



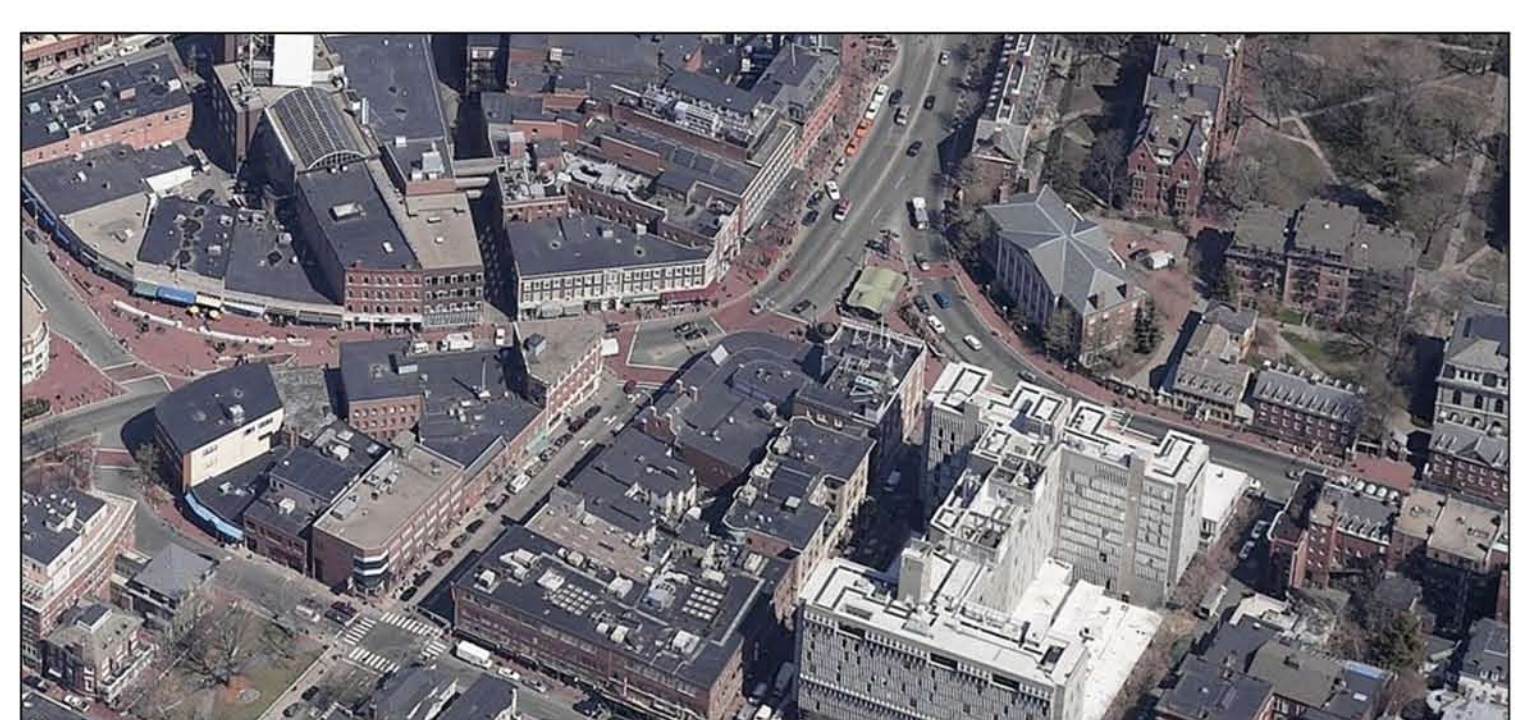
# ENVIRONMENTAL MANAGEMENT PROJECT

ENVIRONMENTAL HEALTH AND SAFETY | HARVARD UNIVERSITY PLANNING OFFICE  
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## ABSTRACT

Evaluating and understanding the environmental, health & safety issues and impacts at a large urban University campus is a daunting task. Harvard's Cambridge/Allston campus consists of over 500 buildings each with its own unique EH&S footprint. Harvard's EH&S Department provides EH&S support services to all of Harvard's school and departments and has the responsibility of assisting the University with environmental permitting and plan development, EH&S training, spill response, etc. For many EH&S programs, regulatory agencies considers Harvard a single entity and requires the University to maintain University-wide inventories for related equipment (boilers, WWT units, generators, tanks, etc.) along with obtaining University-wide permits. EH&S has collaborated with Harvard's schools & departments to establish and maintain a database that contains EH&S related equipment and EH&S incident reports.

