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A Guide to Port Redevelopment Assessments

by

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Introduction

The purpose of this course is to provide a guideline on how to conduct an assessment for a port redevelopment project, specifically looking at the infrastructure and environmental constraints present within the properties to be reviewed. This initial assessment phase should be considered non-invasive, i.e. no sampling of soils, groundwater, and physical buildings and structures, but more of a roadmap for where future investigations should be focused should a site be attractive for redevelopment. The assessment should be used as a tool to analyze the environmental impacts and physical infrastructure present at the site with relation to the potential redevelopment of the Site. A complete redevelopment assessment will go beyond engineering review and include economic assessments (market analysis) and planning assessments, as well as legal reviews. This course will focus on the environmental and infrastructure assessments associated with a port site, since this course is aimed at an engineering audience. Sometimes redevelopment assessments are conducted with a specific new use in mind, which helps narrow the scope of the assessments, other times it is conducted with a broader view of what could happen with the site in the future. For the purposes of this course, we will spend the most time looking at the broad view redevelopment aspects, but we will also discuss screening site for a specific end use as well.

Oftentimes ports that have potential for redevelopment are blighted and have fallen past their peak usages, therefore, the environmental impacts dominate the redevelopment options. Environmental limitations are common within properties that have current and historical industrial usage and do not represent a barrier to redevelopment, rather they represent factors and limitations that need to be addressed as part of the redevelopment.



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Photo: LA(PHOT) Paul A'Barrow./MOD

Similarly, the physical infrastructure for sites that are being eyed for redevelopment may have fallen into some level of disrepair or less frequent maintenance. Other times the physical infrastructure on site is in good working order, however your client is anticipating or exploring a market change. In any redevelopment scenario, it's important to look at the physical infrastructure to see how it has played a role on site in the past, currently, and what role it could play in a redeveloped site.

It is very important however during these initial assessments to highlight what the potential issues could be with respect to both infrastructure and environmental considerations so that your client or the end-user can have a better understanding of what cost considerations could impact the redevelopment of the site and warrant further investigation.



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Review Existing Data

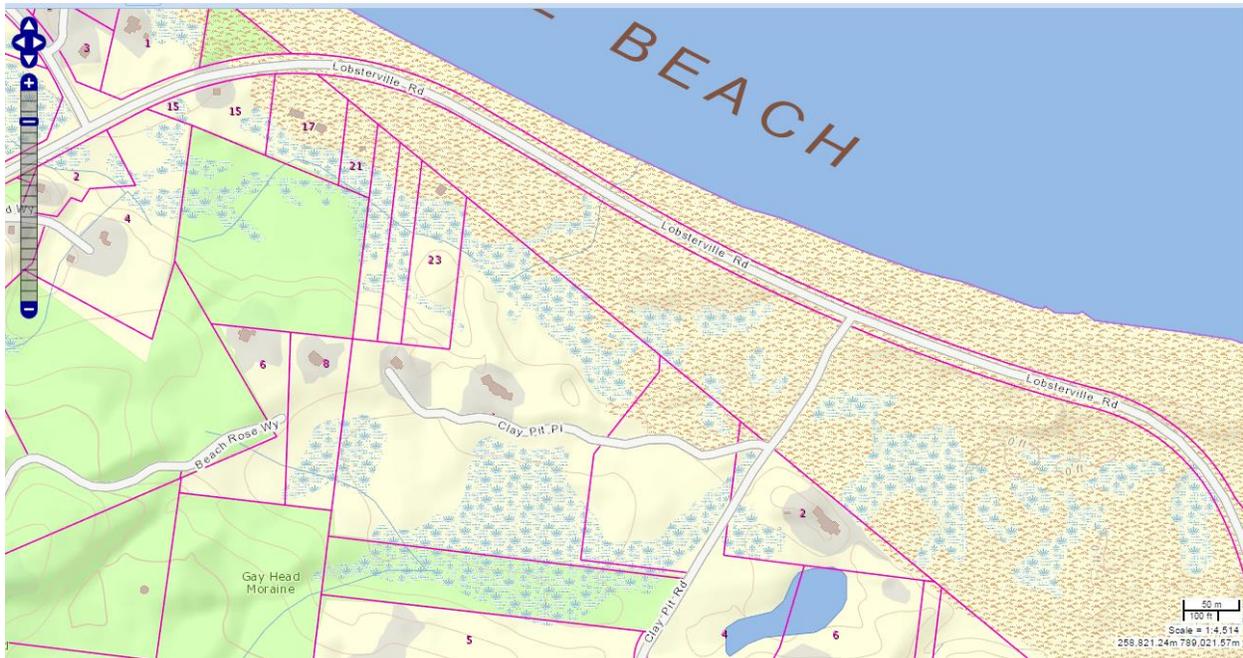
The first step in conducting the assessment, as with any project, is to see what information on the site is readily available. Your client or the local municipality may have copies of plans, reports, studies, and permits for work previously done on a Site. This information is infinitely valuable to give a historical perspective on what has been done at the Site, what are the issues they have attempted to address and what were the strategies. Historical documentation review is very important because it can provide plenty of background on a Site and keep you from repeating work that has already been completed, particularly if they were strategies that didn't work or meet the desired goals.

Following the review of the historical documentation, checking publicly available information is another great planning tool. GIS programs and databases can provide a wealth of data and information on a project Site that can help to mold the path forward for the project. Some valuable information you may be able to gain from GIS analysis can include:

- Property lines and parcel sizes
- Physical infrastructure near the site (roadways, rail, etc.)
- Land use within the surrounding watershed
- Presence of Endangered Species and/or Habitat
- Wetlands and natural resources in the area
- Drinking water supplies
- Surrounding topography



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Source: MassGIS

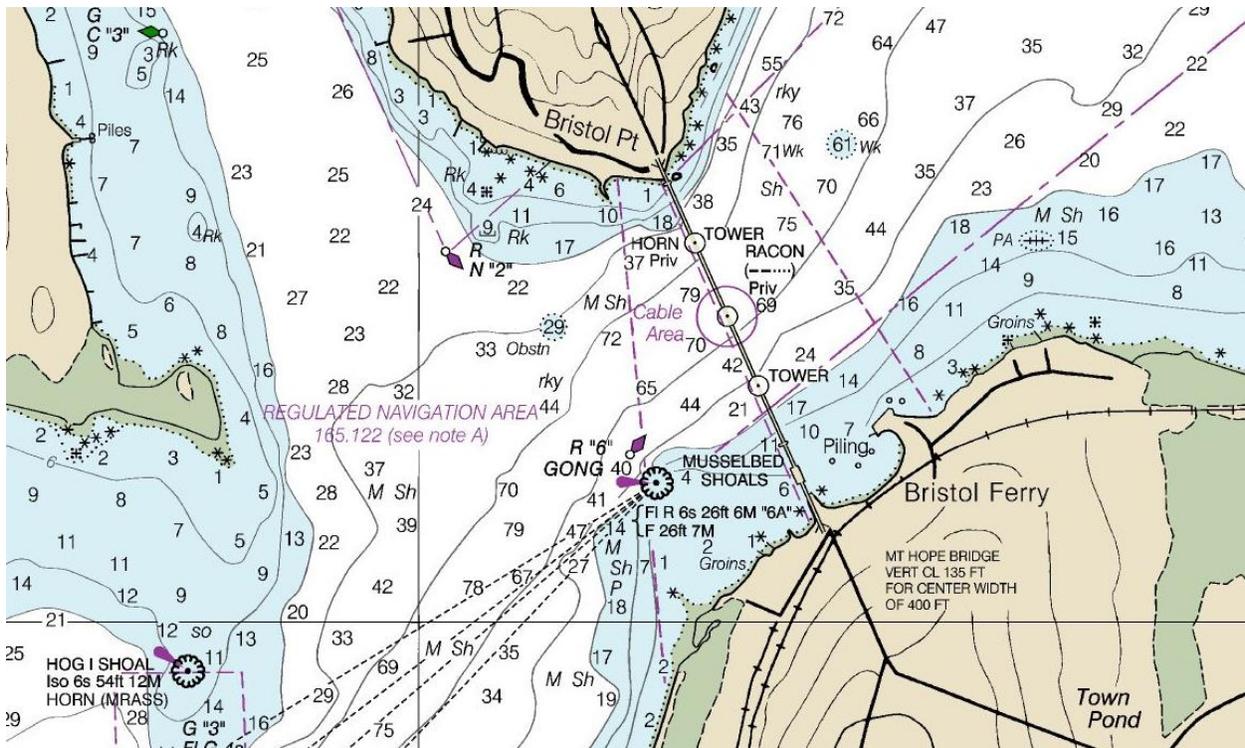
As you can see on the image, there are coastal dunes and wetlands in this project vicinity, along with an inland waterbody. These are important items to note because environmental regulations require setbacks and protections for these resources.

