



STORM LID – GIS TOOL

THE TODDLER STAGE

Katie Heim
GIS Coordinator
City of Arlington

Abe Calderon
GIS Analyst
City of Arlington

Jennifer Schmidt
GIS & CAD Manager
Herrera Environmental Consultants



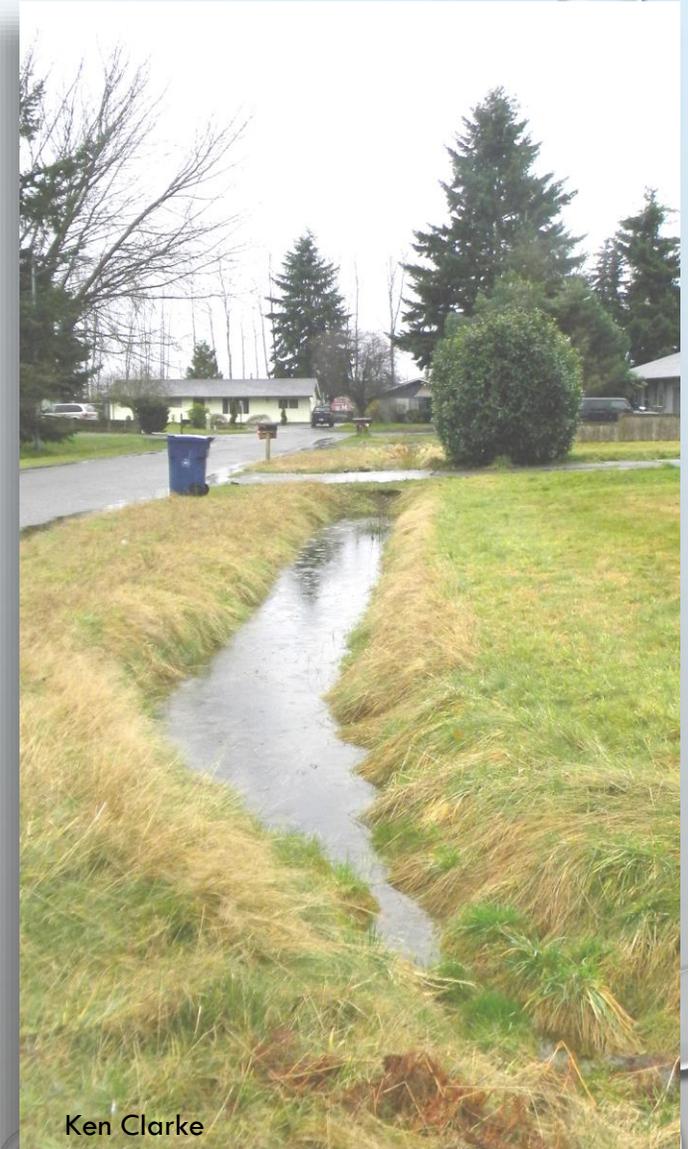
PURPOSE

- **WOULDN'T IT BE GREAT.....**
 - **GIS TOOL**
 - **ACCESSIBLE TO STAFF AND DEVELOPERS**
 - **PROVIDE STORM BPM**

“...This proposal would hire a GIS consultant with database experience to work cooperatively with City staff to implement the database structure, input stormwater prescriptions, and produce a user interface and report-creation menu. The end product will be a tool useful to city stormwater, engineering, and planning staff for prescribing site specific recommended stormwater strategies for development and re-development based on physical location in the City.”

TWO DELIVERABLES

- GEOSPATIAL TOOL
 - [PYTHON SCRIPTS]
 - [MODEL]
 - [GDB]
- STORM BMP CRITERIA MAPS (HARD COPY)



Ken Clarke

HERRERA TO THE RESCUE

- HERRERA WINS BID
 - WORK WITH JENNIFER SCHMIDT
 - DEVELOP AN IDEA OF WHAT TOOL WILL DO
 - LIMITED RESOURCES – NO ARCSERVER



GEOSPATIAL TOOL PROJECT

- **WHAT DATA DOES IT NEED**
- WHAT REPORT IS RETURNED
- HOW WILL IT BE DEPLOYED



WHAT DATA?



THE HARD WORK

- THAT'S GREAT! NOW WE HAVE TO...
 - VET DATA
 - CLEAN DATA
 - MESSAGE DATA
 - DISCARD DATA
 - SAY "HECK WITH IT, DATA IS FINE"
 - OH NO! LOOK AT THE DATE!



