

Photogrammetry and Location & Surveys Units Products to Support Planning and Design Activities – Should be requested by Central or Division Project Managers						
Product	WHAT It Provides	WHAT it is used for	Typical Scale	WHEN is it typically ordered?	Units involved	How long to deliver product?
Controlled Aerial Photography (individual photo frames)	Overhead frame aerial photographs flown in leaf off flight season in anticipation of formal mapping/surveys request made at a later date outside of annual request cycle. These flights are typically low altitude flights that cover multiple corridors or alignments that are still under consideration for selection. Photo identifiable targets used to control the aerial photography are set in advance of the photo mission.	To have leaf off aerial photography available for out of cycle mapping/surveys requests. Commonly referred to as “fly and sit”.	Aerial photos are defined by coverage area, and planned mapping product. Use standard scale for planned mapping product.	Prior to or during leaf off flight season. When preferred corridor or alignment is selected outside of leaf off flight season. <b>Best Practice</b> Annual Mapping/Surveys Request Cycle <b>When Necessary</b> Out of Cycle	Photogrammetry plans flight and control configuration, and acquires photos. Location & Surveys sets and ground surveys photo identifiable targets called “panels”.	1-4 weeks from receipt of verified aerial photography limits
Digital Mosaic (raster digital image mapping)	Project specific georeferenced raster digital image product that aligns with existing statewide geospatial datasets. 2-D raster digital image (*.sid) file. Raster digital image products do not have a scale. The Ground Sample Distance (GSD) of a pixel defines the product detail. This product has <u>no vertical information</u> derived from its photo mission. Existing statewide LiDAR elevation data available upon request. Municipal property data available upon request.	Used for corridor studies, functional design work, and corridor selection for large projects. Can be used to detect and identify land cover change in dynamic areas as project development and design are ongoing.	<b>Standard</b> 0.5 ft GSD (use 1”=100’ or 1”=200’) <b>Alternative</b> use 1”=400’ for 1.0 ft GSD use 1”=50’ for 0.25 ft GSD	Start of project development. Existing statewide orthophotos are old or do not reflect current land cover. <b>Best Practice</b> Annual Mapping/Surveys Request Cycle <b>When Necessary</b> Out of Cycle	Photogrammetry plans flight, acquires photos, and produces mapping. No Location and Surveys involvement.	1-3 months after aerial photography completed. Requires receipt of verified mapping limits in advance of photo mission.
Orthophotography (raster digital image mapping + DEM with TIN)	Project specific georeferenced raster digital image product with elevation data that aligns with existing statewide geospatial datasets. 2-D raster digital image (*.sid) file, 3-D (digital elevation model) DEM (.dgn) file with 20 ft spaced elevation points and break lines on roads and significant water features, and corresponding triangulated irregular network (TIN) file. Municipal property data available upon request.	Used for corridor studies, functional design work, and corridor selection for large projects where both horizontal and vertical accuracy is required. This is the most common coverage ordered during planning studies for new location projects.	<b>Standard</b> 0.5 ft GSD (use 1”=100’ or 1”=200’) <b>Alternative</b> Upon request	Prior to functional and preliminary design activities. <b>Best Practice</b> Annual Mapping/Surveys Request Cycle <b>When Necessary</b> Out of Cycle	Photogrammetry plans flight and control configuration, acquires photos, and produces mapping. Location & Surveys sets and ground surveys “panels”.	2-4 months after aerial photography completed and receipt of photo control. Requires receipt of verified mapping limits in advance of photo mission
