

Felts Brook Hydrology Report

Watershed Description

Felts Brook flows north from Brewer to the Penobscot River. The area of interest to this project starts at the culvert crossing under Route 1A and continues part way towards Eastern Ave. A small unnamed tributary flowing west from near the old rail bed and joining Felts Brook just north of the cleared area by the intersection of I-395 and Route 1A is also included. The majority of the watershed is wooded, with some low-lying marshy areas and cleared fields.

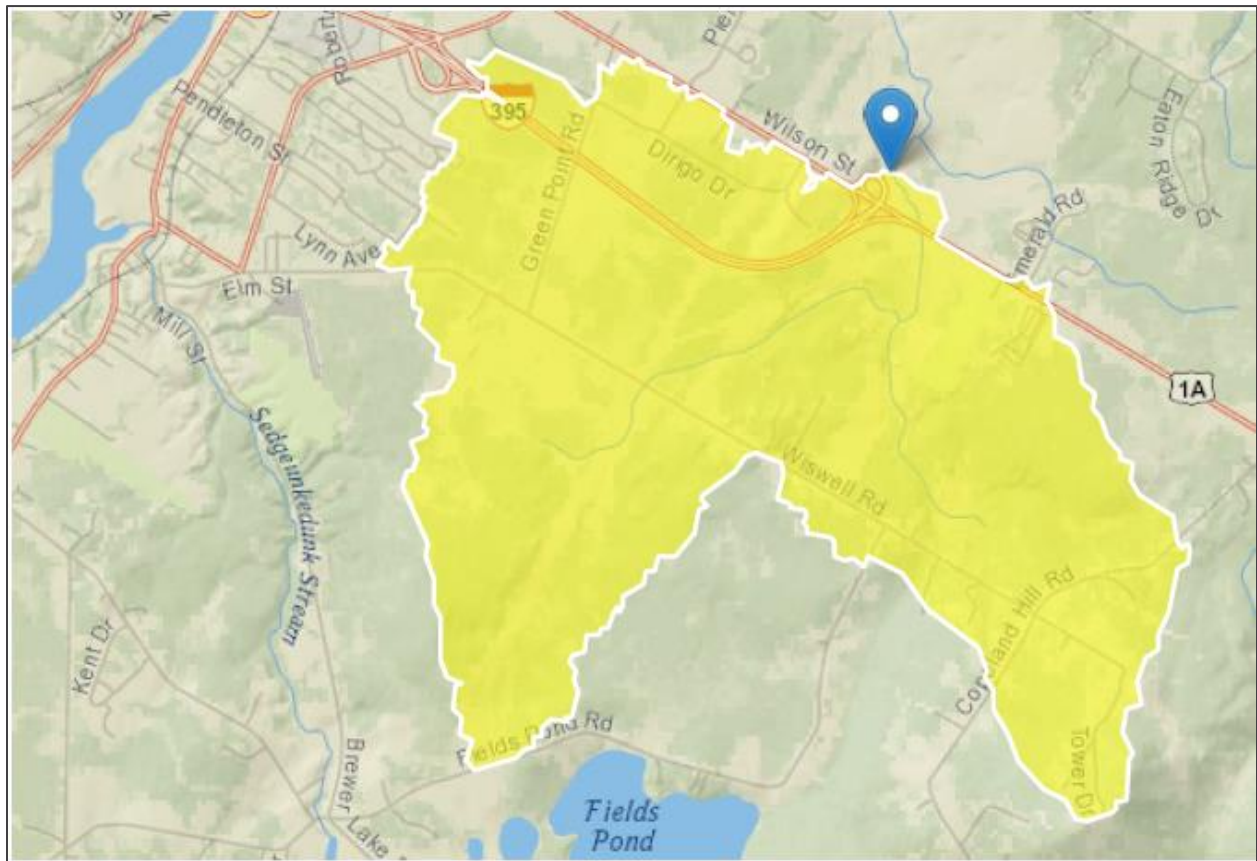


Figure 1: StreamStats watershed for Felts Brook at study site

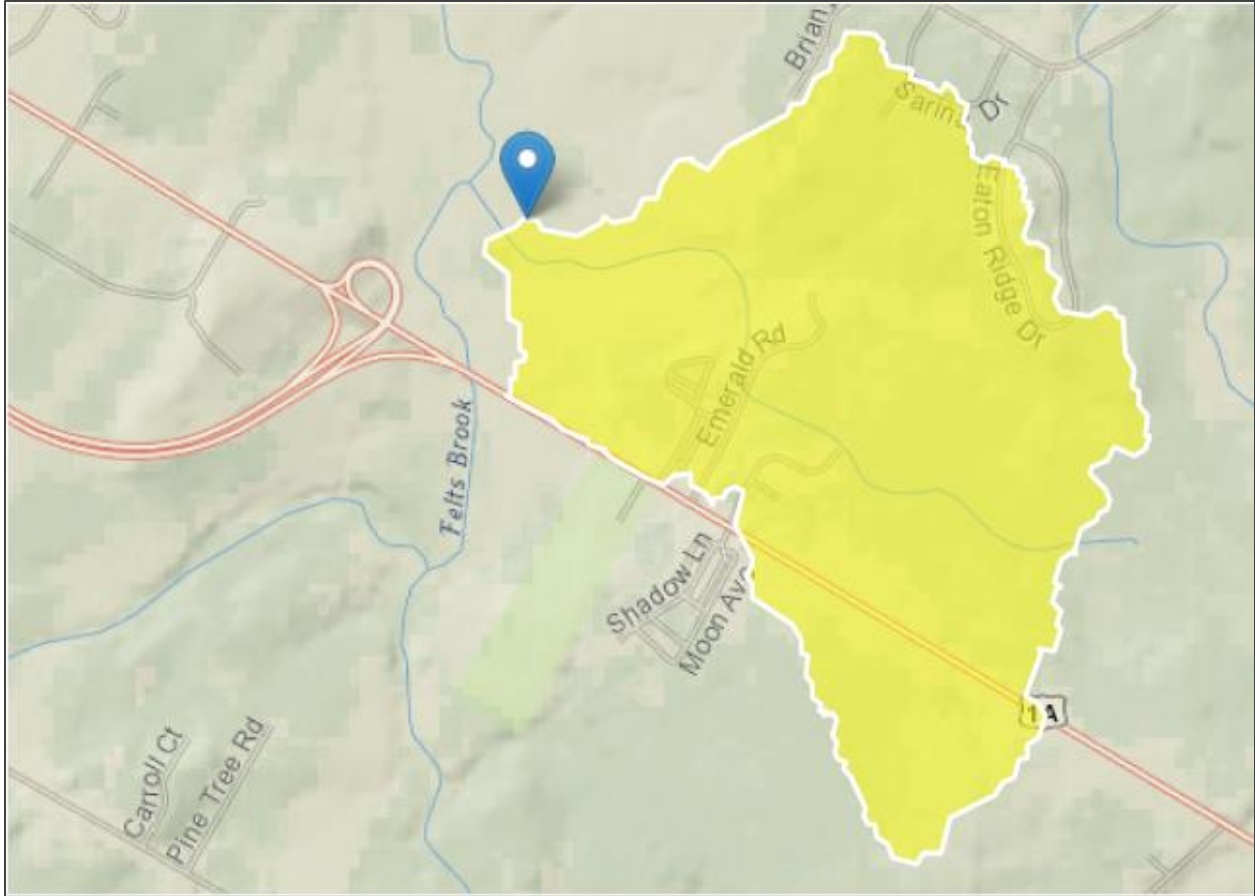


Figure 2: StreamStats watershed for tributary at study site

Nature of Flood Risk

Periodic seasonal flooding over the stream banks is typical for flatter areas of the watershed. The area of interest is well outside of the influence of the Penobscot River for flooding.

Previous Hydrologic Studies in Watershed

The FEMA Flood Insurance Study for the City of Brewer, Maine (1977) gives 1% recurrence flood flows for Felts Brook at the confluence with the Penobscot River. The Flood Insurance Rate Map for the City of Brewer (Community-Panel Number 230104 0005 B, 1978) gives additional elevation and flooding limit data for Felts Brook.

