SOILS AND GEOLOGY REPORT ADDENDUM
FOR
MC CLINTOCK STATION LOT A
(VOLLMER ROAD RV STORAGE)
ORIGINAL REPORT
"GEOLOGY & HYDROGEOLOGY
McCLINTOCK STATION
EL PASO COUNTY, COLORADO,
DATED FEBRUARY 22ND, 1978

Prepared For:
Scott Belknap
3603 First Light Drive
Castle Rock, CO 80109

November 2023
Project No. 25251.00

Prepared By:
JR Engineering, LLC
5475 Tech Center Drive
Colorado Springs, CO 80919
719-593-2593

PCD File No. PPR-2245

November 22, 2023
JR Engineering
5475 Tech Center Drive
Colorado Springs, CO 80919

Attn: Charlene Durham

RE: Addressing Geologic Hazard and Soils Report for Vollmer RV Storage, Lot A, McClintock Station

Dear Charlene Durham,

The purpose of this letter is to address the need for a geologic hazard and soils report to support he proposed development of Lot A, McClintock Station known as Vollmer RV Storage.

A Geologic Hazard and Soils Report was previously prepared and approved for the above referenced site by Lincoln-DeVore Testing Lab, dated February 22, 1978, and titled “Geology & Hydrogeology McClintock Station, El Paso County, Colorado”. This report will be referred to as the “Original Report” herein and is attached in its entirety to this letter.

The site has been visited by JR Engineering personnel, as recent as December of 2022. Lot A, remains undeveloped, undisturbed, and is consistent with the descriptions included in the Original Report. There have been no known or evident changes to the grading or topography on the project site.

Site specific geologic mapping was performed as a part of the Original Report and is included in the attached. The site is mapped as Qes: Eolian Sand of Quaternary Age, & Qp: Piney Creek Alluvium of Quaternary age.

The geologic constraints and hazards identified on this site from the Original Report, include erosion potential and “somewhat expansive soils” The Original Report states “These problems can all be avoided or mitigated without great difficulty, and should prove to be no obstacle to successful development”. Mitigation methods and recommendations for construction are included in the Original Report and the proposed designs have been reviewed and are considered proper and appropriate in regards to these concerns.

In general the sire soils are suitable for the proposed embankments. Groundwater should be expected to be encountered in deeper cuts and along drainage areas. If excavations encroach on the groundwater level unstable soil conditions may be encountered. Excavation of saturated soils will be difficult with rubber-tired equipment. Stabilization using shot rock or geogrids may be necessary.

Any areas to receive fill should have all topsoil, organic material or debris removed. Prior to fill placement a qualified Geotechnical representative should observe the subgrade. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1. The subgrade should be scarified and moisture conditions to within 2 percent of optimum moisture content an compacted to a minimum of 95 percent of its maximum Standard Proctor Dry Density ASTM D-698 (cohesive soils) or 95 percent of its Modifies Proctor Dry Density ASTM D-1557 (granular soils) prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if soft soils or shallow groundwater conditions are encountered.

New fill should be place in thin lifts not to exceed 6 inches after compaction while maintaining at least 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 for sandy soils, and a minimum of 95 percent of its maximum Standard Proctor Dry Density, ASTM D-698 for clay soils. These Materials should be placed at a moisture content conducive to compaction, usually 0 to +/- 2% of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by a qualified Geotechnical representative during construction. a qualified Geotechnical representative should approve any import materials prior to placing or hauling them to the site.

It should be noted that no structures are proposed with this site. The entire site lies outside of any mapped flood plain according to FEMA Map No. 08041C0533G, dated December 7, 2018 (see attached).

JR Engineering recommends that a qualified Geotechnical representative be on-site to observe the proposed embankment construction, and to specifically assess the suitability of the on-site soils for use in the embankment construction.

It is our opinion that the conclusions and recommendations in the "Geology & Hydrogeology McClintock Station, El Paso County, Colorado" by Lincoln-DeVore Testing Lab, dated February 22, 1978 remain valid and the report may be used for the proposed development of Lot A, McClintock Station. Please direct any questions to Ryan Burns at JR Engineering.

Respectfully submitted,

COLORADO LICENSED
RYAN BURNS
R.E.B.
0054412
11/21/23
PROFESSIONAL ENGINEER

JR ENGINEERING, LLC

Ryan Burns, PE
Client/Project Manager
Ph: (303) 267-6178
Cell: (203) 577-8656
Email: rburns@jrengineering.com

References:

1. Lincoln-DeVore Testing Lab, dated February 22, 1978, and titled *"Geology & Hydrogeology McClintock Station, El Paso County, Colorado"*

2. Federal Emergency Management Agency, December 7, 2018. *Flood Insurance Rate Maps, Map Number 08041C0533G*

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

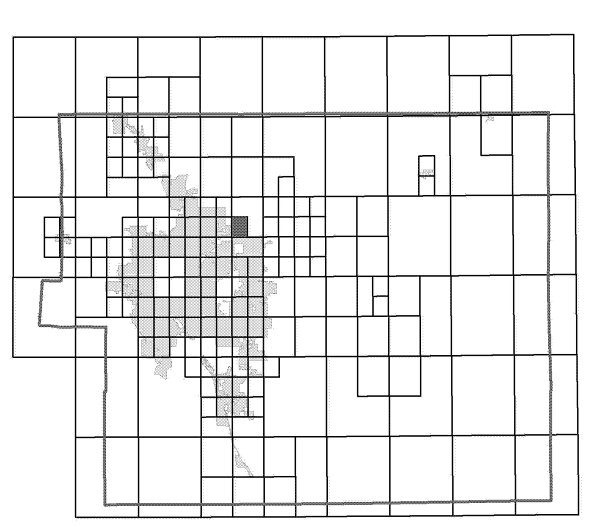
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

