Power BI Questions (Corporate Finance)

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POWER BI QUESTIONS (CORPORATE FINANCE)

Question 1

Trail Holdings (Trail), a vintner located in the Okanagan Valley, is considering opening a distribution centre in Toronto. The proposed site for the centre is a block of land that Trail purchased two years ago for $500,000. Building the centre is projected to cost $750,000. In addition, Trail will have to spend $100,000 on new equipment and make an investment in net working capital of $250,000. In making its capital-budgeting decision, Trail has decided to use a five-year planning horizon, which coincides with the estimated life of the new equipment.

Both the building and the equipment will be depreciated on a straight-line basis to zero salvage value, with the building over 20 years and the equipment over five years. An independent appraiser has said that the value of the land is currently $600,000 and that it should be worth $800,000 in five years. The appraiser also believes that the building will be worth 70% of its original cost in five years.

Trail's marginal tax rate is 28%, its weighted average cost of capital is 17%, and the applicable CCA rates on the new building and the new equipment are 6% and 20%, respectively. Both assets qualify for the Accelerated Investment Incentive, and therefore 1.5 times the CCA can be claimed in the year of acquisition. Assume that on disposal, there are still assets remaining in the classes, and that the UCC balances will still be positive after the deduction of the proceeds.

Distribution is considered less risky than making wine, and the risk-adjusted discount rate has been estimated to be 15%.

Finally, based on market analysis, Trail has developed the following pro forma income statements for the centre:

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues	$ 620,000	$ 750,000	$ 800,000	$ 800,000	$ 850,000
Cost of goods sold	310,000	375,000	400,000	400,000	425,000
Depreciation	57,500	57,500	57,500	57,500	57,500
Income before taxes	252,500	317,500	342,500	342,500	367,500

Required:

a) Based on the NPV method, should Trail open the new distribution centre?

b) In order to analyze the investment in the distribution centre in Toronto, management needs to understand where Trail's customers are located in order to design the trucking routes and determine the number of trucks that might be required. In

particular, management wants a mapping of customers by city in Ontario in order to understand the scope and timing of deliveries inside and outside of Toronto. The sales department has prepared a list of customers located in Ontario and their specific city.

i. To assist Trail's management with this analysis, create a map visualization of the customer locations using Power BI and the following file: QUESTION1.DATA.xlsx.

ii. Using the map, answer the following questions:

1. Which city has the highest number of customers? The lowest number of customers?

2. Which city is the farthest from Toronto?

3. What is similar about Barrie, Hamilton, and Waterloo?

4. If the distance from Toronto to Barrie and back is all that can be travelled in one day, which cities would likely require an overnight stay or overtime to be paid to the driver?

5. Does it make sense that the distribution centre is located in Toronto?

Question 2

You currently work as a credit analyst at HM Bank and are reviewing a renewal application for an existing line of credit from a client, Morton Construction Ltd. (Morton). Morton builds high-end custom-designed homes. As part of your due diligence, you are reviewing 10 other construction companies in the same geographic area that provide services ranging from industrial and corporate construction to housing construction in new residential areas, and custom builds.

Morton is currently using its maximum allowable amount of line of credit and is asking for an additional amount, up to $1,000,000, to manage its working capital needs. You must decide if Morton should be provided any additional amount or if the existing limits should stay in place.

An assistant has prepared an Excel file with comparative information you have selected for comparison: QUESTION2.DATA.xlsx.

Note that all the financial data in the file is in thousands of dollars.

Required:

a) The first comparison you want to analyze is a debt-to-EBITDA ratio. Create a stacked bar chart showing each company's name and its debt-to-EBITDA ratio. Comment on how Morton compares to peers and whether the amount of the line of credit should be changed given its current debt balance.

b) The next comparison you decide to analyze is the debt ratio. Create a funnel chart showing the company's name and its debt ratio. Comment on how Morton compares to peers and whether, based on its debt ratio, the amount of the line of credit should be changed.

c) The last comparison required is an analysis of the EBITDA margin. Create a scatter graph showing a comparison of total assets to EBITDA margin and comment on how Morton compares and why. Put Total assets on the X-Axis and EBITDA margin on the Y-Axis.

d) Given the above analyses, conclude on whether Morton's line of credit should be increased, decreased, or left at its current limit.

