

**SPECIAL PUBLICATION 5-B**

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

by

**CGS LIBRARY**  
by **Schroeder, B. J., and W. J. Wick**



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

**1974**

**PRICE \$10.00**

## 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."

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



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**PRICE \$10.00**

*S. D. Schwochow  
Ralph Shroba  
Phil Wicklein  
Robert H. Gast*

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*

Phillip C. Wicklein  
Project Consultant

*Stephen D. Schwochow*

Stephen D. Schwochow  
Consultant

*Ralph R. Shroba*

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.

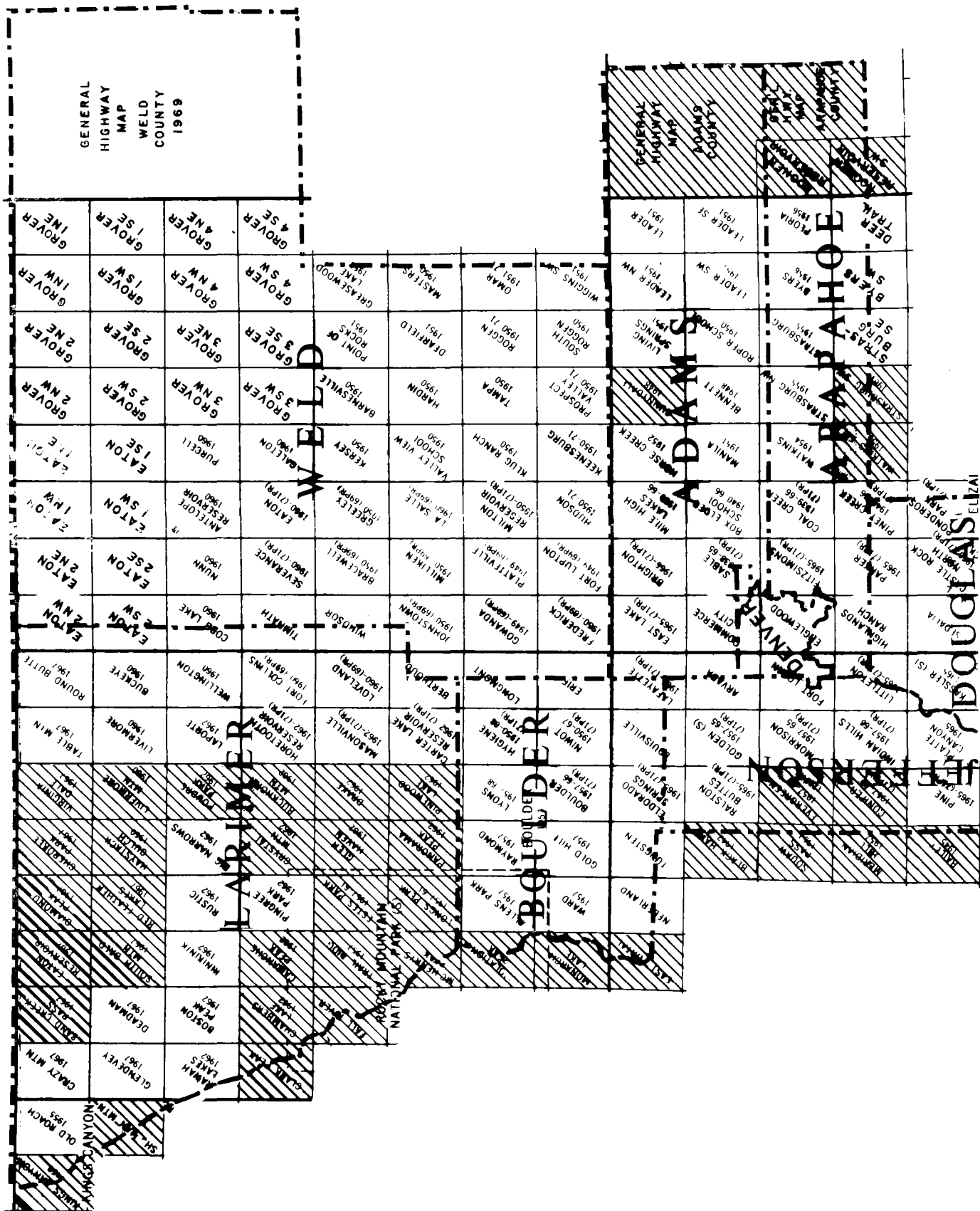
Results of this study are being distributed in three different ways:

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



**DOUGLAS**

**PUBLICO**

**AREA**

**PLACE OR AREA**

**EL PASO COUNTY MAP 1966**

**GENERAL HIGHWAY MAP EL PASO COUNTY 1966**

**LEGEND:**

- Area
- Place or Area

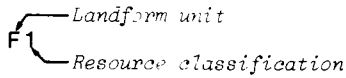
The map displays numerous land parcels across El Paso County, Texas. Key features include:

- Major Highways:** I-69 (Interstate 69) and US-80 (U.S. Highway 80) are shown running through the county.
- Geographic Labels:** "DOUGLAS" is labeled on the left side, "PUBLICO" in the center, and "AREA" at the bottom right.
- Map Titles:** "EL PASO COUNTY MAP 1966" and "GENERAL HIGHWAY MAP EL PASO COUNTY 1966" are prominently displayed.
- Legend:** Located at the bottom right, it defines symbols for "Area" (represented by a solid black box) and "Place or Area" (represented by a hatched box).
- Parcel Information:** Numerous individual parcels are identified with owner names and acquisition years. Examples include:
  - WITMORE (1963)
  - ST. HANLEY (1963)
  - HILLMAN (1963)
  - BULLHORN (1963)
  - MILGROVE (1963)
  - OWEN CANTON (1963)
  - HOBSON (1963)
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1960  
PURCELL

NYC 8-44

# 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

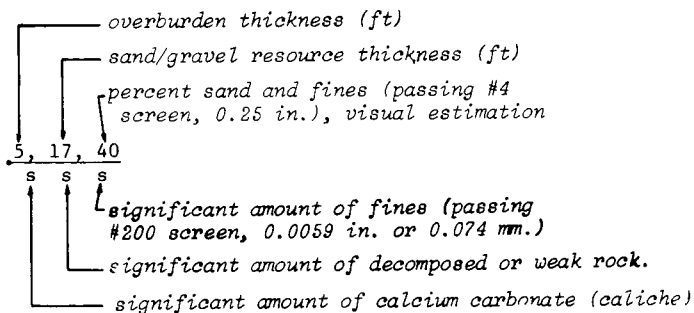
### Unevaluated Resource

- 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
-  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.

ALLENS PARK QUADRANGLE  
COLORADO-Boulder CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

Topographic map of the Mount Diablo area in California. The map shows contour lines, roads, and geographical features. Key locations include Mount Diablo, Diablo Canyon, and the Middle St. Vrain Creek. A note at the bottom right states: "NOTE: Valley fill along the Middle St. Vrain Creek probably contains local deposits of sand and gravel." The map includes a grid with coordinates and a scale bar.

1. Location unit  
 2. Resource classification

**APPENDIX 10115**

E Floodplain deposit  
 T Stream terrace deposit  
 V Valley fill (F & T)  
 U Unalut Deposits  
 A Alluvial fan  
 W Wind-deposited sand (eolian)  
 M Marine deposits  
 L Lotic/alluvial aprilla...

**APPENDIX CLASSIFICATION**

1. Flow direction  
 1.1 (Cont 128) defined on SE stream,  
 1.2 defined on NW stream,

2. Gravel: relatively clean and small  
 3. Gravel: significant fines, decomposed rock,  
 within channels

4. Flow direction  
 1.1 (Cont 128) defined on SE stream, NW  
 1.2 (Cont 128) defined on NW stream, NW stream, NW stream

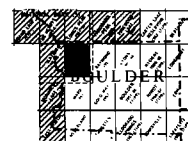
5. Sand

6. Unsorted resource

7. Probable aggregate resource

**NOT FINALS**

8. Operating gravel and/or sand pit  
 9. Abandoned gravel and/or sand pit  
 10. Operating stone quarry  
 11. Abandoned stone quarry  
 12. Potential quarry aggregate resource or a  
 13. potential aggregate resource  
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 97. potential aggregate resource  
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 99. potential aggregate resource  
 100. potential aggregate resource



QUADRANGLE LOCATION

NON-RESOURCE OR  
WITHDRAWN AREA

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



ROAD CLASSIFICATION

Medium-duty \_\_\_\_\_ Light-duty \_\_\_\_\_

Unimproved dirt \_\_\_\_\_

☐ State Route

ALLENS PARK, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

ALTA VISTA QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
1:25000 FEET

## 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 Wind-deposited sand (eolian)  
M Man-made deposits (slag, tailings, spalls, etc.)

### RESOURCE CLASSIFICATION

**CRANDALL QUADRANGLE**  
(as last 1958 revision on 84 screen, visual estimation)  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed rock, calcareous  
**FIN SANDS**  
(greater than 1/16 passing 40 screen, 40% retained on 200 screen, visual estimation)  
3 Sand

### Unlimited Resource

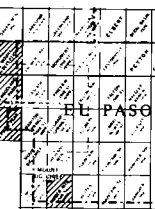
4 Probable aggregate resource

### 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  
Selected well or drill-hole location with over-  
burden thickness (ft) and sand/gravel resource  
thickness (ft), obtained from well logs.  
"G" indicates gravel; "S" indicates sand  
"u" in symbol denotes unconsolidated or  
unknown property.  
"M" denotes Colorado Geological Survey  
underground and gravel projects  
Well hole  
Landform boundary, solid where known or  
dashed where approximate or inferred.

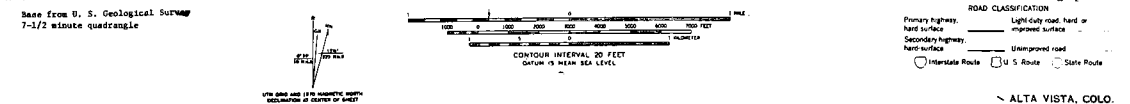
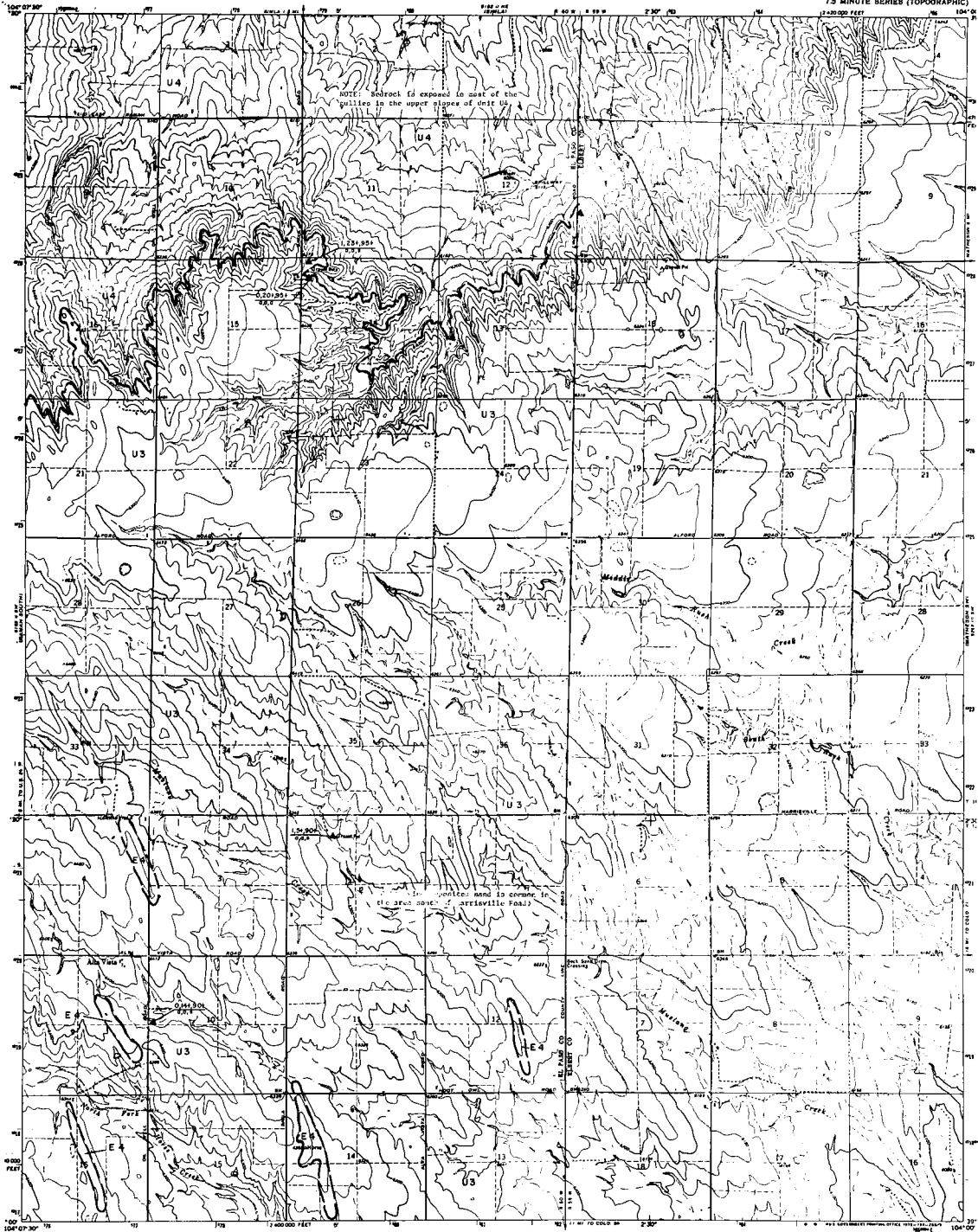
### STATION, LOCATION AND ORIENTAL DESCRIPTION OF SYMBOL

overburden thickness (ft)  
sand/gravel resource thickness (ft)  
current sand and fines (passing 40  
screen, 2.36 in.), visual estimation  
significant amount of fines (passing  
100 screen, 0.075 in. or 0.075 mm.)  
significant amount of decomposed or void rock  
significant amount of calcareous (caliche)  
"u" in symbol denotes unconsolidated or  
unknown property.  
"M" in symbol denotes property owned  
or managed by MNR



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

ALTA VISTA, COLO.

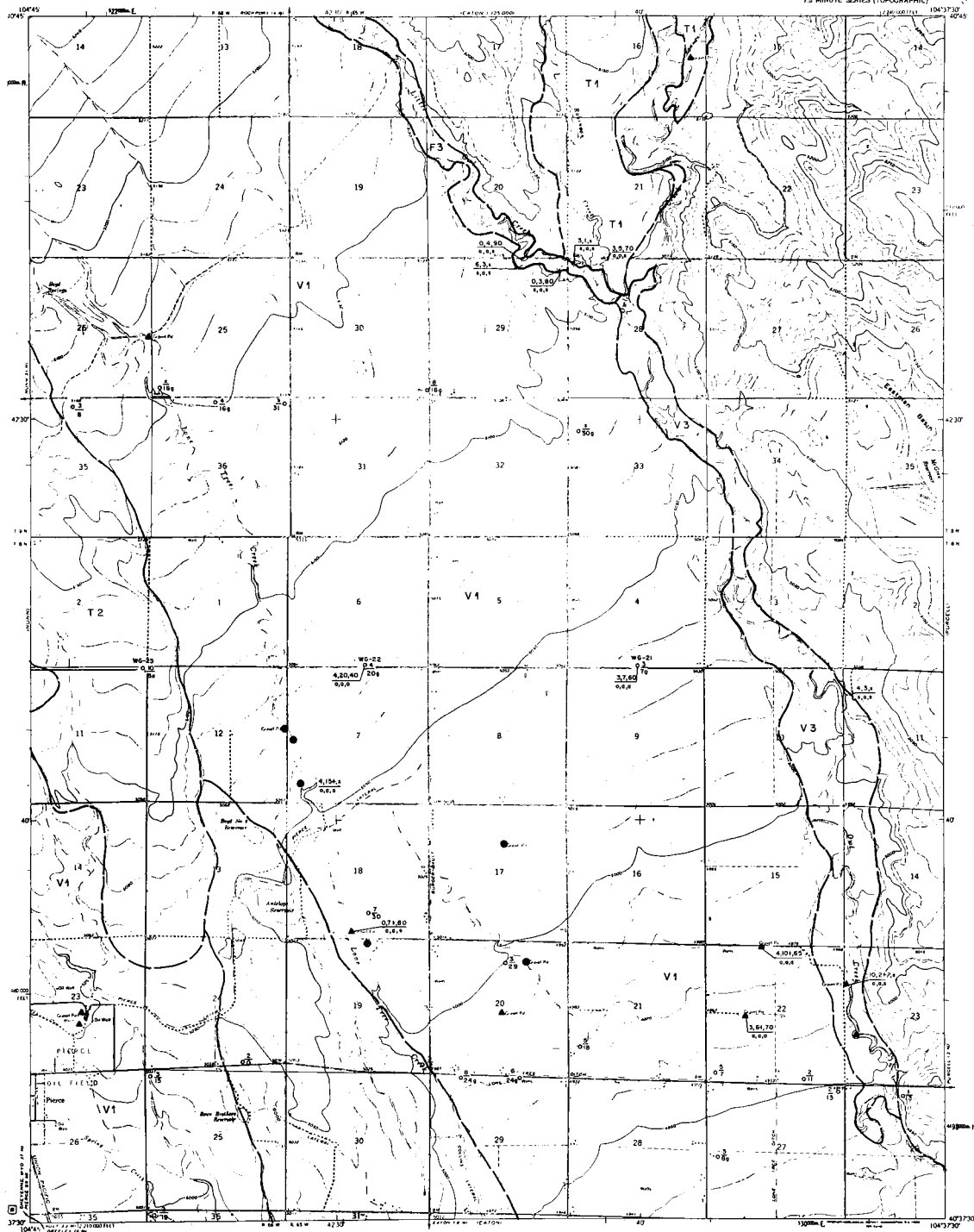
Base from U. S. Geological Survey  
7-1/2 minute quadrangle

UTM GRID AND 10°N MAGNETIC NORTH  
DECLINATION IN CENTER OF SHEET

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

- CONTOUR**  
Assume classification
- LANDFORMS**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Upland deposits  
A Alluvial fan  
E Erosion-deposited sand (alluvial)  
M Man-made deposits (slag, tailings, etc.)
- AGGREGATE CLASSIFICATION**  
Coarse Sand/Gravel  
(all listed 100% material on 48 screen, usual estimation)  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, calcium carbonate  
Fine Sand/Gravel  
(all listed 100% material on 48 screen, 60% retained on 100 screen, usual estimation)  
3 Sand  
Unvaluated 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  
"a" indicates gravel; "s" indicates sand  
"u" indicates unvaluated or unknown property  
"m" denotes Colorado Geological Survey "Mineral Land and Gravel Property" drill hole  
Landowner boundary, solid where known or observed; dashed where approximate or inferred
- SECTION, LOCATION AND ORIENTAL**  
SECTION OF QUAD  
overburden thickness (ft)  
underground resource thickness (ft)  
percent sand and fines (passing 48 screen, 0.25 in.), usual estimation  
significant amount of fines (passing 100 screen, 0.075 in. or 0.075 mm)  
significant amount of decomposed or weak rock  
significant amount of various materials  
"a" or "s" symbol denotes unvaluated or unknown property  
"u" or "m" symbol denotes property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR  
WYDRAIN AREA

## 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 I-687.

Maped by: Stephen D. Schwabach  
Date: June 30, 1976

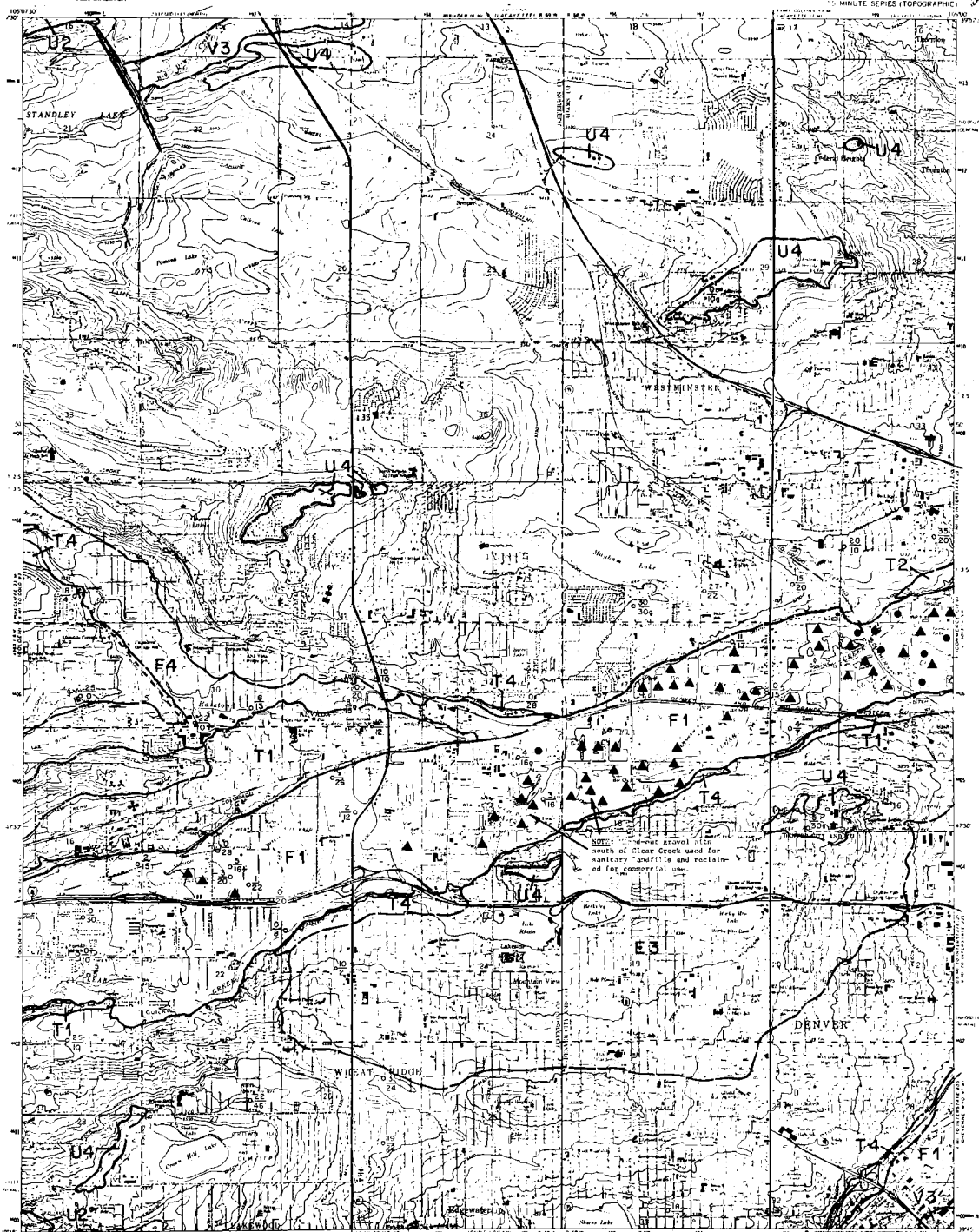
ROAD CLASSIFICATION  
Heavy duty ——— Light duty ———  
Medium duty - - - - - Unimproved det. - - - - -  
U.S. Route

ANTELOPE RESERVOIR, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

ARVADA QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

**Geologic units**  
Geologic classification

- Geologic units**
- F Fluvial deposit
  - T Tertiary terrace deposit
  - V Valley fill (F & T)
  - U Unconsolidated
  - A Alluvial fan
  - E Eolian deposit
  - M Marine deposit (along coastline, etc.)

## Resource classification

- Gravel resources**  
1 Gravel: relatively clean and smooth  
2 Gravel: significant fines, decomposed rock, calcareous material
- Sand resources**  
3 Sand
- Probable aggregate resource**  
4

## 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 owner's permission (if later sand/gravel resource thickness (ft) section from well logs)
- "x" indicates gravel; "s" indicates sand
- "in symbol denotes unutilized or unknown property
- "m" denotes Colorado Geological Survey "Weather/Soil and Gravel" project
- "L" on boundary, solid shows known or abandoned sand where representative or inferred

## Station location and geologic description of profile

- overburden thickness (ft)
- underlying resource thickness (ft)
- resource sand and gravel (ft) of section, 0.12 ft, total overburden
- significant amount of fines (less than 0.075 mm), 0.075 to 0.25 mm
- significant amount of decomposed or weak rock
- significant amount of medium to coarse sand
- "x" in symbol denotes unutilized or unknown property
- "s" in symbol denotes properly 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, Pleistocene 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 1-731.

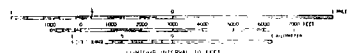
Inter-County Regional Planning Commission, 1961, Drainage courses plan for the Denver region - Part 1, sand and gravel resources: Denver, Colo., Inter-County Reg. Plan. Comm. pl. 1.

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 1-850-A.

Maped 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**

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

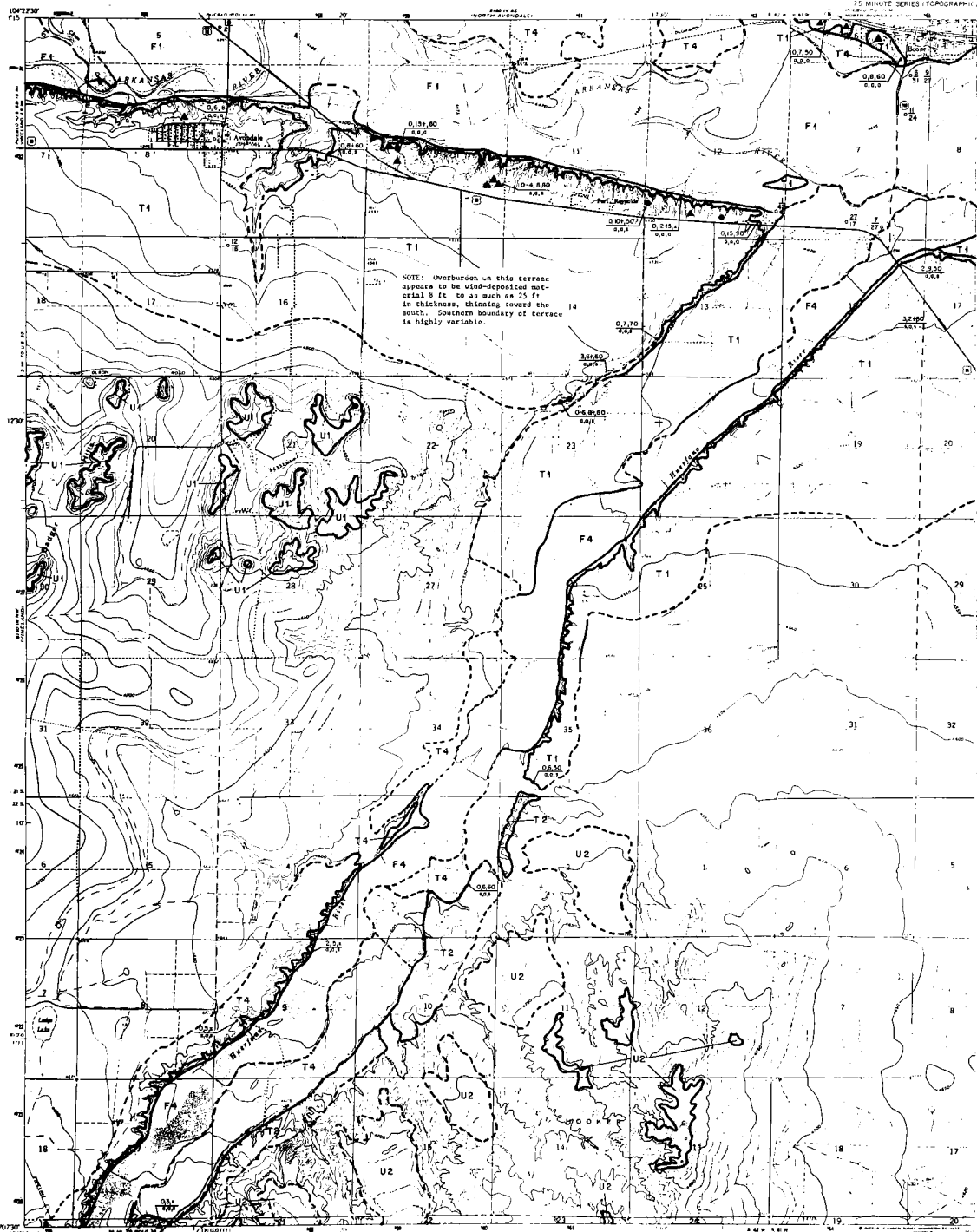
ARVADA COLO



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

— Contour line  
— Resource classification

### RESOURCE CLASSIFICATION

- F Fluvial deposit
- T Terrace deposit
- V Valley fill (F & T)
- U Unconsolidated
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Man-made deposits (slag, tailings, spoils, etc.)

### RESOURCE CLASSIFICATION

1 Gravel: relatively clean and well sorted

2 Gravel: significant fines, decomposed rock, calcareous sediment

3 Sand

4 Potential aggregate resources

### NOTES

- 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, "a" indicates sand
- "u" in symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey material and gravel analysis
- Location boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND GEOLOGICAL

DESCRIPTION OF SYMBOL

Overburden thickness (ft.)

Non-ground resource thickness (ft.)

Partial sand and gravel (spacing 84 ft.)

Significant amount of fines (spacing 84 ft.)

Significant amount of decomposed or weak rock

Significant amount of calcareous sediment (calciferous)

"u" in symbol denotes unconsolidated or unknown property

"m" in symbol denotes property absent or insignificant

GENERAL MAP OF COLORADO

AVONDALE QUADRANGLE

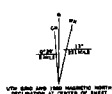
NON-RESOURCE OR WITHDRAWN AREA

QUADRANGLE LOCATION

Map by: Stephen D. Schwabach

Date: June 30, 1974

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



CONTOUR INTERVAL: 10 FEET  
DOTTED LINE REPRESENTS LIGHT CONTOUR  
SOLID LINE REPRESENTS DARK CONTOUR

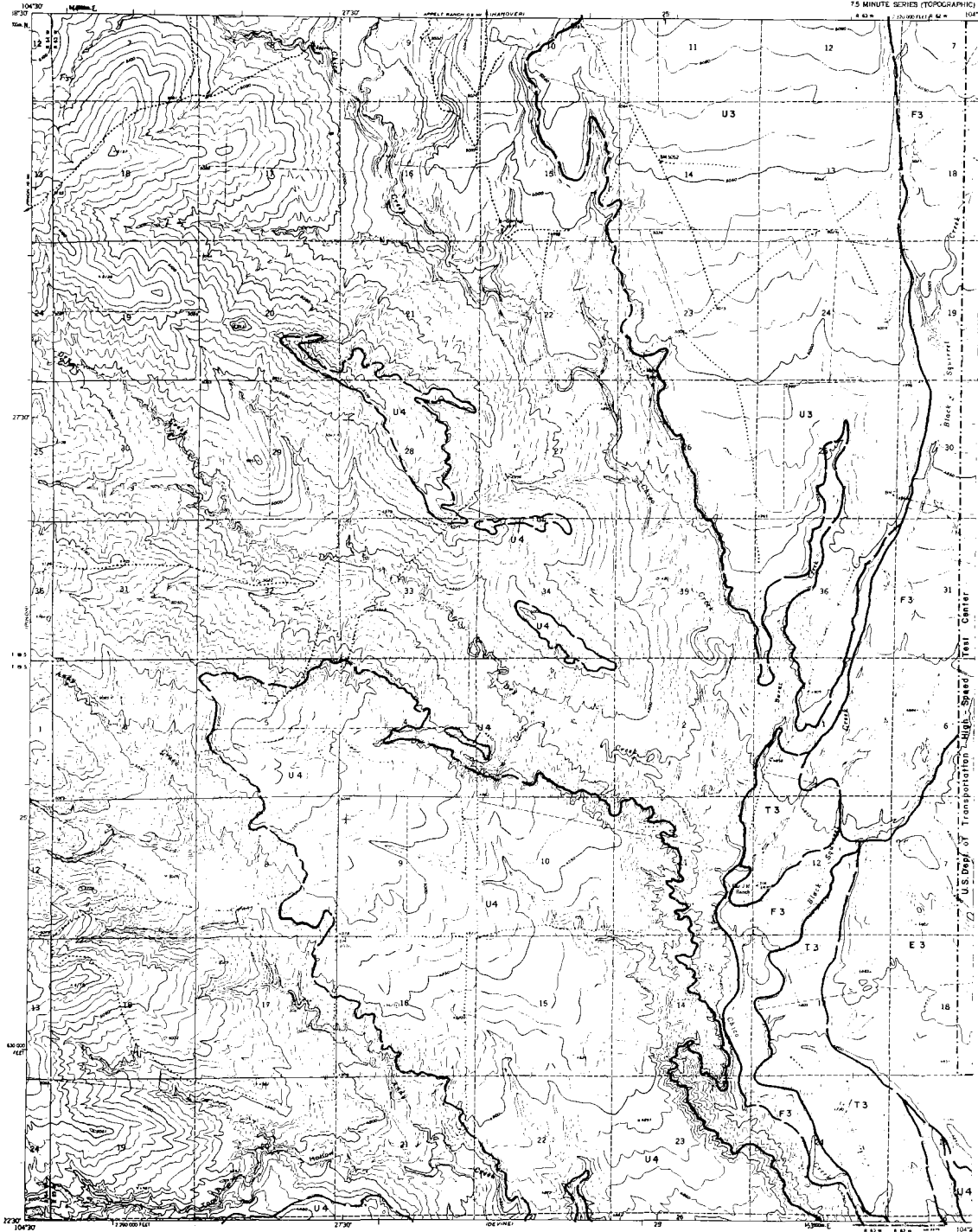
ROAD CLASSIFICATION  
Heavy duty — Light duty —  
Medium duty — Unimproved dirt —  
U.S. Road — State Road

AVONDALE, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

BAR J H RANCH QUADRANGLE  
COLORADO-PUEBLO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
1:50,000



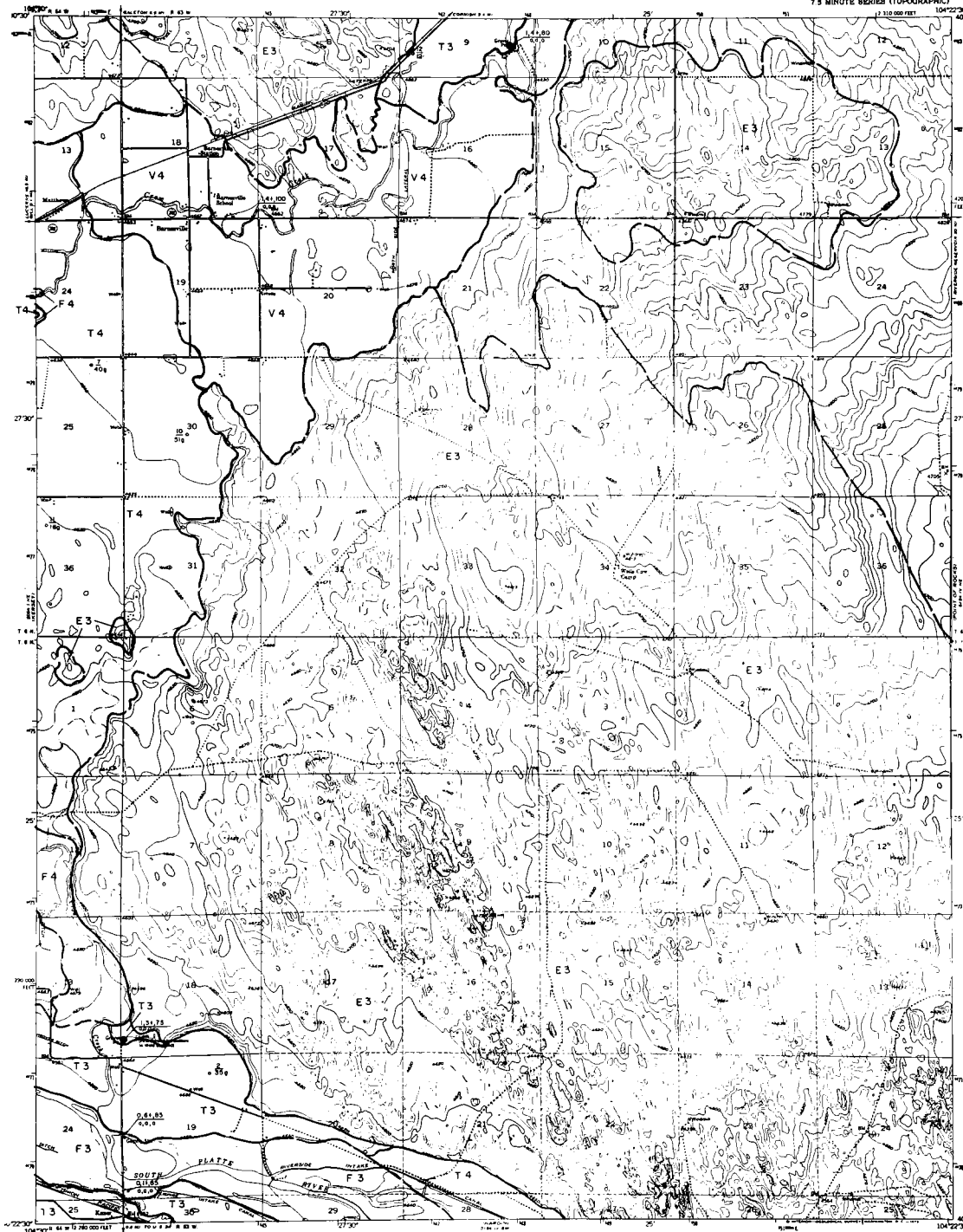
## EXPLANATION

- Landform unit**  
Approximate classification
- LANDFORM UNIT**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Upland deposits  
A Alluvial fan  
E Viscous-deposited sand (colluvium)  
M Man-made deposits (landfill, waste, etc.)
- AGGREGATE CLASSIFICATION**  
**Gravel**  
1 Gravel: 50% or more of 1/16 to 1/8 inch, 50% or more of 1/8 to 1/4 inch, 50% or more of 1/4 to 1/2 inch, 50% or more of 1/2 to 1 inch, 50% or more of 1 inch to 2 inches, 50% or more of 2 to 4 inches, 50% or more of 4 to 8 inches, 50% or more of 8 to 16 inches, 50% or more of 16 to 32 inches, 50% or more of 32 to 64 inches, 50% or more of 64 to 128 inches, 50% or more of 128 to 256 inches, 50% or more of 256 to 512 inches, 50% or more of 512 to 1024 inches, 50% or more of 1024 to 2048 inches, 50% or more of 2048 to 4096 inches, 50% or more of 4096 to 8192 inches, 50% or more of 8192 to 16384 inches, 50% or more of 16384 to 32768 inches, 50% or more of 32768 to 65536 inches, 50% or more of 65536 to 131072 inches, 50% or more of 131072 to 262144 inches, 50% or more of 262144 to 524288 inches, 50% or more of 524288 to 1048576 inches, 50% or more of 1048576 to 2097152 inches, 50% or more of 2097152 to 4194304 inches, 50% or more of 4194304 to 8388608 inches, 50% or more of 8388608 to 16777216 inches, 50% or more of 16777216 to 33554432 inches, 50% or more of 33554432 to 67108864 inches, 50% or more of 67108864 to 134217728 inches, 50% or more of 134217728 to 268435456 inches, 50% or more of 268435456 to 536870912 inches, 50% or more of 536870912 to 1073741824 inches, 50% or more of 1073741824 to 2147483648 inches, 50% or more of 2147483648 to 4294967296 inches, 50% or more of 4294967296 to 8589934592 inches, 50% or more of 8589934592 to 17179869184 inches, 50% or more of 17179869184 to 34359738368 inches, 50% or more of 34359738368 to 68719476736 inches, 50% or more of 68719476736 to 137438953472 inches, 50% or more of 137438953472 to 274877906944 inches, 50% or more of 274877906944 to 549755813888 inches, 50% or more of 549755813888 to 1099511627776 inches, 50% or more of 1099511627776 to 2199023255552 inches, 50% or more of 2199023255552 to 4398046511104 inches, 50% or more of 4398046511104 to 8796093022208 inches, 50% or more of 8796093022208 to 17592186044416 inches, 50% or more of 17592186044416 to 35184372088832 inches, 50% or more of 35184372088832 to 70368744177664 inches, 50% or more of 70368744177664 to 140737488355328 inches, 50% or more of 140737488355328 to 281474976710656 inches, 50% or more of 281474976710656 to 562949953421312 inches, 50% or more of 562949953421312 to 1125899906842624 inches, 50% or more of 1125899906842624 to 2251799813685248 inches, 50% or more of 2251799813685248 to 4503599627370496 inches, 50% or more of 4503599627370496 to 9007199254740992 inches, 50% or more of 9007199254740992 to 18014398509481984 inches, 50% or more of 18014398509481984 to 36028797018963968 inches, 50% or more of 36028797018963968 to 72057594037927936 inches, 50% or more of 72057594037927936 to 144115188075855872 inches, 50% or more of 144115188075855872 to 288230376151711744 inches, 50% or more of 288230376151711744 to 576460752303423488 inches, 50% or more of 576460752303423488 to 1152921504606846976 inches, 50% or more of 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3831238852164

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

- CONTOUR UNIT**  
— Elevation  
— Elevation class/contour
- LAPORAL UNIT**  
F Floodplain deposit  
T River terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
W Wind-deposited sand (loess)  
M Hummock deposits (lake, tillage, etc.)
- RESOURCE CLASSIFICATION**  
1. (a) **CONTOUR UNIT**  
Use (a) 300 feet on 40 screen, 1000 ft. contour  
1. Gravel relatively clean and sound  
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  
\* Related well or drill-hole location with over-  
burden thickness (ft), sand/gravel resource  
thickness (ft), material from well logs  
\* "F" indicates gravel, "T" indicates sand  
\* "U" indicates decomposed or  
alluvial deposit  
\* "W" indicates Colorado Geological Survey  
"operational and gravel projects"  
\* Well hole  
\* Landowner boundary, solid where known or  
assumed, dashed where approximate or  
inferred
- STATION, LOCATION AND ORIENTATIONAL  
INDICATION OF SYMBOL**  
\* Overburden thickness (ft)  
\* Sand/gravel resource thickness (ft)  
\* Percent sand and fines (spacing of  
screen, 2.5 in., 100 ft contour)  
\* Significant amount of fines (spacing  
100 ft screen, 1.000 in. or 0.075 in.)  
\* Significant amount of decomposed or weak rock  
\* "U" indicates decomposed or alluvial  
deposit  
\* "W" indicates Colorado Geological Survey  
"operational and gravel projects"  
\* Well hole  
\* Landowner boundary, solid where known or  
assumed, dashed where approximate or  
inferred

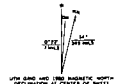


QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN  
AREA

REFERENCE: Burkland, L.J., and Brown, R.P.,  
1957. Geology and ground-water resources of the  
lower South Platte River valley between Hardin,  
Colorado, and Fort Collins, Nebraska: U. S. Geol.  
Survey Water-Supply Paper 1578, pl. 1.

Map by: Philip C. Wicklen  
Date: June 30, 1974

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



CONTOUR INTERVAL 10 FEET  
DARTON IS MEAN SEA LEVEL

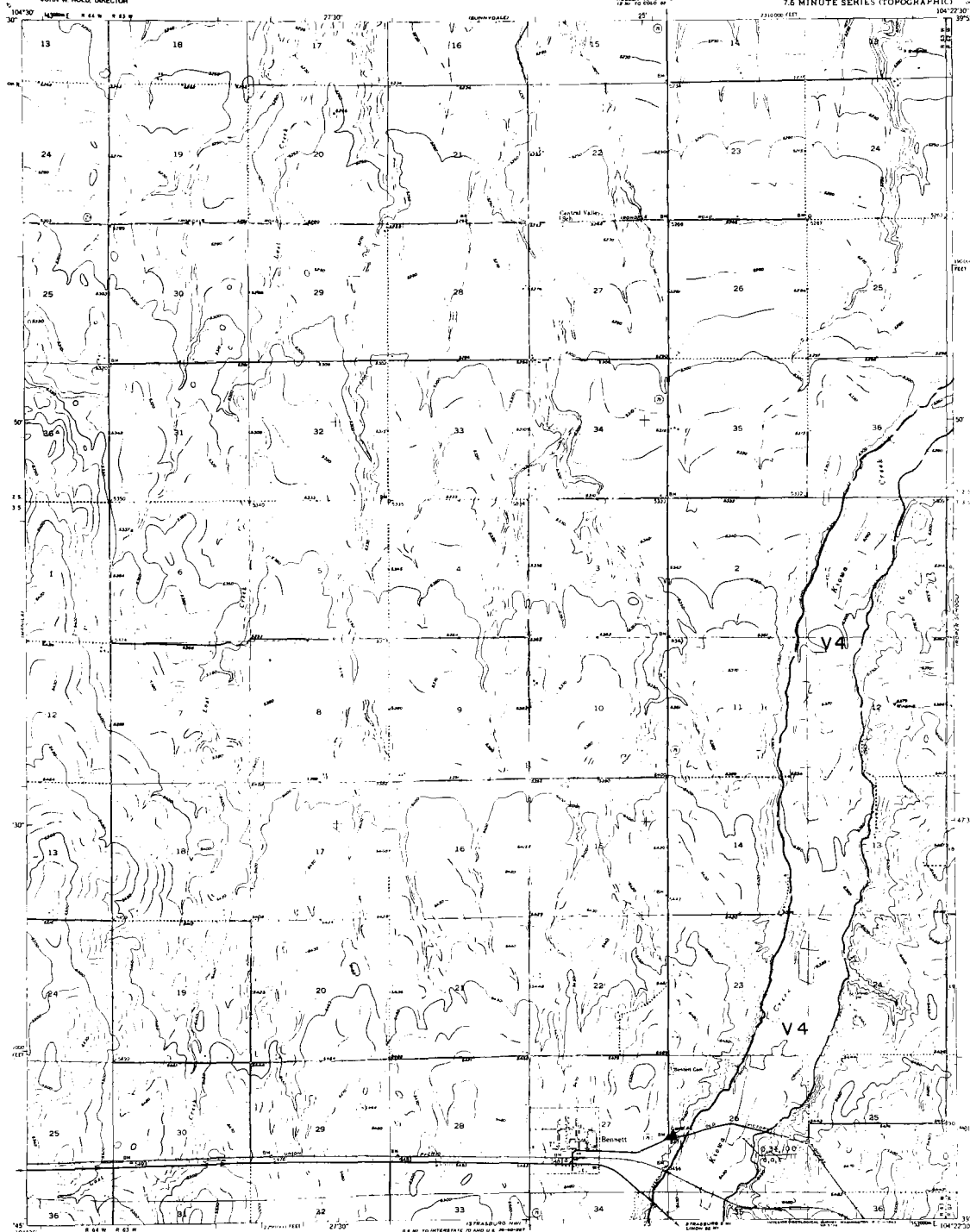
ROAD CLASSIFICATION  
Heavy duty ——— Light duty ———  
Medium-duty ——— Unimproved dirt ———  
□ U.S. Route    ○ State Route

BARNESVILLE, COLO.

## RESOURCES MAP

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

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



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

ROAD CLASSIFICATION

Heavy-duty \_\_\_\_\_ Light-duty \_\_\_\_\_

Unimproved dirt .....  
C. State Route

BENNETT, COLO.

- Landform unit
- Resource classification

## APPENDIX

F	Floodplain deposit
T	Stream terrace deposit
V	Valley fill (F & T)
U	Upland deposits
A	Alluvial fan
E	Wind-deposited sand
M	Man-made deposits
L	Lake fillings, artificial

RESOURCE CLASSIFICATION

Coarse Aggregate  
130 (used for normal) = 11 screen,  
1200 (used for fine)

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

Flow aggregate  
greater than 10' planning 10' screen, 10' marked in 30" screen, small aggregate

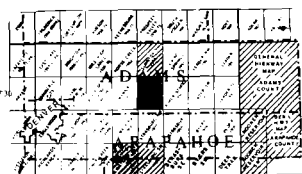
4 Probable hardware resource



### MAP SYMBOLS

**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). Wellhead
- " indicates gravel " indicates sand
- " In symbol denotes unavailable or unknown property.
- ⊙ "See Colorado Geological Survey Midland-Slope and Gravel projects drill hole
- Lignite boundary, solid where known or observed, dashed where approximate or inferred

## STATION, LOCATION AND GEOLOGICAL

[illegible]

 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

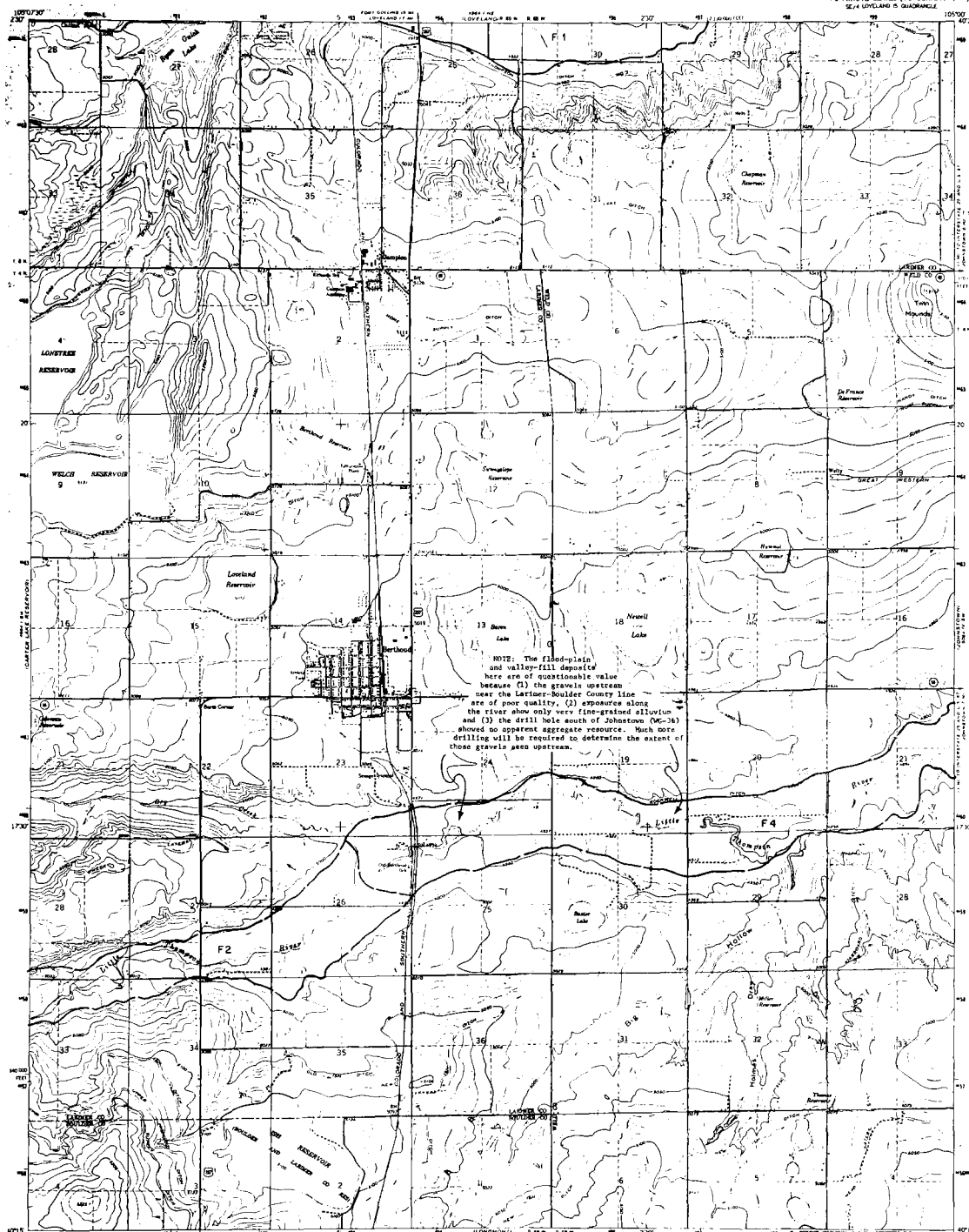
Mapped by: Phillip C. Wicklein  
Date: June 30, 1974

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

BERTHOUD QUADRANGLE  
COLORADO

7.5 MINUTE SERIES (TOPOGRAPHIC)  
SCALE: UNLAWFUL TO QUADRANGLE

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



## EXPLANATION

Landform units  
Resource classification

### LANDFORM UNITS

- F Flood-plain deposit
- T Tertiary terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Erosional deposit (scabline)
- M Man-made deposits (roads, railroads, etc.)

### RESOURCE CLASSIFICATION

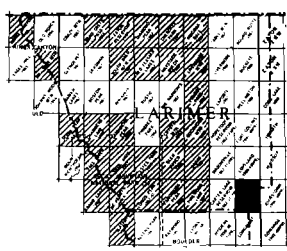
- 1 Gravel: (1) 100% gravel, 20-40 mm, 100% gravel
- 2 Gravel: significant fines, decomposed rock, talus, talus
- 3 Sand: (1) 100% sand, 20-40 mm, 100% sand
- 4 Probable aggregate resources

### NOTES

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Selected unit of drill-hole locations with open-hole (1) 100% gravel, 20-40 mm, 100% gravel
- Selected unit of drill-hole locations with open-hole (2) 100% sand, 20-40 mm, 100% sand
- "F" indicates flood-plain, "V" indicates valley fill
- "E" is symbol denotes erosion/scabline or alluvial fan
- "M" denotes Colorado Geological Survey Man-made and Gravel projects
- Drill hole
- Landform boundary, well where known or observed; dashed where approximation or inferred

### STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE

- Aggregates (1) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (2) 100% sand, 20-40 mm, 100% sand
- Aggregates (3) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (4) 100% sand, 20-40 mm, 100% sand
- Aggregates (5) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (6) 100% sand, 20-40 mm, 100% sand
- Aggregates (7) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (8) 100% sand, 20-40 mm, 100% sand
- Aggregates (9) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (10) 100% sand, 20-40 mm, 100% sand
- Aggregates (11) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (12) 100% sand, 20-40 mm, 100% sand
- Aggregates (13) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (14) 100% sand, 20-40 mm, 100% sand
- Aggregates (15) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (16) 100% sand, 20-40 mm, 100% sand
- Aggregates (17) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (18) 100% sand, 20-40 mm, 100% sand
- Aggregates (19) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (20) 100% sand, 20-40 mm, 100% sand
- Aggregates (21) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (22) 100% sand, 20-40 mm, 100% sand
- Aggregates (23) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (24) 100% sand, 20-40 mm, 100% sand
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- Aggregates (27) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (28) 100% sand, 20-40 mm, 100% sand
- Aggregates (29) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (30) 100% sand, 20-40 mm, 100% sand
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- Aggregates (73) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (74) 100% sand, 20-40 mm, 100% sand
- Aggregates (75) 100% gravel, 20-40 mm, 100% gravel
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- Aggregates (77) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (78) 100% sand, 20-40 mm, 100% sand
- Aggregates (79) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (80) 100% sand, 20-40 mm, 100% sand
- Aggregates (81) 100% gravel, 20-40 mm, 100% gravel
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- Aggregates (83) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (84) 100% sand, 20-40 mm, 100% sand
- Aggregates (85) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (86) 100% sand, 20-40 mm, 100% sand
- Aggregates (87) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (88) 100% sand, 20-40 mm, 100% sand
- Aggregates (89) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (90) 100% sand, 20-40 mm, 100% sand
- Aggregates (91) 100% gravel, 20-40 mm, 100% gravel
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- Aggregates (93) 100% gravel, 20-40 mm, 100% gravel
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- Aggregates (96) 100% sand, 20-40 mm, 100% sand
- Aggregates (97) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (98) 100% sand, 20-40 mm, 100% sand
- Aggregates (99) 100% gravel, 20-40 mm, 100% gravel
- Aggregates (100) 100% sand, 20-40 mm, 100% sand



### QUADRANGLE LOCATION

- Non-resource or withdrawn area

Geology modified after: Colton, R.B., and Mitch, R.B., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Front Range Corridor, Colorado: U. S. Geol. Survey Map 1-853 D.

Map 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-PUEBLO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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

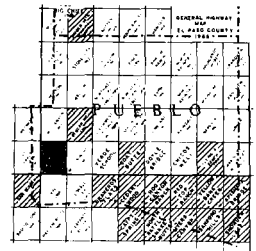


Land use and classification

- LAND USE**
- F Floodable 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, spoil, etc.)

- RESOURCE CLASSIFICATION**
- Coarse Aggregate**  
(all except 100 mesh and on 44 screen, visual estimation)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcareous carbonate
- Fine Aggregate**  
(passing 100 mesh, on 44 screen, 40% retained, on 425 mesh, visual 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
  - Selected well or drill-hole location with over-burden thickness (ft) over sand/gravel, thickness (ft), obtained from well logs
  - "x" indicates gravel; "s" indicates sand
  - "u" in symbol denotes unclassified or unknown property
  - "w" denotes Colorado Geological Survey Window (road and gravel products)
  - Landform boundary, solid where known or inferred; dashed where approximate or indicated
- STATION LOCATION AND CHRONOLOGICAL DESCRIPTION OF SYMBOL**
- overburden thickness (ft)
  - undrilled resource thickness (ft)
  - percent sand and fines (passing 44 screen, 0.25 in.), visual estimation
  - significant amount of fines (passing 100 mesh, 0.075 in. or 0.075 mm.)
  - significant amount of decomposed or weak rock
  - significant amount of calcareous carbonate (caliche)
  - "u" in symbol denotes unclassified or unknown property
  - "s" in symbol denotes properly sorted or unclassified



■ QUADRANGLE LOCATION  
▨ NON-RESOURCE OR VETERINARY AREA

Geology modified after Scott, G. R., and Taylor, R. B., 1973, U. S. Geological Survey, Map 100-331.

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

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



SCALE 1:24,000  
CONTOUR INTERVAL, 20 FEET  
ELEVATION IN FEET  
BEULAH, COLORADO

**ROAD CLASSIFICATION**

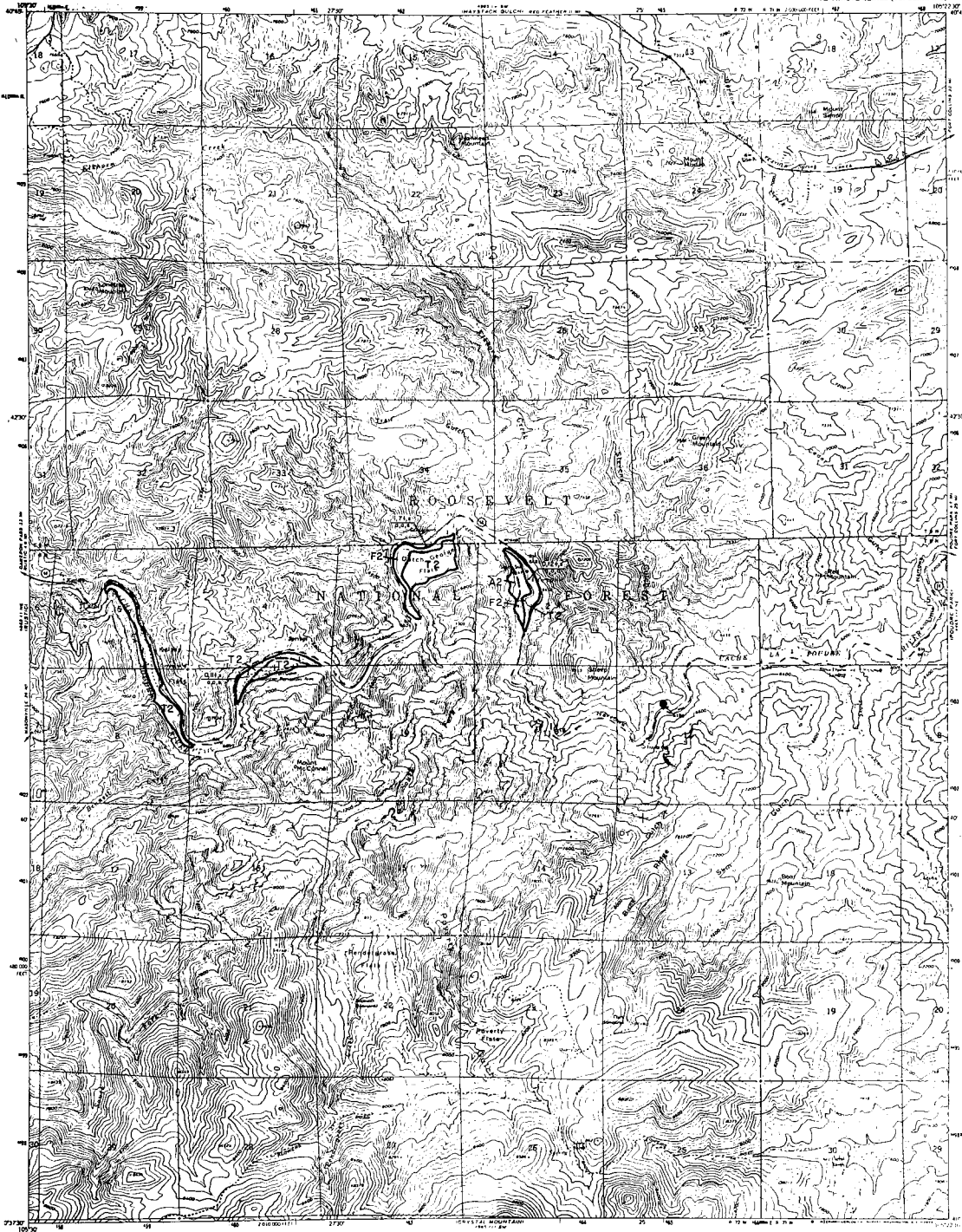
Medium duty ————  
Light duty ————  
Unimproved dirt ————  
State Route ————

BEULAH, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

Long-term unit  
Resource classification

### LANDFORM DATA

- 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, etc.)

### RESOURCE CLASSIFICATION

- Gravel, Sandstone**  
(at least 30% gravel or 40% sand, visual estimation)
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, calcareous cementation
- Fill, Sandstone**  
(greater than 75% passing 40 screen, 80% retained on 420 screen, visual estimation)
- 3 Sand
- Unconsolidated Resources**

- 4 Unconsolidated 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 overburden thickness (fill over sandstone resource thickness (ft), shaded from well logs, "x" indicates gravel, "m" indicates sand, "s" in symbol denotes unconsolidated or unknown property.
- "m" denotes Colorado Geological Survey "Unconsolidated and Gravel" project
- Drill hole
- Landform boundary, solid where known or observed, dashed where approximated or inferred

### STATION, LOCATION AND GEOLOGICAL

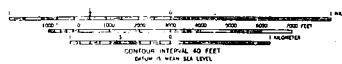
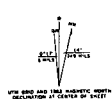
- OVERBURDEN THICKNESS (ft)**  
unconsolidated resource thickness (ft)  
percent sand and fines (passing 40 screen, 0.25 in., visual estimation)
- significant amount of fines (passing 40 screen, 0.25 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- "x" in symbol denotes unconsolidated or unknown property
- "m" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR  
VETERINARY AREA

Map by: Stephen D. Schwachow  
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 ALBERT'S QUADRANGLE

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

## EXPLANATION

Landform unit  
Resource classification

### LANDFORM UNIT

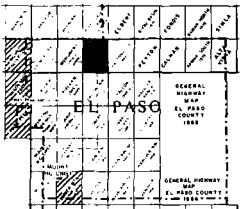
- F Floodable deposit
- T Tertiary terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Eolian deposit and (colluvial)
- M Mountainous (slag, tailings, etc.)

### RESOURCE CLASSIFICATION

- 1 Coarse aggregate  
(at least 30% retained on #4 screen,  
visual estimation)
- 2 Gravel: relatively clean and sound  
This bedrock unit would require blasting  
and crushing to make aggregate.
- 3 Fine aggregate  
(passing #20 sieve, 60% retained on #40 screen, 100%  
retained on #100 screen, visual estimation)
- 4 Sand
- 5 Overlaid resource
- 6 Probable aggregate resource

### MAP SYMBOLS

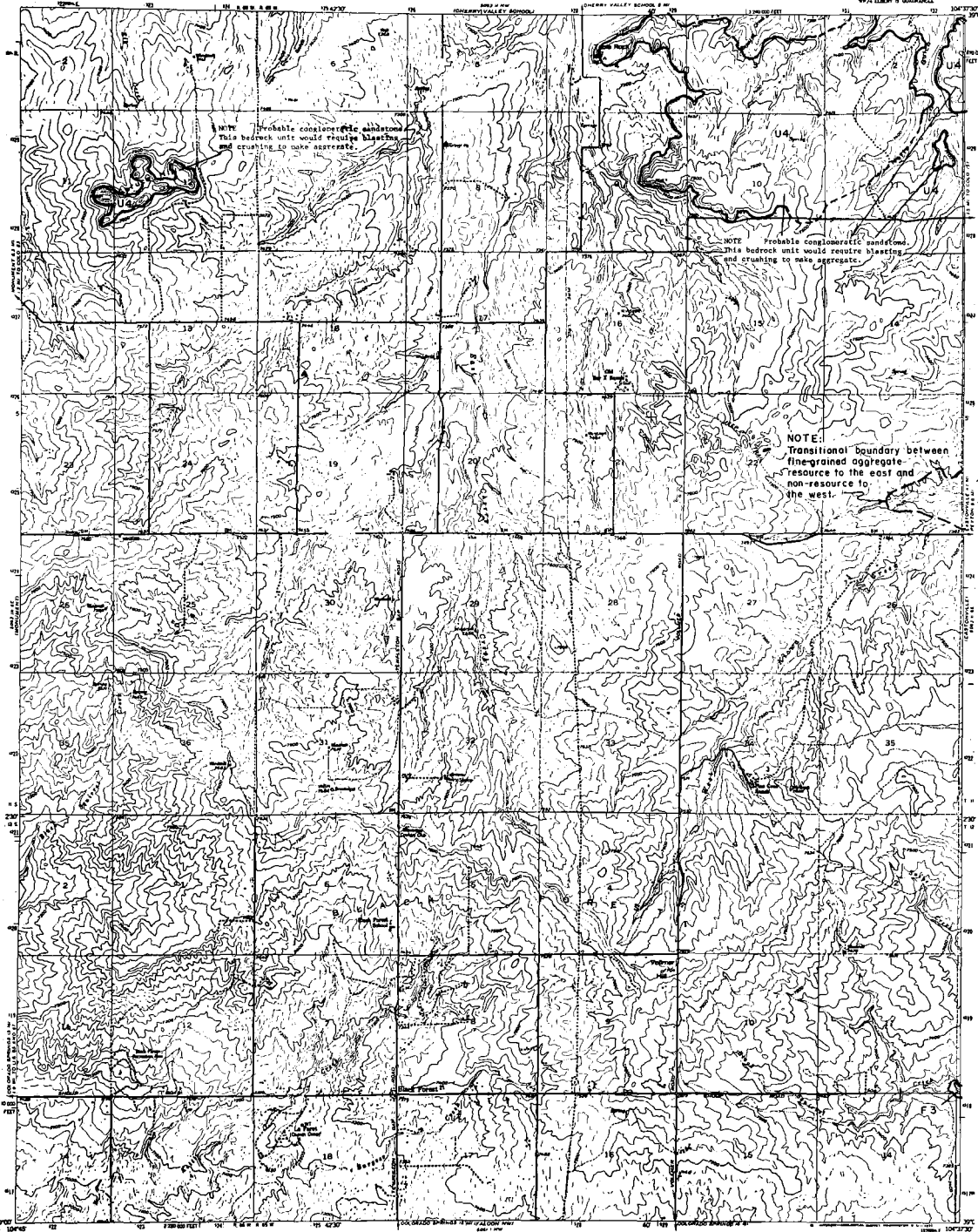
- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Selected only or suitable location with overburden thickness (ft) over sand/gravel resource thickness (ft): obtained from well logs
- "u" indicates gravel; "s" indicates sand
- "x" is symbol denotes overlaid or unknown property
- "m" denotes Colorado Geological Survey window/land and gravel projects
- drill hole
- Landform boundary, solid where known or inferred; dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF SPONSOR
- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (ignoring #4 screen, 0.25 in.), visual estimation
- significant amount of fines (passing #100 sieve, 0.0075 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- "u" or symbol denotes overlaid or unknown property
- "x" is symbol denotes property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR WYDRAH AREA

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-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-857 A.

Maped by: Phillip C. Wickleson  
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

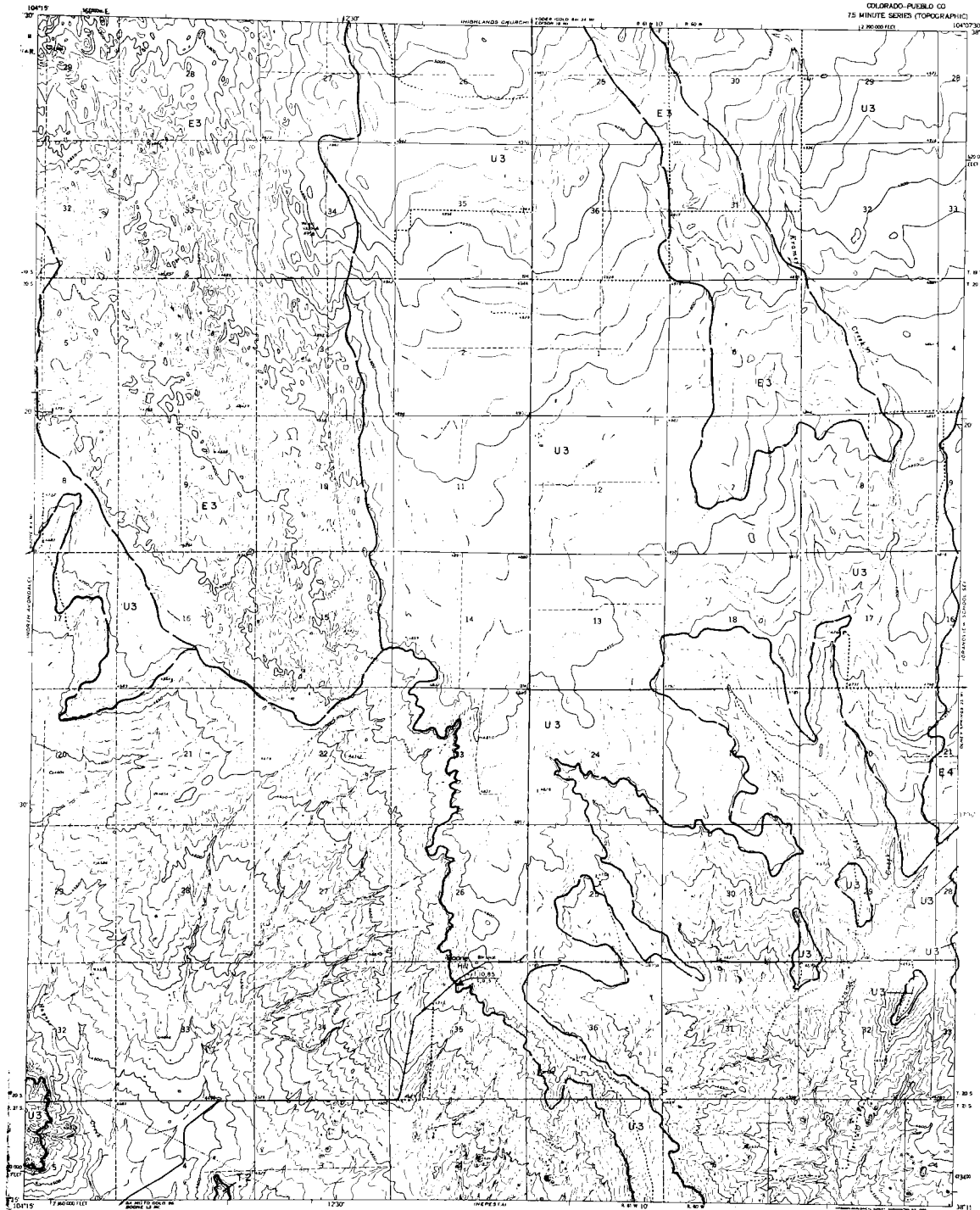
BLACK FOREST, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

Long-term unit  
Resource classification

### LITHOLOGY

- F Floodplain deposit
- T Brown surface deposit
- V Valley fill (F & T)
- U Unconsolidated
- A Alluvial fan
- E Wind-deposited sand (loess)
- M Holocene deposits
- ... (other symbols and descriptions)

### RESOURCE CLASSIFICATION

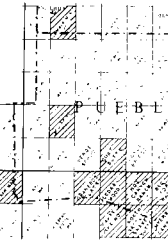
- 1 Gravel: relatively clean and sand
- 2 Gravel: significant fines, decomposed rock, talus, cobbles
- 3 Sand
- 4 Potential aggregate resource

### 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 well-head location with overburden thickness (ft) over sand/gravel resource thickness (ft), indicated from well logs
- "a" indicates gravel, "s" indicates sand
- "x" in symbol denotes unconsolidated or unknown properties
- "W" denotes Colorado Geological Survey wellhead and gravel projects' drill hole
- Land-use boundary, well, mine, house or structure: dashed lines represent in interval

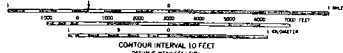
### STATION LOCATION AND ORIENTAL

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- operating sand and gravel operating as shown, 0.25 (in.), 0.5 (in.)
- significant amount of fines (greater than 200 screen, 0.075 in. or 0.25 mm)
- significant amount of decomposed or weak rock
- significant amount of calcium hydroxide (caustic)
- "x" in symbol denotes unconsolidated or unknown property
- "a" in symbol denotes properly placed or categorized



QUADRANGLE LOCATION  
NON-RESOURCE OR WILDERNESS AREA

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



ROAD CLASSIFICATION  
Medium duty  
Light-duty  
Unimproved dirt

BOONE HILL, COLO.

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

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

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



Landform unit  
Resource classification

LAURENCE GUYTON

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...)

RELEVANCE CLASSIFICATION

George Seagrave  
for least 25% retained on # 60 mesh,  
visual attrition)

1 Gravel: relatively clean and sound

2 Gravel: significant fines, decomposed rock  
calcium carbonate.

File As

3 Seed

4 Probable accessible resource

### Major Findings

Operating gravel and/or sand  
Abandoned gravel and/or sand  
Operating stone quarry  
Abandoned stone quarry  
Potential quarry aggregate

Selected well or drill-hole  
burden thickness (ft) over a  
thickness (ft), obtained from  
"a" indicates gravel; "e" is  
"a" is symbol denotes unaval  
unknown property.

Landform boundary, solid  
observed; dashed where  
inferred.

STATION, LOCATION AND GEOLOGICAL

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (average, 0.22 in.), plus

- significant amount of fl
- \$500 across, 0.0032 in.
- significant amount of de
- significant amount of no

\*a\* in symbol denotes property of unknown property  
\*a\* in symbol denotes property of or insignificant

[illegible]

QUADRANGLE

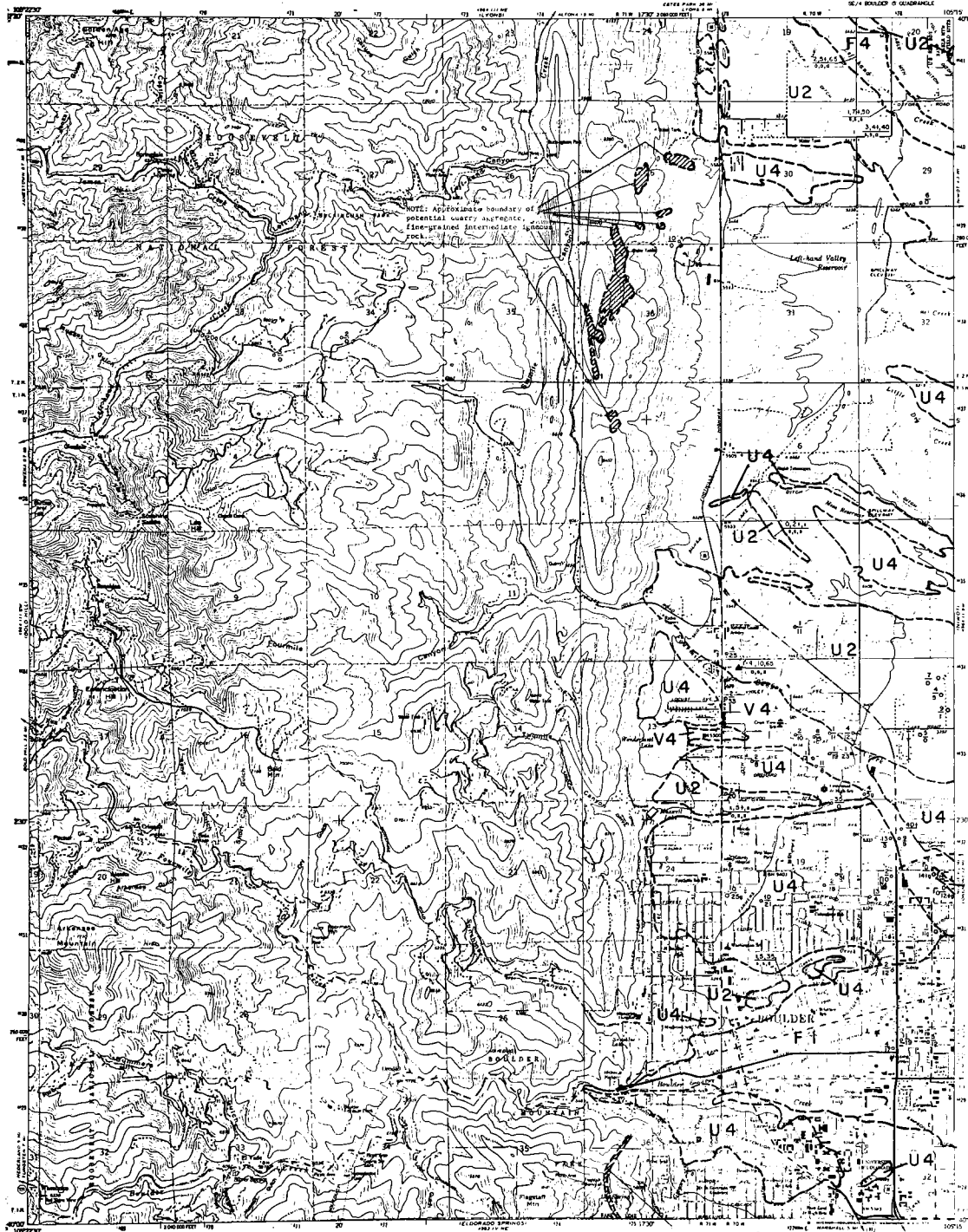
 NON-RESOURCE  
WITHDRAWN /

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

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

BOULDER QUADRANGLE  
COLORADO-BOLDER CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
SCALE: BOLDER 9 QUADRANGLE



## EXPLANATION

Conform 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 Mountain deposits (talus, scree, etc.)

## RESOURCE CLASSIFICATION

- Gravel Resources**  
(at least 100 feet of gravel on 40 acres, 625 feet of gravel on 100 acres, ideal situation)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, talus, or cement
  - 3 Sand
  - 4 Probable aggregate resources

## NOTES

- 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
- 6 Potential well-sorted, medium to coarse-grained sand/gravel resource
- 7 Potential well-sorted, medium to coarse-grained sand/gravel resource
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- 9 Potential well-sorted, medium to coarse-grained sand/gravel resource
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- 100 Potential well-sorted, medium to coarse-grained sand/gravel resource

## STATION, LOCATION AND ORIENTAL

- LOCATION OF QUARRY**
- 1 overburden thickness (ft)
  - 2 sand/gravel resource thickness (ft)
  - 3 overburden and fine (ft) (ft) (ft)
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  - 100 overburden and fine (ft) (ft) (ft)

## QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:

Colton, R.B., and Petch.

N.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Freeley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-855 D.

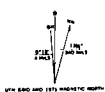
Gardner, W.H., 1968. Engineering Geologic Map of the Boulder Quadrangle, Boulder County, Colorado: U. S. Geol. Survey Open-File Report.

Map 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 40 FEET  
BASED ON MEAN SEA LEVEL

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

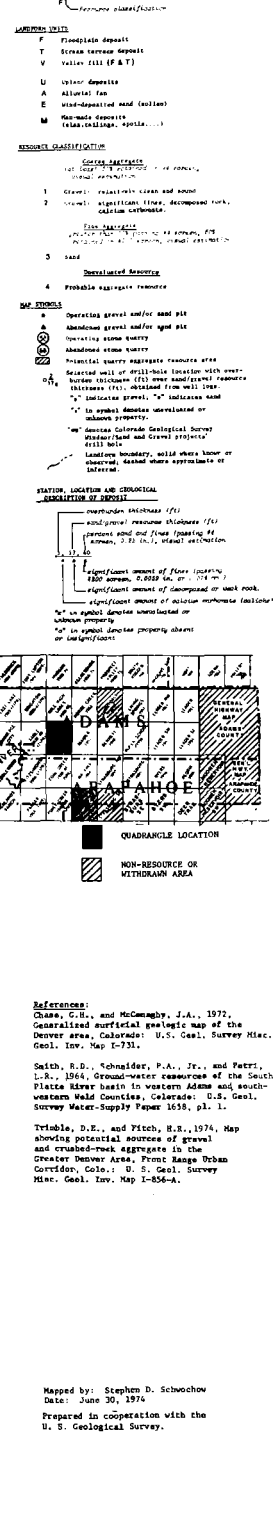
Heavy duty  
Medium duty  
Light duty  
Unimproved dirt  
U.S. Road  
State Road

BOULDER COLO.

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

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

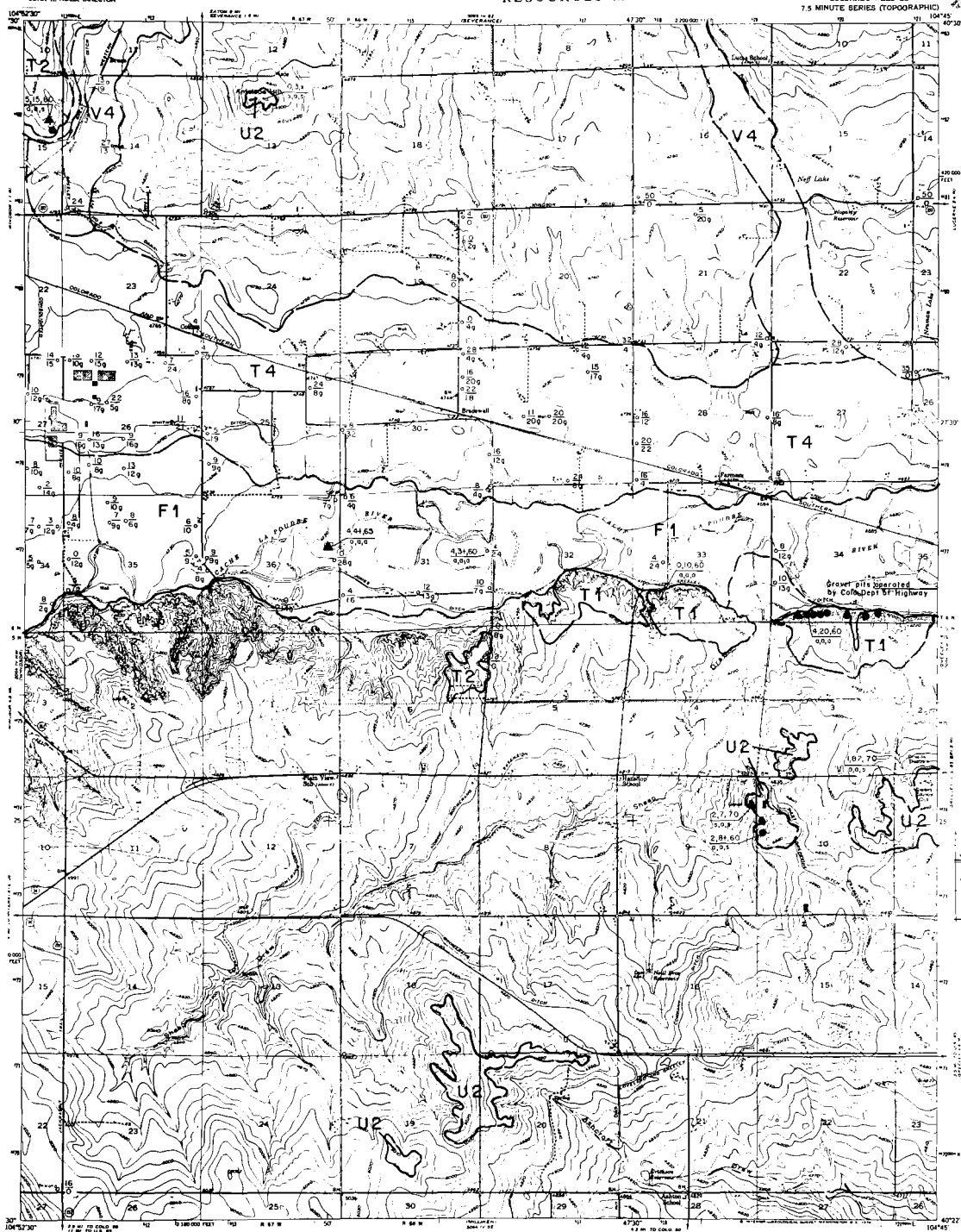
↳ Landform Unit



# 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

### LEGEND

- F Fluvial deposits
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Eolian deposits (sand dunes)
- M Man-made deposits (e.g., fill, etc.)

### RESOURCE CLASSIFICATION

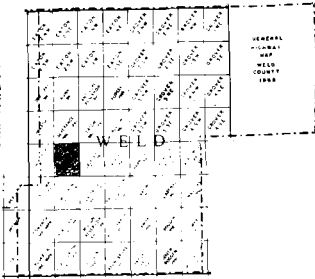
- 1 Gravel: relatively clean and well sorted
- 2 Gravel: significant fines, decomposed rock, medium to coarse
- 3 Sand
- 4 Probable aggregate resource

### MAP SYMBOLS

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Recreational 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
- "s" in symbol denotes unconsolidated or medium property
- "m" denotes Colorado Geological Survey "Mineral Land and Grant Project" drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND ELEVATION

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (sp. wt. 2.65 g/cc)
- corner, 0.22 in. x 0.22 in. steel estimation
- significant amount of fines (sp. wt. 2.65 g/cc)
- significant amount of decomposed or weak rock
- significant amount of medium to coarse material
- "s" or "m" symbol denotes unconsolidated or medium property
- "s" or "m" symbol denotes property absent or insignificant



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:  
Spear, F. W., III, 1972, Map of surficial geology of the Bracewell quadrangle: Recon. mapping for Colorado Geol. Survey Window Environmental Geology Project, open-file map.

Berebey, 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 1-587.

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-Greeley Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map 1-855-D.

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

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. HALL, DIRECTOR

## EXPLANATION

Location well  
Resource value function

### LEGEND

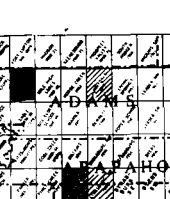
F Floodplain deposit  
T Terrace deposit  
V Valley fill (F & T)  
U Unconsolidated  
A Alluvial fan  
E Eolian-deposited sand (alluvial)  
M Man-made deposits (slag, tailings, etc.)

### RESOURCE CLASSIFICATION

Gravel (G)  
Coarse sand (CS)  
Fine sand (FS)  
Silt (S)  
Clay (C)  
Shale (SH)  
Limestone (L)  
Sandstone (ST)  
Gneiss (GN)  
Granite (GR)  
Schist (SCH)  
Slate (SL)  
Quartzite (QT)  
Metamorphic (M)  
Igneous (I)  
Sedimentary (S)  
Volcanic (V)  
Plutonic (P)  
Metasedimentary (MS)  
Metavolcanic (MV)  
Metaplutonic (MP)  
Metamorphic (M)  
Igneous (I)  
Sedimentary (S)  
Volcanic (V)  
Plutonic (P)  
Metasedimentary (MS)  
Metavolcanic (MV)  
Metaplutonic (MP)

### MAP SYMBOLS

Overburden thickness (ft)  
Percentage sand and fines (percent)  
Significant amount of fines (percent)  
Significant amount of sand (percent)  
Significant amount of gravel (percent)  
Significant amount of coarse sand (percent)  
Significant amount of fine sand (percent)  
Significant amount of silt (percent)  
Significant amount of clay (percent)  
Significant amount of shale (percent)  
Significant amount of sandstone (percent)  
Significant amount of gneiss (percent)  
Significant amount of granite (percent)  
Significant amount of schist (percent)  
Significant amount of slate (percent)  
Significant amount of quartzite (percent)  
Significant amount of metamorphic (percent)  
Significant amount of igneous (percent)  
Significant amount of sedimentary (percent)  
Significant amount of volcanic (percent)  
Significant amount of plutonic (percent)  
Significant amount of metasedimentary (percent)  
Significant amount of metavolcanic (percent)  
Significant amount of metaplutonic (percent)



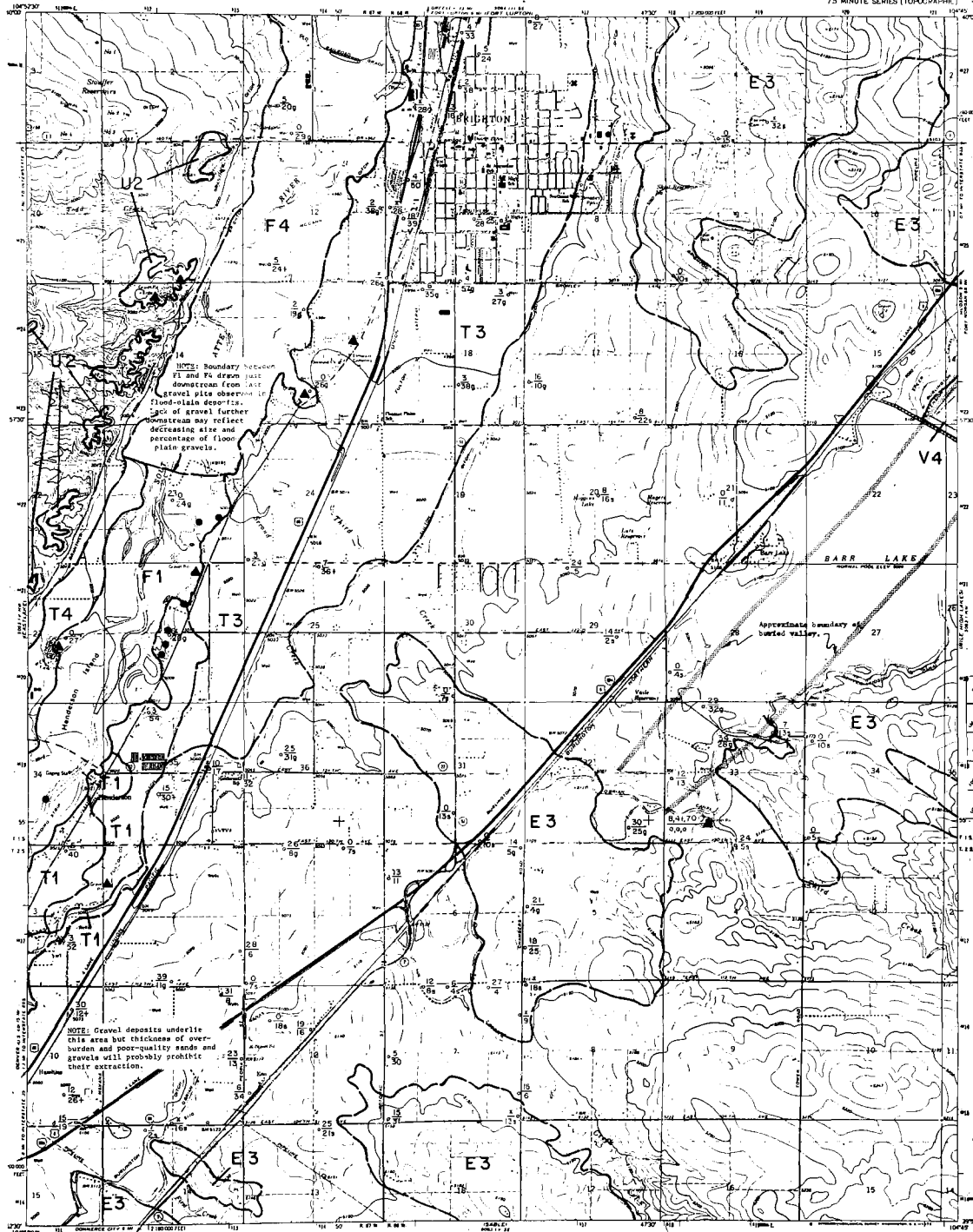
QUADRANGLE LOCATION  
NON-RESOURCE OR  
VETERAN AREA

References:  
U.S. Geological Survey, 1980, *Geological map of the Brighton area, Colorado*, U.S. Geological Survey, Open-File Report 80-1, p. 1.  
Hamilton, J.L., and Owen, W.B., 1972, *Geological map of the Brighton area, Colorado*, U.S. Geological Survey, Open-File Report 72-1, p. 1.  
Owen, W.B., and Hamilton, J.L., 1972, *Geological map of the Brighton area, Colorado*, U.S. Geological Survey, Open-File Report 72-1, p. 1.

Hamilton, J.L., and Owen, W.B., 1972, *Geological map of the Brighton area, Colorado*, U.S. Geological Survey, Open-File Report 72-1, p. 1.  
Owen, W.B., and Hamilton, J.L., 1972, *Geological map of the Brighton area, Colorado*, U.S. Geological Survey, Open-File Report 72-1, p. 1.  
Hamilton, J.L., and Owen, W.B., 1972, *Geological map of the Brighton area, Colorado*, U.S. Geological Survey, Open-File Report 72-1, p. 1.

Map 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

Heavy duty  
Medium duty  
Light duty

Interstate Route  
U.S. Route  
State Route

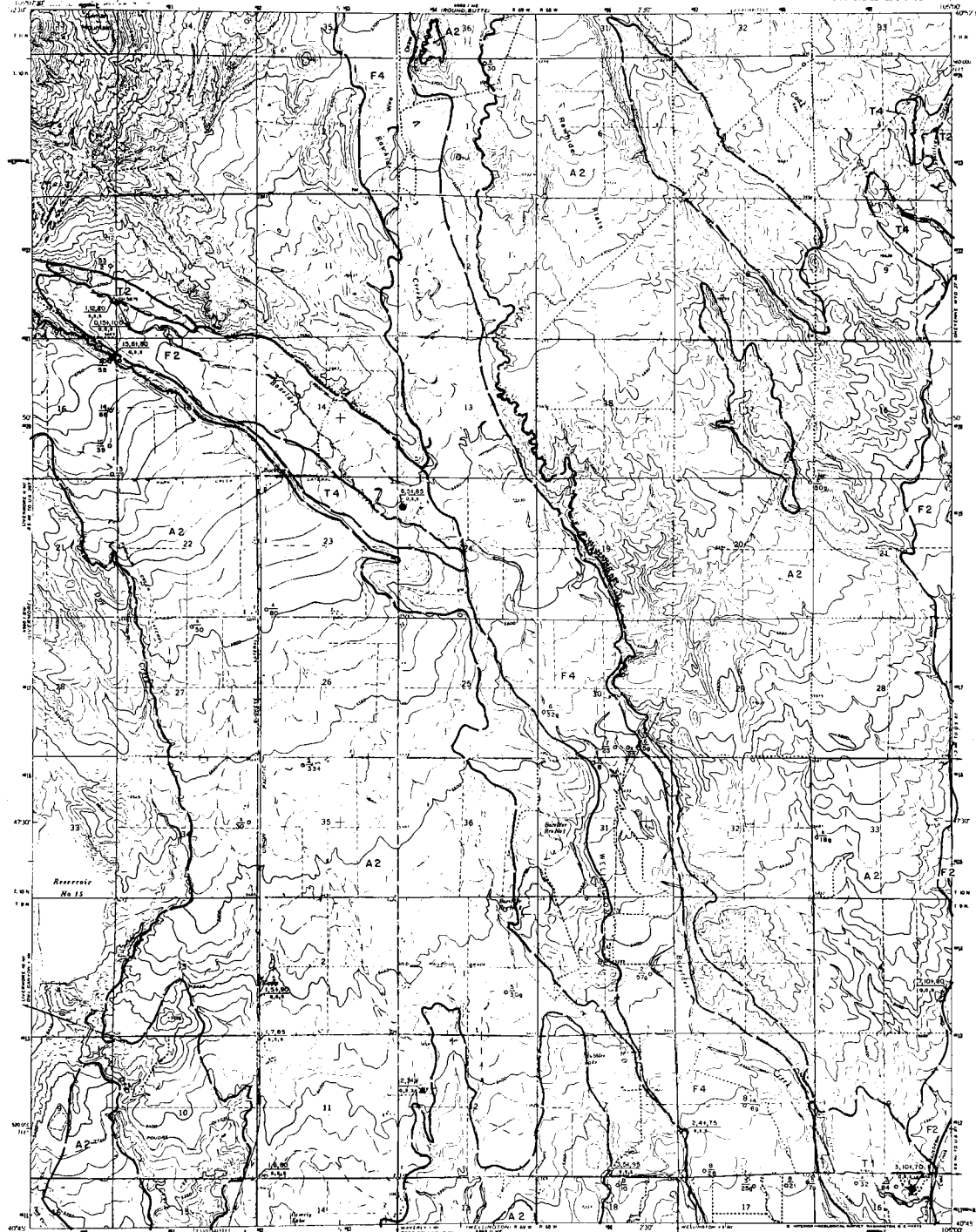
BRIGHTON, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

### LEGEND

- F Fluvial deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Eolian deposit (sand dunes)
- M Man-made deposits (slag, tailings, spoil, etc.)

### RESOURCE CLASSIFICATION

- CLASS 1: GRAVEL**  
(at least 10% retained on #4 screen, visual estimation)
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, sodium carbonate
- CLASS 2: SAND**  
(greater than 100 passing #4 screen, 40% retained on #20 screen, visual estimation)
- 3 Sand
- CLASS 3: PROBABLY 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
- Estimated 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" to symbol denotes unmineralized or unknown property
- "u" denotes Colorado Geological Survey (unmineralized and stream-proven) 2011 data
- Landform boundary, solid where known or observed; dashed where approximate or inferred

### STATION, LOCATION AND CHRONOLOGICAL SIGNIFICANCE OF DEPOSITS

- overburden thickness (ft)
- unmineralized resource thickness (ft)
- percent sand and fines (percent to screen, 2.5 to 100, visual estimation)
- significant amount of fines (greater than 100 passing #4 screen, 2.5 to 100, visual estimation)
- significant amount of decomposed or weak rock
- significant amount of sodium carbonate (sulfate)
- "u" in symbol denotes unmineralized or unknown property
- "u" in symbol denotes property absent or insignificant



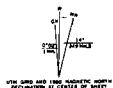
- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

### REFERENCE:

Harley, L.A., and Schneider, 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 1-587.

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

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



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

BUCKEYE, COLO.  
NAD45-W1990/775  
1960  
AIR 494 1 42-52308 7577

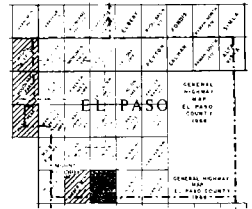
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

BUTTES QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
BY A. F. HARRIS

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

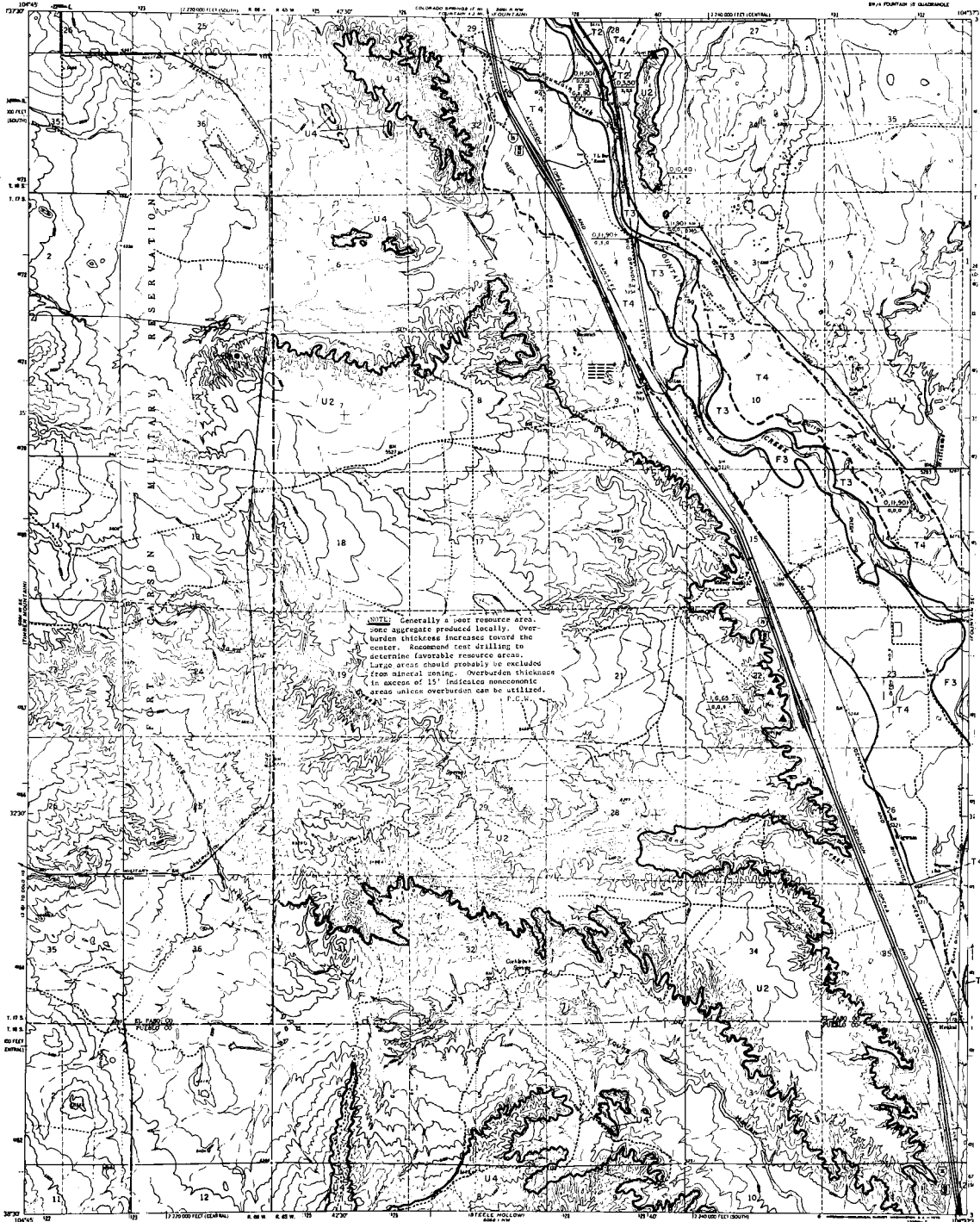
## EXPLANATION

- LANDFORMS**
- 1. Floodplain deposit
  - 2. Stream terrace deposit
  - 3. Valley fill (F & T)
  - 4. Upland deposits
  - 5. Alluvial fan
  - 6. Wind-blown sand (dunes)
  - 7. Non-sorted deposits (colluvium, talus, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Analysis**  
(at least 100 feet on 44 acres, visual estimation)
- 1. Gravel: relatively clean and small
  - 2. Gravel: significant fines, decomposed rock, talus, carbonates
- Fill Analysis**  
(material less than 44 acres, 400 feet on 440 acres, 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
  - Estimated quarry aggregate resource area
  - Selected well or drill-hole location with overburden thickness (ft) over sand and gravel resource thickness (ft), obtained from well logs
  - "T" indicates gravel, "S" indicates sand
  - "C" is symbol denotes unutilized or unknown property
  - "W" denotes Colorado Geological Survey Water/road and gravel projects
  - Drill hole
  - Landform boundary, with where known or inferred
- SECTION, LOCATION AND CHRONOLOGICAL DESCRIPTION OF SYMBOLS**
- 1. Significant amount of fines (passing 200 mesh, 0.075 mm, or 0.075 mm.)
  - 2. Significant amount of decomposed or weak rock
  - 3. Significant amount of calcareous material (calcite)
  - 4. "W" in symbol denotes unutilized or unknown property
  - 5. "S" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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



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

U.S. GEOLOGICAL SURVEY  
BUTTES QUADRANGLE  
COLORADO  
7-1/2 MINUTE SERIES  
BY A. F. HARRIS  
1966

CONTOUR INTERVAL 20 FEET  
ELEVATION IN FEET SEA LEVEL

ROAD CLASSIFICATION  
Heavy duty Light duty  
Unimproved dirt  
Highway route U.S. Route

BUTTES, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

BYERS QUADRANGLE

COLORADO  
75 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

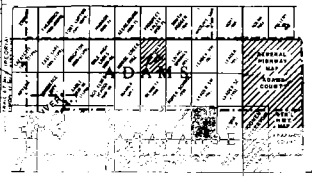
Legend symbols for various features and resources.

**LANDFORMS**  
F Floodplain deposit  
T Trench terrace deposit  
V Valley (all of it)  
U Upland deposit  
A Alluvial fan  
E Erosion-deposited sand (terrace)  
M Man-made deposits (levee, dikes, etc.)

**RESOURCE QUALITY**  
1 Good  
2 Fair  
3 Poor  
4 Problematic aggregate resources

**NON-RESOURCE**  
A Abandoned gravel and/or sand pit  
B Abandoned stone quarry  
C Abandoned stone quarry  
D Potential quarry aggregate resource area  
E Selected well or drill-hole location with water-level thickness (ft) over sand/gravel; resource thickness (ft) obtained from well logs  
F "x" indicates gravel, "y" indicates sand  
G "x" in symbol denotes unmineralized or unknown property  
H "x" denotes geological features (shaded and cross) projected  
I "x" in symbol denotes unmineralized or unknown property  
J "x" in symbol denotes property shown or insignificant

**STATION, LOCATION AND GEOLOGICAL INFORMATION**  
1. Contour interval (ft)  
2. Contour interval (ft)  
3. Contour interval (ft)  
4. Contour interval (ft)  
5. Contour interval (ft)  
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38. Contour interval (ft)  
39. Contour interval (ft)  
40. Contour interval (ft)  
41. Contour interval (ft)  
42. Contour interval (ft)  
43. Contour interval (ft)  
44. Contour interval (ft)  
45. Contour interval (ft)  
46. Contour interval (ft)  
47. Contour interval (ft)  
48. Contour interval (ft)  
49. Contour interval (ft)  
50. Contour interval (ft)

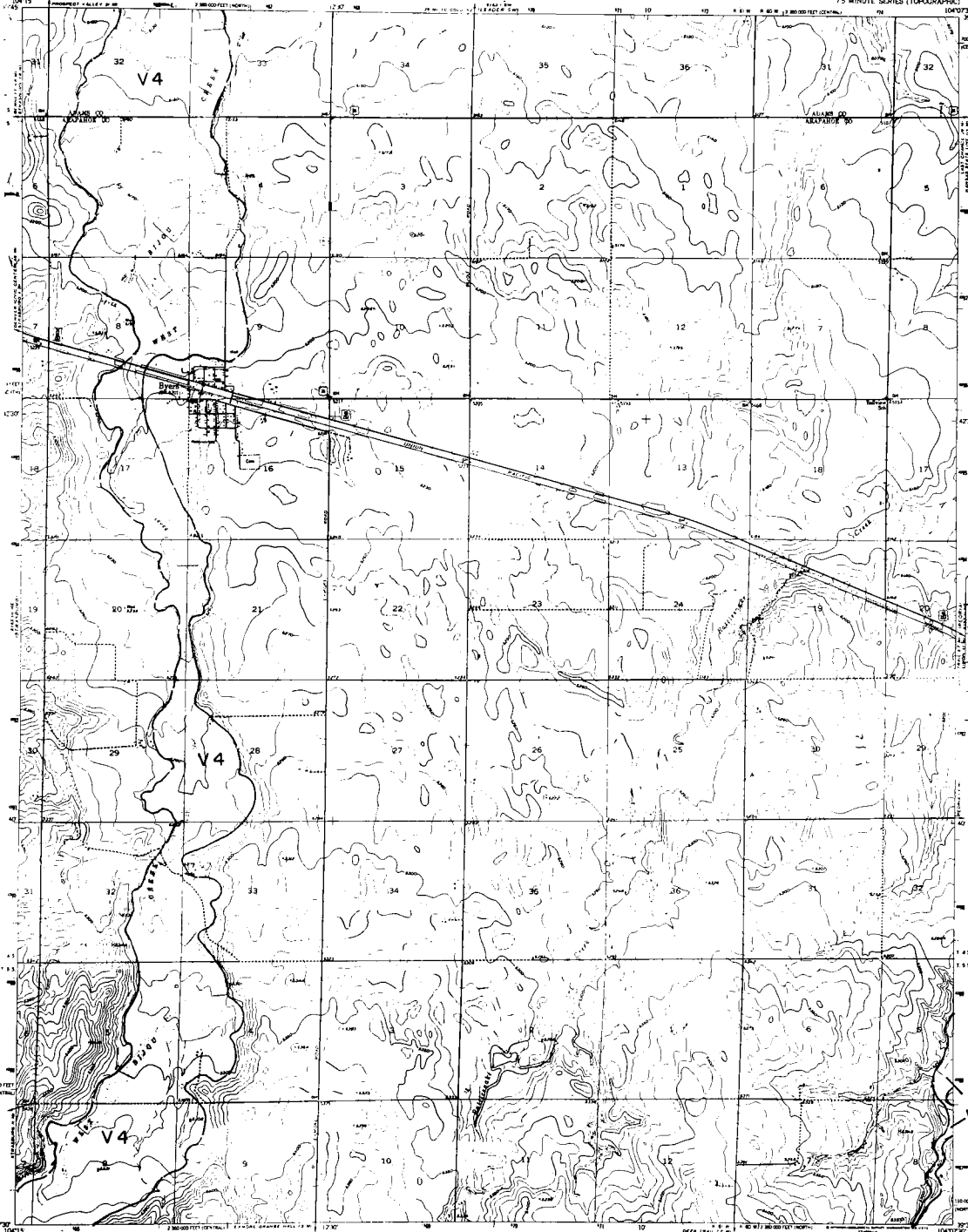


**QUADRANGLE LOCATION**  
NON-RESOURCE OF VITRIFIED AREA

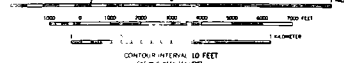
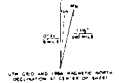
Reference:  
Shadai, S.A., 1971. The Bijou Creek Damites and Reservoirs of Adams and Arapahoe Counties Colorado. Colo. Sch. Mines: EK-137

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

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



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

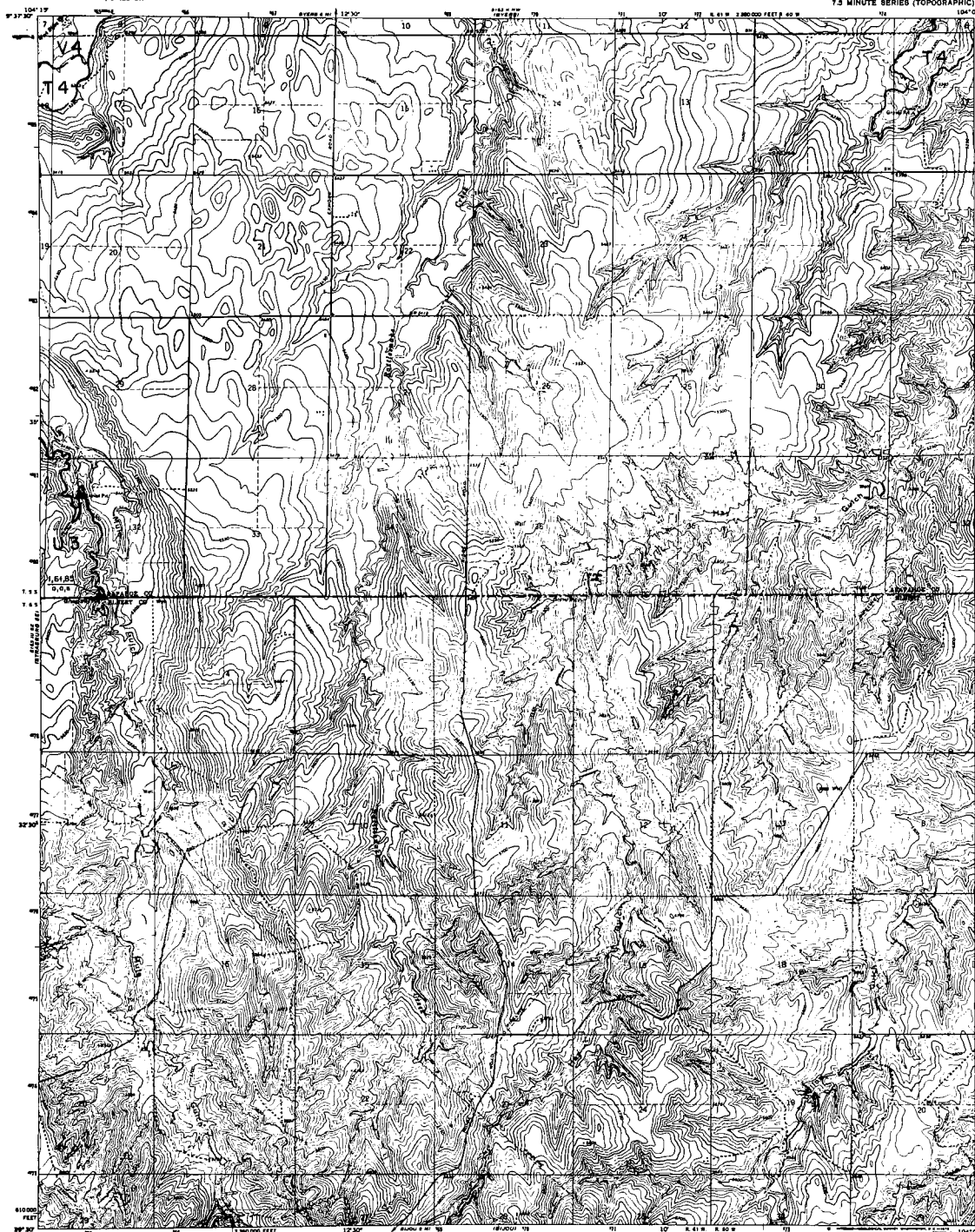


**ROAD CLASSIFICATION**  
Heavy duty  
Light duty  
Medium duty  
Unimproved dirt  
U.S. Route

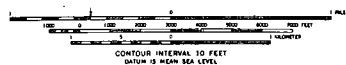
BYERS COLO  
N79275-W704875/75  
1956

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

BYERS SW QUADRANGLE  
COLORADO  
15 MINUTE SERIES (TOPOGRAPHIC)






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



**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

BYERS SW, COLO.

