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File 1980-0030
Date 5/31/01

Project Name: Country Glen – Final Plat & Plan

Present	Scanned	
		A few items are denoted with an asterisk (*), which means they are to be scanned for permanent record on the ISYS retrieval system. In some instances, not all entries designated to be scanned are present in the file. There are also documents specific to certain files, not found on the standard list. For this reason, a checklist has been included. **Remaining items, (not selected for scanning), will be marked present on the checklist. This index can serve as a quick guide for the contents of each file.** **Files denoted with (**) are to be located using the ISYS Query System. Planning Clearance will need to be typed in full, as well as other entries such as Ordinances, Resolutions, Board of Appeals, and etc.**
X	X	***Summary Sheet – Table of Contents**
		Application form
		Receipts for fees paid for anything
		***Submittal checklist**
X	X	***General project report**
		Reduced copy of final plans or drawings
		Reduction of assessor's map
		Evidence of title, deeds
X	X	***Mailing list**
		Public notice cards
		Record of certified mail
X		Legal description
		Appraisal of raw land
		Reduction of any maps – final copy
X	X	***Final reports for drainage and soils (geotechnical reports)**
		Other bound or nonbound reports
		Traffic studies
		Individual review comments from agencies
		***Consolidated review comments list**
		***Petitioner's response to comments**
		***Staff Reports**
		***Planning Commission staff report and exhibits**
		***City Council staff report and exhibits**
		***Summary sheet of final conditions**
		***Letters and correspondence dated after the date of final approval (pertaining to change in conditions or expiration date)**

DOCUMENTS SPECIFIC TO THIS DEVELOPMENT FILE:

X	X	Action Sheet	X		Irrigation Commitment Letter
X	X	Review Sheet Summary	X		Deeds
X		Review Sheets	X		Request for Treasurer's Certificate of Taxes Due
X	X	Letter from Dennis Cole to John Shaw re: building setback – 1/8/82	X		Petition and Application for Rezoning
X	X	Memo from Planning to Petitioners re: Extension Request – 3/26/84	X	X	Ordinance No. 1889 - **
X	X	File Reference – 3/16/84	X	X	Subpoena to Bob Goldin – 1/6/83
X	X	Certified letter to Petitioners from Planning Commission re: enforcement of development schedules – 2/13/84	X		Letter from Sue Drissel to Leroy McKee re: approval of petition scheduled for CC– 5/1/80
X		Development Application	X		Response to comments – 4/19/82
X	X	Letter from Donald Dirksen, Office of Regional Housing re: request for firm commitment – 2/19/81	X	X	Letter from John Shaw to City Council re: guarantee for improvements – 3/30/82
X		Impact Statement	X	X	Planning Commission Minutes - ** - 4/29/80, 4/27/82
X		Subdivision Summary Form	X		Mechanical Site Plan
X	X	Development Report	X		Sewer & Drainage Plan & Details

X		Traffic Flow Plan	X		Typical Exterior Elevations
X		Filing Plan	X		Pre. Utilities & Drainage Plan
X		Electrical Site Plan	X		Location Map
X		Vicinity Map	X	X	Soil and foundation Investigation - 2/15/80
X		Landscape Plan			

Acres 12.4 File # ~~38-80~~ 30-80

Units 258 ACTION SHEET Zone N/A

Density 21 Tax Area Code

Activity ZONING of ANNEX - PR-21 - Country Glen

Phase Preliminary Date Neighbors Notified 4.18.80

Date Submitted 1 April 80 Date CIC/MCC Legal Ad

Date Mailed Out PC Hearing Date 29 April 80

Review Agencies 10 day Review Period - Return By

Send		Send	
___	COUNTY ROAD DEPARTMENT	✓	FIRE city
___	COUNTY HEALTH DEPARTMENT	✓	IRRIGATION G.V.
___	COUNTY SURVEYOR	✓	DRAINAGE G.J.
___	COMTRONICS	✓	WATER (UTE) CLIFTON)
___	GRAND VALLEY RURAL POWER	___	SEWER
✓	MOUNTAIN BELL	✓	CITY ENGINEER/~~UTILITIES~~ TRANSP. ENGINEER
✓	PUBLIC SERVICE	___	MACK, LOMA, MESA, COLLBRAN
___	SOIL CONSERVATION SERVICE	___	FRUITA, PALISADE
___	SCHOOL DISTRICT 51	✓	Jim Patterson
___	STATE HIGHWAY	✓	P.D. - Ed VanderTook
___	STATE GEOLOGICAL	✓	Energy Office
___	STATE HEALTH - RADIOLOGICAL	✓	Parks & Rec.
___	TRANSAMERICA TITLE	✓	Tec. Review

Board	Date	Comments
GJPC	4/29/80	zoning & annexation - app to PR 21 preliminary plan - rec. app. of plan subject to staff recommend.
CC	5/21/80	APPROVED (consent agenda) subj. to conditions of GJPC)

Common Location N.E. Corner of F 1/2 & 25 road.

Staff Comments

LEGAL OK
resubmit sent 6-16-80

Original Documents

___ Imp. Agreement $_____ Appraisal x .05 = $_____ Open Space; _____

___ Imp. Guarantee Receipt #_____ Check #_____

___ Covenants _____ Open Space Dedication

___ Power of Attorney

___ Dev. Schedule

REVIEW SHEET SUMMARY

FILE# 30-80

ITEM ZONING OF ANNEX.-PR 21COUNTRY GLEN — DATE SENT TO REVIEW DEPT. 4-04-80

PRELIMINARY PLAN — DATE DUE 4-16-80

PETITIONER Leroy E. McKee/John S. Neilson, Jr.

LOCATION N.W. Corner of F½ & 25 Road

DATE REC.	AGENCY	COMMENTS
4-07-80	MAPPING	No objection
4-16-80	TRANS. ENG.	There is very little internal traffic circulation through the development (single access points to 5 of the 6 parking lots). This could present a problem for emergency vehicles (especially fire) and to the residents if these access points had to be closed for any reason.
4-17-70	CITY FIRE	Proposed water main sizes within this development are inadequate. We need a minimum 8" looped line in order to meet requirements for this type of development. Hydrant spacing will be 300' min. This will apply to 25 Rd. & F½ Rd also. Reccomend that another large line be run east on F½ Rd. to property line in order to loop the water system within the development. On site hydrants will also be required. In order to locate these, we need a plat with distances and building sizes. All access roadways must meet minimum size limitations for fire apparatus numbering system should be approved by this office also in order to avoid loss of time due to difficulty in locating the proper residence. All water lines and hydrants should be in prior to commencing construction. 12" water line that is proposed will be needed in order to provide adequate fire flows.
4-17-80	CITY ENGINEER	Power of attorney for full street improvements on F½ and 25 Road should be granted prior to recording plat. Right of way at corner of F½ and 25 Road should be rounded to 20 ft. radius. I assume that internal sewer system will be privately owned and maintained. Detailed plans for any public sewers must be submitted for my approval prior to construction. This development will add significant traffic impact to the already deficient road system in this area. Apparently no public streets are proposed internal to the site.
4-16-80	UTE WATER	1. In order to meet fire flow requirements for this development the developer will be required to continue an existing 12" water main extension from the intersection of 24½ and F Roads. 2. The extension will run East in the N. ROW of F Road to 25 Road, then North in the E. side ROW of 25 Rd to a point intersecting the North property boundary as presented in the preliminary plan. 3. Class 200, 12" AC pipe will be installed according to Ute Water requirements and good engineering practices. (Approximately 6091' @ $14.75 per foot = $89,842.25.) 4. Cost of the extension and cost participation in the existing extension will be borne by the developer and is subject to rebates from subsequent extensions and/or connections, for a 10 year period from the date of contract. 5. Extension policies, tap & connection fees will apply.

#30-80 ZONING OF ANNEX.-PR 21 COUNTRY GLEN PRELIMINARY PLAN

4-18-80	PUBLIC SERVICE	Gas: Will require exhibit type easement. Request that developer contact P.S.Co. Gas Engineering prior to final plat. Electric: Requests exhibit type easement. See proposed route shown on plan returned to Planning Department.
4-21-80	PARKS & REC.	A landscape plan should be an intregal part of the development not just a rubber stamp beautification. The distinction between evergreen and decidious is not sufficient for evaluation.

DESIGN & DEVELOPMENT PLANNER
A more direct pedestrian linkage to the mail/laundry may be of more benefit than a circuitous route; human behavior is to travel the shortest path (whether it's improved or not).

2. Athrough route--possibly making the R-V area accessible from both F½ and 25 Road would be desirable.
3. Dependent on the width of the pedestrian path and type of surface-some of the paths could be designed to function as alternate access for emergency vehicles.
4. Appropriate R.O.W. should be dedicated, with 25 Road considered an arterial (100'R.O.W.), and F½ Road a collector (66'R.O.W.)
5. Indicate groundcover in landscape plan.
6. Trash container areas should be indicated on plan.
7. The following items should be addressed at final submittal:
   A. Covenants for maintenance
   B. Landscaping timetable
   C. POA for road improvements
   D. Details of tot lot, cross section of pedestrian ways.
   E. Signage program
   F. Type of screening (details on proposed wooden fence).

STAFF RECOMMENDATION
Recommend approval of re-zone as it conforms to the recommendations of the Northwest Vicinity Plan.
Recommend approval of preliminary plan with the following to be addressed in final submittal:

1. Comments of design & Development Planner re: landscaping & design elements.
2. Appropriate R.O.W. where necessary and POA for full street improvements to 25 and F½ Road.
3. R.O.W. at corner of F½ and 25 Roads should be rounded to 20 ft. radius (City Engineer).
4. Meet with transportation engineer to work out internal circulation for emergency access vehicles.

4-29-80 GJPC - FLAGER/SCHOENBECK PASSED 6-0 A MOTION TO RECOMMEND APPROVAL TO THE CITY COUNCIL OF THE ZONING OF THE ANNEXATION AS PR 21.

FLAGER/RIDER PASSED 6-0 A MOTION TO RECOMMEND APPROVAL TO THE CITY COUNCIL OF THE PRELIMINARY PLAN, SUBJECT TO ALL STAFF COMMENTS AND RECOMMENDATIONS.

COUNTRY GLEN

A PLANNED UNIT DEVELOPMENT

Preliminary Plan
and
Request for Rezoning

Developer: John S. Neilson Jr.

Designer: Muchow & Partners, Inc.

Engineer: Paragon Engineering, Inc.

ZONE CHANGE REQUEST

CONTENTS

PETITION AND APPLICATION FOR REZONING

STATE OF COLORADO)
) ss.
COUNTY OF MESA)

TO THE PLANNING COMMISSION OF THE CITY OF GRAND JUNCTION

Gentlemen:

We, the undersigned, being the owners of the following described property, situated in the City of Grand Junction, County of Mesa, State of Colorado, to-wit:

Beginning at the W¼ corner of Section 3, Township 1 South, Range 1 West of the Ute Meridian, thence South 89°57' East 659.85 feet, thence North 00°01' West 980.2 feet, thence South 74°27' West 400.0 feet, thence South 64°16' West 141.0 feet, thence West 147.2 feet, thence South 811.2 feet to the Point of Beginning; EXCEPT the West and South 30 feet for road right-of-way.

Containing 12.4 acres, more or less, do respectfully petition and request that the Planning Commission amend the zoning ordinance of the City of Grand Junction by changing said above described land from AFT zone to P.R. 21 zone.

Respectfully submitted,

Leroy E. McKee et al (Owner)

John S. Neilson, Jr. (Option Holder)

STATE OF COLORADO)
) ss.
COUNTY OF MESA)

The foregoing instrument was acknowledged before me this _____ day of _____ By _____ for the purposes therein set forth.

My commission expires: _____

Notary Public

*NOTE: Filing of a petition to rezone requires a deposit of $270.00 with the Planning Office to defray the cost of the amendment.

IMPACT ANALYSIS

General

Country Glen is a proposed multiple family rental project located in the Northeast quadrant of 25 and F½ Roads. A total of 258 one and two bedroom units shall be constructed in two phases, with the first 108 units to be available for rent in the summer of 1981. Tennis courts and swimming pools shall be provided for tenant use in the common open areas, which comprise 40% of the site. The project shall provide middle-income housing, with 20% of the units (52 apartments) designated for low-income FHA Section 8 qualified tenants.

Population

Growth Projections

Mesa County and Grand Junction are in the precarious position of becoming a primary service center for Western Colorado's Oil Shale production. This possibility has given a somewhat speculative nature to the area. However, even without such development, the region is expected to have a good rate of growth each year. The following data was obtained from the COLORADO WEST AREA COUNCIL OF GOVERNMENTS Growth Monitoring System Project Report for State Planning and Management, Region XI, December 1977.

POPULATION GROWTH PROJECTIONS

MESA COUNTY	BASED ON NATURAL GROWTH	BASED ON GROWTH DUE TO ENERGY DEVELOPMENT
1978	68,864	74,167
1979	72,882	78,275
1980	76,899	87,665
1981	80,917	89,494
1982	84,934	95,126
1983	88,952	99,448
1984	92,969	105,055
1985	96,987	110,565
1990	117,074	132,177
1995	137,161	153,072
2000	157,249	173,760
CITY OF GRAND JUNCTION		
1978	26,168	28,044
1979	27,695	29,570
1980	29,222	31,097
1981	30,748	33,471
1982	32,275	35,482
1983	33,802	37,036
1984	35,328	39,056
1985	36,855	40,967
1900	44,488	48,951
1995	52,121	56,784
2000	59,755	64,575

Source: Colorado West Area Council of Governments (Growth Monitoring System Project Report for State Planning and Management, Region XI -- December, 1977)

Population

Mesa County was included in a 1977 Special Census conducted by the U.S. Census Bureau. The County itself experienced a 22.9 percent increase in population between April 1, 1970 and March 21, 1977. The City of Grand Junction itself over the same period had an increase of 3.7 percent per year or 25.9 percent for the seven year period. The following information was based on the census and is referenced to the same.

Population Figures by Decades

YEAR	GRAND JUNCTION	MESA COUNTY	STATE OF COLORADO
1900	3,503	9,267	539,700
1910	7,754	22,197	799,024
1920	8,665	22,281	939,629
1930	10,247	25,908	1,035,791
1940	12,479	33,791	1,123,296
1950	14,504	38,974	1,325,089
1960	18,694	50,715	1,753,925
1970	20,170	54,374	2,207,259
1977	25,398	66,848	not in special census

Percent Population by Age Groups

AGE	GRAND JUNCTION	MESA COUNTY	AGE	GRAND JUNCTION	MESA COUNTY
Under 5	10.4	10.9	45-49	6.2	6.1
5- 9	10.3	11.1	50-54	5.5	5.4
10-14	9.6	10.5	55-59	4.6	4.6
15-19	8.0	7.9	60-64	4.1	3.9
20-24	4.7	4.7	65-69	3.7	3.6
25-29	5.0	5.2	70-74	3.1	3.8
30-34	6.3	6.1	75 & over	4.5	3.7
			Median age	31.6	29.7

At this writing, incentives for oil shale development have been approved by Congress, and Presidential approval is imminent. Energy related growth is inevitable to the Grand Junction area by this action.

Availability of Rental Housing

An independent housing study was performed in January and February of 1980. The survey size was 424 units, comparable to those proposed at Country Glen. There was one two-bedroom apartment vacancy found.

High mortgage rates and growth shall further widen the gap between available rental units and the demand for them. Country Glen shall address that need.

Impact on Area

This portion of the northwest area is currently in commercial/industrial use to the south of F½ Road and in residential/agriculture use to the north. Fountainhead Subdivision, approximately ½ mile north of the site, has received final approval with a gross density of eight units to the acre. The Northwest Task Force has recommended that the subject area be used for high density residential, a recommendation in keeping with the proposed development. When the developer of Country Glen extends sanitary sewer and adequate water to the area, it is anticipated that several of the larger tracts will be developed.

Country Glen is located at the intersection of a principle arterial (25 Road) and a collector, F½ Road.[1] Access to Grand Junction is via Patterson Road, ½ mile south, or Highway 6 & 50, located approximately one mile south. Traffic would be discouraged along F½ Road, although the developer shall give power-of-attorney for the improvement of that road.

The developer of Country Glen is proposing to construct a 12 inch sewer main to the interceptor line the City of Grand Junction is to construct in Patterson Road in the spring of 1981. A 12 inch water main shall also be

1. Small, Cooley 1980

constructed in 25 Road to ensure adequate fire protection. The map following, Exhibit II, outlines these improvements.

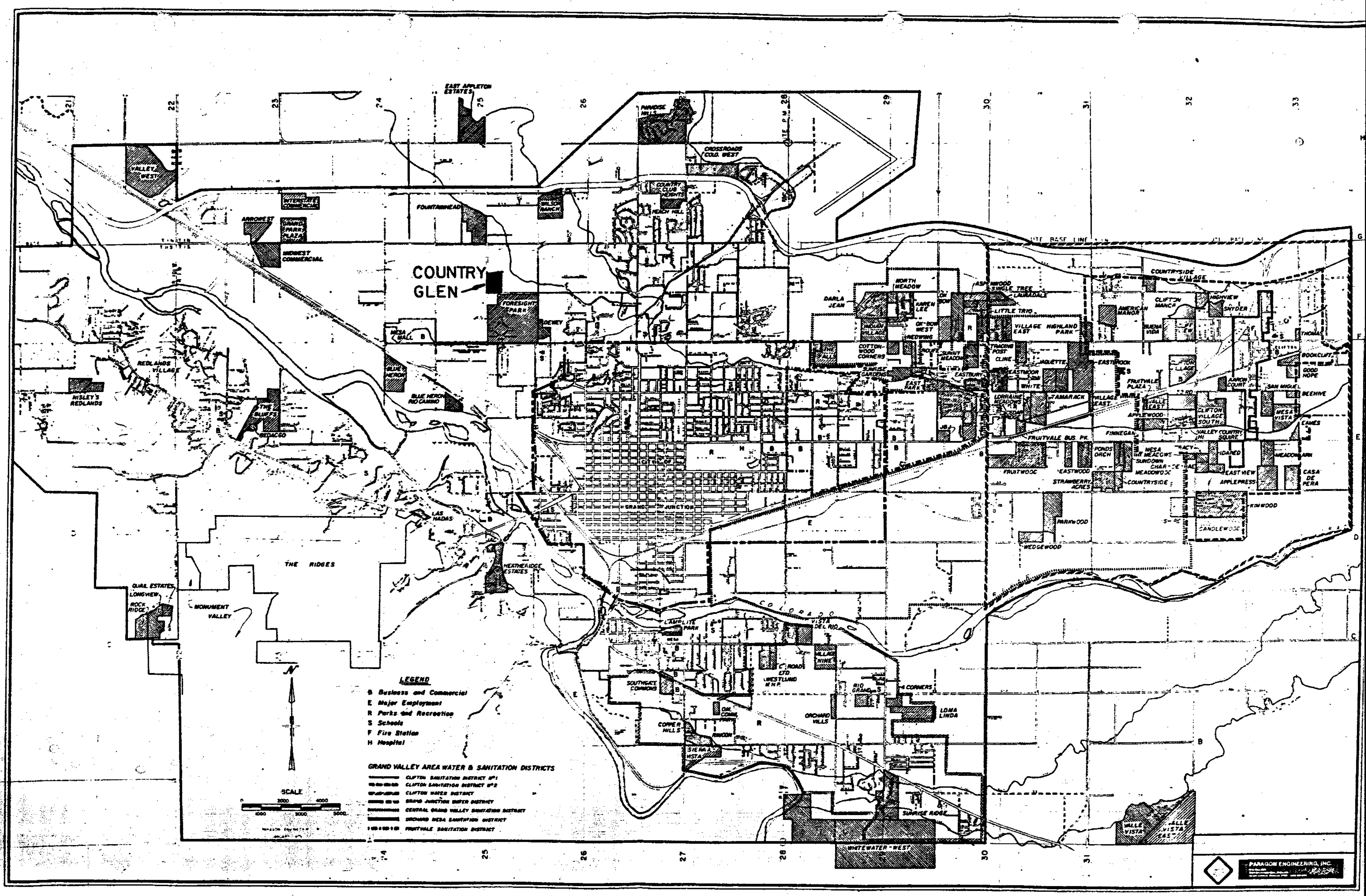
Accessability

Country Glen abutts Foresight Park, a planned industrial development, to the south. It is located approximately one mile north and east of the Mesa Mall. Both of these facilities shall be major employment centers when fully developed. The core area is easily accessed via Patterson Road or Highway 6 & 50. The following map (Exhibit III) shows the proximate distance to business, employment and commercial centers.

SUMMARY

Country Glen meets a housing need in the Grand Junction area by providing a combination of low and moderate income apartments. The high density is in keeping with area planning recommendations, yet is offset by a high percentage of landscaped open area. The site amenities proposed are superior to those in comparable developments.

For these reasons we would request approval of the rezone and preliminary plan.



COUNTRY GLEN
EAST APPLETON ESTATES
PARADISE HILLS
CROSSROADS COLO. WEST
COUNTRY CLUB HEIGHTS
VALLEY WEST
ARROWEST
MIDWEST COMMERCIAL
FOUNTAINHEAD
FORESIGHT PARK
MESA MALL
REDLANDS VILLAGE
HISLEY'S REDLANDS
THE BLUFFS
BLUE HERON
RIO CAMINO
LAS HADAS
THE RIDGES
HEATHERIDGE ESTATES
QUAIL ESTATES
LONGVIEW
ROCK RIDGE
MONUMENT VALLEY
GRAND JUNCTION
COLORADO
LAMPLITE PARK
VISTA DEL RIO
SOUTHRIDGE COMMONS
WESTLAND M.H.P.
RIO GRANDE
CORNERS
LOMA LINDA
ORCHARD VILLS
COPPER HILLS
SIERRA VISTA
SUNRISE RIDGE
WHITEWATER WEST
DARLA JEAN
NORTH MEADOW
KAREN LEE
OX-BOW WEST
ASPENWOOD
SINGLE TREE
LAURADALE
LITTLE TRIO
VILLAGE EAST
HIGHLAND PARK
COTTONWOOD CORNERS
SUNRISE GARDENS
SUNNY MEADOW
EASTBURY
TRADING POST
CLINE
EASTMOOR
JAQUETTE
EASTBROOK
LORRAINE MEADOWS
TAMARACK
VILLAGE EAST
FRUITVALE PLAZA
FRUITVALE BUS. PK.
FINNEGAN
PONDS ORCH
FRUITWOOD
EASTWOOD
STRAWBERRY ACRES
COUNTRYSIDE
PARKWOOD
WEDGEWOOD
COUNTRYSIDE VILLAGE
AMERICAN MANOR
CLIFTON MANOR
HIGHVIEW
SNYDER
BUENA VIDA
BOOKCLIFF
GOOD HOPE
SAN MIGUEL
BEEHIVE
MESA VISTA
CLIFTON VILLAGE SOUTH
VALLEY COUNTRY SQUARE
APPLEWOOD
EAST VIEW
APPLEPRESS
CASA DE PERA
MEADOWPARK
CANDLEWOOD
KIRKWOOD
VILLE VISTA
VALLE VISTA EAST
LEGEND
B Business and Commercial
E Major Employment
R Parks and Recreation
S Schools
F Fire Station
H Hospital
GRAND VALLEY AREA WATER & SANITATION DISTRICTS
CLIFTON SANITATION DISTRICT Nº1
CLIFTON SANITATION DISTRICT Nº2
CLIFTON WATER DISTRICT
GRAND JUNCTION WATER DISTRICT
CENTRAL GRAND VALLEY SANITATION DISTRICT
ORCHARD MESA SANITATION DISTRICT
FRUITVALE SANITATION DISTRICT
SCALE
N
PARAGON ENGINEERING, INC.

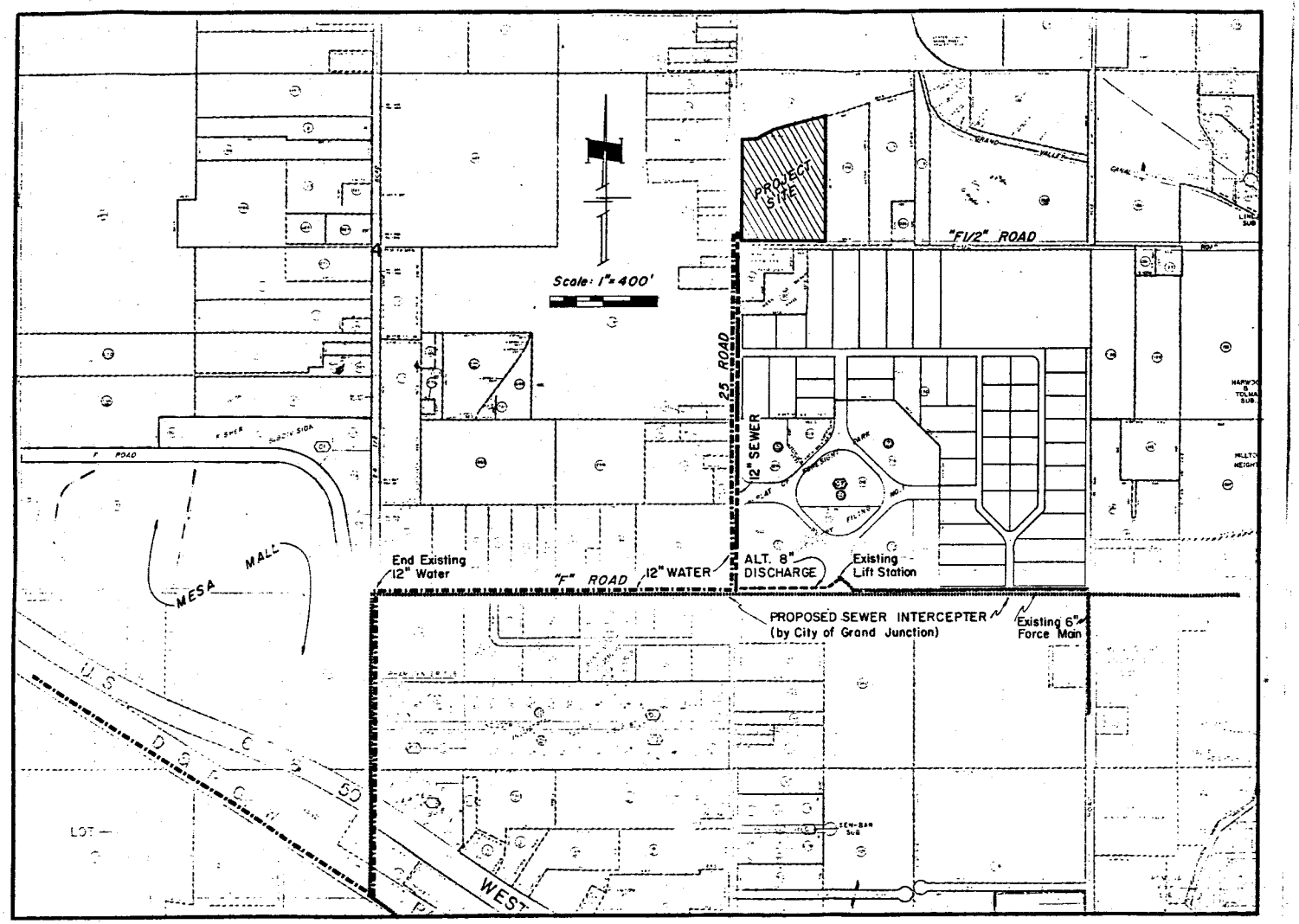

PROJECT SITE
"F1/2" ROAD
Scale: 1"=400'
25 ROAD
12" SEWER
F ROAD
MESA MALL
End Existing 12" Water
"F" ROAD
12" WATER
ALT. 8" DISCHARGE
Existing Lift Station
PROPOSED SEWER INTERCEPTER (by City of Grand Junction)
Existing 6" Force Main
U S HIGHWAY 50
WEST
LOT 1

EXHIBIT II

KEY TO EXHIBIT III

Schools

1. Pomona
2. West Junior High
3. Appleton
4. Holy Family
5. Tope
6. Intermountain Junior Academy
7. Grand Junction High
8. Project R-5
9. East Junior High
10. Columbine
11. Lincoln Park
12. Intermountain Bible College
13. Orchard Avenue
14. Riverside
15. Nisley
16. Mesa College

Location Map

Points of Interest

17. Foresight Park for Industry
18. Bookcliff Country Club
19. Federal Office Building
20. Airport
21. St. Mary's Hospital

22. Osteopathic Hospital
23. Center for the Arts
24. Veterans Hospital
25. Woolco
26. K-Mart
27. Sears
28. City Hall, County Courthouse
29. Police/Fire Departments
30. Public Library

Parks

31. Hillcrest Manor
32. St. Mary's
33. Sherwood Park
34. Lilac
35. Spring Valley
36. Hawthorne
37. Lincoln Park

PRELIMINARY PLAN
APPLICATION

Contents

27-2.2 PRELIMINARY PLAN APPLICATION Fee Paid _____

Amount _____ Date _____

A. (18) COPIES OF THIS APPLICATION REQUIRED. NUMBERING SYSTEM CORRESPONDS WITH GRAND JUNCTION DEVELOPMENT REGULATIONS. LAYOUTS AND DESIGNS INITIATED FOR THIS APPLICATION SHOULD INCORPORATE THE DESIGN STANDARDS REVIEWED IN SECTION III OF THE REGULATION. IF QUESTION NOT APPLICABLE, INDICATE BY N/A.

B. Country Glen
(Name of Subdivision)

C. Owners and or/Subdividers

Leroy E. McKee et al	John S. Neilson, Jr.	
(Name)	(Name)	(Name)
552 25 Road, Grand Jct., CO	Suite 840 650 South Cherry St. Denver, CO 80222	
(Address)	(Address)	(Address)
243-2582	393-0701	
(Business Phone)	(Business Phone)	(Business Phone)

Designer:

Muchow & Partners/Paragon Engineering, Inc.	534-5800 (243-8966 P.E.)
(Name)	(Business Phone)
1725 Blake Street, Denver, CO 80202	Colo. P.E. No. 9402
(Address)	(Registration and Number)

D. Legal Description. (Attach additional sheets as necessary.)
Beginning at the W¼ corner of Section 3, Township 1 South, Range 1 West of the Ute Meridian, thence South 89°57' East 659.85 feet, thence North 00°01' West 980.2 feet, thence South 74°27' West 400.0 feet, thence South 64°16' West 141.0 feet, thence West 147.2 feet, thence South 811.2 feet to the Point of Beginning; EXCEPT the West and South 30 feet for road right-of-way.

Total Acreage 12.39.

E. Eighteen (18) copies of completed application and map submitted?

Yes X No _____ If "no", explain:

The following checklist shall be completed to insure that the map contains the essential information required by the subdivision regulations.

FOR COMPLETE SUBMITTAL REQUIREMENTS, SEE THE GRAND JUNCTION DEVELOPMENT REGULATIONS. INCOMPLETE SUBMITTALS WILL NOT BE ACCEPTED!

27-2.2 f.	Scale and Size	
(1)	Proposed Name	X
(2)	Location and Boundaries	X
(3)	Names and Addresses of Subdivider and Engineer or Surveyor	X

(4)	Date of Preparation	X
(5)	Total Acreage	X
(6)	Location and Dimensions for Existing Streets, Alleys, Easements, and Water Courses	X
(7)	Location, Dimensions, and Names of Proposed Streets, Alleys, Easements, Lot Lines and Public Sites. Show PRELIMINARY Street Engineering including Pavement Widths, Curb, Gutters, Crosspans, and Sidewalks with Horizontal Dimensions	X
(8)	Topography	X
(9)	Floodplain Designation	N/A
(10)	Land Use Breakdown - Number and Size of Lots	N/A
(11)	Sites for Multi-Family Residential, Business or Non-public Uses	(258 units/1 lot X
(12)	Adjacent Zoning	X
(13)	Names and Locations of Adjoining Subdivisions, Names and Dimensions of Existing Streets and Other Relevant Data on Adjoining Properties	X
(14)	Location and Size of Existing Sewer and Water Lines, and Proposed Utility Easements	X
(15)	Location and Size of Proposed Water and Sewer Taps, Easements, Line Sizes, Fire Hydrant Locations, and Street Lighting	X
(16)	All Applicable Drainage Information as Required in Sec. 27-2.2f, paragraph (4), (Preliminary Plat Requirements). The ENTIRE drainage system to an acceptable disposal site must be addressed, NOT limited to on-site only.	X
(17)	Geologic Report (Preliminary Statement)	X

NOTE: ENGINEERING INFORMATION SUBMITTED ON PRELIMINARY PLAT IS NOT INTENDED TO BE DETAILED DESIGN. IT SHOULD BASICALLY BE A GRAPHIC PLAN WHICH SHOWS INTENT AND ANSWERS BASIC ENGINEERING QUESTIONS. (SIX (6) COPIES OF DRAINAGE, UTILITIES, AND ROADWAY INFORMATION REQUIRED FOR SUBMITTAL).

Text
Eighteen (18) copies of text material in report form submitted?
Yes X No _____ If "no", explain:

Subdivision Summary Form? Yes X No _____

27-2.2 f (4) Copy of certificate of title with a list of all mortgages, judgments, liens, etc. of record. (3 copies)

This application completed by:

PARAGON ENGINEERING, INC.
(Name)

Kathy F. McIntyre
(Signature)

P. O. Box 2872, Grand Junction, CO 81501
(Address)

31 March 1980
(Date)

DEVELOPMENT SUMMARY FORM

CITY OF GRAND JUNCTION

Date: March 28, 1980

Development Name: Country Glen Filing

Location of Development: TOWNSHIP 1 South RANGE 1 West SEC 3 1/4 Northeast

Owner(s) NAME Leroy E. McKee. Esther M. McKee

ADDRESS 652 25 Road, Grand Junction, CO 81501

Developer (s) NAME John S. Neilson, Jr.