STORM BMP CRITERIA

- 11 DIFFERENT STORM BMP CRITERIA TABLES
 - AVAILABLE DATA
 - MODIFY DATA BASED ON CRITERIA
 - CREATE “NOT AVAILABLE” AREAS

Table #	BMP Category	BMP Reference
1	Infiltrating Bioretention Cell/Swale	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes</i>)
2	Infiltrating Bioretention Planter Box	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes</i>)
3	Non-infiltrating Bioretention	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes</i>)
4	Permeable Pavement	Volume V, BMP T5.15 (<i>Permeable Pavements</i>)
5	Ponds and Wetlands	Volume III, <i>Detention Ponds</i> ; Volume V, BMP T10.10 (<i>Wetponds - Basic and Larae</i>). BMP T10.30
6	Basic Filter Strips	Volume V, BMP T9.40 (<i>Basic Filter Strips</i>)
7	Biofiltration Swales	Volume V; BMP T9.10 (<i>Basic Biofiltration Swale</i>), BMP T9.20 (<i>Wet Biofiltration Swale</i>), and BMP T9.30 (<i>Continuous Inflow Biofiltration Swale</i>)
8	Underground Detention and Treatment	Volume III, <i>Detention Tanks and Detention Vaults</i> ; Volume V, BMP T10.20 (<i>Wetvaults</i>), BMP T8.20 (<i>Sand Filter Vault</i>), and BMP T8.30 (<i>Linear Sand Filter</i>)
9	Aboveground Sand Filtration	Volume V; BMP T8.10 (<i>Basic Sand Filter Basin</i>), BMP T8.11 (<i>Large Sand Filter Basin</i>), and BMP T8.40 (<i>Media Filter Drain</i>)
10	Infiltration BMPs	Volume III, Section 3.1.1 and Volume V, BMP T5.10A (<i>Downspout Full Infiltration</i>); Volume III, Section 3.3 (<i>Infiltration Basins and Infiltration Trenches</i>); and Volume V, BMP T7.40 (<i>CAVFS</i>)
11	Dispersion BMPs	Volume III, Section 3.1.2 and Volume V, BMP T5.10B (<i>Downspout Dispersion Systems - Dispersion Trenches and Splashblocks</i>); Volume III, Section 3.1.3 and Volume V, BMP T5.10C (<i>Peferated Stub-Out Connections</i>); Volume V, BMP T5.11 (<i>Concentrated Flow Dispersion</i>); Volume V, BMP T5.12 (<i>Sheet Flow Dispersion</i>); and Volume V, BMP T5.30 (<i>Full Dispersion</i>)

Table 1. DRAFT Site Suitability Criteria for Infiltrating Bioretention Cells and Swales.				
Site Suitability Criteria ¹			Stormwater Management Manual for Western Washington Reference	Notes
Category	Value	Units		
Specific Criteria				
Offset from Sidewalk	≥ 6	in	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes, Figure 7.4.1</i>)	From sidewalk
	≥ 12	in	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes, Figure 7.4.1</i>)	From conc band or gutter
Bottom Width	≥ 1	ft	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes, Bioretention</i>)	
General Criteria				
Drainage Slope	≤ 8	%	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes, Infeasibility Criteria</i>)	
Saturated Hydraulic Conductivity	≥ 0.30	in/hr		
Hydrologic Soil Group	A, B, or C	NA		Class D soils are saturated and typically not feasible for infiltration.
Water Table Depth	> 1	ft	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes, Infeasibility Criteria</i>)	Can be > 1 foot if the drainage basin does not exceed the following: - 5,000 square feet of pollution-generating impervious surface - 10,000 square feet of impervious area - 3/4 acres of pervious surface
	> 3	ft		A separation down to 3 feet may be considered based on results from additional analyses.
Drinking Water Wells or Open Water Features	≥ 100	ft	Volume III, Section 3.3.7 (<i>Site Suitability</i>) and Volume V, Section 4.3.1 (<i>Setbacks, Slopes, and Embankments; Setbacks</i>)	
Springs Used for Drinking Water	≥ 200	ft		≥ 100 ft in Volume III, Section 3.3.7 and Volume V, Section 4.3.1
From the Top of Slopes > 20% over 10' of Vertical Relief	> 50	ft		≥ 15% in Volume V, Section 4.3.1
Deep Soil Contamination Area	> 100	ft		
Surface Soil Contamination Area	> 10	ft		
Landslide hazard and erosion hazard areas	Not allowed	NA		
Model Toxics Control Act or Federal Superfund Law areas	Not allowed	NA	Volume V, BMP T7.30 (<i>Bioretention Cells, Swales, and Planter Boxes, Infeasibility Criteria</i>)	
Small On-site Sewage Disposal Drainfield Buffer	> 10	ft		
Underground Storage Tank (< 1,100 gallons) Buffer	> 10	ft		
Underground Storage Tank (> 1,100 gallons) Buffer	> 100	ft		
Landfill Buffer (closed or active)	> 100	ft		
Infiltration Facility Related Setbacks				
Septic System or Drain Field Buffer	≥ 100	ft	Volume III, Section 3.3.7 (<i>Site Suitability</i>)	
Building Foundation Setback (Downslope/Upslope)	≥ 20/ ≥ 100	ft		
Native Growth Projection Easement (NGPE) Setback	≥ 20	ft		
Groundwater Protection Area	Not allowed	NA		