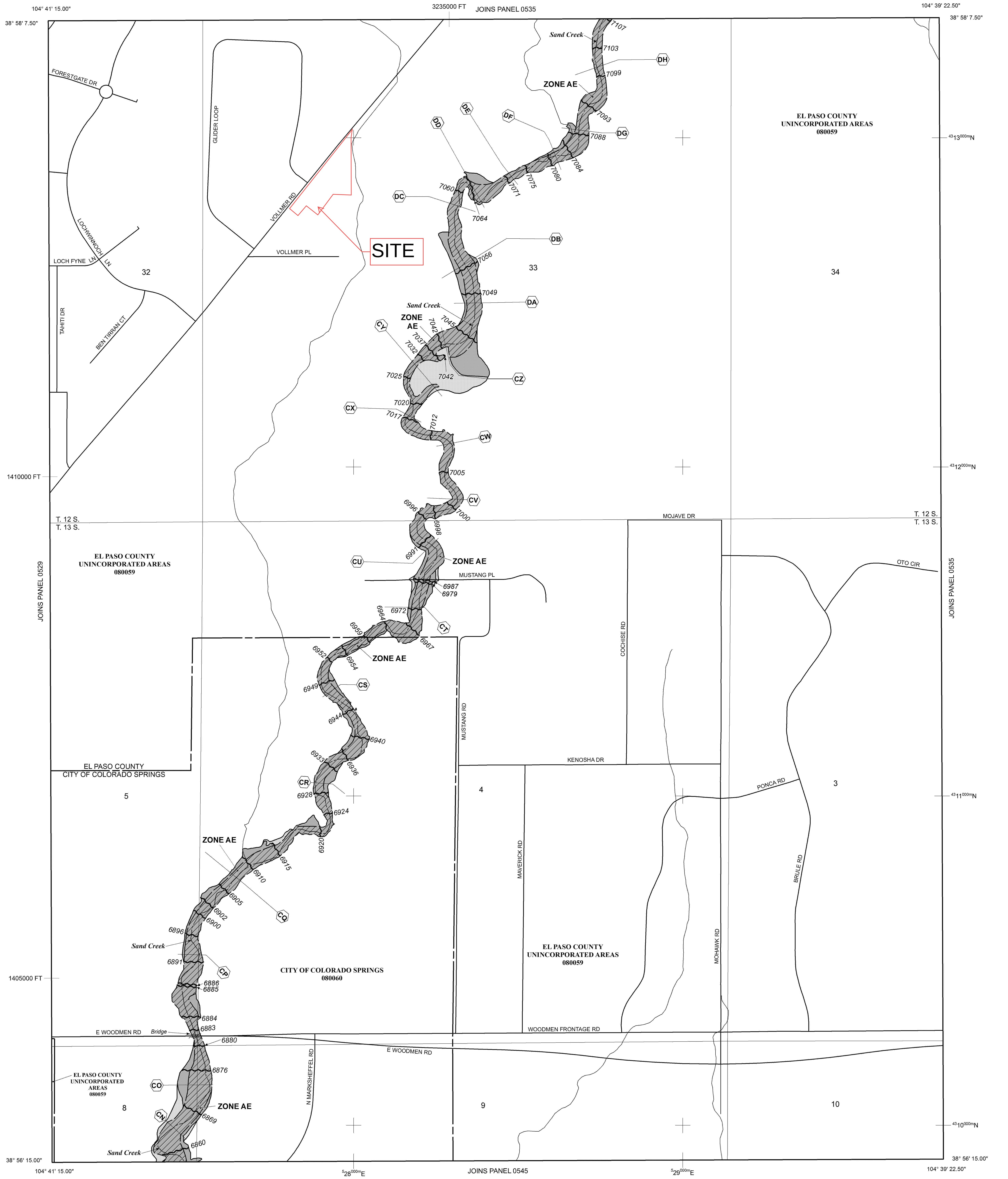
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 12 SOUTH, RANGE 65 WEST, AND TOWNSHIP 13 SOUTH, RANGE 65 WEST.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D Boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A—A Cross section line

23- - - -23 Transect line

97° 07' 30.00" 32° 22' 30.00" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 13

6000000 FT — 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection

DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

• M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0533G

FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 533 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0533	G
EL PASO COUNTY	080059	0533	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 08041C0533G

MAP REVISED DECEMBER 7, 2018

Federal Emergency Management Agency

Lincoln DeVore

1000 West Fillmore St.
Colorado Springs, Colorado 80907
(303) 632-3593
Home Office

February 22, 1978

Mr. J. Marcus Brown
Box 7, Hermit Lakes
Creede, CO 81130

Re: GEOLOGY & HYDROGEOLOGY

McCLINTOCK STATION

EL PASO COUNTY, COLORADO

Dear Mr. Brown;

Transmitted herewith is a report concerning the general and engineering geology and hydrogeology of the McClintock Station site in El Paso County, Colorado. This report has been prepared in compliance with the requirements of Colorado Senate Bill 35 (30-28-133 C.R.S. 1973 as amended) and the El Paso County Subdivision Regulations.

Respectfully submitted,

LINCOLN-DeVORE TESTING LAB.

Richard N. Morris, Director
Geological Investigations

Joseph R. Infascelli,
Professional Geologist

RNM/sam
LDTL Job No. 19828

2700 Highway 50 West
Pueblo, Colo 81003
(303) 546-1150

P.O. Box 1427
Glenwood Springs, Colo 81601
(303) 945-6020

109 Rosemont Plaza
Montrose, Colo 81401
(303) 249-7838

P.O. Box 607
Gunnison, Colo 81230
(303) 641-2276

P.O. Box 1643
Rock Springs, Wyo 82901
(307) 382-2649

INTRODUCTION:

Personnel of Lincoln-DeVore have completed an investigation of a proposed subdivision site on a tract known as the McClintock Station property in El Paso County, Colorado. This tract may be described as that part of the northwest quarter of the southwest quarter and the south half of the northwest quarter of Section 33 lying southeast of the right-of-way of Vollmer Road in Township 12 South, Range 65 West of the Sixth Principal Meridian. Certain smaller tracts within the above described property are excluded, leaving a total subdivision area of about 37 acres. The site lies about 12 miles northeast of the center of the city of Colorado Springs, Colorado, and may be reached via Templeton Gap Road (State Highway 189) and Vollmer Road. It is proposed that the property be subdivided into three lots, for eventual commercial or industrial uses. The purpose of this report, which was authorized by Mr. Danny Mientka of Equity Realty and Investment Company, is to determine the geological and soils properties of the site as they affect engineering and environmental considerations. Methods employed in this investigation include a review of the published literature, air photo analysis, and field reconnaissance.

The proposed subdivision lies on a broad upland plain, just south of a high, forested area known as the Black Forest. Lying a short distance south of the drainage divide between the South Platte River and the Arkansas River drainage basins; the property is contained within the basin of Sand Creek, a tributary of Fountain Creek and of the Arkansas River. All drainage from the site flows to the south, directly into Sand Creek; the drainage pattern is rather poorly developed (especially in the northern part of the property), is dendritic, and displays no apparent structural control. The terrain is composed of a series of very low, very gentle, south-trending ridges, separated by swales and small gullies. This gully-and-ridge pattern is better developed to the south than to the north. Elevations within the property range from about 7020 feet above mean sea level to about 7080 feet above mean sea level. Slopes tend to be relatively uniform and range from about 2% in the drainageways to (locally) as much as about 10% on the ridges.