ADDRESS 650 South Cherry Street, Suite 840 Denver, CO 80222

Type of Development	Number of Dwelling Units	Area* (Acres)	% of * Total Area
( ) Single Family			
(X) Apartments	258	2.6	21%
( ) Condominiums			
( ) Mobile Homes			
( ) Commercial	N. A.		
( ) Industrial	N. A.		
( ) Other (specify)			
Street & Parking		4.3	35%
Walkways		0.3	2%
Dedicated School Sites			
Reserved School Sites			
Dedicated Park Sites			
Reserved Park Sites			
Private Open Areas		4.4	35%
Easements (Pamona Lateral #290)		0.2	2%
Other (Specify) Tennis Courts & Swimming Pools		0.6	5%
TOTAL			
***By Map Measure**		12.4	100%

Estimated Water Requirements _____ gallons/day.

Proposed Water Source(s) Ute Water Conservancy District

Estimated Sewage Disposal Requirement 77,400 gallons/day.

ACTION:

Planning Commission Recommendation

Approval ( )

Disapproval ( )

Remarks _____

Date _____, 19____.

City Council

Approval ( )

Disapproval ( )

Remarks _____

Date _____, 19____.

Note: This form is required by C.R.S. 106-3-37 (4) but is not a part of the regulations of the City of Grand Junction.

Transamerica Title Insurance Company

REALTY WORLD-MONUMENT REALTY
ATTN: PAT STUCKER

	AMOUNT	PREMIUM
OWNER	$ 430,000.00	$ 914.50
MORTGAGE	$	$
ADDITIONAL CHARGES		$
COST OF TAX CERTIFICATE		$ NO
SURVEY COSTS		$
TOTALS		$

Your Reference _____

No. 6807098 C

CC's To:

(1) Gene Mast
301 First National Bank Blg.

Sheet 1 of 4

652 25 Road

COMMITMENT TO INSURE

Transamerica Title Insurance Company, a California corporation, herein called the Company, for a valuable consideration, hereby commits to issue its policy or policies of title insurance, as identified in Schedule A, in favor of the proposed insured named in Schedule A, as owner or mortgagee of the estate or interest covered hereby in the land described or referred to in Schedule A, upon payment of the premiums and charges therefor; all subject to the provisions of Schedules A and B and to the conditions and stipulations shown on the inside of the cover.

Customer Contact: Jeanice A. Swank
Phone: 242-8234

By JEANICE A. SWANK
AUTHORIZED SIGNATURE

The effective date of this commitment is November 29, 19 79 at 8:00 A M.
At which time fee title was vested in:

LEROY E. McKEE and ESTHER M. McKEE, in joint tenancy.

SCHEDULE A

1. Policies to be issued:
   (A) Owners':

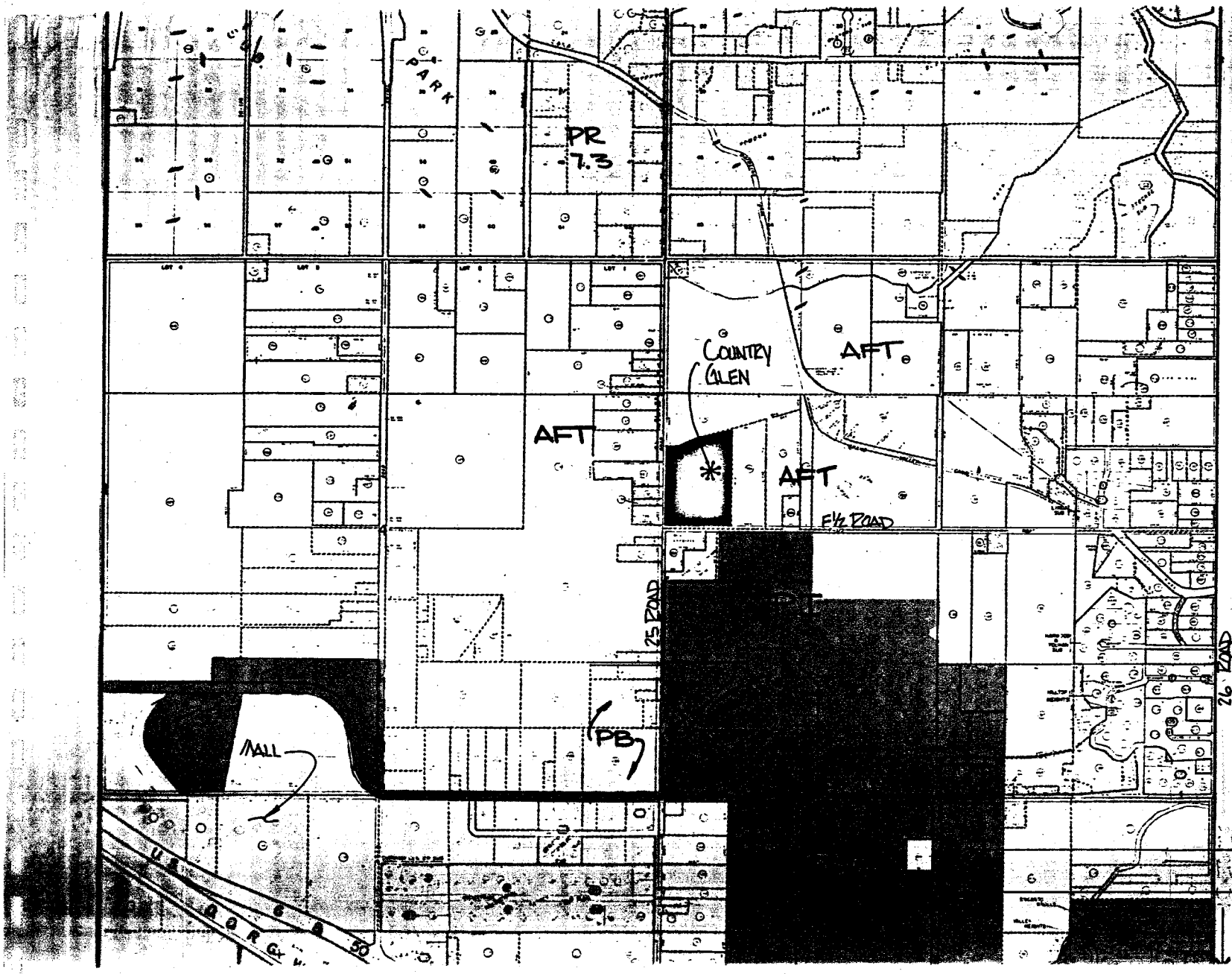
   JOHN S. NEILSON, JR.

   (B) Mortgagee's:

SCHEDULE A—Continued

2. Covering the Land in the State of Colorado, County of Mesa
Described as:

Beginning at the W¼ corner of Section 3, Township 1 South, Range 1 West of the Ute Meridian, thence South 89°57' East 659.85 feet, thence North 00°01' West 980.2 feet, thence South 74°27' West 400.0 feet, thence South 64°16' West 141.0 feet, thence West 147.2 feet, thence South 811.2 feet to the point of beginning; EXCEPT the West and South 30 feet for road right of way.


PARK
PR
7.3
COUNTRY
GLEN
AFT
AFT
AFT
F½ ROAD
25 ROAD
26 ROAD
PB
MALL
50
CITY BOUNDARIES
SURROUNDING CITY
& COUNTY ZONES
PAMONA SCHOOL
GD. JCT. FIRE STATION
TO DOWNTOWN
GRAND JUNCTION

Covenants

Country Glen shall be owned by the developer, and operated and maintained by a management company. The units will not be condominiumized. Rules shall be established for the tenants protection, and that of the development.

C Neal Carpenter, *President*
N. Kent Baker
Eugene R. Brauer
Gordon W. Bruchner
Patrick C. Dwyer
Robert J. Shreve
Dale J. Steichen
Robert D. Thomas
Gary R. Windolph

ARIX

A Professional Corporation
Engineers Architects Planners

760 Horizon Drive
Grand Junction, Colorado 81501
303 243 7569

March 24, 1980

Mesa County Planning Commission
Colorado Department of Health

Gentlemen:

A gamma radiation survey was conducted in compliance with Senate Bill #35 as a portion of our client services. The following information is presented as details of this survey.

Proposed Building Site
Location/Description: Country Glen Subdivision

Owner's Name: John S. Neilson

Owner's Address: 650 South Cherry Street, Suite 840, Denver, Colorado

Survey Requested By: Paragon Engineering - T. Logue

Date of Survey: March 24, 1980 Survey By: J. Tell Tappan

Instrument Type: Scintillometer Serial No.: 300

Calibration: Cross calibrated with gas proportional ionization chamber

Survey Results (See attached plat map)

(___) All meter readings less than 0.02 milliRoentgen per hour (20 micro R/h). No tailings indicated.

(_X_) Highest reading between .02 - .04 milliRoentgens per hour.

(___) Some readings greater than .04 milliRoentgens per hour.

(___) Gamma radiation coming from adjacent area.

(___) Tailings deposits indicated.

Description of Deposit: In concrete stoop south side of abandoned shed and spot on soil east side of abandoned garage.

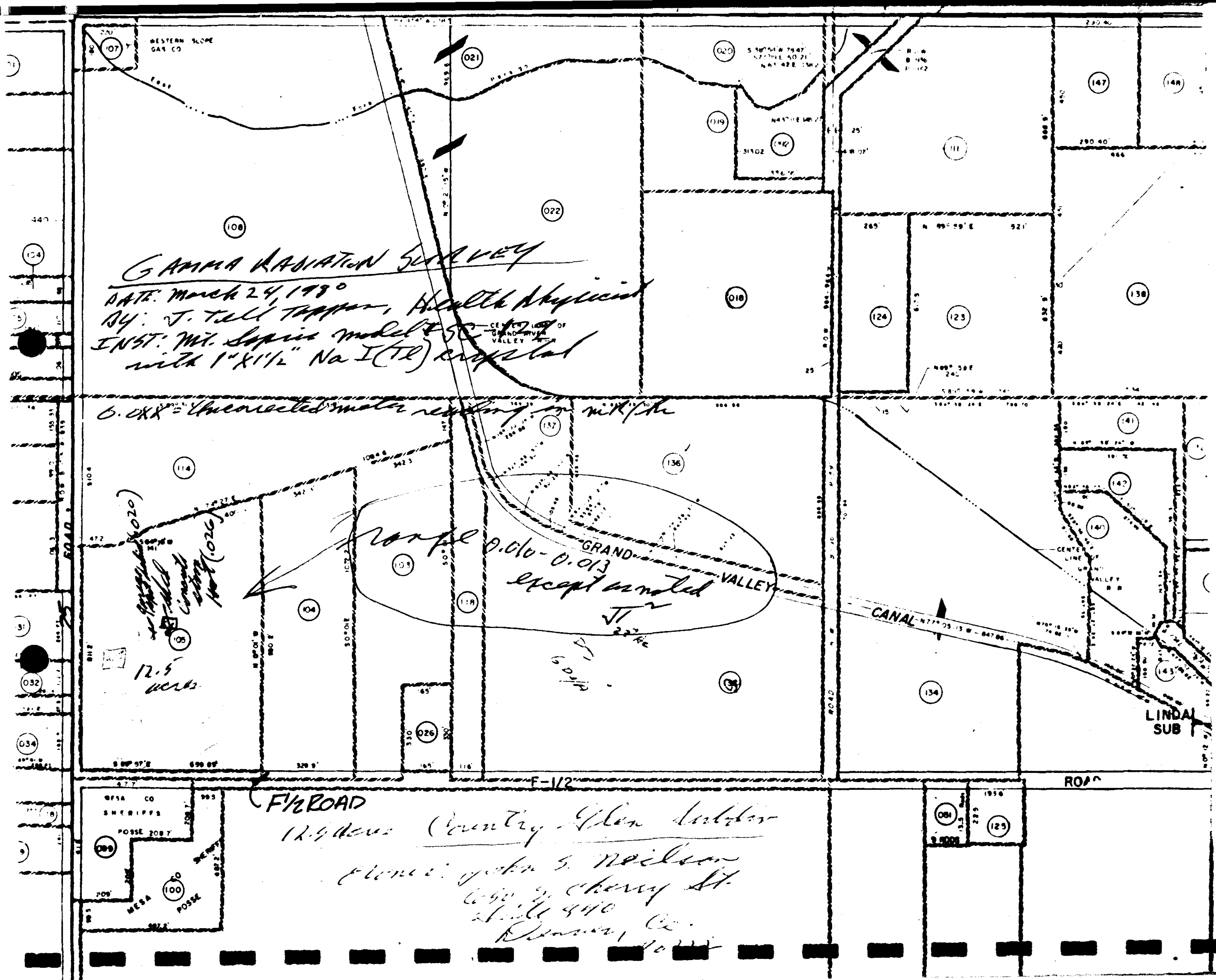
Recommendations: Remove concrete stoop from shed and excavate tailings from ground area east of garage, and transport to C.D.H. tailings repository prior to commencing site preparation. Contact C.D.H. (245-2400) for monitoring assistance during tailings removal.

Respectfully submitted,

ARIX, A Professional Corporation

J. Tell Tappan
Health Physicist

JTT/kaf
Enclosure: Plat Map
cc: Client w/enclosure
File w/enclosure


GAMMA RADIATION SURVEY
DATE: March 24, 1980
INST: Mt. Sopris model
with 1"X1½" NaI(Tl) crystal
0.0XX = Uncorrected meter reading in mR/hr
Normal 0.016-0.013
except as noted
WESTERN SLOPE GAS CO
GRAND VALLEY CANAL
F-1/2 ROAD
F½ ROAD
12.5 acres
LINDA SUB
MESA CO SHERIFFS POSSE
MESA CO POSSE

GTL GEO-TESTING
Geotechnical Engineering and Materials Testing
LABORATORIES, INC.

March 31, 1980

Paragon Engineering, Inc.
P.O. Box 2872
Grand Junction, Colorado 81502

Attention: Katy McIntyre
Re: Geologic Hazards and Mineral Resources, Proposed Multi-Family Housing Project by John Neilson, near 25 & F½ Roads, Grand Junction, Colorado, Job 1-41

Gentlemen:

As requested, we visited the referenced site, located in part of the SW¼, NE¼, Section 3, T 1S., R. 1W., Ute Meridian, to determine the geologic hazards and/or mineral resources, if any, for land use control. The site is bordered on the south by F½ Road, the west by 25 Road, and is about 900 feet long north to south and 630 feet wide east to west.

The site was being drilled and sampled for evaluation of the site specific engineering characteristics during our geologic reconnaissance. The test holes generally showed about one foot of medium stiff silts and clays over about 50 to 55 feet of soft to very soft silts and clays with occasional sand lenses over dense gravels and cobbles over Mancos Shale bedrock. Groundwater was generally encountered at shallow depths. The soils are generally slopewash and debris fan materials originating from the nearby Mancos Shale and Mesa Verde Formations in the Bookcliffs.

We feel the depth to bedrock should pose no problems related to swelling and that the only possible problems will be a high groundwater table and the compressibility of the normally consolidated clays and silts, which are being evaluated at this time.

We feel that no known mineral resources will be made inaccessible by this project; however, there are oil and gas fields in the area which have not been evaluated at this time.

In summary, there are no apparent geological reasons why this project should not be approved.

Should you have any questions, please call.

Yours truly,

GEO TESTING LABORATORIES, INC.

Andrew A. Porter

Andrew A. Porter, P.E.
President

AAP/kl

RAVOLA VERY FINE SANDY LOAM, 0 to 2 percent slopes, Class I Land (Rf)

This soil occurs either along washes or arroyas extending from the north or on broad coalescing alluvial fans. The alluvial material from which the soil has developed was derived from sandstone and shale and ranges from 4 to 20 feet deep.

This soil is much like Ravola fine sandy loam, 0 to 2 percent slopes, but is generally more uniformly level. The texture is prevailingly very fine sandy loam, but the percentage of silt is noticeably higher in some places. A few small areas that have a loam texture are included.

The 10- or 12-inch surface layer consists of light brownish-gray to very pale-brown very fine sandy loam. In some places the underlying thin depositional layers vary only slightly in color or texture. In other places, especially near drainage courses, the layers are more variable and may grade to loam, silt loam, or fine sandy loam. Nevertheless, layers of very fine sandy loam are more numerous. Below depths of 4 to 5 feet, the texture is sandier, and at depths of 8 to 12 feet strata of loamy fine sand, gravel, and scattered sandstone rock are common.

Disseminated lime occurs from the surface downward. Owing to the friable consistence of the successive layers, the tilth, internal drainage, available supply of moisture for plants, permeability to plant roots, and other physical properties are favorable and assure a wide suitability range for crops. The organic-matter content, however, is low. The soil is slightly saline under native cover and has a few strongly saline spots. Occasionally the water table is high.

No severe limitations exist for this soil type.

BILLINGS SILTY CLAY LOAM, 0 to 2 percent slopes, Class IIs Land (Bc)

This soil, locally called adobe, is one of the most important and extensive in the Grand Valley. It is derived from deep alluvial deposits that came mainly from Mancos shale but in a few places from fine-grained sandstone materials. The deposits ordinarily range from 4 to 40 feet deep but in places exceed 40 feet. The deposits have been built up from thin sediments brought in by the streams that have formed the coalescing alluvial fans or have been dropped by the broad washes that have no drainage channel. The thickest deposit, near Grand Junction, was built up by Indian Wash.

Although moderately fine textured, this Billings soil permits successful growth of deep-rooted crops such as alfalfa and tree fruits. Its permeability is normally not so favorable as that of the Mesa, Fruita, and Ravola soils. Its tilth and workability are fair, but it puddles so quickly when wet and bakes so hard when dry that good tilth can be maintained only by proper irrigation and special cultural practices. Runoff is slow and internal drainage is very slow.

Like all other soils in the area, this one has a low organic-matter content. Under natural conditions it contains a moderate concentration of salts derived from the parent rock (Mancos shale). In places, however, it contains so much salt that good yields cannot be obtained. Some large areas are so strongly saline they cannot be used for crops. Generally, this soil is without visible lime, but it is calcareous. In many places small white flecks or indistinct light-colored streaks or seams indicate that lime, gypsum, or salts are present.

Soil limitations are classified as severe for local roads and streets (poor traffic-supporting capacity, moderate to high water tables common), shallow excavations (high water tables common), and septic tank filter fields (slow permeability, poor internal drainage, seasonal high water table).

APPENDIX

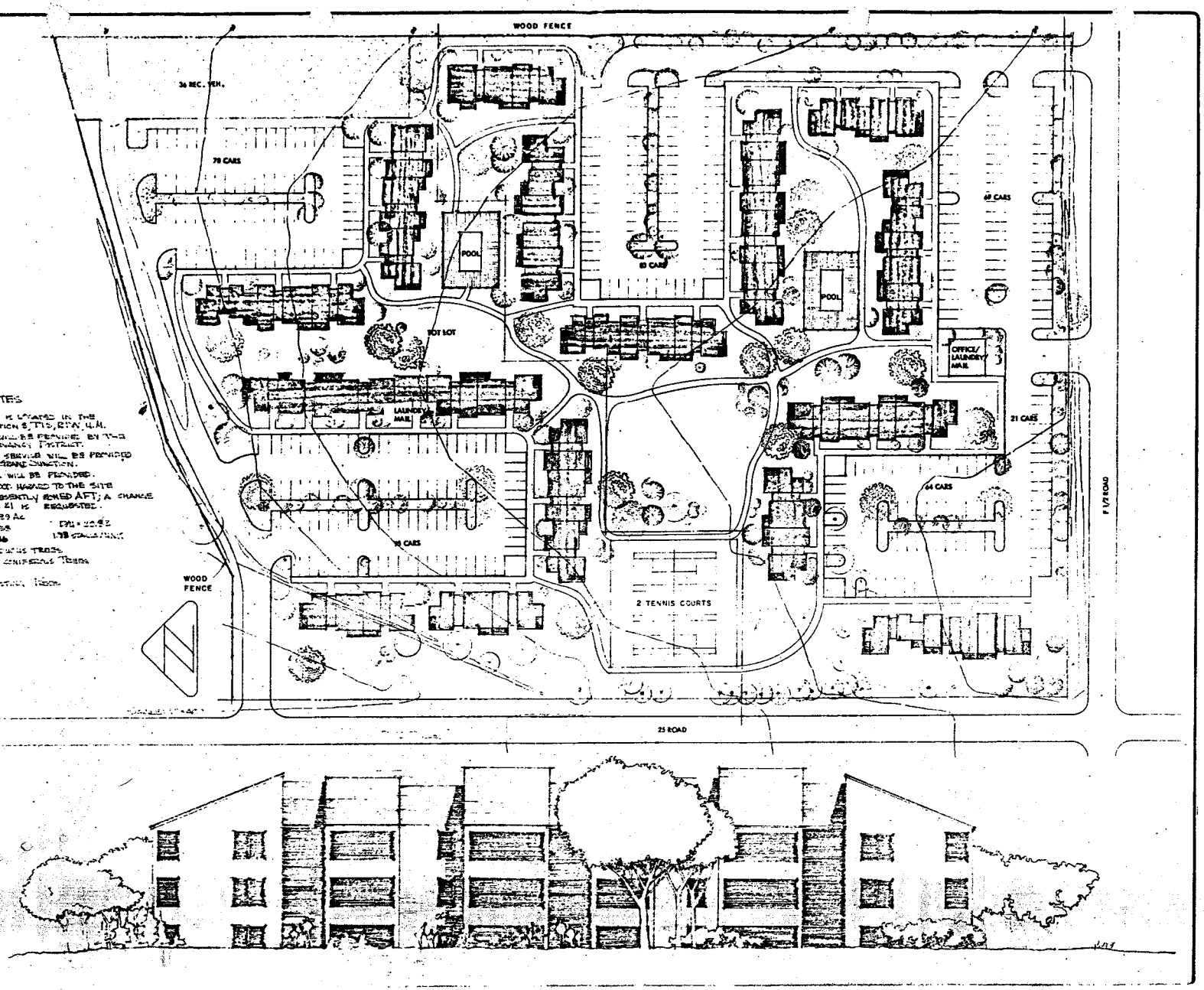
Preliminary Development Plan

Preliminary Building Elevations

Preliminary Drainage Plan

Preliminary Utilities Plan

Inducement Bond Resolution



GENERAL NOTES

- THIS DEVELOPMENT IS LOCATED IN THE SW¼NE¼ OF SECTION 8, T1S, R1W, U.M.
- POTABLE WATER WILL BE PROVIDED BY THE GRAND JUNCTION DRAINAGE DISTRICT.
- SANITARY SEWER SERVICE WILL BE PROVIDED BY THE CITY OF GRAND JUNCTION.
- IRRIGATION WATER WILL BE PROVIDED.
- THERE IS NO FLOOD HAZARD TO THE SITE
- THIS SITE IS PRESENTLY ZONED AFT; A CHANGE OF ZONING TO PR 21 IS REQUESTED.
- TOTAL AREA = 12.89 Ac
  TOTAL UNITS: 268 DU = 20.8/Ac
  TOTAL PARKING: 486 1.78 SPACES/UNIT
- INDICATES DECIDUOUS TREES
- INDICATES CONIFEROUS TREES
- INDICATES SHRUB MASS

CHECKED
DATE
SCALE

REVISIONS | BY

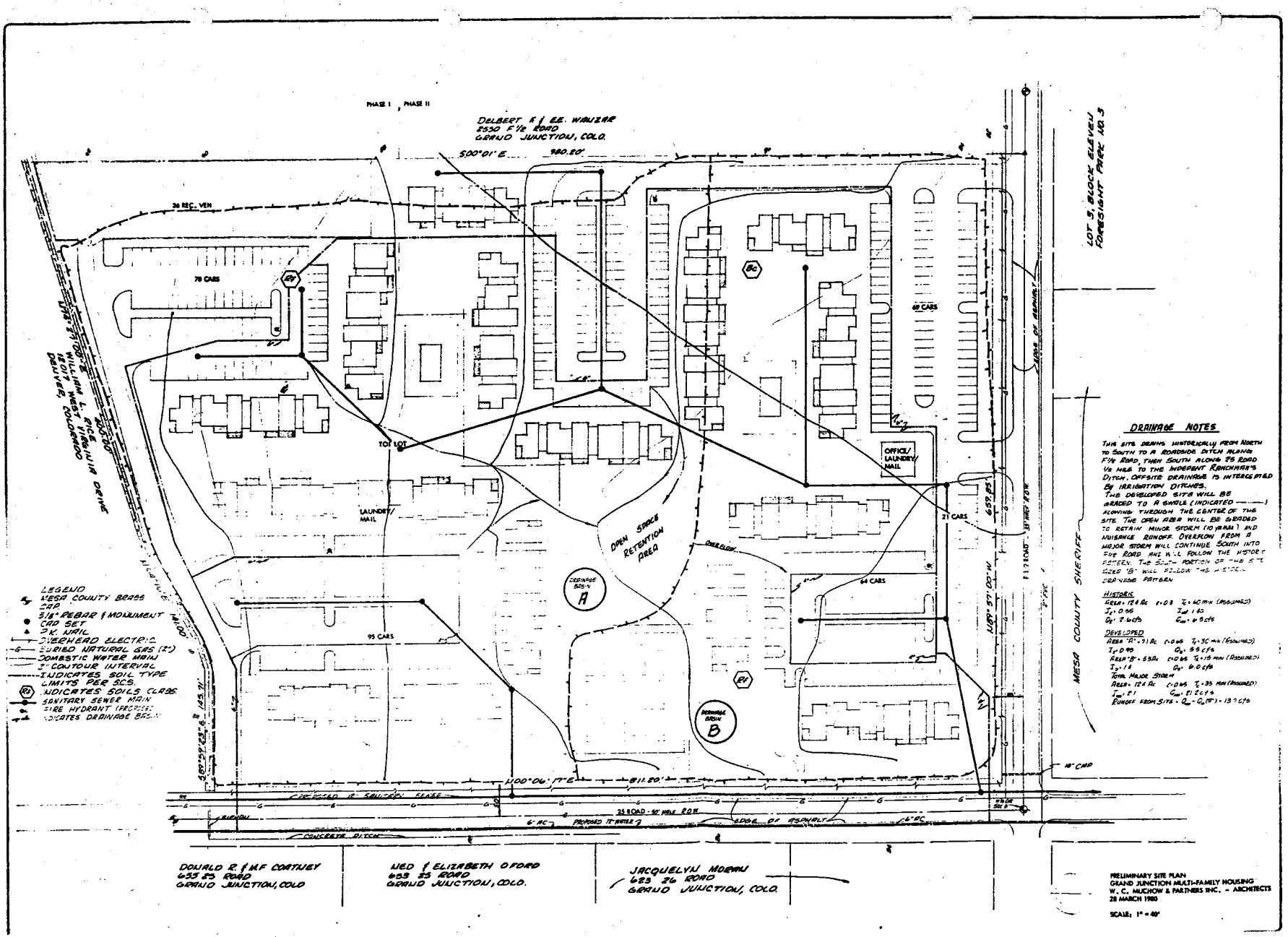
Developer: JOHN S. NEILSON, Jr. 393-0701
650 S. Cherry St. Ste. 840, Denver, Co 80222
PARAGON ENGINEERING, INC.
Architect: MUCHOW & PARTNERS, INC. 534-5800
& Planner: 1725 Blake St. Denver, Colorado 80202

COUNTRY GLEN

A PLANNED RESIDENTIAL DEVELOPMENT
CITY OF GRAND JUNCTION

PRELIMINARY LANDSCAPING PLAN

SHEET 3 OF 3 SHEETS



CHECKED
DATE
SCALE

REVISIONS | BY

Developer: JOHN S. NEILSON, Jr. 303-0701
650 S. Cherry St., Stn. 840, Denver, Co. 80222
Architect: MUCHOW & PARTNERS, INC. 534-6800
& Planner: 1725 Blake St. Denver, Colorado 80202

COUNTRY GLEN
A PLANNED RESIDENTIAL DEVELOPMENT
CITY OF GRAND JUNCTION
PREL. UTILITIES & DRAINAGE PLAN

SHEET 2 OF 3 SHEETS

OF INDUCEMENT TO AUTHORIZE ISSUANCE OF DEVELOPMENT REVENUE BONDS FOR NEILSON PROJECT.

WHEREAS, the County of Mesa, State of Colorado (the "Issuer"), a body politic and corporate and a political subdivision of the State of Colorado, is authorized and empowered by the provisions of the County and Municipality Development Revenue Bond Act, Colorado Revised Statutes 1973 §29-3-101 et seq., as amended (the "Act"), to finance a project, as that term is defined in the Act, and to issue its industrial revenue bonds for the purpose of paying the cost of financing a project; and

WHEREAS, John Neilson, Jr. has requested the Issuer to issue and sell to Newman and Associates, Inc., as underwriter (the "Purchaser"), its industrial revenue bonds pursuant to provisions of the Act for the purpose of financing a multi-family residential housing facility constituting a project, as that term is defined by the Act (the "Project"), for John Neilson, Jr. or an entity to be organized by him (the "Corporation"); and

WHEREAS, the Issuer wishes to declare its intention to authorize an issue of its industrial revenue bonds for the purpose of paying the costs of financing the Project, when so requested by the Corporation, upon such terms and conditions as may then be agreed upon by the Issuer, the Corporation and the Purchaser;

NOW, THEREFORE, be it resolved by the Board of County Commissioners of the Issuer that it does hereby declare its intention to authorize the issuance and sale of industrial revenue bonds of the Issuer to the Purchaser under and in accordance with the Act, in an amount necessary to pay the cost of the Project, which is described in Attachment A, presently estimated to be $5,000,000, and upon such terms and conditions as may be mutually agreed upon by the Issuer, the Corporation and the Purchaser, the issuance and sale of such bonds to be authorized by resolution of the Issuer at a meeting to be held for such purpose. Such bonds and the interest coupons, if any, appurtenant thereto shall never constitute the debt or indebtedness of the Issuer within the meaning of any provision or limitation of the Colorado constitution or statutes, and shall not constitute nor give rise to a pecuniary liability of the Issuer or a charge against its general credit or taxing power.

Passed and approved this 26th day of February, 1980.

COUNTY OF MESA, STATE OF COLORADO

Earl Sawyer
County Clerk

Rick Enstrom
Chairman, Board of County Commissioners

MESA COUNTY 1883 SEAL COLORADO

ATTACHMENT A

1. The project will be located northeast of the intersection of F and a Half Road and 25 Road, in the City of Grand Junction, Colorado.

2. The project will consist generally of approximately 120 units of multi-family residential housing for low- and middle-income families or persons intended for use as the sole place of residence by the owners or intended occupants.

BDIVISION Country Gl[illegible]

CATION NE Quadrent 25 and F½ Roads

VELOPER John S. Neilson, Jr.

DRESS 650 South Cherry Street, Suite 840, Denver, CO 80222 PHONE 393-0701

GINEER Paragon Engineering, Inc.

DRESS P.O. Box 2872, Grand Junction, CO 81502 PHONE 243-8966

PE OF OCCUPANCY Apartments NO. UNITS 258

IMUM ELEVATION OF WATER SERVICE 4592

average pressure in the UTE system is 60 pounds per square inch and these ndards are based on this average. However, pressures vary throughout the a and UTE reserves the right to require individual analysis in specific areas

FIXTURE	FIXTURE VALUE(60 psi)		NO. OF FIXTURES		NO. OF UNITS		FIXTURE VALUE
htub only or with shower	11	X	-1-	X	258	=	2838
wer only	6	X	-0-	X		=	
atory 3/8" connection	3	X	-1-	X	258	=	774
1/2" connection	6	X		X		=	
er Closet--Flush Valve (Public)	47	X		X		=	
Tank Type (Household)	4	X	-1-	X	258	=	1032
nal--Pedestal Flush Valve	47	X	-0-	X		=	
Wall or Stall	16	X		X		=	
nking Fountain (Public)	3	X	-0-	X		=	
chen Sink--1/2" connection	4	X	-1-	X	258	=	1032
3/4" connection	10	X		X		=	
hwasher (Household)-1/2" connection	6	X	-1-	X	258	=	1548
3/4" connection	14	X		X		=	
hing Machine--1/2" connection	7	X	-22-	X	1	=	154
3/4" connection	16	X		X		=	
1" connection	34	X		X		=	
side Hose Bib--1/2" connection	9	X	-0-	X		=	
5/8" connection	13	X		X		=	
3/4" connection	16	X		X		=	
ers: (Check with UTE Water for fixture value)							
Evaporative Cooler	1	X	-1-	X	258	=	258
		X		X		=	
		X		X		=	
AL COMBINED FIXTURE VALUE						=	7636

COST APPROACH

In order to estimate the value of a real property by the Cost Approach, it is necessary to estimate the reproduction cost of improvements as of the date of the appraisal, and deduct whatever depreciation has accrued to those improvements to develop an estimate of the value of the improvements alone. The value of the land parcel on which the improvements are located is then added to the improvements value resulting in an indicated value for the property by the Cost Approach. The value of the subject land will be considered first.

Land Valuation

Several recent sales of land parcels comparable to the subject site were analyzed in order to estimate its value as if vacant. Seven of these land sales are summarized on the following page.

All of the land sales have occurred since March of 1981. Sale activity among multi-family development parcels has increased over the past year as apartment rents have risen. Upward adjustment, particularly to the older sales, is therefore necessary to reflect a rising land value trend to develop indicated values for the subject land.

