

Cherne, Curtis

From: Kiehne, Tessa E [kiehne_t@aps.edu]
Sent: Wednesday, January 27, 2010 2:03 PM
To: Cherne, Curtis
Subject: RE: Elevation Certificate

Sounds perfect! Thank you! I'll see you then.

-----Original Message-----

From: Cherne, Curtis [mailto:CCCherne@cabq.gov]
Sent: Wed 1/27/10 1:49 PM
To: Kiehne, Tessa E
Subject: RE: Elevation Certificate

Tess,
How about Friday at 3:30?
600 2nd St NW, Suite 201 (near 2nd and Lomas/Roma).

Curtis

From: Kiehne, Tessa E [mailto:kiehne_t@aps.edu]
Sent: Wednesday, January 27, 2010 1:32 PM
To: Cherne, Curtis
Subject: RE: Elevation Certificate

I would GREATLY appreciate the help if you don't mind working on it with me. When would be a good time for you? I can come to your office anytime after 3:00 any day this week or next.

Thanks!!

Tess

-----Original Message-----

From: Cherne, Curtis [mailto:CCCherne@cabq.gov]
Sent: Wed 1/27/10 1:23 PM
To: Kiehne, Tessa E
Subject: RE: Elevation Certificate

Tessa,

I called FEMA. Yes, you need to apply for a LOMA. Even though the map will not be amended. You are welcome to come in and we can sit down and go through it, or just call back or e-mail.
My office is downtown.

Curtis Cherne, P.E.
Senior Engineer
Development and Building Services
Planning Department, COA
924-3695

1/27/2010

From: Kiehne, Tessa E [mailto:kiehne_t@aps.edu]
Sent: Wednesday, January 27, 2010 1:02 PM
To: Cherne, Curtis
Subject: FW: Elevation Certificate

-----Original Message-----

From: Advantage Surveying [<mailto:asurveying1001@qwestoffice.net>]
Sent: Wed 1/6/10 9:48 AM
To: Kiehne, Tessa E
Subject: Elevation Certificate

Good Morning Tess,

Here is a revised copy of your elevation certificate. Have a great day.

Thank you.

1/27/2010

Arctic Certificate - applies for COMA
doesn't change the map - copy
Comp-F have to ^{SD}MT-1

656 cotton tail SW

87121

7-55

220-0166

Southwind Subd

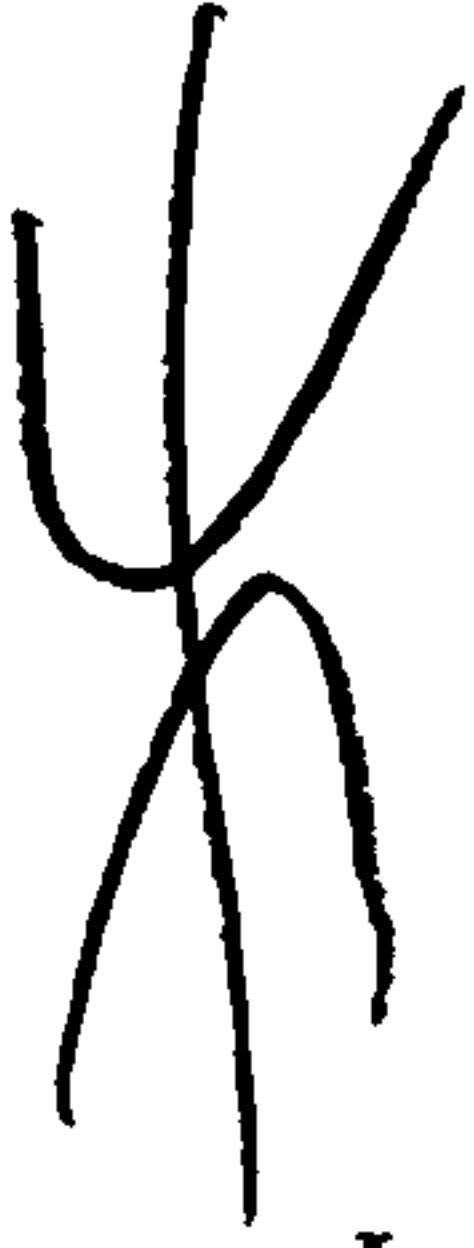
under a tree

Map 320 Lower Right corner

Alt 5080

Prod 81.7

Lag 5084.13



January 25, 2010

Levi J. Valdez, P.E.
George T. Rodriguez-Consulting
12800 San Juan NE
Albuquerque, NM 87123

Re: Coors Park & Sell, Grading and Drainage Plan
Engineer's Stamp dated 1-4-10 (J11/D032)

Dear Mr. Valdez,

Based upon the information provided in your submittal received 1-8-10, the above referenced plan is approved for Sit Plan for Building Permit and Platting action by the DRB.

The above referenced plan is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

To obtain a temporary or permanent CO, Engineer Certification of the Grading Plan is required per the DPM is required and the storm drain work in the City ROW must be inspected and accepted. Please contact Duane Schmitz, 235-8016, to schedule an inspection.

A separate permit (SO 19) is required for construction within City ROW. A copy of this approval letter must be on hand when applying for the excavation/barricading permit. If there is a Work Order associated with this project, this work is to be included in the Work Order.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharge.

This project requires a Topsoil Disturbance Permit since it is disturbing $\frac{3}{4}$ of an acre or more.

If you have any questions, you can contact me at 924-3695.

Sincerely,

Curtis A. Cherne, P.E.

MT-1

Revisions to National Flood Insurance Program Maps

Application Forms and Instructions for Conditional
and Final Letters of Map Amendment and Letters of
Map Revision Based on Fill

FEMA Form 81-87

Series December 2007



FEMA

APPLICATION FORMS FOR CONDITIONAL AND FINAL LETTERS OF MAP AMENDMENT AND LETTERS OF MAP REVISION BASED ON FILL

General Background Information

In 1968, the U.S. Congress passed the National Flood Insurance Act, which created the National Flood Insurance Program (NFIP). The NFIP was designed to reduce future flood losses through local floodplain management and to provide protection for property owners against potential losses through an insurance mechanism that allows a premium to be paid for the protection of those most in need. The creation of the NFIP represented a major shift in Federal strategy from previous structural flood-control and disaster relief programs.

As part of the agreement for making flood insurance available to a community, the NFIP requires the community to adopt floodplain management ordinances that meet certain minimum requirements intended to reduce future flood losses. The community official or agency responsible for floodplain management in a community may be able to provide information that would be useful to a requester. This official or agency usually is responsible for engineering, public works, flood control, or planning in the community as well.

Use of Application Forms

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) implemented the use of application forms for requesting revisions or amendments to NFIP maps for two reasons. First, because the forms provide a step-by-step process for requesters to follow and are comprehensive, requesters are assured of providing all of the necessary information to support their requests without having to go through an iterative process of providing additional information in a piecemeal fashion, which can result in a time-consuming and cost-intensive process. Second, use of the forms ensures that the requesters' submissions are complete and more logically structured, and generally allows DHS-FEMA to complete its review in a shorter timeframe.

The application forms included in this package were designed to assist requesters (community officials, individual property owners, and others) in gathering the information DHS-FEMA needs to determine whether property (parcels of land or structures) is likely to be flooded during the flood event that has a 1-percent-annual-chance of being equaled or exceeded in any given year (base flood). Lands that are at risk of being inundated by the base flood are called Special Flood Hazard Areas (SFHAs).

The forms in this package shall be used to request Letters of Map Amendment (LOMAs), Conditional Letters of Map Amendment (CLOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), and Conditional Letters of Map Revision Based on Fill (CLOMR-Fs), as defined below. Please note that not all of the forms apply to every request. Only those forms that apply to the request should be submitted.

LOMA	A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill (natural grade) would not be inundated by the base flood.
CLOMA	A letter from DHS-FEMA stating that a proposed structure that is not to be elevated by fill (natural grade) would not be inundated by the base flood if built as proposed.
LOMR-F	A letter from DHS-FEMA stating that an existing structure or parcel of land that has been elevated by fill would not be inundated by the base flood.
CLOMR-F	A letter from DHS-FEMA stating that a parcel of land or proposed structure that will be elevated by fill would not be inundated by the base flood if fill is placed on the parcel as proposed or the structure is built as proposed.

If the request is being made for a LOMA to be issued on a single residential property, the MT-EZ form, entitled "Application Form for Single Lot or Structure, Amendments to National Flood Insurance Program Maps," may be used instead of the forms in this package. This form is available in both an English and Spanish version. Forms for this purpose may be downloaded from our website at http://www.fema.gov/plan/prevent/fhm/dl_mt-ez.shtm.

The forms in this package and the form entitled "Application Form for Single Lot or Structure, Amendments to National Flood Insurance Program Maps," **shall not be used** in the following instances:

- Requests involving changes in Base Flood Elevations (BFEs);
- Requests involving changes in regulatory floodway boundary delineations;
- Requests for properties in alluvial fan areas;
- Requests involving property and/or structures that have been elevated by fill placed within the regulatory floodway, channelization projects, bridge/culvert replacement projects, or other flood control improvements; or
- Requests involving changes in coastal high hazard areas (V zones).

For such requests, the community must submit the request to DHS-FEMA in accordance with Title 44, Chapter I, Code of Federal Regulations (CFR), Part 65 of the NFIP regulations, which is available online at http://www.access.gpo.gov/nara/cfr/waisidx_02/44cfrv1_02.html, using the separately published MT-2 application forms package entitled "Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision." Forms for this purpose may be downloaded from our website at http://www.fema.gov/plan/prevent/fhm/dl_mt-2.shtm.

Please note that the forms in this package may be used for property that has been inadvertently included in a V zone or the regulatory floodway. However, if the property is to be removed from a V zone, it must not be located seaward of the landward toe of the primary frontal dune.

For additional assistance in completing these forms, you may consult the LOMA Tutorial, available on DHS-FEMA's Internet site at: http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm.

Data Submission Requirements

In accordance with the NFIP regulations, DHS-FEMA will use the information provided by these application forms to make a determination on whether to remove property (parcel(s) of land or a structure(s)) from a designated SFHA. In certain instances, additional data that are not referenced on these forms may be required. A DHS-FEMA representative will notify the requester of any additional requirements.

Applicable Regulations

The regulations pertaining to LOMAs, CLOMAs, LOMR-Fs, and CLOMR-Fs are presented in Title 44, Chapter I, CFR, Parts 65 and 70, which is available online at http://www.access.gpo.gov/nara/cfr/waisidx_02/44cfrv1_02.html. The purpose of Part 70 is to provide an administrative procedure whereby DHS-FEMA will review information submitted by an owner or lessee of property who believes that their property has been inadvertently included in a designated SFHA. Part 70 provides information about the technical difficulty of accurately delineating the SFHA boundaries on a NFIP map for a community. Part 70 procedures shall not apply if the topography has been altered to raise the original ground to or above the BFE since the effective date of the first NFIP map [i.e., a Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map] showing the property to be within the SFHA. Requests involving changes in topography (such as the placement of fill) are handled under the procedures described in Part 65.

Fee Requirements

Title 44, Chapter I, CFR, Part 72 of the NFIP regulations, which is available online at http://www.access.gpo.gov/nara/cfr/waisidx_02/44cfrv1_02.html, presents information regarding the reimbursement procedure initiated by DHS-FEMA to allow for the recovery of costs associated with the review of requests for CLOMAs, CLOMR-Fs, and LOMR-Fs via a review and processing fee. There is no review and processing fee for requests for single/multiple, lot/structure LOMAs.

Revised fee schedules are published periodically, but no more than once annually, as a notice in the *Federal Register*. For the most up-to-date fee schedule, please contact the DHS-FEMA Map Assistance Center toll free at 1-877-FEMAMAP (1-877-336-2627) or consult the DHS-FEMA Internet site at http://www.fema.gov/plan/prevent/fhm/fm_fees.shtm.

Payment must be submitted in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card payment. In addition, the requester must complete the Payment Information Form. The payment should be mailed **together** with the application and supporting data to the address listed in the Address for Submitting Requests section of these instructions.

Basis of Determination

If no fill has been placed, DHS-FEMA's determination as to whether the SFHA designation may be removed from the structure(s) on a property will be based on a comparison of the BFE with the elevation of the Lowest Adjacent Grade to the structure (lowest ground touching the structure) including any attached decks or garage. If fill has been placed, DHS-FEMA's determination will be based on a comparison of the BFE with the elevation of the lowest adjacent grade to the structure (lowest ground touching the structure) including any attached decks or garage and a completed Community Acknowledgment Form (see instructions for the Community Acknowledgment Form [Form 3] for more information).

For DHS-FEMA to remove the SFHA designation from a legally defined property or portion of property that does not have a structure on it, the elevation of the lowest ground on the property must be at or above the BFE.

Please note the following special considerations that may affect DHS-FEMA's determination:

- In areas of shallow/sheet flooding (Zone AO), the elevation of the Lowest Adjacent Grade (including deck posts) of the structure(s) must be above the surrounding grade by an amount equal to or greater than the depth shown on the NFIP map. In addition, adequate drainage paths are required to guide floodwaters around and away from the structure(s); the structure(s) should be on an elevated pad within the Zone AO area. With your application package, in addition to elevation information regarding the structure(s), provide a map showing the topographic data of the property and the immediate surrounding area, and the location of any structure(s) existing on the property (certified by a registered professional engineer or licensed land surveyor) to demonstrate that the above criteria have been met.
- If the lowest floor of a building has been elevated on posts, piers, or pilings above the BFE and any portion of the structure (i.e., posts, pilings, or piers) is still below the BFE, the building will not be removed from the SFHA.

Response Timeframe

In accordance with the procedures of Title 44, Chapter I, CFR, Part 72, which is available online at http://www.access.gpo.gov/nara/cfr/waisidx_02/44cfrv1_02.html, DHS-FEMA will notify the requester of the determination in writing within 60 days of the date of receipt of all required data. Information about the status of active Letter of Map Change (LOMC) requests is available from DHS-FEMA's Mapping Information Platform (MIP) at <https://hazards.fema.gov>. The MIP allows requesters to search Open LOMCs by entering their Project (Case) Number and Project Type to find out the status of their request. From the MIP Home Page requesters should click on Tools & Links, Public Reports and select Public Reports from the Report Category dropdown.

Effect on Insurance Purchase Requirements

Although DHS-FEMA may issue a LOMA or LOMR-F removing a structure(s) from the SFHA, it is the lending institution's prerogative to require flood insurance, as a condition of a loan, if it deems such action appropriate. If, however, the lending institution agrees to waive the flood insurance purchase requirement for a structure, the property owner is eligible for a full refund of the premium paid for the current policy year, provided that no claim is pending or has been paid on the policy in question during the same policy year. If the property owner has been required to renew his or her policy during a period when a revised NFIP map was being printed, the premium will be refunded for an additional year. To initiate processing of the refund, the property owner should provide the LOMA or LOMR-F and evidence of the waiver of the flood insurance requirement from the lending institution to the insurance agent or broker who sold the policy.

Conditional Determinations

To qualify for a CLOMA or CLOMR-F, the proposed project must meet the same criteria as those required for a LOMA or LOMR-F. After construction is completed or fill is placed, certified as-built information must be submitted to DHS-FEMA for a LOMA or LOMR-F to be issued. The NFIP regulations do not require that a CLOMA or CLOMR-F be requested and issued for a proposed project. Check with local community officials to see if they are required.

Property owners and developers should note that a CLOMA or CLOMR-F merely provides comment on the proposed plan and does not revise or amend the NFIP map. It also does not relieve Federal agencies of the need to comply in carrying out their responsibilities for providing federally undertaken, financed, or assisted construction and improvements or in their regulating and licensing activities, in accordance with the provisions of Executive Order 11988 (<http://www.fema.gov/plan/ehp/ehplaws/eo11988.shtm>).

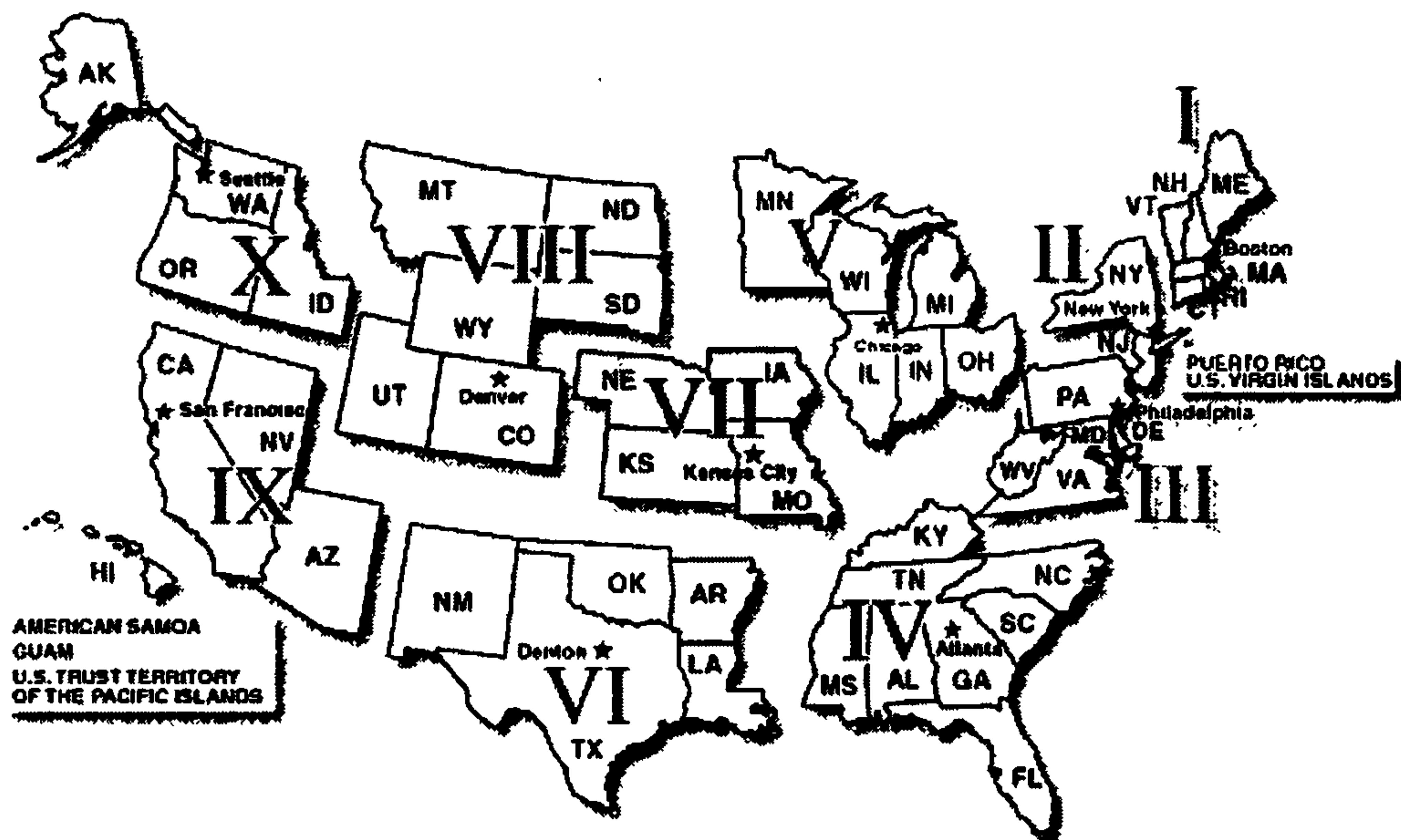
Address for Submitting Requests

Please submit all application forms and data to support a request to remove a property from the floodplain, including any applicable fees to the address listed below.

Mail your request to...

LOMC Clearinghouse
6730 Santa Barbara Court
Elkridge, MD 21075
Attn.: LOMA Manager

FEMA REGIONS



INSTRUCTIONS FOR COMPLETING THE PROPERTY INFORMATION FORM (FORM 1)

General Instructions

The Property Information Form (Form 1) may be completed by the property owner, or on behalf of the property owner by authorized persons including but not limited to; the property owner's agent, licensed land surveyor, or registered professional engineer to support a request for a Letter of Map Amendment (LOMA), Conditional Letter of Map Amendment (CLOMA), Letter of Map Revision Based on Fill (LOMR-F), or Conditional Letter of Map Revision Based on Fill (CLOMR-F) for existing or proposed, single or multiple lots/structures.

Before completing this form, the requester must obtain one of the following documents from the County/Parish Clerk, Recorder, or Register of Deeds for the community:

- A copy of the Deed for the property, showing the recordation information (e.g., Book/Volume and Page numbers or Document/Instrument number) containing the recorder's seal and recordation date, accompanied by a tax assessor's or other suitable map showing the surveyed location of the property.
- A copy of the Plat Map for the property, showing the recordation information (e.g., Book/Volume and Page numbers or Document/Instrument number) and containing the recorder's seal and recordation date.

The requester also must obtain a photocopy of the effective FIRM panel (including the Title Block) that shows the area in which the property is located. The FIRM should be available at the community map repository or from the community official or agency responsible for floodplain management. However, the FIRM Index and FIRM panels may be ordered from the Map Service Center (MSC), for a nominal fee. To place orders from the MSC, go to their Internet site: <http://www.msc.fema.gov>. A FIRMette, which can be printed from the MSC website, may be submitted in lieu of a photocopy of the FIRM.

This site allows requesters to search the MSC for maps and other technical data historically available from the MSC online. Requesters can search by the three following criteria: Catalog, Map Search, and Quick Order. Catalog allows requesters to search through the DHS-FEMA Flood Map Store for available data. Map Search allows requesters to search for data available for an individually specified map area. Quick Order allows requesters to search and order available data by specific FIRM panel or Community number. Payment must be in the form of a credit card. Only Visa and MasterCard are accepted.

Requesters without Internet access should contact the MSC by calling 1-800-358-9616. They may fax their requests to the MSC at 1-800-358-9620.

Requesters should note that for multiple property (structure or lot) requests, this form should only be completed once to describe the entire project. One form for each lot is not necessary.

Specific Instructions

Basis of Request

Select the type of MT-1 Letter of Map Change (LOMC) being requested, by checking only one box. Next to each type of LOMC a brief definition has been provided to assist the requester in making an informed selection.

Fill Placement

Fill is defined as material from any source (including the subject property) placed that raises the ground (natural grade) to or above the Base (1%-annual-chance) Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE. **Fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in a Special Flood Hazard Area is considered natural grade. The Special Flood Hazard Area (SFHA) is the area that would be inundated by the base flood.** Assistance to ascertain if fill has been placed on your property may be available from the community official or agency responsible for floodplain management. You may consult with the community map repository to obtain previous editions of the NFIP map, archived topographic data, or

permit drawings related to construction on the site. If the structure footprint is located on ground higher than the surrounding area, fill may have been placed. Additional sources for assistance would include the developer or engineer/designer of the subdivision, previous owners of the site, persons who have owned or resided on adjacent parcels, and large scale aerial photographs (check the tax assessor's office). In addition, historic NFIP maps may be available on DHS-FEMA's Map Service Center (MSC), for a nominal fee. To place orders from the MSC, interested parties may visit the MSC web site at <http://www.msc.fema.gov> and click on the "FEMA Flood Map Store" link. For additional information regarding historic maps, interested parties may contact the DHS-FEMA Map Assistance Center toll free, at 1-877-FEMA MAP (1-877-336-2627).

Regardless of the type of LOMC being requested, DHS-FEMA must require the requester to clearly state, to the best of his or her knowledge, whether fill was or was not placed on his or her property. The requester must select either "yes" or "no." If fill was placed on the property, the requester must provide the month and year fill was placed. In addition, for proposed projects, DHS-FEMA requires the requester to clearly state whether fill will be placed on his or her property. If fill will be placed, the requester must provide the month and year fill will be placed.

Number 1 - Street Address

Enter the street address (911 type) for the structure or property being reviewed (subject property). For requests involving multiple lots or structures, attach a separate piece of paper when space is insufficient.

Number 2 - Legal Description

Describe the property by referring to the Deed or Plat Map. The description may consist of a lot number and subdivision name, a parcel number, a tract number, or any other information provided in the Deed or Plat to identify the property (e.g. Lot 2, Block 1, Floodville Estates). It is not necessary to reproduce a lengthy description of the property as it appears in the Deed.

Number 3 - Subject of Determination

DHS-FEMA makes determinations on parcels of land or structures. The requester should select parcel of land, portion of a parcel, or a structure. If the request is for a structure on a property, the date of construction must be provided in this section. Date of construction information may usually be obtained from real estate settlement documents, the property developer, or the local government office where real estate and/or land development transactions are recorded. If there is more than one structure on a property, attach a separate piece of paper with the dates of construction. If the request is for a portion of a parcel, a certified metes and bounds description and map of the area to be removed, certified by a licensed land surveyor or registered professional engineer, are **required**. The metes and bounds description must cover the specific area to be removed, and it must be tied to an identifiable starting point. If the description is for a legally recorded lot or parcel, the metes and bounds description should commence or begin at the lot or parcel corner. Please see the example below for the preferred format of metes and bounds descriptions.

BEGINNING at the northeast lot corner; thence S16°42'22"E, 100.00 feet; thence S33°14'40"W, 145.92 feet; thence S89°13'29"W, 156.01 feet; thence N16°42'22"W, 223.14 feet; thence 210.49 feet along a curve to the left having a radius of 542.00 feet to the POINT OF BEGINNING

Number 4 - Number of Structures or Properties

DHS-FEMA makes determinations on single or multiple, lots (parcels of land) or structures. Select the choice that best describes your request.

Required Data

All requests must include the following data:

- Property description documentation must be enclosed for every request and will consist of either the Plat Map or Deed (containing the recorder's stamp and recordation date) accompanied by a tax assessor's map or other suitable map showing the surveyed location of the property. The recordation data (e.g., Book, Volume, Page, Reel, Document Number, and Date) must be evident on the copies of these documents so that DHS-FEMA may use the legal description of the property. In addition, DHS-FEMA must be able to identify the property exactly.

If the property is not recorded on a Plat Map, a copy of a tax assessor's map or other suitable map must be submitted to aid DHS-FEMA in locating the property.

- A photocopy of the effective FIRM panel, annotated to show where the property is located, must be submitted for every request. If your community has a separate Flood Boundary and Floodway Map (FBFM), please include a copy. The panel number and effective date of the FIRM must appear on the copy submitted. The actual map or a photographic copy must be used. A reproduction from a photocopy is unacceptable due to possible distortion.
- The Elevation Form (Form 2) must be included for all requests, except requests for determinations in which the FIRM already shows the property to be CLEARLY outside the SFHA. For cases in which the determination for the property or structure is uncertain, elevation data must be submitted to provide a definitive determination. This form must be completed by a licensed land surveyor or registered professional engineer. If an NFIP Elevation Certificate has been completed for a structure, it may be submitted in lieu of this form. The Elevation Certificate must be certified by a licensed land surveyor or registered professional engineer.
- The Community Acknowledgment Form (Form 3) must be included for all LOMR-F or CLOMR-F, or for LOMA requests in which the property has been inadvertently included within the NFIP regulatory floodway. For LOMR-F and CLOMR-F requests only Section A needs to be completed. For LOMA requests in which the property has been inadvertently included within the regulatory floodway, only Section B needs to be completed (see INSTRUCTIONS FOR COMPLETING OPTIONAL FORMS of these instructions for additional information on the certification requirements of this form).

Review and Processing Fee

The appropriate review and processing fee must be submitted for requests involving proposed projects and for requests involving the placement of fill (e.g., CLOMA, LOMR-F, or CLOMR-F). The Payment Information Form should be included with the processing fee. No fee is required to obtain a determination based on existing conditions (i.e. LOMA) as long as no fill has been placed. For the current fee schedule visit DHS-FEMA's Flood Map-Related Fees Internet site: http://www.fema.gov/plan/prevent/fhm/fm_fees.shtm.

Signature

The requester must provide his or her name, mailing address, and telephone number. The requester must also sign and date, where indicated, to certify the accuracy of the information provided. A Licensed Land Surveyor, Registered Professional Engineer, or other designated agent may sign this form for the requester if they are submitting on their behalf.

INSTRUCTIONS FOR COMPLETING THE ELEVATION FORM (FORM 2)

General Instructions

The Elevation Form (Form 2) must be completed by a licensed land surveyor or registered professional engineer (authorized by law to certify the information requested). If the request is to remove the structure, and an NFIP Elevation Certificate has already been completed for this property, it may be submitted in lieu of this form. If the request is to remove the entire legally recorded property, or a portion thereof, the lowest lot elevation must be provided on Form 2. If the request is to have the SFHA designation removed from the entire legally recorded property, but the only elevation provided is the Lowest Adjacent Grade to Structure, the determination will be issued for the structure.

For a licensed land surveyor or registered professional engineer to complete this form, it will be necessary to obtain the effective Flood Insurance Rate Map (FIRM) panel, effective Flood Boundary and Floodway Map (FBFM) panel (if printed), and Flood Insurance Study (FIS) report that cover the area in which the property is located. These can be obtained from the community map repository or ordered from the Map Service Center (MSC), for a nominal fee. To place orders from the MSC, go to their Internet site: <http://www.msc.fema.gov>.

The DHS-FEMA Flood Map Store allows users, including homeowners, surveyors, and engineers, to search the MSC for maps and other technical data historically available from the MSC, online. Searches can be conducted under the three following criteria: Catalog, Map Search, and Quick Order. Catalog allows surveyors and engineers to search through the Flood Map Store for available data. Map Search allows surveyors and engineers to search for data available for an individually specified map area. Quick Order allows surveyors and engineers to search available data by a specific FIRM panel or Community number. All search criteria will allow surveyors and engineers to search desired data and add that data to a "shopping cart" for later payment options. Payment must be in the form of a credit card. Only Visa and MasterCard are accepted.

Surveyors and engineers that do not have Internet access should contact the MSC by calling 1-800-358-9616. They may fax their requests to the MSC at 1-800-358-9620.

Number 1 - Community Number

Provide the six digit NFIP community number as it appears in the Title Block of the FIRM panel. In addition, include the name of the property (i.e. legal description) and/or the property's address.

This diagram shows a sample FIRM panel for a single community. The panel is titled "NATIONAL FLOOD INSURANCE PROGRAM" and "FIRM FLOOD INSURANCE RATE MAP". It specifies the "TOWN OF FLOODVILLE, FLOOD COUNTY, USA". It is labeled "PANEL 4 OF 20" and includes a note "SEE MAP INDEX FOR PANELS NOT PRINTED". The "COMMUNITY-PANEL NUMBER" is "990008 0038X". The "EFFECTIVE DATE" is "AUGUST 19, 1998". The Federal Emergency Management Agency logo is at the bottom.

Figure 1. Sample FIRM Panel (Single Community)

This diagram shows a sample FIRM panel for a countywide area. The panel is titled "NATIONAL FLOOD INSURANCE PROGRAM" and "FIRM FLOOD INSURANCE RATE MAP". It specifies "FLOOD COUNTY, USA AND INCORPORATED AREAS". It is labeled "PANEL 38 OF 40" and includes a note "SEE MAP INDEX FOR PANELS NOT PRINTED". A table lists communities and their panel numbers: "FLOOD COUNTY, INCORPORATED AREAS" with panel number "38". The "MAP NUMBER" is "990008 0038X". The "EFFECTIVE DATE" is "AUGUST 19, 1998". The Federal Emergency Management Agency logo is at the bottom.

Figure 2. Sample FIRM Panel (Countywide)

For additional information on reading FIRM panels you may consult the tutorial “How to Read a FIRM” on DHS-FEMA’s Internet site: http://www.fema.gov/media/fhm/firm/ot_firm.htm.

*Please note that, in some communities, the only NFIP maps available may be Flood Hazard Boundary Maps, instead of FIRMs.

Number 2 - Conditionals

Identify whether the elevations being provided are based on existing or proposed conditions.

Number 3 - Elevation Datum

Provide the elevation datum (e.g., NGVD 29, NAVD 88, or other specified) for which the property elevations shown on the form are referenced. If the datum being referenced is different than the datum used to produce the effective FIS, please provide the datum conversion.

Number 4 – Geographic Coordinate Data

The surveyor or engineer must provide the latitude and longitude of the property in decimal degrees to the nearest thousandths (00.000), and indicate the appropriate horizontal datum.

Number 5 - Type of Construction

If the request involves or will involve a structure, provide the type of construction.

Crawl Space – The bottom floor is below the first floor, is enclosed by solid and partial perimeter walls, and may be above ground level (grade) on one or more sides. Spaces below ground level on all sides must meet the requirements of FEMA Technical Bulletin 11-01. Spaces with a bottom floor elevation more than 2.0 feet below the Lowest Adjacent Exterior Grade (LAG) elevation will be classified as a basement.

Slab on Grade – The bottom floor is at or above ground level (grade) on at least one side.

Basement/Enclosure – The bottom floor (basement or underground garage) is below ground level (grade) on all sides. See Crawl Space above.

Other – All other structure types not listed above including, but not limited to split levels, structures on piers, mobile homes, etc. Please be as detailed as possible.

Number 6 – Subsidence or Uplift

Land subsidence is the lowering of the ground as a result of water, oil, gas extraction, as well as other phenomena such as soil compaction, decomposition of organic material, and tectonic movement. Periodically, the National Geodetic Survey reveals some benchmarks to determine new elevations above the National Geodetic Vertical Datum of 1929 (NGVD 29) or above the North American Vertical Datum of 1988 (NAVD 88); however, not all benchmarks are releveled each time.

Check “yes” if the area of the property is in an area of subsidence or uplift, and provide the date of the current releveing; check “no” if the area of the property is not in an area of subsidence or uplift. In areas experiencing ground subsidence (e.g., Harris County, Texas, and Incorporated Areas); the most recently adjusted Elevation Reference Mark (ERM) must be used for accurate ground and structure elevations. Please consult the effective Flood Insurance Study (FIS) for your community or local floodplain administrator for the most current ERM data.

In general, the effects of subsidence can be accounted for by determining grade and structure elevations using benchmark elevations with the same releve date as the benchmarks used to develop the Base (1%-annual-chance) Flood Elevations (BFEs) on the FIRM. Please be aware that benchmark releve dates can be different for different flooding sources. No adjustment is necessary to the BFEs on the FIRM.

Elevation Table

A row in the elevation table must be completed for each property (parcels of land or structures) involved in this request (subject property).

Lot/Block Number – Provide the property’s lot and/or block number if available. In the absence of a lot or block number, the registered professional engineer or licensed land surveyor must include an identifier that clearly states for what the elevations are being referenced (e.g. residential structure, commercial building, unit 1, etc.).

Lowest Lot Elevation – For requests involving property, or a portion thereof, provide the lowest lot elevation to the nearest tenth (0.1) of a foot or meter. If the FIRM shows BFEs in meters, the accuracy of the lowest lot elevation must be to the nearest tenth of a meter.

Lowest Adjacent Grade (LAG) to the Structure – For requests involving a structure, provide the LAG elevation, to the nearest tenth (0.1) of a foot or meter. If the FIRM shows BFEs in meters, the accuracy of the LAG elevation must be to the nearest tenth of a meter.

Base Flood Elevation – Provide the BFE affecting the property. FEMA will verify the BFE during the review process. BFEs can be obtained by locating the property on the effective FIRM for the community in which the property is located. Upon locating the property on the FIRM, the engineer or surveyor should determine the type of flooding and in which flood zone the property is located. The summary below will provide direction for how to determine the BFE as a result of the flooding type and flood zone determination.

Base Flood Elevation Source – Provide the source used in determining the BFE (e.g. FIRM, profile, floodway data table, Community Determined, or other source). When submitting a BFE that is either community determined or from an alternate source, please include in the request, sufficient data that supports the BFE.

Riverine Flooding Systems (Zones AE or A1-A30) – Consult the FIS report for the community in which the property is located. Next, locate the flood profile for the flooding source by name. Estimate the property’s location along the flood profile and interpolate the BFE using the 100-yr. flood profile line.

Lacustrine (Stillwater) Flooding Systems – Consult the FIS report for the community in which the property is located. Next, locate the Summary of Stillwater Elevations table. Locate the flooding source, by name, and use the BFE listed in the table. The flooding source’s BFE is normally shown to the nearest one-tenth of a foot. If the flooding source is not listed in the “Summary of Stillwater Elevations” table, use the BFE as shown on the FIRM.

Coastal Flooding Systems (Zones AE or A1-A30 and VE or V1-V30) – First, obtain the BFE from the FIRM panel. Next, consult the FIS report for the community in which the property is located. Locate the Summary of Stillwater Elevations table in the FIS report. Identify the flooding source, by name, and use the BFE listed in the table. Compare the BFE listed in this table to the BFE obtained from the FIRM. If the stillwater elevation listed in this table is less than or equal to the whole-foot BFE shown on the map minus 0.5 foot, a wave height, wave runup, and/or wave setup component exists. In this case, the whole-foot BFE shown on the map should be used for rating, construction, and floodplain management purposes. If the stillwater elevation listed in the “Summary of Stillwater Elevations” table is greater than the whole-foot BFE shown on the map minus 0.4 foot, the stillwater elevation shown in the table shall be used as the BFE. Note that any property/structure located seaward of the landward toe of the primary frontal dune may not be removed from a Zone VE or V1-V30.

Zone A Flooding – If the property is located in a Zone A, an area of approximate flooding with no BFEs determined, a BFE will need to be determined by the engineer or surveyor. First, the engineer or surveyor should determine if a Federal, State, or local government agency has developed a BFE. Such agencies include the U.S. Army Corps of Engineers, the U.S. Geological Survey, the State’s Department of Natural Resources, Department of Environmental Quality, or Department of Transportation; or the local Planning and Zoning Department. If a BFE has not previously been developed, the engineer or surveyor should consult DHS-FEMA’s Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-year) Flood Elevations (http://www.fema.gov/pdf/fhm/fm_zna.pdf), 1995 publication. This publication is an excellent resource, which details the appropriate methods for determining BFEs in SFHAs designated flood zone A. To obtain a copy of this publication, or to obtain additional information about developing BFEs, contact the FEMA Map Assistance Center (FMAC) toll free at 1-877-FEMA MAP (1-877-336-2627). If the property is greater than 50 lots or 5 acres, whichever is the

lesser, the engineer or surveyor must determine a BFE as a provision of Part 60.3(b)(3), which is available online at http://www.access.gpo.gov/nara/cfr/waisidx_03/44cfr60_03.html.

Shallow Flooding (Zone AH) – If the property is located in flood zone AH, an area of shallow flooding, the engineer or surveyor should use the flood elevation listed on the FIRM. If different elevations appear within the same SFHA, the BFE is obtained by linear interpolation between two adjacent BFE lines.

Shallow/Sheet Flooding (Zone AO) – For a property located in Zone AO, the characteristics of the Zone AO area shown on the NFIP map will determine the appropriate methodology to be used to develop the BFE for the property. If the flooding is conveyed by the street, provide the highest top of curb or crown of street elevation (whichever is higher) along the property line and add this to the depth of flooding. The lowest adjacent grade elevation must be above the curb or street elevation by an amount equal to or greater than the depth of flooding shown on the NFIP map. If the entire property is inundated by the SFHA and the flow is not conveyed by the street, add the depth of flooding to the average surrounding grade. If the property is partially inundated by the SFHA and the street does not convey the flow, add the depth of flooding to the lowest lot elevation. Along with the information required for one of the above-mentioned methods, provide sufficient certified topographic information, including flow paths, to show that the structure is located on high ground relative to the depth indicated on the NFIP map.

If the request involves multiple properties (parcels of land or structures), elevations must be provided for each property. If the number of properties for which DHS-FEMA is to make a determination exceeds the number of rows on the Elevation Table, additional photocopies of the table may be attached to the back of the Elevation Form.

Certification (by a licensed land surveyor, registered professional engineer, or architect)

The certifier must provide his or her name, license number and expiration date, his or her company name, telephone number and, if applicable, his or her fax number. The certifier's seal, if available, may be provided here. The certifier must sign and date the Elevation Form, where indicated, to certify the accuracy of the information provided. Not all states authorize architects and engineers to certify elevation information. Consult the state board of registration for more information.

INSTRUCTIONS FOR COMPLETING OPTIONAL FORMS

General

While Forms 1 and 2 must be completed for all requests, Form 3 must only be completed when applicable. Instructions for completing this form are provided below.

Community Acknowledgment Form (Form 3)

The Community Acknowledgment Form (Form 3) must be completed for all requests involving the placement of fill, existing or proposed, or requests for land or structures that are inadvertently included in the NFIP regulatory floodway. The form must be completed and signed by the community official responsible for floodplain management in the community. The community name and the subject property address shown in Items 1 and 2 of the Property Information Form must appear in the spaces provided. Space has been provided within each section for the community official to provide comments on the project (e.g. Section A- The project is reasonably safe from flooding and satisfies Parts 60.3 and 65.5 of the NFIP regulations. Section B - Removal of the project from the regulatory floodway will not result in an increase in Base Flood Elevations.). If additional space is required by the community official to provide the community's comments on a project, additional sheets may be attached to the back of this form.

