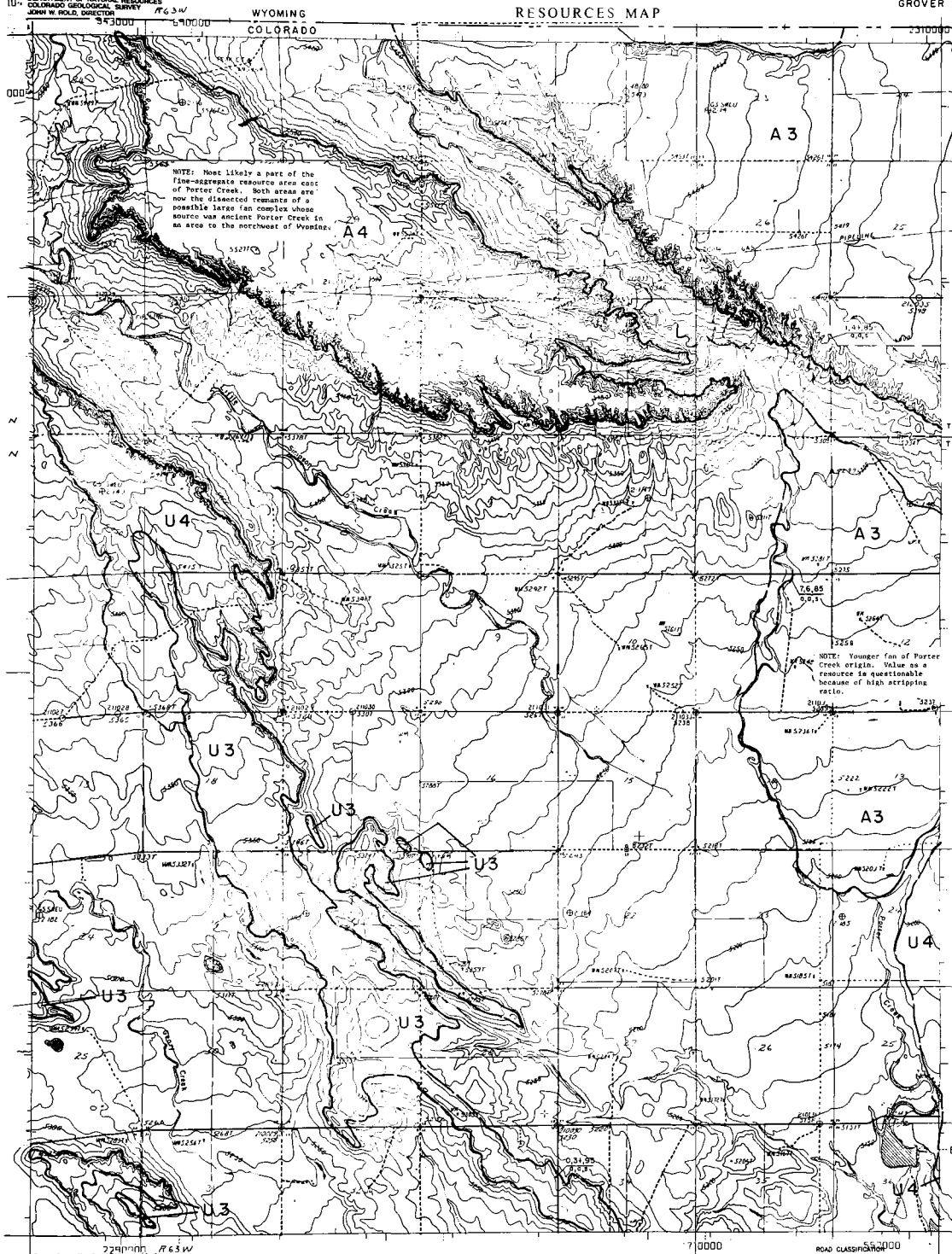
R6 Base from U. S. Geological Survey 7-1/2 minute quadrangle

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

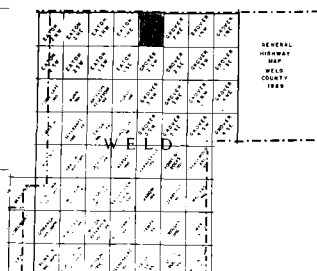
GROVER 2 NW

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
DAVID W. HOLS, DIRECTOR



EXPLANATION

- LANDFORM UNIT**
Resource Classification
- LANDFORM UNIT**
P Fluvial deposit
T Stream terrace deposit
V Valley fill (F.A.T.)
U Upland deposits
A Alluvial fan
E Wind-deposited sand (colluvial)
M Hummock deposits (sand, silt, clay, pebbles, etc.)
- AGGREGATE CLASSIFICATION**
Gravel aggregate (as defined by 28 CFR 25.101)
1 Gravel: relatively clean and sound
2 Gravel: significant fines, decomposed rock, calcareous substance
Silt aggregate (as defined by 28 CFR 25.101)
3 Sand
Unconsolidated Resource
4 Probable aggregate resource
- MAP SYMBOLS**
* Operating gravel and/or sand pit
* Abandoned gravel and/or sand pit
* Operating stone quarry
* Abandoned stone quarry
* Potential quarry: Aggregate resource area - delineated well or drilled hole location with open bottom (shaded) (1) over sand/gravel resource (shaded) (2); (shaded) (3) indicates sand
* In sand dunes unconsolidated or where exposed
* American Colorado Geological Survey (Wentworth) sand and gravel properties (shaded) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) (101) (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) 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QUADRANGLE LOCATION
NON-RESOURCE OR VETNAMIAN AREA

REFERENCE: Weist, W.C., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgwick, and Weld Counties, Colo.; U. S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

Mapped by: Stephen D. Schwachow
Date: June 30, 1974

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

CONTOUR INTERVAL 10 FEET

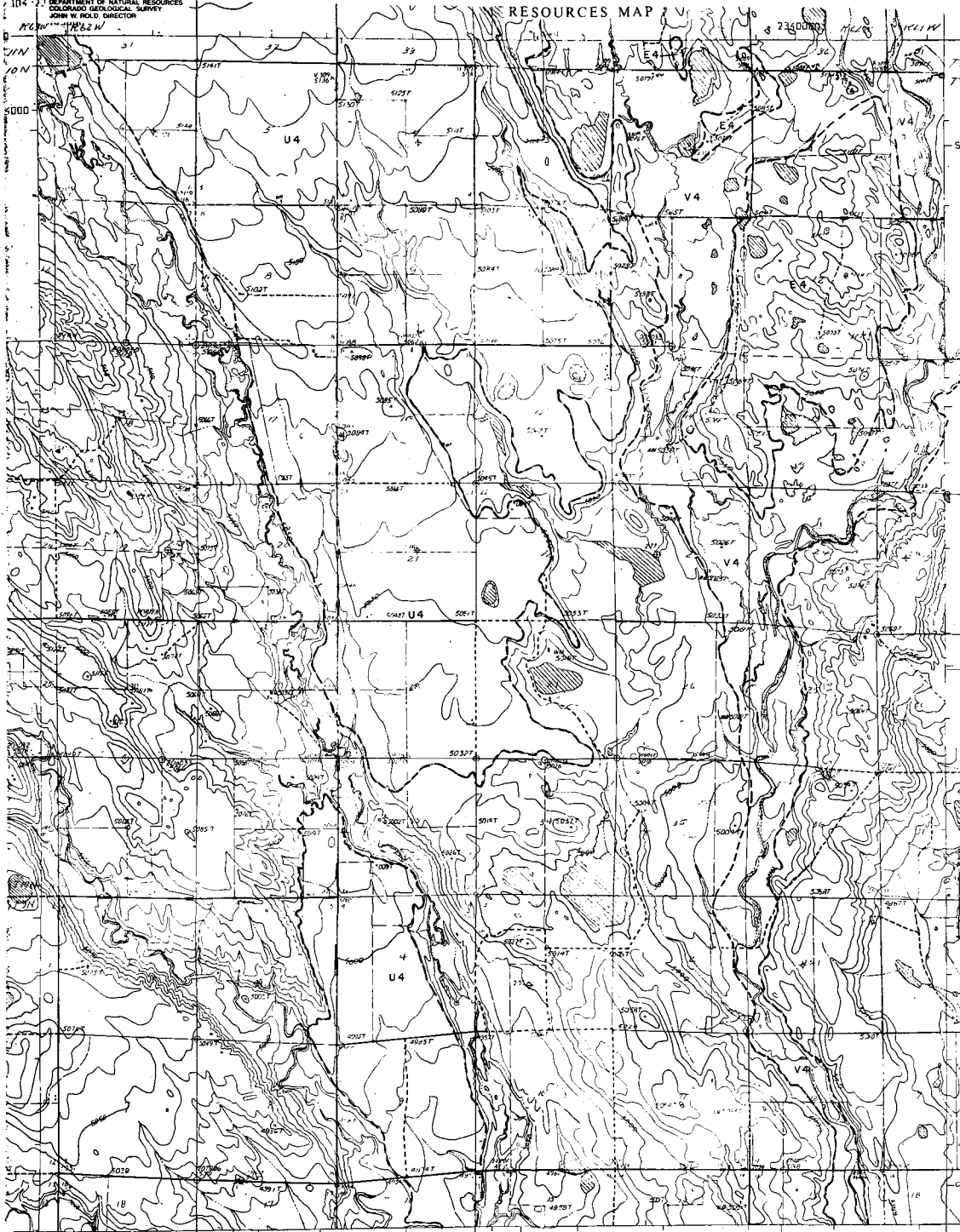
GROVER 2 NW (02)
75 MINUTE SERIES (TOPOGRAPHIC) A.F.C.

SAND, GRAVEL AND QUARRY AGGREGATE

GROVER 2 SE

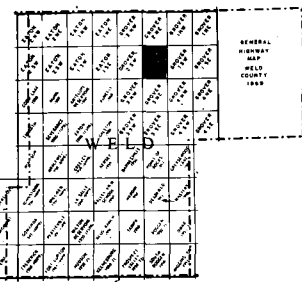
104-23 DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. FOLEY, DIRECTOR

RESOURCES MAP



EXPLANATION

- Landform and Resource Classification
- LANDFORMS**
 - F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (landfills, spoils...)
- RESOURCE CLASSIFICATION**
 - Gravel Resources** (as listed on 1957 map, actual estimate)
 - 1 Gravel: relatively clean and small
 - 2 Gravel: significant fines, unrounded rock, calcareous
 - Sand Resources** (greater than 70% passing 60 screen, 60% retained on 100 screen, actual estimate)
 - 3 Sand
 - Unconsolidated Aggregate**
 - 4 Probably aggregate resource
- USE SYMBOLS**
 - v Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operational stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with owner location (10); over sand/gravel resource (10); obtained from well logs
 - "T" indicates gravel; "E" indicates sand
 - "*" in symbol denotes unclassified or unknown property
 - "*" denotes Colorado Geological Survey Water/Soil and Ground projects
 - drill hole
 - Landform boundary, solid black lines = observed; dashed black appearance in letters
- STATUS, LOCATION AND CATEGORICAL INDICATION OF SYMBOL**
 - no resource (blank)
 - undiscovered resource (10)
 - potential sand and gravel (containing 40 screen, 0.25 in., actual estimate)
 - significant amount of fines (passing 100 screen, 0.075 in., or 0.075 mm.)
 - significant amount of disintegrated or weak rock
 - significant amount of calcareous aggregate (caliche)
 - "*" in symbol denotes unclassified or unknown property
 - "*" in symbol denotes property about or under litigation



R 62 W
 base from U. S. Geological Survey
 7.5' x 7.5' minute quadrangle

2320000

CONTOUR INTERVAL 10 FEET

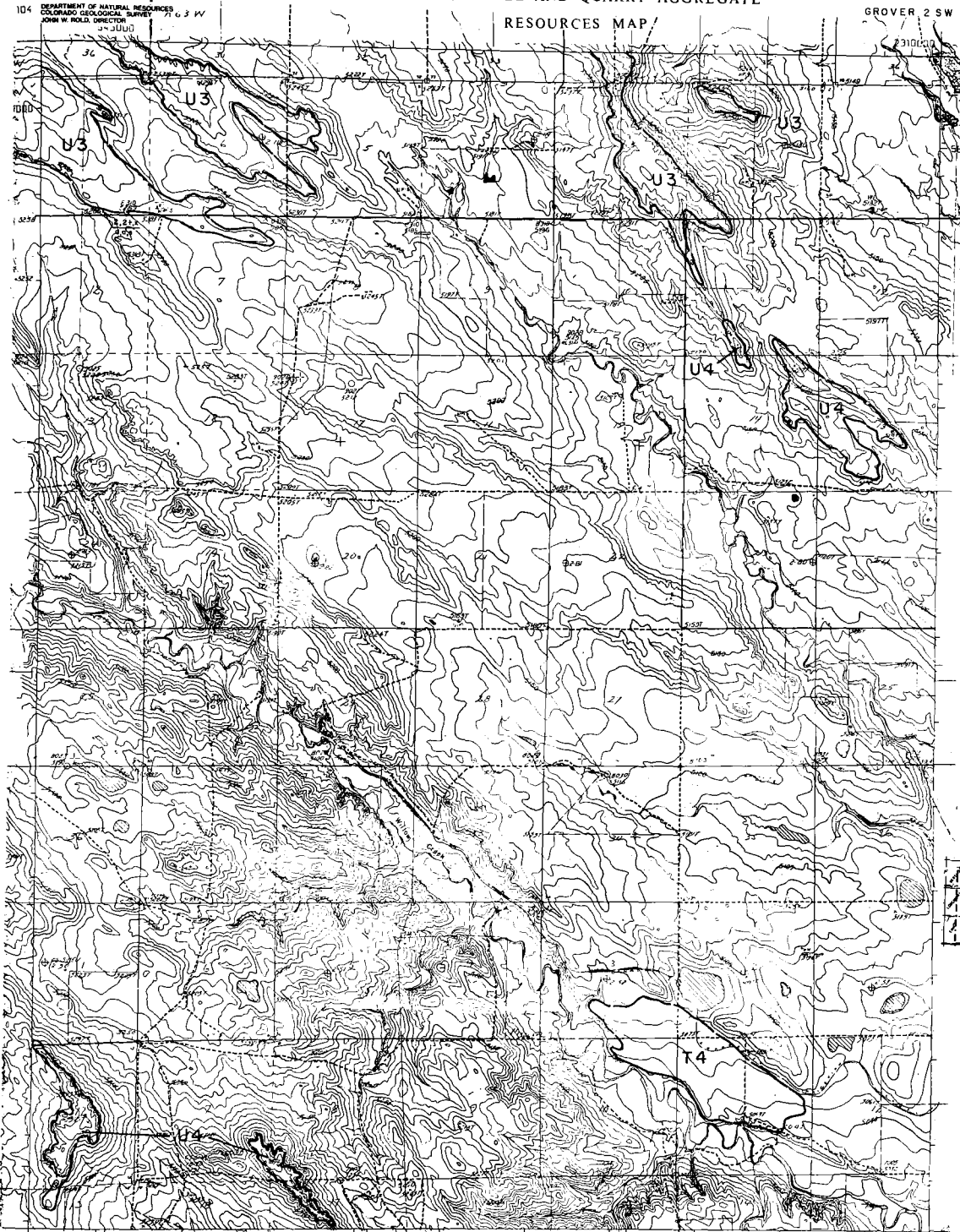
ROAD CLASSIFICATION 563000
 Primary highway: hard surface
 Secondary highway: hard surface
 Unimproved road
 Interstate Route U S. Route State Route

Mapped by: Ralph R. Shroba
 Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

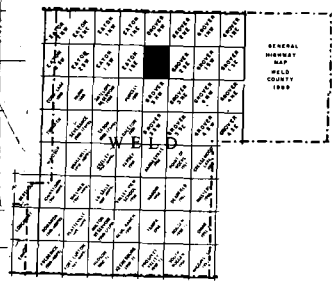
GROVER 2 SW

104 DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- LOCATION UNITS**
Resource classification
- MAPPER'S NOTE**
F Floodable deposit
T Sandstone deposit
V Valley fill (F & T)
U Unconsolidated aggregate
A Alluvial fan
E Wind-deposited sand (eolian)
M Manganese deposits (black shales, etc.)
- RESOURCE CLASSIFICATION**
1. **CLASS 1**
Gravel: relatively clean and sound
Gravel: significant fines, unconsolidated
2. **CLASS 2**
Silt, claystone
3. **CLASS 3**
Sand
4. **PROBABLE AGGREGATE RESOURCE**
- MAP SYMBOLS**
* Operating gravel and/or sand pit
A Abandoned gravel and/or sand pit
O Operating stone quarry
A Abandoned stone quarry
P Potential quarry aggregate resource area
S Selected well or drill hole location with sandstone thickness (ft) and significant resource thickness (ft) obtained from well logs
"u" indicates gravel, "s" indicates sand
"m" in symbol denotes unconsolidated or unknown resource
"M" denotes Colorado Geological Survey "Manganese and Gravel project" drill hole
Lashford boundary, solid where known or dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATIONAL CHARACTERISTICS OF AGGREGATE**
— Overburden thickness (ft)
— Sand/gravel resource thickness (ft)
— Gravel and fines (percent) to 100 mesh, 0.075 in., 4.75 mm
— Significant amount of fines (percent) 100 mesh, 0.075 in., 4.75 mm
— Significant amount of unconsolidated or unknown property
— "u" in symbol denotes property about or insignificant



QUADRANGLE LOCATION
NON-RESOURCE OR VITREOUS AREA

Mapped by: Stephen D. Schuchow
Date: June 30, 1974

7280000
Base from U. S. Geological Survey
7-1/2 minute quadrangle

ROAD CLASSIFICATION
Primary highway: hard surface
Secondary highway: improved surface
Unimproved road
Interstate Route
U. S. Route
State Route

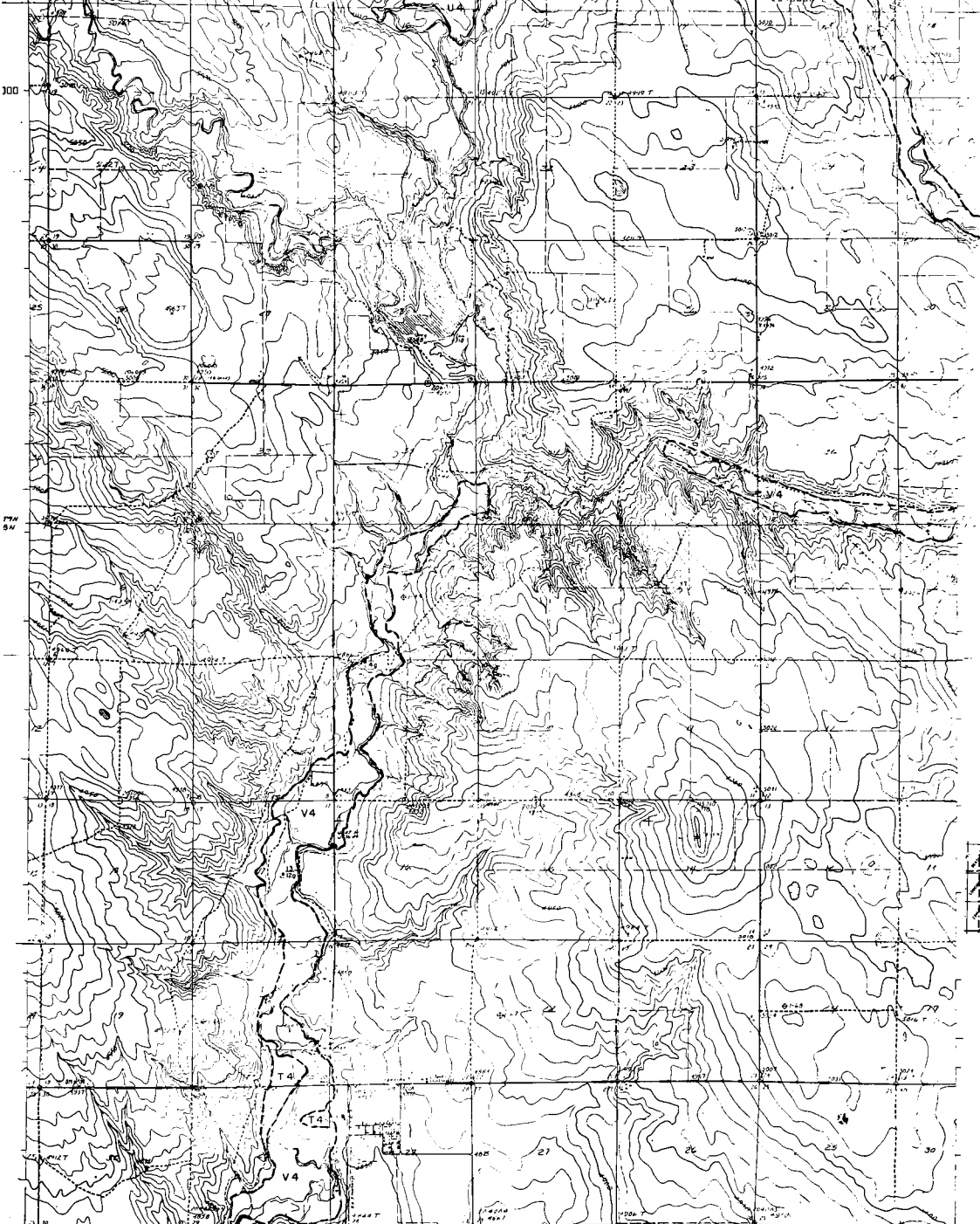
CONTOUR INTERVAL 10 FEET

SAND, GRAVEL AND QUARRY AGGREGATE

GROVER 3 NE

RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. RYAN, DIRECTOR



EXPLANATION

- Landform units
 Resource class/Function
- LITHOLOGICAL UNITS**
- F Fluvialite deposit
 - T Tuvaa terrace deposit
 - V Valley fill (F & T)
 - U Unalut deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Nonmarine deposits (slag, tailings, waste...)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
 (at least 20% retained on #4 screen, 40% at least)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- Fine Aggregate**
 (greater than 75% passing #4 screen, 60% retained on #20 screen, 100% at least)
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); shaded from well logs
 - "G" indicates gravel; "S" indicates sand
 - "U" in symbol denotes unevaluated or unknown property
 - "W" denotes Colorado Geological Survey wellhead and gravel projects drill hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- FLIGHT, LOCATION AND ORIENTATIONAL INFORMATION OF REPORT**
- nonburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - average sand and gravel spacing ft screen, 2.00 in., 100% retention
 - significant amount of fines spacing 100 screen, 0.075 in. or 0.075 mm.
 - significant amount of decomposed or weak rock
 - "U" in symbol denotes unevaluated or unknown property
 - "W" in symbol denotes property absent or Geology/owner



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Ralph S. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle
 2320000

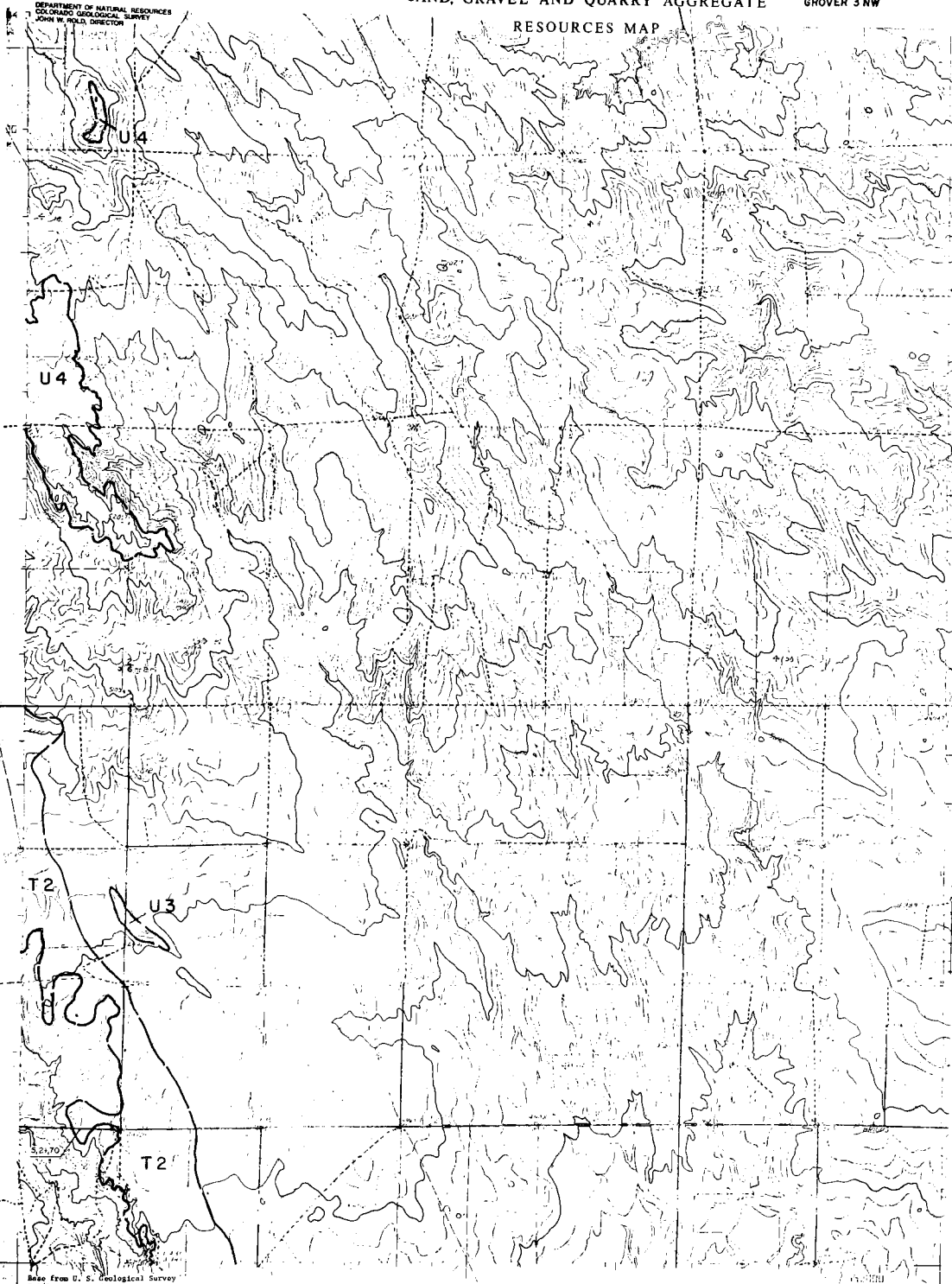
- ROAD CLASSIFICATION**
- Primary highway: hard surface
 - Light duty road: ASP or improved surface
 - Secondary highway: hard surface
 - Unimproved road
 - Interstate Route
 - U. S. Route
 - State Route

CONTOUR INTERVAL 10 FEET

SAND, GRAVEL AND QUARRY AGGREGATE GROVER 3 NW

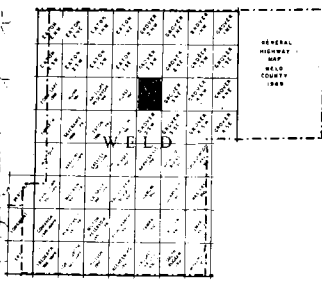
RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. HILD, DIRECTOR



EXPLANATION

- Landform units
- Resource classification
- LANDFORM UNITS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - W Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (alluvial)
 - M Man-made deposits (levee, channel, levee, ...)
- RESOURCE CLASSIFICATION**
 - CLAY SANDS**
 - 1 Cream relatively clean and sand
 - 2 Gravel significant (fine, decomposed rock, calcium carbonate)
 - SAND SANDS**
 - 3 Sand
 - Quarry Aggregate Resource**
 - 4 Probable aggregate resource
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - ▭ Abandoned gravel and/or sand pit
 - ▭ Operating stone quarry
 - ▭ Abandoned stone quarry
 - ▭ Potential quarry aggregate resource area
 - Related well or drill-hole location with water-bearing thickness (ft) and sand/gravel resource thickness (ft); obtained from well logs.
 - Landform gravel; "x" indicates sand
 - "x" in symbol denotes unrelieved or shallow gravity
 - ▭ American Colorado Geological Survey "discovery" and gravel projects' well hole
 - ▭ Landform boundary, solid where known or observed; dashed where approximate or inferred.
- STATUS, LOCATIONS AND GEOLOGICAL SIGNIFICANCE OF WELLS**
 - ▭ nonbearing thickness (ft)
 - ▭ sand/gravel resource thickness (ft)
 - ▭ gravel and fines (spacing of screen, 1/2 in. to 1/2 inch maximum)
 - ▭ Significant amount of fines (spacing 1/2 in. max., 0.002 in. or 0.075 mm)
 - ▭ Significant amount of decomposed or weak rock
 - ▭ Significant amount of calcium carbonate (calcite)
 - "x" in symbol denotes unrelieved or shallow gravity
 - "x" in symbol denotes property status or significance



- ▭ QUARRY/AGGREGATE LOCATION
- ▭ NON-RESOURCE OR WITHDRAWN AREA

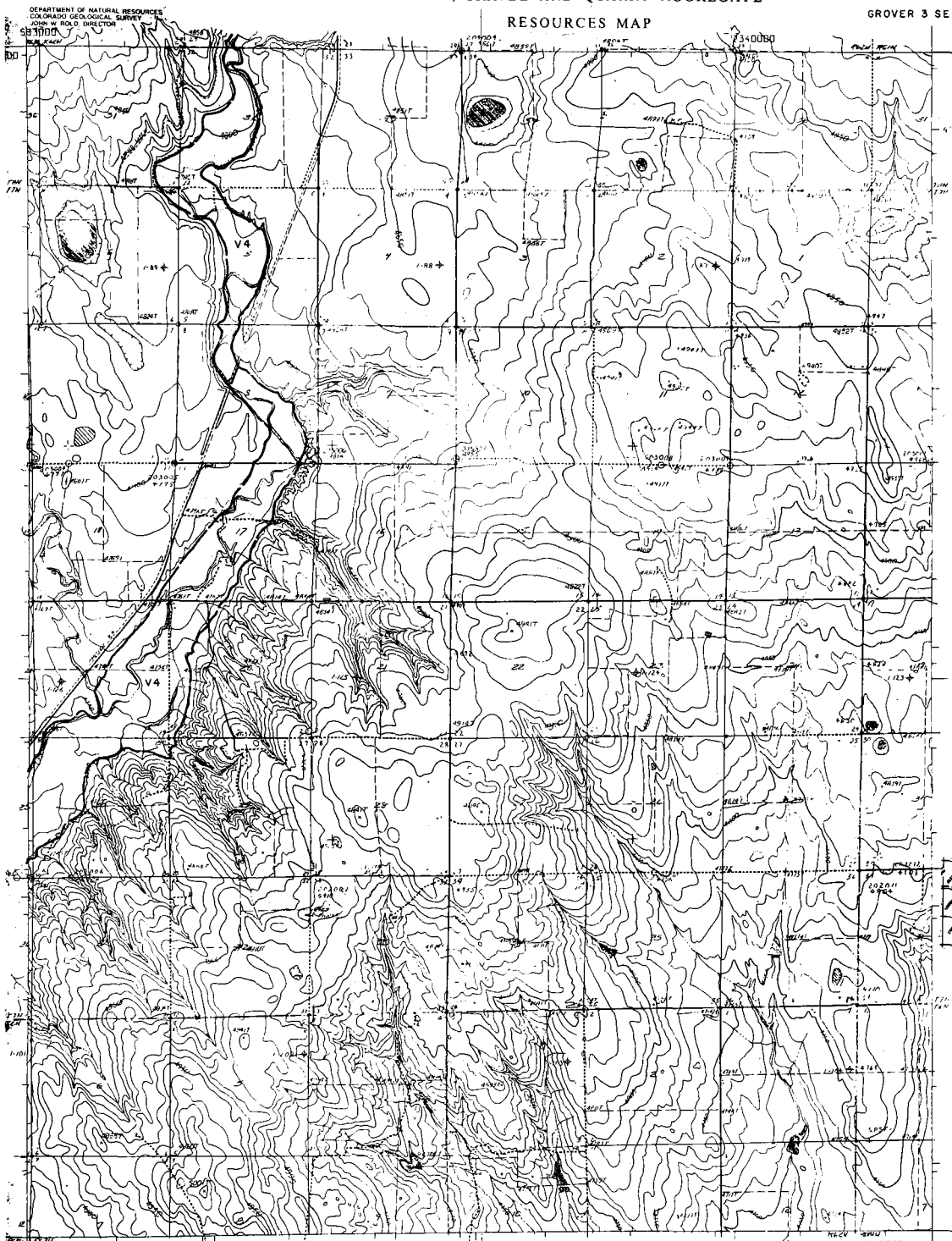
Mapped by: Stephen D. Schwchow
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

GROVER 3 SE



EXPLANATION

- Landform unit
Resource classification
- LANDFORM UNITS**
 - F Fluvial deposits
 - T Trench terrace deposits
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mixed deposits (eolian, colluvial, glacial, etc.)
- RESOURCE CLASSIFICATION**
 - Gravel Resources**
 - 1 Gravel 200+ ft thick on 44 acres, steel extraction
 - 2 Gravel relatively fine and sand
 - 3 Gravel: significant fines, decomposed rock, calcareous
 - Fill Resources**
 - 1 Gravel 200+ ft thick on 44 acres, steel extraction
 - 2 Sand
 - Undrained Resources**
 - 4 Probable aggregate resources
- MAP SYMBOLS**
 - * Operating gravel and/or sand pit
 - ◉ Abandoned gravel and/or sand pit
 - ◉ Operating stone quarry
 - ◉ Abandoned stone quarry
 - Potential quarry aggregate resource area
 - ◉ Natural well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "u" indicates gravel, "s" indicates sand
 - "in symbol denotes unutilized or unknown resource
 - "in symbol denotes Colorado Geological Survey "Wellhead and Corehole" (well hole)
 - Landform boundary, solid lines shown or observed, dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL INFORMATION OF RESOURCES**
 - ◉ Overburden thickness (ft)
 - ◉ Sand/gravel resource thickness (ft)
 - ◉ Current well and flow (ft/min) or (gpm, 0.75 ft.) or (ft/min)
 - ◉ Significant amount of fines (weight)
 - ◉ Significant amount of decomposed or wash rock
 - ◉ Significant amount of siliceous carbonate (caliche)
 - * in symbol denotes unutilized or unknown property
 - "u" in symbol denotes property absent or unutilized

GENERAL INDEX MAP

11111	11112	11113	11114	11115	11116	11117	11118	11119	11120
11121	11122	11123	11124	11125	11126	11127	11128	11129	11130
11131	11132	11133	11134	11135	11136	11137	11138	11139	11140
11141	11142	11143	11144	11145	11146	11147	11148	11149	11150
11151	11152	11153	11154	11155	11156	11157	11158	11159	11160
11161	11162	11163	11164	11165	11166	11167	11168	11169	11170
11171	11172	11173	11174	11175	11176	11177	11178	11179	11180
11181	11182	11183	11184	11185	11186	11187	11188	11189	11190
11191	11192	11193	11194	11195	11196	11197	11198	11199	11200

Mapped by: Phillip C. Vicklets
Date: June 30, 1974

- ROAD CLASSIFICATION J000
- Primary highway, hard surface
- Lightly used road, hard surface
- Secondary highway, hard surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route

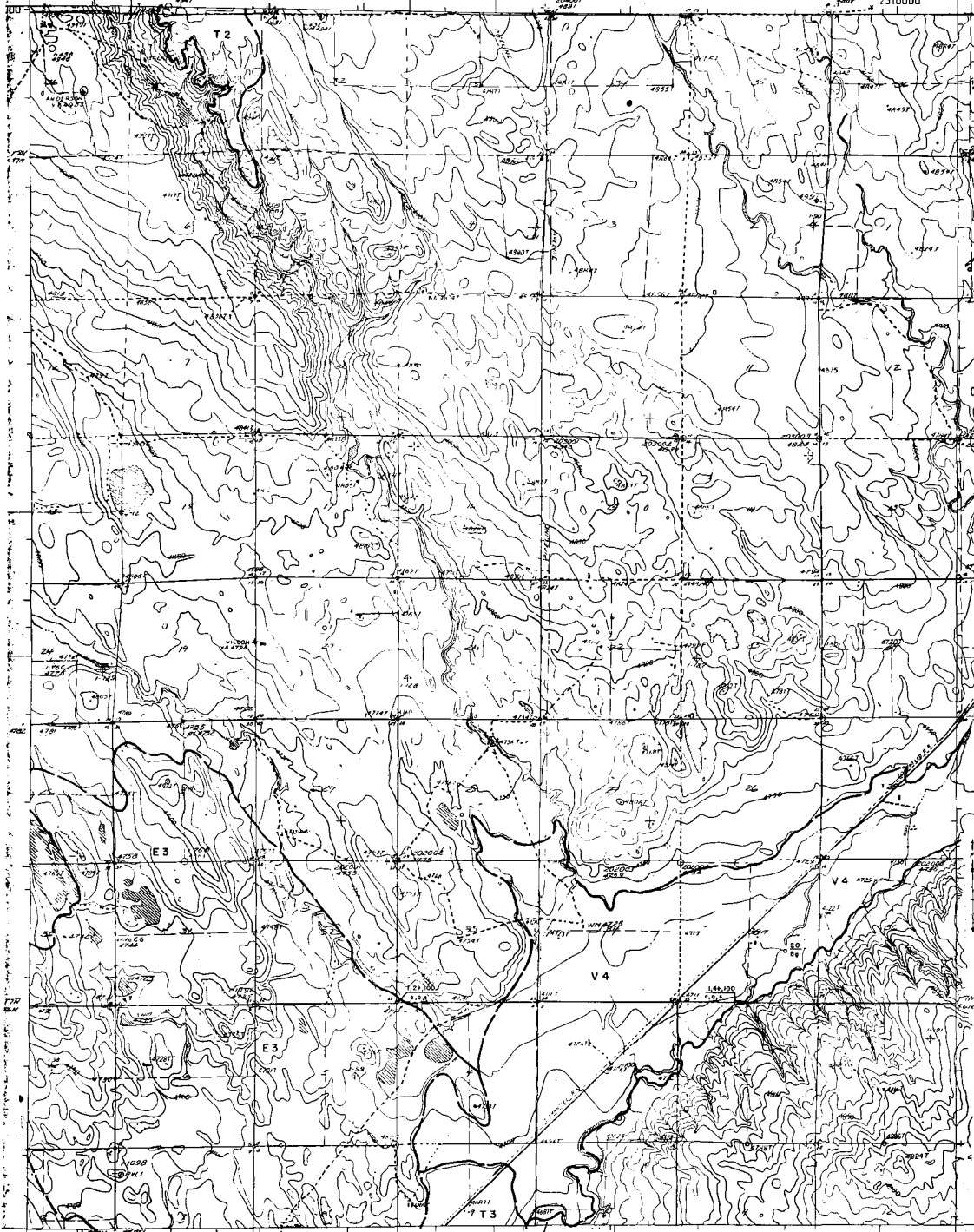
CONTOUR INTERVAL 10 FEET

Base from U. S. Geological Survey
7 1/2 minute quadrangle
2320000
2010000

SAND, GRAVEL AND QUARRY AGGREGATE

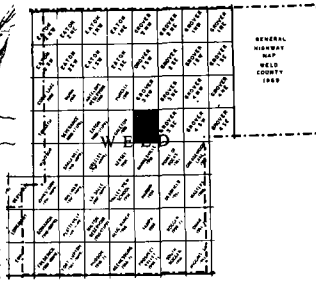
RESOURCES MAP

GROVER 3 SW



EXPLANATION

- Contour interval
 Resource classification
- MAPPING UNIT**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Upland deposit and (rollin)
 - M Non-made deposits (lake, talus, sp...)
- RESOURCE CLASSIFICATION**
- CONTOUR INTERVAL**
 10 feet (or specified on 41 survey, visual indication)
- 1 Gravel: relatively clean and sized
 - 2 Gravel: significant fines, decomposed rock calcine carbonate
- FINE MATERIALS**
 (Percent sand: 100 percent of screen, 60 retained on 200 screen, visual indication)
- 3 Sand
 - 4 Potential aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well of drill-hole location with over-burden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "T" indicates gravel; "U" indicates sand
 - "S" in symbol denotes unventilated or unknown property
 - "W" denotes Colorado Geological Survey Western Sand and Gravel project; 4011 mile
 - Location boundary, with where known or observed, shown where approximate or inferred
- STATION LOCATION AND ORIOLOGICAL RESOLUTION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (percent of screen, 0.30 in.), visual indication
 - significant amount of decomposed or rock mat.
 - significant amount of calcine carbonate (rollin)
 - "S" in symbol denotes unventilated or unknown property
 - "W" in symbol denotes property shown or designated



QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Wickles
 Date: June 30, 1974

2280000
 Base from U. S. Geological Survey
 7-1/2 minute quadrangle

CONTOUR INTERVAL 10 FEET

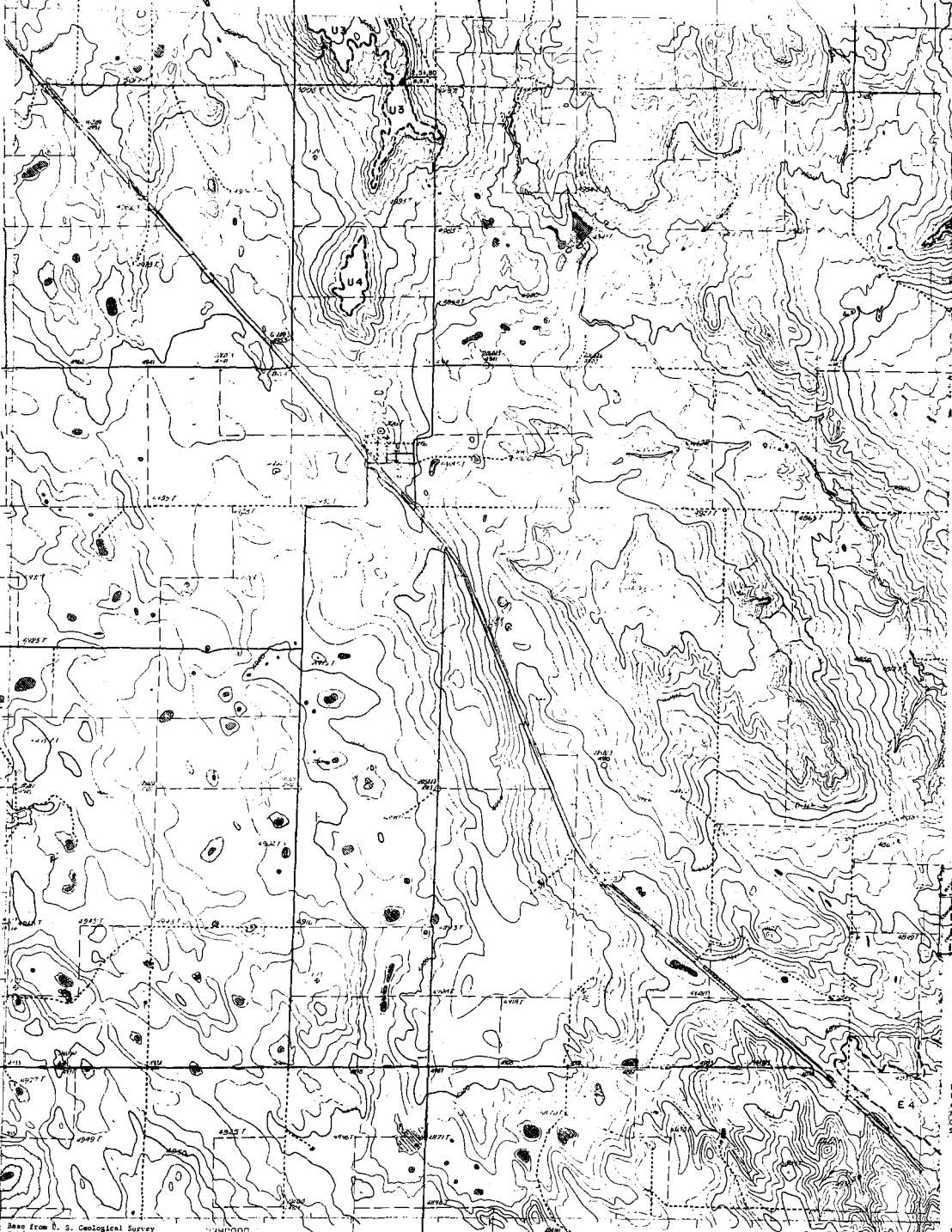
ROAD CLASSIFICATION
 Boundary highway: Lightly road, hard of
 hard surface
 Secondary highway: Lightly road, hard of
 hard surface
 Unimproved road
 Interstate Route U.S. Route State Route

GROVER 3 SW (13) A.F.C.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

GROVER 4NE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. PAUL, DIRECTOR



EXPLANATION

- Landform units
- Resource classification
- LANDFORM UNITS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Eolian-deposited sand (millions)
 - M Mesozoic deposits (shales, sandstones, etc.)
- RESOURCE CLASSIFICATION**
 - Class 1: Gravel**
 - 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, indurated calcareous.
 - Class 2: Sand**
 - 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operated stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Indurated well or crystalline limestone with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "s" indicates gravel; "m" indicates sand
 - "s" in symbol denotes unconsolidated or medium property
 - "m" American Colorado Geological Survey "Master" field and cover project's well logs
 - Landform boundary, solid black lines or shaded; dashed lines show approximate or inferred
- PERCENTAGE LOCATION AND QUALITY INDICATION OF SANDS**
 - overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (greater than 200 mesh, 0.075 mm), visual estimation
 - significant amount of fines (greater than 200 mesh, 0.075 mm, or 0.075 mm)
 - significant amount of decomposed or weak rock
 - significant amount of indurated calcareous material
 - unknown property
 - "s" in symbol denotes property about or unapplicable



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Weist, W.C., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgwick, and Weld Counties, Colo.: U. S. Geol. Survey Water-Supply Paper 1800-B, p. 1.

Mapped by: Ralph S. Shrobe
Date: June 30, 1974

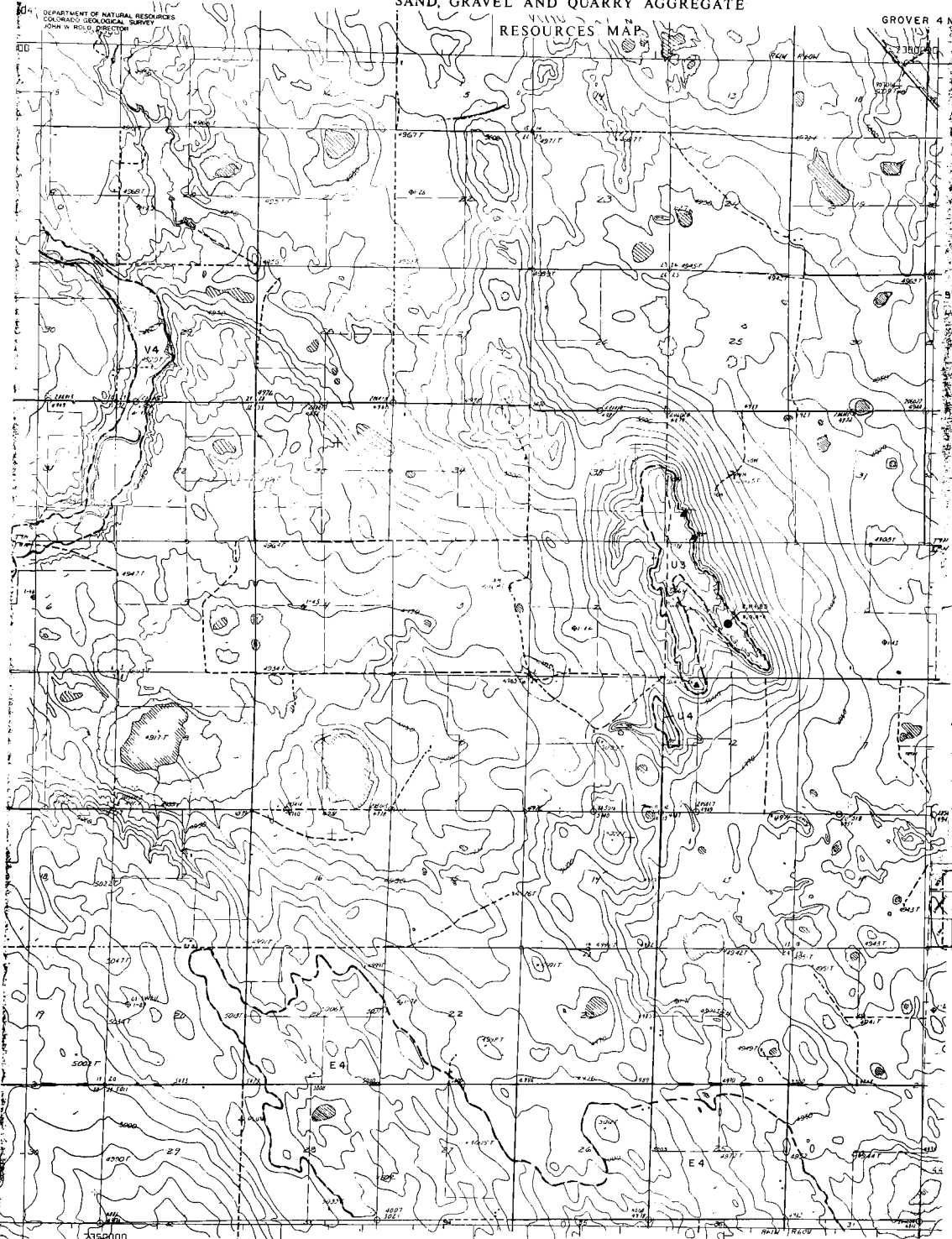
Based from U. S. Geological Survey
7-1/2 minute quadrangle 1340000

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

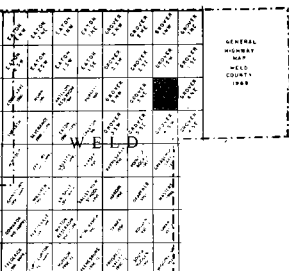
GROVER 4 NW

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. RILEY, DIRECTOR



EXPLANATION

- Contour interval
 Contour classification
- MAPPING DATA**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unsorted deposit
 - A Alluvial fan
 - E Wind-blown sand (eolian) (sand, siltstone, spalls...)
 - M M
- RESOURCE CLASSIFICATION**
 - Coarse Aggregate (as found, not processed or reworked, actual extraction)
 - 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
 - Fine Aggregate (material less than 75 passing #20 screen, dry, reduced to #20 screen, actual extraction)
 - 3 Sand
 - Unutilized Resource
 - 4 Probable aggregate resource
- WELL SYMBOLS**
 - Operating gravel and/or sand pit
 - Operating sand and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Proposed heavy aggregate resource area
 - Refractured well or drilled hole location with overburden thickness (ft) over sand/gravel resource thickness (ft). (Abandoned well legs " " indicate none; " " indicate sand " " in which device abandoned or missing gravel)
 - " " denotes Colorado Geological Survey drilled hole
 - Landline boundary, solid where known or inferred; dashed where approximate or inferred
- STATUS, LOCATION AND GEOLOGICAL SIGNIFICANCE OF DEPOSIT**
 - Overburden thickness (ft)
 - Refractured resource thickness (ft)
 - Correct sand and gravel spacing by screen, 0.28 in. x, actual extraction
 - Significant amount of fines (passing #20 screen, 0.075 in. or 0.075 mm.)
 - Significant amount of decomposed or weak rock
 - Significant amount of eolian carbonate (caliche)
 - " " on public domain, mineral rights, or unknown property
 - " " on public domain, mineral rights, or unknown property
 - " " on public domain, mineral rights, or unknown property



QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Ralph R. Shroba
 Date: June 30, 1974

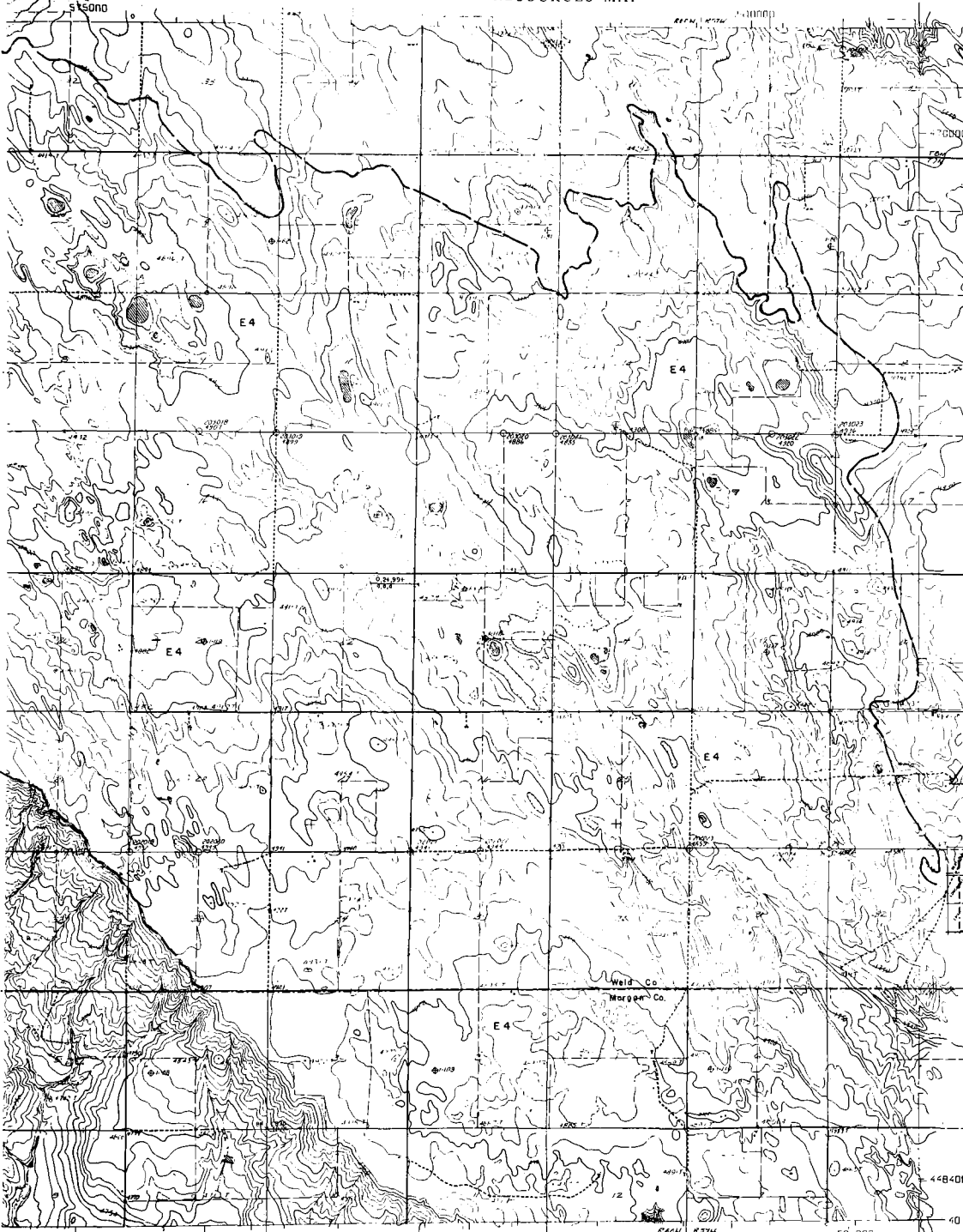
Scale 574000
 Data from U. S. Geological Survey
 7-1/2 minute quadrangle

ROAD CLASSIFICATION 574000
 Primary highway: Light-duty road, hard or improved surface
 Secondary highway: Unimproved road
 Hard surface: Interstate Route, U. S. Route, State Route

CONTOUR INTERVAL 10 FEET

SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

GROVER 4 SE



EXPLANATION

- Contour interval
 Resource classification
- LANDFORMS**
- F Floodplain deposit
 - F Slope terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-mine deposit (clay, siltstone, shale, ...)
- RESOURCE CLASSIFICATION**
- CLASSIFICATION**
 (as listed on resource map)
- 1 Class: relatively clean and sound
 - 2 Class: significant fines, decomposed, calcareous
 - 3 Class: ...
- OPERATING QUARRIES**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Relieved well or fill-hole location with overburden thickness (ft) over sand/gravel resource
 - Thickness (ft) obtained from well logs
 - "S" indicates gravel, "G" indicates sand
 - "L" symbol denotes unvestigated or unknown property
 - "M" denotes Colorado Geological Survey Mineral Land Use Gravel project
 - "L" in
 - Landform boundary, solid where known or estimated; dashed where approximate or inferred
- POSITION, LOCATION AND CONDITION OF HIGHWAY**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Permanent road and fines (spacing of 1/2 mile, 2/3 mi., 1/4 mile section)
 - Significant amount of fines (spacing 1/2 mile, 2/3 mi., or 1/4 mi.)
 - Significant amount of decomposed or weak rock
 - "M" in symbol denotes unvestigated or unknown property
 - "L" in symbol denotes property absent or landform

10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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QUADRANGLE LOCATION
 NON-RESOURCE OR WETDRINK AREA

Mapped by: Ralph R. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey 2390000
 7 1/2 minute quadrangle

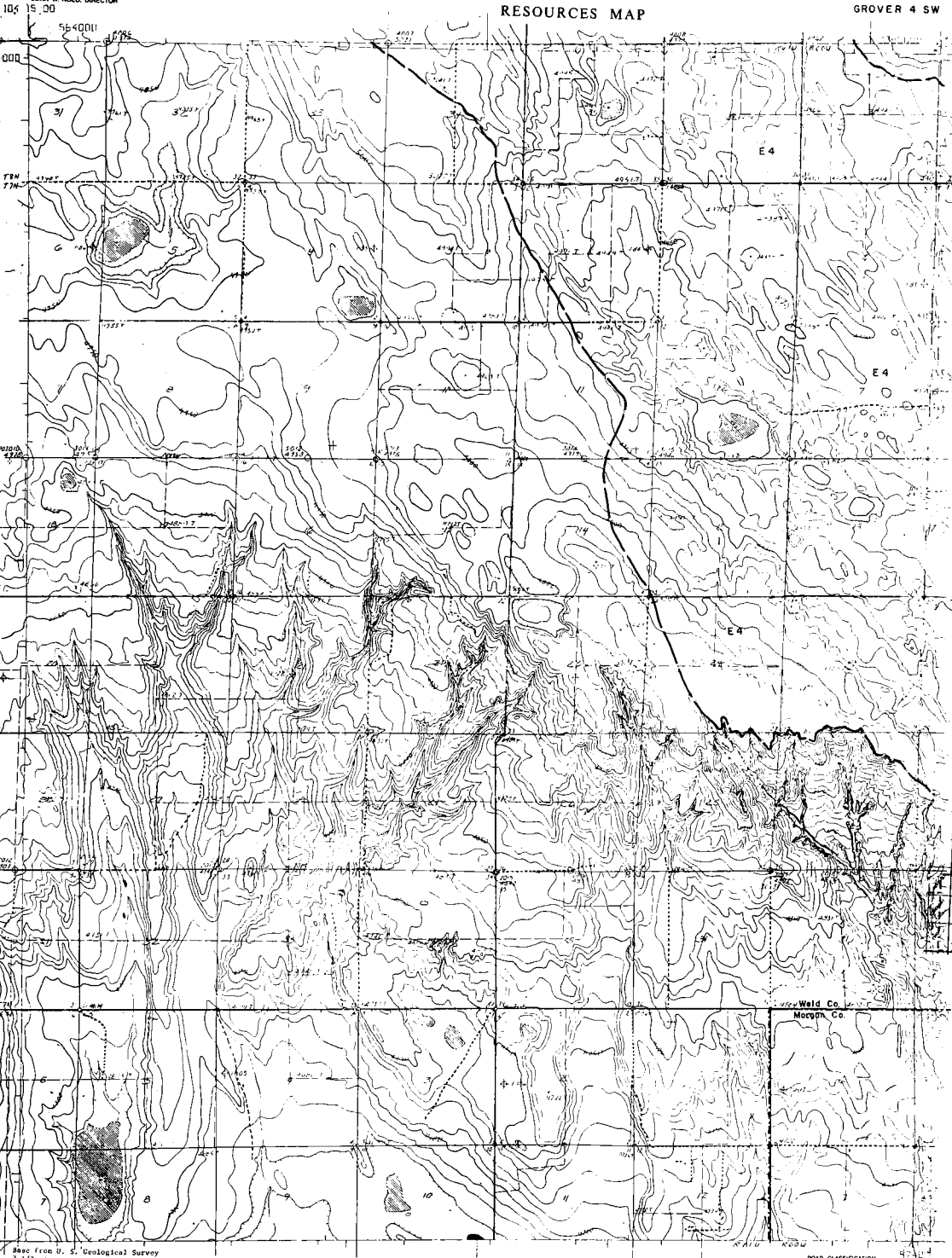
CONTOUR INTERVAL 10 FEET

ROAD CLASSIFICATION

- Primary highway, hard surface
- Secondary highway, hard surface
- Light-duty road, hard or improved surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route

SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

GROVER 4 SW



EXPLANATION

- CONTOUR AND**
 Elevation classification
- LANDFORMS**
- F Floodable deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Wind deposits
 - A Alluvial fan
 - E Wind-deposited sand (alluvial)
 - M Non-mud deposits (shale, siltstone, etc.)
- RESOURCE CLASSIFICATION**
- Coarse aggregate**
 (as found and measured on the screen, 4.75 mm)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous
- Fine aggregate**
 (as found and measured on the screen, 20 mesh to 250 mesh, 4.75 mm)
- 3 Sand
 - 4 Potential aggregate resource
- QUARRIES**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- WELLS**
- Related well or drill-hole bottom log with sand/gravel thickness (ft), obtained from well logs
 - "m" indicates mud; "s" indicates sand
 - "x" in symbol denotes material of unknown quantity
 - "no" denotes Colorado Geological Survey Waterflood and Ground Protection Well No.
 - Landform boundary, solid where known or inferred; dashed where approximate or inferred
- FLATTON, LOCATION AND CHARACTERISTICS OF SANDS**
- sand/gravel thickness (ft)
 - percent sand and fines (using 4.75 mm, 0.075 mm, 0.0075 mm)
 - significant amount of sand/gravel in wash rock
 - significant amount of material in wash rock
 - "m" in symbol denotes unconsolidated or unknown property
 - "x" in symbol denotes property absent or uncertain



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Wicklein
 Date: June 30, 1974

ROAD CLASSIFICATION

- Primary highway
- Hard surface
- Secondary highway
- Hard surface
- Light-duty road, hard or unpaved surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route

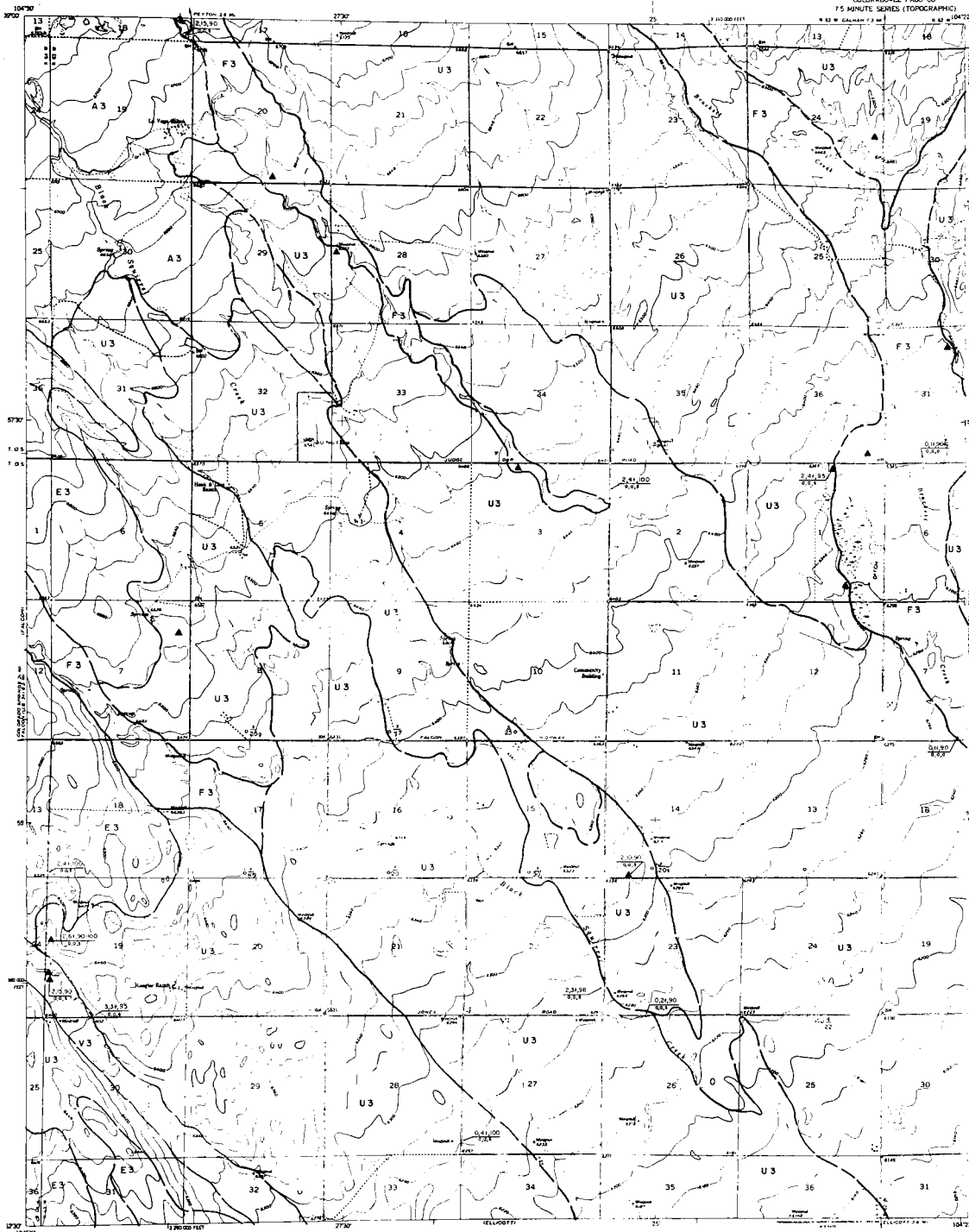
CONTOUR INTERVAL 10 FEET

Base from U. S. Geological Survey
 7-1/2 minute quadrangle

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

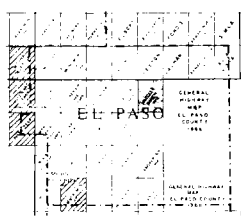
HAEGLER RANCH QUADRANGLE
COLORADO-EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



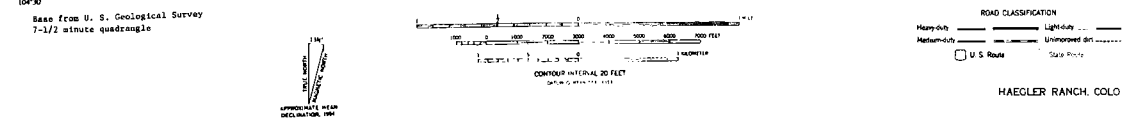
EXPLANATION

- Landform unit
- Resource classification
- LANDFORM UNIT**
- F Floodplain deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Eolian deposit (sand dune)
- U Upland deposit (sand, silt, clay, etc.)
- RESOURCE CLASSIFICATION**
- 1 Gravel, relatively free and sound
- 2 Gravel, significant fines, increased wash, certain categories
- 3 Sand
- 4 Probable aggregate resource
- MAP SYMBOLS**
- Abandoned gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Relieved well or drilled-in location with over-buried thickness (ft) over designated resource thickness (ft), obtained from well logs
- "I" indicates gravel, "S" indicates sand
- "C" in symbol denotes constructed or unknown property
- "W" denotes Colorado Geological Survey Water/Flood and Growth projects
- "R" in symbol denotes unutilized or unknown property
- Landform boundary, solid where known or dashed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- 1. Section: 10th Range 1st
- 2. Township: 36th Range 1st
- 3. Range: 10th Range 1st
- 4. Section: 10th Range 1st
- 5. Township: 36th Range 1st
- 6. Range: 10th Range 1st
- 7. Section: 10th Range 1st
- 8. Township: 36th Range 1st
- 9. Range: 10th Range 1st
- 10. Section: 10th Range 1st
- 11. Township: 36th Range 1st
- 12. Range: 10th Range 1st
- 13. Section: 10th Range 1st
- 14. Township: 36th Range 1st
- 15. Range: 10th Range 1st
- 16. Section: 10th Range 1st
- 17. Township: 36th Range 1st
- 18. Range: 10th Range 1st
- 19. Section: 10th Range 1st
- 20. Township: 36th Range 1st
- 21. Range: 10th Range 1st
- 22. Section: 10th Range 1st
- 23. Township: 36th Range 1st
- 24. Range: 10th Range 1st
- 25. Section: 10th Range 1st
- 26. Township: 36th Range 1st
- 27. Range: 10th Range 1st
- 28. Section: 10th Range 1st
- 29. Township: 36th Range 1st
- 30. Range: 10th Range 1st
- 31. Section: 10th Range 1st
- 32. Township: 36th Range 1st
- 33. Range: 10th Range 1st
- 34. Section: 10th Range 1st
- 35. Township: 36th Range 1st
- 36. Range: 10th Range 1st
- 37. Section: 10th Range 1st
- 38. Township: 36th Range 1st
- 39. Range: 10th Range 1st
- 40. Section: 10th Range 1st
- 41. Township: 36th Range 1st
- 42. Range: 10th Range 1st
- 43. Section: 10th Range 1st
- 44. Township: 36th Range 1st
- 45. Range: 10th Range 1st
- 46. Section: 10th Range 1st
- 47. Township: 36th Range 1st
- 48. Range: 10th Range 1st
- 49. Section: 10th Range 1st
- 50. Township: 36th Range 1st
- 51. Range: 10th Range 1st
- 52. Section: 10th Range 1st
- 53. Township: 36th Range 1st
- 54. Range: 10th Range 1st
- 55. Section: 10th Range 1st
- 56. Township: 36th Range 1st
- 57. Range: 10th Range 1st
- 58. Section: 10th Range 1st
- 59. Township: 36th Range 1st
- 60. Range: 10th Range 1st
- 61. Section: 10th Range 1st
- 62. Township: 36th Range 1st
- 63. Range: 10th Range 1st
- 64. Section: 10th Range 1st
- 65. Township: 36th Range 1st
- 66. Range: 10th Range 1st
- 67. Section: 10th Range 1st
- 68. Township: 36th Range 1st
- 69. Range: 10th Range 1st
- 70. Section: 10th Range 1st
- 71. Township: 36th Range 1st
- 72. Range: 10th Range 1st
- 73. Section: 10th Range 1st
- 74. Township: 36th Range 1st
- 75. Range: 10th Range 1st
- 76. Section: 10th Range 1st
- 77. Township: 36th Range 1st
- 78. Range: 10th Range 1st
- 79. Section: 10th Range 1st
- 80. Township: 36th Range 1st
- 81. Range: 10th Range 1st
- 82. Section: 10th Range 1st
- 83. Township: 36th Range 1st
- 84. Range: 10th Range 1st
- 85. Section: 10th Range 1st
- 86. Township: 36th Range 1st
- 87. Range: 10th Range 1st
- 88. Section: 10th Range 1st
- 89. Township: 36th Range 1st
- 90. Range: 10th Range 1st
- 91. Section: 10th Range 1st
- 92. Township: 36th Range 1st
- 93. Range: 10th Range 1st
- 94. Section: 10th Range 1st
- 95. Township: 36th Range 1st
- 96. Range: 10th Range 1st
- 97. Section: 10th Range 1st
- 98. Township: 36th Range 1st
- 99. Range: 10th Range 1st
- 100. Section: 10th Range 1st



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schuchow
Date: July 30, 1974



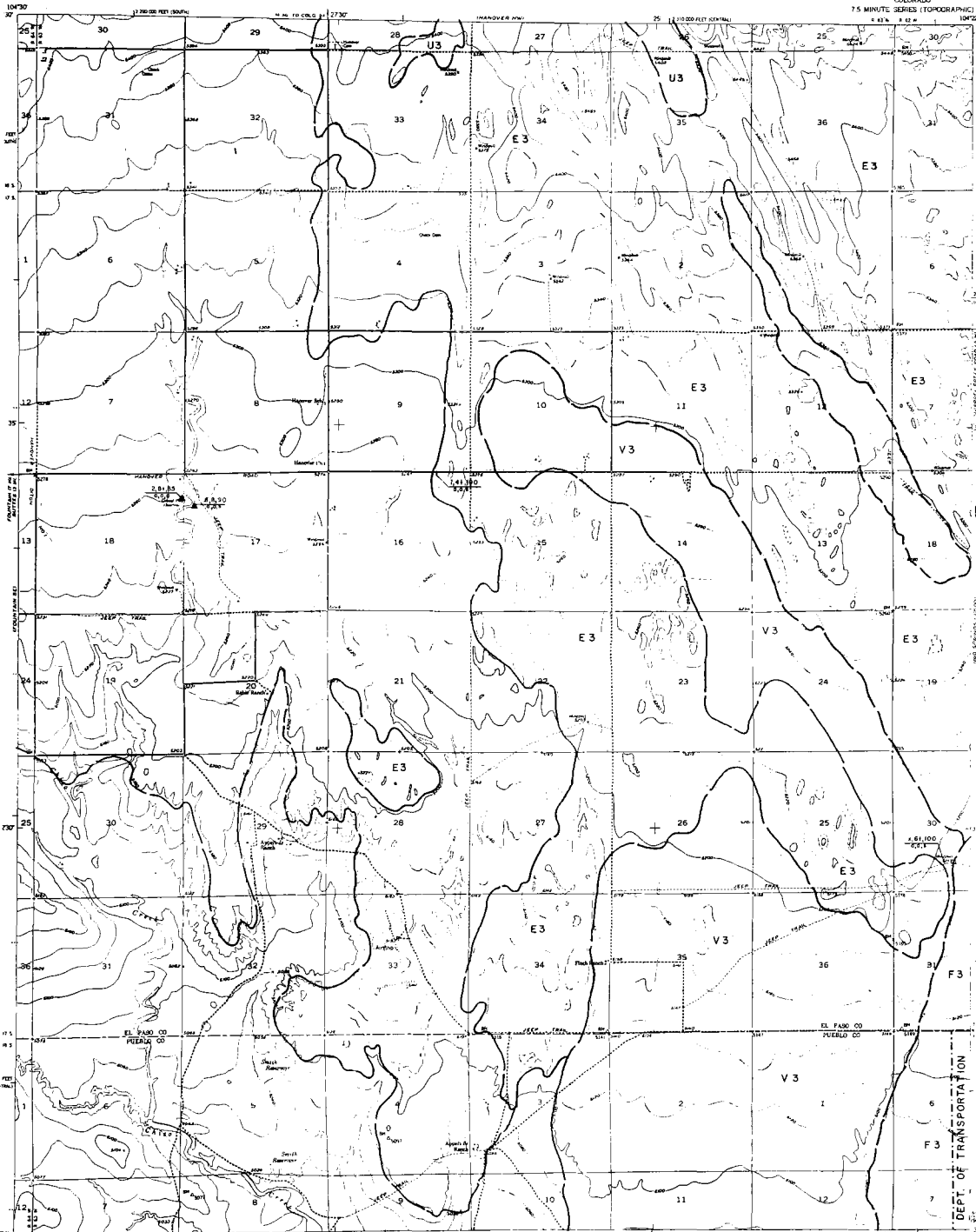
HAEGLER RANCH, COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

HANOVER QUADRANGLE
COLORADO

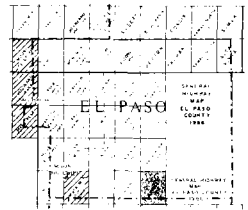
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR

7.5 MINUTE SERIES (TOPOGRAPHIC)
1:62,500



EXPLANATION

- Landform units**
Resource class/flowline
- LANDFORM UNITS**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Hummock deposits (caliche, talus, scoria, etc.)
- RESOURCE CLASSIFICATION**
- CLASSIFICATION**
See legend for resource codes (E3, V3, F3, U3)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous contents
 - 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Proposed quarry aggregate resource area
 - Mineral well or drill-hole location with associated calcareous fill, obtained from well logs
 - "G" indicates gravel; "S" indicates sand
 - "U" in symbol denotes unmineralized or unknown supply
 - "M" denotes Colorado Geological Survey "Mineral Reserves and Gravel Potential" drill hole
 - Landform boundary, well shown known or observed; dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATIONAL INFORMATION**
- North-south distance (ft)
 - Longitude (degrees, minutes, seconds)
 - Percent and from (bearing or azimuth, 0 to 360 degrees, true)
 - Significant amount of flow (average 1000 ft, or 0.07 mi)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcareous contents (average 1000 ft, or 0.07 mi)
 - "U" in symbol denotes unmineralized or unknown supply
 - "M" in symbol denotes mineral reserve or drill-hole



Base from U. S. Geological Survey 7-1/2 minute quadrangle

SCALE: 1:62,500

CONTOUR INTERVAL 20 FEET (BASED ON MEAN SEA LEVEL)

ROAD CLASSIFICATION

Hard-duty	Light-duty
Medium-duty	Unimproved dirt

U U.S. Route
 S State Route

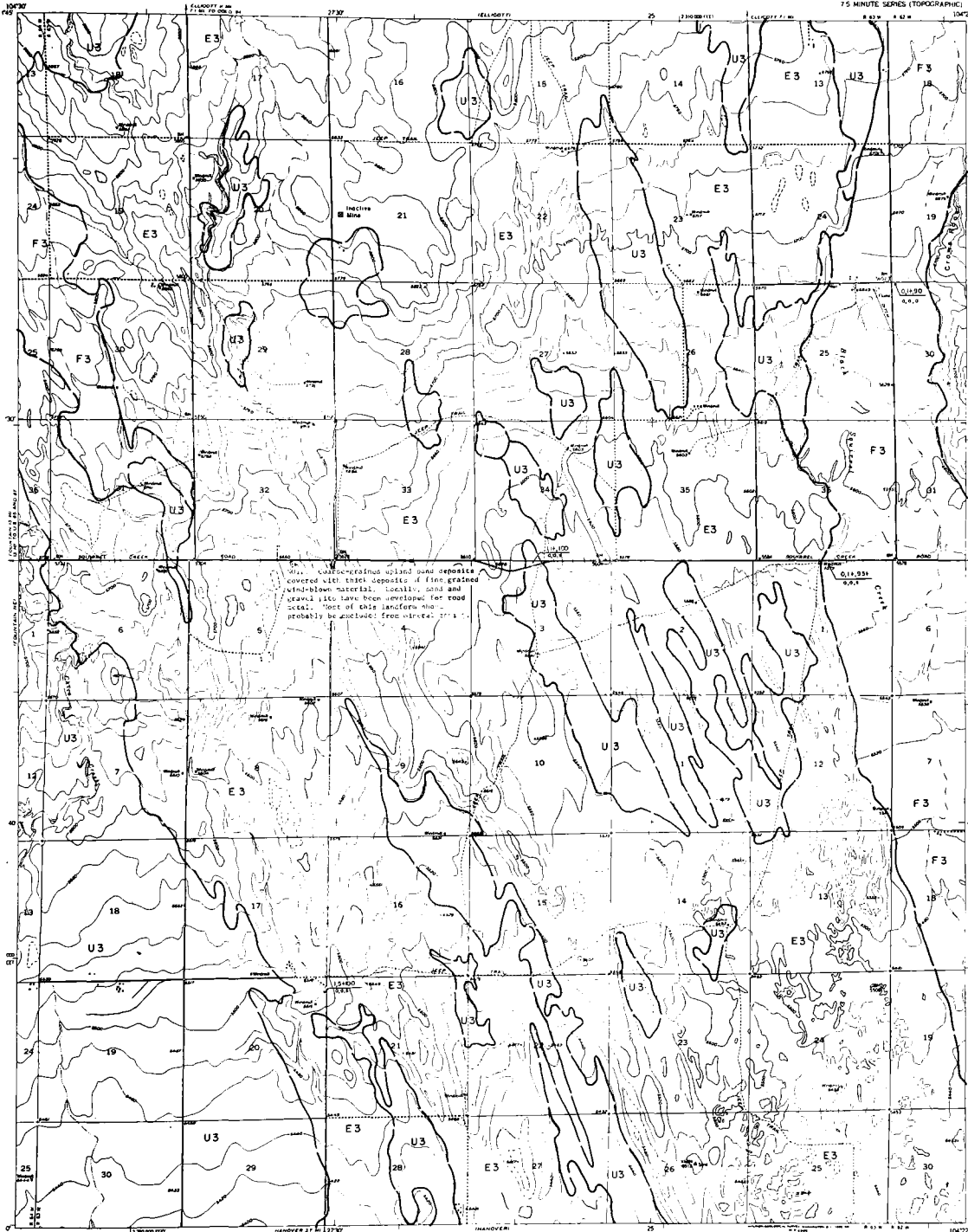
HANOVER, COLO.