Since ports are located along navigable waterways, another important resource to review is the published nautical chart for the area. NOAA, the National Oceanic and Atmospheric Administration, has a great resource available that allows you to download the latest of all published navigational charts, <http://www.charts.noaa.gov/InteractiveCatalog/nrnc.shtml>. These charts can help you learn:

- Approximate depths in the study area
- Presence of navigational buoys in the area
- Presence of navigational channels in the area
- Presence of known obstructions/ shoal points in the area.



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Source: NOAA Navigation Chart 13226

This navigational chart shows several notable features that would be important to note for vessel traffic passing through this area. For one, there is a bridge with a vertical clearance of 135 feet vertically and 400 feet horizontally, which shouldn't restrict anything but some mammoth ocean-going vessels. In addition, there is a cable crossing in the area to note, several navigational buoys, and a couple of shoals, which represent hazards to navigation.

Lastly, if your project is located near a federally maintained navigational channel, the US Army Corps of Engineers, through its navigation section, posts their most up to date channel conditions surveys on their website.

Historical / Archaeological Resources

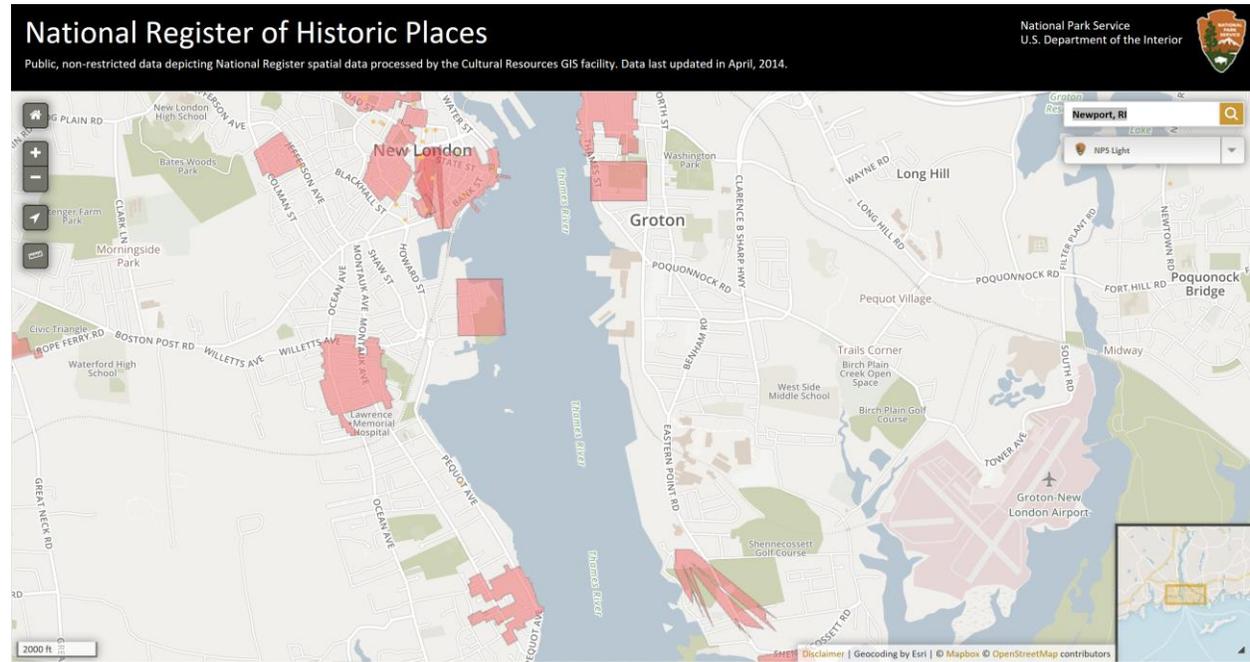
Our nation has developed and grown around our waterways. Almost all of our major cities have developed on or adjacent to a waterbody, and the waterways played a major impact on the lives of the Native Americans. Therefore, a lot of our ports may have some historical or archaeological resource associated with them. At a minimum any redevelopment assessment



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should review whether any historical/archaeological resources exist at the site. The National Parks Service runs the National Register of Historic Places and has a database from which you can check to see if the port property is listed or if there are listed properties nearby.

<https://www.nps.gov/subjects/nationalregister/database-research.htm>



Source: NPS.Gov

The above screengrab from the National Register of Historic Places website shows that along this body of water there are numerous sites listed on the register (shown as a red shade). The interactive webpages allow you to click on each site and gather information that can be useful if any of these sites abut or are nearby the site you are evaluating.

In addition, the local State Historic Preservation Office usually has publicly available data to see if there are state listed resources worth noting at the site. And while notification/ consultation of the local Native American tribes is not required at this level of assessment, it is certainly helpful if an informal inquiry can be done to see if there are resources on the site they would like to see preserved.

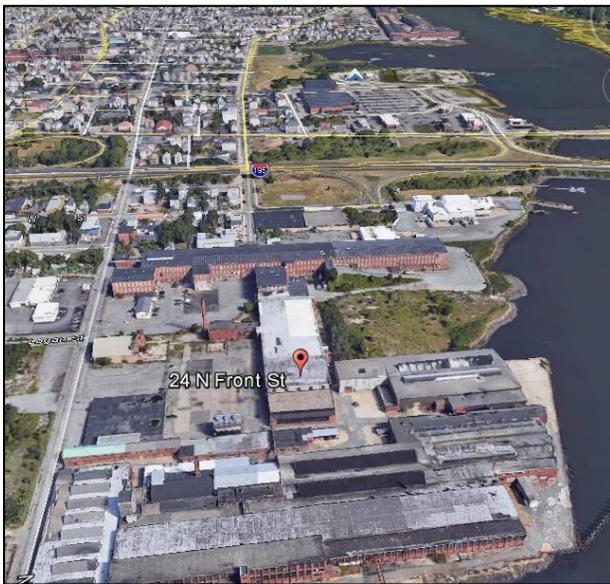
The best resource to consult for this type of data is typically the local planning agency. They are incredibly knowledgeable about most site's histories, and if not, the specific site you are working on, they know a lot about the local area. They can often tell you if previous projects had issues or constraints from historical/archaeological resources (or anything else that will impact

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redevelopment) and can point you in the right direction for what to look for or what some potential issues could be.