- Landform with
- Features:
  - glaciation

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<br>(slag, tailings, spoil...) |

#### RESOURCE CLASSIFICATION

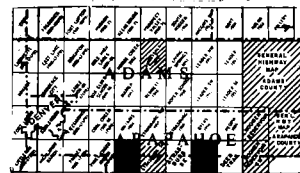
- Coarse Aggregate  
(at least 20% retained on # 4 screen, visual estimation)
- 1 Gravel: relatively clean and sound.
  - 2 Gravel: significant fines, decomposed rock, calcium carbonate.
- Fine Aggregate  
(greater than 10% passing # 4 screen, 45% retained on # 100 screen, visual estimation)
- 3 Sand



## Unvalued 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 sites
- Gravel and/or pit-drill-hole locations with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
- "n" Indicates gravel; "s" Indicates sand
- "m" In symbol denotes unwatered and unknown property
- "m" denotes California Geological Survey Window/Hand and Gravel projects/ drilled hole
- Landform boundary, solid where known or observed; dashed where approximate or

## STATION, LOCATION AND GEOLOGICAL

- DESCRIPTION OF DEPOSIT**
- overburden thickness (ft)
  - hardground/ resource thickness (ft)
  - parent sand and fines (passing #4 screen, 0.25 in., visual estimation)
  - significant amount of fines (passing 100 screen, 0.005 in. or 0.074 mm.)
  - significant amount of decomposed or weak rock.
  - significant amount of calcium carbonate (calcite) unknown property
  - "n" in symbol denotes unconsolidated or unknown property
  - "a" in symbol denotes property absent



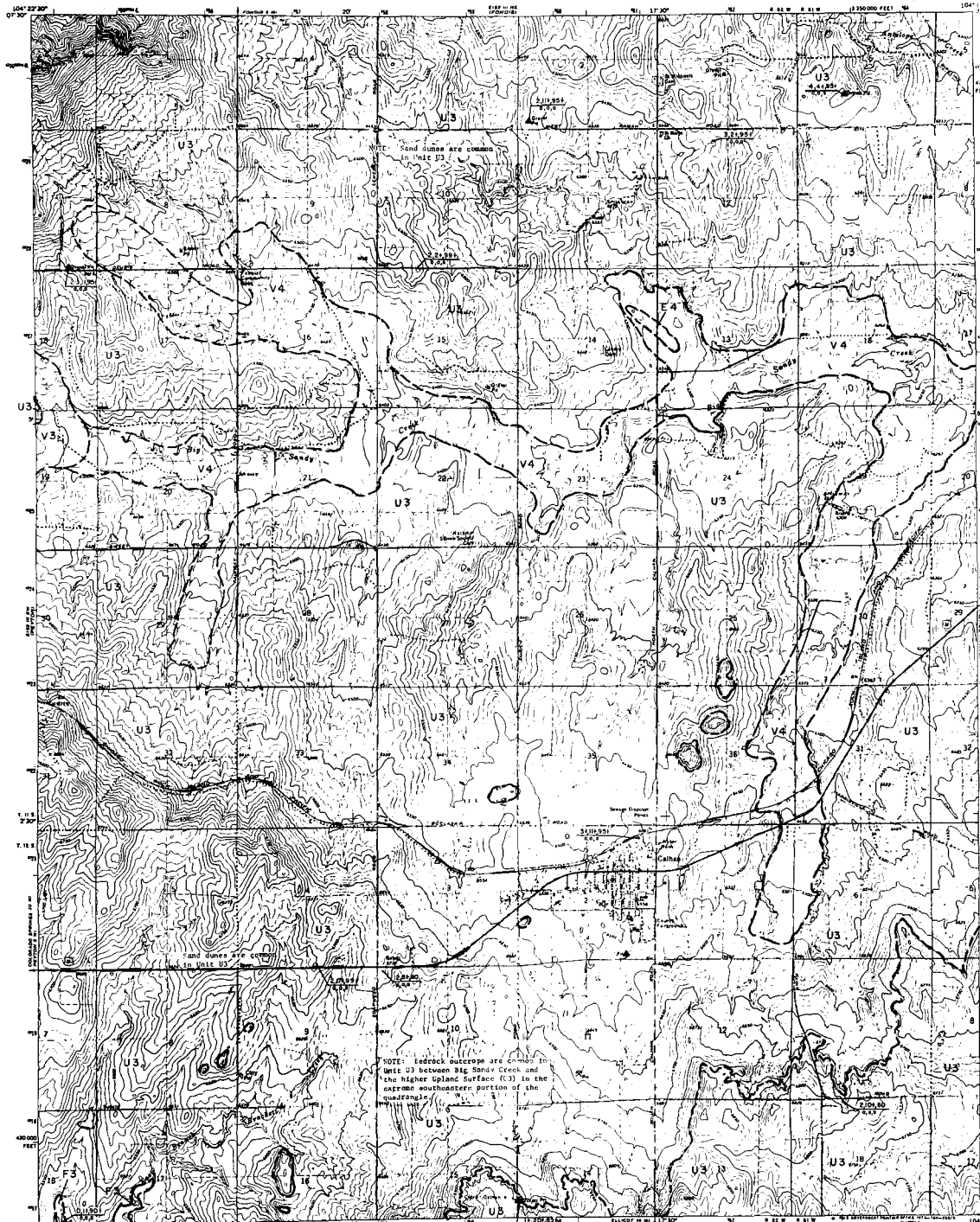
 QUADRANGLE LOCATION  
 NON-RESOURCE OR  
 WITHDRAWN AREA

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

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

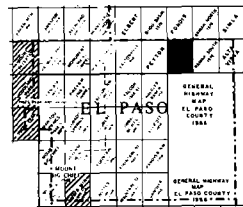
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. ROLLS, DIRECTOR

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



## EXPLANATION

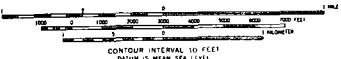
- LANDFORM UNIT**  
Resource classification
- LANDFORM UNIT**  
F Floodplain deposit  
V River terrace deposit  
V Valley fill (F & V)  
U Upland deposit  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Marine deposit (sand, silt, clay, etc.)
- RESOURCE CLASSIFICATION**  
Gravel (includes sand and gravel)  
(a) sand 75% passing #4 screen, 25% retained on #20 screen, visual estimation  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, calcareous surfaces  
Fine aggregate  
(a) sand 75% passing #4 screen, 25% retained on #20 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  
Potential quarry aggregate resource area  
Indicated well or drill-hole location with owner's permission (U3) over sand/gravel resource thickness (ft), indicated from well logs  
"a" indicates gravel; "s" indicates sand  
"u" in symbol denotes unutilized or unknown property  
"u" denotes Colorado Geological Survey "unutilized and/or gravel projects" still held  
Landform boundary, solid where known or observed, dashed where approximate or inferred
- SYMBOLS FOR QUANTITY**  
sand/gravel resource thickness (ft)  
percent sand and fines (passing #4 screen, 0-100%), visual estimation  
significant amount of fines (passing #20 screen, 0-100% or 0-10% w.t.)  
significant amount of decomposed or weak rock  
significant amount of calcareous materials (caliche)  
"u" or symbol denotes unutilized or unknown property  
"a" in symbol denotes property absent or unutilized



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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

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



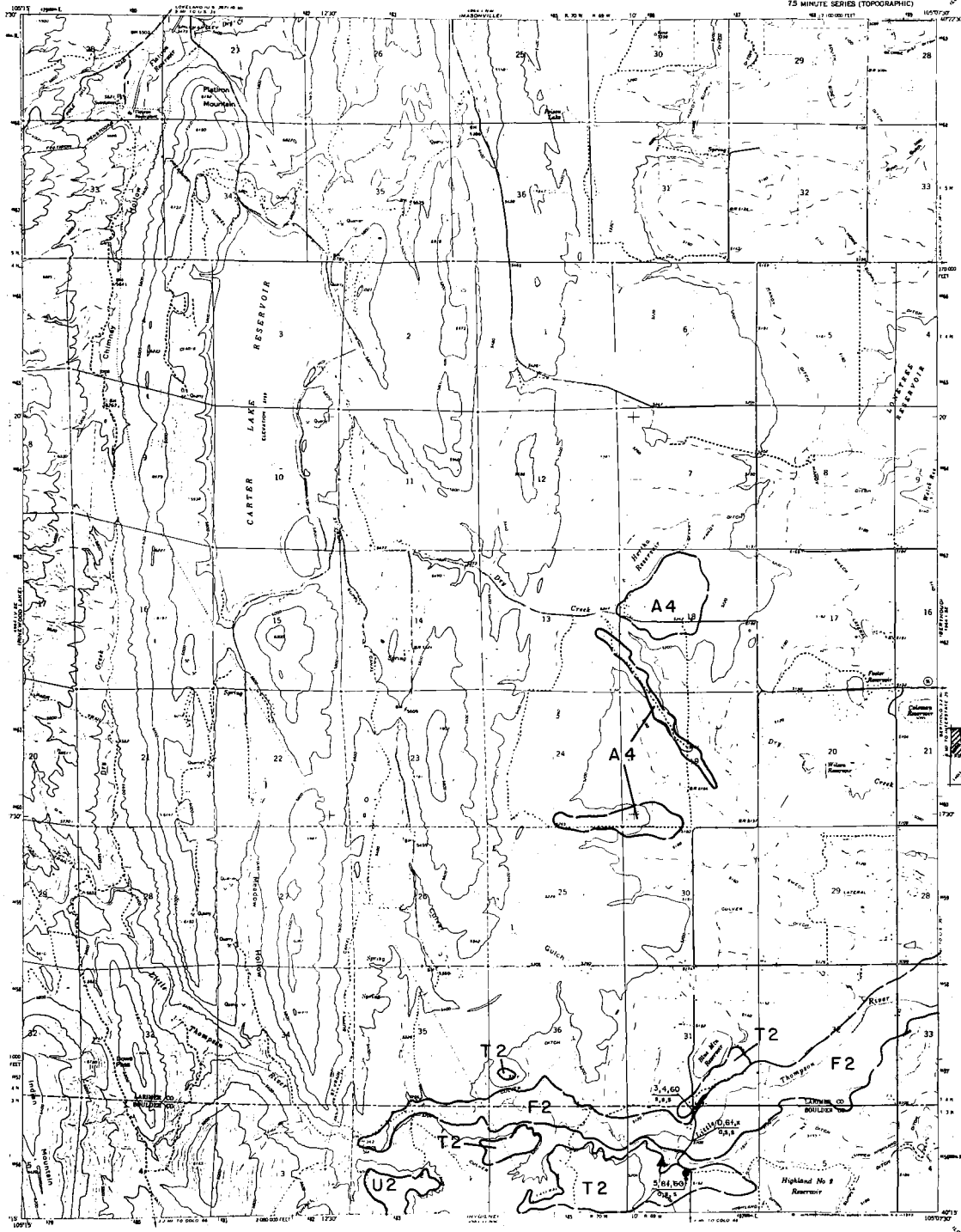
**ROAD CLASSIFICATION**  
Primary highway: Light-duty road, hard or hard surface  
Secondary highway: Improved surface  
Unimproved road  
Interstate Route  
U S Route  
State Route

CALHAN, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

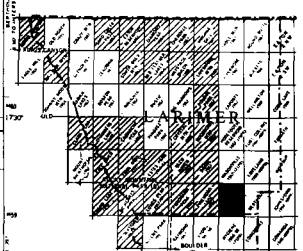
CARTER LAKE RESERVOIR  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

- Landform unit**  
Landform Classification
- LAKEPORT UNIT**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Upland deposits  
A Alluvial fan  
E Eolian-deposited sand (wind)  
M Non-made deposits (slag, tailings, spilla...)
- RESOURCE CLASSIFICATION**  
**Gravel**  
(a) Gravel 100 percent or more, 40 screen, visual estimation  
(b) Gravel, relatively clean and sound  
(c) Gravel, significant fines, decomposed rock, sodium carbonate  
**Gravel**  
(a) Gravel 100 percent or more, 40 screen, 200 retained on 100 screen, visual estimation  
(b) Gravel  
**Unconsolidated aggregate**  
(a) 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  
"x" indicates gravel; "o" indicates sand  
"u" in symbol denotes unconsolidated or unknown property  
"m" denotes Colorado Geological Survey Mineral (sand and gravel) project  
Well hole  
Landform boundary, solid where known or inferred, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL CHARACTERISTICS OF RESOURCES**  
Quadrangle thickness (ft)  
Sand/gravel resource thickness (ft)  
Percent sand and fines (passing #4 screen, 7.5 mm), visual estimation  
Significant amount of fines (passing #100 screen, 0.075 mm, or 0.075 mm)  
Significant amount of decomposed or weak rock  
Significant amount of sodium carbonate (salts)  
"u" in symbol denotes unconsolidated or unknown property  
"m" in symbol denotes mineral project or large deposit

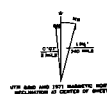


■ QUADRANGLE LOCATION  
■ NON-RESOURCE OR VETERINARY AREA

Geology modified after: Calver, R. B., and Pritch, M. A., 1974. Map showing potential sources of gravel and crushed-rock aggregates in the Boulder-Port Collins-Crested Butte 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 (FOOT)  
500 FT (152.4 M)  
200 FT (61.0 M)  
100 FT (30.5 M)  
50 FT (15.2 M)  
25 FT (7.6 M)  
10 FT (3.0 M)  
5 FT (1.5 M)  
2 FT (0.6 M)  
1 FT (0.3 M)

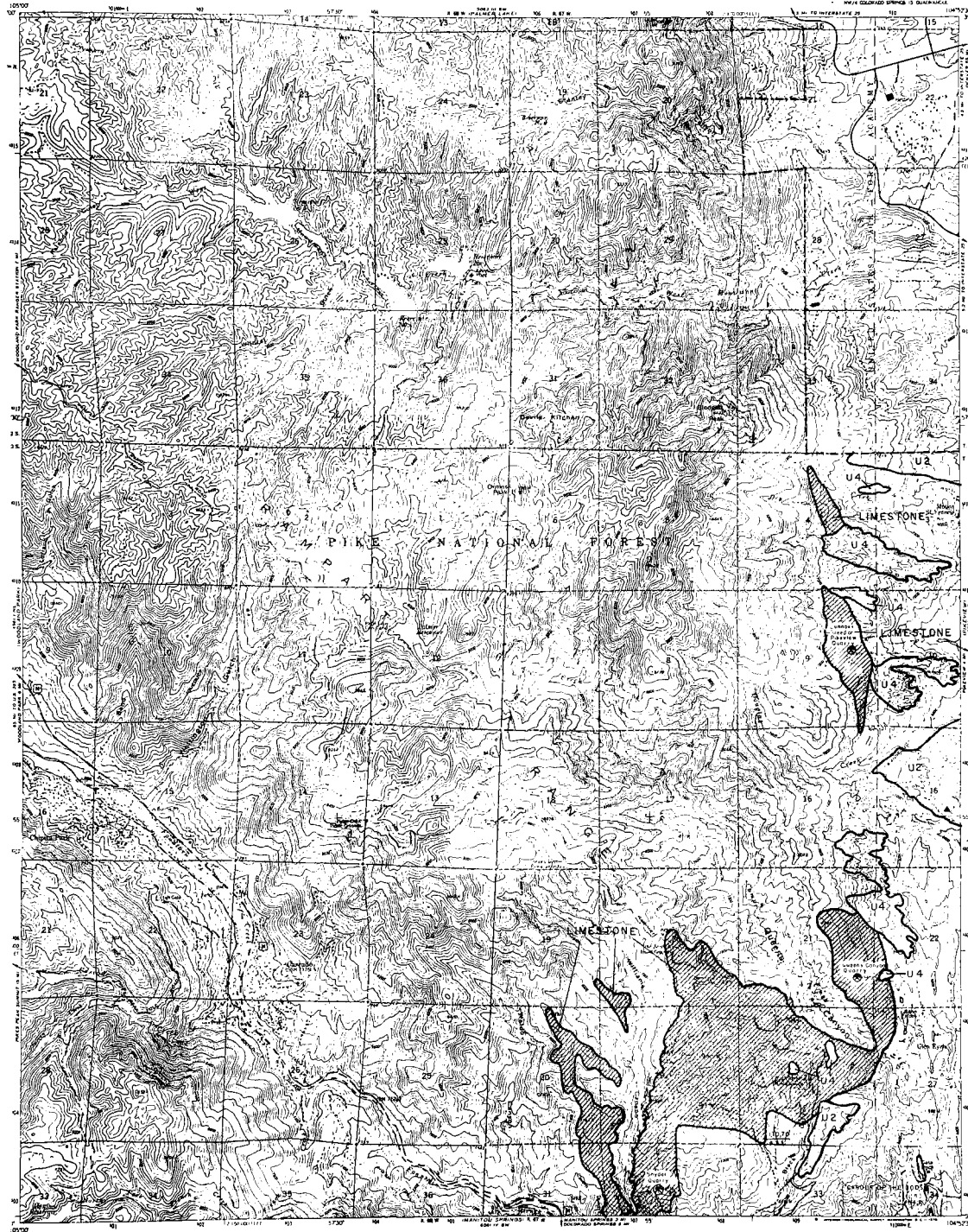
ROAD CLASSIFICATION  
Major road  
Light duty  
Unimproved dirt  
State Road

CARTER LAKE RESERVOIR, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

CASCADE QUADRANGLE  
COLORADO-EL PASO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
1964 QUADRANGLE SHEET 2 SUBQUADRANGLE

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



## EXPLANATION

### LEGEND

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

### RESOURCE CLASSIFICATION

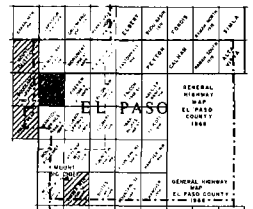
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, talus, carbonate
- 3 Sand
- 4 Probable aggregate resource

### 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 overburden thickness (ft) over designated resource thickness (ft); shaded from well logs.
- g Indicated ground "x" indicates sand
- h Is symbol denotes unutilized or unknown property
- i "x" denotes Colorado Geological Survey Mineralized and Gravel projects
- j Well hole
- k Land-use boundary, solid where known or dashed where not known or inferred

### STATION, LOCATION AND ORIENTATIONAL

- 1 station location (ft)
- 2 station location (ft)
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- 99 station location (ft)
- 100 station location (ft)



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:

- Scott, G.H., & Mohr, R. A.  
1973, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado; U. S. Geological Survey Map, NW-487.
- Trumble, 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 1-837 A.

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

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

ROAD CLASSIFICATION  
Heavy duty ——— Left duty ———  
Medium duty ——— Improved det. ———  
□ U.S. Road

CASCADE, COLO.

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

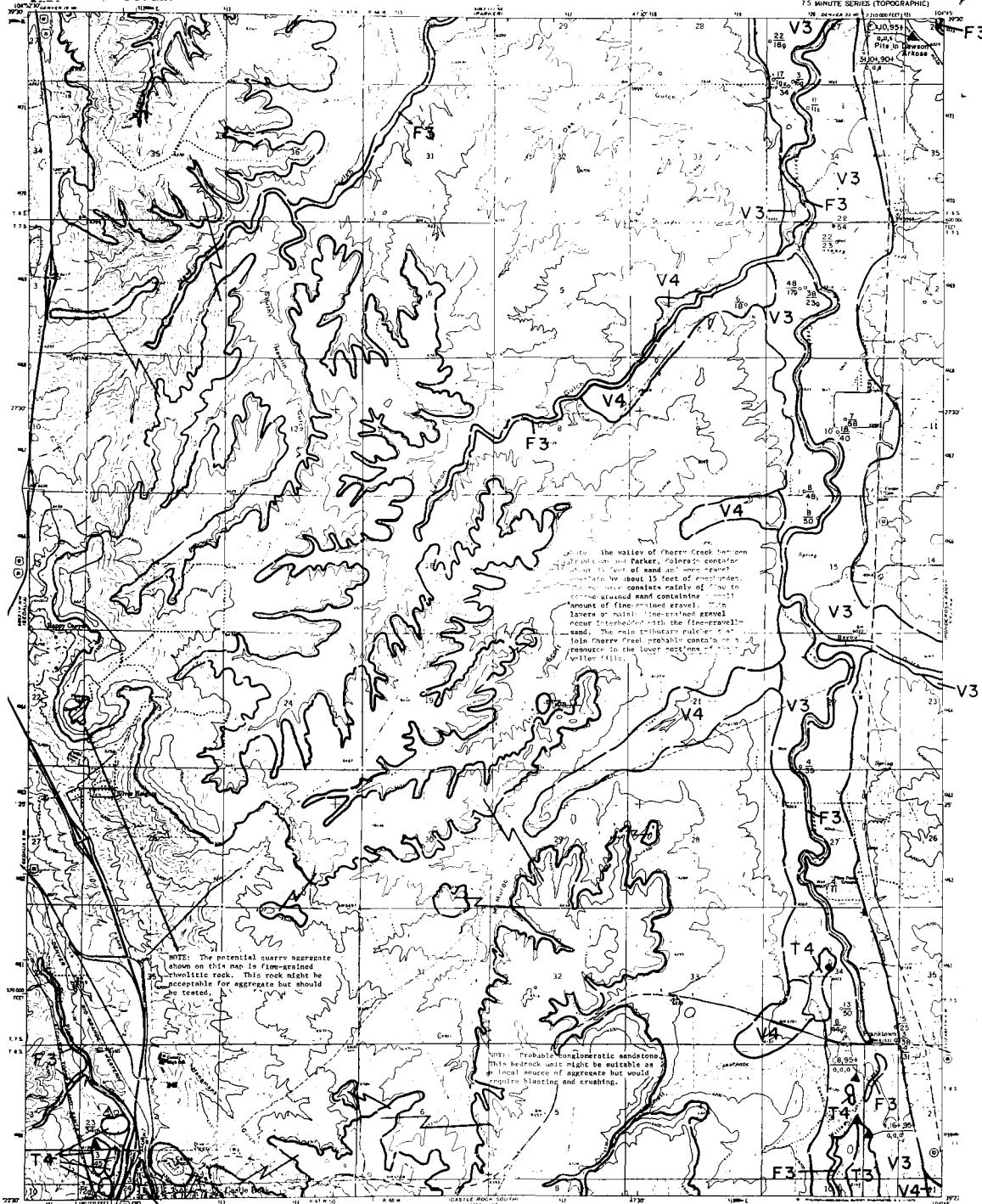


CONTOUR INTERVAL, 40 FEET  
DATUM IS MEAN SEA LEVEL

# 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. HODGINS, DIRECTOR



## EXPLANATION

Legend unit  
Resource class/function

- LEGEND UNIT**
- F Fluvial deposits
  - T Tidal terrace deposits
  - V Valley fill (F & T)
  - U Upland deposits
  - A Alluvial fan
  - E Eolian deposits
  - M Marine deposits (beach, dune, etc.)

## RESOURCE CLASSIFICATION

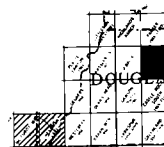
- CLASSIFICATION**
- 1 Gravel: relatively clean and sound
  - 2 Gravel: slightly finer, decomposed rock, medium to coarse
  - 3 Sand
  - 4 Probable aggregate resources

## MAP SYMBOLS

- 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
  - "x" indicates gravel; "s" indicates sand
  - "L" indicates location unutilized or unknown property
  - "M" denotes Colorado Geological Survey Mineral Land and Geology Survey drill hole
  - Location boundary, solid where known or observed; dashed where approximate or inferred

## SECTION LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE

- SECTION LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and gravel (ignoring 40 percent sand and gravel)
  - significant amount of decomposed or weak rock
  - significant amount of material susceptible to leaching
  - "x" in symbol denotes unutilized or unknown property
  - "M" in symbol denotes property owned by the U.S. Geological Survey



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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

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

Map by: Ralph E. Shroba  
Date: June 30, 1974

Prepared in cooperation with the U. S. Geological Survey

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

CASTLE ROCK NORTH, COLO.



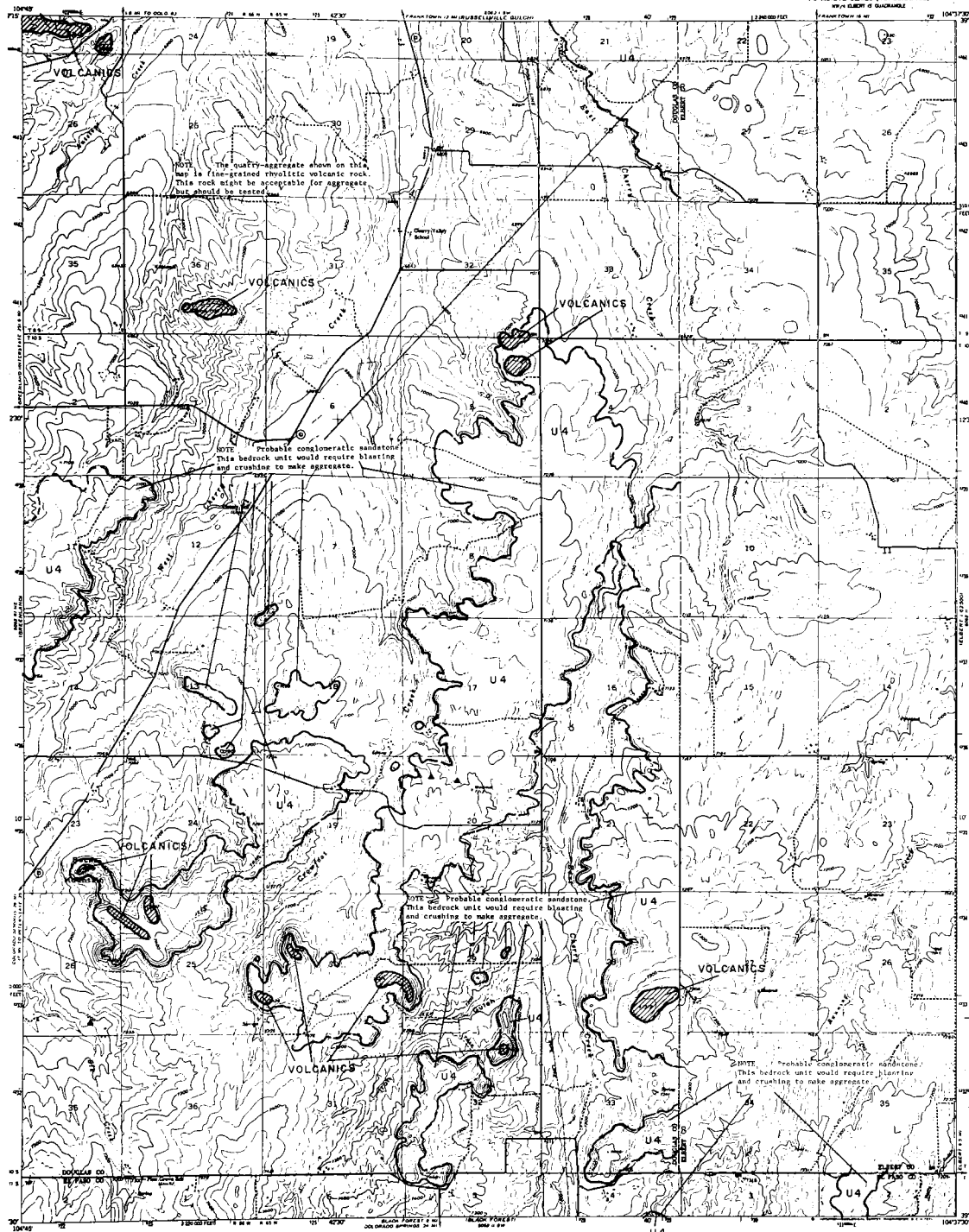


# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

CHERRY VALLEY SCHOOL QUADRANGLE

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

7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

- 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 Marine deposits  
 (See outline, page...)
- RESOURCE CLASSIFICATION**  
 1 Gravel: relatively clean and sound  
 2 Gravel: significant fines, decomposed rock, shallow 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  
 \* Potential well or mine (includes waste material thickness (ft), waste sand/gravel resource thickness (ft), obtained from well logs)  
 \* "x" indicates gravel; "s" indicates sand  
 \* "u" in symbol denotes unconsolidated or unknown property  
 \* "w" denotes Colorado Geological Survey  
 \* "d" denotes road and gravel project  
 \* "d" in symbol denotes unconsolidated or unknown property  
 \* "u" in symbol denotes unconsolidated or unknown property  
 \* "w" in symbol denotes unconsolidated or unknown property  
 \* "d" in symbol denotes unconsolidated or unknown property
- STATION, LOCATION AND GEOLOGICAL**  
 \* Overburden thickness (ft)  
 \* Sand/gravel resource thickness (ft)  
 \* Gravel/sand and fines (percent of screen, 0.075 in., or 0.075 mm)  
 \* Significant amount of fines (percent of screen, 0.075 in., or 0.075 mm)  
 \* Significant amount of decomposed or waste rock  
 \* Significant amount of solution carbonate material  
 \* "u" in symbol denotes unconsolidated or unknown property  
 \* "w" in symbol denotes unconsolidated or unknown property  
 \* "d" in symbol denotes unconsolidated or unknown property



QUADRANGLE LOCATION

NON-RESOURCE OR  
WITHDRAWN AREA

Geology modified after:

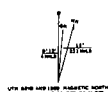
Trimble, D.F., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-857 A.

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

Mapped by: Phillip C. 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



CONTOUR INTERVAL 20 FEET  
ELEVATION IN FEET

ROAD CLASSIFICATION

Major road

Light duty

Unimproved or

Salt Road

CHERRY VALLEY SCHOOL COLO.



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

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



- ↳ transform unit
- ↳ resources a transformation

**LABORATORY 11**

- 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....)

## SOURCE CLASSIFICATION

- Coarse Aggregate  
(at least 80% retained on #4 screen, visual inspection)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcine carbonate.
- Fine Aggregate  
(greater than 75% passing #4 screen, 60% retained on #200 screen, visual inspection)
- 3 Sand

### Generalized Anxiety

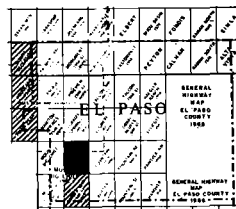
- 4 Probable aggregate response

### MAP STUDY-1

- 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 locations with over-  
 burden thickness (ft) over and gravel resource  
 thickness (ft) over and gravel resource  
 thickness (ft) over and gravel resource  
 "x" indicates gravel; "y" indicates sand  
 "u" in symbol denotes unmineralized or  
 unknown property.  
 "m" denotes Colorado Geological Survey  
 Window/Band and Gravel projects'  
 drill hole  
 Landfill location, solid where known or  
 observed; dashed where approximate or  
 inferred.

## STATION, LOCATION AND GEOLOGICAL.

- DESCRIPTION OF PROPERTY**
- ✓ overburden thickness (ft)
  - ✓ sand/gravel fraction thickness (ft)
  - ✓ percent sand and fines (passing #6 screen, 0.25 in.), visual estimation
  - ✓ significant amount of fines (passing #200 screen, 0.075 in. or 0.075 mm.)
  - ✓ significant amount of decomposed or weak rock
  - ✓ significant amount of extension carbonate (calcite)
- \*% in symbol denotes uncalculated or estimated property
- \*% in symbol denotes property absent or insignificant



## QUADRANGLE LOCATION\*

- 
- NON-RESOURCE OR WITHDRAWN AREA

Geology Modified after:  
Harrus, 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.  
Scott, G.R., & Mobus, R. A., 1973, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, MF-482.  
Trimble, D.E., and Vitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle A Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-857-A.

## APPENDIX

McLaughlin, K.F., 1947, Pennsylvanian stratigraphy of Colorado Springs quadrangle: Am. Assoc. Petroleum Geol. Bull. v. 31, p. 1936-1981.

Finlay, C.I., 1916, Colorado Springs  
Folio, Colorado: U.S. Geol. Survey  
Folio no. 203.

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

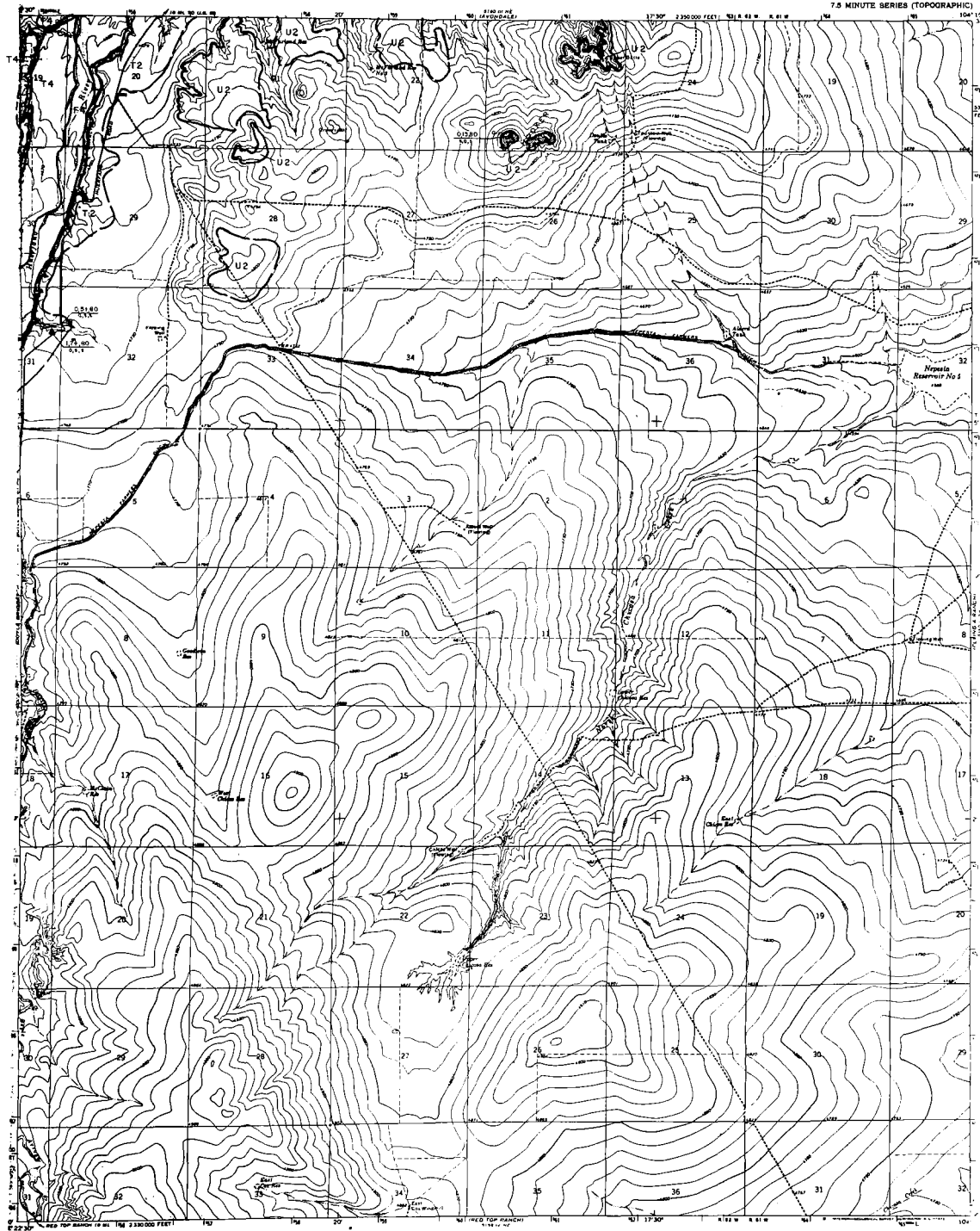
Prepared in cooperation with the  
U. S. Geological Survey.

CHEYENNE MOUNTAIN, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

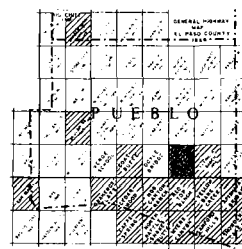
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. HALL, DIRECTOR

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



## EXPLANATION

- CONTOUR LINES**  
— Contour lines  
--- Contour lines (interpolated)
- ROADS**  
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, etc.)
- RESOURCE CLASSIFICATION**  
**Gravel Resources**  
(a) Gravel resources on F, T, and V deposits, (b) gravel resources on U, A, E, and M deposits.  
1 Gravel resources on F, T, and V deposits  
2 Gravel resources on U, A, E, and M deposits  
**Sand Resources**  
(a) Sand resources on F, T, and V deposits, (b) sand resources on U, A, E, and M deposits.  
3 Sand resources on F, T, and V deposits  
4 Sand resources on U, A, E, and M deposits
- 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 unmineralized or unknown property.  
"s" denotes Colorado Geological Survey Vindicator and Gravel projects' #1111 data  
Landform boundary, solid where known or inferred, dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT**  
— Sand/gravel thickness (ft)  
— Sand/gravel resource thickness (ft)  
— Present sand and fines (spacing as shown, 0.12 in.), visual extraction  
— Significant amount of decomposed or well-sorted  
— Significant amount of volcanic outcrops (asterisk)  
"u" in symbol denotes unmineralized or unknown property.  
"s" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR  
WITHDRAWN AREA

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

**ROAD CLASSIFICATION**  
Primary highway: ———  
Secondary highway: ———  
Unimproved road: .....  
Interstate Route: ———  
U.S. Route: ———  
State Route: ———

CHICOS WELL, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

COAL CREEK QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

### LANDFORMS

- F Floodplain deposit
- T Trench or river deposit
- V Valley fill (F & T)
- U Upland, alluvial
- A Alluvial fan
- E Wind-deposited sand dunes
- M Man-made structure
- M Mining activity, open pit

### AGGREGATE CLASSIFICATION

- 1 Gravel: rippled, clean and round
- 2 Gravel: rippled and clean, decomposed rock, pebbles common
- 3 Sand
- 4 Unconsolidated aggregate
- 5 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
- Area for which no definite aggregate resource was determined (this area is not shown on the map)
- Indicates gravel: "G" indicates sand
- "S" in symbol denotes unconsolidated or abandoned resource
- "M" denotes Colorado Geological Survey Mineral Land and Gravel project
- "L" in symbol denotes land use or other factor which may be of interest

### STATION, LOCATION AND TOPOGRAPHICAL

- 1 Station: location and topographical
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- 3 Station: location and topographical
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- 99 Station: location and topographical
- 100 Station: location and topographical

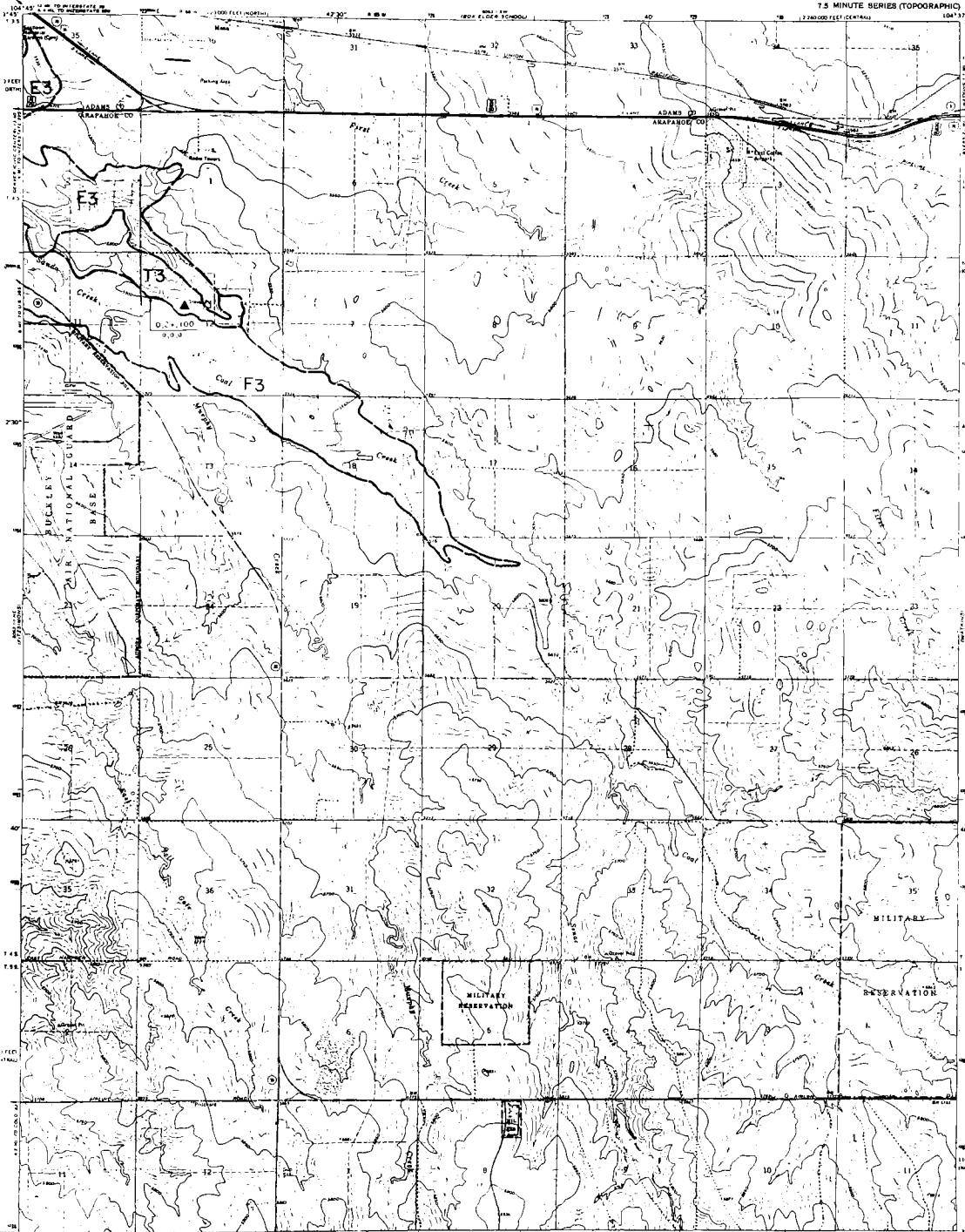


- QUADRANGLE LOCATION
- ROAD-RESOURCE OR WITHDRAWN AREA

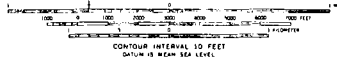
### Reference:

- Chase, C.N., and McConaghy, J.A., 1972. Generalized surficial geologic map of the Denver area, Colorado. U.S. Geol. Survey Misc. Geol. Inv. Map 1-731.
- Trimble, D.E., and Petch, 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 1-856-A.

Mapped 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 10 FEET  
DATUM IS MEAN SEA LEVEL

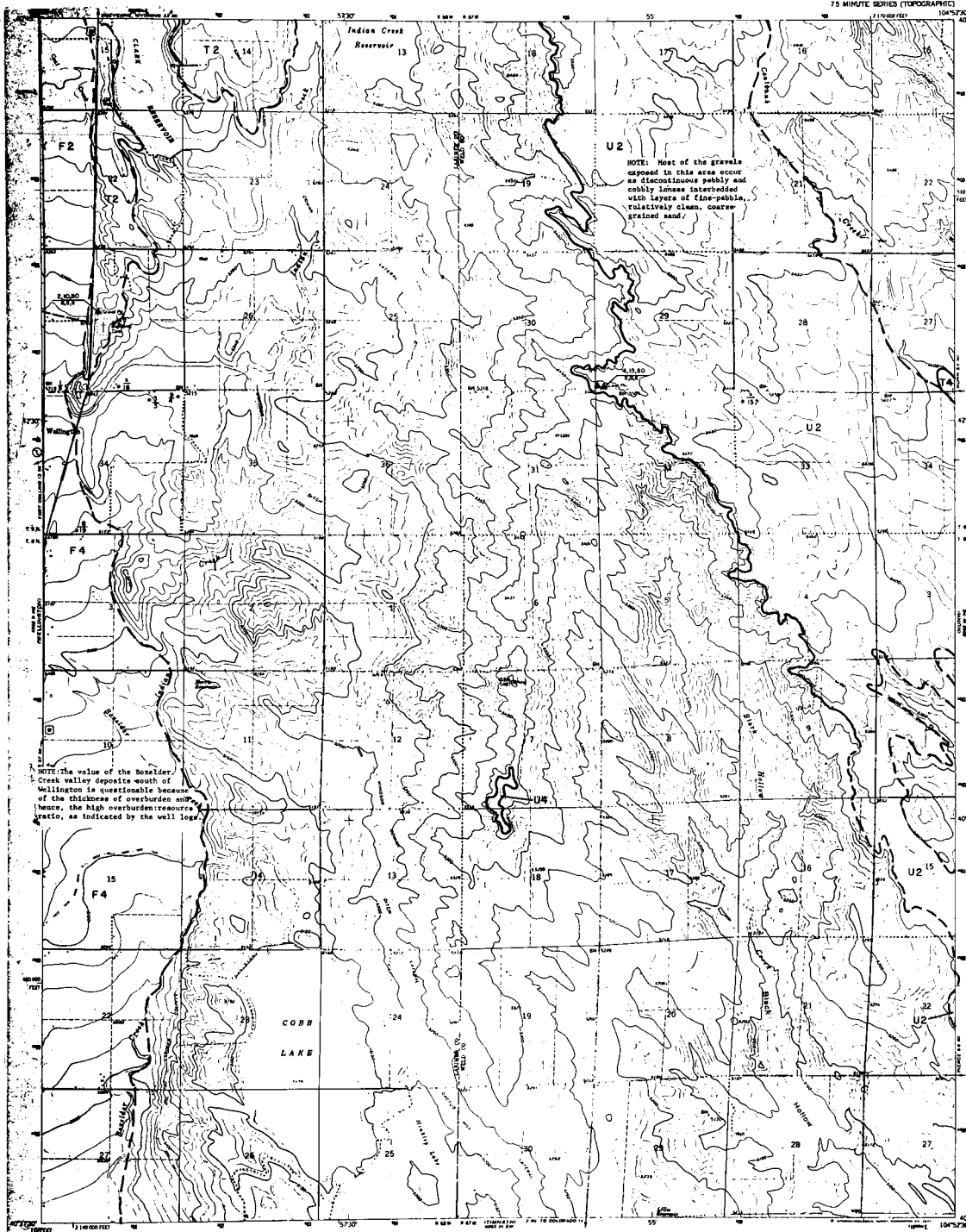
- ROAD CLASSIFICATION
- Highway
- Major road
- Minor road
- Unimproved road
- Interstate Road
- U.S. Route
- State Road

COAL CREEK, 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. HALL, DIRECTOR



## EXPLANATION

- Legend**  
Landform unit  
Resource classification
- LANDFORM UNITS**  
F Floodplain deposit  
T Tertiary 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**  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed rock, calcitic cementation  
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  
Selected unit or specific 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 unconsolidated or unknown property  
"w" denotes Colorado Geological Survey Water/land and gravel products drill hole  
Landform boundary, solid where known or observed; dashed where approximate or inferred
- SYMBOLS, LOCATION AND ORIGIN OF SPECIFIC RESOURCES**  
overburden thickness (ft)  
sand/gravel resource thickness (ft)  
overburden sand and fines (ignoring 4 ft screen, 2.5 ft in.), visual estimation  
significant amount of fines (ignoring 4 ft screen, 2.5 ft in. or 2.5 ft in.)  
significant amount of decomposed or unit rock  
significant amount of selected materials (includes unknown property)  
"u" in symbol denotes unconsolidated or unknown property  
"w" in symbol denotes property shown or investigated

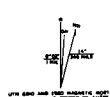


QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:  
Hershey, L.A., and Schuchter, P.A., Jr., 1973.  
Geologic map of the lower Cache la Poudre River  
basin, north-central Colorado: U. S. Geol. Survey  
Misc. Geol. Inv. Map 1-687.

Mapped by: Stephen B. Schwachow  
Date: June 30, 1978

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



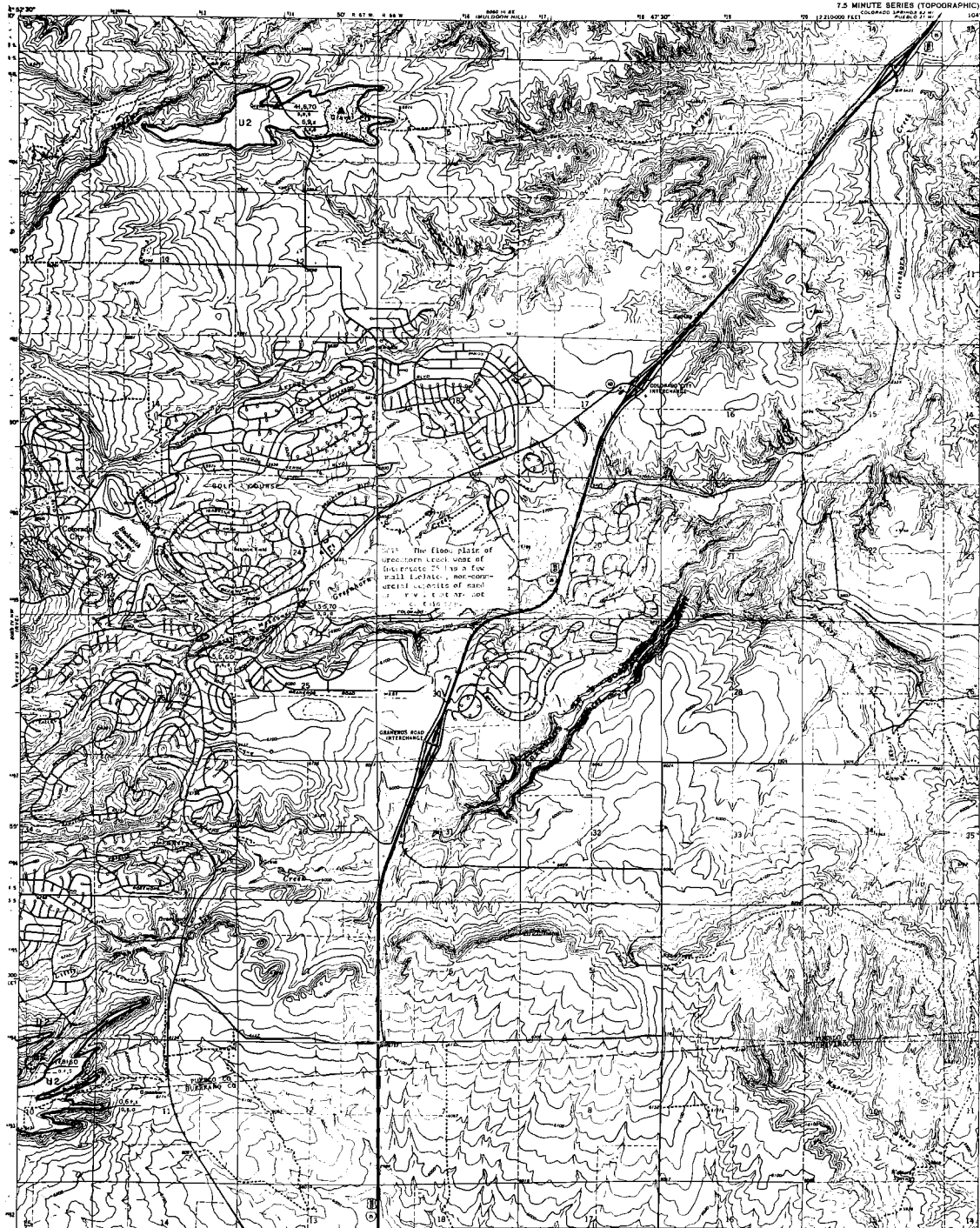
ROAD CLASSIFICATION  
Medium duty Light duty  
Unimproved dirt U.S. Route State Route

COBB LAKE, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

COLORADO CITY QUADRANGLE  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
COLORADO STATE 31 W.



## EXPLANATION

Land use units  
Topographic classification

### LAND USE 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 Non-sorted deposits (slag, tailings, spillover...)

### RESOURCE CLASSIFICATION

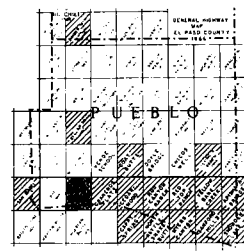
- 1 Gravel: relatively clean and round
- 2 Gravel: significant fines, decomposed rock, certain cementations
- 3 Sand
- 4 Probable aggregate resource

### 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
- 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
- "A" in symbol denotes unconsolidated or unknown property
- "M" denotes Colorado Geological Survey Woodstock and Gravel projects
- drill hole
- Land use boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND ORIGIN

- non-sorted resource (ft)
- non-sorted resource thickness (ft)
- percent sand and fines (passing #10 screen, 0.15 in., visual estimate)
- significant amount of fines (passing #100 screen, 0.0075 in. or 0.075 mm)
- significant amount of decomposed or weak rock
- significant amount of medium to coarse (coarser)
- "A" in symbol denotes unconsolidated or unknown property
- "M" in symbol denotes property owned or leased



### QUADRANGLE LOCATION

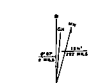
NON-RESOURCE OR  
WATERBORN AREA

### REFERENCE:

Blanco, Graham, 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.

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

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

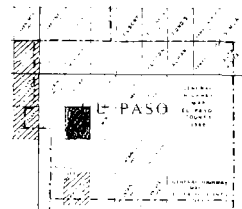




CONTOUR INTERVAL 20 FEET  
DATUM IS MEAN SEA LEVEL

- Primary highway
- Hard surface
- Secondary highway
- Hard surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route

COLORADO CITY, COLO.

COLORADO SPRINGS QUADRANGLE  
COLORADO-EL PASO CO  
15 MINUTE SERIES (TOPOGRAPHIC)  
1:250,000 SCALE

[illegible][illegible]

 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

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

Trimble, D.E., and Pichel

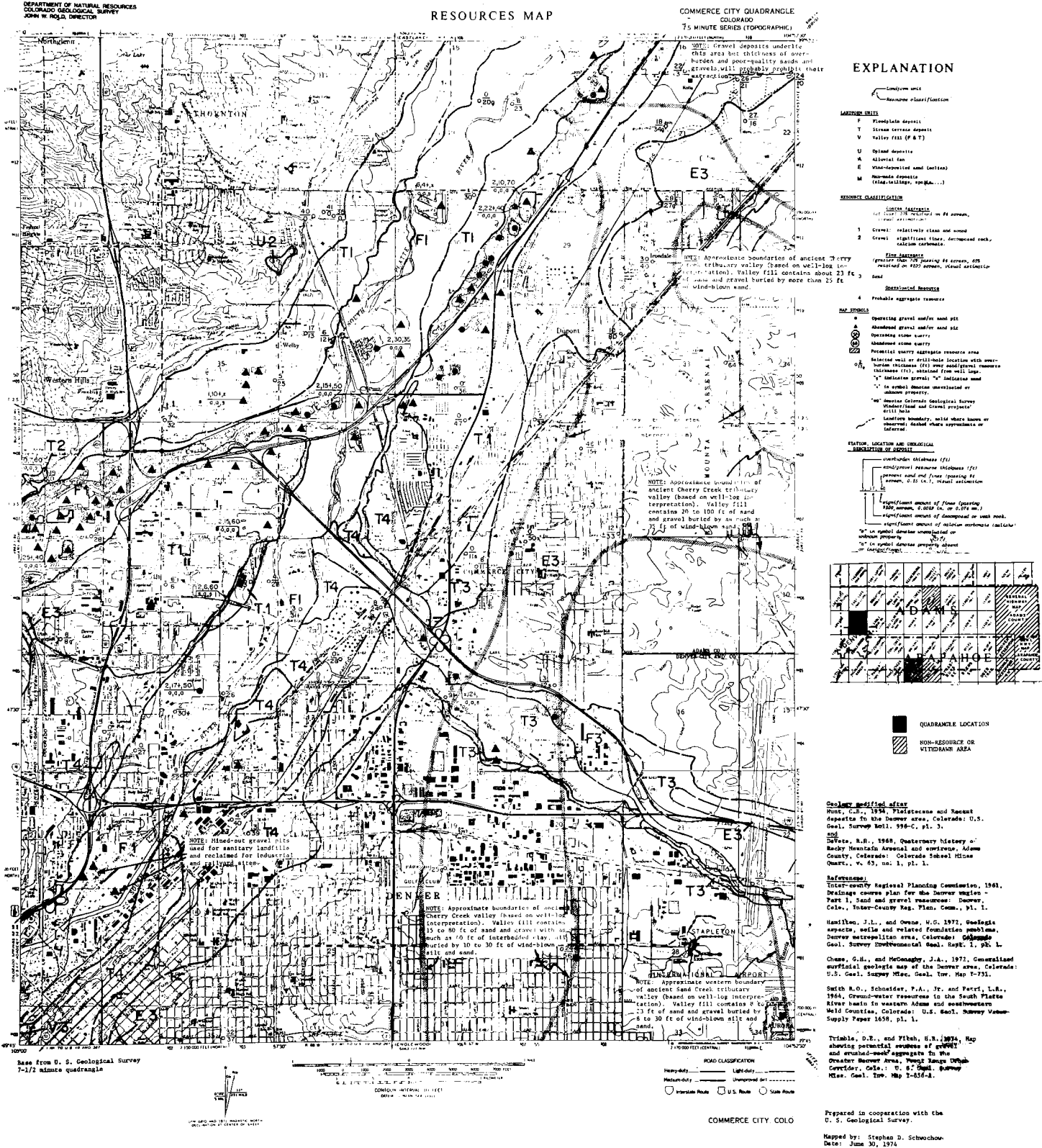
Trimble, D.E., and Pritch, R.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-857 A.

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

COLORADO SPRINGS, COLO



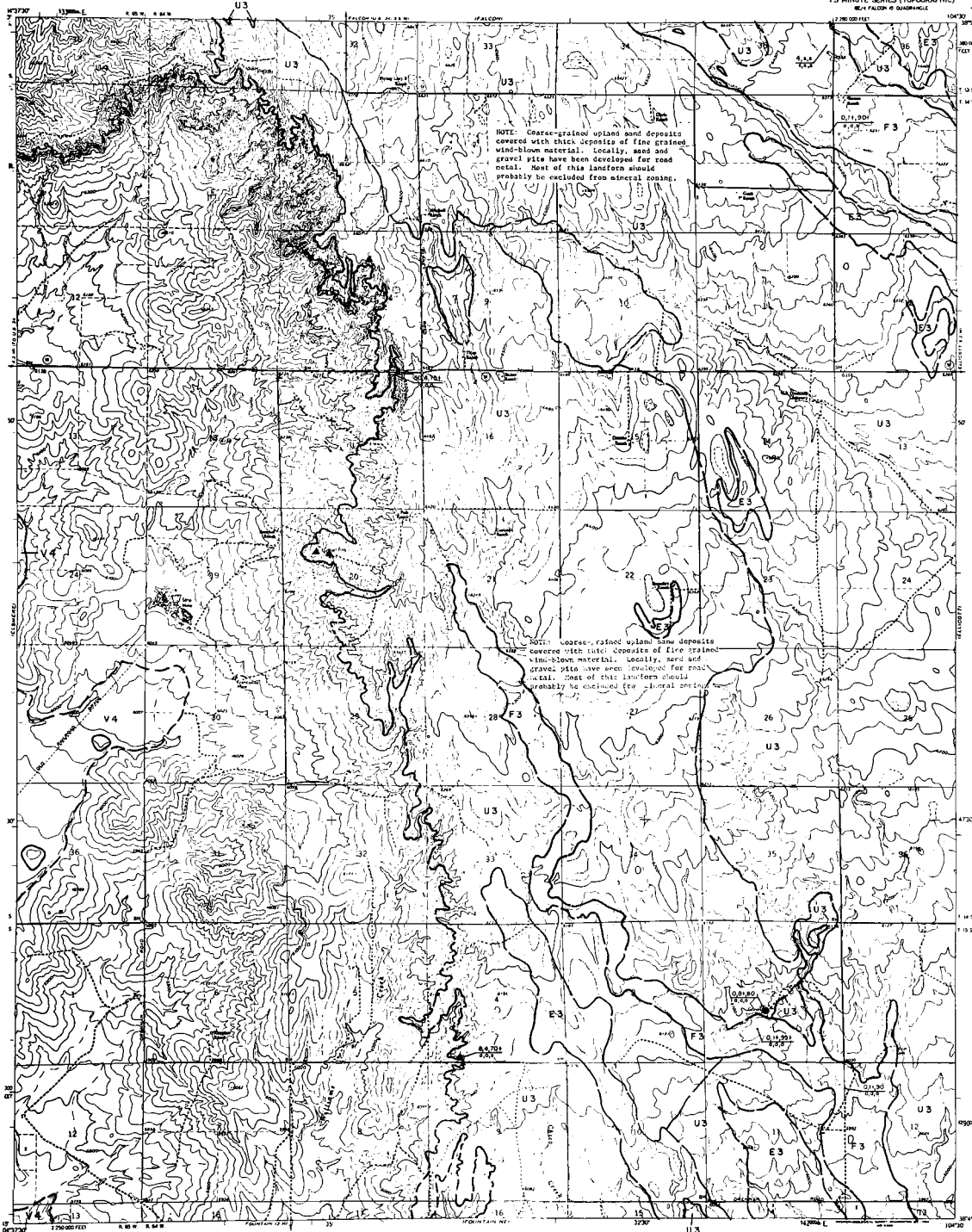
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. ROLD, DIRECTOR



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

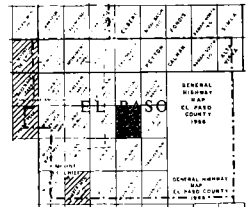
CORRAL BLUFFS QUADRANGLE  
COLORADO, EL PASO CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
M-1 FALCON 6 QUADRANGLE

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



## EXPLANATION

- SYMBOLS**
- Landform unit
  - Resource classification
- SYMBOLS**
- F Floodplain deposit
  - T Stream terrace deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (colluvial)
  - M Man-made deposits (slag, tailings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- 1. Coarse-grained aggregate**  
(at least 20% retained on #4 screen, of total retention)
- Gravel: relatively clean and round
  - Gravel: significant fines, decomposed rock, sodium carbonate
- 2. Fine aggregate**  
(75% retained on #20 screen, 100% retained on #40 screen, of total retention)
- Sand
  - Unconsolidated aggregate
  - 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 logs
  - "u" indicates gravel; "s" indicates sand
  - "u" in symbol denotes unconsolidated or unknown property
  - "m" denotes Colorado Geological Survey mineralized and gravel projects
  - NOTE: Landform boundaries, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATIONAL CONVENTIONS**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines (passing #4 screen, 100% retained on #40 screen)
  - significant amount of fines (passing #40 screen, 100% retained on #100 screen)
  - significant amount of decomposed or weak rock
  - significant amount of sodium carbonate (halite)
  - "u" in symbol denotes unconsolidated or unknown property
  - "s" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Golder, P. L., 1968,  
U. S. Geological Survey, Map CG-783.

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

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

APPROXIMATE NEAR  
EQUATION: 1980



ROAD CLASSIFICATION  
Medium duty Light 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 W. HOLS, DIRECTOR

## EXPLANATION

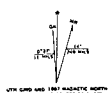
- LANDFORMS**
- Sandstone ridge/crest
  - Sandstone valley
- LANDFORMS**
- T Trench deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Erosional deposit (alluvium)
  - M Marine deposit (shale, siltstone, etc.)
- AGGREGATE CLASSIFICATION**
- Gravel**
- 1 Gravel: relatively clean and round
  - 2 Gravel: significant fines, unconsolidated, calcareous
- Sand**
- 3 Sand
- 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
  - Related well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
  - "r" in symbol denotes unconsolidated or unknown property.
  - "m" denotes Colorado Geological Survey Mineral Base and Gravel project drill hole.
  - Landform boundary, solid where known or inferred, dashed where approximate or inferred.
- STATION LOCATION AND ORIENTATIONAL INFORMATION**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines (summing to 100%)
  - significant amount of fines (summing to 100%)
  - significant amount of decomposed or sand rock
  - significant amount of solution (dolomite, calcite)
  - "r" in symbol denotes unconsolidated or unknown property.
  - "m" in symbol denotes property shown or insignificant.



QUADRANGLE LOCATION  
NON-RESOURCE OR  
WETLAND AREA

Map by: Stephen D. Schwechhoefer  
Date: June 30, 1974

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



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

CRAZY MOUNTAIN, COLO. - WYO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DAKAN MOUNTAIN QUADRANGLE  
COLORADO  
75 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

Landform units  
Resource class/location

**LANDFORM UNITS**  
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 (caliche, caliche, spalls, etc.)

**RESOURCE CLASSIFICATION**  
**Coarse Aggregate**  
Let 1000 - 4" maximum on 48 screen, retained material  
1 Gravel: selectively clean and sorted  
2 Gravel: significant fines, decomposed rock, calcareous carbonate  
**Fine Aggregate**  
Greater than 100 passing 48 screen, 200 retained on 480 screen, retained material  
3 Sand  
**Unconsolidated Resource**  
4 Potentially aggregate resource

**KEY 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 Indicated with an arrow (arrow points to resource thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs)  
g "g" indicates gravel; "s" indicates sand  
h "h" in symbol denotes unconsolidated or unknown property  
i "i" denotes Colorado Geological Survey (Colorado Sand and Gravel Projects) well log  
j Lead line boundary, well shown (arrow or dashed line) shown where appropriate or inferred

**STATION, LOCATION AND ORIENTAL**  
**LOCATION OF QUARRY**  
— Overburden thickness (ft)  
— Sand/gravel resource thickness (ft)  
— Potential sand and gravel (passing 48 screen, 200 retained on 480 screen)  
— Significant amount of fines (passing 100 screen, 200 retained on 480 screen)  
— Significant amount of decomposed or weak rock  
— Significant amount of relation to resource (e.g., in symbol denotes unconsolidated or unknown property)  
— "h" in symbol denotes property shown or inferred



QUADRANGLE LOCATION  
NON-RESOURCE OR  
VITRIFIED AREA

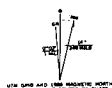
Geology Modified after:  
Harris, J.C., 1931, Structural geology of the eastern flank of the southern Front Range, Colorado: University of Colorado Ph.D. Thesis, 121 p., 3 pls.

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

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



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



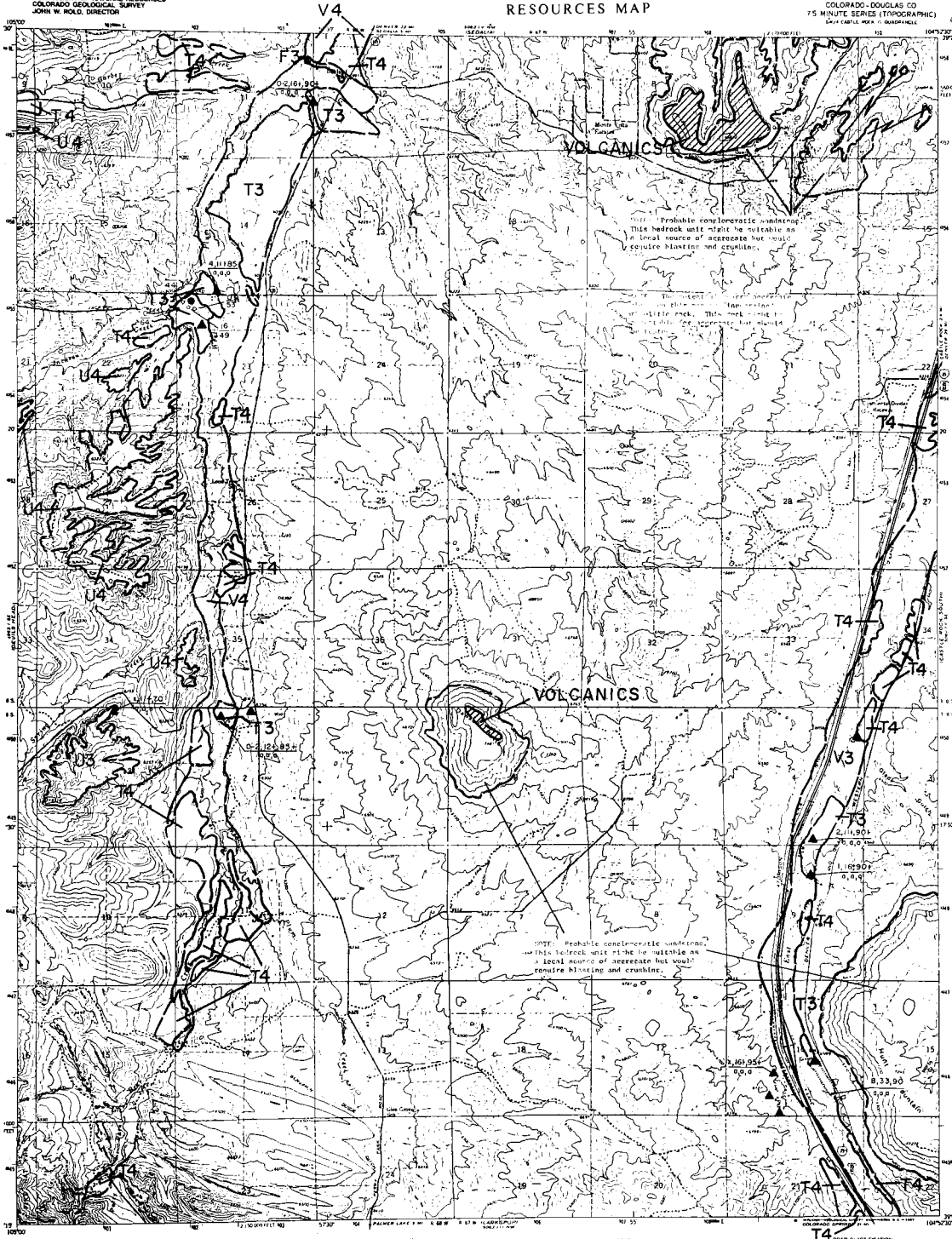
ROAD CLASSIFICATION  
Medium duty ——— Light duty ———  
Unimproved dirt ———

DAKAN MOUNTAIN COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

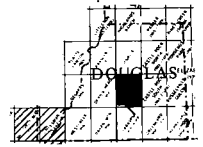
DAWSON BUTTE QUADRANGLE  
COLORADO-DOUGLAS CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
6447 CATTLE ROCK - QUADRANGLE

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 deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Man-made deposits (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- Gravel**  
(1) Gravel: relatively clean and sound  
(2) Gravel: significant fines, decomposed rock, calcareous
- Sand**  
(3) Sand  
(4) Probable aggregate resources
- 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
  - Selected well or drill-hole location with over-burden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
  - "a" indicates gravel "c" indicates sand
  - "s" in symbol denotes unmineralized or unknown property
  - "sa" denotes Colorado Geological Survey Water/Flood and Gravel projects
  - "s" in symbol denotes unmineralized or unknown property
  - "sa" in symbol denotes property owned or controlled
- STATION, LOCATION AND GEOLOGICAL SIGNIFICANCE OF SPURTS**
- Vertical thickness (ft)
  - Horizontal thickness (ft)
  - Percent sand and fines (spurs) to gravel, 0.25 in. or 0.075 mm
  - Significant amount of fines (spurs) 0.075 mm, 0.002 in. or 0.05 mm
  - Significant amount of decomposed or weak rock
  - Significant amount of mineral carbonate (calcite)
  - "a" in symbol denotes unmineralized or unknown property
  - "sa" in symbol denotes property owned or controlled



QUADRANGLE LOCATION  
NON-RESOURCE OR VETERINARY AREA

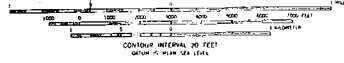
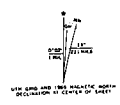
Geology Modified after:  
Tschuba, D.E., and Pitch, H.R., 1976, Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U.S. Geol. Survey Map 1-557-A.

Reference:  
Chase, C.W., and McCook, J.A., 1973, Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map 1-731.

Mapped by: Ralph B. 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**

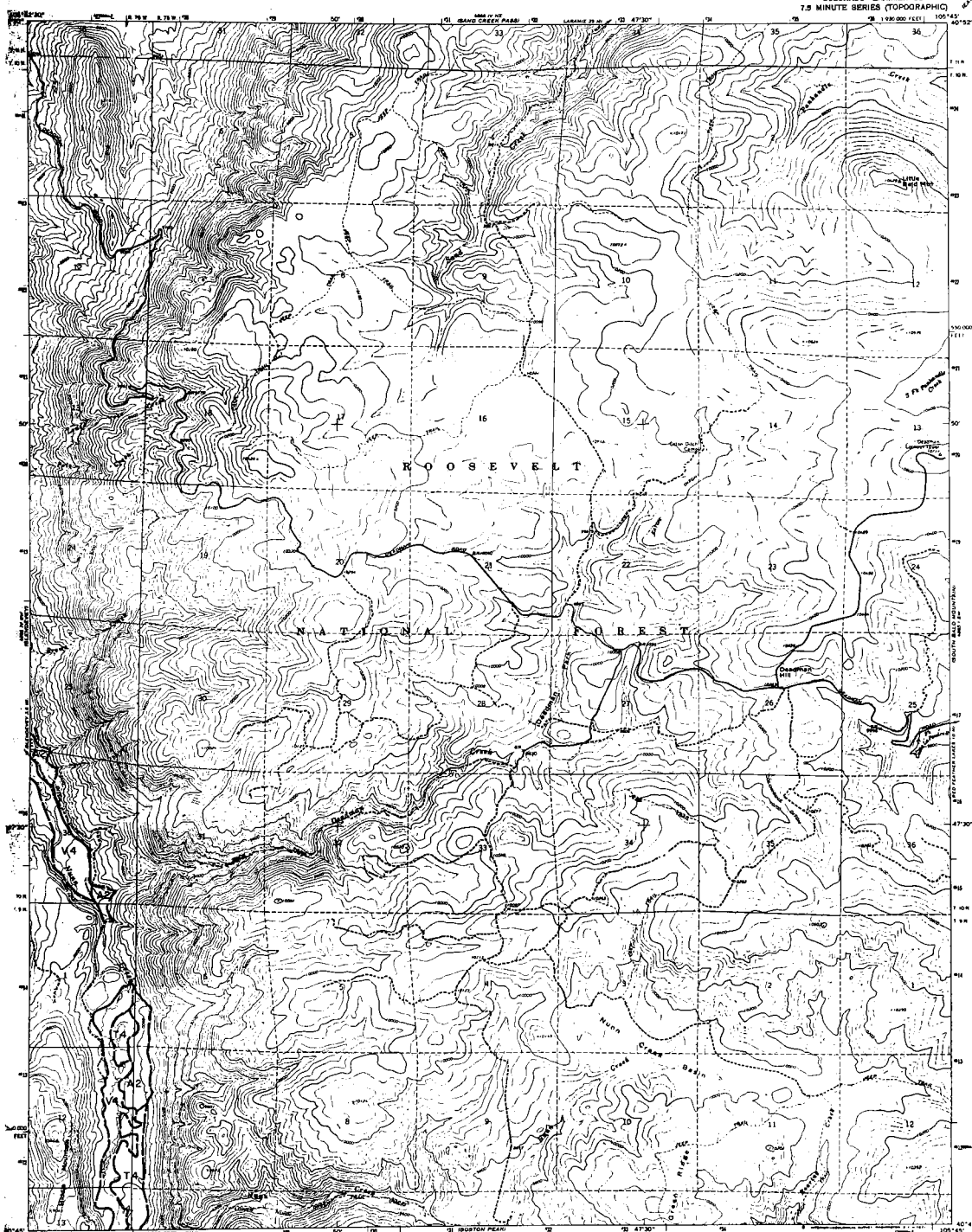
- Heavy-duty
- Medium-duty
- Unimproved dirt
- Interstate Route
- U.S. Route
- State Route

DAWSON BUTTE, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

Landform unit  
Resource classification

### LANDFORM UNIT

- P Floodplain deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Unsed deposits
- A Alluvial fan
- E Wind-deposited sand (sandbar)
- M Man-made deposits (slag, tailings, spoils, etc.)

### RESOURCE CLASSIFICATION

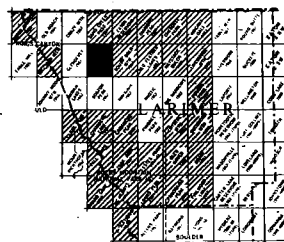
- COARSE SANDS**  
(at least 10% retained on #4 screen, visual estimation)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, tabular calcifers
- FINE SANDS**  
(greater than 75% passing #4 screen, 60% retained on #200 screen, visual estimation)
- 3 Sand
  - 4 Probable 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
- Relieved well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
- "a" indicates gravel; "m" indicates sand
- "a" to symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey (landslide and stream projects)
- Gravel pits
- Landform boundary, solid where known or observed; dashed where approximate or inferred

### STATION, LOCATION AND ORIENTATION

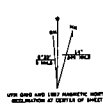
- ORIENTATION OF SYMBOL**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines (passing #4 screen, 7.5 in., visual estimation)
  - significant amount of fines (passing #200 screen, 0.004 in. or 0.075 mm.)
  - significant amount of decomposed or weak rock
  - significant amount of medium to coarse sand (a/m)
  - "a" to symbol denotes unconsolidated or unknown property
  - "m" to symbol denotes property about or long/short



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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

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



CONTOUR INTERVAL, 40 FEET  
DOTTED LINES REPRESENT 20-FOOT CONTOURS  
DATUM IS MEAN SEA LEVEL

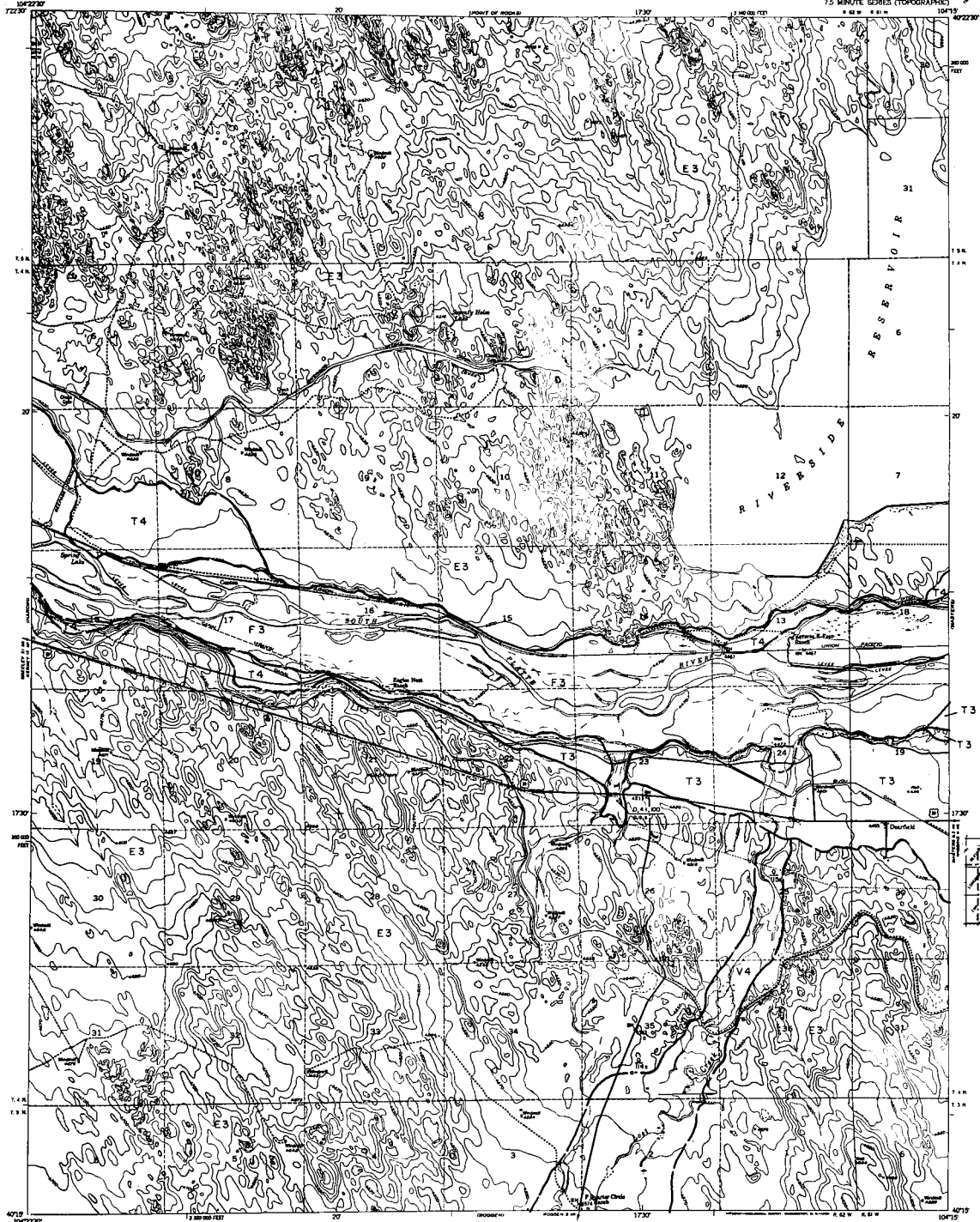
ROAD CLASSIFICATION  
Light duty Unimproved dirt

DEADMAN, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

DEARFIELD QUADRANGLE  
COLORADO-WELD CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100



## EXPLANATION

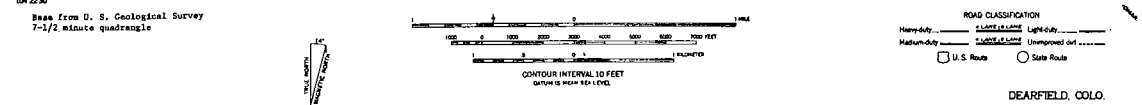
- Landform units**  
Resource classification
- LOCATED PITS**  
F Fluvial deposits  
S Alluvial terrace deposits  
V Valley fill (F & T)  
U Upland deposits  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Man-made deposits (slag, tailings, waste...)
- RESOURCE CLASSIFICATION**  
Crown aggregate  
(at least 25% sand and/or gravel in 40 acres, visual estimation)  
1 Crown: relatively clean and sound  
2 Crown: significant fines, decomposed rock, caliche cementation  
Firm aggregate  
(greater than 75% passing #4 screen, 40% retained on #100 screen, visual estimation)  
Sand  
Determined resource  
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  
Gravelly soil or fine sand (gravel) resource thickness (ft) over sand/gravel resource thickness (ft) indicated from well logs  
"s" indicates gravel; "m" indicates sand  
"u" in red indicates unmineralized or unknown property  
"m" denotes Colorado Geological Survey Mineral Land and Gravel (MLG) drill hole  
Landform boundary, solid black line or dashed line where appropriate or inferred
- STATION, LOCATION AND GEOLOGICAL ANALYSIS OF JORDAN**  
contour thickness (ft)  
sand/gravel resource thickness (ft)  
percent sand and/or gravel (gravel) resource thickness (ft) over sand/gravel resource thickness (ft) indicated from well logs  
"s" indicates gravel; "m" indicates sand  
"u" in red indicates unmineralized or unknown property  
"m" denotes Colorado Geological Survey Mineral Land and Gravel (MLG) drill hole  
Landform boundary, solid black line or dashed line where appropriate or inferred



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 Hardin, Colorado, and Paxton, Nebraska: U. S. Geol. Survey Water-Supply Paper 1378, pl. 1.

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



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



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DECKERS QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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

## EXPLANATION

Resource classification

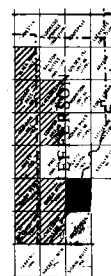
- LANDFORMS**
- F Floodplain deposit
  - T Terrace terrace deposit
  - V Valley fill (F & T)
  - U Upland deposits
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Man-made deposits (landfills, spoil, etc.)

## RESOURCE CLASSIFICATION

- Coarse Aggregate**  
(at least 20% retained on #4 screen, visual estimation)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcareous carbonates
- Fine Aggregate**  
(greater than 70% passing #4 screen, 80% retained on #20 screen, visual estimation)
- 3 Sand
  - 4 Probable aggregate resources

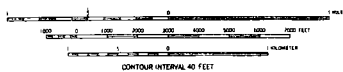
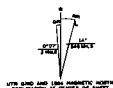
## NOTES

- \* 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 average thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs. "r" indicates gravel; "s" indicates sand.
  - \* "u" symbol denotes unutilized or unknown property.
  - \* "u" denotes Colorado Geological Survey "Widest/Lean and Gravel" project's drill hole.
  - \* Landform boundary, solid where known or observed; dashed where approximate or inferred.
- STATUS, LOCATION AND TOPOGRAPHICAL INFORMATION BY SYMBOL**
- \* contour thickness (ft)
  - \* sand/gravel resource thickness (ft)
  - \* percent sand and fines (passing #4 screen, 0.075 in.), visual estimation
  - \* significant amount of fines (passing #20 screen, 0.850 in. or 0.075 mm)
  - \* significant amount of decomposed or weak rock
  - \* significant amount of calcareous carbonates (calcite)
  - \* "u" symbol denotes unutilized or unknown property
  - \* "u" in symbol denotes property owner



■ QUADRANGLE LOCATION  
▨ NON-RESOURCE OR WITHDRANN AREA

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



ROAD CLASSIFICATION  
Major road ——— Light duty ———  
Unimproved dirt ———

DECKERS, COLO.

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

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

DEER-TRAIL QUADRANGLE  
COLORADO

- LEGEND CONT
- |   |  |
|---|--|
| 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<br>(slag, tailings, spoil....) |

RESOURCE CLASSIFICATION

- Coarse Aggregate  
(at least 20% 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, 85% retained on #100 screen, visual estimation)

Unvalued Resource


- 4 Probable aggregate resources
- MAP SYMBOLS
- Operating gravel and/or sand pit
  - Abandoned gravel and/or sand pit
  - Operating river quarry
  - Abandoned river 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 logs.
  - "-" indicates gravel; "+" indicates sand
  - "-" to (x) symbol denotes undeclared and unknown property.
  - "no" denotes Colorado Geological Survey Window/Head and Gravel projects' drill hole
  - Landform features, solid white human or resources; dashed where approximate or inferred.

## STATION, LOCATION AND GEOLOGICAL

- ANALYSIS OF DEPOSIT
- overburden thickness (ft)  
hard/prime resource thickness (ft)  
percent sand and fines (passing #4 screen, 0.25 in.), visual estimation  
17.4  
significant amount of fines (passing #20 screen, 0.0075 in. or 0.074 mm.)  
significant amount of decomposed or weak rock  
significant amount of unlime carbonate (see "a" in symbol)



QUADRANGLE LOCATION

 NON-RESOURCE OR  
WITHDRAWN AREA

Mapped by: Phillip C. Wicklein  
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

DEER TRAIL, COLO.  
N 10 1/2 - W 10 1/2 CL 5

1969

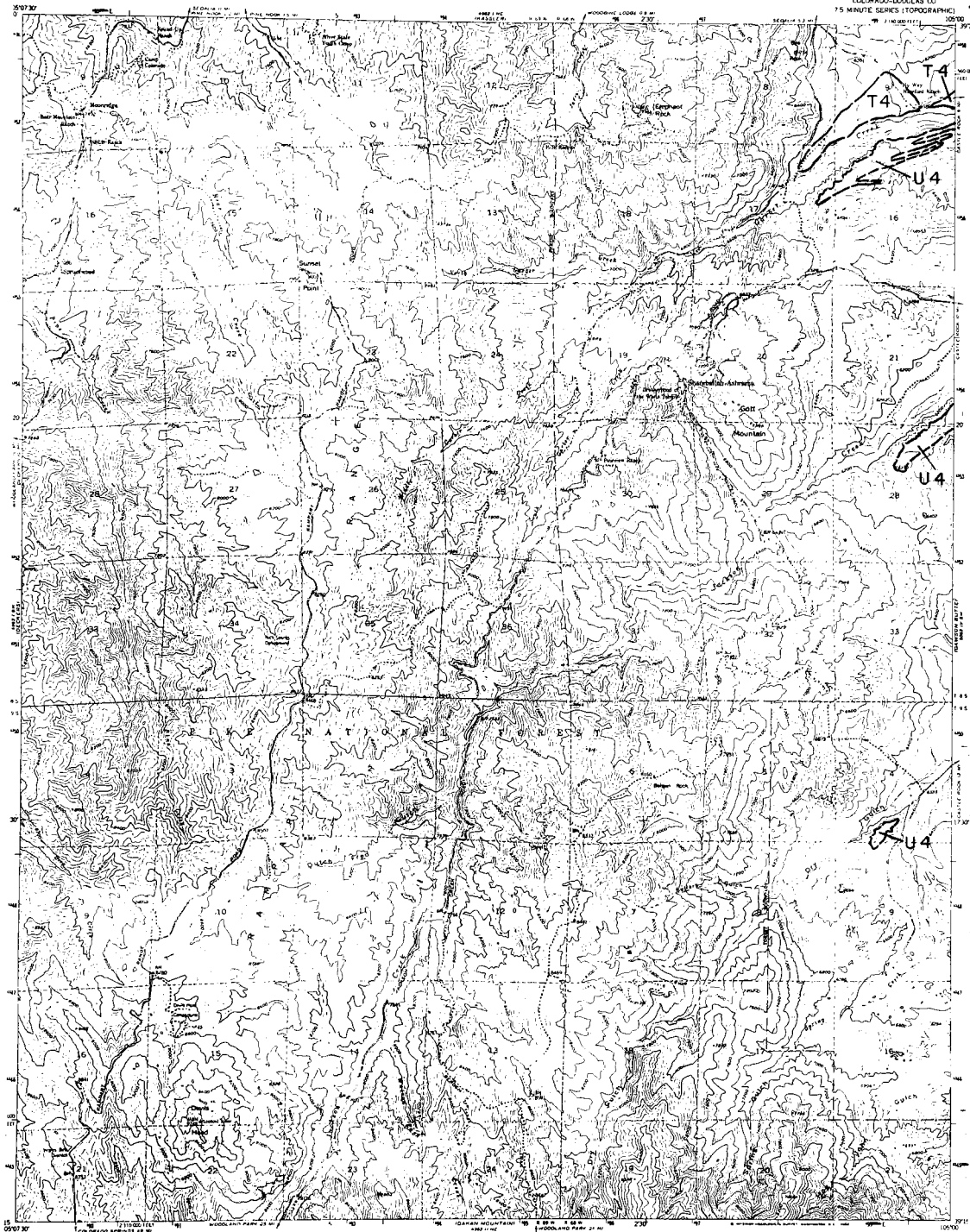
AM9 9153 G 04-04PHEA YET



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

### LANDFORMS

- F Floodplain deposit
- T Trench (erosion deposit)
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Non-eroded deposit (e.g., talings, uplands...)

### RESOURCE CLASSIFICATION

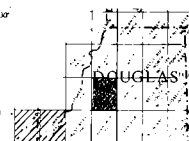
- Gravel, Sand, and Aggregate**
  - 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcareous carbonate
  - Fine Gravel**
    - 3 Sand
    - 4 Unconsolidated Sandstone
    - 5 Probable aggregate resource

### 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 disjunctive location with overburden thickness (ft) over underlying resource thickness (ft) obtained from well logs
- "a" indicates gravel, "s" indicates sand
- "x" in symbol denotes unevaluated or unknown property
- "m" denotes Colorado Geological Survey Machine (and Great Project) drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND ORIGIN

- overburden thickness (ft)
- underlying resource thickness (ft)
- percent sand and fines (percent of gravel, 0.075 in. or less)
- significant amount of fines (percent of gravel, 0.075 in. or less)
- significant amount of decomposed or weak rock
- significant amount of calcareous material
- "x" in symbol denotes unevaluated or unknown property
- "m" in symbol denotes property subject to litigation



### QUADRANGLE LOCATION

- NON-RESOURCE OR WITHDRAWN AREA

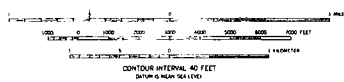
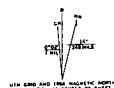
### REFERENCE:

Trimble, D.E., and Jitch, 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.

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



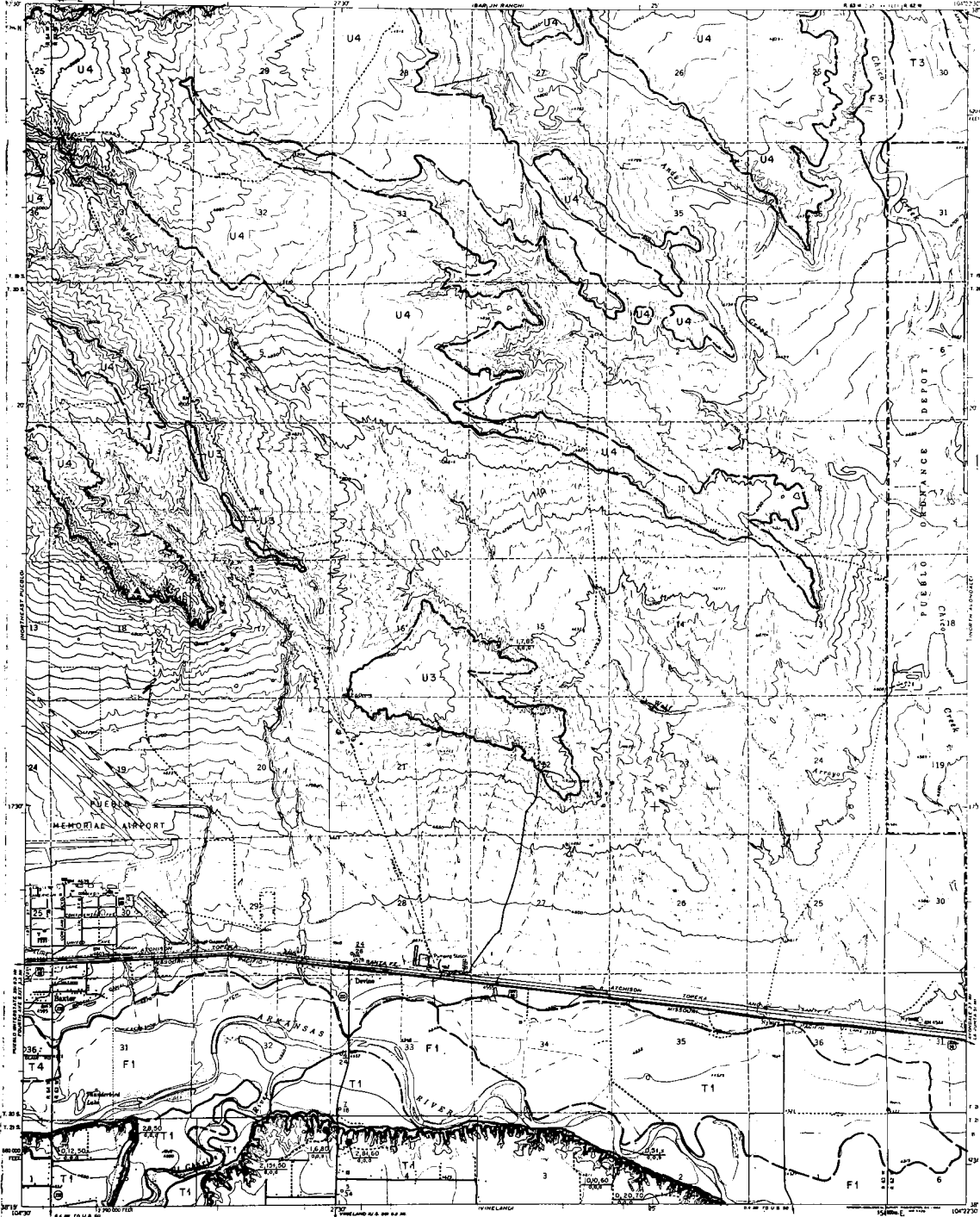
ROAD CLASSIFICATION  
Lightly Unimproved dirt

DEVILS HEAD, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

Landform unit  
Approximate classification

**LANDFORM UNIT**  
F Floodplain deposits  
T Stream terrace deposits  
V Valley fill (F & T)  
U Upland deposits  
A Alluvial fan  
E Eolian deposits (sand dunes)  
W Marine deposits (clay, silt, sand, gravel, etc.)

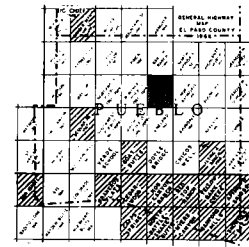
**RESOURCE CLASSIFICATION**  
Crown (sandstone)  
(as listed) 100 ft. or more, 100 ft. or more, 100 ft. or more  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, unconsolidated, calcium carbonate  
3 Sand  
4 Probable aggregate resources

**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 estimated thickness (ft.) over sand/gravel resource thickness (ft.) obtained from well logs  
"a" indicates gravel; "s" indicates sand  
"c" in symbol denotes consolidated or unknown property  
"w" denotes Colorado Geological Survey Water/Sand and Gravel projects  
Landform boundary, well where known or observed, shaded where appropriate or inferred

**STATION, LOCATION AND GEOLOGICAL DISCUSSION OF SYMBOLS**

Northward thickness (ft.)  
Southward thickness (ft.)  
Gravel/sand and fines (approx. 66 percent, 10 to 15 in., manual estimation)  
Gravel/sand amount of fines (approx. 1000 screen, 0.075 in. or 0.075 mm)  
Gravel/sand amount of unconsolidated or sand rock  
Gravel/sand amount of calcareous carbonate (caliche)  
"a" in symbol denotes unconsolidated or unknown property  
"s" in symbol denotes properly sorted or unconsolidated



QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

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

ROAD CLASSIFICATION

Heavy-duty Light-duty  
Medium-duty Unimproved dirt

U.S. Route State Route

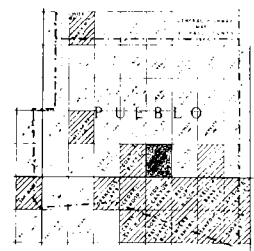
DEVINE, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

DOYLE BRIDGE QUADRANGLE

## EXPLANATION

- LEGEND**
- SYMBOLS**
- Floodplain deposit
  - Brown surface deposit
  - Valley fill (F & T)
  - Alluvial fan
  - Wind-deposited sand (aeolian)
  - Man-made deposits (landfill, spoil, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Resources**
- (at least 20% gravel on 40 screen, official estimate)
1. Gravel: relatively clean and sound
  2. Gravel: significant fines, decomposed rock, calcium carbonate
- Sand Resources**
- (at least 20% sand on 40 screen, official estimate)
3. Sand
- Unexploited 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
- NOTES**
- 1. Potential quarry aggregate resource area: boundary and location of aggregate resource area; boundary indicates (1) area and gravel resource; (2) boundary (1) is based on well logs; (2) indicates gravel; "S" indicates sand; "T" in symbol denotes unconsolidated or unknown resources.
  - 2. "W" denotes Colorado Geological Survey Waterflood and gravel projects drill hole.
  - 3. Boundary boundary, solid where known or observed, dashed where approximate or inferred.
- STATION, LOCATION AND ORIGIN**
- LOCATION OF RESOURCES**
- Unconsolidated resources (F)
  - Well-sorted medium to coarse (F)
  - Unconsolidated resources (T)
  - Unconsolidated resources (S)
  - Unconsolidated resources (W)
- QUADRANGLE LOCATION**
- NON-RESOURCE OR VETERAN AREA**

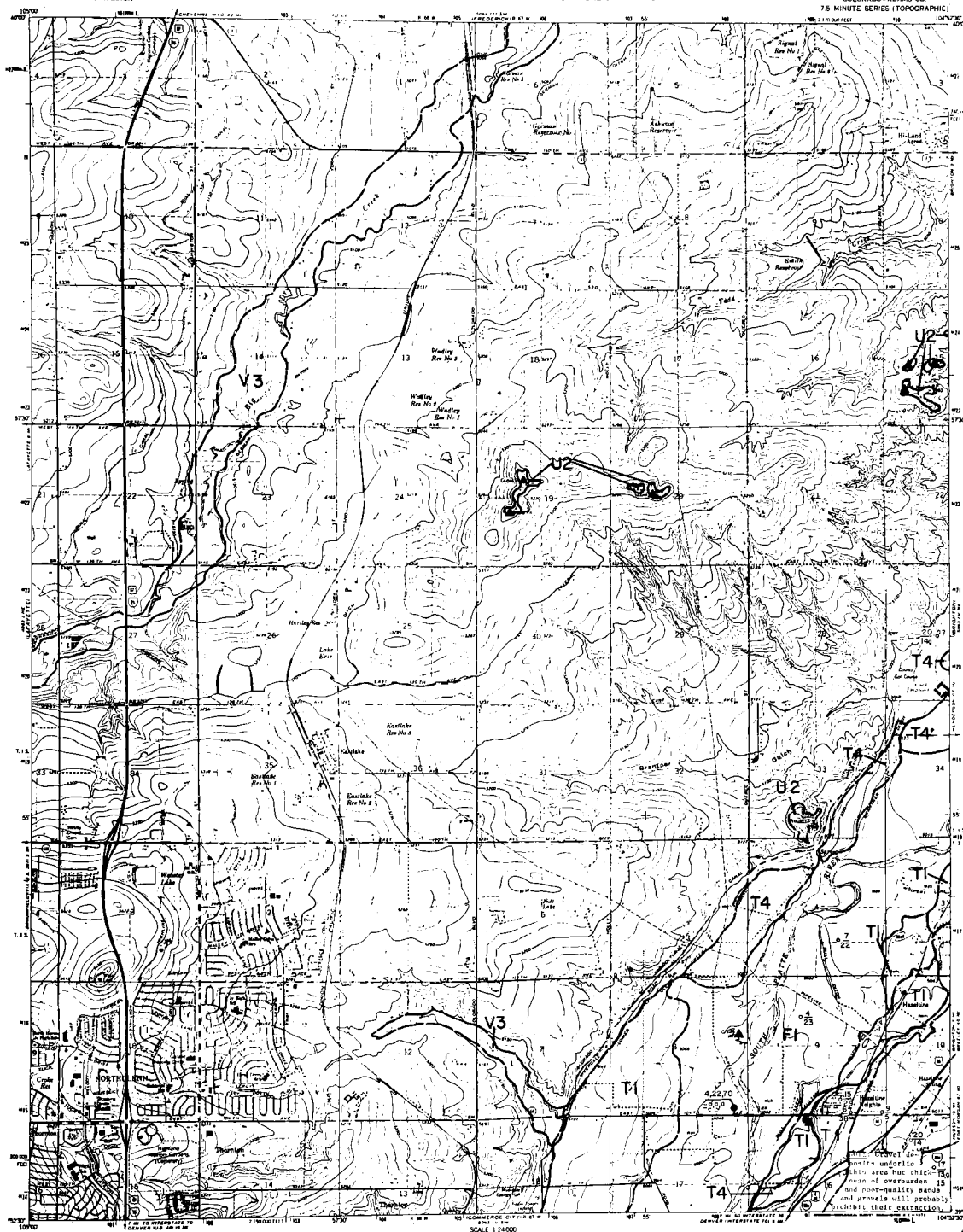


Mapped by: Stephen D. Schwachow  
Date: June 30, 1974

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

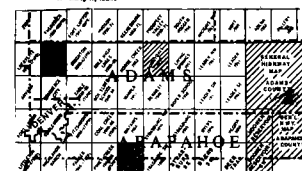
EASTLAKE QUADRANGLE  
COLORADO-ADAMS CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

- Landform 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-swept sand (colluvial)
  - M Man-made deposits (landfill, spoil, etc.)
- AGGREGATE CLASSIFICATION**
- Gravel**  
Gravel: relatively clean and round  
Gravel: significant fines, decomposed rock  
Gravel: significant fines, decomposed rock  
Gravel: significant fines, decomposed rock
- Sand**  
Sand: relatively clean and round  
Sand: significant fines, decomposed rock  
Sand: significant fines, decomposed rock
- Quarry aggregate resource**  
Quarry aggregate resource: relatively clean and round  
Quarry aggregate resource: significant fines, decomposed rock  
Quarry aggregate resource: significant fines, decomposed rock
- MAP SYMBOLS**
- Operating gravel and/or sand pit
  - Abandoned gravel and/or sand pit
  - Operating stone quarry
  - Abandoned stone quarry
  - Prospected quarry aggregate resource area
  - Selected well or drill-hole location with overburden thickness (ft) over sand and gravel resource thickness (ft), obtained from well logs.
  - "N" indicates gravel; "S" indicates sand
  - "N" in symbol denotes unmineralized or unknown property.
  - "W" denotes Colorado Geological Survey Windermere and Gravel project's drill hole
  - Landform boundary, solid where known or observed, dashed where approximate or inferred.
- STATION LOCATION AND GEOLOGICAL CLASSIFICATION OF AGGREGATE**
- contour thickness (ft)
  - wind-blown sand thickness (ft)
  - percent sand and fines (passing #10 mesh, 0.075 in.), usual notation
  - significant amount of fines (passing #10 mesh, 0.075 in., or 0.075 mm.)
  - significant amount of decomposed or sand rock
  - significant amount of material unmineralized or unknown property
  - "N" in symbol denotes unmineralized or unknown property
  - "W" in symbol denotes property shown as designated



QUADRANGLE LOCATION  
NON-RESOURCE OR WINDERMERE AREA

**References:**  
Schuchman, S.D., 1972, Surficial geology of the Eastlake quadrangle, Adams County, Colorado: Colorado School Mines Yearbook, Winter Session, v. 63, no. 1, p. 1.

In Vite, S.B., 1968, Quaternary history of the Eastlake area and environs, Adams County, Colorado: Colorado School Mines Yearbook, Winter Session, v. 63, no. 1, p. 1.

Hamilton, J.L., and Owens, W.C., 1972, Windermere, a study of the geologic problems, Denver metropolitan area, Colorado: Colorado Geol. Survey Environmental Science Report, 1, p. 1.

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

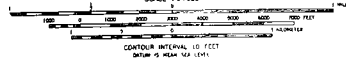
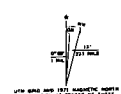
Chase, G.H., and McLaughlin, R.H., 1972, Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Map 1-731.

Smith, R.D., Schneider, P.A., Jr., and Fritz, L.H., 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 1618, p. 1.

Trumble, D.E., and Pritch, H.H., 1974, Map showing potential sources of gravel and (quarry) aggregate in the Greater Denver Area, Front Range Urban Corridor, Colo.: U.S. Geol. Survey Misc. Geol. Map 1-858a.

Map by: Stephen D. Schuchman  
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**

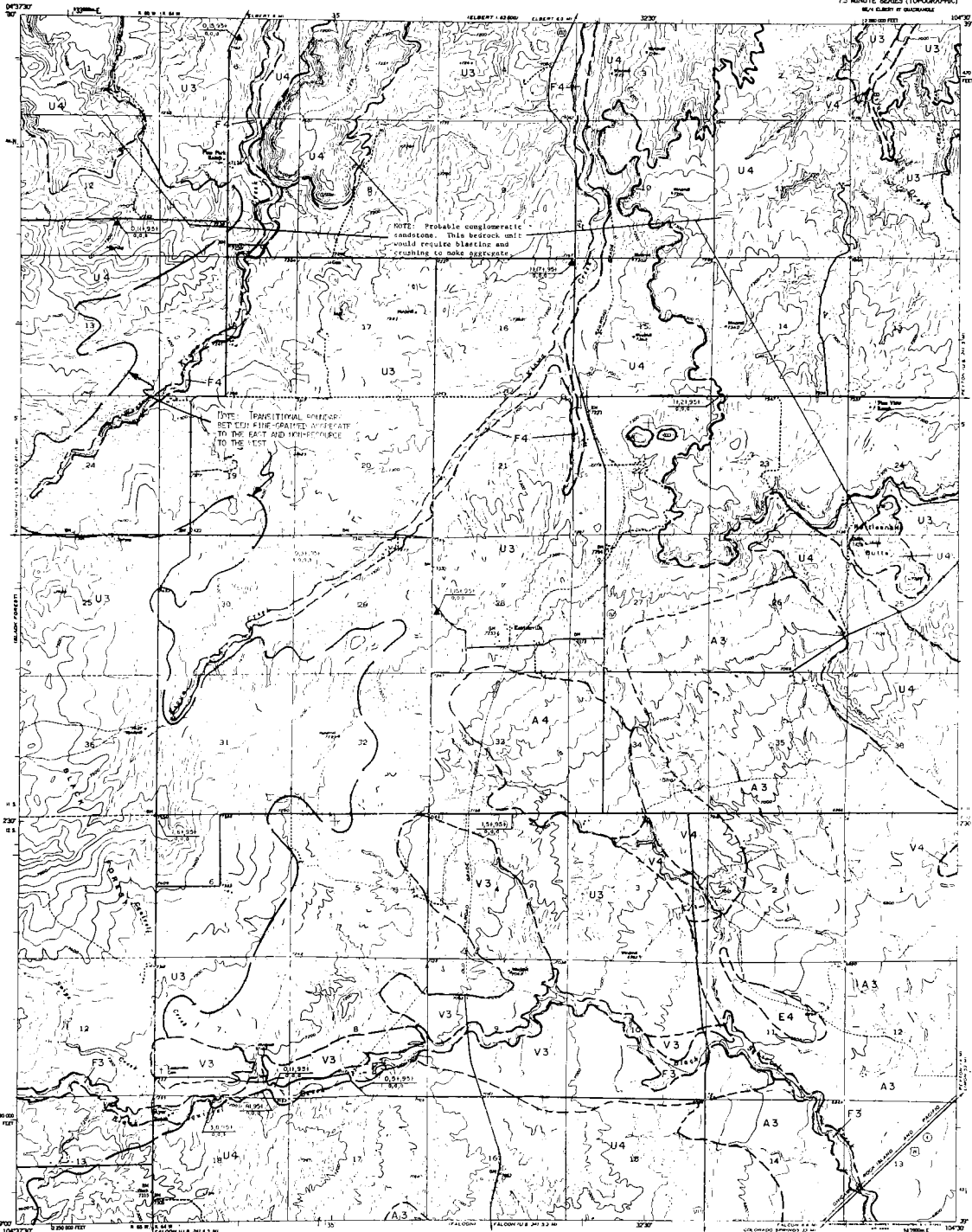
- Light duty
- Medium duty
- Heavy duty
- Interstate Route
- U.S. Route
- State Route

EASTLAKE, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

EASTONVILLE QUADRANGLE  
COLORADO-EL PASO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
BASE MAP OF 1960



## EXPLANATION

### SYMBOLS

- Floodplain deposit
- ▲ Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Wind-swept sand (eolian)
- M Man-made deposits (slag, tailings, refuse, etc.)

