Instructions for Currently Known Extent (CKE) of Contamination GIS Submissions

GEOGRAPHIC INFORMATION SYSTEMS (GIS) INSTRUCTIONS

Contaminated Site Remediation & Redevelopment

New Jersey Department of Environmental Protection

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Instructions for Currently Known Extent GIS Submissions

The following document will assist a submitter to prepare a submission for a Currently Known Extent (CKE) of contamination 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 CKE Submission.

1. **Introduction**
   A CKE is defined in the Technical Requirements for Site Remediation (Tech Regs) (N.J.A.C. 7:26E) as the aerial extent of ground water in which concentrations of one or more contaminants exceed any applicable ground water remediation standard (GWRS). The CKE, which is usually associated with contaminant exceedances in potable wells, shall encompass all properties with potable well contamination above a GWRS. Section 4.1.6 and Appendix A of the [IEC technical guidance document](#) outlines how to map a CKE.

   A CKE must be submitted with the IEC Engineered System Response Action Report (N.J.A.C. 7:26E-1.11(a)7vi) and an updated version, if necessary, with the Source Control Report (N.J.A.C. 7:26E-1.11(a)8v). A revised CKE could be submitted with the Annual Monitoring and Maintenance Report if conditions warrant. The CKE polygon depicting the CKE boundary should be submitted as an ArcGIS shapefile or a Computer-Aided Design (CAD) dwg file. CKEs are used by NJDEP staff, water purveyors, and local officials to make decisions concerning appropriate treatment and/or replacement of contaminated drinking water supplies.

   The Tech Regs requires the mapping of current known extents of ground water contamination, vapor intrusion areas, and direct contact areas. At this time, only the ground water CKEs can be processed by Contaminated Site Remediation & Redevelopment (CSRR).

2. **GIS Submission**
   The GIS compatible map, which is referred to as a "*GIS Deliverable*" includes the CKE that is identified in the IEC report. If the report does not revise the shape of an existing CKE boundary, then a CKE Submission may not be required. Check NJ GeoWeb to view the CKE boundary. If the CKE boundary is accurately mapped in NJ GeoWeb, then a GIS Submission is not required.

   If a GIS Deliverable is required, the Deliverable is not submitted with the IEC report. It should be submitted directly to the CSRR's GIS unit using a different process. When the IEC Report is sent to CSRR, the GIS Deliverable should be attached to an email and sent to srpgis_cke@dep.nj.gov The email must comply with the following strict format to reconnect the GIS deliverable to the IEC Report. The subject line and email body are used by CSRR to identify the deliverable. The acronym CKE is used to identify a submission as Currently Known Extent 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, CKE

   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 who could 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.

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

2.5 Resubmission of failed GIS Submission
If the CKE 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 or .dxf CAD drawing file utilizing the New Jersey State Plane Coordinate System, North American Datum of 1983 (NAD83), using feet as the units of measure. The deliverable should consist of polygon(s) that represent the horizontal extent of the CKE(s).

3.1 CKE GIS Deliverable Naming Protocol
The CKE GIS Deliverable should be named as the Program Interest number of the CSRR case followed by an underscore and then the date of submission (YYYYMMDD) followed by CKE, which is the valid Submittal Type Acronym for this submission type (figure 2). If there are multiple CKE submissions being submitted for the same Program Interest, then the files should

be numbered sequentially [i.e., CKE1, CKE2, etc.].

Figure 2. Examples of the File Naming Protocol for a CKE GIS Deliverable

File Naming example for CKE submission:
  Site Name: ABC Industry
  Program Interest number: 013164
  Date of Submittal: April 1, 2017 (in yyyymmdd format)

Correct File Name for this example:
 013164_20170401CKE

For multiple submissions:
    013164_20170401CKE1
    013164_20170401CKE2

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 CSRR 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 a GIS usable format to be successful. All CKE 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 all the CKEs that are included in the associated IEC Report. 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 IEC Report.

3.3.1 Shapefile Schema

The schema in table 1 should be used when creating a shapefile as a CKE Deliverable. The shapefile should include only the CKE boundaries; do not include other shapes such as Tax Parcels or streets. Problems may be caused by including additional features that are not related to the CKE boundary in the shapefile Deliverable. When completing the attribute table, the Type field is used to identify the CKE Boundary shape. The Descript field includes a short description of the CKE, including the case name. The Contam field includes a list of contaminants that are detected above the applicable contaminant standards in potable wells within the CKE.

A CKE Shapefile Template is available for download from CSRR's GIS Deliverables Templates web page.