LAND SALE COMPARISON SUMMARY

NO.	LOCATION	LAND AREA (SF/ACRES)	ZONING/ DWELLING UNITS	DENSITY (DU/ACRE)	SALE DATE	SALE PRICE	SALE PRICE P.S.F.	SALE PRICE PER UNIT	SUBJECT INDICATED VALUE/UNIT
1.	West Side 28-1/4 Road North of North Avenue	47,916 1.10	PR-41 20-City	18.2	10/81	$ 120,000	$2.50	$6,000	$4,900
2.	West Side 27-1/2 Road North of F Road	150,282 3.45	PR-8 26-City	7.5	10/81	$ 180,000	$1.20	$6,923	$6,200
3.	South Side F Road West of 29 Road	365,033 8.38	PR-20 89-City	10.6	9/81	$ 310,000	$ .85	$3,483	$3,300
4.	East of 32-1/2 Road Between D-3/4 and E Roads	422,968 9.71	R-4 112-County	11.5	9/81	$ 525,000	$1.24	$4,688	$5,000
5.	Northeast Corner Independent Avenue and Poplar Street	47,916 1.10	RMF64 30-City	27.3	8/81	$ 138,249	$2.89	$4,608	$4,100
6.	Northwest Corner G and 25 Roads	1,694,048 38.89	PR-8* 311-County	8.0	4/81	$1,300,000	$ .77	$4,180	$5,100
7.	West Side 24-1/2 Road North of F Road	320,602 7.36	PR-17 125-County	17.0	3/80	$ 314,500	$ .98	$2,516	$2,900

All of the land sales have been or are proposed for development residential projects. It is most useful, therefore, to analyze the land sales on a sale price per dwelling unit basis. Sale price per square foot of land is also considered. Generally speaking, all other things being equal, land parcels with lower densities may be expected to have somewhat higher sale prices per unit and somewhat lower sale prices per square foot of land. With minor exceptions, the land sale comparisons exhibit this trend after adjustment for location and time. In this analysis, the density of the proposed Country Glen Apartments with 21.18 dwelling units per acre is recognized. Additional adjustments are made to the sale prices of the comparisons to reflect size and location differences.

Comparison No. 1 is the site of the proposed Briargate Townhouse Condominiums. This project is intended for use as motel units, although it will be legally divided as condominiums. After adjustment for time passage since this sale, density of the development and the inferior location of the subject to this parcel, the resulting value indication for the subject is estimated at $4,900 per unit.

Comparison No. 2 is the site of the proposed Arbors Condominiums. The location of this land sale is considered comparable to that of the subject; however, after adjustments for time and density of the proposed development, the value indication for the subject land is estimated at $6,200 per unit.

Comparison No. 3 is the site of the proposed Peppertree Condominiums. Here again, the location is considered comparable to the subject; however, adjustments for time and density are necessary. The resulting value indication is estimated at $3,300 per unit.

Comparison No. 4 is an outlying parcel with inferior location to the subject. Prior to sale, this parcel had been platted for the 112-unit Green Acres Condominium Complex. Adjustments for time, location and density result in a value indication for the subject of $5,000 per unit.

Comparison No. 5 has a superior location to the subject, adjustment for which is offset by upward adjustment for time and density. Adjustments for time, location and density result in a value indication for the subject of $4,100 per unit.

Comparison No. 6 is the Fountainhead subdivision which is currently in the process of rezone from eight to twelve units per acre. This is the most comparably located parcel to the subject less than one-half mile north. Recognizing the rezone potential as well as time since the sale and density, the value indication for the subject is estimated at $5,100 per unit.

Comparison No. 7 is also geographically quite close to the subject a short distance north of the Mesa Mall. This parcel is improved with an older single family residence with interim use value offset by demolition cost. No preliminary development activity has occurred as yet on this parcel. Adjustments for

time and density result in a value indication for the subject of $2,900 per unit.

After consideration of all of the land sale comparisons and giving approximately equal weight to each, the analysis of these land sales on a price per dwelling unit basis results in a value indication for the subject land of $4,500 per unit. This is applied to the land parcel as follows:

$4,500 per unit X 144 units = $648,000

The above value indication is equivalent to $2.19 per square foot for the 296,295 square feet of land area. This is near the upper end of the $.76 to $2.93 per square foot range of sale prices per square foot in the comparisons. Since the density of the subject land parcel at 21.18 dwelling units per acre is near the upper end of the range of the comparisons from 7.5 to 27.3 units per acre, the land value indication is considered reasonable. It is our opinion then that the current market value of fee simple interest in the Country Glen Phase I land parcel is $648,000.

Delbert F. Wanzer
E. E. Wanzer
2550 F½ Road
Grand Junction, CO 81501

William L. Rice
12017 West Virginia Avenue
Denver, CO 80223

Mesa County Sheriff
655 Ute Avenue
Grand Junction, CO 81501

Industrial Development, Inc.
P. O. Box 1330
Grand Junction, CO 81502

Jacquelyn Moran
623 25 Road
Grand Junction, CO 81501

Ned and Elizabeth Olford
653 25 Road
Grand Junction, CO 81501

Donald R. and M. F. Coatney
655 25 Road
Grand Junction, CO 81501

2945-041-00-034
Jacquelyn A. Moran
623 26 Road
Grand Junction, CO. 81501
#30-80

2945-041-00-033
Jacquelyn A. Moran
623 26 Road
Grand Junction, CO. 81501
#30-80

2945-041-00-32
Ned L. & Elizabeth A. Olford
653 25 Road
Grand Junction, CO. 81501
#30-80

2945-041-00-143
D.R. & M.F. Coatney
655 25 Road
Grand Junction, CO. 81501
#30-80

2945-041-00-142
Herman L. & Connie L. Crist
145 Willowbrook
Grand Junction, CO. 81501
#30-80

2945-041-00-095
Gertrude Spencer
667 25 Road
Grand Junction, CO. 81501
#30-80

2945-033-15-003
Colorado West Improvements
P.O. Box 1330
Grand Junction, CO. 81502
#30-80

2945-032-00-114
PWS Investments
P.O. Box 2026
Grand Junction, CO. 81502
#30-80

2945-032-00-104
Delbert F. & Edna E. Wanzer
2520 F 1/2 Road
Grand Junction, CO. 81501
#30-80

2945-033-00
Mesa County Sheriff's Posse
P.O. Box 1386
Grand Junction, CO. 18502
#30-80

Country Glen Assoc
1666 S. University Blvd.
Denver, CO

Kent Mundt

TABLE OF CONTENTS

chen and associates, inc.
CONSULTING ENGINEERS

SOIL & FOUNDATION
ENGINEERING

5080 RD. 154 • GLENWOOD SPRINGS, COLORADO 81601 • 303/945-7458

SOIL AND FOUNDATION INVESTIGATION FOR PROPOSED RESIDENTIAL DEVELOPMENT COUNTRY GLEN APARTMENTS, 25 AND F½ ROADS, GRAND JUNCTION, COLORADO

Prepared For:

Victorio Investment Co.
3400 Stapleton Plaza Office Bldg.
Denver, CO 80207

Attn: Mr. John Shaw

Job No. 23,493

February 3, 1982

CONCLUSIONS

The construction of the proposed development is feasible from a geotechnical engineering standpoint. Several foundation alternatives are discussed in the body of this report as well as other geotechnical considerations for the proposed development.

SCOPE

This report presents the results of a soil and foundation investigation for the proposed residential development, Country Glen Apartments, to be located at 25 and F½ Roads in Grand Junction, Colorado. The project site is shown on Figure 1. This report has been prepared to summarize the data obtained and to present our conclusions and recommendations based on the conditions encountered. Design parameters and a discussion of geotechnical engineering considerations related to the construction of the proposed facility are included. A previous soils study performed at the site by Geo Testing Laboratories, Inc. has been reviewed and utilized as background information to this report.

PROPOSED CONSTRUCTION

The proposed residential development will consist of 18 buildings containing approximately 250 units. The proposed buildings will be predominantly 12-plexes but will include 8, 20 and 24-unit structures as well. The residential buildings will be 2 to 3 stories and of combined wood frame and masonry construction. Also included in the development are parking and recreational facilities as well as a small community building to contain office, mail and laundry facilities.

The development is to be constructed in two phases. Phase I will consist of the northern portion of the site containing approximately 60% of the proposed development. Phase II will encompass the remainder of the site (refer to Figure 1). Exterior wall loads are estimated to be a maximum of 4 kips per lineal foot, and interior wall loads are anticipated to be a maximum of 8.6 kips per lineal foot. Minimal cut and fill is expected within building and parking lot pad areas.

Should the proposed construction or loadings vary significantly from those described above, this office should be notified at once so that the recommendations made in this report may be re-evaluated and revised as necessary.

SITE CONDITIONS

The site of the proposed residential development is located northwest of downtown Grand Junction on the east side of 25 Road just north of the intersection of F½ Road. The site is generally flat with a very slight slope downward to the southwest. The northwestern corner of the site appears to be approximately 2 to 3 feet higher in elevation than the adjacent portions of the site. Prior land use consists of agricultural and irrigated pasture. A concrete lined irrigation ditch runs westward along the northern boundary of the parcel cutting across a small portion of the northwest corner of the parcel. Numerous other irrigation ditches crisscross the site though all were observed to be dry at the time of the field work.

A small house and several out buildings were located on the southwestern portion of the site off 25 Road approximately 200 feet north of F½ Road.

The owner of the house stated that the house had experienced severe settlement problems though no visible signs of distress were readily apparent. The owner stated that the floors had been releveled and walls built out to plumb during recent remodeling. The foundations of the existing structure consisted of ungrouted stone in some portions and concrete spread footings in the newer portions. The garage exhibits visible signs of distress along the rear wall. The structure consists of wood frame constructed over concrete spread footings.

The site appeared to be covered mostly in grasses below a 4 to 6 inch blanket of snow at the time of the field work. The west side of the property along 25 Road and the area immediately surrounding the house is lined in deciduous trees approximately 20 to 40 feet in height

SUBSOIL CONDITIONS

Thirty-eight exploratory holes were completed with 4-inch continuous flight auger powered by a truck-mounted CME 55 drilling unit for the purpose of identifying subsoil conditions. The locations of test holes are illustrated in Figure 1. Graphic logs of the subsoil profiles encountered are presented in Figures 2 through 7. Disturbed and relatively undisturbed samples were taken and returned to the office for examination by the project engineer and laboratory testing. Results of laboratory testing including in-situ moisture and density, gradation, index properties and swell-consolidation testing are presented in Figures 8 through. 16 and summarized in Table I.

Subsoil conditions encountered across the site were generally uniform and consisting of silty clay to clayey silt overlying a deep dense gravel deposit. The results of swell-consolidation testing indicate

that the silt and clay tends to be highly compressible even under very light loadings, as illustrated in Figures 8 through 14 and 16. The soils were very soft to medium stiff, wet and would yield large total and differential settlements for even very lightly loaded foundations. An upper dessicated crust above the soft wet soils was generally found to be of minimal depths . The gravels encountered at depths varying from 56 to 58 feet contained large quantities of cobbles and tended to be dense to very dense. The gravel should prove competent for support of end bearing piles. Gravels were logged at depths ranging from 52 to 53 feet during the previous soils study.

Free ground water levels were measured in the exploratory holes at the time of drilling and 2 to 12 days later. Water levels were measured at depths ranging from 2 to 9 feet but were generally uniform ranging from 2 to 4 feet over the majority of the site. The deeper water depths were measured in Holes 13 through 17 located in the northwest corner of the property.

FOUNDATION RECOMMENDATIONS

Since the subsoils at the site which will directly underlie the structure consist of highly compressible silts and clays, the use of conventional shallow spread footings will involve a high risk of structural damage due to total and differential settlements. For the expected loading range to about 8.6 kips per lineal foot, settlements are estimated to range between 1 to 4 inches which can occur over several months. Based on the results of our field and laboratory investigations, and the type of buildings proposed, several alternative foundation designs have been considered. These foundation systems consist of driven piles,

spread footings placed on preconsolidated subsoils or stiffened slabs. Each of these alternatives is discussed below:

Driven Pile Foundations: Piles driven to refusal in the underlying coarse granular soils should prove the least risk type foundation and will have the advantage of providing a relatively high load capacity while eliminating excessive settlement potential. The following design and construction details should be observed for driven pile foundations.

(1) Piles driven to refusal in the underlying coarse granular strata will have an allowable load capacity on the order of 30 to 70 tons depending on the pile type and section The structural capacity of the pile section can be used in calculation of the allowable load. A 10-inch concrete filled pipe, frequently used in this area, would have an allowable capacity of about 50 tons. Steel pile section areas should be reduced by the amount of predicted corrosion for the design life of the pile

(2) The upper clays have sufficient strength to assume the pile to be continuously supported. If lateral load of the building is to be taken in the piling system, battering should be considered.

(3) If close spacing or pile clustering is required, some ground heave could occur. We believe this is a remote possibility provided a minimum spacing of 2 1/2 times the pile diameter is maintained. However, the top elevation of each pile should be recorded and if heave is experienced the pile should be reset.

(4) The hammer used in pile driving should have a minimum energy of 15,000 ft-lb. and be sized to the pile section. Assuming a 10-inch closed end pipe pile, we expected 10 or more blows of the hammer

operating at the manufacturer's recommended speed and stroke required to drive the pile one inch will be adequate.

(5) Observation during pile driving by a qualified engineer or technician should be provided to verify design assumptions and installation requirements. Each pile should be visually inspected and checked for buckling and plumbness.

Spread Footings or Stiffened Slab Foundations on Preconsolidated Subgrade: Improvement of the load capacity of the natural subsoils by consolidation prior to construction would permit the use of spread footing foundations and greatly reduce potential excessive settlements. Preconsolidation of the site would probably be most effectively achieved by placement of a surcharge loading or soil stockpile over the entire building area. Following surcharge removal, spread footings could then be placed on the natural soils.

Consolidation involves a reduction in water content as a result of the soil compression. For fine-grained soils such as present on-site, this process can continue up to several months. This time span would probably not be acceptable for the multiple building construction proposed. The rate of consolidation can be accellerated by providing water collection and shortened drainage paths through vertical drains, consisting of sand columns or synthetic or paper wicks. The time required to essentially achieve total consolidation would therefore be dependent on drain spacing. Based on the results of laboratory time rate consolidation tests, Figure 16, and our experience in near-by areas, we estimate a required consolidation period of 5 weeks for a 10 foot spacing and 2 weeks for a 5 foot spacing. The depth of drains should be equal to the

narrow building dimension or extend to gravels whichever is the less. The drains should be surface outletted to permit free drainage.

Required magnitude of surcharge loading will depend on the proposed foundation configuration and allowable settlement potential. Assuming lightly loaded stiffened slabs or continuous footings about 1.5 to 5 feet wide, we recommend a minimum surcharge of 750 psf or about 6 feet of soil depth. The surcharge loading should cover the entire building areas and extend to a minimum of 10 feet beyond the building perimeter. The surcharging material should be predominantly sand and gravel. The material can be re-used in subsequent building areas depending on construction sequence. If time permits, staggered construction that allows one site to be surcharged while another site is under construction would probably be the most economical. Use of vertical drains as described above could reduce consolidation times sufficiently to permit fairly rapid construction by this method. The following design and construction details should be observed for spread footings or stiffened slabs placed on preconsolidated subsoils:

(1) Foundations placed on preconsolidated natural subsoils may be designed for a maximum soil bearing pressure of 1500 psf. A minimum footing dimension of 18 inches for walls and 24 inches for columns should be used. All topsoil or locally soft soils should be removed and the foundation bearing elevation lowered to competent bearing strata.

(2) Completed foundation excavations should be observed by a representative of the soil engineer prior to concrete placement to verify proper bearing conditions.

(3) Footings should be provided with adequate soil cover for frost protection.

(4) Foundation walls should be adequately reinforced to span a minimum unsupported length of 15 feet. Masonry walls should also be reinforced to redistribute loading and reduce cracking in the event of some settlement.

(5) In areas of locally high ground water, dewatering techniques may be required such as the placement of a gravel mat and a perimeter underdrain prior to foundation installation.

Settlements for spread footings placed on preconsolidated silts and clays are estimated to be approximately 1 to 1 1/2 inches total and 3/4 to 1 inch differential. Settlements may be reduced by increasing the surcharge loading or decreasing the bearing pressure. For stiffened slabs with bearing pressures less than or equal to the surcharge loading, settlements should be minimal and less than 3/4 inch total and differential. If vertical drains are adequately outletted, settlements should occur at the time of construction.

FLOOR SLABS

We understand that crawl space construction is tentatively proposed for the residential units. The upper natural soils are capable of supporting lightly loaded floor slabs. However, these soils possess a potential for large settlements over prolonged time which could cause severe floor slab cracking. The only positive solution is construction of a structural floor with an air space beneath it. If the owner

realizes the risk of slab-on-grade construction and this system is required, we suggest the following design and construction details be observed:

(1) Floor slabs should be separated from all bearing walls and columns with a positive expansion joint.

(2) Interior partitions resting on the floor slabs should be provided with a slip joint at the bottom of the well so that in the event the floor slab moves this movement will not be transmitted to the upper structure.

(3) Floor slabs should be provided with control joints to reduce damage due to shrinkage cracking and they should be reinforced.

(4) A 4-inch gravel layer should be placed beneath the floor slabs.

(5) Required fill should consist of nonexpansive soils similar to the on-site silts and clays compacted to at least 90% of standard Proctor density at a moisture content near optimum.

The above precautions will not prevent the movement of floor slabs; however, they should reduce the damage if such movement occurs.

If surcharge loadings are used to preconsolidate the subsoils as described above for the foundations, consolidated natural soils will be capable of supporting lightly loaded floor slabs without the high settlement potential. Floor slabs on the preconsolidated soils should include expansion joints and gravel layers as described above.

PAVEMENTS

Samples of potential subgrade materials were taken from test holes 34 through 38 and other selected test holes. Soils obtained consisted mainly of silts and silty clays which are considered a poor subgrade for

support of pavements. Typical daily traffic is assumed to be relatively light and consist of automobiles. Based on the general subsoil conditions and traffic loadings, is recommended that a minimum of 3 inches of hot mix bituminous concrete and 6 inches of aggregate base course be used in primary drive areas. In the parking areas, it is recommended that 2 inches of hot mix bituminous asphalt and 6 inches of aggregate base course be used.

All topsoil, vegetation and debris should be removed from pavement areas. The subgrade and any required fill should be compacted to at least 95% of standard Proctor density at a moisture content near optimum. In areas of locally high ground water and soft soils, it may be necessary to stabilize the subgrade through use of a coarse gravel layer and/or a synthetic filter fabric.

SUBSURFACE DRAINAGE

Due to the presence of high ground water over the majority of the site, it may be advantageous to provide subsurface drainage by way of intercept drains to locally lower the ground water level. This would aid in the required stabilization of any near surface soils which may be encountered in pavement and building areas. The drains could be placed in the bedding material adjacent to underground utility lines. The drains should consist of a perforated pipe embedded in free draining granular material sloped at a minimum 1% grade. Each drain should be continuous and daylight to a suitable gravity outlet.

Underdrains should also be installed to protect below grade construction such as deep crawl spaces or the swimming pool. Where crawl space area is kept to a minimum and constructed near to above existing ground

levels, an underdrain does not appear warranted. The pool should be protected by a blanket type gravel drain connected to a perforated pipe leading to suitable outlet. A check valve system may also be feasible to allow equalization of hydrostatic pressures.

SURFACE DRAINAGE

The following drainage precautions should be observed during construction and maintained at all times after the buildings have been completed:

(1) Inundation of the foundation excavation should be avoided during construction. Perimeter underdrains may be required in areas of high ground water to permit foundation construction.

(2) Miscellaneous backfill around the building should be moistened and compacted to at least 90% of standard Proctor density.

(3) The ground surface surrounding the exterior of the building should be sloped to drain away from the building in all directions.

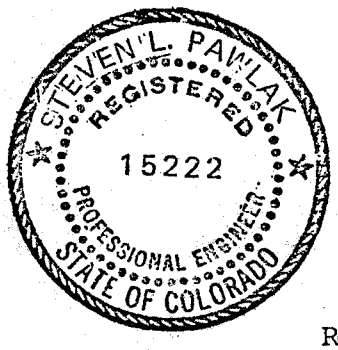
(4) Roof downspouts and drains should discharge well beyond the limits of all backfill.

CORROSION

Results of water soluble sulfates, pH and total water soluble salts tests are presented on Table I and indicate a relatively high corrosion potential. Therefore, we recommend the use of Type V cement for concrete exposed to the upper natural soils. Consideration should also be given to use of an approved nonmetalic conduit, cathodic protection, use of bedding material, etc. for all buried materials.

LIMITATIONS

This report has been prepared in accordance with generally accepted soil and foundation engineering practices in this area for the use by the client for design purposes. The conclusions and recommendations submitted in this report are based upon the data obtained from the test holes drilled at the locations indicated on the test hole plan. The nature and extent of variations between the test holes may not become evident until excavation is performed. If during construction, soil and ground water conditions appear to be different from those described herein, this office should be advised at once so that re-evaluation of the recommendations may be made. We recommend on-site observation of excavations and foundation bearing strata by a soil engineer.



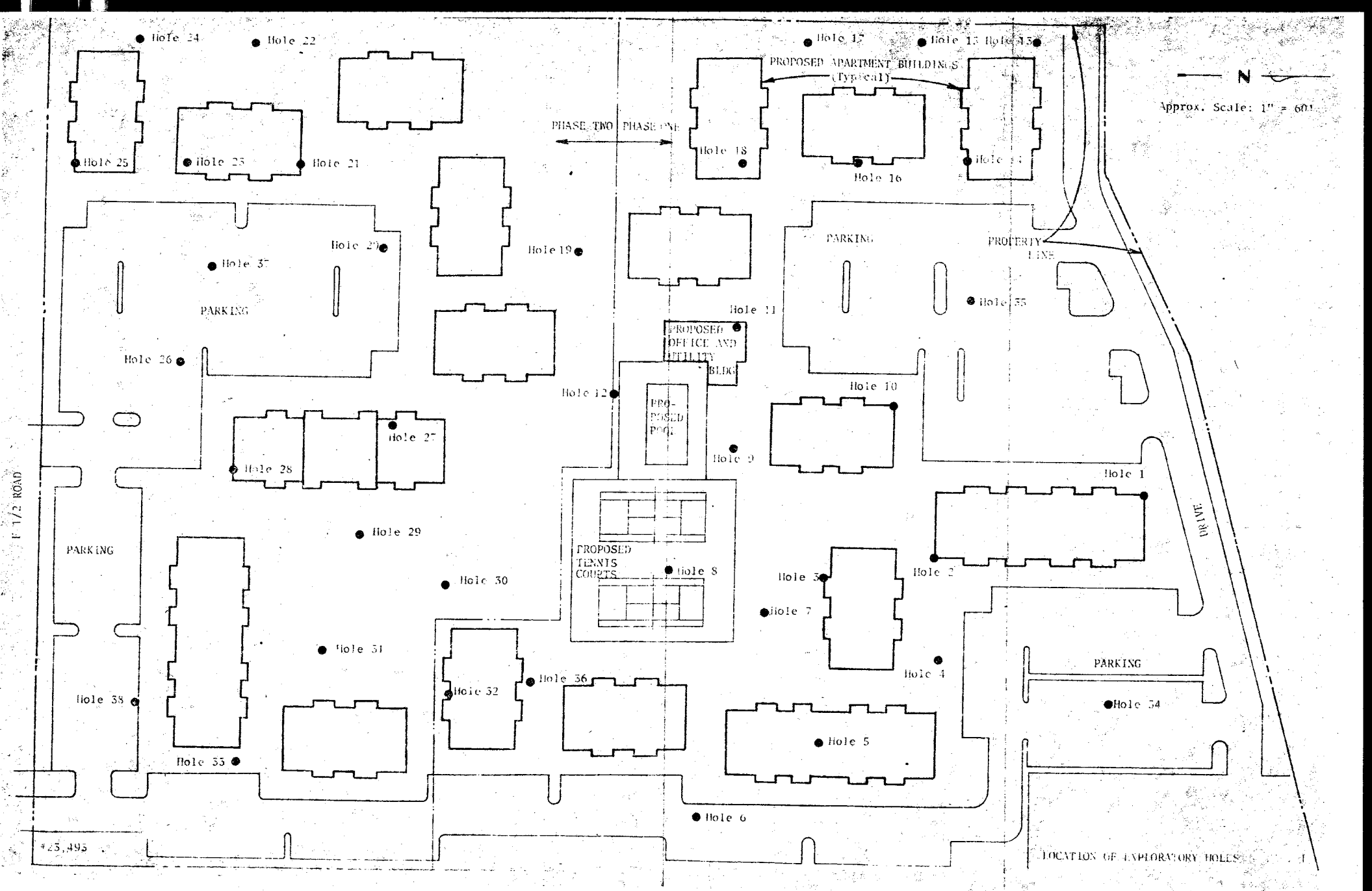
CHEN AND ASSOCIATES, INC.

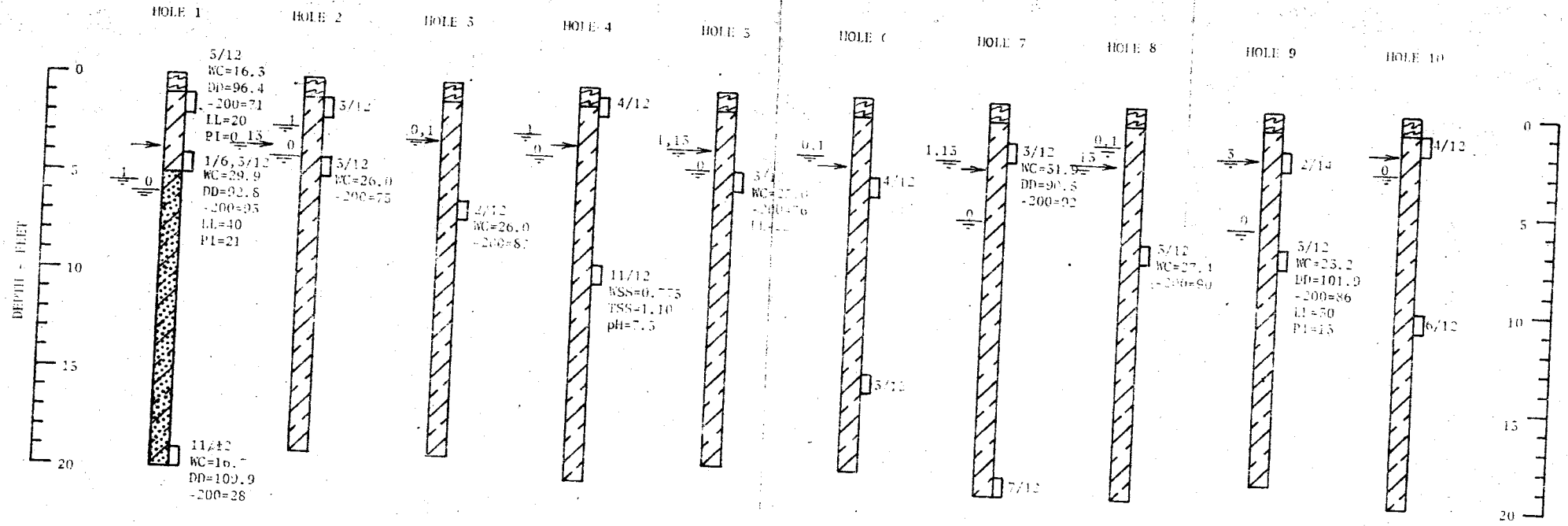
By Michael J. Byle
Michael J. Byle

Reviewed By Steven L. Pawlak
Steven L. Pawlak, P.E.

MJB/dc

cc: Leonard Szopinski


Hole 24
Hole 22
Hole 17
Hole 13
Hole 15
PROPOSED APARTMENT BUILDINGS (Typical)
N
Approx. Scale: 1" = 60'
PHASE TWO
PHASE ONE
Hole 25
Hole 23
Hole 21
Hole 18
Hole 16
Hole 14
Hole 37
Hole 20
Hole 19
PARKING
PROPERTY LINE
PARKING
Hole 11
Hole 35
PROPOSED OFFICE AND UTILITY BLDG.
Hole 26
Hole 12
Hole 10
PRO-POSED POOL
Hole 27
Hole 28
Hole 9
Hole 1
F 1/2 ROAD
Hole 29
PARKING
PROPOSED TENNIS COURTS
Hole 8
Hole 3
Hole 2
DRIVE
Hole 30
Hole 7
Hole 31
Hole 4
PARKING
Hole 38
Hole 32
Hole 36
Hole 34
Hole 5
Hole 33
Hole 6
#25,495
LOCATION OF EXPLORATORY HOLES



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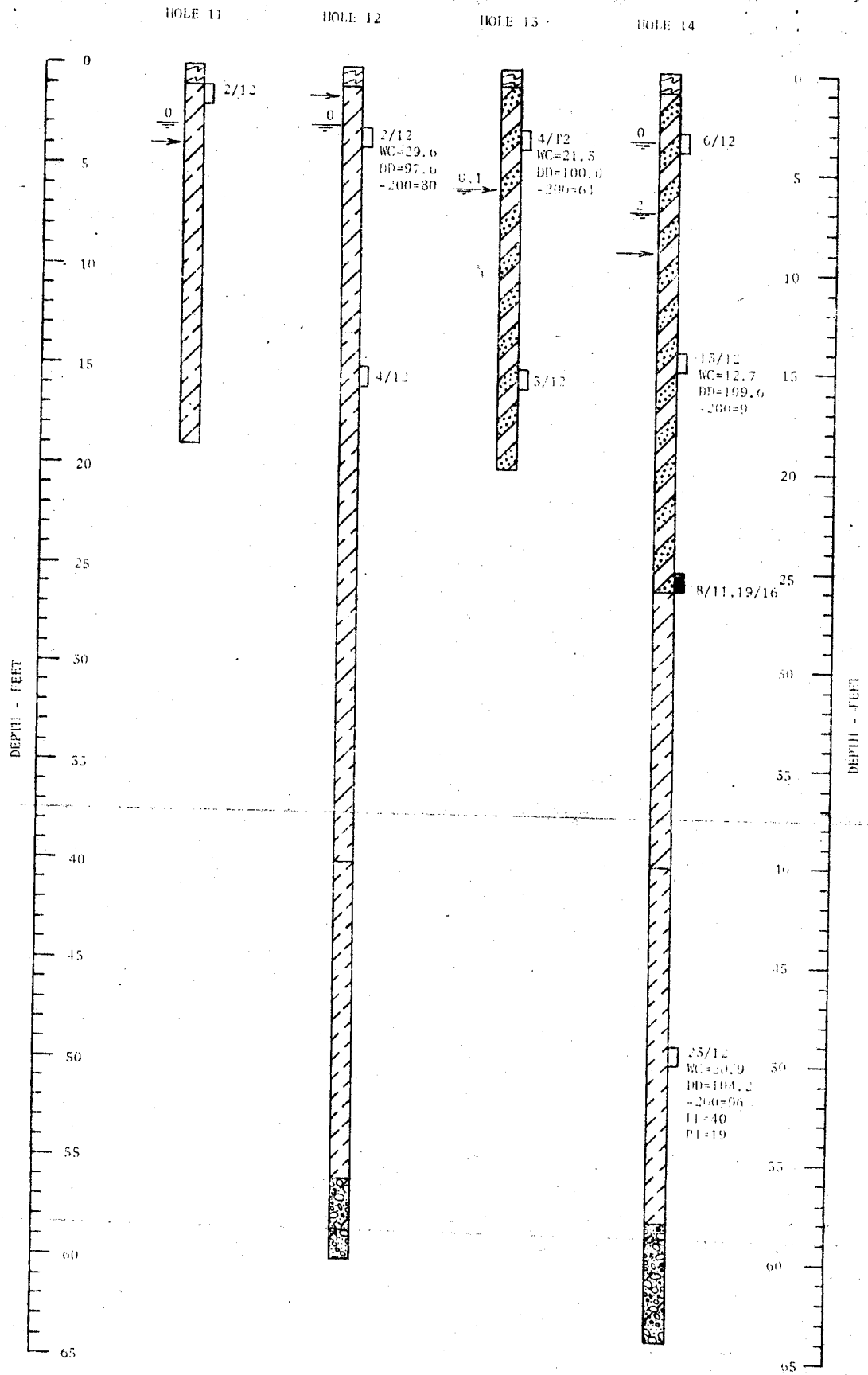
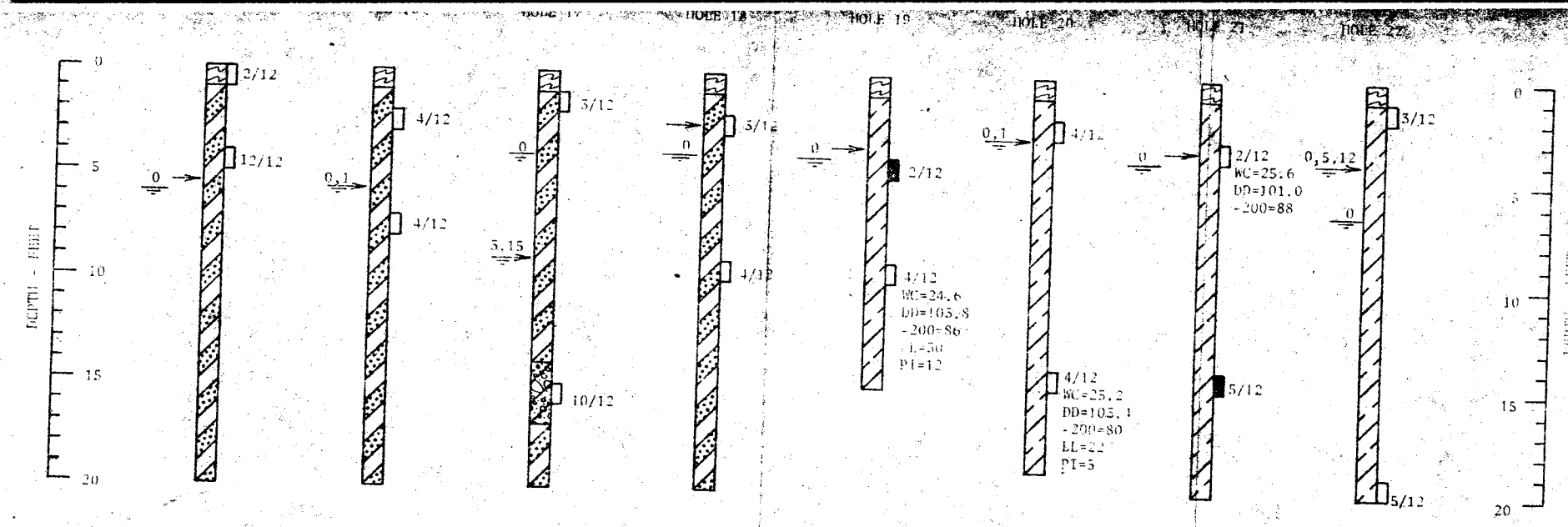
LOGS OF EXPLORATORY HOLES - Fig. 2



