New Mexico State Highway Department

Geology & Aggregate Resources

District 4

Prepared by

Geology Section

New Mexico State Highway Department

Materials Laboratory Bureau

in cooperation with

U.S. Department of Transportation

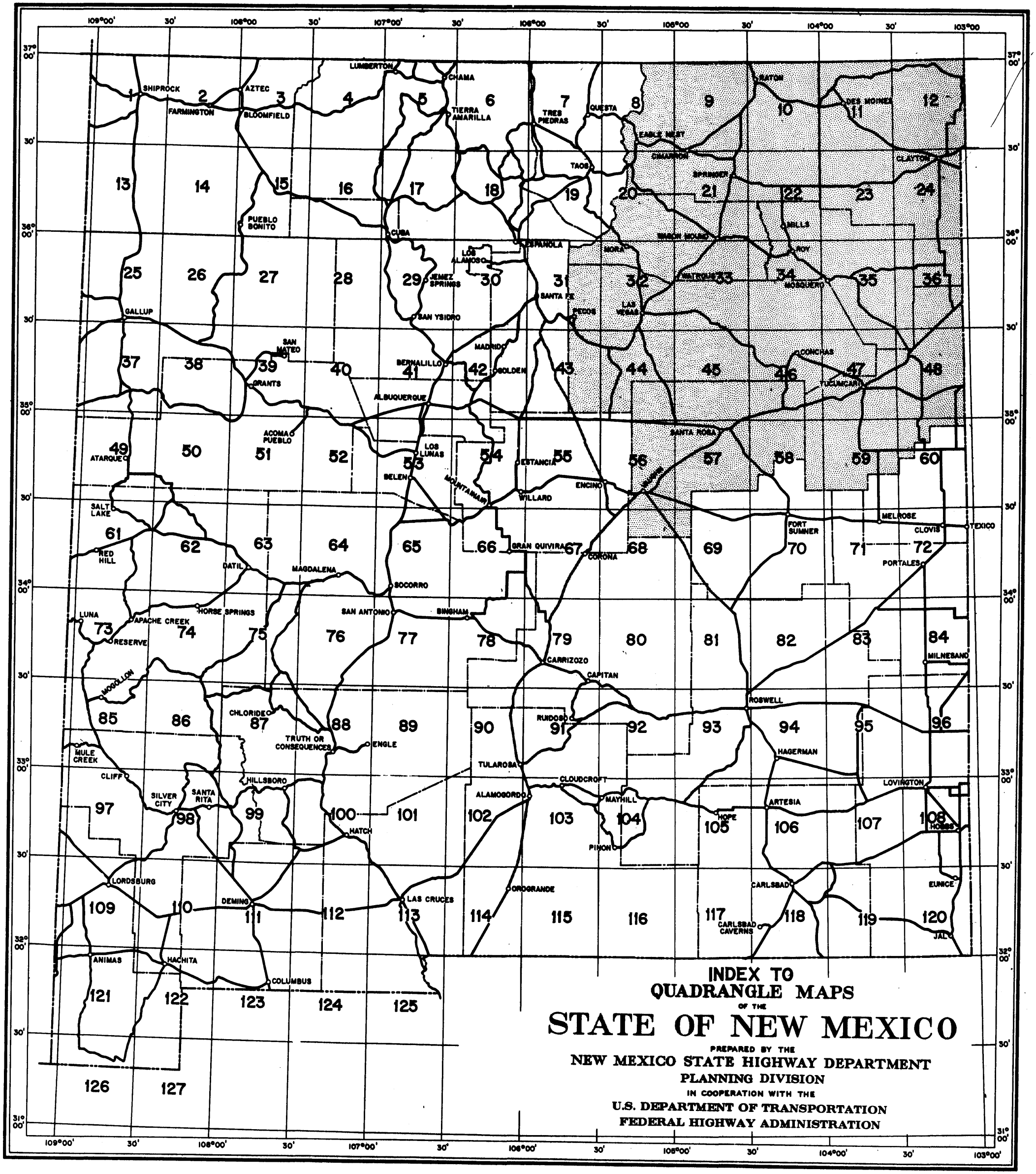
Federal Highway Administration

CONTENTS

ACKNOWLEDGEMENTS

Many people have contributed to this mapping project. The authors wish to express their thanks to these persons and firms, and others too numerous to mention here, who have contributed to the production of this book.

Offset	:	Duplicating Services, N.M. S.H.D.
Color Work	:	Univ. of N.M. Printing Plant, Alb., N.M., Tom Payne and Dave Speer
Separations	:	Harper House, Dallas, Texas
Base Maps	:	Planning Division, N.M.S.H.D.
Material Investigation Crews	:	N.M.S.H.D
Personnel of the Testing Lab	:	N.M.S.H.D.
Geology Section Personnel	:	Warren T. Bennett, Geotechnical Engr., Mapping, Author and Editor; Arlon D. Lovelace, Chief Geologist, Author and Editor; James B. Yarbrough, Geologist, Geological Research Author, Mapping; Daniel D. Sowle, Geologist, Mapping, Sampling; Richard D. Lueck, Geologist, Mapping, Sampling; William A. Gonzales, E.T. III, Drafting and Artwork; Ray Salazar, E.T. II, Drafting and Artwork



INDEX TO QUADRANGLE MAPS OF THE STATE OF NEW MEXICO

PREPARED BY THE
NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING DIVISION
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Preface

Personnel of the Geology Unit, NMSHD, continue mapping the surface geology of New Mexico as it applies to the availability of suitable road building aggregates. This project was initiated in its present form in 1968 and has been carried on as a Research Project by use of Federal Highway Planning and Research funds through the Planning Division of the New Mexico State Highway Department in cooperation with the United States Department of Transportation, Federal Highway Administration.

The fundamental purpose behind the use of geology to locate suitable deposits for any road-building project is one of basic economics. The length of haul (pit to job-site) is a critical economic factor on any construction job. For every mile of haul that can be eliminated, the resultant savings of tax dollars varies from 5 to 10 cents per ton mile. It can readily be seen that eliminating one mile of haul on a job requiring 500,000 tons, which is not an unusual amount, will result in an immediate cost reduction between 25,000 to 50,000 tax dollars. Since New Mexico is the fifth largest state of the conterminous United States and its highway network must of necessity be expanded, it is obvious that the long-term savings generated by this project could approach astronomical proportions. Because of the potential enormity of such savings, this mapping program will ultimately pay great dividends to the beleagurered taxpayer. It is hoped that it will also result in new and additional geological information for the professional geologist as well as the layman and that it will create a renewed interest in the Quaternary geology from a scientific and academic viewpoint. Increased knowledge of aggregate science and a general knowledge of the characteristics of the rocks upon which a road foundation is to be built should also improve the quality of our future highway network.

The approach to locating road-building aggregate is no different than the search for other natural resources. A working hypothesis that will show why suitable aggregate can or cannot be found and having a reasonable understanding of the risk involved is necessary. Most reconnaissance efforts are nothing more than common-sense attempts to establish some predictability as to what should be expected when a test hole is dug. Delineating various pediment or terrace levels regarding age continuity, material type and a myriad of other characteristics, easily eliminates useless prospecting where a particular hypothesis suggests that no suitable aggregate will be found. Carrying this approach further, a working hypothesis can be developed to locate aggregate accumulations that are totally obscured from view, such as hidden, buried stream channels. Riskwise, easily delineated geomorphic or bedrock surfaces can be classed as probable resources, whereas those that are totally obscured from view would be classed as probable or exploratory. Landforms with developed and tested pits would, of course, be classed as proven sites. It is not the purpose of this study to show all of the locations where material pits may be placed. The purpose is to show the prospector a reasonable cross-section of the type of materials he may be able to locate in a particular landform or bedrock formation. Most aggregate prospecting will be and has been done on diagnostic landforms and are medium to low-risk ventures. Exploratory sites will be higher risk ventures and usually will not be attempted except in circumstances of last resort.

This publication should help the prospector establish a workable approach in locating materials pits and be an improvement over the somewhat fortuitous approach that has been used in the past. We are aware that pit sites located from photographic interpretation of geology do not guarantee success, and the results provided by test holes ultimately prove or disprove an aggregate source. However, over a long term, the use of practical geology for aggregate prospecting will be of great benefit to the construction industry.

The geology and aggregate resources maps are presented in color on the regular N.M.S.H.D. base maps, 30 minute quadrangles, one inch equals 3 miles. They are placed in numerical order as the state numbering system pertains to N.M.S.H.D. District **4**. Each map has an explanation of the rock units mapped and other symbols used that do not appear on the standard legend for the base maps. Most of the symbols used are self-explanatory; however, in order not to confuse the reader, the pit symbols and numbering system probably deserve some additional explanation.

The solid black circle denotes an existing pit or quarry; the half-black circle denotes a prospective site that has been sampled and tested; and the asterick indicates a prospective site that has not been sampled or tested. The numbers beside the circles refer directly to the material pit summary charts and the charts are placed directly behind the geology and aggregate resource maps. All numbers preceded by a zero represent prospective pit sites. Numbers not preceded by a zero represent the year and numerical sequence in which the pit was explored, i.e., pit 6457 is the fifty-seventh pit explored by the laboratory crews in 1964.

The greatest single difficulty encountered in mapping Quaternary deposits is establishing continuity of map units and symbols over reasonably long distances. Since Quaternary stratigraphy is morphostratigraphic (both geomorphic and stratigraphic) and this work done by several geologists, the reader will find some discontinuity of map units or stratigraphic nomenclature from one quadrangle to another in the Quaternary and Tertiary systems. In this event each map should be studied individually since the purpose of this study is to aid the prospector in choosing the best possible source of aggregate in a particular area.

If this and the following publications benefit the taxpayers of New Mexico through a systematic approach in developing and conserving another of the state's natural resources, then its primary objective will have been accomplished. And if it is utilized by those within and without the geological profession to further the knowledge of New Mexico geology then the subsidiary objectives will also have been accomplished.

LEGEND FOR BASE MAP UNITS

Roads
- Primitive
- Unimproved
- Graded and Drained
- Gravel or Stone-not Graded and Drained
- Gravel or Stone-Graded and Drained
- Bituminous Surfaced
- Paved
- Divided Highway
- Road or Street in congested area

Mileage indicated thus — 1.0 — 8 — 0.6 — 0.8

Highway Interchange

Federal Aid Interstate Highway Number — FAI 25

Federal Aid Primary Highway Number — FAP 41

Federal Aid Secondary Highway Number — FAS 1441

End of Federal Aid Route — FAP 4

Federal Aid Interstate Highway Number — 10

U.S. Highway Number — 84

State Highway Number — 30

- National or State Line
- County Line
- Indian Reservation, Military Reservation, National Park, National Monument, National Forest, State Park and Game or Bird Refuge Line
- Land Grant Line
- City Limit Line
- Township Line

Boundaries and Monuments
- Section Line-Surveyed
- Boundary Monuments
- Triangulation Station
- Identical Lookout and Triangulation Station
- Identical Airway Beacon and Triangulation Station
- Identical Church and Triangulation Station
- Identical Schoolhouse and Triangulation Station
- Identical Building and Triangulation Station

Permanent Bench Mark and Elevation — BM 1238

Prominent Elevation — 7520'

- Township Corner in Place
- Section Corner in Place
- State Capital
- County Seat
- Other City, Town or Village

City, Town or Village
- City, Town or Village (Incorporated)
- Town or Village (Dashed Line denotes limits of Supplementary Vicinity Map)

- Dwelling or Farm Unit
- Group of Dwellings (Figure denotes number of units) — 12
- Hotel
- Store or Small Business House
- Post Office
- Business and Post Office

Farms, Dwellings, Industrial Units, etc.
- City Hall
- Schoolhouse
- Church
- Cemetery
- Hospital
- Factory or Industrial Plant
- Electric Power Station
- Radio Station
- Correctional Institution
- Sawmill
- Drive-in Theater
- Fire Station
- Historic Ruin
- Vacant Units are shown by open symbols, thus :
- Figure denotes number of units of like kind — 2
- Mine
- Corral
- Windmill
- Well or Water Tank
- Artesian Wells
- Oil or Gas Wells
- Forest Ranger Station, District
- Forest Ranger Station, Yearlong
- Forest Ranger Station, Seasonal
- Permanent Lookout Station
- Camping Ground
- Railroad
- Narrow Gauge Railroad
- Railroad Tunnel
- Railroad Station (Local Agent)
- Railroad Station (Prepay)

Railroad Crossings
- Grade
- Railroad above
- Railroad below

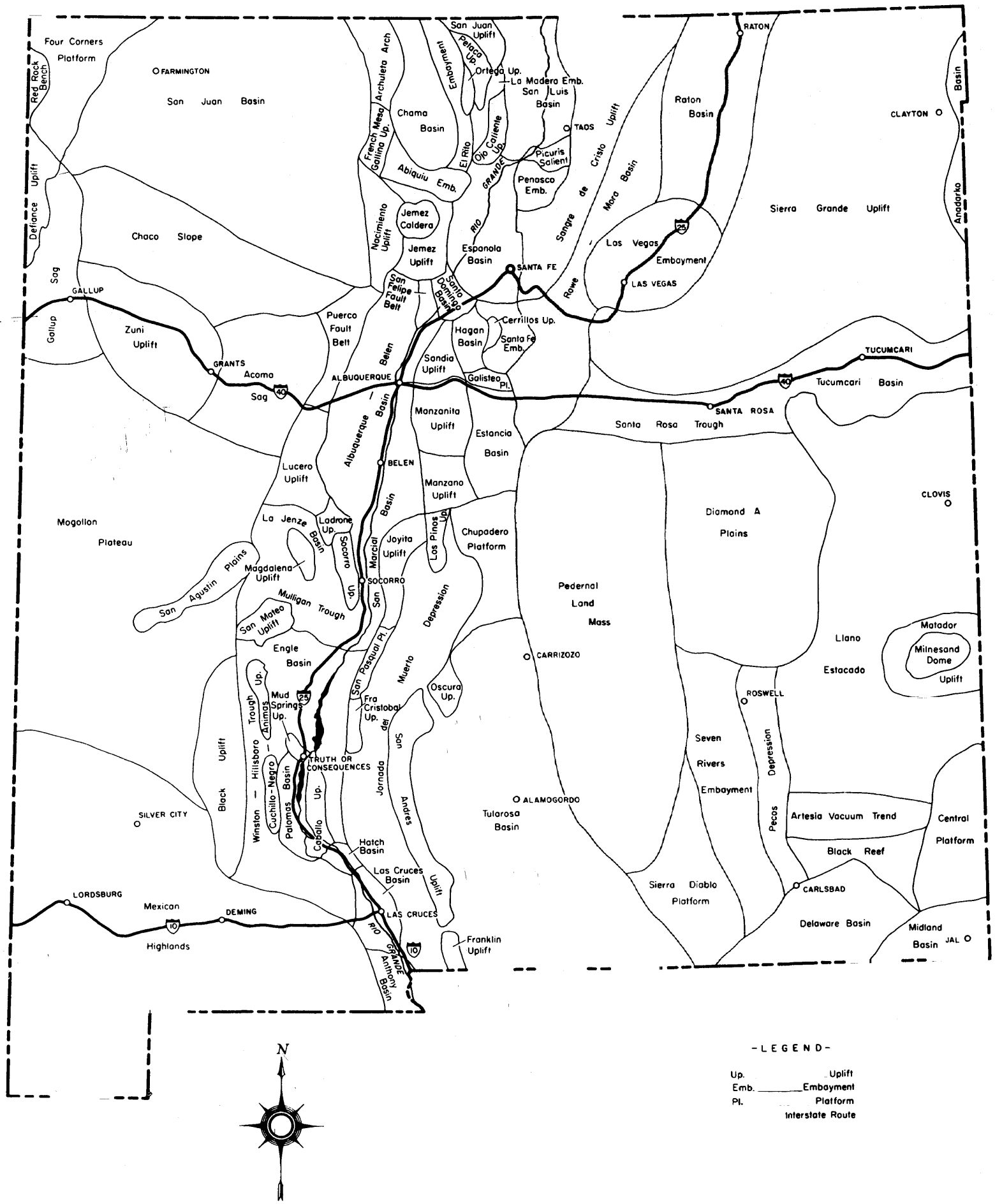
Bridges
- Railroad
- Highway (over 20' span)

- Ford
- Dam on Large River
- Dam on Small Stream
- Reservoir and Dam
- Ditch or Canal
- Flume
- Syphon
- Pipe Line or Conduit
- Tramway
- Telephone or Telegraph Line
- Telephone or Telegraph Line along road
- Transmission Line
- Fence (any type)
- Spring
- River
- Stream
- Intermittent Stream
- Large Intermittent Stream
- Marsh or Swamp
- Levee or Dike
- Mountain Range, Mesa or Butte
- Sink or Depression

Air Navigation
- Air Route
- Army, Navy or Marine Corps Field
- Commercial or Municipal Airport
- Intermediate Field
- Landing Area or Strip
- Airway Light Beacon

AGGREGATE RESOURCES AND GEOLOGY
NEW MEXICO STATE HIGHWAY DEPARTMENT

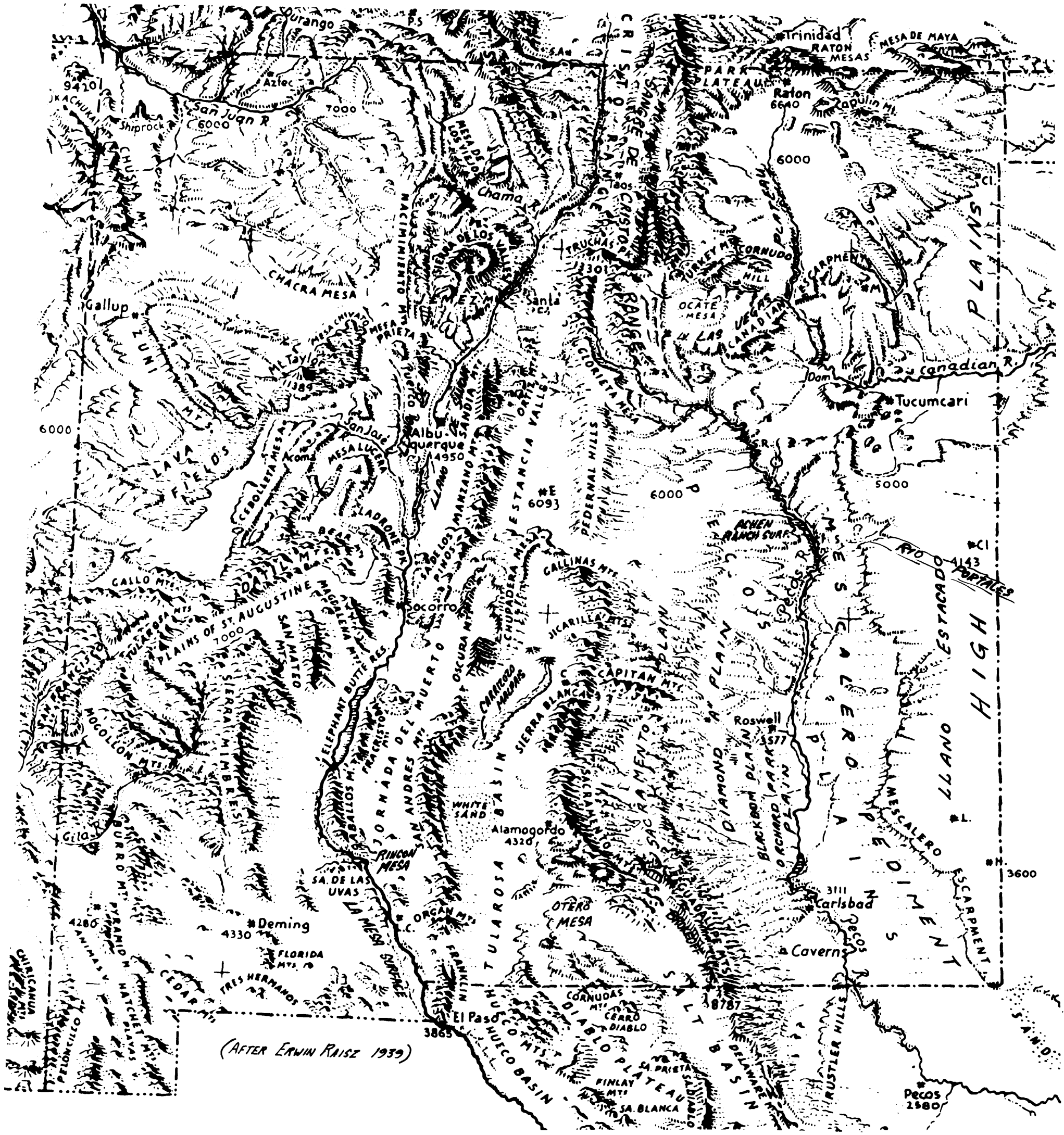
STRUCTURAL UNITS OF NEW MEXICO



GEOLOGIC TIME CHART

ERAS	PERIODS (of time) or SYSTEMS (of rock)	EPOCHS or SERIES	APPROXIMATE TIME IN YEARS SINCE BEGINNING OF EACH	PHYSICAL AND BIOLOGICAL FEATURES
CENOZOIC	QUATERNARY	Recent	10,000-15,000	Development of man.
		Pleistocene	1,000,000	Ice sheets over Europe and North America; appearance of early man.
	TERTIARY	Pliocene	11,000,000	Development of modern plants and animals; formation of mountains in western America.
		Miocene	25,000,000	Highest development of larger mammals; formation of mountains, including the Alps, Andes, and Himalayas.
		Oligocene	40,000,000	Development of higher mammals.
		Eocene & Paleocene	70,000,000	Rise to dominance of mammals; appearance of ancestral horse and primates.
MESOZOIC	CRETACEOUS		135,000,000	Extinction of dinosaurs; development of early mammals and flowering plants; deposit of chalk beds.
	JURASSIC		180,000,000	Appearance of flying reptiles and birds; dominance of dinosaurs; appearance of primitive mammals; abundance of coniferous trees.
	TRIASSIC		230,000,000	Appearance of dinosaurs; dominance of reptiles; appearance of cycadaceous trees.
PALEOZOIC	PERMIAN		280,000,000	Development of reptiles; decline of huge plants of the Mississippian and Pennsylvanian.
	PENNSYLVANIAN		310,000,000	Age of coal; formation of coal beds from luxuriant plant life in warm, swampy forests; great fernlike trees; appearance of primitive conifers; abundance of insect life; first appearance of reptiles; development of amphibians.
	MISSISSIPPIAN		345,000,000	
	DEVONIAN		400,000,000	Age of fish; appearance of primitive amphibians; development of primitive plant life on dry continents.
	SILURIAN		425,000,000	Appearance of scorpions, the first animals to live on dry land; extensive coral reefs.
	ORDOVICIAN		500,000,000	Floods and recessions of shallow seas; deposits of limestone, lead, and zinc ores; abundance of marine invertebrate life; appearance of a few primitive fishlike vertebrates.
	CAMBRIAN		600,000,000	Shallow seas over much of the land; formation of sedimentary rocks; development of marine invertebrate life, including brachiopods, snails, sponges, and trilobites.
PRECAMBRIAN	PROTEROZOIC		1,500,000,000	Formation of mountains; deposits of iron ore; abundance of lime secreting algae; appearance of sponges.
	ARCHEOZOIC		2,000,000,000+	Great volcanic activity; formation of igneous rocks; some microscopic algae; probably some protozoa.

PHYSIOGRAPHIC PROVINCES
of
NEW MEXICO



EXPLANATION

QUAD No. 8

QUATERNARY

- Qal — Alluvium
- Ql — Landslide debris
- Qg — Gravel deposits

TERTIARY

- QTb — Basalt
- QTg — Older Gravels
- Tam — Amalia Formation
- Tb — Basalt
- Ta — Abiquiu Tuff
- Tgr — Granite
- Tdp — Dacite Porphyry
- Ty — Volcanic rocks undivided
- Ts — Early Tertiary Sediments

CRETACEOUS

- TKp — Poison Canyon and Raton Formation
- Kvt — Vermejo Formation and Trinidad Sandstone
- Kpn — Pierre Shale and Upper Niobrara
- K — Cretaceous rocks undivided
- Kd — Dakota Sandstone

JUR. TRIA.

- JTr — Jurassic and Triassic rocks undivided

PERMIAN

- PPsc — Sangre de Cristo Formation

PENNS.

- P — Pennsylvanian rocks undivided

MISS. DEV.

- MD — Mississippian and Devonian rocks undivided

PRECAMBRIAN

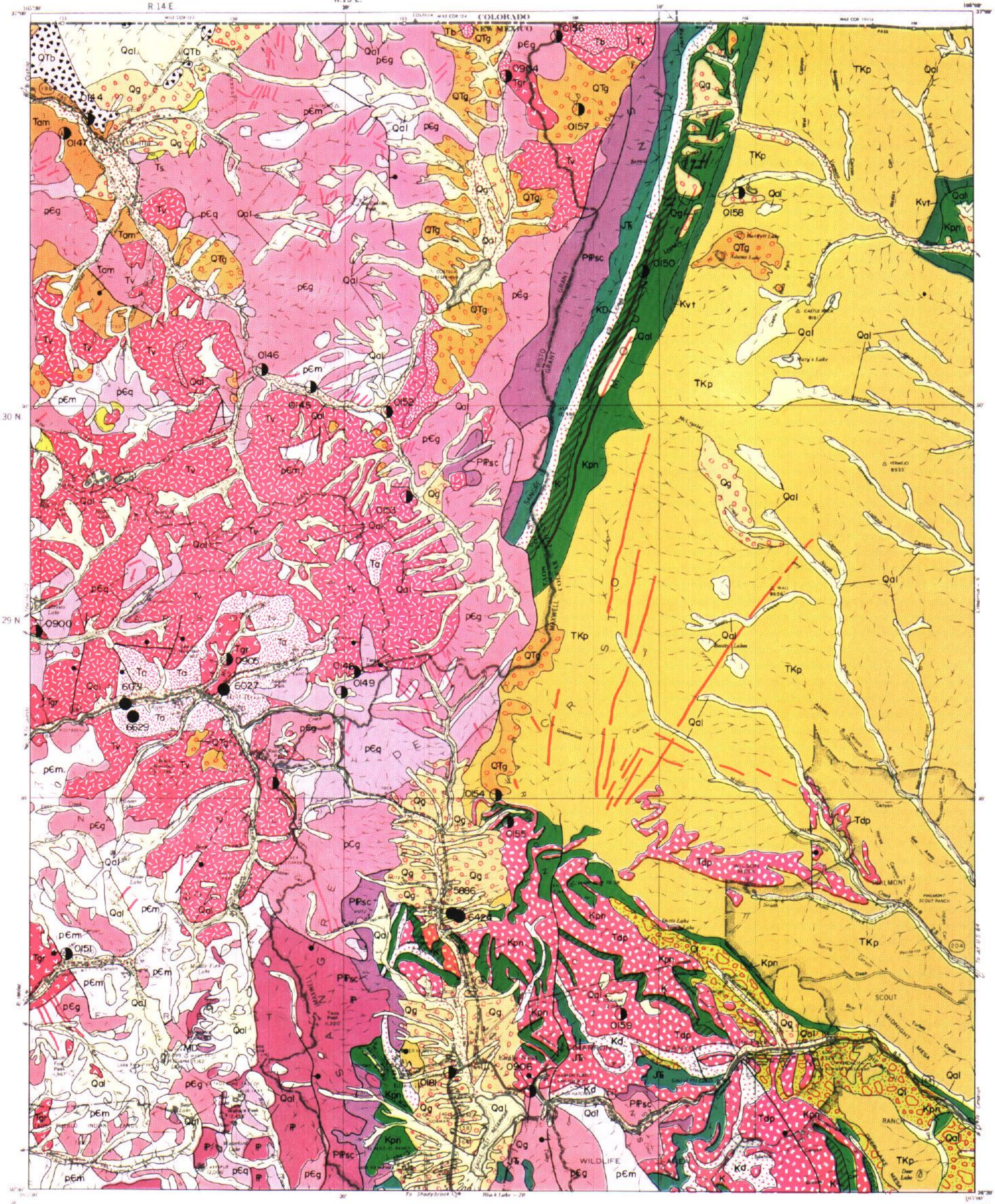
- p€g — Granite
- p€m — Metamorphic rocks undivided
- p€q — Quartzite

- Developed Pit or Quarry
- Prospect Pit or Quarry
- Fault
- Downthrown side
- * Selected exploration site

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

GEOLOGY and AGGREGATE RESOURCES

EAGLE NEST QUADRANGLE 8
COLFAX & TAOS COUNTIES



Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 36½° North American Datum

DATE OF INVENTORY
GEOLOGY FEB.1975
AGGREGATE RESOURCES FEB.1975

Longitude West from Greenwich

Scale 1/126720 or 1 Inch = 3 Miles

DATE OF INVENTORY
TAOS COUNTY 1965
COLFAX COUNTY 1964

EAGLE NEST
QUADRANGLE
8

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5886	6031	6424	0143
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Maxwell Grant	Carson Nat. Forest	Maxwell Grant	Carson Nat. Forest
	County	Colfax	Taos	Colfax	Taos
Formation		Qg	Qal	Qg	Tv
Rock Type		sand & gravel	sand & gravel	sand & gravel	andesite
Source Rock (Gravel)		various	various	various	-
Quality of Material		good	good	good	excellent
Thickness of Material		14'	12' plus	15'	30' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		sand & gravel	-	clay & gravel	2
Vegetation		grass & brush	trees	brush	various trees
Local Terrain		flat	stream bed	flat	mountain top
Thickness of Overburden		2'	1'	2'	0-1'
P. I. (Overburden)		12	8	10	-
Estimated Quantity (cu. yds)		80,000	50,000	70,000	unlimited
Los Angeles Wear		21.2	26.0	22.6	21.6
Soundness Loss		-	9.8	-	6.2
Average Maximum Size		12"	6"	12"	-
% Retained on 2" Sieve		40	25	35	-
Pit Average % Passing	Crushed to:	1"	1"	1"	1"
	2"	-	-	-	-
	1"	100	100	100	100
	½"	60	86	73	65
	No. 4	34	40	42	26
	No. 10	24	25	30	15
	No. 200	6	3	8	4
Plasticity Index		6	S.N.P.	6	S.N.P.

Remarks:

Pit Number		0144	0145	0146	0147
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Sangre de Cristo Grant	Sangre de Cristo Grant	Sangre de Cristo Grant	Sangre de Cristo Grant
	County	Taos	Taos	Taos	Taos
Formation		OTb	Qal	pEq	Tam
Rock Type		basalt	sand & gravel	granite talus	rhyolite tuff
Source Rock (Gravel)		-	various	granite	-
Quality of Material		good	fair	fair	excellent
Thickness of Material		16'	15'	5'	50' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		shale & clay	-	granite	-
Vegetation		greasewood	grass	none	pine trees
Local Terrain		flat mesa top	alluvial fan	mountainous	high bluff
Thickness of Overburden		1'	-	none	0-1"
P. I. (Overburden)		4	-	-	-
Estimated Quantity (cu. yds.)		unlimited	50,000	10,000	unlimited
Los Angeles Wear		28.8	39.6	46.8	15.6
Soundness Loss		1.3	7.4	8.3	1.4
Average Maximum Size		-	8"	12"	-
% Retained on 2" Sieve		-	30	70	-
Pit Average % Passing	Crushed to:	1"	1"	1"	1"
	2"	-	-	-	-
	1"	100	100	100	100
	½"	54	84	82	52
	No. 4	24	57	48	21
	No. 10	14	42	32	10
	No. 200	5	11	8	2
Plasticity Index		S.N.P.	S.N.P.	S.N.P.	S.N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0148	0149	0150	0151
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Carson Nat. Forest	Carson Nat. Forest	Maxwell Grant	Carson Nat. Forest
	County	Taos	Taos	Colfax	Taos
Formation		Tv	pEq	Ti	Qal
Rock Type		andesite	quartzite	diorite	sand & gravel
Source Rock (Gravel)		-	-	-	various
Quality of Material		good	excellent	excellent	good
Thickness of Material		30' plus	50' plus	dike 100' wide	15'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		-	-	-	-
Vegetation		pine trees	pine trees	none	pine trees
Local Terrain		hilly	hilly	ridge	dry wash
Thickness of Overburden		0-1'	0-1'	-	-
P. I. (Overburden)		-	-	-	-
Estimated Quantity (cu. yds)		unlimited	unlimited	unlimited	300,000
Los Angeles Wear		17.6	41.6	14.4	28.0
Soundness Loss		-	1.5	0.7	5.6
Average Maximum Size		-	-	-	8"
% Retained on 2" Sieve		-	-	-	45
	Crushed to:	1"	1"	1"	as received
Pit Average % Passing	2"	-	-	-	72
	1"	100	100	100	52
	½"	54	63	55	40
	No. 4	21	22	19	29
	No. 10	12	12	11	22
	No. 200	3	1	2	7
Plasticity Index		S.N.P.	S.N.P.	S.N.P.	S.N.P.

Remarks:

Pit Number		0152	0153	0154	0155
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Sangre de Cristo Grant	Sangre de Cristo Grant	Maxwell Grant	Maxwell Grant
	County	Taos	Taos	Colfax	Colfax
Formation		Tv	Tv	QTg	Tdp
Rock Type		rhyolite	dacite	sand & gravel	andesite
Source Rock (Gravel)		-	-	various	-
Quality of Material		excellent	excellent	fair	good
Thickness of Material		50'	50' plus	7.5' plus	30'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		-	-	shale	-
Vegetation		grass	grass & trees	pine trees	pine trees
Local Terrain		hilly	mountainous	mountain top	mountainous
Thickness of Overburden		0-1'	0-1'	1-2'	0-1'
P. I. (Overburden)		-	-	S.N.P.	-
Estimated Quantity (cu. yds.)		500,000 plus	unlimited	unlimited	unlimited
Los Angeles Wear		24.0	14.8	40.4	17.6
Soundness Loss		-	-	-	-
Average Maximum Size		-	-	12"	-
% Retained on 2" Sieve		-	-	25	-
	Crushed to:	1"	1"	as received	1"
Pit Average % Passing	2"	-	-	76	-
	1"	100	100	66	100
	½"	85	59	56	62
	No. 4	32	24	43	23
	No. 10	17	13	27	13
	No. 200	4	3	8	3
Plasticity Index		S.N.P.	S.N.P.	9	S.N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0156	0157	0518	0159
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Maxwell Grant	Maxwell Grant	Maxwell Grant	Cimarron Can. Wildlife
	County	Colfax	Colfax	Colfax	Colfax
Formation		Ty	QTg	Qg	Tdp
Rock Type		rhyolite tuff	sand & gravel	sand & gravel	monzonite porphyry
Source Rock (Gravel)		-	various	various	-
Quality of Material		good	good	fair	good
Thickness of Material		50' plus	14' plus	9'	50' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		-	-	shale	-
Vegetation		pine trees	grass & pine trees	pine trees	spruce, fir, pine
Local Terrain		mountain top	rolling	low terrace	mountain
Thickness of Overburden		0-1'	1'	1'	0-4'
P. I. (Overburden)		-	S.N.P.	7	-
Estimated Quantity (cu. yds)		unlimited	15,000 plus	100,000 plus	unlimited
Los Angeles Wear		24.8	34.0	58.0	20.8
Soundness Loss		11.4	10.6	26.0	0.9
Average Maximum Size		-	12"	16"	-
% Retained on 2" Sieve		-	40	40	-
Pit Average % Passing	Crushed to:	1"	as received	as received	1"
	2"	-	68	54	-
	1"	100	55	38	100
	½"	65	46	32	56
	No. 4	22	31	23	20
	No. 10	11	23	16	12
	No. 200	2	6	6	2
Plasticity Index		S.N.P.	9	8	S.N.P.

Remarks:

Pit Number		0181	0900	0904	0905
Location	Section	not sectionalized	SE 1/4 18	not sectionalized	not sectionalized
	Township & Range	Maxwell Grant	29N 13E	Sangre de Cristo Grant	Carson Nat. Forest
	County	Colfax	Taos	Taos	Taos
Formation		Qq	pEq	Tb	Tqr
Rock Type		gravel	quartzite	basalt	granite
Source Rock (Gravel)		mixed	-	-	-
Quality of Material		poor	excellent	good	fair
Thickness of Material		10'	80' plus	35' plus	26' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		clay	-	quartzite	-
Vegetation		grass	pine	pine & aspen	pine, spruce & aspen
Local Terrain		low terrace	mountainous	mountainous	mountainous
Thickness of Overburden		1-2'	0-4'	0-3'	0-4'
P. I. (Overburden)		15	-	6-12	S.N.P.
Estimated Quantity (cu. yds.)		50,000	unlimited	300,000 plus	200,000 plus
Los Angeles Wear		46.8	22.8	27.6	39.6
Soundness Loss		-	4.6	6.2	36.9
Average Maximum Size		4"	-	-	-
% Retained on 2" Sieve		25	-	-	-
Pit Average % Passing	Crushed to:	as received	1"	1"	1"
	2"	80	-	-	-
	1"	61	100	100	100
	½"	47	49	56	60
	No. 4	33	19	24	26
	No. 10	24	10	13	15
	No. 200	9	2	2	2
Plasticity Index		10	N.P.	N.P.	N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE 8 (4)

MATERIAL PIT SUMMARY

Pit Number		0906
Location	Section	not sectionalized
	Township & Range	Cimarron Can.Wildlife Area
	County	Colfax
Formation		PP
Rock Type		limestone
Source Rock (Gravel)		-
Quality of Material		good
Thickness of Material		25'
Thickness of Cap (Caliche)		-
Material Underlying Formation		shale
Vegetation		pine
Local Terrain		mountainous
Thickness of Overburden		0-20'
P. I. (Overburden)		-
Estimated Quantity (cu. yds)		25,000 plus
Los Angeles Wear		22.8
Soundness Loss		7.1
Average Maximum Size		-
% Retained on 2" Sieve		-
Pit Average % Passing	Crushed to:	1"
	2"	-
	1"	100
	½"	65
	No. 4	24
	No. 10	11
	No. 200	2
Plasticity Index		N.P.

