U.S. Department of Homeland Security
500 C Street, SW
Washington, DC 20472

FEMA

W-09040
July 27, 2009

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

FROM: Jhun de la Cruz
Chief, Underwriting Branch
Risk Insurance Division

SUBJECT: NFIP Underwriting Bulletin – Guidelines for Determining the Conversion from NGVD 29 to NAVD 88

The National Flood Insurance Program (NFIP) requires an Elevation Certificate (EC) with specific elevation measurements to rate certain buildings. These measurements are sometimes recorded using different standards, either the National Geodetic Vertical Datum of 1929 (NGVD 29) or the North American Vertical Datum of 1988 (NAVD 88). The purpose of this memorandum is to assist in determining the conversion of NGVD 29 measurements to NAVD measurements for consistent use on the EC.

NAVD 88 has replaced NGVD 29 as the standard reference datum in the United States for surveying and mapping activities performed or financed by the Federal Government. Most recent Flood Insurance Rate Maps (FIRMs) use NAVD 88 datum, while older FIRMs use NGVD 29 datum. Although rare, some FIRMs are now being published with Base Flood Elevations (BFEs) in both NAVD 88 and NGVD 29 measurements.

New ECs and BFEs used for insurance rating must always use the same datum as the FIRM. When an existing EC provides the building elevations referenced to NGVD 29, and the BFEs on the FIRM are referenced to NAVD 88, the NGVD 29 elevation must be converted to NAVD 88. This conversion may be accomplished by using the conversion factor that FEMA utilized when the map datum was updated, or it may be calculated for the specific building location.

Various tools for obtaining the conversion factor and calculating the elevation referenced to NAVD 88 are described in the attachment and may be accessed on the following web sites:

- Map Service Center at http://msc.fema.gov (May provide conversion factor in Flood Insurance Study)
- NOAA at http://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl (Provides conversion tool)
- iTouchMap.com at http://itouchmap.com/latlong.html (Provides latitude and longitude)

If you have any questions, please contact David Zaika of my staff at 202-212-2068.

cc: IBHS, FIPNC, Vendors, Government Technical Representative
Required Routing: Underwriting

Attachment

Converting Existing Elevations When the Flood Map Vertical Datum Changes from NGVD 29 to NAVD 88

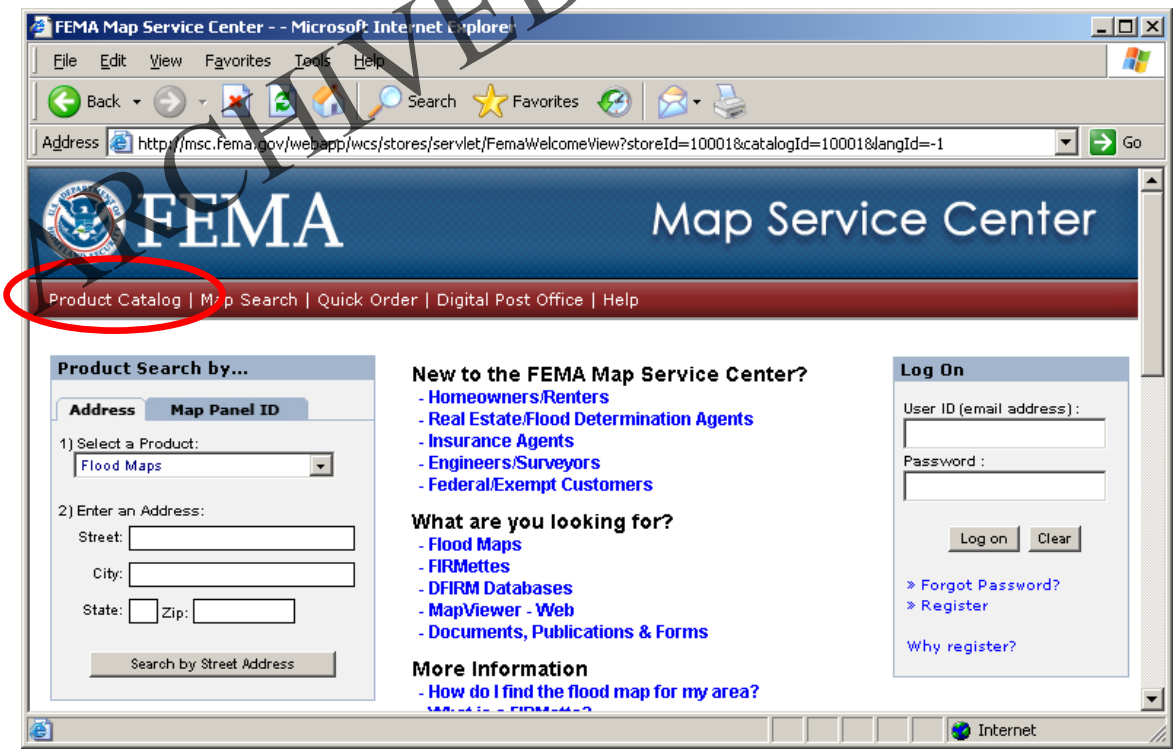
Elevations referenced to NGVD 29 can be converted to NAVD 88 by using a conversion factor. This conversion factor is just added to the NGVD 29 elevation to compute the equivalent NAVD 88 elevation. The simplest method is to use the offset used by FEMA.