Table 1. CKE 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	CKE Boundary
Descript	Text	100	Short description of the CKE	n/a
Contam	Text	255	include a list of contaminants	n/a

3.3.2 CAD File Schema

The schema in table 2 should be used when creating a CAD file as a CKE Deliverable. The CAD file may include features other than the CKE boundary, but the best submittal practice is to create a CAD file that only includes the polygons associated with the IEC Report. The value in the Layer field identifies the CKE Boundary polygon. For the CKE Boundary polygon, the value of the Layer field should be "CKE Boundary." Please do not name any other point, polyline, annotation, graphic, or any other map element in this way. The Descript and Contam fields should be added to the CAD drawing and completed as outlined below. The Descript field includes a short description of the CKE, including the case name. The Contam field includes a list of contaminants that are detected above the applicable contaminant standards in potable wells within the CKE.

Table 2. CKE CAD Drawing Schema

Field Name	Type	Length	Description	Valid Values
Layer	Text	50	What the shape represents	CKE Boundary
Descript	Text	100	Description of the CKE	n/a
Contam	Text	255	Include a list of contaminants	n/a

The GIS Deliverable must be georeferenced and should be defined in "model space." CAD drawings with a locally established point of origin (0,0) are not acceptable as these have not been georeferenced to the NJ State Plane Coordinate System and if submitted, will be returned for correction. The CKE feature in the CAD drawing must be a polygon.

Additional CAD Help is provided on CSRR's GIS web page under Guidance Documents and in the Administrative Requirements for GIS Deliverables.

4. GIS Submittal Example

The following are examples of CKE Deliverables for a fictitious ABC Industry site with a Preferred ID of 013164. Sampling has identified nine private potable wells that have exceeded the drinking water standards for several compounds. A CKE is created by merging the nine tax parcels into one polygon. The Deliverable was created on April 1, 2017.

4.1 Deliverable examples

If the CKE is already established, then check Groundwater Contamination Areas (CKE) in NJ GeoWeb to view the CKE boundary. If the CKE boundary is not in NJ GeoWeb or is incorrect, then a GIS Deliverable should be submitted. If the CKE boundary is already in NJ GeoWeb and is correct, then a GIS Deliverable does not have to be resubmitted.

4.1.1 CKE Shapefile Deliverable

To complete the Deliverable, the CKE shapefile template was downloaded from the web site and added to the appropriate GIS application. A single polygon feature was digitized for the CKE (figure 3). The fields in the attribute table (table 3) were filled in based on the information in the IEC Report. A value of "CKE Boundary" was entered into the Type field in the attribute table, which is used to identify the CKE shape. The description of the CKE was inputted into the Descript field. The length of the Descript field is 100 characters, but only a short description is required. The list of contaminants that were detected above the applicable contaminant standards were entered into the Contam field.

Instead of downloading the CKE template from the web, a user could alternatively create a shapefile from scratch following the schema presented in table 1 in a GIS application.

Figure 3. Map of the Shapefile used in CKE Deliverable example.

Table 3. GIS attribute table for the CKE Deliverable shown in figure 3.

FID	Shape	Type	Descript	Contam
0	Polygon	CKE Boundary	Rocky's Cleaners CKE	TCE, PCE

4.1.2 CKE 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 georeferencing the drawing and adding the CKE boundary features into an existing CAD file. Additional features (polygons) other than the CKE boundary are permitted in a CAD file, but it is suggested that a clean CAD drawing be created with only the polygon of concern. All CAD files must be georeferenced.