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 9

QUATERNARY

- Qal — Alluvium
- Qfp — Floodplain deposits
- Qab — Bolson deposits
- Qld — Lake deposits
- Ql — Landslide debris
- Qps — Piedmont slope deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qop — Older Pediment deposits

TERT.

- Tpc — Poison Canyon Formation
- Ti — Intrusive rocks undivided

TERT.–CRET.

- TKr — Raton Formation

CRETACEOUS

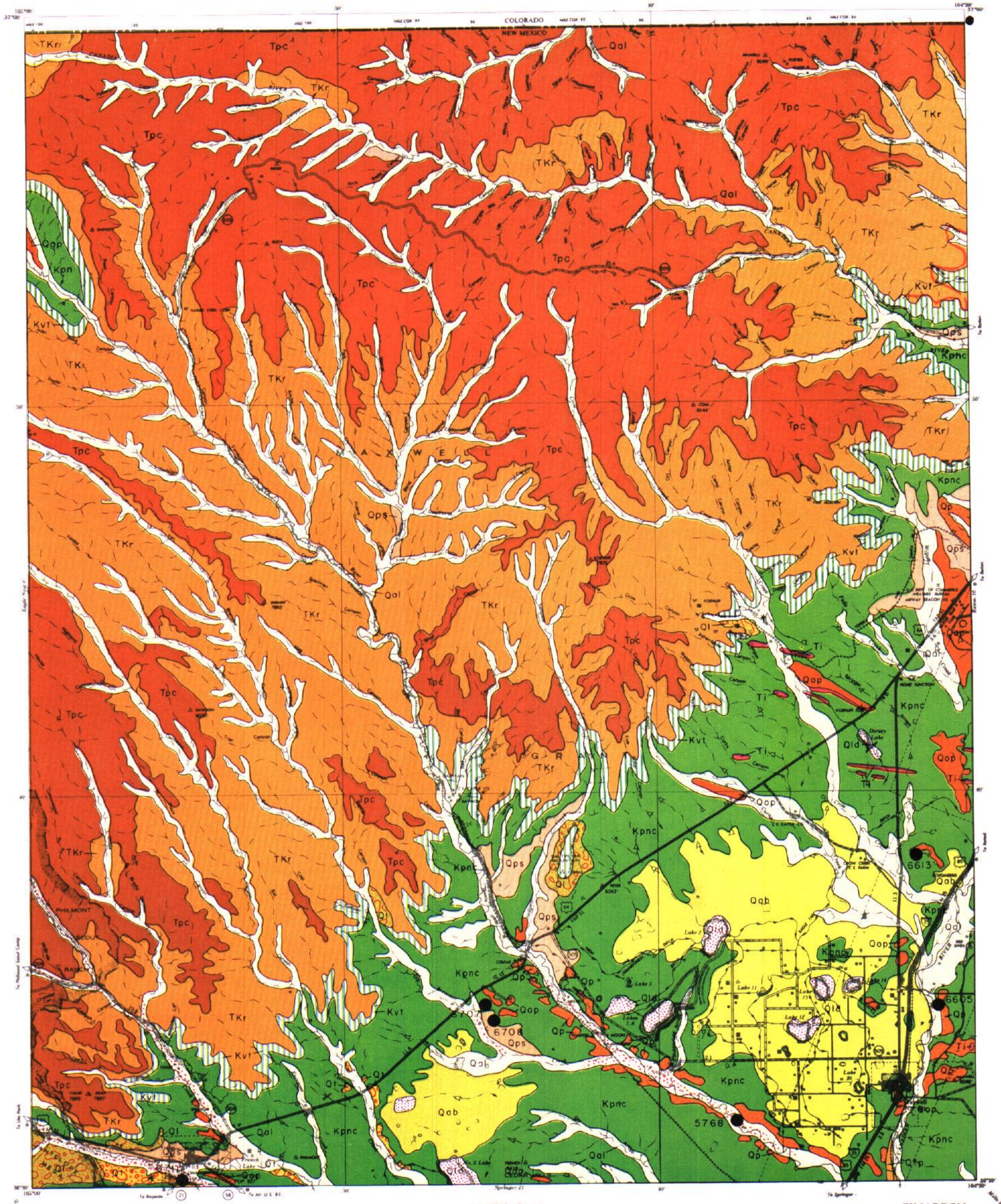
- Kvt — Vermejo Formation and Trinidad Sandstone undivided
- Kpn — Pierra Shale and upper part of Niobrara Formation

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

CIMARRON QUADRANGLE-9
COLFAX COUNTY



Control by National Geodetic Survey, U.S. Geological Survey
U.S. Forest Service; Bureau of Land Management and Planning Division.
Modified Cone Projection Standard Parallel 36°N Datum North American

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale 1/126,720 or 1 Inch = 2 Miles

1977

CIMARRON
QUADRANGLE
9

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5768	6605	6613	6707
Location	Section	Not Sectionalized	Not Sectionalized	Not Sectionalized	Not Sectionalized
	Township & Range	Maxwell Grant	Maxwell Grant	Maxwell Grant	Maxwell Grant
	County	Colfax	Colfax	Colfax	Colfax
Formation		Qt	Qt	Qop	Qt
Rock Type		sand and gravel	sand and gravel	sand and gravel	gravel
Source Rock (Gravel)		quartzite & igneous	limestone & igneous	igneous & various	various
Quality of Material		excellent	good	poor	fair
Thickness of Material		5'	8' plus	8'	6-10'
Thickness of Cap (Caliche)					
Material Underlying Formation		conglomerate & shale	shale	shale	shale
Vegetation		grass	grass	grass	grass
Local Terrain		river bank	river bank	hilltop	stream bank
Thickness of Overburden		0-2'	0-2'	0-2'	1-4'
P. I. (Overburden)		8	N.P.	12	12
Estimated Quantity (cu. yds)		500,000 plus	200,000	25,000	50,000
Los Angeles Wear		32.4	25.6	27.6	28.0
Soundness Loss			12.6	22.9	16.6
Average Maximum Size		4"	4"	2"	3"
% Retained on 2" Sieve		15	8	8	7
	Crushed to:	as received	as received	as received	as received
	2"	76	84	89	87
Pit	1"	57	76	79	72
Average	½"	43	62	66	51
% Passing	No. 4	31	39	45	30
	No. 10	24	25	29	21
	No. 200	3	5	8	4
Plasticity Index		N.P.	N.P.	8	N.P.
Remarks:					

Pit Number		6708	6711
Location	Section	Not Sectionalized	Not Sectionalized
	Township & Range	Maxwell Grant	Cimarron City Limits
	County	Colfax	Colfax
Formation		Qt	Qt
Rock Type		gravel	sand and gravel
Source Rock (Gravel)		various	quartzite & igneous
Quality of Material		fair	excellent
Thickness of Material		10'	20' plus
Thickness of Cap (Caliche)			
Material Underlying Formation		shale	
Vegetation		grass	grass
Local Terrain		stream bank	hilly
Thickness of Overburden		1-4'	0-2'
P. I. (Overburden)		12	
Estimated Quantity (cu. yds.)		75,000	100,000 plus
Los Angeles Wear		28.0	29.6
Soundness Loss		16.6	21.8
Average Maximum Size		3"	6"
% Retained on 2" Sieve		7	45
	Crushed to:	as received	as received
	2"	87	71
Pit	1"	72	62
Average	½"	51	53
% Passing	No. 4	30	28
	No. 10	21	18
	No. 200	4	5
Plasticity Index		N.P.	N.P.
Remarks:			

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to: 2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to: 2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 10

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Ql — Landslide debris
- Qps — Piedmont slope deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qc — Cinder and Scoria
- Qb — Basalt
- Qvc — Volcanic cones, vents and cinders
- Qop — Older Pediment deposits

QUAT.-TERT.

- QTb — Basalt

TERT.

- Tpc — Poison Canyon Formation
- Tb — Basalt and Basaltic Andesite
- Ti — Intrusive rocks undivided

TERT.-CRET.

- Tkr — Raton Formation

CRETACEOUS

- Kv — Vermejo Formation
- Kt — Trinidad Sandstone
- Kpnc — Pierra Shale and upper part of Niobrara Formation
- Kgh — Greenhorn Limestone
- Kg — Graneros Shale
- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRIASSIC

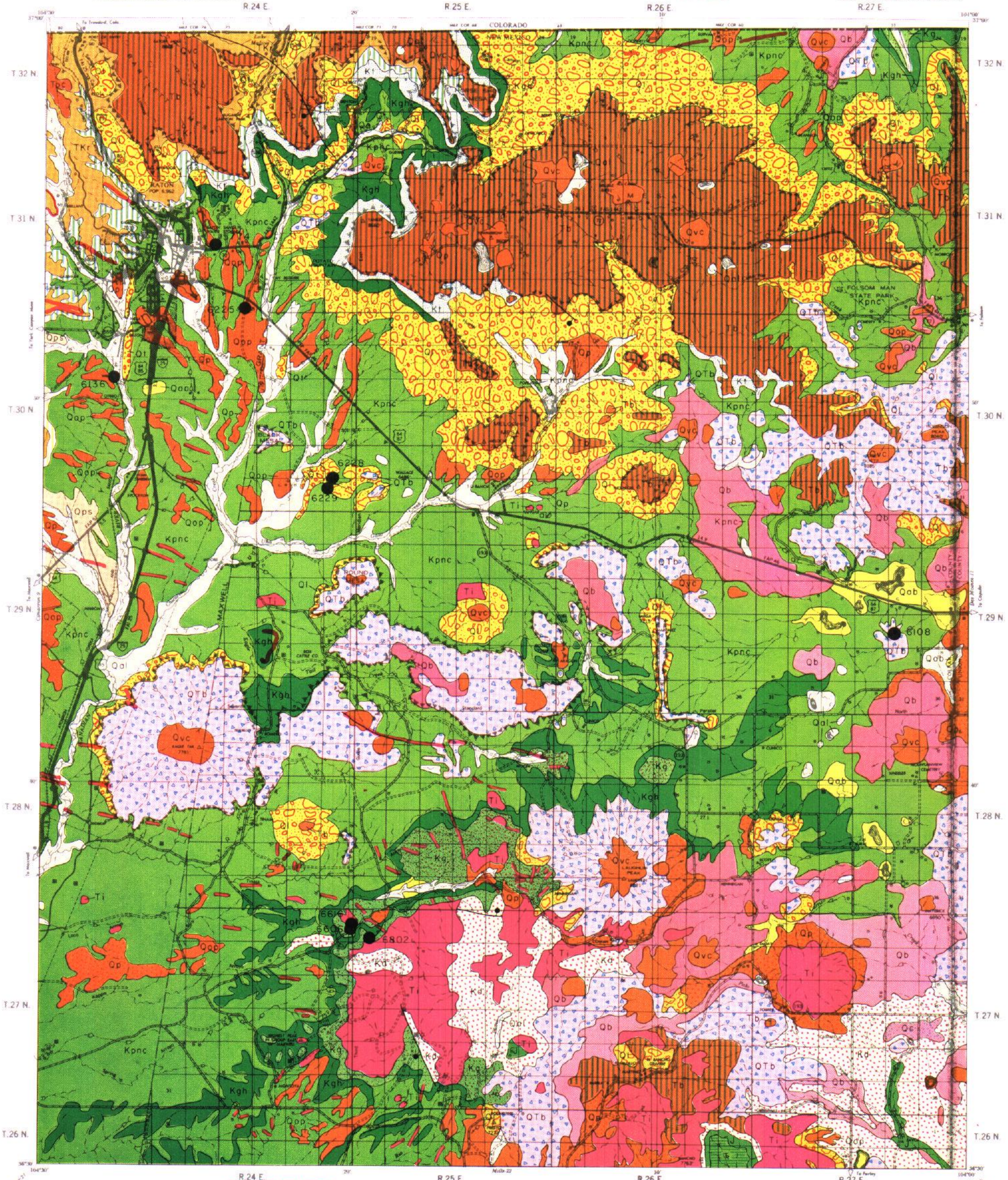
- Tr — Triassic undifferentiated

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

RATON QUADRANGLE-10
COLFAX & UNION COUNTIES



Control by National Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division
Modified Conic Projection Standard Parallel 39½° North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale $\frac{1}{190080}$ or 1 Inch = 3 Miles

STATUTE MILES

1976

RATON
QUADRANGLE
10

QUADRANGLE PAGE 10

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5774	6108	6136	6225
Location	Section	SW 20	W 23	Not sectionalized	SW 33
	Township & Range	31N 24E	29N 27E	Maxwell Grant	31N 24E
	County	Colfax	Colfax	Colfax	Colfax
Formation		Qop	Qtb	Qop	Qp
Rock Type		sand and gravel	basalt	sand and gravel	sand and gravel
Source Rock (Gravel)		igneous and various	--	various	volcanic and various
Quality of Material		good	good	fair to poor	good
Thickness of Material		12'	18' plus	10'	10-15'
Thickness of Cap (Caliche)		--	--	--	--
Material Underlying Formation		shale	shale	clay and gravel	shale
Vegetation		grass	grass	grass	grass
Local Terrain		rolling	hilltop	hilly	rolling
Thickness of Overburden		1-3'	1'	2-5'	2-4'
P. I. (Overburden)		15	19	7	20
Estimated Quantity (cu. yds)		100,000 plus	500,000 plus	500,000	250,000 plus
Los Angeles Wear		36.0	21.0/16.8	22.0	30.0
Soundness Loss		--	1.0	14.4	12.6
Average Maximum Size		4"	--	3"	5"
% Retained on 2" Sieve		18	--	20	15
Pit Average % Passing	Crushed to:	as received	2"	as received	as received
	2"	74	100	74	64
	1"	62	64	61	45
	½"	52	30	52	34
	No. 4	34	10	40	24
	No. 10	21	5	35	19
	No. 200	5	1	6	7
Plasticity Index		8	N.P.	N.P.	10

Remarks:

Pit Number		6228	6229	6606	6616
Location	Section	SW 25	NE 36	NE 1	NE 1
	Township & Range	30N 24E	30N 24E	27N 24E	27N 24E
	County	Colfax	Colfax	Colfax	Colfax
Formation		Ti	Ti	Ti	Ti
Rock Type		dacite-andesite	dacite	monzonite	monzonite
Source Rock (Gravel)		--	--	--	--
Quality of Material		good	good	good	good
Thickness of Material		20' plus	20' plus	12' plus	12' plus
Thickness of Cap (Caliche)		--	--	--	--
Material Underlying Formation		sandstone	sandstone	shale	shale
Vegetation		grass	grass	grass	grass
Local Terrain		hilly	hilly	hilltop	hilltop
Thickness of Overburden		--	--	1'	1'
P. I. (Overburden)		--	--	10	14
Estimated Quantity (cu. yds.)		200,000 plus	250,000 plus	50,000 plus	80,000 plus
Los Angeles Wear		20.0	34.8	20.4	16.0
Soundness Loss		4.2	5.0	3.0	3.0
Average Maximum Size		--	--	--	--
% Retained on 2" Sieve		--	--	--	--
Pit Average % Passing	Crushed to:	2"	2"	2"	as received
	2"	100	100	100	100
	1"	77	79	84	82
	½"	28	28	32	35
	No. 4	12	12	14	13
	No. 10	7	7	8	7
	No. 200	2	2	2	2
Plasticity Index		N.P.	N.P.	N.P.	6

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6802
Location	Section	SW 6
	Township & Range	27N 25E
	County	Colfax
Formation		Ti
Rock Type		syenite
Source Rock (Gravel)		--
Quality of Material		good
Thickness of Material		12'
Thickness of Cap (Caliche)		--
Material Underlying Formation		quartzite
Vegetation		grass
Local Terrain		hilly
Thickness of Overburden		1'
P. I. (Overburden)		9
Estimated Quantity (cu. yds)		100,000 plus
Los Angeles Wear		28.8
Soundness Loss		4.0
Average Maximum Size		--
% Retained on 2" Sieve		--
Pit Average % Passing	Crushed to:	2"
	2"	100
	1"	65
	½"	27
	No. 4	12
	No. 10	7
	No. 200	2
Plasticity Index		N.P.

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 11

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Qe — Eolian deposits
- Ql — Landslide debris
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qc — Cinder and Scoria
- Qb — Basalt
- Qvc — Volcanic cones, vents and cinders

QUAT.–TERT.

- QTb — Basalt
- QTb₂ — High level basalt

TERT.

- Toc — Ogallala Formation Caliche
- Tou — Ogallala Formation undifferentiated
- Tog — Ogallala Formation Gravel
- Tb — Basalt and Basaltic Andesite

CRET.

- Kpnc — Pierra Shale and upper part of Niobrara Formation
- Kgh — Fort Hays Formation
- Kg — Graneros Shale
- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRIASSIC

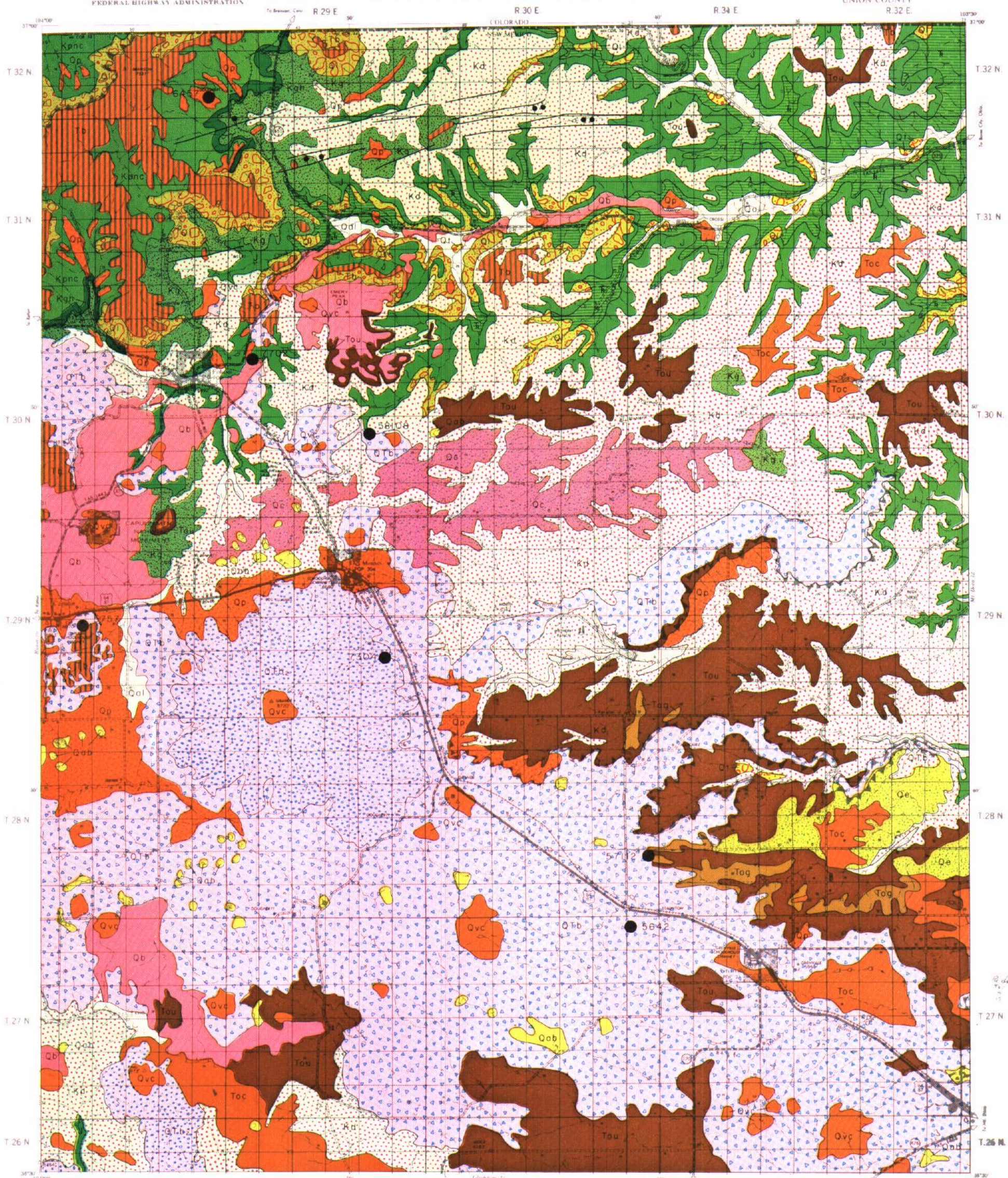
- R — Triassic undifferentiated

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

DES MOINES QUADRANGLE-11
UNION COUNTY



R 28 E
R 29 E
R 30 E
R 31 E
R 32 E

DATE OF INVENTORY
GEOLOGY MAY 1961
AGGREGATE RESOURCES MAY 1961

Scale 1/126720 or 1 Inch = 3 Miles

DES MOINES
QUADRANGLE
11

QUADRANGLE PAGE 11

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5642	5757	6457	7304
Location	Section	NW 6	NE 20	NE 36	NE 26
	Township & Range	27N 31E	29N 28E	32N 28E	29N 29E
	County	Union	Union	Union	Union
Formation		QTb	Tb	Qp	QTb_2
Rock Type		basalt	basalt and sand	gravel and caliche	basalt
Source Rock (Gravel)		--	--	igneous and various	--
Quality of Material		good	good	fair	excellent
Thickness of Material		8' plus	12'	12' plus	12'
Thickness of Cap (Caliche)		--	--	--	--
Material Underlying Formation		--	soil and gravel	clay	gravel
Vegetation		grass	grass	grass and juniper	grass and juniper
Local Terrain		flat	hillside	hilly	hilly
Thickness of Overburden		2"	0-2'	1-5'	1'
P. I. (Overburden)		19	12	17	11
Estimated Quantity (cu. yds)		500,000 plus	500,000 plus	200,000 plus	500,000 plus
Los Angeles Wear		44.0	22.0	23.6	22.4
Soundness Loss		--	--	11.5	4.8
Average Maximum Size		--	--	4"	--
% Retained on 2" Sieve		--	--	25	--
Pit Average % Passing	Crushed to:	2"	as received	as received	1½"
	2"	100	95	70	100
	1"	31	86	55	54
	½"	18	76	42	23
	No. 4	11	65	28	11
	No. 10	8	54	23	7
	No. 200	3	9	9	2
Plasticity Index		8	N.P.	13	N.P.

Remarks:

Pit Number		7702	57112	58108
Location	Section	NE 7	NE 30	SE 23
	Township & Range	30N 29E	28N 31E	30N 29E
	County	Union	Union	Union
Formation		QTb	Tou	QTb
Rock Type		basalt boulders	caliche	basalt gravel
Source Rock (Gravel)		--	--	--
Quality of Material		good	good	good
Thickness of Material		3-5'	10'	20' plus
Thickness of Cap (Caliche)		--	1-3'	--
Material Underlying Formation		caliche and sandstone	soft caliche	sandstone
Vegetation		grass	grass	juniper and grass
Local Terrain		hilly	mesa edge	hilly
Thickness of Overburden		1'	1-2'	1'
P. I. (Overburden)		9	15	15
Estimated Quantity (cu. yds.)		150,000 plus	500,000 plus	500,000 plus
Los Angeles Wear		29.0	30.0	24.2
Soundness Loss		19.6	--	--
Average Maximum Size		6"	--	--
% Retained on 2" Sieve		30	--	15
Pit Average % Passing	Crushed to:	as received	2"	as received
	2"	60	100	82
	1"	49	50	62
	½"	43	24	49
	No. 4	36	10	36
	No. 10	28	5	4
	No. 200	10	1	7
Plasticity Index		8	N.P.	N.P.

Remarks: 57112 & 58108 : Filler material nearby.

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

QUADRANGLE PAGE _____

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

EXPLANATION

QUAD No. 12

QUATERNARY

- Qal — Alluvium
- Qaa — Alluvial Aprons
- Qab — Bolson deposits
- Qe — Eolian deposits
- Ql — Landslide debris
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qvc — Volcanic cones, vents and cinders

QUAT.–TERT.

- QTb — Basalt
- QTb_2 — High level basalt

TERT.

- Toc — Ogallala Formation Caliche
- Tou — Ogallala Formation undifferentiated
- Tog — Ogallala Formation Gravel
- Tb — Basalt

CRET.

- Kg — Graneros Shale
- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRIASSIC

- $\overline{TR}$ — Triassic undifferentiated

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

MT. DORA QUADRANGLE-12
UNION COUNTY

R.32 E. R.33 E. R.34 E. R.35 E. R.36 E. R.37 E.

T.32 N. T.31 N. T.30 N. T.29 N. T.28 N. T.27 N. T.26 N.

COLORADO

OKLAHOMA

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Control by National Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division
Modified Conic Projection Standard Parallel 36° North American Datum

Scale 1/126720 or 1 Inch = 2 Miles

MT. DORA
QUADRANGLE
12

1970

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6435	55114
Location	Section	NW 10	SE 11
	Township & Range	26N 33E	27N 36E
	County	Union	Union
Formation		QTb	Toc
Rock Type		basalt	caliche
Source Rock (Gravel)		--	--
Quality of Material		good	good
Thickness of Material		10' plus	10'
Thickness of Cap (Caliche)		0-1'	2-3'
Material Underlying Formation		caliche	soft caliche
Vegetation		grass	grass
Local Terrain		mesa edge	hilltop
Thickness of Overburden		0-3'	1'
P. I. (Overburden)		15	10
Estimated Quantity (cu. yds)		500,000 plus	200,000 plus
Los Angeles Wear		23.2	Cap: 30.0 Soft: 50.0
Soundness Loss		2.0	--
Average Maximum Size		--	--
% Retained on 2" Sieve		--	--
	Crushed to:	2"	2"
	2"	100	100
Pit	1"	83	47
Average	½"	34	25
% Passing	No. 4	17	13
	No. 10	10	8
	No. 200	3	2
Plasticity Index		N.P.	8

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
	Crushed to:	
	2"	
Pit	1"	
Average	½"	
% Passing	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No.20

QUATERNARY

- Qat — Alluvium
- Ql — Landslide debris
- Qp — Pediment deposits
- Qop — Older Pediment deposits

TERTIARY

- QTb — Basalt
- QTc — Cinders and Scoria
- Tdp — Dacite Porphyry
- Tp — Picuris Tuff
- TKp — Poison Canyon and Raton Formation

CRETACEOUS

- Kpn — Pierre Shale and Upper Niobrara
- K — Cretaceous rocks undivided
- Kgh — Greenhorn Limestone
- Kd — Dakota sandstone

JURASSIC

- J — Jurassic Rocks undivided

TRIASSIC

- R — Triassic rocks undifferentiated

PERMIAN

- Pb — Bernal Formation
- Pg — Glorieta Sandstone

PENN-SYLVANIAN

- PPsc — Sangre de Cristo Formation
- P — Pennsylvanian rocks undivided

MISS.-DEV.

- MD — Mississippian and Devonian rocks undivided

PRECAMBRIAN

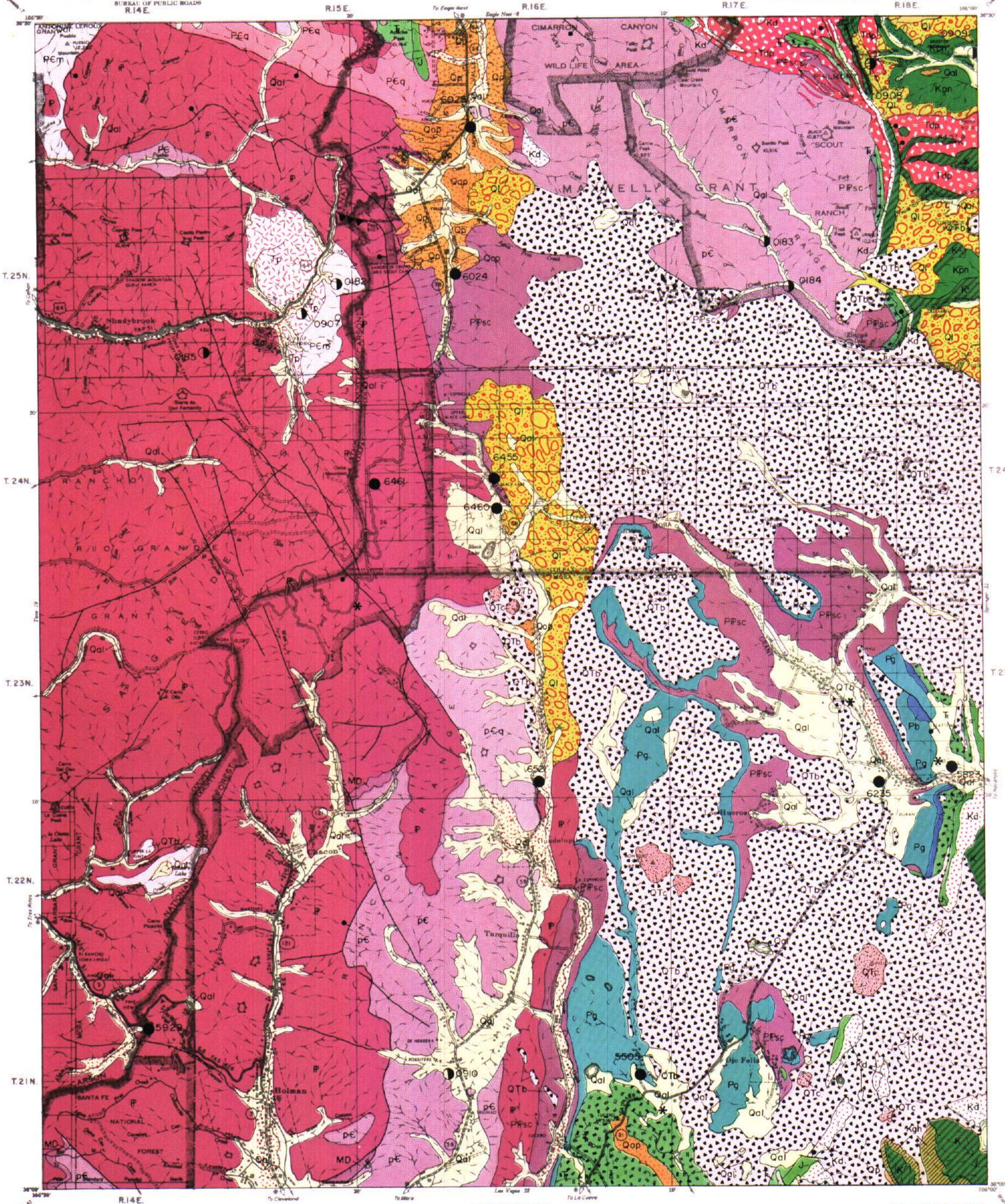
- pEm — Metamorphic rocks undivided
- pEq — Quartzite
- pE — Precambrian undivided
- pEg — Granite

- Developed Pit or Quarry
- Prospect Pit or Quarry
- Fault
- Downthrown side
- Selected exploration site

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

GEOLOGY and AGGREGATE RESOURCES

BLACK LAKE QUADRANGLE-20
COLFAX MORA & TAOS COUNTIES



Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 39½° North American Datum

DATE OF INVENTORY
GEOLOGY JAN. 1975
AGGREGATE RESOURCES JAN. 1975

Scale 1/190080 or 1 Inch = 3 Miles
STATUTE MILES

DATE OF INVENTORY
MORA COUNTY 1965
TAOS COUNTY 1965
COLFAX COUNTY 1964

BLACK LAKE
QUADRANGLE
20

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5505	5823	5929	6024
Location	Section	not sectionalized	SE 1/4 34	not sectionalized	not sectionalized
	Township & Range	Mora Grant	23N 18E	Mora Grant	Maxwell Grant
	County	Mora	Mora	Mora	Colfax
Formation		Qal	Qal	P	Qp
Rock Type		sand & gravel	gravel	ls, interbedded shale	gravel
Source Rock (Gravel)		ss, basalt & quartzite	basalt & various	-	rhyolite & various
Quality of Material		poor	good	good	good
Thickness of Material		4'	13' plus	18' plus	25' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		sandstone	shale & sandstone	shale	ls, ss, shale
Vegetation		grass	grass	pine	pine trees
Local Terrain		rolling	rolling	mountainous	mountainous
Thickness of Overburden		0-3'	1'	0-2'	0-3'
P. I. (Overburden)		S.N.P.	8	12	8
Estimated Quantity (cu. yds)		25,000	330,000 plus	550,000 plus	400,000 plus
Los Angeles Wear		48.4	36.0	17.8	51.2
Soundness Loss		12.3	20.0	23.4	22.2
Average Maximum Size		4"	5"	-	9"
% Retained on 2" Sieve		13	11	-	34
Pit Average % Passing	Crushed to:	1 1/2 "	as received	1"	as received
	2"	100	92	-	51
	1"	67	79	100	40
	½"	29	69	58	31
	No. 4	15	63	22	24
	No. 10	10	60	11	20
	No. 200	1	20	2	12
Plasticity Index		N.P.	5	N.P.	N.P.

Remarks:

Pit Number		6025	6235	6455	6460
Location	Section	not sectionalized	not sectionalized	NE 1/4 20	21
	Township & Range	Maxwell Grant	Mora Grant	24N 16E	24N 16E
	County	Colfax	Mora	Colfax	Colfax
Formation		pEq	Qal	QTb	P
Rock Type		quartzite	gravel	basalt	sandstone
Source Rock (Gravel)		-	basalt, qtzt, ss	-	-
Quality of Material		fair	good	fair	good
Thickness of Material		25' plus	10'	40'	18'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		-	-	-	-
Vegetation		grass	grass	trees	trees
Local Terrain		rolling	rolling	hilly	hilly
Thickness of Overburden		0-1'	0-2'	2'	0-2'
P. I. (Overburden)		10	S.N.P.	17	S.N.P.
Estimated Quantity (cu. yds.)		100,000 plus	100,000	50,000	20,000
Los Angeles Wear		38.0	36.6	25.6	-
Soundness Loss		4.1	16.3	5.7	-
Average Maximum Size		-	6"	-	-
% Retained on 2" Sieve		-	8	-	-
Pit Average % Passing	Crushed to:	1"	as received	1"	-
	2"	-	81	-	-
	1"	100	67	100	-
	½"	60	55	62	-
	No. 4	23	40	25	-
	No. 10	12	32	14	100
	No. 200	2	10	4	22
Plasticity Index		N.P.	N.P.	S.N.P.	S.N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE 20 (2)

MATERIAL PIT SUMMARY

Pit Number		6461	6521	0182	0183
Location	Section	NW 1/4 23	not sectionalized	not sectionalized	not sectionalized
	Township & Range	24N 15E	Mora Grant	Maxwell Grant	Maxwell Grant
	County	Colfax	Mora	Taos	Colfax
Formation		P	Qal	pEm	Qal
Rock Type		sandstone	sand & gravel	phyllite	sand & gravel
Source Rock (Gravel)		-	quartzite & igneous	-	various
Quality of Material		fair	good	good	fair
Thickness of Material		10'	8' plus	-	10'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		-	-	-	-
Vegetation		trees	underbrush & grass	various trees	grass
Local Terrain		hilside	creek bottom	mountainous	low gravel terrace
Thickness of Overburden		1'	0-3'	-	0-1'
P. I. (Overburden)		S.N.P.	S.N.P.	-	-
Estimated Quantity (cu. yds)		15,000	175,000 plus	unlimited	10,000
Los Angeles Wear		-	36.9	19.2	64.0
Soundness Loss		-	15.3	3.3	20.8
Average Maximum Size		-	3"	-	24"
% Retained on 2" Sieve		-	25	-	45
Pit Average % Passing	Crushed to:	-	as received	1"	as received
	2"	-	91	-	73
	1"	-	68	100	62
	½"	-	41	72	49
	No. 4	-	23	25	35
	No. 10	100	16	13	25
	No. 200	26	4	3	2
Plasticity Index		S.N.P.	N.P.	S.N.P.	N.P.
Remarks:					

Pit Number		0184	0185	0907	0908
Location	Section	not sectionalized	NE 1/4 35	not sectionalized	not sectionalized
	Township & Range	Maxwell Grant	25N 14E	Maxwell Grant	Philmont Scout Ranch
	County	Colfax	Taos	Taos	Colfax
Formation		pEq	P	Tp	Tdp
Rock Type		quartzite	limestone	sand & gravel	dacite
Source Rock (Gravel)		-	-	quartzite & various	-
Quality of Material		good	excellent	fair	fair
Thickness of Material		50' plus	18'	30' plus	80' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		-	-	-	-
Vegetation		grass & trees	aspen & pine	grass & sparce pine	pine
Local Terrain		mountainous	mountainous	mountainous	mountainous
Thickness of Overburden		-	0-6'(sandstone)	-	-
P. I. (Overburden)		-	S.N.P.	-	-
Estimated Quantity (cu. yds.)		500,000 plus	500,000 plus	200,000 plus	unlimited
Los Angeles Wear		25.6	22.8	34.4	25.1
Soundness Loss		2.0	2.9	31.3	11.0
Average Maximum Size		-	-	5"	-
% Retained on 2" Sieve		-	-	18	-
Pit Average % Passing	Crushed to:	1"	1"	as received	1"
	2"	-	-	79	-
	1"	100	100	68	100
	½"	61	70	49	50
	No. 4	22	25	31	36
	No. 10	13	13	21	20
	No. 200	2	2	4	12
Plasticity Index		S.N.P.	S.N.P.	N.P.	2
Remarks:					

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0909	0910
Location	Section	not sectionalized	not sectionalized
	Township & Range	Philmont Scout Ranch	Mora Grant
	County	Colfax	Mora
Formation		Qg	Qal
Rock Type		gravel	sand & gravel
Source Rock (Gravel)		igneous & sandstone	quartzite & various
Quality of Material		fair	fair
Thickness of Material		1-4'	10'
Thickness of Cap (Caliche)		-	-
Material Underlying Formation		silt & shale	-
Vegetation		grass	grass
Local Terrain		rolling	hilly
Thickness of Overburden		0-2'	2'
P. I. (Overburden)		S.N.P.	N.P.
Estimated Quantity (cu. yds)		50,000	100,000 plus
Los Angeles Wear		46.0	53.2
Soundness Loss		9.8	19.9
Average Maximum Size		10"	8"
% Retained on 2" Sieve		31	35
Pit Average % Passing	Crushed to:	as received	as received
	2"	81	63
	1"	58	59
	½"	43	50
	No. 4	33	43
	No. 10	28	37
	No. 200	16	3
Plasticity Index		N.P.	N.P.
Remarks:			

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

EXPLANATION

QUAD No. 21

QUATERNARY

- Qal — Alluvium
- Qfp — Floodplain deposits
- Qab — Bolson deposits
- Qld — Lake deposits
- Qaf — Alluvial fan deposits
- Ql — Landslide debris
- Qta — Quaternary Talus
- Qps — Piedmont slope deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qop — Older Pediment deposits

QUAT.–TERT.