Topographic (T) Mapping (graphic planimetric mapping including municipal property + DTM with TIN)	Project or corridor specific graphic planimetric mapping with municipal property data and more detailed elevation data than DEM product. 2-D microstation design (.dgn) file with limited detail graphic planimetric mapping including municipal property data, 3-D (digital terrain model) DTM (.dgn) file with 20 ft spaced elevation points and more detailed break lines than DEM product, and corresponding TIN file. Digital mosaic of photo mission used to generate topographic mapping available upon request.	Used to support preliminary design activities for larger projects.	<b>Standard</b> 1”=200’ <b>Alternative</b> 1”=100’	Prior to preliminary design activities. <b>Best Practice</b> Annual Mapping/Surveys Request Cycle <b>When Necessary</b> Out of Cycle	Photogrammetry plans flight and control configuration, acquires photos, and produces mapping. Location & Surveys sets and ground surveys “panels”, and field classifies planimetric features.	2-4 months after aerial photography completed and receipt of photo control. Requires receipt of verified mapping limits in advance of photo mission.
Shell Plan Sheet (SPS) Mapping (graphic planimetric mapping + DTM with TIN)	More feature and topographic detail than topographic mapping. 2-D microstation design (.dgn) file with highly detailed graphic planimetric mapping, 3-D DTM (.dgn) file with highly detailed elevation points and break lines, and corresponding TIN file. This is a lesser product than preliminary plan sheet mapping as it does NOT include field classification of planimetric features. Municipal property data available upon request. Digital mosaic of photo mission used to generate SPS available upon request.	Used to support preliminary design activities for smaller projects. Usually supplemented with additional detailed ground surveys to produce Final Surveys.	<b>Standard</b> 1”=50’ <b>Alternative</b> 1”=30’ 1”=20’	Prior to preliminary or final design activities. <b>Best Practice</b> Annual Mapping/Surveys Request Cycle <b>When Necessary</b> Out of Cycle	Photogrammetry plans flight and control configuration, acquires photos, and produces mapping. Location & Surveys sets and ground surveys “panels”.	2-4 months after aerial photography completed and receipt of photo control. Requires receipt of verified mapping limits in advance of photo mission.
Preliminary Plan Sheet (PPS) Mapping (graphic planimetric mapping + DTM with TIN)	More feature and topographic detail than topographic mapping. 2-D microstation design (.dgn) file with highly detailed graphic planimetric mapping, 3-D DTM (.dgn) file with highly detailed elevation points and break lines, and corresponding TIN file. Includes field classification of planimetric features to final plan sheet specifications. Municipal property data available upon request. Digital mosaic of photo mission used to generate PPS available upon request.	Used to support preliminary design activities for smaller projects. Usually supplemented with additional detailed ground surveys to produce Final Surveys.	<b>Standard</b> 1”=50’ <b>Alternative</b> 1”=30’ 1”=20’	Prior to preliminary or final design activities. <b>Best Practice</b> Annual Mapping/Surveys Request Cycle <b>When Necessary</b> Out of Cycle	Photogrammetry plans flight and control configuration, acquires photos, and produces mapping. Location & Surveys sets and ground surveys “panels”, and field classifies planimetric features.	2-4 months after aerial photography completed and receipt of photo control. Requires receipt of verified mapping limits in advance of photo mission.
Final Surveys (graphic planimetric mapping + DTM with TIN + supporting ground surveys)	This is the most comprehensive mapping/survey product available. Final Surveys includes all information provided from Preliminary Plan Sheet Mapping plus the addition of more accurate ground surveys for utility locations, drainage features, pavement elevations, and obscured areas, along with detailed property survey data.	Used to support Final Design activities. Base mapping/survey product used for R/W plans and construction plans.	<b>Standard</b> 1”=50’ <b>Alternative</b> 1”=30’ 1”=20’	Prior to final design activities. <b>Best Practice</b> Annual Mapping/Surveys Request Cycle <b>When Necessary</b> Out of Cycle	Location and Surveys performs extensive ground surveys for all required data content. Photogrammetry provides SPS or PPS when involved.	Varies. Requires receipt of verified surveys limits.