The EH&S Department in collaboration with Harvard University Planning Office is investigating the potential benefits of using data visualization to determine if GIS will improve the University's EH&S programs. Current EH&S inventories and other databases will be integrated with a GIS system to allow EH&S to visualize EH&S impacts, risks and trends at the University to allow us to target our efforts and improve programs.



## OBJECTIVE

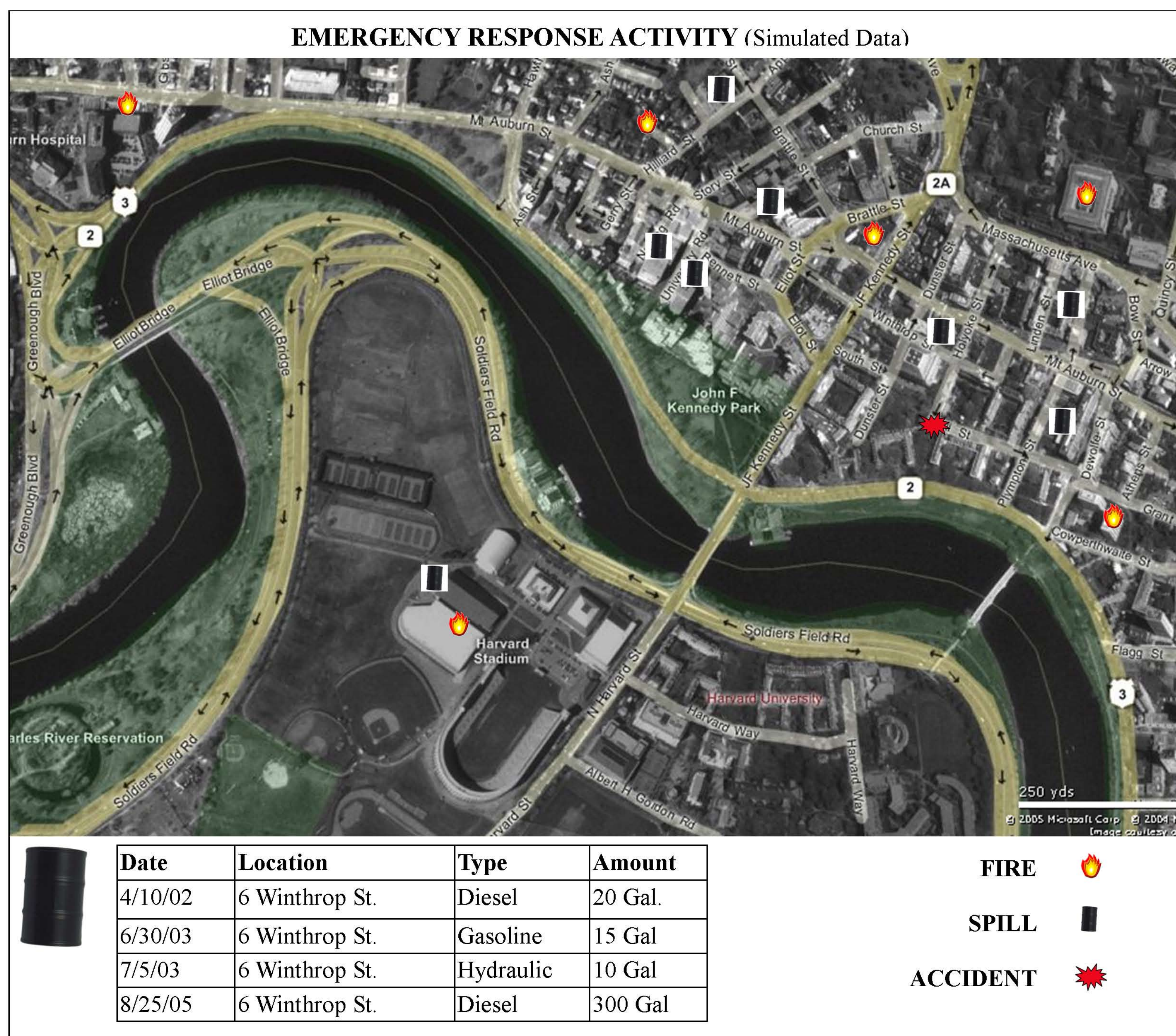
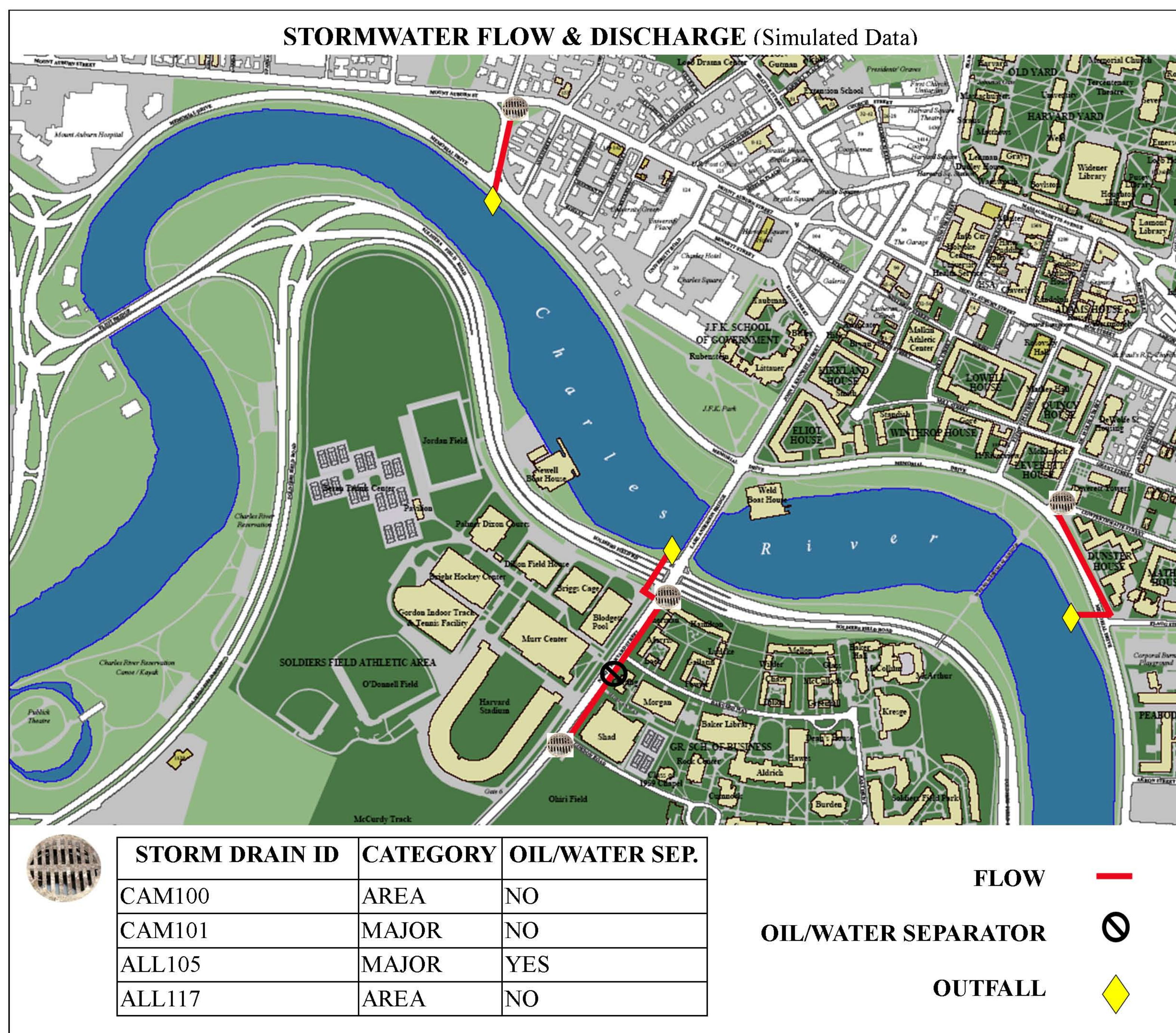
### 1) Improve EH&S programs at the University:

Currently we maintain a database of oil containing devices holding ten or more gallons of oil such as above ground storage tanks (AST), Underground storage tanks (UST), oil/water separators, etc and air emissions sources to include emergency generators, boilers, etc. This database includes numerous fields related to the device and must be updated on an annual basis. There is a separate database to maintain satellite accumulation areas and Universal waste areas throughout the campus. By integrating current EH&S inventories and data with GIS technology, campus wide evaluations can be made to assist in monitoring annual updates, sensitive populations and critical operations.



### 2) Improve our ability to plan and strategize:

We will be able to share information with individual schools and departments easily by creating various layers that will visually identify specific equipment, piping systems or hazardous areas. This information can be used to identify areas where attention is needed or where potential problems may occur. By mapping piping systems we will also be able to greatly improve emergency responses that involve the release of oil into the environment by assisting responders in the strategic placement of recovery booms.



## OBJECTIVE (continued)

### 3) Track trends:

The EH&S Department is also responsible for providing 24 hour emergency response for the University. To assist us in managing University Emergency incidents we have created a database to log the details of each response. By integrating the current emergency response database with the GIS map interface we will be able to graphically identify patterns of response activity over space and time. Visually displaying emergency response activity will provide our department with the ability to easily identify high risk areas of the University and improve our training and response activities accordingly.

## METHODOLOGY

When equipment such as oil containing devices and air emissions sources are inventoried each year, a hand-held GPS will be used to collect exact device position using longitude and latitude coordinates. This data will be entered into the EH&S Facility Environmental Inventory Management Database (FEIMS).

This information along with other attributes associated with the equipment can then be converted to table format and linked to a GIS map of the Cambridge and Allston Campus.

## METHODOLOGY (continued)

The underlying base maps will be provided by Harvard University Planning Office. Additional supporting maps of storm water and sanitary discharges to outfall pipes can be provided by the Environmental Protection Agency (EPA) and local municipalities.

