JT Vespalec

Lab section: 302

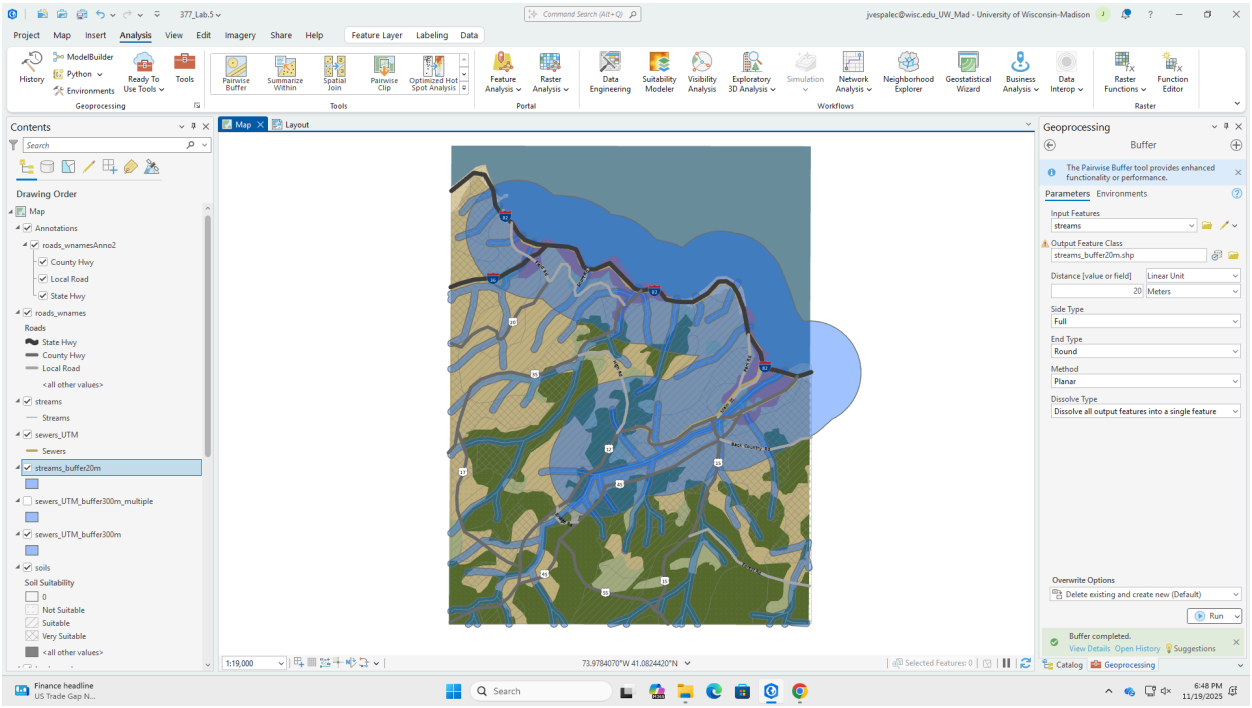
Question 1: Find a tool that you could use to merge multiple spatial datasets together. Within which Toolbox is it located? Also list the Toolset, and the Tool name (Hint, read ahead) (0.5pt)

A tool used to merge multiple spatial datasets is the Merge tool. You can find the tool in the Data Management Toolbox, within the General Toolset, and then find the tool named Merge.

Question 2: Explain what dissolve does. What would be the consequence if we skipped the dissolve step? (1 pt)

The dissolve feature removes internal boundaries for polygons that share a common attribute value and combines them into a single polygon. By skipping the dissolve step, there would be many smaller fragmented polygons that would ultimately cause incorrect calculations when conducting spatial analysis because the areas would appear as separate sites rather than one contiguous area.

