Functional Requirements

for

Customer Information System Outage Notification Application

Version 1.3 Final

Revision History

Name	Date	Reason For Changes	Version
Analyst 1	6/17/2015	Drafted	Façade
Analyst 2	6/17/2015	Drafted	Façade
Analyst 2	6/20/2015	Drafted	Façade
Analyst 2	6/22/2015	Drafted	Façade
Analyst 2	6/26/2015	Drafted	Filled
Analyst 2	6/28/2015	Incorporated DH comments	Filled
Analyst 2	7/5/15	Reviewed and Updated	Filled
Analyst 2	7/6/15	Quality Review and Update	Focused

1. Problem Statement

The utility's new Customer Information and Billing System (CIS) must have a way to identify and notify users that are affected by an ongoing or planned interruption in sewer service ("outage notification").
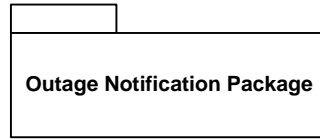
Use Cases

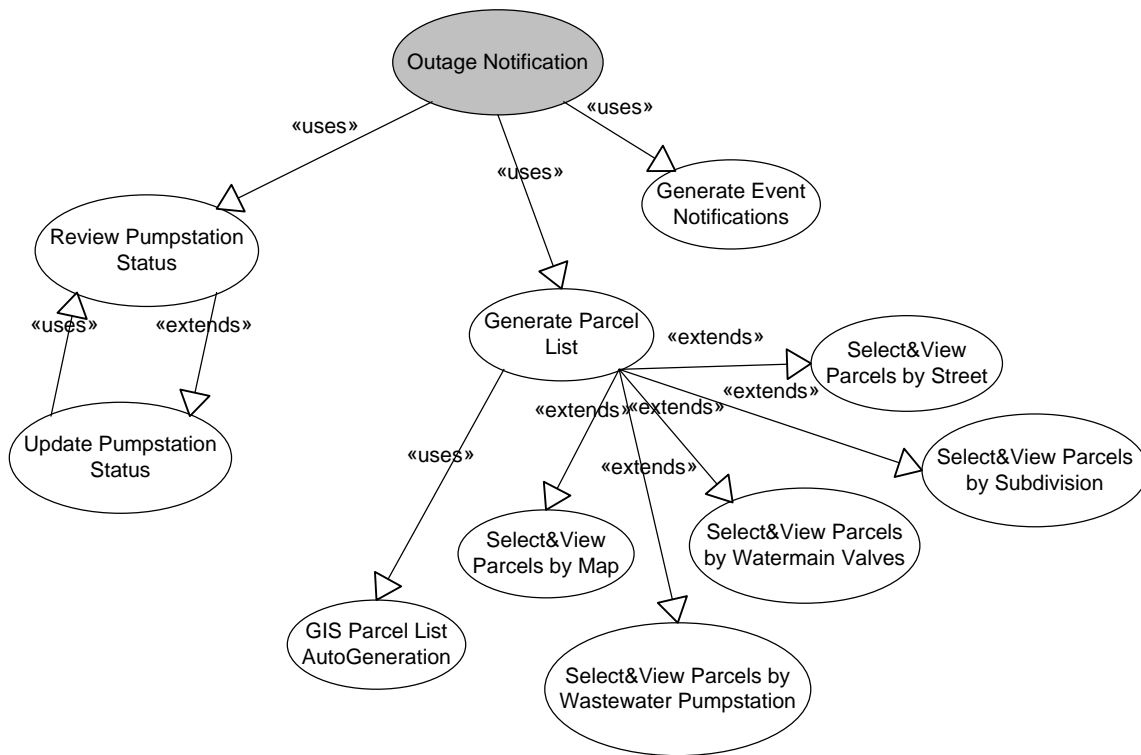**Figure 1**. Outage Notification Package
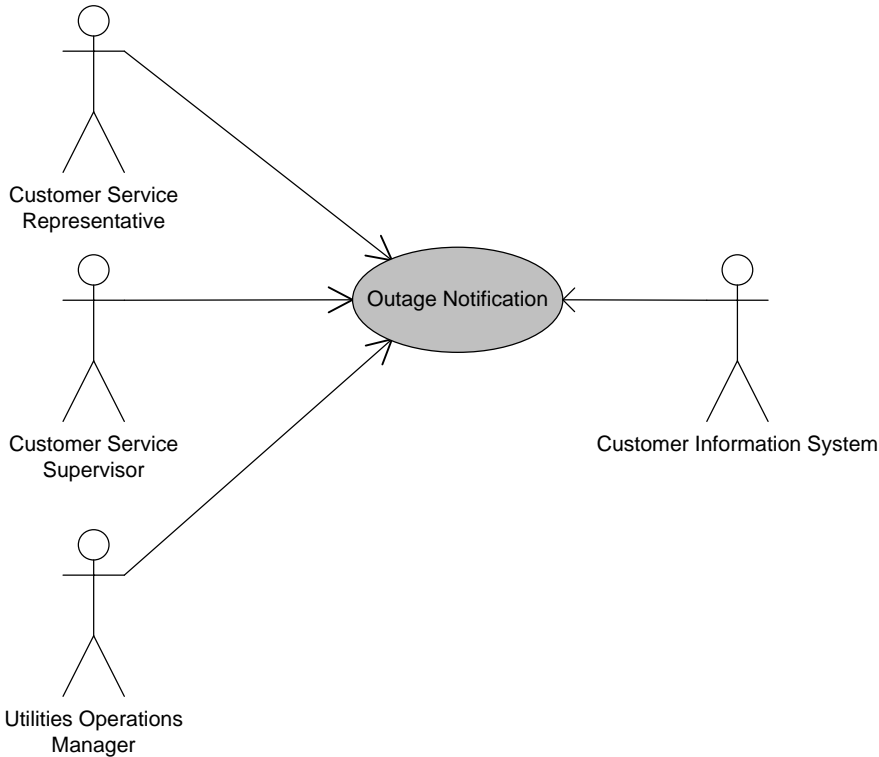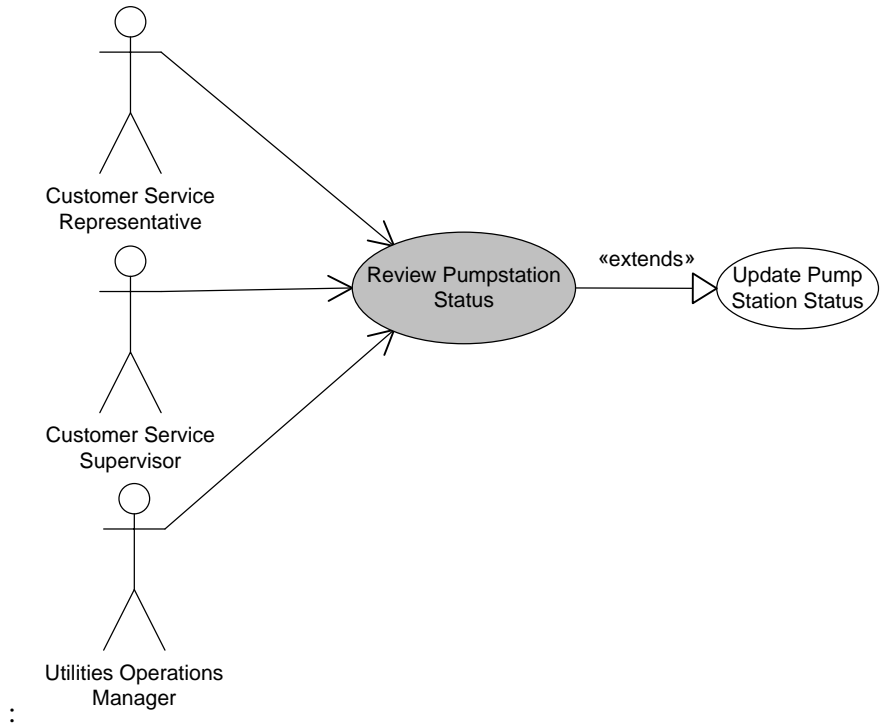