### RESOURCE CLASSIFICATION

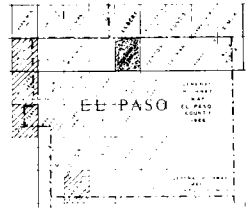
- 1. Gravel: relatively clean and sound
- 2. Gravel: significant fines, decomposed rock, weakly indurated
- 3. Sand
- 4. Probable aggregate resource

### 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 over-burden thickness (ft) and sand/gravel resource thickness (ft), obtained from well logs
- "X" indicates gravel; "Y" indicates sand
- "N" in small circles unutilized or unknown property
- "M" denotes Colorado Geological Survey Mineralogical and Chemical Analysis
- Landmark boundary, solid where known or observed, dashed where approximate or inferred

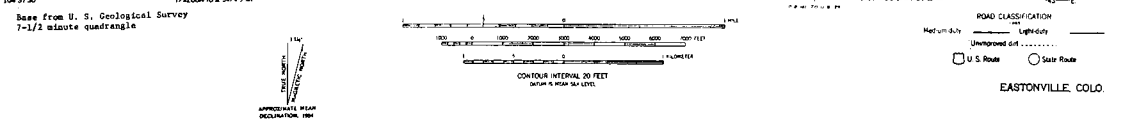
### SECTION, LOCATION AND TOPOGRAPHICAL DESCRIPTION OF SYMBOLS

- Overburden thickness (ft)
- Sand/gravel resource thickness (ft)
- Gravel and/or sand resource thickness (ft)
- Gravel and/or sand resource thickness (ft)
- Significant amount of fines (gravel) (100 mesh, 0.075 mm or 0.075 mm)
- Significant amount of decomposed or weak rock
- Significant amount of material (material)
- "N" in small circles unutilized or unknown property
- "M" in small circles properly placed or unutilized



- QUADRANGLE LOCATION
- ▨ NON-RESOURCE OR WITHDRAWN AREA

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



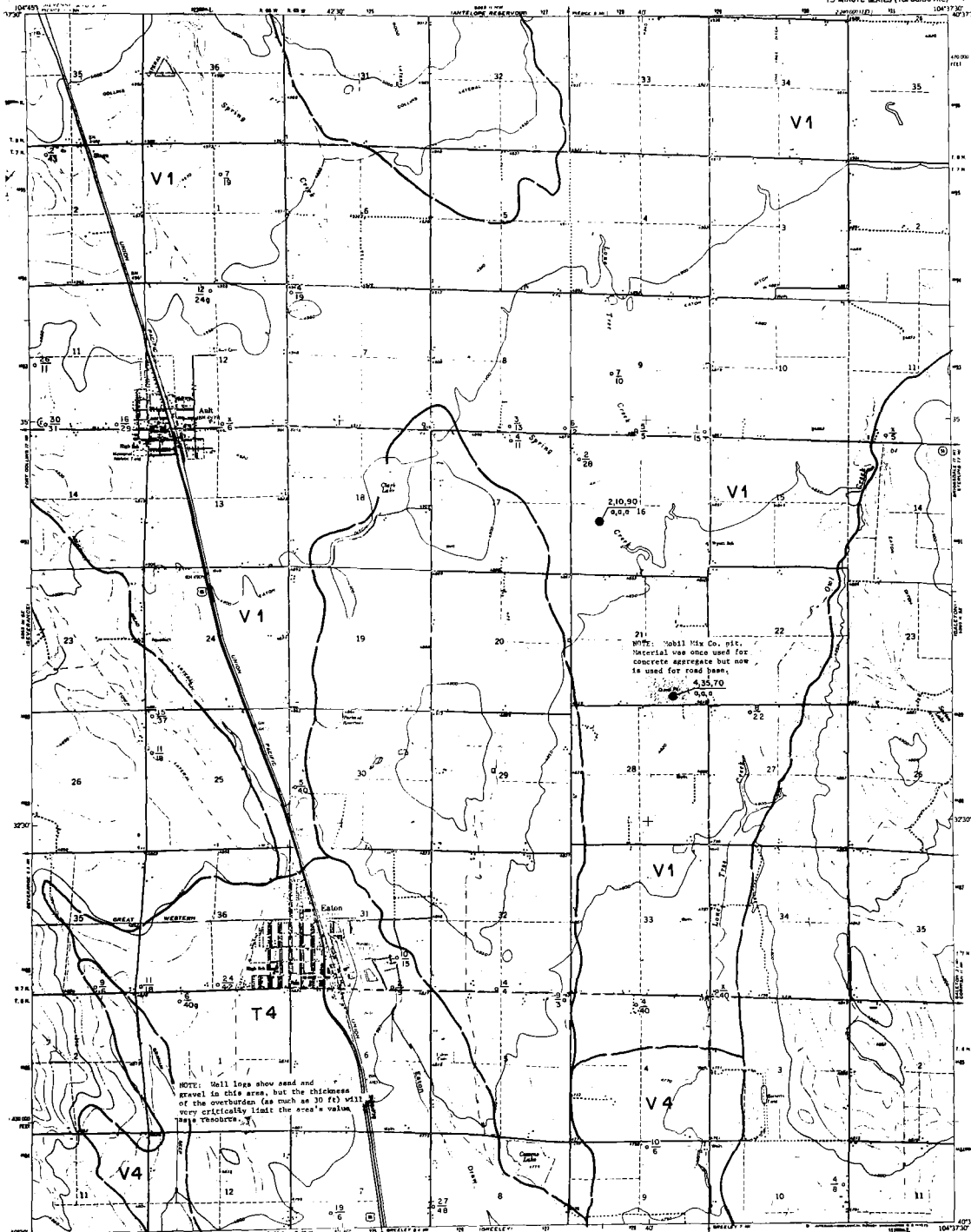
EASTONVILLE, COLO.

# 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 H. HALL, DIRECTOR



### EXPLANATION

Landform units  
Resource class (findings)

**AGGREGATE TYPES**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (P & T)

U Upland deposits  
A Alluvial fan  
E Eolian-deposited sand (eolian)  
M Hummock deposits (sand, silt, clay, pebbles...)

#### AGGREGATE CLASSIFICATION

**Gravel (sandstone)**  
(at least 50% retained on 48 screen, visual estimation)  
1 Gravel: relatively clean and unsorted  
2 Gravel: significant fines, decomposed rock, calcareous

**Fine sandstone**  
(greater than 75% passing 48 screen, 40% retained on 200 screen, visual estimation)  
3 Sand

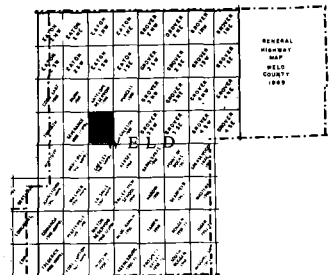
**Unconsolidated Resources**  
4 Probable aggregate resources

#### 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.  
"x" indicates areas of undisturbed sand and gravel property.  
"w" in symbol denotes Geological Survey Water/land and gravel projects.  
"d" in symbol denotes Geological Survey Water/land and gravel projects.  
Landform boundary, with above names or labels where appropriate in text.

#### STATION LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE

overburden thickness (ft)  
sand/gravel resource thickness (ft)  
percent sand and fines (passing 48 screen, 0.075 in., visual estimation)  
significant amount of fines (passing 100 screen, 0.0075 in., or 0.075 in.)  
significant amount of decomposed or calcareous rock.  
significant amount of calcareous sandstone (caliche)  
"x" in symbol denotes undisturbed or unknown property.  
"w" in symbol denotes property shared or changed/lost.



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

#### REFERENCE:

Hershey, 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 7-687.

Yarn, R.B., III, 1972, Map of surficial geology of the Eaton quadrangle, eastern, western, and central Colorado: U. S. Geol. Survey Environmental Geology Project, open-file map.

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

Geology modified after: Eaton, R.B., and Pritch, R.B., 1974, Map showing potential sources of gravel and crushed-rock aggregates in the Boulder-Fort Collins-Orchard Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 7-655-D.

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

Prepared in cooperation with the  
U. S. Geological Survey

EATON, COLO.

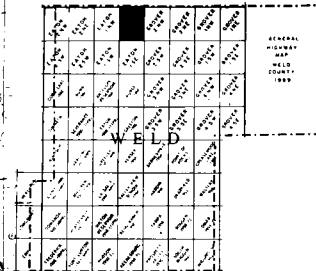
# SAND, GRAVEL AND QUARRY AGGREGATE

## RESOURCES MAP

EATON 1 NE

### EXPLANATION

- Legend**
- Landform - 111
  - Resource classification
- LOCATIONS**
- T Trench deposit
  - V Valley fill (F & T)
  - U Unfilled deposit
  - A Alluvial fan
  - E Eolian deposit and (inclined)
  - M Man-made deposit (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- Coarse aggregate**
    - (a) Class 1: measured on 48 screen, visual estimation
    - 1 Gravel: relatively clean and sound
    - 2 Gravel: significant fines, decomposed rock, certain subgrades
  - Fill aggregate**
    - (b) Class 2: measured on 48 screen, 48% retained on 100 screen, visual estimation
    - 3 Sand
  - Partial Resource**
  - Possible aggregate resource**
- NOTES**
- Operating gravel and pit
  - Abandoned gravel and pit
  - Operating stone quarry
  - Abandoned stone quarry
  - Recessed 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; "u" indicates sand
  - "u" in capital letters properly placed or unclassified
  - "u" in small letters properly placed or unclassified
  - "u" denotes Colorado Geological Survey
  - Welded and gravel resource
  - Drill hole
  - Leakage boundary, solid where known or dashed where approximate or inferred
- STATION, LOCATION AND COORDINATE**
- DESCRIPTION OF DEPOSIT**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines (passing #100 screen, 0.075 in.), visual estimation
  - significant amount of fines (passing #100 screen, 0.075 in. or 0.075 mm.)
  - significant amount of decomposed or weak rock
  - significant amount of micron carbonate (mash)
  - "u" in capital letters properly placed or unclassified
  - "u" in small letters properly placed or unclassified



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

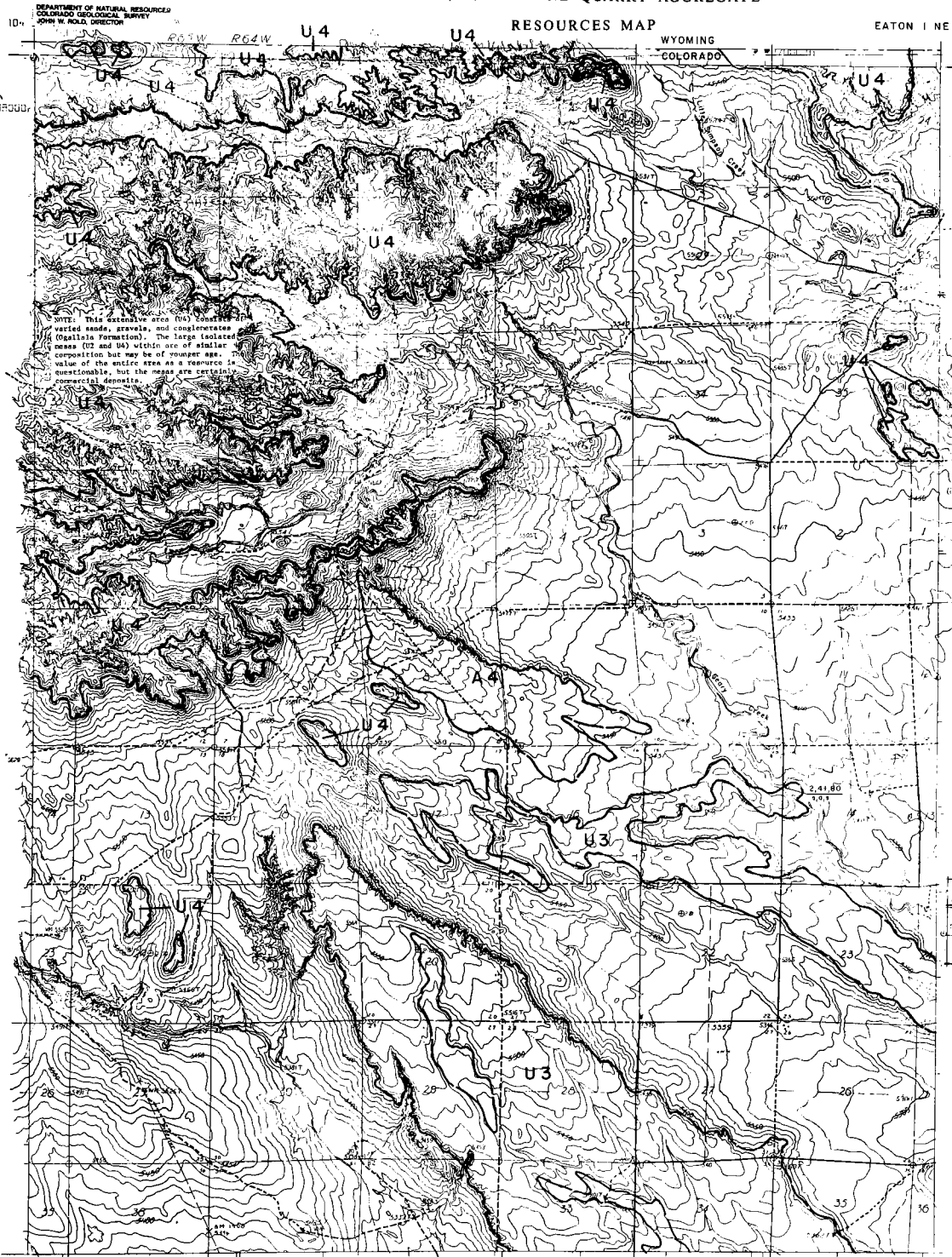
**REFERENCE:**

Lover, H.E., and Crist, W.A., 1967, Geology and ground-water resources of Larimer County, Wyoming: U.S. Geol. Survey Water-Supply Paper 1836, pl. 1.

West, 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.

Denon, 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 R64W 11

ROAD CLASSIFICATION

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

FOOTING INTERVAL 10 FEET



## SAND, GRAVEL AND QUARRY AGGREGATE

EATON 1 NW

## RESOURCES MAP

WYOMING

COLORADO

R 66 W R 65 W

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

## EXPLANATION

Landform units  
Resource classification

## LANDFORM UNITS

- T Tephritic 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, etc.)

## RESOURCE CLASSIFICATION

- 1. **Gravel:** relatively clean and sound
- 2. **Gravel:** significant fines, decomposed rock, talus, etc.
- 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 suitable location with very hard thickness (ft) over sand/gravel resource thickness (ft), indicated from well logs
- "u" indicates gravel; "m" indicates sand
- "u" in symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey unconsolidated and gravel resource drill hole
- Quarry boundary, solid where known or observed; dashed where approximate or inferred

## POSITION, LOCATION AND GEOLOGICAL

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (sp. grav. 2.65 g/cc, visual estimation)
- significant amount of fines (sp. grav. 2.65 g/cc, 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 WETLAND 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.
- Denham, H.N., 1974, personal communication.
- Wiat, W.G., 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. Schuchow  
Date: June 30, 1974

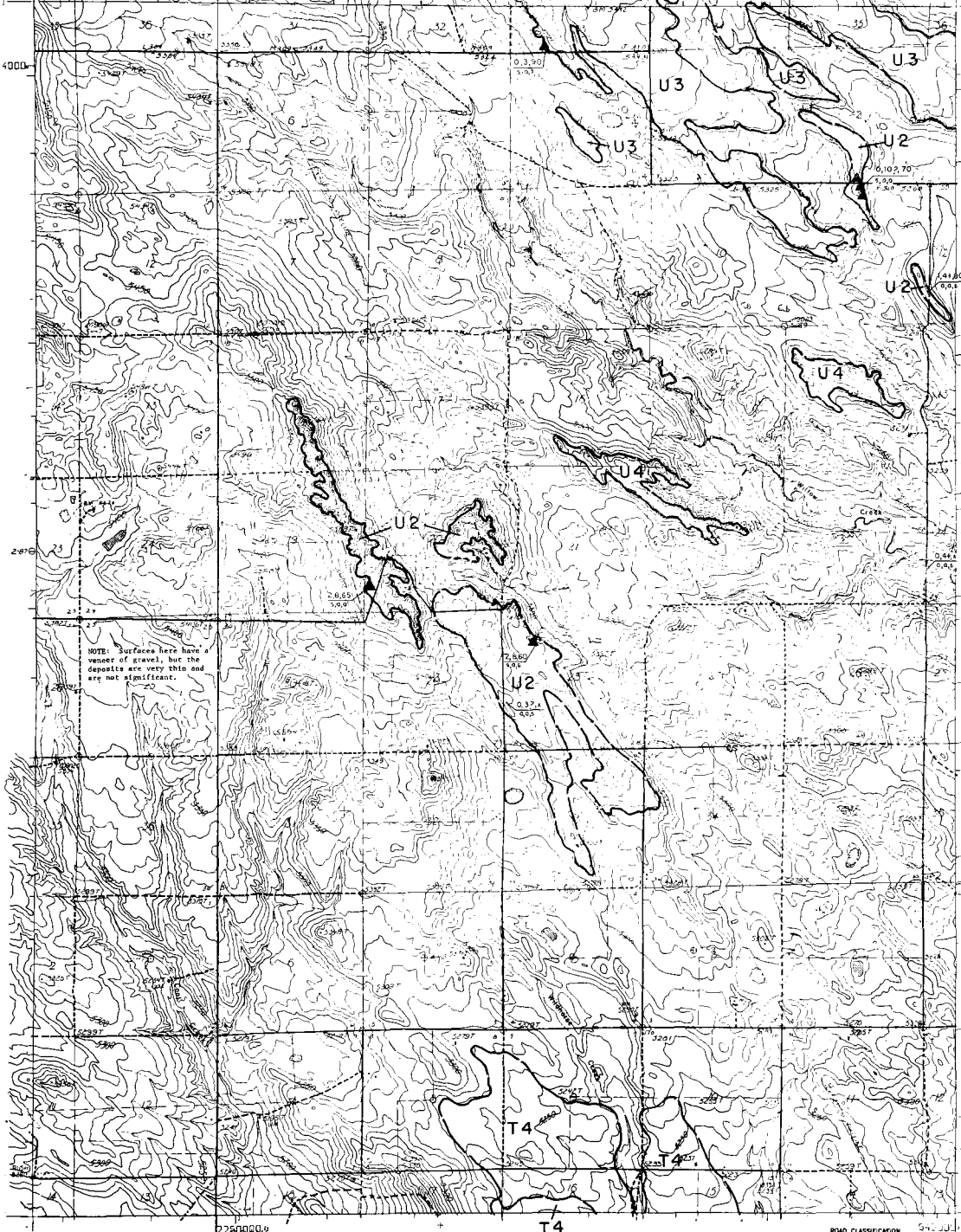
- Primary highway: hard surface
- Secondary highway: hard surface
- Light-duty road: hard or improved surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route

EATON 1 NW (03) 001

CONTOUR INTERVAL 10 FEET

22100001  
Data from U. S. Geological Survey  
7-1/2 minute quadrangle

NOTE: This extensive area (U4) consists of varied sands, gravels, and conglomerates (Ogallala 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

- LEGEND**
- Low-level well
  - Low-level well/flowline
- LANDFORMS**
- F Floodplain deposit
  - T Terrace terrace deposit
  - V Valley (all F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Eolian deposit and fan (alluvial)
  - M Man-made deposits (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- 1. **Gravel:** relatively clean and round
  - 2. **Gravel:** significant fines, decomposed rock, calcareous
  - 3. **Gravel:** significant fines, decomposed rock, calcareous
  - 4. **Gravel:** significant fines, decomposed rock, calcareous
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  - 98. **Gravel:** significant fines, decomposed rock, calcareous
  - 99. **Gravel:** significant fines, decomposed rock, calcareous
  - 100. **Gravel:** significant fines, decomposed rock, calcareous



QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

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

**ROAD CLASSIFICATION**

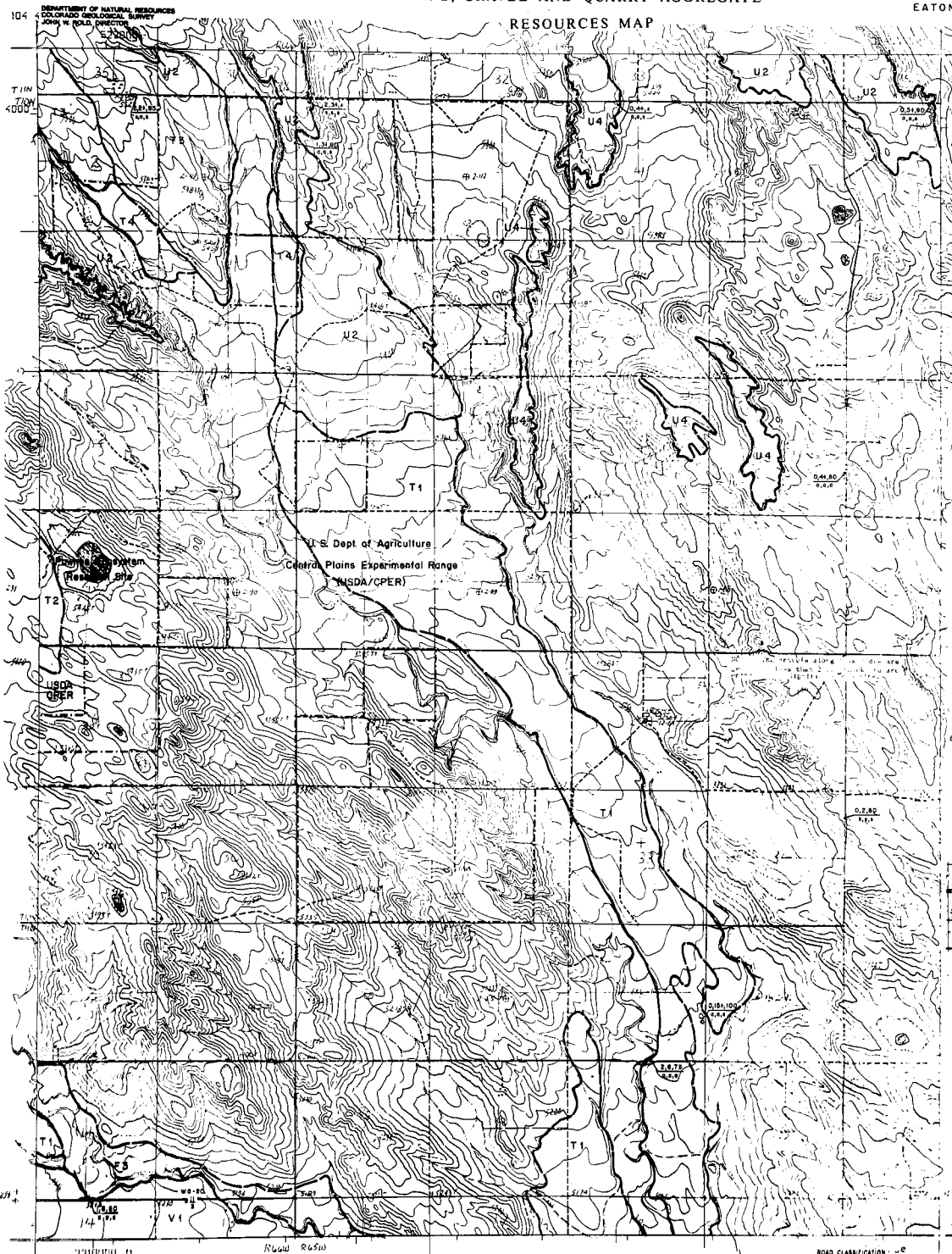
Primary highway  
Light duty road, hard or improved surface  
Secondary highway  
Unimproved road  
Interstate Route  
U.S. Route  
State Route

EATON 15E (108) COLO

# SAND, GRAVEL AND QUARRY AGGREGATE

EATON 1 SW

## RESOURCES MAP



### EXPLANATION

Landform unit  
Map-unit classification

#### LANDFORM UNIT

- # Fluvial deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Eolian deposit (sand dunes)
- M Man-made deposits (slag, tailings, spoil, etc.)

#### RESOURCE CLASSIFICATION

- Gravel**  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed rock, calcareous cementation
- Sand**  
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
- Historical 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" in symbol denotes unutilized or unknown property
- "u" denotes Colorado Geological Survey (Colorado State and Great Western) drill hole
- Landform boundary, solid where known or observed; dashed where approximate or inferred

#### EXTENT, LOCATION AND ORIGIN OF INFORMATION

- overburden thickness (ft)
- undisputed resource thickness (ft)
- parent sand and fines spacing ft
- parent, 0.25 in., or 0.50 in.
- significant amount of fines (spacing 0.25 in. or 0.50 in. or 0.75 in.)
- significant amount of decomposed or weak rock
- "u" in symbol denotes unutilized or unknown property
- "u" in symbol denotes property about or insignificant



#### QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

#### REFERENCE:

Bartholomew, 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-487.

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

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

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

CONTOUR INTERVAL 10 FEET

ROAD CLASSIFICATION: -C  
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

## EATON 2 NE



- LANDFORM CODE**
- |   |   |
|---|---|
| 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<br>(slag, tailings, spoil, ...) |

RESOURCE CLASSIFICATION

- Crusher Aggregate  
at least 10% retained on #4 screen,  
visual attrition!
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock,  
calcium carbonate,
- Fine Aggregate  
greater than 70% passing #4 screen, 50%  
retained on #200 screen, visual attrition

**Devaluated 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
- Selected well or drill-hole location with one or more water uses (1) uses sand/gravel from the thickness (1); indicates sand will log.
- "s" indicates gravel; "a" indicates sand
- "i" in symbol denotes unadjusted or unknown property.
- "m" denotes Colorado Geological Survey Window/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**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines passing #4 screen, 0.075 in., usual distribution
  - 1 12 40
  - significant amount of fines (passing 100 mesh, 0.0075 in.)
  - significant amount of decomposed or weak rock
  - significant amount of acidic substances (pH < 4)
- 4
- "a" in symbol denotes unclassified or unknown property
- "b" in symbol denotes property absent or insufficient

QUADRANGLE LOCATION

 NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:  
Lowry, M.E., and Crist, M.A., 1967, Geology and  
ground-water resources of Laramie County, Wyoming:  
U. S. Geol. Survey Water-Supply Paper 1834, pl. 1.

Denson, N.H., 1974, personal communication.

Wolfe, V.G., Jr., 1965,

Weist, W.G., Jr., 1965,  
Reconnaissance of ground-water re-  
sources 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, \_\_\_\_\_ Light duty road, hard or  
hard surface \_\_\_\_\_ improved surface \_\_\_\_\_

Secondary highway, \_\_\_\_\_ Unimproved road \_\_\_\_\_  
hard surface \_\_\_\_\_

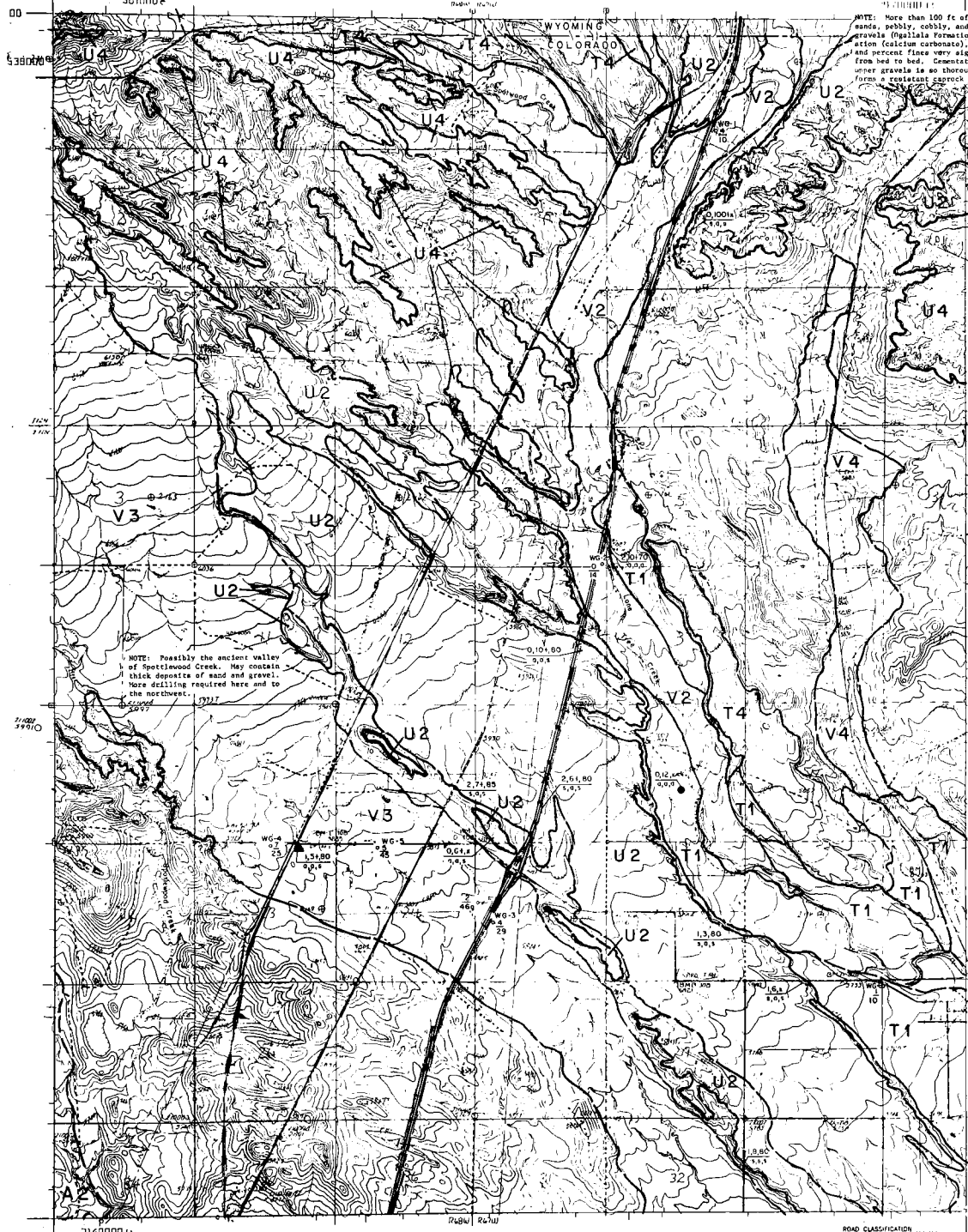
☐ Interstate Route ☐ U.S. Route ☐ State Route

EATON 2NE 104 COLO

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

EATON 2 NW

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



## 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 (airports, etc.)

### 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 pit
- Abandoned gravel and/or pit
- Abandoned quarry
- Potential quarry aggregate resource area
- Isolated well or drill-hole location with maximum thickness (ft) and gravel resource thickness (ft), obtained from well logs
- "x" indicates gravel, "s" indicates sand
- "u" in symbol denotes unutilized or unknown property
- "m" denotes Colorado Geological Survey "Mineralized and Gravel" project
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND GEOLOGICAL

- Station, location and geological
- Maximum thickness (ft)
- Gravel resource thickness (ft)
- Percent sand and fines (percent)
- Notes: 0.75 ft., 1 ft., 2 ft., 3 ft., 4 ft., 5 ft., 6 ft., 7 ft., 8 ft., 9 ft., 10 ft., 11 ft., 12 ft., 13 ft., 14 ft., 15 ft., 16 ft., 17 ft., 18 ft., 19 ft., 20 ft., 21 ft., 22 ft., 23 ft., 24 ft., 25 ft., 26 ft., 27 ft., 28 ft., 29 ft., 30 ft., 31 ft., 32 ft., 33 ft., 34 ft., 35 ft., 36 ft., 37 ft., 38 ft., 39 ft., 40 ft., 41 ft., 42 ft., 43 ft., 44 ft., 45 ft., 46 ft., 47 ft., 48 ft., 49 ft., 50 ft., 51 ft., 52 ft., 53 ft., 54 ft., 55 ft., 56 ft., 57 ft., 58 ft., 59 ft., 60 ft., 61 ft., 62 ft., 63 ft., 64 ft., 65 ft., 66 ft., 67 ft., 68 ft., 69 ft., 70 ft., 71 ft., 72 ft., 73 ft., 74 ft., 75 ft., 76 ft., 77 ft., 78 ft., 79 ft., 80 ft., 81 ft., 82 ft., 83 ft., 84 ft., 85 ft., 86 ft., 87 ft., 88 ft., 89 ft., 90 ft., 91 ft., 92 ft., 93 ft., 94 ft., 95 ft., 96 ft., 97 ft., 98 ft., 99 ft., 100 ft., 101 ft., 102 ft., 103 ft., 104 ft., 105 ft., 106 ft., 107 ft., 108 ft., 109 ft., 110 ft., 111 ft., 112 ft., 113 ft., 114 ft., 115 ft., 116 ft., 117 ft., 118 ft., 119 ft., 120 ft., 121 ft., 122 ft., 123 ft., 124 ft., 125 ft., 126 ft., 127 ft., 128 ft., 129 ft., 130 ft., 131 ft., 132 ft., 133 ft., 134 ft., 135 ft., 136 ft., 137 ft., 138 ft., 139 ft., 140 ft., 141 ft., 142 ft., 143 ft., 144 ft., 145 ft., 146 ft., 147 ft., 148 ft., 149 ft., 150 ft., 151 ft., 152 ft., 153 ft., 154 ft., 155 ft., 156 ft., 157 ft., 158 ft., 159 ft., 160 ft., 161 ft., 162 ft., 163 ft., 164 ft., 165 ft., 166 ft., 167 ft., 168 ft., 169 ft., 170 ft., 171 ft., 172 ft., 173 ft., 174 ft., 175 ft., 176 ft., 177 ft., 178 ft., 179 ft., 180 ft., 181 ft., 182 ft., 183 ft., 184 ft., 185 ft., 186 ft., 187 ft., 188 ft., 189 ft., 190 ft., 191 ft., 192 ft., 193 ft., 194 ft., 195 ft., 196 ft., 197 ft., 198 ft., 199 ft., 200 ft., 201 ft., 202 ft., 203 ft., 204 ft., 205 ft., 206 ft., 207 ft., 208 ft., 209 ft., 210 ft., 211 ft., 212 ft., 213 ft., 214 ft., 215 ft., 216 ft., 217 ft., 218 ft., 219 ft., 220 ft., 221 ft., 222 ft., 223 ft., 224 ft., 225 ft., 226 ft., 227 ft., 228 ft., 229 ft., 230 ft., 231 ft., 232 ft., 233 ft., 234 ft., 235 ft., 236 ft., 237 ft., 238 ft., 239 ft., 240 ft., 241 ft., 242 ft., 243 ft., 244 ft., 245 ft., 246 ft., 247 ft., 248 ft., 249 ft., 250 ft., 251 ft., 252 ft., 253 ft., 254 ft., 255 ft., 256 ft., 257 ft., 258 ft., 259 ft., 260 ft., 261 ft., 262 ft., 263 ft., 264 ft., 265 ft., 266 ft., 267 ft., 268 ft., 269 ft., 270 ft., 271 ft., 272 ft., 273 ft., 274 ft., 275 ft., 276 ft., 277 ft., 278 ft., 279 ft., 280 ft., 281 ft., 282 ft., 283 ft., 284 ft., 285 ft., 286 ft., 287 ft., 288 ft., 289 ft., 290 ft., 291 ft., 292 ft., 293 ft., 294 ft., 295 ft., 296 ft., 297 ft., 298 ft., 299 ft., 300 ft., 301 ft., 302 ft., 303 ft., 304 ft., 305 ft., 306 ft., 307 ft., 308 ft., 309 ft., 310 ft., 311 ft., 312 ft., 313 ft., 314 ft., 315 ft., 316 ft., 317 ft., 318 ft., 319 ft., 320 ft., 321 ft., 322 ft., 323 ft., 324 ft., 325 ft., 326 ft., 327 ft., 328 ft., 329 ft., 330 ft., 331 ft., 332 ft., 333 ft., 334 ft., 335 ft., 336 ft., 337 ft., 338 ft., 339 ft., 340 ft., 341 ft., 342 ft., 343 ft., 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566 ft., 567 ft., 568 ft., 569 ft., 570 ft., 571 ft., 572 ft., 573 ft., 574 ft., 575 ft., 576 ft., 577 ft., 578 ft., 579 ft., 580 ft., 581 ft., 582 ft., 583 ft., 584 ft., 585 ft., 586 ft., 587 ft., 588 ft., 589 ft., 590 ft., 591 ft., 592 ft., 593 ft., 594 ft., 595 ft., 596 ft., 597 ft., 598 ft., 599 ft., 600 ft., 601 ft., 602 ft., 603 ft., 604 ft., 605 ft., 606 ft., 607 ft., 608 ft., 609 ft., 610 ft., 611 ft., 612 ft., 613 ft., 614 ft., 615 ft., 616 ft., 617 ft., 618 ft., 619 ft., 620 ft., 621 ft., 622 ft., 623 ft., 624 ft., 625 ft., 626 ft., 627 ft., 628 ft., 629 ft., 630 ft., 631 ft., 632 ft., 633 ft., 634 ft., 635 ft., 636 ft., 637 ft., 638 ft., 639 ft., 640 ft., 641 ft., 642 ft., 643 ft., 644 ft., 645 ft., 646 ft., 647 ft., 648 ft., 649 ft., 650 ft., 651 ft., 652 ft., 653 ft., 654 ft., 655 ft., 656 ft., 657 ft., 658 ft., 659 ft., 660 ft., 661 ft., 662 ft., 663 ft., 664 ft., 665 ft., 666 ft., 667 ft., 668 ft., 669 ft., 670 ft., 671 ft., 672 ft., 673 ft., 674 ft., 675 ft., 676 ft., 677 ft., 678 ft., 679 ft., 680 ft., 681 ft., 682 ft., 683 ft., 684 ft., 685 ft., 686 ft., 687 ft., 688 ft., 689 ft., 690 ft., 691 ft., 692 ft., 693 ft., 694 ft., 695 ft., 696 ft., 697 ft., 698 ft., 699 ft., 700 ft., 701 ft., 702 ft., 703 ft., 704 ft., 705 ft., 706 ft., 707 ft., 708 ft., 709 ft., 710 ft., 711 ft., 712 ft., 713 ft., 714 ft., 715 ft., 716 ft., 717 ft., 718 ft., 719 ft., 720 ft., 721 ft., 722 ft., 723 ft., 724 ft., 725 ft., 726 ft., 727 ft., 728 ft., 729 ft., 730 ft., 731 ft., 732 ft., 733 ft., 734 ft., 735 ft., 736 ft., 737 ft., 738 ft., 739 ft., 740 ft., 741 ft., 742 ft., 743 ft., 744 ft., 745 ft., 746 ft., 747 ft., 748 ft., 749 ft., 750 ft., 751 ft., 752 ft., 753 ft., 754 ft., 755 ft., 756 ft., 757 ft., 758 ft., 759 ft., 760 ft., 761 ft., 762 ft., 763 ft., 764 ft., 765 ft., 766 ft., 767 ft., 768 ft., 769 ft., 770 ft., 771 ft., 772 ft., 773 ft., 774 ft., 775 ft., 776 ft., 777 ft., 778 ft., 779 ft., 780 ft., 781 ft., 782 ft., 783 ft., 784 ft., 785 ft., 786 ft., 787 ft., 788 ft., 789 ft., 790 ft., 791 ft., 792 ft., 793 ft., 794 ft., 795 ft., 796 ft., 797 ft., 798 ft., 799 ft., 800 ft., 801 ft., 802 ft., 803 ft., 804 ft., 805 ft., 806 ft., 807 ft., 808 ft., 809 ft., 810 ft., 811 ft., 812 ft., 813 ft., 814 ft., 815 ft., 816 ft., 817 ft., 818 ft., 819 ft., 820 ft., 821 ft., 822 ft., 823 ft., 824 ft., 825 ft., 826 ft., 827 ft., 828 ft., 829 ft., 830 ft., 831 ft., 832 ft., 833 ft., 834 ft., 835 ft., 836 ft., 837 ft., 838 ft., 839 ft., 840 ft., 841 ft., 842 ft., 843 ft., 844 ft., 845 ft., 846 ft., 847 ft., 848 ft., 849 ft., 850 ft., 851 ft., 852 ft., 853 ft., 854 ft., 855 ft., 856 ft., 857 ft., 858 ft., 859 ft., 860 ft., 861 ft., 862 ft., 863 ft., 864 ft., 865 ft., 866 ft., 867 ft., 868 ft., 869 ft., 870 ft., 871 ft., 872 ft., 873 ft., 874 ft., 875 ft., 876 ft., 877 ft., 878 ft., 879 ft., 880 ft., 881 ft., 882 ft., 883 ft., 884 ft., 885 ft., 886 ft., 887 ft., 888 ft., 889 ft., 890 ft., 891 ft., 892 ft., 893 ft., 894 ft., 895 ft., 896 ft., 897 ft., 898 ft., 899 ft., 900 ft., 901 ft., 902 ft., 903 ft., 904 ft., 905 ft., 906 ft., 907 ft., 908 ft., 909 ft., 910 ft., 911 ft., 912 ft., 913 ft., 914 ft., 915 ft., 916 ft., 917 ft., 918 ft., 919 ft., 920 ft., 921 ft., 922 ft., 923 ft., 924 ft., 925 ft., 926 ft., 927 ft., 928 ft., 929 ft., 930 ft., 931 ft., 932 ft., 933 ft., 934 ft., 935 ft., 936 ft., 937 ft., 938 ft., 939 ft., 940 ft., 941 ft., 942 ft., 943 ft., 944 ft., 945 ft., 946 ft., 947 ft., 948 ft., 949 ft., 950 ft., 951 ft., 952 ft., 953 ft., 954 ft., 955 ft., 956 ft., 957 ft., 958 ft., 959 ft., 960 ft., 961 ft., 962 ft., 963 ft., 964 ft., 965 ft., 966 ft., 967 ft., 968 ft., 969 ft., 970 ft., 971 ft., 972 ft., 973 ft., 974 ft., 975 ft., 976 ft., 977 ft., 978 ft., 979 ft., 980 ft., 981 ft., 982 ft., 983 ft., 984 ft., 985 ft., 986 ft., 987 ft., 988 ft., 989 ft., 990 ft., 991 ft., 992 ft., 993 ft., 994 ft., 995 ft., 996 ft., 997 ft., 998 ft., 999 ft., 1000 ft.



## 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 1834, pl. 1.
- Noor, F.E., 1959, Geomorphic evolution of the east flank of the Larimer Range, Colorado and Wyoming; Univ. Wyoming Unpub. 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 Weld Counties, Colo.; U. S. Geol. Survey Water-Supply Paper 1809-L, pl. 1.

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

EATON 2 NW (04) COLO.

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

CONTOUR INTERVAL 10 FEET

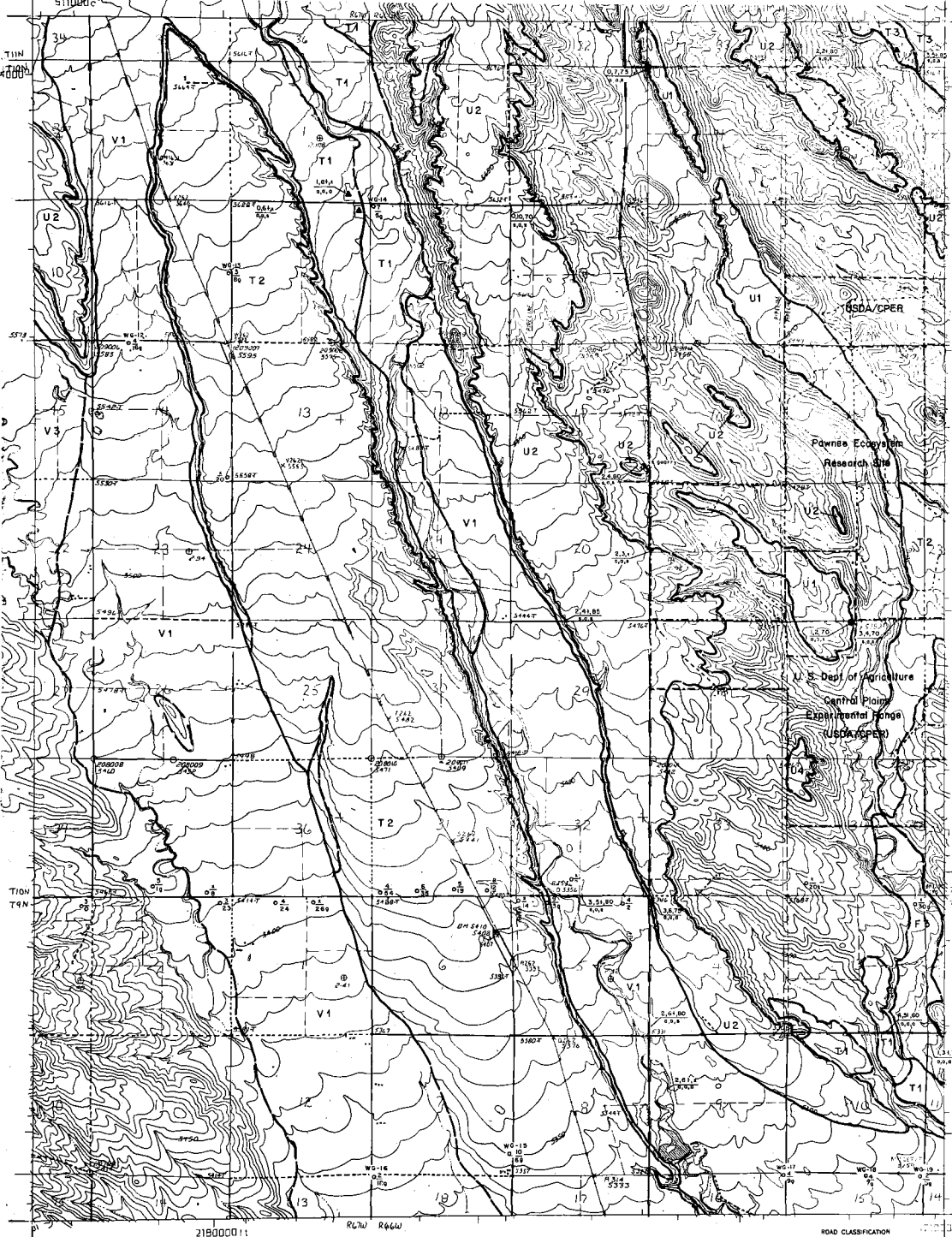
Base from U. S. Geological Survey 7-1/2 minute quadrangle



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

EATON 2SE

DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. ROLLA, DIRECTOR  
5110000



## EXPLANATION

Legend symbols for resource types and map features.

### LEGEND

- Topographic map
- Screen service deposit
- Valley fill (F & T)
- Optimal deposits
- Alluvial fan
- Wind-deposited sand (wind)
- Man-made deposits (slag, tailings, spillover...)

### RESOURCE CLASSIFICATION

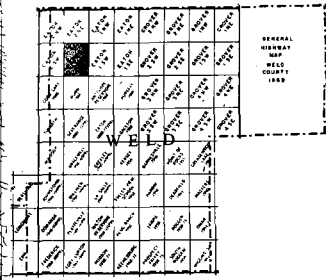
- Gravel Resource**  
(at least 500 ft. exposed on 1/4 acre, visual estimation)  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, calcareous, etc.
- Sand Resource**  
(greater than 10 ft. exposed on 1/4 acre, 50% retained on 200 screen, visual estimation)  
3 Sand
- Unconsolidated Deposits**  
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 overburden thickness (ft) over sand and gravel resource thickness (ft), obtained from well logs.
- "r" indicates gravel; "s" indicates sand
- "u" in symbol denotes unconsolidated or unknown property
- "w" denotes Colorado Geological Survey Window/Lead and Gravel resource drill hole
- Landmark boundary, mild where known or observed; dashed where approximate or inferred

### POSITION, LOCATION AND TOPOGRAPHICAL DESCRIPTION OF DEPOSIT

- overburden thickness (ft)
- aggregate resource thickness (ft)
- percent sand and fines (passing #4 screen, 0.25 in., visual estimation)
- significant amount of fines (passing #20 screen, 0.0075 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- significant amount of material (substrate) includes:
- "u" in symbol denotes unconsolidated or unknown property
- "w" in symbol denotes property absent or designated



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

### REFERENCES:

- 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 T-687.
- U.S.D.A. Poudre Site Ecosystem Research Headquarters, Map.

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

EATON 2SE (06) COLO

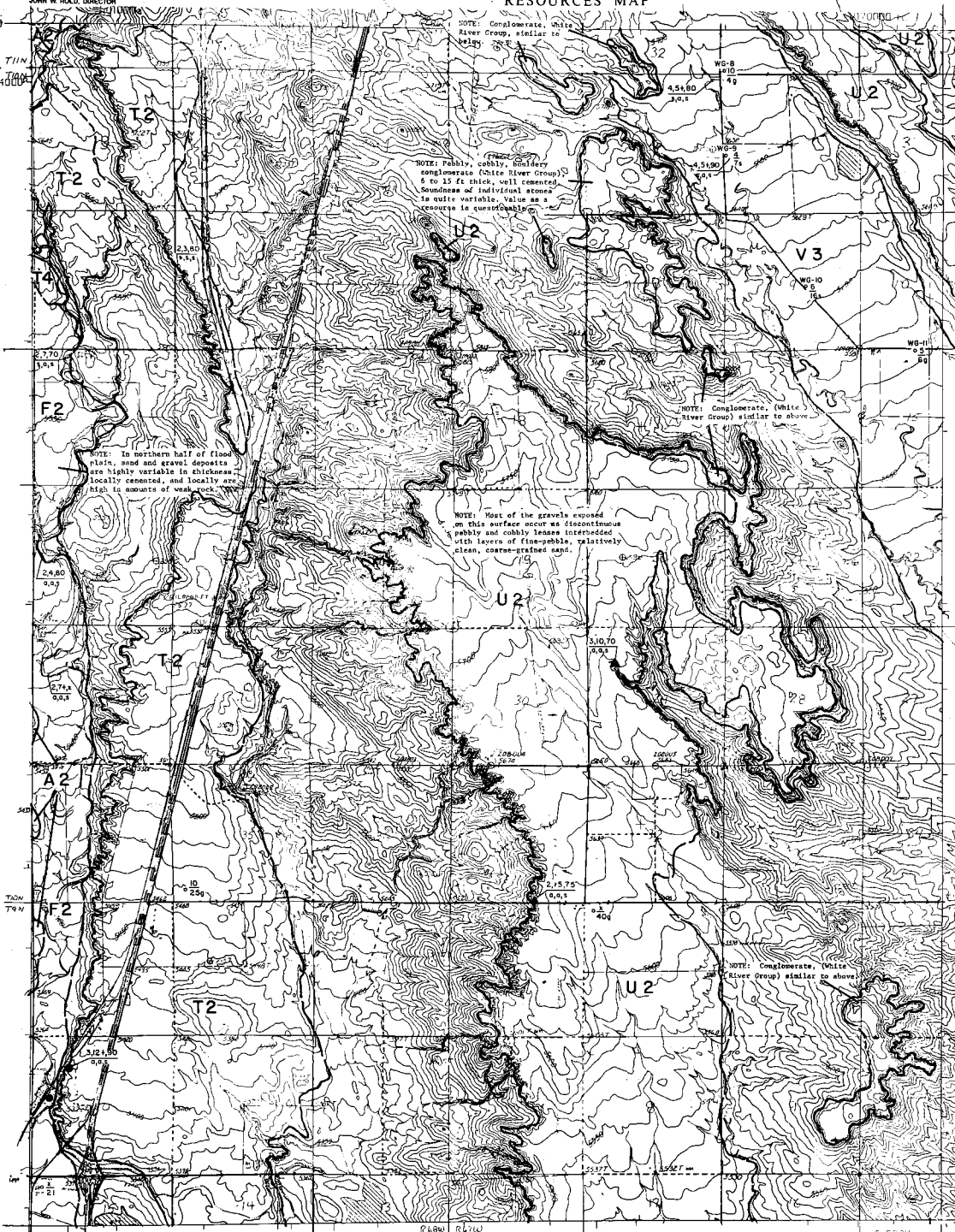
ROAD CLASSIFICATION  
Primary highway, Light-duty road, hard surface  
Hard surface, Improved surface  
Secondary highway, Hard surface  
Unimproved road  
Interstate Route, U.S. Route, State Route

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

CONTOUR INTERVAL, 10 FEET

SAND, GRAVEL AND QUARRY AGGREGATE  
RESOURCES MAP

EATON 2 SW



EXPLANATION

- LEGEND**
- CONTOUR LINE**  
Resource classification
- LANDFORMS**
- F Floodplain deposit
  - T Tertiary terrace deposit
  - V Valley fill (F & T)
  - U Unconsolidated
  - A Alluvial fan
  - E Eolian deposit (sand dunes)
  - M Mudslope deposits (slag, tailings, spilla...)
- RESOURCE CLASSIFICATION**
- Gravel Aggregate**
- 1 Gravel: relatively clean and round
  - 2 Gravel: significant fines, decomposed rock, solution carbons
- Fill Aggregate**
- 1 Gravel: 75% passing #4 screen, 0% retained on #20 screen, visual estimation
  - 2 Sand
- Overburden Resource**
- 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 drillhole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
  - "u" indicates gravel; "s" indicates sand
  - "x" in symbol denotes unconsolidated or solution property
  - "m" denotes Colorado Geological Survey unconsolidated and gravel resource drill hole
  - Landform boundary, with where known or observed; shaded where approximate or inferred
- STATUS, LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOLS**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - current sand and fines (passing #4 screen, 0.075 in., visual estimation)
  - significant amount of fines (passing #20 screen, 0.0075 in. or 0.075 mm)
  - significant amount of decomposed or weak rock
  - significant amount of solution carbons (indicate) without property
  - "u" in symbol denotes unconsolidated or solution property
  - "s" in symbol denotes property sand or gravel/sand



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

**REFERENCE:**  
Areas of conglomerate outcrop adopted in part from Hareless, L.A., and Schneider, P.A., Jr., 1971. Geologic map of the lower Cache la Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-687.

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

**ROAD CLASSIFICATION**

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

EATON 2SW (05) COLO.

CONTOUR INTERVAL: 10 FEET

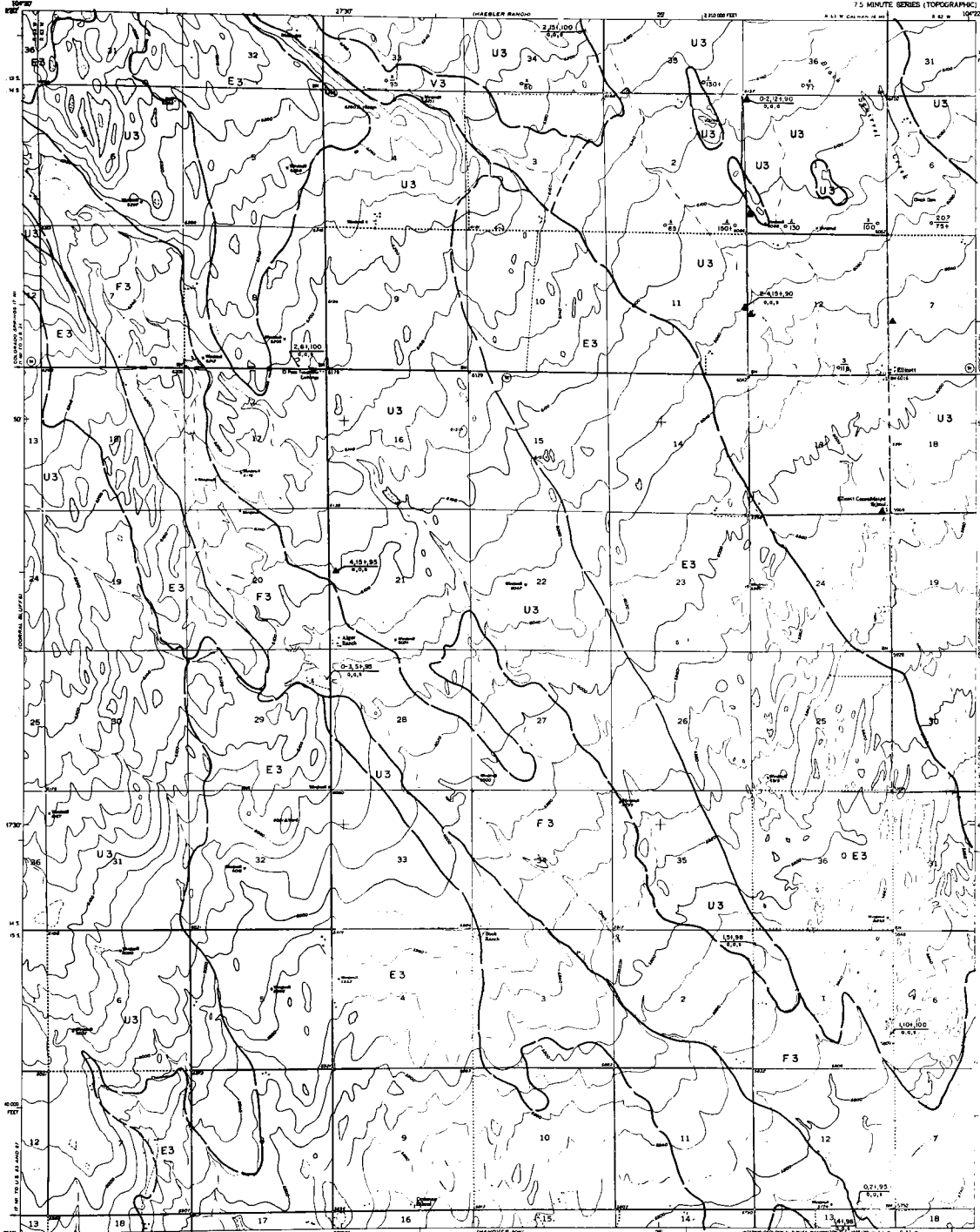




# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

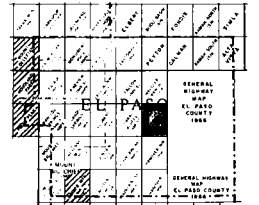
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. ROLD, DIRECTOR

ELLIOTT QUADRANGLE  
COLORADO-63, PASEO CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

- Landform units**  
Resource classification
- LANDFORM UNITS**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (V & T)  
U Upland deposits  
A Alluvial fan  
E Wind-suspended sand (eolian)  
M Non-mine deposits (slag, tailings, waste, etc.)
- RESOURCE CLASSIFICATION**  
COWLEY SANDHILLS  
(all listed are included on 1:62,500 scale, 7.5 minute series)  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed rock, calcine carbonate  
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 overburden thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs  
"u" indicates gravel; "s" indicates sand  
"u" in symbol denotes unconsolidated or unknown property  
"m" denotes Colorado Geological Survey Mineral Land and Crown Projects  
Well hole  
Landform boundary, solid where known or observed, dashed where approximate or inferred
- NOTATION, LOCATION AND GEOLOGICAL INFORMATION OF AREAS**  
Non-gravel thickness (ft)  
Sand/gravel resource thickness (ft)  
Percent sand and fines (assuming 4% carbon, 0.25 in. L, 0.075 mm)  
Significant amount of fines (assuming 100 percent, 0.002 in. or 0.075 mm)  
Significant amount of decomposed or weak rock  
Significant amount of micaceous carbonate (calcine)  
"u" in symbol denotes unconsolidated or unknown property  
"m" in symbol denotes property subject or insignificant

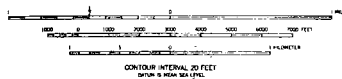


QUADRANGLE LOCATION  
NON-RESOURCE OR MITHERRANK AREA

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

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

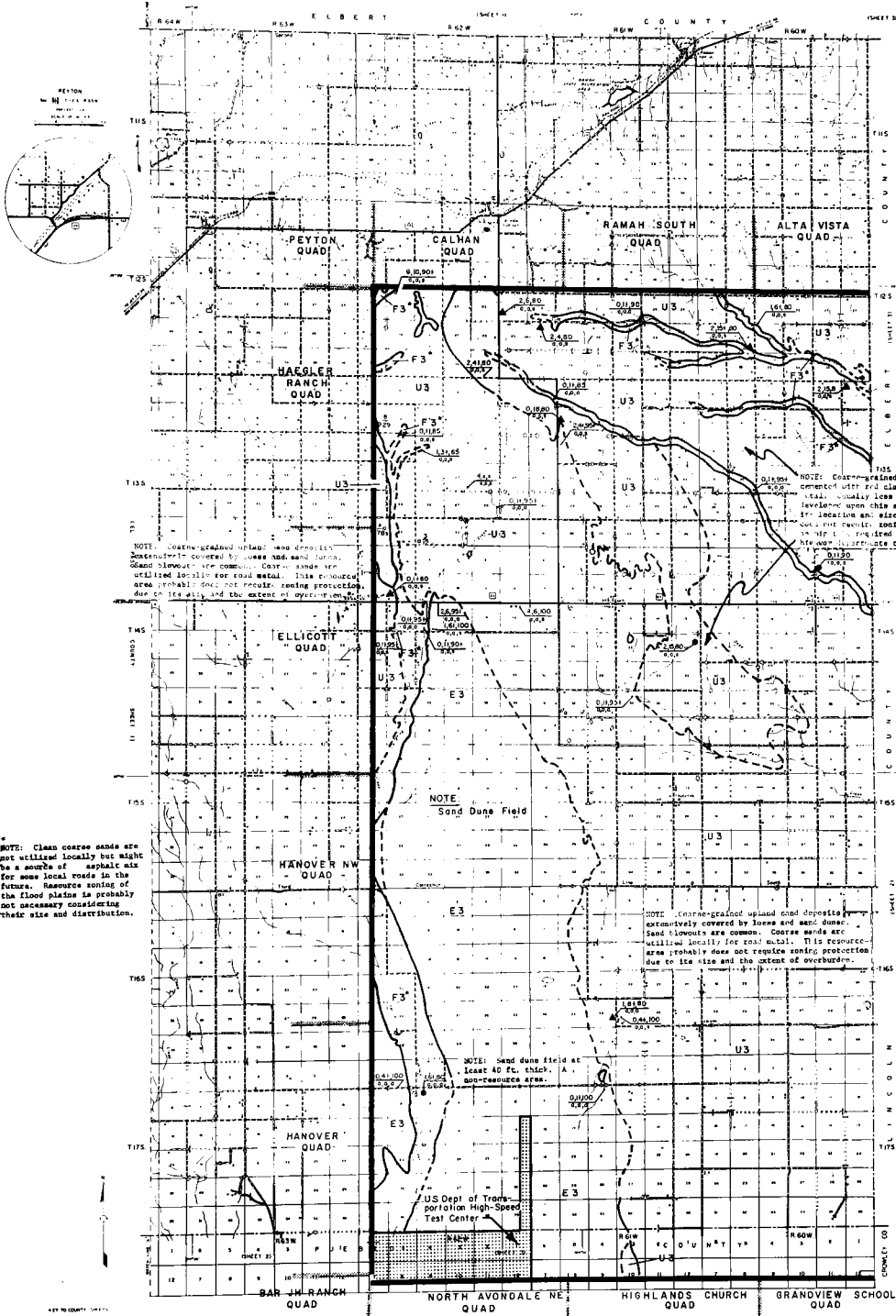
APPROXIMATE MEAN  
DECLINATION, 1984



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

ELLIOTT, COLO.

SAND, GRAVEL AND QUARRY AGGREGATE  
RESOURCES MAP



## EXPLANATION

$\begin{cases} \text{1. } x_1 \rightarrow \text{wird} \\ \text{2. } \text{wird} \rightarrow \text{classified} \end{cases}$

LANDFORM UNITS

- |   |                                      |
|---|--------------------------------------|
| F | Floodplain deposit                   |
| T | Savanna terrace deposit              |
| V | Valley fill (F & T)                  |
| U | Upland deposits                      |
| A | Alluvial fan                         |
| E | Eolian-deposited sand (eolian)       |
| M | Man-made deposits<br>(anthropogenic) |

#### RESOURCE CLASSIFICATION

- [illegible]

DATE: 1/14/68

- a Operating gravel and/or sand pit
- b Abandoned gravel and/or sand pit
- c Iterative stone quarry
- d Abandoned stone quarry
- e Potential quarry aggregate resource area
- f Selected well or drill-hole location with overburden thickness ( $\pm$ ) over sand/gravel resource thickness ( $\pm$ ), obtained from well logs.
- g "x" indicates gravel; "-" indicates sand
- h "x" symbol denotes unevaluated or unknown properties.
- i) Genesee Colorado Geological Survey Windfall/Hand and Crawl projects' drill hole
- j Uniform boundary, solid where known or observed; dashed where approximate or inferred

## STATION, LOCATION AND GEOLOGICAL

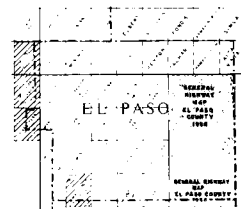
between thickness 100  
100 gms - 100 cm thickness 100  
100 gms - 100 cm thickness 100  
100 gms - 100 cm thickness 100  
100 gms - 100 cm thickness 100

- ↑ significant amount of fines (passing 120 mesh, 0.075 in. or 0.074 mm)
- ↑ significant amount of uncolored or weak rock
- ↑ significant amount of volcanic fragments

\* in special device investigated or unknown property

† in special device properly placed or tested

11. *Phragmites* (Common reed)


**QUADRANGLE LOCATION** NON-RESOURCE OR  
WITHDRAWN AREA

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

GENERAL HIGHWAY MAP  
EL PASO COUNTY  
COLORADO

STATE DEPARTMENT OF HIGHWAYS  
DIVISION OF HIGHWAYS - STATE OF COLORADO  
PLANNING AND RESEARCH DIVISION  
IN COOPERATION WITH THE  
U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

452 K. E. O. Eide et al.

1966  
 20175, 2000000 20175 20175-20175 20175 20175 20175

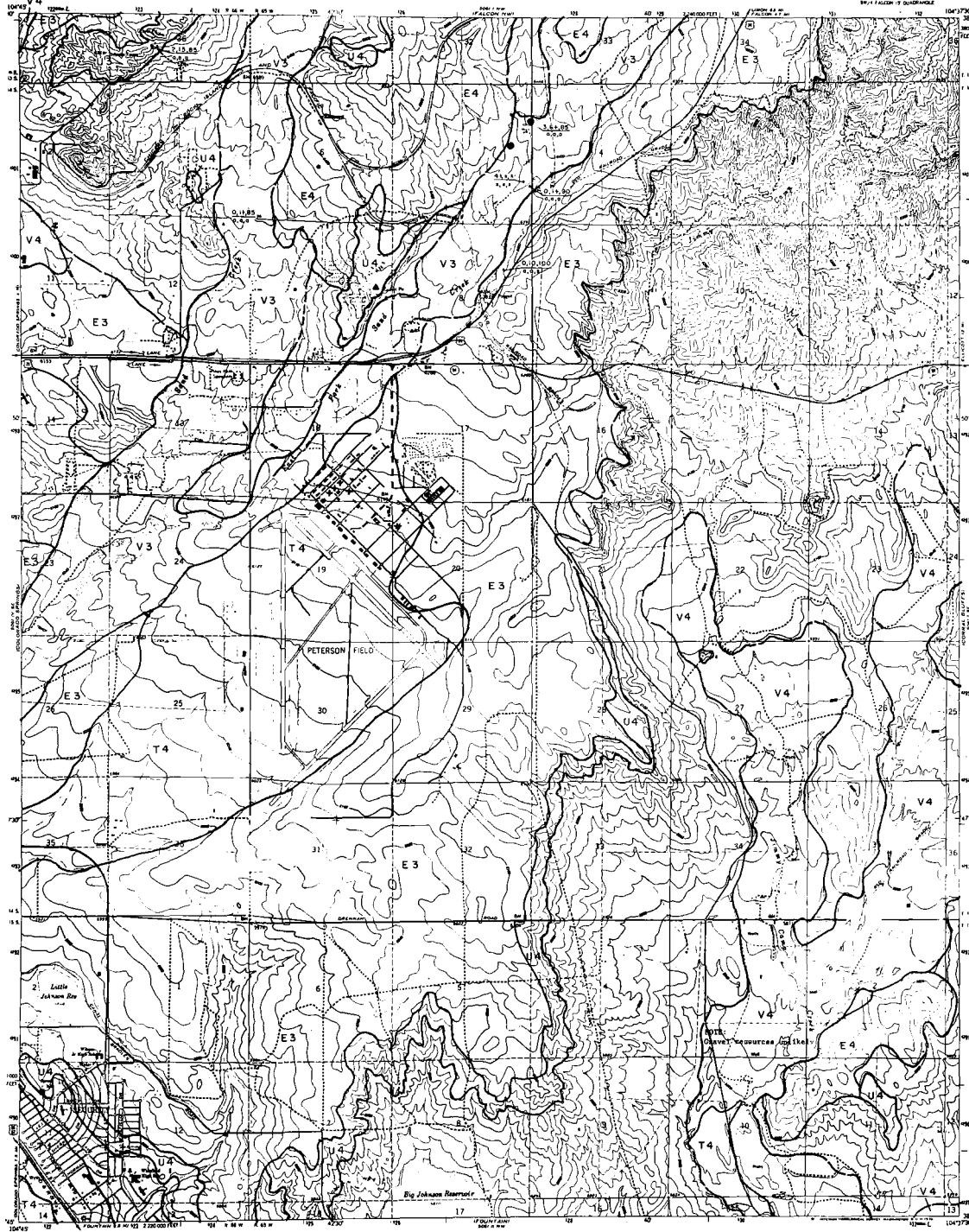
SECURITY INDEX OF THE UNITED STATES AS OF JANUARY 1980

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# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

ELSMERE QUADRANGLE  
COLORADO-EL PASO CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
8411 ALLEN 13 QUADRANGLE

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



## EXPLANATION

Contour interval  
Elevation 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 Man-made deposits (dike, tailings, spoil, etc.)

### RESOURCE CLASSIFICATION

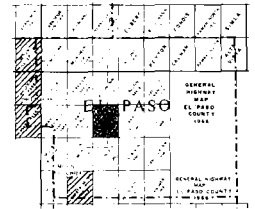
**Gravel resources**  
(at least 30% gravel on 44 screen, 44" maximum)  
1 Gravel: relatively clean and smooth  
2 Gravel: significant fines, decomposed rock, and/or calcareous  
**Sand resources**  
(greater than 75% passing 44 screen, 40% retained on 100 screen, 44" maximum)  
3 Sand  
**Unclassified resources**  
4 Probable aggregate resource

### MAP SYMBOLS

• Overlain gravel and/or sand pit  
• Abandoned gravel and/or sand pit  
• Operating stone quarry  
• Potential quarry aggregate resource area  
• Selected well or drill-hole location with measured thickness (ft) and sand/gravel resource thickness (ft); distance from well top:  
"s" indicates gravel; "s" indicates sand  
"u" in symbol denotes unclassified or unknown property  
"m" denotes Colorado Geological Survey mineral/land and gravel project  
• Well hole  
• Landform boundary, solid where known or dashed where approximate or inferred

### STATION, LOCATION AND TOPOGRAPHICAL

**THICKNESS OF ROCKS**  
— overburden thickness (ft)  
— sand/gravel resource thickness (ft)  
— gravel and fines passing 44 screen, 40% retained on 100 screen, 44" maximum  
— significant amount of fines (passing 100 screen, 40% retained on 100 screen, 44" maximum)  
— significant amount of decomposed or weak rock  
"u" in symbol denotes unclassified or unknown property  
"m" in symbol denotes property absent or unspecified



■ QUADRANGLE LOCATION  
▨ NON-RESOURCE OR WETLAND AREA

Geology modified after Scott, G.N. & Ubus, R.A. 1975, Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, M-482.  
Tribble, D.E., and Fitch, R.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-537 A.

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

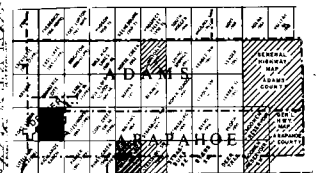
ELSMERE, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

ENGLEWOOD QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

- LANDFORMS**
- F Pleistocene deposit
  - T Tertiary terrace deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (aeolian)
  - M Holocene deposits (slag-tailings, spilla...)
- MINERAL CLASSIFICATION**
- Gravel**
- 1 Gravel: relatively clean and round
  - 2 Gravel: significant fines, decomposed rock, calcareous
- Fine aggregate**
- 3 Sand
- Quarry aggregate**
- 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 indicated with an outline (area showing as burden thickness 175' over assigned resource thickness 175', outlined from well logs)
  - "a" indicates gravel; "s" indicates sand
  - "u" in symbol denotes unevaluated or unknown quantity
  - See Denver Geological Survey Mineral and Gravel Project 1971-74
  - Level on map, well logs, or other sources of information should be used to determine actual resource thickness
- STATION, LOCATION AND ORIENTAL**
- SECTION OF MAP**
- overburden thickness (ft)
  - burden thickness (ft)
  - significant amount of fines (passing #100 screen, 0.0075 in. or 0.25 mm)
  - significant amount of decomposed or weak rock
  - significant amount of calcareous material
  - "u" in symbol denotes unevaluated or unknown quantity
  - "a" in symbol denotes property shown on map



QUADRANGLE LOCATION

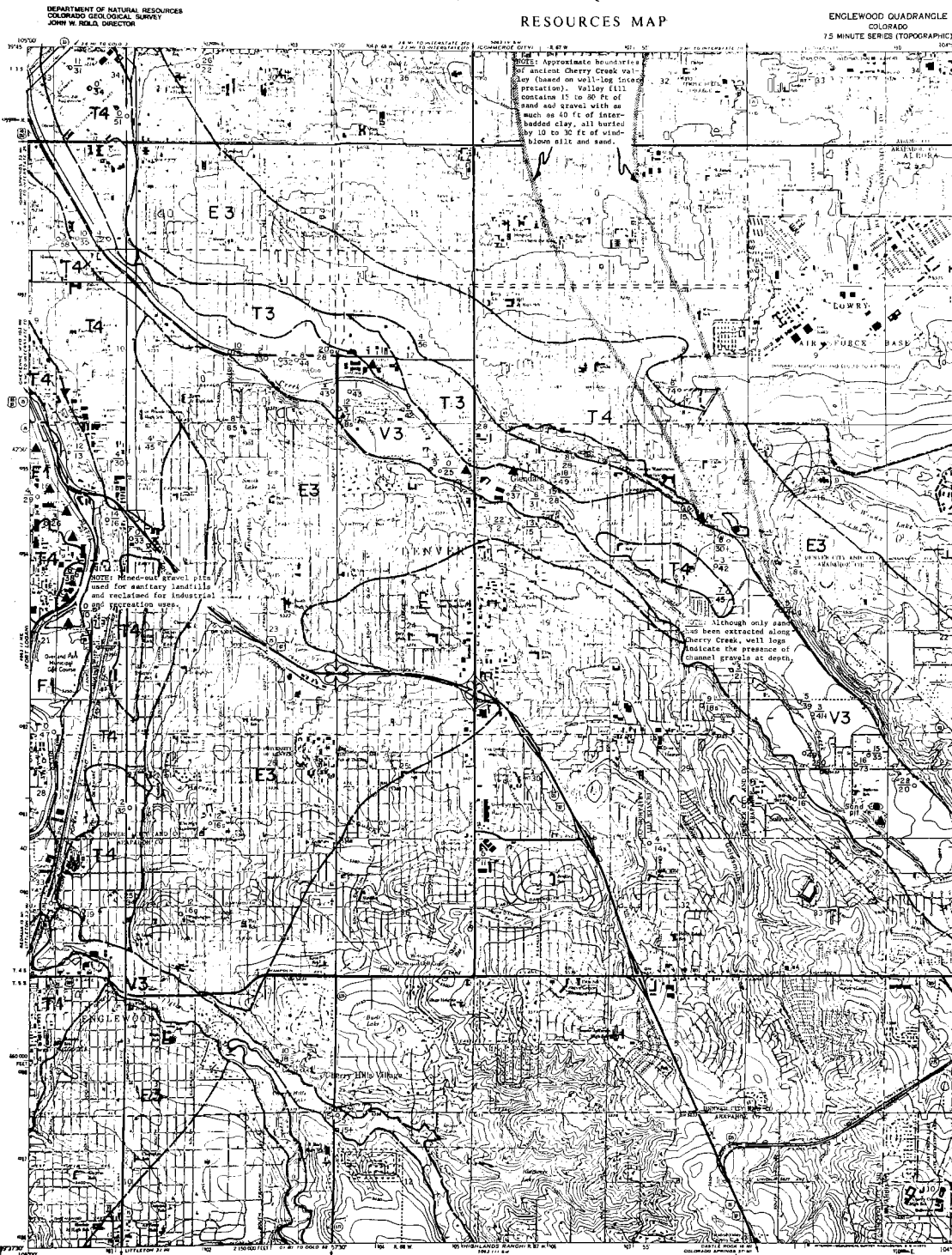
NON-RESOURCE OR WITHDRAWN AREA

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

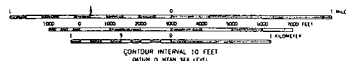
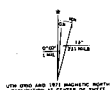
**References:**  
Inter-County Regional Planning Commission, 1961, Drainage course plan for the Denver region - Part 1, Sand and gravel resources: Denver, Colo., Inter-County Reg. Plan. Comm., pl. 1.  
Hamilton, J.L., and Owens, W.C., 1972, Geologic aspects, soils and related foundation problems, Denver 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. Map 1-731.  
Trumble, D.W., and Pitch, W.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. Map 1-856-A.

Map 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



CONTOUR INTERVAL, 10 FEET  
OPTION 0 MEAN SEA LEVEL



**ROAD CLASSIFICATION**

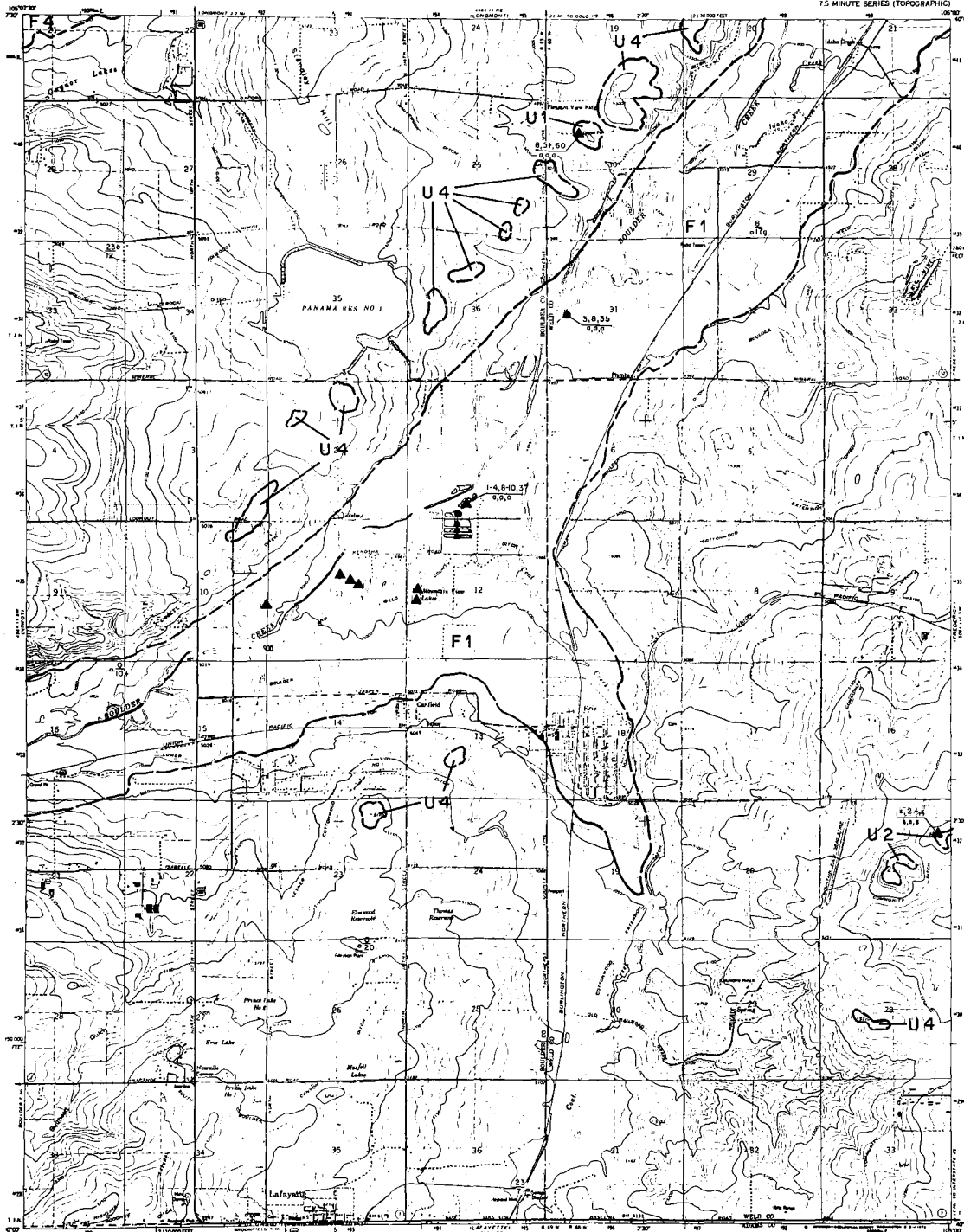
- Heavy-duty
- Medium-duty
- Interstate Route
- U.S. Road
- State Road
- Light-duty
- Unimproved PI

ENGLEWOOD, COLO.  
7-1/2 MINUTE SERIES  
1963  
PHOTOGRAPHED 1971  
AND MAP 11-1-856-A

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

ERIE QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

- Legend:**  
 (Symbol) Land use  
 (Symbol) Resource classification
- LAND USE**  
 F Floodable deposit  
 T Steep terrain deposit  
 V Valley fill (F & T)  
 U Upland deposit  
 A Alluvial fan  
 E Eolian deposit and (colluvium)  
 M Man-made deposits (colluvium, debris, etc.)
- RESOURCE CLASSIFICATION**  
 (1) **Gravel**  
 (a) About 100% gravel on 10 acres, (visual estimation)  
 1 Gravel: relatively clean and sand  
 2 Gravel: significant fines, decomposed rock, calcareous  
 3 Sand  
 (b) **Gravel**  
 (a) About 100% gravel on 10 acres, (visual estimation)  
 1 Gravel: relatively clean and sand  
 2 Gravel: significant fines, decomposed rock, calcareous  
 3 Sand  
 (c) **Gravel**  
 (a) About 100% gravel on 10 acres, (visual estimation)  
 1 Gravel: relatively clean and sand  
 2 Gravel: significant fines, decomposed rock, calcareous  
 3 Sand
- HOW SYMBOLS**  
 (Symbol) Operating gravel and/or sand pit  
 (Symbol) Abandoned gravel and/or sand pit  
 (Symbol) Operating stone quarry  
 (Symbol) Abandoned stone quarry  
 (Symbol) Potential quarry aggregate resource area  
 Selected well or drill-hole location with over-  
 burden thickness (ft) over sand and gravel resource  
 thickness (ft); obtained from well logs  
 "r" indicates gravel; "s" indicates sand  
 "u" in symbol denotes unconsolidated or  
 unknown property  
 "w" denotes Colorado Geological Survey  
 Window/road and gravel projects  
 drill hole  
 Landform boundary, solid where known or  
 observed; dashed where approximate or  
 inferred
- STATION LOCATION AND GEOLOGICAL  
DESCRIPTION OF DEPOSIT**  
 (Symbol) overburden thickness (ft)  
 (Symbol) sand/gravel resource thickness (ft)  
 (Symbol) percent sand and fines (passing #10  
 screen, 0.075 in.), visual estimation  
 (Symbol) significant amount of fines (passing  
 #100 screen, 0.003 in. or finer)  
 (Symbol) significant amount of decomposed or weak rock  
 (Symbol) significant amount of calcareous materials (caliche)  
 "r" in symbol denotes unconsolidated or  
 unknown property  
 "w" in symbol denotes property owned  
 or leased/owned

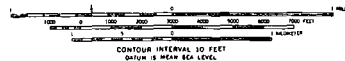
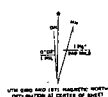


**QUADRANGLE LOCATION**  
 (Symbol) NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:  
 Colton, R.B., and Fitch, H.R., 1974. Map  
 showing potential sources of gravel and  
 crushed-rock aggregates in the Boulder-  
 Fort Collins-Greeley Area, Front Range  
 Urban Corridor, Colo.: U. S. Geol. Survey  
 Misc. Geol. Inv. Map 1-555-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  
 Medium-duty  
 Light-duty  
 Unimproved dirt  
 U.S. Route  
 State Route

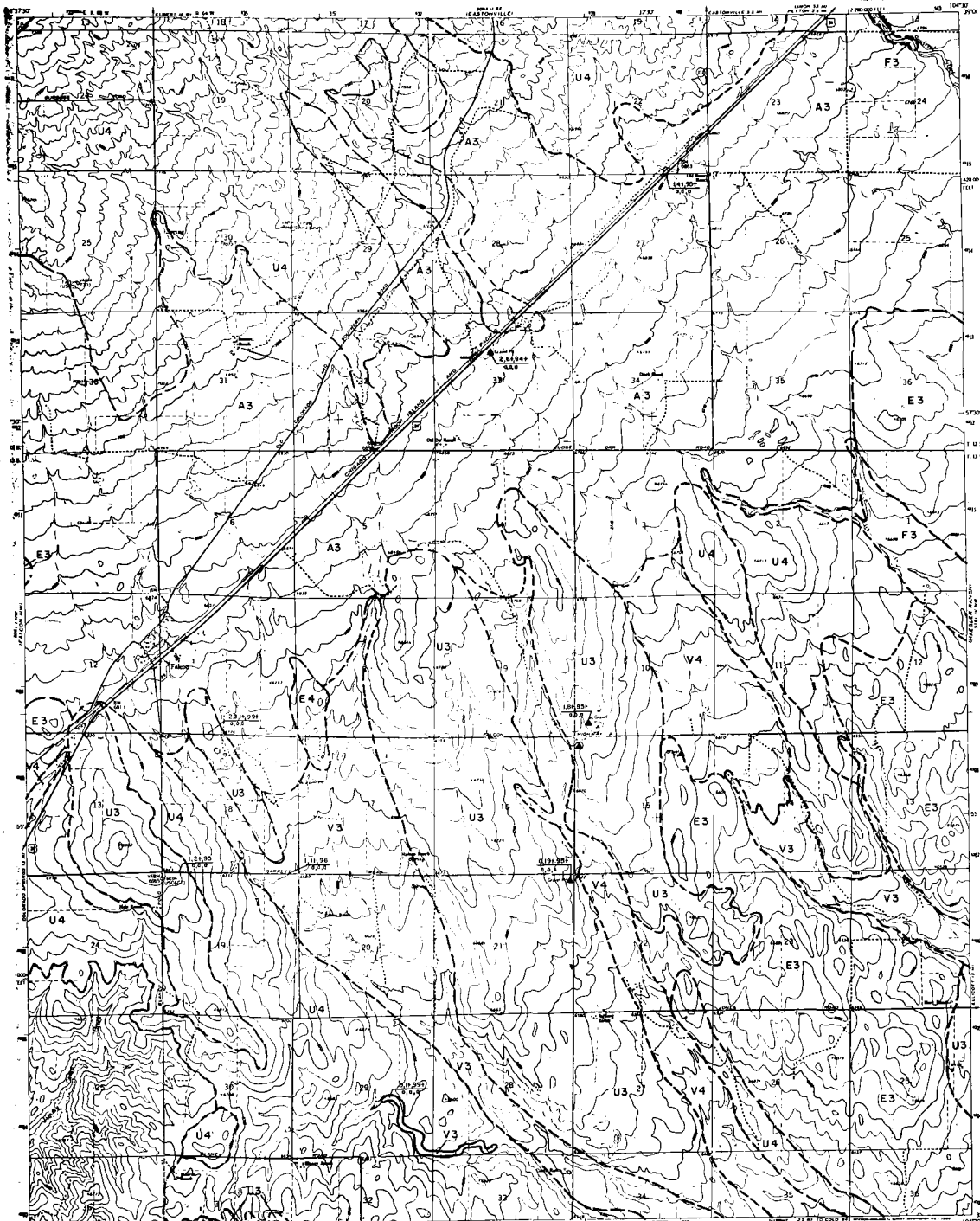
ERIE, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

FALCON QUADRANGLE  
COLORADO—EL PASO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
1:250,000 SCALE



## EXPLANATION

Landform units  
Resource classification

### LANDFORM UNITS

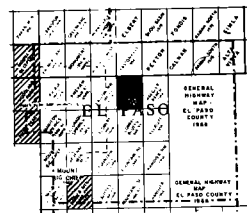
- F Fluvial deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Marine deposits (beach, dune, etc.)

### RESOURCE CLASSIFICATION

- Gravel Deposits**  
(as shown on 1:250,000 scale map)  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, calcareous carbonate  
**Sand Deposits**  
(as shown on 1:250,000 scale map)  
3 Sand  
**Regulated Resources**  
4 Probable aggregate resource

### MAP SYMBOLS

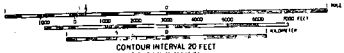
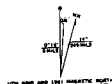
- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- "u" indicates gravel, "v" indicates sand
- "u" in symbol denotes unconsolidated or unknown deposit
- "m" denotes Colorado Geological Survey Mineral/Stone and Gravel project's drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF DUMPS**  
  - overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines (percent of coarse, 0.075 mm., sieve retention)
  - significant amount of fines (percent 100 mesh, 0.002 in. or finer)
  - significant amount of decomposed or weak rock
  - significant amount of calcareous carbonate (caliche)
  - "u" in symbol denotes unconsolidated or unknown deposit
  - "v" in symbol denotes properly sorted or significant



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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

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

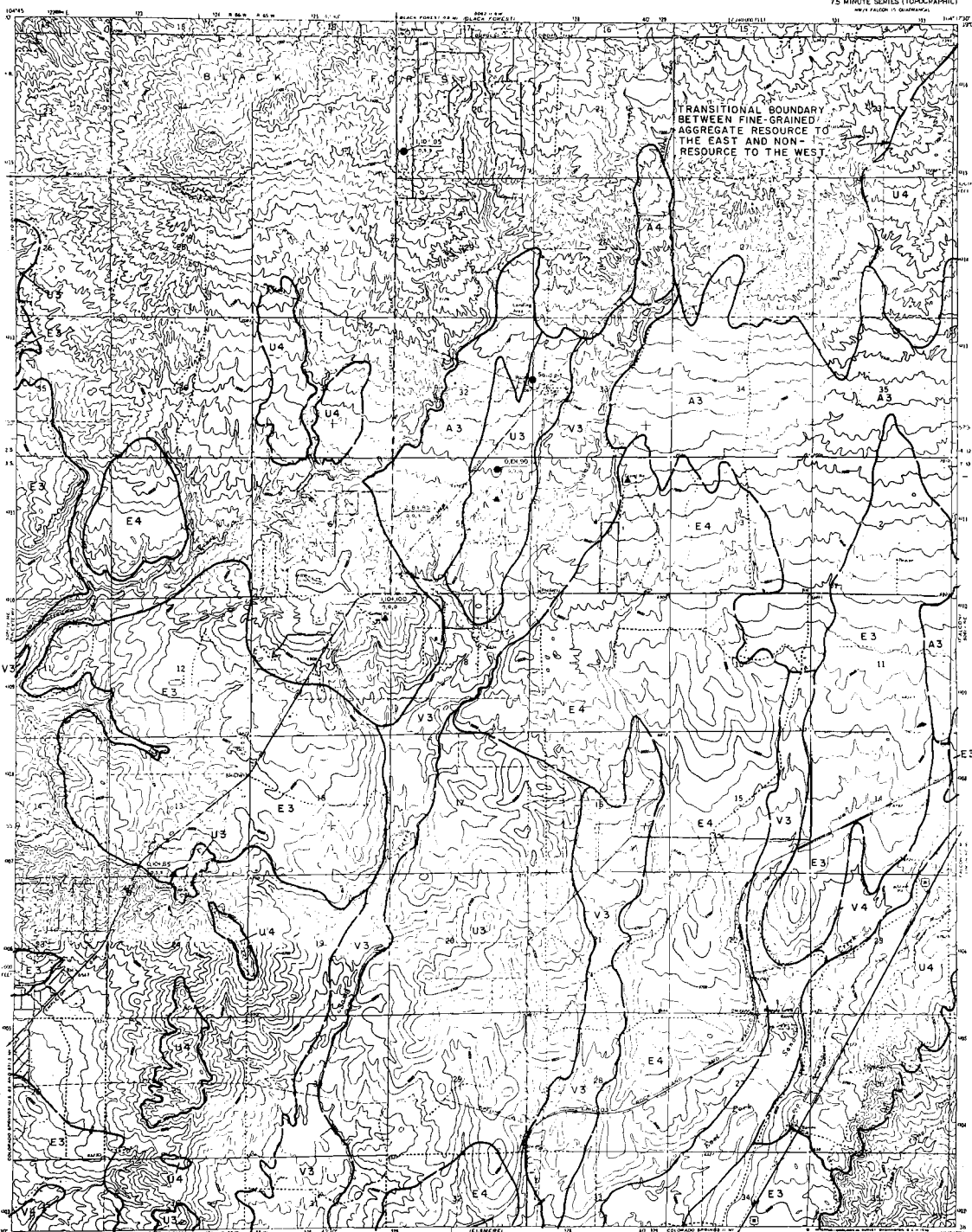


ROAD CLASSIFICATION  
Heavy duty  
Light duty  
Unimproved dirt  
U.S. Route  
State Route  
FALCON, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

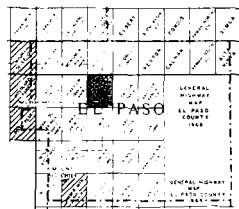
FALCON NW QUADRANGLE  
COLORADO EL PASO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
NORTH ARROW

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



## EXPLANATION

- Landform Unit**  
Resource Classification
- LANDFORM UNIT**  
F Floodplain deposit  
T Trough terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Non-mine deposits (slag, tailings, waste, etc.)
- MINERAL CLASSIFICATION**  
Gravel Aggregate  
(at least 25% retained on 48 screen, actual distribution)  
1 Gravel: relatively clean and well  
2 Gravel: significant fines, decomposed rock, cation rich  
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 deep hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) indicated from well logs  
"s" indicates gravel; "m" indicates sand  
"u" in symbol denotes unevaluated or unknown properties  
"w" denotes Colorado Geological Survey Waterflood and/or gravel projects drill hole  
Landform boundary, solid where known or dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL EXPLANATION OF SYMBOLS**  
northward thickness (ft)  
sand/gravel thickness (ft)  
Isolated well and hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) indicated from well logs  
"s" indicates gravel; "m" indicates sand  
"u" in symbol denotes unevaluated or unknown properties  
"w" denotes Colorado Geological Survey Waterflood and/or gravel projects drill hole  
Landform boundary, solid where known or dashed where approximate or inferred



- QUADRANGLE LOCATION**  
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, G.R., & Mobus, R. A. 1973. Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, 1:50,000.

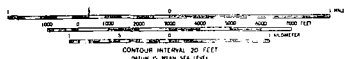
**REFERENCE:**  
Tribble, D.E., and Petch, R.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-537 A.

Map 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

UTM GRID AND TRUE NORTH  
DECLINATION AT CENTER OF SHEET



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

FALCON NW, COLO

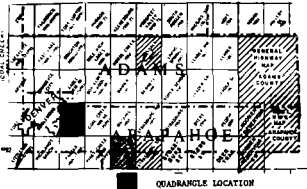
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

FITZSIMONS QUADRANGLE  
75 MINUTE SERIES (TOPOGRAPHIC)  
COLORADO

## EXPLANATION

- 1:25,000 scale
- LITHOLOGY**
- F Fluvial deposit
  - T Tertiary deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E High-dissection sand (colluvial)
  - M High-dissection sand (colluvial)
  - N High-dissection sand (colluvial)
- AGGREGATE CLASSIFICATION**
- 1 Gravel, well-sorted, clean and sound
  - 2 Gravel, well-sorted, clean and sound, decomposed rock, calcareous materials
  - 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
  - Isolated well-sorted fluvial deposit with overburden (thickness 10' or more sand/gravel resource)
  - Isolated well-sorted fluvial deposit with overburden (thickness 10' or more sand/gravel resource)
  - "a" in symbol denotes unconsolidated or unknown provenance
  - "b" denotes Colorado Geological Survey field/road and gravel projects
  - Landform boundary, well shown or observed, dashed where approximate or inferred
- STATUS, LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE**
- "a" in symbol denotes fluvial
  - "b" in symbol denotes fluvial
  - "c" in symbol denotes fluvial
  - "d" in symbol denotes fluvial
  - "e" in symbol denotes fluvial
  - "f" in symbol denotes fluvial
  - "g" in symbol denotes fluvial
  - "h" in symbol denotes fluvial
  - "i" in symbol denotes fluvial
  - "j" in symbol denotes fluvial
  - "k" in symbol denotes fluvial
  - "l" in symbol denotes fluvial
  - "m" in symbol denotes fluvial
  - "n" in symbol denotes fluvial
  - "o" in symbol denotes fluvial
  - "p" in symbol denotes fluvial
  - "q" in symbol denotes fluvial
  - "r" in symbol denotes fluvial
  - "s" in symbol denotes fluvial
  - "t" in symbol denotes fluvial
  - "u" in symbol denotes fluvial
  - "v" in symbol denotes fluvial
  - "w" in symbol denotes fluvial
  - "x" in symbol denotes fluvial
  - "y" in symbol denotes fluvial
  - "z" in symbol denotes fluvial



QUADRANGLE LOCATION

NON-RESOURCE OR  
ULTRAMAFIC AREA

## REFERENCE:

Wright, D.E., and Petch, R.H. 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-330-A.

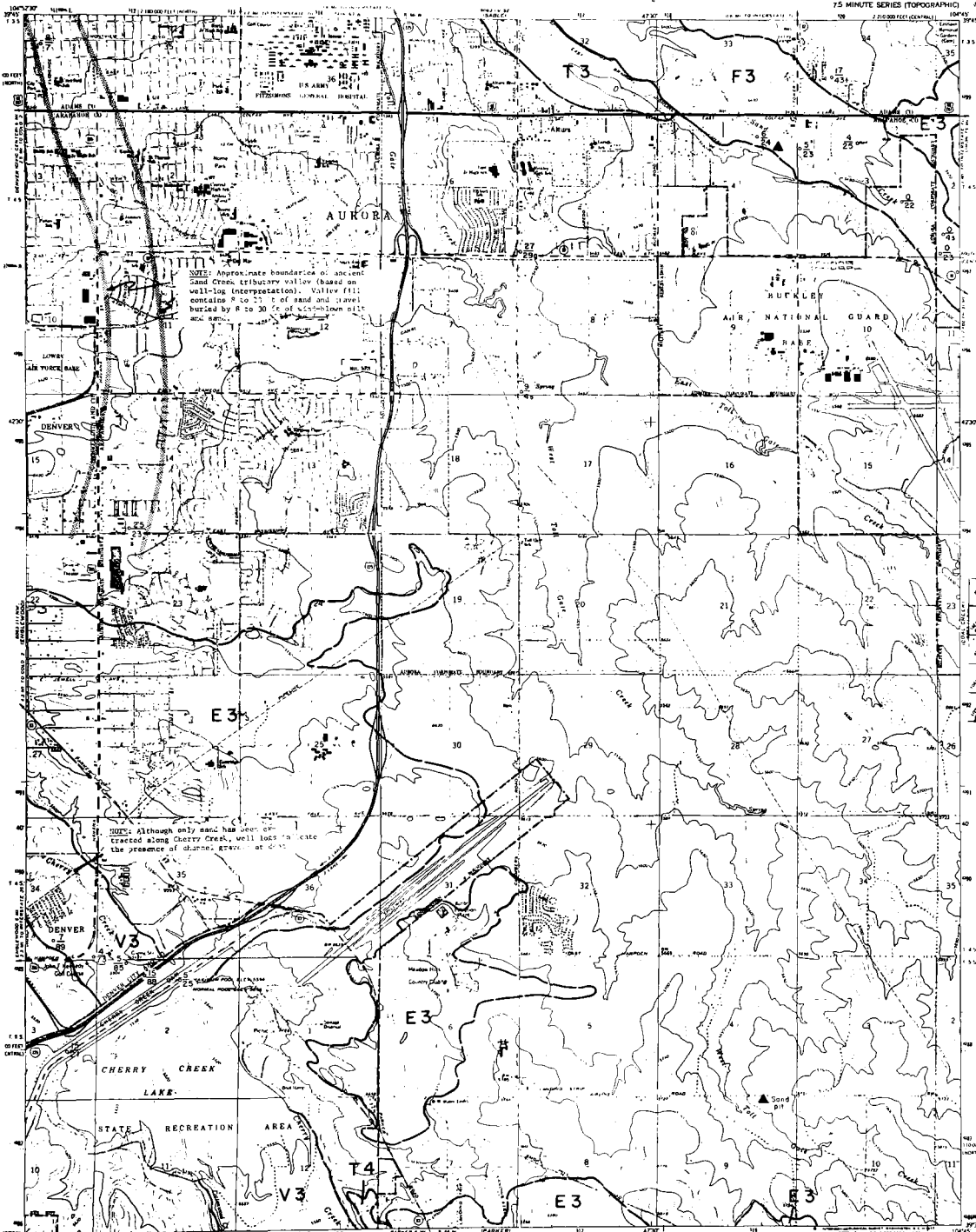
Chase, G.H., and McConaghy, J.A. 1972. Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map T-731.

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.

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



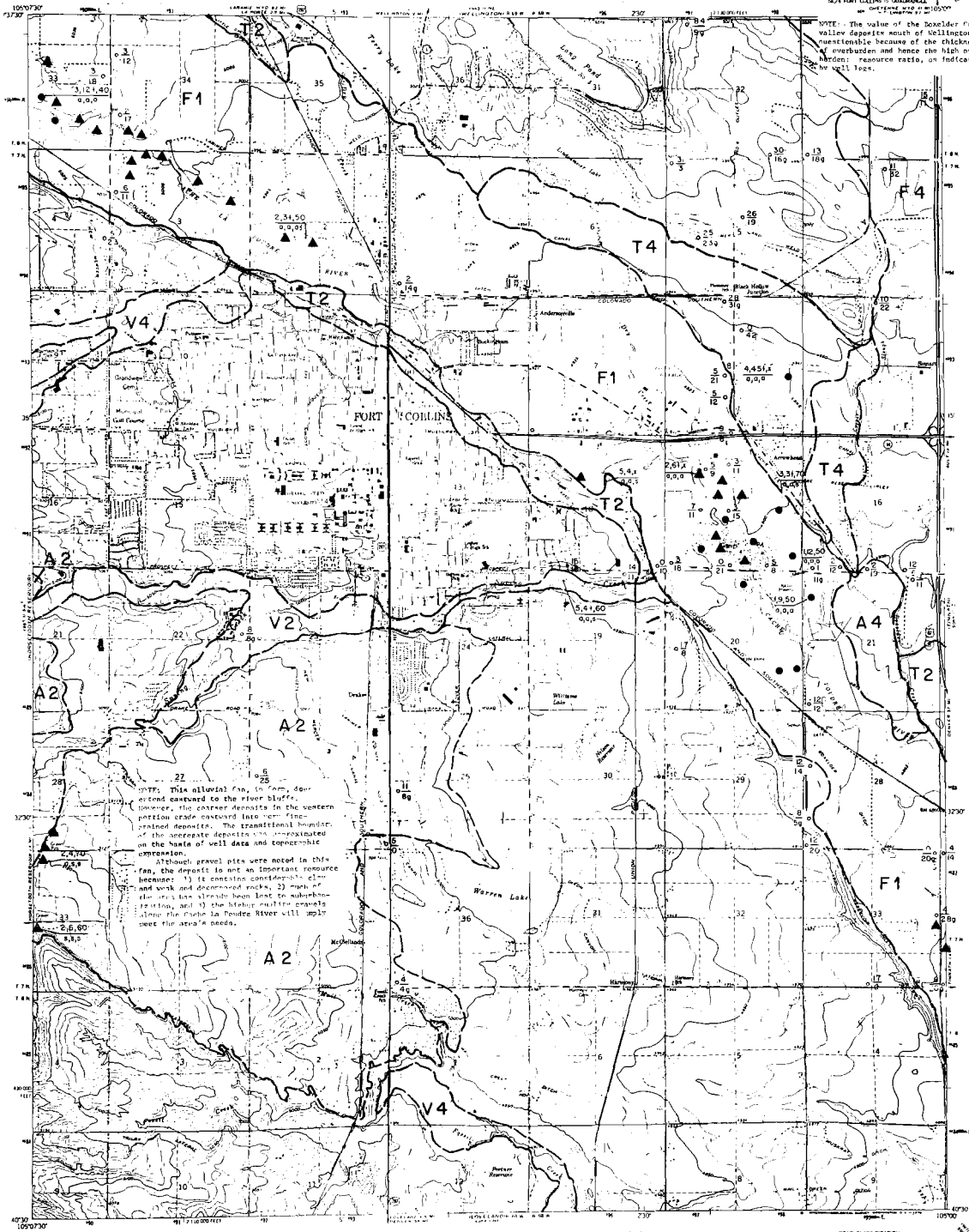
ROAD CLASSIFICATION

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

FITZSIMONS, COLO.

FORT COLLINS QUADRANGLE  
COLORADO-LAPIMER CD  
7.5 MINUTE SERIES (TOPOGRAPHIC)

NOTE: The value of the Boxelder Creek valley deposits south of Wellington is questionable because of the thickness of overburden and hence the high overburden: resource ratio, as indicated by well logs.



- └ Localism unit
- └ See across classification

- LANDFORM UNITS
- F Floodplain deposit  
T Stream terrace deposit  
V Valler fill (F & T)  
  
U Upland deposits  
A = Alluvial fan  
E Wind-deposited sand (eolian)  
M Man-made deposits  
(aircraft, military, waste, ...)

RESOURCE CLASSIFICATION

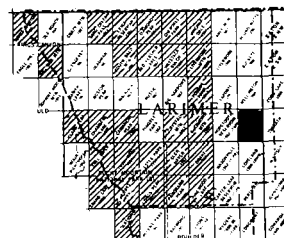
- Coarse Aggregate  
at least 2% retained on # 4 screen,  
usual distribution
- 1 Gravel relatively clean and sound
  - 2 Gravel significant fines, decomposed rock, calcium carbonate.
- Fine Aggregate  
passing thru # 4 screen at above, 10%  
retained on # 20 screen, usual distribution
- 3 Sand
- Unconsolidated Aggregate
- 4 Possible aggregate removal



#### MANUSCRIPT

- 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 no  
burden thickness (1) over sand/gravel resource  
thickness (2), obtained from well logs.
- "a" indicates gravel; "s" indicates sand
- "u" in symbol denotes unevaluated or  
unknown property.
- "w" denotes Colorado Geological Survey  
"Window/Hand and Gravel projects"  
drill hole
- Landform boundary, solid where known or  
observed; dashed where approximate or  
inferred

## STATION, LOCATION AND GEOLOGICAL

- DESCRIPTION OF DEPOSIT**
- ✓ not under duress (if)
  - ✓ not given pursuant to duress (if)
  - ✓ person sound and free (appears to be) (if not, state otherwise)
  - ✓ significant amount of time (appears to be) (if not, state otherwise)
  - ✓ significant amount of dispositive or work work
  - ✓ sufficient amount of address assistance facilities
- \* in symbol denotes unrelated or unknown property  
 \* in symbol denotes property absent or insignificant



-  QUADRANGLE LOCATION  
 NON-RESOURCE OR  
 UPTURNING AREA

#### REFERENCE

- Suwa, P. B., III, 1972. Geol. map of surficial geology of the Fort Collins quadrangle: Recon. mapping for Colorado Geol. Survey Windsor Environmental Geology Project, open-file map.
- Ching, P.-W., 1972. Economic gravel deposits of the lower Cache la Poudre River: Colorado State Univ. Unpub. Master Sch. Thesis.
- Shelton, D.C., 1974, personal communication.
- Hershey, L. A. and Schneider, P. A. 1972. Geological map of the lower Cache la Poudre River basin, north-central Colorado. Colorado Geol. Survey NMRG Geol. Inv. Map #-1687.

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-Greeley Area, Front Range Urban Corridor, Colorado, U.S. Geol. Survey Map T-844-B.

Mapped by: Stephen D. Schwachow  
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

FORT COLLINS, COLO.

- *category* unit
- *category* classification

Geology modified after

Hunt, C.B., 1954, *Platonicus Recent deposits* - to the Denver area, Colorado: U.S. Geol. Survey Bull. 936-c, pl. 3.

References

Inter-County Regional Planning Commission, 1961, *Designations counties plan for the Denver region* - a study of the Denver area, Colorado: Denver Chamber, Inter-County Reg. Plan. Comm., pl. 1.

Hamilton, J.L., and Owens, W.E., 1972, *Geologic aspects, soils and related foundations problems* - Denver, Colorado: Denver Chamber, Colorado Geol. Survey Environmental Geology Rept. 1, p. 1.

Chase, G.H., and McGeough, J.A., 1972, *Generalized surficial geologic map of the Denver area, Colorado*: U.S. Geol. Survey Misc. Geol. Surv. Map 1-731.

Trinkle, D.E., and Pritch, 1974, *Map showing potential areas of erosion, landslides and crushed-rock aggregate in the Greater Denver Area*, Front Range Urban Corridor, Gale, U. S. Geol. Survey Misc. Geol. Surv. Map 1-850-A.

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

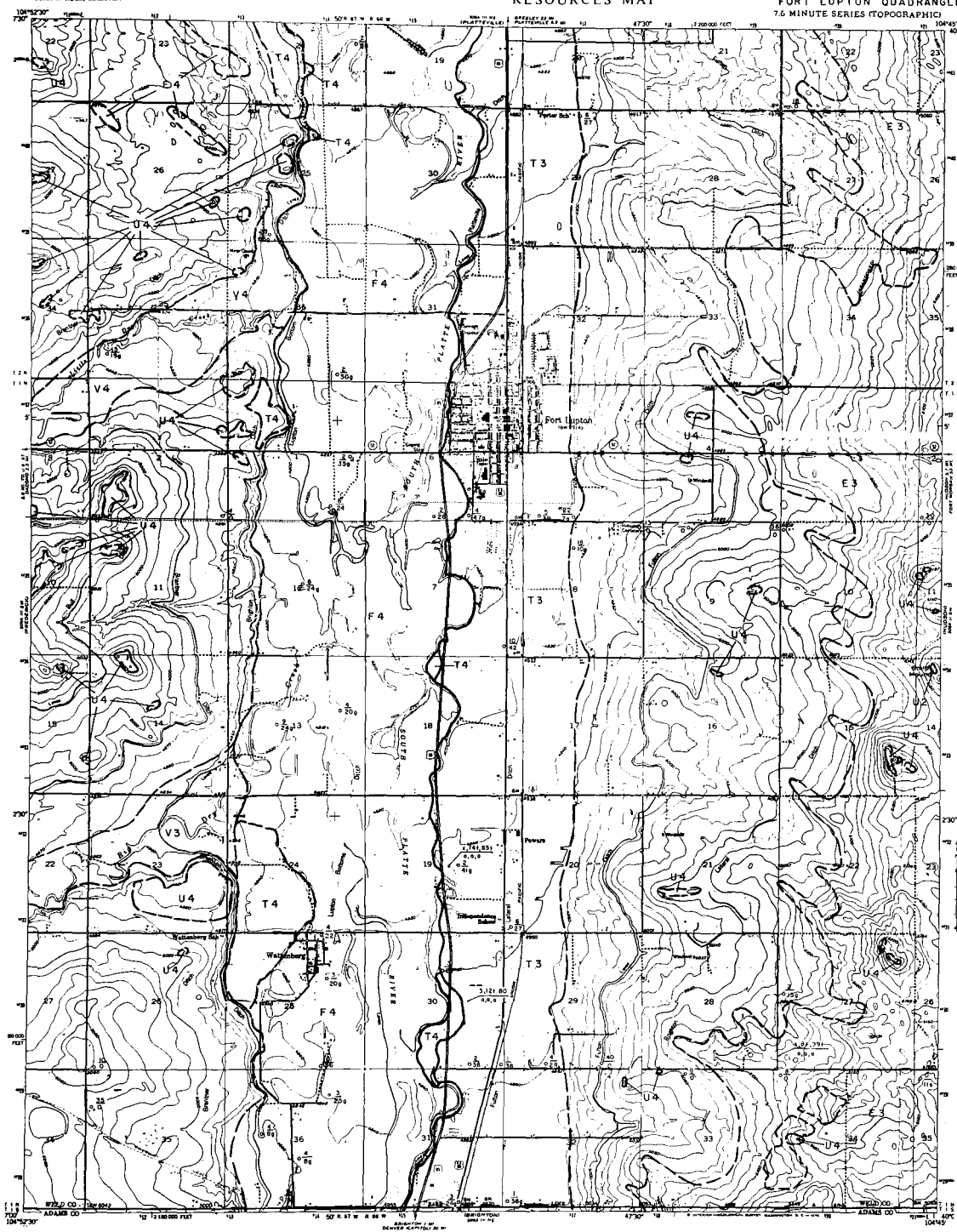
Prepared in cooperation with the  
U. S. Geological Survey.

