

DS #

4512

DS INDEX:

APN:

138-02-101-015

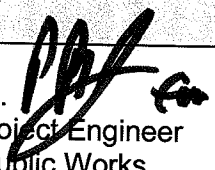
PROJECT:

LONE MOUNTAIN SENIOR APARTMENTS

SUBMITTAL

4TH



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		March 3, 2011
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E.  Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Update # 1 to the Lone Mountain Senior Apartments	
Cross Streets:	Lone Mountain & Rainbow	
File Number:	F:\Depot\DSMemos\DS4512D.ZNAE.doc	
Parcel Number:	13802101015	
Zoning Action:	NEW SDR-41043, SUP-41039	
FEMA Flood Zone	YES ☒ X	NO
Proposed Storm Drain	YES	NO ☒ X
COPIES TO:		Impulse Engineering
		Ovation Development
		Bart Anderson, P.E., DevCo
		CCRFC

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1 st Submittal	11/24/2010 & Supplemental 11/29/2010	12/7/2010	Not Approved	\$400.00	158043: \$400
2 nd Submittal	12/21/2010	01/03/2011	Conditional Approval	\$400.00	159673: \$400
3 rd Submittal	1/25/2011	2/3/2011	CCRFC Conc. Recv'd	N/C	N/C
4 rd Submittal	2/7/2011 & Supplemental 2/23/2011	3/3/2011	Not Approved	\$100	162205: \$100
TOTAL FEES (LDDRS):				\$800.00	----

REMARKS: Submittal # 4 is to Update the site. The Site Plan has been modified and the development area is reduced in size. A small portion of this site is located in a FEMA Special Flood Hazard Area, Zone AE. No changes to the Flood Zone are shown.

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Department of Development Services concurrence.
	is conditionally approved subject to FEMA approval of CLOMR.

Update # 1 reduces the site development, layout and impacts to the Flood Zone. The project has submitted for a new SDR 41043 and SUP 41039. The SDR is currently scheduled to be heard on April 12, 2011. The drainage study update cannot be approved until after Planning Commission approval is provided.

1. Provide a copy of the zoning/planning conditions associated with this site with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the Planning Commission and/or *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

2. The provided HEC-RAS analysis has made adjustments to the Mannings n-values. Flood Control takes no exception to these revisions as there are appropriate based upon a more detailed review and analysis.
3. This site is adjacent to an ongoing CCRFCD Master Plan facility. The Gowan Outfall – Lone Mountain Branch project has been awarded with construction scheduled to begin in early 2011. The Gowan Outfall project proposes to install a storm drain lateral with a 12.5-foot DM drop inlet on the south side of Lone Mountain Road immediately east of this development. Continue to coordinate the site construction with the Gowan Outfall – Lone Mountain Branch project through Engineering Design; contact Gina Venglass @ 229-6790.
4. Grading Plan (Sheet 7):
Section J/12 shows a low wall with wrought iron above, yet the wall is shown as Construction Note #14, wrought iron per detail B. Review and revises accordingly.
5. The engineer has provided a table on the grading plans that shows the quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
6. This site accepts offsite flows and conveys them through the site. The provided "Public Drainage Easement to be Privately Maintained" needs to be shown on the plans. The proposed easement includes the 100-year flood zone within the project site. Public drainage easements must be recorded by separate document prior to the final acceptance of the improvement plans. Submit the easement

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see <http://ndep.nv.gov/bwpc/storm01.htm> or call (775) 687-9429.

NOTE: This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

END OF REMARKS

PBJ

T/R/S: T20S/R60E/S02
AREA L02

UPDATE #1 TO THE
TECHNICAL DRAINAGE STUDY
FOR
LONE MOUNTAIN SENIOR APARTMENTS

W.O. #2010017
February 7, 2010

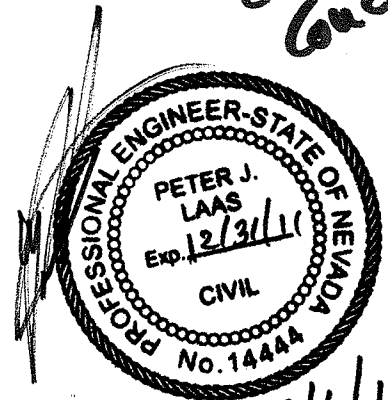
Prepared for:

OVATION DEVELOPMENT
6021 S. Fort Apache Road, Suite 100
Las Vegas, Nevada 89148
Phone: (702) 990-2350

Prepared by:

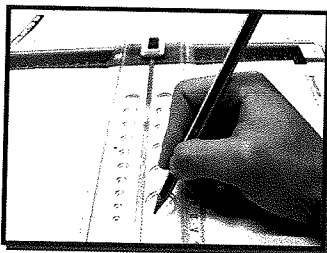
Impulse

Civil Engineering & Planning
625 Dinard Way
North Las Vegas, NV 89031
Phone: 702-308-7115 · Fax: 702-478-8535

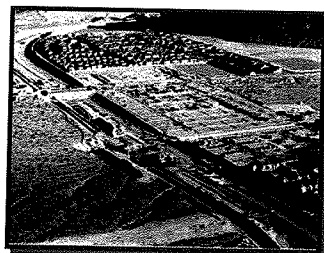


2/6/11

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Civil Engineering



Land Planning



Flood Control



Utilities

Impulse

Civil Engineering & Planning

625 Dinard Way
North Las Vegas, NV 89031

PHONE 702-308-7115

FAX 702-478-8535

February 7, 2010

City of Las Vegas
Public Works – Flood Control
333 North Rancho Drive
Las Vegas, Nevada 89107

**Re: Update #1 to the
Lone Mountain Senior Apartments
Technical Drainage Study**

Submitted for your approval is Update #1 to the **Technical Drainage Study for Lone Mountain Senior Apartments** a proposed 1.77 acre senior affordable apartment development. The site is in a FEMA Special Flood Hazard, Zone AE as shown on Community Panel Number 32003C2155E and is not adjacent to any Clark County Regional Flood Control District (CCRFCD) Master Planned Facilities according to the CCRFCD Master Plan Update, Figure F-19. CCRFCD concurrence is required. A copy of this study will be provided to CCRFCD after approval from the City of Las Vegas.

If you have any questions or require additional information, please call me at (702) 308-7115.

Sincerely,
IMPULSE CIVIL ENGINEERING



Peter J. Laas, P.E.
Principal

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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

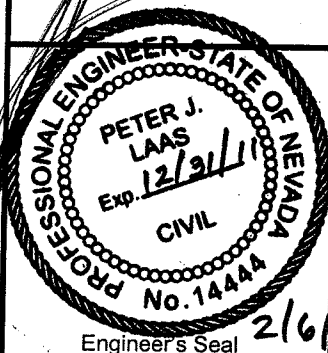
DRAINAGE STUDY INFORMATION FORM

Name of Development: Lone Mountain Senior Apartments Date: February 5, 2011Location of Development: a) Descriptive (Cross Streets) North/South: Rainbow West: Lone Mountain
b) Sect. 02 Town 20S Range 60EName of Owner Ovation Development Assessors Parcel No.: 138-02-101-015Telephone No.: (702) 990-2390 Facsimile No.: (702) 990-2391Address: 6021 S. Fort Apache Road, Suite 100
Las Vegas, Nevada 89148Contact Person - Name: Pete Laas, P.E. Telephone No.: (702) 308-7115Firm: Impulse Civil EngineeringAddress: 625 Dinard Way, North Las Vegas, NV 89031

Type of Land Development/ Land Disturbance Process:

☐ Rezoning	☐ Subdivision Map	☐ Clearing and Grading Only
☐ Parcel Map	☐ Planned Unit Development	☐ Other (Please specify below)
☐ Large Parcel Map	☒ Building Permit	

1. Total Owned Land Area: At Site: 3+/- acres Being Developed/Disturbed: 3+/- acres
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? YES NO
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? YES NO
4. Proposed type of development (Residential, Commercial, etc.)? Multi-Family Residential
5. Approximate upstream land area which drains to the subject site? 0 Acres
6. Has the site drainage been evaluated in the past? YES NO If yes, please identify documentation: City of Las Vegas Neighborhood Flood Control Master Plan, Technical Drainage Study for Lone Mountain Senior Apartments, Gowan Outfall Lone Mountain Branch, Rancho to Decatur
7. If known, please briefly identify the proposed discharge point (s) of runoff from the site:
The proposed discharge points are into public streets, Rainbow Avenue and Lone Mountain Road
8. Briefly describe your proposed schedule for the subject project: A.S.A.P.



Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

* Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

Local Entity File No. _____

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Lone Mountain Senior Apartments

Map ID:

Firm Name: Impulse Civil Engineering

Engineer: Pete Laas, P.E.