Figure 2. Use Case Hierarchy Diagram

Figure 3. Use Case 0 - Outage Notification Use Case Diagram

Use Case ID:	0		
Use Case Name:	**Outage Notification**		
Iteration:	Focused		
Created By:	Analyst 1	Last Updated By:	Analyst 1
Date Created:	7-7-2015	Date Last Updated:	7-7-2015
Actor:	Customer Service Representative (CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM) Customer Information System (CIS)		
Description:	The User (CSR, CSS or UOM), in response to an ongoing or planned outage of sewer system pumpstations, generates a report and updates CIS with records of customers affected by the outage event.		
Triggers:	Outage event has occurred or is planned.		
Preconditions:	▪ GIS Outage Notification Application online. ▪ CIS online.		
Postconditions:	CIS updated with database records documenting the outage event and the affected parcels (i.e. customers).		
Priority:	High		
Frequency of Use:	Moderate		
Normal Course of Events:	1. User receives information that an outage has occurred, or is planned. 2. User invokes the GIS Outage Notification Application. 3. GIS Outage Notification Application updates CIS with database records documenting the outage event and the affected parcels (i.e. customers).		
Alternative Courses:	None		
Exceptions:	None		
Extensions:	None.		
Includes (Uses):	Use Cases 1, 2, 9		
Related Business Rules:	None.		
Special Requirements:	None.		
Assumptions:	None.		
Notes and Issues:	Fault tolerance is required to assure that a backup way of notifying customers of outage events exists, in the case that the Outage Notification Application, CIS, or interface between the two is not working.		

Customer Service
Representative

Review Pumpstation
Status

«extends»

Update Pump
Station Status

Customer Service
Supervisor

Utilities Operations
Manager

:

Figure 4. Use Case 1 - Review Pump Station Status Use Case Diagram

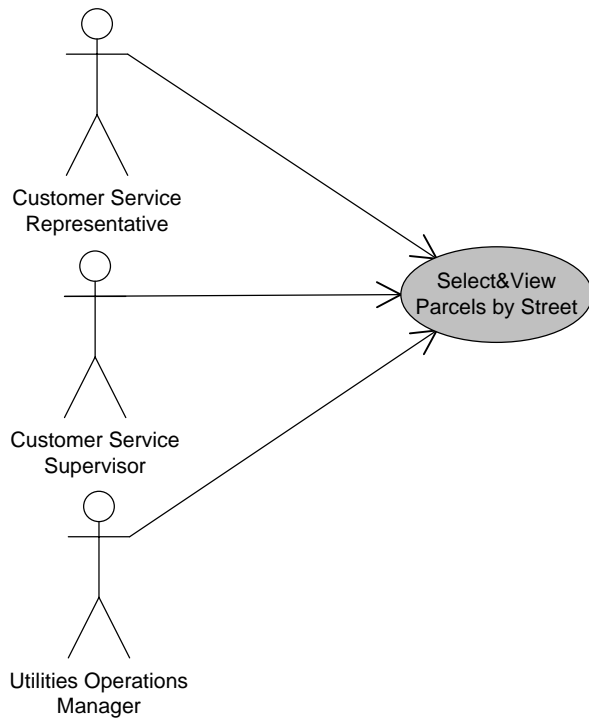| Use Case ID:	1		
Use Case Name:	**Review Pumpstation Status**		
Iteration:	Focused		
Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-17-2015	Date Last Updated:	7-6-2015
Actor:	Customer Service Representative (CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM)		
Description:	The user (CSR, CSS or UOM) confirms that the pump stations' statuses are up-to-date, before generating an outage event notification list.		
Triggers:	Outage event has occurred or is planned.		
Preconditions:	▪ Up to date pump station GIS feature class dataset with current pump station status values exist are presented to user within GIS application's map user interface. ▪ Parcel GIS feature class dataset must exist and presented to user within GIS application's map user interface. ▪ GIS Data Server online ▪ GIS Web Server online		
Postconditions:	None		
Priority:	Unknown		
Frequency of Use:	Moderate		
Normal Course of Events:	1. User receives information that an outage has occurred, or is planned. 2. User invokes the GIS Outage Notification application. 3. User reviews display of pump stations' statuses on GIS' application's map. 4. User confirms that the pump stations' statuses are up-to-date in the GIS.		
Alternative Courses:	3a. User reviews display of pump station's statuses in pump station status list		
Exceptions:	If the CSR or CSS determines that the pump stations' statuses are not up-to-date, they will notify the UOM responsible for updating the pump station statuses.		
Extensions:	Use Case 2 – Update Pumpstation Status		
Includes:	None		
Related Business Rules:	None		
Special Requirements:	None		
Assumptions:	User provided with GUI control to invoke this use case.		
Notes and Issues:	▪ It is not clear how User knows for certain that the pump stations' statuses are correct in the GIS. ▪ SCADA or a real-time data feedback system is required to assure that pump stations' statuses are all correct and up-to-date. ▪ CSR or CSS must work through the UOM to assure that the status of the pumpstations are correct.		
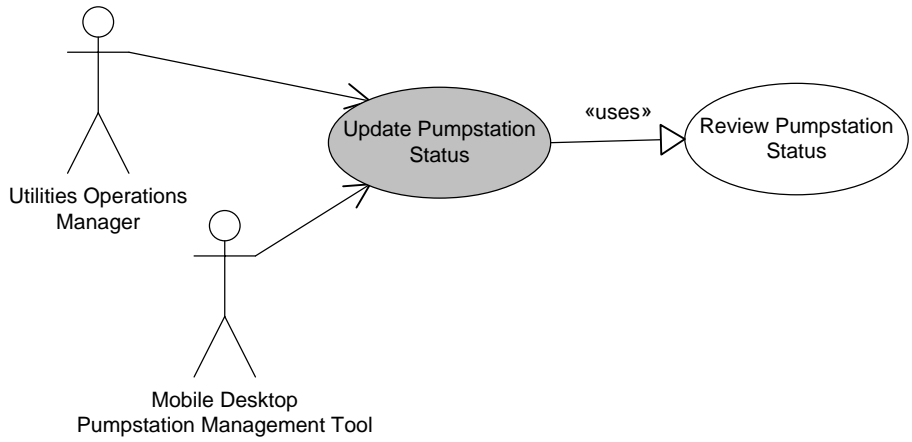
Figure 5. Use Case 2 - Update Pumpstation Status Use Case Diagram

| Use Case ID:	2		
Use Case Name:	**Update Pumpstation Status**		
Iteration:	Focused		
Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-20-2015	Date Last Updated:	7-6-2015
Actor:	Utilities Operations Manager (UOM) Mobile Desktop Pumpstation Management Tool (MDPMT)		
Description:	UOM updates the pump stations' status attribute values to identify which ones are working and which are not working (or planned to not be working).		
Triggers:	UOM learns from Actors in Use Case 1 (Review Pumpstation Status) that the pump stations' status attribute values are not up-to-date in the GIS Outage Notification application.		
Preconditions:	Use Case 1, and notification from the CSR or CSS, or direct observation by the UOM that pump stations' status attribute values are not up-to-date in the GIS Outage Notification application.		
Postconditions:	The pump station status attribute values are up-to-date in the GIS Outage Notification application geodatabase.		
Priority:	Unknown		
Frequency of Use:	Moderate		
Normal Course of Events:	1. UOM invokes the Pumpstation Management Tool in the Mobile Desktop application. 2. UOM changes the pump stations' status attribute values, documents the outage event and updates the GIS data records of the affected pump stations.		
Alternative Courses:	None		
Exceptions:	None		
Extensions:	None		
Includes ("uses"):	Use Case 1 – Review Pumpstation Status		
Related Business Rules:	CSR or CSR must notify the UOM of their observations of incorrect pumpstation statuses resulting from their Review of Pumpstations' Statuses (Use Case 1).		
Special Requirements:	None		
Assumptions:	None		
Notes and Issues:	▪ It is not clear how User knows for certain that the pump stations' statuses are correct in the GIS. ▪ SCADA or a real-time data feedback system is required to assure that pump stations' statuses are all correct and up-to-date.		