FORT LOGAN, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

FORT LUPTON QUADRANGLE  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

Topographic units  
Resource class/function

**LANDFORM UNITS**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (U & T)  
U Upland deposit  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Non-made deposits (slag, tailings, spoil, etc.)

**RESOURCE CLASSIFICATION**  
**CRUDE ANALYSIS**  
1. Gravel: pit/runs, clean and round  
2. Gravel: significant fines, decomposed rock, calcium carbonate  
**FINE ANALYSIS**  
3. Sand: finer than 100 meshing 94 screen, 40% retained on 420 screen, visual estimation  
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 site  
Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource  
Thickness (ft) obtained from well logs  
"x" indicates gravel, "s" indicates sand  
"u" in symbol denotes unutilized or unknown property  
"w" denotes Colorado Geological Survey Wonderfield and Gravel project  
Drill hole  
Landform boundary, solid where known or inferred; dashed where approximate or inferred  
**LOCATION, LOCATION AND GEOLOGICAL INFORMATION OF DEPOSIT**  
Overburden thickness (ft)  
Sand/gravel resource thickness (ft)  
Percent sand and fines (ignoring 40 screen, 0.75 in., visual estimation)  
Significant amount of fines (ignoring 420 screen, 0.250 in. or 0.075 mm.)  
Significant amount of decomposed or weak rock  
Significant amount of silicon carbide (silica)  
"u" 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:

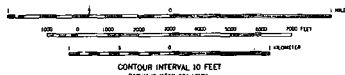
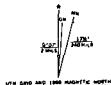
Colton, R.B., and Fitch, H.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Oreana Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map T-855 B.

Soister, P. E., 1965, U. S. Geological Survey Geological Quadrangle Map, CP-397.

Mapped by: Ralph B. 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 1:250,000 SCALE)

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

FORT LUPTON, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

FOUNTAIN QUADRANGLE  
COLORADO-EL PASO CO.  
75 MINUTE SERIES (TOPOGRAPHIC)  
BY: MONTANA 11 QUADRANGLE

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

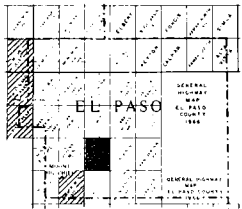
## EXPLANATION

Landform unit  
Resource classification

**LANDFORM UNITS**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Unfilled deposits  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Non-mine deposits (slag, tailings, spilla...)

**RESOURCE CLASSIFICATION**  
**Gravel resources**  
(at least 50% passing 48 screen, visual estimation)  
1 Gravel: relatively clean and sized  
2 Gravel: significant fines, unrounded rock, talus, carbonates  
**Sand resources**  
(greater than 20 passing 30 screen, 48 screen, 100 mesh, 200 mesh, 425 mesh, visual estimation)  
3 Sand  
**Detrital Resources**  
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) over sand/gravel resource thickness (ft), obtained from well logs  
"T" indicates presence of talus and sand  
"S" in symbol denotes unconsolidated or unknown property  
"M" denotes Colorado Geological Survey "Mineral Land and Forest" project  
"B" in symbol denotes boundary, wild where known or observed, dashed where approximated or inferred  
**STATION, LOCATION AND ORIENTATIONAL INDICATIONS OF QUARRY**  
overburden thickness (ft)  
sand/gravel resource thickness (ft)  
percent sand and fines (passing 48 screen, 0.075 in.), visual estimation  
significant amount of fines (passing 100 screen, 0.0075 in. or 0.075 mm.)  
significant amount of decomposed or weak rock  
significant amount of calcareous carbonate material  
"M" in symbol denotes unconsolidated or unknown property  
"B" in symbol denotes boundary, wild where known or observed, dashed where approximated or inferred

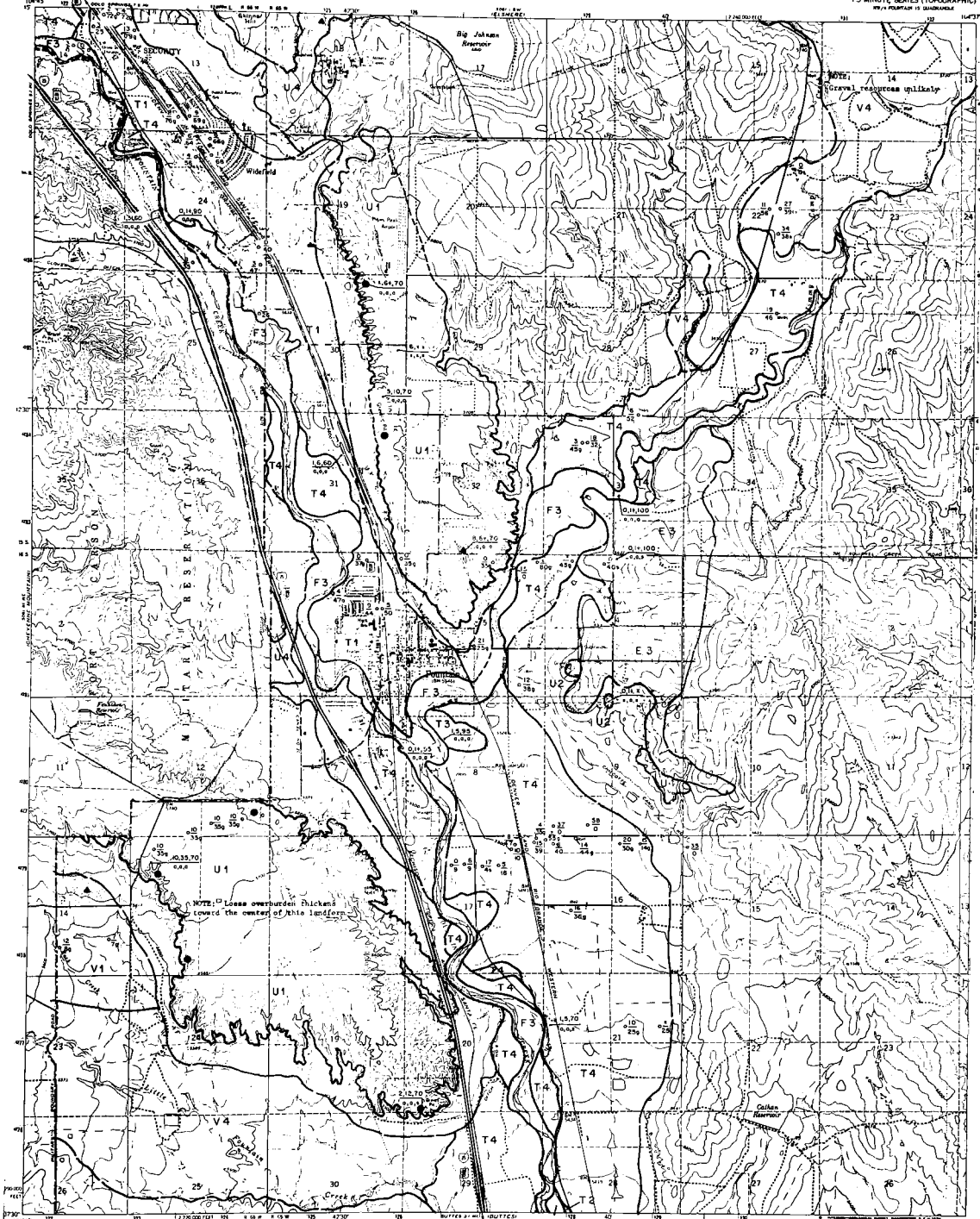


QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, G.R., & Hobbs, R.A. 1973. Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, 100-482.  
**REFERENCE**  
Trumble, U.E., and Fitch, H.A., 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.

Maped by: Phillip C. Wickline  
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 SEA LEVEL

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

FOUNTAIN, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

FOUNTAIN NE QUADRANGLE  
COLORADO-EL PASO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
40-1 (PARTIAL IN QUADRANGLE)

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

## 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 (slag, tailings, spoil, etc.)

**RESOURCE CLASSIFICATION**  
**CLAY SANDS**  
1. Clay: 15-20% sand, 80% clay, 10-15% silt, 1-2% gravel, 1-2% organic matter.  
2. Clay: 15-20% sand, 80% clay, 10-15% silt, 1-2% gravel, 1-2% organic matter.  
**FINE SANDS**  
1. Sand: 15-20% sand, 80% clay, 10-15% silt, 1-2% gravel, 1-2% organic matter.  
2. Sand: 15-20% sand, 80% clay, 10-15% silt, 1-2% gravel, 1-2% organic matter.

**UNCLASSIFIED RESOURCES**  
1. Possible 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  
Detected well or drillable location with over-  
burden thickness (ft) over sand/gravel resource  
thick as (ft), obtained from well logs.  
"x" indicates gravel, "u" indicates sand  
"s" is symbol denotes unclassified or  
unknown property.  
"w" denotes Colorado Geological Survey  
Watershed and/or County boundary.  
Landform boundary, solid where known or  
dashed where approximate or inferred.

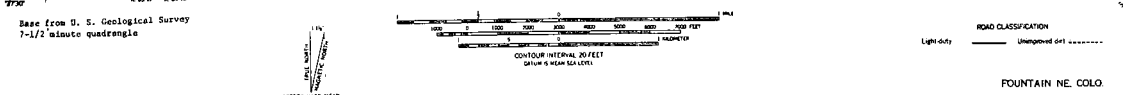
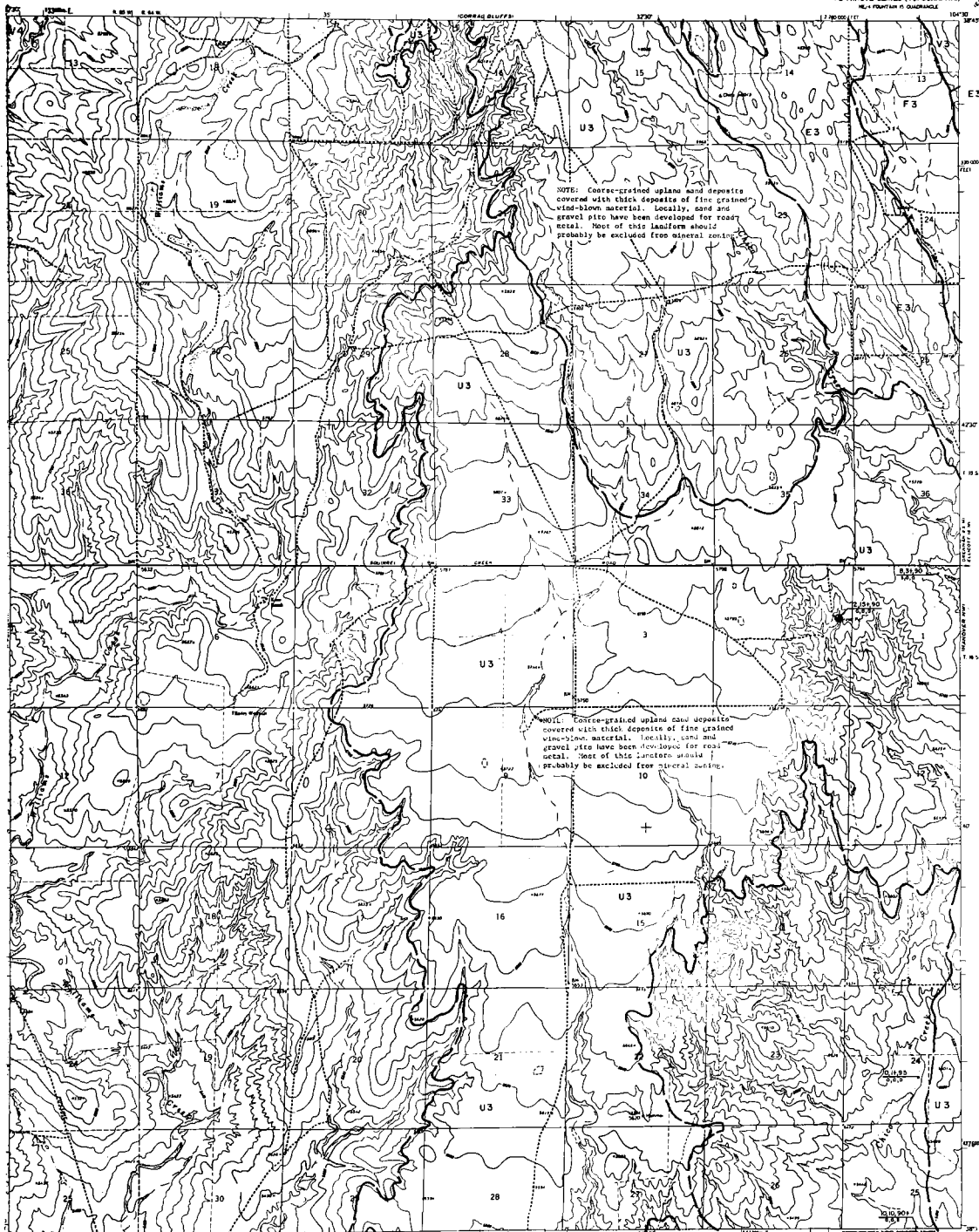
**STATION, LOCATION AND COORDINATE  
EXPLANATION OF SYMBOLS**  
Overburden thickness (ft)  
Sand/gravel thickness (ft)  
Percent sand and fines (passing #20  
screen, 7.5 in. 1, visual estimation)  
Significant amount of fines (passing  
#20 screen, 0.075 in. or 0.075 mm)  
Significant amount of decomposed or weak rock.  
Significant amount of mineral carbonate (calcite)  
"u" in symbol denotes unclassified or  
unknown property.  
"w" in symbol denotes property absent  
or unapplied.

**QUADRANGLE LOCATION**  
NON-RESOURCE OR  
WILDERNESS AREA

EL PASO  
COUNTY  
COLORADO

QUADRANGLE LOCATION  
NON-RESOURCE OR  
WILDERNESS AREA

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



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

FOUNTAIN SE QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
SCALE: FOUNTAIN SE QUADRANGLE

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

## 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 Hummock deposits (slag-tailings, spalls, ...)

### RESOURCE CLASSIFICATION

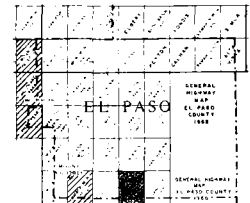
- Coarse Aggregate**
  - 1 Gravel: relatively clean and round
  - 2 Gravel: significant fines, decomposed rock, calcareous cementation
- Fine Aggregate**
  - 3 Sand: greater than 75% passing 48 screen, 425 retained on 425 screen, visual estimation
  - 4 Probable aggregate resource

### 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 drill-hole location with overburden thickness (ft); over sand/gravel resource thickness (ft); obtained from well logs
- "a" indicates gravel, "u" indicates sand
- "u" in symbol denotes unvaluated or unknown property
- "a" denotes Colorado Geological Survey Wellhead/Reclaim and Control project drill hole
- Wellhead/Reclaim, well where known or observed; shaded where approximate or inferred

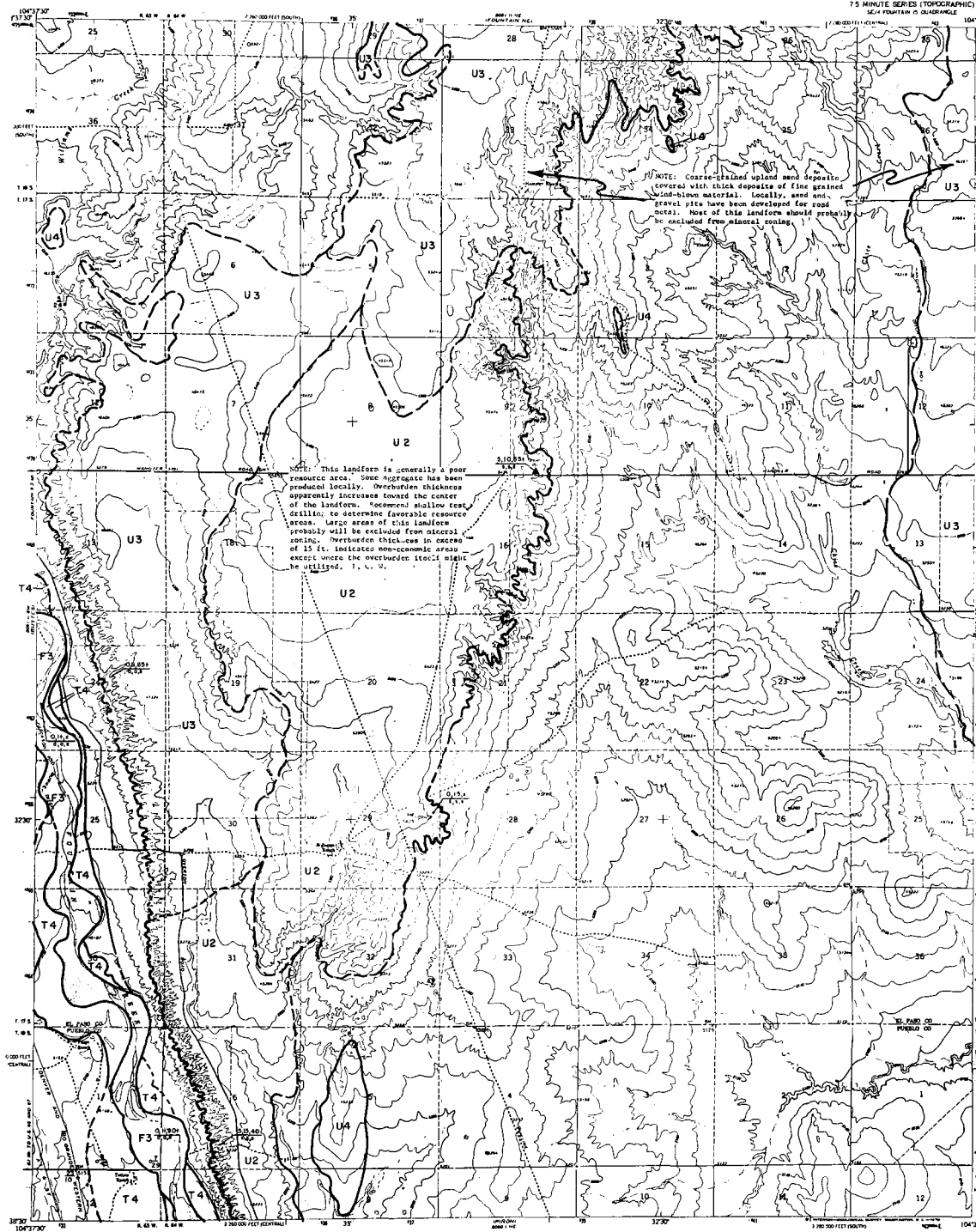
### STATION LOCATION AND ORIENTATION

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (ignoring 48 screen, 0.30 in.), visual estimation
- significant amount of fines (ignoring 48 screen, 0.30 in. or 0.075 mm)
- significant amount of decomposed or such rock
- significant amount of calcareous cementation (caliche)
- "a" in symbol denotes unvaluated or unknown property
- "u" in symbol denotes property absent or insignificant

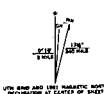


- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

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



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



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

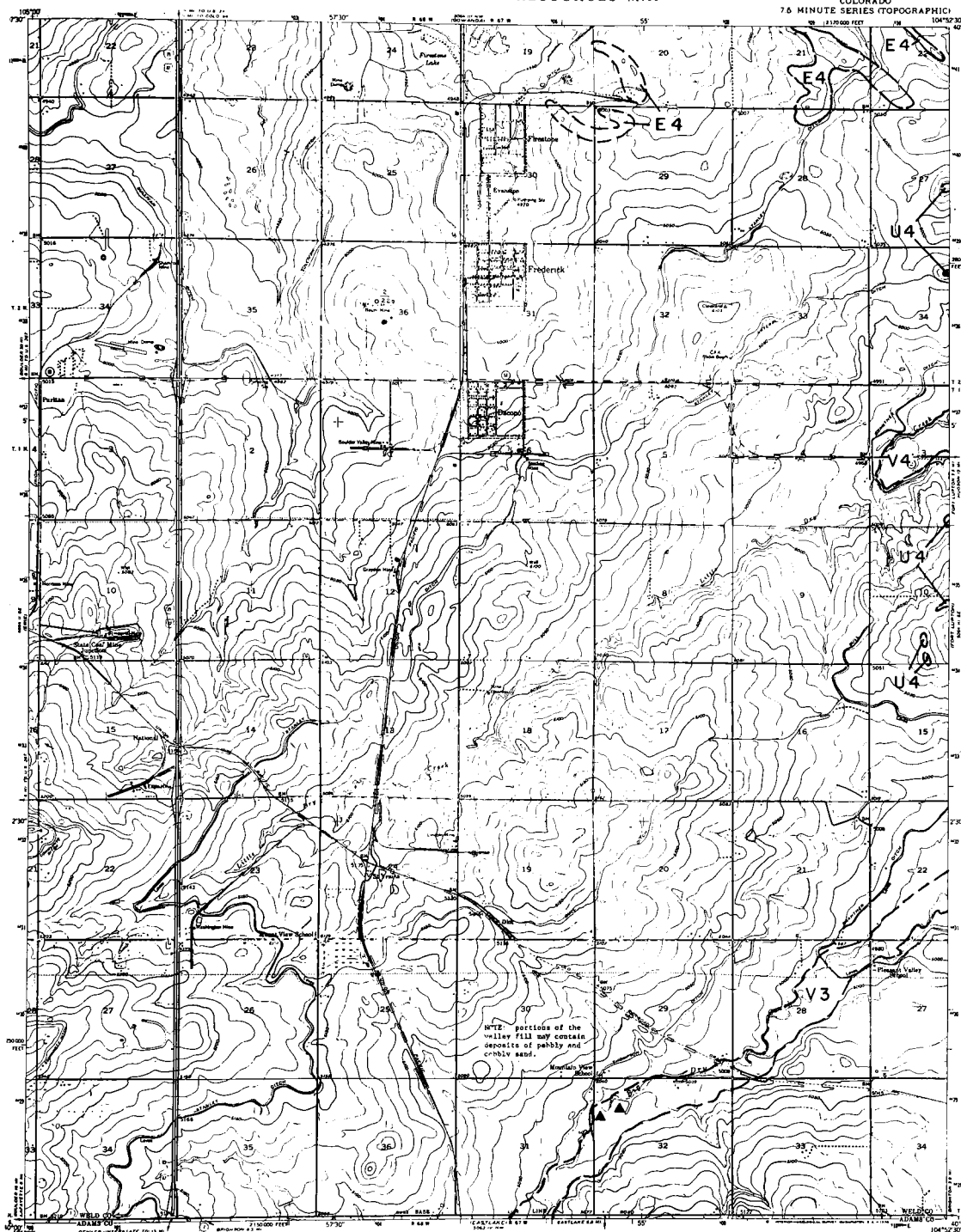
FOUNTAIN SE, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

FREDERICK QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

Landform units  
See map classification

### LANDFORM UNITS

- F Floodplain deposit
- T Tertiary terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Man-made deposits (tailings, waste, etc.)

### ROCK CLASSIFICATION

- 1 Coarse sandstone (at least 10% pebbles 1/16" to 1/8" in diameter)
- 2 Coarse, relatively clean and unaltered sandstone
- 3 Coarse, significantly fine, decomposed sandstone
- 4 Sandstone

### ROAD CLASSIFICATION

- 1 Road
- 2 Road
- 3 Road

### UNCLASSIFIED RESOURCES

- 1 Probable aggregate resource

### NOTES

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Indicated well or drill hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) indicated from well logs
- "s" indicates gravel, "u" indicates sand
- "u" in symbol denotes unclassified or unknown property
- "u" denotes Colorado Geological Survey boundary (sand and gravel projects) drill hole
- Landform boundary, solid where known or observed; dashed where approximate or inferred

### STATION, LOCATION AND GEOLOGICAL INFORMATION

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (passing #100 mesh, 0.075 mm), (eolian sandstone)
- significant amount of fines (passing #100 mesh, 0.075 mm, or 0.075 mm)
- significant amount of decomposed or weak rock
- significant amount of siliceous carbonate facies
- "u" in symbol denotes unclassified or unknown property
- "u" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION

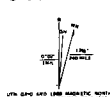
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:  
Colton, R.H., and Fitch, W.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Greeley 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.

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



CONTOUR INTERVAL 10 FEET  
DARTON IS MEAN SEA LEVEL

ROAD CLASSIFICATION  
HARD SURFACE ALL WEATHER ROADS  
HEAVY-DUTY  
MEDIUM-DUTY  
LIGHT-DUTY  
IMPROVED DIRT  
UNIMPROVED DIRT  
LOW-SURFACE GRADED, OR NARROW HARD SURFACE  
INTERSTATE ROUTE  
U. S. ROUTE  
STATE ROUTE

FREDERICK, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

GALETON QUADRANGLE  
COLORADO: WELD CO.  
75 MINUTE SERIES (TOPOGRAPHIC)

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

## 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 Eolian deposit (sand dunes)
- M Man-made deposits (slag, tailings, spoil, etc.)

### RESOURCE CLASSIFICATION

- Gravel Resources**  
(at least 30% gravel on 40 acres, visual estimation)
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, natural aggregate
- Sand Resources**  
(gravel less than 10% passing 40 screen, 40% retained on 200 screen, visual estimation)
- 3 Sand
- Unutilized 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 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" symbol denotes unutilized or unknown property
- "w" denotes Colorado Geological Survey (Washington and Denver projects)
- Drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND GRAPHICAL

- contour thickness (ft)
- contour thickness (ft)
- percent sand and fines (passing 40 screen, 0.25 in.), visual estimation
- significant amount of fine (passing 200 screen, 0.0075 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- "u" symbol denotes unutilized or unknown property
- "w" symbol denotes property shown on this map

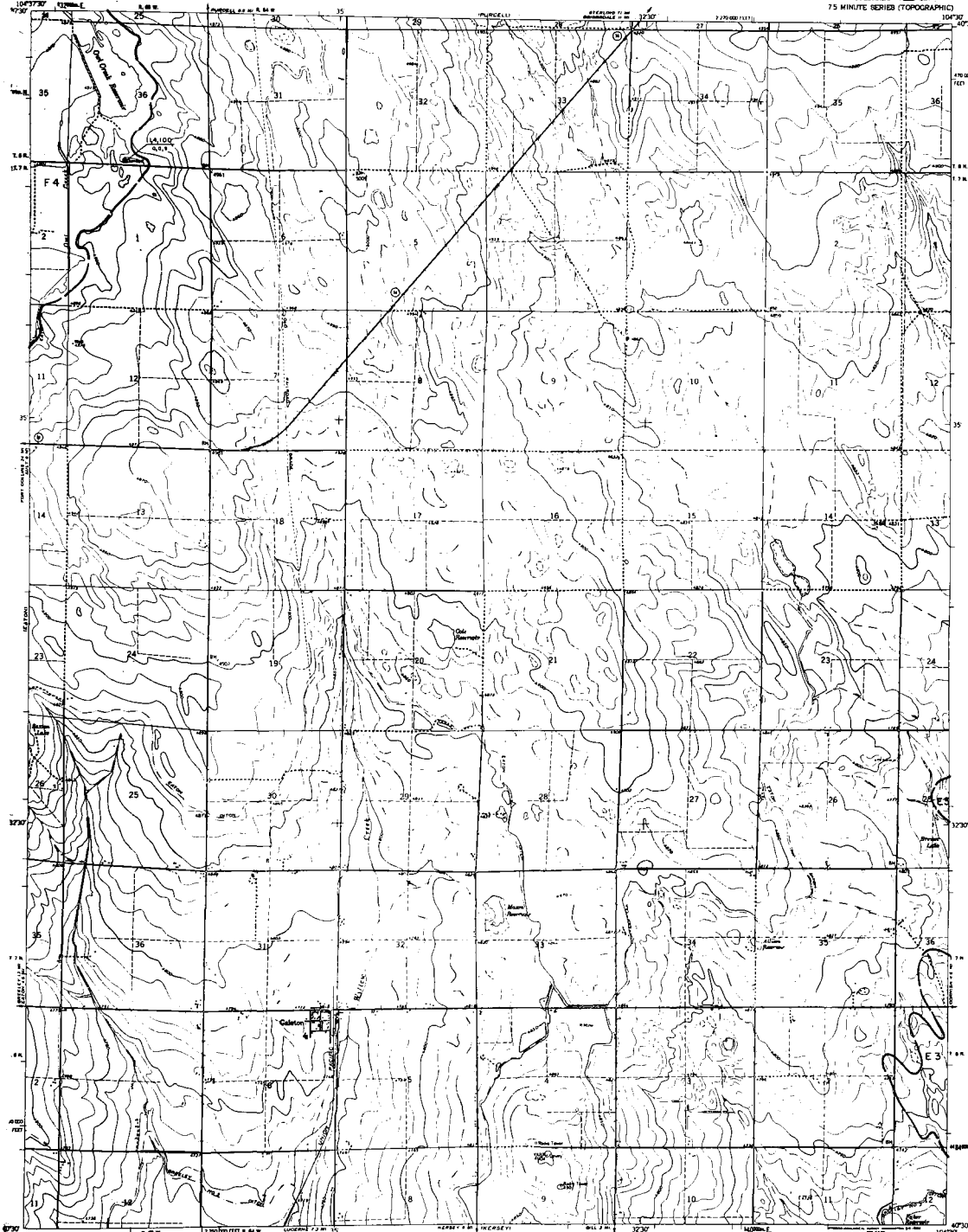


- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

### REFERENCE:

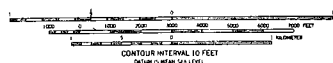
Dunn, R. H., III, 1972, Map of surficial geology of part of the Galeton quadrangle: Reconnaissance mapping for Colorado Geol. Survey Window Environmental Geology Project, open-file map.

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



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

APPROXIMATE MEAN  
DECLINATION, 1980



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

GALETON, COLO.



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

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



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	Man-made deposits (slag, tailings, spoil....)

RESOURCE CLASSIFICATION

- 3 Coarse Aggregate  
(at least 50% retained on #6 screen, visual inspection)
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, calcium carbonate.
- 3 Fine Aggregate  
(greater than 10% passing #4 screen, 60% retained on #20 screen, visual inspection)
- 3 Sand
- 4 Disseminated Rebar
- 4 Probable aggregate resources

### MAP SYMBOLS



a Operating gravel and/or sand pit  
 Abandoned gravel and/or sand pit  
 (X) Operating stone quarry  
 (M) Abandoned stone quarry  
 (ZZ) Potential quarry aggregate resource sites  
 Selected well or drill-hole location with over-  
 burden thickness (ft) over sand/gravel resource  
 thickness (ft), obtained from well logs.  
 "s" indicates gravel; "a" indicates sand  
 "x" is symbol denotes unclassified or  
 unknown property.  
 "m" denotes Colorado Geological Survey  
 Window/Island and Gravel projects  
 drill hole  
 Landform boundary, solid white lines or  
 observed; dashed where approximate or  
 inferred.

STATE, LOCATION AND GEOLOGICAL  
DEPOSITION OF DEPOSIT

**DESCRIPTION OF ECOSYSTEM**

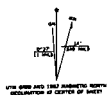
coral/burden thickness (ft)  
hard/ground resource thickness (ft)  
percent sand and fines (ignoring 11 screen, 0.25 in.), actual estimation  
1 3 37 60  
significant amount of fines (passing 100 screen, 0.15 in. or less, 0.075 mm)  
significant amount of decomposed or weak rock  
significant amount of calcine carbonate (calcite)  
%\* in signal denotes unweathered or unknown property  
%\* in signal denotes property absent or insignificant



 QUADRANGLE LOCATION  
 NON-RESOURCE OR  
 WITHDRAWN AREA

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

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



CONTOUR INTERVAL 40 FEET  
DOTTED LINES REPRESENT 20-FOOT CONTOURS  
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION

Light-duty \_\_\_\_\_ Unimproved dirt .....

GLENDENEY, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

GOLDEN QUADRANGLE  
COLORADO-JEFFERSON CO  
7 1/2 MINUTE SERIES (TOPOGRAPHIC)

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

## EXPLANATION

Contour interval  
100 feet (unless otherwise noted)

### LEGEND

- F Fluvial deposit
- T Tertiary deposit
- V Volcanic (T & T)
- U Unconsolidated
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Miscellaneous deposits (clastic, igneous, etc.)

### RESOURCE CLASSIFICATION

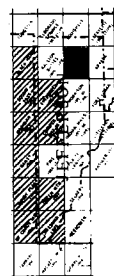
- 1 Gravel: relatively clean and sound, abundant
- 2 Gravel: significant fines, decomposed rock, calcareous
- 3 Sand
- 4 Potential aggregate resource

### NOTES

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Sectioned out or drill hole location with overburden thickness (ft) over sand/gravel resource thickness (ft)
- "T" indicates gravel, "A" indicates sand
- "X" in symbol denotes unconsolidated or unknown property
- "W" denotes Colorado Geological Survey Wellhead and Steel project drill hole
- Landform boundary, solid where known or inferred, dashed where approximate or inferred

### STATION, LOCATION AND CORRELATION

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- potential sand and fines (opening 4.75 mm) (ft)
- significant amount of fines (opening 4.75 mm) (ft)
- significant amount of decomposed or weak rock
- significant amount of calcareous material
- "X" in symbol denotes unconsolidated or unknown property
- "W" in symbol denotes wellhead or steel project

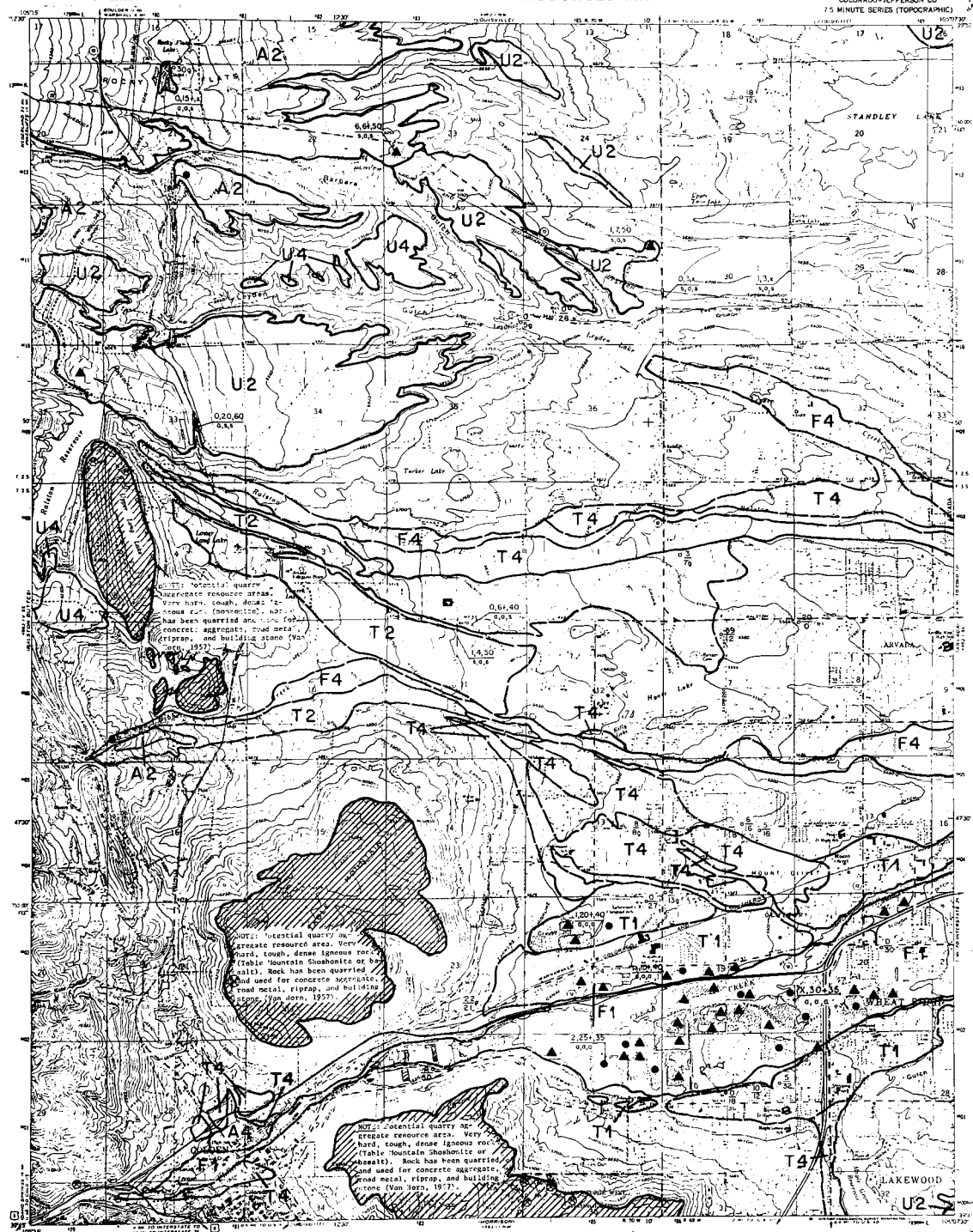


QUADRANGLE LOCATION  
NON-RESOURCE OR  
WETLAND AREA

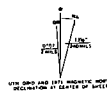
Geology modified after:  
Carmichael, W.E., Simpson, H.E., and Hart, S.S., 1971, Preliminary engineering geologic map of the Golden Quadrangle, Jefferson County, Colorado; U.S. Geol. Survey Misc. Field Studies Map MF-308, and  
Van Horn, Richard, 1972, Surficial and bedrock geologic map of the Golden Quadrangle, Jefferson County, Colorado; U.S. Geol. Survey Misc. Geol. Inv. Map 1-761-A.

References:  
Inter-County Regional Planning Commission, 1961, Drainage course plan for the Denver region - Part 1, Sand and gravel; Denver, Colo., Inter-County Reg. Plann. Comm., pl. 1.  
Hamilton, J.L., and Owens, W.C., 1972, Geologic aspects, soils and related drainage problems, Denver metropolitan area, Colorado; Colorado Geol. Survey Environmental Geology (Sept. 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 1-731.  
Van Horn, Richard, 1957, Bedrock geology of the Golden Quadrangle, Colorado; U.S. Geol. Survey Geol. Quad. Map 7-103.

Trishla, D.E., and Pitch, H.A., 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 1-856-A.



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
- Unimproved dirt
- U.S. Route
- State Route
- Interstate Route

GOLDEN, COLO.

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

DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
4004 W. FIELD, DENVER

GOLD HILL QUADRANGLE  
COLORADO-Boulder CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
SW 1/4 BOULDER CO. QUADRANGLE



Landform unit<sup>1</sup>  
 Reservoir classification<sup>2</sup>

LANDFORMS CHIT

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

RESOURCE CLASSIFICATION

Coarse Aggregate  
 Gal Sieve: 50% retained on #4 screen, visual attrition

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

Fine Aggregate  
 Igniter than 100 passing #4 screen, 60% retained on #300 screen, visual attrition

## Overvalued Element

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.
- "s" indicates gravel; "g" indicates sand
- in symbol denotes unvaluated or unknown property
- "m" denotes Colorado Geological Survey (Vindicator Sand and Gravel) projects' drill hole
- Landform boundary, solid where known or observed; dashed where approximated or inferred

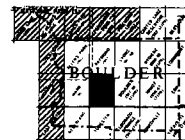
## STATION, LOCATION AND GEOLOGICAL

**DESCRIPTION OF SYMBOLS**

- overburden thickness (ft)
- nonfossiliferous resource thickness (ft)
- percent acid and fines (passing #4 screen, 0.85 (n.), visual estimation)
- 13
- 40
- significant amount of fines (passing 200 screen, 0.0648 in. or 0.078 mm.)
- significant amount of decomposed or weak rock.
- significant amount of oilstone materials (quartzite)

"n" in symbol denotes unmineralized or unknown property

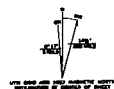
"n" in symbol denotes property absent or insignificant



 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

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

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



CONTOUR INTERVAL 40 FEET

ROAD CLASSIFICATION

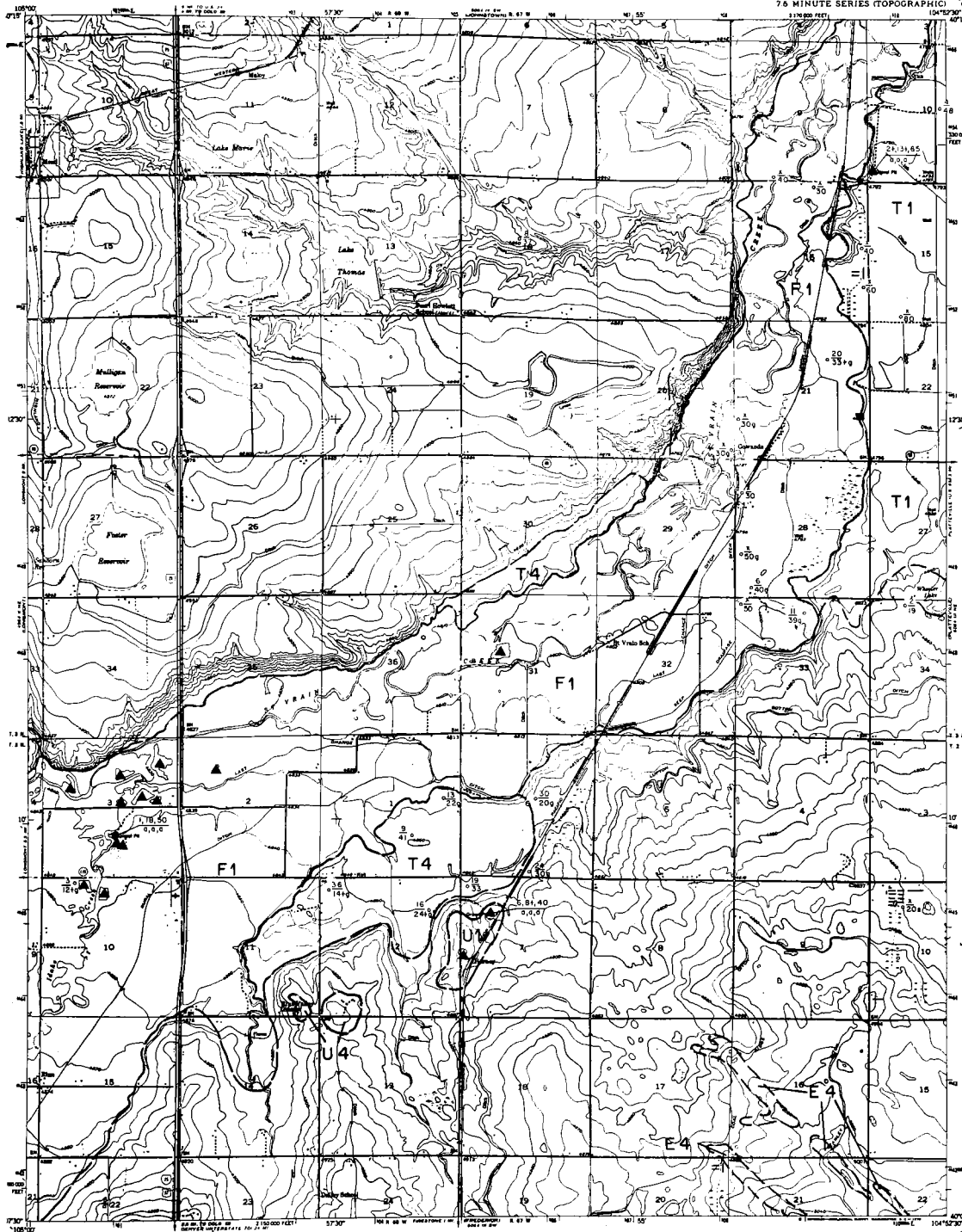
Medium-duty \_\_\_\_\_ Light-duty \_\_\_\_\_  
Unimproved dirt \_\_\_\_\_  
☐ State Route

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 UNIT**  
F Fluvial/late deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Mountain-dwelling sand (eolian)  
(e.g., talus, talus, etc.)
- RESOURCE CLASSIFICATION**  
1. **Gravel**  
1. Gravel: relatively clean and sound  
2. Gravel: significant fines, decomposed rock, calcareous cementation  
2. **Flow aggregate**  
3. Sand  
3. **Unconsolidated Resource**  
4. Probable aggregate resource
- MAP SYMBOLS**  
Operating gravel surface and pit  
Operating stone quarry  
Unconsolidated quarry aggregate resource area  
Historical well or drill-hole location with over-  
burden thickness (ft) over sand/gravel resource  
thickness (ft), obtained from well logs  
"a" indicates gravel; "s" indicates sand  
"u" in symbol denotes unconsolidated or  
unknown property  
"w" denotes Colorado Geological Survey  
boundary, solid where known or  
dashed where approximate or  
inferred
- SECTION LOCATION AND GEOLOGICAL  
DESCRIPTION OF SYMBOLS**  
Overburden thickness (ft)  
Unconsolidated resource thickness (ft)  
Gravel sand and fines (gravel 66  
percent, 2 to 10 ft), (sand 100 percent)  
Significant amount of fines (gravel  
100 percent, 0.075 to 0.075 mm)  
Significant amount of decomposed or weak rock  
Significant amount of calcareous cementation  
"u" in symbol denotes unconsolidated or  
unknown property  
"w" in symbol denotes property above  
or insignificant



- QUADRANGLE LOCATION  
▨ NON-RESOURCE OR  
WITHDRAWN AREA

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

UTM GRID AND 1983 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 10 FEET  
DATUM IS MEAN SEA LEVEL

**ROAD CLASSIFICATION**  
HARD SURFACE ALL WEATHER ROADS ON WEATHER ROADS  
Heavy-duty improved dirt  
Medium-duty unpaved dirt  
Light-duty gravel or hard-packed surface  
Unimproved dirt  
Gravel Road 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 Fluvial deposit
- T Tertiary terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Man-made deposit (slag, tailings, spillover...)

### RESOURCE CLASSIFICATION

Coarse aggregate  
(for 100% BSE retained on 48 screen, official estimation)

- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, increased rock, custom estimate

Fine aggregate  
(passed thru 100 screen, 48 screen, 48% retained on 100 screen, official estimation)

- 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

Selected well or drill-hole location with overburden thickness (ft) over sand and gravel resource thickness (ft), indicated from well log.

"u" indicates gravel; "s" indicates sand  
"u" in symbol denotes unconsolidated or unknown property

"w" denotes Colorado Geological Survey Wellhead and Gravel Indicator

Landform boundary, solid where known or observed; dashed where approximate or inferred

### STATION LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT

Overburden thickness (ft)

Non-drill-hole resource thickness (ft)

Percent sand and fines (passing #4 screen, 0.25 in.), visual estimation

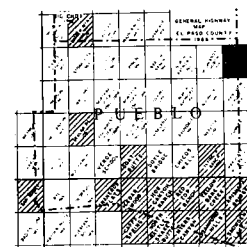
Light/finest amount of fines (passing #100 screen, 0.0075 in. or 0.075 mm)

Significant amount of decomposed or weak rock

Significant amount of solution surface (caliche)

"u" in symbol denotes unconsolidated or unknown property

"w" in symbol denotes property absent or doubtful



QUADRANGLE LOCATION  
NON-RESOURCE OR  
WITHDRAWN AREA

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

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

GRANDVIEW SCHOOL SET  
CONTOUR INTERVAL 10 FEET  
ELEVATION IN FEET

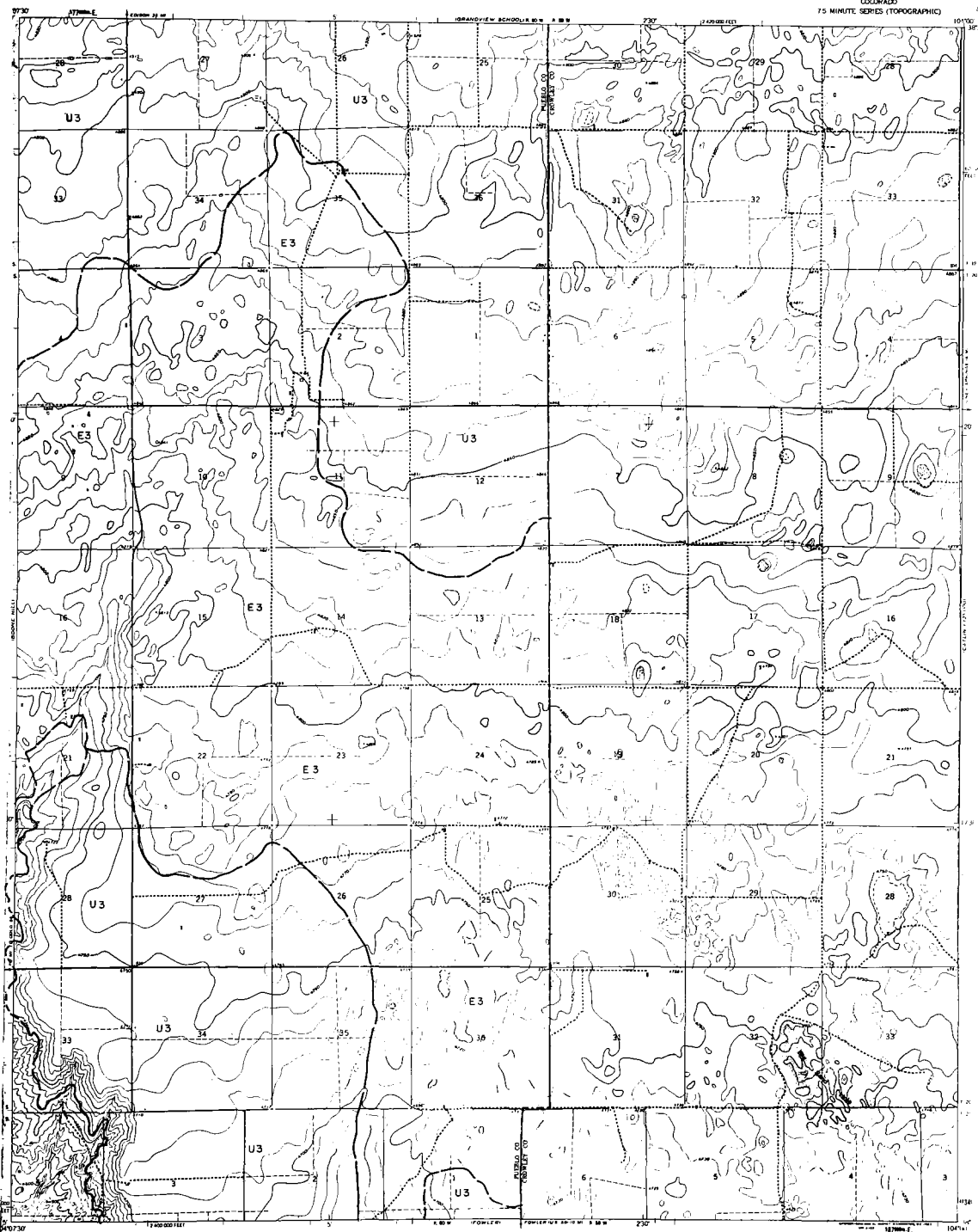
ROAD CLASSIFICATION

Light duty Unimproved dirt

GRANDVIEW SCHOOL COLO

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

GRANDVIEW SCHOOL SE QUADRANGLE  
COLORADO  
75 MINUTE SERIES (TOPOGRAPHIC)



- ↳ Landform unit
- ↳ Resource classification

- Landform 2017
- F Floodplain deposit
  - T Terasse 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

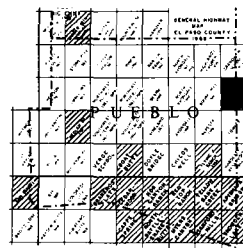
1. Gravel - relatively clean and sound  
(at least 80% retained on #6 screen,  
visual estimation)
2. Gravel - significant fines, decomposed rock,  
calcium carbonate.
3. Fine Aggregate  
(greater than 75 passing #6 screen, 80%  
retained on #100 screen, visual estimation)
4. Unwashed Aggregate  
Probably aggregate source

### 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), thickness (ft) drill log  
 "a" indicates gravel; "s" indicates sand  
 \* in symbol denotes unevaluated or  
 unknown property  
 "ms" denotes Colorado Geological Survey  
 Windsor/Sand and Gravel projects' drill line  
 Landform boundary, solid where known or  
 observed; dashed where approximate or  
 inferred.

## STATION, LOCATION AND GEOLOGICAL.

- DESCRIPTION OF SAMPLE**
- overburden thickness (ft)  
hard/medium resource thickness (ft)  
parent sand and fines (passing 6 screen, 0.25 in.), visual estimation  
12 60  
significant amount of fines (passing 1200 screen, 0.0039 in. or 0.074 mm.)  
significant amount of disconformity or wash rock.  
significant amount of calcareous carbonates (calciche)  
"n" in symbol denotes uncalibrated or unknown property.  
"a" in symbol denotes property absent or insignificant.



QUADRANGLE LOCATION

NON-RESOURCE OR  
WITHDRAWN AREA

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

ROAD CLASSIFICATION

GRANDVIEW SCHOOL SE, COLO

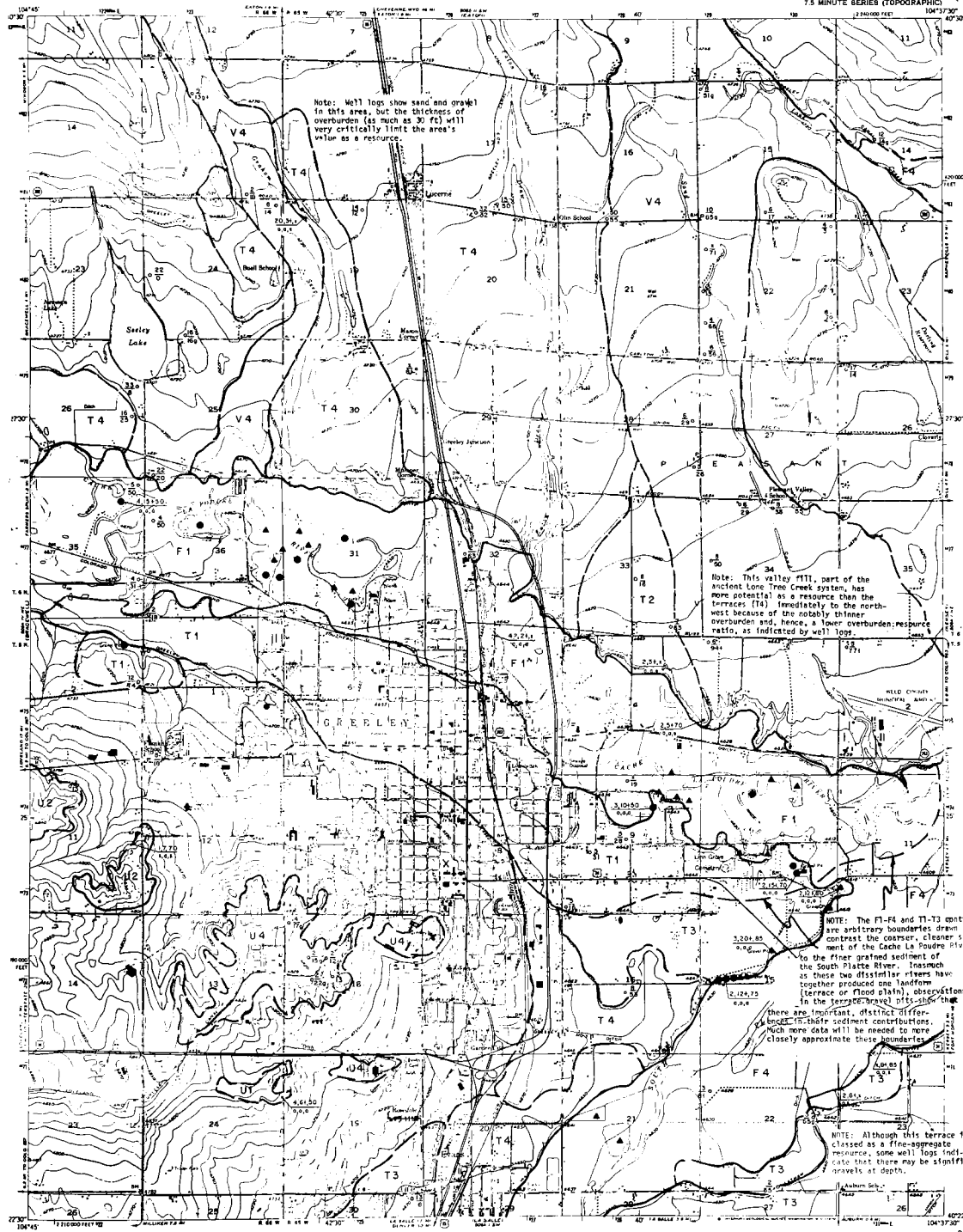




# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

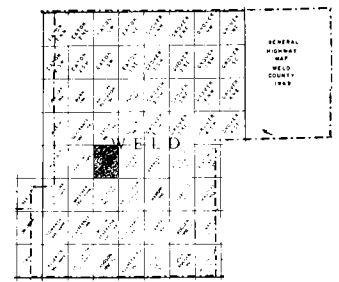
GREELEY QUADRANGLE  
COLORADO-WELD CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
(2340000 FEET)

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



## EXPLANATION

- LEGEND**
- SYMBOLS**
- Topographic deposit
  - Stream terrace deposit
  - Valley fill (F & T)
  - Unaltered deposits
  - Alluvial fan
  - Wind-deposited sand (aeolian)
  - Remnant deposits (clay, silt, sand, gravel, etc.)
- RESOURCE CLASSIFICATION**
- 1. Coarse aggregate (at least 75% passing 48 screen, actual estimation)
  - 2. Gravel: relatively clean and smooth (gravel: sand 75% passing 48 screen, 0.075 retained on #200 screen, actual estimation)
  - 3. Sand
  - 4. Probable aggregate resource
- NOTE: 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 boundary line with even-numbered thickness (ft) over sand/gravel resource area)
  - "ft" indicates amount of deposit or rock mass
  - "in" symbol denotes unaltered or unaltered property
  - "m" denotes Colorado Geological Survey Modified (Sand and Gravel) project
  - "L" indicates location boundary, although known or observed, does not show approximate or inferred
- STATION, LOCATION AND GEOLOGICAL CLASSIFICATION OF DEPOSIT**
- overburden thickness (ft)
  - unaltered resource thickness (ft)
  - present sand and fines (passing 48 screen, 0.075 in. or 0.075 in.)
  - significant amount of deposit or rock mass
  - significant amount of deposit or rock mass
  - "ft" in symbol denotes unaltered or unaltered property
  - "m" in symbol denotes property of inferred or unaltered



**QUADRANGLE LOCATION**

**References:**

Swan, F. H., III, 1972, Map of surficial geology of the Greeley quadrangle: Recon. Mapping for Colorado Geol. Survey Midway 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 1-587.

Shelton, D. C., 1974, Personal communication.

Smith, R. O., and Schneider, P. A., Jr., and Peck, L. L., 1984, 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. 1.

Geology modified after: Colton, W. 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 1-855-B.

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

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

CONTOUR INTERVAL 10 FEET  
EARTH IS NEAR SEA LEVEL

ROAD CLASSIFICATION

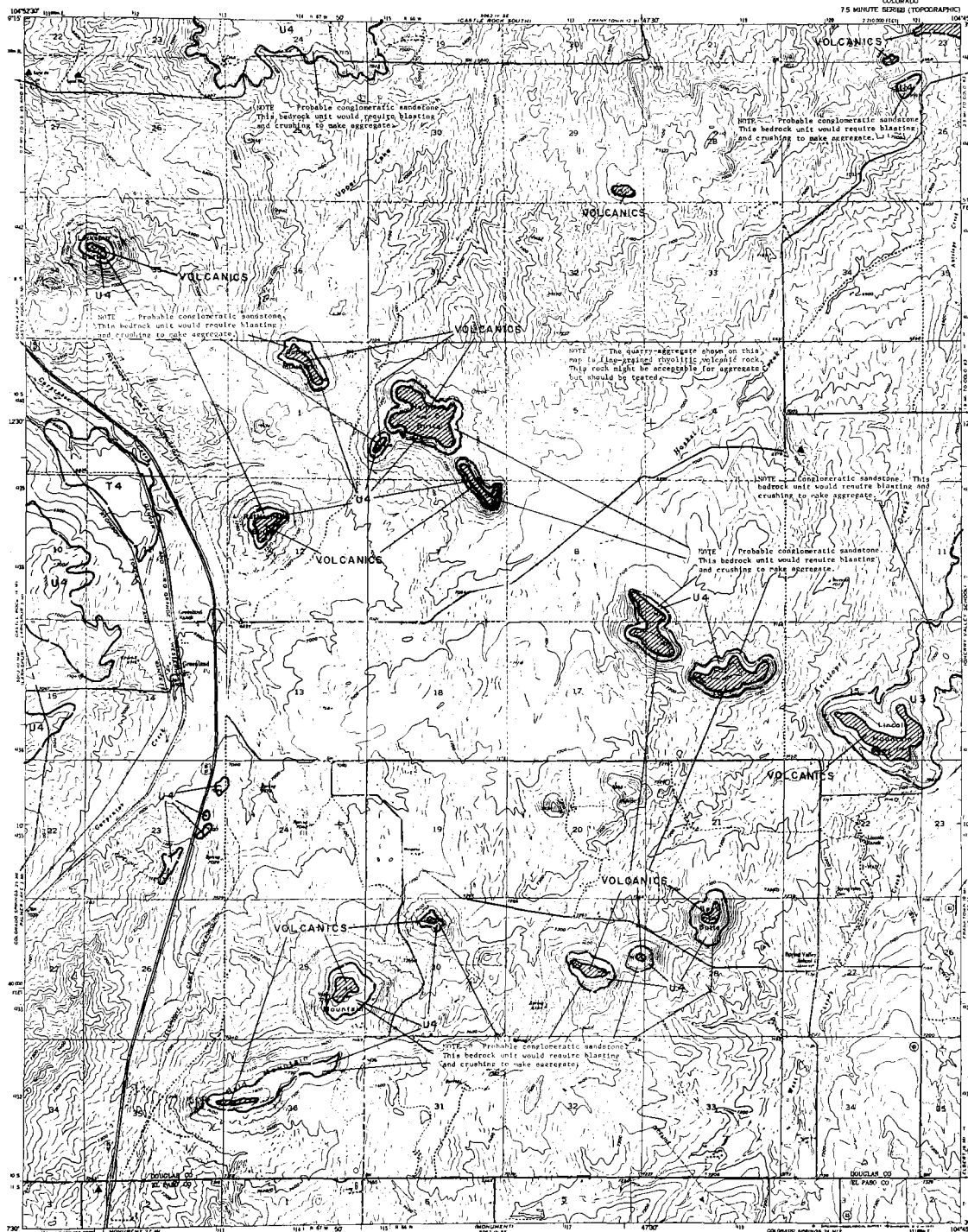
- HEAVY DUTY ALL WEATHER ROAD
- IMPROVED DIRT ROAD
- UNIMPROVED DIRT ROAD
- LOOSE SURFACE GRAVEL OR NARROW HARD SURFACE
- U. S. ROUTE
- STATE ROUTE

GREELEY, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

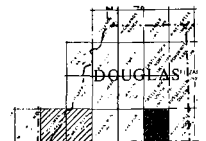
GREENLAND QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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 Upland deposits
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Nonclastic deposits (e.g., talus, scree, etc.)
- RESOURCE CLASSIFICATION**
- 1 Coarse aggregate (at least 25% retained on #4 screen, usual distribution)
  - 2 Gravel: relatively clean and sound
  - 3 Gravel: significant fines, decomposed rock, additional treatment
  - 4 Sand
  - 5 Unutilized Resource
  - 6 Probable aggregate resource
- MAP SYMBOLS**
- \* Operating gravel and/or sand pit
  - A Abandoned gravel and/or sand pit
  - Q Abandoned stone quarry
  - Q<sub>1</sub> Potential quarry aggregate resource area
  - Q<sub>2</sub> Selected well or drill-hole location with measured thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
  - "s" indicates gravel; "m" indicates sand
  - "x" in symbol denotes unutilized or unknown property
  - "ms" denotes Colorado Geological Survey "Measured Sand and Gravel Project" drill hole
  - Location boundary, solid short lines or dashed where appearance or inferred
- STATION, LOCATION AND ORIENTAL**
- ABANDONED QUARRY**
- Q<sub>1</sub> Overburden thickness (ft)
  - Q<sub>2</sub> Sand/gravel resource thickness (ft)
  - Q<sub>3</sub> Percent sand and fines (percent by weight, 0.075 in.), actual determination
  - Q<sub>4</sub> Significant amount of fines (percent 100 screen, 0.075 in. or finer)
  - Q<sub>5</sub> Significant amount of decomposed or weak rock
  - Q<sub>6</sub> Significant amount of solution surface (inches)
  - Q<sub>7</sub> "x" in symbol denotes property about or unutilized



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

## 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 1-537 A.
- Trimble, Donald, 1974, U.S.G.S. Personal Communication.

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

Prepared in cooperation with the  
U. S. Geological Survey

**ROAD CLASSIFICATION**



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

GREENLAND, COLO.

GROVER I NE

[illegible]

1 Location and Access information  
 2 Geologic description  
 3 Geologic history  
 4 Stratigraphic description  
 5 Geologic map  
 6 Geologic cross-section  
 7 Geologic interpretation  
 8 Geologic interpretation  
 9 Geologic interpretation  
 10 Geologic interpretation  
 11 Geologic interpretation  
 12 Geologic interpretation  
 13 Geologic interpretation  
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 99 Geologic interpretation  
 100 Geologic interpretation

 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

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

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

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

GROVER INW

WYOMING  
COLORADO

A2

APPROXIMATE  
BOUNDARY

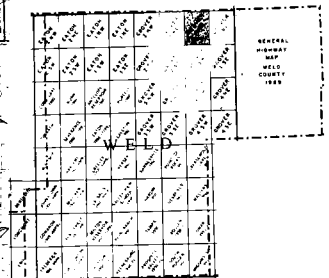
V4

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

Fig. 4

- ↳ Uniform unit
- ↳ Resource classification

- SUPPLY DATA**
- F Fluvio-lacustrine deposit  
T Tertiary terrace deposit  
V Valley fill ("F" & "T")  
U Upland deposits  
A Alluvial fan  
E Wind-reported sand (eolian)  
M Marine deposits  
(e.g., lagoon, delta, spits...)
- SOURCE CLASSIFICATION**
- Coarse substrate  
1 All gravelly material on 66 square,  
visual inspection:  
  
1 Gravel: negligible class and round  
2 Gravel: significant fines, decomposed rock,  
alluvial carbonates  
  
Fine substrate  
1 Silt/clayey fine grained or sandy silt  
retained in #20 screen, small percent  
2 Sand  
  
Distributed resource  
4 Probable aggregate resource
- NOT SYMBOLS**
- Operating gravel and/or sand pit  
Abandoned gravel and/or sand pit  
Overlain creek quarry  
Abandoned stone quarry  
Potential quarry aggregate resource area  
Related well to drill-hole location with over-  
burden thickness or over unconsolidated resources  
thickness ("ft"); obtained from well logs  
"ft" indicates ground, "m" indicates sand  
"x" symbol denotes overlain or  
unknown property  
"m" source Geologic Geological Survey  
Winds/Wind and Creek projects  
Well hole  
Landform boundary, would share known or  
estimated, dashed where approximate or  
inferred
- FLATTON, LOCATION AND GEOLOGICAL  
DESCRIPTION OF AREAS**
- multichannel channels (ft)  
multichannel resource thickness (ft)  
percent sand and fines (spacing at  
normal, 0.8 ft/s), normal orientation  
significant amount of flow timing  
(flow season, 0.016 ft/s, or 0.5 ft/s m.)  
significant amount of decomposed or weak rock.  
"ft" = significant amount of relation appropriate materials  
or insufficient  
"m" = spatial domains uninhabited or  
unknown property  
"x" = spatial domains potentially absent or  
insufficient



QUADRANGLE LOCATION

 NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: 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 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 ISE

## EXPLANATION

Legend symbols for various features and resources.

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

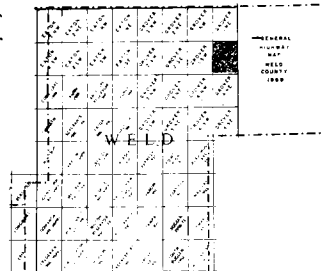
**MINERAL CLASSIFICATION**  
 (See Table 1 for Mineral in % column)  
 (Mineral abundance)  
 1 Gravel: relatively clean and round  
 2 Gravel: significant clay, decomposed rock, tabular carbonate  
 3 Sand  
 4 Possible aggregate resource

**MINERAL CLASSIFICATION**  
 (See Table 1 for Mineral in % column)  
 (Mineral abundance)  
 1 Gravel: relatively clean and round  
 2 Gravel: significant clay, decomposed rock, tabular carbonate  
 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  
 \* Related well or drill-hole location with over-  
 borhole thickness (ft) over sand/gravel resource  
 \* Thickness (ft) obtained from well logs  
 \* 1" indicates gravel; 1/2" indicates sand  
 \* "x" in symbol denotes unclassified or  
 unknown property  
 \* "m" denotes mineralogical survey  
 \* "W" denotes (sand and gravel) projects  
 \* "G" denotes  
 \* Landform boundary, solid where known or  
 dashed where approximate or  
 inferred

**STATION, LOCATION AND ORIENTAL  
 DESCRIPTION OF SYMBOL**  
 \* overburden thickness (ft)  
 \* sand/gravel resource thickness (ft)  
 \* (current sand and fines) (spatial ft)  
 \* (current, 2 ft in ft, actual sediment)  
 \* (spatial) amount of fines (spatial  
 4000 square, 4,000 sq. or 0.01 sq. mi.)  
 \* (spatial) amount of sand/gravel or sand rock  
 \* (spatial) amount of material sandstone (table)

"x" in symbol denotes unclassified or  
 unknown property  
 "m" in symbol denotes mineralogical survey  
 "W" in symbol denotes (sand and gravel) projects  
 "G" in symbol denotes gravel



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

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

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





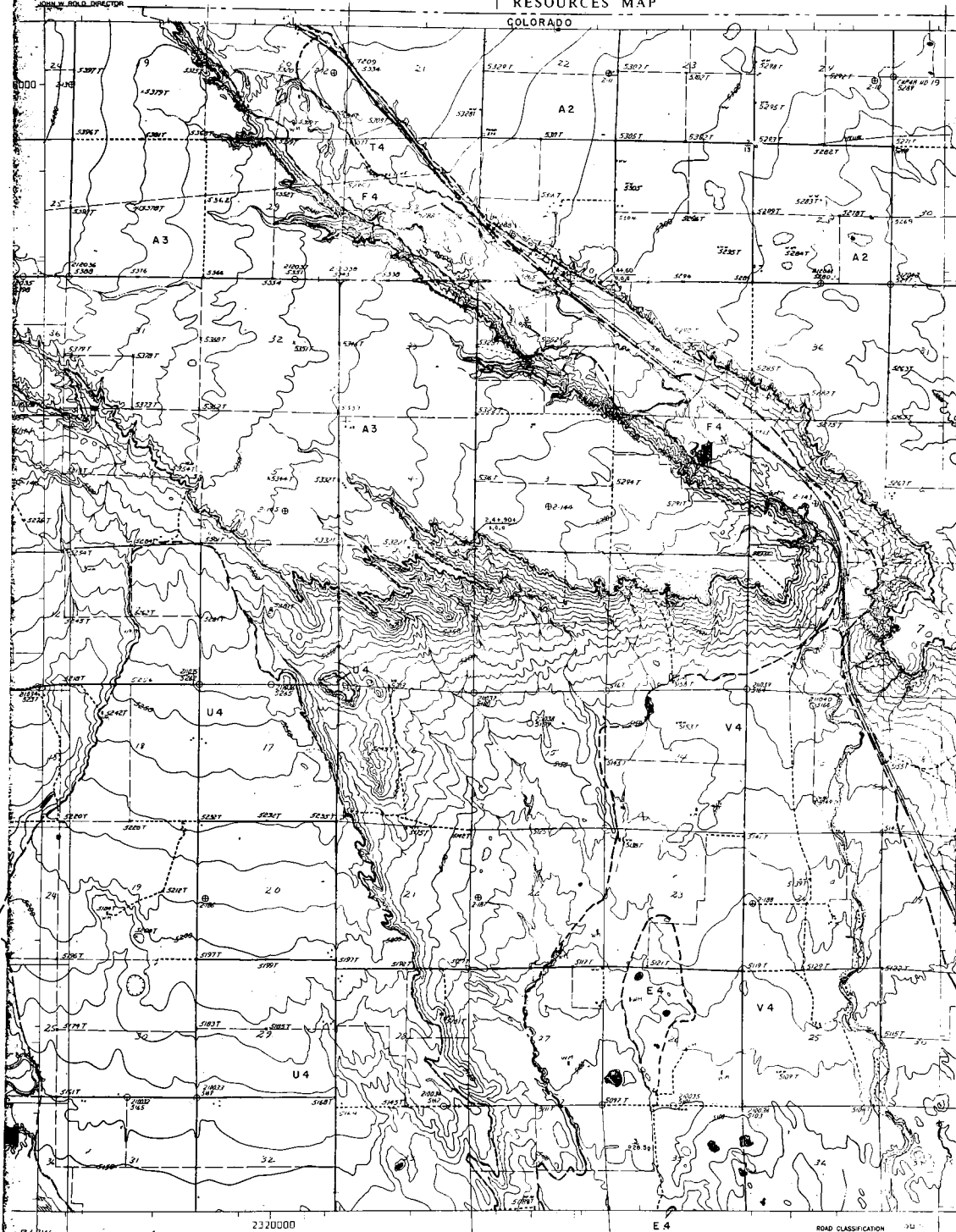
# SAND, GRAVEL AND QUARRY AGGREGATE

## RESOURCES MAP

GROVER 2NE

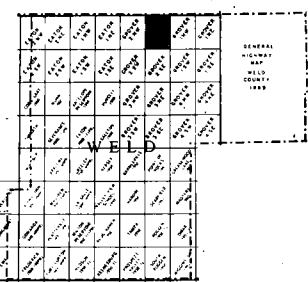
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. BOULDER DIRECTOR

COLORADO



### EXPLANATION

- Landform unit resource classification**
- Landform unit
  - Resource classification
- LANDFORM UNIT**
- T Tundra deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Eolian-deposited sand (colluvial)
  - M Marine deposit (clay, silt, sand, gravel, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Aggregate**  
(at least 10% retained on 48 screen, visual estimation)
  - 1 Gravel: relatively clean and small
  - 2 Gravel: significant fines, decomposed rock, solution carbonates
  - Fine Aggregate**  
(greater than 75% passing 48 screen, 1% retained on 100 screen, visual estimation)
  - 3 Sand
  - Overburden 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
  - Resource quarry aggregate resource area
  - Selected well or drill-hole location with overburden thickness (ft) over overburden, resource thickness (ft), obtained from well logs.
  - "x" indicates gravel, "y" indicates sand
  - "z" in symbol denotes 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 CHRONOLOGICAL DESCRIPTION OF RESOURCES**
- overburden thickness (ft)
  - undisturbed resource thickness (ft)
  - percent sand and fines (passing 48 screen, 0.075 in., visual estimation)
  - significant amount of flow (passing 100 screen, 0.0075 in., or 0.075 mm)
  - significant amount of decomposed or weak rock
  - significant amount of solution carbonate (indicate)
  - "x" in symbol denotes unmineralized or unknown property
  - "y" in symbol denotes property about or large/fine



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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

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

R64  
Data from U. S. Geological Survey  
7-1/2 minute quadrangle

2320000

E 4

CONTOUR INTERVAL 10 FEET

**ROAD CLASSIFICATION**

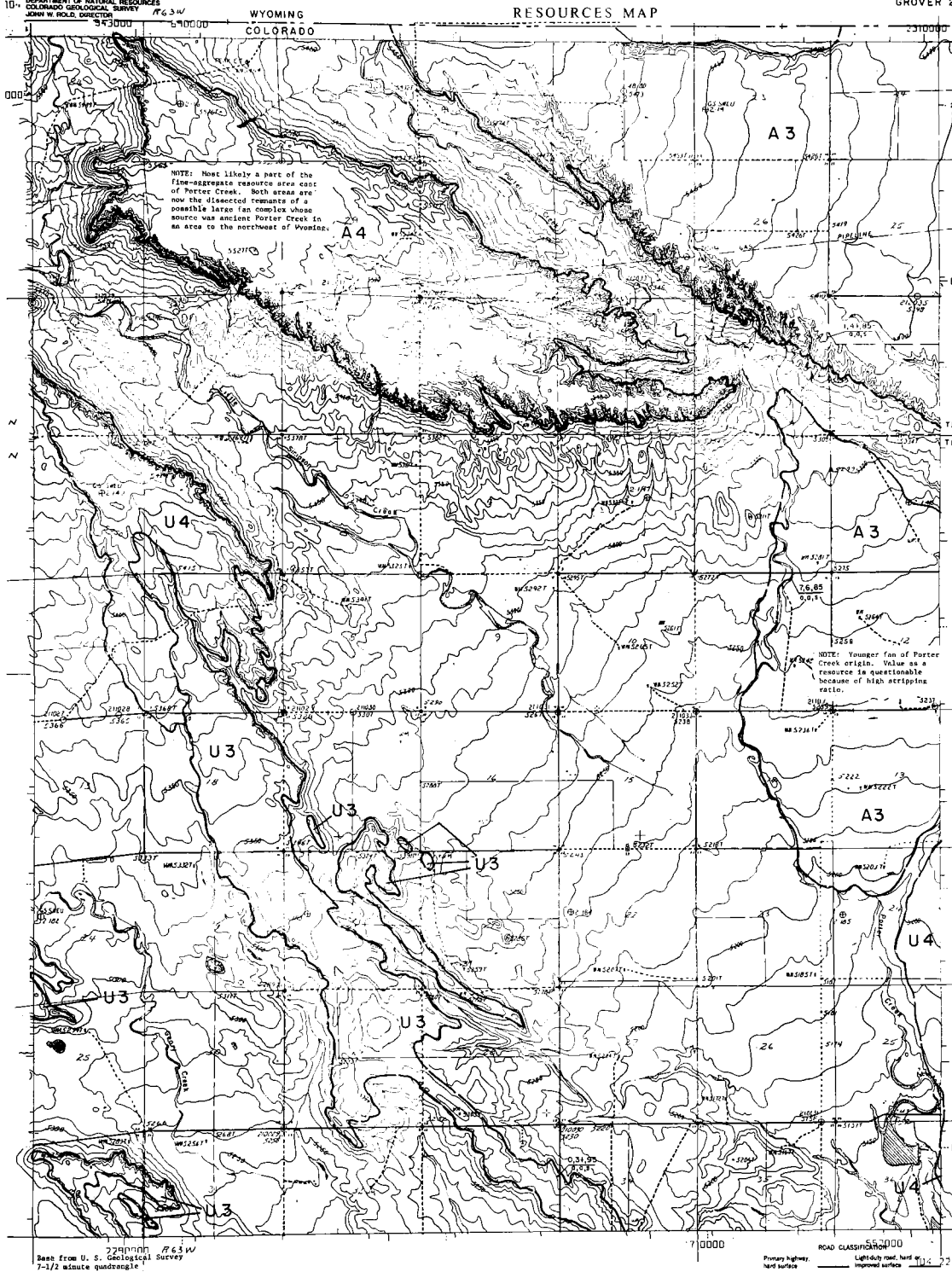
- Primary highway, hard surface
- Light-duty road, hard or improved surface
- Secondary highway, hard surface
- Unimproved road
- Interstate Route
- U. S. Route
- State Route

# SAND, GRAVEL AND QUARRY AGGREGATE

## RESOURCES MAP

GROVER 2 NW

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



### EXPLANATION

- LANDFORMS**
- 1. Floodplain deposit
  - 2. Stream terrace deposit
  - 3. Valley fill (F & T)
  - 4. Upland deposits
  - 5. Alluvial fan
  - 6. Wind-deposited sand (dunes)
  - 7. Man-made deposits (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- Gravel**
- 1. Gravel: relatively clean and sound
  - 2. Gravel: significant fines, decomposed rock, solution castings
- Sand**
- 1. Sand: relatively clean and sound
  - 2. Sand: significant fines, decomposed rock, solution castings
- Unconsolidated Resource**
- 1. 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
  - Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), indicated from well log.
  - "s" indicates gravel, "a" indicates sand
  - "u" in gravel denotes unconsolidated or unknown proper
  - "m" denotes Colorado Geological Survey Water/land and gravel project drill hole
  - Landform boundary, solid white known or observed, dashed where approximate or inferred
- STATION, LOCATION AND OBSERVATIONAL DESCRIPTION OF DEPOSIT**
- Overburden thickness (ft)
  - Sand/gravel resource thickness (ft)
  - Percent sand and fines (spacing of number, 0-100 (%), exact indication 100.0)
  - Significant amount of fines (spacing of 100, 0-100 (%), exact indication 100.0)
  - Significant amount of decomposed or weak rock
  - Significant amount of solution castings (indicated)
  - "u" in gravel denotes unconsolidated or unknown proper
  - "m" in gravel denotes properly chosen or insignificant



**QUADRANGLE LOCATION**

**NON-RESOURCE OR WITHDRAWN AREA**

REFERENCE: Veit, 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-B, pl. 1.

Mappeo 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

Secondary highway: hard surface

Unimproved road

Interstate Route

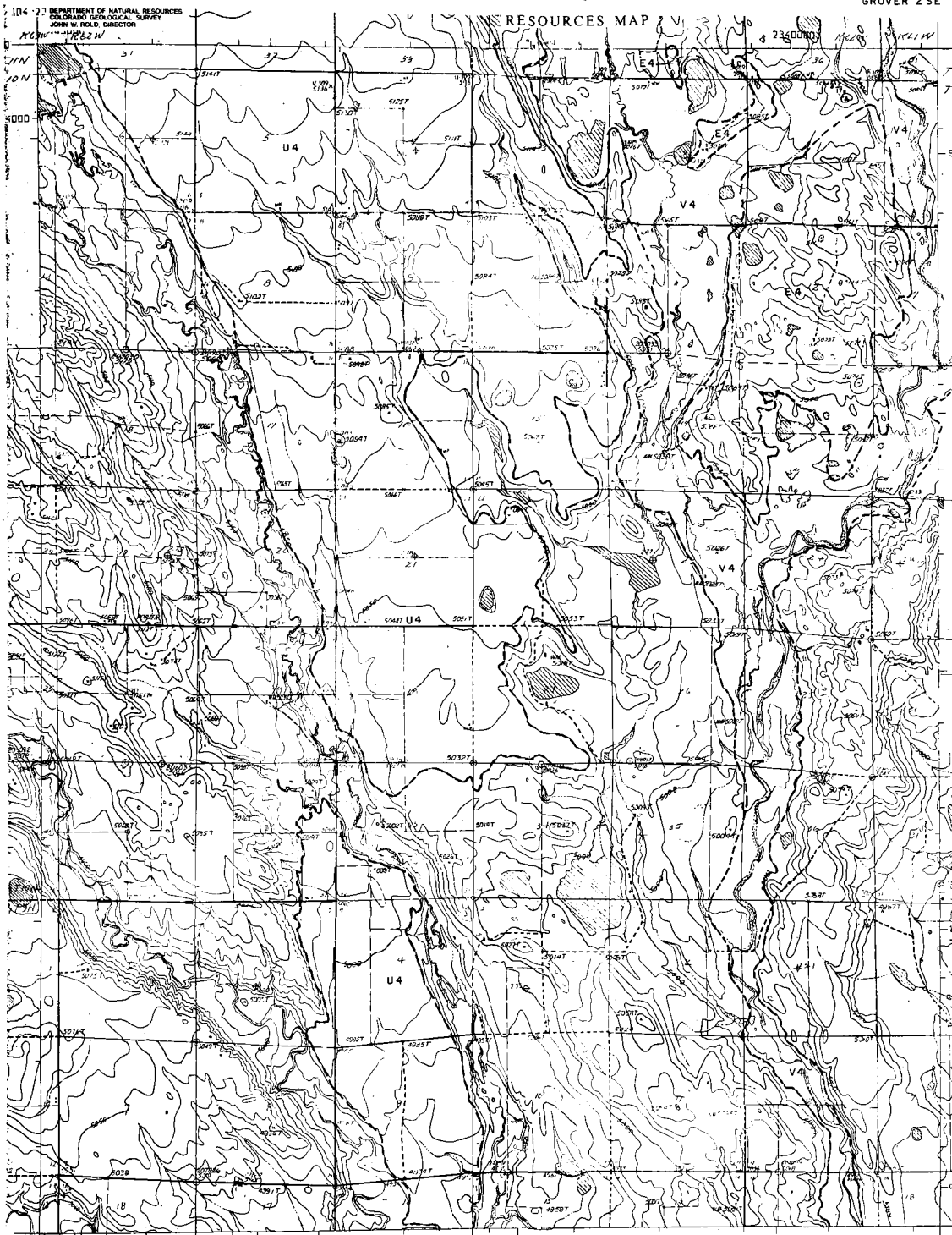
U. S. Route

State Route

GROVER 2 NW (01)  
75 MINUTE SERIES (TOPOGRAPHIC) A.F.C.

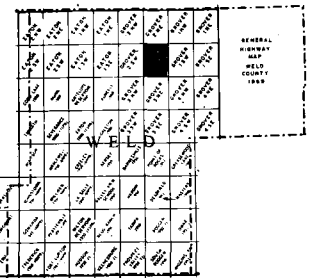
# SAND, GRAVEL AND QUARRY AGGREGATE

GROVER 2 SE



## EXPLANATION

- LANDFORMS**
- landform unit
  - landform class/function
- LANDFORMS**
- F Fluvial deposits
  - T Stream terrace deposit
  - V Valley fill (F & T)
  - U Upland deposits
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Man-made deposits (dams, levees, spoil, etc.)
- RESOURCE CLASSIFICATION**
- Coarse Sandstone**  
(at least 50% sandstone on 64 screen, visual estimation)
- 1 Gravel: relatively clean and well sorted
  - 2 Gravel: significant fines, unsorted, calc. cementation
- Fine Sandstone**  
(greater than 70% passing 64 screen, 60% retained on 100 screen, visual estimation)
- 3 Sand
- Unconsolidated Aggregate**
- 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 locations with owner location (distance (ft) over sand/gravel resource thickness (ft), obtained from well logs)
  - "N" indicates north; "S" indicates south
  - "N" in symbol denotes unconsolidated or unknown property
  - "W" denotes Colorado Geological Survey Water/land and gravel project
  - drill hole
  - Landform boundary, solid where known or observed, dashed where approximate or inferred
- FLATNESS, LOCATION AND ORIENTATIONAL INFORMATION**
- contour thickness (ft)
  - contour thickness (ft)
  - percent sand and fines (passing 100 screen, 0.075 in. or 0.075 mm)
  - significant amount of sandstone or much rock
  - significant amount of sandstone or much rock
  - "N" in symbol denotes unconsolidated or unknown property
  - "W" in symbol denotes property shown or indicated



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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

R 62 W  
base from U. S. Geological Survey  
7-1/2 minute quadrangle

232000

CONTOUR INTERVAL 10 FEET

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



- ↳ Longform will
- ↳ Research classification

## LASTFORM 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, spoil, etc.)

#### RESOURCE CLASSIFICATION

SOILS CLASSIFICATION

Carbon Aggregate  
(at least 50% retained on #1 screen,  
visual examination)

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

Fine Aggregate  
(greater than 75% passing #10 screen, 60%  
retained on #20 screen, visual examination)

**Downloaded by:**

- 4 Probable aggregate resources

### WATER RESOURCES

- Operating gravel and/or sand pit  
Abandoned gravel and/or sand pit  
Operating stone quarry  
Abandoned stone quarry  
Potential quarry aggregate resources 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  
"a" in symbol denotes unconsolidated or unknown property.  
"w" denotes Colorado Geological Survey Water/Heat and Gravel projects' drill hole  
Landform boundary, solid where known or inferred; dashed where approximate or inferred

## STATION, LOCATION AND CITY/STATE:

ANALYSIS OF RESULTS

- overburden thickness (ft)
- average basal resource thickness (ft)
- percent sand and fines (passing 10 screen, 0.05 in.), virtual estimation
- significant amount of fines (passing 1000 screen, 0.0015 in. or 0.014 mm.)
- significant amount of decomposed or weak rock
- significant amount of calcium carbonate (calcite)

"u" in symbol denotes unsaturated or unknown property

"s" in symbol denotes property absent or insignificant

QUADRANGLE LOCATION

 NON-RESOURCE OR WITHDRAWN  
AREA

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

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

552000  
ROAD CLASSIFICATION

ROAD CLASSIFICATION

Primary highway. \_\_\_\_\_ Light-duty road, hard or \_\_\_\_\_  
hard surface \_\_\_\_\_ improved surface 104 22 3

Secondary highway. \_\_\_\_\_  
hard surface \_\_\_\_\_ Unimproved road \_\_\_\_\_

☐ Interstate Route ☐ U. S. Route ☐ State Route

CONTOUR INTERVAL 10 FEET

## RESOURCES MAP

DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. ROLD, DIRECTOR  
550000-1111



- Landform work
- Resource classification

LAETITIA SMITH

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

**Change Accounts:**

(at least 500 pps/min on ft screen,  
visual estimation)

1 Gravel: relatively clean and sound

2 Gravel: significant fines, decomposed rock,

Fine Aggregate  
greater than 70% passing #4 screen, 80%  
retained on #200 screen, visual estimation

3        Unvaluated 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-bored interval over sand/gravel resource thickness (14), obtained from well logs.
- "s" indicates gravel; "a" indicates sand
- "x" is symbol denotes unclassified or unknown property.
- "m" denotes Colorado Geological Survey Under/land and Gravel projects' drill hole
- Landform boundary, acid there known or observed; dashed where approximate or inferred.

## STATION, LOCATION AND GEOLOGICAL

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (passing #6 screen, 0.25 in.), visual estimation

significant amount of fines (passing  
100 screen, 0.0015 in. or 0.074 mm.)

— significant amount of decomposed or weak rock.  
— significant amount of calcareous carbonate ('caliche').

\* in symbol denotes uncalculated or unknown property  
\* in symbol denotes property absent or insignificant.



■ 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

2320000

ROAD CLASSIFICATION 5.0000

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



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

GROVER 3 NW

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

## EXPLANATION

Conformable unit  
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 (alluvial)
- M Man-made deposits (lake, landfill, gravel, etc.)

### RESOURCE CLASSIFICATION

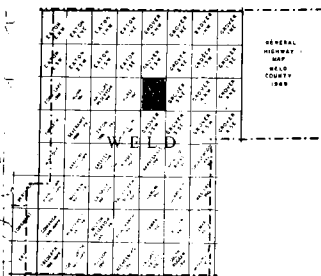
- Class 1: SAND**  
(as defined by the U.S. Army Corps of Engineers, 1954, p. 100)
- 1 Gravel: relatively large and round
- 2 Gravel: significant (100% decomposed rock, calcium carbonate)
- Class 2: GRAVEL**  
(as defined by the U.S. Army Corps of Engineers, 1954, p. 100)
- 3 Sand
- Class 3: QUARRY AGGREGATE**  
(as defined by the U.S. Army Corps of Engineers, 1954, p. 100)
- 4 Potentially 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
- Related 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
- "u" in symbol denotes unrelieved or unknown property
- "m" denotes Colorado Geological Survey Mineralogical and Chemical Projects' drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND GEOLOGICAL INFORMATION

- contour interval (ft)
- handwritten resource thickness (ft)
- ground and floor (spacing 4 ft)
- ground, 0.100 in. or 0.125 in.
- significant amount of fine (spacing 100 mm, 0.100 in. or 0.125 in.)
- significant amount of decomposed or weak rock
- significant amount of calcium carbonate (calcite)
- "u" in symbol denotes unrelieved or unknown property
- "a" in symbol denotes property absent or insignificant



GRID MAP LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

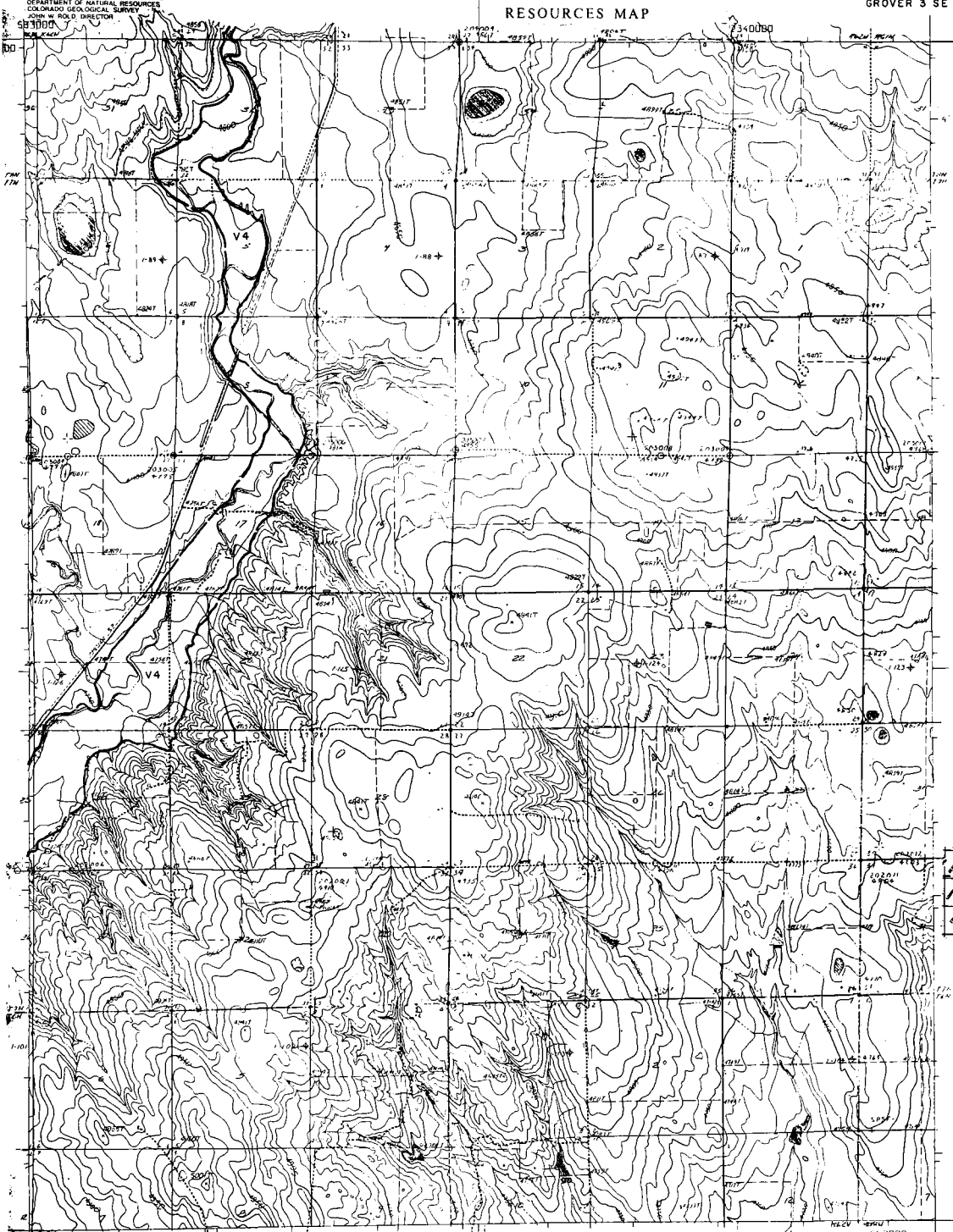
Mapped by: Stephen D. Schwachow  
Date: June 30, 1974

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

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

GROVER 3 SE

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



## EXPLANATION

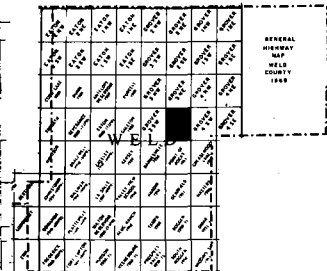
Landform unit  
Resource class/function

- 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, waste, etc.)

- RESOURCE CLASSIFICATION**
- Coarse Aggregate**  
for road and crushed on 48 screen, (actual estimation)
- 1 Gravel: relatively clean and round
  - 2 Gravel: significant fines, decomposed rock, actual estimation
- Fine Aggregate**  
finer than 75 passing 48 screen, 48% retained on 100 screen, actual 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
  - Selected well or drill-hole location with overburden thickness (ft) and sand/gravel resource thickness (ft), obtained from well logs
  - "m" indicates gravel, "s" indicates sand
  - "i" in symbol denotes unutilized or unknown property
  - "m" denotes Colorado Geological Survey Waterflood and Corewell projects
  - drill hole
  - Landform boundary, solid where known or observed; dashed where approximate or inferred

- SYMBOLS, LOCATION AND ORIENTATIONAL DESCRIPTION OF SYMBOLS**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines (percent 48 screen, 0.30 to 1, actual estimation)
  - significant amount of fines (passing 750 screen, 0.004 to 0.075 mm.)
  - significant amount of decomposed or weak rock
  - significant amount of relative carbonate (caliche)
  - "u" in symbol denotes unutilized or unknown property
  - "m" in symbol denotes property adjacent to significant



QUADRANGLE LOCATION  
NON-RESOURCE OR  
WITHDRAWN AREA

Map by: Phillip C. Wicklets  
Date: June 30, 1974

CONTOUR INTERVAL 10 FEET

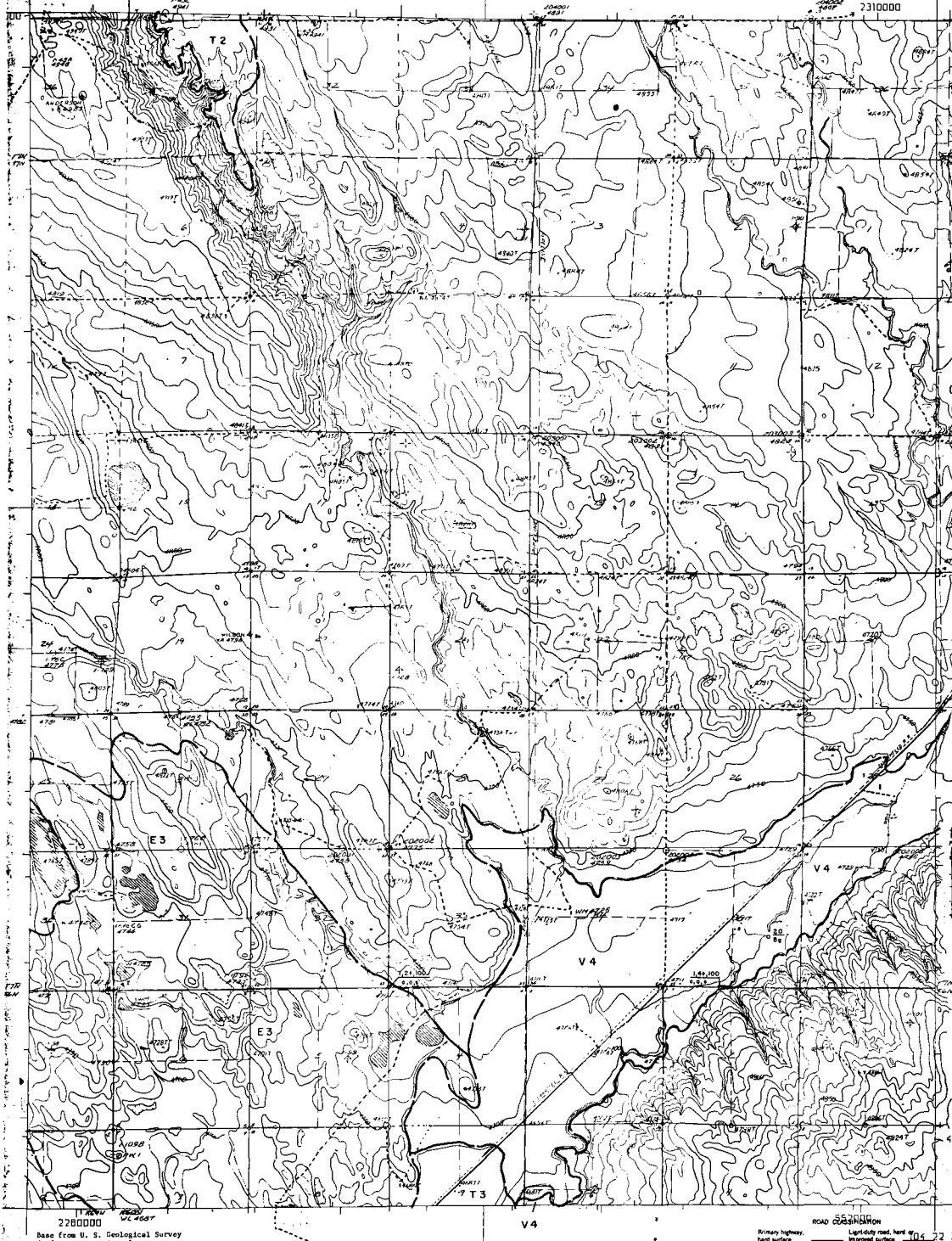
ROAD CLASSIFICATION 3000  
Primary highway: hard surface  
Lightly used road, hard surface  
Secondary highway: hard surface  
Unimproved road  
Interstate Route U.S. Route State Route

GROVER 3 SE 11AFC

# SAND, GRAVEL AND QUARRY AGGREGATE

## RESOURCES MAP

GROVER 3 SW



### EXPLANATION

Contour interval  
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 Non-made deposits (slag, tailings, spoils...)

### RESOURCE CLASSIFICATION

- Gravel**
- 1 Gravel: relatively clean and sized
  - 2 Gravel: unsorted, fine, decomposed rock calcareous
- Fill**
- 1 Gravel: relatively clean and sized, 60% retained on #100 sieve, visual estimation
  - 2 Sand

### OVERLAPPED 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
- Circle (ft): obtained from well logs
- "T" indicates gravel; "U" indicates sand
- "x" in symbol denotes unventilated or unknown property
- "W" denotes Colorado Geological Survey Visitor/Lead and Gravel projects
- 60 ft hole
- Landform boundary, with where known or observed, shaded where approximate or inferred

### STATION LOCATION AND ORIENTATIONAL INFORMATION

- contour interval (ft)
- contour interval (ft)
- percent sand and fines (percent ss)
- percent sand and fines (percent ss)
- significant amount of decomposed or weak rock
- significant amount of calcareous materials (calciferous)
- "x" in symbol denotes unventilated or unknown property
- "W" in symbol denotes property shown or investigated



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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

2780000  
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: hard surface  
Interstate Route  
U.S. Route  
State Route

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

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

GROVER 4 NE

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 Eolian-deposited sand (millon)
- M Man-made deposits (slag, tailings, spoils, etc.)

### RESOURCE CLASSIFICATION

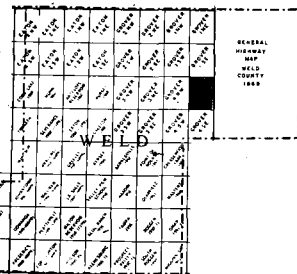
- Gravel Aggregate**  
(at least 10% passing 48 screen, visual estimation)  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, talus, carbonates
- Sand Aggregate**  
(greater than 75% passing 48 screen, 425 retained on 200 screen, visual estimation)  
3 Sand
- Normalized Aggregate**  
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
- Relocated well or drill-hole location with water-bearing thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- "r" indicates gravel; "s" indicates sand  
"u" in symbol denotes unmineralized or unknown property
- "w" denotes Colorado Geological Survey Modified/Find and Gravel projects
- Well hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### SYMBOL, LOCATION AND ORIGIN

- water-bearing thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (passing 48 screen, 0.075 mm), visual estimation
- significant amount of fines (passing 100 screen, 0.0025 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- significant amount of calcareous material
- "u" in symbol denotes unmineralized or unknown property
- "w" in symbol denotes property about or suspected



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Under, V.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 1809-1, pl. 1.

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

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

734000

GROVER 4 NW

EXPLANATION

- ↳ Long-term unit
- ↳ feature classification

LAUFORD 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, spoil, ...)

REPORT CLASSIFICATION

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

Gravel: relatively clean and sound

Gravel: significant fines, decomposed rock, calcium carbonate.

Fine Aggregate  
(greater than 75% passing #4 screen, 50% retained on #200 screen, visual estimator)

3      Devaluated Resource

4      Probable accessible 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.

"n" indicates negative; "s" indicates sand

"-" in symbol denotes unobserved or unknown property.

"w" denotes Colorado Geological Survey Wellbore/Sand and Gravel projects' drill hole

Location boundary, solid where known or observed; dashed where approximate or inferred

## STATION, LOCATION AND GEOLOGICAL

**QUALIFIERS OF DEPOSIT**

overburden thickness (ft)  
sand/gravel resource thickness (ft)  
percent sand and fines (testing 14  
cores, 0.26 in., visual estimation)

1 1.5 50

significant amount of fines (passing  
#20 screen, 0.3054 in. or 0.074 mm.)  
significant amount of decomposed or weak rock  
significant amount of occluded carbonate (indicator

"r" in symbol denotes unmineralized or  
unknown property  
"m" in symbol denotes property, amount  
or insignificant

 QUADRANGLE LOCATION NON-RESOURCE OR WITHDRAWN AREA

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

ROAD CLASSIFICATION 574000

Primary highway, hard surface \_\_\_\_\_ Light-duty road, hard or improved surface 704 07-

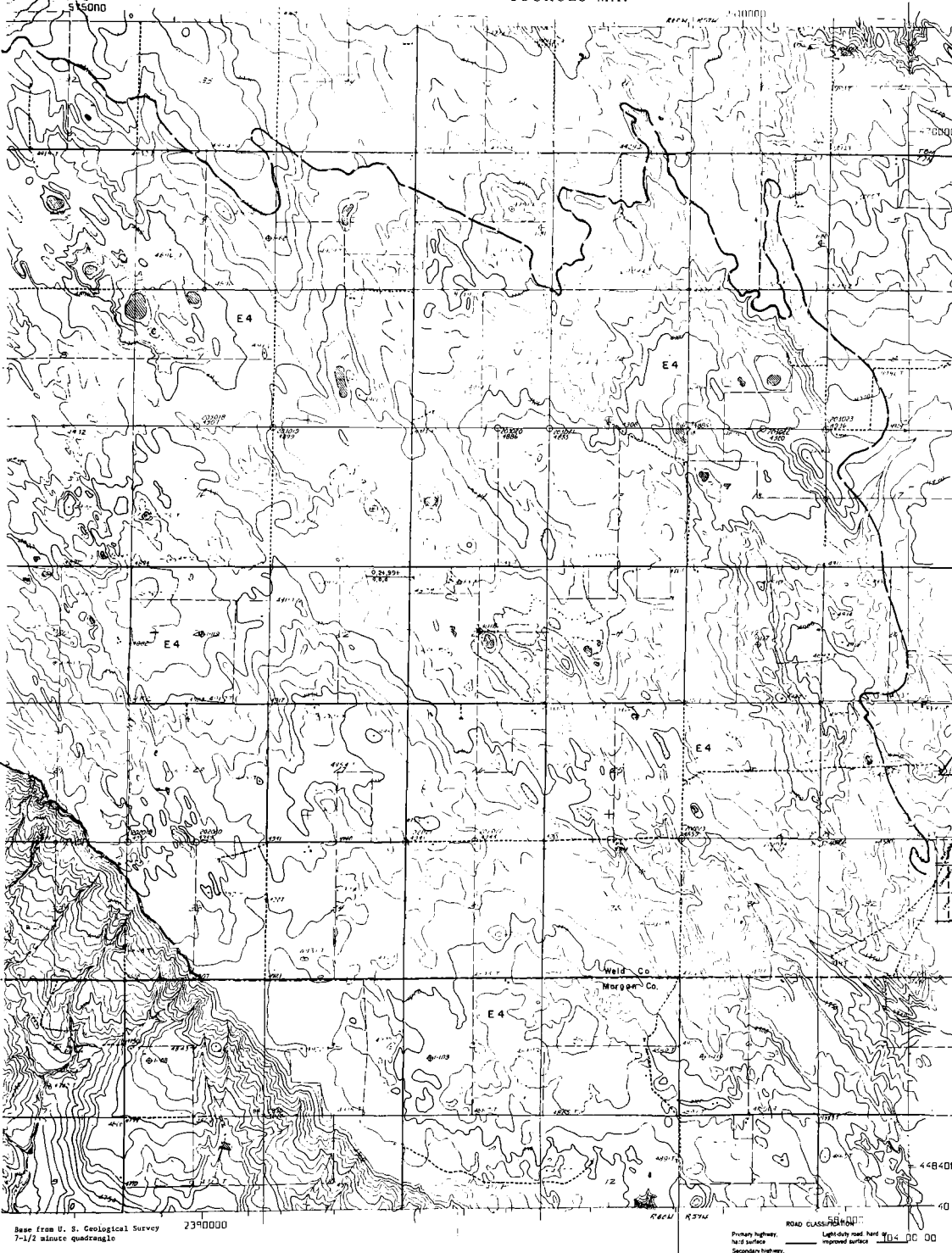
Secondary highway, hard surface \_\_\_\_\_ Unimproved road \_\_\_\_\_

☐ Interstate Route ☐ U. S. Route ☐ State Route

CONTOUR INTERNAL 10 FEET

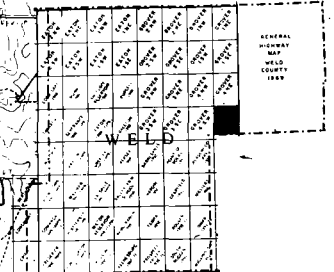
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

GROVER 4 SE



## EXPLANATION

- Land-use unit**  
Resource classification
- LAND-USE 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 Man-made deposits (dike tailings, waste...)
- RESOURCE CLASSIFICATION**  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed conc., calcium carbonate  
3 Sand  
4 Probable aggregate resources
- MAP SYMBOLS**  
Operating gravel and/or sand pit  
Abandoned gravel and/or sand pit  
Abandoned stone quarry  
Potential quarry aggregate resource area  
Revised well or drill-hole location with near-surface thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs  
"x" indicates gravel, "s" indicates sand  
"u" in symbol denotes unconsolidated or unknown property  
"m" denotes Colorado Geological Survey Modernized and Gravel project  
County boundary, solid where known or abstracted; dashed where approximate or inferred
- STATION, LOCATION AND CORRELATION**  
STATION: LOCATION OF AGGREGATE  
contour thickness (ft)  
sand/gravel resource thickness (ft)  
segment road and fines (spacing at corners, 5-10 ft., 10 ft. intersection)  
significant amount of fines (spacing 10 ft. corners, 5-10 ft., or 0-10 ft. m.)  
significant amount of decomposed or weak rock  
significant amount of calcareous nodules residue  
"u" in symbol denotes unconsolidated or unknown property  
"m" in symbol denotes property abstracted or located



QUADRANGLE LOCATION  
NON-RESOURCES OR WITHDRAWN AREA

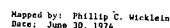
Base from U. S. Geological Survey 2390000  
7-1/2 minute quadrangle

CONTOUR INTERVAL 10 FEET

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

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





ROAD CLASSIFICATION

Primary highway \_\_\_\_\_ Light-duty road, hard or improved surface \_\_\_\_\_

Secondary highway \_\_\_\_\_ Unimproved road \_\_\_\_\_

hard surface \_\_\_\_\_

hard surface \_\_\_\_\_

☐ Interstate Route ☐ U.S. Route ☐ State Route

CONTOUR INTERVAL 10 FEET

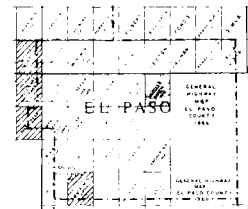
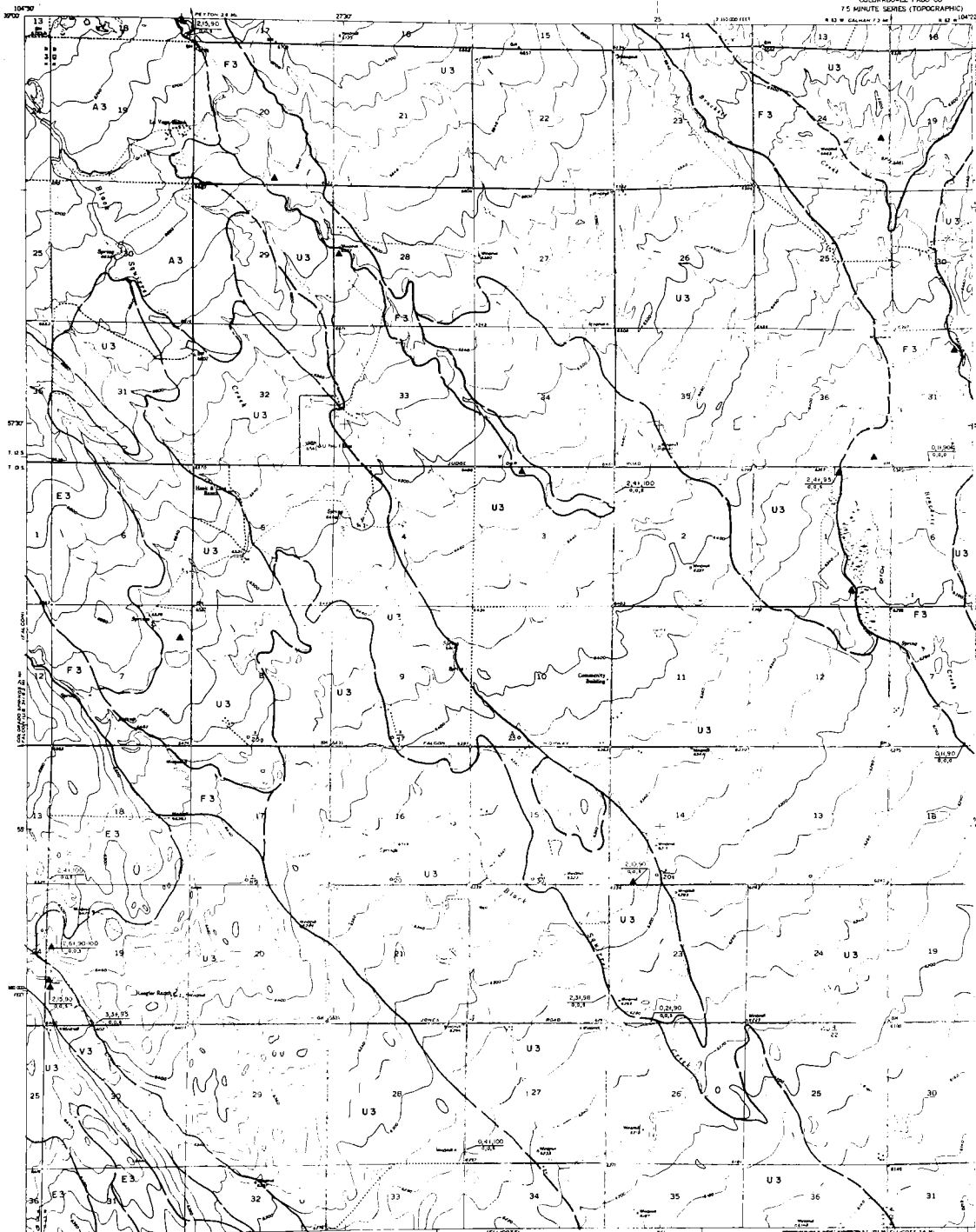
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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

## EXPLANATION

- Legend**
- Landform units
  - Resource classification
- LANDFORM UNITS**
- F Fluvial deposits
  - T Trench terrace deposits
  - V Valley fill (F & T)
  - U Upland deposits
  - A Alluvial fan
  - E Eolian deposits (sand dunes)
  - M Man-made deposits (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- 1. QUANTITATIVE**
- 1.1 Screened aggregate
  - 1.2 Crushed aggregate
  - 1.3 Gravel, relatively free and sound
  - 1.4 Gravel, significant fines, fragmented rock, rather catenaceous
- 2. QUANTITATIVE**
- 2.1 Gravel, relatively free and sound, 40% retained on #20 screen, usual estimation
  - 2.2 Gravel, relatively free and sound, 40% retained on #20 screen, usual estimation
  - 2.3 Sand
  - 2.4 Unutilized resources
  - 2.5 Probable aggregate resources
- 3. QUANTITATIVE**
- 3.1 Operating gravel and/or sand pit
  - 3.2 Abandoned gravel and/or sand pit
  - 3.3 Operating stone quarry
  - 3.4 Abandoned stone quarry
  - 3.5 Potential quarry aggregate resource area
  - 3.6 Related well or drill-bit location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
  - 3.7 Indication gravel, "C" indication sand
  - 3.8 "C" in symbol denotes unutilized or unknown property
  - 3.9 Denotes Colorado Geological Survey Wonder/Lead and Gravel projects
  - 3.10 Locum boundary, solid where known or dashed where approximate or inferred
- 4. QUANTITATIVE**
- 4.1 Station, location and geological description of deposit
  - 4.2 Station, location and geological description of deposit
  - 4.3 Station, location and geological description of deposit
  - 4.4 Station, location and geological description of deposit
  - 4.5 Station, location and geological description of deposit
  - 4.6 Station, location and geological description of deposit
  - 4.7 Station, location and geological description of deposit
  - 4.8 Station, location and geological description of deposit
  - 4.9 Station, location and geological description of deposit
  - 4.10 Station, location and geological description of deposit



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Map by: Stephen D. Schuchow  
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
- U.S. Route
- State Road

HAEGLER RANCH, COLO

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

HANOVER QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

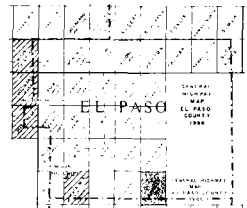
## EXPLANATION

Landform unit  
Resource class/feature

**LANDFORM UNITS**  
F Fluvial deposit  
T Tectonic terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Marine deposit (clay, silt, sand, gravel, etc.)