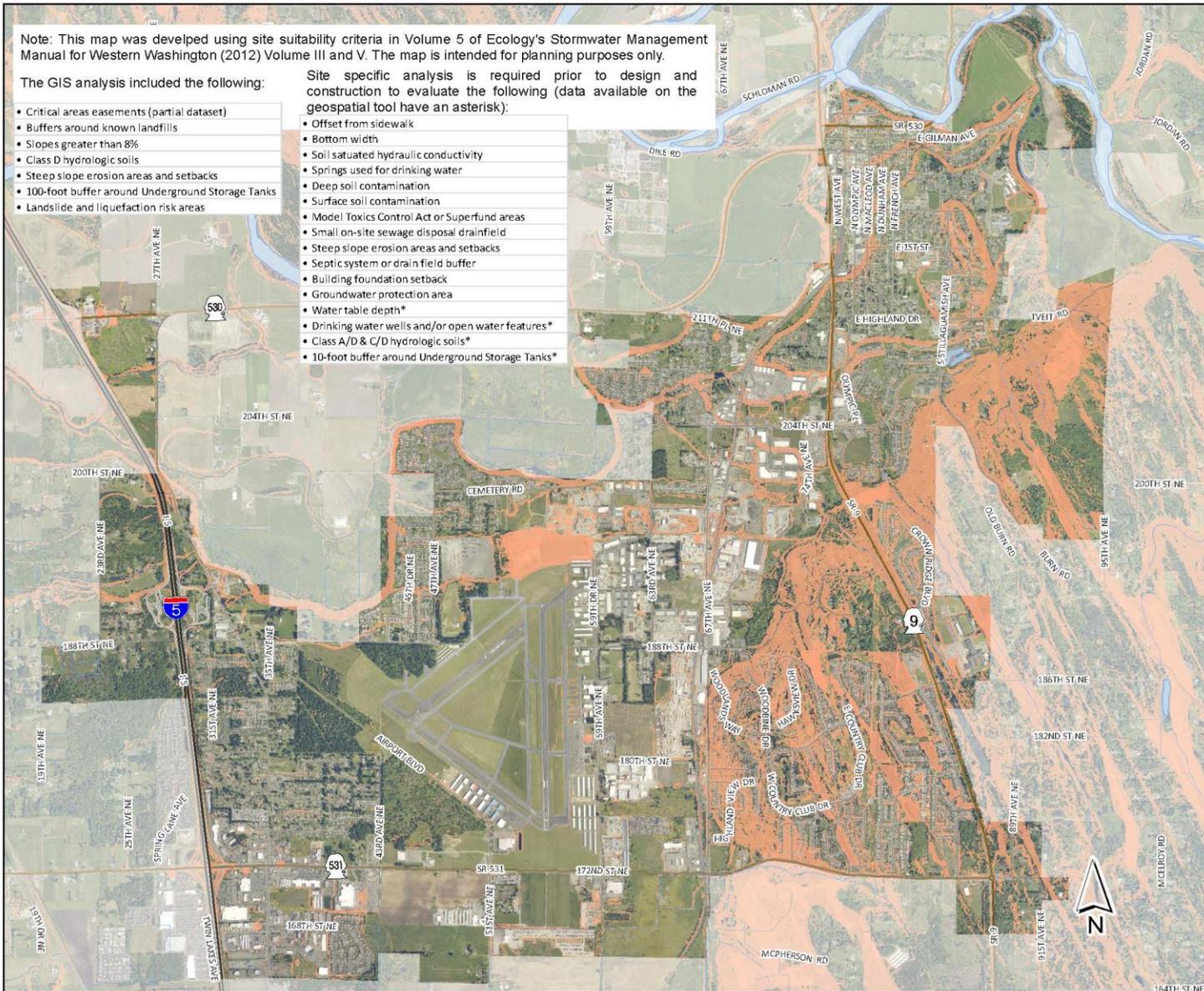
Note: This map was developed using site suitability criteria in Volume 5 of Ecology's Stormwater Management Manual for Western Washington (2012) Volume III and V. The map is intended for planning purposes only.

