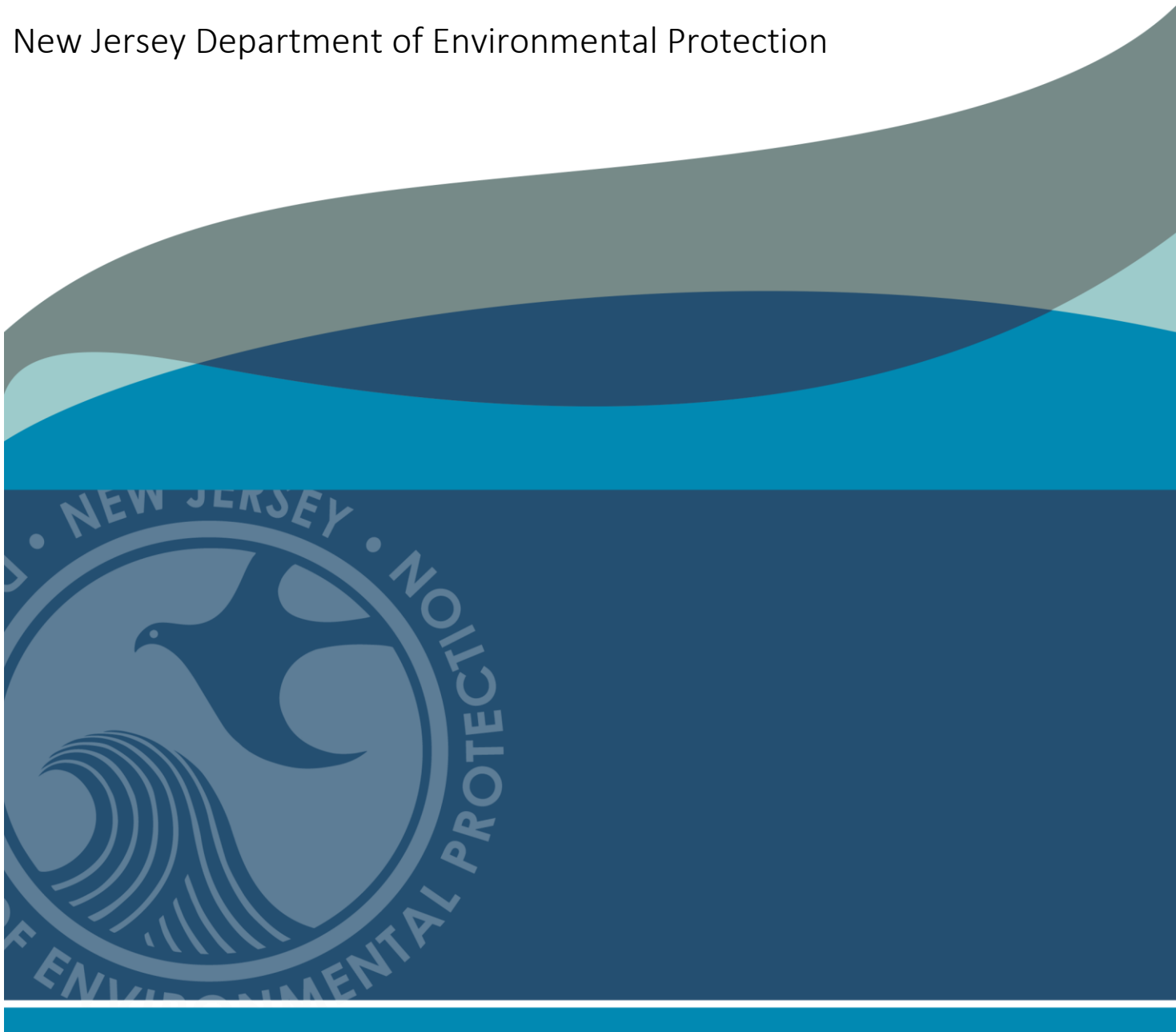


# Instructions for Linear Construction GIS Submissions

GEOGRAPHIC INFORMATION SYSTEMS (GIS) INSTRUCTIONS

Contaminated Site Remediation & Redevelopment

New Jersey Department of Environmental Protection



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# Instructions for Linear Construction GIS Submissions