Figure 6. Use Case 3 - Generate Parcel List Use Case Diagram (with relationships to supporting Use Cases)

Use Case ID:	3		
Use Case Name:	**Generate Parcel List**		
Iteration:	Filled		
Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-26-2015	Date Last Updated:	07-06-2015
Actor:	Customer Service Representative (CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM)		
Description:	The User (CSR, CSS, or UOM) creates a list of parcels affected by an outage affecting one or more sewer system pump stations.		
Triggers:	Notification of an ongoing sewer system pump station outage event or one being planned due to maintenance.		
Preconditions:	- The pump stations' statuses are up-to-date. - GIS Data Server is online. - GIS Web Server is online.		
Postconditions:	A list of parcels for the User to review and submit.		
Priority:	High		
Frequency of Use:	Moderate		
Normal Course of Events:	1. User receives notification of an ongoing or planned sewer system outage event. 2. User invokes the Outage Notification application. 3. User chooses to generate a list of parcels automatically from the GIS (Use Case 10 – GIS Parcel List Autogeneration).		

Alternative Course:	1. User receives notification of an ongoing or planned sewer system outage event.
	2. User invokes the Outage Notification application.
	3. User chooses to interactively create a new list of selected parcels, or add/delete parcels to/from the existing selected parcels list by using one or some combination of the Parcel Select and View tools:
	    a. Use Case 4: by Street
	    b. Use Case 5: by Subdivision
	    c. Use Case 6: by Water Main Valves
	    d. Use Case 7: by Wastewater Pumpstation
	    e. Use Case 8: by Map		

Exceptions:	None		
Extensions:	Use Cases 4-8		
Includes(Uses):	Use Case 10 – GIS Parcel List Autogeneration		
Related Business Rules:	None		
Special Requirements:	None		
Assumptions:	- Pump stations' status attribute values stored within the GIS geodatabase are correct and up-to-date. 2. Use Case 10's assumptions concerning GIS data dependencies are met		
Notes and Issues:	None.		

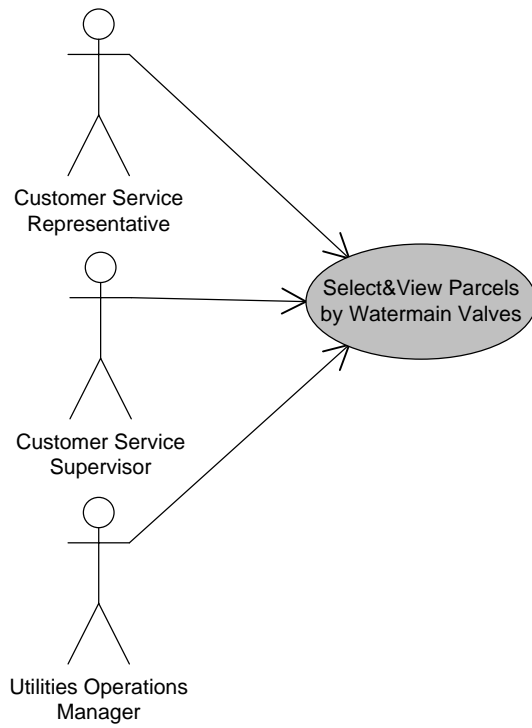**Figure 7.** Use Case 4 - Select and View Parcels by Street Use Case Diagram

Use Case ID:	4
Use Case Name:	**Select and View Parcels by Street**
Iteration:	Filled
Created By:	Analyst 2

Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-17-2015	Date Last Updated:	07-06-2015