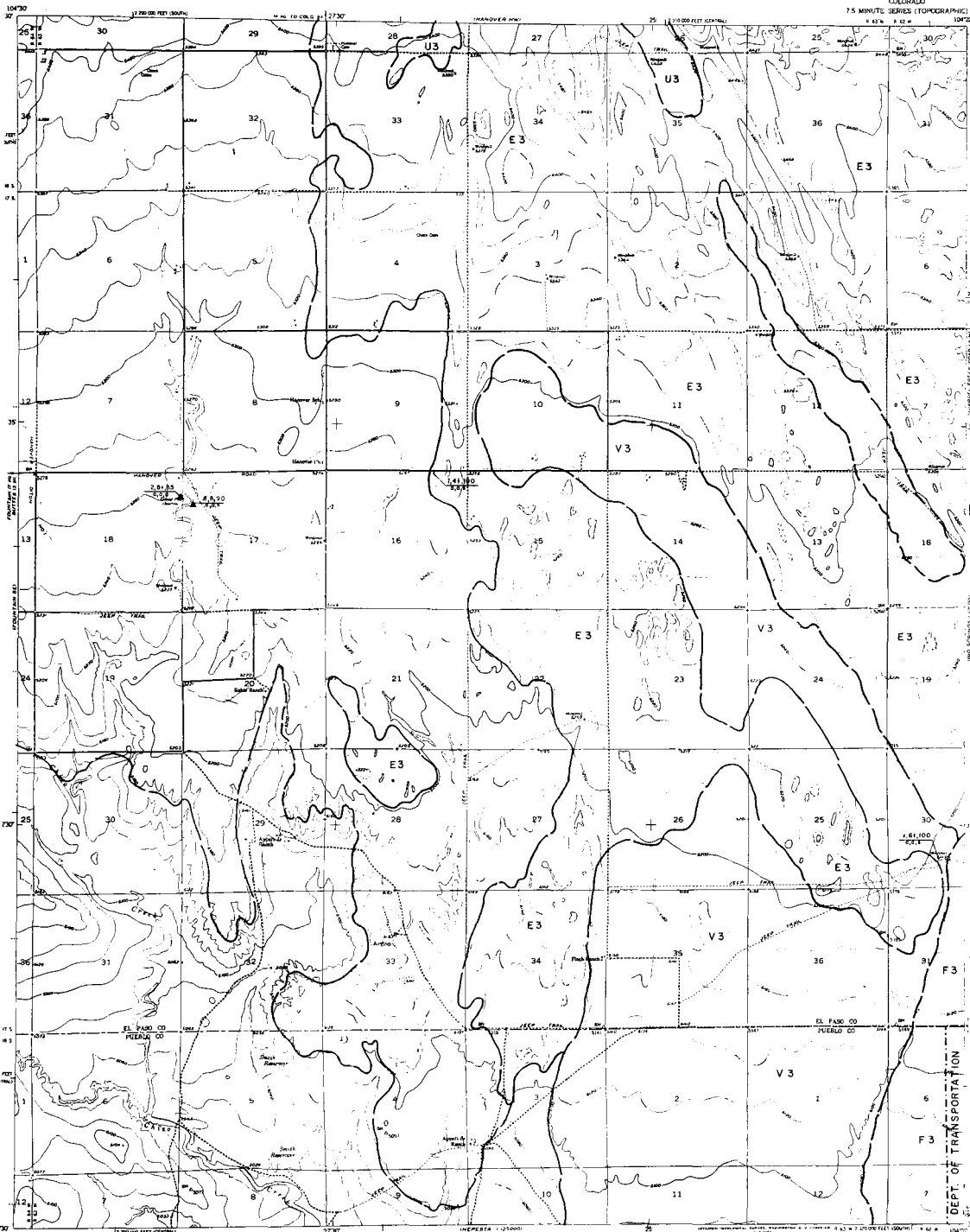
**RESOURCE CLASSIFICATION**  
1. Gravel: relatively clean and well sorted, abundant  
2. Gravel: significant fines, decomposed rock, medium to coarse  
3. Sand  
4. Probable aggregate resource

**MAP SYMBOLS**  
Operating gravel and/or sand pit  
Operating stone quarry  
Potential quarry aggregate resource area  
Mineral well or drill-hole location with overburden thickness (ft) near sand/gravel resource  
"m" indicates gravel, "s" indicates sand  
"u" or symbol denotes unmineralized or unknown property  
"m" denotes Colorado Geological Survey boundary and "drill hole"  
Landform boundary, solid where known or observed; dashed where approximate or inferred  
**STATION, LOCATION AND CHRONOLOGICAL INFORMATION**  
northward thickness (ft)  
southward thickness (ft)  
percent and from (starting at corner, 0.1 in. 1, 1/2 inch estimation)  
significant amount of fines (less than 0.075 mm)  
significant amount of decomposed or weak rock  
significant amount of siliceous carbonate (limestone)  
"u" or symbol denotes unmineralized or unknown property  
"m" or symbol denotes property absent or insignificant



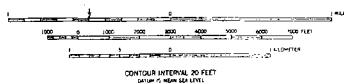
QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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



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

APPROXIMATE MEAN  
DECOMPOSITION 1974



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

HANOVER, COLO.

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

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



- ↳ Land use
- ↳ Resource allocation

LANDFORM (METS)

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)

## RESULTS AND DISCUSSION















Gravel Aggregate  
-at least 75% retained on #6 screen,  
-small amount of fines:

1	Gravel	relatively clean and sound
2	Gravel	significant fines, decomposed rock salts and carbonates.

Fine Aggregate  
 (greater than 75% passing #4 screen, 60%  
 retained on #200 screen, visual estimation)

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 no bottom thickness (ft) over sand/gravel
-  Selected well or drill-hole location with bottom thickness (ft) over sand/gravel
-  Shutter (feet), obtained from well logs
-  Indicated gravel; "a" indicates sand
-  Indicated sand; "a" indicates gravel
-  Unlabeled device; unavaluated or unknown property
-  Denver Colorado Geological Survey Waterflood and Gravel projects
-  Drill hole
-  Landform boundary, solid where known or observed; dashed where approximate or inferred

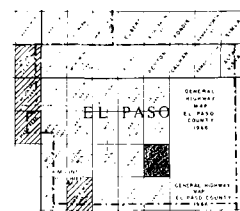
STATION, LOCATION AND GEOLOGICAL

DESCRIPTION OF DEPOSIT

- overhead thickness (ft)
- hardened resource thickness (ft)
- percent and fine (passing #20 screen, 0.15 in.), visual estimation
- significant amount of fines (passing #200 screen, 0.0075 in. or 0.75 mm)
- significant amount of decomposed or weak rock
- significant amount of solution carbonate (calcite)

"x" in symbol denotes untested or unknown property

"u" in symbol denotes property absent or insignificant

 ORANGE LOCATION NON-RESOURCE OR  
WITHDRAWN AREA

Geology modified after Solister, P. E., 1968,  
U. S. Geological Survey, Map GQ-725.

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

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



CONTOUR INTERVAL 20 FEET

ROAD CLASSIFICATION

Heavy-duty \_\_\_\_\_ Light-duty \_\_\_\_\_  
Medium-duty \_\_\_\_\_ Unimproved dirt .....

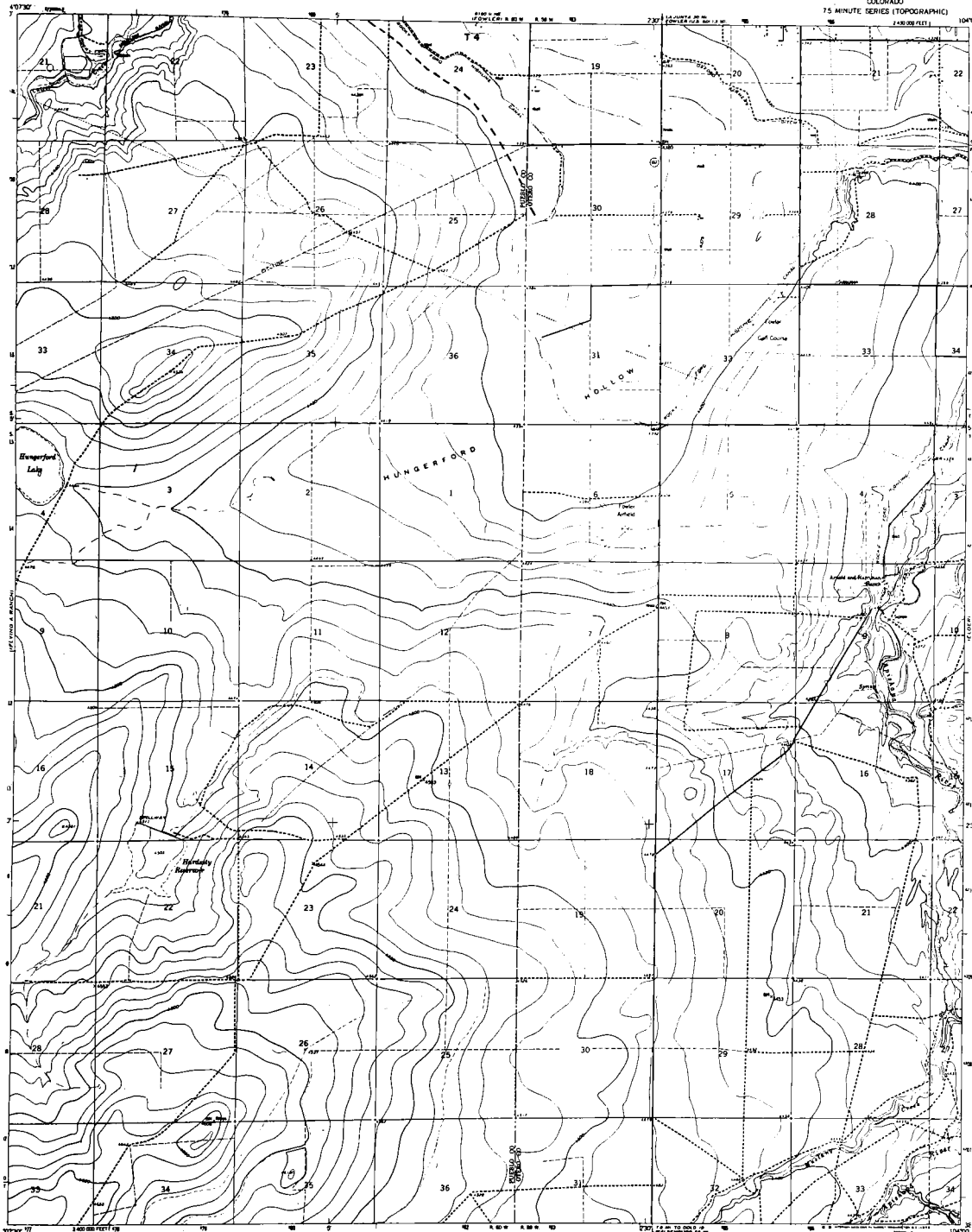
 U.S. Route       State Route

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

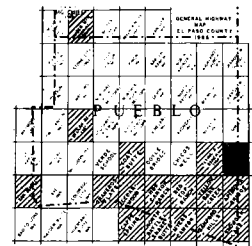
Landform units  
Resource of Sand/Gravel

**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 Non-sand deposit (clay, silt, gravel, etc.)

**RESOURCE CLASSIFICATION**  
**Coarse Aggregate**  
(at least 10% passing 48 screen, 48% retained on #20 screen, actual estimation)  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed rock, solution calcareous  
**Fine Aggregate**  
(greater than 75% passing #48 screen, 48% retained on #20 screen, actual estimation)  
3 Sand  
**Unsuitable Resource**  
4 Probably aggregate resource

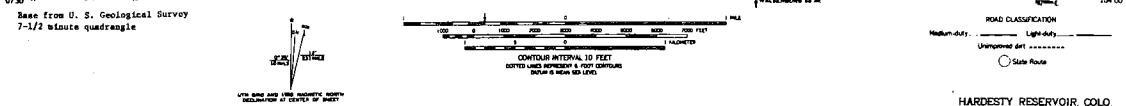
**MAP SYMBOLS**  
A Operating gravel and/or sand pit  
B Abandoned gravel and/or sand pit  
C Operating stone quarry  
D Abandoned stone quarry  
E Potential quarry aggregate resource area  
F Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.  
G "x" indicates gravel; "o" indicates sand  
H In symbol denotes unmineralized or unknown property  
M denotes Colorado Geological Survey Mineral/land and gravel projects  
L drill hole  
Landform boundary, solid where known or inferred, dashed where approximate or inferred

**STATION, LOCATION AND ORIGIN OF AGGREGATE**  
overburden thickness (ft)  
sand/gravel resource thickness (ft)  
percent sand and fines (passing #48 screen, 0-75 in.), actual estimation  
significant amount of fines (passing #20 screen, 0-60 in. or 0.75 in.)  
significant amount of decomposed or weak rock  
significant amount of minor or unknown material  
"u" in symbol denotes unmineralized or unknown property  
"x" in symbol denotes property absent or insignificant



■ QUADRANGLE LOCATION  
▨ NON-RESOURCE OR WITHDRAWN AREA

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

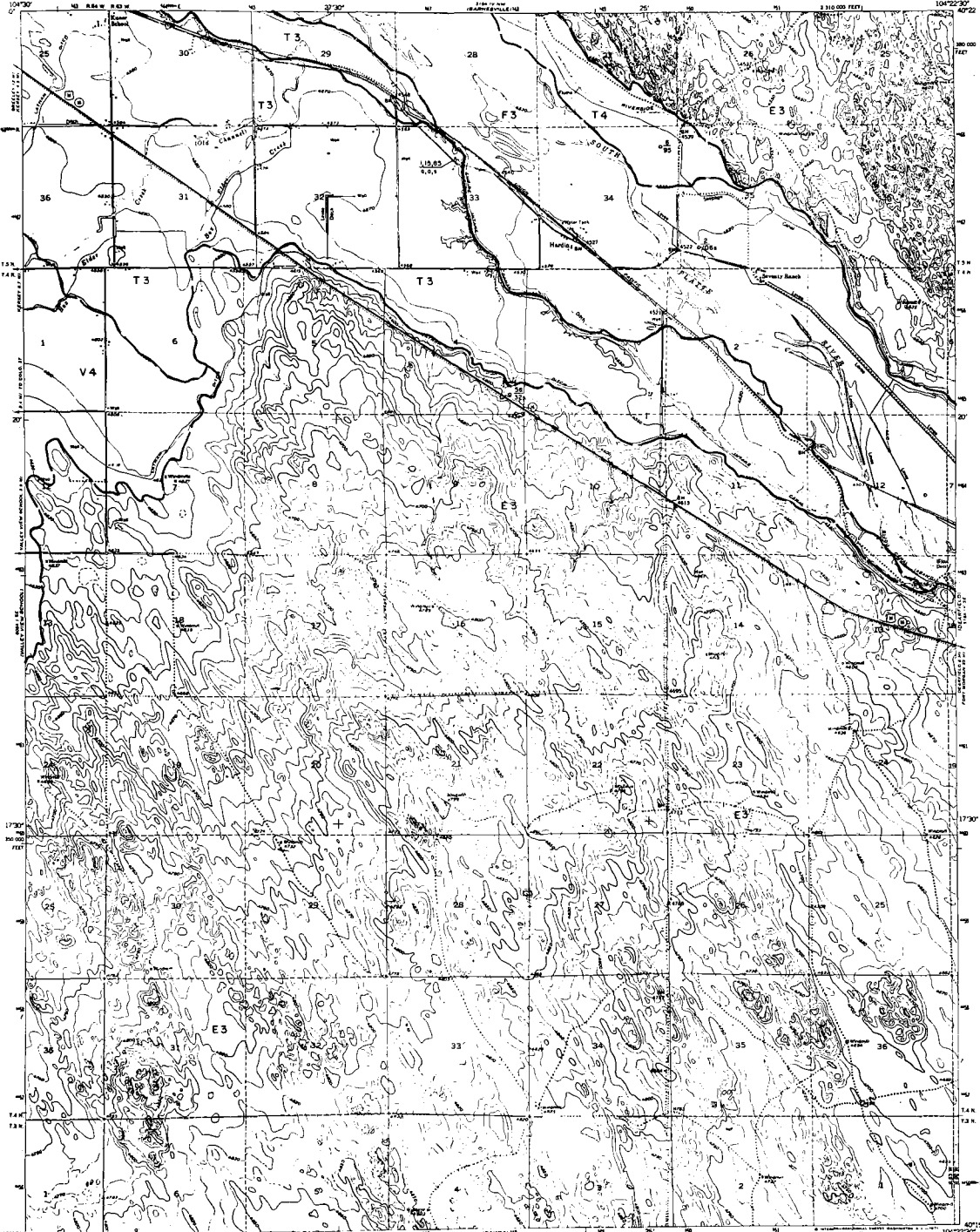


ROAD CLASSIFICATION  
Main-duty ——— Light-duty ———  
Unimproved det. - - - - -  
State Route ○

HARDESTY RESERVOIR, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

HARDIN QUADRANGLE  
COLORADO-WELD CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
104°22'30" W  
37°52'00" N



## EXPLANATION

- Landform unit**  
Resource identification
- LANDFORM UNIT**  
F Fluvial deposit  
T Tertiary terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M (slag, tailings, spoils...)
- RESOURCE CLASSIFICATION**  
**COARSE AGGREGATE**  
1st (about 100' recorded on 40' screen, visual estimation)  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed, thin, medium to coarse  
**FINE AGGREGATE**  
(greater than 100' passing 40' screen, 60' recorded on 100' screen, visual estimation)  
3 Sand  
**Unconsolidated Aggregate**  
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  
\* Indicated 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.  
\* "s" in circles denotes unconsolidated or medium property.  
\* "m" denotes Colorado Geological Survey Waterflooded and Gravel resource.  
\* Well hole.  
\* Landform boundary, solid black lines or observed dashed where specimens or inferred.
- POSITION, LOCATION AND GEOLOGICAL INFORMATION OF QUADRANGLE**  
\* overburden thickness (ft)  
\* sand/gravel resource thickness (ft)  
\* percent sand and fines (passing 40' screen, 0 to 100, visual estimation)  
\* significant amount of fines (passing 100' screen, 0 to 100, or 0.075 to 1)  
\* significant amount of decomposed or weak rock.  
\* significant amount of medium carbonate (calcite)  
\* "s" in circles denotes unconsolidated or medium property.  
\* "m" in circles denotes properly placed or insignificant.

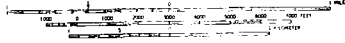
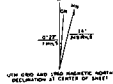


QUADRANGLE LOCATION  
NON-RESOURCE OR WYTHAM AREA

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 Fawcett, Nebraska: U. S. GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1376, pl. 1.

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

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



CONTOUR INTERVAL 10 FEET  
(BASED ON 100' MEAN SEA LEVEL)

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

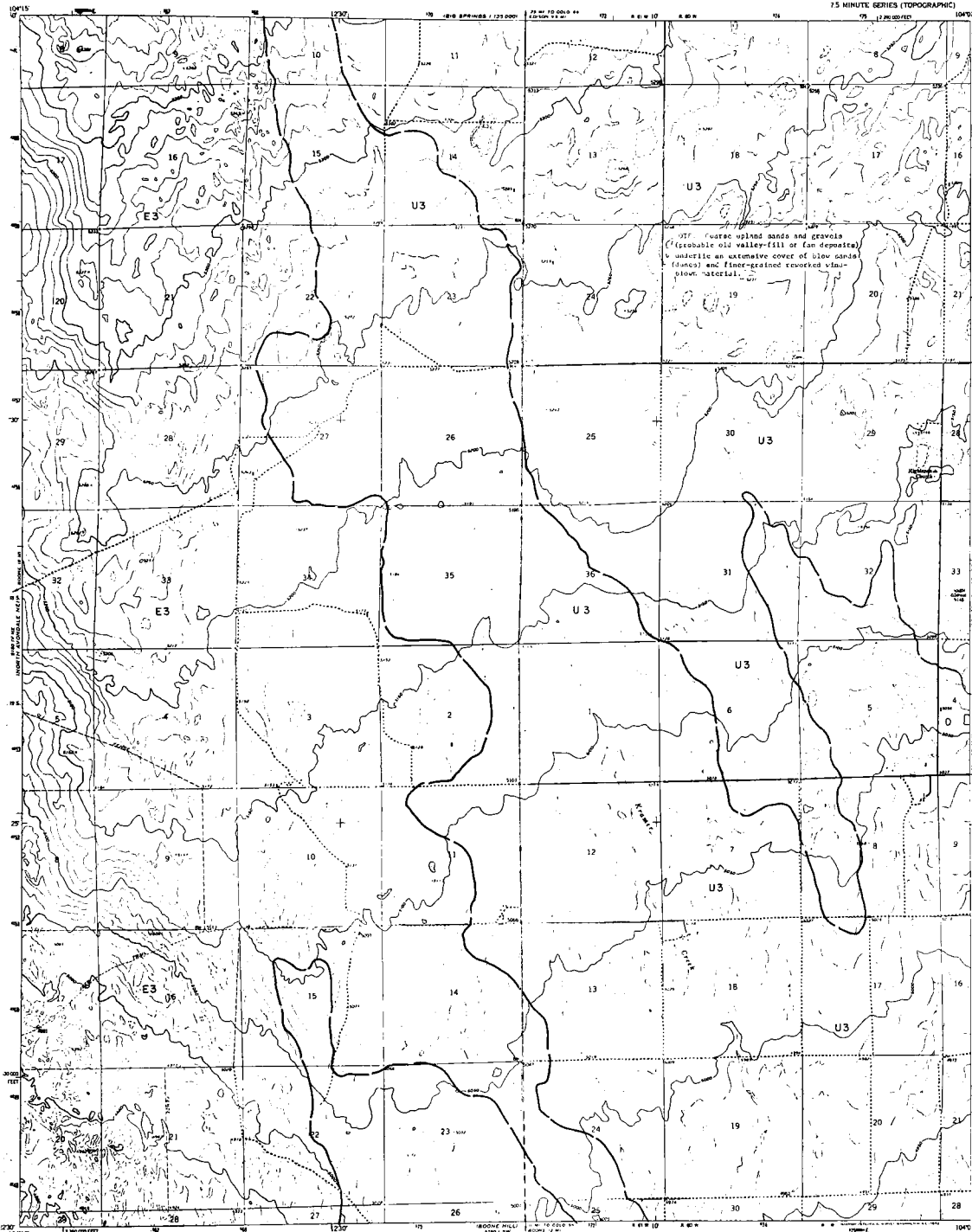
HARDIN, COLO.  
NAD83 1042237.5  
1993  
AMS 5184 IV SW-SERIES 1977



# SAND, GRAVEL AND QUARRY AGGREGATE

## RESOURCES MAP

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



## EXPLANATION

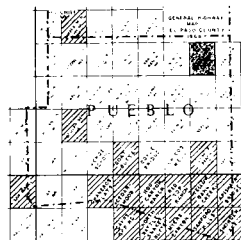
Landform unit  
Resource unit classification

- LANDFORM UNITS**
- F Fluvial deposit
  - T Tectonic deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Eolian deposit and (alluvial)
  - M Marine deposit (e.g., talus, silt, etc.)

- RESOURCE CLASSIFICATION**
- 1 Coarse aggregate (e.g., gravel, sand, and/or crushed rock)
  - 2 Gravel (relatively clean and round)
  - 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 unit or delineable location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
  - "y" indicates gravel; "s" indicates sand
  - "u" in symbol denotes unutilized or unknown property
  - "m" denotes Colorado Geological Survey boundary (land and gravel products) drill hole
  - Landform boundary, with where known or observed; dashed where approximated or inferred

- STATION LOCATION AND TOPOGRAPHIC DESCRIPTION OF SYMBOL**
- Overburden thickness (ft)
  - Sand/gravel resource thickness (ft)
  - Percent sand and fines (ignoring 40 screen, 0.075 in., visual estimation)
  - Significant amount of fines (passing 100 screen, 0.0075 in., or 0.075 mm)
  - Significant amount of dampness on unit rock
  - "u" in symbol denotes unutilized or unknown property
  - "m" in symbol denotes properly placed or changed/changed



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

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



HIGHLANDS CHURCH, COLO

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

HIGHLANDS RANCH QUADRANGLE  
MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

**LEGEND**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Unad deposit  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Man-made deposits (landfill, spoil, etc.)

## RESOURCE CLASSIFICATION

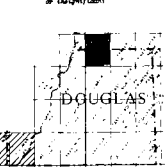
**CLASSIFICATION**  
(or last 725 feet) - 40 acres, 100 ft. wide  
1 Gravel: relatively clean and sand  
2 Gravel: significant fines, decomposed rock  
3 Sand  
4 Probable aggregate resource

## 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) over sand/gravel resource thickness (ft); shaded from well logs  
"x" indicates gravel; "s" indicates sand  
"u" in symbol denotes unconsolidated or unknown property  
"m" denotes Colorado Geological Survey "under/land and gravel project" drill hole  
Landline boundary, solid where known or inferred; dashed where approximate or inferred

## STATION, LOCATION AND TOPOGRAPHICAL INFORMATION

underburden thickness (ft)  
sand/gravel resource thickness (ft)  
parent and old river (showing as common) (ft) on 1/4 section  
significant amount of fines (showing as common) (ft) on 1/4 section  
significant amount of decomposed or weak rock  
significant amount of mineral resources (tailings)  
"u" in symbol denotes unconsolidated or unknown property  
"m" in symbol denotes property owned or leased by mineral

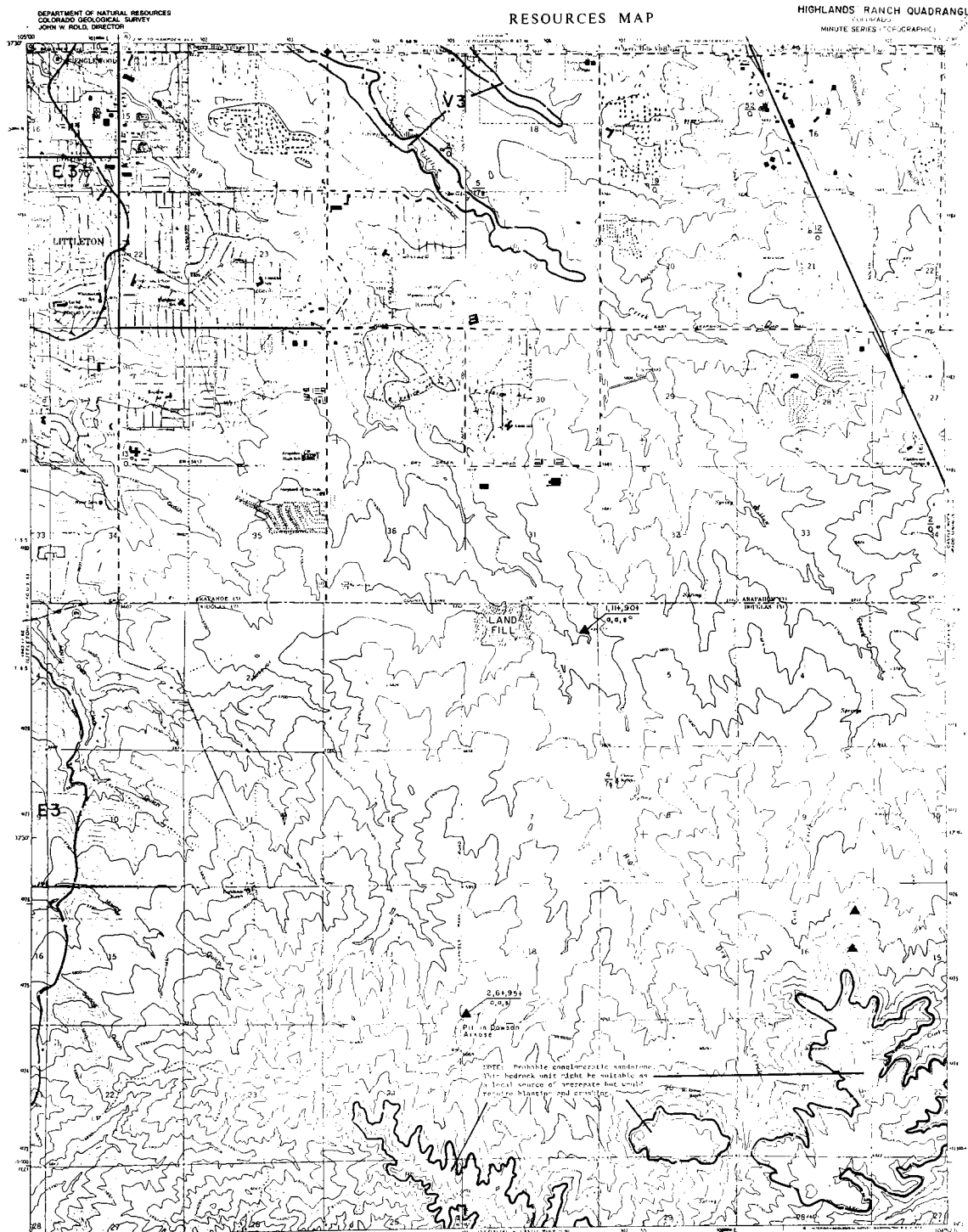


QUADRANGLE LOCATION  
NON-RESOURCE OR VETERAN AREA

## REFERENCE

Chase, G.H., and McCaughey, J.A., 1972. Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Map T-731.  
Petrie, D.F., and Fitch, 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. Map T-856-A.

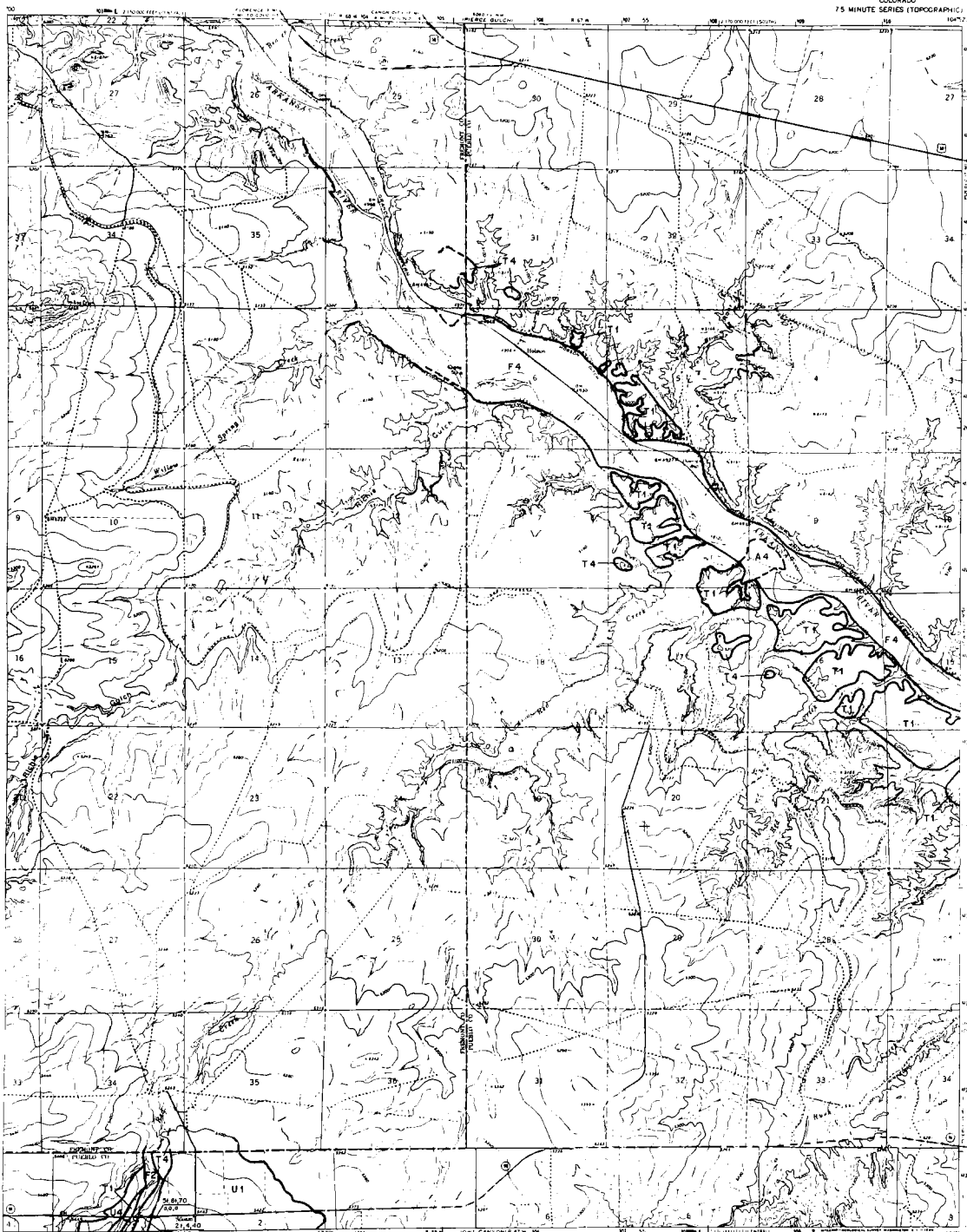
Map by: Ralph S. Shroba  
Date: June 30, 1974  
Prepared in cooperation with the U. S. Geological Survey.



Scale from U. S. Geological Survey 7-1/2 minute quadrangle  
ROAD CLASSIFICATION  
Heavy duty Light duty  
Medium duty Unimproved dirt  
Unimproved Road U.S. Road State Road  
HIGHLANDS RANCH COLO

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

HOBBSON QUADRANGLE  
COLORADO  
75 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

Conform unit  
Resource classification

### LAPTOP UNIT

- F Floodplain deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (alluvial)
- M Marine deposit (sand, silt, clay, etc.)

### RESOURCE CLASSIFICATION

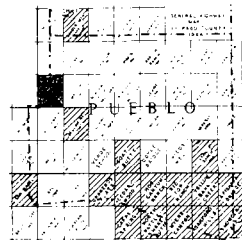
- 1. Gravel: relatively clean and well sorted
- 2. Gravel: significant fines, decomposed rock, calcareous materials
- 3. Sand
- 4. Probable aggregate resource

### HOBBSON QUADRANGLE

- 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
- "r" indicates gravel; "s" indicates sand
- "r" in symbol denotes unconsolidated or volcanic material
- "m" denotes Colorado Geological Survey "Master/Block and Gravel" projects
- Drill hole
- Landform boundary, solid where known or dashed where approximate or inferred

### FLATTON, LOCATION AND GEOLOGICAL

- overburden thickness (ft)
- related well or drill-hole location with over-burden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- significant amount of fines (silt, clay, etc.) in sand or gravel
- significant amount of decomposed or weak rock
- significant amount of relation to resource (miles)
- "r" in symbol denotes unconsolidated or volcanic material
- "m" denotes Colorado Geological Survey "Master/Block and Gravel" projects
- Drill hole
- Landform boundary, solid where known or dashed where approximate or inferred

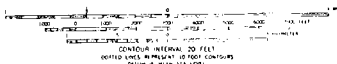


QUADRANGLE LOCATION  
NON-RESOURCE OR WETDRY AREA

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

Map by: Ralph R. Shrobe  
Date: June 30, 1974

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



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

HOBBSON, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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

## EXPLANATION

**Landform unit**  
Resource classification

**LANDFORM UNITS**  
P Floodplain deposits  
T River terrace deposits  
V Valley fill (P & T)  
U Upland deposits  
A Alluvial fan  
B Wind-deposited sand (eolian)  
M Man-made deposits (fill, landfill, spoil, ...)

**RESOURCE CLASSIFICATION**  
CLASS 1 (SAND & GRAVEL)  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed rock, calcareous material  
3 Sand  
4 Probable aggregate resource

**QUALITY CLASSIFICATION**  
1 Quaternary 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  
6 Reserved well: hole location with overburden thickness (ft) over aggregate resource thickness (ft), obtained from well logs  
7 "a" indicates gravel; "s" indicates sand  
8 "u" in symbol denotes unconsolidated or unknown property  
9 "m" denotes Colorado Geological Survey Mountain Road and Gravel Projects  
10 Well hole  
11 Landform boundary, solid where known or observed; dashed where approximate or inferred

**MAP SYMBOLS**  
1 Quaternary 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  
6 Reserved well: hole location with overburden thickness (ft) over aggregate resource thickness (ft), obtained from well logs  
7 "a" indicates gravel; "s" indicates sand  
8 "u" in symbol denotes unconsolidated or unknown property  
9 "m" denotes Colorado Geological Survey Mountain Road and Gravel Projects  
10 Well hole  
11 Landform boundary, solid where known or observed; dashed where approximate or inferred

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

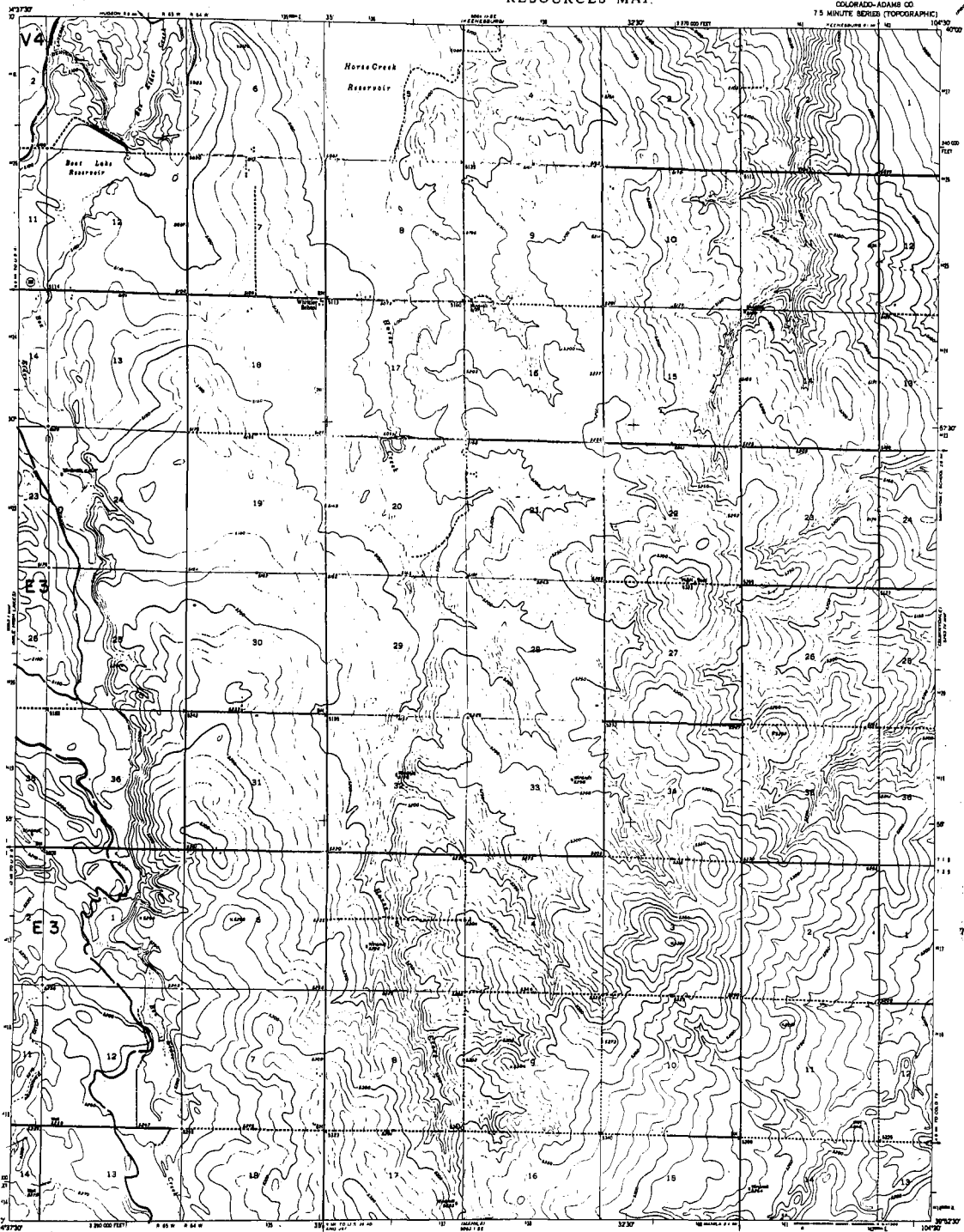
**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known

**STATION, LOCATION AND ORIGIN**  
1 Overburden thickness (ft)  
2 Sand/gravel resource thickness (ft)  
3 Reserve sand and gravel (spacing at 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
4 Significant amount of fines (spacing 100 ft, 10 ft, 5 ft, 2 ft, 1 ft)  
5 Significant amount of decomposed or weak rock  
6 Significant amount of calcareous material  
7 "a" in symbol denotes unconsolidated or unknown property  
8 "s" in symbol denotes sand  
9 "m" in symbol denotes property absent or (un)known



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



CONTOUR INTERVAL 10 FEET  
Datum is mean sea level.

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

HORSE CREEK, COLO.

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

**REFERENCE:**  
Bath, L.D., Schneider, P.A., Jr., and Petri, L.R., 1968, Ground-water resources of the South Platte River basin in western Adams and southeastern Weld Counties, Colorado; U. S. Geol. Survey Water-Supply Paper 1058, pl. 1.

HORSETOOTH RESERVOIR

DOI: 10.1002/col.10402



**LANGUAGE FILE**

- |   |  |
|---|--|
| F | Floodplain deposit                               |
| T | Stream terrace deposit                           |
| V | Valley fill (F & T)                              |
| U | Dune deposits                                    |
| A | Alluvial fan                                     |
| E | Wind-deposited sand (eolian)                     |
| M | Man-made deposits<br>(slag, tailings, spoils...) |

EXERCISE CLASSIFICATION

Corticea Asperata

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

Flow Analysis  
(greater than 70% passing #4 screen, 60% retained on #200 screen, visual extinction)

- 3 Land  
Devaluated Resource  
4 Probable aggregate resource

## NAF STUDIOS

- [illegible]

## STATION, LOCATION AND GEOLOGICAL

- DESCRIPTION OF MODEL
- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and gravel passing #4 screen, 0.85 (s.), lateral estimation
- 17, 40
- sign/cross percent of fines (passing #10 sieve, 0.075 mm.)
- sign/cross amount of decomposed or weak rock
- sign/cross amount of volcanic ash/basalts (vol%)
- "s" in symbol denotes unestimated or unknown property
- "a" in symbol denotes property absent or insignificant

QUADRANT LOCATION

NON-RESOURCE OR  
WITHDRAWN AREA

#### REFERENCE:

- Swan, F. R., 1971, 1972, Map of surficial geology of part of the Horsetooth Reservoir quadrangle: Katom. Mapping for Colorado Geol. Survey Windoor Environmental Geology Project, open-file map.
- Bradstock, 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.

- Bershey, 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.

Shaleon, D.C., 1974, personal communication.

Geology modified after: Colton, W.B., and Fitch, E.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: Stephan D. Schwachow  
Date: June 30, 1974

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

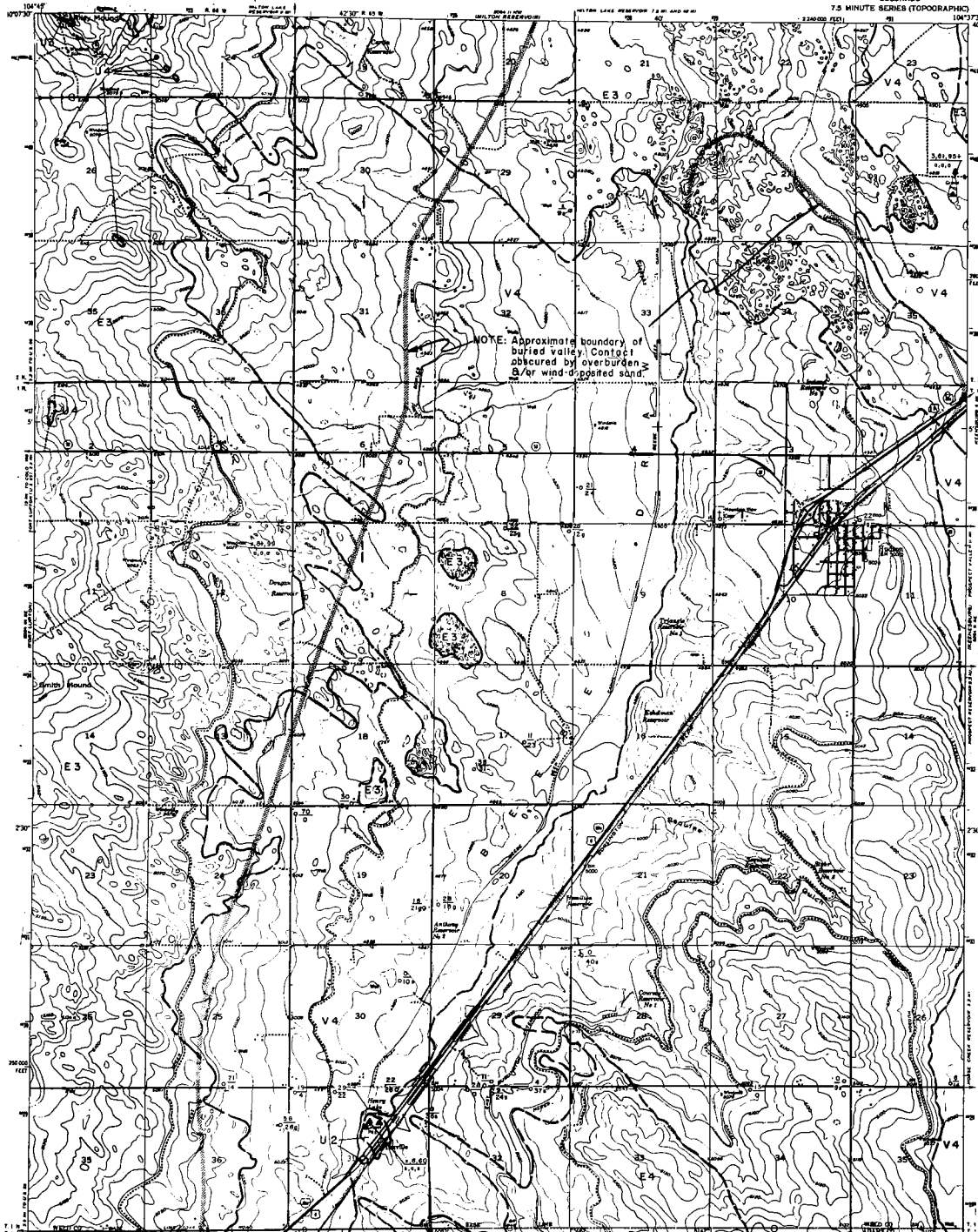
HORSETOOTH RESERVOIR, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE

## RESOURCES MAP

HUDSON QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



### EXPLANATION

- Landform unit  
Resource classification
- AGGREGATE TYPES**
- F Floodplain deposit
  - T Stream terrace deposit
  - V Valley fill (F & T)
  - U Wind deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Man-made deposits (slag, tailings, refuse, etc.)
- RESOURCE CLASSIFICATION**
- Gravel** (estimated on 10 screen, actual estimation)
- 1 Gravel: relatively clean and round
  - 2 Gravel: significant fines, untempered rock, calcine tailings
- Sand** (estimated on 20 screen, actual estimation)
- 3 Sand
  - 4 Probable aggregate resource
- WELL TYPES**
- A Abandoned gravel and/or sand pit
  - Q Operating stone quarry
  - Q Abandoned stone quarry
  - Q Potential quarry aggregate resource area
  - Q Isolated well or drill-hole location with untempered thickness (U) over sand/gravel; thickness (U), obtained from well logs.
  - "s" indicates gravel; "f" indicates sand
  - "s" in symbol denotes untempered or unknown property
  - "u" denotes Colorado Geological Survey (untempered) and Gravel project (tempered)
  - Landform boundary, solid where known or inferred
  - Landform boundary, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL INFORMATION OF AGGREGATE**
- nominal thickness (ft)
  - undrained maximum thickness (ft)
  - percent sand and fines (spacing of screen, 0.075 in. or 0.075 mm.)
  - significant amount of untempered or well rock
  - significant amount of material untempered (untempered)
  - "u" in symbol denotes untempered or unknown property
  - "s" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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

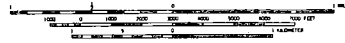
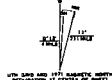
Collier, R.B., and Pich, J.H., 1974, Map showing potential sources of gravel and crushed-rock aggregates in the Boulder-Fort Collins-Oradley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-835-D.

Map by: Ralph B. 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

ADDITIONAL DATA  
CONTOUR INTERVAL: 10 FEET



CONTOUR INTERVAL 10 FEET  
ELEVATION IN FEET

**ROAD CLASSIFICATION**

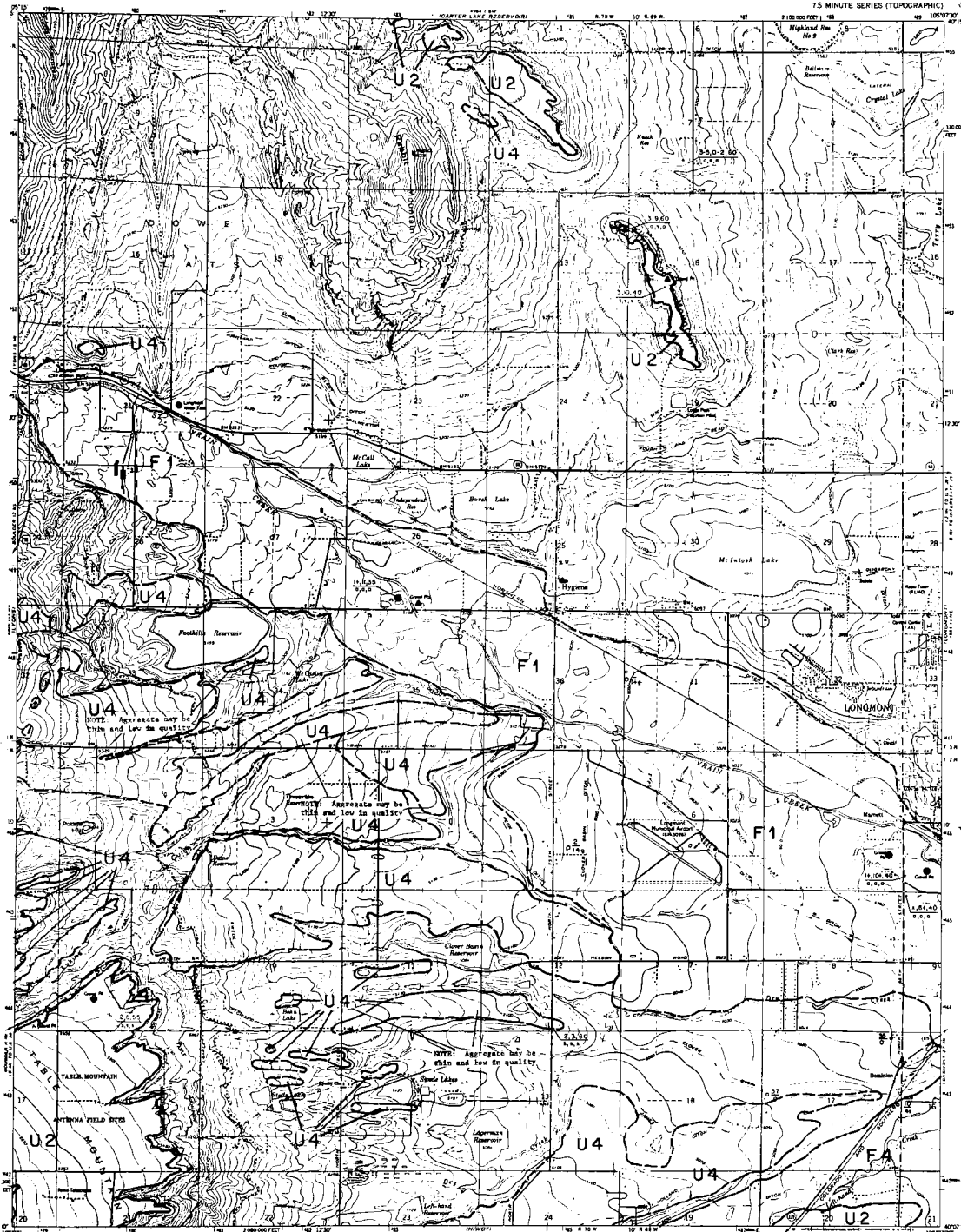
- Primary highway: hard surface
- Secondary highway: hard surface
- Unimproved road
- Interstate Route
- U. S. Route
- State Route

HUDSON, COLO.



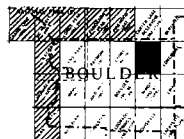
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

HYGIENE QUADRANGLE  
COLORADO-Boulder CO  
15 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

- Landform units**  
Resource class/function
- 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 Non-sand deposits (slag, tailings, waste, etc.)
- RESOURCE CLASSIFICATION**  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, calcareous cementation  
3 Sand  
4 Probable aggregate resource
- MAP SYMBOLS**  
\* Operating gravel and/or sand pit  
\* Abandoned gravel and/or sand pit  
\* Overlying some quarry  
\* Abandoned some quarry  
\* Potential quarry aggregate resource area  
\* Potential well or drill-hole location with overburden thickness (ft) over sand/gravel resource  
\* Thickness (ft) obtained from well logs  
\* "x" indicates gravel; "s" indicates sand  
\* "u" in circle denotes unconsolidated or unknown property  
\* "m" denotes Colorado Geological Survey  
\* Unconsolidated and gravel projects  
\* Drill hole  
\* Landform boundary, solid where known or observed, dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL**  
**CLASSIFICATION OF ROCKS**  
\* Overburden thickness (ft)  
\* Sand/gravel resource thickness (ft)  
\* Gravel and sand (ft) overlying #4  
\* Gravel, 2.5 ft or more, 0.005 ft or 0.01 ft  
\* Significant amount of fines (passing 100 screen, 0.005 ft or 0.01 ft)  
\* Significant amount of decomposed or weak rock  
\* Significant amount of calcareous cementation (calcite)  
\* "u" in circle denotes unconsolidated or unknown property  
\* "m" in circle denotes properly observed or unobserved



QUADRANGLE LOCATION

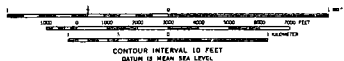
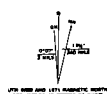
NON-RESOURCE OR  
WETLAND AREA

Geology modified after:  
Colborn, R.B., and Petch, W.B., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Greeley Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map I-835-D.

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



CONTOUR INTERVAL 10 FEET  
ELEVATION IN FEET SEA LEVEL

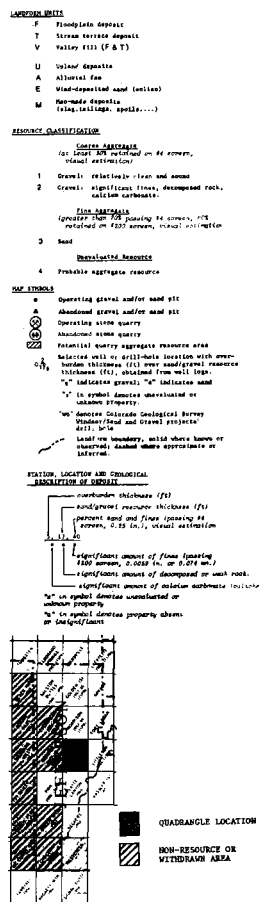
**ROAD CLASSIFICATION**  
Heavy-duty Light-duty  
Medium-duty Unimproved dirt  
U.S. Route State Route

HYGIENE, COLO.

## RESOURCES MAP

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

Uniform wire



Geology modified after  
Seett, C.R., 1961, Preliminary geologic map  
of the Indian Hills quadrangle, Jefferson  
County, Colorado: U.S. Geol. Survey Misc.  
Geol. Inv. Map I-333.

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

Triable, D.Z., and Fitch, H.N., 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 1-856-A.

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

Prepared in cooperation with the  
U. S. Geological Survey

ROAD CLASSIFICATION

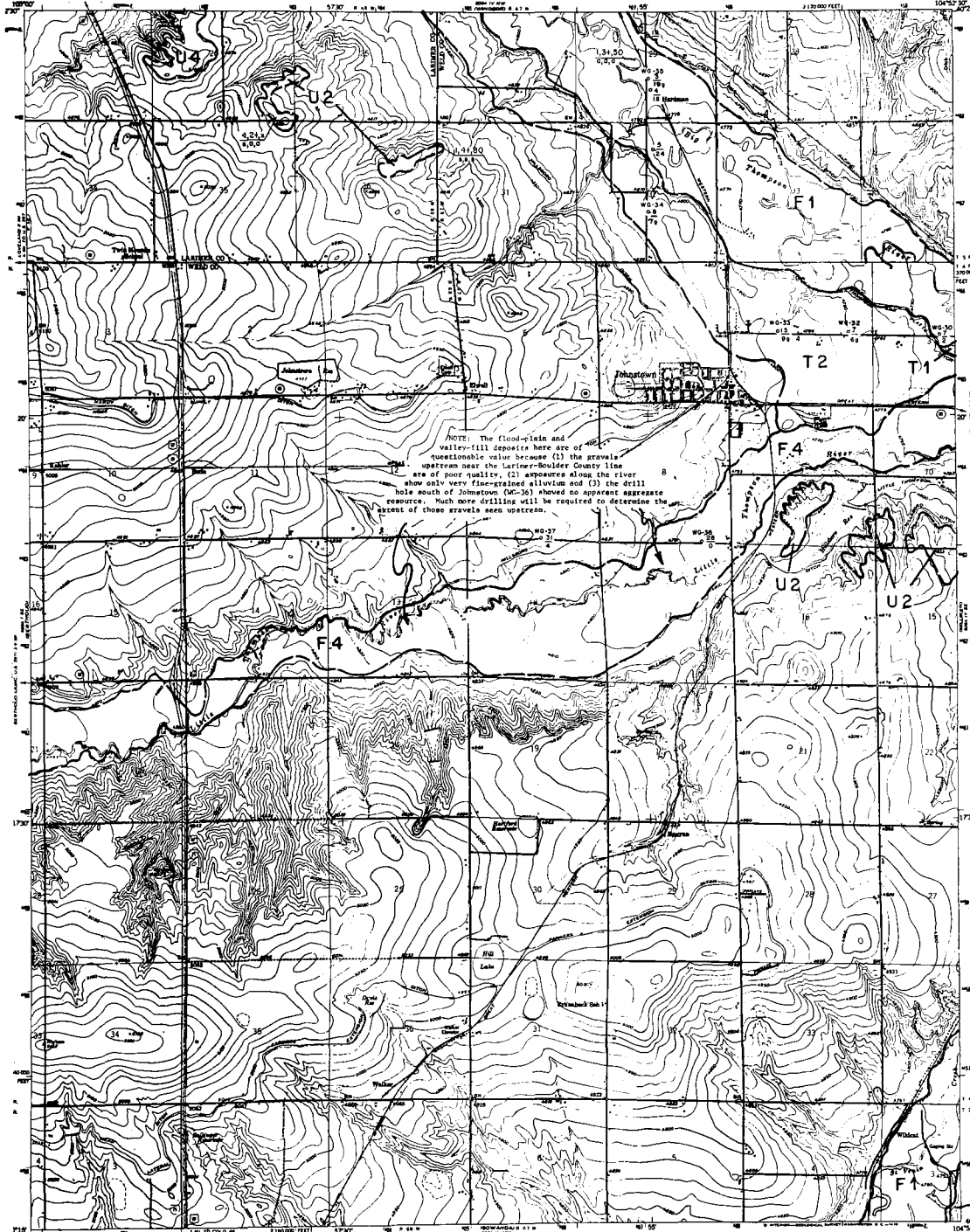
Heavy-duty \_\_\_\_\_ Light-duty \_\_\_\_\_  
Medium-duty \_\_\_\_\_ Unimproved dirt \_\_\_\_\_  
 U.S. Route  State Route

INDIAN HILLS, COLO

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

Contour lines  
Resource classification

### LANDFORMS

- F Floodplain deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- C Cold-deposited sand (colluvium)
- M Man-made deposits (slag, tailings, spalls, etc.)

### AGGREGATE CLASSIFICATION

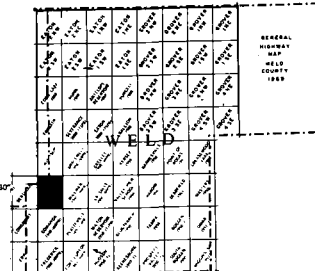
- 1 Gravel, relatively clean and sound
- 2 Gravel, significant fines, unconsolidated rock, calcium carbonate
- 3 Sand
- 4 Detrital material
- 5 Possible aggregate resource

### 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 (1) over sand/gravel resource thickness (2), obtained from well logs
- "s" indicates gravel; "f" indicates sand
- "r" in symbol denotes unconsolidated or unknown property
- "w" denotes Colorado Geological Survey Water-Road and Gravel project
- Drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF EXPOSURE

- Overburden thickness (ft)
- Unconsolidated exposure thickness (ft)
- Percent sand and fines (passing #4 screen, 7.5 in. or 0.075 mm.)
- Significant amount of fines (passing #20 screen, 0.009 in. or 0.075 mm.)
- Significant amount of decomposed or weak rock
- Significant amount of material suitable for aggregate
- "s" in symbol denotes unconsolidated or unknown property
- "w" in symbol denotes property absent or insignificant



### QUADRANGLE LOCATION

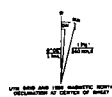
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:  
Colton, R.B., and Vitch, H.B., 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 I-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  
DATA IS MEAN SEA LEVEL

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

JOHNSTOWN, COLO.

Handwritten: *Handwritten*

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

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. WOLD, DIRECTOR

## EXPLANATION

Landform unit  
Resource classification

**LANDFORM UNIT**  
F Floodplain deposit  
T Alluvial terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
E Erosion-deposited sand (colluvial)  
M Man-made deposits (slag, tailings, spalls, etc.)

### RESOURCE CLASSIFICATION

**GRAVEL**  
(as last 100' retained on #4 screen, visual estimation)  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, local contamination  
**SAND**  
(greater than 75% passing #4 screen, 20% retained on #20 screen, Manual estimation)  
3 Sand  
**DETERMINED RESOURCE**  
4 Probable aggregate resource

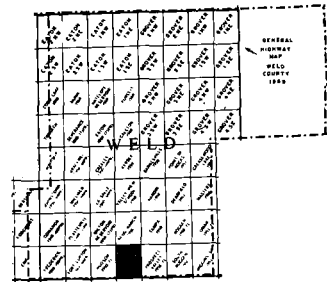
### MAP SYMBOLS

Operating gravel and/or sand pit  
Abandoned gravel and/or sand pit  
Operating stone quarry  
Abandoned stone quarry  
Potential quarry aggregate resource area  
Revised well or drill-hole location with over-  
burden thickness (ft) over sand/gravel resource  
thickness (ft); obtained from well logs.  
"s" indicates gravel; "n" indicates sand  
"n" in symbol denotes unclassified or  
unknown resource  
"n" denotes Colorado Geological Survey  
Well/Drill and Core/Drill hole  
Landform boundary, well shown, known or  
observed; dashed where approximate or  
inferred

### NOTATION, LOCATION AND GEOLOGICAL

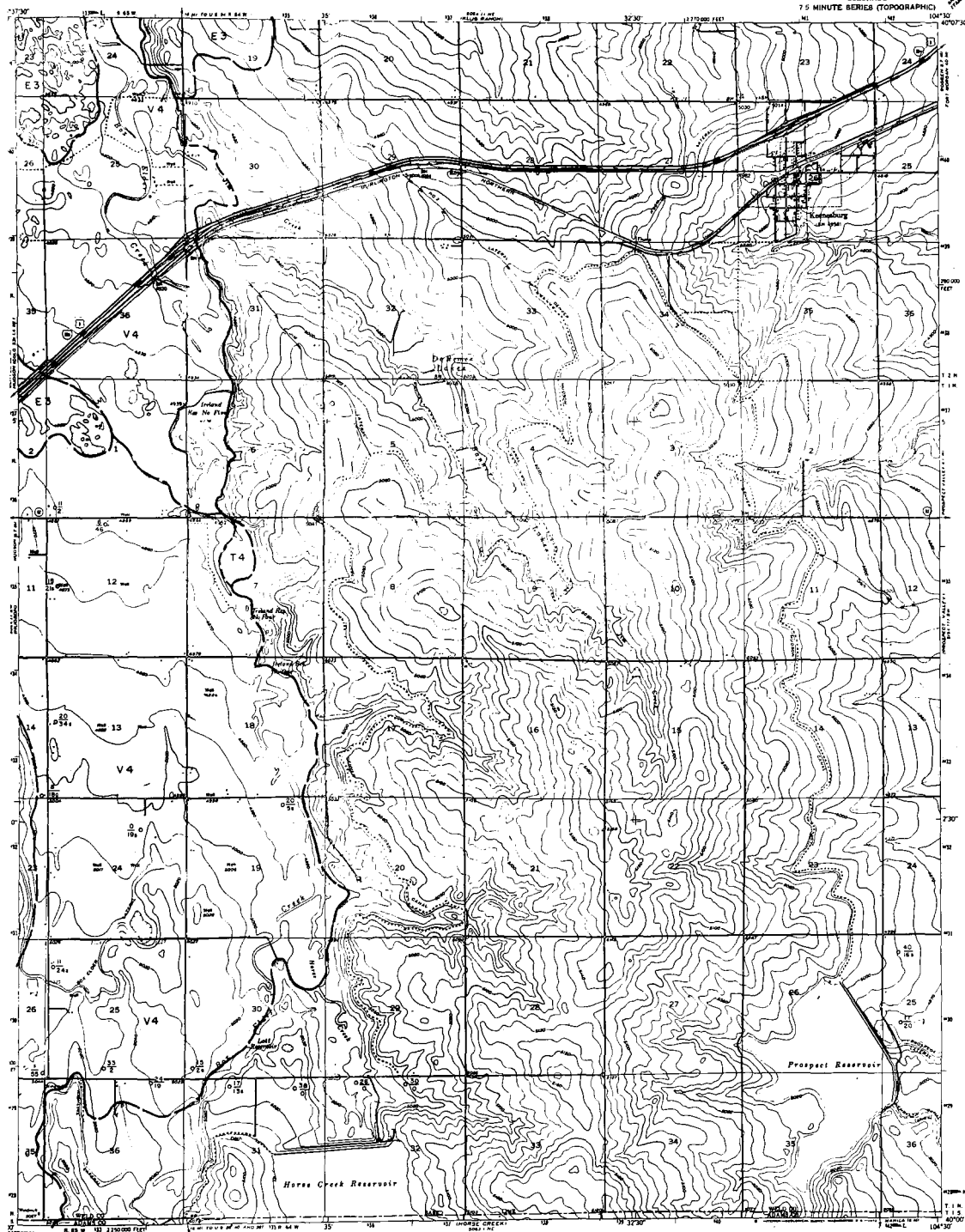
#### ABANDONED OR DRY PIT

overburden thickness (ft)  
sand/gravel resource thickness (ft)  
percent sand and fines (passing #4  
screen, 0.30 in.), visual estimation  
significant amount of fines (passing  
#20 screen, 0.0075 in. or 0.075 mm.)  
significant amount of decomposed or weak rock  
significant amount of solution carbonate (calciferous)  
"n" or symbol denotes unclassified or  
unknown property  
"n" in symbol denotes property absent  
or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR WETLAND AREA

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



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

Scale 1 inch = 1 mile  
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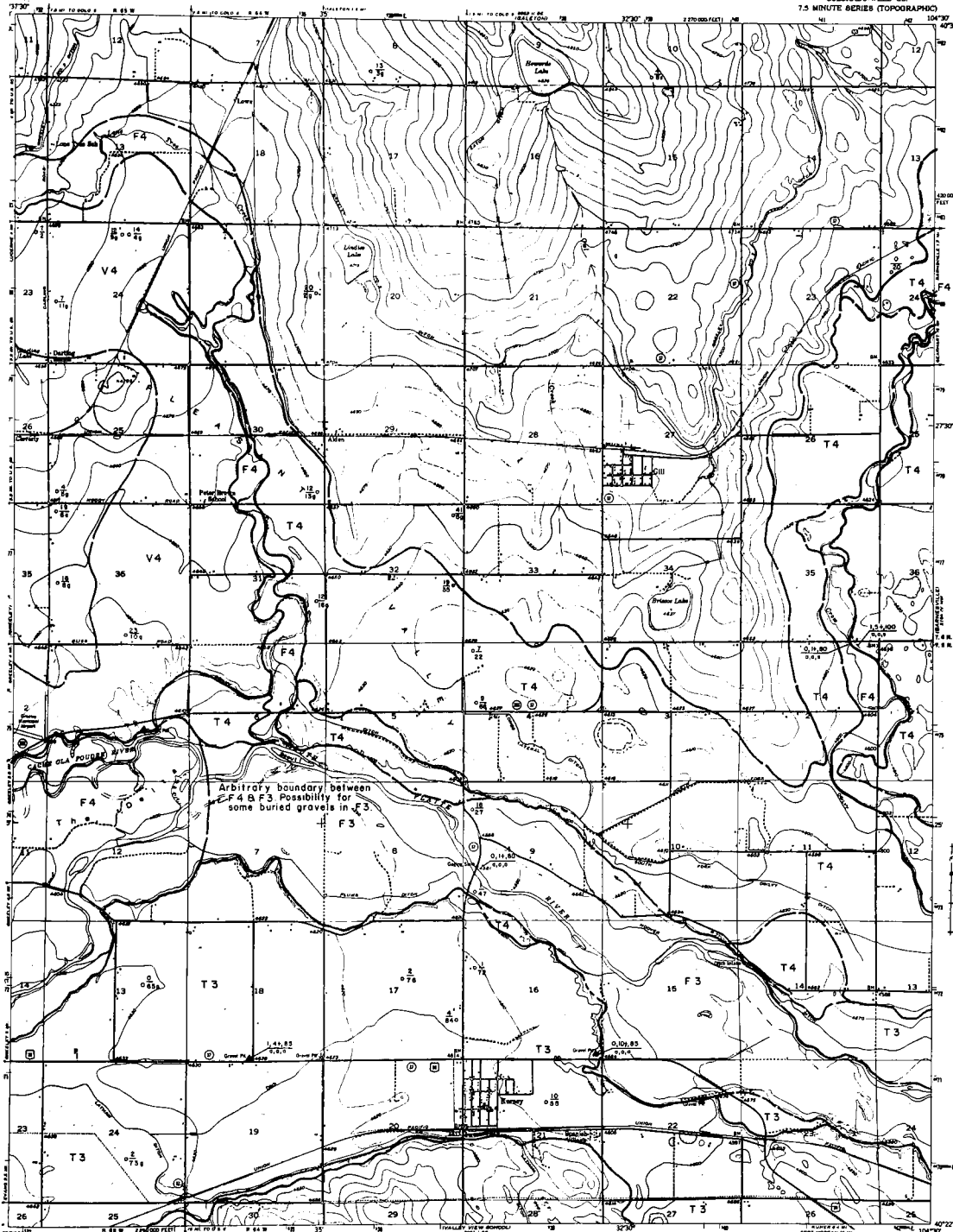
Scale 1 inch = 1 mile  
Scale 1 inch = 1 mile  
Scale 1 inch = 1 mile

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

KEENESBURG, COLO.

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

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



- Land/own with
- Resource classification

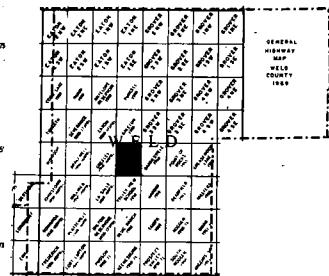
- L LAGOON MUD
  - F Fluvial/deltaic deposit
  - T Tidal/marine deposit
  - V Valley fill (P & T)
  - U Unclad deposits
  - A Alluvial fan
  - E Wind-deposited sand (aeolian)
  - M Marine/marine deposits
  - (Chert/limestone, etc....)
- SEDIMENTARY CLASSIFICATION
- CLASTIC SEDIMENTS
- (at least 1% sand/particle on 44 screen, 0.075 mm)
- 1 Gravel: relatively clean and smooth
  - 2 Gravel: significant thin, decomposed rock, calcium carbonate.
- FINE SEDIMENTS
- (gravel less than 1% passing 44 screen, 40% retained on 200 screen, at least 10% clay)
- 3 Sand
  - 4 Probable aggregate resource



### KAP 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
- "x" in symbol denotes unutilized or unknown property
- "m" denotes Geological Survey Windsor/Essex and Central projects
- Drill hole
- Landform boundary, well where known or observed; dashed where approximate or inferred.

STATION, LOCATION AND GEOLOGICAL  
DESCRIPTION OF QUARRIES

- overburden thickness (ft)  
sand/gravel: maximum thickness (ft)  
percent sand and fines (spacing 80  
screen, 0.075 in.), actual accumulation  
17 18 19  
significant amount of fines (spacing  
80 screen, 0.0075 in. or 0.075 mm)  
significant amount of decomposed or weak rock  
significant amount of detrital carbonate (calcite)  
in symbol denotes untested or  
unknown property  
"a" in symbol denotes property absent  
or insignificant



 QUADRANGLE LOCATION  
 NON-RESOURCE OR  
 WITHDRAWN AREA

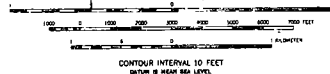
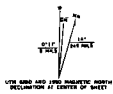
**REFERENCE :**

Smith, R.O., Schneider, P.A., Jr.,  
and Patri, L.R., 1966, Ground-water resources  
of the South Platte River basin in western  
Adams and southwestern Weld Counties, Colorado:  
U. S. Geol. Survey Water-Supply Paper 1638, pl. 1.

Dunn, F. H., III, 1972, Map of surficial geology of  
part of the Keweenaw quadrangle: Reconn. mapping  
for Colorado Geol. Survey Windsor 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



CONTOUR INTERVAL 10 FEET  
DATUM IS MEAN SEA LEVEL

HARD-SURFACE ALL WEATHER ROAD DRY WEATHER ROAD  
 Heavy-duty..... 1.5-2.0 Improved dirt.....  
 Medium-duty... .. 1.0-1.5 Unimproved dirt.....  
 Loose-surface, graded or narrow hard-surface . . . . .  
☐ U. S. Route      ☐ State Route

KERSEY, COLO.



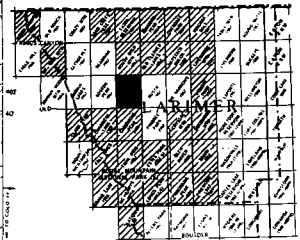
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

KINKINIK QUADRANGLE  
COLORADO LARIMER CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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

## EXPLANATION

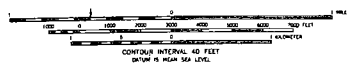
- LANDFORM UNIT**  
Depositive classification
- LANDFORM UNIT**  
F Floodplain deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Upland deposits  
A Alluvial fan  
E Eolian-deposited sand (colluvial)  
M Marine deposits (slag, tailings, spilla...)
- RESOURCE CLASSIFICATION**  
Crown Aggregate  
See text for definition on 44 square.  
B-1000: 10000000  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed rock, calcareous cementation  
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 overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.  
"a" indicates gravel, "s" indicates sand  
"u" in symbol denotes unutilized or unknown property.  
"m" denotes Colorado Geological Survey Map of land and gravel projects.  
Drill hole  
Landform boundary, solid where known or inferred, dashed where approximate or inferred.
- STATUS, LOCATION AND GEOLOGICAL SIGNIFICANCE OF DEPOSIT**  
overburden thickness (ft)  
sand/gravel resource thickness (ft)  
percent sand and fines (passing #4 screen, 0.075 in.), stand estimation  
significant amount of decomposed or weak rock.  
significant amount of material unutilized (unlike)  
"a" in symbol denotes unutilized or unknown property.  
"m" in symbol denotes property owned or significant.



QUADRANGLE LOCATION  
NON-RESOURCE OR WETLAND AREA

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

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

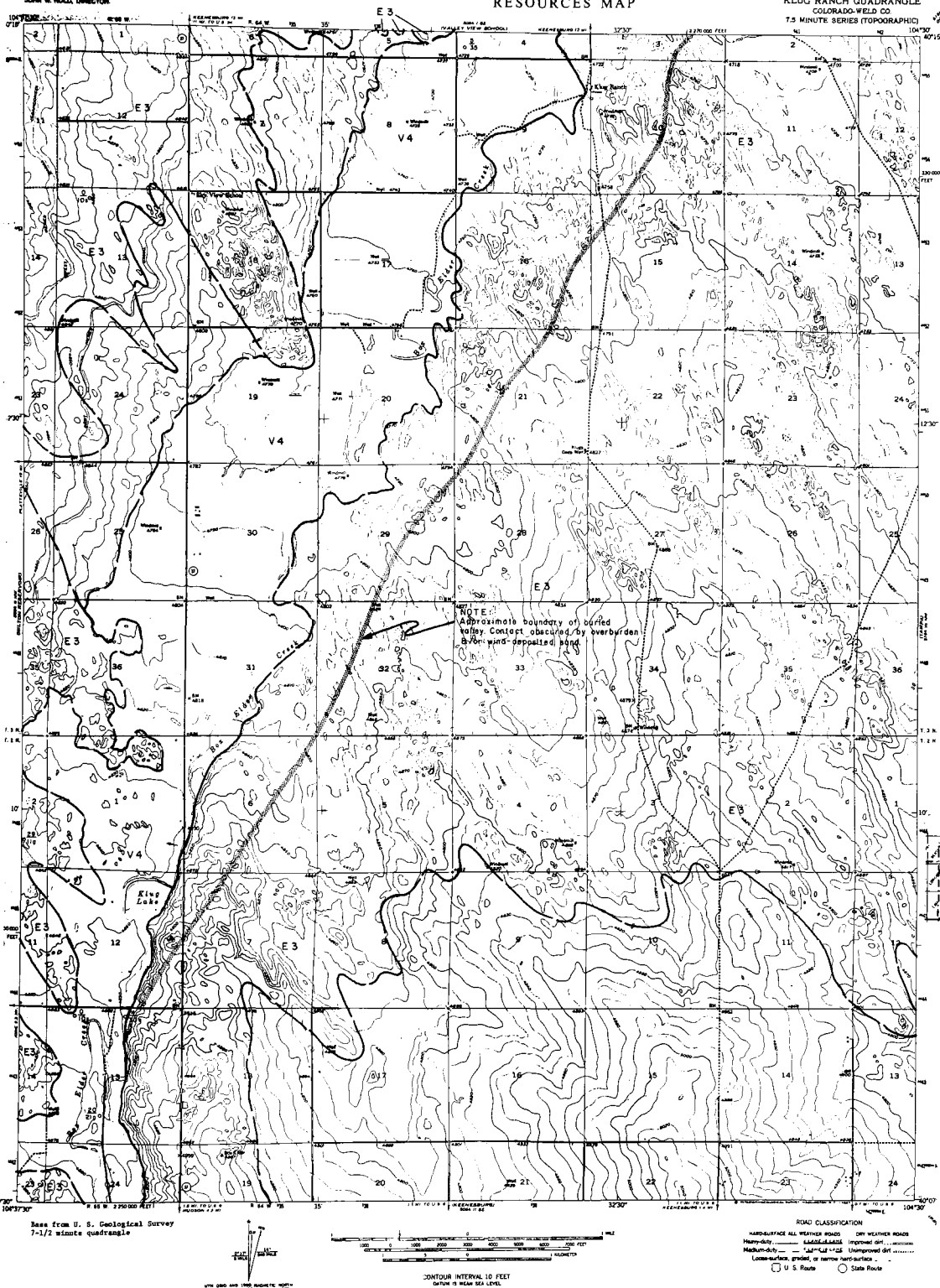


ROAD CLASSIFICATION  
Medium duty  
Light duty  
Unimproved dirt  
State Route

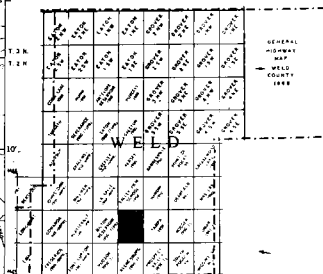
KINKINIK, COLO.



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

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



100% 100%  
 Resource classification  
 RESOURCE TYPE  
 F Fluvial/delta deposit  
 T Terrace terrace deposit  
 V Valley fill (F & T)  
 U Unfilled deposits  
 A Alluvial fan  
 V Wind-deposited sand (aeolian)  
 M Marine deposits  
 B Buildings (applies...)  
 RESOURCE CLASSIFICATION  
 Oceanic (aeolian)  
 (for limit 70% restricted on the screen,  
 actual restriction)  
 1 Gravel: relatively clean and small  
 2 Gravel: significant fines, decomposed  
 3 Medium to coarse sand  
 4 Sand  
 5 Sand  
 6 Gravelly sand  
 7 Probable aggregate resource  
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 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

Reference: Smith, R. O. and others,  
1964, U.S.C.S. Water Supply Paper  
1658, Plate I.

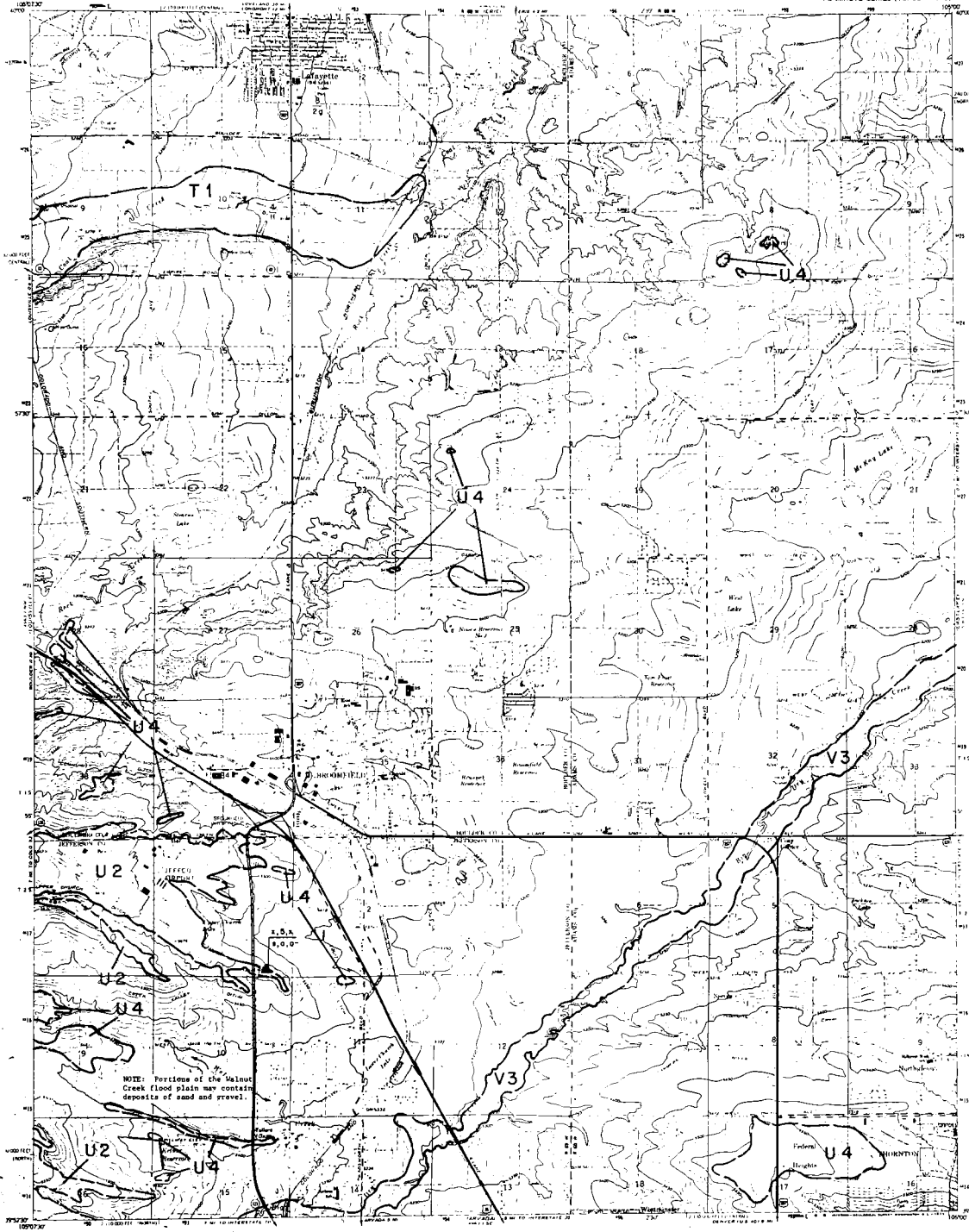
Mapped by: Phillip C. Wicklein  
Date: June 30, 1974

KLUO RANCH, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

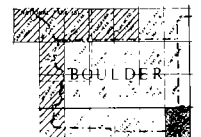
LAFAYETTE QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

- LOCALITY DATA**
- F Floodplain deposit
  - T Trench deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Marine deposit (along-shelf, updrift, etc.)
- RESOURCE CLASSIFICATION**
- Gravel**
- 1 Gravel, relatively clean and sound
  - 2 Gravel, significant fines, decomposed rock bottom surfaces
- Sand**
- 3 Sand
- Unconsolidated Resources**
- 4 Potential 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
  - Gravel well or gravel pit (indicated with cross-hatched pattern)
  - Gravel (indicated with cross-hatched pattern)
  - Sand (indicated with cross-hatched pattern)
  - "X" in gravel resource indicates no known resource
  - "X" in sand resource indicates no known resource
  - Resource boundary, solid where known or inferred, dashed where approximate or inferred
- STATION, LOCATION AND COORDINATE**
- LOCATION OF SURVEIL**
- Topographic map of the Denver area, Colorado, U. S. Geol. Survey Misc. Geol. Inv. Map 1-731.
- Topographic map of the Denver area, Colorado, U. S. Geol. Survey Misc. Geol. Inv. Map 1-731.
- Topographic map of the Denver area, Colorado, U. S. Geol. Survey Misc. Geol. Inv. Map 1-731.



QUADRANGLE LOCATION

NON-RESOURCE OR  
VETERAN AREA

## REFERENCE

Chase, C.H., and McConagh, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-731.

Reichle, H. N. 1974, personal communication.

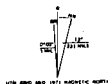
## Geology modified after:

Trumble, D.E., and Fitch, R.N., 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 1-856-A.

Map 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 dirt ————

U.S. Route ———— State Route ————

LAFAYETTE, COLO.

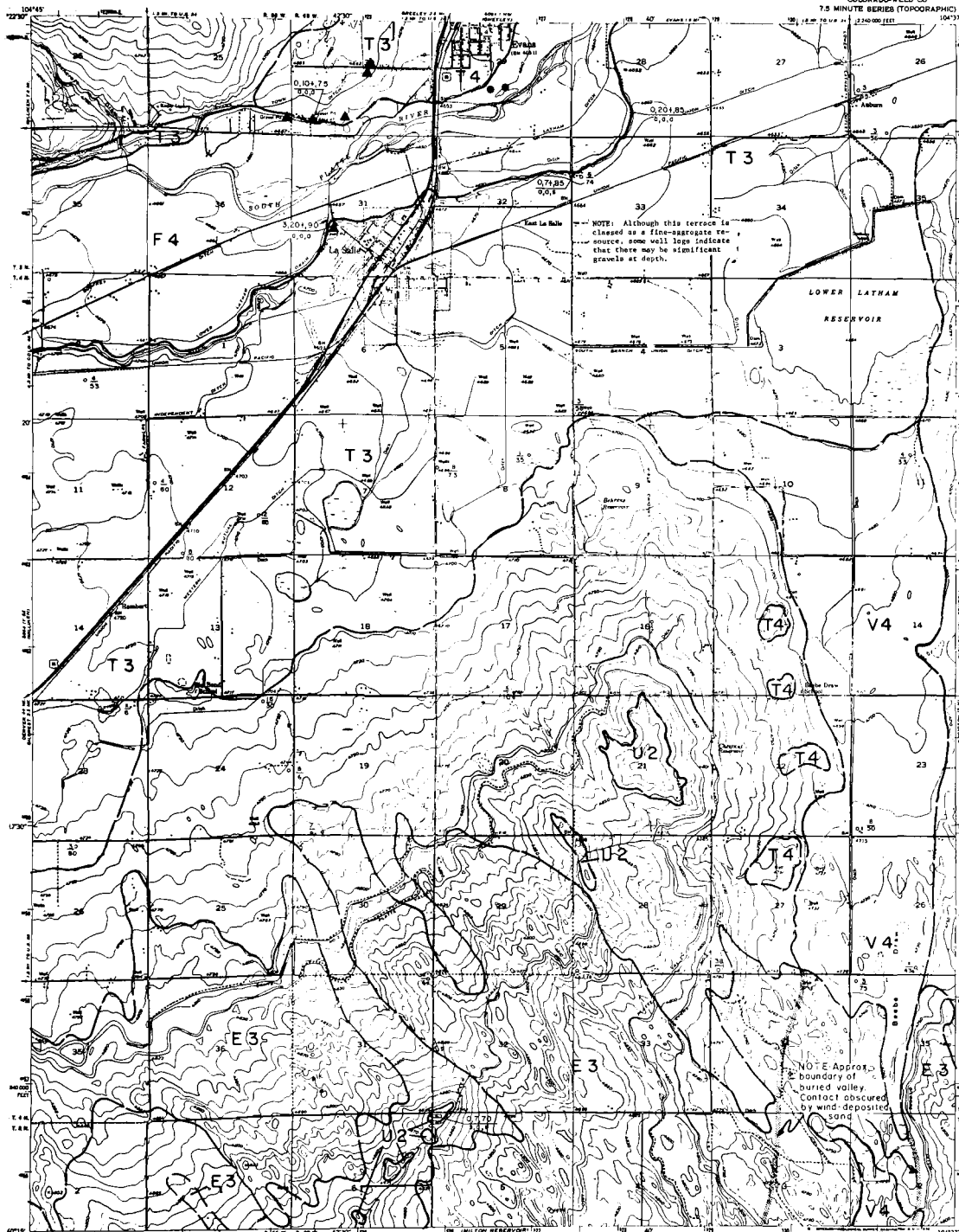




# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

SYMBOLS  
F Floodplain deposit  
T Terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
W Wind-deposited sand (local)  
M Non-made deposits (colluvium, spalls...)

## RESOURCE CLASSIFICATION

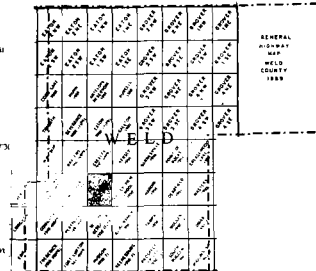
1. Gravel: relatively clean and well sorted
2. Gravel: significant fines, decomposed rock, calcareous materials
3. Sand
4. Possible aggregate resource

## MAP SYMBOLS

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
6. Selected well or drill-hole location with water-bearing thickness (ft), obtained from well logs
7. "X" indicates ground surface elevation and "X" in symbol denotes unconsolidated or unknown property
8. "W" denotes Colorado Geological Survey measured and gravel projects
9. "X" in symbol denotes unconsolidated or unknown property
10. "X" in symbol denotes property above or unconsolidated

## STATION, LOCATION AND GEOLOGICAL

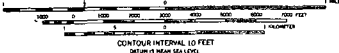
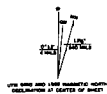
1. Water-bearing thickness (ft)
2. Sand-gravel resource thickness (ft)
3. Gravel and sand (ft) (specifying 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400, 420, 440, 460, 480, 500, 520, 540, 560, 580, 600, 620, 640, 660, 680, 700, 720, 740, 760, 780, 800, 820, 840, 860, 880, 900, 920, 940, 960, 980, 1000)
4. Significant amount of decomposed or well-sorted
5. Significant amount of calcareous materials (caliche)
6. "X" in symbol denotes unconsolidated or unknown property
7. "X" in symbol denotes property above or unconsolidated



REFERENCE:  
Smith, R.O., Schneider, P.A., Jr., and Peard, 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 1658, p. 1.  
Geology modified after:  
Colton, R.B., 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 1-855-D.

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  
Heavy-duty all-weather roads Improved dirt  
Medium-duty all-weather roads Unimproved dirt  
Light-duty all-weather roads Gravel or narrow hard-surface  
U.S. Route

LA SALLE, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

LEADER QUADRANGLE  
COLORADO ADAMS CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

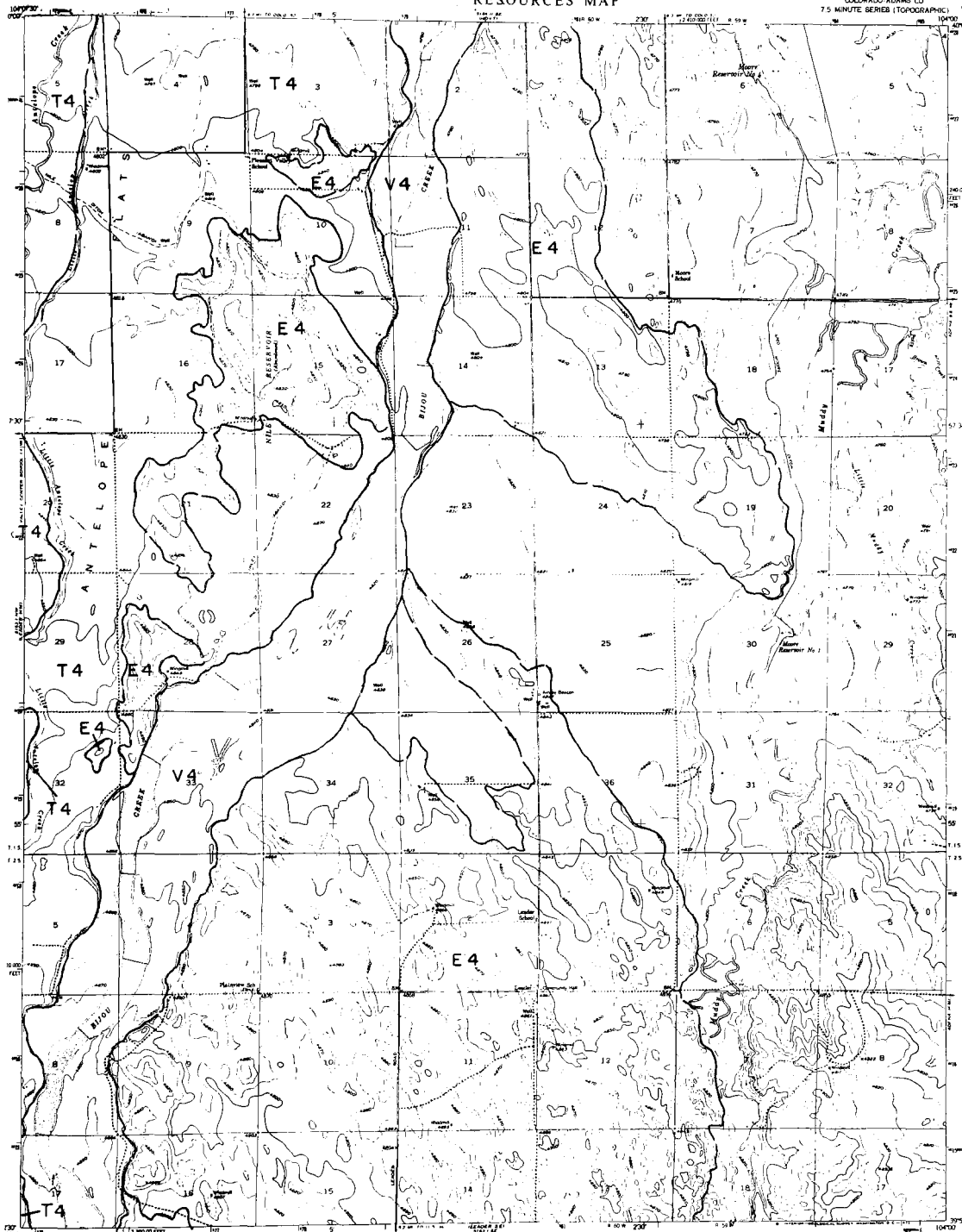
## EXPLANATION

- Landform unit**  
Resource classification
- LANDFORM DATA**
- F Fluvial deposit
  - T Stream terrace deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Mined deposit (slag, tailings, waste, etc.)
- RESOURCE CLASSIFICATION**
- Current Resources**  
Not listed but included on 40 acres, (actual estimation)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcine columns
  - 3 Sand
  - 4 Potential aggregate resource
- NOTED**
- 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 depth "x" indicates sand
  - "x" in symbol denotes unmineralized or unknown property
  - "x" denotes Colorado Geological Survey boundary (land and gravel property) drill hole
  - Landform boundary, solid shows known or observed; dashed shows where approximate or inferred
- STATION LOCATION AND ORIENTATIONAL DESCRIPTION OF SYMBOL**
- Overburden thickness (ft)
  - Sand/gravel resource thickness (ft)
  - Percent sand and fines (expressed as percent, 0.25 in. 1, actual estimation)
  - Significant amount of fines (expressed as percent, 0.25 in. 1, or 0.25 in. 1)
  - Significant amount of decomposed or waste rock
  - Significant amount of calcine columns (indicate)
  - "x" on symbol denotes unmineralized or unknown property
  - "x" in symbol denotes property owned or insignificant

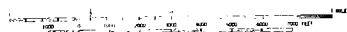
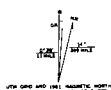


■ QUADRANGLE LOCATION  
▨ NON-RESOURCE OR VITREOUS AREA

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



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



CONTOUR INTERVAL 10 FEET  
ELEVATION IN FEET SEA LEVEL

**ROAD CLASSIFICATION**

Highway —————  
Main road —————  
Local road —————  
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. HOLS, DIRECTOR

LEADER NW QUADRANGLE  
COLORADO-ADAMS CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
1:50,000 SCALE

## EXPLANATION

Landform units  
Resource classification

### LANDFORM UNITS

- F Floodplain deposits
- T Tectonic terrace deposits
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan -
- E Wind-deposited sand (eolian)
- M Mountain deposits
- L Lake (alluvial, glacial, ...)

### RESOURCE CLASSIFICATION

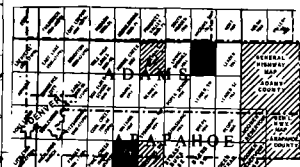
- Gravel Deposits**  
(at least 20% retained on #4 screen, 60% retained on #20 screen, 10% passing #100 screen)
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, talus, cobbles
- Sand Deposits**  
(greater than 75% passing #4 screen, 60% retained on #20 screen, 10% passing #100 screen)
- 3 Sand
- 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
- Estimated wall or fill thickness (ft) over sand/gravel resource
- Thickness (ft) of sand/gravel resource
- "s" indicates gravel, "m" indicates sand
- "s" in symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey mineral (sand and gravel) project
- Drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

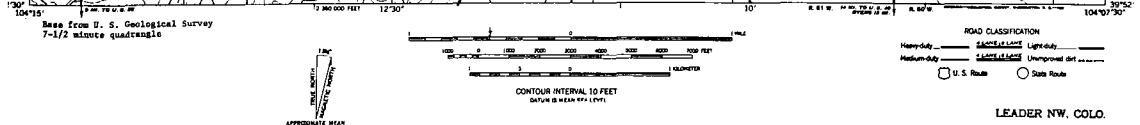
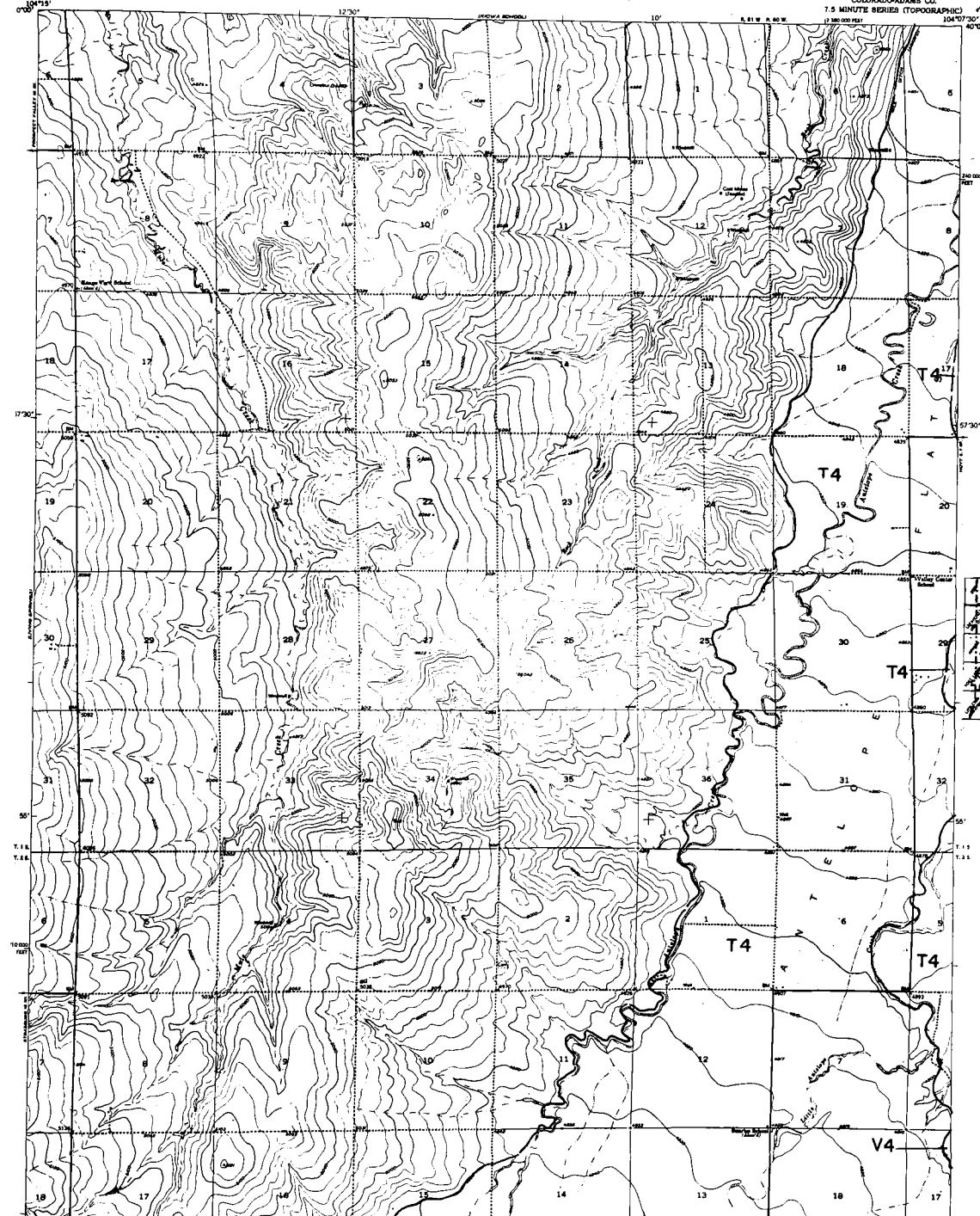
### STATION, LOCATION AND ORIGIN

- Station, location and origin of resource
- Overburden thickness (ft)
- Sand/gravel resource thickness (ft)
- Percent sand and fines (passing #100 screen, < 0.075 mm) - material estimation
- Significant amount of fines (passing #100 screen, < 0.075 mm)
- Significant amount of decomposed or weak rock
- Significant amount of solution cavities (includes unknown property)
- "s" in symbol denotes unconsolidated or unknown property
- "m" in symbol denotes properly observed or confirmed



- QUADRANGLE LOCATION
- NON-RESOURCE OR WETLAND AREA

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



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

LEADER NW, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

## EXPLANATION

### LANDFORMS

- A Alluvial deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Unfilled deposit
- A Alluvial fan
- E Eolian-deposited sand (colluvial)
- M Marine deposit (shale, siltstone, etc.)