In the eastern United States, the conversion factor is generally a single value for the whole community/county. NAVD 88 is lower than NGVD 29 in the east, so the conversion factor will be a negative number. The elevation converted to NAVD 88 will be a lower number than the elevation in NGVD 29.

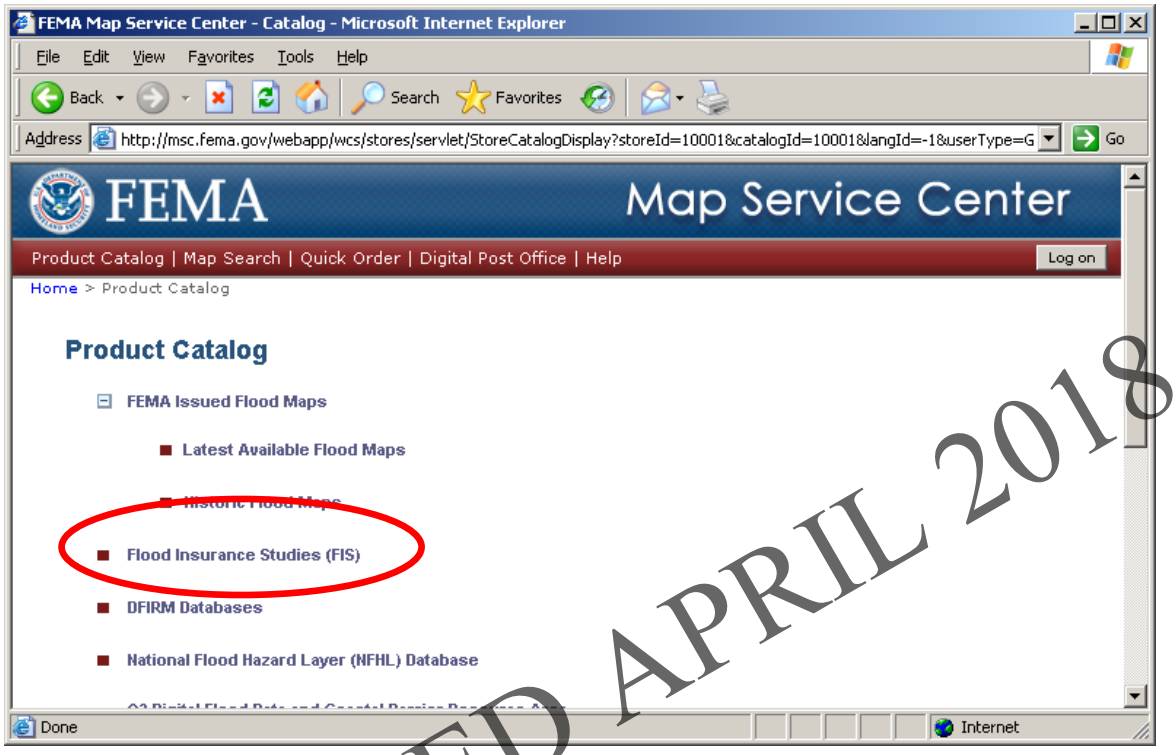
In the western United States, individual streams or watersheds have their own conversion factors. NAVD 88 is generally higher than NGVD 29, so the conversion factor will be a positive number. The elevation converted to NAVD 88 will be a higher number than the elevation in NGVD 29.

To find the offset used by FEMA, you generally need to look at the Flood Insurance Study for the community/county. You can access this online at http://msc.fema.gov.

