

York County Hazard Mitigation Viewer

Python Workflows

Arcade Expressions

Customized Print Tools

Purpose of Project

Provide easily associated hazards for citizens and municipalities:

- Citizens/Municipalities found finding hazard information difficult to find
- Make information more accessible
- Information in Hazard Mitigation Plan Cumbersome/Difficult to public

Better awareness:

- Discovered largely, citizens are unaware of potential hazards
- Who and How to Contact
- Inform Existing and First Home Buyers

Support our Existing Hazard Mitigation Plan

Identify available funding and other resources to implement mitigation actions

Tour of Application

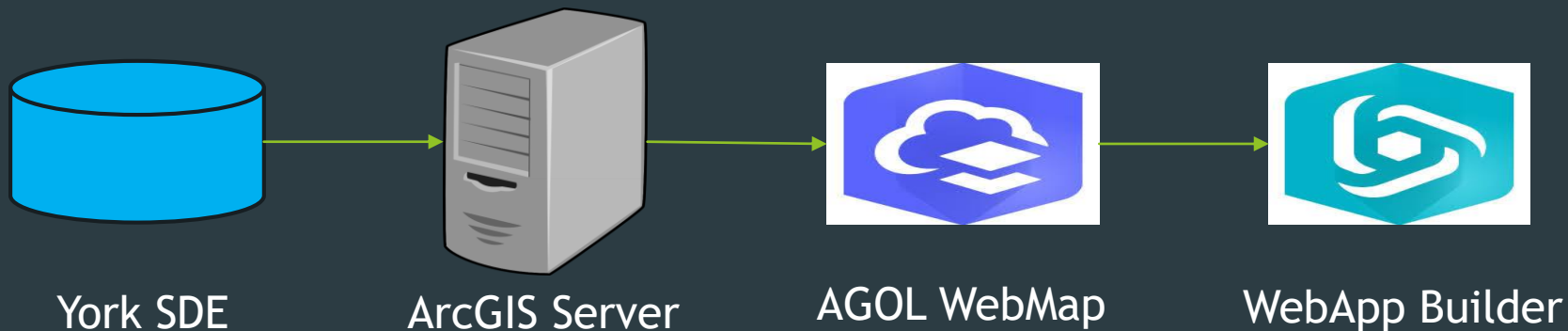
Data-

Stored on our Enterprise SDE

Map/Feature Services Published to ArcGIS Server

Hazard Service Consumed in ArcGIS Online Web Map

Web Map then Shared As WebApp Builder Application



Tour of Application

Widgets:



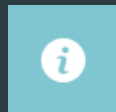
Layer List



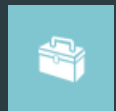
Legend



Search



About- Contact Information



Geoprocessing: 2 Geoprocessing Services
1- Hazard Reporting
2- Emergency Contact

Tour of Application

Contact Information-

Hazard Information Links

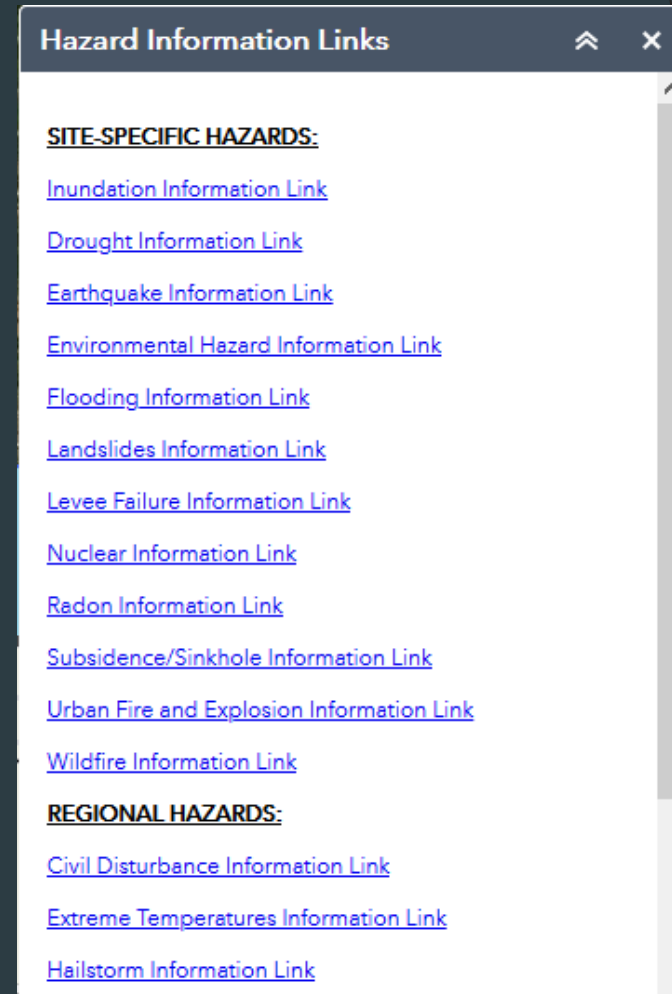
- [Site-Specific](#)
- [Regional](#)

Hazard Mitigation Funding and Resources

- Pennsylvania Emergency Management Agency(PEMA)
- Federal Emergency Management Agency(FEMA)
- United States Army Corps of Engineers(USACE)

Other Contact Information

- York County Emergency Management Agency
- York County Planning Commission
- FEMA/PEMA



Tour of Application

Layers-

York County ArcGIS Server:

Hazmit Parcels

Earthquake

Inundation Area

Sinkhole Prone Geology

Landslide Area

Nuclear Area

Radon

Environmental Hazards

Drought Prone Area

Urban Fire Area

Wildfire Area

Levee Area

Consumed from Other Sources:

FEMA Flood Hazard Zones

PASDA York County 2018 Imagery

Cached Services:

York County Base Map

Layer List

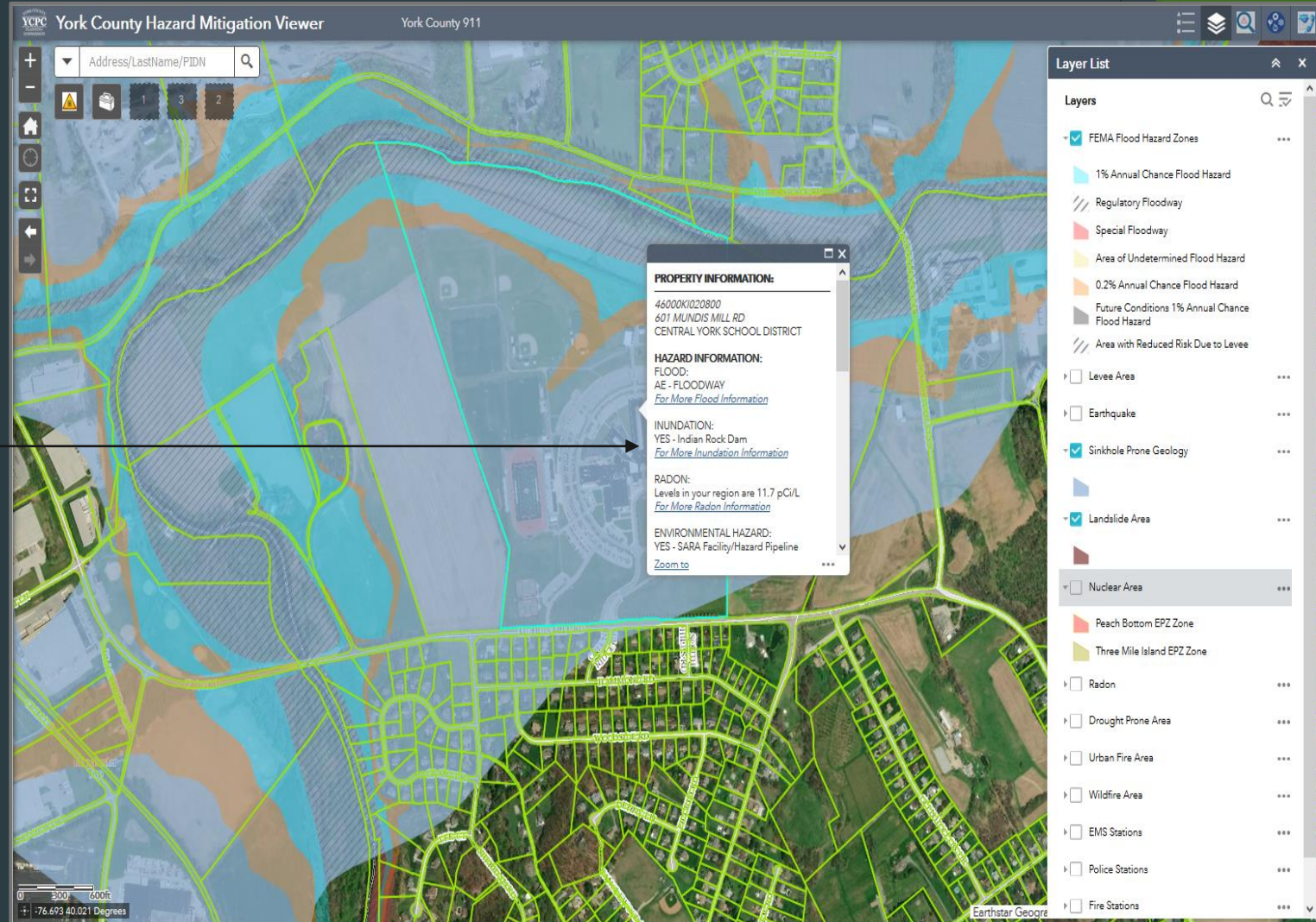
Layers

- ▶ ☐ FEMA Flood Hazard Zones
- ▶ ☐ Levee Area
- ▶ ☐ Earthquake
- ▶ ☐ Sinkhole Prone Geology
- ▶ ☐ Landslide Area
- ▶ ☐ Nuclear Area
- ▶ ☐ Radon
- ▶ ☐ Drought Prone Area
- ▶ ☐ Urban Fire Area
- ▶ ☐ Wildfire Area
- ▶ ☐ EMS Stations
- ▶ ☐ Police Stations
- ▶ ☐ Fire Stations
- ▶ ☒ Imagery - York County 2018

Tour of Application

Arcade Popup Windows-

```
//var checkvalue = $feature.MUNI_NAME  
var img_blank = 'https://www.esri.com/'  
var img_show = 'https://developers.arcgis.com/'  
var test = '{expression/expr13}'  
var City = 'City'  
if ($feature["FLOOD"] != 'Not in any FEMA FLOOD ZONES'){  
  return 'FLOOD:' + TextFormatting.NewLine +  
    $feature.FLOOD + TextFormatting.NewLine;}  
}
```



Underlying Work

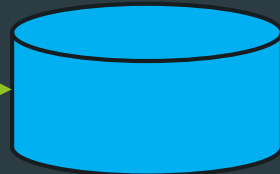
Setting Up-

Python/File Geodatabases-



Python 2.7

Base Data



Hazard Mitigation Inputs:

- Floodplains
- Dam Inundation
- Landslides
- Radon
- Environmental Hazards
- Levee
- Sinkholes
- Nuclear
- Earthquake
- Drought
- Fire - Urban/Wild

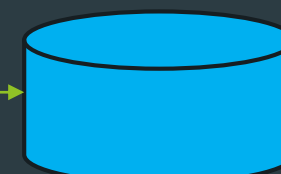
Hazmit Data



Intermediate Layers:

- Union
- Sort
- Dissolve

Production



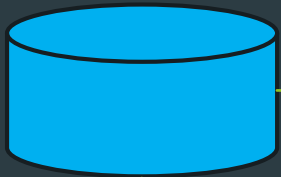
Hazmit Parcel Layer:
Product of Hazard Mitigation and
Intermediate Layers Reside

Underlying Work

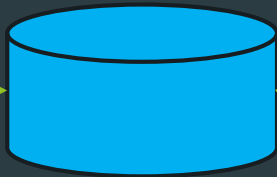
Publishing-

Migrating Data from Production

Production



York SDE



Hazard Parcel Layer:
-Delete Features
-Append Features from Hazard
Parcels from Production

Window Task Scheduler:

- Python Script
- Runs when we receive parcel updates

ArcGIS Server



Hazard Parcel Layer:
Stop/Start Service

AGOL Web Map



Hazard Parcel Layer:
Web Map Updated with newest
Hazard Parcel Information

Setting Up Schema for Hazard Parcel Layer

Hazard Parcel Layer

Information Derived 2 Different Way

- Parcel Fields Appended
- Hazard Fields Calculated

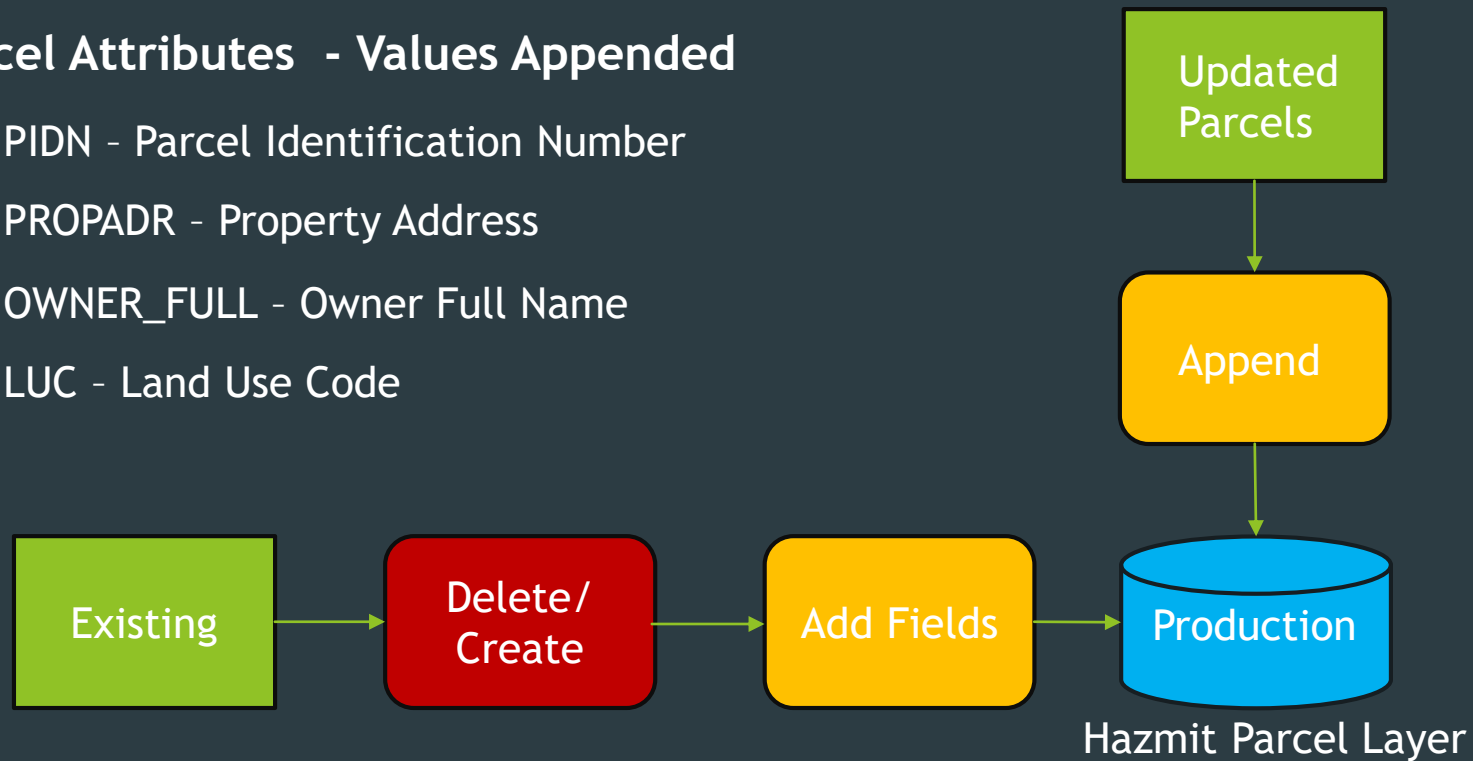
Parcel Attributes - Values Appended

PIDN - Parcel Identification Number

PROPADR - Property Address

OWNER_FULL - Owner Full Name

LUC - Land Use Code



Setting Up Schema

Hazard Attributes - Values Calculated

FLOOD - Flood Zone(100 or 500 yr.)

INUNDATION - Dam Inundation

LANDSLIDES - Landslide Area

RADON - Avg. Radon in Zip Code

ENIV_HAZARD - Hazard Route/SARA

LEVEE - Levee Area

SINKHOLE - Sinkhole Area

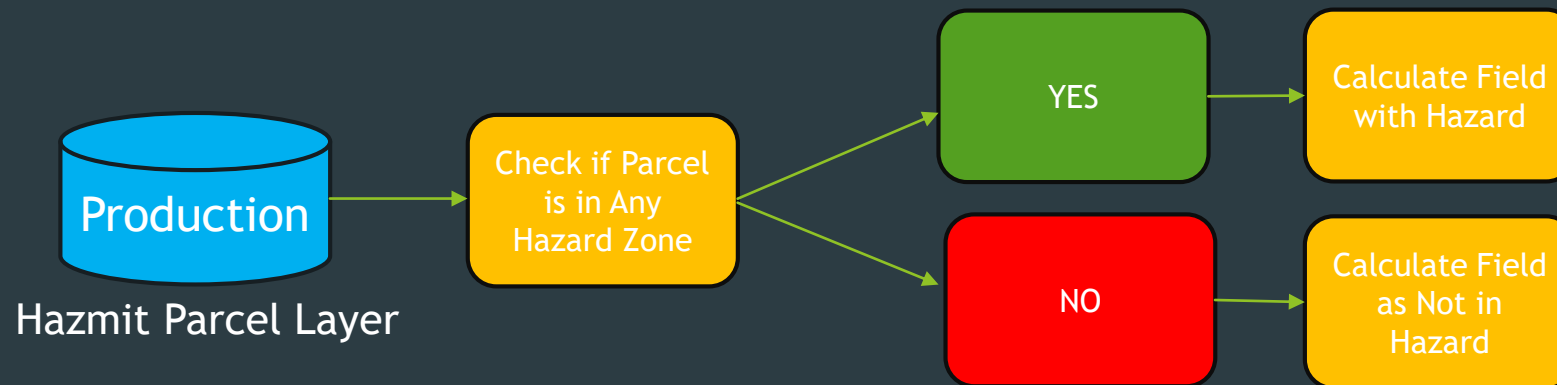
NUCLEAR - Nuclear Emergency Planning Zone

EARTHQUAKE - Earthquake (Very Slight or Slight)

DROUGHT - Potential Groundwater Stress

WILDFIRE - Wildfire Zone

URBANFIRE - Urban Fire Zone



Python Scripting - Initial Steps

Modules-

arcpy, os, sys, time, datetime, traceback, string, shutil, glob

```
# Import system modules
import arcpy, os, sys, time, datetime, traceback, string, shutil, glob
```

Inputs-

```
# Hazitmit Workspaces
arcpy.env.workspace = r"\\YCPFCFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Production.gdb"
Test_gdb = r"\\YCPFCFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Hazmit_Data.gdb"
Base_DataGDB = r"\\YCPFCFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Base_Data.gdb"

# Edit Hazmit Data
Hazmit_Data = os.path.join(arcpy.env.workspace, 'HazMit_Parcel')

# Variables coming from York SDE
YorkParcel = r"\\YCPFCFS1\GIS_Projects\IS\GIS_Connections\GIS@York.sde\York.GIS.Land_Base\York.GIS.Parcels"
York_Floodplain = r"\\YCPFCFS1\GIS_Projects\IS\GIS_Connections\GIS@York.sde\York.GIS.HYDRO_Floodplains"

# Variables coming from York Projects SDE
York_Projects_HazMit_Parcel = r"\\YCPFCFS1\GIS_Projects\IS\GIS_Connections\GIS@York_Projects.sde\York_Projects.GIS.HazMit_Parcel_WebViewer_Data"

# Base_Data.gdb variables
York_DamInundation = os.path.join(Base_DataGDB, "inundation_area")
York_Landslide = os.path.join(Base_DataGDB, "Landslide_Final")
York_Radon = os.path.join(Base_DataGDB, "Radon_Zipcodes_w_R_AVG")
York_Eniv_Hazard = os.path.join(Base_DataGDB, "SARA_HazardRt_Pipeline")
York_Levee = os.path.join(Base_DataGDB, "YorkCounty_LeveeData")
York_Sinkhole = os.path.join(Base_DataGDB, "Karst_Topography")
York_Nuclear = os.path.join(Base_DataGDB, "County_EPZ")
York_Earthquake = os.path.join(Base_DataGDB, "Earthquake")
York_Drought = os.path.join(Base_DataGDB, "stressed_area")
York_Wild_Fire = os.path.join(Base_DataGDB, "WildfireArea_Finished")
York_Urban_Fire = os.path.join(Base_DataGDB, "UrbanFire_TotalArea_Dssl2")
```

Python Scripting - Updating Parcel Attributes

Delete/Create Hazmit Parcel Layer-

```
arcpy.env.workspace = r"\\YCPDFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Production.gdb"
```

```
# Edit Hazmit Data  
Hazmit_Data = os.path.join(arcpy.env.workspace, 'HazMit_Parcel')
```

```
message (report,"Deleting Feature Class {}".format("HazMit_Parcel"))  
arcpy.Delete_management(Hazmit_Data)  
  
message (report,"Creating Feature Class {}".format("HazMit_Parcel"))  
arcpy.CreateFeatureclass_management(arcpy.env.workspace, 'HazMit_Parcel', "POLYGON")
```

Creating Fields and Appending Parcel Data-

```
# Variables coming from York SDE  
YorkParcel = r"\\YCPDFS1\GIS_Projects\IS\GIS_Connections\GIS@York.sde\York.GIS.Land_Base\York.GIS.Parcels"
```

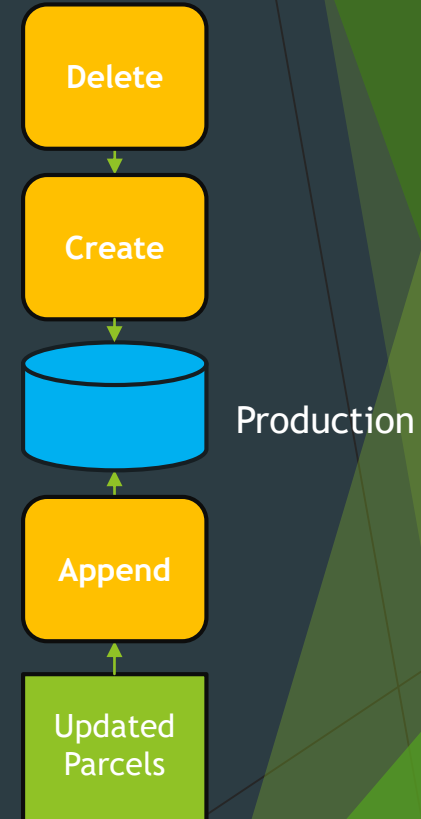
```
fieldNames = ["PIDN", "PROPADR", "OWNER_FULL", "LUC", "FLOOD", "INUNDATION", "LANDSLIDE", "RADON", "ENIV_HAZARD", \  
              "LEVEE", "SINKHOLE", "NUCLEAR", "EARTHQUAKE", "DROUGHT", "WILDFIRE", "URBANFIRE"]
```

```
for f in fieldNames:  
    message (report,"Adding Field {} to {}".format(f, Hazmit_Data))  
    if f != "OWNER_FULL":  
        arcpy.AddField_management(Hazmit_Data, f, "TEXT", "", "", 50, f, "NULLABLE", "")  
    else:  
        arcpy.AddField_management(Hazmit_Data, f, "TEXT", "", "", 255, f, "NULLABLE", "")
```

```
del f
```

```
message (report,"Appending {} Data from York_Edit to HazMit_Parcel_Edit".format(fieldNames[0:3]))  
arcpy.Append_management(YorkParcel, Hazmit_Data, "NO_TEST", \  
    "Shape_Length \\"Shape_Length\\" false true true 8 Double 0 0 ,First,#;\nShape_Area \\"Shape_Area\\" false true true 8 Double 0 0 ,First,#;\nPIDN \\"PIDN\\" true true false 50 Text 0 0 ,First,#,\\"+YorkParcel+\",PIDN,-1,-1;\nPROPADR \\"PROPADR\\" true true false 50 Text 0 0 ,First,#,\\"+YorkParcel+\",PROPADR,-1,-1;\nOWNER_FULL \\"OWNER_FULL\\" true true false 255 Text 0 0 ,First,#,\\"+YorkParcel+\",OWNER_FULL,-1,-1;\nLUC \\"LUC\\" true true false 50 Text 0 0 ,First,#,\\"+YorkParcel+\",LUC,-1,-1;\nFLOOD \\"FLOOD\\" true true false 50 Text 0 0 ,First,#;\nINUNDATION \\"INUNDATION\\" true true false 50 Text 0 0 ,First,#;\nLANDSLIDE \\"LANDSLIDE\\" true true false 50 Text 0 0 ,First,#;\nRADON \\"RADON\\" true true false 50 Text 0 0 ,First,#,\\"")
```

```
arcpy.CalculateField_management(Hazmit_Data, "OWNER_FULL", "!OWNER_FULL![:50]", "PYTHON")
```



