Appendix E
Determining Impervious Cover Acreage

Introduction

The CII GP regulates stormwater discharges from Commercial, Industrial, and Institutional sites with 1 acre or more of impervious cover in the Charles, Mystic, and Neponset River Watersheds. The permit requires knowledge of the CII site's impervious cover acreage for several permit requirements, including the timeline for NOI submission and the site's pollutant load reduction requirement. For the purposes of this permit, impervious cover is defined as "any surface that prevents or significantly impedes the infiltration of water into the underlying soil. This can include but is not limited to: roads, driveways, parking areas, other areas created using nonporous material, buildings, rooftops, structures, artificial turf and compacted gravel or soil."[1] EPA uses "impervious surface," "impervious area," and "impervious cover" interchangeably.

Permittees must provide information on their site's impervious cover in their NOI submission to ensure appropriate coverage under the draft CII GP, and to determine when NOI submission must take place, based on the NOI timeframes outlined in Part 1.10 of the draft CII GP.

Permittees must provide impervious cover determinations for NOI submissions that are accurate and representative of site conditions at the time of the permit effective date. Permittees can verify this information upon NOI submittal, which is based on the below-mentioned parcel-level analysis or provide this information themselves.

EPA has carried out a technical analysis in all three watersheds that has determined the amount of impervious area covering a site based on the available data from the 2016 MassGIS Land Use/Land Cover data[2,3] and the February 2023 MassGIS Property Tax Parcels for the Mystic and Neponset River Watersheds and the January 2024 MassGIS Property Tax Parcels for the Charles River Watershed [4] Results from this EPA analysis are available at https://www.epa.gov/npdes-permits/residual-designation-charles-river-watershed-mystic-river-watershed-and-neponset#ParcelLevelInteractiveMap.

Verifying Impervious Cover Acreage

If a Permittee chooses to use the EPA-determined impervious cover acreage of their site for NOI submission and calculation of the site-specific pollution load reduction requirement, the

[1] EPA Region 1 Preliminary Clean Water Act Residual Designation Determination for Certain Stormwater Discharges in the Charles, Mystic, and Neponset River Watersheds, in Massachusetts (September 22, 2022, citing US EPA MS4 2016 permit)

[2] https://www.mass.gov/info-details/massgis-data-2016-land-coverland-use

[3] The 2016 Land Use/Land Cover dataset is consistent with C-CAP's (Coastal Change Analysis Program) High-Resolution Land Cover Classification Scheme and defines any impervious cover as "Anthropogenic features which do not allow infiltration from precipitation. This includes buildings, parking lots, and roads developed from asphalt, concrete, or other constructed surfaces. Impervious can also include unpaved roads and similar features (driveways, parking areas, etc.) that are highly trafficked and often compacted, leading to their functioning like a paved, impervious surface."

[4] https://www.mass.gov/info-details/massgis-data-property-tax-parcels

Permittee may choose to use the interactive web map that displays the results of the parcel-level analysis at https://www.epa.gov/npdes-permits/residual-designation-charles-river-watershed-mystic-river-watershed-and-neponset#ParcelLevelInteractiveMap. To navigate to their CII site in the web map, Permittees can enter their site address into the search bar of the map viewer. To determine the impervious cover for their site, the permittee must click anywhere within their site outline. The pop-up box will show the amount of impervious area covering the site. The permittee can enter this information into their NOI to determine permit eligibility.

Since the impervious cover data that currently informs this map is from a dataset that was developed in 2016, the calculations provided by EPA only provide a reasonable technically justifiable determination of impervious cover based on the GIS data from 2016 and before. If the CII site has undergone changes in the form of new additions or removal of impervious cover due to new development or redevelopment since 2016, the Permittee shall use of one of the following methodologies to determine the impervious cover acreage on site.

Alternative Methods for Determining Impervious Cover Acreage
This Appendix provides Permittees with three different methodologies if the Permittee wants to demonstrate a different impervious cover acreage than what was determined as part of the EPA parcel analysis in the three watersheds, or if the Permittee needs to demonstrate a different impervious cover acreage because the amount of impervious cover has changed since the 2016 parcel analysis data was created.