Mapped by: Stephen D. Schuchow
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

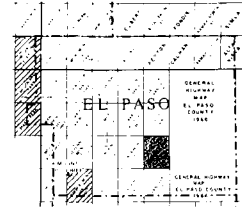
HANOVER NW QUADRANGLE
COLORADO-EL PASO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. POLA, DIRECTOR



EXPLANATION

- GENERAL NOTES**
- F Floodplain deposit
 - T River terrace deposit
 - W Water fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (railroad, pipeline, spoil, ...)
- RESOURCE CLASSIFICATION**
- CLASSIFICATION**
- 1 Gravel: relatively clean and smooth
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- EL PASO COUNTY**
- AGGREGATE**
- 3 Sand
 - 4 Probable aggregate resource
- NON-RESOURCE**
- 5 Operating gravel and/or sand pit
 - 6 Abandoned gravel and/or sand pit
 - 7 Abandoned river quarry
 - 8 Abandoned river quarry
 - 9 Potential quarry aggregate resource area
 - 10 Selected well or drill-hole location with measured thickness (ft) from modified resource thickness (ft), obtained from well logs
 - 11 Indicated gravel; "G" indicates sand
 - 12 In arid areas unsaturated or subsoil property
 - 13 "G" denotes Colorado Geological Survey "verified and gravel projects" drill hole
 - 14 Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND COORDINATE**
- DESCRIPTION OF SYMBOLS**
- 15 crosshatch thickness (ft)
 - 16 sand/gravel resource thickness (ft)
 - 17 percent sand and fines (spacing 40 ft interval, 0.25 in., visual estimation)
 - 18 significant amount of fines (spacing 100 ft interval, 0.250 in. or 0.250 in.)
 - 19 significant amount of decomposed or weak rock
 - 20 significant amount of calcium carbonate (calcium)
 - 21 "G" in arid areas unsaturated or subsoil property
 - 22 "G" in arid areas property absent or inadequate

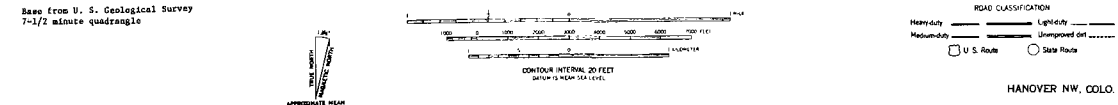


CHADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Soister, P. T., 1968, U. S. Geological Survey, Map GQ-723.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974



ROAD CLASSIFICATION

Heavy-duty Light-duty

Medium-duty Unimproved dirt

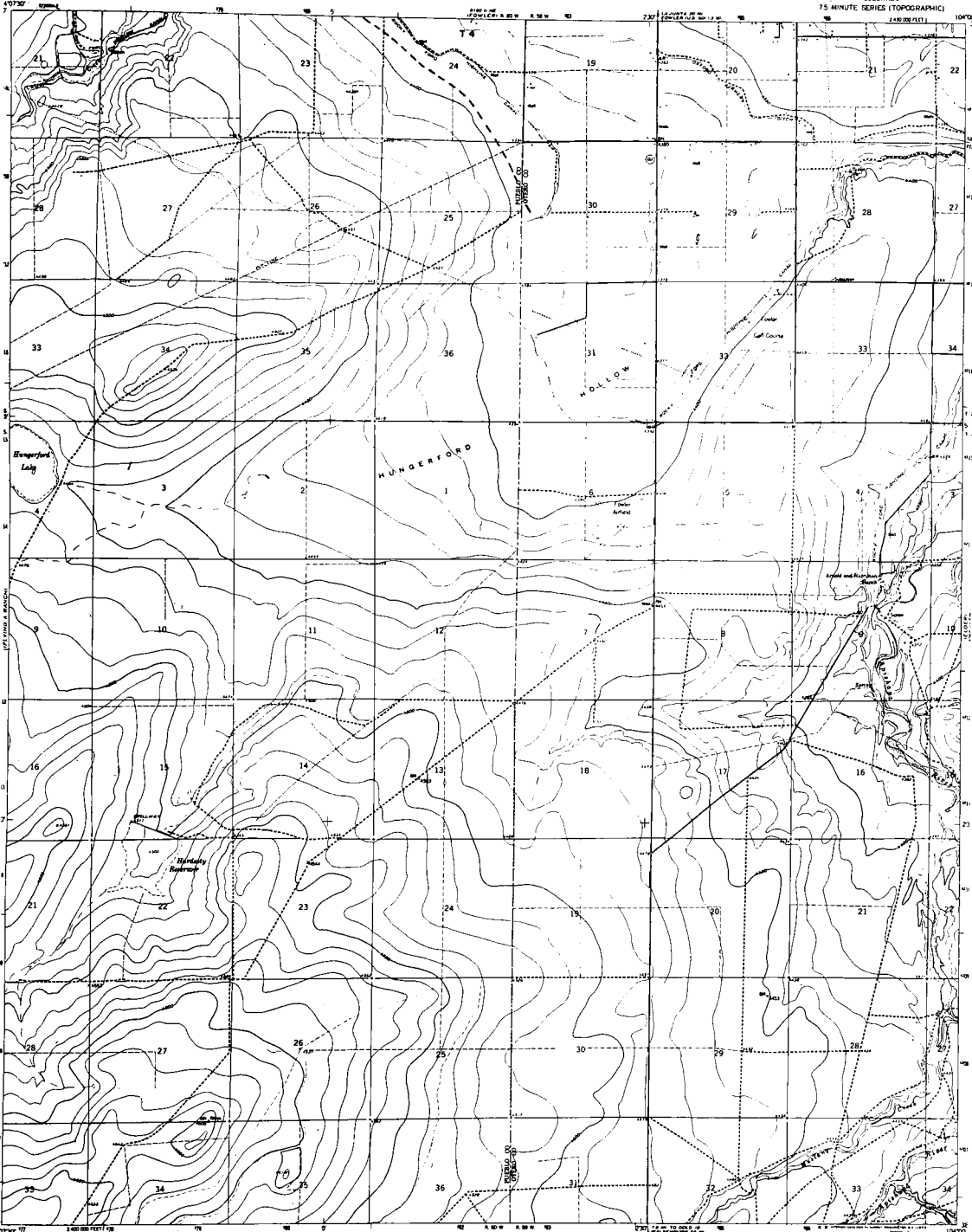
U.S. Route State Route

HANOVER NW, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

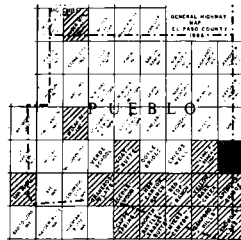
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLL, DIRECTOR

HARDESTY RESERVOIR QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)



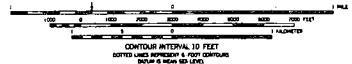
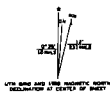
EXPLANATION

- Contour units**
— Resource classification
- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mesa-top deposit (sand, silt, shale, etc.)
- RESOURCE CLASSIFICATION**
- GRAVEL AGGREGATE**
1st QUANT. 200 YDS. OR MORE, 80% RETAINED ON #20 SCREEN, MEAN ESTIMATION
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, solution carbonates
- SAND AGGREGATE**
1st QUANT. 200 YDS. OR MORE, 80% RETAINED ON #20 SCREEN, MEAN ESTIMATION
- 3 Sand
 - 4 Probably aggregate resource
- WATER RESOURCES**
- WATER**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Reconital quarry aggregate resource area
- WELL**
- Reconital well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "r" indicates gravel; "s" indicates sand
 - "u" in symbol denotes unventilated or unknown property
 - "m" denotes Colorado Geological Survey "Mesa-Top Sand and Gravel projects" drill hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATIONAL INFORMATION OF RESOURCES**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (passing #40 screen, 0.30 in.), visual estimation
 - significant amount of decomposed or weak rock
 - significant amount of silt or carbonate material
 - "u" in symbol denotes unventilated or unknown property
 - "m" in symbol denotes property absent or insignificant



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL, 10 FEET
DOTTED LINES APPROXIMATE 100' CONTOURS
DASHED LINES 100' INTERVAL

ROAD CLASSIFICATION

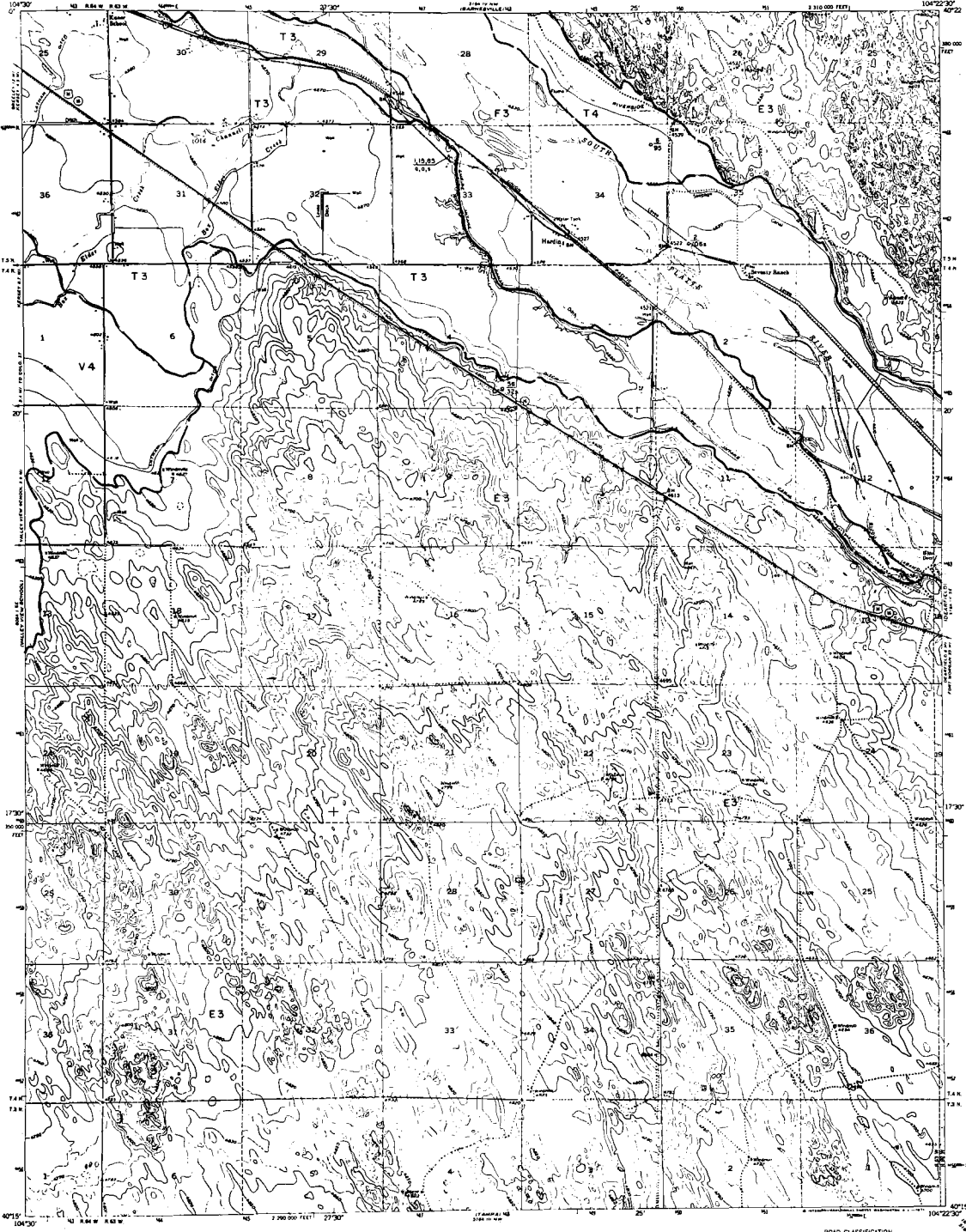
- Highway
- Light-duty
- Unimproved det.
- State Route

HARDESTY RESERVOIR, COLO.

Mapped by: Stephen D. Schwachow
Date: June 30, 1974

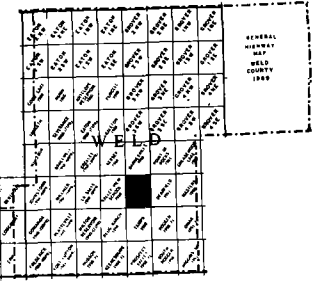
SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

HARDIN QUADRANGLE
 COLORADO-WELD CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)
 104°22'30" W
 37°50' N



EXPLANATION

- Landform unit
 Resource classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Tertiary terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-sand deposits (slag, tailings, spoils...)
- RESOURCE CLASSIFICATION**
- GRAVEL QUANTITIES**
 (at least 200' recorded on 44 screen, visual estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- SAND QUANTITIES**
 (greater than 100' clearing 44 screen, 400' retained on 400 mesh, visual estimation)
- 3 Sand
 - 4 Probable aggregate resource
- QUARRY TYPES**
- * Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Indicated well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), shaded from well logs.
 - "G" indicates gravel; "S" indicates sand
 - "L" in symbol denotes unconsolidated or loose property
 - "W" denotes Colorado Geological Survey "Water-Supply and Geology" (W.S.G.) drill hole
 - Landform boundary, solid where shown or observed, dashed where approximate or inferred
- SECTION, LOCATION AND STRATIGRAPHIC CORRELATION OF SECTORS**
- overburden thickness (ft)
 sand/gravel resource thickness (ft)
 percent sand and fines (greater 44 screen, 0-50 on 400 mesh, visual estimation)
- Significant amount of fines (greater than 500 mesh, 0-500 on 400 mesh)
 ○ Significant amount of decomposed or weak rock
 ○ Significant amount of calcium carbonate (not for use as aggregate unless crushed or broken property)
- "L" in symbol denotes unconsolidated or loose property
 "W" in symbol denotes property owned or leased

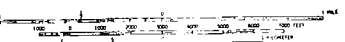
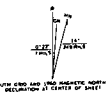


■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WETDRAIN AREA

REFERENCE: Bjorklund, L.J., and Brown, R.F., 1957, Geology and ground-water resources of the lower South Platte River valley between Huerfano, Colorado, and Fawns, Nebraska; U. S. GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1376, p. 1.

Mapped by: Phillip C. Wicklein
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET
 (ON A 10' MESH 50' LEVEL)

ROAD CLASSIFICATION

- Heavy-duty
- Medium-duty
- Light-duty
- Unimproved
- U. S. Route
- State Route

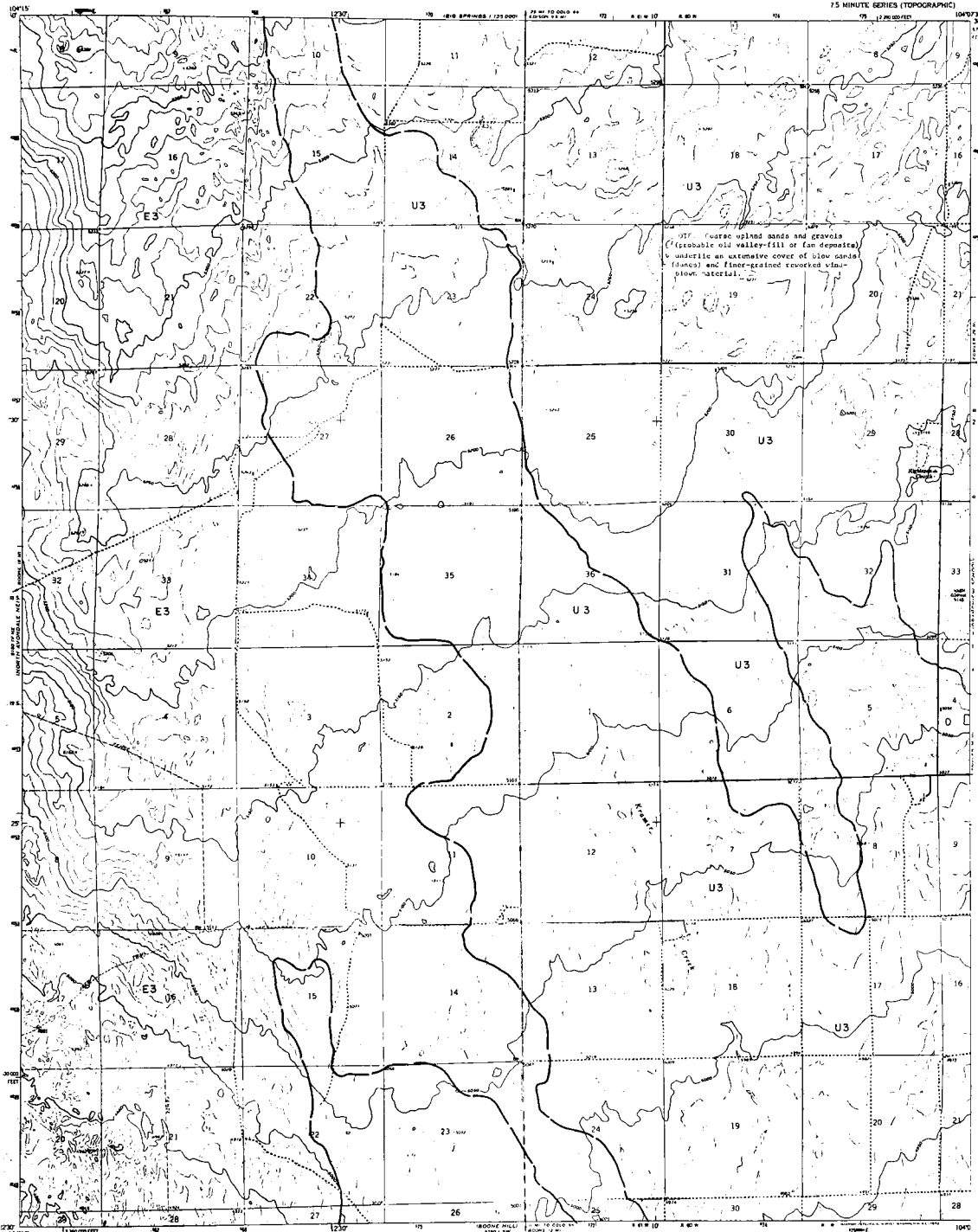
HARDIN COLO.
 W6019-W6225/7.5
 1950
 AMS 5184 IV SW-SERIES V877

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

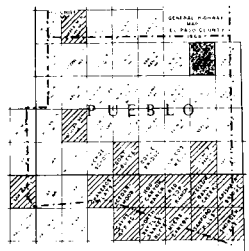
HIGHLANDS CHURCH QUADRANGLE
 COLORADO-PUEBLO CO
 7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. HOLS, DIRECTOR



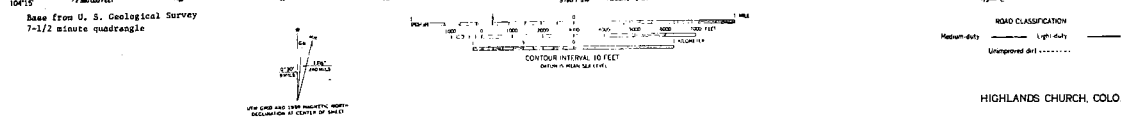
EXPLANATION

- Landform unit
- Boundary of landform unit
- LANDFORM UNIT
- F Fluvial deposit
- T Tertiary terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Eolian deposits and loess
- M Marine deposits (e.g., dunes, spits...)
- RESOURCE CLASSIFICATION
- Coarse aggregate
- 1 Gravel: relatively clean and round
- 2 Gravel: significant fines, decomposed rock, calcine carbonates
- 3 Sand
- 4 Probable aggregate resource
- MAP SYMBOLS
- Operating gravel and/or sand pit
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Selected unit of drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- "g" indicates gravel; "s" indicates sand
- "f" in symbol denotes unconsolidated or otherwise specified
- Geological Colorado Geological Survey
- Boundary of landform unit
- Landform boundary, with where known or observed; dashed where approximations or inferred
- STATION LOCATION AND GEOLOGICAL DESCRIPTION OF BORING
- Overburden thickness (ft)
- Sand/gravel resource thickness (ft)
- Percent sand and fines (ignoring the coarse, 0.075 to 0.25 mm)
- Significant amount of fines (exceeding 15% fines, 0.075 to 0.25 mm)
- Significant amount of decomposed or weak rock
- "f" in symbol denotes unconsolidated or otherwise specified
- "g" in symbol denotes gravel; "s" in symbol denotes sand



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schewchow
 Date: June 30, 1974



HIGHLANDS CHURCH, COLO

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

HIGHLANDS RANCH QUADRANGLE
MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

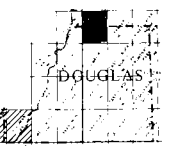
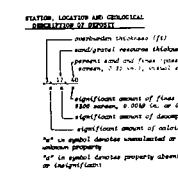
EXPLANATION

Resource Classification

- LEGEND (LITHO)**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Alluvial fan (E & T)
 - U Wind deposit
 - A Alluvial fan
 - E Wind-deposited sand (medium)
 - M Non-made deposits (lake, alluvial, etc.)

- AGGREGATE CLASSIFICATION**
- GRAVEL DEPOSIT**
(or larger size deposits) - 40 screen, 100% sandstone
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed, etc. (includes 100% sandstone)
- SAND**
- 3 Sand
 - 4 Probable aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Related well or drill-hole location with source
 - Surface elevation (100' interval) and/or gravel resource
 - "S" indicates gravel, "M" indicates sand
 - In symbol circles: "S" indicates sandstone or medium property
 - "M" denotes Colorado Geological Survey "Underfoot and Gravel Project" drill hole
 - Location boundary, not shown where not shown; dashed where approximate or inferred

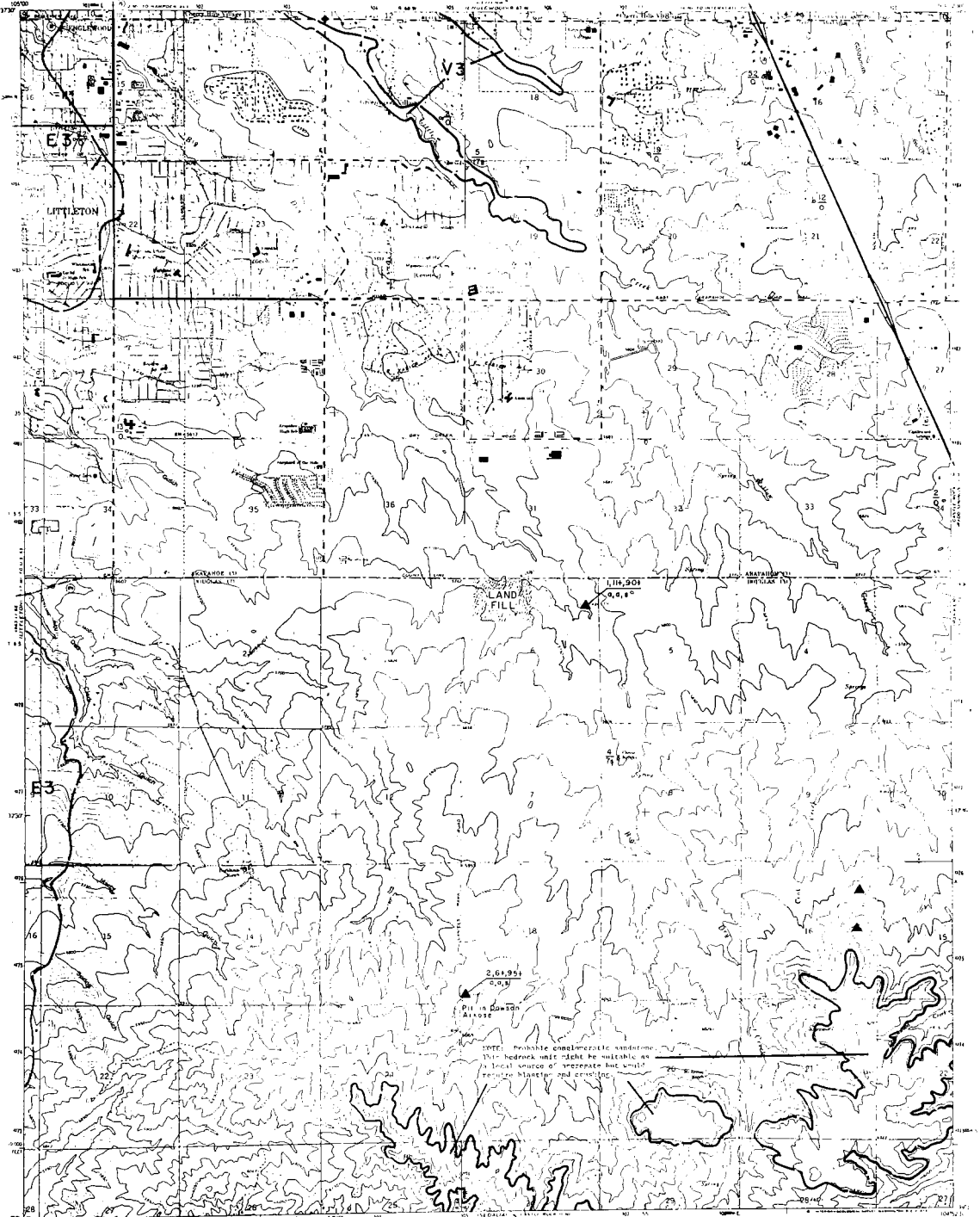


- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

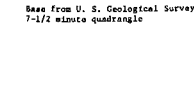
REFERENCE:

Chase, C.H., and McCaskey, J.A., 1972. Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map T-731.

Trumble, D.F., and Pritch, S.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map T-856-A.



Map from U. S. Geological Survey
7-1/2 minute quadrangle



- ROAD CLASSIFICATION**
- Heavy Duty
 - Light Duty
 - Medium Duty
 - Unimproved dirt
 - Gravel Road
 - U.S. Road
 - State Road

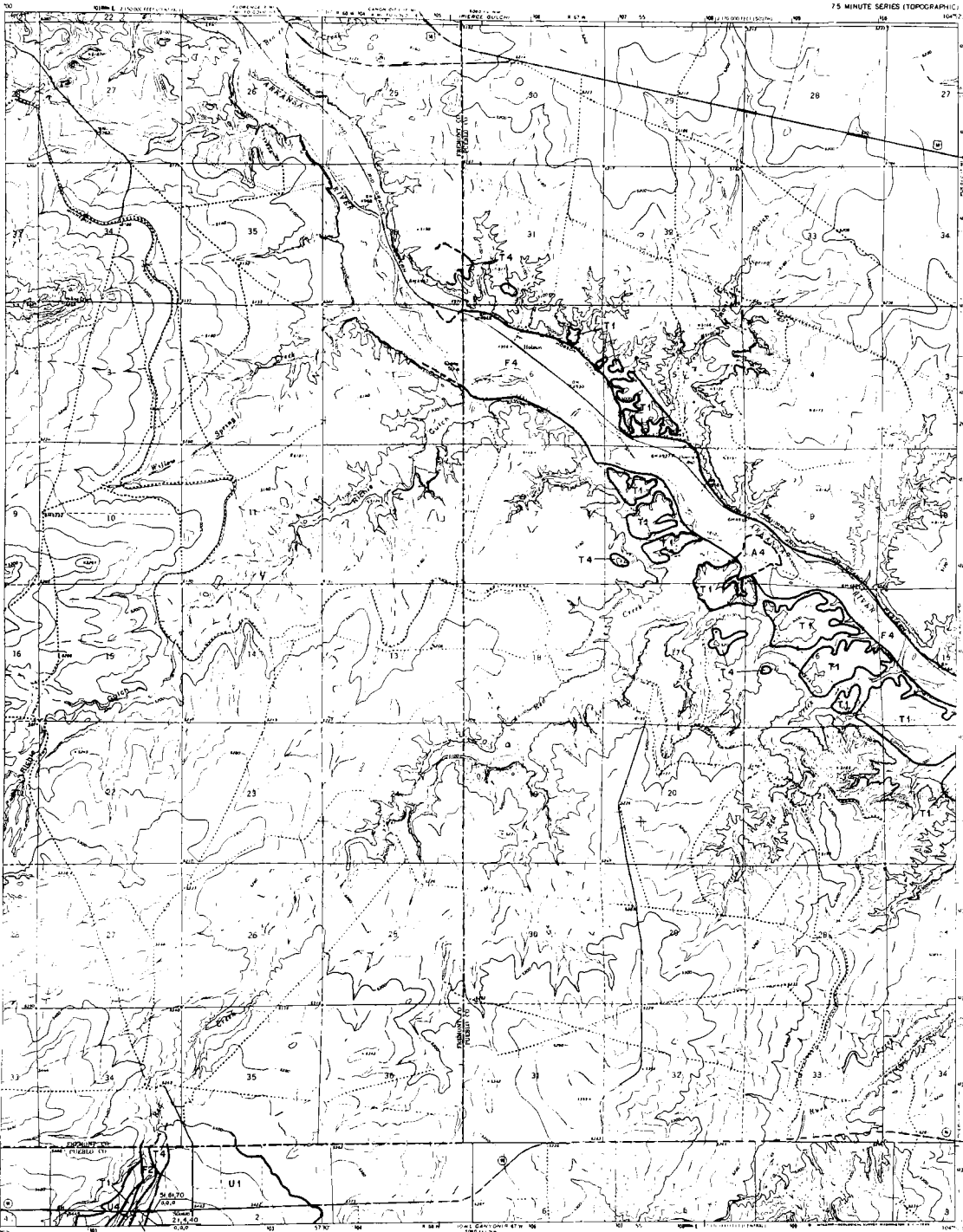
Mapped by: Ralph B. Shroba
Date: June 30, 1974
Prepared in cooperation with the
U. S. Geological Survey.

HIGHLANDS RANCH COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

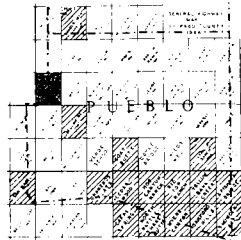
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

HOBSON QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Landform units
Resource classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Marine deposits (beach, dunes, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
- 1 Gravel, rounded to 24 inches, 100% or more
 - 2 Gravel, rounded to 24 inches, 75% or more
 - 3 Gravel, rounded to 24 inches, 50% or more
 - 4 Gravel, rounded to 24 inches, 25% or more
 - 5 Gravel, rounded to 24 inches, 10% or more
 - 6 Gravel, rounded to 24 inches, 5% or more
 - 7 Gravel, rounded to 24 inches, 2% or more
 - 8 Gravel, rounded to 24 inches, 1% or more
 - 9 Gravel, rounded to 24 inches, less than 1%
 - 10 Sand, rounded to 24 inches, 100% or more
 - 11 Sand, rounded to 24 inches, 75% or more
 - 12 Sand, rounded to 24 inches, 50% or more
 - 13 Sand, rounded to 24 inches, 25% or more
 - 14 Sand, rounded to 24 inches, 10% or more
 - 15 Sand, rounded to 24 inches, 5% or more
 - 16 Sand, rounded to 24 inches, 2% or more
 - 17 Sand, rounded to 24 inches, 1% or more
 - 18 Sand, rounded to 24 inches, less than 1%
- Fin Aggregate**
- 1 Gravel, rounded to 24 inches, 100% or more
 - 2 Gravel, rounded to 24 inches, 75% or more
 - 3 Gravel, rounded to 24 inches, 50% or more
 - 4 Gravel, rounded to 24 inches, 25% or more
 - 5 Gravel, rounded to 24 inches, 10% or more
 - 6 Gravel, rounded to 24 inches, 5% or more
 - 7 Gravel, rounded to 24 inches, 2% or more
 - 8 Gravel, rounded to 24 inches, 1% or more
 - 9 Gravel, rounded to 24 inches, less than 1%
 - 10 Sand, rounded to 24 inches, 100% or more
 - 11 Sand, rounded to 24 inches, 75% or more
 - 12 Sand, rounded to 24 inches, 50% or more
 - 13 Sand, rounded to 24 inches, 25% or more
 - 14 Sand, rounded to 24 inches, 10% or more
 - 15 Sand, rounded to 24 inches, 5% or more
 - 16 Sand, rounded to 24 inches, 2% or more
 - 17 Sand, rounded to 24 inches, 1% or more
 - 18 Sand, rounded to 24 inches, less than 1%
- Geological Features**
- 1 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Related well or drill-hole location with over-burden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "T" indicates gravel "T" indicates sand
 - "S" in symbol denotes unutilized or unknown quantity
 - "M" denotes Colorado Geological Survey "Mineral/Stone and Gravel" projects
 - "H" in symbol denotes unutilized or unknown quantity
 - Landform boundary, solid where known or dashed where approximate or inferred
- STATUS, LOCATION AND GEOLOGICAL SIGNIFICANCE OF SYMBOLS**
- 1 Significant amount of fine (less than 20 mesh, 0.075 mm, or 0.075 in.) aggregate above or dispersed or well rock.
 - 2 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 3 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 4 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
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 - 20 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 21 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 22 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 23 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 24 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
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 - 29 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 30 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 31 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 32 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 33 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
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 - 39 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
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 - 41 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
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 - 46 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 47 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 48 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 49 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.
 - 50 Significant amount of medium (20-60 mesh) (0.85-2.5 mm, or 0.033-0.1 in.) aggregate.

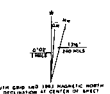


QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, C. R., 1972,
U. S. Geological Survey Map MP-353.

Mapped by: Ralph S. Shroba
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL: 20 FEET
ELEVATION IN FEET
DATE: 1974

ROAD CLASSIFICATION

Medium-duty Light-duty
Unimproved det. State Road
US Route State Road

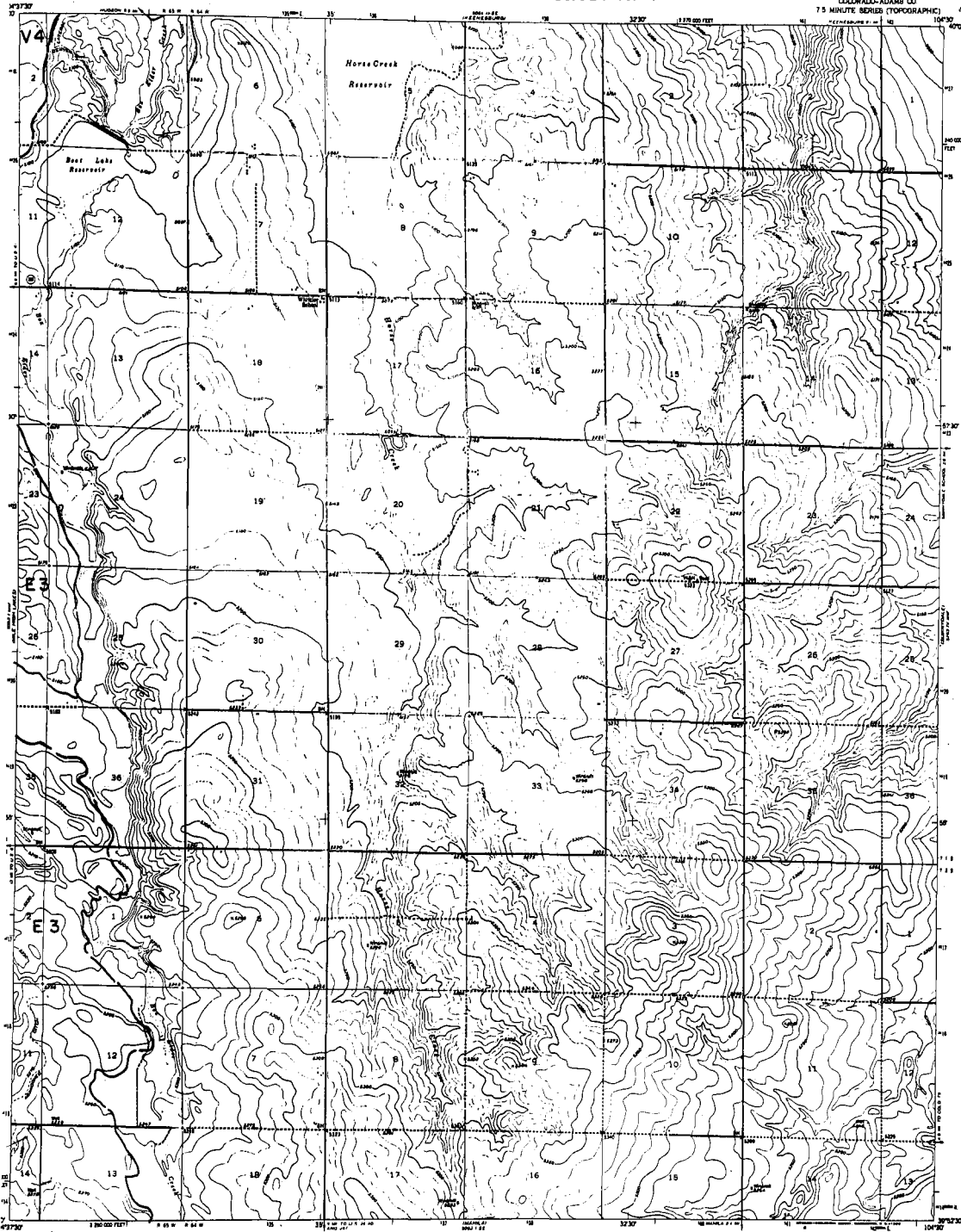
HOBSON, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

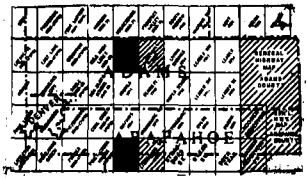
HORSE CREEK QUADRANGLE
 COLORADO-ADAMS CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. ROLD, DIRECTOR



EXPLANATION

- Landform unit
 - Resource class/location
- LANDFORM UNITS**
- P Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & V)
 - U Upland deposit
 - A Alluvial fan
 - B Wind-deposited sand (colluvial)
 - M Man-made deposits (fill, alluvium, spalls, ...)
- AGGREGATE CLASSIFICATION**
- CLASSIFICATION**
- 1 Gravel: relatively clean and round
 - 2 Gravel: significant fines, unrounded rock, clastic substrate
- FIN SANDS**
- 3 Sand: (graded) 20-100 mesh; 85 percent, 20 mesh; 90 percent, 40 mesh; 95 percent, 60 mesh; 100 percent, 80 mesh
- UNVALUED RESOURCES**
- 4 Probable aggregate resource
- USE SYMBOLS**
- a Operating gravel and/or sand pit
 - b Abandoned gravel and/or sand pit
 - c Operating stone quarry
 - d Abandoned stone quarry
 - e Potential quarry aggregate resource area
- AGGREGATE RESOURCE AREAS**
- "a" indicates gravel; "s" indicates sand
 - "u" in symbol denotes unvalued or unknown resource
 - "M" denotes Colorado Geological Survey Modified Road and Drainage Project
 - "R" indicates road
 - "D" indicates drain
 - "W" indicates water
 - "L" indicates land
 - "P" indicates property
 - "S" indicates site
- STATUS, LOCATION AND DIMENSIONAL SPECIFICATION OF AREAS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (grading as shown, 0-25 in. U.S. standard)
 - Significant amount of fines (grading 100 percent, 0-25 in. or 0-25 in.)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcareous carbonate rock
 - "u" in symbol denotes unvalued or unknown property
 - "M" in symbol denotes property owned or controlled



QUADRANGLE LOCATION

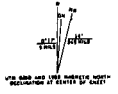
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

Bethy, E.D., Schneider, P.A., Jr., and Petri, L.R., 1988, Ground-water resources of the South Platte River basin to western Adams and southeastern Weld Counties, Colorado, U. S. Geol. Survey Water-Supply Paper 1658, p. 1.

Mapped by: Phillip C. Wicklein
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET
 (unless otherwise noted)

ROAD CLASSIFICATION

Heavy-duty _____

Medium-duty _____

Light-duty _____

U. S. Road _____

State Road _____

HORSE CREEK, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

HORSETOOTH RESERVOIR

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. NEILA, DIRECTOR



EXPLANATION

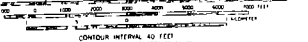
- LANDFORMS**
- Alluvial fan
 - Alluvial cone
 - Alluvial plain
 - Alluvial terrace
 - Alluvial valley
 - Alluvial wedge
 - Alluvial deposit
 - Alluvial deposit (alluvial fan)
 - Alluvial deposit (alluvial cone)
 - Alluvial deposit (alluvial plain)
 - Alluvial deposit (alluvial terrace)
 - Alluvial deposit (alluvial valley)
 - Alluvial deposit (alluvial wedge)
- ROAD CLASSIFICATION**
- 1. Gravel: relatively clean and sound
 - 2. Gravel: significant fines, maximum rock, clean aggregate
- ROAD CLASSIFICATION**
- 1. Gravel: relatively clean and sound
 - 2. Gravel: significant fines, maximum rock, clean aggregate
- ROAD CLASSIFICATION**
- 1. Gravel: relatively clean and sound
 - 2. Gravel: significant fines, maximum rock, clean aggregate
- ROAD CLASSIFICATION**
- 1. Gravel: relatively clean and sound
 - 2. Gravel: significant fines, maximum rock, clean aggregate



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

- REFERENCE:**
- Swan, F. R., 1972. Map of surficial geology of part of the Horsetooth Reservoir quadrangle; Bascom mapping for Colorado Geol. Survey Midway Environmental Geology Project, open-file map.
 - Bradlock, W. A., Calvert, R. H., O'Connor, J. T., and Swann, G. A., 1973. Geologic map of the Horsetooth Reservoir quadrangle, Larimer County, Colorado; U.S. Geological Survey Open-File Map.
 - Barber, L.A., and Schnatler, P.A., Jr., 1974. Geologic map of the lower Cache La Poudre River basin, north-central Colorado; U.S. Geol. Survey Misc. Geol. Inv. Map I-687.
 - Shelton, D.C., 1974, personal communication.
- Geology modified after: Colton, W.B., and Pritch, R.R., 1976, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Creeley Area, Front Range Urban Corridor, Colorado; U.S. Geol. Survey Map I-655 D.
- Maped by: Stephen D. Schuchow
 Date: June 30, 1974
- Prepared in cooperation with the U.S. Geological Survey.

Base from U.S. Geological Survey
 7-1/2 minute quadrangle



CONTOUR INTERVAL 40 FEET
 SURFACE ELEVATION IN 1000' CONTOURS
 0.1" = 100'

ROAD CLASSIFICATION

— Light duty
 — Unimproved dirt

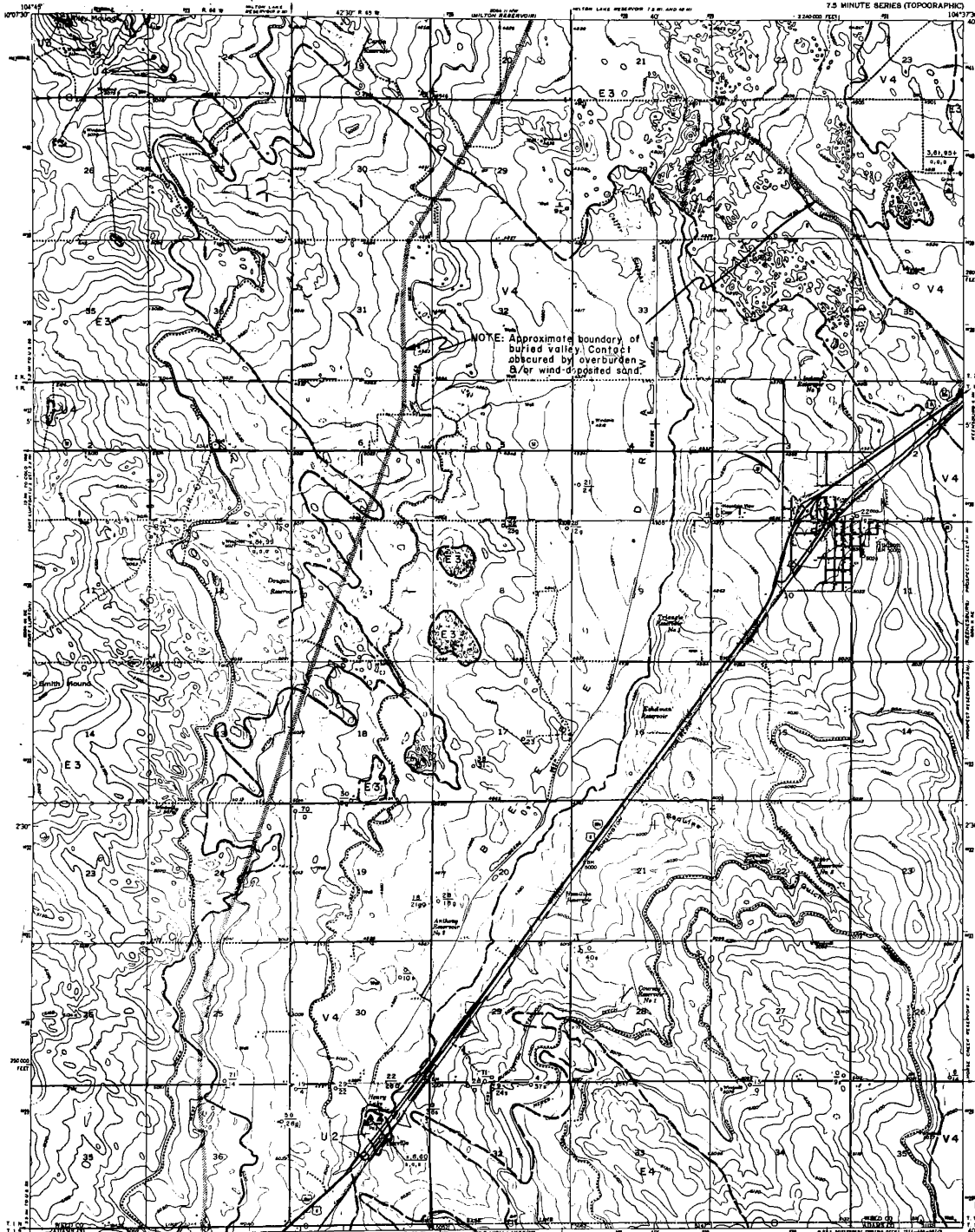
HORSETOOTH RESERVOIR, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

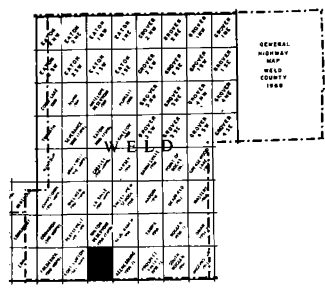
HUDSON QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- Landform units**
Resource classification
- LITHOLOGIC UNIT**
- F Floodplain deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Unfold deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (landfill, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Aggregate**
(All facts are estimated on 40 acres, actual estimation)
- 1 Gravel: relatively clean and well sorted
 - 2 Gravel: significant fines, unsorted, and/or calcareous
- Sand Aggregate**
(Aggregates from 750 panning 40 acres, 50% retained on 200 screen, actual estimation)
- 3 Sand
 - 4 Probable aggregate resources
- QUARRIES**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
"r" indicates presence of "r" distance sand
"s" in symbol denotes unconsolidated or unknown property.
"m" denotes Colorado Geological Survey "mineral/land and/or gravel" project.
Landform boundary, solid where known or observed; dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE**
- overburden thickness (ft)
 - aggregate resource thickness (ft)
 - percent sand and fines (spacing #)
 - significant amount of decomposed or soil rock
 - significant amount of fines (spacing #)
 - significant amount of material unobtainable for use
 - "s" in symbol denotes unconsolidated or unknown property
 - "m" in symbol denotes property absent or unexplored

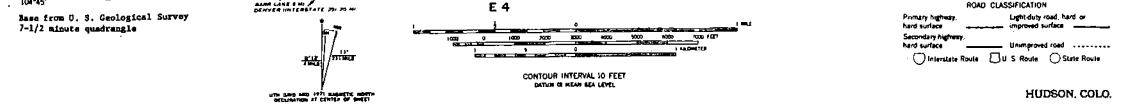


■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Control modified after Selover, P. E., 1965, U. S. Geological Survey, Geologic Quadrangle Map, GQ-398.

Colton, R. B., and Pritch, R. B., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Vest Collias-Owensley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-855-D.

Mapped by: Ralph R. Shroba
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

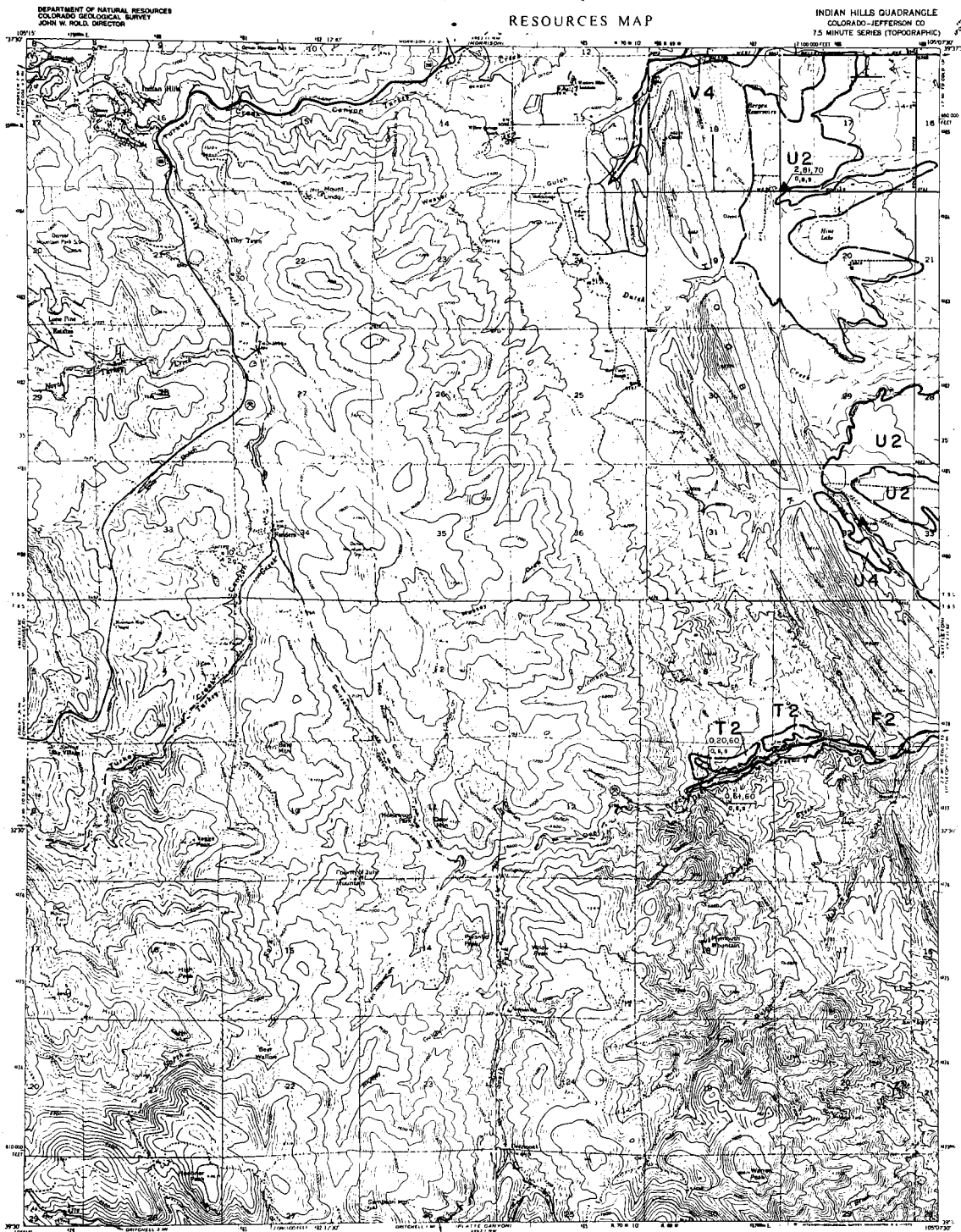


HUDSON, COLO.

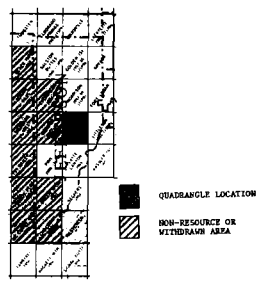
SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

INDIAN HILLS QUADRANGLE
COLORADO—JEFFERSON CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION



- LANDFORMS**
- F Floodplain deposit
 - T Trench deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (fill, etc.)
- ROAD CLASSIFICATION**
- 1 Gravel: relatively clean and smooth
 - 2 Gravel: significant fines, decomposed rock, natural carbamate
 - 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Related well or drill-hole location with mineral thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "I" indicates gravel, "G" indicates sand
 - "I" in symbol denotes uncalibrated or uncalibrated
 - "G" in symbol denotes Geological Survey Water/Soil and Gravel projects data
 - Local on boundary, solid when known or observed, dashed where approximate or inferred
- STATION LOCATION AND TOPOGRAPHIC REPRESENTATION OF SYMBOLS**
- contour interval thickness (ft)
 - contour interval thickness (ft)
 - percent sand and fines (percent) at given 0.25 mi. interval
 - significant amount of fine sanding (sand)
 - significant amount of decomposed or weak rock
 - significant amount of mineral aggregate (sand)
 - "I" in symbol denotes uncalibrated or uncalibrated
 - "G" in symbol denotes property shown or uncalibrated



Geology modified after
SECT. G.R., 1961, Preliminary geologic map
of the Indian Hills quadrangle, Jefferson
County, Colorado; U.S. Geol. Survey Misc.
Geol. Inv. Map T-373.

References:
Chase, G.R., and McConaghy, J.A., 1972,
Generalized surficial geologic map of the
Denver area, Colorado; U.S. Geol. Survey
Misc. Geol. Inv. Map T-731.

Trumble, D.E., and Pritch, H.R., 1974, Map
showing potential sources of gravel
and crushed-rock aggregate in the
Greater Denver Area, Front Range Urban
Corridor, Colo.; U. S. Geol. Survey
Misc. Geol. Inv. Map T-856-A.

Mapped by: Stephen D. Schwochov
Date: June 30, 1974

Prepared in cooperation with the
U. S. Geological Survey

Base from U. S. Geological Survey
7-1/2 minute quadrangle

CONTOUR INTERVAL 40 FEET
(1:25,000 SCALE)

ROAD CLASSIFICATION

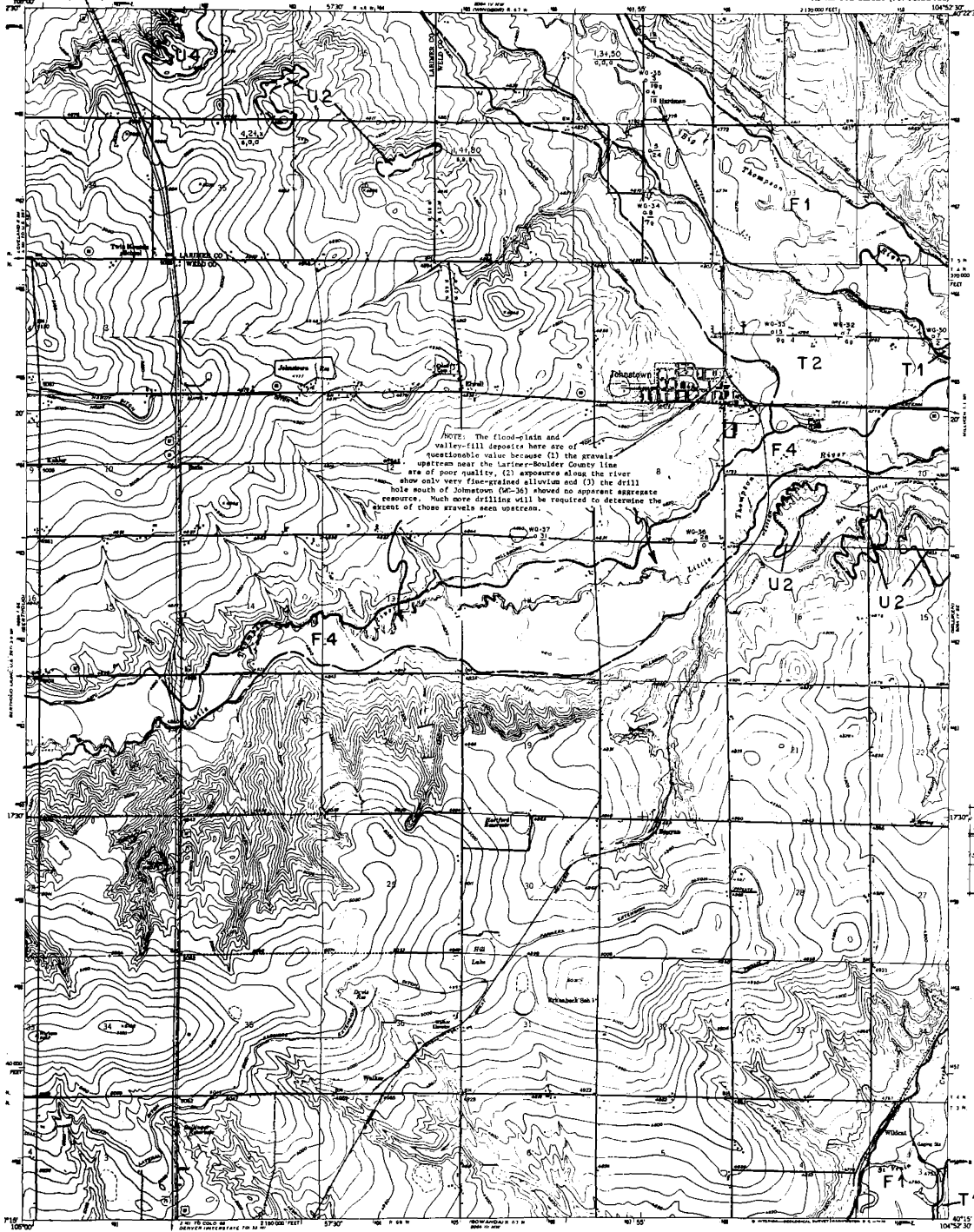
- Heavy Duty
- Medium Duty
- Light Duty
- Unimproved dirt
- U.S. Road
- State Road

INDIAN HILLS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

JOHNSTOWN QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

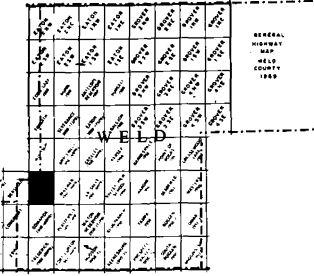
Contour with resource classification

- LANDFORM UNIT**
- F Floodplain deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Manmade deposits (embankment, spoil, ...)

- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
for use in concrete - 1/2" minus, (total aggregate)
- 1 Gravel, calcareous; clean and sound
 - 2 Gravel, siliceous; fine, decomposed rock, calcareous
- Fine Aggregate**
(smaller than #20 sieve) 40 percent, (20) minus or 80 percent, (40) minus or 20 percent, (100) minus or 0 percent
- 3 Sand
- Unutilized Resource**
- 4 Probable aggregate resource

- NOT SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential heavy aggregate resource area
 - Selected well or drill-hole location with open bottom (circle) (1) over sand gravel resource thickness (1/2) obtained from well log
 - "R" indicates gravel; "S" indicates sand
 - "*" in symbol denotes unutilized or unknown property
 - "W" denotes Colorado Geological Survey Well Log (Sand and Gravel) Project
 - Drill hole
 - Landmark mentioned, with name known or obscure; shaded where approximate or inferred

- SYMBOL LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- interbedded (1/2) sand/gravel resource thickness (1/2) (percent) sand and fines (percent) of screen, 0.25 in., usual definition
 - significant amount of fines (percent) 200 screen, 2.000 in. or 4.750 in.
 - significant amount of decomposed or weak rock
 - significant amount of solution submicron calcareous
 - "*" in symbol denotes unutilized or unknown property
 - "W" in symbol denotes property owned or leased/leased



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:
Colton, H.B., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregates in the Boulder-Fort Collins-Creeley Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map 1-855-D.

Mapped by: Stephen D. Schwechow
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey
7-1/2 minute quadrangle



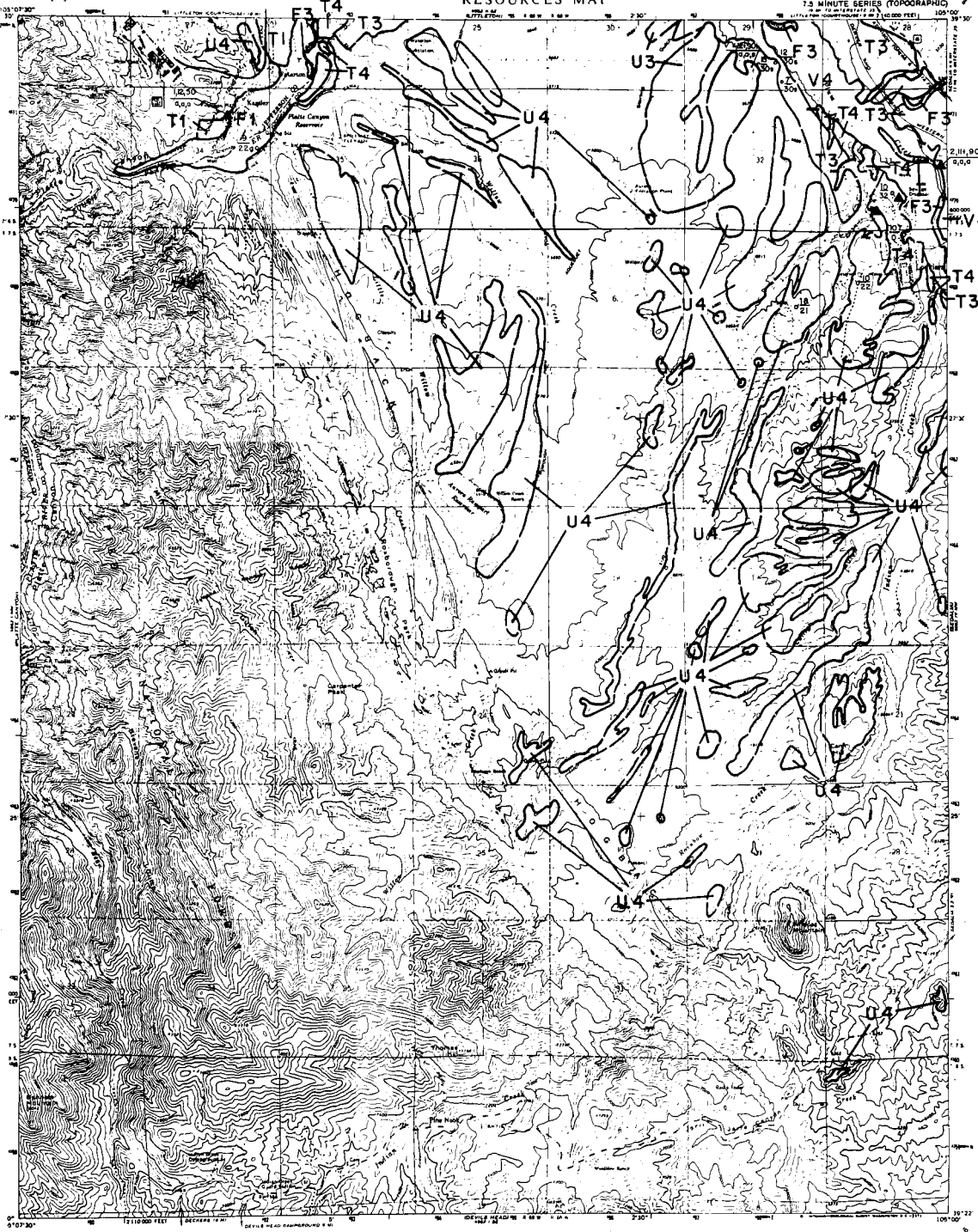
CONTOUR INTERVAL 10 FEET
ELEVATION IN MEAS. SEA LEVEL

- ROAD CLASSIFICATION**
- Heavy-duty
 - Medium-duty
 - Light-duty
 - Unimproved det.
 - U.S. Route
 - State Route

JOHNSTOWN, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

KASSLER QUADRANGLE
 COLORADO
 7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

Resource classification

- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Nonquartz aggregate
 - S Sandstone aggregate

- ROCK CLASSIFICATION**
- (See legend for rock classification on 1:50,000 scale)
- 1 Cracks: relatively clean and sound
 - 2 Cracks: significant filled, decomposed rock, talus on surface
 - 3 Sand
 - 4 Probable aggregate resource

- AGGREGATE**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Revised well or drill-hole location with resource thickness (ft) and sand/gravel resource thickness (ft), obtained from well logs
 - "ft" indicates gravel; "s" indicates sand
 - "ft" in symbol denotes restricted or unknown property
 - "ft" denotes Colorado Geological Survey boundary/land and gravel projects
 - "ft" indicates well
 - Landform boundary, solid when known or observed; dashed when approximate or inferred

- SYMBOLS, LOCATIONS AND GEOLOGICAL INFORMATION OF RESOURCES**
- Resource thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Revised well and fine spacing (ft)
 - Revised well and fine spacing (ft) corner, 0.1 ft (0.1 m), symbol indication
 - Revised amount of fine spacing (ft) (0.1 ft (0.1 m) or 0.1 ft (0.1 m))
 - Revised amount of decomposed or sand rock
 - Revised amount of surface aggregate (ft)
 - "ft" in symbol denotes restricted or unknown property
 - "ft" in symbol denotes property, absent or damaged/lost



Geology modified after:
 Smith, C.R., 1963, Tertiary geology and geomorphic history of the Kassler quadrangle, Colorado; U.S. Geol. Survey Prof. Paper 421-A, 70 p., 1 pl.

References:
 Chase, G.H., and McConaghy, J.A., 1972, Generalized surficial geology map of the Denver area, Colorado; U.S. Geol. Survey Misc. Geol. Map 1-732.

Trumble, D.E., and Petch, H.R., 1979, Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.; U.S. Geol. Survey Misc. Geol. Map 1-856-A.

Mapped by: Ralph S. Shrobe
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



CONTOUR INTERVAL 40 FEET
 DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION

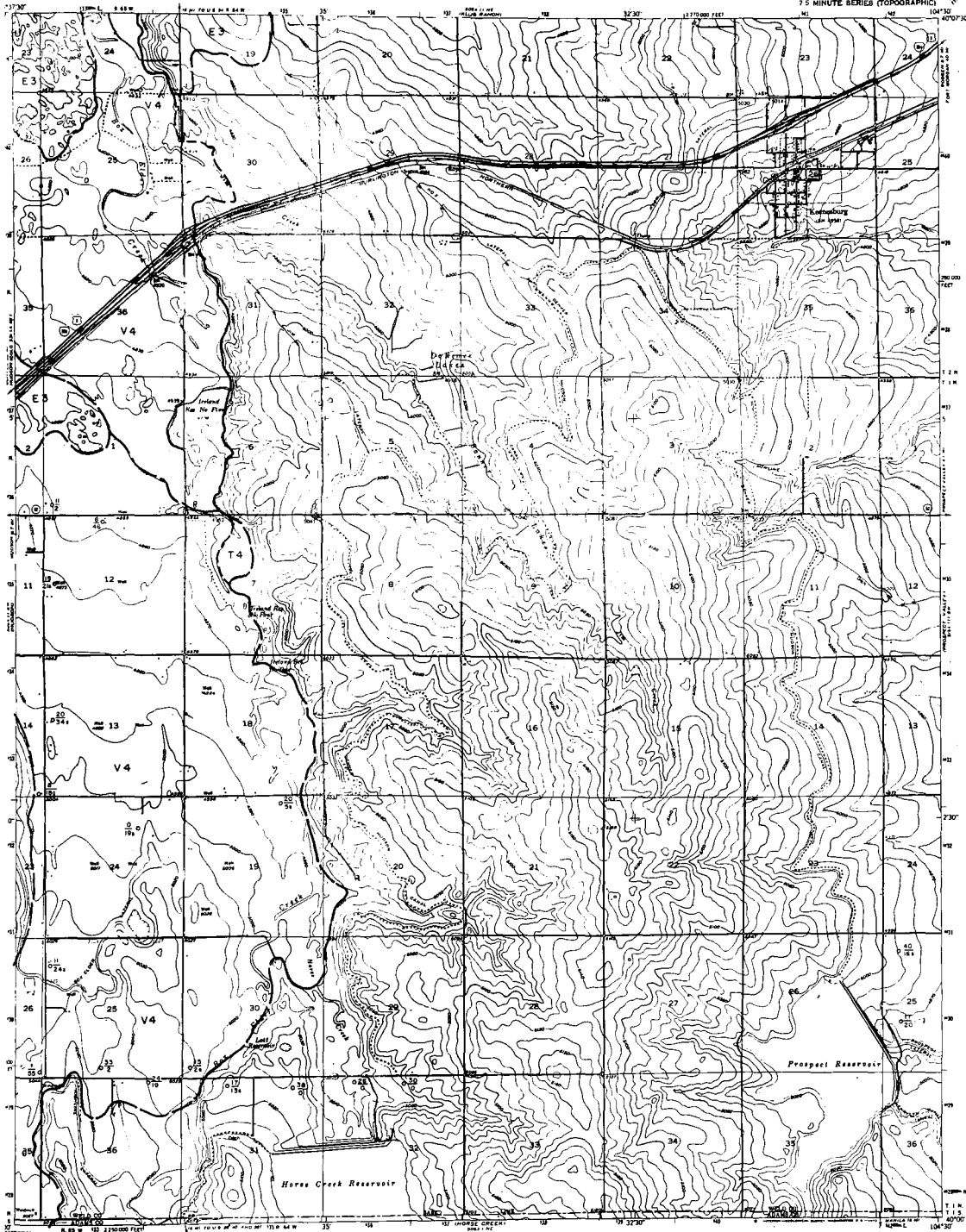
- Highway
- Major road
- U.S. Road
- Light road
- Unimproved rd.
- State Road

KASSLER, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

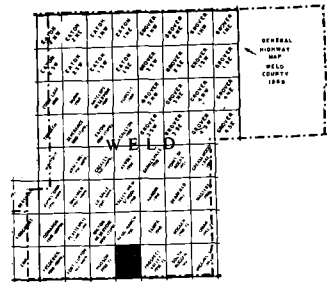
KEENESBURG QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR



EXPLANATION

- Legend**
- LANDFORMS**
- F Fluvial deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - M Sand-deposited sand (colluvial)
 - Unconsolidated deposit (slag, tailings, spalls, ...)
- RESOURCE CLASSIFICATION**
- Gravel**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock
- Fill Aggregate**
- 3 Gravel: finer than #20 passing 60 percent, and retained on #200 screen, mineral aggregate
 - 4 Probable aggregate resource
- ROAD CLASSIFICATION**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Refracted well or fault-block location with over-burial thickness (1) over sand/gravel resource thickness (1); obtained from well logs
 - "d" indicates gravel; "s" indicates sand
 - "r" in symbol denotes unrefracted or unknown refractivity
 - "m" denotes Colorado Geological Survey Watershed and Great Inland Basin
 - "w" in symbol denotes unrefracted or unknown property
 - "u" in symbol denotes property owned or leased/owned
- TOWN, LOCATION AND ORIGIN**
- AGGREGATE RESOURCES**
- overburden thickness (ft)
 - undrained resource thickness (ft)
 - percent sand and fines (passing #10 screen, 0.075 in.), visual estimation
 - significant amount of fines (passing #200 screen, 0.0075 in.)
 - significant amount of decomposed or weak rock
 - significant amount of siliceous carbonate (calcite)
 - "r" or "s" symbol denotes unrefracted or unknown property
 - "u" in symbol denotes property owned or leased/owned



QUADRANGLE LOCATION

NON-RESOURCE OR VETERINARY AREA

Mapped by: Phillip C. Micklin
Date: June 30, 1974

Based on U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

Primary highway: _____

Back surface: _____

Secondary highway: _____

Hard surface: _____

Unimproved road: _____

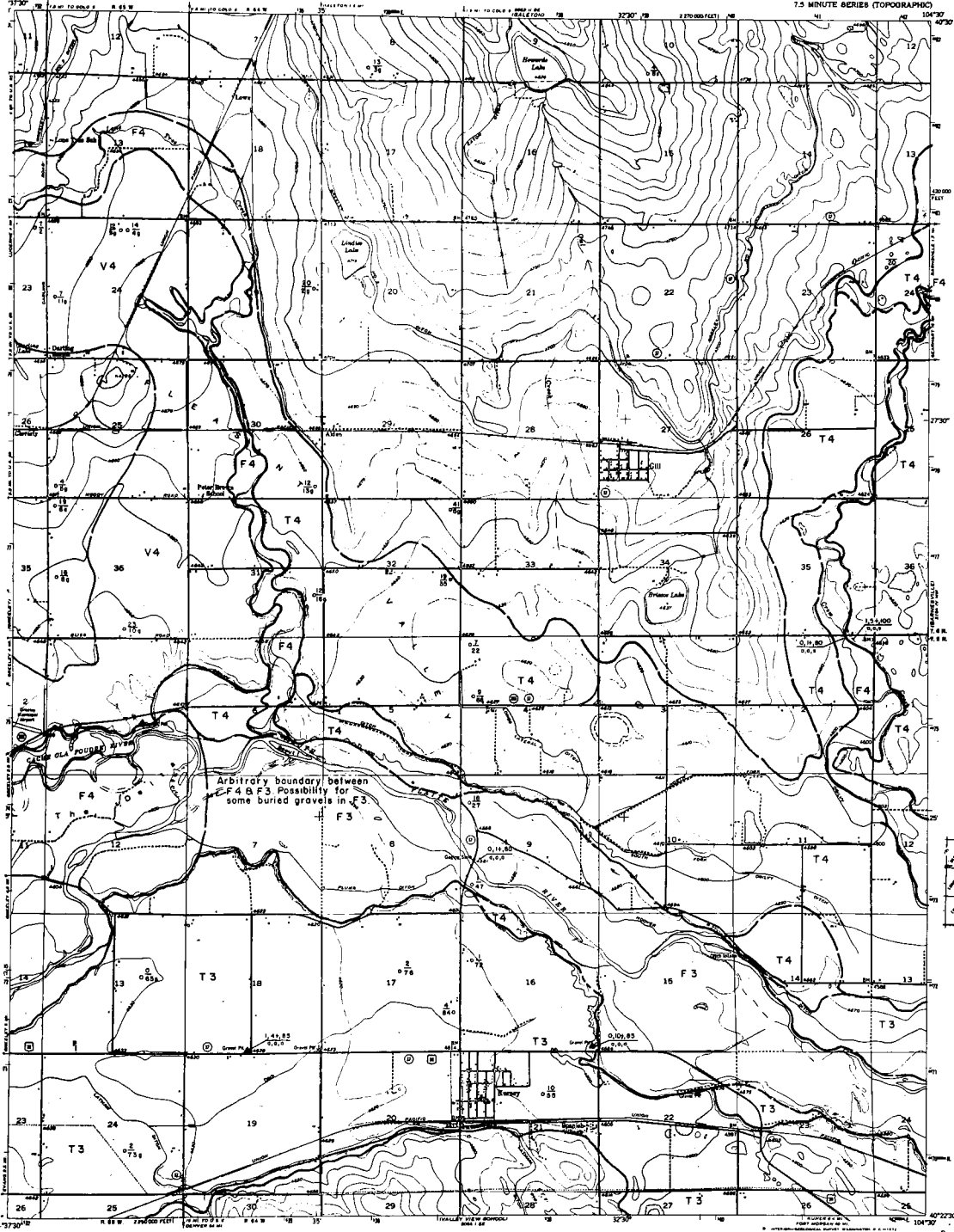
Interstate Route: [Symbol] U. S. Route: [Symbol] State Route: [Symbol]

KEENESBURG, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

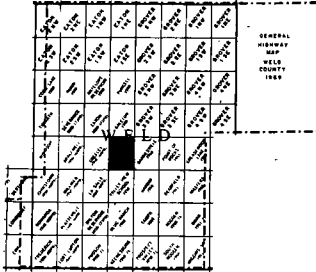
KERSEY QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYAN, DIRECTOR



EXPLANATION

- Landform units**
Resource classification
- LANDFORM UNIT**
- F Fluvial deposit
 - T Terrace or mesa deposit
 - V Valley fill (Q₁ & T₁)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (colluvium)
 - M Mollusc deposits (Palaemonetes, sp. etc.)
- RESOURCE CLASSIFICATION**
- Gravel Aggregate**
(at least 30% passing #10 screen, visual estimation)
- 1 Gravel: relatively clean and well-sorted
 - 2 Gravel: significant fines, decomposed, such as alluvium or moraine
- Sand Aggregate**
(greater than 75% passing #40 screen, 60% retained on #100 screen, visual estimation)
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Sectional well drill-hole location with open-hole thickness (ft) and flow (gpm) or (m³/day)
 - Sectional well drill-hole location with open-hole thickness (ft) and flow (gpm) or (m³/day)
 - "*" indicates gravel, "s" indicates sand
 - "*" in symbol denotes unclassified or unknown property
 - "**" denotes Colorado Geological Survey project (sand and gravel project) drill hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATION - DIMENSIONS OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - pattern and flow (gpm) or (m³/day)
 - screen (ft) or (m), visual estimation
 - significant amount of fines (passing #100 screen, 60% or 60% or 60% or 60%)
 - significant amount of decomposed or sand rock
 - significant amount of section carbonate (matrix)
 - "*" in symbol denotes unclassified or unknown property
 - "**" in symbol denotes property absent or unclassified



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

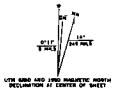
REFERENCE:

Smith, R.O., Schneider, F.A., Jr., and Patel, L.N., 1964, Ground-water resources of the South Platte River basin in western Adams and southeastern Weld Counties, Colorado: U. S. Geol. Survey Water-Supply Paper 1658, pl. 1.

Sven, F. B., III, 1972, Map of surficial geology of part of the Kersey quadrangle: Reconnaissance mapping for Colorado Geol. Survey Windsor Environmental Geology Project, open-file map.