- QTb — Basalt

TERT.

- Ti — Intrusive rocks undivided
- Tki — Intrusives, predominantly

CRETACEOUS

- Kpn — Pierra Shale and upper part of Niobrara Formation
- Knf — Fort Hays Limestone
- Kc — Carlile Shale
- Kgh — Greenhorn Limestone
- Kgg — Greenhorn Limestone and Graneros Shale combined
- Kg — Graneros Shale
- K — Cretaceous rocks undivided
- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

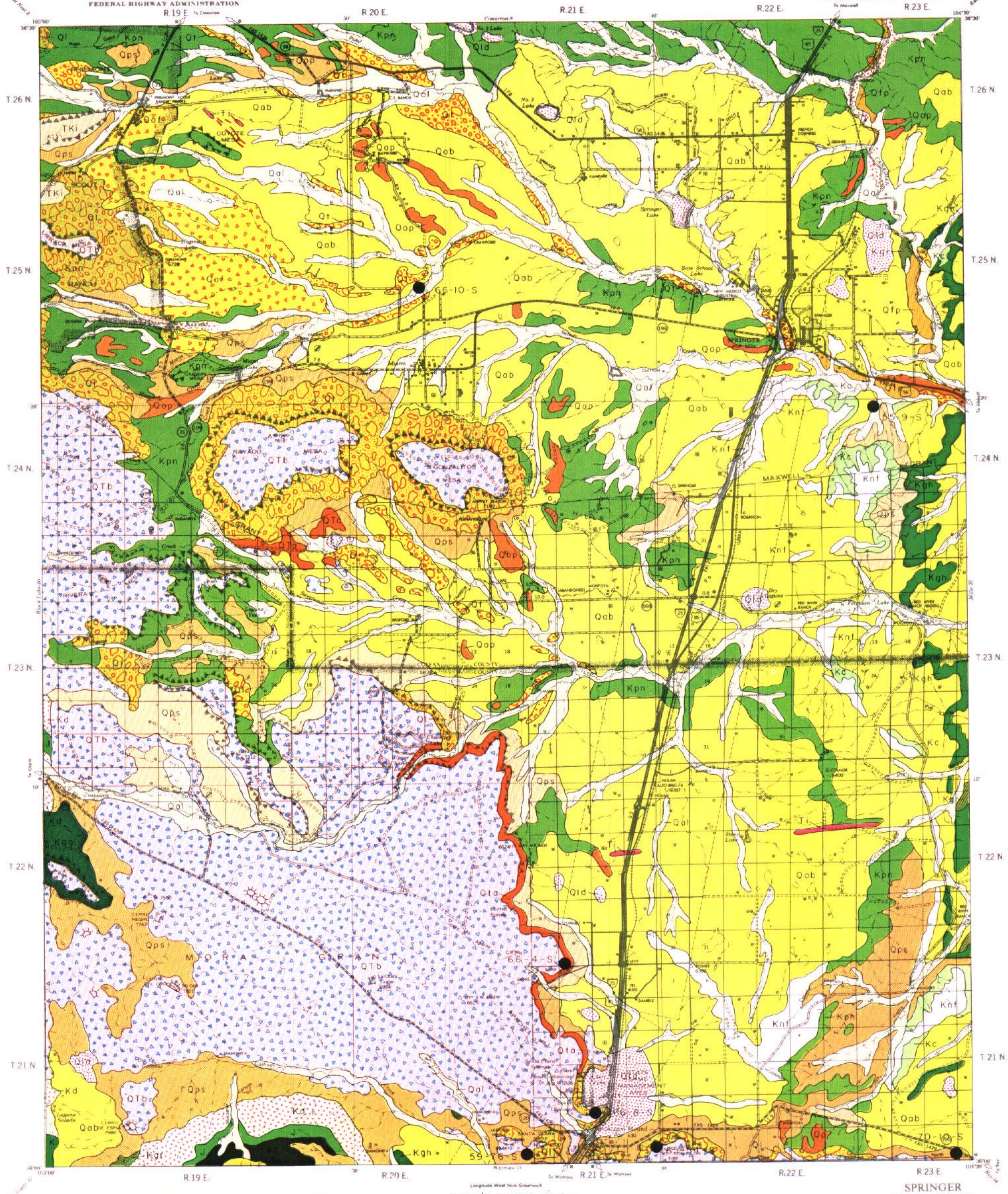
TRIASSIC

- Trc — Chinle Formation
- Trs — Santa Rosa Sandstone

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

GEOLOGY AND AGGREGATE RESOURCES

SPRINGER QUADRANGLE-21
COLFAX & MORA COUNTIES



DATE OF INVENTORY
GEOLOGY MAY 1981

QUADRANGLE PAGE 21

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5509	5976	6554	6604
Location	Section	Not sectionalized	Not sectionalized	SE 35	SW 33
	Township & Range	Maxwell Grant	Mora Grant	21N 21E	22N 21E
	County	Colfax	Mora	Mora	Mora
Formation		Qal	QTb	QTb	QTb
Rock Type		sand and gravel	basalt	basalt	basalt
Source Rock (Gravel)		quartzite & limestone	--	--	--
Quality of Material		poor	good	good	good
Thickness of Material		11' plus	10' plus	20' plus	12' plus
Thickness of Cap (Caliche)		--	--	--	--
Material Underlying Formation		water	sandstone and shale	sandstone and shale	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		creek bottom	hillside	mesa edge	mesa edge
Thickness of Overburden		0-1'	--	--	0-2'
P. I. (Overburden)		N.P.	--	--	8
Estimated Quantity (cu. yds)		10,000	250,000 plus	500,000 plus	500,000 plus
Los Angeles Wear		26.8	17.2	13.2	31.6
Soundness Loss		--	1.2	0.5	9.6
Average Maximum Size		3"	--	--	--
% Retained on 2" Sieve		6	--	--	--
Pit Average % Passing	Crushed to:	3/4"	2"	2"	2"
	2"	--	100	100	100
	1"	100	67	74	79
	½"	83	23	23	31
	No. 4	48	10	18	16
	No. 10	35	6	5	10
	No. 200	5	1	1	3
Plasticity Index		N.P.	N.P.	N.P.	N.P.
Remarks:					

Pit Number		6608	6610	7010
Location	Section	SW 21	Not sectionalized	SE 32
	Township & Range	21N 21E	Maxwell Land Grant	21N 23E
	County	Mora	Colfax	Mora
Formation		QTh	Qop	Qps
Rock Type		basalt	sand and gravel	caliche
Source Rock (Gravel)		--	various	--
Quality of Material		good	good	good
Thickness of Material		20' plus	10' plus	8'
Thickness of Cap (Caliche)		--	--	3'
Material Underlying Formation		sandstone	clay	sandstone
Vegetation		grass	grass	grass
Local Terrain		mesa edge	rolling	rolling
Thickness of Overburden		0-2'	1-5'	1-2'
P. I. (Overburden)		12	12	11
Estimated Quantity (cu. yds.)		500,000 plus	250,000	20,000
Los Angeles Wear		30.0	30.0	25.0
Soundness Loss		10.4	8.6	2.9
Average Maximum Size		--	4"	--
% Retained on 2" Sieve		--	15	--
Pit Average % Passing	Crushed to:	2"	as received	2"
	2"	100	84	100
	1"	86	59	90
	½"	34	41	72
	No. 4	18	26	50
	No. 10	11	19	34
	No. 200	4	3	13
Plasticity Index		N.P.	N.P.	N.P.
Remarks:				

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

QUADRANGLE PAGE _____

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

EXPLANATION

QUAD No. 22

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Qe — Eolian deposits
- Ql — Landslide debris
- Qps — Piedmont slope deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qc — Cinders and Scoria
- Qvc — Volcanic cones, vents and cinders
- Qop — Older Pediment deposits

QUAT.–TERT.

- QTb — Basalt

TERT.

- Toc — Ogallala Formation Caliche
- Tou — Ogallala Formation undifferentiated
- Tog — Ogallala Formation Gravel
- Ti — Intrusive rocks undivided

CRETACEOUS

- Kpnc — Pierra Shale and upper part of Niobrara Formation
- Kc — Carlile Shale
- Kgh — Greenhorn Limestone
- Kg — Graneros Shale
- K — Cretaceous rocks undivided
- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRIASSIC

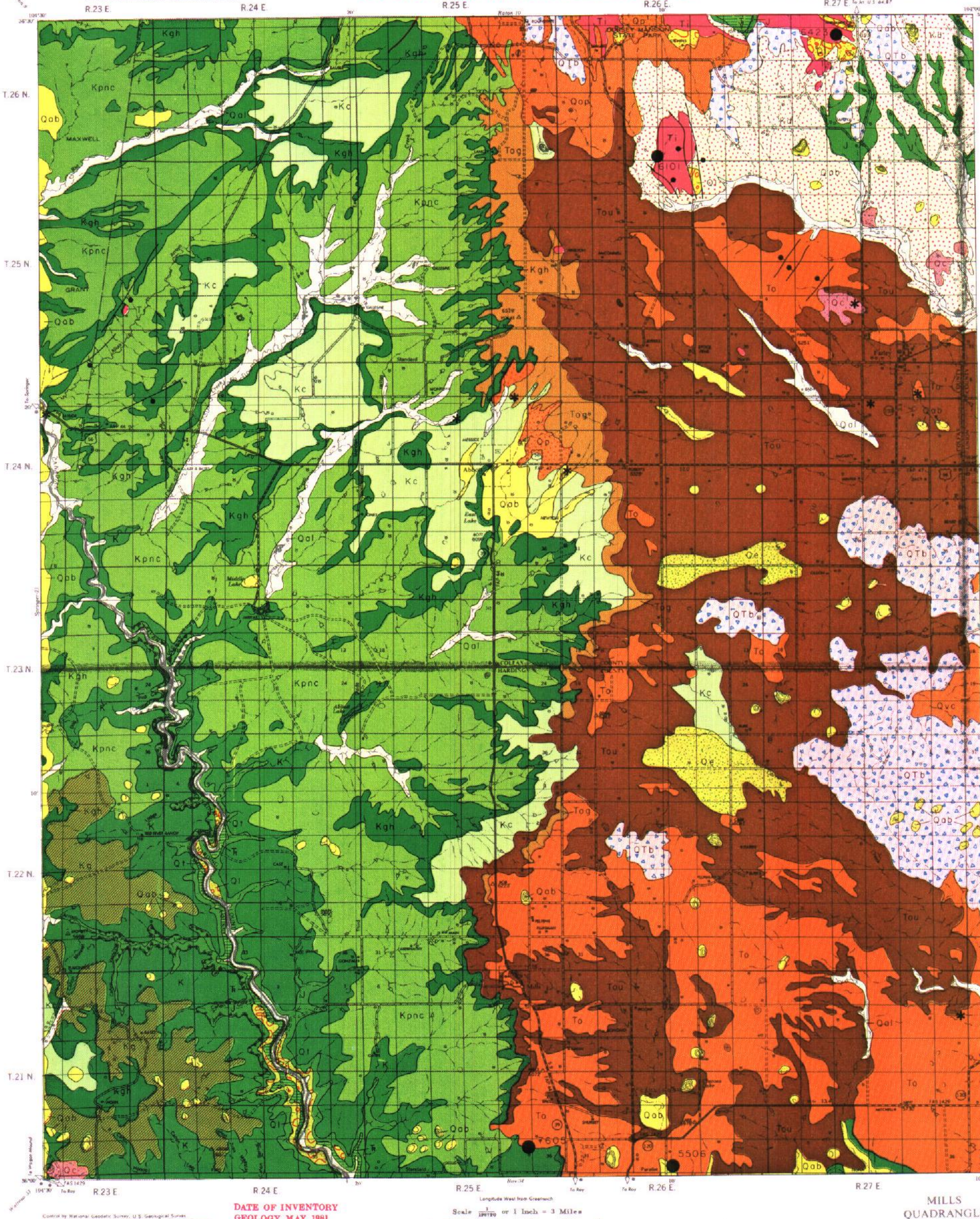
- TR — Triassic undifferentiated

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

MILLS QUADRANGLE-22
COLFAX, HARDING, MORA & UNION COUNTIES



R.23 E. R.24 E. R.25 E. R.26 E. R.27 E.

Control by National Geodetic Survey, U.S. Geological Survey
U.S. Forest Service, Bureau of Land Management and Planning Division,
Modified Conic Projection Standard Parallel 36½° North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Longitude West from Greenwich

Scale 1/126720 or 1 Inch = 2 Miles

STATUTE MILES

MILLS
QUADRANGLE
22

QUADRANGLE PAGE 22

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5506	6101	6423	7605
Location	Section	SW 34	NW 3	NW 16	NE 35
	Township & Range	21N 26E	25N 26E	26N 27E	21N 25E
	County	Harding	Colfax	Colfax	Harding
Formation		Toc	Ti	Ti	Toc
Rock Type		caliche	diorite	diorite	caliche
Source Rock (Gravel)					
Quality of Material		good	good	good	excellent
Thickness of Material		10' plus	12-17'	13'	10' plus
Thickness of Cap (Caliche)		2-3'			2'
Material Underlying Formation		caliche	sandstone	sand	caliche
Vegetation		rolling	grass	grass	grass
Local Terrain		grass	mesa top	hilly	hilly
Thickness of Overburden		3'	2'	3'	1'
P. I. (Overburden)		15	16	16	11
Estimated Quantity (cu. yds)		250,000 plus	500,000 plus	500,000 plus	500,000 plus
Los Angeles Wear		30.4	15.6	8.8	22.9
Soundness Loss			1.5	0.4	3.8
Average Maximum Size					
% Retained on 2" Sieve					
	Crushed to:	3/4"	as received	as received	1"
	2"		100	100	
Pit	1"	100	40	94	100
Average	½"	78	17	84	77
% Passing	No. 4	36	7	66	35
	No. 10	22	4	54	20
	No. 200	6	1	5	4
Plasticity Index		8	N.P.	N.P.	N.P.

Remarks:

Pit Number	
Location: Section	
Township & Range	
County	
Formation	
Rock Type	
Source Rock (Gravel)	
Quality of Material	
Thickness of Material	
Thickness of Cap (Caliche)	
Material Underlying Formation	
Vegetation	
Local Terrain	
Thickness of Overburden	
P. I. (Overburden)	
Estimated Quantity (cu. yds.)	
Los Angeles Wear	
Soundness Loss	
Average Maximum Size	
% Retained on 2" Sieve	
Crushed to:	
2"	
Pit 1"	
Average ½"	
% Passing No. 4	
No. 10	
No. 200	
Plasticity Index	

Remarks:

QUADRANGLE PAGE 22

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5506	6101	6423	7605
Location	Section	SW 34	NW 3	NW 16	NE 35
	Township & Range	21N 26E	25N 26E	26N 27E	21N 25E
	County	Harding	Colfax	Colfax	Harding
Formation		Toc	Ti	Ti	Toc
Rock Type		caliche	diorite	diorite	caliche
Source Rock (Gravel)					
Quality of Material		good	good	good	excellent
Thickness of Material		10' plus	12-17'	13'	10' plus
Thickness of Cap (Caliche)		2-3'			2'
Material Underlying Formation		caliche	sandstone	sand	caliche
Vegetation		rolling	grass	grass	grass
Local Terrain		grass	mesa top	hilly	hilly
Thickness of Overburden		3'	2'	3'	1'
P. I. (Overburden)		15	16	16	11
Estimated Quantity (cu. yds)		250,000 plus	500.000 plus	500,000 plus	500,000 plus
Los Angeles Wear		30.4	15.6	8.8	22.9
Soundness Loss			1.5	0.4	3.8
Average Maximum Size					
% Retained on 2" Sieve					
	Crushed to:	3/4"	as received	as received	1"
	2"		100	100	
Pit	1"	100	40	94	100
Average	½"	78	17	84	77
% Passing	No. 4	36	7	66	35
	No. 10	22	4	54	20
	No. 200	6	1	5	4
Plasticity Index		8	N.P.	N.P.	N.P.

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
	Crushed to:	
	2"	
Pit	1"	
Average	½"	
% Passing	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

EXPLANATION

QUAD No. 23

QUATERNARY	Qal	Alluvium
	Qab	Bolson
	Qe	Eolian deposits
	Ql	Landslide debris
	Qp	Cinders and Scoria
	Qvc	Volcanic cones, vents
QUAT.-TERT.	QTb	Basalt
	QTb_2	High level basalt
TERT.	Toc	Ogallala Formation Caliche
	Tou	Ogallala Formation undifferentiated
	Tog	Ogallala Formation Gravel
CRET.	K	Cretaceous rocks undivided
	Kd	Dakota Formation
JUR.	J	Jurassic undivided
TRIASSIC	$\tilde{T}rc$	Triassic undifferentiated

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

GLADSTONE QUADRANGLE-23
UNION & HARDING COUNTIES

R 28 E | R 29 E | R 30 E | R 31 E | R 32 E

T. 26 N. | T. 25 N. | T. 24 N. | T. 23 N. | T. 22 N. | T. 21 N.

Qvc QTb2 Qe Toc Tou Kd QTb Qal J Qc Qp Tog To K

69-23-S
69-24-S
59-82-S
63-16-S

Control by National Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division
Modified Conic Projection Standard Parallel 34°N North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale 1/126720 or 1 Inch = 2 Miles
STATUTE MILES

1976

GLADSTONE
QUADRANGLE
23

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6923	6924	5982	6316
Location	Section	NE 9	NW 20	NE 29	NE 19
	Township & Range	24N 29E	24N 29E	21N 28E	21N 32E
	County	Union	Union	Harding	Harding
Formation		QTb	QTb	Toc	Toc
Rock Type		basalt	basalt	caliche	caliche
Source Rock (Gravel)					
Quality of Material		good	good	good	good
Thickness of Material		15' plus	12' plus	10' plus	12' plus
Thickness of Cap (Caliche)				2-4'	3'
Material Underlying Formation		sand and silt	sand and silt	soft caliche	sand and silt
Vegetation		grass	grass	grass	grass
Local Terrain		mesa edge	flat	canyon edge	mesa top
Thickness of Overburden		0-2'	0-3'	0-2'	2-3'
P. I. (Overburden)		18	17		13
Estimated Quantity (cu. yds.)		unlimited	25,000	250,000 plus	75,000 plus
Los Angeles Wear		16.0	22.4	36.8	cap: 25.6 soft: 64.8
Soundness Loss		2.0	7.0	1.7	cap: 3.7
Average Maximum Size					
% Retained on 2" Sieve					
Pit Average % Passing	Crushed to:	2"	2"	2"	2"
	2"	100	100	100	100
	1"	70	62	93	82
	½"	27	27	80	36
	No. 4	13	11	60	17
	No. 10	7	6	48	11
	No. 200	2	2	15	3
Plasticity Index		N.P.	N.P.	8	N.P.
Remarks:		6923: 45% silica in chemical analysis			

Pit Number					
Location	Section				
	Township & Range				
	County				
Formation					
Rock Type					
Source Rock (Gravel)					
Quality of Material					
Thickness of Material					
Thickness of Cap (Caliche)					
Material Underlying Formation					
Vegetation					
Local Terrain					
Thickness of Overburden					
P. I. (Overburden)					
Estimated Quantity (cu. yds.)					
Los Angeles Wear					
Soundness Loss					
Average Maximum Size					
% Retained on 2" Sieve					
Pit Average % Passing	Crushed to:				
	2"				
	1"				
	½"				
	No. 4				
	No. 10				
	No. 200				
Plasticity Index					
Remarks:					

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 24

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Qe — Eolian deposits
- Ql — Landslide debris
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qc — Cinders and Scoria
- Qvc — Volcanic cones, vents and cinders

QUAT. TERT.

- QTb — Basalt
- QTb_2 — High level basalt

TERT.

- Toc — Ogallala Formation Caliche
- Tou — Ogallala Formation undifferentiated
- Tog — Ogallala Formation Gravel

CRET.

- Kg — Graneros Shale
- Kd — Dakota Formation

JUR.

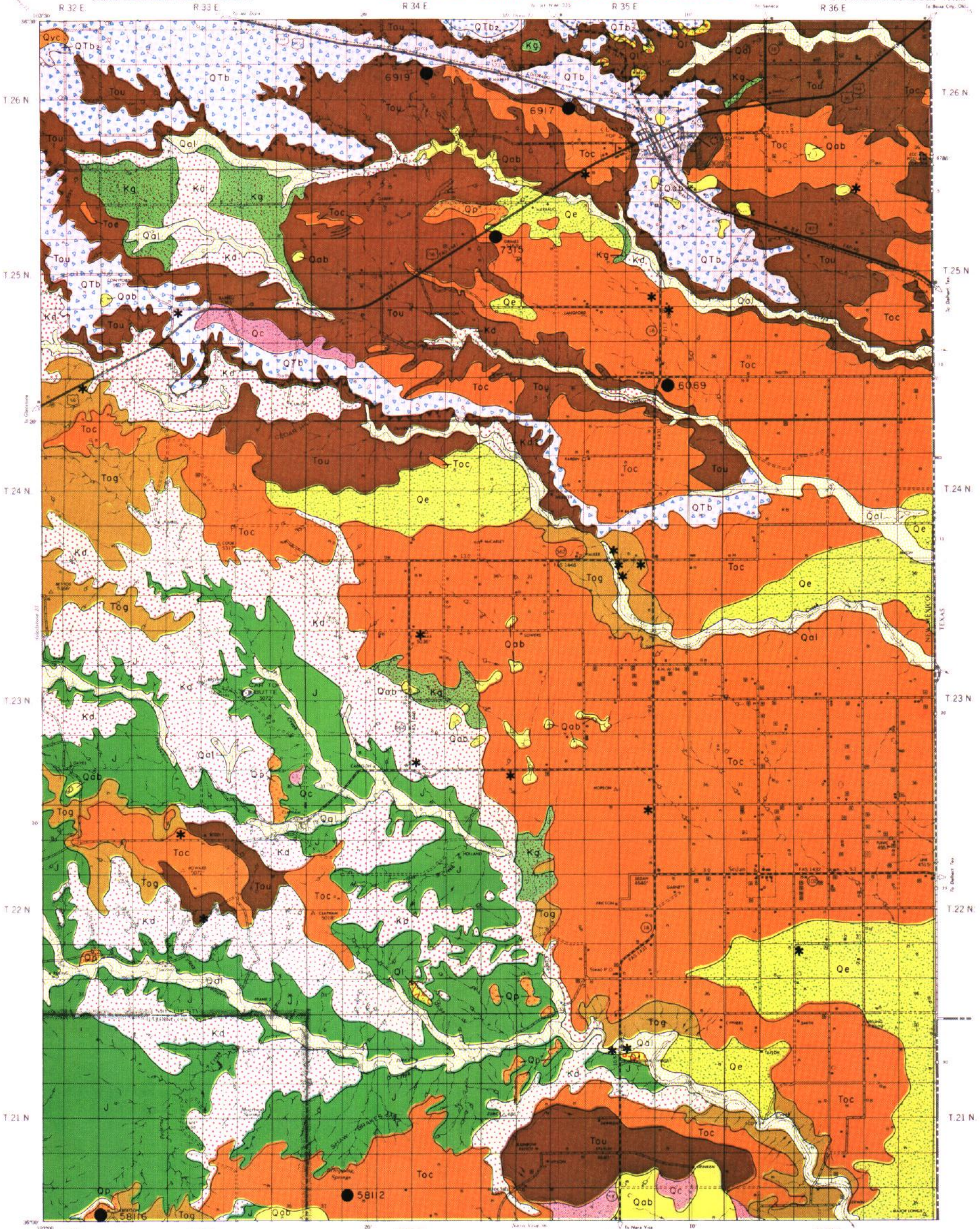
- J — Jurassic undivided

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

CLAYTON QUADRANGLE-24
UNION & HARDING COUNTIES



Control by National Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division
Modified Conic Projection Standard Parallel 34° North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Longitude West from Greenwich
Scale 1/126720 or 1 Inch = 3 Miles
0 1 2 3 4
STATUTE MILES

DATE OF INVENTORY
HARDING COUNTY 1970
UNION COUNTY 1970

CLAYTON
QUADRANGLE
24

1970

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		58112	58116	6069	6917
Location	Section	NW 32	SW 31	NW 2	NW 29
	Township & Range	21N 34E	21N 33E	24N 35E	26N 35E
	County	Union	Harding	Union	Union
Formation		Toc	Qp	Toc	QTb
Rock Type		caliche	gravel	caliche	basalt
Source Rock (Gravel)			various		
Quality of Material		excellent	fair	good	excellent
Thickness of Material		12' plus	7'	8' plus	12'
Thickness of Cap (Caliche)		3'		2-3'	
Material Underlying Formation		soft caliche	sandstone	soft caliche	clay
Vegetation		grass	grass	grass	grass
Local Terrain		flat	rolling	flat	mesa edge
Thickness of Overburden		1-2'	0-6'	1-3'	1-2'
P. I. (Overburden)		11	10	9	10
Estimated Quantity (cu. yds)		500,000 plus	150,000	500,000 plus	500,000 plus
Los Angeles Wear		27.6	28.0	22.4	34.8
Soundness Loss				1.7	6.3
Average Maximum Size			2"		
% Retained on 2" Sieve			15		
Pit Average % Passing	Crushed to:	2"	as received	2"	2"
	2"	100	89	100	100
	1"	86	76	78	77
	½"	68	62	50	29
	No. 4	46	48	30	15
	No. 10	33	38	22	9
	No. 200	8	10	5	3
Plasticity Index		N.P.	14	7	N.P.
Remarks:					

Pit Number		6919	7315
Location	Section	N 22	SW 12
	Township & Range	26N 34E	25N 34E
	County	Union	Union
Formation		QTb	Toc
Rock Type		basalt	caliche
Source Rock (Gravel)			
Quality of Material		excellent	good
Thickness of Material		12'	10' plus
Thickness of Cap (Caliche)			1-3'
Material Underlying Formation		clay	soft caliche
Vegetation		grass	grass
Local Terrain		mesa edge	hilly
Thickness of Overburden		1'	0-2'
P. I. (Overburden)		12	N.P.
Estimated Quantity (cu. yds.)		500,000 plus	100,000 plus
Los Angeles Wear		23.0	25.6
Soundness Loss		6.4	8.6
Average Maximum Size			
% Retained on 2" Sieve			
Pit Average % Passing	Crushed to:	2"	2"
	2"	100	100
	1"	87	88
	½"	41	64
	No. 4	22	47
	No. 10	14	35
	No. 200	5	8
Plasticity Index		N.P.	N.P.
Remarks:			

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 31

QUATERNARY

- Qal — Alluvium
- Ql — Landslide debris
- Qt_1 — Terrace deposits (post-glacial)
- Qt_2 — Terrace deposits (Pinedale)
- Qt_3 — Terrace deposits (Late Bull Lake)
- Qp — Pediment deposits
- Qop — Older Pediment deposits
- Qgl — Glacial deposits

QUATERNARY TERTIARY

- QTsf — Santa Fe Formation

TERTIARY

- Ti — Intrusive rocks undivided

TRIASSIC JURASSIC

- J — Jurassic Rocks undivided

TRIASSIC

- Tr — Triassic Rocks undivided

PERMIAN

- Pb — Bernal Formation
- Psa — San Andres Limestone
- Pg — Glorieta Sandstone
- Py — Yeso Formation
- PPsc — Sangre de Cristo Formation

PENNSYLVANIAN

- P — Pennsylvanian rocks undivided

PRECAMBRIAN

- p€q — Quartzite
- p€g — Granite

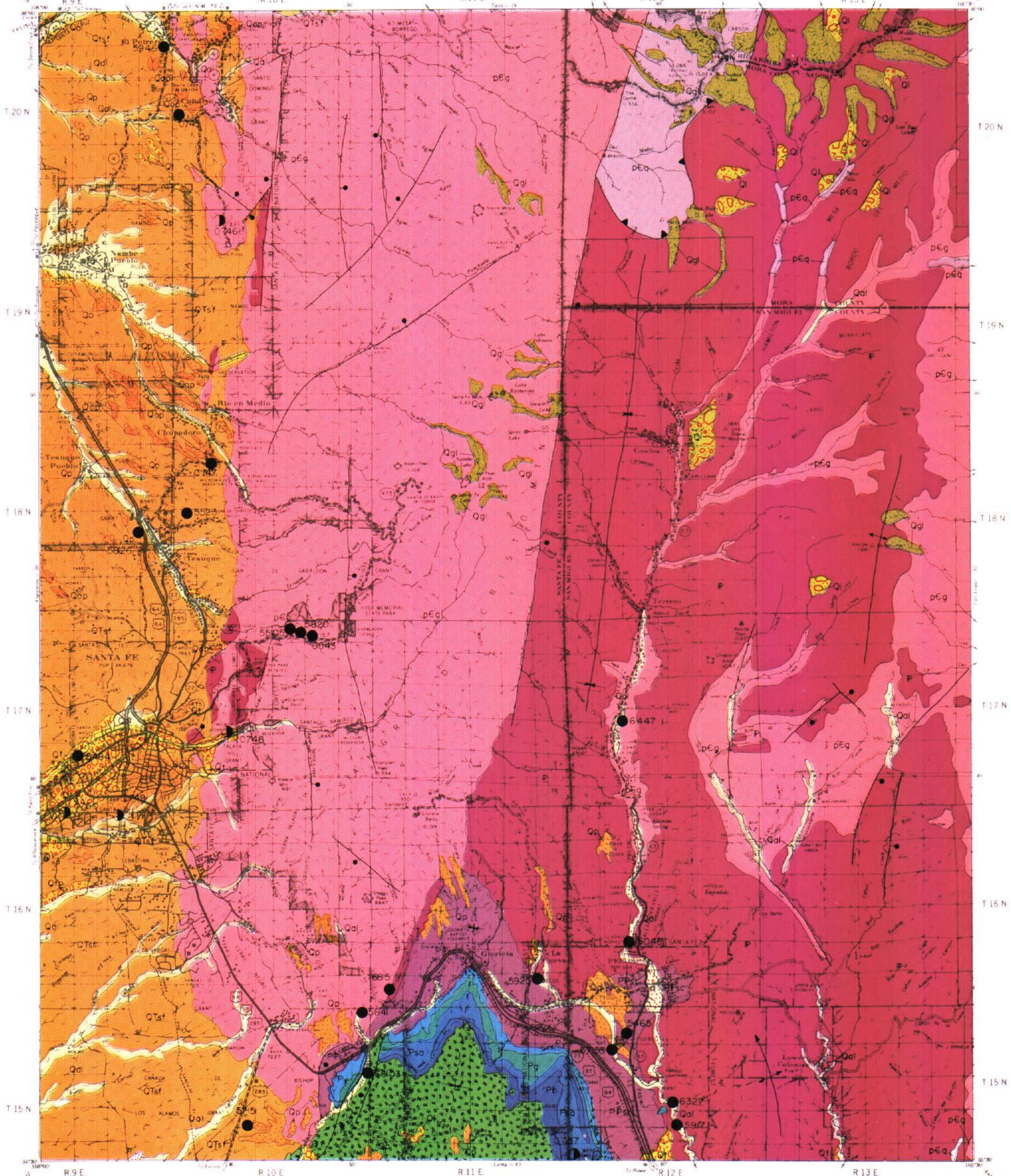
- Developed Pit or Quarry
- Prospect Pit or Quarry
- Fault
- Downthrown side
- Selected exploration site

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

GEOLOGY and AGGREGATE RESOURCES

SANTA FE QUADRANGLE - 31

SANTA FE SAN MIGUEL MORA & RIO ARRIBA COUNTIES



Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 36°N North American Datum

DATE OF INVENTORY
GEOLOGY JAN 1975
AGGREGATE RESOURCES JAN 1975

Longitude West from Greenwich
Scale 1:126720 or 1 Inch = 3 Miles
STATUTE MILES

DATE OF INVENTORY

SANTA FE	COUNTY	1967
SAN MIGUEL	COUNTY	1965
RIO ARRIBA	COUNTY	1967
MORA	COUNTY	1965

SANTA FE
QUADRANGLE
31

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5465	5484	5523	55105
Location	Section	SW 1/4 5	not sectionalized	N 1/2 19	SE 1/4 3
	Township & Range	15N 12E	Santa Fe Grant	18N 10E	17N 10E
	County	San Miguel	Santa Fe	Santa Fe	Santa Fe
Formation		Qp	Qtl	QTsf	pEg
Rock Type		gravel	sand & gravel	sand & gravel	granite
Source Rock (Gravel)		granite & various	granite	granite & various	-
Quality of Material		good	good	good	fair
Thickness of Material		6' plus	10' plus	8'	12' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		clay	silt	silt & clay	-
Vegetation		juniper	sage & grass	juniper	pine
Local Terrain		hilly	river floor	mountainous	mountainous
Thickness of Overburden		0-2'	0-2'	0-3'	3'
P. I. (Overburden)		0-8	S.N.P.	S.N.P.	N.P.
Estimated Quantity (cu. yds)		100,000	200,000 plus	175,000	unlimited
Los Angeles Wear		36.4	34.0	40.0	36.0
Soundness Loss		6.7	5.2	2.3	2.5
Average Maximum Size		7"	5"	3"	-
% Retained on 2" Sieve		22	21	17	-
Pit Average % Passing	Crushed to:	as received	as received	as received	3/4"
	2"	73	86	93	-
	1"	61	70	86	100
	½"	47	52	65	89
	No. 4	37	37	44	55
	No. 10	29	26	33	37
	No. 200	16	6	4	6
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

Pit Number		5641	56103	57151	57153
Location	Section	E 1/2 1	not sectionalized	not sectionalized	N 1/2 8
	Township & Range	15N 10E	Bishop John Lamy Grant	Bishop John Lamy Grant	15 N 12 E
	County	Santa Fe	Santa Fe	Santa Fe	San Miguel
Formation		Qal	Qal	Qip	Qp
Rock Type		gravel	sand & gravel	sand & gravel	sand & gravel
Source Rock (Gravel)		granite	granite & various	granite & various	granite & various
Quality of Material		good	good	poor	good
Thickness of Material		8'	10'	14' plus	7' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		clay & shale	shale & clay	granite	clay
Vegetation		pine	juniper	juniper	pine & juniper
Local Terrain		mountainous	mountainous	hilly	mountainous
Thickness of Overburden		0-4'	2-4'	3-5'	0-2'
P. I. (Overburden)		8	N.P.	10	N.P.
Estimated Quantity (cu. yds.)		225,000	75,000	200,000	75,000
Los Angeles Wear		34.4	Top: 36.4 Bottom: 43.2	50.0	37.6
Soundness Loss		4.4	4.7	2.6	10.6
Average Maximum Size		6"	5"	4"	5"
% Retained on 2" Sieve		31	17	9	18
Pit Average % Passing	Crushed to:	as received	as received	as received	as received
	2"	83	86	86	73
	1"	62	67	70	63
	½"	50	50	57	55
	No. 4	35	32	41	46
	No. 10	24	20	28	39
	No. 200	2	2	3	5
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks: 57153: water at 7'

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5820	58126	5917	5920
Location	Section	E 1/2 3	SW 1/4 24	SW 1/4 22	NW 1/4 36
	Township & Range	17N 10E	18N 9E	15N 12 E	16N 11E
	County	Santa Fe	Santa Fe	San Miguel	Santa Fe
Formation		pEg	QTsf	Qal	P
Rock Type		granitic schistose	gravel	sand & gravel	limestone
Source Rock (Gravel)		-	granite & various	various	-
Quality of Material		fair	good	good	good
Thickness of Material		80' plus	8' plus	10' plus	9' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		-	silt & clay	shale	shale & clay
Vegetation		pine	juniper	juniper	pine
Local Terrain		mountainous	mountainous	hilly	mountainous
Thickness of Overburden		0-3'	2-8'	0-5'	-
P. I. (Overburden)		S.N.P.	11	N.P.	-
Estimated Quantity (cu. yds)		unlimited	50,000 plus	125,000	100,000 plus
Los Angeles Wear		24.7	35.2	35.2	26.8
Soundness Loss		3.1	5.2	4.6	3.1
Average Maximum Size		-	6"	8"	-
% Retained on 2" Sieve		-	20	37	-
Pit Average % Passing	Crushed to:	1"	as received	as received	1"
	2"	-	74	58	-
	1"	100	51	50	100
	½"	56	38	41	47
	No. 4	22	27	30	20
	No. 10	12	19	22	11
	No. 200	2	2	2	2
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

Pit Number		5946	6043	6048	6327
Location	Section	NE 1/4 12	W 1/2 2	SW 1/4 21	SW 1/4 15
	Township & Range	20N 9E	17N 10E	16N 12E	15N 12E
	County	Santa Fe	Santa Fe	San Miguel	San Miguel
Formation		QTsf	pEg	Qal	Qp
Rock Type		sand & gravel	metamorphics	sand & gravel	gravel
Source Rock (Gravel)		various	-	limestone & granite	granite & quartzite
Quality of Material		good	good	good	good
Thickness of Material		11' plus	20'	10' plus	8'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		clay	granite	-	shale & sandstone
Vegetation		juniper	pine	pine	juniper
Local Terrain		mountainous	mountainous	canyon floor	hilly
Thickness of Overburden		0-3'	0-3'	0-4'	0-3'
P. I. (Overburden)		S.N.P.	0-9	N.P.	S.N.P.
Estimated Quantity (cu. yds.)		5,000 plus	125,000	150,000	75,000
Los Angeles Wear		45.9	22.1	27.2	26.6
Soundness Loss		5.0	2.7	6.0	4.8
Average Maximum Size		5"	-	4"	6"
% Retained on 2" Sieve		30	-	15	18
Pit Average % Passing	Crushed to:	as received	1"	as received	as received
	2"	79	-	78	64
	1"	67	100	59	49
	½"	57	57	47	41
	No. 4	45	23	36	32
	No. 10	32	13	29	27
	No. 200	5	4	3	11
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

6048: water at 7'

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6447	6815	0745	0746
Location	Section	SE 1/4 20	NE 1/4 31	NW 1/4 19	5
	Township & Range	17N 12E	16N 11E	20N 10E	19N 10E
	County	San Miguel	Santa Fe	Santa Fe	Santa Fe
Formation		Qal	ℙ	QTsf	pЄg
Rock Type		gravel	limestone	sand & gravel	micaceous granite
Source Rock (Gravel)		granite & quartzite	-	granite with quartzite	-
Quality of Material		good	good	good	fair to good
Thickness of Material		10' plus	5' plus	30'	100' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		granite	clay and shale	silt	-
Vegetation		pine	pine	juniper	pinon, chamisa, scrub oak
Local Terrain		canyon bottom	mountainous	mountainous	mountainous
Thickness of Overburden		3-10'	0-2'	0-3'	0-2'
P. I. (Overburden)		9	S.N.P. - 8	S.N.P.	-
Estimated Quantity (cu. yds)		250,000	125,000	100,000	unlimited
Los Angeles Wear		28.8	18.4	42.4	26.5
Soundness Loss		5.6	5.9	7.6	36.6
Average Maximum Size		7"	-	2"	-
% Retained on 2" Sieve		41	-	4	-
Pit Average % Passing	Crushed to:	as received	1"	as received	1"
	2"	54	-	94	-
	1"	44	100	82	100
	½"	35	66	73	78
	No. 4	26	41	60	43
	No. 10	20	37	47	24
	No. 200	3	3	18	2
Plasticity Index		N.P.	N.P.	N.P.	N.P.
Remarks:					

Pit Number		0747	0748	0749	0750
Location	Section	SW 1/4 8	not sectionalized	N 1/2 2	SE 1/4 33
	Township & Range	18N 10E	Santa Fe Grant	16N 9E	17N 9E
	County	Santa Fe	Santa Fe	Santa Fe	Santa Fe
Formation		Qop	Qtm	Qp	QTh
Rock Type		gravel	gravel	sand & gravel	sand & gravel
Source Rock (Gravel)		granite	granite	granite & various	granite
Quality of Material		fair	poor	excellent	good
Thickness of Material		8'	25' plus	15' plus	10' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		silt & clay	granite	-	silt
Vegetation		juniper	juniper	juniper	juniper
Local Terrain		mountainous	mountainous	hilly	rolling
Thickness of Overburden		0-4'	0-4'	0-3'	0-2'
P. I. (Overburden)		S.N.P.	10	S.N.P.	S.N.P.
Estimated Quantity (cu. yds.)		150,000	175,000 plus	200,000	125,000
Los Angeles Wear		47.4	34.3	34.6	34.1
Soundness Loss		8.4	3.6	3.9	5.1
Average Maximum Size		6"	4"	5"	5"
% Retained on 2" Sieve		10	7	23	5
Pit Average % Passing	Crushed to:	as received	as received	as received	as received
	2"	60	93	88	99
	1"	47	81	74	93
	½"	40	68	57	71
	No. 4	30	56	40	49
	No. 10	22	47	28	37
	No. 200	8	27	6	9
Plasticity Index		N.P.	11	N.P.	N.P.
Remarks:					

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0757
Location	Section	NW 1/4 30
	Township & Range	15N 12E
	County	San Miguel
Formation		Psa
Rock Type		limestone
Source Rock (Gravel)		-
Quality of Material		good
Thickness of Material		8' plus
Thickness of Cap (Caliche)		-
Material Underlying Formation		sandstone
Vegetation		pine, pinon, & scrub oak
Local Terrain		hilly
Thickness of Overburden		0-2'
P. I. (Overburden)		-
Estimated Quantity (cu. yds)		75,000
Los Angeles Wear		39.8
Soundness Loss		4.9
Average Maximum Size		-
% Retained on 2" Sieve		-
Pit Average % Passing	Crushed to:	1"
	2"	-
	1"	100
	½"	58
	No. 4	27
	No. 10	17
	No. 200	5
Plasticity Index		N.P.