Section A – Requests Involving the Placement of Fill

Instructions for Communities:

As a participant in the NFIP under 44 CFR 60.3(a)(2), you are required to ensure, prior to issuing a floodplain development permit, that an applicant is in compliance with local and NFIP regulations, and has obtained all necessary Federal and State permits related to development. The most commonly required Federal permits are wetlands permits under Section 404 of the Clean Water Act of 1972 and incidental take permits under Section 10 of the Endangered Species Act of 1972. Necessary State permits vary depending on the State. If you are not sure if a wetlands permit is required, refer the applicant to your U.S. Army Corps of Engineers District Office. If the proposed development impacts on threatened or endangered species or you are unsure if it does, have the applicant consult with the nearest U.S. Fish and Wildlife Service field office.

Instructions for Applicants:

You are responsible for obtaining all necessary Federal, State, and local permits as a condition of obtaining a LOMR-F or CLOMR-F. Your community is required to verify that you have obtained these necessary permits prior to issuing a floodplain development permit or signing the Community Acknowledgment Form (MT-1 Form 3). The most commonly required Federal permits are wetlands permits under Section 404 of the Clean Water Act of 1972 and incidental take permits under Section 10 of the Endangered Species Act of 1972. Necessary State permits vary depending on the State. If you need a wetlands permit or are not sure if one is required, contact your U.S. Army Corps of Engineers District Office. If your proposed development impacts on threatened or endangered species or you are unsure if it does, consult with the nearest U.S. Fish and Wildlife Service field office.

To assist communities in determining if a property or structure, existing or proposed, is reasonably safe from flooding, DHS-FEMA has published Technical Bulletin 10-01. This bulletin outlines safe building practices, which when followed, may reduce the risk of flood damage to a property or structure. Community Officials interested in obtaining copies of this bulletin should visit our Internet site at <http://www.fema.gov/pdf/fima/tb1001.pdf>. Community Officials that do not have Internet access should contact the DHS-FEMA Map Assistance Center (FMAC) toll free at 1-877-FEMA MAP (1-877-336-2627) and request a copy of this Technical Bulletin be mailed.

All inquiries regarding these, or other NFIP regulations, should contact the FMAC for assistance.

Section B – Property Located within the Regulatory Floodway

Required for all requests that are inadvertently included in the regulatory floodway. The regulatory floodway is the area of the Special Flood Hazard Area that must remain unobstructed in order to prevent unacceptable increases in Base Flood Elevations. This form must be signed by a community official, responsible for floodplain management, to acknowledge the community's acceptance of a revision to the regulatory floodway within the community.

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY
PROPERTY INFORMATION FORM

O.M.B. NO. 1660-0015
Expires December 31, 2010

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.63 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0015). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

This form may be completed by the property owner, property owner's agent, licensed land surveyor, or registered professional engineer to support a request for a Letter of Map Amendment (LOMA), Conditional Letter of Map Amendment (CLOMA), Letter of Map Revision Based on Fill (LOMR-F), or Conditional Letter of Map Revision Based on Fill (CLOMR-F) for existing or proposed, single or multiple lots/structures. In order to process your request, all information on this form must be completed in its entirety. Incomplete submissions may result in processing delays. Please check the item below that describes your request:

☐ LOMA	A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill (natural grade) would not be inundated by the base flood.
☐ CLOMA	A letter from DHS-FEMA stating that a proposed structure that is not to be elevated by fill (natural grade) would not be inundated by the base flood if built as proposed.
☐ LOMR-F	A letter from DHS-FEMA stating that an existing structure or parcel of land that has been elevated by fill would not be inundated by the base flood.
☐ CLOMR-F	A letter from DHS-FEMA stating that a parcel of land or proposed structure that will be elevated by fill would not be inundated by the base flood if fill is placed on the parcel as proposed or the structure is built as proposed.

Fill is defined as material from any source (including the subject property) placed that raises the ground to or above the Base Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE. **Fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in a Special Flood Hazard Area (SFHA) is considered natural grade.**

Has fill been placed on your property to raise ground that was previously below the BFE?

☐ Yes ☐ No If yes, when was fill placed?

/ month/year

Will fill be placed on your property to raise ground that is below the BFE?

☐ Yes ☐ No If yes, when will fill be placed?

/ month/year

1. Street Address of the Property (if request is for multiple structures, please attach additional sheet):

2. Legal description of Property (Lot, Block, Subdivision)(complete description as it appears in the Deed is not necessary):

3. Are you requesting that the SFHA designation be removed from (check one):

- ☐ the entire legally recorded property?
- ☐ a portion of land within the bounds of the property? (A certified metes and bounds description and map of the area to be removed, certified by a licensed land surveyor or registered professional engineer, are required. For the preferred format of metes and bounds descriptions, please refer to the MT-1 Form 1 Instructions.)
- ☐ structures on the property? What are the dates of construction?

4. Is this request for a (check one):

- ☐ single structure
- ☐ single lot
- ☐ multiple structures (How many structures are involved in your request? List the number:)
- ☐ multiple lots (How many lots are involved in your request? List the number:)

In addition to this form (MT-1 Form 1), ALL requests must include the following:

- Copy of the effective FIRM panel and/or Flood Boundary and Floodway Map (FBFM) (if applicable) on which the property location has been accurately plotted (property inadvertently located in the NFIP regulatory floodway will require Section B of MT-1 Form 3)
- Copy of the Plat Map for the property (with recordation data and stamp of the Recorder's Office)
OR
- Copy of the property Deed (with recordation data and stamp of the Recorder's Office), accompanied by a tax assessor's map or other certified map showing the surveyed location of the property relative to local streets and watercourses
- Form 2 – Elevation Form. If the request is to remove the structure, and an Elevation Certificate has already been completed for this property, it may be submitted in lieu of Form 2. If the request is to remove the entire legally recorded property, or a portion thereof, the lowest lot elevation must be provided on Form 2.

Please include a map scale and North arrow on all maps submitted.

For LOMR-Fs and CLOMR-Fs, the following must be submitted in addition to the items listed above:

- Form 3 – Community Acknowledgment Form

Processing Fee (see instructions for appropriate mailing address; or, visit http://www.fema.gov/fhm/frm_fees.shtml for the most current fee schedule)

Revised fee schedules are published periodically, but no more than once annually, as noted in the Federal Register. Please note: single/multiple lot(s)/structure(s) LOMAs are fee exempt. The current review and processing fees are listed below:

Check the fee that applies to your request:

- ☐ \$325 (single lot/structure LOMR-F following a CLOMR-F)
- ☐ \$425 (single lot/structure LOMR-F)
- ☐ \$500 (single lot/structure CLOMA or CLOMR-F)
- ☐ \$700 (multiple lot/structure LOMR-F following a CLOMR-F; or multiple lot/structure CLOMA)
- ☐ \$800 (multiple lot/structure LOMR-F or CLOMR-F)

Please submit the Payment Information Form for remittance of applicable fees. Please make your check or money order payable to: National Flood Insurance Program.

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Applicant's Name:
Please Print or Type

Company:

Mailing Address:

Daytime Telephone No.:

E-Mail Address:
(optional)

Fax No.:

Date

Signature of Applicant (required)

If you have any questions concerning DHS-FEMA policy, or the NFIP in general, please contact the FEMA Map Assistance Center toll free at 1-877-FEMA MAP (1-877-336-2627), or visit the Flood Hazard Mapping website at <http://www.fema.gov/fhm/>.

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY
ELEVATION FORM

O.M.B. NO. 1660-0015
Expires December 31, 2010

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0015). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. Please do not send your completed survey to the above address.

This form must be completed for requests and must be completed and signed by a registered professional engineer or licensed land surveyor. A DHS - FEMA National Flood Insurance Program (NFIP) Elevation Certificate may be submitted in lieu of this form for single structure requests.

For requests to remove a structure on natural grade OR on engineered fill from the Special Flood Hazard Area (SFHA), submit the lowest adjacent grade (the lowest ground touching the structure), including an attached deck or garage. For requests to remove an entire parcel of land from the SFHA, provide the lowest lot elevation; or, if the request involves an area described by metes and bounds, provide the lowest elevation within the metes and bounds description. In order to process your request, all information on this form must be completed in its entirety. Incomplete submissions may result in processing delays.

- NFIP Community Number: Property Name or Address:
- Are the elevations listed below based on ☐ existing or ☐ proposed conditions? (Check one)
- What is the elevation datum? ☐ NGVD 29 ☐ NAVD 88 ☐ Other (explain) If any of the elevations listed below were computed using a datum different than the datum used for the effective Flood Insurance Rate Map (FIRM) (e.g., NGVD 29 or NAVD 88), what was the conversion factor?
- Local Elevation +/- ft. = FIRM Datum**

Please provide the Latitude and Longitude of the most upstream edge of the structure (in decimal degrees):
Indicate Datum: ☐ NAD83 ☐ NAD27 Lat. Long.

Please provide the Latitude and Longitude of the most upstream edge of the property (in decimal degrees):
Indicate Datum: ☐ NAD83 ☐ NAD27 Lat. Long.
- For the existing or proposed structures listed below, what are the types of construction? (check all that apply)
☐ crawl space ☐ slab on grade ☐ basement/enclosure ☐ other (explain)
- Has DHS - FEMA identified this area as subject to land subsidence or uplift? (see instructions) ☐ Yes ☐ No
If yes, what is the date of the current releveing? / (month/year)

Lot Number	Block Number	Lowest Lot Elevation*	Lowest Adjacent Grade To Structure	Base Flood Elevation	BFE Source	For DHS - FEMA Use Only

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name:	License No.:	Expiration Date:
Company Name:	Telephone No.:	Fax No.:
Signature:	Date:	

*For requests involving a portion of property, include the lowest ground elevation within the metes and bounds description. Please note: If the Lowest Adjacent Grade to Structure is the only elevation provided, a determination will be issued for the structure only.

Seal (optional)

Continued from Page 1.

[illegible]

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name:	License No.:	Expiration Date:
Company Name:	Telephone No.:	Fax No.:
Signature:	Date:	

Seal (optional)

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY
COMMUNITY ACKNOWLEDGMENT FORM

O.M.B. NO. 1660-0015
Expires December 31, 2010

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.38 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0015). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

This form must be completed for requests involving the existing or proposed placement of fill (complete Section A) OR to provide acknowledgment of this request to remove a property from the SFHA which was previously located within the regulatory floodway (complete Section B).

This form must be completed and signed by the official responsible for floodplain management in the community. **The six digit NFIP community number and the subject property address must appear in the spaces provided below.** Incomplete submissions may result in processing delays.

Community Number:

Property Name or Address:

A. REQUESTS INVOLVING THE PLACEMENT OF FILL

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision Based on Fill (LOMR-F) or Conditional LOMR-F request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a Conditional LOMR-F, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by DHS-FEMA, all analyses and documentation used to make this determination. For LOMR-F requests, we understand that this request is being forwarded to DHS-FEMA for a possible map revision. For LOMR-F or Conditional LOMR-F requests that have the potential to impact an endangered species, documentation will be submitted to show that we have complied with Sections 9 and 10 of the Endangered Species Act (ESA). Section 9 of the ESA prohibits anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required from U.S. Fish and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted.

Community Comments:

Community Official's Name and Title: *(Please Print or Type)*

Telephone No.:

Community

Name:

Community Official's Signature: (required)

Date:

B. PROPERTY LOCATED WITHIN THE REGULATORY FLOODWAY

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this request for a LOMA. We understand that this request is being forwarded to DHS-FEMA to determine if this property has been inadvertently included in the regulatory floodway. We acknowledge that no fill on this property has been or will be placed within the designated regulatory floodway. We find that the completed or proposed project meets or is designed to meet all of the community floodplain management requirements.

Community Comments:

Community Official's Name and Title: *(Please Print or Type)*

Telephone No.:

Community Name:

Community Official's Signature (required):

Date:

**FEDERAL EMERGENCY MANAGEMENT AGENCY
PAYMENT INFORMATION FORM**

Community Name: _____

Project Identifier: _____

THIS FORM MUST BE MAILED, ALONG WITH THE APPROPRIATE FEE, TO THE ADDRESS BELOW OR FAXED TO THE FAX NUMBER BELOW.

Type of Request:

☐ MT-1 application }
☐ MT-2 application }

FEMA
Fee Charge System Administrator
6730 Santa Barbara Court
Elkridge, MD 21075

☐ EDR application }

FEMA Project Library
847 South Pickett St.
Alexandria, VA 22304
FAX (703) 212-4090

Request No.: _____ (if known)

Amount: _____

☐ INITIAL FEE* ☐ FINAL FEE ☐ FEE BALANCE** ☐ MASTER CARD ☐ VISA ☐ CHECK ☐ MONEY ORDER

*Note: Check only for EDR and/or Alluvial Fan requests (as appropriate).

**Note: Check only if submitting a corrected fee for an ongoing request.

COMPLETE THIS SECTION ONLY IF PAYING BY CREDIT CARD

CARD NUMBER

				—					—					—					
1	2	3	4		5	6	7	8		9	10	11	12		13	14	15	16	

EXP. DATE

		—		
Month			Year	

Date

Signature

NAME (AS IT APPEARS ON CARD): _____
(please print or type)

ADDRESS: _____
(for your
credit card
receipt—please
print or type)

DAYTIME PHONE: _____



FEMA

W-09020

April 2, 2009

MEMORANDUM TO: Write Your Own (WYO) Company Principal Coordinators and
NFIP Servicing Agent

Edward Z. Connor

FROM: Edward Connor
Acting Federal Insurance Administrator
National Flood Insurance Program

SUBJECT: Revised Elevation Certificate and Floodproofing Certificate Approved

The Office of Management and Budget (OMB) has approved the collection of information under OMB Number 1660-0008, which includes the Elevation Certificate (FEMA Form 81-31) and the Floodproofing Certificate (FEMA Form 81-65). The new expiration date for both forms is March 31, 2012.

The only changes to the Floodproofing Certificate are the new expiration date and revised Paperwork Burden Disclosure Notice. Significant changes to the Elevation Certificate and Instructions are noted below:

- In Section A, items A8.d and A9.d are added, asking:
Engineered flood openings? ☐ Yes ☐ No

- In Section C, item C2.h is added, which reads:

Lowest adjacent grade at lowest elevation of deck or stairs, including structural support _____ ☐ feet ☐ meters (Puerto Rico only)
(This information is provided if the certificate is being used to support a request for a LOMA or LOMR-F.)

- The Instructions for Section A for items A.8.b-c and A.9.b-c have been revised, in part, to allow the height of flood openings to be determined from the interior grade or floor. The revision reads:

Enter ... the number of permanent flood openings in the crawlspace or enclosure(s) [for Items A9.b-c, in the attached garage] that are no higher than 1.0 foot above the higher of the exterior or interior grade or floor immediately below the opening. ... If the interior grade elevation is used, note this in the Comments area of Section D.

- Instructions for other sections have been clarified and expanded, as needed.
- Two new Building Diagrams have been added:
 1. The new Diagram 1B is for raised-slab-on-grade or slab-on-stem-wall-with-fill single- and multiple-floor buildings. (Diagram 1 from the old Elevation Certificate is Diagram 1A on the new Elevation Certificate.)
 2. The new Diagram 9 is for all buildings (other than split-level) elevated on a sub-grade crawlspace.

As stated in WYO Clearinghouse bulletin W-09008, dated February 26, 2009, FEMA will permit a "phase-in" of the revised Elevation Certificate on a voluntary basis. During a 12-month transition period beginning April 1, 2009, we will accept either the new form or the old form. This voluntary transition period will allow sufficient time for coordination and training of all affected NFIP stakeholders. Elevations certified on or after the last day of the transition period must be submitted on the new Elevation Certificate form with the expiration date of March 31, 2012.

PDF files of both forms are attached. Please note that related updates to the *Flood Insurance Manual* will soon be forthcoming as a Supplement to the May 1, 2009, Revisions.

If you have any questions regarding this matter, please contact Mary Ann Chang at 202-212-4712.

cc: Vendors, IBHS, FIPNC, FEMA Regions, Government Technical Representative

Required Routing: Data Processing, Claims, Underwriting



FEMA

NATIONAL FLOOD INSURANCE PROGRAM

ELEVATION CERTIFICATE

AND

INSTRUCTIONS

NATIONAL FLOOD INSURANCE PROGRAM ELEVATION CERTIFICATE

PAPERWORK REDUCTION ACT NOTICE

Public reporting burden for this data collection is estimated to average 3.75 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting this form. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street SW, Washington DC 20472, Paperwork Reduction Project (1660-0008).

NOTE: Do not send your completed form to this address.

PURPOSE OF THE ELEVATION CERTIFICATE

The Elevation Certificate is an important administrative tool of the National Flood Insurance Program (NFIP). It is to be used to provide elevation information necessary to ensure compliance with community floodplain management ordinances, to determine the proper insurance premium rate, and to support a request for a Letter of Map Amendment (LOMA) or Letter of Map Revision based on fill (LOMR-F).

The Elevation Certificate is required in order to properly rate Post-FIRM buildings, which are buildings constructed after publication of the Flood Insurance Rate Map (FIRM), located in flood insurance Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, and AR/AO. The Elevation Certificate is not required for Pre-FIRM buildings unless the building is being rated under the optional Post-FIRM flood insurance rules.

As part of the agreement for making flood insurance available in a community, the NFIP requires the community to adopt a floodplain management ordinance that specifies minimum requirements for reducing flood losses. One such requirement is for the community to obtain the elevation of the lowest floor (including basement) of all new and substantially improved buildings, and maintain a record of such information. The Elevation Certificate provides a way for a community to document compliance with the community's floodplain management ordinance.

Use of this certificate does not provide a waiver of the flood insurance purchase requirement. Only a LOMA or LOMR-F from the Federal Emergency Management Agency (FEMA) can amend the FIRM and remove the Federal mandate for a lending institution to require the purchase of flood insurance. However, the lending institution has the option of requiring flood insurance even if a LOMA/LOMR-F has been issued by FEMA. The Elevation Certificate may be used to support a LOMA or LOMR-F request. Lowest floor and lowest adjacent grade elevations certified by a surveyor or engineer will be required if the certificate is used to support a LOMA or LOMR-F request. A LOMA or LOMR-F request must be submitted with either a completed FEMA MT-EZ or MT-1 package, whichever is appropriate.

This certificate is used only to certify building elevations. A separate certificate is required for floodproofing. Under the NFIP, non-residential buildings can be floodproofed up to or above the Base Flood Elevation (BFE). A floodproofed building is a building that has been designed and constructed to be watertight (substantially impermeable to floodwaters) below the BFE. Floodproofing of residential buildings is not permitted under the NFIP unless FEMA has granted the community an exception for residential floodproofed basements. The community must adopt standards for design and construction of floodproofed basements before FEMA will grant a basement exception. For both floodproofed non-residential buildings and residential floodproofed basements in communities that have been granted an exception by FEMA, a floodproofing certificate is required.

Additional guidance can be found in FEMA Publication 467-1, Floodplain Management Bulletin: Elevation Certificate, available on FEMA's website at <http://www.fema.gov/library/viewRecord.do?id=1727>.

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires March 31, 2012

Important: Read the instructions on pages 1-9.

SECTION A - PROPERTY INFORMATION

A1. Building Owner's Name		For Insurance Company Use:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Policy Number
		Company NAIC Number

City

State

ZIP Code

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)

A5. Latitude/Longitude: Lat. _____ Long. _____ Horizontal Datum: ☐ NAD 1927 ☐ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number _____

A8. For a building with a crawlspace or enclosure(s):

- a) Square footage of crawlspace or enclosure(s) _____ sq ft
b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
c) Total net area of flood openings in A8.b _____ sq in
d) Engineered flood openings? ☐ Yes ☐ No

A9. For a building with an attached garage:

- a) Square footage of attached garage _____ sq ft
b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____
c) Total net area of flood openings in A9.b _____ sq in
d) Engineered flood openings? ☐ Yes ☐ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number		B2. County Name		B3. State	
B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9:

☐ FIS Profile ☐ FIRM ☐ Community Determined ☐ Other (Describe) _____

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☐ NAVD 1988 ☐ Other (Describe) _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.

Benchmark Utilized _____ Vertical Datum _____

Conversion/Comments _____

Check the measurement used.

- | | | |
|--|------------|--|
| a) Top of bottom floor (including basement, crawlspace, or enclosure floor) | _____ feet | ☐ meters (Puerto Rico only) |
| b) Top of the next higher floor | _____ feet | ☐ meters (Puerto Rico only) |
| c) Bottom of the lowest horizontal structural member (V Zones only) | _____ feet | ☐ meters (Puerto Rico only) |
| d) Attached garage (top of slab) | _____ feet | ☐ meters (Puerto Rico only) |
| e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments) | _____ feet | ☐ meters (Puerto Rico only) |
| f) Lowest adjacent (finished) grade next to building (LAG) | _____ feet | ☐ meters (Puerto Rico only) |
| g) Highest adjacent (finished) grade next to building (HAG) | _____ feet | ☐ meters (Puerto Rico only) |
| h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support | _____ feet | ☐ meters (Puerto Rico only) |

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☐ Check here if comments are provided on back of form.

Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☐ No

Certifier's Name

License Number

Title

Company Name

Address

City

State

ZIP Code

Signature

Date

Telephone

PLACE
SEAL
HERE

IMPORTANT: In these spaces, copy the corresponding information from Section A.			For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Policy Number
City	State	ZIP Code	Company NAIC Number

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments

Signature

Date

☐ Check here if attachments

SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1-E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1-E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).

a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.

E2. For Building Diagrams 6-9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8-9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F - PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. *The statements in Sections A, B, and E are correct to the best of my knowledge.*

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments

SECTION G - COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8 and G9.

G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)

G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.

G3. ☐ The following information (Items G4-G9) is provided for community floodplain management purposes.

G4. Permit Number

G5. Date Permit Issued

G6. Date Certificate Of Compliance/Occupancy Issued

G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement

G8. Elevation of as-built lowest floor (including basement) of the building _____ ☐ feet ☐ meters (PR) Datum _____

G9. BFE or (in Zone AO) depth of flooding at the building site _____ ☐ feet ☐ meters (PR) Datum _____

G10. Community's design flood elevation _____ ☐ feet ☐ meters (PR) Datum _____

Local Official's Name

Title

Community Name

Telephone

Signature

Date

Comments

☐ Check here if attachments

Building Photographs
See Instructions for Item A6.

			For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Policy Number
City	State	ZIP Code	Company NAIC Number
If using the Elevation Certificate to obtain NFIP flood insurance, affix at least two building photographs below according to the instructions for Item A6. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." If submitting more photographs than will fit on this page, use the Continuation Page on the reverse.			

Building Photographs
Continuation Page

			For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Policy Number
City	State	ZIP Code	Company NAIC Number
If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View."			

INSTRUCTIONS FOR COMPLETING THE ELEVATION CERTIFICATE

The Elevation Certificate is to be completed by a land surveyor, engineer, or architect who is authorized by law to certify elevation information when elevation information is required for Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, or AR/AO. Community officials who are authorized by law or ordinance to provide floodplain management information may also complete this form. For Zones AO and A (without BFE), a community official, a property owner, or an owner's representative may provide information on this certificate, unless the elevations are intended for use in supporting a request for a LOMA or LOMR-F. Certified elevations must be included if the purpose of completing the Elevation Certificate is to obtain a LOMA or LOMR-F.

The property owner, the owner's representative, or local official who is authorized by law to administer the community floodplain ordinance can complete Section A and Section B. The partially completed form can then be given to the land surveyor, engineer, or architect to complete Section C. The land surveyor, engineer, or architect should verify the information provided by the property owner or owner's representative to ensure that this certificate is complete.

In Puerto Rico only, elevations for building information and flood hazard information may be entered in meters.

SECTION A – PROPERTY INFORMATION

Items A1-A4. This section identifies the building, its location, and its owner. Enter the name(s) of the building owner(s), the building's complete street address, and the lot and block numbers. If the building's address is different from the owner's address, enter the address of the building being certified. If the address is a rural route or a Post Office box number, enter the lot and block numbers, the tax parcel number, the legal description, or an abbreviated location description based on distance and direction from a fixed point of reference. For the purposes of this certificate, "building" means both a building and a manufactured (mobile) home.

A map may be attached to this certificate to show the location of the building on the property. A tax map, FIRM, or detailed community map is appropriate. If no map is available, provide a sketch of the property location, and the location of the building on the property. Include appropriate landmarks such as nearby roads, intersections, and bodies of water. For building use, indicate whether the building is residential, non-residential, an addition to an existing residential or non-residential building, an accessory building (e.g., garage), or other type of structure. Use the Comments area of the appropriate section if needed, or attach additional comments.

Item A5. Provide latitude and longitude coordinates for the center of the front of the building. Use either decimal degrees (e.g., 39.5043°, -110.7585°) or degrees, minutes, seconds (e.g., 39° 30' 15.5", -110° 45' 30.7") format. If decimal degrees are used, provide coordinates to at least 4 decimal places or better. When using degrees, minutes, seconds, provide seconds to at least 1 decimal place or better. The latitude and longitude coordinates must be accurate within 66 feet. When the latitude and longitude are provided by a surveyor, check the "Yes" box in Section D and indicate the method used to determine the latitude and longitude in the Comments area of Section D. If the Elevation Certificate is being certified by other than a licensed surveyor, engineer, or architect, this information is not required. Provide the type of datum used to obtain the latitude and longitude. FEMA prefers the use of NAD 1983.

Item A6. If the Elevation Certificate is being used to obtain flood insurance through the NFIP, the certifier must provide at least two photographs showing the front and rear of the building taken within 90 days from the date of certification. The photographs must be taken with views confirming the building description and diagram number provided in Section A. To the extent possible, these photographs should show the entire building including foundation. If the building has split-level or multi-level areas, provide at least two additional photographs showing side views of the building. In addition, when applicable, provide a photograph of the foundation showing a representative example of the flood openings or vents. All photographs must be in color and measure at least 3"x3". Digital photographs are acceptable.

Item A7. Select the diagram on pages 7-9 that best represents the building. Then enter the diagram number and use the diagram to identify and determine the appropriate elevations requested in Items C2.a-h. If you are unsure of the correct diagram, select the diagram that most closely resembles the building being certified.

Item A8.a Provide the square footage of the crawlspace or enclosure(s) below the lowest elevated floor of an elevated building with or without permanent flood openings. Take the measurement from the outside of the crawlspace or enclosure(s). Examples of elevated buildings constructed with crawlspace and enclosure(s) are shown in Diagrams 6-9 on pages 8-9. Diagram 2, 4, or 9 should be used for a building constructed with a crawlspace floor that is below the exterior grade on all sides.

Items A8.b-d Enter in Item A8.b the number of permanent flood openings in the crawlspace or enclosure(s) that are no higher than 1.0 foot above the higher of the exterior or interior grade or floor immediately below the opening. (A permanent flood opening is a flood vent or other opening that allows the free passage of water automatically in both directions without human intervention.) If the interior grade elevation is used, note this in the Comments area of Section D. Estimate the total net area of all such permanent flood openings in square inches, excluding any bars, louvers, or other covers of the permanent flood openings, and enter the total in Item A8.c. If the net area cannot be reasonably estimated, provide the size of the flood openings without consideration of any covers and indicate in the Comments area the type of cover that exists in the flood openings. Indicate in Item A8.d whether the flood openings are engineered. If applicable, attach a copy of the Individual Engineered Flood Openings Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES), if you have it. If the crawlspace or enclosure(s) have no permanent openings within 1.0 foot above adjacent grade, enter "0" (zero) in Items A8.b-c.

Item A9.a Provide the square footage of the attached garage with or without permanent flood openings. Take the measurement from the outside of the garage.

Items A9.b-d Enter in Item A9.b the number of permanent flood openings in the attached garage that are no higher than 1.0 foot above the higher of the exterior or interior grade or floor immediately below the opening. (A permanent flood opening is a flood vent or other opening that allows the free passage of water automatically in both directions without human intervention.) If the interior grade elevation is used, note this in the Comments area of Section D. This includes any openings that are in the garage door that are no higher than 1.0 foot above the adjacent grade. Estimate the total net area of all such permanent flood openings in square inches and enter the total in Item A9.c. If the net area cannot be reasonably estimated, provide the size of the flood openings without consideration of any covers and indicate in the Comments area the type of cover than exists in the flood openings. Indicate in Item A9.d whether the flood openings are engineered. If applicable, attach a copy of the Individual Engineered Flood Openings Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES), if you have it. If the garage has no permanent flood openings within 1.0 foot above adjacent grade, enter "0" (zero) in Items A9.b-c.

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

Complete the Elevation Certificate on the basis of the FIRM in effect at the time of the certification.

The information for Section B is obtained by reviewing the FIRM panel that includes the building's location. Information about the current FIRM is available from the Federal Emergency Management Agency (FEMA) by calling 1-800-358-9616. If a Letter of Map Amendment (LOMA) or Letter of Map Revision (LOMR-F) has been issued by FEMA, please provide the letter date and case number in the Comments area of Section D or Section G, as appropriate.

For a building in an area that has been annexed by one community but is shown on another community's FIRM, enter the community name and 6-digit number of the annexing community in Item B1, the name of the new county in Item B2, and the FIRM index date for the annexing community in Item B6. Enter information from the actual FIRM panel that shows the building location, even if it is the FIRM for the previous jurisdiction, in Items B4, B5, B7, B8, and B9.

If the map in effect at the time of the building's construction was other than the current FIRM, and you have the past map information pertaining to the building, provide the information in the Comments area of Section D.

Item B1. NFIP Community Name & Community Number. Enter the complete name of the community in which the building is located and the associated 6-digit community number. For a newly incorporated community, use the name and 6-digit number of the new community. Under the NFIP, a "community" is any State or area or political subdivision thereof, or any Indian tribe or authorized native organization, that has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction. To determine the current community number, see the NFIP *Community Status Book*, available on FEMA's web site at <http://www.fema.gov/fema/csb.shtm>, or call 1-800-358-9616.

Item B2. County Name. Enter the name of the county or counties in which the community is located. For an unincorporated area of a county, enter "unincorporated area." For an independent city, enter "independent city."

Item B3. State. Enter the 2-letter state abbreviation (for example, VA, TX, CA).

Items B4-B5. Map/Panel Number and Suffix. Enter the 10-character "Map Number" or "Community Panel Number" shown on the FIRM where the building or manufactured (mobile) home is located. For maps in a county-wide format, the sixth character of the "Map Number" is the letter "C" followed by a four-digit map number. For maps not in a county-wide format, enter the "Community Panel Number" shown on the FIRM.

Item B6. FIRM Index Date. Enter the effective date or the map revised date shown on the FIRM Index.

Item B7. FIRM Panel Effective/Revised Date. Enter the map effective date or the map revised date shown on the FIRM panel. This will be the latest of all dates shown on the map. The current FIRM panel effective date can be determined by calling 1-800-358-9616.

Item B8. Flood Zone(s). Enter the flood zone, or flood zones, in which the building is located. All flood zones containing the letter "A" or "V" are considered Special Flood Hazard Areas. The flood zones are A, AE, A1-A30, V, VE, V1-V30, AH, AO, AR, AR/A, AR/AE, AR/A1-A30, AR/AH, and AR/AO. Each flood zone is defined in the legend of the FIRM panel on which it appears.

Item B9. Base Flood Elevation(s). Using the appropriate Flood Insurance Study (FIS) Profile, Floodway Data Table, or FIRM panel, locate the property and enter the BFE (or base flood depth) of the building site. If the building is located in more than one flood zone in Item B8, list all appropriate BFEs in Item B9. BFEs are shown on a FIRM or FIS Profile for Zones A1-A30, AE, AH, V1-V30, VE, AR, AR/A, AR/AE, AR/A1-A30, AR/AH, and AR/AO; flood depth numbers are shown for Zone AO. Use the AR BFE if the building is located in any of Zones AR/A, AR/AE, AR/A1-A30, AR/AH, or AR/AO. In A or V zones where BFEs are not provided on the FIRM, BFEs may be available from another source. For example, the community may have established BFEs or obtained BFE data from other sources for the building site. For subdivisions and other developments of more than 50 lots or 5 acres, establishment of BFEs is required by the community's floodplain management ordinance. If a BFE is obtained from another source, enter the BFE in Item B9. In an A Zone where BFEs are not available, complete Section E and enter N/A for Section B, Item B9. Enter the BFE to the nearest tenth of a foot (nearest tenth of a meter, in Puerto Rico).

Item B10. Indicate the source of the BFE that you entered in Item B9. If the BFE is from a source other than FIS Profile, FIRM, or community, describe the source of the BFE.

Item B11. Indicate the elevation datum to which the elevations on the applicable FIRM are referenced as shown on the map legend. The vertical datum is shown in the Map Legend and/or the Notes to Users on the FIRM.

Item B12. Indicate whether the building is located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA). (OPAs are portions of coastal barriers that are owned by Federal, State, or local governments or by certain non-profit organizations and used primarily for natural resources protection.) Federal flood insurance is prohibited in designated CBRS areas or OPAs for buildings or manufactured (mobile) homes built or substantially improved after the date of the CBRS or OPA designation. For the first CBRS designations, that date is October 1, 1983. Information about CBRS areas and OPAs may be obtained on the FEMA web site at <http://www.fema.gov/business/nfip/cbrs/cbrs.shtm>.

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

Complete Section C if the building is located in any of Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, or AR/AO, or if this certificate is being used to support a request for a LOMA or LOMR-F. If the building is located in Zone AO or Zone A (without BFE), complete Section E instead. To ensure that all required elevations are obtained, it may be necessary to enter the building (for instance, if the building has a basement or sunken living room, split-level construction, or machinery and equipment).

Surveyors may not be able to gain access to some crawlspaces to shoot the elevation of the crawlspace floor. If access to the crawlspace is limited or cannot be gained, follow one of these procedures.

- Use a yardstick or tape measure to measure the height from the floor of the crawlspace to the "next higher floor," and then subtract the crawlspace height from the elevation of the "next higher floor." If there is no access to the crawlspace, use the exterior grade next to the structure to measure the height of the crawlspace to the "next higher floor."
- Contact the local floodplain administrator of the community in which the building is located. The community may have documentation of the elevation of the crawlspace floor as part of the permit issued for the building.
- If the property owner has documentation or knows the height of the crawlspace floor to the next higher floor, try to verify this by looking inside the crawlspace through any openings or vents.

In all three cases, provide the elevation in the Comments area of Section D on the back of the form and a brief description of how the elevation was obtained.

Item C1. Indicate whether the elevations to be entered in this section are based on construction drawings, a building under construction, or finished construction. For either of the first two choices, a post-construction Elevation Certificate will be

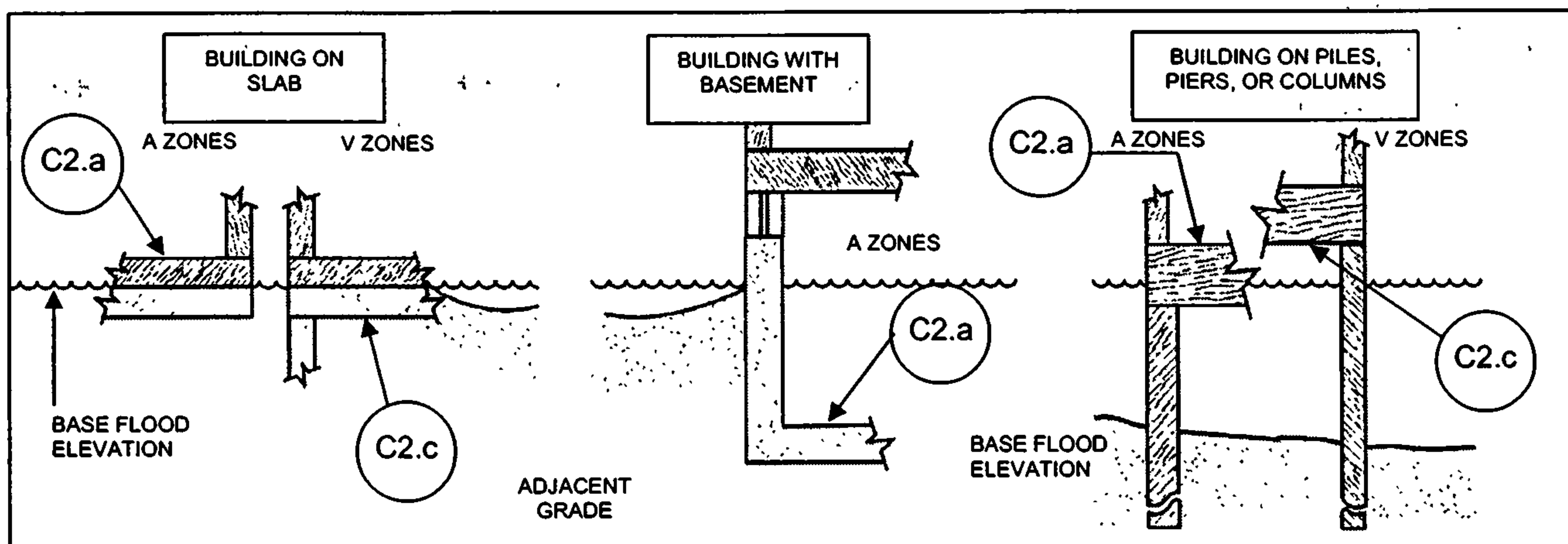
required when construction is complete. If the building is under construction, include only those elevations that can be surveyed in Items C2.a-h. Use the Comments area of Section D to provide elevations obtained from the construction plans or drawings. Select "Finished Construction" only when all machinery and/or equipment such as furnaces, hot water heaters, heat pumps, air conditioners, and elevators and their associated equipment have been installed and the grading around the building is completed.

Item C2. A field survey is required for Items C2.a-h. Most control networks will assign a unique identifier for each benchmark. For example, the National Geodetic Survey uses the Permanent Identifier (PID). For the benchmark utilized, provide the PID or other unique identifier assigned by the maintainer of the benchmark. For GPS survey, indicate the benchmark used for the base station, the Continuously Operating Reference Stations (CORS) sites used for an On-line Positioning User Service (OPUS) solution (also attach the OPUS report), or the name of the Real Time Network used.

Also provide the vertical datum for the benchmark elevation. All elevations for the certificate, including the elevations for Items C2.a-h, must use the same datum on which the BFE is based. Show the conversion from the field survey datum used if it differs from the datum used for the BFE entered in Item B9 and indicate the conversion software used. Show the datum conversion, if applicable, in this section or in the Comments area of Section D.

For property experiencing ground subsidence, the most recent reference mark elevations must be used for determining building elevations. However, when subsidence is involved, the BFE should not be adjusted. Enter elevations in Items C2.a-h to the nearest tenth of a foot (nearest tenth of a meter, in Puerto Rico).

Items C2.a-d Enter the building elevations (excluding the attached garage) indicated by the selected building diagram (Item A7) in Items C2.a-c. If there is an attached garage, enter the elevation for top of attached garage slab in Item C2.d. (Because elevation for top of attached garage slab is self-explanatory, attached garages are not illustrated in the diagrams.) If the building is located in a V zone on the FIRM, complete Item C2.c. If the flood zone cannot be determined, enter elevations for all of Items C2.a-h. For buildings in A zones, elevations a, b, d, and e should be measured at the top of the floor. For buildings in V zones, elevation c must be measured at the bottom of the lowest horizontal structural member of the floor (see drawing below). For buildings elevated on a crawlspace, Diagrams 8 and 9, enter the elevation of the top of the crawlspace floor in Item C2.a, whether or not the crawlspace has permanent flood openings (flood vents). *If any item does not apply to the building, enter "N/A" for not applicable.*



Item C2.e Enter the lowest platform elevation of at least one of the following machinery and equipment items: elevators and their associated equipment, furnaces, hot water heaters, heat pumps, and air conditioners in an attached garage or enclosure or on an open utility platform that provides utility services for the building. Note that elevations for these specific machinery and equipment items are required in order to rate the building for flood insurance. Local floodplain management officials are required to ensure that all machinery and equipment servicing the building are protected from flooding. Thus, local officials may require that elevation information for all machinery and equipment, including ductwork, be documented on the Elevation Certificate. If the machinery and/or equipment is mounted to a wall, pile, etc., enter the platform elevation of the machinery and/or equipment. Indicate machinery/equipment type and its general location, e.g., on floor inside garage or on platform affixed to exterior wall, in the Comments area of Section D or Section G, as appropriate. *If this item does not apply to the building, enter "N/A" for not applicable.*

Items C2.f-g Enter the elevation of the ground, sidewalk, or patio slab immediately next to the building. For Zone AO, use the natural grade elevation, if available. This measurement must be to the nearest tenth of a foot (nearest tenth of a meter, in Puerto Rico) if this certificate is being used to support a request for a LOMA or LOMR-F.

Item C2.h Enter the lowest grade elevation at the deck support or stairs. For Zone AO, use the natural grade elevation, if available. This measurement must be to the nearest tenth of a foot (nearest tenth of a meter, in Puerto Rico) if this certificate is being used to support a request for a LOMA or LOMR-F.