The proposed subdivision is located about 11 miles north-northeast of the weather station at Colorado Springs (Peterson Field), Colorado. Climatological data for that station indicates that mean monthly temperatures in the area vary from a low of about 29° F. in January to a high of about 71° F. in July. Extreme temperatures have been recorded as low as -31° F. (January, 1883) and as high as 100° F. (June and July, 1954). Precipitation averages slightly below 16 inches per year, and has varied from as little as about six inches to as much as about 25 inches. About 70% of the annual precipitation occurs between the months of May and September, usually during brief, violent, summer thunderstorms. Due to the higher elevation of the site, the climate in the immediate area would be expected to be somewhat cooler than at Peterson Field. However, available data indicates that the average precipitation is probably about the same. The Black Forest area is notable for very large thunderstorms; one of these (May 30, 1935) is known to have dropped about 24 inches of rain in a one-day period. Snowfall in the area is usually light, although strong winds can sometimes result in blizzard conditions with extensive drifting.

Vegetation on the site is dominated by various dryland bunch grasses, notably blue grama (*Bouteloua gracilis*) and western wheatgrass (*Agropyron smithii*). Numerous species of "weeds" and other low herbals are also found. A number of trees, both coniferous and deciduous, are found in the immediate area. However, all of these trees appeared to have been planted by human hands, and are not representative of the native community in any way. The animal community is varied and is representative of the high plains and foothills belt in general. Among the larger mammal species present are the coyote (*Canis latrans*), the common striped skunk (*Mephitis mephitis*), and the mountain cottontail (*Sylvilagus nuttalli*).

Previous land uses in the area have been dominated by grazing and related agricultural pursuits. More recently, the tract has been the site of a natural gas pipeline transmission station; the now abandoned station is presently used for a variety of agricultural and light industrial purposes.

Most of the land so used is excluded from the proposed subdivision.

GENERAL GEOLOGY:

The geologic setting of the proposed subdivision is dominated by the Dawson Formation, a sequence of sandstones and claystones which underlies the entire area, and by certain alluvial sand deposits which have been derived directly from the Dawson bedrock. The soils found on the site have been developed directly from the alluvial materials, and their engineering characteristics are in many ways derived from the parent rock. No other surficial deposits appear to exist on the site itself, although it is likely that materials such as windblown sands and silts may be found in the general vicinity.

Only one group of rocks underlying the site will have any significant effect on the engineering and hydrologic properties of the proposed subdivision. This is the Dawson Arkose Formation of the Dawson Group, a unit of very late Cretaceous and Paleocene age (deposited between about 66 million and about 60 million years before the present). Overall, the formation consists of many irregular and lenticular (discontinuous in areal extent) beds of sandstone and claystone. Most of the sandstones were derived from erosion of the Pikes Peak Granite of the mountains to the west; consequently, they contain large quantities of feldspar minerals in addition to the quartz normally found in sandstones (i.e. they are arkosic rather than quartzose). The sandstones are normally yellow to white in color and are relatively soft rocks. Locally, sandstone beds may be stained various shades of yellow, brown, red, and purple by iron minerals and other substances. These stained beds are often rather harder than the unstained sandstones. Most of the sandstones contain quantities of clay in addition to the sand. The clay is partially derived from the *in situ* weathering of feldspar minerals, with the remainder being a consequence of original deposition. Some of the sandstones are composed of fragments of the volcanic rock andesite. As these rocks also contain large quantities of feldspars and other readily weathered minerals, they also tend to break down to clayey sands, generally with a higher clay content than those derived from the arkosic sandstones. By far the greatest proportion of the Dawson Arkose beds are composed of sandstones.

Although claystones are present within the Dawson Arkose Formation, they are more prevalent in the underlying Denver and (to a lesser degree) Arapahoe Formations of the Dawson Group. The top of the Denver Formation is estimated to be about 300 feet beneath the surface in the vicinity of the proposed subdivision. Most of the claystones are light in color, and are apparently either the product of feldspar weathering or the alteration of beds of volcanic ash. A few beds may also reflect the original deposition of clay in the formation. Throughout the formation, in both the claystones and the sandstones, the predominant clay minerals are usually members of the montmorillonite group (bentonites).

The total thickness of the Dawson Group beneath the proposed subdivision is about 1600 feet. Underlying the Dawson, in turn, are the shales, sandstones, and coals of the Laramie Formation, the water-bearing sandstones of the Fox Hills Sandstone, the very thick, marine, clay shales of the Pierre Shale, and a number of older sedimentary formations. For the purposes of this report, all of the older formations will be considered as being so deeply buried that they will not affect the site.

The period of deposition of the Dawson Group marks an important change in the geologic history of western North America. For many millions of years, the western part of the continent had either been submerged under shallow seas or else been raised only a very little above sea level. It was during this long slice of geologic time that nearly two miles of marine sandstones, limestones, and (especially) shales accumulated in the region. The sea waters, and the rocks deposited within them, covered and buried the eroded remains of ancient mountains and plains dating from an even earlier time.

Beginning about 70 million years ago, the seas started to recede and the land began to rise as <u>tectonic</u> forces (those tending to move and deform large segments of the earth's crust) warped, bent, and broke the underlying rock beds. This period of tectonic activity is termed the Laramide <u>orogeny</u> (period of mountain building); by about 66 million years before the present, the orogeny had raised the land surface to elevations of several thousand feet above sea level and had formed the roots of the present-day Rocky Mountains. Along the base of what would become the Front Range of Colorado, there developed a zone of deformation in which the flat-lying sedimentary rocks were abruptly bent and folded upwards against the rising mountains.

Stresses involved in the upfolding locally became too great for the rocks to withstand along much of the mountain front, resulting in the formation of a system of <u>faults</u> (breaks in the earth's crust, involving differential movement along the break). The closest fault of this system, the Rampart Range Fault, is found about 11 miles to the west of the proposed subdivision. Many thousands of feet of differential vertical movement have taken place along this fault, resulting in the present side-by-side contact of the billion-year-old Pikes Peak Granite with the much younger Dawson Group.

At about the same time that the Laramide mountains were being uplifted, a large structural trough, the Denver Basin, was being downdropped. This trough roughly parallels the mountain front and extends from the vicinity of Pueblo, Colorado, northward to about the Wyoming state line. It was in this subsiding basin that materials such as fragments of volcanic rocks, older sedimentary beds, and Pikes Peak Granite were deposited to form the Dawson Group.

In the period since deposition of the Dawson rocks, the southern Denver Basin has been covered by other, younger rock beds - notably the Castle Rock Conglomerate and a layer of volcanic rhyolite -- and then been subjected to erosion. This long period of erosion has been broken by a few episodes of deposition, in which debris eroded from the mountains has been washed over the area. There are, however, no such young deposits now remaining in the area. Despite the erosion which has taken place, the resistant nature of the Dawson Arkose sandstones, combined with that of the now-vanished rhyolite and Castle Rock Conglomerate, has resulted in the persistance of the Black Forest area as a topographic highland.