The following document will assist a submitter to prepare a submission for a Linear Construction (LC) Geographic Information System (GIS) Deliverable. The specific requirements for GIS deliverables are outlined in the [Administrative Requirements for GIS Deliverables](#) Guidance document. This document supplements [Administrative Requirements for GIS Deliverables](#) with instructions specific to a LC Submission.

## 1. Introduction

A LC project involves construction and development to create, maintain or alter a roadway, railroad or utility by a person conducting a LC project that:

1. Includes one or more contaminated properties; and
2. Will generate more than 200 cubic yards of contaminated soil for fill or disposal during the duration of the LC project.

On completion of an LC project, the person conducting the LC project is required to prepare a Final LC Report that summarizes the history of investigations and material management activities as they pertain to the construction of the project. The [LC Project Technical Guidance document](#) indicates that the final report shall include a GIS compatible map that includes the excavated area and the locations of contaminated properties. Individual maps of the contaminant properties are not required to be submitted in a GIS format.

## 2. GIS Submission

The GIS compatible map, which is referred to as a “*GIS Deliverable*” includes all areas of excavation and the contaminated properties that are part of the LC project. The GIS features should be represented as polygons, not as lines or points. Each distinct area of excavation and contaminated property should be represented as a polygon.

The Deliverable is not submitted with the LC Project Final Report Form. It should be submitted directly to the Contaminated Site Remediation & Redevelopment CSSR’s GIS unit using a different process. When the LC Project Final Report Form is sent to CSSR, the GIS Deliverable should be attached to an email and sent to [srpgis@dep.nj.gov](mailto:srpgis@dep.nj.gov). The submitter should also attach a PDF version of the LC project map to the email. The email must comply with the following strict format to allow for the GIS deliverable to be reconnected with the Final Report Form. The subject line and email body are used by SRWMP to identify the deliverable. The acronym LC is used to identify the submission as a LC Submission Type.

### 2.1 Email Subject Line

The subject line of the email should contain the Program Interest Number and Submission Type Acronym, separated by a comma.

Example: 013164, LC

### 2.2 Email Body (Metadata)

The required basic information about the Deliverable should be included in the body of the email. This information, which is referred to as metadata, identifies: 1) the environmental company / LSRP (consultant) overseeing the work, 2) the professional who created the GIS submission and should be contacted if there are GIS technical issues, and 3) the site

identification information. The metadata should be included in the email as a series of fields that includes the information for the submittal. The user should copy the [metadata templates](#) from the [GIS Deliverable Templates](#) web page or fields listed in figure 1 into the email and complete the information. At the time of submission, the Activity Number may not be available. If true, leave the Activity Number field blank.

**Figure 1. Metadata requirements.** The required fields listed below need to be copied into the body of the email and the appropriate information completed for each field.

Program Interest Number for Site:  
Activity Number:  
Name of Site as known to NJDEP:  
Street Address of Site:  
Municipality of Site:  
County of Site:  
Submission Type Acronym:  
Submission Description:  
Name of LSRP (or consultant) overseeing work:  
LSRP's License Number:  
LSRP's Email Address:  
Name of GIS Author Company:  
Mailing Address:  
Name of Professional performing GIS work:  
Email for Professional performing GIS work:  
Phone Number for Professional performing GIS work:

### 2.3 Spatial Accuracy

The accuracy of the GIS Deliverables must meet the standards established by the Department in the NJDEP Mapping and Digital Data Standards (current version issued on February 7, 2021).

