UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED AS PART OF THE
MISSOURI RIVER BASIN INVESTIGATIONS

OFR 47-22

COMPOSITION OF GRAVELS IN PERCENT[1]

Number of sample	3[2,6]	4	6	7[6]	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23[6]	24	24	26[6]	27[6]	28	29	29	30	31	33
Basalt, diabase, "greenstone"	13	11	7	3	5	10	6	9	3	2	6	3	1	8	7	9	8	13	11	4	11	-	3	5	5	7	7	3	6	3
Chert, chalcedony, opaline silica	-	1	1	6	25	3	5	6	7	16	4	14	18	9	3	5	3	2	4	46	70[7]	37	4	8	47	6	5	25	12	42
Coarse-grained, dark, "basic" rocks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	-	-	-	-
Dolomite and limestone	70	67	58	55	26	59	54	64	59	52	69	45	62	53	68	57	47	19	36	5	11	-	64	58	-	45	41	26	14	2
Gneiss		9	9	18	12	10	10	4	8	11	11	14	6	10	-	10	11	20	7	1	2	-	12	10	4	19	3	15	9	9
Granite	8	5	12	7	6	13	7	10	9	7	4	9	5	3	14	16	17	25	25	3	5	3	6	5	3	6	22	11	2	4
Quartz	4	-	3	-	1	1	3	1	7	1	-	5	-	4	1	-	3	4	3	5	-	2	-	-	5	2	5	2	-	2
Quartzite	[8]	4	3	4	18	1	5	3	-	4	3	4	3	6	5	1	7	7	10	26	-	55	10	7	24	9	7	15	45	33
Rhyolite and similar rocks	1	-	1	2	4	1	2	1	1	1	-	2	1	4	-	2	2	-	3	9	-	3	2	3	8	1	5	1	6	4
Sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	1	-	-	1	2	-
Schist	1	-	-	3	1	-	2	1	-	1	-	4	1	3	1	-	2	10	-	-	-	-	5	2	3	3	3	1	1	-
Siltstone, shale, marly material	-	3	6	1	-	2	6	-	6	5	3	-	3	3	-	-	-	-	-	-	-	-	1	1	-	1	-	-	-	1
Miscellaneous, including ironstone, limonite, and marcasite concretions	3	-	-	1	-	-	-	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-	1	-	-	-	-	-	-	-

Number of sample	34	35	36	37	38	40	41	42	43	44	46	47	48	49	50[2,6]	52	54	55	56	57	58	59[2,8]	60	61[2]	62	64	65	66	69	70
Basalt, diabase, "greenstone"	2	9	13	5	6	5	2	3	8	10	8	9	7	3	7	1	8	2	7	5	7	4	8	3	6	10	1	5	4	8
Chert, chalcedony, opaline silica	9	14	12	11	6	1	50	5	1	3	13	26	16	5	10	50	11	39	16	40	15	11	29	37	26	11	3	-	2	3
Coarse-grained, dark, "basic" rocks	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-		-	1	-	-	-
Dolomite and limestone	47	30	38	59	55	45	15	54	36	35	42	15	27	45	45	12	27	17	45	-	34	42	8	4	5	47	45	50	39	62
Gneiss	20	21	14	11	14	32	2	13	28	22	18	12	7	12	11	2	19	6	11	-	8	5	11	7	15	14	22	35	36	11
Granite	5	11	13	5	10	8	3	6	10	16	6		6	5	-	4	12	1	6	3	11	5	6	3	8	3	8	7	12	5
Quartz	2	3	-	1	2	1	2	-	-	-	3	9	2	1	1	1	2	3	1	-	1	1	5	3	4	2	3	1	1	
Quartzite	4	10	2	4	5	-	22	6	4	3	6	19	26	21	14	22	10	25	11	40	15	16	26	31	25	10	6	2	2	5
Rhyolite and similar rocks	3	2	3	1	1	2	2	2	1	4	1	5	5	2	5	2	2	2	3	10	2	9	7	10	3	-	4	-	-	3
Sandstone	-	-	-	1	-	-	1	-	-	-	-	1	-	1	-	2	-	-	-	1	-	1	-	1	-	-	-	-	-	-
Schist	5	-	1	2	-	5	-	7	12	3	3	5	1	2	2	1	5	1	-	-	4	3		-	6	2	7		3	2
Siltstone, shale, marly material	-		4		1	1	1	3	-	4	-	-	3	1	3	-	1	4	-	-		1	-		2	1		-	1	1
Miscellaneous, including ironstone, limonite, and marcasite concretions	-		-	-	-	-	-	-	-	-	-	-	-	1	2	3	1	-	-	1	2	2	-	1	-		-	-	-	-