There are no outcrops of Dawson bed-rock anywhere on or near the site. Consequently, it was not possible to determine the precise nature of the dip (angle at which rock beds slope from the horizontal), fracture pattern, or any other structural data pertaining to the rock. However, the site is very near to the axis of the Denver Basin, a fact which suggests that the average dip is almost horizontal. Furthermore, the Dawson beds possess low competence and are too young to have been subjected to extensive tectonic stresses. Fracture patterns are thus not usually well developed.

The entire area surrounding the site is covered by a variable, but relatively thick, cover of Holocene age (deposited within the last 10,000 years) surficial deposits. Two different classes of these unconsolidated materials have been mapped within the site itself. These are, respectively, a deposit of Piney Creek Alluvium and a covering blanket of aeolian (wind-deposited) sand.

The Piney Creek Alluvium consists of the stream-laid deposits which have been formed since the end of the last glacial period ("Ice Age") about 10,000 years ago. Regionally, the Piney Creek Alluvium may contain any material from clay to gravel, is usually soft and poorly compacted, and is often subject either to flooding or high groundwater. Within the immediate area of the proposed subdivision, the material usually consists of a light-colored clayey sand, containing some coarse sand and gravel up to two inches in diameter. The total thickness of the deposit (some of which may actually be part of an older alluvial deposit) is between 35 and 40 feet in the subdivision; the top 20 feet or so is usually more clayey than the underlying beds. As is typical of stream-laid deposits, the section consists of a stack of erratic, thin lenses of sandy and clayey material. Within the area of the subdivision, groundwater has been found in this deposit at depths of between 15 and 25 feet. A thin belt of this material adjacent to the present channel of Sand Creek is technically distinguished as the Post-Piney Creek Alluvium. This deposit is extremely recent in ago and generally lies within the present-day floodplain of the creek. Virtually all of the components of the alluvium were derived locally from rocks of the Dawson Arkose Formation.

All parts of the site not covered by the Piney Creek Alluvium are mapped as being covered by aeolian sands. This is a deposit of fairly uniform, fine-grained, light-colored sand, with minor amounts of clay and silt. Also derived mostly from bedrock of the Dawson Arkose Formation, these sands were picked up by strong winds in the relatively recent geologic past, transported to the area by those winds, and dumped as the winds lost energy. It is not uncommon to find that this deposit is very thin and forms a veneer over older, alluvial deposits. Hence, despite the indicated presence of aeolian sand on the map, it is usually the case that alluvium of Piney Creek age - or older - will be found at depths of only a few feet.

ENGINEERING GEOLOGY:

Generally speaking, the proposed subdivision site is relatively free from significant geologic hazards or problems. Of those problems which do exist, the most important are those relating to site drainage and ground-water conditions, erosion potential, and somewhat expansive soils. These problems can all be avoided or mitigated without great difficulty, and should prove to be no obstacle to successful development of the property.

SLOPE STABILITY. There do not appear to be any significant hazards due to slope stability problems. This fact is a function both of the ground slope, which is generally too flat for development of slope failures, and of the on-site soils, which are a combination of sand and clay which is not particularly susceptible to failure. An exception to this general statement can be made for the banks of some of the larger waterways, where limited areas might slump due to undermining for stream erosion. This potential problem will be treated in more detail as an erosion hazard.

It is, of course, possible that small failures could occur as a result of man-made excavations and cuts on the site. Although the clay content of the soil lends the soil mass a certain amount of cohesion, resulting in short-term stability of very steep cut faces, safety considerations will require that excavations or trenches of more than four feet total depth be either shored or laid back to about a 1:1 slope. This should be done for all excavations expected to remain open for more than a very short time (i.e. a day or so).

SOIL FACTORS. Most of the on-site soils will provide a stable base for structural foundations, pavements, and similar features, and few problems are to be expected in this regard. The soils are not generally susceptible to consolidation under load, although some of the sands - particularly the aeolian materials and the Post-Piney Creek Alluvium - may undergo a fairly rapid subsidence if very heavily loaded. This will be due mostly to a collapse and reordering of the soil structure as opposed to true consolidation, which requires a gradual change in volume resulting from the expulsion of water. By and large, however, structural foundations will not bear directly on these soils; such foundations will penetrate most of the aeolian sand, bearing instead on underlying alluvial material, and will not be placed on the very recent alluvium at all due to flooding problems. It will, therefore, probably be found that allowable bearing values on the site will range from somewhere around 2000 pounds per square foot for the loosest sands to in excess of 3500 pounds per square foot for the better-consolidated sands and clayey sands.

Minimum allowable bearing values, probably in the neighborhood of 500 to 1000 pounds per square foot, will probably have to be used due to the propensity of the montmorillonite clays found in the soil to absorb water and expand in volume ("swelling" or "heaving"). The resulting uplift pressures should not be sufficient to damage properly designed and constructed foundations; however, concrete slabs on grade, sidewalks, and pavements may show some damage from this cause. Structures to be built on this site should have individual geotechnical investigations performed for them so that specific soil conditions and design values may be determined for each building. Furthermore, some sort of subgrade bearing analysis should be performed for the on-site soils if development of the area will require that access roads and parking areas be subjected to repeated heavy wheel loadings.

As a rule, soils developed from Dawson rocks do not contain large quantities of corrosive sulfate minerals, and it is unlikely that special precautions will have to be taken on this account. Nevertheless, it is good practice in most of Colorado to use Type II cement in all concrete which will be in contact with the soil due to that cement's greater resistance to sulfate attack. This will provide cheap insurance against any possible sulfate problems.

EROSION. The windblown and sandy alluvial soils found in the vicinity of the McClintock Station are generally susceptible to accelerated erosion under the proper conditions, and precautions should be taken during development to prevent soil damage from this cause.

Both the aeolian sands and some of the fine-grained components of the alluvial soils are susceptible to erosion by wind action (deflation) if exposed. At present, these soils are fairly well protected by vegetation, and those areas which are presently not covered are flat-lying and do not induce erosive turbulence in the laminar wind flow. Disturbance due to construction, however, could have the effect of both removing protective vegetation and creating turbulence, leading to rapid removal of the fine-grained materials. It is worth noting that very similar processes led to the formation of the aeolian sands now present on the site. Erosive activities of this sort, while possible at any time of the year, are most probable during the late winter and spring months, when high-intensity wind storms are known to regularly occur. It is therefore important that ground surfaces not be stripped of vegetation or otherwise be greatly disturbed unnecessarily. Ground which must be disturbed for construction purposes should be either revegetated, paved over, or graded flat and otherwise protected at the earliest opportunity. This is particularly true during the high wind period. It is possible that the sequencing of construction operations might permit the use of buildings or other facilities as partial windbreaks; however, it should be remembered that small obstructions will serve only to increase wind turbulence. Site planning should incorporate the same approach by using structures as windbreaks for parking lots and work areas.

