

PRELIMINARY DRAINAGE STUDY

FOR

MELON APARTMENTS PROJECT



PREPARED FOR:

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Holtville, CA. 92250

Development
DESIGN &
ENGINEERING
inc.

Revision 09-01-17
Revision 07-19-17

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Exhibit A – FEMA FIRM Panel
Exhibit B – Drainage Plan

1 INTRODUCTION

1.1 Purpose

The purpose of this drainage report is to present the drainage criteria, methodology and analysis of the on-site drainage conditions, for the Melon Multi-Family Residential Project it is also to provide recommendations for drainage and grading concepts for the proposed site development. This report addresses the recommended on-site drainage facilities by:

- Establishing drainage design criteria and concepts.
- It is established in this drainage study that the whole project area will drain to the retention basin. Supported by the hydrology and hydraulic calculation it is determined that the proposed retention basin has the capacity to retain the volume resulting from calculating a laminar flow of 3 inches of rain over the entire project.
- The drainage design will be conducted in accordance with the County of Imperial's design criteria that establishes that 100% of the 100-year storm (3 inches of rain) will be stored on-site, and drainage will be released into the IID drainage system using an existing drainage connection.

Calculations were performed according to the methodology and procedures outlined in the *County of Imperial Department of Public Works Engineering Design Guidelines Manual for the Preparation and Checking of Street Improvements, Drainage and Grading Plans with Imperial County, 2008*.

Included in the appendices are the on-site drainage maps and retention calculations.

2 LOCATION

The proposed Melon Multi-Family Residential Project is currently situated on approximately +/- 8.19 acres of undeveloped land currently located within the County of Imperial and the City of Holtville jurisdiction located on the northeast corner of Melon Avenue and Ninth Street

The Project site includes five parcels (APNs 045-390-067, 045-390-065, 045-390-066, 045-390-044, 045-390-006). The site is bordered by and accessible from Melon Avenue on the west. The northern boundary is E. Underwood Road and the southern boundary is 9th Street