Python Scripting - Looping thru Hazard Inputs

List of Inputs- Hazard Layers defined from Base Data GDB

```
# Base_Data.gdb variables
York_DamInundation = os.path.join(Base_DataGDB,"inundation_area")
York_Landslide = os.path.join(Base_DataGDB,"Landslide_Final")
York_Radon = os.path.join(Base_DataGDB,"Radon_Zipcodes_w_R_AVG")
York_Eniv_Hazard = os.path.join(Base_DataGDB,"SARA_HazardRt_Pipeline")
York_Levee = os.path.join(Base_DataGDB,"YorkCounty_LeveeData")
York_Sinkhole = os.path.join(Base_DataGDB,"Karst_Topography")
York_Nuclear = os.path.join(Base_DataGDB,"County_EPZ")
York_Earthquake = os.path.join(Base_DataGDB,"Earthquake")
York_Drought = os.path.join(Base_DataGDB,"stressed_area")
York_Wild_Fire = os.path.join(Base_DataGDB,"WildfireArea_Finished")
York_Urban_Fire = os.path.join(Base_DataGDB,"UrbanFire_TotalArea_Dsslv2")
```

```
Input_Features = [York_Floodplain,\
York_DamInundation,\
York_Landslide,\
York_Radon,\
York_Eniv_Hazard,\
York_Levee,\
York_Sinkhole,\
York_Nuclear,\
York_Earthquake,\
York_Drought,\
York_Wild_Fire,\
York_Urban_Fire]
```

Process Loops thru each Hazard Layer

```
for i in Input_Features:
    if i == York_Floodplain:
        print "Process Floodplain Input"

    if i == York_DamInundation:
        print "Process Dam Inundation Input"

    if i == York_Radon:
        print "Process Radon Input"

    if.....
```

Geoprocessing Steps in For Loop:

- 1- Union
- 2- Sort
- 3- Dissolve
- 4- Join
- 5- Calculate Field

Base Data



Hazard
Type

For Loop

Union
Sort
Dissolve



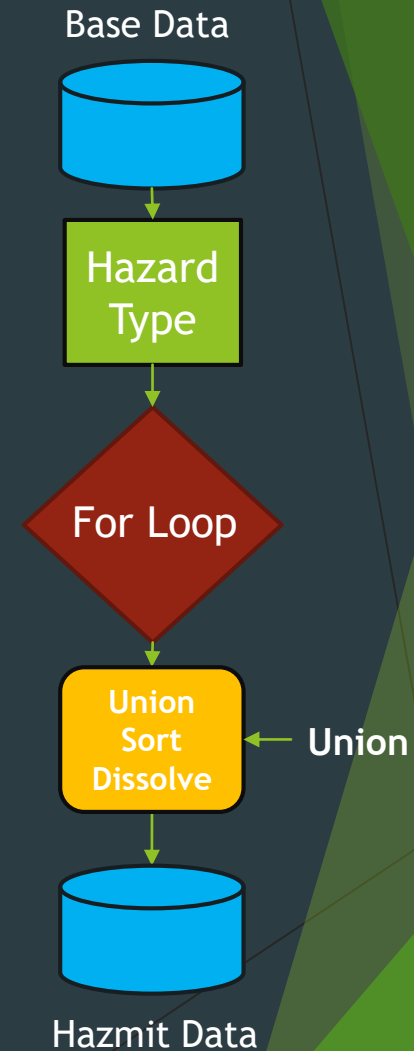
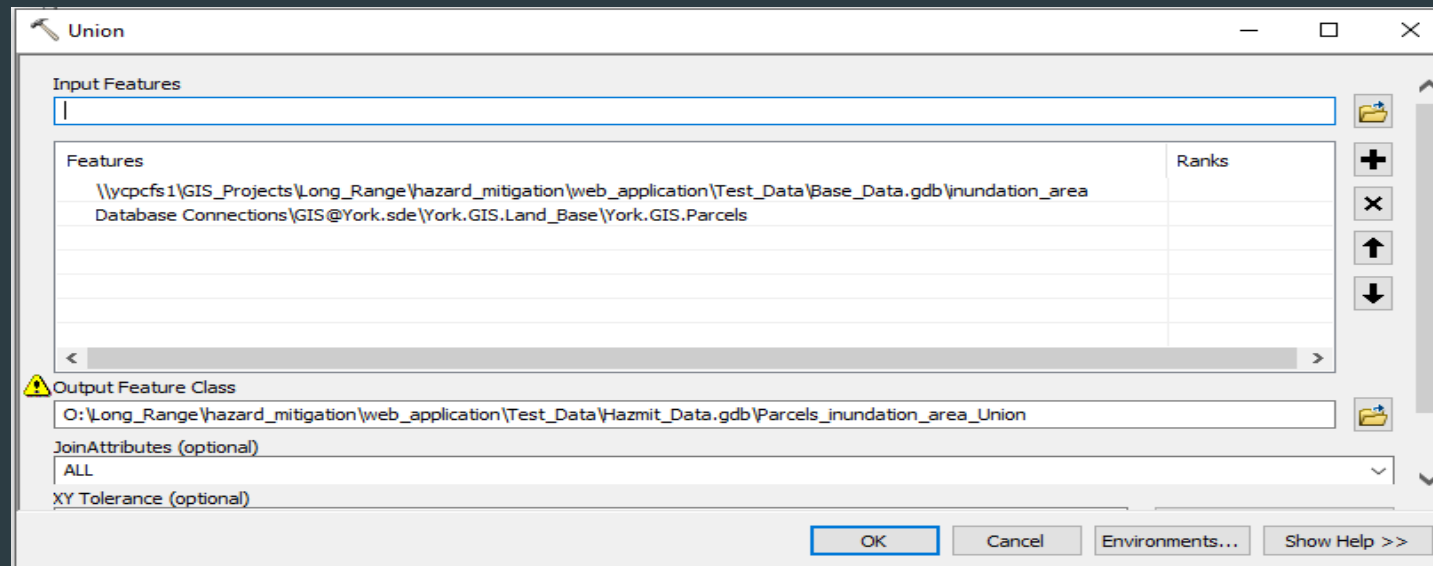
Python Scripting - Updating Hazard Attributes

Union: Updated Parcels and Hazard Input-

```
# Variables coming from York SDE
YorkParcel = r"\\YCPDFS1\GIS_Projects\IS\GIS_Connections\GIS@York.sde\York.GIS.Land_Base\York.GIS.Parcels"

Test_gdb = r"\\YCPDFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Hazmit_Data.gdb"

for i in Input_Features:
    if i == York_Floodplain:
        Haz_Union = "Parcels_" + i.split(".")[1] + "_Union"
        message (report,"Start Union with {} and {}".format(YorkParcel.split("\\")[-1],i.split(".")[1]))
        arcpy.Union_analysis (" "+YorkParcel+"; "+i+"", os.path.join(Test_gdb, Haz_Union), "ALL", "")
        message (report,"Union Complete")
    else:
        Haz_Union = "Parcels_" + i.split("\\")[-1] + "_Union"
        message (report,"Start Union with {} and {}".format(YorkParcel.split("\\")[-1],i.split("\\")[-1]))
        arcpy.Union_analysis (" "+YorkParcel+"; "+i+"", os.path.join(Test_gdb, Haz_Union), "ALL", "")
        message (report,"Union Complete")
```



Python Scripting - Updating Hazard Attributes

Sort: Union Layer Output-

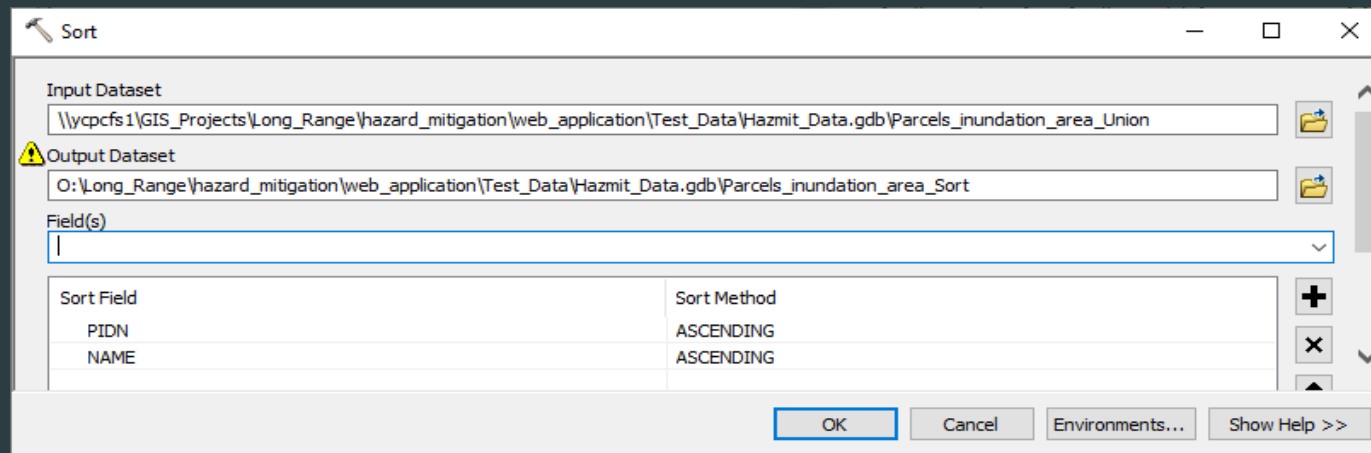
```
Test_gdb = r"\\YCPDFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Hazmit_Data.gdb"
```

```
Haz_Union = "Parcels_" + i.split(".")[1] + "_Union"
```

```
# Make a layer from the feature class  
arcpy.MakeFeatureLayer_management(os.path.join(Test_gdb, Haz_Union), "Selected_Layer")
```

```
if i == York_DamInundation:  
    #Haz_Select = "Parcels_" + i.split("\\")[1] + "_Select"  
    ii = i.split("\\")[1]  
    where = "NOT FID_" + str(ii) + " = -1 AND NOT PIDN = '' "  
  
    arcpy.SelectLayerByAttribute_management("Selected_Layer", "NEW_SELECTION", where)  
    #arcpy.Select_analysis("Selected_Layer", os.path.join(Test_gdb, Haz_Select), "")  
    message(report, "Start Sort Step for {}".format(i.split("\\")[1]))  
    arcpy.Sort_management("Selected_Layer", os.path.join(Test_gdb, "Parcels_" + i.split("\\")[1] + "_Sort"), [[sort_fields[0], "ASCENDING"], [sort_fields[3], "ASCENDING"]], "UR")
```

```
sort_fields = ["PIDN", "FLD_ZONE", "ZONE_SUBTY", "NAME", "R_AVG", "Envir_Hazard", "Feature_Name", "Karst_Feature", "NAME", "Hzrd_Zone", "TYPE_AREA", "Widfire_Type", "Urban_Type"]
```



