

Public Works Infrastructure Asset Management System County of El Dorado

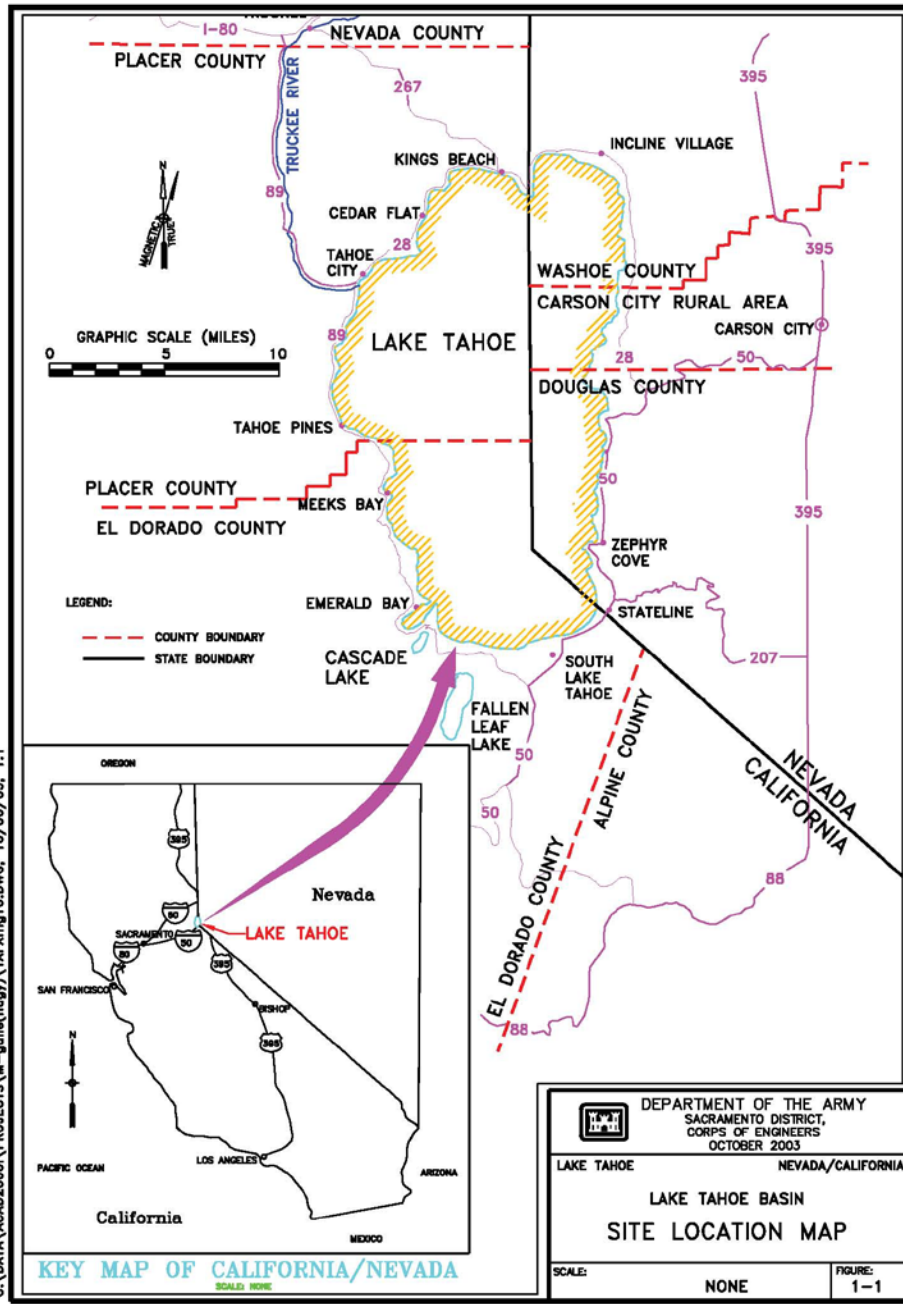
Long Range Planning and Tahoe Engineering

Russ Wigart, CPSWQ


Brendan Ferry, CPSWQ

Daniel Kikkert, P.E.

C:\DATA\ACAD2000\PROJECTS\M-galle(nsg)\TAF\mg10.DWG, 10/06/03, 1:1



KEY MAP OF CALIFORNIA/NEVADA

 DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS OCTOBER 2003	
LAKE TAHOE	NEVADA/CALIFORNIA
LAKE TAHOE BASIN SITE LOCATION MAP	
SCALE:	NONE
FIGURE:	1-1

South Lake Tahoe

- Population ~25,000
 - ~200 County road miles
 - ~8,500 homes
- Asset Management System
 - 12 years in development
 - 3 years field verification work
 - Conversion of CAD to GIS
 - Approximately 2 million invested to date