Calculated Flow Data

Current flow data at the site of the proposed Route 9 alignment was calculated by the Maine DOT Environmental Office Hydrology Section using the U.S.G.S. regression equations (Hodgkins 1999 and Lombard/Hodgkins 2015).

The flows from the 1977 Flood Insurance Study were calculated using the 1975 regression equations published by U.S.G.S for Maine. Flows for the FIS are given at the confluence with the Penobscot River.

Summary of watershed and flows

	Felts Brook	Tributary	
Drainage Area	5.30	1.00	mi ²
Q1.1	79.1	24.5	ft ³ /s
Q10	319.5	100.8	ft ³ /s
Q25	419.5	131.7	ft ³ /s
Q50	486.7	154.1	ft ³ /s
Q100	570.1	180.3	ft ³ /s
Q500	764.3	243.3	ft ³ /s
FIS Drainage Area	9.4		mi ²
FIS 10% Recurrence	510		ft ³ /s
FIS 2% Recurrence	860		ft ³ /s
FIS 1% Recurrence	1040		ft ³ /s
FIS 0.2% Recurrence	1620		ft ³ /s
FIRM 1% Recurrence Elevation	82.3		ft
FIRM 1% Elevation Downstream	80.5		ft

Note: FIRM elevations converted from NGVD 1929 to NAVD 1988 (datum shift of -0.702 ft).