Address: 625 Dinard Way

City: North Las Vegas

State: Nevada

Zip: 89031

Phone Number: (702) 308-7115

Fax Number: (702) 478-8535

Property Owner: Ovation Development

Address: 6021 South Fort Apache Road, Suite 100

City: Las Vegas

State: Nevada

Zip: 89148

Reviewed By:

Date Received:

Date Accepted for Review:

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT

Yes

No

☒

☐

Design Manual **Standard Form 1** with the engineer's seal and signature.

☒

☐

Design Manual **Standard Form 4**.

☒

☐

2 copies of the 24" x 36" Drainage Plan.

☐

☒

A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS

- | Yes | No | |
|-------------------------------------|--------------------------|--|
| ☒ | ☐ | A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated. |
| ☒ | ☐ | A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated. |
| ☒ | ☐ | Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs. |
| ☒ | ☐ | On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs. |
| ☒ | ☐ | Vicinity Map with local and major cross streets identified and a north arrow. |

III. DRAINAGE PLAN

- | Yes | No | |
|-------------------------------------|--------------------------|---|
| ☒ | ☐ | Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada. |
| ☒ | ☐ | Minimum scale: 1" = 60'. |
| ☒ | ☐ | Project Name. |
| ☒ | ☐ | Vicinity Map with local and major cross streets. |
| ☒ | ☐ | Revision box. |
| ☒ | ☐ | North arrow and bar scale. |
| ☒ | ☐ | Engineer's/consultant's address and phone number. |
| ☒ | ☐ | Elevation datum and benchmark. |
| ☒ | ☐ | Legend for symbols and abbreviations. |
| ☒ | ☐ | Cut/fill scarps, where applicable. |
| ☒ | ☐ | Street names, grades, widths. |
| ☒ | ☐ | Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. |

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☒	☐	Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
☒	☐	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
☒	☐	Proposed typical street sections
☐	☐	Streets with off-set crowns.
☒	☐	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes
☒	☐	Property lines.
☒	☐	Right-of-way lines and widths, existing and proposed.
☒	☐	Existing improvements and their elevations.
☒	☐	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
☒	☐	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
☒	☐	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for The 10-year and 100-year flows.
☒	☐	Location and cross-section of street capacity calculations.
☐	☐	Cross-sectional detail for channels, including cutoff wall locations.
☒	☐	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
☐	☐	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
☐	☐	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
☐	☐	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☐	☐	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
☒	☐	Building and/or lot numbers.
☐	☐	Alignment of all existing, proposed, or future Regional facilities adjacent to the site.
☒	☐	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
☒	☐	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
☒	☐	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
☒	☐	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

IV. HYDROLOGIC ANALYSIS

Yes	No	
☒	☐	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
☒	☐	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
☒	☐	Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
☒	☐	Use of correct precipitation values in and around the McCarran Airport rainfall area.
☒	☐	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
☒	☐	A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
☒	☐	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
☒	☐	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes

No

- | | | |
|-------------------------------------|-------------------------------------|---|
| ☐ | ☒ | Flow split calculations and supporting documentation or reference for the method of flow split calculations used. |
| ☒ | ☐ | Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. $Q_{100} d \times v \leq 8$, $Q_{10} d \times v \leq 6$ and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan. |
| ☒ | ☐ | A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria. |
| ☐ | ☐ | Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged). |
| ☐ | ☐ | Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate. |
| ☒ | ☐ | Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, which ever is greater. |
| ☒ | ☐ | A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. <ul style="list-style-type: none"> • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report. |
| ☐ | ☐ | Provide a 50 percent clogging factor in the capacity calculation for drop inlets. |
| ☐ | ☐ | Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation. |
| ☒ | ☐ | The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed. |

REFERENCE:

STANDARD FORM 2



CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 06/06/01)

The following checklist is intended as a supplemental **guide** for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (Design Manual).

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT

Yes	No	
		A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
<i>N/A</i>		Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.

II. GRADING PLAN INFORMATION

Yes	No	
		(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
		Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)
		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
		All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
		Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
		Back of lot elevations and lot drainage pattern for all lots including common lots.
		Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
		This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
		Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
		Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
		Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
		The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
		Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.
		Lots with "B and C Type Drainage" shall be required to install an underground nuisance drainage system or a 2-foot valley gutter through the lot. 16" x 24" minimum block wall openings are required for both options.
		Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

- An appointment must be made to preview this checklist in conjunction with Clark County Regional Flood Control District Manual Standard Form 2 prior to the City accepting a new Drainage Study for review. The engineer may contact the Flood Control Section at 229-6541.
- Following the acceptance of the Drainage Study (meeting the minimum acceptable information above), there will be a charge of \$250 for each Drainage Study review submittal. These fees are payable at the time the Grading Permit is obtained.
- The Drainage Study must be accepted prior to submitting grading plans to the Land Development Section for review.

