# Yes, Queries Can Be Spatial, Too

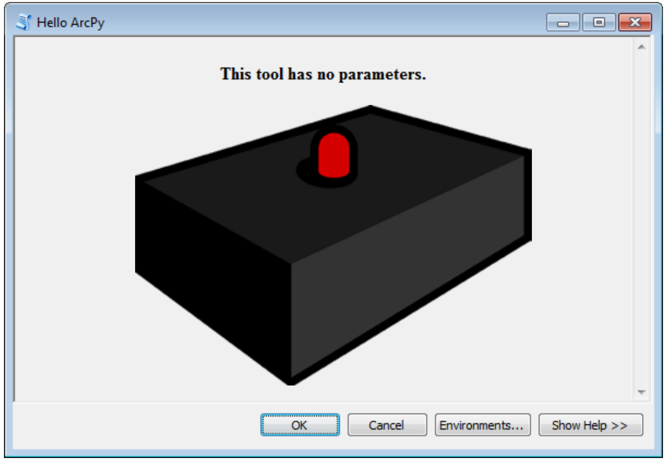
Michael Olkin, GISP
Springfield Water and Sewer Commission
michael.olkin@waterandsewer.org

# Time for some Vitamin SQL

# My Cat Doesn’t Care About SQL

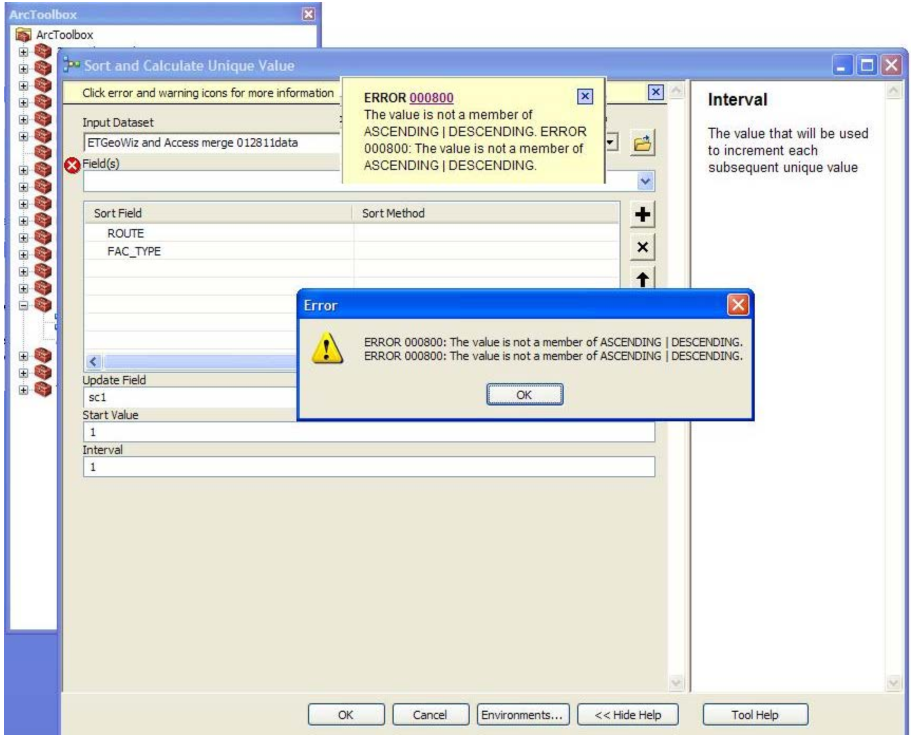
Why should we?

# Geoprocessing is a bit of a Black Box



Hello ArcPy

This tool has no parameters.



ArcToolbox

Sort and Calculate Unique Value

Click error and warning icons for more information

ERROR 000800
The value is not a member of ASCENDING | DESCENDING. ERROR 000800: The value is not a member of ASCENDING | DESCENDING.

Input Dataset: ETGeoWiz and Access merge 012811data

Field(s)

| Sort Field | Sort Method |
|---|---|
| ROUTE | |
| FAC_TYPE | |

Update Field: sc1

Start Value: 1

Interval: 1

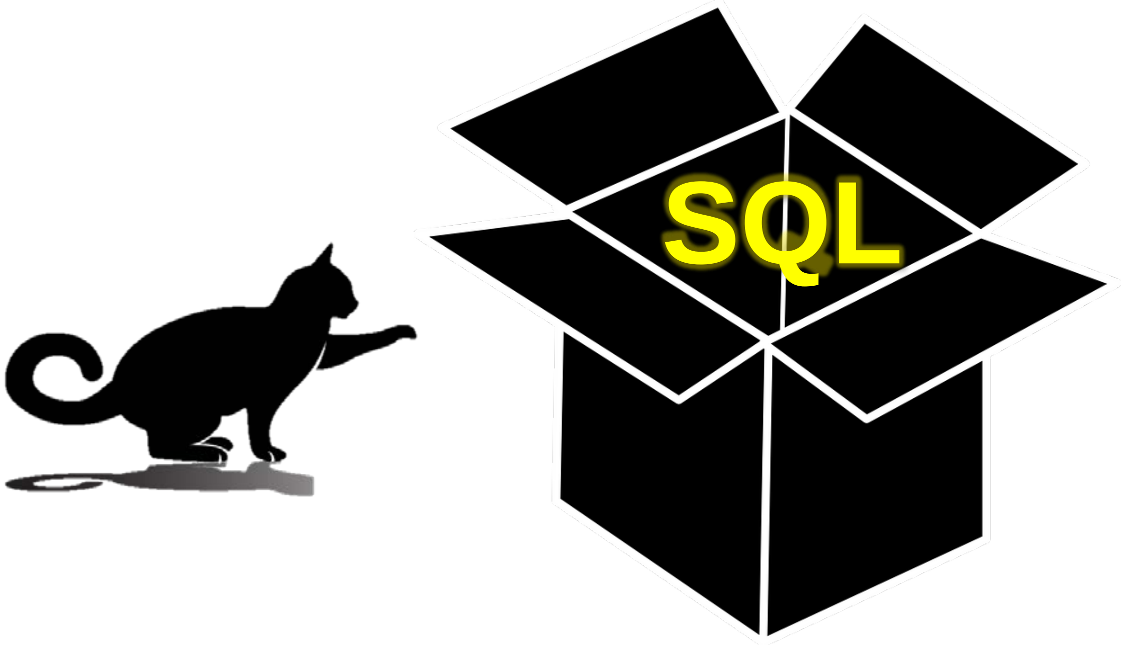
Error

ERROR 000800: The value is not a member of ASCENDING | DESCENDING.
ERROR 000800: The value is not a member of ASCENDING | DESCENDING.

**Interval**

The value that will be used to increment each subsequent unique value

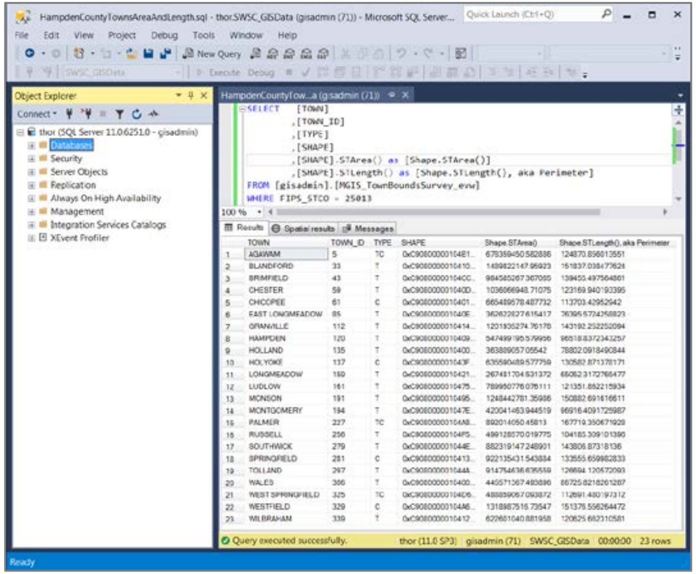
# SQL is somewhere inside of the Black Box