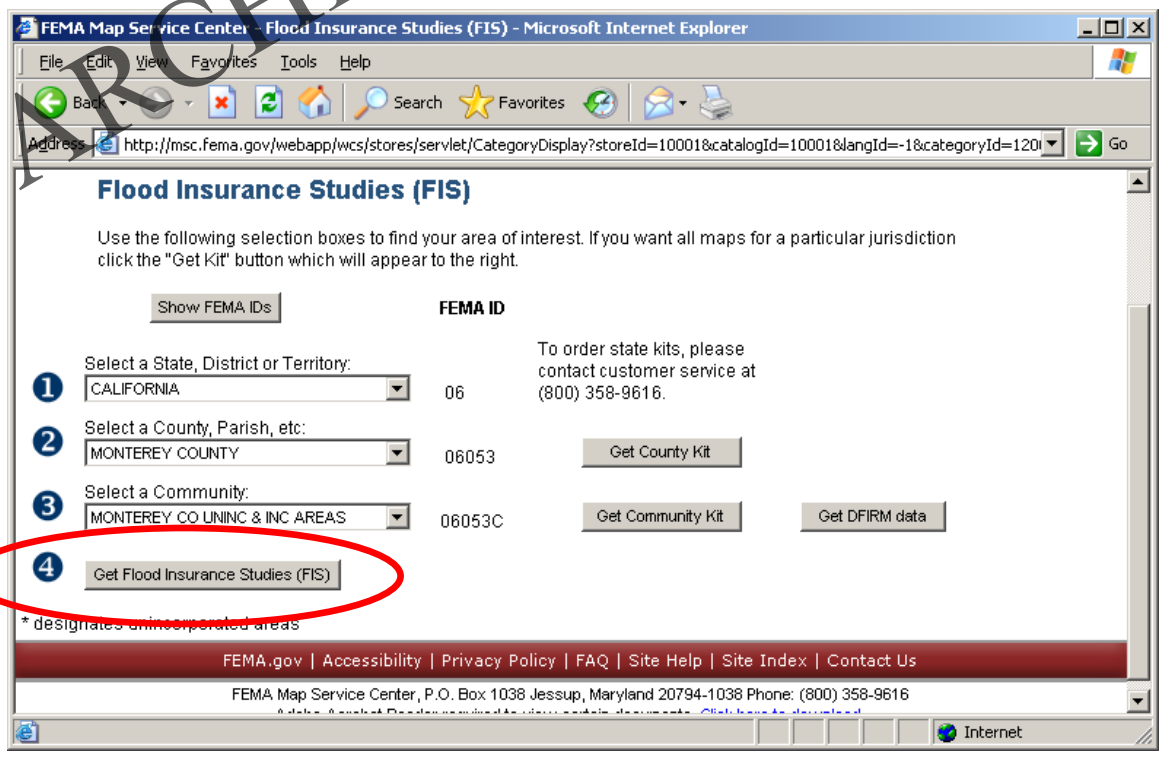
Choose "Product Catalog" in the red navigation bar:



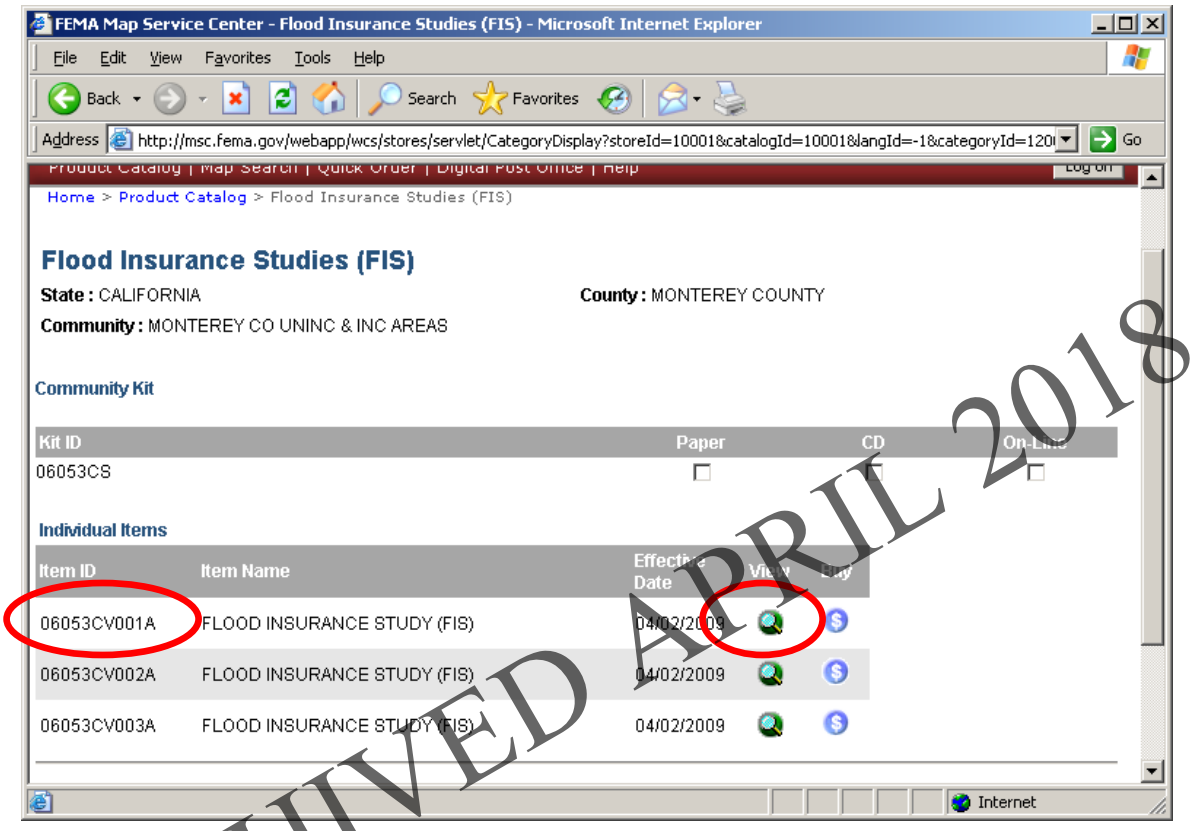
Choose “Flood Insurance Studies” from the product list:



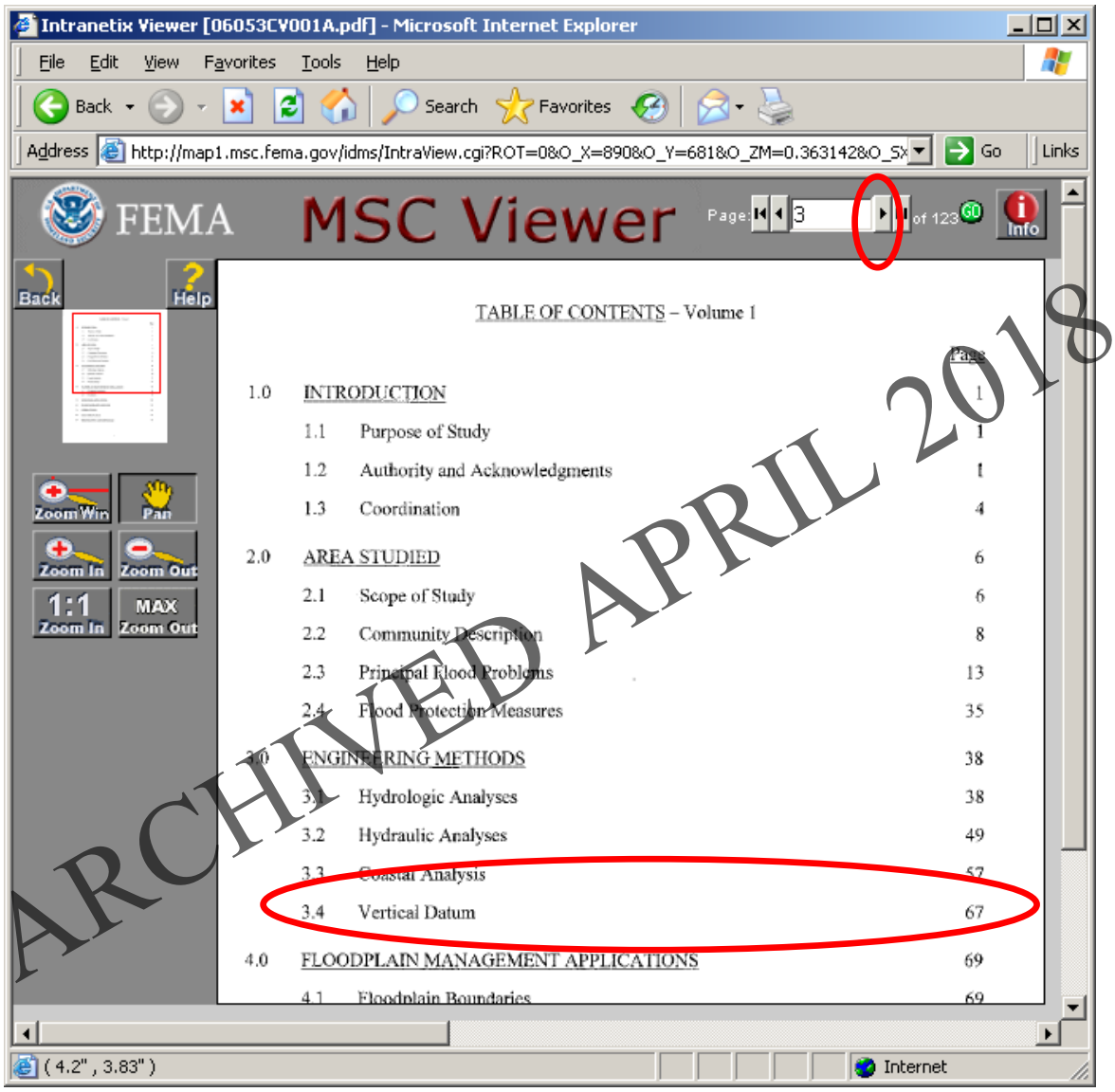
Choose the State, County, and Community you need and click “Get Flood Insurance Studies (FIS)”:



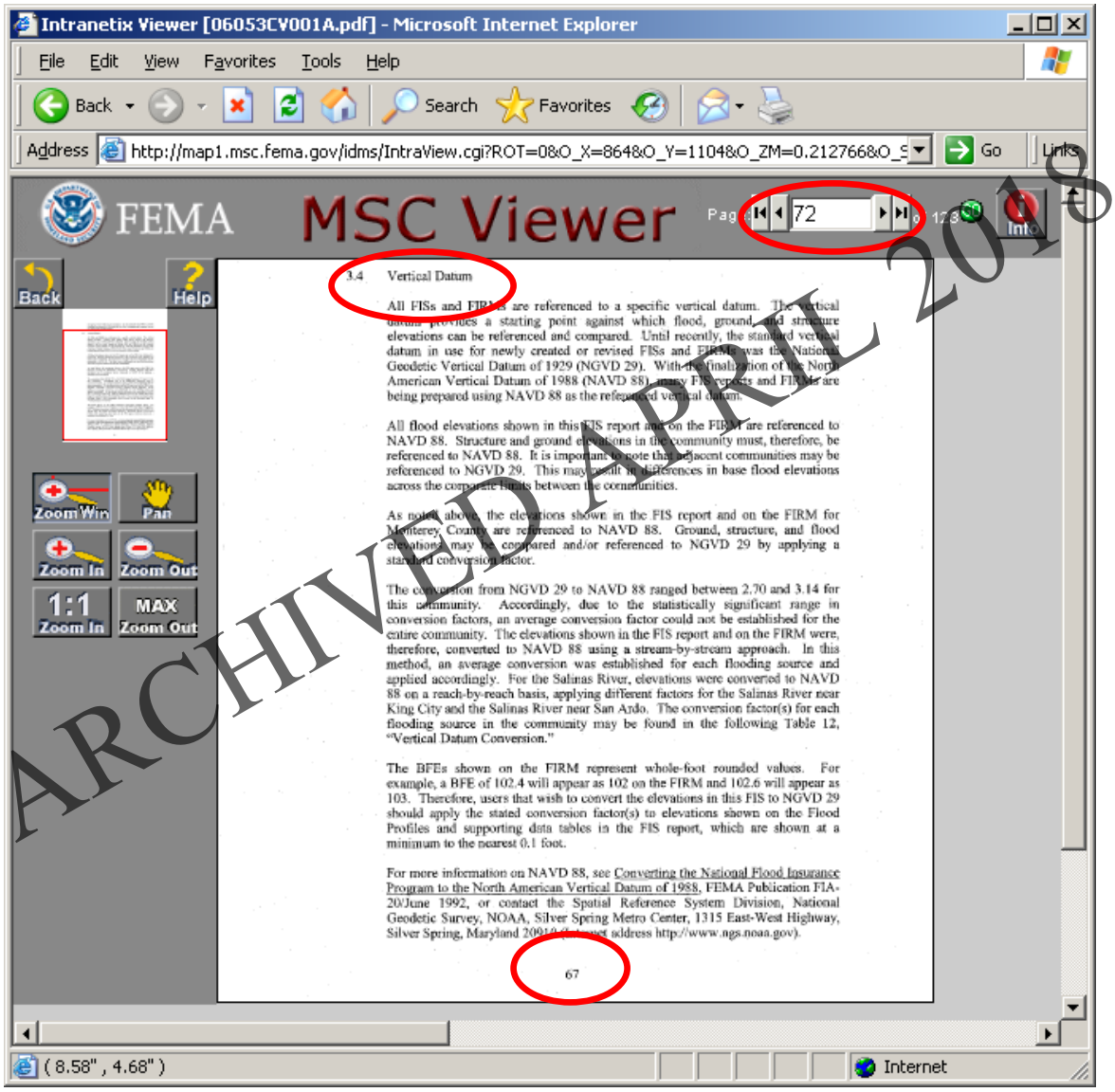
Click on the “View” icon next to Volume 1 (Item ID contains “V001”):



When the viewer appears, click on the right arrow next to the “Page” navigation box to move forward a few pages to the table of contents:



The vertical datum section is usually in Chapter 3 of the Flood Insurance Study. Use the page number from the table of contents to skip ahead. Type the page number shown in the table of contents into the "Page" navigation box, then use the right arrow to move forward to the actual page containing the vertical datum section. The apparent discrepancy in the page numbers is because of the introductory pages at the front of the document. The actual page number is visible at the bottom of the page.



For a single conversion value, the text will look like this:

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

Effective information for this countywide FIS report was converted from NGVD29 to NAVD88 based on data presented in TABLE 8. The average conversion of -0.609 foot was applied to convert all effective Base Flood Elevations (BFEs). Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities in other counties not presented in this countywide FIS may be referenced to NGVD29. This may result in differences in BFEs across the corporate limits between communities.

For multiple conversion values, the text will look like this:

The conversion from NGVD 29 to NAVD 88 ranged between 2.70 and 3.14 for this community. Accordingly, due to the statistically significant range in conversion factors, an average conversion factor could not be established for the entire community. The elevations shown in the FIS report and on the FIRM were, therefore, converted to NAVD 88 using a stream-by-stream approach. In this method, an average conversion was established for each flooding source and applied accordingly. For the Salinas River, elevations were converted to NAVD 88 on a reach-by-reach basis, applying different factors for the Salinas River near King City and the Salinas River near San Ardo. The conversion factor(s) for each flooding source in the community may be found in the following Table 12, "Vertical Datum Conversion."