This document is intended as an aid in preparing Technical Drainage Studies for the City of Las Vegas. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all-inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

F:\Depot\DOCS\Memos\jbCHKLIST7.doc
6-Jun-01

The purpose of this study is to update the drainage study for Lone Mountain Senior Apartments (CLV# 4512). The original study was based on a 152 unit site plan that comprised of two separate parcels. Parcel 1, APN 138-02-101-015, which is owned by Lone Mountain Apartments I, LLC and Parcel 2, APN 138-02-101-002, which is owned by David and Jessica Livingston ETAL. The original site plan processed, obtained approval of zone change, and approval of a site development review. The drainage study was prepared, submitted, reviewed, approved and obtained Clark County Regional Flood Control Concurrence. The CLOMR application was prepared, community acknowledgement obtained, and the fee was obtained. The CLOMR application was ready to submit to FEMA when my client notified me that the owner of Parcel 2 was not willing to proceed. At that time, my client instructed me to prepare a 75 unit site plan based on Parcel 1 only. This study will update the original study by reducing the area of disturbance. We will limit the discussion to the pertinent areas that are affected.

1.0 GENERAL LOCATION AND DEVELOPMENT DESCRIPTION

1.1 Scope

The purpose of this report is to provide detailed hydrologic and hydraulic analyses for the proposed development of parcel 138-02-101-015, generally located at the southeast corner of Lone Mountain Road and Rainbow Boulevard, and to provide appropriate drainage mitigation recommendations.