# Controlled Aerial Photography Example

Controlled Aerial Photography: many individual frames covering requested area



# Controlled Aerial Photography: 1 individual frame of many frames



Panel – ground surveyed photo control point



# Digital Mosaic Example



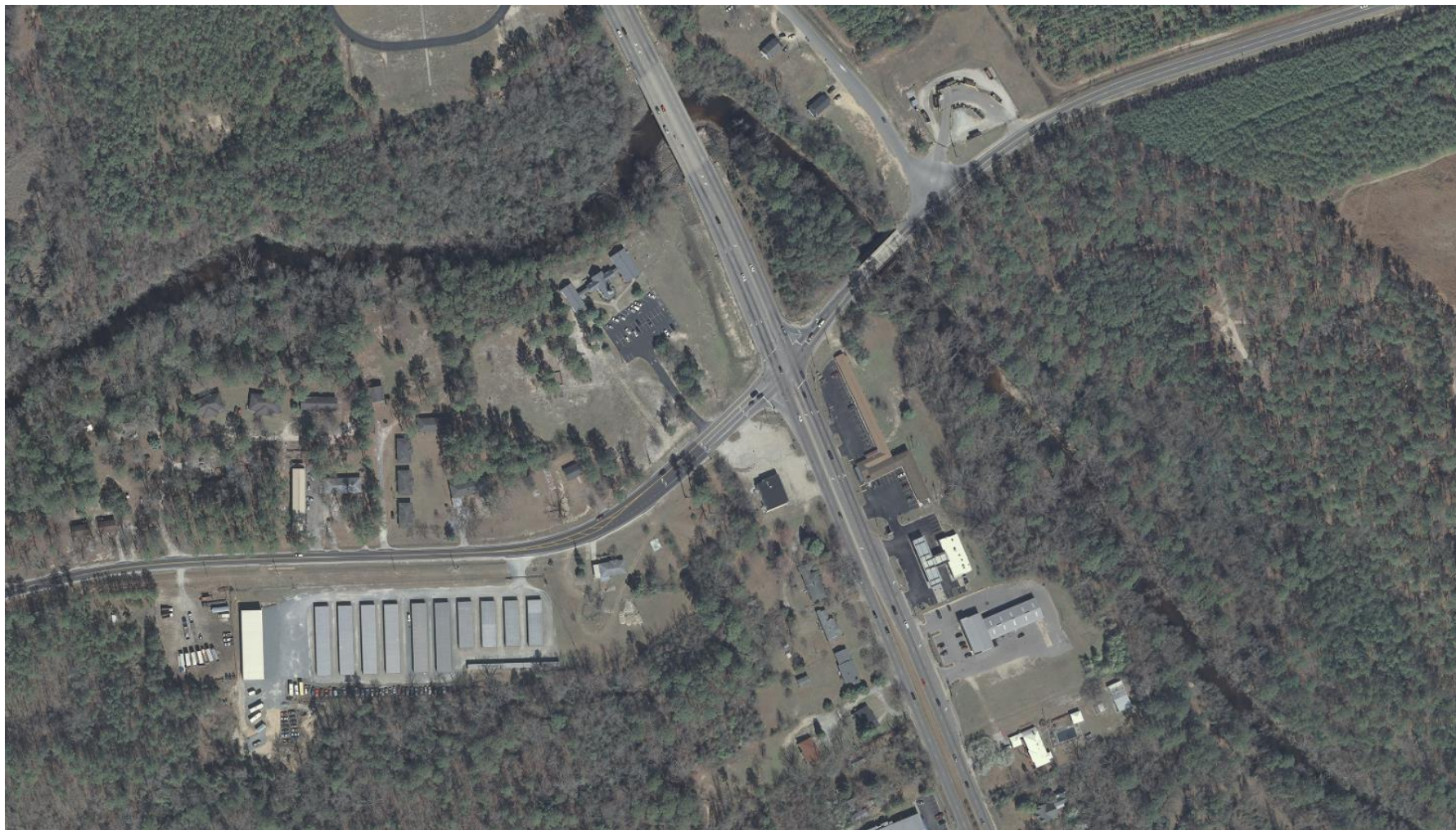
# Digital Mosaic: 2-D raster digital image product (NO elevation data)