### 2.4 PDF Linear Construction Map

The submitter should attach a PDF version of the LC project map to the email. The information on the map should support the features in the GIS Deliverable.

### 2.5 Resubmission of failed GIS Submission

If the LC Deliverable is not acceptable, an email response to the submitter will identify the issues and how to resubmit the GIS Deliverable.

## 3. GIS Deliverable

The GIS Deliverable shall be submitted as a GIS shapefile or a georeferenced .dwg CAD drawing file utilizing the New Jersey State Plane Coordinate System (NAD83) with feet as the unit of measure. The deliverable should consist of a series of polygon shapes that represent all the excavated areas and the property boundary for each contaminated property.

### 3.1 LC Project GIS Deliverable Naming Protocol

The LC Project GIS Deliverable should be named as the Program Interest number of the LC project followed by an underscore and then the date of submission (YYYYMMDD) followed by LC, which is the valid Submittal Type Acronym for this submission type (figure 2).

**Figure 2. Examples of the File Naming Protocol for a LC Project GIS Deliverable**

<u>File Naming example for LC Project submission:</u>	
Site Name:	DEF Pipeline Inc.
Program Interest number:	345678
Date of Submittal:	April 1, 2017 (in yyyyymmdd format)
<u>Correct File Name for this example:</u>	
345678_20170401LC	

### 3.2 GIS Deliverable Types

A GIS Deliverable is submitted as either a GIS Shapefile or CAD drawing file. The shapefile is the preferred format for all SRWMP GIS submittals since it is easily imported into GIS. A shapefile is an open geospatial vector data format for GIS software. It can be created by several different GIS software programs. A CAD drawing is a group of points, lines, polylines, and text that are organized by layers to produce technical drawings. Each drawing feature contains information used to produce the drawing such as line weight, line type and color. This format can be used to produce a GIS Deliverable provided several guidelines are followed. A CAD file must be carefully prepared for the conversion into GIS to be successful. All LC Project GIS Deliverables should conform to the structure, or schema, outlined in the [Administrative Requirements for GIS Deliverables](#).

### 3.3 GIS Deliverable Schema

The GIS Deliverable must show the complete extent of the LC excavated area(s) and all associated contaminated property boundaries. These features should be drawn as polygons and included in one Deliverable. The file structure in the tables below should be used to generate the Deliverable depending on if it is a shapefile or CAD drawing.

The attribute values for the polygons must correspond to the information contained in the LC Project Final Report Form.

#### 3.3.1 Shapefile Schema

The schema in table 1 should be used when creating a shapefile as a LC Deliverable. The value in the Type field is used to distinguish between Excavated Area and Contaminated Property polygons. For Excavated Area polygons, the value of the Type field should be “Excavated Area” and Contaminated Property polygons should be “Contaminated Site.” The Descript field should be completed for Excavated Area features only, while the Pref\_ID, Name and Address fields should be completed for the contaminated properties.

A [LC Project Shapefile Template](#) is available for download from CSSR’s [GIS Deliverables Templates](#) web page.

**Table 1. LC Shapefile Schema**

Field Name	Type	Length	Description	Valid Values
FID	Object ID	-	Esri unique identifier	n/a
Shape	Geometry	-	Esri geometry field	n/a
Type	Text	50	What the shape (feature) represents	Excavated Area Contaminated Site
Descript <sup>①</sup>	Text	100	Short description of the excavated area	n/a
Pref_ID <sup>②</sup>	Text	25	Preferred ID for the contaminated property	n/a
Name <sup>②</sup>	Text	50	Name of the contaminated property	n/a
Address <sup>②</sup>	Text	50	Address of the contaminated property	n/a

Note: ① only complete this field for excavated area polygons  
 ② only complete this field for contaminated properties

### 3.3.2 CAD File schema

The schema in table 2 should be used when creating a CAD file as a LC Deliverable. The value in the Layer field is used to distinguish between Excavated Area and Contaminated Property polygons. For Excavated Area polygons, the value of the Layer field should be “Excavated Area” and Contaminated Property polygons should be “Contaminated Site.” Please do not name any other point, polyline, annotation, graphic, or any other map element in this way. The Descript, Pref\_ID, Name and Address fields should be added to the CAD file and completed as outlined below. The Descript field should be completed for Excavated Area features only, while the Pref\_ID, Name and Address fields should be completed only for contaminated properties.