LOGS OF EXPLORATORY HOLES - Fig. 3

23,493



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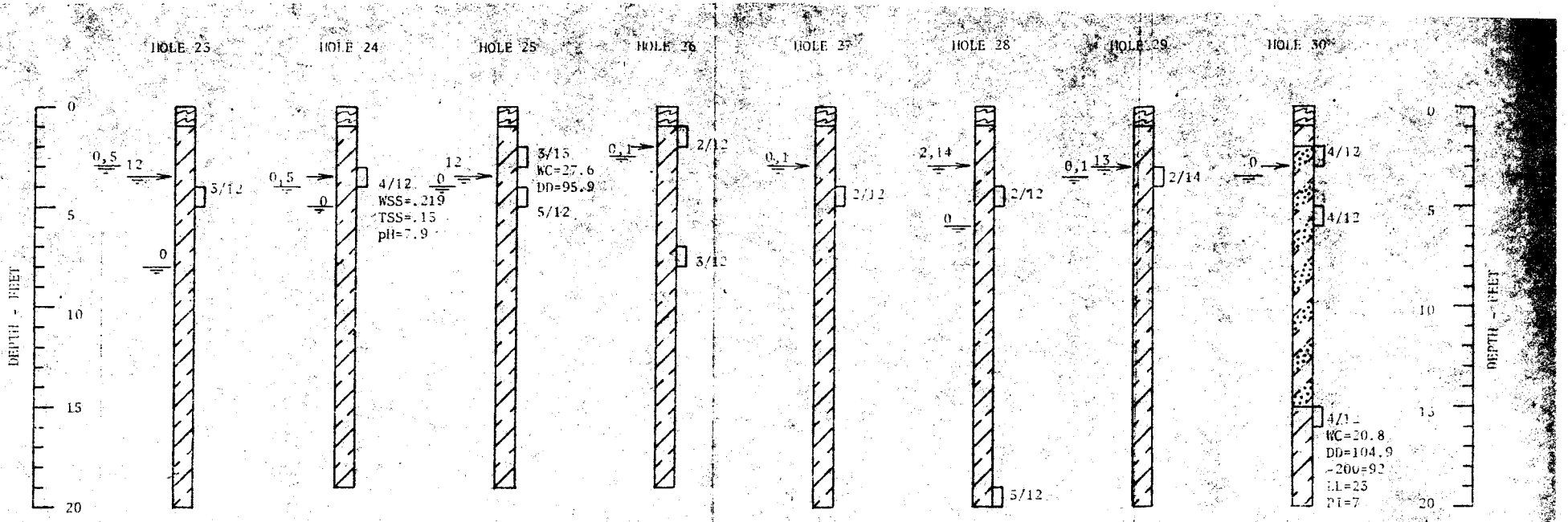
LOGS OF EXPLORATORY HOLES - Fig. 4



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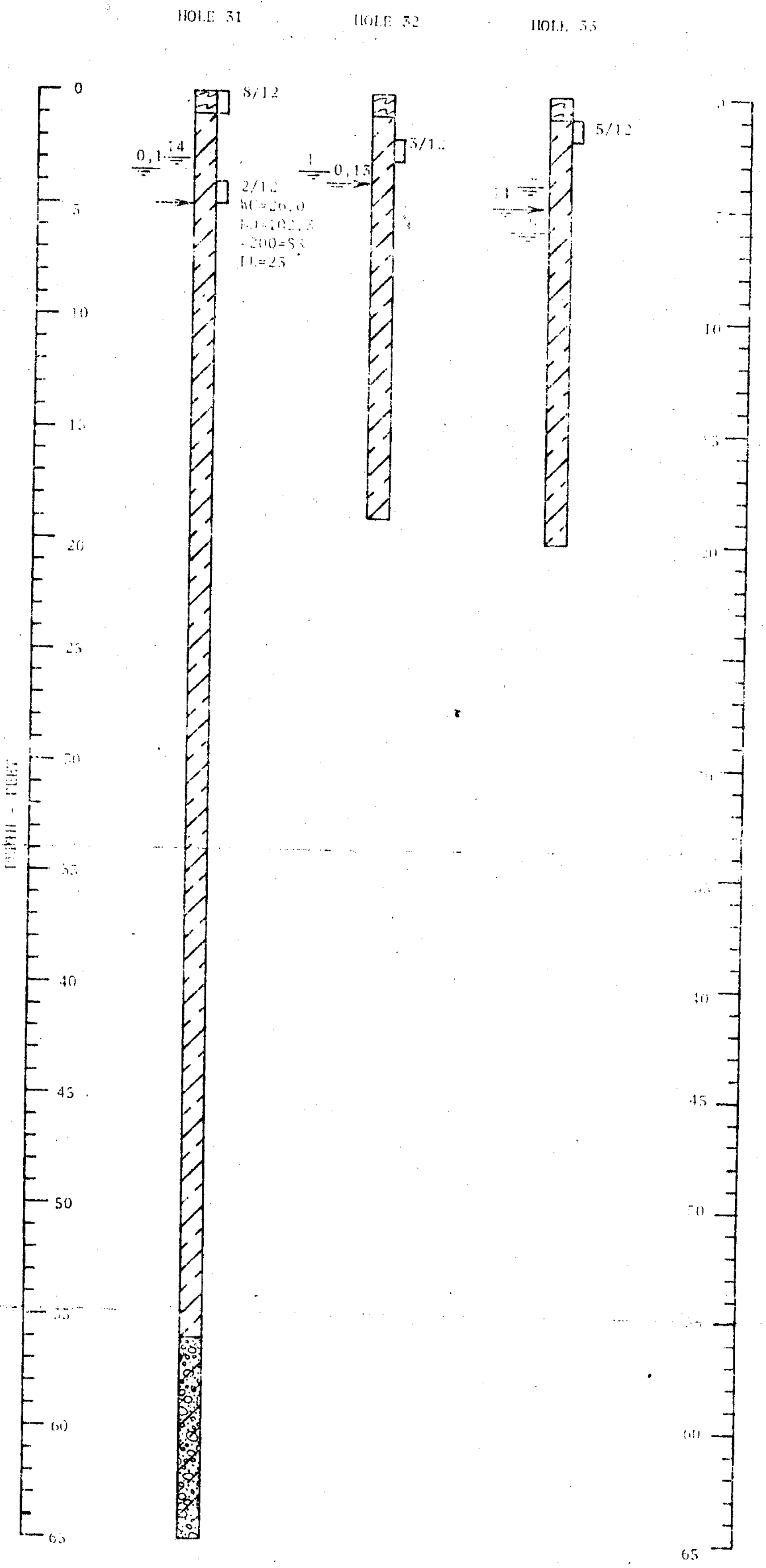
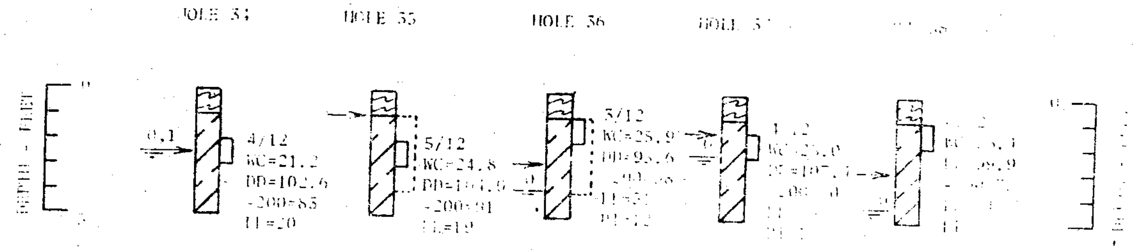
LOGS OF EXPLORATORY HOLES - Fig. 5

#23,493



LOGS OF EXPLORATORY HOLES - Fig. 6



PAVEMENT HOLES

NOTES:

(1) Test holes were drilled on January 11 through 14, 19[illegible] with a four inch diameter [illegible] flight power auger.

(2) Water levels were measured on January 14, 1982 and on January 2[illegible], 1982.

(3) WC = Water Content (%);
DD = Dry Density (pcf);
-200 = Percent Passing No. 200 Sieve;
LL = Liquid Limit (%);
PI = Plasticity Index (%);
WSS = Water Soluble Sulfates (%);
TSS = Total Water Soluble Salts (%);
pH = Soil Acidity.

LEGEND:

[illegible], [illegible], [illegible] heated, dark brown.

Silt and Cl[illegible] (ML-[illegible]), slightly sandy with lenses of silty sand, [illegible] wet, [illegible]-brown.

[illegible] stiff, [illegible] moist, medium brown to gray-brown.

Sand [illegible], silty to very silty, slightly gravelly, loose, wet, medium brown.

Sand [illegible], silty, clayey, loose to medium dense, wet, medium brown to gray brown.

Sand [illegible], [illegible] gravelly, clayey, slightly silty, very loose [illegible], [illegible] brown.

[illegible] very sandy, silty, loose, wet, gray-brown.

Gravel [illegible], sandy, silty, clayey, cobbles, dense to very dense, wet, gray brown.

Gravel [illegible], slightly clayey to clayey, cobbles, dense to very dense, wet, [illegible] brown.

Undisturbed [illegible] Sample. The symbol 4/12 indicates that 4 blows of a 140 pound hammer falling 30 inches were required to drive the sampler 12 inches.

Standard Penetration Test Sample ASTM D-1586.

Disturbed Bulk Sample

Depth at which free water was encountered and number of days after drilling measurement was taken.

Depth at which hole caved.

#23,493

[illegible] OF EXPLORATORY HOLES, LEGEND & NOTES - Fig. [illegible]

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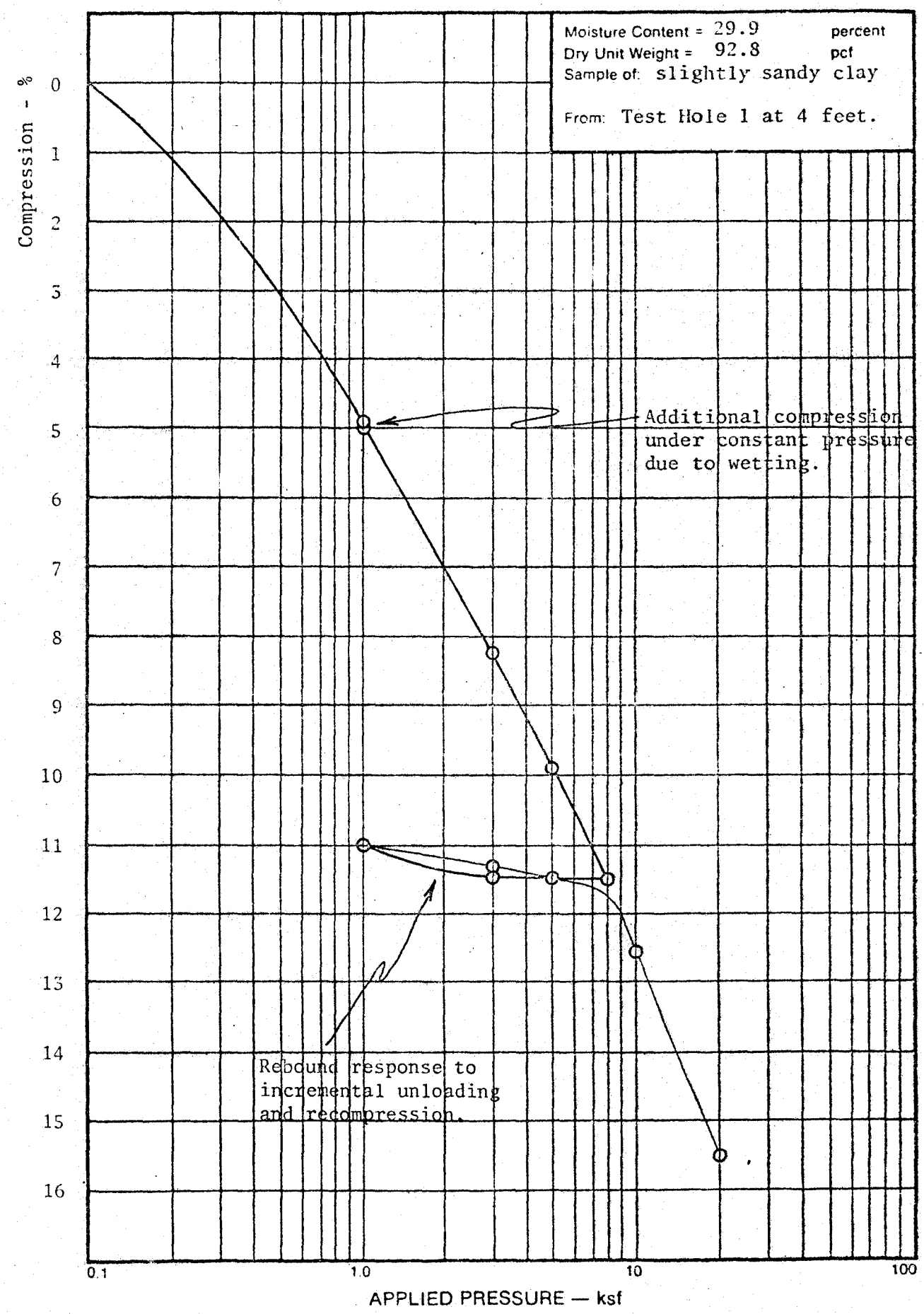
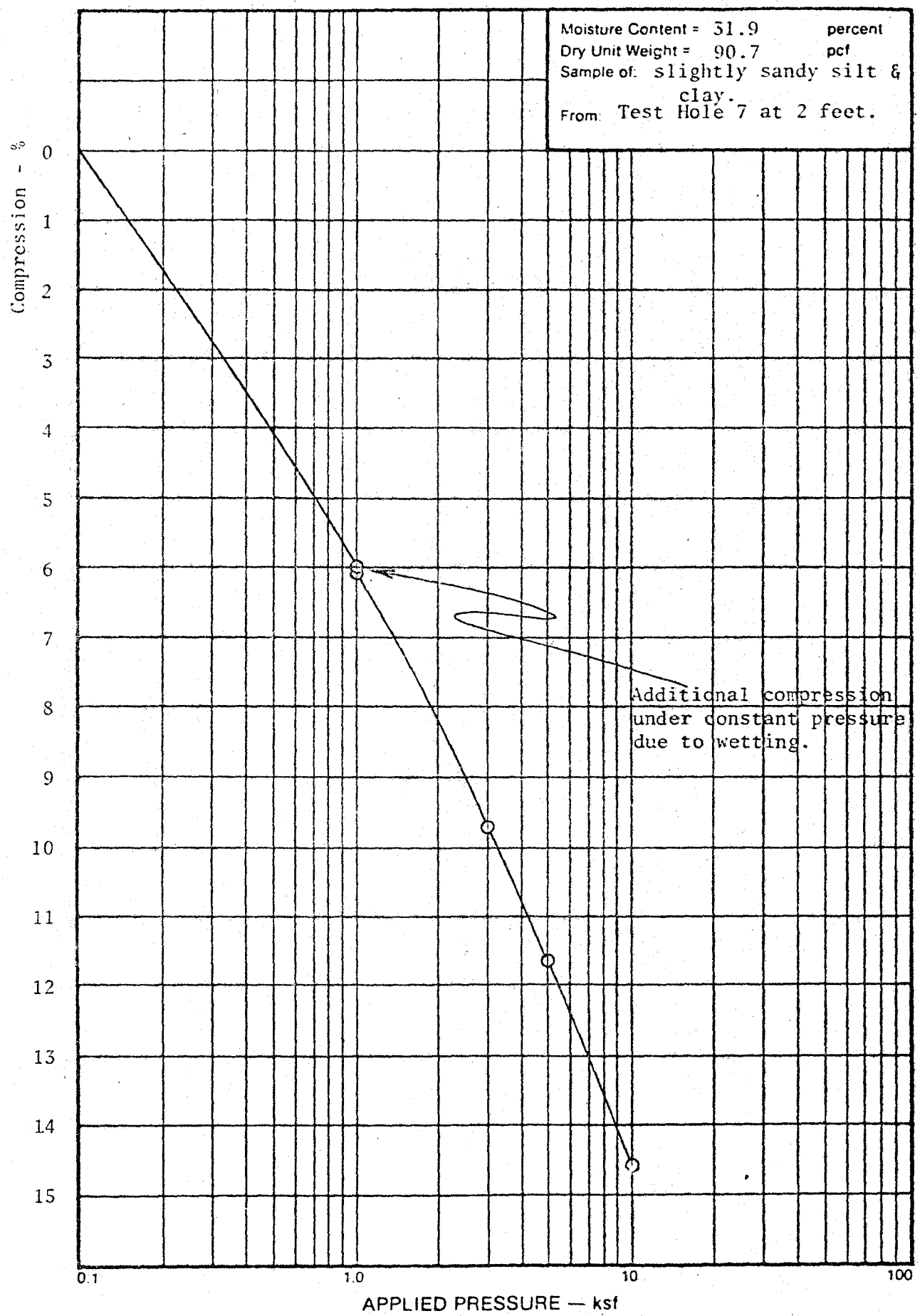


#23,495

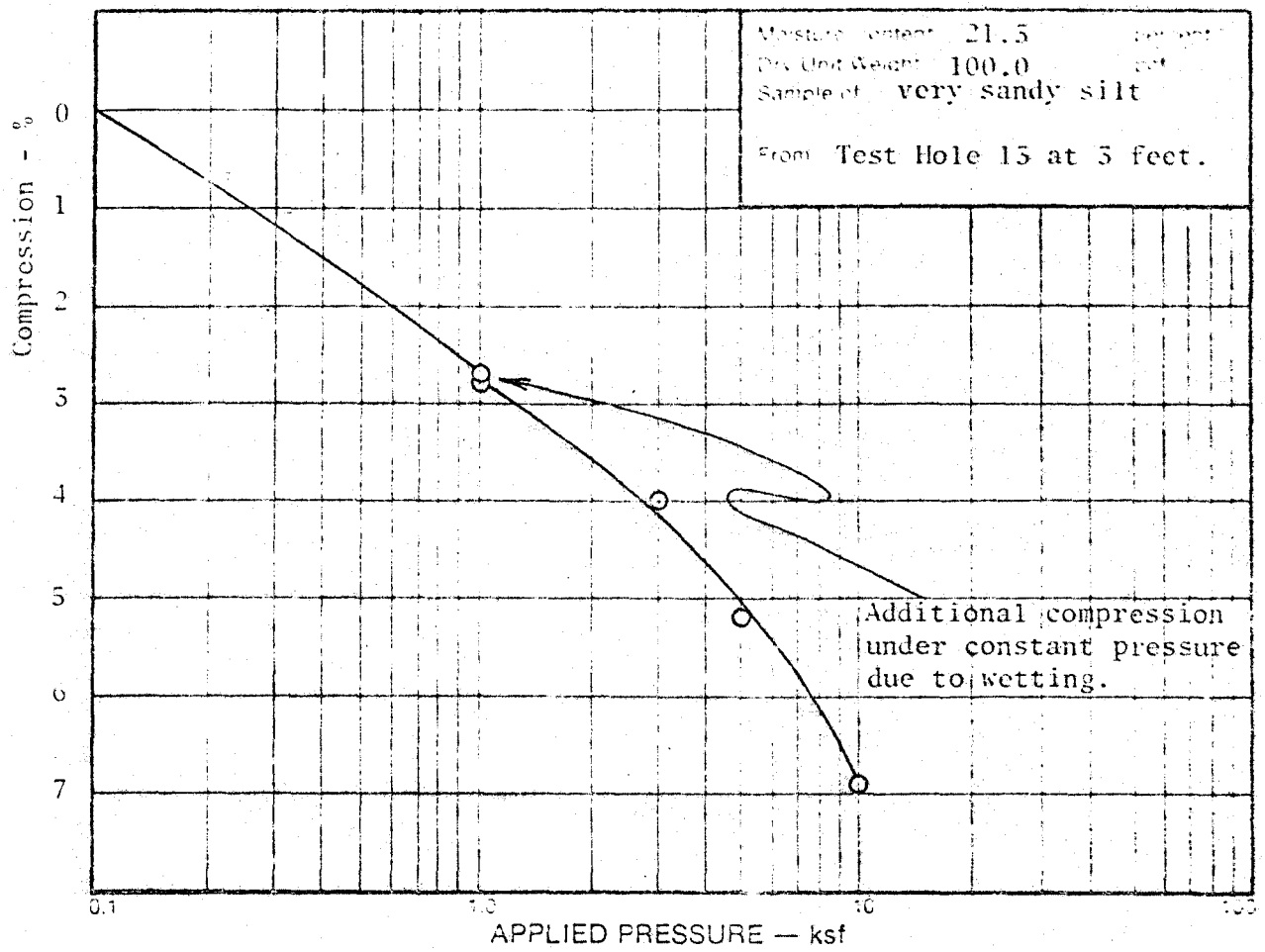
SWELL-CONSOLIDATION TEST RESULTS

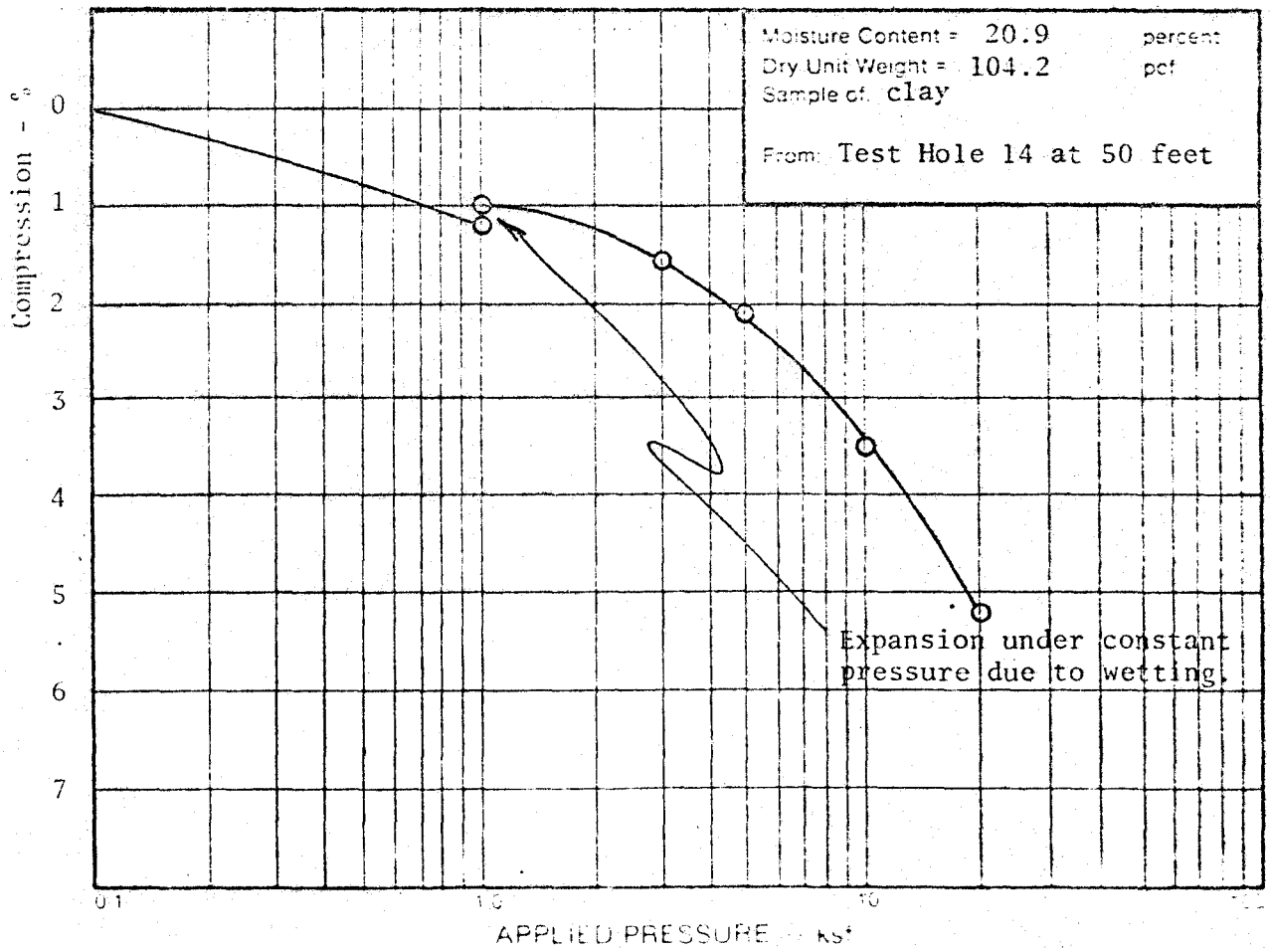
Fig 8

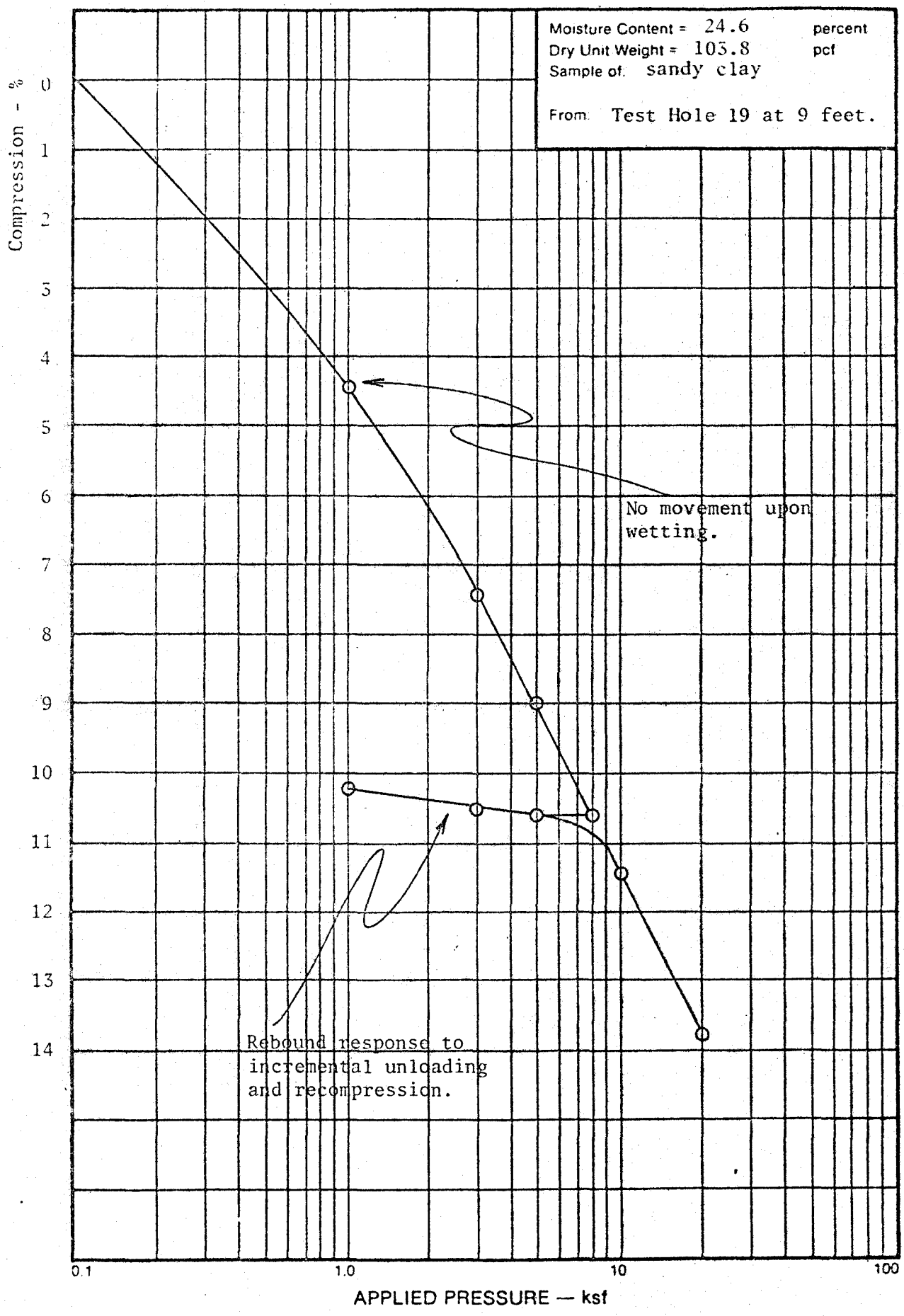
chen and associates, inc.