Most of the on-site soils are relatively susceptible to gully erosion by concentrated runoff waters. This problem can be eliminated by designing on-site drainage systems in such a way that runoff waters will not become concentrated in areas of unprotected soil. By and large, drainage channels should either be lined or grassed, and the banks of larger channels (such as the tributaries of Sand Creek) should be protected against erosion and slumping. This work could be incorporated with floodplain protective work in the areas of the larger channels. Particular care should be taken in the design and construction of culverts and conduits on the site to ensure that properly-sized pipe is used. Although small diameter pipe can carry relatively large flows if a head is allowed to develop, such flows are made possible only by a significant increase in the velocity of the fluid flow. As erosive potential increases as a power function of fluid velocity, dramatic gullying can occur at the downstream end of undersized culverts. This type of erosion has been well documented in areas of sediments derived from the Dawson Group.

DRAINAGE & GROUNDWATER. Although no floodplain has been designated for the reach of Sand Creek in the vicinity of the proposed subdivision, the design of drainage facilities should be done with care. As noted, all structures should be kept out of the physiographic floodplain of the creek, and steps should be taken to protect the stream banks. It should be kept in mind that the area is subject to extremely large summer thunderstorms, and point precipitation values approaching the maximum probable precipitation for the entire region have been recorded in the Black Forest area several times within recorded history. The storm of May 30, 1935, previously described, was centered in the immediate vicinity of the proposed subdivision and is only one of several such storms which are known to have occurred.

At the present time, a groundwater table exists within 15 to 25 feet of the ground surface within this site. This is, in itself, no problem except to structures with very deep basements or buried facilities. There is, however, a possibility that localized clayey beds of very low permeability may exist at variable depths under the surface. These beds would present an obstacle to infiltrating water (i.e. from storms), and might cause the formation of a perched water table. The situation would, of course, be aggravated by the infiltrating wastewater placed in the soil by leaching fields. Structural excavations should be inspected prior to the actual construction of foundations to determine if such conditions exist; if so, drains and other appropriate modifications to the foundation design can be constructed.

SEISMICITY & RADIOACTIVITY. Although eastern Colorado is not considered to be notably active in terms of earthquakes and general seismicity, recent geological investigations over the region have suggested that the actual seismicity of the area is somewhat greater than had been previously thought. There are no known faults in the immediate vicinity of the proposed subdivision, and the closest known major fault system is the Rampart Range Fault system, found at the base of the mountains about 11 miles to the west. Evidence has been found suggesting that this fault system has been active as recently as about 100,000 years ago. Although the danger of damaging earthquakes is not great, the entire region is now considered to fall within seismic risk zone 2 as defined in the latest edition of the Uniform Building Code. All structures to be placed on the site should be designed with this consideration in mind, particularly since the structures will probably be founded upon unconsolidated sands.

It is not believed that there are any significant deposits of radioactive minerals within the vicinity of the site. Although occurences of radioactive minerals have been noted in Dawson bedrock within the Black Forest itself, these deposits are some miles to the north. Considering that the bedrock under the site is shielded by a considerable thickness of alluvial material, and that the alluvium is sufficiently disperse in origin that material from any radioactive deposit would be present only in very low concentration, it is not believed that there is any measurable radiation present from natural sources on this site.

MINERAL RESOURCES:

Known deposits of economic or potentially economic mineral deposits in the vicinity of the proposed subdivision are limited to the alluvial sands. These sands have potential value as construction aggregate and road base material. Limited exploration has also occurred in recent years for oil and gas deposits. This exploration has thus far not been productive, and there is no reason to believe that petroleum will be encountered on or near the site. Although coal may underlie the property at very great depth - in the Laramie Formation - it does not outcrop and does not constitute a commercial deposit, the extraction of which would be influenced by development of the property. While coals are found in the Dawson Group, they are of very limited extent, are quite thin, and are generally of very poor quality. They are not considered to be an extractable resource. No other minerals are known to occur on or near the site.

Limited extraction of sand for road base and aggregate uses has previously occurred in the upper valley of Sand Creek, most notably in the northeastern part of Section 6, Township 13 South, Range 65 West of the 6th P.M. This pit is located a short distance to the southwest of the site. A review of the available drill hole logs for the site suggests that the alluvial sands underlying the proposed subdivision are of the same general type as those which have been extracted. On this basis, it can be stated that a layer of usable sand underlies the subdivision, beginning at about three to five feet beneath the surface and extending to about 20 to 25 feet beneath the surface. This material contains considerable clay and will require processing before it can be used for construction purposes. If processed for aggregate uses, a yield of 50% to 75% can be anticipated; if processed for road base use, yields of up to about 85% can be expected. The material is arkosic and not of extremely high quality. Furthermore, the deposit is of very marginal economic value, and extraction is probably not justified in view of the local market and supply for low quality aggregate and base. The material will, however, make a good base for structures and pavements on the site, and it may be possible to develop a limited extraction program in conjunction with the overall development of the site, using the material either for on-site uses or for local marketing. Such a program is to be encouraged in terms of resource conservation and the possibility of aggregate shortages in the future. It is very unlikely, however, that the economic value of the resource would be sufficient to preclude development of the site pending extraction.

SEWAGE DISPOSAL:

It is proposed that sewage disposal be accomplished on this site by means of individual treatment systems for each lot. This is the only practical alternative, as there are no trunk sewer lines anywhere near the site and as current population levels do not justify the construction of a community treatment system.

As of the writing of this report, weather conditions have prevented the performance of percolation tests within the boundaries of the proposed subdivision. However, tests have previously been conducted in the excluded lots in the center of the site. These tests indicate a percolation rate of about five minutes per inch in the alluvial sands; it is believed that this rate is representative of the alluvial sands over the entire site. This percolation rate is the maximum permitted by State law and regulation for standard septic tank and leach field systems. It can be inferred that the soil has the capacity to rapidly absorb large quantities of liquid, but that the rate of absorbtion is sufficiently great to possibly interfere with the waste treatment processes active in the soil.