Question 3

You currently work as a financial analyst at Johannsen & Company and report to the vice president of finance, Samina. Samina provided a spreadsheet to you (QUESTION3.DATA.xlsx) and has asked you to review sales data for each of the six stores that the company has.

Required:

a) Samina asks that you prepare a clustered column chart showing the total sales for 20X1 and total sales for 20X2 for each store. Comment on which stores seem to be performing poorly and should be further investigated. Enter Store as the Axis and then the two years of sales in Value.

b) Samina has also asked you to create a clustered bar chart to show the sales per square foot for each store. Comment on the information provided by this chart and conclude which stores appear to be performing poorly and which are performing the best.

c) Based on the information analyzed from the two graphs, which store location is the overall poorest performer and should be immediately investigated to assess if it should be closed? Provide two examples of additional information you would require before a decision to close the store can be made.

Solutions

Solution to Question 1

a) Net present value calculation

The relevant cash flows (excluding the CCA tax shields and CCA tax shield lost) for the proposed distribution centre and their timing are presented in the following table:

Initial investments:						
Land	$(586,000)					
Building	(750,000)					
Equipment	(100,000)					
Net working capital	(250,000)					
Incremental after-tax operating cash flows:						
Revenues		$ 620,000	$ 750,000	$ 800,000	$ 800,000	$ 850,000
Cost of goods sold		(310,000)	(375,000)	(400,000)	(400,000)	(425,000)
Pre-tax operating income		310,000	375,000	400,000	400,000	425,000
Tax 28%		(86,800)	(105,000)	(112,000)	(112,000)	(119,000)
Incremental after-tax operating cash flows		223,200	270,000	288,000	288,000	306,000
Salvage:						
Land						772,000
Building						525,000
Net working capital						250,000

Notes:

Initial investment in land = [600,000 – 0.28 × ½ × (600,000 – 500,000)] = 586,000

Salvage value of land = Land [800,000 – 0.28 × ½ × (800,000 – 600,000)] = 772,000

Salvage value of building 0.70 × $750,000 = 525,000

CCA tax shields:

Building $\frac{750{,}000 \times 0.06 \times 0.28}{(0.06 + 0.15)} \times \frac{1.225}{1.15}$ 63,913

Equipment $\frac{100{,}000 \times 0.20 \times 0.28}{(0.20 + 0.15)} \times \frac{1.225}{1.15}$ 17,043

Lost tax shield:

Building $\frac{(0.7 \times 750{,}000) \times 0.06 \times 0.28}{(0.06 + 0.15)} \times \frac{1}{(1.15)^5}$ (20,881)

NPV calculation

Initial investments:

Building	750,000	
Equipment	100,000	
Land [600,000 – 0.28 × ½ × (600,000 – 500,000)]	586,000	
Net working capital	250,000	
		$ (1,686,000)

CCA tax shields:

Building $\frac{750{,}000 \times 0.06 \times 0.28}{(0.06 + 0.15)} \times \frac{1.225}{1.15}$ 63,913

Equipment $\frac{100{,}000 \times 0.20 \times 0.28}{(0.20 + 0.15)} \times \frac{1.225}{1.15}$ 17,043

Lost tax shield:

Building $\frac{(0.7 \times 750{,}000) \times 0.06 \times 0.28}{(0.06 + 0.15)} \times \frac{1}{(1.15)^5}$ (20,881)

Salvage:

Land [800,000 – 0.28 × ½ × (800,000 – 600,000)] ÷ $(1.15)^5$	383,820
Building 0.70 × 750,000 ÷ $(1.15)^5$	261,018
Net working capital 250,000 ÷ $(1.15)^5$	124,294

Increase in net operating income:

223,200 ÷ 1.15 + 270,000 ÷ $(1.15)^2$ + 288,000 ÷ $(1.15)^3$
+ 288,000 ÷ $(1.15)^4$ + 306,000 ÷ $(1.15)^5$
= 194,087 + 204,159 + 189,365 + 164,665 + 152,136 904,412

NPV **$ 47,619**

Because the NPV for the centre is positive, Trail should build the distribution centre.