TABLE 12 – VERTICAL DATUM CONVERSION

STREAM	CONVERSION FACTOR (ft)
Arroyo Seco	2.99
Calera Creek	2.91
Canyon Del Rey (a.k.a. Arroyo Del Rey)	2.80
Carmel River	2.82
Carmel River South Highway 1 Overbank	2.75
Carmel River North Highway 1 Overbank	2.75
Carmel River Hacienda	2.77
Carmel River Schutte Overbank	2.82
Carmel River Garland Ranch	2.86
Castroville Boulevard Wash	2.74
Corncob Canyon Creek (to include Overflow)	2.72
East Branch Gonzales Slough	3.01
El Toro Creek	2.89
Elkhorn Slough	2.74
Gabilan Creek	2.75
Gonzales Slough	3.01
Harper Creek	2.93
Josselyn Canyon Creek	2.74
Natividad Creek	2.75
Pajaro River	2.71
Pine Canyon Creek	3.02
Reclamation Ditch	2.77

To calculate the elevation in NAVD 88, add the conversion factor to the existing elevation. For example, assume the existing elevation in NGVD 29 is 54.25 ft. for the top of bottom floor. You might also want to convert other elevations such as top of next higher floor, bottom of lowest horizontal structural member, lowest adjacent grade next to building, etc.

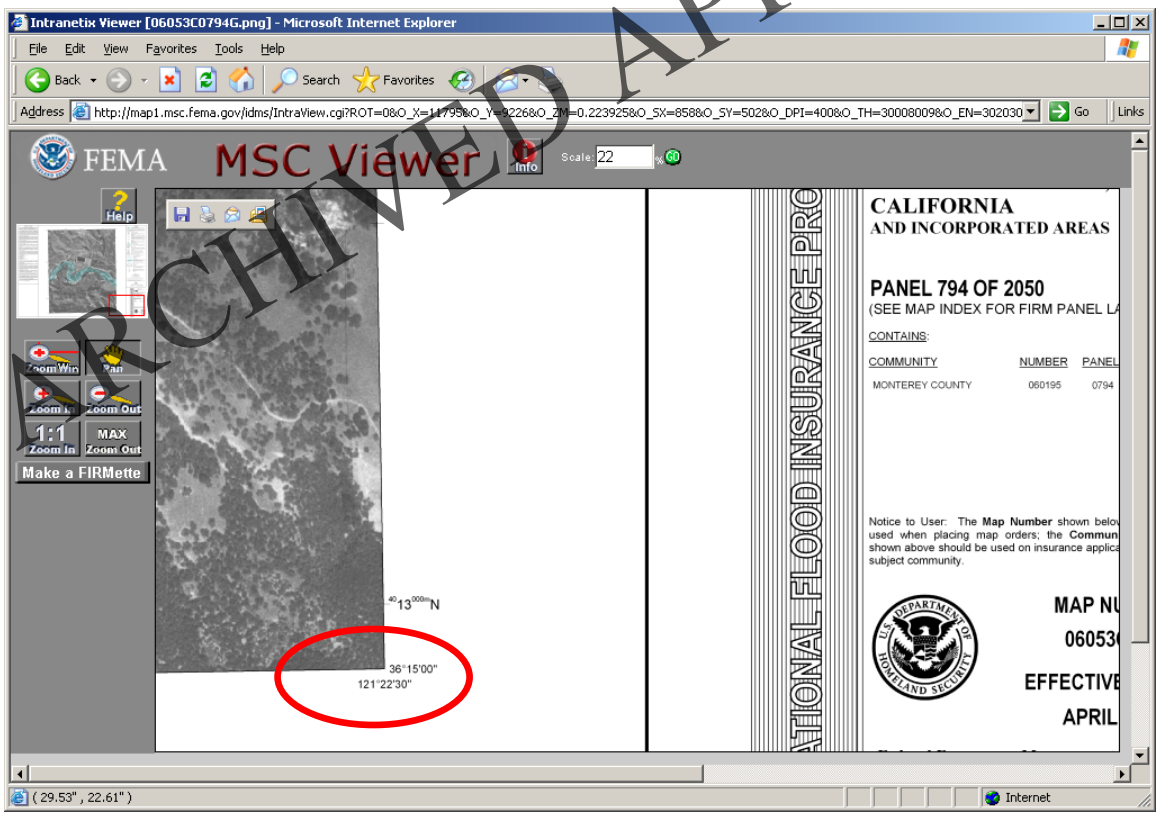
In the first example, the countywide conversion factor is -0.609. The elevation in NAVD 88 would be:
54.2 + -0.609 = 53.591 or 53.6 ft.

Remember, if you add a negative number to the existing elevation, the resulting elevation will be a lower number.