Physical Resources

The next thing to look at are the physical resources surrounding the Port site that will have an impact on any redevelopment strategies.



Source: Google Earth

The image above shows a bird's eye view of site with its connection to the waterways and the roadways, including the highway that passes just to the north of it.

Surface Water

The port Site you are reviewing likely lies on a navigable waterway and thus you'll need to understand how that waterway will impact any redevelopment scenarios. You'll want to review the other surrounding sites along your waterway, are they industrial in nature? Commercial? Recreational? The redevelopment scenario will need to complement its surrounding uses. For example, you don't want to re-develop small ship building site in a recreational boating area into an intensive industrial usage like steel pipe fabrication, that will cause conflicts with the surrounding uses. Furthermore, you'll want to note the neighboring industrial uses (including historical ones, as they will have an environmental impact on the sediments along the waterway in front of your Site.

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The EPA produces a list of impaired waters, referred to as the 303(d) list, which comes from the enabling part of the Clean Water Act that allows states to list impaired waters and create TMDLs. This list can be checked to see if the surface waterbody has been assessed, and if so, what if any are the factors impairing that water. If, for instance, there is a TMDL, or Total Maximum Daily Loading, listed for the waterbody adjacent to your site, that is of significant note for redevelopment, as any redevelopment scenario will need to factor in ways to reduce and control that pollutant from the Site, so it doesn't further detriment the waterbody. You can check <https://www.epa.gov/tmdl/overview-listing-impaired-waters-under-cwa-section-303d> to gain an understanding of the impairments and limitations of the waterway that the Site you are assessing discharges into.

Natural Resources

The natural resources, such as wetlands and endangered species habitat, that surround or occupy your Site, could have caused limitations or require mitigation for any redevelopment project, therefore, it is imperative to understand how and what presence they hold at the Site. Wetlands can be identified visually, often there are easy to spot indicator species, or they may be mapped through a GIS data-layer. In addition, wetlands may have been identified during work previously done at the Site, on an adjacent site that may be hydraulically connected to the Site you are working on. Either way, understanding their presence and how the local regulations will govern

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the redevelopment is crucial. The same thing goes for priority habitats; if it represents a state or federally listed endangered species habitat. “Takings” may not be allowed or would require some mitigation offsets, usually at a larger scale than the taking, anywhere from 2:1 to 5:1 depending on the species and the nature of the taking. Most times in your preliminary research you won’t be able to tell for which species the area represents habitat, but only that the area is mapped habitat, which may require further investigations or broad assumptions for this assessment.



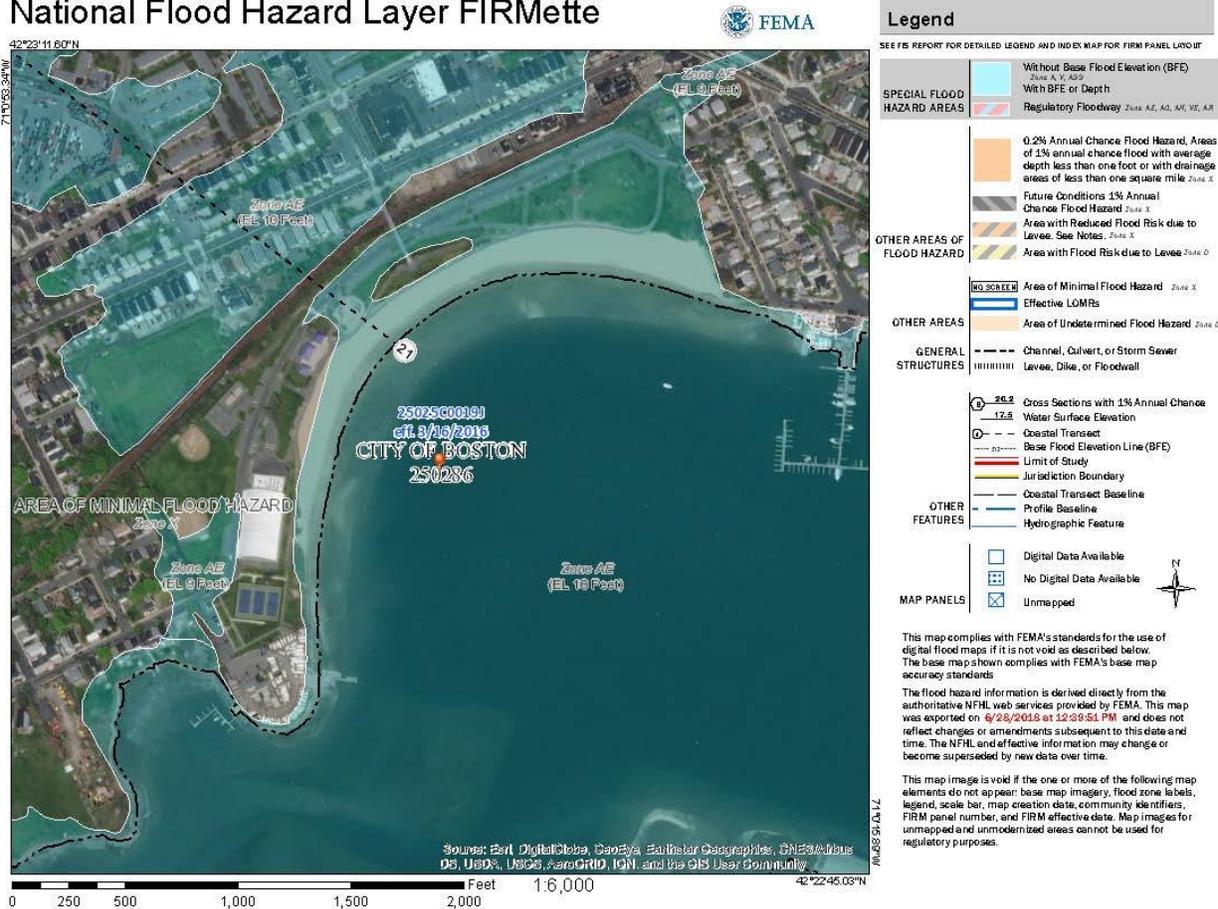
Floodplains

Understanding how a property lies with respect to the floodplain is another key aspect to be identified. The presence of a mapped floodplain on a site will influence where key infrastructure should and should not be placed, whether changes in grade will be possible, and influence the insurance rate for the site, which may make some redevelopment options not economically viable. The Federal Emergency Management Agency (FEMA) produces Flood Insurance Rate Maps (FIRMs) through its National Flood Insurance Program that makes it quick and easy to determine if your Site lies within a mapped floodplain and what the annual chance of flooding is associated with that floodplain. The Map Service Center, <https://msc.fema.gov/portal/home>, should be the first stop to make a “FIRMette” for the Site showing its relationship to the floodplain. These maps typically show the base flood elevation (BFE) for the floodplain, which is in the NAVD88 datum. So, it's important when comparing a base flood elevation to the site elevations of any plans you may have that you understand how the datums correlate.