Actor:	Customer Service Representative (CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM)
Description:	User (CSR, CSS, or UOM) interactively selects and views parcels by entering a postal address or subset of a postal address (i.e. full address, street name, portion of street name, municipality, and/or zip-code).
Triggers:	Use Case 3, Alternate Course 1.a.
Preconditions:	▪ GIS geodatabase parcel feature class with street address attributes presented within the application's map interface. ▪ GIS Data Server is online. ▪ GIS Web Server is online.
Postconditions:	A selected set of parcels.
Priority:	High
Frequency of Use:	Moderate
Normal Course of Events:	1. User chooses to select parcels by Street 2. User queries GIS for all or part of a street address. 3. GIS returns a list of selected parcels matching street address query criteria. 4. User refines the selected set of parcels by refining the query criteria. 5. User confirms that the selected parcels are correct.
Alternative Course:	After step 3 or 4, User decides not to use the selected parcels, chooses to cancel the select by street, and returns to Generate Parcel List Use Case.
Exceptions:	User cannot confirm a set of parcels, then the Utilities GIS representative is contacted for assistance.
Extensions:	None.
Includes:	None.
Related Business Rules:	None.
Special Requirements:	Geodatabase parcel feature class with primary address attributes.
Assumptions:	Address matching (geocoding) functionality for identifying parcels which works on any subset and combination of street address attributes, including simple street name and street name substring.
Notes and Issues:	This Use Case returns a selected set of parcels for subsequent addition or subtraction to the selected set (default = null) maintained by the calling Generate Parcel List Use Case #3.
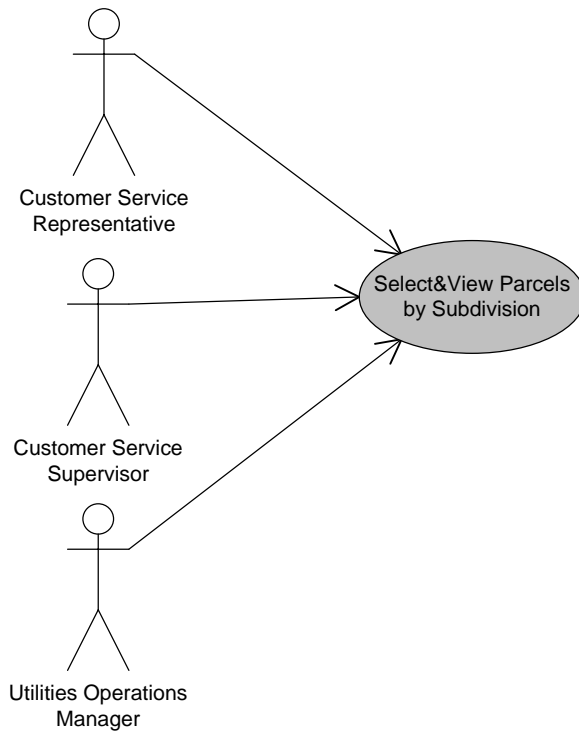
Figure 8. Use Case 5 - Select and View Parcels by Subdivision Use Case Diagram
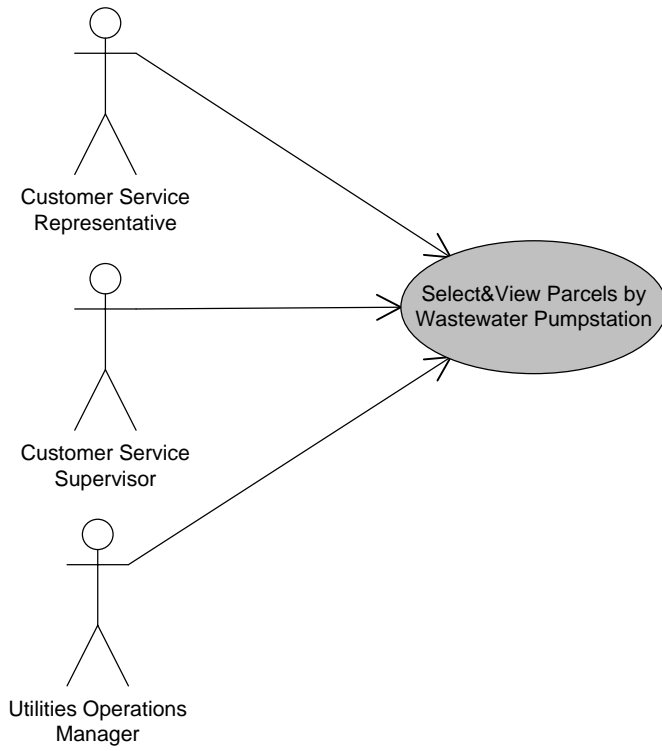
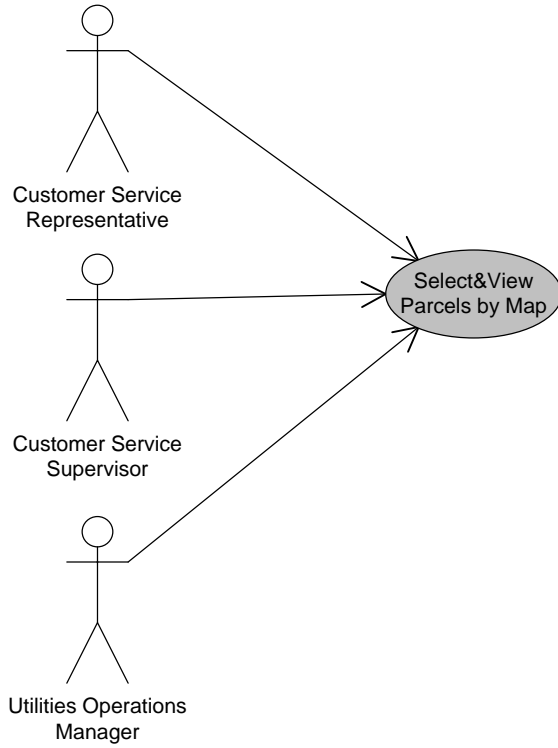| Use Case ID:	5		
Use Case Name:	**Select and View Parcels by Subdivision**		
Iteration:	Filled		
Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-20-2015	Date Last Updated:	07-06-2015
Actor:	Customer Service Representative (CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM)		
Description:	User (CSR, CSS, or UOM) interactively selects and views parcels by entering a full or partial subdivision name.		
Triggers:	Use Case 3, Alternate 1.b.		
Preconditions:	▪ Geodatabase feature classes for subdivisions and parcels must exist and be visible within the application's map user interface. ▪ Parcels are associated with subdivisions. ▪ GIS Data Server is online. ▪ GIS Web Server is online.		
Postconditions:	A selected set of parcels.		
Priority:	High		
Frequency of Use:	Moderate		
Normal Course of Events:	1. User selects Select by Subdivision 2. User queries the GIS for all or part of a subdivision name. 3. The GIS returns a list of subdivisions matching query. 4. User selects a subdivision to view the affected parcels. 5. User can optionally refine the selection by refining the query. 6. User confirms that the selected parcels are correct.		
Alternative Courses:	After step 4 or 5, User decides not to use the selected parcels, chooses to cancel the select by subdivision, and returns to Generate Parcel List Use Case.		
Exceptions:	User cannot confirm a set of parcels, then Utilities GIS representative is contacted for assistance.		
Extensions:	None.		
Includes:	None.		
Related Business Rules:	None.		
Special Requirements:	None.		
Assumptions:	Parcels are associated with subdivisions through preprocessing spatial overlay, or through a dynamic overlay (i.e. spatial "contains") function.		
Notes and Issues:	This Use Case returns it's selected set of parcels for addition to the selected set (default = null) maintained by the calling Generate Parcel List Use Case #3.		