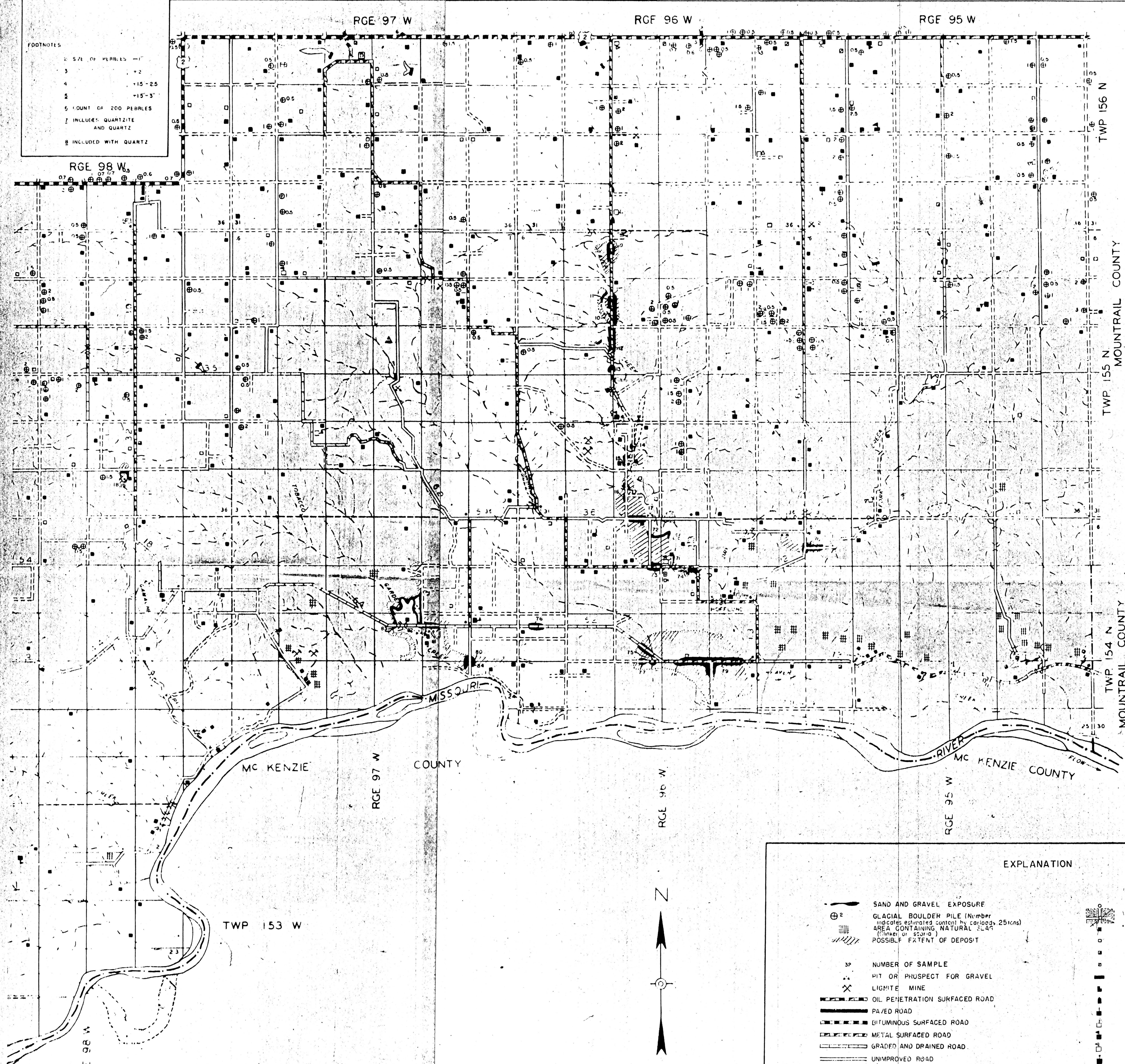
Number of sample	72	73	74	75	76	77	78	79	80	81	82	83	85	86	87	88	89	90[8]	91	92[5]	93	94	97	98	100	101
Basalt, diabase, "greenstone"	7	5	7	6	6	6	2	5	11	6	1	6	14	6	13	7	6	8	10	5	5	6	7	8	11	9
Chert, chalcedony, opaline silica	10	10	16	52	2	43	48	4	15	6	3	-	6	3	5	1	11	12	10	18	4	5	24	28	42	2
Coarse-grained, dark, "basic" rocks	-	-	-	-	-	-	-	-	-			-	-		-	-	-	1	-	-	-	-		-	-	-
Dolomite and limestone	59	68	40	4	74	4	3	4	33	61	76	73	44	57	59	41	40	39	33	21	40	39	20	10	9	59
Gneiss		6	9	2	9	5	2	2	11	12	10	14	9	5	9	28	24	21	22	27	15	1	6	6	1	1
Granite	11	4	8	1	6	6	2	4	8	8	8	2	9	11	6	10	10	5	8	9	16	24	9	9	4	13
Quartz	2	1	9	6	-	3	11	8	-	1	1	1	4	2	2	3	1	2	2	4	4	6	1	1	6	-
Quartzite	8	6	8	22	2	29	31	31	11	3	1	4	6	5	3	4	4	8	12	10	14	2	21	33	25	8
Rhyolite and similar rocks	-	-	2	5	-	4	1	6	1	1	-	-	-	-	1	2	1	1	-	2	1	5	3	4	2	1
Sandstone	-	-	-	-	-	-	-	-	-		-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Schist	1		1	1	-	-	-	-	2		-	-	2	-	1	1	3	2	1	4	-	12	8	1	2	6
Siltstone, shale, marly material	2		1	1	-	-	-		6	1	-	-	4	1	-	3		1	2	-	-	-	-		-	1
Miscellaneous, including ironstone, limonite, and marcasite concretions	-		-	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	1