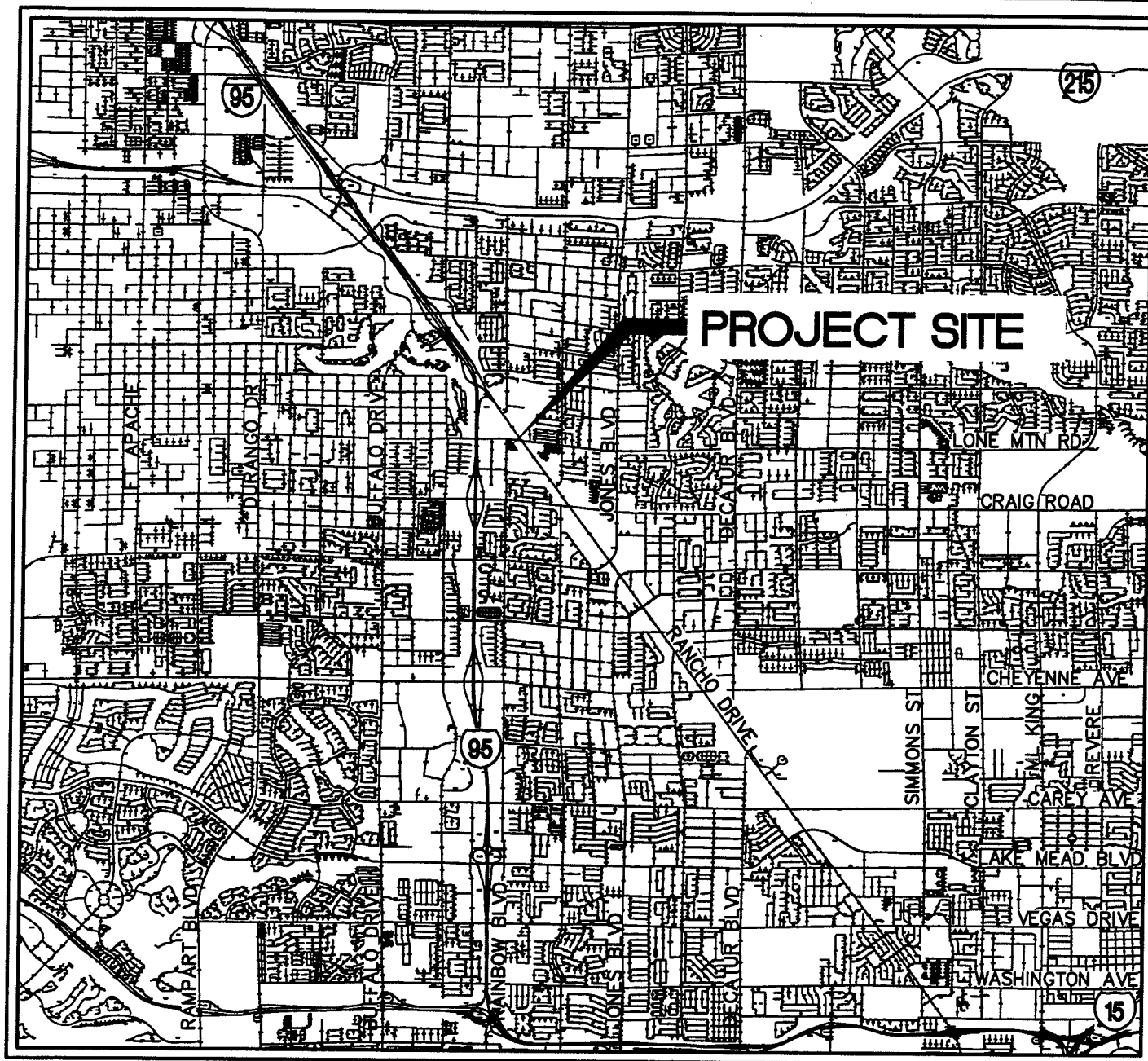
1.2 Location

There is no change to the location of this project but Figures 1 and 2 are revised and provided for reference. The site is bounded by an existing condominium development to the south, the existing Fire Station Number 9 to the west, vacant land to the east and the existing Santa Fe Station casino to the north.

1.3 Description of Property

The project site consists of approximately 1.77 acres of undeveloped desert land. The topography is relatively flat with a gentle slope of approximately 0.5% to the west. The vegetation is classified as poor, with less than 50% ground cover.

File: C:\Impulse\Projects\Clients\Ovation\Lane Mountain\Hydrology\FIG-1.dwg Sheet: NC MAP Date: 04-Feb-11 3:38:20pm