Alternative format

Item	Years	Amount	(1 – tax)	After-tax cash flow	PV @ 15%
Cost of building		(750,000)		(750,000)	(750,000)
Cost of equipment		(100,000)		(100,000)	(100,000)
Cost of land [600,000 – 0.28 × ½ × (600,000 – 500,000)]		(586,000)		(586,000)	(586,000)
Working capital investment		(250,000)		(250,000)	(250,000)
Salvage, building	5	525,000		525,000	261,018
Salvage, land [800,000 – 0.28 × ½ × (800,000 – 600,000)]	5	772,000		772,000	383,820
Salvage, working capital	5	250,000		250,000	124,294
Pre-tax operating cash flow, Year 1	1	310,000	72%	223,200	194,087
Pre-tax operating cash flow, Year 2	2	375,000	72%	270,000	204,159
Pre-tax operating cash flow, Year 3	3	400,000	72%	288,000	189,365
Pre-tax operating cash flow, Year 4	4	400,000	72%	288,000	164,665
Pre-tax operating cash flow, Year 5	5	425,000	72%	306,000	152,136

CCA tax shield (building) = $\frac{750{,}000 \times 0.06 \times 0.28}{0.06 + 0.15} \times \frac{1 + (1.50 \times 0.15)}{1 + 0.15}$ 63,913

CCA tax shield (equipment) = $\frac{100{,}000 \times 0.20 \times 0.28}{0.20 + 0.15} \times \frac{1 + (1.50 \times 0.15)}{1 + 0.15}$ 17,043

Tax shield lost on salvage (building) = $\frac{261{,}018^{*} \times 0.06 \times 0.28}{0.06 + 0.15}$ (20,881)