Figure 1: Project Vicinity Map

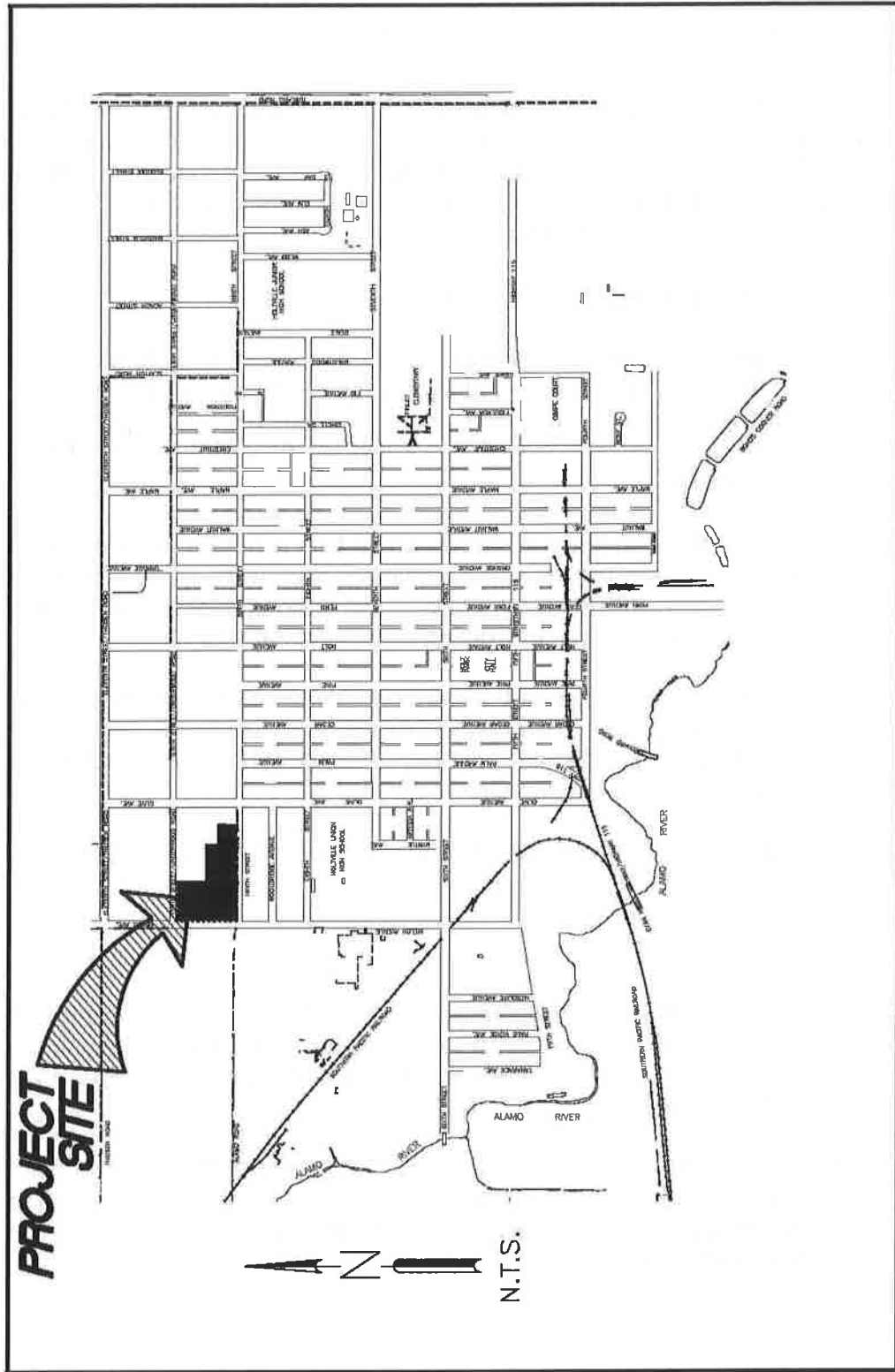
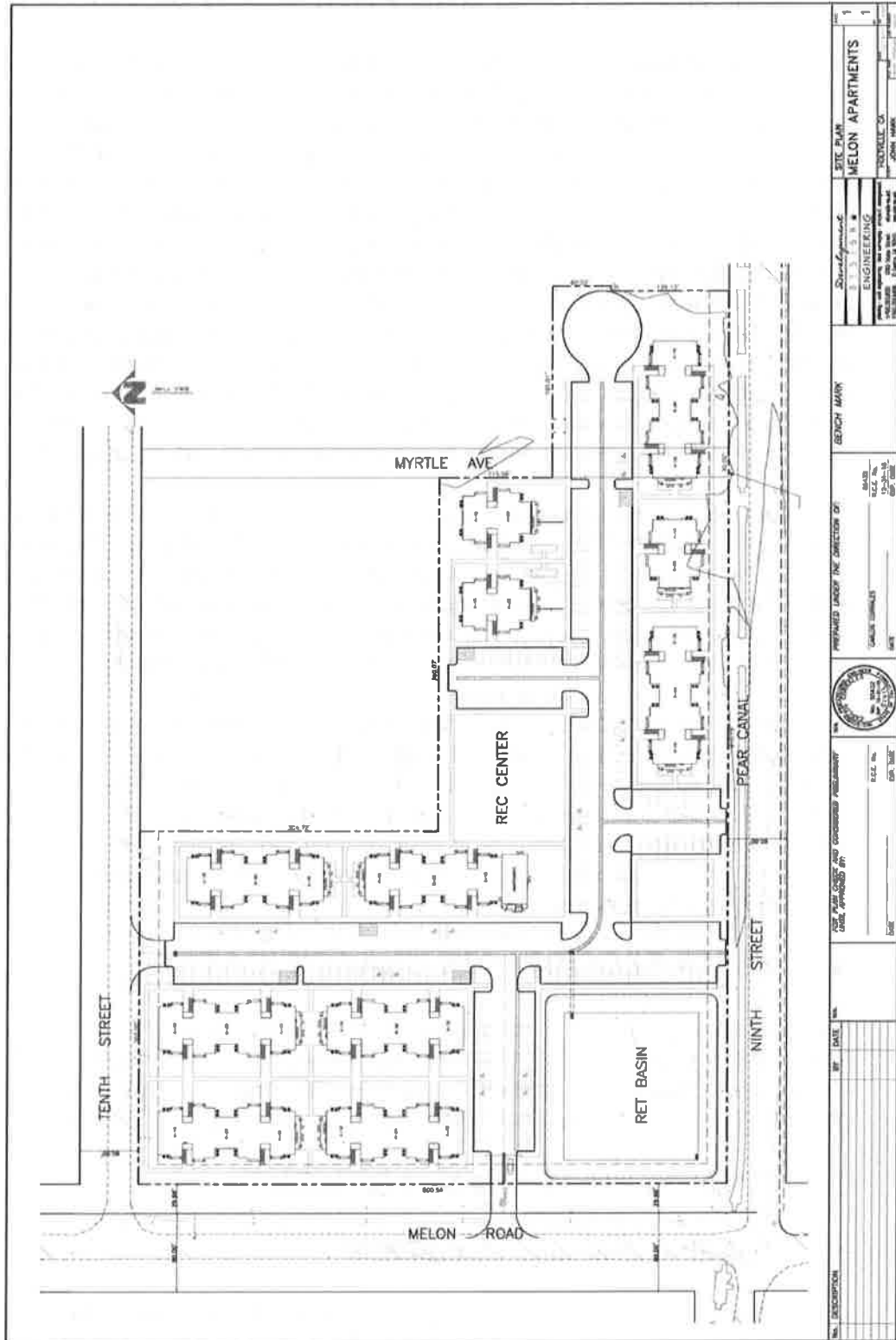