VICINITY MAP
NOT TO SCALE



FIGURE 1

Impulse

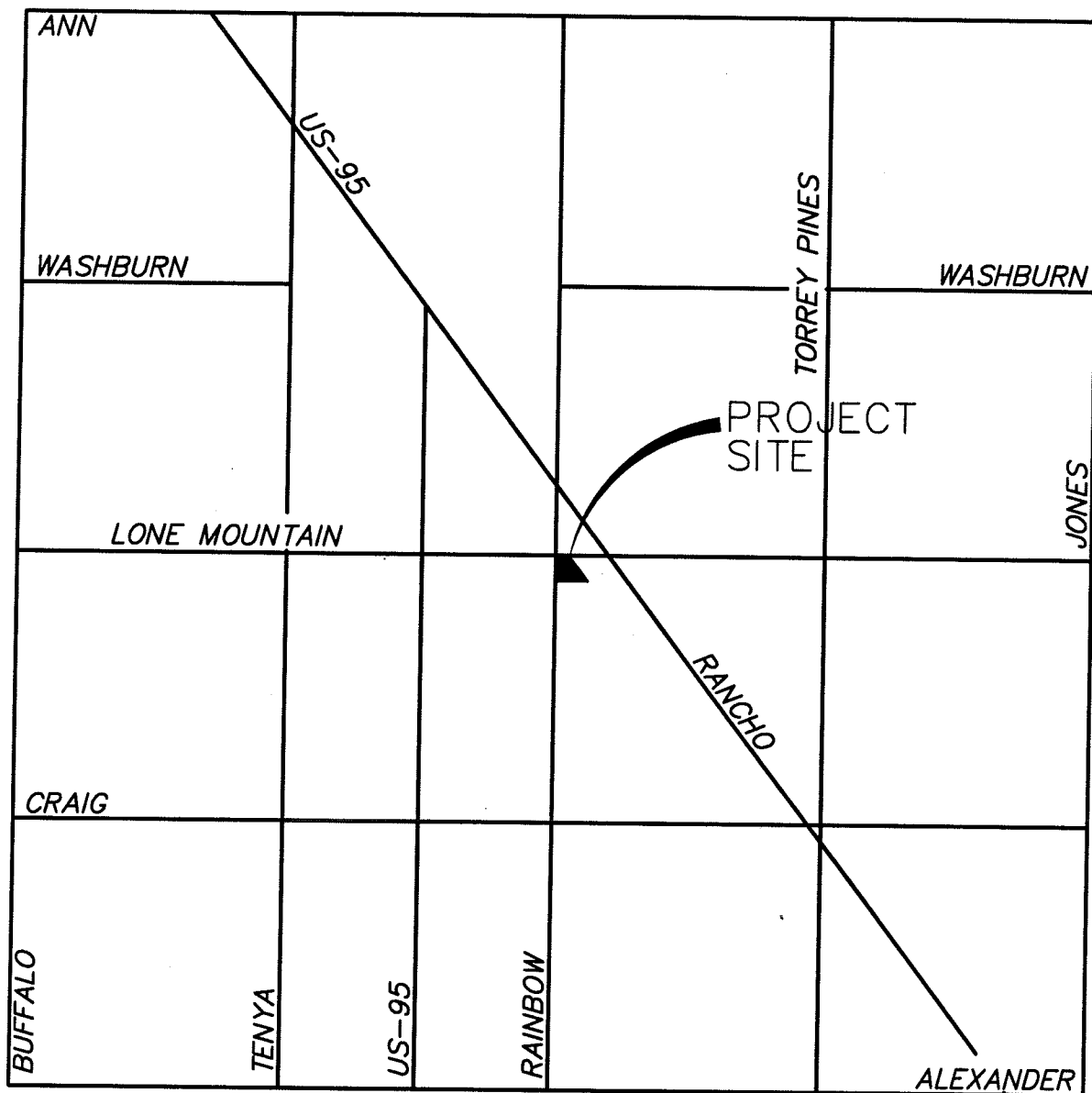
Civil Engineering & Planning

PLANNERS • CIVIL ENGINEERS

625 DINARD WAY • NORTH LAS VEGAS, NEVADA 89031 • (702) 308-7115

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LOCATION MAP

NOT TO SCALE



FIGURE 2

Impulse

Civil Engineering & Planning

PLANNERS • CIVIL ENGINEERS

625 DINARD WAY • NORTH LAS VEGAS, NEVADA 89031 • (702) 308-7115

$$I = \int F \cdot dt$$

2.0 DRAINAGE BASIN DESCRIPTION

2.1 Off-site Drainage Description

There is no change to the offsite drainage basin configuration.

2.2 Onsite Drainage Description

The general drainage pattern for the site is to the north and east. There is a prevailing drainage channel along the east side of the site, mostly on the existing Funny's Mobile Mart and gas station property to the east. In the existing condition, a portion of the property drains to Rainbow Boulevard and the remainder drains to Lone Mountain Road. Basin EX1 represents the portion of the site that drains to Lone Mountain Road and Basin EX2 represents the portion that drains to Rainbow Boulevard. The offsite basins combine with EX1 and drain east in Lone Mountain Road. A 24x36 existing condition basin map shows the sub-basin delineation and is included in a map pocket at the rear of this report.

In the developed condition, the existing condition drainage patterns were maintained as closely as possible. The site was analyzed as two separate basins. Basin PR1 represents the portion of the property that drains to Lone Mountain Road, combines with the offsite flows and then east in Lone Mountain Road. Basin PR2 represents the portion of the site that drains west to Rainbow Boulevard. A 24x36 proposed condition basin map shows the sub-basin delineation and is included in a map pocket at the rear of this report.

2.3 FEMA Flood Hazard Zone

The Special Flood Hazard Areas for Clark County, Nevada are outlined in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), dated September 27, 2002. The site is affected by a designated Special Flood Hazard Area (SFHA) Zone AE as shown on Figure 3, which is a replication of Community Panel No. 32003C2155 E.

Although the site is affected by the effective SFHA Zone AE, it is evident based on the project specific topographic data that the zone boundary is not accurate. That being said, an exhibit is provided (Figure 3A) which shows the site grading with respect to the effective base flood elevations. It should be noted that the site was graded at 1% from the flow line in Lone Mountain Road through the sidewalk drain. Once on-site, the grade drops to 0.40% through the effective flood zone, then transitions to 1.25% for 50-feet then to 0.50% for the remainder of the site.

While the top of curb elevations are slightly higher than the base flood elevations, the flow line elevations and finished grade elevations within the published SFHA are below the base flood elevations. In addition, the proposed finished floor elevation is greater than 1.5-feet above the effective base flood elevations, specifically at river station 108+07.00.

2.4 Regional Flood Control Master Plan Update

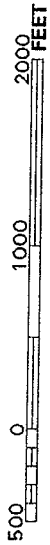
The site is not adjacent to a regional facility as shown on Figure 4, which is a replication of Figure F-19 in the *2008 Clark County Regional Flood Control District Flood Control Master Plan Update for the Las Vegas Valley*.