Table 1: Summary of watershed and flows

Eaton Brook Hydrology Report

Watershed Description

Eaton Brook flows north from Holden to the Penobscot River. The majority of the watershed is wooded, with some low-lying marshy areas and cleared fields.

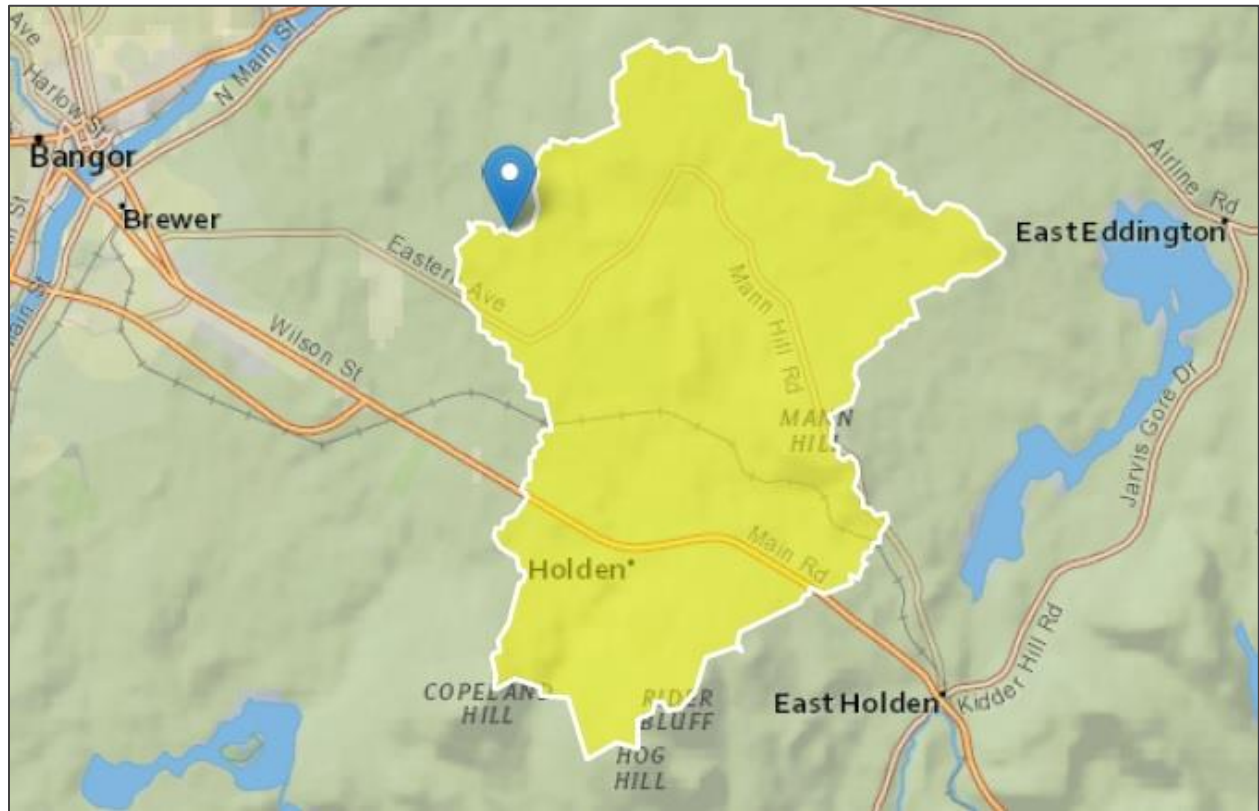


Figure 3: StreamStats watershed for Eaton Brook at study site

Nature of Flood Risk

Periodic seasonal flooding over the stream banks is typical for flatter areas of the watershed. The area of interest is well outside of the influence of the Penobscot River for flooding. There is beaver activity in the area which may affect results for typical seasonal flooding, but is not expected to affect design flood results.

Previous Hydrologic Studies in Watershed

The FEMA Flood Insurance Study for the City of Brewer, Maine (1977) gives 1% recurrence flood flows for Eaton Brook at the confluence with the Penobscot River, but the detailed study limits do not extend upstream to the project site. The Flood Insurance Rate Map for the City of Brewer (Community-Panel Number 230104 0005 B, 1978) gives approximate flooding limits but no elevations for Eaton Brook at the project.