# Orthophotography Example

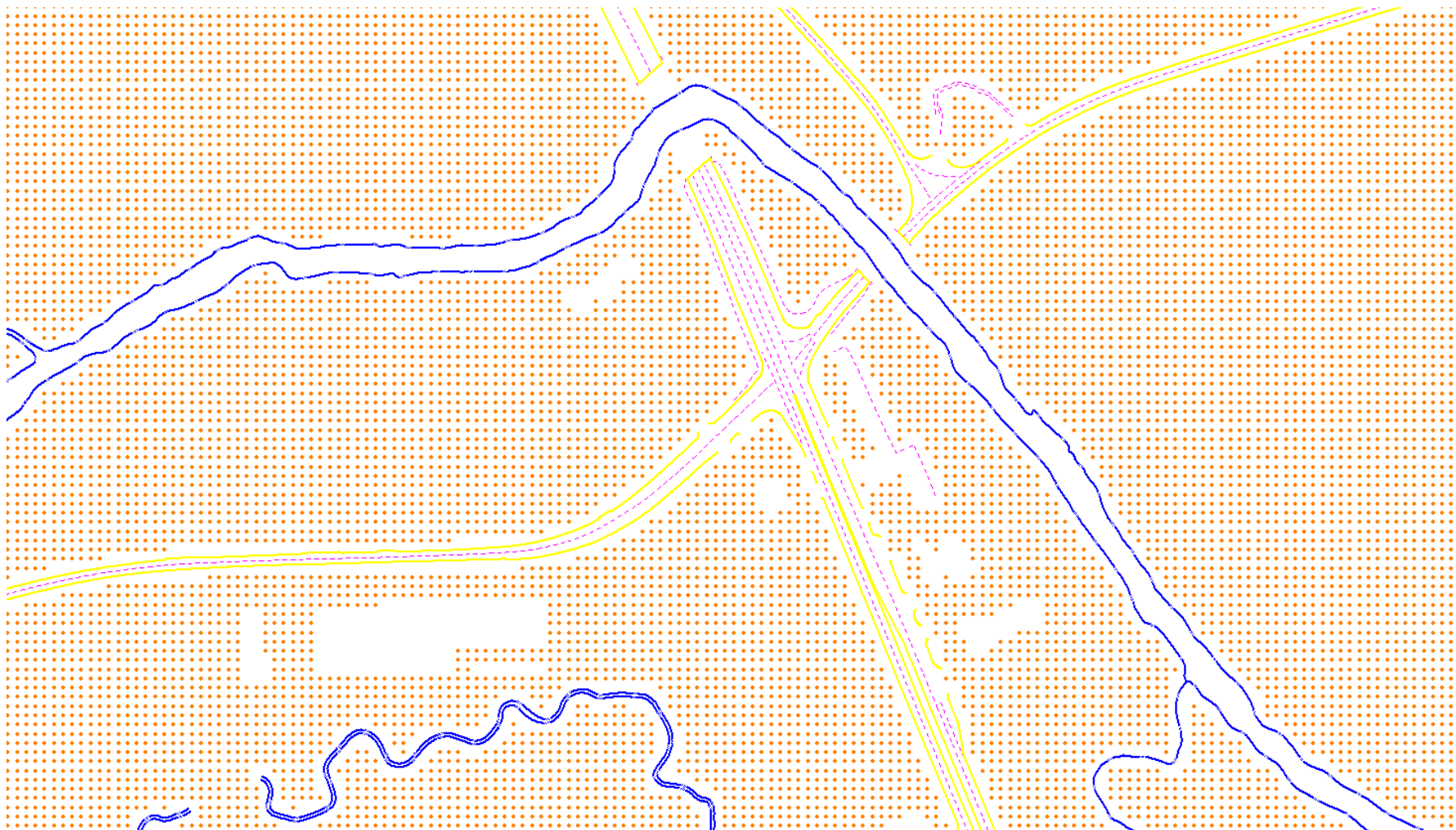


Orthophotography: 2-D raster digital image (includes DTM with delivery)