Mapped by: Phillip C. Wicklen
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET
DATHUM = MEAN SEA LEVEL

ROAD CLASSIFICATION

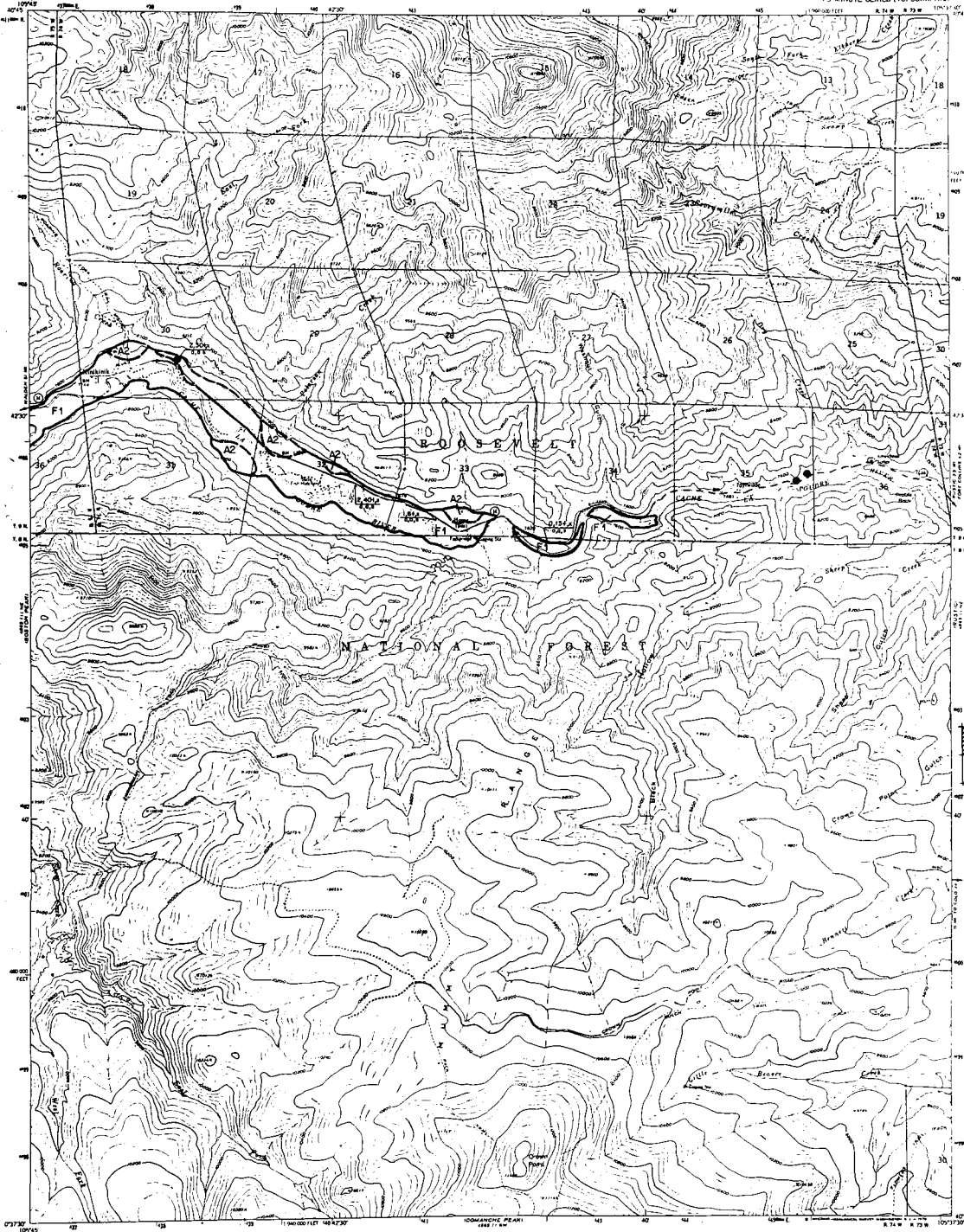
HIGHWAY SURFACE ALL WEATHER ROADS DRY WEATHER ROADS
HIGHWAY SURFACE GRAVEL SURFACE IMPROVED GR. SURFACE
MODERATELY GRAVEL SURFACE IMPROVED GR. SURFACE
LOOSE SURFACE, GRADED OR NORTH HARD SURFACE
U. S. Route State Route

KERSEY, COLO.

**SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP**

KINKINIK QUADRANGLE
COLORADO-LARIMER CO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLS, DIRECTOR



EXPLANATION

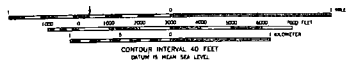
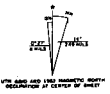
- Landform unit*
Resource classification
- LANDFORM UNIT**
- F Floodplain deposit
 - T Teras terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Eolian deposit (dune, etc.)
 - M Marine deposit (beach, etc.)
- RESOURCE CLASSIFICATION**
- COARSE AGGREGATE**
(for use in paving on 44 screen, 84:100 ratio)
- 1 Gravel (relative) clean and sound
 - 2 Gravel (relative) clean, decomposed rock, calcareous cement
- FINE AGGREGATE**
(greater than 75 passing 60 screen, 425 retained on 820 screen, visual retention 95% or more)
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Essential quarry hydrographic resource area
 - Selected well or drill-hole location with upper horizon thickness (ft) over sand/gravel, thickness (ft) obtained from well logs
 - "a" indicates gravel, "s" indicates sand
 - "r" in symbol denotes unmineralized or unknown property
 - "m" denotes Colorado Geological Survey "unofficial and gravel projects" drill hole
 - Landform boundary, solid where known or assumed, dashed where approximate or inferred
- STATUS, LOCATION AND GEOLOGICAL SIGNIFICANCE OF DEPOSIT**
- Numbered thickness (ft)
 - Numbered resource thickness (ft)
 - Percent sand and fines (passing #4 screen, 0.075 in., or 0.075 mm.)
 - Significant amount of decomposed or acid rock
 - Significant amount of mineral unmineralized (unleached)
 - "a" in symbol denotes unmineralized or unknown property
 - "m" in symbol denotes property absent or insignificant



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schwechow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

- Medium-duty
- Light-duty
- Unimproved det.
- State Route

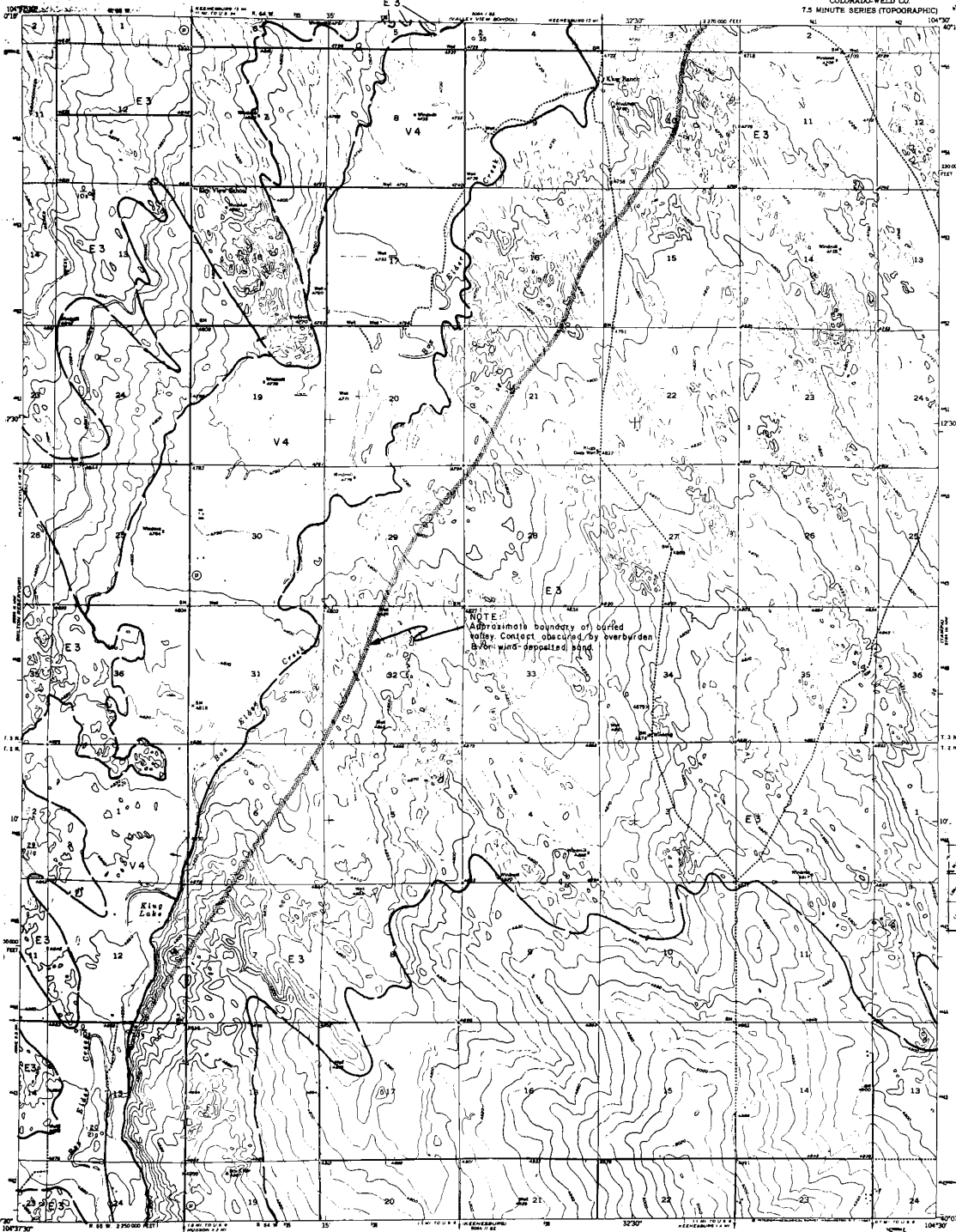
KINKINIK, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

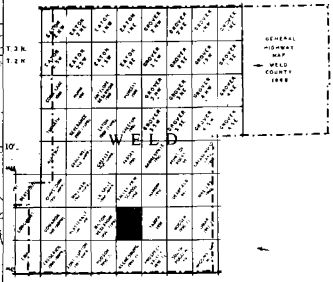
KLUG RANCH QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. KENNEL, DIRECTOR



EXPLANATION

- Geologic Unit**
Resource Classification
- MAP SHEET UNIT**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unconformity
 - A Alluvial fan
 - E Wind-deposited sand (alluvial)
 - M Manganese deposit (sandstone, shale, etc.)
- RESOURCE CLASSIFICATION**
(see legend for details on # of acres, volume of material)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
 - 3 Sand
 - 4 Potential aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - ◉ Abandoned gravel and/or sand pit
 - ◻ Open-pit stone quarry
 - ◻ Abandoned stone quarry
 - ◻ Potential quarry aggregate resource area
- Selected well or drill-hole location with symbol:
 1/2" = 100' horizontal distance (if not indicated)
 1/4" = 50' horizontal distance (if not indicated)
 * In symbol: denotes unmineralized or unknown property.
 ** American Geological Survey "Water/Flow and Gravel" projects.
 † Well hole.
 ‡ Landform boundary, with shore lines or channels. Actual shore approximate or inferred.
- SECTION, LOCATION AND ORIENTATIONAL INFORMATION OF SYMBOLS**
- coordinate distance (ft)
 - width/length maximum thickness (ft)
 - percent sand and fines (percent # of screen, 0.075 in. mesh material)
 - length/width amount of fines (percent # of screen, 0.075 in. or 0.075 in.)
 - length/width amount of decomposed or sand mark
 - length/width amount of calcium carbonate (percent)
 - * In symbol: denotes unmineralized or unknown property.
 - ** In symbol: denotes property above or below ground.

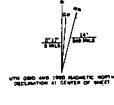


- ◼ QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Reference: Smith, R. O. and others, 1964, U.S.G.S. Water Supply Paper 1658, Plate 1.

Mapped by: Phillip C. Wicklen
Date: June 30, 1974

Base from U. S. Geological Survey 7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET (FROM SEA LEVEL)

ROAD CLASSIFICATION

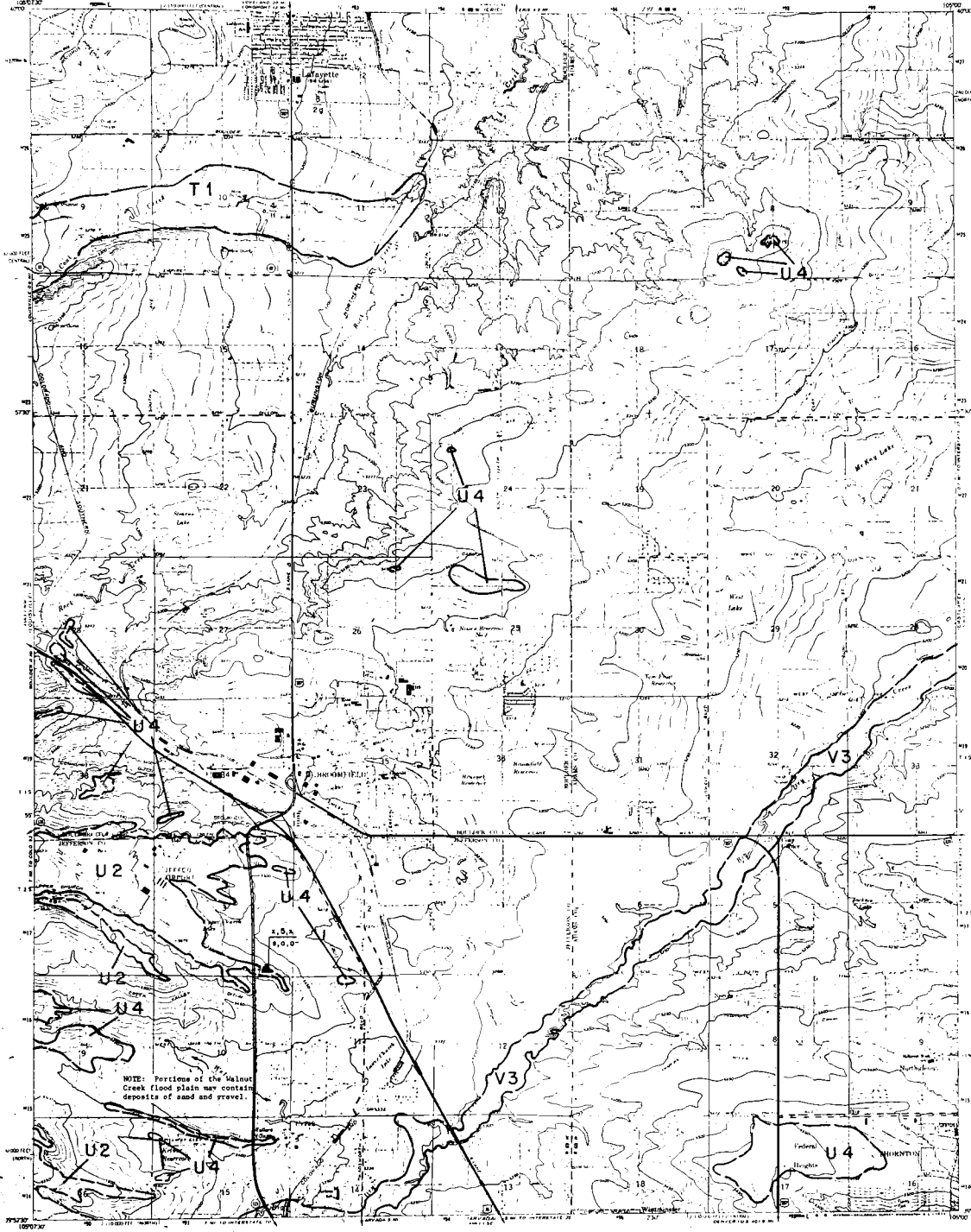
HARD SURFACE ALL WEATHER ROADS ONE WEATHER ROAD
 Heavy-duty LARGE GRADES Improved dirt
 Medium-duty LIGHT GRADES Unimproved dirt
 Loose-surface, gravel, or native materials U.S. Route
 State Route

KLUG RANCH, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

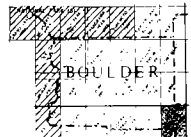
LAFAYETTE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



EXPLANATION

- LITHOLOGICAL UNITS**
- F Floodplain deposits
 - T Tertiary terrace deposits
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Modern deposits (e.g., alluvial, eolian, etc.)
- RESOURCE CLASSIFICATION**
- 1 Gravel, resistant, clean and sound
 - 2 Gravel, significant fines, decomposed rock, cohesionless
 - 3 Sand
 - 4 Promising aggregate resources
- NOT SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Quarry with an approved quarry permit
 - Quarry with a permit to mine sand and gravel
 - Quarry with an approved permit to mine sand and gravel
 - "S" indicates gravel, "G" indicates sand
 - "M" in symbol indicates material of modern origin
 - US Bureau of Geographical Names
 - Quarry boundary, solid where known or inferred, dashed where approximate or inferred
- STATION, LOCATION AND ELEVATION (ELEVATION OF SURFACE)**
- Station
 - Location
 - Elevation



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WETLAND AREA

REFERENCE:
Chase, C.R., and McConahy, J.A., 1972. Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-7231.
Fuchter, M. N. 1974. personal communication.

Geology modified after:
Tettable, D.E., and Fitch, R.R., Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map 1-836-A.

Mapped by: Ralph E. Shroba
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

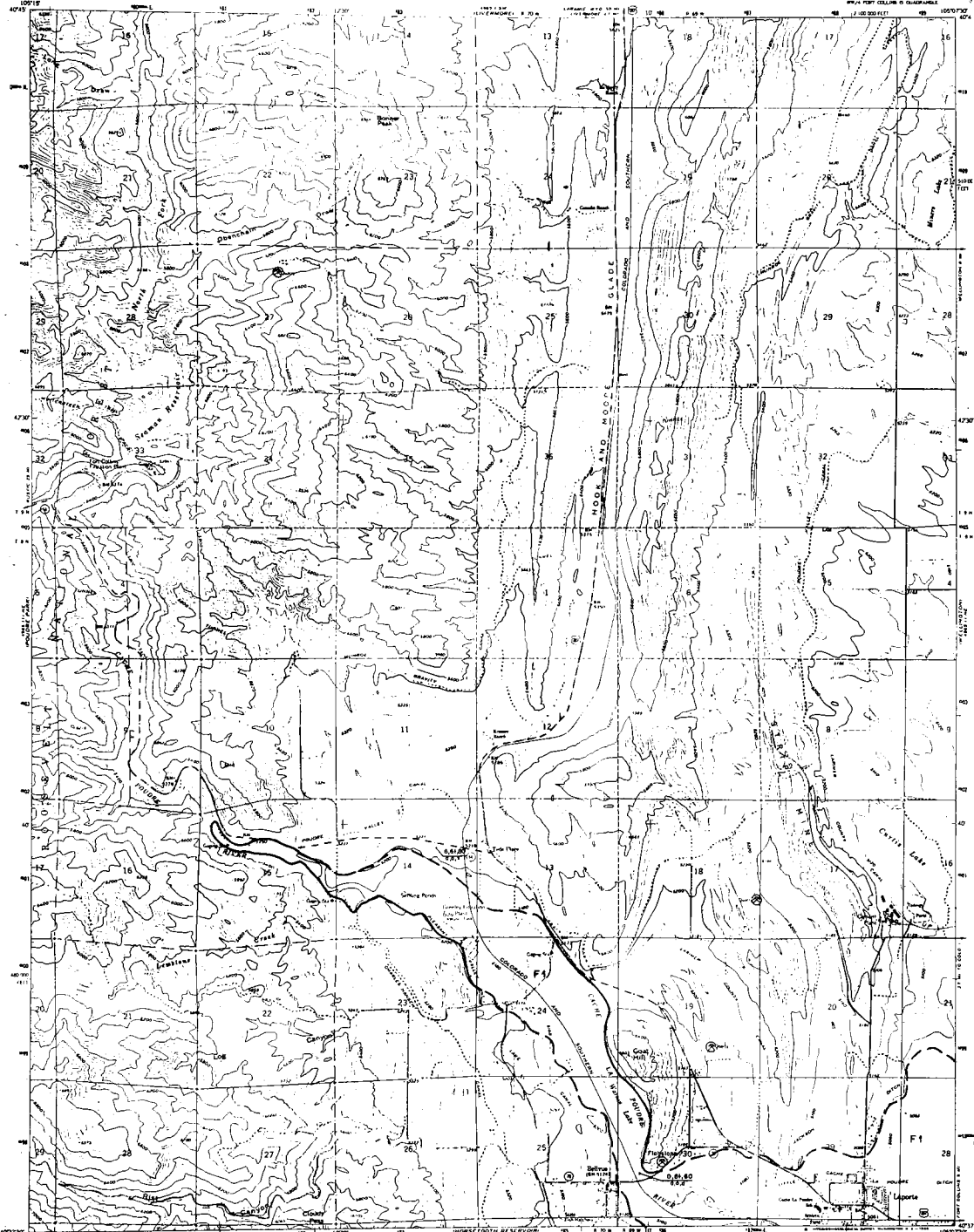
- Heavy Duty
- Light Duty
- Unimproved Det.
- U.S. Route
- State Route

LAFAYETTE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

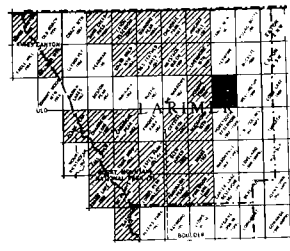
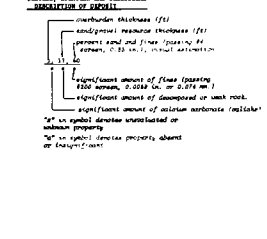
LAPORTE QUADRANGLE
COLORADO-LAHMER 23
7.5 MINUTE SERIES (TOPOGRAPHIC)
U.S. GEOLOGICAL SURVEY

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. FOLEY, DIRECTOR



EXPLANATION

- LANDFORM UNIT**
 - Landform unit
 - Appearance & Classification
- LANDFORM UNIT**
 F Fluvial deposit
 T Terrace terrace deposit
 V Valley fill (F & T)
 U Upland deposits
 A Alluvial fan
 E Wind-deposited sand (eolian)
 M Marine deposits (glaciolacustrine, eolian, ...)
- RESOURCE CLASSIFICATION**
 1 Gravel: relatively clean and sound
 2 Gravel: significant fines, decomposed rock, calcium carbonate
 3 Sand
 4 Potential Resource
 5 Proven aggregate resource
- USE SYMBOLS**
 a Operating gravel and/or sand pit
 b Abandoned gravel and/or sand pit
 c Operating stone quarry
 d Abandoned stone quarry
 e Potential quarry aggregate resource area
 f Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs
 g " indicates gravel; " indicates sand
 h " in symbol denotes unreluctated or unknown property
 i " in symbol denotes Colorado Geological Survey (Lahmer-23 and Gravel projects) well log
 j Landform boundary, solid where known or observed, dashed where unreluctated or inferred.



QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

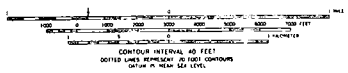
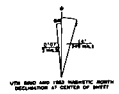
REFERENCE:
 Harshey, L.A., and Schneider, P.A., Jr., 1972, Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-587.

Owen, F. H., III, 1972, Map of surficial geology of part of the Laporte quadrangle: Reconnaissance mapping for Colorado Geol. Survey, Western Environmental Geology Project, open-file map.

Braddock, W.A., Conner, J.J., Swann, G.A., and Wohlford, D.D., 1973, Geologic map and sections of the Laporte quadrangle, Larimer County, Colorado: U. S. Geol. Survey open-file map.

Mapped by: Stephen D. Schwabow
 Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



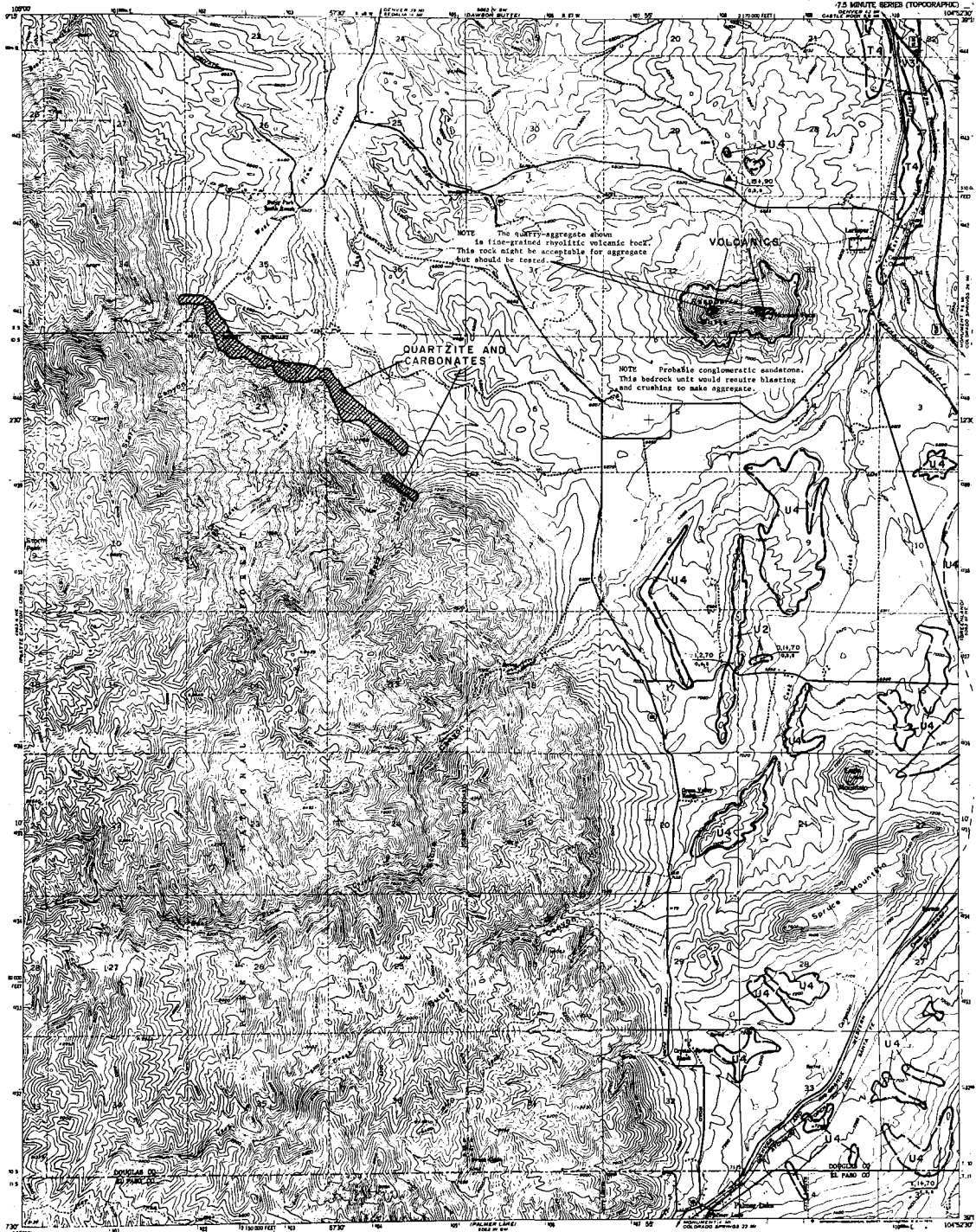
ROAD CLASSIFICATION
 Heavy-duty ——— Light-duty ———
 Medium-duty ——— Unimproved det. ———
 U.S. Route State Route

LAPORTE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR

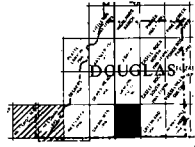
LARKSPUR QUADRANGLE
COLORADO



EXPLANATION

- Legend**
- LANDFORMS**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Hummock deposits (Mesa, tableland, spits, etc.)
- ROAD CLASSIFICATION**
- CONTOUR INTERVALS**
- 1 Contour interval of 40 feet, 1000 ft contour
- 2 Contour interval of 20 feet, 1000 ft contour
- 3 Contour interval of 10 feet, 1000 ft contour
- 4 Contour interval of 5 feet, 1000 ft contour
- ROAD CLASSIFICATION**
- 1 Heavy-duty
 - 2 Medium-duty
 - 3 Light-duty
 - 4 Unimproved dirt
 - 5 Interstate Route
 - 6 U.S. Route
 - 7 State Route

- ROAD CLASSIFICATION**
- 1 Heavy-duty
 - 2 Medium-duty
 - 3 Light-duty
 - 4 Unimproved dirt
 - 5 Interstate Route
 - 6 U.S. Route
 - 7 State Route
- ROAD CLASSIFICATION**
- 1 Heavy-duty
 - 2 Medium-duty
 - 3 Light-duty
 - 4 Unimproved dirt
 - 5 Interstate Route
 - 6 U.S. Route
 - 7 State Route



- QUADRANGLE LOCATION**
- QUADRANGLE LOCATION
 - ▨ NON-RESOURCE OR WITHDRAWN AREA

Technology Modified after:
Harris, J.C., 1951, Structural geology of the western flank of the southern Front Range, Colorado: University of Colorado Ph.D. Thesis, 121 p., 3 pls.

Tribble, D.E., and Fitch, B.R., 1974, Map showing potential sources of gravel and crushed-rock aggregates in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U.S. Geol. Survey Map I-437 A.

REFERENCE: Tribble, Donald, 1974, U.S.G.S. p. Personal Communication

Lee, W.T., 1902, Areal geology of the Castle Rock region. *Am. Geologist*, v. 25, p. 96-109, Pl. 1:250,000.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Prepared in cooperation with the U.S. Geological Survey.

Base from U.S. Geological Survey
7-1/2 minute quadrangle



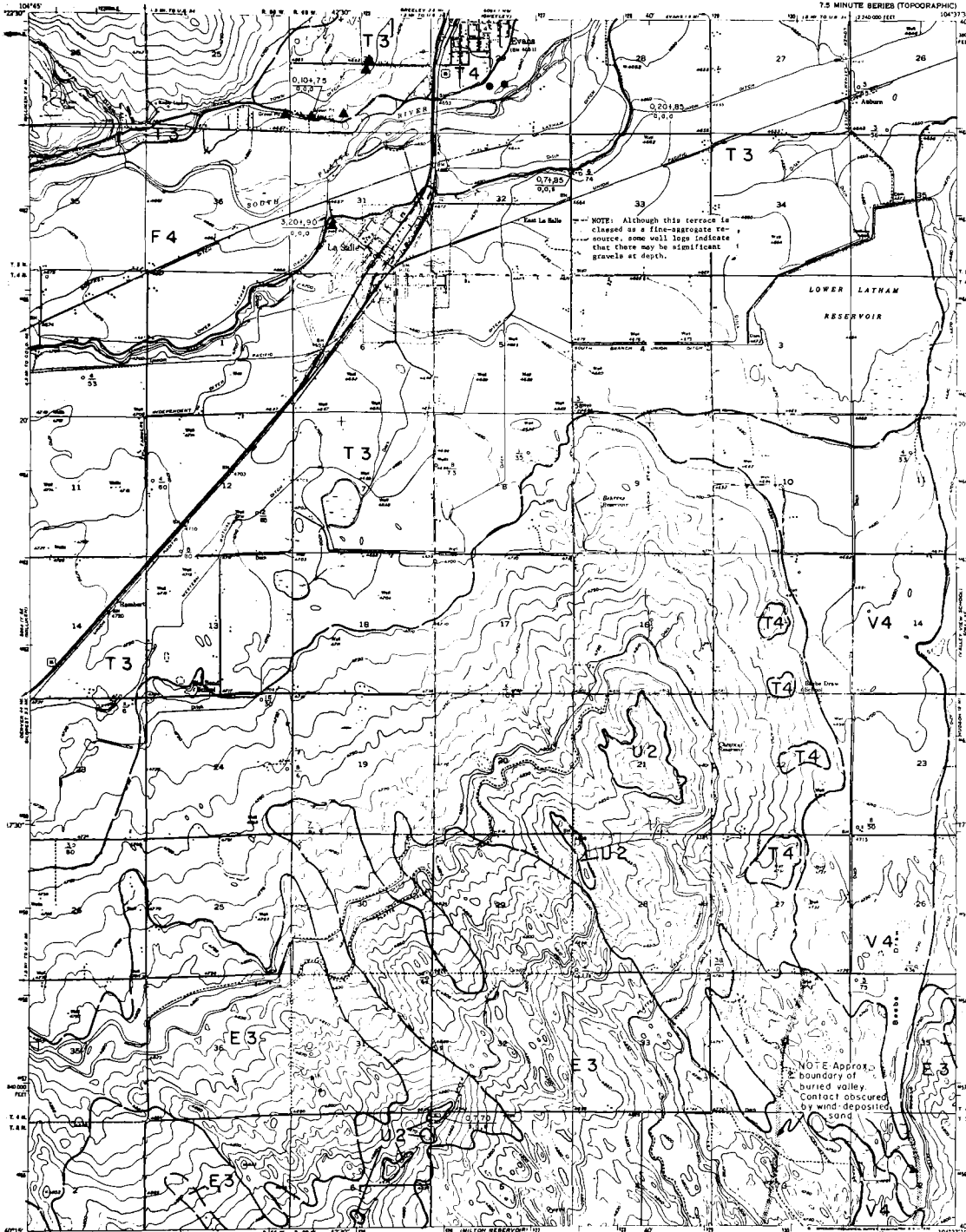
- ROAD CLASSIFICATION**
- Heavy-duty
 - Medium-duty
 - Light-duty
 - Unimproved dirt
 - Interstate Route
 - U.S. Route
 - State Route

LARKSPUR, COLO.

**SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP**

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLL, DIRECTOR

LA SALLE QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



NOTE: Although this terrace is classed as a fine-aggregate resource, some well logs indicate that there may be significant gravels at depth.

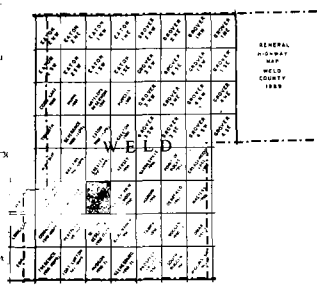
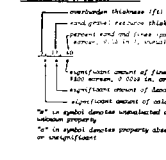
NOTE: Approximate boundary of buried valley. Contact obscured by wind-deposited sand.

EXPLANATION

- SYMBOLS**
- Contour interval
 - Floodline symbol
 - Stream terrace symbol
 - Valley fill (F & T)
 - Upland deposits
 - Alluvial fan
 - Wind-deposited sand (colluvial)
 - Non-made deposits (colluvial, spalls, ...)

- RESOURCE CLASSIFICATION**
- GROUP 1: GRAVEL**
- 1 Gravel: relatively clean and well sorted
 - 2 Gravel: significant fines, decomposed rock, talus, calcareous
- GROUP 2: SAND**
- 3 Sand
- GROUP 3: POTENTIAL QUARRY AGGREGATE RESOURCE**
- 4 Potentially aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- EXPLANATION OF SYMBOLS**
- Selected well or drill-hole location with upper horizon (T3), obtained from well logs
 - Selected well or drill-hole location with "U" in symbol denotes unconsolidated or unknown property
 - "W" denotes Colorado Geological Survey Water-Use and Ground-Water Project (W-113) well
 - Land-use boundary, solid when known or inferred, dashed when approximate or inferred



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

Smith, R.O., Schneider, P.A., Jr., and Peck, L.R., 1964, Ground-water resources of the South Platte River basin in western Adams and southeastern Weld Counties, Colorado: U. S. Geol. Survey Water-Supply Paper 1658, p. 1.

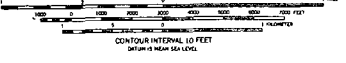
Geology modified after:

- Colton, R.S., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregates in the Boulder-Fort Collins-Greeley Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map I-855-D.

Mapped by: Stephen B. Schochow
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



- ROAD CLASSIFICATION**
- Hand-drawn all weather roads
 - Improved dirt
 - Macadamized
 - Unimproved dirt
 - Loose surface, graded, or narrow base surface
 - U.S. Road

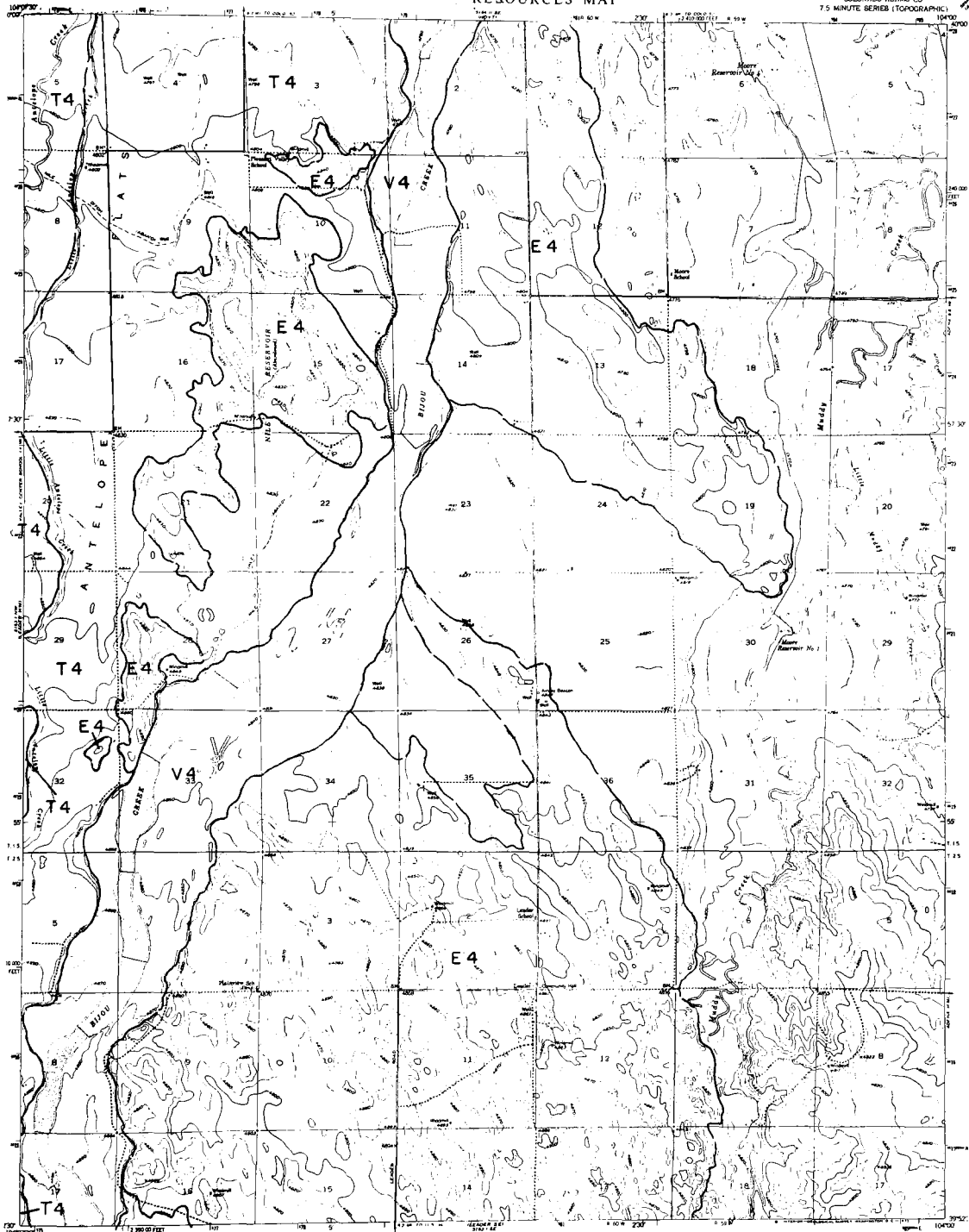
LA SALLE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

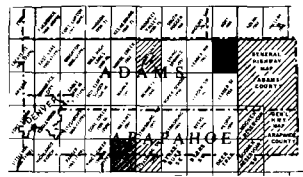
LEADER QUADRANGLE
COLORADO-ADAMS CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR

EXPLANATION



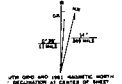
- Landform unit**
Resource classification
- LANDFORM UNIT**
 P Fluvial deposit
 T Stream terrace deposit
 V Valley fill (F & T)
 U Upland deposits
 A Alluvial fan
 E Wind-deposited sand (eolian)
 M Mesquite deposits (sage, calliandra, apricot...)
- RESOURCE CLASSIFICATION**
Coarse Aggregate
 (1) Coarse sand (retained on #4 screen, 0.85 in. actual estimation)
 1 Gravel: relatively clean and sound
 2 Gravel: significant fines, decomposed rock, calcium carbonate
Fine Aggregate
 (1) Gravel: less than 75 passing #4 screen, 0.85 in. actual on #100 screen, actual estimation
 3 Sand
Unutilized Resource
 4 Probable aggregate resource
- NOT SYMBOLS**
 * Operating gravel and/or sand pit
 * Abandoned gravel and/or sand pit
 * Operating stone quarry
 * Abandoned stone quarry
 * Potential quarry aggregate resource area
 * Selected well or pit/pond location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 * "x" indicates mineral "x" indicates sand
 * "u" in symbol denotes unutilized or unknown property
 * "u" denotes Colorado Geological Survey boundary (same and lines represent) drill hole
 * Landform boundary, solid where known or observed; dashed where approximate or inferred.
- SECTION LOCATION AND CHARACTERISTICS**
RESOURCES OF SECTIONS
 * Overburden thickness (ft)
 * Abandoned resource thickness (ft)
 * Present sand and fines (passing #4 screen, 0.85 in.), actual estimation
 * Significant amount of fines (passing #100 screen, 0.150 in. or 0.075 in.)
 * Significant amount of siliceous material (silica)
 * Significant amount of decomposed or weak rock.
 * "u" symbol denotes unutilized or unknown property
 * "x" in symbol denotes property absent or insignificant



- QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHERMANN AREA

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Map from D. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET
elevation is MEAN SEA LEVEL.

- ROAD CLASSIFICATION**
 Heavy-duty Light-duty
 Medium-duty Unimproved dirt
 U.S. Route State Route

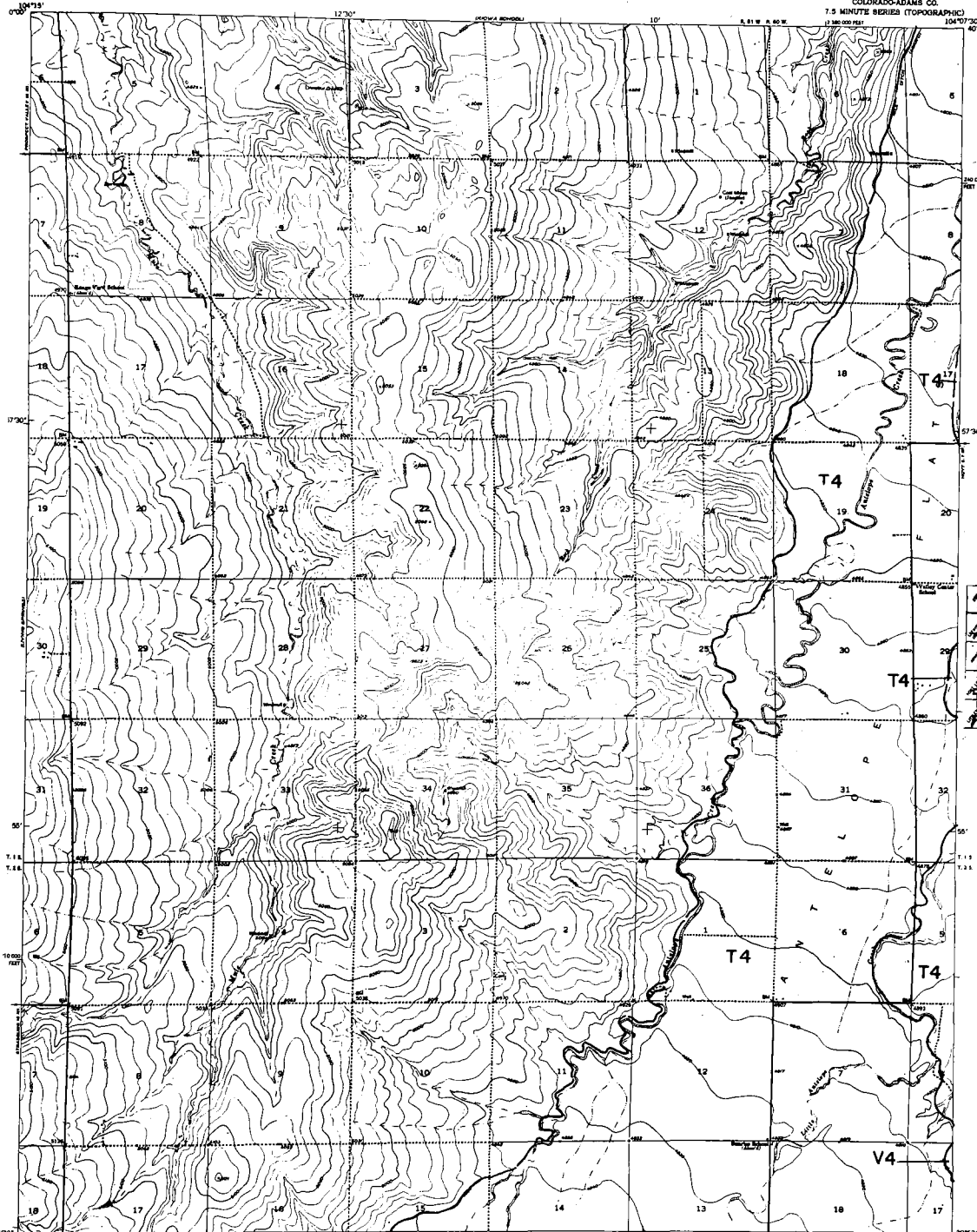
LEADER, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR

LEADER NW QUADRANGLE
COLORADO-ADAMS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
104°07'30"

EXPLANATION



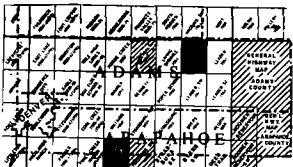
Landform units
Resource classification

- LANDFORM UNITS**
- F Floodplain deposit
 - T Trench (erosion channel)
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan -
 - E Wind-deposited sand (eolian)
 - M Mountain deposits (talus, talus-like spalls, ...)

- RESOURCE CLASSIFICATION**
- CLASS**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, lacustrine carbonate
 - 3 Sand
 - 4 Probable aggregate resource

- KEY SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Shaded area or hatched area (containing aggregate resource)
 - Shaded area (1): indicates from well logs
 - "G" indicates gravel, "S" indicates sand
 - "L" in symbol denotes unutilized or unknown property
 - "M" denotes Colorado Geological Survey mineral land and gravel projects (1981) data
 - Landform boundary, solid where known or observed, dashed where approximate or inferred

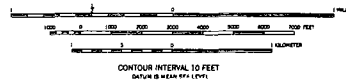
- SYMBOL, LOCATION AND CHRONOLOGICAL SEQUENTIAL OF SYMBOLS**
- overburden thickness (ft)
 - total gravel percentage thickness (%)
 - percent sand and fines (using all symbols, 0-30 to 100 percent retention)
 - significant amount of fines (using 100, 200, 400, 800, 1600, or 3200 mesh)
 - significant amount of decomposed or weak rock
 - significant amount of solution carbonate (includes)
 - "M" on symbol denotes unutilized or unknown property
 - "L" on symbol denotes property absent or doubtful



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WYEDRAHM AREA

Mapped by: Phillip C. Micklein
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



- ROAD CLASSIFICATION**
- Heavy-duty STATE ROAD
 - Medium-duty STATE ROAD
 - Unimproved dirt road
 - U. S. Route
 - State Road

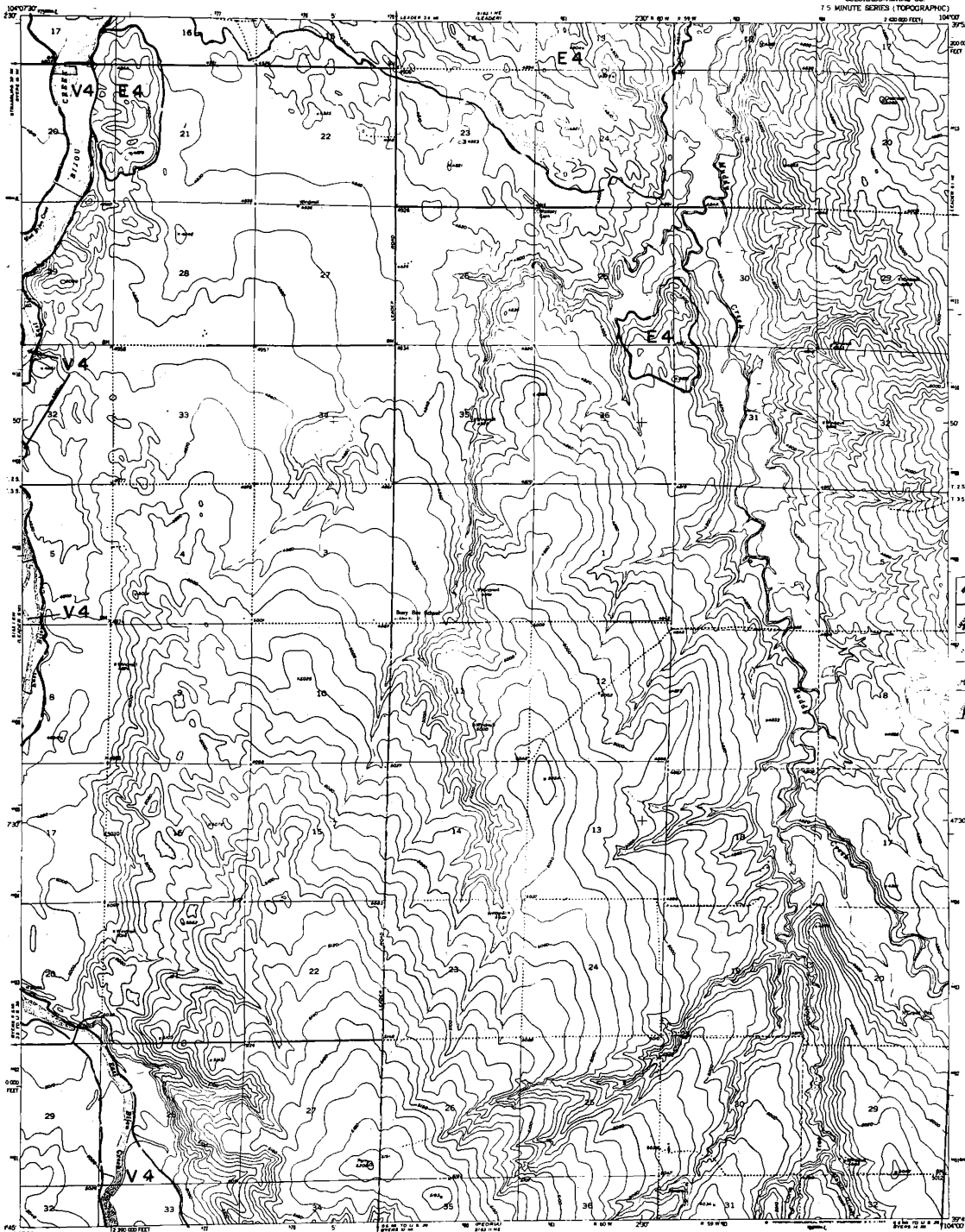
LEADER NW, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

LEADER SE QUADRANGLE
COLORADO-ADAMS CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR



- MAPSYMBOLS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated sand (colluvium)
 - A Alluvial fan
 - E Sand-deposited sand (colluvium)
 - M Non-mine deposits (till, colluvium, etc.)
- RESOURCE CLASSIFICATION**
- CLASSIFICATION**
(for areas 200 acres or more, or 100 acres, if mineral extraction)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous
 - 3 Sand
 - 4 Probable aggregate resource
- POP. SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Proposed quarry aggregate resource area
 - Revised well or drill-hole location with overburden thickness (ft) and sand/gravel resource thickness (ft), obtained from well logs. "s" indicates gravel; "m" indicates sand.
 - "s" in symbol denotes unmineralized or unknown property.
 - "m" denotes Colorado Geological Survey (C.G.S.) and gravel projects.
 - Land-use boundary, solid where known or observed, dashed where approximate or inferred.
- STATUS, LOCATION AND GEOLOGICAL SPECIFICATION OF SYMBOL**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (spacing as shown, 0.25 in. = 0.25%)
 - significant amount of fines (spacing 0.25 in. = 0.25%)
 - significant amount of decomposed or weak rock
 - significant amount of mineral resource (spacing 0.25 in. = 0.25%)
 - "s" in symbol denotes unmineralized or unknown property
 - "m" in symbol denotes property absent or insignificant



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WET/DRAIN AREA

REFERENCE:
Shadell, S.A., 1971. The Bijou Creek Damites and Reservoirs of Adams and Arapahoe Counties, Colorado; Colorado School of Mines: 82-117.

Mapped by: Phillip C. Wickham
Date: June 30, 1974

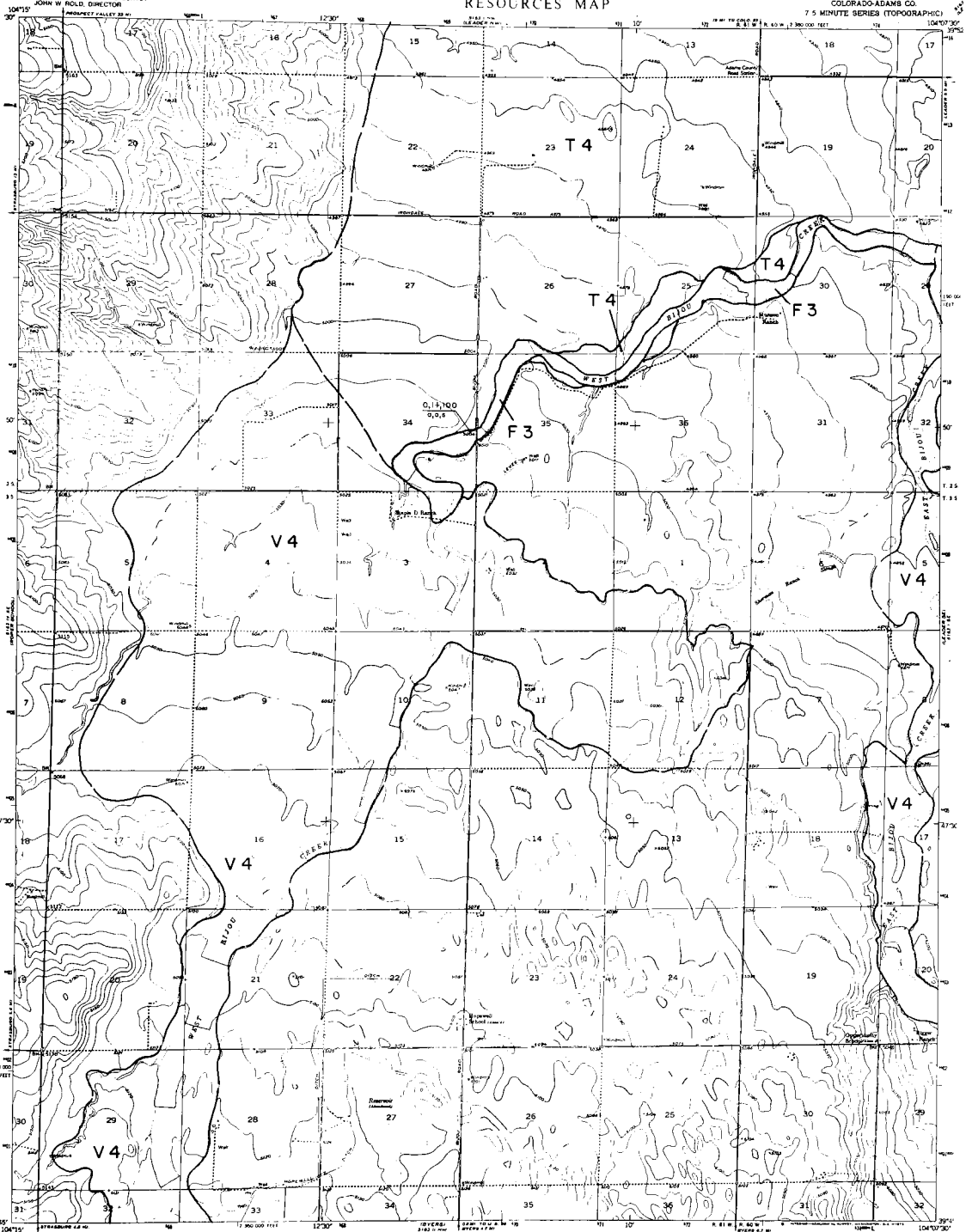
Base from U. S. Geological Survey
7.5 minute quadrangle



SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

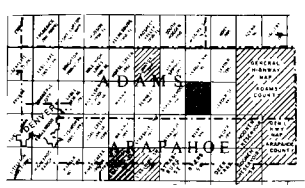
LEADER SW QUADRANGLE
COLORADO-ADAMS CO.
7.5 MINUTE SERIES TOPOGRAPHIC

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLLIDAY, DIRECTOR



EXPLANATION

- Location unit
- Resource classification
- RESOURCE UNITS**
 - F Floodplain deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, opima...)
- RESOURCE CLASSIFICATION**
 - Class Aggregate
 - 1 Gravel, relatively clean and sound
 - 2 Gravel, significant fines, decomposed rock, calcium carbonate
 - Class Aggregate
 - 3 Sand
 - 4 Potentially aggregate resource
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Indicates well or excellent location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "0" indicates gravel; "1" indicates sand
 - "x" in symbol denotes unevaluated or unknown property
 - "0" denotes Colorado Geological Survey (sand/gravel and gravel properties) 1975 data
 - Resource boundary, solid where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND DIMENSIONAL INFORMATION**
 - overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - observed good and fine spacing (ft)
 - observed good and fine spacing (ft)
 - significant amount of fines (spacing 1000 screen, 0.075 in. or 3/250 mesh)
 - significant amount of decomposed or weak rock
 - significant amount of calcium carbonate material
 - "x" in symbol denotes unevaluated or unknown property
 - "0" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL: 10 FEET
BASED ON MEAN SEA LEVEL



ROAD CLASSIFICATION
Heavy duty _____ Light duty _____
Medium duty _____ Unimproved dirt _____
U.S. Route _____ State Route _____

LEADER SW, COLO.
N945-W1040/5/5
1952
AND 5142 1-6V-SERIES 1977

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

LITTLETON QUADRANGLE
COLORADO
MINUTE SERIES (TOPOGRAPHIC)

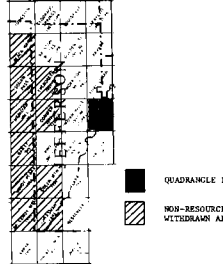
EXPLANATION

- LITHOLOGIC UNITS**
- F Floodplain deposit
 - T Tertiary terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated
 - A Alluvial fan
 - E Erosion-resistant sand (terrace)
 - M Man-made deposits (landfill, spoil, etc.)

- RESOURCE CLASSIFICATION**
- Gravel**
- 1 Gravel, relatively clean and sound
 - 2 Gravel, significant fines, decomposed rock, calcium carbonate
- Sand**
- 3 Sand
 - 4 Potentially aggregate resource

- MAP SYMBOLS**
- ▲ Operating gravel and/or sand pit
 - ▲ Abandoned gravel and/or sand pit
 - ⊙ Operating stone quarry
 - ⊙ Abandoned stone quarry
 - ⊙ Potential quarry aggregate resource area
 - ⊙ Selected well or drill-hole location with overall thickness (ft) and sandstone resource thickness (ft), obtained from well log
 - " " Indicated gravel; " " Indicated sand
 - " " to symbol denotes unvested or unknown property
 - " " Denver Colorado Geological Survey "Disturbed and Gravel" project
 - " " to symbol denotes solid where known or observed, dashed where approximate or inferred

- SECTION, LOCATION AND GENERAL CHARACTER OF RESOURCES**
- ⊙ Section thickness (ft)
 - ⊙ Sandstone resource thickness (ft)
 - ⊙ Significant amount of fines (passing 20 mesh, > 0.85 mm, or 0.075 mm)
 - ⊙ Significant amount of decomposed or weak rock
 - ⊙ to symbol denotes unvested or unknown property
 - ⊙ to symbol denotes property absent or disputed/owned



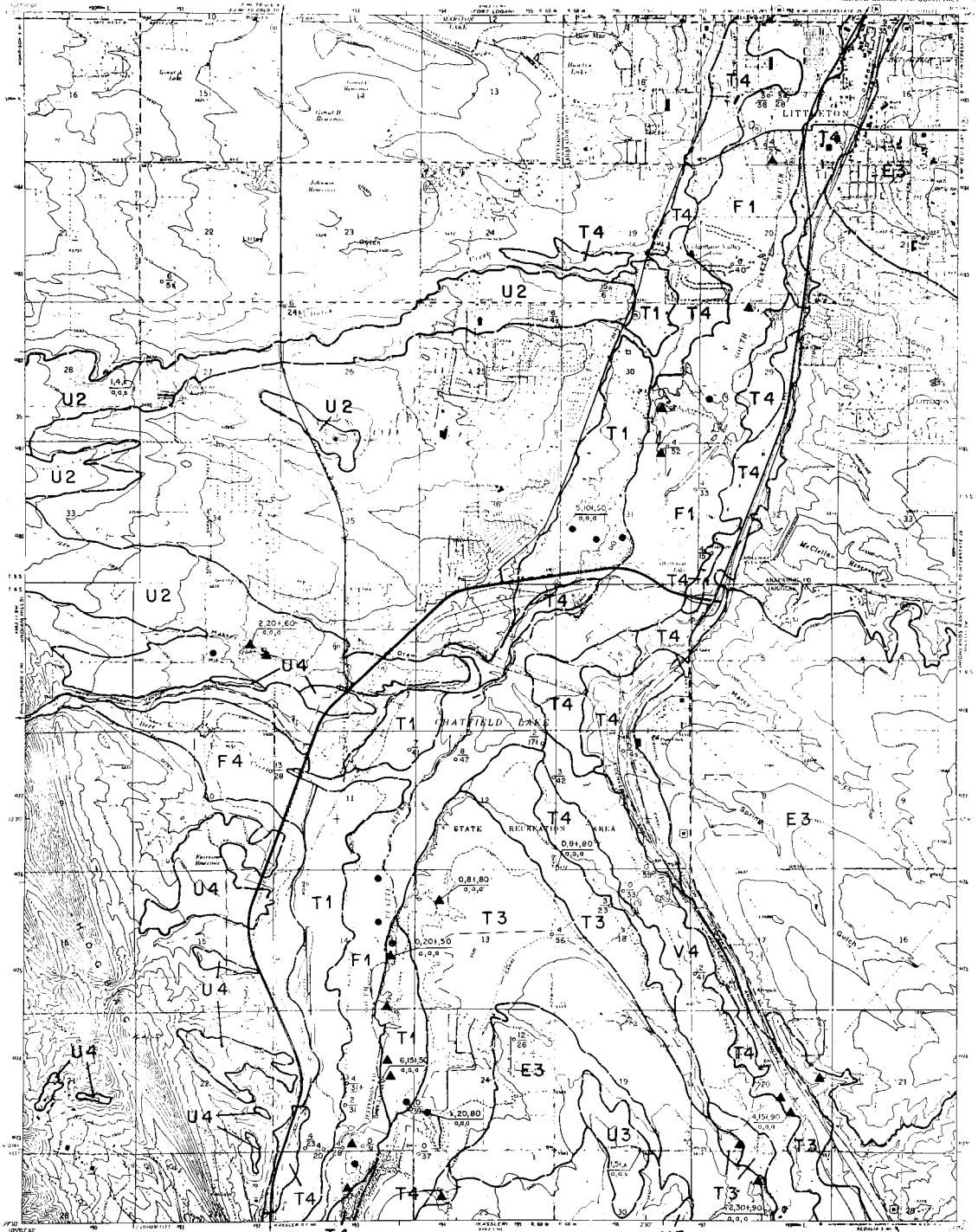
Geology modified after:
Scott, C.R., 1961, Geology of the Littleton quadrangle, Jefferson, Douglas, and Arapahoe Counties, Colorado; U.S. Geol. Survey Bull. 1121-B, pl. 1.

References:
Inter-County Regional Planning Commission, 1963, Drainage course plan for the Denver region - Part 1, Sand and gravel resources; Denver, Colo., Inter-County Reg. Plan. Comm., pl. 1.

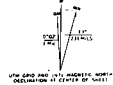
Hamilton, J.L., and Owen, W.C., 1972, Geologic aspects, soils and related foundation problems, Denver metropolitan area, Colorado; Colorado Geol. Survey Environmental Geology Rept. 1, pl. 1.

Chase, C.H., and McConaghy, J.A., 1977, Generalized vertical geologic map of the Denver area, Color. Geol. Survey Misc. Geol. Inv. Map 1-850-A.

Trotter, D.E., and Fitch, W.R., 1974, Map showing potential sources of gravel and crush-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.; U.S. Geol. Survey Misc. Geol. Inv. Map 1-850-A.



Base from U. S. Geological Survey
7-1/2 minute quadrangle



FOOTING INTERVAL: 10 FEET

- ROAD CLASSIFICATION**
- Heavy duty
 - Medium duty
 - Light duty
 - Unimproved dirt
 - U.S. Route
 - State Route

LITTLETON COLO

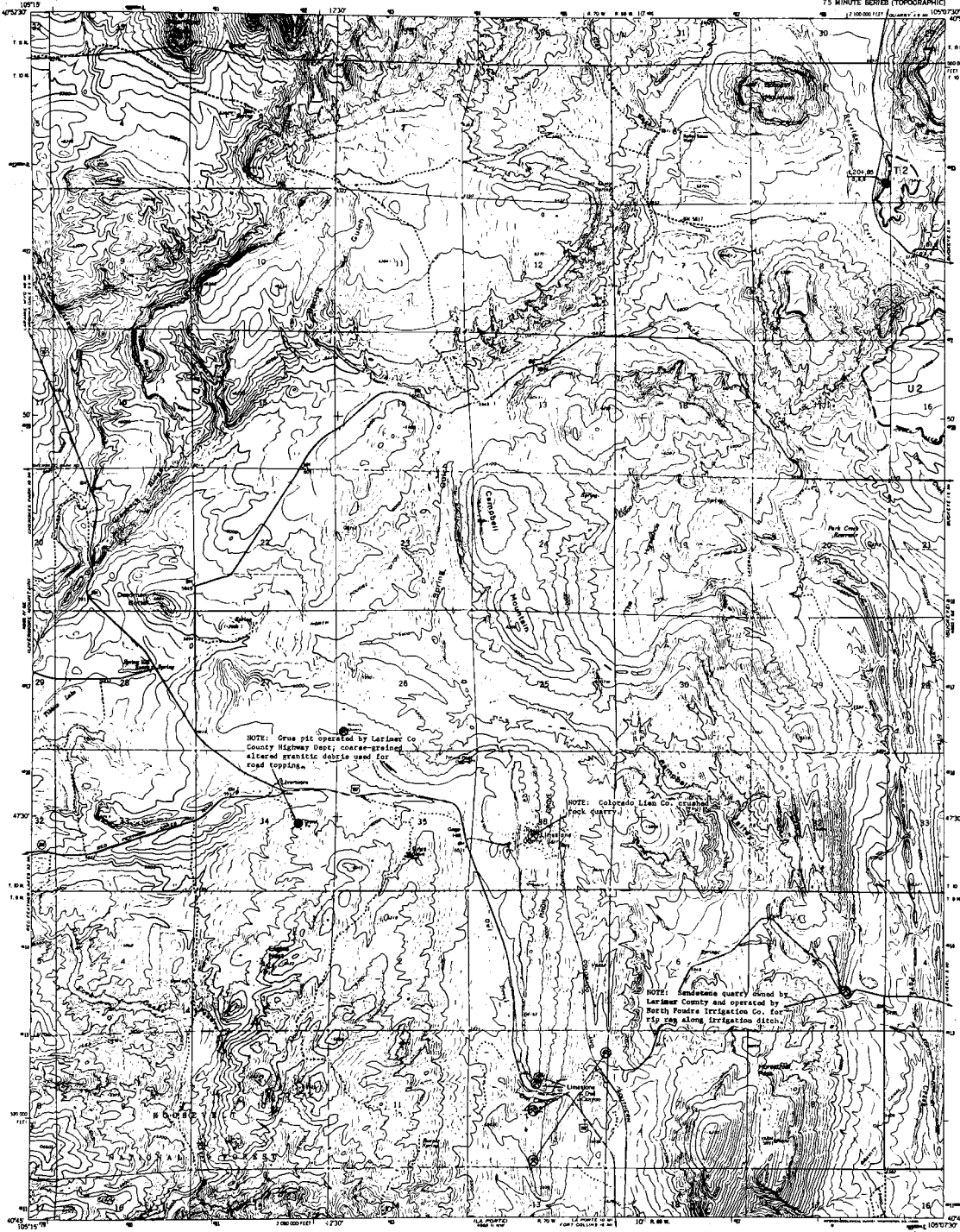
Mapped by: Stephen D. Schuechow
Date: June 30, 1974

Prepared in cooperation with the
U. S. Geological Survey

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

LIVERMORE QUADRANGLE
COLORADO-LARIMER CO.
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



EXPLANATION

- Landform unit**
Resource classification
- LANDFORM UNIT**
- F Fluvial deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-matrix loessite (clay, silt, sand, gravel, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 50% retained on #4 screen, round estimation)
- 1 Coarse: relatively clean and sound
 - 2 Coarse: significant fines, decomposed rock, calcine overburden
- Fine Aggregate**
(greater than 75% passing #4 screen, 60% retained on #20 screen, round estimation)
- 3 Sand
 - 4 Probable aggregate resource
- NOT SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area situated with an overburden thickness with overburden thickness (ft) over sand/gravel resource thickness (ft) calculated from well logs
 - "s" indicates gravel; "a" indicates sand
 - "a" in symbol denotes material is calcine overburden
 - "a" in symbol denotes Geological Survey Method/Find and Class project/soil hole
 - Location number of soil sample taken in field; dashed lines approximate to laboratory
- SYMBOLS, LOCATION AND CHEMICAL ANALYSIS OF PROFILES**
- overburden thickness (ft)
 - non/gravel resource thickness (ft)
 - percent sand and fines (passing #4 screen, 0.075 in. or 0.075 mm.)
 - percent 0.25 in. or 6.35 mm. material
 - significant amount of fines (passing #20 screen, 0.0075 in. or 0.191 mm.)
 - significant amount of decomposed or weak rock
 - significant amount of calcine overburden (calcine)
 - "a" in symbol denotes material is calcine overburden
 - "a" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION
NON-RESOURCE OR WATERSHED AREA

REFERENCE:
Hercher, L. A., and Schneider, P. A., Jr., 1972. Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Surv. Map 1-607.

Mapped by: Stephen D. Schwochow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION
Light-duty
Unimproved dirt
U.S. Route
State Route

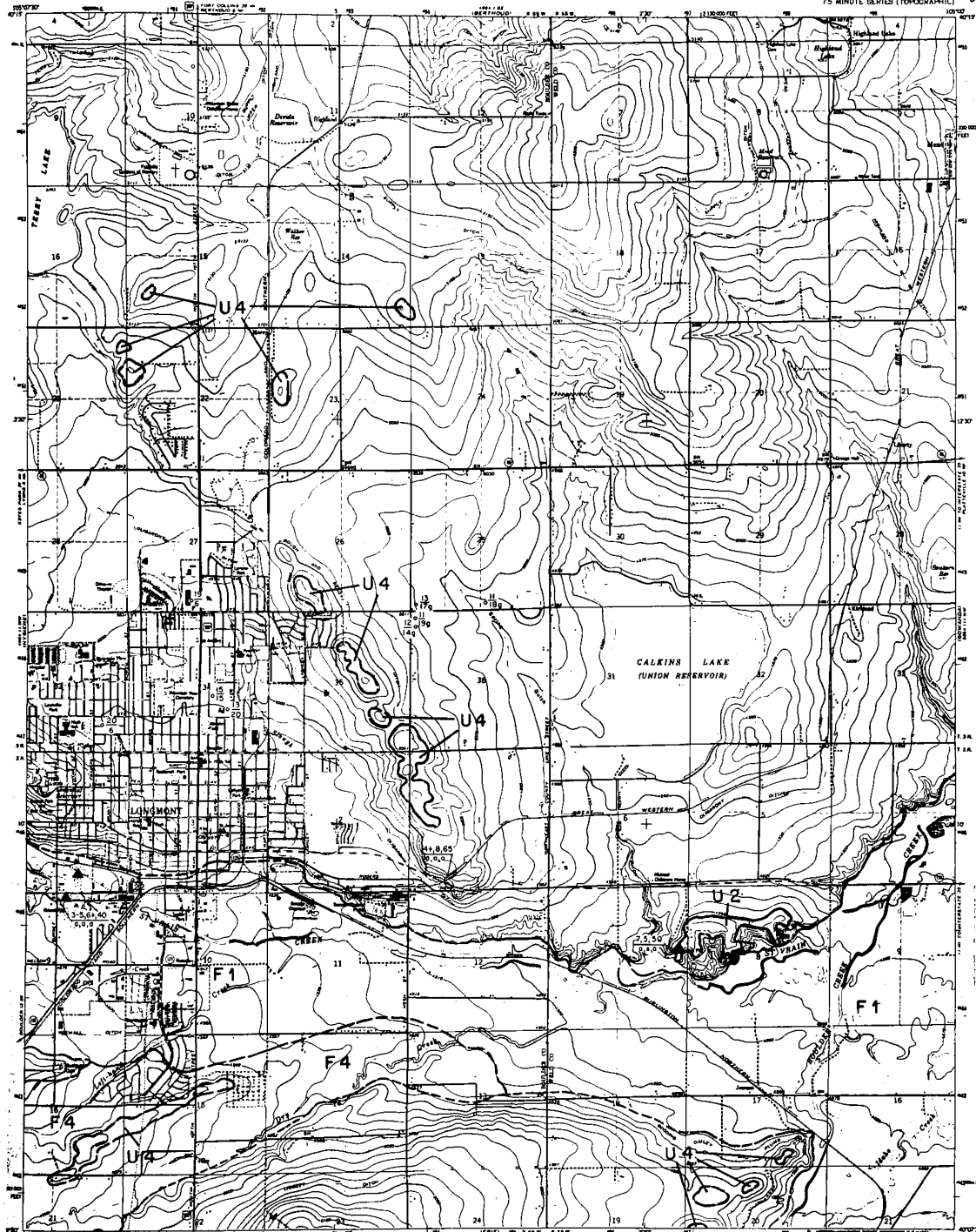
LIVERMORE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

LONGMONT QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYAN, DIRECTOR



EXPLANATION

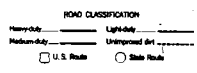
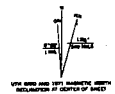
- Landtype unit
 - Resource class (location)
- RESOURCE UNIT**
- F Fluvial deposit
 - T Tectonic terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (other than fill, etc.)
- RESOURCE CLASSIFICATION**
- CLASS 1**
(for use on 1:50,000 scale or smaller, 1:250,000 scale)
- 1 Good: relatively clean and sound
 - 2 Good: significant fines, unconsolidated, calcareous
 - 3 Sand
- CLASS 2**
(for use on 1:250,000 scale or smaller, 1:100,000 scale)
- 4 Probable aggregate resource
- UNIT SYMBOLS**
- a Operating gravel and/or sand pit
 - b Abandoned gravel and/or sand pit
 - c Operating stone quarry
 - d Abandoned stone quarry
 - e Potential quarry aggregate resource area
- NOTES**
- 1. Selected well or drill-hole location with over-burden thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs.
 - 2. "U" indicates gravel; "E" indicates sand.
 - 3. "M" in symbol denotes unconsolidated or man-made.
 - 4. "U" in symbol denotes Geological Survey Mason/land and gravel projects' drill hole.
 - 5. Location boundary, solid shows known or observed; dashed shows approximate or inferred.
- SYMBOL LOCATION AND ORIENTATIONAL INFORMATION OF SYMBOL**
- 1. sand/gravel resource thickness (ft)
 - 2. overburden thickness (ft)
 - 3. minimum sand and fines (passing #10 screen, 0.075 in.), relative orientation
 - 4. significant amount of fines (passing #20 screen, 0.085 in. or 0.075 in.)
 - 5. significant amount of decomposed or weak rock
 - 6. significant amount of siliceous carbonate (caliche)
 - 7. "U" in symbol denotes unconsolidated or man-made
 - 8. "M" in symbol denotes man-made

Symbol	Description
□	QUADRANGLE LOCATION
▨	NON-RESOURCE OR WITHDRAWN AREA

Geology modified after: Colton, R.B., and Finch, H.H., 1971, Map showing potential resources of gravel and crushed-rock aggregate in the Boulder-Park Collins-Preley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-559-D.

Mapped by: Ralph E. Stroba
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey 7.5-minute quadrangle

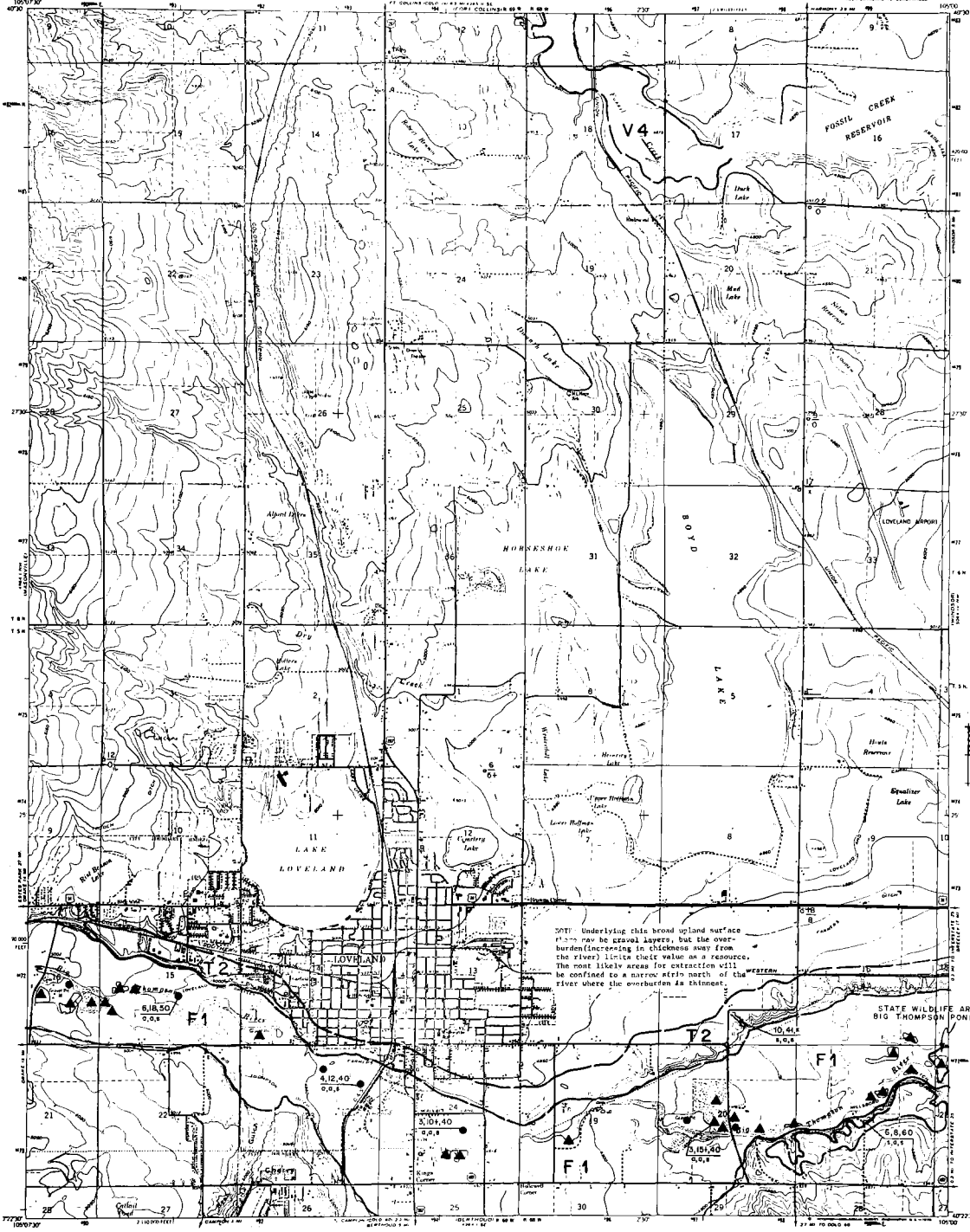


LONGMONT, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

LOVELAND QUADRANGLE
COLORADO-LARIMER CO
75 MINUTE SERIES (TOPOGRAPHIC)
NEW CONTOUR QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



EXPLANATION

- Terrane Unit
- Resource Classification

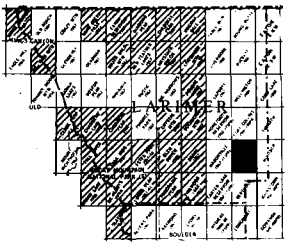
- LITHOLOGICAL**
- Fossiliferous deposit
- Strata terrace deposit
- Valley fill (F & T)
- Old sand deposit
- Alluvial fan
- Sandstone deposit (see notes)
- Mudsand deposit (see notes)

- ROCK CLASSIFICATION**
- GRAVEL**
 - 1 Gravel: relatively clean and round
 - 2 Gravel: significant fines, decomposed rock, tabular detritus
- SAND**
 - 3 Sand
- Estimated Resource**
- 4 Probable aggregate resources

- MAP SYMBOLS**
- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- Indicated gravel
- No symbol denotes unutilized or unknown property
- Well location Colorado Geological Survey
- Well location private
- Landform boundary, solid where known or observed, dashed where approximate or inferred

- STATION LOCATION AND GEOMETRICAL SIMILITUDE OF SYMBOLS**
- overburden thickness (ft)
- significant amount of medium sandstone (ft)
- percent sand and fines (ignoring 40 percent, 0.25 in., default estimation)
- significant amount of fine sandstone (ft)
- significant amount of medium sandstone (inches)
- No symbol denotes unutilized or unknown property
- No symbol denotes property absent or designated

NOTE: Underlying this broad upland surface there may be gravel layers, but the overburden (increasing in thickness away from the river) limits their value as a resource. The most likely areas for extraction will be confined to a narrow strip north of the river where the overburden is thinnest.