*We can speak directly with our data*

# Today: Spatial Queries in Two Environments

SQL Server Management Studio

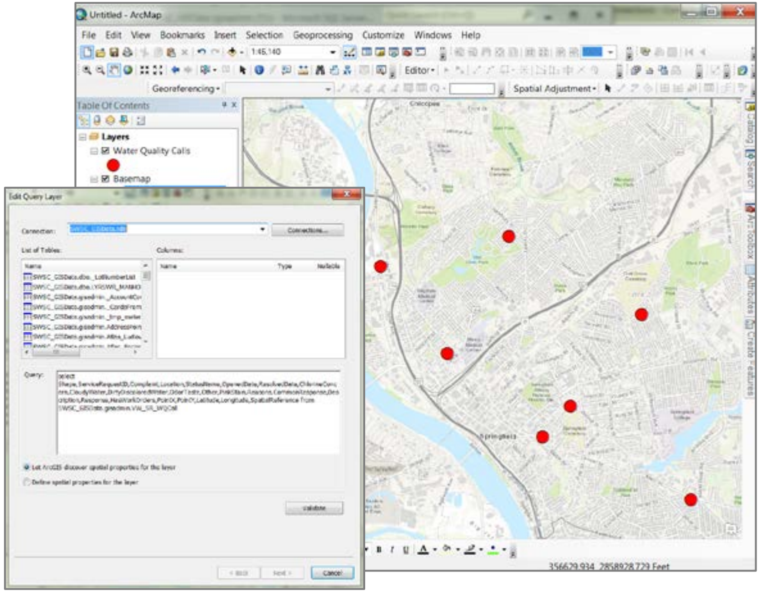

HampdenCountyTownsAreaAndLength.sql - thor.SWSC_GISData (gisadmin (71)) - Microsoft SQL Server...
Quick Launch (Ctrl+Q)
File Edit View Project Debug Tools Window Help
New Query
SWSC_GISData
Execute Debug
Object Explorer
Connect
thor (SQL Server 11.0.6251.0 - gisadmin)
Databases
Security
Server Objects
Replication
Always On High Availability
Management
Integration Services Catalogs
XEvent Profiler
HampdenCountyTow...a (gisadmin (71))
100 %
Results
Spatial results
Messages
Ready

```
SELECT    [TOWN]
         ,[TOWN_ID]
         ,[TYPE]
         ,[SHAPE]
         ,[SHAPE].STArea() as [Shape.STArea()]
         ,[SHAPE].STLength() as [Shape.STLength(), aka Perimeter]
FROM [gisadmin].[MGIS_TownBoundsSurvey_evw]
WHERE FIPS_STCO = 25013
```

| | TOWN | TOWN_ID | TYPE | SHAPE | Shape.STArea() | Shape.STLength(), aka Perimeter |
|---|---|---|---|---|---|---|
| 1 | AGAWAM | 5 | TC | 0xC90800000104E1... | 678359450.582886 | 124870.856013551 |
| 2 | BLANDFORD | 33 | T | 0xC9080000010410... | 1489822147.95923 | 151837.038477624 |
| 3 | BRIMFIELD | 43 | T | 0xC90800000104CC... | 984585267.367065 | 139455.497564861 |
| 4 | CHESTER | 59 | T | 0xC90800000104 0D... | 1036066948.71075 | 123169.940193395 |
| 5 | CHICOPEE | 61 | C | 0xC90800000104 01... | 665489578.487732 | 113703.42952942 |
| 6 | EAST LONGMEADOW | 85 | T | 0xC90800000104 0E... | 362622827.615417 | 76395.5724258823 |
| 7 | GRANVILLE | 112 | T | 0xC908000001 0414... | 1201935274.76178 | 143192.252252094 |
| 8 | HAMPDEN | 120 | T | 0xC90800000104 09... | 547499195.579956 | 96518.8372343257 |
| 9 | HOLLAND | 135 | T | 0xC90800000104 00... | 363889057.05542 | 78802.0918490844 |
| 10 | HOLYOKE | 137 | C | 0xC90800000104 3F... | 635590489.577759 | 130582.871378171 |
| 11 | LONGMEADOW | 159 | T | 0xC90800000104 21... | 267481704.631372 | 65062.3172766477 |
| 12 | LUDLOW | 161 | T | 0xC90800000104 75... | 789950776.076111 | 121351.862215934 |
| 13 | MONSON | 191 | T | 0xC90800000104 95... | 1248442781.35986 | 150882.691616611 |
| 14 | MONTGOMERY | 194 | T | 0xC90800000104 7E... | 420041463.944519 | 96916.4091725987 |
| 15 | PALMER | 227 | TC | 0xC90800000104A8... | 892014050.45813 | 167719.350671929 |
| 16 | RUSSELL | 256 | T | 0xC90800000104F5... | 499128570.019775 | 104185.309101396 |
| 17 | SOUTHWICK | 279 | T | 0xC90800000104 4E... | 882319147.248901 | 143806.87318136 |
| 18 | SPRINGFIELD | 281 | C | 0xC90800000104 13... | 922135431.543884 | 133555.659982833 |
| 19 | TOLLAND | 297 | T | 0xC90800000104 4A... | 914754636.635559 | 126694.120572093 |
| 20 | WALES | 306 | T | 0xC90800000104 00... | 445571367.493896 | 86725.8218261287 |
| 21 | WEST SPRINGFIELD | 325 | TC | 0xC90800000104D6... | 488859067.093872 | 112691.480197312 |
| 22 | WESTFIELD | 329 | C | 0xC90800000104A6... | 1318987516.73547 | 151376.556264472 |
| 23 | WILBRAHAM | 339 | T | 0xC9080000010412... | 622601040.881958 | 120625.662310581 |

Query executed successfully. | thor (11.0 SP3) | gisadmin (71) | SWSC_GISData | 00:00:00 | 23 rows

ArcGIS Desktop/Pro (*query layers*)


Untitled - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
1:45,140
Editor
Georeferencing
Spatial Adjustment
Table Of Contents
Layers
Water Quality Calls
Basemap
Catalog
Search
ArcToolbox
Attributes
Create Features
Chicopee
Springfield
356629.934 2858928.729 Feet
Edit Query Layer
Connection:
SWSC_GISData.sde
Connections...
List of Tables:
Columns:
Name
Type
Nullable
SWSC_GISData.dbo._LotNumberList
SWSC_GISData.dbo.LYRSWS_MAINO
SWSC_GISData.gisadmin._AccessCtr
SWSC_GISData.gisadmin._CondoFrom
SWSC_GISData.gisadmin._tmp_meter
SWSC_GISData.gisadmin.AddressPoin
SWSC_GISData.gisadmin.Alba_LatLo
Query:
Validate
&lt; Back
Next &gt;
Cancel

```
select
Shape,ServiceRequestID,Complaint,Location,StatusName,OpenedDate,ResolvedDate,ChlorineConcerns,CloudyWater,DirtyDiscoloredWater,OdorTaste,Other,PinkStain,Reasons,CorrosionInhibitor,Description,Response,HasWorkOrders,PointX,PointY,Latitude,Longitude,SpatialReference from
SWSC_GISData.gisadmin.VW_SR_WQCall
```