The GIS analysis included the following:

- Critical areas easements (partial dataset)
- Buffers around known landfills
- Slopes greater than 8%
- Class D hydrologic soils
- Steep slope erosion areas and setbacks
- 100-foot buffer around Underground Storage Tanks
- Landslide and liquefaction risk areas

Site specific analysis is required prior to design and construction to evaluate the following (data available on the geospatial tool have an asterisk):

- Offset from sidewalk
- Bottom width
- Soil saturated hydraulic conductivity
- Springs used for drinking water
- Deep soil contamination
- Surface soil contamination
- Model Toxics Control Act or Superfund areas
- Small on-site sewage disposal drainfield
- Steep slope erosion areas and setbacks
- Septic system or drain field buffer
- Building foundation setback
- Groundwater protection area
- Water table depth*
- Drinking water wells and/or open water features*
- Class A/D & C/D hydrologic soils*
- 10-foot buffer around Underground Storage Tanks*



City of Arlington

**Storm BMP Site Suitability Criteria
Table 1 - Infiltrating Bioretention
Cells and Swales**

DRAFT

Legend

- Sites not feasible for bioretention cells & swales
- State Highway
- State Route
- Streets
- Rivers; Ponds
- Streams

Streams and waterbodies courtesy of Snohomish County Dept of Information Systems, December 2009.

Aerial flown in summer 2012.

Scale:
1 in = 2,333 feet

Date:
11/12/2014

File:
Table1_11x17_14.mxd

Drawn by:
kdh

Maps and GIS data are distributed "AS-IS" without warranties of any kind, either express or implied, including but not limited to warranties of suitability for a particular purpose or use. Map data are compiled from a variety of sources which may contain errors and users who rely upon the information do so at their own risk. Users agree to indemnify, defend and hold harmless the City of Arlington for any and all liability of any nature arising out of or resulting from the lack of accuracy or correctness of the data, or the use of the data presented in the maps.

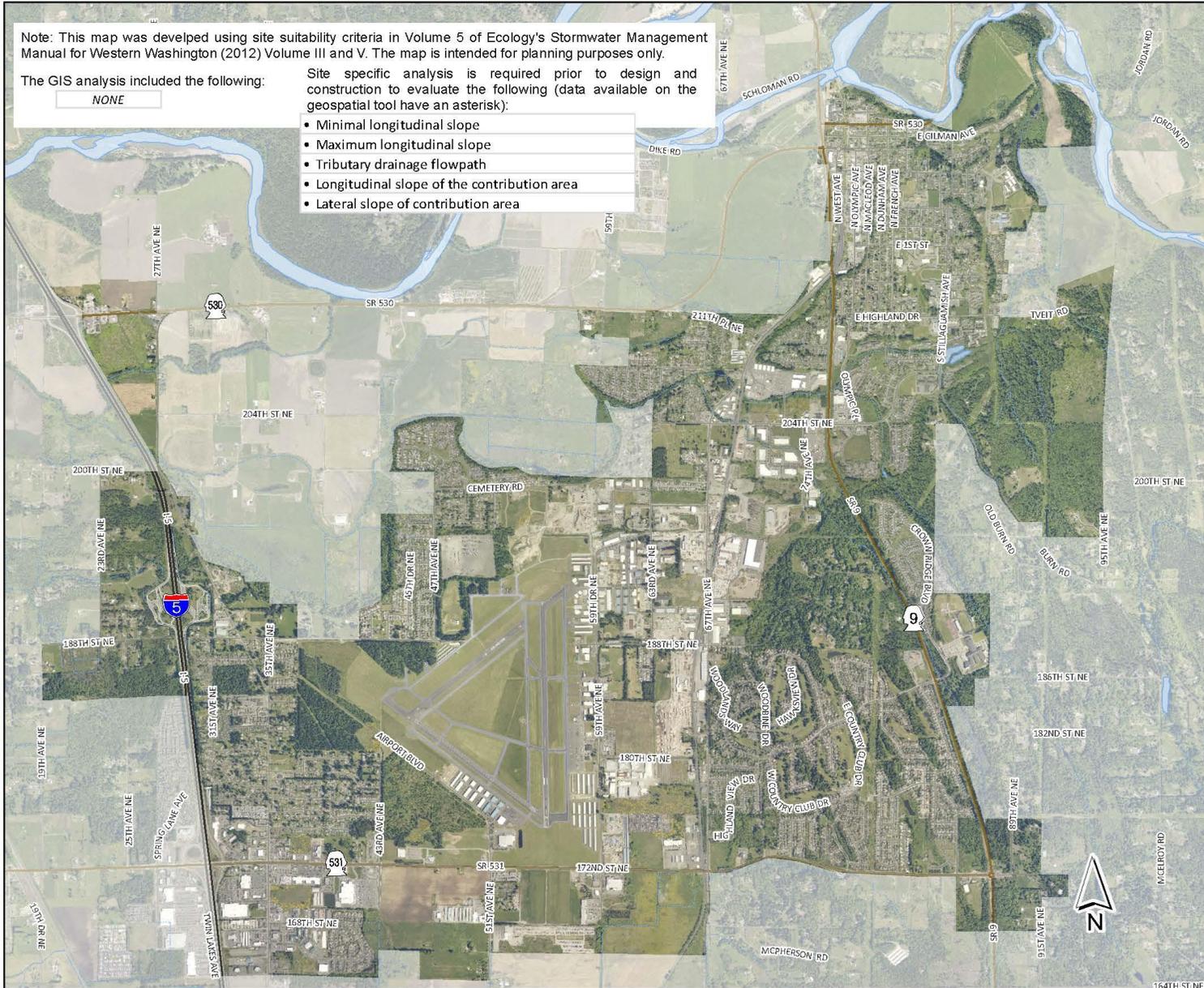
Note: This map was developed using site suitability criteria in Volume 5 of Ecology's Stormwater Management Manual for Western Washington (2012) Volume III and V. The map is intended for planning purposes only.