**Table 2. LC Project CAD Drawing Schema**

Field Name	Type	Length	Description	Valid Values
Layer	Text	50	What the shape (feature) represents	Excavated Area Contaminated Site
Descript	Text	100	Short description of the excavation area	n/a
Pref_ID <sup>②</sup>	Text	255	Preferred ID for the contaminated property	n/a
Name <sup>②</sup>			Name of the contaminated property	n/a
Address <sup>②</sup>			Address of the contaminated property	n/a

Note: ① only complete this field for excavated area polygons  
 ② only complete this field for contaminated properties

CAD files must be georeferenced using NAD 83 NJ State Plane Coordinate feet. Drawings with a locally established point of origin (0,0) are not acceptable. A CAD file usually contains a tremendous amount of information that may not be related to the LC Excavation Areas and contaminated properties. The best submittal practice is to create a CAD file that only includes the polygons associated with the LC Project Final Report Form.

Additional [CAD Help](#) is provided on CSSR’s GIS web page under Guidance Documents and in the [Administrative Requirements for GIS Deliverables](#).



#### 4. GIS Submittal Example

This LC Project example is for a fictitious gas pipeline project (DEF Pipeline Inc) where several sections of a gas main were replaced. The project consisted of two distinct excavated areas and three contaminated properties were encountered during the excavation. The contaminated properties were Main Street Auto Repair (Preferred ID: 012345), 120 2<sup>nd</sup> Street (Preferred ID: 234560) and Main Street Store (Preferred ID: 123456).

##### 4.1 LC Project Shapefile Deliverable

To complete the GIS Deliverable, the LC shapefile template was downloaded from the web site and added to the GIS software. Five polygon features were added (figure 3), two related to the excavated areas and three to the contaminated property boundaries. The parcels for the contaminated properties were used to create the contaminated property boundary polygons. The attribute table for the shapefile (table 3) was filled in based on the information in the LC Project Final Report Form. The Type field in the attribute table is used to differentiate between the excavated areas and contaminated properties. For the excavated areas, a value of “Excavated Area” was added to the Type field and a description of the excavated area was inputted into the Descript field. For the contaminated properties, a value of “Contaminated Site” was added to the Type field and the Preferred ID, Name and Address was inputted into the Pref\_ID, Name, and Address fields, respectively.

Instead of downloading the LC template from the web, a user could create a shapefile from scratch using the schema in table 1.

*Figure 3. Map of the Shapefile used in LC Project example. The five polygons depict the three contaminated properties and two excavated areas.*



**Table 3.** GIS attribute table for the LC Project Deliverable shown in figure 3.

FID	Shape	Type	Descript	Pref_ID	Name	Address
0	Polygon	Excavated Area	Main Street Gas Pipeline upgrade (north side of street)			
1	Polygon	Excavated Area	Main Street Gas Pipeline upgrade (north side of street)			
2	Polygon	Contaminated Site		012345	Main St Auto Repair	119 Main St, Town, NJ
3	Polygon	Contaminated Site		234560	120 2 <sup>nd</sup> Street	120 Main St, Town, NJ
4	Polygon	Contaminated Site		123456	Main St Store	123 Main St, Town, NJ