2.5 Previous Drainage Studies

The site has been studied in the past. The City of Las Vegas Neighborhood Flood Control Master Plan, Technical Drainage Study for Lone Mountain Apartments, and the Gowan Outfall Lone Mountain Branch, Rancho to Decatur all studied this site. None of these studies are referenced since flows and topology have changed. The Gowan Outfall Lone Mountain Branch, Rancho to Decatur is referenced to avoid conflict although the proposed facility is not adjacent to the proposed property.

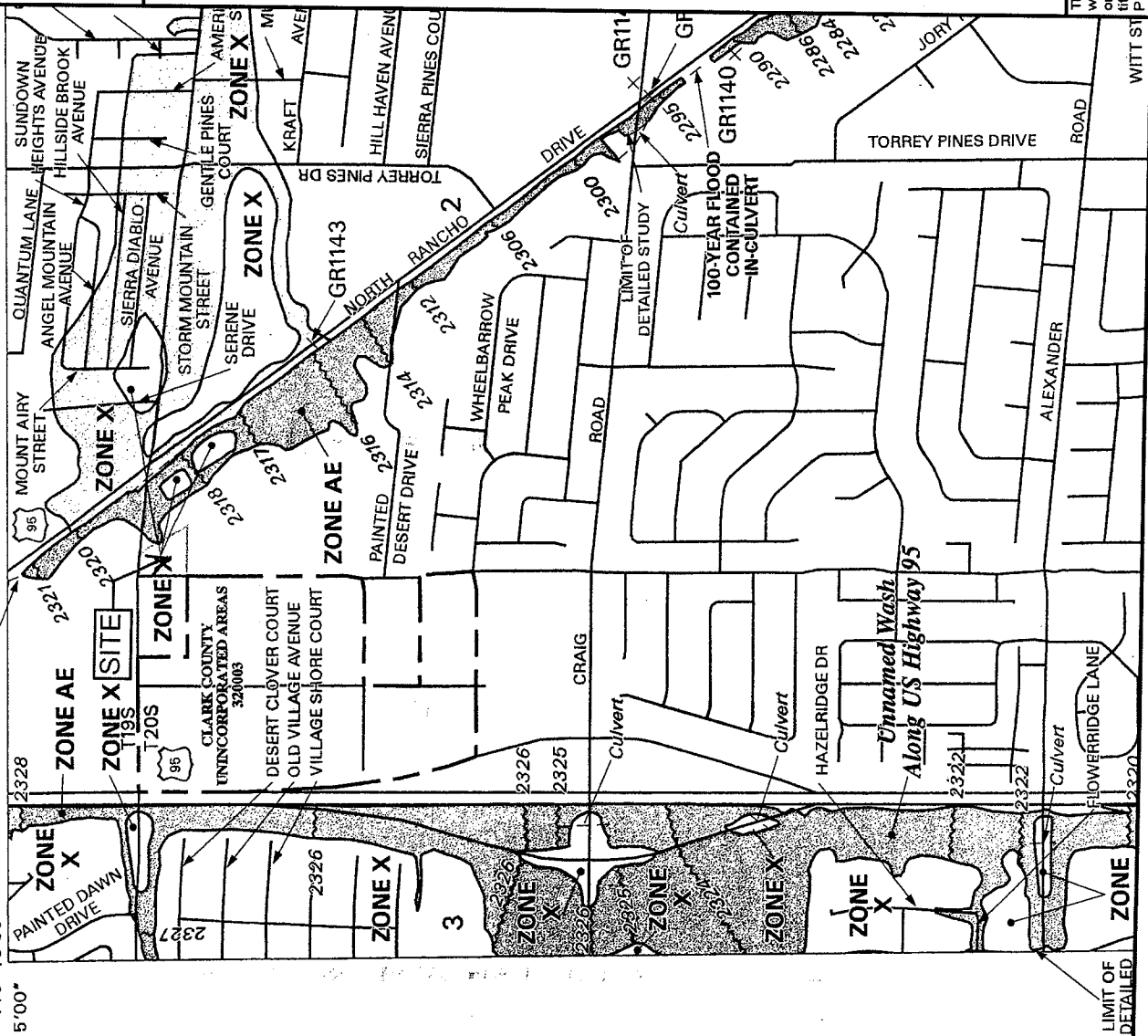


MAP SCALE 1" = 1000'



100-YEAR FLOOD
CONTAINED IN CULVERT

115°15'00"
36°15'00"



