Assessing Storm Water Runoff Fees in Westminster, Colorado

Sandy R. Malesky
GIS Specialist
City of Westminster, CO
smalesky@ci.westminster.co.us

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WESTMINSTER, COLORADO

33.5 Square Miles
Population: 109,838
Avg. HH Income: $74,690

City Manager–Council Gov’t
1,000+ City Employees

½ hour east of the foothills of the Rocky Mountains

About 10 miles NW of Denver
Westminster GIS

- GIS Staff of 4
- 2 part-time IT staff dedicated to GIS functions
- Serving 9 Departments
- 100+ Users
- Licenses: 8 ArcInfo, 17 ArcView – About 25 daily users
- Enterprise ArcSDE, SQL Server
Storm Water Utility (SWU) History

- Dec. 2000: City adopts storm water regulations, Federal mandate for NPDES, Phase II
- 2001-2002: City develops programs to collect fees for infrastructure development, maintenance, etc.
- Original program used table-based data and some GIS
- Previously, there were no water meters locations; impervious surface data was inconsistent
- AML scripts ran the GIS tools – hard to troubleshoot
- 2005: Decision to upgrade the procedure and the necessary GIS data
Current Storm Water Utility (SWU) Framework

PROJECTED 2008 REVENUE = $2,000,000

- SWU fees are calculated monthly, in association with the water bill cycle
- Runs as a vector-based procedure
  - No imagery
- Program runs from set of models
  - Created in Model Builder 9.1 (updated in 9.2)
  - All input to the models is GIS data
- Models pull data directly from SDE feature classes
- Results are archived each month in GIS formats
SWU Procedure
STEP 1 – Data Input

- Impervious Surface Datasets:
  - Primarily from developers’ AutoCAD files, which we require as part of the development process
  - Added to GIS during development
  - Constant maintenance – 90+ projects in progress in the City

CHARGEABLE SURFACES

- Parking Lots
- Road Areas
  - paved drives
- Impervious Surfaces
  - tennis/basketball courts
  - patios/walkways
  - asphalt play areas
- Building Footprints
- Pools
Parcels
Certificates of occupancy determine that billing will begin
Parcel boundaries are added from plat/survey data

Water Meters
Approx. 32,000 meters
Location is GPS’d or placed (estimated) into appropriate parcel
11 types of meters (i.e. commercial, irrigation, apartments, etc..)

Linked by unique identifier field
Not always a 1-to-1 relationship
- **SWU Billing Polygons**

  Contain meters of the same type or for specific area

  Include meters and parcels belonging to a certain development area

- **5 Types of Polygons**
  - Single Family Detached
  - Apartments
  - Townhomes
  - Parks
  - Commercial

  Contain the info that tells billing program which formula to use
SWU Procedure

STEP 2 – Data Updates

- Monthly report of new meters & account numbers from Utility Billing Dept. – *These are added to the GIS*
- Monthly report of new Certificates of Occupancy – *Attributes updated in GIS parcels*
- GPS meter location edits made by Public Works staff
- Parcel-Meter Links verified in GIS
  - Important for assigning impervious to correct meter

Approx. 1 Full Day of Work

*(the impervious surface updates are continuous)*
SWU Procedure
STEP 3 – The Formulas

- 697 Storm Billing Polygon Areas
- Single Family Detached properties billed flat fee of $3.00
- 3,100 square feet is the SFD estimate for impervious surface
- All other formulas are based on a factor of 3,100

EXAMPLE
- Billing polygon has 9,300 sq. ft. of impervious surface
- Fee factor is 3
- $3.00 x 3 = $9.00 total fee for the polygon
Five Formula Types

- **Single Family Detached** – Flat fee of $3.00 per account
- **Townhomes** – totals the impervious in the development and divides it proportionally to the meters, depending on how many units the meter serves
- **Apartments** – Totals the impervious in the development and divides it equally among the meters
- **Commercial** – Totals the impervious within each parcel in the development, then apportions it to the meters in the respective parcel
- **Parks** – Same as the Apartments formula
SWU Procedure

STEP 4 – The Models & The Results

- Union all the impervious
- Select out non-billable meters and polygons
- Calculate impervious square footage
- Assign fees to meters based on their respective formulas in the SWU polygons

Why not Python?

SDE issues
If you aren’t a code writer, it’s hard to maintain knowledge
Models break it up the program for easier troubleshooting & updates
Models create results tables and archive snapshots of feature classes – *contained in a personal GDB*

- Table with fees in $$ for each account
- Union of all impervious Feature classes
- Copy of input Feature classes
What advantages does a GIS method have?

- Instead of flat fees, all non-SFD properties’ fees are based on square footage to be “fair”. Bob’s flower shop shouldn’t pay the same as Wal-Mart, even if they are in the same development.
- Already input the impervious features for each project, why not use them?
- Can implement topology to avoid double charges, and find missing impervious areas
- VISUAL of what’s going on, and archives for each month
- Actual (not estimated) square footage can be charged, and fees will change when impervious surface changes
Lessons Learned & Future Plans

- Contracting the creation of the Model Builder tools was great, but we made sure to own them after they were completed.
- Archiving data is important to figure out billing discrepancies and to answer questions from customers.
- Individual polygons for all non-SFDs – currently, some developments are sharing billable areas.
- Possibly using new imagery/LIDAR to determine impervious surface for single family homes.

Sandy R. Malesky
GIS Specialist, City of Westminster, CO
smalesky@ci.westminster.co.us
303-430-2400 ext. 2141