- Site Plans or Site Survey
- GIS analysis
- Google Earth

In the sections below, each of the approaches is outlined in more detail.

Site Plans or Site Survey
This method assumes that the permittee may have existing site plans/surveys that contain enough detail for identifying impervious cover on site. These existing site plans/surveys may be from a construction project or other project that show the existing site in sufficient detail and reflect current site conditions. The site plans/surveys must have sufficient detail in them to be able to determine a reasonable technically justifiable determination of impervious cover.

Additionally, the permittee may have a set of site plans/surveys developed that include the CII site's separate storm sewer system elements as outlined in Part 2.2.1. of the Draft CII GP to meet this requirement and that of Part 2.2.1.

GIS analysis
This method assumes the Permittee is familiar with the use of a GIS program.

Using a GIS analysis to determine the impervious cover area on a site can be completed most simply by downloading the MassGIS 2016 Land Used Land Cover (LULC) data[5] and MassGIS parcel data.[6]

The LULC data set does not have any changes in impervious cover after 2016 so any changes in impervious cover since then are not captured in this dataset. If the site has significantly changed since 2016 an updated impervious cover layer will be required to use this method. In some cases, municipalities have updated versions of impervious cover datasets. The parcel data is updated annually and can be downloaded by town. Permittees who own more than one parcel that are adjacent to one another, "contiguous parcels" will need to carry out this calculation for each parcel and add up the total impervious cover acreage.

Before loading the shapefiles into a GIS program, it is important to always check the coordinate system and units that are used and make sure they fit the user's needs.

Once both the impervious cover data and the parcel boundary data is loaded into a GIS software where it can be viewed, the impervious cover data needs to be "Clipped" to the parcel boundary of interest. The user first has to navigate to the parcel of interest and select it. In programs like ArcGIS Pro the tool is called "Pairwise Clip" or more simply "Clip" in older versions. Most other GIS programs also have a tool with this functionality. There should now be a layer able to show where the impervious cover is within the parcel only. The shapefile now needs to be "Dissolved" according to the field that stores the impervious cover information to combine all impervious area into one on the parcel. In programs like ArcGIS Pro the tool is call "Pairwise Dissolve" or "Dissolve" in older versions.

The area field of the shapefile may need to be updated if it did not do so automatically. The user should now have a value for amount impervious cover in their chosen units on any given parcel based on the LULC data they used.

Google Earth

Using this method, the Permittee must enter the following link into their web browser: https://earth.google.com/web/. A desktop application works best for this analysis. To navigate to their site, the Permittee must enter their site address into the search bar. Using the "Add Path or Polygon" tool, the Permittee will delineate the impervious surfaces on their site by clicking on the corner points of the footprint of impervious cover on their site. To determine the area, the last click point must connect to the first click point. Note, while delineating the impervious surface area the Permittee should be zoomed in on the map as much as is reasonable to create the most accurate impervious surface estimate. Once the shape has been determined a pop-up window informs the user of the total area of interest outlined using the tool in acres. If there are non-contiguous sections of the site, the Permittee must repeat this exercise as many times as necessary to obtain the total impervious area.

[5] https://www.mass.gov/info-details/massgis-data-2016-land-coverland-use
[6] https://www.mass.gov/info-details/massgis-data-property-tax-parcels

Reporting Changes to Impervious Cover Acreage

If the Permittee changes impervious cover acreage after the permit effective date, the Permittee must submit this information to EPA as part of a Change NOI and meet the relevant permit requirements related to increases in impervious cover and increased discharges. In scenarios where the Permittee adds impervious cover, they need to comply with sections 2.1.1.B.b.i and/or 2.1.1.B.b.ii, which require the Permittee to design the site such that the runoff load generated from this newly added impervious cover must not exceed the load that existed for the previous pervious area.

If the Permittee refines or otherwise changes their impervious cover acreage as part of the storm sewer system mapping requirement and the pollution load reduction responsibility outlined in Part 2.1.1.B.b of the permit, the permittee must indicate this impervious cover change as part of a Change NOI. The permittee will also report on changes to the impervious acreage that occurs as part of a redevelopment in a Change NOI.