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 32

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Qld — Lake deposits
- Qaf — Alluvial fan deposits
- Ql — Landslide debris
- Qps — Piedmont slope deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qb — Basalt
- Qop — Older Pediment deposits

TERT.

- Ti — Intrusive rocks undivided

CRETACEOUS

- Knf — Fort Hays Limestone
- Kc — Carlile Shale
- Kgh — Greenhorn Limestone
- Kgg — Greenhorn Limestone
- Kg — Graneros Shale
- K — Cretaceous rocks undivided
- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRAISSIC

- Trc — Chinle Formation
- Tr — Triassic undifferentiated
- Trs — Santa Rosa Sandstone

PER.

- P — Lower Permian undivided

PER.-PENN.

- PPsc — Sangre de Cristo undivided

PENN.

- IP — Pennsylvanian rock undivided

MISS.-DEV.

- MD — Miss. and Dev. undivided

PRECAMB.

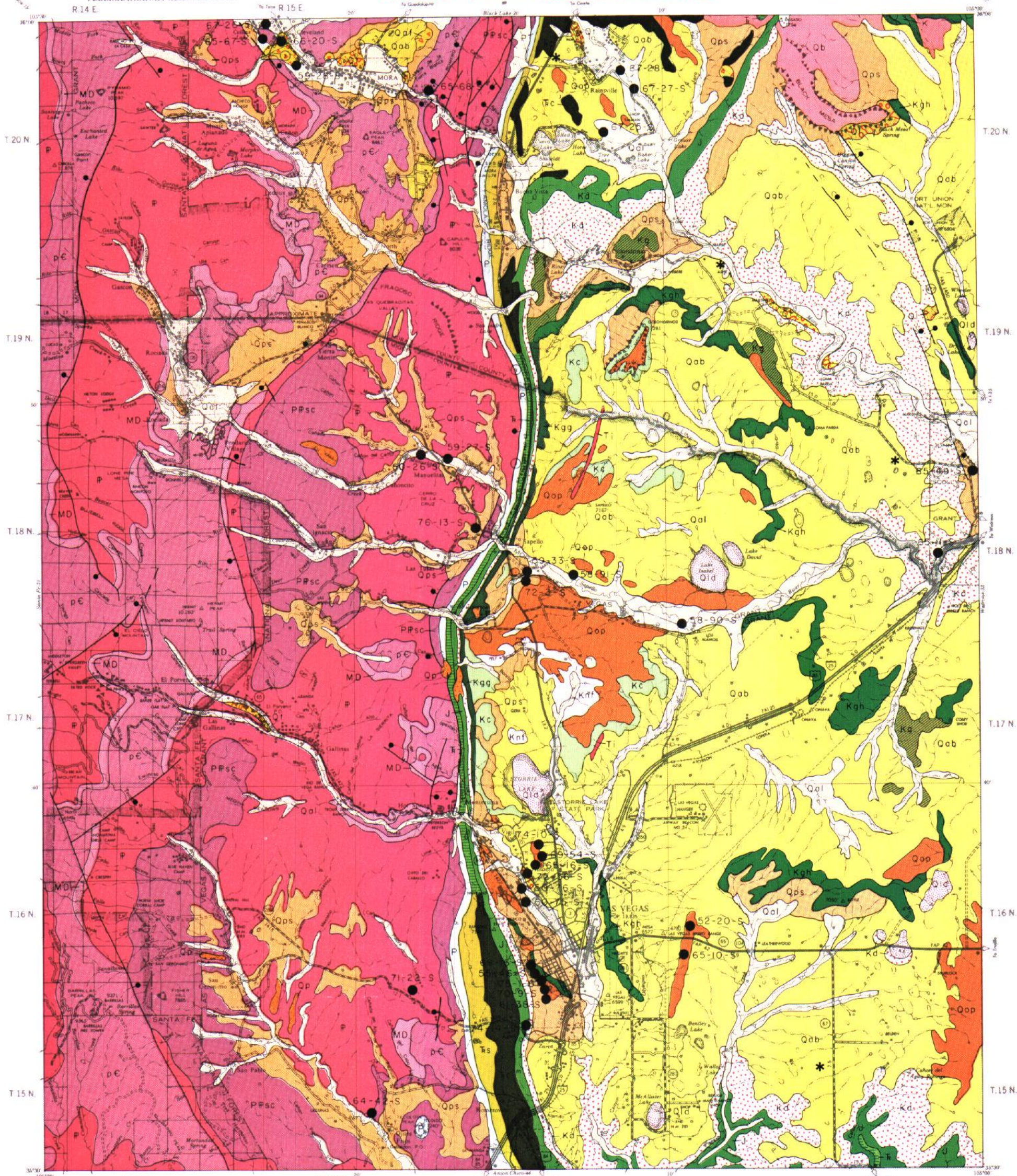
- p€ — Precambrian undivided

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

LAS VEGAS QUADRANGLE-32
MORA & SAN MIGUEL COUNTIES



Control by National Geodetic Survey; U.S. Geological Survey; U.S. Forest Service; Bureau of Land Management and Planning Division
Modified Conic Projection Standard Parallel 34°15' North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

LAS VEGAS
QUADRANGLE
32

1977

QUADRANGLE PAGE 32

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5075	5076	5220	5546
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Las Vegas Grant	Las Vegas Grant	Las Vegas Grant	Las Vegas Grant
	County	San Miguel	San Miguel	San Miguel	San Miguel
Formation		Qps	Qps	Qop	Qop
Rock Type		sand and gravel	sand and gravel	sand and gravel	sand and gravel
Source Rock (Gravel)		various	various	limestone and quartzite	various
Quality of Material		fair	fair	good	good
Thickness of Material		10'	10'	5' plus	5-11'
Thickness of Cap (Caliche)		-	-	0-1'	-
Material Underlying Formation		silt	silt	sandstone	shale
Vegetation		grass	grass	grass	grass
Local Terrain		flat	flat	hilltop	hilltop
Thickness of Overburden		0-4'	0-4'	0-2'	2'
P. I. (Overburden)		-	-	6 plus	6 plus
Estimated Quantity (cu. yds)		20,000	20,000	75,000	5,000
Los Angeles Wear		-	-	-	6.0
Soundness Loss		-	-	-	-
Average Maximum Size		-	-	3"	3"
% Retained on 2" Sieve		-	-	10	5
Pit Average % Passing	Crushed to:	-	-	-	3/4"
	2"	-	-	-	-
	1"	-	-	-	100
	½"	-	-	-	68
	No. 4	-	-	-	38
	No. 10	-	-	-	28
	No. 200	-	-	-	4
Plasticity Index		-	-	-	N.P.

Remarks:

Pit Number		5890	5891	5927	5928
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Las Vegas Grant	Mora Grant	Mora Grant	Mora Grant
	County	San Miguel	San Miguel	San Miguel	Mora
Formation		Qal	Qal	Qal	Qal
Rock Type		sand and gravel	sand	gravel	sand and gravel
Source Rock (Gravel)		igneous and various	various	quartzand various	quartzite and various
Quality of Material		good	good	good	good
Thickness of Material		8'	6' plus	5'	16' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		shale	clay	shale	-
Vegetation		grass	grass	grass	grass and trees
Local Terrain		rolling	river bottom	river bottom	river bottom
Thickness of Overburden		1-4'	0-2'	2'	2'
P. I. (Overburden)		N.P.	N.P.	6 plus	6
Estimated Quantity (cu. yds.)		150,000	150,000 plus	100,000	250,000 plus
Los Angeles Wear		42.0	-	47.2	39.6
Soundness Loss		-	-	17.5	6.8
Average Maximum Size		6"	6"	5"	21"
% Retained on 2" Sieve		19	12	13	21
Pit Average % Passing	Crushed to:	as received	-	-	as received
	2"	71	-	-	60
	1"	59	-	-	42
	½"	48	-	-	30
	No. 4	37	-	-	20
	No. 10	28	-	-	15
	No. 200	1	-	-	1
Plasticity Index		N.P.	-	-	N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5933	6026	6138	6442
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Las Vegas Grant	Mora Grant	Las Vegas Grant	Las Vegas Grant
	County	San Miguel	San Miguel	San Miguel	San Miguel
Formation		Qal	Qal	Qop	P
Rock Type		gravel	sand and gravel	sand and gravel	limestone
Source Rock (Gravel)		various	quartzite and various	various	-
Quality of Material		good	good	good	good
Thickness of Material		10'	6' plus	11'	13' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		clay	sandstone and shale	shale	shale
Vegetation		grass	grass	grass	grass and trees
Local Terrain		river bottom	river bottom	hilltop	mountainous
Thickness of Overburden		0-2'	1-2'	3-5'	1-4'
P. I. (Overburden)		N.P.	6 plus	13	14
Estimated Quantity (cu. yds)		150,000	100,000	10,000 plus	500,000 plus
Los Angeles Wear		-	-	42.8	28.8
Soundness Loss		10.5	4.8	4.4	3.2
Average Maximum Size		6"	5"	4"	-
% Retained on 2" Sieve		10	20	15	-
Pit Average % Passing	Crushed to:	-	-	as received	1"
	2"	-	-	72	-
	1"	-	-	56	100
	½"	-	-	44	65
	No. 4	-	-	32	28
	No. 10	-	-	24	16
	No. 200	-	-	8	3
Plasticity Index		-	-	9	N.P.
Remarks:					

Pit Number		6510	6511	6516	6549
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Las Vegas Grant	John Scolly Grant	Las Vegas Grant	John Scolly Grant
	County	San Miguel	Mora	San Miguel	Mora
Formation		Qop	Qal	Qop	Qal
Rock Type		sand and gravel	sand and gravel	sand and gravel	sand and gravel
Source Rock (Gravel)		various	various	various	various
Quality of Material		good	good	good	good
Thickness of Material		10' plus	12' plus	12'	11' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		shale	sandstone	shale	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		hilltop	river bottom	hilltop	stream bottom
Thickness of Overburden		2'	8-12'	3'	6'
P. I. (Overburden)		11	7	15	N.P.
Estimated Quantity (cu. yds.)		300,000 plus	10,000 plus	10,000	150,000 plus
Los Angeles Wear		34.8	37.6	42.0	49.2
Soundness Loss		7.2	7.4	12.4	12.3
Average Maximum Size		4"	4"	6"	5"
% Retained on 2" Sieve		16	14	21	18
Pit Average % Passing	Crushed to:	as received	as received	as received	as received
	2"	69	64	85	64
	1"	53	53	72	48
	½"	37	40	57	35
	No. 4	27	31	43	26
	No. 10	22	22	32	22
	No. 200	4	3	11	3
Plasticity Index		N.P.	N.P.	12	N.P.
Remarks:					

QUADRANGLE PAGE 32

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6567	6568	6620	6725
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Mora Grant	Mora Grant	Mora Grant	Mora Grant
	County	Mora	Mora	Mora	Mora
Formation		Qal	Qal	Qaf	Qal
Rock Type		gravel	gravel	sand and gravel	sand and gravel
Source Rock (Gravel)		various	various	quartzite and various	various
Quality of Material		good	good	good	good
Thickness of Material		13' plus	6' plus	12' plus	10'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		sand	granite	limestone	clay
Vegetation		grass and brush	grass	grass	grass
Local Terrain		stream bottom	river bottom	river bottom	hilltop
Thickness of Overburden		3'	0-2'	1'	0-2'
P. I. (Overburden)		6'	6	N.P.	6 plus
Estimated Quantity (cu. yds)		200,000 plus	150,000	200,000 plus	250,000
Los Angeles Wear		37.6	-	39.6	39.2
Soundness Loss		4.5	26.8	6.8	9.5
Average Maximum Size		6"	3"	7"	6"
% Retained on 2" Sieve		24	9	25	17
Pit Average % Passing	Crushed to:	as received	-	as received	-
	2"	57	-	45	-
	1"	38	-	30	-
	½"	29	-	22	-
	No. 4	21	-	17	-
	No. 10	18	-	14	-
	No. 200	3	-	1	-
Plasticity Index		N.P.	-	N.P.	-
Remarks:					

Pit Number		6726	6727	6728	6916
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Mora Grant	Mora Grant	Mora Grant	Las Vegas Grant
	County	Mora	Mora	Mora	San Miguel
Formation		Qal	Qal	Qal	Qop
Rock Type		sand and gravel	sand and gravel	sand and gravel	sand and gravel
Source Rock (Gravel)		various	various	various	various
Quality of Material		good	good	good	good
Thickness of Material		10' plus	8'	12'	10'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		limestone	clay	sandstone	limestone and shale
Vegetation		grass	grass	grass	grass
Local Terrain		river bottom	river bottom	river bottom	hilltop
Thickness of Overburden		1'	3'	5'	3'
P. I. (Overburden)		N.P.	13	10	12
Estimated Quantity (cu. yds.)		200,000	300,000	250,000	50,000
Los Angeles Wear		38.8	39.6	36.7	33.0
Soundness Loss		3.9	2.4	3.6	26.8
Average Maximum Size		15"	4"	3"	3"
% Retained on 2" Sieve		27	16	5	8
Pit Average % Passing	Crushed to:	-	as received	as received	as received
	2"	-	74	73	66
	1"	-	57	46	50
	½"	-	45	33	38
	No. 4	-	34	23	26
	No. 10	-	25	18	18
	No. 200	-	8	3	5
Plasticity Index		-	11	N.P.	9
Remarks:					

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6954	7009	7122	7203
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Las Vegas Grant	Las Vegas Grant	Las Vegas Grant	Las Vegas Grant
	County	San Miguel	San Miguel	San Miguel	San Miguel
Formation		Qop	Qop	[illegible]	Qal
Rock Type		sand and gravel	sand and gravel	limestone	sand and gravel
Source Rock (Gravel)		various	various	-	various
Quality of Material		good	good	good	good
Thickness of Material		6' plus	10'	14' plus	10'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		sandstone and shale	shale	sandstone	clay
Vegetation		grass	grass	grass and trees	grass
Local Terrain		hilltop	hilltop	mountainous	river bottom
Thickness of Overburden		0-2'	3'	1'	0-3'
P. I. (Overburden)		6 plus	12	12	N.P.
Estimated Quantity (cu. yds)		10,000	1,000	500,000 plus	150,000 plus
Los Angeles Wear		35.6	35.0	35.2	-
Soundness Loss		13.4	8.1	8.2	-
Average Maximum Size		5"	2"	-	6"
% Retained on 2" Sieve		14	7	-	14
Pit Average % Passing	Crushed to:	as received	as received	2"	-
	2"	-	77	100	-
	1"	-	59	62	-
	½"	-	42	25	-
	No. 4	-	28	11	-
	No. 10	-	20	6	-
	No. 200	-	5	2	-
Plasticity Index		10	N.P.	N.P.	-
Remarks:					

Pit Number		7256	7410	7414	7501
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Las Vegas Grant	Las Vegas Grant	Las Vegas Grant	Las Vegas Grant
	County	San Miguel	San Miguel	San Miguel	San Miguel
Formation		Qt	Qop	Kd	Qop
Rock Type		gravel	sand and gravel	sandstone	sand. gravel & conglomerate
Source Rock (Gravel)		various	various	-	various
Quality of Material		fair	good	-	good
Thickness of Material		6' plus	15' plus	20' plus	6' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		clay	sandstone and shale	shale	silt
Vegetation		grass	grass	grass and trees	grass
Local Terrain		river bank	hilltop	mountainous	flat
Thickness of Overburden		0-3'	2'	-	0-2'
P. I. (Overburden)		N.P.	14	-	-
Estimated Quantity (cu. yds.)		15,000 plus	10,000	200,000 plus	75,000 plus
Los Angeles Wear		36.9	34.9	-	-
Soundness Loss		8.0	6.6	-	40^{0}, 48^{4}, & 63^{4}
Average Maximum Size		4"	6"	-	5"
% Retained on 2" Sieve		10	25	-	15
Pit Average % Passing	Crushed to:	as received	as received	-	as received
	2"	-	39	-	-
	1"	-	28	-	-
	½"	-	22	-	-
	No. 4	-	16	-	-
	No. 10	-	12	-	-
	No. 200	-	3	-	-
Plasticity Index		-	10	-	-
Remarks:					

QUADRANGLE PAGE 32

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		7613
Location	Section	not sectionalized
	Township & Range	Mora Grant
	County	Mora
Formation		P
Rock Type		limestone
Source Rock (Gravel)		-
Quality of Material		good
Thickness of Material		16' plus
Thickness of Cap (Caliche)		-
Material Underlying Formation		shale
Vegetation		grass & trees
Local Terrain		mountainous
Thickness of Overburden		4'
P. I. (Overburden)		10
Estimated Quantity (cu. yds)		500,000 plus
Los Angeles Wear		16.6
Soundness Loss		1.7
Average Maximum Size		-
% Retained on 2" Sieve		-
Pit Average % Passing	Crushed to:	1½"
	2"	100
	1"	65
	½"	26
	No. 4	11
	No. 10	5
	No. 200	2
Plasticity Index		N.P.
Remarks:		

Pit Number	
Location — Section	
Location — Township & Range	
Location — County	
Formation	
Rock Type	
Source Rock (Gravel)	
Quality of Material	
Thickness of Material	
Thickness of Cap (Caliche)	
Material Underlying Formation	
Vegetation	
Local Terrain	
Thickness of Overburden	
P. I. (Overburden)	
Estimated Quantity (cu. yds.)	
Los Angeles Wear	
Soundness Loss	
Average Maximum Size	
% Retained on 2" Sieve	
Pit Average % Passing — Crushed to:	
2"	
1"	
½"	
No. 4	
No. 10	
No. 200	
Plasticity Index	
Remarks:	

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 33

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Qld — Lake deposits
- Qaf — Alluvial fan deposits
- Qps — Piedmont slope deposits
- Qp — Pediment deposits
- Qop — Older Pediment deposits

QUAT. TERT.

- QTb — Basalt

TERT.

- To — Ogallala Formation
- Ti — Intrusive rocks undivided

CRETACEOUS

- Kc — Carlile Shale
- Kgh — Greenhorn Limestone
- Kg — Graneros Shale
- K — Cretaceous rocks undivided
- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRIASSIC

- Trc — Chinle Formation
- Trs — Santa Rosa Sandstone

PERMIAN

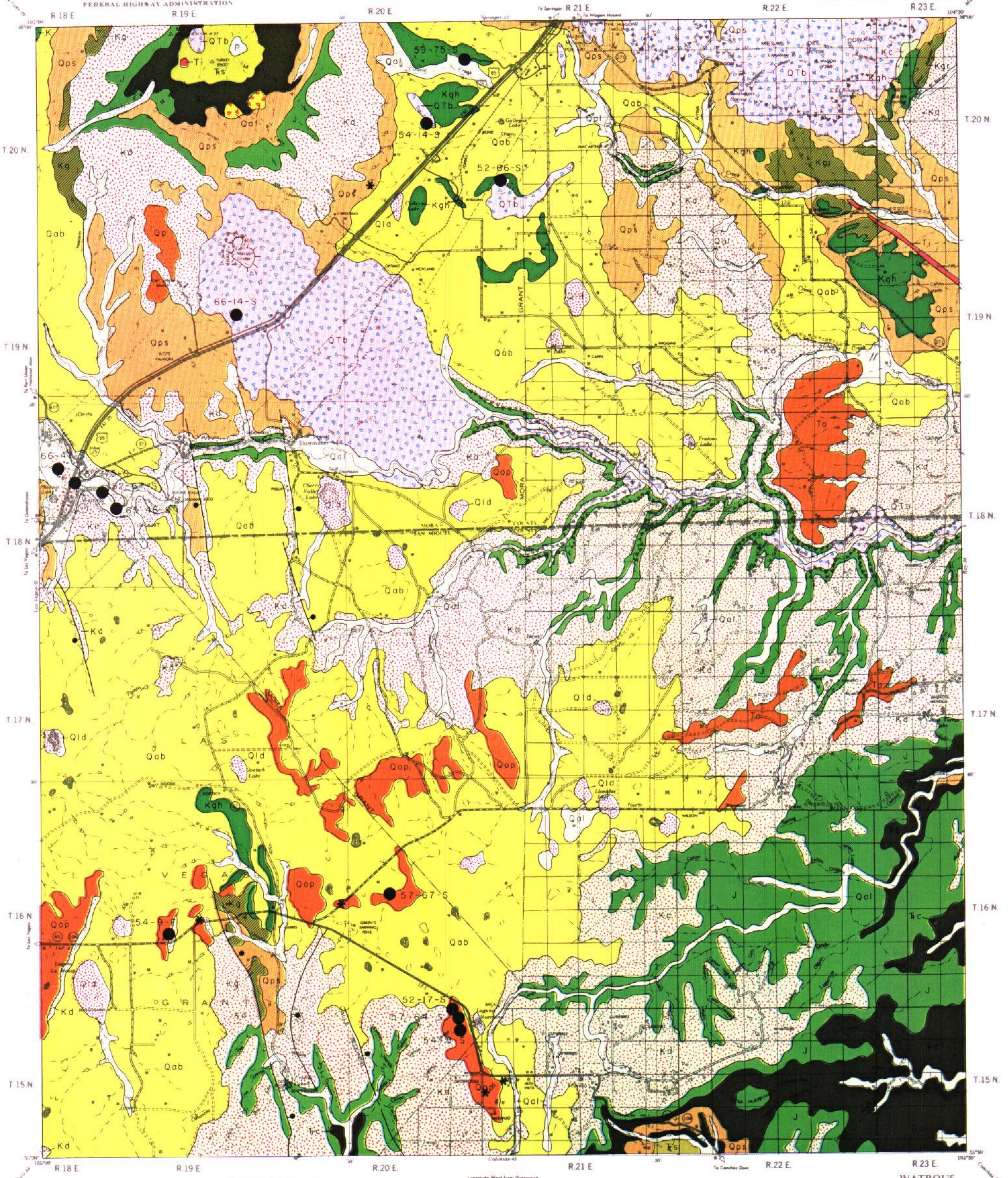
- P — Lower Permian undivided

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

WATROUS QUADRANGLE-33
MORA & SAN MIGUEL COUNTIES



Control by National Geodetic Survey, U.S. Geological Survey
U.S. Forest Service, Bureau of Land Management and Planning Division
Modified Conic Projection Standard Parallel 35½° North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

WATROUS
QUADRANGLE
33

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5217	5266	5267	5408
Location	Section	Not Sectionalized	Not Sectionalized	Not Sectionalized	Not Sectionalized
	Township & Range	Las Vegas Grant	Mora Grant	John Scolly Grant	Las Vegas Grant
	County	San Miguel	Mora	Mora	San Miguel
Formation		Qop	QTb	Qal	Qop
Rock Type		caliche	cinders	sand and gravel	caliche
Source Rock (Gravel)				various	
Quality of Material		good	good	good	good
Thickness of Material		4'	10'	10' plus	4'
Thickness of Cap (Caliche)		1-2'			1'
Material Underlying Formation		sandstone & shale	limestone & shale	clay	sandstone
Vegetation		grass	grass	cottonwoods & brush	grass
Local Terrain		rolling	hilly	river bottom	rolling
Thickness of Overburden				0-2'	0-2'
P. I. (Overburden)				N.P.	6 plus
Estimated Quantity (cu. yds)		200,000	100,000	100,000	200,000
Los Angeles Wear		26.8	49.6	45.1	41.2; 26.8
Soundness Loss					
Average Maximum Size				3"	
% Retained on 2" Sieve				14	
Pit Average % Passing	Crushed to:				
	2"				
	1"				
	½"				
	No. 4				
	No. 10				
	No. 200				
Plasticity Index					
Remarks:					

Pit Number		5409	5414	5764	5767
Location	Section	Not Sectionalized	Not Sectionalized	Not Sectionalized	Not Sectionalized
	Township & Range	Las Vegas Grant	Mora Grant	Las Vegas Grant	Las Vegas Grant
	County	San Miguel	Mora	San Miguel	San Miguel
Formation		Qop	QTb	Qop	Qop
Rock Type		sand	cinders	caliche	caliche
Source Rock (Gravel)					
Quality of Material		fair	good	good	good
Thickness of Material		4' plus	20'	4'	10'
Thickness of Cap (Caliche)				1'	3'
Material Underlying Formation		shale and sandstone	limestone	sandstone	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		rolling	rolling	rolling	rolling
Thickness of Overburden		0-2'		0-2'	2'
P. I. (Overburden)		N.P.		6 plus	13
Estimated Quantity (cu. yds.)		25,000	200,000 plus	200,000	500,000
Los Angeles Wear			40.0	38.0, 60.0	40.0, 30.0
Soundness Loss					
Average Maximum Size					2"
% Retained on 2" Sieve					100
Pit Average % Passing	Crushed to:				
	2"				47
	1"				23
	½"				11
	No. 4				7
	No. 10				1
	No. 200				N.P.
Plasticity Index					
Remarks:					

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5775	5975	6546	6614
Location	Section	Not Sectionalized	Not Sectionalized	Not Sectionalized	Not Sectionalized
	Township & Range	John Scolly Grant	Mora Grant	John Scolly Grant	John Scolly Grant
	County	Mora	Mora	Mora	Mora
Formation		Qal	Qal	Qal	QTb
Rock Type		sand and gravel	gravel	sand and gravel	basalt
Source Rock (Gravel)		various	limestone & various	various	
Quality of Material		good	fair	good	good
Thickness of Material		12' plus	5'	12' plus	10' plus
Thickness of Cap (Caliche)					
Material Underlying Formation		clay	shale	clay	shale
Vegetation		grass & cottonwoods	grass	cottonwoods & brush	grass
Local Terrain		river bottom	rolling	river bottom	rolling
Thickness of Overburden		2-5'	0-2'	0-4'	0-1'
P. I. (Overburden)		N.P.	6 plus	6	9
Estimated Quantity (cu. yds)		100,000	150,000	150,000	500,000 plus
Los Angeles Wear		38.0	52.4	46.4	20.8'
Soundness Loss		4.6	5.6		4.2
Average Maximum Size		6"	6"	4"	
% Retained on 2" Sieve		15	53	7	
Pit Average % Passing	Crushed to:	as received	as received	as received	1"
	2"	85	47	72	
	1"	71	36	53	100
	½"	62	31	40	53
	No. 4	55	25	31	24
	No. 10	47	21	26	15
	No. 200	2	4	3	4
Plasticity Index		N.P.	40	N.P.	N.P.

Remarks:

Pit Number		6647
Location	Section	Not Sectionalized
	Township & Range	John Scolly Grant
	County	Mora
Formation		Qal
Rock Type		sand & gravel
Source Rock (Gravel)		various
Quality of Material		good
Thickness of Material		10' plus
Thickness of Cap (Caliche)		
Material Underlying Formation		clay
Vegetation		cottonwoods & brush
Local Terrain		river bottom
Thickness of Overburden		0-2'
P. I. (Overburden)		N.P.
Estimated Quantity (cu. yds.)		100,000
Los Angeles Wear		46.0
Soundness Loss		1.9
Average Maximum Size		4"
% Retained on 2" Sieve		17
Pit Average % Passing	Crushed to:	3/4"
	2"	
	1"	100
	½"	79
	No. 4	47
	No. 10	37
	No. 200	6
Plasticity Index		N.P.

Remarks:

EXPLANATION

QUAD No. 34

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Qaf — Alluvial fan deposits
- Ql — Landslide debris
- Qps — Piedmont slope deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qc — Cinder and Scoria
- Qop — Older Pediment deposits

QUAT.–TERT.

- QTb — Basalt

TERT.

- Tou — Ogallala Formation undifferentiated
- Ti — Intrusive rocks undivided

CRET.

- Kgh — Greenhorn Limestone
- K — Cretaceous rocks undivided
- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRIASSIC

- $\overline{T}_R$c — Chinle Formation
- $\overline{T}_R$cc — Cuervo Sandstone Member of the Chinle Formation
- $\overline{T}_R$ — Triassic undifferentiated
- $\overline{T}_R$s — Santa Rosa Sandstone

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

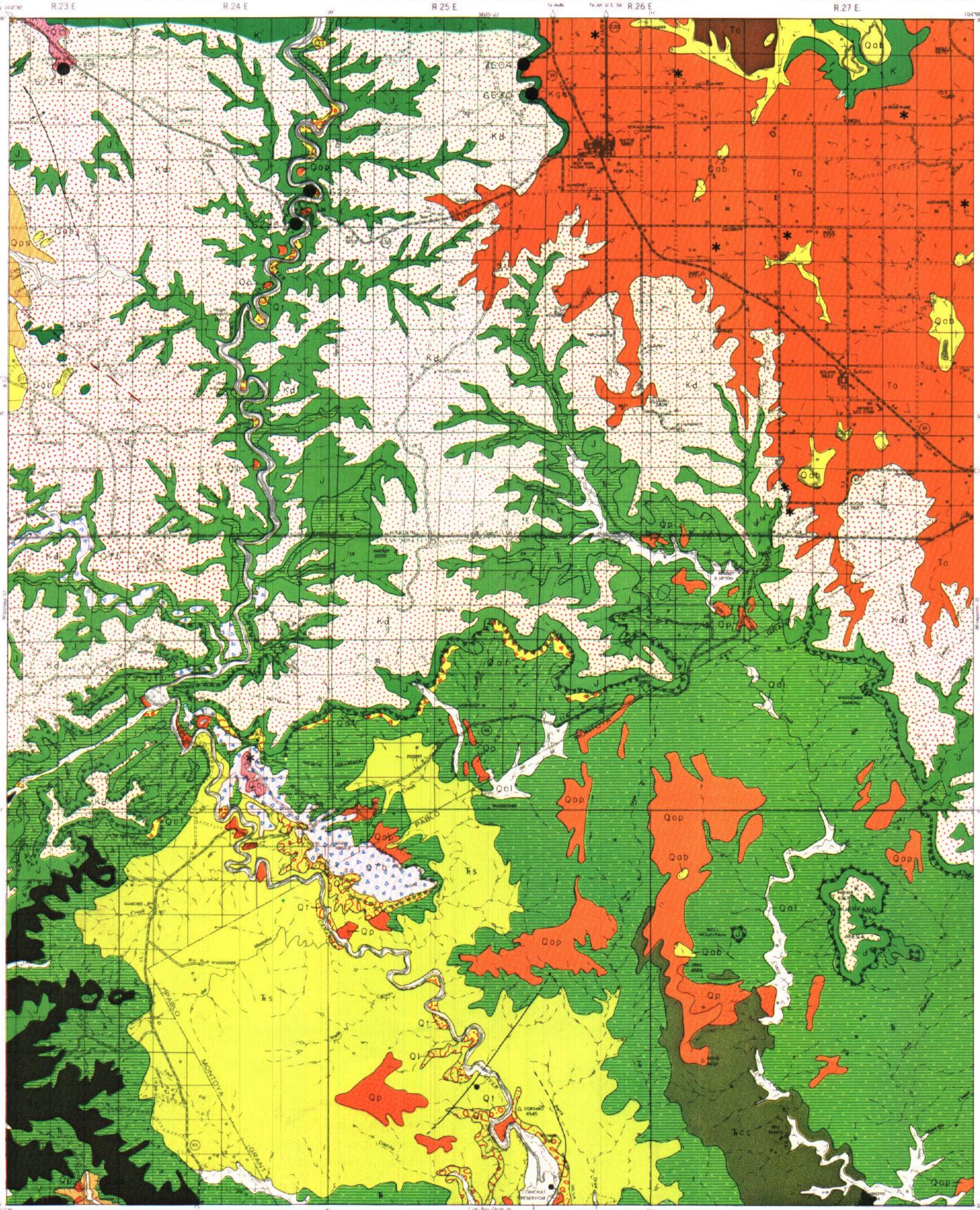
NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

ROY QUADRANGLE-34
MORA, HARDING & SAN MIGUEL COUNTIES

R.23 E. R.24 E. R.25 E. R.26 E. R.27 E.

T.20 N. T.19 N. T.18 N. T.17 N. T.16 N. T.15 N.



DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale 1/126720 or 1 Inch = 2 Miles

ROY
QUADRANGLE
34

1977

QUADRANGLE PAGE 34

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6226	6227	6630	6724
Location	Section	SE 35	SE 26	NE 13	NE 10
	Township & Range	20N 24E	20N 24E	20N 25E	20N 23E
	County	Mora	Mora	Harding	Mora
Formation		Qp	Qt	Toc	Qc
Rock Type		gravel	gravel	caliche	caliche
Source Rock (Gravel)		various	various		
Quality of Material		fair	good	good	good
Thickness of Material		8'	11	8' plus	9'
Thickness of Cap (Caliche)				2-3'	2-3'
Material Underlying Formation		sandstone	sandstone	siltstone	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		mountainous	canyon	mesa top	rolling
Thickness of Overburden		2'	0-2'	1-2'	0-2'
P. I. (Overburden)		10	6	10	20
Estimated Quantity (cu. yds)		50,000 plus	50,000	200,000 plus	100,000 plus
Los Angeles Wear		36.8	39.2	33.6	27.2
Soundness Loss		6.9	8.1	5.8	6.3
Average Maximum Size		3"	4"		
% Retained on 2" Sieve		20	25		
Pit Average % Passing	Crushed to:	as received	as received	2"	2"
	2"	79	53	100	100
	1"	74	42	79	88
	½"	60	32	59	76
	No. 4	36	23	41	54
	No. 10	20	18	30	38
	No. 200	40	3	12	10
Plasticity Index		10	N.P.	N.P.	N.P.