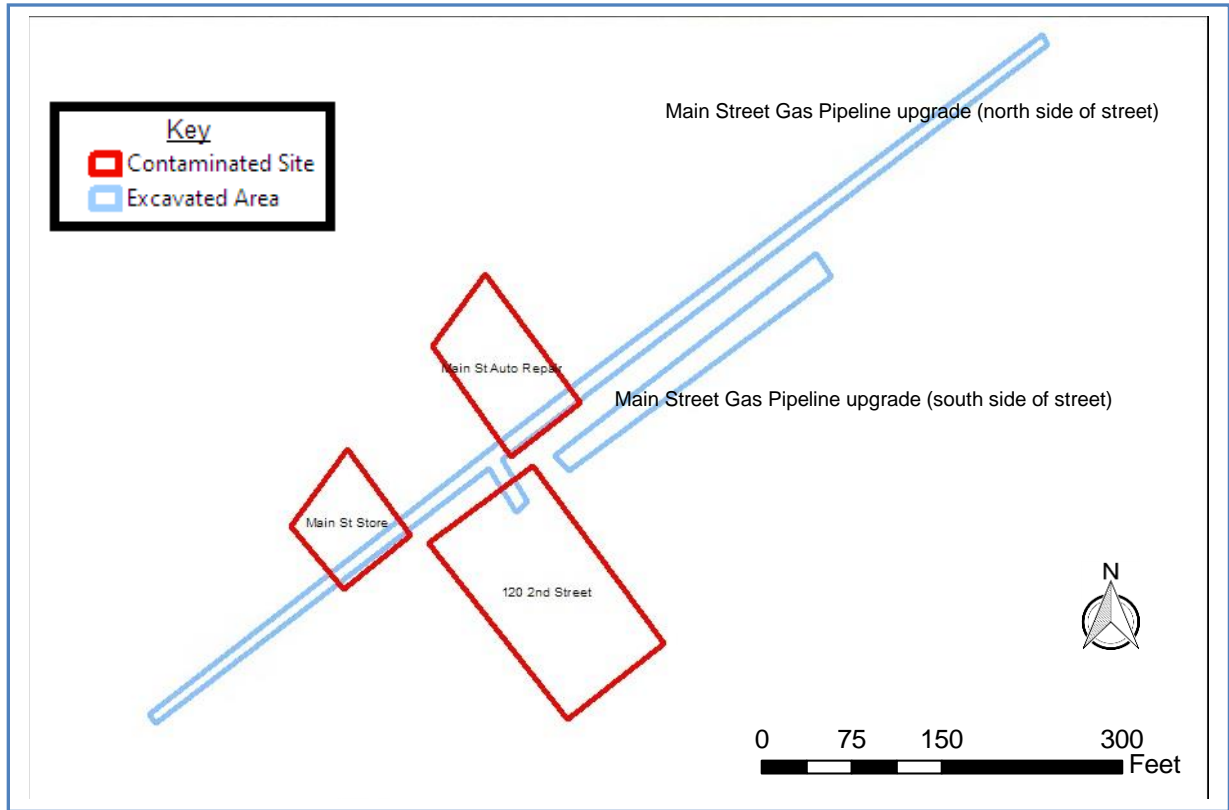
#### 4.1.2 LC Project CAD file Deliverable

A CAD deliverable has some minor differences from a shapefile deliverable. A CAD file may be used for several different purposes and is usually retrofitted to become a GIS Deliverable by adding the Site Boundary and/or AOC features into an existing CAD file. Additional features (polygons) other than the required features are permitted in a CAD file. It is important to note that a CAD file must be georeferenced.