Current Flow Data

Current flow data at the site of the proposed Route 9 alignment was calculated by the Maine DOT Environmental Office Hydrology Section using the U.S.G.S. regression equations (Hodgkins 1999 and Lombard/Hodgkins 2015).

Summary of watershed and flows

Drainage Area	13.2	mi ²
Q1.1	185.5	ft ³ /s
Q10	733.6	ft ³ /s
Q25	939.3	ft ³ /s
Q50	1100.5	ft ³ /s
Q100	1273.7	ft ³ /s
Q500	1700.6	ft ³ /s

Table 1: Summary of watershed and flows

Eaton Brook Tributary Hydrology Report

Watershed Description

Unnamed Eaton Brook Tributary flows north from Eddington to join with Eaton Brook in Brewer before flowing to the Penobscot River. The area of interest to this project is close to where the power lines cross the stream. Most of the watershed is wooded, with low lying marshy areas along the stream, large wetland areas upstream, and some cleared areas along the powerlines.

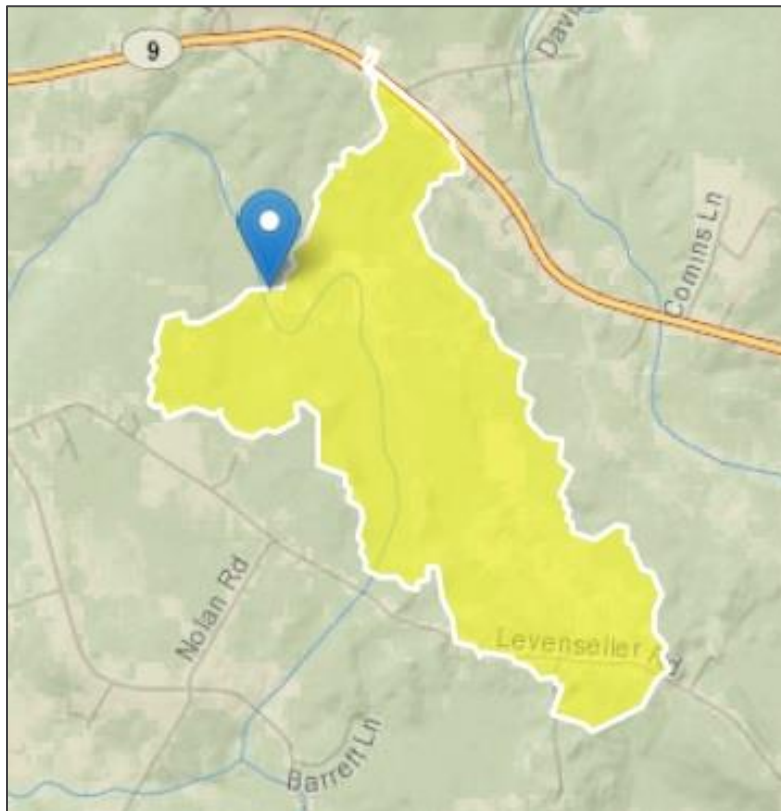


Figure 4: StreamStats watershed for Unnamed Eaton Brook Tributary at study site

Nature of Flood Risk

Periodic seasonal flooding over the stream banks is typical for flatter areas of the watershed. The area of interest is well outside of the influence of the Penobscot River for flooding. Tree line in wetland areas is considered an indicator of the limits of frequent flooding.

Previous Hydrologic Studies in Watershed

No detailed flood analysis was located. The Flood Insurance Rate Map for the Town of Eddington (Community-Panel Number 230382 0005 B, 1978) gives approximate flooding limits but no elevations at the project.

Current Flow Data

The hydrology for this site was calculated from the USGS regression equations for Maine (Hodgkins/Lombard). Based on the calculated bank-full width being significantly less than observed and the model not flooding the area expected from observation of vegetation types, it appears that these flows could be significantly lower than the actual flows. Both the watershed area and the wetlands percentage are outside the range that the regression equations are validated for, increasing the inaccuracy of the calculated flows. In addition, the regression values can vary by up to 50% within the 68% confidence limit, and outliers may vary even more. Based on this, the calculated regression flows are likely understating the actual flows by a substantial amount, and the model analyses reported were run with values increased by 50%. This increase was used first as a trial value, and since it did not result in obviously excess flooding was carried through the rest of the analysis.

Summary of watershed and flows

	Regression	Increased 50%
Drainage Area	1.40	mi ²
Q1.1	18.4	27.6 ft ³ /s
Q10	64.7	97.0 ft ³ /s
Q25	84.6	126.9 ft ³ /s
Q50	95.0	142.5 ft ³ /s
Q100	111.1	166.7 ft ³ /s
Q500	143.9	215.8 ft ³ /s

Table 1: Summary of watershed and flows