The GIS analysis included the following:

NONE

Site specific analysis is required prior to design and construction to evaluate the following (data available on the geospatial tool have an asterisk):

- Minimal longitudinal slope
- Maximum longitudinal slope
- Tributary drainage flowpath
- Longitudinal slope of the contribution area
- Lateral slope of contribution area



City of Arlington

**Storm BMP Site Suitability Criteria
Table 6 - Basic Filter Strips**

DRAFT

Legend

- Sites not feasible for basic filter strips
- State Highway
- State Route
- Streets
- Rivers; Ponds
- Streams

Streams and waterbodies courtesy of Snohomish County Dept of Information Systems, December 2009.

Aerial flown in summer 2012.

Scale: 1 in = 2,333 feet

Date: 11/12/2014

File: Table6_11x17_14.mxd

Drawn by: kdh

Maps and GIS data are distributed "AS-IS" without warranties of any kind, either express or implied, including but not limited to warranties of suitability for a particular purpose or use. Map data are compiled from a variety of sources which may contain errors and users who rely upon the information do so at their own risk. Users agree to indemnify, defend, and hold harmless the City of Arlington for any and all liability of any nature arising out of or resulting from the lack of accuracy or correctness of the data, or the use of the data presented in the maps.

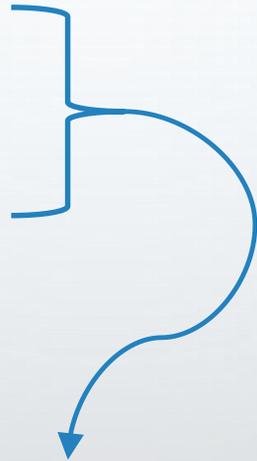
GEOSPATIAL TOOL PROJECT

- **WHAT DATA DOES IT NEED**
- WHAT REPORT IS RETURNED
- HOW WILL IT BE DEPLOYED



THE TOOL WOULD BE EVEN BETTER IF...