NPV **$47,619**

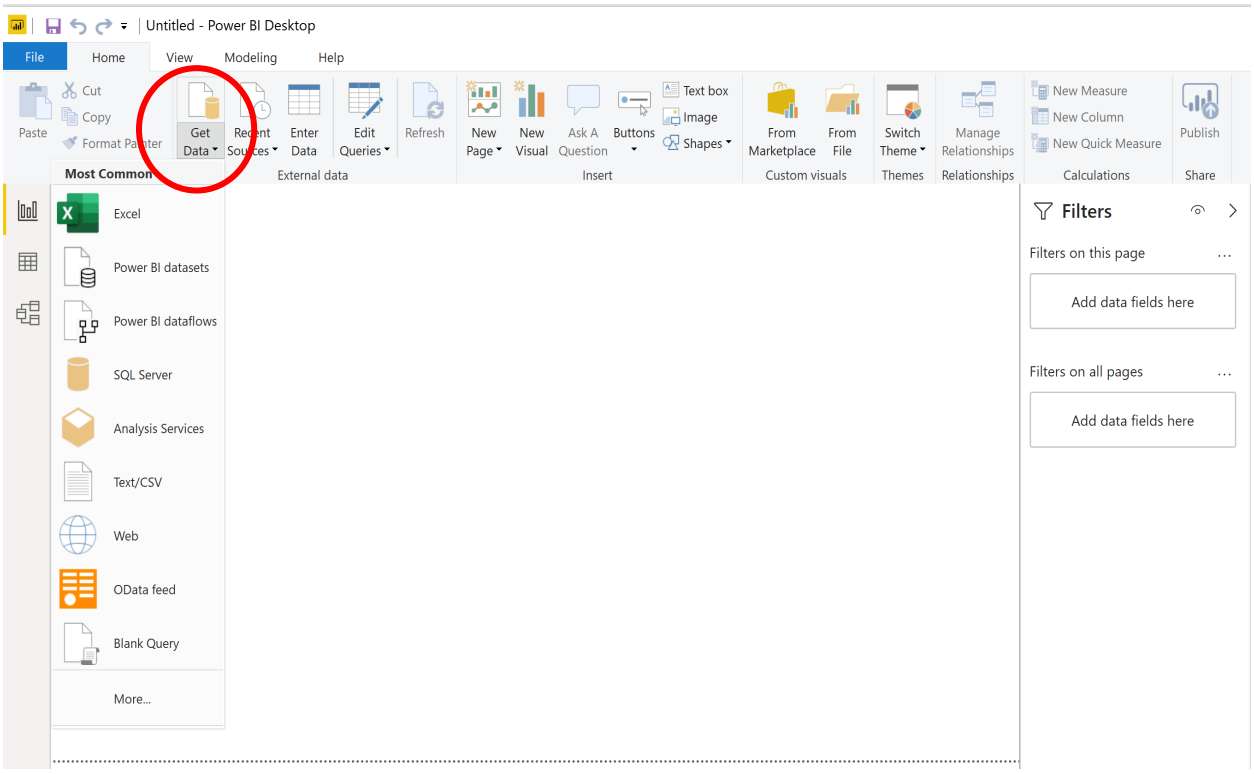
*Present value of salvage

b) Power BI mapping

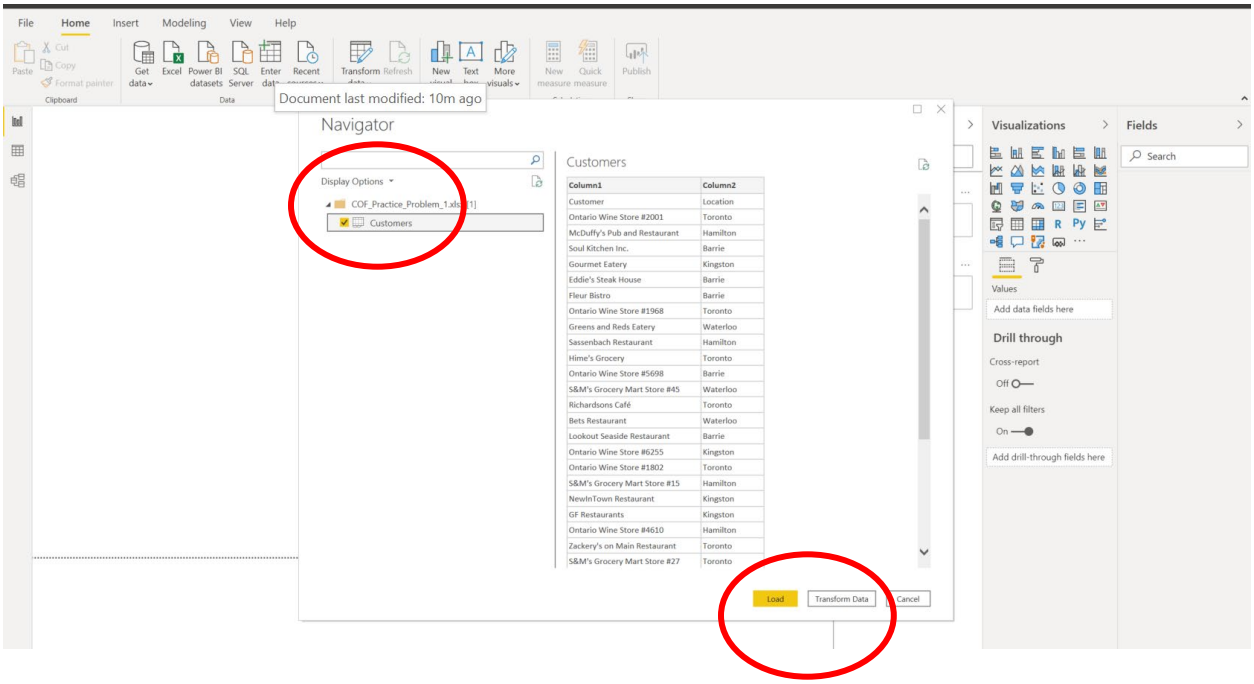
Step 1:

Open Power BI and import the file QUESTION1.DATA.xlsx using the Get Data function. This function is found on the Home ribbon at the top of the page.

Select “Get Data”, which opens a pane of common file types. Select Excel, browse for the location of the file, and select the file.