From the test results and from what is known of the surficial geology, it appears that individual sewage disposal systems may be successfully used on this site. However, considering that a considerable volume of waste is likely to be discharged into the soil, and that a shallow groundwater table (which is presently in use as a water supply) underlies the site, it is strongly recommended that some sort of treatment other than that afforded by conventional septic tanks be provided prior to transmitting wastewater to the leach field. Treatment could be provided by aerobic-type septic tanks, by miniaturized package plants, or by other means suitable for the specific industrial installation in question. For this reason, it will be necessary that each treatment system be individually engineered for site conditions and user requirements.

WATER SUPPLY:

It is proposed that the water supply for the proposed subdivision be provided by wells tapping the alluvial and bedrock aquifers underlying the area. This is the mode of supply presently in use for the existing facilities near the site. One of the wells from which groundwater is to be withdrawn is already in existence and has been adjudicated. The remainder of the water is to be taken from wells which have not yet been drilled. On the basis of available data, it appears that sufficient groundwater underlies the site to supply the needs of the development, and that this groundwater can be used without significantly affecting the rights of senior users in the area.

It is the understanding of Lincoln-DeVore that the entire 37-acre tract will be used for light industrial and commercial uses. As the precise nature of those uses is not known, the calculation of water use for the site must be made using the El Paso County rule-of-thumb which estimates the water demand for this type of use as one acre-foot per acre per year. On this basis, the total estimated water demand is 37 acre-feet per year. This corresponds to a demand of 12,056,487 gallons per year, 33,031.5 gallons per day, and 22.9 gallons per minute. This is the quantity and rate which must be supplied by on-site wells.

The geology, topography and drainage characteristics of this site have already been described elsewhere in this report. It need be added that recharge to the aquifers underlying the site occurs both as a result of stream losses from Sand Creek - which is intermittent and usually exists only as underflow in the subsurface - and from direct infiltration of rainfall and snowmelt into the ground. Although it is difficult to say which factor is more significant in recharging the subsurface, it would appear that most recharge is via the direct route during periods of snowfall and light, steady rainfall, and that recharge is dominated by stream losses during the thunderstorm season. Recharge on this site is largely a function of the relatively permeable surface soils, and probably will not be influenced significantly in its magnitude by the pumping of wells in this subdivision.

The influence of vegetation on the amount of water available for recharge is not great at present. The native vegetation is dominated by shallow-rooted, dryland, ground cover plants, and it does not appear that evapotranspiration on this site is any greater than that expected throughout east-central Colorado. The only <u>phreatophytes</u> (water-loving plants) on or near the site are a few large trees, planted as landscaping around the old pumping station buildings. These trees are too few in number to radically affect evapotranspiration, and will probably not influence on-site infiltration at all.

Development of the site can be anticipated to have some effect upon recharge characteristics as a consequence of alteration of the native ground surface. The most important effect will be the increase in stormwater runoff caused by an increase in the amount of impermeable surface on the site and an increase in the efficiency with which drainage is removed from the property. This should not be of great consequence, however, as a significant amount of infiltration occurs after runoff water enters the streambed. In addition, the use of leaching fields on this site will tend to minimize the total effect of groundwater removal by artificially replacing a major proportion of the extracted water into the subsurface.

All groundwater extracted on this site will come from the Dawson Arkose bedrock aquifer, with possible very minor contributions from the Denver Formation aquifer. Other bedrock aquifers exist beneath the site, most notably in the Arapahoe Formation and the Laramie-Fox Hills complex; these, however, are found at too great a depth for economical extraction on the scale contemplated. The Dawson Arkose aquifer encompasses most of the beds of the Dawson Arkose Formation. However, only the sandier beds yield water to wells at measurable rates. The clayey beds do contribute some water; this water is usually forced from the claystone by overburden pressure and enters the sandstone beds only very slowly. The entire formation is considered as one aquifer. However, the lenticularity and variation in permeability which is characteristic of the formation tends to divide the "aquifer", for practical purposes, into a succession of small, local aquifers separated by less permeable beds. The hydraulic connection between beds at different levels in the formation is thus often rather tenuous. Within the immediate area of the proposed subdivision, bedrock wells tap the Dawson Arkose aquifer at both shallow and intermediate depths. Pumping from the deeper wells does not seem to have any noticeable effect upon water levels in the shallow wells and vice versa. It would appear from the evidence that water levels in the shallow wells - which commonly encounter water at depths of 15 to 25 feet - are heavily influenced by the underflow characteristics of Sand Creek and the surrounding alluvium. Connections between the shallow groundwater table and the deeper water table appear to be slow-developing and of relatively low magnitude.

Examination of detailed logs of water wells drilled on the proposed subdivision and in the excluded tracts indicates that about 170 feet of sandstone lies in the Dawson Arkose underlying the site. This figure, which includes all logged sandstones which appear to have relatively low clay contents, amounts to slightly over one-half of the formation. Approximately 76 feet of more or less continuous sandstone is found at depths between about 50 and about 150 feet beneath the ground surface. Another group of sandy beds, amounting to about 55 feet of continuous sandstone, is found at depths of just over 200 feet. The remaining footage is distributed among three thin sequences elsewhere in the geologic section. It is these beds which will be the primary sources of groundwater. Groundwater levels reported by drillers are somewhat unreliable, as measurements are usually made immediately after the well is drilled. Under these circumstances, the groundwater levels have not stabilized and represent flows from only those beds which produce relatively large quantities of water. Stable water levels in unpumped wells tend to stabilize at about 15 to 25 feet beneath the surface in shallow wells and at about 130 feet beneath the surface in wells which fully penetrate the Dawson Arkose aquifer.

The actual yield of the wells and their impact on the aquifer can be predicted only if the hydraulic properties of that aquifer are known. That knowledge is usually derived from the results of pumping tests of wells penetrating the aquifer. Although several wells are found in the vicinity of the proposed subdivision, none of the shallow wells has had a true pumping test performed upon it, and only one existing deeper well can claim such a test. The wells found on or near the site are as follows:

Permit #8745R; Location-NW^4 SW^4 Section 33; Drilled 1947
Total depth = 255'; Water level = 50'; Reported yield 5 gpm.

Permit #8746R; Location-NW^4 SW^4 Section 33; Drilled 1946
Total depth = 300'; Water level = unknown; Reported yield 6 gpm.

Permit #8747R; Location-NW^4 SW^4 Section 33; Drilled 1948
Total depth = 245'; Water level = 54'; Reported yield 4 gpm.

Permit #8748R; Location-NW^4 SW^4 Section 33; Drilled 1952
Total depth = 237'; Water level unknown; Reported yield 10 gpm.
(The above four wells are all on the excluded tracts)

Permit #17108F; Location-NW^4 SW^4 Section 33; Drilled 1973
Total depth = 440'; Water level = 127'; Reported yield 30 gpm.