Take a screenshot of your buffers



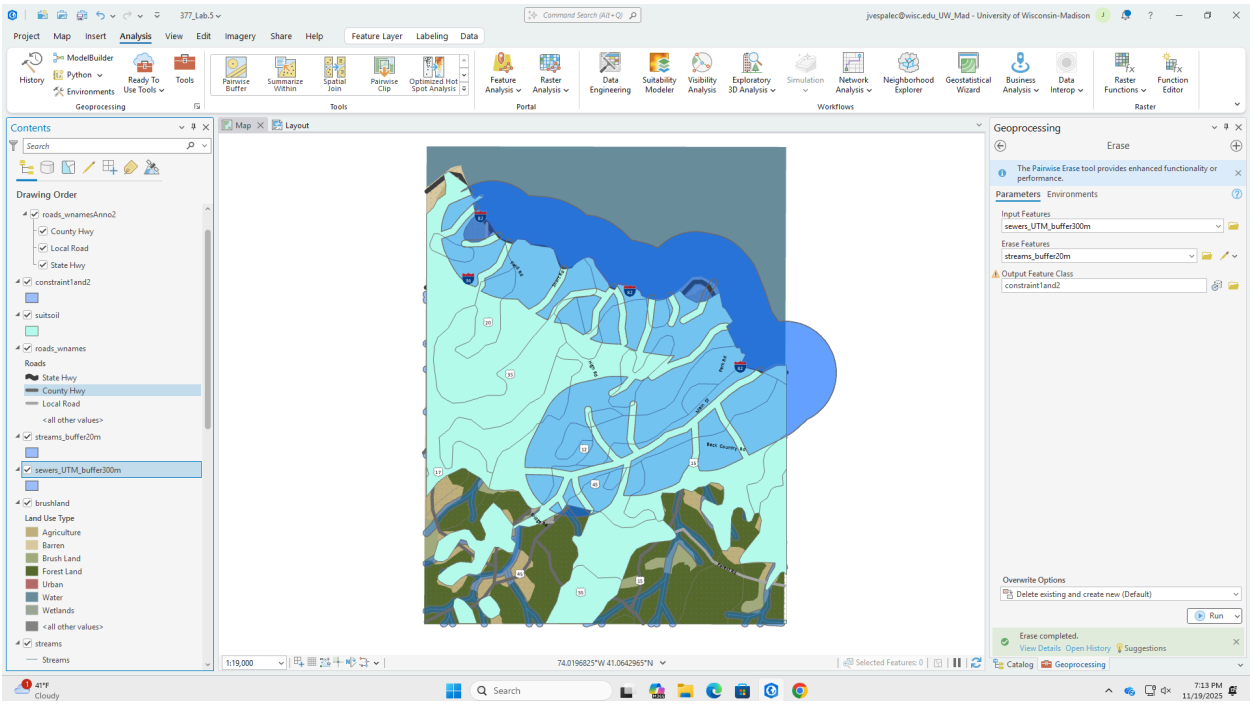
Question 3: Name which layer should be the input feature and which layer should be the erase feature. Explain your choice. Use the same naming as the actual files you are using for this task. (0.5pt)

Input feature: sewers_UTM_buffer300m

Erase feature: streams_buffer20m since we are subtracting this (smaller) feature from the larger sewers buffer

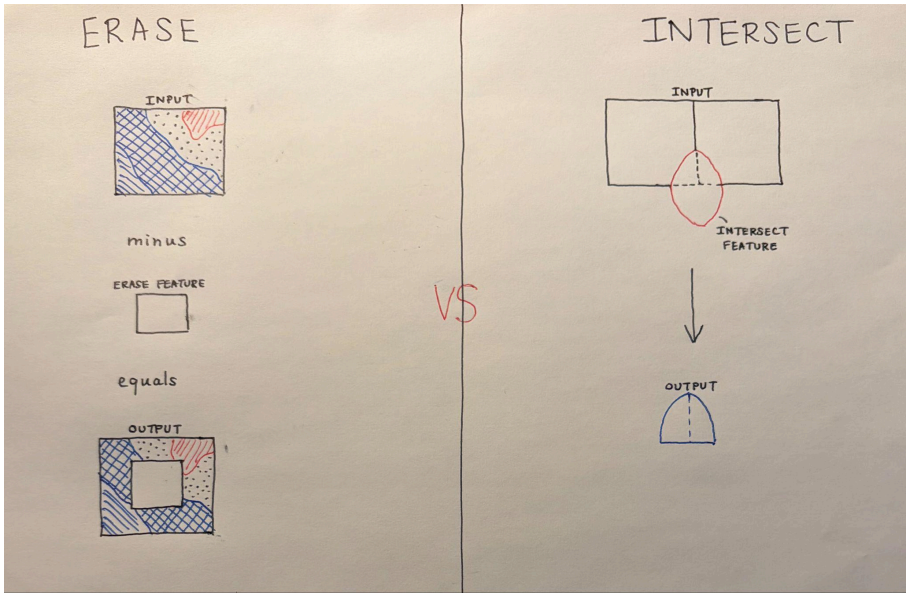
These are the input and erase features because we want to keep the areas within the sewer buffer but remove the areas within the stream buffer. Therefore, we subtract the stream buffer (the erase feature) from the sewer buffer (the input feature).