● Let ArcGIS discover spatial properties for the layer

○ Define spatial properties for the layer

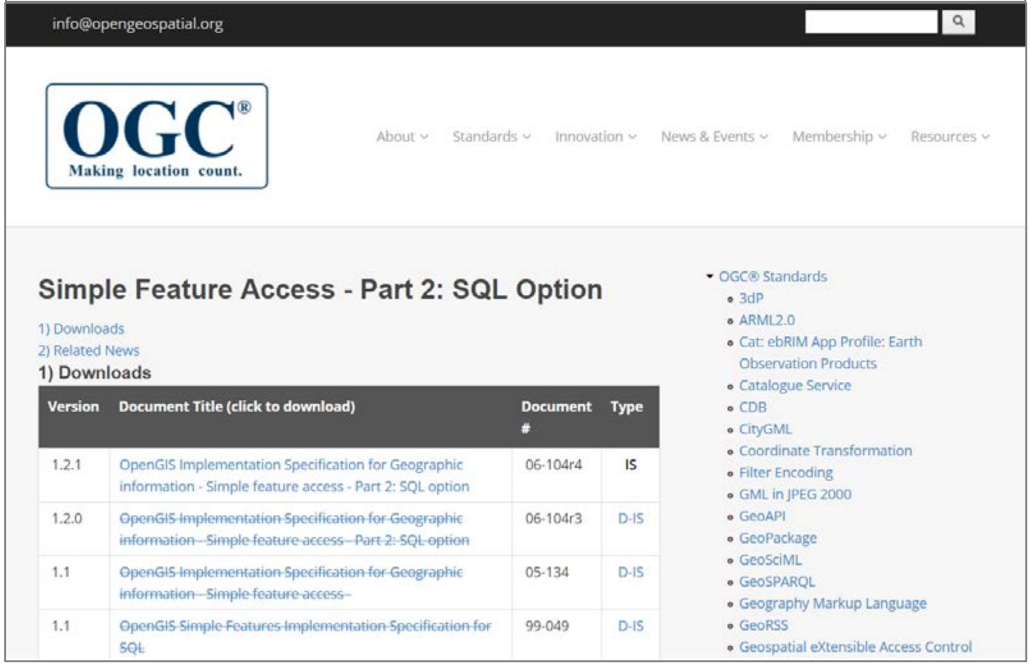
# OGC Simple Feature Specification

Standard for storing & querying spatial data

Esri support goes all the way back to ArcSDE 9.0

Default Esri Enterprise GDB storage format

http://www.opengeospatial.org/standards/sfs



## Simple Feature Access - Part 2: SQL Option

1) Downloads
2) Related News

**1) Downloads**

| Version | Document Title (click to download) | Document # | Type |
|---|---|---|---|
| 1.2.1 | OpenGIS Implementation Specification for Geographic information - Simple feature access - Part 2: SQL option | 06-104r4 | IS |
| 1.2.0 | ~~OpenGIS Implementation Specification for Geographic information - Simple feature access - Part 2: SQL option~~ | 06-104r3 | D-IS |
| 1.1 | ~~OpenGIS Implementation Specification for Geographic information - Simple feature access -~~ | 05-134 | D-IS |
| 1.1 | ~~OpenGIS Simple Features Implementation Specification for SQL~~ | 99-049 | D-IS |

- OGC® Standards
  - 3dP
  - ARML2.0
  - Cat: ebRIM App Profile: Earth Observation Products
  - Catalogue Service
  - CDB
  - CityGML
  - Coordinate Transformation
  - Filter Encoding
  - GML in JPEG 2000
  - GeoAPI
  - GeoPackage
  - GeoSciML
  - GeoSPARQL
  - Geography Markup Language
  - GeoRSS
  - Geospatial eXtensible Access Control

# Why Bother with Spatial Queries?

**Be Cross-Platform**: Get Spatial without any ArcGIS Software

**Normalize**: Avoid hard-coding redundant attributes

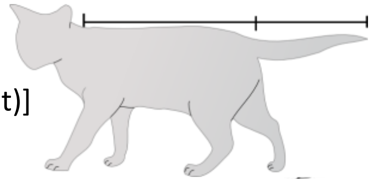
**Drain the Shapefile Swamp**: cut down on geoprocessed data-scraps

# Basics: Line Length & Polygon Area

- ArcGIS automatically displays calculated lengths & areas
  - We can do the same via queries

(fe)Line Length

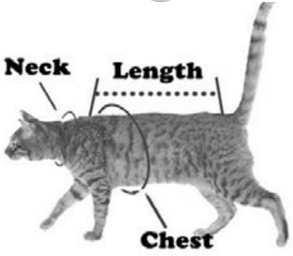
```
SELECT [SHAPE].STLength() as [Length (Ft)]
,CAST([SHAPE].STLength() as int) as [Rounded (Ft)]
```



| Length (Ft) | Rounded (Ft) |
|---|---|
| 1056.36436184714 | 1056 |

Polygon Area

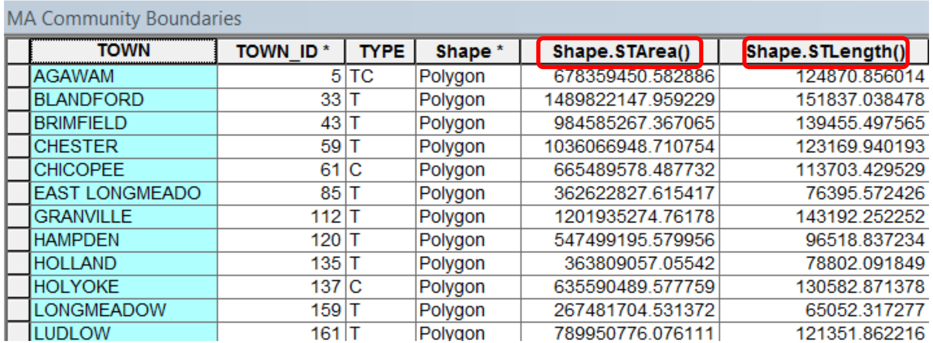
```
SELECT SHAPE.STArea() as [Area (SqFt)]
,CAST([SHAPE].STArea() as int) as [Rounded (SqFt)]
```



| Area (SqFt) | Rounded (SqFt) |
|---|---|
| 5165.25909423828 | 5165 |

# ArcGIS Attribute Table Includes Length & Area

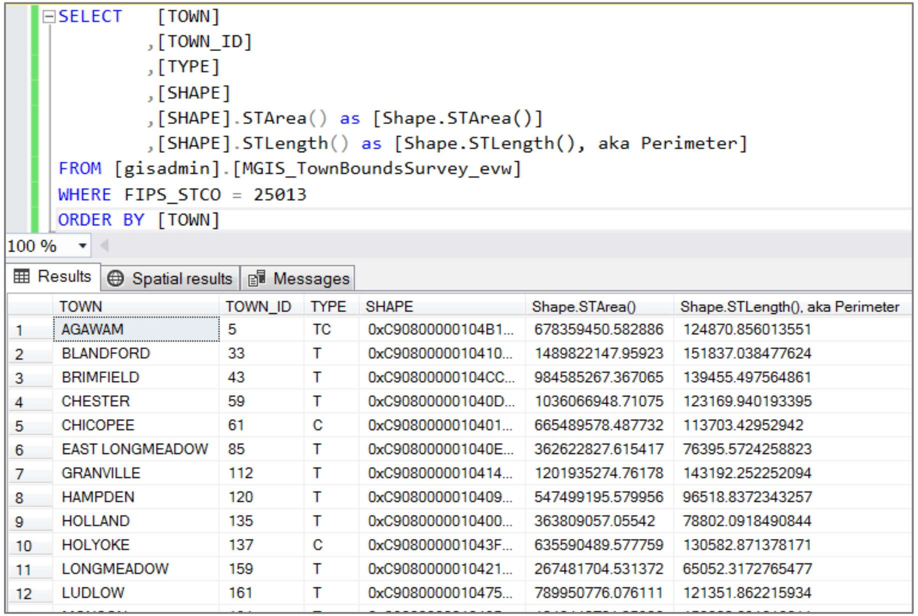
*Courtesy of the **.STArea()** & **.STLength()** OGC standard SQL methods*



MA Community Boundaries

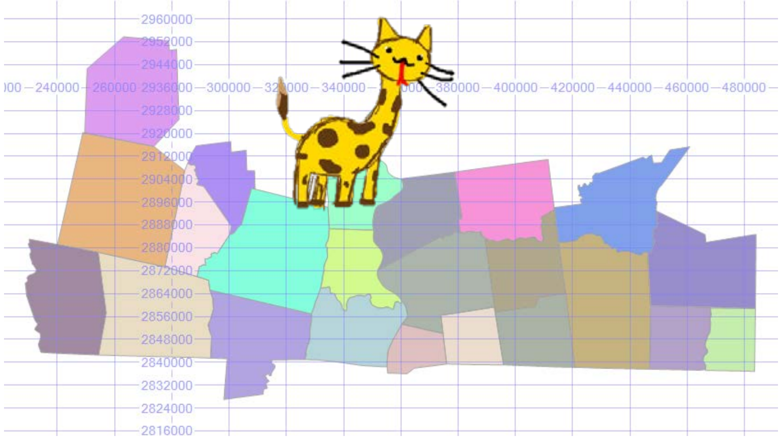
| TOWN | TOWN_ID * | TYPE | Shape * | Shape.STArea() | Shape.STLength() |
|---|---|---|---|---|---|
| AGAWAM | 5 | TC | Polygon | 678359450.582886 | 124870.856014 |
| BLANDFORD | 33 | T | Polygon | 1489822147.959229 | 151837.038478 |
| BRIMFIELD | 43 | T | Polygon | 984585267.367065 | 139455.497565 |
| CHESTER | 59 | T | Polygon | 1036066948.710754 | 123169.940193 |
| CHICOPEE | 61 | C | Polygon | 665489578.487732 | 113703.429529 |
| EAST LONGMEADO | 85 | T | Polygon | 362622827.615417 | 76395.572426 |
| GRANVILLE | 112 | T | Polygon | 1201935274.76178 | 143192.252252 |
| HAMPDEN | 120 | T | Polygon | 547499195.579956 | 96518.837234 |
| HOLLAND | 135 | T | Polygon | 363809057.05542 | 78802.091849 |
| HOLYOKE | 137 | C | Polygon | 635590489.577759 | 130582.871378 |
| LONGMEADOW | 159 | T | Polygon | 267481704.531372 | 65052.317277 |
| LUDLOW | 161 | T | Polygon | 789950776.076111 | 121351.862216 |