Figure 9. Use Case 6 - Select and View Parcels by Water Main Valves Use Case Diagram

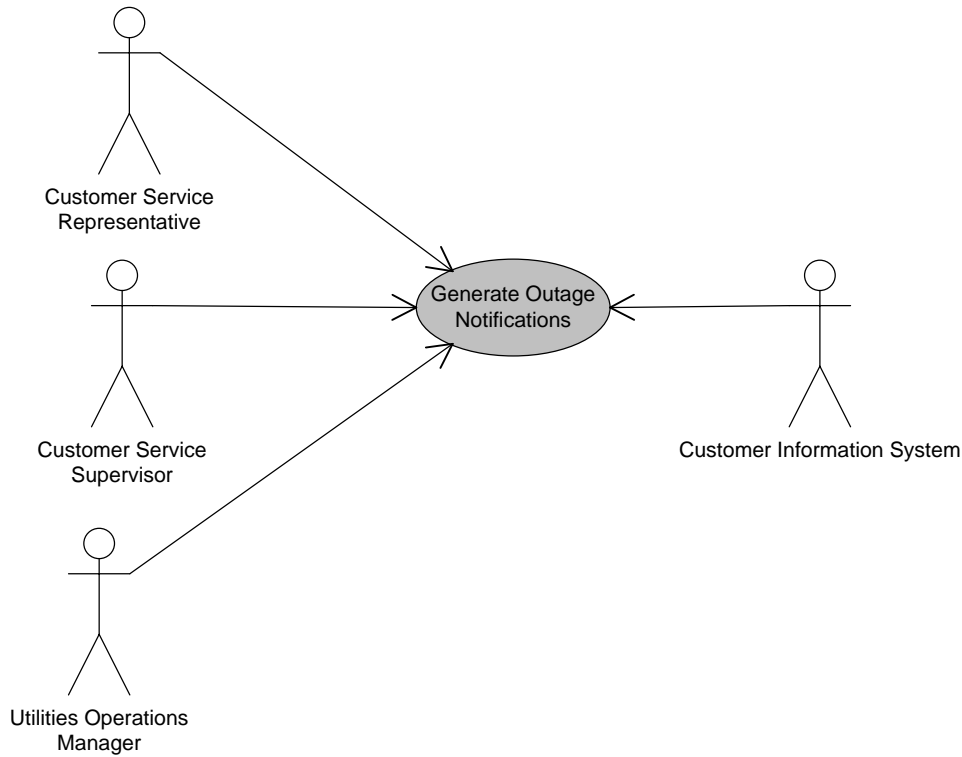| Use Case ID:	6		
Use Case Name:	**Select and View Parcels by Water Main Valves**		
Iteration:	Filled		
Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-20-2015	Date Last Updated:	07-06-2015
Actor:	Customer Service Representative(CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM)		
Description:	User (CSR, CSS, or UOM) interactively selects and views parcels by entering identifiers for water main valves.		
Triggers:	Use Case 3, Alternate 1.c.		
Preconditions:	▪ Geodatabase feature class datasets for water mains, valves, and parcels and cartographic presentation within the applications user interface. ▪ GIS Data Server is online. ▪ GIS Web Server is online.		
Postconditions:	A selected set of parcels.		
Priority:	High		
Frequency of Use:	Moderate		
Normal Course of Events:	1. User selects the Select by Water Main Valves option. 2. User enters two or more valves or picks them from dropdown lists. 3. The GIS displays selected parcels that are affected by (i.e. downstream) from the Water Main Valves. 4. User can change the selected set of parcels, if necessary, by refining the query. 5. The User confirms that the selected parcels are correct.		
Alternative Courses:	After step 3 or 4, User decides not to use the selected parcels, chooses to cancel the select by subdivision, and returns to Generate Parcel List Use Case.		
Exceptions:	User cannot confirm a set of parcels, then the Utilities GIS representative is contacted for assistance.		
Extensions:	None.		
Includes:	None.		
Related Business Rules:	None.		
Special Requirements:	None.		
Assumptions:	Valves are related to the parcels they affect, either through preprocessing or dynamically at run-time.		
Notes and Issues:	This Use Case returns it's selected set of parcels for addition to the selected set (default = null) maintained by the calling Generate Parcel List Use Case #3.		

Figure 10. Use Case 7 - Select and View Parcels by Wastewater Pumpstation Use Case Diagram

Use Case ID:	7		
Use Case Name:	**Select and View Parcels by Wastewater Pump Station**		
Iteration:	Filled		
Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-20-2015	Date Last Updated:	07-06-2015
Actor:	Customer Service Representative (CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM)		
Description:	User (CSR, CSS, or UOM) interactively selects and views parcels by selecting wastewater pump stations.		
Triggers:	Use Case 3, Alternate 1.d		
Preconditions:	▪ Geodatabase feature class datasets for pump stations and parcels exist and cartographically symbolized and labeled within the application's user interface. ▪ GIS Data Server is online. ▪ GIS Web Server is online.		
Postconditions:	A selected set of parcels.		
Priority:	High		
Frequency of Use:	Moderate		
Normal Course of Events:	1. User chooses select by Wastewater Pump Station. 2. User enters a pump station number. 3. The GIS displays a selection of parcels affected by the pump station entered. 4. User can refine the selection set if necessary by by refining the query 5. User confirms that the selected parcels are correct.		
Alternative Courses:	1. User chooses select by Wastewater Pump Station. 2. User enters a or selects a pump station from a list 3. The GIS displays a selection of parcels affected by the pump station entered. 4. User can refine the selection set if necessary by refining the query 5. User confirms that the selected parcels are correct.		
Exceptions:	If the CSR cannot confirm a set of parcels, then the Utilities GIS representative is contacted for assistance.		
Extensions:	None.		
Includes:	None.		
Related Business Rules:	None.		
Special Requirements:	Parcels are related to pump stations through preprocessing or dynamic spatial analysis (requires overlay analysis of pumpstations service areas or pumpstation/pipe/parcel topology tracing).		
Assumptions:	None		
Notes and Issues:	This Use Case returns it's selected set of parcels for addition to the selected set (default = null) maintained by the calling Generate Parcel List Use Case #3.		