List with General Fields Names

Sort

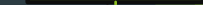
Union
Sort
Dissolve

Hazmit Data

Base Data



Hazard
Type



For Loop



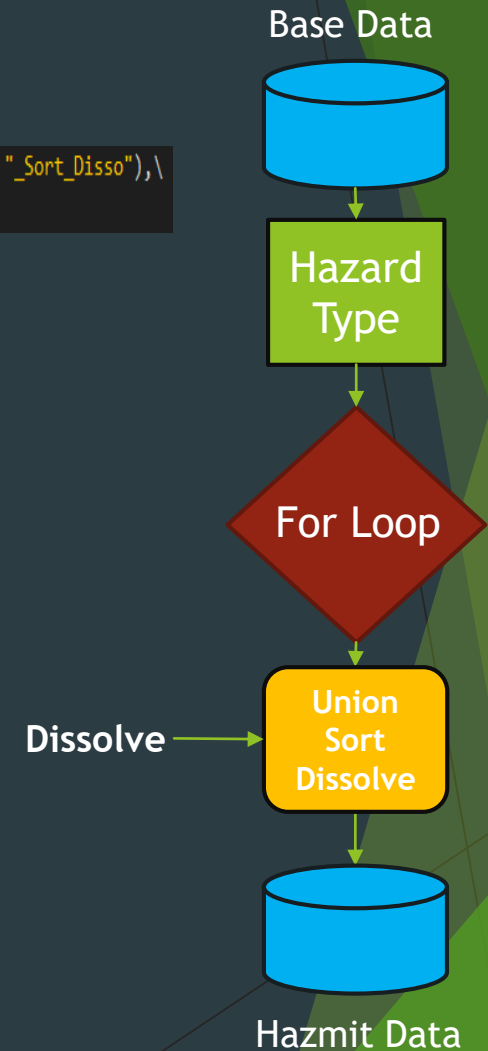
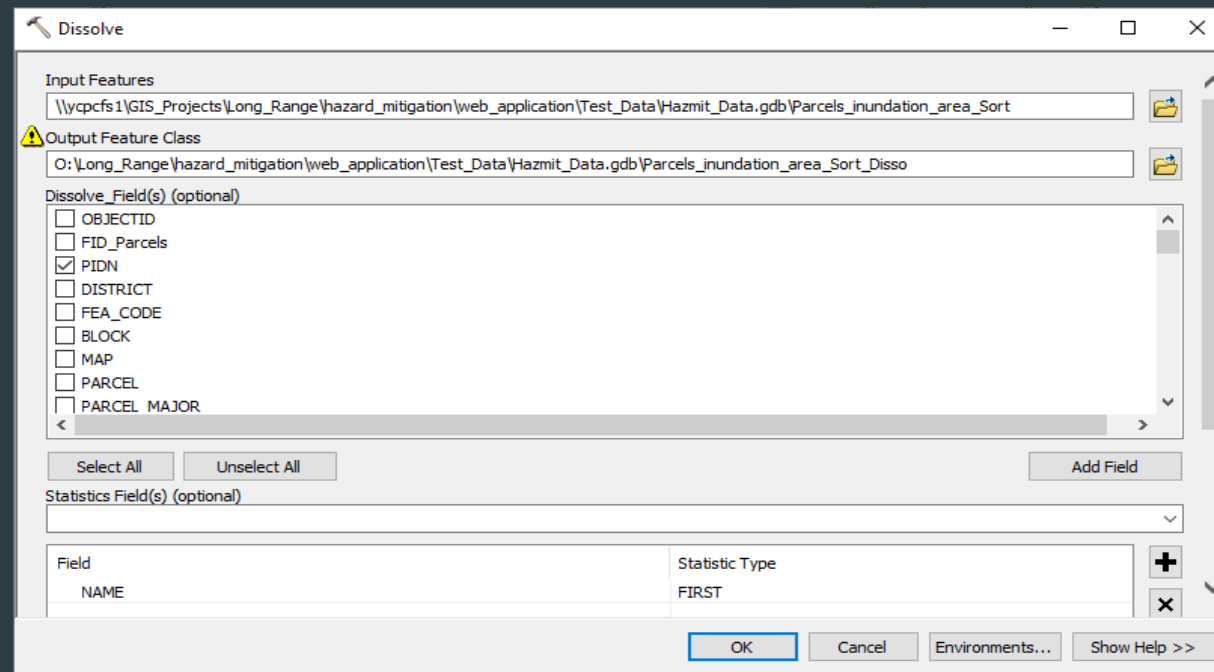
Python Scripting - Updating Hazard Attributes

Dissolve: Sort Layer Output-

```
Test_gdb = r"\\YCPFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Hazmit_Data.gdb"
```

```
arcpy.Dissolve_management(os.path.join(Test_gdb, "Parcels_" + i.split("\\")[-1] + "_Sort"), os.path.join(Test_gdb, "Parcels_" + i.split("\\")[-1] + "_Sort_Disso"),\n|"+str(sort_fields[0])+"", ""+str(sort_fields[3])+" FIRST", "MULTI_PART", "DISSOLVE_LINES")
```

```
sort_fields = ["PIDN", "FLD_ZONE", "ZONE_SUBTY", "NAME", "R_AVG", "Envir_Hazard", "Feature_Name", "Karst_Feature", "NAME", "Hzrd_Zone", "TYPE_AREA", "Widfire_Type", "Urban_Type"]
```



Python Scripting - Updating Hazard Attributes

Join: Dissolve Layer Output to Hazmit by PIDN-

```
Test_gdb = r"\\YCPDFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Hazmit_Data.gdb"
```

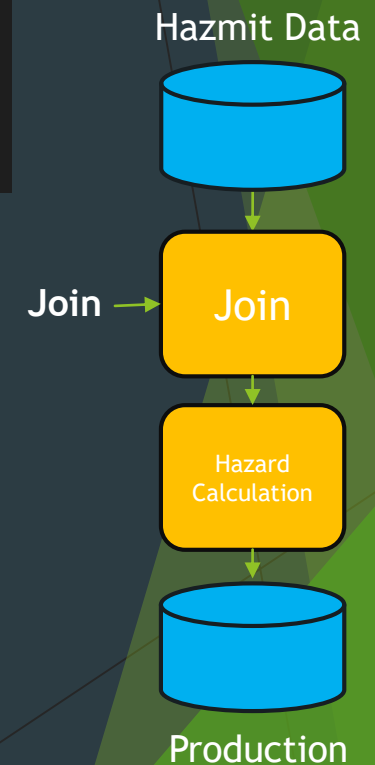
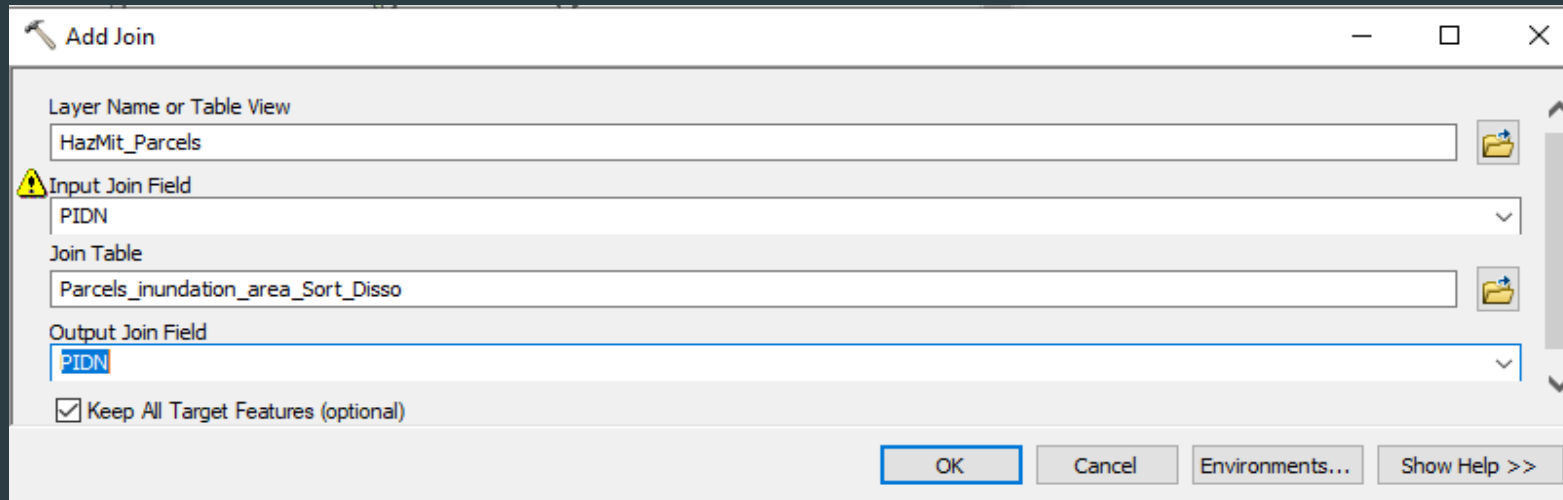
```
Sort_Dissolve = "Parcels_" + i.split("\\")[-1] + "_Sort_Disso"

# Make a layer from the feature class
arcpy.MakeFeatureLayer_management(os.path.join(Test_gdb, Sort_Dissolve), Sort_Dissolve)

# Make a layer from the feature class
arcpy.MakeFeatureLayer_management(os.path.join(arcpy.env.workspace, "HazMit_Parcels"), "HazMit_Parcels_Layer")

message (report,"Joining {} and {}".format("HazMit_Parcels_Layer", Sort_Dissolve))
arcpy.AddJoin_management( "HazMit_Parcels_Layer", ""+str(sort_fields[0])+"" , Sort_Dissolve, ""+str(sort_fields[0])+"" )
```

```
sort_fields = ["PIDN", "FLD_ZONE", "ZONE_SUBTY", "NAME", "R_AVG", "Envir_Hazard", "Feature_Name", "Karst_Feature", "NAME", "Hzrd_Zone", "TYPE_AREA", "Widfire_Type", "Urban_Type"]
```



Python Scripting - Updating Hazard Attributes

Calculation: Make Hazard Field Calculation-

```
if i == York_DamInundation:  
    message (report,"Calculating")  
    arcpy.CalculateField_management("HazMit_Parcels_Layer", "HazMit_Parcels.INUNDATION", "\"YES - \" + !\"+Sort_Dissolve+.FIRST_NAME! ", "PYTHON", "")  
    arcpy.SelectLayerByAttribute_management ("HazMit_Parcels_Layer", "NEW_SELECTION", "\"HazMit_Parcels.INUNDATION\" IS NULL")  
    arcpy.CalculateField_management("HazMit_Parcels_Layer", "HazMit_Parcels.INUNDATION", "\"Not in Inundation Area\"", "PYTHON", "")  
  
arcpy.RemoveJoin_management ("HazMit_Parcels_Layer")
```

Calculate Field

Input Table: HazMit_Parcels

Field Name: HazMit_Parcels.INUNDATION

Expression: "YES -" + !Parcels_inundation_area_Sort_Disso.FIRST_NAME!

Expression Type (optional): PYTHON_9.3

OK Cancel Environments... Show Help >>

Calculate Field

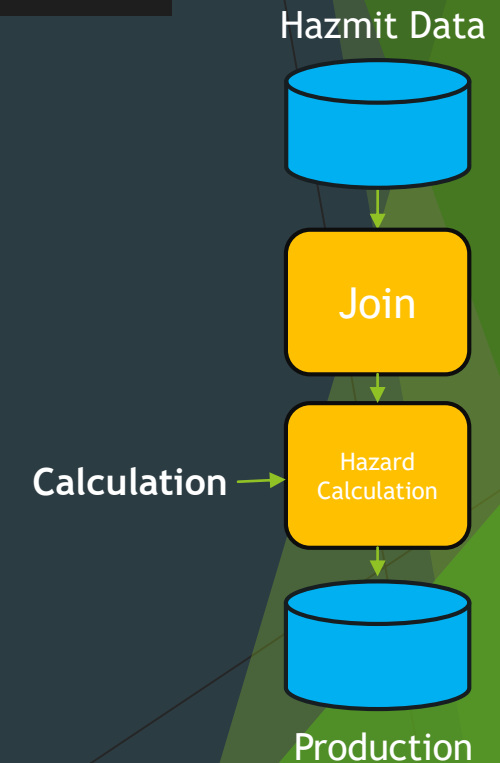
Input Table: HazMit_Parcels

Field Name: HazMit_Parcels.INUNDATION

Expression: "Not in Inundation Area"