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

Complete as indicated. This section of the Elevation Certificate may be signed by only a land surveyor, engineer, or architect who is authorized by law to certify elevation information. Place your license number, your seal (as allowed by the State licensing board), your signature, and the date in the box in Section D. You are certifying that the information on this certificate represents your best efforts to interpret the data available and that you understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001. Use the Comments area of Section D, on the back of the certificate, to provide datum, elevation, openings, or other relevant information not specified on the front.

SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO & ZONE A (WITHOUT BFE)

Complete Section E if the building is located in Zone AO or Zone A (without BFE). Otherwise, complete Section C instead. Explain in the Section F Comments area if the measurement provided under Items E1- E4 is based on the "natural grade."

Items E1.a and b Enter in Item E1.a the height to the nearest tenth of a foot (tenth of a meter in Puerto Rico) of the top of the bottom floor (as indicated in the applicable diagram) above or below the highest adjacent grade (HAG). Enter in Item E1.b the height to the nearest tenth of a foot (tenth of a meter in Puerto Rico) of the top of the bottom floor (as indicated in the applicable diagram) above or below the lowest adjacent grade (LAG). For buildings in Zone AO, the community's floodplain management ordinance requires the lowest floor of the building be elevated above the highest adjacent grade at least as high as the depth number on the FIRM. Buildings in Zone A (without BFE) may qualify for a lower insurance rate if an engineered BFE is developed at the site.

Item E2. For Building Diagrams 6-9 with permanent flood openings (see pages 8-9), enter the height to the nearest tenth of a foot (tenth of a meter in Puerto Rico) of the next higher floor or elevated floor (as indicated in the applicable diagram) above or below the highest adjacent grade (HAG).

Item E3. Enter the height to the nearest tenth of a foot (tenth of a meter in Puerto Rico), in relation to the highest adjacent grade next to the building, for the top of attached garage slab. (Because elevation for top of attached garage slab is self-explanatory, attached garages are not illustrated in the diagrams.) *If this item does not apply to the building, enter "N/A" for not applicable.*

Item E4. Enter the height to the nearest tenth of a foot (tenth of a meter in Puerto Rico), in relation to the highest adjacent grade next to the building, of the platform elevation that supports the machinery and/or equipment servicing the building. Indicate machinery/equipment type in the Comments area of Section F. *If this item does not apply to the building, enter "N/A" for not applicable.*

Item E5. For those communities where this base flood depth is not available, the community will need to determine whether the top of the bottom floor is elevated in accordance with the community's floodplain management ordinance.

SECTION F - PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

Complete as indicated. This section is provided for certification of measurements taken by a property owner or property owner's representative when responding to Sections A, B, and E. The address entered in this section must be the actual mailing address of the property owner or property owner's representative who provided the information on the certificate.

SECTION G - COMMUNITY INFORMATION (OPTIONAL)

Complete as indicated. The community official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Section C may be

filled in by the local official as provided in the instructions below for Item G1. If the authorized community official completes Sections C, E, or G, complete the appropriate item(s) and sign this section.

Check **Item G1** if Section C is completed with elevation data from other documentation, including elevations obtained from the Community Rating System Elevation Software, that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. Indicate the source of the elevation data and the date obtained in the Comments area of Section G. If you are both a community official and a licensed land surveyor, engineer, or architect authorized by law to certify elevation information, and you performed the actual survey for a building in Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/A1-A30, AR/AE, AR/AH, or AR/AO, you must also complete Section D.

Check **Item G2** if information is entered in Section E by the community for a building in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.

Check **Item G3** if the information in Items G4-G10 has been completed for community floodplain management purposes to document the as-built lowest floor elevation of the building. Section C of the Elevation Certificate records the elevation of various building components but does not determine the lowest floor of the building or whether the building, as constructed, complies with the community's floodplain management ordinance. This must be done by the community. Items G4-G10 provide a way to document these determinations.

Item G4. Permit Number. Enter the permit number or other identifier to key the Elevation Certificate to the permit issued for the building.

Item G5. Date Permit Issued. Enter the date the permit was issued for the building.

Item G6. Date Certificate of Compliance/Occupancy Issued. Enter the date that the Certificate of Compliance or Occupancy or similar written official documentation of as-built lowest floor elevation was issued by the community as evidence that all work authorized by the floodplain development permit has been completed in accordance with the community's floodplain management laws or ordinances.

Item G7. New Construction or Substantial Improvement. Check the applicable box. "Substantial Improvement" means any reconstruction, rehabilitation, addition, or other improvement of a building, the cost of which equals or exceeds 50 percent of the market value of the building before the start of construction of the improvement. The term includes buildings that have incurred substantial damage, regardless of the actual repair work performed.

Item G8. As-built lowest floor elevation. Enter the elevation of the lowest floor (including basement) when the construction of the building is completed and a final inspection has been made to confirm that the building is built in accordance with the permit, the approved plans, and the community's floodplain management laws or ordinances. Indicate the elevation datum used.

Item G9. BFE. Using the appropriate FIRM panel, FIS Profile, or other data source, locate the property and enter the BFE (or base flood depth) of the building site. Indicate the elevation datum used.

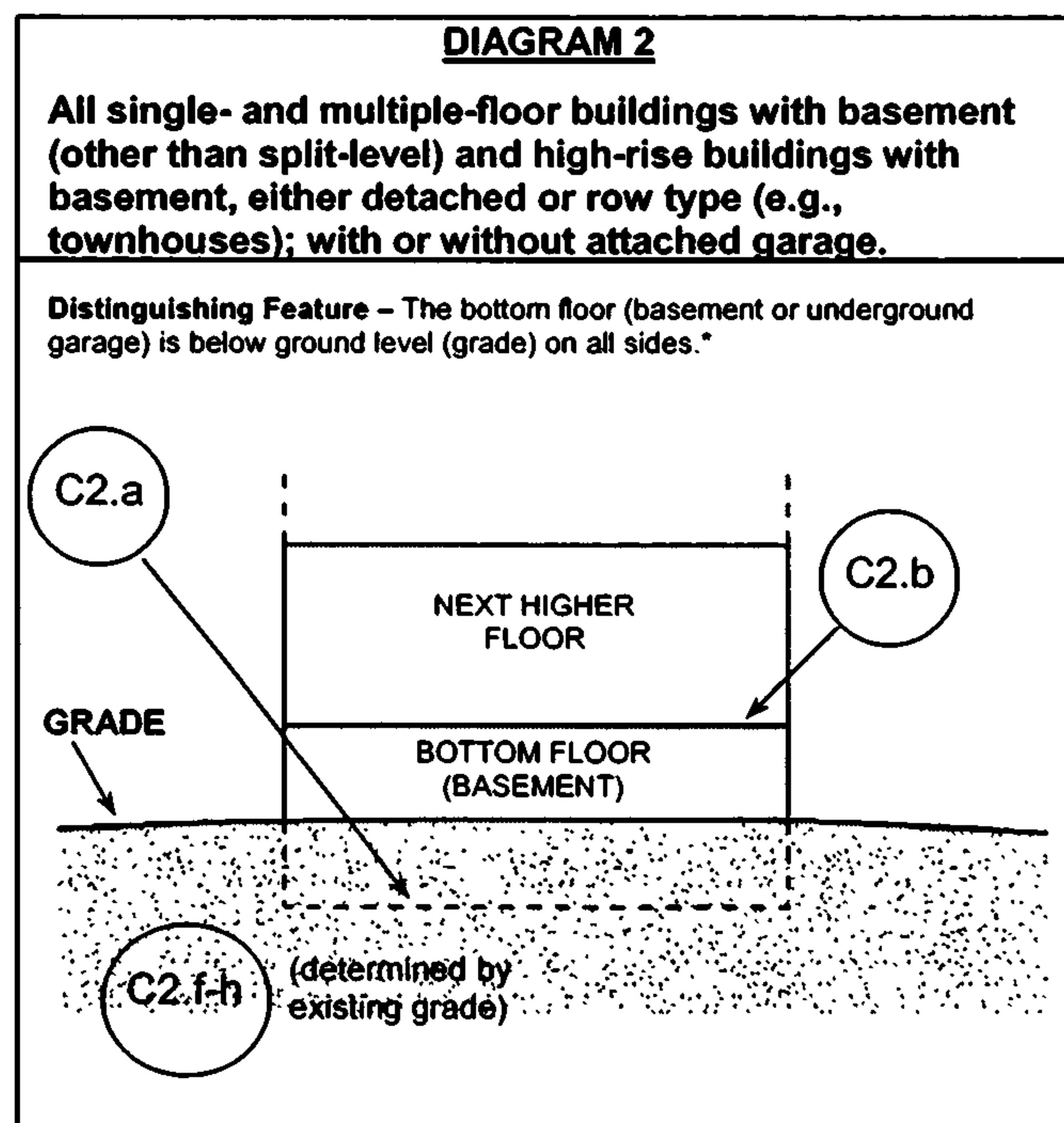
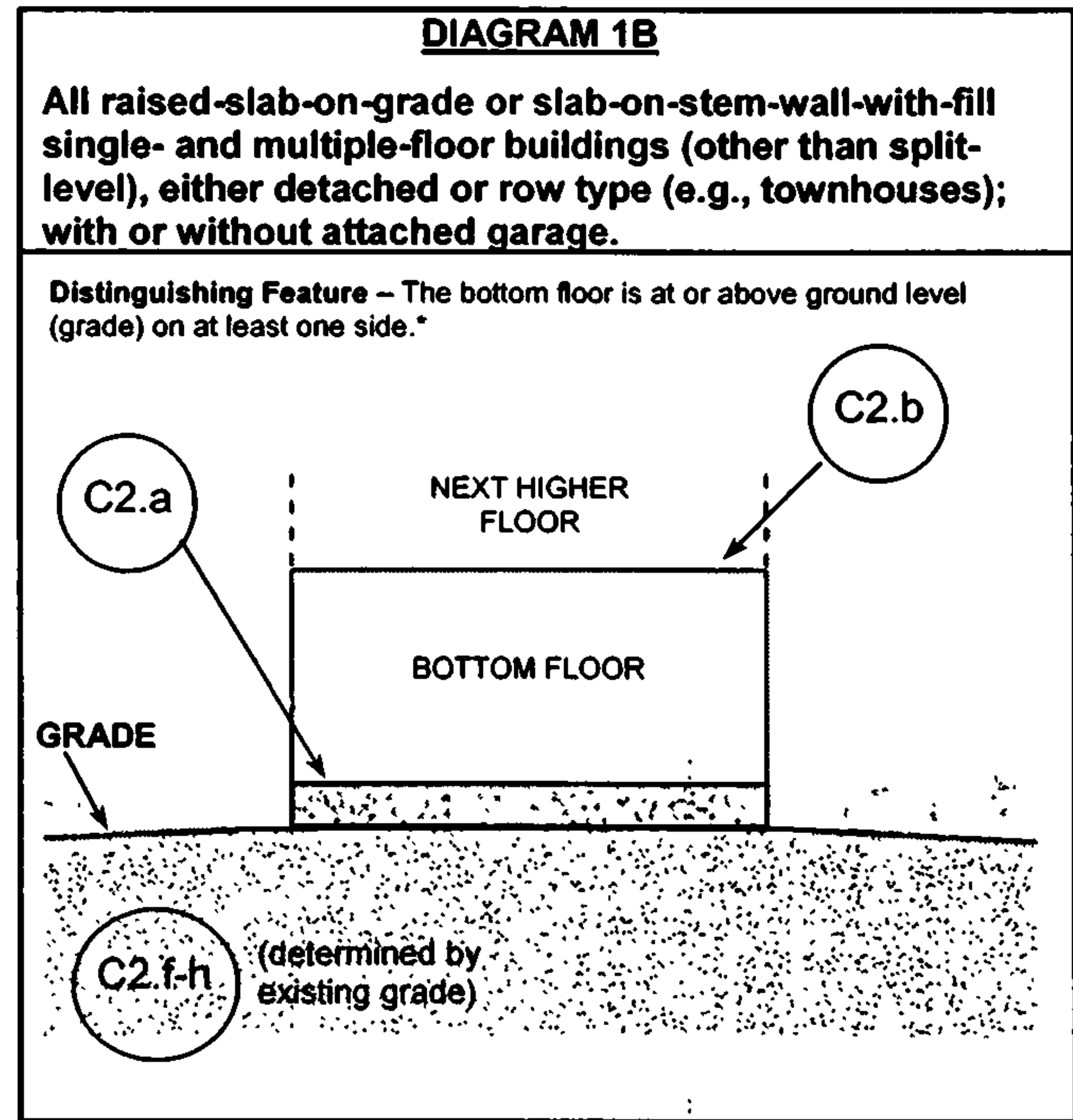
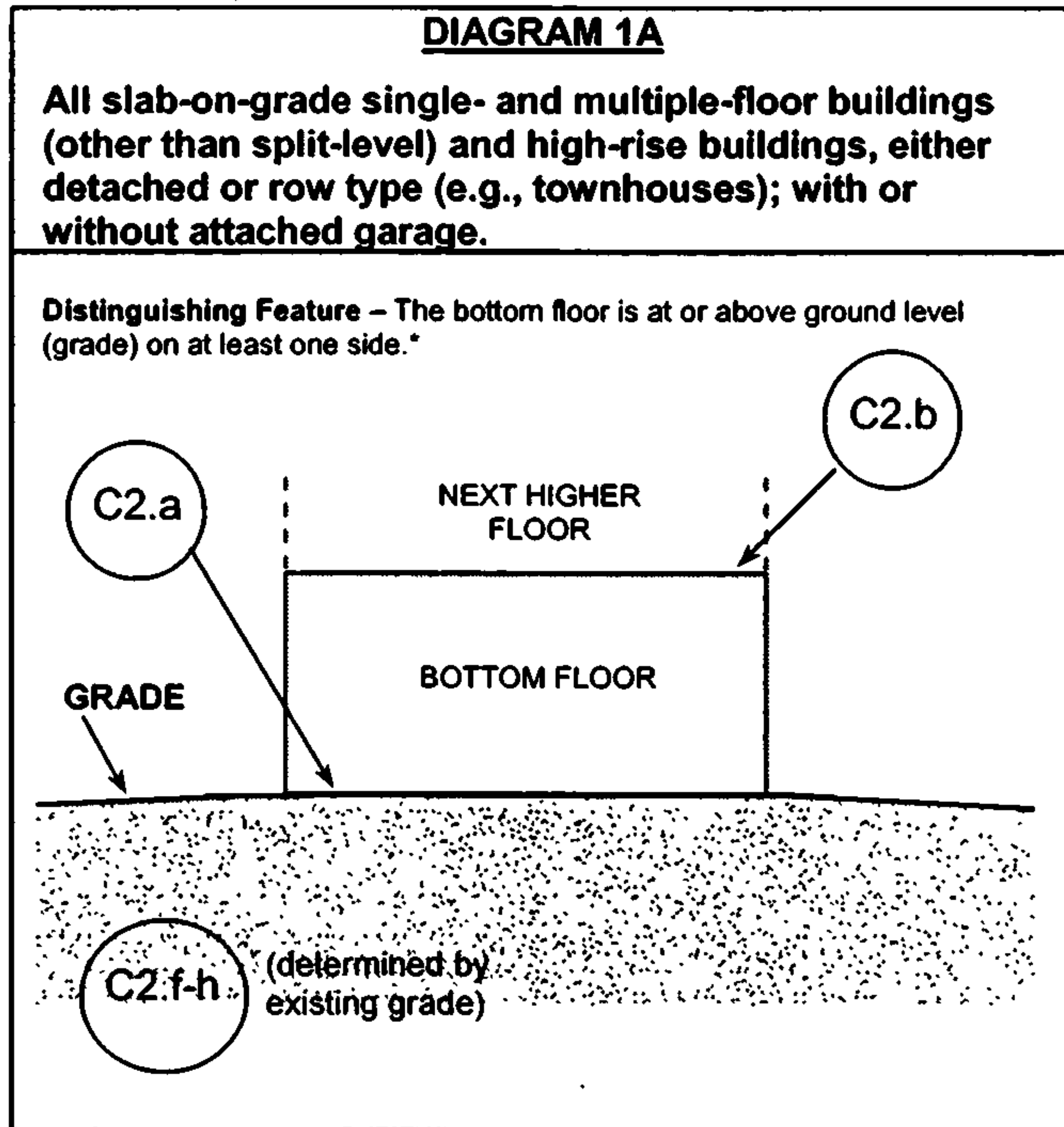
Item G10. Community's design flood elevation. Enter the elevation (including freeboard above the BFE) to which the community requires the lowest floor to be elevated. Indicate the elevation datum used.

Enter your name, title, and telephone number, and the name of the community. Sign and enter the date in the appropriate blanks.

BUILDING DIAGRAMS

The following diagrams illustrate various types of buildings. Compare the features of the building being certified with the features shown in the diagrams and select the diagram most applicable. Enter the diagram number in Item A7, the square footage of crawlspace or enclosure(s) and the area of flood openings in square inches in Items A8.a-c, the square footage of attached garage and the area of flood openings in square inches in Items A9.a-c, and the elevations in Items C2.a-h.

In A zones, the floor elevation is taken at the top finished surface of the floor indicated; in V zones, the floor elevation is taken at the bottom of the lowest horizontal structural member (see drawing in instructions for Section C).

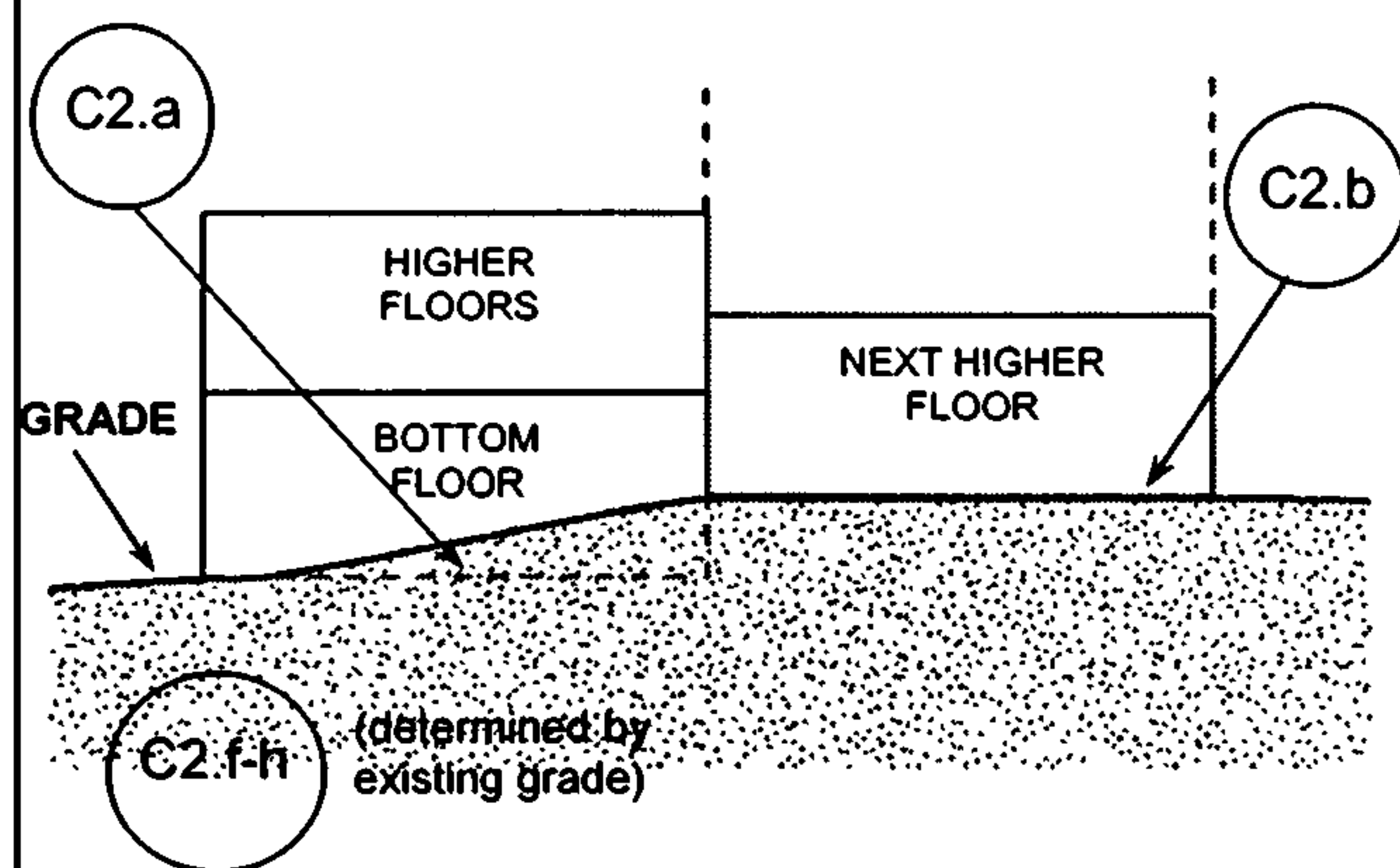


* A floor that is below ground level (grade) on all sides is considered a basement even if the floor is used for living purposes, or as an office, garage, workshop, etc

DIAGRAM 3

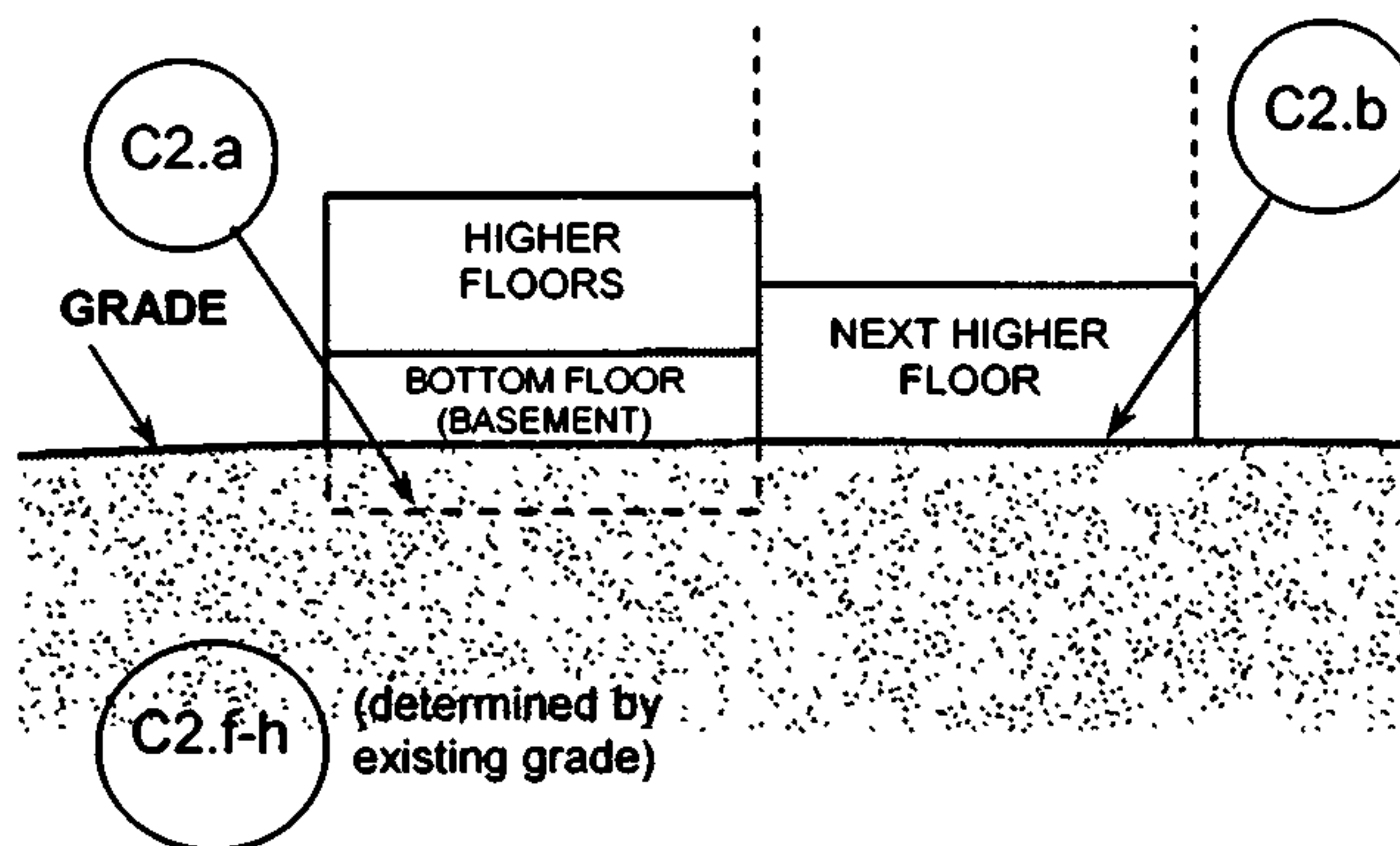
All split-level buildings that are slab-on-grade, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (excluding garage) is at or above ground level (grade) on at least one side.*

**DIAGRAM 4**

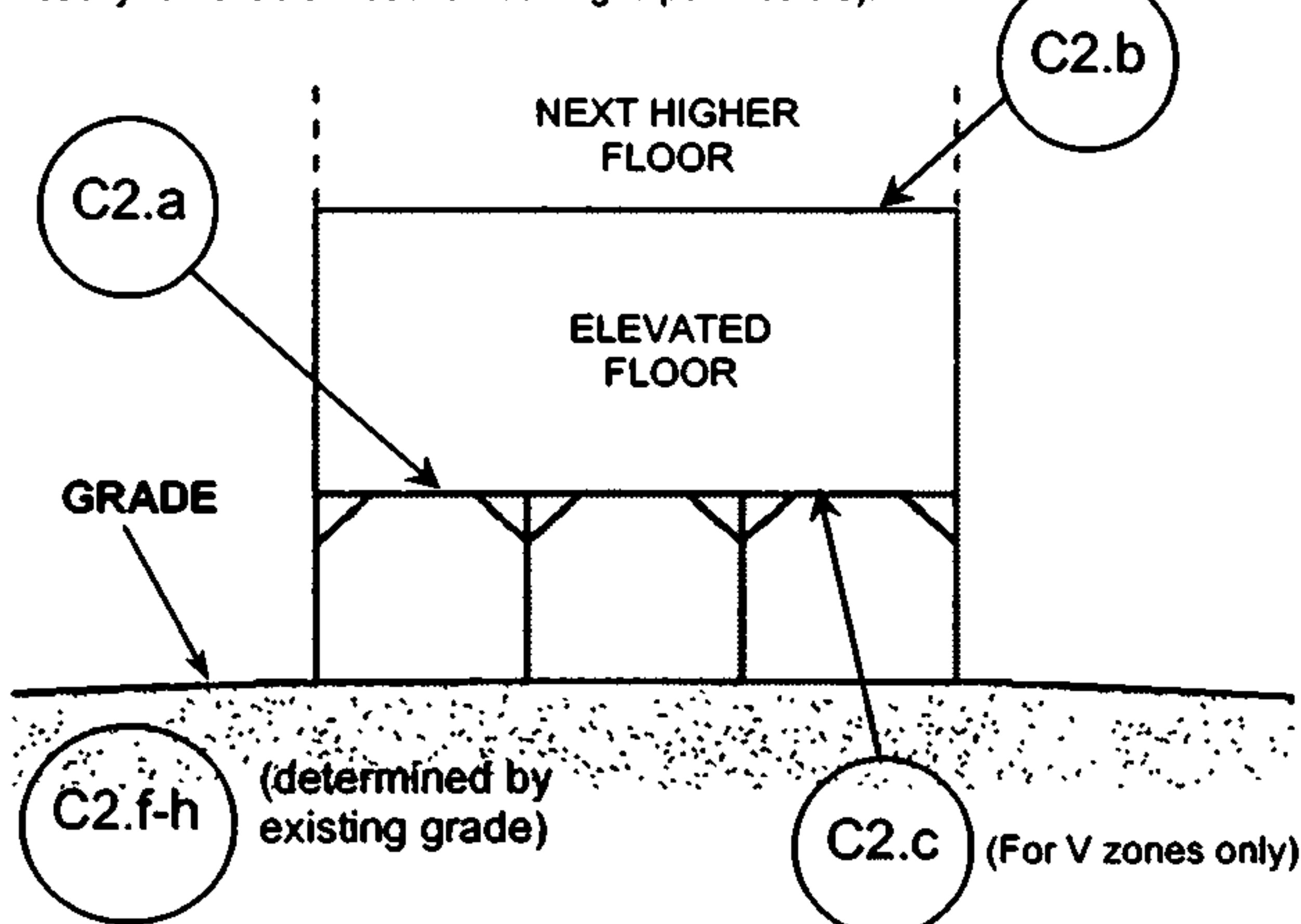
All split-level buildings (other than slab-on-grade), either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (basement or underground garage) is below ground level (grade) on all sides.*

**DIAGRAM 5**

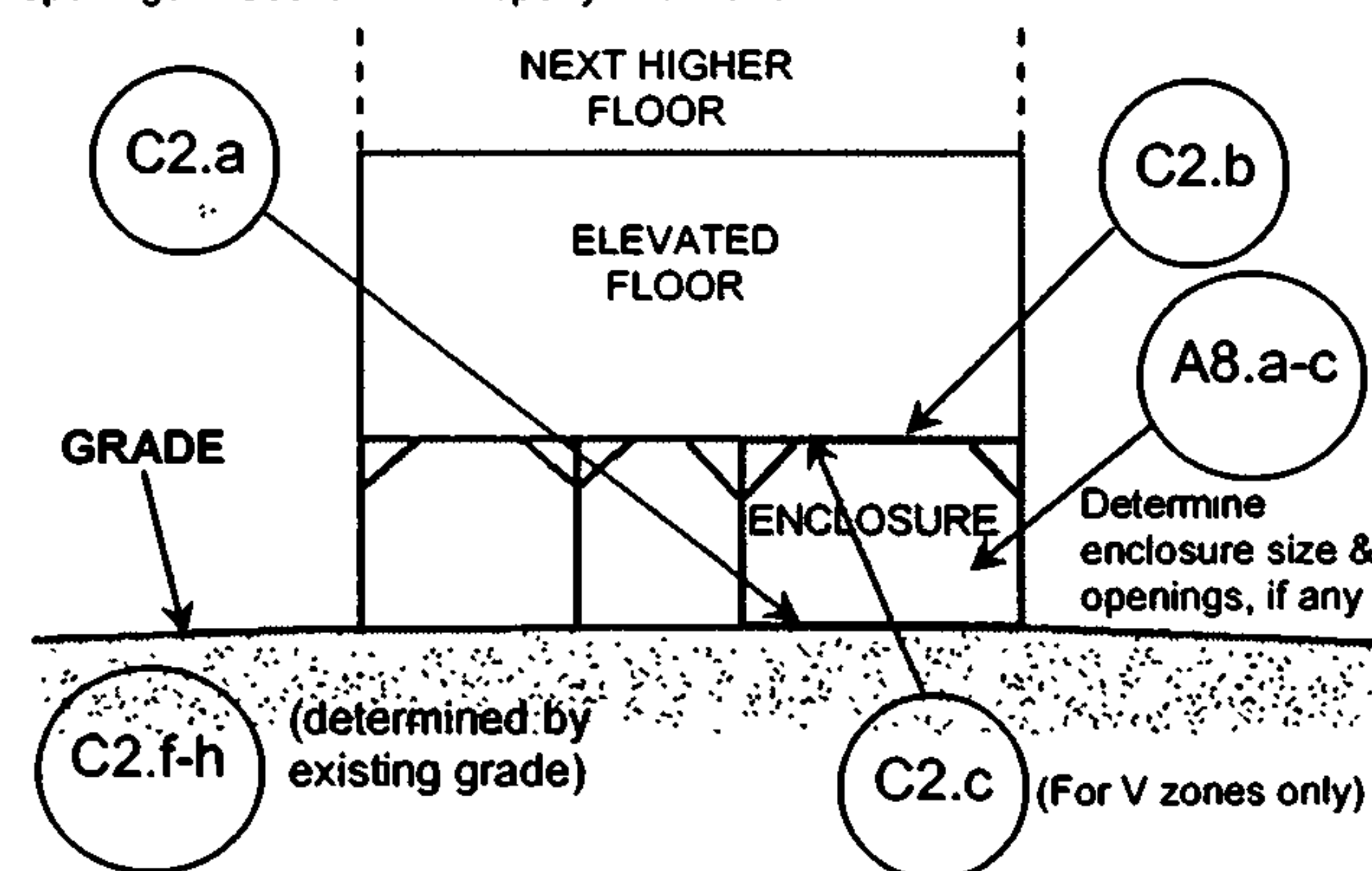
All buildings elevated on piers, posts, piles, columns, or parallel shear walls. No obstructions below the elevated floor.

Distinguishing Feature – For all zones, the area below the elevated floor is open, with no obstruction to flow of flood waters (open lattice work and/or readily removable insect screening is permissible).

**DIAGRAM 6**

All buildings elevated on piers, posts, piles, columns, or parallel shear walls with full or partial enclosure below the elevated floor.

Distinguishing Feature – For all zones, the area below the elevated floor is enclosed, either partially or fully. In A Zones, the partially or fully enclosed area below the elevated floor is with or without openings** present in the walls of the enclosure. Indicate information about enclosure size and openings in Section A – Property Information.



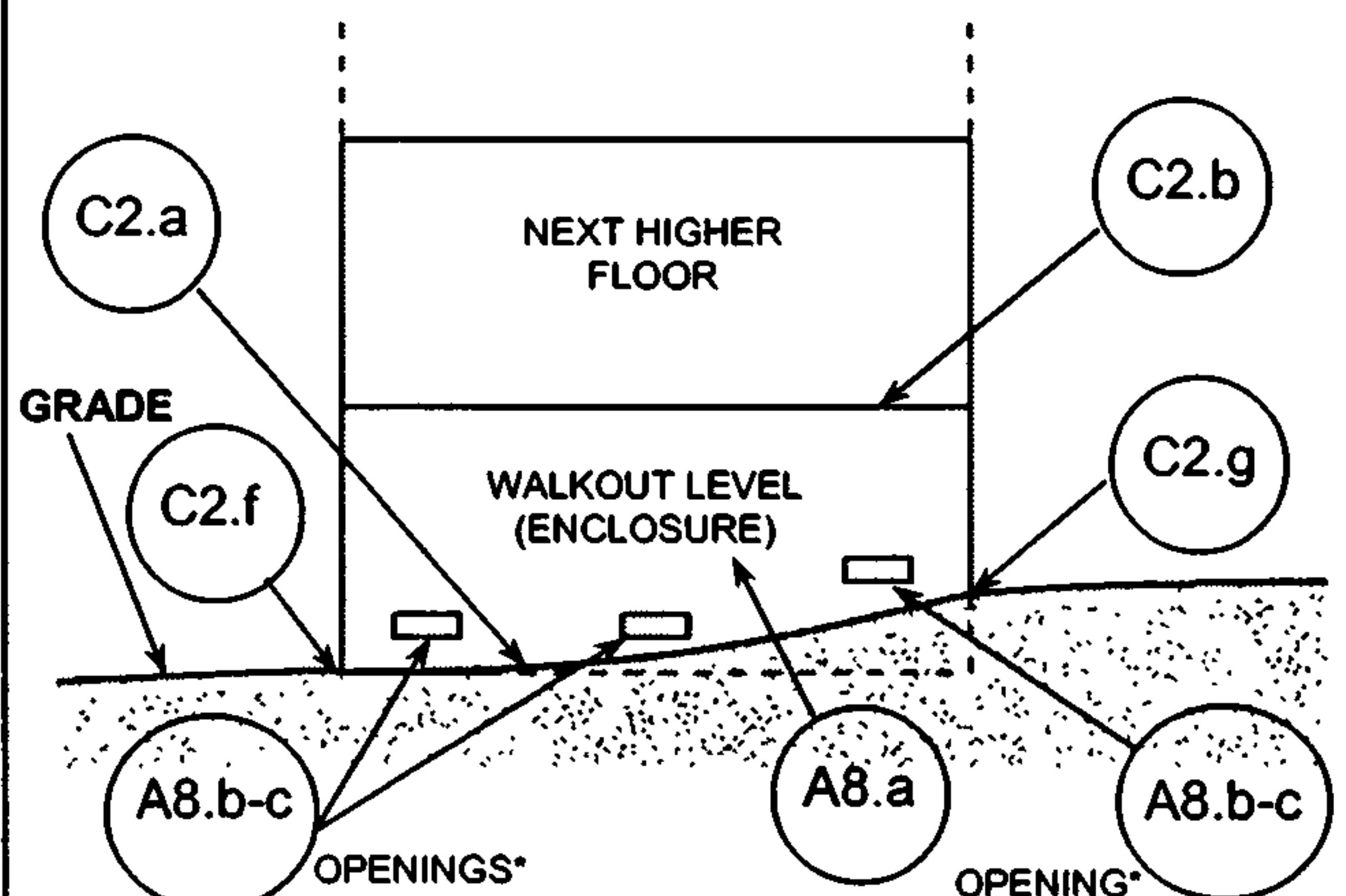
* A floor that is below ground level (grade) on all sides is considered a basement even if the floor is used for living purposes, or as an office, garage, workshop, etc.

** An "opening" is a permanent opening that allows for the free passage of water automatically in both directions without human intervention. Under the NFIP, a minimum of two openings is required for enclosures or crawlspaces. The openings shall provide a total net area of not less than one square inch for every square foot of area enclosed, excluding any bars, louvers, or other covers of the opening. Alternatively, an Individual Engineered Flood Openings Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES) must be submitted to document that the design of the openings will allow for the automatic equalization of hydrostatic flood forces on exterior walls. A window, a door, or a garage door is not considered an opening; openings may be installed in doors. Openings shall be on at least two sides of the enclosed area. If a building has more than one enclosed area, each area must have openings to allow floodwater to directly enter. The bottom of the openings must be no higher than one foot above the higher of the exterior or interior grade or floor immediately below the opening. For more guidance on openings, see NFIP Technical Bulletin 1.

DIAGRAM 7

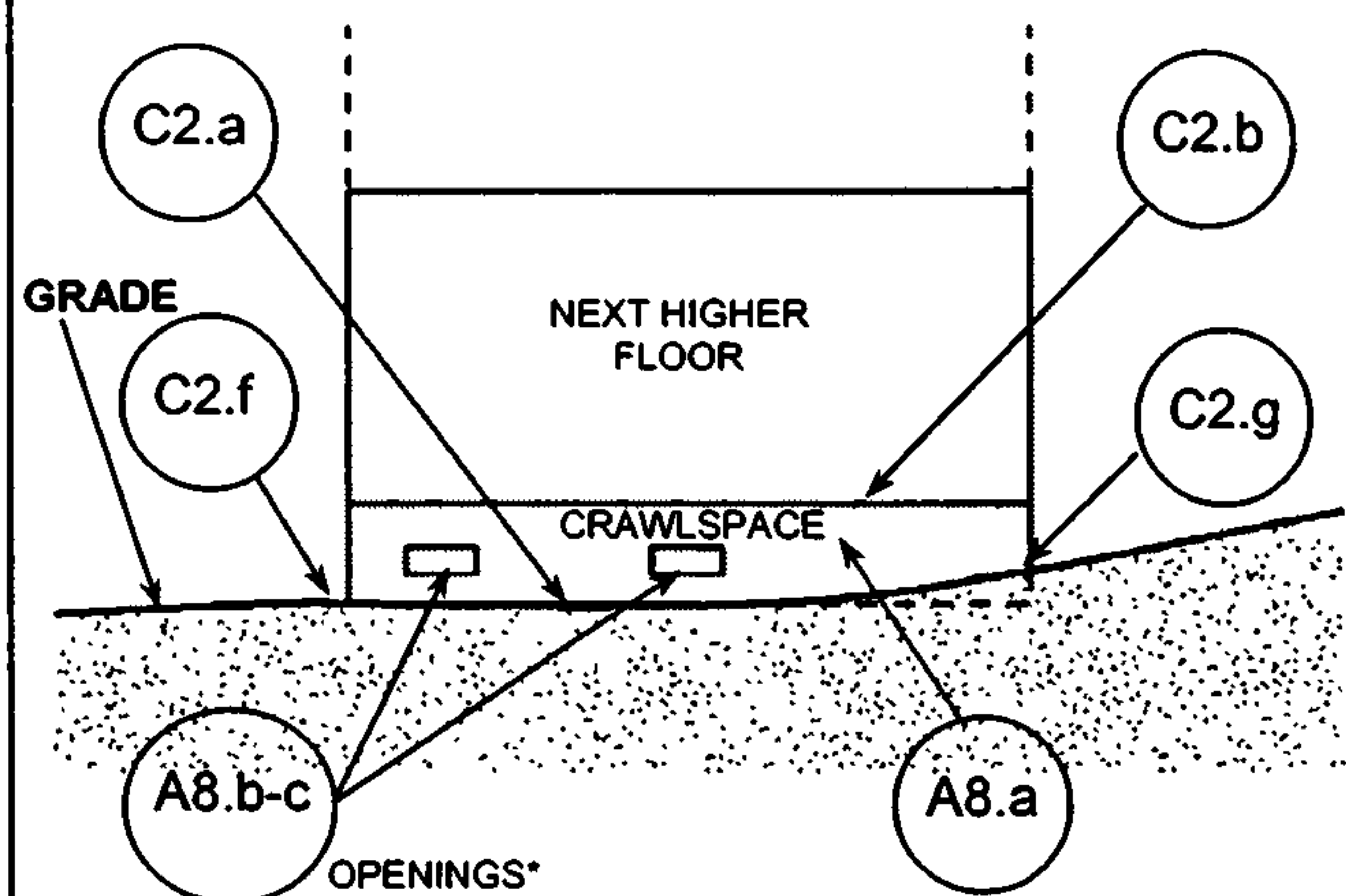
All buildings elevated on full-story foundation walls with a partially or fully enclosed area below the elevated floor. This includes walkout levels, where at least one side is at or above grade. The principal use of this building is located in the elevated floors of the building.