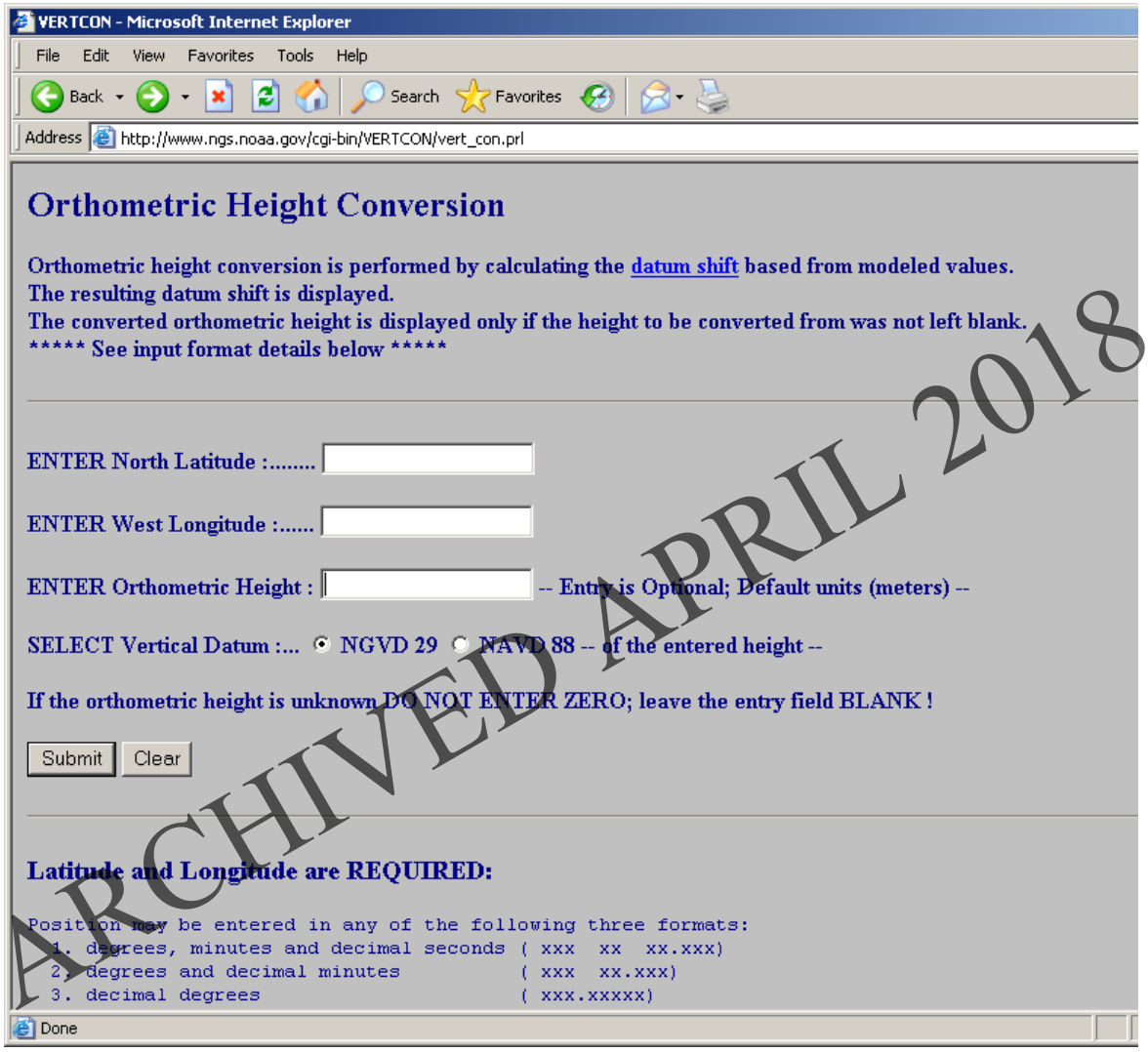
In the second example, the conversion factor for Arroyo Seco is 2.99. So for a structure affected by flooding from Arroyo Seco, the elevation in NAVD 88 would be:
54.2 + 2.99 = 57.19 or 57.2 ft.

Site-Specific Datum Conversion

If you are unable to determine the conversion factor used by FEMA, you can compute a location-specific conversion factor yourself. This requires determining the approximate latitude and longitude for the location. One way to do this is to use one of the latitude and longitude values displayed at the corner of the flood map showing the location.



The National Geodetic Survey (NGS) provides a vertical datum conversion tool known as VERTCON at: http://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl.



Enter the latitude, longitude in the degrees, minutes, seconds format (just replace the ° ‘ “ symbols with a space).

Enter the elevation in NGVD 29 that you want to convert (e.g., top of bottom floor, top of next higher floor, bottom of lowest horizontal structural member, lowest adjacent grade next to building). If the elevation is measured in feet (most places other than Puerto Rico), be sure to include “ft” after the elevation so that the result will be in feet. As in the Arroyo Seco example above, this example uses a building elevation of 54.2 ft. Click on Submit.

The result produced by VERTCON is shown below. Using this latitude and longitude, the conversion factor is 2.986 and the building elevation in NAVD 88 is 57.186. Rounded to a tenth of a foot, the building elevation is 57.2, which is the same as using the FEMA conversion factor.

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 36 15

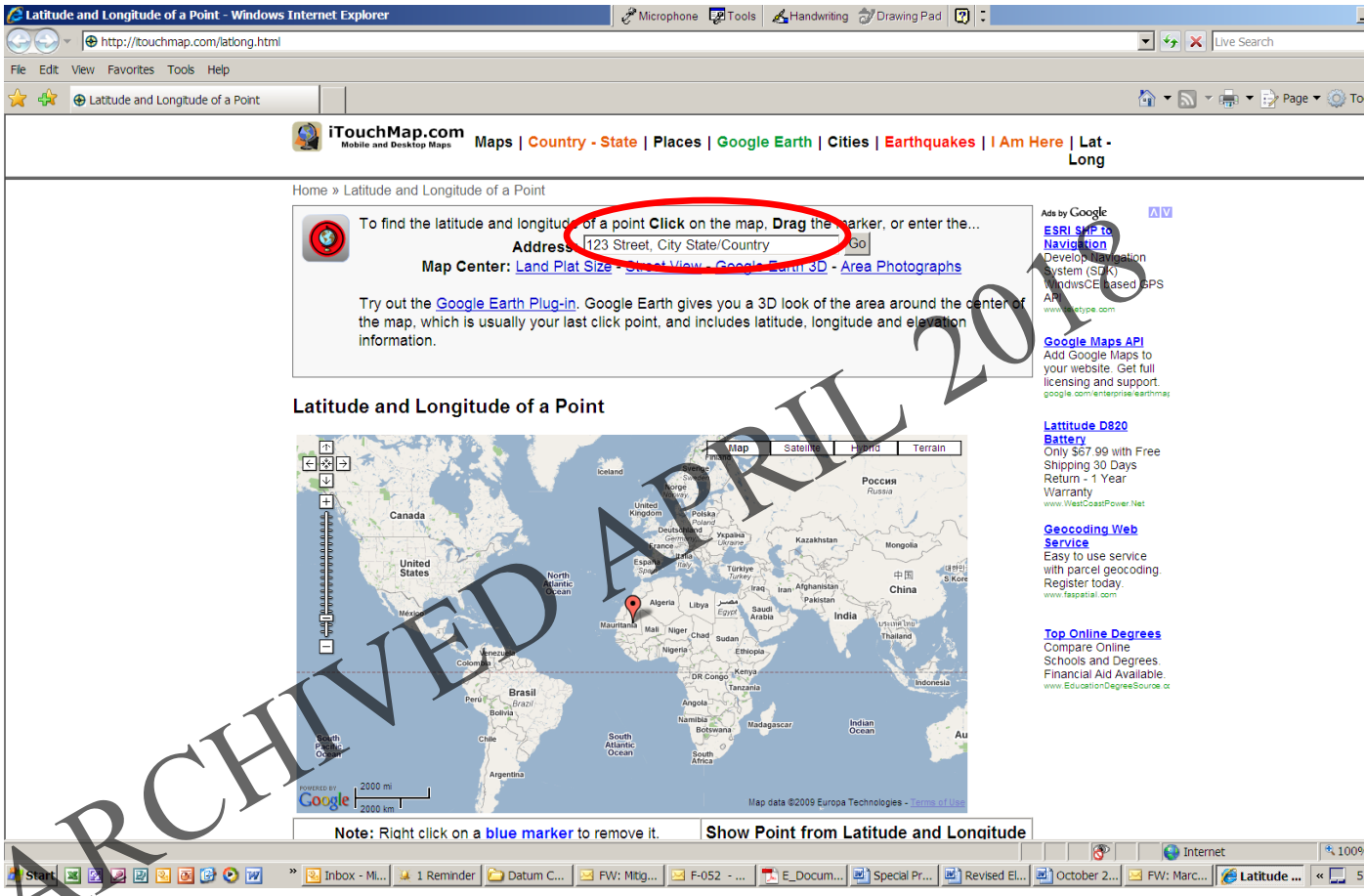
Longitude: 121 22 30

NGVD 29 height: 54.2 ft

Datum shift (NAVD 88 minus NGVD 29): 2.986 feet

Converted to NAVD 88 height: 57.186 feet

If you do not know the latitude and longitude of a property, the iTouchMap.com site (http://itouchmap.com/latlong.html) provides a very simple tool for finding this information. Enter the property street address, City, State, and ZIP Code, then click "Go."



The property latitude and longitude will appear on the next screen. You should be able to copy and paste this information to the NGS VERTCON site to calculate the datum conversion factor.