Take a screenshot after Erase operation

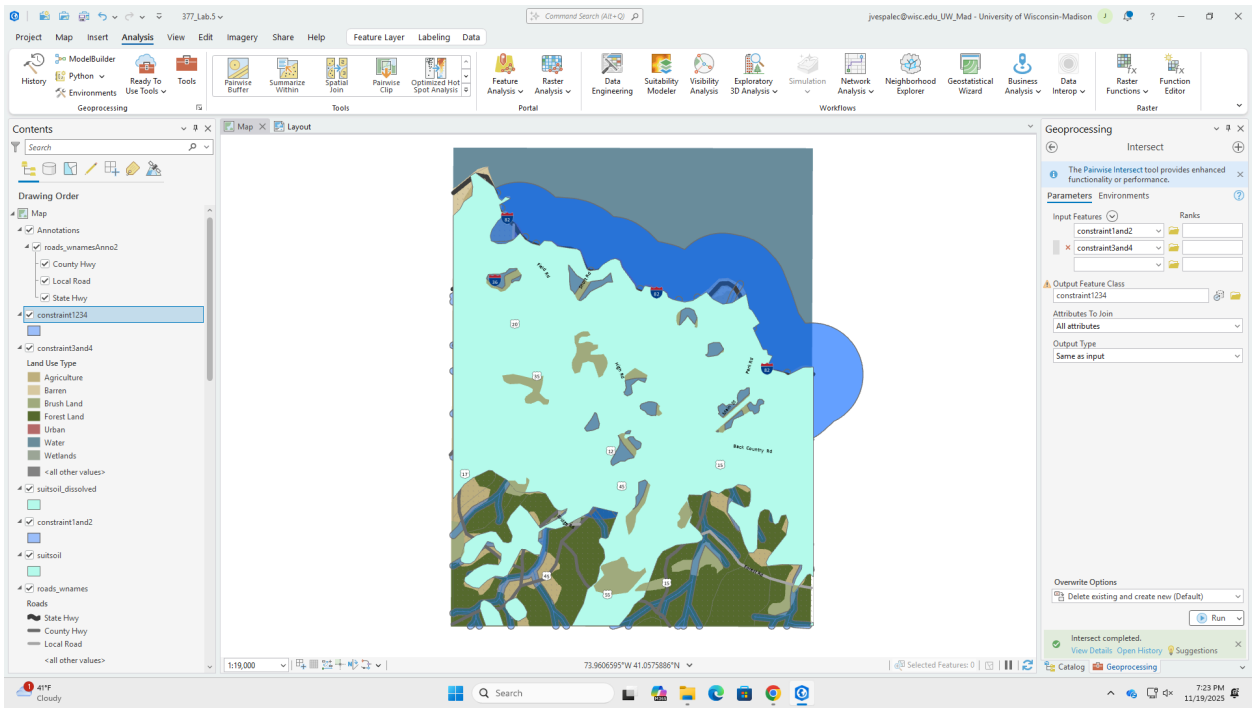


Question 4: You performed ERASE and INTERSECT operations to create the constraint1and2 and constraint3and4 feature classes. Compare the difference between these two operations in terms of the information contained in the output feature classes. In addition, use flow diagrams to show the process for both Erase and Intersect – include simple drawings of the inputs and outputs. (2 pts)

The erase tool outputs areas of the input area that overlap with the erase layer while the intersect tool outputs just the overlapping areas between all input layers.



Screenshot after Task 5



Question 5: Describe conceptually step-by-step how you completed this task (choosing areas that meet the size requirement). Name the tool(s) you used and list any parameters you had to specify. (1pt)

When completing this task, I first used the Multipart to Singlepart tool to break the intersection result into individual polygons to measure each one separately. Then, I opened the attribute table and used the Shape_Area field to find polygon areas. After that, I used Select Layer by Attribute to apply a query of Shape_Area greater than or equal to 2000. Then, I exported the selected features as a new feature class named “sites”.