Expression Type (optional): PYTHON

OK Cancel Environments... Show Help >>



Python Scripting - Moving Updates to Enterprise

Deleting Old Hazmit Information-

```
# Variables coming from York Projects SDE
York_Projects_HazMit_Parcel = r"\\YPCPFS1\GIS_Projects\IS\GIS_Connections\GIS@York_Projects.sde\York_Projects.GIS.HazMit_Parcel_WebViewer_Data"

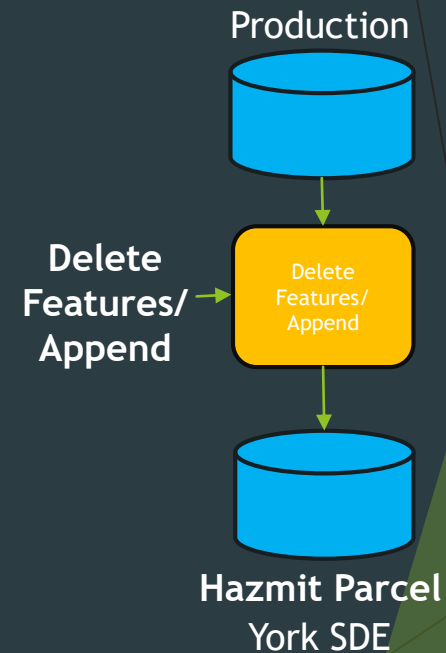
arcpy.env.workspace = r"\\YPCPFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Production.gdb"

# Edit Hazmit Data
Hazmit_Data = os.path.join(arcpy.env.workspace, 'HazMit_Parcel')

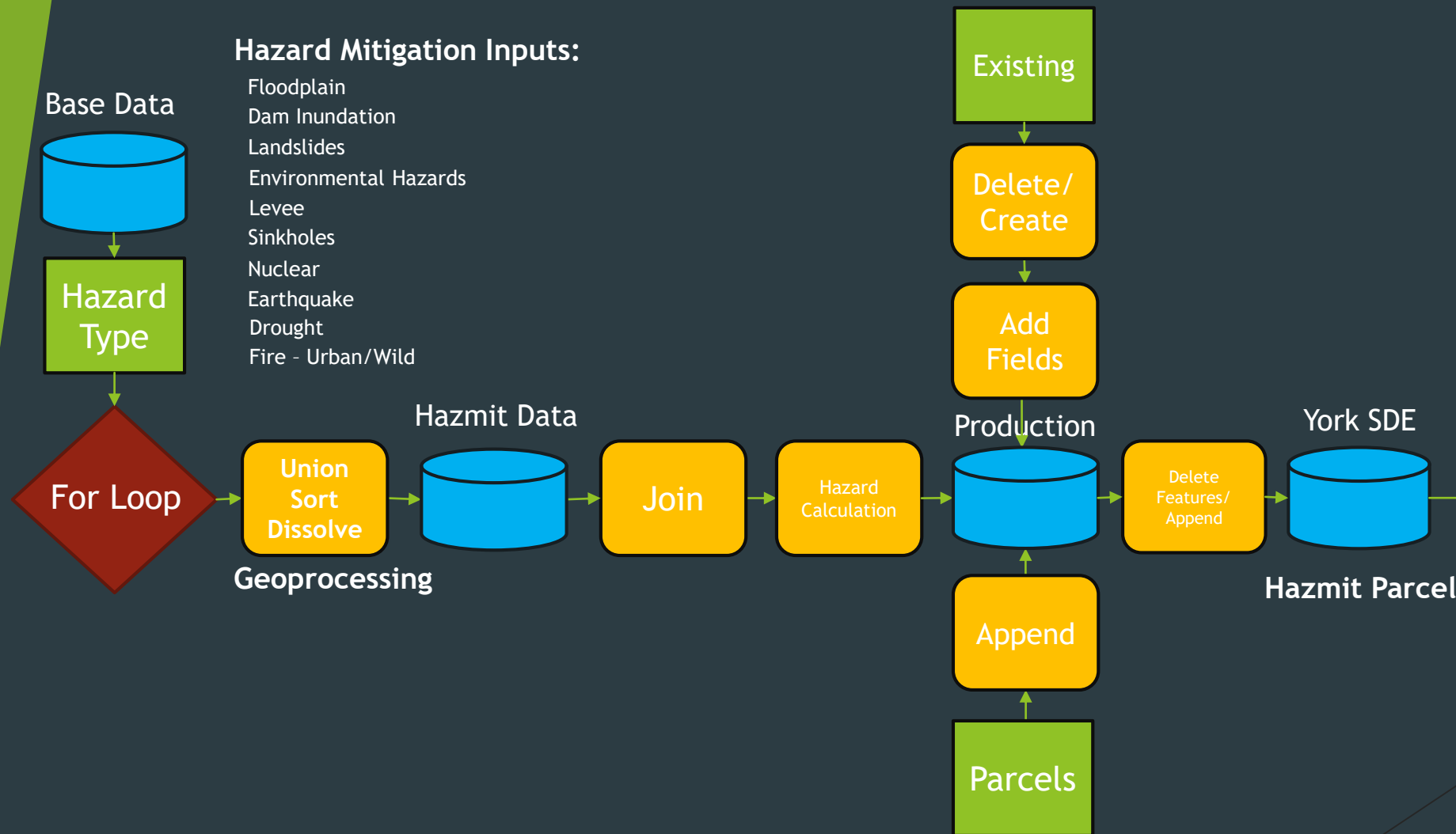
# Process: Delete Features
message (report,"Deleting Old Hazmit Information")
arcpy.DeleteFeatures_management(York_Projects_HazMit_Parcel)
```

Append New Hazmit Information-

```
# Process: Append
message (report,"Appending new hazmit information into York Projects")
arcpy.Append_management(Hazmit_Data, York_Projects_HazMit_Parcel, "NO_TEST", "\
PIDN \"PIDN\" true true false 13 Text 0 0 ,First,#,\"+Hazmit_Data+\",PIDN,-1,-1;\
PROPADR \"PROPADR\" true true false 8 Text 0 0 ,First,#,\"+Hazmit_Data+\",PROPADR,-1,-1;\
OWNER_FULL \"OWNER_FULL\" true true false 8 Text 0 0 ,First,#,\"+Hazmit_Data+\",OWNER_FULL,-1,-1;\
LUC \"LUC\" true true false 54 Text 0 0 ,First,#,\"+Hazmit_Data+\",LUC,-1,-1;\
FLOOD \"FLOOD\" true true false 81 Text 0 0 ,First,#,\"+Hazmit_Data+\",FLOOD,-1,-1;\
INUNDATION \"INUNDATION\" true true false 40 Text 0 0 ,First,#,\"+Hazmit_Data+\",INUNDATION,-1,-1;\
LANDSLIDE \"LANDSLIDE\" true true false 40 Text 0 0 ,First,#,\"+Hazmit_Data+\",LANDSLIDE,-1,-1;\
RADON \"RADON\" true true false 124 Text 0 0 ,First,#,\"+Hazmit_Data+\",RADON,-1,-1;\
ENIV_HAZARD \"ENIV_HAZARD\" true true false 40 Text 0 0 ,First,#,\"+Hazmit_Data+\",ENIV_HAZARD,-1,-1;\
LEVEE \"LEVEE\" true true false 40 Text 0 0 ,First,#,\"+Hazmit_Data+\",LEVEE,-1,-1;\
SINKHOLE \"SINKHOLE\" true true false 40 Text 0 0 ,First,#,\"+Hazmit_Data+\",SINKHOLE,-1,-1;\
NUCLEAR \"NUCLEAR\" true true false 40 Text 0 0 ,First,#,\"+Hazmit_Data+\",NUCLEAR,-1,-1;\
EARTHQUAKE \"EARTHQUAKE\" true true false 1 Text 0 0 ,First,#,\"+Hazmit_Data+\",EARTHQUAKE,-1,-1;\
DROUGHT \"DROUGHT\" true true false 4 Text 0 0 ,First,#,\"+Hazmit_Data+\",DROUGHT,-1,-1;\
WILDFIRE \"WILDFIRE\" true true false 8 Double 8 38 ,First,#,\"+Hazmit_Data+\",WILDFIRE,-1,-1;\
URBANFIRE \"URBANFIRE\" true true false 2 Text 0 0 ,First,#,\"+Hazmit_Data+\",URBANFIRE,-1,-1;\
Shape \"Shape\" false false true 0 Double 0 0 ,First,#;\
Shape.STArea() \"Shape.STArea()\" false false true 0 Double 0 0 ,First,#;\
Shape.STLength() \"Shape.STLength()\" false false true 0 Double 0 0 ,First,#\", "")
```



Python Scripting - Workflow/Results



Data for Application

Field	Value
OBJECTID	98620
Shape	Polygon
Shape_Length	391.553934
Shape_Area	8206.13623
PIDN	4600001026000
PROPADR	32 N MANHEIM ST
OWNER_FULL	HURSH WARREN A & SANDRA L
LUC	102
FLOOD	Not in any FEMA FLOOD ZONES
INUNDATION	YES - Indian Rock Dam
LANDSLIDE	Not in Landslide Area
RADON	11.7
ENIV_HAZARD	YES - Hazard Route/SARA Facility
LEVEE	Not in Levee Risk Area
SINKHOLE	YES - Area Susceptible to Sinkholes
NUCLEAR	Not in an Emergency Planning Zone
EARTHQUAKE	YES - Slight Risk
DROUGHT	Not Water Challenged
WILDFIRE	Not in Wildfire Zone
URBANFIRE	YES - Parcel Susceptible to Urban Fire
OBJECTID	10038
PIDN	4600001026000
NAME	Indian Rock Dam
Shape_Length	349.86931
Shape_Area	5195.864964

Arcade Expressions

Arcade Expressions -

- A simple, portable scripting language for creating custom visualizations and labeling expressions.
- Can be used in AGOL Web Maps Pop ups, JavaScript, ArcGIS Pro

Used in the Hazard Mitigation Web Map in Process-

The screenshot illustrates the configuration and use of Arcade Expressions in a web map. On the left, the 'Hazmit Parcel' layer is selected, and the 'Configure Pop-up' option is chosen from the context menu. The central panel, 'Pop-up Contents', shows the 'Display' dropdown set to 'A custom attribute display' and a 'CONFIGURE' button. Below this, the 'Attribute Expressions' section explains that expressions can be used to create new information from existing fields. A list of expressions is shown, including FLOOD, INUNDATION, LANDSLIDE, RADON, ENVIR HAZARD, LEVEE, SINKHOLE, and NUCLEAR. The 'Pop-up Media' section is also visible. On the right, a map view shows a parcel highlighted in green, with a pop-up window displaying the following information:

PROPERTY INFORMATION:
420001E0055A0
894 BIG MOUNT RD
YOUNG BELINDA A

HAZARD INFORMATION:
RADON:
Levels in your region are 7.3 pCi/L
[For More Radon Information](#)

EARTHQUAKE:
YES - Slight Risk
[For More Earthquake Information](#)

DROUGHT:
YES - Water Challenged Area
[For More Drought Information](#)

[Zoom to](#) [Get Directions](#)

Arcade Expressions - Creating

Add Arcade Expression-

Used Results from the Calculation Fields from the Hazmit Parcel Layer

Configure Pop-up

Hazmit Parcel

☒ Show Pop-ups

Pop-up Title

PROPERTY INFORMATION:

Pop-up Contents

Display: A custom attribute display

CONFIGURE

Configure Attributes

Attribute Expressions

Adding expressions allows you to create new information from existing fields for use in pop-ups.

ADD

- FLOOD [expression/expr0]
- INUNDATION [expression/expr1]
- LANDSLIDE [expression/expr2]
- RADON [expression/expr3]
- ENVIR HAZARD [expression/expr4]
- LEVEE [expression/expr5]
- SINKHOLE [expression/expr6]
- NUCLEAR [expression/expr7]

INUNDATION Edit

Expression

```
1 //var checkvalue = $feature.MUNI_NAME
2 var img_blank = 'https://www.esri.com/'
3 var img_show = 'https://developers.arcgis.com/'
4 var City = 'City'
5
6 if ($feature["INUNDATION"] != 'Not in Inundation Area'){
7   return 'INUNDATION:' + TextFormatting.NewLine + $feature.INUNDATION
8 }
9
10
```

Test

Globals Functions Constants Existing

\$feature

Layer: Hazmit Parcel

\$layer

Feature Layer: HazMit_Parcels_New

\$datastore

Web Map: Hazard Mitigation Template

\$map

Field	Value
OBJECTID	98620
Shape	Polygon
Shape_Length	391.553934
Shape_Area	8206.13623
PIDN	4600001026000
PROPADR	32 N MANHEIM ST
OWNER_FULL	HURSH WARREN A & SANDRA L
LUC	102
FLOOD	Not in any FEMA FLOOD ZONES
INUNDATION	YES - Indian Rock Dam
LANDSLIDE	Not in Landslide Area
RADON	11.7
ENIV_HAZARD	YES - Hazard Route/SARA Facility
LEVEE	Not in Levee Risk Area
SINKHOLE	YES - Area Susceptible to Sinkholes
NUCLEAR	Not in an Emergency Planning Zone
EARTHQUAKE	YES - Slight Risk
DROUGHT	Not Water Challenged
WILDFIRE	Not in Wildfire Zone
URBANFIRE	YES - Parcel Susceptible to Urban Fire
OBJECTID	10038
PIDN	4600001026000
NAME	Indian Rock Dam
Shape_Length	349.86931
Shape_Area	5195.864964

Arcade Expressions- Setup

Created 3 Arcade Expressions per Hazard Under Hazmit Parcel Layer-

1- Initial:

If Hazard Attribute Type in Hazard Parcel Layer is equal (==) to any hazard type, then label, else ignore

2- Hazard Link

If Hazard Attribute Type in Hazard Parcel Layer is equal (==) to any hazard type, then add Hazard Link, else ignore

3- Return URL in Hazard Link

If Hazard Attribute Type in Hazard Parcel Layer is equal (==) to any hazard type, then return Hazard URL, else ignore

Arcade Expressions- Initial

Initial:

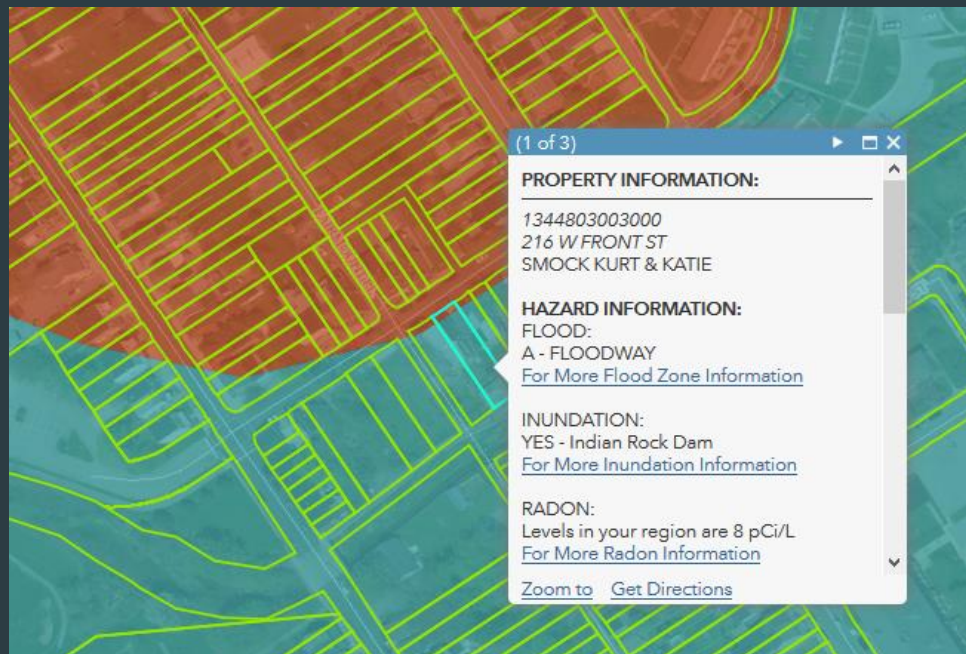
```
if ($feature["INUNDATION"] != 'Not in Inundation Area'){  
    return 'INUNDATION:' + TextFormatting.NewLine + $feature.INUNDATION + TextFormatting.NewLine;}←
```

Parcel not in Inundation Hazard Zone

York_Projects.GIS.HazMit_Parcels_WebViewer_Data							
	PIDN	FLOOD	INUNDATION	LANDSLIDE	RADON	ENIV_HAZARD	SINKHOLE
▶	0100903002200	Not in any FEMA FLOOD ZONES	Not in Inundation Area	Not in Landslide Area	12.8	YES - Hazard Route/SARA Facility	Not in Levee Risk Area

Parcel in Inundation Hazard Zone

York_Projects.GIS.HazMit_Parcels_WebViewer_Data							
	PIDN	FLOOD	INUNDATION	LANDSLIDE	RADON	ENIV_HAZARD	SINKHOLE
▶	1344803003300	A - FLOODWAY	YES - Indian Rock Dam	Not in Landslide Area	8	YES - Hazard Route/SARA Facility	Not in Levee Risk Area



Field	Value
OBJECTID	12078
Shape	Polygon
Shape_Length	307.912457
Shape_Area	3708.842763
PIDN	1344803003000
PROPADR	216 W FRONT ST
OWNER_FULL	SMOCK KURT & KATIE
LUC	103
FLOOD	A - FLOODWAY
INUNDATION	YES - Indian Rock Dam
LANDSLIDE	Not in Landslide Area
RADON	8
ENIV_HAZARD	YES - Hazard Route/SARA Facility
LEVEE	Not in Levee Risk Area
SINKHOLE	YES - Area Susceptible to Sinkholes
NUCLEAR	Not in an Emergency Planning Zone
EARTHQUAKE	YES - Slight Risk
DROUGHT	Not Water Challenged
WILDFIRE	Not in Wildfire Zone
URBANFIRE	YES - Parcel Susceptible to Urban Fire

Arcade Expressions- Hazard Link

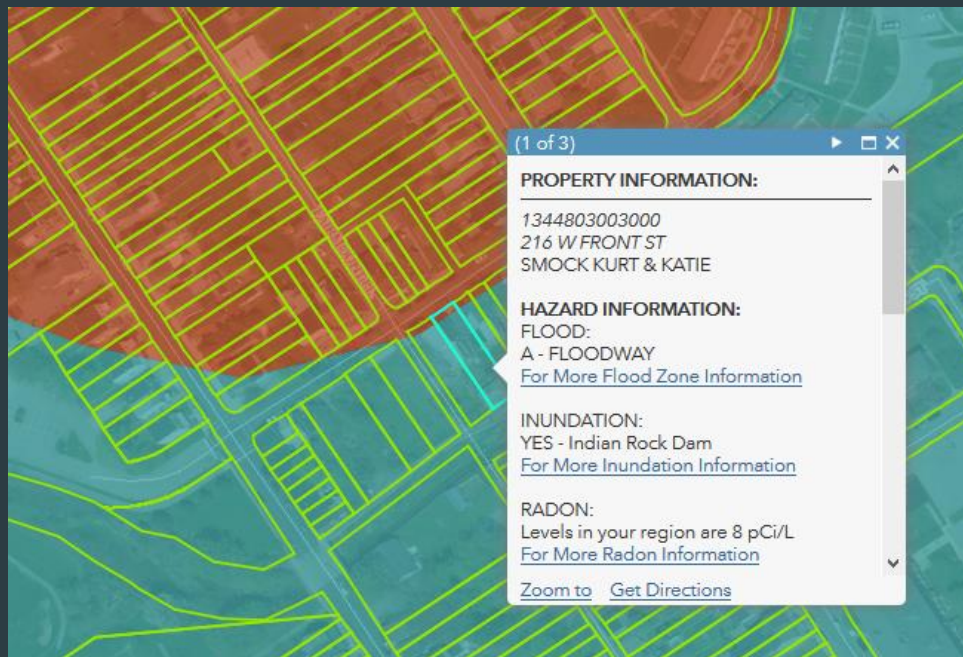
Hazard Link:

```
if ($feature["INUNDATION"] != 'Not in Inundation Area'){  
    return "For More Inundation Information" + TextFormatting.NewLine + TextFormatting.NewLine;
```

Return URL in Hazard Link :

```
var img_show = 'https://www.ycpc.org/DocumentCenter/View/1358/Dam-Failure'
```

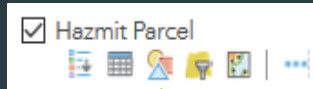
```
if ($feature["INUNDATION"] != 'Not in Inundation Area'){  
    return img_show;
```



Field	Value
OBJECTID	12078
Shape	Polygon
Shape_Length	307.912457
Shape_Area	3708.842763
PIDN	1344803003000
PROPADR	216 W FRONT ST
OWNER_FULL	SMOCK KURT & KATIE
LUC	103
FLOOD	A - FLOODWAY
INUNDATION	YES - Indian Rock Dam
LANDSLIDE	Not in Landslide Area
RADON	8
ENIV_HAZARD	YES - Hazard Route/SARA Facility
LEVEE	Not in Levee Risk Area
SINKHOLE	YES - Area Susceptible to Sinkholes
NUCLEAR	Not in an Emergency Planning Zone
EARTHQUAKE	YES - Slight Risk
DROUGHT	Not Water Challenged
WILDFIRE	Not in Wildfire Zone
URBANFIRE	YES - Parcel Susceptible to Urban Fire

Arcade Expressions- Custom Attribute Display

Popup Configuration of Hazmit Parcel:



Pop-up Contents

Display: A custom attribute display ▾

CONFIGURE

[Configure Attributes](#)

Hazard Link

Return URL for Hazard Link

Custom Attribute Display:

Initial Arcade Expression

Custom Attribute Display

Use the area below to define, format, and lay out the information you want to display.

Font [] **Size** small

{PIDN}
{PROPADR}
{OWNER_FULL}

HAZARD INFORMATION:

{expression/expr0}{expression/expr24}{expression/expr1}{expression/expr25}
{expression/expr2}{expression/expr26}{expression/expr3}{expression/expr27}
{expression/expr4}{expression/expr28}{expression/expr5}{expression/expr29}

OK **CANCEL**

Arcade Expressions- Custom Attribute Display

Hazard Information in Hazmit Parcel Popup:

Custom Attribute Display

Use the area below to define, format, and lay out the information you want to display.

HAZARD INFORMATION:

{expression/expr0}{expression/expr24}{expression/expr1}{expression/expr25}
{expression/expr2}{expression/expr26}{expression/expr3}{expression/expr27}
{expression/expr4}{expression/expr28}{expression/expr5}{expression/expr29}
{expression/expr6}{expression/expr30}{expression/expr7}{expression/expr31}
{expression/expr8}{expression/expr32}{expression/expr9}{expression/expr33}
{expression/expr10}{expression/expr34}{expression/expr11}{expression/expr35}

OK CANCEL

Results:

PROPERTY INFORMATION:

1344803005900
561 SMITH ST
LENKER MICHAEL P

HAZARD INFORMATION:

FLOOD:
A - FLOODWAY
[For More Flood Zone Information](#)

INUNDATION:
YES - Indian Rock Dam
[For More Inundation Information](#)

RADON:
Levels in your region are 8 pCi/L
[For More Radon Information](#)

[Zoom to](#) [Get Directions](#)

Add Field Name:

WILDFIRE {expression/expr10}
URBAN FIRE {expression/expr11}
Flood1 {expression/expr14}
Inundation1 {expression/expr15}
Landslide1 {expression/expr16}
Radon1 {expression/expr17}
EnvironmentalHazard1 {expression/expr18}
Levee1 {expression/expr19}
Sinkhole1 {expression/expr20}

Initial Link

Link Properties:

Create Link

URL: {expression/expr12}

Link Text: {expression/expr24}

Set Cancel

Return URL for Hazard Link

Hazard Link

Customized Reporting - Steps

1- Requirements/Considerations:

2- Setup:

- Create Toolbox/Add Script
- Source
- Parameters
- Setting up MXD

3- Underlying Python:

- Modules and Inputs
- Calling MXD in Script
- Creating Site-Specific Hazard List
- Adding Site Specific/Regional PDFs

Hazard Reporting Tool PDF



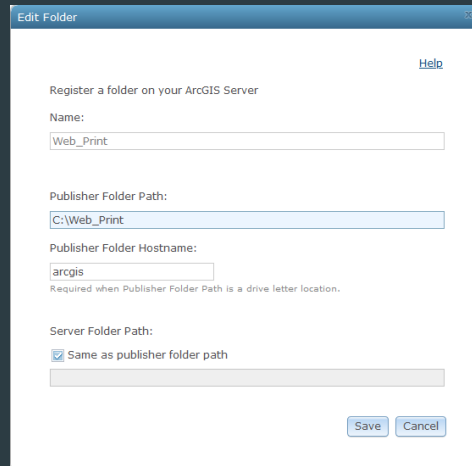
Customized Reporting Requirements/Considerations

Some things to consider:

1- Reports are generated by 13-digit Parcel Identification Number(PIDN)

2- Register Directories with ArcGIS Server Manager

Data Stores



Register a folder on your ArcGIS Server

Name: Web_Print

Publisher Folder Path: C:\Web_Print

Publisher Folder Hostname: arcgis

Required when Publisher Folder Path is a drive letter location.