Number of sample	104[4]	105	106	107	108[6]	108	10[illegible]	109	110	111	112	113	115	117	119	120	121	122	122	124	125	133	134	136	136	137	137
Basalt, diabase, "greenstone"	6	6	15	5	7	6	2	8	9	2	6	2	8	10	2	6	-	7	8	3	7	3	4		4	5	3
Chert, chalcedony, opaline silica	5	16	28	23	36	51	6	4	4	30	-	1	-	-	-	7	-	2	2	-	1	1	3	13	13	7	9
Coarse-grained, dark, "basic" rocks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-
Dolomite and limestone	42	16	13	29	4	3	43	54	38	4	45	52	48	54	32	38	59	53	53	63	56	63	56	19	11	8	18
Gneiss	24	20	1	10	2	-	22	14	21	1	37	27	31	19	36	23	35	21	1	28	27	21	19	-	-	1	1
Granite	7	13	2	3	3	5	8	11	14	1	5	10	3	9	13	2	-	9	16	1	2	5	10	13	14	12	13
Quartz	-	6	40	-	1	34	1	1	1	1	-	-	2	-	4	1	-	2	11	-	1	2	3	7	4	5	9
Quartzite	7	17	[8]	20	41	[8]	12	4	10	53	7	3	1	5	4	14	3	3	-	5	4	2	4	41	35	36	24
Rhyolite and similar rocks	4	2	-	4	5	1	-	1	-	7	-	-	-	-	-	3	1	-	1	1	-	-	-	3	2	1	2
Sandstone	1	-	-	1	-	-	1	-	-	-	-	1	-	-	-	2	-	1	-	-	-	-	-	1	1	2	1
Schist	4	4	1	3	1	-	3	2	3	1	-	3	7	3	9	1	-	-	6	-	-	2	-	1	-	1	1
Siltstone, shale, marly material	-	-	-	1		-	1	-		-		1	-	-		3	1	1	2	1	1	1	1	1	10	9	11
Miscellaneous, including ironstone, limonite, and marcasite concretions	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1	1	3	3