Distinguishing Feature – For all zones, the area below the elevated floor is enclosed, either partially or fully. In A Zones, the partially or fully enclosed area below the elevated floor is with or without openings* present in the walls of the enclosure. Indicate information about enclosure size and openings in Section A – Property Information.

**DIAGRAM 8**

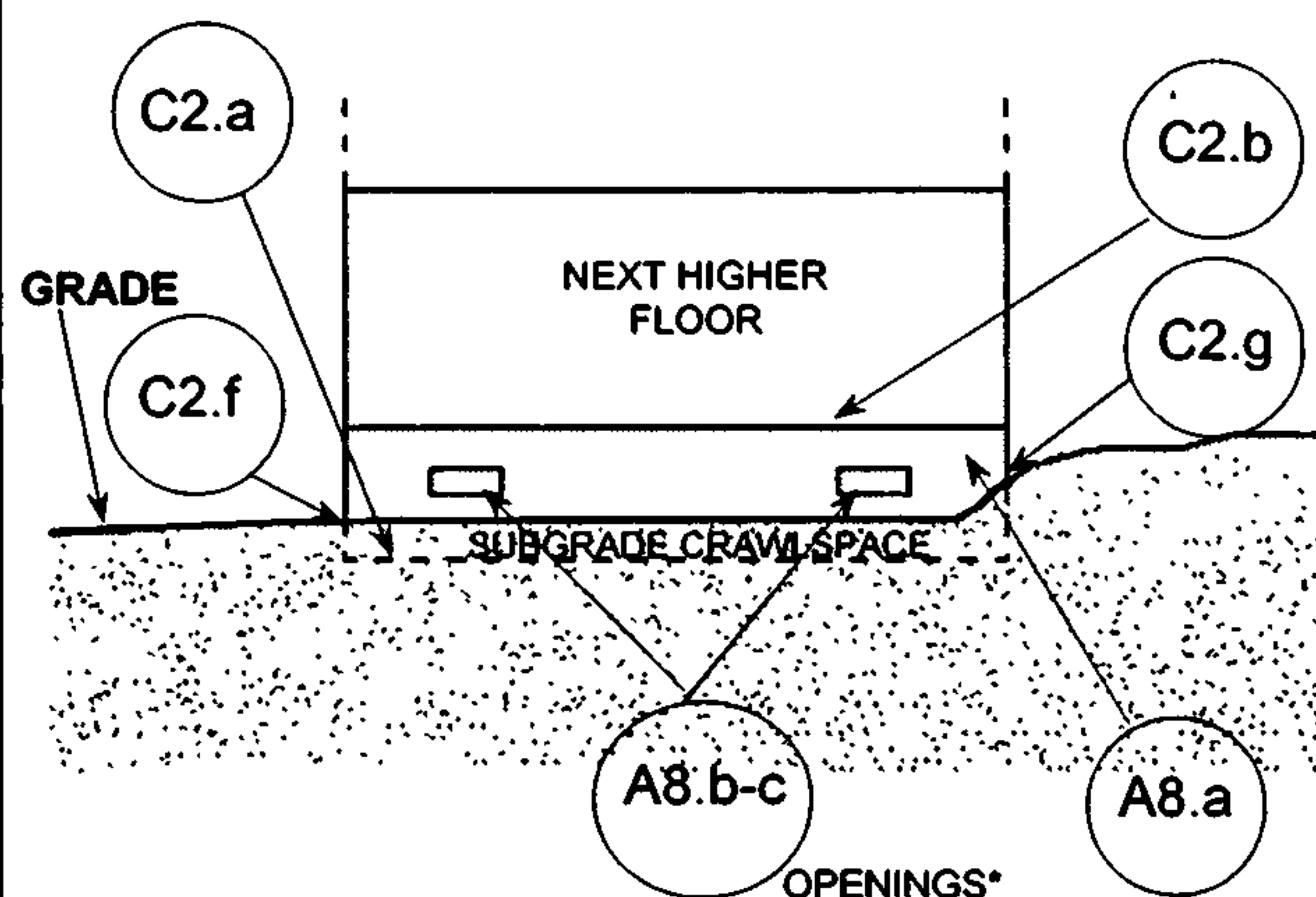
All buildings elevated on a crawlspace with the floor of the crawlspace at or above grade on at least one side, with or without an attached garage.

Distinguishing Feature – For all zones, the area below the first floor is enclosed by solid or partial perimeter walls. In all A zones, the crawlspace is with or without openings* present in the walls of the crawlspace. Indicate information about crawlspace size and openings in Section A – Property Information.

**DIAGRAM 9**

All buildings (other than split-level) elevated on a sub-grade crawlspace, with or without attached garage.

Distinguishing Feature – The bottom (crawlspace) floor is at or below ground level (grade) on all sides.** (If the distance from the crawlspace floor to the top of the next higher floor is more than 5 feet, or the crawlspace floor is more than 2 feet below the grade (LAG) on all sides, use Diagram 2.)



* An "opening" is a permanent opening that allows for the free passage of water automatically in both directions without human intervention. Under the NFIP, a minimum of two openings is required for enclosures or crawlspaces. The openings shall provide a total net area of not less than one square inch for every square foot of area enclosed, excluding any bars, louvers, or other covers of the opening. Alternatively, an Individual Engineered Flood Openings Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES) must be submitted to document that the design of the openings will allow for the automatic equalization of hydrostatic flood forces on exterior walls. A window, a door, or a garage door is not considered an opening; openings may be installed in doors. Openings shall be on at least two sides of the enclosed area. If a building has more than one enclosed area, each area must have openings to allow floodwater to directly enter. The bottom of the openings must be no higher than one foot above the higher of the exterior or interior grade or floor immediately below the opening. For more guidance on openings, see NFIP Technical Bulletin 1.

** A floor that is below ground level (grade) on all sides is considered a basement even if the floor is used for living purposes, or as an office, garage, workshop, etc.

National Flood Insurance Program

FLOODPROOFING CERTIFICATE

FOR NON-RESIDENTIAL STRUCTURES

The floodproofing of non-residential buildings may be permitted as an alternative to elevating to or above the Base Flood Elevation; however, a floodproofing design certification is required. This form is to be used for that certification. Floodproofing of a residential building does not alter a community's floodplain management elevation requirements or affect the insurance rating unless the community has been issued an exception by FEMA to allow floodproofed residential basements. The permitting of a floodproofed residential basement requires a separate certification specifying that the design complies with the local floodplain management ordinance.

BUILDING OWNER'S NAME

STREET ADDRESS (Including Apt., Unit, Suite, and/or Bldg. Number) OR PO ROUTE AND BOX NUMBER

OTHER DESCRIPTION (Lot and Block Numbers, etc.)

FOR INSURANCE COMPANY USE

POLICY NUMBER

COMPANY NAIC NUMBER

CITY

STATE

ZIP CODE

SECTION I FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

Provide the following from the proper FIRM:

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE OF FIRM INDEX	FIRM ZONE	BASE FLOOD ELEVATION (In AO Zones, Use Depth)
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SECTION II FLOODPROOFING INFORMATION (By a Registered Professional Engineer or Architect)

Floodproofing Design Elevation Information:

Building is floodproofed to an elevation of feet NGVD. (Elevation datum used must be the same as that on the FIRM.)

Height of floodproofing on the building above the lowest adjacent grade is feet.

(NOTE: For insurance rating purposes, the building's floodproofed design elevation must be at least one foot above the Base Flood Elevation to receive rating credit. If the building is floodproofed only to the Base Flood Elevation, then the building's insurance rating will result in a higher premium.)

SECTION III CERTIFICATION (By Registered Professional Engineer or Architect)

Non-Residential Floodproofed Construction Certification:

I certify that, based upon development and/or review of structural design, specifications, and plans for construction, the design and methods of construction are in accordance with accepted standards of practice for meeting the following provisions:

The structure, together with attendant utilities and sanitary facilities, is watertight to the floodproofed design elevation indicated above, with walls that are substantially impermeable to the passage of water.

All structural components are capable of resisting hydrostatic and hydrodynamic flood forces, including the effects of buoyancy, and anticipated debris impact forces.

I certify that the information on this certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

CERTIFIER'S NAME

LICENSE NUMBER (or Affix Seal)

TITLE

COMPANY NAME

ADDRESS

CITY

STATE

ZIP CODE

SIGNATURE

DATE

PHONE

Copies should be made of this Certificate for: 1) community official, 2) Insurance agent/company, and 3) building owner.

**FLOOD INSURANCE
FLOODPROOFING CERTIFICATE
FEMA FORM 81-65**

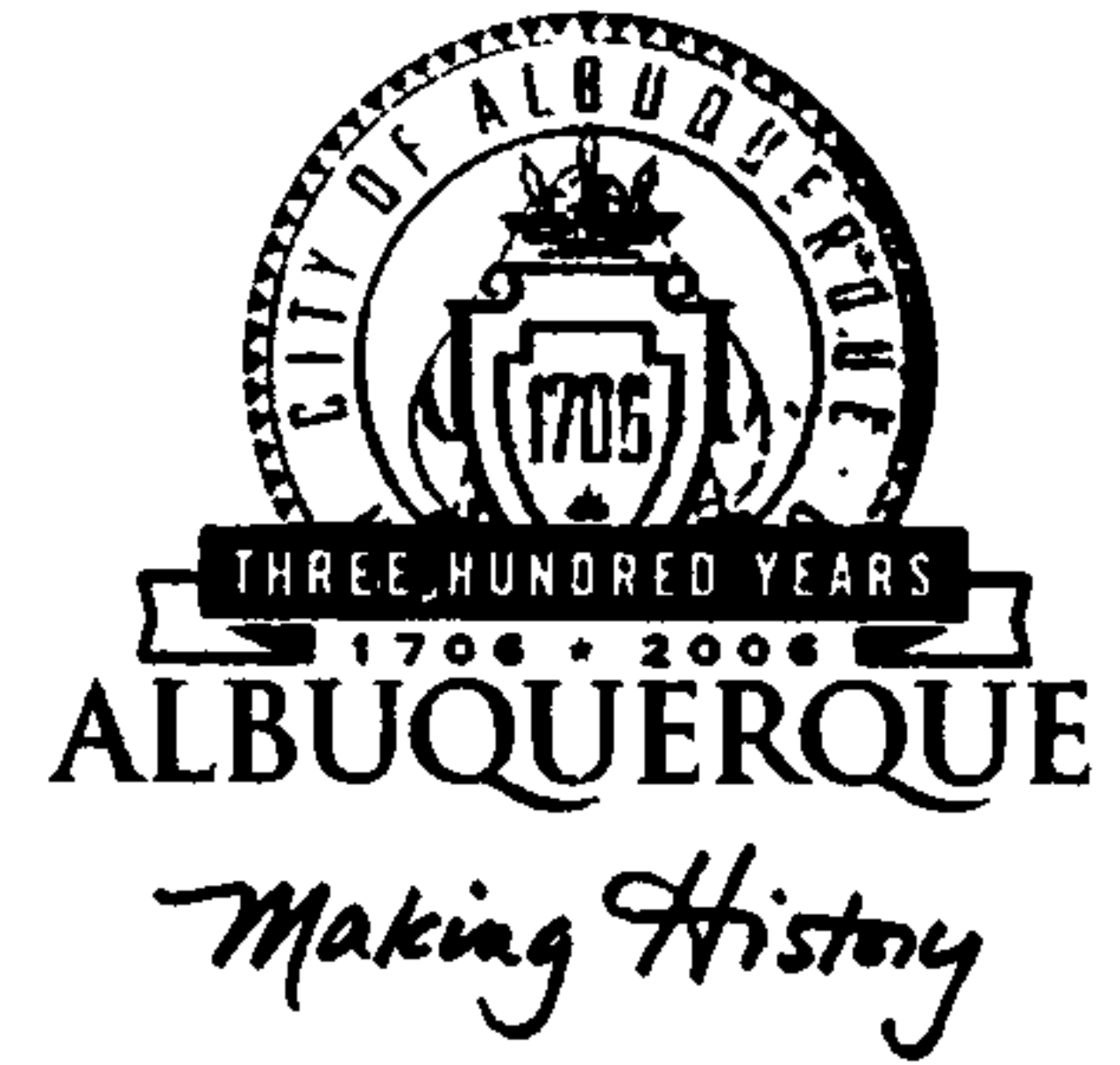
GENERAL—This information is provided pursuant to Public Law 96-511 (the Paperwork Reduction Act of 1980, as amended), dated December 11, 1980, to allow the public to participate more fully and meaningfully in the Federal paperwork review process.

AUTHORITY—Public Law 96-511, amended; 44 U.S.C. 3507; and 5 CFR 1320

PAPERWORK BURDEN DISCLOSURE NOTICE—Public reporting burden for this data collection is estimated to average 3.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting this form. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street SW, Washington, DC 20472, Paperwork Reduction Project (1660-0008).

NOTE: Do not send your completed form to this address.

CITY OF ALBUQUERQUE



February 16, 2006

Mr. James D. Hughes, PE
MARK GOODWIN & ASSOCIATES
P.O. Box 90606
Albuquerque, NM 87199

RE: SOUTHWYND SUBDIVISION (L-10/D20)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 08/10/2002
Engineers Certification dated 10/26/2005

Dear Doug:

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

Based upon the information provided in your Engineer's Certification Submittal dated 02/16/2006, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty. Due to the developer, Pulte Homes, paying for flood insurance for the few homes that are still in the floodplain and other upstream issues beyond your control, FEMA approval of the LOMR will no longer be required for release of the SIA.

If you have any questions, you can contact me at 924-3982

Sincerely,

Bradley Bingham, PE, CFM

Principal Engineer, Planning Dept.- Hydrology
Development and Building Services

C: Marilyn Maldonado, COA# 686081
Russell Grayson, Pulte Homes
File

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: Southwynd Subdivision

DRB #: _____

EPC#: _____

ZONE MAP/DRG. FILE #: L10/D20

WORK ORDER#: 686081

LEGAL DESCRIPTION: Tract 3A Town of Atrisco Grant Unit 2

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA

ADDRESS: PO Box 90606

CITY, STATE: Albuquerque, NM

CONTACT: James D. Hughes, PE

PHONE: 828-2200

ZIP CODE: 87199

OWNER: Sivage Thomas Homes

ADDRESS: 7445 Pan American Frwy NE

CITY, STATE: Albuquerque, NM

CONTACT: Robert Lupton

PHONE: 341-6800

ZIP CODE: 87109

ARCHITECT: _____

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying

ADDRESS: P.O. Box 30701

CITY, STATE: Albuquerque, NM

CONTACT: Tim Aldrich

PHONE: 884-1990

ZIP CODE: 87107

CONTRACTOR: _____

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

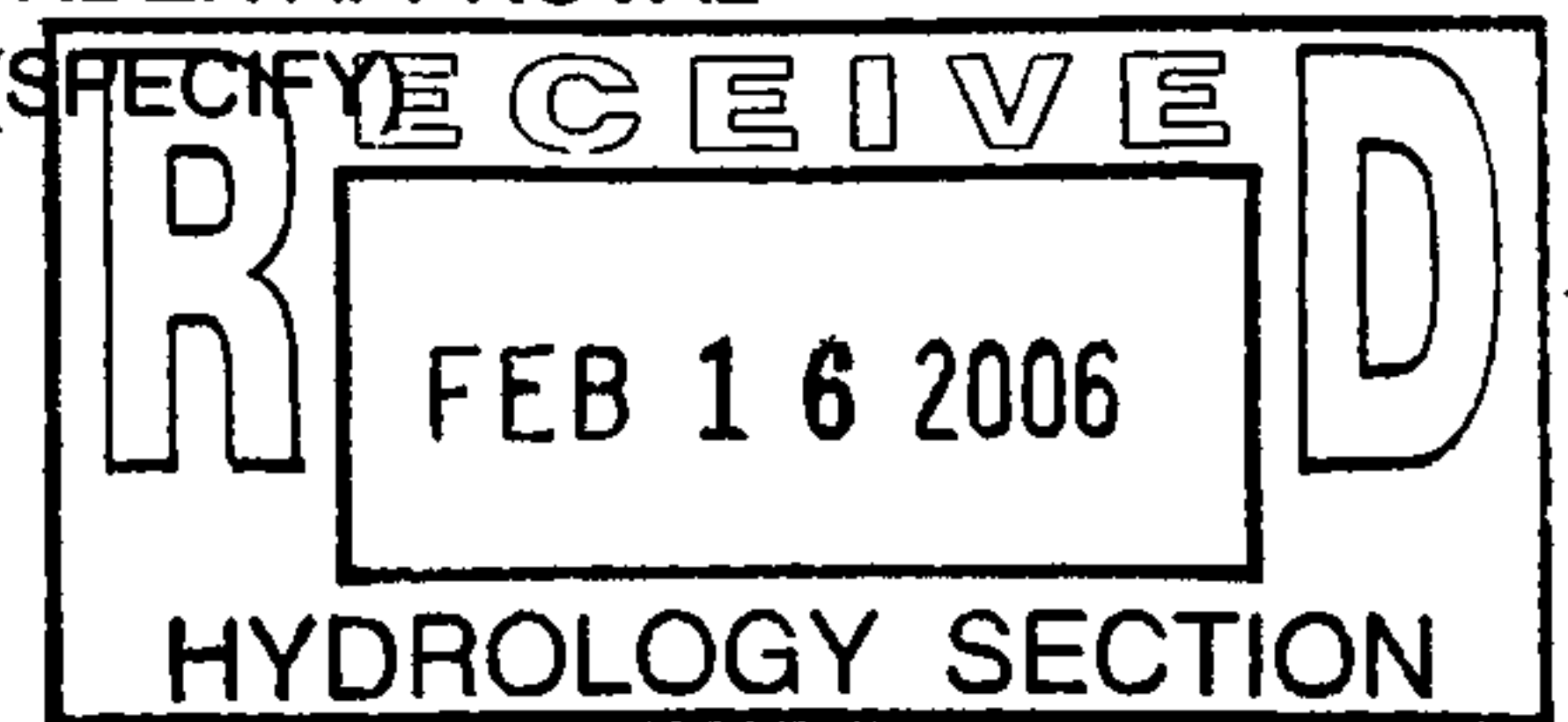
- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL, **REQUIRES TCL or equal**
- ☐ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☒ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION (TCL)
- ☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ☒ SIA / FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM.)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY _____)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED



DATE SUBMITTED: 2-15-06

BY: _____

James D. Hughes

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

September 20, 2002

James Hughes, P.E.
Mark Goodwin & Associates, PA
PO Box 90606
Albuquerque New Mexico 87119

RE: Amended Grading and Drainage Plan for Southwynd Subdivision (L10-D20) Dated August 9, 2002

Dear Mr. Hughes:

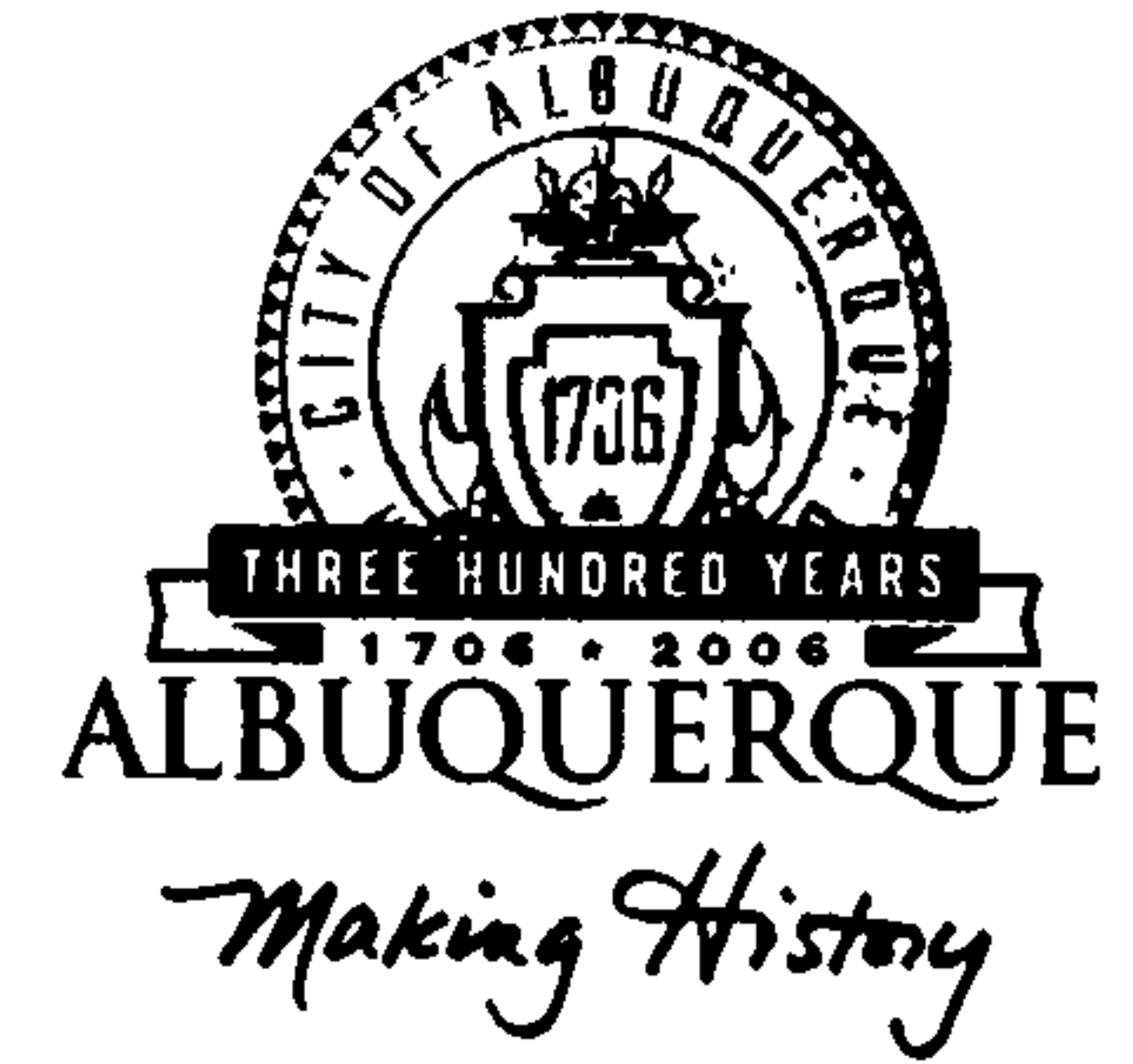
The above referenced drainage plan received August 28, 2002 is approved. Please submit the drainage covenant for the subdivision's detention pond prior to final plat approval.

If you have any questions please call me at 924-3982.

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

CITY OF ALBUQUERQUE



October 31, 2005

Mr. James D. Hughes, PE
MARK GOODWIN & ASSOCIATES
P.O. Box 90606
Albuquerque, NM 87119

RE: SOUTHWYND SUBDIVISION (L-10/D20)
Engineers Certification for Release of Financial Guaranty
Approved Engineers Stamp dated 08/09/2002
Submitted Engineers Stamp dated 11/05/2002
Engineers Certification dated 10/26/2005

Dear Doug:

P.O. Box 1293

Based upon the information provided in your Engineer's Certification Submittal dated 10/31/2005, the above referenced plan cannot be approved for Grading and Drainage Certification for Release of Financial Guaranty.

Albuquerque

2. The Approved Grading and Drainage Plan has an Engineer's Seal date of 08/09/2002 not 11/05/2002 as indicated in your submittal. (See attached copies of Grading Plan approval letter and Engineer's Seal).

New Mexico 87103

If you have any questions, you can contact me at 924-3982.

www.cabq.gov

Sincerely,

Arlene V. Portillo
Plan Checker, Planning Dept.- Hydrology
Development and Building Services

C: File



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

September 20, 2002

James Hughes, P.E.
Mark Goodwin & Associates, PA
PO Box 90606
Albuquerque New Mexico 87119

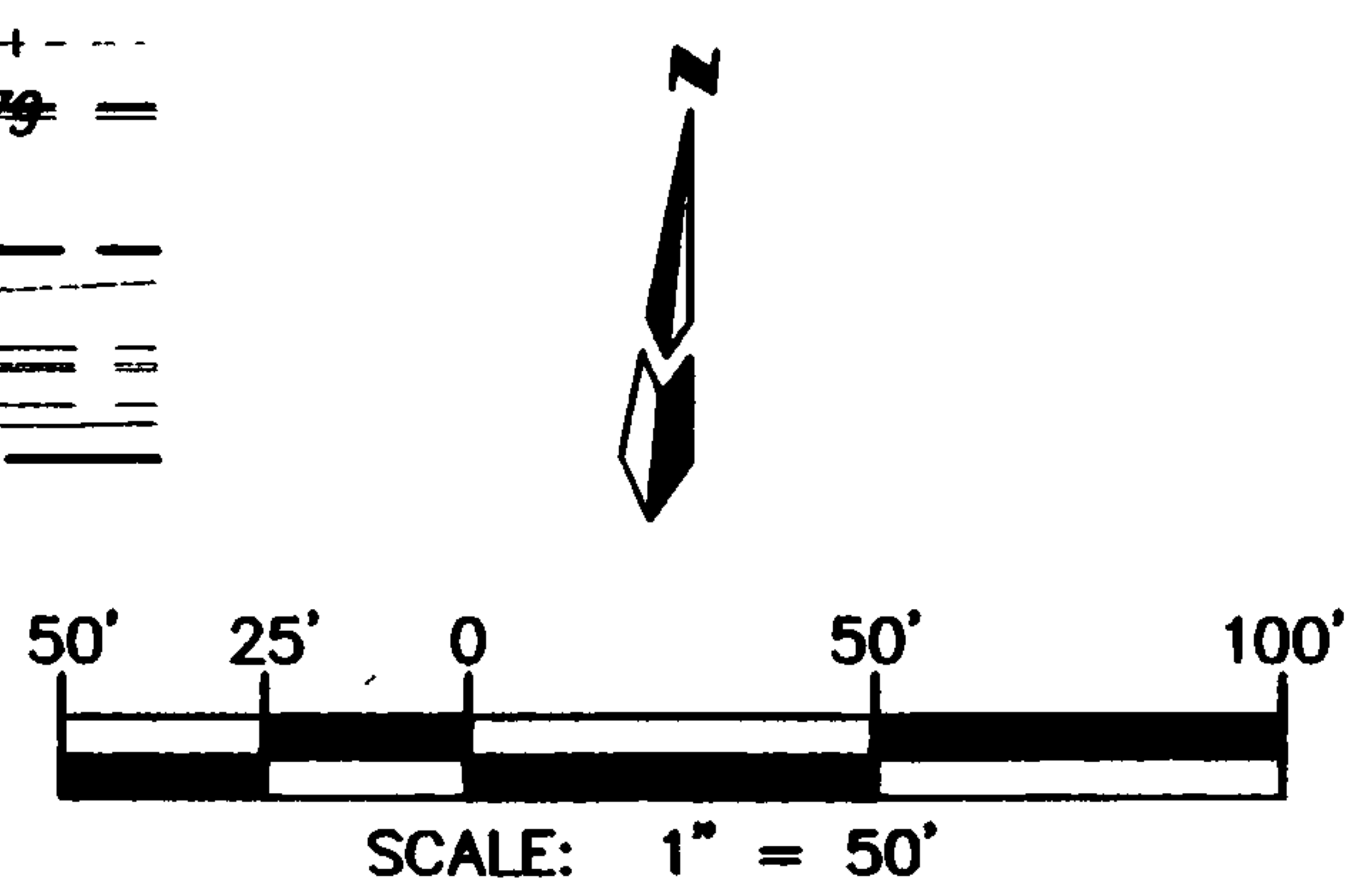
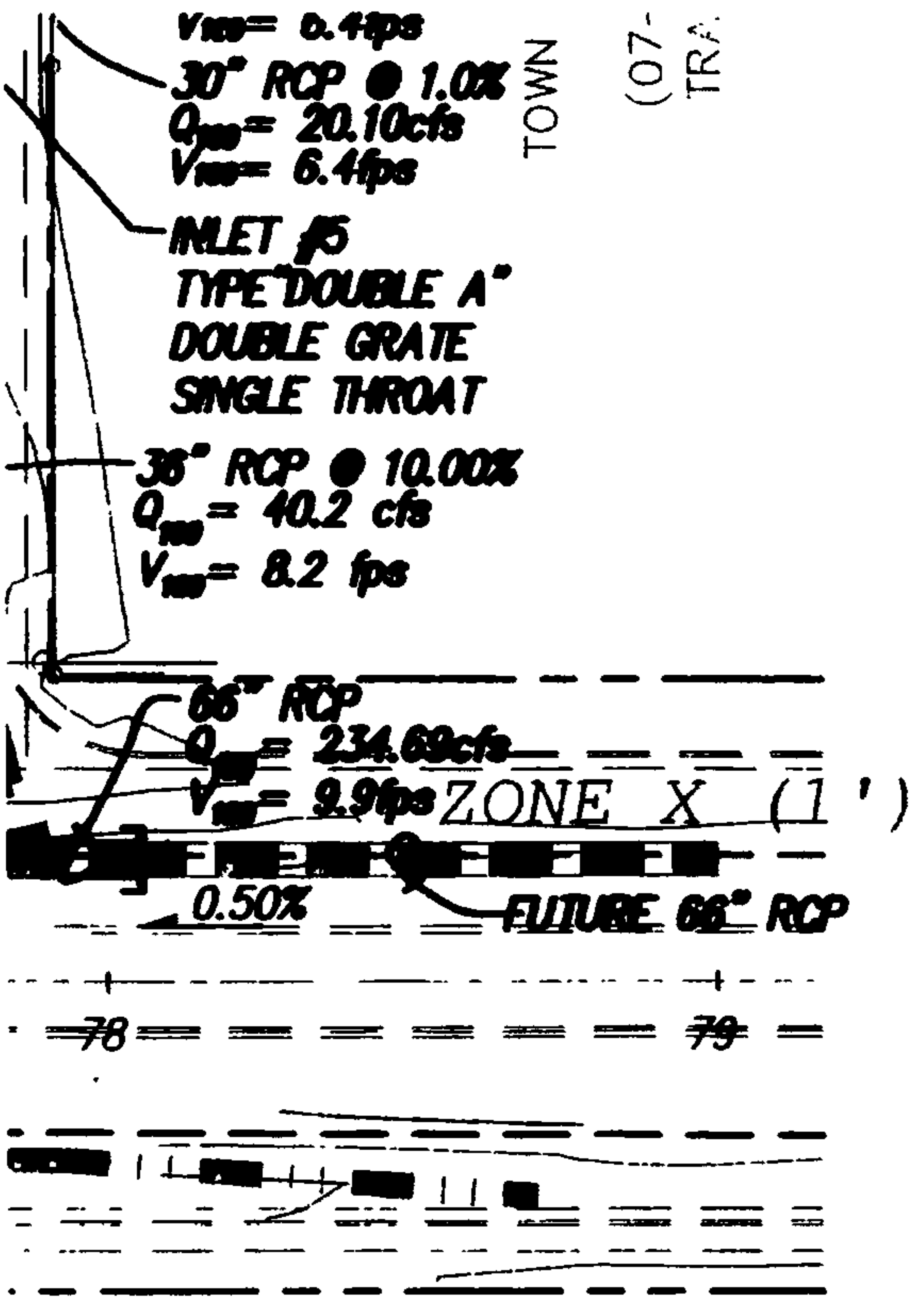
RE: Amended Grading and Drainage Plan for Southwynd Subdivision (L10-D20) Dated August 9, 2002

Dear Mr. Hughes:

The above referenced drainage plan received August 28, 2002 is approved. Please submit the drainage covenant for the subdivision's detention pond prior to final plat approval. If you have any questions please call me at 924-3982.

Sincerely,

Carlos A. Montoya
City Floodplain Administrator



TRACT 413

22 AC.FT
7.22 ac.ft.
44 ac.ft.

8.9

COMPLETED
ENGINEER'S
GRADING

/KJS RDQ

APPROVED FOR ROUGH GRADING (18")					
CITY HYDROLOGY _____			DATE _____		
MARK GOODWIN & ASSOCIATES, P.A. CONSULTING ENGINEERS P.O. BOX 90606 ALBUQUERQUE, NEW MEXICO 87199 (505) 828-2200, FAX (505) 797-9539					
CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT					
RECEIVED AUG 23 2002 HYDROLOGY SECTION SOUTHWYND SUBDIVISION GRADING AND DRAINAGE PLAN					
DESIGN REVIEW COMMITTEE		CITY ENGINEER APPROVAL		LAST DESIGN UPDATE	
CITY PROJECT NO. 686081		ZONE MAP NO. L-10-Z		SHEET 5 OF 3	

ENGINEER'S SEAL

2068

								REMARKS	BY
REVISIONS									
DESIGN									
								DESIGNED BY	JDH
								DATE	12/01
								DRAWN BY	KJS
								DATE	12/01

THIS DRAFT

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: Southwynd Subdivision

DRB #: _____

EPC#: _____

ZONE MAP/DRG. FILE #: L10/D20

WORK ORDER#: _____

LEGAL DESCRIPTION: Tract 3A Town of Atrisco Grant Unit 2

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA

ADDRESS: PO Box 90606

CITY, STATE: Albuquerque, NM

CONTACT: James D. Hughes, PE

PHONE: 828-2200

ZIP CODE: 87199

OWNER: Sivage Thomas Homes

ADDRESS: 7445 Pan American Frwy NE

CITY, STATE: Albuquerque, NM

CONTACT: Robert Lupton

PHONE: 341-6800

ZIP CODE: 87109

ARCHITECT: _____

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying

ADDRESS: P.O. Box 30701

CITY, STATE: Albuquerque, NM

CONTACT: Tim Aldrich

PHONE: 884-1990

ZIP CODE: 87107

CONTRACTOR: _____

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL, *REQUIRES TCL or equal*
- ☐ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☒ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION (TCL)
- ☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

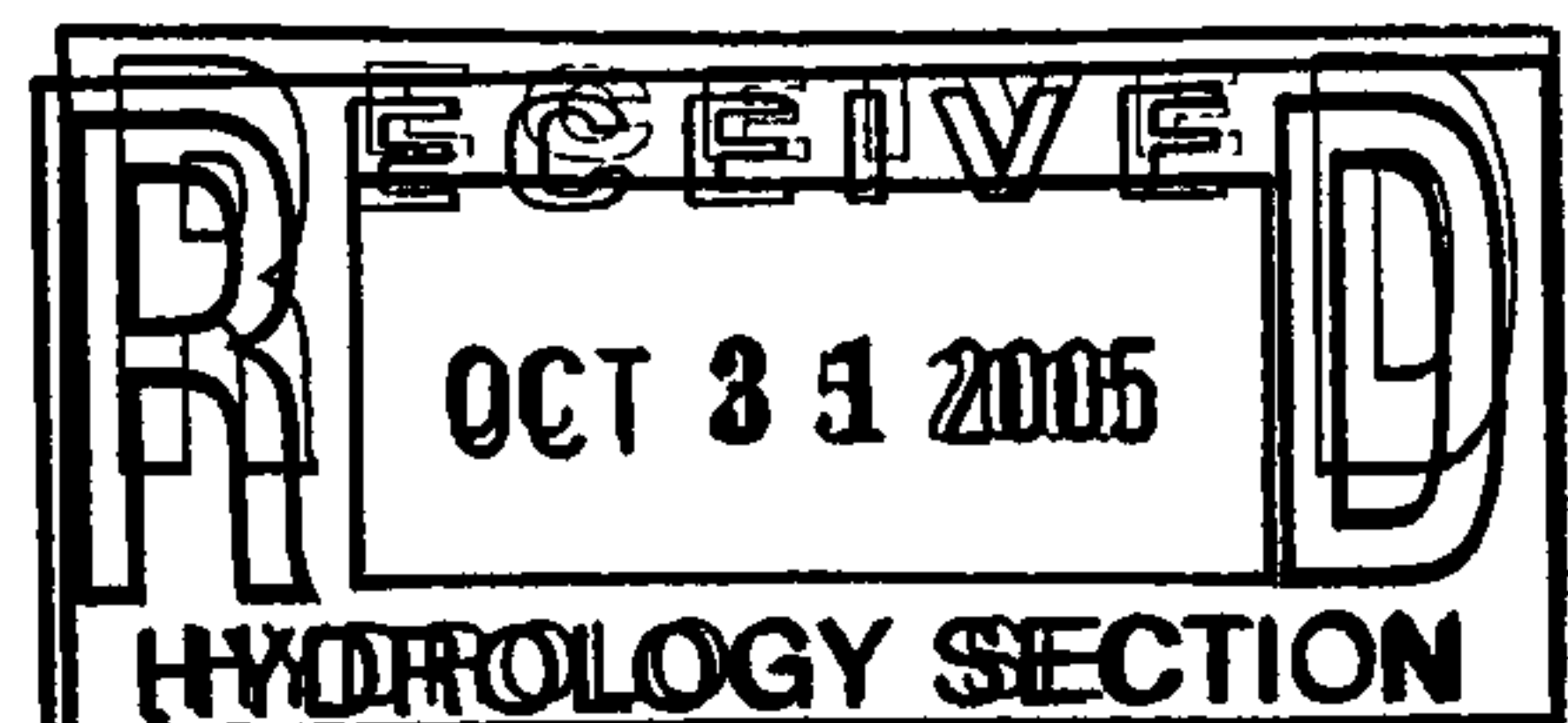
- ☒ SIA / FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM.)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED

DATE SUBMITTED: _____

BY: _____



Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

MARK GOODWIN & ASSOCIATES, PA

LETTER OF TRANSMITTAL

TO: Brad Bingham

DATE: October 26, 2005

COA Floodplain Administrator

cc: Russ Grayson

RE: Southwynd Subdivision

Pulte Homes of New Mexico, Inc.