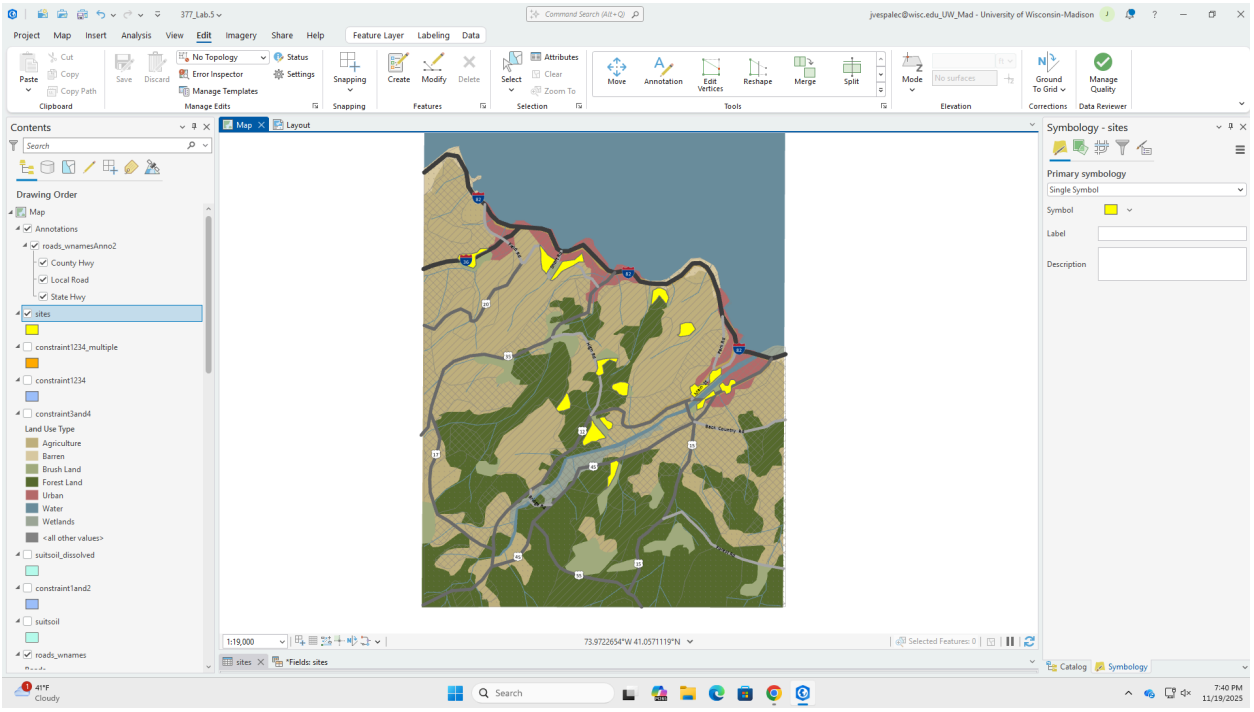
Question 6: In your opinion, what is the best site among all potential sites? Explain your reasoning in detail. (1 pt)

I would choose Site 1 for the small lab and office building. Many of the other sites were too close to urban areas, so I eliminated those first. I then checked the cost for the remaining sites and site 1’s cost seems to be very reasonable for its size. The location of the site is optimal because it’s close to enough to an urban area and has great access to major roads, making it accessible for workers from the urban area. Additionally, it’s close to the main river and wetland, so workers will have easy access to conduct aquaculture research. Despite its smaller size compared to other sites, its location makes it the best choice for the lab and office building.

Question 7: What other real-world factors (data layers) do you think could be helpful when considering a site location that hasn’t been taken into account in our project? How could you incorporate those factors into the spatial analysis? List at least 2 other factors and describe what kind of analysis would need to be performed. (1 pt)

Other factors to consider include the distance from residential areas and whether the site overlaps any conservation/protected areas. To make sure the site isn’t within a certain distance (let’s say 200 meters) from a residential area, we could create a buffer around residential areas, assuming we had a layer for residential zones, then erase those buffered layers from the sites being considered. In a similar way, to ensure the site isn’t within a conservation area, assuming we have a layer of conservation areas, we could then erase any overlapping candidate locations.

Screenshot of final potential sites



Color copy of your map (export the map as a .JPEG or a .PNG file so it can be inserted into this document easily)

Site Suitability Data

Object I	Shape Area (Meters^2)	Price ($)
1	4976	6219.7
2	8962	11203
3	2899	3623.47
4	5107	6383.83
5	5865	7331.17
6	3162	3952.72
7	4038	5046.89
8	8307	10384.14
9	4891	6113.99
10	5830	7287.23
11	5994	7492.24
12	7945	9931.27
13	7004	8755.11
14	7638	9547.26

Site Suitability Map

Land Use Type

- Agriculture
- Barren
- Brush Land
- Forest Land
- Urban
- Water
- Wetlands

Roads

- State Hwy
- County Hwy
- Local Road

Soil Suitability

- Not Suitable
- Suitable
- Very Suitable

Waterways and Drainage

- Sewers
- Streams

N

0 250 500 Meters

Name: JT Vespalec
Projection: WGS 1984 UTM Zone 18N
Date: 11/18/2025