# Orthophotography: 3-D graphic DEM (limited break lines - roads and drainage)



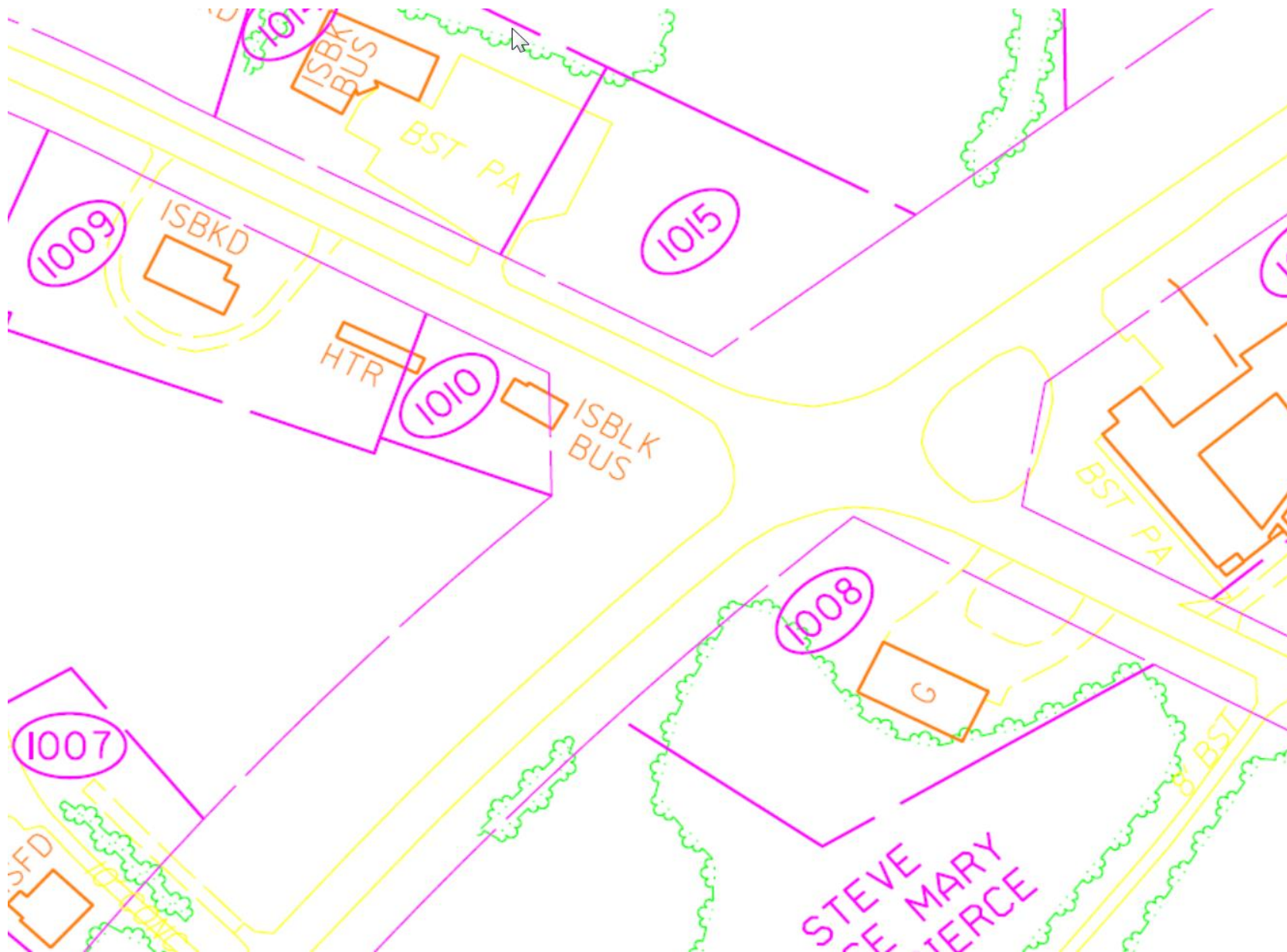
# Topographic Mapping Example

# Topographic Mapping: Digital Mosaic (available upon