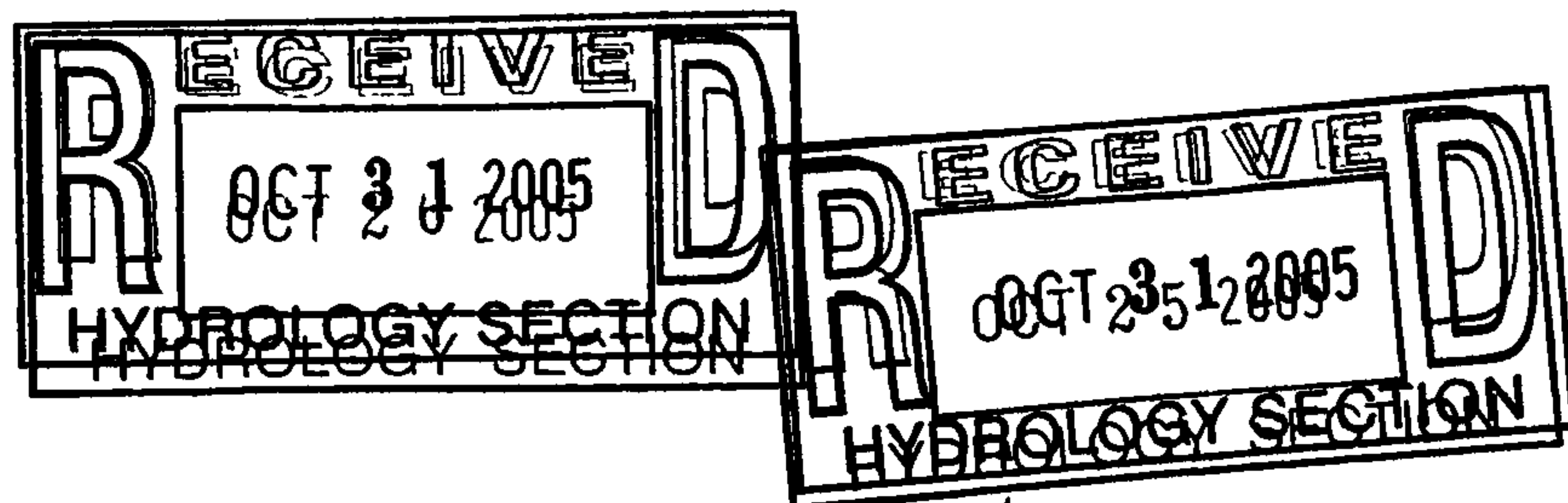
ITEMS BEING TRANSMITTED

1	Drainage and Transportation Information Sheet
1	Grading & Drainage Plan (Engineers Certification)

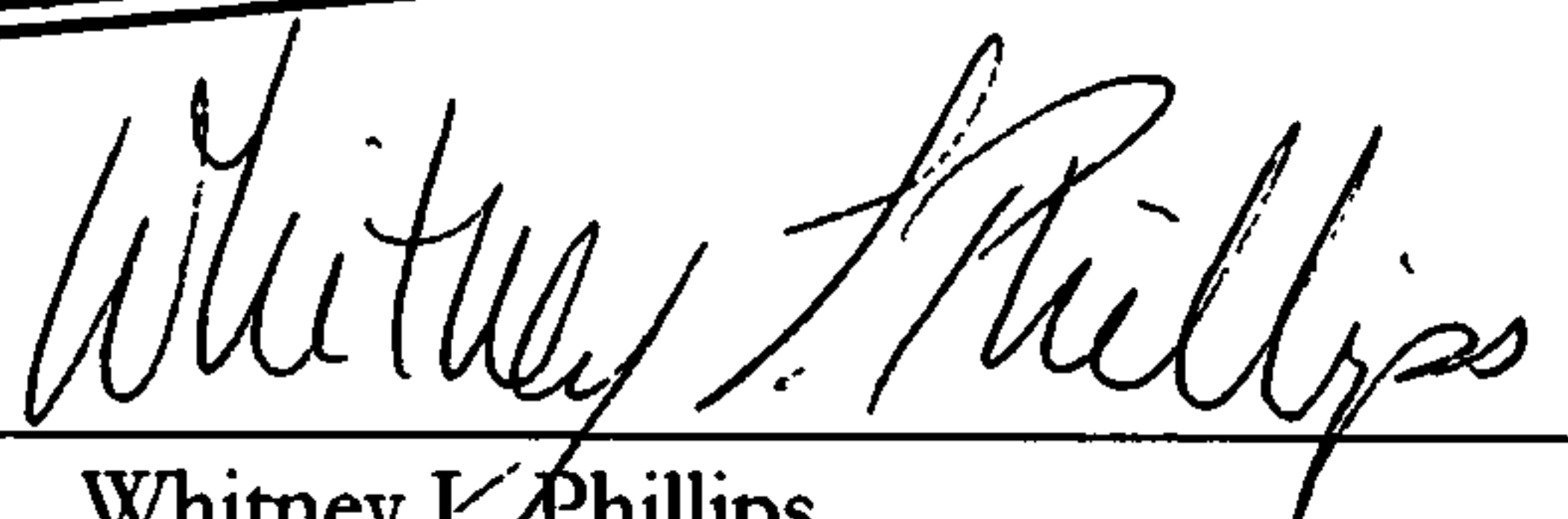
- ☐ FOR YOUR USE
☐ AS YOU REQUESTED

- ☐ FOR YOUR RECORDS
☐ FOR YOUR COMMENTS

Notes:



PROJECT ENGINEER: James D. Hughes, PE


Whitney L. Phillips

MARK GOODWIN & ASSOCIATES, PA

LETTER OF TRANSMITTAL

TO: Russell Grayson

DATE: October 26, 2005

Pulte Homes of New Mexico, Inc.

cc: Brad Bingham

RE: Southwynd LOMR

COA Floodplain Administrator

ITEMS BEING TRANSMITTED

1	Letter From Doug Hughes, PE

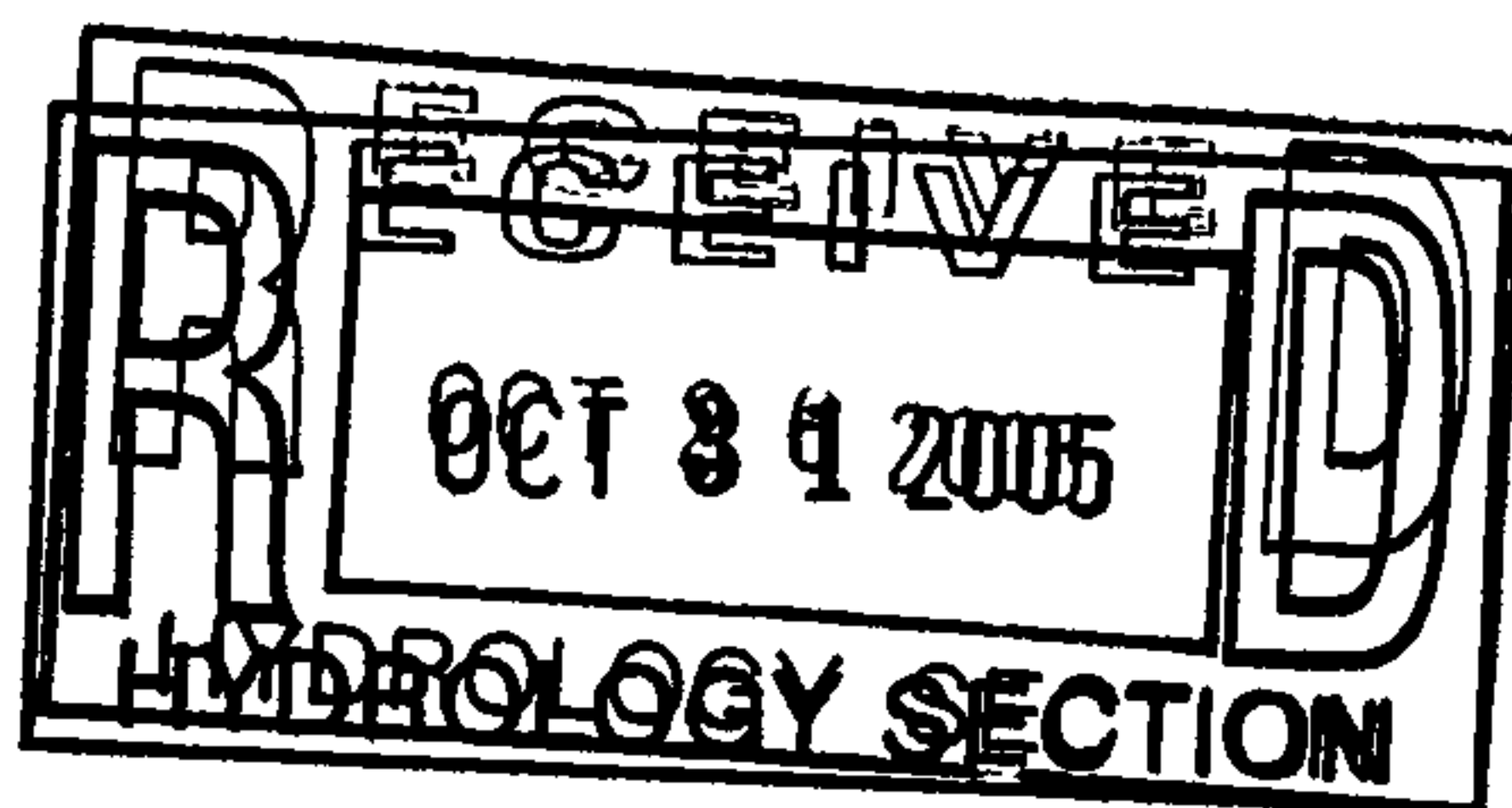
☐ FOR YOUR USE

☐ FOR YOUR RECORDS

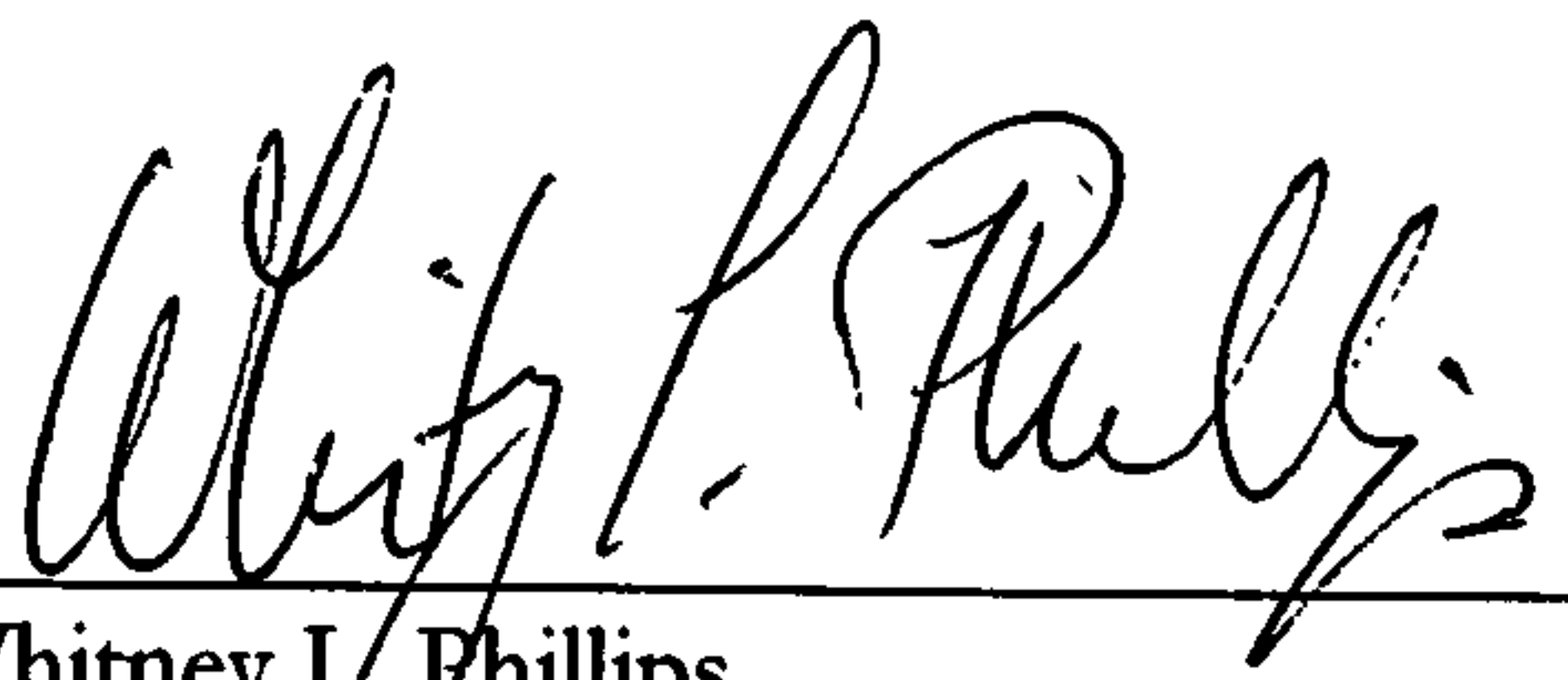
☐ AS YOU REQUESTED

☐ FOR YOUR COMMENTS

Notes:



PROJECT ENGINEER: James D. Hughes, PE


Whitney L. Phillips



D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539

October 25, 2005

Mr. Russell Grayson
Pulte Homes of New Mexico, Inc.
7445 Pan American Frwy. NE
Albuquerque, NM 87109

Re: Southwynd LOMR

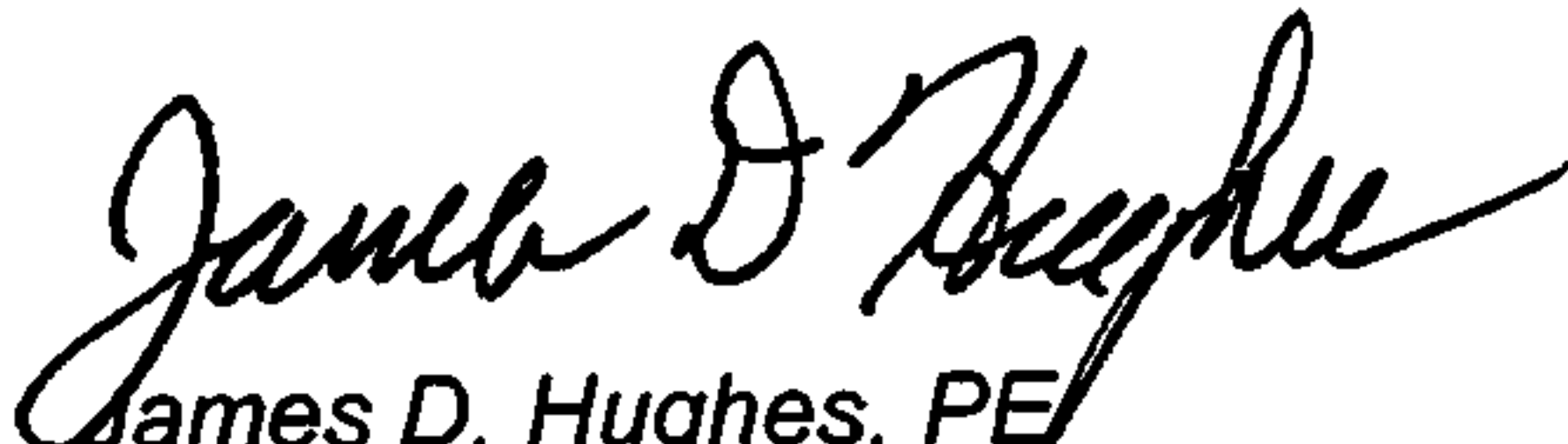
Dear Mr. Grayson:

Mark Goodwin met with Brad Bingham recently and was again reassured that the City will require the developer of Vista West Subdivision to provide ponding in accordance with the Development Process Manual thus allowing Pulte Homes to complete the Southwynd project and to modify the flood plain there as previously planned.

Please contact our office if you have any questions.

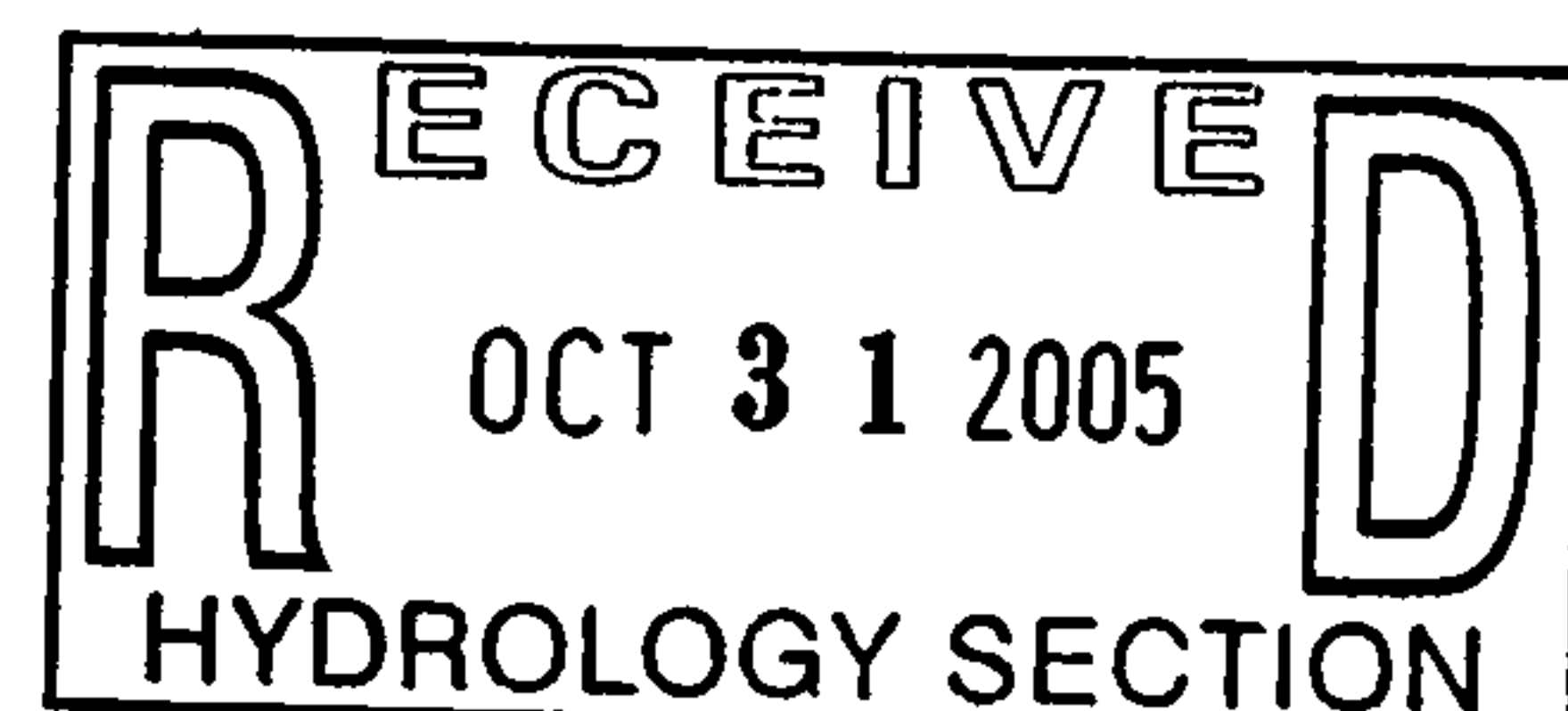
Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.


James D. Hughes, PE
Senior Engineer

JDH/wp

xc: Brad Bingham – COA Floodplain Administrator





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 14, 2002

James Hughes, PE
Mark Goodwin & Associates, PA
PO Box 90606
Rio Rancho, NM 87119

**Re: Southwynd Subdivision Grading and Drainage
Engineer's Stamp Dated 1-31-02, (L10/D20)**

Dear Mr. Hughes,

Based on the information contained in your submittal dated 2-08-02, the above referenced plan cannot be approved for Preliminary Plat or Building Permit until the following comments are addressed:

- Please identify all offsite flows on the basin map north of Eucariz that will affect Unser. Also, please label all roads.
- Please state the pipe size for the future storm drain on Unser between Eucariz and Tower. Who will be placing this future pipe in Unser?
- All runoff from improvements made must be kept on site until the future storm drain connects to Coors. Please show that the two temporary ponds on site will hold all road improvement runoff such as, Unser, Eucariz, Tower, and site drainage.
- Public easements and covenants for the maintenance of both ponds will be needed.
- Is there going to be a pipe placed in Eucariz? Please show profile.

If you have any questions, you can contact me at 924-3982.

Sincerely,


Carlos A. Montoya, PE
City Floodplain Administrator, PWD
Development and Building Services

c: Terri Martin, Hydrology
File (2)

MARK GOODWIN

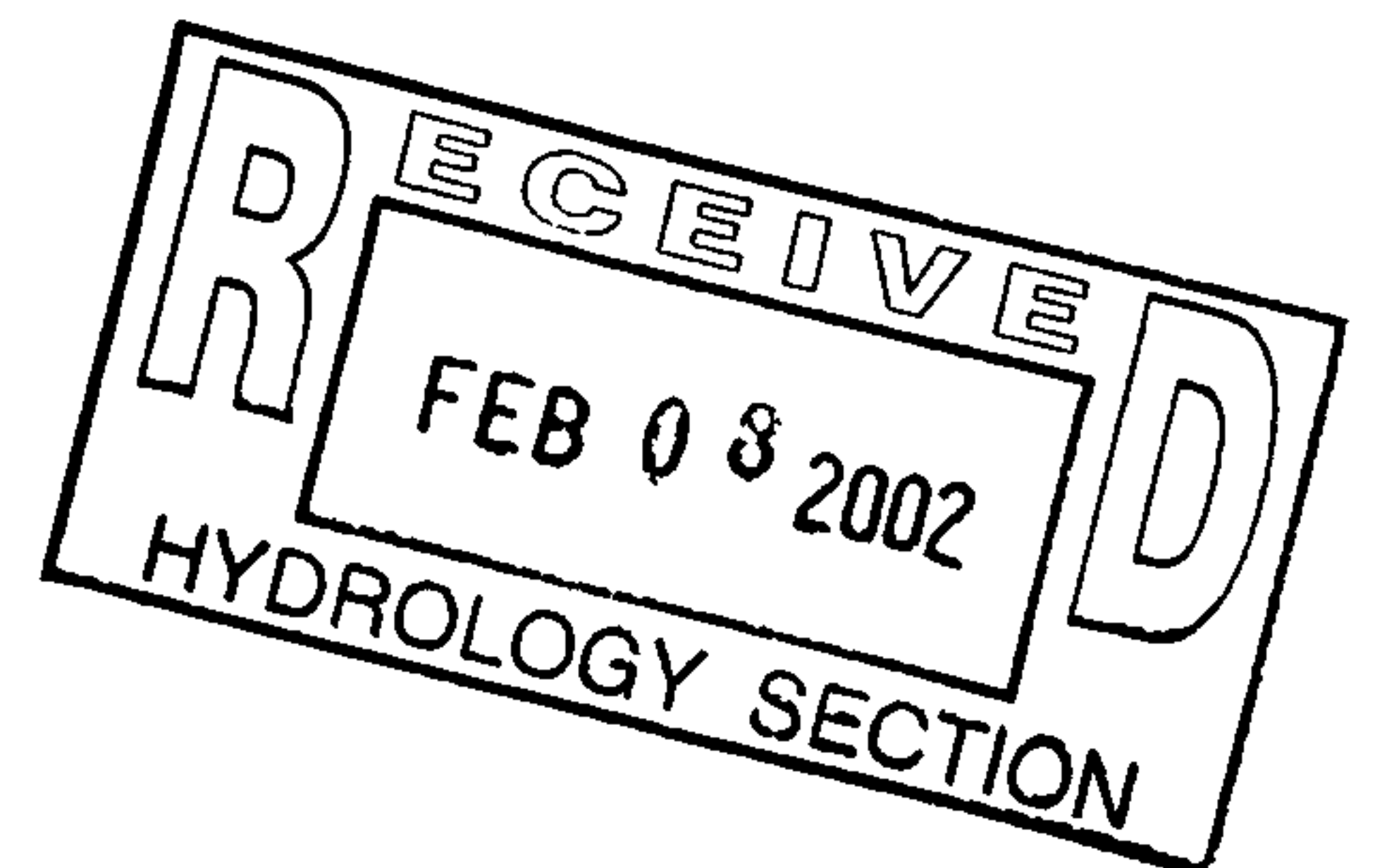
& ASSOCIATES

dmg

DRAINAGE REPORT
FOR
SOUTHWYND SUBDIVISION

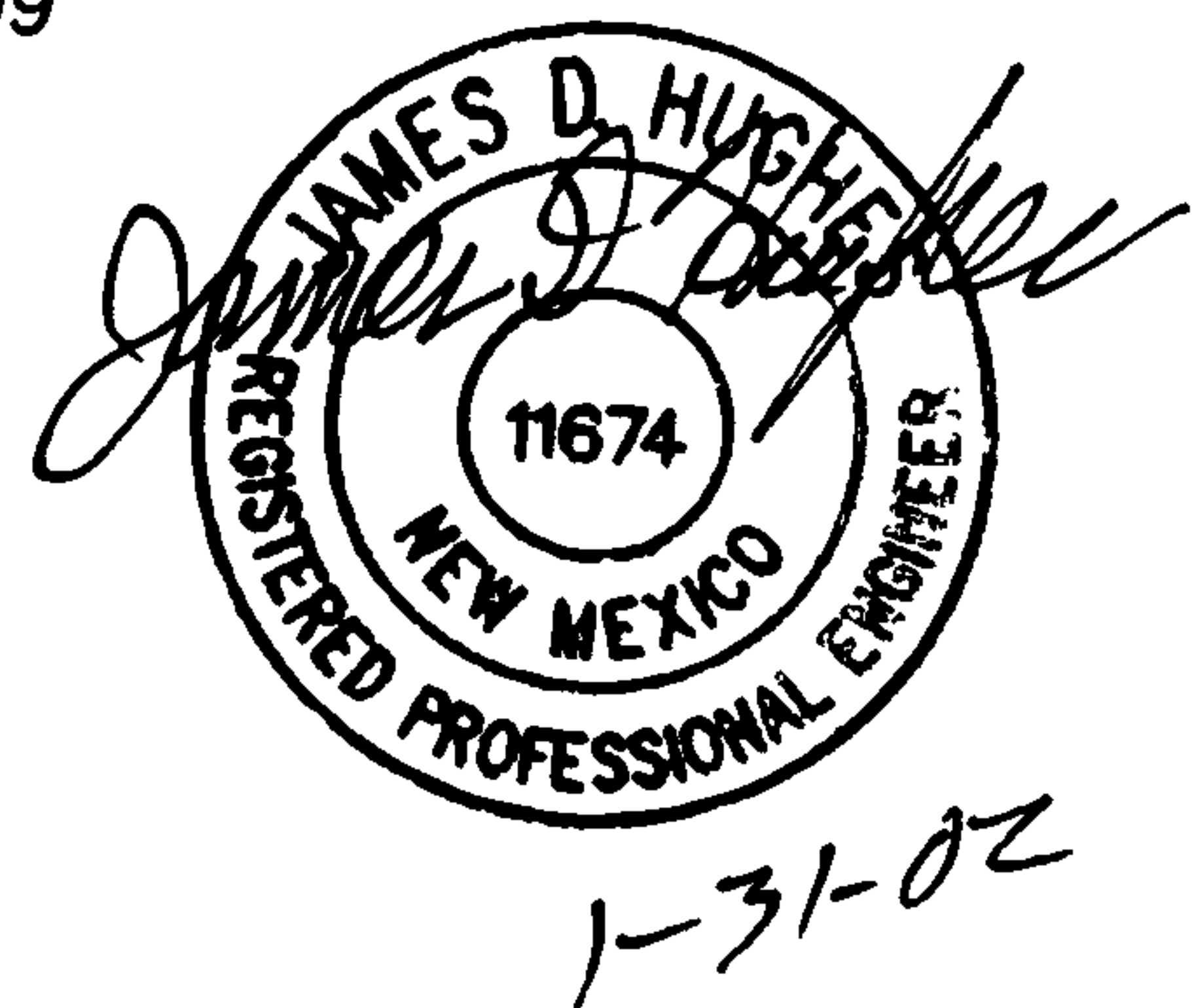
Prepared for

Sivage Thomas Homes
Albuquerque, NM 87110



Prepared by

Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199



January 2002

TABLE OF CONTENTS

Report

- *Cover Page*
- *Drainage Information Sheet*
- *Vicinity Map (M-9)*
- *Purpose*
- *Existing Conditions*
- *Proposed Management Plan*
- *Analysis Procedure*

Calculations and Data

- *Table 1 — Summary of Hydrology*
- *Table 2 — Street Drainage Capacities*
- *Sump Inlet Capacities*
- *Pond Volumes Calculations*
- *AHYMO, 100-Yr Summary*
- *AHYMO, 10-Yr Summary*
- *AHYMO, 100-Yr Detailed Output*
- *AHYMO, 10-Yr Detailed Output*
- *Street Capacity Plates 22.3 D-1 & D-3*
- *HGL Calculations*

Pockets

- *Grading and Drainage Plan, Sheets 1 & 2*
- *Preliminary Profile of Tower Rd. Storm Sewer*
- *Basin Map (foldout)*

PURPOSE

The primary purpose of this report is to demonstrate the adequacy of the proposed drainage to allow this 19.28 acre site to be subdivided into about 125 single-family, detached, residential lots, and so associated public drainage infrastructure can be constructed and turned over to the City of Albuquerque for maintenance.

EXISTING CONDITIONS

This property is surrounded on three sides by totally undeveloped property and by Tower Road on the fourth side. There is only about 18 acres of undeveloped land west of this site that drains into it and another 10 acres drain in from the east side. A large offsite drainage area has been diverted by the SAD 222 constriction of storm sewer about 450 West of 82nd Street. This site has a flood plain in the southeast corner which ponds all existing onsite drainage, so there is no runoff from this site under existing conditions.

Vista Sandia is an existing 42 acre residential subdivision west of this site that will eventually drain to the Tower Rd. Storm Sewer in front of this site, but presently retains 100-yr flows in onsite ponds. Valencia Estates is another residential subdivision built in the Southwest corner of the intersection of Tower Road and Unser Boulevard, but it does not contribute any flow to Tower Road in front of this site. Two more developments north of Eucariz Avenue, Encanto Village East of Unser Boulevard and Whispering Pointe west of Unser Boulevard, have been planned to drain north and do not contribute any flow to this development. The first four of the following references each included designs with HGL calculations for the Tower Road storm sewer in front of this project.

REFERENCES

1. *Vista Sandia Subdivision Drainage Report by MARK GOODWIN & ASSOCIATES PA, MAY 97*
2. *Whimpering Pointe Drainage Report by MARK GOODWIN & ASSOCIATES PA, DEC. 97*
3. *"Drainage Report for Vista Sandia Subdivision" by Daggett Engineering & Surveying, Sept. 98*
4. *As built Plans for Vista Sandia Unit 2 by Daggett Engineering. Aug 00*
5. *Encanto Village Drainage Report by MARKGOODWIN & ASSOCATES, PA, APRIL 99*
6. *Construction Plans for Valencia Estates by MARK GOODWIN & ASSOCIATES, PA, APRIL 01*

PROPOSED MANAGEMENT PLAN

This 19.28 acre residential development will have free discharge to storm sewer in Tower Road. This project will construct the Tower Road storm sewer across its frontage only. Until the Tower Road trunk line is completed to its outfall at the Amole Del Norte Channel, by others, this project will provide onsite temporary retention ponds to handle onsite developed runoff plus offsite undeveloped runoff from the 100-Yr, ten day storm. The flood plain is based on flood insurance rate map FIRM NUMBER #35001-00328D effective September 1996, which is to be modified in conjunction with SAD-222. It will show that all 100-Yr flow is removed from Tower Road. That project should be completed in September 2002. In the interim, construction of the onsite retention pond will provide more than enough volume to compensate for the fill being placed below the 100-Yr. elevation in the "AH" portion of the Special Flood Hazard Area, SFHA. So, there will be no significant adverse impact to adjacent properties. In the interim the flood plain will remain as shown, and an elevation certificate will be required for any house built in that zone to show that the floor of the house is above the 100-Yr elevation. This project will construct retention Ponds sufficient to contain the 100-YR flood plain, so that the "AH" zone may otherwise be removed from the site. A LOMR will be requested by this development to address remapping the "AH" zone on this site with the assumption that the SAD-222 improvements will divert all 100-YR flow in Tower Road at a point located 450' west of 82nd Street. If both the SAD and this project are completed FEMA will issue a LOMR removing all SFHA's from the lots in this development.

ANALYSIS PROCEDURES

Final design for the Tower Rd. storm sewer was accomplished by updating, the Vista Sandia Design to include impacts from Whispering Point, Encanto Village and Valencia Estates, on the Drainage Basin Boundaries, the AHYMO model, and the HGL calculations. The single biggest change was that of revising times of concentration. Most of the watershed is very flat (ie 0.50% slopes for long distances). Equations B-2 and B-9 were used from DPM Section 22.2 where a velocity of 0.7 fps was used for the upper 400, a velocity of 1.4 fps was used for the next 1600 and 2.1 fps was used below the first 2000'. This significantly reduced the ultimate peak flow to Tower Road storm drain, so the pipe was downsized and new HGL calculations were run.

The horizontal geometry of the Vista Sandia Plan was modified in Tower Rd. to reflect changes from Valencia Estates, and this development(ie Tower Road storm sewer moved to north side of road). Another big change is the location that basin # 115 is added. It now drains into the Tower Rd. storm sewer at 75th Street instead of Stenson. The existing storm sewer in Vista Sandia Subdivision was not re-analyzed because the reduced flows from this new hydrology would have to be re-analyzed at each inlet to determine the new pipe flows. For the purpose of this analysis it is assumed that since the HGL at the down stream end of the Vista Sandia storm sewer is lower than originally designed, the HGL throughout Vista Sandia will also be lower. It was originally designed using a higher flow.

Inlet spacing and design for Tower Road and Unser Boulevard will limit 10-Yr spread of flow to leave one lane open in each direction. The onsite sump inlets have no emergency overflow so they were designed to pass 100-Yr. flow through the grates assuming 50% of the grates will clog.

Pads in the flood plain were set 1.0' above the elevation published on the FIRM, and The 100-YR 6hr volume from AMYMO was used to calculate the 10-day volume. The actual pond volumes were calculated using the Conic Method.

One last minute change was made to basin # 114E by changing the grading plan and street capacities and inlet calculations because it turns out that Cotton Tail Street has capacity to drain all of Crepe Myrtle Road. The drainage basins and AHYMO were not changed. Proration was used to determine peak flows to inlets and for street capacities.

TABLE 1 - SUMMARY OF HYDROLOGY

Description	Basin ID	Area Acres	Area Sq. Mi.	Land Treatment				Hr. Tp	Future 100-YR Peak Flow		Existing 100-YR Peak Flow & Volume		
				A	B	C	D		Inc. (cfs)	Cumm (cfs)	Q ₁₀₀ (cfs)	V ₁₀₀ 6-Hr (Ac-ft)	V ₁₀₀ 10-day (Ac-ft)
Eucariz Ave. @ 82 nd st.	110	1.58	0.0025	0	10	0	90	0.28	5.33				
Vista Sandia	111	41.12	0.0643	0	28	15	57	0.28	95.55	101.08			
Tower Rd.	112	1.89	0.0030	0	10	0	90	0.20	6.55	105.80			
Res. West of Unser	113A	<u>8.80</u>	0.0138	0	28	15	57	<u>0.21</u>	<u>24.30</u>		→ SEE MS	low?	
Eucariz & W ½ Unser	113B	3.18	0.0050	0	20	0	80	0.30	8.22	135.19			
Commercial	114A	4.20	0.0066	0	10	10	80	0.13	17.11				
E ½ Unser & N ½ Tower	114B	3.28	0.0051	0	20	0	80	0.23	9.82				
S ½ Tower Rd.	114C	1.20	0.0019	0	10	0	90	0.13	5.13	154.18			
Southwynd	114D	13.11	0.0205	0	28	15	57	0.22	35.30				
Southwynd	114E	8.44	0.0132	0	28	15	57	0.30	18.69				
Res. East of 75 th St.	115A	9.80	0.0153	0	28	15	57	0.17	30.41				
Tower	115B	1.36	0.0021	0	10	0	90	0.17	5.06				
Tower	115C	1.36	0.0021	0	10	0	90	0.17	5.06	234.69			
Res. East of Sensen	116	22.50	0.0352	0	28	15	57	0.20	64.19	282.28			
Tower	117		0.0000	--	--	--	--	0.13	10.52	288.12			

Description	Basin ID	Area Acres	Area Sq. Mi.	Land Treatment				Hr. Tp	Future 100-YR Peak Flow		Existing 100-YR Peak Flow & Volume		
				A	B	C	D		Inc. (cfs)	Cumm (cfs)	Q ₁₀₀ (cfs)	V ₁₀₀ 6-Hr (Ac-ft)	V ₁₀₀ 10-day (Ac-ft)
Eucariz Ave. @ 82 nd st.	110	1.58	0.0025	0	10	0	90	0.28			5.33	0.294	0.472
Vista Sandia	111	41.12	0.0643	0	28	15	57	0.28			95.55	5.006	7.936
Tower Rd.	112	1.89	0.0030	0	10	0	90	0.20			6.55	0.289	0.502
Res. West of Unser	113A	8.80	0.0138	100	0	0	0	0.21			7.84	0.331	0.331
Eucariz & W ½ Unser	113B	3.18	0.0050	0	50	50	0	0.30			4.33	0.222	0.222
Commercial	114A	4.20	0.0066	90	0	10	0	0.13			6.18	0.172	0.172
E½ Unser & N½ Tower	114B	3.28	0.0051	0	10	50	40	0.23			8.16	0.369	0.533
S ½ Tower Rd.	114C	1.20	0.0019	0	10	50	40	0.13			4.19	0.137	0.197
Southwynd	114D	13.11	0.0205	0	28	15	57	0.22			35.30	1.594	2.528
Southwynd	114E	8.44	0.0132	0	28	15	57	0.30			18.69	1.026	1.627
Res. East of 75th St.	115A	9.80	0.0153	20	0	60	20	0.17			23.84	0.864	1.109
Tower	115B	1.36	0.0021	0	10	50	40	0.17			4.03	0.152	0.220
Tower	115C	1.36	0.0021	0	10	50	40	0.17			4.03	0.152	0.220
Res. East of Sensen	116	22.50	0.0352	20	0	70	10	0.20			4.00	1.658	1.939
Tower	117		0.0000	--	--	--	--	0.13			47.38	0.283	0.283

100 YEAR PRECIPITATION (From Figures D, E and F, and Eq. 28 of DPM 22.2)

$P_{60} = 1.90"$, $P_{360} = 2.20"$, $P_{1440} = 2.67"$, $P_{10 \text{ days}} = 10.0 - [24.9 / (2.67")^{1.4}] = 3.70"$

TABLE 2 — STREET DRAINAGE CAPACITIES

Basin No.	Area Ac.	% of Total			Contributing Basins	Curb Type/Slope	Flow Depth ft ⁽¹⁾	Velocity fps	Ener gy Dept h ft ⁽²⁾	Location
			Increment	Cumm.						
10YR CAPACITY IN ARTERIAL STREETS										
114B	3.28	100	6.18cfs			std 64% 0.85%	0.40'	2.4	0.49	Tower Rd.
115B	1.36	100	3.27cfs			std 64% .50%	0.36'	1.7	0.40	Tower Rd. Sta 78+00
100YR CAPACITY IN LOCAL STREETS										
114E	2.60	30.81	5.76cfs			roll 28' 0.50% *0.05%	0.29'	1.7	0.33	Crepe Myrtle Rd. Sta 14+ 50
114D	2.60	19.83	7.00cfs			roll 28' 0.50 %	0.30	1.8	0.35	Javeline Rd. Sta 15+ 50
114D	2.60	19.83	7.00cfs			roll 26' 0.50%	0.30	1.8	0.35	Greywolf Rd. Sta 28+00
114E	2.13	25.3	4.73cfs			std 40' 0.5%	.41	1.9	0.47	75 th St. Sta 19+50'
114D	8.74	66.66	23.53cfs			std 28' 0.5%				Cotton Tail St. Sta 16+50
114E	2.13	84.24	15.74	39.27	66.66 % of 114D	std 28' 0.5%	0.63'	3.2	0.79	Cotton Tail St. Sta 16+50

⁽¹⁾ Flow depths are taken from Plate 22.3 D-1 and 22.3 D-2 of the DPM and reduced by 3/4" for roll curb types to account for the differences in gutter depression. Allowable depths may not exceed curb heights which are 0.33' for roll curb and gutter and 0.67' for standard curb and gutter.

⁽²⁾ Energy depth is calculated as flow depth plus energy head. Allowable depths are 0.20' above top of curb.

4" .35

34' from che

SUMP INLET CAPACITIES

Tower Rd. Station 72+36

Inlet # 1

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right-of-way elevation. The length of the single grate facing the street is 3.25'± and the depth is 0.36' at the lip of the gutter. The sides are each 2' long (4' total) and the average depth is 0.527'* from the weir equation:

$$(front) \quad Q \text{ cap} = 3.0 \times 3.25' \times 0.36'^{1.5} = 2.11 \text{ cfs}$$

$$(sides) \quad Q \text{ cap} = 3.0 \times 4.0' \times 0.527'^{1.5} = 4.59 \text{ cfs}$$

$$(total) \quad Q \text{ cap} = 2.11 \text{ cfs} + 4.59 \text{ cfs} = 6.70 \text{ cfs}$$

* NOTE: These depths assume one lane is to remain open so the maximum spread of water is 20'.

The 10 year flow to the sump inlet is 6.18cfs. The inlet has a capacity of 6.70 cfs thus providing a safety factor that would allow 8% of the inlet to clog without exceeding the normal design criteria.

75th Street
Inlets # 2, 3, 4, & 5

STATE OFFSITE
FLOWS NO
EUCARIZE
- SHOW + IDENTIFY
WHERE FLOWS
GUTTER
ON
BASIN
MAP

Only 2.13 acres of Basin-#114E drains to the sump inlets on 75th street including the south half of Eucarize between Pistachio Street and the entire 60' width of 75th Street plus 15' of the rear yards of this development that back up to 75th Street. That portion of 114E is 25.3% or 4.73cfs which is joined by all of basin #115A and 11B for a total of 40.20 cfs fully developed 100yr flow, to the sump in 75th Street.

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right-of-way elevation. The length of the double grate facing the street is 6.5' and the depth is 0.745'* at the lip of the gutter. The sides are each 2' long (4' total) and the average depth is 0.912'*. From the weir equation:

(front) $Q_{cap} = 3.0 \times 6.5 \times 0.745'^{1.5} = 12.54 \text{ cfs}$

(sides) $Q_{cap} = 3.0 \times 4.0' \times 0.912'^{1.5} = 10.45 \text{ cfs}$

(total) $Q_{cap} = 12.54 \text{ cfs} + 10.45 \text{ cfs} = 22.99 \text{ cfs}$

The length of single grate facing the street is 3.25' and the depth is 0.745'* at the lip of the gutter. The sides are each 2' long (4' total) and the average depth is 0.912'*. From the weir equation:

(Front) $Q_{cap} = 3.0 \times 3.25 \times 0.745'^{1.5} = 6.27 \text{ cfs}$

(Sides) $Q_{cap} = 3.0 \times 4.0' \times 0.912'^{1.5} = 10.45 \text{ cfs}$

(Total) $Q_{cap} = 6.27 \text{ cfs} + 10.45 \text{ cfs} = 16.72 \text{ cfs}$

* Note: These depths assume standard 8" curb with the right of way 10' behind the curb and 0.20 above the top of the curb.