### RESOURCE CLASSIFICATION

- 1 Crowned aggregate (at least 200 feet wide and 10 feet deep, crown elevation)
- 2 Crowned: relatively clean and sound
- 3 Crowned: significant fines, decomposed rock, talus, cobbles, etc.
- 4 Sand
- 5 Uncovered aggregate
- 6 Probable aggregate resource

### MAP SYMBOLS

- Operating gravel and/or sand pit
- Operating stone quarry
- Operating quarry aggregate resource area
- Principal well or still-hole location with over-bank thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- "s" indicates gravel; "m" indicates sand
- "s" in symbol denotes unmineralized or volume property
- "m" denotes Colorado Geological Survey (mineralized and crown) projects
- Still hole
- Landform boundary, solid black lines or observed; dashed black lines approximate or inferred

### STATION, LOCATION AND GEOLOGICAL

#### DESCRIPTION OF RESULTS

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and gravel (sparsely to screen, 0.25 in. or less, class) section
- significant amount of fines (passing 100 screen, 0.075 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- significant amount of siliceous overburden (mils)
- "s" in symbol denotes unmineralized or volume property
- "m" in symbol denotes property absent or unmineralized



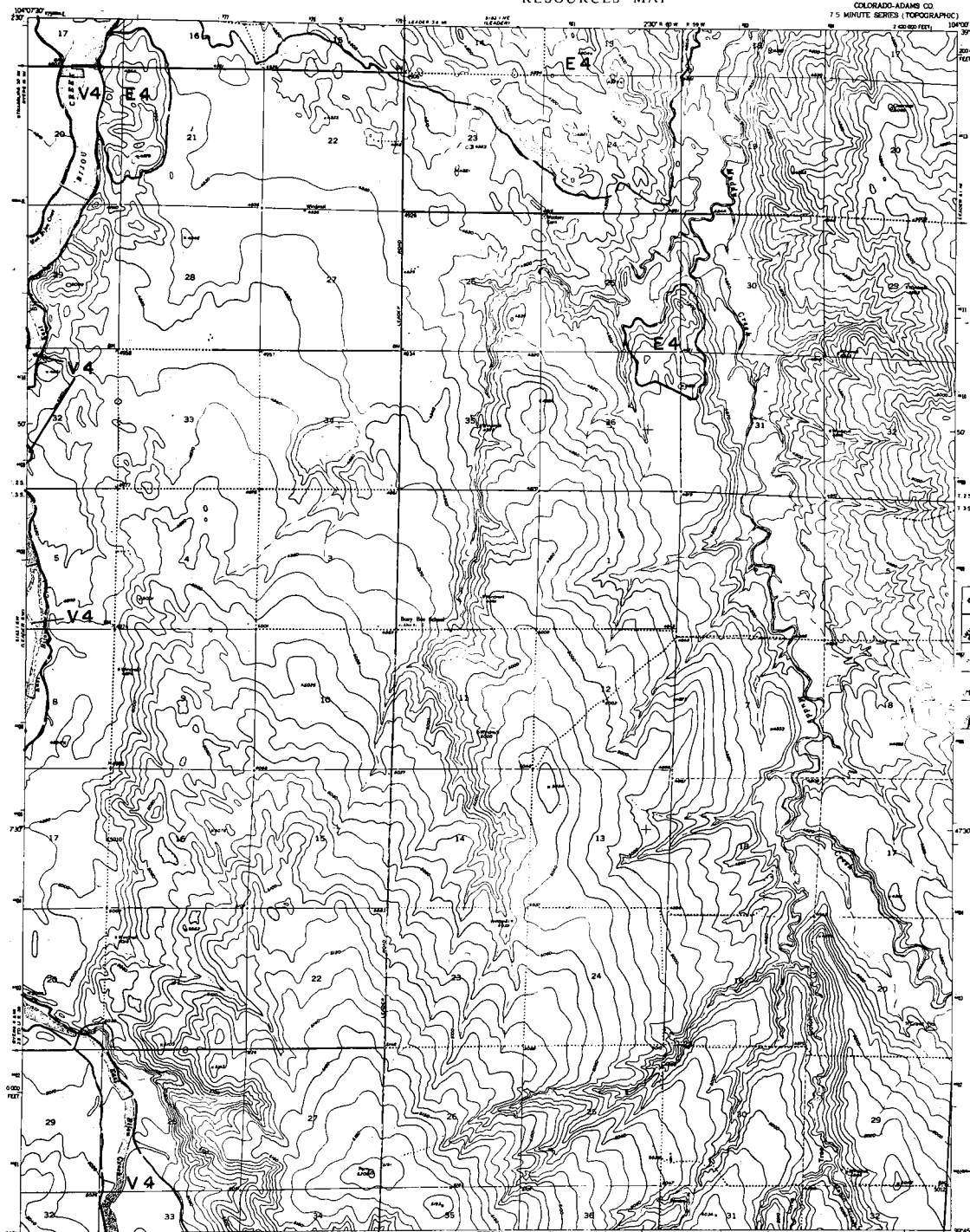
QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

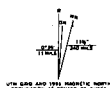
REFERENCE:  
Shadell, S.A., 1971, The Silver Creek Dam and Reservoir of Adams and Arapahoe Counties, Colorado, Colorado School of Mines: EE-1327.

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

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



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



CONTOUR INTERVAL 10 FEET  
Datum is Mean Sea Level



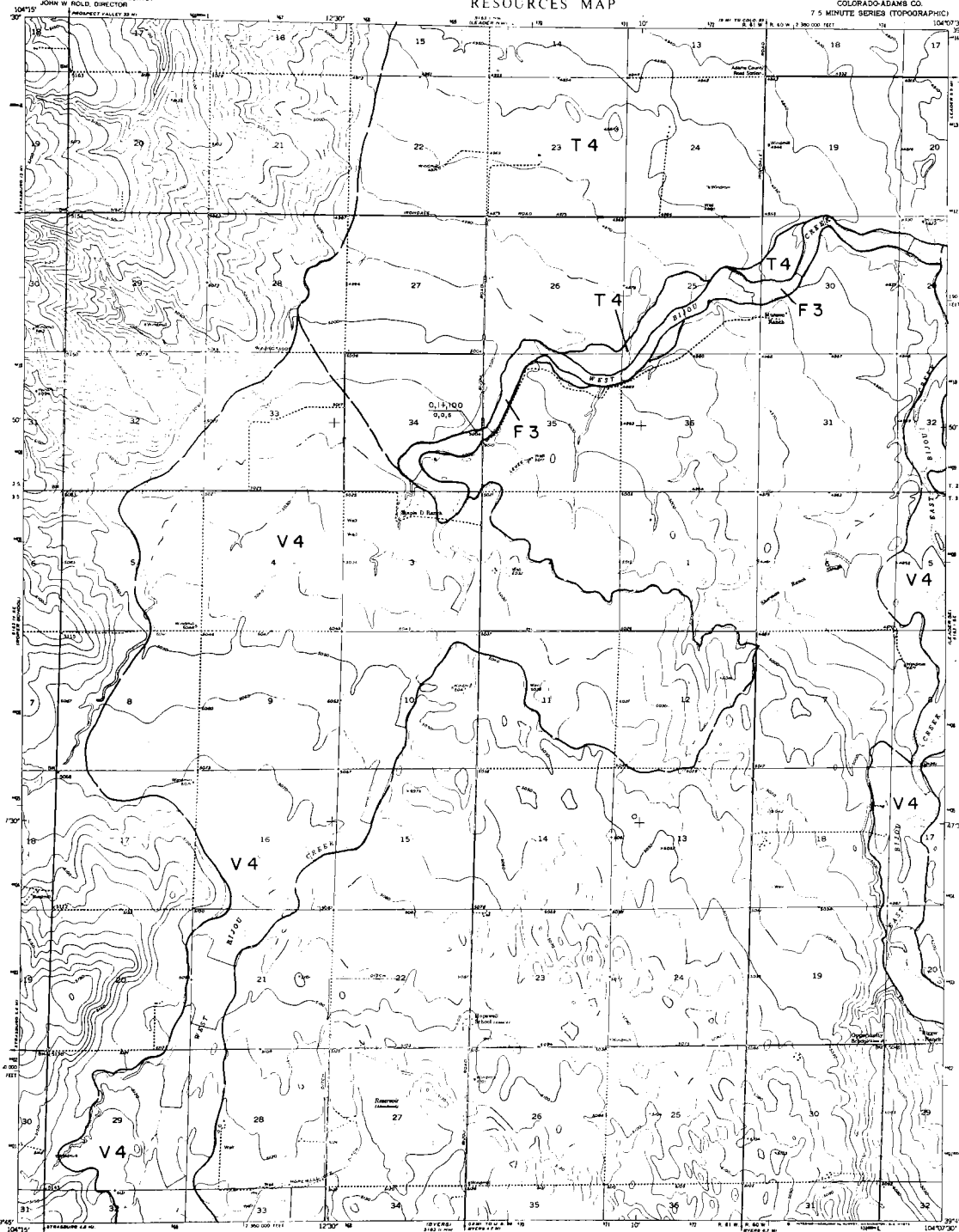
ROAD CLASSIFICATION  
Heavy-duty ROAD CLASSIFICATION  
Medium-duty ROAD CLASSIFICATION  
Light-duty ROAD CLASSIFICATION  
Unimproved dirt ROAD CLASSIFICATION  
U.S. Route  
State Route

LEADER SE, COLO.  
H3945-W1040/7.5  
1951  
AND 5183 1 SE-SERIES 7077

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

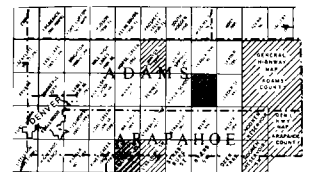
LEADER SW QUADRANGLE  
COLORADO-ADAMS CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

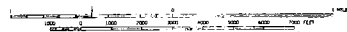
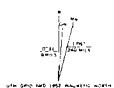
- LOCATION UNIT**  
Resource classification
- RESOURCE UNIT**  
F Floodplain deposit  
T Trench terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
E Eolian deposit (sand dunes)  
M Man-made deposits (slag, tailings, opine...)
- NEEDS CLASSIFICATION**  
Group Aggregate  
1. Gravel, relatively clean and sound  
2. Gravel, significant fines, decomposed rock, calcareous materials  
3. Sand  
4. Potable aggregate resource
- MAP SYMBOLS**  
Operating gravel surface and pit  
Abandoned gravel surface and pit  
Operating stone quarry  
Abandoned stone quarry  
Potential quarry aggregate resource area  
Gravel pit or alluvial deposit with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs  
"s" indicates gravel; "a" indicates sand  
"u" in symbol denotes unutilized or unknown property  
"we" denotes Colorado Geological Survey (sand/gravel and gravel properties) drill hole  
Quadrangle boundary, solid where known or observed; dashed where approximate or inferred
- RELATION, LOCATION AND ORIGIN**  
LOCATION OF SOURCE  
overburden thickness (ft)  
sand/gravel resource thickness (ft)  
overburden sand and fines (spacing 4 ft)  
overburden, 0.25 to 1.0, small estimation  
significant amount of fines (spacing 4 ft)  
significant amount of decomposed or weak rock  
significant amount of calcareous materials  
"u" in symbol denotes unutilized or unknown property  
"we" in symbol denotes property owned or controlled



QUADRANGLE LOCATION  
NON-RESOURCE OR  
WITHDRAWN AREA

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

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



CONTOUR INTERVAL, 10 FEET  
DASHED LINE, 50 FEET



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

LEADER SW, COLO.  
N945-W1040/5/5

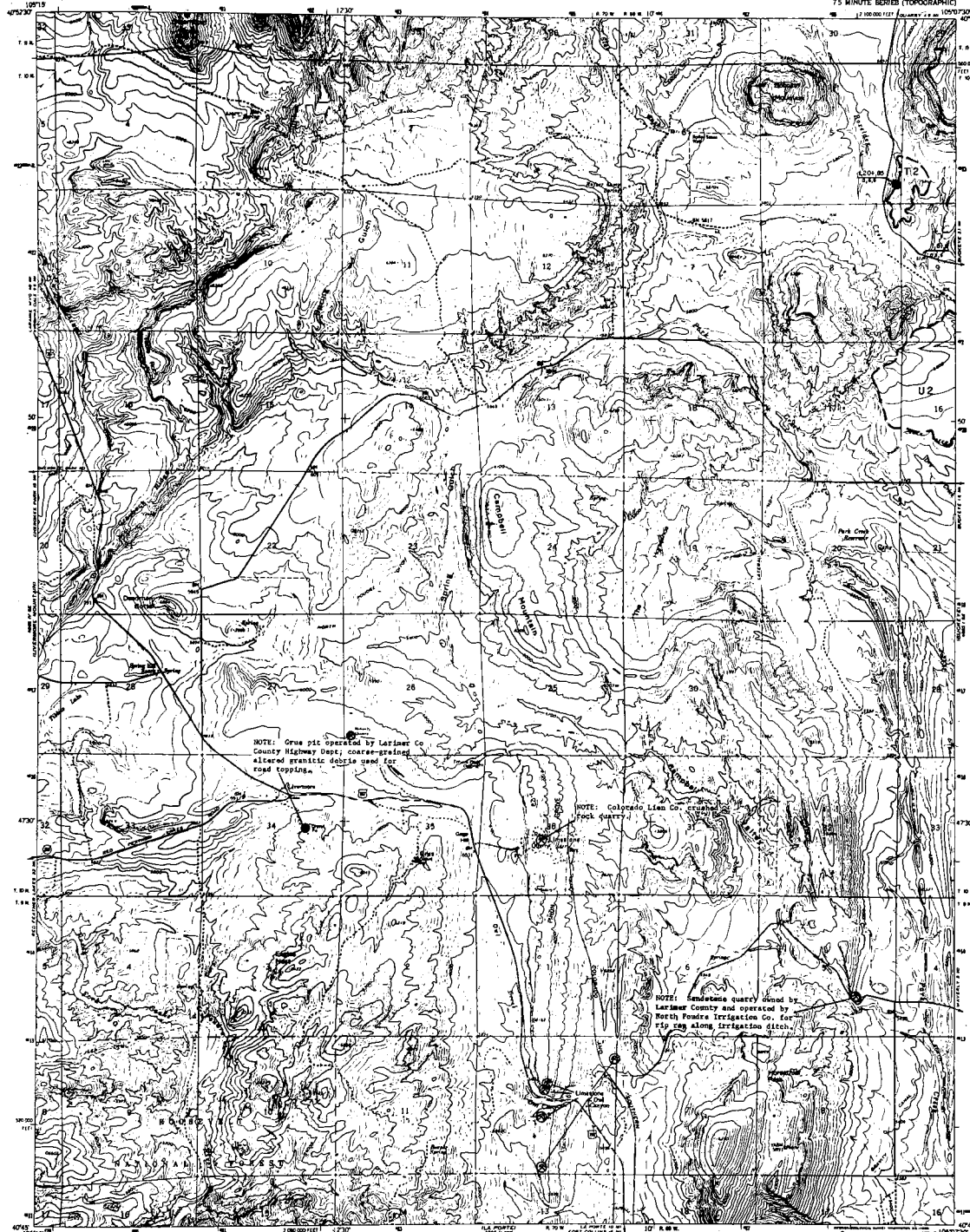
1962  
AND RING 1 BY SERIES 1977



# 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. HOLD, DIRECTOR



## EXPLANATION

Landform unit  
Resource classification

### LANDFORM UNIT

- F Fluvial deposit
- T Trench surface deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Non-saline deposits (slag, tailings, spoils, ...)

### RESOURCE CLASSIFICATION

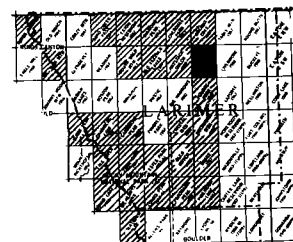
- Gravel Aggregate**  
(at least 50% washed on #4 screen, visual estimation)  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, calcine overburden
- Sand Aggregate**  
(greater than 75% passing #4 screen, 60% washed on #20 screen, visual estimation)  
3 Sand
- Quarry Aggregate**  
4 Probable aggregate resource

### NOT SYMBOLS

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Probable quarry aggregate resource area
- Isolated waste or debris hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) "Isolated from well top"
- "s" indicates gravel; "a" indicates sand
- "u" in symbol denotes unutilized or unknown property
- "m" denotes Colorado Geological Survey Modified/land and gravel projects
- Gravel hole
- Landform boundary, solid waste house or structure; dashed where appearance is inferred

### SYMBOL, LOCATION AND ORIENTATION

- overburden thickness (ft)
- nonvertical resource thickness (ft)
- vertical sand and stone (passing #4 screen, 0.25 in.), visual estimation
- significant amount of fines passing #20 screen, 0.075 in. or 0.075 mm
- significant amount of decomposed or weak rock
- significant amount of calcine overburden (calcine)
- "u" in symbol denotes unutilized or unknown property
- "m" in symbol denotes properly absent or ineligible/known

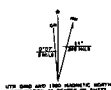


QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:  
Herscher, 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 1-687.

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

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



ROAD CLASSIFICATION  
Medium duty .....  
Unimproved dirt .....  
U.S. Route .....  
State Route .....

LIVERMORE, COLO.



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

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

EXPLANATION

- └ Landform type
- └ Resource classification

LAUNDRY UNIT

F Fluvio-deltaic 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  
(dams, railways, canals)

**RESOURCE CLASSIFICATION**

**Course Aggregate**  
for Initial 50% retained on #4 screen, usual retention

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

**Fine Aggregate**  
generally less 10% passing #4 screen, 50% retained on #100 screen, usual retention

- 3 Sand

## 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

Described well or drill-hole location with overburden thickness (ft) and sand/gravel resource thickness (ft), obtained from well logs.

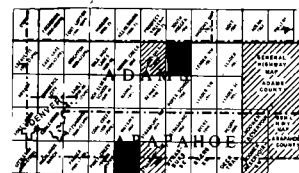
- "g" indicates gravel, "s" indicates sand
- "u" in symbol denotes unmineralized or unknown property.
- "ee" denotes Colorado Geological Survey Window/Land and Gravel projects

drill hole

Landform boundary, solid where known or observed; dashed where approximate or inferred.

STATION, LOCATION AND GEOLOGICAL  
DESCRIPTION OF DEPOSIT

- overburden thickness (ft)
- and sand resource thickness (ft)
- permanent sand and fringe spacing as  
a means of estimating sand thickness
- significant amount of fringe spacing  
8200 acres, 0.0019 in. or 0.019 mm
- significant amount of decomposed or weak rock
- significant amount of below carbonate surface
- "a" in spatial domain characterized or  
unknown property
- "b" in spatial domain properly defined  
or well-defined







QUADRANGLE LOCATION

 NON-RESOURCE OR

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

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

**ROAD CLASSIFICATION**

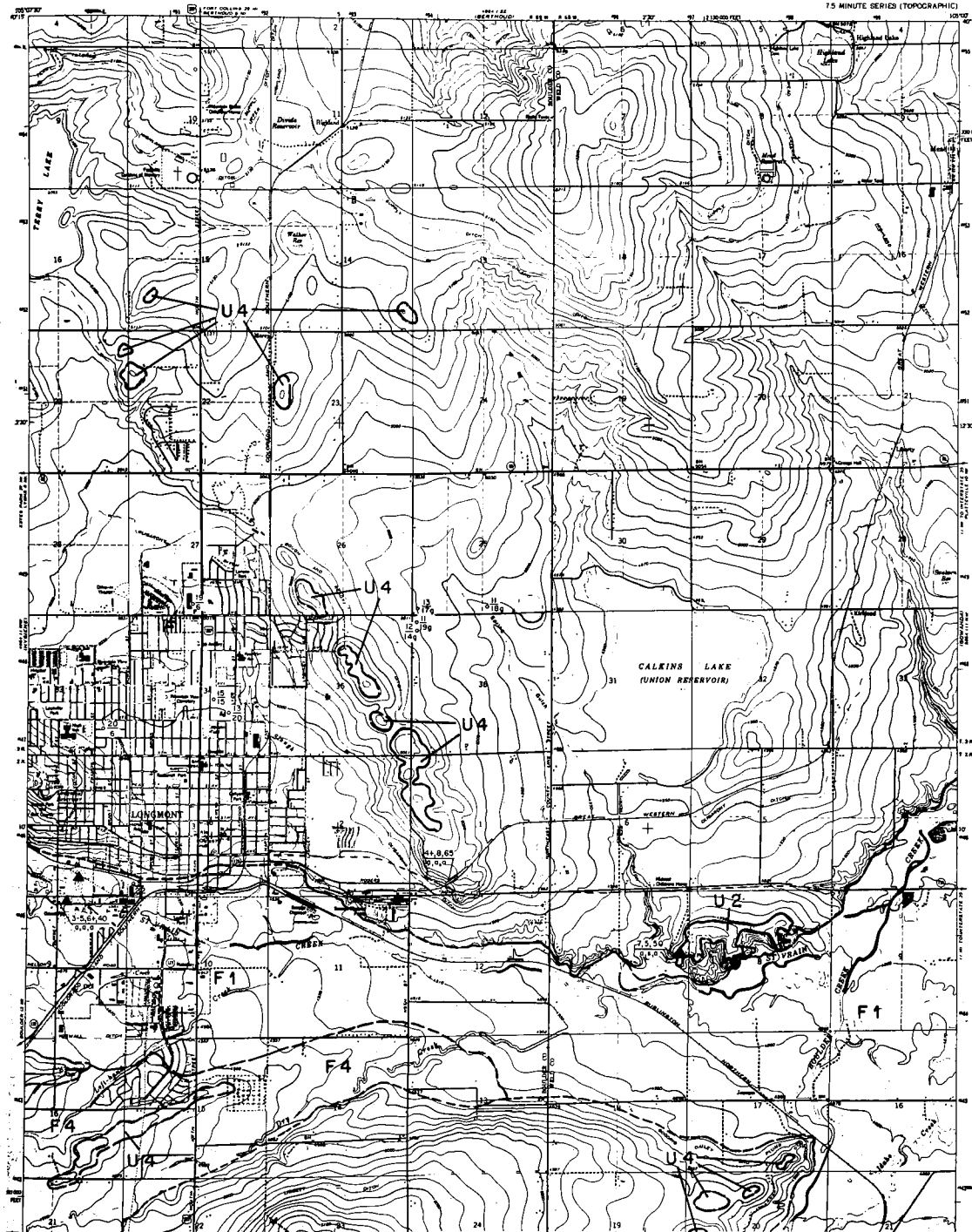
Heavy-duty		Light-duty	
Medium-duty		Unimproved dirt	
 U.S. Route		 State Route	

LIVING SPRINGS, 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. HOLA, DIRECTOR



## 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 Man-made deposits (embankment, levee, etc.)

### RESOURCE CLASSIFICATION

- Gravel**  
Gravel is defined as 1/8" to 3/4" in size, rounded or sub-rounded, and is not cemented.
- 1 Gravel: relatively clean and unaltered
  - 2 Gravel: significant fines, non-uniform rock, calcareous
- Sand**  
Sand is defined as 1/16" to 1/4" in size, rounded or sub-rounded, and is not cemented.
- 3 Sand

### DETERMINED PROPERTIES

- 4 Probable aggregate resources

### NOTES

- Operating gravel and/or sand pit
  - Abandoned gravel and/or sand pit
  - Operating stone quarry
  - Abandoned stone quarry
  - Potential quarry aggregate resources area
  - Related well or drill-hole location with every known thickness (ft) over sand/gravel measured thickness (ft), obtained from well logs.
  - "r" indicates gravel; "s" indicates sand
  - "x" in symbol denotes unclassified or unknown property.
  - "u" denotes Colorado Geological Survey Hydro/land and gravel projects
  - Drill hole
  - Location boundary, solid shows known or observed; dashed shows approximate or inferred.
- SYMBOL LOCATION AND ORIENTATIONAL DESCRIPTION OF SYMBOL**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - potential sand and fines (passing #20 screen, 0.85 in.) or 0.75 in.
  - significant amount of decomposed or weak rock
  - significant amount of siliceous carbonate (calcite)
  - "u" in symbol denotes unclassified or unknown property
  - "x" in symbol denotes property shown as insignificant

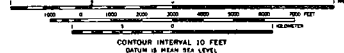


Quadrangle modified after: Colman, S.B., and Finch, H.N., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Burns, Collins-Denver Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map 1-859-D.

Map by: Ralph E. Strohs  
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

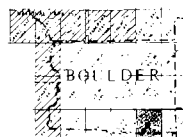
LONGMONT, COLO.

LOUISVILLE QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

HIGT



(1) USEFUL FOR FIELD IDENTIFICATION  
 FOR FIELD CLASSIFICATION  
LABORATORY USE  
 F Floodplain deposit  
 T Stream terrace deposit  
 W Alluvial fans (F & T)  
 U Unconsolidated  
 A Alluvial fan  
 E Elevated deposit (colluvial)  
 M Marine deposits  
 (sedimentology, geology...)  
SOURCE CLASSIFICATION  
 1 Gravelly unconsolidated  
 2 Gravelly consolidated  
 3 Gravelly consolidated  
 4 Gravelly consolidated  
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 154 Gravelly consolidated  
 155 Gravelly consolidated  
 156 Gravelly consolidated



 QUADRANGLE LOCATION  
 NON-RESOURCE OR

**CYPRINE:**

Chase, C.H., and McConachy, J.A., 1972.  
Invertebrate geology: map of the Denver  
Corridor. U. S. Geol. Survey Misc. Geol.  
Map 1-731.

Friable, D.R., and Pritch, R.N., 1974.  
Mammalian 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 1-856-A.

**Geology modified after:**

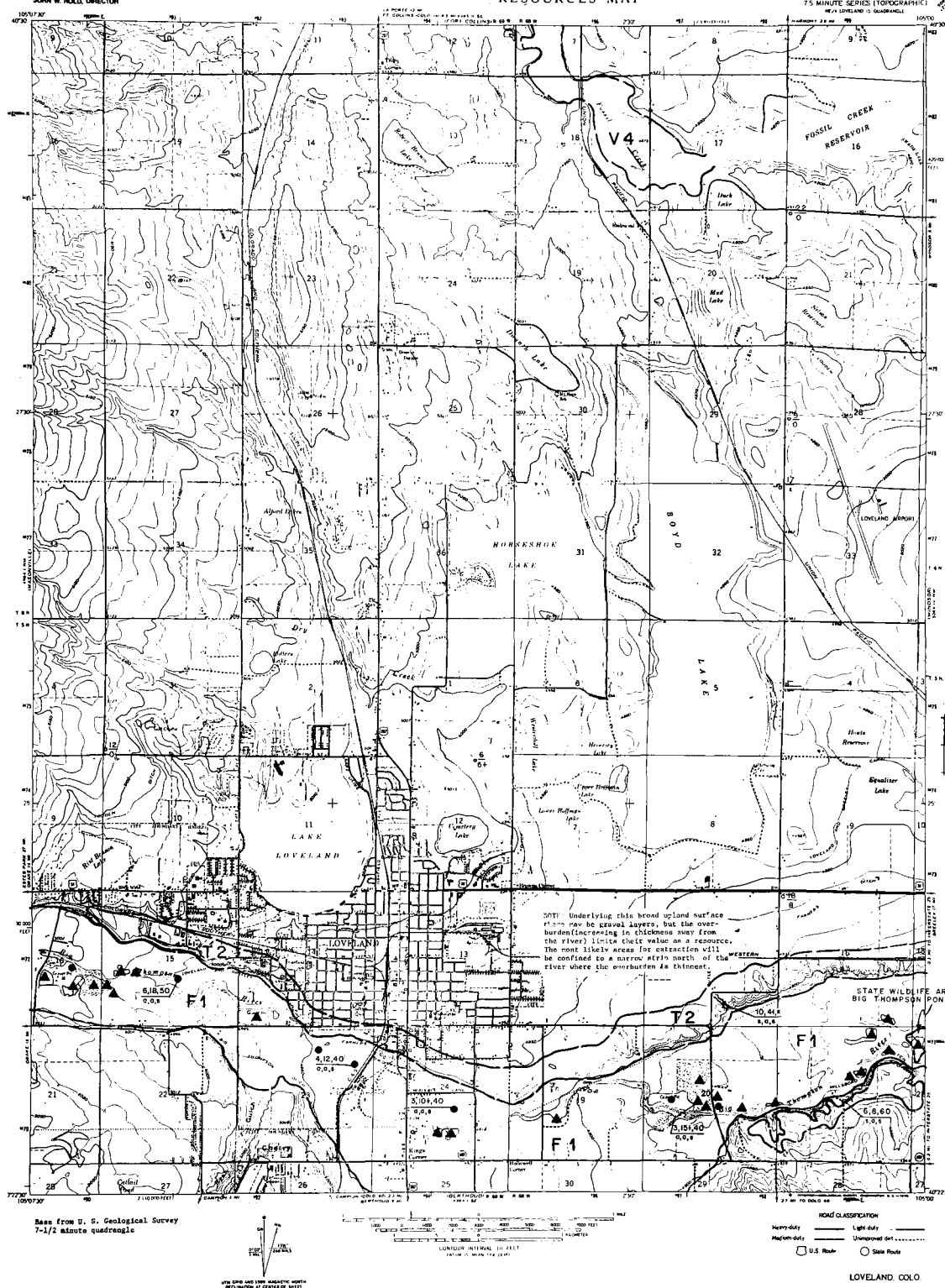
Malde, H.E., 1955. Surficial  
geology of the Louisville  
quadrangle, Colorado: U.S. Geol  
Survey Bull. 996-E, p. 211-259,

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

Prepared in cooperation with the  
U. S. Geological Survey

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

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



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

LYONS QUADRANGLE  
COLORADO-Boulder CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
NEXT TO BOLDER CO. QUADRANGLE

## EXPLANATION

Landform unit  
Resource classification

### LANDFORM UNIT

- F Fluvial deposit
- T Trench deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Eolian deposit
- M Man-made deposit

### RESOURCE CLASSIFICATION

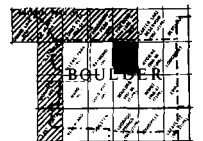
- 1. **Gravel**: relatively clean and sound
- 2. **Gravel**: slightly finer, decomposed rock, calcium carbonate
- 3. **Sand**: (greater than 70% passing #4 screen, 0% retained on #20 screen, usual estimation)
- 4. **Unconsolidated aggregate**
- 5. **Probable aggregate resource**

### MAP SYMBOLS

- 6. **Operational gravel and/or sand pit**
- 7. **Abandoned gravel and/or sand pit**
- 8. **Operating stone quarry**
- 9. **Abandoned stone quarry**
- 10. **Potential quarry aggregate resource area**
- 11. **Relieved well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs**
- 12. **"a" indicates gravel; "s" indicates sand**
- 13. **"u" is symbol denoting unconsolidated or unknown property**
- 14. **"m" denotes Colorado Geological Survey wellhead and gravel producer drill hole**
- 15. **Landform boundary, solid where known or observed; dashed where approximate or inferred**

### ESTIMATION, LOCATION AND QUANTITY

- 16. **Overburden thickness (ft)**
- 17. **Sand/gravel resource thickness (ft)**
- 18. **Percent sand and fines (greater than #4 screen, 0-75 (s), usual estimation)**
- 19. **Significant amount of fines (greater than #4 screen, 0-75 (s), usual estimation)**
- 20. **Significant amount of decomposed or weak rock**
- 21. **Significant amount of unconsolidated aggregate**
- 22. **"u" or "m" denotes unconsolidated or unknown property**
- 23. **"a" or "s" denotes gravel or sand**
- 24. **"u" or "m" denotes unconsolidated or unknown property**
- 25. **"a" or "s" denotes gravel or sand**



QUADRANGLE LOCATION

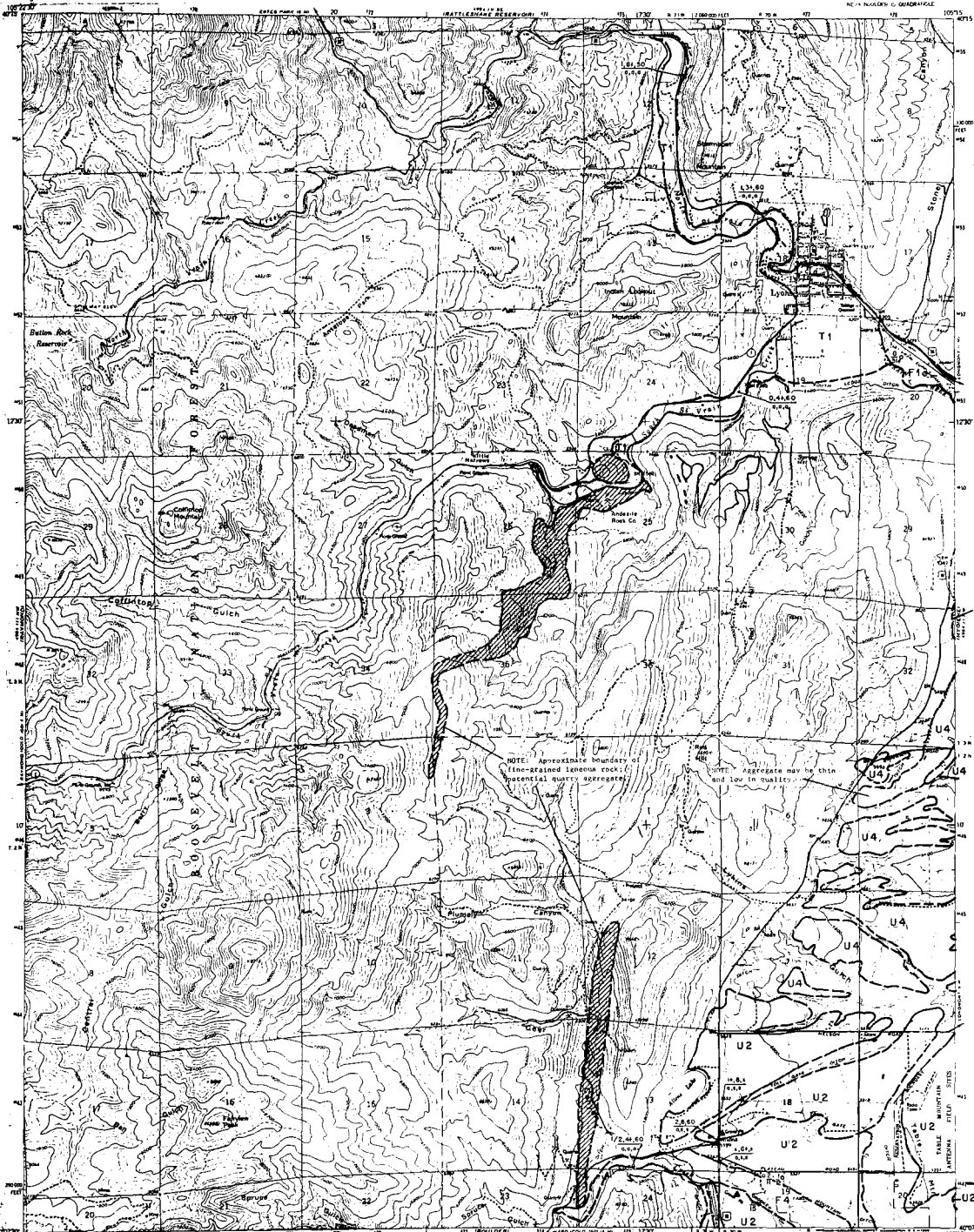
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after: Colton, R.R., and Pritch, H.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 D.

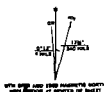
Map by: Ralph R. Shroba

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 40 FEET  
DATA IS MEAN SEA LEVEL

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

LYONS, COLO.

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

MANILA QUADRANGLE  
COLORADO-ADAMS CO.  
5 MINUTE SERIES (TOPOGRAPHIC)



- Landform map
- ... with classification

## LANDFORM UNITS:

- F Floodplain deposit
- T Terrace terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Man-made deposits

### QUALITATIVE QUALIFICATION

Gravel Aggregate  
1. Gravel: relatively clean and round  
2. cravel: significant fines, decomposed rock, chalky, carbonaceous



Iron Aggregate  
3. Land

Unvalued Resource

4 Probable aggregate resource

### MAP SYMBOLS

[illegible]

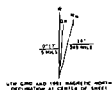
 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

**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 southwestern Weld Counties, Colorado: U. S. Geol. Survey Water-Supply Paper 1658, pl. 1.

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

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



1000' 0' 1000' 2000' 3000' 4000' 5000' 6000' 7000' 8000' 9000' 10000'

1 2 3 4 5 6 7 8 9 10

10 FEET

CONTOUR INTERVAL 10 FEET

ROAD CLASSIFICATION

Heavy-duty	_____	CLANE PLANE	Light-duty	_____
Medium-duty	_____	CLANE PLANE	Unimproved dirt	-----
<input type="checkbox"/> U. S. Route			<input type="checkbox"/> State Route	

MANILA, COLO



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

MANITOU SPRINGS QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
1944 EDITION REVISED TO 1964

## EXPLANATION

Landform unit  
Resource class/function

- LANDFORM UNIT**
- P Fluvial deposit
  - T River terrace deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Man-made deposit (slag, tailings, spoils, etc.)

## RESOURCE CLASSIFICATION

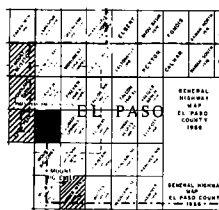
- CLASSIFICATION**
- For each 200' contour interval, 10' screen, 10' interval
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcine, etc.
  - 3 Sand
  - 4 Probable aggregate resource

## 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 drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs
- "a" indicates gravel; "s" indicates sand
- "u" in symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey (landform and gravel product) drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

## SECTION, LOCATION AND ORIENTATIONAL

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- gravel: sand and/or clay (gravel: sand: clay, 1:1:1; usual estimation)
- significant amount of fines (passing 200 mesh, 75.000 in. or 0.075 mm)
- significant amount of decomposed or weak rock
- "u" in symbol denotes unconsolidated or unknown property
- "m" in symbol denotes property absent or unclear/lost



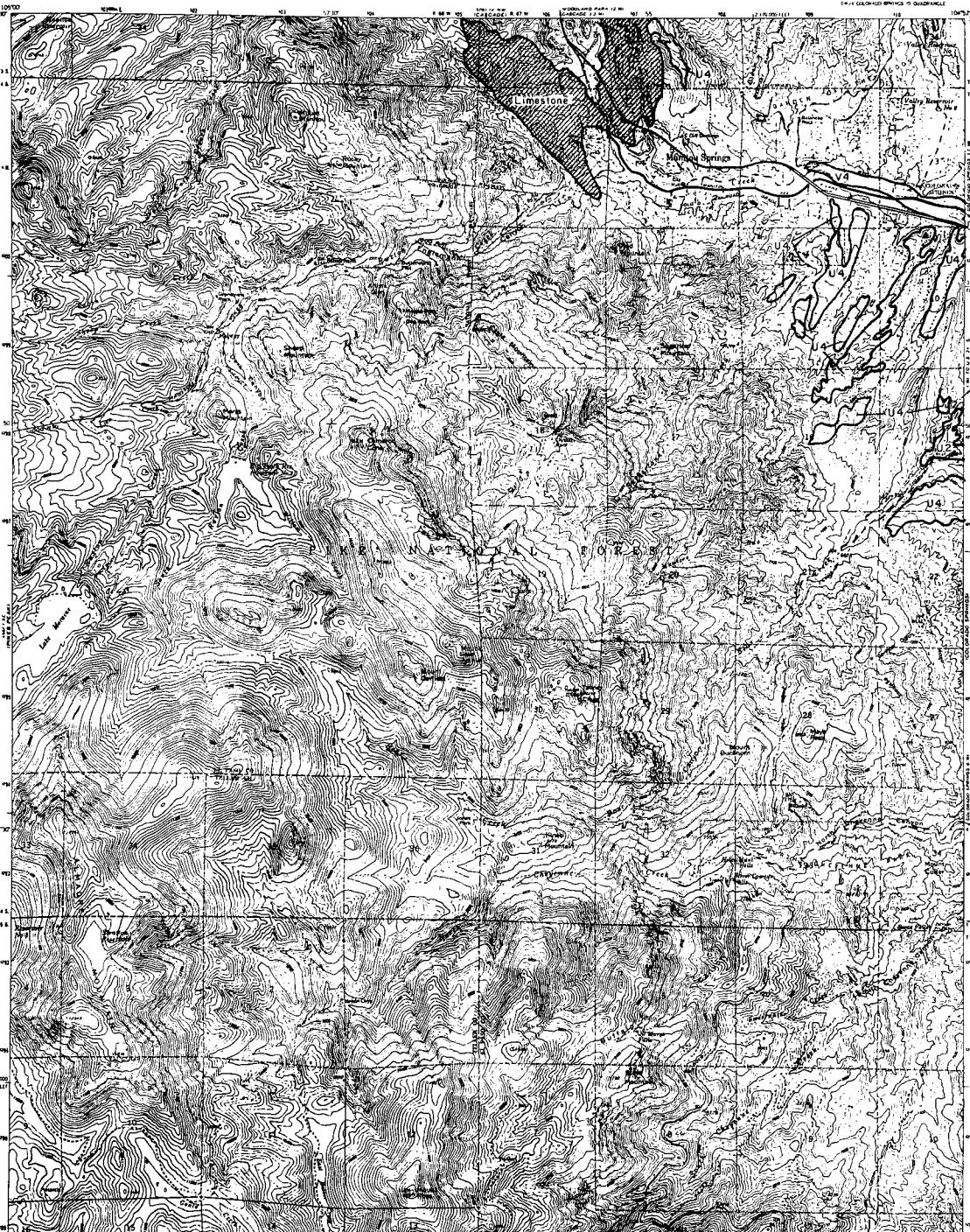
QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, G.R., & Wobus, R. A. 1973. Reconnaissance geologic map of Colorado Springs and vicinity, Colorado: U. S. Geological Survey Map, 100-1002.

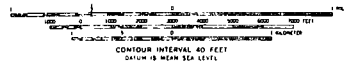
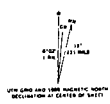
**REFERENCES:**

Trumble, D. E., and Pritch, R. R., 1974. Map shows 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.

Maped 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 ——— Light duty ———

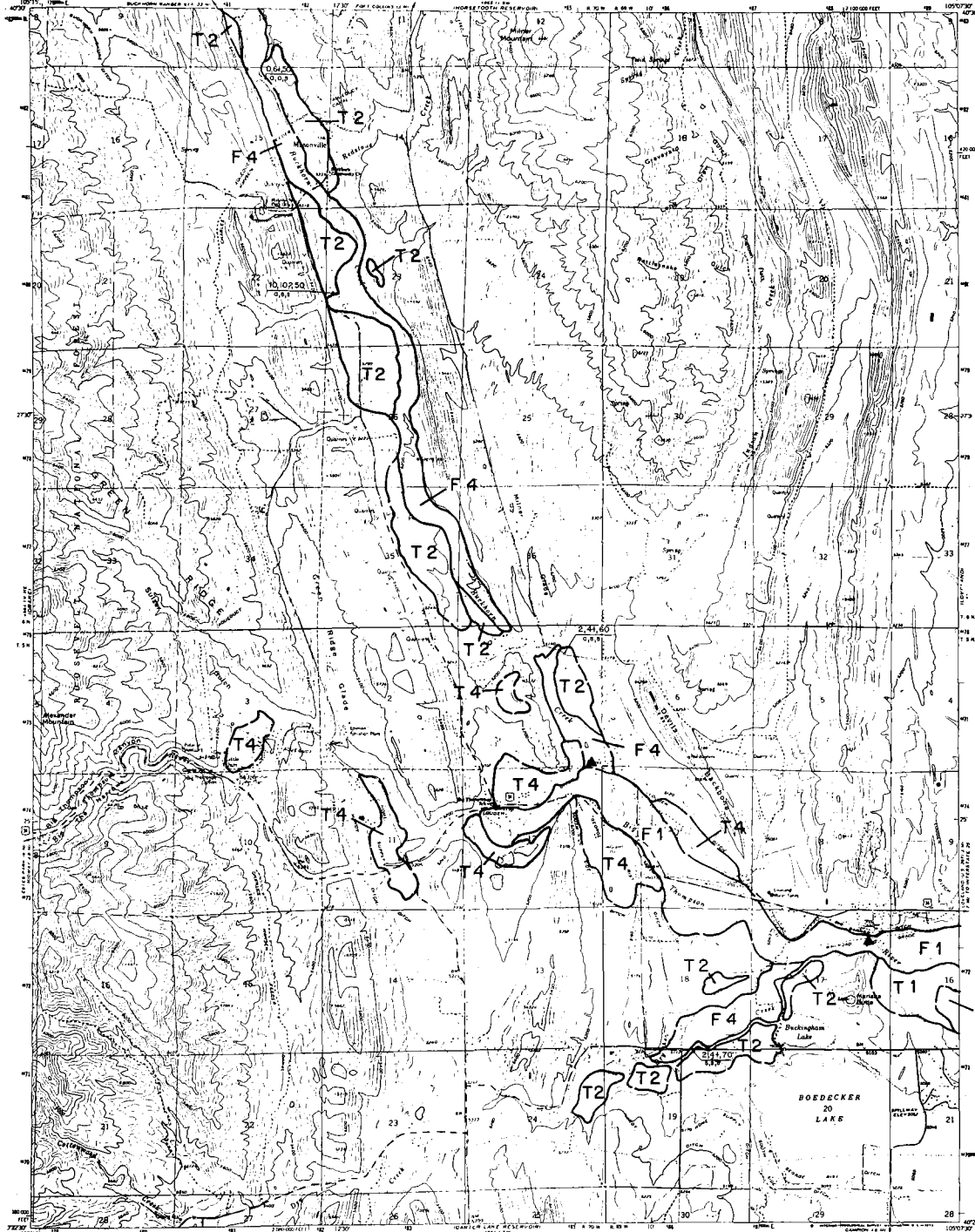
Medium duty ——— Unimproved dirt ———

U.S. Route

MANITOU SPRINGS, COLO.

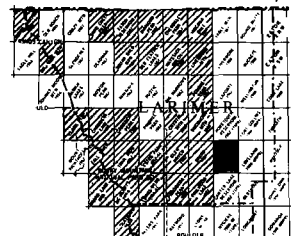
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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



## EXPLANATION

- Landform and 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 Manmade deposit (slag tailings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Resources**  
(of lower 250 feet below 4000 feet, visual observation)
- 1 Gravel: relatively clean and sand
  - 2 Gravel: significant fines, decomposed rock, calcareous cementation
- Fill Resources**  
(greater than 250 feet below 4000 feet, 600 feet below 4000 feet, visual observation)
- 3 Sand
  - 4 Probable aggregate resource
- Unclassified Resource**
- MAP SYMBOLS**
- Operating gravel and/or sand pit
  - Abandoned gravel and/or sand pit
  - Operating stone quarry
  - Abandoned stone quarry
  - Principal quarry aggregate resource area
  - Related well or drilled location with water-bearing thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs
  - "a" indicates gravel; "s" indicates sand
  - "x" in symbol denotes unclassified or unknown property
  - "m" denotes Colorado Geological Survey Waterflood and Ground Project
  - Still hole
  - Location boundary, solid when known or observed; dashed when approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE**
- resource thickness (ft)
  - non-gravel resource thickness (ft)
  - summary sand and gravel (space) ft
  - bottom, 100 ft or 200 ft
  - significant amount of fines (space) 1000 ft
  - significant amount of decomposed or weak rock
  - significant amount of siliceous cementation (space) 1000 ft
  - "m" on symbol denotes unclassified or unknown property
  - "x" on symbol denotes property subject to litigation



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

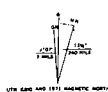
Geology modified after: Colton, R.R., and Petch, R.R., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Owens area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-855 D.

**REFERENCE:**  
Braddock, V.A., Calvert, R.R., Gwarsch, S.J., and Nims, P., 1970, Geologic map of the Masonville quadrangle, Larimer County, Colorado: U. S. Geol. Survey Map I-855 D.

Map by: Stephen D. Schwach  
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, 40 FEET  
DOTTED LINES, INTERVAL 1000 FEET  
(BASED ON MEAN SEA LEVEL)

**ROAD CLASSIFICATION**

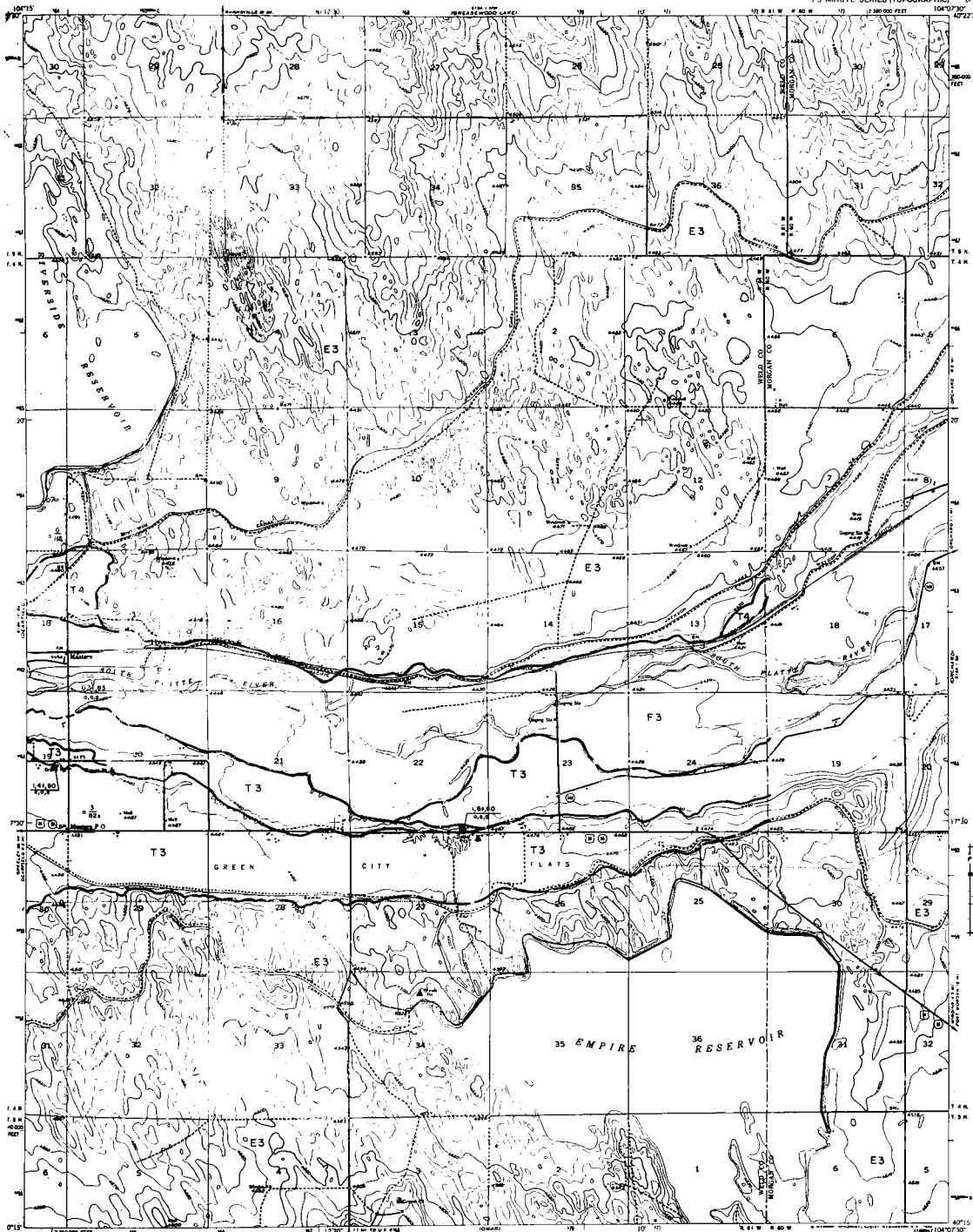
- Light duty
- Medium duty
- Unimproved dirt
- U.S. Route

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. HOLS, DIRECTOR



## EXPLANATION

- LAND USE**  
F Floodable deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Unconsolidated  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Non-made deposits (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**  
**UNIT 1: GRAVEL**  
1 Gravel: relatively clean and round  
2 Gravel: significant fines, decomposed rock, calcareous carbonate  
**UNIT 2: SAND**  
3 Sand  
**UNIT 3: QUARRY AGGREGATE**  
4 Potentially aggregate resources
- MAP SYMBOLS**  
A Abandoned gravel and/or sand pit  
B Abandoned stone quarry  
C Potential quarry aggregate resource area  
D Isolated well or drill-hole location with owner  
E Indicate gravel, "G" indicate sand  
F Is symbol denotes unconsolidated or unknown property  
G Is symbol denotes unconsolidated or unknown property  
H Is symbol denotes unconsolidated or unknown property  
I Is symbol denotes unconsolidated or unknown property  
J Is symbol denotes unconsolidated or unknown property  
K Is symbol denotes unconsolidated or unknown property  
L Is symbol denotes unconsolidated or unknown property  
M Is symbol denotes unconsolidated or unknown property  
N Is symbol denotes unconsolidated or unknown property  
O Is symbol denotes unconsolidated or unknown property  
P Is symbol denotes unconsolidated or unknown property  
Q Is symbol denotes unconsolidated or unknown property  
R Is symbol denotes unconsolidated or unknown property  
S Is symbol denotes unconsolidated or unknown property  
T Is symbol denotes unconsolidated or unknown property  
U Is symbol denotes unconsolidated or unknown property  
V Is symbol denotes unconsolidated or unknown property  
W Is symbol denotes unconsolidated or unknown property  
X Is symbol denotes unconsolidated or unknown property  
Y Is symbol denotes unconsolidated or unknown property  
Z Is symbol denotes unconsolidated or unknown property
- STATION, LOCATION AND ORIGIN**  
RESOLUTION OF SYMBOLS  
A Significant amount of fines (greater than 10% passing 20 mesh, 0.075 mm, or 0.075 mm)  
B Significant amount of decomposed or soft rock  
C Significant amount of calcareous material  
D Is symbol denotes unconsolidated or unknown property  
E Is symbol denotes unconsolidated or unknown property  
F Is symbol denotes unconsolidated or unknown property  
G Is symbol denotes unconsolidated or unknown property  
H Is symbol denotes unconsolidated or unknown property  
I Is symbol denotes unconsolidated or unknown property  
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W Is symbol denotes unconsolidated or unknown property  
X Is symbol denotes unconsolidated or unknown property  
Y Is symbol denotes unconsolidated or unknown property  
Z Is symbol denotes unconsolidated or unknown property

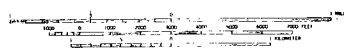
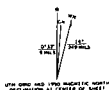


QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

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 Paxton, Nebraska; U. S. Geol. Survey Water-Supply Paper 1575, pl. 1.

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

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



CONTOUR INTERVAL 10 FEET  
BUT IN SOME CASES

ROAD CLASSIFICATION  
Heavy-duty road, improved det.  
Medium-duty road, improved det.  
Light-duty road, improved det.  
Unimproved det.  
U. S. Route  
State Route

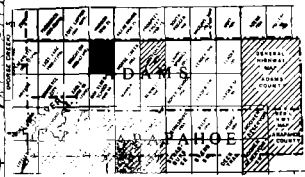
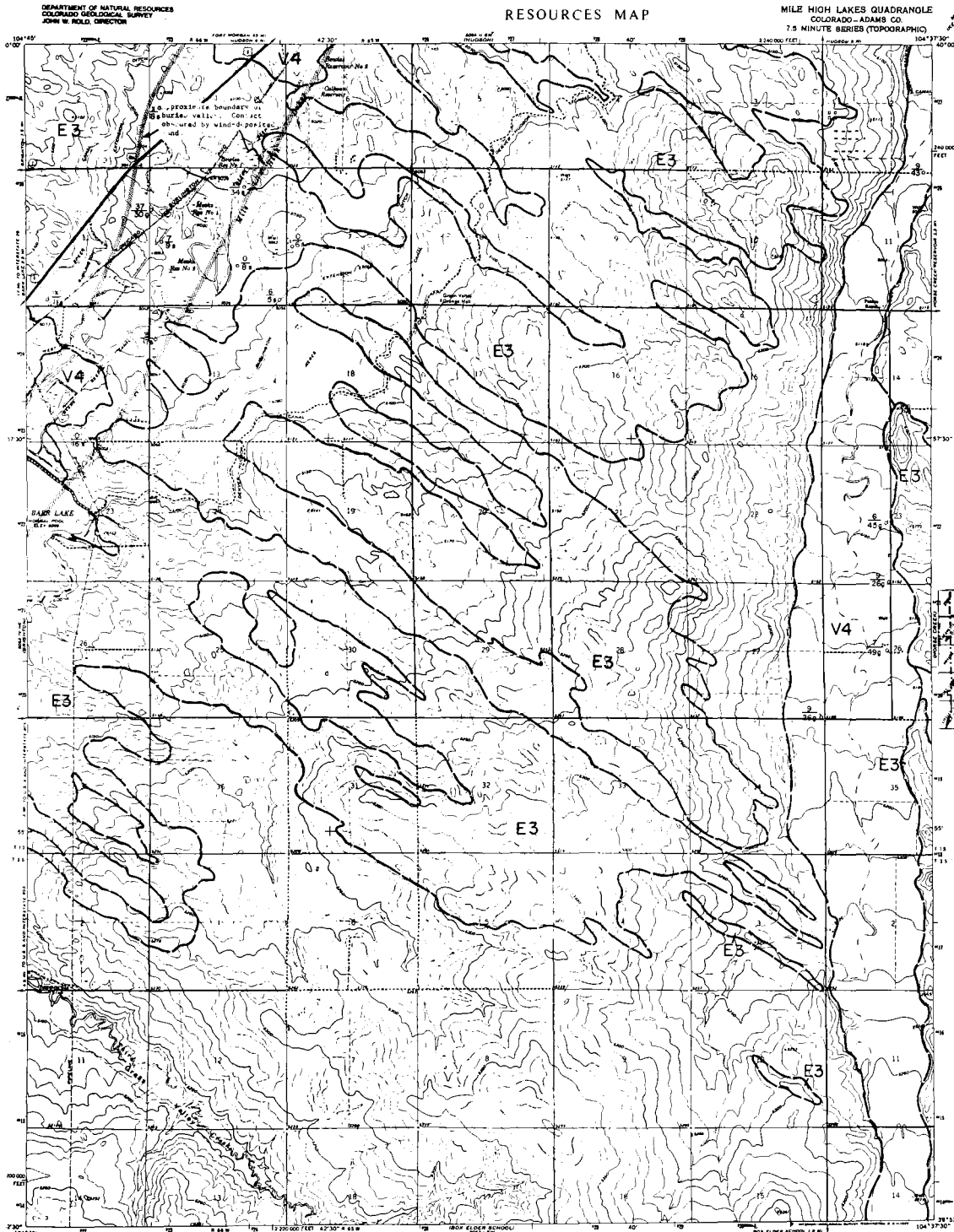
MASTERS, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

MILE HIGH LAKES QUADRANGLE  
COLORADO - ADAMS CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

- GENERAL NOTES**
- 1. This map is a compilation of data from various sources and is not a field map.
  - 2. The map is based on the 7.5 minute topographic series of the U.S. Geological Survey.
  - 3. The map is a compilation of data from various sources and is not a field map.
  - 4. The map is based on the 7.5 minute topographic series of the U.S. Geological Survey.
- SYMBOLS**
- 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
  - 6. Relieved well or drilled hole location with water thickness (ft.) over sand/gravel resource thickness (ft.) obtained from well logs
  - 7. "a" indicates gravel; "s" indicates sand
  - 8. "a" in symbol denotes unrelieved or unknown property
  - 9. "s" denotes Colorado Geological Survey Water-Supply Division (C.G.S.W.S.D.) well
  - 10. "a" in symbol denotes unrelieved or unknown property
  - 11. "s" in symbol denotes unrelieved or unknown property
  - 12. "a" in symbol denotes unrelieved or unknown property
  - 13. "s" in symbol denotes unrelieved or unknown property
  - 14. "a" in symbol denotes unrelieved or unknown property
  - 15. "s" in symbol denotes unrelieved or unknown property
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  - 17. "s" in symbol denotes unrelieved or unknown property
  - 18. "a" in symbol denotes unrelieved or unknown property
  - 19. "s" in symbol denotes unrelieved or unknown property
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  - 23. "s" in symbol denotes unrelieved or unknown property
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  - 26. "a" in symbol denotes unrelieved or unknown property
  - 27. "s" in symbol denotes unrelieved or unknown property
  - 28. "a" in symbol denotes unrelieved or unknown property
  - 29. "s" in symbol denotes unrelieved or unknown property
  - 30. "a" in symbol denotes unrelieved or unknown property
  - 31. "s" in symbol denotes unrelieved or unknown property
  - 32. "a" in symbol denotes unrelieved or unknown property
  - 33. "s" in symbol denotes unrelieved or unknown property
  - 34. "a" in symbol denotes unrelieved or unknown property
  - 35. "s" in symbol denotes unrelieved or unknown property
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  - 87. "s" in symbol denotes unrelieved or unknown property
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  - 91. "s" in symbol denotes unrelieved or unknown property
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  - 93. "s" in symbol denotes unrelieved or unknown property
  - 94. "a" in symbol denotes unrelieved or unknown property
  - 95. "s" in symbol denotes unrelieved or unknown property
  - 96. "a" in symbol denotes unrelieved or unknown property
  - 97. "s" in symbol denotes unrelieved or unknown property
  - 98. "a" in symbol denotes unrelieved or unknown property
  - 99. "s" in symbol denotes unrelieved or unknown property
  - 100. "a" in symbol denotes unrelieved or unknown property



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

**References:**  
Chamberlain, C.P., and McGonigley, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map 1-731.  
Seth, R.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 1658, pl. 1.  
Trimble, D.L., and Fitch, H.R., 1976, 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 1-856-A.

Map 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  
Scale: 1 inch = 1 mile  
Contour interval: 10 feet  
Datum: Mean Sea Level  
Road Classification:   
Highway   
Unimproved dirt   
Mileage Route   
U.S. Route   
State Road

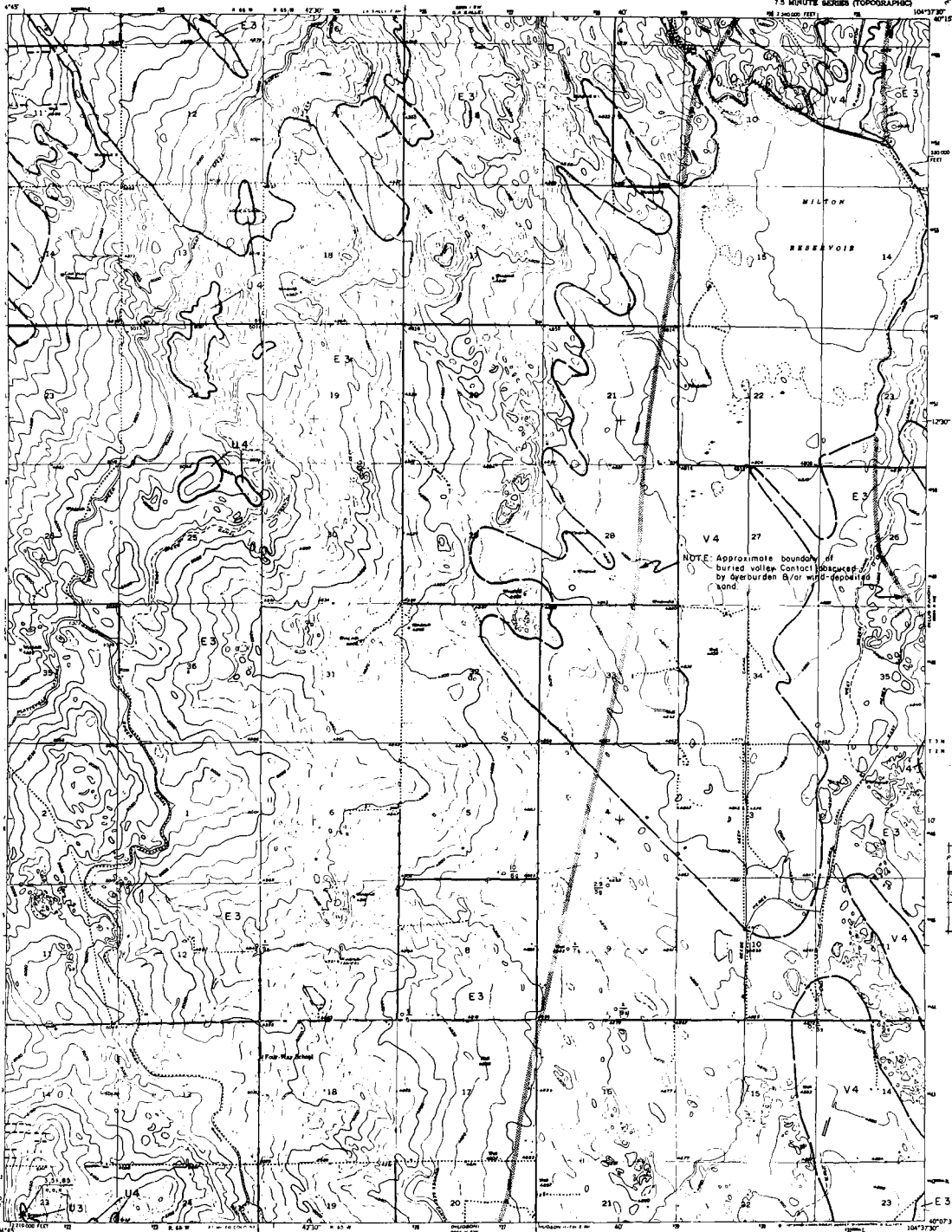
MILE HIGH LAKES, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

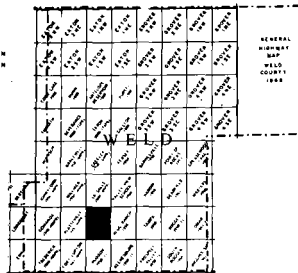
MILTON RESERVOIR  
COLORADO-WELD CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

- LEGEND**
- SYMBOLS**
- Fluvial deposit
  - Gravel terrace deposit
  - Valley fill (F & T)
  - Wind deposit
  - Alluvial fan
  - Wind-deposited sand (dunes)
  - Normal deposit (slag, tailings, spillover...)
- RESOURCE CLASSIFICATION**
- Class 1 Aggregate**  
(1) 100' to 200' (30-60') in 40 acres, "road" material
- Gravel: relatively clean and sound
  - Gravel: significant fines, decomposed rock, calcareous cement
- Class 2 Aggregate**  
(2) 100' to 200' (30-60') in 40 acres, "road" material
- Sand
- Unutilized Resource**
- 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
  - Isolated well or fill-hole location with overburden thickness (1) over significant resource thickness (2), obtained from well log
  - "u" indicates gravel; "s" indicates sand
  - "r" is symbol denotes overburden or unknown property
  - "m" denotes Colorado Geological Survey classified and gravel pit area
  - Landform boundary, solid where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND SYMBOLS**
- SYMBOLS OF SPECIAL**
- Overburden thickness (1)
  - Isolated well or fill-hole location with overburden thickness (1) over significant resource thickness (2), obtained from well log
  - Significant amount of fines (greater than 100 mesh, 0.075 in. or 0.075 mm)
  - Significant amount of decomposed or weak rock
  - Significant amount of million tonnage (million) without property
  - "u" is symbol denotes overburden or unknown property
  - "m" is symbol denotes property owned or significant



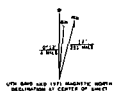
QUADRANGLE LOCATION  
NON-RESOURCE OR  
VITRIFIED AREA

Geology modified after:  
Calkin, R.B., and Pich, H.B., 1974, Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map I-655-D.

Map by: Ralph B. 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 10 FEET  
DATA TO NEAR SEA LEVEL

ROAD CLASSIFICATION

HAZARDOUS ALL WEATHER ROADS  
Main-ditch  
Medium-ditch  
Low-ditch, grade, or narrow road surface  
U. S. Road  
Scale Road

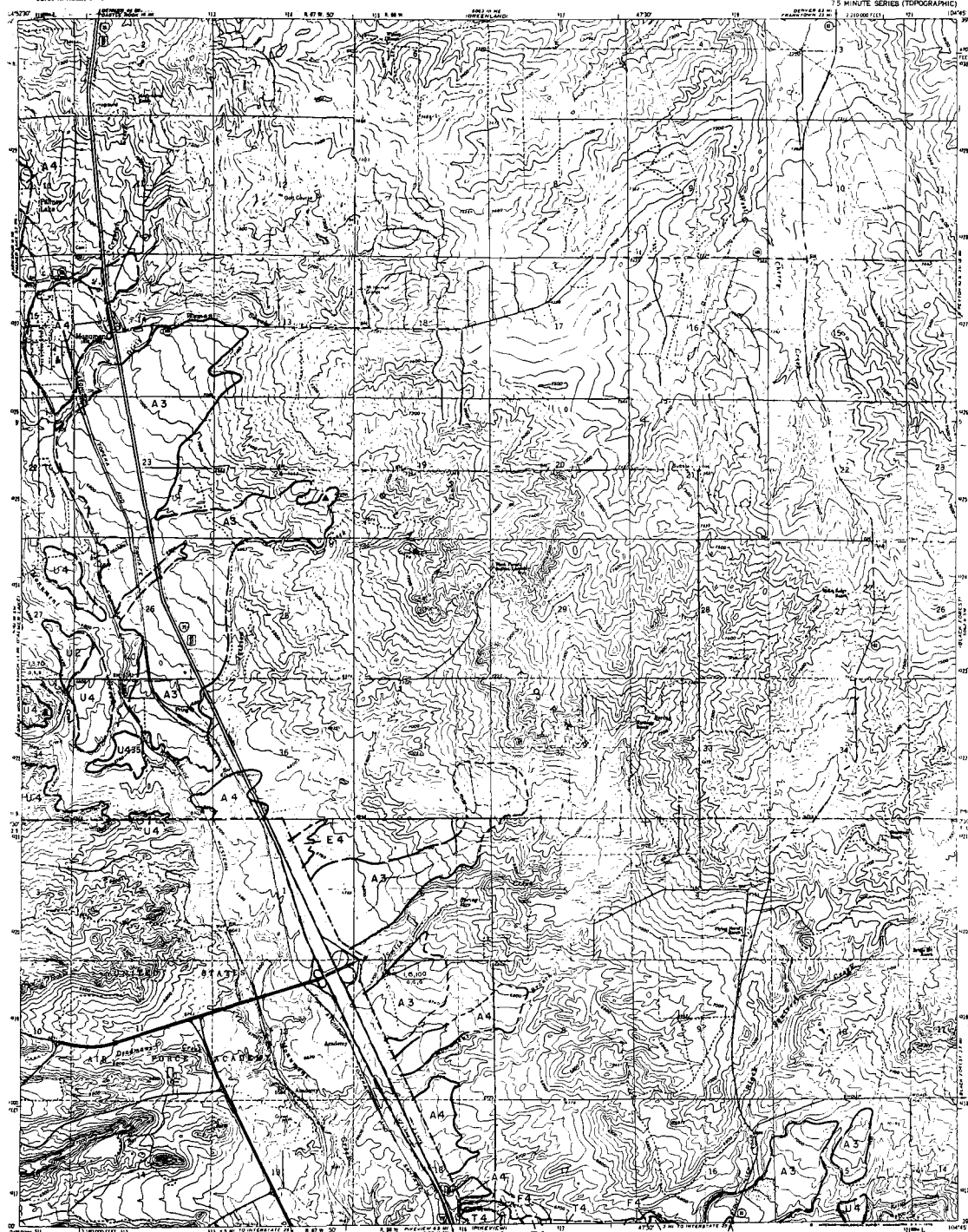
MILTON RESERVOIR, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

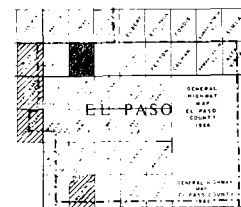
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. HALL, DIRECTOR

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



## EXPLANATION

- Legend:**
- 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 Non-mine deposits (slag, tailings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- SAND/GRAVEL**
- 1 Gravel: relatively clean and sand
  - 2 Gravel: significant fines, decomposed rock, calcareous cementation
  - 3 Sand
  - 4 Probable aggregate resource
- QUARRY AGGREGATE**
- 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:**
- Intersecting well or drill-hole location with owner
  - Boundary thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
  - "T" indicates gravel, "M" indicates sand
  - "S" in symbol denotes unconsolidated or unknown property
  - "W" denotes Colorado Geological Survey "Wider" (Sand and Gravel project) drill hole
  - Landform boundary, solid where known or observed, dashed where approximate or inferred
- 4. STATION, LOCATION AND GEOLOGICAL INFORMATION OF SYMBOL**
- overlain thickness (ft)
  - underlain resource thickness (ft)
  - owner name and finer (bearing to corner, 0.25 in., usual with 1/4 in.)
  - significant amount of fines (bearing to corner, 0.25 in., or 0.25 in.)
  - significant amount of decomposed or weak rock
  - significant amount of eolian carbonate (calciferous)
  - "W" in symbol denotes unconsolidated or unknown property
  - "M" in symbol denotes property about or designated



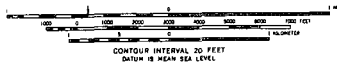
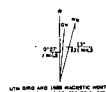
## REFERENCE:

Trimble, D.F., 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.

Map 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
  - 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

Resource classification

### LEGEND

- F Fluvial deposit
- T Tertiary deposit
- V Valley fill (F & T)
- U Unconsolidated
- A Alluvial fan
- W Wind-deposited sand (lacustrine)
- M Marine deposit (lacustrine, aprite, etc.)

### RESOURCE CLASSIFICATION

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

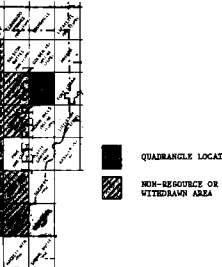
### ROAD CLASSIFICATION

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Relieved well or well-like structure with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log
- "x" indicates gravel; "s" indicates sand
- "u" in symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey "Morrison" and "Crawley" projects
- "d" in symbol denotes decomposed or inferior
- Land-use boundary, not where known or observed; dashed lines represent or inferred

### STATION, LOCATION AND ELEVATION

- overburden thickness (ft)
- non-gravel resource thickness (ft)
- vertical and fine spacing of gravel, 0.25 in. to 1.0 in. vertical
- significant amount of decomposed or weak rock
- significant amount of material unconsolidated or unknown property
- "u" in symbol denotes unconsolidated or unknown property
- "m" in symbol denotes Morrison project
- "c" in symbol denotes Crawley project

- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA



Source: Modified after Smith, G.H., 1977, Geologic map of the Morrison quadrangle, Jefferson County, Colorado, U.S. Geological Survey, Misc. Geol. Map 1-790-A.

Source: G.H., 1977, Map showing potential resource areas for non-metallic mineral resources, Morrison quadrangle, Jefferson County, Colorado, U.S. Geological Survey, Misc. Geol. Map 1-790-B.

Source: Fennell, R.L., 1968, Quaternary geology of the Morrison quadrangle, Colorado, Min. Geol. Soc., v. 1, no. 4.

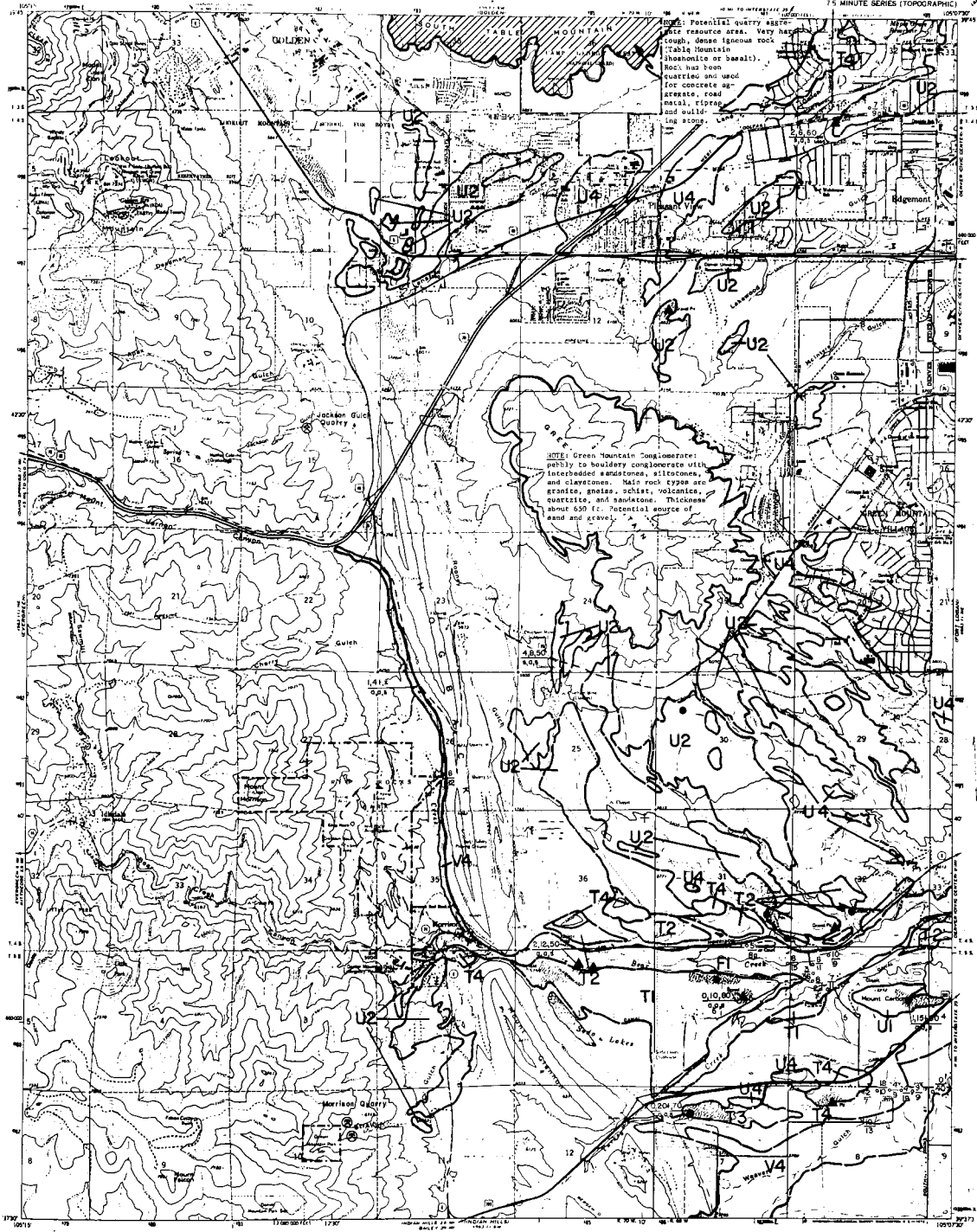
Source: Regional Planning Commission, 1968, Land-use resource plan for the Denver region, Part 1, Sand and gravel resources, Denver, Colo., Regional Planning Commission, p. 1.

Source: Hamilton, J.L., and Owens, W.C., 1972, Geologic map, with and without foundation problems, Denver, Morrison area, Colorado, Colorado State Survey, Miscellaneous Geology Report, 1, p. 1.

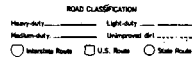
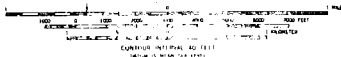
Source: Chase, G.H., and McCann, G.A., 1967, Generalized geologic map of the Denver area, Colorado, U.S. Geological Survey, Misc. Geol. Map 1-731.

Source: Triebel, G.E., and Pyle, H.H., 1974, Map showing potential resource areas of gravel and other mineral aggregates in the Denver region, Colorado, U.S. Geological Survey, Misc. Geol. Map 1-790-A.

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



Base from U. S. Geological Survey  
7.5 minute quadrangle

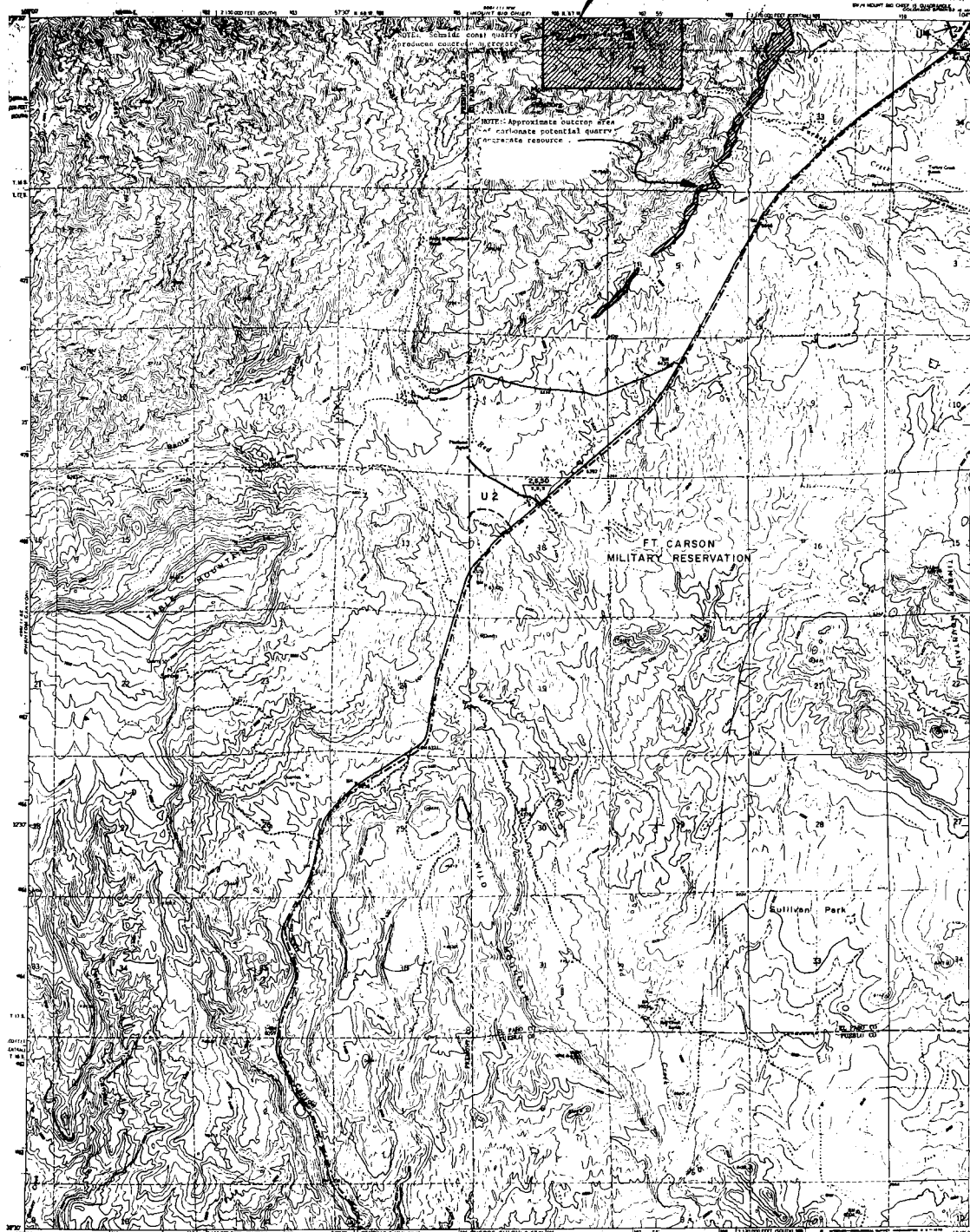


MORRISON, COLO.



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


MOUNT PITTSBURGO QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



Landform unit  
Residence class (Kortum)

- [illegible]

[illegible]

 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

**REFERENCE :**

McLaughlin, K.P., 1947, Pennsylvanian stratigraphy of Colorado Springs quadrangle: Am. Assoc. Petroleum Geol. Bull. v. 31, p. 1936-1981.

Finlay, G.I., 1916, Colorado Springs  
 Folio, Colorado: U.S. Geol. Survey Folio no. 203

Geology Modified after:  
Harms, 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

ROAD CLASSIFICATION \_\_\_\_\_  
 \_\_\_\_\_ Light duty \_\_\_\_\_  
 Unimproved dirt \_\_\_\_\_  
 ( ) State Route \_\_\_\_\_  
 MOUNT PITTSBURG, COLO.

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

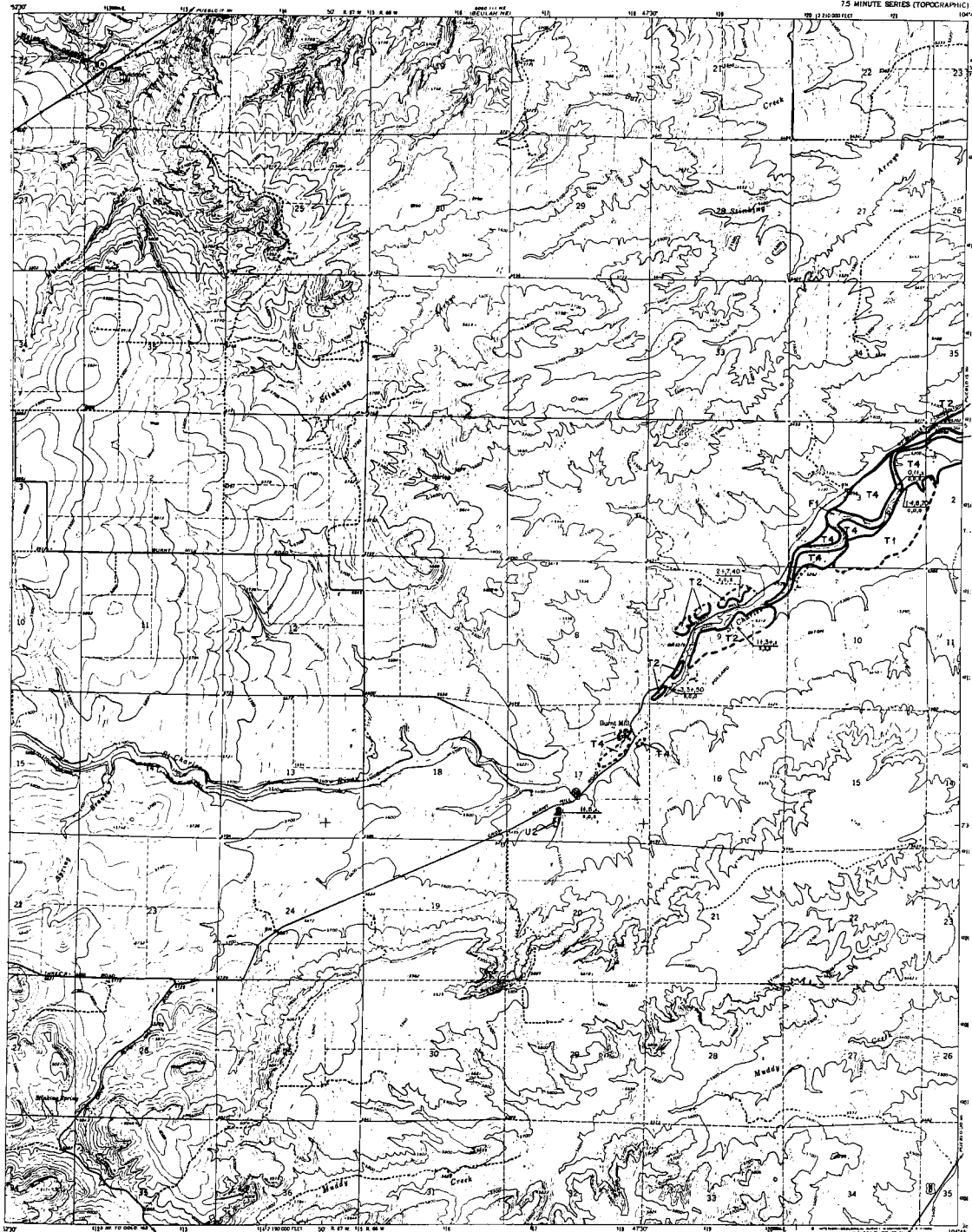
Figure 1 is a plan view map of the study area. It shows the coastline and bathymetry. A scale bar at the top indicates distances from 0 to 10,000 feet. A north arrow is located in the upper right corner. Dotted lines represent 25-foot contours. The datum is mean sea level.

MOUNT PITTSBURG, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

MULDON HILL QUADRANGLE  
COLORADO-PUEBLO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



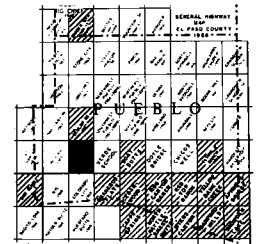
## EXPLANATION

- Landform unit  
Resource classification
- LANDFORM UNITS**
- F Floodplain deposit
  - T Tread terrace deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Man-made deposits (slag, tailings, etc.)

- RESOURCE CLASSIFICATION**
- Gravel**  
(as shown by material on 40 acres, 100' contour interval)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcareous carbonate
- Sand**  
(as shown by material on 40 acres, 400' contour interval)
- 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
  - Relative well or drill-hole location with associated thickness (ft) over sand/gravel resource
  - Thickness (feet) of sand/gravel resource
  - "x" indicates gravel; "s" indicates sand
  - "x" in symbol denotes unmineralized or unknown property
  - "m" American Colorado Geological Survey boundary line and gravel projects
  - Still hole
  - Landform boundary, solid where known or observed; dashed where approximate or inferred

- STATION, LOCATION AND ORIENTATIONAL INFORMATION**
- 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 decomposed or weak rock
  - significant amount of calcareous carbonate (caliche)
  - "x" in symbol denotes unmineralized or unknown property
  - "s" in symbol denotes property absent or insignificant



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

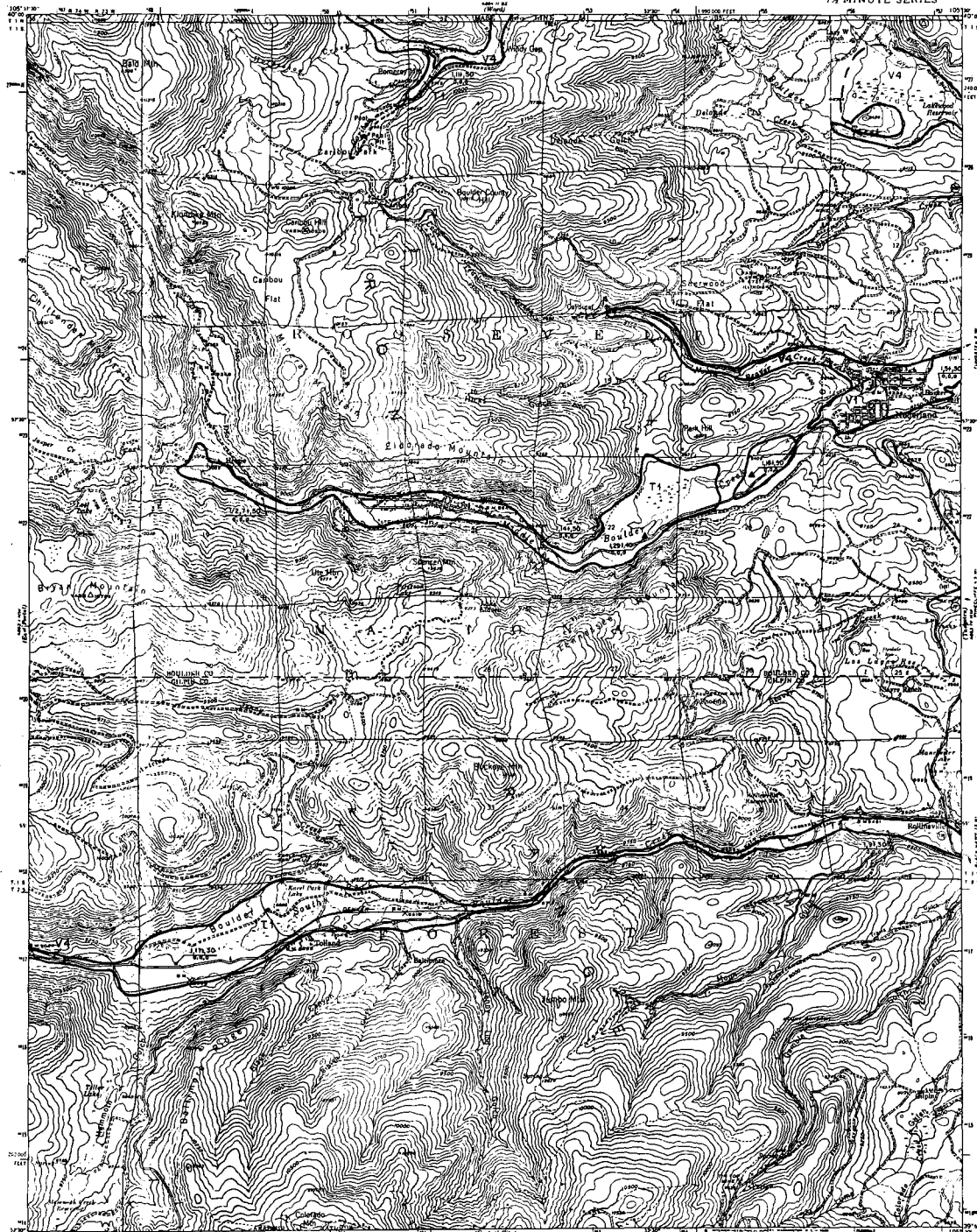
MULDON HILL, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

COLORADO  
NEDERLAND QUADRANGLE  
7 1/2-MINUTE SERIES



## EXPLANATION

Landform unit  
Reservoir class/condition

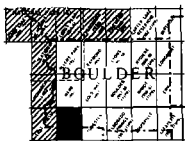
**LANDFORM UNIT**  
R Riverbank deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Upland deposit  
A Alluvial fan  
C Wind-deposited sand (colluvium)  
M Non-mine deposit (slag, tailings, opels, etc.)

**RESOURCE CLASSIFICATION**  
(1) **Current Resources**  
(a) **Quarry** - 250' or more, actual estimation  
1 Gravel: relatively pure and good  
2 Gravel: significant fines, increased rock, section not suitable  
(b) **Fill Material**  
(c) **Gravel** - 250' or more, actual estimation  
(d) **Gravel** - 250' or more, actual estimation  
3 Sand

**Overestimated Resource**  
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 overburden thickness (ft) over sand/gravel resource thickness (ft); obtained from well logs  
"r" indicates gravel; "s" indicates sand  
"u" in symbol denotes unestimated or unknown property  
"w" denotes Colorado Geological Survey Winter/Field and Crown projects  
0133 wells  
Landform boundary, mild sheet known or observed, but more appropriate to be indicated

**STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE**  
non-processed thickness (ft)  
non-processed resource thickness (ft)  
percent sand and fines (coarsest 40 percent, 0.5 ft, actual estimation)  
significant amount of fines (greater than 200 mesh, 0.25 ft, or 0.375 mm)  
significant amount of decomposed or weak rock  
significant amount of solution carbonate (colluvium)  
"u" in symbol denotes unestimated or unknown property  
"w" in symbol denotes properly absent or negligible

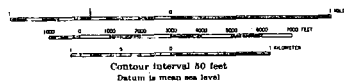


QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE:  
Gable, D. J., 1969,  
U. S. Geol. Survey Geol.  
Quad Map GQ-033.

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

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



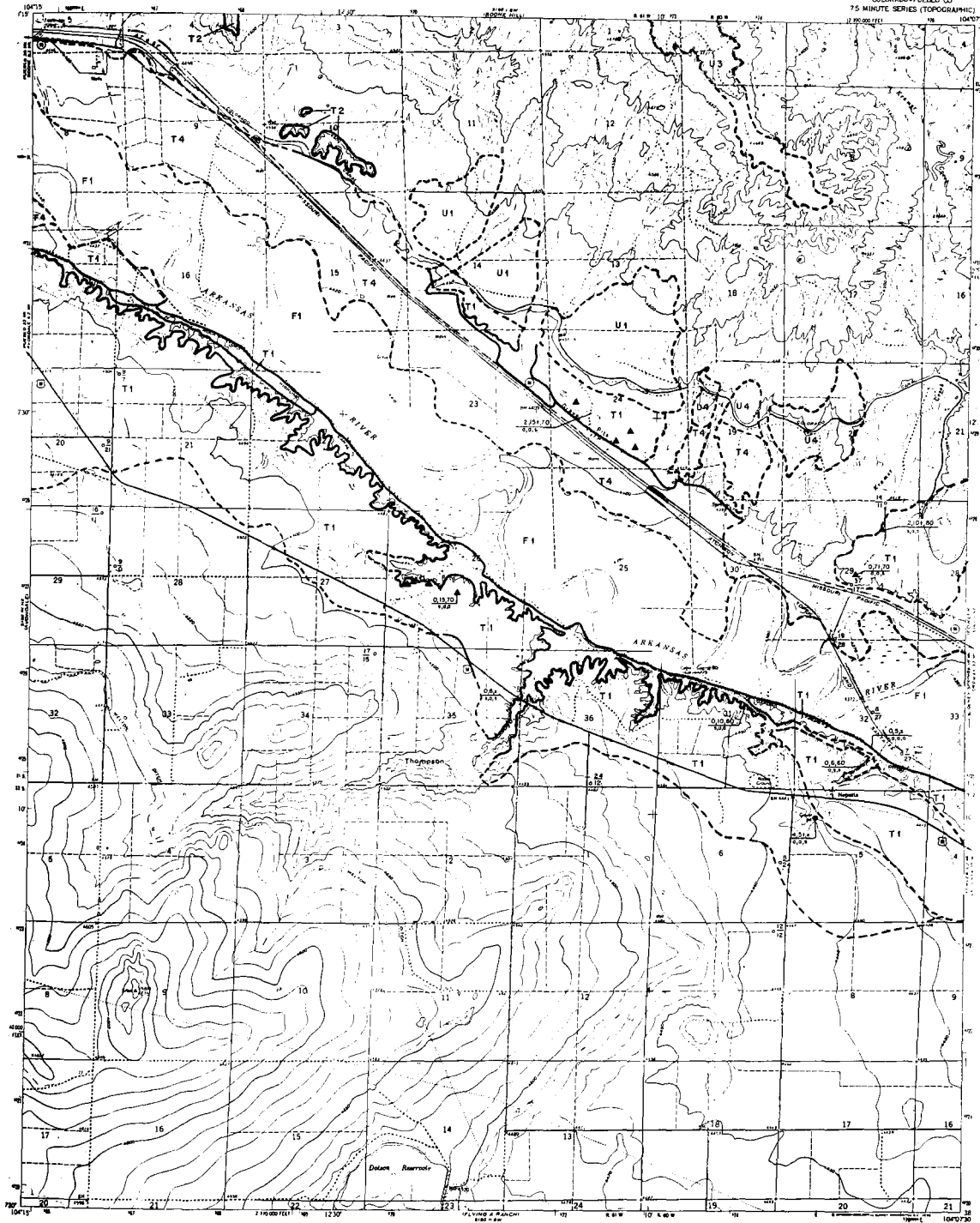
ROAD CLASSIFICATION  
Medium-duty  
Light-duty  
Unimproved dirt  
State Route  
NEDERLAND, COLO.



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

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

NEPESTA QUADRANGLE  
COLORADO-HARBLO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

Landform units  
Resource classification

### LANDFORM UNITS

- F Fluvial deposits
- T Stream terrace deposits
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Wind-swept sand (eolian)
- M Marine deposits (sand, silt, shells, etc.)

### RESOURCE CLASSIFICATION

- 1 Gravel: relatively clean and well sorted
- 2 Gravel: significant fines, detrital rock, calcareous cement
- 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
- Prospected quarry aggregate resource, no data
- Selected well or drilled hole (depth, etc.)
- Border thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- Thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- "a" indicates gravel; "s" indicates sand
- "x" in symbol denotes unclassified or unknown property
- "no" denotes Colorado Geology (all types)
- Water (land and water) (shaded)
- Drill hole
- Landform boundary, all of the above or observed; dashed circle approximate or inferred

### SECTION, LOCATION AND TOPOGRAPHIC DESCRIPTION OF SYMBOLS

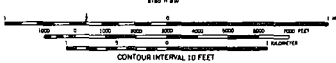
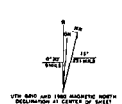
- 1. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 2. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 3. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 4. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 5. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 6. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 7. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 8. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 9. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 10. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 11. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 12. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 13. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 14. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 15. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 16. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 17. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 18. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 19. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 20. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 21. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 22. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 23. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 24. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 25. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 26. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 27. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 28. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 29. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 30. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 31. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 32. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 33. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 34. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 35. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)
- 36. Section thickness (1/2 inch, 3/4 inch, 1 inch, etc.)



QUADRANGLE LOCATION  
7.5-MINUTE SERIES  
HARBLORE AREA

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

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



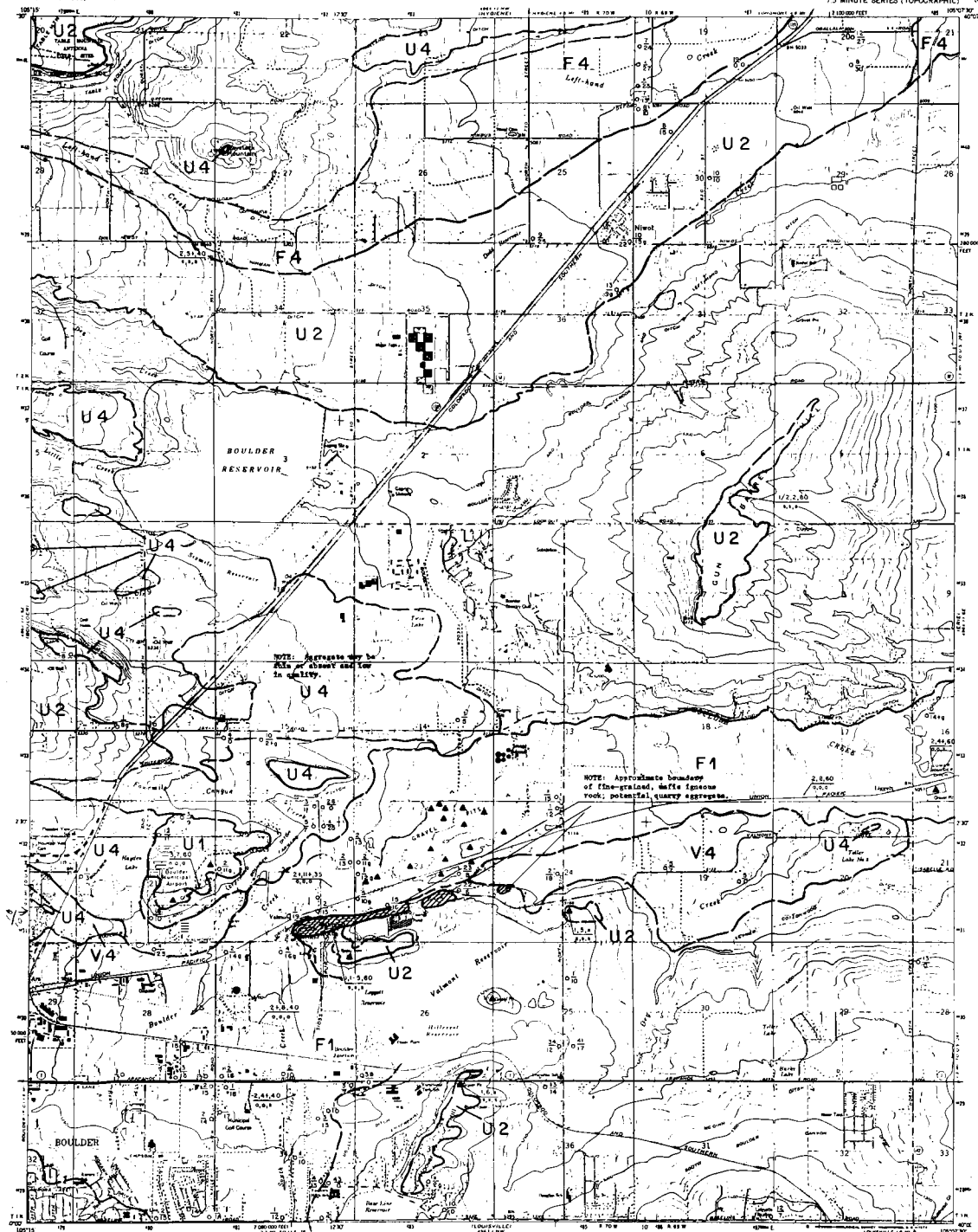
ROAD CLASSIFICATION  
Heavy duty ——— Light duty ———  
Medium duty ——— Unimproved dirt ———  
□ U.S. Route ○ State Route

NEPESTA, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

NIWOT QUADRANGLE  
COLORADO-Boulder CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

Contour interval  
Resource classification

### LEGEND

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

### RESOURCE CLASSIFICATION

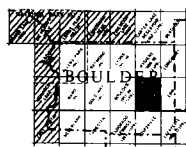
- Gravel resources**  
(at least 50% retained on 84 screen, visual estimation)
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, cation cementation
- Sand resources**  
(smaller than 20 passing 40 screen, 4/5 retained on 60 mesh screen, visual estimation)
- 3 Sand
- Unutilized 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
- Material well or drill-hole location with overburden thickness (ft) over sand/gravel resource
- Location (ft) of station from well top
- "a" indicates gravel, "s" indicates sand
- "u" in symbol denotes unutilized or unknown property
- "m" denotes Colorado Geological Survey Mineral (sand and gravel) projects
- Drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION LOCATION AND CIRCULAR

- Overburden thickness (ft)
- Horizontal resource thickness (ft)
- Vertical sand and fines (passing 40 screen, 4/5 retained on 60 mesh screen)
- Significant amount of fines (passing 100 screen, 2/100 in, or 0.075 mm)
- Significant amount of decomposed or weak rock
- Significant amount of solution carbonate (cavities)
- "u" in symbol denotes unutilized or unknown property
- "m" in symbol denotes property owned or controlled

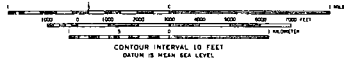
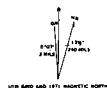


QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after: Colton, R.B., and Petch, H.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: Ralph B. 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



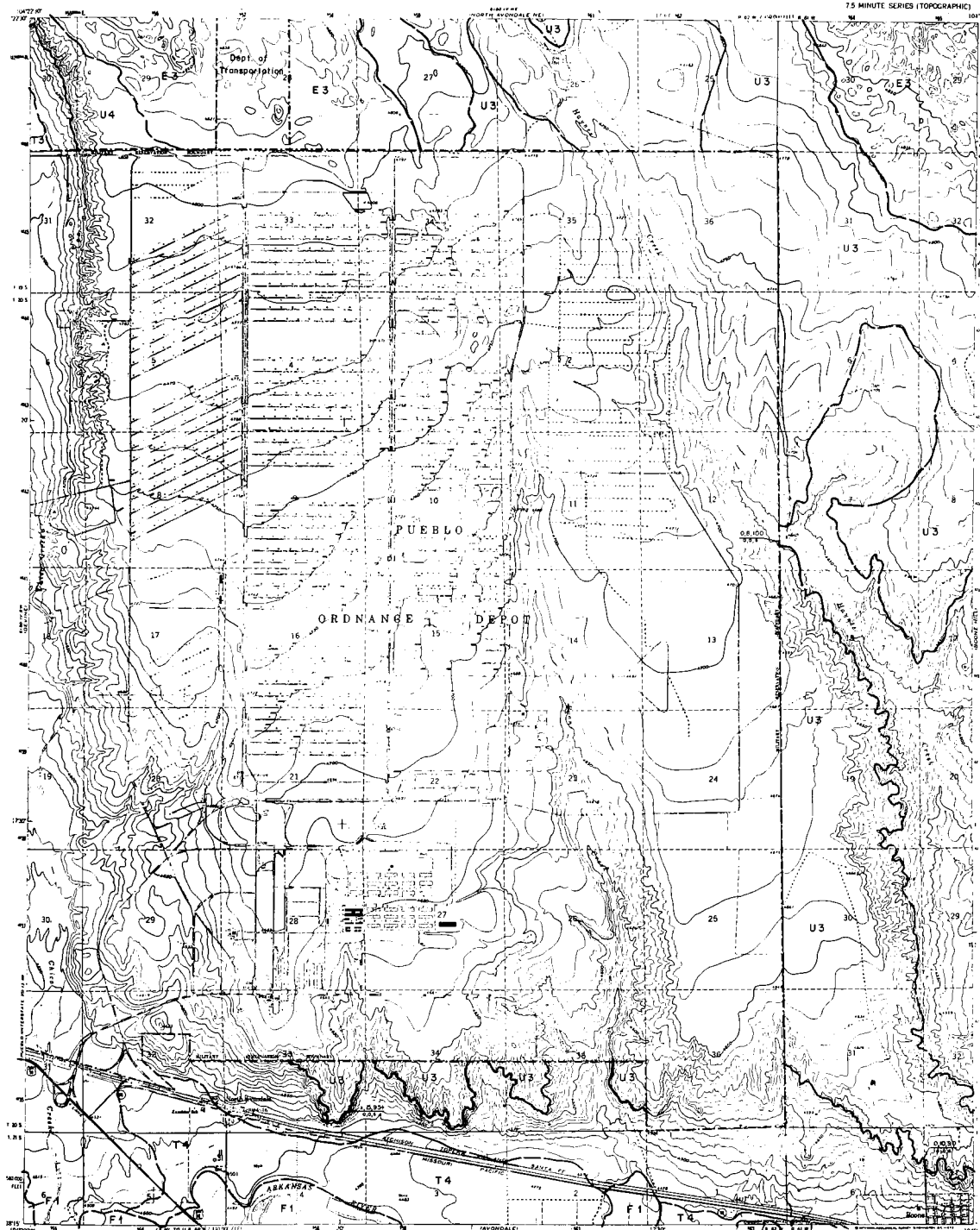
ROAD CLASSIFICATION  
Heavy-duty  
Medium-duty  
Light-duty  
Unimproved dirt  
State Route

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. HOLS, DIRECTOR



## EXPLANATION

Legend unit  
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 Man-made deposits (slag, tailings, spoil, etc.)

### RESOURCE CLASSIFICATION

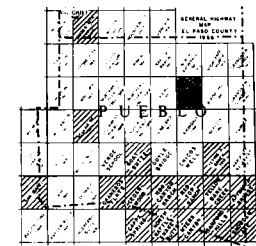
- Gravel Resources**  
Gravel 30% retained on #4 screen, 60% retained on #100 screen, 100% passing #200 screen.
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed int. medium hardness
- Fine Aggregate**  
Gravel 30% retained on #4 screen, 60% retained on #100 screen, 100% passing #200 screen.
- 3 Sand
- 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
- "a" indicates gravel; "s" indicates sand
- "x" is symbol denoting unconsolidated or unknown property
- "m" denotes Colorado Geological Survey material used and correct products
- Drill hole
- Landform boundary, solid where known or observed, dashed where approximated or inferred

### NOTES, LOCATION AND ORIENTATION

- LOCATION OF AQUIFERS**  
overburden thickness (ft)  
underlying resource thickness (ft)  
current sand and fines (passing #4 screen, 0.25 in.), gravel percentage
- significant amount of fines (passing #100 screen, 0.075 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- significant amount of calcium carbonate (calciferous)
- "x" in symbol denotes unconsolidated or unknown property
- "m" in symbol denotes properly selected or insignificant

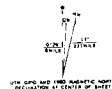


QUADRANGLE LOCATION

NON-RESOURCE OR  
WITHERMAN AREA

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

Base from U. S. Geological Survey  
7.5 minute quadrangle



CONTOUR INTERVAL: 10 FEET  
QUICKSANDS IN PRESENT 1:50,000 CONTOURS  
DARTON 1:50,000 SEA LEVEL

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

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. ROLD, DIRECTOR

## EXPLANATION

— Sand/Gravel unit  
— Sandstone class/clastic

### LITHOLOGIC UNITS

- F Fluvial deposit
- T Terrace deposit
- V Valley fill (F & T)
- U Unconsolidated
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Marine deposit (sand, silt, clay, etc.)