Remarks:

Pit Number		7604
Location	Section	NW 12
	Township & Range	20N 25E
	County	Harding
Formation		Toc
Rock Type		caliche
Source Rock (Gravel)		
Quality of Material		good
Thickness of Material		12' plus
Thickness of Cap (Caliche)		2-3'
Material Underlying Formation		siltstone
Vegetation		grass
Local Terrain		mesa top
Thickness of Overburden		0-2'
P. I. (Overburden)		6
Estimated Quantity (cu. yds.)		250,000 plus
Los Angeles Wear		cap: 21 hard cal.: 29
Soundness Loss		1.8
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	2"
	2"	100
	1"	84
	½"	57
	No. 4	41
	No. 10	33
	No. 200	10
Plasticity Index		N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number	
Location	Section
	Township & Range
	County
Formation	
Rock Type	
Source Rock (Gravel)	
Quality of Material	
Thickness of Material	
Thickness of Cap (Caliche)	
Material Underlying Formation	
Vegetation	
Local Terrain	
Thickness of Overburden	
P. I. (Overburden)	
Estimated Quantity (cu. yds)	
Los Angeles Wear	
Soundness Loss	
Average Maximum Size	
% Retained on 2" Sieve	
Pit Average % Passing	Crushed to:
	2"
	1"
	½"
	No. 4
	No. 10
	No. 200
Plasticity Index	

Remarks:

Pit Number	
Location	Section
	Township & Range
	County
Formation	
Rock Type	
Source Rock (Gravel)	
Quality of Material	
Thickness of Material	
Thickness of Cap (Caliche)	
Material Underlying Formation	
Vegetation	
Local Terrain	
Thickness of Overburden	
P. I. (Overburden)	
Estimated Quantity (cu. yds.)	
Los Angeles Wear	
Soundness Loss	
Average Maximum Size	
% Retained on 2" Sieve	
Pit Average % Passing	Crushed to:
	2"
	1"
	½"
	No. 4
	No. 10
	No. 200
Plasticity Index	

Remarks:

EXPLANATION

QUAD No. 35

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Qe — Eolian deposits
- Qyp — Younger Pediment deposits
- Ql — Landslide debris
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qc — Cinder and Scoria
- Qop — Older Pediment deposits

QUAT.-TERT.

- QTb — Basalt

TERT.

- Toc — Ogallala Formation Caliche
- To — Ogallala Formation

CRET.

- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRIASSIC

- Rc — Chinle Formation
- R — Triassic undifferentiated

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

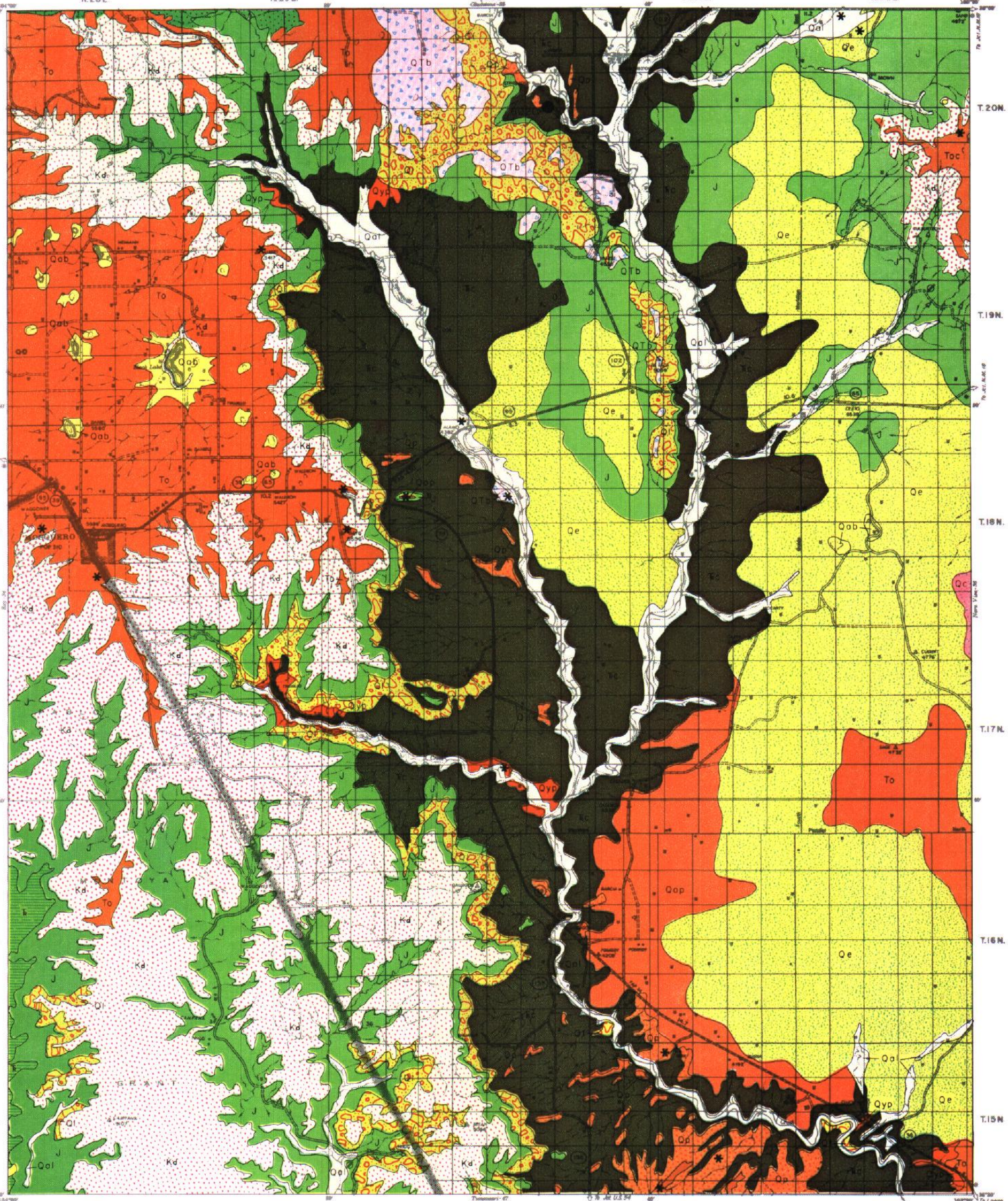
NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

GEOLOGY AND AGGREGATE RESOURCES

MOSQUERO QUADRANGLE 35
HARDING & SAN MIGUEL COUNTIES

R.28E. R.29E. R.30E. R.31E. R.32E.

T.20N. T.19N. T.18N. T.17N. T.16N. T.15N.



Control by U.S. Coast and Geodetic Survey; U.S. Geological Survey; U.S. Forest Service; Bureau of Land Management and Planning Division - Modified Lamb Projection Standard

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale 1/126720 or 1 Inch = 2 Miles

DATE OF INVENTORY
HARDING COUNTY 1984
SAN MIGUEL COUNTY 1985

MOSQUERO QUADRANGLE 35

QUADRANGLE PAGE 35

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6020
Location	Section	SE 14
	Township & Range	20N 30E
	County	Harding
Formation		Qp
Rock Type		sand & gravel
Source Rock (Gravel)		basalt and various
Quality of Material		good
Thickness of Material		12'
Thickness of Cap (Caliche)		
Material Underlying Formation		clay
Vegetation		grass
Local Terrain		rolling
Thickness of Overburden		2-8'
P. I. (Overburden)		10
Estimated Quantity (cu. yds)		20,000
Los Angeles Wear		34.8
Soundness Loss		6.0
Average Maximum Size		3"
% Retained on 2" Sieve		15
Pit Average % Passing	Crushed to:	as received
	2"	74
	1"	59
	½"	47
	No. 4	34
	No. 10	29
	No. 200	5
Plasticity Index		N.P.

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 36

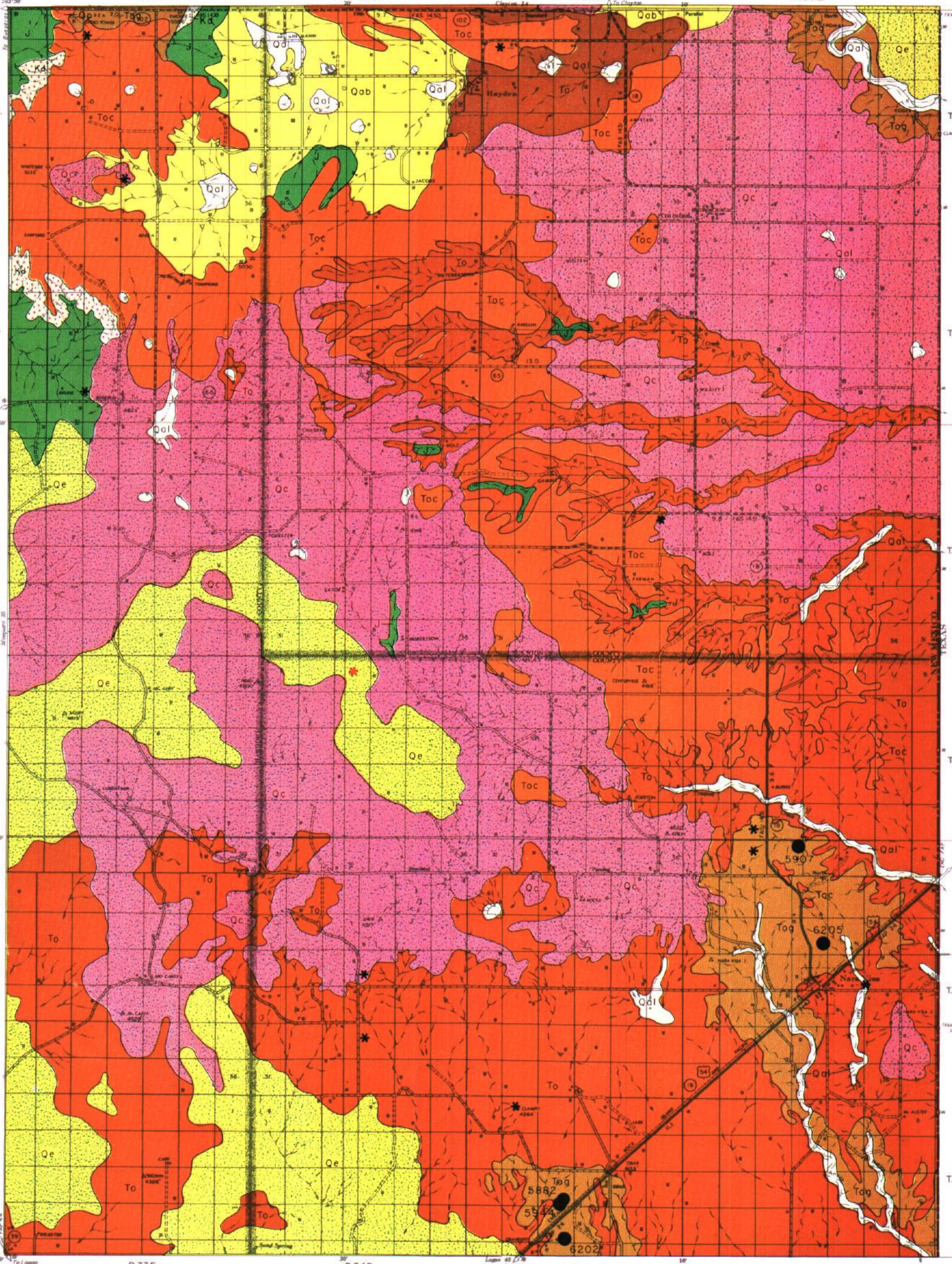
QUAT.	Qal	Alluvium
	Qab	Bolson deposits
	Qe	Eolian deposits
	Qp	Pediment deposits
QUAT.-TERT.	Qtc	High level caliche
TERT.	Toc	Ogallala Formation Caliche
	To	Ogallala Formation undifferentiated
	Tog	Ogallala Formation Gravel
CRET.	Kd	Dakota Formation
JUR.	J	Jurassic undivided

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

GEOLOGY AND AGGREGATE RESOURCES

NARA VISA QUADRANGLE 36
QUAY UNION & HARDING COUNTIES



DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Control by U.S. Coast and Geodetic Survey; U.S. Geological Survey; U.S. Forest Service; Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 38½° North American Datum

Longitude West from Greenwich

Scale 1/190080 or 1 Inch = 3 Miles

STATUTE MILES

DATE OF INVENTORY	
HARDING COUNTY	1964
QUAY COUNTY	1963
UNION COUNTY	1964

NARA VISA
QUADRANGLE
36

QUADRANGLE PAGE 36

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5907	5944 & 5882	6202	6203 & 6205
Location	Section	NE 33	SE 16	SE 21	SE 10
	Township & Range	17N 36E	15N 35E	15N 35E	16N 36E
	County	Quay	Quay	Quay	Quay
Formation		Tog	Tog	Tog	Tog
Rock Type		gravel	sand & gravel	sand and gravel	gravel
Source Rock (Gravel)		various	various	various	various
Quality of Material		good	good	good	good
Thickness of Material		5-10'	10'	15' plus	10'
Thickness of Cap (Caliche)		0-1'	0-2'	0-2'	0-2'
Material Underlying Formation		sand	clay	sand	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		rolling	rolling	rolling	rolling
Thickness of Overburden		0-1'	0-2'	2'	0-2'
P. I. (Overburden)		12	N.P.	9	9
Estimated Quantity (cu. yds)		100,000 plus	100,000 plus	250,000 plus	200,000 plus
Los Angeles Wear		26.0	28.0	29.2	24.0
Soundness Loss			2.6	3.9	10.6
Average Maximum Size		2"	2"	3"	4"
% Retained on 2" Sieve		8	16	20	25
Pit Average % Passing	Crushed to:	as received	as received	as received	as received
	2"	95	69	81	70
	1"	76	56	68	58
	½"	58	39	51	47
	No. 4	38	26	33	35
	No. 10	30	21	25	29
	No. 200	7	2	6	7
Plasticity Index		N.P.	N.P.	7	N.P.

Remarks:

Pit Number	
Location	Section
	Township & Range
	County
Formation	
Rock Type	
Source Rock (Gravel)	
Quality of Material	
Thickness of Material	
Thickness of Cap (Caliche)	
Material Underlying Formation	
Vegetation	
Local Terrain	
Thickness of Overburden	
P. I. (Overburden)	
Estimated Quantity (cu. yds.)	
Los Angeles Wear	
Soundness Loss	
Average Maximum Size	
% Retained on 2" Sieve	
Pit Average % Passing	Crushed to:
	2"
	1"
	½"
	No. 4
	No. 10
	No. 200
Plasticity Index	

Remarks:

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 43

QUATERNARY

- Qaf — Alluvium
- Qe — Eolian deposits
- Qld — Lake deposits
- Ql — Landslide debris
- Qab — Bolson deposits
- Qt — Terrace deposits
- Qp — Pediment deposits
- Qc — Cinders and Scoria
- Qpc — Pediment deposits
- Qop — Older Pediment deposits

TERTIARY

- QTsf — Santa Fe Formation
- Tes — Espinaso Volcanics
- Ti — Intrusive rocks undivided
- Tg — Galisteo Formation

CRETACEOUS

- Kmv — Mesa Verde Group
- Km — Mancos Shale
- Kg — Gallup Sandstone
- Kd — Dakota Sandstone

JURASSIC

- Jm — Morrison Formation
- Jt — Todilto Formation
- Je — Entrada Formation

TRIASSIC

- TR — Triassic rocks undivided

PERMIAN

- Pb — Bernal Formation
- Psa — San Andres Limestone
- Pg — Glorieta Sandstone
- Py — Yeso Formation
- Pyl — Yeso Limestone

PERMIAN-PENN.

- PPsc — Sangre de Cristo Formation

PENNSYLVANIAN

- PPm — Madera Limestone
- PPs — Sandia Formation

PRECAMB.

- pC — Precambrian undivided

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT

PLANNING AND PROGRAMMING DIVISION

BUREAU OF PUBLIC ROADS

GEOLOGY and AGGREGATE RESOURCES

LAMY QUADRANGLE–43

SANTA FE SAN MIGUEL & TORRANCE COUNTIES

R.9E. R.10E. R.11E. R.12E. R.13E.

T.15N. T.14N. T.13N. T.12N. T.11N. T.10N. T.9N.

Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 34°15' North Anderson Datum

DATE OF INVENTORY
GEOLOGY JUNE 1972
GEOLOGY AND AGGREGATE RESOURCES 1972

Longitude West from Greenwich

Scale 1/190080 or 1 Inch = 3 Miles

STATUTE MILES

DATE OF INVENTORY
SAN MIGUEL COUNTY 1965
SANTA FE COUNTY 1967
TORRANCE COUNTY 1961

LAMY QUADRANGLE 43

MATERIAL PIT SUMMARY

Pit Number		5561	5583	5592	5914
Location	Section	NE 1/4 15	NW 1/4 14	S 1/2 14	SW 1/4 13
	Township & Range	9N 11E	9N 10E	9N 13E	9N 9E
	County	Torrance	Torrance	Torrance	Torrance
Formation		Qpcg	Qpcg	Pyl	Qab
Rock Type		conglomerate	caliche	limestone	sand & gravel
Source Rock (Gravel)		various	-	-	polygenetic
Quality of Material		excellent	fair	good	good
Thickness of Material		13' plus	15'	15'	10' plus
Thickness of Cap (Caliche)		0-6'	4'	-	-
Material Underlying Formation		limestone	sandstone & shale	sandstone	sand & silt
Vegetation		grass	grass & cedar	grass & juniper	grass
Local Terrain		hilly	mesa	hilly	flat
Thickness of Overburden		0-2'	0-3'	0-8'	2-9'
P. I. (Overburden)		9	10-N.P.	9	10-N.P.
Estimated Quantity (cu. yds)		145,000	170,000	325,000	500,000
Los Angeles Wear		32.0	27.2	40.0	37.2
Soundness Loss		-	-	-	-
Average Maximum Size		-	-	-	2"
% Retained on 2" Sieve		-	-	-	5
Pit Average % Passing	Crushed to:	3/4"	1"	3/4"	as received
	2"	-	-	-	100
	1"	100	100	100	88
	½"	89	37	77	77
	No. 4	59	15	43	59
	No. 10	45	8	32	49
	No. 200	5	2	14	4
Plasticity Index		N.P.	N.P.	N.P.	N.P.
Remarks:					

Pit Number		5923	5971	6243	6248
Location	Section	SE 1/4 16	NE 1/4 32	S 1/2 31	E 1/2 24
	Township & Range	9N 12E	10N 12E	10N 10E	14N 13E
	County	Torrance	San Miquel	Santa Fe	San Miguel
Formation		Qpcq	Psa	Psa	Qt
Rock Type		caliche, sand &gravel	limestone	limestone	gravel
Source Rock (Gravel)		polygenetic	-	-	polygenetic
Quality of Material		good	excellent	good	good
Thickness of Material		20' plus	12' plus	7'	10'
Thickness of Cap (Caliche)		0-10'	-	-	-
Material Underlying Formation		limestone & sandstone	sandstone	sandstone	shale
Vegetation		grass	scattered pinon	grass	pinon & juniper
Local Terrain		flat	plateau	rolling	hilly
Thickness of Overburden		0-6'	2'	1-5'	0-6'
P. I. (Overburden)		12-40	11	16-N.P.	18-N.P.
Estimated Quantity (cu. yds.)		60,000	400,000	325,000	150,000
Los Angeles Wear		30.0	20.0	21.2	cal.qvl:31.2 qvl:27.6
Soundness Loss		-	0.5	0.6	- 3.0
Average Maximum Size		2"	-	-	6" -
% Retained on 2" Sieve		1	-	-	20 -
Pit Average % Passing	Crushed to:	as received	2"	2"	as received as received
	2"	100	100	100	85 42
	1"	97	52	56	66 30
	½"	92	30	24	52 23
	No. 4	84	21	12	40 14
	No. 10	77	16	6	36 9
	No. 200	28	8	2	23 2
Plasticity Index		7-N.P.	9	8	15 N.P.
Remarks:					

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6253	6255	6256	6463
Location	Section	NW 1/4 & SW 1/4 18	SW 1/4 9	S 1/2 16	N 1/2 17
	Township & Range	14N 14E	14N 13E	14N 13E	14N 13E
	County	San Miguel	San Miguel	San Miguel	San Miguel
Formation		Pm	Pm	Qt	Pm
Rock Type		limestone	limestone	sand & gravel	limestone
Source Rock (Gravel)		-	-	polygenetic	-
Quality of Material		good	good	fair	good
Thickness of Material		11' plus	8' plus	7'	12' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		sandstone & shale	shale	shale	shale & sandstone
Vegetation		grass & pinon	pinon & juniper	grass & pinon	pinon & cedar
Local Terrain		hilly	hilly	hilly	hilly
Thickness of Overburden		1'	1.5'	3-4'	0-4'
P. I. (Overburden)		20	11	19	N.P.
Estimated Quantity (cu. yds)		unlimited	unlimited	50,000	unlimited
Los Angeles Wear		24.4	22.8	28.4	30.4
Soundness Loss		4.04	1.9	-	3.6
Average Maximum Size		-	-	6"	-
% Retained on 2" Sieve		-	-	25	-
Pit Average % Passing	Crushed to:	2"	2"	as received	2"
	2"	100	100	74	100
	1"	69	72	48	92
	½"	38	32	34	34
	No. 4	20	14	23	15
	No. 10	11	7	18	9
	No. 200	3	2	2	3
Plasticity Index		5	6	N.P.	N.P.

Remarks:

Pit Number		0629	0630	0631	0632
Location	Section	not sectionalized	not sectionalized	not sectionalized	not sectionalized
	Township & Range	Bishop Lamy Grant	Bishop Lamy Grant	San Cristoval Grant	San Cristoval Grant
	County	Santa Fe	Santa Fe	Santa Fe	Santa Fe
Formation		QTsf	Qop	Qal	Qp
Rock Type		gravel	gravel	sand & gravel	gravel
Source Rock (Gravel)		quartzite & granite	polygenetic	limestone & various	quartzite & sandstone
Quality of Material		good	good	good	good
Thickness of Material		40' plus	0-4'	8'	6'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		sandstone	sandstone	-	sandstone
Vegetation		cedar & grass	pine	grass	grass
Local Terrain		hilly	mountainous	river bottom	valley slope
Thickness of Overburden		0-2'	0-1'	0-4'	0-2'
P. I. (Overburden)		N.P. .	S.N.P.	8	7
Estimated Quantity (cu. yds.)		775,000	125,000	75,000	150,000
Los Angeles Wear		32.7	29.3	31.8	40.0
Soundness Loss		6.6	13.6	7.2	28.4
Average Maximum Size		7"	6"	5"	4"
% Retained on 2" Sieve		27	17	17	10
Pit Average % Passing	Crushed to:	as received	as received	as received	as received
	2"	69	85	90	63
	1"	59	72	79	53
	½"	51	56	42	38
	No. 4	37	44	23	23
	No. 10	27	34	19	16
	No. 200	13	10	10	6
Plasticity Index		10	9	N.P.	9

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0633	0634	0635	0636
Location	Section	not sectionalized	NE 1/4 28	SE 1/4 9	NW 1/4 28
	Township & Range	Los Trigos Grant	14N 12E	13N 12E	13N 9E
	County	San Miguel	San Miguel	San Miguel	Santa Fe
Formation		Pm	Qt	Qop	Ti
Rock Type		limestone	gravel	gravel	monzonite
Source Rock (Gravel)		-	various	polygenetic	-
Quality of Material		good	good	good	excellent
Thickness of Material		30'	0-4'	1-5'	200' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		sandstone	shale & sandstone	limestone & sandstone	-
Vegetation		pinon & juniper	juniper & grass	pine	grass
Local Terrain		edge of canyon	hilly.	mountainous	mountainous
Thickness of Overburden		trace	0-2'	0-1'	-
P. I. (Overburden)		10-15	8	S.N.P.	-
Estimated Quantity (cu. yds)		unlimited	50,000	100,000	unlimited
Los Angeles Wear		16.8	31.9	22.0	16.7
Soundness Loss		-	13.4	20.1	2.5
Average Maximum Size		-	10"	11"	-
% Retained on 2" Sieve		-	28	21	-
Pit Average % Passing	Crushed to:	1"	as received	as received	1"
	2"	-	80	82	-
	1"	100	58	61	100
	½"	46	41	49	61
	No. 4	17	29	37	24
	No. 10	9	25	30	14
	No. 200	2	13	11	3
Plasticity Index		N.P.	12	8	N.P.

Remarks:

Pit Number		0637	0638	0639	0640
Location	Section	SE 1/4 2	NE 1/4 23	not sectionalized	not sectionalized
	Township & Range	12N 9E	12N 9E	San Cristoval Grant	San Cristoval Grant
	County	Santa Fe	Santa Fe	Santa Fe	Santa Fe
Formation		Ti	Qp	Qal	Psa
Rock Type		monzonite	gravel	sand & gravel	limestone
Source Rock (Gravel)		-	polygenetic	various	-
Quality of Material		good	excellent	excellent	excellent
Thickness of Material		50' plus	20'	7' plus	15' plus
Thickness of Cap (Caliche)		-	0-5'	-	-
Material Underlying Formation		-	shale	sandstone	sandstone
Vegetation		grass	grass & cactii	grass	juniper & grass
Local Terrain		rolling	plain escarpment	arroyo	mountainous
Thickness of Overburden		-	1'	-	0-2'
P. I. (Overburden)		-	8	-	S.N.P.
Estimated Quantity (cu. yds.)		550,000	275,000	75,000	unlimited
Los Angeles Wear		22.8	26.6	39.8	23.8
Soundness Loss		2.0	24.1	41.7	5.9
Average Maximum Size		-	9"	6"	-
% Retained on 2" Sieve		-	27	18	-
Pit Average % Passing	Crushed to:	2"	as received	as received	1"
	2"	100	89	91	-
	1"	98	71	84	100
	½"	53	44	68	58
	No. 4	22	27	43	25
	No. 10	12	23	28	16
	No. 200	2	11	6	4
Plasticity Index		N.P.	15	N.P.	N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0641	0642	0643		0644		
Location	Section	NE 1/4 20	NE 1/4 15	SE 1/4 31		NE 1/4 27		
	Township & Range	12N 12E	11N 9E	12N 11E		11N 11E		
	County	San Miguel	Santa Fe	Santa Fe		Santa Fe		
Formation		Psa	Qpcg	Qpcg		Qpcg		
Rock Type		limestone	caliche	caliche		caliche & small gravel		
Source Rock (Gravel)		-	-	-		-		
Quality of Material		good	good	good		good		
Thickness of Material		25'	8-12'	10'		7'		
Thickness of Cap (Caliche)		-	0-3'	3'		2'		
Material Underlying Formation		sandstone	sand & silt	sandstone & shale		sandstone		
Vegetation		juniper & grass	grass	grass		grass		
Local Terrain		hilly	flat	rolling		rolling		
Thickness of Overburden		1'	0-2'	1'		1'		
P. I. (Overburden)		S.N.P.	S.N.P.	S.N.P.		10		
Estimated Quantity (cu. yds)		unlimited	445,000	200,000		200,000		
Los Angeles Wear		24.2	23.2	cap:32.8	soft caliche	cap:19.8	s.c:28.8	
Soundness Loss		4.1	33.7	17.9	-	18.7	-	
Average Maximum Size		-	-	-	-	-	-	
% Retained on 2" Sieve		-	-	-	-	-	-	
Pit Average % Passing	Crushed to:	2"	1"	1"	1"	1"	1"	
	2"	100	-	-	-	-	-	
	1"	98	100	100	100	100	100	
	½"	51	79	67	81	60	74	
	No. 4	20	30	25	46	22	35	
	No. 10	12	16	13	29	11	24	
	No. 200	4	3	2	8	2	5	
Plasticity Index		N.P.	N.P.	N.P.	N.P.	N.P.	N.P.	

Remarks:

Pit Number		0645	0646	0647
Location	Section	SW 1/4 8	NW 1/4 23	NE 1/4 4
	Township & Range	11N 13E	10N 10E	9N 9E
	County	San Miguel	Santa Fe	Torrance
Formation		Qal	Tr	Qab
Rock Type		sand & gravel	quartzitic limestone	sand
Source Rock (Gravel)		sandstone & limestone	fault scarp	-
Quality of Material		good	good	excellent
Thickness of Material		6' plus	12' plus	6' plus
Thickness of Cap (Caliche)		-	-	-
Material Underlying Formation		sandstone	sandstone	-
Vegetation		grass	grass	grass
Local Terrain		valley floor	mountainous	stream channel
Thickness of Overburden		0-3'	0-2'	0-2'
P. I. (Overburden)		S.N.P.	S.N.P.	S.N.P.
Estimated Quantity (cu. yds.)		175,000	50,000	150,000
Los Angeles Wear		82.1	28.0	-
Soundness Loss		42.9	6.6	-
Average Maximum Size		5"	-	-
% Retained on 2" Sieve		11	-	-
Pit Average % Passing	Crushed to:	as received	1"	as received
	2"	64	-	-
	1"	56	100	-
	½"	51	53	-
	No. 4	46	21	-
	No. 10	43	13	100
	No. 200	6	3	15
Plasticity Index		N.P.	N.P.	N.P.

Remarks:

EXPLANATION

QUAD No. 44

QUATERNARY

- Qal — Alluvium
- Qe — Eolian deposits
- Ql — Landslide debris
- Qld — Lake deposits
- Qaa — Alluvial Aprons
- Qt — Terrace deposits (Post Glacial)
- Qt_2 — Terrace deposits (Pinedale)
- Qt_3 — Terrace deposits (Lake Bull Lake)
- Qt_4 — Terrace deposits (Early Bull Lake)
- Qp — Pediment deposits
- Qpc — Pediment deposits
- Qpcg — Pediment deposits

CRETACEOUS

- Km — Mancos Shale
- Kd — Dakota Sandstone

JURASSIC

- Jm — Morrison Formation
- Jt — Todilto Formation
- Jet — Entrada & Todilto undivided

TRIASSIC

- Tru — Upper Triassic rocks (inc. Chinle)
- Trl — Lower Triassic rocks (inc. Santa Rosa)

PERMIAN

- Pb — Bernal Formation
- Psa — San Andres Limestone
- Pg — Glorieta Sandstone
- Py — Yeso Formation
- PPsc — Sangre de Cristo Formation
- PPm — Madera Limestone

PERMIAN-PENN.

- PPs — Sandia Formation

PRECAMB.

- p€ — Precambrian undivided

- Established pit or quarry
- Prospect pit or quarry
- Fault (downthrown side)
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

GEOLOGY and AGGREGATE RESOURCES

ANTON CHICO QUADRANGLE - 44

SAN MIGUEL GUADALUPE TORRANCE COUNTIES

R.14E. R.15E. R.16E. R.17E. R.18E.

T.15N. T.14N. T.13N. T.12N. T.11N. T.10N. T.9N.

Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division-Modified Conic Projection Standard Parallel 34½° North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1975
AGGREGATE RESOURCES MAY 1975

Scale 1/126720 or 1 Inch = 3 Miles

STATUTE MILES

DATE OF INVENTORY
SAN MIGUEL COUNTY 1965
GUADALUPE COUNTY 1965
TORRANCE COUNTY 1961

ANTON CHICO
QUADRANGLE
44

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5596	5701	5855	5934
Location	Section	SE 1/4 13	3	not sectionalized	not sectionalized
	Township & Range	9N 14E	9N 14E	Anton Chico Grant	Anton Chico Grant
	County	Torrance	Torrance	Guadalupe	Guadalupe
Formation		Qpcg	Psa	Qpc	Qt (2)
Rock Type		sand & gravel	limestone	sand & gravel	sand & gravel
Source Rock (Gravel)		sandstone & quartzite	-	various	various
Quality of Material		good	good	excellent	good
Thickness of Material		14' plus	9' plus	12' plus	9'
Thickness of Cap (Caliche)		0-3'	1-3'	1-2'	-
Material Underlying Formation		silt	caliche & sandstone	sandstone	sandstone & shale
Vegetation		grass	juniper	grass	juniper
Local Terrain		rolling	hilly	rolling	hilly
Thickness of Overburden		0-4'	1'	1'	1'
P. I. (Overburden)		8	7	9	6
Estimated Quantity (cu. yds)		400,000	200,000 plus	200,000 plus	100,000
Los Angeles Wear		36.0	28.0	cap:26.1 gvl:29.6	32.8
Soundness Loss		18.0	27.2	6.4 2.8	9.6
Average Maximum Size		10"	-	- 5"	14"
% Retained on 2" Sieve		32	-	- -	34
Pit Average % Passing	Crushed to:	as received	1"	1" as received	as received
	2"	83	-	- 72	68
	1"	71	100	100 48	54
	½"	59	90	65 27	43
	No. 4	44	21	29 16	30
	No. 10	36	12	17 12	22
	No. 200	10	3	3 3	7
Plasticity Index		N.P.	9	N.P. 0-10	N.P.

Remarks:

5855: includes pit no. 5801 adjacent

Pit Number		6018	6328	6439	6440
Location	Section	NW 1/4 32	N 1/2 25	SW 1/4 27	not sectionalized
	Township & Range	14N 14E	14N 14E	14N 15E	Tecolote Grant
	County	San Miguel	San Miguel	San Miguel	San Miguel
Formation		Qt (3)	Pm	Pm	Qal
Rock Type		gravel	limestone	limestone	sand & gravel
Source Rock (Gravel)		various	-	-	granite, quartzite & ls
Quality of Material		good	excellent	excellent	excellent
Thickness of Material		6'	17' plus	19' plus	5'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		clay	shale & sandstone	shale & sandstone	sandstone
Vegetation		juniper	juniper	juniper	grass & juniper
Local Terrain		hilly	mountainous	mountainous	hilly
Thickness of Overburden		2'	1'	1'	2-4'
P. I. (Overburden)		13	13	-	S.N.P.
Estimated Quantity (cu. yds.)		25,000	unlimited	unlimited	150,000
Los Angeles Wear		39.2	28.8	24.9	38.8
Soundness Loss		4.1	6.1	2.5	7.5
Average Maximum Size		12"	-	-	14"
% Retained on 2" Sieve		38	-	-	18
Pit Average % Passing	Crushed to:	as received	1"	1"	as received
	2"	51	-	-	83
	1"	25	100	100	66
	½"	18	62	66	50
	No. 4	14	27	25	38
	No. 10	13	17	14	29
	No. 200	3	4	3	6
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6701	6702	6703	6704
Location	Section	not sectionalized	NE 1/4 6	SW 1/4 5	NE 1/4 6
	Township & Range	Anton Chico Grant	12N 17E	12N 17E	12N 17E
	County	Guadalupe	San Miquel	San Miquel	San Miguel
Formation		Qt (2)	Psa	Psa	Qe
Rock Type		gravel	limestone	limestone	filler sand
Source Rock (Gravel)		various	-	-	-
Quality of Material		good	good	good	good
Thickness of Material		4'	10' plus	6' plus	4'
Thickness of Cap (Caliche)		-	trace	trace	-
Material Underlying Formation		sandstone	sandstone	sandstone	shale & sandstone
Vegetation		grass	grass & juniper	juniper & grass	juniper & grass
Local Terrain		rolling	hilly	hilly	hilly
Thickness of Overburden		2'	1'	1'	1'
P. I. (Overburden)		9	6	6	S.N.P.
Estimated Quantity (cu. yds)		50,000	150,000	150,000	50,000
Los Angeles Wear		44.0	22.8	24.0	-
Soundness Loss		7.1	8.8	5.8	41
Average Maximum Size		7"	-	-	-
% Retained on 2" Sieve		19	-	-	-
Pit Average % Passing	Crushed to:	as received	1"	1"	as received
	2"	89	-	-	-
	1"	66	100	100	-
	½"	52	64	69	no.10: 100
	No. 4	35	29	33	no.40: 99
	No. 10	28	18	19	no.80: 73
	No. 200	12	4	4	no.200: 29
Plasticity Index		5	N.P.	N.P.	N.P.

Remarks:

Pit Number		0805	0806	0807	0808
Location	Section	NW 1/4 5	not sectionalized	not sectionalized	SE 1/4 36
	Township & Range	14N 15E	Tecolote Grant	Las Vegas Grant	14N 14E
	County	San Miquel	San Miguel	San Miguel	San Miquel
Formation		pЄ	Qt	Qt	Qt (4)
Rock Type		granite	sand & gravel	gravel	gravel
Source Rock (Gravel)		-	granite & various	various	limestone & granite
Quality of Material		poor	good	fair	fair
Thickness of Material		25' plus	6'	6'	5'
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		-	silt	sandstone	sandstone
Vegetation		pine	grass	juniper	juniper
Local Terrain		mountainous	hilly	mountainous	hilly
Thickness of Overburden		0-3'	1'	-	1'
P. I. (Overburden)		S.N.P.	S.N.P.	-	S.N.P.
Estimated Quantity (cu. yds.)		250,000 plus	100,000	5,000	15,000
Los Angeles Wear		35.4	47.6	38.1	29.8
Soundness Loss		8.3	2.4	26.0	7.7
Average Maximum Size		-	6"	3"	2"
% Retained on 2" Sieve		-	27	18	5
Pit Average % Passing	Crushed to:	1"	as received	as received	as received
	2"	-	92	93	59
	1"	100	80	72	51
	½"	68	69	48	47
	No. 4	29	58	33	40
	No. 10	14	48	27	33
	No. 200	2	3	8	17
Plasticity Index		N.P.	N.P.	7	N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0809	0810	0811	0812
Location	Section	not sectionalized	NE 1/4 17	NE 1/4 18	not sectionalized
	Township & Range	Tecolote Grant	12N 15E	10N 16E	Anton Chico Grant
	County	San Miguel	San Miguel	Guadalupe	Guadalupe
Formation		Psa	Qt (2)	Qpcg	Qp
Rock Type		vuqqy conqlomeratic ls.	qravel	caliche & qravel	qravel
Source Rock (Gravel)		-	limestone & various	various	limestone
Quality of Material		poor	qood	qood	qood
Thickness of Material		8' plus	3-12'	5' plus	4'
Thickness of Cap (Caliche)		-	-	1'	-
Material Underlying Formation		shale & sandstone	sandstone & limestone	sandstone	sandstone
Vegetation		juniper	juniper	juniper	qrass
Local Terrain		hilly	hilly	mountainous	hilly
Thickness of Overburden		1'	0-2'	1-2'	0-2'
P. I. (Overburden)		S.N.P.	S.N.P.	10	9
Estimated Quantity (cu. yds)		25,000	150,000	250,000	100,000
Los Angeles Wear		28.4	58.0	cap:37.6 qvl:32.3	29.9
Soundness Loss		15.0	36.5	28.7 12.8	13.9
Average Maximum Size		-	4"	- 4"	5"
% Retained on 2" Sieve		-	30	- 19	15
Pit Average % Passing	Crushed to:	1"	as received	1" as received	as received
	2"	-	69	- 87	72
	1"	100	56	100 56	58
	½"	63	46	64 43	49
	No. 4	27	40	28 33	38
	No. 10	16	35	16 28	31
	No. 200	5	13	3 14	18
Plasticity Index		N.P.	N.P.	N.P. N.P.	9

Remarks:

Pit Number		0813
Location	Section	NE 1/4 18
	Township & Range	9N 14E
	County	Torrance
Formation		Py
Rock Type		limestone
Source Rock (Gravel)		-
Quality of Material		qood
Thickness of Material		10'
Thickness of Cap (Caliche)		0-1'
Material Underlying Formation		sandstone
Vegetation		juniper
Local Terrain		hilly
Thickness of Overburden		1'
P. I. (Overburden)		S.N.P.
Estimated Quantity (cu. yds.)		150,000
Los Angeles Wear		38.9
Soundness Loss		37.8
Average Maximum Size		-
% Retained on 2" Sieve		-
Pit Average % Passing	Crushed to:	1"
	2"	-
	1"	100
	½"	68
	No. 4	31
	No. 10	19
	No. 200	5
Plasticity Index		N.P.