request)

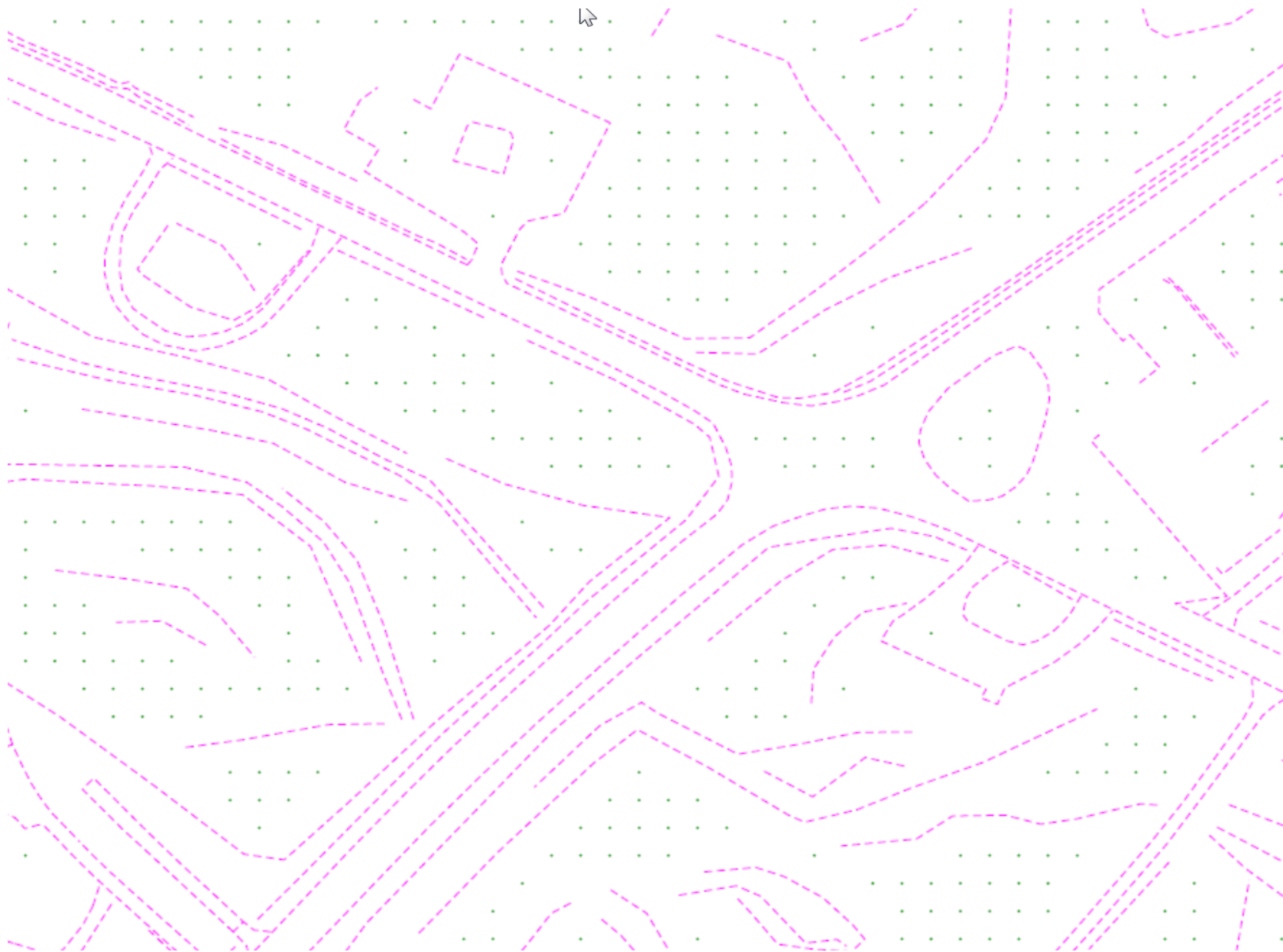




# Topographic Mapping: 2-D graphic planimetric mapping (includes municipal property)



# Topographic Mapping: 3-D graphic DTM (no ground surveyed