### RESOURCE CLASSIFICATION

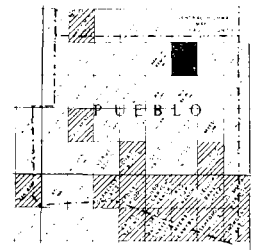
- 1 Gravel: relatively clean and round
- 2 Gravel: significant fines, unconsolidated rock, medium to coarse
- 3 Sand
- 4 Probable aggregate source

### AGGREGATE

- Operating gravel pit; sand pit
- Abandoned gravel pit; sand pit
- Operating stone quarry
- Abandoned stone quarry
- Perennial quarry aggregate resource area
- Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), indicated from well logs
- "a" indicates sand
- "s" indicates gravel
- "m" indicates material unsuitable or unknown property
- "m" American Colorado Geological Survey (Mineral Land and Geology Project)
- Grill hole
- Location boundary, solid where known or dashed where approximate or inferred

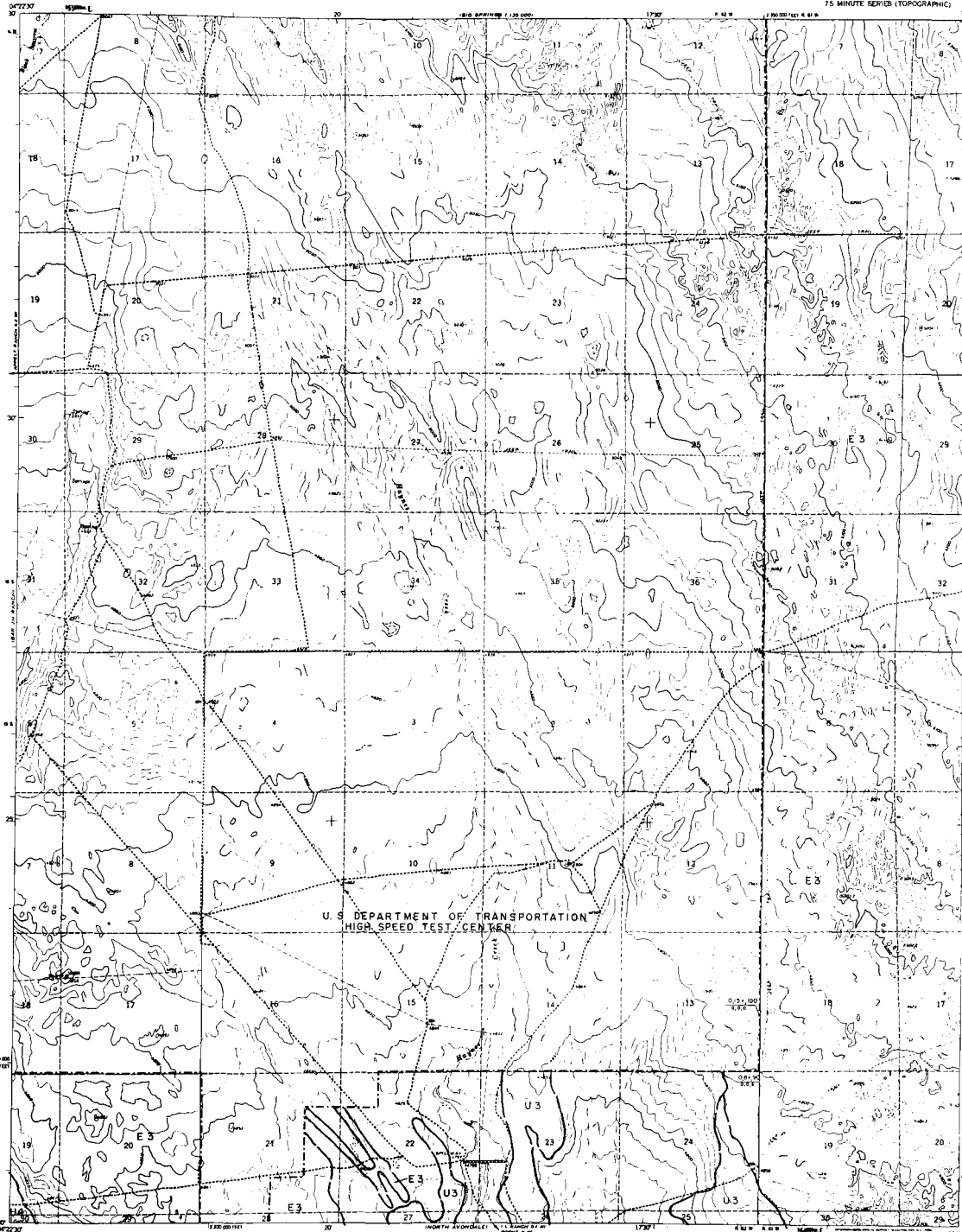
### PLATON, LOCATION AND CHRONOLOGICAL

- overburden thickness (ft)
- unconsolidated resource thickness (ft)
- parent sand and gravel resource thickness (ft), indicated from well logs
- significant amount of fines (passing #100 screen, 0.075 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- "a" in symbol denotes unsuitable or unknown property
- "s" in symbol denotes property absent or insignificant

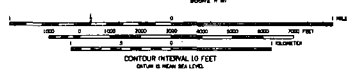


■ QUADRANGLE LOCATION  
▨ NON-RESOURCE OR WITHDRAWN AREA

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



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

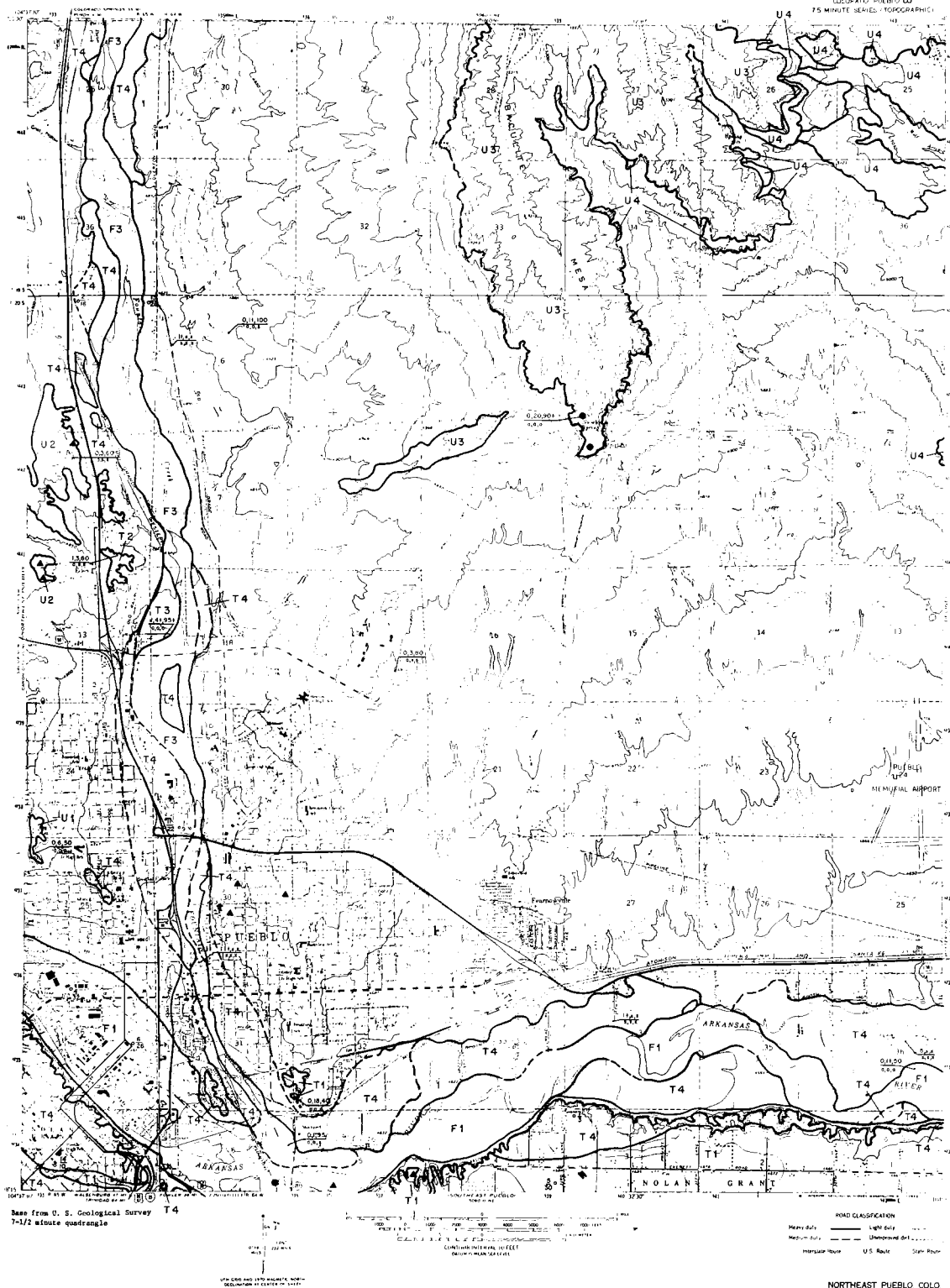


ROAD CLASSIFICATION  
Unimproved det. ....

NORTH AVONDALE NE, COLO.

NORTHEAST PUEBLO QUADRANGLE  
COLORADO PUEBLO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)


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




- Landform unit
- Response classification

- [illegible]



 QUADRANGLE *Unpublished*

 NON-RESOURCE OR  
WITHDRAWN AREA

Geology modified after Scott, J. R., 1964.  
U. S. Geological Survey, map A-408.

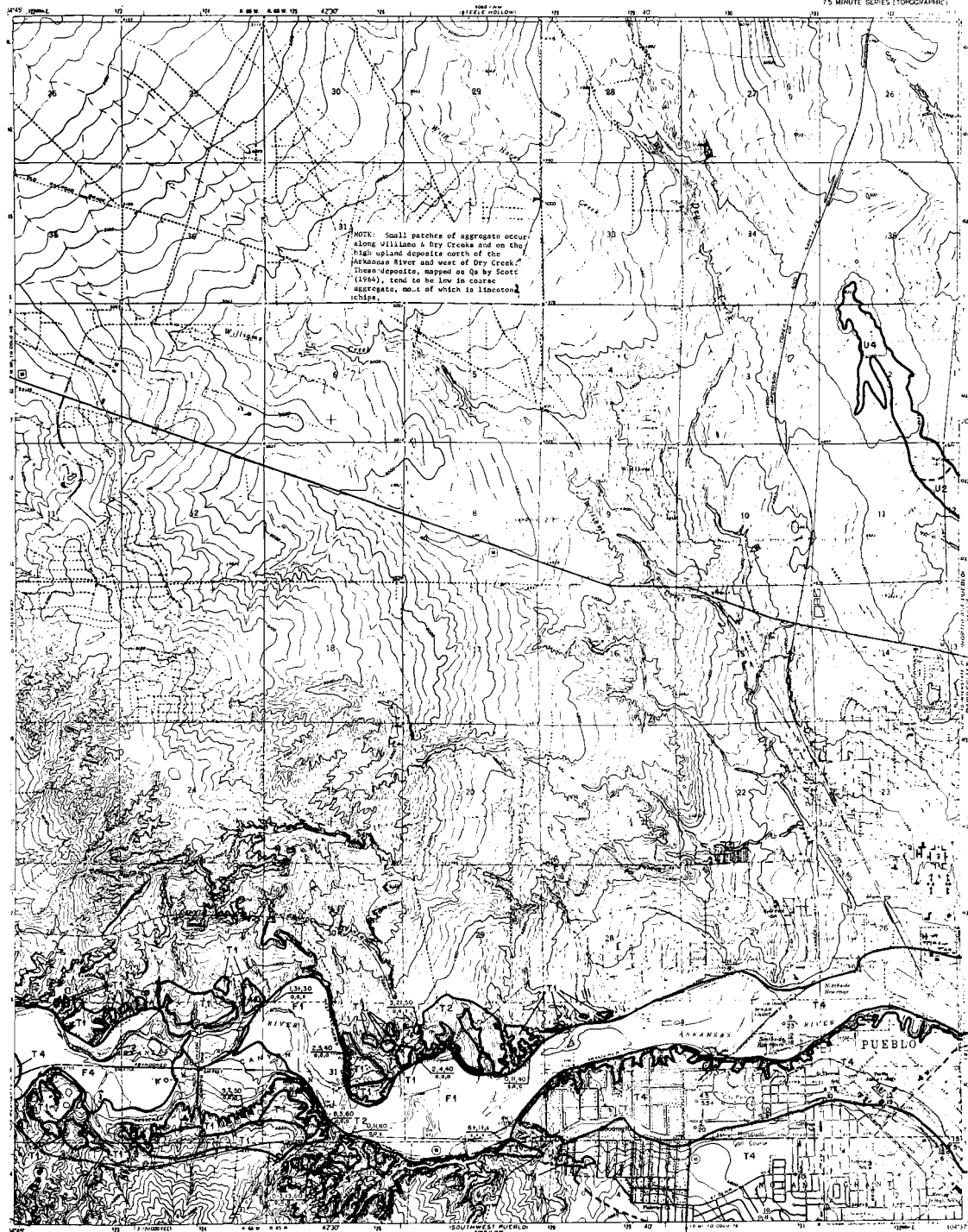
Mapped by: Phillip C. Wicklein  
 Date: June 30, 1974

NORTHEAST PUEBLO COLO

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

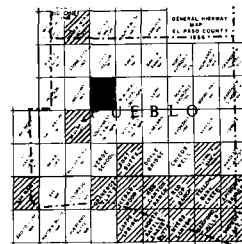
NORTHWEST PUEBLO QUADRANGLE  
COLORADO - PUEBLO CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

- Landform units**  
Resource classification
- Landform units**  
F Floodplain deposits  
T Stream terrace deposits  
V Valley fill (F & T)  
U Upland deposits  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Man-made deposits (slag, tailings, waste, etc.)
- Resource classification**  
Qa Sand and gravel (not mapped on 1:50,000 scale, 1964)  
Qb Gravel, relatively clean and small  
Qc Gravel, significant fines, occasional rock, calcareous  
Qd Fine aggregate (gravel) that is passing 48 screen, 40% retained on 100 screen, visual estimation  
Qe Sand  
Qf Probable aggregate resources
- 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 Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.  
g "x" indicates gravel; "y" indicates sand  
h "u" in symbol denotes unutilized or unknown property.  
i "m" denotes Colorado Geological Survey "Master/land and Creek project" drill hole  
j Landowner boundary, solid where known or inferred  
k General location of resource area
- STATION, LOCATION AND GEOMETRIC INFORMATION BY SYMBOL**  
overburden thickness (ft)  
sand/gravel resource thickness (ft)  
percent sand and fines (passing 48 screen, 0.30 in.), visual estimation  
significant amount of fines (passing 100 screen, 0.0075 in., or 0.075 mm.)  
significant amount of material overburden (inches)  
"u" in symbol denotes unutilized or unknown property  
"x" in symbol denotes property about or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, G. R., 1964,  
U. S. Geological Survey Map 1-408.

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

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

UTM GRID AND 1970 MAGNETIC NORTH  
MAGNETIC NORTH OF 1970 IS 11° 15' E



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

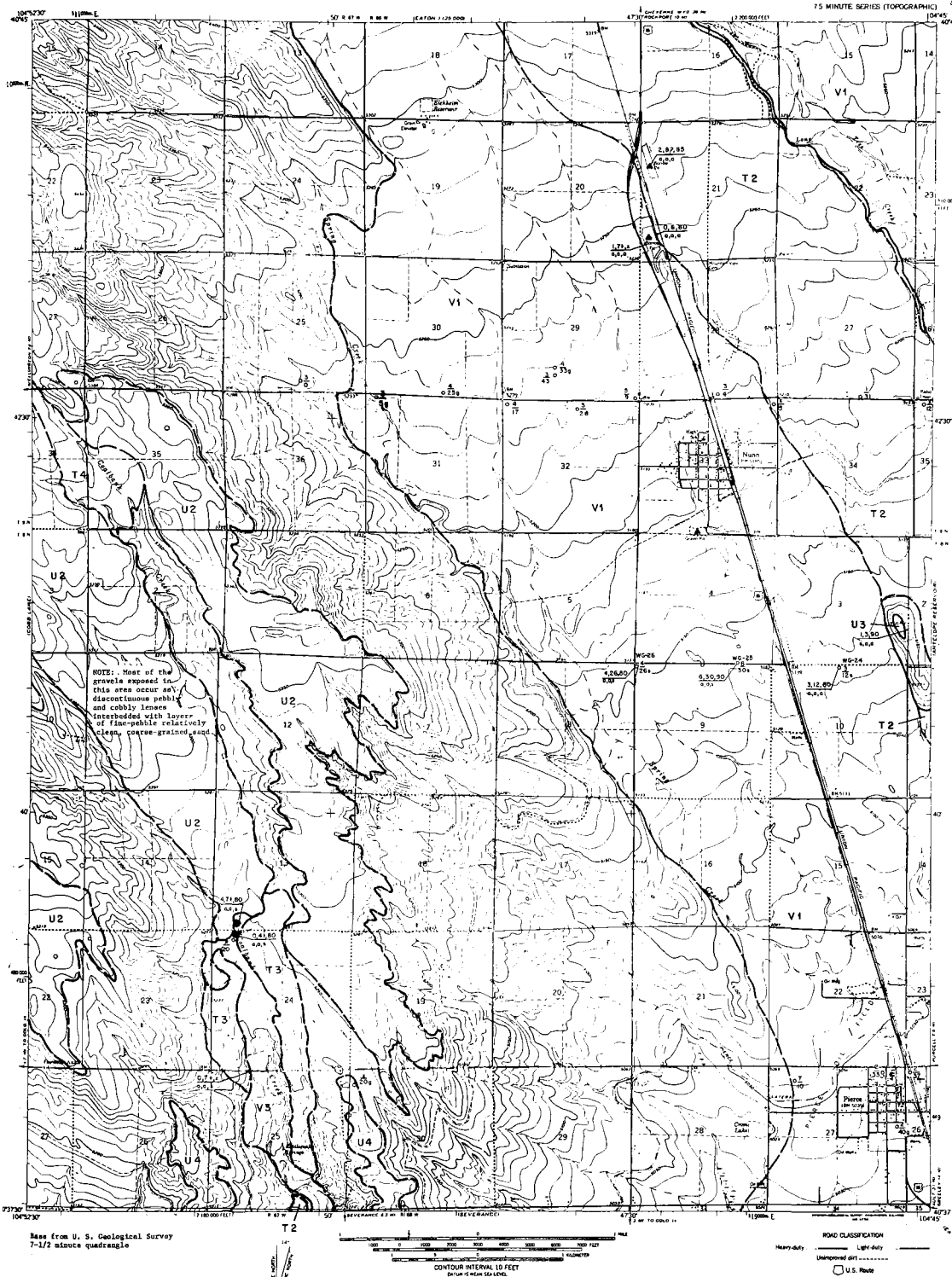
NORTHWEST PUEBLO, COLO.



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

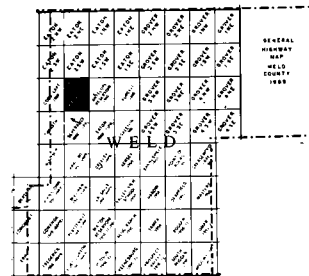
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. HALL, DIRECTOR

NUNN QUADRANGLE  
COLORADO, WELD CO.  
7.5 MINUTE, SERIES (TOPOGRAPHIC)



## EXPLANATION

- Landform units  
— boundary of landform unit
- LANDFORM UNITS**
- F Floodplain deposit
  - T Terrace deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Erosional deposit (alluvial)
  - M Man-made deposit (slag, tailings, spoil, etc.)
- RESOURCE CLASSIFICATION**
- Gravel**  
1. Gravel: relatively clean and sound  
2. Gravel: significant fines, decomposed rock, calcium carbonate
- Sand**  
3. Sand: relatively clean and sound  
4. Sand: significant fines, decomposed rock, calcium carbonate
- Quarry Aggregate**  
5. Quarry Aggregate: relatively clean and sound  
6. Quarry Aggregate: significant fines, decomposed rock, 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
  - Selected mill or full-scale location with overburden thickness (ft) and sand/gravel resource thickness (ft), obtained from well logs
  - "a" indicates gravel; "s" indicates sand
  - "u" symbol denotes unutilized or unknown property
  - "w" denotes Colorado Geological Survey boundary and crown protector
  - Landform boundary, solid where known or dashed, dashed where approximate or inferred
- QUANTITY, LOCATION AND CHARACTERISTICS OF RESOURCES**
- overburden thickness (ft)
  - gravel resource thickness (ft)
  - current sand and gravel (acre-ft)
  - potential sand and gravel (acre-ft)
  - significant amount of fines (greater than 100 mesh, 0.075 in. or 0.875 mm)
  - significant amount of decomposed or weak rock
  - "u" symbol denotes unutilized or unknown property
  - "a" symbol denotes gravel; "s" symbol denotes sand
  - "u" symbol denotes unutilized or unknown property



QUADRANGLE LOCATION  
NON-RESOURCE OR  
WETLAND AREA

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

NUNN, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

OLD ROACH QUADRANGLE  
COLORADO-WYOMING  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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

## EXPLANATION

Landform unit  
Resource classification

### LANDFORM UNIT

- F Floodplain deposit
- T Trench surface deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- M Wind-deposited sand (alluvial)
- E Non-made deposits (along alluvial fan...)

### RESOURCE CLASSIFICATION

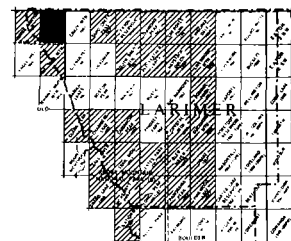
- Gravel (sandstone)
  - 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcareous
- Line deposits
  - 3 Sand
- Unutilized resources
  - 4 Probable aggregate resources

### 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
- Colored well or drill-hole location with orientation (thickness of line representing resource thickness (ft); obtained from well logs)
- "x" indicates gravel, "o" indicates sand
- "x" in symbol denotes unutilized or unknown property
- "o" denotes Colorado Geological Survey "Gravel and Sand" project
- Drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND COORDINATE

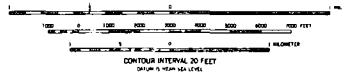
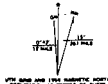
- North-south distance (ft)
- East-west distance (ft)
- Section, range and line (bearing as shown, 0 to 360, or 0 to 180)
- Significant amount of fines (passing No. 200 sieve, 0.075 mm or 0.075 mm)
- Significant amount of decomposed or small rock
- Significant amount of calcareous sandstone (caliche)
- "x" in symbol denotes unutilized or unknown property
- "o" in symbol denotes property owned or controlled



QUADRANGLE LOCATION

NON-RESOURCE OR  
WETLAND AREA

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



### ROAD CLASSIFICATION

- Light duty
- Unimproved dirt

OLD ROACH, COLO. - WYO

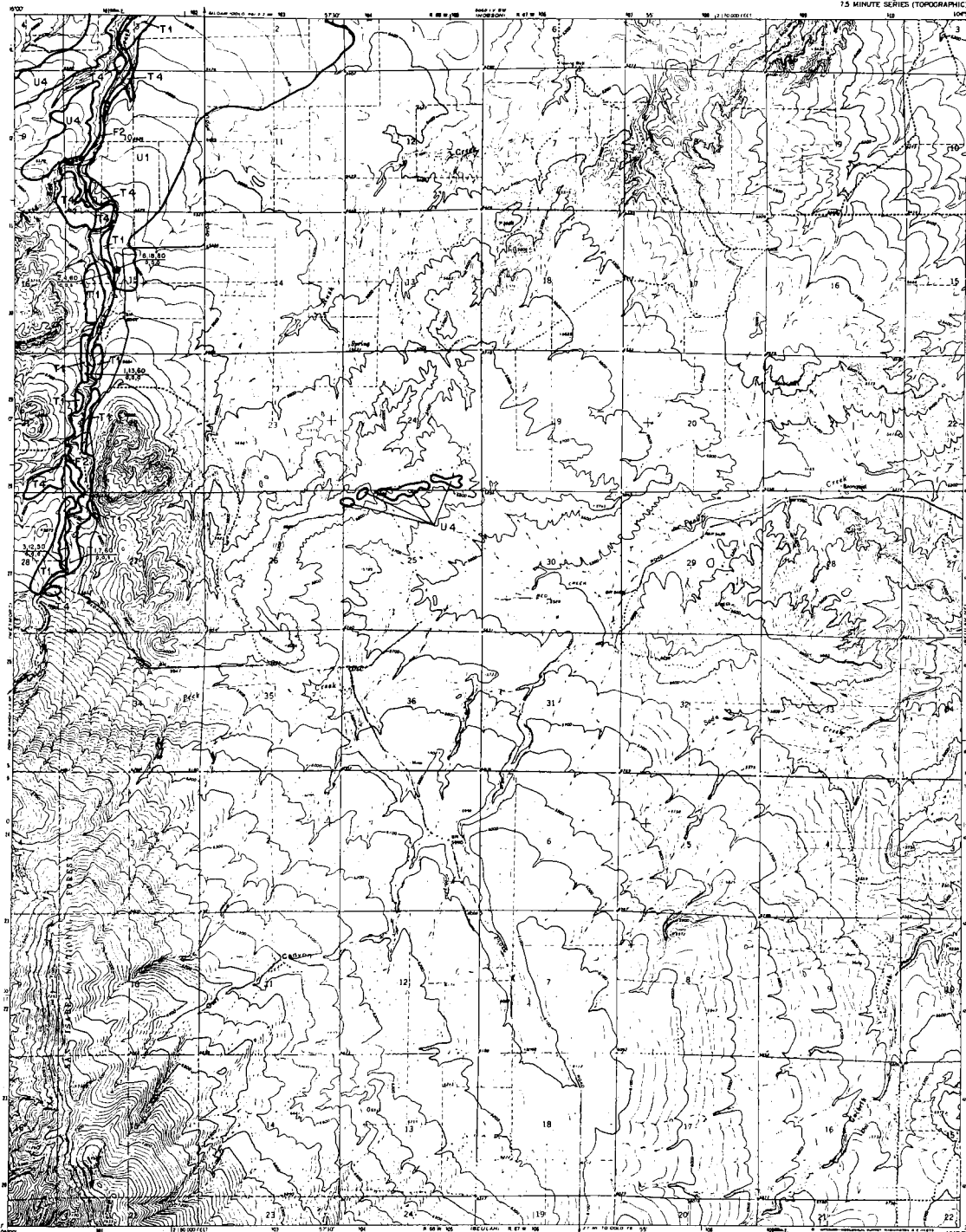
Maped by: Stephen B. Schwachow  
Date: June 30, 1974



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

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

OWL CANYON QUADRANGLE  
COLORADO-PUEBLO CO.  
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 Non-sand deposits (caliche, talus, etc.)

### RESOURCE CLASSIFICATION

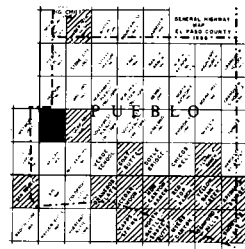
- 1 **Coring Resources**  
(at least 200 feet of sand and gravel, about 100 feet of gravel)
- 2 Gravel: relatively clean and sound
- 3 Gravel: significant fines, unconsolidated, caliche cemented
- 4 **Fill Materials**  
(gravel: less than 75% passing #4 screen, 40% retained on #100 screen, about 100 feet)
- 5 Sand
- 6 **Unconsolidated Resources**
- 7 Probable aggregate resources

### NOTES

- 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
- 6 Related well or drill-hole location with sample thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs.
- 7 "x" indicates gravel, "y" indicates sand
- 8 "x" in symbol denotes unconsolidated or unknown property.
- 9 "m" denotes Colorado Geological Survey "underfoot and down" project
- 10 "x" in symbol denotes property about or insignificant
- 11 Landform boundary, solid where known or inferred; dashed where approximate or inferred

### PLATON, LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT

- 1 overburden thickness (ft)
- 2 sand/gravel resource thickness (ft)
- 3 percent sand and fines (passing #4 screen, 7.5 in.), mixed estimation
- 4 length/width amount of fill (feet)
- 5 length/width amount of fill (feet)
- 6 length/width amount of fill (feet)
- 7 length/width amount of fill (feet)
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- 95 length/width amount of fill (feet)
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- 97 length/width amount of fill (feet)
- 98 length/width amount of fill (feet)
- 99 length/width amount of fill (feet)
- 100 length/width amount of fill (feet)



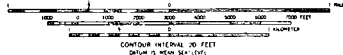
QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, G. R., 1973.  
U. S. Geological Survey Map NF-547.

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

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



ROAD CLASSIFICATION  
Light-duty Unimproved dirt

OWL CANYON COLO

PALMER LAKE QUADRANGLE  
COLORADO-EL PASO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



- Transform unit
- Resource classification

### LANDFORM UNITS

- | 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<br>(slag, tailings, spoils....) |











RESOURCE CLASSIFICATION

- RESOURCE CLASSIFICATION
- Coarse aggregate  
at least 2.5 passing - 80 screen,  
retained distribution
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcium carbonate.
- Fine aggregate  
(greater than 75 passing 80 screen, 4.75

### Derivational Evidence

- 4 Probable aggregate count:

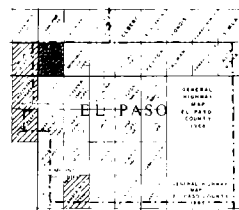
#### SAFE STUDY

-  Operating gravel and/or sand pit  
 Abandoned gravel and/or sand pit  
 Operating stone quarry  
 Abandoned stone quarry  
 Potential quarry aggregate resources area  
 Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log  
 "s" indicates gravel, "a" indicates sand  
 "x" in symbol denotes unclassified or unknown property.  
 "m" denotes Colorado Geological Survey Window/Sand and Gravel projects' drill hole  
 Landform boundary, solid where known or observed, dashed where approximate or inferred.

## STATION, LOCATION AND GEOLOGICAL

- STATION, LOCATION AND GEOLOGICAL  
DESCRIPTION OF PROFILE**
- overburden thickness (ft)
  - underground thickness (ft)
  - percent sand and fines (spacing of deposit, 0.25 in., usual notation)
  - significant amount of fines (spacing 1/2) stream, 0.250 in. or 0.076 mm.)
  - significant amount of decomposed or weak rock
  - significant amount of solution carbonate (outcrop)

in symbol denotes unconsolidated or weakly  
consolidated property  
"a" in symbol denotes property absent or  
insignificant



QUADRANGLE LOCATION

 NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:

Triable, D.E., and Petch, 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.

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.

PALMER LAKE, COLO



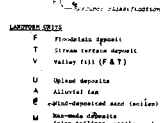




DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. HOLL, DIRECTOR

PEORIA QUADRANGLE  
COLORADO  
5 MINUTE SERIES (TOPOGRAPHIC)

EXPLANATION



#### RESOURCE CLASSIFICATION

of 121 of 126 pictures in 66 scenes.

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

1000 Applicants  
cheated than 100 passing the screen, 100  
retained in 1000 screen, visual extinction.

- 4 Probable aggregate resource

## Name: \_\_\_\_\_

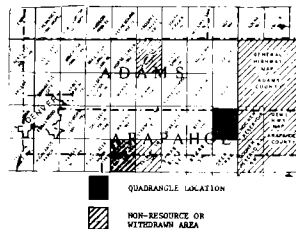
- \* Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- \* Operating stone quarry
- Abandoned stone quarry
- \*\*\*\*\* Potential quarry aggregate resource area
- Selected well or drill-hole location with overburden thickness (ft) over sand/gravel; resource thickness (ft), obtained from well logs.
- " " Indication gravel; " " Indication sand
- " " is symbol denoting unmineralized or unknown property.
- " " denotes Colorado Geological Survey Winder/Leach and Gravel 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 measure thickness (ft)
- percent sand and fines (passing #10 screen, 0.25 in.), initial saturation
- 10
- 30
- significant amounts of fines (passing #100 screen, 0.005 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- significant amount of sodium carbonate (soda ash)

\* in symbol denotes unconsolidated or unstable property  
\* in symbol denotes property values or intervals




ecology modified after  
Salster, P. E., 1972,  
Peoria geologic quadrangle  
U.S.G.S. 64-875.

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

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

Heavy duty ————— Light duty  
Medium duty ————— Unimproved

 U.S. Route

PEORIA, COLO  
H/9375-W10400/75  
1986

AM8 5103 11 HE-SZPTEB VBT

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

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



- ↳ Ecological niche

**LEADERLINE**

- F Fluvial-lacustrine deposit
- T Terrace terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Hum-mound deposits  
(slag, tailings, spoils...)

#### RESOURCE CLASSIFICATION

COMPILE ADDRESS  
(at least 30% returned on 84 screen,  
viewed 001000000)

1 Gravel: relatively clean and sound

2 Gravel: significant fines, decomposed rock,

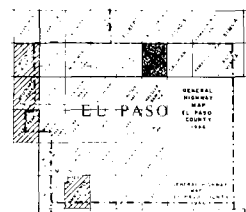
File Abstracts  
(greater than 70% passing #4 screen, 60%  
retained on #200 screen, visual estimation)

4 Probable aggregate resource

## MAP STUDY

\* Operating gravel sand/water pit  
 \* Abandoned gravel sand/water sand pit  
 \* Operating stone quarry  
 \* Abandoned stone quarry  
 \* Geological quarry aggregate resource area  
 \* Including wall or drill-hole location with over-  
 \* burden indication (if) over sand/gravel resource  
 \* thickness (if), "w" = "wall"  
 \* "i" indication gravel; "s" indication sand  
 \* "s" is symbolic denotation unsaturated or  
 \* unknown property.  
 \* "w" denotes or Colorado Geological Survey  
 \* Watershed and/or stream project  
 \* drill hole  
 \* Leafless boundary, unless otherwise  
 \* observed. Dashed symbol appropriate or  
 \* inferred.

## STATION, LOCATION AND GEOLOGICAL

[illegible]

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

CONFIDENCE INTERVAL 20 PCT  
FROM 0- MEAN 2.6 LITERS

ROAD CLASSIFICATION:

**ROAD CLASSIFICATION**

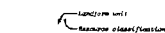
Primary highway, hard surface	—————	Light duty road, hard or improved surface
Secondary highway, hard surface	- - - - -	Unimproved road

Interstate Route    U.S. Route    State Route

PEYTON, COLO.

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

EXPLANATION



## LAWRENCE, WATKINS

- |   |  |
|---|--|
| F | Floodplain deposits                      |
| T | Stream terrace deposits                  |
| V | Valley fill (F & T)                      |
| U | Upland deposits                          |
| A | Alluvial fan                             |
| E | Wind-deposited sand                      |
| M | Non-sand deposits (slag, tailings, etc.) |

## REPORT CLASSIFICATION

- Aggregate Supply Function
- Curve Aggregate  
(at least 30% retained on #1 screen, visual estimation)
- 1 Gravel: relatively clean and sound.
  - 2 Gravel: significant fines, decomposed rock, calcine carbonate.
- Fine Aggregate  
(greater than 100 passing #1 screen, 60% retained on #200 screen, visual estimation)
- 3 Sand
- Unvaluated Reserve
- 4 Probable aggregate resource

REF STOCKS

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Relocated well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), indicated from well logs
- "s" indicates granite; "a" indicates sand
- "i" is symbol denoting unmineralized or unknown prospect
- Source: Colorado Geological Survey
- Windsor/Land and Gravel projects
- drill hole
- Landfill location, well where known or observed, dashed where approximate or inferred

## STATION LOCATION AND ELEVATION

- STATION, LOCATION AND CHRONOLOGICAL  
SIMPLICITY OF PROFILE
- overburden thickness (ft)
  - soil profile resource thickness (ft)
  - parent sand and fines (spacing to  
next, 0.25 to 1, vertical distance)
  - 3 to 4
  - 
  - expected amount of fines (spacing  
1/2 to 1, 0.25 to 0.5 ft)
  - expected amount of development of soil marks
  - expected amount of relative carbonate content
- "if" in spatial domain unimportant or  
without property
- "if" in spatial domain property absent or  
unimportant

 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

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

PIERCE GULCH COLO



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PINE QUADRANGLE  
COLORADO-JEFFERSON CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

Geologic Classification

- Geologic Units**
- T Tertiary deposits
  - V Valley fill (F & T)
  - U Unconsolidated deposits
  - A Alluvial fan
  - E Eolian deposits (sand dunes)
  - M Man-made deposits (landfill, spoil, etc.)

## RESOURCE CLASSIFICATION

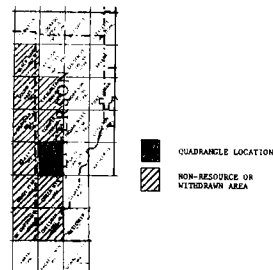
- Gravel**
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, talus, or other
- Coarse Sand**
- 3 Sand
- Unconsolidated Resources**
- 4 Probable aggregate resource

## 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
- Indicated well or drill-hole location with water-bearing thickness (ft) and sand/gravel resource thickness (ft) obtained from well logs
- "a" indicates gravel; "s" indicates sand
- "x" in symbol denotes unconsolidated or common property
- "x" denotes Colorado Geological Survey project/land and gravel aggregate drill hole
- Landline boundary, solid where known or surveyed; dashed where approximate or indicated

## NOTES TO THE USER

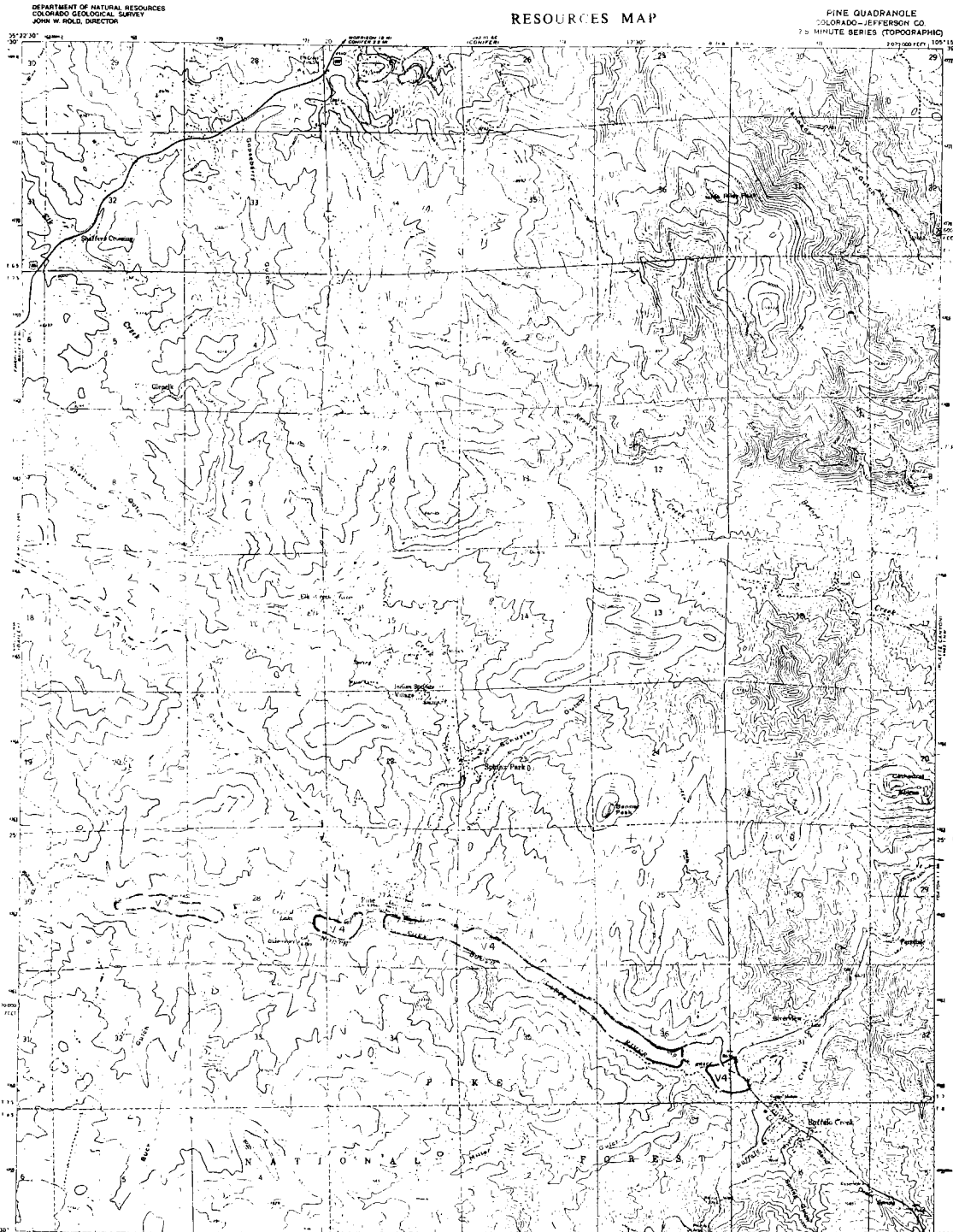
- 1. Gravel and sand resources (ft)
- 2. Sand resources (ft)
- 3. Gravel resources (ft)
- 4. Sand resources (ft)
- 5. Gravel resources (ft)
- 6. Sand resources (ft)
- 7. Gravel resources (ft)
- 8. Sand resources (ft)
- 9. Gravel resources (ft)
- 10. Sand resources (ft)



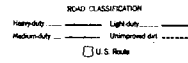
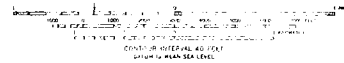
Geology modified after:  
Tribble, O.E., and Fitch, R.P., 1974, Map showing potential sources of gravel and crushed-stone aggregate in the Denver Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Map, Map 1-555-A.

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

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



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



PINE, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PINEY CREEK QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

Geologic classification

- LACUSTRINE DEPOSITS**
- F Fine-grained lacustrine
  - T Silty lacustrine deposits
  - V Valley fill (F & T)
  - U Unclastic lacustrine
  - A Alluvial fan
  - E Eolian deposits (sand dunes)
  - M Man-made deposits (slag, tailings, spoils, etc.)

## AGGREGATE CLASSIFICATION

- Gravel**  
(at least 25% retained on #4 screen, 100% passing #10)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, organic contents
- Sand**  
(20 to 75% passing #4 screen, 75 to 100% passing #20 screen, 100% passing #60 screen)
- 3 Sand
  - 4 Probable aggregate resource

## MAP SYMBOLS

- \* Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Connecting access quarry
- Abandoned access quarry
- Potential quarry aggregate resource area
- Inactive well or field hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well log: "s" indicates gravel; "m" indicates sand
- "s" in symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey "sand/gravel and gravel projects" well log
- Land-use boundary, solid where known or observed; dashed where approximate or inferred

## STATION, LOCATION AND ORIENTAL

- RESOLUTION OF SYMBOLS**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - coarse sand and 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 not suitable for use
  - "s" or "m" denotes unconsolidated or unknown property
  - "s" or "m" denotes property shown or designated



## QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

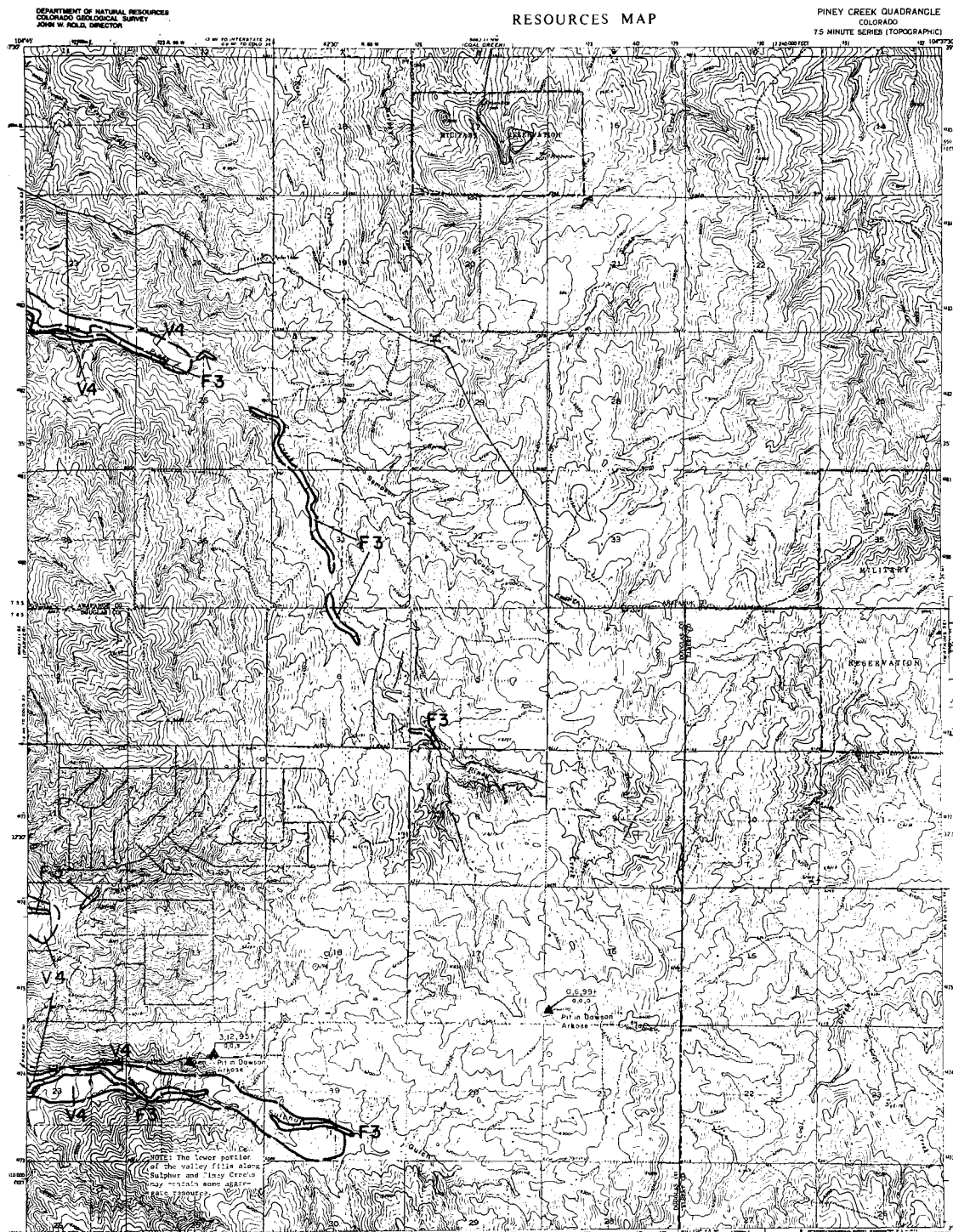
## Geology modified after:

Trybala, D.E., and Piche, H.R., 1974. Map showing potential resources of gravel and crushed-rock aggregates to the Greater Denver Area, Front Range Urban Corridor, Colo., U. S. Geol. Survey Misc. Geol. Inv. Map 1-731.

Map 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

Light-duty Unimproved dirt

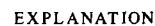
CONTOUR INTERVAL: 10 FEET

DATE: 1974

PINEY CREEK, COLO.



PINGREE PARK QUADRANGLE  
COLORADO-LARIMER CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



- F1  $\left\{ \begin{array}{l} \text{Landform units} \\ \text{Resource classification} \end{array} \right.$

## LAWRENCE WHITE

- |   |   |
|---|---|
| F | Floodplain deposit                            |
| T | Stream terrace deposit                        |
| V | Valley fill (F & T)                           |
| U | Upland deposits                               |
| A | Alluvial fan                                  |
| E | Wind-deposited sand (aeolian)                 |
| M | Man-made deposits<br>(slag, tailings, spoils) |












**RESOURCE CLASSIFICATION**

- Coarse Aggregate  
(at least 50% retained on #4 screen,  
visual estimation)
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock,  
calcium carbonate.

File As

- 3 Sand

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- 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.
  -  "a" indicates grade "a" indicated area
  -  "s" is symbol denotes unmineralized or unknown property
  -  "sw" denotes Colorado Geological Survey Window/Lead and Core's projects
  -  drill hole
  -  landform boundary, solid where known or inferred; dashed where approximate or inferred.

## STATION LOCATION AND COORDINATES

- STATION, LOCATION AND GEOLOGICAL  
DESCRIPTION OF DEPOSIT
- corundum thickness (ft)  
sandy/mud. resource thickness (ft)  
percent sand and fines (passing #4  
screen, 0.125 in.), average estimation
- 1 1.6 10
- significant amount of fines (passing  
#200 screen, 0.00425 in. or 0.074 mm.)  
significant amount of decomposed or wash rock.  
significant amount of calcium carbonate (calcite)
- \* in symbol denotes unmineralized or  
unknown property  
\*\* in symbol denotes property absent  
or insignificant

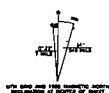


CHADBRIDGE LOCATION

 NON-RESOURCE OR  
WITHDRAWN AREA

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

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



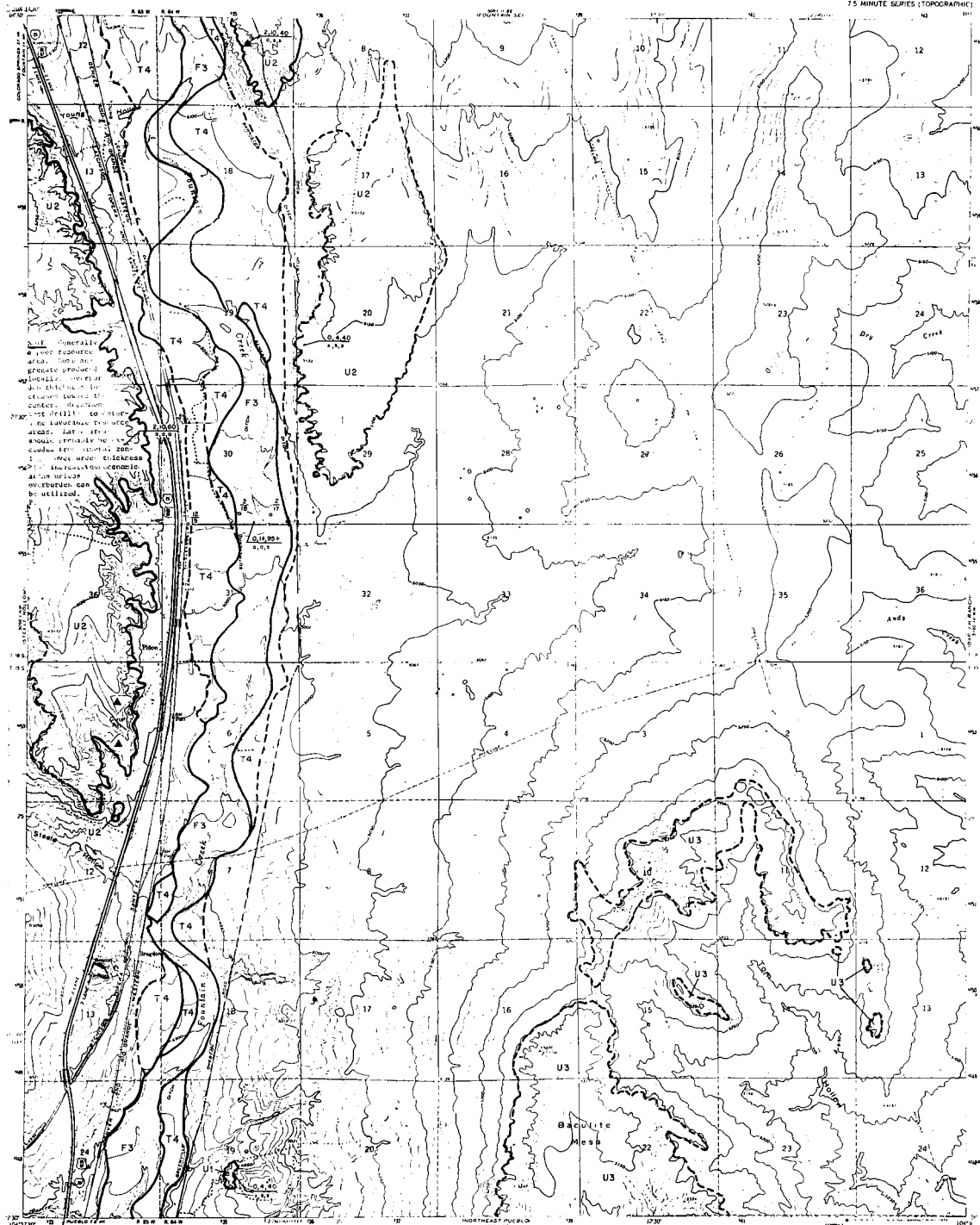
CONTOUR INTERVAL, 40 FEET

ROAD CLASSIFICATION

PINGREE PARK, COLO.

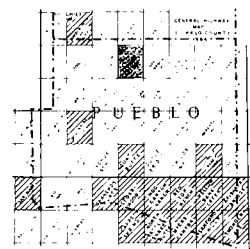
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PINON QUADRANGLE  
COLORADO-PUEBLO CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

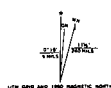
- Landform unit  
Resource classification
- LANDFORM UNITS**
- F Fluvial deposit
  - T Stream terrace deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Marine deposit (clay, silt, sand, gravel, etc.)
- RESOURCE CLASSIFICATION**
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, inclusion of boulders
  - 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 overburden thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs. "x" indicates gravel; "s" indicates sand.
  - "x" in small circles uncorrelated or unknown property.
  - "s" denotes Colorado Geological Survey identified sand and gravel properties.
  - Landform boundary, solid where known or observed; dashed where approximate or inferred.
- SECTION LOCATION AND GEOLOGICAL SPECIFICATION OF AREAS**
- Overburden thickness (ft)
  - Gravel resource thickness (ft)
  - Sand resource thickness (ft)
  - Gravel resource thickness (ft) overburden thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs. "x" indicates gravel; "s" indicates sand.
  - Significant amount of fines (appearing in the sample, 0.075 mm or 0.075 mm)
  - Significant amount of decomposed or weak rock
  - Significant amount of inclusion of boulders (inclusion)
  - "x" in small circles uncorrelated or unknown property
  - "s" in small circles property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Map by: Phillip C. Wicklen  
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 - - - - -  
Interstate Route U.S. Route

PINON, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

PLATTE CANYON QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

Response class of function

- LEGEND**
- F Fill (alluvial)
  - T Terrace deposits
  - V Valley fill (F & T)
  - U Unconsolidated
  - A Alluvial fan
  - E Eolian deposits (sand)
  - M Marine deposits (slag, tailings, etc.)

## RESOURCE CLASSIFICATION

- Gravel**
- 1 Gravel: relatively clean and sound
  - 2 Gravel: Aggregates fines, decomposed rock, siliceous
- Sand**
- 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
- Probable quarry aggregate resource area
- Related well or drill-hole location with overburden thickness (ft) and gravel resource (cubic yd), indicated from well logs
- "g" indicates gravel, "s" indicates sand
- "x" in symbol denotes unconsolidated or unknown property
- "m" denotes Colorado Geological Survey "Master/Bed and Crown" projects
- Will hole
- Location boundary, solid where known or observed; dashed where approximate or inferred

## NOTES

- overburden thickness (ft)
- unconsolidated resource thickness (ft)
- percent sand and fines (ignoring 80
- bottom, 0.25 in., visual distinction
- significant amount of fines (greater
- than 0.075 in., or 0.075 mm.)
- significant amount of decomposed or soft rock
- significant amount of siliceous resources (indicate)
- "x" in symbol denotes unconsolidated or
- unknown property
- "g" or "s" in symbol denotes gravel or sand
- or unconsolidated



QUADRANGLE LOCATION

NON-RESOURCE OR

VETERAN AREA

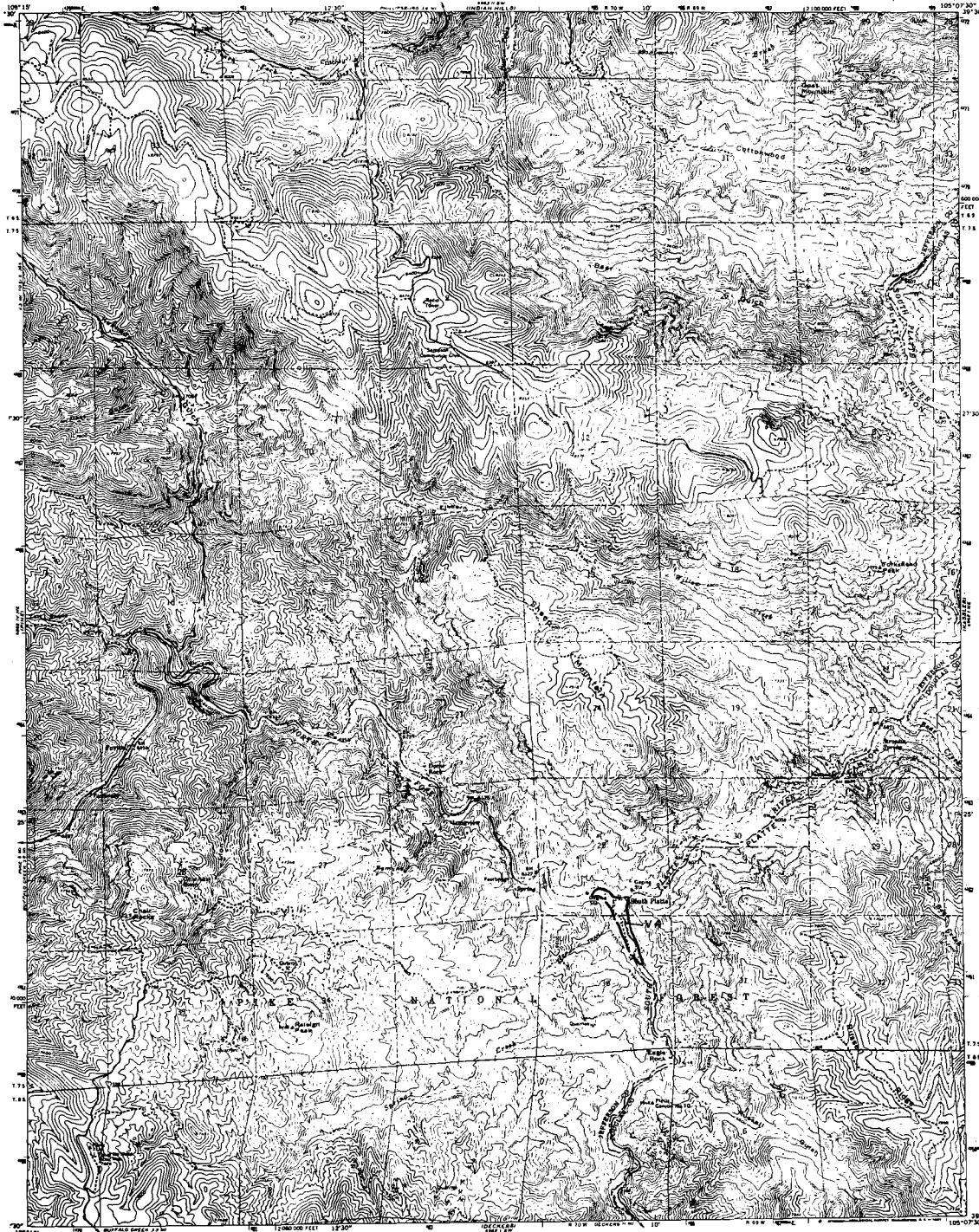
**REFERENCE:**

Wicks, D.H., and Wicks, D.H., 1974, Map showing potential resources of gravel and crushed-rock aggregate in the Platte Canyon Area, Platte Canyon 7.5 Minute Quadrangle, Colorado, U. S. Geol. Survey, Misc. Geol. Map 1-439-A.

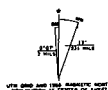
Map by: Phillip C. Wicklen  
Date: June 30, 1974

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

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



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



ROAD CLASSIFICATION

Legend: Unimproved dirt

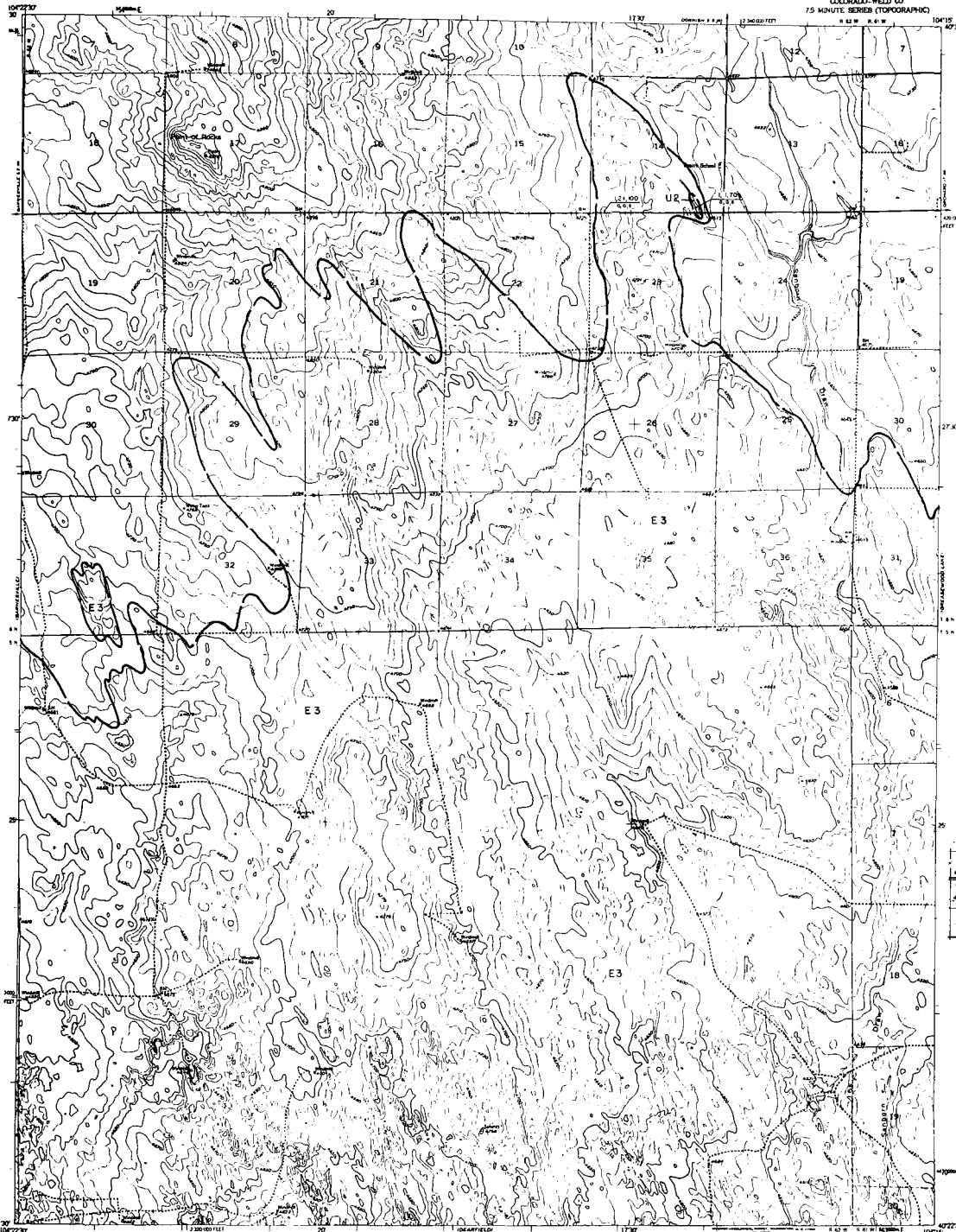
PLATTE CANYON, COLO.



# 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

- Landform unit**  
Resource classification
- LANDFORM UNIT**
- F Floodable deposit
  - T Stream terrace deposit
  - V Valley fill (F & T)
  - U Unbed deposits
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Man-made deposits (slag, tailings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- Gravel aggregate**  
Gravel is defined as 1/4" to 3/4" material.
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- Sand aggregate**  
Sand is defined as 1/4" to 3/4" material.
- 3 Sand
- Unvalued resource**
- 4 Probable aggregate resource**
- MAP SYMBOLS**
- Overlain gravel and/or sand pit
  - Abandoned gravel and/or sand pit
  - Operating stone quarry
  - Abandoned stone quarry
  - Resource quarry aggregate resource area
  - Selected well or drill-hole location with overburden thickness (ft) and gravel resource thickness (ft), obtained from well logs.
  - "s" indicates sand; "g" indicates gravel; "u" indicates unvalued or unknown property.
  - "w" denotes Colorado Geological Survey watershed boundary, solid where known or observed, dashed where approximate or inferred.
- STATION, LOCATION AND ORIENTAL**  
**SECTION OF SPOT**
- overburden thickness (ft)
  - gravel resource thickness (ft)
  - percent sand and fines (quarry 80, stream, 0.75 in.), gravel extraction
  - significant amount of fines (passing 100 mesh, 0.075 in. or 0.075 mm)
  - significant amount of decomposed or weak rock.
  - "u" = gravel resource unvalued or unknown property
  - "w" in symbol denotes property owned
  - "g" in symbol denotes property owned

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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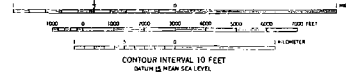
QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Blockland, L.J., and Brown, R.F., 1957, 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.

Map by: Phillip C. Wicklin  
Date: June 30, 1974

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

APPROXIMATE MEAN  
DECLINATION, 1983



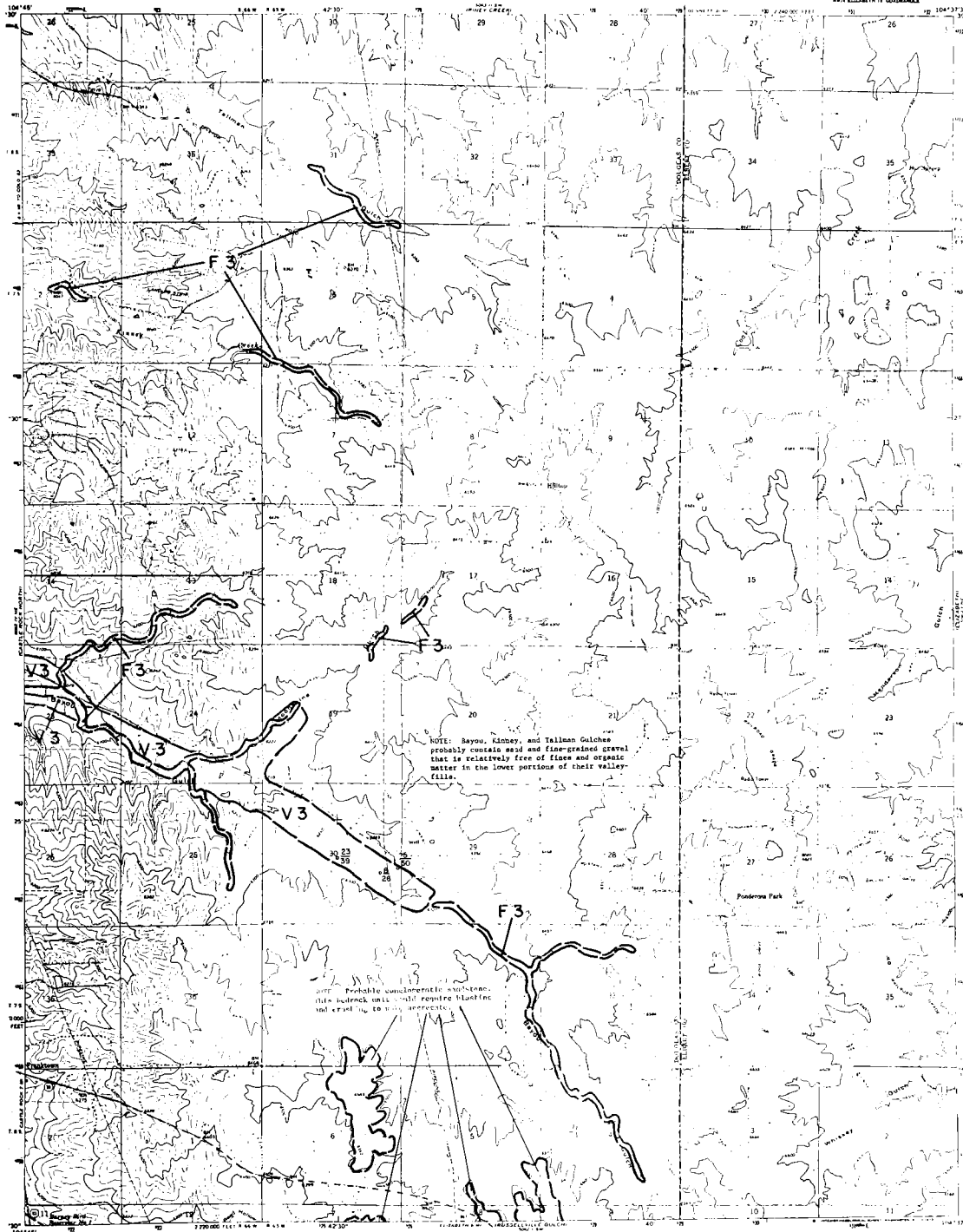
ROAD CLASSIFICATION  
Heavy-duty solid line Light-duty thin line  
Medium-duty dashed line Unimproved dirt dotted line  
U.S. Route circle with number State Route circle with number

POINT OF ROCKS, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

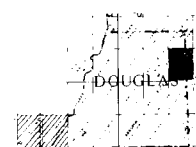
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. PAUL, DIRECTOR

PODEROSA PARK  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
WITH ELEVATIONS IN QUADRANGLE



## EXPLANATION

- LEGEND**
- F Floodplain deposits
  - T Stream terrace deposits
  - V Valley fill (F & T)
  - U Upland deposits
  - A Alluvial fan
  - E Erosion-deposited sand (estuary)
  - M Non-male deposits (e.g., talus, scree, etc.)
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF SITES**
- 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
  - 6. Potential well or debris-hole location with over-buried fillstone (fill over sand and gravel resource) (see note on map)
  - 7. Potential gravel pit (see note on map)
  - 8. In-situ gravel (see note on map)
  - 9. In-situ gravel (see note on map)
  - 10. In-situ gravel (see note on map)
  - 11. In-situ gravel (see note on map)
  - 12. In-situ gravel (see note on map)
  - 13. In-situ gravel (see note on map)
  - 14. In-situ gravel (see note on map)
  - 15. In-situ gravel (see note on map)
  - 16. In-situ gravel (see note on map)
  - 17. In-situ gravel (see note on map)
  - 18. In-situ gravel (see note on map)
  - 19. In-situ gravel (see note on map)
  - 20. In-situ gravel (see note on map)
  - 21. In-situ gravel (see note on map)
  - 22. In-situ gravel (see note on map)
  - 23. In-situ gravel (see note on map)
  - 24. In-situ gravel (see note on map)
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  - 26. In-situ gravel (see note on map)
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  - 28. In-situ gravel (see note on map)
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  - 30. In-situ gravel (see note on map)
  - 31. In-situ gravel (see note on map)
  - 32. In-situ gravel (see note on map)
  - 33. In-situ gravel (see note on map)
  - 34. In-situ gravel (see note on map)
  - 35. In-situ gravel (see note on map)
  - 36. In-situ gravel (see note on map)
  - 37. In-situ gravel (see note on map)
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  - 39. In-situ gravel (see note on map)
  - 40. In-situ gravel (see note on map)
  - 41. In-situ gravel (see note on map)
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  - 47. In-situ gravel (see note on map)
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  - 49. In-situ gravel (see note on map)
  - 50. In-situ gravel (see note on map)
  - 51. In-situ gravel (see note on map)
  - 52. In-situ gravel (see note on map)
  - 53. In-situ gravel (see note on map)
  - 54. In-situ gravel (see note on map)
  - 55. In-situ gravel (see note on map)
  - 56. In-situ gravel (see note on map)
  - 57. In-situ gravel (see note on map)
  - 58. In-situ gravel (see note on map)
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  - 61. In-situ gravel (see note on map)
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  - 94. In-situ gravel (see note on map)
  - 95. In-situ gravel (see note on map)
  - 96. In-situ gravel (see note on map)
  - 97. In-situ gravel (see note on map)
  - 98. In-situ gravel (see note on map)
  - 99. In-situ gravel (see note on map)
  - 100. In-situ gravel (see note on map)



**REFERENCE:**

Chase, C.N., and McConaghy, J.A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-731.

**Geology modified after:**

Trumble, D.E., and Pich, 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 1-856-A.

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

PODEROSA PARK, COLO.



# 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. ROLD, DIRECTOR

## EXPLANATION

Landform unit  
Resource classification

### LANDFORM UNITS

- F Fluvial deposit
- T Stream terrace deposit
- V Valley (1:10,000)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Man-made deposits (landfill, spoil, etc.)

### RESOURCE CLASSIFICATION

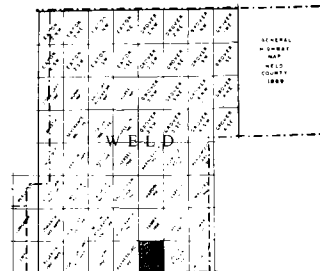
- 1 Gravel: relatively clean and round
- 2 Gravel: significant fines, decomposed rock, medium carbonates
- 3 Sand
- 4 Probable aggregate resources

### DOT 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 overburden thickness (ft) over road/gravel resource
- Thickness (ft) obtained from well logs
- "u" indicates gravel, "s" indicates sand
- "(u)" indicates unconsolidated or unknown property
- "m" denotes Colorado Geological Survey
- Landform boundary, solid where known or observed; dashed where approximate or inferred

### STATION, LOCATION AND COORDINATE

- overburden thickness (ft)
- relieved well or drill-hole location with overburden thickness (ft) over road/gravel resource
- present spot and fence property of
- known, 0.1 ft to 0.1 ft
- significant amount of fines (gravel) 0.1 ft to 0.1 ft
- significant amount of decomposed or weak rock
- significant amount of medium carbonate (sandstone)
- "u" in spot indicates unconsolidated or unknown property
- "(u)" in spot indicates property status of unconsolidated

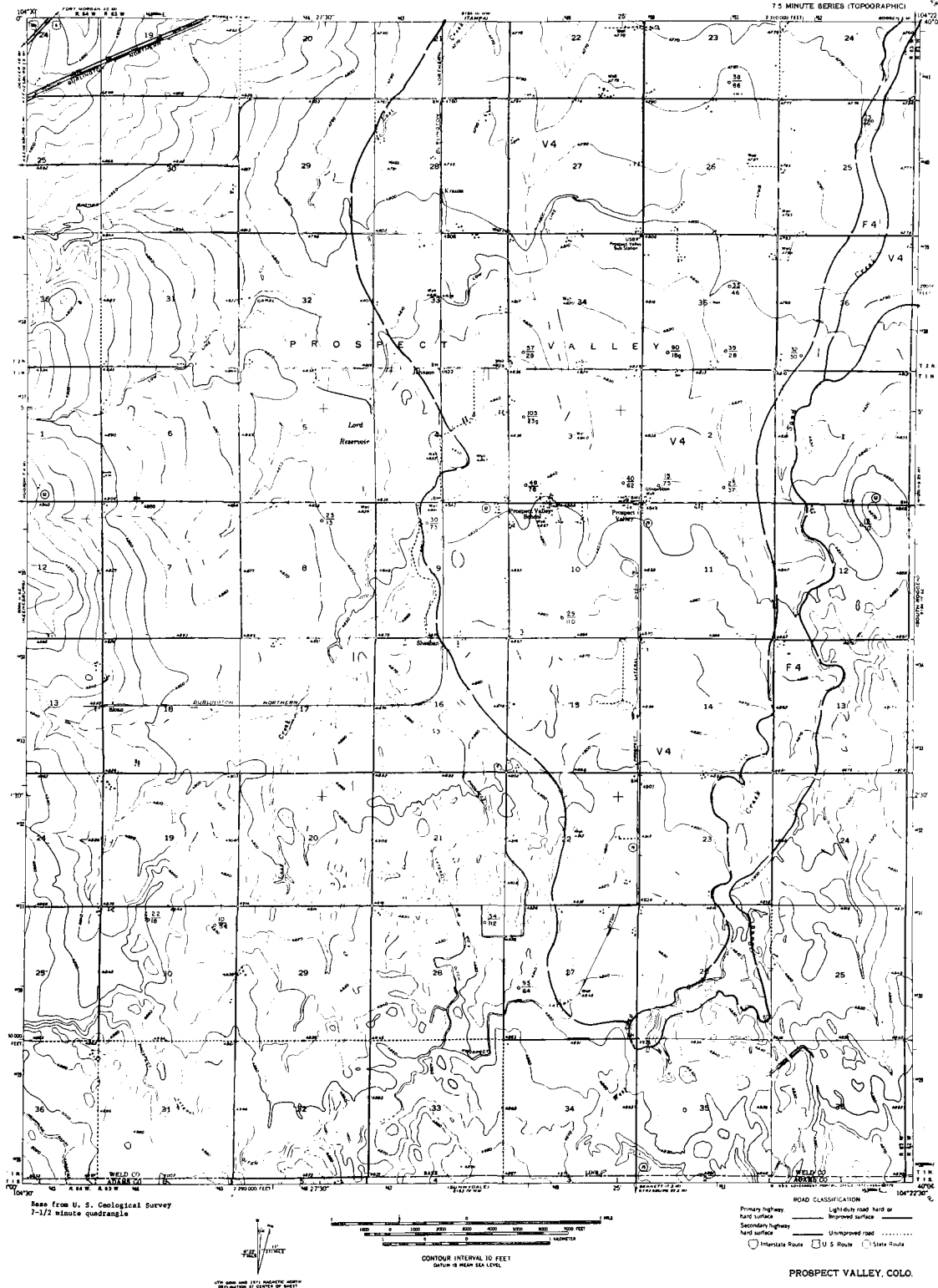


QUADRANGLE LOCATION

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 Hardin, Colorado, and Paxton, Nebraska: U. S. Geol. Survey Water-Supply Paper 1378, pl. 1.

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



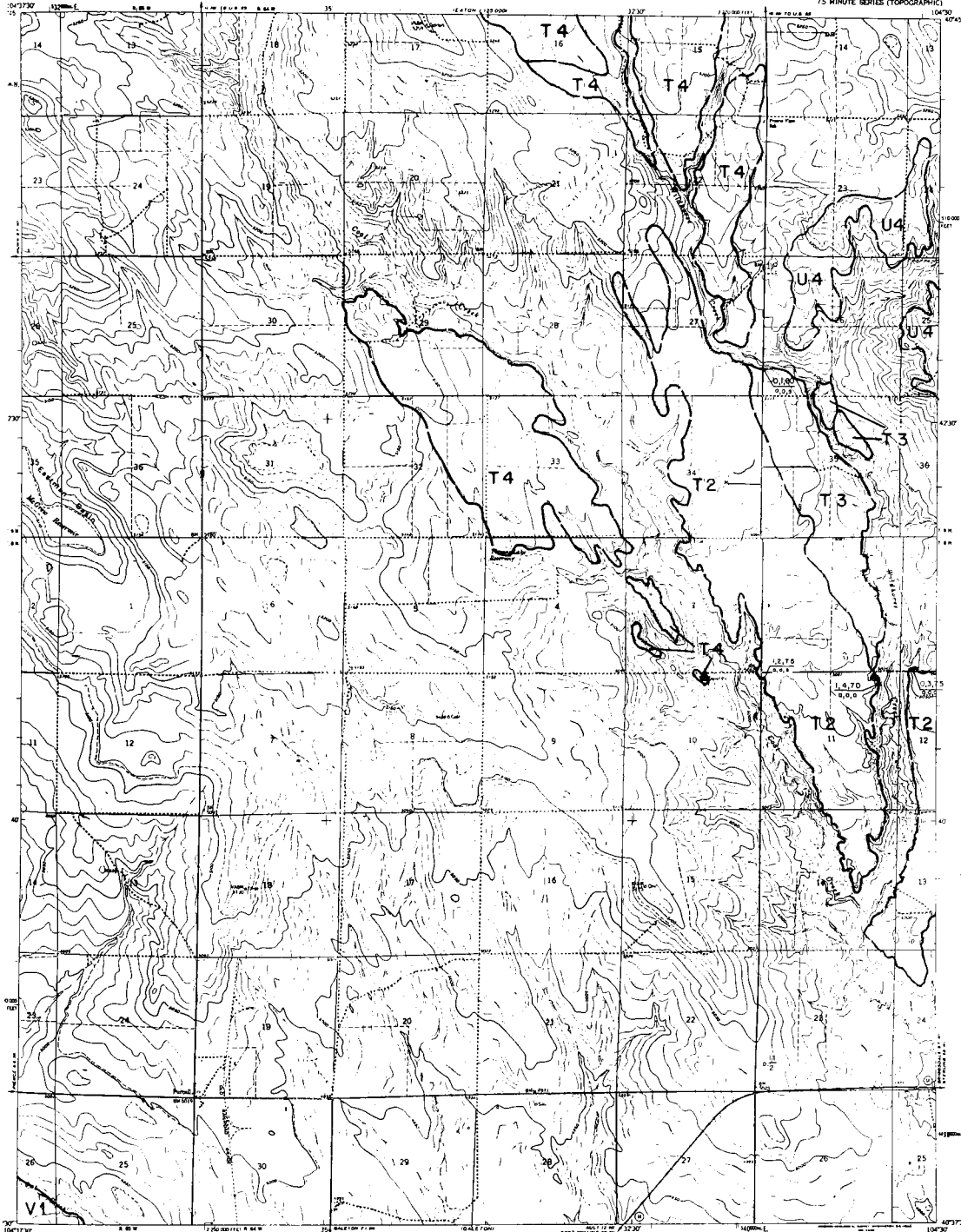
ROAD CLASSIFICATION  
Primary highway  
Secondary highway  
Unimproved road  
Interstate Route  
U.S. Route  
State Route

PROSPECT VALLEY, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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

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



## EXPLANATION

Topographic Lines  
Contours  
Place/Location

### AGGREGATE TYPES

- T Sandstone deposit
- T Stream terrace deposit
- V Valley fill (S & T)
- U Other deposits
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Man-made deposits (slag, tailings, refuse, etc.)

### RESOURCE CLASSIFICATION

- 1 Gravel: relatively clean and round
- 2 Gravel: significant fines, decomposed rock, solution castings
- 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
- Permitted quarry aggregate resource area
- Rejected well or drill-hole location with overburden (includes fill over sand/gravel resource)
- Abandoned fill, obtained from well logs
- "I" indicates gravel, "S" indicates sand
- "X" in symbol denotes unclassified or unknown property
- "W" denotes Colorado Geological Survey wellhead and gravel pit location
- Drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION LOCATION AND ORIENTATION

- contour interval 200'
- contour interval 100'
- contour interval 50'
- contour interval 20'
- contour interval 10'
- contour interval 5'
- contour interval 2'
- contour interval 1'
- contour interval 0.5'
- contour interval 0.25'
- contour interval 0.125'
- contour interval 0.0625'
- contour interval 0.03125'
- contour interval 0.015625'
- contour interval 0.0078125'
- contour interval 0.00390625'
- contour interval 0.001953125'
- contour interval 0.0009765625'
- contour interval 0.00048828125'
- contour interval 0.000244140625'
- contour interval 0.0001220703125'
- contour interval 0.00006103515625'
- contour interval 0.000030517578125'
- contour interval 0.0000152587890625'
- contour interval 0.00000762939453125'
- contour interval 0.000003814697265625'
- contour interval 0.0000019073486328125'
- contour interval 0.00000095367431640625'
- contour interval 0.000000476837158203125'
- contour interval 0.0000002384185791015625'
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- contour interval 0.000000000116415321826934814453125'
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- contour interval 0.00000000002910383045673370361328125'
- contour interval 0.000000000014551915228366851806640625'
- contour interval 0.0000000000072759576141834259033203125'
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RALSTON BUTTES QUADRANGLE  
COLORADO-JEFFERSON CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



F → Longform writ  
 F → Research classification

LANDFORMS: 2115

F	Floodplain deposits
T	Stream terrace deposits
V	Valley fill (F & T)
U	Upland deposits
A	Alluvial fan
E	Wind-deposited sand
M	Man-made deposits (fence, tailings, spoil)

**RESOURCE CLASSIFICATION**

Coarse Aggregate  
(at least 80% retained on # 4 screen, actual estimate)  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decompose rock, sodium carbonate.

Fine Aggregate  
greater than 75 passing # 4 screen, 4% retained on # 20 screen, actual estimate

3 Sand

Overvalued Resource

4 Probable REVERSE resource

## MAP STRONGS

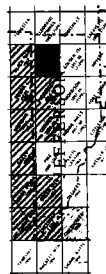
- \* Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource area
- Searched well or drill-hole location with over-bore hole chips (s) over sand/gravel resource chip(s) (s), or drilled hole with well logs.
- "s" indicates gravel; "m" indicates sand
- "s" in symbol denotes unvaluated or unknown property.
- "m" denotes Colorado Geological Survey Windsor/Jand and Gravel projects' drill hole
- Landform boundary, well where known or observed; dashed where approximate or inferred.



## STATION, LOCATION AND ECOLOGICAL.

**DESCRIPTION OF DEPOSIT**

- overburden thickness (ft)
- sand/gravel resource thickness (ft)
- percent sand and fines (assuming no silt/clay, 0.55 to 1, visual estimation)
- significant amount of fines (passing 1000 screen, 0.0150 (in. or 0.0748 mm.)
- significant amount of decomposed or weak rock.
- significant amounts of calcareous carbonate (calcite)

"a" in symbol denotes concentrated or unknown property  
 "s" in symbol denotes property absent or insignificant



 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

Geology modified after:

Sheridan, D.M., Maxwell, C.H.,  
Aibee, A.L., and Van Horn, Richard.  
1958, Preliminary map of the bedrock  
geology of the Kalston Buttes quadrangle,  
Jefferson County, Colorado: U. S. Geol.  
Survey Mineral Inv. Field Studies Map  
MF-179.

Tribble, D.E., 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 I-856-A.

**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 I-731.

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



UFW 6400 440 (37) 0404(14) 0000

CONTOUR INTERVAL, 100 FT

CONTINUOUS INTERVAL AND FILL

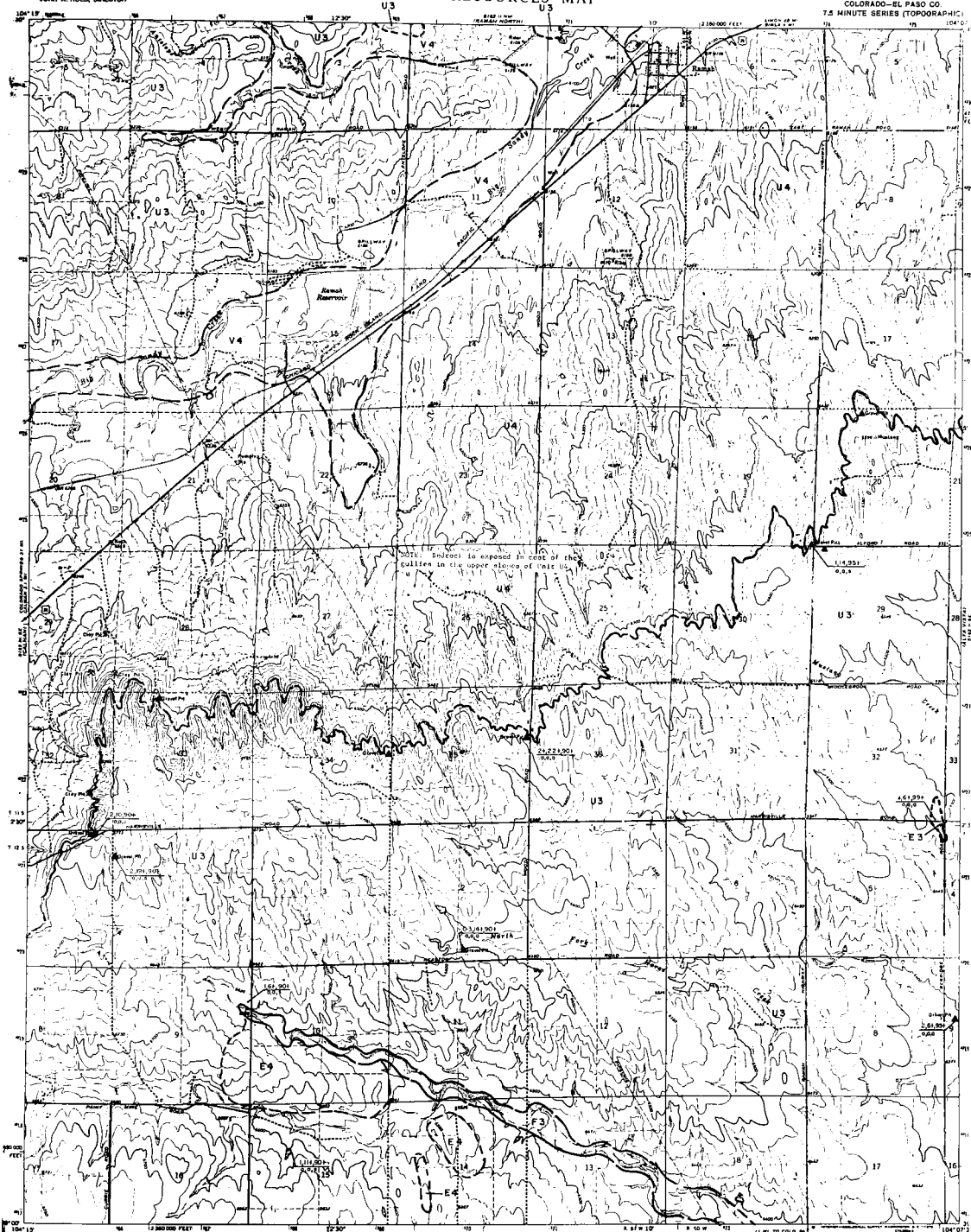
ROAD CLASSIFICATION

Heavy-duty \_\_\_\_\_ Light-duty \_\_\_\_\_  
Medium-duty \_\_\_\_\_ Unimproved det. \_\_\_\_\_  
{ } U.S. Route { } State Route

RALSTON BUTTES, COLO.

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

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



- Landform units
- Reservoir classification

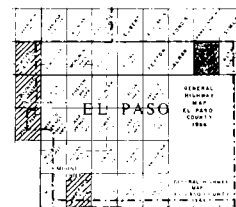
**LANDFORM UNITS**

F	Fluvial-in deposit
T	Terrace deposit
V	Valley fill (F & T)
U	Upland deposits
A	Alluvial fan
E	Eolian-deposited sand (dunes)
M	Man-made deposits (farms, buildings, etc.)

RESOURCE CLASSIFICATION

- 1 Gravel: relatively clean and round
- 2 Gravel: significant fines, decomposed rock, calcareous matrix.
- 3 Fine Aggregate  
finer than #4 passing 85 percent, 1% retained on #200 screen, usual estimation
- 4 Sand
- 5 Ungraded Material
- 6 Probable aggregate: residual

## MAP SYMBOLS:

[illegible]

 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



CONTOUR INTERVAL 20 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

RAMAH SOUTH, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

RAWAH LAKES QUADRANGLE  
COLORADO

75 MINUTE SERIES (TOPOGRAPHIC)

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

## EXPLANATION

Landform units  
Resource classification

### LANDFORM UNITS

- F Floodplain deposits
- T Stream terrace deposits
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Man-made deposits (fals, scallid, spalls...)

### RESOURCE CLASSIFICATION

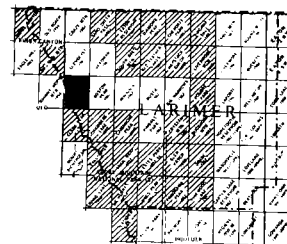
- 1 Coarse aggregates (at least 100 particles on 48 screen, visual estimation)
- 2 Gravel: relatively clean and round
- 3 Gravel: significant fines, decomposed rock, calcareous materials
- 4 Fine aggregates (greater than 100 passing 48 screen, 200 retained on 420 screen, visual estimation)
- 5 Sand
- 6 Unavailable resources
- 7 Probable aggregate resources

### MAP SYMBOLS

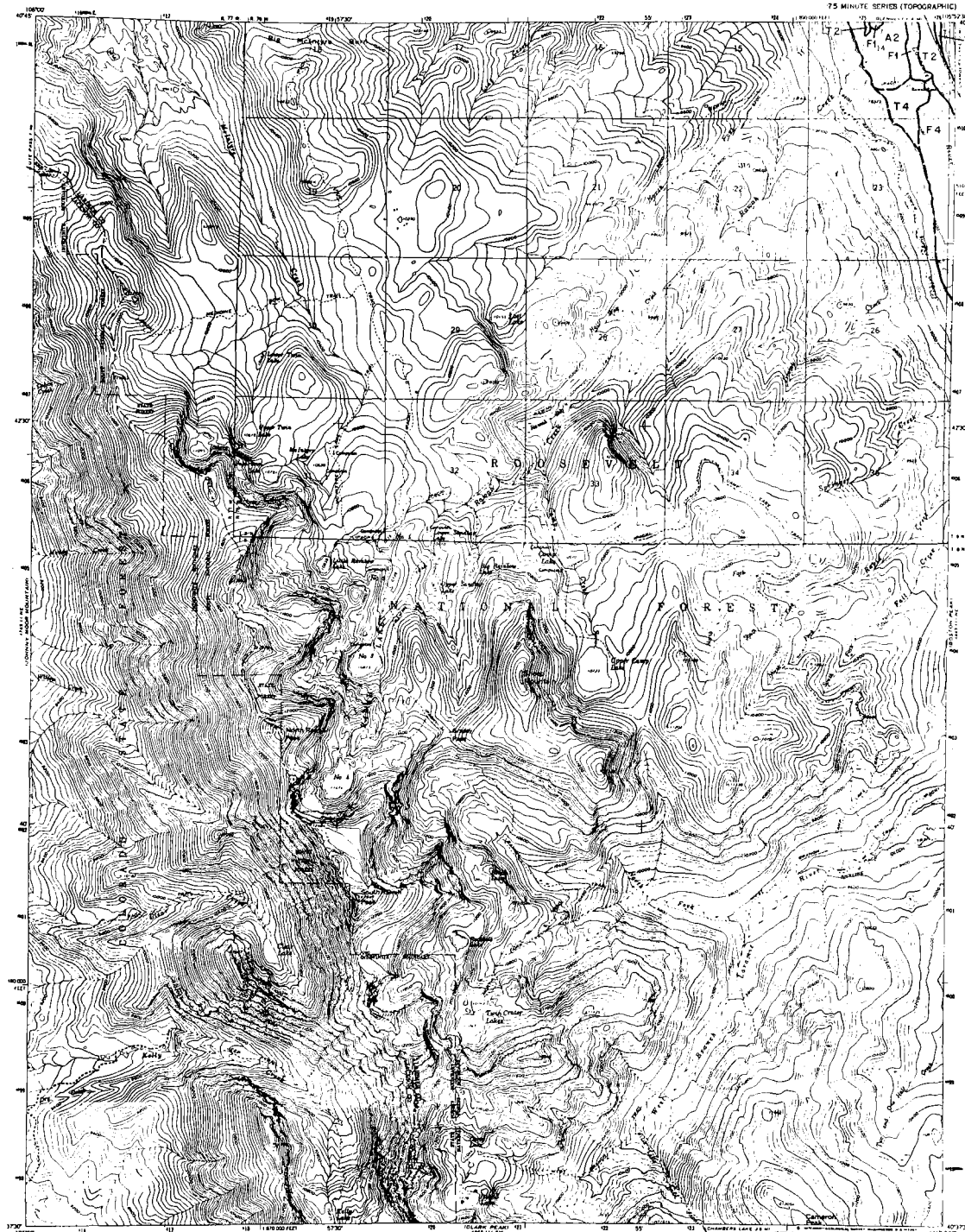
- A Operating gravel and/or sand pit
- B Abandoned gravel and/or sand pit
- C Operating stone quarry
- D Abandoned stone quarry
- E Potential quarry aggregate resource area
- F Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- G "I" in symbol denotes unmineralized or unknown property
- H American Colorado Geological Survey (ACGS) sand and gravel resource
- I Well
- J Landform boundary, solid where known or dashed where approximate or inferred

### STATION, LOCATION AND CHRONOLOGICAL

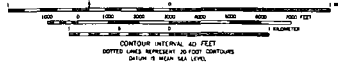
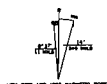
- overburden thickness (ft)
- mineral resource thickness (ft)
- percent sand and fines (percent of screen, 0.075 in. or 0.075 mm.)
- significant amount of fines (percent, 100 screen, 0.075 in. or 0.075 mm.)
- significant amount of decomposed or weak rock
- significant amount of calcareous materials
- "u" in symbol denotes unmineralized or unknown property
- "a" 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, 40 FEET  
DOTTED LINES INDICATE 20-FOOT CONTOURS  
DASHED LINES INDICATE 10-FOOT CONTOURS

ROAD CLASSIFICATION  
Light-duty ... Unimproved dirt ...

RAWAH LAKES, COLO.

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

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

RAYMOND QUADRANGLE  
COLORADO-Boulder CO  
75 MINUTE SERIES (TOPOGRAPHIC)  
1:250,000 SCALE



Landform unit  
Resource classification

## LANDFILL UNITS

Geologic 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  
for (200) 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 75 passing #4 screen, 4%  
retained on #20 screen, visual estimation:

### Revealed Response

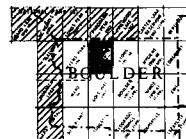
4 Probable aggregate resource

## 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 over-  
 bored thickness (ft) over sand/gravel resource  
 thickness (ft), obtained from well logs.  
 "a" indicates quarry, "n" indicates sand  
 " " in symbol denotes unvaluated or  
 unknown project  
 "wg" denotes Colorado Geological Survey  
 Windward/Sand and Gravel project  
 drill hole  
 Landform boundary, solids where known or  
 observed; dashed where approximate or  
 inferred

## STATION, LOCATION AND GEOLOGICAL

significant amount of bone (passing  
 PET screen, 0.01% (n. or 0.014 cm.)  
 significant amount of decalcified or weak rock.  
 significant amount of calcium carbonate (calcite)  
 "n" in symbol denotes unmineralized or  
 unknown property  
 "n" in symbol denotes property absent  
 or undetectable



 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

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





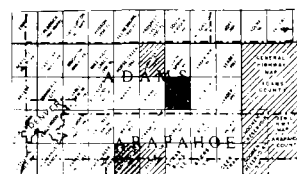
ROPER SCHOOL QUADRANGLE  
COLORADO-ADAMS CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## REFERENCES

- [illegible]



QUADRANGLE LOCATION

NON-RESOURCE OR  
WITHDRAWN AREA

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

HARD SURFACE ALL WEATHER ROADS      DRY WEATHER ROADS  
 Heavy-duty \_\_\_\_\_ FLAKE-IN-PLACE      Light-duty \_\_\_\_\_  
 Medium-duty \_\_\_\_\_ FLAKE-ON-LATE      Unimproved dirt \_\_\_\_\_  
 U.S. Route      State Route

ROPER SCHOOL, 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. ROLD, DIRECTOR

## EXPLANATION

Conformable unit  
Resource classification

**LITHOLOGIC UNITS**  
F Floodplain deposit  
T Stream terrace deposit  
V Alluvial fill (F & T)  
U Unconsolidated  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Pleistocene deposits (clay, siltstone, gravel, etc.)

### RESOURCE CLASSIFICATION

**GRAVEL RESOURCES**  
(at 1000 feet elevation on 40 acres, based on 1977 survey)  
1 Gravel: relatively clean and sound  
2 Gravel: significant fines, decomposed rock, calcareous material

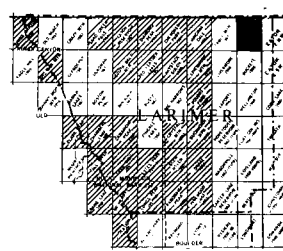
**SAND RESOURCES**  
(based on 1977 survey, 40 acres, based on 1977 survey, based on 1977 survey)  
3 Sand  
4 Probable aggregate resource

### NOTES

1. Outcrops of 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  
6. Selected well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs  
7. "u" indicates gravel, "v" indicates sand  
8. "u" in symbol denotes unconsolidated or unknown property  
9. "m" denotes Colorado Geological Survey studies/land and gravel projects  
10. Drill hole  
11. Landform boundary, solid where known or observed, dashed where interpretation or inferred

### STATION, LOCATION AND CIRCUMSTANCES

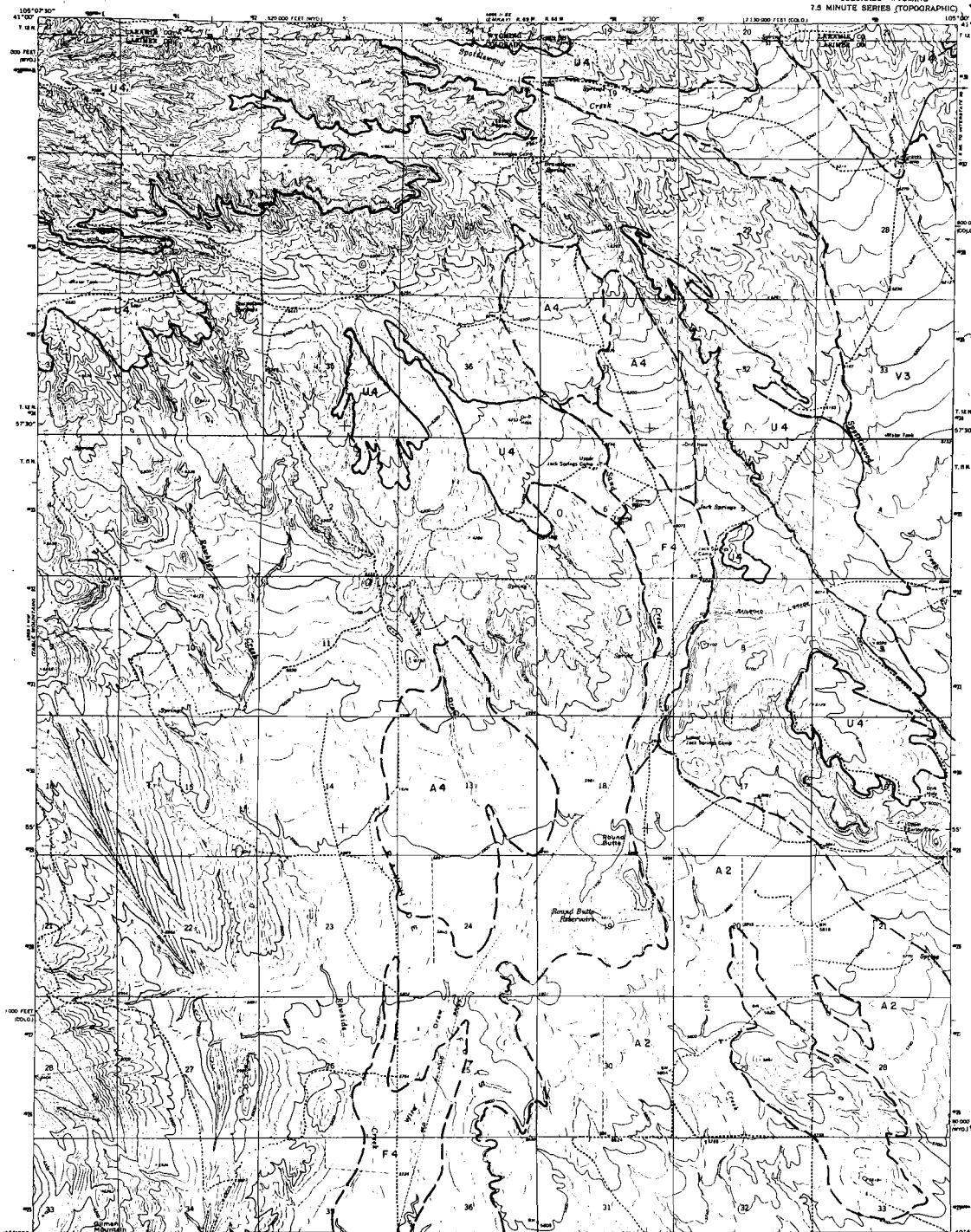
**CLASSIFICATION OF SYMBOLS**  
1. non-quantitative thickness (ft)  
2. non-quantitative resource thickness (ft)  
3. percent sand and fines (based on 40 acres, 0.25 in., 0.25 in.)  
4. significant amount of fines (based on 40 acres, 0.25 in., 0.25 in.)  
5. significant amount of decomposed or weak rock  
6. significant amount of solution carbonate (caliche)  
7. "u" in symbol denotes unconsolidated or unknown property  
8. "m" in symbol denotes property owned or leased/owned



QUADRANGLE LOCATION  
NON-RESOURCE OR WETLAND AREA

**REFERENCE:**  
Moore, P.E., 1959, Geomorphic evolution of the east flank of the Laramie Range, Colorado and Wyoming: Univ. Wyoming Unpub. Ph.D. Thesis, pl. 4.  
Denson, W.M., 1974, personal communication.  
Weist, W.C., Jr., 1965, Reevaluation 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.  
Lover, 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.

Map by: Stephen D. Schenck  
Date: June 30, 1974



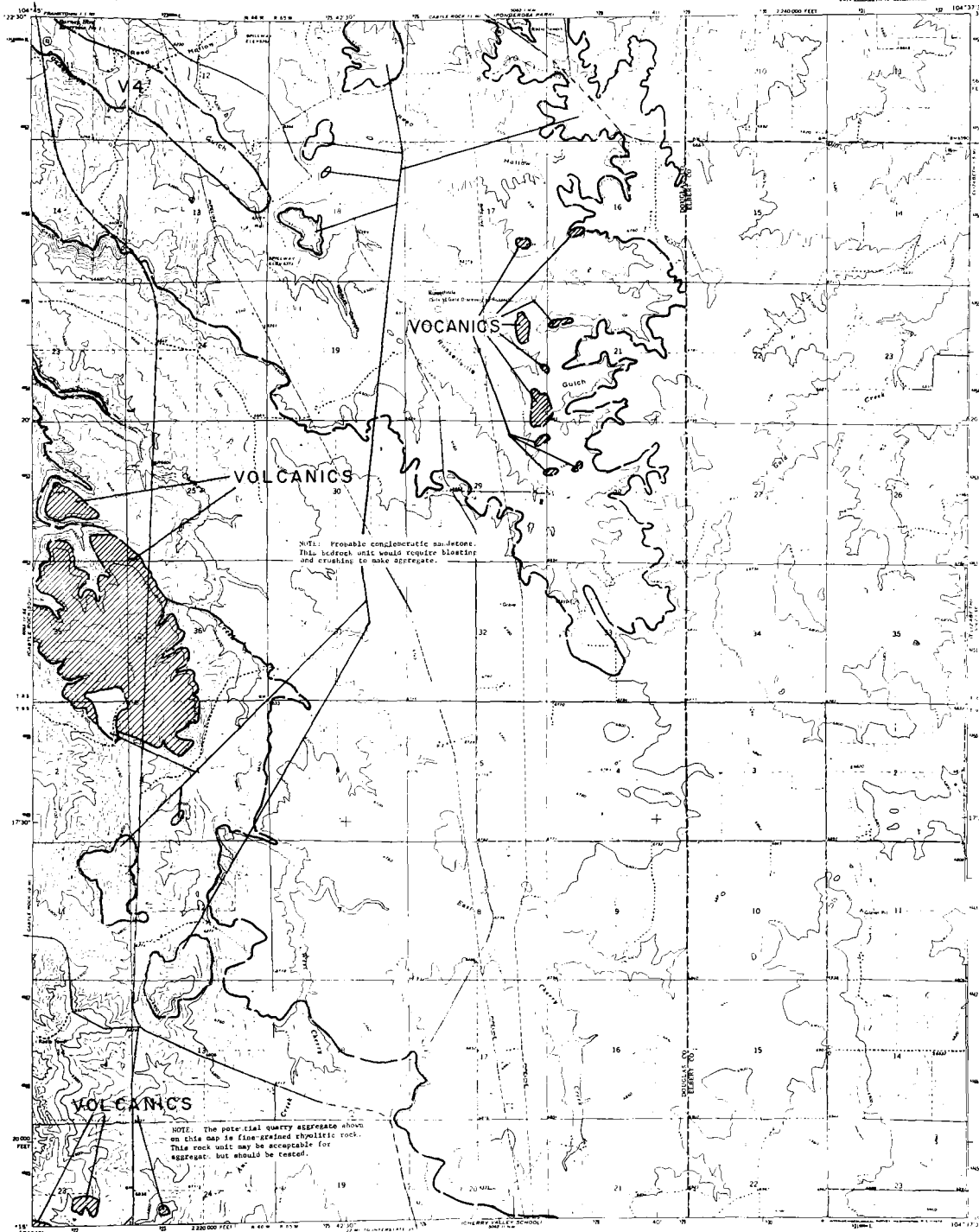
Base from U. S. Geological Survey 7.5-minute quadrangle  
CONTOUR INTERVAL 20 FEET  
DATUM IS MEAN SEA LEVEL  
ROAD CLASSIFICATION  
Light-duty Unimproved dirt

ROUND BUTTE, COLO. - WYO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

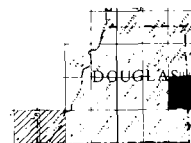
RUSSELLVILLE GULCH  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
SIX-EIGHTEEN IS QUADRANGLE

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



## EXPLANATION

- LANDFORMS**
- F Floodplain deposit
  - T Terrace surface deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Non-mine deposits (slag, tailings, spoils, etc.)
- RESOURCE CLASSIFICATION**
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, increased rock content
  - 3 Sand
  - 4 Designated Resource
  - 5 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 Related well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs
  - g "a" indicates gravel; "s" indicates sand
  - h "r" in symbol denotes revegetated or unknown property
  - i "u" denotes Colorado Geological Survey Wilder/land and gravel projects
  - j "b" in symbol denotes boundary, wild share known or observed; shaded where interpretation is inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF AGGREGATE**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines (percent) at bottom, 0 to 100, value estimated
  - significant amount of fines (meaning fine sand, 0.075 to 0.425 mm)
  - significant amount of decomposed or weak rock
  - significant amount of siliceous materials indicate
  - "u" or symbol denotes unutilized or unknown property
  - "r" in symbol denotes property absent or land/forest



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHERED AREA

**REFERENCE:**  
Chase, G.H., and McConaghy, J.A., 1973. Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map 1-733.

Geology modified after:  
Trimble, D.E., and Petch, 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.

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

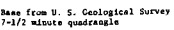
CONTOUR INTERVAL 20 FEET  
DATUM IS MEAN SEA LEVEL

**ROAD CLASSIFICATION**  
Major Road  
Minor Road  
Unimproved Rd  
State Route

RUSSELLVILLE GULCH, COLO.

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

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



RUSTIC. COLO

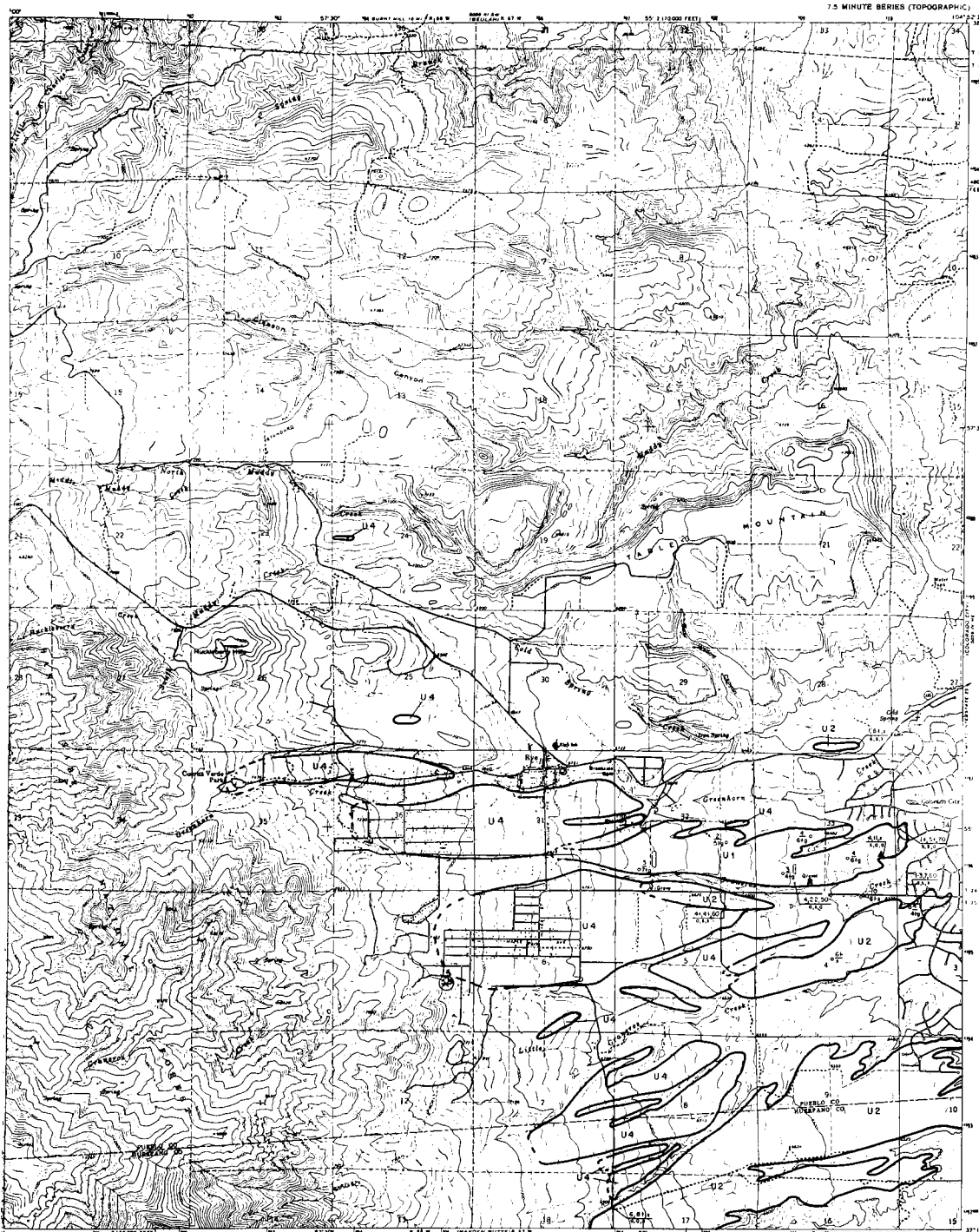
- language unit
- resource classification

- 

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

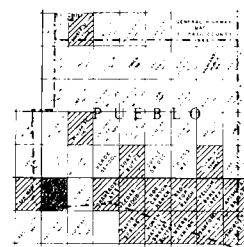
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

RYE QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

- Landform units  
Resource classification
- MAPPER'S KEY**
- F Floodplain deposits
  - 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, etc.)
- RESOURCE CLASSIFICATION**
- COARSE AGGREGATE**  
(at least 10% retained on 48 screen, visual estimation)
- 1 Gravel: relatively clean and round
  - 2 Gravel: slightly less than 48 screen, rounded rock, medium texture
  - 3 Sand
- FINE AGGREGATE**  
(passed 48 screen, retained on 200 screen, visual estimation)
- 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); selected fine well logs
  - "G" indicates gravel; "S" indicates sand
  - "r" in symbol denotes unconsolidated or unknown property
  - "M" denotes Colorado Geological Survey material and stream "exposed" drill hole
  - Location boundary, solid where known or observed; dashed where approximate or inferred
- STATION LOCATION AND GEOLOGICAL DESCRIPTION OF SURVEY**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - percent sand and fines (passing 20 screen, 0.25 in. or 0.075 mm.)
  - significant amount of fines (passing 200 screen, 0.004 in. or 0.106 mm.)
  - significant amount of decomposition or weak rock
  - significant amount of medium to coarse material
  - "G" in symbol denotes unconsolidated or unknown property
  - "S" in symbol denotes property absent or insignificant



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

REFERENCE: Stephen Blasco, 1971,  
Geologic Map of the Rye-Colored  
City Area, Pueblo and Huerfano  
Counties, Colorado: Colorado School  
of Mines, U. S. Thesis 1360,  
Plate 1.

