In [11]:

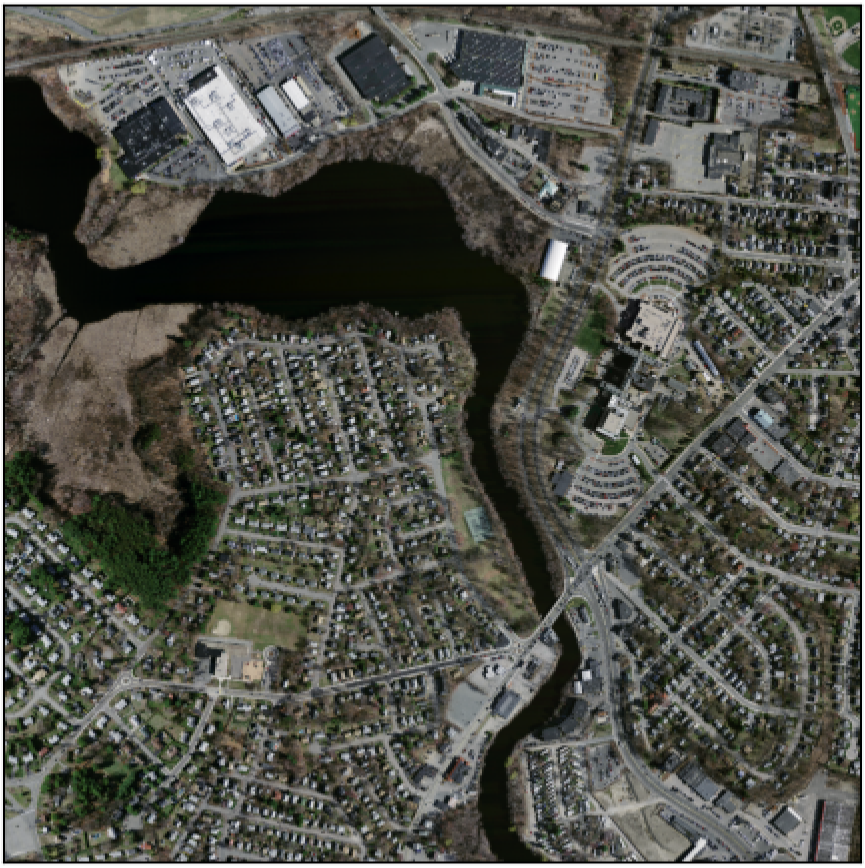
```
import numpy as np
import cv2
from matplotlib import pyplot as plt
```

In [37]:

```
img = cv2.imread(r'/content/drive/MyDrive/png (1)/train (1)/22678915_15 (1).png')
b,g,r = cv2.split(img)
rgb_img = cv2.merge([r,g,b])
gray = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
ret, thresh = cv2.threshold(gray,0,255,cv2.THRESH_BINARY_INV+cv2.THRESH_OTSU)
# noise removal
kernel = np.ones((2,2),np.uint8)
#opening = cv2.morphologyEx(thresh,cv2.MORPH_OPEN,kernel, iterations = 2)
closing = cv2.morphologyEx(thresh,cv2.MORPH_CLOSE,kernel, iterations = 2)
# sure background area
sure_bg = cv2.dilate(closing,kernel,iterations=3)
# Finding sure foreground area
dist_transform = cv2.distanceTransform(sure_bg,cv2.DIST_L2,3)
# Threshold
ret, sure_fg = cv2.threshold(dist_transform,0.1*dist_transform.max(),255,0)
# Finding unknown region
sure_fg = np.uint8(sure_fg)
unknown = cv2.subtract(sure_bg,sure_fg)
# Marker labelling
ret, markers = cv2.connectedComponents(sure_fg)
# Add one to all labels so that sure background is not 0, but 1
markers = markers+1
markers[unknown==255] = 0
markers = cv2.watershed(img,markers)
img[markers == -1] = [255,0,0]
plt.plot(211),plt.imshow(rgb_img)
plt.title('Input Image'), plt.xticks([]), plt.yticks([])

plt.tight_layout()
plt.show()
```

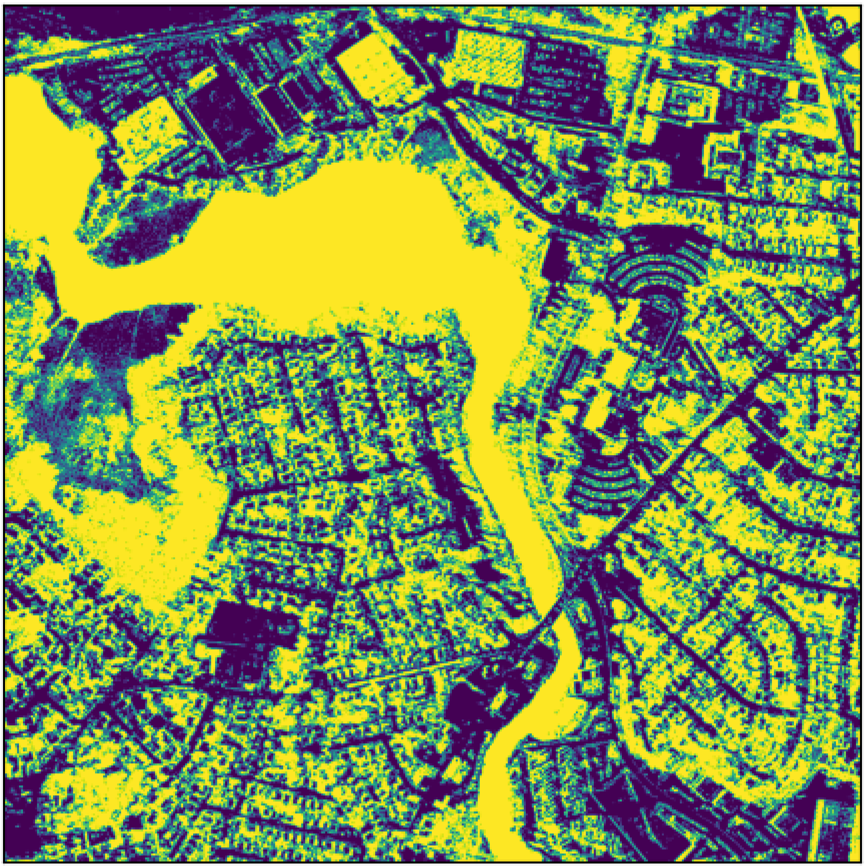
Input Image



In [39]:

```
plt.plot(212),plt.imshow(thresh)
plt.imsave(r'thresh.png',thresh)
plt.title("Otsu's binary threshold"), plt.xticks([]), plt.yticks([])
plt.tight_layout()
plt.show()
```

Otsu's binary threshold



```
In [ ]:
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