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

REFERENCES:
 Swan, F. W., III, and Whitney, J. W., 1972, Map of surficial geology of the Loveland quadrangle: Recon. Mapping for Colorado Geol. Survey Under Environmental Geology Project, open-file map.
 Shelton, D.C., 1974, personal communication.

Geology modified after:
 Catton, R.B., and Pitch, R.B., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Orealey Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map I-855-D.

Mapped by: Stephen D. Schwochow
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey
7-1/2 minute quadrangle



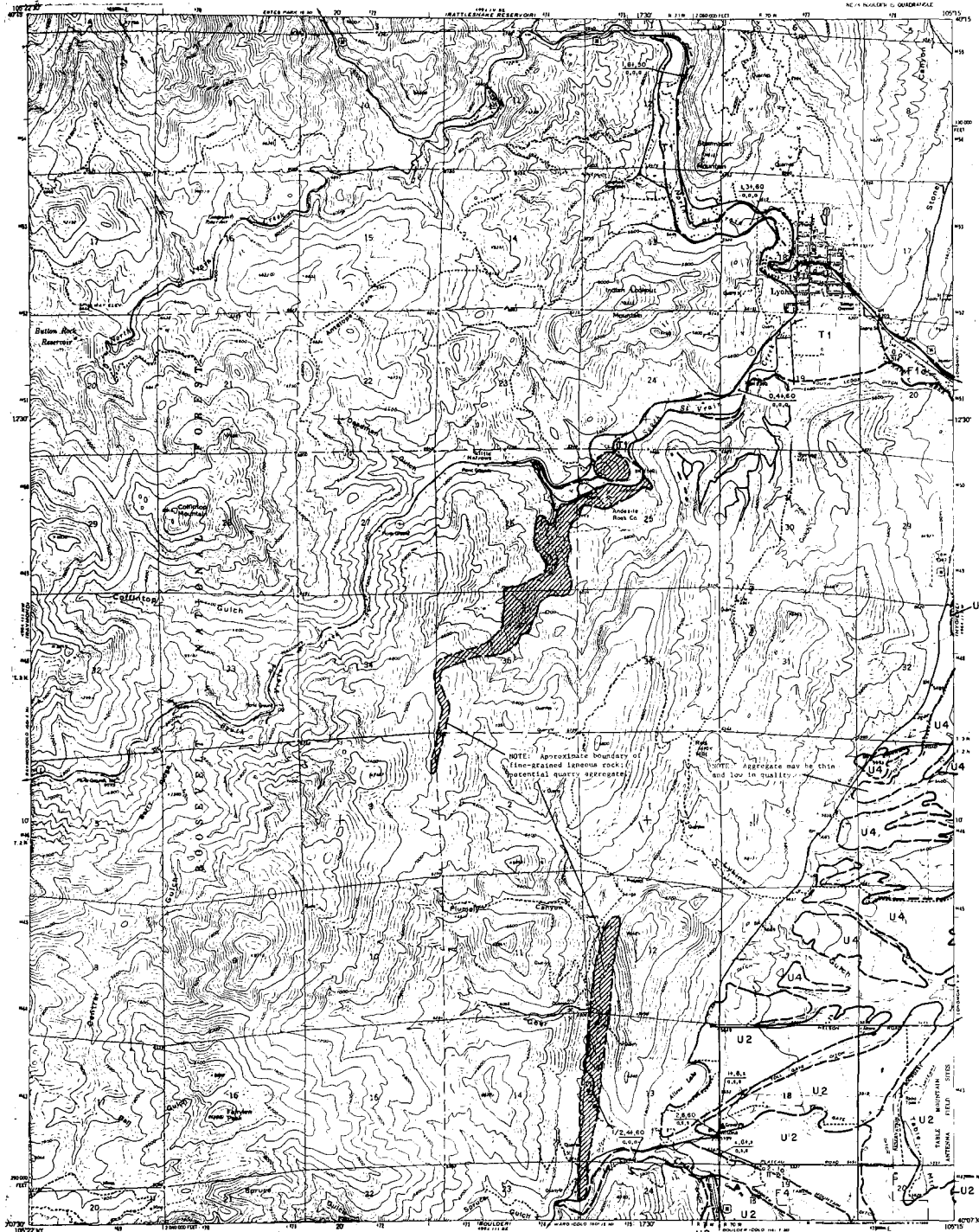
ROCK CLASSIFICATION
 Heavy duty _____ Light duty _____
 Medium duty _____ Unconsolidated detritus _____
 U.S. Road _____ State Route _____

LOVELAND, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

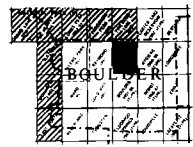
LYONS QUADRANGLE
COLORADO-HOULEY CO
7.5 MINUTE SERIES, 1:50,000
N. 1974

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- Landform units
Resource classification
- LANDFORM UNITS**
- F Fluvial terrace deposit
 - T Tidal terrace deposit
 - V Valley fill (F & T)
 - U Unad deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Hummock deposits (shrub, tallgrass, sedge, ...)
- RESOURCE CLASSIFICATION**
- CLASS 1 AGGREGATE**
Less than 250,000 cu yd. or 40 acres, usual occurrence
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- CLASS 2 AGGREGATE**
Greater than 250,000 cu yd. or 40 acres, not restricted to 4000 acres, usual occurrence
- 3 Sand
 - 4 Probable aggregate resource
- NON-RESOURCE**
- Operative gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Relieved well or drill-hole intersect with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "Indicates gravel" "A" indicates sand
 - In some cases unmineralized or unknown property
 - "As done by Colorado Geological Survey, Water-Well and Groundwater Section, 1971
 - Landform boundary, solid short lines or observed dashed short lines or lateral
- POSITION, LOCATION AND ORIENTATIONAL INFORMATION**
- SYMBOLS OF AGGREGATE**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand, 0-100%, or 0-100% gravel
 - significant amount of fines (opening 75µm mesh, 0.25 mm, or 0.075 mm)
 - significant amount of decomposed or sand rock
 - significant amount of calcium carbonate (calcite)
 - "or" symbol denotes unmineralized or unknown property
 - "or" symbol denotes property absent or insignificant

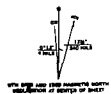


■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after: Colton, R. R., and Fitch, H. S., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Port Collins-Creeley Area, Front Range Urban Corridor, Colorado. U. S. Geol. Survey Map I-855 D.

Mapped by: Ralph S. Shroba
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey 7.5-minute quadrangle



ROAD CLASSIFICATION

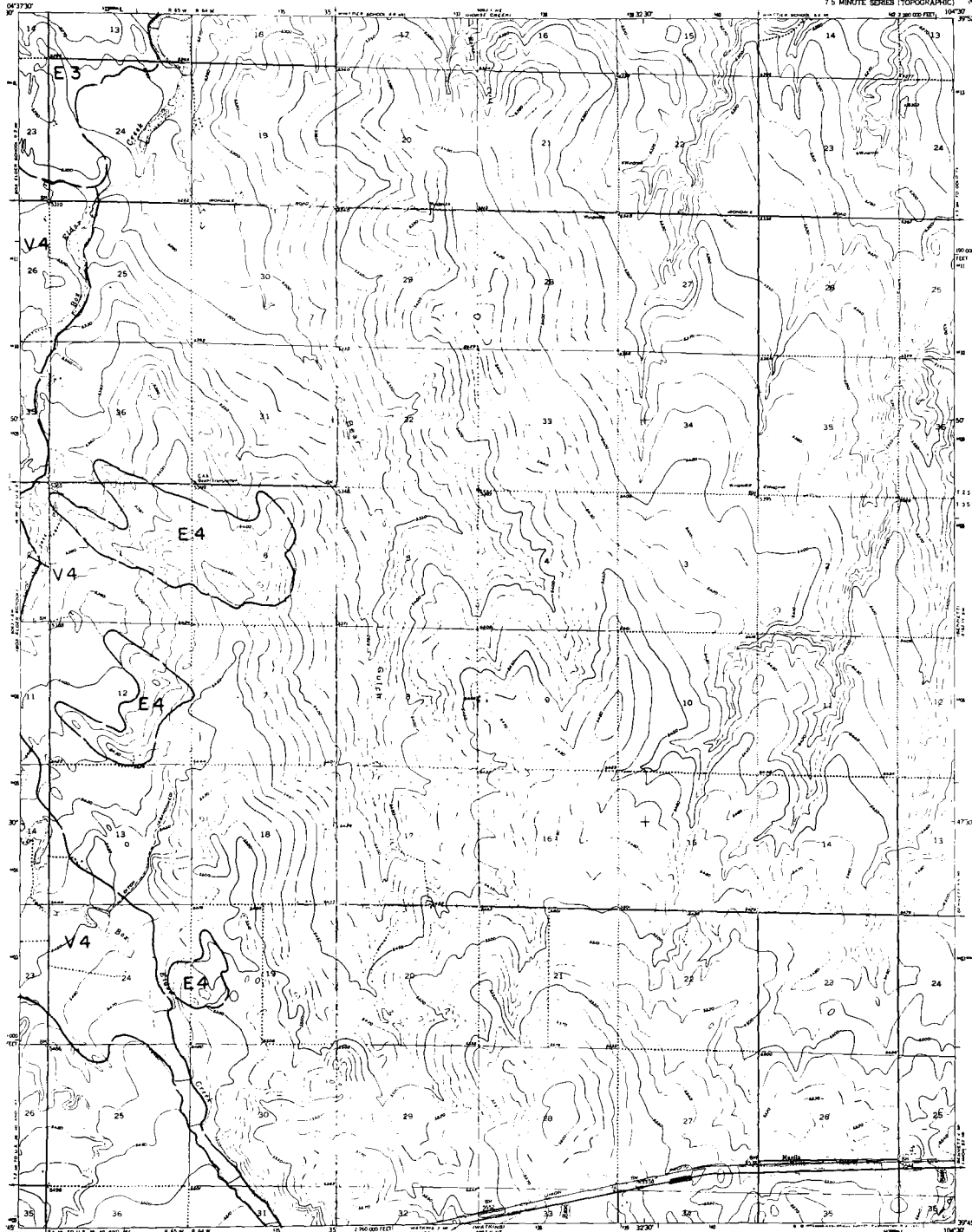
- Heavy-duty ————— Light-duty —————
- Medium-duty - - - - - Unimproved dirt - - - - -
- U.S. Route □ State Route □

LYONS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

MANILA QUADRANGLE
COLORADO-ADAMS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Contour Interval
 - Sandstone Deposits
 - Vastly Miss (F & T)
 - Unaltered Deposits
 - Altered Sand
 - Wind-Deposited Sand (Tuffaceous)
 - Medium Deposits (Sandstone, Siltstone)
- NUMERIC CLASSIFICATION**
- 1 Gravel: well-sorted, clean and sound
 - 2 Gravel: significantly finer, decomposed, or tuffaceous
 - 3 Sand
 - 4 Potential aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or pit
 - Abandoned gravel and/or pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Potential sand or gravel aggregate resource area
 - Potential tuffaceous aggregate resource area
 - Potential siltstone aggregate resource area
 - Potential shale aggregate resource area
 - Potential limestone aggregate resource area
 - Potential dolomite aggregate resource area
 - Potential granite aggregate resource area
 - Potential gneiss aggregate resource area
 - Potential schist aggregate resource area
 - Potential quartzite aggregate resource area
 - Potential mica-schist aggregate resource area
 - Potential amphibolite aggregate resource area
 - Potential mafic aggregate resource area
 - Potential felsic aggregate resource area
 - Potential igneous aggregate resource area
 - Potential metamorphic aggregate resource area
 - Potential sedimentary aggregate resource area
 - Potential volcanic aggregate resource area
 - Potential plutonic aggregate resource area
 - Potential igneous aggregate resource area
 - Potential metamorphic aggregate resource area
 - Potential sedimentary aggregate resource area
 - Potential volcanic aggregate resource area
 - Potential plutonic aggregate resource area
- STATION, LOCATION AND TOPOGRAPHICAL DESCRIPTION OF PIT**
- Abandoned business site
 - Sand/gravel resource (thickness 10')
 - Potential sand and gravel (thickness 10')
 - Sand/gravel resource (thickness 20')
 - Potential sand and gravel (thickness 20')
 - Significant amount of fine (quartz) sand (thickness 20')
 - Significant amount of coarse (quartz) sand (thickness 20')
 - Significant amount of clean (quartz) sand (thickness 20')
 - Significant amount of tuffaceous sand (thickness 20')
 - Significant amount of siltstone (thickness 20')
 - Significant amount of shale (thickness 20')
 - Significant amount of limestone (thickness 20')
 - Significant amount of dolomite (thickness 20')
 - Significant amount of granite (thickness 20')
 - Significant amount of gneiss (thickness 20')
 - Significant amount of schist (thickness 20')
 - Significant amount of quartzite (thickness 20')
 - Significant amount of mica-schist (thickness 20')
 - Significant amount of amphibolite (thickness 20')
 - Significant amount of mafic (thickness 20')
 - Significant amount of felsic (thickness 20')
 - Significant amount of igneous (thickness 20')
 - Significant amount of metamorphic (thickness 20')
 - Significant amount of sedimentary (thickness 20')
 - Significant amount of volcanic (thickness 20')
 - Significant amount of plutonic (thickness 20')

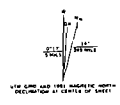


- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
Smith, R.O., Schneider, P.A., Jr., and Petri, L.R., 1964, Ground-water resources of the South Platte River basin in western Adams and southeastern Weld Counties, Colorado: U. S. Geol. Survey Water-Supply Paper 1558, pl. 1.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



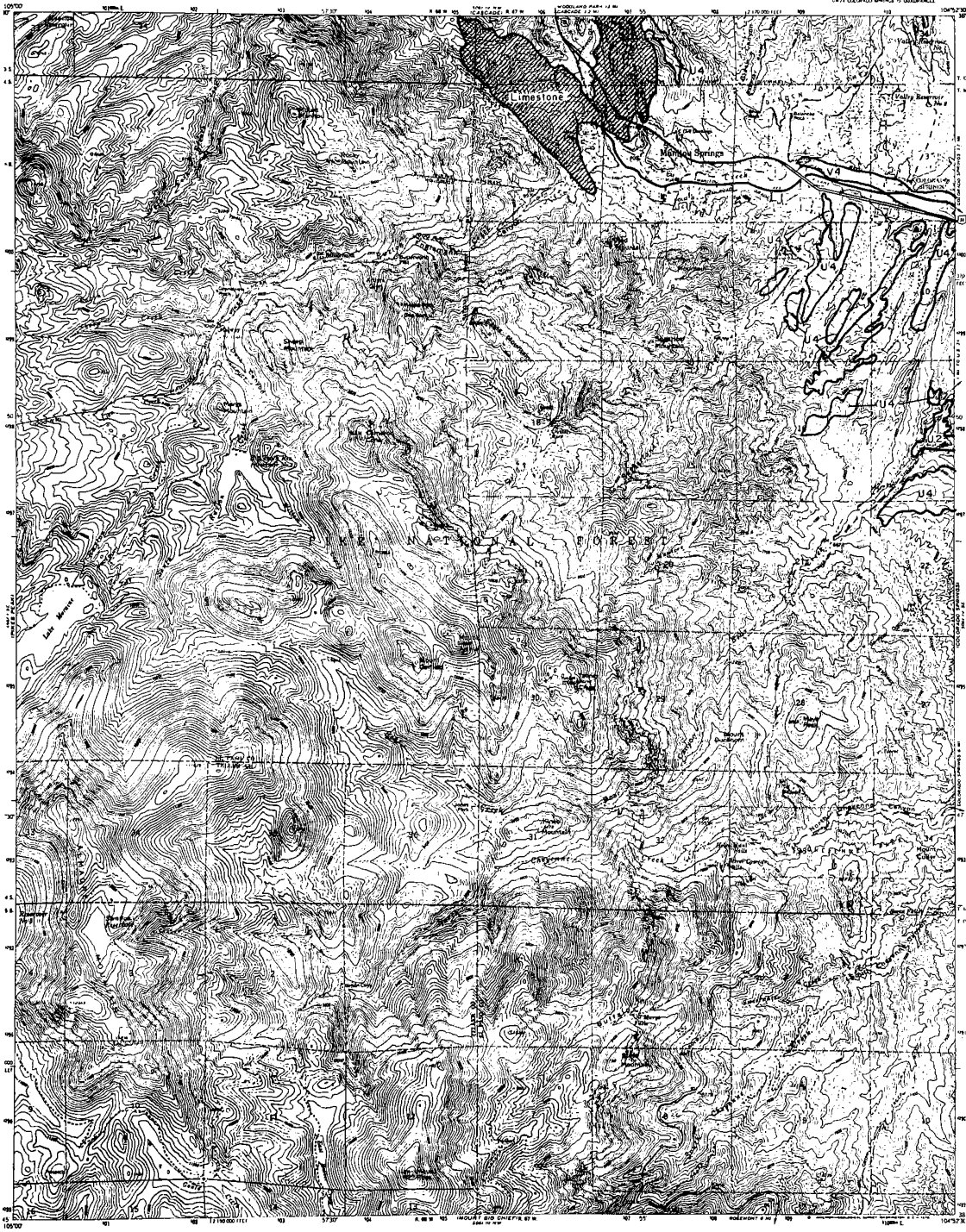
- ROAD CLASSIFICATION**
- Highway
 - Light Duty Road
 - Medium Duty Road
 - Unimproved dirt road
 - U.S. Route
 - State Route

MANILA, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

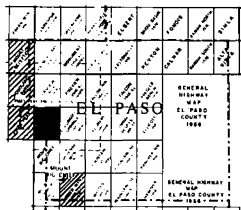
MANITOU SPRINGS QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)
FIRST COLORADO STATE P. QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLL, DIRECTOR



EXPLANATION

- Landform Units**
 - Contour lines
 - Shaded relief
- LITHOLOGIC UNITS**
- 7 Sandstone deposit
 - 7 Shale deposit
 - V Valley fill (F.A.T.)
 - U Unconsolidated deposit
 - A Alluvial fan
 - E Sand-dominant sand (unit)
 - M Sandstone deposit (tag: calcite, opaline, ...)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
 (see note on methods on p. 8 of cover, if not estimated)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcite cementation
- Fine Aggregate**
 (ignores less than 75 percent of cover, 100 percent on 100' screen, 100' estimation)
- 3 Sand
 - 4 Unavailable Resource
 - 4 Probable aggregate resource
- NOT SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Recessed water materials resource area
 - Recessed well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "G" indicates gravel; "S" indicates sand
 - "R" in symbol denotes unavailability or unknown property
 - "M" denotes Colorado Geological Survey Wilderness and Great projects drill hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and gravel (percent of cover, "75" or "100", 100' estimation)
 - significant amount of fines (exceeding 100 percent, 200 or 40 mesh)
 - significant amount of decomposed or weak rock
 - "R" in symbol denotes unavailability or unknown property
 - "M" in symbol denotes property owned or leased/leased



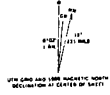
- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, C.R., & Huber, R.A. 1973, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, 100-A22.

REFERENCE:
 Trimble, D. E., and Petch, R. R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-557 A.

Mapped by: Phillip C. Wicklein
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



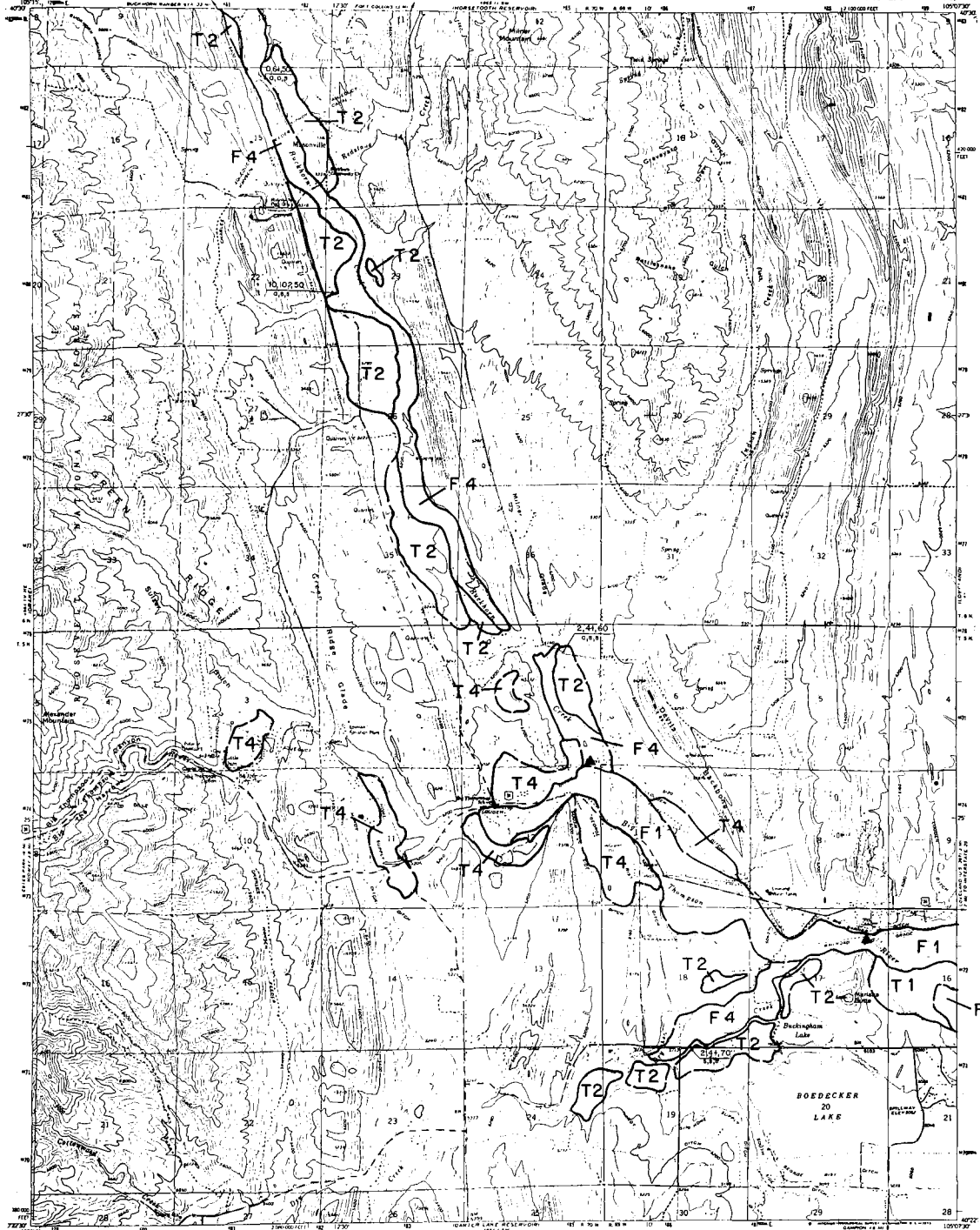
- ROAD CLASSIFICATION**
- Heavy duty
 - Medium duty
 - Light duty
 - Unimproved dirt
 - U.S. Route

MANITOU SPRINGS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

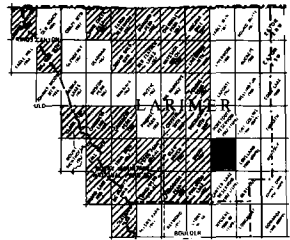
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLT, DIRECTOR

MASONVILLE QUADRANGLE
COLORADO-LARIMER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
1:50,000



EXPLANATION

- Landform used**
Resource classification
- LANDFORM UNIT**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag tailings, spoils, ...)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(of size 20 mesh and 48 screen, visual estimation)
- 1 Gravel: relatively clean and sand
 - 2 Gravel: significant fines, decomposed rock, inclusion fragments
- Fine Aggregate**
(finer than 20 mesh) (by screen, size related on 48 screen, visual estimation)
- 3 Sand
 - 4 Probable aggregate resource
- QUI PROBLE**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Related well or fractured limestone with overburden thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs
 - "I" indicates gravel, "S" indicates sand
 - "L" in symbol denotes unutilized or unknown property
 - "M" denotes Colorado Geological Survey (Mined and/or mineral project) drill hole
 - Location boundary, which shows known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL CLASSIFICATION OF AGGREGATE**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - quarry area and flow capacity ft² (bottom, 1:20 to 1:100, contact relationship)
 - light/loose amount of fines (quantity 1000 screen, 0.075 to 0.075 mm.)
 - significant amount of decomposed or weak rock
 - significant amount of inclusion fragments (inclusion)
 - "M" in symbol denotes unutilized or unknown property
 - "M" in symbol denotes property subject to Mined/Mineral



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR METHUEN AREA

Geology modified after: Colton, R.R., and Pisch, R.R., 1974; Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Orealey Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-855 D.

REFERENCE:
Bradford, V.A., Calvert, R.B., Gwaramakt, S.J., and Niculaya, Prings, 1970. Geologic map of the Masonville quadrangle, Larimer County, Colorado: U. S. Geol. Survey Geol. Quad Map GC-832.

Maped by: Stephen D. Schowch
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20 FOOT CONTOURS
DASHED "X" MARKS SEA LEVEL

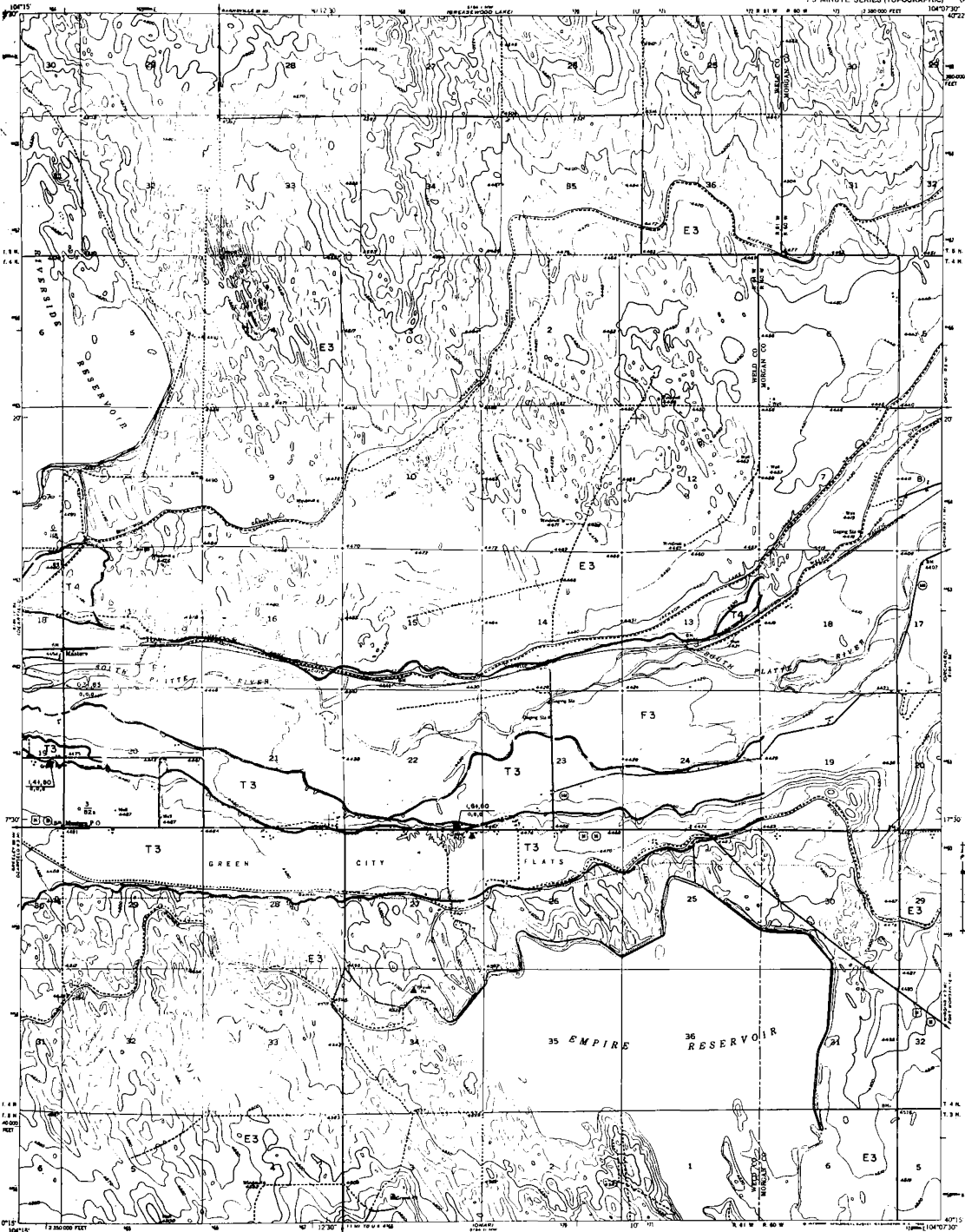
ROAD CLASSIFICATION
Medium duty Light duty
Unimproved dirt U.S. Route

MASONVILLE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

MASTERS QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLD, DIRECTOR



EXPLANATION

- Landform Unit**
Symbol: [Symbol] Name: [Symbol] Classification
- LANDFORM UNIT**
- F Floodplain deposit
 - T Terrace terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Sandstone sand (alluvial)
 - M Non-made deposits (slag, tailings, opaline, etc.)
- RESOURCE CLASSIFICATION**
- GRAVEL RESOURCES**
1 Gravel: relatively clean and round
2 Gravel: significant fines, decomposed rock, calcium carbonate
- SAND RESOURCES**
3 Sand
- Unutilized Resource**
4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel sand/and pit
 - Abandoned gravel sand/and pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Isolated well or drill-hole location with overburden thickness (ft.) and gravel from well logs
 - "A" indicates gravel; "S" indicates sand
 - "C" is symbol denoting commercial or unknown property
 - "M" denotes Colorado Geological Survey material from sand and gravel projects
 - "U" is symbol denoting property absent or insignificant
 - Landform boundary, solid where known or dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATION**
- DESCRIPTION OF SYMBOLS**
- overburden thickness (ft.)
 - and gravel resource thickness (ft.)
 - percent sand and fines (based on screen, 0.075 to 2.0 mm.)
 - significant amount of fines (passing 480 screen, 0.075 to 0.25 mm.)
 - significant amount of unconsolidated or soft rock
 - significant amount of soluble carbonate material
 - "A" or "S" symbol denotes unutilized or unknown property
 - "M" is symbol denoting property absent or insignificant

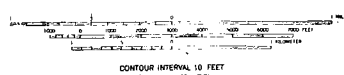
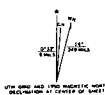


QUADRANGLE LOCATION
NON-RESOURCE OR
SITING AREA

REFERENCE: Storklund, L.J., and Brown, W.F.,
1957, Geology and ground-water resources of the
lower South Platte River valley between Hardin,
Colorado, and Paxson, Nebraska; U. S. Geol.
Survey Water-Supply Paper 1378, pl. 1.

Mapped by: Phillip C. Vicklein
Date: June 30, 1974

Map from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET
OTHER 15 FEET

ROAD CLASSIFICATION

IMPROVED GRAVEL ALL WEATHER ROAD OR WEATHER ROAD
Heavy-duty IMPROVED GRAVEL IMPROVED DET.
Medium-duty IMPROVED GRAVEL IMPROVED DET.
Lower-duty gravel or narrow hard-surface

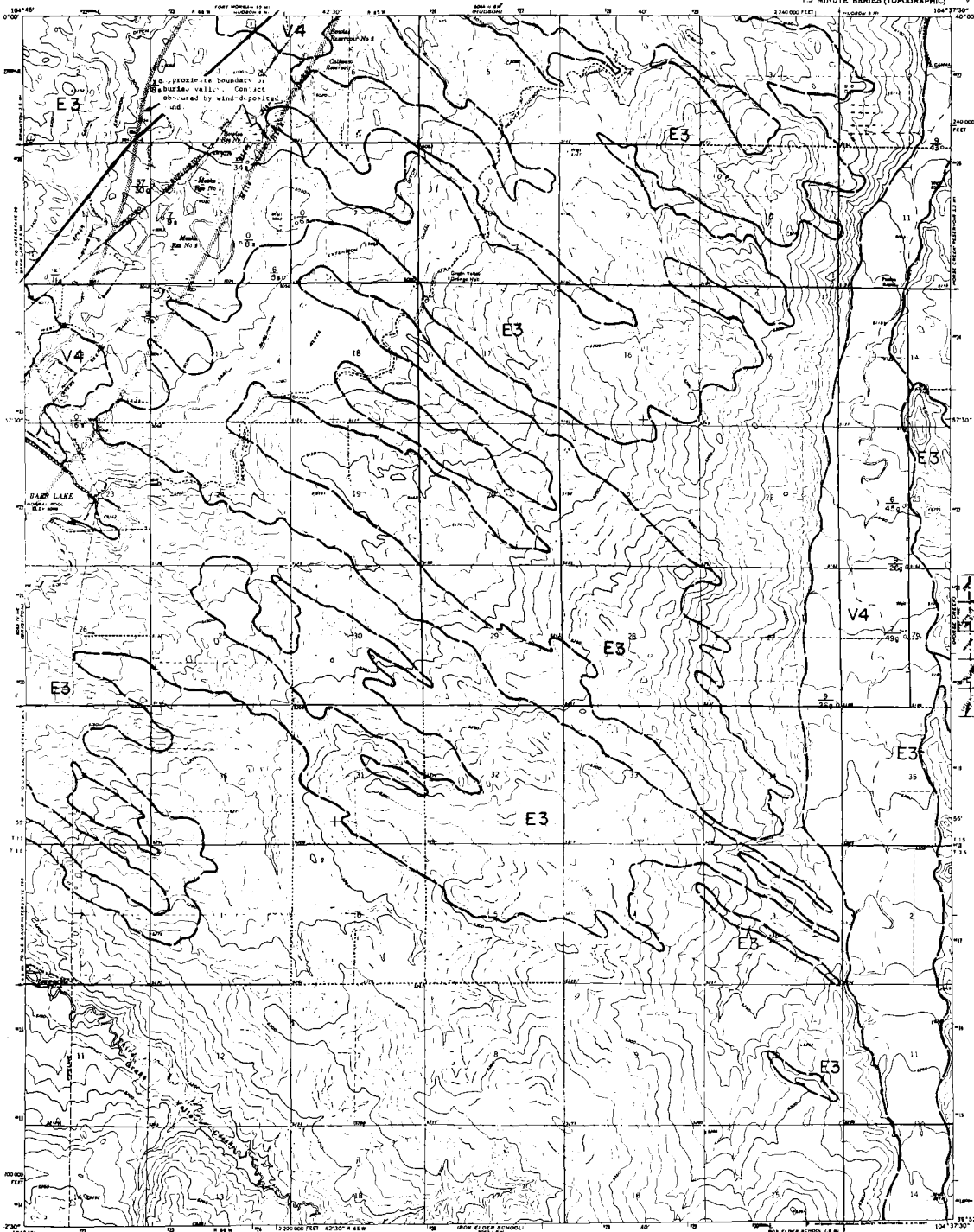
□ U. S. Route ○ State Route

MASTERS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

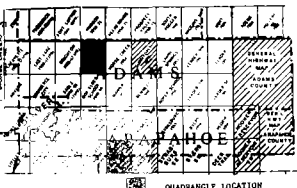
MILE HIGH LAKES QUADRANGLE
COLORADO - ADAMS CO.
7 1/2 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR



EXPLANATION

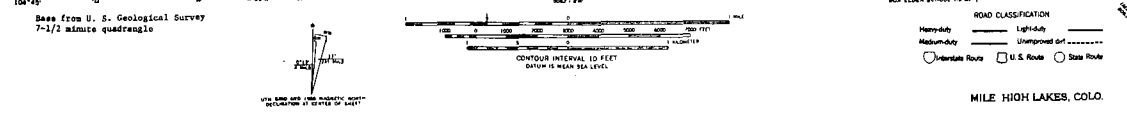
- GENERAL NOTES**
- T Traction terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Erosion-resistant sand (limited)
 - M Non-sand deposits (slag, tailings, rubble, etc.)
- ROAD CLASSIFICATION**
- 1 Gravel: relatively clean and smooth
 - 2 Gravel: significant fines, decomposed rock, section aggregate
 - 3 Sand
 - 4 Ungraded Resource
 - 5 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource area
 - Refractured well or drilled hole location with average thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "I" indicates gravel; "S" indicates sand
 - "I" in symbol denotes unutilized or unknown property
 - "S" denotes Colorado Geological Survey Waterflooded and caved aggregate
 - "E" in symbol denotes unutilized or unknown property
 - Section boundaries, well shown known or observed; dashed where approximated or inferred
- SECTION BOUNDARIES AND GEOLOGICAL INFORMATION**
- Section boundary thickness (ft)
 - Abandonment of well (open space to be present) used for gravel (open space to be present) used for sand/gravel aggregate
 - Approximate amount of fines (percent) present in gravel (percent) present in sand/gravel aggregate
 - Approximate amount of decomposed or well rock
 - Approximate amount of decomposed or well rock
 - "I" in symbol denotes unutilized or unknown property
 - "S" in symbol denotes unutilized or unknown property



QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

References:

- Chase, C.S., and McConaghy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map 1-731.
- Smith, W.D., Schneider, P.A., Jr., and Petri, L.R., 1954, Ground-water resources of the southwestern Weld Counties, Colorado: U.S. Geol. Survey Water-Supply Paper 1038, pl. 1.
- Tribble, D.L., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.: U.S. Geol. Survey Misc. Geol. Inv. Map 1-836A.



ROAD CLASSIFICATION

- Highway
- Light-duty
- Medium-duty
- Unimproved dirt
- Interstate Route
- U.S. Route
- State Route

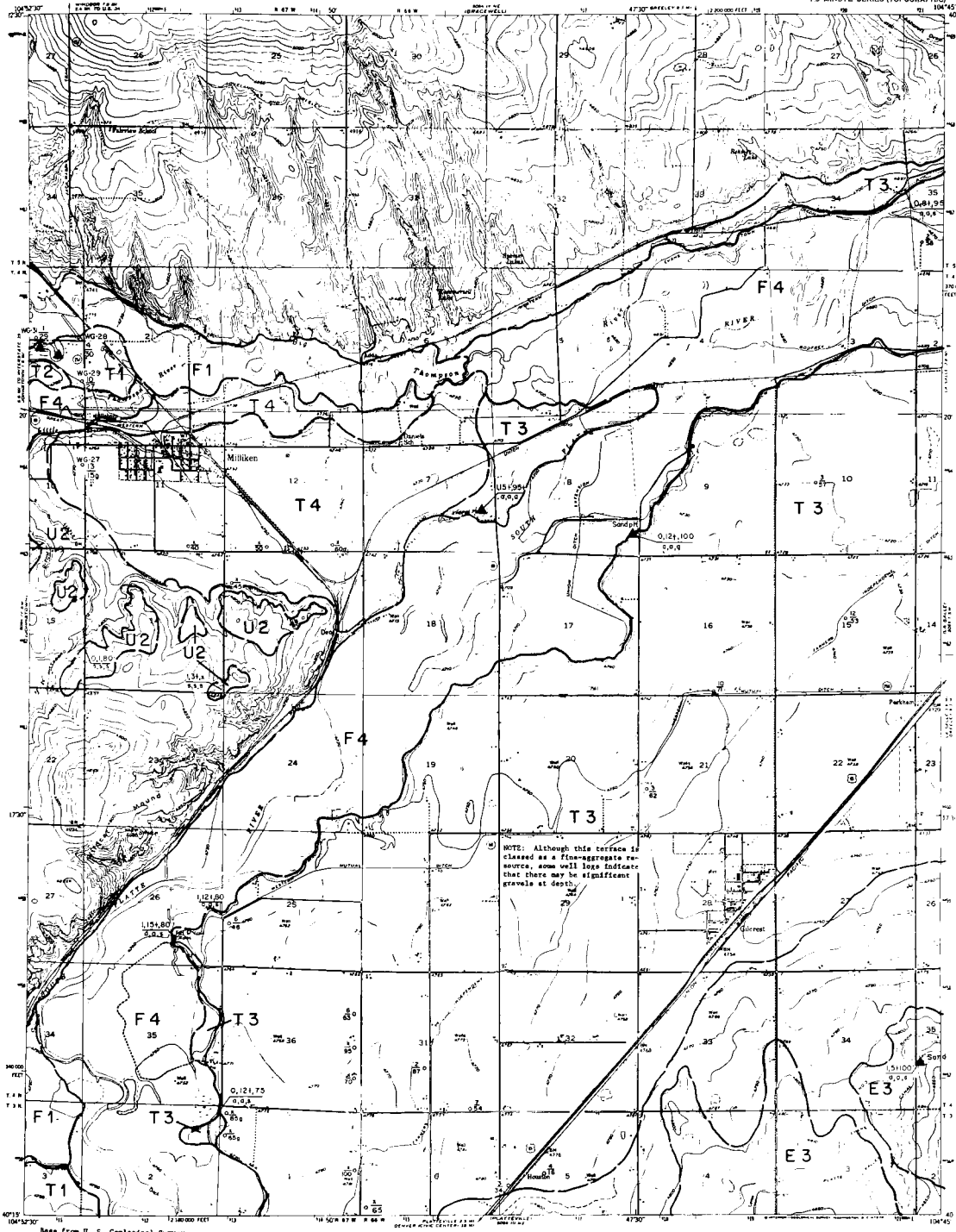
MILE HIGH LAKES, COLO.

Mapped by: Stephen D. Schoewch
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

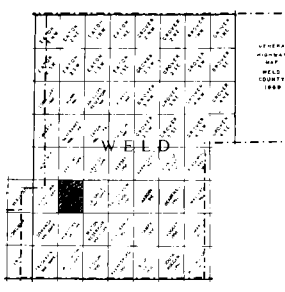
MILLIKEN QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- SYMBOLS**
- F Fine-grained deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Unconsolidated sand (alluvial)
 - M Residual deposit (clay, siltstone, etc.)
- RESOURCE CLASSIFICATION**
- Coarse aggregate**
(1) Gravel: well-sorted clean and sand equivalent (Fines, decomposed rock, calcareous)
- Fine aggregate**
(1) Sand: well-sorted, clean, and sand equivalent (Fines, decomposed rock, calcareous)
- Unconsolidated Resources**
- (1) Potential aggregate resources
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential water aggregate resource area
 - Watered well or drill-hole location with overburden thickness (ft) other sand/gravel resource thickness (ft) obtained from well logs
 - "S" indicates gravel; "U" indicates sand
 - "*" in symbol denotes unconsolidated or unknown property
 - "W" denotes Colorado Geological Survey Water-Flow and Great Project
 - Uniform boundary, well where known or observed; dashed where approximate or inferred
- SECTION, LOCATION AND GEOMETRIC DIMENSION OF DEPOSIT**
- Overburden thickness (ft)
 - and gravel resource thickness (ft)
 - percent sand and fines (using 40 mesh)
 - area (sq. ft.)
 - volume (cu. ft.)
 - weight (tons)
 - value (\$)
- NOTE:** "S" in symbol denotes unconsolidated or unknown property; "U" in symbol denotes property absent or unguaranteed.



QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Smith, R.O., Schneider, P.A., Jr., and Pezzi, L.R., 1964, Ground-water resources of the South Platte River basin to western Adams and southwestern Weld Counties, Colorado; U. S. Geol. Survey Water-Supply Paper 1658, pl. 1.

Geology modified after: Colton, R.B., and Fitch, R.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Creeley Area, Front Range Urban Corridor, Colorado; U. S. Geol. Survey Map I-855-0.

Mapped by: Stephen D. Schuchow
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

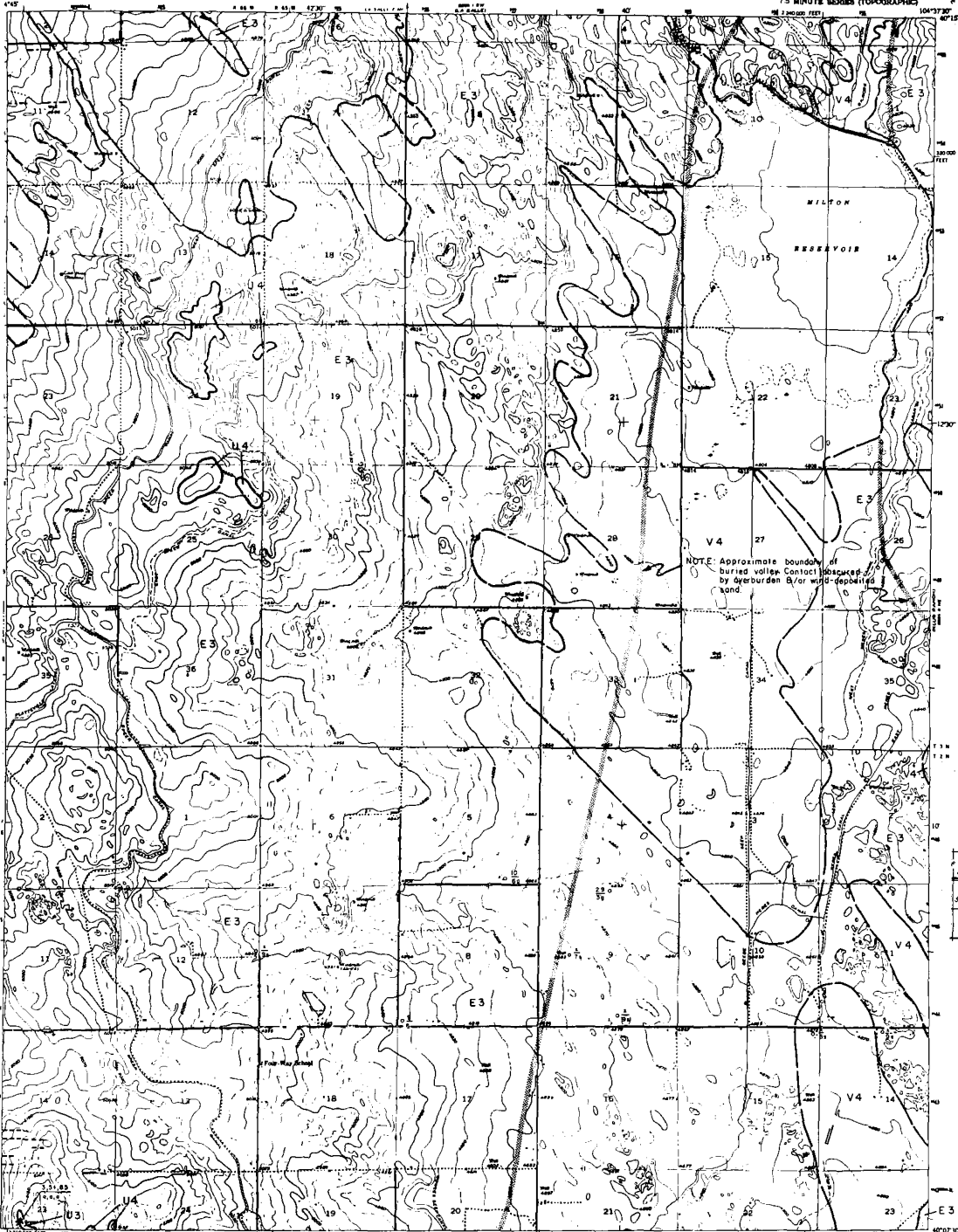


MILLIKEN, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

MILTON RESERVOIR
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. RYAN, DIRECTOR



EXPLANATION

CONTOUR INTERVAL 10 FEET
BASE MAP

- LANDFORMS**
- F Floodable deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Wind deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Hummock deposits (e.g., mounds, spits, ...)

RESOURCE CLASSIFICATION

- GRAVEL**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous
- SAND**
- 3 Sand
 - 4 Probable aggregate resource

MAP SYMBOLS

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Isolated well or drill hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log
- "u" indicates gravel; "s" indicates sand
- "u" in symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey classified and cored "probable" gravel beds
- Landform boundary, solid where known or observed; dashed where approximate or inferred

STATION, LOCATION AND SYMBOLICAL ABANDONED QUARRY

- overburden thickness (ft)
- overburden thickness (ft)
- overburden thickness (ft)
- significant amount of fines (greater than 200 mesh, 0.075 mm or 0.075 mm)
- significant amount of decomposed or well rock
- significant amount of calcareous material
- "u" or "s" symbol denotes unconsolidated or unknown property
- "m" or "p" symbol denotes property absent or unproven

NOTE: Approximate boundary of buried valley contact obscured by overburden &/or wind-deposited sand.



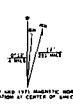
QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after
Colton, R.B., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Orealey Area, Front Range Urban Corridor, Colo.; U. S. Geol. Survey Misc. Geol. Inv. Map I-855-D.

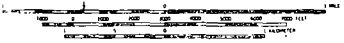
Mapped by: Ralph S. Shroba
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey

Base from U. S. Geological Survey 7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET
BASED ON MEAN SEA LEVEL



ROAD CLASSIFICATION

ROAD SURFACE ALL WEATHER ROADS
 Heavy-duty Improved dirt
 Medium-duty Unimproved dirt
 Local-surface, graded, or narrow hard surface
 U.S. Route
 State Route

DRY WEATHER ROADS
 Improved dirt
 Unimproved dirt

MILTON RESERVOIR, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

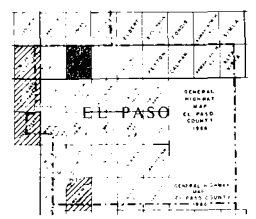
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR

MONUMENT QUADRANGLE
COLORADO-EL PASO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Land/DEM unit
Resource classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Eolian-deposited sand (eolian)
 - M Marine deposits (sand, siltstone, spalls...)
- RESOURCE CLASSIFICATION**
- GRAVEL AGGREGATE**
(1) 100 to 200 ft. spacing 44 acres, 47%
(2) 100 to 200 ft. spacing 44 acres, 47%
- SAND AGGREGATE**
(1) 100 to 200 ft. spacing 44 acres, 47%
(2) 100 to 200 ft. spacing 44 acres, 47%
- 3** Sand
- 4** Probable aggregate resource
- NON-RESOURCE**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Isolated well or drill-hole location with cover
 - Bottom thickness (ft.) over sand/gravel resource thickness (ft.), obtained from well logs
 - "*" indicates gravel; "S" indicates sand
 - "*" in symbol denotes uninvestigated or unknown property
 - "*" denotes Colorado Geological Survey "Sand and Gravel project" drill hole
 - Location boundary, solid where known or observed; dashed where approximate or inferred
- 4** STATION, LOCATION AND GEOLOGICAL CLASSIFICATION BY SYMBOL
- contour interval thickness (ft.)
 - undrilled resource thickness (ft.)
 - gravel and fines (spacing 44 acres, 47% ft.), gravel unit/rock
 - significant amount of fines (spacing 44 acres, 47% ft., or 0.174 mi.)
 - significant amount of decomposed or well rock
 - significant amount of eolian carbonate (sandstone)
 - "*" in symbol denotes uninvestigated or unknown property
 - "*" in symbol denotes property absent or designated



QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

Tribble, D.E., and Fitch, R.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado; U. S. Geol. Survey Map I-857 A.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey 7-1/2 minute quadrangle

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION

- Heavy duty
- Medium duty
- Light duty
- Unimproved dirt
- Interstate Route
- U.S. Route
- State Route

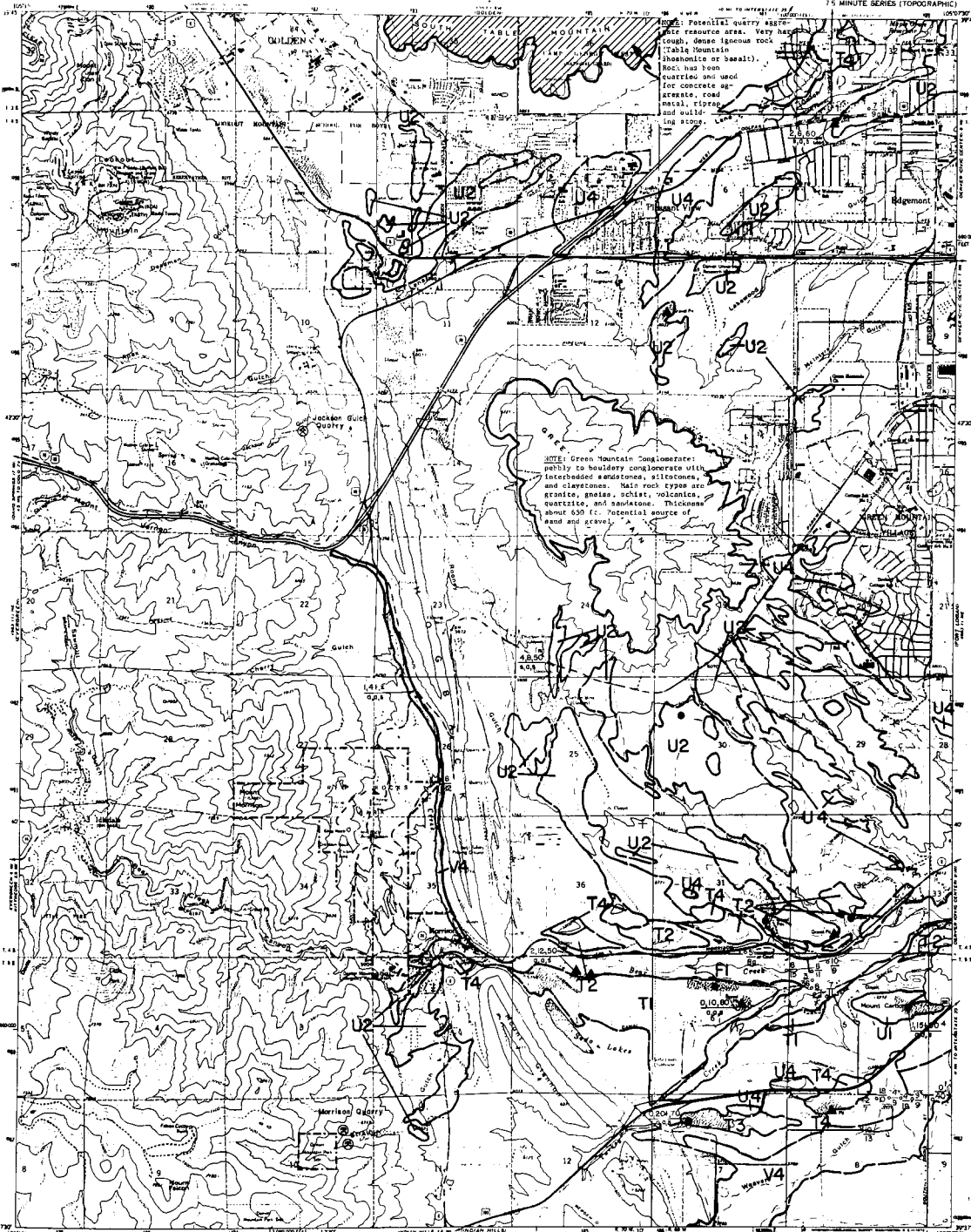
MONUMENT, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

MORRISON QUADRANGLE
COLORADO-JEFFERSON CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION



Potential quarry aggregate resource area. Very hard, tough, dense igneous rock (table Mountain phonolite or basalt). Rock has been quarried and used for concrete aggregate, road metal, riprap, and building stone.

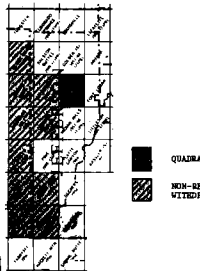
NOTE: Green Mountain conglomerate partly to boundary conglomerate with interbedded sandstone, siltstone, and claystone. Main rock types are granite, gneiss, schist, volcanic quartzite, and sandstone. Thickness about 500 ft. Potential source of sand and gravel.

- ROAD CLASSIFICATION**
- Light-duty
 - Unimproved dirt
 - U.S. Route
 - State Route

- ROAD CLASSIFICATION**
- 1 Gravel, relatively clean and smooth
 - 2 Gravel, significant fines, decomposed rock, calcium carbide
 - 3 Sand
 - 4 Probable aggregate resource

- ROAD CLASSIFICATION**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Relative well or well-sorted sandstone with moderate thickness (ft.) over sand/gravel resource thickness (ft.) obtained from well log
 - "I" indicates gravel, "S" indicates sand
 - "I" in small circles unavaliable or unknown quantity
 - "S" in small circles unavaliable or unknown quantity
 - "No" denotes Colorado Geological Survey "sand/gravel and gravel projects" data
 - Land-use boundary, unless where shown or otherwise noted, shows approximate or inferred

- ROAD CLASSIFICATION**
- overburden thickness (ft.)
 - non/gravel resource thickness (ft.)
 - percent sand and fines (percent of gravel, 0-100%) (total extraction)
 - significant amount of fines (percent of gravel, 0-100%) (total extraction)
 - significant amount of decomposed or sand rock
 - significant amount of relative sandstone (percent)
 - unavaliable or unknown quantity
 - "S" in small circles unavaliable or unknown quantity



Courtesy modified after
Rold, J.W., 1977, Strategic map of the Morrison quadrangle, Jefferson County, Colorado. U.S. Geol. Survey Misc. Geol. Map 1-790-A.

See
Foster, C.L., 1972, Map showing potential resource areas for non-metallic mineral resources, Morrison quadrangle, Jefferson County, Colorado. U.S. Geol. Survey Misc. Geol. Map 1-790-B.

References
Frost, J.L., 1968, Quaternary geology of the Morrison quadrangle, Colorado. Min. Geologist, v. 1, no. 4.

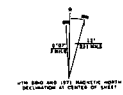
Imperial County Regional Planning Commission, 1966, Resource areas plan for the Imperial region - Part 1, Sand and gravel resources. Denver, Colo., Imperial County Reg. Plan. Comm. p. 1.

Hamilton, J.L., and Owen, W.C., 1972, Geologic resources, soils and related environmental problems, Denver, north-south area, Colorado. Colorado Geol. Survey Environmental Geology Report, 1, p. 1.

Chase, G.H., and McCannery, J.A., 1967, Generalized geologic map of the Denver area, Colorado. U.S. Geol. Survey Misc. Geol. Map 1-731.

Trumble, D.E., and Pfluh, H.R., 1974, Map showing potential resource areas of gravel and crushed-rock aggregate in the Greater Denver Area. Front Range Urban Corridor, Colo. D. T. P. Geol. Survey. Misc. Geol. Map 1-790-A.

Base from U. S. Geological Survey
7.5 minute quadrangle



- ROAD CLASSIFICATION**
- Light-duty
 - Unimproved dirt
 - U.S. Route
 - State Route

MORRISON, COLO.

Mapped by: Stephen D. Schwechler
Date: June 30, 1974

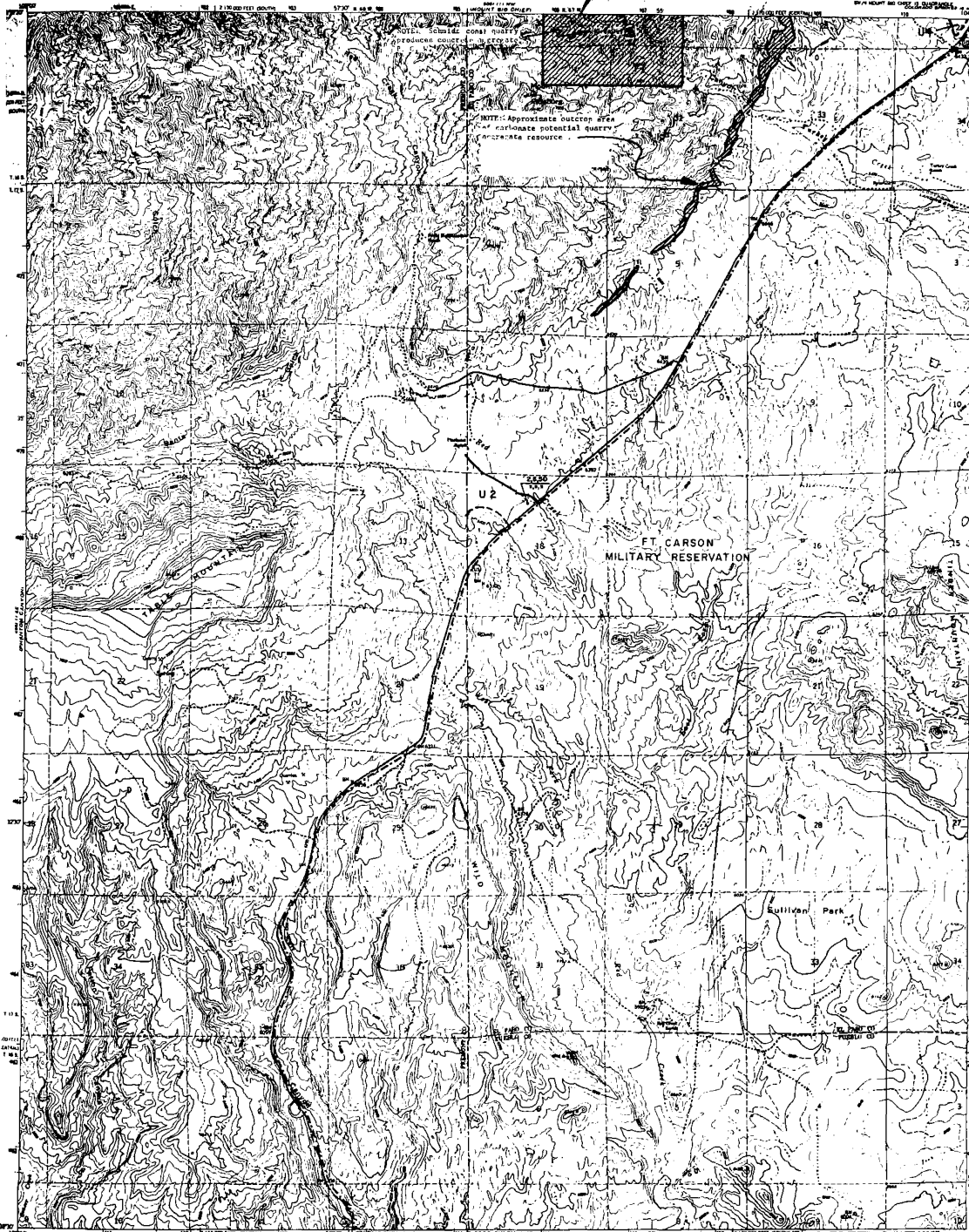
Prepared in cooperation with the
U. S. Geological Survey.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLLA, DIRECTOR

NOTE: Potential quarry aggregate resource areas of medium-grained to coarse-grained, F. C. G.

MOUNT PITTSBURGO QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
REVISED AND CORRECTED 1954



EXPLANATION

Landform unit
Resource classification

LANDFORM UNIT

- F Fluvial deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Non-deposited sand (colluvium)
- M Non-sand deposits (shale, siltstone, etc.)

RESOURCE CLASSIFICATION

- CORRELATION SYMBOLS**
(as listed on record on 84 survey, visual verification)
- 1 Gravel: relatively clean and coarse
 - 2 Gravel: variable fines, uncoarse rock, calcareous
- FIN SYMBOLS**
(except for 10' spacing 64 survey, 625' recorded on 210' survey, visual verification)
- 3 Sand
 - 4 Probable aggregate resource

MAP SYMBOLS

- Shaded area: gravel and/or sand pit
- A: Shaded area: sand and/or gravel pit
- Operating stone quarry
- Shaded area: quarry
- Potential quarry aggregate resource area
- Section well or drill-hole location with overall thickness (ft) over sand/gravel resource
- Thickness (ft), obtained from well logs
- "s" indicates gravel; "m" indicates sand
- "v" symbol denotes unclassified or unknown property
- "w" symbol denotes Colorado Geological Survey unclassified sand and gravel property
- Landform boundary, with where known or inferred; dashed where approximate or inferred

SECTION, LOCATION AND CORRELATION

- DESCRIPTION OF SYMBOLS**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Section sand and fines (spacing 64 survey, 625' or 645' visual verification)
 - Significant amount of fines (spacing 100 survey, 2,000' or 2,075' m)
 - Significant amount of decomposed or sand rock
 - Significant amount of calcareous sandstone (caliche)
 - "s" symbol denotes unclassified or unknown property
 - "m" symbol denotes property absent or unclassified

	Gravel and/or sand pit
	Sand and/or gravel pit
	Operating stone quarry
	Shaded area quarry
	Potential quarry aggregate resource area
	Section well or drill-hole location
	Thickness (ft) over sand/gravel resource
	Thickness (ft) obtained from well logs
	"s" indicates gravel
	"m" indicates sand
	"v" symbol denotes unclassified or unknown property
	"w" symbol denotes Colorado Geological Survey unclassified sand and gravel property
	Landform boundary, with where known or inferred; dashed where approximate or inferred

- QUADRANGLE LOCATION
- NON-RESOURCE OR METAMORPHIC AREA

REFERENCE:

McLaughlin, R.P., 1947, Pennsylvania stratigraphy of Colorado Springs quadrangle: Am. Assoc. Petroleum Geol. Bull. v. 31, p. 1936-1981.

Finley, G.I., 1916, Colorado Springs Folio, Colorado: U.S. Geol. Survey Folio no. 203.

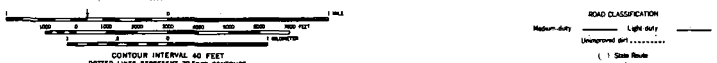
Geology Modified after:
Sierra, J.C., 1951, Structural geology of the eastern flank of the southern Front Range, Colorado: University of Colorado Ph.D. Thesis, 121 p., 3 pls.

Mapped by: Phillip C. Wickless
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 30-FOOT CONTOURS
GATHIN @ MEAN SEA LEVEL

FOR DATA AND 1960 SURVEY DATA
INFORMATION OF SOURCE OF DATA



ROAD CLASSIFICATION

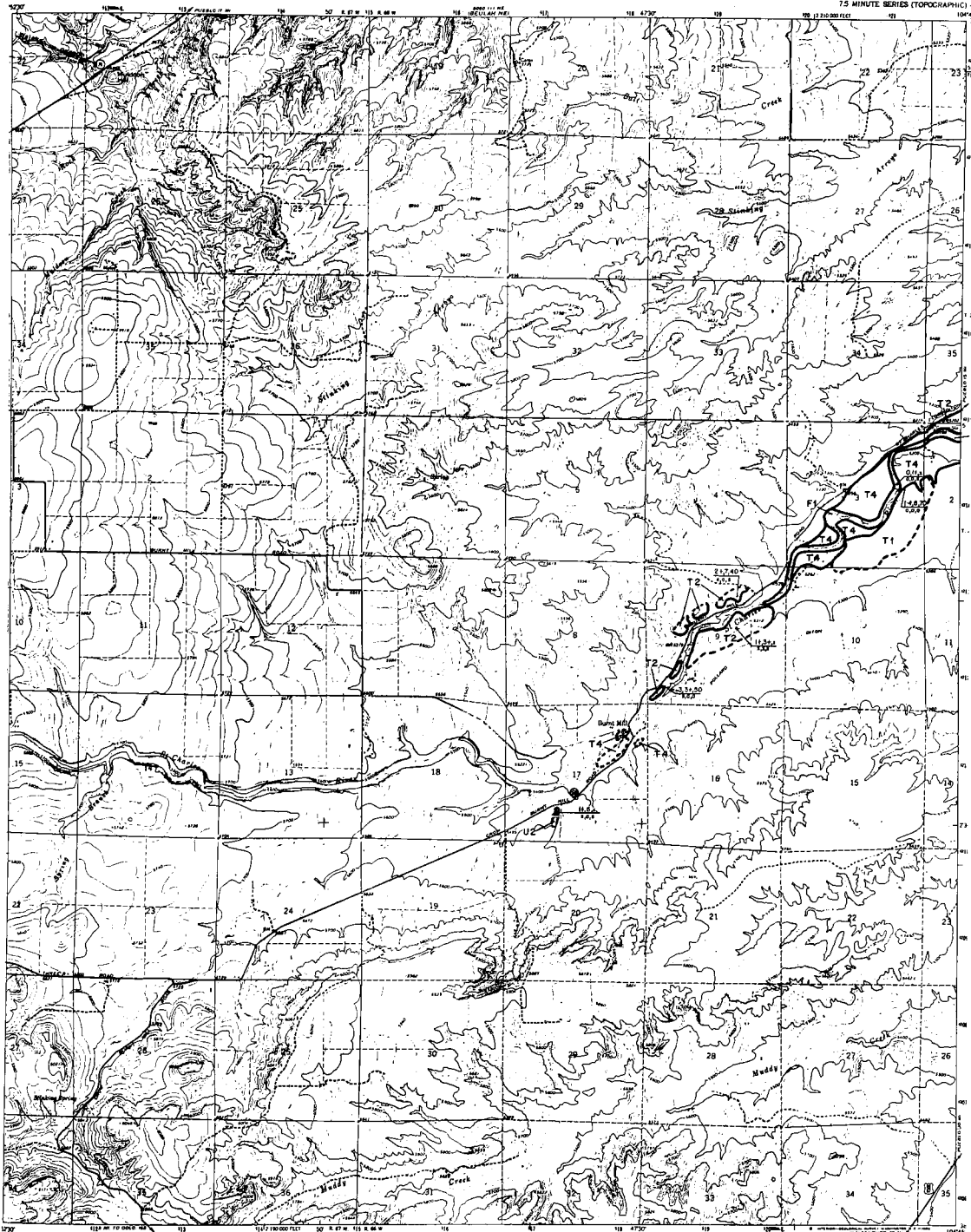
- Major-duty
- Light duty
- Unimproved dirt
- State Route

MOUNT PITTSBURGO, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

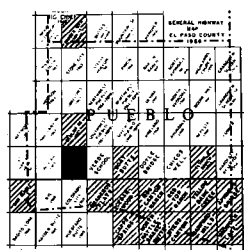
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. KOLA, DIRECTOR

MULDON HILL QUADRANGLE
COLORADO—PUEBLO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

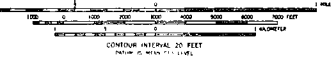
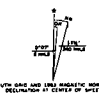
- Landform unit
- Resource classification
- LANDFORM UNITS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Manmade deposits (landfill, etc.)
- RESOURCE CLASSIFICATION**
 - 1 **Gravel** (Percent gravel 75, passing 48 screen, 40% retained on #200 screen, visual estimation)
 - 2 **Gravel** (relatively clean and sound)
 - 3 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 4 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 5 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 6 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 7 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 8 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 9 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 10 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 11 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 12 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 13 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 14 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 15 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 16 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 17 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 18 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 19 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 20 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 21 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 22 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 23 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 24 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 25 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 26 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 27 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 28 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 29 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 30 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 31 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 32 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 33 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 34 **Gravel** (significant fines, unconsolidated, calcium carbonate)
 - 35 **Gravel** (significant fines, unconsolidated, calcium carbonate)
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Blindfold well or drilled location with uncertain thickness (ft) over sand/gravel resource
 - Blindfold well or drilled location with uncertain thickness (ft) over sand/gravel resource
 - "s" indicates gravel, "g" indicates sand
 - "u" in symbol denotes unconsolidated or unknown property
 - "m" American Colorado Geological Survey boundary lines and ground projects
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- FRATTION, LOCATION AND ORIENTATIONAL INDICATION OF SYMBOL**
 - overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (ignoring 48 screen, 2.0 to 2.0 mm)
 - right/float amount of decomposed or weak rock
 - right/float amount of coarse carbonates (matrix)
 - right/float amount of coarse carbonates (matrix)
 - "u" in symbol denotes unconsolidated or unknown property
 - "m" in symbol denotes property shown or unproven



QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Ralph R. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



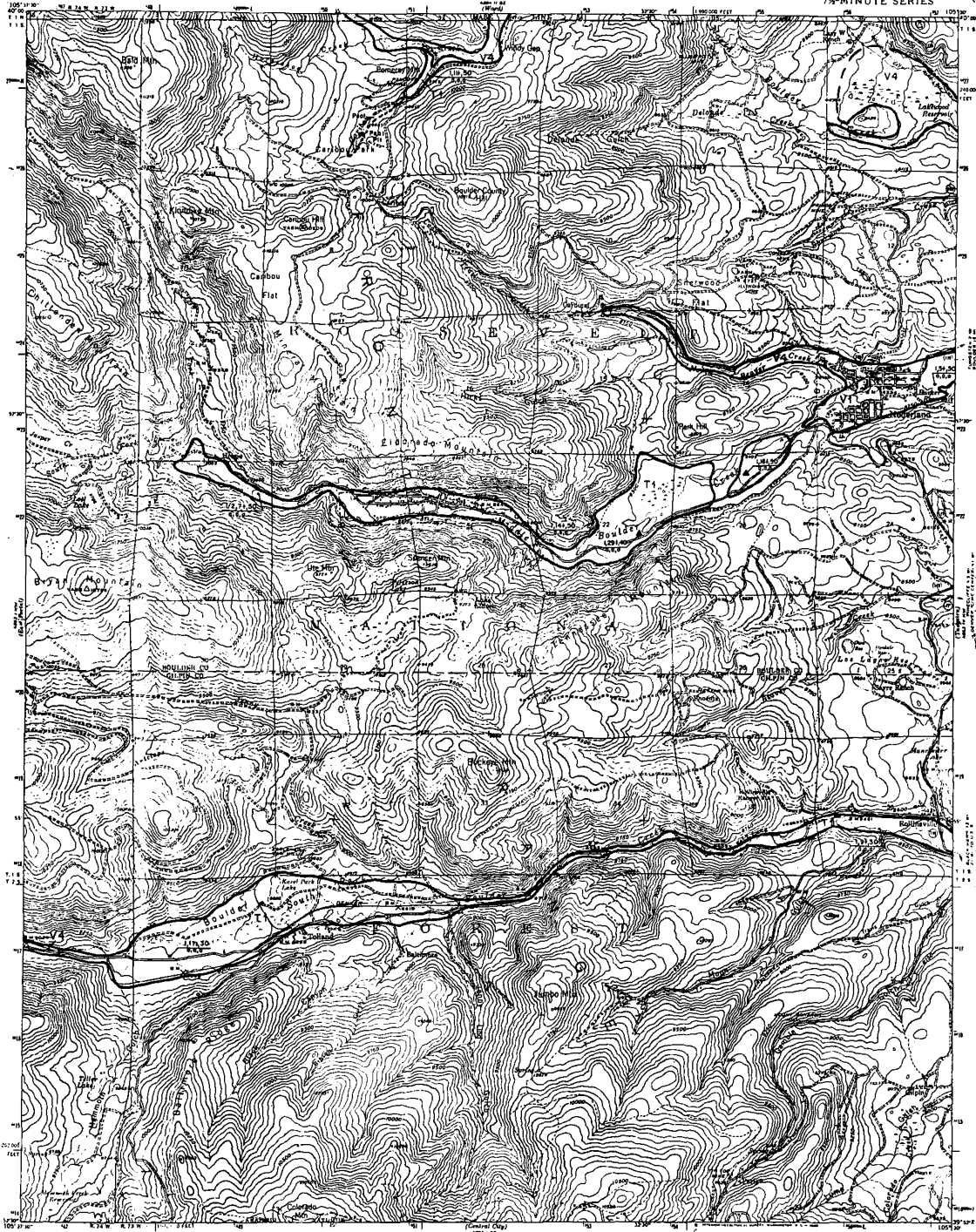
ROAD CLASSIFICATION
 Heavy-duty ——— Light-duty ———
 Medium-duty - - - - - Unimproved dirt
 U.S. Route State Route

MULDON HILL, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

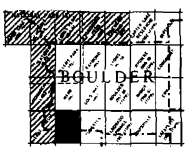
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR

COLORADO
NEDERLAND QUADRANGLE
7 1/2-MINUTE SERIES



EXPLANATION

- Legend**
- Landform Unit**
 R Fluvialite deposit
 T Stream terrace deposit
 V Valley fill (F & T)
 U Upland deposit
 A Alluvial fan
 E Eolian-deposited sand (eolian)
 M Man-made deposits (slag, tailings, opaline...)
- Resource Classification**
- Coarse Aggregate**
 1 Gravel: relatively clean and sound
 2 Gravel: silty/clayey fines, decomposed rock, solution cutthroat
Fine Aggregate
 3 Sand
 4 Probable aggregate resource
- Quarry Status**
- Operating gravel and/or sand pit**
Abandoned gravel and/or sand pit
Operating stone quarry
Abandoned stone quarry
 Potential quarry aggregate resource area
 Selected well or drill-hole location with over-
 burd thickness (ft) and sand/gravel resource
 thickness (ft), obtained from well log
 "M" indicates gravel; "S" indicates sand
 "A" in symbol denotes unconsolidated or
 unknown property
 "W" denotes Colorado Geological Survey
 drilled/flow and gravel fracture
 1/2 mile
 Landform boundary, solid where known or
 dashed where approximate or
 indicated
- STATION LOCATION AND GEOLOGICAL
DESCRIPTION OF DEPOSIT**
- contour (thickness ft)
 sand/gravel resource thickness (ft)
 gravel and fine (coarse ft
 coarse, 0.30 to 1, visual estimation
 Significant amount of fines (greater
 than 20% of total) or less than
 significant amount of silty/clayey material
 or unique property
 "M" in symbol denotes unconsolidated or
 unknown property
 "A" in symbol denotes properly placed or
 impure/loose

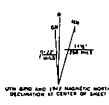


QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
 Gable, D. J., 1959,
 U. S. Geol. Survey Geol.
 Quad Map GQ-833.