Permit #43497; Location-NW^4 SW^4 Section 33; Drilled 1970
Total depth = 198'; Water level = 42'; Reported yield 7 gpm.

Of these wells, #17108F is the well which has been tested. This particular well fully penetrates the Dawson Arkose aquifer and extends about 140 feet into the Denver Formation. It has been cased off above the 200-foot level, so that it properly reflects hydrologic conditions only in the lower part of the aquifer. This well was pumped for about five days at a steady rate of about 28.6 gallons per minute, for a drawdown of 49.7 feet. Although two monitoring wells were observed in conjunction with this pumping test, no drawdowns were observed in them. Both the monitoring wells were significantly more shallow than the main well, and both appeared to be heavily influenced by near-surface groundwater conditions. Consequently, no definitive information on aquifer hydrologic properties was obtained. However, the records strongly suggest that shallow wells in the area of the subdivision can safely yield about five gallons per minute, and that fully-penetrating wells can safely yield about 30 gallons per minute.

As good hydraulic values are not available, it is difficult to recommend proper well spacings. As a first consideration, it can be seen that fully penetrating wells, in which the upper portion of the aquifer is cased off, probably will not have any significant adverse effects upon shallow wells. Well spacing is therefore not a consideration when properly constructed wells penetrating to different depths are involved. If two fully penetrating wells are drilled on the site, spacings of about 1000 feet between wells should effectively prevent interference between the two wells. For wells penetrating only to shallow depths, minimum spacings of about 500 feet should be sufficient.

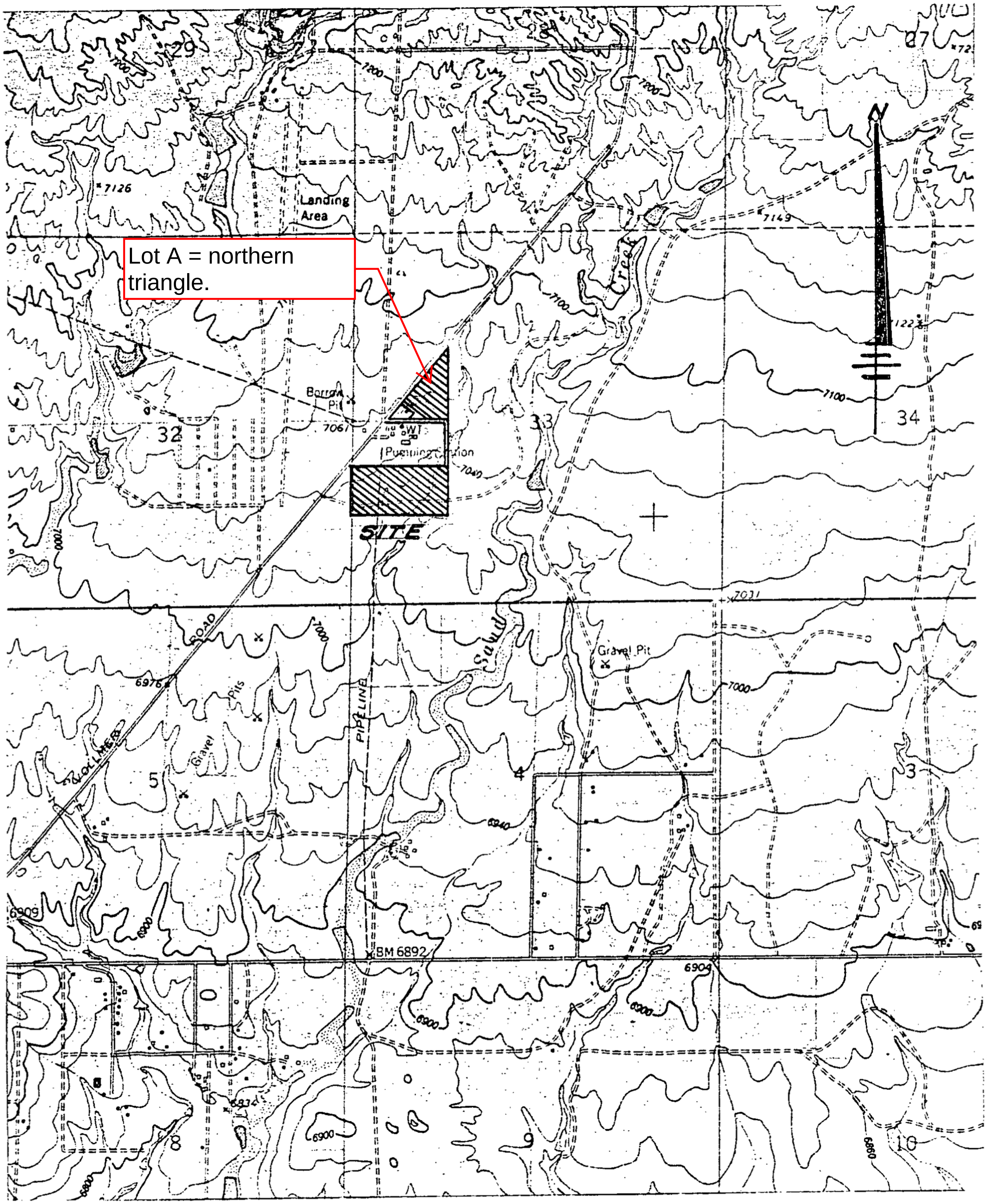
The effect of water withdrawals upon the supply contained in the aquifers can be evaluated in two ways. The first method assumes that no recharge to the aquifer will occur and that the entire consumptive use will be drawn out of the quantity of water stored in the aqiifer at the commencement of groundwater withdrawal. The second way to compute the effect of groundwater withdrawal upon the aquifer is to assume that a percentage of the precipitation falling upon the site will infiltrate into the ground and recharge the aquifer. For the purpose of calculating the consumptive use of the subdivision, it is assumed that about 75% of the water withdrawn by wells will be returned to the subsurface by leaching fields. This will limit the actual consumptive use to 25% of the total water demand, or about 9.25 acre-feet per year.

Using the first method, it can be seen that the 260 feet of Dawson Arkose rock underlying the site can be divided into two categories: the 170 feet of sandstone which will yield water to wells, and the 90 feet of clayey rock which will not yield water to wells. From what is known of the rocks, it can be assumed that the sandstone possess a porosity of about 20%, and that the pore space will be essentially saturated with water. Furthermore, about half of this water can be removed by wells. Therefore, there is about 629 acre-feet of available groundwater in storage in these beds. The clayey beds will, over the long run, yield a small amount of water as the sandier beds drain. It is estimated that the clay beds will ultimately yield about one-fifth as much water as an equivalent thickness of sandstone. Therefore, about 67 acre-feet of water can be supplied by the clayey beds, for a total yield from the aquifer of about 696 acre-feet. This is sufficient groundwater to supply the consumptive use of the subdivision for about 75 years.