# Using .STArea() & .STLength() in our own Query



```
SELECT    [TOWN]
         ,[TOWN_ID]
         ,[TYPE]
         ,[SHAPE]
         ,[SHAPE].STArea() as [Shape.STArea()]
         ,[SHAPE].STLength() as [Shape.STLength(), aka Perimeter]
FROM [gisadmin].[MGIS_TownBoundsSurvey_evw]
WHERE FIPS_STCO = 25013
ORDER BY [TOWN]
```

| | TOWN | TOWN_ID | TYPE | SHAPE | Shape.STArea() | Shape.STLength(), aka Perimeter |
|---|---|---|---|---|---|---|
| 1 | AGAWAM | 5 | TC | 0xC90800000104B1... | 678359450.582886 | 124870.856013551 |
| 2 | BLANDFORD | 33 | T | 0xC9080000010410... | 1489822147.95923 | 151837.038477624 |
| 3 | BRIMFIELD | 43 | T | 0xC90800000104CC... | 984585267.367065 | 139455.497564861 |
| 4 | CHESTER | 59 | T | 0xC908000001040D... | 1036066948.71075 | 123169.940193395 |
| 5 | CHICOPEE | 61 | C | 0xC9080000010401... | 665489578.487732 | 113703.42952942 |
| 6 | EAST LONGMEADOW | 85 | T | 0xC908000001040E... | 362622827.615417 | 76395.5724258823 |
| 7 | GRANVILLE | 112 | T | 0xC9080000010414... | 1201935274.76178 | 143192.252252094 |
| 8 | HAMPDEN | 120 | T | 0xC9080000010409... | 547499195.579956 | 96518.8372343257 |
| 9 | HOLLAND | 135 | T | 0xC9080000010400... | 363809057.05542 | 78802.0918490844 |
| 10 | HOLYOKE | 137 | C | 0xC908000001043F... | 635590489.577759 | 130582.871378171 |
| 11 | LONGMEADOW | 159 | T | 0xC9080000010421... | 267481704.531372 | 65052.3172765477 |
| 12 | LUDLOW | 161 | T | 0xC9080000010475... | 789950776.076111 | 121351.862215934 |

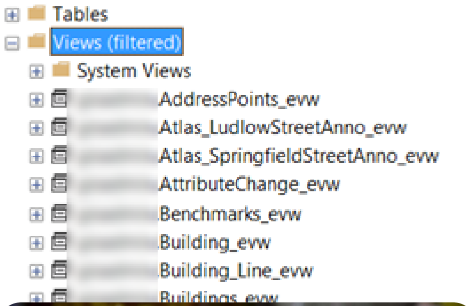


# A word about querying Versioned Feature Classes

Versioned Feature Classes have a “Versioned View”

The Versioned View provides the current posted Default version of the data

Naming convention:
<Feature Class Name>_EVW



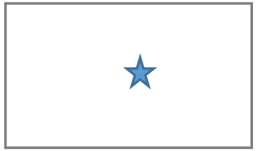
- Tables
- Views (filtered)
  - System Views
  - AddressPoints_evw
  - Atlas_LudlowStreetAnno_evw
  - Atlas_SpringfieldStreetAnno_evw
  - AttributeChange_evw
  - Benchmarks_evw
  - Building_evw
  - Building_Line_evw
  - Buildings_evw

http://desktop.arcgis.com/en/arcmap/10.5/manage-data/
using-sql-with-gdbs/what-is-a-versioned-view.htm

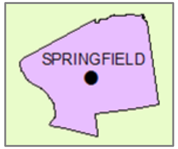
# Spatial Data Can Be Rendered Via SQL Queries

Points from X/Y or Lat/Lon fields

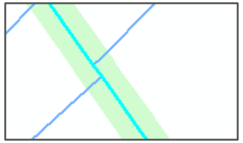
| Latitude | Longitude |
|---|---|
| 42.11638925 | -72.83398931 |



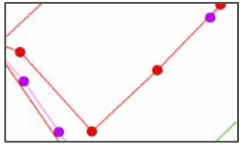
Points from Polygon Centroids



Buffers from any features



Points from line Start or End nodes



# Basics: Make Your Point

## Constructing a GIS-readable point from x/y or lat/long columns

```
SELECT Latitude, Longitude, SpatialRef
```

| Latitude | Longitude | SpatialRef |
|---|---|---|
| 42.11638925 | -72.83398931 | 4326 |

```
SELECT GEOMETRY::STGeomFromText('POINT(' +
CONVERT(VARCHAR, Longitude) + ' ' +
CONVERT(VARCHAR, Latitude) + ')', SpatialRef)
as Shape
```

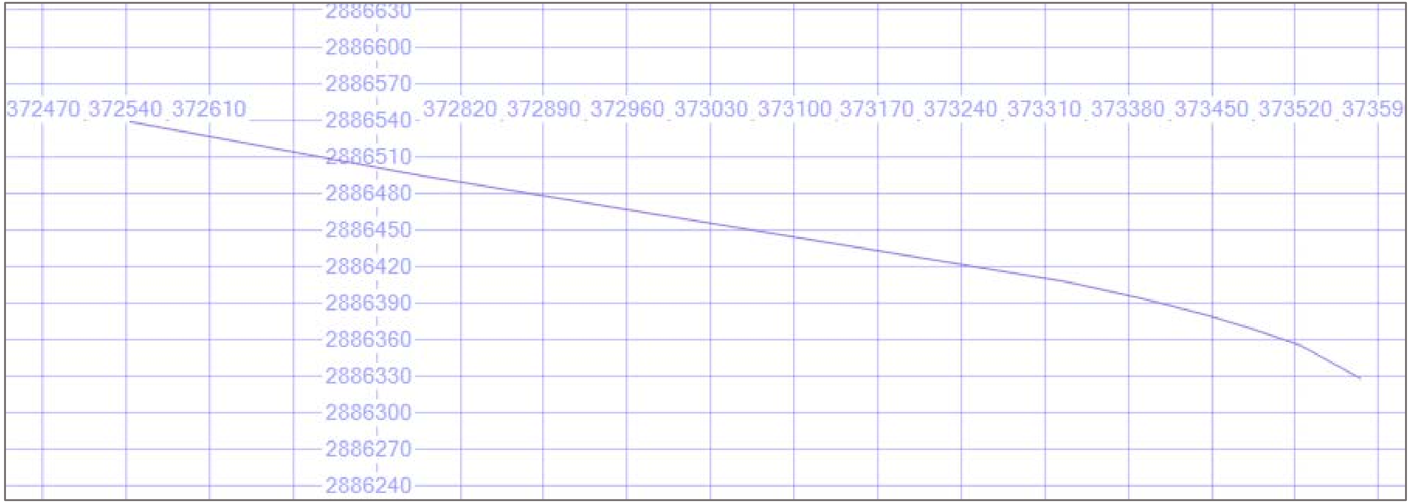
| Shape |
|---|
| 0xE6100000010C79EAB214603552C0902DC… |

```
SELECT [Shape].ToString() as ShapeString
```

| ShapeString |
|---|
| POINT (-72.83398931 42.11638925) |

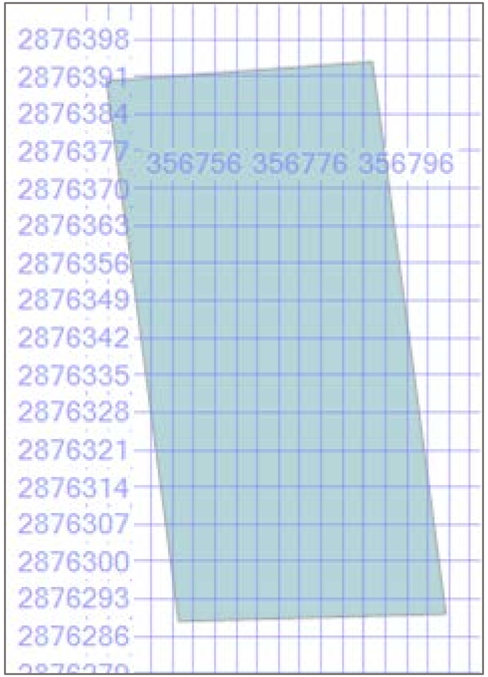
# Basics: Draw The Line

```
LINESTRING (373574.7 2886328.4, 373524.0 2886355.7, 373481.9 2886369.7, 373447.6 2886379.8,
373392.2 2886393.9, 373326.7 2886407.9, 372787.8 2886494.5, 372543.0 2886538.8)
```