Mapped by: Ralph B. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey
 7 1/2 minute quadrangle



Contour Interval 40 feet
 Datum is mean sea level

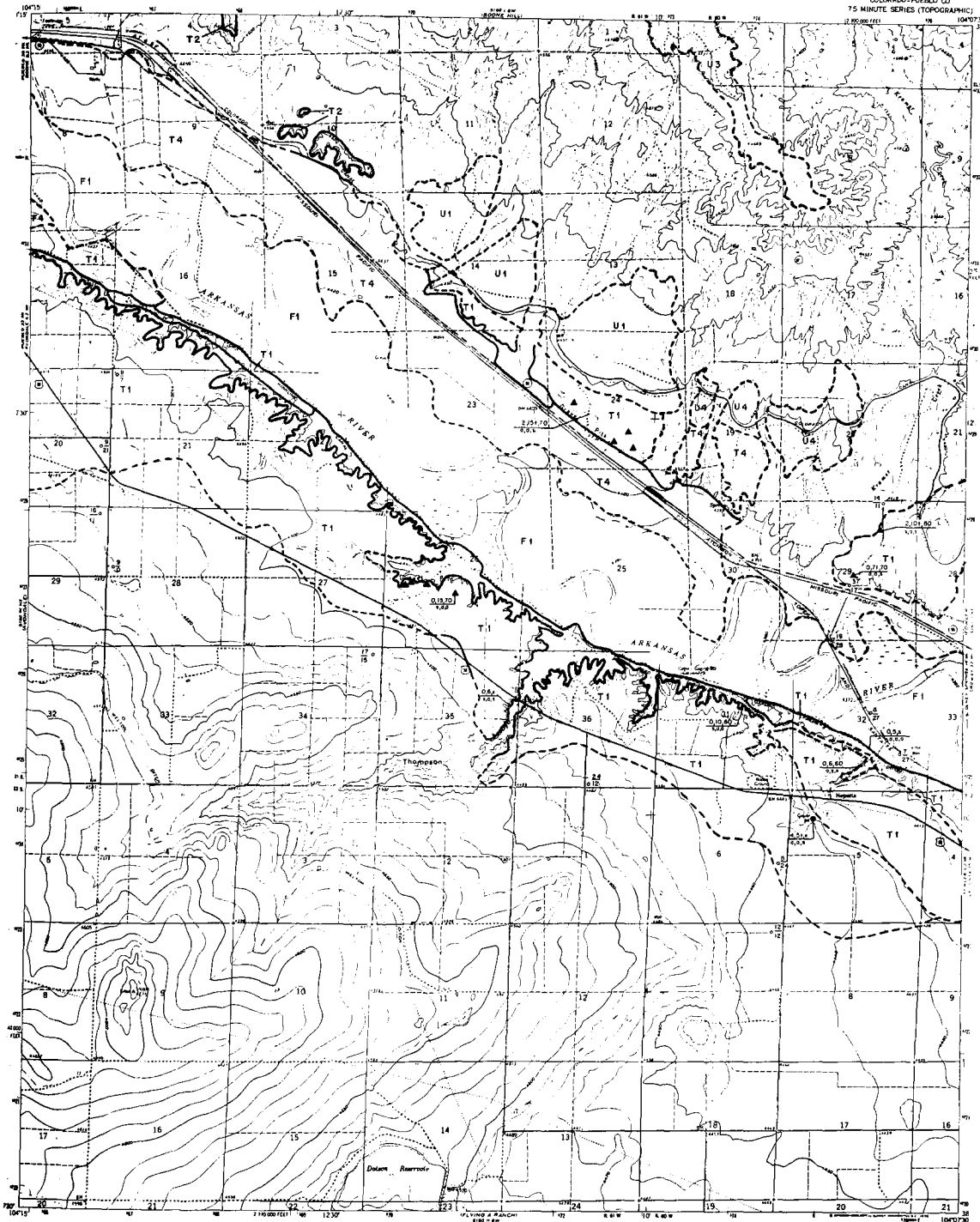
ROAD CLASSIFICATION
 Main-daily
 Light-duty
 Unimproved dirt
 State Route

NEDERLAND, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

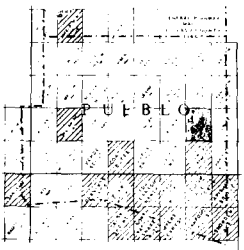
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLT, DIRECTOR

NEPESTA QUADRANGLE
COLORADO-HUEBLO CO.
75 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

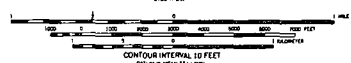
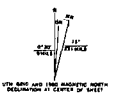
- Landform Classification**
- LANDFORM UNITS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Miscellaneous (lake, talus, spalls, etc.)
- RESOURCE CLASSIFICATION**
- COARSE AGGREGATE**
Not listed for material in 48 inches, or less, diameter
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, deteriorated rock, talus, talus, etc.
 - 3 Sand
- Reclassified Aggregate**
- 4 Probable aggregate resource
- USE SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Abandoned stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource
 - Existing well or discharge location (with name)
 - Surface discharge (fill over sand and gravel)
 - Discharge (fill) obtained from pit, top
 - "L" indicates gravel; "S" indicates sand
 - "L" symbol denotes unutilized or unknown property
 - "S" denotes Colorado Geological Survey (landfilled and gravel "fill" pits)
 - Landform boundary, with name shown or observed; shaded areas represent or indicate
- OTHER LOCATIONS AND FEATURES**
- DESCRIPTION OF SYMBOLS**
- Mountain (hatched)
 - Alluvial fan (hatched)
 - Stream (solid and flow, contour as shown, 1:1 to 1:100 scale)
 - Significant amount of fine (grading 1000 screens or finer) sand and gravel
 - "L" symbol denotes unutilized or unknown property
 - "S" symbol denotes unutilized or unknown property
 - "L" symbol denotes unutilized or unknown property



□ QUADRANGLE LOCATION
□ NON-RESOURCES USE WITHIN AREA

Mapped by: Stephen D. Schwoebel
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

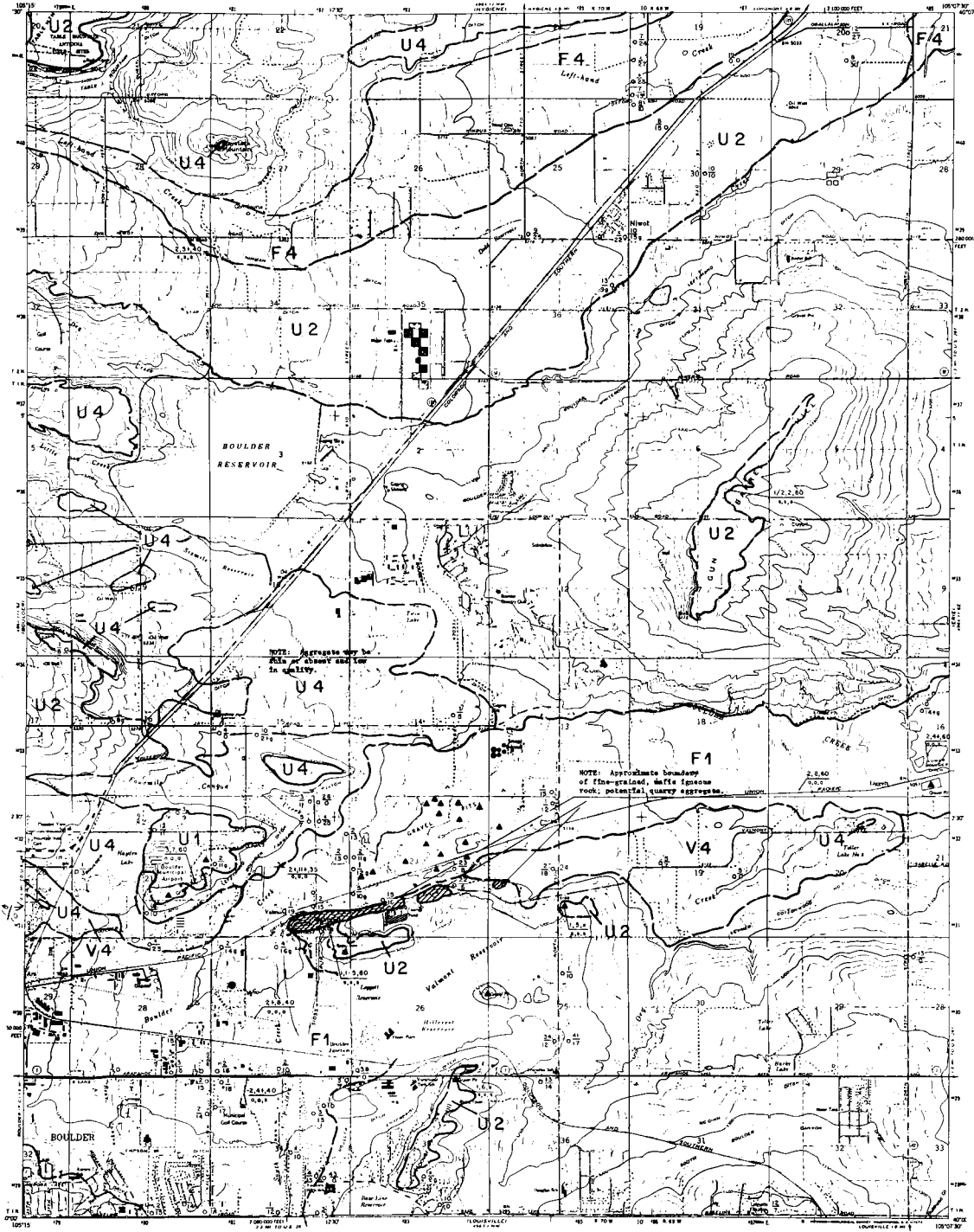
- Heavy duty
- Light duty
- Medium duty
- Unimproved dirt
- U.S. Route
- State Route

NEPESTA, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

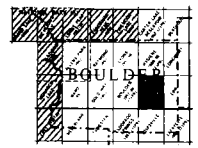
NIWOT QUADRANGLE
COLORADO - BOULDER CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. BOUDA, DIRECTOR



EXPLANATION

- CONTOUR DATA**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - M Man-made deposit (landfill)
 - E Erosion deposit (landfill, debris, ...)
- RESOURCE CLASSIFICATION**
- CRUSHED ROCK**
(as shown on 1:25,000 scale map)
- 1 Gravel: primarily clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- FINE SANDS**
(shown on 1:25,000 scale map)
- 1 Sand: 100% passing 40 sieve, 60% retained on 200 sieve, natural occurrence
 - 2 Sand: 100% passing 40 sieve, 60% retained on 200 sieve, natural occurrence
 - 3 Sand: 100% passing 40 sieve, 60% retained on 200 sieve, natural occurrence
- PROBABLE AGGREGATE RESOURCES**
- OPERATING AND POTENTIAL QUARRIES**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- LANDFORM BOUNDARIES**
(shown on 1:25,000 scale map)
- Landform boundary, solid where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND CORRELATION INFORMATION OF BOUNDARIES**
- contour interval (ft)
 - landform resource thickness (ft)
 - potential sand and fines (passing 40 sieve, 60% or 100% retained on 200 sieve)
 - significant amount of fines (passing 100 sieve, 0.075 in. or 0.075 in.)
 - significant amount of decomposed or weak rock
 - significant amount of solution carbonate (outside)
 - * in special deposit (unconsolidated or unknown property)
 - ** in special deposit (primary deposit or high-purity)

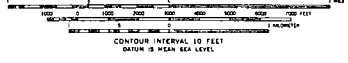


QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after: Colton, R.S., and Piteh, U.S.G.S., 1976, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Oreley Area, Front Range Urban Corridor, Colorado; U.S. Geol. Survey Map I-855 D.

Mapped by: Ralph R. Shroba
Date: June 30, 1976
Prepared in cooperation with the U.S. Geological Survey.

Base from U.S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

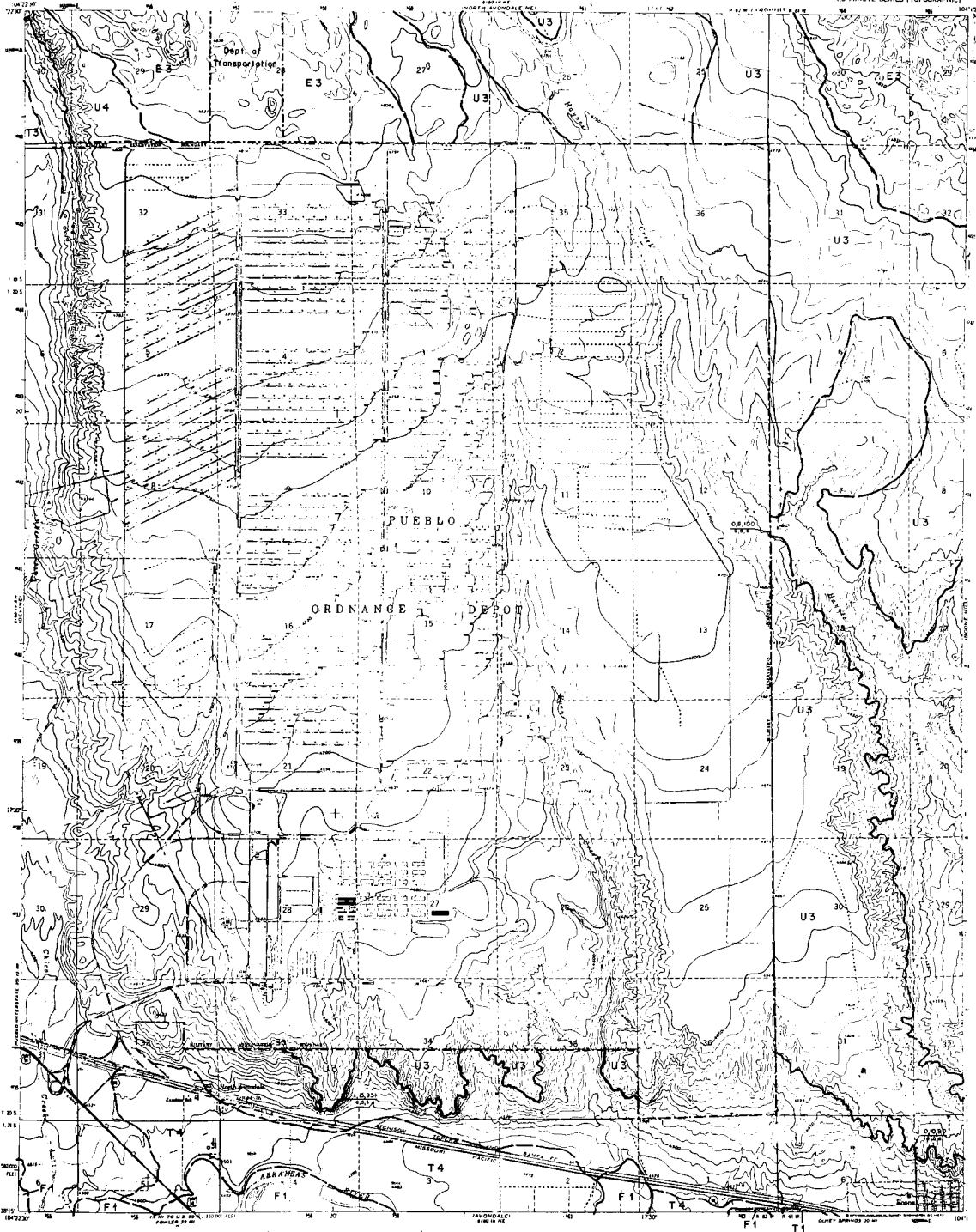
- Heavy-duty
- Light-duty
- Medium-duty
- Unimproved dirt
- State Road

NIWOT, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

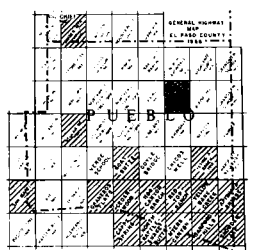
NORTH AVONDALE QUADRANGLE
COLORADO, PUEBLO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. POLK, DIRECTOR



EXPLANATION

- Landform Unit**
Resource Classification
- LANDFORM UNIT**
- F Fluvialite deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Marine deposit (clay, siltstone, sandstone, ...)
- RESOURCE CLASSIFICATION**
- Gravel Aggregate**
at least 20% retained on #10 screen, 60% retained on #20 screen, visual estimation
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed int. medium hardness
 - 3 Sand
- Fine Aggregate**
greater than 75% passing #10 screen, 60% retained on #20 screen, visual estimation
- Probable aggregate resource**
- USE SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs
 - "a" indicates gravel; "s" indicates sand
 - "L" is symbol denoting unconsolidated or unknown property
 - "M" denotes Colorado Geological Survey "Mined and Gravel Products" #111 hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATUS, LOCATION AND ORIENTATION**
- OVERBURDEN THICKNESS (ft)**
- solid: gravel resource thickness (ft)
 - arrows: sand and fines (passing #10 screen, > 2.0 ft), visual estimation
 - arrows, 0-25 (in.), visual estimation
- SIGNIFICANT AMOUNT OF FINE (PASSING #10 SCREEN, > 2.0 FT)**
- SIGNIFICANT AMOUNT OF SAND/AND OR SILT**
- SIGNIFICANT AMOUNT OF SOLID MEDIUM HARDNESS**
- "L" IS SYMBOL DENOTING UNCONSOLIDATED OR UNKNOWN PROPERTY**
- "M" DENOTES COLORADO GEOLOGICAL SURVEY "MINED AND GRAVEL PRODUCTS" #111 HOLE**
- LANDFORM BOUNDARY, SOLID WHERE KNOWN OR OBSERVED, DASHED WHERE APPROXIMATE OR INFERRRED**



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schwach
Date: June 30, 1974

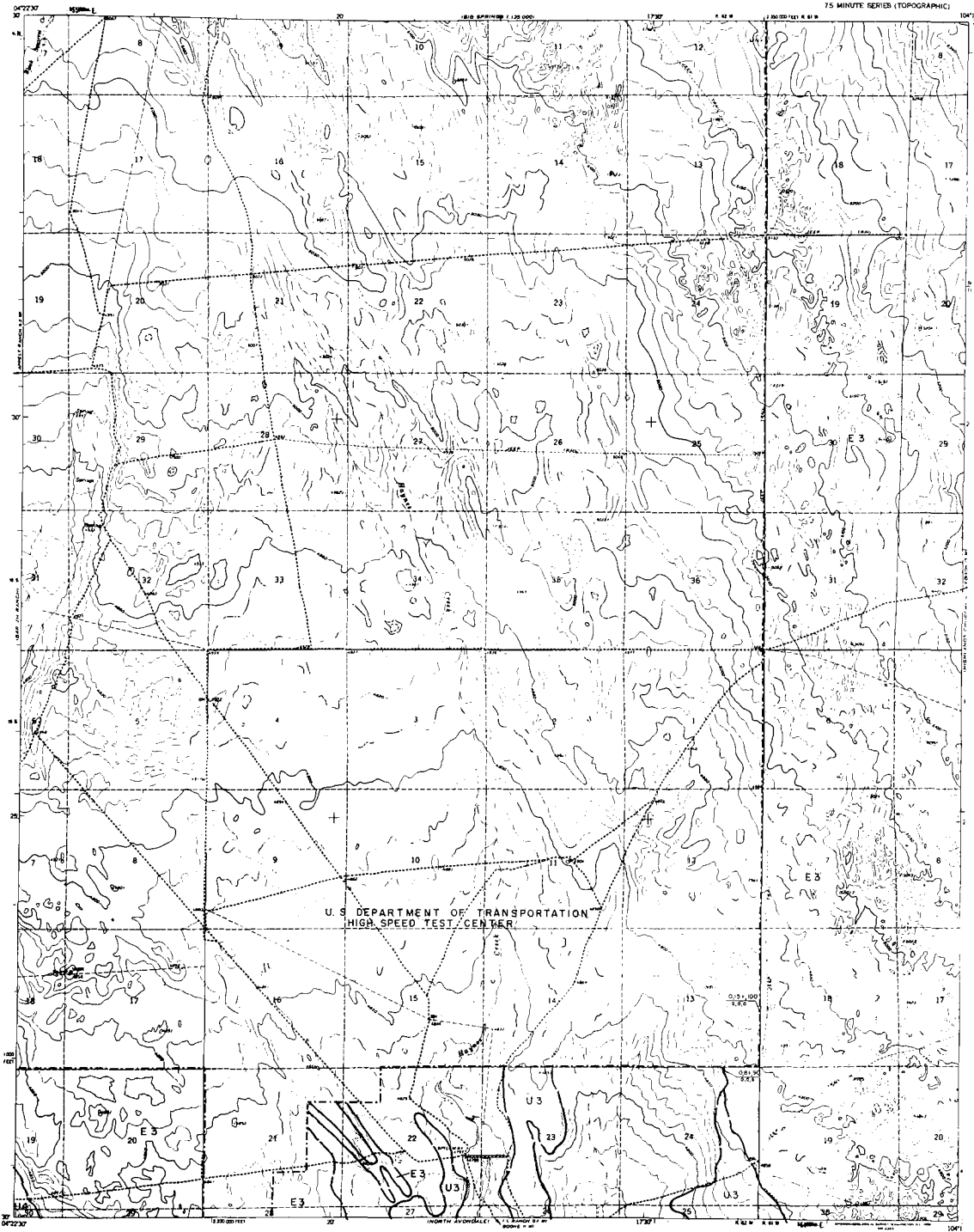


NORTH AVONDALE, COLO

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

NORTH AVONDALE NE QUADRANGLE
COLORADO-PUEBLO CO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR



EXPLANATION

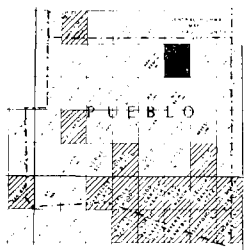
Contour lines
Elevation class/contour

- LANDFORMS**
- F Fluvial deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag tailings, spoil, ...)

- RESOURCE CLASSIFICATION**
- Coarse Materials**
(as listed) are related to the amount of sand/silt/clay
- 1 Gravel: relatively clean and rounded
 - 2 Gravel: significant fines, unrounded rock, angular particles
- Fine Materials**
(listed) are 75 passing #4 screen, 100 retained on #100 screen, usual designation
- 3 Sand
 - 4 Probable aggregate resource

- USE SYMBOLS**
- Overlying gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Overlying river quarry
 - Abandoned river quarry
 - Revealed quarry aggregate resource area
 - Revealed well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), indicated from well logs: "m" (metastatic gravel), "s" (metastatic sand), "u" (unconsolidated sandstone) or "u" (unconsolidated sandstone)
 - "m" American Colorado Geological Survey boundary (sand and gravel projects)
 - Grill hole
 - Landform boundary, solid where known or observed, dashed where approximated or inferred

- PLACING, LOCATION AND DIMENSIONAL SPECIFICATION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (percent #4 screen, 0.075 in.), usual designation
 - significant amount of fines (percent #100 screen, 0.0075 in. or 0.075 mm.)
 - significant amount of medium coarse sand (percent #40 screen, 0.425 mm.)
 - "u" in symbol denotes unconsolidated or common property
 - "m" in symbol denotes property owned or leased



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION
Unimproved rd

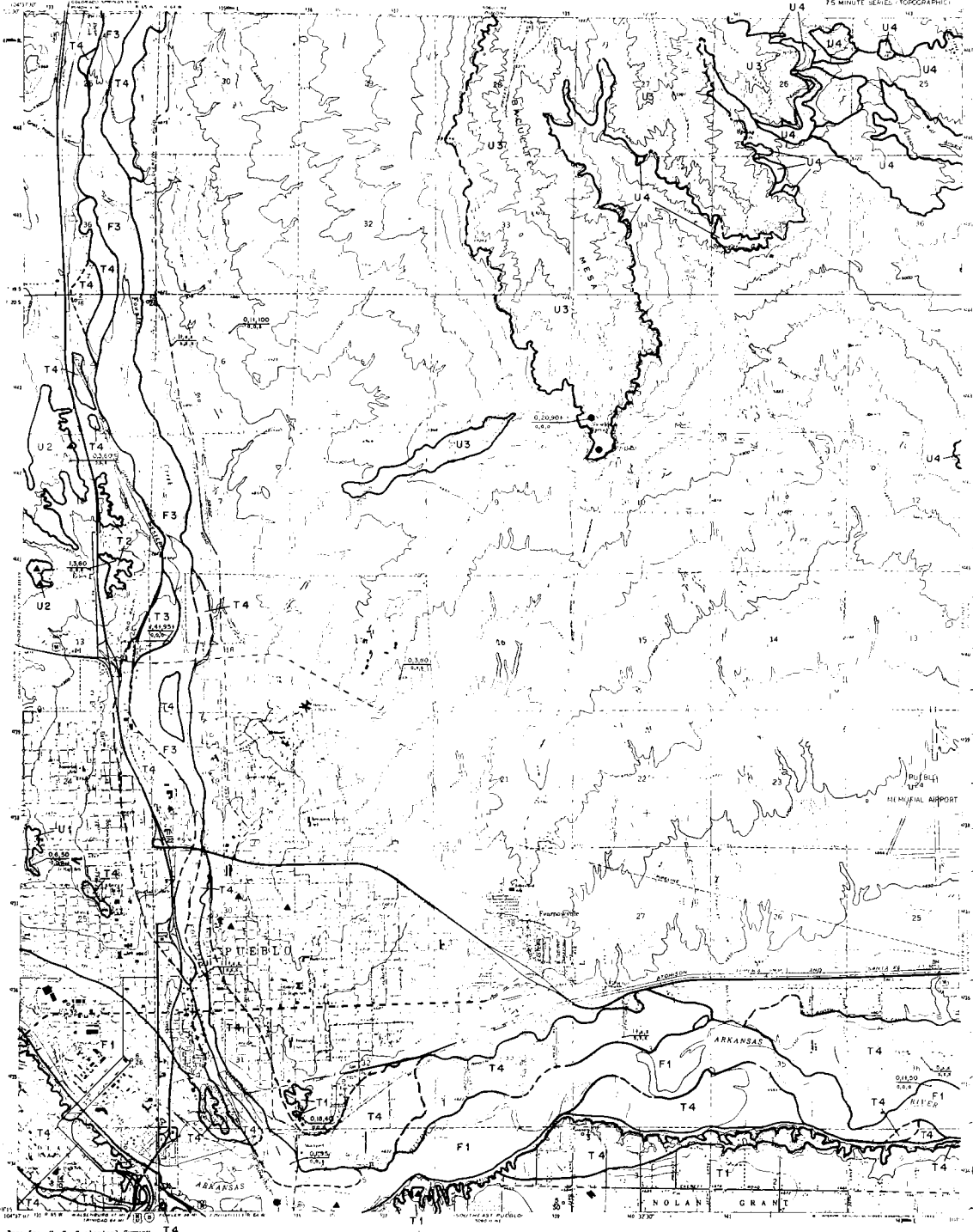
NORTH AVONDALE NE, COLO.

Mapped by: Stephen D. Schwachow
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

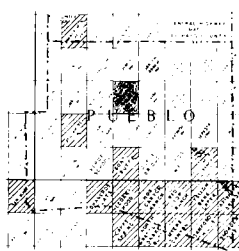
NORTHEAST PUEBLO QUADRANGLE
COLORADO GEOLOGICAL SURVEY
7.5 MINUTE SERIES: TOPOGRAPHIC



DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR



EXPLANATION

- CONTOUR UNIT**
 --- Elevation
 --- Resource classification
- LETTER CODES**
 F Floodplain deposit
 T River terrace deposit
 V Valley fill (B & T)
 U Upland deposit
 A Alluvial fan
 E Wind-deposited sand (eolian)
 M Marine deposits (clastic, siltstone...)
- RESOURCE CLASSIFICATION**
 1 Good deposits
 2 Fair deposits
 3 Poor deposits
 4 Probable aggregate resource
- MAP SYMBOLS**
 * Operating gravel and/or sand pit
 * Abandoned gravel and/or sand pit
 * Operating stone quarry
 * Abandoned stone quarry
 * Potential quarry aggregate resource area
 * Station well or drill hole location with resource thickness (ft) from sand/gravel resource thickness (F3), obtained from well logs
 * Station area: "F" indicates sand
 * "U" symbol denotes unconsolidated or alluvial deposits
 * "M" denotes Colorado Geological Survey studies (sand and gravel projects)
 * "L" indicates lead/zinc boundary, which shows home or interest. Actual show appearance as inferred.
- STATION, LOCATION AND ORIENTATIONAL INFORMATION**
 * Station number (F3)
 * Sand/gravel resource thickness (F3)
 * Station sand and fines (spacing #)
 * Station, 0.25 to 0.5 mile orientation
 * Significant amount of fines (spacing #)
 * Significant amount of sand and fines (spacing #)
 * Significant amount of siltstone (siltstone)
 * "U" symbol denotes unconsolidated or alluvial deposits
 * "M" symbol denotes property about or abandoned



 QUADRANGLE
 NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, J. R., 1964, U. S. Geol. Surv. map 408.

Mapped by: Phillip C. Wickline
 Date: June 30, 1974

Based from U. S. Geological Survey 7-1/2 minute quadrangle

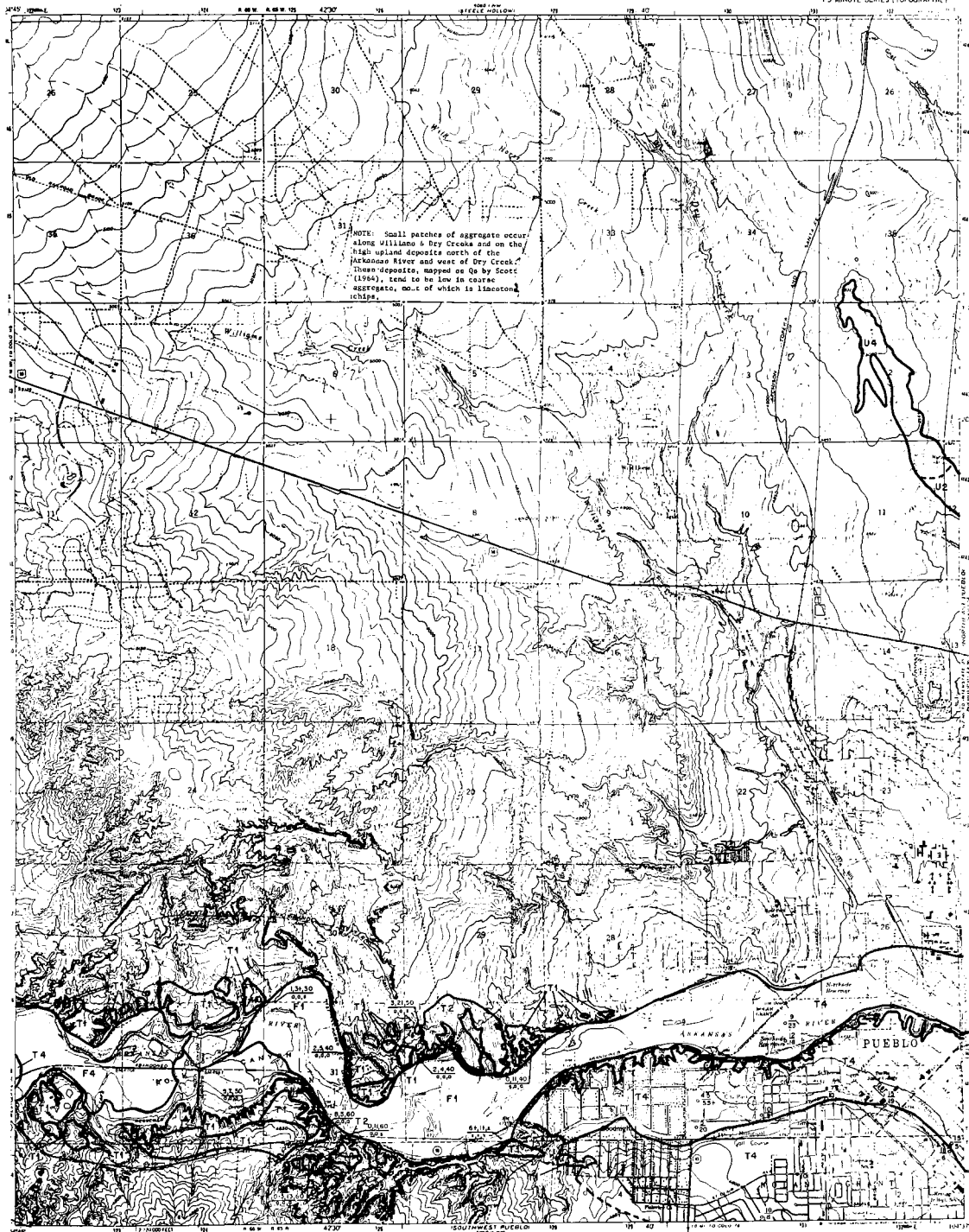


NORTHEAST PUEBLO COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

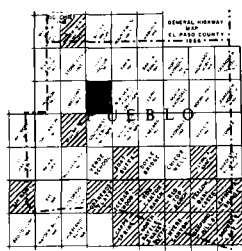
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. BOGA, DIRECTOR

NORTHWEST PUEBLO QUADRANGLE
COLORADO - PUEBLO CO.
75 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Landscape units**
Resource classification
- AGGREGATE UNIT**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (landfill, waste, etc.)
- AGGREGATE CLASSIFICATION**
- 1st QUANTIFICATION**
Based on 1960 survey, 1:50,000 scale
- 1 Overall: relatively clean and small
 - 2 Overall: significant fines, unconsolidated, calcareous
- 2nd QUANTIFICATION**
Based on 1960 survey, 1:50,000 scale
- 3 Sand
 - 4 Fractured aggregate resources
- AGGREGATE CLASSIFICATION**
- a Operating gravel and/or sand pit
 - b Abandoned gravel and/or sand pit
 - c Operating stone quarry
 - d Abandoned stone quarry
 - e Potential quarry aggregate resource area
- AGGREGATE CLASSIFICATION**
- 1a Selected well or drill-hole locations with upper bedrock thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - 1b Indication general "X" indicates sand
 - 1c In symbol denotes unconsolidated or medium property
 - 1d In symbol denotes Geological Survey "Sand and Gravel Project" well hole
 - 1e Limestone boundary, solid where known or observed, dashed where appearance is inferred.
- PLATEAU LOCATION AND ORIENTATIONAL INDICATOR**
- 1a Overall: resource thickness (ft)
 - 1b Overall: sand and fines (ft) (ft) (ft)
 - 1c Overall: sand and fines (ft) (ft) (ft)
 - 1d Overall: sand and fines (ft) (ft) (ft)
 - 1e Overall: sand and fines (ft) (ft) (ft)
 - 1f Overall: sand and fines (ft) (ft) (ft)
 - 1g Overall: sand and fines (ft) (ft) (ft)
 - 1h Overall: sand and fines (ft) (ft) (ft)
 - 1i Overall: sand and fines (ft) (ft) (ft)
 - 1j Overall: sand and fines (ft) (ft) (ft)
 - 1k Overall: sand and fines (ft) (ft) (ft)
 - 1l Overall: sand and fines (ft) (ft) (ft)
 - 1m Overall: sand and fines (ft) (ft) (ft)
 - 1n Overall: sand and fines (ft) (ft) (ft)
 - 1o Overall: sand and fines (ft) (ft) (ft)
 - 1p Overall: sand and fines (ft) (ft) (ft)
 - 1q Overall: sand and fines (ft) (ft) (ft)
 - 1r Overall: sand and fines (ft) (ft) (ft)
 - 1s Overall: sand and fines (ft) (ft) (ft)
 - 1t Overall: sand and fines (ft) (ft) (ft)
 - 1u Overall: sand and fines (ft) (ft) (ft)
 - 1v Overall: sand and fines (ft) (ft) (ft)
 - 1w Overall: sand and fines (ft) (ft) (ft)
 - 1x Overall: sand and fines (ft) (ft) (ft)
 - 1y Overall: sand and fines (ft) (ft) (ft)
 - 1z Overall: sand and fines (ft) (ft) (ft)

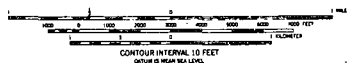


■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, G. R., 1964, U. S. Geological Survey Map I-408.

Mapped by: Ralph R. Shroba
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

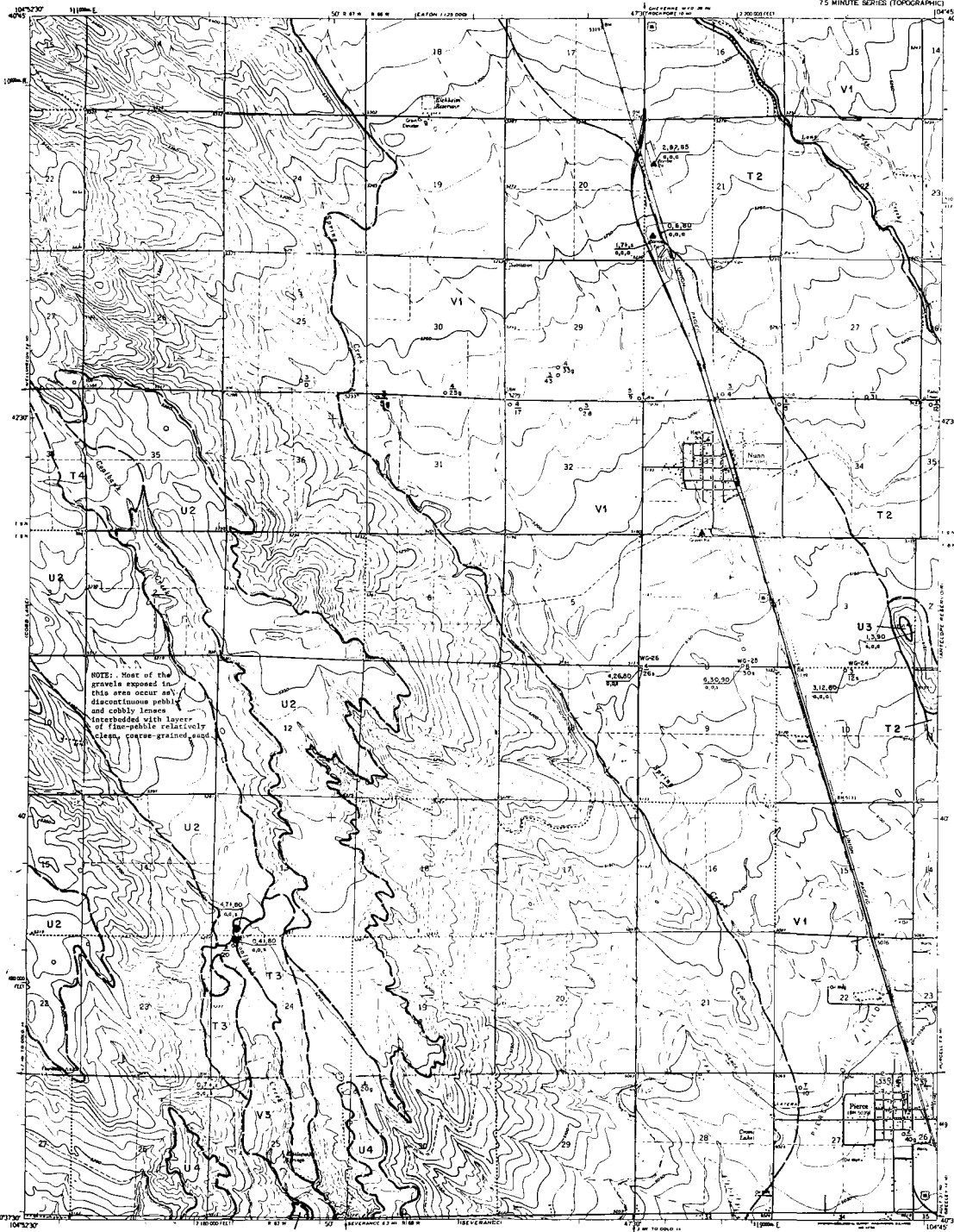
- Heavy duty
- Light duty
- Medium duty
- Unimproved det.
- U.S. Route
- State Road

NORTHWEST PUEBLO, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

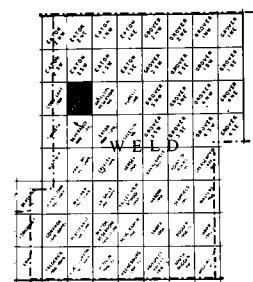
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. WELLS, DIRECTOR

NUNN QUADRANGLE
COLORADO: WELD CO.
75 MINUTE, SERIES (TOPOGRAPHIC)



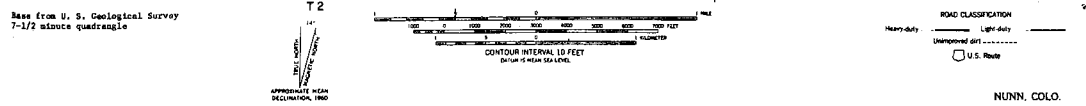
EXPLANATION

- Landform unit**
 - Same as classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Inter-deposited sand (alluvial)
 - M Sandstone deposit (e.g., colluvium, spolia, etc.)
- RESOURCE CLASSIFICATION**
- Coarse aggregate**
 of 200 mesh or larger, 100% sandstone
- 1 Coarse aggregate - clean and sound
 - 2 Coarse aggregate - class, decomposed rock, or calcareous
- Fine aggregate**
 (greater than 10 passing 40 screen, 80% retained on #200 screen, official definition)
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource with selected soil or fill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "a" indicates gravel; "s" indicates sand
 - "c" or "m" denotes unconsolidated or unknown property.
 - "W" denotes Colorado Geological Survey unconsolidated and coarse aggregate fill-hole boundary, valid where known or assumed; Central where approximate or tentative.
- QUALITY, QUANTITY AND GEOLOGICAL DESCRIPTION OF SANDS**
- Overburden thickness (ft)
 - Estimated resource thickness (ft)
 - Current sand and fines (percent of screen, 20-200 mesh, official definition)
 - Significant amount of fines (greater than 200 screen, 0.075 in. or 0.075 mm)
 - Significant amount of decomposed or weak rock.
 - Significant amount of calcareous material
 - "a" or "s" symbol denotes unconsolidated or unknown property.
 - "c" or "m" symbol denotes properly obtained or unobtainable.



QUADRANGLE LOCATION
 NON-RESOURCE OR VETERINARY AREA

Mapped by: Stephen D. Schwabow
 Date: June 30, 1974

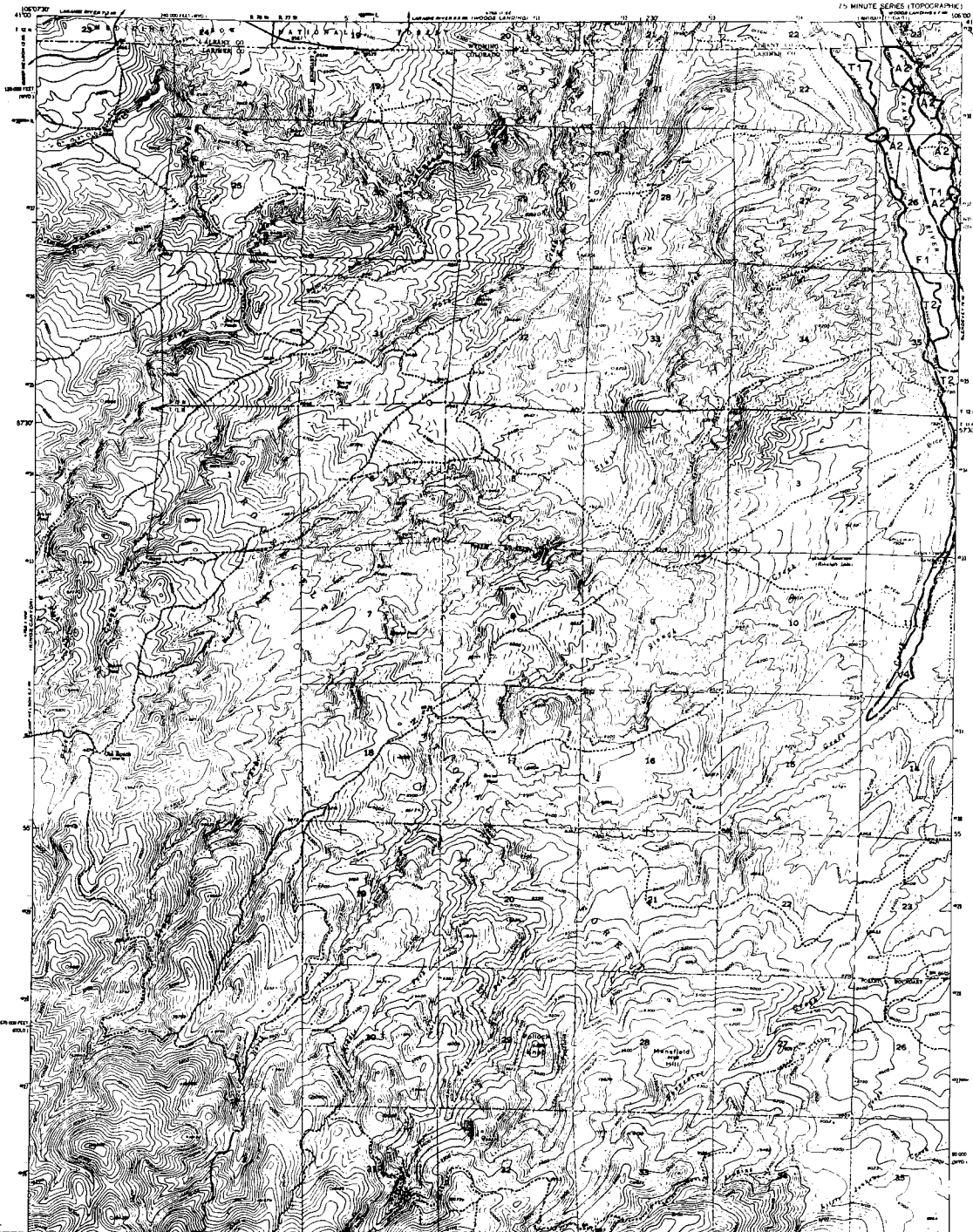


NUNN, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

OLD ROACH QUADRANGLE
COLORADO, WYOMING
7 1/2 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLL, DIRECTOR



EXPLANATION

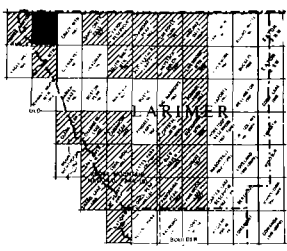
Landform units
Resource classification

- LANDFORM UNITS**
- F Floodplain deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland terrace
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Nonmarine deposit (along-talweg spalls...)

- RESOURCE CLASSIFICATION**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, surface carbonates
 - 3 Sand
 - 4 Probable aggregate resource

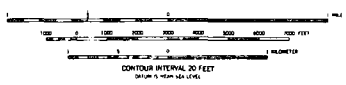
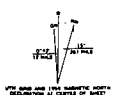
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with elevation (shaded) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource
 - "L" in symbol denotes unventilated or shallow pits
 - "W" denotes Colorado Geological Survey "Underfoot and Gravel" projects
 - Drill hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred

- STATION, LOCATION AND GEOLOGICAL INTERPRETATION OF SYMBOLS**
- shaded diamond (1/2 inch diameter) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource
 - shaded square (1/2 inch diameter) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource
 - shaded circle (1/2 inch diameter) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource
 - shaded triangle (1/2 inch diameter) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource
 - shaded diamond (1/2 inch diameter) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource
 - shaded square (1/2 inch diameter) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource
 - shaded circle (1/2 inch diameter) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource
 - shaded triangle (1/2 inch diameter) (1/2 inch diameter) resource (shaded) (1/2 inch diameter) resource



QUADRANGLE LOCATION
NON-RESOURCE OR WETDRY AREA

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION
Light duty
Medium duty
Unimproved dirt

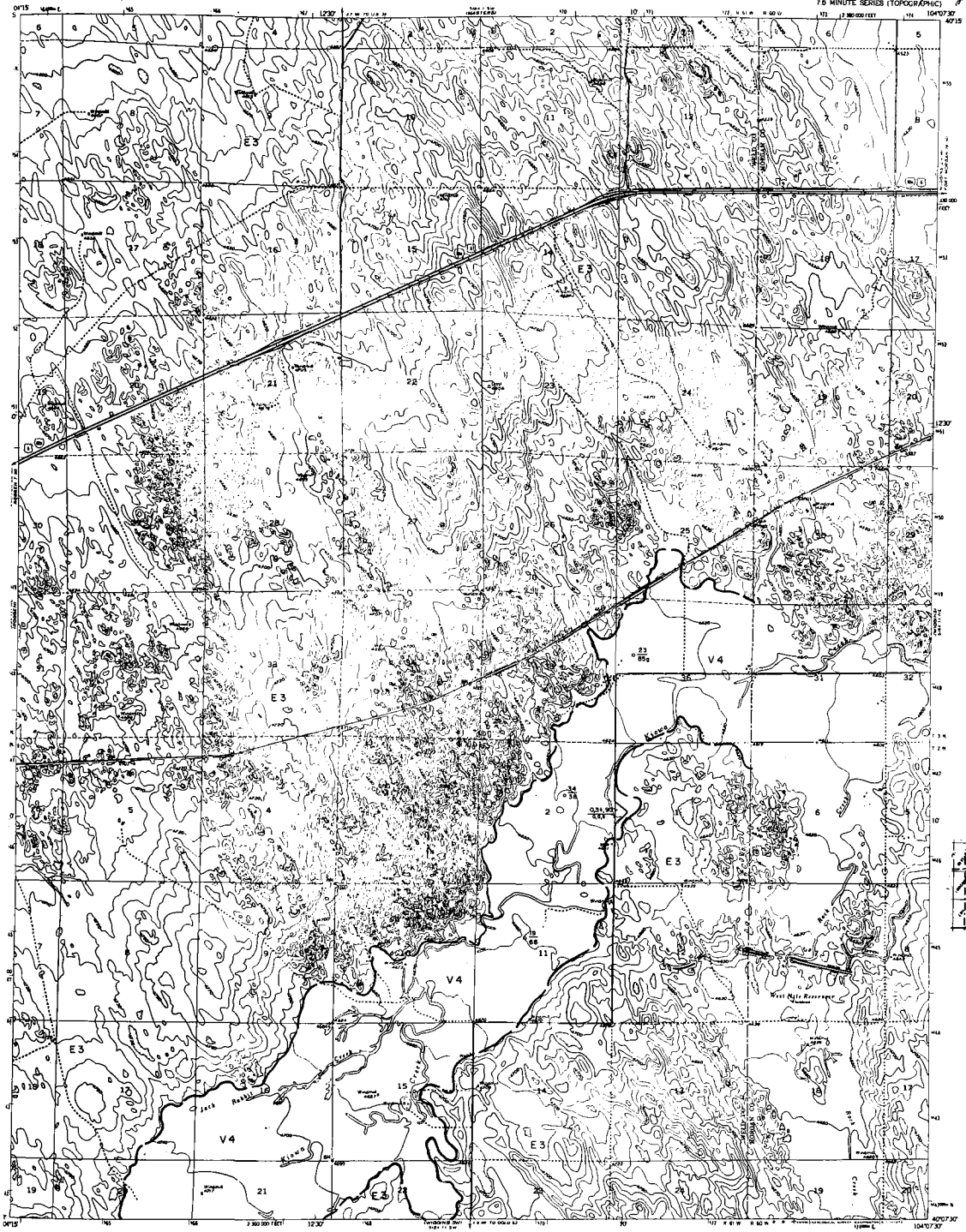
OLD ROACH, COLO. - W 10

Mapped by: Stephen B. Schochov
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLO, DIRECTOR

OMAR QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (tailings, spoils, ...)
- RESOURCE CLASSIFICATION**
- Gravel**
1 Gravel: relatively clean and sound
2 Gravel: significant fines, decomposed rock, calcareous content
- Sand**
1 Sand
- Unconsolidated Aggregate**
1 Probable aggregate resources
- WELLS**
- Operated gravel and/or pit
 - ⊗ Abandoned gravel and/or pit
 - ⊙ Operating stone quarry
 - ⊘ Abandoned stone quarry
 - Potential water resource (radius area)
 - Isolated well or drill-hole location with owner's permission (fill over sand/gravel resource thickness (ft), obtained from well logs)
 - " " Isolated gravel; " " Indicated sand
 - " " In urban areas unconsolidated or unknown property
 - " " Success Colorado Geological Survey investigation and gravel prospect
 - " " Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION LOCATION AND GENERAL DESCRIPTION OF BENCH**
- Bench-top thickness (ft)
 - Bench-slope maximum thickness (ft)
 - Percent sand and fines (spacing of 0.075 in., 0.25 in., default estimation)
 - Significant amount of fines (spacing 0.075 in., 0.25 in. or 0.075 in.)
 - Significant amount of decomposed or weak rock
 - Significant amount of eolian sandstone (filler)
 - " " In urban areas unconsolidated or unknown property
 - " " In urban areas property shown or color/fill



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WETDRAIN AREA

REFERENCE: Bjorklund, L. J., and Brown, R. P., 1957, Geology and ground-water resources of the lower South Platte River valley between Hardin, Colorado, and Paxton, Nebraska: U. S. Geol. Survey water-supply paper 1376, pl. 1.

Mapped by: Phillip C. Wicklin
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle

3 500 000 FEET

CONTOUR INTERVAL 10 FEET

UTM GRID AND 1983 MAGNETIC NORTH
VECTORS INDICATE DIRECTION OF WEST

ROAD CLASSIFICATION

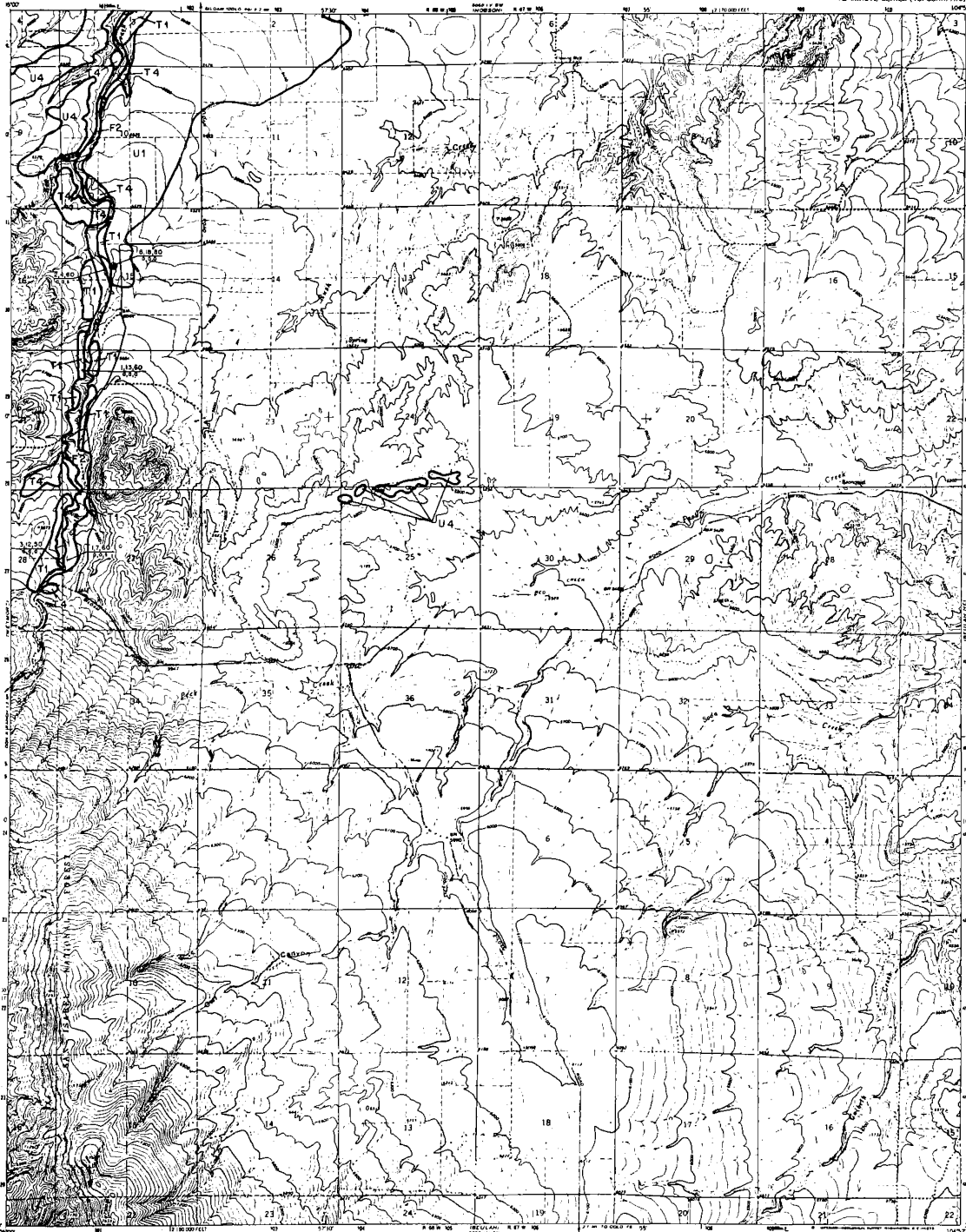
- Primary highway hard surface
- Lightly used hard or unpaved surface
- Secondary highway hard surface
- Unimproved road
- Interstate Route
- U. S. Route
- State Route

OMAR, COLO.

**SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP**

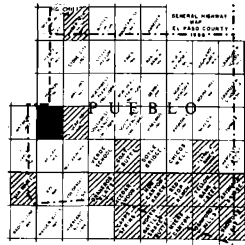
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. KOLA, DIRECTOR

OWL CANYON QUADRANGLE
COLORADO-PUEBLO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Landform unit
- Boundary classification
- LANDFORM UNITS**
- F Fluvial deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Marine deposits (shells, corals, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Deposits**
1st listed and preferred on 50' contour, where indicated
- 1 Gravel: relatively clean and round
- 2 Gravel: significant fines, occasional rock, calcareous material
- Sand Deposits**
(preferred on 100' contour, where indicated on 150' contour, stream cuttings)
- 3 Sand
- 4 Unclassified Resources
- Possible aggregate resources
- NON-RESOURCES**
- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Related well or drill-hole location with associated thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
- "X" indicates ground is underlain by sand
- "L" symbol denotes unconsolidated or unknown property.
- "W" symbol indicates geological survey project/land and gravel project/ (100' scale)
- Landform boundary, solid where known or inferred. Dashed where approximate or inferred.
- RELATION, LOCATION AND GEOLOGICAL SIGNIFICANCE OF DEPOSITS**
- Overlap thickness (ft)
- Underlap resource thickness (ft)
- Percent sand and fines (spacing of contour, 0.5 ft in., varied orientation)
- Percent gravel (spacing of contour, 100' contour, 2,000 ft. or 0.5 ft. in.)
- Significant amount of decomposed or sand rock.
- Significant amount of certain aggregate materials.
- "X" symbol denotes unconsolidated or unknown property.
- "W" symbol denotes property absent or unlogged.

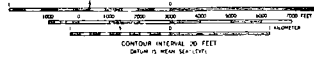
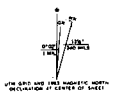


■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, O. R., 1973,
U. S. Geological Survey Map NF-547.

Mapped by: Ralph R. Shroba
Date: June 30, 1976

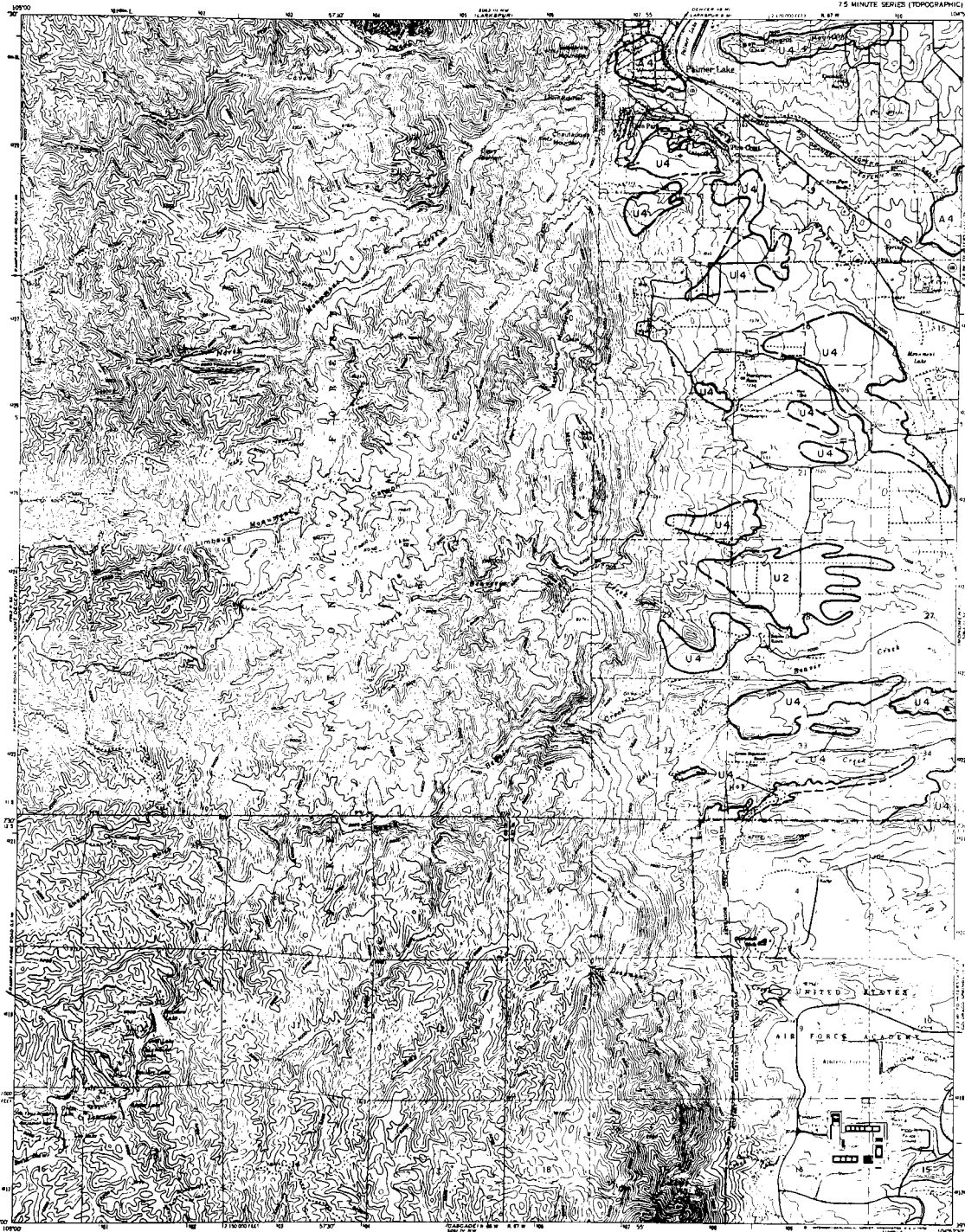
Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION
 Light duty —————
 Unimproved dirt - - - - -

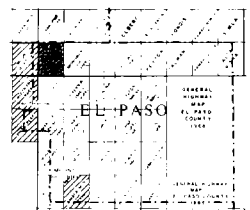
OWL CANYON COLO

SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP



EXPLANATION

- CONTOUR LINES**
 - Contour interval 40 feet
 - Contour interval 20 feet
- ROAD CLASSIFICATION**
 Heavy duty
 Light duty
 Medium duty
 Unimproved det.
 State Route
- MAP SYMBOLS**
 * Operating gravel and/or sand pit
 * Abandoned gravel and/or sand pit
 * Operated stone quarry
 * Abandoned stone quarry
 * Potential quarry aggregate resource area
 * Potential well of aggregate (location only, not proven thickness) (U) (see sand/gravel resource thickness (T) indicated from well log)
 * "T" indicates gravel, "S" indicates sand
 * "in symbol" denotes unproved or unmin property
 * "in" denotes Colorado Geological Survey "Wellhead and Core" indicator
 * "L" denotes Landon boundary, solid lines names of observed sandstone deposits of lateral
- AGGREGATE QUANTIFICATION**
 * Gravel: relatively clean and sound
 * Gravel: significant fines, decomposed rock, calcine content
 * Sand
 * Probable aggregate resource
- NOTES**
 * "in symbol" denotes unproved or unmin property
 * "in" denotes Colorado Geological Survey "Wellhead and Core" indicator
 * "L" denotes Landon boundary, solid lines names of observed sandstone deposits of lateral
- AGGREGATE QUANTIFICATION**
 * Gravel: relatively clean and sound
 * Gravel: significant fines, decomposed rock, calcine content
 * Sand
 * Probable aggregate resource
- NOTES**
 * "in symbol" denotes unproved or unmin property
 * "in" denotes Colorado Geological Survey "Wellhead and Core" indicator
 * "L" denotes Landon boundary, solid lines names of observed sandstone deposits of lateral



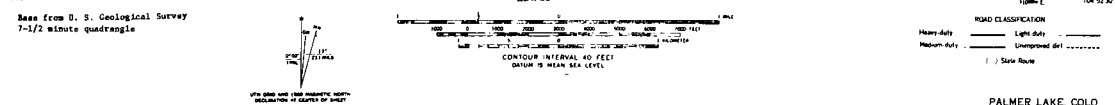
QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:
 Trimble, D.E., and Pritch, R.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado; U. S. Geol. Survey Map T-857 A.

REFERENCE: Trimble, Donald, 1974, U.S.G.S.; Personal Communication.

Mapped by: Phillip C. Wicklen
 Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.



Base from U. S. Geological Survey
 7-1/2 minute quadrangle

ROAD CLASSIFICATION
 Heavy duty
 Light duty
 Medium duty
 Unimproved det.
 State Route

PALMER LAKE, COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PARKER QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1957

EXPLANATION

LAND USE

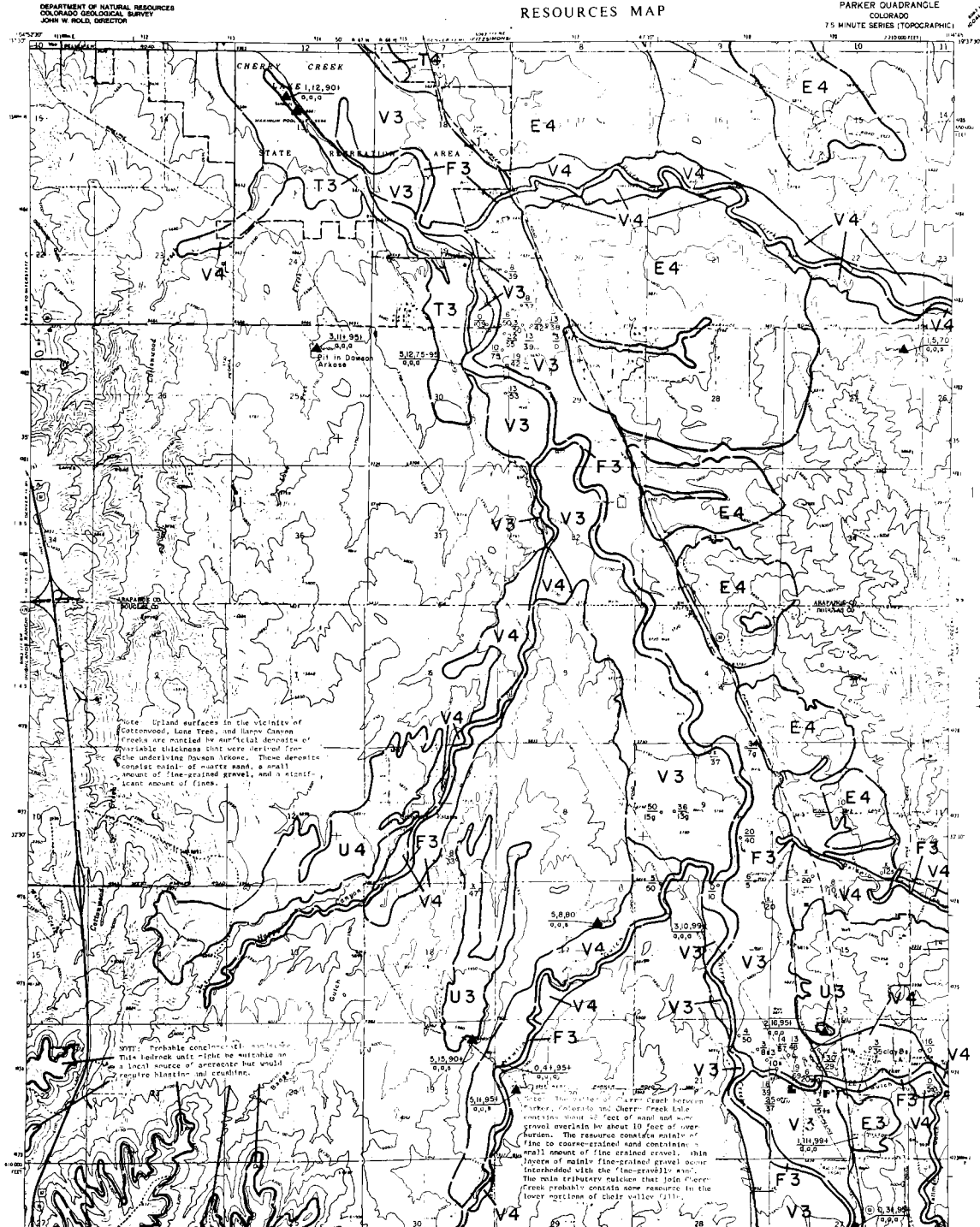
- F floodplain deposit
- T stream terrace deposit
- V valley fill (F & T)
- U upland deposits
- A alluvial fan
- E wind-deposited sand (eolian)
- M non-made deposits (see notes)

ROAD CLASSIFICATION

- Heavy Duty
- Medium Duty
- Light Duty
- Unimproved dirt
- Interstate Route
- U.S. Route
- State Route

STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF SANDS

Station 112,901
Station 111,994
Station 111,995
Station 111,996
Station 111,997
Station 111,998
Station 111,999
Station 112,000
Station 112,001
Station 112,002
Station 112,003
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Station 112,100



Note: Upland surfaces in the vicinity of Cottonwood, Lone Tree, and Lacey Canyon Creeks are mantled by surficial deposits of variable thickness that were derived from the underlying Dawson rocks. These deposits consist mainly of waste sand, a small amount of fine-grained gravel, and a significant amount of fines.

Note: Probable cone-shaped sand pits in this alluvial unit might be suitable as a local source of aggregate but would require blasting and grading.

Note: The nature of gravel Creek between Parker, Colorado and Cherry Creek Lake crosses about 10 feet of sand and gravel overlain by about 10 feet of overburden. The resource contains mainly fine to coarse-grained sand containing a small amount of fine-grained gravel. Thin layers of mainly fine-grained gravel occur interbedded with the fine-grained sand. The main tributary gulches that join Cherry Creek probably contain some resource in the lower portions of their valley fills.

See from U. S. Geological Survey 7-1/2 minute quadrangle



ROAD CLASSIFICATION

- Heavy Duty
- Medium Duty
- Light Duty
- Unimproved dirt
- Interstate Route
- U.S. Route
- State Route

PARKER, COLO.



REFERENCE:

Chase, C.R., and McConagh, J.A., 1972. Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-731.

Tribble, D.E., and Pitesh, H.S., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-859-A.

Geology modified after:

Harberry, J. O., 1973. Map showing construction materials resources in the Parker quadrangle, Arapahoe and Douglas Counties, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-770-L.

Harberry, J. O. and Lidwall, R. M., 1972. Geologic map of the Parker quadrangle, Arapahoe and Douglas Counties, Colorado: U. S. Geol. Survey Misc. Inv. Map I-770-A.

Mapped by: Ralph R. Shroba
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

PEORIA QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

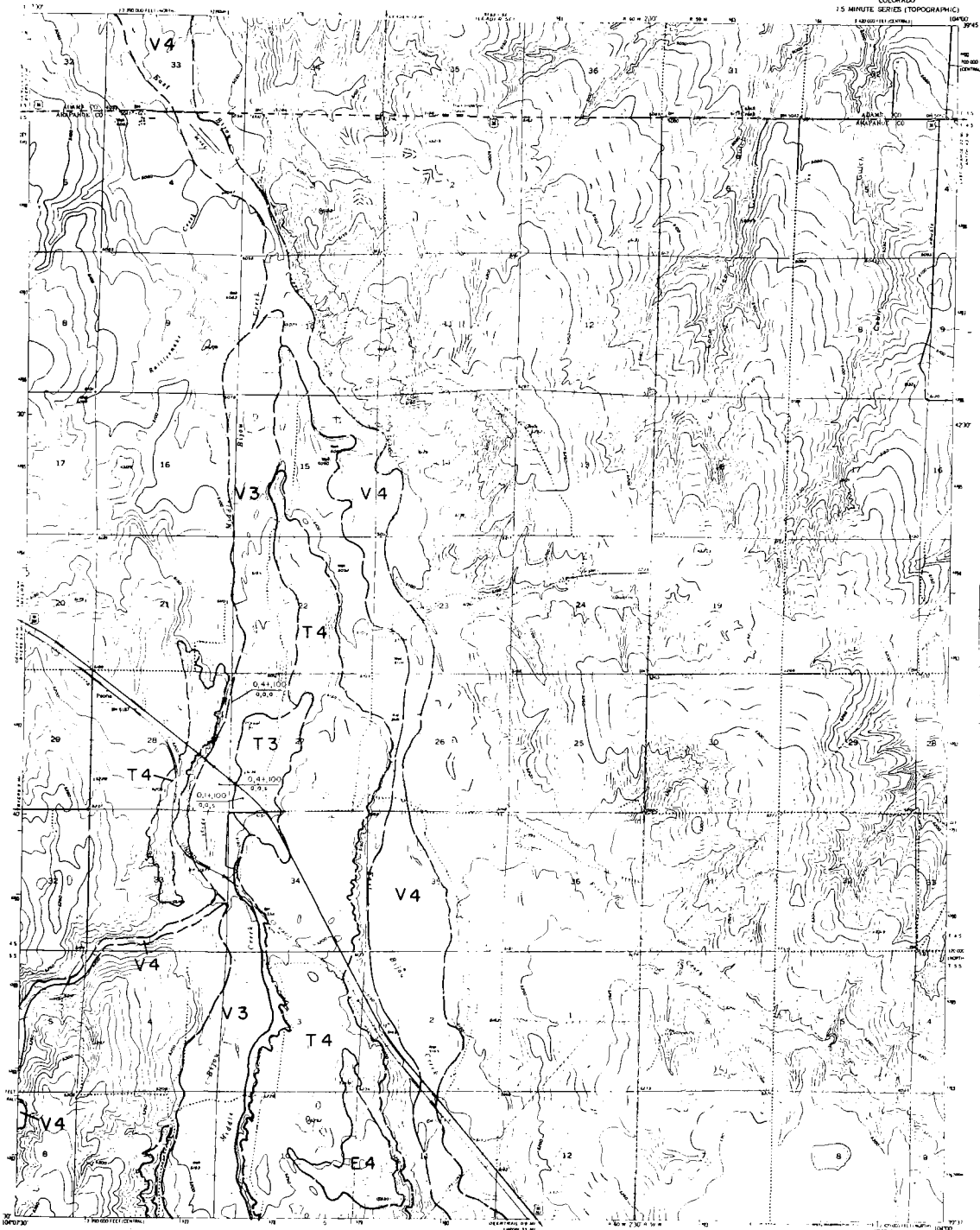
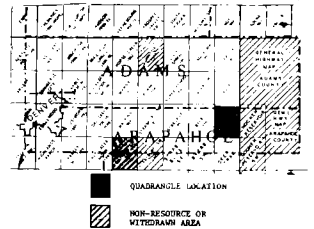
- LAPPORETT CODES**
- F Floodable deposit
 - T Stream terrace deposit
 - V valley fill (F & T)
 - U Unconsolidated
 - A Alluvial fan
 - E wind-deposited sand (barren)
 - M Non-mineable (clay, siltstone, shale, ...)

- RESOURCE CLASSIFICATION**
- CLASS 1: GRAVEL**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, siliceous carbonate

- CLASS 2: SAND**
- 3 Sand
 - 4 Probable aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Operating stone quarry
 - Closed stone quarry
 - Potential quarry aggregate resource area
 - Relined well or drill-hole location with associated thickness (ft) over non-aggregate resource thickness (ft), obtained from well logs
 - "I" indicates gravel, "S" indicates sand
 - "I" in symbol denotes unconsolidated or unknown property
 - "M" denotes Colorado Geological Survey Mineral/Soil and Gravel project drill hole

- STATION LOCATION AND GEOLOGICAL INTERPRETATION OF SYMBOLS**
- unconsolidated thickness (ft)
 - aggregate resource thickness (ft)
 - percent sand and fines (quantity as percent of total), detail explanation
 - significant amount of fines (quantity as percent of total)
 - significant amount of decomposed or weak rock
 - significant amount of siliceous carbonate (quantity as percent of total)
 - in symbol denotes unconsolidated or unknown property
 - in symbol denotes property value or interpretation



Base from U. S. Geological Survey
7.5 Minute quadrangle



ROAD CLASSIFICATION

- Main duty
- Light duty
- Unimproved det.
- U.S. Route

PEORIA COLO
R39375 - W100075
1966

ALL SITES IN RED-BARRIER ZONE

Geology modified after
Holtzer, P. E., 1972,
Regional Geologic Reconnaissance,
Bulletin 148-B75.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PIERCE GULCH QUADRANGLE
 COLORADO
 7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

Landform unit
 Resource classification

- LANDFORM UNITS**
- F Fluvial plain
 - T Trough terrace slope
 - V Valley fill (F & T)
 - U Upland apron
 - A Alluvial fan
 - C Cold-deposited sand (alluvium)
 - M Hummock deposits (colluvium, talus, etc.)

- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
 (at least 20% material on # 20 mesh, 4 mesh retention)
- 1 Gravel: relatively clean and well sorted
 - 2 Gravel: significant fines, decomposed rock, certain textures
- Fine Aggregate**
 (material that will pass # 20 mesh, 4 mesh retention on # 100 mesh, 20 mesh retention)
- 3 Sand
 - 4 Probable aggregate resource

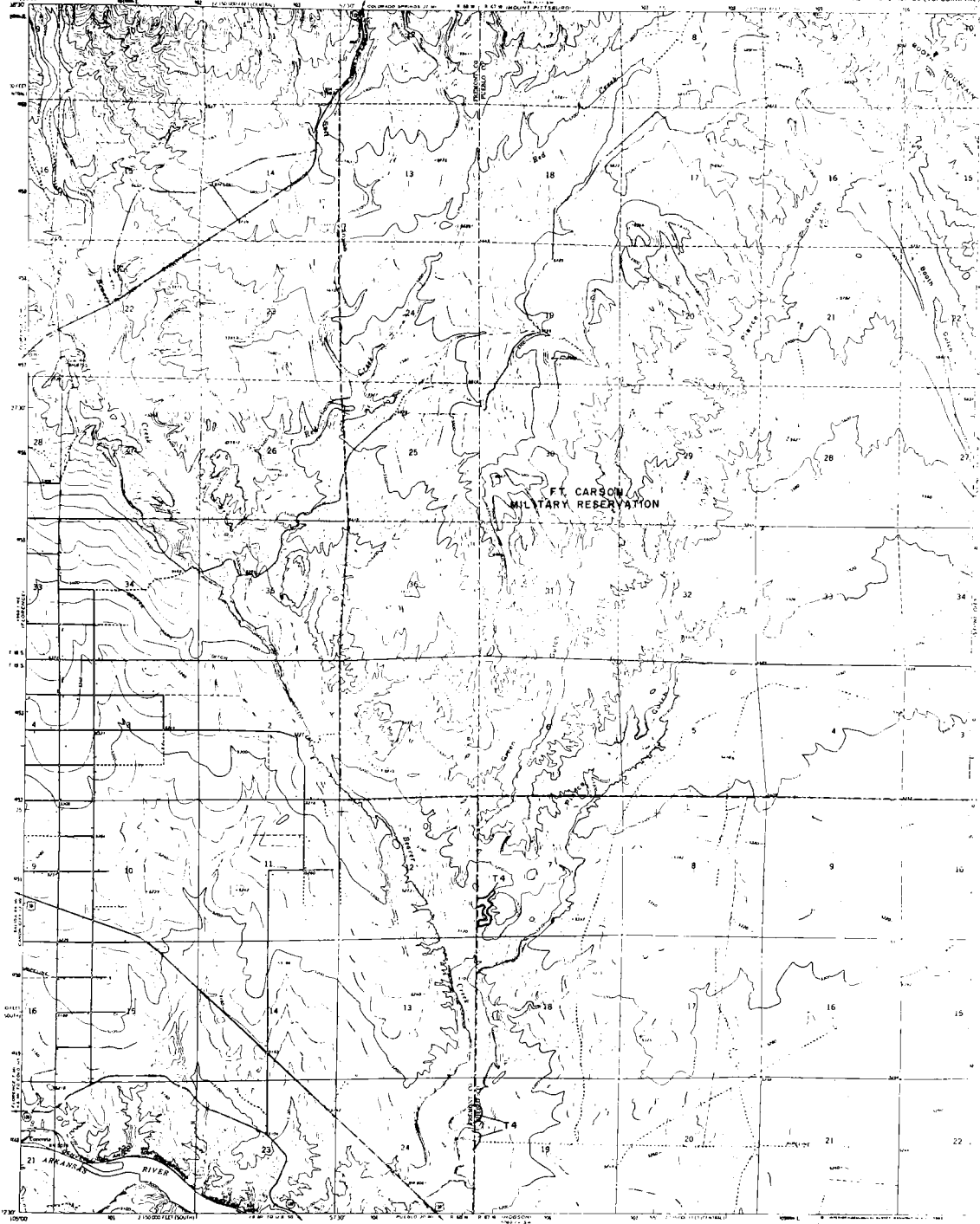
- NOTES**
- * Operating gravel and/or sand pit
 - ▲ Abandoned gravel and/or sand pit
 - Operating stone quarry
 - ▣ Abandoned stone quarry
 - ▨ Potential quarry aggregate resource area
 - ▧ Potential well or drilled hole location with overburden thickness (ft) over sand/gravel resource
 - ▩ Potential well or drilled hole location with overburden thickness (ft), obtained from well logs
 - " indicates gravel; " indicates sand
 - " in () indicates unconsolidated or unknown property
 - ▭ denotes Colorado Geological Survey boundary (land and gravel) project
 - ▮ Hill hole
 - ▯ location boundary, well that has not been observed, dashed short segments or located

- POSITION, LOCATION AND CHARACTERIZATION OF QUARRY**
- ▭ non-urban thickness (ft)
 - ▩ rural growth maximum thickness (ft)
 - ▨ operating well and flow (gpm) or (cfs) or (m³/min), 0.28 to 1, actual extraction
 - ▧ significant amount of flow operating
 - ▩ significant amount of decomposed or waste rock
 - ▨ significant amount of decomposed or waste rock
 - ▩ no potential decomposed or waste rock property
 - ▨ no potential decomposed or waste rock property
 - ▩ no potential decomposed or waste rock property
 - ▨ no potential decomposed or waste rock property

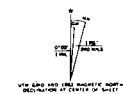


- ▣ QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Ralph R. Shroba
 Date: June 30, 1976



Base from U. S. Geological Survey
 7-1/2 minute quadrangle



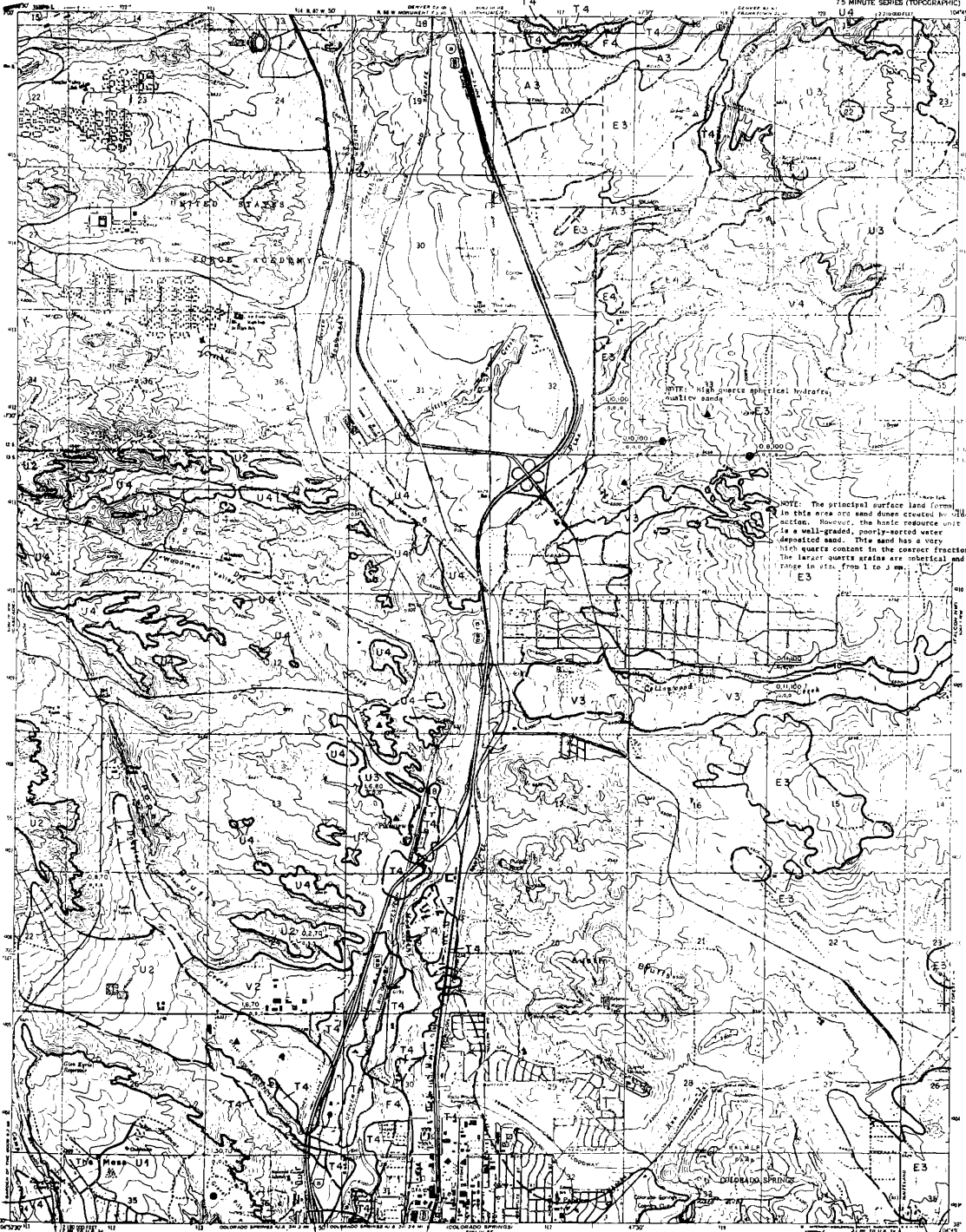
CONTOUR INTERVAL: 20 FEET
 OFFICIAL STATE MAP OF COLORADO
 DATE: 1962

- ROAD CLASSIFICATION**
- ▬ Medium duty
 - ▬ Light duty
 - ▬ Unimproved dirt
 - ▬ U.S. Route
 - ▬ State Route

PIERCE GULCH COLO

SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

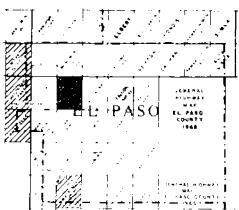
PIKEVIEW QUADRANGLE
 COLORADO, EL PASO CO
 7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Landform unit
- Resource classification
- LANDFORM UNITS**
 - F Floodplain deposit
 - T Trough terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Hummock (tundra)
 - K Kame (tundra, moraine...)
- RESOURCE CLASSIFICATION**
 - 1 Gravel: relatively clean and sand
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
 - 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Section well or multiple section with well
 - Section thickness (ft) over sand/gravel resource thickness (ft) indicated from well log
 - "s" indicates gravel; "m" indicates sand
 - "s" in symbol denotes unweathered or siliceous gravel
 - "m" denotes Colorado Geological Survey resource sand and gravel project's drill hole
 - Landform boundary, solid where same or observed; dashed where approximate or inferred
- STATION, LOCATION AND DIMENSIONAL LIMITATION OF SYMBOL**
 - overburden thickness (ft)
 - total gravel resource thickness (ft)
 - total sand and fines (silt, clay, etc.) thickness (ft) in 10' interval
 - significant amount of fines (opening 100 microns, 0.0075 in. or 0.075 mm)
 - significant amount of decomposed or weak rock
 - significant amount of calcium carbonate material
 - "s" or "m" symbol denotes unweathered or siliceous gravel
 - "m" or "s" symbol denotes properly obtained or unobtainable

NOTE: The principal surface land forms in this area are sand dunes created by wind action. However, the basic resource unit is a well-sorted, poorly-sorted water deposited sand. This sand has a very high quartz content in the coarse fraction. The larger quartz grains are spherical and range in size from 1 to 2 mm.



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITNESS AREA

Geology modified after Scott, C.R., & Mohr, R. A. 1973, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, MF-482.

Geology modified after Stickler, R.J., 1973, Geologic map of Cottonwood Creek area, Plate I, Colorado School of Mines, M.S. Thesis, T-1516.

REFERENCE:
 Trimble, D.E., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-857 A.

Mapped by: Phillip C. Wickless
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey.

Map from U. S. Geological Survey
 7-1/2 minute quadrangle



CONTOUR INTERVAL 20 FEET
 DATUM IS MEAN SEA LEVEL

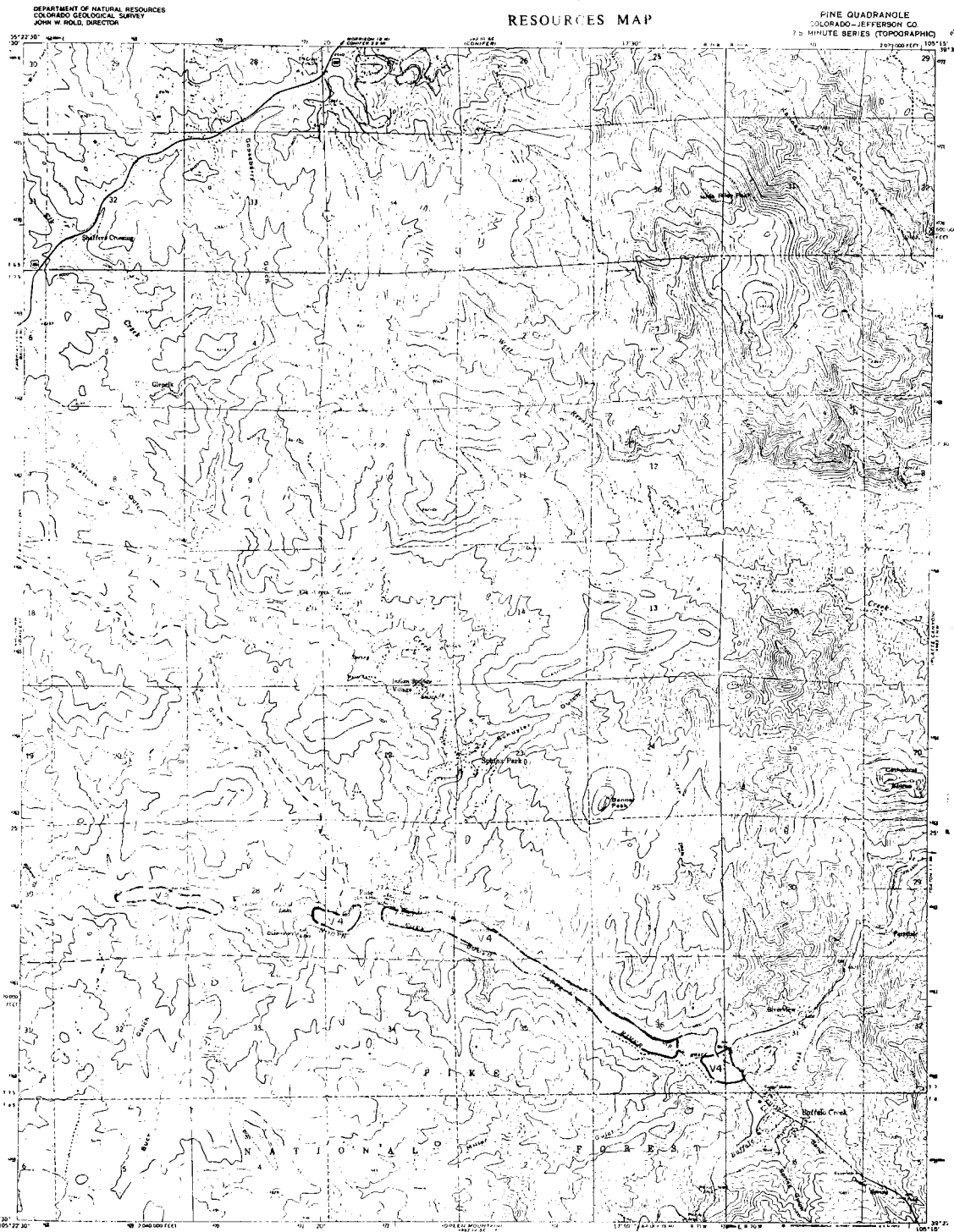
- ROAD CLASSIFICATION
- Heavy duty
 - Medium duty
 - Light duty
 - Unimproved dirt
 - Interstate Route
 - U.S. Route
 - State Route

PIKEVIEW, COLO.

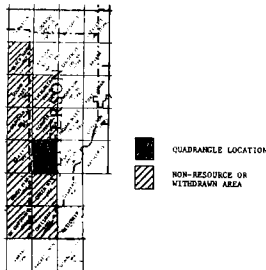
SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

PINE QUADRANGLE
COLORADO-JEFFERSON CO.
7.5-MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

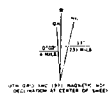


- AGGREGATE DEPOSITS**
- F Fluvial fan deposit
 - T Terrace terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mesquite deposit (silt, siltstone, siltstone...)
- RESOURCE CLASSIFICATION**
- GRADE ANALYSIS**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, silty or sandy
- FINE SANDS**
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with water-bearing thickness (ft) and sand/gravel resource thickness (ft), obtained from well logs.
 - "A" indicates gravel; "M" indicates sand
 - "S" in symbol denotes unsaturated or seasonally saturated
 - "W" denotes Colorado Geological Survey "Probed and Gravel Analyzed" drill hole
 - Boundary boundary, solid where known or surveyed; dashed where approximate or estimated
- NOT TO SCALE - TOPOGRAPHICAL**
- 1:250,000 SCALE**
- 1:50,000 SCALE**
- 1:25,000 SCALE**
- 1:12,500 SCALE**



Geology modified after:
Tribble, O.E., and Fitch, H.P., 1978, Map showing potential sources of gravel and crushed-stone aggregate in the Denver Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Mine Geol. Map, Map I-615-A.

Base from U. S. Geological Survey
7.5-minute quadrangle



ROAD CLASSIFICATION

- Heavy-duty
- Light-duty
- Unimproved dirt
- U.S. Road

PINE, COLO.

Mapped by: Phillips C. Wicklein
Date: June 30, 1974

Prepared in cooperation with the
U. S. Geological Survey.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PINEY CREEK QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

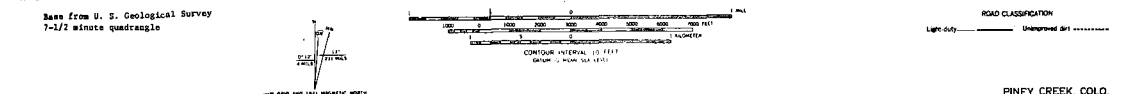
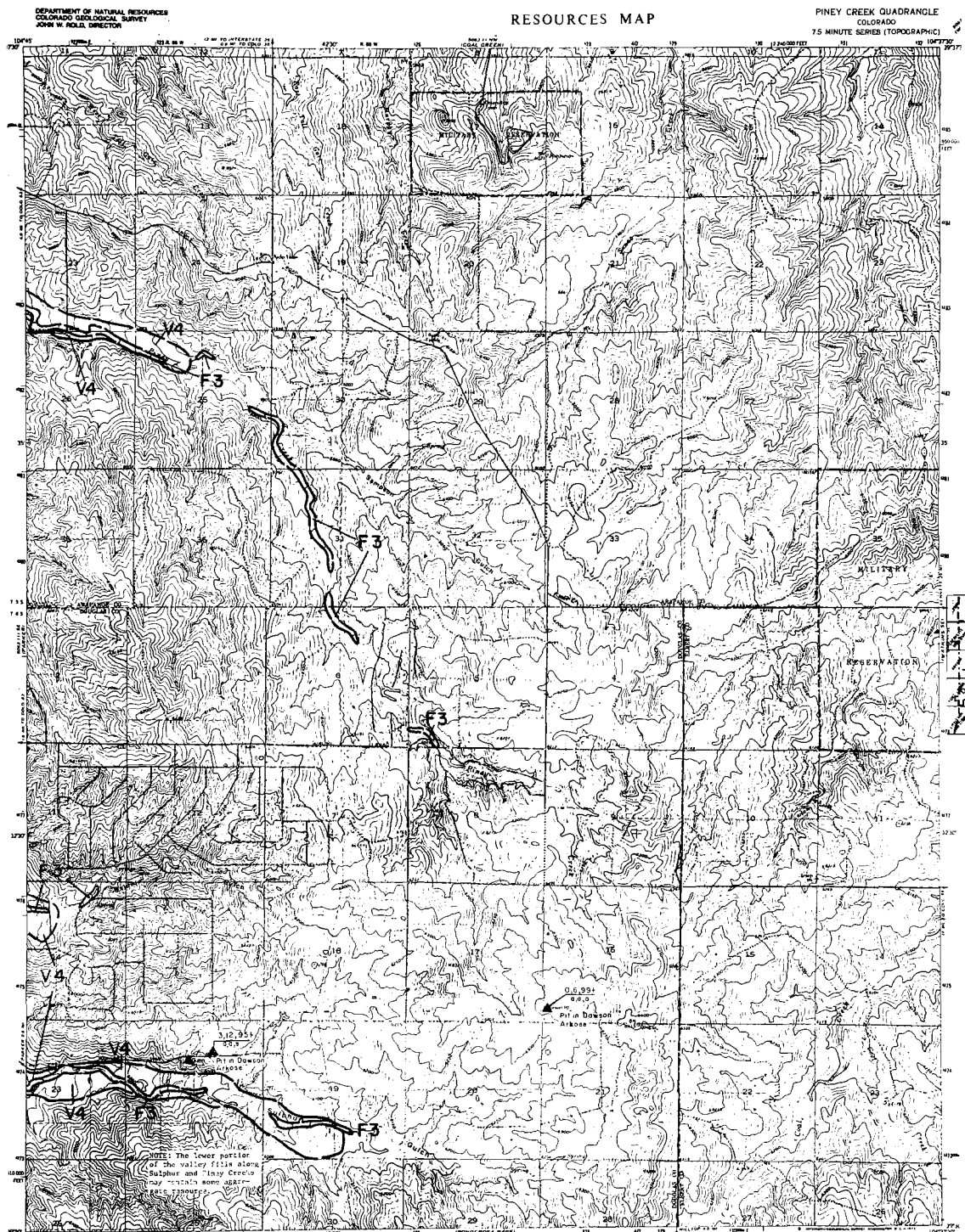
- LEGEND**
- F Fossiliferous deposit
 - T Tertiary terrace deposit
 - V Valley fill (F & T)
 - U Unclay deposit
 - A Alluvial fan
 - E Eolian deposit (sand dune)
 - M Man-made deposits (slag, tailings, spoils...)
- RESOURCE CLASSIFICATION**
- Gravel**
- 1 Gravel, relatively clean and sound
 - 2 Gravel, significant fines, decomposed rock, soft mudstone
- Sand**
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Isolated well-sorted sandstone (1) or sandstone (2) over sandstone resource thickness (1), isolated from well logs
 - "s" indicates gravel; "m" indicates sand
 - "*" in symbol denotes unconsolidated or unknown property
 - "ac" denotes Colorado Geological Survey "Acquired and/or Gravel projects" (1) or (2)
 - Lead line boundary, solid where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATIONAL INDICATOR OF SYMBOLS**
- contour interval (ft)
 - road/gravel resource thickness (ft)
 - road/gravel resource thickness (ft)
 - road/gravel resource thickness (ft)
 - significant amount of fines (passing 100 mesh, 0.004 in., or 0.075 mm.)
 - significant amount of decomposed or soft rock
 - significant amount of solution nodules (cavities)
 - "*" in symbol denotes unconsolidated or unknown property
 - "ac" in symbol denotes property owned or leased



Geology modified after:
 Trybale, D.E., and Piteb, S.R., 1974, Map showing potential resources of gravel and crushed-rock aggregates in the Greater Denver Area, Front Range Urban Corridor, Colo., U. S. Geol. Survey Misc. Geol. Inv. Map 1-4500.

REFERENCE:
 Chase, G.H., and McConaghy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-731.

Mapped by: Ralph R. Shrobs
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey.



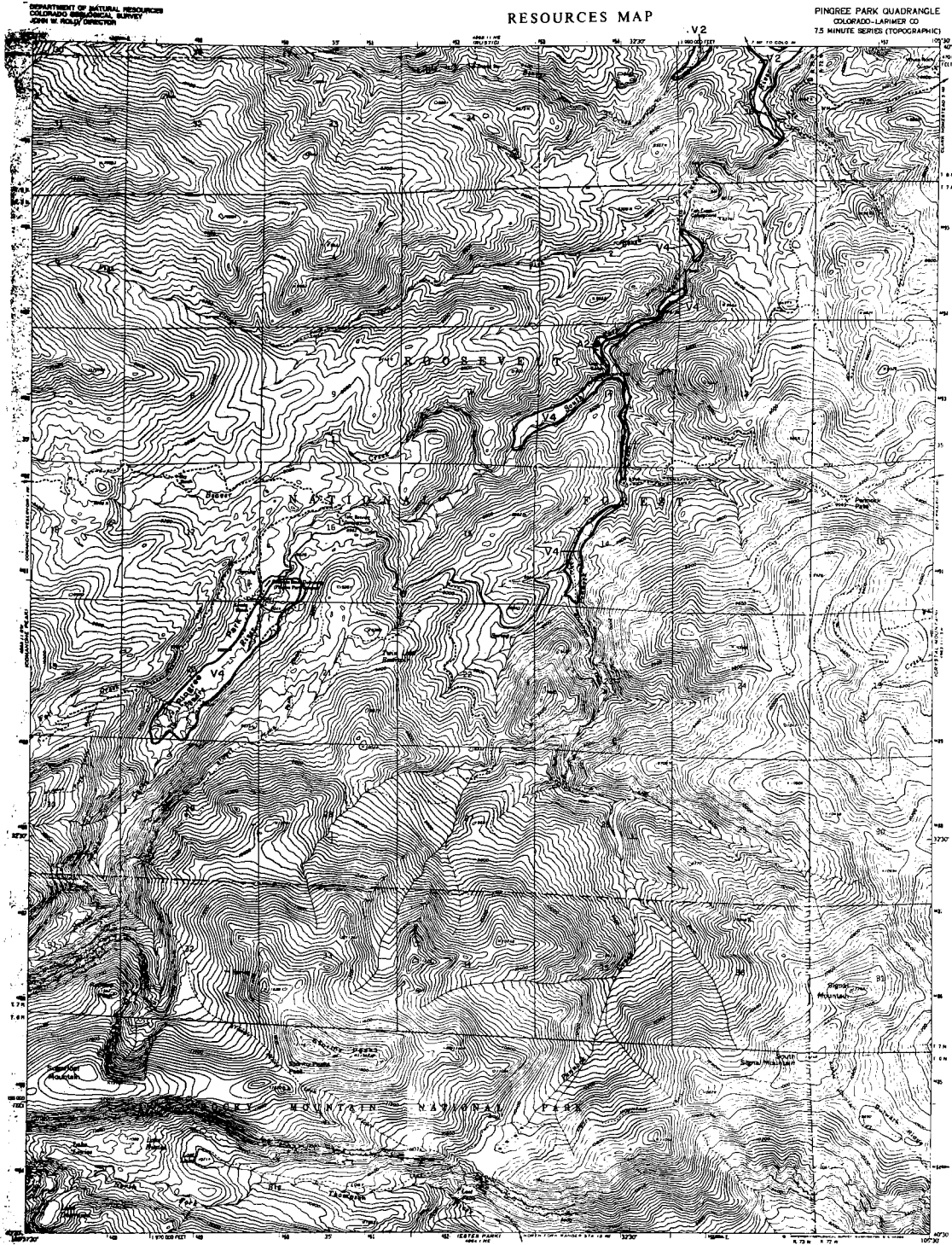
Base from U. S. Geological Survey
 7-1/2 minute quadrangle

ROAD CLASSIFICATION
 Light duty Unimproved dirt

PINEY CREEK, COLO.

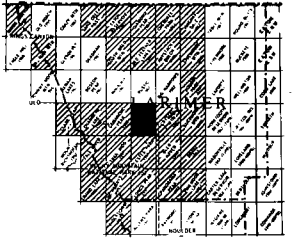
SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

PINGREE PARK QUADRANGLE
COLORADO-LARIMER CO
7.5 MINUTE SERIES (TOPOGRAPHIC)



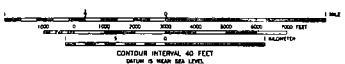
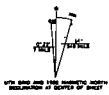
EXPLANATION

- Contour lines
 - Road classification
 - Quarry location
 - Non-resource or Victorian area
- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Non-sand deposits (slag, tailings, spalls...)
- RESOURCE CLASSIFICATION**
- Gravel** (see legend for grading of gravel, etc. retained on #20 screen, visual estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, talcum calcinings
- Sand** (see legend for grading of sand, etc. retained on #20 screen, visual estimation)
- 3 Sand
 - 4 Probable aggregate resources
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource site
 - Selected well or drill-hole location with measured thickness (ft.) and sand/gravel resource thickness (ft.), obtained from well logs.
 - "A" indicates gravel; "S" indicates sand
 - "X" in symbol denotes unclassified or unknown property.
 - "M" in symbol denotes mechanical survey, "M" indicates and gravel projects.
 - "L" in symbol denotes location boundary, solid shows known or checked, dashed where approximate or inferred.
- STATUS, LOCATION AND CHARACTERIZATION OF RESOURCES**
- non-sound thickness (ft.)
 - sound/gravel resource thickness (ft.)
 - percent sand and fines (passing #40 screen, 0.25 in.), visual estimation
 - Significant amount of fines (passing #200 screen, 0.0075 in. or 0.297 mm.)
 - Significant amount of decomposed or weak rock.
 - Significant amount of silicon-containing materials.
 - "M" in symbol denotes unclassified or unknown property.
 - "X" in symbol denotes property absent or unclassified.



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR VICTIMIAN AREA

Base from U. S. Geological Survey
7-1/2 minute quadrangle



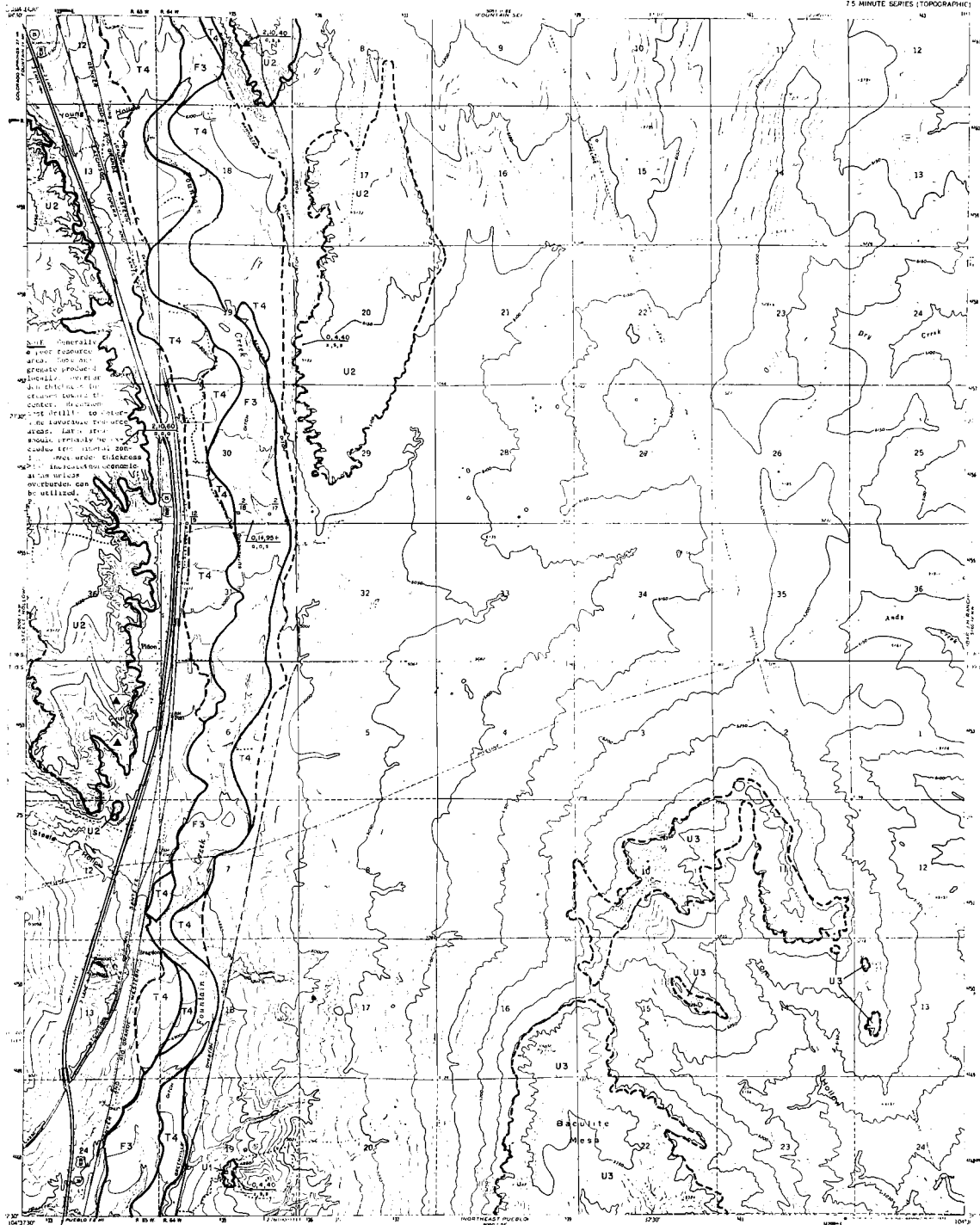
ROAD CLASSIFICATION
Light duty — Unimproved dirt —

PINGREE PARK, COLO.

Mapped by: Stephen D. Schwochow
Date: June 30, 1974

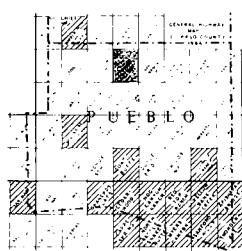
SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

PINON QUADRANGLE
 COLORADO-PUEBLO CO
 7.5 MINUTE SERIES, TOPOGRAPHIC



EXPLANATION

- Landform with
 Resource classification
- LANDFORMS**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Marine deposits (beach, dunes, spits, etc.)
- RESOURCE CLASSIFICATION**
- Gravel resources**
 of size 100 to 400 microns or 40 percent
 gravel extraction
- 1 Gravel relatively clean and sound
 - 2 Gravel significant fines, decomposed rock, calcareous nodules
- Fine aggregate**
 (material 75 microns or smaller, 100
 percent or 100 percent gravel extraction)
- 3 Sand
 - 4 Probable aggregate resource
- QUIRY SYMBOLS**
- Operating gravel and/or sand pit
 - ▲ Abandoned gravel and/or sand pit
 - ⊙ Operating stone quarry
 - ⊙ Abandoned stone quarry
 - ⊙ Potential quarry aggregate resource area
 - ⊙ Selected well or geologic location with over-
 burden thickness (1) over sand/gravel resource
 thickness (2); obtained from well logs.
 "1" indicates gravel; "2" indicates sand
 - "*" in symbol denotes unrelieved or
 unknown property
 - ⊙ denotes Colorado Geological Survey
 identified and gravel properties
 drill hole
 - ⊙ Landform boundary, solid where known or
 observed; dashed where approximate or
 inferred
- SECTION LOCATION AND GEOLOGICAL
 DESCRIPTION OF DEPOSIT**
- overburden thickness (ft)
 - aggregate resource thickness (ft)
 - percent sand and fines (percent of
 gravel; 0-75 (s), gravel extraction)
 - significant amount of fines (appearing
 100 percent, 0-100 (s), or 0-100 (s))
 - significant amount of decomposed or weak rock
 - significant amount of calcareous nodules
 (calcareous)
 - in symbol denotes unrelieved or
 unknown property
 - in symbol denotes property absent or
 insignificant



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR
 WITHDRAWN AREA

Mapped by: Phillip C. Wicklett
 Date: June 30, 1974



Base from U. S. Geological Survey
 7-1/2 minute quadrangle

ROAD CLASSIFICATION

- Heavy duty
- Medium duty
- Light duty
- Unimproved dirt
- Interstate Route
- U. S. Route

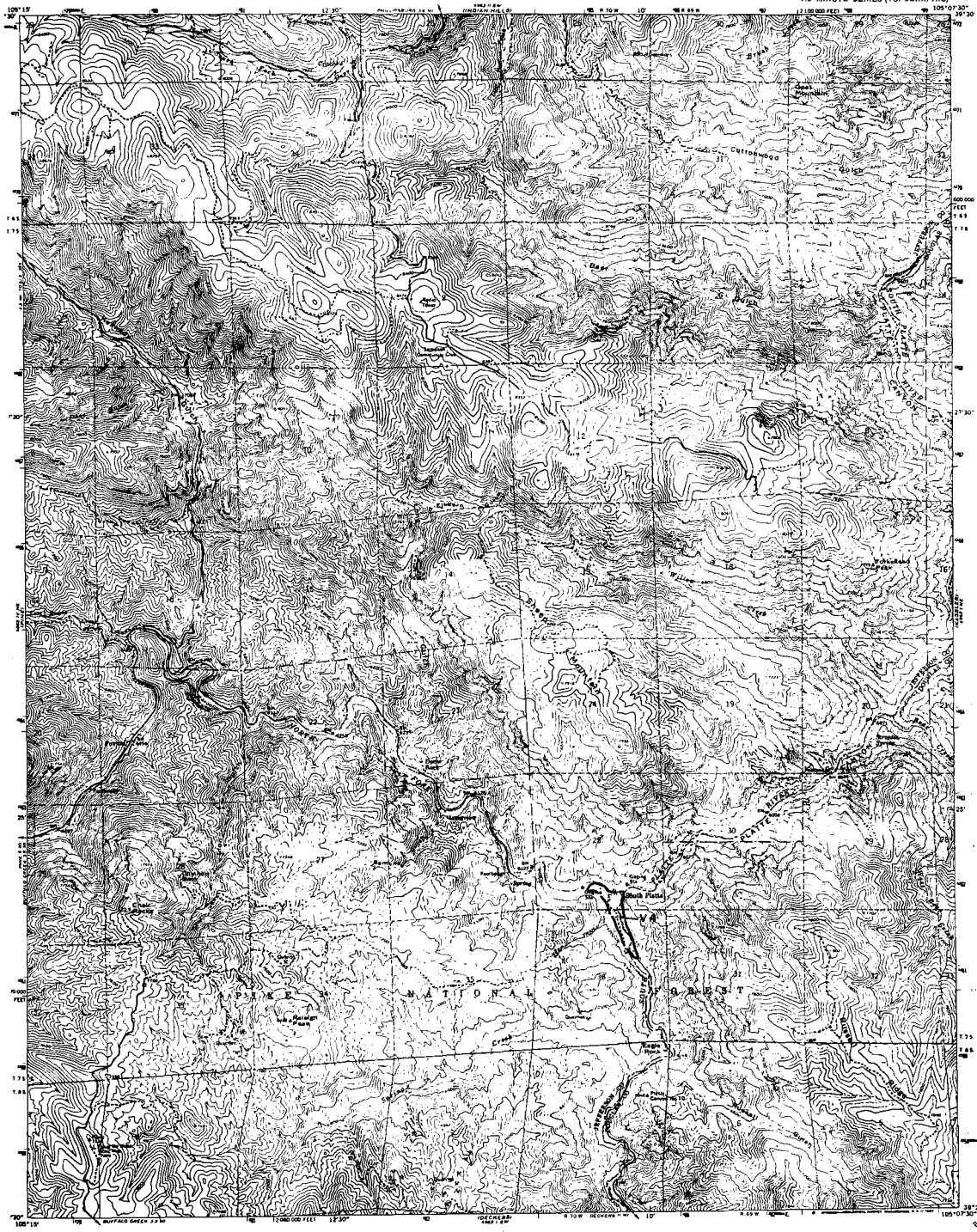
PINON, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PLATTE CANYON QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR

EXPLANATION

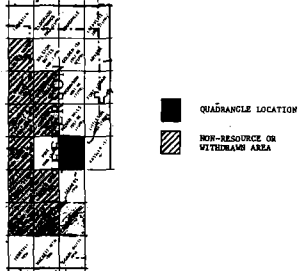


- LITHOLOGIC UNIT**
- F Fluvialite deposit
 - T Tertiary terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated
 - A Alluvial fan
 - E Eolian deposit (sand)
 - M Marine deposit (slag, tailings, spalls...)

- RESOURCE CLASSIFICATION**
- Gravel Resources**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, solution fragments
- Sand Resources**
- 3 Sand
 - 4 Probable aggregate resources

- MAP SYMBOLS**
- Operating gravel and/or pit
 - Abandoned gravel and/or pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Proposed quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), indicated from well logs
 - "s" indicates gravel, "m" indicates sand
 - "s" in symbol denotes unconsolidated or unknown property
 - "m" denotes Colorado Geological Survey "Wells and Drives" project
 - Well hole
 - Location boundary, solid where known or observed; dashed where approximate or inferred

- TEXTURE, LOCATION AND ORIENTATION OF DEPOSIT**
- Overburden thickness (ft)
 - Unconsolidated resource thickness (ft)
 - Percent sand and fines (based on wet screen, 0.075 in., gravel retention)
 - Significant amount of fines (greater than 50% screen, 0.075 in. or 0.075 mm.)
 - Significant amount of decomposed or weak rock
 - Significant amount of solution nodules or inclusions
 - "s" in symbol denotes unconsolidated or unknown property
 - "m" in symbol denotes property absent or unconsolidated



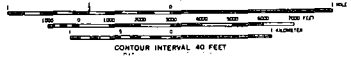
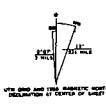
REFERENCE

Wicklin, D.H., and Vink, R.L., 1974, Map showing potential resources of gravel and crushed-stone aggregate in the Greater Denver Area, Proceedings 1974 Meeting, Colo. U. S. Geol. Surv. Res. Rept. Inv. 450-1.

Mapped by: Phillip C. Wicklin
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

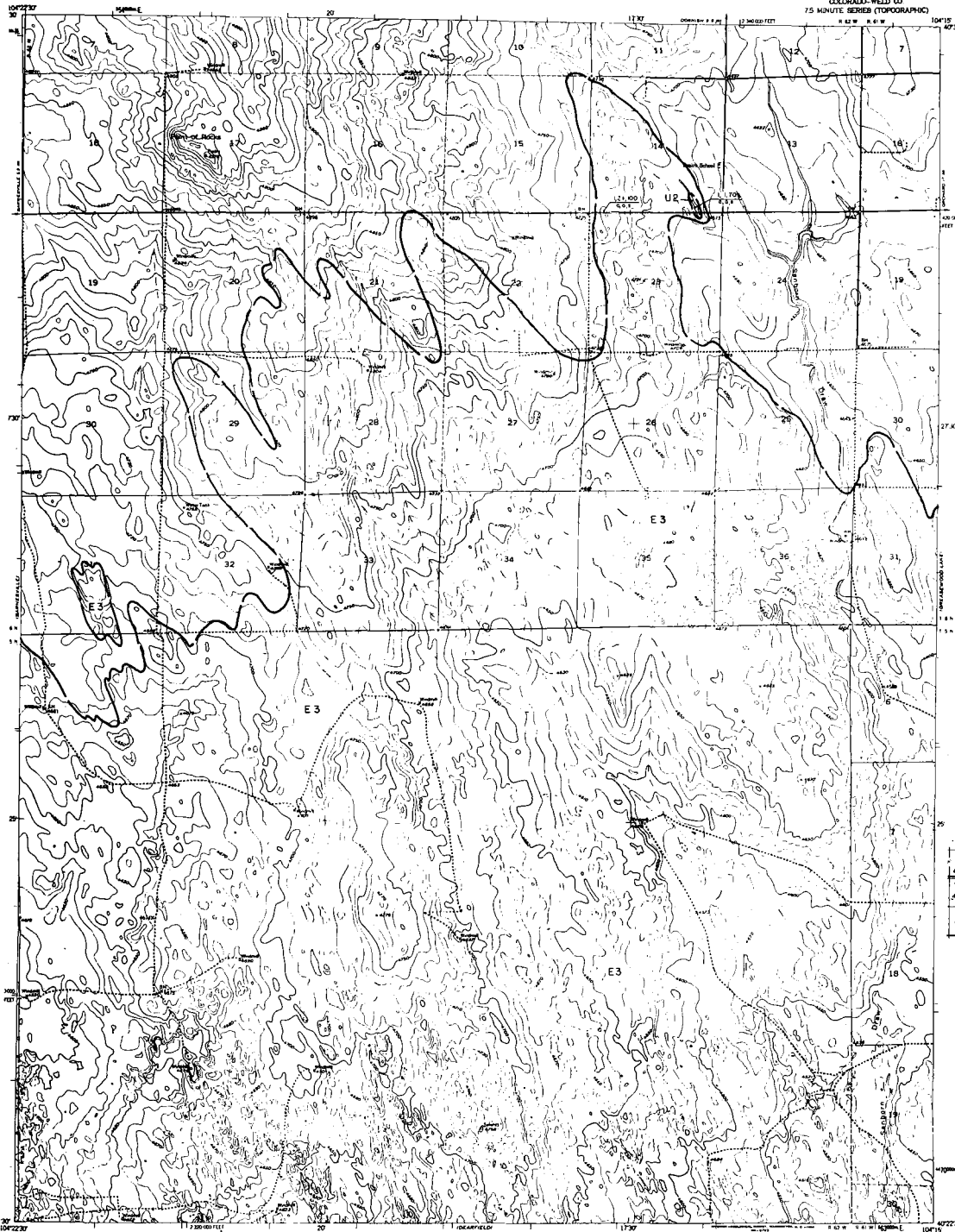
Unimproved dirt

PLATTE CANYON, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

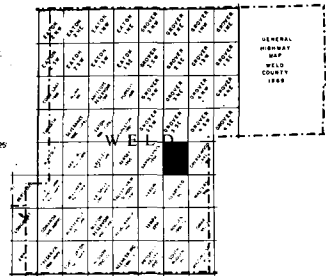
POINT OF ROCKS QUADRANGLE
COLORADO, WELD CO.
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR



EXPLANATION

- Contour unit
Resource classification
- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unbed deposits
 - A Alluvial fan
 - E Non-sorted sand (colluvial)
 - M Man-made deposits (old tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(as defined in Regulation 40 C.R.S. 40-101)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- Fine Aggregate**
(as defined in Regulation 40 C.R.S. 40-101)
- 3 Sand
 - 4 Probable aggregate resources
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with water-table thickness (10' over sand/gravel resource thickness (10'), obtained from well logs. "g" indicates gravel; "s" indicates sand. "u" in symbol denotes unevaluated or unknown property.
 - "W" denotes Colorado Geological Survey withdrawal and/or "proposed" withdrawal.
 - Landform boundary, solid where known or observed, dashed where approximate or inferred.
- STATUS, LOCATION AND ORIENTATIONAL INDICATION OF SYMBOLS**
- Method of thickness (ft)
 - Method of resource thickness (ft)
 - Percent sand and fines (passing #20 screen, 0.85 in.), actual extraction
 - Significant amount of fines (passing #100 screen, 0.075 in. or 0.075 mm.)
 - Significant amount of decomposed or unbed rock.
 - "u" in symbol denotes unevaluated or unknown property.
 - "W" in symbol denotes property owned or withdrawn.

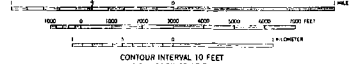


QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Bjorklund, L.J., and Brown, R.F., 1973, Geology and groundwater resources of the lower South Platte River valley between Hardin, Colorado, and Paxton, Nebraska; U. S. Geol. Survey Water-Supply Paper 1378, pl. 1.

Maped by: Phillip C. Wicklin
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



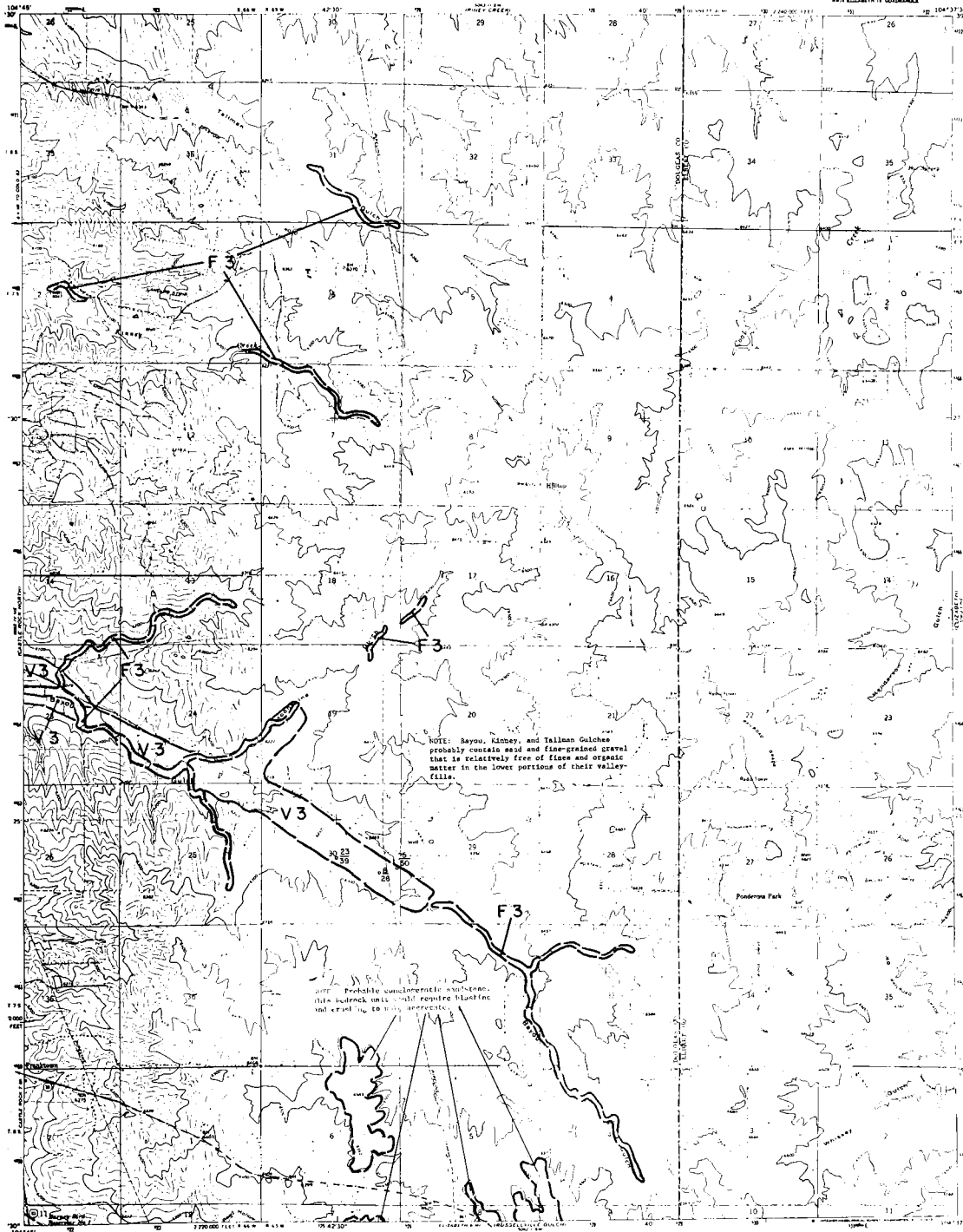
ROAD CLASSIFICATION
Heavy-duty _____ Light-duty _____
Medium-duty _____ Unimproved dirt _____
U.S. Route _____ State Route _____

POINT OF ROCKS, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

PODEROSA PARK
7.5 MINUTE SERIES (TOPOGRAPHIC)
WITH ELEGANTINE QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. PAUL, DIRECTOR

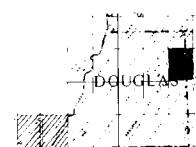


EXPLANATION

- SYMBOLS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley floor (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Inter-deltaic and lacustrine
 - M Non-mine deposits (including colluvium, etc.)
- AGGREGATE CLASSIFICATION**
- Gravel: relatively clean and rounded
 - Gravel: angular, coarse, dimensional rock, calcareous
 - Sand
 - Probable aggregate resource
- ROAD SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Watered well or drilled hole location with owner
 - Watered well (100' over sand/gravel resource thickness (FT), obtained from well logs)
 - "W" indicates drilled "W" indicates sand
 - "S" in symbol denotes unwatered or unknown property
 - "G" denotes Colorado Geological Survey Water/Well and Gravel projects
 - "L" indicates landowner boundary, well where known as observed, shaded where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOLS**
- "W" under Wellhead (100' over sand/gravel resource thickness (FT), obtained from well logs)
 - "W" in symbol denotes unwatered or unknown property
 - "G" in symbol denotes property owned or managed by CGS

NOTE: Bayou, Kinney, and Tallman Gulches probably contain sand and fine-grained gravel that is relatively free of fines and organic matter in the lower portions of their valley floors.

NOTE: Probable conglomeratic sandstone, this bedrock unit could require blasting and grading to mine aggregates.



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

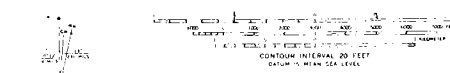
REFERENCE:
Chase, C.H., and McConaghy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado; U. S. Geol. Survey Misc. Geol. Inv. Map I-731.

Geology modified after:
Tribble, D.E., and Pisch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Greater Denver Area, Front Range Urban Corridor, Colorado; U. S. Geol. Survey Misc. Geol. Inv. Map I-856-A.

Mapped by: Ralph R. Shroba
Date: June 30, 1974
Prepared in cooperation with the U. S. Geological Survey.

PODEROSA PARK, COLO.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



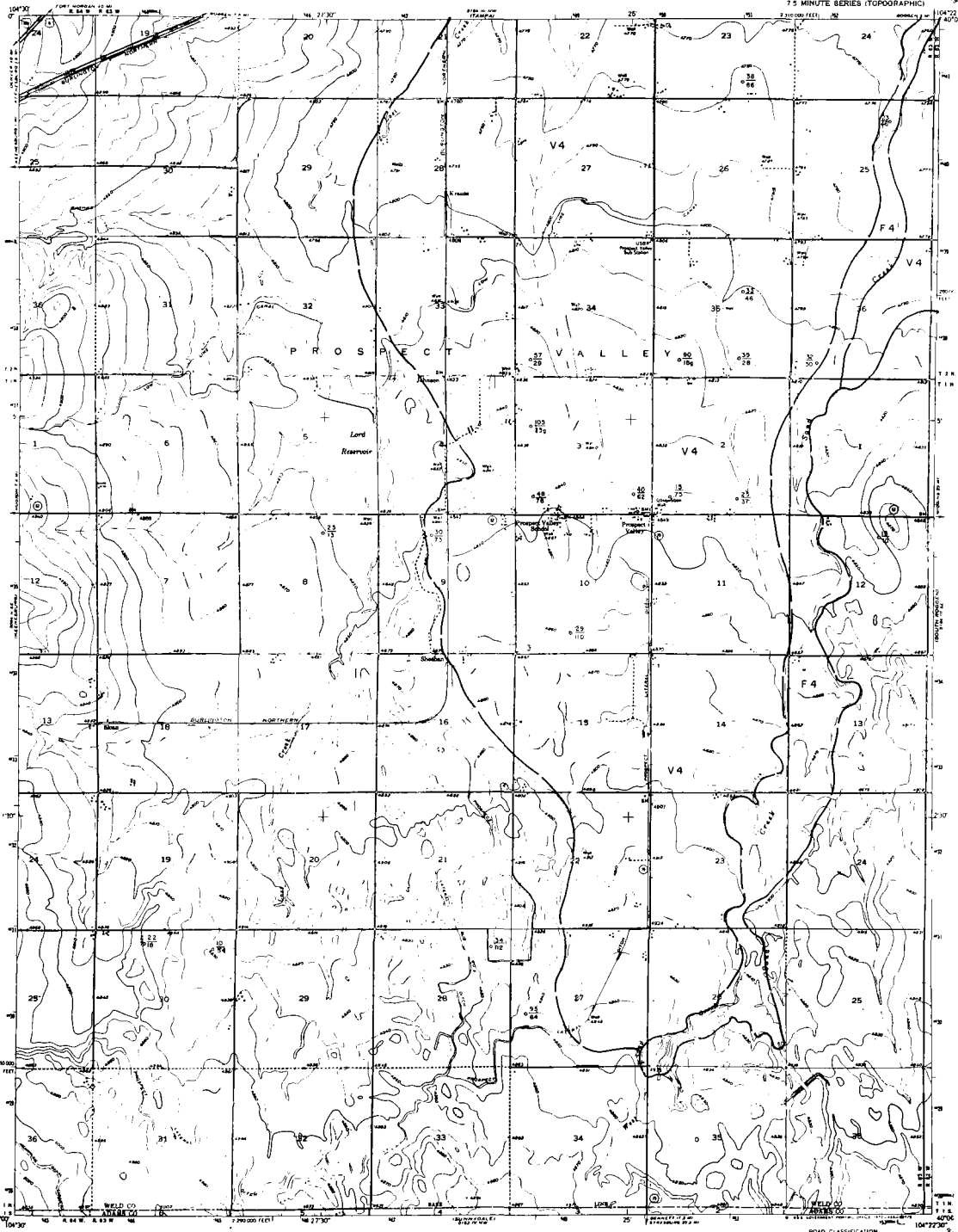
ROAD CLASSIFICATION
Medium-duty Light-duty
Unimproved rd. State Road

CONTOUR INTERVAL 20 FEET
CONTAINING MEAN SEA LEVEL

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PROSPECT VALLEY QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR



EXPLANATION

Landform unit
Resource classification

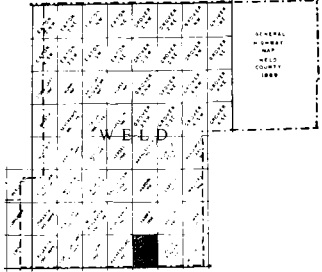
- LITHOLOGIC UNIT**
- F Fluvial deposit
 - T Stream terrace deposit
 - W (Alluvial fan & T)
 - U Unconsolidated
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (concrete, brick, etc.)

- RESOURCE CLASSIFICATION**
- GRAVEL**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- SAND**
- 3 Sand

- POTENTIAL RESOURCES**
- 4 Probable aggregate resources

- QUIP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Relieved well or drill-hole location with water
 - Location of well (1) obtained from well logs
 - "2" indicates gravel; "3" indicates sand
 - "4" in circle: access unobstructed or unobtainable
 - "5" in circle: Colorado Geological Survey field location and gravel project field site
 - Landform boundary, solid where known or observed; dashed where approximate or inferred

- STATION, LOCATION AND PROSPECT CLASSIFICATION OF QUARRY**
- Quarry location (1) (2)
 - Quarry location (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36)
 - Significant amount of fines (over 10% fines, 0.075 to 0.150 mm)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcium carbonate (limestone)
 - "4" in circle: access unobstructed or unobtainable
 - "5" in circle: gravel project area or investigation



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Bjorklund, L.J., and Brown, R.F., 1957, Geology and ground-water resources of the lower South Platte River valley between Gardiner, Colorado, and Paxton, Nebraska: U. S. Geol. Survey Water-Supply Paper 1378, p. 1.

Mapped by: Phillip C. Wickless
Date: June 30, 1974

- ROAD CLASSIFICATION**
- Primary highway: hard surface
 - Light-duty road: hard or improved surface
 - Secondary highway: hard surface
 - Unimproved road
 - Interstate Route
 - U.S. Route
 - State Route

CONTOUR INTERVAL 10 FEET
Datum is Mean Sea Level



UTM ZONE 18N, EPOCH 1983, MERIDIAN 108W, CENTER OF MASS

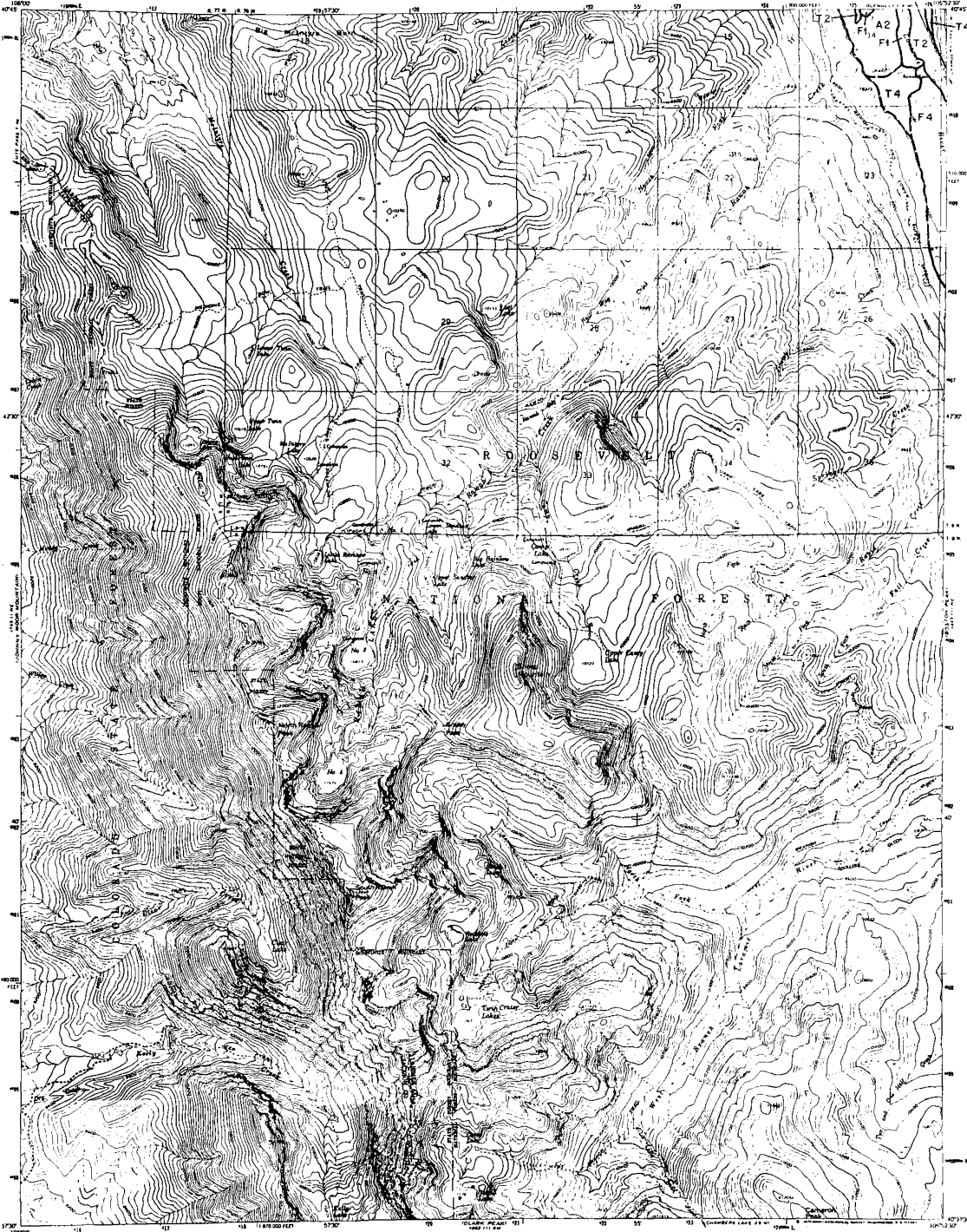
PROSPECT VALLEY, COLO.

Base from U. S. Geological Survey
7-1/2 minute quadrangle

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

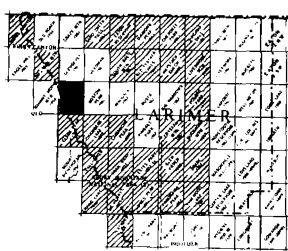
RAWAH LAKES QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN H. HOLS, DIRECTOR



EXPLANATION

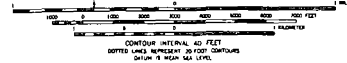
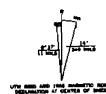
- Contour interval
Reference class/contour
- LANDFORMS**
- F Floodplain deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Man-made deposits (artificially deposited...)
- AGGREGATE CLASSIFICATION**
- Gravel resources**
(at least 100 percent on 40 screen, 100% sandstone)
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, talus, carbonates
- Sand resources**
(greater than 100 percent on 40 screen, 25% retained on 200 screen, visual retention)
- 3 Sand
- Unutilized resources**
- 4 Potential aggregate resource
- USE STATUS**
- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
Selected well or drill-hole location with overburden thickness (ft), obtained from well logs
"G" indicates gravel; "S" indicates sand
"U" in symbol denotes unutilized or unknown property
"M" denotes Colorado Geological Survey "Mudflow and Crevasse" project
"C" in symbol denotes Colorado Geological Survey "C" project
Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL SIGNIFICANCE OF DEPOSIT**
- contour interval (ft)
- percentage resource (closure %)
- percent sand and fines (greater than screen, 0.075 in. or 2.75 mm.)
- significant amount of decomposed or weak rock
- significant amount of fines (greater than screen, 0.075 in. or 2.75 mm.)
- significant amount of solution carbonate facies
- "U" in symbol denotes unutilized or unknown property
- "M" in symbol denotes property absent or unutilized



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schwabow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL, 40 FEET
DOTS ON MAP ARE 10 FOOT SPACINGS
DASHES ON MAP ARE 50 FOOT SPACINGS

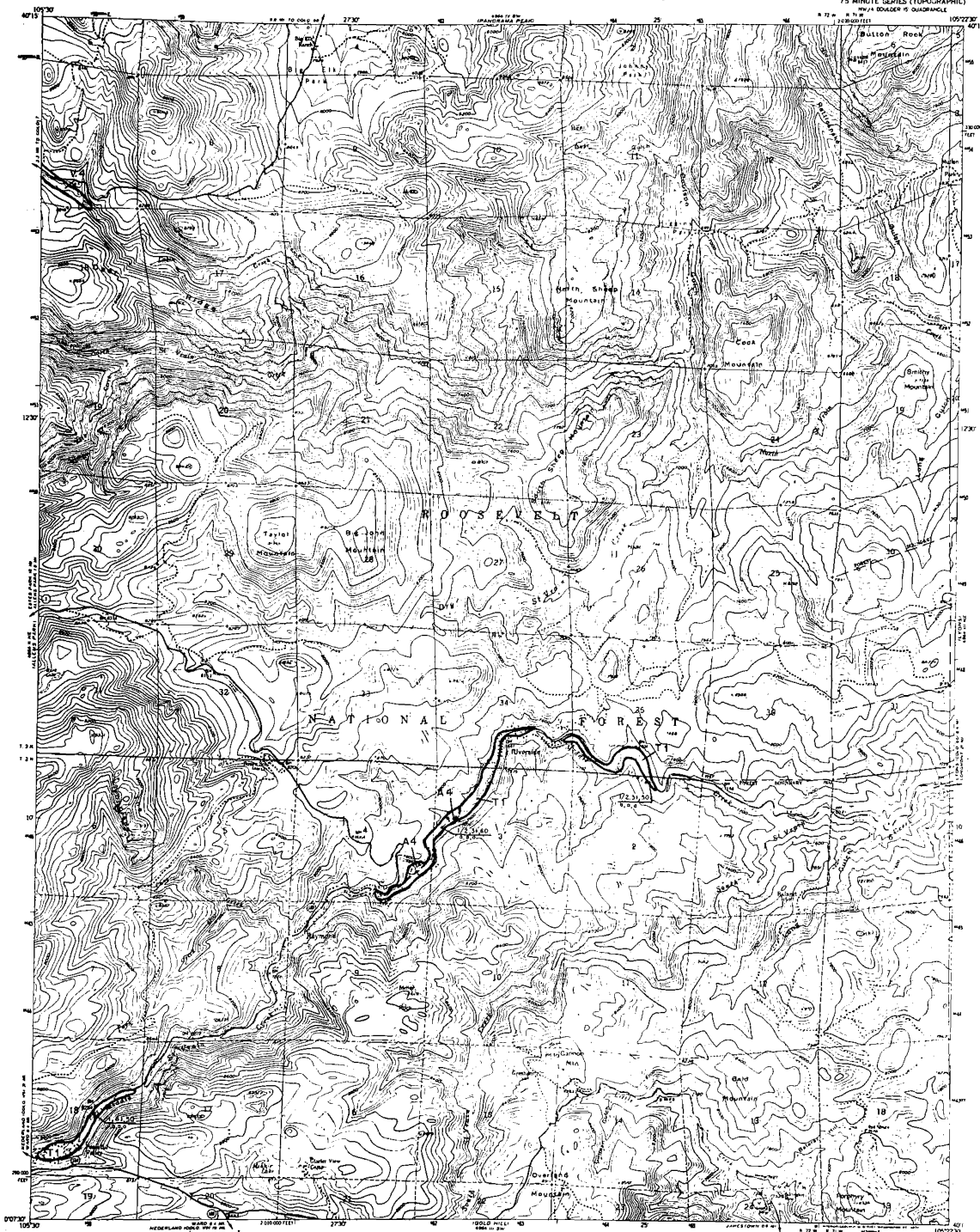
ROAD CLASSIFICATION
Light-duty Unimproved dirt

RAWAH LAKES, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

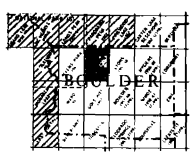
RAYMOND QUADRANGLE
COLORADO-Boulder CO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLLA, DIRECTOR



EXPLANATION

- CONTOUR INTERVAL**
80 FEET
- LANDFORMS**
F Floodplain deposit
T Stream terrace deposit
V Valley fill (F & T)
U Upland deposit
A Alluvial fan
C Sand-transported sand (alluvial)
M Man-made deposit (slag, tailings, spoil, etc.)
- ROAD CLASSIFICATION**
1 Grade: relatively steep and sound
2 Grade: significant flaws, decomposed rock, section cutbacks
3 Sand
4 Probable aggregate resource
- AGGREGATE RESOURCES**
Operating gravel and/or sand pit
Abandoned gravel and/or sand pit
Operating stone quarry
Abandoned stone quarry
Potential quarry aggregate resource area
Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); shaded from well logs
"S" indicates gravel; "M" indicates sand
"X" in well-log denotes unclassified or unknown property
"W" denotes Colorado Geological Survey "WATERBURY" and "GRAVEL" projects
"D" in well-log denotes unclassified or unknown property
Landform boundary, solid where known or observed; dashed where approximate or inferred
- WATER, LAKES AND CREEKS**
Water bodies thickness (ft)
Shaded area indicates the location of water bodies and their location
Significant amount of flow (bearing 4000 cfs) shown; 4000 cfs or less shown
Significant amount of discharge or leak rock
Significant amount of solution carbonate (indicates unknown property)
"X" in symbol denotes property subject to investigation



QUADRANGLE LOCATION
NON-RESOURCE OR WETLAND AREA

Base from U. S. Geological Survey
7-1/2 minute quadrangle

FOR SALE AND SPECIFIC INFORMATION
CONTACT THE DISTRICT OFFICE



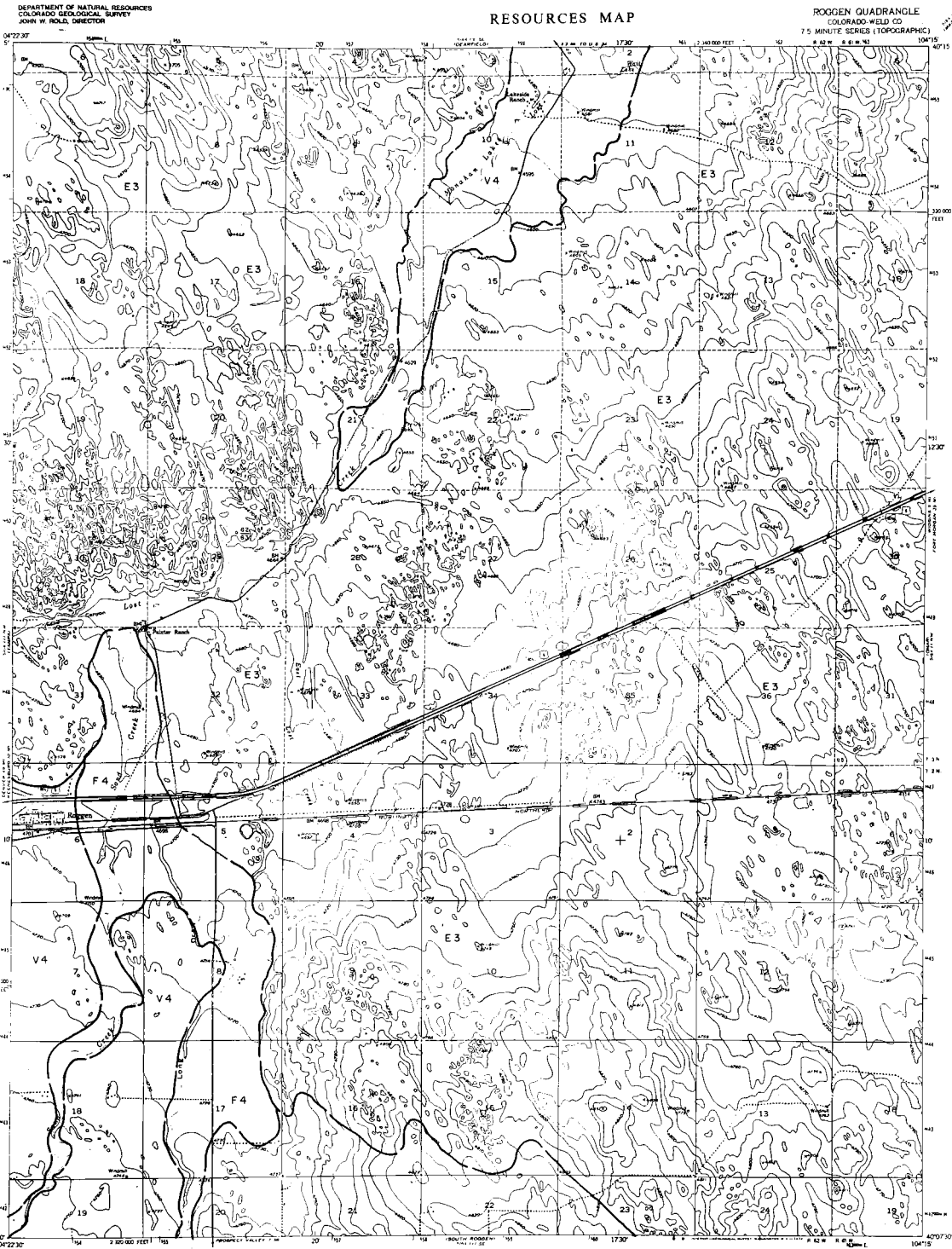
ROAD CLASSIFICATION
Light duty
Disrupted detour
State Route

RAYMOND, COLO.

Mapped by: Ralph H. Shroba
Date: June 30, 1974

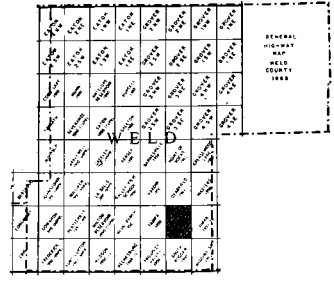
SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

ROGGEN QUADRANGLE
COLORADO WELD CO
7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- AMOUNTS**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unaltered aggregate
 - A Alluvial fan
 - E Erosional deposit (colluvium)
 - M Man-made deposits (slag, tailings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- Gravel**
- 1 Gravel: relatively clean and sand
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- Sand**
- 1 Sand: relatively clean and well sorted
 - 2 Sand: significant fines, decomposed rock, calcium carbonate
- Quarry Aggregate Resource**
- 1 Quarry aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with geologic thickness (1) over sand/gravel resource thickness (2), obtained from well logs
 - " " indicates gravel; " " indicates sand
 - " " in symbol denotes unutilized or unknown property
 - " " denotes Colorado Geological Survey wellhead and gravel collection drill hole
 - Land-use boundary, solid where known or observed; dashed where approximate or inferred
- UNITED STATES GEOLOGICAL SURVEY**
- DESCRIPTION OF SYMBOLS**
- Overburden thickness (ft)
 - Aggregate resource thickness (ft)
 - Significant amount of fines (passing 100 mesh, 0.075 in. or 0.075 mm)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcium carbonate (calciferous)
 - " " in symbol denotes unutilized or unknown property
 - " " in symbol denotes property owned or controlled by



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR UTILIZED AREA

REFERENCE: Bjorklund, L.J., and Brown, R.P., 1957, Geology and ground-water resources of the lower South Platte River valley between Sardin, Colorado, and Paxton, Nebraska; U. S. Geol. Survey Water-Supply Paper 1376, pl. 1.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Base from U. S. Geological Survey 7-1/2 minute quadrangle

CONTOUR INTERVAL: 10 FEET (BASED ON MEAN SEA LEVEL)

ROAD CLASSIFICATION

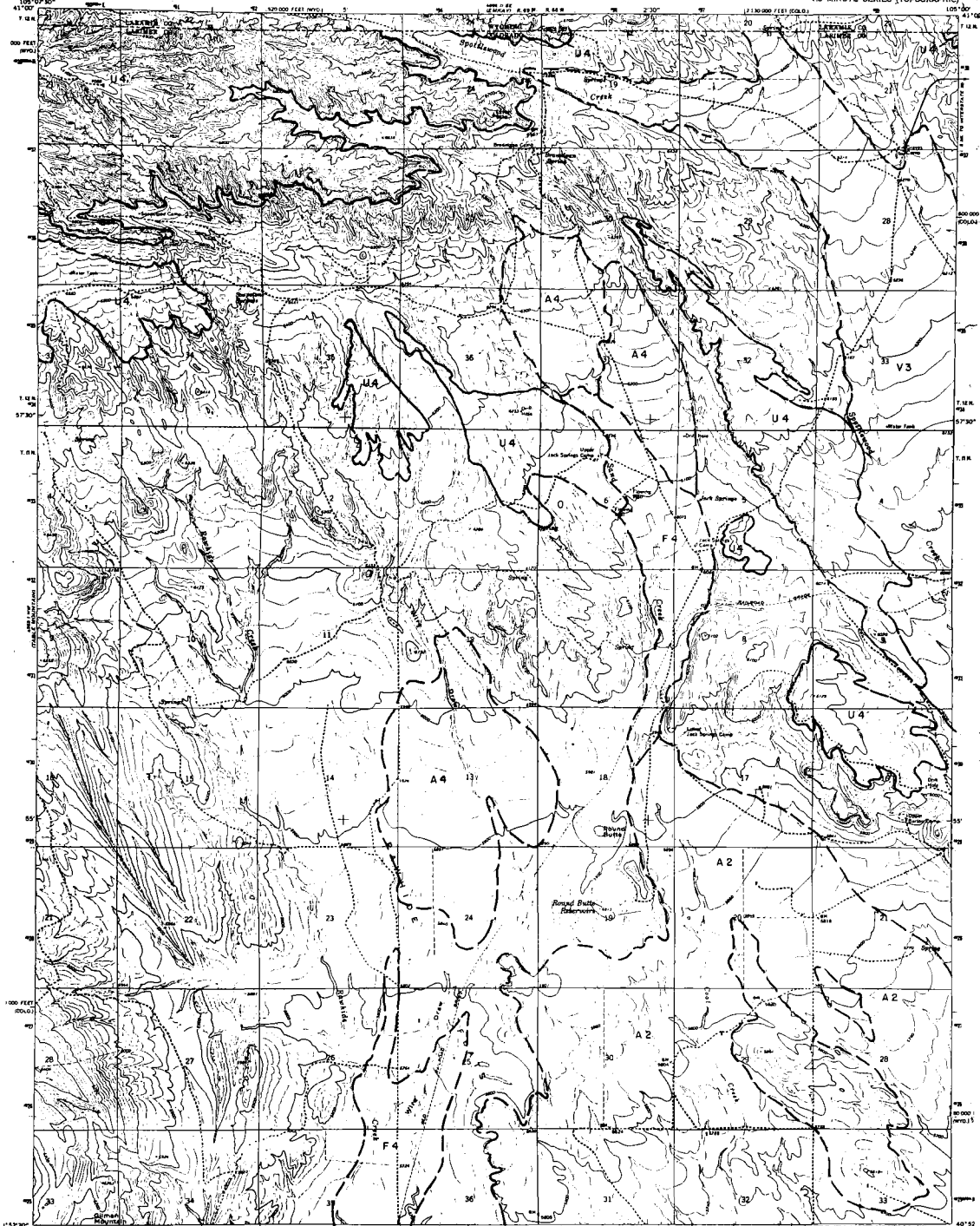
- Primary highway: Light-colored road, hard or hard surface
- Secondary highway: Dark surface
- Unimproved road: Dotted line
- Interstate Route: Circle with number
- U. S. Route: Square with number
- State Route: Circle with number

ROGGEN, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

ROUND BUTTE QUADRANGLE
COLORADO-WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLS, DIRECTOR



EXPLANATION

- Landform well

 Resource class/location
- LANDFORMS**

 - F Floodplain deposit
 - T Stream terrace deposit
 - V Alluvial fan (F & T)
 - U Unfold deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (fill, tailings, spoils, ...)

- RESOURCE CLASSIFICATION**

 - GRAVEL AGGREGATE**
(at least 10% gravel on 40 screen, final estimation)
 - 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcine carbonaceous
 - SAND AGGREGATE**
(greater than 10% sand on 40 screen, 60% retained on 200 screen, final estimation)
 - 3 Sand
 - POTENTIAL QUARRY**
 - 4 Potential aggregate resource

- WELL SYMBOLS**

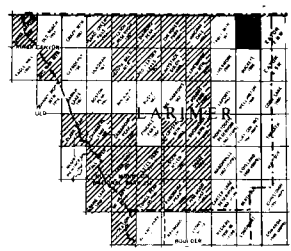
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area

Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs:

 - "G" indicates gravel, "S" indicates sand
 - "*" in symbol denotes unventilated or unknown property
 - "W" denotes Colorado Geological Survey Water/Soil and Geol. projects
 - "D" in symbol denotes drilled or observed, sand where known or observed, sand where occurrence is inferred.

- STATION, LOCATION AND CHRONOLOGICAL CLASSIFICATION OF ROAD**

 - non-resource thickness (ft)
 - resource thickness (ft)
 - gravel and fine sand (greater than 10% on 40 screen, 60% on 200 screen, final estimation)
 - significant amount of fines (greater than 10% on 40 screen, 60% on 200 screen, final estimation)
 - significant amount of decomposed or sand rock
 - significant amount of solution carbonate (calcine)
 - "*" in symbol denotes unventilated or unknown property
 - "W" in symbol denotes property owned or leased/owned



QUADRANGLE LOCATION
 NON-RESOURCE OR WETLAND AREA

REFERENCE:

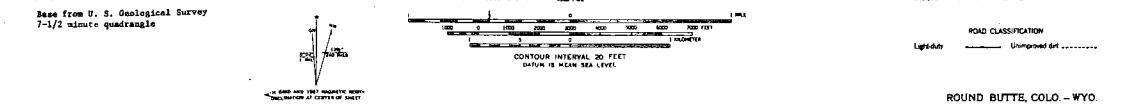
Moore, P.E., 1959. Cenozoic evolution of the east flank of the Larzac Range, Colorado and Wyoming; Univ. Wyoming Pub. Ph.D. Thesis, pl. 4.