Server Folder Path: ☒ Same as publisher folder path

Save Cancel

3- Inputs need to be recognized by Server

Server doesn't understand local paths

Local-

O:\Long_Range\hazard_mitigation\web_application\Test_Data\Production.gdb

UNC (Universal Naming Convention)-

\\YCPDFS1\GIS_Projects\Long_Range\hazard_mitigation\web_application\Test_Data\Production.gdb

4- Outputs/Intermediate Steps delivered to Server Scratch

Examples:

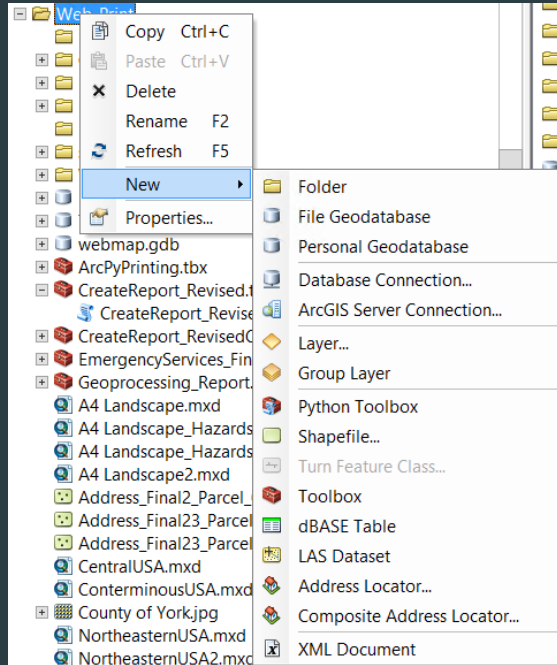
PDF_File = os.path.join(arcpy.env.scratchFolder + '\\' + output_name)

OutputFile = os.path.join(arcpy.env.scratchFolder + '\\' + "Appended_" + output_name)

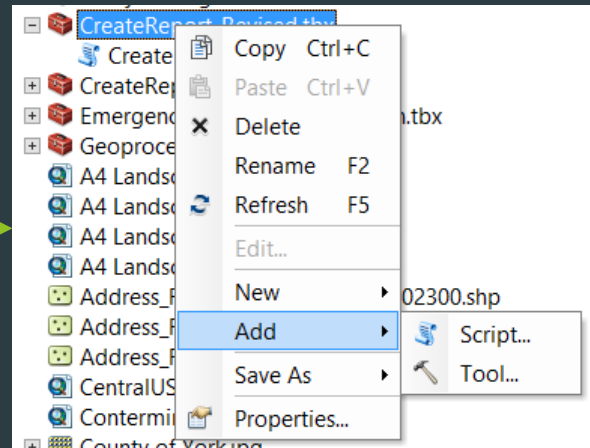
Customized Reporting - Setup on Server

Creating Toolbox on Registered Folder-

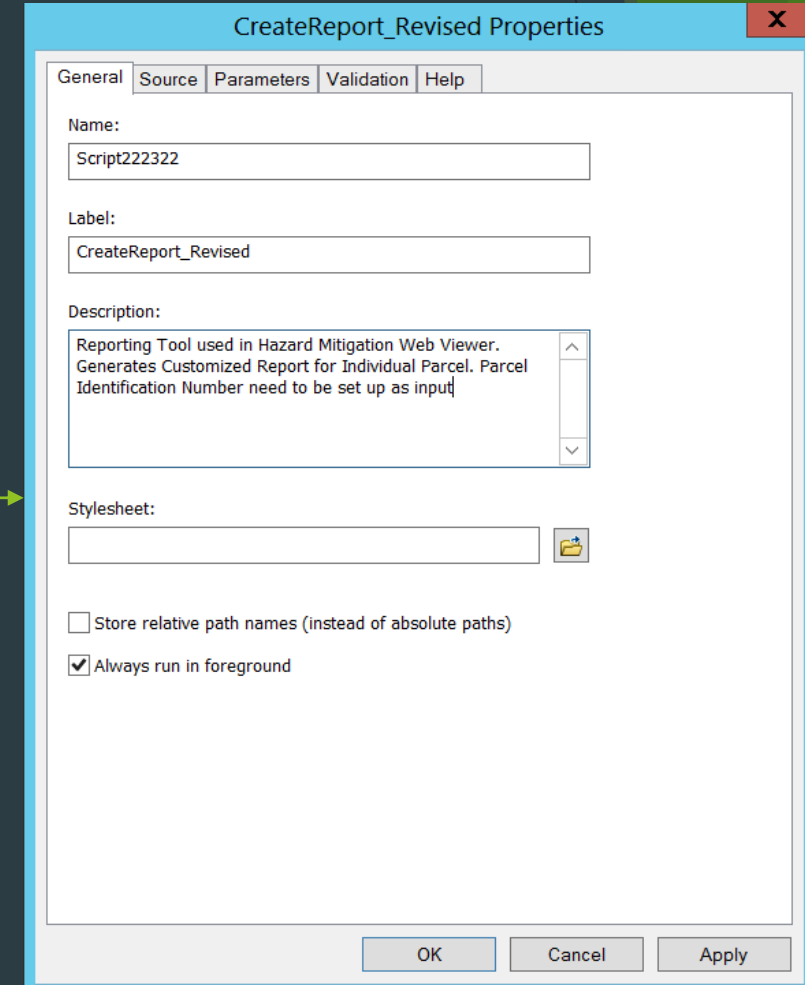
Create Toolbox-



Add Script-



Script Properties



Customized Reporting - Setup on Server

Source and Parameters-

Source- Call Python Script

The screenshot shows the 'CreateReport_Revised Properties' dialog box with the 'Source' tab selected. The 'Script File' field contains the path 'C:\Web_Print\PrintTool\Hazmit_Report.py'. Below this field, there are two checkboxes: 'Show command window when executing script' (unchecked) and 'Run Python script in process' (checked). The dialog has 'OK', 'Cancel', and 'Apply' buttons at the bottom.

Script File:
C:\Web_Print\PrintTool\Hazmit_Report.py

☐ Show command window when executing script
☒ Run Python script in process

Parameters- Set Inputs and Outputs

The screenshot shows the 'CreateReport_Revised Properties' dialog box with the 'Parameters' tab selected. It features a table with 'Display Name' and 'Data Type' columns. The first row is 'Name_List' with a 'String' data type, and the second row is 'Output_PDF' with a 'File' data type. Below the table is a 'Parameter Properties' section with a table of properties for the selected parameter. At the bottom, there is instructional text about adding new parameters.

Display Name	Data Type
Name_List	String
Output_PDF	File

Click any parameter above to see its properties below.

Property	Value
Type	Required
Direction	Input
MultiValue	No
Default	
Environment	
Filter	None
Obtained from	

To add a new parameter, type the name into an empty row in the name column, click in the Data Type column to choose a data type, then edit the Parameter Properties.

Input = 13 digit PIDN

Output = Hazard PDF

Customized Reporting - Setup

Parameters Properties-

Input = 13 Digit PIDN (Name_List)

Output = Hazard PDF (Output_PDF)

String
String
String Hidden
TIN
TIN Layer
Table
Table View
Terrain Layer
Text File
Tile Size
Time configuration
Time unit
Tool
Toolbox
Topo features
Topology
Topology Layer
Transformation function
VPF Coverage
VPF Table
Variant
Vertical factor
WCS Coverage
WMS Map
Weighted Overlay Table
Weighted Sum
Workspace
Workspace or Feature Dataset
Workspace or Raster Catalog
XY Domain
Z Domain

CreateReport_Revised Properties

General Source Parameters Validation Help

Display Name	Data Type
Name_List	String
Output_PDF	File

Click any parameter above to see its properties below.

Parameter Properties

Property	Value
Type	Required
Direction	Input
MultiValue	No
Default	
Environment	
Filter	None
Obtained from	

To add a new parameter, type the name into an empty row in the name column, click in the Data Type column to choose a data type, then edit the Parameter Properties.

Input
Input
Output

OK Cancel Apply

File
File
Folder
Formulated Raster
Fuzzy function
GPServer
GeoDataServer
Geodataset
Geometric Network
Geostatistical Layer
Geostatistical Search Neighborhood
Geostatistical Value Table
GlobeServer
Graph
Graph Data Table
Group Layer
Horizontal factor
INFO Expression
INFO Item
INFO Table
Image Service
Index
Internet Tiled Layer
LAS Dataset
LAS Dataset Layer
Layer
Layer File
Line
Linear unit
Long
M Domain

CreateReport_Revised Properties

General Source Parameters Validation Help

Display Name	Data Type
Name_List	String
Output_PDF	File

Click any parameter above to see its properties below.

Parameter Properties

Property	Value
Type	Derived
Direction	Output
MultiValue	No
Default	
Environment	
Filter	None
Obtained from	

To add a new parameter, type the name into an empty row in the name column, click in the Data Type column to choose a data type, then edit the Parameter Properties.

Output
Input
Output

OK Cancel Apply

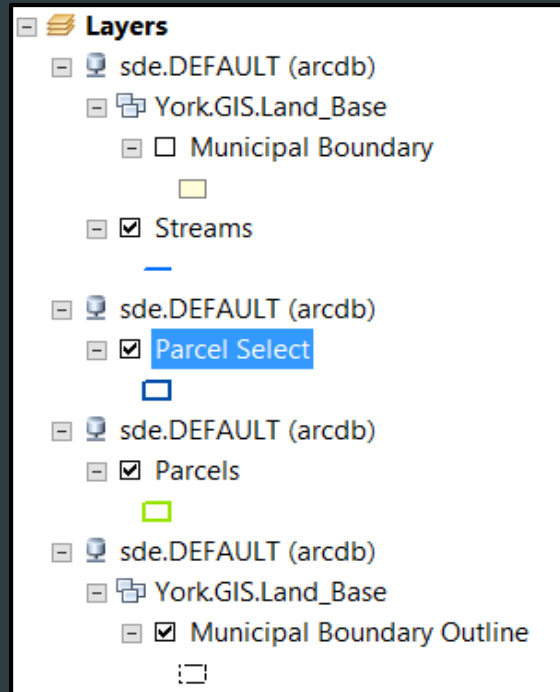
Customized Reporting - Set up MXD

Data Driven Pages

- Predefine DataDriven Pages in MXD
- Set Data Driven Pages Dynamic Text

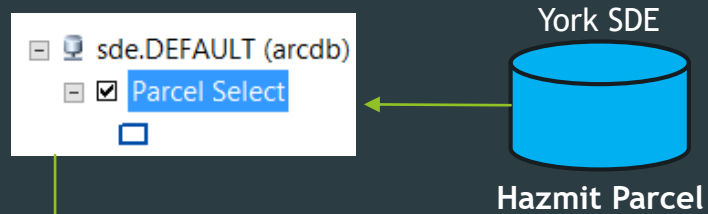
Definition Query on Hazmit Parcel Layer

- Layer Properties/Query Builder



Customized Reporting - Set up MXD

Setup Query on Hazmit Parcels



Definition Query:

PIDN = '53000IJ0188C0'

Query Builder...

Search Order...

Query Builder

Query Builder

OBJECTID
PIDN
FLOOD
INUNDATION
RADON

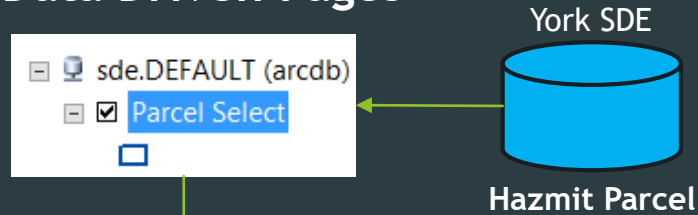
= <> Like
> >= And
< <= Or
_ % () Not
Is In Null Get Unique Values Go To:

SELECT * FROM York_Projects.GIS.HazMit_Parcels_WebViewer_Data
PIDN = '53000IJ0188C0'

Clear Verify Help Load... Save...
OK Cancel

Customized Reporting - Set up MXD

Data Driven Pages



Set Data Driven Pages Dynamic Text

York SDE
Hazmit Parcel



Page Attribute Dynamic Text

Index layer field:

OBJECTID

OBJECTID

PIDN

PROPADR

OWNER_FULL

LUC

FLOOD

INUNDATION

LANDSLIDE

RADON

ENV_HAZARD

LEVEE

SINKHOLE

NUCLEAR

EARTHQUAKE

DROUGHT

WILDFIRE

URBANFIRE

Shape.STArea()

Shape.STLength()

Predefine DataDriven Pages in MXD

Set Up Data Driven Pages

Definition Extent

What are data driven pages?
An index layer is used to produce multiple output pages using a single layout. Each page shows the data at a different extent. The extents are defined by the features in the index layer.