Figure 2: Project Site Map



3 SITE CONDITIONS AND PROPOSED DEVELOPMENT

The proposed Melon Multi-Family Residential Project is in line with the future vision and path stated in the General Plan to maintain residential opportunities that meet the needs of all residents adding to the diverse housing stock. The project is located at the corner of Melon Ave. and 9th Street in Holtville near the City of Holtville's Boundary abutting the county line. The proposed project will be comprised of 11 Multi-Family Building Units that will contain 152 total dwelling units. Within these 11 Multi-Family Building Units, 8 will be of Unit Type 1 and 3 will be of Unit Type 2. Located at the projects center will be a location for a .34 acre Residential Community Designated Area. Additionally, maintenance and laundry facility buildings will be located at the eastern portion of the proposed project. There are a total of 13 proposed new building structures for the project. The proposed project would add an additional 152 dwelling units to the City of Holtville's current housing stock, thus improving the quality of life for those citizens of Holtville who choose to live in the new proposed development.

The main access to the proposed project will be located on Melon Road located west of the project site. Secondary access will be located on the north Tenth Street. The proposed circulation of the project is linear with a cul-du-sac located at the far East portion of the project site. Parking spaces line the path of interior traffic. The proposed project will contain a total of 266 parking spaces, 16 of which will be designated handicap to meet the ADA requirement.

In order to control storm runoff there will be a retention basin located at the southwest portion of the proposed project. The retention basin is located at that location due to the sites topographic nature. The retention basin is designed to retain the onsite storm water. The retention basin drainage will be discharged to a City's approved drain outlet or to drain-out by percolation. If the retention basin is to drain-out by percolation and exceeds the 72- hour threshold then a mosquito abatement will be required.

4 FEMA FLOODPLAIN CLASSIFICATION

The proposed project site is located on the FEMA FIRM Panel 1734 of 2300, Map number 06025C1734C effective September 26, 2008 in Zone X. The FEMA Un-shaded Zone X designation is an area determined to be outside the 0.2% annual chance floodplain. The FIRM panels are included in Exhibit A.

5 STORM WATER MANAGEMENT

5.1 Existing Drainage Conditions

The existing farm field of the proposed project site is graded to a compound planar slope. Generally, the field slopes from east to west at slope percentage

rates between 0.10% to 0.20%, and south to north at slope percentage rates between 0.01% to 0.20%. The very flat topography allows for the irrigation water to move slowly over the field and promote absorption into the existing clay soils.

A private tail water ditch receives drainage water from the old farm field, which exists along the westerly edge of the project site, heads north, and ultimately discharges into the Palmetto Drain. Elevated roads surround the westerly, southerly and northerly project site boundaries respectively and an irrigation canal on the southerly project site boundary.

Off-site storm water may pond up against these facilities and since the off-site flow patterns will be maintained it has been determined (based on field inspections) that the off-site drainage will have minimal or no impacts on the project site.

5.2 Proposed Drainage Conditions and Hydrology Calculations

Based on the current proposed development the drainage from the site will flow to the southwest corner of the Project site where a storm water retention basin approximately 0.75 acres in size is proposed. The drainage analysis is based on on-site volumes, will include the amount of storm water generated by the 100-year storm (3 inches of rain in 24 hours) and it is assumed that 100% of the 100-year storm (a "C" factor of 1) will be retained on site. Retention basin calculations are provided in this section.

The developer is working with the City of Holtville through an Encroachment Permit to discharge the above mentioned basin to a drain located along the easterly side of Melon Avenue, south of Ninth Street.

All on-site storm water contributions will be managed within the limits of the project and will be directed to the proposed retention basin (via surface run off or through a conveyance system) then discharging into the City of Holtville Drainage System. No storm water contributions will be disposed of into any County Public Right of Way.

After a 100-year storm event, the retention basin should empty within 72 hours. If this is not done the owner should provide a mosquito abatement plan to the satisfaction of the County Environmental Health Services Department.