Map by: Ralph S. Shroba  
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  
State Route

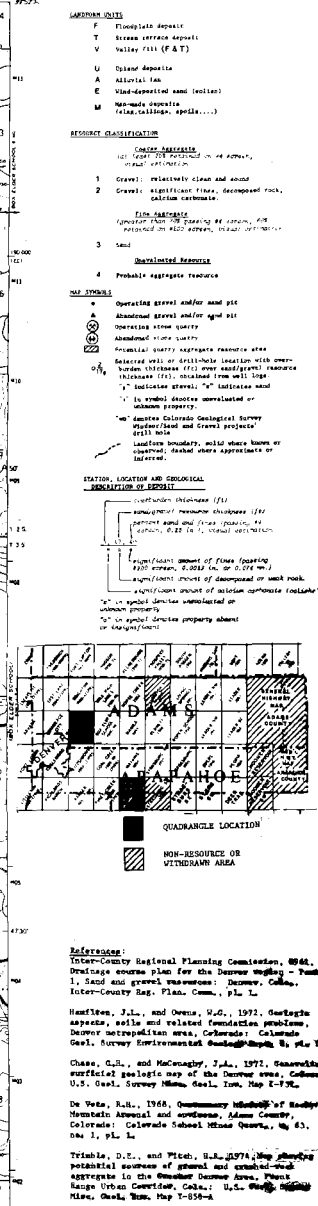
RYE, COLO.



SABLE QUADRANGLE  
COLORADO

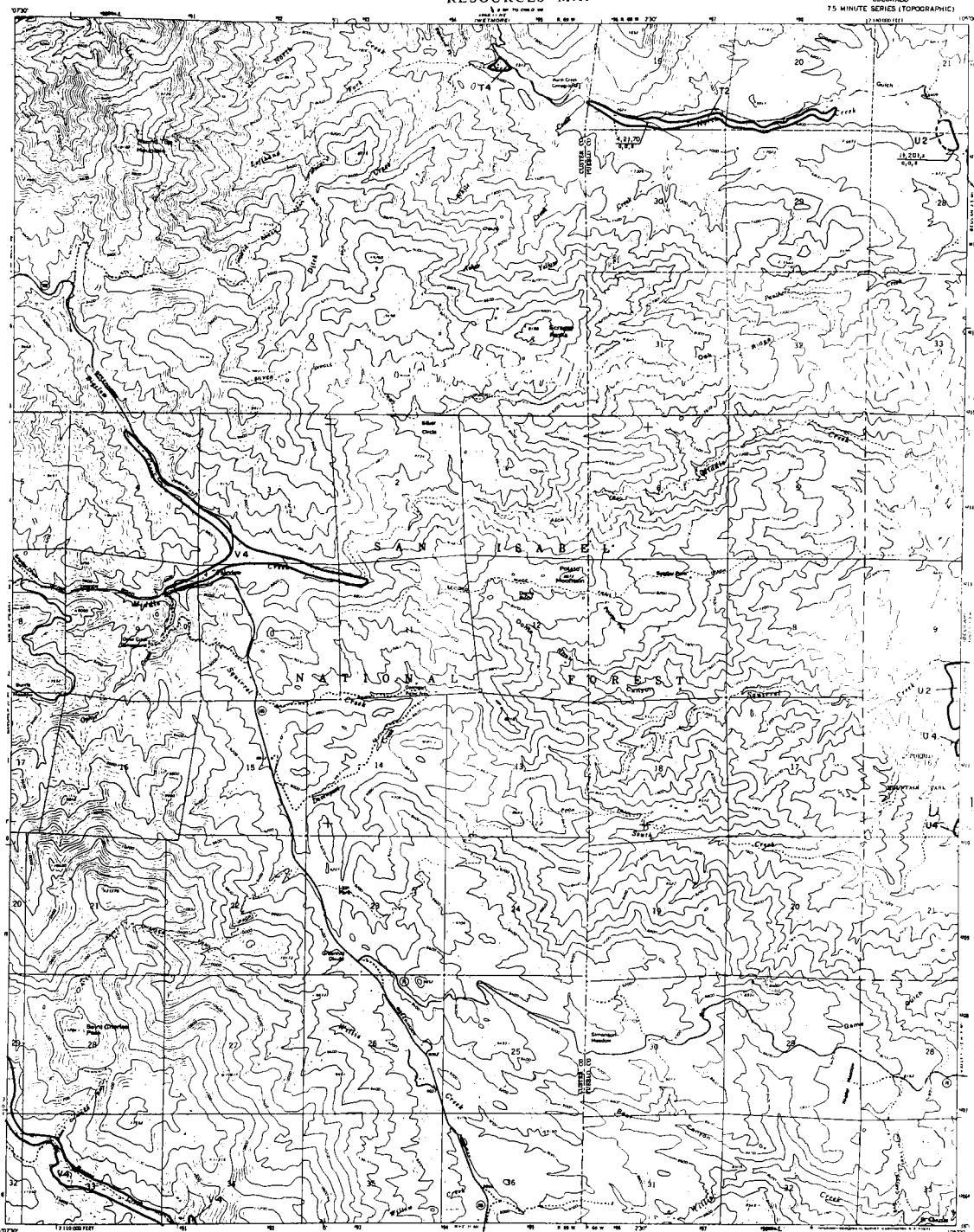
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. ROLD, DIRECTOR

- └ Landform unit.
- └ Regional classification



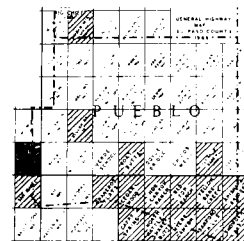
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

SAINT CHARLES PEAK QUADRANGLE  
COLORADO  
75 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

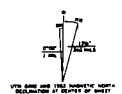
- Landform units  
Resource classification
- LANDFORM UNITS**
- F Floodplain deposit
  - T Stream terrace deposit
  - V Valley fill (F & T)
  - U Upland deposits
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Man-made deposits (slag, tailings, spalls, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Resources**  
(all listed are measured on 80 acres, visual estimation)
- 1 Gravel, relatively clean and sound
  - 2 Gravel, significant fines, decomposed rock, abundant overburden
- Sand Resources**  
(gravel from 100 ft. measured 80 acres, 80% retained on #20 screen, visual estimation)
- 3 Sand
- Unutilized 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
  - Permitted 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, "s" indicates sand
  - "u" in symbol denotes unutilized or unknown property
  - "w" denotes Colorado Geological Survey Window/Blank and Crown protection
  - 2000 ft. boundary, well where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND CHRONOLOGICAL DESCRIPTION OF RESOURCES**
- Overburden thickness (ft)
  - Sand/gravel resource thickness (ft)
  - Percent sand and fines (passing #10 screen, 0.25 in., visual estimation)
  - Significant amount of fines (passing #20 screen, 0.075 in. or 0.075 mm.)
  - Significant amount of decomposed or weak rock
  - Significant amount of material not suitable for use
  - "u" in symbol denotes unutilized or unknown property
  - "w" in symbol denotes property owned or controlled



QUADRANGLE LOCATION  
NON-RESOURCE OR WITHDRAWN AREA

Map by: Ralph E. Shroba  
Date: June 30, 1974

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



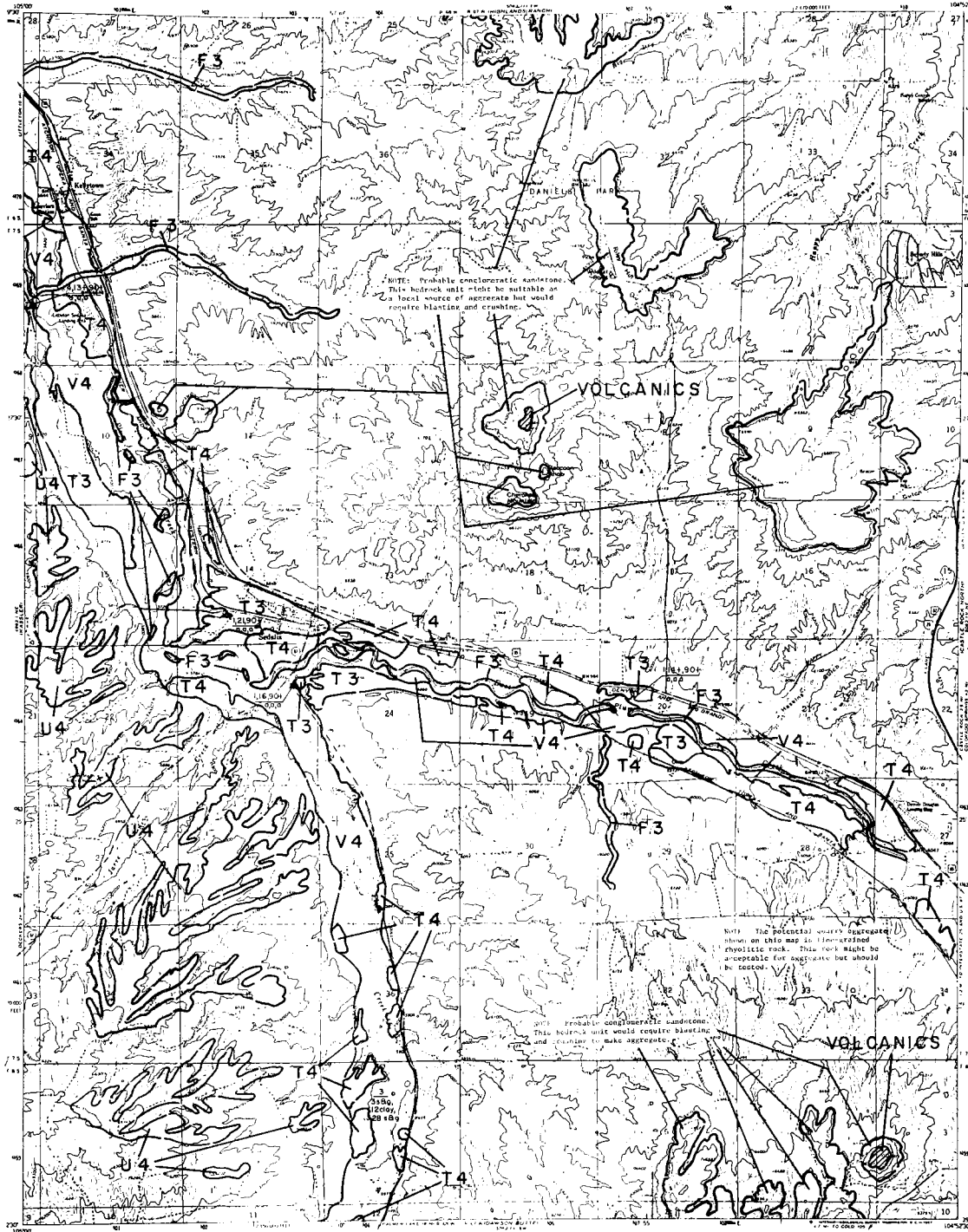
ROAD CLASSIFICATION  
Main-dry Light-dry  
Unimproved pit State Road

SAINT CHARLES PEAK COLO

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

SEDALIA QUADRANGLE  
COLORADO-DOUGLAS CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
REV. 1-1974, 1975, 1976

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



## EXPLANATION

- Legend**
- Contour units
  - Resource classification
- MAP SYMBOLS**
- F3 Floodplain deposit
  - T Terrace terrace deposit
  - V Valley fill (F & T)
  - U Upland deposits
  - A Alluvial fan
  - E Erosion-deposited sand (alluvial)
  - M Man-made deposits (slag, tailings, etc.)
- RESOURCE CLASSIFICATION**
- Gravel Resources**  
(as shown on 1:50,000 scale map, unless otherwise noted)
- Gravel: relatively clean and sound
  - Gravel: significant fines, decomposed rock, calcareous
- Fill Resources**  
(as shown on 1:50,000 scale map, unless otherwise noted)
- Fill
  - Probable aggregate resource
- NOTES**
- Operating gravel and/or sand pit
  - Abandoned gravel and/or sand pit
  - Operating stone quarry
  - Abandoned stone quarry
  - Frontal quarry aggregate resource area
  - Related well or drill hole location with overburden thickness (ft), sand/gravel resource thickness (ft), abandoned (well) logs, "x" indicates gravel, "s" indicates sand
  - "x" in symbol denotes unconsolidated or unknown property
  - "m" denotes Colorado Geological Survey "Material and/or Gravel" project
  - Drill hole
  - Landmark boundary, solid when known or observed, dashed when approximate or inferred
- SYMBOLS, LOCATION AND ORIGIN:**
- Overburden thickness (ft)
  - Sand/gravel resource thickness (ft)
  - Current sand and gravel (opening 84 square, 2.33 in.), straight estimation
  - Significant amount of fines (opening 84 square, 2.33 in., straight estimation)
  - Significant amount of decomposed or weak rock
  - Significant amount of calcareous material (calcium)
  - "x" in symbol denotes unconsolidated or unknown property
  - "m" in symbol denotes property owned or leased



QUADRANGLE LOCATION  
NON-RESOURCE OR  
VITRIFIED AREA

**REFERENCE:**  
Chase, G.L., and McGowen, J.A., 1971. Generalized surficial geologic map of the Denver area, Colorado: U. S. Geol. Survey Misc. Geol. Map 1-731.

**Geology modified after:**  
Tribble, D.E., and Pritch, H.P., 1974. Map showing potential resources of gravel and crushed-rock aggregate in the Denver Denver Area, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Map 1-856-A.

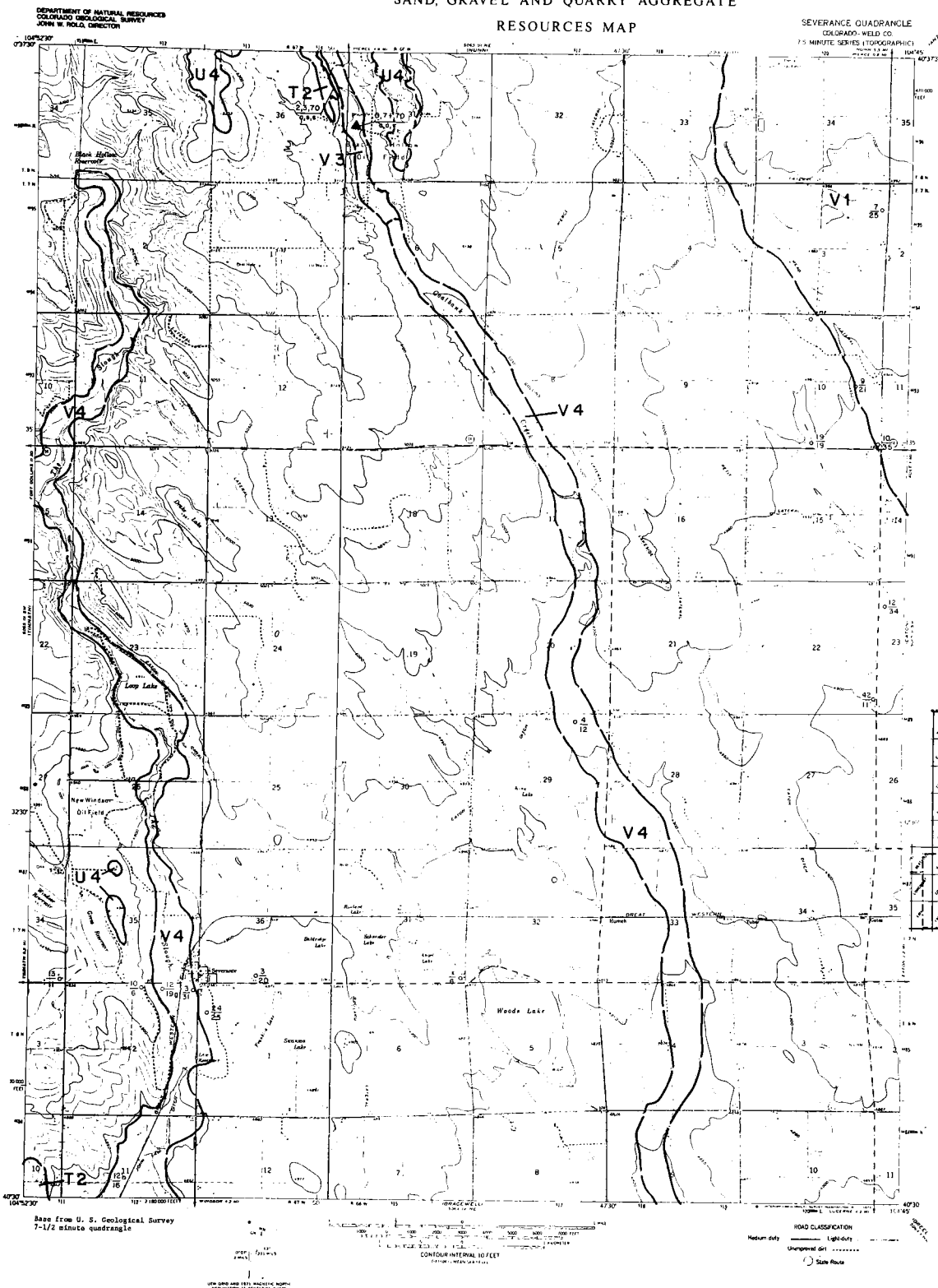
Map by: Ralph B. Shrobs  
Date: June 30, 1974

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

SEDALIA, COLO

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

SEVERANCE QUADRANGLE  
COLORADO, WELD CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

- Legend**
- Resource Classification**
- 1** Gravel: relatively clean and sound
- 2** Gravel: significant fines, decomposed rock, solution openings
- 3** Sand
- 4** Potential aggregate resources
- 5** Potential aggregate resources
- 6** Potential aggregate resources
- 7** Potential aggregate resources
- 8** Potential aggregate resources
- 9** Potential aggregate resources
- 10** Potential aggregate resources
- 11** Potential aggregate resources
- 12** Potential aggregate resources
- 13** Potential aggregate resources
- 14** Potential aggregate resources
- 15** Potential aggregate resources
- 16** Potential aggregate resources
- 17** Potential aggregate resources
- 18** Potential aggregate resources
- 19** Potential aggregate resources
- 20** Potential aggregate resources
- 21** Potential aggregate resources
- 22** Potential aggregate resources
- 23** Potential aggregate resources
- 24** Potential aggregate resources
- 25** Potential aggregate resources
- 26** Potential aggregate resources
- 27** Potential aggregate resources
- 28** Potential aggregate resources
- 29** Potential aggregate resources
- 30** Potential aggregate resources
- 31** Potential aggregate resources
- 32** Potential aggregate resources
- 33** Potential aggregate resources
- 34** Potential aggregate resources
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- 46** Potential aggregate resources
- 47** Potential aggregate resources
- 48** Potential aggregate resources
- 49** Potential aggregate resources
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- 51** Potential aggregate resources
- 52** Potential aggregate resources
- 53** Potential aggregate resources
- 54** Potential aggregate resources
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- 56** Potential aggregate resources
- 57** Potential aggregate resources
- 58** Potential aggregate resources
- 59** Potential aggregate resources
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- 66** Potential aggregate resources
- 67** Potential aggregate resources
- 68** Potential aggregate resources
- 69** Potential aggregate resources
- 70** Potential aggregate resources
- 71** Potential aggregate resources
- 72** Potential aggregate resources
- 73** Potential aggregate resources
- 74** Potential aggregate resources
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- 78** Potential aggregate resources
- 79** Potential aggregate resources
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- 81** Potential aggregate resources
- 82** Potential aggregate resources
- 83** Potential aggregate resources
- 84** Potential aggregate resources
- 85** Potential aggregate resources
- 86** Potential aggregate resources
- 87** Potential aggregate resources
- 88** Potential aggregate resources
- 89** Potential aggregate resources
- 90** Potential aggregate resources
- 91** Potential aggregate resources
- 92** Potential aggregate resources
- 93** Potential aggregate resources
- 94** Potential aggregate resources
- 95** Potential aggregate resources
- 96** Potential aggregate resources
- 97** Potential aggregate resources
- 98** Potential aggregate resources
- 99** Potential aggregate resources
- 100** Potential aggregate resources



**WELD CO.**

**SEVERANCE, COLO.**

**REFERENCE:**

Hersey, L.A., and Schneider, F.A., Jr., 1973. Geologic map of the lower Cache La Poudre River basin, north-central Colorado: U. S. Geol. Survey Misc. Geol. Inv. Map I-487.

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

Sven, F. H., III, 1972. Map of surficial geology of part of the Severeance quadrangle: Recon. mapping for Colorado Geol. Survey Windsor Environmental Geology Project, open-file map.

**Geology modified after:**

Colton, R.B., and Vitch, R.R., 1974. Map showing potential sources of gravel and crushed-rock aggregate in the Boulder-Fort Collins-Steamer Areas, Front Range Urban Corridor, Colo.: U. S. Geol. Survey Misc. Geol. Inv. Map I-855-D.

Maped by: Stephen D. Schowch

Date: June 30, 1974

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

SEVERANCE, COLO.



- 
- Figure 1 is a map of the United States showing the distribution of the 1000 most common plant species. The map is a 10x10 grid of squares, each representing a 1-degree latitude/longitude cell. The squares are shaded to indicate the presence of at least one of the 1000 species. The distribution is dense in the eastern half of the country and sparser in the western half. A legend in the top right corner indicates '1000 MOST COMMON' and '1000 MOST COMMON'.




 QUADRANGLE LOCATION  
 NON-RESOURCE OR WITHDRAWN AREA

Geology modified after Scott, G. R., 1969,  
U. S. Geological Survey Map I-597.

Mapped by: Phillip C. Wicklein  
 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. \_\_\_\_\_  
 Interstate Route  U.S. Route  State Route

SOUTHEAST PUEBLO, COLO.





SOUTHWEST PUEBLO QUADRANGLE  
COLORADO-PUEBLO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

SOUTHWEST PUEBLO QUADRANGLE  
COLORADO-PUEBLO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



- 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	Man-made deposits (e.g., collings, spoils...)

REPORT CLASSIFICATION

- 1 Gravel: relatively clean and some  
2 Gravel: significant fines, decomposed rock  
caliche carbonate.
- 3 Sand
- 4 Probable aggregate resource

#### MAP SYMBOLS

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
- <sub>1</sub> Buried well or drill-hole location with or without thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs
- "g" Indicates gravity "s" Indicates sand
- "s" is symbol, denotes unconsolidated or unknown property.
- "w" denotes Colorado Geological Survey Window/Sand and Gravel projects' drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

## STATION, LOCATION AND GEOLOGICAL

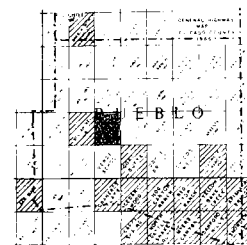
**DESCRIPTION OF PROPERTY**

- coordinate thickness (ft)
- perpendicular measures thickness (ft)
- percent sand and fines (passing #6 screen, 0.85 (in.), visual estimation)

- significant amount of fines (passing #200 screen, 0.0075 (in. or 0.274 mm.)
- significant amount of fines (passing #40 screen, 0.0475 (in. or 1.206 mm.)
- significant amount of fines (passing #60 screen, 0.25 (in. or 6.35 mm.)

\*in a general service unsaturated or without property.

\*in a general service property, about 0.0075 (in. or 0.274 mm.)



QUADRANGLE LOCATION

 NON-RESOURCE OR WITHDRAWN AREA

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

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

ROAD CLASSIFICATION

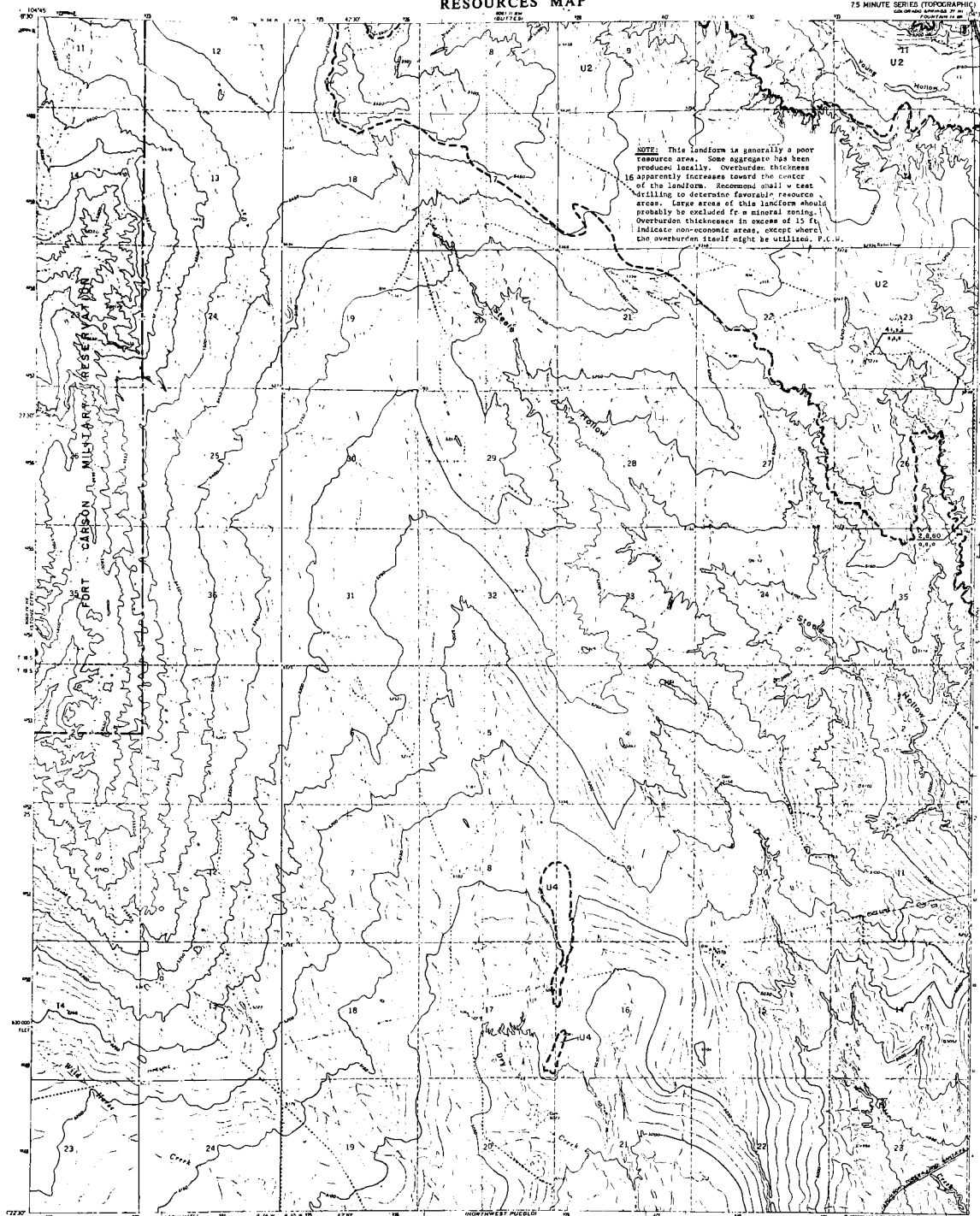
Heavy duty	————	Light duty
Medium duty	- - - - -	Unimproved dirt

 Interstate Route    U.S. Route    State Route

SOUTHWEST PUEBLO, COLO.

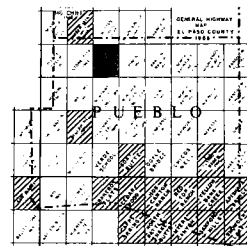
# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

STEELE HOLLOW QUADRANGLE  
COLORADO-PUEBLO CO  
75 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

- Landform unit**  
Resource classification
- LANDFORM UNIT**  
F Floodable deposit  
T Stream terrace deposit  
V Valley fill (F & T)  
U Upland deposits  
A Alluvial fan  
E Wind-deposited sand (and silt)  
M Hummock deposits (clay, silt, sand, gravel, etc.)
- RESOURCE CLASSIFICATION**  
**CLASS 1**  
(at least 100 ft. of sand, gravel, or silt)  
1 Gravel: relatively clean and well sorted  
2 Gravel: significant fines, decomposed rock, calcareous materials  
**CLASS 2**  
(greater than 100 ft. of sand, gravel, or silt)  
3 Sand  
4 Potential 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; "s" indicates sand  
"u" in symbol denotes unconsolidated or unknown property  
"s" in symbol denotes consolidated or known property  
"u" in symbol denotes gravel and/or sand  
"s" in symbol denotes sand and/or gravel  
Landform boundary, solid white lines or dashed, dashed shows approximate or inferred
- STATION LOCATION AND ORIENTATIONAL INFORMATION OF SYMBOLS**  
Symbol: thickness (ft.)  
Symbol: resource thickness (ft.)  
Symbol: sand and fines (passing #4 screen, 0.425 in., or 0.075 mm.)  
Symbol: gravel (passing #10 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #20 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #40 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #60 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #100 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #1000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #1200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #1400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #1600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #1800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #2000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #2200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #2400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #2600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #2800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #3000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #3200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #3400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #3600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #3800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #4000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #4200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #4400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #4600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #4800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #5000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #5200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #5400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #5600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #5800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #6000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #6200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #6400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #6600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #6800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #7000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #7200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #7400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #7600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #7800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #8000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #8200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #8400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #8600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #8800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #9000 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #9200 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #9400 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #9600 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #9800 screen, 0.850 in., or 0.149 mm.)  
Symbol: gravel (passing #10000 screen, 0.850 in., or 0.149 mm.)



QUADRANGLE LOCATION  
NON-RESOURCE OR WILDBURN AREA

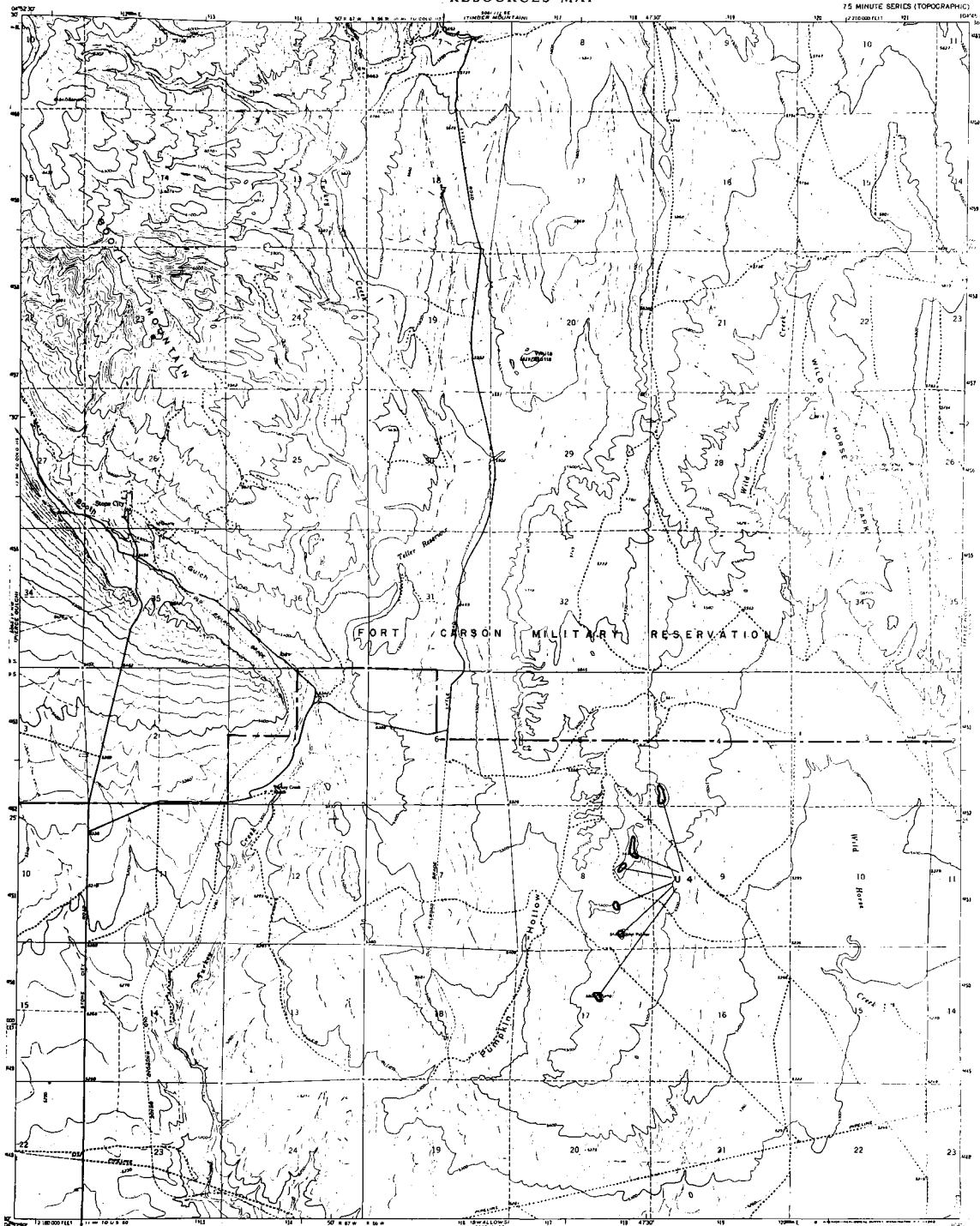
Mapped by: Phillip C. Wicklen  
Date: June 30, 1974

STEELE HOLLOW, COLO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

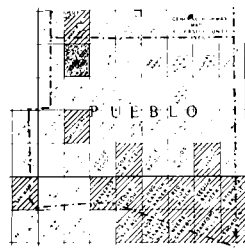
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. ROLD, DIRECTOR

STONE CITY QUADRANGLE  
COLORADO-PUEBLO CO  
75 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

- Land use unit  
Resource classification
- LEGEND**
- F Floodplain deposit  
T Tertiary terrace deposit  
V Valley fill (F & T)  
U Unconsolidated  
A Alluvial fan  
E Wind-deposited sand (eolian)  
M Man-made deposits (chemical, waste, etc.)
- RESOURCE CLASSIFICATION**
- GROUP 1: SAND**  
(at least 25% sand in 84 screen, visual estimation)  
1 Gravel: relatively clean and sand  
2 Gravel: significant fines, decomposed rock, calcium carbonate  
**GROUP 2: GRAVEL**  
(greater than 75% passing 84 screen, 60% retained on 200 screen, visual estimation)  
3 Sand  
**GROUP 3: PROBABLY AGGREGATE**  
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) and sand/gravel resource thickness (ft), obtained from well logs  
"v" indicates gravel; "s" indicates sand  
"u" in symbol denotes unconsolidated or unknown property  
"m" denotes man-made (chemical, waste, etc.)  
Watershed boundary, solid where known or inferred; dashed where approximate or inferred  
Landform boundary, solid where known or inferred; dashed where approximate or inferred
- STATION, LOCATION AND GEOLOGICAL DESCRIPTION OF SYMBOLS**
- sand/gravel thickness (ft)  
— sand/gravel resource thickness (ft)  
— gravel and sand fines (passing 84 screen, 2.00 in. or 0.075 mm.)  
— significant amount of decomposed or sand rock  
— significant amount of calcium carbonate (caliche)  
"u" in symbol denotes unconsolidated or unknown property  
"m" in symbol denotes man-made (chemical, waste, etc.)

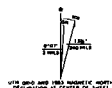


QUADRANGLE LOCATION

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 THAN 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

Landform unit  
Resource classification

### LANDFORM UNITS

- F Floodable deposit
- T Tertiary terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Wind-deposited sand (eolian)
- M Marine deposit (sand, silt, clay, etc.)

### RESOURCE CLASSIFICATION

- 1 Good aggregate resource (at least 100,000 cu yd. or 40 acres, visual estimation)
- 2 Good: relatively clean and sound
- 3 Good: significant fines, decomposed rock, calcareous materials
- 4 Fair aggregate resource (at least 100,000 cu yd. or 40 acres, 60% or more of material is sand, gravel, or crushed rock, visual estimation)
- 5 Poor 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 by a dashed line with a cross-hatch pattern; obtained from well logs, thickness (ft), or sand/gravel resource thickness (ft); obtained from well logs)
- "a" indicates gravel; "s" indicates sand
- "x" in symbol denotes unclassified or unknown property
- "u" indicates Colorado Geological Survey Unconformity and Gravel Project drill hole
- Landform boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND ORIGIN

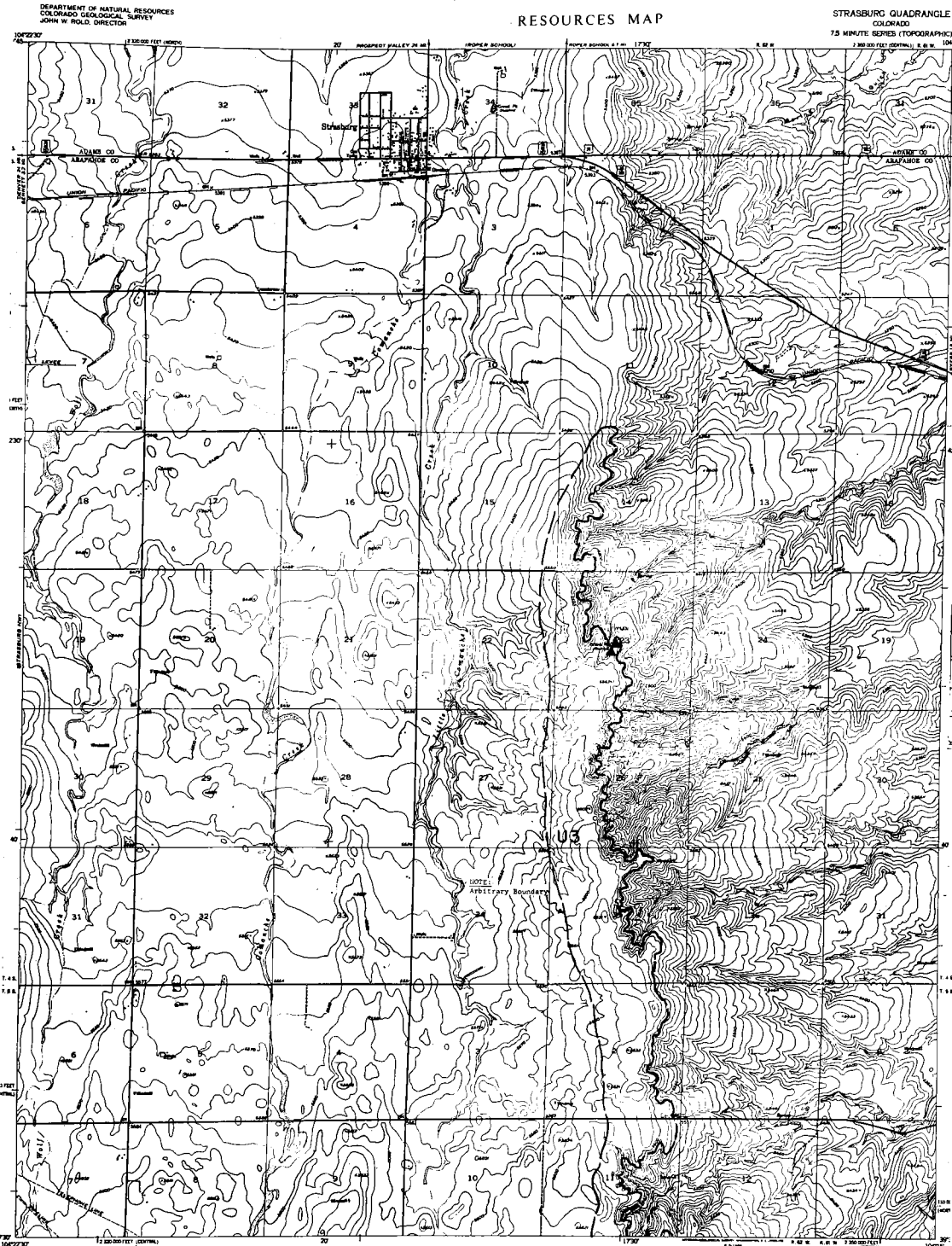
- Overburden thickness (ft)
- Underground resource thickness (ft)
- Percent sand and fines (percent of rock)
- Significant amount of fines (percent of rock)
- Significant amount of decomposed or weak rock
- Significant amount of calcareous materials
- "x" in symbol denotes unclassified or unknown property
- "u" in symbol denotes property owned by U.S. Geological Survey



QUADRANGLE LOCATION  
NON-RESOURCE OR  
WATERBORN AREA

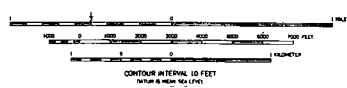
Reference:  
Shankle, S.A., 1971, The Skjoe Creek Damites and Reservoirs of Adams and Arapahoe Counties, Colorado: Colo. Sch. Mines, 66:1327.

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



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

APPROXIMATE  
DECLINATION, 1955



QUADRANGLE LOCATION

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

STRASBURG, COLO.  
H6327 5--W10415/7.5

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

STRASBURG NW QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

### LEGEND

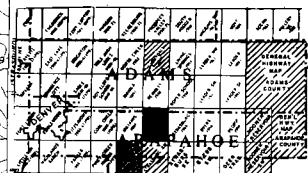
- F Floodable deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposits
- A Alluvial fan
- E Well-sorted sand (volcanic)
- M Man-made deposits (landfills, spoil, etc.)

### RESOURCE CLASSIFICATION

- Gravel Analysis**  
For first 200 feet below surface or to 100 feet, whichever is less.
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcareous
  - 3 Sand
  - 4 Unavailable Resource
  - 5 Probable aggregate resource

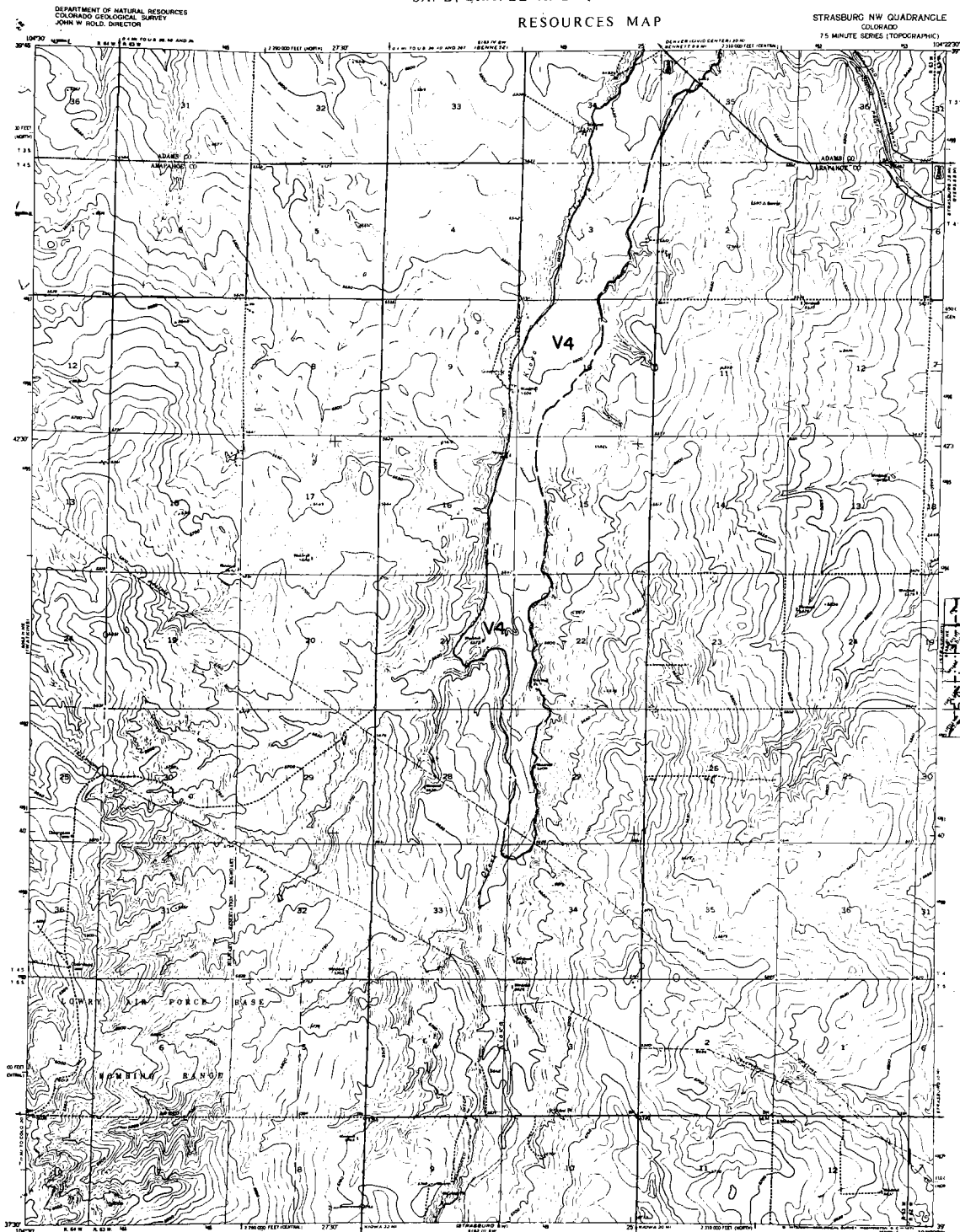
### MAP SYMBOLS

- Operating gravel and/or sand pit
  - Abandoned gravel and/or sand pit
  - Operating stone quarry
  - Abandoned stone quarry
  - Potential quarry aggregate resource area
  - Isolated well or drill-hole location with overburden thickness (ft) over sand/gravel resource thickness (ft) obtained from well logs.
  - "s" indicates gravel "s" indicates sand
  - "u" in symbol denotes unutilized or unknown property.
  - "W" denotes Colorado Geological Survey Water/Sand and Gravel project area.
  - Landform boundary, solid where known or observed, dashed where approximate or inferred.
- STATION, LOCATION AND GEOLOGICAL CHARACTERISTICS OF AGGREGATE**
- overburden thickness (ft)
  - sand/gravel resource thickness (ft)
  - present sand and fines (percentage of primary, 0 to 100, total estimation)
  - significant amount of fines (percentage, 100, 50, 25, or 0-25 %)
  - significant amount of decomposed or weak rock
  - significant amount of inclusion nonmetallic material
  - "u" in symbol denotes unutilized or unknown property.
  - "s" in symbol denotes property absent or insignificant

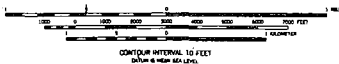
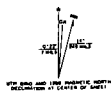


- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

Map by: Phillip C. Wickham  
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
  - U.S. Route
  - State Route

STRASBURG NW, COLO.  
R3937-1-10000-5/7.5  
1965  
ANS 4162 10 NW-SERIES 1977

# SAND, GRAVEL AND QUARRY AGGREGATE

## RESOURCES MAP

STRASBURG SE QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

## EXPLANATION

Feature classification

- LANDFORM CODES**
- 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, etc.)

### RESOURCE CLASSIFICATION

- Gravel (sandstone)**  
1. Drawn: relatively clean and sound  
2. Drawn: significant fines, decomposed rock, fractious materials
- Gravel (granite)**  
1. Drawn: relatively clean and sound  
2. Drawn: significant fines, decomposed rock, fractious materials
- Sand**

### UNCLASSIFIED RESOURCES

1. Probable aggregate resource

### NOTES

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Potential quarry aggregate resource area
- Selected well or drill-hole location with upper horizon thickness (ft) over sand/gravel resource thickness (ft); shaded area will show "x" indicates gravel; "s" indicates sand
- "x" in symbol denotes unclassified or unknown property
- "m" denotes Colorado Geological Survey "Mineral/Quarry and Gravel Projects" drill hole
- Land-use boundary, solid where known or observed; dashed where approximate or inferred

### SYMBOLS, LOCATION AND GEOLOGICAL DESCRIPTION BY SYMBOL

- contour thickness (ft)
- hand-drawn resource thickness (ft)
- percent sand and fines (percent of screen, 0.075 mm, or 0.075 mm)
- significant amount of fines (passing 100 screen, 0.075 mm, or 0.075 mm)
- significant amount of decomposed or weak rock
- significant amount of solution approximate (indicate "x" in symbol denotes unclassified or unknown property)
- "x" in symbol denotes unclassified or unknown property
- or light/dark

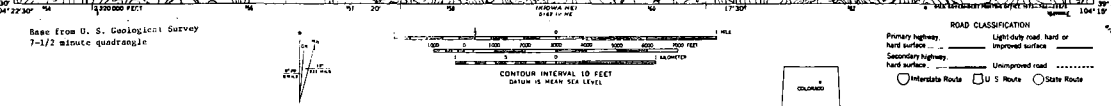
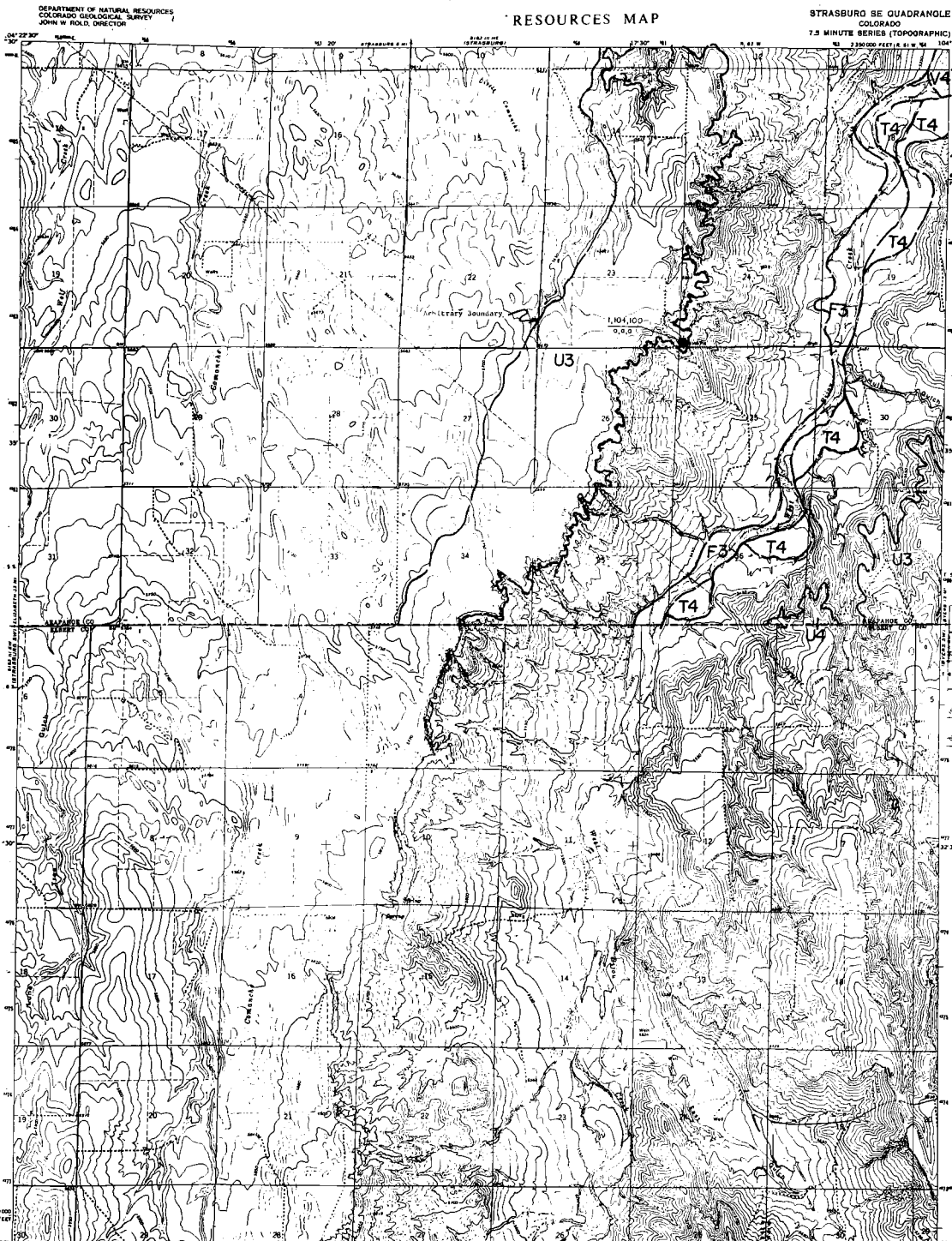


QUADRANGLE LOCATION

NON-RESOURCE OR VETERAN AREA

**Reference:**  
Shadwin, S.A., 1971, The Big Horn Creek Damages and Reservoirs of Adams and Arapahoe Counties, Colorado: Colo. 5th. Mines ER-1327.

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



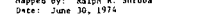
### ROAD CLASSIFICATION

- Primary highway: hard surface, light-duty road, hard or improved surface
- Secondary highway: hard surface, unpaved road
- Interstate Route: U.S. Route: State Route

STRASBURG SE, COLO.  
87930-110415/7.5

1969  
AGE 1:10,000 7.5-MINUTE SERIES 1971





SWALLOWS, COLO

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

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

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



## EXPLANATION

### LEGEND

- F Fluvial deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Unfilled deposit
- A Alluvial fan
- W Wind-deposited sand (aeolian)
- M Man-made deposits (slag, tailings, spoils, ...)

### RESOURCE CLASSIFICATION

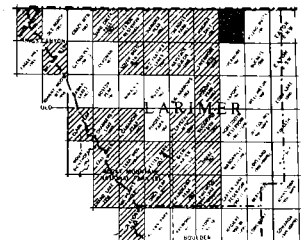
- 1 Gravel: relatively clean and sound
- 2 Gravel: significant fines, decomposed rock, calcine tailings
- 3 Sand
- 4 Probable aggregate resource

### 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.), obtained from well logs
- "g" indicates gravel; "s" indicates sand
- "u" symbol denotes unconsolidated or unknown property
- "d" denotes Colorado Geological Survey boundary (land and forest property)
- "b" symbol denotes boundary, solid where known or observed, dashed where approximate or inferred

### STATION, LOCATION AND ORIENTAL

- Northward distance (ft.)
- Eastward distance (ft.)
- Permanent road and first spacing of corners, 5 to 10 ft., shown
- Significant amount of fines (spacing 800 ft., 0.05 ft. or 0.02 ft.)
- Significant amount of decomposed or weak rock
- Significant amount of siliceous sandstone (calcine)
- "u" or symbol denotes unconsolidated or unknown property
- "d" or symbol denotes property absent or unimportant



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

### REFERENCE

- Loupy, H.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.
- Morse, F.L., 1959, Geomorphic evolution of the east flank of the Larimer Range, Colorado and Wyoming, Div. Wyoming Geol. Ph.D. Thesis, pl. 4.
- Denson, H.N., 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 1805-L, pl. 1.

Map by: Stephen D. Shwachow  
Date: June 30, 1974

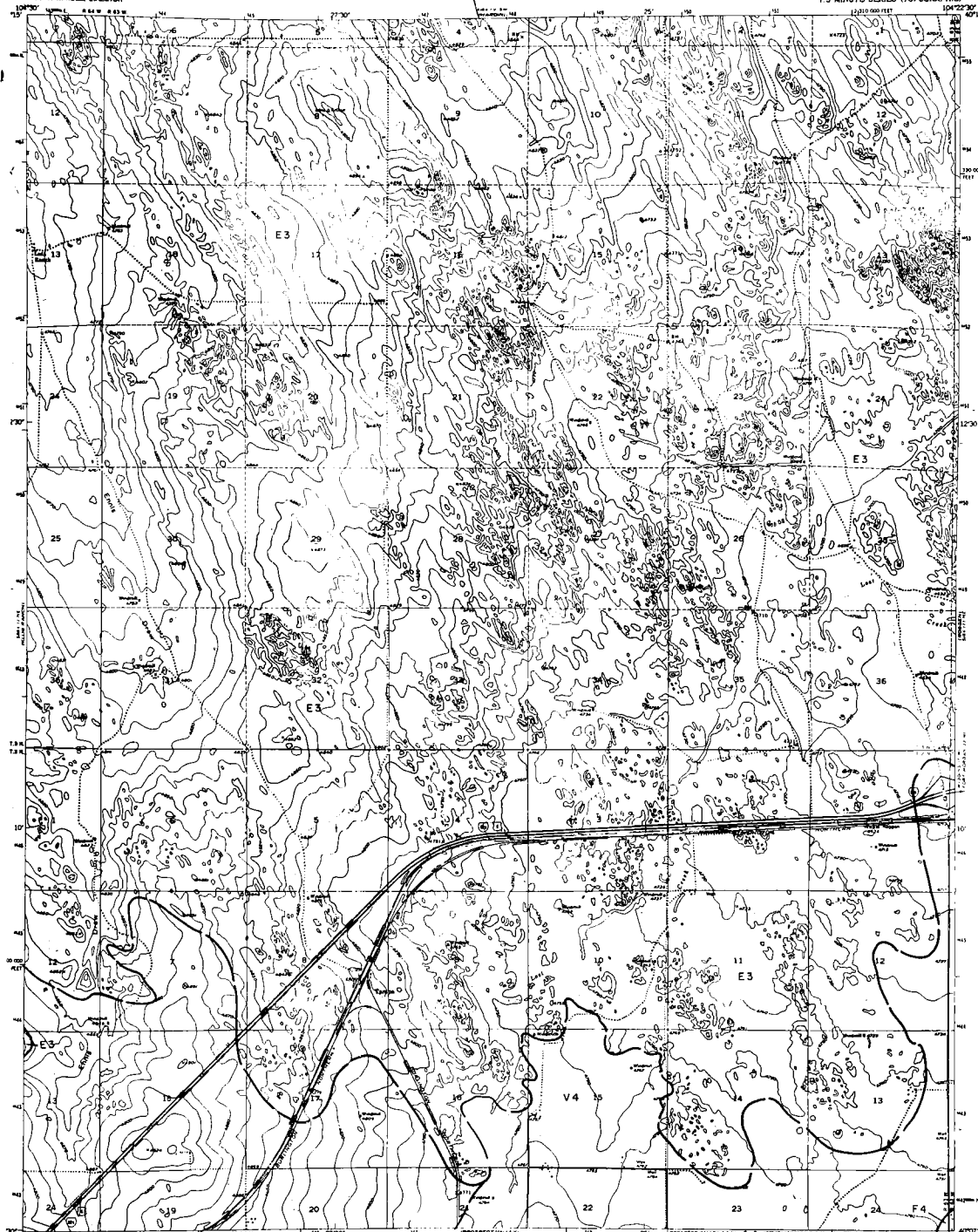
ROAD CLASSIFICATION  
Lightly Unimproved det.

TABLE MOUNTAIN, COLO.-WYO.

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

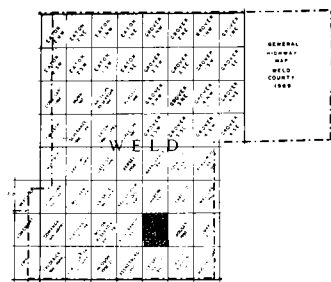
TAMPA QUADRANGLE  
COLORADO-WELD CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

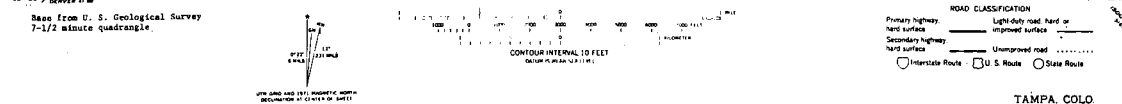
- Landform units**  
Landform classification
- LANDFORM UNITS**
- F Floodplain deposit
  - T Stream terrace deposit
  - V Valley fill (F & T)
  - U Unsorted deposit
  - A Alluvial fan
  - E Wind-deposited sand (eolian)
  - M Non-mine deposit (slag, tailings, waste, etc.)
- RESOURCE CLASSIFICATION**
- Gravel (alluvial)**  
1. Gravel: relatively clean and round  
2. Gravel: significant fines, decomposed rock (matrix carbonate)  
3. Sand  
4. Probable aggregate resource
- Map symbols**
- Quarrying gravel under sand pit
  - Abandoned gravel under sand pit
  - Quarrying 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
  - "s" indicates gravel; "m" indicates sand
  - "s" in symbol denotes unutilized or unknown property
  - "m" denotes Colorado Geological Survey water/sand and gravel prospects
  - Drill hole
  - Landform boundary, solid where known or dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATIONAL INFORMATION OF REPORT**
- contour interval (ft)
  - percent sand and fines (percent to bottom, 0-100%) (small sediment)
  - significant amount of fines (percent 100 percent, 0.001 to 0.075 mm)
  - significant amount of decomposed or weak rock
  - significant amount of carbon carbonate (calcite)
  - "s" in symbol denotes unutilized or unknown property
  - "m" in symbol denotes property, absent or uncertain



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 Hardie, Colorado, and Paxton, Nebraska; U. S. Geol. Survey Water-Supply Paper 1378, p. 1.

Map by: Phillip C. Wicklen  
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

TAMPA, COLO.

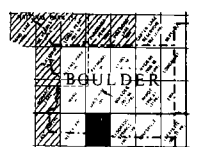


# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

COLORADO  
TUNGSTEN QUADRANGLE  
7 1/2-MINUTE SERIES  
FPM 501 (1-10-72)

## EXPLANATION

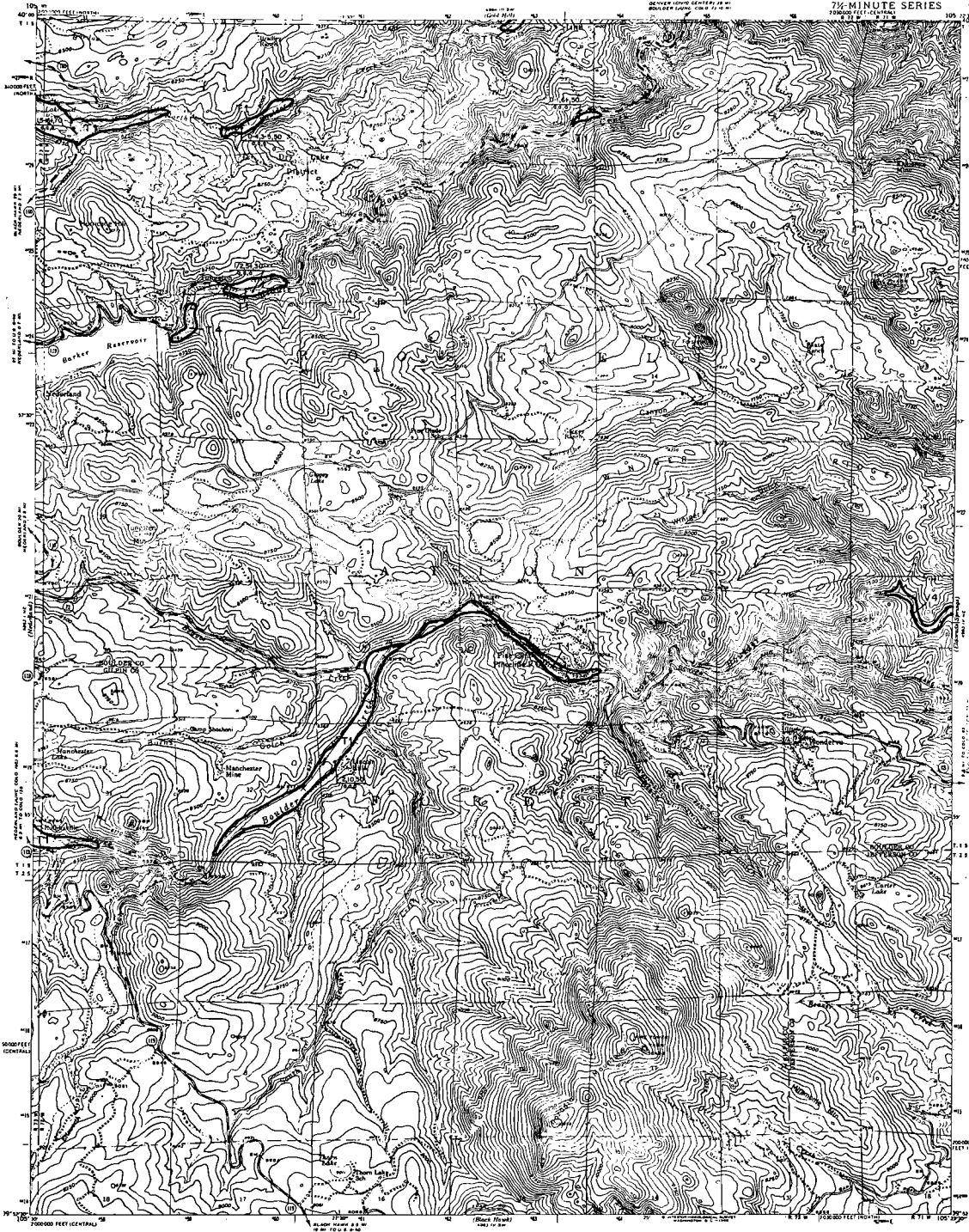
- Landform unit**  
Landform classification
- LANDFORM UNITS**
- P Floodplain deposit
  - T Tertiary terrace deposit
  - V Valley fill (P & T)
  - U Upland deposit
  - A Alluvial fan
  - E Erosional deposit (alluvium)
  - M Man-made deposits (slag, tailings, waste, etc.)
- VEGETATION CLASSIFICATION**
- 1 Open forest
  - 2 Closed forest
  - 3 Shrub
  - 4 Grass
  - 5 Bare
- ROAD CLASSIFICATION**
- 1 Major highway
  - 2 Minor highway
  - 3 Local road
  - 4 Unimproved road
  - 5 Footpath
- STATION, LOCATION AND GEOLOGICAL INFORMATION**
- 1 Station
  - 2 Location
  - 3 Geological information



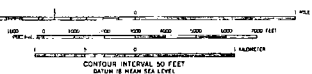
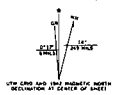
**QUADRANGLE LOCATION**  
NON-RESOURCE OR WITHDRAWN AREA

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

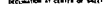


ROAD CLASSIFICATION  
Major road  
Minor road  
Unimproved road  
Footpath

TUNGSTEN, COLO.

VALLEY VIEW SCHOOL QUADRANGLE  
COLORADO-WELD CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)

**ACKNOWLEDGMENTS**



HARD-SURFACE ALL WEATHER ROADS DM

Medium-duty — —  $\frac{1}{2}$  in.  $\frac{1}{2}$  in. Unimproved dirt road.

U.S. Route      State Route

## F. How

## Course

1    Gravel relatively clean and round

Revised Source

-  Operating stone quarry

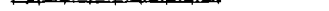
 Peters

0123456789101112131415161718192021222324252627282930313233343536373839404142434445464748495051525354555657585960616263646566676869707172737475767778798081828384858687888990919293949596979899100

3, 12, 40

significant amount of demand to reach a

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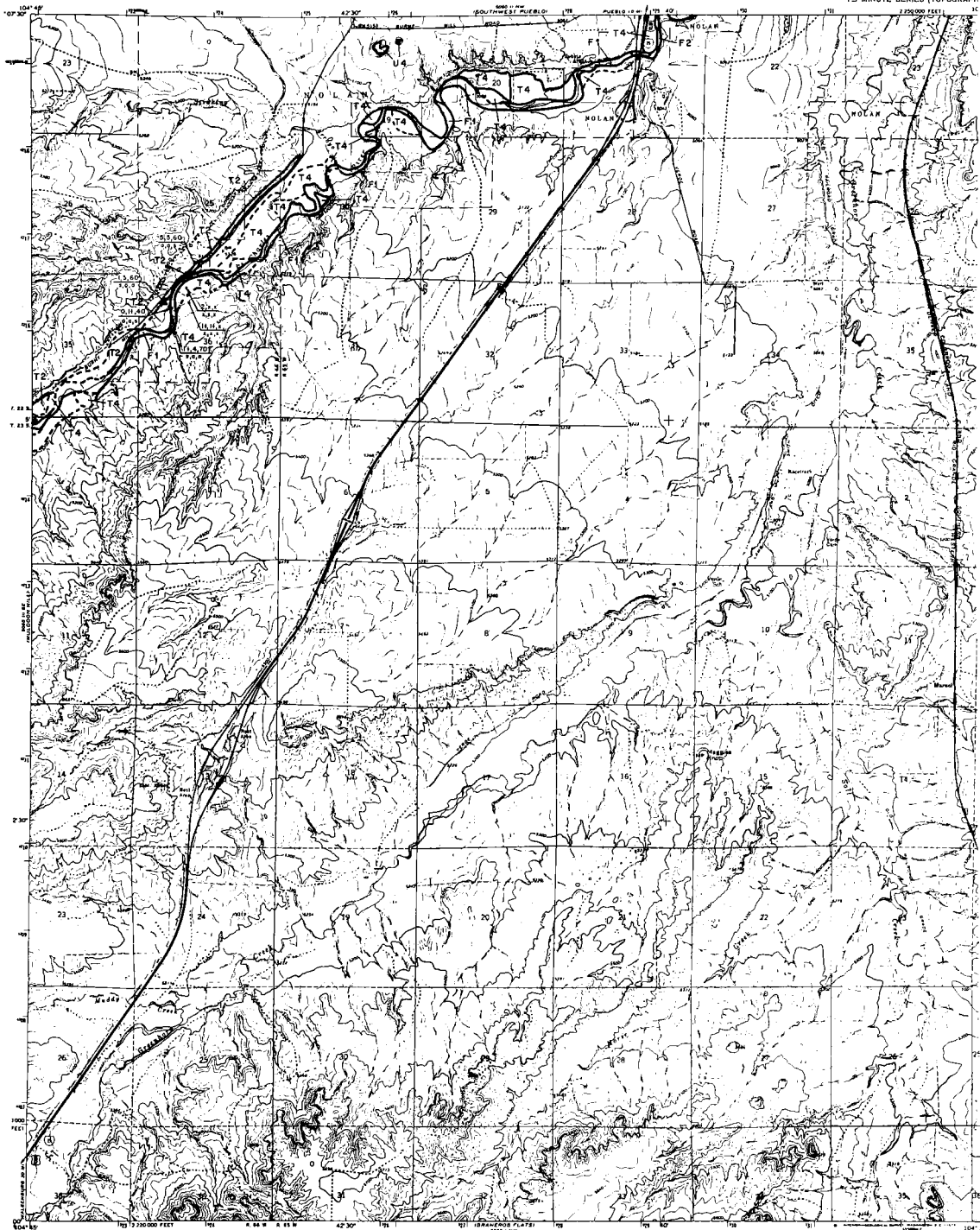
**Figure 1**

22



# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

VERDE SCHOOL QUADRANGLE  
COLORADO-PUEBLO CO.  
7.5 MINUTE SERIES (TOPOGRAPH)



## EXPLANATION

Land use with  
new class function

### LAND USE

- P Plateau deposit
- T Stream terrace deposit
- V Valley fill (F & T)
- U Upland deposit
- A Alluvial fan
- E Eolian deposit (sand dunes)
- M Man-made deposit (slag, tailings, etc.)

### RESOURCE CLASSIFICATION

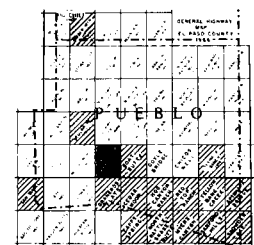
- 1 Gravel: relatively clean and sound
- 2 Gravel: silty/clayey, decomposed rock, cobbles common
- 3 Sand
- 4 Probable aggregate resource

### 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 and gravel resource thickness (ft). Shaded from well log.
- "g" indicates gravel; "s" indicates sand
- "u" in symbol denotes unutilized or unknown property
- "wt" denotes Colorado Geological Survey Window/Beam and Core project drill hole
- Landform boundary, solid where known or dashed where approximate or inferred

### STATION LOCATION AND GEOLOGICAL DESCRIPTION OF DEPOSIT

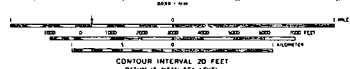
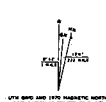
- Overburden thickness (ft)
- Unutilized resource thickness (ft)
- Percent sand and fines (excluding 40 screens, 0.25 in. or finer) saturation
- Significant amount of fines (loading 500 screen, 0.075 in. or finer)
- Significant amount of decomposed or weak rock
- Significant amount of sulfide carbonate (include)
- "u" in symbol denotes unutilized or unknown property
- "wt" in symbol denotes property owned or leased by



QUADRANGLE LOCATION

NON-RESOURCE OR WITHDRAWN AREA

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



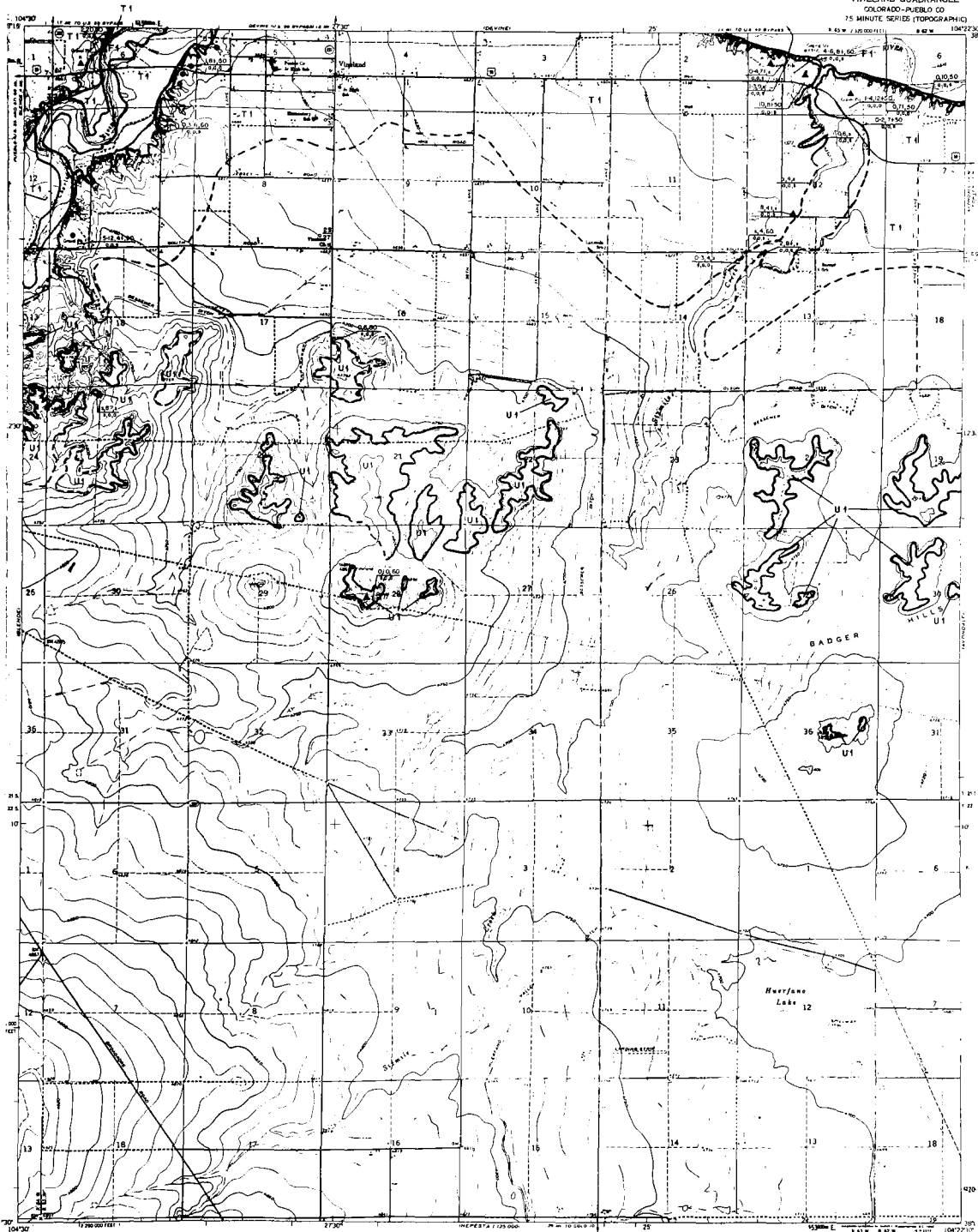
- Primary highway: Light-duty road, hard or hard surface
- Secondary highway: Unimproved road, hard surface
- Interstate Route: U.S. Route
- State Route

VERDE SCHOOL, COLO.

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

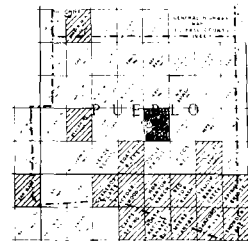
DEPARTMENT OF NATURAL RESOURCES  
COLORADO GEOLOGICAL SURVEY  
JOHN W. ROLD, DIRECTOR

VINELAND QUADRANGLE  
COLORADO-PUEBLO CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



- Landform writ.
- Resource classification

- [illegible]



QUADRANGLE LOCATION

NON-RESOURCE OR  
WITHDRAWN AREA

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

\_\_\_\_\_ Light duty \_\_\_\_\_

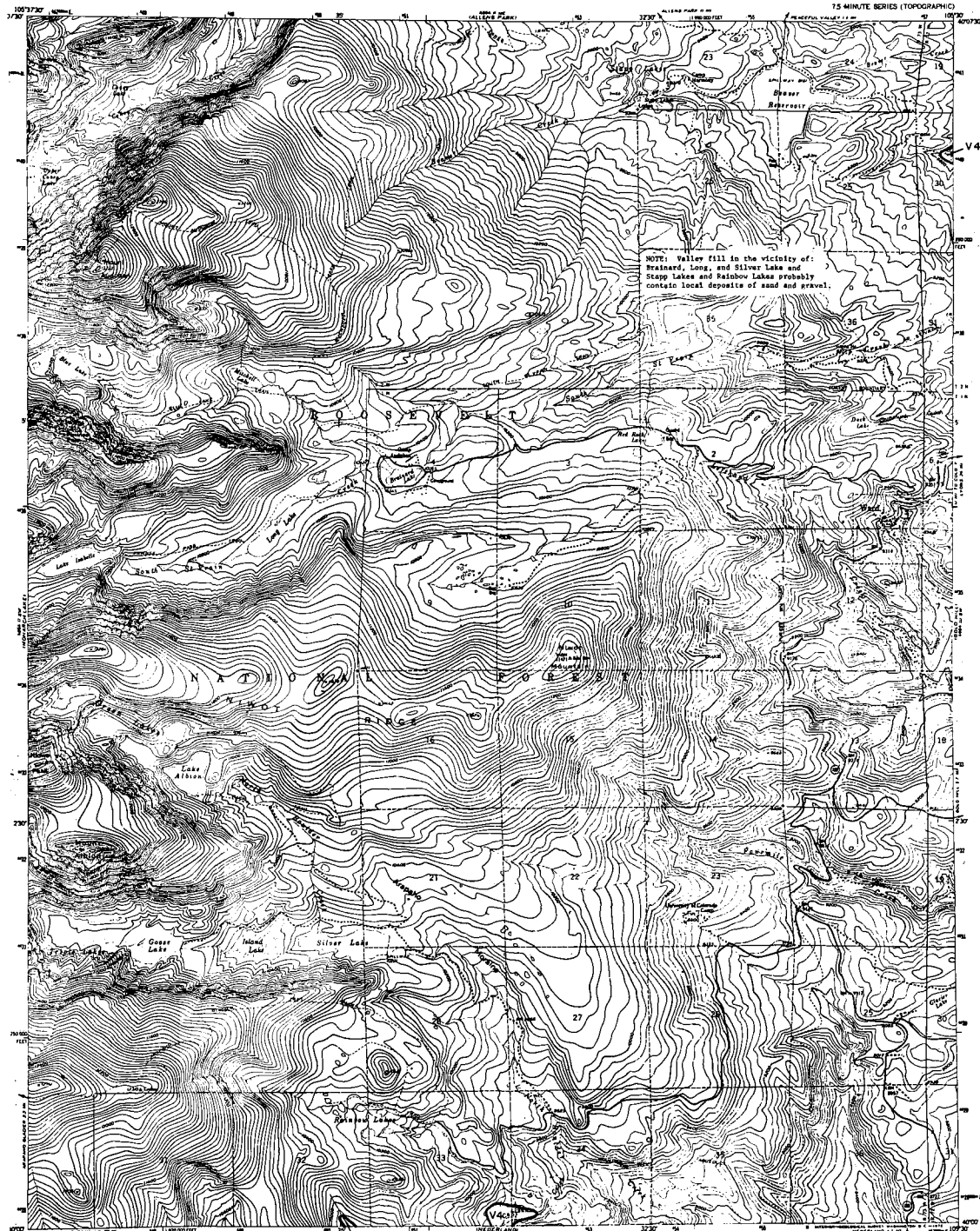
\_\_\_\_\_ Unimproved dirt \_\_\_\_\_

U.S. Route      State Route

VINELAND, COLO

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

WARD QUADRANGLE  
COLORADO-Boulder CO  
5 MINUTE SERIES (TOPOGRAPHIC)



- Landform unit
- Resource classification

**LASTNAME, FIRST**

- FORM 5111**
- |   |   |
|---|---|
| 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<br>(dams, tailpipes, spoils,....) |

RESOURCE CLASSIFICATION

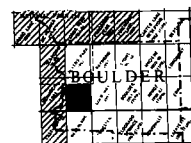
- Core Description
- Core Aspects  
(at least 40% retained on #4 screen, visual estimation)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcium carbonate.
- Fine Aspects  
(greater than 75% passing #4 screen, 40% retained on #20 screen, visual estimation)
- 3 Sand
  - 4 Probable aggregate sources

#### MAP STRING-1

- Operating gravel and/or sand pit
- Abandoned gravel and/or sand pit
- Operating stone quarry
- Abandoned stone quarry
- Potential quarry aggregate resource uses
- 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
- "i" to symbol denotes unmineralized or unknown projects
- "us" denotes Colorado Geological Survey Window/land and Gravel projects
- drill hole
- Landform boundary, soil where known or observed; dashed where approximate or inferred

## STATION, LOCATION AND GEOLOGICAL

- conclusion of experiment**
- 
- omebarden thickbase (f)  
 acid/gravel resources thickbase (f)  
 percent sand and fines (passing #4 screen, 0.25 in.)  
 visual estimation  
 significant amount of decomposed or weak rock  
 significant amount of calcareous omebarden (fossiliferous)
- \* in symbol denotes unmineralized or unknown property  
 \* in symbol denotes property absent

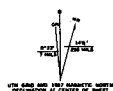


**QUADRANTILE LOCATION**

 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



CONTOUR INTERVAL 40 FEET

#### ROAD CLASSIFICATION

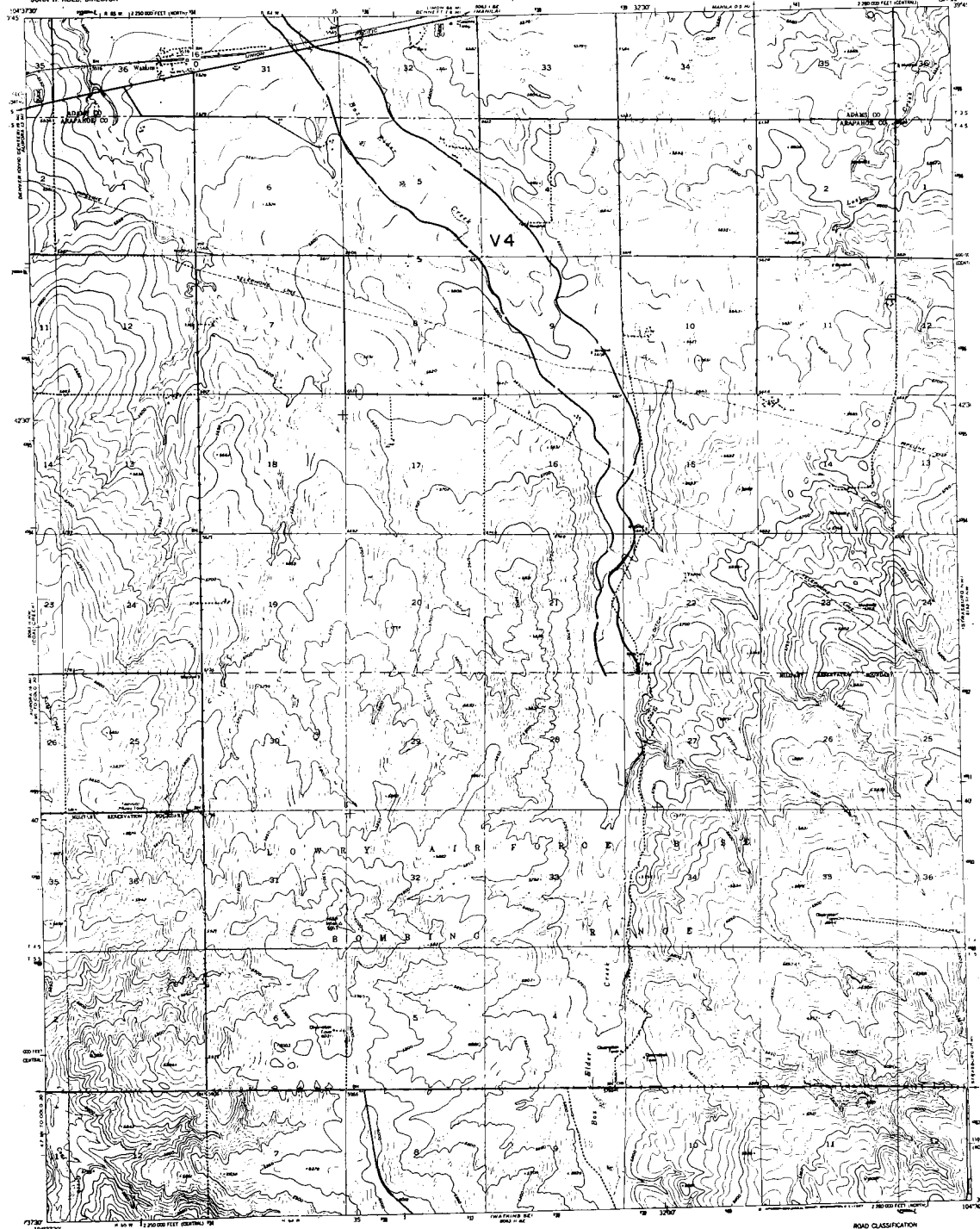
.....

WARD, COLO

WATKINS QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
2 780 000 FILE 1 (CENTRAL) 11

{
   
 - Wendy: 0000 0000 0000 0000
   
 - Reg: 0000 0000 0000 0000
   
 }

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



LAKSHON 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 (concrete, asphalt, etc...)

RESOURCE CLASSIFICATION

Coarse Aggregate  
not least 20% retained "in 48 screen,  
visual examination"

1 Gravel: relatively clean and sound

2 Gravel: significant fines, decomposed rock  
calcium carbonate.

Fine Aggregate  
finer than 75 passing 48 screen, 100%  
aggregate than 75 passing 48 screen, 100%  
passing 48 screen, 100% passing 48 screen, 100%

4 Probable aggregate exposure

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:

- "a" indicates gravel; "b" indicates sand
- "x" in symbol denotes unclassified or unknown property.
- "m" denotes Colorado Geological Survey Mineral Land and Gravel projects

drill hole

Landform boundary, solid where known or observed, dashed where approximated or inferred

STATION, LOCATION AND GEOLOGICAL

[illegible]

QUADRANGLE LOCATION

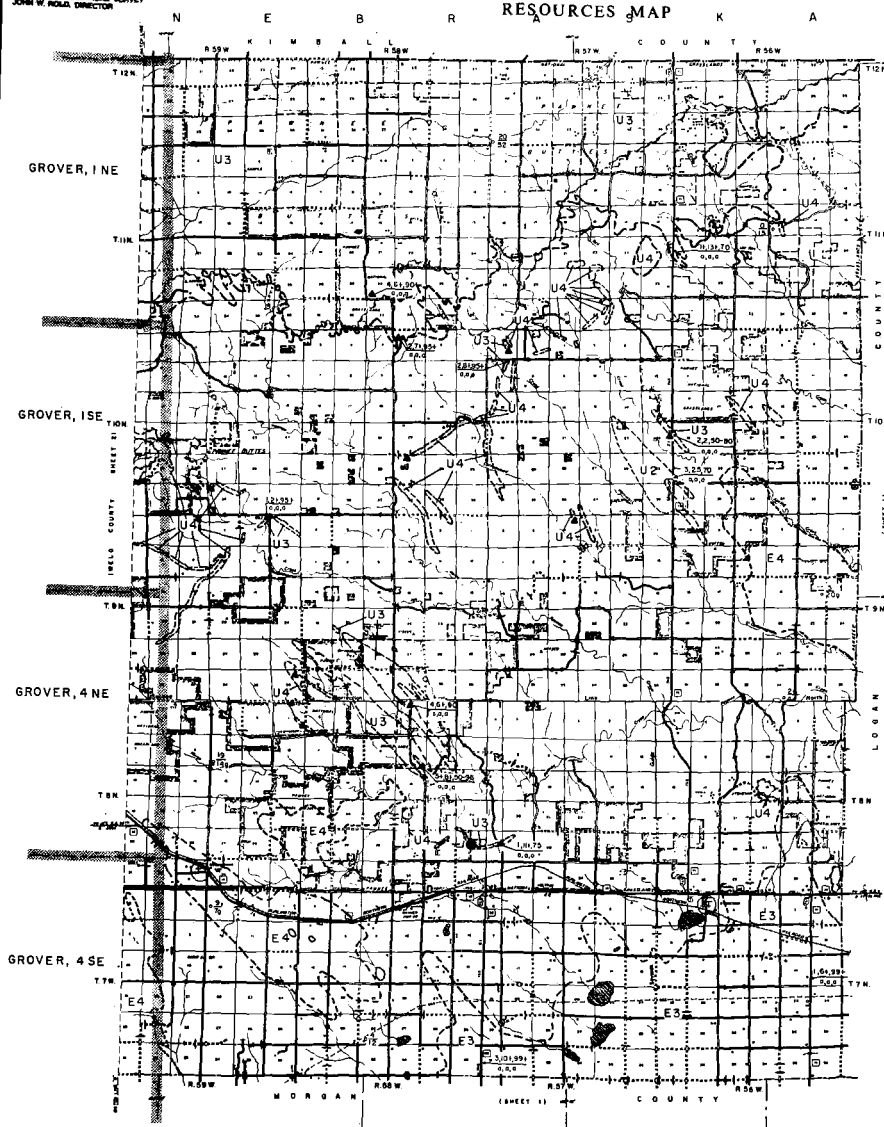
NON-RESOURCE OR  
EXCLUDED AREA

App'd by: Phillip C. Wicklein  
Date: June 30, 1974

WATKINS, COLO.  
KJ9375-W10430/75  
1954

AND 2063 2 RESEARCH VETS

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP



## EXPLANATION

- Legend**
- Landform units**  
Random classification
- Landform units**  
F Fluvial deposit  
T Tectonic deposit  
V Valley fill (F & T)  
U Unconsolidated  
A Alluvial fan  
E Eolian deposit  
M Man-made deposits (e.g., fill, spoil, etc.)
- Resource classification**  
1 Gravel: relatively close and sand  
2 Gravel: relatively close and sand  
3 Sand  
4 Potentially aggregate resource
- Map symbols**  
A Abandoned gravel and sand pit  
B Abandoned stone quarry  
C Abandoned stone quarry  
D Potential quarry aggregate resource area  
E Selected well or drill-hole location with over-  
burden thickness (ft) and gravel/sand resource  
thickness (ft), obtained from well logs.  
F "X" indicates gravel/sand resource area  
G "X" in symbol denotes unclassified or  
unknown property  
H "X" in symbol denotes geological survey  
boundary and gravel/sand resource  
area  
I "X" in symbol denotes gravel/sand resource  
area, shaded where appropriate or  
labeled
- Notation, location and geological  
classification of deposit**  
J Significant thickness (ft)  
K Significant thickness (ft)  
L Significant thickness (ft)  
M Significant thickness (ft)  
N Significant thickness (ft)  
O Significant thickness (ft)  
P Significant thickness (ft)  
Q Significant thickness (ft)  
R Significant thickness (ft)  
S Significant thickness (ft)  
T Significant thickness (ft)  
U Significant thickness (ft)  
V Significant thickness (ft)  
W Significant thickness (ft)  
X Significant thickness (ft)  
Y Significant thickness (ft)  
Z Significant thickness (ft)



- Quadrangle location**  
Non-resource or  
withdrawn area

## REFERENCE

- Wells, M. 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  
1600-L, p.11.  
Damon, H.H., 1974, personal communication.

Map by: Ralph R. Shrode  
Date: June 30, 1974

## GENERAL HIGHWAY MAP WELD COUNTY COLORADO

STATE DEPARTMENT OF HIGHWAYS  
DIVISION OF HIGHWAY CONSTRUCTION  
PLANNING AND DESIGN SECTION  
U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AID TO HIGHWAYS

1969

WELD COUNTY, COLORADO

WELD COUNTY, COLORADO

WELD COUNTY, COLORADO

WELD COUNTY, COLORADO

WELD COUNTY, COLORADO

WELD COUNTY, COLORADO

WELD COUNTY, COLORADO

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WELD COUNTY, COLORADO

WELD COUNTY, COLORADO

WELD COUNTY, COLORADO

WELLINGTON QUADRANGLE  
COLORADO-LARIMER CO  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
NE 1/4 FORT COLLINS 15 QUADRANGLE

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



- Landform unit
- Resource classification

## LANDFILL FEES

- |   |  |
|---|--|
| 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**

- Aggregates (continued)
- Coarse Aggregate  
(at least 25% retained on # 4 screen, visual estimation)
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcine carbonate.
- Fine Aggregate  
(greater than 75% passing # 4 screen, 80% retained on # 20 screen, visual estimation)
- 1 Sand

- 4 / Probable aggregate resource

## MAP SYMBOLS

- new ribbon
- 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-bore thickness (ft): over sand/gravel resource
- ch, thickness (ft), above from drill logs
- "s" indicates gravel; "a" indicates sand
- "-" in symbol denotes unmineralized or unknown property.
- "us" denotes Colorado Geological Survey Window/Hand and Gravel projects
- drill hole
- landform boundary, solid if known or observed, dashed where approximate or inferred.

## STATION, LOCATION AND GEOLOGICAL

- classification of objects**
- overbush thickness (fl)  
underbush thickness (fl)  
percent sand and fines (passing #4 screen, 0.85 in.), actual saturation
- 1 2 3 4
- \* significant amount of fines (passing #100 screen, 0.150 in. or 0.075 in.)  
\* significant amount of decomposed or weak rock  
\* significant amounts of calcareous overburden (limestone)  
\* in symbol denotes unsaturated or unknown property  
\* in symbol denotes property absent or insignificant

 QUADRANGLE LOCATION NON-RESOURCE OR  
WITHDRAWN AREA

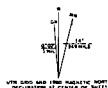
#### REFERENCE:

REFERENCE:  
Berahey, 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.

Sumn, F. H., III, 1972, Map of surficial geology of part of the Wellington quadrangle: Reconnaissance mapping for Colorado Coal Survey Windsor Environmental Geology Project, open-file map.

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

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



CONTOUR MAP OF THE pCMVcat CONSTRUCT

DNA SIZE (bp) 1000 500 250 100 50 20 10 5 3 1

ROAD CLASSIFICATION

Heavy duty	_____	Light duty	_____
Medium duty	_____	Unimproved dirt	_____

U.S. Route      State Route

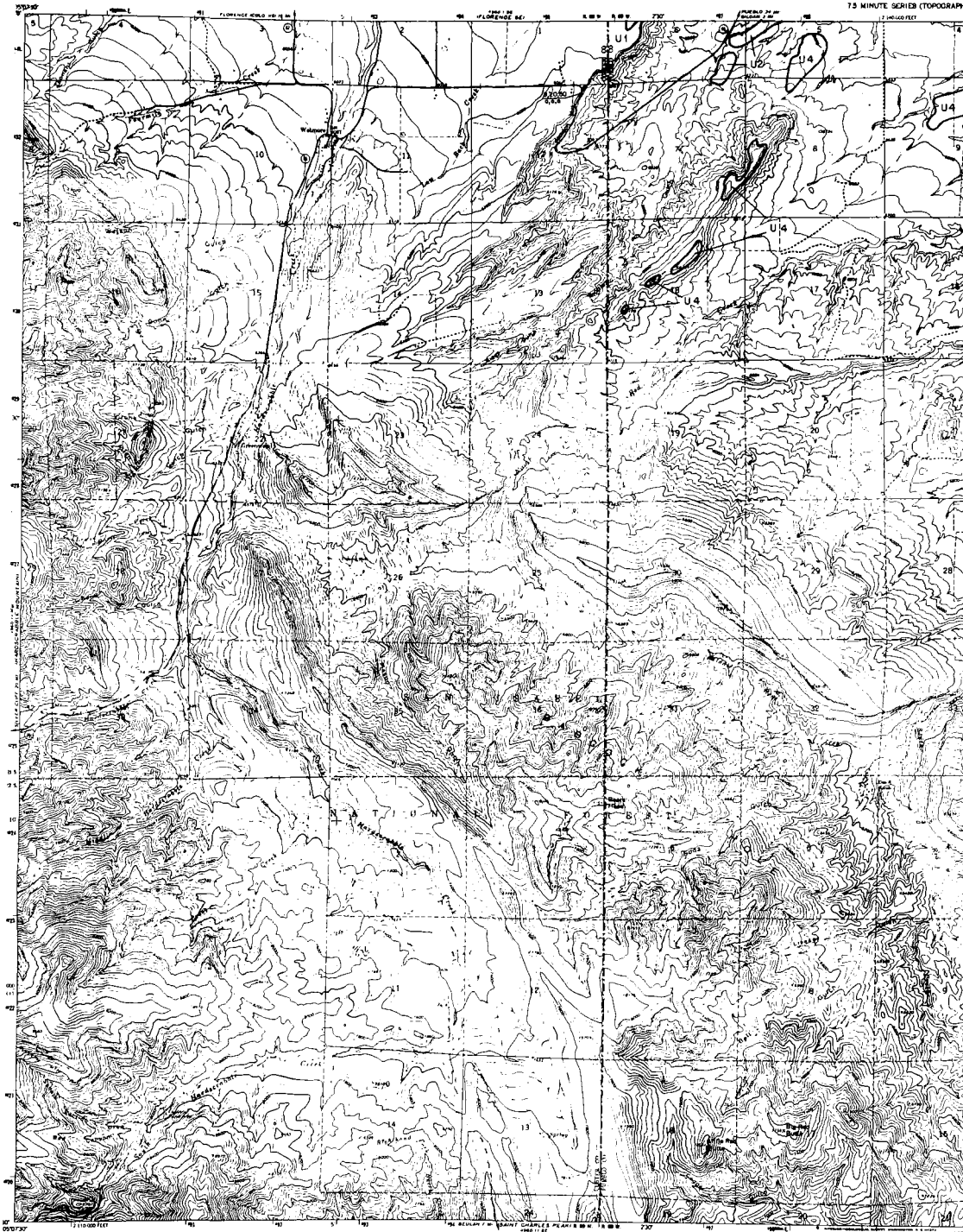
WELLINGTON, COLO.





# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

WETMORE QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)



## EXPLANATION

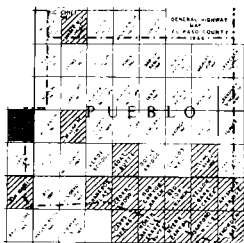
Landform unit  
Resource classification

**LANDFORM UNITS**  
P Fluvial deposit  
T Trench terrace deposit  
V Valley fill (P & T)  
U Upland deposits  
A Alluvial fan  
E Eolian-deposited sand (alluvial)  
M Marine-deposited (slag, tailings, syrite...)

**RESOURCE CLASSIFICATION**  
Group 1: gravel  
Group 2: sand  
Group 3: sand and gravel  
Group 4: sand, gravel, and quarry 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  
Selected well or drill-hole location with associated thickness (ft) over sand/gravel resource thickness (ft), obtained from well logs  
"u" indicates gravel; "s" indicates sand  
"u" is symbol denoting unconsolidated or unknown property  
"m" denotes Colorado Geological Survey "underground and ground" evidence  
drill hole  
Landform boundary, solid where known or observed; dashed where approximate or inferred

**LOCATION, LOCATION AND ORIENTATION**  
LOCATION OF AREA  
overburden thickness (ft)  
sand/gravel resource thickness (ft)  
current sand and gravel (ft)  
average, 2.5 ft (s), gravel section  
significant amount of fines (greater than 200 mesh, 0.075 in. or 0.075 mm.)  
significant amount of decomposed or weak rock  
significant amount of solution carbonate (calcite)  
"u" is symbol denoting unconsolidated or unknown property  
"m" is symbol denoting property absent or untested/known

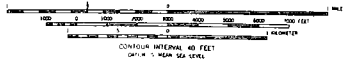


QUADRANGLE LOCATION  
NON-RESOURCE OR WETDRAM AREA

Geology modified after Taylor, R. S., and Stock, R. S., 1973, U. S. Geological Survey Map MF-548.

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

Base from U. S. Geological Survey  
7.5 minute quadrangle



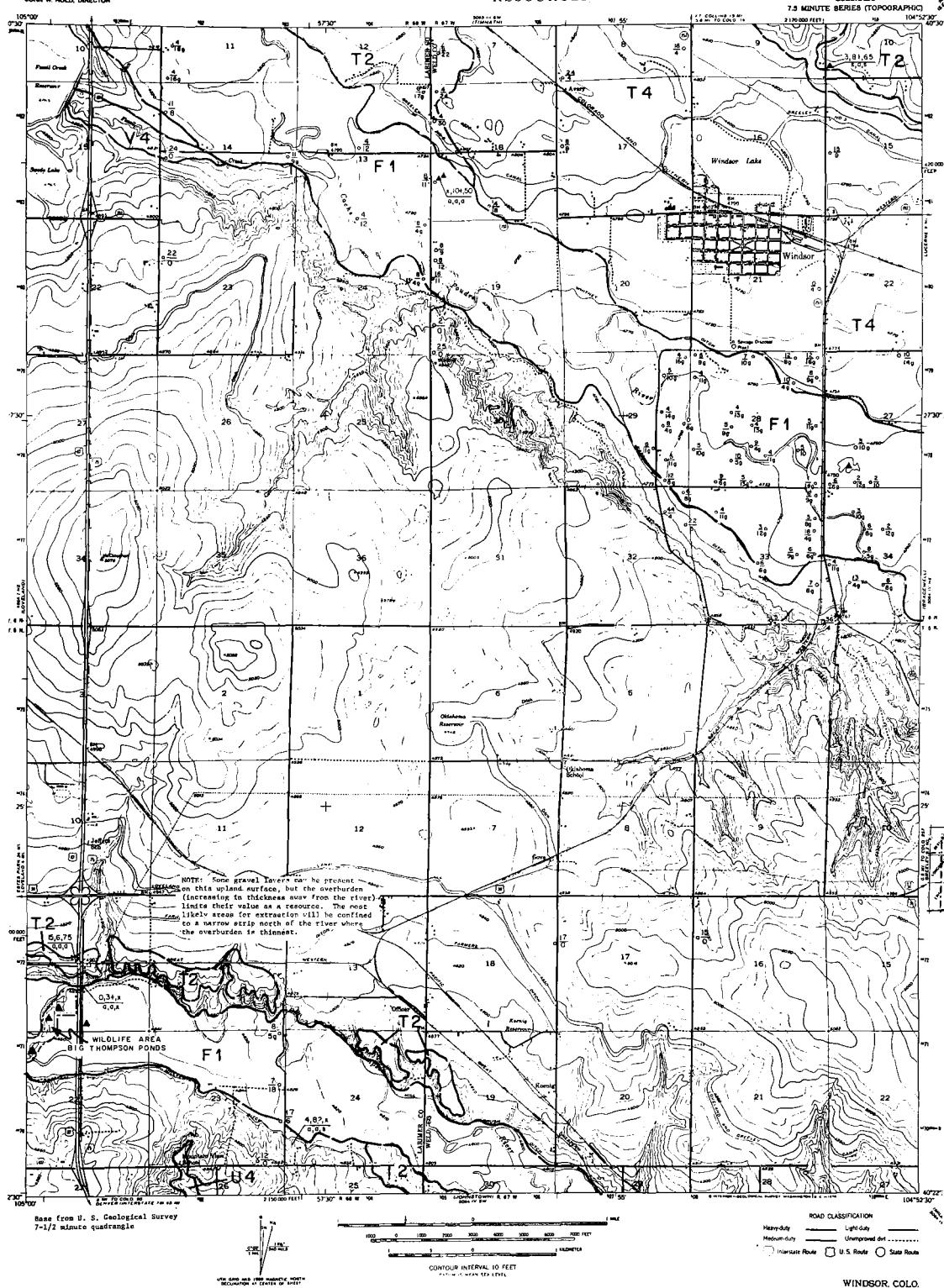
ROAD CLASSIFICATION  
Main road  
Light road  
Unimproved dirt  
State Road

WETMORE, COLO.



WINDSOR QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

LANDFORMS SHEET

F	Floodplain deposit
T	Stream terrace deposit
V	Valley fill (F & Y)
U	Upland deposits
A	Alluvial fan
E	Wind-deposited sand (dune)
M	Man-made deposits {ash, tailings, spoil....}

SOURCE CLASSIFICATION

Loose Aggregate  
not in the matrix and in the corners,  
usual orientation.

- 1 Gravel: relatively clean and round
- 2 Gravel: significant fines, decomposed rock, calcic carbonate.

Fine aggregate  
typical than 3 passing #5 sieve, not  
retained in #20 appears usual orientation

- 3 Sand

Unconsolidated Resource

- 4 Probable aggregate resource

### MAP SYMBOLS

[illegible]

QUADRANGLE LOCATION

NON-RESOURCE OR  
MUTUAL-USE AREA

#### REFERENCE

Swan, F. H., III, 1972, Map of surficial geology of part of the Windsor quadrangle: Reconm. 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 1-687.

October 2004

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-Greeley Area, Front Range Urban Corridor, Colorado: U. S. Geol. Survey Map I-855 D.

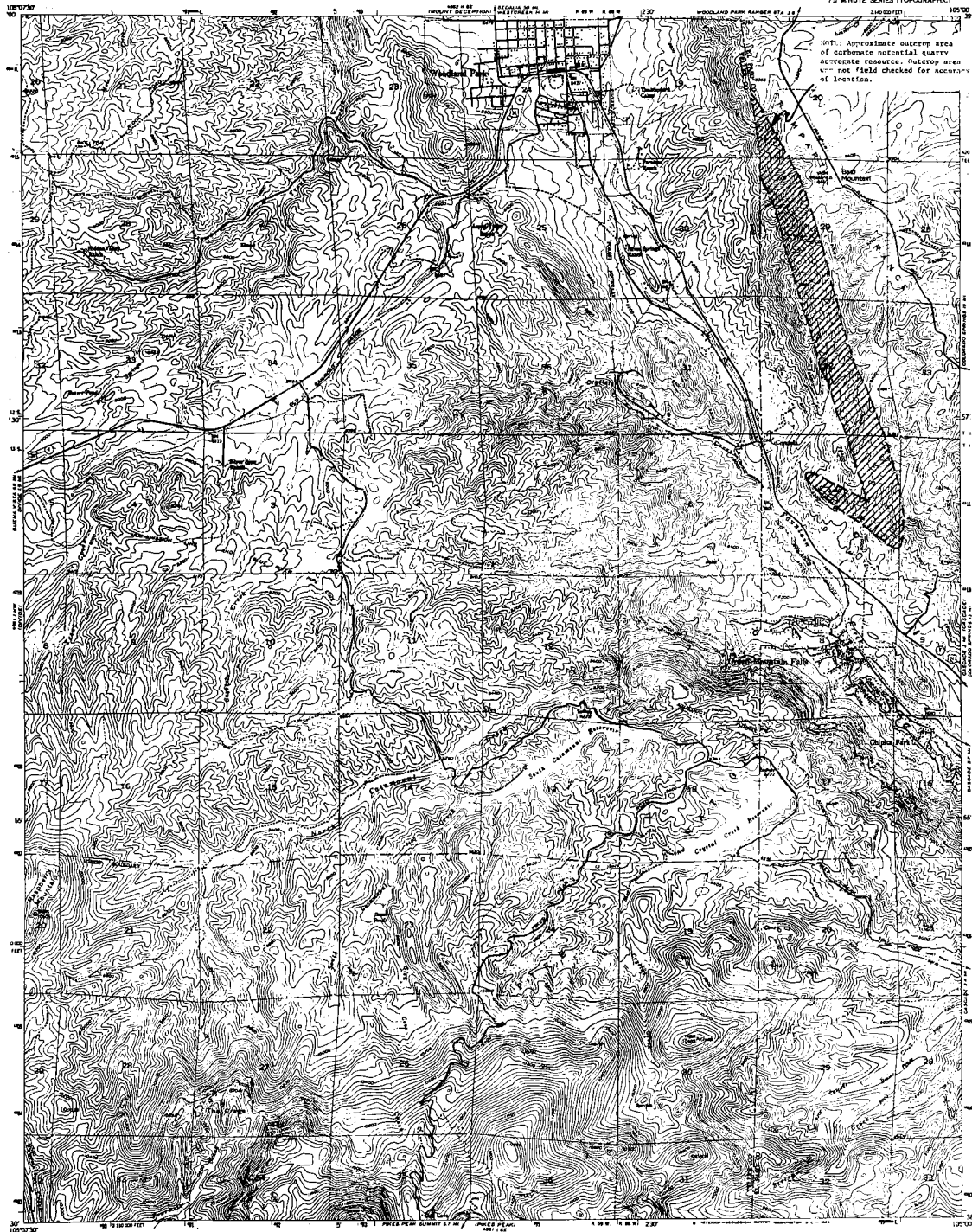
Mapped by: Stephen D. Schwachow  
Date: June 30, 1974

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

# SAND, GRAVEL AND QUARRY AGGREGATE RESOURCES MAP

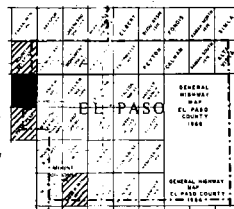
WOODLAND PARK QUADRANGLE  
COLORADO  
7.5 MINUTE SERIES (TOPOGRAPHIC)

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



## EXPLANATION

- LANDFORMS**
- F Floodplain deposit
  - T Tertiary terrace deposit
  - V Valley fill (F & T)
  - U Upland deposit
  - A Alluvial fan
  - E Wind-deposited sand (terrace)
  - M Man-made deposits (levees, dikes, etc.)
- RESOURCE CLASSIFICATION**
- CLASS 1 - SANDS**  
(at least 25% sand)  
Visual estimation
- 1 Gravel: relatively clean and sound
  - 2 Gravel: significant fines, decomposed rock, calcium carbonate
- CLASS 2 - GRAVELS**  
(at least 25% gravel)  
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 area
  - Related 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" symbol denotes unmineralized or unknown property
  - "M" denotes Colorado Geological Survey Mineral/land and gravel projects
  - Drill hole
  - Landform boundary, solid where known or observed; dashed where approximate or inferred
- STATION, LOCATION AND ORIENTATIONAL INFORMATION**
- Overburden thickness (ft)
  - Sand/gravel resource thickness (ft)
  - Gravel and fines - ranging to 20% fines; visual estimation
  - Significant amount of fines (greater than 20% or 2.0% to 2.5% fines)
  - Significant amount of decomposed or soft rock
  - Significant amount of calcium carbonate (calcite)
  - "L" symbol denotes unmineralized or unknown property
  - "M" in symbol denotes property owned or managed by M



- QUADRANGLE LOCATION
- NON-RESOURCE OR WITHDRAWN AREA

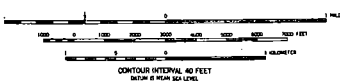
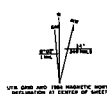
**REFERENCE:**

Crosby, 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.

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

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



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

WOODLAND PARK, COLO.