☒ Enable Data Driven Pages

Index Layer

Data Frame: Layers

Layer: Parcel Select

Name Field: PIDN

Sort Field: OBJECTID

☒ Sort Ascending

Optional Fields

Rotation: none

Spatial Reference: none

Page Number: none

Starting Page Number: 1

OK Cancel



Customized Reporting - Modules and Inputs

Modules-

import json, os, uuid, collections, arcpy, shutil

from PyPDF2 import PdfFileMerger

```
import json, os, uuid, collections, arcpy, shutil
from PyPDF2 import PdfFileMerger

from fpdf import FPDF
```

Download and Install PyPDF2 Library
<https://pypi.org/project/PyPDF2/>
python -m pip install pypdf2

Inputs-

```
#mxd = arcpy.mapping.MapDocument(arcpy.GetParameterAsText(0))
mxd = arcpy.mapping.MapDocument(r"C:\Web_Print\A4 Landscape2.mxd")

NameList = arcpy.GetParameterAsText(0)
#NameList = "36000KH0175B0"

output_name = str(NameList) + '.pdf'
PDF_File = os.path.join(arcpy.env.scratchFolder + '\\', output_name)
OutputFile = os.path.join(arcpy.env.scratchFolder + '\\', "Appended_" + output_name)

flood_pdf = r"C:\Web_Print\Report\Flooding.pdf"
inundation_pdf = r"C:\Web_Print\Report\Dam Failure.pdf"
landslide_pdf = r"C:\Web_Print\Report\Landslide.pdf"
radon_pdf = r"C:\Web_Print\Report\Radon Exposure.pdf"
hazard_pdf = r"C:\Web_Print\Report\Environmental Hazards.pdf"
env_hazard = r"C:\Web_Print\Report\Environmental Hazards.pdf"
levee_pdf = r"C:\Web_Print\Report\Levee Failure.pdf"
sinkhole_pdf = r"C:\Web_Print\Report\Subsidence Sinkhole.pdf"
nuclear_pdf = r"C:\Web_Print\Report\Nuclear Incidents.pdf"
earthquake_pdf = r"C:\Web_Print\Report\Earthquake.pdf"
drought_pdf = r"C:\Web_Print\Report\Drought.pdf"
wildfire_pdf = r"C:\Web_Print\Report\Wildfire.pdf"
urbanfire_pdf = r"C:\Web_Print\Report\Urban Fire Explosion.pdf"
extreme_pdf = r"C:\Web_Print\Report\Extreme Temperatures.pdf"
civildisturb_pdf = r"C:\Web_Print\Report\Civil Disturbance.pdf"
hailstorm_pdf = r"C:\Web_Print\Report\Hailstorm.pdf"
hurricane_pdf = r"C:\Web_Print\Report\Hurricane Tropical Storm Noreaster.pdf"
invasive_pdf = r"C:\Web_Print\Report\Invasive Species.pdf"
lightning_pdf = r"C:\Web_Print\Report\Lightning Strike.pdf"
massfood_pdf = r"C:\Web_Print\Report\Mass Food and Animal Contamination.pdf"
pandemic_pdf = r"C:\Web_Print\Report\Pandemic and Infectious Disease.pdf"
terrorism_pdf = r"C:\Web_Print\Report\Terrorism.pdf"
tornado_pdf = r"C:\Web_Print\Report\Tornado Windstorm.pdf"
winterstorm_pdf = r"C:\Web_Print\Report\Winter Storm.pdf"

arcpy.SetParameterAsText(1, OutputFile)
```

Input called in Toolbox Script
13 Digit PIDN (e.g 36000KH017500)

PDFs Stored on Registered Folder on
Web Server

Lists-

```
pdfs = []
sitespecific = []
```

Where PDFs and Text Information is Stored

Output called in Toolbox Script
Hazard PDF

Customized Reporting - Calling MXD in Script

MXD Variable

```
#mxd = arcpy.mapping.MapDocument(arcpy.GetParameterAsText(0))
mxd = arcpy.mapping.MapDocument(r"C:\Web_Print\A4 Landscape2.mxd")
```

Calling Parcel Select Layer from MXD

```
NameList = arcpy.GetParameterAsText(0)
#NameList = "36000KH0175B0"
```

```
for lyr in arcpy.mapping.ListLayers(mxd):
    if lyr.name == "Parcel Select":
        lyr.definitionQuery = "PIDN = '"+NameList+"'"
        with arcpy.da.SearchCursor(lyr, fieldNames) as cursor:
            for row in cursor:
                arcpy.AddMessage(u'{0}, {1}, {2}, {3}, {4}, {5}, {6}, \
{7}, {8}, {9}, {10}, {11}, {12}'\
.format(row[0], row[4], row[5], row[6], row[7], row[8],
```

Refresh DataDriven Pages from MXD

```
for indexPage in ddp.selectedPages:
    ddp.currentPageID = indexPage
    ddp.exportToPDF(PDF File, "CURRENT")
```

Append DataDriven MXD to PDF List

```
output_name = str(NameList) + '.pdf'
PDF_File = os.path.join(arcpy.env.scratchFolder + '\\\\' + output_name)
```

```
pdfs = []
```

```
pdfs.append(PDF_File)
```



Customized Reporting - Adding Site Specific PDFs

PDF Per Site Specific Hazard on Parcel Select Definition Query



```
for lyr in arcpy.mapping.ListLayers(mxd):
    if lyr.name == "Parcel Select":
        lyr.definitionQuery = "PIDN = '" + NameList + "'"
        with arcpy.da.SearchCursor(lyr, fieldNames) as cursor:
            for row in cursor:
                arcpy.AddMessage(u'{0}, {1}, {2}, {3}, {4}, {5}, {6}, {7}, {8}, {9}, {10}, {11}, {12}'\
                    .format(row[0], row[4], row[5], row[6], row[7], row[8], row[9], row[10], row[11], row[12], row[13], row[14], row[15]))

                if row[4] != 'Not in any FEMA FLOOD ZONES':
                    FloodFile = os.path.join(arcpy.env.scratchFolder + '\\', "Flood_" + output_name)
                    shutil.copy2(flood_pdf, FloodFile)
                    pdfs.append(FloodFile)
                    sitespecific.append("Flooding Information")

                if row[5] != 'Not in Inundation Area':
                    InundationFile = os.path.join(arcpy.env.scratchFolder + '\\', "Inundation_" + output_name)
                    shutil.copy2(inundation_pdf, InundationFile)
                    pdfs.append(InundationFile)
                    sitespecific.append("Inundation Information")

                if row[6] != 'Not in Landslide Area':
                    LandslideFile = os.path.join(arcpy.env.scratchFolder + '\\', "Landslide_" + output_name)
                    shutil.copy2(landslide_pdf, LandslideFile)
                    pdfs.append(LandslideFile)
                    sitespecific.append("Landslide Information")

                if row[7] != 'N/A':
                    RadonFile = os.path.join(arcpy.env.scratchFolder + '\\', "Radon_" + output_name)
                    shutil.copy2(radon_pdf, RadonFile)
                    pdfs.append(RadonFile)
                    sitespecific.append("Radon Information")

                if row[8] != 'Not in Environmental Hazard Area':
                    HazardFile = os.path.join(arcpy.env.scratchFolder + '\\', "Hazard_" + output_name)
                    shutil.copy2(hazard_pdf, HazardFile)
                    pdfs.append(HazardFile)
                    sitespecific.append("Environmental Hazard Information")

                if row[9] != 'Not in Levee Risk Area':
                    LeveeFile = os.path.join(arcpy.env.scratchFolder + '\\', "Levee_" + output_name)
                    shutil.copy2(levee_pdf, LeveeFile)
                    pdfs.append(LeveeFile)
                    sitespecific.append("Levee Information")
```

Input 13 Digit PIDN Number

Field Names in Parcel Select

```
fieldNames = ["PIDN", "PROPADR", "OWNER_FULL", "LUC", "FLOOD", "INUNDATION", "LANDSLIDE", "RADON", "ENV_HAZARD", "\
    "LEVEE", "SINKHOLE", "NUCLEAR", "EARTHQUAKE", "DROUGHT", "WILDFIRE", "URBANFIRE"]
```

Checking Value Types from
Parcel Select within Search Cursor

Append Text to Site Specific List

Append PDF to PDF List

Customized Reporting - Creating Site-Specific Hazard List

Custom PDF Class-

```
class CustomPDF(FPDF):  
    def header(self):  
        # Set up a logo  
        self.image(r'C:\Web_Print\YCPC Logo.jpg', 180, 18, 22)  
        self.set_font('Helvetica', 'B', 18)  
  
        self.ln(20)  
  
        # Add an address  
        self.cell(5)  
        self.set_text_color(31, 73, 125)  
        self.cell(20, 5, 'SITE-SPECIFIC HAZARD LIST FOR {}'.format(NameList), ln=1)  
        self.set_line_width(1)  
        self.set_draw_color(253, 185, 37)  
        self.line(10, 40, 200, 40)  
  
        # Line break  
        self.ln(10)  
  
    def footer(self):  
        self.set_y(-10)  
  
        self.set_font('Arial', 'I', 8)  
  
        # Add a page number  
        page = 'Page ' + str(self.page_no()) + '/{nb}'  
        self.cell(0, 10, page, 0, 0, 'C')  
  
    def create_pdf(pdf_path):  
        pdf = CustomPDF()  
        # Create the special value {nb}  
        pdf.alias_nb_pages()  
        pdf.add_page()  
        pdf.set_font('Times', 'B', 15)  
        line_no = 1  
        for site in sitespecific:  
            pdf.set_text_color(31, 73, 125)  
            pdf.cell(10, 10, txt="{} - {}".format(line_no, site), ln=1)  
            line_no += 1  
        pdf.output(pdf_path)
```

Defines Logo

Defines Title

SITE-SPECIFIC HAZARD LIST FOR 40000FH0021C0

- 1 - Radon Information
- 2 - Earthquake Information
- 3 - Wildfire Information

```
sitespecific = ['Radon Information',\  
                'Earthquake Information',\  
                'Wildfire Information']
```



Customized Reporting - Adding Regional PDFs

Adding Regional Hazard List PDF to PDF List

```
RegionalFile = os.path.join(arcipy.env.scratchFolder + '\\\' + "RegionalList_" + output_name)
shutil.copy2(regionalList, RegionalFile)
pdfs.append(RegionalFile)
```

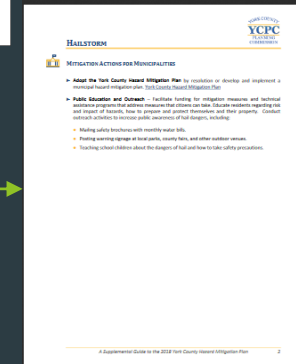
Adding Regional Hazard PDF to PDF List

```
RegionalFile = os.path.join(arcipy.env.scratchFolder + '\\\' + "RegionalList_" + output_name)
shutil.copy2(regionalList, RegionalFile)
pdfs.append(RegionalFile)
```

```
ExtremeFile = os.path.join(arcipy.env.scratchFolder + '\\\' + "Extreme_" + output_name)
shutil.copy2(extreme_pdf, ExtremeFile)
pdfs.append(ExtremeFile)
```

```
CivilDisturbFile = os.path.join(arcipy.env.scratchFolder + '\\\' + "CivilDisturb_" + output_name)
shutil.copy2(civildisturb_pdf, CivilDisturbFile)
pdfs.append(CivilDisturbFile)
```

Regional Hazard List/ PDF Per Regional Hazard



Merging PDFs from PDF List

```
pdfs = ['u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\SiteSpecificList_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Flood_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Radon_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Hazard_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Sinkhole_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Nuclear_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Earthquake_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Urbanfire_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\RegionalList_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Extreme_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\CivilDisturb_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Hailstorm_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Hurricane_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Invasive_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Lightning_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\MassFood_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Pandemic_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Terrorism_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Tornado_36000KH0175B0.pdf',
'u'C:\\Users\\ADMINI~1.YCP\\AppData\\Local\\Temp\\2\\scratch\\Wintersform_36000KH0175B0.pdf']
```

```
if not sys.warnoptions:
    import warnings
    warnings.simplefilter("ignore")
    merger = PdfFileMerger()

    for pdf in pdfs:
        merger.append(pdf)

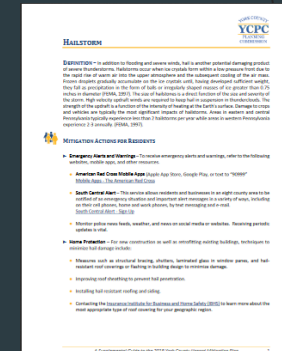
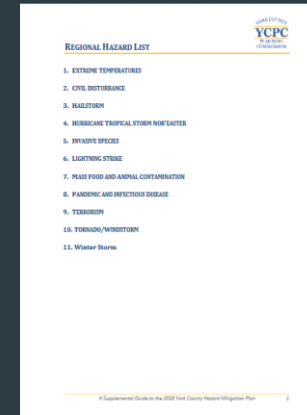
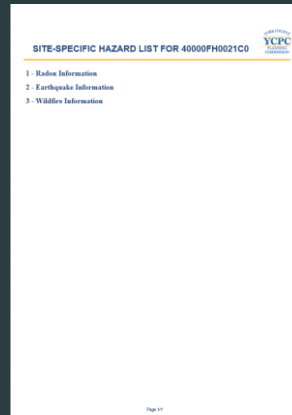
    merger.write(OutputFile)
```

From PyPDF2 Library

```
output_name = str(NameList) + '.pdf'
PDF_File = os.path.join(arcipy.env.scratchFolder + '\\\' + output_name)
OutputFile = os.path.join(arcipy.env.scratchFolder + '\\\' + "Appended_" + output_name)

arcipy.SetParameterAsText(1, OutputFile)
```

DataDriven	Page PDF	Site Specific Hazard List	PDF Per Site Specific Hazard	Regional Hazard List	PDF Per Regional Hazard
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Emergency Service Contact List

Sources and Links-

Hazard Mitigation Viewer

<http://yorkcountypa.maps.arcgis.com/apps/webappviewer/index.html?id=c4d2d3a465c84a60a8e5773a3b76107e>

Hazard Mitigation Update Script

<https://github.com/simora123/HazardMitigationUpdate.py/blob/master/HazMitUpdate.py>

Hazmit Reporting Tool Process

<https://github.com/simora123/HazmitReport>

Thank you!

Joseph P Simora, GISP

Senior GIS Analyst

York County Planning Commission(YCPC)

28 East Market Street

York, PA 17401-1580

717-771-9870 x1724

jsimora@ycpc.org