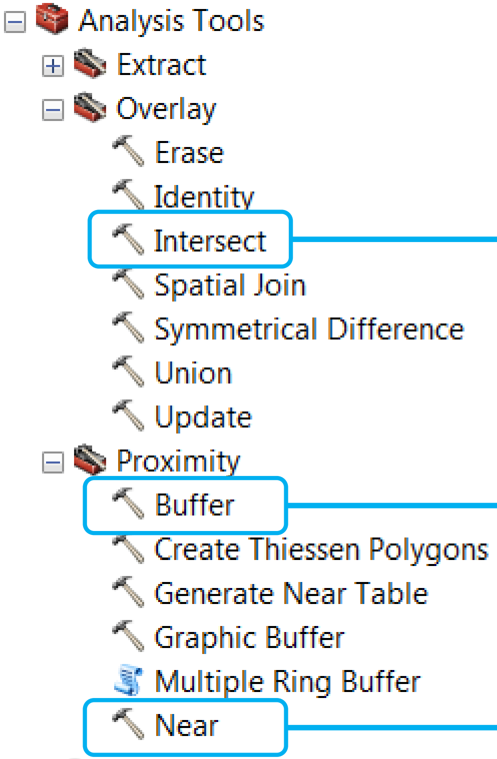


# Basics: Create a Polygon

POLYGON ((356803.4 2876290.2, 356789.6 2876393.7, 356739.7 2876390.1, 356753.2 2876288.8, 356803.4 2876290.2))



# Another way of looking at ArcToolbox



- Analysis Tools
  - Extract
  - Overlay
    - Erase
    - Identity
    - Intersect
    - Spatial Join
    - Symmetrical Difference
    - Union
    - Update
  - Proximity
    - Buffer
    - Create Thiessen Polygons
    - Generate Near Table
    - Graphic Buffer
    - Multiple Ring Buffer
    - Near

Layer1.Shape.**STIntersection**(Layer2.Shape)

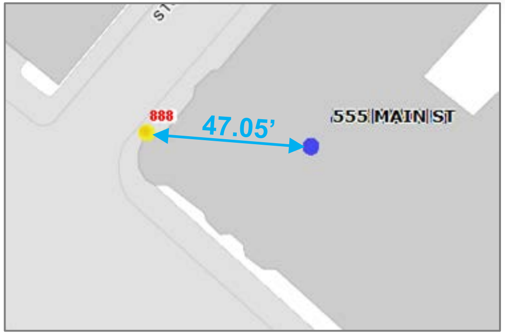
Layer1.**STBuffer**(<distance>)

various ways, using **STDistance**

# Distance: Point to Point

## *Where’s the Nearest Hydrant?*

```
DECLARE @PT GEOMETRY
SET @PT = (SELECT SHAPE
           FROM AddressPts as a
           WHERE a.Address = ‘555 MAIN ST’)

SELECT TOP 1 h.HydrantID
,h.SHAPE.STDistance(@PT) as Distance
,h.SHAPE.ToString() as HydrantGeometry
FROM Hydrants as h
ORDER BY h.SHAPE.STDistance(@PT)
```



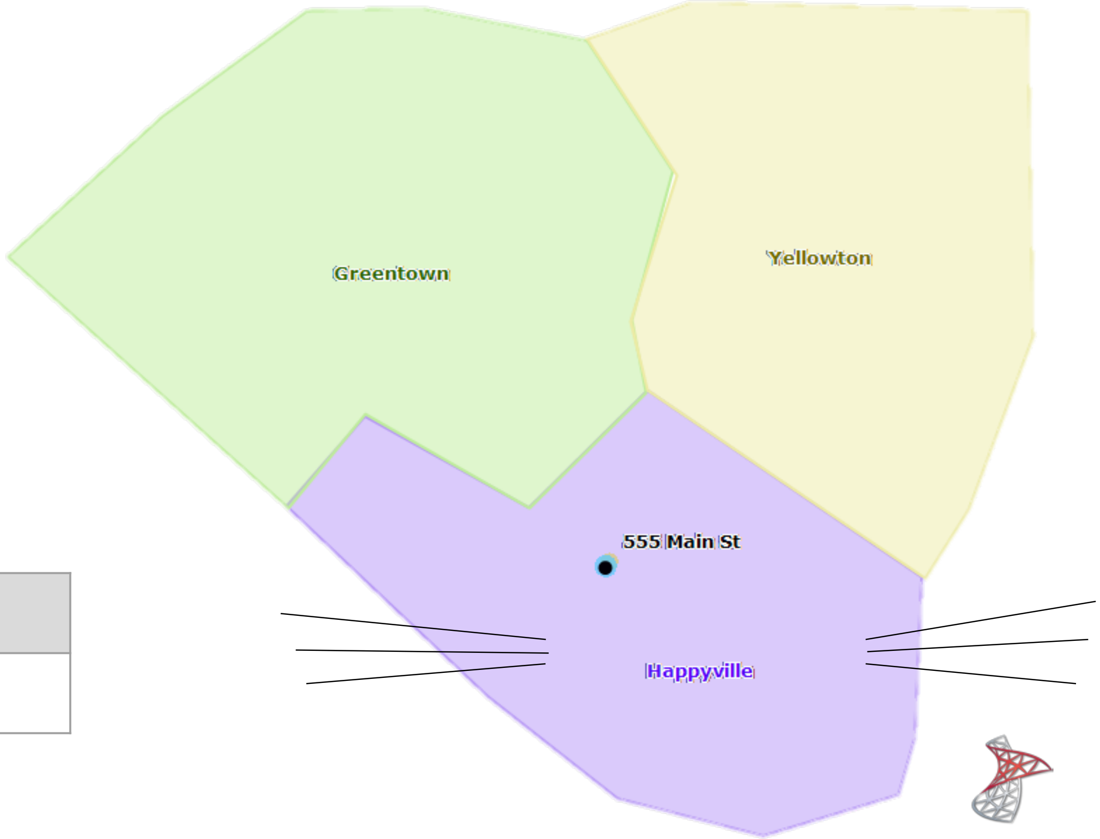
| HydrantID | Distance | HydrantGeometry |
|---|---|---|
| 888 | 47.05 | POINT (361358.95999999344 2863573.450000003) |

# Point in Polygon

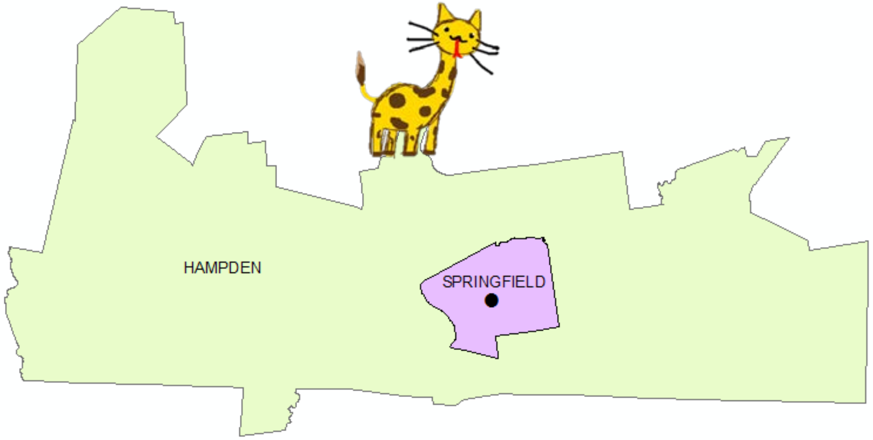
*In which neighborhood is this address?*

```
SELECT a.Address, n.Neighborhood
FROM AddressPts as a
JOIN Neighborhoods as n
ON n.Shape.STContains(a.Shape) = 1
WHERE a.Address = '555 MAIN ST'
```

| Address | Neighborhood |
|---|---|
| 555 MAIN ST | Happyville |



# Polygon Center in Polygon



## Example: Town in County

```
SELECT t.TOWN as Community ,c.COUNTY as County
,format((t.SUM_ACRES / c.AREA_ACRES),'P1') as [% Coverage of County]
FROM MGIS_TOWNBOUNDSSURVEY t
JOIN MGIS_COUNTYBOUNDARIES c
ON c.shape.STIntersects(t.shape.STCentroid()) = 1
WHERE t.TOWN = 'SPRINGFIELD'
```