To complete the example Deliverable:

- Use an existing CAD file for the site
- Import DEP Imagery into CAD file and georeference the drawing. The [CAD Help](#) section of CSSR’s GIS web page has guidance on importing Imagery and georeferencing.
- Add four fields to the CAD file. Name the fields Descript, Pref\_ID, Name and Address.
- If they are not already present, add the areal extent of the excavated areas and the parcel boundaries of the contaminated properties to the CAD file (figure 5). The features must be polygons, they cannot be a series of line segments.
- Enter the information from the Final LC Report into the CAD file (table 4) for the following features.
  - For Areas that were excavated, enter the value ‘Excavated Area’ into the layer field and a description in the Descript field. Do not enter a value into the Pref\_ID, Name and Address fields.
  - For parcels of contaminated properties, enter the value ‘Contaminated Site’ into the layer field. Also enter the Preferred ID (aka Program Interest), the name and address for the contaminated property. Do not enter a value into the Descript field for these polygons.
- Use the Purge and Explode commands, if necessary, to clean the drawing and improve the uploading into GIS.
- Name the file using the protocol in Section 3.1 (013164\_20170401LC.dwg for this example)

**Figure 4.** Drawing of the CAD file used in the LC Project example. The CAD Drawing includes multiple features including the three contaminated properties and two excavated areas.



**Table 4.** Example of the CAD table (as shown in GIS) for the Linear Construction Project shown in figure 4.

FID	Shape	Entity	Layer	Descript	Pref_ID	Name	Address	Linetype
0	Polygon	LWPolyline	Excavated Area	Main Street Gas Pipeline upgrade (north side of street)				Continuous
1	Polygon	LWPolyline	Excavated Area	Main Street Gas Pipeline upgrade (south side of street)				Continuous
2	Polygon	LWPolyline	Contaminated Site		012345	Main St Auto Repair	119 Main St, Town, NJ	Continuous
3	Polygon	LWPolyline	Contaminated Site		234560	120 2 <sup>nd</sup> Street	120 Main St, Town, NJ	Continuous
4	Polygon	LWPolyline	Contaminated Site		123456	Main St Store	123 Main St, Town, NJ	Continuous



#### 4.2 Submittal (email)

Once the GIS Deliverable is created and the Final LC Report has been submitted, the Deliverable could be submitted to SRWMP through the following steps:

- 1) Open email,
- 2) Attach the GIS Deliverable (must be a shapefile) to the email,
- 3) Attach the PDF map of the LC project,
- 4) Fill out the subject line correctly ('013164, LC' for this example),
- 5) Copy the metadata section into the email and complete as needed, then
- 6) Email to [srpgis@dep.nj.gov](mailto:srpgis@dep.nj.gov)

A completed email for this fictitious DEF Pipeline Inc site is shown in figure 5.

*Figure 5. Example of email sent to CSSR. The attached Deliverable is a shapefile.*



The screenshot shows an email composition interface. At the top left is a 'Send' button with a right-pointing arrow. To its right are 'To' and 'Cc' fields. The 'To' field contains the email address [srpgis@dep.nj.gov](mailto:srpgis@dep.nj.gov). Below these fields is the 'Subject' field, which contains the text '013164, LC'. Underneath the subject field are four attachment boxes, each with a document icon, a filename, and a size: '013164\_20200401LC.dbf' (1 KB), '013164\_20200401LC.prj' (479 bytes), '013164\_20200401LC.shp' (1012 bytes), and '013164\_20200401LC.shx' (132 bytes). Below these is a fifth attachment box with a PDF icon, the filename 'LC\_map.pdf', and the size '84 KB'. The main body of the email contains the following metadata text:

Program Interest Number for Site: 013164  
Activity Number:  
Name of Site as known to NJDEP: Main St Gas pipeline upgrade  
Street address of Site: Main St  
Municipality of Site: Town  
County of Site: County  
Submission Type Acronym: LC  
Submission Description: pipeline upgrade for section of pipeline along Main Street  
Name of LSRP (or consultant) overseeing work: Jane Doe  
LSRP's license number: 0000000  
LSRP's Email Address: Jane.Doe@provider.com  
Name of GIS author Company: GIS Firm  
Mailing address: 1 Main St, Newark NJ 08000  
Name of Professional performing GIS work: John Doe  
Email for Professional performing GIS work: John.Doe@provider.com  
Phone Number for Professional performing GIS work: (609) 000-0000