#23,493 SWELL-CONSOLIDATION TEST RESULTS Fig 9


Moisture Content = 21.5 percent
Dry Unit Weight = 100.0 pcf
Sample of: very sandy silt
From: Test Hole 15 at 5 feet.
Additional compression under constant pressure due to wetting.
Compression - %
0
1
2
3
4
5
6
7
0.1
1.0
10
APPLIED PRESSURE — ksf


Moisture Content = 20.9 percent
Dry Unit Weight = 104.2 pcf
Sample of: clay
From: Test Hole 14 at 50 feet
Expansion under constant pressure due to wetting.
Compression - %
0
1
2
3
4
5
6
7
0.1
1.0
10
APPLIED PRESSURE — ksf



#25,495

SWELL-CONSOLIDATION TEST RESULTS

Fig. 11

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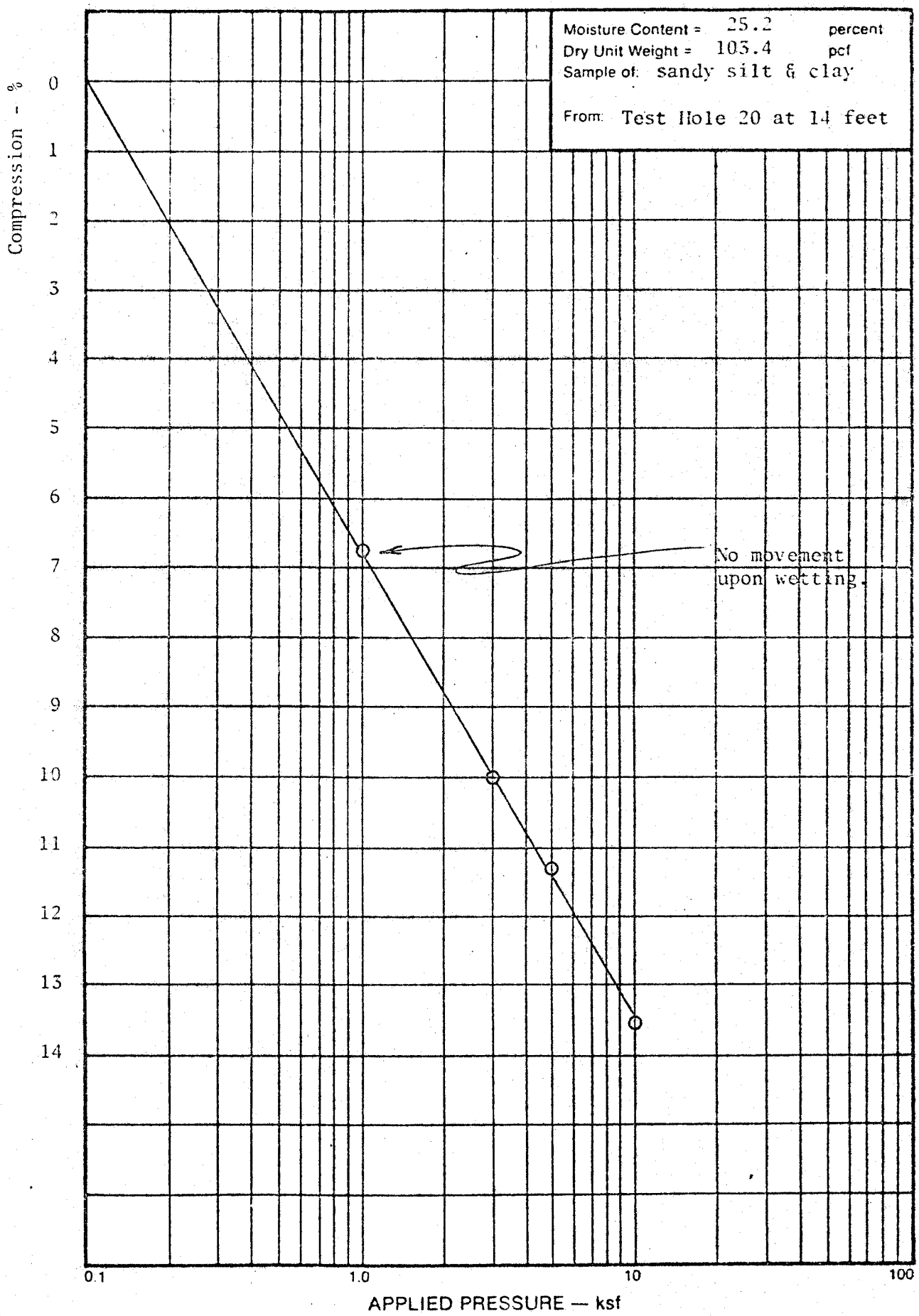

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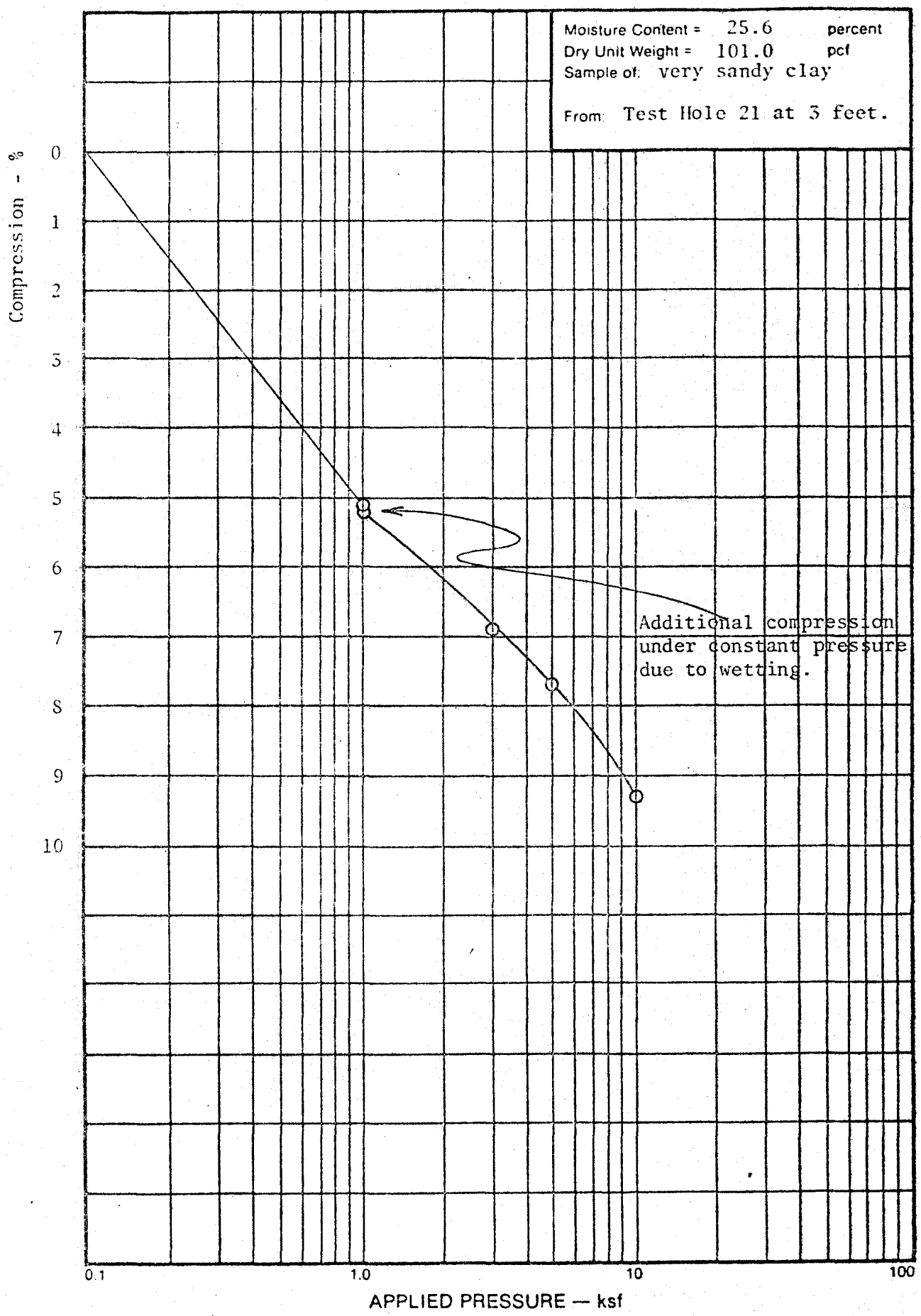
SWELL-CONSOLIDATION TEST RESULTS

Fig 12



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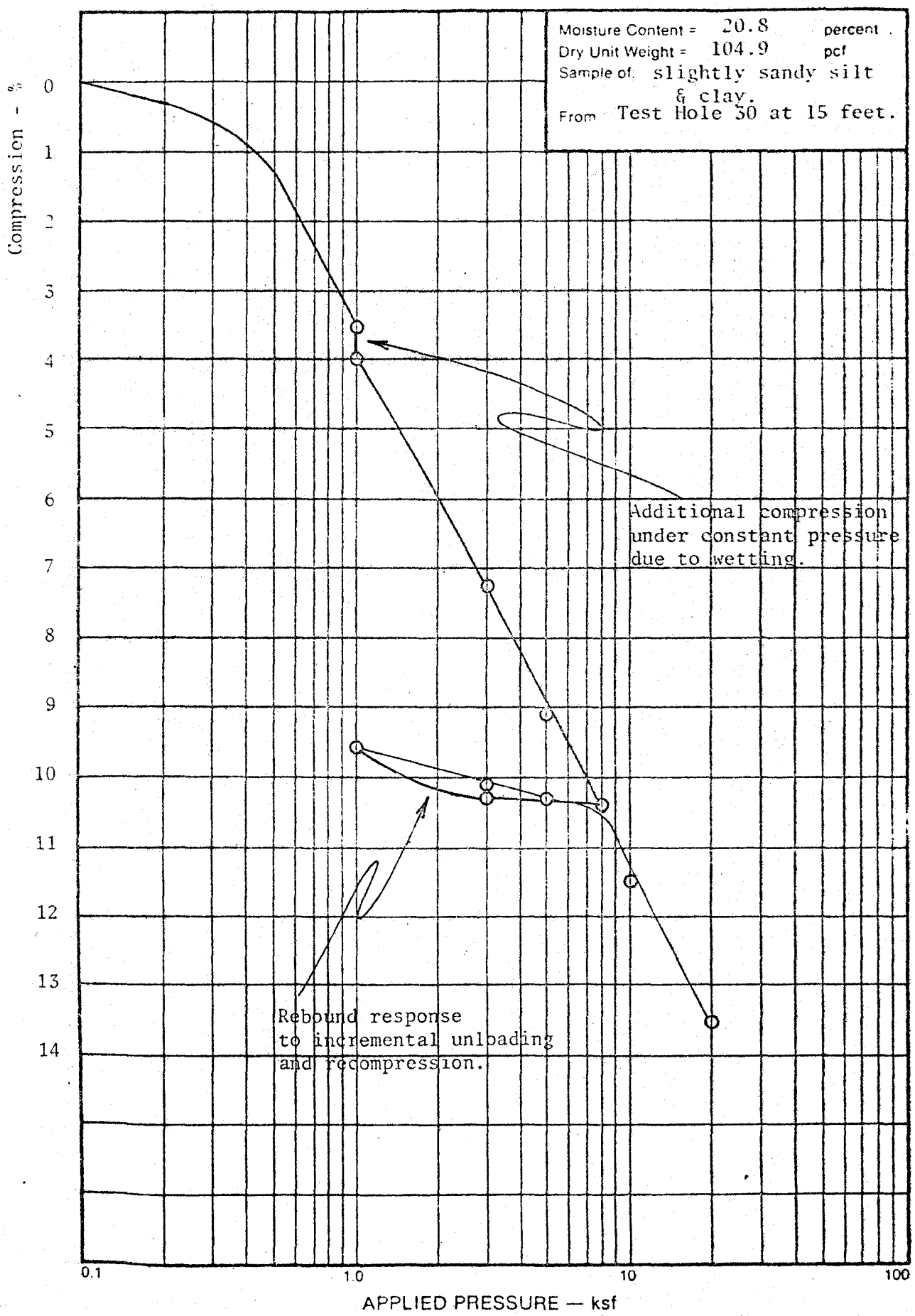
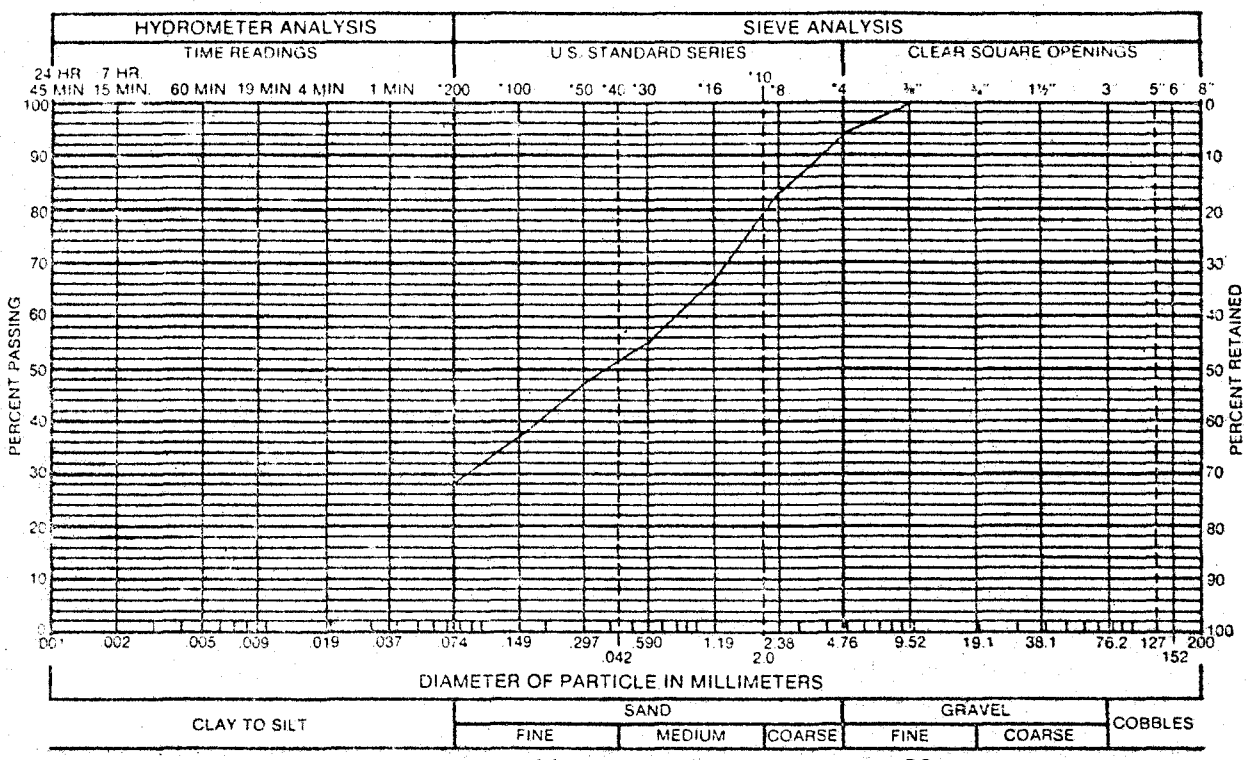
SWELL-CONSOLIDATION TEST RESULTS

Fig. 13



#23,493 SWELL-CONSOLIDATION TEST RESULTS Fig. 14

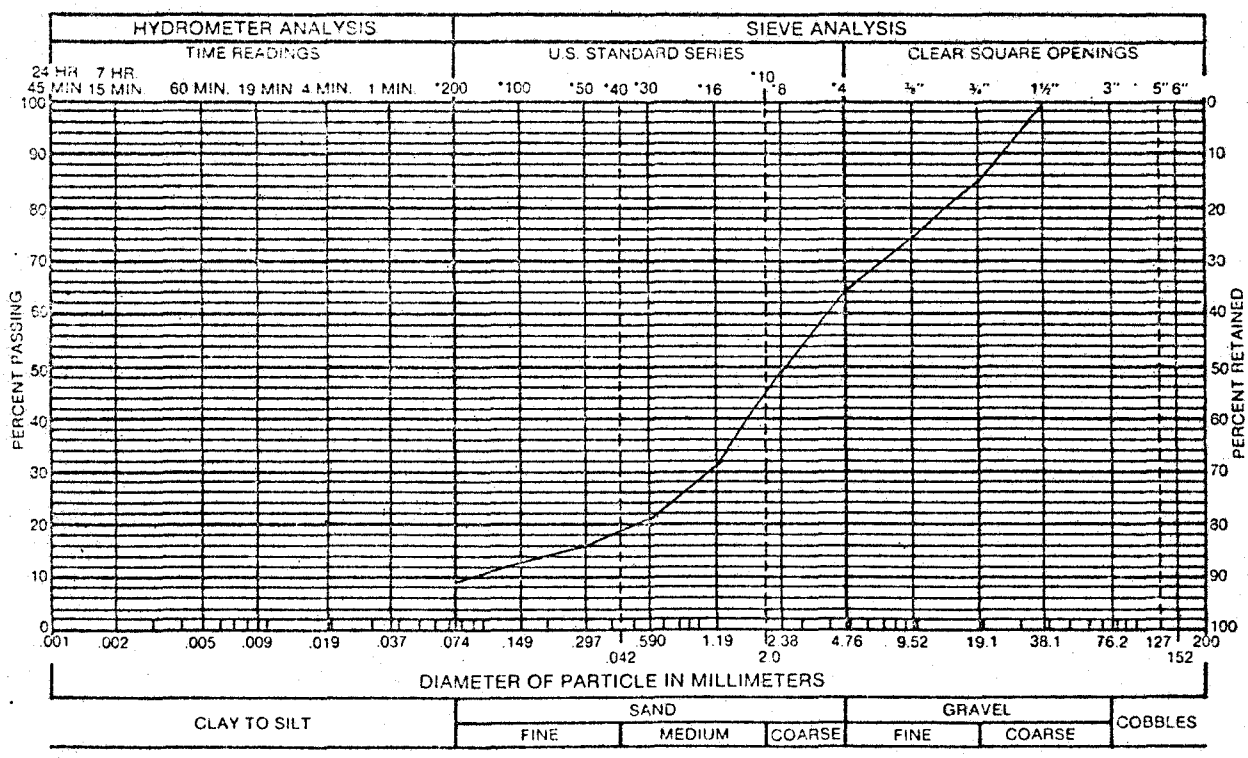
chen and associates, inc.



GRAVEL 6 % SAND 66 % SILT AND CLAY 28 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF silty sand FROM Test Hole 1 at 19 feet.

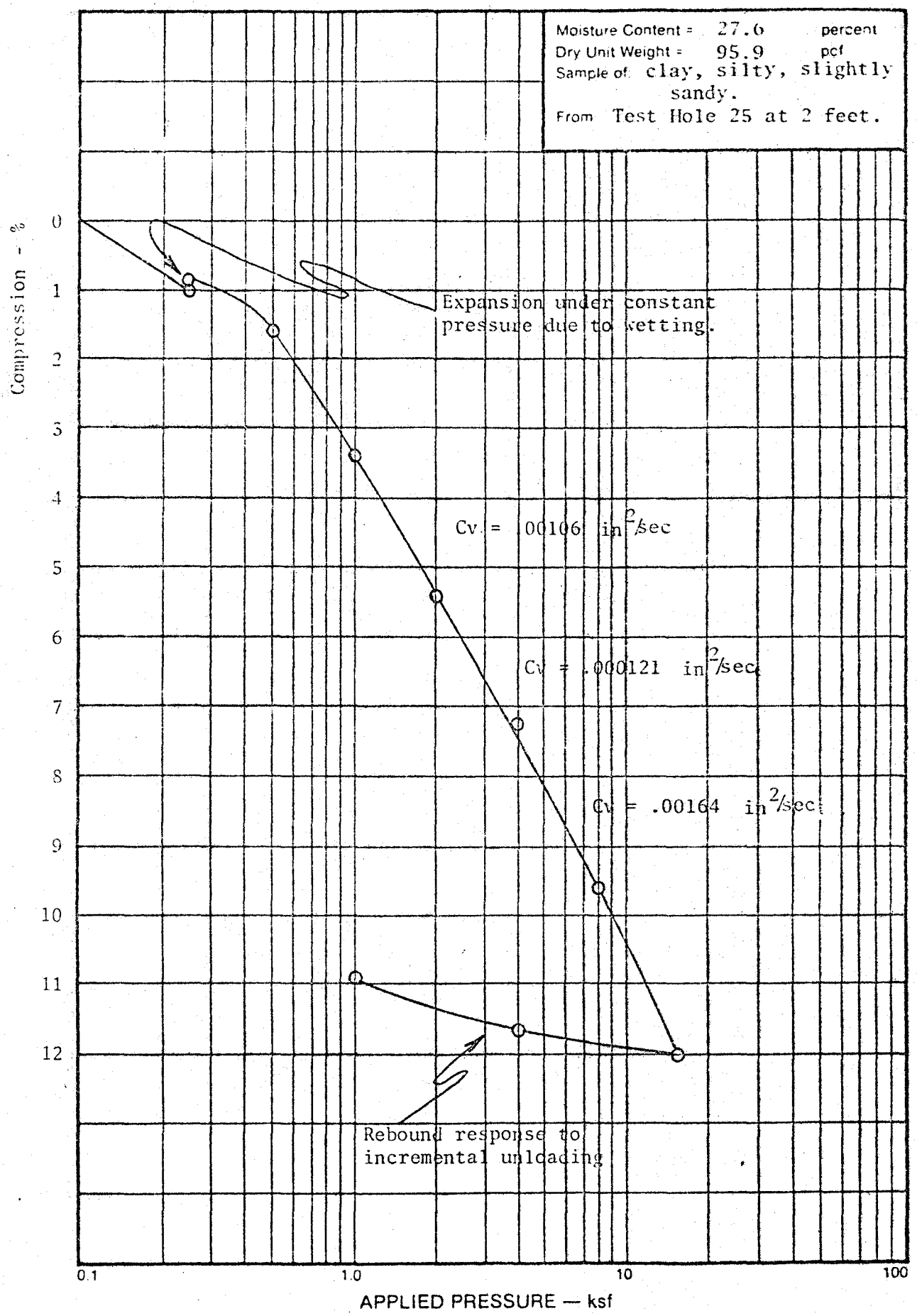


GRAVEL 36 % SAND 55 % SILT AND CLAY 9 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF gravelly sand FROM Test Hole 14 at 14 feet

#23,493 GRADATION TEST RESULTS Fig. 15



Time Rate

#23,493 SWELL-CONSOLIDATION TEST RESULTS Fig. 16

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Job No. 23,493
Sheet 1 of 2

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION		PERCENT PASSING NO. 200 SIEVE	ATTERBERG LIMITS		WSS	TSS	Ph	SOIL OR BEDROCK TYPE
HOLE	DEPTH (FEET)			GRAVEL (%)	SAND (%)		LIQUID LIMIT (%)	PLASTICITY INDEX (%)				
1	1	16.3	96.4			71	20	0				sandy silt
	4	29.9	92.8			93	40	21				slightly sandy clay
	19	16.7	109.9	6	66	28						very silty sand
2	4	25.6				75						sandy silt-clay
3	6	26.0				87						sandy silt-clay
4	9								0.775	1.10	7.5	very sandy clay
5	4	25.0				76	22	NP				sandy silt
7	2	31.9	90.7			92						slightly sandy silt-clay
8	2	27.4				90						slightly sandy silt-clay
9	7	23.2	101.9			86	30	13				sandy clay
12	3	29.6	97.6			80						sandy clay
13	3	21.3	100.0			64						very sandy silt
14	14	12.7	109.6	36	55	9						gravelly sand
	50	20.9	104.2			96	40	19				clay
19	9	24.6	103.8			86	30	12				sandy clay

CHEN AND ASSOCIATES

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION		PERCENT PASSING NO. 200 SIEVE	ATTERBERG LIMITS		WSS	TSS	Ph	SOIL OR BEDROCK TYPE
HOLE	DEPTH (FEET)			GRAVEL (%)	SAND (%)		LIQUID LIMIT (%)	PLASTICITY INDEX (%)				
20	14	25.2	103.4			80	22	5				sandy silt-clay
21	3	25.6	101.0			68						very sandy clay
24	3								0.219	0.15	7.9	very sandy clay
25	2	27.6	95.9									clay, silty, slightly sandy
30	15	20.8	104.9			92	23	7				slightly sandy silt-clay
31	4	26.0	102.3			88	23	NP				sandy silt
34	2	21.2	102.6			83	20	NP				sandy silt
35	2	24.8	104.0			91	19	0				slightly sandy silt
36	1	25.9	95.6			98	31	12				clay
37	1.5	25.0	107.4			70	20	1				very sandy silt
38	1	23.4	99.9			75	24	7				sandy silt-clay

REVIEW SHEET SUMMARY

FILE NO. 30-80 TITLE HEADING Country Glen Apartments DUE DATE 4/12/82

ACTIVITY - PETITIONER - LOCATION - PHASE - ACRES Petitioner: Country Glen Associates/ John S. Neilson. Location: Northeast corner of F.5 and 25 Road. A request for a final plat and plan of 256 units on 13.382 acres in a planned residential zone at 21 unt-s per acre.

a. Consideration of final plat.

b. Consideration of final plan.

PETITIONER ADDRESS 715 Horizon Drive, Suite 490, Grand Junction, CO 81501

ENGINEER ARIX

DATE REC.	AGENCY	COMMENTS
4/7/82	Ute Water	No objection to development. The project will be served from a newly installed 12" water main in 25 Road. However, the on-site water system is not acceptable to the Ute District as proposed. If the developer wishes to remain totally responsible for the maintenance of all on-site water lines, the objections to the proposed system will be dropped. If the developer wishes the Ute District to assume responsibility for any part of the on-site system, changes will be necessary. 1.) Water lines located in easements must be confined between curb and gutter. No part of the main line shall be installed under parking (driving lanes only), and no part of the main line shall be located between buildings or through landscaped areas. 2.) Easement widths for water mains shall be no less than 20 feet in width with the main centered therein. 3.) Domestic water meters shall be limited to a maximum of one per building with a strong possibility that a meter may serve more than one building. The engineer is requested to indicate domestic service lines up to and including the desired meter locations. 4.) The 8" line indicated along F 1/2 Road shall be installed within the North 1/2 of dedicated R.O.W. and not on the property. This line will extend to the East property boundary, regardless of service connection points for the development. 5.) All water lines 6" or greater in diameter shall be Class 150 AC pipe. Water lines 2", 3" or 4" in diameter shall be Class 200 Solvent Weld PVC. 6.) Water line installation shall be in accordance with Ute Water Specifications. Following receipt and approval of a corrected Utility Composit and Plat (Water line easement width & location), the Developer is required to submit two sets of detailed Water Line Construction Drawings. Policies and fees in effect at the time of application will apply.
4/9/82	Mountain Bell	Easements are adequate for our use.
4/9/82	City Utilities	Although easements are shown for sanitary sewer lines the city sewer maintenance equipment could not get to many of the manholes as shown.
4/12/82	Transportation Engineer	Bumper stops (or some other method) should be installed on all parking stalls adjacent to sidewalks to prevent vehicles from encroaching over the sidewalks and interfering with pedestrians.
4/13/82	Planning Staff Comments	1. Is Filing #1 intended to be a 1 lot or 2 lot subdivision? If it's 1 lot, then phasing line should be eradicated, so not to lend confusion. 2. What is the total percentage of open space?

DATE REC.	AGENCY	COMMENTS
	Planning Staff Comments (Cont.)	3. Previous staff comments on 4/16/80 still apply. 4. Trash pick-up should be coordinated with Bill Reeves, Sanitation Engineer. 5. How will the landscaping be maintained? 6. Lighting scheme should be shown on plan. 7. Need POA prior to recording plat. 8. Project must obtain building permit within 1 year of final approval or be scheduled for rehearing. 9. Low profile at entries, sight-distance should be checked so no hazards exist. 10. Sidewalks should be wide enough to prevent car overhang from being a problem. 11. Some parking stalls in question. 12. Development to north should take into consideration Country Glen's entry on 25 Road. 13. Need elevation and dimension, or are they the same as previously submitted?
4/13/82	G.J. Fire	Fire hydrants and line size as shown on plan is not adequate as shown. The proposed 6 inch line must be increased to an 8 inch. 5 additional fire hydrants must be installed at the following locations. 1. North access to development off of 25 Rd. 2. North east corner of access (24 plex). 3. Southeast access from F½ Rd. 4. Center access from F½ Rd. 5. Corner of F½ and 25 Rd. on road right of way. 6. Relocate on site hydrant off of F½ Rd. near 12 plex and 8 plex, 25 F½ Rd. across parking lot to north. We estimate a required fire flow of 4250 GPM. Every 3 story building containing 15 or more apartments must have an approved fire alarm system meeting requirements of NFPA #72 (a,b,c,). Building must be provided with adequate fire extinguisher to meet N.F.P.A. #10. Although not required by fire code, we would recommend that a standpipe system be installed. This could be dry pipe system for the larger apartment building. Water line, and fire hydrants must be installed before construction.
4/14/82 Late 4/13/82 "		GW. Drainage P.S. Co.
4/19/82	City Engineer	20 ft. wide easements should be granted for all sanitary sewers. Power of attroney for full street improvements should be granted for F 1/2 Road and 25 Road. Vehicular access should be provided to all sanitary sewer manholes to allow flushing maintenance operations. Grades and pipe sizes are not shown on the sanitary sewer plan but 8 inch minimum pipe size and 0.4% minimum sewer grade are required as stated in note no. 5. Detailed plans for the sanitary sewer system should be submitted for my review and approval prior to construction. A financial guarantee in accordance with Development Regulations Section 27-2.3 should be obtained for all public improvements.
4/16/82-Late-		City Parks

DATE REC.	AGENCY	COMMENTS
5/6/82	GJPC Minutes of 4/27/82	MOTION: (COMMISSIONER SUSAN RINKER) "ON FILE #30-80, FINAL PLAT COUNTRY GLEN APARTMENTS, I MOVE THAT WE FORWARD TO CITY COUNCIL WITH THE RECOMMENDATION FOR APPROVAL, SUBJECT TO STAFF AND REVIEW AGENCY COMMENTS." COMMISSIONER BILL O'DWYER SECONDED THE MOTION. CHAIRMAN LITLE REITERATED THE MOTION, CALLED FOR A VOTE, AND THE MOTION CARRIED UNANIMOUSLY. MOTION: (COMMISSIONER SUSAN RINKER) "ON FILE #30-80, FINAL PLAN COUNTRY GLEN APARTMENTS, I MOVE THAT WE FORWARD TO CITY COUNCIL WITH THE RECOMMENDATION FOR APPROVAL, SUBJECT TO STAFF AND REVIEW AGENCY COMMENTS." COMMISSIONER O'DWYER SECONDED THE MOTION. CHAIRMAN LITLE REITERATED THE MOTION, CALLED FOR A VOTE, AND THE MOTION PASSED 5-0.

#30-80

Ray Rushing? Dev. Dept.?

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL/AREA OFFICE
EXECUTIVE TOWER - 1405 CURTIS STREET
DENVER, COLORADO 80202

February 19, 1981

Put in Country Glen PD File

REGION VIII

IN REPLY REFER TO:
8HDH

Mr. Brad Calbert
Victorio Mortgage Company
3400 Stapleton Plaza
Denver, Colorado 80207

Dear Mr. Calbert:

Your request for a Firm Commitment for Project Mortgage Insurance on Country Glen Apartments, located in Grand Junction, Colorado, will be accepted at any time during the life of this commitment. Your request must conform in content to previous submissions in connection with the proposal. (Requests for Firm Commitments must be accompanied by contract drawings and detailed specifications, as well as firm cost estimates shown on FHA Form 2328.)

The project will have the following characteristics:

Total Units 108, Type of Building Walkup, with unit compositions of:

Type of Unit	Sq. Ft.	Number	Monthly Market Rental
1 BR	597	30	$310
2 BR	731	24	$370
2 BR	726	32	$370
2 BR (Sec. 8)	726	20	$399
2 BR (Sec. 8 HC)	803	2	$399

Equipment and services included in rent are: Ranges, refrigerators, air conditioning, kitchen exhaust fan, laundry facilities, disposal, dishwasher, carpet, drapes, swimming pool, tennis court, water and trash removal.

Number of Parking Spaces: 209 open spaces.

The estimated project replacement cost of this project is $3,933,363, which includes $420,000 as the Department of Housing and Urban Development's (HUD) estimate of the value of the land with off-site improvements installed (note: Excess costs resulting

from unusual on-site conditions which will be provided for in the construction cost estimate will be deducted from this value and will also affect the "as is" land value for cost certification purposes, or the "as is" value of the property in rehabilitation projects). Included in the development cost estimates are the following items: Cost of structures and land improvements, carrying charges and financing, legal, cost certification and organizational expenses, consultant's fee (if applicable), design and supervisory architect's fee, bond premium, management fund (if applicable), contingency reserve (if rehabilitation), builder's and sponsor's profit, and risk allowance (if applicable) or builder's profit.

The maximum insurable mortgage supportable by the economics of the proposal is $3,156,300. This represents a mortgage loan to replacement cost ratio of 80 percent. The cash you will be expected to furnish at closing is estimated to be $525,156 (which includes equity investment, working capital and off-site construction costs). Please contact Mr. Carl Iverson at 837-2431, who will advise you on the correct preparation of FHA Form 2328, Contractor's and/or Mortgagor's Cost Breakdown.

The above basic elements of the proposal upon which our estimates are computed cannot be altered without affecting the conclusions contained herein. The completed project must meet applicable code requirements and the HUD Minimum Property Standards.

Final development of the proposal must be coordinated with the FHA Design Representative, Mr. Bill Dickerson at 837-5961, assigned to this project. Mr. Dickerson will be available to assist the sponsor and the architect with the development of the final design and off-site requirements. Enclosed is a list of architectural deficiencies noted in the review of the Conditional Commitment application.

It should be noted that this commitment does not constitute approval of the 22 proposed Section 8 units. Section 8 Contract Authority is not presently available for this project.

The approval of this commitment is conditioned upon the following exhibits being submitted prior to submission of the firm commitment application:

1. Rents and expenses are based on gas baseboard hot water heat and domestic hot water. Project must be revised to reflect gas heat as electric heating adversely affects marketability and the mortgage;

2. Air conditioning for each unit required by the Grand Junction market area and project should be revised to include it;

3. Site boundary along ditch/canal must be fenced to provide physical barrier for safety of occupants;

4. Radiation hazards to be removed and site radiation levels accepted in letter from Colorado Department of Health;

5. Sponsor must submit evidence that the high pressure gas pipeline at west edge of property meets Title 49, "Transportation" of the Code of Federal Regulations, parts 192.607, 192.609. 192.611 and 192.613;

6. Sponsor must submit from local authorities evidence of domestic water and sewer availability and willingness to serve; and

7. Subject site is located within a 500 year floodplain and design and construction plans should reflect floodproofing measures.

Your application must be submitted within 120 days following the date of this letter, otherwise this Conditional Commitment will expire. Any renewal or extension of this commitment may be based either upon this commitment or upon reexamination of the proposal, at the option of this office.

If none of the aforementioned project characteristics and figures established herein are changed in the Request for Firm Commitment and if the final drawings and specifications submitted with the Request and the firm cost estimates are acceptable to HUD, HUD will issue a Firm Commitment for a maximum loan in the amount shown above. If you should have any questions in regard to this letter, please contact Ms. Ann Kizzier, Multifamily Housing Representative, at (303) 837-3563.

Sincerely,

Donald J. Dirksen
Director
Office of Regional Housing

Enclosures

ARCHITECTURAL REVIEW COMMENTS

PROJECT NAME: Country Glen

Project No.: 101-35302-PM-L8/C099-0056-003

Location: Grand Junction, Colorado

Date of Review report: August 5, 1980

1. ~~LUI number assigned to the project should be indicated on the drawings.~~ MPS

2. There is a potential problem of headlight glare and exhaust emissions into garden level apartments must be set back from sidewalk 8' minimum. See MPS 4910.1, 307-2.2.

3. Provide minimum 5% handicapped parking spaces, per MPS 4910.1, 306-2.2.

4. Provide an 8' width minimum distances between parking bays. Maximum number of spaces per bay is 20. See MPS 4910.1, 306-4.3.

5. Provide speed breaks to prevent fast travel per MPS 4910.1 306-5.1.

6. Space must be set aside for maintenance employee parking. See MPS 4910.1, 314-4.2.

7. Provide management and maintenance space per MPS 4910.1, 401-2.2.

8. Provide space for project storage and identify this space on the drawings, see MPS 4910.1, 401-2.4.

9. Provide additional garbage areas. Garbage areas should be within 150' of all dwelling units.

10. Provide furniture layout for all units. Unit "D" primary bedroom is too small per Table 4-1.1.

11. Provide 36" ref. space unit "C" per Table 4-1.2.

12. Provide at least 5% of total number of units designed specifically for handicapped including bathrooms and kitchens. See Multifamily Exhibit Checklist.

13. Provide minimum 18" adjacent to wall oven unit "E" handicapped, per Table 4-1.2.

14. Provide separate storage cabinet minimum 30" wide, 2-18" deep shelves, 6" shelves on the doors an 48" to the top shelf. Handicapped unit only, per Multifamily Exhibit Checklist. Provide lap or chop boards which rest on wheelchair arms.

15. Range must have front controls handicapped units only.

16. "Provide note to drawings." Double sink must drain to back and side and bowls must be undercoated. Sinks must have lever type faucets in handicapped units only.

17. Provide tilt mirror in handicapped bath. Provide horizontal and vertical grab bars. Show mounting HT.

18. Non-scald valves are required in showers for handicapped.

19. Add note: "Primary bedroom closet rod must be adjustable to 48" above floor."

20. Provide 1' door clearance on the latch side of the entry door per Multifamily Exhibit Checklist.

21. Add following note to drawings:

    "Lavatory with 4" deep undercoated bowl and lever-type faucet, drains at side or rear, any exposed hot water piping and drains to be well insulated, and front edge capable of withstanding a 250 pound load (Lavatory legs not acceptable) mounting height two feet ten inches.

22. Provide additional interior general storage for unit "C" 200 cu. ft. required, we calculated 162 cu.ft. Unit "B" is acceptable if one of the shelf areas is removed in either bedroom and folding doors are provided. Unit "D" 150 cu.ft. minimum is required, we calculated 120 cu.ft.