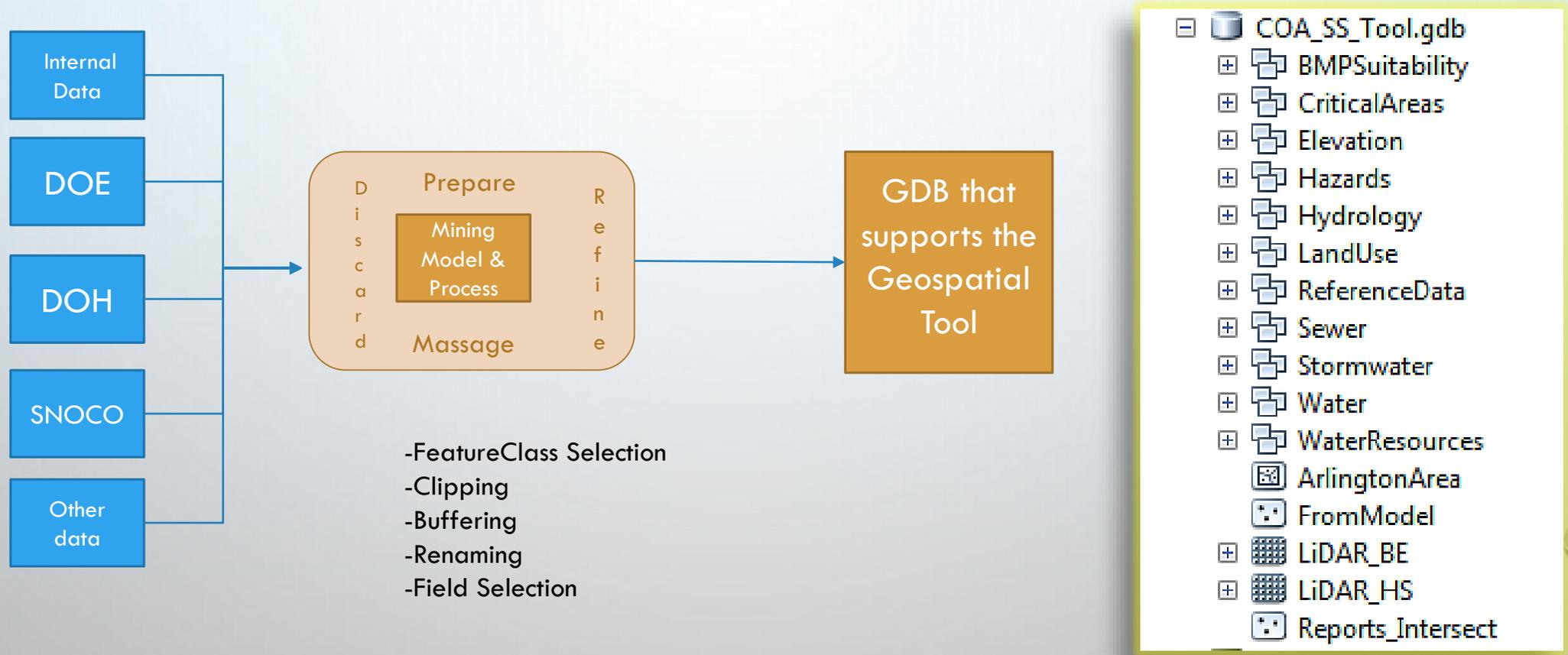
USE MODELBUILDER/PYTHON
POPULATE GEODATABASE



TOOL SPECIFIC GDB



GEOSPATIAL TOOL DATA GDB



STORM BMP POLYGONS



- COA_SS_Tool.gdb
 - BMPSuitability
 - Lanfill
 - Lanfill_buf100ft
 - Table10Infiltration
 - Table11Dispersion
 - Table1InfilSwales
 - Table2InfilPlanter
 - Table3Noninfil
 - Table4Permeable
 - Table5DetentionPonds
 - Table6FilterStrips
 - Table7BioSwales
 - Table8UndergrndTreat
 - Table9SandInfil