The 100 yr flow to the sump inlets 2 thru 5 is 40.20 cfs. There are two single grate inlets and two double grate inlets with a combined capacity of 79.42 cfs thus providing a safety factor that would allow 50% of the inlets to clog without exceeding the normal design criteria. For HGL calculations, each inlet is assumed to take one fourth of the 100-Yr flow (10.05 cfs each).

Cottontail St.

inlets 6, 7, 8, & 9

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right-of-way elevation. The length of the double grate facing the street is 6.5'± and the depth is 0.745 at the lip of the gutter. The sides are each 2' long (4' total) and the average depth is 0.912**. From the weir equation:

$$(Front) \ Q \ cap = 3.0 \times 6.5 \times 0.745^{1.5} = 12.54 \ cfs$$

$$(Sides) \ Q \ cap = 3.0 \times 4.0' \times 0.912^{1.5} = 10.45 \ cfs$$

$$(Total) \ Q \ cap = 12.54 \ cfs + 10.45 \ cfs = 22.99 \ cfs$$

* NOTE: These depths assume standard are 8": curb with the right-of-way 9' behind the curb and 0.20' above the top of the curb.

The 100-year flow to the sump inlets 6 thru 9 is 49.26 cfs. There are four sump inlets (inlets # 6, 7, 8, & 9) with a combined capacity of 91.96 cfs thus providing a safety factor that would allow 47% of the inlets to clog without exceeding the normal design criteria. For HGL calculations, each inlet is assumed to take one fourth of the 100-Yr flow (12.32 cfs each).

POND-2 Version: 4.01
 S/N: 88020607

OFF-SITE POND WEST OF SITE, & NORTH OF TOWER ROAD ON COMMERCIAL

CALCULATED 01-28-2002 10:08:19
 DISK FILE : G:SWYND2 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
61.50	1,600.00	0.04	0.00	0.00	0.00
77.13	*I*	0.24	0.38	1.96	1.96
82.50	15,625.00	0.36	0.51	3.57	3.57

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1)) * (sq.rt(Area2) - sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
 Ei = Elevation at which to interpolate area
 Area1,Area2 = Areas computed for E1, E2, respectively
 IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))$$

where: EL1, EL2 = Lower and upper elevations of the increment
 Area1,Area2 = Areas computed for EL1, EL2, respectively
 Volume = Incremental volume between EL1 and EL2

POND-2 Version: 4.01
S/N: 88020607

ON-SITE POND AT 75TH STREET AND TOWER ROAD

CALCULATED 01-28-2002 09:26:55
DISK FILE : G:SWYND .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
58.00	4,850.00	0.11	0.00	0.00	0.00
77.25	*I*	0.51	0.85	5.48	5.48
78.00	22,938.00	0.53	0.88	5.87	5.87

I ---> Interpolated area from closest two planimeter readings.

$$IA = (\text{sq.rt}(\text{Area1}) + ((\text{Ei}-\text{E1})/(\text{E2}-\text{E1})) * (\text{sq.rt}(\text{Area2}) - \text{sq.rt}(\text{Area1})))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1, Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1, Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

AHYMO 100-YR Summary

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
INPUT FILE = swynd.dat

RUN DATE (MON/DAY/YR) = 01/24/2002
USER NO. = M_GOODWN.101

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	110.00	-	1	.00300	5.53	.294	1.83780	1.665	2.879	PER IMP= 90.00
COMPUTE NM HYD	111.00	-	2	.06440	95.55	5.006	1.45757	1.665	2.318	PER IMP= 57.00
ADD HYD	111.10	1& 2	1	.06740	101.08	5.300	1.47448	1.665	2.343	
ROUTE	111.20	1	3	.06740	100.50	5.300	1.47448	1.665	2.330	
COMPUTE NM HYD	112.00	-	2	.00295	6.55	.289	1.83780	1.565	3.471	PER IMP= 90.00
ADD HYD	112.10	2& 3	1	.07035	105.80	5.589	1.48971	1.665	2.350	
COMPUTE NM HYD	113A	-	6	.01380	24.30	1.073	1.45757	1.598	2.752	PER IMP= 57.00
ADD HYD	113.10	1& 6	7	.08415	126.97	6.662	1.48443	1.665	2.358	
COMPUTE NM HYD	113B	-	2	.00500	8.22	.456	1.70926	1.665	2.570	PER IMP= 80.00
ADD HYD	113.10	7& 2	1	.08915	135.19	7.118	1.49703	1.665	2.369	
ROUTE	113.20	1	3	.08915	133.78	7.118	1.49704	1.665	2.345	
COMPUTE NM HYD	114A	-	2	.00660	17.11	.612	1.73948	1.499	4.051	PER IMP= 80.00
ADD HYD	114.10	2& 3	1	.09575	142.54	7.730	1.51374	1.665	2.326	
COMPUTE NM HYD	114B	-	2	.00510	9.82	.465	1.70926	1.598	3.009	PER IMP= 80.00
ADD HYD	114.20	1& 2	1	.10085	151.58	8.195	1.52362	1.665	2.348	
COMPUTE NM HYD	114C	-	2	.00190	5.13	.186	1.83780	1.499	4.215	PER IMP= 90.00
ADD HYD	114.30	1& 2	1	.10275	154.18	8.381	1.52943	1.665	2.345	
COMPUTE NM HYD	114D	-	2	.02050	35.30	1.594	1.45757	1.598	2.690	PER IMP= 57.00
ADD HYD	114.40	1& 2	1	.12325	186.40	9.975	1.51748	1.632	2.363	
COMPUTE NM HYD	114E	-	2	.01320	18.69	1.026	1.45757	1.698	2.212	PER IMP= 57.00
ADD HYD	114.50	1& 2	1	.13645	204.67	11.001	1.51168	1.665	2.344	
ROUTE	114.60	1	3	.13645	204.76	11.001	1.51168	1.665	2.345	
COMPUTE NM HYD	115A	-	2	.01530	30.41	1.189	1.45757	1.532	3.105	PER IMP= 57.00
ADD HYD	115.10	2& 3	1	.15175	226.85	12.190	1.50622	1.632	2.336	
COMPUTE NM HYD	115B	-	2	.00210	5.06	.206	1.83780	1.532	3.763	PER IMP= 90.00
ADD HYD	115.20	1& 2	1	.15385	230.77	12.396	1.51074	1.632	2.344	
COMPUTE NM HYD	115C	-	2	.00210	5.06	.206	1.83780	1.532	3.763	PER IMP= 90.00
ADD HYD	115.30	1& 2	1	.15595	234.69	12.602	1.51514	1.632	2.351	
ROUTE	115.40	1	3	.15595	233.31	12.602	1.51515	1.665	2.338	
COMPUTE NM HYD	116.00	-	2	.03231	64.19	2.512	1.45757	1.532	3.104	PER IMP= 57.00
ADD HYD	116.10	2& 3	3	.18826	282.28	15.114	1.50526	1.632	2.343	
ROUTE	116.20	3	1	.18826	281.94	15.114	1.50526	1.632	2.340	
COMPUTE NM HYD	117.00	-	2	.00391	10.52	.383	1.83780	1.499	4.203	PER IMP= 90.00
ADD HYD	117.10	1& 2	1	.19217	288.12	15.497	1.51203	1.632	2.343	
COMPUTE NM HYD	110.00	-	1	.00300	5.53	.294	1.83780	1.665	2.879	PER IMP= 90.00
COMPUTE NM HYD	111.00	-	2	.06440	95.55	5.006	1.45757	1.665	2.318	PER IMP= 57.00
ADD HYD	111.10	1& 2	1	.06740	101.08	5.300	1.47448	1.665	2.343	
ROUTE	111.20	1	3	.06740	100.50	5.300	1.47448	1.665	2.330	
COMPUTE NM HYD	112.00	-	2	.00295	6.55	.289	1.83780	1.565	3.471	PER IMP= 90.00
ADD HYD	112.10	2& 3	1	.07035	105.80	5.589	1.48971	1.665	2.350	
COMPUTE NM HYD	113A	-	6	.01380	7.84	.331	.44912	1.598	.887	PER IMP= .00
COMPUTE NM HYD	113B	-	2	.00500	4.33	.222	.83200	1.698	1.354	PER IMP= .00
ADD HYD	113.10	6& 2	1	.01880	11.76	.552	.55094	1.632	.977	
ROUTE	113.20	1	3	.01880	11.29	.552	.55100	1.665	.938	

Existing Off-site
Plus This Development
Future Ultimate Development

COMPUTE NM HYD	114A	-	2	.00660	6.18	.172	.48994	1.532	1.463	PER IMP=	.00
ADD HYD	114.10	2& 3	1	.02540	15.21	.725	.53511	1.632	.936		
COMPUTE NM HYD	114B	-	2	.00510	8.16	.369	1.35530	1.598	2.501	PER IMP=	40.00
ADD HYD	114.20	1& 2	1	.03050	23.29	1.094	.67224	1.632	1.193		

1100

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AHYMO 10-YR Summary

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	ROUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
RAINFALL TYPE= 1										RAIN6= 1.470
COMPUTE NM HYD	110.00	-	1	.00300	3.55	.182	1.13749	1.665	1.850	PER IMP= 90.00
COMPUTE NM HYD	111.00	-	2	.06440	56.39	2.858	.83208	1.665	1.368	PER IMP= 57.00
ADD HYD	111.10	1& 2	1	.06740	59.94	3.040	.84565	1.665	1.390	
ROUTE	111.20	1	3	.06740	59.67	3.040	.84566	1.665	1.383	
COMPUTE NM HYD	112.00	-	2	.00295	4.23	.179	1.13749	1.565	2.238	PER IMP= 90.00
ADD HYD	112.10	2& 3	1	.07035	63.08	3.219	.85789	1.665	1.401	
COMPUTE NM HYD	113A	-	6	.01380	14.40	.612	.83208	1.598	1.630	PER IMP= 57.00
ADD HYD	113.10	1& 6	7	.08415	75.53	3.831	.85365	1.665	1.403	
COMPUTE NM HYD	113B	-	2	.00500	5.16	.276	1.03669	1.665	1.611	PER IMP= 80.00
ADD HYD	113.10	7& 2	1	.08915	80.69	4.108	.86391	1.665	1.414	
ROUTE	113.20	1	3	.08915	79.55	4.108	.86391	1.665	1.394	
COMPUTE NM HYD	114A	-	2	.00660	10.87	.372	1.05562	1.499	2.573	PER IMP= 80.00
ADD HYD	114.10	2& 3	1	.09575	85.03	4.479	.87712	1.665	1.388	
COMPUTE NM HYD	114B	-	2	.00510	6.18	.282	1.03669	1.598	1.893	PER IMP= 80.00
ADD HYD	114.20	1& 2	1	.10085	90.72	4.761	.88518	1.665	1.406	
COMPUTE NM HYD	114C	-	2	.00190	3.32	.115	1.13749	1.499	2.728	PER IMP= 90.00
ADD HYD	114.30	1& 2	1	.10275	92.39	4.876	.88985	1.665	1.405	
COMPUTE NM HYD	114D	-	2	.02050	20.91	.910	.83208	1.598	1.593	PER IMP= 57.00
ADD HYD	114.40	1& 2	1	.12325	111.12	5.786	.88023	1.665	1.409	
COMPUTE NM HYD	114E	-	2	.01320	11.02	.586	.83208	1.665	1.305	PER IMP= 57.00
ADD HYD	114.50	1& 2	1	.13645	122.15	6.372	.87557	1.665	1.399	
ROUTE	114.60	1	3	.13645	122.25	6.372	.87557	1.665	1.400	
COMPUTE NM HYD	115A	-	2	.01530	18.03	.679	.83208	1.532	1.841	PER IMP= 57.00
ADD HYD	115.10	2& 3	1	.15175	134.58	7.051	.87118	1.665	1.386	
COMPUTE NM HYD	115B	-	2	.00210	3.27	.127	1.13749	1.532	2.430	PER IMP= 90.00
ADD HYD	115.20	1& 2	1	.15385	137.00	7.178	.87482	1.632	1.391	
COMPUTE NM HYD	115C	-	2	.00210	3.27	.127	1.13749	1.532	2.430	PER IMP= 90.00
ADD HYD	115.30	1& 2	1	.15595	139.52	7.306	.87835	1.632	1.398	
ROUTE	115.40	1	3	.15595	138.95	7.306	.87835	1.665	1.392	
COMPUTE NM HYD	116.00	-	2	.03231	38.06	1.434	.83208	1.532	1.840	PER IMP= 57.00
ADD HYD	116.10	2& 3	3	.18826	166.53	8.739	.87041	1.632	1.382	
ROUTE	116.20	3	1	.18826	165.99	8.739	.87041	1.632	1.378	
COMPUTE NM HYD	117.00	-	2	.00391	6.81	.237	1.13749	1.499	2.721	PER IMP= 90.00
ADD HYD	117.10	1& 2	1	.19217	169.97	8.977	.87584	1.632	1.382	
COMPUTE NM HYD	110.00	-	1	.00300	3.55	.182	1.13749	1.665	1.850	PER IMP= 90.00
COMPUTE NM HYD	111.00	-	2	.06440	56.39	2.858	.83208	1.665	1.368	PER IMP= 57.00
ADD HYD	111.10	1& 2	1	.06740	59.94	3.040	.84565	1.665	1.390	
ROUTE	111.20	1	3	.06740	59.67	3.040	.84566	1.665	1.383	
COMPUTE NM HYD	112.00	-	2	.00295	4.23	.179	1.13749	1.565	2.238	PER IMP= 90.00
ADD HYD	112.10	2& 3	1	.07035	63.08	3.219	.85789	1.665	1.401	
COMPUTE NM HYD	113A	-	6	.01380	1.45	.064	.08647	1.598	.164	PER IMP= .00
COMPUTE NM HYD	113B	-	2	.00500	1.79	.087	.32495	1.698	.559	PER IMP= .00
ADD HYD	113.10	6& 2	1	.01880	3.15	.150	.14988	1.665	.262	
ROUTE	113.20	1	3	.01880	2.83	.150	.14990	1.732	.236	
COMPUTE NM HYD	114A	-	2	.00660	1.44	.039	.11121	1.532	.341	PER IMP= .00
ADD HYD	114.10	2& 3	1	.02540	3.45	.189	.13983	1.698	.212	

COMPUTE NM HYD	114B	-	2	.00510	4.70	.200	.73698	1.598	1.440	PER IMP=	40.00
ADD HYD	114.20	1& 2	1	.03050	7.93	.390	.23966	1.632	.406		

[illegible]

AH YMO 100-YR Output

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
 RUN DATE (MON/DAY/YR) = 01/24/2002
 START TIME (HR:MIN:SEC) = 17:21:11 USER NO.= M_GOODWN.I01
 INPUT FILE = swynd.dat

***** VISTA SANDIA SUBDIVISION AND OUTFALL IN TOWER RD.
 ***** REVISED CONDITIONS FOR SOUTHWYND SUBDIVISION
 ***** 100-YEAR 6-HOUR STORM EVENT
 ***** JAN. 23, 2002

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=1.90 IN RAIN SIX=2.20 IN
 RAIN DAY=2.67 IN DT=0.0333 HR

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
 DT = .033300 HOURS END TIME = 5.994000 HOURS

.0000	.0013	.0027	.0041	.0055	.0069	.0084
.0099	.0115	.0131	.0147	.0164	.0181	.0199
.0217	.0236	.0255	.0275	.0296	.0317	.0339
.0362	.0386	.0411	.0437	.0464	.0492	.0522
.0553	.0586	.0621	.0673	.0729	.0789	.0913
.1196	.1634	.2264	.3124	.4256	.5701	.7500
.9698	1.1808	1.2673	1.3402	1.4049	1.4637	1.5178
1.5681	1.6150	1.6590	1.7004	1.7395	1.7764	1.8113
1.8444	1.8758	1.9056	1.9338	1.9607	1.9678	1.9733
1.9786	1.9836	1.9884	1.9930	1.9974	2.0016	2.0056
2.0095	2.0133	2.0170	2.0205	2.0240	2.0273	2.0306
2.0337	2.0368	2.0398	2.0428	2.0456	2.0484	2.0512
2.0538	2.0565	2.0590	2.0615	2.0640	2.0664	2.0688
2.0712	2.0735	2.0757	2.0779	2.0801	2.0823	2.0844
2.0865	2.0885	2.0906	2.0925	2.0945	2.0965	2.0984
2.1003	2.1021	2.1039	2.1058	2.1076	2.1093	2.1111
2.1128	2.1145	2.1162	2.1179	2.1195	2.1211	2.1228
2.1243	2.1259	2.1275	2.1290	2.1306	2.1321	2.1336
2.1351	2.1365	2.1380	2.1394	2.1409	2.1423	2.1437
2.1451	2.1465	2.1478	2.1492	2.1505	2.1519	2.1532
2.1545	2.1558	2.1571	2.1584	2.1596	2.1609	2.1621
2.1634	2.1646	2.1658	2.1670	2.1682	2.1694	2.1706
2.1718	2.1730	2.1741	2.1753	2.1764	2.1776	2.1787
2.1798	2.1809	2.1820	2.1831	2.1842	2.1853	2.1864
2.1875	2.1885	2.1896	2.1906	2.1917	2.1927	2.1938
2.1948	2.1958	2.1968	2.1978	2.1988	2.1998	

COMPUTE NM HYD ID=1 HYD NO=110.0 AREA=0.0030 SQ MI
 PER A=0 PER B=10 PER C=0 PER D=90
 TP=0.28 HR MASS RAINFALL=-1

K = .152600HR TP = .280000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 5.0748 CFS UNIT VOLUME = .9974 B = 526.28 P60 = 1.9000
 AREA = .002700 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .274666HR TP = .280000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599935
UNIT PEAK = .35095 CFS UNIT VOLUME = .9586 B = 327.55 P60 = 1.9000
AREA = .000300 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 110.00

RUNOFF VOLUME = 1.83780 INCHES = .2940 ACRE-FEET
PEAK DISCHARGE RATE = 5.53 CFS AT 1.665 HOURS BASIN AREA = .0030 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=111.0 AREA=0.0644 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.28 HR MASS RAINFALL=-1

K = .152663HR TP = .280000HR K/TP RATIO = .545225 SHAPE CONSTANT, N = 7.102687
UNIT PEAK = 68.972 CFS UNIT VOLUME = .9997 B = 526.10 P60 = 1.9000
AREA = .036708 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .256531HR TP = .280000HR K/TP RATIO = .916183 SHAPE CONSTANT, N = 3.864253
UNIT PEAK = 34.221 CFS UNIT VOLUME = .9996 B = 346.02 P60 = 1.9000
AREA = .027692 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 111.00

RUNOFF VOLUME = 1.45757 INCHES = 5.0062 ACRE-FEET
PEAK DISCHARGE RATE = 95.55 CFS AT 1.665 HOURS BASIN AREA = .0644 SQ. MI.

ADD HYD ID=1 HYD NO=111.1 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 111.10

RUNOFF VOLUME = 1.47448 INCHES = 5.3002 ACRE-FEET
PEAK DISCHARGE RATE = 101.08 CFS AT 1.665 HOURS BASIN AREA = .0674 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0037 DIA=4.5 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.23	.32	.63	2.00
.47	.88	2.72	2.75
.70	1.59	6.33	3.27
.94	2.40	11.39	3.66
1.17	3.30	17.78	3.95
1.41	4.25	25.37	4.17
1.64	5.25	33.99	4.33
1.88	6.28	43.46	4.44
2.11	7.32	53.57	4.49
2.35	8.38	64.12	4.50
2.58	9.43	74.85	4.50
2.81	10.46	85.53	4.50
3.05	11.47	95.86	4.50
3.28	12.43	105.54	4.50
3.52	13.34	114.20	4.50
3.75	14.17	121.40	4.50
3.99	14.90	126.55	4.50
4.22	15.50	128.67	4.50
4.50	15.90	128.67	4.50

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=450 FT SLP=.0037

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.235	.316	.63	.0630
.469	.880	2.72	.0404
.704	1.588	6.33	.0314
.938	2.402	11.39	.0264
1.173	3.296	17.78	.0232
1.407	4.249	25.37	.0209
1.641	5.248	33.99	.0193
1.876	6.277	43.46	.0181
2.111	7.325	53.57	.0171
2.345	8.380	64.12	.0163
2.579	9.430	74.85	.0157
2.814	10.463	85.53	.0153
3.049	11.468	95.86	.0150
3.283	12.432	105.54	.0147
3.518	13.338	114.20	.0146
3.752	14.169	121.40	.0146
3.987	14.900	126.55	.0147
4.221	15.495	128.67	.0151

ROUTE 4.500 15.904 128.67 .0155
ID=3 HYD NO=111.2 INFLOW ID=1 DT=0 HR
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 111.20

RUNOFF VOLUME = 1.47448 INCHES = 5.3002 ACRE-FEET
PEAK DISCHARGE RATE = 100.50 CFS AT 1.665 HOURS BASIN AREA = .0674 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=112.0 AREA=0.00295SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.20 HR MASS RAINFALL=-1

K = .109000HR TP = .200000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.9863 CFS UNIT VOLUME = .9980 B = 526.28 P60 = 1.9000
AREA = .002655 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .196190HR TP = .200000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930
UNIT PEAK = .48314 CFS UNIT VOLUME = .9711 B = 327.55 P60 = 1.9000
AREA = .000295 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 112.00

RUNOFF VOLUME = 1.83780 INCHES = .2891 ACRE-FEET
PEAK DISCHARGE RATE = 6.55 CFS AT 1.565 HOURS BASIN AREA = .0030 SQ. MI.

ADD HYD ID=1 HYD NO=112.1 ID=2 & 3
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 112.10

RUNOFF VOLUME = 1.48971 INCHES = 5.5893 ACRE-FEET
PEAK DISCHARGE RATE = 105.80 CFS AT 1.665 HOURS BASIN AREA = .0703 SQ. MI.

COMPUTE NM HYD ID=6 HYD NO=113A AREA=0.0138 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.21 HR MASS RAINFALL=-1

K = .114450HR TP = .210000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 19.713 CFS UNIT VOLUME = .9994 B = 526.28 P60 = 1.9000
AREA = .007866 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .192505HR TP = .210000HR K/TP RATIO = .916690 SHAPE CONSTANT, N = 3.862009
UNIT PEAK = 9.7731 CFS UNIT VOLUME = .9987 B = 345.86 P60 = 1.9000
AREA = .005934 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=6 CODE=1

HYDROGRAPH FROM AREA 113A

RUNOFF VOLUME = 1.45757 INCHES = 1.0728 ACRE-FEET
PEAK DISCHARGE RATE = 24.30 CFS AT 1.598 HOURS BASIN AREA = .0138 SQ. MI.

ADD HYD ID=7 HYD NO=113.1 ID=1 & 6
PRINT HYD ID=7 CODE=1

PARTIAL HYDROGRAPH 113.10

RUNOFF VOLUME = 1.48443 INCHES = 6.6621 ACRE-FEET
PEAK DISCHARGE RATE = 126.97 CFS AT 1.665 HOURS BASIN AREA = .0842 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=113B AREA=0.0050 SQ MI
PER A=0 PER B=20 PER C=0 PER D=80
TP=0.30 HR MASS RAINFALL=-1

K = .163500HR TP = .300000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 7.0170 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.9000
AREA = .004000 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .294285HR TP = .300000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599935
UNIT PEAK = 1.0918 CFS UNIT VOLUME = .9870 B = 327.55 P60 = 1.9000
AREA = .001000 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 113B

RUNOFF VOLUME = 1.70926 INCHES = .4558 ACRE-FEET
 PEAK DISCHARGE RATE = 8.22 CFS AT 1.665 HOURS BASIN AREA = .0050 SQ. MI.

ADD HYD ID=1 HYD NO=113.1 ID=7 & 2
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 113.10

RUNOFF VOLUME = 1.49703 INCHES = 7.1178 ACRE-FEET
 PEAK DISCHARGE RATE = 135.19 CFS AT 1.665 HOURS BASIN AREA = .0892 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0052 DIA=5 FT N=.013

RATING CURVE PIPE SECTION 1.0				
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT	
.00	.00	.00	.00	
.26	.39	.99	2.22	
.52	1.09	4.28	3.06	
.78	1.96	9.94	3.63	
1.04	2.97	17.88	4.06	
1.30	4.07	27.92	4.39	
1.56	5.25	39.83	4.64	
1.82	6.48	53.37	4.81	
2.08	7.75	68.23	4.93	
2.35	9.04	84.11	4.99	
2.61	10.35	100.67	5.00	
2.87	11.64	117.53	5.00	
3.13	12.92	134.29	5.00	
3.39	14.16	150.51	5.00	
3.65	15.35	165.70	5.00	
3.91	16.47	179.30	5.00	
4.17	17.49	190.61	5.00	
4.43	18.39	198.70	5.00	
4.69	19.13	202.03	5.00	
5.00	19.63	202.03	5.00	

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=1090 FT SLP=.0052

TRAVEL TIME TABLE REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ. FT.	FLOW RATE CFS	TRAVEL TIME HRS
.261	.390	.99	.1200
.521	1.086	4.28	.0769

.782	1.961	9.94	.0597
1.042	2.966	17.88	.0502
1.303	4.069	27.92	.0441
1.563	5.246	39.83	.0399
1.824	6.479	53.37	.0368
2.084	7.749	68.23	.0344
2.345	9.043	84.11	.0326
2.606	10.345	100.67	.0311
2.866	11.641	117.53	.0300
3.127	12.918	134.29	.0291
3.387	14.159	150.51	.0285
3.648	15.348	165.70	.0280
3.908	16.467	179.30	.0278
4.169	17.492	190.61	.0278
4.429	18.395	198.70	.0280
4.690	19.130	202.03	.0287
5.000	19.635	202.03	.0294

ROUTE ID=3 HYD NO=113.2 INFLOW ID=1 DT=0 HR
 PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 113.20

RUNOFF VOLUME = 1.49704 INCHES = 7.1179 ACRE-FEET
 PEAK DISCHARGE RATE = 133.78 CFS AT 1.665 HOURS BASIN AREA = .0892 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114A AREA=0.0066 SQ MI
 PER A=0 PER B=10 PER C=10 PER D=80
 TP=0.133HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 20.893 CFS UNIT VOLUME = .9989 B = 526.28 P60 = 1.9000
 AREA = .005280 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .118216HR TP = .133000HR K/TP RATIO = .888844 SHAPE CONSTANT, N = 3.990548
 UNIT PEAK = 3.5187 CFS UNIT VOLUME = .9966 B = 354.54 P60 = 1.9000
 AREA = .001320 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114A

RUNOFF VOLUME = 1.73948 INCHES = .6123 ACRE-FEET
 PEAK DISCHARGE RATE = 17.11 CFS AT 1.499 HOURS BASIN AREA = .0066 SQ. MI.

ADD HYD ID=1 HYD NO=114.1 ID=2 & 3
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.10

RUNOFF VOLUME = 1.51374 INCHES = 7.7301 ACRE-FEET
PEAK DISCHARGE RATE = 142.54 CFS AT 1.665 HOURS BASIN AREA = .0958 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114B AREA=0.0051 SQ MI
PER A=0 PER B=20 PER C=0 PER D=80
TP=0.23 HR MASS RAINFALL=-1

K = .125350HR TP = .230000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106437
UNIT PEAK = 9.3357 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.9000
AREA = .004080 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .225618HR TP = .230000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599935
UNIT PEAK = 1.4526 CFS UNIT VOLUME = .9905 B = 327.55 P60 = 1.9000
AREA = .001020 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114B

RUNOFF VOLUME = 1.70926 INCHES = .4649 ACRE-FEET
PEAK DISCHARGE RATE = 9.82 CFS AT 1.598 HOURS BASIN AREA = .0051 SQ. MI.

ADD HYD ID=1 HYD NO=114.2 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.20

RUNOFF VOLUME = 1.52362 INCHES = 8.1950 ACRE-FEET
PEAK DISCHARGE RATE = 151.58 CFS AT 1.665 HOURS BASIN AREA = .1009 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114C AREA=0.0019 SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.133HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.7664 CFS UNIT VOLUME = .9976 B = 526.28 P60 = 1.9000
AREA = .001710 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130466HR TP = .133000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599935
UNIT PEAK = .46793 CFS UNIT VOLUME = .9703 B = 327.55 P60 = 1.9000
AREA = .000190 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114C

RUNOFF VOLUME = 1.83780 INCHES = .1862 ACRE-FEET
PEAK DISCHARGE RATE = 5.13 CFS AT 1.499 HOURS BASIN AREA = .0019 SQ. MI.

ADD HYD ID=1 HYD NO=114.3 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.30

RUNOFF VOLUME = 1.52943 INCHES = 8.3812 ACRE-FEET
PEAK DISCHARGE RATE = 154.18 CFS AT 1.665 HOURS BASIN AREA = .1028 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114D AREA=0.0205 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.22 HR MASS RAINFALL=-1

K = .119900HR TP = .220000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 27.952 CFS UNIT VOLUME = .9997 B = 526.28 P60 = 1.9000
AREA = .011685 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .201672HR TP = .220000HR K/TP RATIO = .916690 SHAPE CONSTANT, N = 3.862003
UNIT PEAK = 13.858 CFS UNIT VOLUME = .9991 B = 345.86 P60 = 1.9000
AREA = .008815 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114D

RUNOFF VOLUME = 1.45757 INCHES = 1.5936 ACRE-FEET
PEAK DISCHARGE RATE = 35.30 CFS AT 1.598 HOURS BASIN AREA = .0205 SQ. MI.

ADD HYD ID=1 HYD NO=114.4 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.40

RUNOFF VOLUME = 1.51748 INCHES = 9.9748 ACRE-FEET
PEAK DISCHARGE RATE = 186.40 CFS AT 1.632 HOURS BASIN AREA = .1233 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114E AREA=0.0132 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.30 HR MASS RAINFALL=-1

K = .163500HR TP = .300000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 13.199 CFS UNIT VOLUME = .9991 B = 526.28 P60 = 1.9000
AREA = .007524 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .275007HR TP = .300000HR K/TP RATIO = .916690 SHAPE CONSTANT, N = 3.862003
UNIT PEAK = 6.5437 CFS UNIT VOLUME = .9978 B = 345.86 P60 = 1.9000
AREA = .005676 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114E

RUNOFF VOLUME = 1.45757 INCHES = 1.0261 ACRE-FEET
PEAK DISCHARGE RATE = 18.69 CFS AT 1.698 HOURS BASIN AREA = .0132 SQ. MI.

ADD HYD ID=1 HYD NO=114.5 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.50

RUNOFF VOLUME = 1.51168 INCHES = 11.0009 ACRE-FEET
PEAK DISCHARGE RATE = 204.67 CFS AT 1.665 HOURS BASIN AREA = .1365 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0042 DIA=6.0 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.31	.56	1.44	2.67
.63	1.56	6.25	3.67
.94	2.82	14.53	4.36
1.25	4.27	26.13	4.87
1.56	5.86	40.80	5.27
1.88	7.55	58.21	5.56
2.19	9.33	77.99	5.78
2.50	11.16	99.72	5.92
2.81	13.02	122.93	5.99
3.13	14.90	147.12	6.00
3.44	16.76	171.75	6.00
3.75	18.60	196.25	6.00
4.06	20.39	219.95	6.00
4.38	22.10	242.15	6.00
4.69	23.71	262.02	6.00
5.00	25.19	278.55	6.00
5.32	26.49	290.38	6.00
5.63	27.55	295.24	6.00
6.00	28.27	295.24	6.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=430 FT SLP=.0042

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.313	.562	1.44	.0466
.625	1.564	6.25	.0299
.938	2.824	14.53	.0232
1.251	4.271	26.13	.0195
1.563	5.859	40.80	.0172
1.876	7.554	58.21	.0155
2.189	9.329	77.99	.0143
2.501	11.159	99.72	.0134
2.814	13.022	122.93	.0127
3.127	14.897	147.12	.0121
3.439	16.764	171.75	.0117
3.752	18.601	196.25	.0113
4.065	20.388	219.95	.0111
4.377	22.101	242.15	.0109
4.690	23.712	262.02	.0108
5.003	25.189	278.55	.0108
5.315	26.489	290.38	.0109
5.628	27.547	295.24	.0111

ROUTE 6.000 28.274 295.24 .0114
ID=3 HYD NO=114.6 INFLOW ID=1 DT=0 HR
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 114.60

RUNOFF VOLUME = 1.51168 INCHES = 11.0009 ACRE-FEET
PEAK DISCHARGE RATE = 204.76 CFS AT 1.665 HOURS BASIN AREA = .1365 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115A AREA=0.0153 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 26.998 CFS UNIT VOLUME = .9997 B = 526.28 P60 = 1.9000
AREA = .008721 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .155837HR TP = .170000HR K/TP RATIO = .916690 SHAPE CONSTANT, N = 3.862003
UNIT PEAK = 13.385 CFS UNIT VOLUME = .9997 B = 345.86 P60 = 1.9000
AREA = .006579 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115A

RUNOFF VOLUME = 1.45757 INCHES = 1.1894 ACRE-FEET
PEAK DISCHARGE RATE = 30.41 CFS AT 1.532 HOURS BASIN AREA = .0153 SQ. MI.

ADD HYD ID=1 HYD NO=115.1 ID=2 & 3
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.10

RUNOFF VOLUME = 1.50622 INCHES = 12.1902 ACRE-FEET
PEAK DISCHARGE RATE = 226.85 CFS AT 1.632 HOURS BASIN AREA = .1518 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115B AREA=0.0021 SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 5.8509 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.9000
AREA = .001890 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .166762HR TP = .170000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930
UNIT PEAK = .40462 CFS UNIT VOLUME = .9657 B = 327.55 P60 = 1.9000
AREA = .000210 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115B

RUNOFF VOLUME = 1.83780 INCHES = .2058 ACRE-FEET
PEAK DISCHARGE RATE = 5.06 CFS AT 1.532 HOURS BASIN AREA = .0021 SQ. MI.

ADD HYD ID=1 HYD NO=115.2 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.20

RUNOFF VOLUME = 1.51074 INCHES = 12.3961 ACRE-FEET
PEAK DISCHARGE RATE = 230.77 CFS AT 1.632 HOURS BASIN AREA = .1539 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115C AREA=0.0021 SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 5.8509 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.9000
AREA = .001890 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .166762HR TP = .170000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930
UNIT PEAK = .40462 CFS UNIT VOLUME = .9657 B = 327.55 P60 = 1.9000
AREA = .000210 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115C

RUNOFF VOLUME = 1.83780 INCHES = .2058 ACRE-FEET
 PEAK DISCHARGE RATE = 5.06 CFS AT 1.532 HOURS BASIN AREA = .0021 SQ. MI.

ADD HYD ID=1 HYD NO=115.3 ID=1 & 2
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.30

RUNOFF VOLUME = 1.51514 INCHES = 12.6019 ACRE-FEET
 PEAK DISCHARGE RATE = 234.69 CFS AT 1.632 HOURS BASIN AREA = .1560 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.006 DIA=6 FT N=.013

RATING CURVE PIPE SECTION 1.0				
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT	
.00	.00	.00	.00	
.31	.56	1.72	2.67	
.63	1.56	7.47	3.67	
.94	2.82	17.37	4.36	
1.25	4.27	31.23	4.87	
1.56	5.86	48.77	5.27	
1.88	7.55	69.58	5.56	
2.19	9.33	93.22	5.78	
2.50	11.16	119.19	5.92	
2.81	13.02	146.92	5.99	
3.13	14.90	175.84	6.00	
3.44	16.76	205.29	6.00	
3.75	18.60	234.56	6.00	
4.06	20.39	262.89	6.00	
4.38	22.10	289.43	6.00	
4.69	23.71	313.18	6.00	
5.00	25.19	332.94	6.00	
5.32	26.49	347.07	6.00	
5.63	27.55	352.88	6.00	
6.00	28.27	352.88	6.00	

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=1070 FT SLP=.006

TRAVEL TIME TABLE REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ. FT.	FLOW RATE CFS	TRAVEL TIME HRS
.313	.562	1.72	.0971
.625	1.564	7.47	.0622

.938	2.824	17.37	.0483
1.251	4.271	31.23	.0406
1.563	5.859	48.77	.0357
1.876	7.554	69.58	.0323
2.189	9.329	93.22	.0297
2.501	11.159	119.19	.0278
2.814	13.022	146.92	.0263
3.127	14.897	175.84	.0252
3.439	16.764	205.29	.0243
3.752	18.601	234.56	.0236
4.065	20.388	262.89	.0231
4.377	22.101	289.43	.0227
4.690	23.712	313.18	.0225
5.003	25.189	332.94	.0225
5.315	26.489	347.07	.0227
5.628	27.547	352.88	.0232
6.000	28.274	352.88	.0238

ROUTE ID=3 HYD NO=115.4 INFLOW ID=1 DT=0 HR
 PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 115.40

RUNOFF VOLUME = 1.51515 INCHES = 12.6019 ACRE-FEET
 PEAK DISCHARGE RATE = 233.31 CFS AT 1.665 HOURS BASIN AREA = .1560 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=116.0 AREA=0.03231 SQ MI
 PER A=0 PER B=28 PER C=15 PER D=57
 TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 57.013 CFS UNIT VOLUME = 1.000 B = 526.28 P60 = 1.9000
 AREA = .018417 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .155837HR TP = .170000HR K/TP RATIO = .916690 SHAPE CONSTANT, N = 3.862003
 UNIT PEAK = 28.266 CFS UNIT VOLUME = .9997 B = 345.86 P60 = 1.9000
 AREA = .013893 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 116.00

RUNOFF VOLUME = 1.45757 INCHES = 2.5117 ACRE-FEET
 PEAK DISCHARGE RATE = 64.19 CFS AT 1.532 HOURS BASIN AREA = .0323 SQ. MI.

ADD HYD ID=3 HYD NO=116.1 ID=2 & 3
 PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 116.10

RUNOFF VOLUME = 1.50526 INCHES = 15.1135 ACRE-FEET
 PEAK DISCHARGE RATE = 282.28 CFS AT 1.632 HOURS BASIN AREA = .1883 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.03 DIA=4.5 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.23	.32	1.79	2.00
.47	.88	7.76	2.75
.70	1.59	18.03	3.27
.94	2.40	32.43	3.66
1.17	3.30	50.63	3.95
1.41	4.25	72.24	4.17
1.64	5.25	96.79	4.33
1.88	6.28	123.75	4.44
2.11	7.32	152.55	4.49
2.35	8.38	182.57	4.50
2.58	9.43	213.14	4.50
2.81	10.46	243.54	4.50
3.05	11.47	272.96	4.50
3.28	12.43	300.51	4.50
3.52	13.34	325.17	4.50
3.75	14.17	345.68	4.50
3.99	14.90	360.36	4.50
4.22	15.50	366.39	4.50
4.50	15.90	366.39	4.50

COMPUTE TRAVEL TIME ID=1 REACH NO=1 NO VS=1 L=1050 FT SLP=.03

TRAVEL TIME TABLE
 REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.235	.316	1.79	.0516
.469	.880	7.76	.0331
.704	1.588	18.03	.0257
.938	2.402	32.43	.0216
1.173	3.296	50.63	.0190
1.407	4.249	72.24	.0172

1.641	5.248	96.79	.0158
1.876	6.277	123.75	.0148
2.111	7.325	152.55	.0140
2.345	8.380	182.57	.0134
2.579	9.430	213.14	.0129
2.814	10.463	243.54	.0125
3.049	11.468	272.96	.0123
3.283	12.432	300.51	.0121
3.518	13.338	325.17	.0120
3.752	14.169	345.68	.0120
3.987	14.900	360.36	.0121
4.221	15.495	366.39	.0123
4.500	15.904	366.39	.0127

ROUTE ID=1 HYD NO=116.2 INFLOW ID=3 DT=0 HR
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 116.20

RUNOFF VOLUME = 1.50526 INCHES = 15.1135 ACRE-FEET
 PEAK DISCHARGE RATE = 281.94 CFS AT 1.632 HOURS BASIN AREA = .1883 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=117.0 AREA=0.00391 SQ MI
 PER A=0 PER B=10 PER C=0 PER D=90
 TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 13.893 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 1.9000
 AREA = .003519 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930
 UNIT PEAK = .96078 CFS UNIT VOLUME = .9862 B = 327.55 P60 = 1.9000
 AREA = .000391 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 117.00

RUNOFF VOLUME = 1.83780 INCHES = .3832 ACRE-FEET
 PEAK DISCHARGE RATE = 10.52 CFS AT 1.499 HOURS BASIN AREA = .0039 SQ. MI.

ADD HYD ID=1 HYD NO=117.1 ID=1 & 2
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 117.10

RUNOFF VOLUME = 1.51203 INCHES = 15.4968 ACRE-FEET
 PEAK DISCHARGE RATE = 288.12 CFS AT 1.632 HOURS BASIN AREA = .1922 SQ. MI.