Remarks:

EXPLANATION

QUAD No. 45

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Ql — Landslide debris
- Qps — Piedmont slope deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qop — Older Pediment deposits

TERT.

- Ti — Intrusive rocks undivided

CRET.

- Kd — Dakota Formation

JUR.

- J — Jurassic undivided
- Jet — Entrada and Todilto undivided

TRIASSIC

- Rc — Chinle Formation
- Rcc — Cuervo Sandstone Member of the Chinle Formation
- Rs — Santa Rosa Sandstone

PERMIAN

- Pb — Bernal Formation
- Psa — San Andres Limestone
- Pg — Glorieta Sandstone

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

COLONIAS QUADRANGLE-45
SAN MIGUEL & GUADALUPE COUNTIES

R.19 E. R.20 E. R.21 E. R.22 E. R.23 E.

T.15 N. T.14 N. T.13 N. T.12 N. T.11 N. T.10 N. T.9 N.

Qab Qop Qal Qp Qpc Ql Ka Kd Jet Trs Trcc Tc Pb Pg Psa

ANTONIO

GRANT

Control by National Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division
Modified Conic Projection Standard Parallel 34°40' North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale 1/250,000 or 1 Inch = 3 Miles

COLONIAS
QUADRANGLE
45

1978

EXPLANATION

QUAD No. 46

QUATERNARY

- Qal — Alluvium
- Qab — Bolson deposits
- Ql — Landslide debris
- Qps — Piedmont Slope deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qop — Older Pediment deposits

TERT.

- Tou — Ogallala Formation undifferentiated

CRET.

- K — Cretaceous rocks undivided

JUR.

- J — Jurassic undivided

TRIASSIC

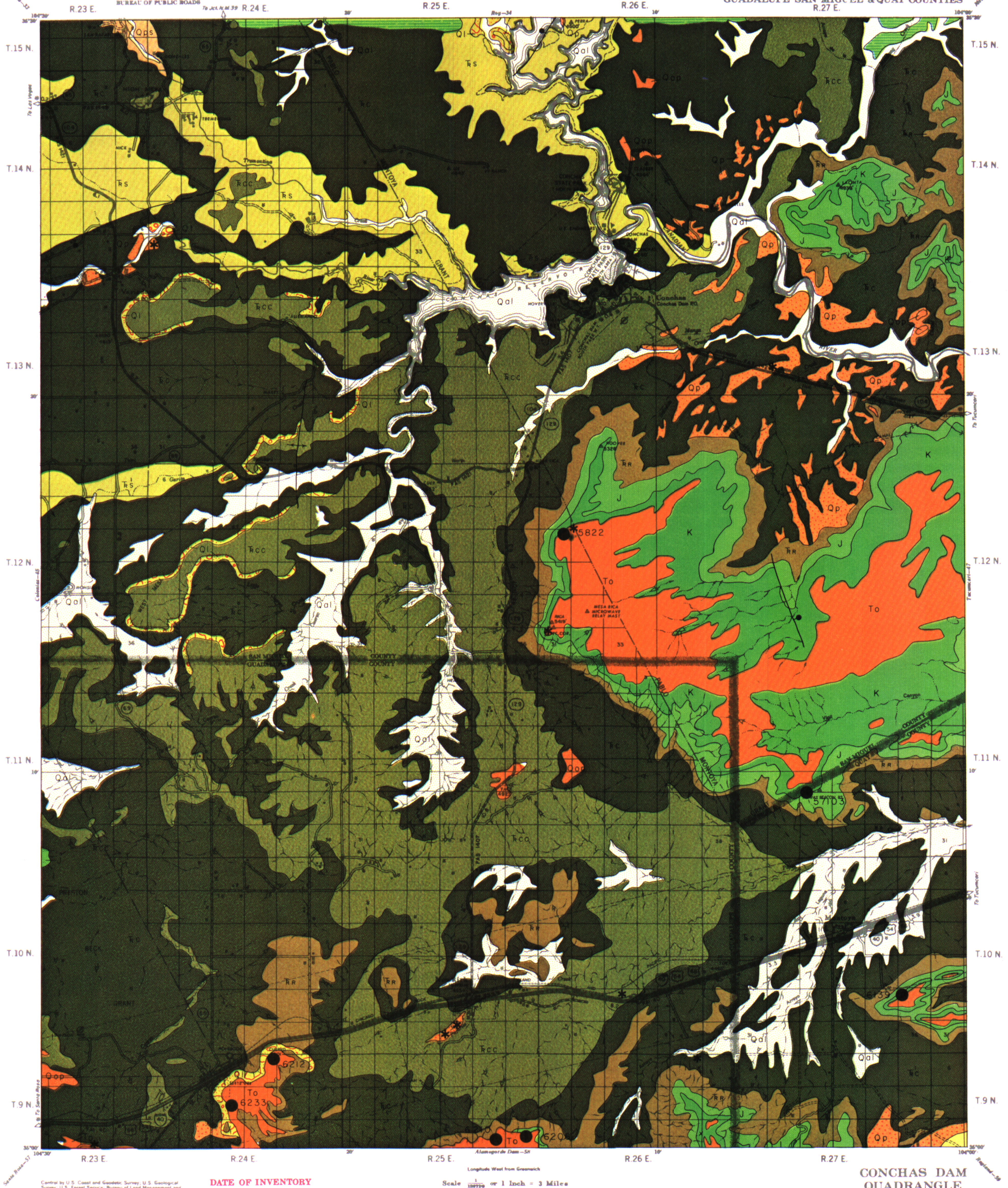
- TRr — Redonda Formation
- TRc — Chinle Formation
- TRcc — Cuervo Sandstone Member of the Chinle Formation
- TRs — Santa Rosa Sandstone

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

GEOLOGY AND AGGREGATE RESOURCES

CONCHAS DAM QUADRANGLE – 46
GUADALUPE SAN MIGUEL & QUAY COUNTIES



Control by U.S. Coast and Geodetic Survey; U.S. Geological Survey; U.S. Forest Service; Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 36½° North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale 1/190080 or 1 Inch = 3 Miles

CONCHAS DAM
QUADRANGLE
46

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		57103	5822	6139	6206
Location	Section	SW¼ 21	NE¼ 18	NW¼ 25	S½ 13
	Township & Range	11N 27E	21N 26E	10N 27E	9N 25E
	County	Quay	San Miguel	Quay	Guadalupe
Formation		To	To	To	To
Rock Type		caliche	caliche	caliche	caliche
Source Rock (Gravel)					
Quality of Material		good	good	good	good
Thickness of Material		12' plus	10'	12' plus	12' plus
Thickness of Cap (Caliche)		3-4'	2-4'	3-4'	2-4'
Material Underlying Formation		soft caliche	sandstone	soft caliche	soft caliche
Vegetation		grass	grass	grass	grass
Local Terrain		mesa top	mesa top	mesa top	mesa top
Thickness of Overburden		0-2'	0-2'	0-4'	0-2'
P. I. (Overburden)		9	10	10	12
Estimated Quantity (cu. yds)		300,000 plus	unlimited	200,000 plus	unlimmited
Los Angeles Wear		cap: 26.0 soft 55.6	cap: 26.0 soft: 31.2	cap: 26.4 soft: 50.0	cap: 27.6
Soundness Loss			0.7	7.1	11.8
Average Maximum Size					
% Retained on 2" Sieve					
Pit Average % Passing	Crushed to:	2"	2"	2"	2"
	2"	100	100	100	100
	1"	48	85	64	81
	½"	22	58	37	38
	No. 4	11	42	20	18
	No. 10	7	33	13	11
	No. 200	2	18	4	4
Plasticity Index		N.P.	8	N.P.	7
Remarks:					

Pit Number		6210	6212	6233
Location	Section	E½ 14	SW¼ 35	S½ 9
	Township & Range	9N 25E	10N 24E	9N 24E
	County	Guadalupe	Guadalupe	Guadalupe
Formation		To	OTp	OTp
Rock Type		caliche	caliche	caliche
Source Rock (Gravel)				
Quality of Material		excellent	good	good
Thickness of Material		12' plus	11' plus	9' plus
Thickness of Cap (Caliche)		3-4'	3-4'	4'
Material Underlying Formation		soft caliche	soft caliche	soft caliche
Vegetation		grass	grass	grass
Local Terrain		mesa top	mesa top	mesa top
Thickness of Overburden		0-2'	0-2'	0-2
P. I. (Overburden)		16	13	13
Estimated Quantity (cu. yds.)		unlimited	unlimited	unlimited
Los Angeles Wear		cp: 27.6 hd cal: 36.0	cap: 30.4 hard: 60	cap: 36.0 soft: 47.2
Soundness Loss		5.1	9.7	cap: 14.0 hard: 5.0
Average Maximum Size				
% Retained on 2" Sieve				
Pit Average % Passing	Crushed to:	2"	2"	2"
	2"	100	100	100
	1"	87	79	97
	½"	47	37	77
	No. 4	26	19	48
	No. 10	18	12	32
	No. 200	7	4	10
Plasticity Index		7	N.P.	13
Remarks:				

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

QUADRANGLE PAGE _____

Pit Number

Location: Section / Township & Range / County

Formation

Rock Type

Source Rock (Gravel)

Quality of Material

Thickness of Material

Thickness of Cap (Caliche)

Material Underlying Formation

Vegetation

Local Terrain

Thickness of Overburden

P. I. (Overburden)

Estimated Quantity (cu. yds)

Los Angeles Wear

Soundness Loss

Average Maximum Size

% Retained on 2" Sieve

Pit Average % Passing: Crushed to: / 2" / 1" / ½" / No. 4 / No. 10 / No. 200

Plasticity Index

Remarks:

Pit Number

Location: Section / Township & Range / County

Formation

Rock Type

Source Rock (Gravel)

Quality of Material

Thickness of Material

Thickness of Cap (Caliche)

Material Underlying Formation

Vegetation

Local Terrain

Thickness of Overburden

P. I. (Overburden)

Estimated Quantity (cu. yds.)

Los Angeles Wear

Soundness Loss

Average Maximum Size

% Retained on 2" Sieve

Pit Average % Passing: Crushed to: / 2" / 1" / ½" / No. 4 / No. 10 / No. 200

Plasticity Index

Remarks:

EXPLANATION

QUAD No. 47

QUATERNARY

- Qal — Alluvium
- Ql — Landslide debris
- Qab — Bolson deposits
- Qe — Eolian deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qt_2 — Older terrace deposits
- Qaf — Alluvial fan deposits
- Qip — Intermediate pediment deposits
- Qop — Older pediment deposits

TERT.

- To — Ogallala Formation

CRET.

- Kd — Dakota Formation

JUR.

- J — Jurassic undivided

TRIASSIC

- $\overline{T}r$ — Redonda Member of Chinle Formation
- $\overline{T}c$ — Chinle Formation
- $\overline{T}s$ — Santa Rosa Sandstone

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

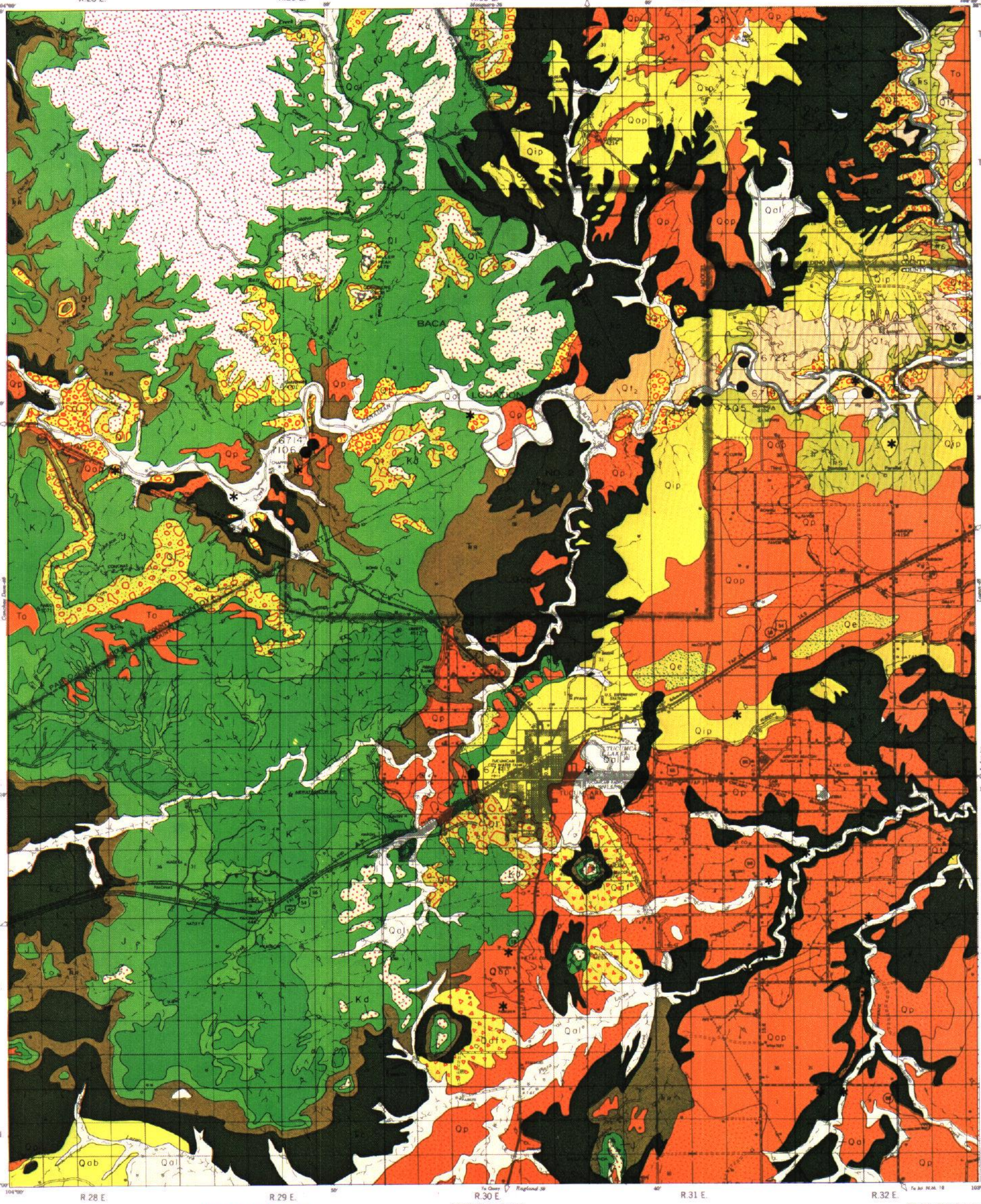
NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

TUCUMCARI QUADRANGLE-47
HARDING, QUAY & SAN MIGUEL COUNTIES

R.28 E. R.29 E. R.30 E. R.31 E. R.32 E.

T.15 N. T.14 N. T.13 N. T.12 N. T.11 N. T.10 N. T.9 N.



DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale 1/126720 or 1 Inch = 2 Miles

TUCUMCARI
QUADRANGLE
47

1976

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5750	57157	6711	6714
Location	Section	W½ 21	SW13, SE14	SE 20	Not Sectionized
	Township & Range	13N 32E	13N 32E	11N 30E	Pablo Montoya Grant
	County	Quay	Quay	Quay	San Miguel
Formation		Qt	Qt	Qp	Qp
Rock Type		sand and gravel	sand and gravel	gravel	gravel
Source Rock (Gravel)		various	various	limestone & various	various
Quality of Material		good	good	good	excellent
Thickness of Material		4-8'	5-9'	9' plus	9-12'
Thickness of Cap (Caliche)				0-1'	
Material Underlying Formation		sandstone	shale	sandstone	shale
Vegetation		grass	grass	grass	grass
Local Terrain		hilly	hilly	rolling	rolling
Thickness of Overburden		6'	2-6'	1-4'	2-5'
P. I. (Overburden)		N.P.	N.P.	6	5
Estimated Quantity (cu. yds)		150,000 plus	150,000 plus	50,000 plus	100,000 + scattered
Los Angeles Wear		32.8	33.2	30.4	37.6
Soundness Loss		1.4		11.4	4.9
Average Maximum Size		5"	4"	2"	5"
% Retained on 2" Sieve		18	22	5	25
Pit Average % Passing	Crushed to:	as received	as received	as received	as received
	2"	87	69	100	65
	1"	58	51	90	49
	½"	37	39	78	33
	No. 4	22	27	57	22
	No. 10	17	21	42	17
	No. 200	2	1	5	3
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

Pit Number		6719	6722	7106	7405
Location	Section	NW 23	Section 14	Not Sectionized	T13N R31E
	Township & Range	13N 31E	13N 31E	Baca Loc. #2 Grant	Baca Loc. #2 Grant
	County	Quay	Quay	San Miguel	San Miguel
Formation		Qt	Qt	Qp	Qt
Rock Type		gravel	gravel	gravel	sand & gravel
Source Rock (Gravel)		various	various	various	various
Quality of Material		good	good	good	good
Thickness of Material		11' plus	12' plus	10'	6-15'
Thickness of Cap (Caliche)					
Material Underlying Formation		shale	shale & sandstone	shale	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		river bank	river bank	rolling	hilly
Thickness of Overburden		1-4'	3-8'	1-6'	3-10'
P. I. (Overburden)		6	6	7	7
Estimated Quantity (cu. yds.)		50,000 plus	100,000 plus	100,000 + scattered	150,000 plus
Los Angeles Wear		32.0	32.0	32.3	31.0
Soundness Loss		7.1	3.3	11.8	4.7
Average Maximum Size		5"	5"	5"	5"
% Retained on 2" Sieve		23	15	21	20
Pit Average % Passing	Crushed to:	as received	as received	as received	as received
	2"	74	92	78	86
	1"	62	46	60	72
	½"	45	33	45	58
	No. 4	30	21	31	47
	No. 10	23	16	23	42
	No. 200	3	3	2	3
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		7406
Location	Section	Baca Loc. #2Grant
	Township & Range	13N 31E
	County	San Miguel
Formation		Qt
Rock Type		sand & gravel
Source Rock (Gravel)		various
Quality of Material		good
Thickness of Material		10' plus
Thickness of Cap (Caliche)		
Material Underlying Formation		sandstone
Vegetation		grass
Local Terrain		hilly
Thickness of Overburden		3-6'
P. I. (Overburden)		N.P.
Estimated Quantity (cu. yds)		150,000 plus
Los Angeles Wear		31.4
Soundness Loss		2.4
Average Maximum Size		5"
% Retained on 2" Sieve		25
Pit Average % Passing	Crushed to:	as received
	2"	69
	1"	57
	½"	47
	No. 4	36
	No. 10	31
	No. 200	4
Plasticity Index		N.P.

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 48

QUATERNARY

- Qal — Alluvium
- Qe — Eolian deposits
- Qyp — Younger Pediment deposits
- Qp — Pediment deposits
- Qt — Terrace deposits
- Qpg — Pediment deposits
- Qop — Older Pediment deposits

TERT.

- To — Ogallala Formation undifferentiated
- Tog — Ogallala Formation Gravel

TRIASSIC

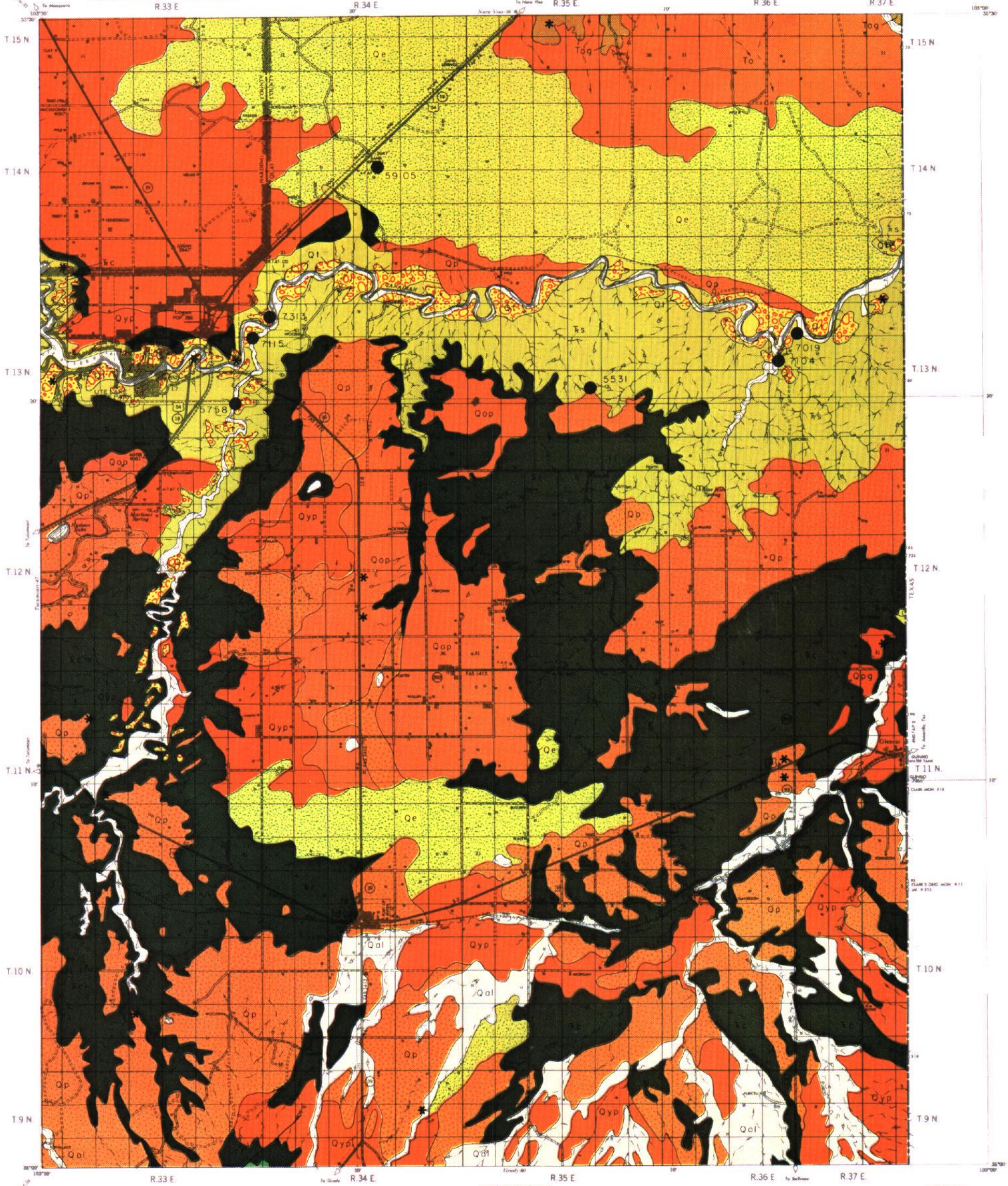
- TRc — Chinle Formation
- TRs — Santa Rosa Sandstone

- Established pit or quarry
- Prospect pit or quarry
- Fault — downthrown side
- Anticline
- Syncline

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY AND AGGREGATE RESOURCES

LOGAN QUADRANGLE-48
QUAY & HARDING COUNTIES



Control by National Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division
Modified Conic Projection Standard Parallel 36°N North American Datum

DATE OF INVENTORY
GEOLOGY MAY 1981
AGGREGATE RESOURCES MAY 1981

Scale 1/250,000 or 1 Inch = 3 Miles
1 0 1 2 3 4
STATUTE MILES

DATE OF INVENTORY
HARDING COUNTY 1970
QUAY COUNTY 1970

LOGAN
QUADRANGLE
48

QUADRANGLE PAGE 48

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5531	5758	59105	7019
Location	Section	NE 22	SW 24	SW 15	SE 10
	Township & Range	13N 35E	13N 33E	14N 34E	13N 36E
	County	Quay	Quay	Quay	Quay
Formation		Qop	Qt	Qe	Qt
Rock Type		sand & gravel	gravel	sand	sand & gravel
Source Rock (Gravel)		various	various		various
Quality of Material		good	good	good	excellent
Thickness of Material		3-7'	7-28'	6'	5-16'
Thickness of Cap (Caliche)					
Material Underlying Formation		conglomerate	sandstone	sand	sandstone & shale
Vegetation		grass	grass	grass	grass
Local Terrain		hilly	canyon	rolling	hilly
Thickness of Overburden		1-5'	7'	0-1'	2-5'
P. I. (Overburden)		10	N.P.	S.N.P.	6
Estimated Quantity (cu. yds)		75,000 plus	10,000	75,000 plus	100,000
Los Angeles Wear		30.2	28.0		32.0
Soundness Loss					2.7
Average Maximum Size		3"	3"		4"
% Retained on 2" Sieve		15	5		20
	Crushed to:	3/4"	as received		as received
	2"		100		84
Pit	1"	100	87		68
Average	½"	86	68	100	52
% Passing	No. 4	59	45		36
	No. 10	44	32		28
	No. 200	11	3		2
Plasticity Index		N.P.	N.P.		N.P.
Remarks:					

7019: additional material one mile to east

Pit Number		7104	7115	7307	7313
Location	Section	NW 15	NW 13	NW 15	SE 12
	Township & Range	13N 36E	13N 33E	13N 33E	13N 33E
	County	Quay	Quay	Quay	Quay
Formation		Qt	Qt	Qt	Qt
Rock Type		gravel	sand & gravel	sand & gravel	gravel
Source Rock (Gravel)		various	various	various	various
Quality of Material		excellent	good	good	good
Thickness of Material		4-9'	4-12'	12'	5-10'
Thickness of Cap (Caliche)					
Material Underlying Formation		shale & silt	shale	shale	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		hilly	rolling	rolling	rolling
Thickness of Overburden		0-4'	1-8'	0-2'	0-3'
P. I. (Overburden)		N.P.	N.P.-8	S.N.P.	N.P.
Estimated Quantity (cu. yds.)		50,000	50,000 plus	50,000 plus	100,000
Los Angeles Wear		33.0	29.0	29.0	30.2
Soundness Loss		6.2	8.4	7.7	11.5
Average Maximum Size		4"	4"	3"	4"
% Retained on 2" Sieve		20	20	25	15
	Crushed to:	as received	as received	as received	as received
	2"	84	85	71	94
Pit	1"	62	72	51	86
Average	½"	41	60	35	73
% Passing	No. 4	26	41	23	56
	No. 10	19	30	17	43
	No. 200	3	4	2	3
Plasticity Index		N.P.	N.P.	N.P.	N.P.
Remarks:					

7104: additional material east and west

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE _____

MATERIAL PIT SUMMARY

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

EXPLANATION

QUAD No. 56

- Developed Pit or Quarry
- Prospect Pit or Quarry
- Fault
- Downthrown side
- Selected exploration site

QUATERNARY

- Qal — Alluvium
- Qe — Eolian sand
- Qe — Eolian deposits
- Ql — Landslide debris
- Qld — Lake deposits
- Qab — Bolson deposits
- Qt — Terrace deposits (post-glacial)
- Qp — Pediment deposits
- Qpc — Pediment deposits Caliche capped fine grained
- Qpcg — Pediment deposits Caliche capped coarse grained

TRIASSIC TERTIARY

- Ti — Intrusive Rocks undivided
- Trs — Lower Triassic rocks (inc. Santa Rosa)

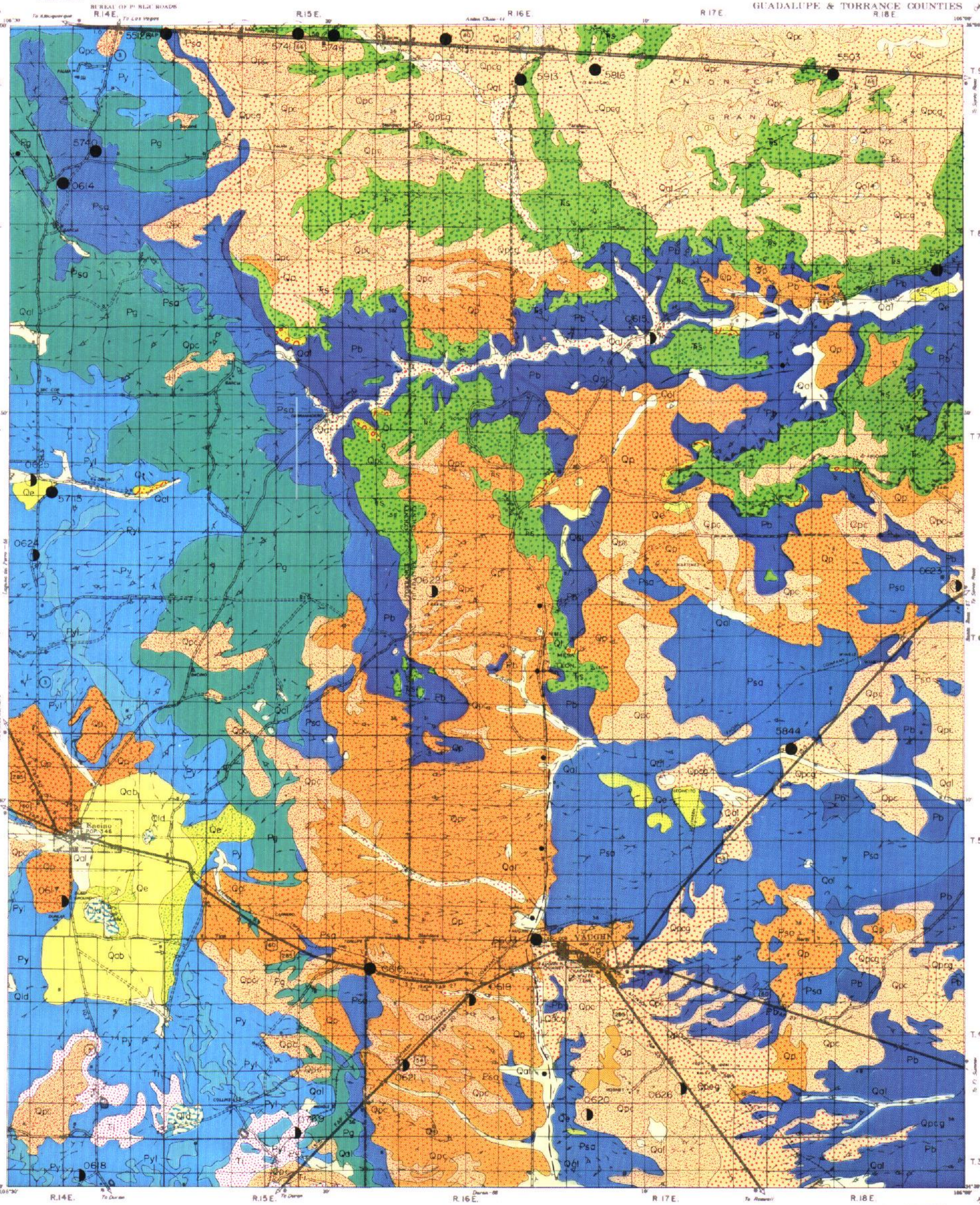
PERMIAN

- Pb — Bernal Formation
- Psa — San Andres Limestone
- Pg — Glorieta Sandstone
- Py — Yeso Formation
- Pyl — Yeso Limestone

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

GEOLOGY and AGGREGATE RESOURCES

VAUGHN
QUADRANGLE - 56
GUADALUPE & TORRANCE COUNTIES



Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division. Modified Conic Projection Standard Parallel 34°? North American Datum

DATE OF INVENTORY
GEOLOGY JAN 1975
AGGREGATE RESOURCES JAN. 1975

Longitude West from Greenwich
Scale 1/190080 or 1 Inch = 3 Miles
STATUTE MILES

DATE OF INVENTORY
GUADALUPE COUNTY 1965
TORRANCE COUNTY 1961

VAUGHN
QUADRANGLE
56

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5503	55128	5713	5740
Location	Section	not sectionalized	NE 1/4 23	NE 1/4 27	SE 1/4 4
	Township & Range	Anton Chico Grant	9N 14E	8N 18E	8N 14E
	County	Guadalupe	Torrance	Guadalupe	Torrance
Formation		Qpcq	Qpcq	Qal	Psa
Rock Type		sand & gravel	caliche	blow sand	limestone
Source Rock (Gravel)		limestone, ss & qtzt	-	-	-
Quality of Material		good	excellent	good	good
Thickness of Material		10' plus	13'	4'	15'
Thickness of Cap (Caliche)		-	3-6'	-	-
Material Underlying Formation		sandstone	limestone	sandstone	sandstone
Vegetation		grass & juniper	grass & small shrubs	grass	juniper & pinon
Local Terrain		rolling	flat - rolling	hilly	hilly
Thickness of Overburden		0-2'	1-4'	0-1'	0-4'
P. I. (Overburden)		10-N.P.	8-18	S.N.P.	8-13
Estimated Quantity (cu. yds)		200,000	100,000	50,000	100,000
Los Angeles Wear		35.6	cap:34.4 soft nod:39.6	-	26.8
Soundness Loss		4,5	23.9	-	2.7
Average Maximum Size		2"	-	-	-
% Retained on 2" Sieve		8	-	-	-
Pit Average % Passing	Crushed to:	as received	3/4"	as received	1"
	2"	93	100	-	-
	1"	85	100	-	100
	½"	72	87	no.10: 100	53
	No. 4	49	47	no,40: 99	18
	No. 10	36	26	no.80: 73	9
	No. 200	5	5	no.200: 19	2
Plasticity Index		N.P.	N.P.	N.P.	N,P.

Remarks:

55128: pit #5501 in the area

Pit Number		5741	5746	57113	5816
Location	Section	NE 1/4 21	NE 1/4 20	SE 1/4 29	N 1/2 25
	Township & Range	9N 15E	9N 15E	7N 14E	9N 16E
	County	Torrance	Torrance	Torrance	Guadalupe
Formation		Qpc	Qpcq	Oe	Qpcg
Rock Type		caliche	gravel	blow sand	caliche
Source Rock (Gravel)		-	various	-	-
Quality of Material		excellent	good	fair	good
Thickness of Material		8-12'	31'	5' plus	6-12'
Thickness of Cap (Caliche)		6'	5-8'	-	3-5'
Material Underlying Formation		sandstone	sandstone	gypsum & sandstone	sandstone
Vegetation		grass & cacti	grass	grass	juniper
Local Terrain		flat - rolling	flat - rolling	hilly	rolling
Thickness of Overburden		1-3'	0-12'	0-1'	2'
P. I. (Overburden)		N.P. - 16	N.P. -12	S.N.P.	N.P.-7
Estimated Quantity (cu. yds.)		100,000	17,000	100,000 plus	400,000
Los Angeles Wear		cap:36.0 nod.cal:27.2	34.8	-	cap:25.0 soft:48.0
Soundness Loss		cap:14.6 42.7	3.7	-	2.8 -
Average Maximum Size		- -	6"	-	- -
% Retained on 2" Sieve		- -	less than 20	-	- -
Pit Average % Passing	Crushed to:	1" 1"	2"	as received	2" 2"
	2"	- -	100	-	100 100
	1"	100 100	61	-	86 93
	½"	62 60	40	no.10: 100	42 71
	No. 4	28 25	27	no.40: 99	23 47
	No. 10	17 15	21	no.80: 73	15 35
	No. 200	2 3	4	no.200: 19	8 13
Plasticity Index		N.P. N.P.	N.P.	S.N.P.	N.P. N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5844	5913	6603	0613
Location	Section	NE 1/4 1	NE 1/4 27	SE 1/4 34	NW 1/4 20
	Township & Range	5N 17E	9N 16E	5N 16E	9N 16E
	County	Guadalupe	Guadalupe	Guadalupe	Guadalupe
Formation		Qpcg	Qe	Qp	Qpc
Rock Type		gravel	blow sand	gravel	conglomerate,cal.& gvl.
Source Rock (Gravel)		limestone & caliche	-	limestone & quartzite	limestone & quartzite
Quality of Material		good	fair	excellent	good
Thickness of Material		17' plus	3' plus	12-30'	14' plus
Thickness of Cap (Caliche)		-	-	-	6'
Material Underlying Formation		limestone	sandstone	sandstone	sand & gravel
Vegetation		grass & yucca	grass	grass & yucca	grass & cholla
Local Terrain		rolling	hilly	flat - rolling	hilly
Thickness of Overburden		0-8'	0-1'	2-8'	-
P. I. (Overburden)		10-12	S.N.P.	7-12	-
Estimated Quantity (cu. yds)		20,000	75,000	170,000	500,000
Los Angeles Wear		22.0	-	25.0	cal:33.6 gvl;20,5
Soundness Loss		6.6	-	8.9	32.8 4,5
Average Maximum Size		6"	-	1"	- 2"
% Retained on 2" Sieve		20	-	70	- -
Pit Average % Passing	Crushed to:	as received	as received	as received	1" as received
	2"	77	-	84	100 93
	1"	65	-	74	100 69
	½"	56	no.10: 100	60	65 38
	No. 4	43	no.40: 98	43	24 21
	No. 10	34	no.80: 46	32	14 17
	No. 200	4	no.200: 18	5	3 5
Plasticity Index		N.P.	N.P.	N.P.	N.P. N.P.