Denson, N.H., 1974. personal communication.

Weist, W.C., Jr. 1965. Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgewick, and Weld Counties, Colo.; U. S. Geol. Survey Water-Supply Paper 1609-1, pl. 1.

Lovly, M.E., and Criss, H.A., 1967. Geology and ground-water resources of Larimer County Wyoming; U. S. Geol. Survey Water-Supply Paper 1834, pl. 1.

Mapped by: Stephen D. Schowchew
Date: June 30, 1974



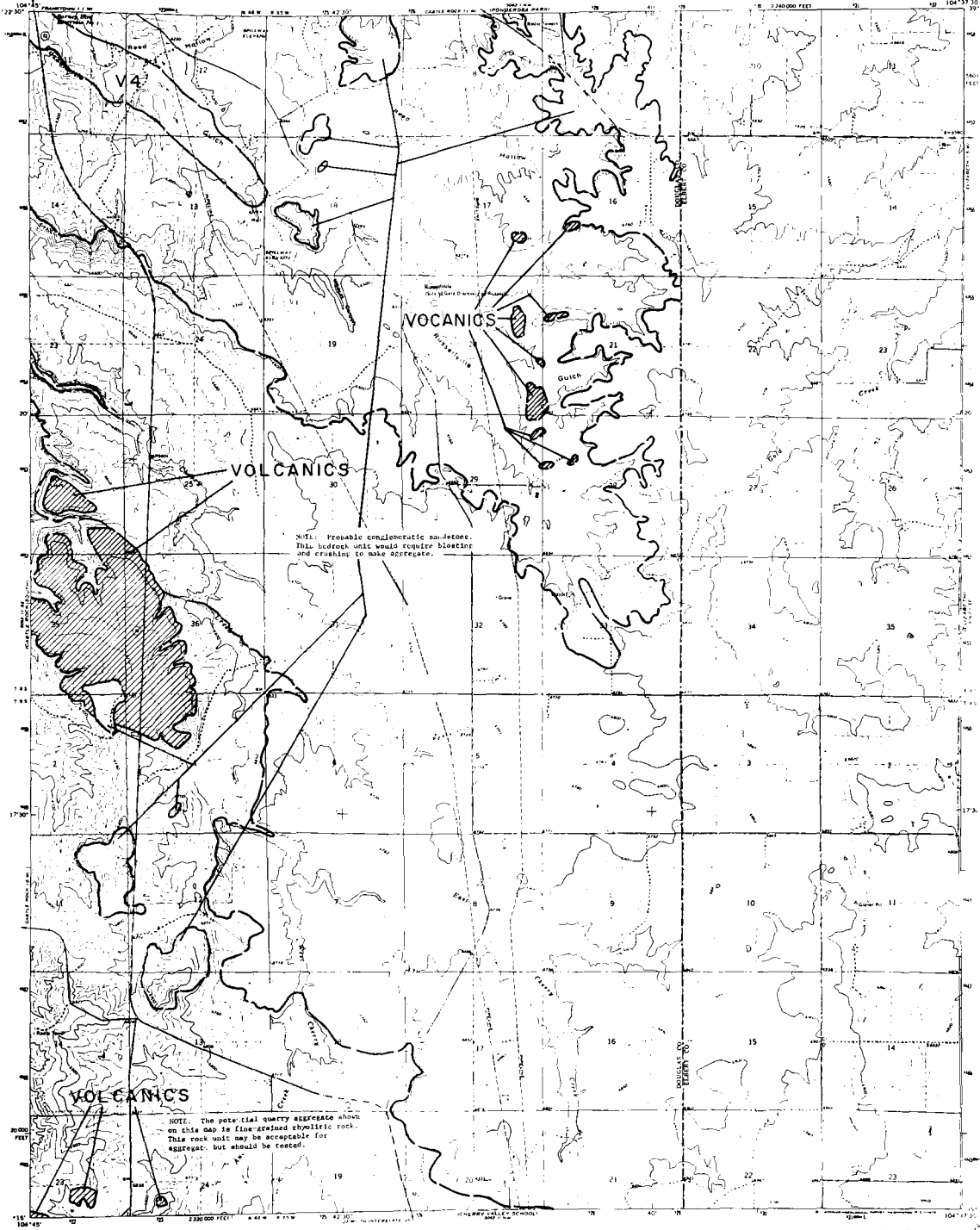
ROAD CLASSIFICATION
 Light-dash Unimproved det.

ROUND BUTTE, COLO. - WYO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

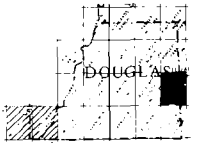
RUSSELLVILLE GULCH
7.5 MINUTE SERIES (TOPOGRAPHIC)
WITH EXPLANATION BY QUADRANGLE

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLS, DIRECTOR



EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Terrace surface deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Erosion-deposited sand (entire)
 - M Non-igneous deposit (sandstone, siltstone, etc.)
- RESOURCE CLASSIFICATION**
- 1 Coarse aggregate (sand & gravel) in alluvium, terrace, etc.
 - 2 Coarse, well-sorted clean sand and gravel
 - 3 Coarse, well-sorted clean sand and gravel with significant fines, increased rock content, etc.
 - 4 Fine aggregate (sand) in alluvium, terrace, etc.
 - 5 Sand
 - 6 Unutilized resource
 - 7 Probable aggregate resource
- MAP SYMBOLS**
- a Operating gravel and/or sand pit
 - b Abandoned gravel and/or sand pit
 - c Operating stone quarry
 - d Abandoned stone quarry
 - e Potential quarry aggregate resource area
 - f Potential well or pit location with overburden thickness (ft) and sand/gravel resource potential (ft) obtained from well logs
 - g "g" indicates gravel; "s" indicates sand
 - h In symbol denotes unutilized or unknown property
 - i "i" denotes Colorado Geological Survey "Water/land and gravel" project
 - j "j" is a boundary, solid shows known or observed, dashed shows unutilized or inferred
- SYMBOL, LOCATION AND ORIENTATIONAL DESCRIPTION OF AGGREGATE**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and gravel (percent) of resource, 0 to 100, (total aggregate)
 - significant amount of fines (percent) (fine sand, silt or clay)
 - significant amount of relative carbonate content
 - significant amount of decomposed or weak rock
 - "u" in symbol denotes unutilized or unknown property
 - "i" in symbol denotes property absent or unutilized



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
Chase, C.H., and McConahy, J.A., 1973. Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-731.

Geology modified after:
Tribble, D.F., and Petch, U.S., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-857-A.

Mapped by: Ralph R. Shroba
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

ROAD CLASSIFICATION

Main Road Light Road
Unimproved Rd State Road

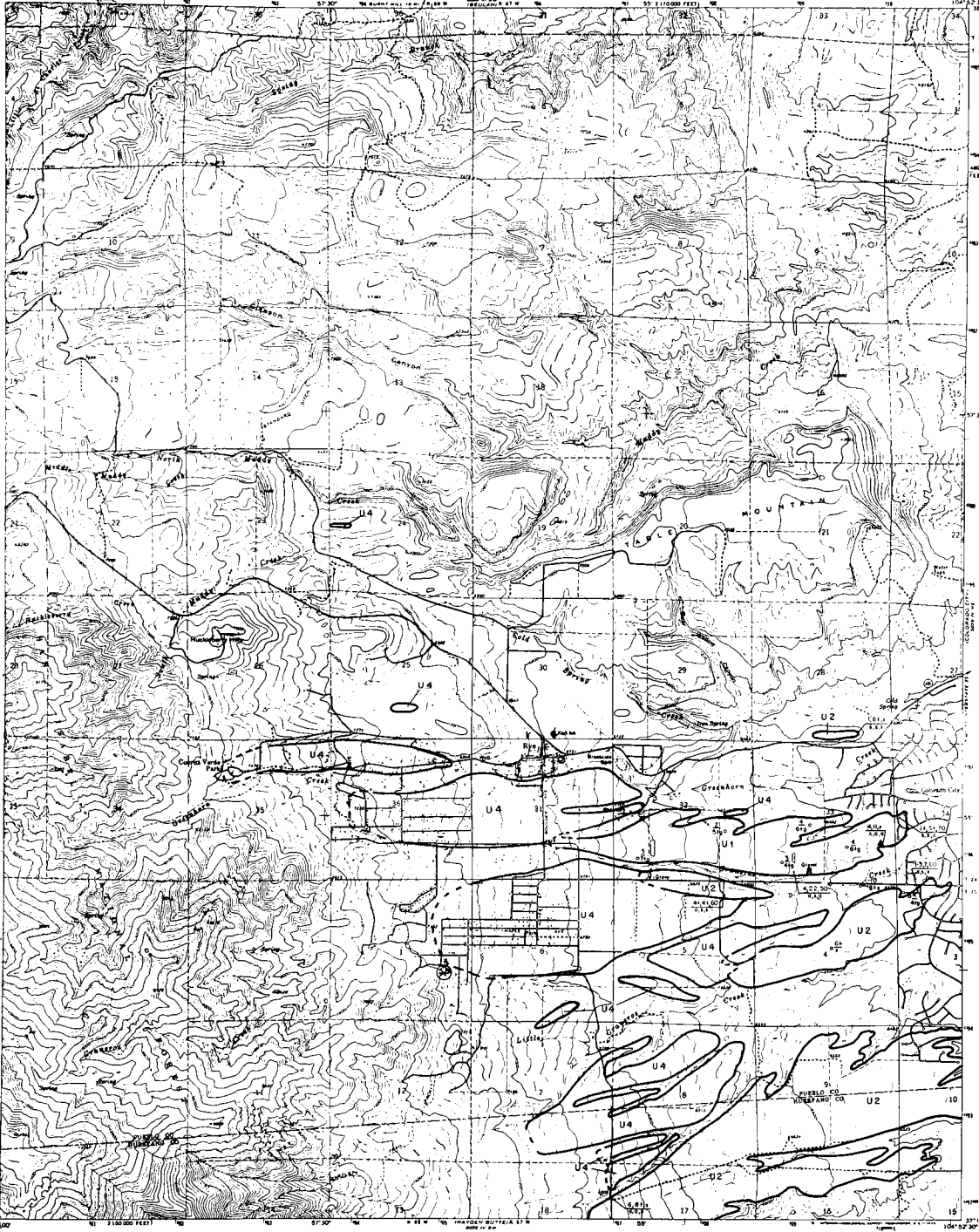
RUSSELLVILLE GULCH, COLO.

Base from U. S. Geological Survey 7-1/2 minute quadrangle

CONTOUR INTERVAL 20 FEET
DATE 10 MAR 1974

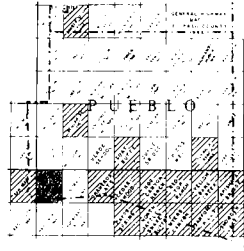
SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

RYE QUADRANGLE
 COLORADO
 7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Contour units
- Resource classification
- MAPPER TITLES**
 - T Floodplain deposits
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Non-depositional sand (concretion, calcification)
 - M Man-made deposits (slag, tailings, spoils, ...)
- RESOURCE CLASSIFICATION**
 - COARSE AGGREGATE**
 - 1 Gravel: relatively clean and round
 - 2 Gravel: significant fines, decomposed rock, calcification
 - FINE AGGREGATE**
 - 3 Sand: retained on #200 screen, usual distribution
 - 4 Probable aggregate resource
- MAP SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource area
 - Selected soil or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs
 - "L" indicates gravel; "S" indicates sand
 - "*" in symbol denotes unutilized or unknown property
 - "M" denotes Colorado Geological Survey "utilized and stone product"
 - Drill hole
 - Location boundary, solid where known or obtained; dashed where approximate or inferred
- STATION LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
 - Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Percent sand and fines (passing #20 screen, 0.075 in., or 0.0075 mm.)
 - Significant amount of fines (passing #200 screen, 0.00425 in., or 0.1075 mm.)
 - Significant amount of decomposed or weak rock
 - Significant amount of aluminum hydroxide (indicator)
 - "*" in symbol denotes unutilized or unknown property
 - "M" in symbol denotes property absent or unright/float

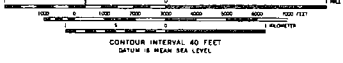


QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Stephen Blasco, 1971, Geologic Map of the Rye-Coloredo City Area, Pueblo and Huerfano Counties, Colorado: Colorado School of Mines, U. S. Thesis T 1360, Plate 1.

Mapped by: Ralph S. Shobe
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



ROAD CLASSIFICATION
 Secondary highway, all weather: Light-duty road all weather
 hard surface: Improved surface
 Unimproved road, fair or dry weather: Unimproved road, fair or dry weather
 State Route: State Route

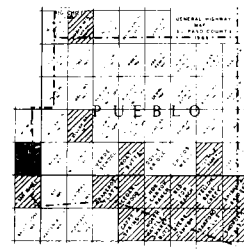
RYE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP



EXPLANATION

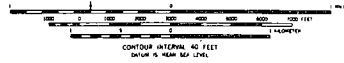
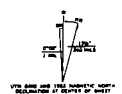
- Contour unit
 - Resource classification
- AGGREGATE UNIT**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated deposit
 - A Alluvial fan
 - E Non-deposited sand (bedrock)
 - M Man-made deposits (fill, tailings, spalls, ...)
- RESOURCE CLASSIFICATION**
- CLASS 1**
 (at least 100 ft² on 40 acres, visual estimation)
- 1 Gravel, relatively clean and sound
 - 2 Gravel, slightly clean, decomposed rock, clean aggregate
- CLASS 2**
 (at least 100 ft² on 40 acres, visual estimation)
- 3 Sand
 - 4 Unavailable resource
 - 5 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log
 - "G" indicates gravel, "S" indicates sand
 - "*" in symbol denotes unutilized or unknown property
 - "M" denotes Colorado Geological Survey Mobile Unit and Crews prediction
 - Landform boundary, with where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOL**
- Overburden: thickness (ft)
 - sand/gravel resource thickness (ft)
 - percent sand and fines (percent of screen, 0.75 in., visual estimation)
 - Significant amount of fines (percent, 200 screen, 0.075 in. or 0.275 mm)
 - Significant amount of decomposed or weak rock
 - Significant amount of material not suitable for use
 - "*" in symbol denotes unutilized or unknown property
 - "*" in symbol denotes property absent or unavailable



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Ralph B. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



CONTOUR INTERVAL: 40 FEET
 (ON A 1:50,000 SCALE)

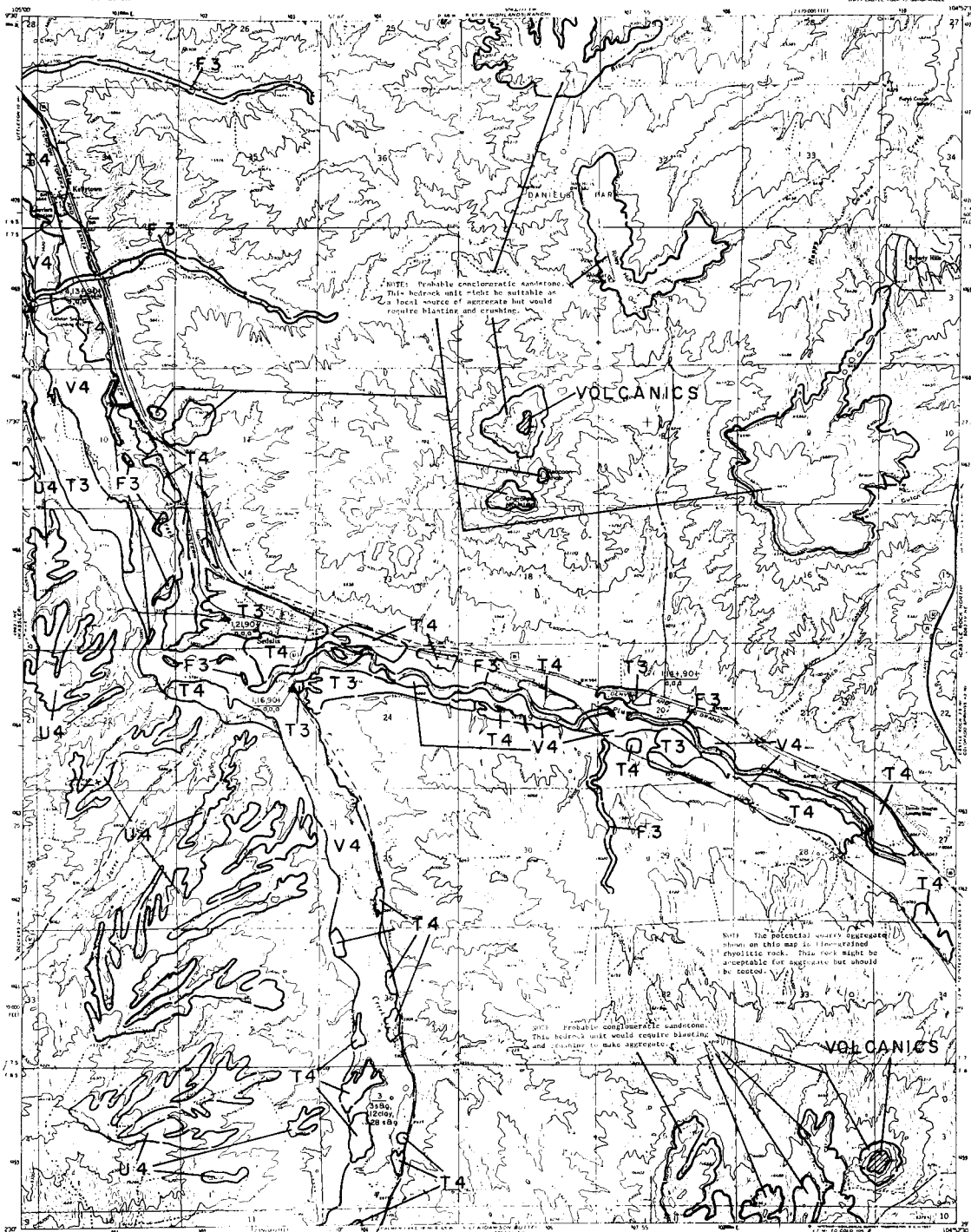
- ROAD CLASSIFICATION**
- Light Duty
 - Unimproved path
 - State Road

SAINT CHARLES PEAK COLO

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

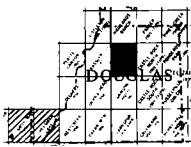
SEDALIA QUADRANGLE
COLORADO-DOUGLAS CO
7.5 MINUTE SERIES (TOPOGRAPHIC)
MAP SCALE: 1:62,500

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- Landform and Resource Classification**
- LANDFORM UNIT**
- T Terrace deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Eolian deposit (sand dune)
 - M Marine deposit (sand, silt, clay, etc.)
- RESOURCE CLASSIFICATION**
- GRAVEL RESOURCE**
(as used in concrete or as aggregate, actual estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, section estimates
- SAND RESOURCE**
(potential sand for housing or concrete, not related to fill source, actual estimation)
- 3 Sand
- PROBABLE RESOURCE**
- 4 Probable aggregate resource
- USE SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Related well or fill-hole location with overburden thickness (ft) over sand/gravel resource (thickness (ft), obtained from well logs)
 - "m" indicates gravel; "s" indicates sand
 - "a" in symbol denotes unconsolidated or unknown gravels
 - "w" indicates Colorado Geological Survey "Washed Sand and Gravel Project" drill hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- SYMBOL LOCATION AND ORIENTATION**
- ORIENTATION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - correct sand and gravel spacing (ft)
 - correct, 2.35 (in.), straight estimation
 - significant amount of fines (spacing 100 screens, 0.075 in. or 0.075 mm.)
 - significant amount of decomposed or weak rock
 - significant amount of siliceous carbonate (includes)
 - "a" in symbol denotes property abstract or Geoprog/Signs



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR VITICULTURAL AREA

REFERENCE:

Chase, G.H., and McGowen, J.A., 1971. Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map T-731.

Geology modified after:

Trumble, D.E., and Pirsch, H.S., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Denver Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map T-856-A.

Mapped by: Ralph B. Shrobs
Date: June 30, 1974

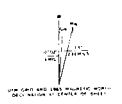
Prepared in cooperation with the U. S. Geological Survey.

ROAD CLASSIFICATION

Heavy duty ————— Light duty —————
Medium duty ————— Unimproved dirt —————
Interstate Route ————— U.S. Route ————— State Route

SEDALIA, COLO.

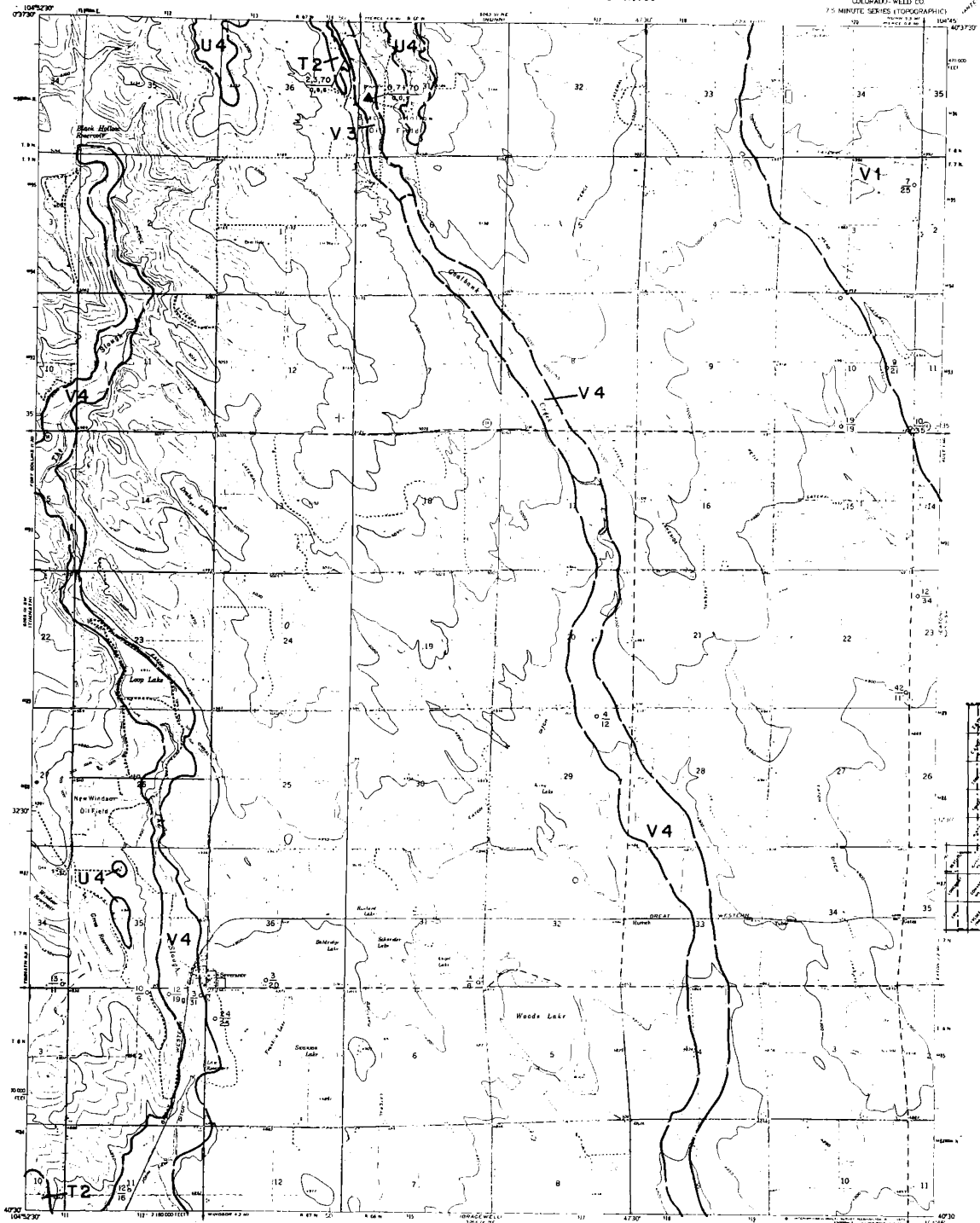
Base from U. S. Geological Survey
7.5-minute quadrangle



SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

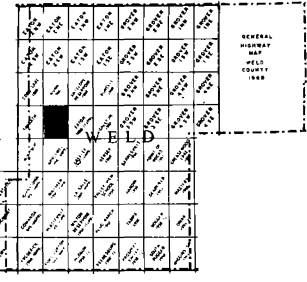
SEVERANCE QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- Landform unit**
Landform classification
- AGGREGATE TYPES**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, spoils, ...)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 50% passing on #4 screen, manual extraction)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, cation carbonate
- Fine Aggregate**
(greater than 200 passing #4 screen, 60% passing on #200 screen, manual extraction)
- 3 Sand
- Overlaid Resource**
- 4 Probable aggregate resources
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log.
 - "I" indicates gravel, "S" indicates sand
 - "X" in symbol denotes unclassified or unknown property.
 - "W" denotes Colorado Geological Survey stream flow and gravel projection.
 - Landform boundary, solid where known or observed, dashed where approximate or inferred.
- STATION LOCATION AND GEOLOGICAL DESCRIPTION OF SPOTWELL**
- Overburden thickness (ft)
 - underlying resource thickness (ft)
 - percent sand and fines (passing #4 screen, 2.0 in.), manual extraction
 - Significant amount of flow (passing 100 screen, 0.075 in. or 0.275 mm.)
 - Significant amount of decomposed or weak rock.
 - Significant amount of sulfide carbonate indicator.
 - "X" in symbol denotes unclassified or improperly.
 - "S" in symbol denotes properly sorted or high/low.



QUADRANGLE LOCATION

NON-RESOURCE OR WITHEARN AREA

REFERENCE:

Merriby, L.A., and Schneider, F.A., Jr., 1972, Geologic map of the lower Cache La Poudre River basin, north-central Colorado; U. S. Geol. Survey Misc. Geol. Inv. Map I-687.

Shelton, D.C., 1974, personal communication.

Sven, F. W., III, 1972, Map of surficial geology of part of the Severance quadrangle: facsimile mapping for Colorado Geol. Survey Windsor Environmental Geology Project, open-file map.

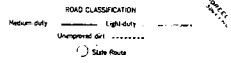
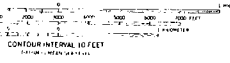
Geology modified after:
Calton, R.B., and Fitch, S.R., 1978, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Creeley Area, Front Range Urban Corridor, Colo.; U. S. Geol. Survey Misc. Geol. Inv. Map I-855-D.

Mapped by: Stephen D. Schwochow
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey.

SEVERANCE, COLO.

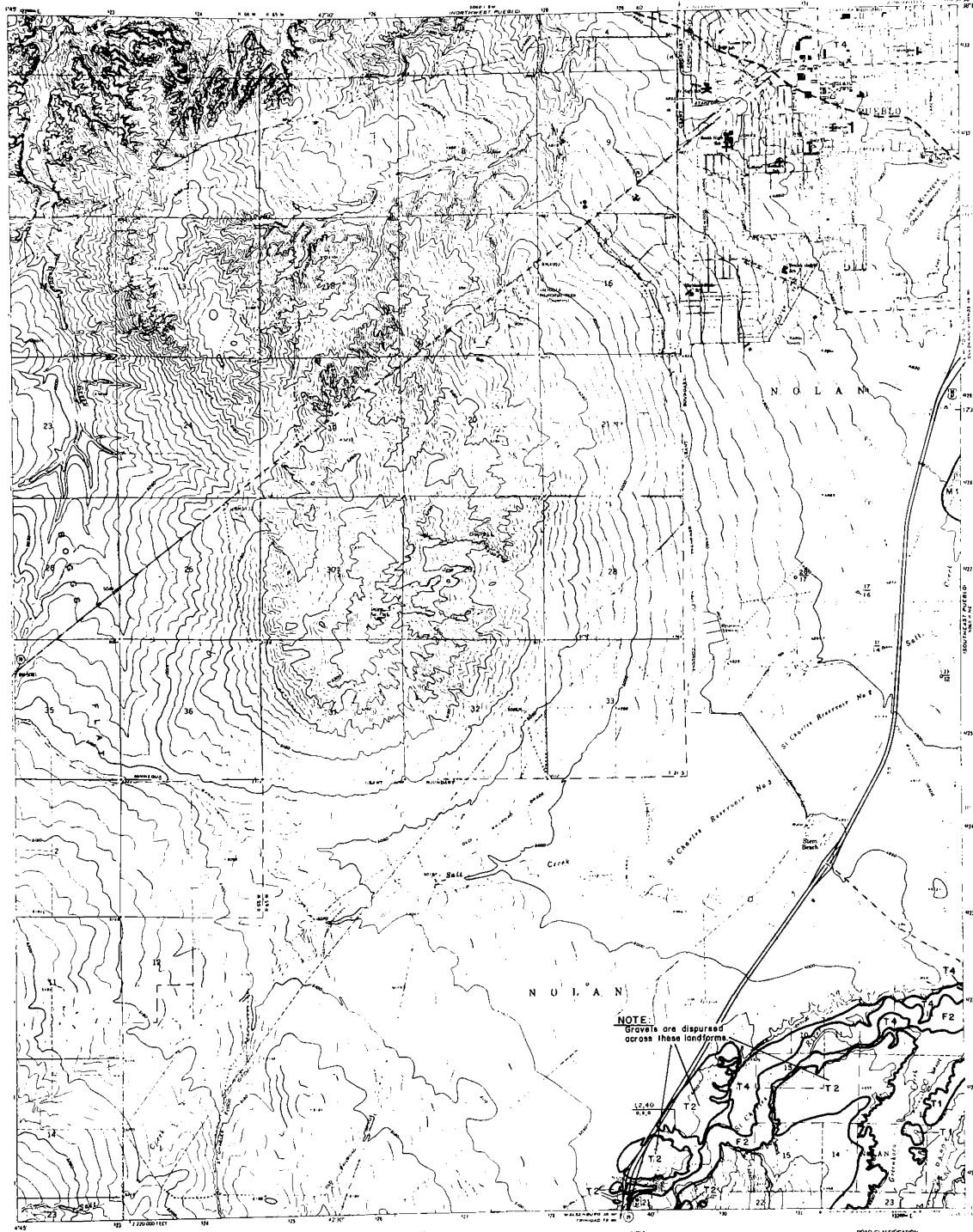
Base from U. S. Geological Survey
7 1/2 minute quadrangle



USE 1983 AND 1975 MAPS; VERIFY SPOTWELL LOCATION IN CENTER OF SHEET

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

SOUTHWEST PUEBLO QUADRANGLE
 COLORADO-PUEBLO CO
 7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

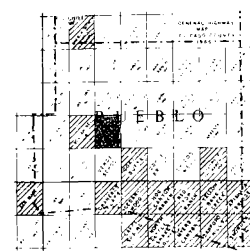
Longform well
 Resource class/location

- LANDFORM UNITS**
- F Floodplain deposit
 - T Tertiary terrace deposit
 - V valley fill (F & T)
 - U Upland alluvium
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, spoils, etc.)

- RESOURCE CLASSIFICATION**
- Gravel Resources**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous
 - 3 Sand
 - 4 Possible aggregate resource

- QUARRY SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selective well or drill-hole location with meter log (includes fill over sand/gravel resource thickness (ft), distance from well top "ft", indicates gravel, "ft" indicates sand)
 - "ft" in symbol denotes unwatered or unwatered (1967)
 - "ft" denotes Colorado Geological Survey Water (Sand and Gravel) projects' drill hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred

- STATION, LOCATION AND GEOLOGICAL CLASSIFICATION OF ROAD**
- contaminated thickness (ft)
 - noncontaminated thickness (ft)
 - gravel and sand fines (passing #10 screen, 0.075 in. or 0.0029 m.)
 - significant amount of decomposed or weak rock
 - significant amount of fines (passing #100 screen, 0.0075 in. or 0.0019 m.)
 - significant amount of soluble materials or weakly cemented
 - "ft" in symbol denotes unwatered or unwatered (1967)
 - "ft" in symbol denotes property status of noncontaminated



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

NOTE
 Gravels are dispersed across these landforms

Base from U. S. Geological Survey
 7-1/2 minute quadrangle

- ROAD CLASSIFICATION**
- Heavy-duty
 - Light-duty
 - Medium-duty
 - Unimproved dirt
 - Interstate Route (I-75, I-25, I-70)
 - State Route (SR-160, SR-166)

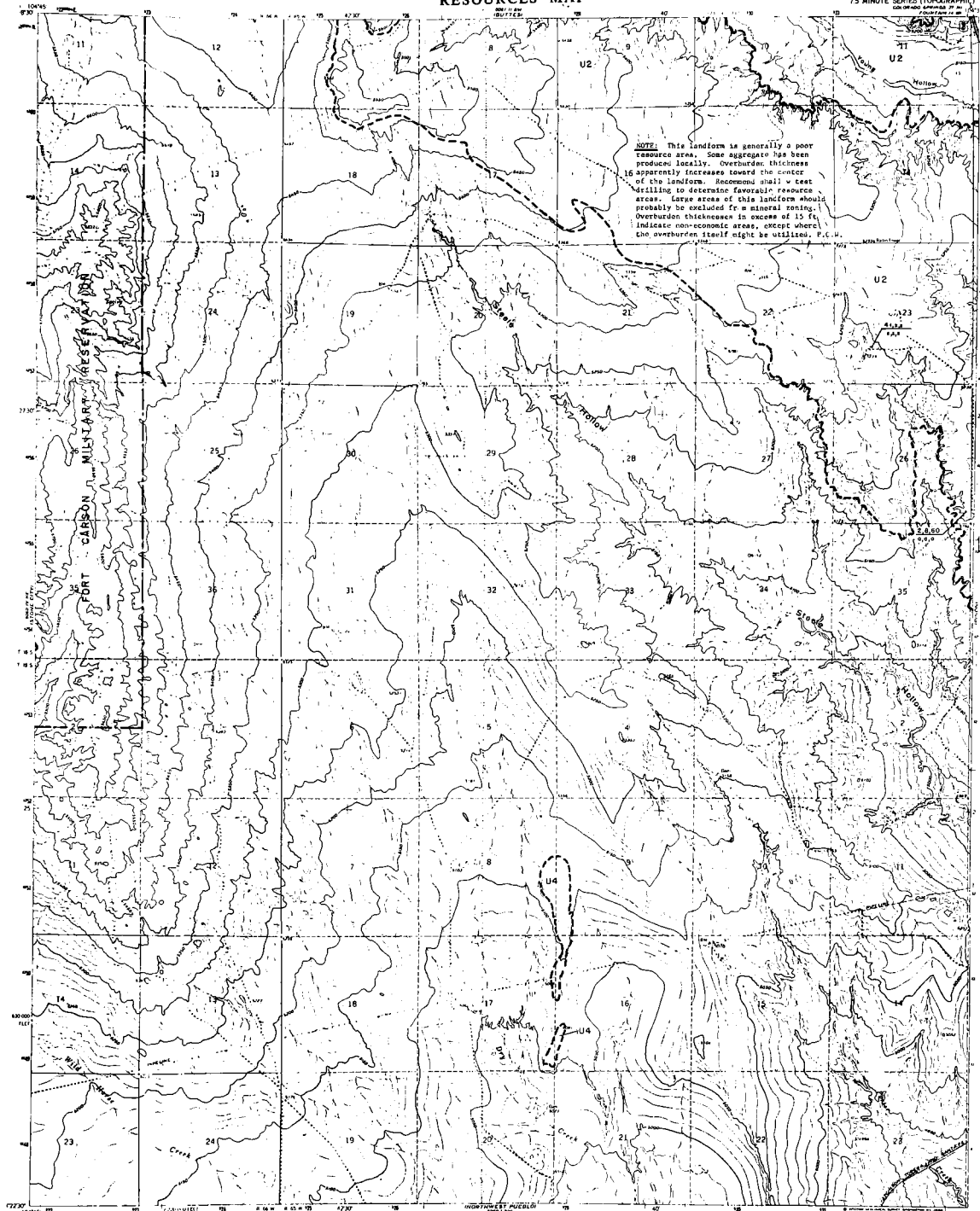
SOUTHWEST PUEBLO, COLO.

Mapped by: Phillip C. Wicklein
 Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE

STEELE HOLLOW QUADRANGLE
 COLORADO-PUEBLO CO
 75 MINUTE SERIES (TOPOGRAPHIC)

RESOURCES MAP



EXPLANATION

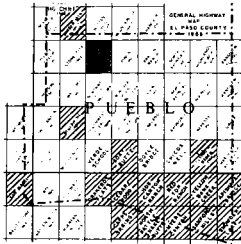
Landform unit
 Resource class/function

- LANDFORM UNIT**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mountain deposits (clay, siltstone, granite, ...)

- RESOURCE CLASSIFICATION**
- Gravel**
 (as listed on 75' contour on 16' contour, visual estimate)
- 1 Gravel: relatively clean and sand
 - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- Sand**
 (greater than 100' passing 48' screen, 60% retained on 100' screen, visual estimate)
- 3 Sand
 - 4 Overburden deposits
 - 5 Probable aggregate resource

- MAP SYMBOLS**
- Overburden gravel and/or sand pit
 - △ Abandoned gravel and/or sand pit
 - Overburden stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft), overburden gravel resource thickness (ft), obtained from well logs.
 - "G" indicates gravel; "S" indicates sand
 - "*" in symbol denotes unutilized or unknown property.
 - "u" denotes Colorado Geological Survey Underfoot and Gravel project
 - Well hole
 - Landform boundary, solid where known or observed, dashed where approximate or inferred.

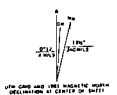
- STATION, LOCATION AND ORIENTAL CHARACTERISTICS OF SYMBOLS**
- Overburden thickness (ft)
 - △ Overburden resource thickness (ft)
 - Gravel and sand fines (passing 48' screen, 60% retained on 100' screen)
 - Significant amount of decomposed or sand rock
 - Significant amount of calcium carbonate (calcite)
 - "*" in symbol denotes unutilized or unknown property.
 - "u" in symbol denotes property absent or unutilized



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Micklen
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



ROAD CLASSIFICATION

- Heavy duty
- Light duty
- Unimproved dirt
- Interstate Route
- U. S. Route

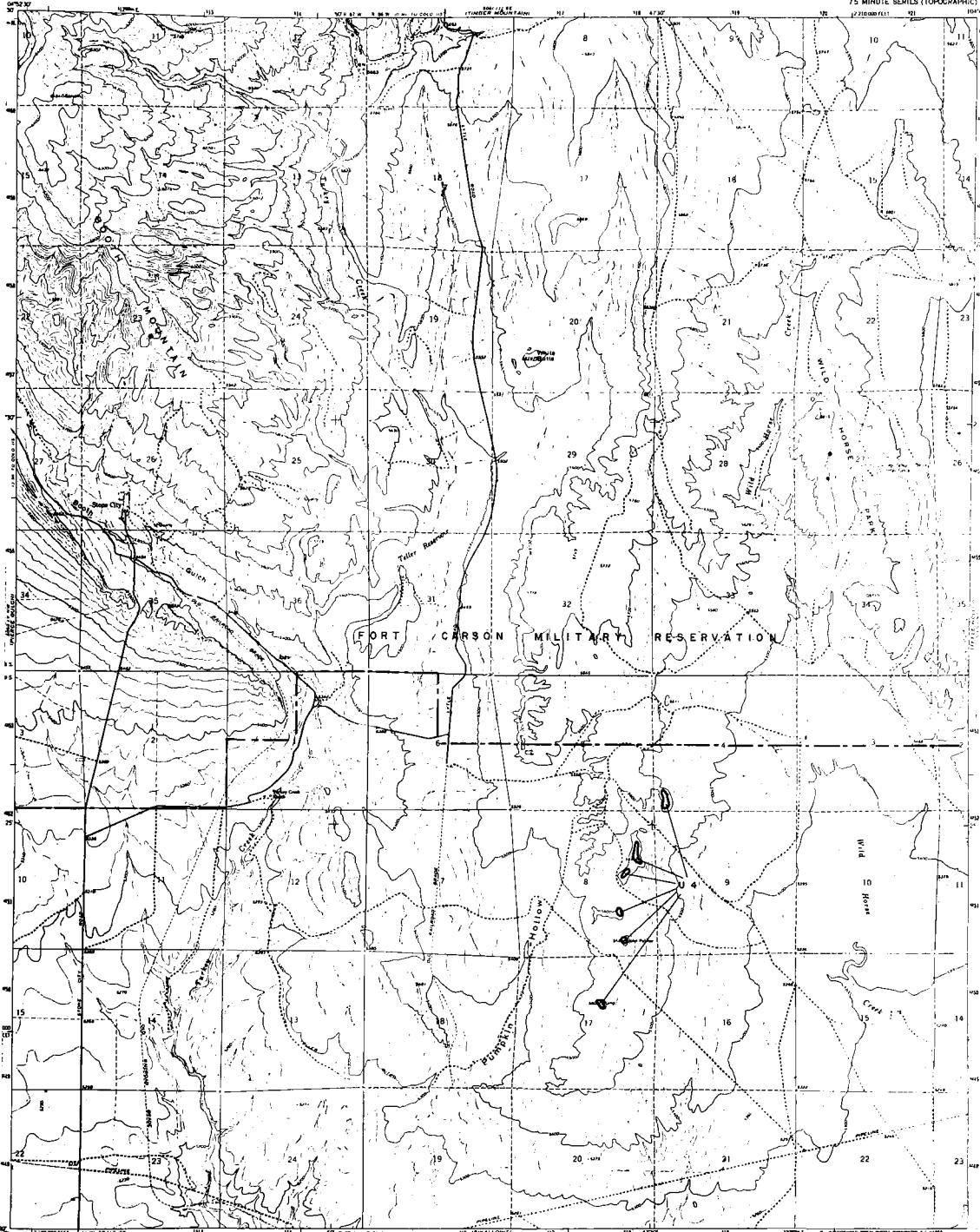
STEELE HOLLOW, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE

DEPARTMENT OF NATURAL RESOURCES
 COLORADO GEOLOGICAL SURVEY
 JOHN W. HOLL, DIRECTOR

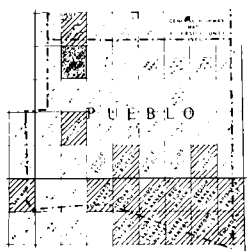
RESOURCES MAP

STONE CITY QUADRANGLE
 COLORADO, PUEBLO CO
 75 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

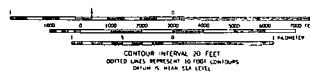
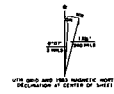
- Contour interval
 Proposed classification
- AGGREGATE TYPES**
- F Fluvialite deposit
 - T River terrace deposit
 - V Valley fill (Q & T)
 - U Unconsolidated
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (landfill, waste, etc.)
- RESOURCE CLASSIFICATION**
- Open Aggregate**
 (at 1000' 200' contour on 84 acres, 1000' contour)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous carbonate
- Fill Aggregate**
 (Gravel: 100' 75' contour on 84 acres, 600' contour on 200' contour, 1000' contour)
- 3 Sand
 - 4 Probable aggregate resource
- USE SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Isolated well or fill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
 - "*" in symbol denotes unclassified or unknown property.
 - "**" denotes Colorado Geological Survey (Water/land use and gravel projects) well hole.
 - Landform boundary, solid where known or observed, dashed where approximate or inferred.
- STATION, LOCATION AND ORIOGRAPHIC DESCRIPTION OF SYMBOLS**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - gravel sand and fines (totaling 84 acres, 2.44 ha.), actual calculation
 - significant amount of decomposed or weak rock
 - significant amount of calcareous carbonate
 - "*" in symbol denotes unclassified or unknown property.
 - "**" in symbol denotes property absent or incomplete.



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Wicklin
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



CONTOUR INTERVAL 20 FEET
 DOTTED LINES REPRESENT 10 FEET CONTOURS
 OTHER S. MEAN SEA LEVEL

ROAD CLASSIFICATION
 Light duty Unimproved dirt

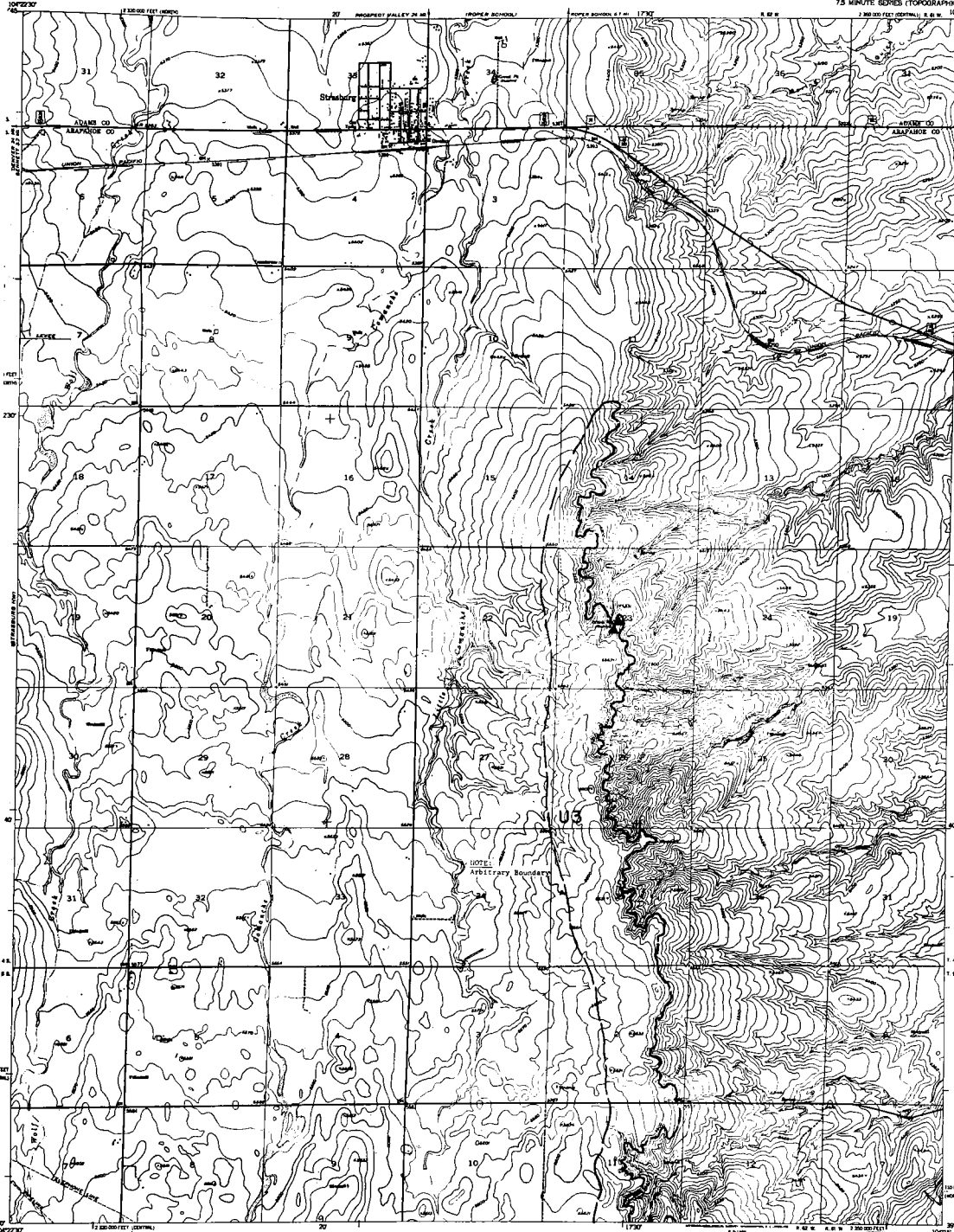
STONE CITY, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

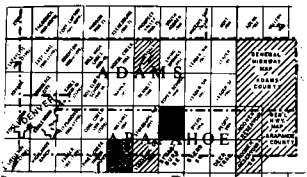
STRASBURG QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

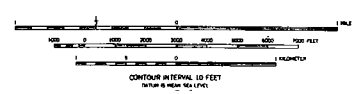
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



- LANDFORM UNITS**
Landform classification
- LANDFORM UNITS**
F Floodable deposit
V Stream terrace deposit
V Valley fill (F & V)
U Upland deposits
A Alluvial fan
E Wind-deposited sand (eolian)
M Marine deposits (beach/shingle, spalls, ...)
- AGGREGATE CLASSIFICATION**
Crown aggregate
for 100% use provided on 40 acres,
"visual estimation"
1 Crown: relatively clean and sound
2 Crown: significant fines, decomposed rock,
caliche carbonates
3 Sand
4 Potential aggregate resource
- MAP SYMBOLS**
Operating gravel and/or sand pit
Abandoned gravel and/or sand pit
Operating stone quarry
Abandoned stone quarry
Potential quarry aggregate resource area
Selected well or drill-hole location with over-
burden thickness (ft) over sand/gravel resource
thickness (ft), obtained from well logs.
"s" indicates gravel; "m" indicates sand
"i" in symbol denotes unutilized or
unknown property.
"w" denotes Colorado Geological Survey
Water/Soil and Gravel projects
drill hole
Landform boundary, well where known or
observed, labeled where appropriate or
colored.
- STATION, LOCATION AND DIMENSIONAL
SAMPLING OF DEPOSIT**
Core/depth (feet)
sand/gravel resource thickness (ft)
percent sand and fines (spacing of
samples, 0.25 in. 1, visual estimation)
Significant amount of fines (spacing
1000 samples, 0.25 in. or 0.076 cm.)
Significant amount of decomposed or weak rock
Significant amount of solution morphology (cavities)
"i" in symbol denotes unutilized or
unknown property.
"w" in symbol denotes property absent
or unexplored.



Base from U. S. Geological Survey
7-1/2 minute quadrangle



- ROAD CLASSIFICATION**
Heavy-duty _____ Light-duty _____
Medium-duty _____ Unimproved det. _____
U. S. Route _____ State Route _____



STRASBURG, COLO.
N832 5--W10415/7.5

- QUADRANGLE LOCATION
- NON-RESOURCE OR
WATERBORN AREA

Reference:
Shedde, S.A., 1971, The Big Horn Creek Deposits
and Reservoir of Adams and Arapahoe Co. Council,
Colorado: Colo. Sch. Minn., CB-1327.

Mapped by: Phillip C. Wicklain
Date: June 30, 1974

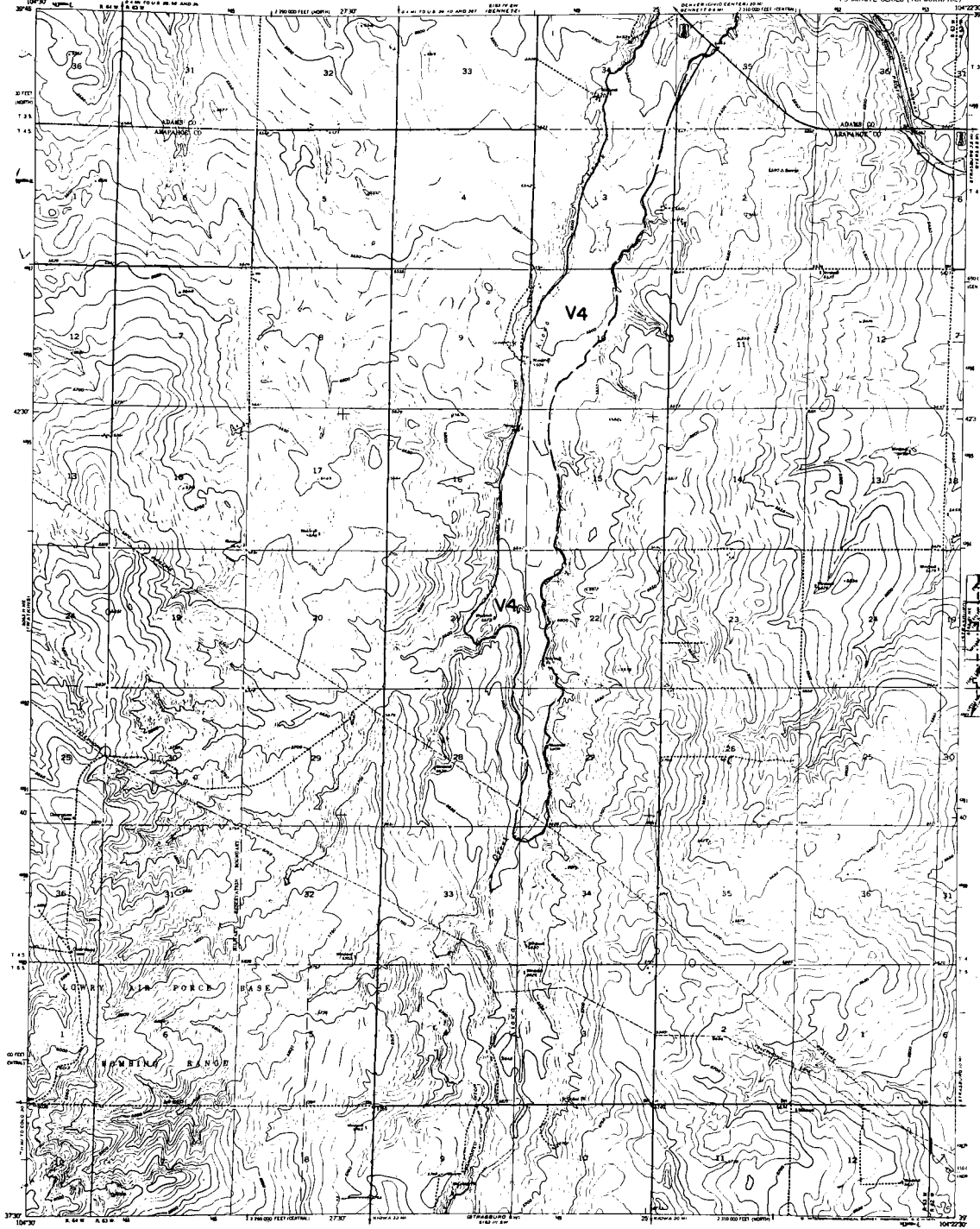
APPROXIMATE BEAR
DECLINATION, 1955

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

STRASBURG NW QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLL, DIRECTOR

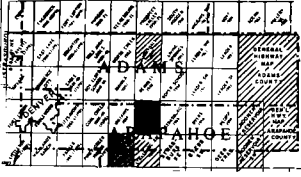


- LEGEND**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Well-sorted sand (silt)
 - M Well-sorted deposits (silt, sandstone, siltstone, ...)

- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
for final 20% material on 4.75 mm...
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, calcareous
- Fine Aggregate**
(material less than 75 microns) # 20 mesh, 200 retained on # 60 mesh, 200 retained on # 100 mesh, 200 retained on # 200 mesh
- 3 Sand
 - 4 Probable aggregate resource

- NO SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Probable quarry aggregate resource area
 - Quarry well or drill-hole location with area
 - Vertical thickness (ft) over sand/gravel resource
 - Thickness (ft) obtained from well logs
 - "s" indicates gravel "m" indicates sand
 - "i" in symbol denotes unutilized or unknown property
 - "u" in symbol denotes unutilized or unknown property
 - "w" denotes Colorado Geological Survey Mineral (Sand and Gravel) projects
 - "b" in symbol denotes boundary, well shows bottom or observed (based where appropriate) as inferred

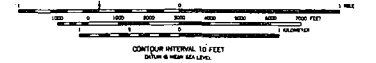
- SYMBOLS**
- overlain thickness (ft)
 - undrained resource thickness (ft)
 - present sand and fines (spacing # 20 mesh, 200 in 1/2 inch maximum)
 - significant amount of fines (spacing # 20 mesh, 200 in 1/2 inch maximum)
 - significant amount of decomposed or weak rock
 - significant amount of calcareous material
 - "u" in symbol denotes unutilized or unknown property
 - "w" in symbol denotes property absent or insignificant



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Wicklin
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTour INTERVAL: 10 FEET
Dotted = Mean Sea Level



- ROAD CLASSIFICATION**
- Light-duty
 - Medium-duty
 - Unimproved dirt
 - U.S. Route
 - State Route

STRASBURG NW, COLO
R3313--R0423.5/7.5
1955
ANS 4142 (1954--SERIES 1977)

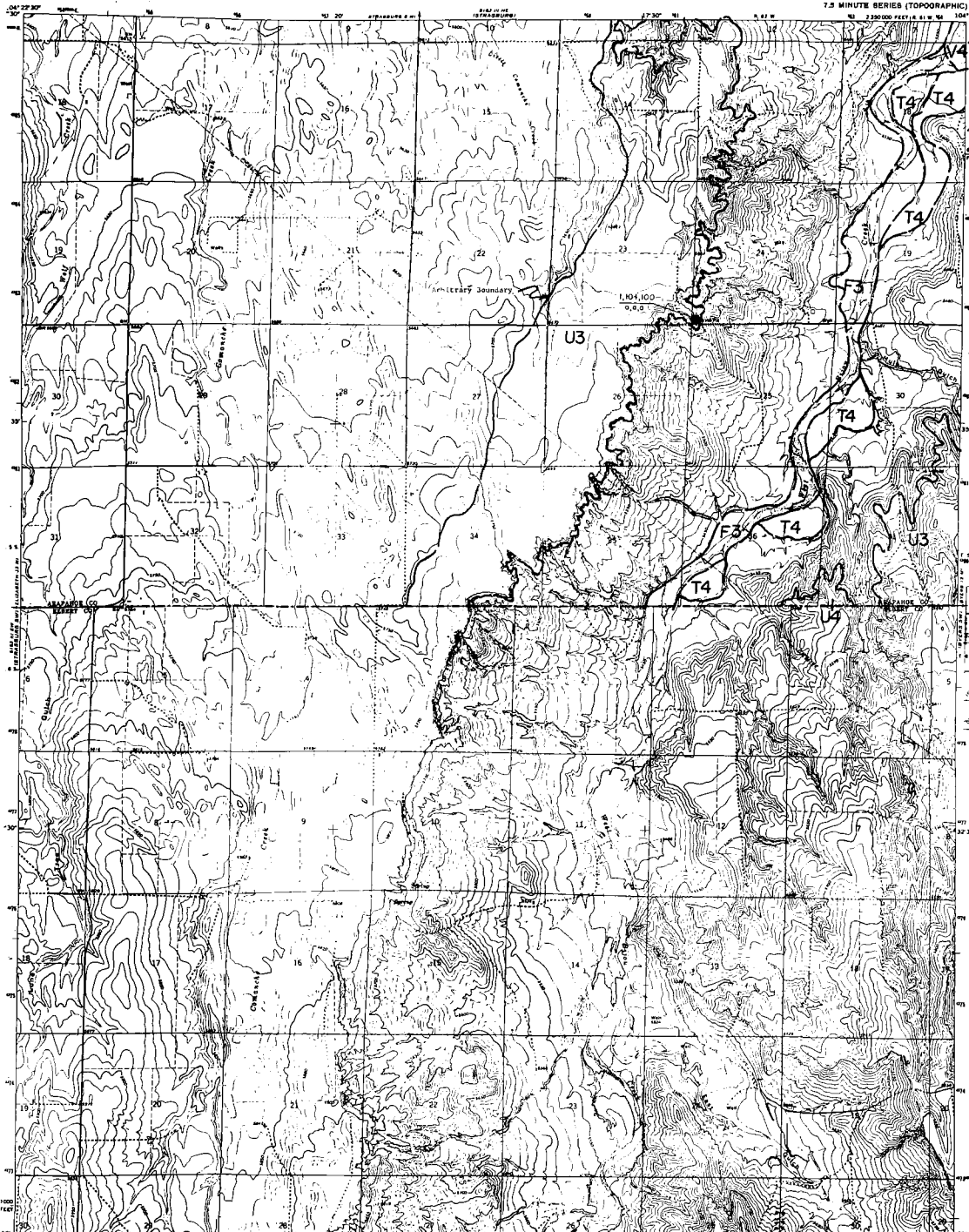
SAND, GRAVEL AND QUARRY AGGREGATE

RESOURCES MAP

STRASBURG SE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROCK, DIRECTOR



- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (V & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-transported sand (colluvial)
 - M Man-made deposits (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- CLASS 1**
- 1 Drawn: relatively clean and unconsolidated
 - 2 Drawn: significant fines, decomposed rock, fraction not shown
- CLASS 2**
- 3 Sand
 - 4 Probable aggregate resource
- KEY SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); dashed line will show "U" indicates sand
 - "U" in symbol denotes unconsolidated or unknown property
 - "M" denotes Colorado Geological Survey "Man-made Sand and Gravel Deposits" drill hole
 - "E" in symbol denotes wind-transported sand where known or observed; dashed line approximate or indicated
- SYMBOL LOCATION AND ORIENTATION**
- DESCRIPTION OF SYMBOLS**
- Overburden thickness (ft)
 - Sand/gravel resource thickness (ft)
 - Percent sand and fines (percent of screen, 0.075 to 0.075 mm.)
 - Significant amount of fines (exceeding 10% screen, 0.075 to 0.075 mm.)
 - Significant amount of decomposed or unconsolidated
 - Significant amount of unconsolidated material
 - "U" in symbol denotes unconsolidated or unknown property
 - "E" in symbol denotes wind-transported sand where known or observed



- QUADRANGLE LOCATION**
- NON-RESOURCE OR VETERAN'S AREA**
- Reference:**
Thaddeus, S. A., 1971, The Big Horn Creek Committee and Reservoirs of Adams and Arapahoe Counties, Colorado: Colo. Sch. Mines ER-1327.

Mapped by: Phillip C. Wickless
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

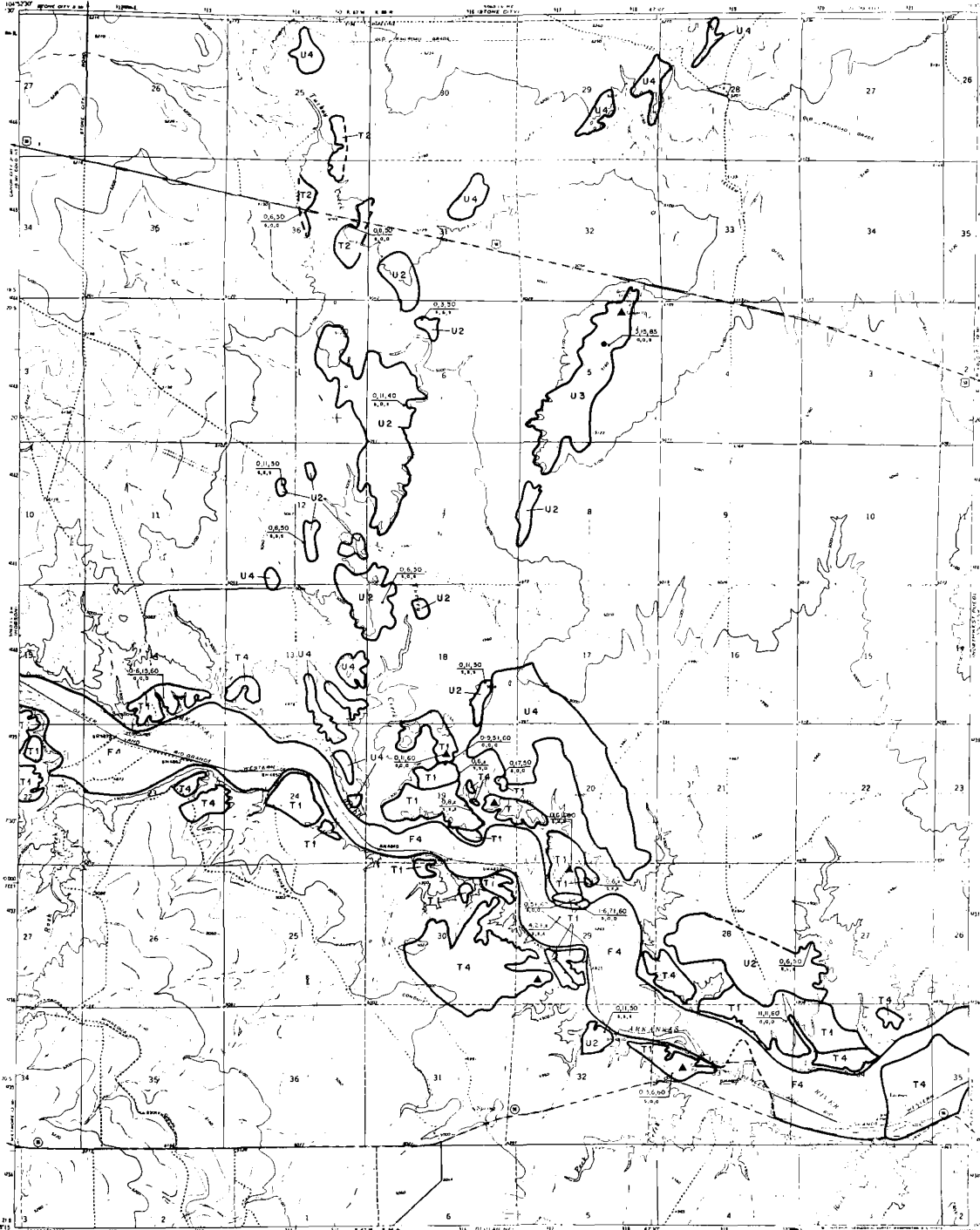
ROAD CLASSIFICATION

- Primary highway: hard surface
- Light-duty road: hard or improved surface
- Secondary highway: hard surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route

STRASBURG SE, COLO.
82930-10415/7.5
1969
AND FIG. 10-BE-SERIES 7571

SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

SWALLOWS QUADRANGLE
 COLORADO-PUEBLO CO
 7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

Symbol for boundary

- LITHOLOGIC UNITS**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated deposit
 - A Alluvial fan
 - E Eolian deposit (sand dunes)
 - M Man-made deposit (tailings, etc.)

- RESOURCE CLASSIFICATION**
- CONFIRMED RESOURCES**
- 1 Gravel: relatively clean and well sorted
 - 2 Gravel: well-sorted from decomposed rock, calcareous detritus
- UNCONFIRMED RESOURCES**
- 3 Sand
 - 4 Potential aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with depth (bottom elevation in feet and ground elevation in feet) (see notes for well logs)
 - "I" indicates gravel, "S" indicates sand
 - "I" in solid circles manufactured on unknown property
 - US Geologic Colorado Geological Survey boundary and colored projection
 - Drill hole
 - Landline boundary, solid where known or observed, dashed where approximate or inferred

STATION LOCATION AND GEOLOGICAL DESCRIPTION OF SAMPLE

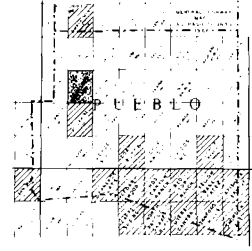
Symbol for station location

Symbol for geological description of sample

Symbol for station location and geological description of sample

Symbol for station location and geological description of sample

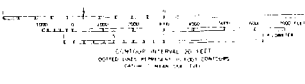
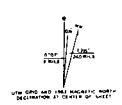
Symbol for station location and geological description of sample



- Symbol for quadrangle location
- Symbol for non-resource or vitiated area

Mapped by: Ralph R. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



ROAD CLASSIFICATION

Medium duty

Light duty

Unimproved dirt

U.S. Route

State Route

SWALLOWS COLO

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

TABLE MOUNTAIN QUADRANGLE
COLORADO - WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR



EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - W Wind-eroded sand (colluvial)
 - M Man-made deposits (slag, tailings, spoils, ...)
- RESOURCE CLASSIFICATION**
- GRAVEL RESOURCES**
1 Gravel: relatively clean and sound
2 Gravel: significant fines, decomposed rock, calcine tailings
- SAND RESOURCES**
3 Sand
- UNCLASSIFIED RESOURCES**
4 Potentially aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft); over sand-gravel transition thickness (ft), obtained from well logs
 - "g" indicates gravel; "s" indicates sand
 - "o" symbol denotes unclassified or unknown property
 - "M" denotes Colorado Geological Survey "Man-made" and "Other" deposits
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND ORIENTAL SIMILITUDE OF BORINGS**
- overburden thickness (ft)
 - sand-gravel transition thickness (ft)
 - percent sand and fines (percent of sample, 2 to 1/2 in.), (total sediment)
 - significant amount of fines (percent of sample, 0.075 to 0.075 mm)
 - significant amount of decomposed or soft rock
 - significant amount of calcine (percent of sample)
 - "o" symbol denotes unclassified or unknown property
 - "M" symbol denotes property absent or ungrouped



QUADRANGLE LOCATION
NON-RESOURCE OR WINDY/BLOWN AREA

REFERENCE:

Lowry, M.E., and Crist, M.A., 1967, Geology and ground-water resources of Larimer County, Wyoming. U. S. Geol. Survey Water-Supply Paper 1834, pl. 1.

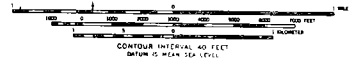
Morre, F.L., 1959, Geomorphic evolution of the east flank of the Larimer Range, Colorado and Wyoming. Univ. Wyoming Pub. Ph.D. Thesis, pl. 4.

Denson, H.M., 1974, personal communication.

Veist, W.G., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Morgan, Sedgewick, and Weld Counties, Colo.: U. S. Geol. Survey Water-Supply Paper 1809-1, pl. 1.

Mapped by: Stephen D. Shuchow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



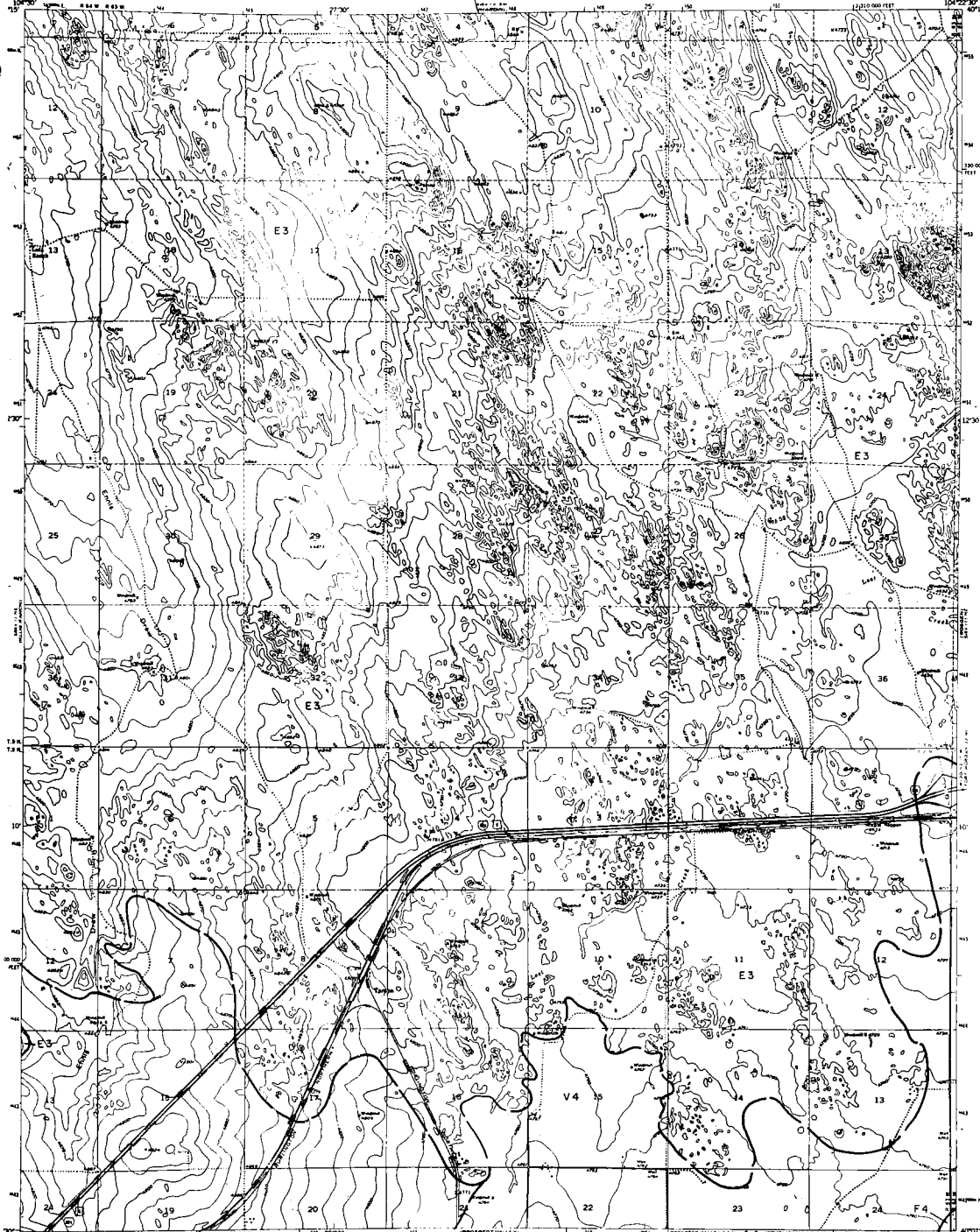
ROAD CLASSIFICATION
Unimproved dirt

TABLE MOUNTAIN, COLO. - WYO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

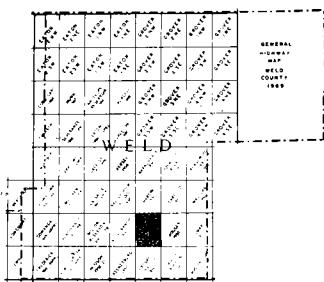
TAMPA QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. MOULT, DIRECTOR



EXPLANATION

- LANDFORM UNITS**
- F Floodplain deposits
 - T Stream terrace deposits
 - V Valley fill (F & T)
 - U Unconsolidated alluvium
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Mesquite deposits (class. indistinct, sparsely...)
- RESOURCE CLASSIFICATION**
- CLASS. 1 (AGGREGATE)**
1 Gravel: relatively clean and round
2 Gravel: significant fines, decomposed rock
3 Sand
- CLASS. 2 (AGGREGATE)**
4 Probable aggregate resource
- MAP SYMBOLS**
- Abandoned gravel and/or sand pit
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with water-bearing thickness (ft.) over sand/gravel resource thickness (ft.), obtained from well logs.
 - "L" indicates gravel; "S" indicates sand
 - "L" in symbol denotes unconsolidated or loose aggregate
 - "W" denotes Colorado Geological Survey Water/Sand and Gravel projects' drill hole
 - Landform boundary, solid where known or inferred; dashed where approximate or inferred.
- STATION, LOCATION AND ORIENTATIONAL INFORMATION**
- Symbol indicates location of sand/gravel resource thickness (ft.)
 - Symbol indicates sand and fines (percent) at bottom, 0-12 in. small diameter
 - Symbol indicates amount of fines (percent) (100 percent, 5-20% or 0-10%)
 - Symbol indicates amount of decomposed or weak rock
 - Symbol indicates amount of soluble carbonate material
 - "L" in symbol denotes unconsolidated or loose aggregate
 - "W" in symbol denotes property, absent or foreign/loan



- QUADRANGLE LOCATION
 NON-RESOURCE OR VETERAN AREA

REFERENCE: Bjorklund, L.J., and Brown, R.F., 1957, Geology and ground-water resources of the lower South Platte River valley between Hardie, Colorado, and Paxton, Nebraska; U. S. Geol. Survey Water-Supply Paper 1378, pl. 1.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET

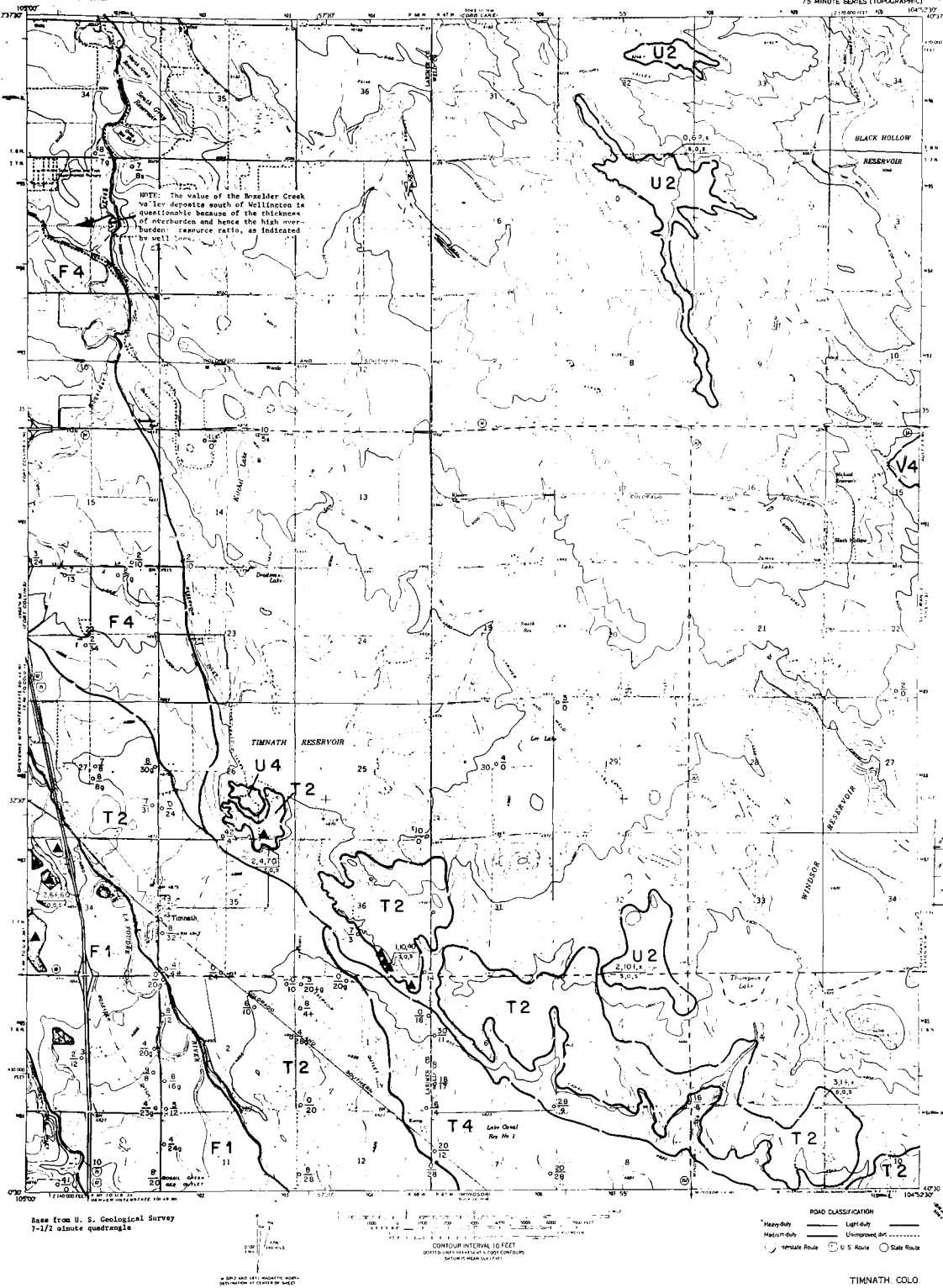
- ROAD CLASSIFICATION**
- Primary highway
 - Hard surface
 - Secondary highway
 - Hard surface
 - Unimproved road
 - Light-duty road hard or improved surface
 - Interstate Route
 - U.S. Route
 - State Route

TAMPA, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

TIMNATH QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. MOLO DIRECTOR



EXPLANATION

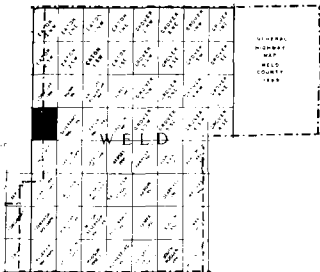
- Contour lines
- Resource/Asset Location

- RESOURCE ZONES**
- F** Fluvial deposit
- T** Trench or river channel
- V** Valley fill (F.A.T.)
- U** Unconsolidated
- A** Alluvial fan
- E** Wind-deposited sand (facies)
- M** Marine deposits (beach-ridge, spits...)