GEOSPATIAL TOOL PROJECT

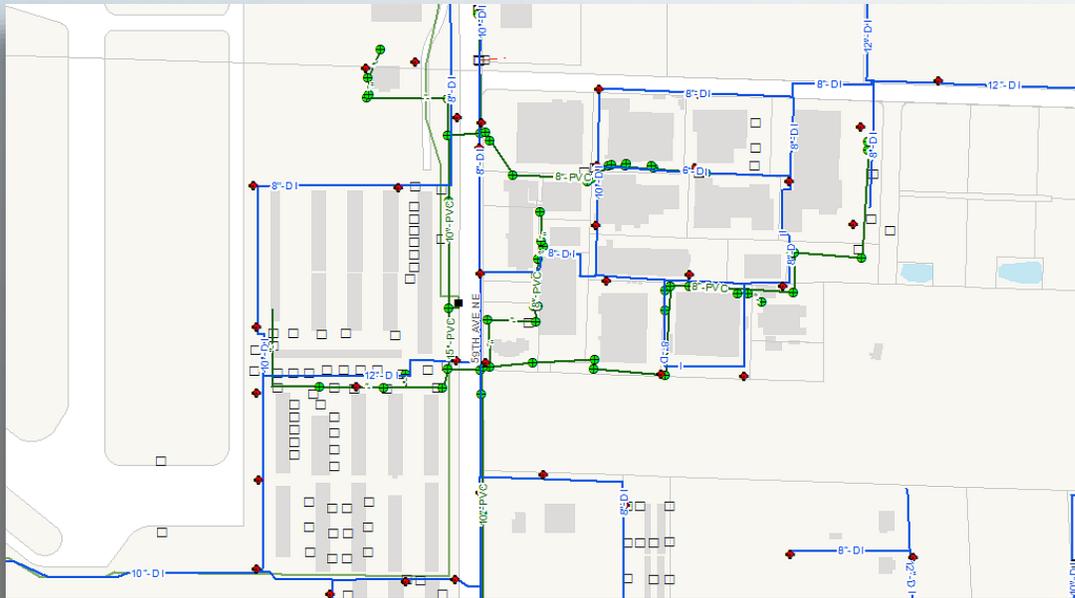
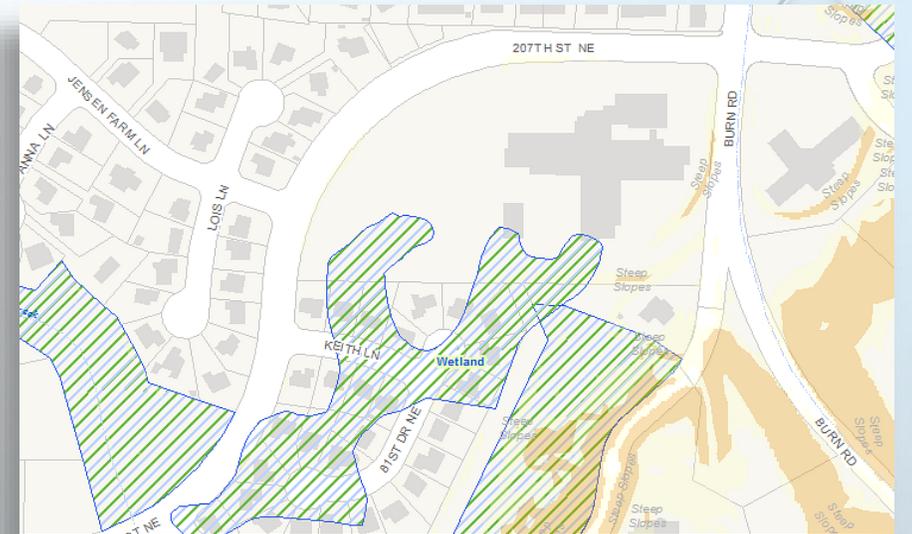
- ~~WHAT DATA DOES IT NEED~~
- WHAT REPORT IS RETURNED
- HOW WILL IT BE DEPLOYED



DEVELOP REPORT

- WHAT INFO

- WHAT MAPS



- RECOMMENDATIONS



CITY OF ARLINGTON
PRELIMINARY SITE ASSESSMENT
SUMMARY REPORT

Parcel Number:	
Address:	
Property Ownership:	<i>City or Private</i>

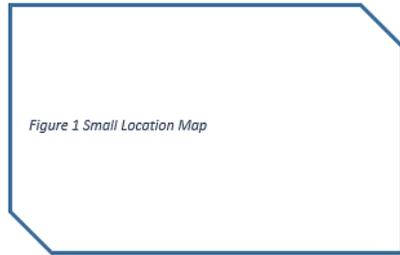


Figure 1 Small Location Map

BMPs Recommended for Evaluation

Infiltrating Bioretention Cell/Swale	<input type="checkbox"/>	Aboveground Sand Filtration	<input type="checkbox"/>
Infiltrating Bioretention Planter Box	<input type="checkbox"/>	Infiltration BMPs	<input type="checkbox"/>
Non-Infiltrating Bioretention	<input type="checkbox"/>	Dispersion BMPs	<input type="checkbox"/>
Permeable Pavement	<input type="checkbox"/>		
Ponds and Wetlands	<input type="checkbox"/>	Site not suitable for BMPs	<input checked="" type="checkbox"/>
Basic Filter Strips	<input type="checkbox"/>		
Biofiltration Swales	<input type="checkbox"/>	Site connects to regional system?	<input checked="" type="checkbox"/>
Underground Detention and Treatment	<input type="checkbox"/>		

Site Characteristics

Hydrologic Soil Groups:	Class A Soils	xx%
	Class B Soils	xx%
	Class C Soils	xx%
	Class D Soils	xx%

Drinking Water Well Onsite?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Buffer Only
Steep Slopes Onsite?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Buffer Only
Landslide Hazard Areas Onsite?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Buffer Only
Erosion Hazard Areas Onsite?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Buffer Only
Soil Contamination Areas Onsite?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Buffer Only
UST Onsite?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Buffer Only
Septic system Onsite?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Buffer Only
MTCA/Superfund Onsite?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Buffer Only
Ground water recharge area?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Ground water discharge area?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