Figure 11. Use Case 8 - Select and View Parcels by Map Use Case Diagram

Use Case ID:	8		
Use Case Name:	**Select and View Parcels by Map**		
Iteration:	Filled		
Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-20-2015	Date Last Updated:	07-06-2015
Actor:	Customer Service Representative (CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM)		
Description:	The User (CSR, CSS, or UOM) has decided to interactively select and delete parcels from the selected set of parcels by using a map selection tool.		
Triggers:	Use Case 3, Alternate 1.e		
Preconditions:	▪ Geodatabase feature class datasets for parcels, subdivisions, wastewater pumpstations, water main valves, service area boundaries exist and be visible on the interface. ▪ GIS Data Server is online. ▪ GIS Web Server is online.		
Postconditions:	A selected set of parcels.		
Priority:	High		
Frequency of Use:	Moderate		
Normal Course of Events:	1. User selects Select Parcels by Map. 2. User uses standard web GIS map navigation tools (pan, zoom in/out) and interactively selects affected parcels to define the outage area. 3. GIS highlights selected parcels and provides standard interface for viewing their attributes. 4. User chooses to add or delete the highlighted parcels to/from the selected set maintained by the Generate Parcel List Use Case (Use Case #3). 5. User confirms that the selected parcels are correct.		
Alternative Courses:			
Exceptions:	If the CSR cannot confirm a set of parcels, then the Utilities GIS representative is contacted for assistance.		
Extensions:	None.		
Includes:	None.		
Related Business Rules:	None.		
Special Requirements:	None.		
Assumptions:	▪ Parcels are selectable. ▪ There exists a global selected set of parcels as described in Use Case #3 and added to and subtracted from through Use Cases 4-8. The parcels in the global selected set are visible through cartographic symbolization, but are distinct from the new set identified by the user in Normal Course of Events 1, 2 and 3. Step 4 unifies the two sets (i.e. global selected set of parcels, and new set) through addition or deletion of the new set to/from the global set to to create an updated global selected set of parcels.		
Notes and Issues:	None.		

Figure 12. Use Case 9 - Generate Event Notifications Use Case Diagram

Use Case ID:	9		
Use Case Name:	Generate Event Notifications		
Iteration:	Filled		
Created By:	Analyst 2	Last Updated By:	Analyst 2
Date Created:	6-26-05	Date Last Updated:	07-05-2015
Actor:	Customer Service Representative (CSR) Customer Service Supervisor (CSS) Utilities Operations Manager (UOM) Customer Information System (CIS)		
Description:	User (CSR, CSS, or UOM) generates the event notification list report and updates the CIS staging tables with outage affected parcels and related event details.		
Triggers:	User selects user interface control indicating that the selected set of parcels are ready for Outage Notifications, and the Outage Notifications List Report and CIS staging files can be generated.		
Preconditions:	A selected set of parcels.		
Postconditions:	An outage event list report, and the CIS staging tables are updated		

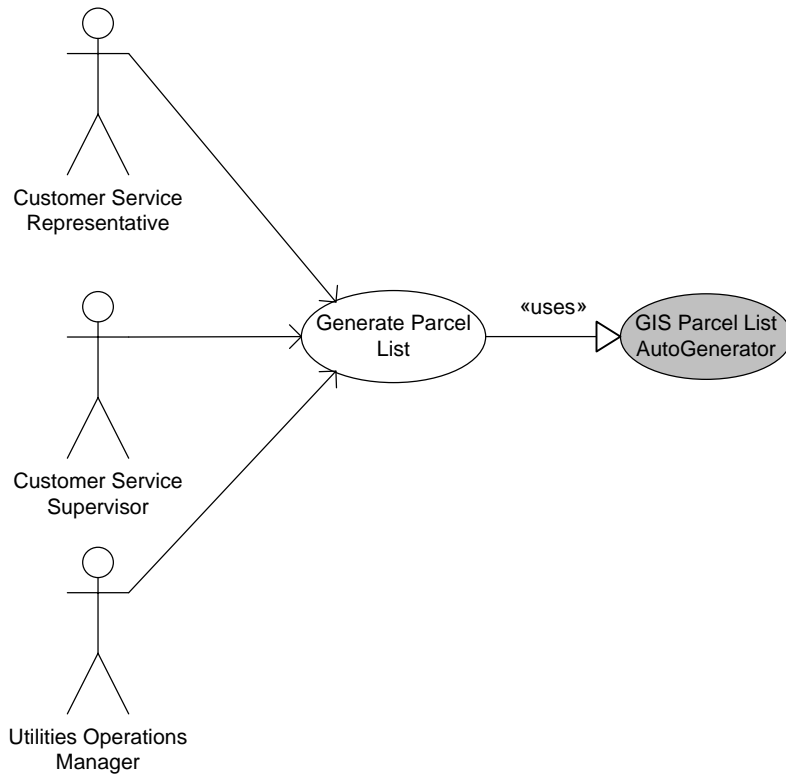|	
	with outage parcel records including outage event details.
Priority:	High
Frequency of Use:	Moderate
Normal Course of Events:	1. User requests the Outage Event Report from the GIS application. 2. User does a quality assurance check of the Outage Event Notification List Report. 3. User requests GIS application to update CIS with Outage Notification Parcels and event related attributes. 4. User closes Outage Notification Application.
Alternative Courses:	After Step 2 of Normal Course of Events, if User not satisfied with contents of the Outage Event Notification List Report, user interface provides option to return to Use Case 1 – Review Pump Station Status.
Exceptions:	If CIS staging tables are not available for writing to, Outage Notification Application updates its own error log documenting the issue.
Extensions:	None.
Includes:	None.
Related Business Rules:	▪ An e-mail is sent to a distribution list when the outage notification list is sent to CIS for approval. ▪ Someone in CIS must approve the outage notification list before it can be sent to the IVR.
Special Requirements:	None.
Assumptions:	None.
Notes and Issues:	None.