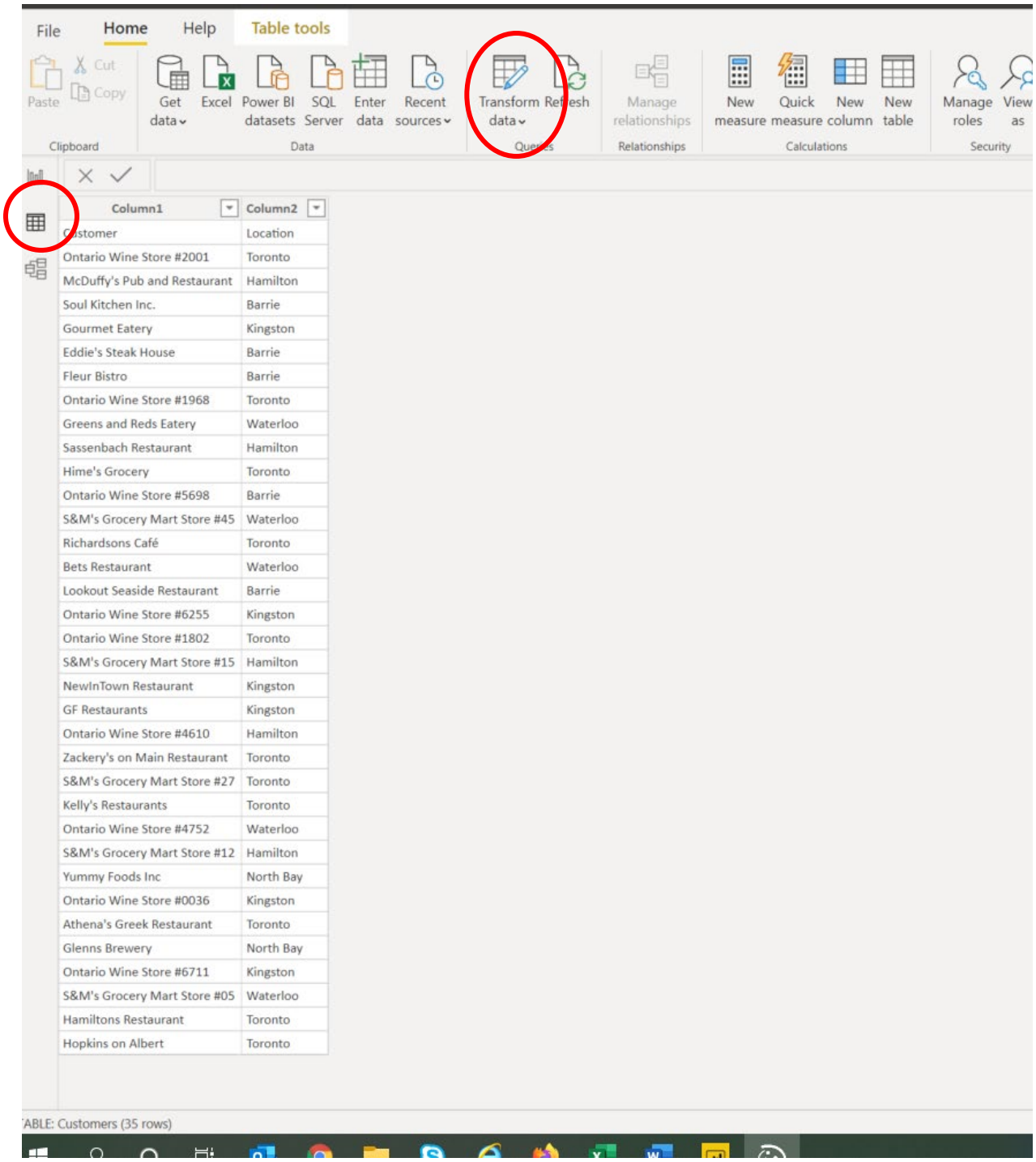
On the Navigator screen, check the “Customers” worksheet. This is the worksheet where the data is found. Once you see it is the correct data, select “Load” at the bottom of the page.