23. Parking lot aisle width should be minimum 26' per 401-62.

24. All entrances to living units must be 3'-0", per MPS 4910.1, 402-3.2.

25. Provide attic access minimum 14"x22" outside of units, per 402-3.11, 402-3.9.

26. Architect must insure that adequate structural ventilation is provided, per Table 4-3.1.

27. Architect must insure that fire alarms are provided per 405-14.1 (a).

William H. Dickerson
Review Architect

Memorandum

U.S. DEPARTMENT OF
HOUSING AND URBAN DEVELOPMENT

TO : Art Tonelli, Director, Multifamily
A&E Division, 8HDE

DATE: August 12, 1980

IN REPLY REFER TO:
8HDE

FROM : R. C. Steele, Multifamily A&E Division, 8HDE

SUBJECT: CIVIL AND SANITARY ENGINEERING
Country Glen, 101-35302-PM-L8/C099-0056-003
25th Road and F½ Road
Grand Junction, Colorado

I have reviewed the enclosed exhibits and talked by phone with Miss K. F. McIntyre with Paragon Engineering, Inc.

Drainage and Grading - As was discussed HUD needs a better scale than the 1"=400', probably 1"=100' or less. The fully developed 100 year flows ($Q_{100's}$) from the 12 acres onsite and 50 acres offsite shed routed on surface is needed. This may involve diversion to the west via a culvert across 25 Road. The site plan should show the natural topography, finish grades, flow arrows, detention, etc.

1. Inverted crowns are not acceptable.

2. If the curb Section of Sheet 4 is used then it must have:

   a. No concentrated flows.

   b. No wheels against the curb but held back with wheel stops.

   c. Backfill a depth of 6", preferably full depth, on side opposite asphalt.

3. Show the 100 year floodplain on Leach Creek shown on a scale 1"=100'.

4. Provide minimum grades per MPS.

5. Follow data sheet 79_g as may be indicated.

Water and Sanitary Sewerage

1. Show a separate irrigation system and annual cost because of the high cost of Ute Water.

2. Show limits of ownership, operation and maintenance:

   a. Ute Water Conservancy District.

   b. City of Grand Junction Sewerage system.

3. Limit line sizes:

   a. Water - 3/4"-1 LU, 1"/2, 1¼"/4, 1½"/7, 2"/14, 2½"/28.

   b. Sewer - 4"/4 units.

4. Provide flowline elevations at all junctures from tie to municipal system to upper ends of building sewers and FF's.

5. Provide minimum 2% grade on all 4" sewers.

6. A curvilinear sewer from MH 79.2 to MH 82.0 would not only eliminate the need of MH 81.1 but we believe would be a better design. See attachment.

R.C. Stark
Regional Site/Sanitary Engineer

Attachment

FHA FORM NO. 2264-A
Rev. 9/70

U. S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL HOUSING ADMINISTRATION

SUPPLEMENT TO PROJECT ANALYSIS

SECTION/TITLE 221D4

☐ FEASIBILITY
☒ CONDITIONAL
☐ FIRM

Name of Mortgagor: Country Glen, Ltd.

Project No.: 101-35302-PM

Name of Project: Country Glen Apartments

Location of Project (Street, City and State): Grand Junction, Colorado

TYPE OF MORTGAGOR

☐ Private ☒ Profit ☐ Public ☐ Non-Profit ☐ State or Federal Instrumentality, etc.
☐ Management Coop. ☐ Sales Coop. ☐ Investor-Sponsor ☐ Builder-Seller ☐ Limited Distribution

TYPE OF PROJECT

☒ Rental Housing ☐ Nursing Home ☒ New Construction ☒ Non-Elevator
☐ Cooperative ☐ Intermediate Care Facility ☐ Rehabilitation ☐ Elevator
☐ Condominium ☐ Housing for the Elderly ☐ Redevelopment ☒ Walk-UP
☐ Land Development ☐ Mobile Home Court ☐ Supplement Loan ☒ 108 Units

I - DETERMINATION OF MAXIMUM INSURABLE MORTGAGE

CRITERIA	(COL. 1)	(COL. 2)	(COL. 3)
1. MORTGAGE OR LOAN AMOUNT REQUESTED IN APPLICATION			$ 3,587,611
2. STATUTORY DOLLAR LIMIT			$ X
3. AMOUNT BASED ON VALUE OR REPLACEMENT COST:			
a. Value (Replcmt. Cost) in Fee Simple $ 3,933,363 × 90 %		$ 3,540,026	
b. Value of Leased Fee $ ____ × ____ %	$		
c. Unpaid Balance of Special Assessment	$		
d. Total Item b Plus Item c		$ 0	
e. Item a Minus Item d			$ 3,540,000
4. AMOUNT BASED ON LIMITATIONS PER FAMILY UNIT:			
a. Number of no Bedroom Units ____ × $ ____	$		
Number of one Bedroom Units 30 × $ 30,399	$ 911,970		
Number of two Bedroom Units 78 × $ 36,743	$ 2,865,954		
Number of three Bedroom Units ____ × $ ____	$		
Number of four or more Bedroom Units ____ × $ ____	$		
b. Cost not Attributable to Dwelling Use $ 3,513,365 x 31% = 108,914 + 209,816 = 318,730 × 90 %	$ 286,857		
c. Item a Plus Item b		$ 4,064,781	
d. Total Number of Spaces ____ × $ ____		$ 0	
e. Sum: Value of Leased Fee and Unpaid Balance of Special Assessment(s)		$ 0	
f. Item c or Item d whichever is applicable - minus Item e			$ 4,064,700
5. AMOUNT BASED ON DEBT SERVICE RATIO:			
a. Mortgage Interest Rate	7.5 %		
b. Mortgage Insurance Premium Rate	.5 %		
c. Initial Curtail Rate	.396850 %		
d. Sum of Above Rates		8.396850 %	
e. Net Income $ 294,483 × 90 %		$ 265,034	
f. Annual Ground Rent $ ____ + Annual Spec.Ass'm. $ ____		$ 0	
g. Item e Minus Item f		$ 265,034	
h. Item g Divided by Item d			$ 3,156,300
6. AMOUNT BASED ON ESTIMATED COST OF REHABILITATION PLUS:			
(i) "As Is" Value, or (ii) Acquisition Cost, or (iii) Existing Mortgage Indebtedness Against Property Before Rehabilitation:			
a. Estimated Cost of New On-Site Improvements	$		
b. Estimated Cost of New Off-Site Construction	$		
c. Total Carrying Charges, Financing and Contingency Reserve	$		
d. Total Legal, Organization and Consultants Fee, if any	$		
e. Sum of Item a through Item d		$	
f. "As Is" Value of Prop. Before Rehab. $ ____ × ____ %	$		
g. Existing Mortgage Indebtedness (Property Owned) or Purchase Price of Property (To be Acquired)	$		
h. Item e Plus Item f or Item g, whichever is lesser		$	
i. Item h × ____ %			$ X
. AMOUNT BASED ON MORTGAGOR'S TOTAL COST OF ACQUISITION:			
a. Purchase Price of Project	$		
b. Repairs and Improvements, if any	$		
c. Total Carrying Charges, Financing, Legal and Organization	$		
d. Sum of Item a through Item c		$	
e. Item d × ____ %			$ X

CRITERIA			(Col. 3)
8. AMOUNT BASED ON SUM OF UNIT MORTGAGE AMOUNTS			$ X
9. AMOUNT BASED ON ESTIMATED COST TO MORTGAGOR:			
a. Total Estimated Cost *(Exclusive of Site and Required Construction Off the Site)*	$		
b. Purchase Price of Site	$		
c. Total Cost of Clearing Site, if any	$		
d. Expense of Relocating Occupants, if any	$		
e. Cost of Off-Site Construction, if any	$		
f. Sum of Item a through Item e		$	
g. Item f x _____ %			$ X

MAXIMUM INSURABLE MORTGAGE *(Lowest of the Foregoing Criteria)* $ 3,156,300

II - TOTAL REQUIREMENTS FOR SETTLEMENT

PART A -

1. Development Cost	$	3,513,363
2. Land Indebtedness *(or Cash Required for Land Acquisition)*	$	210,628
3. Subtotal *(Line 1 + 2)*	$	3,723,991
4. Mortgage Amount	$ 3,156,300	
5. Fees not to be Paid in Cash	$ 318,414	
6. Line 4 − Line 5	$	3,474,714
7. Cash Investment Required *(Line 3 Minus Line 6)*	$	249,277
8. Initial Operating Deficit	$	1,845
9. Commitment, Marketing Fees, Discount(s)	$	78,908
10. Working Capital	$	63,126
11. Off-Site Construction Costs	$	132,000
12. TOTAL ESTIMATED CASH REQUIREMENT *(Lines 7+8+9+10+11)*	$	525,156

FRONT MONEY ESCROW, IF ANY, DETERMINED BY SUBTRACTING LINE 6 AMOUNT FROM LINE 1 AMOUNT. $ 38,649

PART B -

1. FEES NOT TO BE PAID IN CASH:		
a. BSPRA	$	318,414
b. Architect *(Design)*	$	
c. Builder's Profit	$	
d. Other	$	
TOTAL TO PART A, LINE 5	$	318,414
2. COMMITMENT, MKTG., FEES & DISCOUNT(S):		
a. Fees: GNMA	$	
FNMA	$	
Other	$	
b. Discount(s): Perm. Loan -- 2.5%	$	78,908
Constr. Loan	$	
TOTAL TO PART A, LINE 9	$	78,908
3. WORKING CAPITAL:		
a. Working Capital -- 2%	$	63,126
b. Ground Rent During Construction	$	
c. N/R Items not Included in Mortgage	$	
TOTAL TO PART A, LINE 10	$	63,126

III - SOURCE OF FUNDS TO MEET CASH REQUIREMENTS

SOURCE:	AMOUNT
"See Financial Analysis Worksheet"	$
	$
	$
	$
	$

TOTAL AVAILABLE CASH FOR PROJECT $

IV - RECOMMENDATIONS, REQUIREMENTS AND REMARKS

[X] RECOMMEND APPROVAL - SUBJECT TO CONDITIONS STATED BELOW, IF ANY

[ ] RECOMMEND REJECTION FOR REASONS STATED BELOW:

Remarks: Current credit reports and financial statements (Form 2417) must be submitted at firm commitment. Also, sponsor must indicate how he plans to meet cash investment requirement based on current financial statement.

Date 1/28/81 (Signed) W.D. Jordan
Processor, Technician or Examiner

Date 1-28-81 [X] Approved [ ] Rejected (Signed) _____
Chief, Deputy Chief "Finance & Mortgage Credit" or "Mortgage Credit" Section

112712-P Rev. 9 75

A FORM NO. 2264
Rev. 5/70

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL HOUSING ADMINISTRATION

RENTAL HOUSING

PROJECT INCOME ANALYSIS AND APPRAISAL

☐ SAMA
☐ Feasibility (Rehab)
☒ Conditional
☐ Firm

Project Name: COUNTRY GLEN
Project No.: 101-35302-PM-L8/C099-0056-003

LOCATION AND DESCRIPTION OF PROPERTY:

1. Street Nos.	2. Street	3. Municipality	4a. Census Tract No.	4b. Placement Code	5. County
NEC	25 Rd. & F½ Rd	Grand Junction			Mesa

State and Zip Code	7. Type of Project	8. No. Stories	9. Foundation
Colorado	☐ Row (T.H.) ☐ Detached ☐ Elevator ☒ Walkup ☐ Semi-Detached	2½	☒ Slab on Grade ☐ Full Bsmt. ☐ Partial Bsmt. ☐ Crawl Space

6. Basement Floor	10. Number of Units: Proposed	Revenue	Non-Rev.	12. No. of Bldgs.	13. List Accessory Bldgs. and Area	13a. List Recreation Facilities and Area
☐ Structural Slab ☒ Slab on Grade	☒ Proposed ☐ Existing	108		6	laundry mail 1120 sf	tot lot, tennis, pool

SITE INFORMATION

11. Dimensions	14. Zoning: (If recently changed, submit evidence)
irregular 239,790 ft. by ft. or 5.5 AC sq. ft.	21 Units ACRE PUD

BUILDING INFORMATION

16. Yr. Built	16.a	17. Structural System	17.a Floor System	17.b Exterior Finish	18. Heating-A/C System
N/A	☐ Manufactured Housing ☐ Modules ☐ Components ☒ Conventionally Built	wood frame	slab & joist	cedar	EBB

INFORMATION CONCERNING LAND OR PROPERTY:

19. Date Acquired	20. Purchase Price	21. Additional Costs Paid or Accrued	22. If Lease-Hold, Annual Ground Rent	23.a Total Cost	23.b Outstanding Balance	24. Relationship-Business, Personal or Other Between Seller and Buyer
	$	$	$	$	$	

25. Utilities - Public

		Community	Distance From Site
Water	☒	☐	approx. 42'
Sewers	☒	☐	approx. ½ mi.

26. Unusual Site Features -
☐ Cuts ☐ Fills ☐ Rock Formations ☐ Erosion ☒ None
☐ Poor Drainage ☐ High Water Table ☐ Retaining Walls
☐ Other (Specify) _____ ☐ Off Site Improvements

ESTIMATE OF INCOME:

No. of Each Family Type Unit	Rentable Living Area (Sq. Ft.)	Composition of Units	Unit Rent Per Month	Total Monthly Rent For Unit Type
12 "A" 1 BR 18 "D" 1 BR	597 562	LIV, DA, KIT, BA LIV, DA, KIT, BA	$ 310	$ 9,300
24 "B" 2 BR	731	LIV, DA, KIT, BA	370	
32 "C" 2 BR	726	LIV, DA, KIT, BA	370	20,720
20 "C" 2 BR (Sec 8)	726	LIV, DA, KIT, BA	399	
2 "E" 2 BR (Sec. 8)	803	LIV, DA, KIT, BA	399	8,778
		TOTAL ESTIMATED RENTALS FOR ALL FAMILY UNITS		$ 38,798
29. No. Parking Spaces- ☐ Attended ☐ Self Park		Open Spaces 209 @ $ _____ per month		0
		Covered Spaces _____ @ $ _____ per month		
30. Commercial*		Area-Ground Level _____ Sq. Ft. @ $ _____ per sq. ft./mo.		
Attach Documentation		Other Levels laundry 3.00 unit Sq. Ft. @ $ _____ per sq. ft./mo.		324
31.		TOTAL ESTIMATED GROSS PROJECT INCOME AT 100% OCCUPANCY		$ 39,122
32.		TOTAL ANNUAL RENT (Item 31 x 12 months)		$ 469,464

33. Gross Floor Area-	34. Net Rentable Residential Area-	35. Net Rentable Commercial Area-
82,237 Sq. Ft.	74,206 Sq. Ft.	Sq. Ft.

36. NON-REVENUE PRODUCING SPACE

Type of Employee	No. Rms.	Composition of Unit	Location of Unit in Project

37. EQUIPMENT AND SERVICES INCLUDED IN RENT: (Check Appropriate Items)

37. EQUIPMENT -
☐ Ranges (Gas or Elec.)
☒ Refrig. (Gas or Elec.)
☐ Air Cond. (Equip. Only)
☐ Kitchen Exhaust Fan
☐ Laundry Facilities
☐ Other _____
☒ Disposal
☒ Dishwasher
☒ Carpet
☒ Drapes
☐ Swimming Pool
☐ Tennis Court

38. SERVICES - *PBE for Sec. 8 units
GAS: ☐ Heat * ☐ Hot Water * ☐ Cooking ☐ Air Conditioning
ELEC: ☐ Heat ☐ Hot Water ☐ Cooking * ☐ Air Conditioning ☐ Lights, etc. in Unit *
OTHER FUEL: ☐ Heat ☐ Hot Water
☒ WATER ☒ OTHER trash

39. SPECIAL ASSESSMENTS:
a. ☐ Prepayable ☐ Non-Prepayable
b. Principal Balance $ _____
c. Annual Payment $ _____
d. Remaining Term _____ Years

PREVIOUS EDITION OF THIS FORM ARE OBSOLETE

ESTIMATE OF ANNUAL EXPENSE:

ADMINISTRATIVE–
Advertising ---------- $ ____
Management ---------- ____
Other ---------- ____
TOTAL ADMINISTRATIVE -- $ 42,012

OPERATING–
Elevator Main. Exp. ------ $ ____
Fuel *(Heating and Domestic Hot Water)* ____
Lighting & Misc. Power ---- ____
Water ---------- ____
Gas ---------- ____
Garb. & Trash Removal ---- ____
Payroll ---------- ____
Other ---------- ____
TOTAL OPERATING ------ $ 27,108

MAINTENANCE–
Decorating ---------- $ ____
Repairs ---------- ____
Exterminating ---------- ____
Insurance ---------- ____
Ground Expense ---------- ____
Other ---------- ____
TOTAL MAINTENANCE ------ $ 27,000

Replacement Reserve (.0060 x total structures Line 41) ---------- $ 12,842
TOTAL OPERATING EXPENSE ---- $ 108,962

TAXES–
Real Estate: Est. Assessed Value $ @ $ per $1000 --- $ ____
Personal Prop. Est. Assessed Value $ @ $ per $1000 --- ____
Empl. Payroll Tax ---------- ____
Other ---------- ____
Other ---------- ____
TOTAL TAXES ---------- $ 33,156

TOTAL EXPENSE *(Attach Worksheet)* 1316 ------ $ 142,118

INCOME COMPUTATIONS:

Estimated Project Gross Income *(Line C 32 Page 1)* ------ $ 469,464
Occupancy *(Entire Project)* Percentage ---------- .93 %
Effective Gross Income *(Line 30 x Line 31)* -- $ 436,601
Total Project Expenses *(Line 29)* --------- $ 142,118
Net Income to Project *(Line 32 – Line 33)* --- $ 294,483
Expense Ratio *(Line 29 ÷ Line 32)* -------- 33 %

G. ESTIMATED REPLACEMENT COST:

36a. Unusual Land Improvements -- $	247,790		
36b. Other Land Improvements ----			
36c. Total Land Improvements ---------- $			247,790
STRUCTURES–			
37. Main Buildings ---------- $	2,140,264		
38. Accessory Buildings -------			
39. Garages ----------			
40. All Other Buildings --------			
41. TOTAL STRUCTURES -------- $			2,140,264
42. General Requirements ---------- $			119,403
FEES–			
43. Builder's Gen. Overhead @ 2 % -------- $		50,149	
44. Builder's Profit @ ____ % --------		____	
45. Arch. Fee-Design @ 2.75 % --------		73,437	
46. Arch. Fee-Supvr. @ .95 % --------		25,369	
47. Bond Premium ----------		22,699	
48. Other Fees ----------		100,000	
49. TOTAL FEES ------- $			271,654
50. TOT. For all Imprmts. (Lines 36c, 41, 42 & 49) -- $			2,779,111
51. Cost Per Gross Sq. Ft. ---------- $			33.7939
52. Estimated Construction Time ----------			14 Months
CARRYING CHARGES & FINANCING–			
53. Int. 16 Mos. @ 9 % on $ 3,156,300 --- $		189,378	
54. Taxes ----------		7,000	
55. Insurance ----------		10,000	
56. FHA Mtg. Ins. Prc. (1.0%)		31,563	
57. FHA Exam. Fee (0.3%)		9,469	
58. FHA Inspec. Fee (0.5%)		15,782	
59. Financing Fee (1.5%)		47,345	
60. AMPO (%)		0	
61. FNMA GNMA FEE (2.0%)		63,126	
62. Title & Recording ----------		17,375	
63. TOTAL CARRYING CHGS. & FINANCING ----- $			391,038
LEGAL, ORGANIZATION, & AUDIT FEE			
64. Legal ---------- $	4,900		
65. Organization ---------- $	6,100		
66. Cost Certification Audit Fee ---- $	3,000		
67. TOTAL LEGAL, ORGANIZATION, AUDIT FEES $			14,000
68. Builder and Sponsor Profit & Risk ---------- $			318,414
69. Consultant Fee ---------- $			0
70. Supplemental Management Fund ---------- $			10,800
71. Contingency Reserve ---------- $			0
72. TOTAL EST. DEVELOPMENT COST *(Excl. of Land or Off-site Cost)(50+63+67+68+69+70+71)*			3,513,363
73. Warranted Price of Land --- J-14(3) ____ sq. ft. @ $ ____ per sq. ft. ------ $			420,000
74. TOTAL ESTIMATED REPLACEMENT COST OF PROJECT *(Add 72+73)* ---------- $			3,933,363

MAXIMUM PERMISSIBLE RENTAL ANALYSIS:

Rent Formula Residential Total Rent Per Month for 86 unassisted units = 35,554

APARTMENT TYPE	0 BEDROOM	1 BEDROOM	2 BEDROOM	3 BEDROOM	4 BEDROOM
	FMRs 110 %		Sec 8 H/C	Family	
Monthly Administrative Rent Limits ----------	$	$	$ 484	$ 461	$
(NOTE: Each limit must be followed by E for exception or R for regular)			57	57	
Personal Benefit Expenses ----------			427	404	
Administrative Rent Limits Less Personal Benefit Expenses ----------			399	399	
Unit Basic Rents ----------					
Unit Market Rents by Rent Formula ----------					
Unit Market Rents by Comparison ----------	310	370	N/A	N/A	

Attach Documentation

ESTIMATE OF OPERATING DEFICIT:*

Periods	Gross Income	Occup. %	Effec. Gross	Expenses	Net Income	Debt Serv. Reqmt.	Deficit
1. 1st	$ 469,464	85 %	$ 399,044	$ 132,170	$ 266,874	$ 265,029	$ 1,845
2. 2nd	$	%	$	$	$	$	$
					3. TOTAL OPERATING DEFICIT		$ 1,845

Comparables*

INCOME APPROACH TO VALUE:

Estimated Remaining Economic Life 55 Yrs.

Income Approach to Value:

Capitalization Rate Determined By: ☐ Overall Rate From Comparable Projects. ☐ Rate From Band of Investment ☐ Cash Flow to Equity.

Rate Selected _____ %

Net Income *(Line F 34)* - - - - - - - - $ _____ N/A

Capitalized Value *(Line 4 ÷ Line 3)* - - $ _____

6. Value of Leased Fee *(If any)*

Ground Rent $ _____ ÷ Cap. Rate ____ %

= Value of Leased Fee $ _____

N/A

COMPARISON APPROACH TO VALUE:

Address of Comparable Sale	Date	Sale Price	No. Units				
N/A							

8. Indicated Value of Subject by Comparison $ _____

APPRAISAL SUMMARY

CAPITALIZATION $ N/A SUMMATION $ 3,933,363 COMPARISON $ N/A

The fair market value (or replacement cost) of the property, as of the date below, is $ 3,933,363

M. TO BE COMPLETED BY CONSTRUCTION COST ANALYST:

COST NOT ATTRIBUTABLE TO DWELLING USE-

10. Parking	$	36,000
11. Garage		
12. Commercial		
13. Special Ext. Land Improvements		38,000
14. Other		
15. TOTAL	$	74,000
		3.1 %

TOTAL EST. COST OF OFF-SITE REQUIREMENTS-

16. Off-Site	Est. Cost	
Sewer	$	55,000
Water		52,000
Electrical		25,000
17. TOTAL OFF-SITE COSTS- -	$	132,000

N. TO BE COMPLETED BY VALUATION SECTION:

CALCULATION OF BUDGETED CONSTRUCTION COST-

18. Maximum Mortgage Amount (from 2264a) ÷ 90% or × 100% - - - - - - - - - - - - - *(Whichever is Appropriate)*			$ 3,507,000
19. FHA Land Value *(Line G 73)*	$	420,000	
20. Carrying Charges and Fin. - -		391,038	
21. Legal, Organization, Audit Fees		14,000	
22. Consultant Fee - - - - - - - -		0	
23. Design Architect - - - - - - -		73,437	
24. Supervisory Architect - - - -		25,369	
25. Bond Premium - - - - - - - - -		22,699	
26. Supplemental Management Fund		10,800	
27. Contingency Reserve- - - - -		0	
28. Other Fees- - - - - - - - - - -		100,000	
29. Total 19 thru 28 – Deduct -			$ 1,057,343
30. Balance available for construction - - - - - - - -			$ 2,449,657
31. This includes builder's fee of $ _____ or Bldrs. Ovhd. & BSPRA of $		368,563	

O. REMARKS, CONCLUSIONS AND SIGNATURES:

EXPLAIN - ☐ UNUSUAL LAND IMPROVEMENTS *(Sec. G 36a)* HANDBOOK 4465.1, PAGES 2-2 AND 2-3

☐ OTHER FEES *(Sec. G 48)* HANDBOOK 4450.1, PAGE 5-10 ☐ LOW MAINTENANCE MATERIALS

Dickerson/s/ *(Architectural Processor)*	8/11/80 *(Date)*	Art Tonelli/s/ *(Architectural Reviewer)*
S. J. Gurley/s/ *(Valuation Processor)*	1/12/81 *(Date)*	Suzanne R. Bailey/s/ *(Valuation Reviewer)*
Carl Iverson/s/ *(Cost Processor)*	10/10/80 *(Date)*	R. B. Ross/s/

Conclusions: _____

Coordinator — 02/19/81 Date — Director HPMC Division/Chief Underwriter — 2 19 81 Date

Director Area or Insuring Office/Deputy — 02/19/81 (Date)

C. Neal Carpenter,
President
N. Kent Baker
Eugene R. Brauer
Gordon W. Bruchner
Patrick C. Dwyer
Robert J. Shreve
Dale J. Steichen
Robert D. Thomas
Gary R. Windolph

ARIX

A Professional Corporation

Engineers Architects Planners

2021 Clubhouse Drive
Post Office Box 2021
Greeley, Colorado 80631

January 8, 1982

Mr. John Shaw
Victorio Development Corporation
3333 Quebec Avenue
Denver, CO 80207

Dear Mr. Shaw:

SUBJECT: "RIGHT-OF-WAY" OF 25 ROAD AT BUILDING SETBACK, COUNTRY GLEN APARTMENTS, PROJECT NO. 81200

Reference Paragon Engineering Plat of Country Glen dated December 17, 1979, Revised May 6, 1980: 25 Road shows an existing right-of-way of 60' with an annexation of the City of another 20 feet on each side to give a 100 foot right-of-way. This would make the existing site plan "A" difficult to achieve. The buildings would have to be moved 20' to the east. Verification of the extra 20' is necessitated.

Mr. Gene Benson of the Grand Junction Planning Department stated that 25 Road is defined as a minor artery and would require only an 80' right-of-way. In regard to building setback off the right-of-way, the Grand Junction Planning Department has no minimum building setback requirement for PUD's, but in a discussion of setback, Mr. Benson stated that a 20' setback has been the status quo. Therefore, the site plan is to be adjusted by moving the buildings and parking 10' to the east.

Enclosed is a copy of the adjusted site plan. Copies are being sent to Buzz Roeth, Ken Mundt and Gene Benson.

Respectfully,

ARIX, A Professional Corporation

Dennis D. Cole

Dennis Cole

DC:mf

cc: Stephen M. Biagiotti
John Neilson
Gene Benson
Ken Mundt
Buzz Roeth

Country Glen Ute Water Peak Demand Data Sheet

Not applicable for residential, as per conversation with Mr. Charlie Stockton, Ute Water, on March 26, 1982, at 1:33 p.m.

Country Glen Draft of Covenants, Grants of Easements or Restrictions to be imposed, Articles of Incorporation: None, as the entire development is for rental apartments.

April 19, 1982

Grand Junction Planning Commission
City of Grand Junction
P.O. Box 897
Grand Junction, Colorado 81515

Re: Country Glen Apartments
#30-80 Final Plat and Plan

Gentlemen:

The following is offered in response to the Development Department Review Summary. Our comments are placed in the same order as they were listed on your summary for ease in coordination.

1. Ute Water: The on-site water system will remain a private system, therefore objections have been dropped. We will coordinate all final details of our system with Ute Water.

2. Mountain Bell: No comment needed.

3. City Utilities: We are working with the city engineer to resolve access for city sewer maintenance equipment.

4. Transportation Engineer: The five foot wide sidewalk is designed to accommodate the vehicle overhang and still provide adequate walking area for pedestrians.

5. Planning Staff: Filing No. 1 is to be a 1 lot subdivision. The phase line will be removed.

The total open space has been calculated at 42.5% excluding paved and building areas.

Staff comments of 4-16-82 have been incorporated into this submission.

Trash pick-up will be coordinated with the city sanitation engineer.

1666 South University Boulevard, Denver, Colorado 80210 (303) 778-0999

Landscaping will be maintained through use of a sprinkler system. Most water required for this will be provided by owned water rights.

Lighting plan is shown on construction drawings.

A bond document similar to the one accepted by Grand Junction on several of our other projects has been submitted with the Final Plat submission.

We anticipate obtaining a building permit for the first 144 units within the next two months.

We will incorporate low-profile landscaping at all entry points.

Sight distance lines will be checked to insure that no hazard exists.

Sidewalks are five feet wide to allow for pedestrian use and still accommodate vehicle overhang.

The parking areas will be modified to insure that all spaces work without creating traffic-flow problems.

We will work with the property owner to the north to coordinate the 25 Road entries.

Building elevations have been developed and submitted to the Development Department for their information. (3 story)

6. Grand Junction Fire: The water lines will be increased from 6" to 8" and the five additional fire hydrants will be installed.

We are coordinating with the fire department and will install an adequate fire alarm system throughout the project.

We feel that this should satisfactorily answer the questions raised. Should you have any additional concerns, please contact me.

Sincerely,

COUNTRY GLEN ASSOCIATES

John M. Shaw, Partner

JMS/mmh

cc: Steve Biagiotti
Kenneth Mundt

Country Glen Development Schedule

Phase I will commence in June, 1982, with completion set for June, 1983. One hundred forty four (144) units will be constructed in the first phase, along with the club house, swimming pool, two (2) tennis courts, and recreational vehicle parking. The street and parking area will be extended/completed to F 1/2 Road.

Phase II will commence August, 1983, with completion set for August, 1984. One hundred twelve (112) units will be constructed in the second phase.

DISTRICT COURT, CITY AND COUNTY OF DENVER, COLORADO

CASE NO. 82 CV 6432, Courtroom 8

☐ **SUBPOENA (Personal)**
☒ **SUBPOENA TO PRODUCE (Subpoena duces tecum)**

The People of the State of Colorado:

TO: BOB GOLDIN, 559 White Street, Grand Junction, Colorado

You are ordered to attend and give testimony in the District Court of Denver County at 1437 Bannock Street, Denver, Colorado 80202, Courtroom 8 (location) on January 17, 1984 at 9:00a.m. (date and time), as a witness for Empire Savings and Loan in an action between Omnimortgage, Inc., Plaintiff, Country Glen Associates, et al, ~~Plaintiff~~ and Defendant & Third-Party Plaintiffs, & Empire Savings and Loan, Third-Party defendant and also to produce at this time and place (If Applicable):

File documents for City of Grand Junction Planning and Zoning file/
COPY OF ZONING & DEVELOPMENT CODE/
COUNCIL MINUTES - 5/19/82 / PLANNING COMMISSION MINUTES - 4/27/82

now in your custody or control.

Date: January 6, 1983

Pamela McClune
Signature

Pamela McClune, #7965
Attorney for Third-Party Defendant
Type name, address, tele. no., reg. no. below.
1654 California Street
Denver, Colorado 80202
(303)592-6655

Clerk/Deputy

This subpoena is issued pursuant to Rule 45 of the Colorado Rules of Civil Procedure.

RETURN OF SERVICE

State of _____
_____ County _____
I declare under oath that I served this subpoena or subpoena to produce on _____ in _____ County _____ on _____ (Date) at _____ (Time) at the following location:

☐ by (State Manner of Service)

☐ I am over the age of 18 years and am not interested in nor a party to this case.

Signed under oath before me on _____

_____
Notary Public*

_____
Name Date
☐ Private process server
☐ Sheriff, _____ County
Fee $ _____
Mileage $ _____

*Notary should include address and expiration date of commission.

DISTRICT COURT, CITY AND COUNTY OF DENVER, COLORADO

Civil Action No. 82 CV 6432, Division 8

ACCEPTANCE OF SERVICE

OMNIMORTGAGE, INC., a Colorado Corporation,

Plaintiff,

vs.

COUNTRY GLEN ASSOCIATES, a Colorado Joint Venture,
RACQUET CLUB APARTMENTS, LTD., a Colorado limited partnership,
THE VICTORIO COMPANY, an Arizona corporation, doing business in Colorado as The Victorio Land and Cattle Company,
JOHN S. NIELSON, an individual, and
STEPHEN M. BIAGIOTTI, an individual,

Defendants and Third-Party Plaintiffs,

vs.

THE EMPIRE SAVINGS, BUILDING AND LOAN ASSOCIATION, a Colorado Corporation,

Third-Party Defendant.

Bob Goldin, being of lawful age, and being first duly sworn upon oath, deposes and says:

That I have received a true copy of the Subpoena To Produce, and that I accept service.

Dated this ____ day of January, 1984.

_____

State of Colorado)
County of) ss.,

The foregoing Acceptance of Service was subscribed and sworn to before me by Bob Goldin on this ____ day of January, 1984.

WITNESS my hand and official seal.
My commission expires:

_____
Notary Public
Notary's Address:

(S E A L)

CITY - COUNTY PLANNING
grand junction-mesa county 559 white ave. rm. 60 grand jct.,colo. 81501
(303) 244-1628

February 13, 1984

Returned receipt signed for Victoria. at same address

TO: All Owners/Petitioners

FROM: Grand Junction Planning Commission
Grand Junction Planning Department

RE: Enforcement of Development Schedules

Enforcement of development schedules of previously approved projects is an on-going concern for the City of Grand Junction. The City Planning Commission will be having their annual Extension/Reversion public hearing on Tuesday, March 20, 1984 at 7:00 p.m. in the City/County Auditorium, 520 Rood Avenue, Grand Junction, Colorado. You or your representative must be present.

By using the timeframes expected for development, the City is able to anticipate the needs for public services and improvements to provide service for these projects and surrounding areas. The City can also schedule those capital improvements required to be completed in conjunction with the project development itself.