COMPUTE NM HYD ID=1 HYD NO=110.0 AREA=0.0030 SQ MI
 PER A=0 PER B=10 PER C=0 PER D=90
 TP=0.28 HR MASS RAINFALL=-1

K = .152600HR TP = .280000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 5.0748 CFS UNIT VOLUME = .9974 B = 526.28 P60 = 1.9000
 AREA = .002700 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .274666HR TP = .280000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599935
 UNIT PEAK = .35095 CFS UNIT VOLUME = .9586 B = 327.55 P60 = 1.9000
 AREA = .000300 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 110.00

RUNOFF VOLUME = 1.83780 INCHES = .2940 ACRE-FEET
 PEAK DISCHARGE RATE = 5.53 CFS AT 1.665 HOURS BASIN AREA = .0030 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=111.0 AREA=0.0644 SQ MI
 PER A=0 PER B=28 PER C=15 PER D=57
 TP=0.28 HR MASS RAINFALL=-1

K = .152663HR TP = .280000HR K/TP RATIO = .545225 SHAPE CONSTANT, N = 7.102687
 UNIT PEAK = 68.972 CFS UNIT VOLUME = .9997 B = 526.10 P60 = 1.9000
 AREA = .036708 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .256531HR TP = .280000HR K/TP RATIO = .916183 SHAPE CONSTANT, N = 3.864253
 UNIT PEAK = 34.221 CFS UNIT VOLUME = .9996 B = 346.02 P60 = 1.9000
 AREA = .027692 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 111.00

RUNOFF VOLUME = 1.45757 INCHES = 5.0062 ACRE-FEET
 PEAK DISCHARGE RATE = 95.55 CFS AT 1.665 HOURS BASIN AREA = .0644 SQ. MI.

ADD HYD ID=1 HYD NO=111.1 ID=1 & 2
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 111.10

RUNOFF VOLUME = 1.47448 INCHES = 5.3002 ACRE-FEET
 PEAK DISCHARGE RATE = 101.08 CFS AT 1.665 HOURS BASIN AREA = .0674 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0037 DIA=4.5 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.23	.32	.63	2.00
.47	.88	2.72	2.75
.70	1.59	6.33	3.27
.94	2.40	11.39	3.66
1.17	3.30	17.78	3.95
1.41	4.25	25.37	4.17
1.64	5.25	33.99	4.33
1.88	6.28	43.46	4.44
2.11	7.32	53.57	4.49
2.35	8.38	64.12	4.50
2.58	9.43	74.85	4.50
2.81	10.46	85.53	4.50
3.05	11.47	95.86	4.50
3.28	12.43	105.54	4.50
3.52	13.34	114.20	4.50
3.75	14.17	121.40	4.50
3.99	14.90	126.55	4.50
4.22	15.50	128.67	4.50
4.50	15.90	128.67	4.50

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=450 FT SLP=.0037

TRAVEL TIME TABLE REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ. FT.	FLOW RATE CFS	TRAVEL TIME HRS
.235	.316	.63	.0630

.469	.880	2.72	.0404
.704	1.588	6.33	.0314
.938	2.402	11.39	.0264
1.173	3.296	17.78	.0232
1.407	4.249	25.37	.0209
1.641	5.248	33.99	.0193
1.876	6.277	43.46	.0181
2.111	7.325	53.57	.0171
2.345	8.380	64.12	.0163
2.579	9.430	74.85	.0157
2.814	10.463	85.53	.0153
3.049	11.468	95.86	.0150
3.283	12.432	105.54	.0147
3.518	13.338	114.20	.0146
3.752	14.169	121.40	.0146
3.987	14.900	126.55	.0147
4.221	15.495	128.67	.0151
4.500	15.904	128.67	.0155

ROUTE ID=3 HYD NO=111.2 INFLOW ID=1 DT=0 HR
 PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 111.20

RUNOFF VOLUME = 1.47448 INCHES = 5.3002 ACRE-FEET
 PEAK DISCHARGE RATE = 100.50 CFS AT 1.665 HOURS BASIN AREA = .0674 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=112.0 AREA=0.00295SQ MI
 PER A=0 PER B=10 PER C=0 PER D=90
 TP=0.20 HR MASS RAINFALL=-1

K = .109000HR TP = .200000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 6.9863 CFS UNIT VOLUME = .9980 B = 526.28 P60 = 1.9000
 AREA = .002655 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .196190HR TP = .200000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930
 UNIT PEAK = .48314 CFS UNIT VOLUME = .9711 B = 327.55 P60 = 1.9000
 AREA = .000295 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 112.00

RUNOFF VOLUME = 1.83780 INCHES = .2891 ACRE-FEET
 PEAK DISCHARGE RATE = 6.55 CFS AT 1.565 HOURS BASIN AREA = .0030 SQ. MI.

ADD HYD ID=1 HYD NO=112.1 ID=2 & 3
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 112.10

RUNOFF VOLUME = 1.48971 INCHES = 5.5893 ACRE-FEET
PEAK DISCHARGE RATE = 105.80 CFS AT 1.665 HOURS BASIN AREA = .0703 SQ. MI.

COMPUTE NM HYD ID=6 HYD NO=113A AREA=0.0138 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0
TP=0.21 HR MASS RAINFALL=-1

K = .256675HR TP = .210000HR K/TP RATIO = 1.222262 SHAPE CONSTANT, N = 2.911962
UNIT PEAK = 18.043 CFS UNIT VOLUME = .9991 B = 274.56 P60 = 1.9000
AREA = .013800 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=6 CODE=1

HYDROGRAPH FROM AREA 113A

RUNOFF VOLUME = .44912 INCHES = .3306 ACRE-FEET
PEAK DISCHARGE RATE = 7.84 CFS AT 1.598 HOURS BASIN AREA = .0138 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=113B AREA=0.0050 SQ MI
PER A=0 PER B=50 PER C=50 PER D=0
TP=0.30 HR MASS RAINFALL=-1

K = .266653HR TP = .300000HR K/TP RATIO = .888844 SHAPE CONSTANT, N = 3.990548
UNIT PEAK = 5.9090 CFS UNIT VOLUME = .9976 B = 354.54 P60 = 1.9000
AREA = .005000 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 113B

RUNOFF VOLUME = .83200 INCHES = .2219 ACRE-FEET
PEAK DISCHARGE RATE = 4.33 CFS AT 1.698 HOURS BASIN AREA = .0050 SQ. MI.

ADD HYD ID=1 HYD NO=113.1 ID=6 & 2

PRINT HYD

ID=1 CODE=1

PARTIAL HYDROGRAPH 113.10

RUNOFF VOLUME = .55094 INCHES = .5524 ACRE-FEET
PEAK DISCHARGE RATE = 11.76 CFS AT 1.632 HOURS BASIN AREA = .0188 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0052 DIA=5 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.26	.39	.99	2.22
.52	1.09	4.28	3.06
.78	1.96	9.94	3.63
1.04	2.97	17.88	4.06
1.30	4.07	27.92	4.39
1.56	5.25	39.83	4.64
1.82	6.48	53.37	4.81
2.08	7.75	68.23	4.93
2.35	9.04	84.11	4.99
2.61	10.35	100.67	5.00
2.87	11.64	117.53	5.00
3.13	12.92	134.29	5.00
3.39	14.16	150.51	5.00
3.65	15.35	165.70	5.00
3.91	16.47	179.30	5.00
4.17	17.49	190.61	5.00
4.43	18.39	198.70	5.00
4.69	19.13	202.03	5.00
5.00	19.63	202.03	5.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=1090 FT SLP=.0052

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ. FT.	FLOW RATE CFS	TRAVEL TIME HRS
.261	.390	.99	.1200
.521	1.086	4.28	.0769
.782	1.961	9.94	.0597
1.042	2.966	17.88	.0502
1.303	4.069	27.92	.0441
1.563	5.246	39.83	.0399
1.824	6.479	53.37	.0368
2.084	7.749	68.23	.0344

2.345	9.043	84.11	.0326
2.606	10.345	100.67	.0311
2.866	11.641	117.53	.0300
3.127	12.918	134.29	.0291
3.387	14.159	150.51	.0285
3.648	15.348	165.70	.0280
3.908	16.467	179.30	.0278
4.169	17.492	190.61	.0278
4.429	18.395	198.70	.0280
4.690	19.130	202.03	.0287
5.000	19.635	202.03	.0294

ROUTE ID=3 HYD NO=113.2 INFLOW ID=1 DT=0 HR
 PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 113.20

RUNOFF VOLUME = .55100 INCHES = .5525 ACRE-FEET
 PEAK DISCHARGE RATE = 11.29 CFS AT 1.665 HOURS BASIN AREA = .0188 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114A AREA=0.0066 SQ MI
 PER A=90 PER B=0 PER C=10 PER D=0
 TP=0.133HR MASS RAINFALL=-1

K = .156901HR TP = .133000HR K/TP RATIO = 1.179710 SHAPE CONSTANT, N = 3.008112
 UNIT PEAK = 14.018 CFS UNIT VOLUME = .9988 B = 282.48 P60 = 1.9000
 AREA = .006600 SQ MI IA = .62000 INCHES INF = 1.58600 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114A

RUNOFF VOLUME = .48994 INCHES = .1725 ACRE-FEET
 PEAK DISCHARGE RATE = 6.18 CFS AT 1.532 HOURS BASIN AREA = .0066 SQ. MI.

ADD HYD ID=1 HYD NO=114.1 ID=2 & 3
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.10

RUNOFF VOLUME = .53511 INCHES = .7249 ACRE-FEET
 PEAK DISCHARGE RATE = 15.21 CFS AT 1.632 HOURS BASIN AREA = .0254 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114B AREA=0.0051 SQ MI
PER A=0 PER B=10 PER C=50 PER D=40
TP=0.23 HR MASS RAINFALL=-1

K = .125350HR TP = .230000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106437
UNIT PEAK = 4.6678 CFS UNIT VOLUME = .9973 B = 526.28 P60 = 1.9000
AREA = .002040 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .190311HR TP = .230000HR K/TP RATIO = .827440 SHAPE CONSTANT, N = 4.313216
UNIT PEAK = 4.9963 CFS UNIT VOLUME = .9973 B = 375.54 P60 = 1.9000
AREA = .003060 SQ MI IA = .37500 INCHES INF = .90000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114B

RUNOFF VOLUME = 1.35530 INCHES = .3686 ACRE-FEET
PEAK DISCHARGE RATE = 8.16 CFS AT 1.598 HOURS BASIN AREA = .0051 SQ. MI.

ADD HYD ID=1 HYD NO=114.2 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.20

RUNOFF VOLUME = .67224 INCHES = 1.0935 ACRE-FEET
PEAK DISCHARGE RATE = 23.29 CFS AT 1.632 HOURS BASIN AREA = .0305 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114C AREA=0.0019 SQ MI
PER A=0 PER B=10 PER C=50 PER D=40
TP=0.133HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.0073 CFS UNIT VOLUME = .9956 B = 526.28 P60 = 1.9000
AREA = .000760 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .110050HR TP = .133000HR K/TP RATIO = .827440 SHAPE CONSTANT, N = 4.313216
UNIT PEAK = 3.2189 CFS UNIT VOLUME = .9963 B = 375.54 P60 = 1.9000
AREA = .001140 SQ MI IA = .37500 INCHES INF = .90000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114C

RUNOFF VOLUME = 1.35530 INCHES = .1373 ACRE-FEET
 PEAK DISCHARGE RATE = 4.19 CFS AT 1.499 HOURS BASIN AREA = .0019 SQ. MI.

ADD HYD ID=1 HYD NO=114.3 ID=1 & 2
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.30

RUNOFF VOLUME = .71229 INCHES = 1.2308 ACRE-FEET
 PEAK DISCHARGE RATE = 26.24 CFS AT 1.598 HOURS BASIN AREA = .0324 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114D AREA=0.0205 SQ MI
 PER A=0 PER B=28 PER C=15 PER D=57
 TP=0.22 HR MASS RAINFALL=-1

K = .119900HR TP = .220000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 27.952 CFS UNIT VOLUME = .9997 B = 526.28 P60 = 1.9000
 AREA = .011685 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .201672HR TP = .220000HR K/TP RATIO = .916690 SHAPE CONSTANT, N = 3.862003
 UNIT PEAK = 13.858 CFS UNIT VOLUME = .9991 B = 345.86 P60 = 1.9000
 AREA = .008815 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114D

RUNOFF VOLUME = 1.45757 INCHES = 1.5936 ACRE-FEET
 PEAK DISCHARGE RATE = 35.30 CFS AT 1.598 HOURS BASIN AREA = .0205 SQ. MI.

COMPUTE NM HYD ID=3 HYD NO=114E AREA=0.0132 SQ MI
 PER A=0 PER B=28 PER C=15 PER D=57
 TP=0.30 HR MASS RAINFALL=-1

K = .163500HR TP = .300000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 13.199 CFS UNIT VOLUME = .9991 B = 526.28 P60 = 1.9000
 AREA = .007524 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .275007HR TP = .300000HR K/TP RATIO = .916690 SHAPE CONSTANT, N = 3.862003
UNIT PEAK = 6.5437 CFS UNIT VOLUME = .9978 B = 345.86 P60 = 1.9000
AREA = .005676 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=3 CODE=1

HYDROGRAPH FROM AREA 114E

RUNOFF VOLUME = 1.45757 INCHES = 1.0261 ACRE-FEET
PEAK DISCHARGE RATE = 18.69 CFS AT 1.698 HOURS BASIN AREA = .0132 SQ. MI.

ADD HYD ID=1 HYD NO=114.5 ID=3 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.50

RUNOFF VOLUME = 1.45754 INCHES = 2.6197 ACRE-FEET
PEAK DISCHARGE RATE = 52.18 CFS AT 1.632 HOURS BASIN AREA = .0337 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0042 DIA=6.0 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.31	.56	1.44	2.67
.63	1.56	6.25	3.67
.94	2.82	14.53	4.36
1.25	4.27	26.13	4.87
1.56	5.86	40.80	5.27
1.88	7.55	58.21	5.56
2.19	9.33	77.99	5.78
2.50	11.16	99.72	5.92
2.81	13.02	122.93	5.99
3.13	14.90	147.12	6.00
3.44	16.76	171.75	6.00
3.75	18.60	196.25	6.00
4.06	20.39	219.95	6.00
4.38	22.10	242.15	6.00
4.69	23.71	262.02	6.00
5.00	25.19	278.55	6.00

5.32	26.49	290.38	6.00
5.63	27.55	295.24	6.00
6.00	28.27	295.24	6.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=430 FT SLP=.0042

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ. FT.	FLOW RATE CFS	TRAVEL TIME HRS
.313	.562	1.44	.0466
.625	1.564	6.25	.0299
.938	2.824	14.53	.0232
1.251	4.271	26.13	.0195
1.563	5.859	40.80	.0172
1.876	7.554	58.21	.0155
2.189	9.329	77.99	.0143
2.501	11.159	99.72	.0134
2.814	13.022	122.93	.0127
3.127	14.897	147.12	.0121
3.439	16.764	171.75	.0117
3.752	18.601	196.25	.0113
4.065	20.388	219.95	.0111
4.377	22.101	242.15	.0109
4.690	23.712	262.02	.0108
5.003	25.189	278.55	.0108
5.315	26.489	290.38	.0109
5.628	27.547	295.24	.0111
6.000	28.274	295.24	.0114

ROUTE ID=3 HYD NO=114.6 INFLOW ID=1 DT=0 HR
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 114.60

RUNOFF VOLUME = 1.45755 INCHES = 2.6197 ACRE-FEET
PEAK DISCHARGE RATE = 52.22 CFS AT 1.632 HOURS BASIN AREA = .0337 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115A AREA=0.0153 SQ MI
PER A=20 PER B=0 PER C=60 PER D=20
TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 9.4730 CFS UNIT VOLUME = .9989 B = 526.28 P60 = 1.9000
AREA = .003060 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .153530HR TP = .170000HR K/TP RATIO = .903119 SHAPE CONSTANT, N = 3.923408

UNIT PEAK = 25.202 CFS UNIT VOLUME = .9996 B = 350.03 P60 = 1.9000
AREA = .012240 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115A

RUNOFF VOLUME = 1.05887 INCHES = .8640 ACRE-FEET
PEAK DISCHARGE RATE = 23.84 CFS AT 1.565 HOURS BASIN AREA = .0153 SQ. MI.

ADD HYD ID=1 HYD NO=115.1 ID=2 & 3
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.10

RUNOFF VOLUME = 1.33305 INCHES = 3.4837 ACRE-FEET
PEAK DISCHARGE RATE = 73.25 CFS AT 1.598 HOURS BASIN AREA = .0490 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115B AREA=0.0021 SQ MI
PER A=0 PER B=10 PER C=50 PER D=40
TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 2.6004 CFS UNIT VOLUME = .9958 B = 526.28 P60 = 1.9000
AREA = .000840 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .140665HR TP = .170000HR K/TP RATIO = .827440 SHAPE CONSTANT, N = 4.313212
UNIT PEAK = 2.7834 CFS UNIT VOLUME = .9953 B = 375.54 P60 = 1.9000
AREA = .001260 SQ MI IA = .37500 INCHES INF = .90000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115B

RUNOFF VOLUME = 1.35530 INCHES = .1518 ACRE-FEET
PEAK DISCHARGE RATE = 4.03 CFS AT 1.532 HOURS BASIN AREA = .0021 SQ. MI.

ADD HYD ID=1 HYD NO=115.2 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.20

RUNOFF VOLUME = 1.33396 INCHES = 3.6355 ACRE-FEET
 PEAK DISCHARGE RATE = 76.94 CFS AT 1.598 HOURS BASIN AREA = .0511 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115C AREA=0.0021 SQ MI
 PER A=0 PER B=10 PER C=50 PER D=40
 TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 2.6004 CFS UNIT VOLUME = .9958 B = 526.28 P60 = 1.9000
 AREA = .000840 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .140665HR TP = .170000HR K/TP RATIO = .827440 SHAPE CONSTANT, N = 4.313212
 UNIT PEAK = 2.7834 CFS UNIT VOLUME = .9953 B = 375.54 P60 = 1.9000
 AREA = .001260 SQ MI IA = .37500 INCHES INF = .90000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115C

RUNOFF VOLUME = 1.35530 INCHES = .1518 ACRE-FEET
 PEAK DISCHARGE RATE = 4.03 CFS AT 1.532 HOURS BASIN AREA = .0021 SQ. MI.

ADD HYD ID=1 HYD NO=115.3 ID=1 & 2
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.30

RUNOFF VOLUME = 1.33479 INCHES = 3.7872 ACRE-FEET
 PEAK DISCHARGE RATE = 80.62 CFS AT 1.598 HOURS BASIN AREA = .0532 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.006 DIA=6 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER	FLOW	FLOW	MAX
SURFACE	AREA	RATE	WIDTH
ELEV	SQ FT	CFS	FT

.00	.00	.00	.00
.31	.56	1.72	2.67
.63	1.56	7.47	3.67
.94	2.82	17.37	4.36
1.25	4.27	31.23	4.87
1.56	5.86	48.77	5.27
1.88	7.55	69.58	5.56
2.19	9.33	93.22	5.78
2.50	11.16	119.19	5.92
2.81	13.02	146.92	5.99
3.13	14.90	175.84	6.00
3.44	16.76	205.29	6.00
3.75	18.60	234.56	6.00
4.06	20.39	262.89	6.00
4.38	22.10	289.43	6.00
4.69	23.71	313.18	6.00
5.00	25.19	332.94	6.00
5.32	26.49	347.07	6.00
5.63	27.55	352.88	6.00
6.00	28.27	352.88	6.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=1070 FT SLP=.006

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ. FT.	FLOW RATE CFS	TRAVEL TIME HRS
.313	.562	1.72	.0971
.625	1.564	7.47	.0622
.938	2.824	17.37	.0483
1.251	4.271	31.23	.0406
1.563	5.859	48.77	.0357
1.876	7.554	69.58	.0323
2.189	9.329	93.22	.0297
2.501	11.159	119.19	.0278
2.814	13.022	146.92	.0263
3.127	14.897	175.84	.0252
3.439	16.764	205.29	.0243
3.752	18.601	234.56	.0236
4.065	20.388	262.89	.0231
4.377	22.101	289.43	.0227
4.690	23.712	313.18	.0225
5.003	25.189	332.94	.0225
5.315	26.489	347.07	.0227
5.628	27.547	352.88	.0232
6.000	28.274	352.88	.0238

ROUTE ID=3 HYD NO=115.4 INFLOW ID=1 DT=0 HR
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 115.40

RUNOFF VOLUME = 1.33480 INCHES = 3.7873 ACRE-FEET
PEAK DISCHARGE RATE = 79.51 CFS AT 1.632 HOURS BASIN AREA = .0532 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=116.0 AREA=0.03231 SQ MI
PER A=20 PER B=0 PER C=70 PER D=10
TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 10.002 CFS UNIT VOLUME = .9990 B = 526.28 P60 = 1.9000
AREA = .003231 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .151521HR TP = .170000HR K/TP RATIO = .891299 SHAPE CONSTANT, N = 3.978813
UNIT PEAK = 60.511 CFS UNIT VOLUME = .9999 B = 353.75 P60 = 1.9000
AREA = .029079 SQ MI IA = .41667 INCHES INF = 1.01667 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 116.00

RUNOFF VOLUME = .96189 INCHES = 1.6575 ACRE-FEET
PEAK DISCHARGE RATE = 47.38 CFS AT 1.565 HOURS BASIN AREA = .0323 SQ. MI.

ADD HYD ID=3 HYD NO=116.1 ID=2 & 3
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 116.10

RUNOFF VOLUME = 1.19389 INCHES = 5.4447 ACRE-FEET
PEAK DISCHARGE RATE = 123.32 CFS AT 1.598 HOURS BASIN AREA = .0855 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.03 DIA=4.5 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.23	.32	1.79	2.00
.47	.88	7.76	2.75
.70	1.59	18.03	3.27

.94	2.40	32.43	3.66
1.17	3.30	50.63	3.95
1.41	4.25	72.24	4.17
1.64	5.25	96.79	4.33
1.88	6.28	123.75	4.44
2.11	7.32	152.55	4.49
2.35	8.38	182.57	4.50
2.58	9.43	213.14	4.50
2.81	10.46	243.54	4.50
3.05	11.47	272.96	4.50
3.28	12.43	300.51	4.50
3.52	13.34	325.17	4.50
3.75	14.17	345.68	4.50
3.99	14.90	360.36	4.50
4.22	15.50	366.39	4.50
4.50	15.90	366.39	4.50

COMPUTE TRAVEL TIME ID=1 REACH NO=1 NO VS=1 L=1050 FT SLP=.03

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.235	.316	1.79	.0516
.469	.880	7.76	.0331
.704	1.588	18.03	.0257
.938	2.402	32.43	.0216
1.173	3.296	50.63	.0190
1.407	4.249	72.24	.0172
1.641	5.248	96.79	.0158
1.876	6.277	123.75	.0148
2.111	7.325	152.55	.0140
2.345	8.380	182.57	.0134
2.579	9.430	213.14	.0129
2.814	10.463	243.54	.0125
3.049	11.468	272.96	.0123
3.283	12.432	300.51	.0121
3.518	13.338	325.17	.0120
3.752	14.169	345.68	.0120
3.987	14.900	360.36	.0121
4.221	15.495	366.39	.0123
4.500	15.904	366.39	.0127

ROUTE ID=1 HYD NO=116.2 INFLOW ID=3 DT=0 HR
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 116.20

RUNOFF VOLUME = 1.19389 INCHES = 5.4447 ACRE-FEET
PEAK DISCHARGE RATE = 123.37 CFS AT 1.598 HOURS BASIN AREA = .0855 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=117.0 AREA=0.00391 SQ MI
PER A=0 PER B=10 PER C=50 PER D=40
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.1748 CFS UNIT VOLUME = .9975 B = 526.28 P60 = 1.9000
AREA = .001564 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .110298HR TP = .133300HR K/TP RATIO = .827440 SHAPE CONSTANT, N = 4.313216
UNIT PEAK = 6.6093 CFS UNIT VOLUME = .9983 B = 375.54 P60 = 1.9000
AREA = .002346 SQ MI IA = .37500 INCHES INF = .90000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 117.00

RUNOFF VOLUME = 1.35530 INCHES = .2826 ACRE-FEET
PEAK DISCHARGE RATE = 8.59 CFS AT 1.499 HOURS BASIN AREA = .0039 SQ. MI.

ADD HYD ID=1 HYD NO=117.1 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 117.10

RUNOFF VOLUME = 1.20094 INCHES = 5.7273 ACRE-FEET
PEAK DISCHARGE RATE = 129.62 CFS AT 1.598 HOURS BASIN AREA = .0894 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 17:21:13

AHYMO 10-YR Detailed Output

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
 RUN DATE (MON/DAY/YR) = 01/29/2002
 START TIME (HR:MIN:SEC) = 17:17:21 USER NO. = M_GOODWN.I01
 INPUT FILE = SWYND10.DAT

***** VISTA SANDIA SUBDIVISION AND OUTFALL IN TOWER RD.
 ***** REVISED CONDITIONS FOR SOUTHWYND SUBDIVISION
 ***** 10-YEAR 6-HOUR STORM EVENT
 ***** JAN. 29, 2002

RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=1.27 IN RAIN SIX=1.47 IN
 RAIN DAY=1.78 IN DT=0.0333 HR

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
 DT = .033300 HOURS END TIME = 5.994000 HOURS

.0000	.0009	.0018	.0027	.0036	.0046	.0056
.0066	.0076	.0087	.0098	.0109	.0120	.0132
.0144	.0157	.0170	.0183	.0197	.0211	.0226
.0241	.0257	.0273	.0291	.0309	.0327	.0347
.0368	.0390	.0413	.0448	.0485	.0525	.0608
.0798	.1090	.1511	.2086	.2843	.3809	.5011
.6480	.7890	.8469	.8956	.9388	.9781	1.0143
1.0479	1.0793	1.1087	1.1364	1.1625	1.1872	1.2105
1.2326	1.2536	1.2735	1.2924	1.3103	1.3151	1.3188
1.3223	1.3257	1.3289	1.3319	1.3348	1.3377	1.3404
1.3430	1.3455	1.3479	1.3503	1.3526	1.3548	1.3570
1.3591	1.3612	1.3632	1.3651	1.3670	1.3689	1.3707
1.3725	1.3743	1.3760	1.3777	1.3793	1.3809	1.3825
1.3841	1.3856	1.3871	1.3886	1.3901	1.3915	1.3929
1.3943	1.3957	1.3970	1.3983	1.3997	1.4010	1.4022
1.4035	1.4047	1.4060	1.4072	1.4084	1.4095	1.4107
1.4119	1.4130	1.4141	1.4152	1.4163	1.4174	1.4185
1.4196	1.4206	1.4217	1.4227	1.4237	1.4247	1.4257
1.4267	1.4277	1.4287	1.4296	1.4306	1.4315	1.4325
1.4334	1.4343	1.4352	1.4361	1.4370	1.4379	1.4388
1.4397	1.4405	1.4414	1.4422	1.4431	1.4439	1.4448
1.4456	1.4464	1.4472	1.4480	1.4488	1.4496	1.4504
1.4512	1.4520	1.4528	1.4535	1.4543	1.4550	1.4558
1.4565	1.4573	1.4580	1.4588	1.4595	1.4602	1.4609
1.4616	1.4624	1.4631	1.4638	1.4645	1.4651	1.4658
1.4665	1.4672	1.4679	1.4685	1.4692	1.4699	

COMPUTE NM HYD ID=1 HYD NO=110.0 AREA=0.0030 SQ MI
 PER A=0 PER B=10 PER C=0 PER D=90
 TP=0.28 HR MASS RAINFALL=-1

K = .152600HR TP = .280000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 5.0748 CFS UNIT VOLUME = .9974 B = 526.28 P60 = 1.2700
 AREA = .002700 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .297328HR TP = .280000HR K/TP RATIO = 1.061885 SHAPE CONSTANT, N = 3.325462

UNIT PEAK = .32932 CFS UNIT VOLUME = .9559 B = 307.36 P60 = 1.2700
AREA = .000300 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 110.00

RUNOFF VOLUME = 1.13749 INCHES = .1820 ACRE-FEET
PEAK DISCHARGE RATE = 3.55 CFS AT 1.665 HOURS BASIN AREA = .0030 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=111.0 AREA=0.0644 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.28 HR MASS RAINFALL=-1

K = .152829HR TP = .280000HR K/TP RATIO = .545817 SHAPE CONSTANT, N = 7.092815
UNIT PEAK = 68.911 CFS UNIT VOLUME = .9997 B = 525.64 P60 = 1.2700
AREA = .036708 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .272736HR TP = .280000HR K/TP RATIO = .974056 SHAPE CONSTANT, N = 3.625978
UNIT PEAK = 32.579 CFS UNIT VOLUME = .9995 B = 329.41 P60 = 1.2700
AREA = .027692 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 111.00

RUNOFF VOLUME = .83208 INCHES = 2.8579 ACRE-FEET
PEAK DISCHARGE RATE = 56.39 CFS AT 1.665 HOURS BASIN AREA = .0644 SQ. MI.

ADD HYD ID=1 HYD NO=111.1 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 111.10

RUNOFF VOLUME = .84565 INCHES = 3.0398 ACRE-FEET
PEAK DISCHARGE RATE = 59.94 CFS AT 1.665 HOURS BASIN AREA = .0674 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0037 DIA=4.5 FT N=.013

RATING CURVE PIPE SECTION 1.0
WATER FLOW FLOW MAX

SURFACE ELEV	AREA SQ FT	RATE CFS	WIDTH FT
.00	.00	.00	.00
.23	.32	.63	2.00
.47	.88	2.72	2.75
.70	1.59	6.33	3.27
.94	2.40	11.39	3.66
1.17	3.30	17.78	3.95
1.41	4.25	25.37	4.17
1.64	5.25	33.99	4.33
1.88	6.28	43.46	4.44
2.11	7.32	53.57	4.49
2.35	8.38	64.12	4.50
2.58	9.43	74.85	4.50
2.81	10.46	85.53	4.50
3.05	11.47	95.86	4.50
3.28	12.43	105.54	4.50
3.52	13.34	114.20	4.50
3.75	14.17	121.40	4.50
3.99	14.90	126.55	4.50
4.22	15.50	128.67	4.50
4.50	15.90	128.67	4.50

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=450 FT SLP=.0037

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.235	.316	.63	.0630
.469	.880	2.72	.0404
.704	1.588	6.33	.0314
.938	2.402	11.39	.0264
1.173	3.296	17.78	.0232
1.407	4.249	25.37	.0209
1.641	5.248	33.99	.0193
1.876	6.277	43.46	.0181
2.111	7.325	53.57	.0171
2.345	8.380	64.12	.0163
2.579	9.430	74.85	.0157
2.814	10.463	85.53	.0153
3.049	11.468	95.86	.0150
3.283	12.432	105.54	.0147
3.518	13.338	114.20	.0146
3.752	14.169	121.40	.0146
3.987	14.900	126.55	.0147
4.221	15.495	128.67	.0151
4.500	15.904	128.67	.0155

ROUTE ID=3 HYD NO=111.2 INFLOW ID=1 DT=0 HR
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 111.20

RUNOFF VOLUME = .84566 INCHES = 3.0399 ACRE-FEET
PEAK DISCHARGE RATE = 59.67 CFS AT 1.665 HOURS BASIN AREA = .0674 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=112.0 AREA=0.00295SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.20 HR MASS RAINFALL=-1

K = .109000HR TP = .200000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.9863 CFS UNIT VOLUME = .9980 B = 526.28 P60 = 1.2700
AREA = .002655 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .212377HR TP = .200000HR K/TP RATIO = 1.061885 SHAPE CONSTANT, N = 3.325462
UNIT PEAK = .45336 CFS UNIT VOLUME = .9680 B = 307.36 P60 = 1.2700
AREA = .000295 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 112.00

RUNOFF VOLUME = 1.13749 INCHES = .1790 ACRE-FEET
PEAK DISCHARGE RATE = 4.23 CFS AT 1.565 HOURS BASIN AREA = .0030 SQ. MI.

ADD HYD ID=1 HYD NO=112.1 ID=2 & 3
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 112.10

RUNOFF VOLUME = .85789 INCHES = 3.2188 ACRE-FEET
PEAK DISCHARGE RATE = 63.08 CFS AT 1.665 HOURS BASIN AREA = .0703 SQ. MI.

COMPUTE NM HYD ID=6 HYD NO=113A AREA=0.0138 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.21 HR MASS RAINFALL=-1

K = .114450HR TP = .210000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 19.713 CFS UNIT VOLUME = .9994 B = 526.28 P60 = 1.2700
AREA = .007866 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .204458HR TP = .210000HR K/TP RATIO = .973607 SHAPE CONSTANT, N = 3.627688
UNIT PEAK = 9.3116 CFS UNIT VOLUME = .9986 B = 329.53 P60 = 1.2700
AREA = .005934 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=6 CODE=1

HYDROGRAPH FROM AREA 113A

RUNOFF VOLUME = .83208 INCHES = .6124 ACRE-FEET
PEAK DISCHARGE RATE = 14.40 CFS AT 1.598 HOURS BASIN AREA = .0138 SQ. MI.

ADD HYD ID=7 HYD NO=113.1 ID=1 & 6
PRINT HYD ID=7 CODE=1

PARTIAL HYDROGRAPH 113.10

RUNOFF VOLUME = .85365 INCHES = 3.8312 ACRE-FEET
PEAK DISCHARGE RATE = 75.53 CFS AT 1.665 HOURS BASIN AREA = .0842 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=113B AREA=0.0050 SQ MI
PER A=0 PER B=20 PER C=0 PER D=80
TP=0.30 HR MASS RAINFALL=-1

K = .163500HR TP = .300000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 7.0170 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.2700
AREA = .004000 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .318566HR TP = .300000HR K/TP RATIO = 1.061885 SHAPE CONSTANT, N = 3.325462
UNIT PEAK = 1.0245 CFS UNIT VOLUME = .9858 B = 307.36 P60 = 1.2700
AREA = .001000 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 113B

RUNOFF VOLUME = 1.03669 INCHES = .2764 ACRE-FEET
PEAK DISCHARGE RATE = 5.16 CFS AT 1.665 HOURS BASIN AREA = .0050 SQ. MI.

ADD HYD ID=1 HYD NO=113.1 ID=7 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 113.10

RUNOFF VOLUME = .86391 INCHES = 4.1076 ACRE-FEET
 PEAK DISCHARGE RATE = 80.69 CFS AT 1.665 HOURS BASIN AREA = .0892 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0052 DIA=5 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.26	.39	.99	2.22
.52	1.09	4.28	3.06
.78	1.96	9.94	3.63
1.04	2.97	17.88	4.06
1.30	4.07	27.92	4.39
1.56	5.25	39.83	4.64
1.82	6.48	53.37	4.81
2.08	7.75	68.23	4.93
2.35	9.04	84.11	4.99
2.61	10.35	100.67	5.00
2.87	11.64	117.53	5.00
3.13	12.92	134.29	5.00
3.39	14.16	150.51	5.00
3.65	15.35	165.70	5.00
3.91	16.47	179.30	5.00
4.17	17.49	190.61	5.00
4.43	18.39	198.70	5.00
4.69	19.13	202.03	5.00
5.00	19.63	202.03	5.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=1090 FT SLP=.0052

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.261	.390	.99	.1200
.521	1.086	4.28	.0769
.782	1.961	9.94	.0597
1.042	2.966	17.88	.0502
1.303	4.069	27.92	.0441
1.563	5.246	39.83	.0399
1.824	6.479	53.37	.0368
2.084	7.749	68.23	.0344
2.345	9.043	84.11	.0326
2.606	10.345	100.67	.0311
2.866	11.641	117.53	.0300
3.127	12.918	134.29	.0291
3.387	14.159	150.51	.0285
3.648	15.348	165.70	.0280
3.908	16.467	179.30	.0278

4.169	17.492	190.61	.0278
4.429	18.395	198.70	.0280
4.690	19.130	202.03	.0287
5.000	19.635	202.03	.0294

ROUTE ID=3 HYD NO=113.2 INFLOW ID=1 DT=0 HR
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 113.20

RUNOFF VOLUME = .86391 INCHES = 4.1076 ACRE-FEET
PEAK DISCHARGE RATE = 79.55 CFS AT 1.665 HOURS BASIN AREA = .0892 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114A AREA=0.0066 SQ MI
PER A=0 PER B=10 PER C=10 PER D=80
TP=0.133HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 20.893 CFS UNIT VOLUME = .9989 B = 526.28 P60 = 1.2700
AREA = .005280 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .124402HR TP = .133000HR K/TP RATIO = .935354 SHAPE CONSTANT, N = 3.781209
UNIT PEAK = 3.3775 CFS UNIT VOLUME = .9962 B = 340.31 P60 = 1.2700
AREA = .001320 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114A

RUNOFF VOLUME = 1.05562 INCHES = .3716 ACRE-FEET
PEAK DISCHARGE RATE = 10.87 CFS AT 1.499 HOURS BASIN AREA = .0066 SQ. MI.

ADD HYD ID=1 HYD NO=114.1 ID=2 & 3
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.10

RUNOFF VOLUME = .87712 INCHES = 4.4791 ACRE-FEET
PEAK DISCHARGE RATE = 85.03 CFS AT 1.665 HOURS BASIN AREA = .0958 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114B AREA=0.0051 SQ MI
PER A=0 PER B=20 PER C=0 PER D=80
TP=0.23 HR MASS RAINFALL=-1

K = .125350HR TP = .230000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106437
UNIT PEAK = 9.3357 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.2700
AREA = .004080 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .244234HR TP = .230000HR K/TP RATIO = 1.061885 SHAPE CONSTANT, N = 3.325462
UNIT PEAK = 1.3631 CFS UNIT VOLUME = .9894 B = 307.36 P60 = 1.2700
AREA = .001020 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114B

RUNOFF VOLUME = 1.03669 INCHES = .2820 ACRE-Feet
PEAK DISCHARGE RATE = 6.18 CFS AT 1.598 HOURS BASIN AREA = .0051 SQ. MI.

ADD HYD ID=1 HYD NO=114.2 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.20

RUNOFF VOLUME = .88518 INCHES = 4.7611 ACRE-Feet
PEAK DISCHARGE RATE = 90.72 CFS AT 1.665 HOURS BASIN AREA = .1009 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114C AREA=0.0019 SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.133HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.7664 CFS UNIT VOLUME = .9976 B = 526.28 P60 = 1.2700
AREA = .001710 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .141231HR TP = .133000HR K/TP RATIO = 1.061885 SHAPE CONSTANT, N = 3.325462
UNIT PEAK = .43909 CFS UNIT VOLUME = .9686 B = 307.36 P60 = 1.2700
AREA = .000190 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114C

RUNOFF VOLUME = 1.13749 INCHES = .1153 ACRE-Feet
PEAK DISCHARGE RATE = 3.32 CFS AT 1.499 HOURS BASIN AREA = .0019 SQ. MI.

ADD HYD ID=1 HYD NO=114.3 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.30

RUNOFF VOLUME = .88985 INCHES = 4.8763 ACRE-Feet
PEAK DISCHARGE RATE = 92.39 CFS AT 1.665 HOURS BASIN AREA = .1028 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114D AREA=0.0205 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.22 HR MASS RAINFALL=-1

K = .119900HR TP = .220000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 27.952 CFS UNIT VOLUME = .9997 B = 526.28 P60 = 1.2700
AREA = .011685 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .214194HR TP = .220000HR K/TP RATIO = .973607 SHAPE CONSTANT, N = 3.627688
UNIT PEAK = 13.204 CFS UNIT VOLUME = .9990 B = 329.53 P60 = 1.2700
AREA = .008815 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114D

RUNOFF VOLUME = .83208 INCHES = .9097 ACRE-Feet
PEAK DISCHARGE RATE = 20.91 CFS AT 1.598 HOURS BASIN AREA = .0205 SQ. MI.

ADD HYD ID=1 HYD NO=114.4 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.40

RUNOFF VOLUME = .88023 INCHES = 5.7860 ACRE-Feet
PEAK DISCHARGE RATE = 111.12 CFS AT 1.665 HOURS BASIN AREA = .1233 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=114E AREA=0.0132 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.30 HR MASS RAINFALL=-1

K = .163500HR TP = .300000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420

UNIT PEAK = 13.199 CFS UNIT VOLUME = .9991 B = 526.28 P60 = 1.2700
 AREA = .007524 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .292082HR TP = .300000HR K/TP RATIO = .973607 SHAPE CONSTANT, N = 3.627690
 UNIT PEAK = 6.2348 CFS UNIT VOLUME = .9977 B = 329.53 P60 = 1.2700
 AREA = .005676 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 114E

RUNOFF VOLUME = .83208 INCHES = .5858 ACRE-FEET
 PEAK DISCHARGE RATE = 11.02 CFS AT 1.665 HOURS BASIN AREA = .0132 SQ. MI.