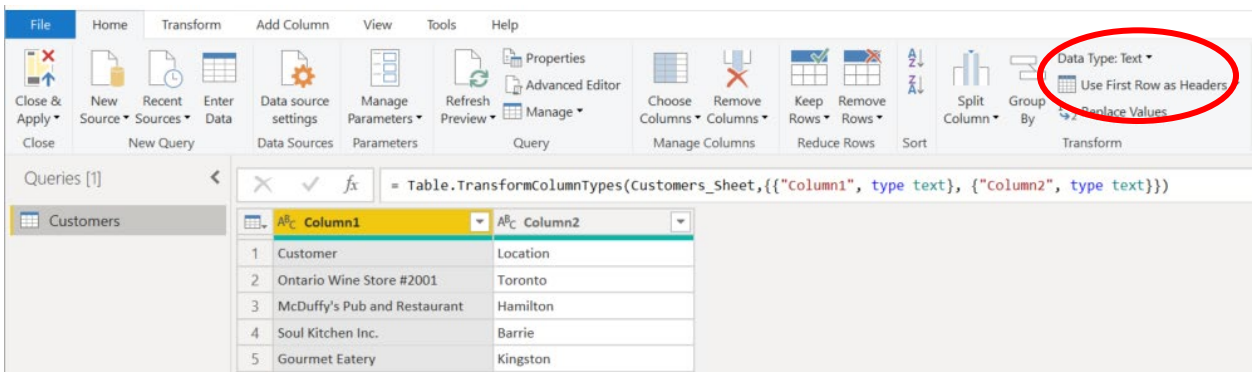
Step 2:

Change the column headings for the data. For this, we will be working in the Data mode of the program. Note that in more previous versions of the software the command is in brackets.

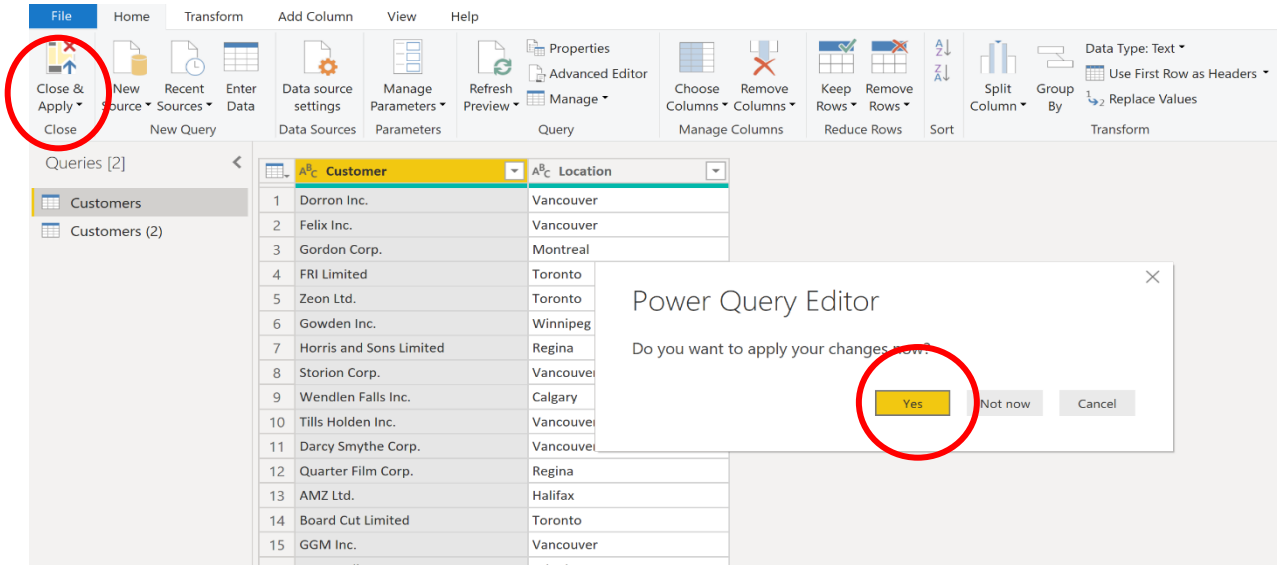
To set the column headings properly to Customer and Location, select the Data icon in the left-hand pane, and then from the drop-down menu under Transform Data (Edit Queries) in the ribbon at the top of the page, select “Transform Data(Edit Queries)”.