The hearing will not be a re-review of the project for technical issues. It will be a discussion of anticipated timeframes for project buildout, and the likelihood of the project itself. Any project discussed without the Owner/Petitioner or representative present at the special hearing will be automatically recommended for reversion.

If an extension is requested by the Owner/Petitioner, the Grand Junction Planning Commission may grant an extension for one year. If the Owner/Petitioner requests a reversion, the Grand Junction Planning Commission will recommend reversion of that project and/or zone.

Enclosed is your project violation of the Grand Junction Zoning and Development Code. Also enclosed is the required submittal information for the Grand Junction Planning Commission to review.

We appreciate your continued cooperation in this process.

If you have any questions, please contact the City Planning Department at 244-1628.

Thank you.

BG/tt

Enclosures

This is to inform you that your project File # 30-80

Project Name Country Glen Apartments

approved on 5/19/82 by the Grand Junction City Council,

is now in violation of the Grand Junction Zoning and Development Code.

It violates the development schedule process as indicated below:

_____ Sec. 7-5-4-C-5 (Final Plan) Following the approval of a Preliminary Plan, the applicant shall file with the Department a Final Development Plan and Final Subdivision Plat in accordance with the approved development schedule. Approval of a Preliminary Plan is effective in accordance with the subdivision regulation (Chapter 6). An approved preliminary area may be finalized by more than one final plan and plat.

The Grand Junction Planning Commission is requiring the following information to be provided to this department a minimum of ten (10) days prior to the Special Public Hearing on March 20, 1984.*

Eight (8) copies of:

a) Location, current property owner, and representative if applicable.

b) Brief discussion of current status of the approved project. This should include the feasibility, likelihood of buildout, or anticipated changes to the approved plan.

c) Development schedule anticipated for completion of next phase or buildout:

d) Any work completed to date on the project to fulfill the next development process requirements. (i.e. if final approval, when is plat to be recorded, or if preliminary approval, when is final plan to be submitted?)

e) Extension requested (one year maximum).

* Any packets not received or received after this date may result in automatic reversion.

ARIX

A Professional Corporation

Engineers Architects Planners

2021 Clubhouse Drive
Post Office Box 2021
Greeley, Colorado 80631

DRAINAGE REPORT
FOR
COUNTRY GLEN APTS.

C. Neal Carpenter, *President*
N. Kent Baker
Eugene R. Brauer
Gordon W. Bruchner
Patrick C. Dwyer
Robert J. Shreve
Dale J. Steichen
Robert D. Thomas
Gary R. Windolph

ARIX

A Professional Corporation
Engineers Architects Planners

2021 Clubhouse Drive
Post Office Box 2021
Greeley, Colorado 80631

February 25, 1982

Victorio Investment Co.
1666 S. University Blvd.
Denver, CO 80210

Gentlemen:

SUBJECT: DRAINAGE REPORT, COUNTRY GLEN APARTMENTS, PROJECT NO. 81200.00
We have prepared a storm drainage report for captioned Subdivision located in the Southwest Quarter of the Northeast Quarter of Section 3, Township, 1 South, Range 1 West of the UTE Meridian, in north western Grand Junction. The entire watershed above the proposed subdivision was considered in the preliminary drainage report by others and no water contributed to this site. The requirements for the City of Grand Junction were considered in the design of the facilities.

Design Criteria

The natural drainage is located near east-west center flowing southerly to F1/2 Road, then south to Independent Ranchman's Ditch. The Rational Method procedure was used for analysis.

The runoff coefficients "C" used for the internal analysis were:

A weighted "C" factor for medium density residential areas.

Undeveloped	Developed
.25	.57

The times of concentration were calculated using an overload flow time equation. This equation and charts, as well as Rainfall-Intensity curves, were taken directly from the Grand Junction Comprehensive Drainage Manual.

The Grand Junction requirements were followed in the design of the detention ponds. This criteria states that the release of runoff from a development must be limited to the 100-year frequency undeveloped peak release rate (8.1 cfs for the 12.4 acre site) during a 100-year frequency storm on the developed tract. All excess runoff must be stored in detention facilities (.6 ac. ft.) to allow this reduction in peak runoff rate. In addition, facilities must be capable of passing runoff from outside contributing basins through the development.

To calculate volumetric requirements of the detention ponds, a procedure developed by A.S. Paintal, P.E., Ph.D., was used. Information on this procedure is located at the end of the enclosed calculations.

I. Drainage Basins

A. Area No. 1

Area 1 as shown on the Drainage Plan forms the basin which will be referred to as the Northwest Parking Lot Basin. Calculations

are located in the back of this report. The total area draining into the Northwest Parking Lot is approximately 1.11 acres. The historic outflow rate for the northwest basin pond is 1.1 C.F.S., 0.1 acre feet of storage is required is discharge through the sidewalk drain.

B. Area No. 2

Area 2 as shown on the drainage plan contributes to the pond draining directly into F1/2 Road. The area forms a large majority of the impervious parking. Calculations are located in the back of this report. The total area draining into this basin is approximately 5.53 acres. The historic flow rate for this basin is 1.9 C.F.S., and 0.32 acre feet of storage is required. Discharge is through a 22" x 13" arch pipe inverted, acting as a weir discharging at low flows.

C. Area 3

Area 3 is the east grass area southwest of the tennis courts. It comprises 2.17 acres of internal area. The maximum overflow rate is 1.1 C.F.S., with 0.1 acre feet of storage required. Discharge to Area 2 pond will be through a 4-inch orifice plate over a 8-inch CMP.

D. Area 4

Area 4 is located in the grassed area adjacent to 25 Road. It also comprises areas of roof discharge and grasses areas, 1.22 acres in size, .08 acre feet of storage is required with a controlled release rate of 1.1 C.F.S. through a 4-inch orifice plate over an 8-inch cmp.

Conclusions

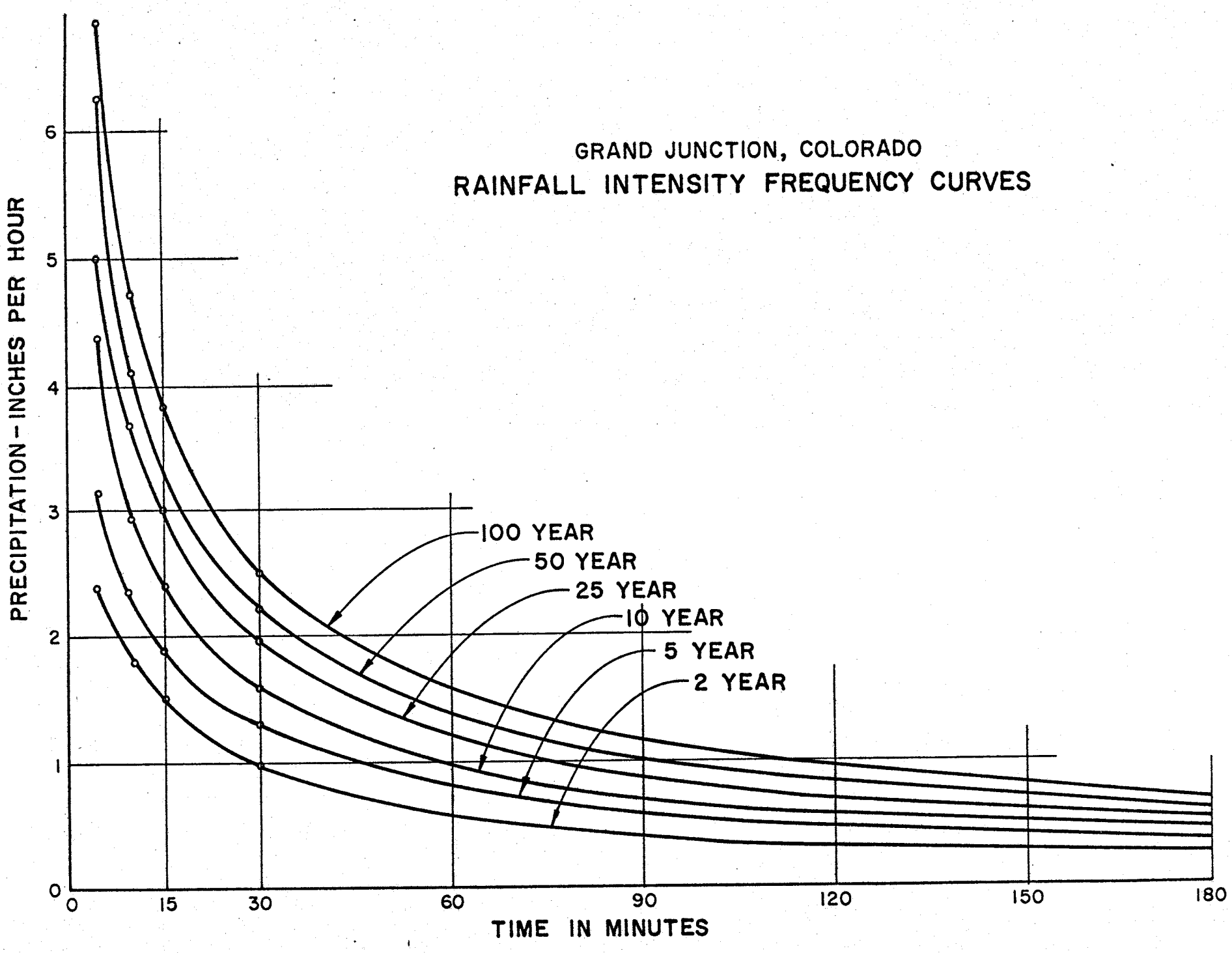
Our calculations show that the historical release rate if 8.1 C.F.S., at 100-year, however; due to obstruction and the lesser detention ponds recommended, the 100-year flow may only be 6.8 C.F.S. The grading established will provide adequate protection to the proposed structures.

Respectfully,

ARIX, A Professional Corporation

Arthur F. Uhrich
Project Engineer

AFU:kav


GRAND JUNCTION, COLORADO
RAINFALL INTENSITY FREQUENCY CURVES
PRECIPITATION - INCHES PER HOUR
0
1
2
3
4
5
6
100 YEAR
50 YEAR
25 YEAR
10 YEAR
5 YEAR
2 YEAR
0
15
30
60
90
120
150
180
TIME IN MINUTES

ARIX

CLIENT VICTORIO JOB NO. 81200.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-3-82 CHECKED BY _____ DATE _____ SHEET _____ OF _____

FOR INFORMATIONAL USE ONLY - AREA NUMBERS DO NOT CORRESPOND TO FINAL NUMBERS

COMPOSITE "C" FACTOR

AREA #1

ROOF	=	.15	X	.80	=	.12	.14
SIDEWALK	=	.07	X	.85	=	.06	✓
GRASS	=	.49	X	.13	=	.06	✓
PARKING	=	.97	X	.9	=	.87	✓
DRIVE	=	.14	X	.85	=	.12	✓
		1.82 AC.	X	"C"	=	1.23	
		COMPOSITE		"C"	=	.675	(.68)

AREA #2

ROOF	=	.81	X	.80	=	.65	
SIDEWALK	=	.25	X	.85	=	.21	✓
GRASS	=	1.50	X	.13	=	.20	✓
PARKING	=	2.85	X	.90	=	2.56	✓
DRIVE	=	.12	X	.85	=	.10	✓
		5.53 AC	X	"C"	=	3.72	
				"C"	=	.673	

AREA #3

ROOF	=	.48	X	.80	=	.38	
SIDEWALK	=	.12	X	.85	=	.10	
GRASS	=	1.22	X	.13	=	.16	
PARKING	=	—	X	—			
DRIVE	=	—	X	—			
TENNIS	=	.35	X	.75	=	.26	
		2.17 AC	X	"C"	=	.90	
				"C"	=	.42	

ARIX

CLIENT VICTORIO JOB NO. 81202.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-3-82 CHECKED BY _____ DATE _____ SHEET _____ OF _____

COMPOSITE "C" FACTOR

AREA #4

ROOF	=	.27	X	.80	=	.22
SIDEWALK	=	.06	X	.85	=	.05
GRASS	=	.78	X	.13	=	.10
PARKING	=	0				
DRIVE	=	0				
POOL	=	.11	X	.45	=	.05
		1.22 Ac	X	.34	=	.42
				"C"	=	.34

AREA #5

ROOF	=	.17	X	.80	=	.14	.16
SIDEWALK	=	.04	X	.85	=	.03	"
GRASS	=	.39	X	.13	=	.05	"
DRIVE	=	.10	X	.85	=	.09	"
		.70 Ac	X	"C"	=	.31	
				"C"	=	.44	(47)

AREA #6

ROOF	=	.15	X	.80	=	.12
SIDEWALK	=	.01	X	.85	=	.01
GRASS	=	.33	X	.13	=	.04
		.49	X	"C"	=	.17
				"C"	=	.35

COMPOSITE "C" FOR TOTAL AREA

11.93 X "C" = 6.75

"C" = .57

ARIX

CLIENT VICTORIO JOB NO. 81200

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-3-82 CHECKED BY _____ DATE _____ SHEET 1 OF 3

DETENTION POND SIZING FOR NORTH PARKING AREA

HISTORICAL DISCHARGE FROM AREA #1 (AREA OF FUTURE PARKING)

100 YEAR

$A = 1.11$ AC.

$C = .25$

$I = 2.87$

$T_c = 1.8(1.1-C)\, L^{1/2} \div S^{1/3}$

$T_c = 1.8(1.1-.25)\, 340^{1/2} \div 1.2^{1/3}$

$T_c = 1.8(.85)\, 18.44 \div 1.21$

$T_c = 23.3$

$Q = CIA \times 1.25$

$Q = 1.1$ CFS

HISTORICAL DISCHARGE FROM AREA #2 (AREA OF FUTURE PARKING)

100 YEAR

$A = 3.72$ AC.

$C = .25$

$I = 1.65$

$T_c = 1.8(1.1-.25)\, L^{1/2} \div S^{1/3}$

$T_c = 1.8(.85)\, 1400^{1/2} \div 1^{1/3}$

$T_c = 57$ MIN.

$Q = CIA \times 1.25$

$Q = 1.9$ CFS

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PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-9-92 CHECKED BY _____ DATE _____ SHEET 2 OF 3

AREA # 1

CRITICAL STORM LENGTH

$$T = \sqrt{(CAab) \div [f_o - (f_o^2 T_c) / (CA_a)]} \quad -b$$

WHERE $C = .9$

$A = 1.1$

$a = 128.57$

$b = 21.43$

$f_o = 1.0$

$T_c = 6.1$

$$T = \sqrt{\frac{.9(1.11)\,128.57(21.43)}{1.0 - \left[\frac{1.0^2\,6.1}{.9(1.1)\,128.57}\right]}} - 21.43$$

$$T = \sqrt{\frac{2752.5}{.95}} - 21.43 = 32.3 \text{ MIN}$$

$I = 2.37$

$Q = CIA(1.25)$

$Q = .9\ 2.37\ 1.11\ (1.25)$

$Q_o = 2.96$

ARIX

CLIENT VICTORIO JOB NO. 81200.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGP DATE 2-9-92 CHECKED BY _____ DATE _____ SHEET 3 OF 3

VOLUME AREA # 1

$$V = Q_o(T) - 2q_o(T+T_c)/3 + q \cdot T_c / 6Q_o$$

$Q_o = 2.96$

$T = 32.3$

$q_o = 1.0$

$T_c = 6.1$

$$V = 2.96(32.3 \times 60) - 2(1.0)\frac{(32.3+6.1)60}{3} + \frac{1.0(6.1)(60)}{6(2.96)}$$

$$V = (5736.46 - 1536) + 20.6$$

$V = .1$ AC FT

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C... VICTORIO JOB NO. 81202.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-5-82 CHECKED BY ____ DATE ____ SHEET 1 OF 4

DETENTION REQUIREMENTS

- ALLOWABLE MAXIMUM OUTFLOW RATE — 100 YR. UNDEVELOPED

FOR A STORM OF 100 YEAR RETURN RATE

RATIONAL METHOD — $Q = CIA(1.25)$

WHERE $A = 12.4$ A

"C" = .25

$I = 2.1$

1.25 = FACTOR $1\frac{1}{2}$ FOR ANTECEDENT MOISTURE CONDITIONS

"I" DEPENDS ON $T_c = \frac{1.8(1.1-C)}{S^{1/3}}$

T_c = 41 MINUTES

"I" FOR 41 MIN & 100 YR STORM = 2.1

$Q = CIA(1.25)$

$Q = .25(2.1)(12.4)1.25$

$Q = 8.1$ CFS — MAX. RELEASE RATE FOR 100 YR. UNDEVELOPED 12.4 ACRES

ARIX

CLIENT VICTORIO JOB NO. 81200.00

PROJECT COUNTRY GLEN APPARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-5-92 CHECKED BY _____ DATE _____ SHEET 2 OF 4

FOR 12.4 ACRES

- DETERMINE THE STORM WHICH PRODUCES MAX. DETENTION REQUIREMENTS:

FOR 100 YR STORM

ASSUME THE RAINFALL INTENSITY-DURATION RELATION CAN BE EXPRESSED AS FOLLOWS:

$$I = \frac{a}{b+T}$$

WHERE I = RAINFALL INTENSITY, IN/HR.

a & b = CONSTANTS

T = DURATION OF RAINFALL MINUTES

FROM GRAPH SUPPLIED BY G.J. OFFICE: (100 YR STORM)

WHEN $T = 30$, $I = 2.50$

$T = 50$, $I = 1.80$

SOLVE FOR a & b: $2.5 = \frac{a}{b+30} \Rightarrow a = 2.5b + 75$

$a = 75 + 2.5b$

$1.8 = \frac{a}{b+50} \Rightarrow = \frac{a}{1.8} - 50$

$a = 2.5\left(\frac{a}{1.8} - 50\right) + 75$

$a = \frac{2.5a}{1.8} - 125 + 75$

$a = 1.3888\,a - 50$

$a = 128.57$

SUBSTITUTING FOR a

$b = \frac{a}{1.8} - 50$

$b = \frac{128.57}{1.8} - 50$

$b = 71.43 - 50$

$b = 21.43$

$\therefore$ FOR THE RANGE NEAR $T = 30$ TO 50 MIN.

$T = \frac{128.57}{21.43 + T}$

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PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR

MADE BY JGF DATE 2-5-92 CHECKED BY DATE SHEET 3 OF 4

- DETERMINE CRITICAL STORM DURATION PRODUCING MAX. DETENTION REQUIREMENTS:

$$T = \sqrt{(CA_a b) \div [q_o - (q_o^2 T_c)/(CA_a)]} - b$$

WHERE $C = .57$

$A = 12.4$ AC.

$a = 128.57$

$b = 21.43$

$q_o = 8.1$

$T_c = 11$ MIN.

$$T = \sqrt{\frac{.57(12.4)\,128.57(21.43}{8.1 - \left[\frac{8.1^2(11)}{.57(12.4)(128.57)}\right]}} - 21.43$$

$$T = \sqrt{\frac{19474.14}{7.305}} - 21.43 = 30.2 \text{ MIN}$$

- STORM PRODUCING MAX. DETENTION STORAGE = 30.2 MIN

$I = 2.48$ (100 YR FROM G.J. CHART)

$q_o = CIA$

$q_o = .57(2.48)\,12.4$

$q_o = 17.53 \times 1.25 = 21.9$

ARIX

OF VICTORIA JOB NO. 91200.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-5-82 CHECKED BY _____ DATE _____ SHEET 4 OF 4

STORAGE REQUIREMENTS FOR WHOLE AREA (12.4 ACRES)

DETENTION STORAGE: ASSUMING ORIFICE CONTROL OF OUTLET

$$V = Q_o T - 2 q_o (T + T_c)/3 + (q_o T_c)/(6 Q_o)$$

WHERE $Q_o = 21.9$ PEAK FLOW RATE DEVELOPED

$T = 30.2$ CRITICAL STORM LONGT (X 60)

$q_o = 8.1$ PEAK FLOW RATE UNDEVELOPED

$T_c = 11$ MIN TIME OF CONCENTRATION (X 60)

$$V = 21.9\,(1812) - 2(8.1)\,\frac{1812 + 660}{3} + \left[(8.1\,660) \div 6(21.9)\right]$$

$$V = (39682.8 - 13349.8) + 40.68$$

$V = 26375$ CU. FT. = .605 AC. FT.

ARIX

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PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-9-92 CHECKED BY _____ DATE _____ SHEET 1 OF 2

DETENTION POND SIZING FOR SOUTH PARKING AREA

CRITICAL STORM LENGTH — AREA #2

$$T = \sqrt{(CAab) \div [q_o - (q_o^2 T_c)/(CA_a)]} - b$$

WHERE $C = .75$

$A = 3.72$

$a = 128.57$

$b = 21.43$

$q_o = 1.9$

$T_c = 11$

$$T = \sqrt{\frac{.75(3.72)(128.57)(21.43)}{1.9 - \left[\frac{1.9^2(11)}{.75(3.72)128.57}\right]}} - 21.43$$

$$T = \sqrt{\frac{7657.16}{1.79}} - 21.43 = 44.11$$

$I = 1.95$

$q_o = CIA$

$q_o = .75\ (3.72)\ 1.95 \times 1.25$

$q_o = 6.8$

ARIX

CLIENT VICTORIO JOB NO. 01200.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR DRAINAGE

MADE BY JGF DATE 2-9-82 CHECKED BY _____ DATE _____ SHEET 2 OF 2

VOLUME OF DETENTION STORAGE - AREA #2

$$V = Q_o T - 2 f_o \left(T + T_c \right)/3 + \left(f_o \cdot T_c \right)/ 6 Q_o$$

$Q_o = 6.8$

$T = 44.1$

$f_o = 1.9$

$T_c = 11$

$$V = 6.8 (2646) - 2\left(1.9\left(\frac{44.1+11}{3}\right)\right) + \frac{1.9(660)}{6(6.8)}$$

$$V = (17993 - 4187.6) + 30.7$$

$$V = 13836 \div 43560 = .32 \text{ AC. FT.}$$

ARIX

CLIENT VICTORIA JOB NO. 91233.00

PROJECT COUNTRY CLUB APARTMENTS CALCULATIONS FOR —

MADE BY JGF DATE 2-9-92 CHECKED BY _____ DATE _____ SHEET _____ OF _____

DRAINAGE SUMMARY

AREA OF PROJECT = 12.4 ACRES

COEFFICIENT OF RUNOFF "C":

FOR UNDEVELOPED LAND = .25

FOR DEVELOPED SITE = .57 (COMPOSITE)

DESIGN DISCHARGE RATE FOR 100 YR. STORM = 8.1 CFS

CALCULATED VOLUME OF DETENTION

(FOR TOTAL 12.4 ACRES) STORAGE = 60 AC.-FT.

STORAGE

NORTH PARKING AREA	=	.1 AC. FT.
EAST GRASS AREA	=	.1 AC. FT.
WEST GRASS AREA	=	.09 AC. FT.
SOUTH PARKING AREA	=	.32 AC. FT.
TOTAL		.60 AC. FT.

ARIX

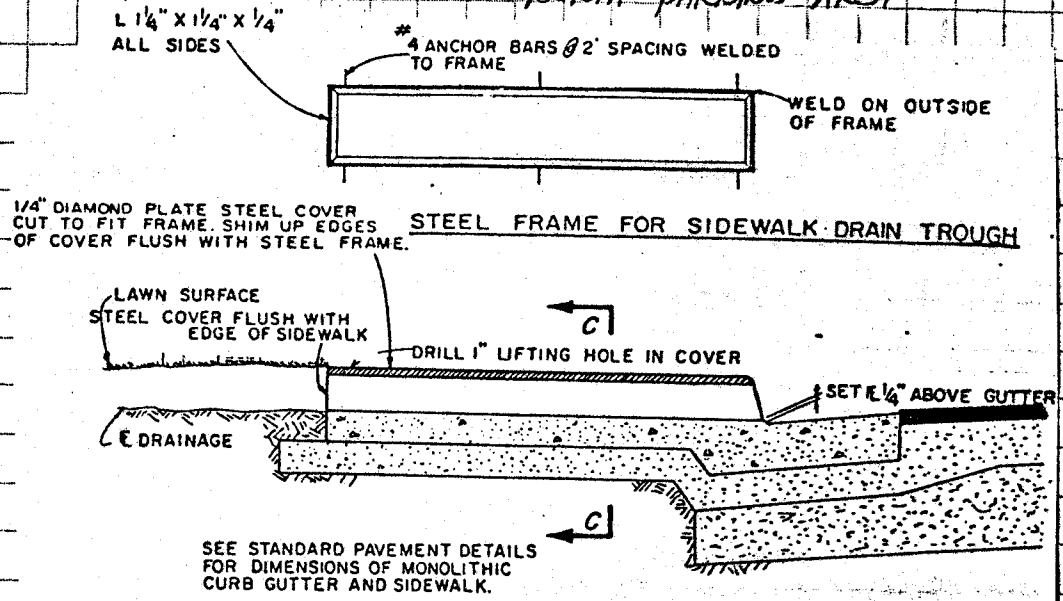
CLIENT VICTORIA JOB NO. 91202.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR CURB DISCHARGE DESIGN

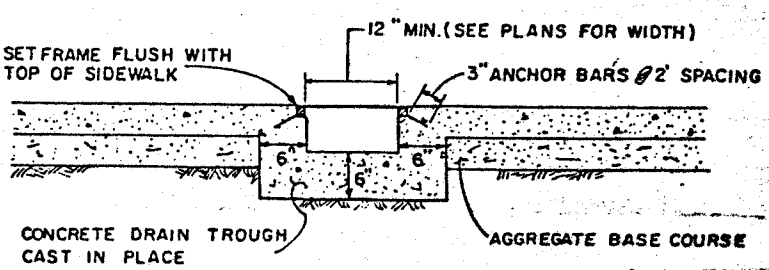
MADE BY JGF DATE 2-10-92 CHECKED BY _____ DATE _____ SHEET 1 OF 2

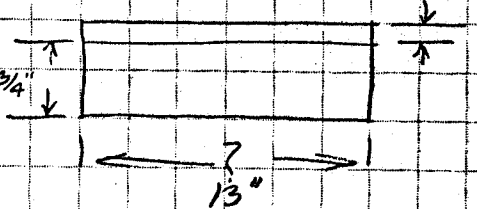
DRAIN TROUGH SIDEWALK SIZING

NORTH PARKING AREA



DRAIN TROUGH FOR SIDEWALK CROSSING





REFERENCE: HANDBOOK OF HYDRAULICS BY KING & BRATER PAGE 5-46

USE FORMULA FOR BROAD CRESTED WEIR

$Q = CLH^{3/2}$

FROM REFERENCE $C = 2.6$ $Q = 1$ CFS FROM 100 YR. UNDEVELOPED DISCHARGE

SOLVE FOR "L" $= \frac{Q}{2.6 H^{3/2}}$

$= \frac{1}{2.6(.359)}$

$L = 1.08'$ OR $13"$

ARIX

CL VICTORIO JOB NO. 81200.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR CVPB DISCHARGE DESIGN

MADE BY JGF DATE 2-10-82 CHECKED BY _____ DATE _____ SHEET 2 OF 2

DRAIN TROUGH SIDEWALK SIZING

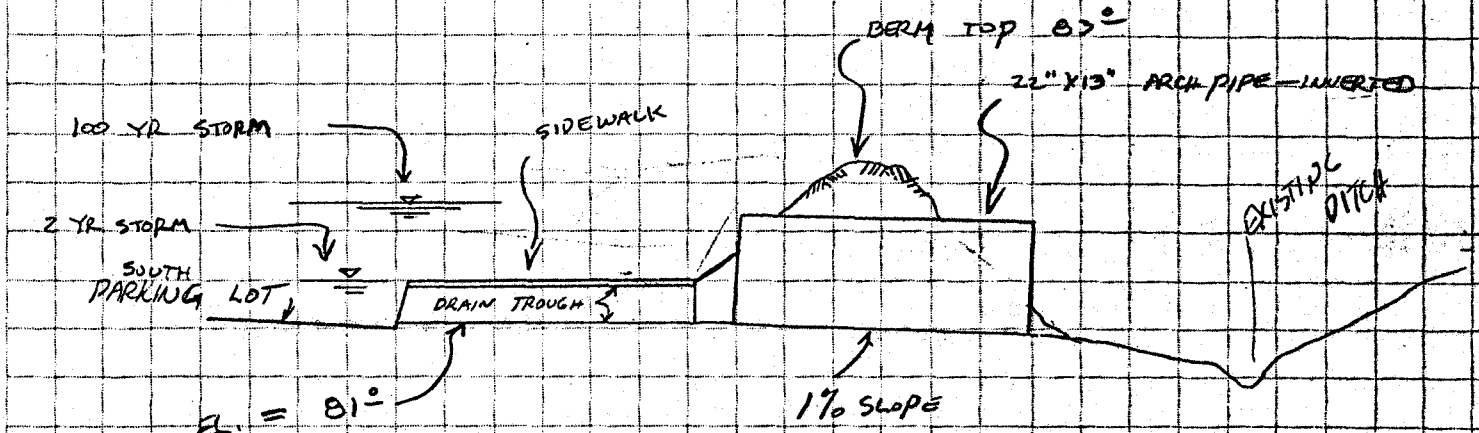
SOUTH PARKING AREA

Q = 8.1 CFS – MAX FOR TOTAL AREA FROM 100 YR UNDEVELOPED

SIZE OF DRAIN TROUGH — USE 4'

OUTLET THIS INTO 22" X13" ARCH PIPE @ 1.0% INVERTED. REF.– HAND BOOK of STEEL DRAINAGE & HWY CONSTR. PRODUCTS – PAGE 195

THE INVERTED NATURE OF THE PIPE WILL ACT AS A WIER, DISCHARGE LOW FLOWS @ LOW RAINFALL RATES ETC. – SEE ARTICLE IN FEB., PUBLIC WORKS PAGE 62



SOUTH DETENTION POND
OUTLET DETAILS

On-Site Stormwater Detention: An Overview

JOHN M. MASON, JR., Ph.D., P.E.
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Texas A&M University

The following article is excerpted from a report entitled *On-Site Detention: An Alternative for the Control of Urban Stormwater*, prepared by the author under the sponsorship of the Texas Innovation Group, and funded by the National Science Foundation's grant No. ISP 7911986 to the Texas Engineering Experiment Station. The author wishes to extend credit to Dr. Edward J. Rhomberg of the Civil Engineering Department, Texas A&M University, who is co-author of course-note text, *Urban Stormwater Management, On-Site Detention*, from which portions of the original report were extracted and summarized.

STREET runoff is composed of many of the pollutants found in sanitary sewage, with comparable concentrations. Stormwater can also contain considerable amounts of metals; zinc, for example, is the product of tire wear on the streets. Fallout from polluted atmospheres is collected on streets whose area sometimes comprises 30 percent of the total city area.

A study[1] in New York City gave the following amounts of metals in runoff. Fourteen percent of the total copper contained in combined dry weather and stormwater flows was attributed to runoff, as was 9 percent of the chromium, 10 percent of the nickel, 31 percent of the zinc, and 12 percent of the cadmium.

As a result of the investigation[2] carried out on a 1,093-acre section of Durham, North Carolina, N.C. Colston concluded, "It is important to note that if Durham provided 100 percent removal of organics and suspended solids from the raw municipal waste on an annual basis, the total reduction of pollutants discharged to Third Fork Creek would only be 52 percent of the COD, 59 percent of the ultimate BOD, and only 5 percent of the total suspended solids. Thus, almost as much COD and BOD loads were derived from stormwater as from the raw sanitary sewage, and most of the suspended solids."

Street litter is an important contributor to the pollution of storm runoff. The accumulation of street litter varies with land usage. The American Public Works Association reports a range of 0.5 to 8 pounds per day per 100 feet of curb with an average loading of 2.4 pounds in a single-family residential area, and 4.7 in commercial areas.[3]

Dust and dirt, with particle sizes less than one-eighth inch are the main component by weight of street litter, varying from 45 to 83 percent of the total. About three percent of the dust and dirt is soluble in water. An analysis of the water pollution potential of this portion gave the following: BOD_5, 5 mg/g; COD, 40 mg/g; total N, 0.48 mg/g; phosphates, .05 mg/g; and coliforms, 106/g.

It is assumed that a two-week accumulation of street litter is washed from the street during a two-hour storm event. The BOD_5 load of 5 mg/g would equal 11.2 lb/mile of street. This is equivalent to 160 percent of the raw sewage BOD_5 and 800 percent of secondary treatment effluent during the storm event.

The very fine silt-like portion of street litter — that with a size less than 43 microns — amounts to only 5.9 percent by weight of the total solids. Yet it contains about one-fourth of the total oxygen demand, from one-third to one-half of the algal nutrients, more than one-half of the heavy metals, and nearly three-fourths of the total pesticides. This is particularly significant because street sweepers are only about 15 percent efficient in removing particles of sizes less than 43 microns.

Certain forms of pollution seem to be inevitable, including normal wear on tires, shoes, pavements, and sidewalks; weathering of buildings and pavements; animal wastes and droppings; and fallout from polluted air. Measures can be taken, however, to decrease the amount of pollution. Public and commercial enterprises can reduce the amount of street litter and property owners can eliminate excessive use of fertilizers and pesticides.

Other measures can be taken to collect contaminants before they enter the sewer system. Street sweepers have been found to be about 50 percent efficient in removing contaminants from street surfaces but only about 15 percent efficient in removing particles of size less than 43 microns. Vacuum-type sweepers are more efficient in removing the small particles but lose efficiency when street surfaces are wet. Increased frequency of sweeping helps, as do multiple passes. Raising the number of passes from one to three increases removal effectiveness from 50 to 85 percent. More frequent cleaning of catch basins also reduces the pollution load on treatment plants.