Figure 4. Drawing of the CAD file used in the CKE example. The CAD Drawing includes multiple features including the CKE Boundary and Tax Parcels.
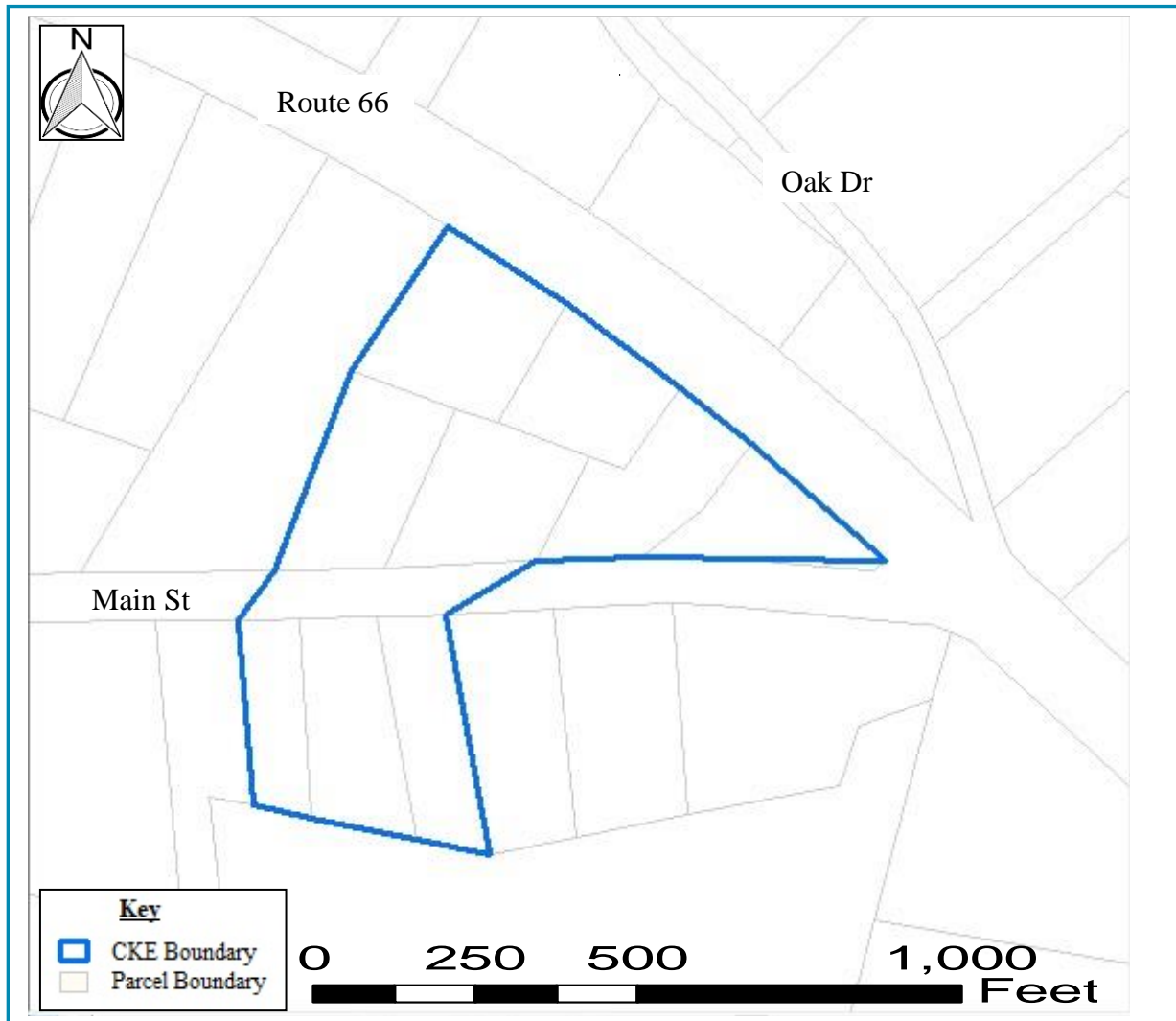
Table 4. Example of the CAD table (as shown in GIS) for the CKE shown in figure 4.

	FID	Shape	Entity	Layer	Descript	Contam	Linetype	RefName
	1	Polygon	Insert	TAX_PRCL			Continuous	BLK_1
	2	Polygon	Insert	TAX_PRCL			Continuous	BLK_1
	3	Polygon	Insert	TAX_PRCL			Continuous	BLK_1
	4	Polygon	Insert	TAX_PRCL			Continuous	BLK_1
	5	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_1
	6	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_1
	7	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_5
	8	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_5
	9	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_5
	10	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_5
	11	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_5
	12	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_12
	13	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_12
	14	Polygon	LWPolyline	TAX_PRCL			Continuous	BLK_12
	16	Polygon	LWPolyline	CKE Boundary	Rocky's Cleaners CKE	TCE, PCE	Hidden	CKE