HYDROLOGY CALCULATION:

The retention basin will be sized using the following formula:

$$V = R I A$$

V = Required storage,
R = Runoff coefficient (1.0),

I = Rainfall intensity total (3 inches),
 A = Area of basin in acres (8.19 Ac).

REQUIRED STORAGE

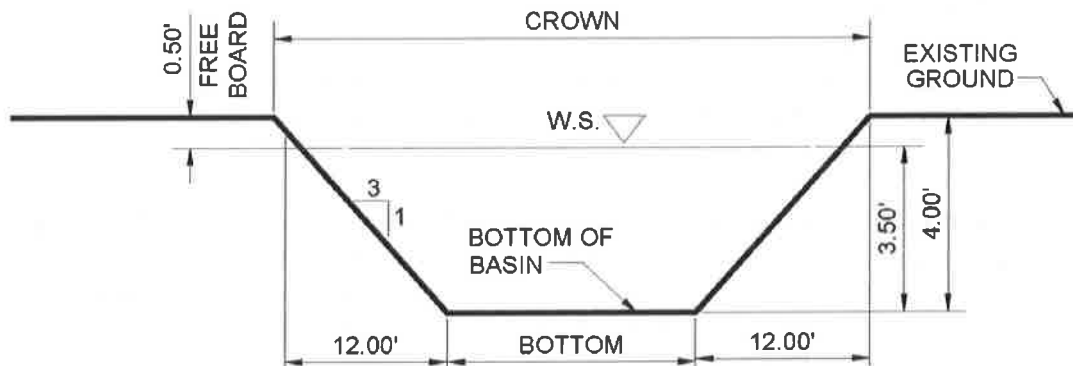
$$V = R I A$$

V = Required storage,
 R = Runoff coefficient (1.0),
 I = Rainfall intensity total (3 inches),
 A = Area of basin in acres (8.19 acres)

$$V_{req'd} = 3/12 \times 1.0 \times 8.19 = 2.05 \text{ ac-ft}$$

RETENTION BASIN SIZING

Average Crown Elevation	977.20
High Water Elevation	876.70
Proposed Bottom Elevation	973.20
Average Depth	4.00 ft
Average Storage Water Depth	3.50 ft



Crown Area Provided	0.75 ac
Water Level Area	0.72 ac
Bottom Area Provided	0.47 ac
Average Area (Total)	0.61 ac
Average Area (Storage)	0.60 ac

STORAGE PROVIDED

- A) TOTAL STORAGE
 (0.61 ac) (4.00 ft) = 2.44 ac-ft

B) WATER LEVEL STORAGE
(0.60 ac) (3.50 ft) = 2.10 ac-ft

The storage provided is > Volume required therefore the retention basin capacity is **ADEQUATE**

RETENTION BASIN DRAIN-OUT TIME

The retention basin will drain-out to the City of Holtville Drainage Swale that runs south along the easterly side of Melon Avenue beginning at the southeast corner of Melon Avenue and Ninth Street through a new 3" diameter force main drain pipe proposed at the southwest corner of the retention basin.

The retention basin shall drain-out in less than 72 hrs. otherwise a mosquito abatement should be implemented