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Furthermore, the state or municipality may have more floodplain information and data layers that can be incorporated into your review and assessment.

National Flood Hazard Layer FIRMette



Source: FEMA

The above image shows a mapped floodplain for the area and even provides the base flood elevation (called out as Elevation 9 or 10 depending on the location).

Climate Change and Rising Sea Levels

This is something of a relatively new aspect to look at and review, but it is not an insignificant factor to look at for a redevelopment assessment. Rising sea levels can pose many different risks to a port side facility. For one, there is the waterside infrastructure, be it a bulkhead, dock, pier, revetment or block wall, etc. Rising sea levels, when combined with king tides, may pose a risk at overtopping these structures. In addition, there is the utility infrastructure which could be put at risk with rising sea levels, as stormwater outfalls may be submerged more often or

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permanently, water and electrical subsurface infrastructure may be more susceptible to infiltration and inflow as well. Most areas have conducted some form of assessment and projected water level rises. If that data is accessible, it would be beneficial to review it and see how those projections would influence the Site you are reviewing. NOAA does have a Sea Level Rise viewer that can provide useful information for your assessment:

<https://coast.noaa.gov/slr/>

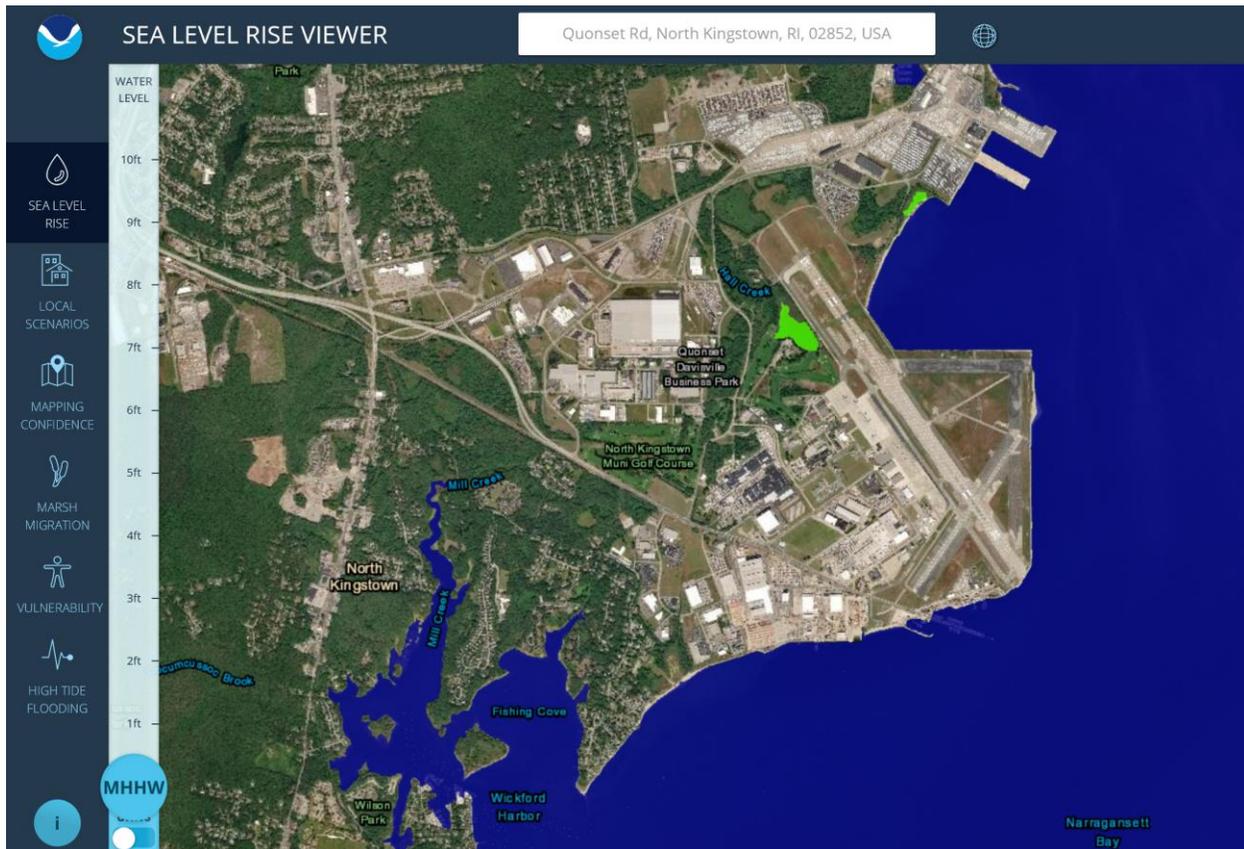


Image 1: Site conditions at current Mean Higher High-Water levels (Source: <https://coast.noaa.gov/slr/>)

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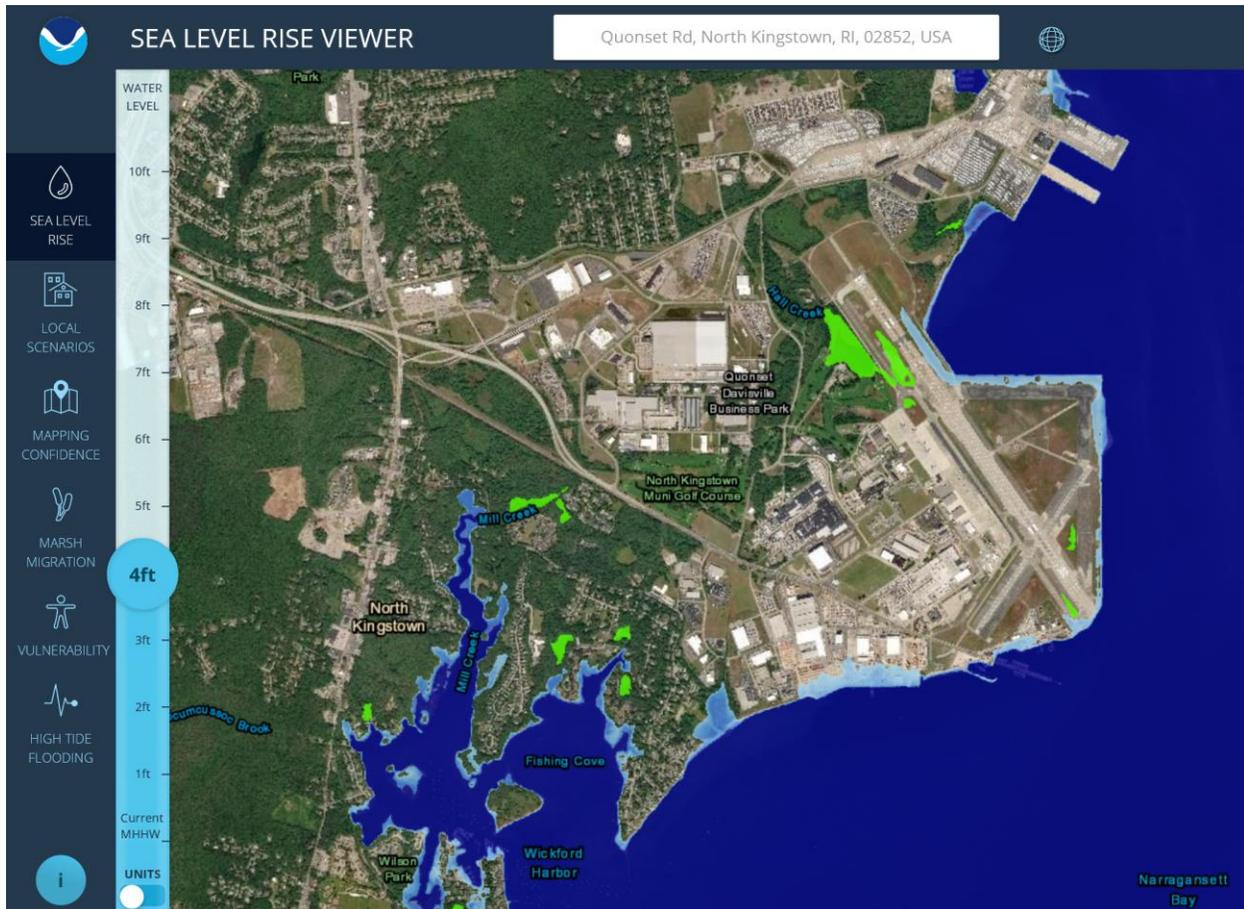