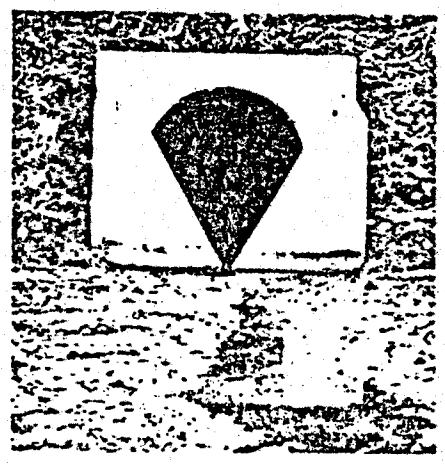
Treatment methods are also used to control stormwater pollutions. Sedimentation, straining, and physical and chemical treatment are among these methods. Some of the more recent developments in treating runoff include applications of swirl concentrators, screening devices, powdered activated carbon, high-rate filtration, and rate-disinfection.

Runoff Storage Techniques

The objective of detention facilities, in general, is simply to regulate the runoff from a storm by distributing it over a longer time period. Methods include surface storage (dry ponds, wet ponds, parking lots, shallow surface catchments, and subsidiary fill impoundments); rooftop storage (rooftop ponding); underground storage (trench, pipe, and cistern storage, and tunnel-reservoir systems); and infiltration storage (dry wells and infiltration trenches).

Dry ponds are the most frequently used type of surface storage. They are small to large "depressions" constructed by usual excavation and embankment procedures that provide for the controlled release of impounded water. They can be made to fit well into small developments because they can be designed and installed as small structures. They are less expensive because they do not require elaborate design and construction measures.

Factors affecting the choice of dry ponds include site conditions (topography and soils), design, proper construction, and adequate maintenance. Since the ponds are not expected to retain water, soil characteristics are not so important. Special care must be taken in constructing the pond bottom to assure drainage of wet-weather spring seepage, base flow, and low storm flows. Minimum bottom grades of two percent and



proper location of the controlled release outlet will help provide complete drainage and eliminate possible mosquito breeding areas.

The high cost of land may limit the feasibility of this technique but the imaginative incorporation of dry ponds into open or green spaces may serve to overcome this limitation. Registering a drainage easement in the county land records may be necessary to prevent the pond from being filled in at some later date. Other disadvantages of this technique include those related to siltation and the need for maintenance.

Wet ponds are ordinary ponds with additional temporary storage above normal pool elevation and with provision for controlled release. They are effective in reducing storm runoff and channel erosion and have added advantages of providing water recreation opportunities and of increasing local land value. They are particularly useful for large urban watersheds and can have great esthetic value.

Wet pond considerations include drowning hazards, site conditions, proximity of other utilities, siltation, and possible pollution from stormwater. The possibility of algal blooms as a result of eutrophication should be noted.

Parking lots can serve as detention ponds if specially graded areas are designed to be inundated and provisions are made for controlled release. They are generally used for small drainage areas and small storms.

Minimum site requirements and little need for soil investigation are advantages.

The interference that detention pond systems cause with normal land uses may be a significant disadvantage. Another undesirable feature is that silt and debris collect in depressions and are not only unsightly but can also clog controlled release devices.

Shallow surface catchments such as vegetated swales (wide, gentle sloping ditches), grassed drainageways, and lawns can be designed for intermittent ponding to control runoff. With imagination, they can be worked unobtrusively and esthetically into open areas and green spaces in urban developments. An advantage is that little site investigation is required, although if poor draining soils are encountered some seepage problems might result. Another advantage is the opportunity for increased infiltration and recharging of the groundwater supply.

Subsidiary fill impoundments are those which result from a subsidiary use of a special fill embankment for a roadway, parking lot fill, or golf course fairway. In these cases, the primary use of the embankment has been modified in the design phase to incorporate impoundment of water with provision for controlled release.

A primary advantage of subsidiary fill impoundments is that runoff control is obtained for little additional cost because of the dual function of the structure. Proper attention must be given to site and soil investigations, proximity of other utilities, design and construction considerations, and requirements for easement.

Rooftop ponding may be used to store precipitation on roofs that are flat, or nearly flat. This technique is used frequently and is one of the most convenient to design and install. Rooftops may be normally wet or dry. Normally, wet rooftops have the advantage of providing a cooling effect on the building. Disadvantages include the effects of expansive forces of freezing water in winter, and the possibility of extensive water damage due to roof leaks.

Normally dry rooftops have roof drains which control the discharge of water. This technique is used frequently because of the opportunity for on-site control. Good design and installation are important because of difficulties associated with inspection.

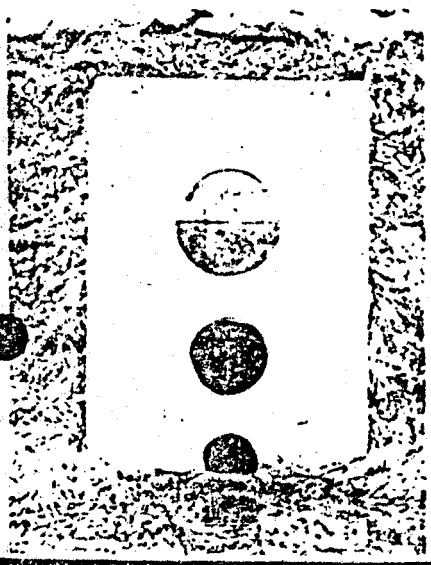
Trench storage is obtained by filling an excavated trench with large (2 to 3-inch) stones. The voids between stones are allowed to fill with water which is discharged by controlled release devices.

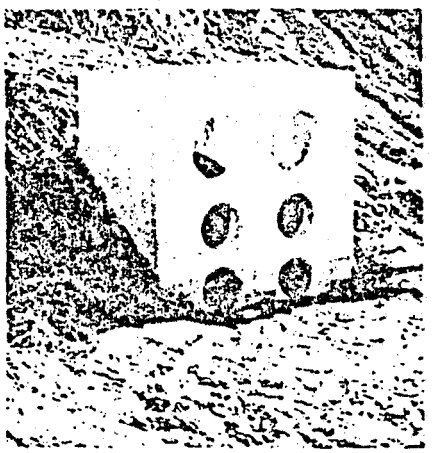
Trench storage capacity is severely limited which makes this technique useful only for runoff from very small areas. Since the surface soils can be rendered almost impervious by oils and sediments, and since the stone pores can become filled with sediments, the usefulness of the trenches can be drastically reduced, requiring extensive maintenance and reconstruction to rehabilitate them. Sedimentation clogging controlled release devices is also a problem with this technique.

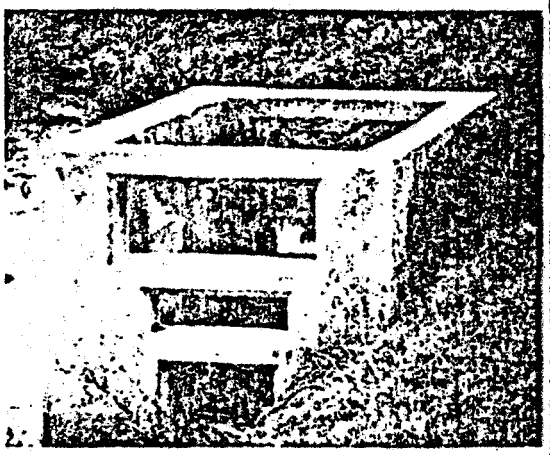
Pipe storage, or storage of storm runoff within oversized storm drainage pipes, is another available technique. The additional construction and material costs of larger-than-necessary drainage pipes may make this alternative prohibitively expensive except in areas of extremely high land value, where land is unavailable, or where storage ponds cannot be used.

Water stored in storm drainage pipes can be released at controlled rates by the use of properly designed outlet devices. The small outlet de-

■ UNIQUE outlets control detention basin flows from storms of various intensities; the smaller openings handle one-year storms, larger openings accommodate ten-year storms, and open tops provide emergency outflow. Outlets, constructed to avoid clogging, were designed so stormwater flow that followed the upstream development did not exceed rate prior to development. V-notch outlet (opposite) checks flow from airport additions in Hanover Township, Pennsylvania. Three below are associated with large urban stormwater drainage system in South Whitehall Township, Pennsylvania. The consultant, G. Edwin Pidcock, of Allentown, Pennsylvania, reports that upon inspection all were working well and no complaints have come from downstream areas.







vices required for small development areas are subject to clogging by leaves, paper, rags, and other debris.

Cistern storage involves collection of storm runoff underground in tanks. The tanks must be properly designed for the loads they must withstand. Although they have the advantage of permitting use of the area above them, the necessarily elaborate structures make this alternative expensive.

For any drainage area but a very small one, the required size of cisterns would make the cost restrictive. The small release devices of small cisterns easily become clogged.

Tunnel-reservoir systems have been investigated by some cities, notably Chicago and San Francisco. In Chicago, the method chosen to protect Lake Michigan was to construct a system of large tunnels (15 to 35 feet in diameter) and reservoirs. The system would have sufficient capacity to prevent overflows to the lake. After a storm, the contents of the tunnel-reservoir system would be pumped out and routed to sewage treatment plants. This plan eliminated the need to expand treatment plant capacity.

San Francisco's combined sewer system used to overflow raw sewage into San Francisco Bay and the Pacific Ocean from 70 to 120 times a year. The city is constructing a system of transport sewers and tunnels which will convey wastewater during storms, and store the flows until treatment plants can process the sewage.

Dry wells are excavated pits which have been filled with 2 to 3-inch stones. Water is allowed to fill the stone voids and then to infiltrate the surrounding soil. One of the earliest used techniques of this sort, dry wells can be used effectively where the soil is sufficiently permeable and bedrock is at a great enough depth. Depending on the stones used to fill the pit, the volume of a dry well should be about three times the volume of the water to be stored.

The effectiveness of a dry well is affected by the ability of water to infiltrate the soil. If the soil pores are clogged by fine material, oil, or other sediments, or if the top surface of the dry well is sealed, it will not function properly. In this event, the dry well must be reconstructed. Maintenance is a difficult proposition. Because of their limited capacity, the use of dry wells is restricted to small drainage areas.

Infiltration trenches are stone-filled trenches similar to dry wells, functioning in the same way. They are not so deep as dry wells but are subject to the same soil and site limitations. Like dry wells, they can become clogged by fine material, oil, or other sediments. They are easier to construct than dry wells and, since they have a higher ratio of surface area to volume, offer better infiltration characteristics. Because of their susceptibility to clogging, inspection difficulties, and limited capacity, infiltration trenches are not widely used.

Storage technique choice criteria to be considered in choosing a storage technique includes the following:

Site Factors

Size and topography of development.
Value of land.
Requirements for site investigations.
Soil characteristics.
Suitability of technique to site.
Accessibility.
Proximity of other utilities.
Environmental benefits.
Erosion.

Facility Factors

Use of facility.
Construction costs.
Design costs.
Inspection and maintenance costs.
Effective life.
Esthetics.
Safety.
Structural integrity.

Runoff Factors

Storm design characteristics.
Base flow.
Controlled release device.
Outlet structure.
Pollution control.
Sedimentation control.
Flood control.
Groundwater recharge.

Outlet Structures

Small on-site detention basins utilize a number of outlet structures to control the discharge from the facility: pipe/culvert, perforated riser pipe, weir, or a special outlet control box.

An emergency spillway must be provided in the event of a critical storm — one that exceeds the basin's design frequency. Most authorities that require detention also stipulate the design capacity of the emergency spillway. The specific criterion may be a 50-year or 100-year return period or a locally established allowable release rate. Where lives or high property values would be endangered by a breached detention basin, the probable maximum design precipitation should be used.

The preferred location of an emergency spillway is on undisturbed ground rather than over a prepared embankment. On-site detention ponds that control runoff from small tracts can safely handle overflows as sheetflow through gentle, well defined swales. The emergency spillway must be sufficiently protected to eliminate any potential erosion. Adequate stabilization may be established by concrete lining or by placing mortared rubble along the discharge channel. A concerted effort should be made to direct the spillway away from high value property and towards the natural drainage pattern.

Economic Aspects

The economic justification for constructing the facilities for control of stormwater runoff has been that they enhance the value of the areas affected. Other benefits would be the creation of recreation areas and the replenishment of the ground water supply. Different approaches are taken in deciding who should pay improvements.

Most cities require developers of new areas to pay for all storm sewers. The cost of main and trunk sewers and drainage canals is usually borne by public agencies.

The various possibilities of financing drainage improvements include:

- Creation of special drainage districts empowered to levy taxes.
- Use of general revenues.
- Special assessments against property which benefits.
- General obligation bonds.
- State and federal grants-in-aid.
- Federal loans.
- Voluntary participation of property owners and developers.

Identifying the beneficiaries of flood and pollution control projects is an important consideration in allocating the costs of such improvements. Certainly, the downstream property owners will benefit directly by having flood-free property. But upland property owners benefit by being relieved of liability. Downstream property owners might be not only owners of residential, commercial, and industrial properties, but also the public which owns the channels, streets, etc. All who use the waters downstream will benefit from reduced pollution. Other benefits derived from flood and pollution control projects are prevention of loss of life and mitigation of health and traffic hazards. □□□

References

1. Nebolsine, Ross, and Vercelli, George L., "Is the Separation of Sewers Desirable," Proceedings, National Symposium on Urban Rainfall and Runoff and Sediment Control, July 1974.
2. Colston, Newton V., "Characterization and Treatment of Urban Land Runoff," USEPA-670/2-74-096, distributed by National Technical Information Service, Springfield, VA, NTIS No. 240 978.
3. American Public Works Association, *Water Pollution Aspects of Urban Runoff*, Federal Water Pollution Control Administration, Water Pollution Control Research Series WP-20-15, January, 1969.

ARIX

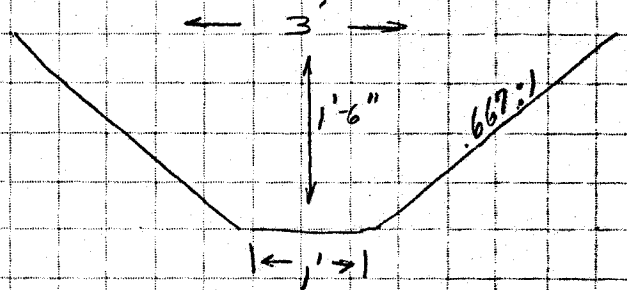
CLIENT VICTORIO JOB NO. 81200.00

PROJECT COUNTRY GLEN APARTMENTS CALCULATIONS FOR

MADE BY JGF DATE 2-23-82 CHECKED BY DATE SHEET OF

IRRIGATION PIPE SIZING

EXISTING DITCH :



• USING THE FORMULA FOR OPEN CHANNEL FLOW :

$$Q = A\left(\frac{1.486}{n}\right) S^{1/2} R^{2/3}$$

A = AREA = 3.0 S.F.

S = SLOPE IN FT PER FT = .003 ± (DO NOT HAVE ADEQUATE INFORMATION)

R = HYDRAULIC RADIUS = $\frac{A}{W}$ = .651

n = .016 - FOR CONCRETE CHANNEL

• ASSUME FLOWING FULL

∴ Q = 11.46 CFS

→ SIZE TWO CULVERTS TO CARRY THIS AMOUNT @ SAME SLOPE OF .3%

• REFERENCE - HANDBOOK OF STEEL DRAINAGE & HWY. CONSTR. PRODUCTS - PAGE 195

USING "n" OF .015 & AT LEAST A TOTAL OF 11.5 CFS

USE ONE 18" & ONE 21" = 12.9 CFS (OR 2-18" IF SLOPE CAN BE AT LEAST .4%

OR @ 84% OF SAME SIZE USE EQUIV. SIZE ARCH PIPES OF 16"X25" GIVING 13.1 CFS TOTAL

NOTE : IT SEEMS THAT GIVEN THE SAME SLOPE FOR DITCH & PIPES THE 18" PLUS 21" CAN CARRY ANYTHING THE DITCH CAN HANDLE

Estimate detention reservoir storage

In detention reservoir design proper balance should be achieved between allowable maximum outflow rate and detention storage.

By A. S. Paintal, P.E., Ph.D.

A SIMPLIFIED PROCEDURE is now available for estimating detention reservoir storage as governed by the characteristics of drainage area and the maximum allowable outflow rate.

The detention reservoir is an effective measure for the management of stormwater run-off and has been endorsed as a general solution for urban drainage problems. The reservoir acts as a temporary storage allowing run-off to be released at a slow predetermined rate to reduce the impact on the downstream drainage system. The facility does not reduce the total volume of run-off, but does increase the flow duration, thereby reducing the peak run-off flow rates.

In the design of detention reservoir, proper balance should be achieved between the allowable maximum outflow rate and the detention storage. The outflow can be through an orifice, a gravity sewer, or a pump. Flow characteristics may cause the outflow rate to vary or have a constant value.

When the inflow to the detention reservoir exceeds the capacity of outflow facility, the storage commences and continues as long as this condition prevails. Outflow will continue until the reservoir is empty.

The models developed in this article are based upon the following assumptions:

- The rainfall intensity—duration relationship can be expressed as follows:

$$I = a/(b + T) \qquad (1)$$

where I = the rainfall intensity, in/hr
a&b = constants, and
T = the duration of rainfall, minutes.

- The storms with durations longer than the time of concentration, t_c, for the drainage area produce larger volumes of run-off even though the peak flow rates are reduced.
- The inflow hydrograph has been taken to be of trapezoidal form as shown in Figure 1. The peak rate of run-off is given by the rational formula as follows:

$$Q_0 = CIA \qquad (2)$$

In which Q_0 = the peak flow rate, cfs.
C = the coefficient of run-off,
I = the rainfall intensity, inches per hour, and
A = the drainage area, acres.

The rising and receding limbs of inflow hydrograph are equal to the time of concentration, t_c.

- The area under the inflow hydrograph represents the total volume of strom run-off and is equal to the peak rate of run-off, Q_0, multipled by the storm duration, T, that is Q_0T.

Detention Storage Model—constant outflow rate:

Figure 2 shows the inflow hydrograph generated by a storm of duration, T. The inflow rate increases at a uniform rate up to time $t = t_c$, and the flow rate is constant beyond time $t = t_c$ throughout the duration of storm. After the cessation of storm, the flow rate decreases at a uniform rate and is zero at $t = T + t_c$. The outflow rate equals the inflow rate until the inflow rate equals the constant allowable outflow rate, q_0.

As long as the storage and the inflow rate are sufficient, the outflow will be constant as shown in Figure 2. The area between the inflow and the outflow hydrographs represents the storage volume required. Mathematically, the storage volume, V, can be expressed as:

$$V = (Q_0 - q_0)^2t_c/Q_0 + (Q_0 - q_0)(T - t_c) \qquad (3)$$

In order to determine the maximum storage requirements, the storage volume, V, is differentiated with respect to the storm duration, T, and the resulting expression is set equal to zero. Simplification and rearrangement of the expression give the following for critical storm duration:

$$T_c = \sqrt{(CAab)/[q_0 - (q_0^2t_c)/(CAa)]} - b \qquad (4)$$

Detention Storage Model—orifice control:

Generally the rate of outflow from a reservoir is affected by the reservoir water surface elevation at the inlet to the drain which may be an orifice, a standard short tube, or a gravity sewer serving the area. The outflow rate increases as the head on the inlet to the drain increases and attains the maximum value at a point where the outflow hydrograph crosses the receding limb of inflow hydrograph. Therefore, the rate of outflow increases as the square root of time during the filling of reservoir and attains the allowable maximum rate, q_0, when the reservoir is full as shown in Figure 3.

Figure 3 shows the inflow and the outflow hydrographs. The required storage is given by the area between the two hydrographs:

$$V = Q_0T - 2q_0(T + t_c)/3 + (q_0^2t_c)/(6Q_0) \qquad (5)$$

In order to find out the critical storm duration, T_c, producing maximum detention storage volume, the above expression for volume, V, is differentiated with respect to storm duration, T, and the derivative is set equal to zero, which on simplification gives:

$$T_c = \sqrt{(CAab)/[(2q_0/3) - (q_0^2t_c)/(6CAa)]} - b \qquad (6)$$

In the following example, the application of design procedures as developed above is illustrated for the estimation of detention storage requirements.

Estimate the volume of a detention reservoir required for a 25-acre land area planned for a residential subdivision in central Illinois. The flood control regulations require that the flow rate from the area should not exceed the flow rate generated by a five-year storm over the area in its present undeveloped state and the reservoir should be designed for a 100-year storm.

The rainfall intensity-duration-frequency relationship for the area is:

$$I = \frac{120T_r^{0.178}}{(T + 20)} \qquad (7)$$

where T_r = return period of storm in years and
T = storm duration in minutes.

The coefficient of runoff, C, and the time of concentration, t_c, of the area are 0.15 and 20 minutes respectively for undeveloped area and 0.45 and 10

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minutes respectively after development of the area. The computations will be made for a) constant outflow condition, and b) orifice controlled outflow condition.

Solution:

- *Allowable Maximum Outflow Rate:* For a storm of 5 year return period (T_r) and 20 minute duration (T), the rainfall intensity

$$I = (120\ T_r^{0.178})/(T + 20)$$
$$= (120 \times 5^{0.178})/(20 + 20) = 3.98\ \text{in/hr}$$

The flow rate, q_0, as computed from the rational formula is

$$q_0 = CIA = 0.15 \times 3.98 \times 25 = 14.91\ \text{cfs}$$

- *Rainfall Intensity-Duration Relationship:* For T_r = 100 years, Equation 7 is reduced as:

$$I = (120\ T_r^{0.175})/(T + 20)$$
$$= (120 \times 100^{0.175})/(T + 20)$$
$$= 268.65/(T + 20)$$

- *Detention Storage:*

Data: $a = 268.65$ $C = 0.45$ $t_c = 10$ min.
$b = 20$ $A = 25$ acres $q_0 = 14.91$ cfs

Constant outflow condition:

Storm Duration producing maximum Detention,

$$T_c = \sqrt{(CAab)/[q_0 - (q_0^2 t_c)/(CAa)]} - b$$

$$T_c = \sqrt{(0.45 \times 25 \times 268.65 \times 20)/[14.91 - (14.91^2 \times 10)/(0.45 \times 25 \times 268.65)]} - 20$$

$$= 45.30\ \text{minutes}$$

Rainfall Intensity, $I = 268.65/(T_c + 20)$
$= 268.65/(45.30 + 20)$
$= 4.11$ in/hr

Peak Rate of Flow, $Q_0 = CIA$
$= 0.45 \times 4.11 \times 25$
$= 46.28$ cubic feet per second

Detention Storage, $V = (Q_0 - q_0)^2 t_c/Q_0 + (Q_0 - q_0)/T_c - t_c)$
$= (46.28 - 14.91)^2(10 \times 60)/(46.28) + (46.28 - 14.91)(45.3 - 10)(60)$
$= 79,200$ cubic feet

Orifice controlled outflow condition:

Storm Duration producing maximum Detention Storage,

$$T_c = \sqrt{(CAab)/[(2q_0)/3 - (q_0^2 t_c)/(6CAa)]} - b$$

$$= \sqrt{(0.45 \times 25 \times 268.65 \times 20)/[(2 \times 14.91)/3 - (14.91^2 \times 10)/(6 \times 0.45 \times 25 \times 268.65)]} - 20$$

$$= 58.47\ \text{minutes}$$

Storm Rainfall Intensity, $I = 268.65/(T_c + 20)$
$= 268.65/(58.47 + 20)$
$= 3.42$ inches per hour

Peak Rate of Flow, $Q_0 = CIA$
$= 0.45 \times 3.42 \times 25$
$= 38.48$ cfs

Detention Storage,

$$V = Q_0 T_c - 2q_0(T_c + t_c)/3 + (q_0^2 t_c)/(6Q_0)$$

$$= (38.48 \times 58.47 \times 60) - (2 \times 14.91)(58.47 + 10)(60)/3 + (14.91^2 \times 10)(60)/(6 \times 38.48)$$

$$= 94,738\ \text{cubic feet}$$

□ □

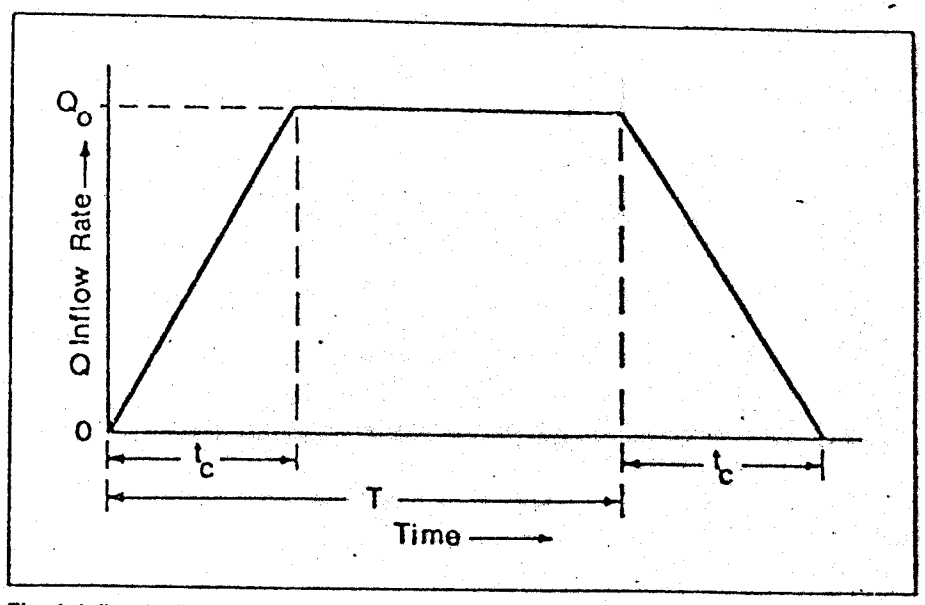


Fig. 1: Inflow hydrograph due to a storm of duration T.

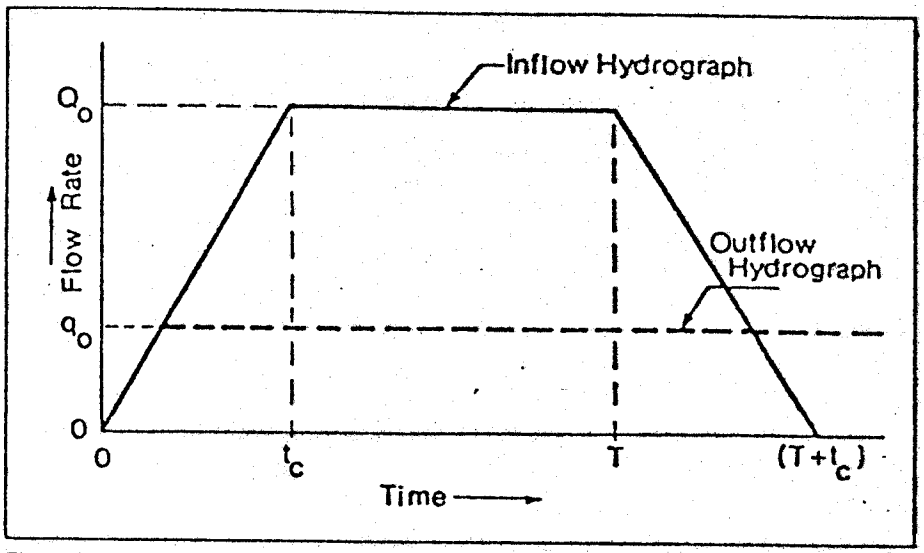


Fig. 2: Detention Storage Model—constant outflow rate.

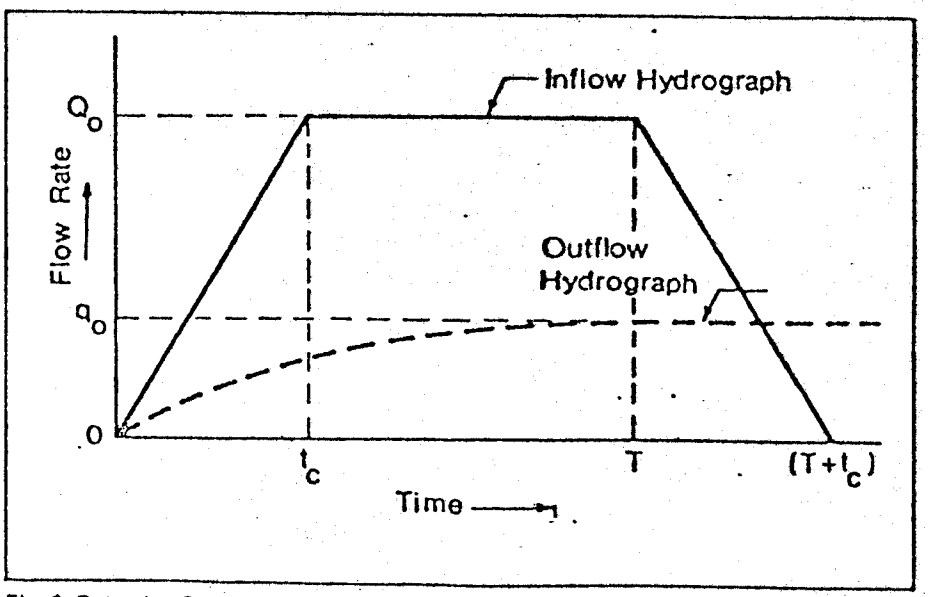
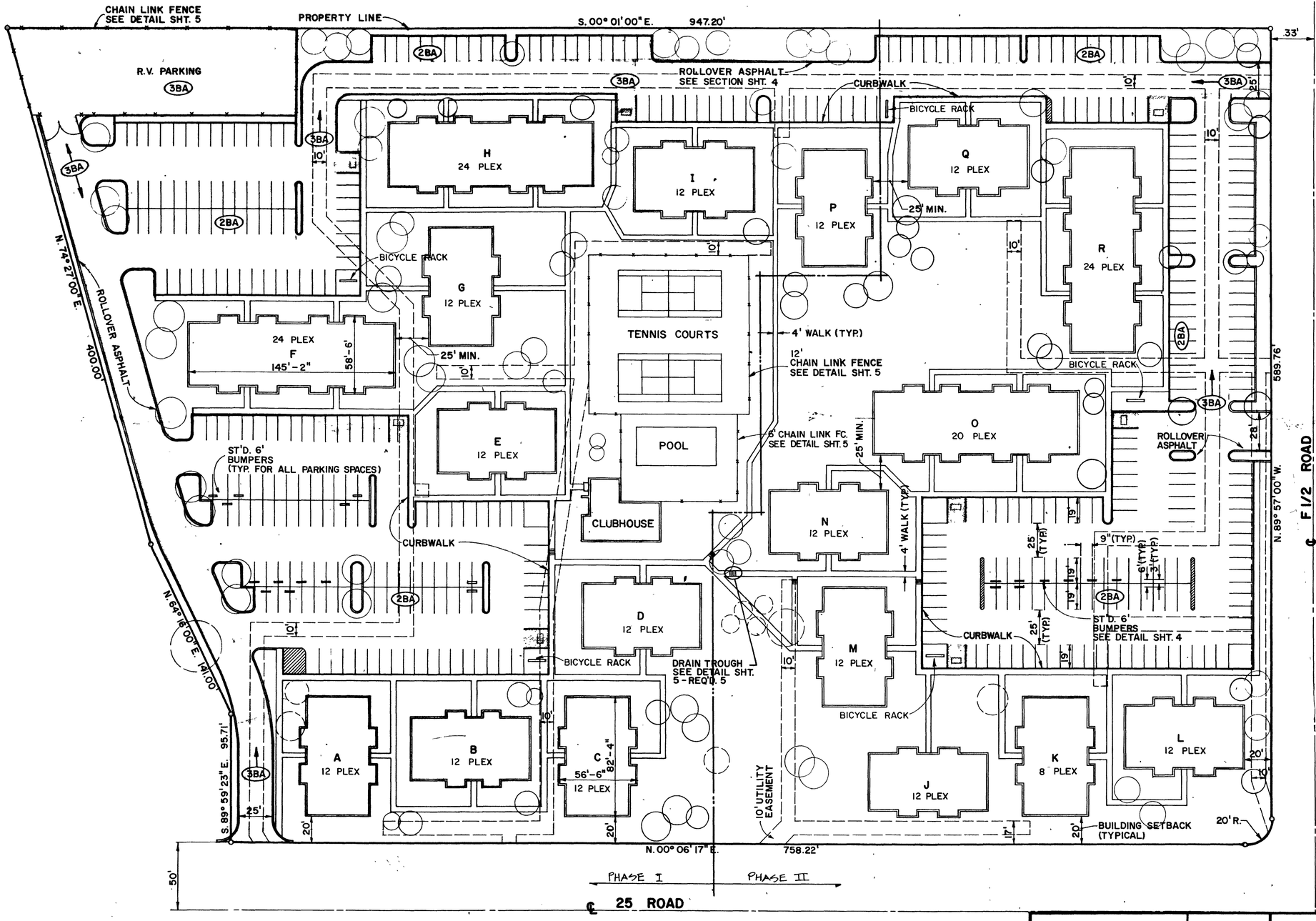


Fig. 3: Detention Storage Model—orifice controlled outflow.



LEGEND

- ROLLOVER ASPHALT
- CURBWALK
- PARKING STRIPING
- NEW TREES
- EXISTING TREES
- 2BA — 2" HOT BITUMINOUS ASPHALT WITH 6" AGGREGATE BASE COURSE IN PARKING AREAS.
- 3" HOT BITUMINOUS ASPHALT WITH 6" AGGREGATE BASE COURSE IN PRIMARY DRIVE AREAS.
- TRASH AREA

#30-80

08-02

A Professional Corporation

ARIX

Engineers Architects Planners

Greeley, Colorado
Grand Junction, Colorado
Riverton, Wyoming

SCALE 1" = 40'
DRAWN J.T.
CHECKED
APPROVED
DATE MAR. 10, 1982
PROJECT NO. 81200.00

CITY OF GRAND JUNCTION, COLORADO

COUNTRY GLEN APARTMENTS

SITE PLAN

1/5