6 CONCLUSIONS

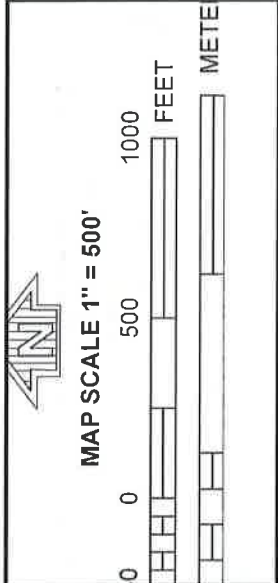
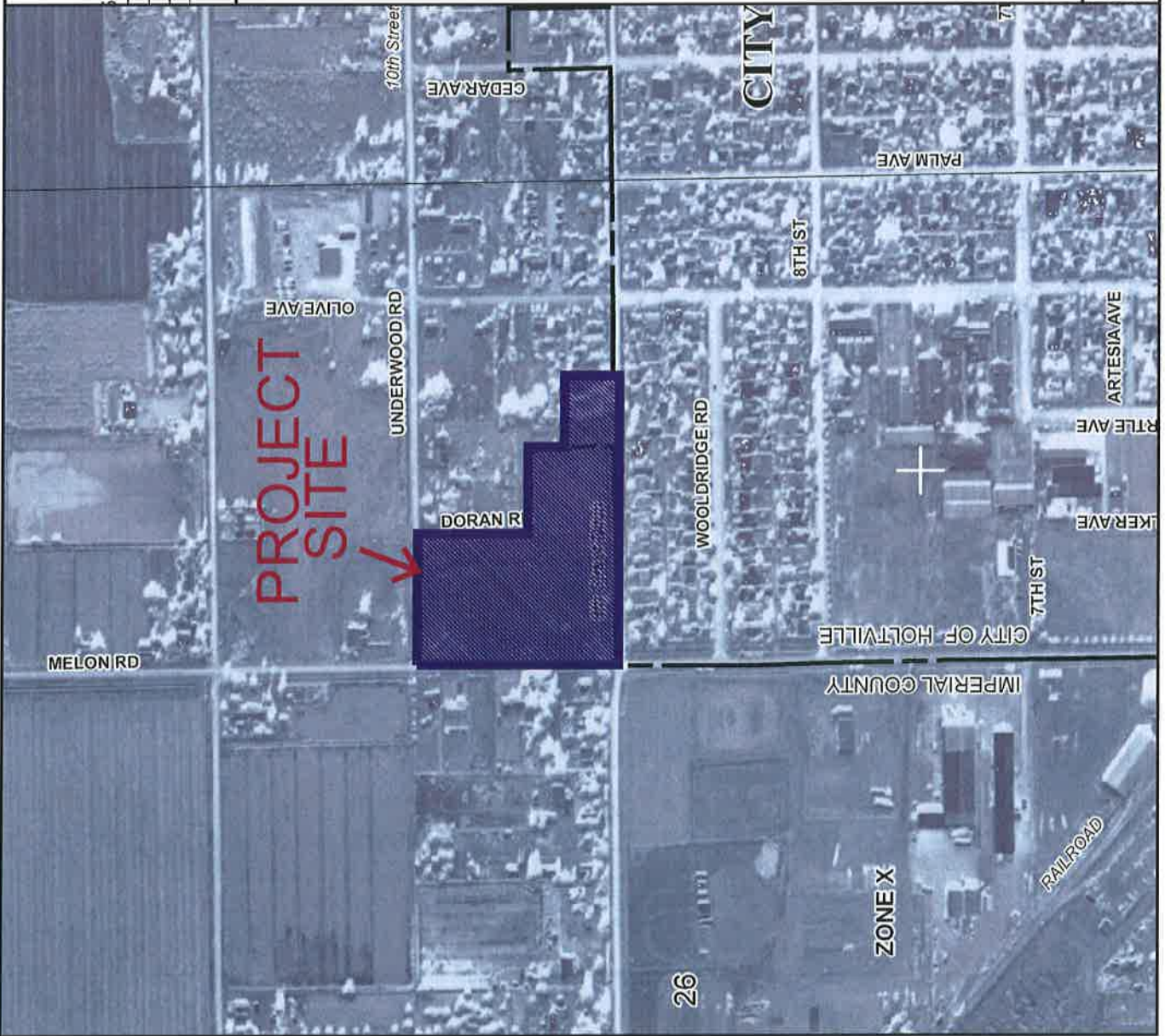
This drainage study report was prepared in accordance with the County of Imperial's design criteria that establishes that 100% of the 100-year storm (3 inches of rain) will be stored on-site, and drainage to be released into the IID drainage system. Additionally, the following facts were considered in the preparation of the drainage report:

- The proposed retention basin will retain 100% of the 100 year storm (3 inches of rain)..
- The drainage stored in the parcel will be release in less than 72 hours or else a mosquito abatement shall be implemented.
- Earthen berms (if required) will be provided to prevent cross drainage.
- Connections to existing City of Holtville drainage facilities will be done according to the City's standards and according to the encroachment documents conditions.
- It has been determined that off-site drainage from existing roads and adjacent fields have minimal or no impacts to the on-site drainage retention capacity.

7 REFERENCES

County of Imperial Department of Public Works, Engineering Design Guidelines Manual for the Preparation and Checking of Street Improvements, Drainage and Grading Plans within Imperial County, September 2008.

Exhibits



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1734C

FIRM
 FLOOD INSURANCE RATE MAP
 IMPERIAL COUNTY,
 CALIFORNIA
 AND INCORPORATED AREAS

PANEL 1734 OF 2300
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
IMPERIAL COUNTY	200005	1734	C
UNINCORPORATED AREAS	200007	1734	C
HOLTVILLE CITY OF	200008	1734	C

Notes to User: The Map Number shown below should be used when extracting map coverages. The Community Number and Panel Number should be used on insurance applications for the subject community.

MAP NUMBER
06025C1734C

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT 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

EXHIBIT A FEMA FIRM PANEL