elevation data)



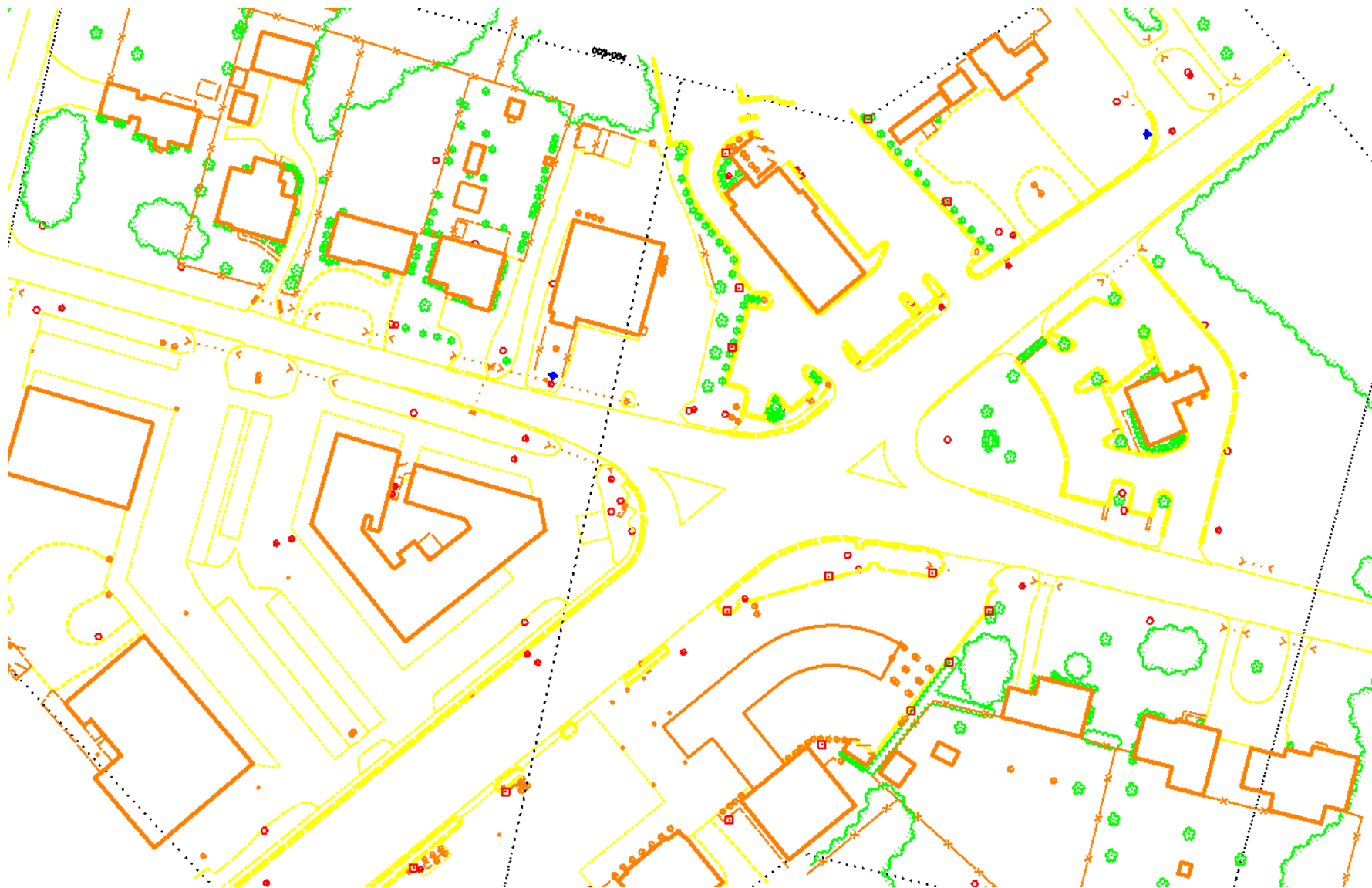
# Shell Plan Sheet Mapping Example



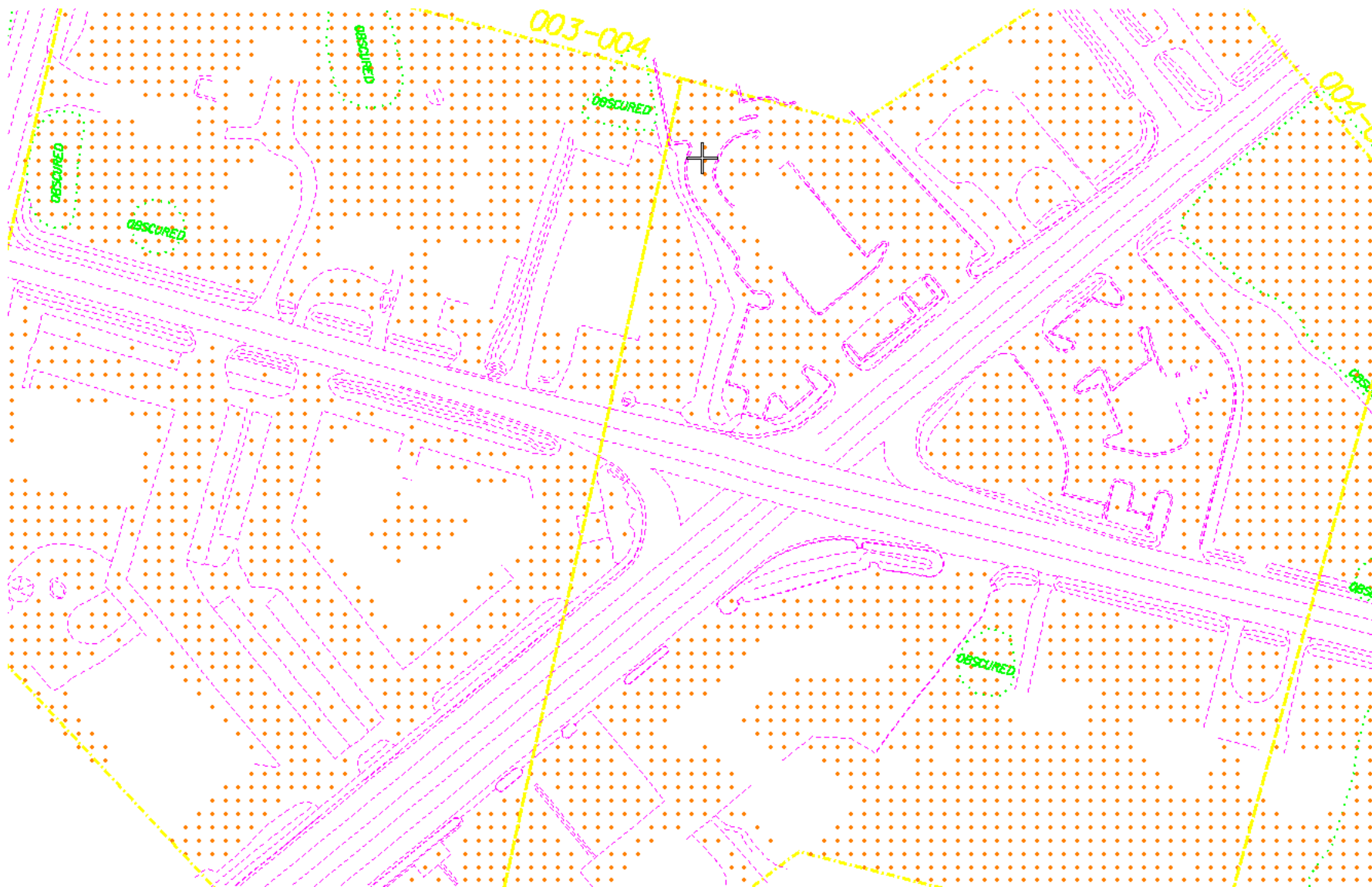
# Shell Plan Sheet Mapping: Digital Mosaic (available upon request)