Image 2: Site conditions with a 4-foot increase over current Mean Higher High-Water levels (Source: <https://coast.noaa.gov/slr/>)

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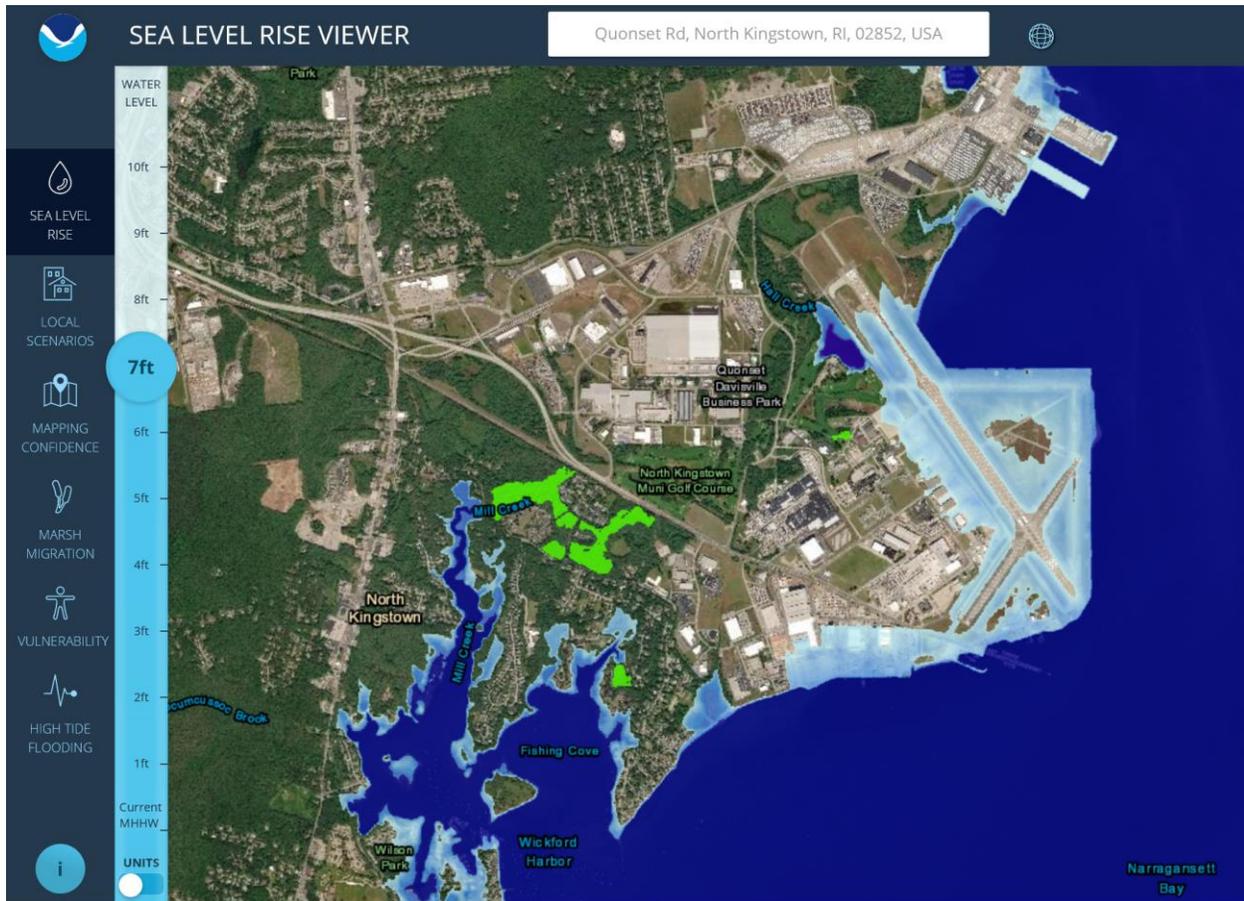


Image 3: Site conditions with a 7-foot increase over current Mean Higher High-Water levels
 (Source: <https://coast.noaa.gov/slr/>)

The three images above show how vulnerable these coastal sites are to the influence of sea level rise over current conditions. As you can see when comparing Image 2 to Image 1, a four-foot rise in sea level creates some smaller pockets of increased flooding, mostly in the “softer (more natural)” site, but the big change comes with a 7-foot rise in sea levels, as shown in Image 3. Image 3 shows increased flooding in both the softer and harder sites, and these harder sites are likely where the bulk of the waterside infrastructure is and thus will be affected.

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John M / *Outer Harbour Wall* / [CC BY-SA 2.0](#)

Climate change isn't only influencing rising sea levels. We are seeing more frequent, higher intensity rainfall events. That's why it is important to review the on-site stormwater management system, as well as gain an understanding of the stormwater management system of the area. If an onsite system is undersized or marginal, its unlikely to perform well in the future, and therefore would require significant upgrades as part of any redevelopment scenario. If the stormwater outfalls for the site are tidal, then high intensity storm events (several inches per hour) that occur during when the tide cycle is on the higher end will cause backups in the stormwater management system as there is less capacity to discharge and more hydraulic head is required to activate tide gates on discharge pipes. This could cause localized flooding on site and upstream in the area.

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Physical Constraints

As you move away from the local physical resources, you are going to want to look at the physical constraints of the Site itself. Some are pretty obvious, but they all are relevant and can play a role in developing your redevelopment assessment. Physical properties to be noted are typically:

- Lot Size (acreage)
- Developed acreage
- Open/ undeveloped acreage
- Restricted areas of the site, if any
- Zoning classification
- Size and location of on-site buildings
- Site Security (fencing, gates, etc.)
- Waterside infrastructure
- Site utility infrastructure



By Dietmar Rabich, CC BY-SA 4.0,

<https://commons.wikimedia.org/w/index.php?curid=42390418>



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With this information, it is critical to develop an understanding of both the current and historical property uses, as they may influence the rest of the assessment and what to look for. The size of the site and the ratio of open space versus already developed space is an important factor for what redevelopment uses will lend themselves better to a site. The existing buildings should also be explored and detailed including their uses. 10,000 sf of manufacturing space may be more attractive to certain uses than 1000 sf of office/commercial space and be less attractive for other uses. The most important thing about the assessment is to have the information readily available.