Figure 13. Use Case 10 - GIS Parcel List AutoGenerator

Use Case ID:	10		
Use Case Name:	**GIS Parcel List AutoGenerator**		
Iteration:	Filled		
Created By:	Analyst 2	Last Updated By:	Analyst 1
Date Created:	6-27-05	Date Last Updated:	07-06-2015
Actor:	Generate Parcel List Use Case (Use Case # 3) *Customer Service Representative (CSR)* *Customer Service Supervisor (CSS)* *Utilities Operations Manager (UOM)*		
Description:	In response to the User (CSR, CSS, or UOM) accepting the default behavior of the Generate Parcel List - Use Case #3, the GIS Parcel List Autogenerator is invoked by the Generate Parcel List Use Case #3 and the GIS automatically identifies parcels affected by wastewater pumpstations with status = off and returns them as the Generate Parcel List parcel selected set.		
Triggers:	Generate Parcel List - Use Case 3		
Preconditions:	Pump stations' statuses must be up-to-date in the GIS.		
Postconditions:	A selected set of parcels.		
Priority:	High		
Frequency of Use:	Moderate		
Normal Course of Events:	1. GIS selects all pump stations with a status of "OFF". 2. GIS identifies the parcels served by the selected pump stations. 3. GIS displays a map showing the affected pump stations and selected parcels.		
Alternative Courses:	None		
Exceptions:	None		
Extensions:	None		
Includes:	None		
Related Business Rules:	None		
Special Requirements:	Pumpstations are related to parcels they serve.		
Assumptions:			
Notes and Issues:			

Functional Requirements

1. The Outage Notification application should enable the Certified Operator (CO) to create a list of parcels (customers) for which a pump station management event or wide-spread outage (weather) event will affect by generating a list from the GIS with pump station status values of "off".
2. When the CO generates an outage list by querying the GIS for pump stations with a status of "off", the application should display the locations of the pump stations as well as a pump station status summary (like the one in the Hurricane Response application). The application should also provide a link to view a list of all of the affected parcels.
3. The application should allow a Dispatcher or CO to create a list of parcels (customers) from information received internally or from a customer calling in with a report.
4. The application should provide the parcel selection methods below to the Dispatcher or CO to select the parcels affected by an isolated outage.
    a. Provide a Select by Street query tool which enables the Dispatcher or CO to input a street name and a cross street to constrain the search of the GIS parcel layer for candidate parcels.
    b. Provide a Select by Subdivision query tool which enables the Dispatcher or CO to input all or part of a subdivision name to search the GIS parcel layer for candidate parcels.
    c. Provide a Select by Water Feature query tool which enables the Dispatcher or CO to input at least two valve numbers to select the water main affected and then select the parcels along the water main.
    d. Provide a Select by Wastewater Feature query tool which enables the Dispatcher or CO to input a pump station id to select the parcels served by that pump station.
    e. Provide a Select by Map query with tools to navigate (by zooming or panning) to candidate parcels.
5. For 4a – b, the application will display a list of records matching the query input and allow the Dispatcher or CO to select one or more records and view the affected parcels and data attributes.
6. For 4c – d, the application will display a selection of parcels matching the query input and allow the Dispatcher or CO to add/delete to/from the selection
7. The selection results interface should display the graphic representation of the parcels as well as the specified data fields:
    a. Parcel id
    b. Owner
    c. Address
    d. Service provider
    e. Whether or not service exists
    f. Service type
8. Provide the capability for the Dispatcher or CO to accept the selected parcels.
9. Provide the capability for the Dispatcher or CO to restart the spatial query process at any time.
10. Provide an interface where the Dispatcher or CO can enter the outage information:
    a. Outage Event Name
    b. Outage Type
    c. Outage Description
    d. Comment
11. Whenever the parcel id is displayed, the formatting of the number should match that of the existing applications.

Business Rules

1. When the Dispatcher or CO generates the outage notification list (i.e. list of parcels/customers affected by the outage) by selecting pump stations with a status of "off", the application should split the list into multiple lists on pump station id, concatenating pump station id and outage event name and populating the outage description with the concatenation.
2. The GIS Outage Notification application will send the notification list to the CIS for approval.
3. Someone in CIS must approve the outage notification list before it can be sent to the IVR system.
4. An e-mail is sent to a yet-to-be-determined distribution list when the outage notification list is sent to CIS for approval.
5. If the GIS application server goes offline during a major outage event and an outage notification list needs to be generated, the Dispatcher or CO should follow the specified emergency plan.