Using the second method, infiltration into the subsurface must be considered. The recent work done by the U.S. Geological Survey suggests that annual recharge rates in the area of the subdivision are in the vicinity of 0.8 inches per year. This amounts to an average annual recharge of about 2.5 acre-feet per year. Deducting this value from the annual consumptive use of 9.25 acre-feet gives a corrected depletion rate of 6.75 acre-feet per year. With this new value, the amount of groundwater in storage under the site will amount to about a 103-year supply. This analysis, of course, neglects the substantial recharge to the aquifer from the underflow of Sand Creek.

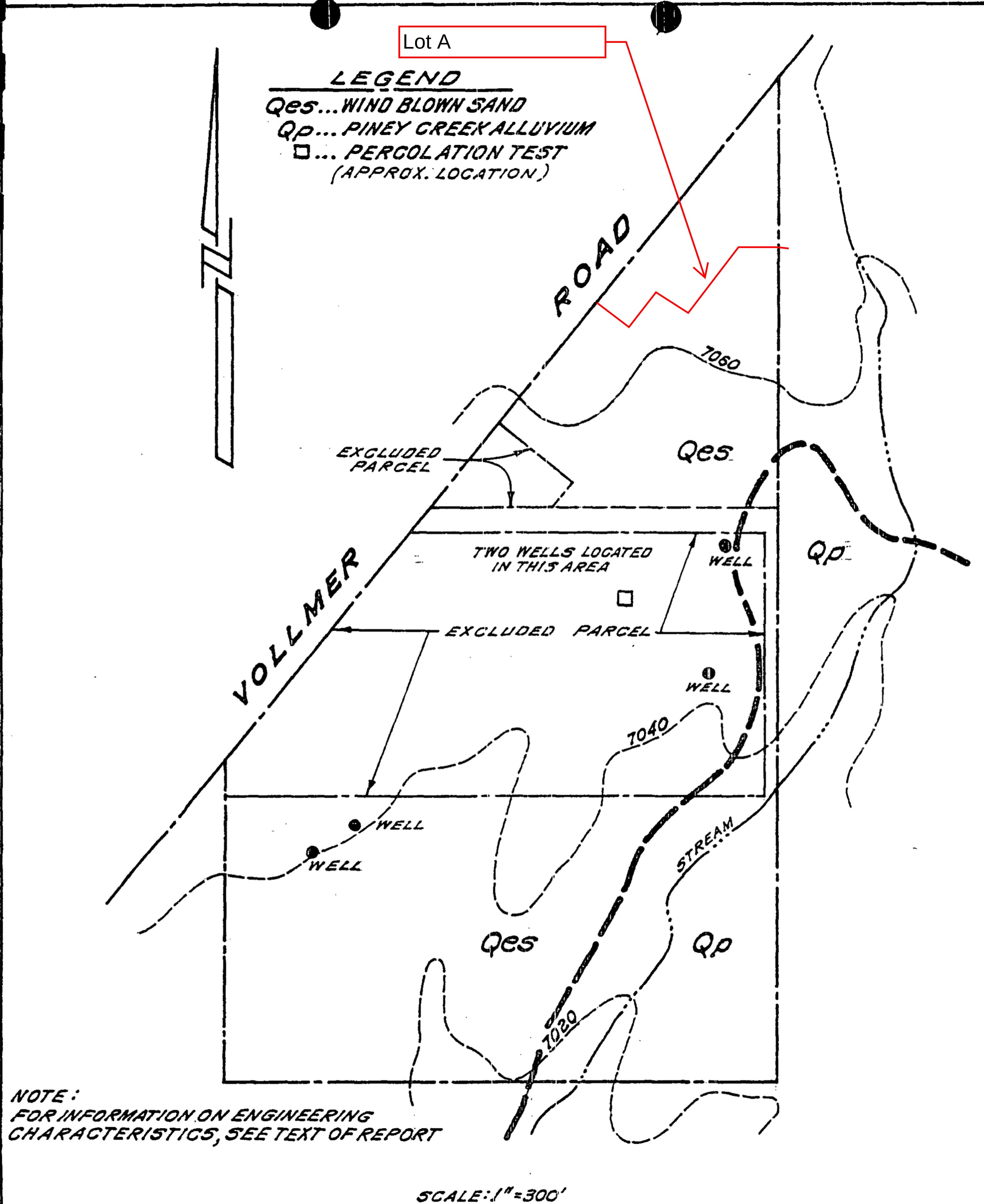
Well #17108F has been adjudicated in the Water Court of Division 2 (Case Number W-4249) and has been awarded an absolute water right as a non-tributary well with a priority date of March 9, 1973, subject to the priority provisions established by state law. The right is for a pumping rate of 40 gallons per minute (0.0888 cubic feet per second) and a total annual withdrawal not to exceed 10 acre-feet. This right is owned by the developer. Although the legalities of arranging for the use of groundwater on this site should be the concern of an attorney specializing in water law, it would appear that the best way to arrange for a supply would be to use this well and water right insofar as possible. The pumping rate established in the adjudication is more than adequate to supply the total demand of the subdivision; however, the total allowable withdrawal is not sufficient. Further legal work may permit the amendment of this right in some manner so as to allow the extraction of more water and to permit the use of other wells on the property as alternate points of diversion for this well. Furthermore, some legal work appears to be needed to correct certain apparent internal inconsistencies in the court decree. It is also likely that the Division of Water Resources will require certain technical work, such as well logging and pump testing, as a condition of any further development of ground-water on this site. However, the results of our investigation lead us to believe that adequate water exists in the subsurface to properly supply the proposed development, and that a legal strategy can be developed to secure a legal right to use the water.

It is believed that all pertinent points relating to this preliminary site investigation have been covered in this report. If questions arise, or if further information is required, please feel free to contact Lincoln-DeVore at any time.



SCALE: 1" = 2000'

GENERAL SITE LOCATION MCCLINTOCK STATION SITE EL PASO COUNTY, COLO.	THE LINCOLN-DeVORE TESTING LABORATORY COLORADO: Colorado Springs, Pueblo, Glenwood Springs, Montrose, Gunnison. WYOMING: Rock Springs



ENGINEERING GEOLOGIC MAP OF
MC CLINTOCK STATION SITE
EL PASO COUNTY, COLO.

THE LINCOLN-DeVORE TESTING LABORATORY
COLORADO: Colorado Springs, Pueblo, Glenwood Springs, Montrose, Gunnison. WYOMING: Rock Springs