Roadway

Site access is another critical feature that needs to be reviewed and noted in the assessment. Roadway access is a very significant factor in the redevelopment potential of a site. It's important to note the distance of the Site to any major state highways and federal interstates. You'll also want to review and assess the local roads leading into the Site. You'll want to note if there are any height, width or cargo restrictions from the Highway to your Site that would affect truck traffic. It's good to understand the existing truck and non-commercial traffic in the area and any restrictions on cargo or turns that could impact operations.



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This image shows a site access roadway that is in poor shape and also shows an overhead restriction of a pipeline crossing up ahead that would require height limitations on traffic into and out of the site.

Rail

While rail access isn't always available at every Port site, when it is available, it can provide significant value. If it's nearby, you'll want to note the distance to the Site and look at potential options for a rail spur extension to connect into the line. If it is available on-site, you'll want to know where the connections are and where on site it goes. For example, does it extend out to the bulkhead, or does it extend directly into the manufacturing facility?

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The attached image shows several waterfront sites in close proximity to a rail yard and their current or planned rail spur extensions out to the bulkhead.

Waterside

Ports often rise and fall based on their waterside infrastructure, so this can be a critical part of any assessment. You'll certainly want to understand the navigable depths in front of your Site, which you should have some data from the NOAA charts. Any redevelopment assessment should also look at the potential to deepen the waterway in front of or from your Site. A good way to understand the potential for that is so see if other sites nearby have been dredged recently. It would be very useful to get a copy of their permits to see what was done with the dredged material for disposal, whether it be offshore or upland. Also, if there is a Federal Navigational Channel nearby, there should be sediment data from the USACE available for that area. Dredging can be challenging, but increasing or maintaining water depths is vital to the successful operation of a Port.



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This image shows a pile supported pier extending out into deeper water and a waterside crane that can be used for loading and unloading vessels.

In addition to the need to understand water depths, it's also important to understand what there is for waterside infrastructure and in what condition it is. For example, is there a bulkhead, a pier or a dock? What materials is it made from? Is there a system in place to protect from or reduce corrosion? What is the length of the waterfront infrastructure, how many vessels can tie up/berth? What about fendering and ladders?



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This image shows a finger pier extending out with a barge berthed on one side. There are large bollards and lighting, which indicates there is likely an electrical connection available shore side.

Environmental Considerations

Port facilities with potential for redevelopment often come with an industrial pass, that could lead to legacy environmental issues that will need to be addressed as part of the redevelopment. For the redevelopment assessment, I often conduct what I consider a Phase I- lite, referring to the ASTM E1527-13 Standard for environmental assessments. I refer to it as a Phase I lite, because unless the client specifically asks for a Phase I (which it may need for bank refinancing or you are working for someone interested in redeveloping the property), I don't follow the ASTM standard to the letter, but follow the spirit of the standard.

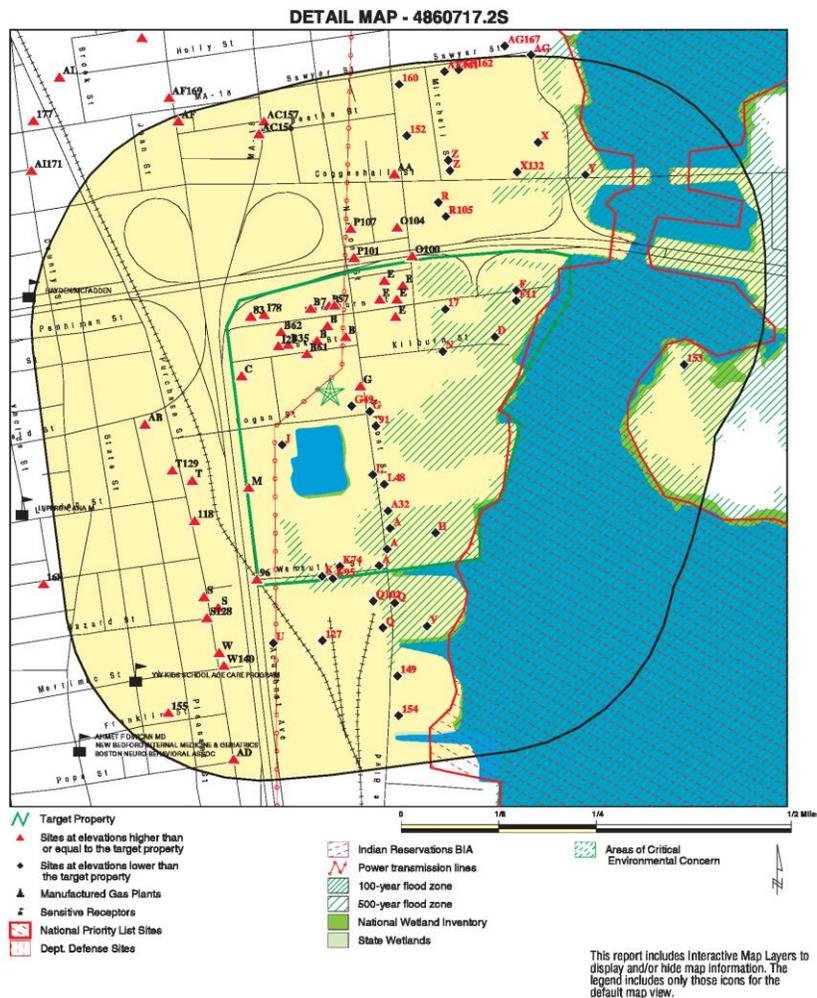
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One of the most important thing to know if the history of uses at the site. Looking through historical reports and studies is helpful. Often the most helpful is to purchase an Environmental History Summary report, such as an EDR report, with historical aerial and topographic maps, as well as Sanborn Maps, which are detailed maps produced in the 19th and 20th centuries for fire insurance companies to assess their potential risks for an area. These can be a great first step in understanding the environmental history of a site and well as identify potential environmental conditions which would require further investigation. These reports will also identify reported spills or Hazardous Waste generators nearby to your site, which could have an impact on the environment of the site.



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Source: EDR

This image shows an EDR radius map report which shows the study area outlined in black and several important features of the neighboring sites, whether they are at a higher or lower elevation, contain a sensitive receptor or are in a flood zone or other natural resource.

Some states also have online databases that will allow you to research a site, see if there were any reportable spills or environmental actions, and what the status of each of those situations is. Perhaps the site has had numerous small, yet reportable spills, however each case has been remediated and considered closed, that is less notable for a redevelopment assessment than a site with an existing environmental remediation situation/need that is still outstanding or unresolved.

This background and historical research should be done ahead of any site visit so that you can be prepared and have an idea of what to look for as you conduct your on-site assessment.



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On-site Assessments

Once you have completed your desktop assessment and researching, it's important to "ground-truth" your initial findings and thoughts by conducting a site visit and documenting the existing conditions. For your site visit, you'll want to document everything you can and spend as much time on site conducting a non-invasive site visit.