PANEL 2155 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2155 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS	COMMUNITY	NUMBER	PANEL	SUFFIX
	NORTH LAS VEGAS, CITY OF	320007	2155	E
	LAS VEGAS, CITY OF	320276	2155	E
	CLARK COUNTY UNINCORPORATED AREAS	320003	2155	E

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



MAP NUMBER
32003C2155 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-WIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

File: C:\Impulse\Projects\Clients\Ovation\Lane Mountain\Hydrology Revised\GRAD-blow-up.dwg Sheet: GRAD Date: 06-Feb-11 9:16:48am

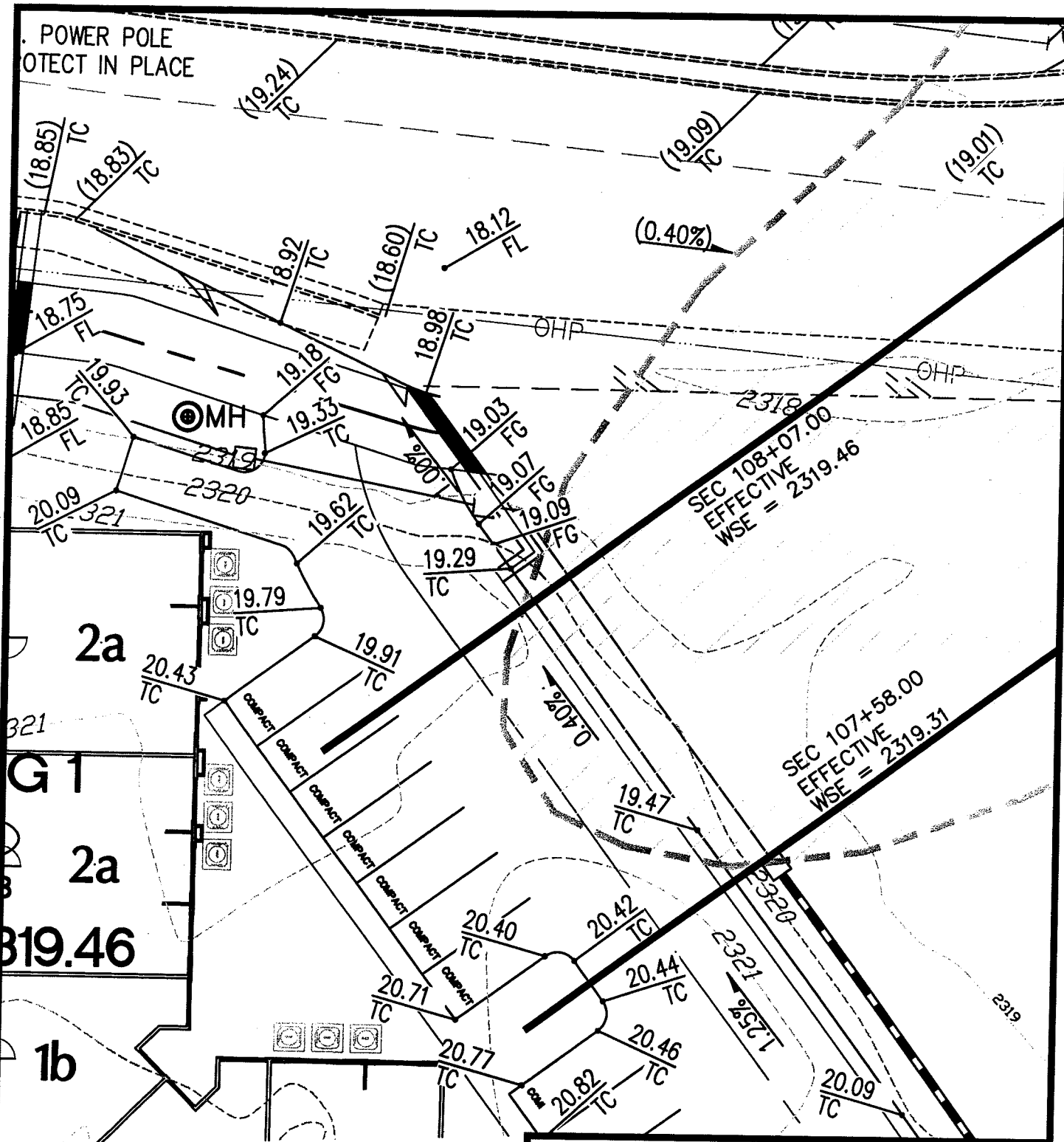


FIGURE 3A

$$I = \int F \cdot dt$$