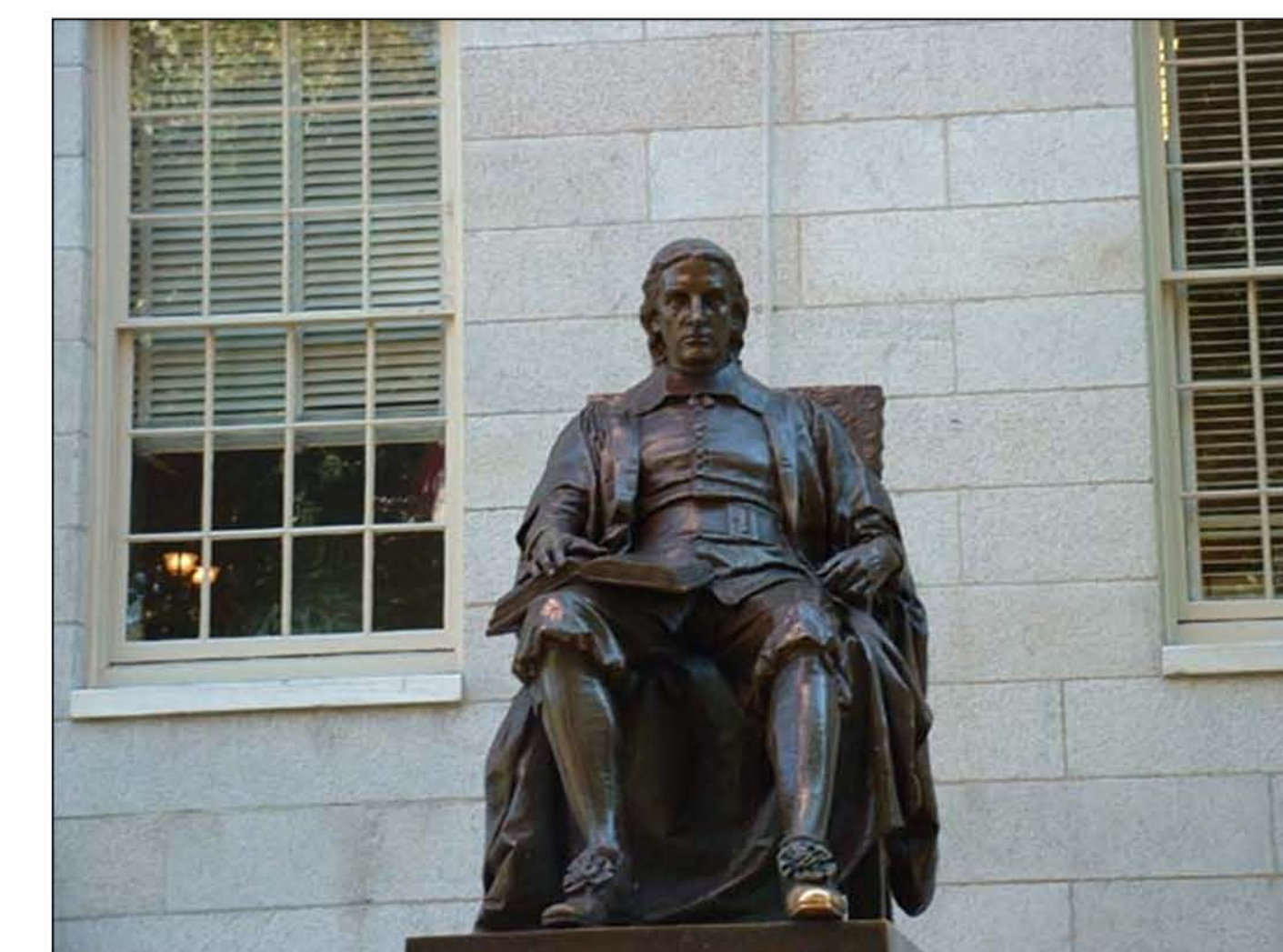
Using ESRI's ARC-INFO as a database and mapping tool, we can create an annual map which depicts the environmental status of Harvard University. We can map industrial wastewater pipes, sanitary discharge lines from buildings, storm water pipes and how all these systems are integrated into eventual outfall discharge into either the Charles River or Boston Harbor.

EH&S has captured detailed information on darkrooms, grease traps, water treatment systems and other environmental equipment. We need to add mapping data on storm drain locations, loading docks, trash receptacles and any other equipment which if damaged or broken, could lead to an environmental consequence.

## FUTURE

In addition to tracking current inventories we can begin to look further into the graphical information created by this project and assess the potential environmental impact on expansion property and plan ahead to minimize environmental risks in the future.

Environmental management GIS knowledge can assist to inform policy makers, planners and others on the history, status and future of the University.



We can begin to answer important questions such as:

- What are the subsoil surface components that could affect the digging of geothermal wells?
- Are their patterns of termite outbreaks on structures of a certain age, construction or location?
- If an oil spill occurs during an emergency, can you locate and isolate the end of line outfall pipe with oil booms in advance of contamination to the Charles River?
- In a severe snow storm, can you locate important below the snow electrical, storm, sanitary and other utility covers?
- Can you map pollution distribution on the Charles River and use this data to identify potential non-point sources of pollution?
- Can you identify patterns of growth over time to estimate future growth in buildings, ground surface runoff and other features?

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