The first thing to look at is the entrances and the perimeter of the property. Starting at the street, it's important to look around and verify the surrounding properties and the type of traffic that passes by on the street. Are there residential properties around, if so, it would be good to get some pictures that frame the site entrance with respect to those residential properties so users can understand how close they are and how potential redevelopment actions could affect them. If the surrounding uses are commercial or industrial, it would be good to take note of truck traffic, roadway conditions, curbing, etc. Note what are the neighboring uses, and when would their peak traffic times be? For example, if your neighboring property is a fish processing facility, then it's likely it will have peak traffic in off hours; very early in the morning to make deliveries to the markets, returning midday. It's not for you to determine whether the neighboring uses are compatible just to point out how those neighboring properties could interact with potential redevelopment options. The Site entrances will be important to document. What is the speed limit of the roadway? Is there a dedicated turn lane into the site, or is there turn off the main travel lane? If so, how is the curbing set up, does it allow for wide turns or is the curb cut short and narrow? Where is the closest traffic light in each direction? These factors will be important on a redeveloped site making a ship to sea connection.

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This image shows the entrance into a site just beyond the fenceline. You can see bollards interspersed throughout the pavement to protect infrastructure, some overhead electrical service and the neighboring steel frame building.

Once you work your way into the site, then you'll want to work systematically to document conditions. How are the utilities brought into the site? Is the electrical service underground or overhead? It'll be good to visit the utility room and see what is available on the electrical service. Is it single phase or three phase service? How many amps is the breaker box rated for? You don't need to be an electrical engineer to understand the available electrical service, most times the limits are clearly marked at the breaker box. You'll also want to look at water service and fire protection. If possible, it would be good to note size/ capacity of the service brought into the site. Are there gate valves on site? What about fire hydrants? If the hydrants aren't on site, where is the nearest? Next up, look for signs of sewerage, which isn't always readily visible. But if there are a series of manhole covers that might signify tankage or a pumping system. There might also be a single manhole cover for the municipal sewer connection.

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Next note the groundcover at the site. Is the entire site paved, if not verify that the percentages you had measured from site plans/ aerial images appear reasonable? What condition is the groundcover? Are there potholes and cracks in the asphalt? Is the concrete cracking and spalling? Do you see signs of differential settlement? Look at the general topography of the site, is it consistent with the site plans you've reviewed? Are there areas that look like they have been or are susceptible to ponding or flooding from large storm events. Are there stormwater management controls visible on site? If so, are they for water quality (treatment systems, bioretention systems, bioswales, etc.) or for water quantity (retention/detention ponds, underground storage). Also look around the surrounding properties with eye towards stormwater management. Is your site located at the bottom of a hill or lower than its neighboring properties? Is there concern from other sites flooding your study site or is your site in a more dominant position, if so, are there sensitive receptors down gradient?



This image shows a stream/swale passing underneath a concrete structure, which indicates traffic passes over the bridge. The stream/swale has a wattle/sock and a steel grate over it, indicating there may have been debris blockages or environmental releases in the past.

Next look at the onsite HVAC system. What is there for heating? Is there natural gas service that comes in the street or is there an on-site oil tank? Aboveground or below ground? If its above

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ground look at the condition of the tank, estimate if there appears to be sufficient secondary containment. How is the tank laid out with respect to the rest of the site? Do the same thing with the cooling system. Where are the cooling towers with respect to the buildings and the rest of the infrastructure?



This image is taken from the shoreline of a site that was evaluated for redevelopment. This is clear that there is a liquid petroleum pipeline the runs into the site there and should be noted as part of the assessment.

Next look at the buildings themselves. Note their condition, signs of stress or fatigue or any notable repairs/upgrades that will be required. It's always best to note the materials of construction and document them. Things that require significant documentation include structural cracks or signs of water damage. It's always important to document the conditions, but also document their location with respect to other site features. For example, water damage noted on the side of a building that is adjacent to a detention pond is worth noting as it might

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mean that the detention pond is inadequately sized or there are issues with the outlet. On the interior, it's important to note the functionality of the space. Is it intended for office space, storage or manufacturing? Are there interior beams or high limitations that could affect functionality?



This image shows the interior of a steel framed structure and gives the users a good perspective on the interior layout and its potential for redevelopment uses.

Lastly look at how the waterside infrastructure interfaces with the land. How can you get to the water from the land? Is there full access via bulkhead, or limited access through a pier or dock? Are there controlled points of access to the water? What materials is the waterside infrastructure from and in what condition is it? Are there physical signs of corrosion? Is there a system in place to protect from or reduce corrosion? Are there loading limitations on the waterfront infrastructure. What about fendering and ladders, are they there and in what condition? The American Society of Civil Engineers has a very thorough and useful publication on how to conduct inspections of waterfront facilities, called *Waterfront Facilities Inspection and Assessment*, https://sp360.asce.org/PersonifyEbusiness/Merchandise/Product-Details/productId/233127082?_ga=2.215857044.2072381304.1687351262-346956726.1645104754 .



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That manual is very helpful in laying out how to conduct an on-sight non-invasive investigation. The entire manual is more intense than what is typically needed for this level of investigation, but it's a great resource, particularly when further investigation is warranted. For these assessments, I generally follow what they refer to as the Level 1 inspections and note any features that may require a more thorough investigation in the future.

Next make sure you look at the Site from an environmental perspective. Are there hazardous materials stored on site? If so, in what condition? How are things laid out on site? Do there appear to be engineering controls associated with environmental risks. Are there signs of historical contamination? Staining or odors? Monitoring wells? Groundwater treatment systems? These things are all vital information and should be noted as environmental remediation can greatly increase the redevelopment costs.

Another great tool to have for your on-site assessment is create a checklist before you visit, so this way you don't miss some key site feature during your visit. Each checklist you make should be site/region specific to make sure you capture the most important features for your assessment, but a sample checklist is shown below:



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Site Investigation Checklist

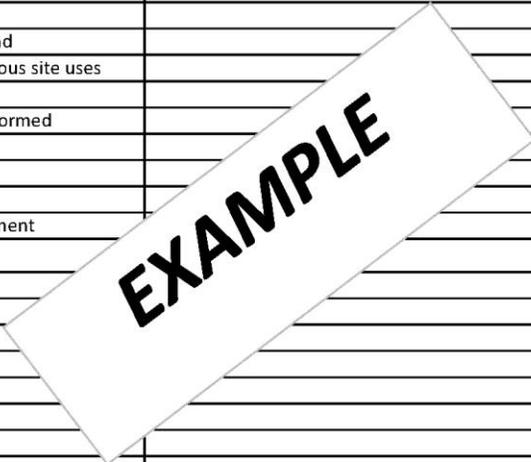
Project Site	
Site Name	
Assessor's Parcel(s) Identifier	
Property Owner(s)	
Property User(s)	
Parcel Size (ac)	
Parcel Size (sf)	
Property Zoning Classification	
Parcel Coverage Building	
Parcel Coverage Impevious (asphalt/ concrete)	
Parcel Coverage Green Space	
Parcel Coverage - undeveloped	
Open storage space	
Hours of Operations restrictions	
Noise/Air concerns or restrictions	
Waterside	
Navigable channel access	
Controlling depth	
Controlling width	
Who is responsible for maintaining channel	
Last time maintenance dredging was performed	
Overhead restrictions	
Local Pilots association	
Channel currents	
Tide Range	
Navigation aids/ markers	
Vessel movement restrictions	
Wind/ weather data	
Buoys	
Vessel Berth depth	
Vessel Berth length	
Submerged obstructions	
Channel bottom characteristics	
Turning Basin/Dolphins/ Pivot Points	
Back in /back out requirements	
Accessibility	
Waterside accessible	
Truck route accessible	
Controlling roadway width	
Roadway restrictions	
Distance to closest Interstate Highway	
Overland overhead restrictions	
Rail accessible	