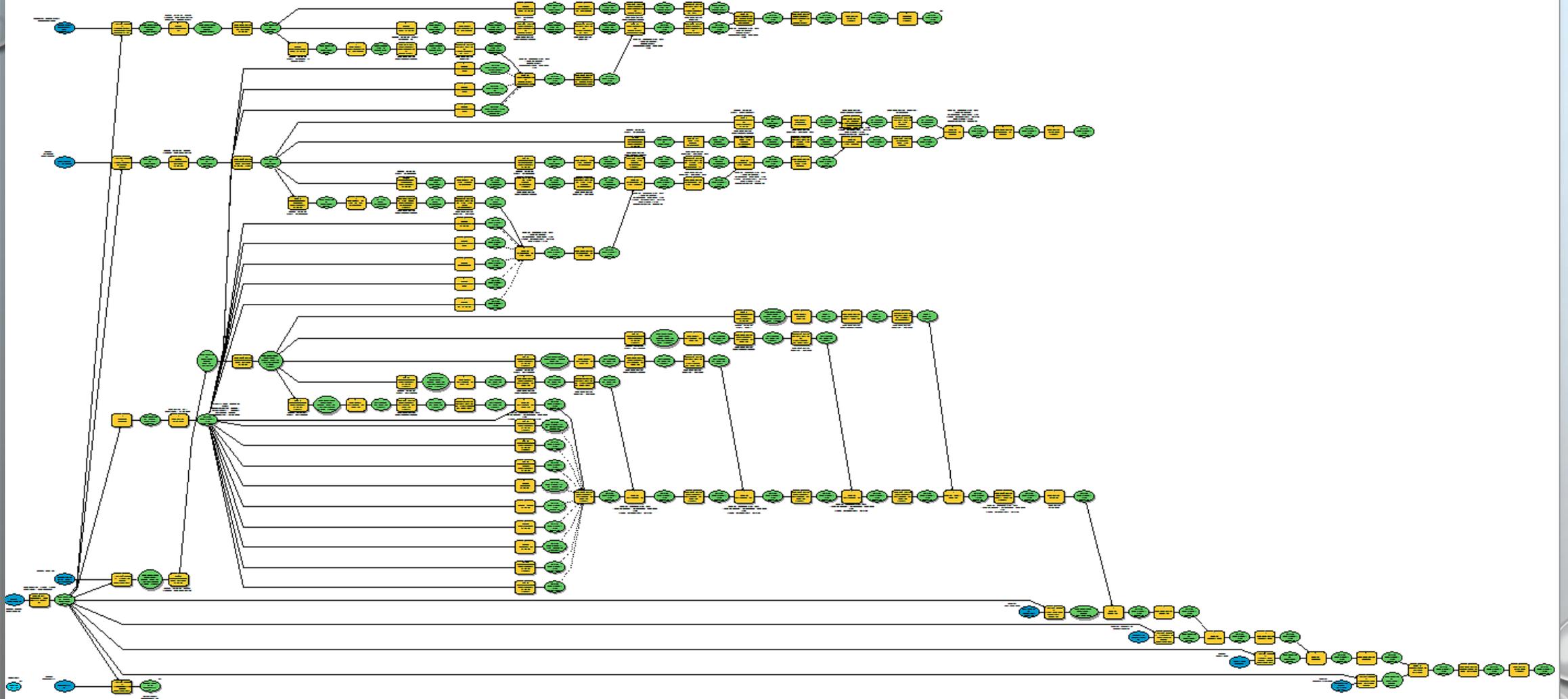
TOOL DRAFT – MARCH 2015

- TROUBLESHOOTING
- SINGLE PARCEL

COA_SSTool_DRAFT_3182015_HEC.tbx
Site Suitability Table (Single Selection)
Arlington_Single_Parcel_Report_Template_03182015_HEC.rlf
Field lists



GEOSPATIAL TOOL



GEOSPATIAL TOOL PROJECT

- ~~WHAT DATA DOES IT NEED~~
- ~~WHAT REPORT IS RETURNED~~
- HOW WILL IT BE DEPLOYED



NEXT STEPS - DEPLOYMENT

- OBVIOUSLY... GET IT WORKING
- CHANGE TOOL FROM SINGLE PARCEL TO CITY-WIDE
- INSTALL AND TEST
- TRAIN STAFF



Ken Clarke

CURRENT BENEFITS

- APPLICATIONS IN OTHER DEPARTMENTS
 - AIRPORT AND SEARCHING LEASE LOTS
- USE OF THE 'NATURAL RESOURCES' GDB
 - ONE STOP SHOPPING
 - MODELBUILDER/PYTHON



THE END OF THE BEGINNING...