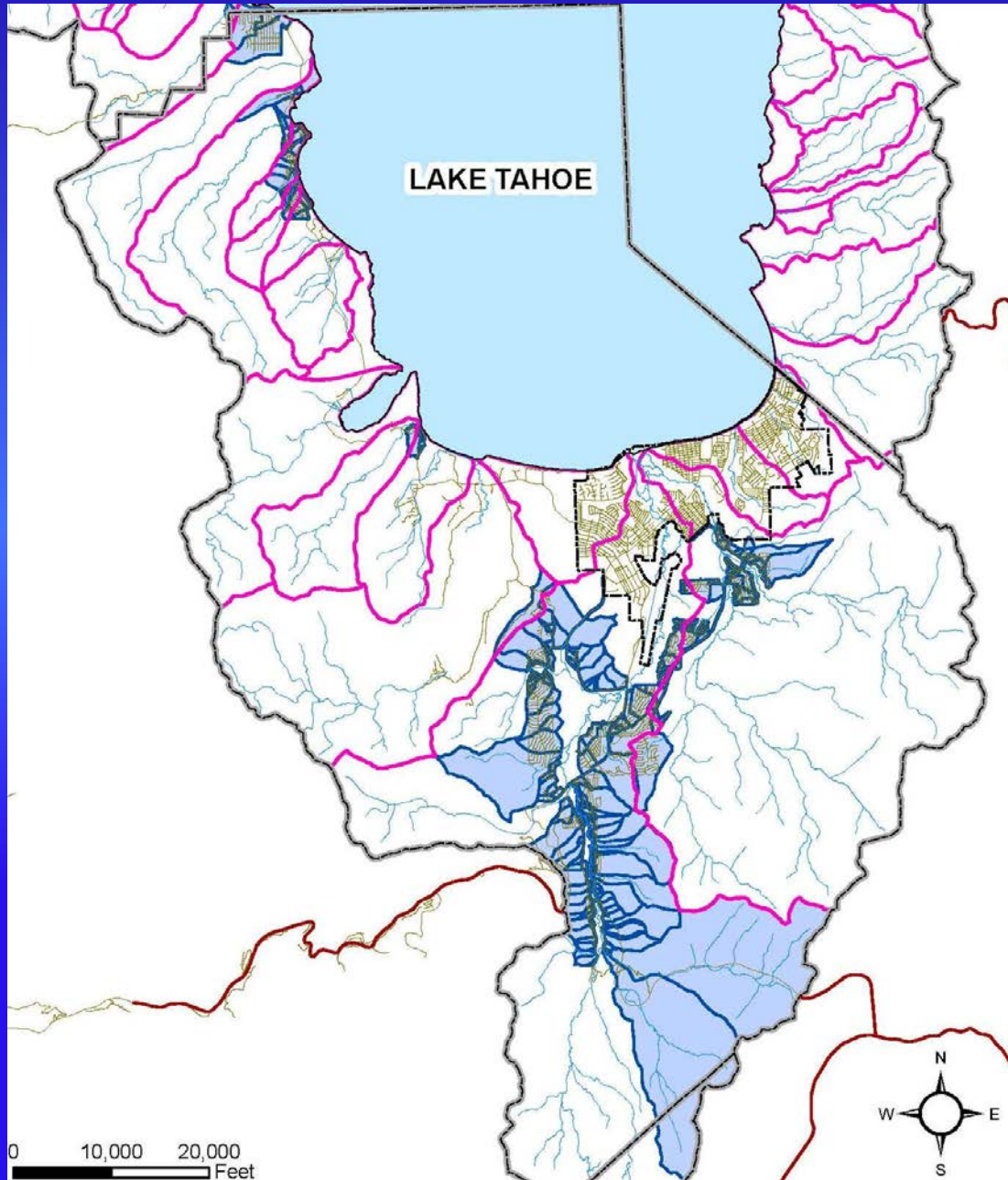
Benefits of an In-house Managed System

- Limit recurring costs
- Develop site specific solutions
- Targeted and focused
- Easily fixed and manipulated
- Eliminates rights / access issues
- Facilitates inter divisional relations
 - Maintenance, Facilities, Bridge, Env, etc..

Evolution of an Evolving System

- 2008 – NPDES Mandated Outfall Inventory
- 2010 – Multiple CAD file compilation to single map network
- 2012 – Began CAD to ArcGIS crosswalk
- 2013 - Created Data Dictionary for Collection
- 2014 – Finalized ArcGIS asset mapwork
- 2015 – Initiated Kerata data collection platform
- 2016 – Switched to Collector data platform
- 2017-19 (Collector Era)
 - Beta Test (2016-17)
 - Finalized Data Dictionary
 - Refine workforce layer application
 - Apply to other divisions (forestry, bridge crew, utilities etc)

Watersheds – El Dorado Mapped

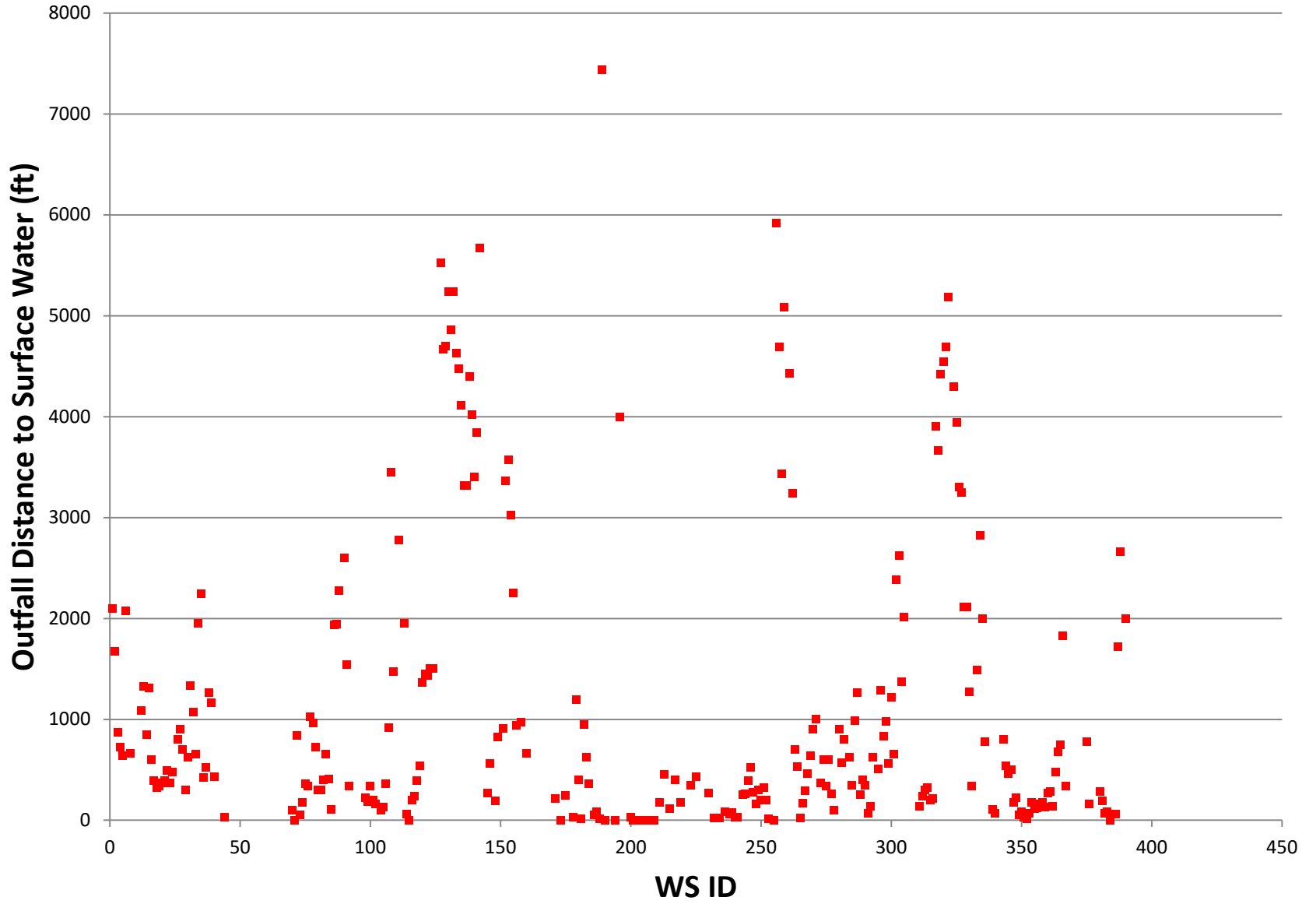


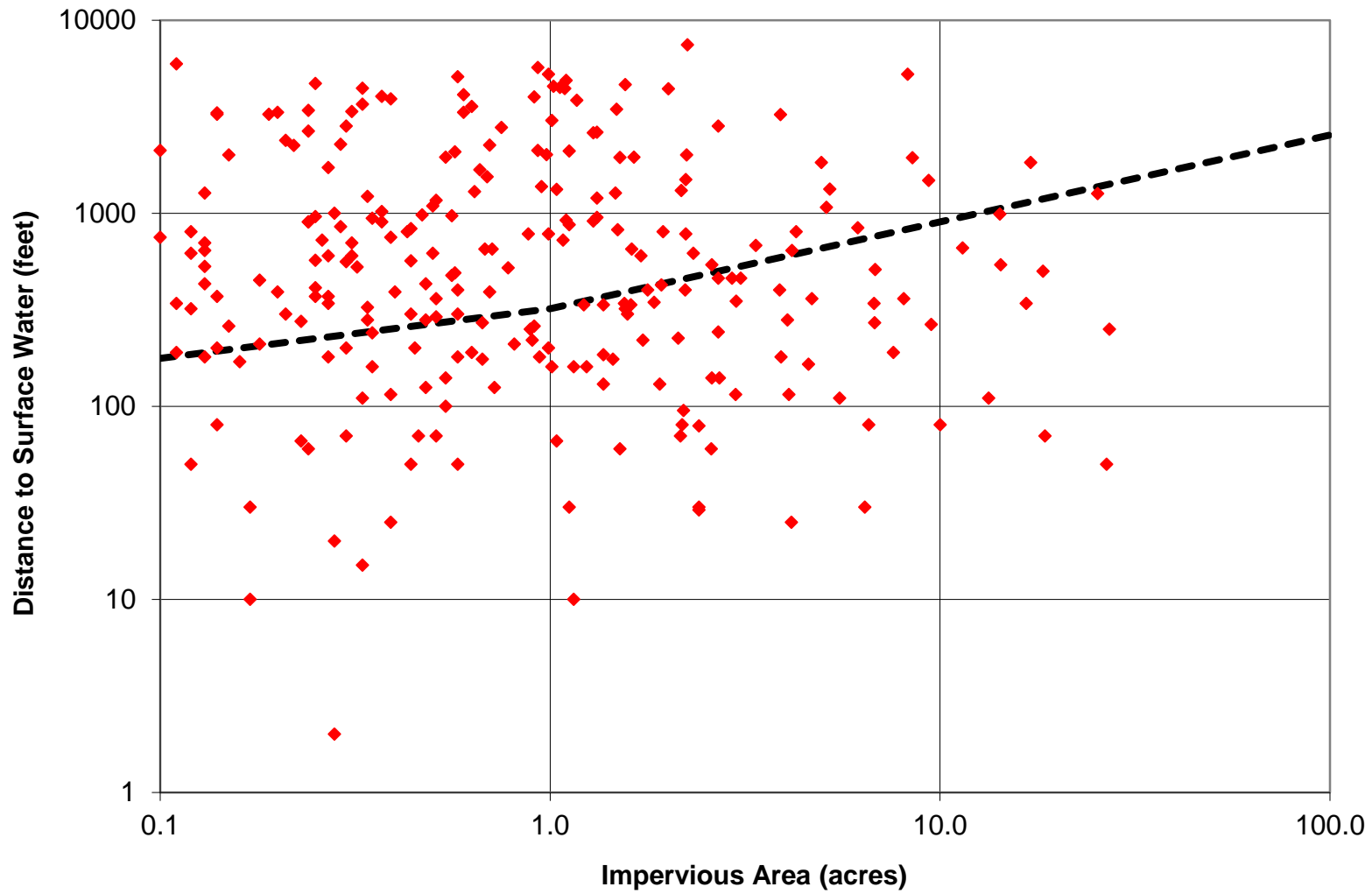
Outfalls

- Defined by EPA:

The point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.

Outfall Distance vs WS ID





Prioritization

- Known watersheds with:
 - Estimated loads
 - Maintenance activities
 - Existing conditions
 - Distance from discharge points to a surface water
- Opportunities:
 - Reduce the loads

Reduce the load

Pollutant Load

$$= (\text{Area} * \text{Precipitation}) * \text{EMC} * \text{connectivity}$$

- Volume Retention
- EMC to Characteristic Runoff Coefficient (CRC)
- Change the connectivity
- Capture of material

Infrastructure

- Utilized County staff and extra help to build a database of all existing County infrastructure in the Tahoe Basin
- Consisted of: Drop Inlets, Sediment Traps, Storm Drain Manholes, Storm Drains, Culverts, Curb/Gutter, Channels, Treatment Basins, and Retaining Structures.
- Data was collected from Subdivision Maps, Record Drawings, and Field Observations using a hand held GPS unit.

Infrastructure Learning Process

- Our County is a wonderland
- Discovery was a normal part of the process: what was shown on subdivision maps and drawings versus what was found in the field
- Leaned heavily on old timers in maintenance and engineering who remembered when



Golden Bear Area



Golden Bear Area



2013/08/14



10/13/2009 12:25

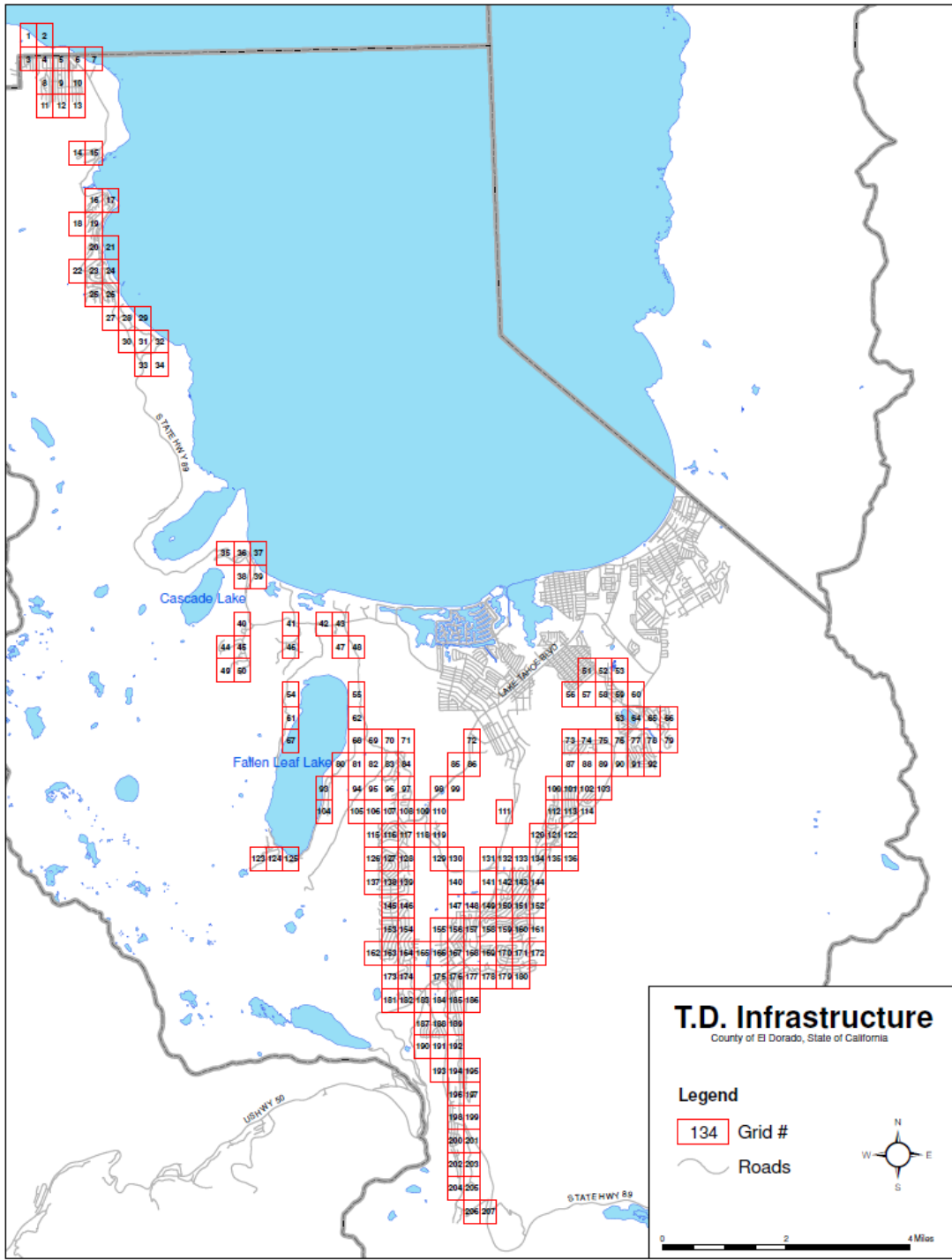
Tahoe Hills Area



Montgomery Estates Area

Asset Management System

- Line work was stored in AutoCAD and the associated data was stored in MS Access
- All data has been converted over to ArcGIS
- Provides a valuable asset management tool. Has become a way to memorialize improvements in the ground ... less knowledge is now slipping through the cracks



Infrastructure Mapbook

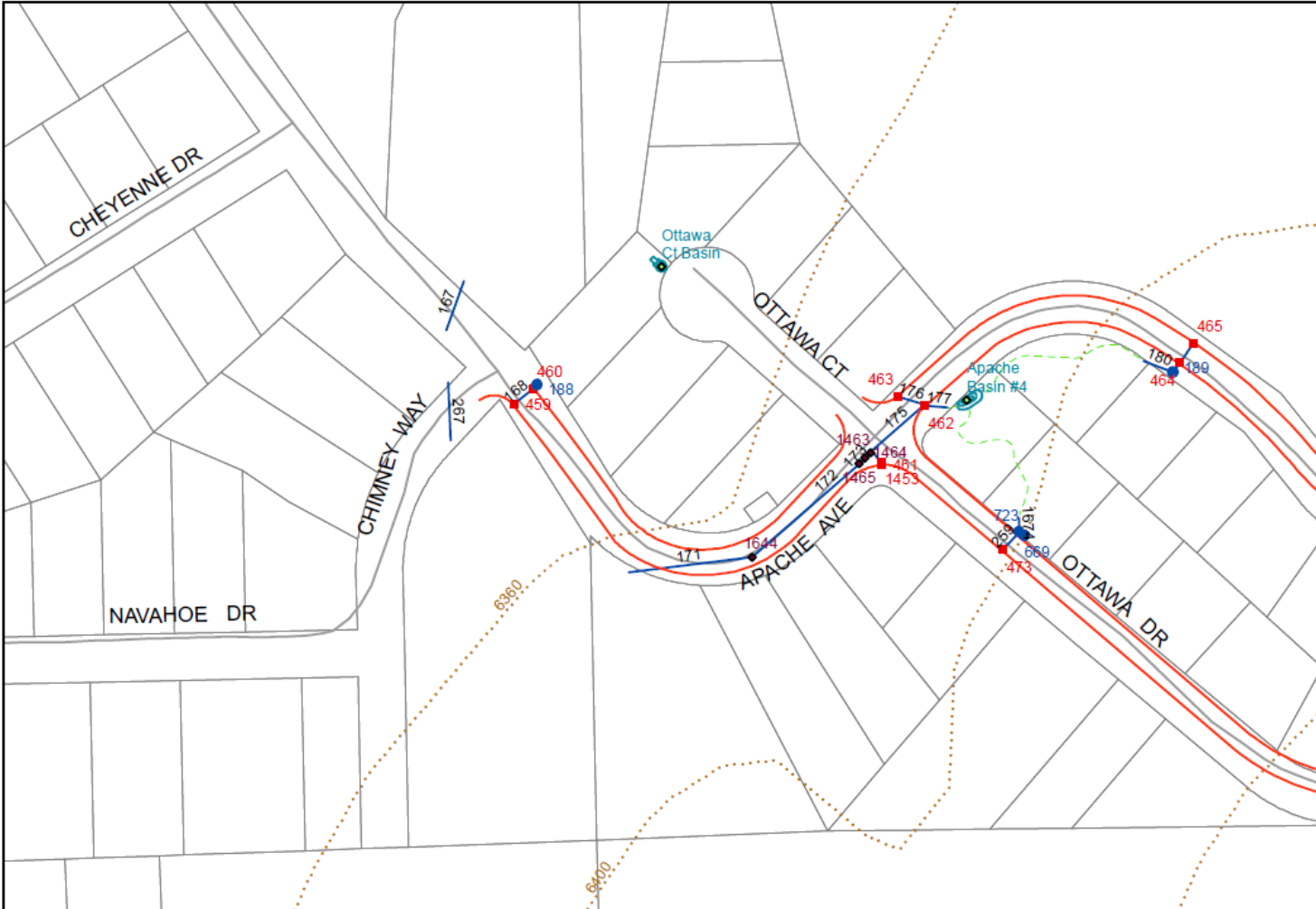
Effective but a paper mess

167	168	169
176	177	178
185	186	

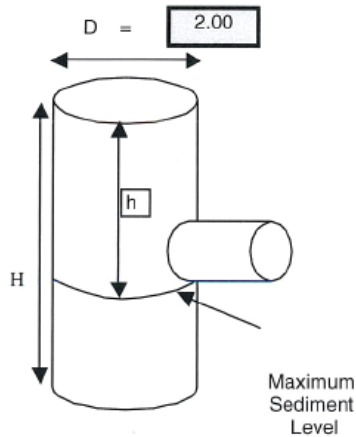
Current Page
177

Legend

- ◆ NID_SDMH
- NID_ST
- NID_DI
- ◆ TID
- - - Channel
- Basin
- ACSwaile
- Curb
- Dike
- PID_Pipe
- Wall
- Contours
- Roads
- Parcels
- Flowline
- Waterbody

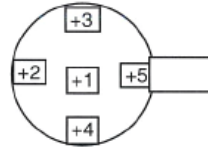


**EROSION CONTROL MAINTENANCE INSPECTION SINGLE
SEDIMENT TRAP - VOLUME TO REMOVE**



DATE 6/6/2013
 LOCATION Fallen Leaf Rd (south side), ~
 180' north east of road down to
 store-boat ramp
 INSPECTED BY WM
 PROJECT 0
 GISCODE _____
 COUNTY ID _____

Depth (h) Measuring Points



Measured Depth to Sediment, ft

1	2	3	4	5
2.00	2.00	2.00	2.00	2.00

(1) Depth To Bottom H, ft	(2) Depth to Connector Invert h, ft	(3) Average Depth to Sediment ft	(4) Average Depth of Sediment ft	(5) Available Storage Depth ft	(6) Percentage Filled %	(7) Volume of Sediment ft
3.50	2.20	2.00	1.50	1.30	115.38%	4.71

- (1) From Elevations shown on Design Plans
- (2) From Elevations shown on Design Plans
- (3) $\text{Sum } (h_1:h_5)/5$
- (4) $(1) - (3)$
- (5) $(1) - (2)$
- (6) $(4) / (5)$
- (7) $(4) * D * D * \text{PI} / 4$

Notes Measure h from lath across opening to sediment

To be filled in by Inspector

Comments: Cleaned and measured by Maintenance

MAINTENANCE WORK ORDER FORM
 El Dorado County D.O.T.

Work Order: NUT - Culvert ⁻²³²²

Project N.O.T. # Job 48711 Date: 11-7-2011

Facility: 18" Culvert Pipe

Location: On Mewuk, west of Poewin at the south end of the subdivision. See attached drawing.

GIS #

Description of Maintenance Work Needed: REMOVE HEAVY ROCK, GRAVEL, SAND SEDIMENT AND DEBRIS BUILD UP AT INLET & OUTLET FLUSH THE PIPE TO CLEAR DEBRIS and CLOGGING.

Work Completion Date: 10-7-13

LABOR REQUIRED TO COMPLETE THE TASK DESCRIBED ABOVE

<u>Laborer's Name</u>	<u>Hours</u>	<u>Hourly Rate</u>	<u>Extended \$ Amount</u>
<u>WAYNE MCKENIGHT</u>	<u>2</u>		
<u>JACK FRECHY</u>	<u>2</u>		
Total Labor Hours	<u>4</u>		Total Labor Costs \$

EQUIPMENT REQUIRED

<u>Equipment</u>	<u>Hours</u>	<u>Hourly Rate</u>	<u>Extended \$ Amount</u>
<u>79-02</u>	<u>2</u>		
Total Equipment Hours	<u>2</u>		Total Equipment Costs \$

TOTAL COSTS/THIS REPORT \$

Comments: APPROX 2 YARDS

THIS REPORT SUBMITTED BY: Wayne McKenight Date 10-7-13



INLET Totally Clogged



OUTLET (Pipe is Full)



No more Paper Logs!



Thank, God.

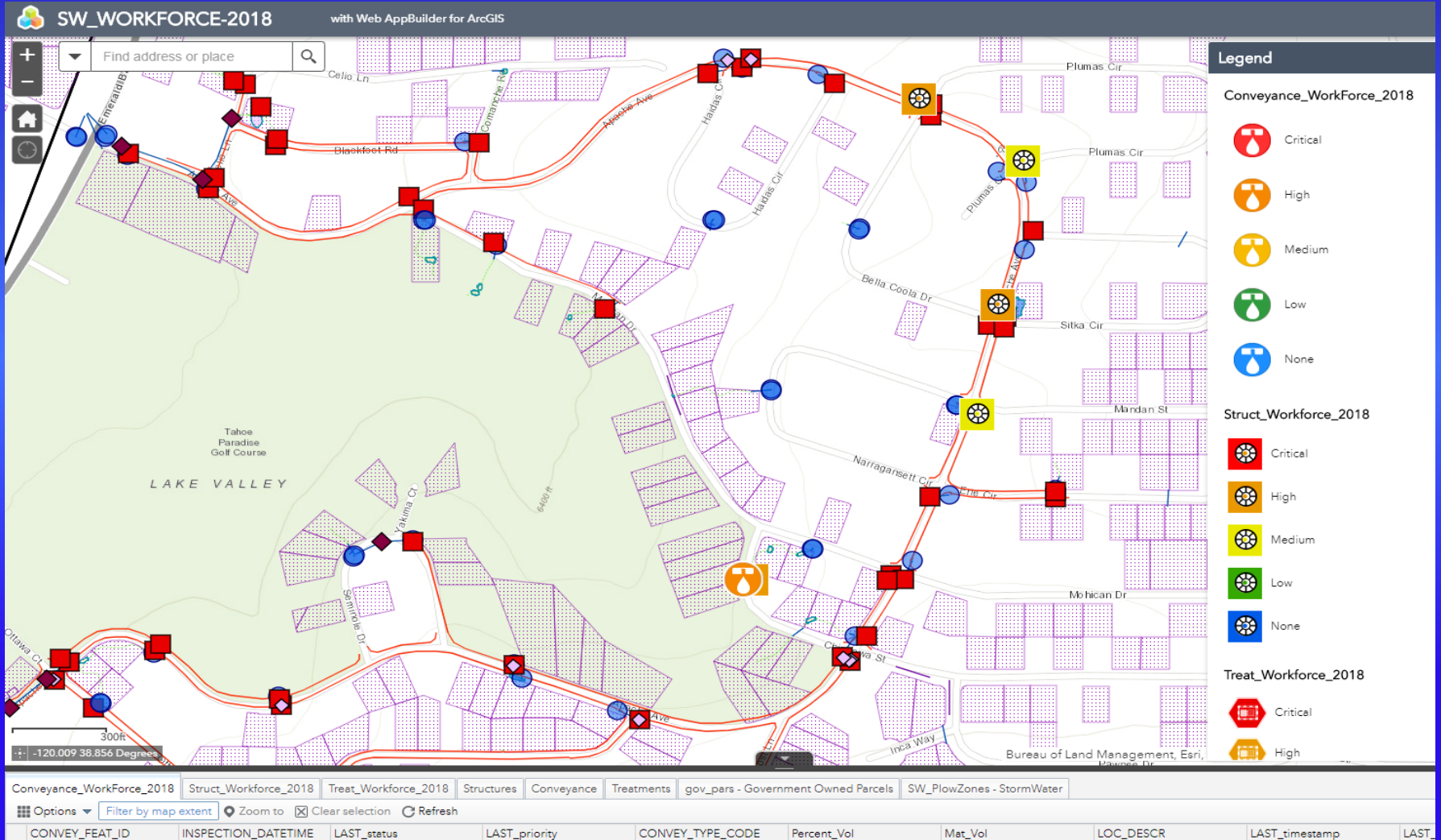
PHEW! I CAN FINALLY



RELAX (YAWN)

**Electronic Data
Collection**

ArcGIS



Data Dictionary

Feature	Tahoe (T) West Slope (WS) Both (B)	FIELD NAME	FIELD TYPE	DOMAIN DATA (Linked to corresponding tab)
SW_STRUCT	B	STRUCT_FEAT_ID	Integer	
	B	STRUCTURE TYPE	Small Integer	1 : Sediment Trap, 2 : Drainage Inlet, 3 : Storm Drain Manhole, 4 : Transverse Drain, 5 : Drainage Basin, 6 : Clean Out
	T	SUBTYPE	Small Integer	1 : Single, 2 : Double, 3 : Triple
	B	PROJECT ID	Integer	
	B	YEAR BUILT	Small Integer	
	B	LOCATION	String	
	B	MATL_CODE	Small Integer	1 : Corrugated Metal, 2 : HDPE, 3 : Reinforced Concrete, 4 : PVC
	B	TYPE_SHAPE_CODE	Small Integer	1 : Circular, 3 : Square
	B	MAJOR_DIM	Integer	
	T	MINOR_DIM	Integer	
	T	BOTTOM_CODE	Small Integer	1 : Infiltrating, 2 : Solid
	T	TOT_DEPTH	Small Integer	
	T	DEPTH_TO_OUTLET	Small Integer	
	B	NOTES	String	
	T	STATUS	Small Integer	1 : Original, 2 : Revised/Replaced, 3 : Inactive
SW_CONVEY		CONVEY_FEAT_ID	Integer	
		CONVEY_TYPE_CODE	Small Integer	2 : Channel, 3 : Curb, 4 : Swale, 5 : Dike
		PROJECT ID	Integer	
		YEAR BUILT	Small Integer	
		LOCATION	String	
		MATL_CODE	Small Integer	1 : Grass, 2 : Blanket, 3 : Rock, 4 : Gunite, 5 : Concrete Block, 6 : Unimproved, 7 : Asphalt Concrete, 8 : Concrete
		NOTES	String	
		STATUS	Small Integer	1 : Original, 2 : Revised/Replaced, 3 : Inactive

Feature	Tahoe (T) West Slope (WS) Both (B)	FIELD NAME	FIELD TYPE	DOMAIN DATA (Linked to corresponding tab)
SW_PIPE	B	PIPE_FEAT_ID	Integer	
	B	PROJECT ID	Integer	
	B	YEAR BUILT	Small Integer	
	B	LOCATION	String	
	B	TYPE_PWALL_CODE	Small Integer	1 : Solid, 2 : Perforated, 3 : Slotted
	B	MATL_CODE	Small Integer	1 : Corrugated Metal, 2 : HDPE, 3 : Reinforced Concrete, 4 : Perforated Metal, 5 : Smooth Metal, 6 : PVC, 7 : Perforated PVC, 8 : Perforated HDPE, 9 : Perforated Corrugated Metal, 11 : Slotted Corrugated Metal
	B	TYPE_SHAPE_CODE	Small Integer	1 : Circular, 2 : Arch, 3 : Square, 4 : Open Square, 5 : Open Arch
	B	MAJOR_DIM	Integer	
	B	INLET_TREATMENT_CODE	Small Integer	1 : Headwall, 2 : Headwall with Wingwalls, 3 : Flared End Section, 4 : Flared End Section with Rock Dissipator, 5 : Flared End Section with Rock Bowl, 6 : Rock Dissipator, 7 : AC Pavement, 9 : No protection, 11 : Drainage Inlet, 12 : Sediment Trap, 13 : Storm Drain Manhole, 14 : Connects to another pipe of same, smaller, or larger diameter, 15 : Tee Pipe - acts as dissipator, 16 : Purposely Plugged with Fill Material or Concrete, 17 : concrete or gunite, 18 : Rock Bowl, 20 : Horizontal or Vertical, 30 : Structure for Cleanout, 31 : Defined Chanel (Rock, Grass, or Dirt), 32 : Sizeable depression for stormwater retention and infiltration, 33 : Concrete Vault, 34 : Structure for Treatment, 35 : Valve for stopping flow, 36 : NOT USED, 80 : Directly discharges to known River or Lake, 99 : NEEDS FIELD VERIFICATION
	B	OUTLET_TREATMENT_CODE	Small Integer	1 : Headwall, 2 : Headwall with Wingwalls, 3 : Flared End Section, 4 : Flared End Section with Rock Dissipator, 5 : Flared End Section with Rock Bowl, 6 : Rock Dissipator, 7 : AC Pavement, 9 : No protection, 11 : Drainage Inlet, 12 : Sediment Trap, 13 : Storm Drain Manhole, 14 : Connects to another pipe of same, smaller, or larger diameter, 15 : Tee Pipe - acts as dissipator, 16 : Purposely Plugged with Fill Material or Concrete, 17 : concrete or gunite, 18 : Rock Bowl, 20 : Horizontal or Vertical, 30 : Structure for Cleanout, 31 : Defined Chanel (Rock, Grass, or Dirt), 32 : Sizeable depression for stormwater retention and infiltration, 33 : Concrete Vault, 34 : Structure for Treatment, 35 : Valve for stopping flow, 36 : NOT USED, 80 : Directly discharges to known River or Lake, 99 : NEEDS FIELD VERIFICATION
	T	SLOPE	Double	
	B	NOTES	String	
	T	STATUS	Small Integer	1 : Original, 2 : Revised/Replaced, 3 : Inactive

Data Dictionary

Feature	Tahoe (T) West Slope (WS) Both (B)	FIELD NAME	FIELD TYPE	DOMAIN DATA (Linked to corresponding tab)
SW_TREATMENT		TREAT_FEAT_ID	Integer	
		TREATMENT TYPE	Small Integer	1 : Vault, 2 : Basin - Dry, 3 : Basin - Wet, 4 : Bed Filter, 5 : Cartridge Filter, 6 : Basin - ArmorFlex, 7 : Basin, 8 : Basin - Rock Lined, 9 : Forebay, 10 : Inundation Area
		PROJECT ID	Integer	
		YEAR BUILT	Small Integer	
		LOCATION	String	
		TREATMENT NAME	String	
		OUTFALL TYPE	String	
		Expected Perc	Double	
		Treatment Volume	Integer	
		Treatment Total Volume	Integer	
		AREA_SPILLWAY	Integer	
		AREA_BOTTOM	Integer	
		ELEV_SPILLWAY	Integer	
		ELEV_BOTTOM	Integer	
		ELEV_TOP	Integer	
		STORAGE_DEPTH	Single	
		GAUGE_INSTALL_DATE	Date	
		WATER_QUALITY_CODE	Small Integer	
		OUTFALL_ID	Integer	
		NOTES	String	

Feature	Tahoe (T) West Slope (WS) Both (B)	FIELD NAME	FIELD TYPE	DOMAIN DATA (Linked to corresponding tab)
SW_SLOPE		SLP_FEAT_ID	Integer	
		TYPE_WALL_CODE	Small Integer	1 : Sloped, 2 : Vertical
		PROJECT ID	Integer	
		YEAR BUILT	Small Integer	
		LOCATION	String	
		MATL_CODE	Small Integer	1 : Timber, 2 : Blanket, 3 : Rock, 4 : Gunite, 5 : Gabion
		HEIGHT	Integer	
		NOTES	String	
		STATUS	Small Integer	1 : Original, 2 : Revised/Replaced, 3 : Inactive
GUARDRAIL		Facility Identifier		-
		Guardrail Location		-
		Guardrail Type		1 : Box Beam Steel, 2 : Bridge Rail, 3 : Cable-High Tension, 4 : Cable-Low Tension, 5 : Thrie-Beam Steel, 6 : W-Beam Steel, 7 : W-Beam Steel-Weak Post, 8 : Wood Timber, 9 : Wood Timber-Steel Backed, 10 : Other, 11 : Unknown
		Rail Count		-
		Start Treatment		1 : Bridge Attachment, 2 : Bull Nose, 3 : Energy Absorbing, 4 : Recycled, 5 : Roll-over, 6 : Sequential Kinking, 7 : Slotted Rail, 8 : Terminal End, 9 : Other, 10 : Unknown
		End Treatment		1 : Bridge Attachment, 2 : Bull Nose, 3 : Energy Absorbing, 4 : Recycled, 5 : Roll-over, 6 : Sequential Kinking, 7 : Slotted Rail, 8 : Terminal End, 9 : Other, 10 : Unknown
		Post Type		1 : Metal, 2 : Wood – DF, 3 : Wood – WP
		Block Type		1 : Metal, 2 : Wood – DF, 3 : Wood – WP
		Post Spacing		-
		Instal Date		-
		Condition		1 : Excellent, 2 : Very Good, 3 : Good, 4 : Fair, 5 : Poor, 6 : Very Poor, 7 : Unknown
		Vegetation Control		Yes or No
		Owned By		El Dorado County, Private, or Other
		Managed By		El Dorado County, Private, or Other

Asset Maintenance



Collector Use by Maintenance

- Established in 2017 after many years of development
- Ipads with Vactor truck, field inspectors and maintenance supervisors
- County assets inspected prior to maintenance and labeled as High, Med, Low
- Assets are then maintained and marked as “completed”

Other Uses of Collector

- Identifying / locating of problems
- Efficient routing of information to responsible divisions
- Efficient Maintenance
- Data Queries
- Illicit Discharges
- Public Engagement

Asset Maintenance

SW_WORKFORCE-2018 with Web AppBuilder for ArcGIS

Find address or place

Legend

Struct_Workforce_2018

- Critical
- High
- Medium
- Low
- None

Treat_Workforce_2018

- Critical
- High
- Medium
- Low
- None

Structures

- Clean Out
- Drainage Basin
- Drainage Inlet
- Sediment Trap
- Storm Drain Manhole

Basin - Wet Inspection

TREATMENT_FEAT_ID 98

Notes basin volume 1626 cf

Treatment Type Basin - Wet

Subtype 0

Group 0

Project 95154

Year Built 2005

Location Boren Way (west side) @ Glen Eagles Rd (north west side)

Treatment Name Glen Eagles Basin

Outfall ID 0

Outfall Type Rock spillway with conc. cut-off wall

[Zoom to](#)

40ft

Bureau of Land Management, Esri

Conveyance_WorkForce_2018 Struct_Workforce_2018 Treat_Workforce_2018 Structures Conveyance Treatments gov_pars - Government Owned Parcels SW_PlowZones - StormWater

Options Filter by map extent Zoom to Clear selection Refresh

TREATMENT_FEAT_ID	INSPECTION_DATETIME	LAST_status	LAST_priority	TREATMENT_TYPE_CODE	LOC_DESCR	LAST_timestamp	LAST_assignmentType
98	8/20/2018, 2:56 PM	Assigned	Critical	3	Boren Way (west side) @ Glen Eagles Rd (north west side)	2018/11/15, 23:58	CCC



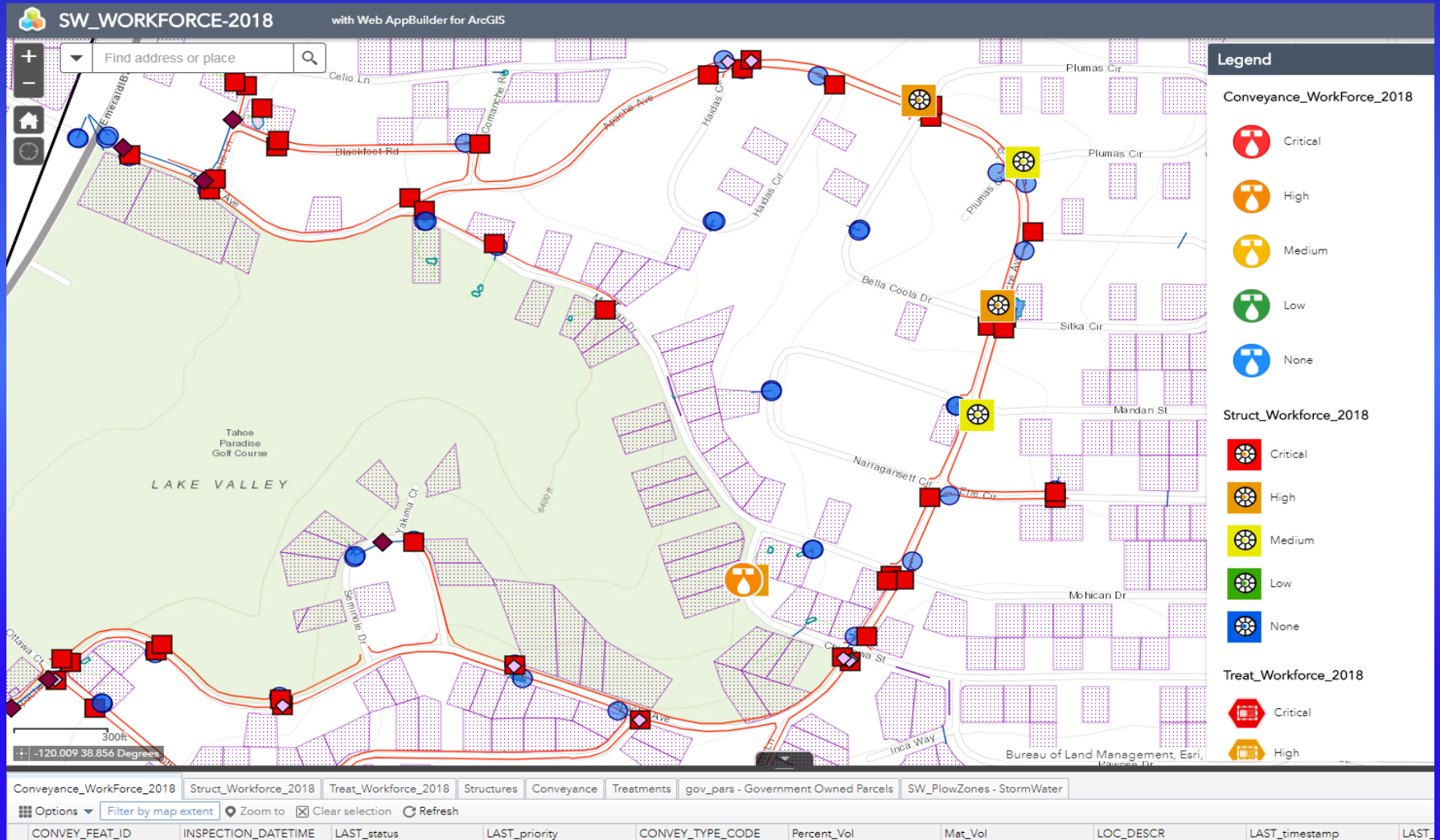
IMG_4717.MOV



Basin - Wet Inspection
Glen Eagles Basin



ArcGIS Walkthrough



Collector / GIS Demo



IMG_4536.MOV

Collector / GIS Demo



IMG_4678.MOV

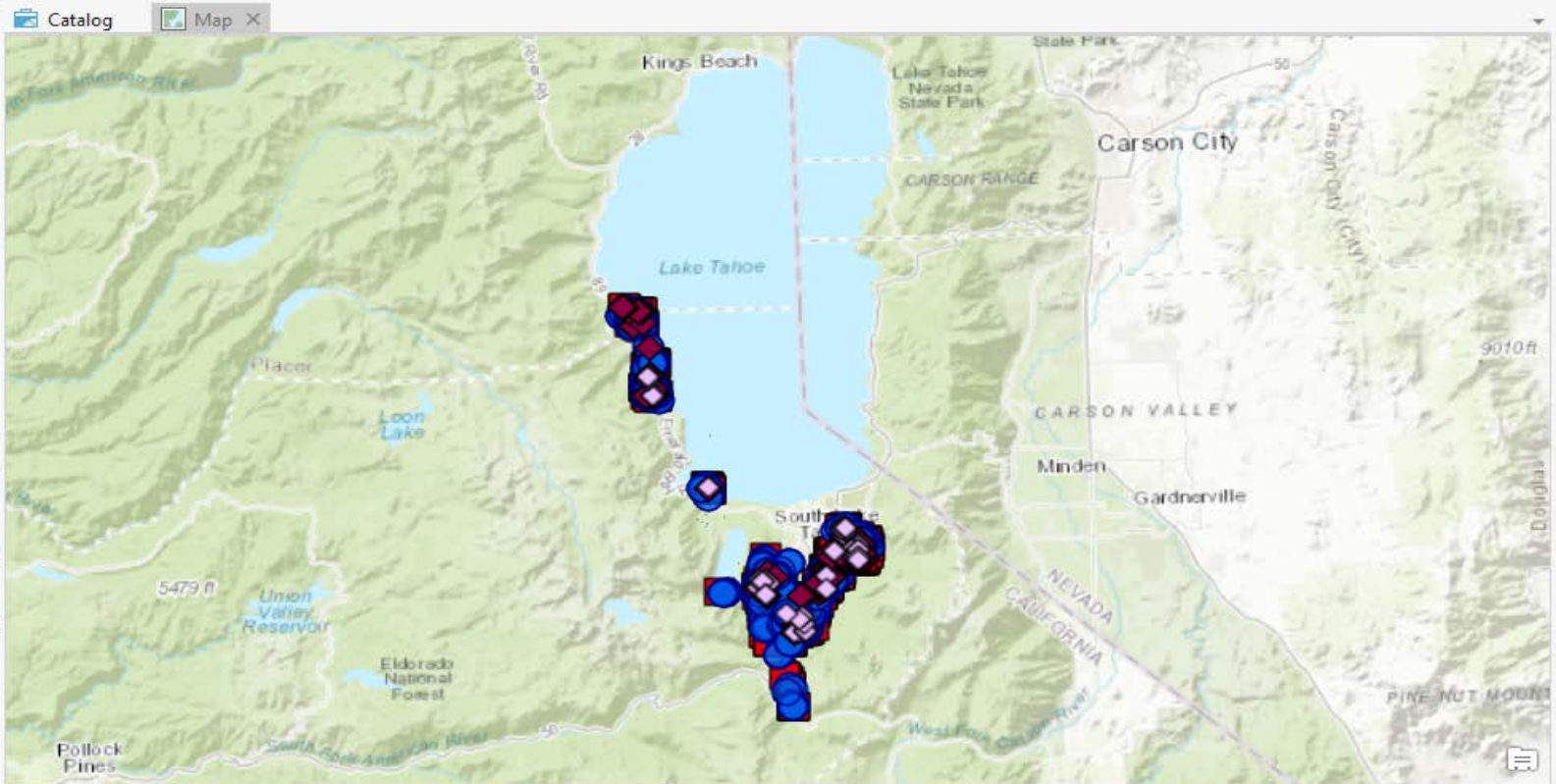
Collector Data

- Exporting data – All data is logged in Collector and stored in ArcGIS Online
- Data can be queried at any time for record keeping, logging or tracking information
- All inspection records are accessible to both management and supervisors
- Information can be seen online or exported to excel
- Information is now being used to track RAM data

Search

Drawing Order

- Map
 - SW_01_29_19
 - Topographic
- Standalone Tables
 - SW_CONVEY_ASSET_MAINT
 - SW_PIPE_ASSET_MAINT
 - SW_SLP_PROT_ASSET_MAIN
 - SW_STRUCT_ASSET_MAINT
 - SW_TREATMENT_ASSET_MA
 - SW_WALL_ASSET_MAINT
 - L12SW_STRUCT_ASSET_MAI



1:406,788 | 120.5598293°W 39.1377903°N | Selected Features: 0

SW_STRUCT_ASSET_MAINT | **SW_PIPE_ASSET_MAINT**

Field:	Add	Delete	Calculate	Selection:	Zoom To	Switch	Clear	Delete
INSPECTION_DATETIME	INSPECTOR	SEDIMENT_DEPTH	WET	CONDITION	PRIORITY	MAINT_DATETIME	MAINT_DESCR	MAINT_STATUS
10/16/2018 9:34:00 PM	Alan Rainhardt and A...	<Null>	NO	<Null>	<Null>	10/16/2018 9:34:36 PM	Cleaned	<Null>
10/17/2018 10:27:01 PM		<Null>	NO	GOOD	<Null>	10/17/2018 10:27:16 PM	Cleaned the flow line...	<Null>
10/22/2018 8:11:55 PM	Alan Rainhardt and A...	<Null>	NO	GOOD	<Null>	10/22/2018 8:13:01 PM	Cleaned about 20 of...	<Null>
10/24/2018 11:27:59 PM	Alan Reinhardt / Leig...	<Null>	YES	<Null>	<Null>	<Null>	<Null>	<Null>
10/30/2018 10:13:20 PM	Jack Freeny and Alex...	<Null>	YES	GOOD	<Null>	10/25/2018 10:13:38 PM	Cleaned	<Null>
10/30/2018 10:19:26 PM	Jack Freeny and Alex...	<Null>	YES	GOOD	<Null>	10/25/2018 10:19:43 PM	Cleaned	<Null>
10/31/2018 5:48:52 PM	Dillon McLaughlin a...	<Null>	NO	GOOD	<Null>	11/1/2018 7:50:11 PM	Cleaned the rock flo...	<Null>
11/6/2018 4:56:59 PM	<Null>	6.9	<Null>	GOOD	<Null>	<Null>	<Null>	<Null>
11/6/2018 9:24:56 PM	Dillon McLaughlin	4.6	<Null>	GOOD	<Null>	<Null>	<Null>	<Null>
11/7/2018 10:28:20 PM	Pipe more than 3/4 p...	<Null>	NO	BAD	High	<Null>	<Null>	<Null>
11/8/2018 10:13:28 PM		<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
11/14/2018 4:59:12 PM	Dillon McLaughlin a...	<Null>	NO	GOOD	<Null>	11/14/2018 4:59:39 PM	Cleaned the flow line...	<Null>
11/14/2018 5:01:18 PM	Dillon McLaughlin a...	<Null>	NO	GOOD	<Null>	11/14/2018 5:01:56 PM	Cleaned the flow line...	<Null>
11/14/2018 5:03:40 PM	Dillon McLaughlin a...	<Null>	NO	POOR	<Null>	<Null>	<Null>	<Null>

Collector

OBJECTID	INSPECTION_DATETIME	INSPECTOR	SEDIMENT_DEPTH	WET	CONDITION	PRIORITY	MAINT_DATETIME	MAINT_DESCR	COMMENTS
862	2017-12-08 22:50			1	3	2	2017-12-08 22:51	Vactor out lower end of pipe and surrounding area. Will need backhoe work to re establish basins and run off ditch. While routing 24 inch pipe we discovered a 12Inch pipe running parralalle. Routers d both pipes and vactored	Backhoe work needed on upper and lower basins
863	2017-12-11 17:00			2	1	3			No di on collector app.
864	2017-12-13 17:01			2	1	1	2017-12-13 17:02		Removed storm drain lid and did not see any debris or buildup to be removed.
865	2017-12-11 22:44			1	3	2	2017-12-11 22:45	Vactor and router	Needs back hoe to re-establish pipe ends.
866	2017-12-11 22:50			1	3	2	2017-12-11 22:51	Dig outlet side of pipe to open	Frozen dirt at time of vactor work
867	2017-12-14 21:19		6	2	3	3	2017-12-14 21:19		Needs vactor and router work. Along with
868	2018-01-12 17:30				3				channel needs thinning downstream
869	2018-01-18 16:40		3	1	1	2			

OBJECTID	INSPECTION_DATETIME	INSPECTOR	SEDIMENT_DEPTH	WET	CONDITION	PRIORITY	MAINT_DATETIME	MAINT_DESCR	COMMENTS
9090	2018-01-16 19:17	Hardman		1	1	2			No lock or lock ring
9091									
9092	2018-04-25 14:45	Zorn							Test upload
9093	2018-04-10 21:48		1		3	3			ST is about 6 inches from the out pipe Can is about 6 inches from the outlet of the pipe.
9094	2018-04-10 21:50	Alex	1		3				Needs cleaning Window to the ST needs cleaning. As well as the flow line
9095	2018-04-10 21:52		2						
9096	2018-04-25 19:35	Todd and Jack				1			
9097	2018-04-25 20:22						2018-04-25 20:23		
9098	2018-04-25 20:33								
9099	2018-04-30 14:47	Alex Padilla	4.5	2	1				Zero sump DI no cleaning required Alex Padilla
9100	2018-04-25 14:56	Todd Bouchard/Jack Freeny	1					Cleaned out the double sediment traps	
9101	2018-04-30 15:40	Alex Padilla/Todd Bouchard	2				2018-04-30 15:41		Zero sump self cleaning transverse drain.
9102	2018-04-30 16:31	Alex Padilla/Todd Bouchard	2.6	1	1	4	2018-04-30 16:32	Vactored out the DI. This one get lots of sediment every year..	
9103	2018-04-30 16:33	Alex Padilla/Todd Bouchard	7.2	1	1	0			This ST only lost .60 of space from last year. N cleaning needed. Checked it and it does not need cleaning. Still plenty of room for sediment
9104	2018-04-30 16:36	Alex Padilla/Todd Bouchard	4.9	2	1				
9105	2018-04-30 17:46	Alex Padilla & Todd Bouchard					2018-04-30 17:47	Cleaned double sand trap	
9106	2018-04-30 17:52	Alex Padilla & Bouchard	1.7				2018-04-30 17:53	Cleaned sandtrap	
9107	2018-04-30 22:06	Alex Padilla & Todd Bouchard	4.3	1			2018-04-30 22:07	Cleaned drainage inlet	
9108	2018-04-30 22:09	Alex Padilla & Todd Bouchard	4.4	1			2018-04-30 22:10	Cleaned drainage inlet	
9109	2018-04-30 22:14		4.4				2018-04-30 22:14	Cleaned drainage inlet	
9110	2018-04-30 22:15	Alex Padilla & Todd Bouchard	5.3				2018-04-30 22:16	Cleaned sediment trap	
9111	2018-04-30 22:19	Alex Padilla Todd Bouchard	3.4				2018-04-30 22:20	Cleaned sediment trap	
9112	2018-04-30 22:21	Alex Padilla Todd Bouchard	2.8				2018-04-30 22:21	Cleaned trap	
9113	2018-05-01 16:22	Zorn				3			Full to overflowing of sediment water passing over and continuing down the line This ST needs to be checked upstream because

Next Steps

- Continued refinements of the tool
- Incorporate Cost Data
- Expand to West Slope
- Purchase more Ipads
- Incorporate PCI
- Training

Questions?