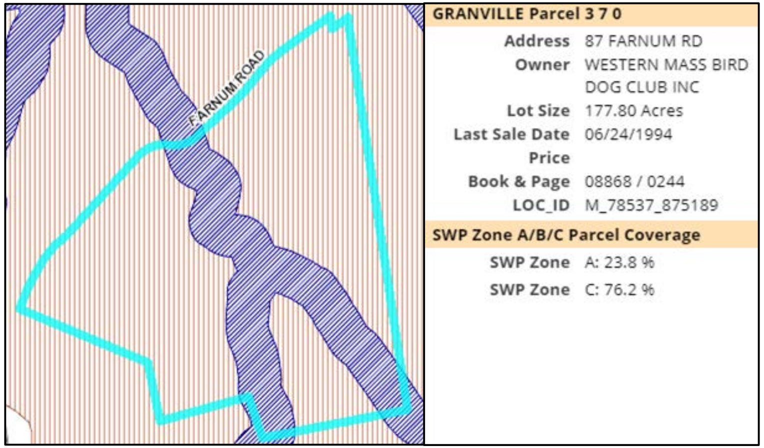
| Community | County | % Coverage of County |
|---|---|---|
| SPRINGFIELD | HAMPDEN | 5.2 % |

# Polygon Overlap Area

*Percentage of parcel in Zone A, B or C watershed protection area*

```
SELECT DISTINCT swp.SWPZONE as [SWP Zone]
,format(sum(swp.Shape.STIntersection(p.Shape).STArea()) / p.Shape.STArea(), 'P1') as [Overlap Pct]
FROM [MGIS_Parcels] p
JOIN [MGIS_SurfaceWaterProtection_ZoneABC] swp
ON p.Shape.STIntersection(swp.shape).STArea() > 0
WHERE p.LOC_ID = 'M_78537_875189'
GROUP BY swp.SWPZONE, p.Shape.STArea()
```

| SWP Zone | Overlap Pct |
|---|---|
| A | 23.8 % |
| C | 76.2 % |



GRANVILLE Parcel 3 7 0

| | |
|---|---|
| Address | 87 FARNUM RD |
| Owner | WESTERN MASS BIRD DOG CLUB INC |
| Lot Size | 177.80 Acres |
| Last Sale Date | 06/24/1994 |
| Price | |
| Book & Page | 08868 / 0244 |
| LOC_ID | M_78537_875189 |

SWP Zone A/B/C Parcel Coverage

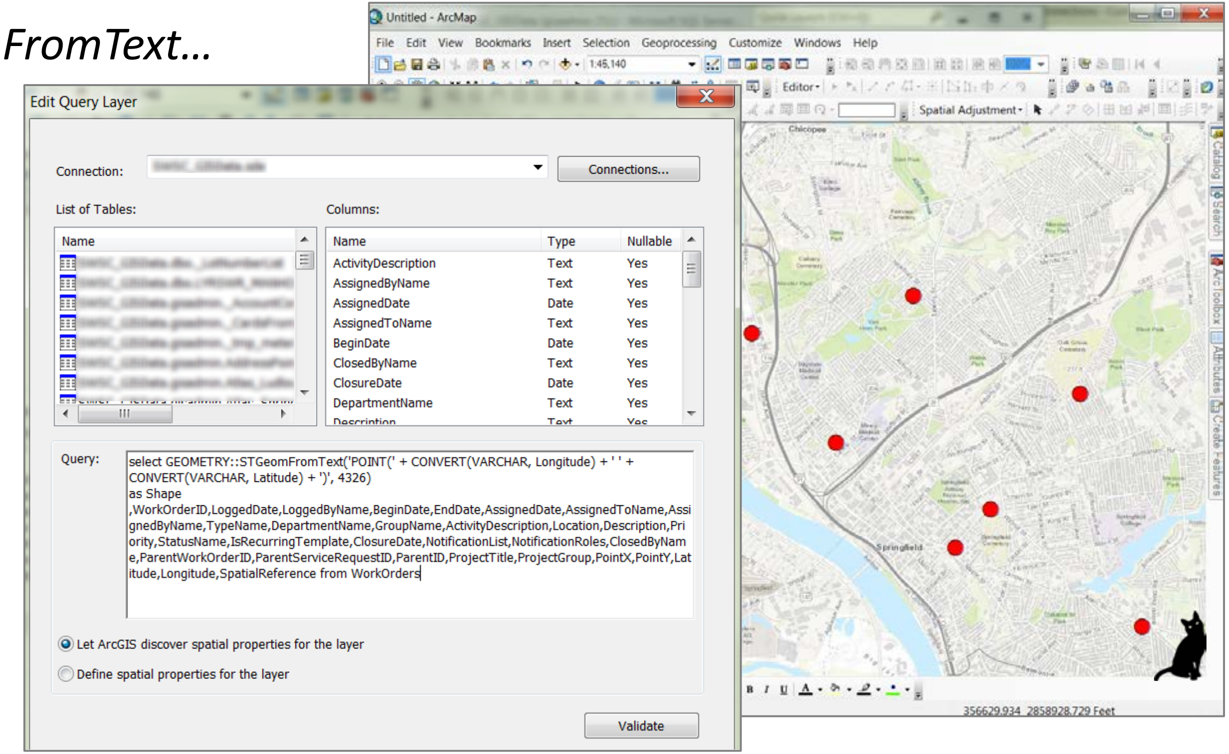
| | |
|---|---|
| SWP Zone | A: 23.8 % |
| SWP Zone | C: 76.2 % |

# Roll your own SHAPE field from x/y or lat/lon fields

*GEOMETRY::STGeomFromText…*

"Live"
point data

Available for
ArcGIS Server
Map Services



Connection: [redacted]

List of Tables:

| Name |
|---|
| [redacted] |
| [redacted] |
| [redacted] |
| [redacted] |
| [redacted] |
| [redacted] |
| [redacted] |
| [redacted] |

Columns:

| Name | Type | Nullable |
|---|---|---|
| ActivityDescription | Text | Yes |
| AssignedByName | Text | Yes |
| AssignedDate | Date | Yes |
| AssignedToName | Text | Yes |
| BeginDate | Date | Yes |
| ClosedByName | Text | Yes |
| ClosureDate | Date | Yes |
| DepartmentName | Text | Yes |
| Description | Text | Yes |

Query:

```
select GEOMETRY::STGeomFromText('POINT(' + CONVERT(VARCHAR, Longitude) + ' ' +
CONVERT(VARCHAR, Latitude) + ')', 4326)
as Shape
,WorkOrderID,LoggedDate,LoggedByName,BeginDate,EndDate,AssignedDate,AssignedToName,AssignedByName,TypeName,DepartmentName,GroupName,ActivityDescription,Location,Description,Priority,StatusName,IsRecurringTemplate,ClosureDate,NotificationList,NotificationRoles,ClosedByName,ParentWorkOrderID,ParentServiceRequestID,ParentID,ProjectTitle,ProjectGroup,PointX,PointY,Latitude,Longitude,SpatialReference from WorkOrders
```