- MINERAL CLASSIFICATION**
- 1** Gravel, relatively clean and sound
- 2** Gravel, significant fines, decomposed rock, cation exchange
- 3** Sand
- 4** Probable aggregate resource

- MAP SYMBOLS**
- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Potential well or drill-hole location with overburden thickness (ft) and sand/gravel resource thickness (ft), obtained from well logs.
- "L" indicates gravel, "S" indicates sand
- "L" or "S" symbol denotes unconsolidated or otherwise deposits
- "M" denotes Colorado Geological Survey Window/Land and Gravel projects' drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred.

- STATION, LOCATION AND DEMOGRAPHIC INFORMATION OF WELLS**
- Production thickness (ft)
- Sand/gravel resource thickness (ft)
- Potential sand and fines (using 40 percent sand) in 100 ft interval
- Significant amount of decomposed rock
- Significant amount of alluvium deposits (facies)
- "L" or "S" symbol denotes unconsolidated or otherwise deposits
- "M" or "L" or "S" symbol denotes property status of the well



QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
 Terrey, L.A., and Schneider, F.A., Jr., 1972, Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-887.
 Ching, F.W., 1972, Economic gravel deposits of the lower Cache La Poudre River: Colorado State Univ. Dept. Master Sci. Thesis.
 Shelton, D.C., 1974, personal communication.

Swan, F.H., III, 1972, Map of surficial geology of part of the Timnath quadrangle, Baca Co., Mapping for Colorado Geol. Survey Window Environmental Geology Project, open-file map.
 Geology modified after: Colton, F.B., and Fitch, B.A., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Greeley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-855-D.

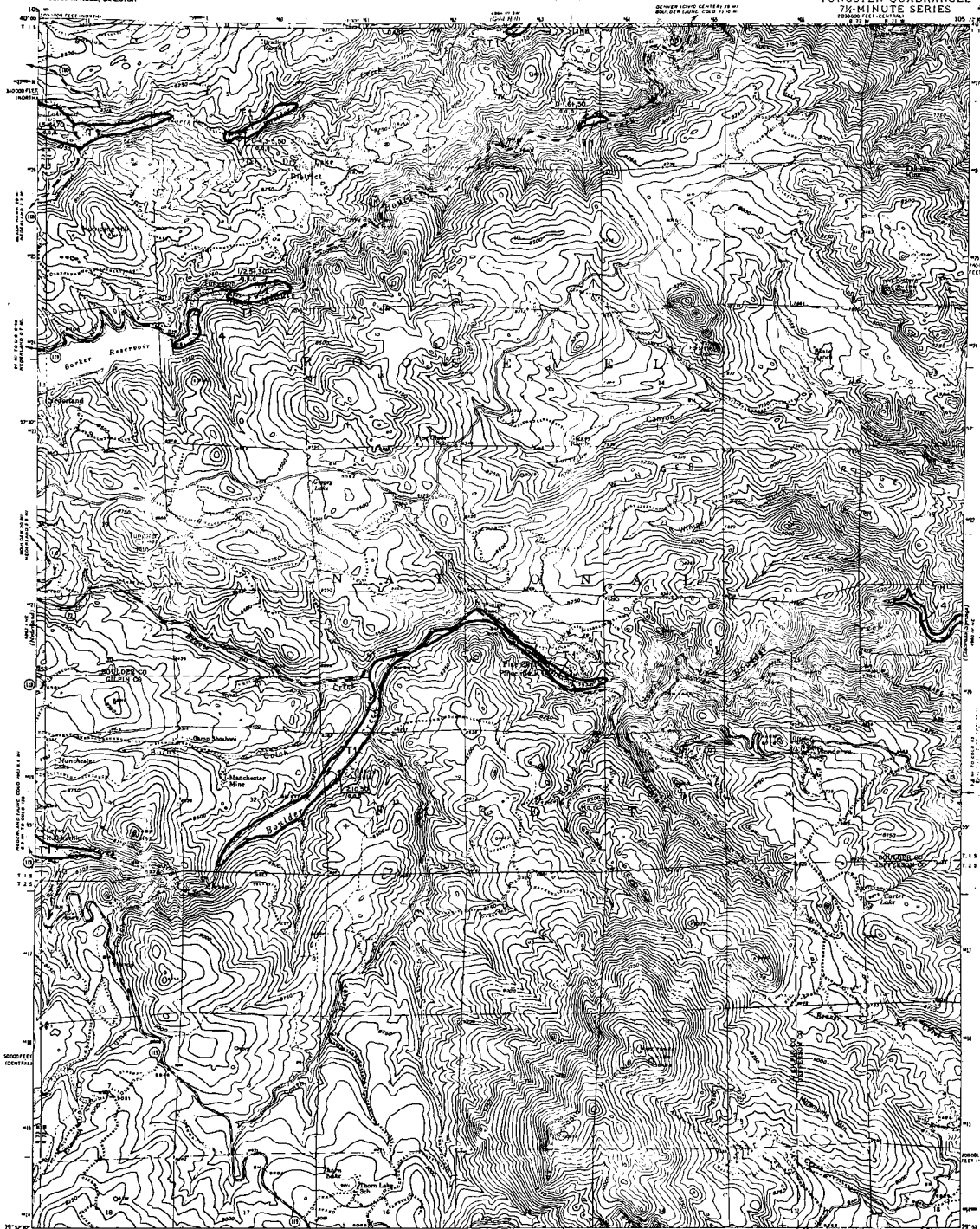
Mapped by: Stephen D. Schoenow
 Date: June 30, 1974
 Prepared in cooperation with the U. S. Geological Survey

TIMNATH, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

COLORADO
TUNGSTEN QUADRANGLE
7 1/2-MINUTE SERIES
FEDERAL GEOLOGICAL SURVEY

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR



EXPLANATION

- Sand/gravel well
- Unknown classification
- LAWSON UNITS**
 - P Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, spoils, ...)
- MINERAL CLASSIFICATION**
 - GRAVEL AGGREGATE**
(at least 10% of material > 48 screen, based on dry weight)
 - 1 Gravel, relatively clean and hard
 - 2 Gravel, significant fines, decomposed rock, calcareous carbonate
 - SAND AGGREGATE**
(greater than 90% passing 20 screen, 90% minus 60 screen, based on dry weight)
 - 3 Sand
 - 4 Probable aggregate resource
- ROAD SYMBOLS**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
- OTHER SYMBOLS**
 - Indicated well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - Indicated sand
 - In symbol denotes unclassified or unknown property
 - American Colorado Geological Survey Method Land and Gravel project
 - Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL CLASSIFICATION OF SYMBOLS**
 - Unclassified (unknown) (ft)
 - 100% gravel, maximum thickness (ft) pavement and fill (total spacing 48 screen, 20 to 60 screen) (ft)
 - Significant amount of fine (passing 100 screen, 10 to 20 screen)
 - Significant amount of decomposed or weak rock
 - Significant amount of medium sandstone (caliche)
 - In symbol denotes unclassified or unknown property
 - In symbol denotes property shown or unclassified

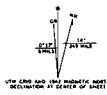


QUADRANGLE LOCATION
 NON-RESOURCE OR WITHDRAWN AREA

Reference:
Gable, D. J., 1972,
U. S. Geol. Survey Geol.
Quad Map GQ-578

Mapped by: Ralph R. Shroba
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



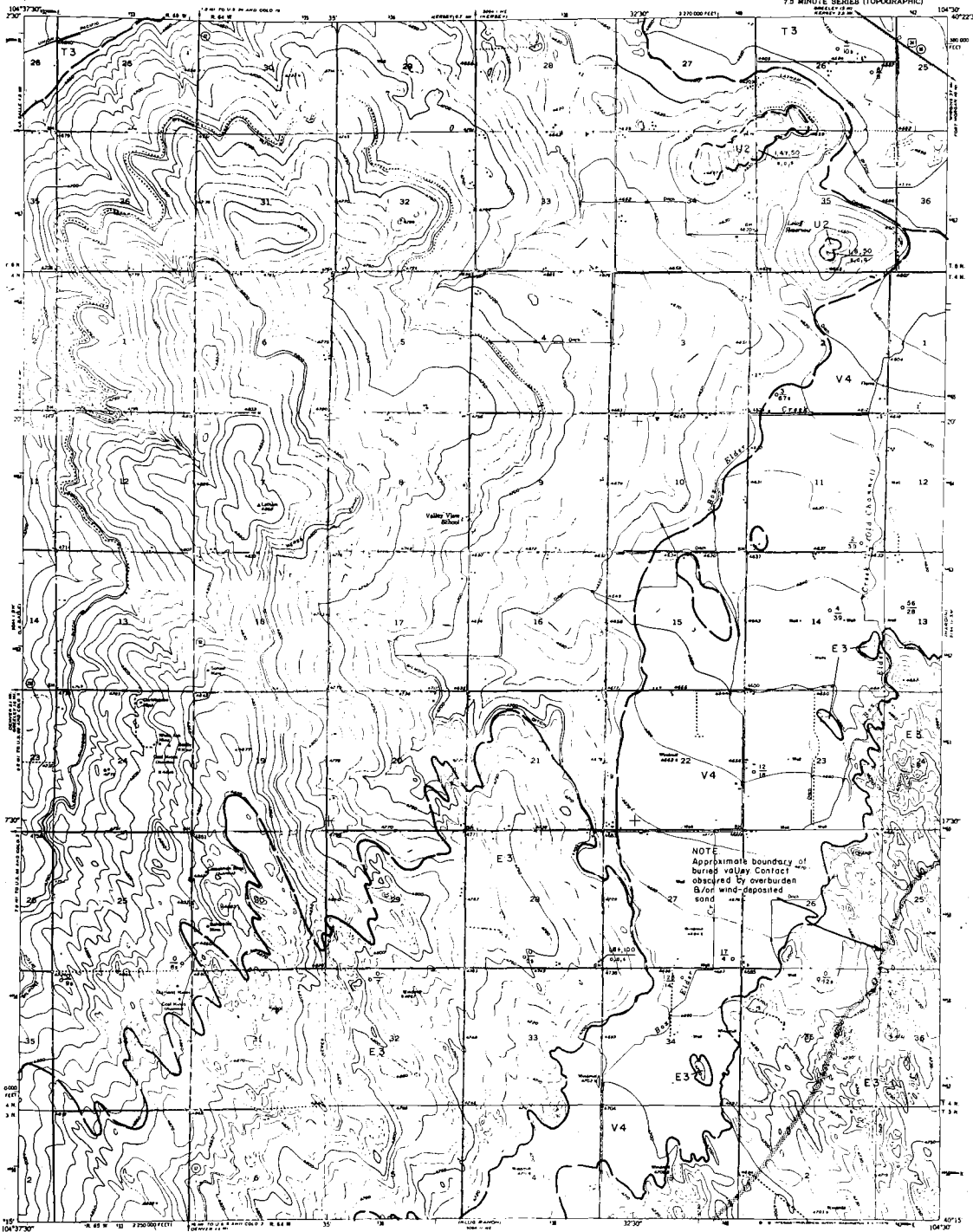
ROAD CLASSIFICATION
Medium Duty Light Duty
Unimproved Gravel State Road

TUNGSTEN, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

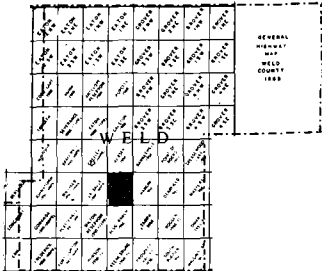
VALLEY VIEW SCHOOL QUADRANGLE
COLORADO-WELD CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR



EXPLANATION

- LEGEND**
- TOPOGRAPHIC SYMBOLS**
- T Sandstone deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Deposits**
- 1 Gravel relatively clean and round
 - 2 Gravel significant fines, decomposed rock, calcareous aggregate
- Coarse Sandstone**
- 3 Sand
- Unutilized Resources**
- 4 Potential aggregate resource
- ROAD SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Intervall well or pit-hole location with overburden (indicated by overburden) resource (indicated by "x" overburden)
 - "x" indicates gravel; "o" indicates sand
 - "u" in gravel denotes unutilized or unknown property
 - "u" denotes Colorado Geological Survey (underground and gravel) resource
 - 6133 hole
 - Landmark boundary, solid where known or observed; dashed where approximate or inferred
- STRATA, LOCATION AND ORIENTAL DIRECTION OF DEPOSITS**
- overburden thickness (ft)
 - underground resource thickness (ft)
 - average sand and fines (quantity of sand, 0.25 in.), gravel (quantity)
 - large (float) amount of fines (quantity) (0.075 mm, 0.075 in. or 0.015 in.)
 - large (float) amount of decomposed or weak rock
 - large (float) amount of minimum aggregate fraction (unknown property)
 - "u" in symbol denotes unutilized or unknown property
 - "o" in symbol denotes property absent or unutilized



QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Reference: Saith, R. O. and others.
1964, U.S.G.S. Water Supply Paper:
1658, Plate I

Prepared by: Phillip C. Micklin
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 10 FEET
(EXCEPT IN BLUE SHADE)

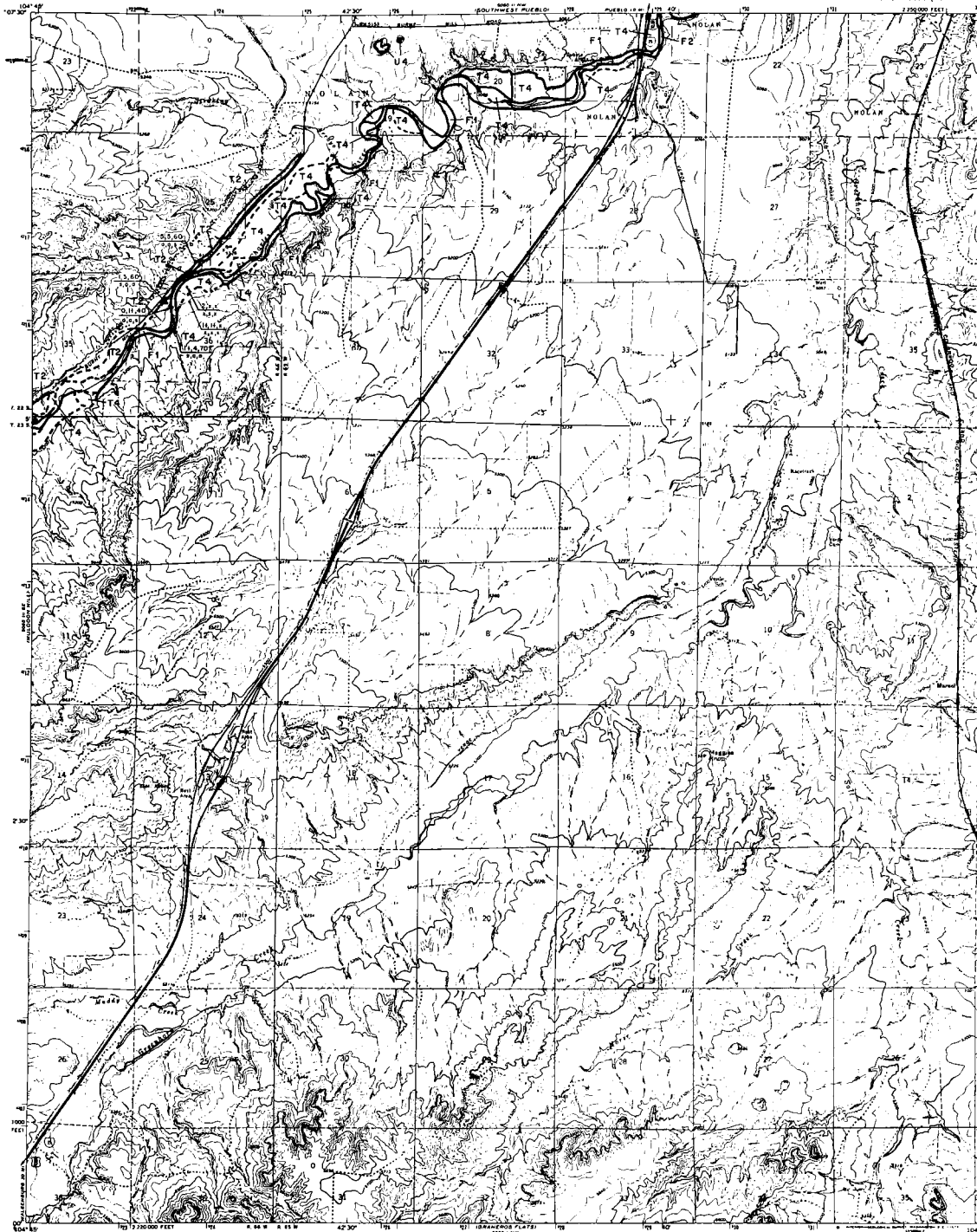
ROAD CLASSIFICATION

UNIMPAVED ALL WEATHER ROADS ON WEATHER ROADS
 HIGHWAY 1 1/2 INCHES WIDE IMPROVED DET.
 MEDIUM-DUTY 1 1/2 INCHES WIDE IMPROVED DET.
 LOWEST SURFACE GRADE IN TOWN OR VILLAGE
 U.S. Route State Route

VALLEY VIEW SCHOOL COLO.

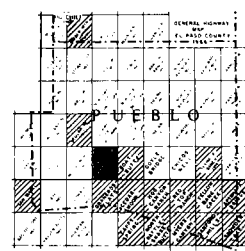
SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

VERDE SCHOOL QUADRANU
 COLORADO-PUEBLO CO.
 7.5 MINUTE SERIES (TOPOGRAPH)



EXPLANATION

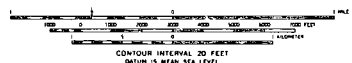
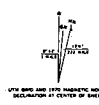
- Land on left
 Section classification
- LANDFORMS**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, spoils...)
- RESOURCE CLASSIFICATION**
- GRAVEL**
- 1 Gravel: relatively clean and sound
 - 2 Gravel: silty/fine silty, decomposed rock, calcareous cementation
- SAND**
- 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or fill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs.
 - "u" indicates gravel; "s" indicates sand
 - "u" in symbol denotes unutilized or unknown property
 - "s" in symbol denotes Colorado Geological Survey Withdrawn and Closes prospect
 - Well hole
 - Landform boundary, solid where known or observed; dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- Overburden thickness (ft)
 - unutilized resource thickness (ft)
 - percent sand and fines (spacing of letters, 7.25 to 1.0, visual estimation)
 - 100 ft
 - Feet/foot percent of fines (spacing 100 across, 0.008 in. or 0.074 in.)
 - Feet/foot percent of decomposed or weak rock
 - significant amount of calcareous cementation (include "u" in symbol denotes unutilized or unknown property)
 - "s" in symbol denotes property absent or unright/lost



■ QUADRANGLE LOCATION
 ▨ NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Phillip C. Wickless
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



CONTOUR INTERVAL 20 FEET
 DATUM IS MEAN SEA LEVEL

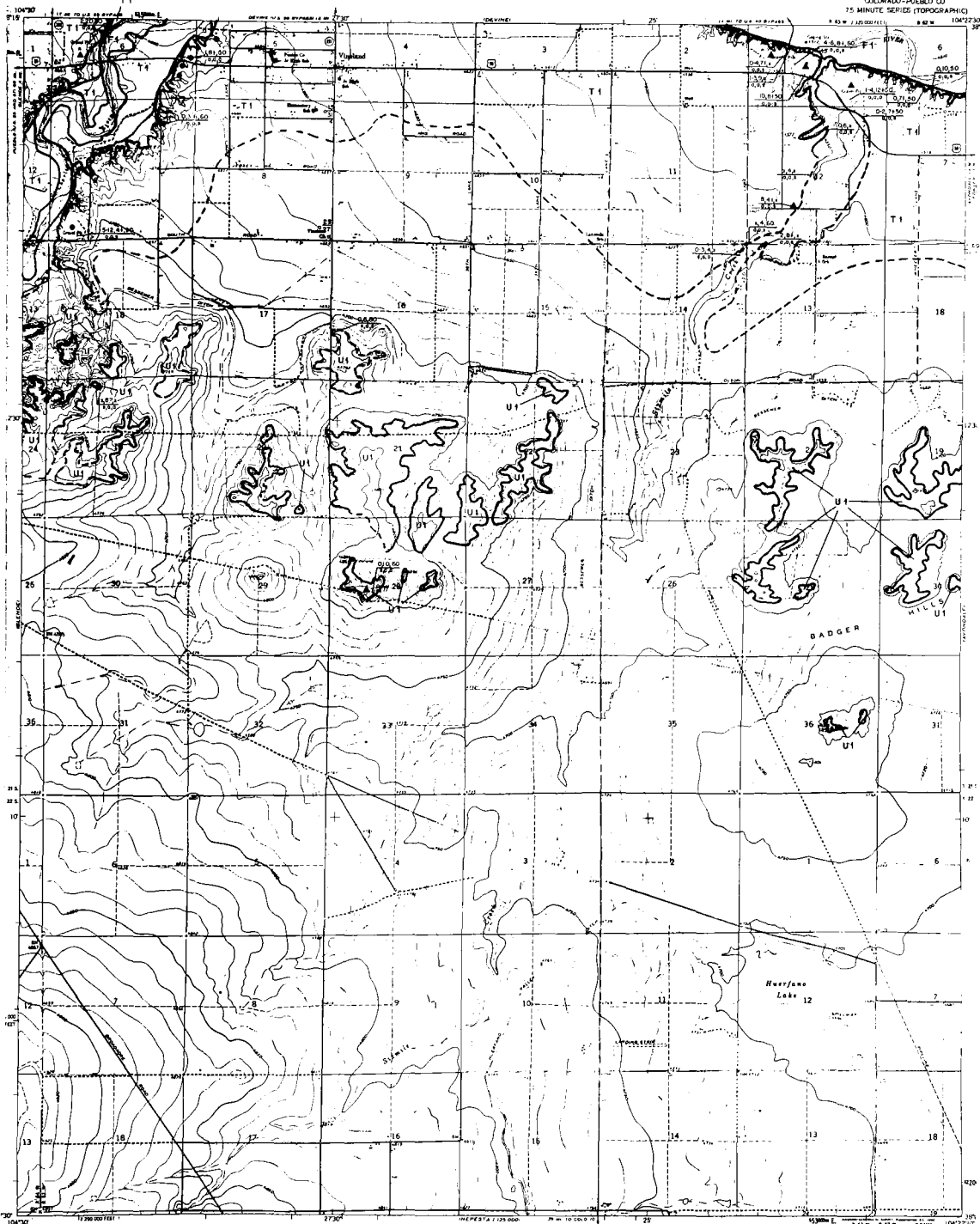
- ROAD CLASSIFICATION**
- Primary highway: Light-duty road, hard or hard surface
 - Secondary highway: Unimproved road
 - Interstate Route: U S Route
 - State Route: State Route

VERDE SCHOOL, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

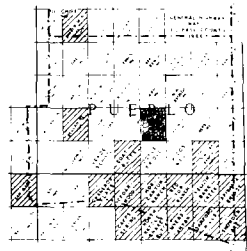
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLLA, DIRECTOR

VINELAND QUADRANGLE
COLORADO-PUEBLO CO
15 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Sand/gravel units
- Resource classification
- LANDFORMS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Unconsolidated deposit
 - A Alluvial fan
 - E Eolian deposit and (alluvial)
 - M Mined deposit (slag, tailings, spoils...)
- RESOURCE CLASSIFICATION**
 - Coarse materials**
 - 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, unconsolidated, and/or laminated
 - Fine materials**
 - 3 Sand
 - 4 Probable aggregate resource
- MAP SYMBOLS**
 - Operating gravel or/and sand pit
 - Abandoned gravel or/and sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Section well or drill-hole location with elevation (elevation (ft) over sand/gravel resource)
 - Indicator gravel
 - Indicator sand
 - Section Colorado Geological Survey (water table and ground water)
 - Well hole
 - Landform boundary, solid where known or dashed where approximate or inferred
- RELATIVE LOCATION AND ORIENTATION**
 - North-south distance (ft)
 - East-west distance (ft)
 - Significant amount of fine (finer than 250 screen, 0.075 in. or 0.075 mm)
 - Significant amount of decomposed or weak rock
 - Section Colorado Geological Survey (water table and ground water)
 - Well hole
 - Landform boundary, solid where known or dashed where approximate or inferred

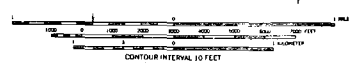


QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Mapped by: Stephen D. Schuchow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION

Heavy-duty _____ Light-duty _____

Medium-duty _____ Unimproved dirt _____

U.S. Route State Route

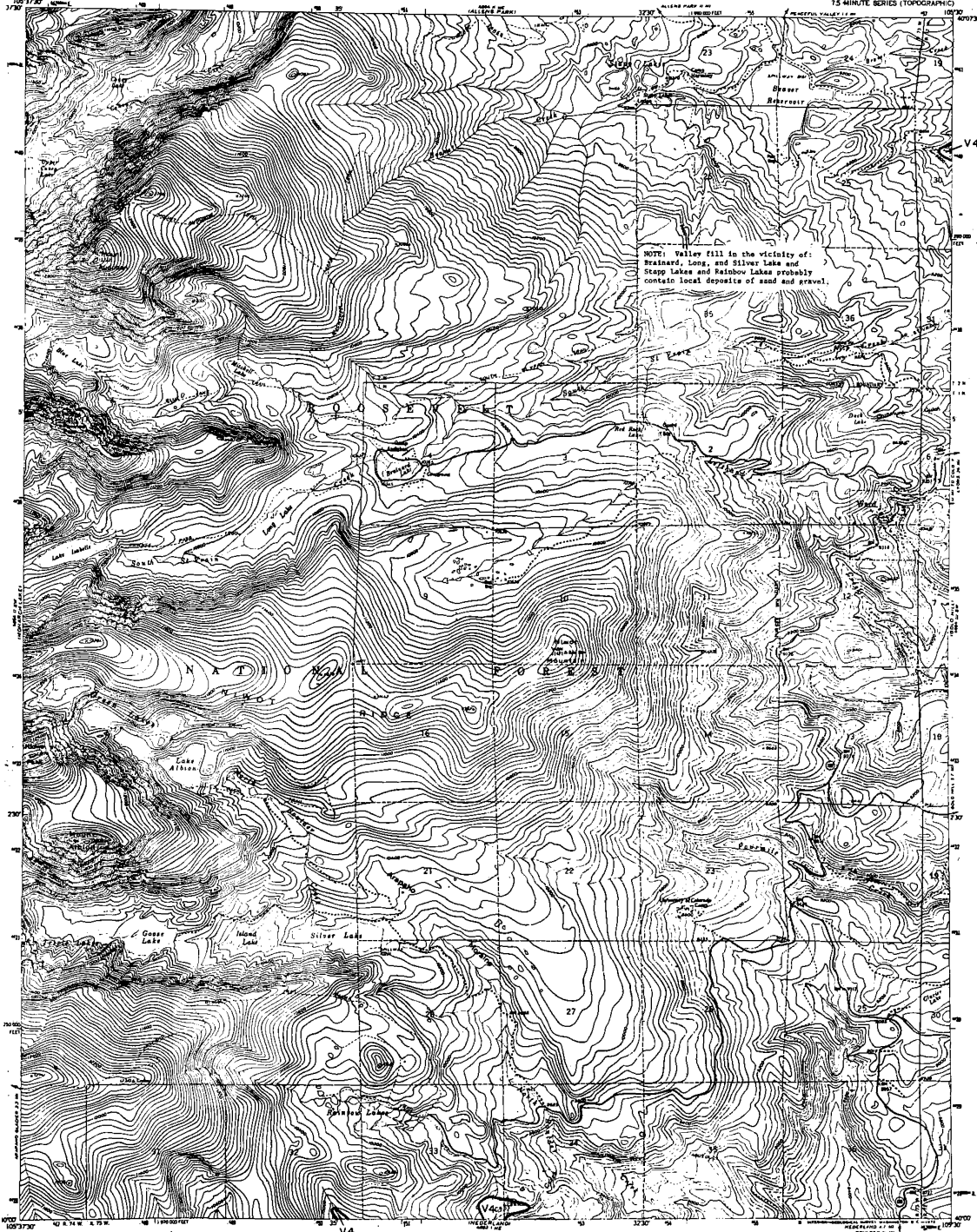
VINELAND, COLO.



SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

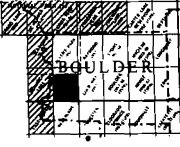
WARD QUADRANGLE
COLORADO-Boulder CO
7.5 MINUTE SERIES (TOPOGRAPHIC)



NOTE: Valley fill in the vicinity of: Bratward, Long, and Silver Lake and Steep Lake and Rainbow Lake probably contain local deposits of sand and gravel.

EXPLANATION

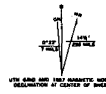
- Contour unit
- Resource classification
- LANDFORM UNITS**
 - F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (canals, ditches, levees, ...)
- RESOURCE CLASSIFICATION**
 - Class 1 Deposits**
 - 1.1 Sand not restricted on 24 acres, 1/2 mile approx. (see note)
 - 1.2 Gravel, relatively clean and sand
 - 1.3 Gravel, significant fines, decomposed rock, calcite carbonates
 - Class 2 Deposits**
 - 2.1 Gravel, 1/2 mile approx. 24 acres, 400' (see note on 240' areas, 1/2 mile approx.)
 - 2.2 Sand
 - 2.3 Potentially aggregate resource
- NON-RESOURCE**
 - Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - Indication gravel, "G" indication sand
 - "G" in symbol denotes unmineralized or unknown property
 - "S" in symbol denotes Geological Survey Mineral/Sand and Gravel projects
 - Fill hole
 - Leakage boundary, solid white lines or observed, dashed where approximate or inferred
- RELATION, LOCATION AND CIRCUMSTANCES OF RESOURCES**
 - unconformity thickness (ft)
 - sand/gravel resource thickness (ft)
 - present sand and fines (spacing in inches, 0.10 to 0.15, visual estimation)
 - significant amount of decomposed or rock rock
 - significant amount of siliceous materials (calcite)
 - "G" in symbol denotes unmineralized or unknown property
 - "S" in symbol denotes property absent or designated



QUADRANGLE LOCATION
 NON-RESOURCE OR WETLAND AREA

Mapped by: Ralph E. Shroba
Date: June 30, 1976

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL, 40 FEET
OTHER S INCH 80 FEET

ROAD CLASSIFICATION
Light duty — Unimproved dirt —————
○ State Road

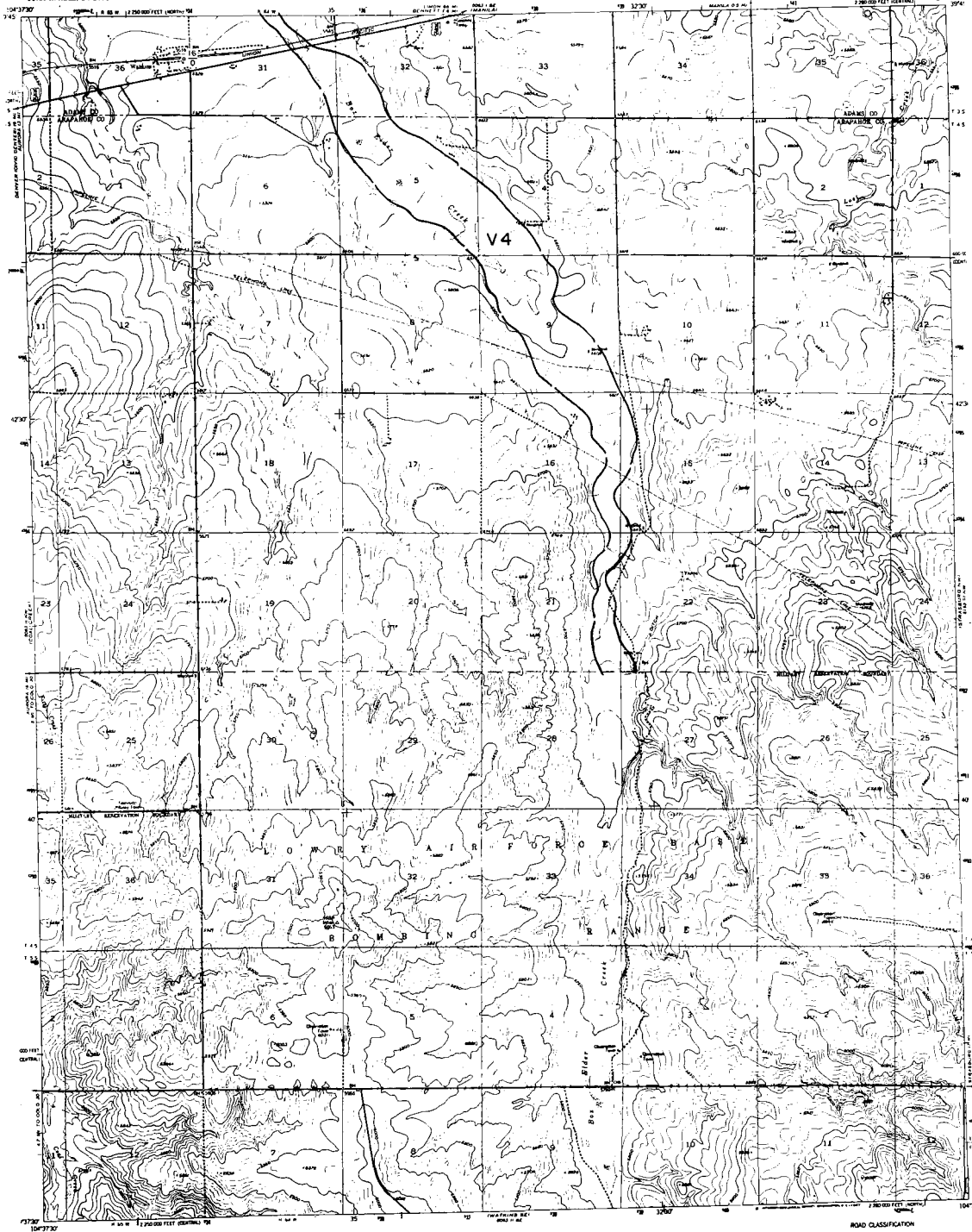
WARD, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

WATKINS QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)
1:50,000

EXPLANATION

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. BOALD, DIRECTOR



LITHOLOGICAL UNITS

- F Floodplain deposit
- T Stream terrace deposit
- W Valley fill (S & T)
- U Quaternary deposits
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Pleistocene deposits (sand, gravel, silt, clay, etc.)

RESOURCE CLASSIFICATION

Class 1
1. Gravel: relatively clean and smooth
2. Gravel: significant fines, decomposed rock
3. Sand

Class 2
1. Sand

Class 3
1. Sand

Class 4
1. Sand

MAP SYMBOLS

- Operating gravel mill/road pit
- Abandoned gravel mill/road pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Selected well or wide-hole location with over-
- burden thickness (ft) over sand/gravel resource
- thickness (ft), indicated from well logs
- "y" indicates gravel; "s" indicates sand
- "x" in symbol indicates unobserved or
- unknown resource
- "m" denotes Colorado Geological Survey
- measured sand and gravel projects
- well logs
- Landform boundary, solid lines have not
- been observed; dashed lines approximate or
- inferred

SYMBOL, LOCATION AND ORIGIN

INDICATION OF SYMBOL

- Overburden thickness (ft)
- and gravel resource thickness (ft)
- (shown as 100 ft, 200 ft, or 300 ft)
- Significant amount of fines (greater
- than 20%) in sand (shown as 20)
- Significant amount of decomposed or weak rock
- Significant amount of calcareous material
- or within property
- "x" or "y" symbol: duplicate property status
- or not observed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Base from U. S. Geological Survey
7-1/2 minute quadrangle

Scale: 1 inch = 1,250 feet (graphic)

CONTOUR INTERVAL 10 FEET
SHOWS 5-FOOT INTERVALS

ROAD CLASSIFICATION

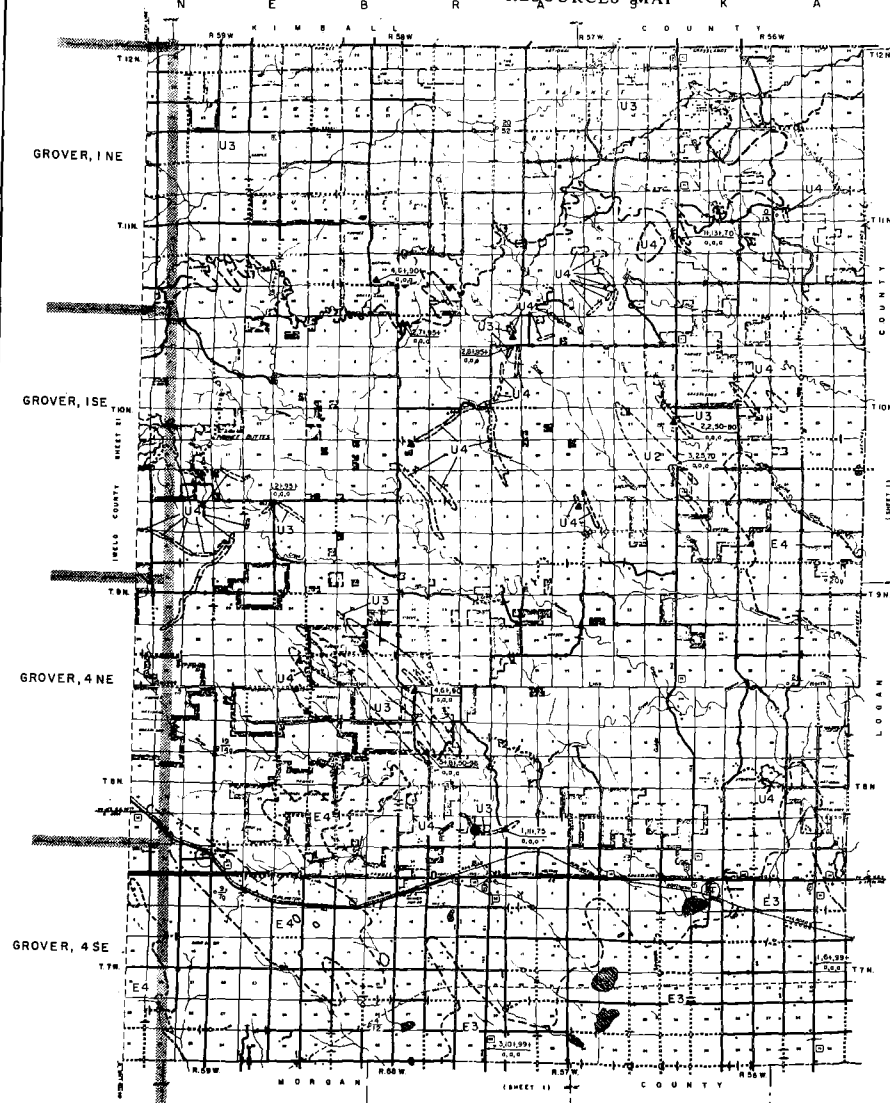
- Heavy-duty
- Medium-duty
- U.S. Route
- Light-duty
- Unimproved dirt
- State Route

WATKINS, COLO.
R38373--W10430/75
1954
JOB 5883 & 82--SACRED VERT

Checked by: J. H. Wickham
Date: June 30, 1974

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY
JOHN W. AQUA, DIRECTOR



EXPLANATION

- Random unit
Resource classification
- LAYERED UNIT**
- F Fluvial deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Wind deposits
 - A Alluvial fan
 - E Wind-deposited sand (alluvial)
 - M Man-made deposits (levees, dikes, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
(at least 10% material in 48 screen, visual estimation)
- 1 Gravel - relatively clean and sand
 - 2 Gravel - significant fines, incorporated into concrete
- Fine Aggregate**
(at least 10% material in #20 screen, 75% retained on #40 screen, visual estimation)
- 3 Sand
- Unutilized Resource**
- 4 Potential aggregate resource
- NO SYMBOL**
- Abandoned gravel and/or sand pit
 - Abandoned stone quarry
 - Abandoned stream quarry
 - Potential quarry aggregate resource area
 - Relined well or drill-hole location with cover
 - Broken (broken fill) and abandoned concrete (broken fill), obtained from well logs
 - "X" indicates gravel, "S" indicates sand
 - "-" in symbol denotes unutilized or unknown property
 - "W" denotes Wetland Geological Survey "Apparent and Covered" project (FWS) site
 - Locality boundary, solid where known or dashed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**
- Numbered (distance in feet) from road intersection
- Approximate bearing (degrees) from road
- Approximate depth and flow (cubic ft per second)
- Approximate amount of material (cubic ft)
- Approximate amount of fines (percent)
- Approximate amount of sand (percent)
- Approximate amount of gravel (percent)
- Approximate amount of aggregate (percent)
- "W" in symbol denotes unutilized or unknown property
- "X" in symbol denotes property about to be utilized



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:

Wade, M. G., Jr., 1965, Reconnaissance of ground-water resources in parts of Larimer, Logan, Norton, Sedgwick, and Weld Counties, Colorado, U. S. Geol. Survey, Water-Supply Paper 1809-L, p.11.

Dameon, H.M., 1974, personal communication.

Mapped by: Ralph E. Shroba
Date: June 30, 1974

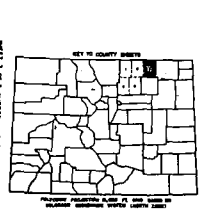
GENERAL LEGEND

- 1. Roadway
- 2. Railroad
- 3. Powerline
- 4. Canal
- 5. Ditch
- 6. Stream
- 7. Well
- 8. Quarry
- 9. Pit
- 10. Abandoned quarry
- 11. Abandoned stream quarry
- 12. Relined well
- 13. Broken concrete
- 14. Locality boundary
- 15. Wetland
- 16. Section corner
- 17. Township and Range corner
- 18. Section corner (with distance)
- 19. Township and Range corner (with distance)
- 20. Section corner (with distance and bearing)
- 21. Township and Range corner (with distance and bearing)
- 22. Section corner (with distance, bearing, and area)
- 23. Township and Range corner (with distance, bearing, and area)
- 24. Section corner (with distance, bearing, area, and acreage)
- 25. Township and Range corner (with distance, bearing, area, and acreage)
- 26. Section corner (with distance, bearing, area, and acreage, and date)
- 27. Township and Range corner (with distance, bearing, area, and acreage, and date)
- 28. Section corner (with distance, bearing, area, and acreage, and date, and name)
- 29. Township and Range corner (with distance, bearing, area, and acreage, and date, and name)
- 30. Section corner (with distance, bearing, area, and acreage, and date, and name, and initials)
- 31. Township and Range corner (with distance, bearing, area, and acreage, and date, and name, and initials)

GENERAL HIGHWAY MAP
WELD COUNTY
COLORADO

STATE DEPARTMENT OF HIGHWAYS
SYSTEM OF ROADWAYS OF COLORADO
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL ROAD ADMINISTRATION

1969

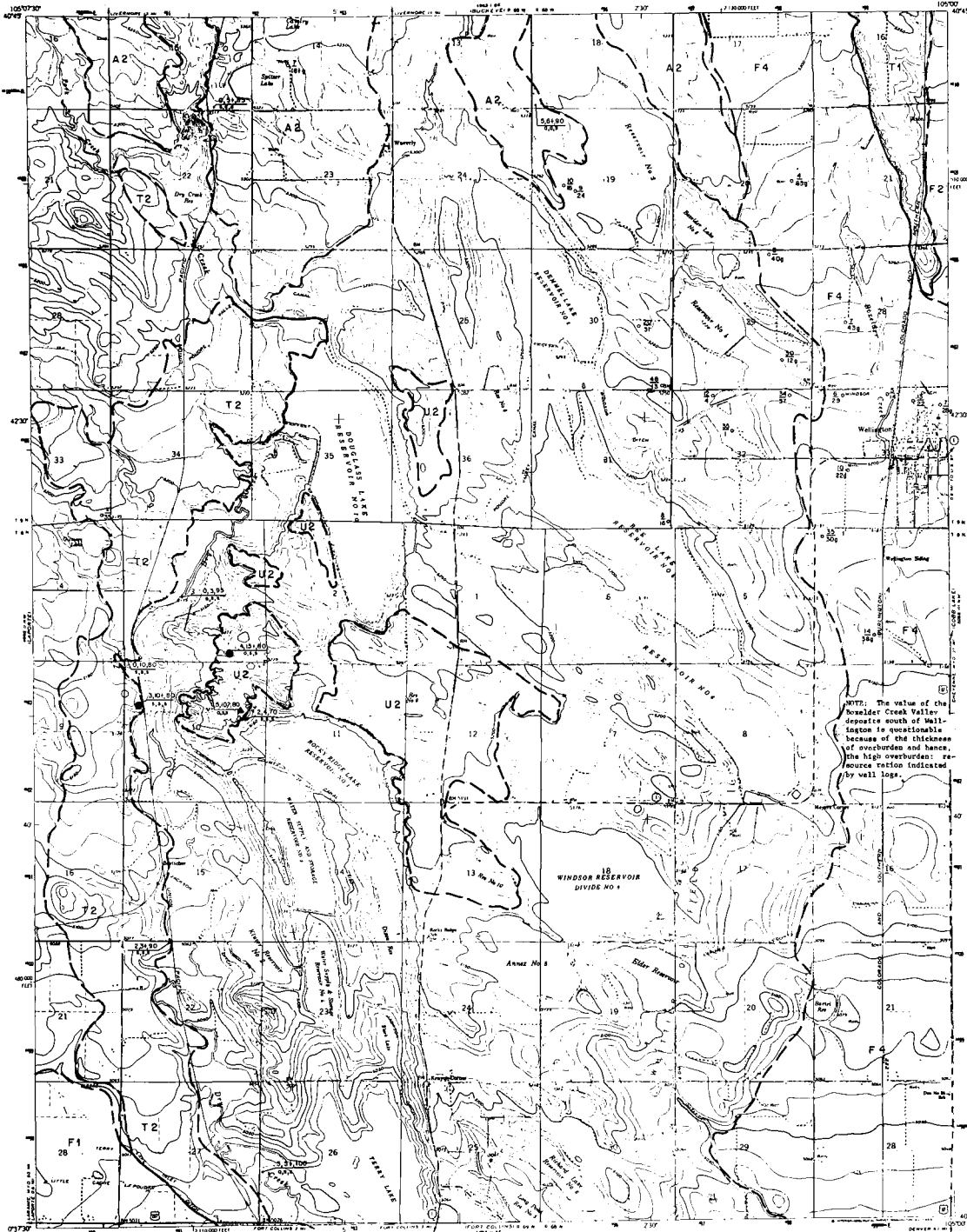


Scale: 1 inch = 10 miles

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

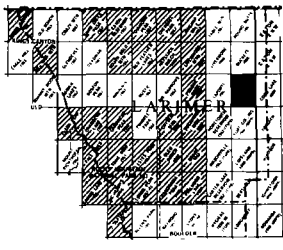
WELLINGTON QUADRANGLE
COLORADO - LARIMER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE 1/4 P. 30, T. 10 N., R. 67 W.

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN H. RYAN, DIRECTOR



EXPLANATION

- Landform units**
Resource classification
- LANDFORM UNITS**
- F Floodplain deposit
 - T Terrace terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Man-made deposits (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**
1/4" to 2 1/2" (20 to 100 mesh) - 5% screen, total extraction
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines, decomposed rock, solution carbonate
 - 3 Sand
 - 4 Probable aggregate resource
- FINE AGGREGATE**
1/4" to 2 1/2" (20 to 100 mesh) - 5% screen, 20% retained on 20 mesh, actual extraction
- OVERBURDEN**
- a Operating gravel and/or sand pit
 - A Abandoned gravel and/or sand pit
 - Q Abandoned stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Related well or drilling location with overburden thickness (1) over sand/gravel resource thickness (2); obtained from well logs; "s" indicates gravel; "u" indicates sand
 - "u" in symbol denotes unconsolidated or unknown strata
 - "u" denotes Colorado Geological Survey boundary (land and gravel contact) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- PLATON QUANTITIES AND SYMBOLIC REPRESENTATIONS**
- overburden thickness (ft)
 - undiscovered resource thickness (ft)
 - percent sand and fines (quantity of coarse, 2.5 to 10, actual extraction)
 - significant amount of fines (quantity of coarse, 2.5 to 10, actual extraction)
 - significant amount of decomposed or weak rock
 - significant amount of solution carbonate (acidic)
 - in an aquifer (water unconsolidated or unknown property)
 - in a special drainage property (acidic or toxic)



■ QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
Retsaby, L.A., and Schaefer, P.A., Jr., 1972, Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-687.
Swan, F. B., III, 1972, Map of surficial geology of part of the Wellington quadrangle, Larimer County, Colorado: Colorado Geol. Survey Windsor Environmental Geology Project, open-file map.

Maped by: Stephen D. Schwochow
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION
Heavy duty Light duty
Medium duty Unimproved det.
U.S. Route State Route

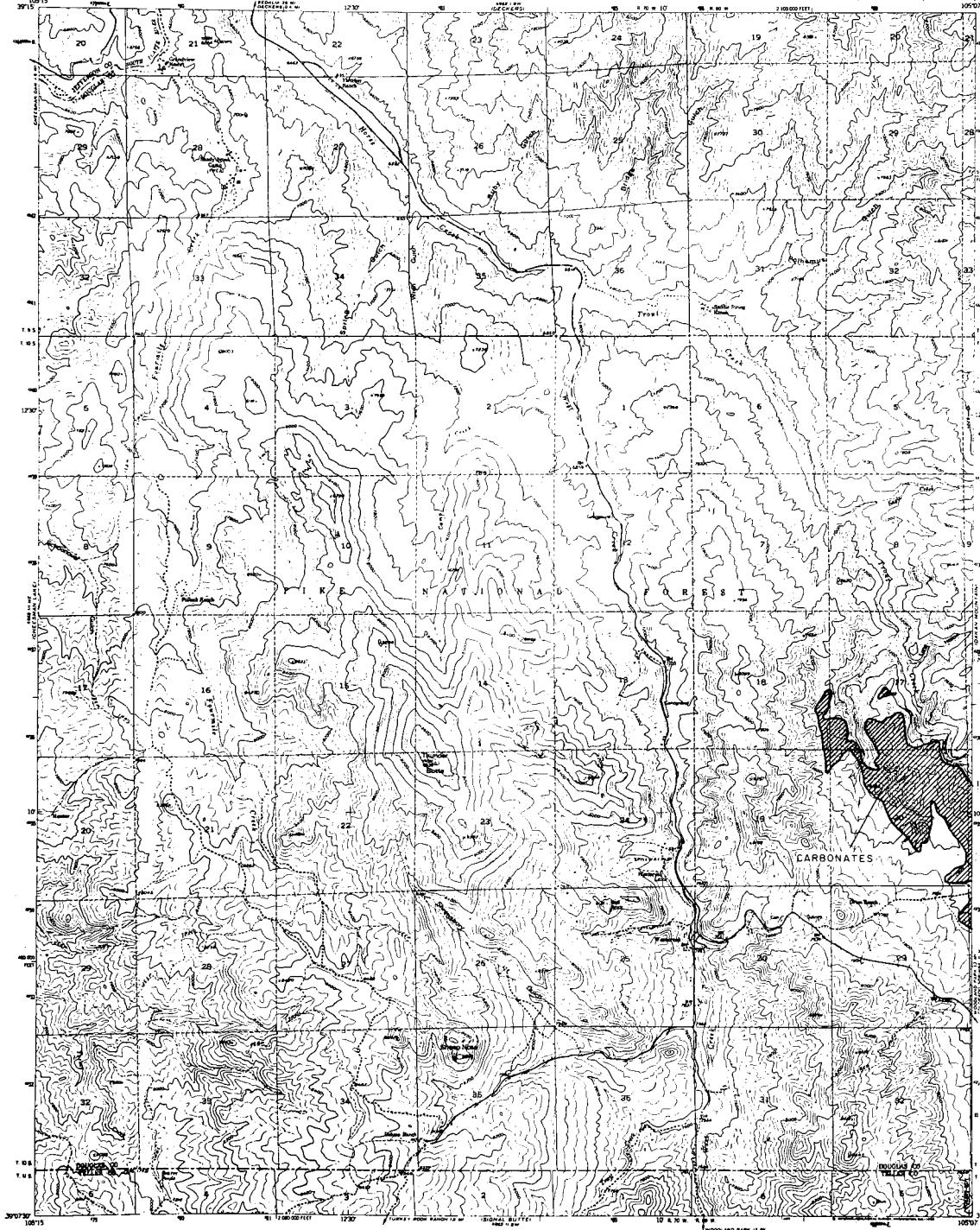
WELLINGTON, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

WESTCREEK QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HALL, DIRECTOR

EXPLANATION

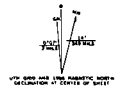


- LEGEND**
- AGGREGATE TYPES**
- F Floodplain deposit
 - T Stream terrace deposit
 - V Valley fill (F & T)
 - U Upland deposit
 - A Alluvial fan
 - E Erosion-deposited sand (contour)
 - M Man-made deposits (lake, tailings, spoil, etc.)
- PROBABLE QUANTITY**
- 1 Good: relatively clean and well sorted
 - 2 Good: slightly finer, decomposed rock, calcian carbonate
 - 3 Fair
 - 4 Marginal resource
- MAP SYMBOLS**
- Operating gravel sand pit
 - Abandoned gravel sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Prospect quarry aggregate resource area
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log
 - "S" indicates gravel; "G" indicates sand
 - "X" in shaded denotes unoperational or unknown property
 - "G" source: Colorado Geological Survey geotechnical and mineral properties file
 - Landmark boundary, well where known or observed; dashed where approximate or inferred
- STATUS, LOCATION AND GENERAL DESCRIPTION OF PROPERTY**
- Operating (shaded)
 - Abandoned (dashed)
 - Prospect (dotted)
 - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log
 - "S" in shaded denotes unoperational or unknown property
 - "G" in shaded denotes property absent or unoperational
- QUADRANGLE LOCATION**
- NON-RESOURCE OR WITHDRAWN AREA**

Geology Modified after:
Horne, J.C., 1951. Structural geology of the eastern flank of the southern Front Range, Colorado; University of Colorado Ph.D. Thesis, 121 p., 3 pls.

Mapped by: Phillip C. Micklin
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



CONTOUR INTERVAL 40 FEET
OTHER @ MEAN SEA LEVEL

ROAD CLASSIFICATION

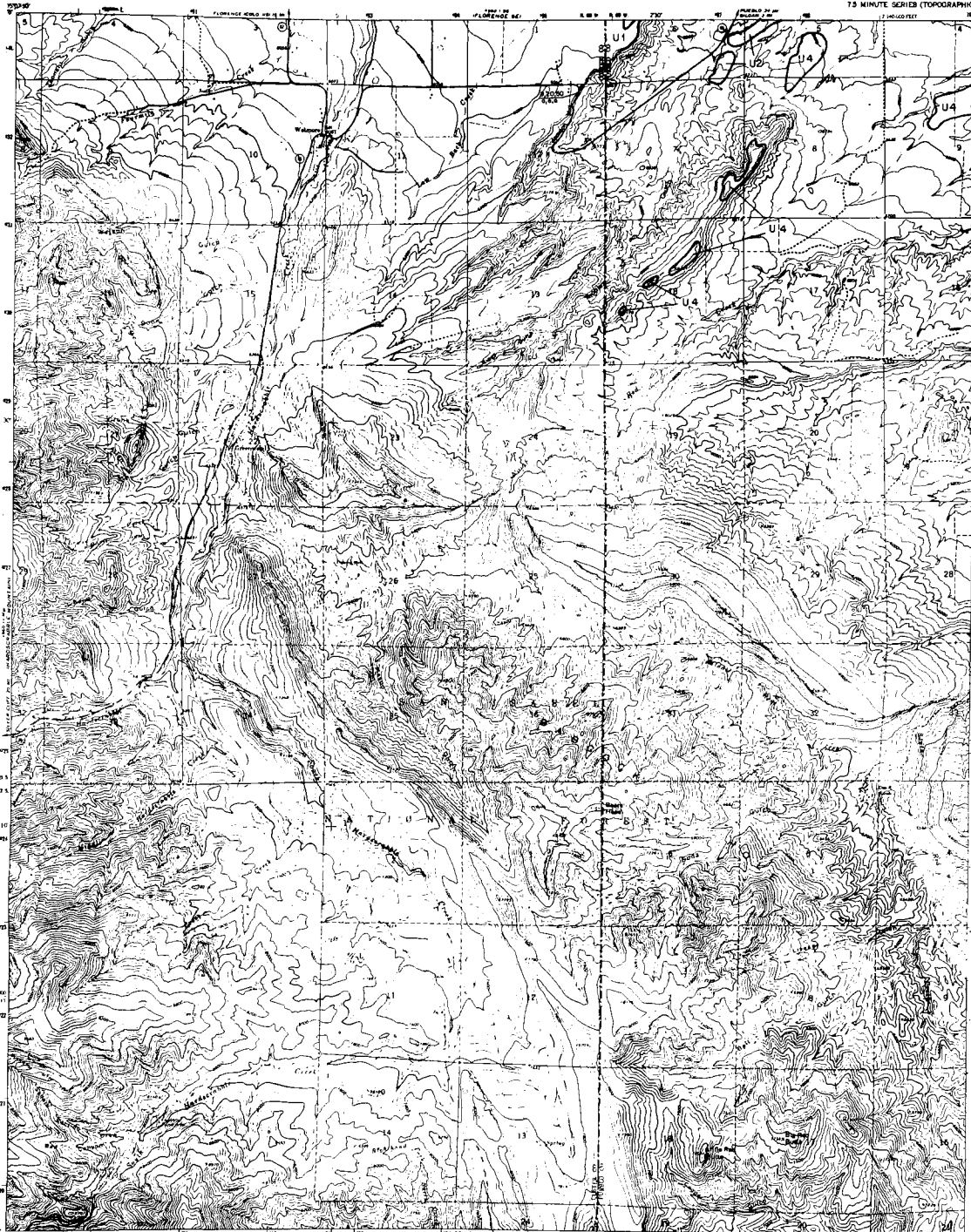
Medium duty Light duty

Unimproved dirt

WESTCREEK, COLO.

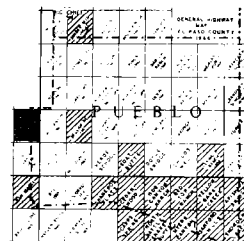
SAND, GRAVEL AND QUARRY AGGREGATE
 RESOURCES MAP

WETMORE QUADRANGLE
 COLORADO
 7.5 MINUTE SERIES (TOPOGRAPHIC)



EXPLANATION

- Landform unit**
 (Resource classification)
- LANDFORM UNITS**
- F Fluvial deposit
 - T Tress terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Eolod-deposited sand (siltstone)
 - M Non-wedge sandstone (slag, tailings, pyrite...)
- RESOURCE CLASSIFICATION**
- Coarse Sand/Gravel**
 (at least 50% retained on 48 screen, visual estimation)
- 1 Gravel: relatively clean and sound
 - 2 Gravel: significant fines; decomposed rock, calcine settlement
- Fine Sand/Gravel**
 (greater than 70% passing 48 screen, 80% retained on 480 screen, visual estimation)
- 3 Sand
 - 4 Probable aggregate resource
- Quarry Aggregate Resources**
- Map Symbols**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Proposed quarry aggregate resource area
 - Indicated well or drill-hole location with measured thickness (ft), obtained from well logs
 - Vertical thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
 - "S" indicates gravel; "M" indicates sand
 - "A" is symbol denoting unconsolidated or unknown property
 - "W" is symbol denoting consolidated or unknown property
 - "C" is symbol denoting consolidated or unknown property
 - Landform boundary, solid where known or observed; dashed where approximate or inferred
- Vertical Location and Orientation**
- Classification of Symbols**
- overburden thickness (ft)
 - sand/gravel resource thickness (ft)
 - measured sand and gravel (passing 48 screen, 80% on 480) visual estimation
 - Significant amount of fines (passing 100 screen, 4.75 to 0.075 mm.)
 - Significant amount of decomposed or weak rock
 - Significant amount of calcine carbonate (calcite)
 - "W" or "C" symbol denoting property status or unknown property
 - "A" or "C" symbol denoting property status or unknown property

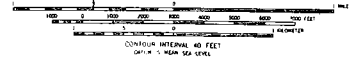
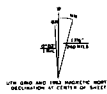


- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Taylor, R. S., and Escher, R. S., 1973, U. S. Geological Survey Map MF-548.

Mapped by: Ralph R. Shroba
 Date: June 30, 1974

Base from U. S. Geological Survey
 7-1/2 minute quadrangle



ROAD CLASSIFICATION

Major city Light city

Improved dirt

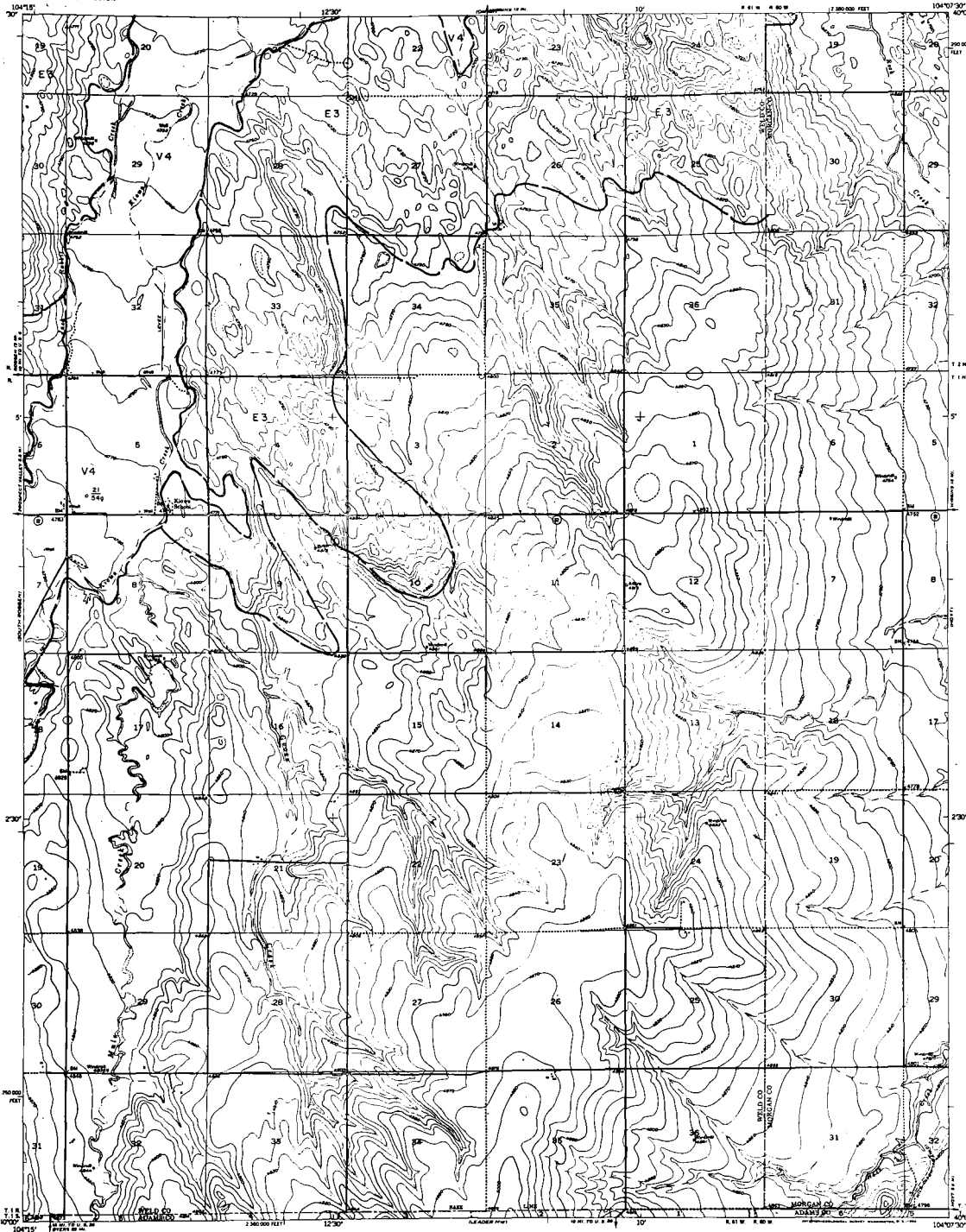
State Road

WETMORE, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE
RESOURCES MAP

WIGGINS SW QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLL, DIRECTOR



EXPLANATION

- LANDFORM UNITS**
Resource classification
- LANDFORM UNITS**
F Floodplain deposit
T Stream terrace deposit
V Valley fill (F & T)
U Upland deposits
A Alluvial fan
E Wind-deposited sand (eolian)
M Man-made deposits (slag, tailings, spoils, ...)
- RESOURCE CLASSIFICATION**
- COARSE AGGREGATE**
See Table 1.5, located on 44 corner, "Road Classification"
- 1 Gravel: relatively clean and round
2 Gravel: significant fines, decomposed rock, calcium carbonate
- FINE AGGREGATE**
Classification based on percent of sand, as reported on #220 screen, of total aggregate
- 3 Sand
4 Probable aggregate resource
- MAP SYMBOLS**
- Operating gravel and/or sand pit
Abandoned gravel and/or sand pit
Operating stone quarry
Abandoned stone quarry
Potential quarry aggregate resource area
Selected well or drill-hole location with overburden thickness (ft) over underlying resource thickness (ft), obtained from well logs
"P" indicates gravel; "S" indicates sand
"u" in symbol denotes unvested or unknown property
"M" denotes Colorado Geological Survey Water/Sand and Gravel projects' well logs
Landform boundary, solid where known or otherwise dashed where approximate or inferred
- STATION, LOCATION AND PHYSICAL DESCRIPTION OF AGGREGATE**
- overburden thickness (ft)
underlying resource thickness (ft)
percent sand and fines (based on screen: 0.30 in.), percent retention
- Significant amount of fines (percent 100 screen, 0.075 in. or 0.075 mm.)
Significant amount of decomposed or weak rock
Significant amount of calcium carbonate (calciferous)
- "u" in symbol denotes unvested or unknown property
"M" in symbol denotes property owned or controlled

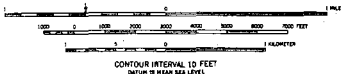


- QUADRANGLE LOCATION
▨ NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Bjorklund, L.J., and Brown, R.P., 1957, Geology and ground-water resources of the lower South Platte River valley between Hardin, Colorado, and Trenton, Nebraska: U. S. Geol. Survey Water-Supply Paper 1376, p. 1.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Base from D. S. Geological Survey 7.5-minute quadrangle



- ROAD CLASSIFICATION**
- Heavy-duty _____ Light-duty _____
Medium-duty _____ Unimproved dirt _____
U.S. Route _____ State Route _____

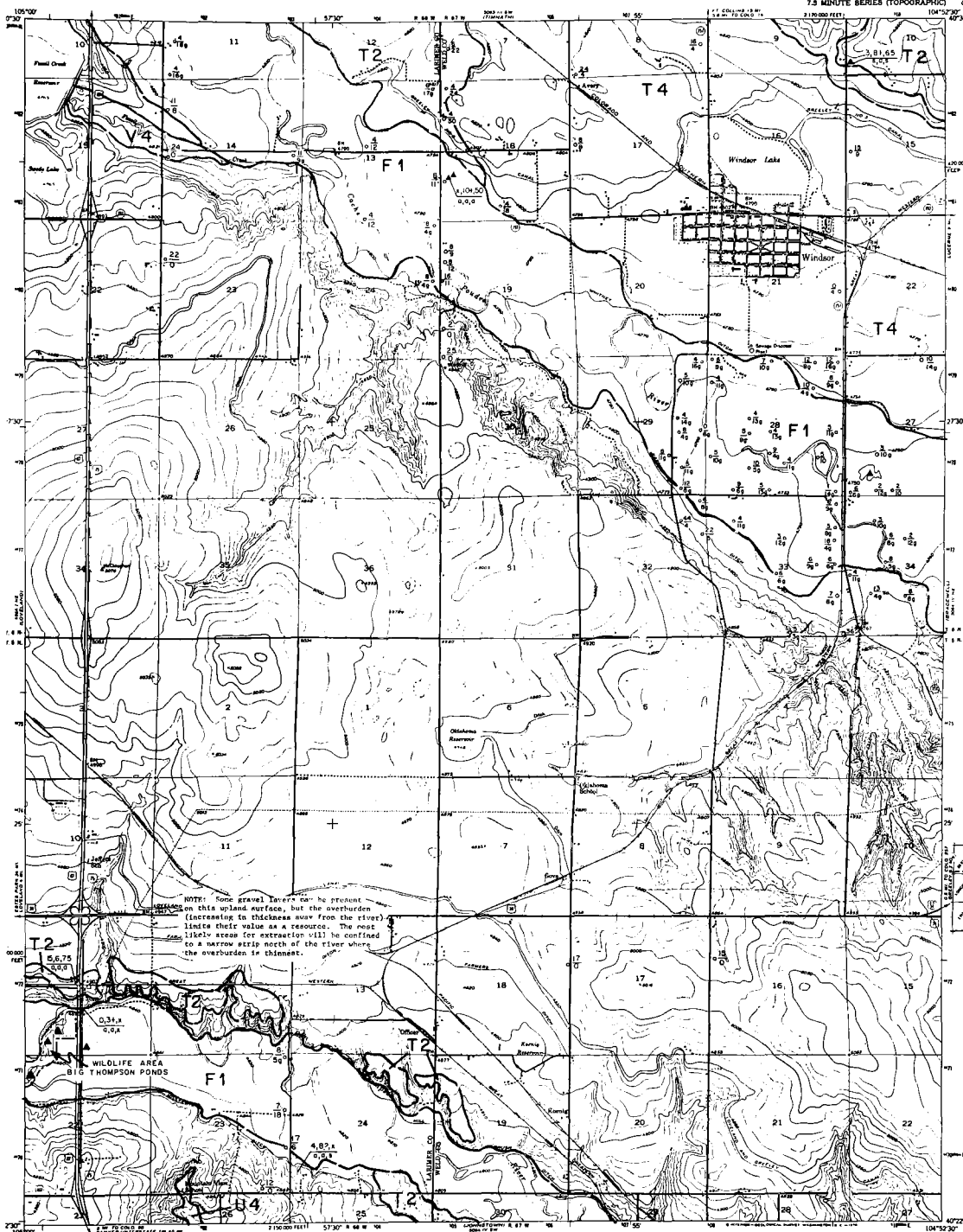
WIGGINS SW, COLO.

APPROXIMATE MEAN
ELEVATION, 1980

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HOLT, DIRECTOR

WINDSOR QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)



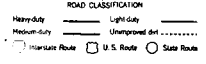
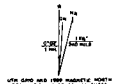
EXPLANATION

- LANDFORMS**
- F Floodplain deposit
 - T Trench terrace deposit
 - V Valley fill (F & T)
 - U Upland deposits
 - A Alluvial fan
 - E Wind-deposited sand (eolian)
 - M Marine deposits (sand, siltstone, shale, ...)
- RESOURCE CLASSIFICATION**
- 1 Gravel: relatively clean and hard
 - 2 Gravel: significant fines, decomposed rock, calcareous cementation
 - 3 Sand
 - 4 Unutilized resources
 - 5 Probable aggregate resource
- ROAD CLASSIFICATION**
- Heavy-duty
 - Medium-duty
 - Unimproved dirt
 - U.S. Route
 - State Route
 - Light duty
 - Unimproved dirt
- MAP SYMBOLS**
- Operating gravel and/or sand pit
 - Abandoned gravel and/or sand pit
 - Operating stone quarry
 - Abandoned stone quarry
 - Potential quarry aggregate resource area
 - Indicated with an irregular outline with overburden thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs
 - "I" indicates gravel, "S" indicates sand
 - "in symbol denotes unutilized or unknown resource
 - "us" American Colorado Geological Survey Windsor Sand and Gravel project's drill hole
 - Indicates boundaries which show those of observed, dashed where approximate or inferred
- STATION LOCATION AND ORIENTATIONAL INFORMATION**
- North-south direction (N)
 - East-west direction (E)
 - Approximate sand and gravel resource thickness (ft)
 - Approximate gravel and sand resource thickness (ft)
 - Significant amount of fines (less than 200 mesh, 75% or more) on a significant amount of decomposed or weak rock
 - Significant amount of calcareous cementation or unknown property
 - "I" in symbol denotes unutilized or unknown property
 - "S" in symbol denotes property shown or unutilized



NOTE: Some gravel layers may be present on this upland surface, but the overburden (increasing in thickness away from the river) limits their value as a resource. The most likely areas for extraction will be confined to a narrow strip north of the river where the overburden is thinnest.

Base from U. S. Geological Survey
7-1/2 minute quadrangle



REFERENCE:

Swan, P. H., III, 1972. Map of surficial geology of part of the Windsor quadrangle: Recon, mapping for Colorado Geol. Survey Windsor Environmental Geology Project, open-file map.

Hershey, L.A., and Schneider, P.A., Jr., 1972. Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-687.

Shelton, D.C., 1974. Personal communication.

Ching, P.W., 1971. Economic gravel deposits of the lower Cache La Poudre River: Colorado State Univ. Unpub. Master Sci. Thesis.

Geology modified after: Colton, R.S., and Pitch, U.S., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Crested Butte Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-855 D.

Mapped by: Stephen B. Schuchow
Date: June 30, 1974

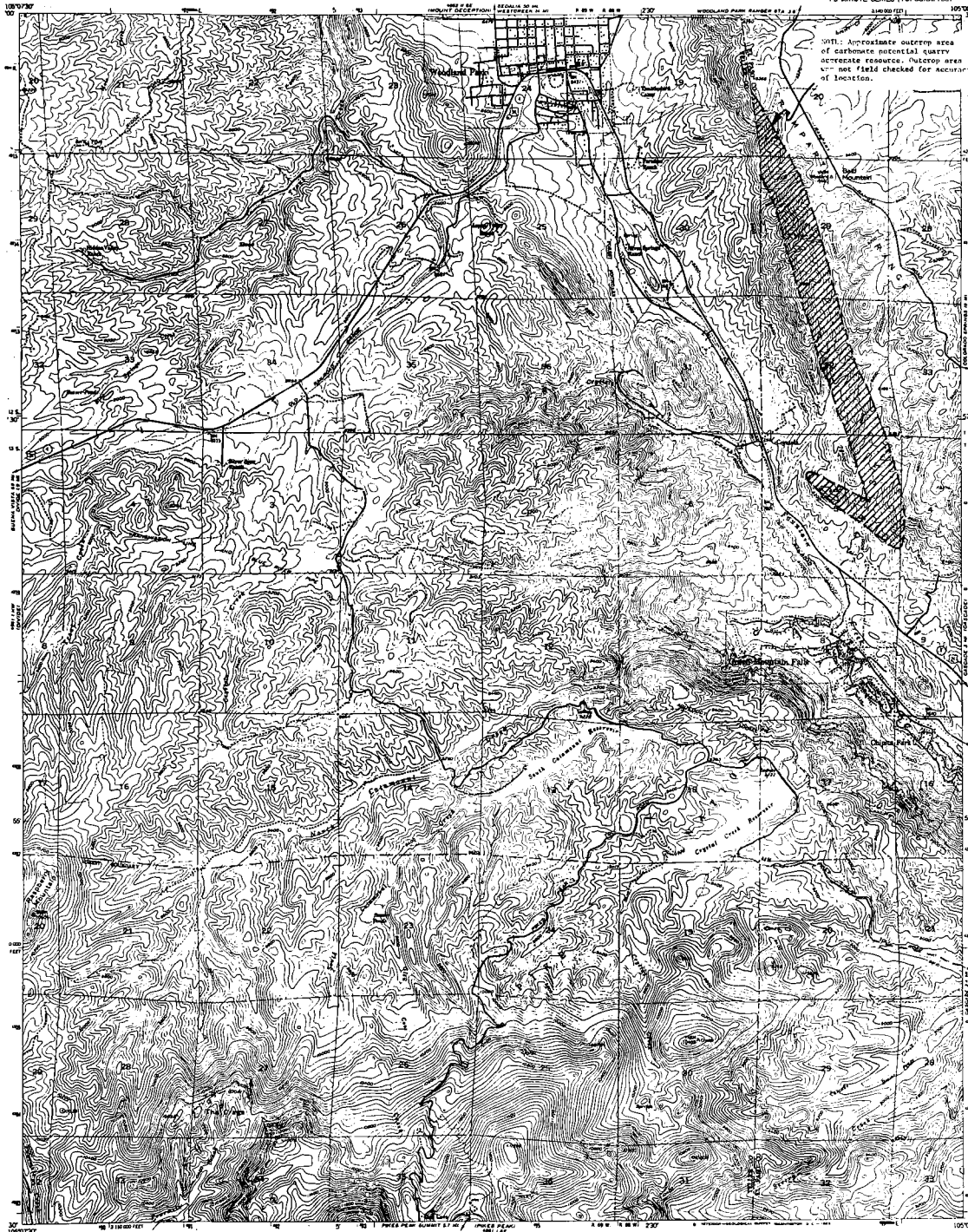
Prepared in cooperation with the
U. S. Geological Survey.

WINDSOR, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

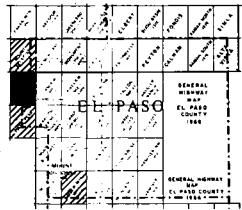
WOODLAND PARK QUADRANGLE
COLORADO
75 MINUTE SERIES (TOPOGRAPHIC)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. HULL, DIRECTOR



EXPLANATION

- LANDFORM UNIT**
Resource classification
- LANDFORM UNIT**
F Floodplain deposit
T Tertiary terrace deposit
V Valley fill (F & T)
U Upland deposits
A Alluvial fan
E Wind-deposited sand (eolian)
M Non-ferrous metallic (chromite, apatite, ...)
- RESOURCE CLASSIFICATION**
1. **GRAVEL** (as defined on 44 screen, actual occurrence)
1 Gravel: relatively clean and sound
2 Gravel: significant fines, decomposed rock, calcitic carbonate
3 Sand
4 **POSSIBLE QUARRY RESOURCE**
- MAP SYMBOLS**
a Operating gravel and/or sand pit
b Abandoned gravel and/or sand pit
c Operating stone quarry
d Abandoned stone quarry
e Potential quarry aggregate resource area
f Related well or drill-hole location with associated thickness (ft) and sand/gravel resource thickness (ft), indicated from well logs.
g Sandstone gravel, "g" indicates sand
h In symbol denotes unmineralized or unknown property
m - denotes Colorado Geological Survey Water/Lead and Cravel projects
i Mill hole
j Landform boundary, solid where known or dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL INTERPRETATION OF SYMBOLS**
a - barbed thickness (ft)
b - sand/gravel resource thickness (ft)
c - gravel and fines resource thickness (ft)
d - significant amount of decomposed or soft rock
e - significant amount of calcitic carbonate (fines)
f - In symbol denotes unmineralized or unknown property
g - In symbol denotes property about an outcrop/face

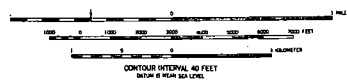
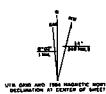


QUADRANGLE LOCATION
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:
Crowley, W.D., 1899, Archean-Cambrian contact near Manitou: Geol. Soc. Am. Bull., v. 10, p. 161-164, Pl. 14, 1:160,000.
Cross, W., 1894, Pike's Peak Folio, Colorado: U. S. Geol. Survey Folio no. 7.

Mapped by: Phillip C. Wicklein
Date: June 30, 1974

Base from U. S. Geological Survey
7-1/2 minute quadrangle



ROAD CLASSIFICATION
Main Road
Minor Road
U.S. Road
State Road

WOODLAND PARK, COLO.