1 DETERMINED BY PEBBLE COUNTS (100 PEBBLES EACH); SIZE OF PEBBLES 1"–2" UNLESS OTHERWISE INDICATED

FOOTNOTES

2 SIZE OF PEBBLES −1"
3 +2"
4 +1.5"–2.5"
5 +1.5"–3"
6 COUNT OF 200 PEBBLES
7 INCLUDES QUARTZITE AND QUARTZ
8 INCLUDED WITH QUARTZ



EXPLANATION

- SAND AND GRAVEL EXPOSURE
- GLACIAL BOULDER PILE (Number indicates estimated content by carloads, 25 tons)
- AREA CONTAINING NATURAL SLAG (Clinker or scoria)
- POSSIBLE EXTENT OF DEPOSIT
- NUMBER OF SAMPLE
- PIT OR PROSPECT FOR GRAVEL
- LIGNITE MINE
- OIL PENETRATION SURFACED ROAD
- PAVED ROAD
- BITUMINOUS SURFACED ROAD
- METAL SURFACED ROAD
- GRADED AND DRAINED ROAD
- UNIMPROVED ROAD
- PRIMITIVE ROAD
- RAILROAD WITHIN ROAD RIGHT OF WAY
- RAILROAD
- RAILWAY STATION
- RAILROAD GRADE CROSSING
- RAILROAD CROSSING – UNDERPASS
- RAILROAD CROSSING – OVERHEAD
- COMMERCIAL OR MUNICIPAL AIRPORT
- INTERMITTENT STREAMS; NARROW
- NARROW STREAMS
- WIDE STREAMS
- NAVIGABLE STREAMS
- IRRIGATION DITCH
- HIGHWAY BRIDGE
- TRUSS (W-Wood, S-Steel)
- LONG RIVER CROSSING
- DAM WITH ROAD
- DAM WITHOUT ROAD
- CEMETERY
- COUNTY SEAT
- OTHER CITIES AND VILLAGES
- INCORPORATED CITY OR VILLAGE (Generalized)
- FARM UNIT
- FARM UNIT VACANT
- DWELLING (Other than farm)
- DWELLING (Other than farm), VACANT
- ROWS OR GROUPS OF DWELLINGS
- STORE OR SMALL BUSINESS
- TOWNHALL, GRANGE OR COMMUNITY HALL
- CHURCH
- CHURCH VACANT
- SCHOOLHOUSE
- SCHOOL HOUSE, VACANT
- POST OFFICE
- PUMPING STATION
- INTENSIVE RECREATION AREA
- BALL FIELD
- BATHING BEACH
- STOCK YARDS
- UNITED STATES HIGHWAY
- STATE LINE
- COUNTY LINE
- TOWNSHIP LINE
- SECTION LINE
- CORPORATE LINE
- TOWNSHIP CORNER
- SLOUGH OR INTERMITTENT LAKE
- AIRPORT BOUNDARY
- TERMINAL OF ROAD DISTANCE
- DISTANCE BETWEEN TERMINALS (In miles and tenths)
- FEDERAL AID HIGHWAY SYSTEM
- HISTORIC SITE

Base map modified after General Highway and Transportation Map of Williams County, prepared by the North Dakota Department of State Highways, 1936, and revised in 1940

Construction material data by D. M. Larrabee, H. R. Morris, and P. E. Truesdell, 1946

PRELIMINARY MAP SHOWING

CONSTRUCTION MATERIALS IN THE SOUTH ONE-HALF OF WILLIAMS COUNTY, NORTH DAKOTA

SHEET 2 OF 2

Scale: 0 1 2 3 Miles

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