● Let ArcGIS discover spatial properties for the layer

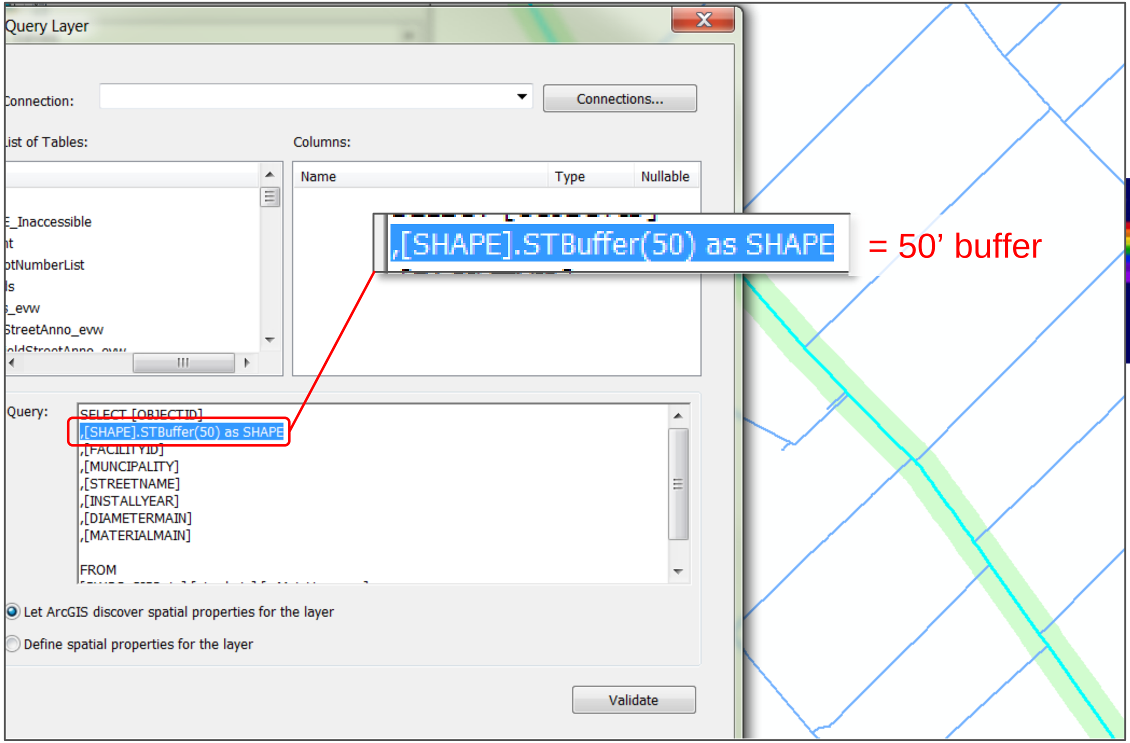
○ Define spatial properties for the layer

# Buffer via a Query Layer

“Live” Buffer

Not recommended for large selection sets

*use a good WHERE clause to narrow the scope*



Query:

```
SELECT [OBJECTID]
,[SHAPE].STBuffer(50) as SHAPE
,[FACILITYID]
,[MUNCIPALITY]
,[STREETNAME]
,[INSTALLYEAR]
,[DIAMETERMAIN]
,[MATERIALMAIN]

FROM
```

● Let ArcGIS discover spatial properties for the layer

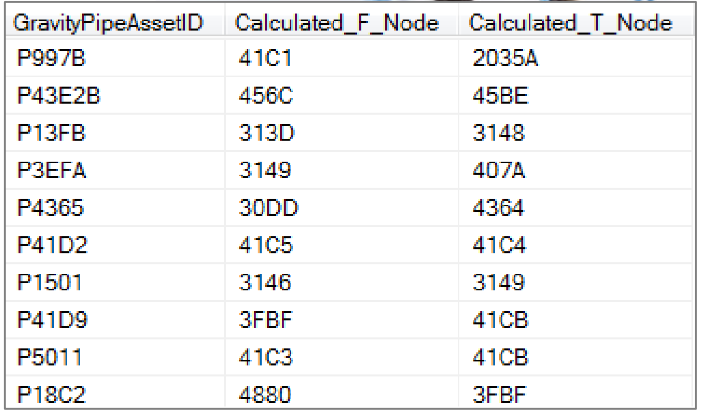
○ Define spatial properties for the layer

,[SHAPE].STBuffer(50) as SHAPE = 50’ buffer

# Line / Point Connectivity

## Selecting upstream / downstream manhole IDs by joining to the coincident start & end nodes of the pipes

```
SELECT     g.[ASSETID] as GravityPipeAssetID
          ,F_MH_XY.ASSETID as Calculated_F_Node
          ,T_MH_XY.ASSETID as Calculated_T_Node

  FROM [GRAVITYPIPE] g

   JOIN [MANHOLE] as F_MH_XY
          on          (g.Shape.STStartPoint()).STX = F_MH_XY.Shape.STX
          and         (g.Shape.STStartPoint()).STY = F_MH_XY.Shape.STY
   JOIN [MANHOLE] as T_MH_XY
          on          (g.Shape.STEndPoint()).STX = T_MH_XY.Shape.STX
          and         (g.Shape.STEndPoint()).STY = T_MH_XY.Shape.STY
```

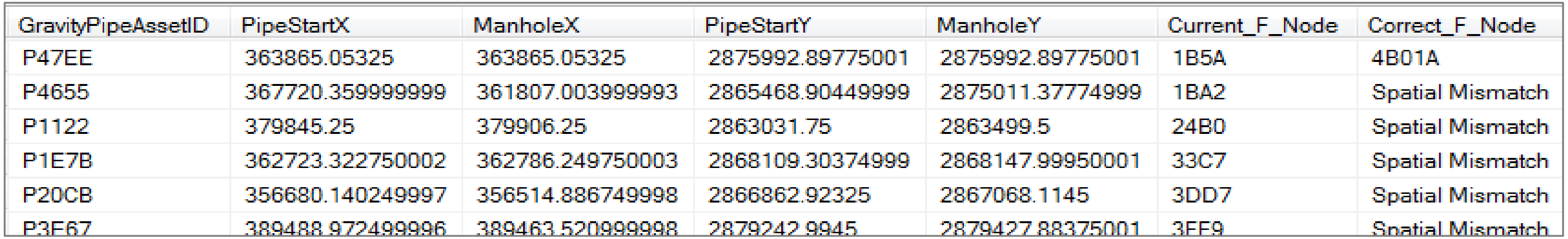


| GravityPipeAssetID | Calculated_F_Node | Calculated_T_Node |
|---|---|---|
| P997B | 41C1 | 2035A |
| P43E2B | 456C | 45BE |
| P13FB | 313D | 3148 |
| P3EFA | 3149 | 407A |
| P4365 | 30DD | 4364 |
| P41D2 | 41C5 | 41C4 |
| P1501 | 3146 | 3149 |
| P41D9 | 3FBF | 41CB |
| P5011 | 41C3 | 41CB |
| P18C2 | 4880 | 3FBF |

# Line / Point Connectivity

## Checking for errors or miscodes with upstream/downstream node values

```
SELECT       g.[ASSETID] as GravityPipeAssetID ,(g.Shape.STEndPoint()).STX as PipeStartX, m.Shape.STX  as ManholeX
                          ,(g.Shape.STEndPoint()).STY as PipeStartY, m.Shape.STY  as ManholeY, g.[F_NODE] as Current_F_Node
                          ,case isnull(mxy.ASSETID,'') WHEN '' THEN 'Spatial Mismatch' ELSE mxy.ASSETID END as Correct_F_Node
FROM GRAVITYPIPE as g
join SMH as m on g.F_NODE = m.ASSETID
join SMH as mxy
             on (g.Shape.STStartPoint()).STX = mxy.Shape.STX
             and (g.Shape.STStartPoint()).STY = mxy.Shape.STY
where m.Shape.STX <> (g.Shape.STStartPoint()).STX and m.Shape.STY <> (g.Shape.STStartPoint()).STY
```

