Flood Damage Data Identifies Risk Issues with Highway Sound Barriers



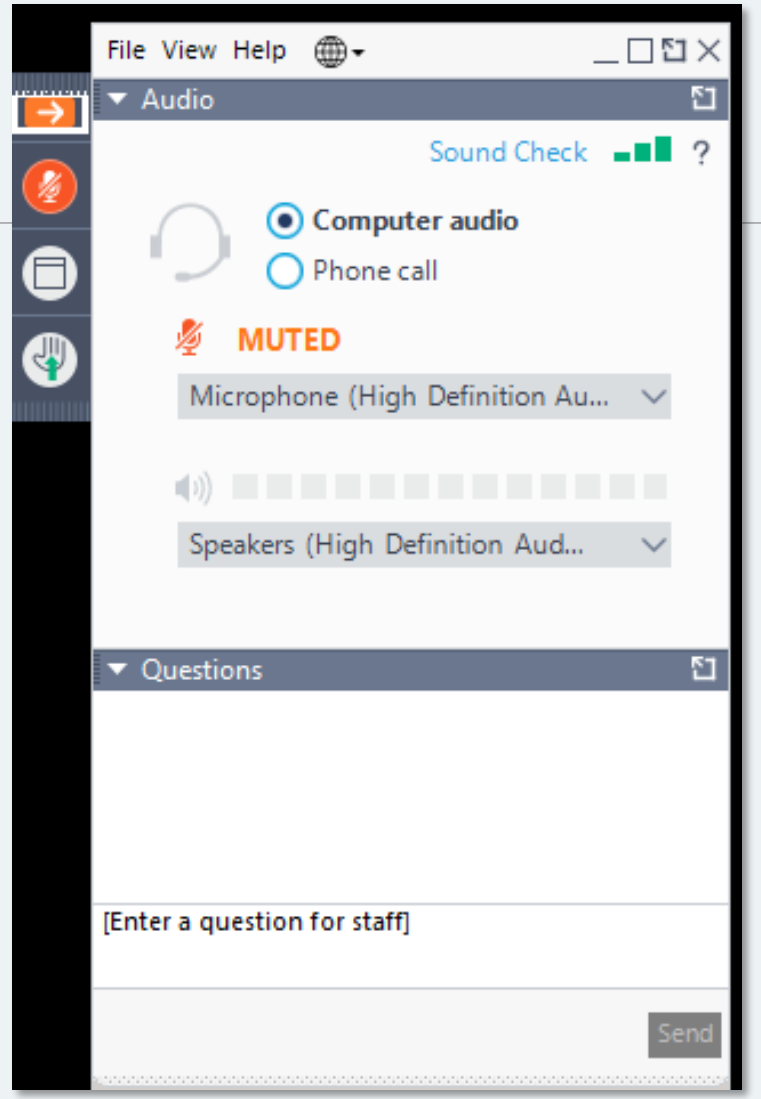
COOPERATING TECHNICAL PARTNERS INFORMATION EXCHANGE WEBINAR

Audio Settings

Open and hide your webinar control panel using the orange arrow button at top left corner

- Choose "Computer audio" to use speakers or headphones
- Choose "Phone call" to dial in using the information provided

Submit questions and comments using the "Questions" panel



Webinar Participation

All lines will be automatically be muted.



Use the "Questions" window in the webinar control panel to submit any questions or comments to the moderator.

Selected questions will be read to the presenters and answered on the live webinar.

Submitted questions not asked during the webinar will be answered by the presenters and posted as a document on the webinar event page at floodsciencecenter.org.

Continuing Education Credits

Certified Floodplain Managers and Certified Planners are eligible for 1 CEC for participating in this webinar.

You must have registered individually and indicated you are a CFM and/or AICP at time of registration.

Eligibility for CEC is dependent on your time spent viewing the webinar, as determined by the webinar software.



Attending this webinar in a group setting or only viewing the recording is NOT eligible for CEC.

Additional Logistics

To suggest future CTP webinar topics, please contact Alan Lulloff at alan@floods.org or type a suggested topic into the Questions panel.

ASFPM CFM CECs will be automatically applied.



Certificates of Attendance will be emailed. Processing will take a few weeks. Please contact cfm@floods.org with any certificate issues only after a few weeks have elapsed.

A follow-up email with a link to the slides and the webinar recording will be sent in about a week or so.

Thank you for joining us!

ASFPM Mapping & Engineering Standards Cmte
Cooperating Technical Partners Subcommittee

Co-chairs: Brooke Seymour, P.E., CFM- bseymour@udfcd.org
Colorado's Mile High Flood District

Darryl Rockfield Jr., CFM - darryl.rockfield@sema.dps.mo.gov
Missouri State Emergency Management Agency

Goals: **Identify common concerns**

Provide opportunities for information exchange

Identify training needs

Promote and document the value of CTPs

Agenda

Using Flood Damage Data for Flood Prediction

– Dr. Sam Brody, Texas A&M

Case Study: Highway Sound Barriers

– Rich Gleason, P.E., Kasraie Consulting

Questions/Discussion



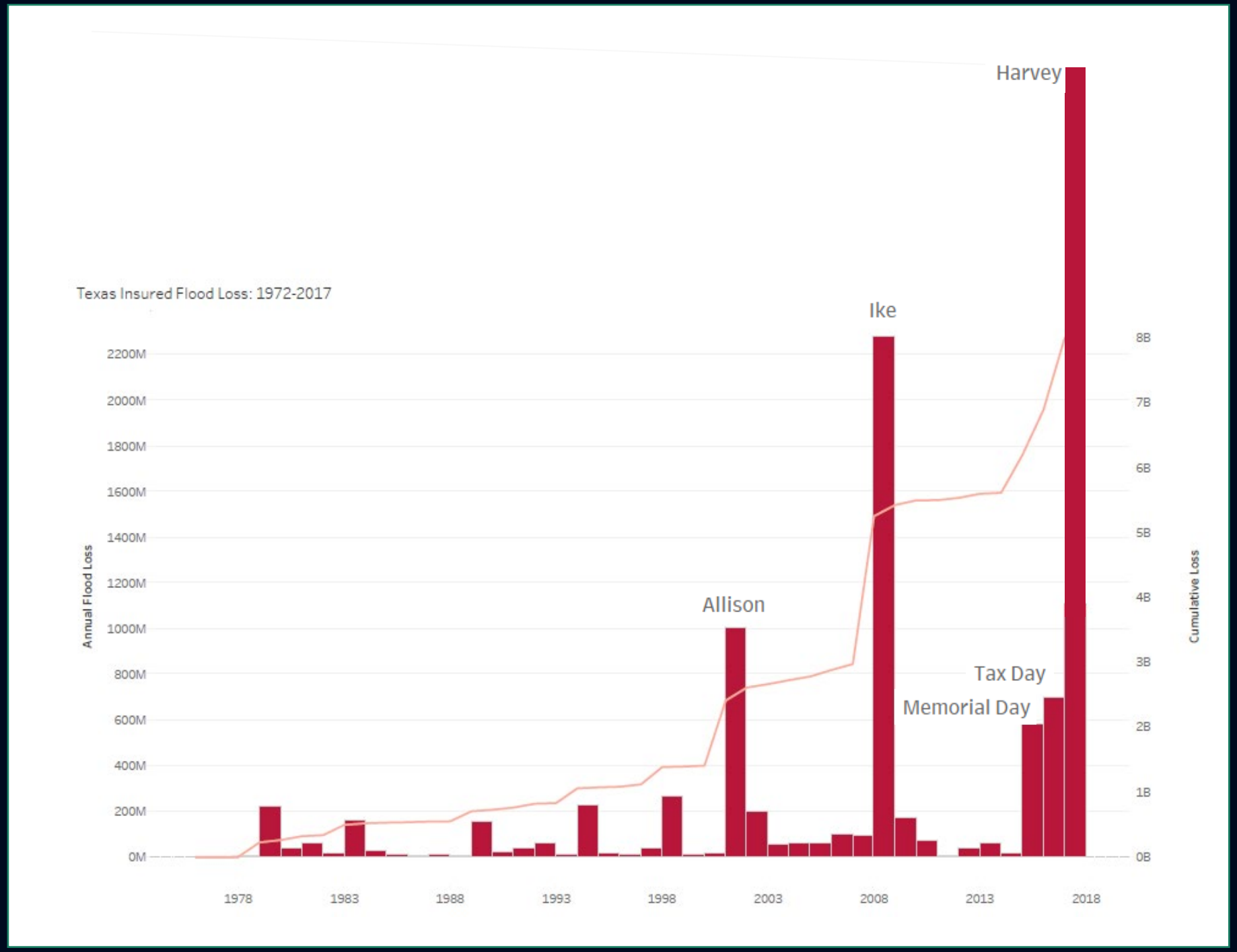
The Built Environment and Increasing Flood Loss

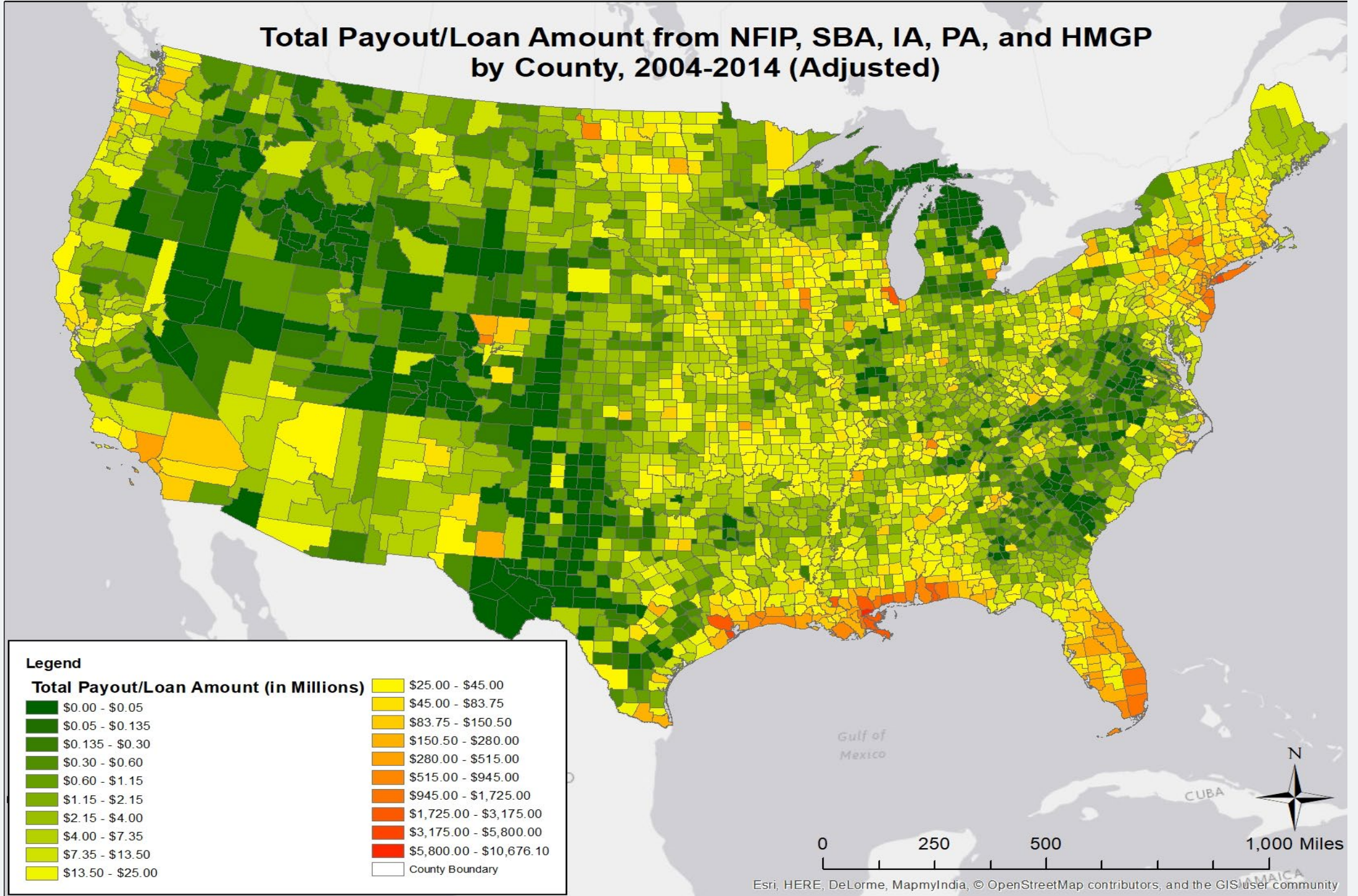
Sam Brody
Director, IDRT

TEXAS A&M UNIVERSITY
GALVESTON CAMPUS

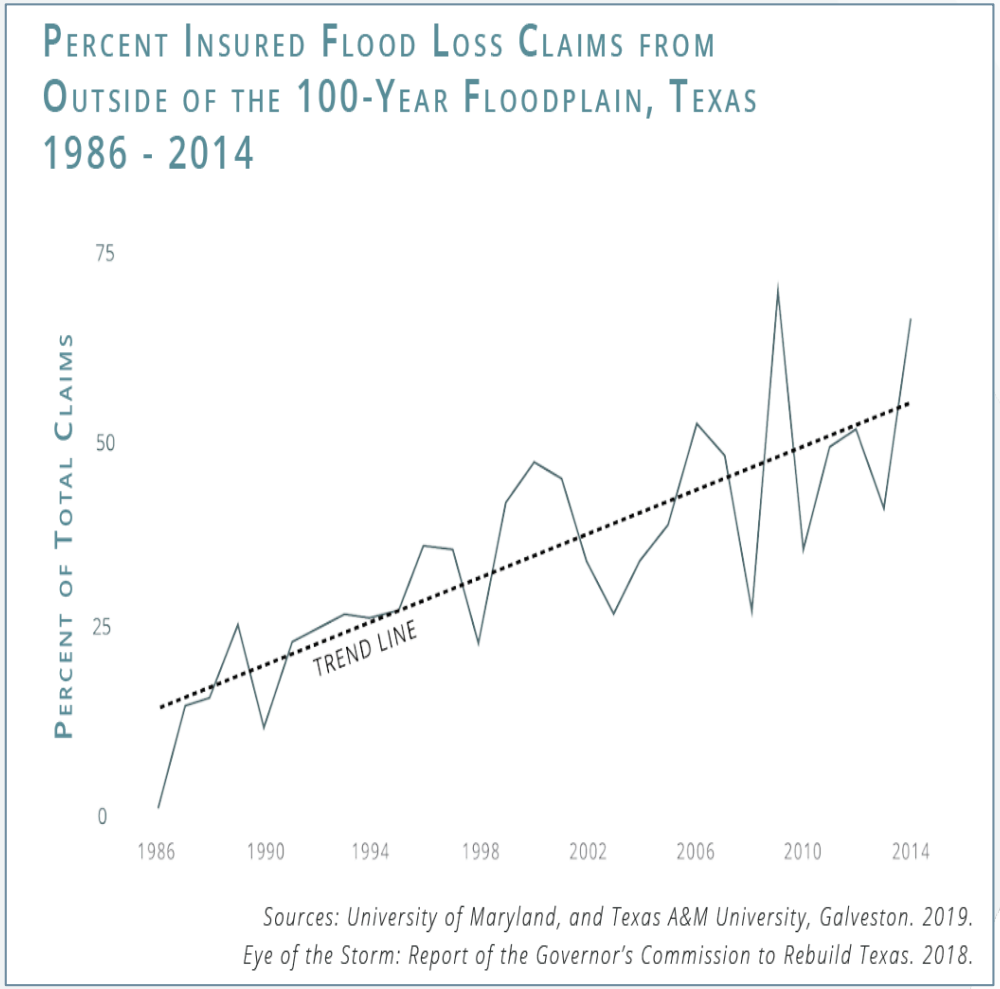

Crystal Inn
VALERO
SPEED LIMIT 35


GMC


Texas Insured Flood Loss: 1972-2017
Harvey
Ike
Allison
Tax Day
Memorial Day
Annual Flood Loss
Cumulative Loss
2200M
2000M
1800M
1600M
1400M
1200M
1000M
800M
600M
400M
200M
0M
8B
7B
6B
5B
4B
3B
2B
1B
0B
1978
1983
1988
1993
1998
2003
2008
2013
2018


Total Payout/Loan Amount from NFIP, SBA, IA, PA, and HMGP
by County, 2004-2014 (Adjusted)
Legend
Total Payout/Loan Amount (in Millions)
$0.00 - $0.05
$0.05 - $0.135
$0.135 - $0.30
$0.30 - $0.60
$0.60 - $1.15
$1.15 - $2.15
$2.15 - $4.00
$4.00 - $7.35
$7.35 - $13.50
$13.50 - $25.00
$25.00 - $45.00
$45.00 - $83.75
$83.75 - $150.50
$150.50 - $280.00
$280.00 - $515.00
$515.00 - $945.00
$945.00 - $1,725.00
$1,725.00 - $3,175.00
$3,175.00 - $5,800.00
$5,800.00 - $10,676.10
County Boundary
Gulf of Mexico
CUBA
N
0
250
500
1,000 Miles
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Triggers of Urban Flooding



Aging and inadequate drainage infrastructure.

Upstream expansion of impervious surfaces.

Development that does not recognize natural drainage patterns—overland flow.

Sprawling development patterns that fragment natural hydrological processes.

Poor drainage maintenance.

Development that places obstacles (walls, roads) or buries (box culverts) streams

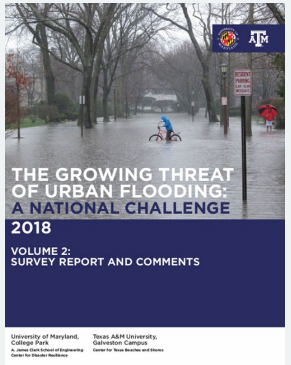
National Survey Results

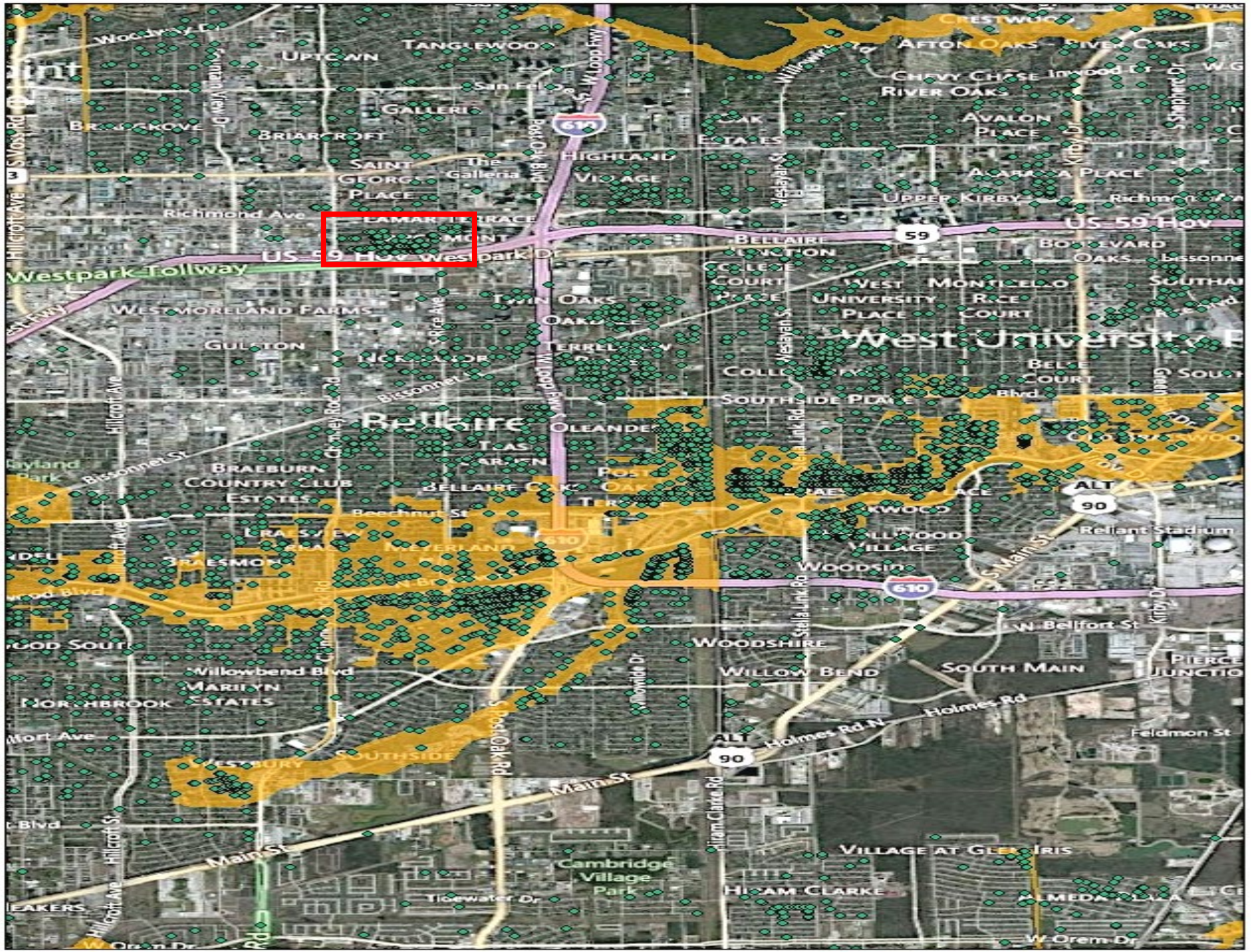
83%of indicated they had experienced urban flooding.

85% had experienced urban flooding outside the SFHA. 65% affected by a moderate or larger urban flood.

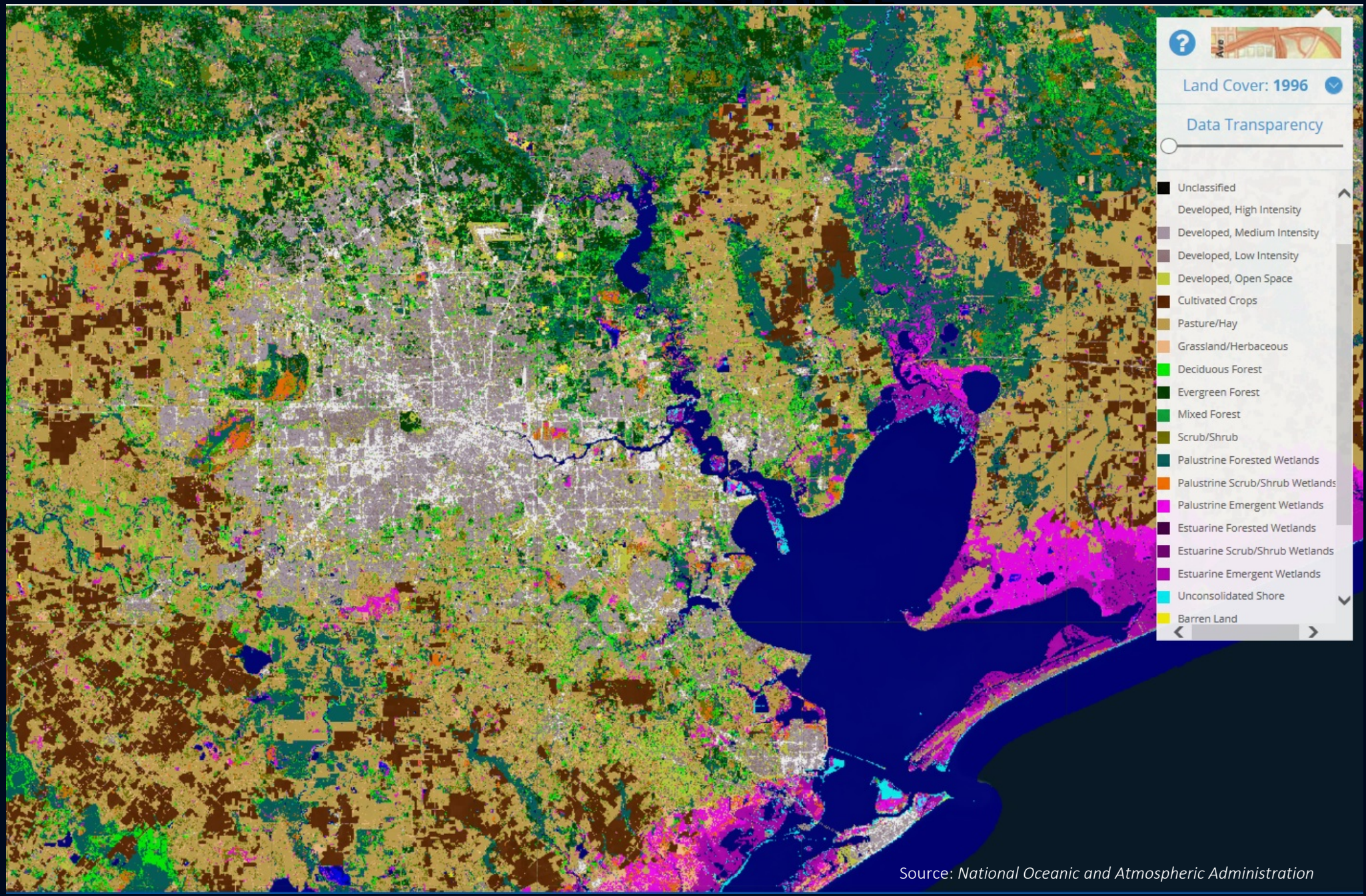
10% or less those residences damaged were covered by insurance under the National Flood Insurance Program.

https://cdr.umd.edu/urban-flooding-report



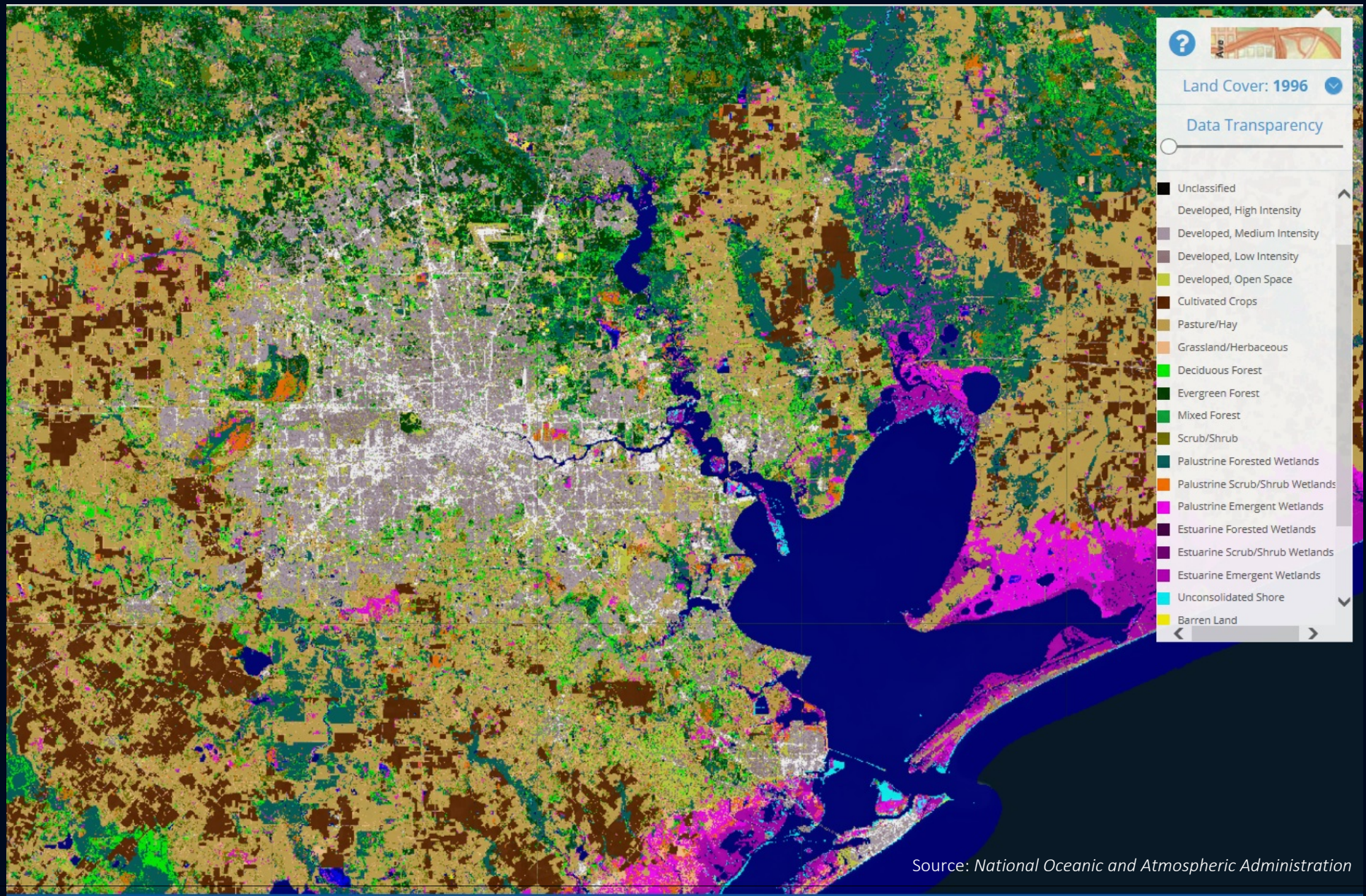

Uptown
Tanglewood
Galleria
Briarcroft
Saint George Place
Highland Village
Afton Oaks
River Oaks
Chevy Chase
Avalon Place
Upper Kirby
Richmond Ave
Lamar
US-59 Hov West
Westpark Tollway
US-59 Hov
Bellaire
Boulevard Oaks
West University Place
Monticello
Twin Oaks
Westmoreland Farms
Gulston
Terrell
Southside Place
Bellaire
Braeburn Country Club Estates
Bellaire Oaks
Meyerland
Braesmont
Willowbend Blvd
Marilyn Estates
Northbrook
Willow Bend
Woodshire
South Main
Holmes Rd
Holmes Rd N
Main St
Cambridge Village Park
Tidewater Dr
Hiram Clarke
Village at Glen Iris
Almeda
Reliant Stadium
Woodside
W Orem Dr
W Belfort St
Feldmon St
Pierce Junction
Beechnut St
Bissonnet St
Hillcroft Ave
Chimney Rock Rd
Post Oak Rd
Stella Link Rd
Kirby Dr
Shepherd Dr
Willowbend Dr
Weslayan St
Bellaire Blvd
Greenbriar St
Fondren Rd
Beltway 8
610
59
90
ALT 90

Houston Area 1996 Land Cover



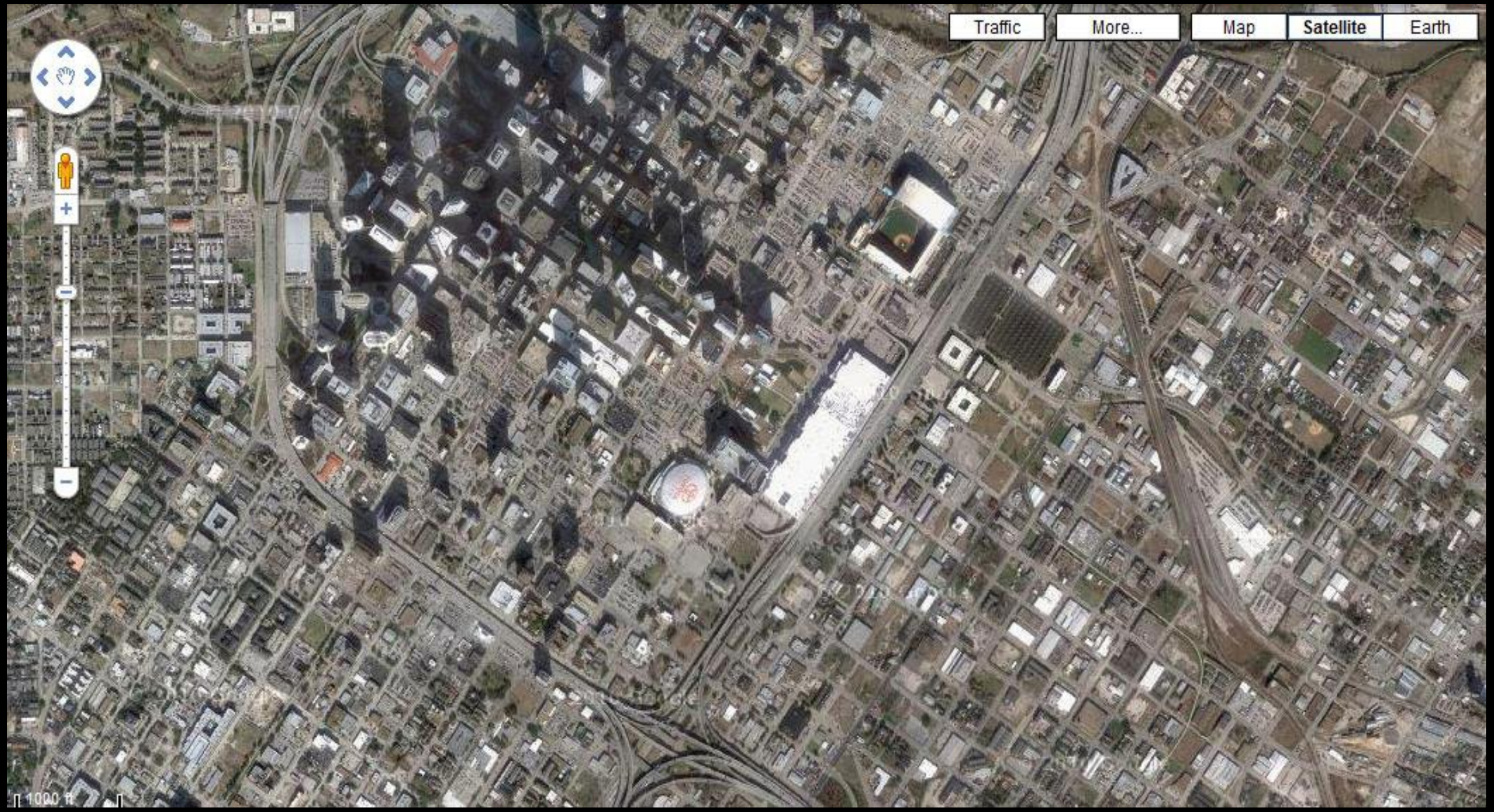
Source: *National Oceanic and Atmospheric Administration*

Houston Area Development Change 2016

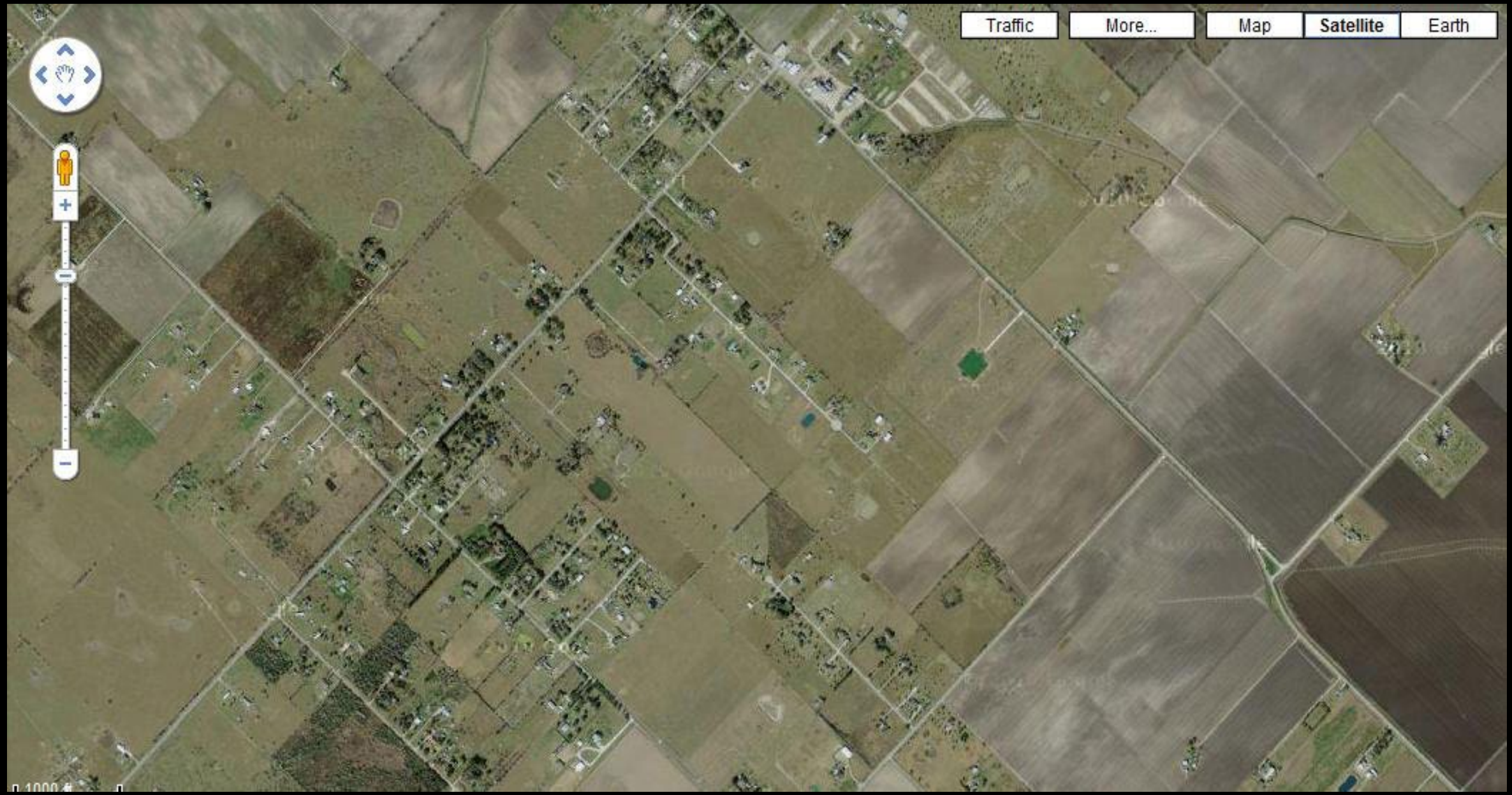


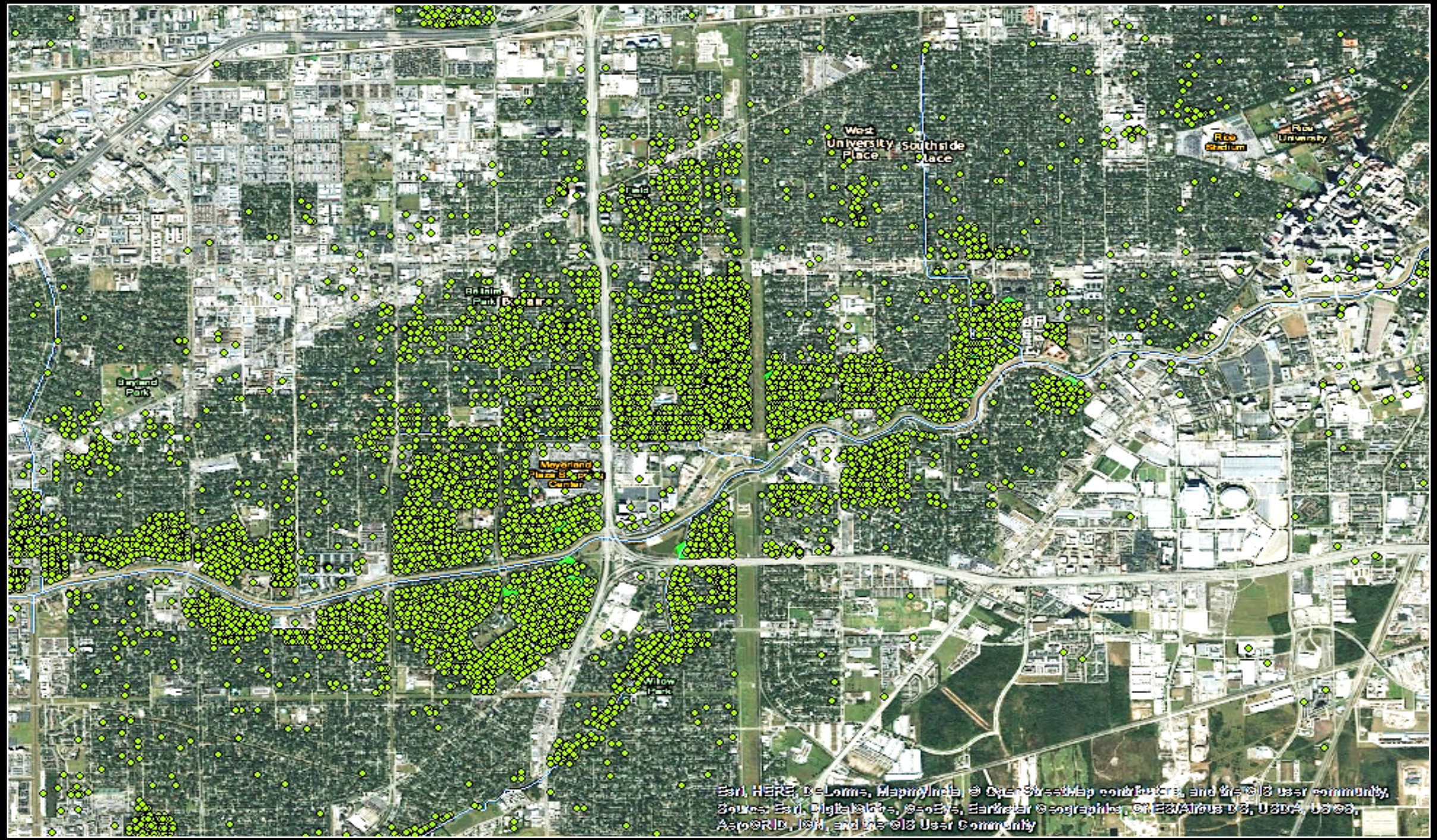
Source: *National Oceanic and Atmospheric Administration*

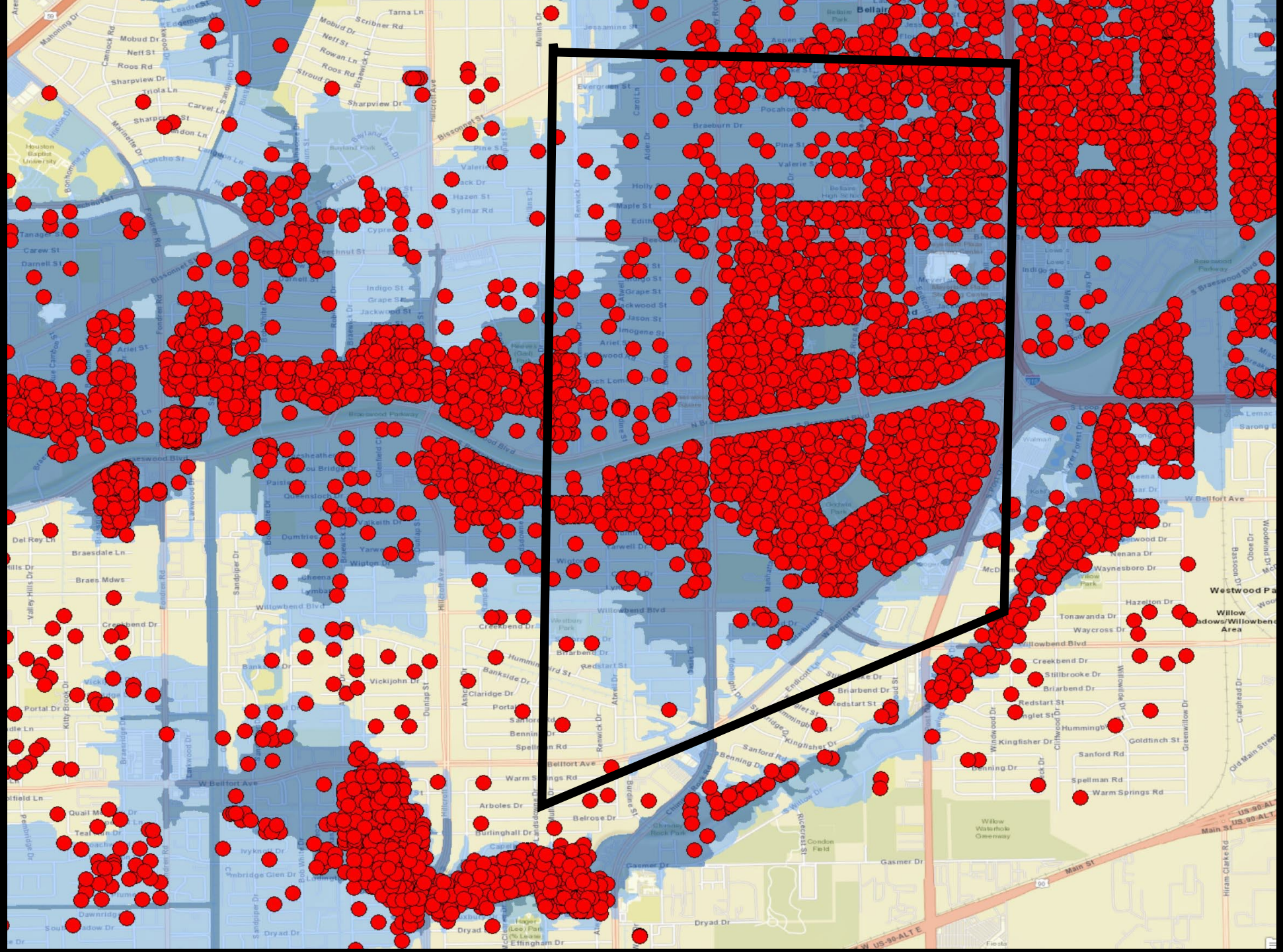
High-Intensity Development Pattern



Low-Intensity Development Pattern




West University Place
Southside Place
Rice Stadium
Rice University
Braeburn Park
Maryland Park
Willow Park
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


Tarna Ln
Scribner Rd
Mobud Dr
Neff St
Rowan Ln
Roos Rd
Sharpview Dr
Triola Ln
Carvel Ln
Marinette Dr
Concho St
Houston Baptist University
Bonhomme Rd
Bissonnet St
Hillcroft Ave
Mullins Dr
Jessamine St
Bellaire
Evergreen St
Carol Ln
Pocahontas
Braeburn Dr
Alder Dr
Pine St
Valerie St
Holly St
Maple St
Edith
Renwick Dr
Hazen St
Sytmar Rd
Cypress
Chestnut St
Indigo St
Grape St
Jackwood St
Jason St
Imogene St
Ariel St
Loch Lomond
Braeswood Parkway
Braeswood Blvd
Braeswood Place
Lemac Dr
Sarong Dr
Carew St
Darnell St
Fondren Rd
Del Rey Ln
Braesdale Ln
Braes Mdws
Valley Hills Dr
Creekbend Dr
Willowbend Blvd
Vickijohn Dr
Dunlap St
Sandpiper Dr
Larkwood Dr
Bob White Dr
Braeridge Dr
Kitty Brook Dr
Portal Dr
Claridge Dr
Bankside Dr
Hummingbird St
Redstart St
Briarbend Dr
Atwell Dr
Ashcroft Dr
Dairy Ln
Manhattan Dr
Endicott St
Stillbrooke Dr
Kingfisher Dr
Sanford Rd
Benning Dr
Spellman Rd
Warm Springs Rd
Belfort Ave
W Bellfort Ave
Arboles Dr
Belrose Dr
Burlinghall Dr
Quail Meadow Dr
Teal Run Dr
Ivyknoll Dr
Timbridge Glen Dr
Dawnridge Dr
Meadow Dr
Dryad Dr
Effingham Dr
Hager (Lee) Park (% Lease)
Gasmer Dr
Chimney Rock Park
Condon Field
Willow Waterhole Greenway
Willow Meadows/Willowbend Area
Westwood Pa
Waynesboro Dr
Nenana Dr
Hazelton Dr
Tonawanda Dr
Waycross Dr
Goldfinch St
Greenwillow Dr
Windwood Dr
Cliffwood Dr
Claighead Dr
Old Main Street
Main St
US-90-ALT E
Hiram Clarke Rd
Fiesta

Dynamic Floodplain Boundaries

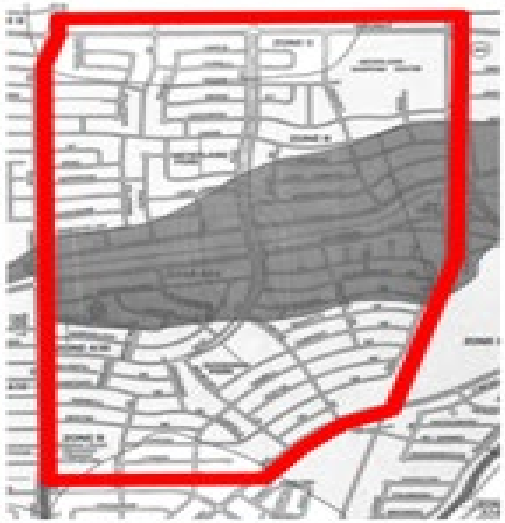
1979



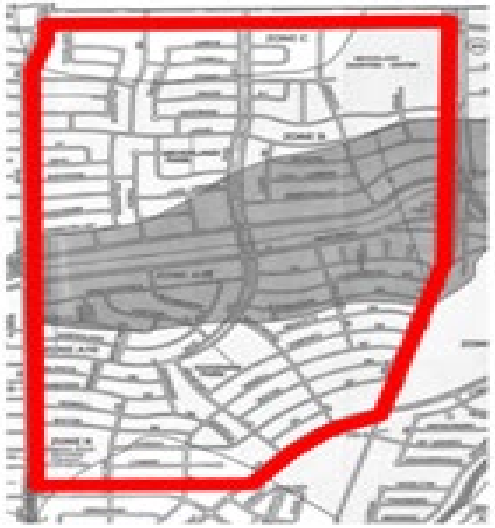
1982



1985



1987



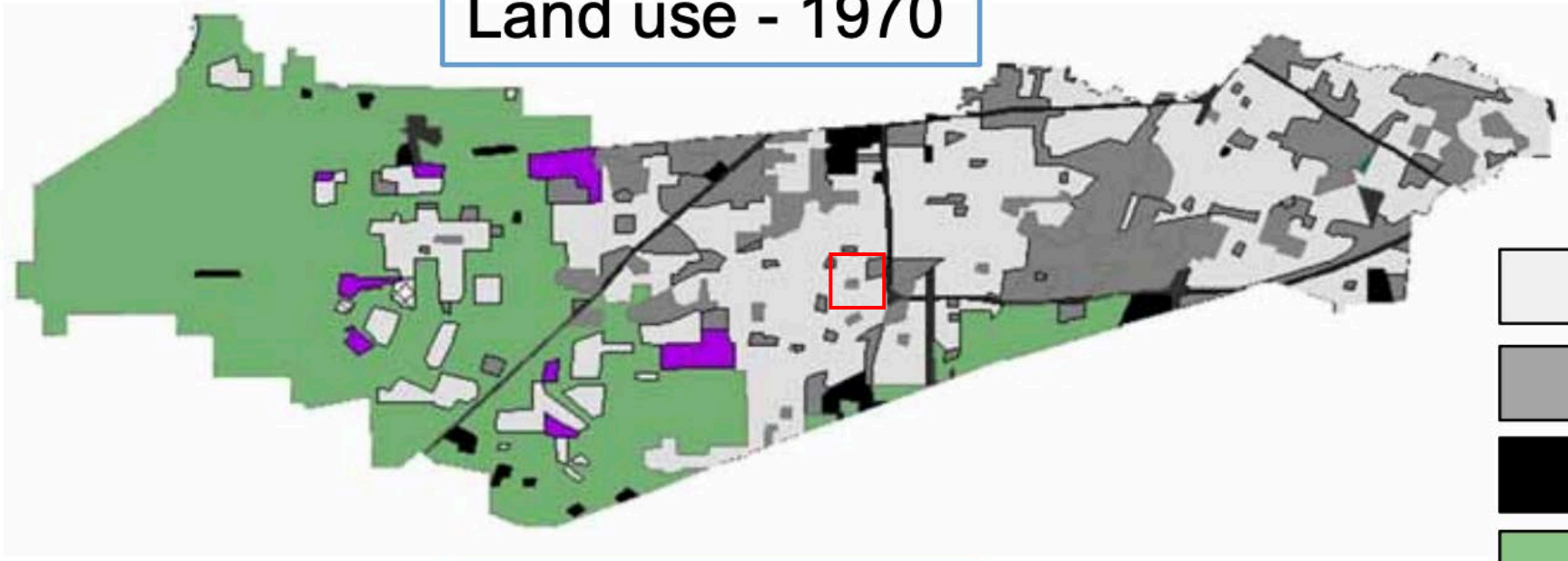
2000



2016



Land use - 1970



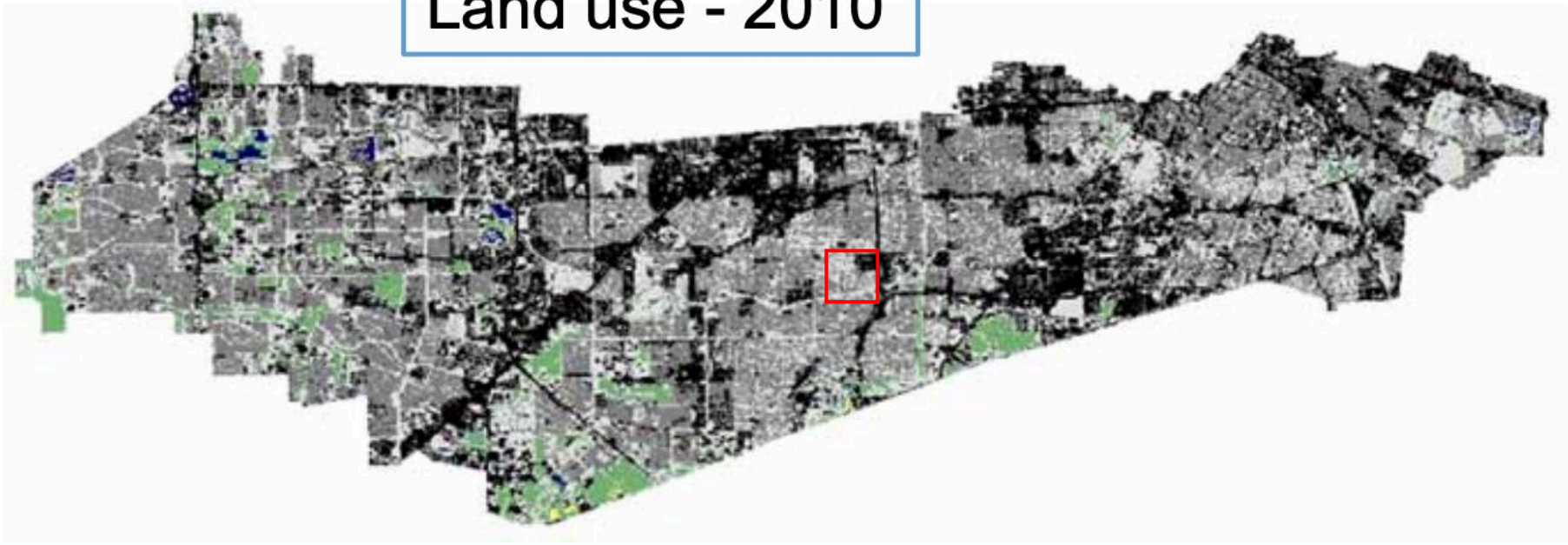
Low Intensity Development

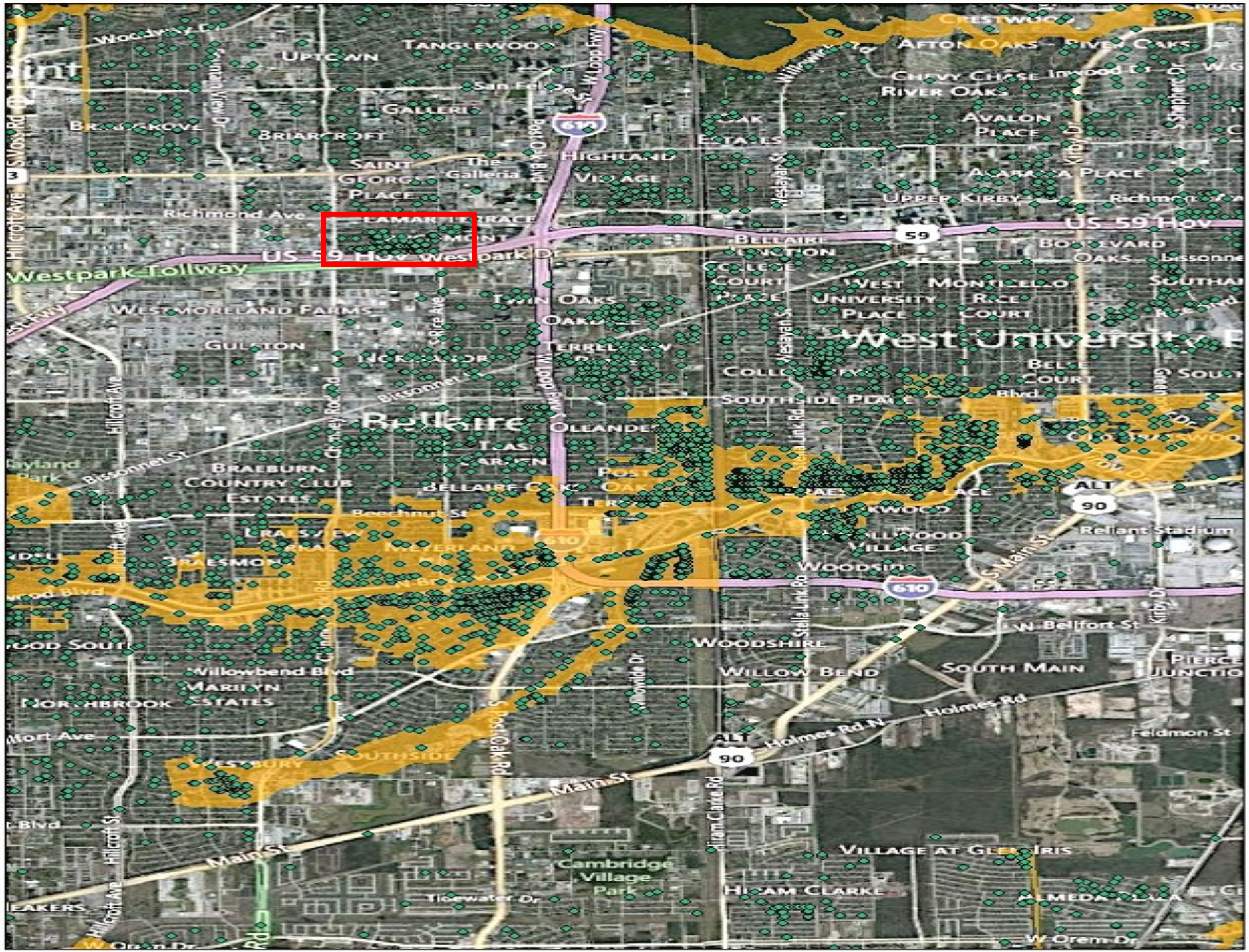
Medium Intensity Development

High Intensity Development

Green Space

Land use - 2010

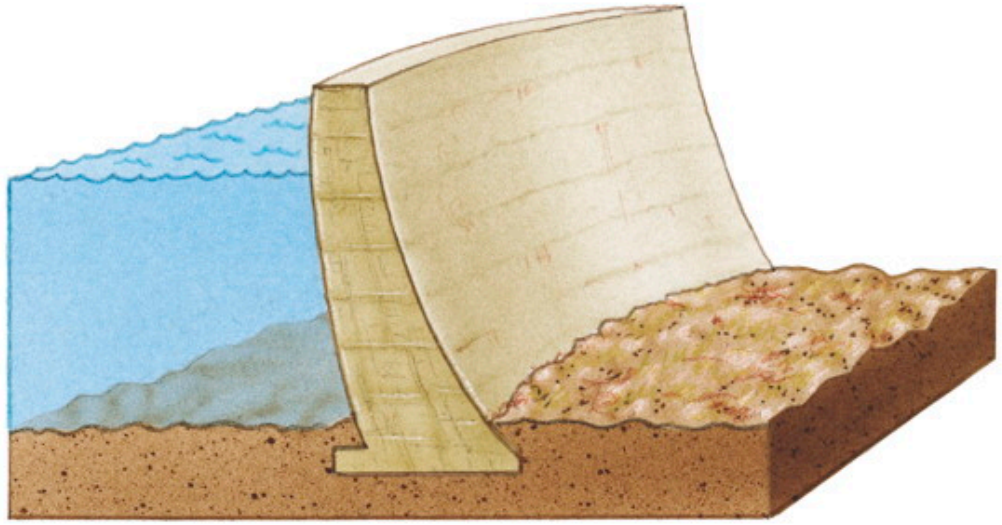


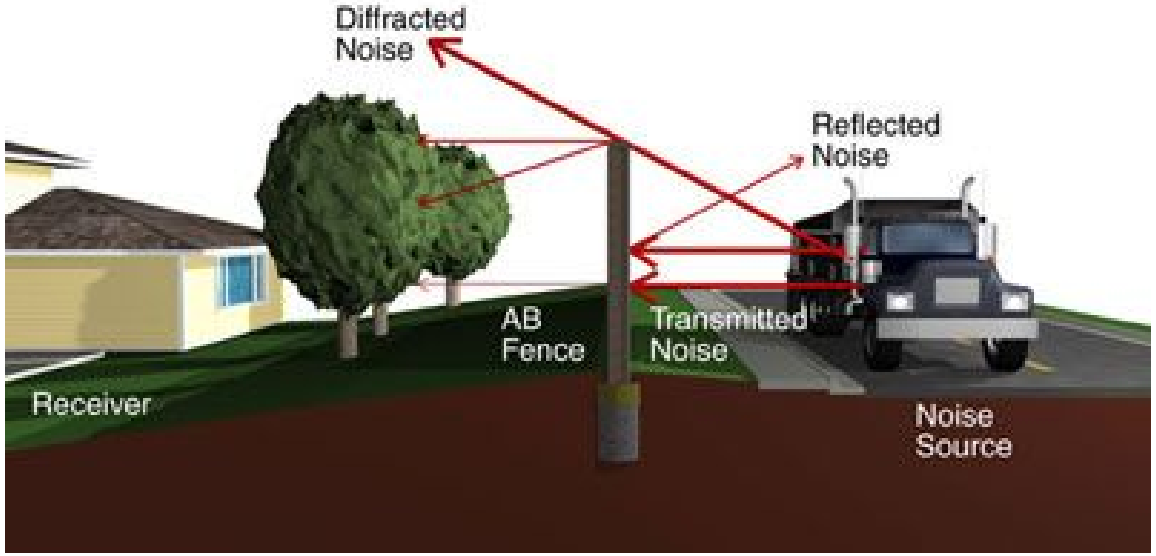

Uptown
Galleria
Highland Village
Richmond Ave
US-59 Hov West
Westpark Tollway
Westmoreland Farms
Gulston
Bellaire
Braeburn Country Club Estates
Meyerland
Willowbend Blvd
Marilyn Estates
Northbrook
Woodshire
Willow Bend
South Main
Holmes Rd
Holmes Rd N
Main St
Cambridge Village Park
Hiram Clarke
Village at Gleannloch Farms
Reliant Stadium
Afton Oaks
River Oaks
Chevy Chase
Avalon Place
Upper Kirby
West University Place
Monticello
Boulevard Oaks
Southside Place
Woodside
Pierce Junction
Almeda
W Orem Dr
59
610
ALT 90

69
59
Southwest Fwy
Southwest Fwy
Southwest Fwy
Southwest Fwy
Windswept Ln
Windswept Ln



Why Sound Walls



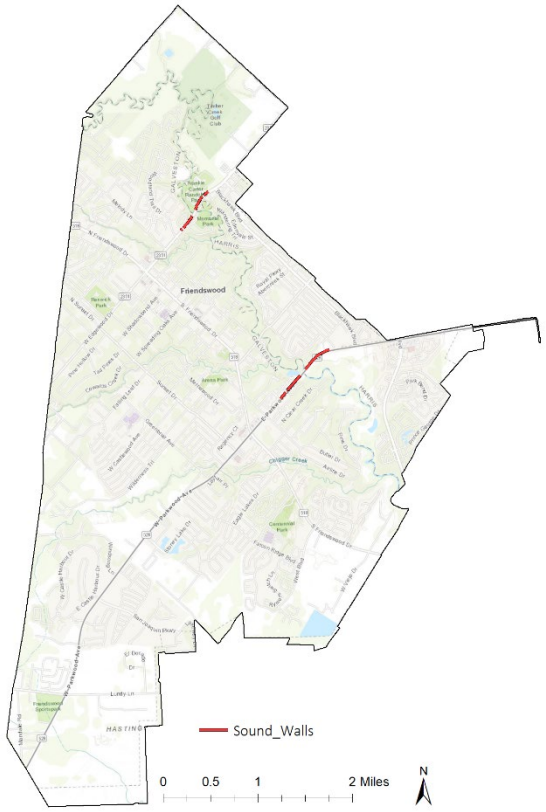



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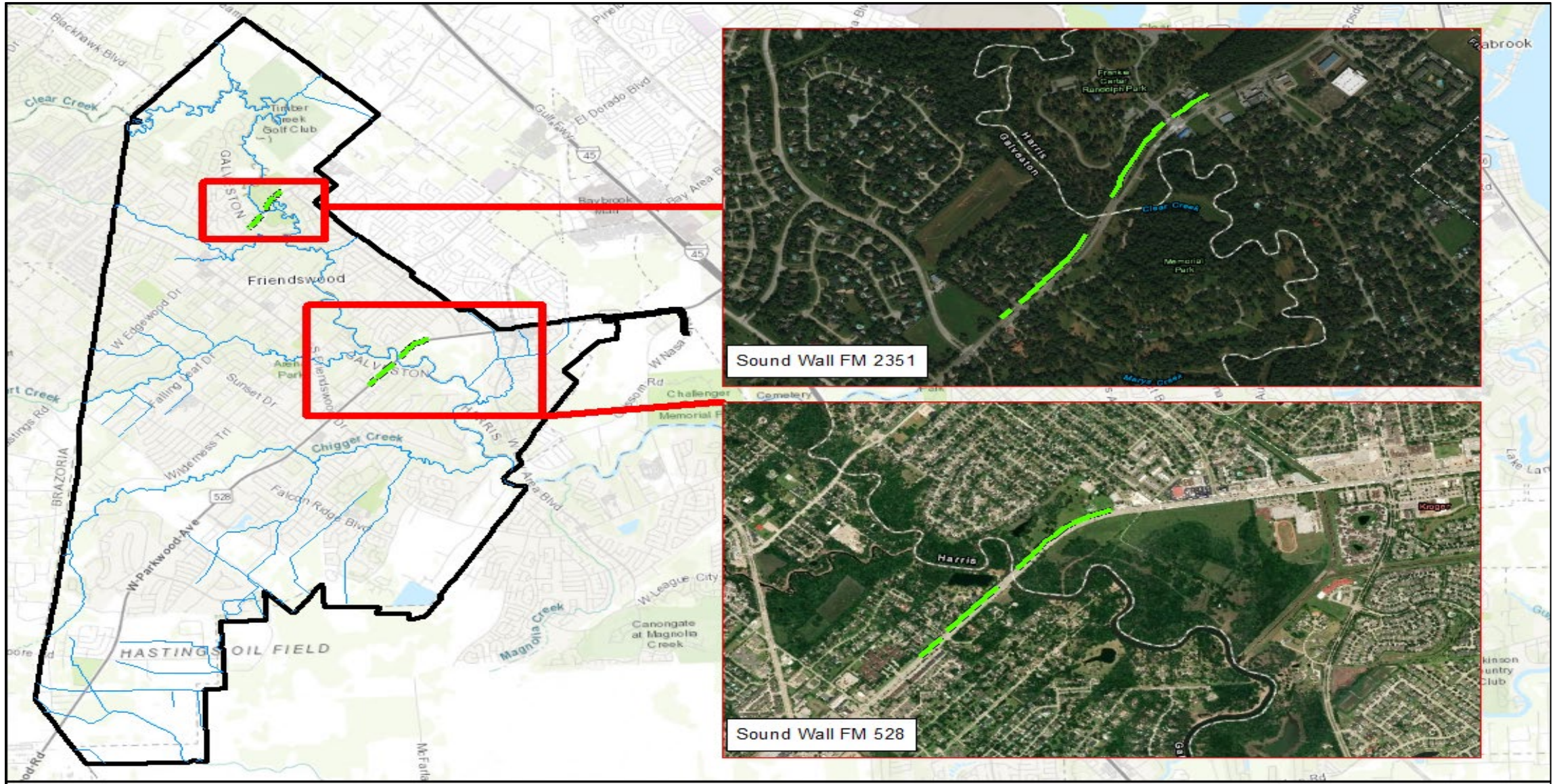




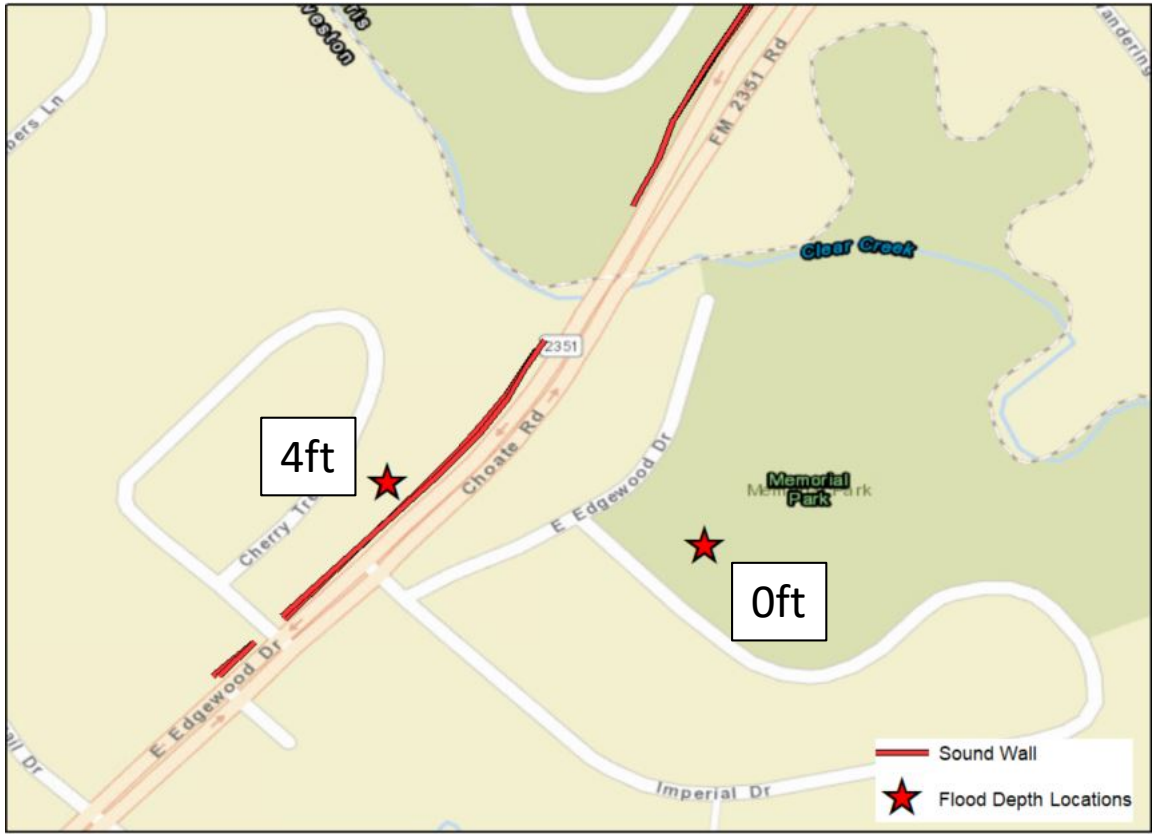




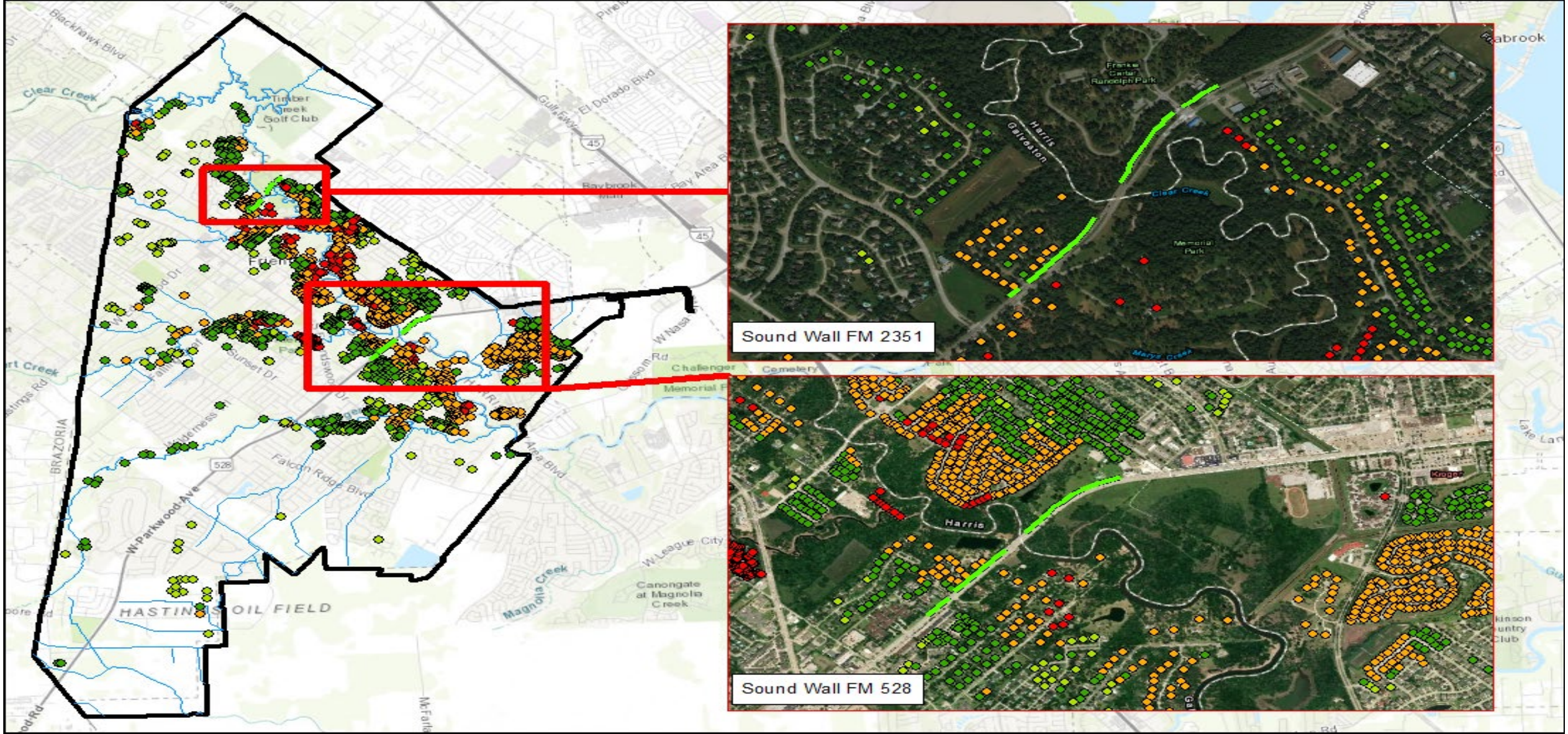
Two Friendswood Soundwalls


Sound Wall FM 2351
Sound Wall FM 528
Friendswood
HASTINGS OIL FIELD
Study Area
Sound Walls
Study Area
0 0.5 1 2
Miles
N

Flood Depth Above and Below






Sound Wall FM 2351
Sound Wall FM 528
HASTINGS OIL FIELD
Damage Catigories
Damage Categories
MINOR
AFFECTED
MAJOR
DESTROYED
Sound Walls
Study Area
0 0.5 1 2
Miles
N


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Google Earth


Tennessee Ave
285
2843


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Google Earth



Poll Question



Flood Mitigation Framework

- Avoid:
  - *Get Out of the Way*
- Accommodate:
  - *Let It Flood*
- Resist:
  - *Stand and Fight*
- Communicate:
  - *Tell The Story of Risk*



Avoidance

Vertical Avoidance, Elevated Structures



Avoidance

Vertical Avoidance, Elevated Structures





Avoidance

Horizontal Avoidance, Open Space Protection




Google Earth

ACCOMMODATE





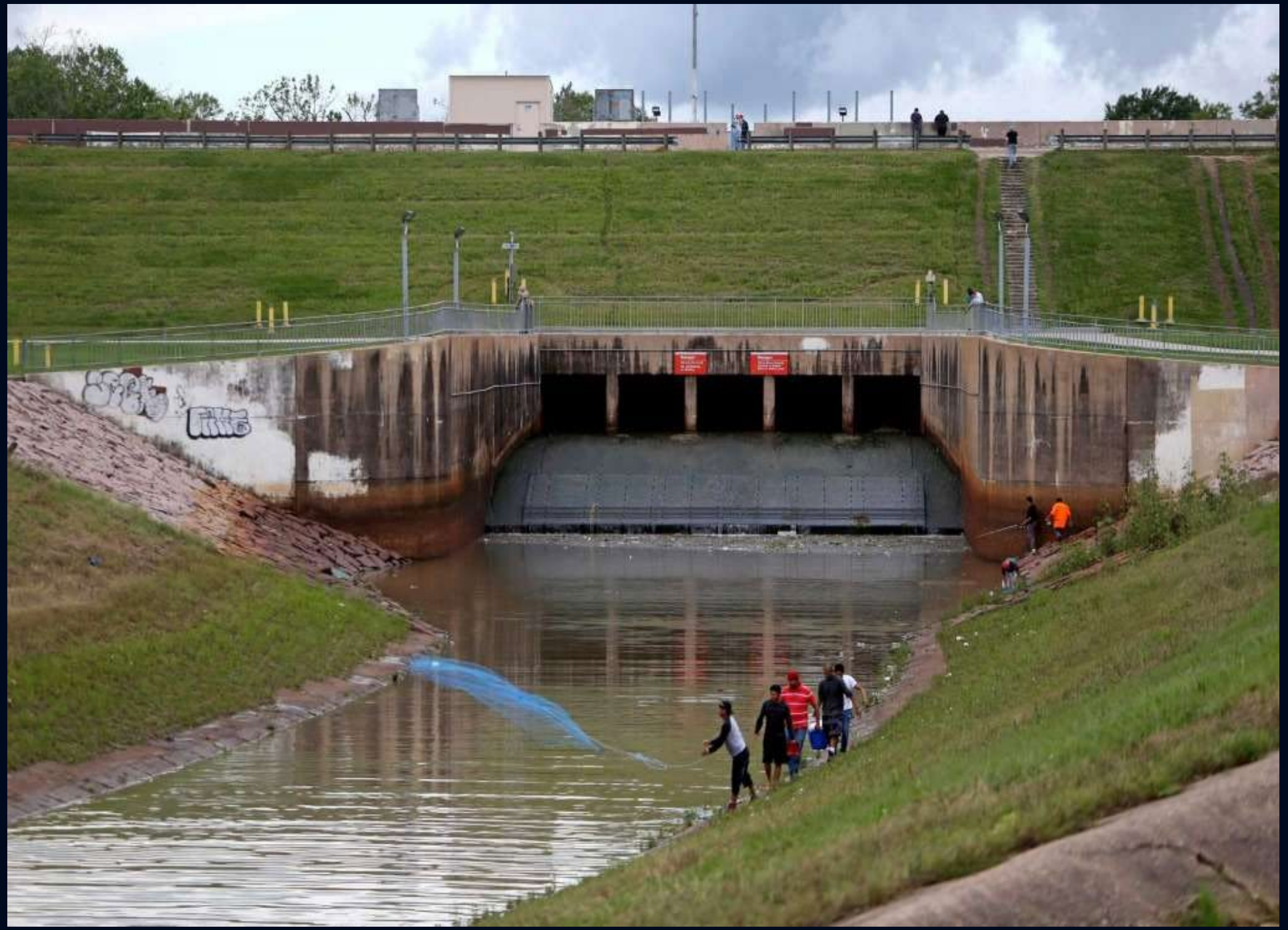






Resist





Dune Protection



Resistance

Multi-Functional Barriers



Resistance

Single-Functional Barriers





COMMUNICATE






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PORTABLE STORAGE + MOVING
1-800-722-5728 www.1800packrat.com
BERKSHIRE HATHAWAY
HomeServices
Anderson Properties
281-433-7621
Scott Mendell
InnerLoopLifestyle.com
DIDN'T
FLOOD



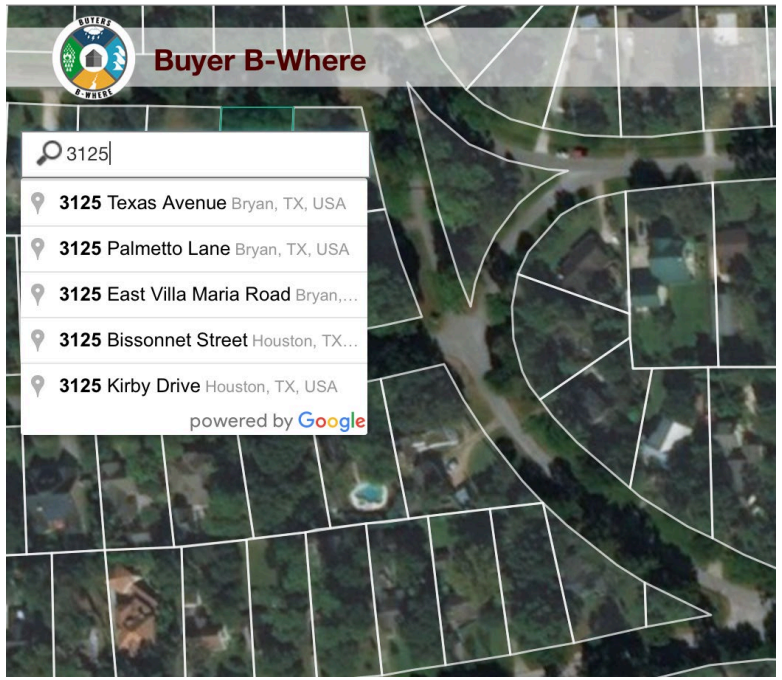
Buyers-BeWhere.com

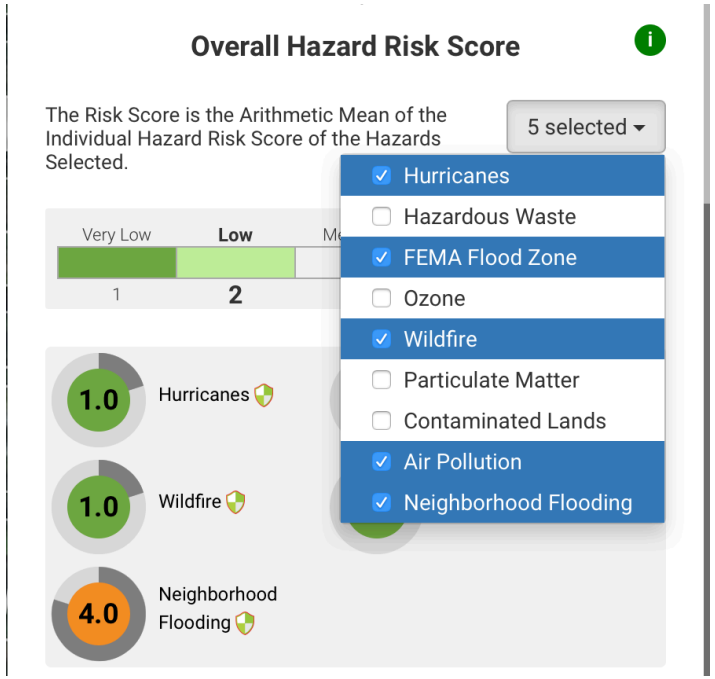
Buyers Be-Where

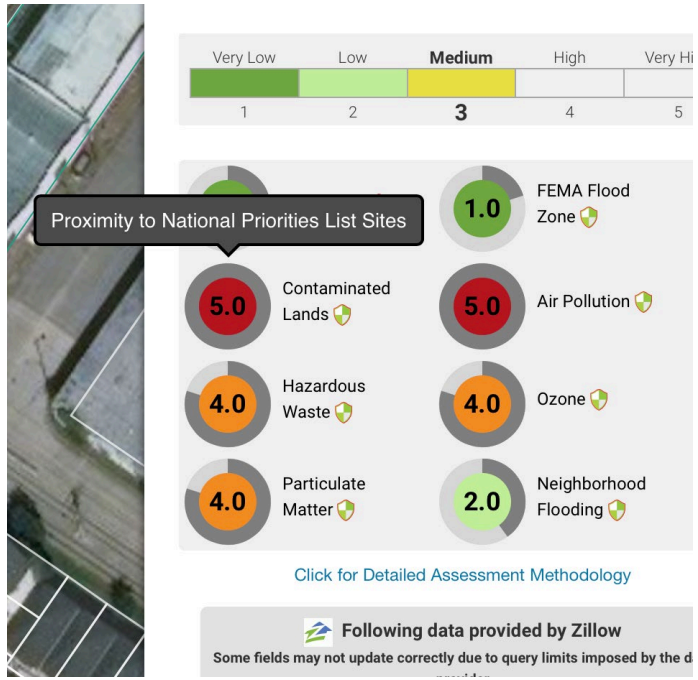
Buyers-BeWhere.com

- Offers on-demand and easy to understand information on a range of hazards
- Allows for customizable risk score for individual parcels relative to surround properties
- Provides solutions to mitigate risks and increase potential long-term value

How it Works







Search an Address

Select the Hazards

Understand the Indicators

CTBS The Center for Texas Beaches and Shores

TEXAS A&M UNIVERSITY GALVESTON CAMPUS.

Institute for Hazard Mitigation Planning and Research

Enter an address

5334 Windswept Ln, Houston, TX 77056, USA

5334 Windswept Lane

Houston, Texas, 77056

OVERALL HAZARD RISK SCORE

Click for Details

Very Low	Low	Medium	High	Very High
1	**2**	3	4	5

SPECIFIC HAZARD RISK ASSESSMENT

Click for Details

Select Hazard Risks using the dropdown below

6 selected

1.0	Hurricanes	1.0	FEMA Flood Zone
1.0	Air Pollution	2.0	Hazardous Waste
2.0	Particulate Matter	5.0	Past Flooding

BUYERS B-WHERE

Feedback

Flooding

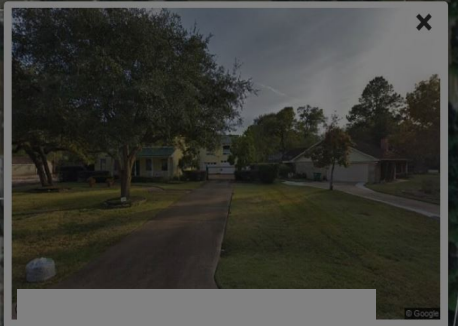
https://www.ready.gov/floods
https://www.fema.gov/media-library-data/1443014398612-a4dfc0f86711bc72434b82c4b100a677/revFEMA_HMA_Grants_4pg_2015_508.pdf

Structural:

- Elevate structures
- Wet proof by installing flood openings or using flood proof materials in foundation or ground level floor
- Dry proof by installing sewer backflow valves, using flood impervious coating on exterior walls, and placing floodgates or shields at all openings
- Install french drains and on site retention

Behavioral:

- Clean and maintain gutters and drains
- Move valuables to higher level
- Be aware where neighbors' properties drain
- Purchase flood insurance
- Check whether there is a high risk classified dam nearby



772 West 42nd Street
Houston, Texas, 77018

Overall Hazard Risk Score

The Risk Score is the Arithmetic Mean of the Individual Hazard Risk Score of the Hazards Selected.

7 selected

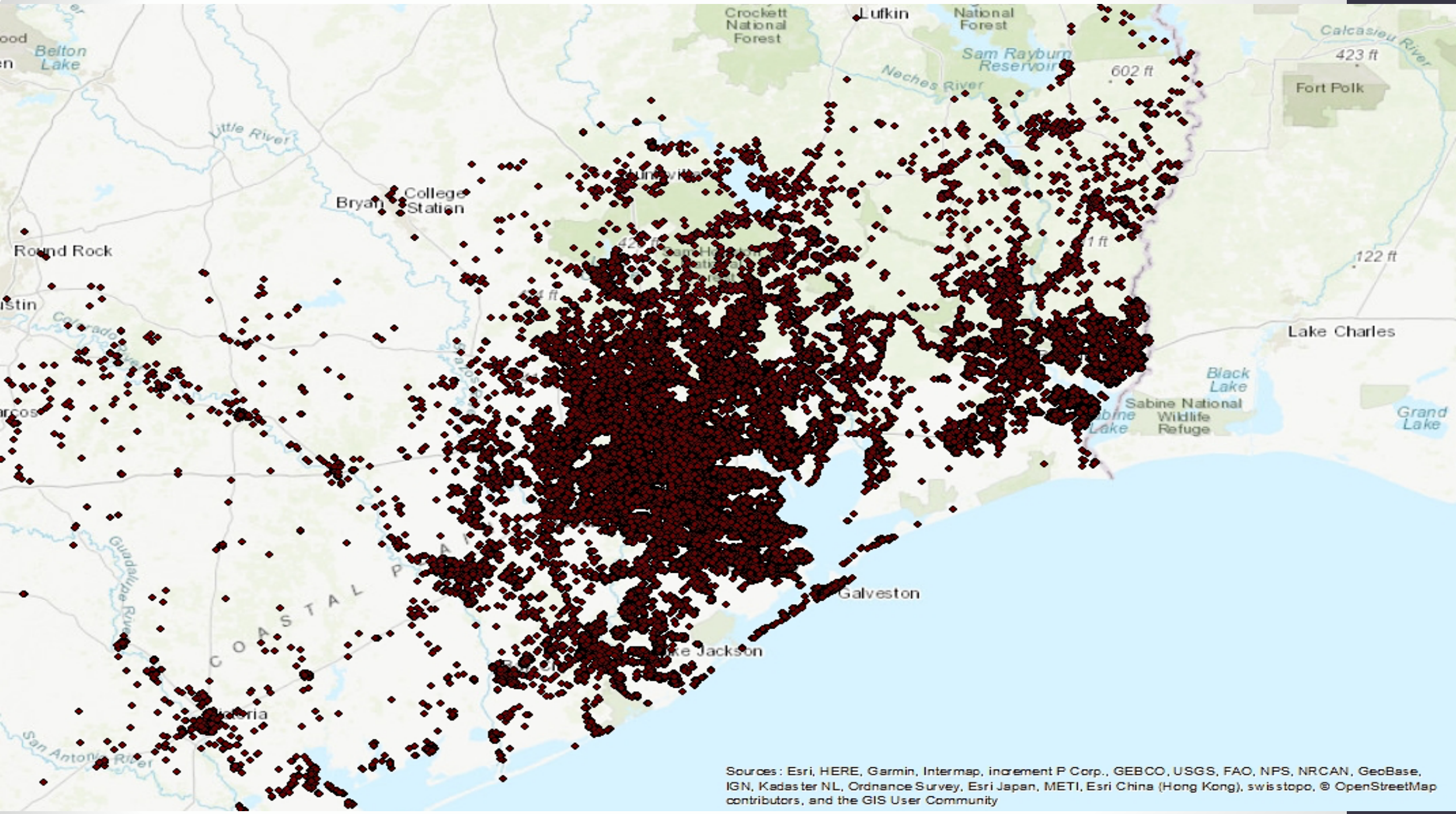
Very Low | Low | Medium | High | Very High
1 | 2 | 3 | 4 | 5

1.0 Hurricanes
3.0 FEMA Flood Zone
1.0 Air Pollution
1.0 Hazardous Waste
5.0 Particulate Matter
1.0 Sea Level Rise
3.0 Neighborhood Flooding

Click for Detailed Assessment Methodology

Following data provided by Zillow
Some fields may not update correctly due to query limits imposed by the data provider

Zestimate: Data not available
Facts: Data not available
Features: Data not available
Description: Data not available.



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

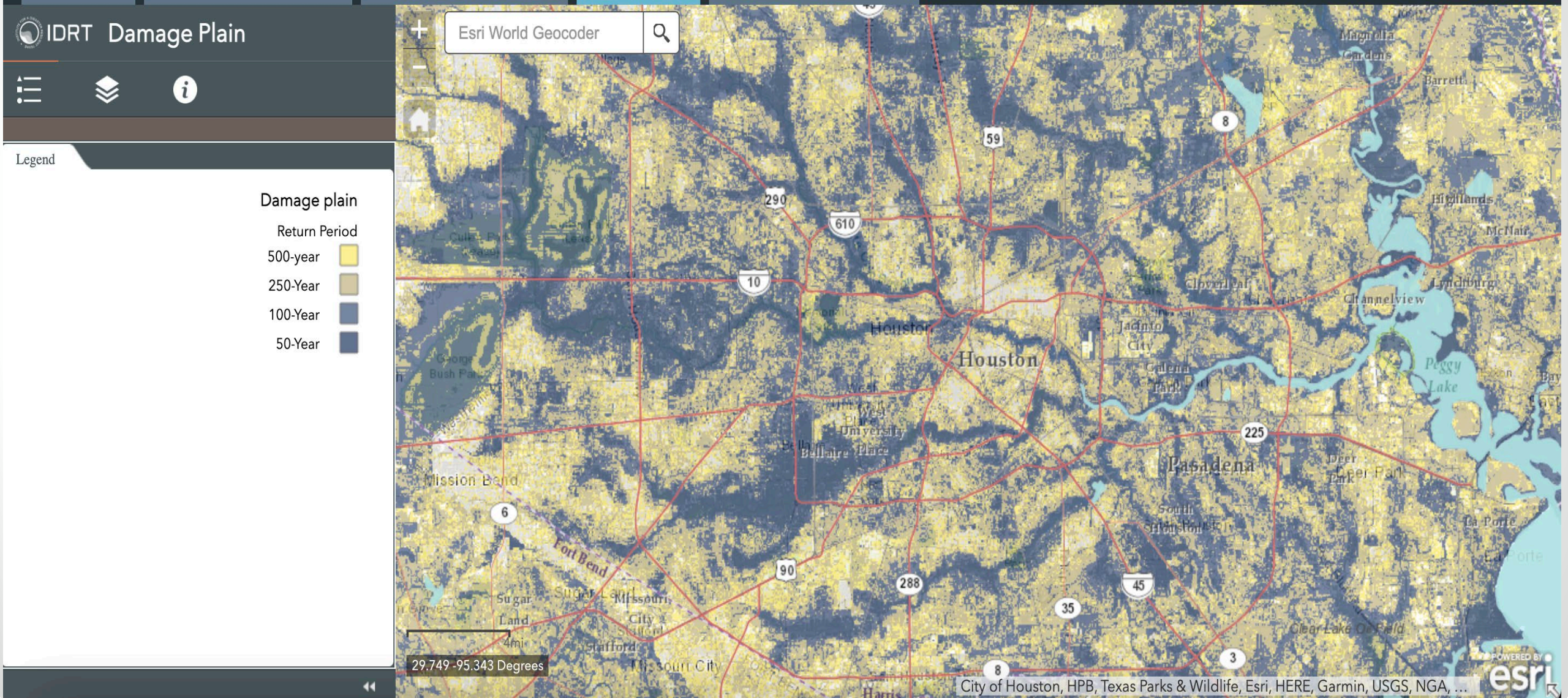
Measuring, Mapping and Managing Flood Risk in Texas

Interactive Map Catalog

IDRT

Introduction | Damage Plain Continuous | Damage Plain Flood Scale | Damage Plain | Flood Hazard Comparison

http://www.texascoastalatlas.com/FloodHazardMapCatalog



Measuring, Mapping and Managing Flood Risk in Texas

Interactive Map Catalog

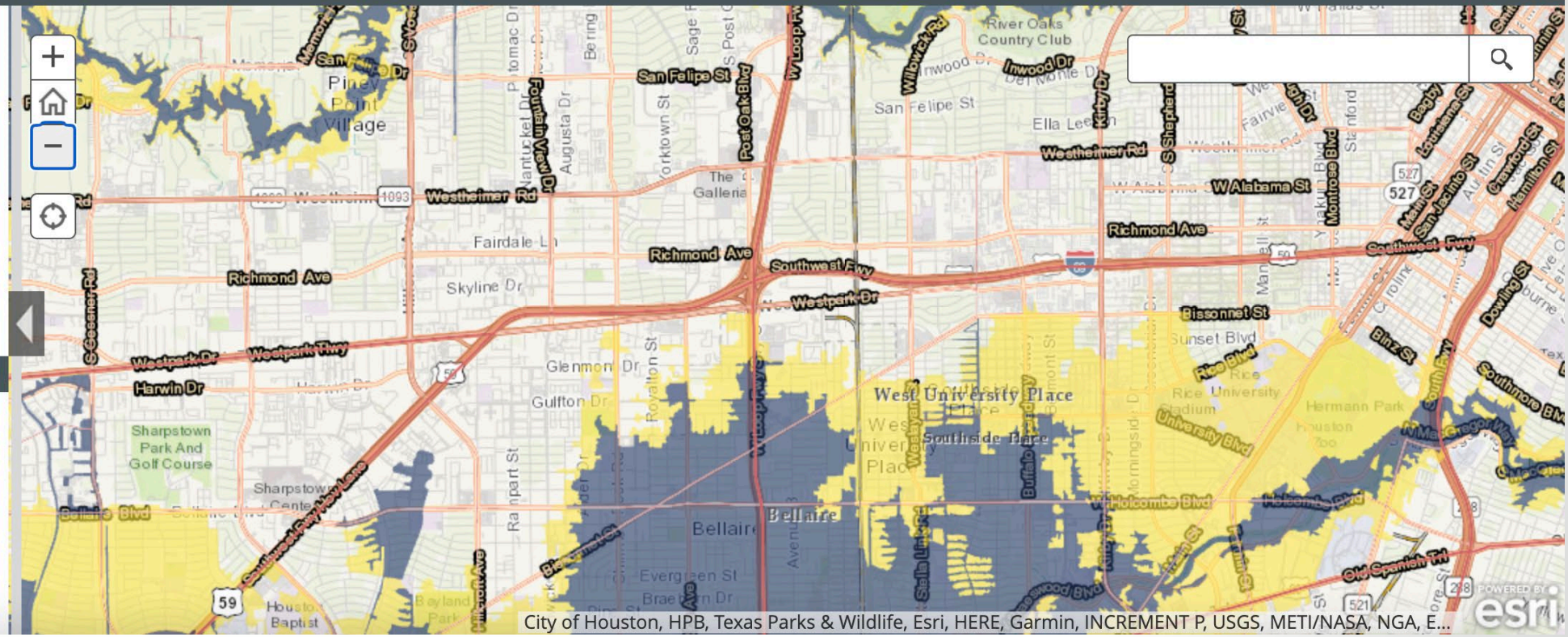
IDRT

Introduction | Damage Plain Continuous | Damage Plain Flood Scale | Damage Plain | Flood Hazard Comparison

Flood Hazard Comparison

Modeled and regulatory Flood hazard areas

Comparison of our modeled flood hazard areas and the regulatory floodplain with a slider view. Please swipe right or left to view the difference.



Legend

Damage Plain	FEMA Floodplain
Return Period	Return Period
500-Year	500-Year
100-Year	100-Year

Measuring, Mapping and Managing Flood Risk in Texas

Interactive Map Catalog

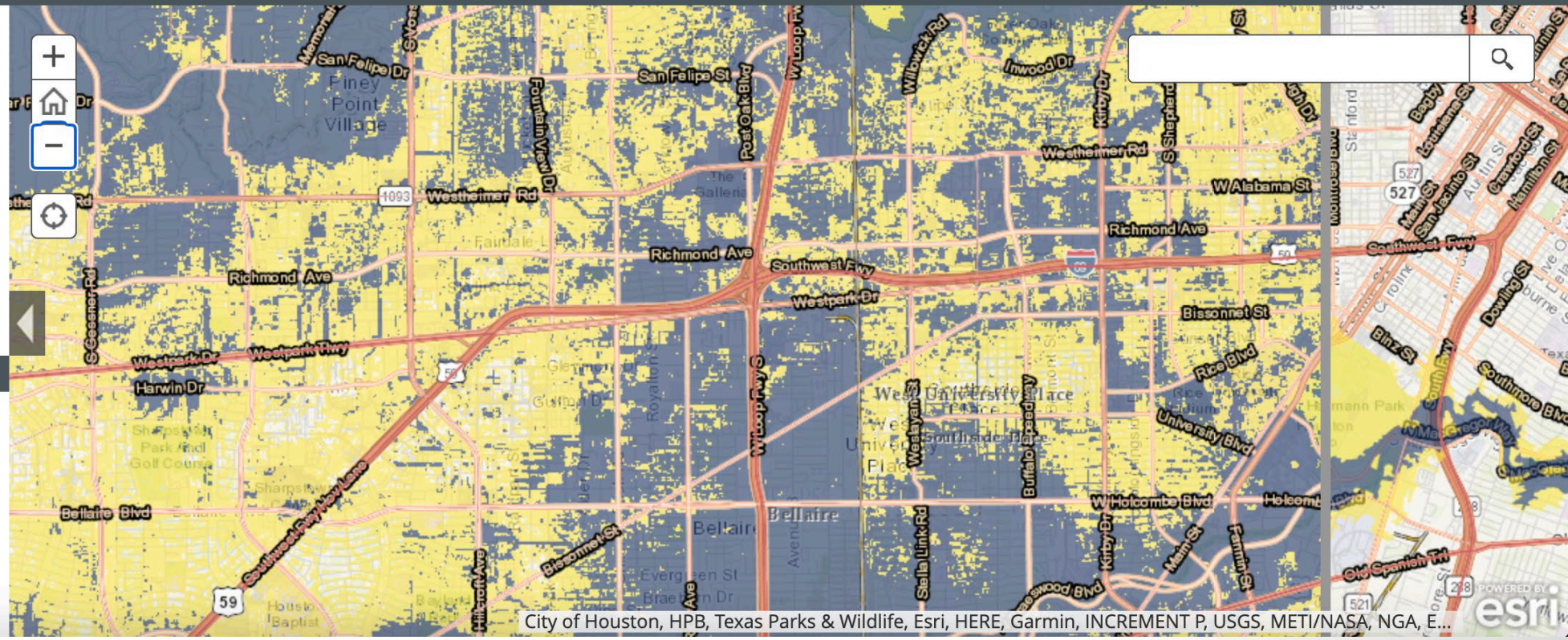
IDRT

Introduction | Damage Plain Continuous | Damage Plain Flood Scale | Damage Plain | Flood Hazard Comparison

Flood Hazard Comparison

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Comparison of our modeled flood hazard areas and the regulatory floodplain with a slider view. Please swipe right or left to view the difference.



Poll Question





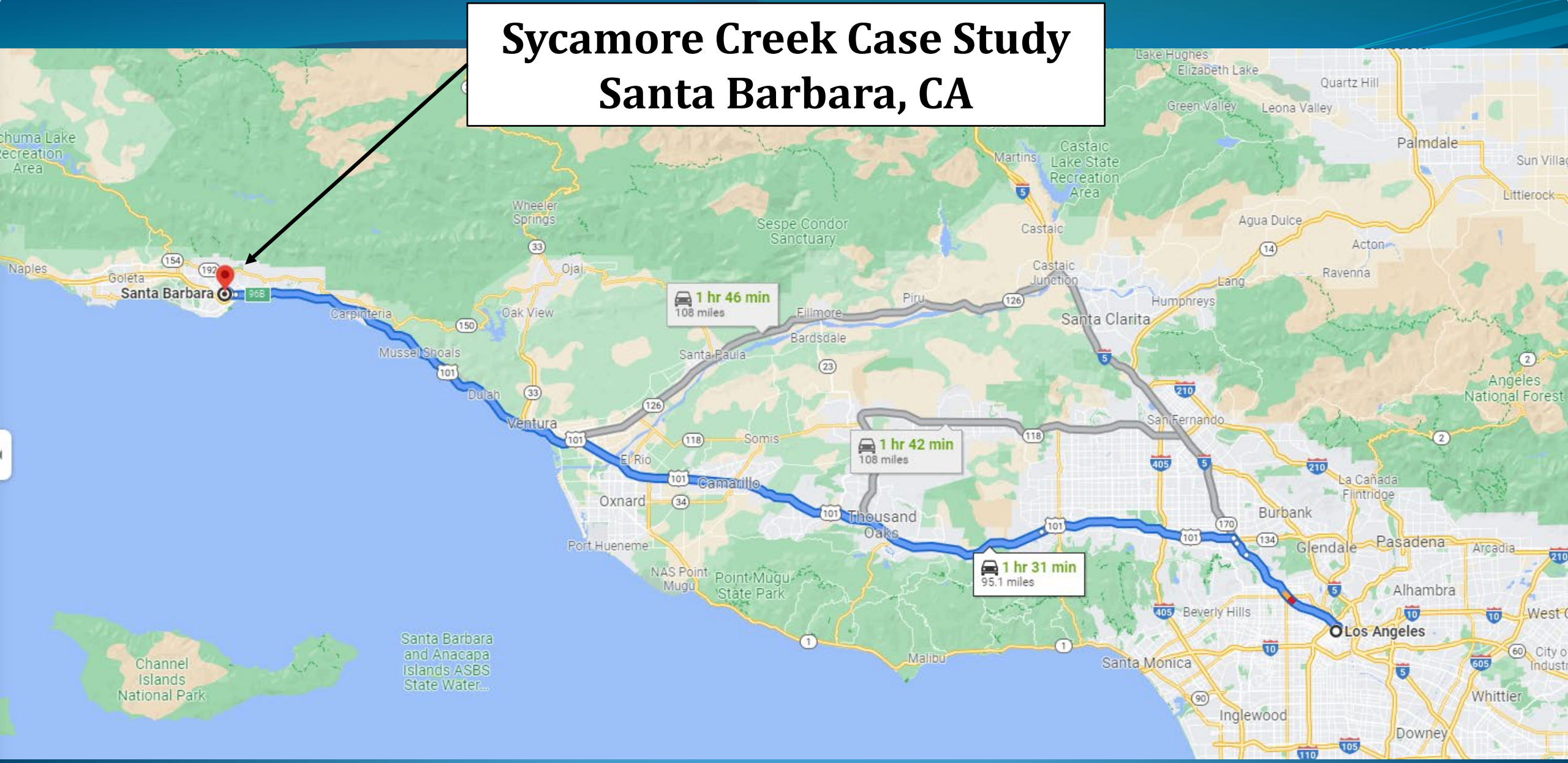
idrt.tamug.edu



Thank You

TEXAS A&M UNIVERSITY
GALVESTON CAMPUS

Sycamore Creek Case Study
Santa Barbara, CA





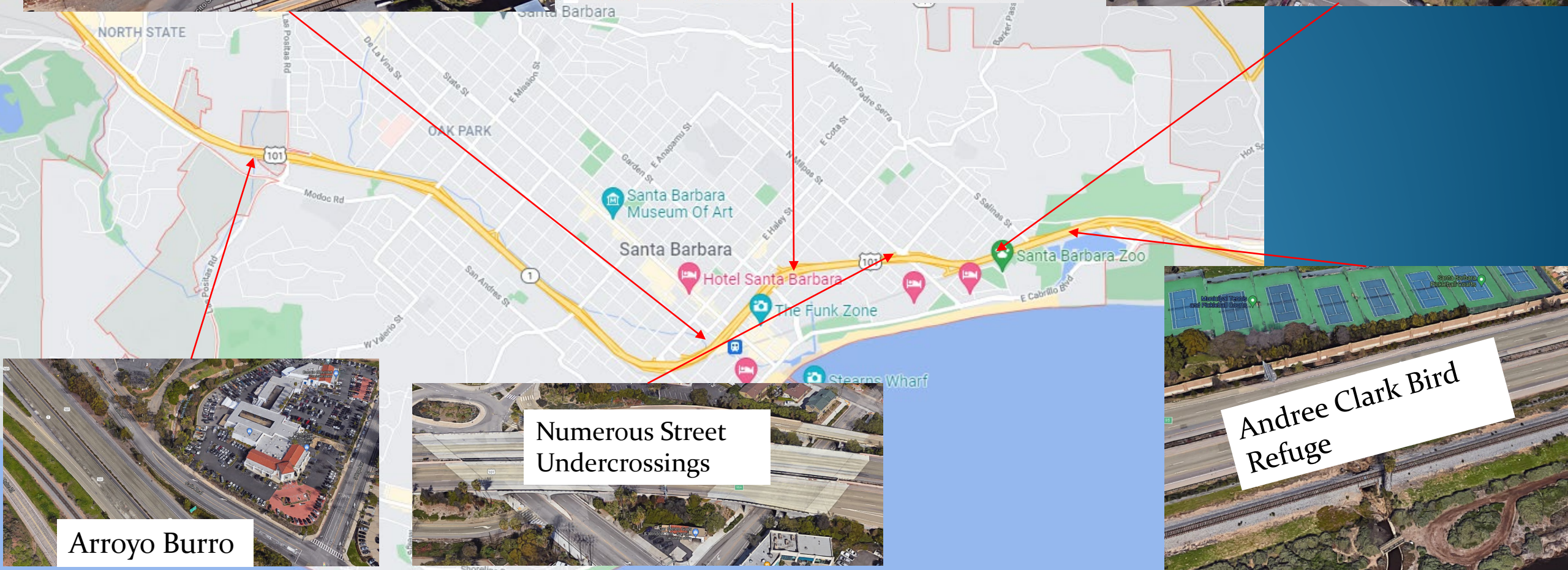





Mission Creek


Laguna Channel


Sycamore Creek

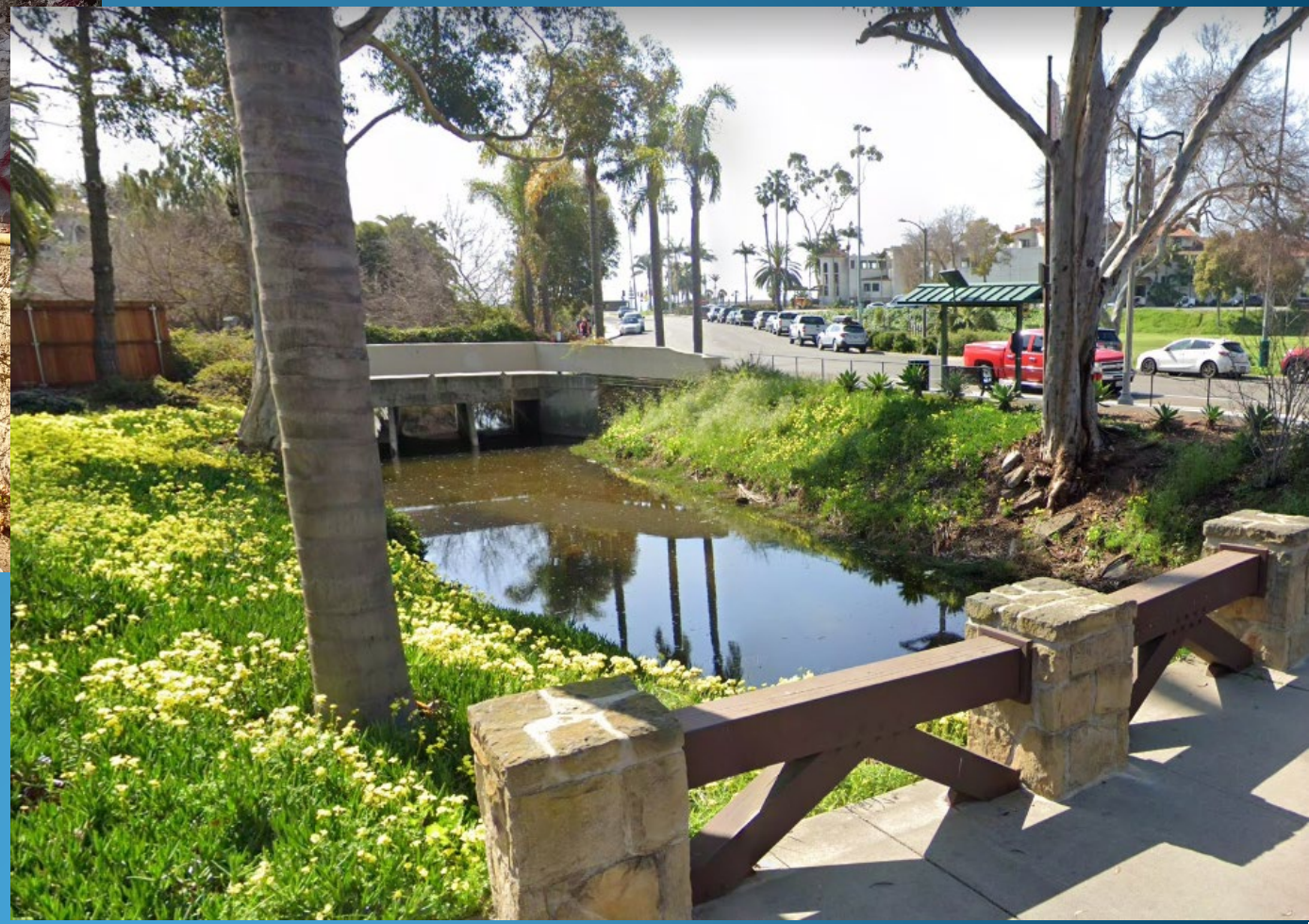

Santa Barbara
NORTH STATE
OAK PARK
Las Positas Rd
De La Vina St
State St
E Mission St
Alameda Padre Serra
Barker Pass
E Anapamu St
Garden St
E Cota St
N Milpas St
E Haley St
S Salinas St
Modoc Rd
101
Santa Barbara Museum Of Art
Santa Barbara
Hotel Santa Barbara
The Funk Zone
Santa Barbara Zoo
E Cabrillo Blvd
San Andres St
W Valerio St
Stearns Wharf
Shoreline Dr

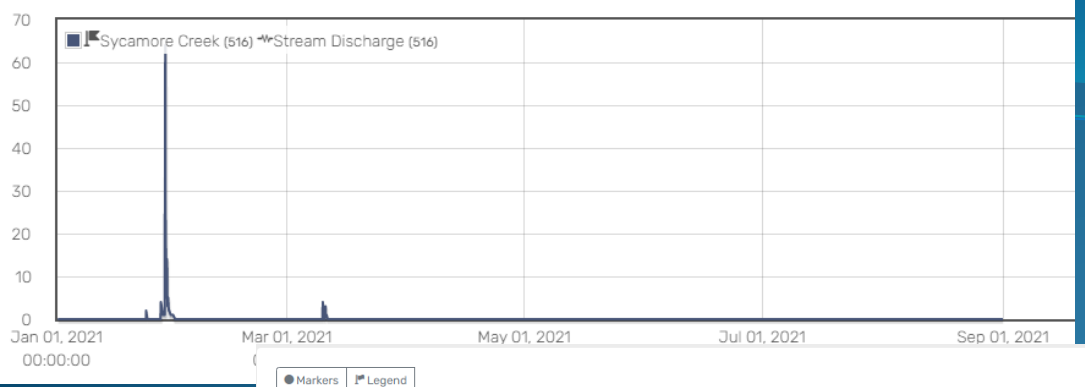
Arroyo Burro

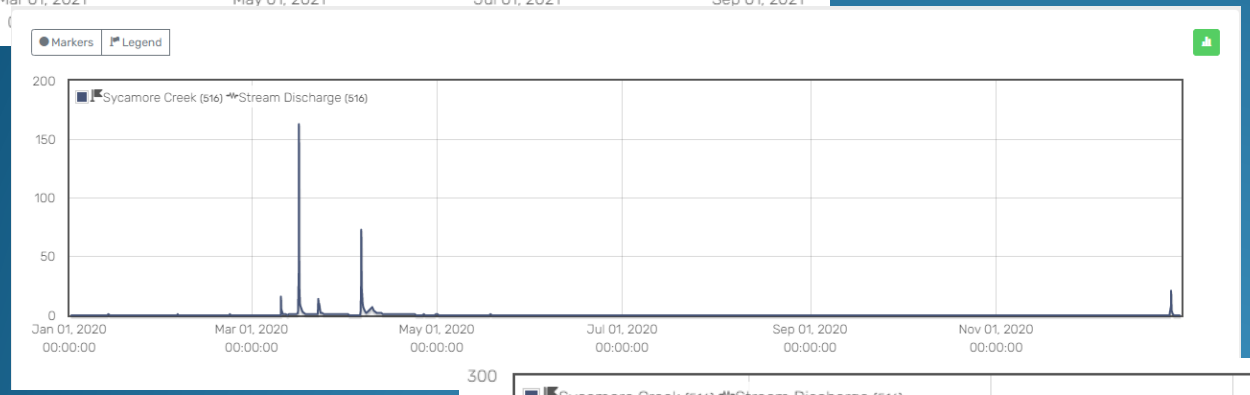
Numerous Street Undercrossings

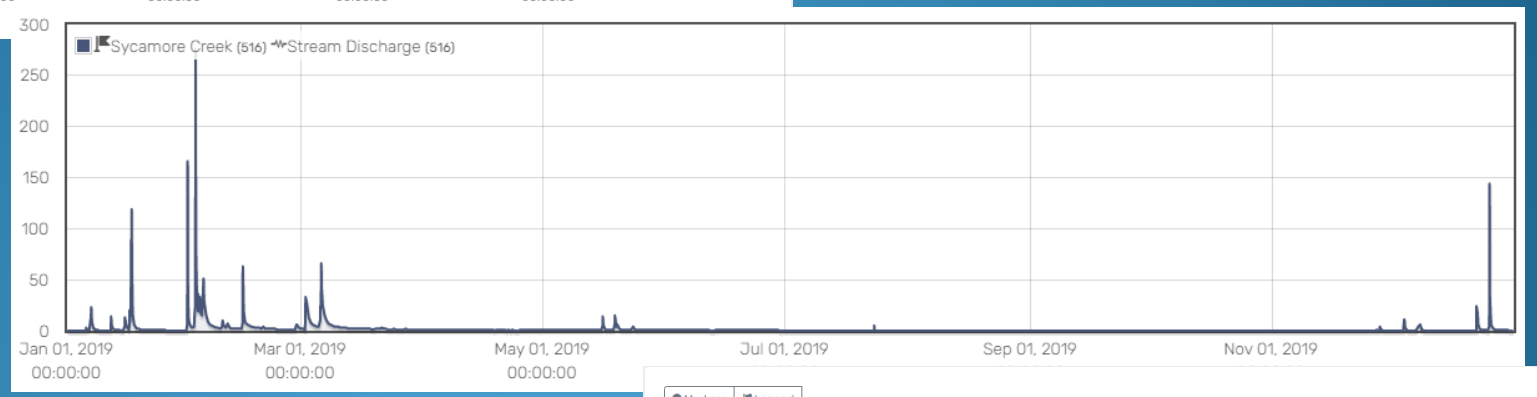
Andree Clark Bird Refuge

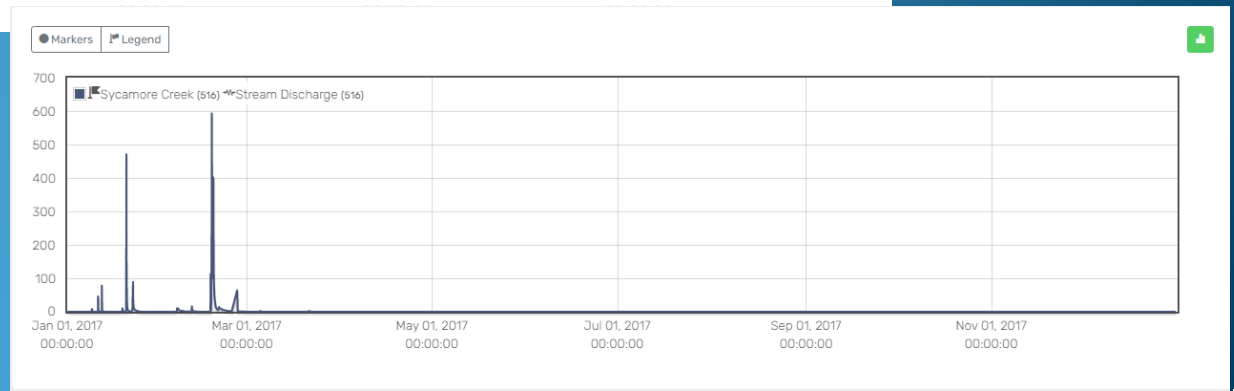




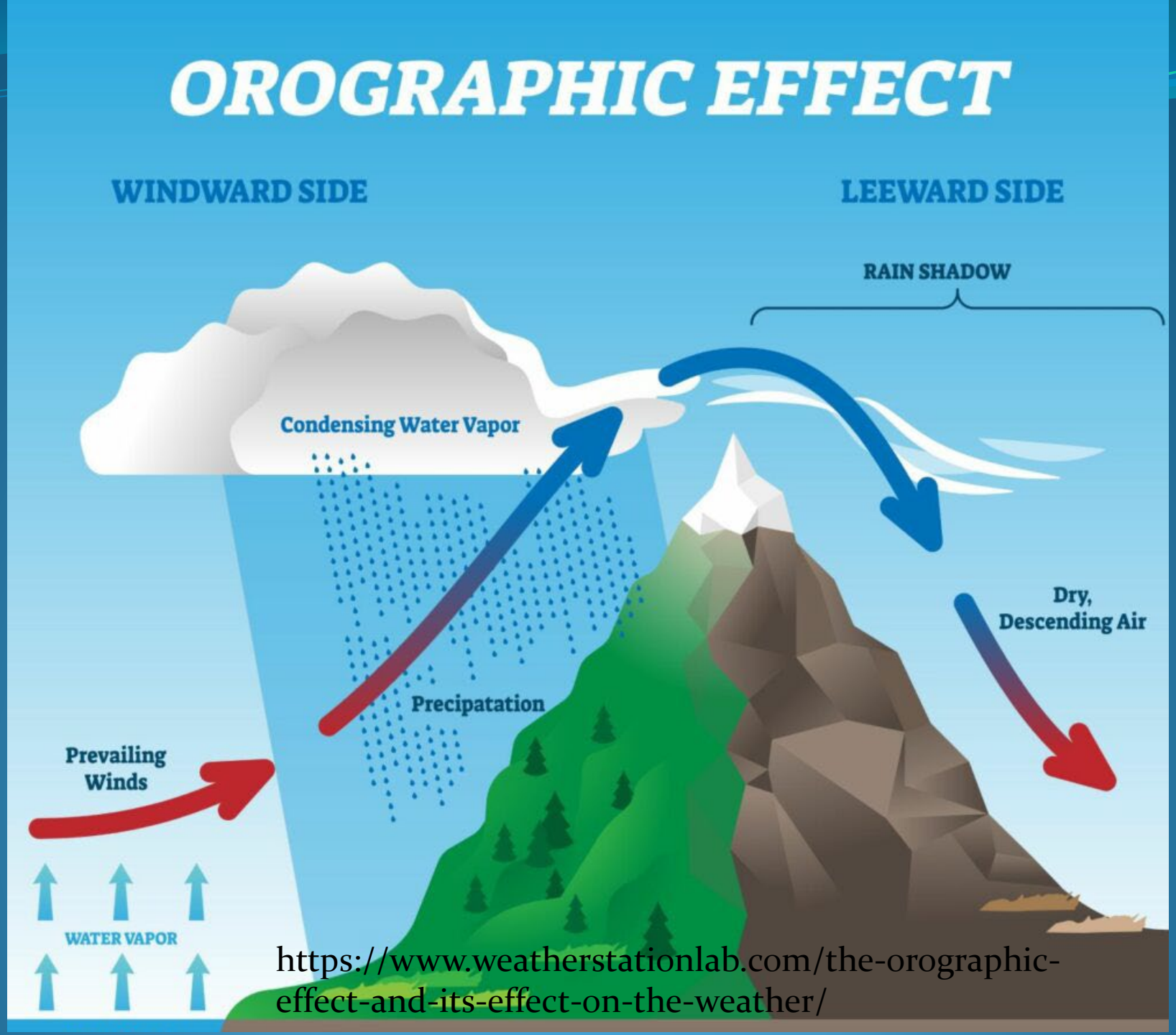






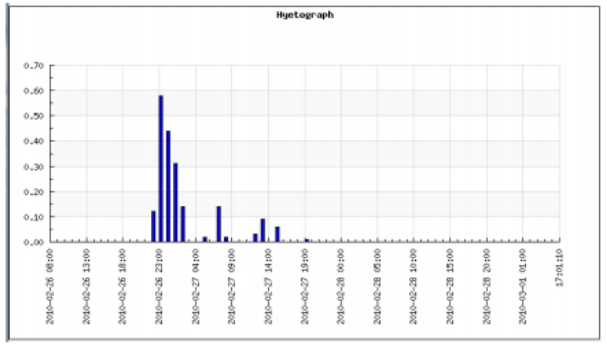


https://rain.cosbpw.net/

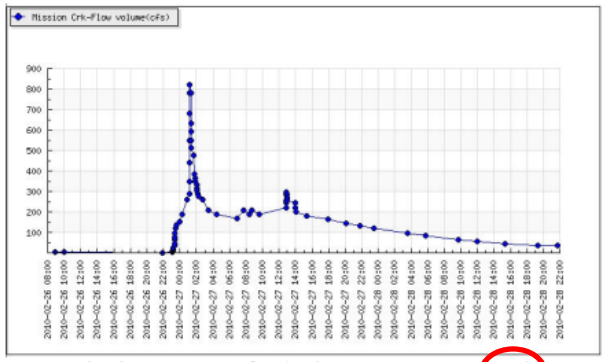


https://www.weatherstationlab.com/the-orographic-effect-and-its-effect-on-the-weather/

February 26-28, 2010

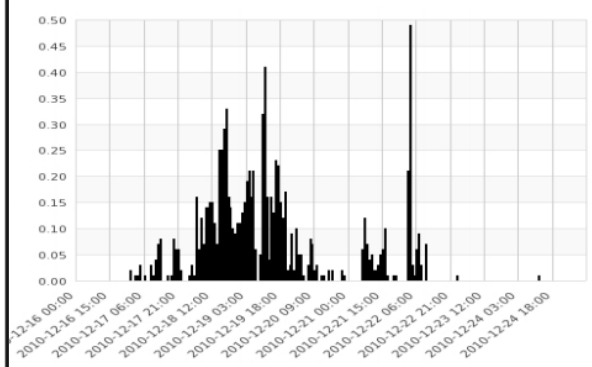


Storm 2.3”, Intensity Max = 0.58”/hr, Watershed: urban

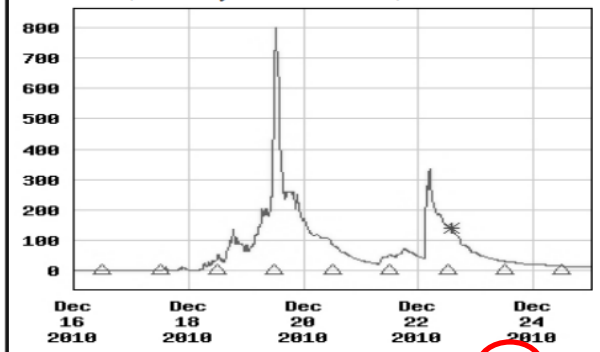


Peak Flow = ~825 cfs / Flow Response = ~0.5 hr

Mission Creek, Santa Barbara

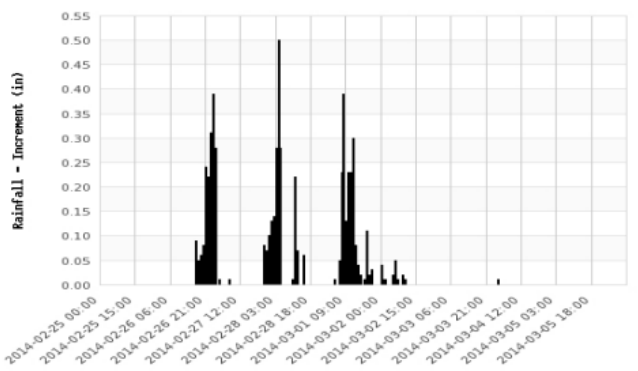


torm = 9.2”, Intensity Max = 0.69”/hr, Watershed: Urban

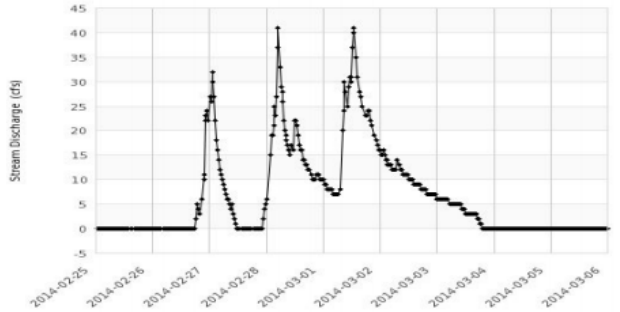


Peak Flow ~ 800 cfs / Flow Response ~1 hr

Mission Creek, Santa Barbara

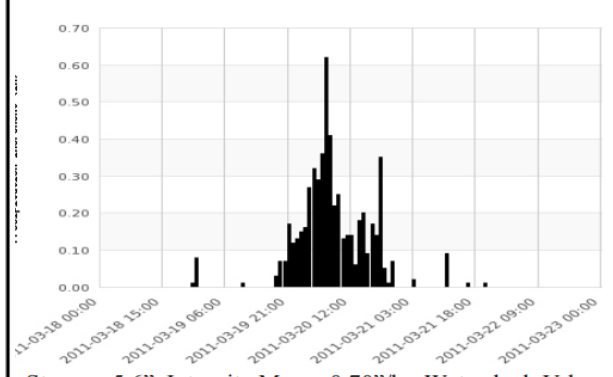


Storm = 5.7”, Intensity Max = 0.60”/hr, Watershed: Urban

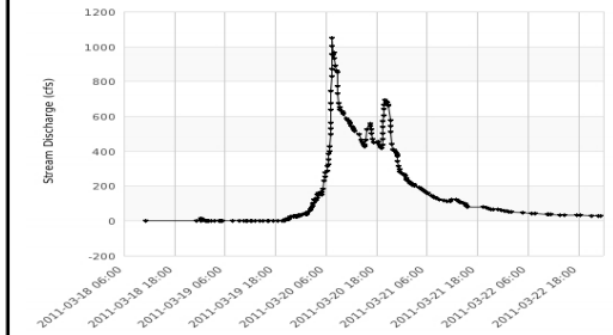


Peak Flow ~40 cfs, Flow Response (ToC) ~1 hr

Mission Creek, Santa Barbara

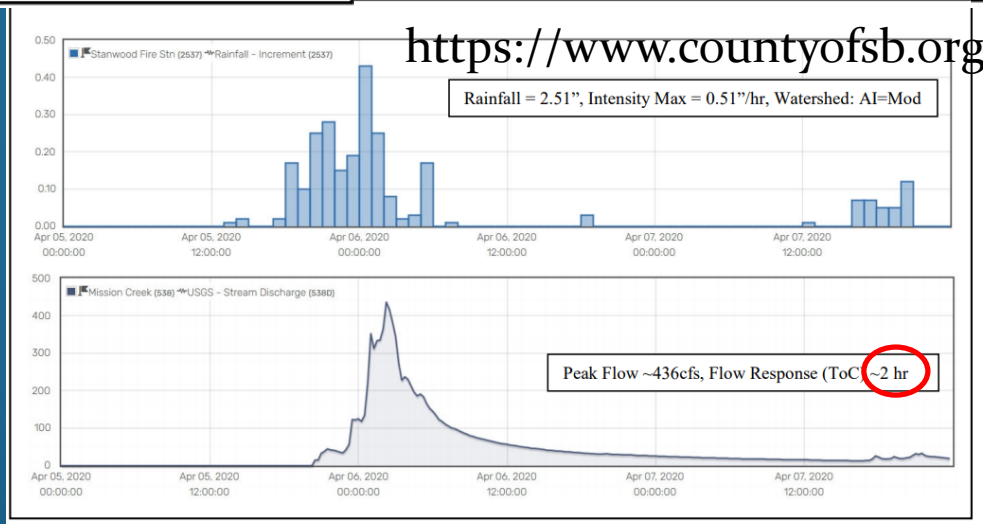


Storm = 5.6”, Intensity Max = 0.70”/hr, Watershed: Urban



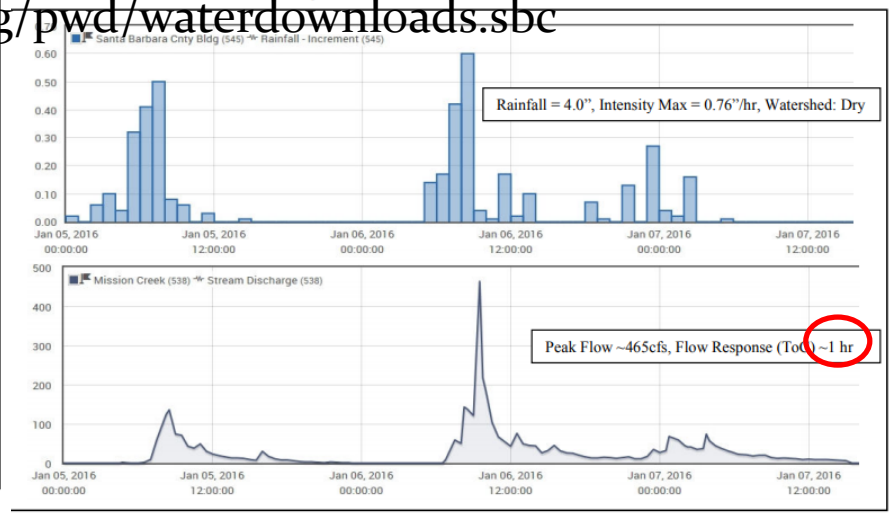
Peak Flow ~ 1050 cfs / Flow Response ~1 hr

https://www.countyofsb.org/pwd/waterdownloads.sbc

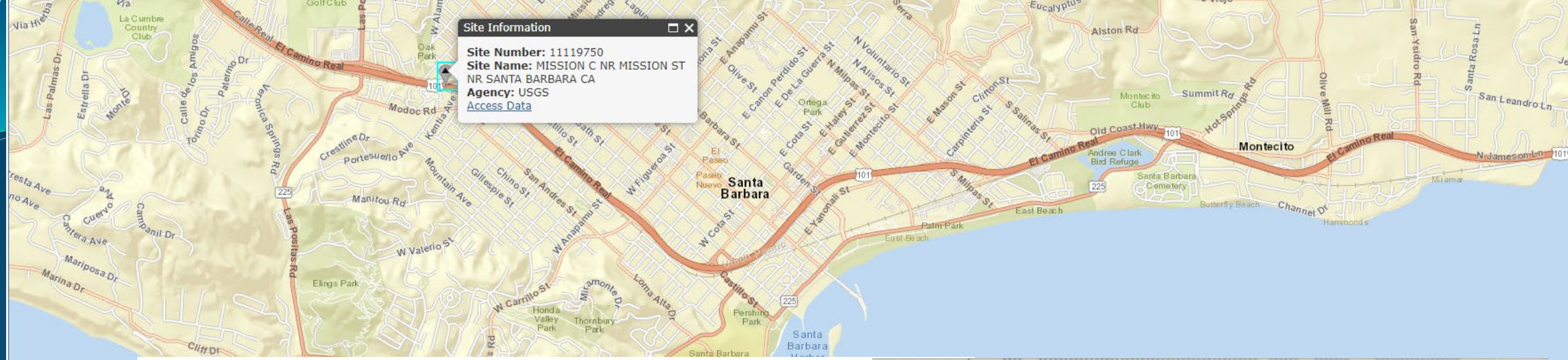


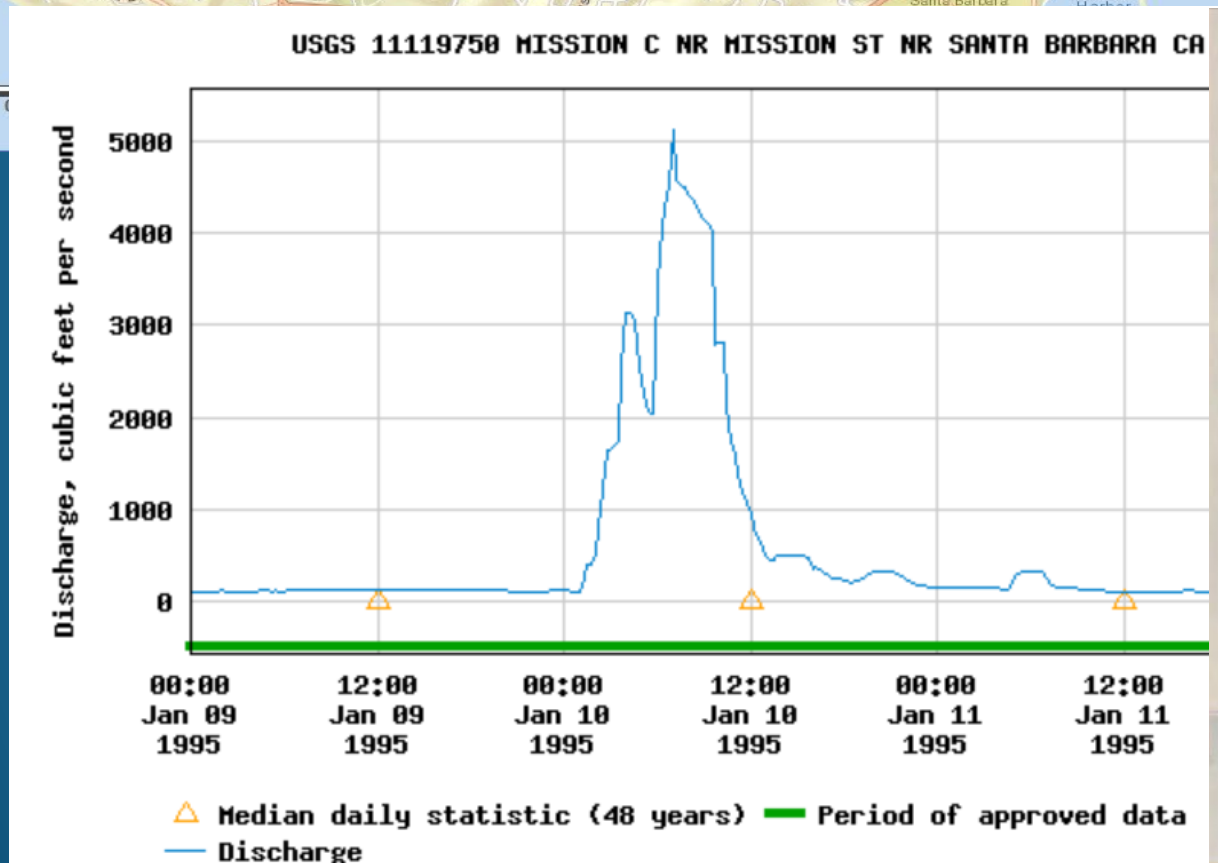
Mission Creek, Santa Barbara (April 5-7, 2020)

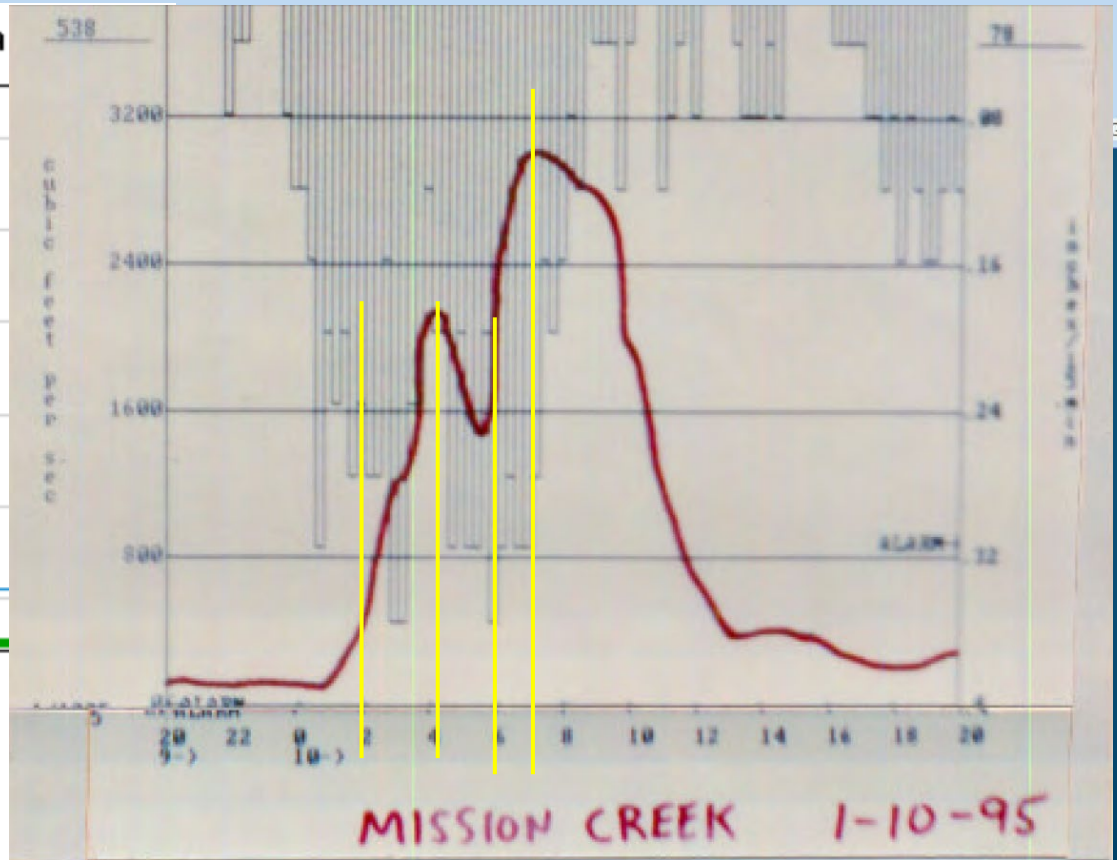
Rainfall & Stream Discharge Correlation



Mission Creek, Santa Barbara (January 5-7, 2016)


Site Information
Site Number: 11119750
Site Name: MISSION C NR MISSION ST NR SANTA BARBARA CA
Agency: USGS
Access Data
Santa Barbara
Montecito
El Camino Real
Modoc Rd
Mission St
Alston Rd
Summit Rd
Old Coast Hwy
Andree Clark Bird Refuge
Santa Barbara Cemetery
East Beach
Palm Park
Butterfly Beach
Channel Dr
Hammonds
Pershing Park
Santa Barbara Harbor
Elings Park
Honda Valley Park
Thornbury Park
Oak Park
Ortega Park
Paseo Nuevo
El Paseo
Mountain Ave
Gillespie St
Chino St
San Andres St
W Anapamu St
W Valerio St
W Carrillo St
W Cota St
E Cota St
Garden St
Las Positas Rd
Las Palmas Dr
Estrella Dr
Calle de los Amigos
Torino Dr
Palermo Dr
Verónica Springs Rd
Crestline Dr
Portesuello Ave
Kenia Ave
Manitou Rd
Campanil Dr
Cantera Ave
Mariposa Dr
Marina Dr
Cliff Dr
Loma Alta Dr
Miramonte Dr
Castillo St
E Yanonali St
S Milpas St
E Haley St
E Gutierrez St
E Montecito St
E Mason St
Carpinteria St
S Salinas St
N Milpas St
N Voluntario St
N Alisos St
E De La Guerra St
E Canon Perdido St
E Olive St
E Anapamu St
Olive Mill Rd
Hot Springs Rd
San Ysidro Rd
Santa Rosa Ln
San Leandro Ln
N Jameson Ln
Miramar
Eucalyptus
La Cumbre Country Club
Golf Club
101
225


USGS 11119750 MISSION C NR MISSION ST NR SANTA BARBARA CA
Discharge, cubic feet per second
5000
4000
3000
2000
1000
0
00:00 Jan 09 1995
12:00 Jan 09 1995
00:00 Jan 10 1995
12:00 Jan 10 1995
00:00 Jan 11 1995
12:00 Jan 11 1995
Median daily statistic (48 years)
Period of approved data
Discharge


538
3200
2400
1600
800
MISSION CREEK 1-10-95

Montecito Mudslides 1/9/2018

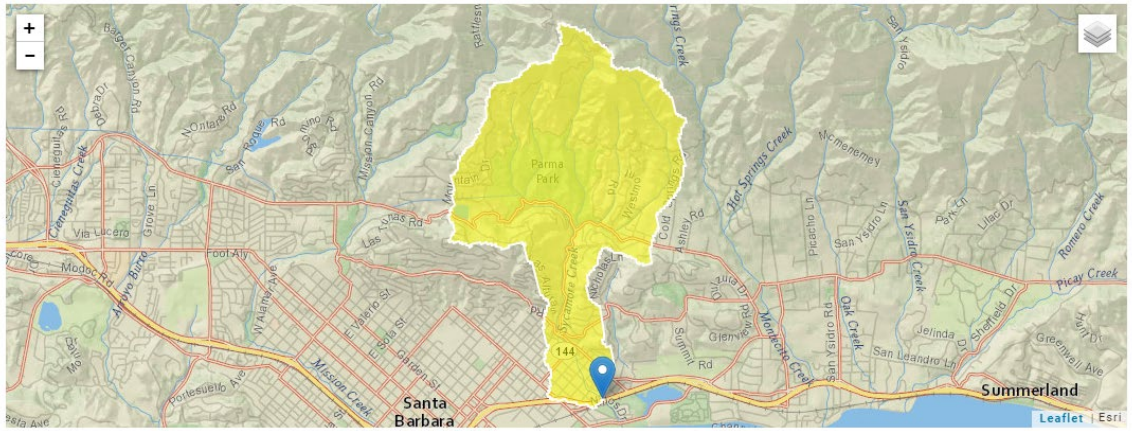





Exit 95: Salina Street
USH 101 over Sycamore Creek
Old Coast Hwy
S Salinas St
Mi Fiesta Market
Delivery
Beachside Taxi SB
S Canada St
Harmon St
Pitos St
Park Pl
Municipal Tennis and Pickleball Courts
Old Coast Park
CA Electric
Santa Barbara Sunrise RV Park
Covina St
Liberty St
S Soledad St
Mariachi Real en Santa Barbara CA
Punta Gorda St
Cats of Africa Exhibit
Por La Mar Cir
Santa Barbara Zoo
Compact zoo with hundreds of animals
Public Bathroom
Ninos Dr
Google

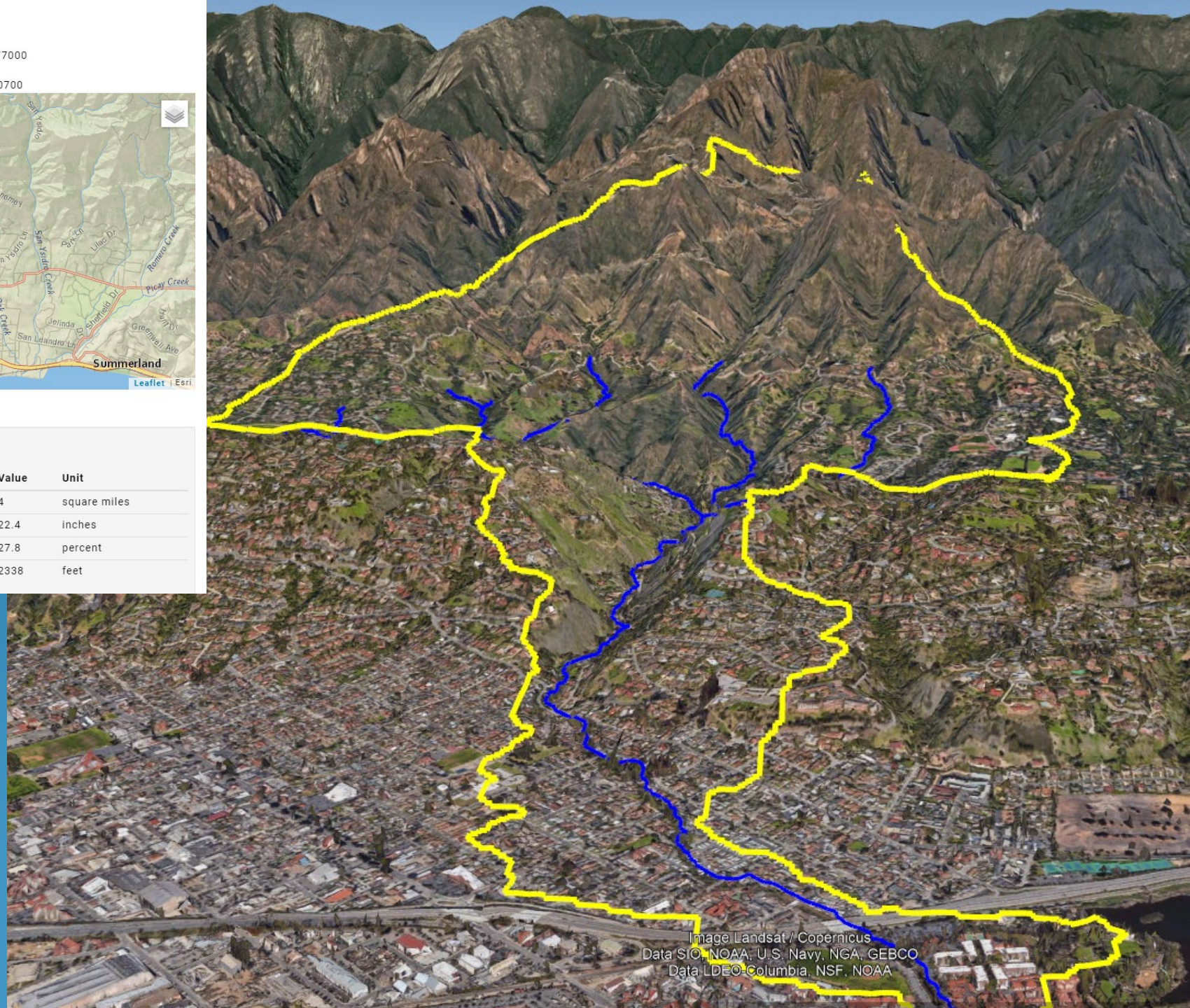
StreamStats Report

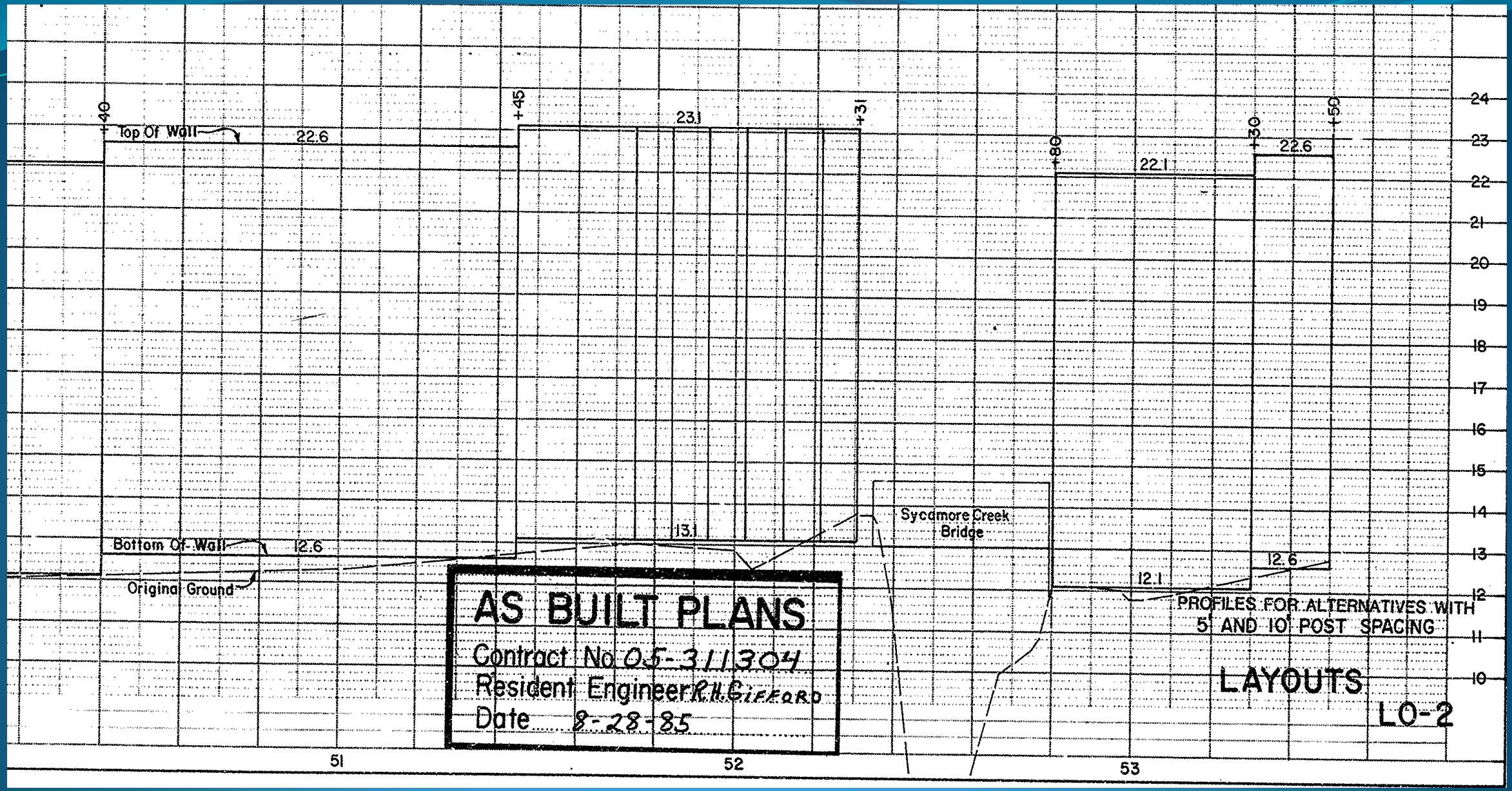
Region ID:	CA
Workspace ID:	CA20210901072039477000
Clicked Point (Latitude, Longitude):	34.42050, -119.67015
Time:	2021-09-01 00:21:11 -0700



Basin Characteristics

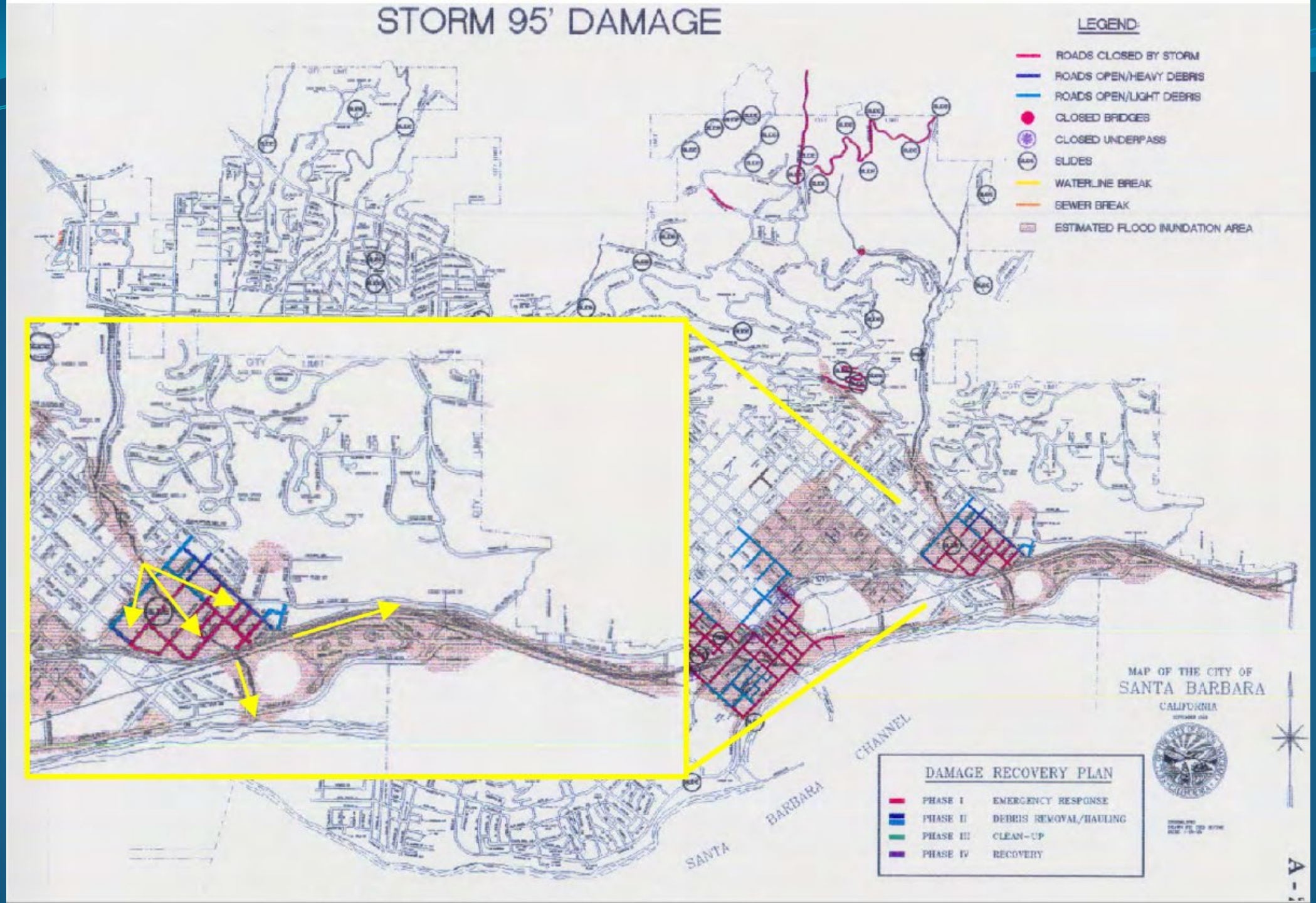
Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	4	square miles
PRECIP	Mean Annual Precipitation	22.4	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	27.8	percent
RELIEF	Maximum - minimum elevation	2338	feet




+40
Top Of Wall
22.6
+45
23.1
+31
+80
22.1
+30
22.6
+50
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
Sycamore Creek
Bridge
13.1
Bottom Of Wall
12.6
Original Ground
12.1
12.6
AS BUILT PLANS
Contract No 05-311304
Resident Engineer R.L. GIFFORD
Date 8-28-85
PROFILES FOR ALTERNATIVES WITH
5' AND 10' POST SPACING
LAYOUTS
LO-2
51
52
53



https://www.aaroads.com/california/us-101nd_ca.html


STORM 95' DAMAGE
LEGEND:
ROADS CLOSED BY STORM
ROADS OPEN/HEAVY DEBRIS
ROADS OPEN/LIGHT DEBRIS
CLOSED BRIDGES
CLOSED UNDERPASS
SLIDES
WATERLINE BREAK
SEWER BREAK
ESTIMATED FLOOD INUNDATION AREA
MAP OF THE CITY OF
SANTA BARBARA
CALIFORNIA
DAMAGE RECOVERY PLAN
PHASE I EMERGENCY RESPONSE
PHASE II DEBRIS REMOVAL/HAULING
PHASE III CLEAN-UP
PHASE IV RECOVERY
CHANNEL
SANTA
BARBARA

Region awash in fear, fun as skies pour

By BEN HELLWARTH
NEWS-PRESS STAFF WRITER

Brent Lathrop swam southbound on Highway 101 Tuesday.

The 57-year-old machinist's accidental journey was one of dozens of bizarre, sometimes harrowing episodes to unfold as Santa Barbara County residents found themselves awash in devastating floods.

Lathrop's watery adventure began when he hopped out of bed and found himself knee-deep in water inside his trailer at the Santa Barbara Sunrise RV Park on Santa Barbara's lower Eastside, one of several neighborhoods where residents woke up to find muddy waters seeping into their homes.

He got out of his trailer to find his neighbors equally soaked.

"This happened so fast that there was no way to get any more RVs out than we did," said Judy Wingfield, manager of the 33-space park at Salinas Street and Highway 101, where just a couple of RVs could drive out before fast-rising waters peaked about 8 a.m. Tuesday.

Several elderly residents were floated from their homes on surfboards and about a dozen people from the park were bused to a nearby evacuation center, but no one was injured, she said.

"We had no indication that we were going to have this type of problem — nothing of this magnitude," Wingfield said.

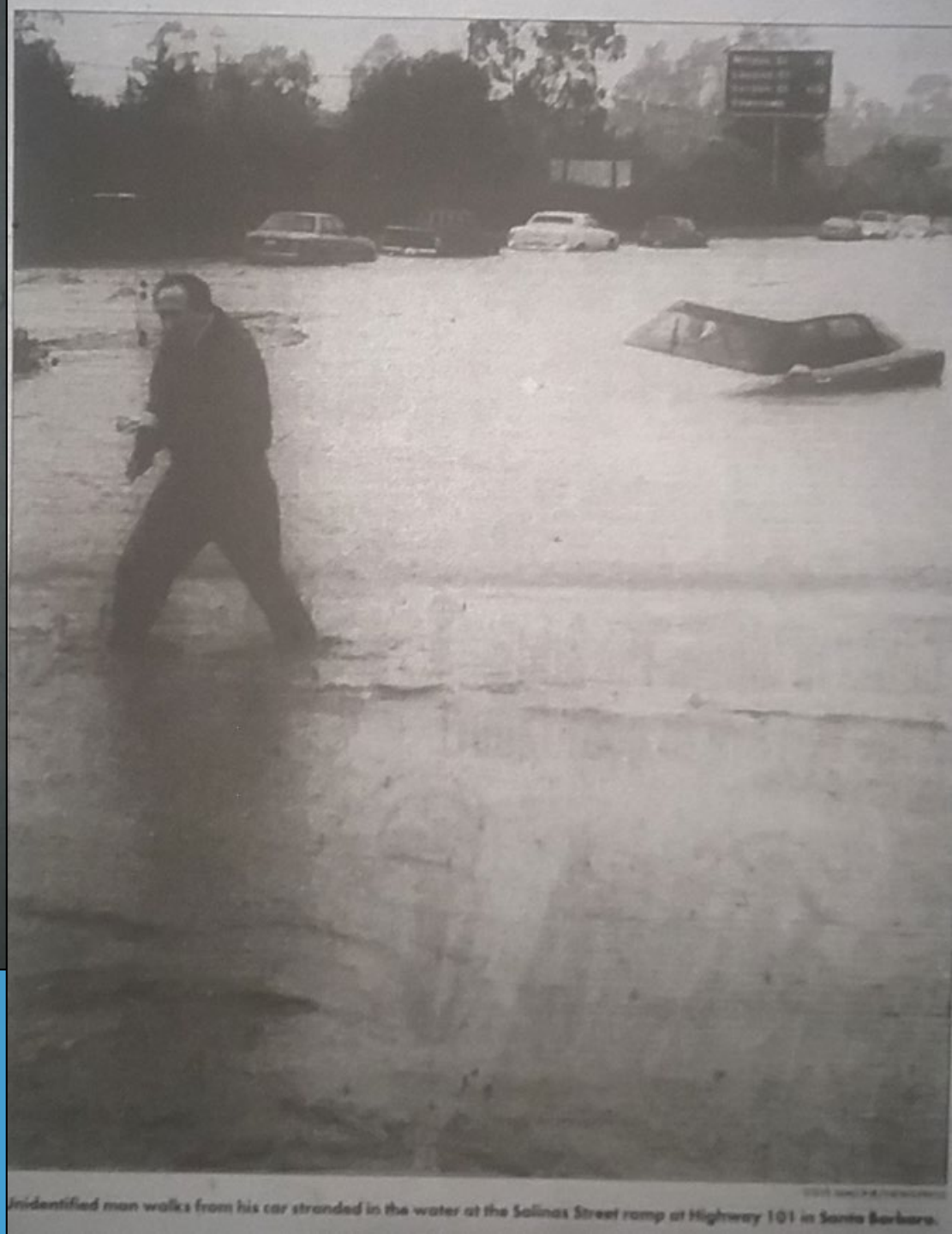
That was Lathrop's feeling when shoulder-high waters began to drain and sucked him under the wooden wall that separates the RV park from Highway 101, sending him bobbing southbound in the northbound lanes.

Lathrop was washed away as he and several others hacked large holes in the wall as an impromptu — and effective — flood control measure when they realized the wall was acting as a dam.

Courtesy Violet Barroso (vbarroso@newspress.com), Santa Barbara News-Press



Brent Lathrop salvages his financial papers from his recreational vehicle in the trailer park at the foot of Salinas Street in Santa Barbara.



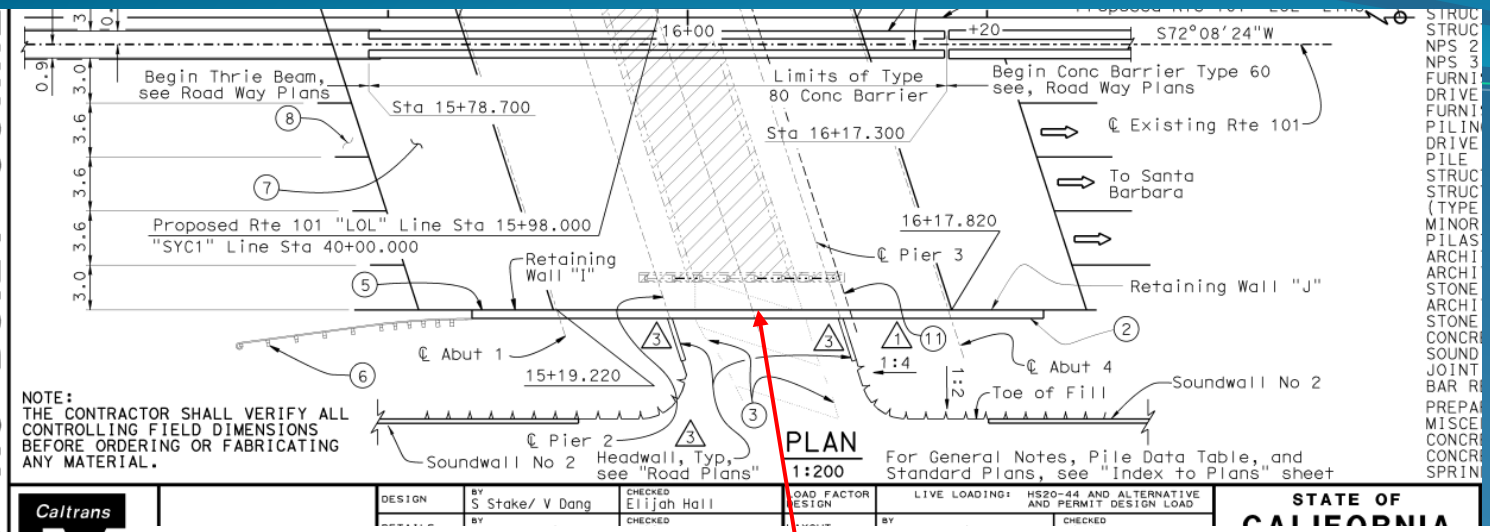
Unidentified man walks from his car stranded in the water at the Salinas Street ramp at Highway 101 in Santa Barbara.

Courtesy Violet Barroso (vbarroso@newspress.com), Santa Barbara News-Press

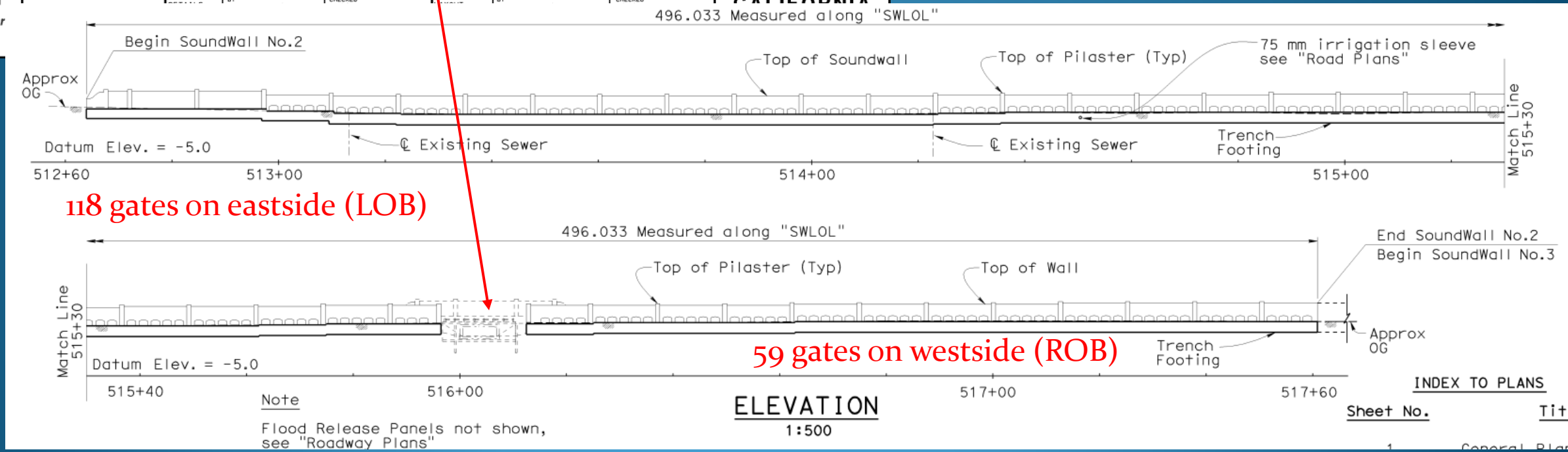


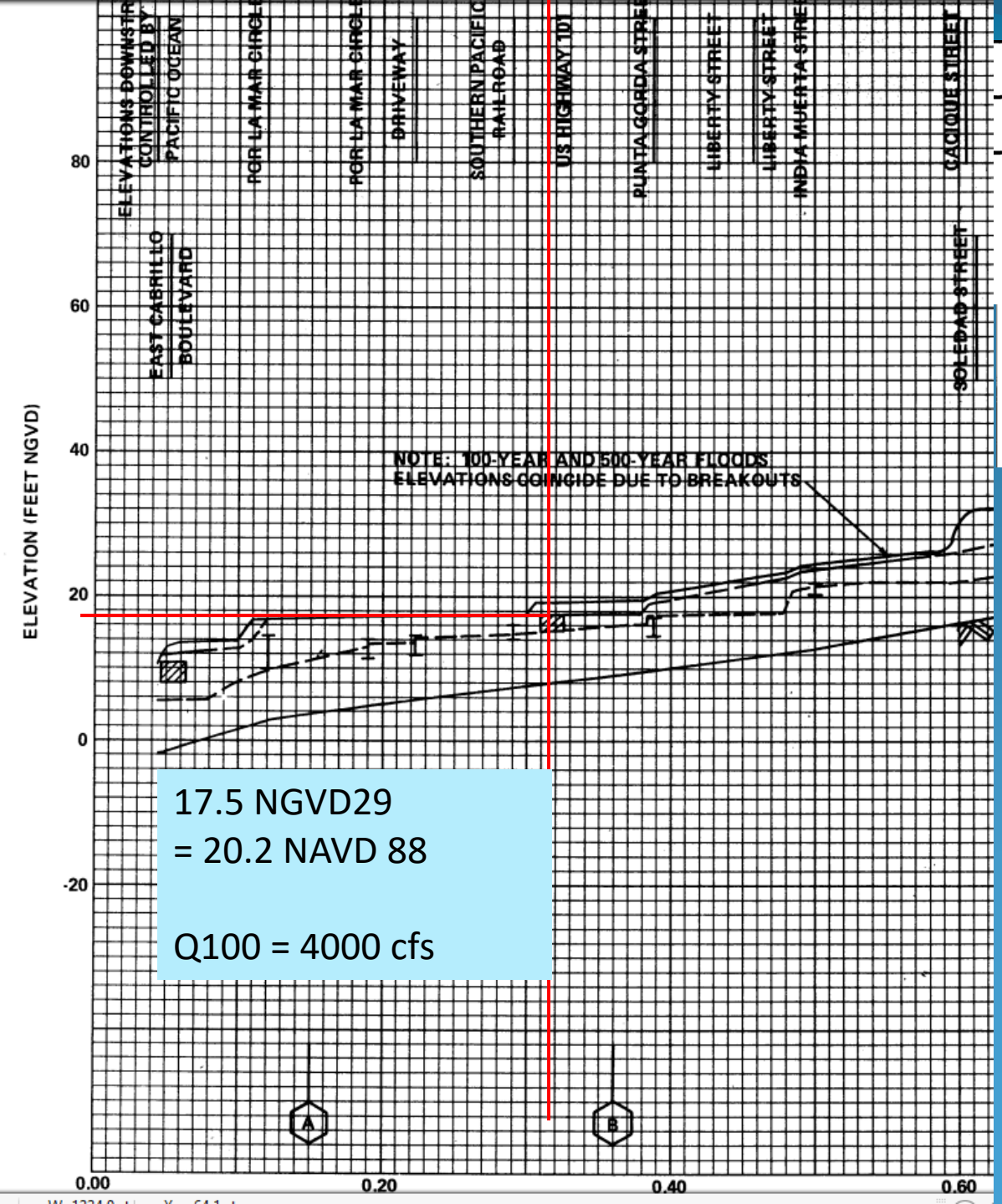
8

Hwy 101 N.B. at Sycamore Ck
City of Santa Barbara 11 Mar 1995
Santa Barbara County 93101
*
325-23



177 gates total





17.5 NGVD29
= 20.2 NAVD 88

Q100 = 4000 cfs

1991

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Sycamore Creek								
A	0.15	355	--[4]	--[4]	16.6	16.6	17.4	0.8
B	0.36	375	--[4]	--[4]	17.8	17.8	18.7	0.9
C	0.71	50	--[4]	--[4]	31.3	31.3	32.0	0.7
D	1.28	50	--[4]	--[4]	70.2	70.2	70.2	0.0
E	1.70	145	--[4]	--[4]	119.4	119.4	119.4	0.0
F	2.31	70	--[4]	--[4]	229.1	229.1	229.1	0.0

2005

Sycamore Creek								
A	792[2]	355	*	*	16.6	16.6	17.4	0.8
B	1,901[2]	375	*	*	17.8	17.8	18.7	0.9
C	3,749[2]	50	*	*	31.3	31.3	32.0	0.7
D	6,758[2]	50	*	*	70.2	70.2	70.2	0.0
E	9,010[2]	145	*	*	119.4	119.4	119.4	0.0
F	12,197[2]	70	*	*	229.1	229.1	229.1	0.0

10.325	17.57	1088.25	364.54	1452.79	.00	.00
10.325	18.61	610.33	450.00	1060.33	450.00	1060.33
10.325	17.02	983.98	446.86	1430.84	.00	.00
10.325	17.62	1098.43	356.50	1454.93	.00	.00
10.326	17.44	1063.31	384.23	1447.54	.00	.00
10.326	18.45	579.00	450.00	1029.00	450.00	1029.00
10.326	17.01	981.32	448.96	1430.28	.00	.00
10.326	17.46	1067.83	380.66	1448.49	.00	.00
10.360	17.71	966.93	182.51	1149.43	.00	.00
10.360	18.70	367.34	400.00	767.34	400.00	767.35

At USH 101

Duplicate Effective

At Xsec B

Duplicate Effective

```
10.360     17.71     966.93     182.51    1149.43       .00       .00

10.360     18.70     367.34     400.00     767.34    400.00     767.35
```

+ 3.3’

Existing with 1985 Soundwall

```
10.360     21.06    1300.00       .00    1300.00       .00       .00

10.360     21.04     669.16     330.23     999.38    330.23     999.38
```

- 3.3’

Proposed CLOMR Soundwall

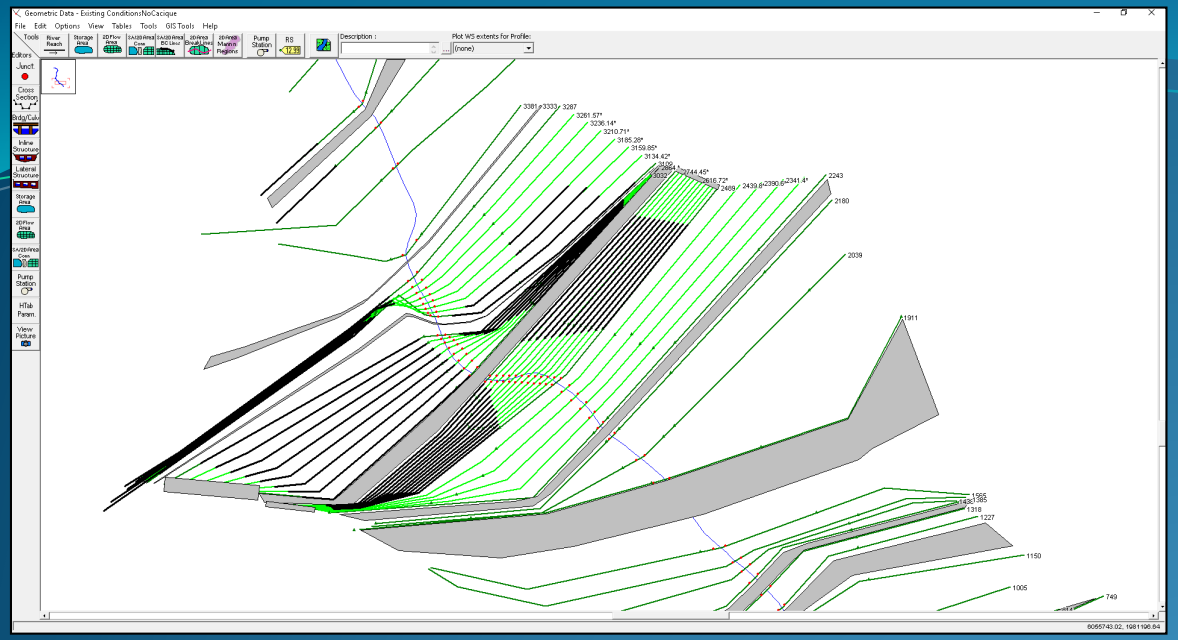
```
*    10.360     17.74     970.47     180.56    1151.03       .00       .00

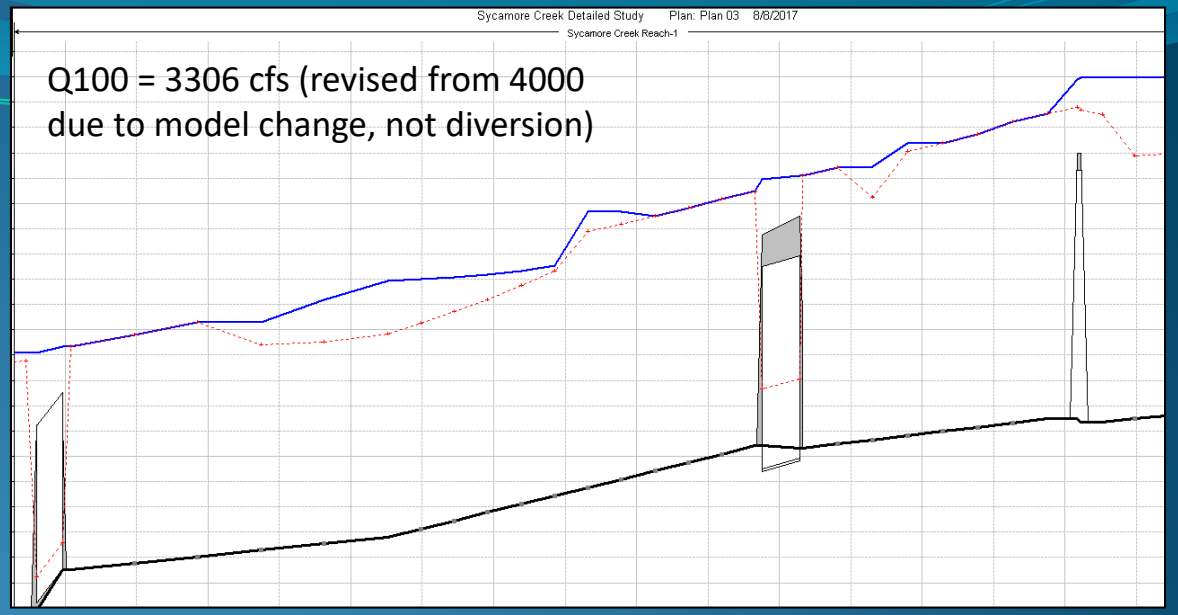
     10.360     18.70     369.27     400.00     769.27    400.00     769.27
```

17.7 NGVD29 = 20.4 NAVD88

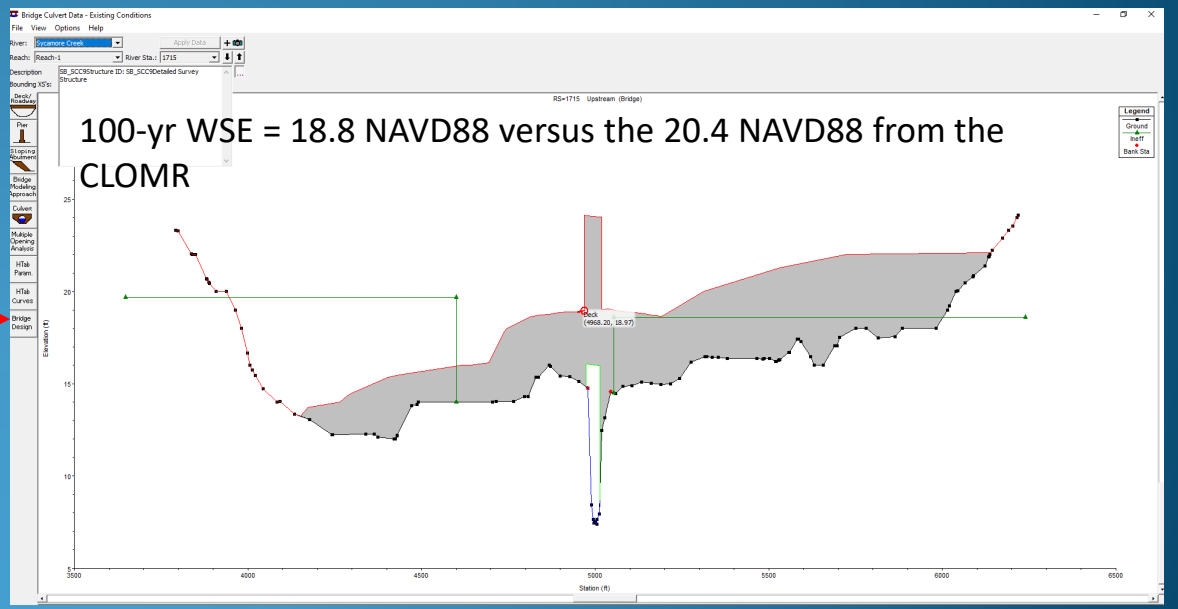
Q = 4000 cfs

A LOMR was never submitted since the BFE did not change between the Duplicate Effective and Proposed CLOMR Soundwall


Geometric Data - Existing ConditionsNoCacique
3381
3333
3287
3261.57*
3236.14*
3210.71*
3185.28*
3159.85*
3134.42*
3109
3083.58*
3058.15*
3032.72*
3007.29*
2981.86*
2956.43*
2931
2905.57*
2880.14*
2854.71*
2829.28*
2803.85*
2778.42*
2752.99*
2727.56*
2702.13*
2676.7*
2651.27*
2625.84*
2600.41*
2574.98*
2549.55*
2524.12*
2498.69*
2473.26*
2447.83*
2422.4*
2396.97*
2371.54*
2346.11*
2320.68*
2295.25*
2269.82*
2244.39*
2218.96*
2193.53*
2168.1*
2142.67*
2117.24*
2091.81*
2066.38*
2040.95*
2015.52*
1990.09*
1964.66*
1939.23*
1913.8*
1888.37*
1862.94*
1837.51*
1812.08*
1786.65*
1761.22*
1735.79*
1710.36*
1684.93*
1659.5*
1634.07*
1608.64*
1583.21*
1557.78*
1532.35*
1506.92*
1481.49*
1456.06*
1430.63*
1405.2*
1379.77*
1354.34*
1328.91*
1303.48*
1278.05*
1252.62*
1227.19*
1201.76*
1176.33*
1150.9*
1125.47*
1100.04*
1074.61*
1049.18*
1023.75*
998.32*
972.89*
947.46*
922.03*
896.6*
871.17*
845.74*
820.31*
794.88*
769.45*
744.02*
718.59*
693.16*
667.73*
642.3*
616.87*
591.44*
566.01*
540.58*
515.15*
489.72*
464.29*
438.86*
413.43*
388
362.57*
337.14*
311.71*
286.28*
260.85*
235.42*
209.99*
184.56*
159.13*
133.7*
108.27*
82.84*
57.41*
31.98*
6.55*
2243
2180
2039
1911
1955
1318
1227
1150
1005
749

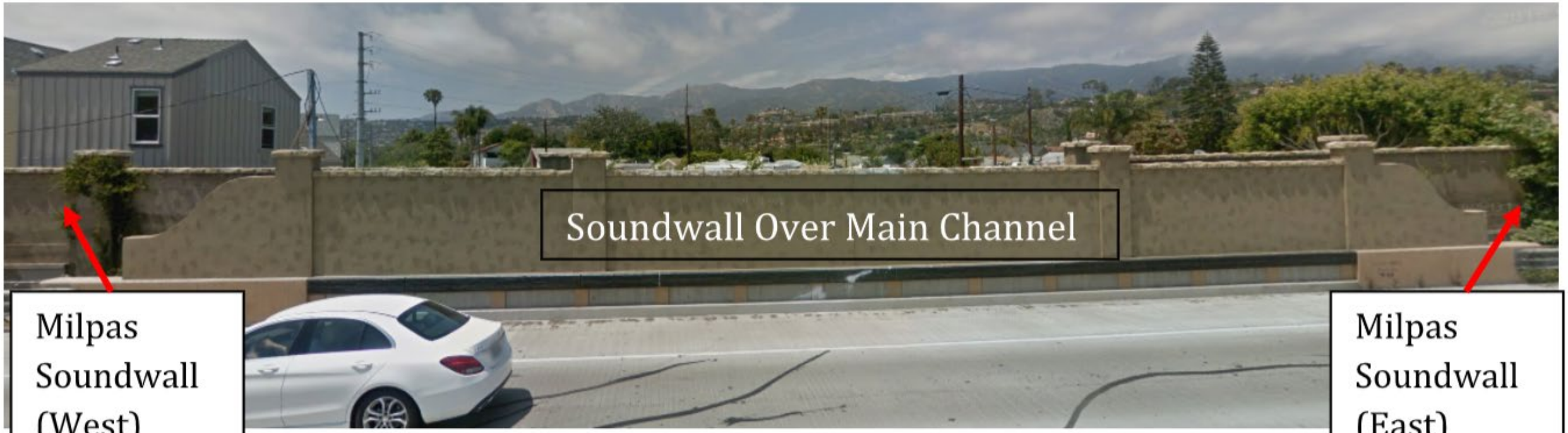

Sycamore Creek Detailed Study Plan: Plan 03 8/8/2017
Sycamore Creek Reach-1
Q100 = 3306 cfs (revised from 4000 due to model change, not diversion)




Bridge Culvert Data - Existing Conditions
100-yr WSE = 18.8 NAVD88 versus the 20.4 NAVD88 from the CLOMR


Laguna St
Garden St 1/2
Downtown
Milpas St
1/2 MILE

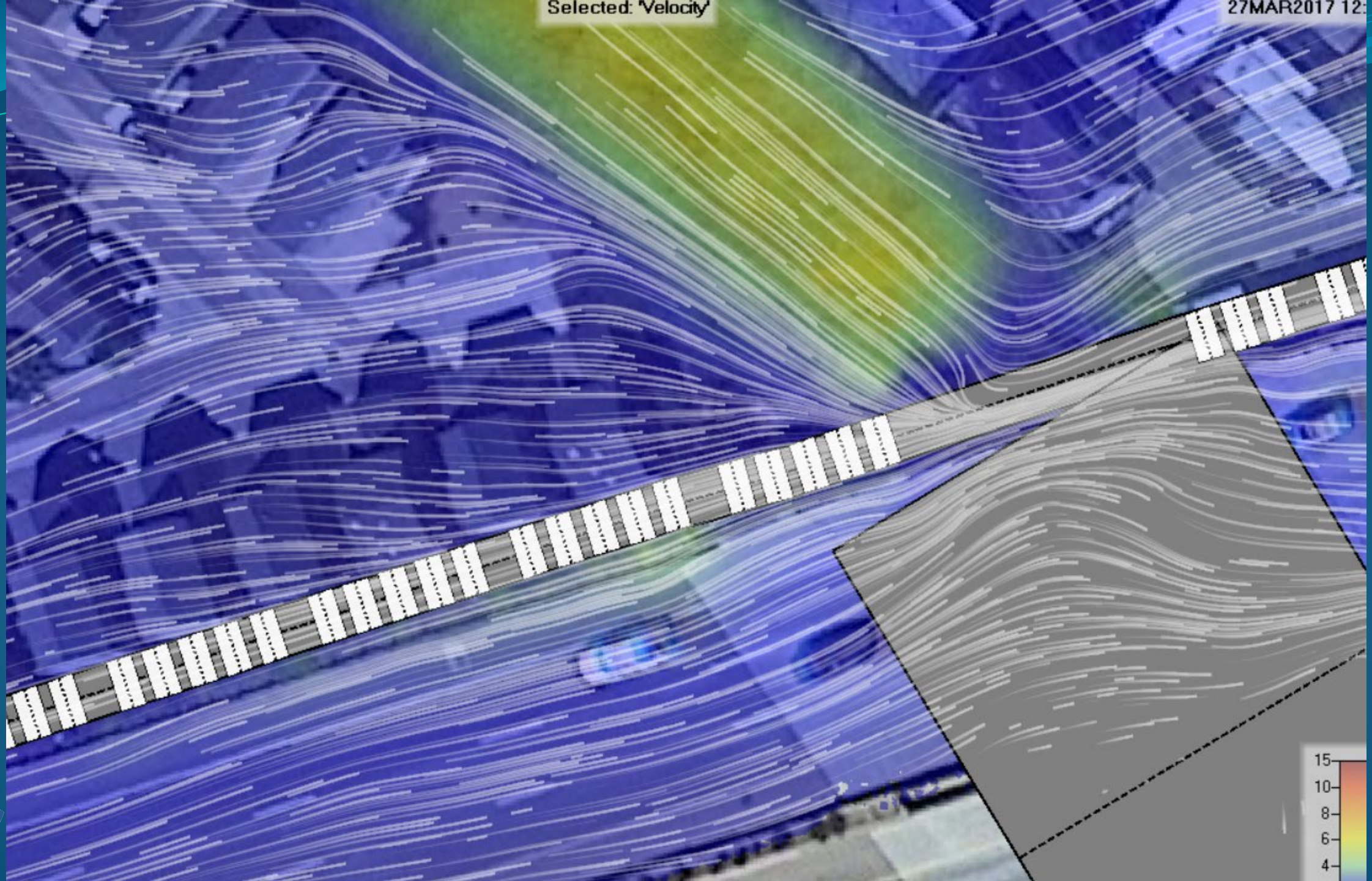



Soundwall Over Main Channel
Milpas Soundwall (West)
Milpas Soundwall (East)

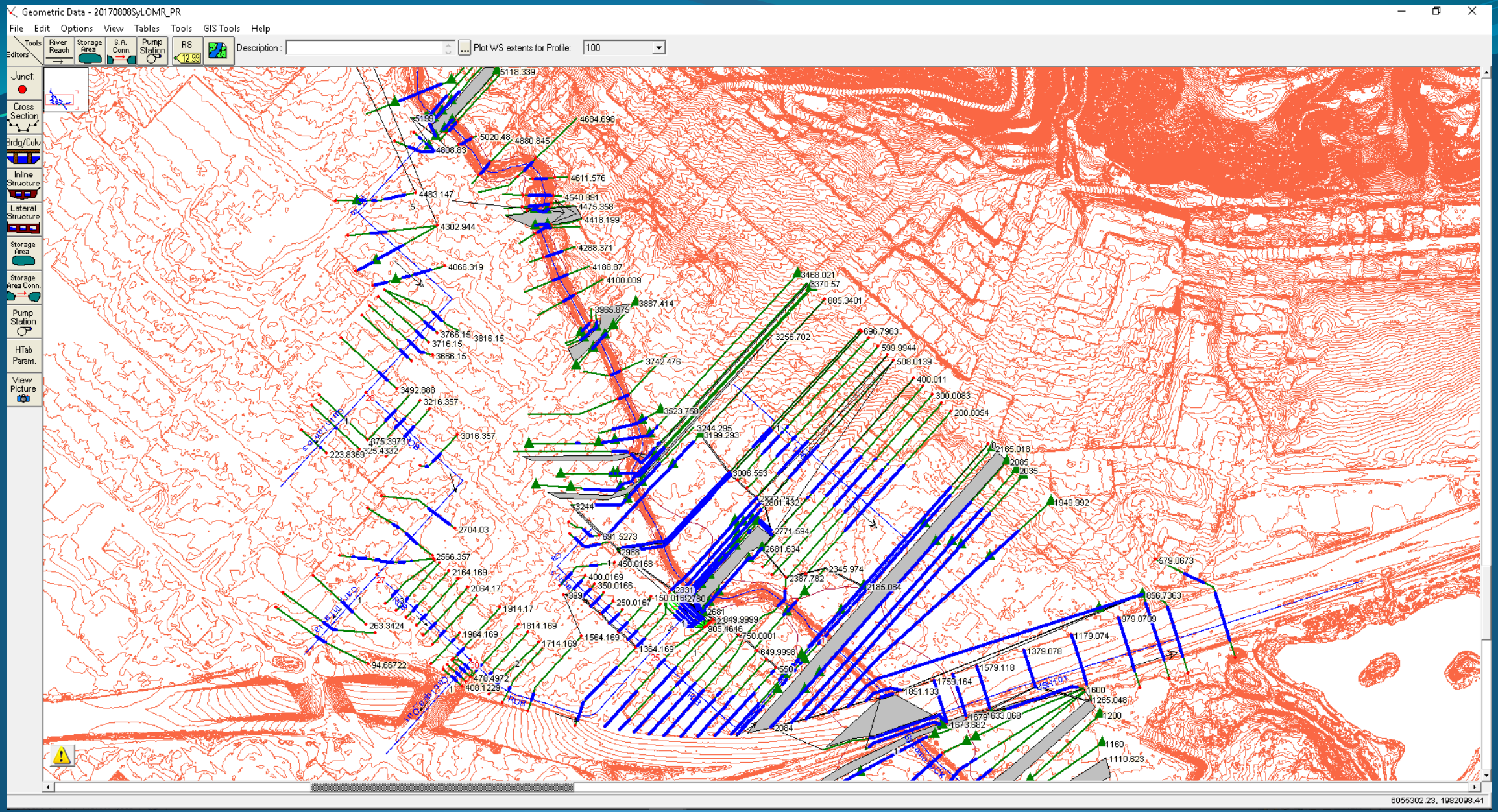


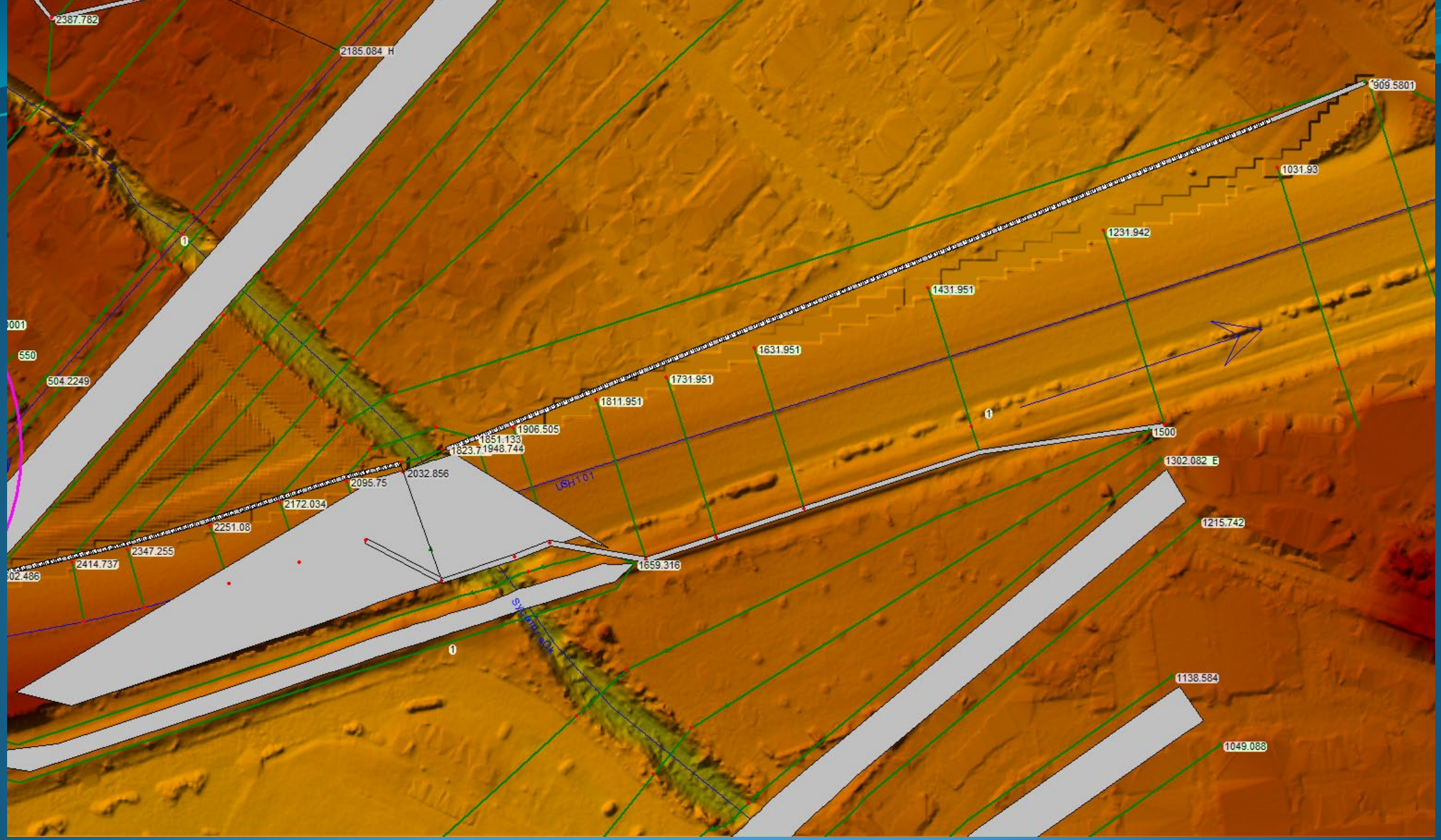

El Camino

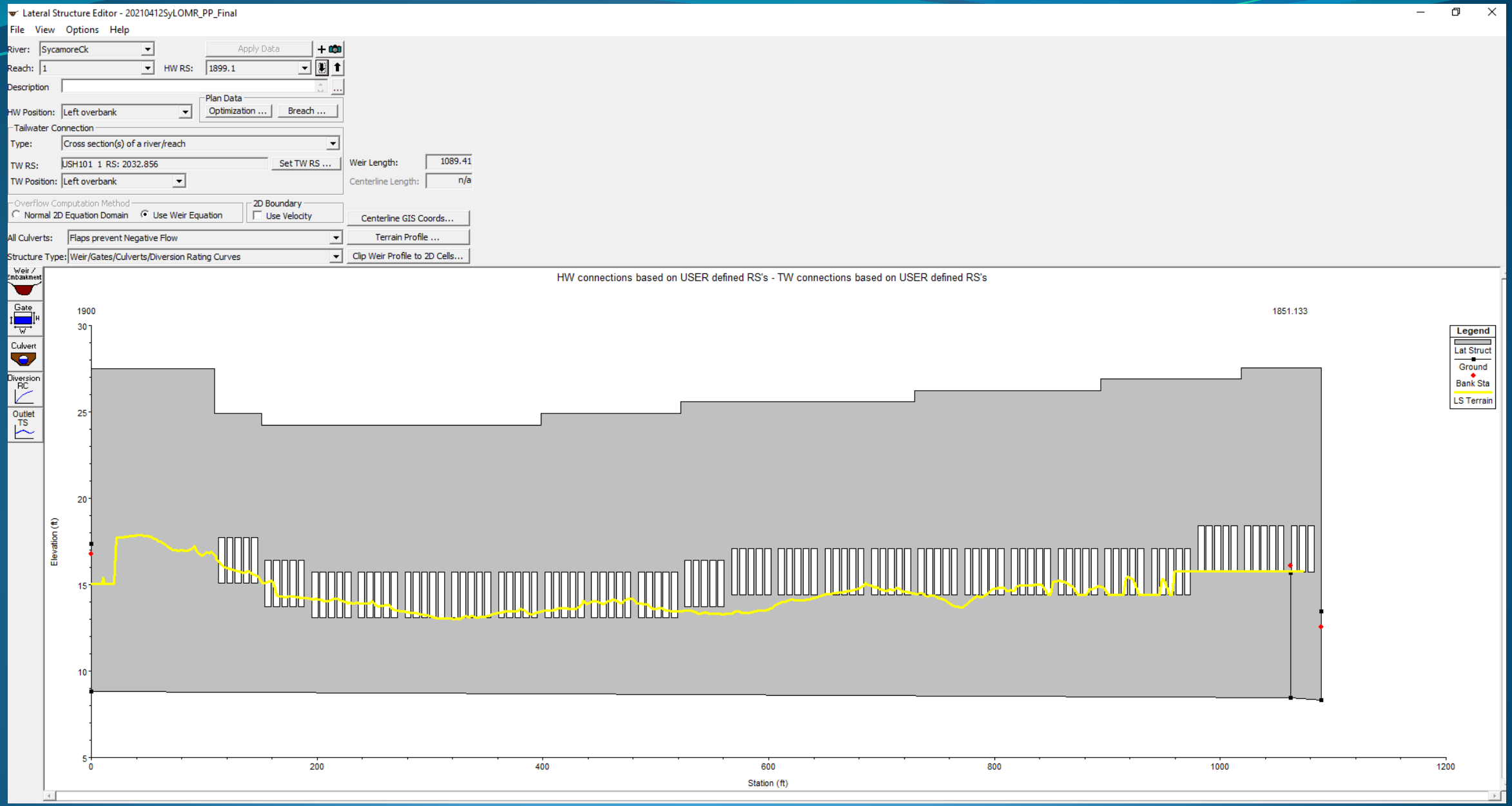



Selected: 'Velocity'
27MAR2017 12:
15
10
8
6
4


4340
4280
4220
4140
4080
4020
3940
3880
3800
3740
3660
3587
3520
3460
3400
3340
3240
3180
3120
3035.006
2960
2900
2800
2660
2540
2440
2320
2240
2100
2020
1940
1860
1680
1620
1540
1440
1350
1235
1160
1070
1020
960.0001
900.0002
839.9999
780.0001
670.0001
580.0001
499.9998
431.5612
331.1638
260.0002
Country Club Apartments
PoopPac
Scenic Dr
Diselo
A Tropical Garden Mobile Home
Muñoz's Auto Repair
Old Coast Hwy
Municipal Tennis Court
Santa Barbara Zoo
Amazing Elephant Exhibit
El Escorial Hoa
Cats of Africa Exhibit
Hyatt Centric Santa Barbara House
Tri County Produce
Motel 6
Inn At East Beach
Hyatt Centric Santa Barbara
East Beach Grill
Dwight Murphy Park
Por La Mar Cir
Del Parque Dr
E Cabrillo Blvd
S Canada St
S Salinas St
Cacique Street
Indio Muerto St
S Voluntario St
Ninos Dr
Corona Del Mar
Orilla Del Mar Dr
S Milpas St
S Alisos St
Funta Gorda St
Harbor View Dr
Ocean View Ave
Lou Dillon Ln
Santa Ynez Ct
Eucalyptus Hill
Ensenada Ave
Quientos St
S Soledad St
La Cadena St
Carpinteria St
Park Pl
Harmon St
Pitos St
Corina St
Bellos
15.0
10.0
9.0
6.0
4.0
2.0
0.0


Geometric Data - 20170808SyLOMR_PR
File Edit Options View Tables Tools GIS Tools Help
Tools Editors
River Reach
Storage Area
S.A. Conn.
Pump Station
RS 12.99
Description :
Plot WS extents for Profile: 100
Junct.
Cross Section
Brdg/Culv
Inline Structure
Lateral Structure
Storage Area
Storage Area Conn.
Pump Station
HTab Param.
View Picture
6055302.23, 1982098.41


2387.782
2185.084 H
909.5801
1031.93
1231.942
1431.951
1631.951
1731.951
1811.951
1906.505
1851.133
1823.7
1948.744
1500
1302.082 E
2032.856
2095.75
2172.034
2251.08
2347.255
2414.737
1659.316
1215.742
1138.584
1049.088
504.2249
USH 101


Lateral Structure Editor - 20210412SyLOMR_PP_Final
File View Options Help
River: SycamoreCk
Reach: 1
HW RS: 1899.1
Apply Data
Description
Plan Data
HW Position: Left overbank
Optimization ...
Breach ...
Tailwater Connection
Type: Cross section(s) of a river/reach
TW RS: USH101 1 RS: 2032.856
Set TW RS ...
TW Position: Left overbank
Weir Length: 1089.41
Centerline Length: n/a
Overflow Computation Method
Normal 2D Equation Domain
Use Weir Equation
2D Boundary
Use Velocity
Centerline GIS Coords...
All Culverts: Flaps prevent Negative Flow
Terrain Profile ...
Structure Type: Weir/Gates/Culverts/Diversion Rating Curves
Clip Weir Profile to 2D Cells...
Weir / Embankment
Gate
Culvert
Diversion RC
Outlet TS
HW connections based on USER defined RS's - TW connections based on USER defined RS's
1900
1851.133
Legend
Lat Struct
Ground
Bank Sta
LS Terrain
Elevation (ft)
Station (ft)
30
25
20
15
10
5
0
200
400
600
800
1000
1200

Sycamore Creek Overflow - U.S. Highway 101	At Andre Clark Bird Refuge	*	487	*	1,091	1,288	1,919
Sycamore Creek	At mouth	3.65	1,410[7]	*	1,826[7]	1,975[7]	2,176[7]
Sycamore Creek	Upstream of U.S. Highway 101	*	1,897	*	2,942	3,306	4,207
Sycamore Creek	Upstream of the confluence of Coyote Creek	1.33	987	*	1,492	1,686	2,145
Sycamore Creek	Approximately 300 feet downstream of the confluence of Sycamore Creek Unnamed Tributary 1	1.17	*	*	*	1,460	*
Sycamore Creek	Upstream of the confluence of Sycamore Creek Unnamed Tributary 1	0.73	*	*	*	867	*

[7] Decrease as a result of overflows at U.S. Highway 101

REVISED DATA

REVISED TO REFLECT LOMR EFFECTIVE: June 21, 2019

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	406	84	484	4.1	12.9	12.9	13.0	0.1
B	678	72	372	5.3	14.1	14.1	14.2	0.1
C	828	148	665	3.0	16.3	16.3	16.4	0.1
D	978	203	849	2.3	16.3	16.3	16.6	0.3
E	1,380	383	1,714	1.2	16.4	16.4	16.7	0.3
F	2,028	232	763	4.2	18.8	18.8	18.9	0.1
G	2,163	232	475	6.9	18.8	18.8	19.0	0.2
H	2,243	206	549	5.9	19.2	19.2	20.2	1.0
I	2,770	165	452	6.6	25.5	25.5	25.8	0.3
J	2,836	155	576	5.2	26.1	26.1	27.1	1.0
K	3,032	213	680	4.8	28.6	28.6	29.3	0.7
L	3,381	162	836	4.0	31.3	31.3	31.9	0.6
M	3,750	31	260	12.7	31.3	31.3	31.7	0.4
N	4,031	68	491	6.7	36.1	36.1	36.9	0.8
O	4,475	60	432	7.7	37.5	37.5	37.9	0.4
P	4,920	42	331	10.0	41.0	41.0	41.0	0.0
Q	5,142	60	290	11.4	42.0	42.0	42.4	0.4
R	5,212	53	496	6.7	49.0	49.0	49.6	0.6
S	5,836	75	302	10.9	55.7	55.7	55.8	0.1
T	6,167	34	332	10.0	59.9	59.9	59.9	0.0
U	6,446	45	286	11.6	63.9	63.9	64.1	0.2
V	6,503	110	613	5.4	66.7	66.7	67.7	1.0
W	6,780	94	379	8.7	70.7	70.7	70.7	0.0
X	7,213	83	356	9.3	79.5	79.5	80.1	0.6
Y	7,857	44	345	9.6	96.0	96.0	96.0	0.0
Z	8,025	42	464	7.1	100.4	100.4	100.7	0.3

REVISED DATA

[1]Feet above Pacific Ocean

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

SANTA BARBARA, CALIFORNIA

AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO REFLECT LOMR EFFECTIVE: June 21, 2019

FLOODING SOURCE: SYCAMORE CREEK

Xsec	FEMA Effective HEC-RAS Model (2011)		2019 LOMR HEC-RAS Model		2021 2D Model		
	WSE	Q100	WSE	Q100	Channel WSE	WSE Range	Q100
A	12.4	3360	12.9	1974	11.1	11.1-12.5	1572
B	13.8	3360	14.1	1974	11.6	14.8	1572
C	17.4	3360	16.3	1974	13.4	16.5	1572
D	18	3360	16.3	1974	13.7	13.6-16.6	1572
E	18.1	3360	16.4	1974	16.5	16.4-16.5	1572
F	18.8	3360	18.8	3167	18.5	16.5-18.8	2522
G	19.1	3360	18.8	3260	18.7	16.9-19.8	2625
H	19.4	3360	19.2	3260	19.7	17.5-20.1	2709
W	70.7	3360	71.4	3306	71.6	71.6	3306
To Bird Sanctuary		0		1286			1045

Questions & Discussion

Dr. Sam Brody
Texas A&M
brodys@tamug.edu

Rich Gleason, P.E.
Kasraie Consulting
gleason@kasraieconsulting.com

Poll Question



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