Remarks:

6603: other developed pits in the area

Pit Number		0614	0615	0616	0617
Location	Section	SE 1/4 8	NW 1/4 5	SW 1/4 6	SE 1/4 29
	Township & Range	8N 14E	7N 17E	4N 16E	5N 14E
	County	Torrance	Guadalupe	Torrance	Torrance
Formation		Psa	Qal	Qp	Qp
Rock Type		limestone	sand & gravel	gravel & sand	sand & gravel
Source Rock (Gravel)		-	ls., ss., & qtzt.	ls., qtzt., ss., & cal.	limestone & quartzite
Quality of Material		good	good	good	good
Thickness of Material		15' plus	6' plus	15' plus	15' plus
Thickness of Cap (Caliche)		-	-	-	-
Material Underlying Formation		sandstone	shale & siltstone	limestone	siltstone
Vegetation		juniper & pinon	grass	yucca & grass	grass
Local Terrain		hilly	arroyo bottom	rolling	flat
Thickness of Overburden		0-3'	0-8'	-	1-4'
P. I. (Overburden)		N.P.	N.P.	N.P.	N.P.
Estimated Quantity (cu. yds.)		200,000	500,000	500,000	50,000
Los Angeles Wear		29.2	31.0	35.8	25.6
Soundness Loss		9.7	21.9	7.7	13.0
Average Maximum Size		-	1"	1"	1"
% Retained on 2" Sieve		-	13	-	100
Pit Average % Passing	Crushed to:	1"	as received	as received	as received
	2"	-	87	100	100
	1"	100	74	98	99
	½"	50	61	90	92
	No. 4	16	52	62	63
	No. 10	9	47	42	48
	No. 200	2	8	7	10
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

0616: Silty clay lenses occur but are less than 1' thick average.

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0618	0619	0620	0621
Location	Section	NW 1/4 10	SW 1/4 10	NE 1/4 31	SW 1/4 20
	Township & Range	3N 14E	4N 16E	4N 17E	4N 16E
	County	Torrance	Guadalupe	Guadalupe	Guadalupe
Formation		Pyl	Qp	Qpc	Qpc
Rock Type		limestone	gravel	caliche	caliche
Source Rock (Gravel)		-	limestone, caliche & qtzt.	-	-
Quality of Material		good	good	good	good
Thickness of Material		5-8'	15'	5'	7-8'
Thickness of Cap (Caliche)		-	-	5'	2-4'
Material Underlying Formation		siltstone & shale	sand & gravel	limestone	limestone
Vegetation		grass, cholla & juniper	grass & yucca	grass & yucca	grass & yucca
Local Terrain		low mesa	valley slope	rolling edge of sink	rolling
Thickness of Overburden		-	1'	-	0-1'
P. I. (Overburden)		-	N.P.	-	N.P.
Estimated Quantity (cu. yds)		100,000	20,000	50,000	500,000
Los Angeles Wear		16.9	23.4	28.9	cap:27.7 nod.cal:38.0
Soundness Loss		2.6	7.3	16.3	9.2 19.8
Average Maximum Size		-	1"	-	- -
% Retained on 2" Sieve		-	4	-	- -
Pit Average % Passing	Crushed to:	1"	as received	1"	1" 1"
	2"	-	96	-	100 -
	1"	100	88	100	98 100
	½"	48	69	65	60 79
	No. 4	16	42	29	27 42
	No. 10	8	31	18	16 30
	No. 200	2	7	4	3 10
Plasticity Index		N.P.	N.P.	N.P.	N.P. 8

Remarks:

Pit Number		0622	0623	0624	0625
Location	Section	SE 1/4 7	NW 1/4 11	SE 1/4 6	NE 1/4 30
	Township & Range	6N 16E	6N 18E	6N 14E	7N 14E
	County	Guadalupe	Guadalupe	Torrance	Torrance
Formation		Qpc	Qpc	Pyl	Qal
Rock Type		caliche	caliche	limestone	sand & gravel
Source Rock (Gravel)		-	-	-	quartzite & limestone
Quality of Material		excellent	excellent	good	good
Thickness of Material		6' plus	10' plus	5'	6' plus
Thickness of Cap (Caliche)		3'	3-4'	-	-
Material Underlying Formation		sand & gravel	limestone	siltstone	siltstone & shale
Vegetation		juniper, grass & yucca	grass & yucca	juniper & grass	grass & thistle
Local Terrain		mesa escarpment	flat	low mesa edge	gently rolling - flat
Thickness of Overburden		0-2'	-	0-5'	1-3'
P. I. (Overburden)		N.P.	-	S.N.P.	S.N.P.
Estimated Quantity (cu. yds.)		500,000	500,000	500,000	200,000
Los Angeles Wear		cap:34.6 soft cal:61.4	cap:21.2 nod.cal:40.0	33.1	26.7
Soundness Loss		24.4 -	24.4 -	4.2	5.5
Average Maximum Size		- -	- -	-	3"
% Retained on 2" Sieve		- -	- -	-	20
Pit Average % Passing	Crushed to:	1" 1"	1" 1"	1"	as received
	2"	- -	- -	-	83
	1"	100 100	100 100	100	76
	½"	65 70	59 68	51	68
	No. 4	31 23	20 31	21	58
	No. 10	14 10	11 20	11	52
	No. 200	3 2	2 4	3	28
Plasticity Index		N.P. N.P.	N.P. N.P.	N.P.	N.P.

Remarks:

0622: possibility of a workable gravel deposit below caliche lift C

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0626		0769
Location	Section	S 1/2 27		SE 1/4 34
	Township & Range	4N 17E		4N 15E
	County	Guadalupe		Torrance
Formation		Qpcg		Ti
Rock Type		gravel & claiche		diorite
Source Rock (Gravel)		limestone, quartzite & igneous		-
Quality of Material		excellent		poor
Thickness of Material		15' plus		11' plus
Thickness of Cap (Caliche)		4-5'		-
Material Underlying Formation		red siltstone & shale		sandstone
Vegetation		grass & yucca		grass
Local Terrain		hilly - rolling		rolling
Thickness of Overburden		trace		0-3'
P. I. (Overburden)		-	-	S.N.P.
Estimated Quantity (cu. yds)		500,000		150,000
Los Angeles Wear		cal. cap: 29.2	gravel: 26.8	57.2
Soundness Loss		40.4	20.1	27.1
Average Maximum Size		-	2-3"	-
% Retained on 2" Sieve		-	9	-
Pit Average % Passing	Crushed to:	1"	as received	1"
	2"	-	55	-
	1"	100	42	100
	½"	65	23	65
	No. 4	29	9	41
	No. 10	17	6	30
	No. 200	6	1	6
Plasticity Index		N.P.	N.P.	N.P.
Remarks:				

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

AGGREGATE RESOURCES and GEOLOGY

SANTA ROSA QUADRANGLE 57
GUADALUPE & DE BACA COUNTIES

EXPLANATION

QUATERNARY

- Qal — Alluvium: Sand, silt, clay
- Qal — Alluvium: Sand, silt, clay and gravel
- Qe — Eolian Deposits: Wind blown sand
- Qt — Terrace Deposits: Sand and gravel
- Qb — Bolson Deposits: Sand, silt, clay and gravel

TERTIARY

- QTp — Pediment Deposits: Heterogeneous deposits of sand, silt, clay and soft caliche
- QTg — Pediment Gravel: Predominantly sand and gravel
- QTc — Caliche: Caliche rock

TRIASSIC

- Rc — Chinle Formation: Maroon to red and gray sandstone, shale and siltstone
- Rsr — Santa Rosa Sandstone: Maroon to red and gray sandstone siltstone and shale

PERMIAN

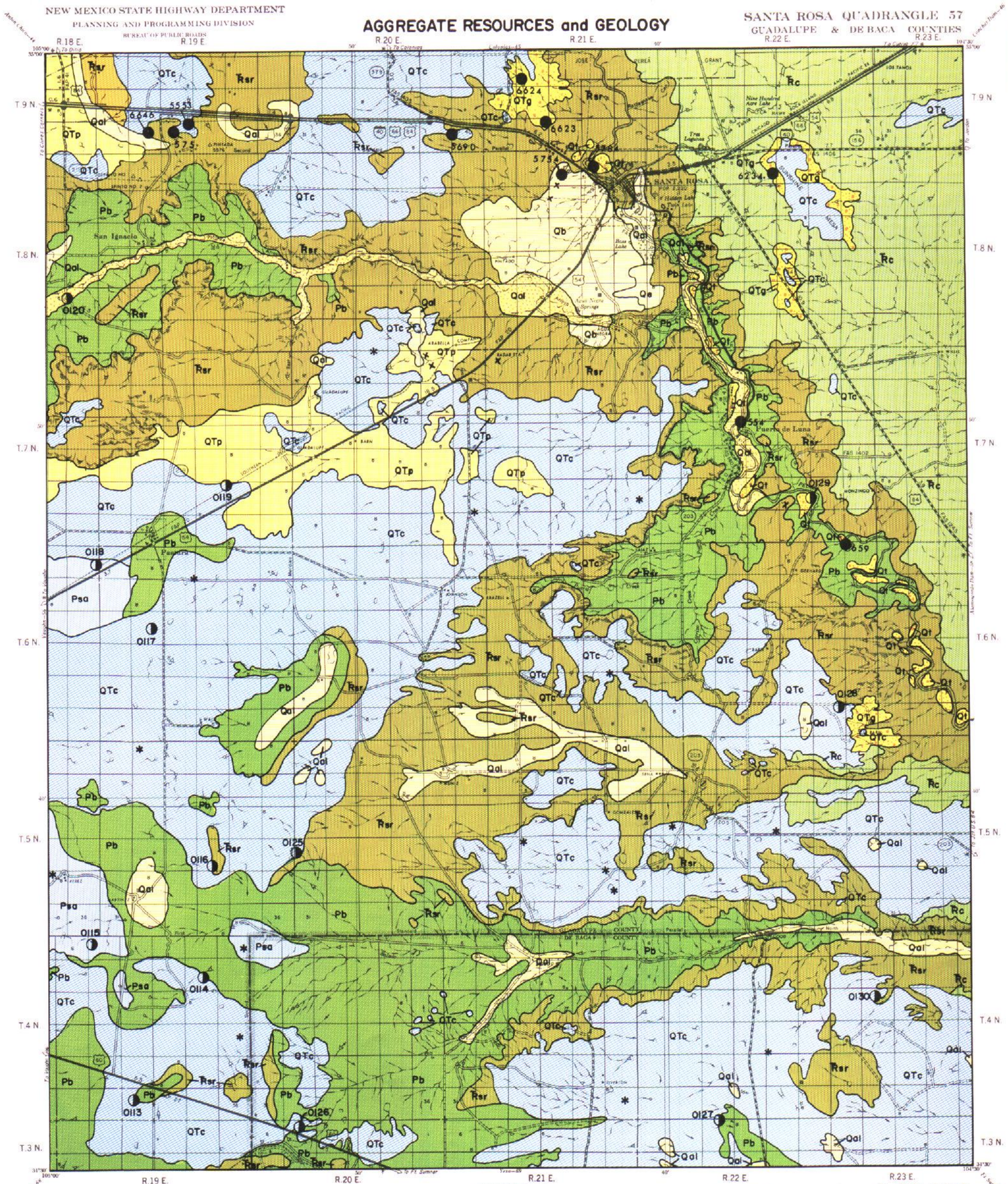
- Pb — Bernal Formation: Orange-red siltstone, sandstone and shale and white gypsum
- Psa — San Andres Formation: Gray to buff limestone with minor gypsum

Fault

Developed pit or quarry

Prospect pit or quarry

* Selected sites not tested



Control by U.S. Coast and Geodetic Survey; U.S. Geological Survey; U.S. Forest Service; Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 34° North American Datum

DATE OF INVENTORY
GEOLOGY JULY 1968
AGGREGATE RESOURCES JULY 1968

Scale 1/190080 or 1 Inch = 3 Miles
STATUTE MILES

DATE OF INVENTORY
QUADALUPE COUNTY 1965
DE BACA COUNTY 1965

SANTA ROSA QUADRANGLE 57

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0118	0119	0120	0125
Location	Section	6	26	25	19
	Township & Range	6 N 19 E	7N 19 E	8 N 18 E	5 N 20 E
	County	Guadalupe	Guadalupe	Guadalupe	Guadalupe
Formation		San Andres	--	alluvium	--
Rock Type		limestone	caliche	sand	caliche
Source Rock (Gravel)		--	--	--	--
Quality of Material		good	good	good	good
Thickness of Material		5' plus	3' plus	8'	5'
Thickness of Cap (Caliche)		--	3' plus	--	2'
Material Underlying Formation		--	--	--	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		rolling	rolling	rolling	rolling
Thickness of Overburden		1'	1'	0.5'	1'
P. I. (Overburden)		--	--	--	--
Estimated Quantity (cu. yds)		unlimited	unlimited	25,000	unlimited
Los Angeles Wear		32.4	27.6	--	28.0
Soundness Loss					6.7
Average Maximum Size					
% Retained on 2" Sieve					
	Crushed to: 2"	1"	1"	1"	1" 1"
Pit Average % Passing	1"	100	100		Cap 100 S.C. 100
	½"	50	73		59 73
	No. 4	21	28		21 29
	No. 10	13	16	100	12 16
	No. 200	3	3	29	2 3
Plasticity Index		S.N.P.	S.N.P.	S.N.P.	S.N.P. S.N.P.
Remarks:					

Pit Number		0126	0127	0128	0129
Location	Section	5	4	24	24
	Township & Range	3 N 20 E	3 N 22 E	6 N 22 E	7 N 22 E
	County	DeBaca	DeBaca	Guadalupe	Guadalupe
Formation			wind-blown sand	--	terrrace deposit
Rock Type		caliche	sand	caliche	gravel
Source Rock (Gravel)		--	--	--	various
Quality of Material		good	good	good	excellent
Thickness of Material		5'	0-5'	9'	18' plus
Thickness of Cap (Caliche)		2'	--	2.5'	--
Material Underlying Formation		--	silt	shale	shale
Vegetation		grass	bearqrass	pinon	mesquite
Local Terrain		rolling	dunes	flat	hilly
Thickness of Overburden		1'	--	0.5'	2'
P. I. (Overburden)		--	--	5.4	--
Estimated Quantity (cu. yds.)		unlimited	15,000	unlimited	500,000
Los Angeles Wear		34.0	--	30.0	20.6
Soundness Loss		12.9	--	7.2	8.7
Average Maximum Size		--		--	4"
% Retained on 2" Sieve		--		--	15'
	Crushed to: 2"	Cap 1" S.C. 1"		Cap 1" S.C. 1"	1"
Pit Average % Passing	1"	100 100		100 100	100
	½"	61 67		76 79	88
	No. 4	24 30		28 28	66
	No. 10	14 19	100	15 16	58
	No. 200	3 5	7	3 4	8
Plasticity Index		S.N.P. S.N.P.	S.N.P.	S.N.P. 10	S.N.P.
Remarks:					

QUADRANGLE PAGE 57

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0130
Location	Section	17
	Township & Range	4 N 23 E
	County	DeBaca
Formation		--
Rock Type		caliche
Source Rock (Gravel)		--
Quality of Material		excellent
Thickness of Material		10'
Thickness of Cap (Caliche)		4'
Material Underlying Formation		sandstone
Vegetation		grass
Local Terrain		flat
Thickness of Overburden		0.5'
P. I. (Overburden)		--
Estimated Quantity (cu. yds)		unlimited
Los Angeles Wear		25.2
Soundness Loss		4.8
Average Maximum Size		--
% Retained on 2" Sieve		--
Pit Average % Passing	Crushed to:	Cap 1" S.C. 1"
	2"	
	1"	100 100
	½"	50 88
	No. 4	18 36
	No. 10	10 22
	No. 200	2 7
Plasticity Index		S.N.P. 6

Remarks:

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		554	575		659	5553	
Location	Section	NW 1/4 16	NE 1/4 33		SW 1/4 36	NE 1/4 33 & SE 1/4 28	
	Township & Range	7 N. 22 E.	9 N. 19 E.		7 N. 22 E.	9 N. 19 E.	
	County	Guadalupe	Guadalupe		Guadalupe	Guadalupe	
Formation		terrace deposit			terrace deposit		
Rock Type		sand & gravel	caliche		sand & gravel	caliche	
Source Rock (Gravel)		various	--		various	--	
Quality of Material		good	fair		good	fair	
Thickness of Material		8'	8'		10'	6'	
Thickness of Cap (Caliche)		--	3'		--	3'	
Material Underlying Formation		shale & conglomerate	sandstone		sandstone & shale	--	
Vegetation		--	grass		grass	grass	
Local Terrain		rolling	rolling		mountainous	rolling	
Thickness of Overburden		3'	1'		1'	1'	
P. I. (Overburden)		7	11		5	6	
Estimated Quantity (cu. yds)		2,000	80,000		25,000	5,000	
Los Angeles Wear		28.0	Cap 32.8	S.C. 51.2	34.4	Cap 40.0	S.C. 54.4
Soundness Loss		--	--	--	--	--	--
Average Maximum Size		8"	--	--	6"	--	--
% Retained on 2" Sieve		--	--	--	25	--	--
Pit Average % Passing	Crushed to:	3/4"	1"	1"	1"	3/4"	3/4"
	2"	--	--	--	--	--	--
	1"	100	100	100	100	100	100
	½"	78	64	72	71	80	93
	No. 4	37	36	45	49	47	74
	No. 10	23	25	34	42	35	64
	No. 200	6	5	8	6	7	16
Plasticity Index		S.N.P.	S.N.P.	S.N.P.	S.N.P.	S.N.P.	S.N.P.

Remarks:

Pit Number		5690		5754	5784	6234
Location	Section	35		SW 1/4 4	NW 1/4 3	4
	Township & Range	9 N 20 E		8 N 21 E	8 N 21 E	8 N 22 E
	County	Guadalupe		Guadalupe	Guadalupe	Guadalupe
Formation		--		terrace deposit	terrace deposit	pediment deposit
Rock Type		caliche		sand & gravel	sand & gravel	sand & gravel
Source Rock (Gravel)		--		various	various	various
Quality of Material		fair		fair	fair	fair
Thickness of Material		7'		15'	10'	12'
Thickness of Cap (Caliche)		3'		--	--	--
Material Underlying Formation		sandstone		--	--	siltstone & sand
Vegetation		grass		grass	grass	grass
Local Terrain		rolling		hilly	rolling	hilly
Thickness of Overburden		1'		3'	1'	0-5'
P. I. (Overburden)		8		13	6	12
Estimated Quantity (cu. yds.)				120,000	80,000	100,000
Los Angeles Wear		Cap 31.2	S.C. 74.8	--	35.6	30.8
Soundness Loss		--	--	--	2.2	--
Average Maximum Size		--	--	6"	6"	3"
% Retained on 2" Sieve		--	--	15	25	--
Pit Average % Passing	Crushed to:	1"	1"	1"	1"	1"
	2"	--	--	--	--	--
	1"	100	100	100	100	100
	½"	50	82	75	80	68
	No. 4	23	67	57	60	43
	No. 10	14	60	45	48	29
	No. 200	3	8	8	9	4
Plasticity Index		S.N.P.	S.N.P.	S.N.P.	5	S.N.P.

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		6623	6624	6646	0113
Location	Section	NW 1/4 33	19, 20	32	33
	Township & Range	9 N 21 E	9 N 21 E	9 N 19 E	4 N 19 E
	County	Guadalupe	Guadalupe	Guadalupe	Guadalupe
Formation		pediment deposit	pediment deposit	--	--
Rock Type		sand and gravel	sand and gravel	caliche	caliche
Source Rock (Gravel)		various	various	--	--
Quality of Material		poor	excellent	good	fair
Thickness of Material		6'	20'	10'	5'
Thickness of Cap (Caliche)		--	--	5'	2'
Material Underlying Formation		sandstone	--	sandstone	silt and clay
Vegetation		grass & sparce trees	grass	grass	grass
Local Terrain		hilly	rolling	rolling	rolling
Thickness of Overburden		2.5'	5'	1'	1'
P. I. (Overburden)		S.N.P.	10	13	--
Estimated Quantity (cu. yds)		166,000	325,000	300,000	unlimited
Los Angeles Wear		30.0	35.2	Cap. 27.2 S.C. 44.4	54.0
Soundness Loss		--	5.2	15.2 --	17.2
Average Maximum Size		6"	6"	-- --	--
% Retained on 2" Sieve		20	25	-- --	--
Pit Average % Passing	Crushed to:	1"	1"	1" 1"	1"
	2"	--	--	--	Cap S.C.
	1"	100	100	100 100	100 100
	½"	87	60	47 60	78 91
	No. 4	65	38	30 44	34 40
	No. 10	50	28	23 38	19 26
	No. 200	7	5	6 13	3 6
Plasticity Index		S.N.P.	5	S.N.P. S.N.P.	S.N.P. S.N.P.

Remarks:

Pit Number		0114	0115	0116	0117
Location	Section	11	5	22	17
	Township & Range	4 N 19 E	4 N 19 E	5 N 19 E	16 N 19 E
	County	Guadalupe	Guadalupe	Guadalupe	Guadalupe
Formation		--	San Andres	alluvium	--
Rock Type		caliche	limestone	sand	caliche
Source Rock (Gravel)		--	--	--	--
Quality of Material		excellent	good	fair	good
Thickness of Material		8' plus	6' plus	5'	8'
Thickness of Cap (Caliche)		6'	--	--	2'
Material Underlying Formation		silt & gypsum	--	--	sandstone
Vegetation		grass	grass	grass	grass
Local Terrain		rolling	rolling	flat	rolling
Thickness of Overburden		1'	1'	--	1'
P. I. (Overburden)		--	--	--	--
Estimated Quantity (cu. yds.)		unlimited	unlimited	100,000	unlimited
Los Angeles Wear		Cap. 24.0 S.C. 39.2	51.6	--	37.6
Soundness Loss		6.5 6.2	6.3	--	14.0
Average Maximum Size		-- --	--	--	--
% Retained on 2" Sieve		-- --	--	--	--
Pit Average % Passing	Crushed to:	1" 1"	1"	--	1"
	2"	-- --	--	--	--
	1"	100 100	100	--	Cap 100 S.C. 100
	½"	46 57	52	--	75 93
	No. 4	16 24	20	--	29 47
	No. 10	8 14	11	100	17 32
	No. 200	1 4	5	33	3 11
Plasticity Index		S.N.P. S.N.P.	S.N.P.	S.N.P.	S.N.P. S.N.P.

Remarks:

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

AGGREGATE RESOURCES and GEOLOGY

ALAMOGORDO DAM QUADRANGLE 58
QUAY DE BACA & GUADALUPE COUNTIES

EXPLANATION

QUATERNARY

Qal — Alluvium
Poorly sorted, fine-grained, gravel, sand, silt and clay in intermittent streams(1); well-sorted, coarse-grained gravel of the Pecos River channel (2)

Qe (1/2) — Eolian deposits
Wind-borne sand(1); Wind-borne silt and clay(2)

Qls — Landslide debris
Sandstone blocks, shale and clay

Qld — Lacustrine deposits
Fine-grained sand, silt and clay with thin alkaline crusts

Qt — Terrace deposits
Well-sorted, coarse-grained river gravels

Qab (1/2) — Alluvium and bolson deposits
Well-sorted, fine-grained gravel and sand with silt and clay cover and local caliche crusts (1); basal, fine-grained gravel and sand (2)

Qp — Pediment deposits
Poorly-sorted gravel, sand, silt and clay

QTp (1/2) — Older pediment deposits
Caliche caprock overlying braided deposits of fine-grained gravel, sand, silt and clay (1); basal fine-grained gravel (2)

CRETACEOUS JURASSIC TERTIARY

To (2/3) — Ogallala Formation
Relatively thick silt, sand and clay cover (1); usually exposed, well-indurated, laminated, often brecciated caliche caprock grading downward into silt, sand, clay and gravel (2); basal gravel (3)

KJ — Cretaceous-Jurassic rocks undivided
Fossiliferous, gray to black shale of the Purgatoire Formation; Dakota Sandstone; buff and brown sandstone, siltstone and shale of the Morrison Formation; Todilto Limestone; tan, fine-grained Entrada sandstone

TRIASSIC

Trc — Chinle Formation
Maroon and red-brown siltstone, sandstone and shale with local conglomeratic stringers

Tsr — Santa Rosa Sandstone
Buff to gray-brown sandstone and conglomerate with minor siltstone and shale

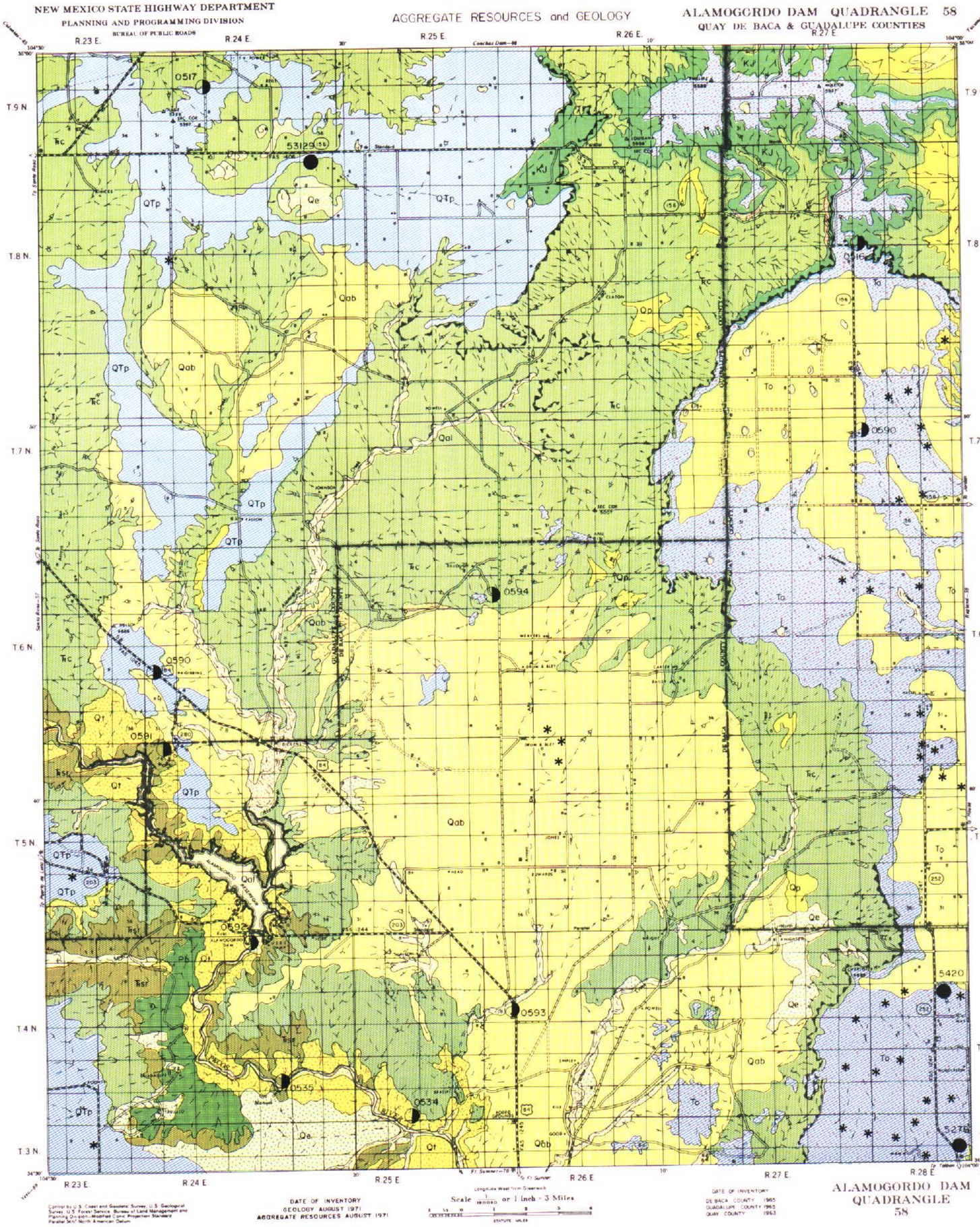
PERMIAN

Pb — Bernal Formation
Maroon to purplish shales, siltstone and sandstone with local anhydrite and gypsum beds

● Developed pit or quarry

◑ Prospect pit or quarry

✱ Selected exploration site and local rock outcrops



Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 34°N North American Datum

DATE OF INVENTORY
GEOLOGY AUGUST 1971
AGGREGATE RESOURCES AUGUST 1971

Scale 1/190080 or 1 inch = 3 Miles

DATE OF INVENTORY
DE BACA COUNTY 1965
GUADALUPE COUNTY 1965
QUAY COUNTY 1963

ALAMOGORDO DAM QUADRANGLE
58

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5278		53129		5420		0516	
Location	Section	SW 1/4 4		NW 1/4 1		NW 1/4 16		SW 1/4 14	
	Township & Range	3N 28 E		8N 24E		4 N 28E		8N 27E	
	County	DeBaca		Guadalupe		DeBaca		Quay	
Formation		To		Qc		To		To	
Rock Type		caliche		caliche		caliche		caliche	
Source Rock (Gravel)									
Quality of Material		good		good		good		good to excellent	
Thickness of Material		3' plus		10' plus		8'		10' plus	
Thickness of Cap (Caliche)		2-3'		3-4'		2-4'		6'	
Material Underlying Formation		red shale		sand & gravel		sand		shale	
Vegetation		grass, yucca, cholla		grass, yucca, sage		grass, yucca		oak, cholla, grass	
Local Terrain		flat		flat to gently rolling		flat plains		edge of ravine	
Thickness of Overburden		none		trace		1-2'		trace	
P. I. (Overburden)						3			
Estimated Quantity (cu. yds)		500,000 plus		500,000		50,000 plus		unlimited	
Los Angeles Wear		Cap 31.1	S.C. 70.5	Cap 20.0	S.C. 52.4	Cap 27.2	S.C. 42.8	Cap 22.4	S.C. 31.2
Soundness Loss		5.5		8.9				5.3	
Average Maximum Size									
% Retained on 2" Sieve									
	Crushed to:	1"	1"	1"	1"	3/4"	3/4"	1"	1"
	2"								
Pit	1"	100	100	100	100	100	100	100	100
Average	½"	60	68	63	75	80	83	74	79
% Passing	No. 4	27	39	25	32	41	46	30	35
	No. 10	15	28	14	20	27	30	16	20
	No. 200	3	8	3	4	7	10	2	6
Plasticity Index		N.P.	N.P.	N.P.	7	6	7	N.P.	N.P.
Remarks:									

0516: Laterally, caliche is hard and banded full depth to underlying bedrock.

Pit Number		0517		0534		0535		0590	
Location	Section	SE 1/4 20		34		S 1/2 25		SW 1/4 14	
	Township & Range	9N 24E		4N 25E		4N 24E		7N 27E	
	County	Guadalupe		DeBaca		DeBaca		Quay	
Formation		Qc		Qt		Qt		To	
Rock Type		caliche		gravel & sand		gravel & sand		caliche	
Source Rock (Gravel)				limestone, quartzite, granite		polygenetic			
Quality of Material		good		good		excellent		fair	
Thickness of Material		10' plus		12' plus		15' plus		3' plus	
Thickness of Cap (Caliche)		2-3'						2'	
Material Underlying Formation		sandstn.siltstn.&grav		sandstone & shale		sandstone & shale		silt	
Vegetation		grass.cholla.juniper		grass.scaterd mesquite		grass. yucca .mesquite		grass. yucca	
Local Terrain		hilly mesa slope		rolling disectd terrace		hilly terraces		flat	
Thickness of Overburden				0-3'		0-4'		trace	
P. I. (Overburden)				10		5		N.P.	
Estimated Quantity (cu. yds.)		unlimited		500,000 plus		unlimited		250,000	
Los Angeles Wear		Cap 31.2	S.C. 40.8	23.6		sand & gravel	28.6	Cap 37.2	
Soundness Loss				5.0			5.2	8.1	
Average Maximum Size				1"			2"		
% Retained on 2" Sieve				34			20		
	Crushed to:	1"	1"	as received		as received		1"	
	2"			66			74		
Pit	1"	100	100	58			63	100	
Average	½"	76	62	50			51	80	
% Passing	No. 4	29	25	36			36	35	
	No. 10	16	15	24			27	19	
	No. 200	3	4	5			4	6	
Plasticity Index		N.P.	N.P.	N.P.			N.P.	N.P.	
Remarks:									

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0591	0592	0593
Location	Section	S 1/2 31	NE 1/4 2	NE 1/4 18
	Township & Range	6N 24E	4N 24E	4N 26E
	County	Guadalupe	DeBaca	DeBaca
Formation		Qt	Qt	Qab
Rock Type		gravel & sand	gravel	sand & gravel
Source Rock (Gravel)		gneiss,granite,limestn	gneiss,qurtzite,igneous	quartzite, caliche, limestone
Quality of Material		excellent	excellent	good
Thickness of Material		50' plus	10' plus	5' plus
Thickness of Cap (Caliche)				
Material Underlying Formation		clay & shale	sandstone	
Vegetation		juniper,grass,yucca	grass, mesquite	grass
Local Terrain		discted rav. terraces	dissected riv. terrace	valley slope ditch bank
Thickness of Overburden		none	none	0-2'
P. I. (Overburden)				S.N.P.
Estimated Quantity (cu. yds)		500,000 plus	500,000	500,000
Los Angeles Wear		27.6	24.5	21.7
Soundness Loss		6.9	8.3	3.9
Average Maximum Size		1"	1"	2"
% Retained on 2" Sieve		30	20	12
	Crushed to:	as received	as received	as received
Pit Average % Passing	2"	87	90	90
	1"	69	58	68
	½"	48	35	47
	No. 4	33	21	34
	No. 10	27	14	28
	No. 200	8	3	2
Plasticity Index		N.P.	N.P.	N.P.

Remarks:

Pit Number		0594				0596	
Location	Section	E 1/2 11				SW 1/4 19	
	Township & Range	6N 25E				6N 24E	
	County	DeBaca				Guadalupe	
Formation		To				Qc	
Rock Type		caliche				caliche	
Source Rock (Gravel)							
Quality of Material		excellent				good	
Thickness of Material		10' plus				4'	
Thickness of Cap (Caliche)		1-2'				1-2'	
Material Underlying Formation		conglomerate				sand	
Vegetation		grass,yucca,juniper				grass, yucca, mesquite	
Local Terrain		mesa slope				flat	
Thickness of Overburden						0-1'	
P. I. (Overburden)		N.P.				6	
Estimated Quantity (cu. yds.)		500,000				500,000	
Los Angeles Wear		Hard Cal: 26.6	Soft Cal: 70.2	Lam.Cal: 31.2	Nod Cal: 29.9	Cap: 31.0	S.C.: 35.2
Soundness Loss		12.4	100.0	10.9	39.2	27.5	
Average Maximum Size							
% Retained on 2" Sieve							
	Crushed to:	1"	1"	1"	1"	1"	1"
Pit Average % Passing	2"						
	1"	100	100	100	100	100	100
	½"	39	80	64	61	20	71
	No. 4	16	33	26	25	33	31
	No. 10	8	17	14	14	17	18
	No. 200	2	4	4	3	4	4
Plasticity Index		N.P.	N.P.	N.P.	N.P.	N.P.	N.P.

Remarks:

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

AGGREGATE RESOURCES and GEOLOGY

RAGLAND QUADRANGLE 59

CURRY DE BACA QUAY & ROOSEVELT COUNTIES

EXPLANATION

QUATERNARY

Qal — Alluvium
Sand, silt and clay with minor gravel

Qe (1, 2) — Eolian deposits
Wind-borne sand (1); Wind-borne silt and clay (2)

Qld — Lacustrine deposits
Fine-grained sand, silt and clay with local alkaline crusts

Qab — Alluvium and bolson deposits
Sand, silt and clay with local stringers of gravel

Qp — Pediment deposits
Relatively thin deposits of sand, silt and clay with minor gravel; locally has thin caliche crusts

CRETACEOUS
TRIASSIC JURASSIC TERTIARY

To (1, 2, 3) — Ogallala Formation
Relatively thick silt, sand and clay cover (1); usually exposed, well-indurated, laminated, often brecciated caliche caprock, grades laterally and downward into nodular, soft caliche overlying silt, sand, clay and gravel (2); basal gravel (3)

KJ — Cretaceous-Jurassic rocks undivided
Includes sandstones and shales of the Graneros and Purgatoire Formations (Cretaceous) and sandstones, siltstones and shales of the Morrison and Entrada Sandstone Formations (Jurassic)

Trc — Chinle Formation
Maroon and green sandstone, siltstone and shale; includes local lenses of fresh-water limestone

Developed pit or quarry

Prospect pit or quarry

Selected exploration site and local rock outcrops

Fault, ball on downthrown side

R.28E. R.29E. R.30E. R.31E. R.32E. R.33E.

T.9N. T.8N. T.7N. T.6N. T.5N. T.4N. T.3N.