ADD HYD ID=1 HYD NO=114.5 ID=1 & 2
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 114.50

RUNOFF VOLUME = .87557 INCHES = 6.3718 ACRE-FEET
 PEAK DISCHARGE RATE = 122.15 CFS AT 1.665 HOURS BASIN AREA = .1365 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.0042 DIA=6.0 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.31	.56	1.44	2.67
.63	1.56	6.25	3.67
.94	2.82	14.53	4.36
1.25	4.27	26.13	4.87
1.56	5.86	40.80	5.27
1.88	7.55	58.21	5.56
2.19	9.33	77.99	5.78
2.50	11.16	99.72	5.92
2.81	13.02	122.93	5.99
3.13	14.90	147.12	6.00
3.44	16.76	171.75	6.00
3.75	18.60	196.25	6.00
4.06	20.39	219.95	6.00
4.38	22.10	242.15	6.00
4.69	23.71	262.02	6.00
5.00	25.19	278.55	6.00

5.32	26.49	290.38	6.00
5.63	27.55	295.24	6.00
6.00	28.27	295.24	6.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=430 FT SLP=.0042

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ. FT.	FLOW RATE CFS	TRAVEL TIME HRS
.313	.562	1.44	.0466
.625	1.564	6.25	.0299
.938	2.824	14.53	.0232
1.251	4.271	26.13	.0195
1.563	5.859	40.80	.0172
1.876	7.554	58.21	.0155
2.189	9.329	77.99	.0143
2.501	11.159	99.72	.0134
2.814	13.022	122.93	.0127
3.127	14.897	147.12	.0121
3.439	16.764	171.75	.0117
3.752	18.601	196.25	.0113
4.065	20.388	219.95	.0111
4.377	22.101	242.15	.0109
4.690	23.712	262.02	.0108
5.003	25.189	278.55	.0108
5.315	26.489	290.38	.0109
5.628	27.547	295.24	.0111
6.000	28.274	295.24	.0114

ROUTE ID=3 HYD NO=114.6 INFLOW ID=1 DT=0 HR
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 114.60

RUNOFF VOLUME = .87557 INCHES = 6.3718 ACRE-FEET
PEAK DISCHARGE RATE = 122.25 CFS AT 1.665 HOURS BASIN AREA = .1365 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115A AREA=0.0153 SQ MI
PER A=0 PER B=28 PER C=15 PER D=57
TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 26.998 CFS UNIT VOLUME = .9997 B = 526.28 P60 = 1.2700
AREA = .008721 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .165513HR TP = .170000HR K/TP RATIO = .973607 SHAPE CONSTANT, N = 3.627688
UNIT PEAK = 12.753 CFS UNIT VOLUME = .9990 B = 329.53 P60 = 1.2700
AREA = .006579 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115A

RUNOFF VOLUME = .83208 INCHES = .6790 ACRE-FEET
PEAK DISCHARGE RATE = 18.03 CFS AT 1.532 HOURS BASIN AREA = .0153 SQ. MI.

ADD HYD ID=1 HYD NO=115.1 ID=2 & 3
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.10

RUNOFF VOLUME = .87118 INCHES = 7.0507 ACRE-FEET
PEAK DISCHARGE RATE = 134.58 CFS AT 1.665 HOURS BASIN AREA = .1518 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115B AREA=0.0021 SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 5.8509 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.2700
AREA = .001890 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .180520HR TP = .170000HR K/TP RATIO = 1.061885 SHAPE CONSTANT, N = 3.325462
UNIT PEAK = .37968 CFS UNIT VOLUME = .9633 B = 307.36 P60 = 1.2700
AREA = .000210 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115B

RUNOFF VOLUME = 1.13749 INCHES = .1274 ACRE-FEET
PEAK DISCHARGE RATE = 3.27 CFS AT 1.532 HOURS BASIN AREA = .0021 SQ. MI.

ADD HYD ID=1 HYD NO=115.2 ID=1 & 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.20

RUNOFF VOLUME = .87482 INCHES = 7.1781 ACRE-FEET
 PEAK DISCHARGE RATE = 137.00 CFS AT 1.632 HOURS BASIN AREA = .1539 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=115C AREA=0.0021 SQ MI
 PER A=0 PER B=10 PER C=0 PER D=90
 TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 5.8509 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.2700
 AREA = .001890 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .180520HR TP = .170000HR K/TP RATIO = 1.061885 SHAPE CONSTANT, N = 3.325462
 UNIT PEAK = .37968 CFS UNIT VOLUME = .9633 B = 307.36 P60 = 1.2700
 AREA = .000210 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 115C

RUNOFF VOLUME = 1.13749 INCHES = .1274 ACRE-FEET
 PEAK DISCHARGE RATE = 3.27 CFS AT 1.532 HOURS BASIN AREA = .0021 SQ. MI.

ADD HYD ID=1 HYD NO=115.3 ID=1 & 2
 PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 115.30

RUNOFF VOLUME = .87835 INCHES = 7.3055 ACRE-FEET
 PEAK DISCHARGE RATE = 139.52 CFS AT 1.632 HOURS BASIN AREA = .1560 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.006 DIA=6 FT N=.013

RATING CURVE PIPE SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.31	.56	1.72	2.67
.63	1.56	7.47	3.67
.94	2.82	17.37	4.36
1.25	4.27	31.23	4.87
1.56	5.86	48.77	5.27
1.88	7.55	69.58	5.56

2.19	9.33	93.22	5.78
2.50	11.16	119.19	5.92
2.81	13.02	146.92	5.99
3.13	14.90	175.84	6.00
3.44	16.76	205.29	6.00
3.75	18.60	234.56	6.00
4.06	20.39	262.89	6.00
4.38	22.10	289.43	6.00
4.69	23.71	313.18	6.00
5.00	25.19	332.94	6.00
5.32	26.49	347.07	6.00
5.63	27.55	352.88	6.00
6.00	28.27	352.88	6.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=1070 FT SLP=.006

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.313	.562	1.72	.0971
.625	1.564	7.47	.0622
.938	2.824	17.37	.0483
1.251	4.271	31.23	.0406
1.563	5.859	48.77	.0357
1.876	7.554	69.58	.0323
2.189	9.329	93.22	.0297
2.501	11.159	119.19	.0278
2.814	13.022	146.92	.0263
3.127	14.897	175.84	.0252
3.439	16.764	205.29	.0243
3.752	18.601	234.56	.0236
4.065	20.388	262.89	.0231
4.377	22.101	289.43	.0227
4.690	23.712	313.18	.0225
5.003	25.189	332.94	.0225
5.315	26.489	347.07	.0227
5.628	27.547	352.88	.0232
6.000	28.274	352.88	.0238

ROUTE ID=3 HYD NO=115.4 INFLOW ID=1 DT=0 HR
 PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 115.40

RUNOFF VOLUME = .87835 INCHES = 7.3055 ACRE-FEET
 PEAK DISCHARGE RATE = 138.95 CFS AT 1.665 HOURS BASIN AREA = .1560 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=116.0 AREA=0.03231 SQ MI
 PER A=0 PER B=28 PER C=15 PER D=57
 TP=0.17 HR MASS RAINFALL=-1

K = .092650HR TP = .170000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 57.013 CFS UNIT VOLUME = 1.000 B = 526.28 P60 = 1.2700
AREA = .018417 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .165513HR TP = .170000HR K/TP RATIO = .973607 SHAPE CONSTANT, N = 3.627688
UNIT PEAK = 26.931 CFS UNIT VOLUME = .9996 B = 329.53 P60 = 1.2700
AREA = .013893 SQ MI IA = .44767 INCHES INF = 1.10349 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 116.00

RUNOFF VOLUME = .83208 INCHES = 1.4338 ACRE-FEET
PEAK DISCHARGE RATE = 38.06 CFS AT 1.532 HOURS BASIN AREA = .0323 SQ. MI.

ADD HYD ID=3 HYD NO=116.1 ID=2 & 3
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 116.10

RUNOFF VOLUME = .87041 INCHES = 8.7393 ACRE-FEET
PEAK DISCHARGE RATE = 166.53 CFS AT 1.632 HOURS BASIN AREA = .1883 SQ. MI.

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=.03 DIA=4.5 FT N=.013

RATING CURVE PIPE SECTION 1.0			
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.23	.32	1.79	2.00
.47	.88	7.76	2.75
.70	1.59	18.03	3.27
.94	2.40	32.43	3.66
1.17	3.30	50.63	3.95
1.41	4.25	72.24	4.17
1.64	5.25	96.79	4.33
1.88	6.28	123.75	4.44
2.11	7.32	152.55	4.49
2.35	8.38	182.57	4.50
2.58	9.43	213.14	4.50
2.81	10.46	243.54	4.50
3.05	11.47	272.96	4.50
3.28	12.43	300.51	4.50
3.52	13.34	325.17	4.50

3.75	14.17	345.68	4.50
3.99	14.90	360.36	4.50
4.22	15.50	366.39	4.50
4.50	15.90	366.39	4.50

COMPUTE TRAVEL TIME ID=1 REACH NO=1 NO VS=1 L=1050 FT SLP=.03

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ. FT.	FLOW RATE CFS	TRAVEL TIME HRS
.235	.316	1.79	.0516
.469	.880	7.76	.0331
.704	1.588	18.03	.0257
.938	2.402	32.43	.0216
1.173	3.296	50.63	.0190
1.407	4.249	72.24	.0172
1.641	5.248	96.79	.0158
1.876	6.277	123.75	.0148
2.111	7.325	152.55	.0140
2.345	8.380	182.57	.0134
2.579	9.430	213.14	.0129
2.814	10.463	243.54	.0125
3.049	11.468	272.96	.0123
3.283	12.432	300.51	.0121
3.518	13.338	325.17	.0120
3.752	14.169	345.68	.0120
3.987	14.900	360.36	.0121
4.221	15.495	366.39	.0123
4.500	15.904	366.39	.0127

ROUTE ID=1 HYD NO=116.2 INFLOW ID=3 DT=0 HR
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 116.20

RUNOFF VOLUME = .87041 INCHES = 8.7393 ACRE-FEET
PEAK DISCHARGE RATE = 165.99 CFS AT 1.632 HOURS BASIN AREA = .1883 SQ. MI.

COMPUTE NM HYD ID=2 HYD NO=117.0 AREA=0.00391 SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 13.893 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 1.2700
AREA = .003519 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .141549HR TP = .133300HR K/TP RATIO = 1.061885 SHAPE CONSTANT, N = 3.325462
UNIT PEAK = .90157 CFS UNIT VOLUME = .9845 B = 307.36 P60 = 1.2700

$$\frac{V^2}{2g} = 0.2' \text{ where } V = 3.6 \text{ fps}$$

old
C&G Roll
C&G

STREET CAPACITY

V fps	$\frac{V^2}{2g}$	D	Roll C&G
4	0.25	0.62	0.396
5	0.39	0.48	0.2
6	0.56	0.31	
7	0.76	0.21	

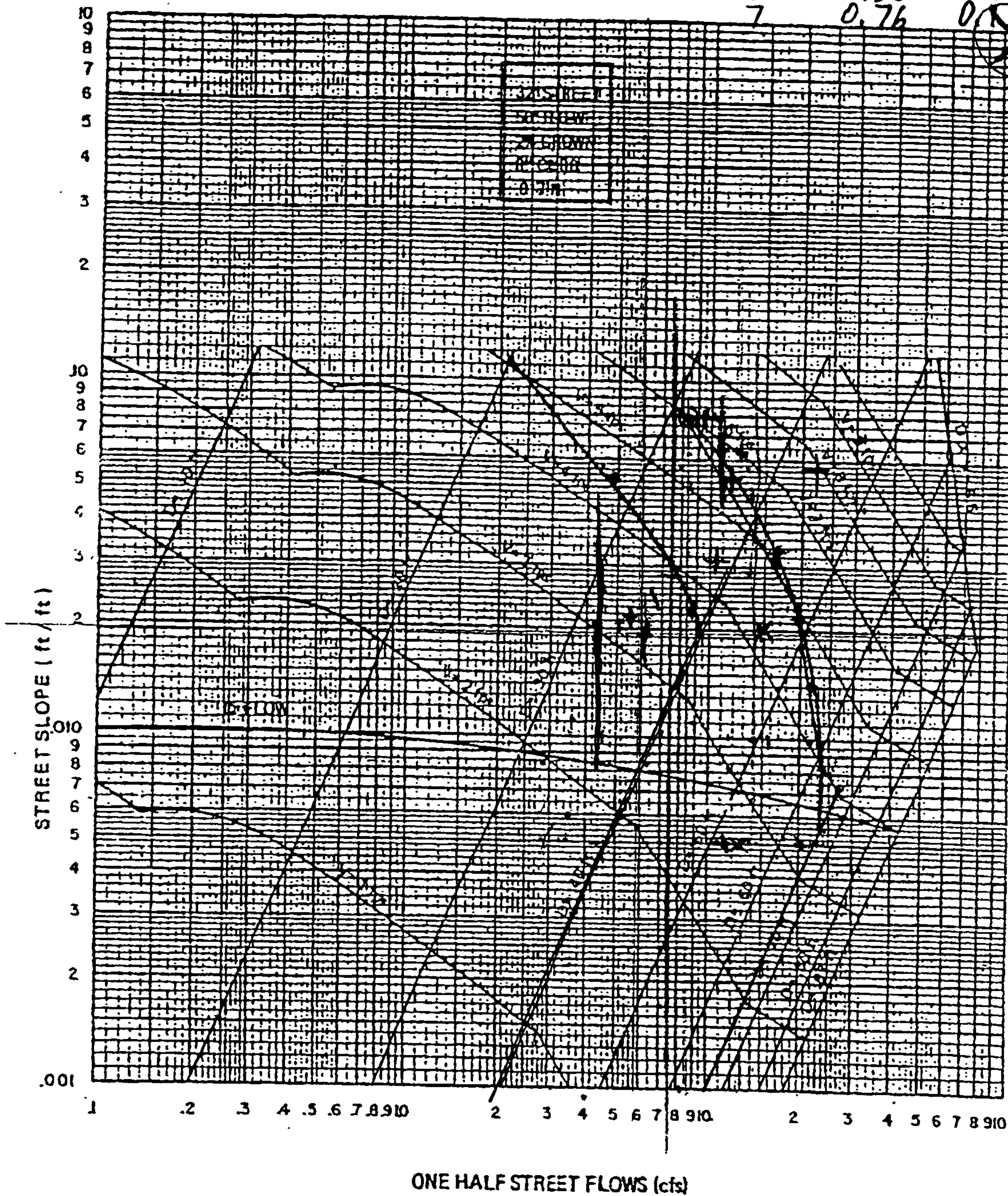


PLATE 22.3 D-1

STREET CAPACITY

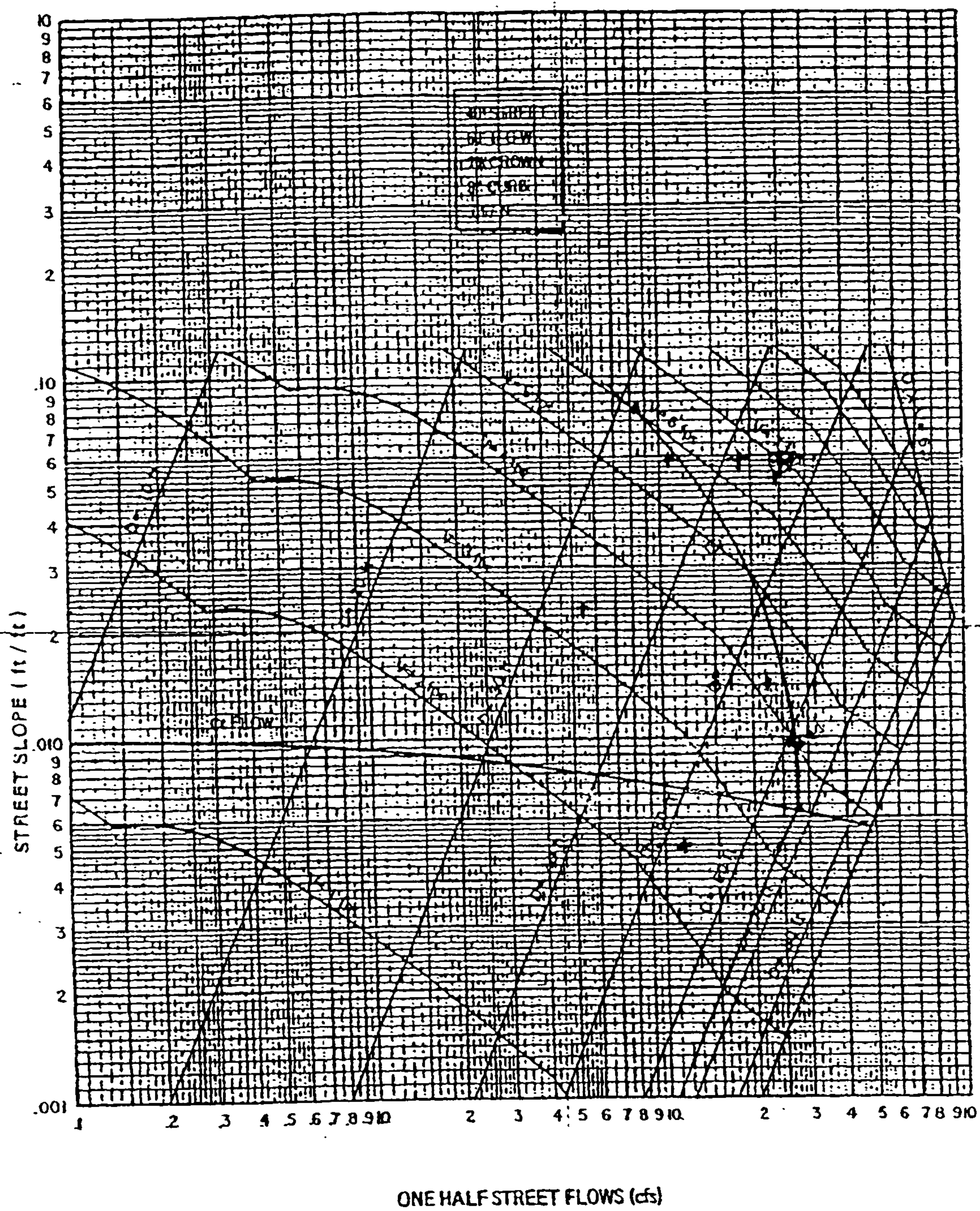


PLATE 22.3 D-2

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Jan 28, 2002 18:16:39

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Input file : SWYND.DAT
Output file: SWYND.OUT
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T1 SOUTHWYND/TOWER ROAD STORM DRAIN HGL CALCULATIONS
T2 ENTERED BY JAMES D. HUGHES DATE: JAN 28, 2002
T3 MAIN LINE ANALYSIS

1

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

[illegible]

PAGE NO 1

PAGE NO 2

PAGE NO 2

PAGE NO 3

1

0 WATER SURFACE PROFILE - ELEMENT CARD LISTING

0 ELEMENT NO	12 IS A TRANSITION	U/S DATA	STATION	INVERT	SECT	N										
			2044.00	54.25	9	.013										
0 ELEMENT NO	13 IS A REACH	U/S DATA	STATION	INVERT	SECT	N						RADIUS	ANGLE	ANG PT	MAN H	
			3110.00	59.84	9	.013						.00	.00	.00	1	
0 ELEMENT NO	14 IS A REACH	U/S DATA	STATION	INVERT	SECT	N						RADIUS	ANGLE	ANG PT	MAN H	
			3540.00	61.99	9	.013						.00	.00	.00	1	
0 ELEMENT NO	15 IS A JUNCTION	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4		
			3542.00	62.00	9	4	0	.013	80.5	.0	63.13	.00	90.00	.00		
0 ELEMENT NO	16 IS A TRANSITION	U/S DATA	STATION	INVERT	SECT	N										
			3544.00	62.99	3	.013										
0 ELEMENT NO	17 IS A REACH	U/S DATA	STATION	INVERT	SECT	N						RADIUS	ANGLE	ANG PT	MAN H	
			4079.00	67.00	3	.013						.00	.00	.00	1	
0 ELEMENT NO	18 IS A JUNCTION	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4		
			4085.00	67.31	3	4	0	.013	19.0	.0	67.13	.00	90.00	.00		
0 ELEMENT NO	19 IS A REACH	U/S DATA	STATION	INVERT	SECT	N						RADIUS	ANGLE	ANG PT	MAN H	
			4655.00	69.02	3	.013						.00	.00	.00	1	
0 ELEMENT NO	20 IS A JUNCTION	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4		
			4658.00	69.03	3	4	0	.013	29.4	.0	68.68	.00	90.00	.00		
0 ELEMENT NO	21 IS A TRANSITION	U/S DATA	STATION	INVERT	SECT	N										
			4661.00	69.52	4	.013										

PAGE NO 4

1 WATER SURFACE PROFILE - ELEMENT CARD LISTING

0 ELEMENT NO	22 IS A REACH	U/S DATA	STATION	INVERT	SECT	N										
			5051.00	70.90	4	.013						RADIUS	ANGLE	ANG PT	MAN H	
												.00	.00	45.30	1	
0 ELEMENT NO	23 IS A REACH	U/S DATA	STATION	INVERT	SECT	N						RADIUS	ANGLE	ANG PT	MAN H	
			5261.00	72.85	4	.013						.00	.00	.00	1	
0 ELEMENT NO	24 IS A JUNCTION	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4		
			5267.00	72.95	4	6	6	.013	25.4	25.4	77.29	77.29	66.00	66.00		
0 ELEMENT NO	25 IS A REACH	U/S DATA	STATION	INVERT	SECT	N						RADIUS	ANGLE	ANG PT	MAN H	
			5377.00	73.16	4	.013						.00	.00	45.30	1	
0 ELEMENT NO	26 IS A SYSTEM HEADWORKS	U/S DATA	STATION	INVERT	SECT							W S ELEV				
			5377.00	73.16	4							.00				

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

1

PAGE 1

WATER SURFACE PROFILE LISTING
SOUTHWYND/TOWER ROAD STORM DRAIN HGL CALCULATIONS

ENTERED BY JAMES D. HUGHES DATE: JAN 28, 2002

MAIN LINE ANALYSIS

0 STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
0 L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		

0	.00	14.12	5.88	20.00	1200.0	7.38	.85	20.85	.00	4.89	7.50	10.00	3.00	0	.00
0	1.31	.00383					.00080	.00		4.09			3.00		
0	1.31	14.13	5.87	20.00	1200.0	7.40	.85	20.85	.00	4.89	7.50	10.00	3.00	0	.00
OHYDRAULIC JUMP													3.00		
0	1.31	14.13	4.01	18.13	1200.0	13.59	2.87	21.00	.00	4.89	7.50	10.00	3.00	0	.00
0	202.97	.00383					.00433	.88		4.09			3.00		
0	204.28	14.90	3.94	18.84	1200.0	13.97	3.03	21.87	.00	4.89	7.50	10.00	3.00	0	.00
0	187.69	.00383					.00480	.90		4.09			3.00		
0	391.97	15.62	3.82	19.44	1200.0	14.65	3.34	22.77	.00	4.89	7.50	10.00	3.00	0	.00
0	131.99	.00383					.00547	.72		4.09			3.00		
0	523.96	16.13	3.70	19.83	1200.0	15.36	3.67	23.50	.00	4.89	7.50	10.00	3.00	0	.00
0	105.47	.00383					.00623	.66		4.09			3.00		
0	629.43	16.53	3.59	20.12	1200.0	16.11	4.04	24.15	.00	4.89	7.50	10.00	3.00	0	.00
0	89.71	.00383					.00709	.64		4.09			3.00		
0	719.13	16.87	3.48	20.35	1200.0	16.90	4.44	24.79	.00	4.89	7.50	10.00	3.00	0	.00
0	79.10	.00383					.00807	.64		4.09			3.00		
0	798.24	17.18	3.37	20.54	1200.0	17.73	4.88	25.43	.00	4.89	7.50	10.00	3.00	0	.00
0	71.37	.00383					.00919	.66		4.09			3.00		
0	869.60	17.45	3.26	20.71	1200.0	18.59	5.37	26.08	.00	4.89	7.50	10.00	3.00	0	.00
0	65.40	.00383					.01047	.68		4.09			3.00		
0	935.00	17.70	3.16	20.86	1200.0	19.50	5.91	26.77	.00	4.89	7.50	10.00	3.00	0	.00
0	935.00	17.70	4.89	22.59	1200.0	9.94	1.53	24.13	.00	4.89	7.50	10.00	3.00	0	.00

PAGE 2

WATER SURFACE PROFILE LISTING

SOUTHWYND/TOWER ROAD STORM DRAIN HGL CALCULATIONS

ENTERED BY JAMES D. HUGHES DATE: JAN 28, 2002

MAIN LINE ANALYSIS

0 STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
0 L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		

0JUNCT STR	.01000						.00091	.00					3.00		
0	936.00	17.71	6.38	24.09	288.1	1.55	.04	24.13	.00	2.33	7.50	10.00	3.00	0	.00
0TRANS STR	.01000						.00024	.00					3.00		
0	937.00	17.72	6.13	23.85	288.1	4.70	.34	24.19	.00	2.95	50.00	10.00	.00	0	.00
0	29.61	.00371					.00045	.01		2.80			.00		
0	966.61	17.83	6.02	23.85	288.1	4.79	.36	24.20	.00	2.95	50.00	10.00	.00	0	.00
OHYDRAULIC JUMP													.00		
0	966.61	17.83	1.19	19.02	288.1	24.24	9.13	28.15	.00	2.95	50.00	10.00	.00	0	.00
0	15.11	.00371					.05049	.76		2.80			.00		
0	981.72	17.89	1.14	19.03	288.1	25.20	9.87	28.90	.00	2.95	50.00	10.00	.00	0	.00
0	17.28	.00371					.05775	1.00		2.80			.00		
0	999.00	17.95	1.09	19.04	288.1	26.43	10.86	29.90	.00	2.95	50.00	10.00	.00	0	.00
0TRANS STR	.01000						.04669	.05					.00		
0	1000.00	17.96	2.58	20.54	288.1	24.79	9.55	30.09	.00	4.64	6.00	.00	.00	0	.00
0	39.00	.02051					.03258	1.27		2.91			.00		
0	1039.00	18.76	2.53	21.29	288.1	25.46	10.08	31.36	.00	4.64	6.00	.00	.00	0	.00
0JUNCT STR	.00500						.03535	.07					.00		

0	1041.00	18.77	2.44	21.21	282.3	26.17	10.65	31.85	.00	4.60		6.00	.00	.00	0	.00
	OTRANS STR	.49500					.03414	.07					.00			
0	1043.00	19.76	3.08	22.84	282.3	24.38	9.24	32.07	.00	4.36		4.50	.00	.00	0	.00
0	141.47	.03133					.03134	4.43			3.08		.00			
0	1184.47	24.19	3.08	27.27	282.3	24.38	9.24	36.50	.00	4.36		4.50	.00	.00	0	.00

1

PAGE 3

WATER SURFACE PROFILE LISTING

SOUTHWYND/TOWER ROAD STORM DRAIN HGL CALCULATIONS

ENTERED BY JAMES D. HUGHES DATE: JAN 28, 2002

MAIN LINE ANALYSIS

0	STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.EL. HF	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
0	L/ELEM	SO									NORM DEPTH		ZR		

0	419.22	.03133					.03054	12.80			3.08		.00		
0	1603.69	37.33	3.14	40.46	282.3	23.85	8.84	49.31	.00	4.36	4.50	.00	.00	0	.00
0	208.41	.03133					.02816	5.87			3.08		.00		
0	1812.10	43.86	3.28	47.14	282.3	22.74	8.04	55.18	.00	4.36	4.50	.00	.00	0	.00
0	94.16	.03133					.02521	2.37			3.08		.00		
0	1906.25	46.81	3.43	50.24	282.3	21.69	7.31	57.55	.00	4.36	4.50	.00	.00	0	.00
0	57.03	.03133					.02268	1.29			3.08		.00		
0	1963.28	48.60	3.60	52.20	282.3	20.68	6.64	58.84	.00	4.36	4.50	.00	.00	0	.00
0	38.10	.03133					.02057	.78			3.08		.00		
0	2001.37	49.79	3.80	53.59	282.3	19.71	6.04	59.63	.00	4.36	4.50	.00	.00	0	.00
0	25.63	.03133					.01892	.48			3.08		.00		
0	2027.00	50.59	4.03	54.62	282.3	18.80	5.49	60.11	.00	4.36	4.50	.00	.00	0	.00
0	13.00	.03133					.01816	.24			3.08		.00		
0	2040.00	51.00	4.36	55.36	282.3	17.92	4.99	60.35	.00	4.36	4.50	.00	.00	0	.00
0	0JUNCT STR	.00500					.01617	.03					.00		
0	2042.00	51.01	7.51	58.52	234.7	14.76	3.38	61.91	.00	4.22	4.50	.00	.00	0	.00
0	OTRANS STR	1.62000					.00956	.02					.00		
0	2044.00	54.25	6.35	60.60	234.7	9.88	1.52	62.11	.00	4.28	5.50	.00	.00	0	.00
0	1066.00	.00524					.00488	5.21			4.34		.00		
0	3110.00	59.84	6.04	65.88	234.7	9.88	1.52	67.40	.00	4.28	5.50	.00	.00	0	.00
0	430.00	.00500					.00488	2.10			4.45		.00		
0	3540.00	61.99	6.07	68.06	234.7	9.88	1.52	69.57	.00	4.28	5.50	.00	.00	0	.00

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PAGE 4

WATER SURFACE PROFILE LISTING

SOUTHWYND/TOWER ROAD STORM DRAIN HGL CALCULATIONS

ENTERED BY JAMES D. HUGHES DATE: JAN 28, 2002

MAIN LINE ANALYSIS

0	STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.EL. HF	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
0	L/ELEM	SO									NORM DEPTH		ZR		

0	0JUNCT STR	.00500					.00350	.01					.00		
0	3542.00	62.00	7.79	69.79	154.2	6.49	.65	70.44	.00	3.47	5.50	.00	.00	0	.00
0	OTRANS STR	.49500					.00413	.01					.00		
0	3544.00	62.99	6.16	69.15	154.2	9.70	1.46	70.61	.00	3.64	4.50	.00	.00	0	.00
0	535.00	.00750					.00615	3.29			3.36		.00		
0	4079.00	67.00	5.51	72.51	154.2	9.70	1.46	73.97	.00	3.64	4.50	.00	.00	0	.00
0	0JUNCT STR	.05167					.00544	.03					.00		
0	4085.00	67.31	5.91	73.22	135.2	8.50	1.12	74.34	.00	3.42	4.50	.00	.00	0	.00
0	570.00	.00300					.00473	2.69			4.50		.00		

PAGE 5

SOUTHWYND/TOWER ROAD STORM DRAIN HGL CALCULATIONS

MAIN LINE ANALYSIS

ZR

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D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539

40/ D020
File

January 24, 2006

Mr. Brad Bingham
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Southwynd

Dear Mr. Bingham:

Please administratively approve the amended grading plan dated November 5, 2002 since that was the final plan as submitted to FEMA for CLOMR, also please approve the previously submitted Engineers certification done on that plan. That certification will be the primary documentation for the LOMR and should be done on the plan that was submitted to FEMA in the CLOMR, the most recent plan.

I have corrected sheet 2 of the certification so it is now on the most current plan dated August 9, 2002. Sheet 1 of the certification was done on the mylar and we have no copy of that sheet prior to the certification. You should find one in your file with the CLOMR.

Please contact our office if you have any questions.

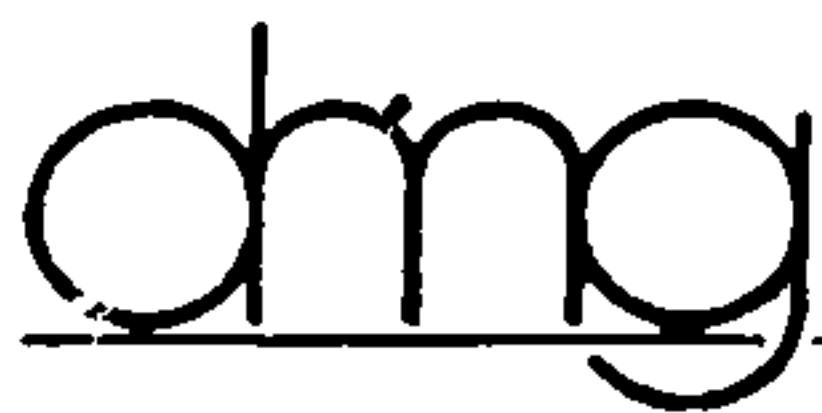
Sincerely,

MARK GOODWIN AND ASSOCIATES, P.A.

James D. Hughes, PE
Senior Engineer

JDH/blc

cc: Russ Grayson w/ attachments



D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmgs@swcp.com

November 5, 2002

Mr. Rajib De
PBS & J
12101 Indian Creek Court
Beltsville, MD 20705

Re: Southwynd Subdivision, Case # 02-06-2608R

Dear Mr. De:

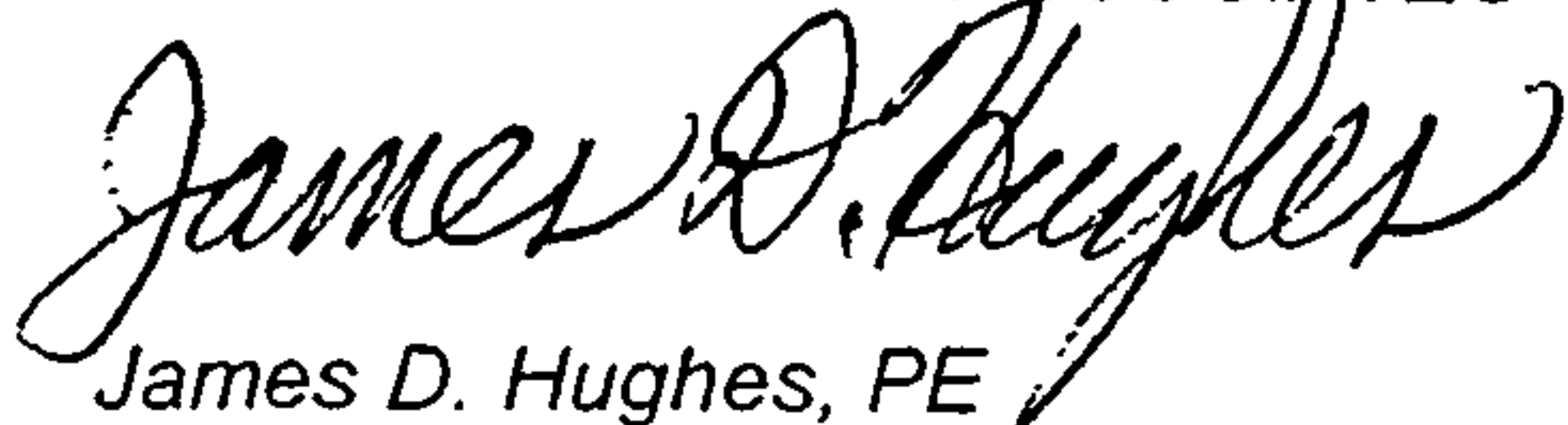
Enclosed please find the following items.

1. AHYMO-97 Printout and Digital files. (Note that the results are the same as AHYMO 94 and volume calculations are by hand and not included in AHYMO.)
2. Revised work Map titled "Grading & Drainage Plan", which now shows only one pond. The combination of the dimensioned pond on the Grading Plan and the Plat with lot line dimensions provides sufficient detail for both construction and volume calculations.
 - A) The record drawing as approved by City of Albuquerque,
 - B) The grading plan modified to show the pond in place of lots 2 thru. 6,
 - C) The recorded southwynd Plat showing one tract where the pond is to be located (ie... Tract 'A' instead of lots 2 thru 6),
 - D) Revised Volume Calculations,
 - E) Construction Plans for the Storm Sewer.
3. Annotated FIRM showing pipes as dotted lines and retention pond. Please reference Case # 02-06-1421R for documentation of the storm sewer west of 82nd St. On Tower Rd.)

If you have any questions please contact me.

Sincerely,

MARK GOODWIN & ASSOCIATES

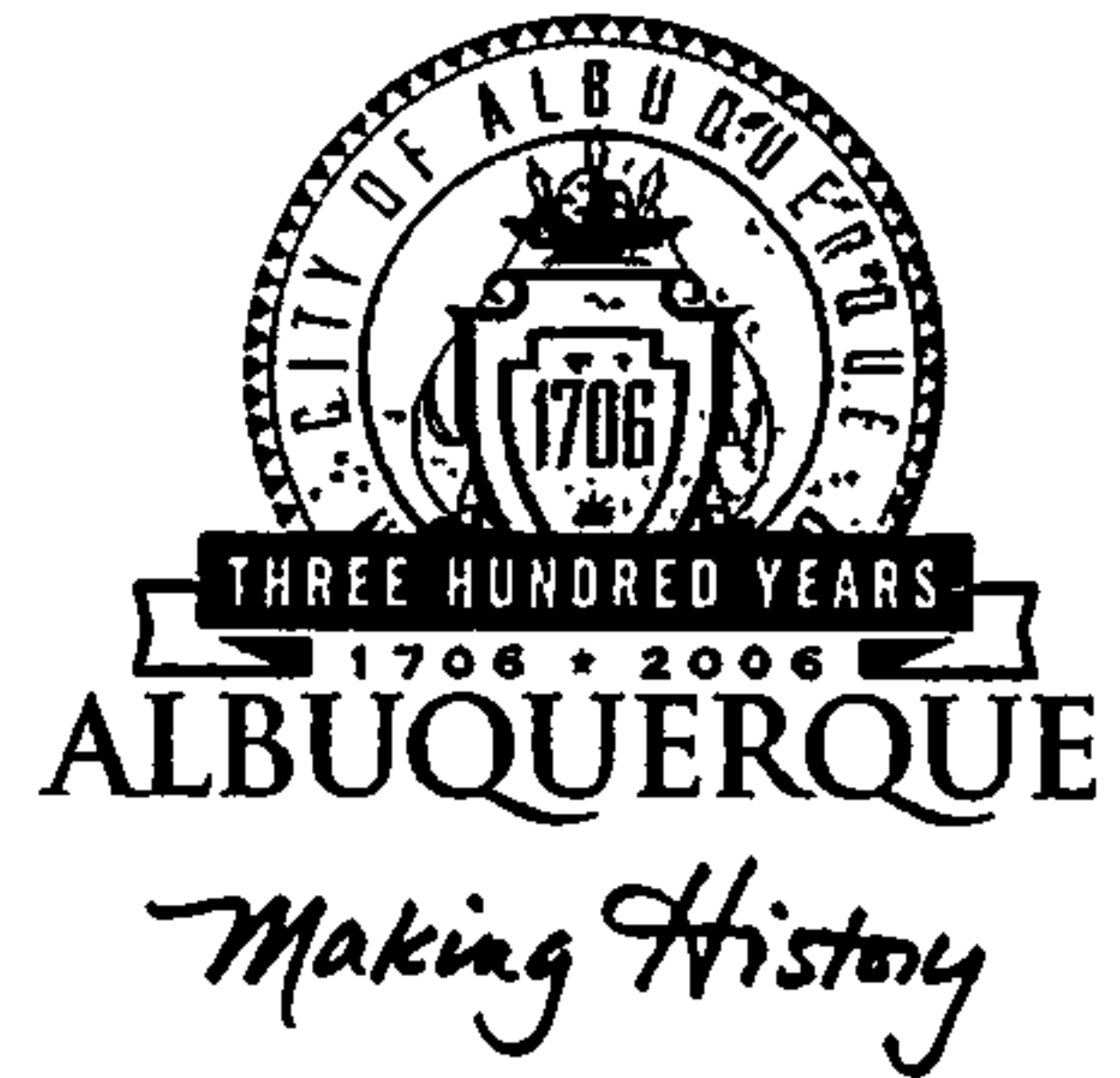


James D. Hughes, PE

JDH/bm

xc: Carlos Montoya — City of Albuquerque
Robert Lupton — Savage-Thomas Homes, Inc.

CITY OF ALBUQUERQUE



October 31, 2005

Mr. James D. Hughes, PE
MARK GOODWIN & ASSOCIATES
P.O. Box 90606
Albuquerque, NM 87119

RE: SOUTHWYND SUBDIVISION (L-10/D20)
Engineers Certification for Release of Financial Guaranty
Approved Engineers Stamp dated 08/09/2002
Submitted Engineers Stamp dated 11/05/2002
Engineers Certification dated 10/26/2005

Dear Doug:

P.O. Box 1293

Based upon the information provided in your Engineer's Certification Submittal dated 10/31/2005, the above referenced plan cannot be approved for Grading and Drainage Certification for Release of Financial Guaranty.

Albuquerque

2. The Approved Grading and Drainage Plan has an Engineer's Seal date of 08/09/2002 not 11/05/2002 as indicated in your submittal. (See attached copies of Grading Plan approval letter and Engineer's Seal).

New Mexico 87103

If you have any questions, you can contact me at 924-3982.

www.cabq.gov

Sincerely,

Arlene V. Portillo
Plan Checker, Planning Dept.- Hydrology
Development and Building Services

C: File