To complete the example CAD Deliverable:
- Use an existing CAD file for the site.
- Import DEP Imagery into CAD file and georeference the drawing. The CAD Help section of CSRR's GIS web page has guidance on importing Imagery and georeferencing.
- Add a field named 'Descript' and a field named 'Contam' to the CAD file.
- If it is not already present, add the CKE boundary to the CAD file (figure 4). The features must be polygons, they cannot be a series of line segments.
    - For the Layer field, enter the value 'CKE Boundary'
    - For the Descript, enter 'Rocky's Cleaners CKE'
    - For the Contam field, enter 'TCE, PCE'
- 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_20170401CKE.dwg for this example)
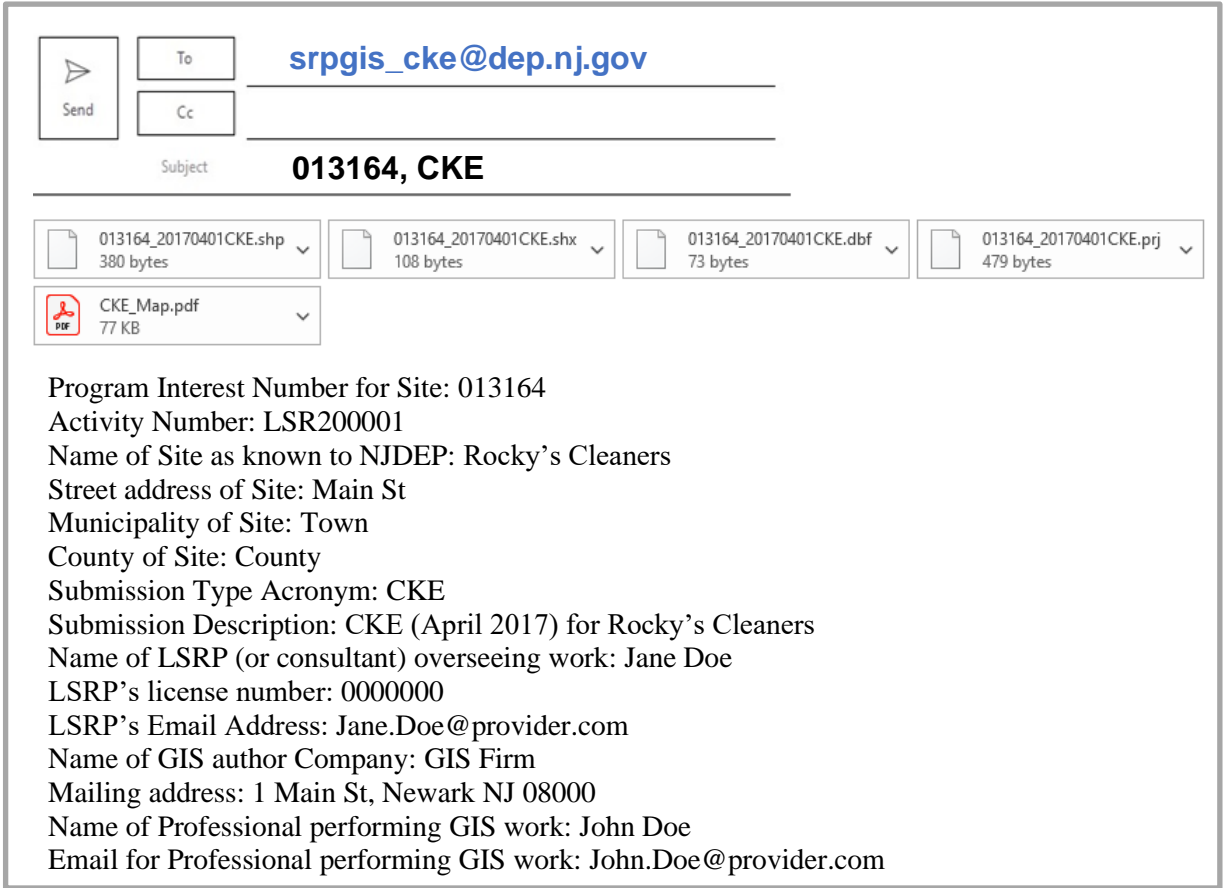
4.2 Submittal by email

Once the GIS Deliverable is created and the IEC Report has been submitted, the Deliverable could be submitted to CSRR through the following steps:

1) Open email,
2) Attach the GIS Deliverable (either shapefile or CAD file) to the email,
3) Attach the PDF map of the CKE,
4) Fill out the subject line correctly ('013164, CKE' for this example),
5) Copy the metadata section into the email and complete as needed, then
6) Email to srpgis_cke@dep.nj.gov

A completed email for this fictitious ABC Industry site is shown in figure 5.

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

To: srpgis_cke@dep.nj.gov
Cc:
Subject: **013164, CKE**

| 013164_20170401CKE.shp 380 bytes | 013164_20170401CKE.shx 108 bytes | 013164_20170401CKE.dbf 73 bytes | 013164_20170401CKE.prj 479 bytes |

CKE_Map.pdf
77 KB

Program Interest Number for Site: 013164
Activity Number: LSR200001
Name of Site as known to NJDEP: Rocky's Cleaners
Street address of Site: Main St
Municipality of Site: Town
County of Site: County
Submission Type Acronym: CKE
Submission Description: CKE (April 2017) for Rocky's Cleaners
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