EXAMPLE



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Distance to railway	
Accessible by Public roadways	
Easements or Shared use roads with restrictions	
Neighboring Property uses	
Potential expansion to neighboring properties	
Site Security	
Controlling Gate widths	
Structural	
Bulkhead construction	
Condition of Bulkhead	
Pilings	
Conditions of Pilings	
Fendering	
Bollards	
Hard Point	
Load out areas adjacent to berth	
Geotechnical properties	
Soil Survey Data	
Site Structures (size, type)	
Site Structure foundations	
Groundwater elevation	
Site History	
Recent Due Diligence reports available	
Previous Site Uses	
Current Site Uses	
Existing Site use capacity	
Ability /desire to change use/ expand	
Environmental Risks based on previous site uses	
Known Brownfield	
Previous remediation activities performed	
Wetlands on-site	
Size of Wetlands	
Development restrictions	
Areas of Fill from previous development	
Utilities	
Electrical Service Provider	
Electrical Service	
Single Phase or 3 Phase	
Transformer on site?	
Closest Transformer	
Overhead or Electric	
Potential to upgrade service	
Wastewater - Municipal Sewer	
Wastewater - On site sewage disposal	
Wastewater - On site pretreatment	
Current NPDES discharge permit	
Stormwater Management system	
Municipal or Private Water Service	
Water pressure	
Easements on site	
Heat source on site	





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Redevelopment Parameters and Considerations

Not all redevelopment assessments have an end use in site, but sometimes the studies are being conducted on multiple properties to evaluate which sites are best suited for a potential type of project. For example, the offshore wind industry is in its early development in the US, and there are several locations along the eastern seaboard that are evaluating their potential to support this industry. This type of end use makes for a more concrete redevelopment assessment because the industry has already developed in the European market and so there are known parameters to gauge a site against. This makes for a more objective review of each site. You can set up a series of inputs for each parameter to determine optimal, acceptable and bare minimum. For example, let's say for a certain manufacturing use, an optimal site area is 25 acres open space, acceptable is 15 acres, and bare minimum is 12 acres. With that you can create a weighted average of which parameters are most important and which are least important and create an overall ranking of each site.

For example, let's say you are looking at five separate properties, with a desired end use of steel manufacturing operations. You know for steel manufacturing you have the following parameters that determine if the site is suitable are:

1. Lot Size
2. Manufacturing Space
3. Waterside Berthing space
4. Waterside Depth
5. Distance to highway or rail

If those are your five parameters you should then discuss with people in the manufacturing industry to see what the optimal, acceptable and bare minimum standards are, and which parameters are more important than other. Manufacturing space may be more important than distance to highway or rail. For this study, let's say we have this:

Parameter	Optimal	Acceptable	Bare Minimum	Importance
Lot Size (ac)	25	15	12	4
Manufacturing Space (s.f.)	40,000	30,000	25,000	5



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Waterside Berthing Space (ft.)	500	450	350	3
Waterside Depth (ft.)	35	25	18	2
Distance to Highway or Rail (mi.)	< ¼ mi.	< ½ mi.	< 2 mi.	1

With that table, you can create a weighted average of which sites are best suited for your manufacturing purpose and the ones that are highest rated can be investigated further (as described above) for a more in-depth look at redevelopment potential. For example, imagine there are four properties with the following characteristics:

Site	Lot Size (ac.)	Manufacturing Space (sf.)	Waterside Berthing Space (ft.)	Waterside Depth (ft.)	Distance to Highway or Rail (mi.)
A	25	30,000	500	20	½
B	12	25,000	450	35	½
C	10	40,000	500	30	1
D	20	40,000	500	18	¼

Based on these characteristics and the parameters previously set up, you can then assign a value to each input and multiply it by its weight, which should be added to get a weighted average. For example, an optimal characteristic could get a score of 5, acceptable a score of 3, and bare minimum a score of 1. The following table shows how this example would rank each site, with the total score being the sum of the each parameters weight times its score:

Site	Lot Size (ac.)	Manufacturing Space (sf.)	Waterside Berthing Space (ft.)	Waterside Depth (ft.)	Distance to Highway or Rail (mi.)	Total Score
Weight	4	5	3	2	1	-
A	5	3	5	2	3	57
B	1	1	3	5	3	31
C	0	5	5	4	2	50
D	4	5	5	1	5	63



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Based on this objective analysis of industry parameters, it appears that the most suitable sites for this end use are in order, Site D, Site A, Site C and Site B.

Limitations and Exceptions

It's important to notify your client and end users of your assessments of the limitations and exceptions of the assessment. Because the assessments are generally conducted at the early stage, assumptions are made, resources are limited, and much of the more thorough investigations will occur if the client proceeds to take the study to the next level. Therefore, it is important to note that data, findings, and conclusions presented in your assessment are based upon a search, review, and analysis of documents and interviews. Conclusions reached regarding the conditions of the properties should not represent a warranty that all areas within the properties are of a similar quality as may be inferred from observable site conditions and available property history.

Due to the limited nature of an assessment, which typically includes desktop research, interviews and site visits, it needs to be clear that no report can completely eliminate uncertainty regarding the potential for environmental liability in connection with the properties and the assessment is intended to reduce, not eliminate, the potential for conditions that result in liability for the end user of the assessment.

The scope of the assessment is intended to aid in the evaluation of infrastructure and environmental constraints. No conclusions should be stated or implied concerning the suitability of the subject properties for its eventual use. Most often the scope of work for an assessment limits the project to be non-intrusive in nature and not include sampling or testing of soils, groundwater, surface water, building materials, or other materials. As a result, the inherent limitations for the assessment should include, but not be limited to:

- **Uncertainty Not Eliminated** - No assessment of this nature can wholly eliminate uncertainty regarding the potential for infrastructure and environmental constraints in connection with a property. Performance of this practice is intended to reduce, but not eliminate, uncertainty regarding the potential for infrastructure and environmental constraints, and this practice recognizes reasonable limits of time and cost.
- **Not Exhaustive** - All Appropriate Inquiry does not mean an exhaustive assessment of a property. There is a point at which the cost of information obtained, or the time required to



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gather it outweighs the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions.

- Level of Inquiry Is Variable - Not every property will warrant the same level of assessment. Consistent with good commercial or customary practice, the appropriate level of environmental site assessment will be guided by the type of property, the expertise and risk tolerance of the user, and the information developed during the inquiry.

Summary

Ports along our waterways have been vital engines of economic development since the founding of our nation. However, just like other aspects of the economic, these ports experience cyclical boom and bust periods, with some areas developed to support an industry that is no longer as viable as it once was. Other times planners/ developers are more forward thinking and are trying to be on the front edge of a new or emerging industry.

A thorough and well conducted redevelopment assessment, as described in this course, should highlight what the potential issues could be with respect to both infrastructure and environmental considerations. This will allow your client or the end-user to be better informed into whether to further investigate a site and if so what to focus their investigation on, or whether to move on and look for another more viable site. Whether it for a site that has fallen past its prime or when trying to find sites for this new industry, redevelopment assessments are a very useful tool to identify potential and pitfalls associated with each site and help clients plan for new projects.