0500 0501 0502 0503 0504 0505 0533 0496 0497 0498 0499 5906 5024 5423

Ragland Forrest McAlister House

Control by U.S. Coast and Geodetic Survey; U.S. Geological Survey; U.S. Forest Service; Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallel 34°N. North American Datum

DATE OF INVENTORY
GEOLOGY AUGUST 1971
AGGREGATE RESOURCES AUGUST 1971

Scale 1/180000 or 1 Inch = 3 Miles

DATE OF INVENTORY
CURRY COUNTY 1964
DE BACA COUNTY 1965
QUAY COUNTY 1963
ROOSEVELT COUNTY 1964

RAGLAND QUADRANGLE 59

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5906	5423	5024
Location	Section	SE 1/4 15	NE 1/4 16	SW 1/4 25
	Township & Range	7N 30E	5N 28E	7N 31E
	County	Quay	Quay	Quay
Formation		To	To	To
Rock Type		caliche,sand,gravel	caliche	caliche
Source Rock (Gravel)		qartzite,basalt,limestone		
Quality of Material		good	fair	good
Thickness of Material		40' plus	11' plus	8' plus
Thickness of Cap (Caliche)		5' plus	0-4'	6-8'
Material Underlying Formation		hard sandstone & conglomerate		sandstone
Vegetation		pine, oak, grass	grass, yucca	grass
Local Terrain		plains escarpment	flat plain	plains
Thickness of Overburden		none	0-4'	trace
P. I. (Overburden)				
Estimated Quantity (cu. yds)		unlimited	50,000	unlimited
Los Angeles Wear		Cap: 32.6 S.C.: 49.6 Gravel: 22.8 Sand:	Cap: 32.8 S.C.: 45.6	Cap: 20.4 Sandy Cal: 65.0
Soundness Loss		17.0 17.0 21.7		20.0 52.0
Average Maximum Size		2"		
% Retained on 2" Sieve		40		
Pit Average % Passing	Crushed to:	1" 1"	3/4"	1" 1"
	2"	79		
	1"	100 100 58	100	100 100
	½"	65 70 45	73	78 85
	No. 4	27 38 29	40	32 47
	No. 10	16 27 22 100	26	18 35
	No. 200	3 7 5 20	8	3 8
Plasticity Index		N.P. 9 N.P. N.P.	3	N.P. N.P.
Remarks:				

Pit Number		0533	0495
Location	Section	NE 1/4 34	SE 1/4 26
	Township & Range	6N 29E	4N 30E
	County	Quay	Roosevelt
Formation		To	To
Rock Type		caliche	sand & gravel
Source Rock (Gravel)			quartzite, sandstone, limestone
Quality of Material		good to excellent	fair to poor
Thickness of Material		10' plus	10' plus
Thickness of Cap (Caliche)		4' plus	
Material Underlying Formation			
Vegetation		grass, yucca	grass
Local Terrain		flat plains	plains, valley slopes
Thickness of Overburden		0-2'	0-15'
P. I. (Overburden)		8	N.P.
Estimated Quantity (cu. yds.)		unlimited	50,000
Los Angeles Wear		Lam. Cal: 41.6 Birdseye Cal: 28.4 Nod. Cal: 47.6	34
Soundness Loss		16.1	
Average Maximum Size			2"
% Retained on 2" Sieve			5
Pit Average % Passing	Crushed to:	1" 1"	as received
	2"	100 100 100	90
	1"	100 100 100	83
	½"	82 58 74	78
	No. 4	44 25 39	68
	No. 10	29 14 28	58
	No. 200	11 3 13	12
Plasticity Index		7 N.P. 12	N.P.
Remarks:			

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0496			0497	0498
Location	Section	SW 1/4 8			W1/2 20	NW 1/4 19
	Township & Range	4N 29E			4N 29E	4N 31E
	County	Roosevelt			Roosevelt	Curry
Formation		To			Trc	To
Rock Type		caliche, sand, gravel			weatherd arkosic sndstn	caliche
Source Rock (Gravel)		quartzite, limestone, granite				
Quality of Material		good			poor	good
Thickness of Material		50' plus			5' plus	8' plus
Thickness of Cap (Caliche)		5' plus			none	8'
Material Underlying Formation		hard sandstone conglomerate				sandstone
Vegetation		juniper, oak			yucca,mesquite,grass	grass, sage, yucca
Local Terrain		steep bluff			rolling	bluffs of stream valley
Thickness of Overburden		none			0-1'	trace
P. I. (Overburden)					N.P.	
Estimated Quantity (cu. yds)		150,000 plus			20,000	unlimited
Los Angeles Wear		Cap: 28.6 Nod. Cal: 58.0		Gravel: 66.0		32.0
Soundness Loss						10.9
Average Maximum Size				1"		
% Retained on 2" Sieve				30		
Pit Average % Passing	Crushed to:	1"		as received	as received	1"
	2"					
	1"	100	100	100		100
	½"	79	96	69		80
	No. 4	56	75	30		32
	No. 10	42	65	18	100	18
	No. 200	9	13	4	22	3
Plasticity Index		N.P.	N.P.	N.P.	N.P.	N.P.
Remarks:						

Pit Number		0499			0500	0501
Location	Section	NE 1/4 9			SW 1/4 27	NE 1/4 31
	Township & Range	4N 29E			7N 28E	7N 29E
	County	Roosevelt			Quay	Quay
Formation		To			To	To
Rock Type		sandy gravel			caliche	caliche
Source Rock (Gravel)		quartzite, limestone				
Quality of Material		good			good	fair to poor
Thickness of Material		10-15'			8' plus	10' plus
Thickness of Cap (Caliche)					1-2'	2' plus
Material Underlying Formation		sandstone & conglomerate			sand	
Vegetation		grass, yucca			grass	thistle, grass
Local Terrain		edge of ravine			gentle valley slope	gentle valley slope
Thickness of Overburden		none			trace	0-2'
P. I. (Overburden)						8
Estimated Quantity (cu. yds.)		50,000			50,000	50,000
Los Angeles Wear		23.6			Cap: 31.6 S.C.: 56.0	Cap: 28.8 S.C.: 62.8
Soundness Loss		7.0				
Average Maximum Size		2"				
% Retained on 2" Sieve		20				
Pit Average % Passing	Crushed to:	as received			1" 1"	1" 1"
	2"	82				
	1"	65			100 100	100 100
	½"	52			86 94	80 93
	No. 4	40			37 61	32 59
	No. 10	31			20 44	18 44
	No. 200	8			5 10	3 19
Plasticity Index		N.P.			N.P. N.P.	9 16
Remarks:						

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0502	0503	0504
Location	Section	NE 1/4 4	NE 1/4 34	SW 1/4 13
	Township & Range	7N 32E	9N 32E	5N 29E
	County	Quay	Quay	Quay
Formation		To	Qp	To
Rock Type		caliche	gravel	caliche
Source Rock (Gravel)			limestn,siltstn,shale	
Quality of Material		good	fair	good
Thickness of Material		20' plus	6' plus	8' plus
Thickness of Cap (Caliche)		1-5'		1-2'
Material Underlying Formation		sand & sandy gravel	clay shale	
Vegetation		juniper, oak, grasses	yucca,mesquite,grass	thistle, grass
Local Terrain		plains escarpment	rolling	flat plains
Thickness of Overburden		trace	none	trace
P. I. (Overburden)				
Estimated Quantity (cu. yds)		unlimited	unlimited	unlimited
Los Angeles Wear		Cap: 23.2 Nod Cal: 27.0 S.C.: 56.0	44.0	Cap: 21.0 Nod. Cal: 53.6
Soundness Loss				6.0
Average Maximum Size			2"	
% Retained on 2" Sieve			40	
Pit Average % Passing	Crushed to:	1½"	as received	1"
	2"	100	64	
	1"	92	56	100
	½"	39	48	78
	No. 4	16	35	31
	No. 10	8	26	16
	No. 200	1	10	2
Plasticity Index		N.P.	10	N.P.
Remarks:				

Pit Number		0505
Location	Section	NW 1/4 11
	Township & Range	5N 32E
	County	Curry
Formation		To
Rock Type		caliche
Source Rock (Gravel)		
Quality of Material		good
Thickness of Material		12' plus
Thickness of Cap (Caliche)		4-5'
Material Underlying Formation		sandstone
Vegetation		grass
Local Terrain		plains
Thickness of Overburden		trace to 3'
P. I. (Overburden)		S.N.P.
Estimated Quantity (cu. yds.)		unlimited
Los Angeles Wear		Cap: 22.4 Soft Cal: 58.0
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	1" 1"
	2"	
	1"	100 100
	½"	80 90
	No. 4	31 51
	No. 10	18 34
	No. 200	4 /
Plasticity Index		N.P. N.P.
Remarks:		

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

AGGREGATE RESOURCES and GEOLOGY

GRADY QUADRANGLE -60
QUAY & CURRY COUNTIES

EXPLANATION

QUATERNARY

Qal — Alluvium
Sand, silt and clay with minor gravel

Qe (1, 2) — Eolian deposits
Wind-borne sand (1); wind-borne silt and clay (2)

Qld — Lacustrine deposits
Fine sand, silt and clay with local alkaline crusts

Qp — Pediment deposits
Relatively thin deposits of sand, silt and clay and poorly sorted gravel; locally has thin caliche crusts

TRIASSIC JURASSIC TERTIARY

To (1, 2) — Ogallala Formation
Relatively thick silt, sand and clay cover (1); usually exposed, well-indurated, laminated, often brecciated caliche caprock, grades laterally and downward into nodular, soft caliche overlying silt, sand, clay and gravel (2)

CRETACEOUS

KJ — Cretaceous-Jurassic rocks undivided
Includes Greenhorn Limestone; Carlile Shale; Dakota Sandstone; fossiliferous, gray to black shale of the Purgatoire Formation; buff and brown sandstone, siltstone and shale of the Morrison Formation; fine-grained, cross-bedded sand of the Entrada Sandstone

Tc — Chinle Formation
Maroon and green sandstone, siltstone and shale; has local beds of fresh-water limestone

● Developed pit or quarry

◑ Prospect pit or quarry

Fault — Downthrown side

* Selected exploration site and local rock outcrops

R.33 E. R.34 E. R.35 E. R.36 E. R.37 E.

T.9 N. T.8 N. T.7 N. T.6 N. T.5 N. T.4 N. T.3 N.

QUAY COUNTY
CURRY COUNTY

Whitlaud
Grady POP.100
Bellview
Broadview
HAMMOND

0491 5688 0493 0494 0492 5839 5716 0490 5451 5807 5808 6550 5805 5804 5521 5949 5588 5902 5901

Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division—Modified Conic Projection Standard Parallels 34° North American Datum

DATE OF INVENTORY
GEOLOGY AUGUST 1971
AGGREGATE RESOURCES AUGUST 1971

Scale 1:63360 or 1 Inch = 1 Mile
STATUTE MILES

DATE OF INVENTORY
CURRY COUNTY 1964
QUAY COUNTY 1963

GRADY
QUADRANGLE
60

QUADRANGLE PAGE 60

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5451	5521	5588	5658	
Location	Section	NW 1/4 27	SE 1/4 3	NE 1/4 16	NE 1/4 29	
	Township & Range	6N 36E	4N 35E	4N 37E	9N 34E	
	County	Curry	Curry	Curry	Quay	
Formation		To	To	To	To	
Rock Type		caliche	caliche	caliche	caliche	
Source Rock (Gravel)						
Quality of Material		good	fair	good	good	
Thickness of Material		13' plus	8' plus	11' plus	10' plus	
Thickness of Cap (Caliche)		4'	4'	3-3.5'	3'	
Material Underlying Formation					gravel	
Vegetation		grass	grass, yucca	grass	juniper, oak, chamisa	
Local Terrain		plains	plains	plains	plains escarpment slope	
Thickness of Overburden		1'	3-4'	1.5-3.5'	3'	
P. I. (Overburden)		10	7	9	13	
Estimated Quantity (cu. yds)		15,000	100,000	40,000	50,000	
Los Angeles Wear		28.4	32	28.0	Cap: 34.0 S.C.: 64.8	
Soundness Loss						
Average Maximum Size						
% Retained on 2" Sieve						
Pit Average % Passing	Crushed to:	2"	1"	3/4"	2"	2"
	2"	100			100	100
	1"	58	100		48	83
	½"	27	82	77	24	68
	No. 4	10	40	35	13	54
	No. 10	6	25	21	8	44
	No. 200	2	14	5	3	12
Plasticity Index		N.P.	7	N.P.	9	N.P.

Remarks:

Pit Number		5716	5804	5805	5807		
Location	Section	SE 1/4 14	SE 1/4 2	SE 1/4 2	SW 1/4 35		
	Township & Range	7N 35E	4N 36E	4N 36E	6N 35E		
	County	Curry	Quay	Curry	Curry		
Formation		To	To	To	To		
Rock Type		caliche	caliche	caliche	caliche		
Source Rock (Gravel)							
Quality of Material		good	good	good	good		
Thickness of Material		15' plus	6' plus	13' plus	15' plus		
Thickness of Cap (Caliche)		5'	4'	4'	4'		
Material Underlying Formation					silt & sandstone		
Vegetation		grass	grass	grass, yucca	grass		
Local Terrain		plains	plains	plains	plains		
Thickness of Overburden		1'	1'	1'	1'		
P. I. (Overburden)		8	N.P.	9	6		
Estimated Quantity (cu. yds.)		150,000	45,000 plus	60,000	200,000		
Los Angeles Wear		31.2	Cap: 34.8 Nod Cal. 23.6 4.1	Cap: 26.4 S.C. 53.6	29.2		
Soundness Loss							
Average Maximum Size							
% Retained on 2" Sieve							
Pit Average % Passing	Crushed to:	2"	2"	2"	2"	2"	2"
	2"	100	100	100	100	100	100
	1"	55	60	68	54	76	61
	½"	28	38	43	23	44	41
	No. 4	15	28	23	11	23	14
	No. 10	10	5	14	6	15	9
	No. 200	2	1	3	1	4	2
Plasticity Index		N.P.	N.P.	17	N.P.	N.P.	N.P.

Remarks:

5805: Pit 5804 in the area

QUADRANGLE PAGE 60

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		5808	5839	5901		
Location	Section	NW 1/4 11	SW 1/4 9	NE 1/4 16		
	Township & Range	5N 35E	8N 33E	4N 35E		
	County	Curry	Quay	Curry		
Formation		local dunes on To	To	To		
Rock Type		wind blown sand	caliche	caliche		
Source Rock (Gravel)						
Quality of Material		good	good	good		
Thickness of Material		15-20'	13' plus	10'		
Thickness of Cap (Caliche)			3'	3'		
Material Underlying Formation		sand & gravel				
Vegetation		sage, grass		grass		
Local Terrain		hummocky dunes	plains escarpment	plains		
Thickness of Overburden		0-5'	1'	1'		
P. I. (Overburden)		N.P.	12	6		
Estimated Quantity (cu. yds)		25,000	50,000	250,000		
Los Angeles Wear			28.4	Cap" 21.6 S.C.: 32.8 Cal. Soil: 56.4		
Soundness Loss				7.6		
Average Maximum Size						
% Retained on 2" Sieve						
Pit Average % Passing	Crushed to:	as received	2"	2"	2"	2"
	2"		100	100	100	100
	1"		64	59	70	70
	½"		28	31	43	43
	No. 4		12	16	25	26
	No. 10	100	7	10	18	19
	No. 200	8	1	2	6	6
Plasticity Index		N.P.	N.P.	N.P.	15	13

Remarks:

Pit Number		5949	6112	6550	0490
Location	Section	NW 1/4 16	SW 1/4 32	NE 1/4 12	NW 1/4 6
	Township & Range	4N 37E	5N 34E	5N 37E	6N 37E
	County	Curry	Curry	Curry	Curry
Formation		To	To	To	To
Rock Type		caliche	caliche	caliche	caliche
Source Rock (Gravel)					
Quality of Material		good	good	good	good to excellent
Thickness of Material		13' plus	3'	6' plus	20-30'
Thickness of Cap (Caliche)		3'	3'	4' plus	4' plus
Material Underlying Formation					
Vegetation		grass	grass	grass, yucca	grass, yucca
Local Terrain		plains	plains	plains, valley slope	valley ledge & slope
Thickness of Overburden		1'	3'	0-1'	trace to 1'
P. I. (Overburden)		17	8	9	10
Estimated Quantity (cu. yds.)		60,000 plus	60,000	600,000	600,000
Los Angeles Wear		Cap:20.8 Nod.Cal: 22.4	29.2	26.6	Cap: 33.0 Nod. Cal: 50.8
Soundness Loss		4.1	1.5	8.4, 4.2	7.2 98.3
Average Maximum Size					
% Retained on 2" Sieve					
Pit Average % Passing	Crushed to:	2"	2" 2"	1"	1"
	2"	100	100 100		
	1"	61	53 100	100	100 100
	½"	46	26 32	72	75 82
	No. 4	19	12 20	30	31 42
	No. 10	13	7 14	17	18 29
	No. 200	3	2 4	4	3 10
Plasticity Index		N.P.	6 10	N.P.	N.P. 10

Remarks:

QUADRANGLE PAGE 60

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0491		0492			0493		0494
Location	Section	NE 1/4 26		SW 1/4 10			NW 1/4 2		SW 1/4 3
	Township & Range	9N 33E		8N 33E			8N 36E		8N 35E
	County	Curry		Curry			Curry		Curry
Formation		To		To			To		To
Rock Type		caliche		caliche			caliche		caliche
Source Rock (Gravel)									
Quality of Material		excellent		good			good		good
Thickness of Material		20' plus		10' plus			12' plus		10-12'
Thickness of Cap (Caliche)		3'		2.5'			4'		3'
Material Underlying Formation				silt			sand		sand
Vegetation		grass, yucca		grass, yucca, juniper			grass, yucca		grass, yucca
Local Terrain		plains escarpment		plains escarpment			plains escarpment		plains escarpment
Thickness of Overburden		0-1'					none		none
P. I. (Overburden)									
Estimated Quantity (cu. yds)		unlimited		unlimited			unlimited		250,000
Los Angeles Wear		24.8		Cap: 20.0 Nod Cal: 20.0			26.0		26.8
Soundness Loss				6.7			33.8		
Average Maximum Size									
% Retained on 2" Sieve									
	Crushed to:	1"		2"		1"	2"		2"
	2"			100			100		100
Pit	1"	100		88		100	90		96
Average	½"	66		38		65	38		64
% Passing	No. 4	24		15		21	18		33
	No. 10	13		8		11	9		12
	No. 200	2		1		3	2		2
Plasticity Index		N.P.		N.P.		N.P.	N.P.		N.P.
Remarks:									

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
	Crushed to:	
	2"	
Pit	1"	
Average	½"	
% Passing	No. 4	
	No. 10	
	No. 200	
Plasticity Index		
Remarks:		

EXPLANATION

QUAD No. 68

QUATERNARY

- Qal — Alluvium
- Qp — Pediment deposits
- Qpc — Pediment deposits
- Qpcg — Pediment deposits
- Qc — Cinders and Scoria

TERTIARY

- Ti — Intrusive rocks undivided

PERMIAN

- Pb — Bernal Formation
- Psa — San Andres Limestone
- Pg — Glorieta Sandstone
- Py — Yeso Formation
- Pyl — Yeso Limestone

PRECAMBRIAN

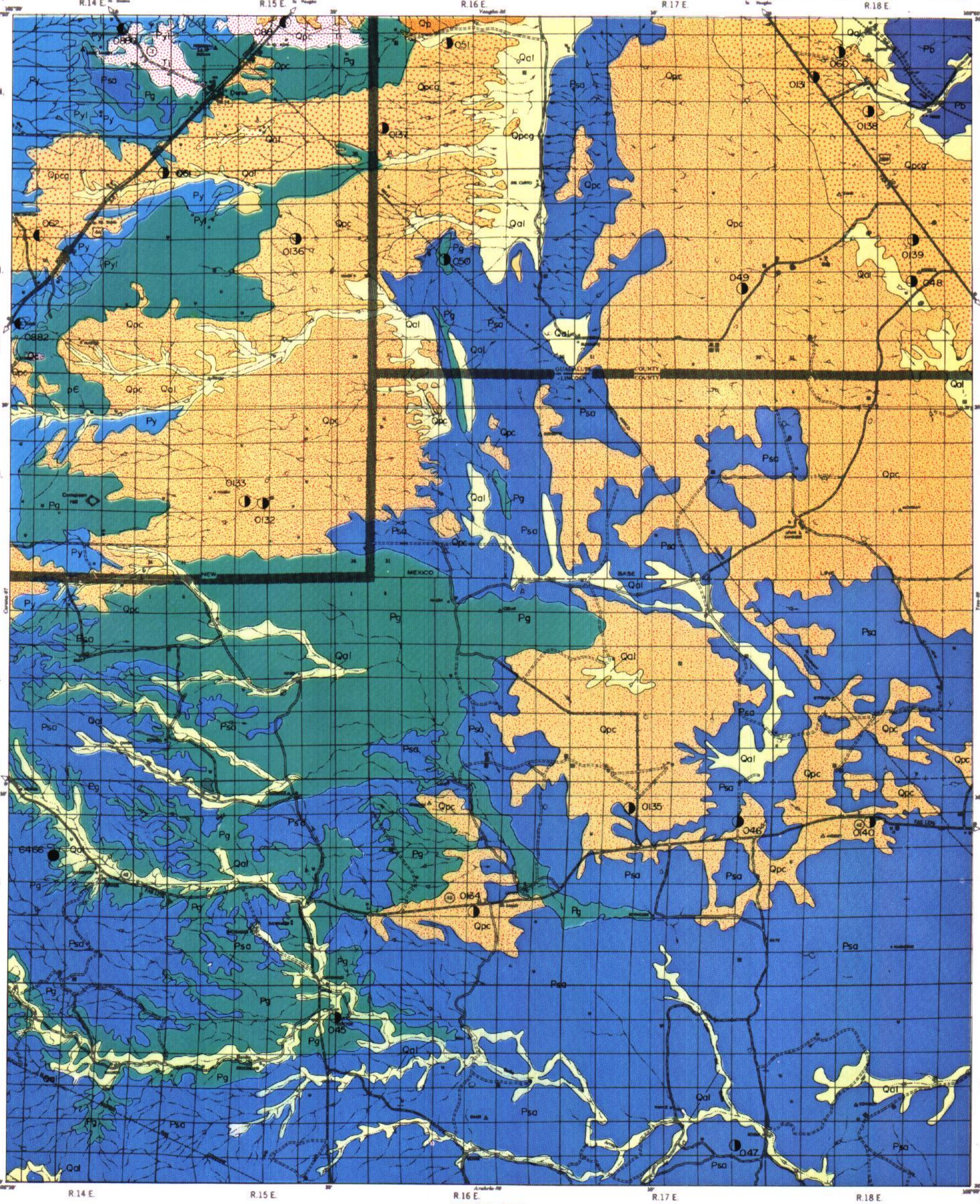
- p€ — Precambrian undivided

- Developed Pit or Quarry
- Prospect Pit or Quarry
- Fault
- Downthrown side
- * Selected exploration site

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
FEDERAL HIGHWAY ADMINISTRATION

GEOLOGY and AGGREGATE RESOURCES

DURAN QUADRANGLE-68
TORRANCE LINCOLN & GUADALUPE COUNTIES



DATE OF INVENTORY
GEOLOGY APR 1975

Scale 1:62500 or 1 Inch = 1 Mile

DURAN
QUADRANGLE

CONSTRUCTION MATERIALS INVENTORY

QUADRANGLE PAGE 68(1)

MATERIAL PIT SUMMARY

Pit Number		6446	045	046	047
Location	Section	NE 1/4 16	SW 1/4 1	NW 1/4 12	SW 1/4 25
	Township & Range	2S 14E	3S 15E	2S 17E	3S 17E
	County	Torrance	Lincoln	Lincoln	Lincoln
Formation		Psa	Psa	Psa	Psa
Rock Type		limestone	limestone	limestone	limestone
Source Rock (Gravel)		-	-	-	-
Quality of Material		excellent	good	excellent	good
Thickness of Material		10' plus	8'	15' plus	5' plus
Thickness of Cap (Caliche)		0-1'	none	0-2'	none
Material Underlying Formation		sandstone	sandstone	gypsiferous sandstone	gypsum
Vegetation		pinon	pinon	grass	grass
Local Terrain		mountainous	hilly	rolling plateau	rolling
Thickness of Overburden		none	0-2'	0-2'	0-3'
P. I. (Overburden)		-	N.P.	N.P.	6
Estimated Quantity (cu. yds)		100,000	75,000 plus	1,000,000	100,000
Los Angeles Wear		20.0	42.0	35.6	25.6
Soundness Loss		1.0	8.5	-	-
Average Maximum Size		-	-	-	-
% Retained on 2" Sieve		-	-	-	-
Pit Average % Passing	Crushed to:	1"	1"	1"	1"
	2"	-	-	-	-
	1"	100	100	100	100
	½"	64	55	53	48
	No. 4	23	24	20	19
	No. 10	12	15	11	10
	No. 200	3	5	3	3
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

#045: sand and gravel available in nearby Bonito Canyon

Pit Number		048	049	050	051
Location	Section	NW 1/4 23	NW 1/4 24	NW 1/4 16	NW 1/4 16
	Township & Range	2N 18E	2N 17E	2N 16E	3N 16E
	County	Guadalupe	Guadalupe	Guadalupe	Guadalupe
Formation		Qpc	Qpc	Psa	Qpcg
Rock Type		caliche	caliche & limestone	limestone	gravel
Source Rock (Gravel)		-	-	-	polygenetic
Quality of Material		fair	good	excellent	good
Thickness of Material		6' plus	10' plus	30' plus	6' plus
Thickness of Cap (Caliche)		-	0-3'	0-1'	1' caliche & gravel
Material Underlying Formation		soft gravely caliche	limestone	sandstone	sand & gravel
Vegetation		cactii & grass	grass	grass & cactii	grass
Local Terrain		rolling	rolling	rolling	hilly
Thickness of Overburden		1'	1'	0-1'	1'
P. I. (Overburden)		N.P.	N.P.	N.P.	N.P.
Estimated Quantity (cu. yds.)		100,000 plus	500,000 plus	500,000 plus	100,000 plus
Los Angeles Wear		30.0	cap: 33.6 ls: 27.2	23.4	30.0
Soundness Loss		11.7	19.7 -	-	23.4
Average Maximum Size		3	- -	-	4"
% Retained on 2" Sieve		5	- -	-	10
Pit Average % Passing	Crushed to:	2"	1" 1"	1"	as received
	2"	100	- -	-	100
	1"	89	100 100	100	97
	½"	58	62 57	56	80
	No. 4	41	28 26	21	56
	No. 10	34	16 14	11	42
	No. 200	15	6 7	3	7
Plasticity Index		N.P.	9 N.P.	N.P.	N.P.

Remarks:

#051: interbedded with caliche and pea gravel

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		060	061	062	0131
Location	Section	NW 1/4 16	S 1/2 36	SE 1/4 8	NW 1/4 20
	Township & Range	3N 18E	3N 14E	2N 14E	3N 18E
	County	Guadalupe	Torrance	Torrance	Guadalupe
Formation		Qpcg	Qpcg	Qpcg	Qpcg
Rock Type		caliche & gravel	caliche	caliche & gravel	caliche
Source Rock (Gravel)		polygenetic	polygenetic	polygenetic	-
Quality of Material		fair	fair	good	good
Thickness of Material		4' plus	7' plus	10' plus	6'
Thickness of Cap (Caliche)		4'	1'	4' soft caliche	2'
Material Underlying Formation		caliche & gravel	sandstone & shale	sand & gravel	soft caliche
Vegetation		grass	juniper & grass	grass & cactii	grass
Local Terrain		rolling	rolling	rolling	rolling
Thickness of Overburden		0-2'	0-1'	1'	6"
P. I. (Overburden)		N.P.	7	8	8
Estimated Quantity (cu. yds)		50,000 plus	100,000	100,000	200,000
Los Angeles Wear		24.4	42.0	34.4	cap: 27.6
Soundness Loss		1.7	-	21.4	37.0
Average Maximum Size		-	-	5"	- s.c.: 2"
% Retained on 2" Sieve		-	-	8	- 15
	Crushed to:	2"	1"	as received	1" as received
	2"	100	-	-	- 100
Pit	1"	91	100	100	100 89
Average	½"	42	84	83	58 53
% Passing	No. 4	20	41	57	24 26
	No. 10	13	25	45	13 17
	No. 200	4	5	12	3 5
Plasticity Index		N.P.	N.P.	6	N.P. 11

Remarks:

Pit Number		0132	0133	0134	0135
Location	Section	SE 1/4 21	SW 1/4 21	SE 1/4 22	SE 1/4 5
	Township & Range	1N 15E	1N 15E	2S 16E	2N 17E
	County	Torrance	Torrance	Lincoln	Lincoln
Formation		Qpc	Qps	Qpc	Qpc
Rock Type		caliche	caliche	caliche	caliche
Source Rock (Gravel)		-	-	-	-
Quality of Material		fair	fair	good	fair
Thickness of Material		10.5'	6'	9'	11'
Thickness of Cap (Caliche)		4.5'	30"	3.5'	1'
Material Underlying Formation		sandy caliche	sandy caliche	sandy caliche	soft caliche
Vegetation		grass	grass	grass	grass
Local Terrain		rolling	rolling	rolling	flat
Thickness of Overburden		18"	1'	1'	1'
P. I. (Overburden)		6	N.P.	4	5
Estimated Quantity (cu. yds.)		200,000	200,000	200,000	450,000
Los Angeles Wear		cap: 43.2	36.0	51.2	cap: 37.6 nod s.c.32.8
Soundness Loss		- -	21.7	36.0	18.9 26.1
Average Maximum Size		- -	-	-	- -
% Retained on 2" Sieve		- -	-	-	100 90
	Crushed to:	cap:2" sc:2"	2"	2"	2" 2"
	2"	100 -	100	100	100 100
Pit	1"	97 100	90	91	87 92
Average	½"	71 90	56	48	44 55
% Passing	No. 4	45 57	31	28	23 35
	No. 10	30 39	21	21	16 27
	No. 200	8 12	6	8	6 12
Plasticity Index		N.P. N.P.	N.P.	N.P.	N.P. 8

Remarks:

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0136	0137	0138	0139
Location	Section	SE 1/4 10	SW 1/4 30	NE 1/4 28	NW 1/4 14
	Township & Range	2N 15E	3N 16E	3N 18E	2N 18E
	County	Torrance	Guadalupe	Guadalupe	Guadalupe
Formation		Qpc	Qpcg	Qpcg	Qpcg
Rock Type		caliche	sand & gravel	sand & gravel	caliche
Source Rock (Gravel)		-	polygenetic	polygenetic	-
Quality of Material		excellent	excellent	excellent	good
Thickness of Material		9'	15' plus	10'	3' plus
Thickness of Cap (Caliche)		9'	-	18"	3'
Material Underlying Formation		nod. sandy caliche	sandstone	silty gravel	limestone
Vegetation		cactii & grass	cactii & grass	grass	grass
Local Terrain		rolling	rolling	flat	flat
Thickness of Overburden		2'	3'	1'	1'
P. I. (Overburden)		7	8	9	N.P.
Estimated Quantity (cu. yds)		550,000	400,000	250,000	250,000
Los Angeles Wear		24.0	26.4	30.2	26.0
Soundness Loss		11.8	10.1	12.8	21.0
Average Maximum Size		-	4"	6"	-
% Retained on 2" Sieve		-	5	12	-
Pit Average % Passing	Crushed to:	2"	as received	as received	2"
	2"	100	-	100	100
	1"	86	100	93	82
	½"	44	69	67	39
	No. 4	20	50	31	18
	No. 10	12	41	17	11
	No. 200	3	13	2	3
Plasticity Index		N.P.	N.P.	N.P.	N.P.

Remarks:

#0136: hole bottomed on nodular, sandy caliche with a show of gypsum

Pit Number		0140		0880	0881	0882
Location	Section	NW 1/4 10		SW 1/4 11	SW 1/4 10	SW 1/4 29
	Township & Range	2S 18E		3N 14E	3N 15E	2N 14E
	County	Lincoln		Torrance	Torrance	Torrance
Formation		Qpc		Pyl	Tj	pЄ
Rock Type		caliche & limestone		limestone	diorite	gneiss
Source Rock (Gravel)		-	-	-	-	-
Quality of Material		excellent	excellent	good	fair	fair
Thickness of Material		2.5'	10' plus	4'	8' plus	15' plus
Thickness of Cap (Caliche)		2.5'	-	-	-	-
Material Underlying Formation		limestone	limestone	gypsum & sandstone	sandstone	-
Vegetation		grass	grass	grass	juniper	grass
Local Terrain		rolling	rolling	rolling	rolling	rolling
Thickness of Overburden		0-6"	3'	0-2'	-	-
P. I. (Overburden)		N.P.	N.P.	9	-	-
Estimated Quantity (cu. yds.)		75,000	500,000	200,000 plus	10,000 plus	7,000
Los Angeles Wear		22.0	31.6	18.0	18.2	32.6
Soundness Loss		24.0	-	2.3	5.5	3.2
Average Maximum Size		-	-	-	-	-
% Retained on 2" Sieve		-	-	-	-	-
Pit Average % Passing	Crushed to:	2"	1"	1"	1"	1"
	2"	100	-	-	-	-
	1"	85	100	100	100	100
	½"	35	68	54	62	47
	No. 4	15	33	21	24	21
	No. 10	9	21	10	13	14
	No. 200	3	9	2	3	3
Plasticity Index		10	N.P.	N.P.	N.P.	N.P.

Remarks:

EXPLANATION

QUATERNARY

- **Qal** — Alluvium
  Sand, silt and clay with local discontinuous deposits of gravel
- **Qg** — Pediment gravel
  Poorly-sorted gravel veneer overlying the Seven Rivers Formation
- **Qc** — Caliche deposits
  Caliche cap rock overlying soft nodular caliche and silt

TERTIARY

- **QTg** — Older gravel deposits
  High-level deposits of partly cemented sand and gravel
- **QTcg** — Caliche and gravel
  Caliche-capped sand and gravel
- **QTp/Psa** — Pediment deposits and San Andres Formation undivided
  Caliche and other surficial deposits grading into limestone
- **Ti** — Intrusives
  Dark-green, decomposed diorite sill

TRIASSIC

- **Rsr** — Santa Rosa Sandstone
  Light-gray to red sandstone, with minor siltstone and shale

PERMIAN

- **Psr** — Seven Rivers Formation
  White gypsum, orange to red siltstone, sandstone and shale
- **Psa** — San Andres Formation
  Gray, massive to thin-bedded limestone with minor gypsum

◑ Prospect pit or quarry

NEW MEXICO STATE HIGHWAY DEPARTMENT
PLANNING AND PROGRAMMING DIVISION
BUREAU OF PUBLIC ROADS

AGGREGATE RESOURCES and GEOLOGY

YESO QUADRANGLE—69
LINCOLN, DE BACA, GUADALUPE & CHAVES COUNTIES

R.19 E. R.20 E. R.21 E. R.22 E. R.23 E.
T.3 N. T.2 N. T.1 N. T.1 S. T.2 S. T.3 S.

DATE OF INVENTORY
GEOLOGY SEPTEMBER 1969
AGGREGATE RESOURCES SEPTEMBER 1969

Control by U.S. Coast and Geodetic Survey, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management and Planning Division—Mercator Conic Projection Standard Parallel 34°N North American Datum

Longitude West from Greenwich

Scale 1/125000 or 1 Inch = 2 Miles

STATUTE MILES

DATE OF INVENTORY
CHAVES COUNTY 1968
DE BACA COUNTY 1965
GUADALUPE COUNTY 1968
LINCOLN COUNTY 1967

YESO
QUADRANGLE
69

MATERIAL PIT SUMMARY

Pit Number		063	064	065	066
Location	Section	SW 25	SE 25	NW 4	W 27
	Township & Range	3N 20E	3N 21E	2N 23E	2N 23E
	County	DeBaca	DeBaca	DeBaca	DeBaca
Formation		Qc	Qc	Qc	Qc
Rock Type		caliche	caliche	caliche	caliche
Source Rock (Gravel)					
Quality of Material		good	good	good	excellent
Thickness of Material		7' plus	8'	5' plus	8'
Thickness of Cap (Caliche)		2'	2'	2'	2'
Material Underlying Formation		silt and sand	sand & silty red beds	sand & silty red beds	sandy silt
Vegetation		grass	grass and cactii	grass and cactii	grass and cactii
Local Terrain		rolling	flat	rolling	rolling
Thickness of Overburden		3"	none	none	none
P. I. (Overburden)		N.P.			
Estimated Quantity (cu. yds)		200,000	100,000 plus	100,000	200,000
Los Angeles Wear		33.6	24.0	28.4	31.6
Soundness Loss					
Average Maximum Size					
% Retained on 2" Sieve					
Pit Average % Passing	Crushed to:	1"	1"	1"	1"
	2"	100	100	100	100
	1"	100	100	100	100
	½"	63	65	58	60
	No. 4	25	23	23	33
	No. 10	14	12	13	13
	No. 200	3	2	2	2
Plasticity Index		N.P.	N.P.	N.P.	N.P.
Remarks:					

Pit Number		068	069	070	071
Location	Section	NW 18	NE 22	NE 25	NW 22
	Township & Range	1N 20E	1N 20E	1N 20E	1S 22E
	County	DeBaca	DeBaca	DeBaca	DeBaca
Formation		QT cg	QTg	Qal	Qal
Rock Type		caliche	sand and gravel	sand and gravel	sand and gravel
Source Rock (Gravel)			quartzite & limestone	quartzite	quartzite & limestone
Quality of Material		good	excellent	excellent	good
Thickness of Material		10'	6' plus	3' plus	4' plus
Thickness of Cap (Caliche)		2'			none
Material Underlying Formation		sand&silty red beds	sandstone	silt and gravel	silt
Vegetation		grass	grass & mesquite	grass & mesquite	grass and cactii
Local Terrain		rolling	hilly	hilly	rolling
Thickness of Overburden		none	1'	none	2'
P. I. (Overburden)			6		
Estimated Quantity (cu. yds.)		500,000	150,000	100,000	
Los Angeles Wear		32.4	28.8	30.4	
Soundness Loss					
Average Maximum Size			5"	4"	3"
% Retained on 2" Sieve			12		
Pit Average % Passing	Crushed to:	1"	as received	as received	
	2"	100	88	100	
	1"	100	76	97	
	½"	46	41	86	
	No. 4	19	26	69	
	No. 10	11	16	50	
	No. 200	2	5	2	
Plasticity Index		N.P.	N.P.	N.P.	
Remarks:					

CONSTRUCTION MATERIALS INVENTORY

MATERIAL PIT SUMMARY

Pit Number		0192
Location	Section	SW 13
	Township & Range	1N 22E
	County	DeBaca
Formation		QTcg
Rock Type		caliche and gravel
Source Rock (Gravel)		quartzite
Quality of Material		good
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		sandstone
Vegetation		grass
Local Terrain		hilly
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks:

0192 needs further exploration

Pit Number		
Location	Section	
	Township & Range	
	County	
Formation		
Rock Type		
Source Rock (Gravel)		
Quality of Material		
Thickness of Material		
Thickness of Cap (Caliche)		
Material Underlying Formation		
Vegetation		
Local Terrain		
Thickness of Overburden		
P. I. (Overburden)		
Estimated Quantity (cu. yds.)		
Los Angeles Wear		
Soundness Loss		
Average Maximum Size		
% Retained on 2" Sieve		
Pit Average % Passing	Crushed to:	
	2"	
	1"	
	½"	
	No. 4	
	No. 10	
	No. 200	
Plasticity Index		

Remarks: