

Cloud Based GIS Standardizes NPDES Monitoring and Reporting for Bay Area Cities

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Alameda County and Contra Costa Clean Water Programs



MAKING COMPLEX SIMPLER

- National Pollutant Discharge Elimination System discharge permits for regulated MS4s require permittees to develop a Storm Water Management Plan, and annual reporting.
- Detailed tracking of mitigation measures
- Data organized to support audits – inspections, photos, etc.
- Reports compute reduced pollutants due to mea
- Each City and the County reports
- Complex report formulas

Can we use GIS to make it simpler?

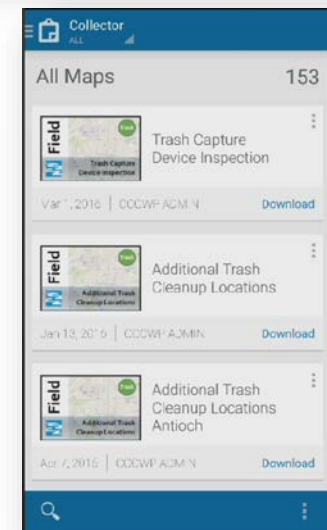
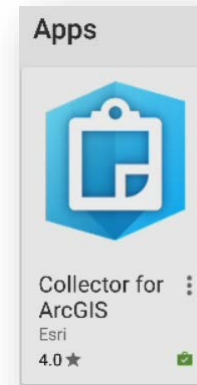
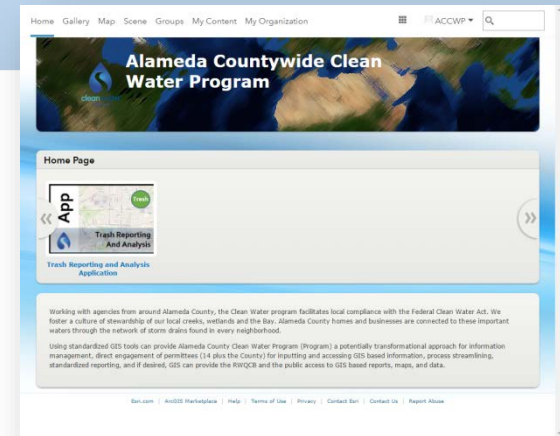
Can GIS make MS4 annual reporting simpler?

- A pilot project
- Use common GIS based platform
- Trash inspection and reporting
- PCB and Mercury project mitigations
- Sponsored by CCCWP – 19 cities plus the County



PROJECT APPROACH

- Objective: Management Trash and PCB Inspections and Reporting
- ArcGIS Online (www.arcgis.com)
- Collector App (download from app store)
- Click Download on map to download to device



MAPS AND APPLICATIONS



App – A web based GIS viewer with editing and report launching capabilities

Field – Collector applications for recording field observations using forms and attaching documents (photos)

REPORTS

- Run reports from the Trash Reporting and Analysis Application
- Click Reporting Dashboard Widget
- Report Types available
 - Annual Trash Report (Excel)
 - Standard Maps
 - Trash Full Capture
 - Trash Generation
 - Tash Management Areas



ReportingDashboard

Annual Trash Report:	
Last Generated:	03/22/2016 14:08:46
Report File:	Trash Report
Generate a New Report:	
Estimated time:	1 Minute
Report Button:	<input type="button" value="Generate"/>

Other Reports:	
Report List:	Trash Full Capture ▾
Last Generated:	03/22/2016 13:50:16
Report File:	Trash Full Capture Report
Generate a New Report:	
Estimated time:	1 Minute
Report Button:	<input type="button" value="Generate"/>

TRASH REPORTING

C.10.a.iii ► Mandatory Trash Full Capture Systems

1) Total number and types of full capture systems (publicly and privately-owned) installed prior to FY 16-17, during FY 16-17, and to-date, including inlet-based and

large flow-through or end-of-pipe systems, and qualifying low impact development (LID) required by permit provision C.3.

2) Total land area (acres) treated by full capture systems for population-based Permittees and total number of systems for non-population based Permittees

compared to the total required by the permit.

Type of Systems	# of Systems	Areas Treated (Acres)
Installed Prior to FY 16-17		
Connector Pipe Screens	3	6
Baskets	1	0
Netting Devices	0	0
HDS Units	0	0
GSRDs	0	0
LID Facilities	1	17
Other	0	0
Installed in FY 16-17		
Connector Pipe Screens	0	0
Baskets	0	0
Netting Devices	0	0
HDS Units	0	0
GSRDs	0	0
LID Facilities	0	0
Other	0	0
Total for all Systems Installed To-date	5	23
Treatment Acreage Required by Permit (Population-based Permittees)		
Total # of Systems Required by Permit (Non-population-based Permittees)		

TRASH REPORTING

C.10.b.ii ► Trash Reduction – Other Trash Management Actions (PART B)

Provide the following:

1) A summary of the on-land visual assessments in each TMA (or control measure area), including the street miles or acres available for assessment (i.e., those associated with VH, H, or M trash generation areas not treated by full capture systems), the street miles or acres

assessed, the % of available street miles or acres assessed, and the average number of assessments conducted per site within the

TMA ID or (as applicable) Control Measure Area	Total Street Miles or Acres Available for Assessment	Summary of On-land Visual Assessments			Jurisdictional-wide Reduction (%)
		Street Miles or Acres Assessed	% of Applicable Street Miles or Acres Assessed	Avg # of Assessments Conducted at Each Site	
1	0.0	0.0	0.0	0	0.0
2	1.9	0.6	29.6	3	22.6
3	3.7	0.9	22.8	3	35.7
4	0.0	0.0	0.0	0	0.0
5	0.0	0.0	0.0	0	0.0
6	0.0	0.0	0.0	0	0.0
7	0.0	0.0	0.0	0	0.0
8	0.0	0.0	0.0	0	0.0
Total		1.4	25.1	7	58.3

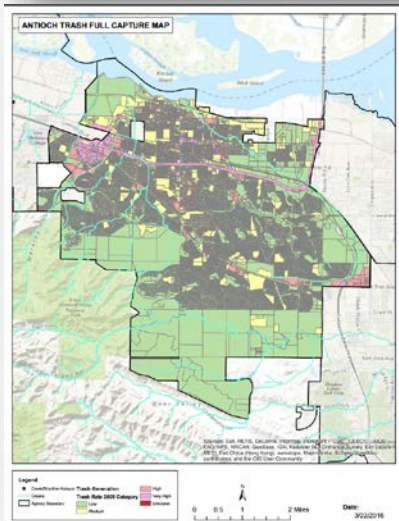
TRASH REPORTING

- Complex computations
- Simple when programmed
- Fed by GIS database

C.10.a.i ▶ Trash Load Reduction Summary	
For population-based Permittees, provide the overall trash reduction percentage achieved to-date within the jurisdictional area of your municipality that generates problematic trash levels (i.e., Very High, High or Moderate trash generation). Base the reduction percentage on the information presented in C.10.b.i-iv and C.10.e.i-ii. Provide a discussion of the calculation used to produce the reduction percentage, including whether the 70% mandatory trash load reduction deadline was attained. If not attained, attach and include reference to a Plan	
Trash Load Reductions	
Percent Trash Reduction in All Trash Management Areas (TMAs) due to Trash Full Capture Systems (as reported C.10.b.i)	8.1%
Percent Trash Reduction in all TMAs due to Control Measures Other than Trash Full Capture Systems (as reported in C.10.b.ii)	58.3%
Percent Trash Reduction due to Jurisdictional-wide Source Control Actions (as reported in C.10.b.iv)	
SubTotal for Above Actions	
Trash Offsets (Optional)	
Offset Associated with Additional Creek and Shoreline Cleanups (as reported in C.10.e.i)	
Offset Associated with Direct Trash Discharges (as reported in C.10.e.ii)	
Total (Jurisdictional-wide) % Trash Load Reduction in FY 16-17	
Discussion of Trash Load Reduction Calculation and Attainment of the 70% Mandatory Deadline:	

STANDARD MAPS

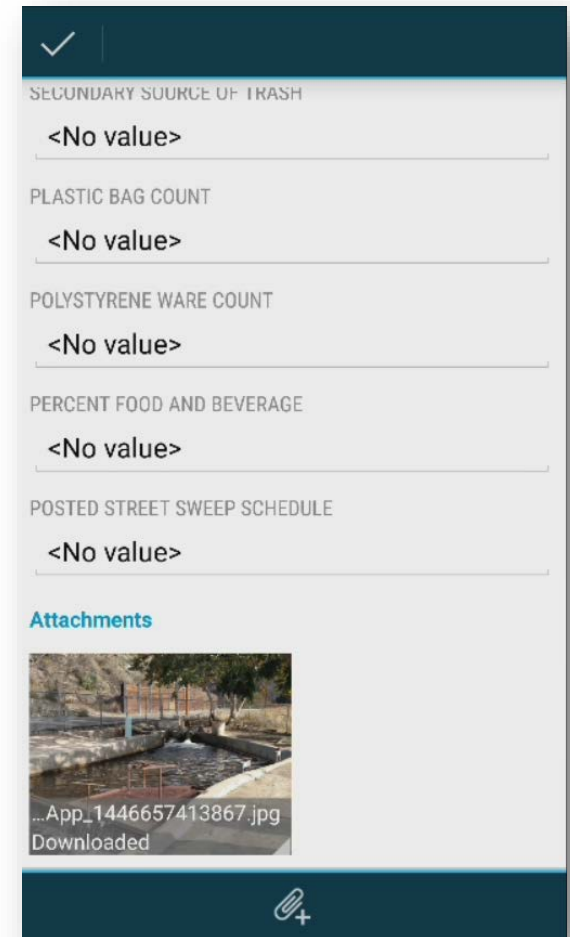
Other Reports:	
Report List:	Trash Full Capture ▼
Last Generated:	Trash Full Capture
Report File:	Trash Generation
	Trash Management
Generate a New Report:	
Estimated time:	1 Minute
Report Button:	<input type="button" value="Generate"/>



- Select Report type from Report List
- Click hyperlink to open previously generated report
- Date of previous report shown under Last Generated
- Click Generate Button to create new report (may take up to 5 minutes to generate)

USING ESRI COLLECTOR

- Phones and tablets
- Supports offline information collection
- Easy to learn and use
- Attachments document condition
- Collector Types
 - Full Trash Capture Devices
 - Creek Cleanup
 - Visual Trash Assessment



The screenshot displays the ESRI Collector app interface. At the top, there is a dark teal header with a white checkmark icon. Below the header, the form contains several input fields, each with a label and a value of "<No value>". The labels are: "SECONDARY SOURCE OF TRASH", "PLASTIC BAG COUNT", "POLYSTYRENE WARE COUNT", "PERCENT FOOD AND BEVERAGE", and "POSTED STREET SWEEP SCHEDULE". Below these fields is a section titled "Attachments" in blue text. Underneath, there is a thumbnail image of a creek cleanup site. Below the image, the text reads "...App_1446657413867.jpg" and "Downloaded". At the bottom of the form, there is a dark teal footer with a white paperclip icon and a plus sign.

ALAMEDA COUNTY CLEAN WATER PROGRAM



- Agreement between Clean Water Programs
- Expand capabilities for detailed project tracking to support broader analysis and reporting
- Collaborative, shared common methods, apps, and tools

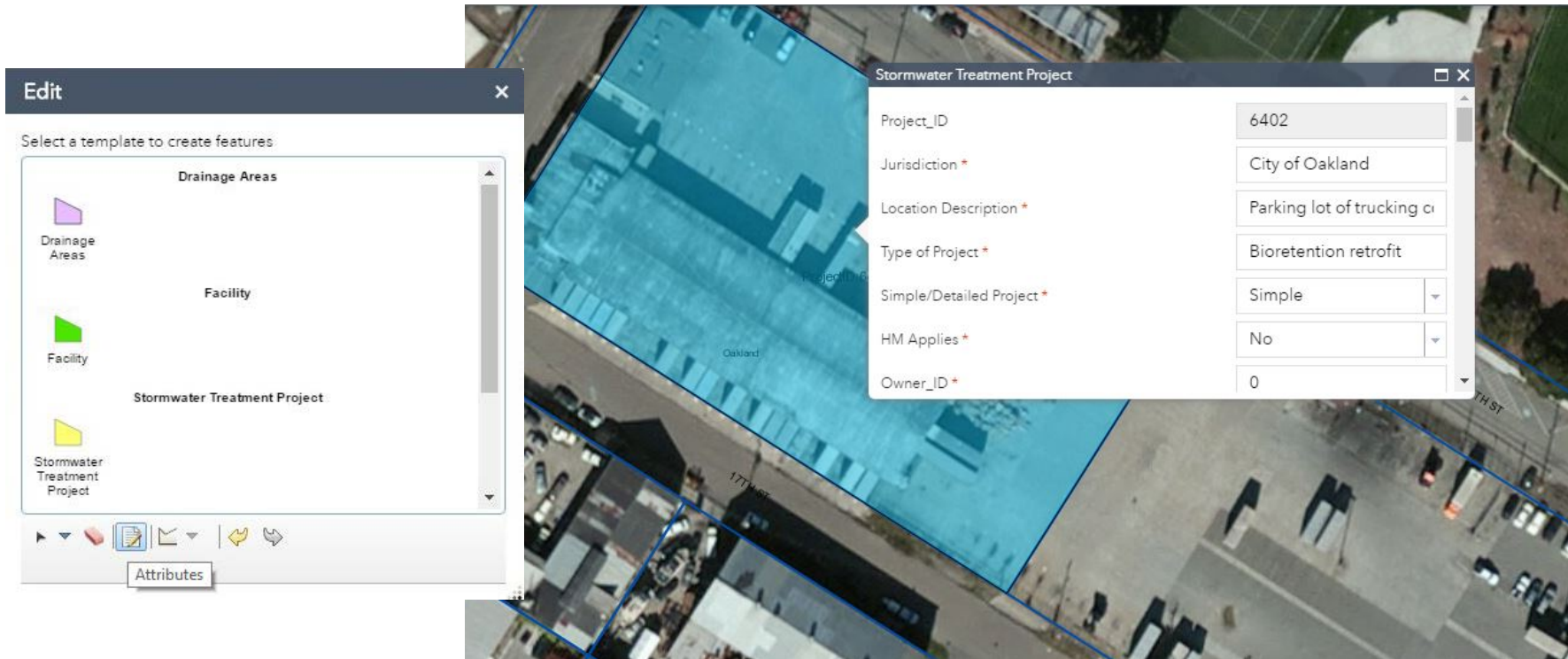


PROJECT TRACKING AND LOAD REDUCTION ACCOUNTING TOOL

- **Project Types**
 - C.3.b Project/Parcel-Based & C.3.b Regulated
 - Green Street/Retrofit
 - Full Trash Capture
 - Source property identification and abatement
- **Data Relationships**
 - Project
 - Facility
 - Drainage Area
- **Simple and Detailed input process**
- Reporting is based on Interim Accounting Methodology from the MRP

DEFINING PROJECTS

- Web app is easy to use for data input and editing



GREEN STREETS PROJECT



-121.889 37.707 Degrees

Drainage Areas Facility Stormwater Treatment Project Source Property Identification and Abatement Parcels st_OM_Agreement ST_OM_INSPECTION st_Source_Ter

Options Filter by Map Extent Zoom to Clear Selection Refresh

Facility ID	Project ID	Facility Type	Percent Area - Simple (%)	Count Simple	Facility Area - Complex (Ac)	GIS Calculate Area (Ac)	Treatment	Hydraulic Sizing Criterion	Hydraulic Sizing Criteria % Capture
12,804	20,004	Bioretention with Underdrain (Unlined)				0.08	Treatment	MRP C.3.d sizing (80% capture)	
12,805	20,004	Bioretention with Underdrain (Unlined)				0.15	Treatment	MRP C.3.d sizing (80% capture)	

PROJECT TRACKING REPORTING

- Standard report structure
- Data driven from GIS
- Easy with one click
- Excel output for agency to tailor

C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 1) – Projects Approved During the Fiscal Year Reporting Period											
Project Name Project No.	Project Location, Street Address	Name of Developer	Project Phase No.	Project Type & Description	Project Watershed	Total Site Area (Acres)	Total Area of Land Disturbed (Acres)	Total New Impervious Surface Area (ft ²)	Total Replaced Impervious Surface Area (ft ²)	Total Pre-Project Impervious Surface Area (ft ²)	Total Post-Project Impervious Surface Area (ft ²)
Private Projects											
PROJ02	Loc 2	Company 2	2	Green Street/Retrofit	Watershed 2	158.36	200.00	4000.00	6000.00	2000.00	1000.00
PROJ03	Loc 3	Company 3	3	Green Street/Retrofit	Watershed 3	79.40	100.00	8000.00	6000.00	2000.00	4676.00
PROJ05	Loc 5	Company 5	5	Parcel-Based	Watershed 5	70.00	500.00	5000.00	6000.00	1000.00	2435.00
PROJ07	Loc 7	Company 7	7	Full Trash Capture	Watershed 7	215.00	600.00	8000.00	6000.00	2000.00	1000.00
PROJ10	Loc 10	Company 10	10	Full Trash Capture	Watershed 10	84.73	100.00	7000.00	6000.00	1000.00	4567.00

- Rollout and engagement of users
 - Account configuration, roles, firewalls
 - Training and support
 - Integrating permittee data

- Countywide implementation Considerations
 - Standardized approach and design yet diverse users
 - Interest in integrating with CMMS or other systems
 - Benefits of common structure and tools for consistency

- Fitting the process to the tools
 - Expectation management

- ArcGIS Online is evolving
 - Popups
 - Full relational model capabilities
 - Limitations on forms

- An evolving solution



TAKE - AWAYS

- The GIS Pilot is now an operational system
- Extending to broader and more detailed analysis and reporting
- ArcGIS Online tools are suited for the regional program
- Adaptable design fits different permittee needs
- Two county collaboration leverages each other's work
- Automation enhances repeatability & predictability of results



Clean Water Program Users

- 19 Contra Costa cities
- Contra Costa County
- 14 Alameda County cities
- Alameda County

Sponsors

- Contra Costa Clean Water Program
 - Rachel Kraai
 - Lucile Paquett
 - Beth Baldwin
- Alameda County Clean Water Program
 - Jim Scanlin

Consultants

- Psomas
- Geosyntec
- Dan Cloak Environmental Consulting
- EOA
- Miller Spatial