# Shell Plan Sheet Mapping: 2-D graphic planimetric mapping (NO classified plan features)



# Shell Plan Sheet Mapping: 3-D graphic DTM (no ground surveyed elevation data)





# Preliminary Plan Sheet Mapping Example

# Preliminary Plan Sheet Mapping: Digital Mosaic (available upon request)

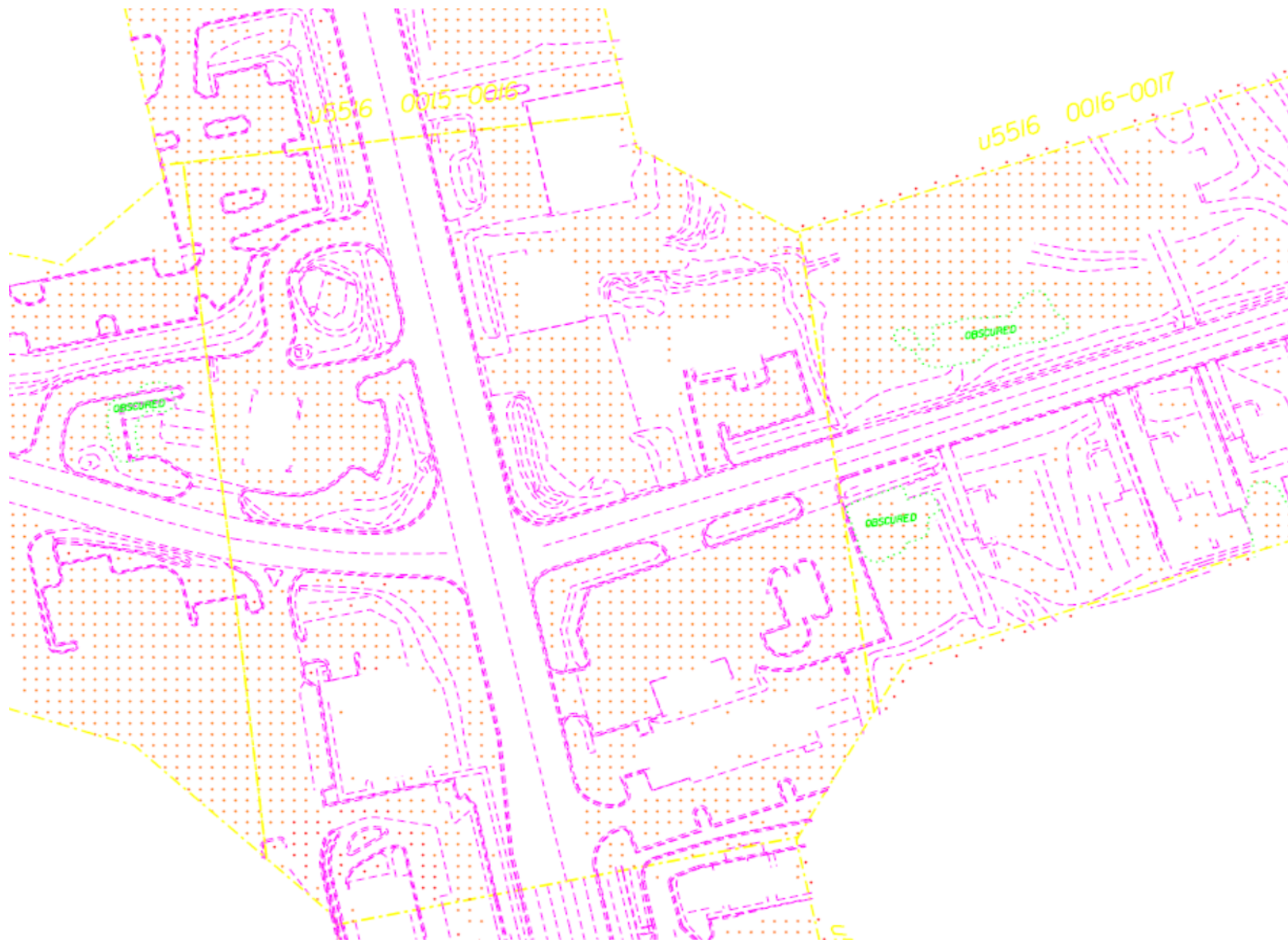


# Preliminary Plan Sheet Mapping: 2-D graphic planimetric mapping (including field classification)





# Preliminary Plan Sheet Mapping: 3-D graphic DTM (no ground surveyed elevation data)



# Final Surveys Example

# Final Surveys: Digital Mosaic (available upon request)





# Final Surveys: 2-D graphic planimetric mapping (including supporting ground survey data)





# Final Surveys: 3-D graphic DTM (including pavement elevations and obscured area elevations)