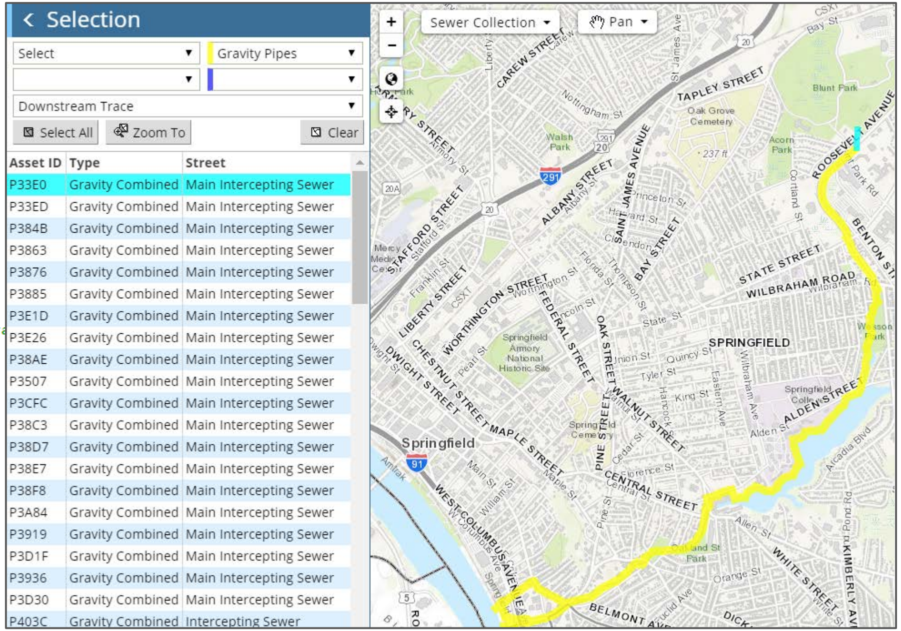


| GravityPipeAssetID | PipeStartX | ManholeX | PipeStartY | ManholeY | Current_F_Node | Correct_F_Node |
|---|---|---|---|---|---|---|
| P47EE | 363865.05325 | 363865.05325 | 2875992.89775001 | 2875992.89775001 | 1B5A | 4B01A |
| P4655 | 367720.359999999 | 361807.003999993 | 2865468.90449999 | 2875011.37774999 | 1BA2 | Spatial Mismatch |
| P1122 | 379845.25 | 379906.25 | 2863031.75 | 2863499.5 | 24B0 | Spatial Mismatch |
| P1E7B | 362723.322750002 | 362786.249750003 | 2868109.30374999 | 2868147.99950001 | 33C7 | Spatial Mismatch |
| P20CB | 356680.140249997 | 356514.886749998 | 2866862.92325 | 2867068.1145 | 3DD7 | Spatial Mismatch |
| P3E67 | 389488.972499996 | 389463.520999998 | 2879242.9945 | 2879427.88375001 | 3EE9 | Spatial Mismatch |

# Practical Benefits of Start/End Node Attributes

## Upstream / Downstream Trace

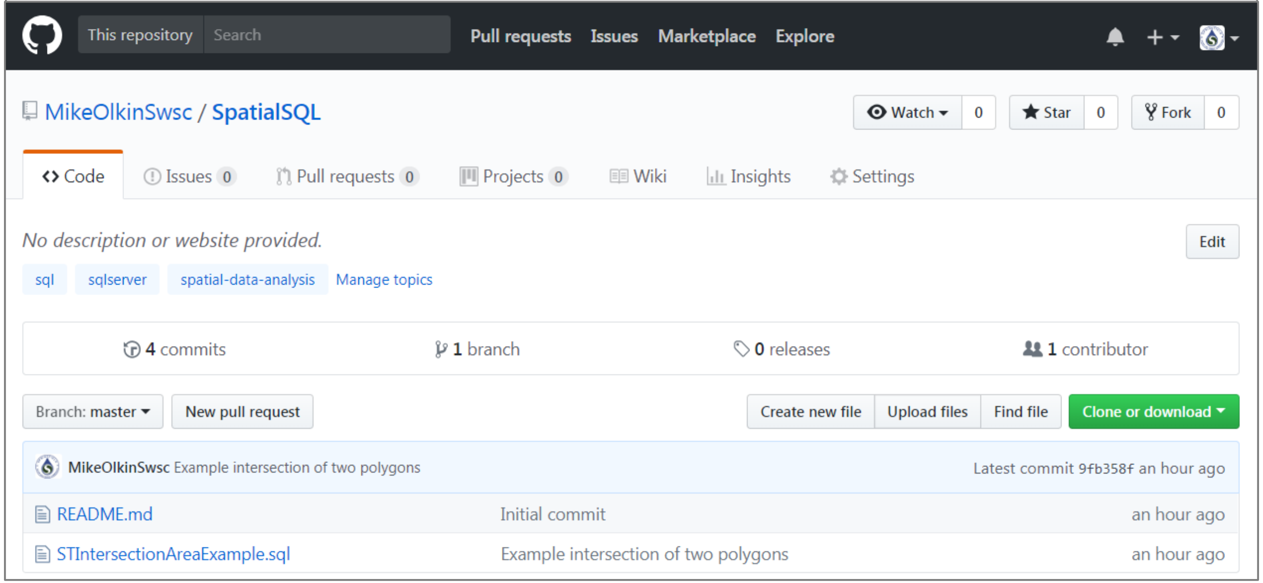
```sql
SET @NewInsertCount = @@ROWCOUNT;

-- the tree traversal:

WHILE @NewInsertCount > 0
-- enter the loop if there was something inserted in the previous statement

BEGIN
    --We insert into #CHILDREN all ASSETIDs which are "children"
    --The @NewInsertCount will indicate how many children are added for each iteration; va
    INSERT INTO #CHILDREN(ID, ASSETID, Location, F_NODE, T_NODE, PipeType )
        SELECT  @NewInsertCount, ASSETID, Location, F_NODE, T_NODE
                ,[PipeSubType] as [PipeType]
                FROM [redacted]Pipes WHERE EXISTS
               (SELECT  ASSETID, Location, F_NODE, T_NODE, PipeSubType FROM #CHILDREN
                WHERE [redacted]Pipes.F_NODE = #CHILDREN.T_NODE)
         AND  NOT EXISTS
              (SELECT  ASSETID, Location, F_NODE, T_NODE, PipeSubType FROM #CHILDREN
               WHERE [redacted]Pipes.ASSETID = #CHILDREN.ASSETID);

         SET @NewInsertCount = @@ROWCOUNT;
    -- if the value is 0 then there were no new children inserted thus no "grandchildren"

END
```



| Asset ID | Type | Street |
|---|---|---|
| P33E0 | Gravity Combined | Main Intercepting Sewer |
| P33ED | Gravity Combined | Main Intercepting Sewer |
| P384B | Gravity Combined | Main Intercepting Sewer |
| P3863 | Gravity Combined | Main Intercepting Sewer |
| P3876 | Gravity Combined | Main Intercepting Sewer |
| P3885 | Gravity Combined | Main Intercepting Sewer |
| P3E1D | Gravity Combined | Main Intercepting Sewer |
| P3E26 | Gravity Combined | Main Intercepting Sewer |
| P38AE | Gravity Combined | Main Intercepting Sewer |
| P3507 | Gravity Combined | Main Intercepting Sewer |
| P3CFC | Gravity Combined | Main Intercepting Sewer |
| P38C3 | Gravity Combined | Main Intercepting Sewer |
| P38D7 | Gravity Combined | Main Intercepting Sewer |
| P38E7 | Gravity Combined | Main Intercepting Sewer |
| P38F8 | Gravity Combined | Main Intercepting Sewer |
| P3A84 | Gravity Combined | Main Intercepting Sewer |
| P3919 | Gravity Combined | Main Intercepting Sewer |
| P3D1F | Gravity Combined | Main Intercepting Sewer |
| P3936 | Gravity Combined | Main Intercepting Sewer |
| P3D30 | Gravity Combined | Main Intercepting Sewer |
| P403C | Gravity Combined | Intercepting Sewer |

# Practice Data & Sample Code

https://github.com/MikeOlkinSwsc/SpatialSQL



MikeOlkinSwsc / SpatialSQL

*No description or website provided.*

sql sqlserver spatial-data-analysis

4 commits | 1 branch | 0 releases | 1 contributor

MikeOlkinSwsc Example intersection of two polygons — Latest commit 9fb358f an hour ago

| | | |
|---|---|---|
| README.md | Initial commit | an hour ago |
| STIntersectionAreaExample.sql | Example intersection of two polygons | an hour ago |

Enjoy…

SOYLENT GREEN

IT'S SQL!

# Yes, Queries Can Be Spatial, Too

Michael Olkin, GISP
Springfield Water and Sewer Commission
michael.olkin@waterandsewer.org
https://github.com/MikeOlkinSwsc/SpatialSQL