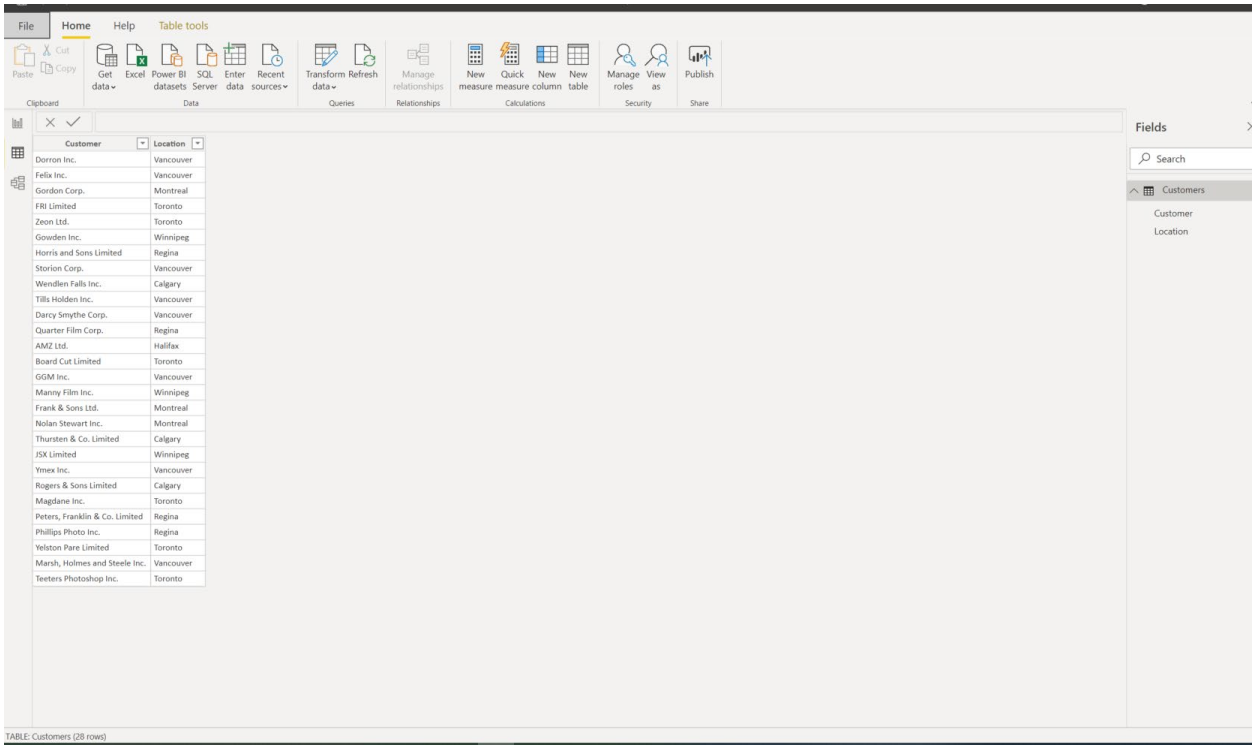
Click “Use First Row as Headers” in the ribbon at the top of the page, and you will see that “Customer” and “Location” have moved to the top of the columns, replacing the titles “Column 1” and “Column 2”.



Close and apply your changes by clicking “Close & Apply” in the ribbon. Alternatively, if you close the window, a dialog box will pop up. Answer “Yes” to apply your changes. In newer versions of the software you may not need to click Yes.

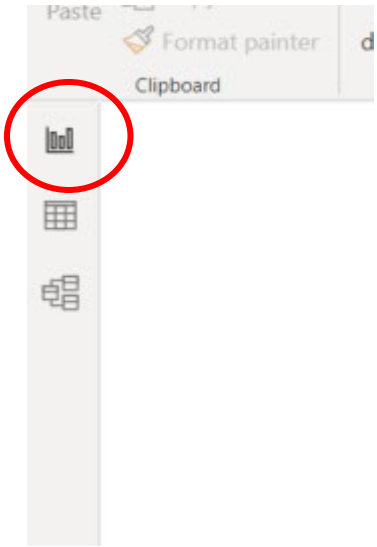


After closing the Power Query Editor screen, your screen should look like the screenshot below. In some versions of PowerBI, students may not see this screen.



The headings are now correct. You are now ready to map the data.

Click on the Graph icon (Report view) in the left-hand pane to move to the visualization mode of the program.



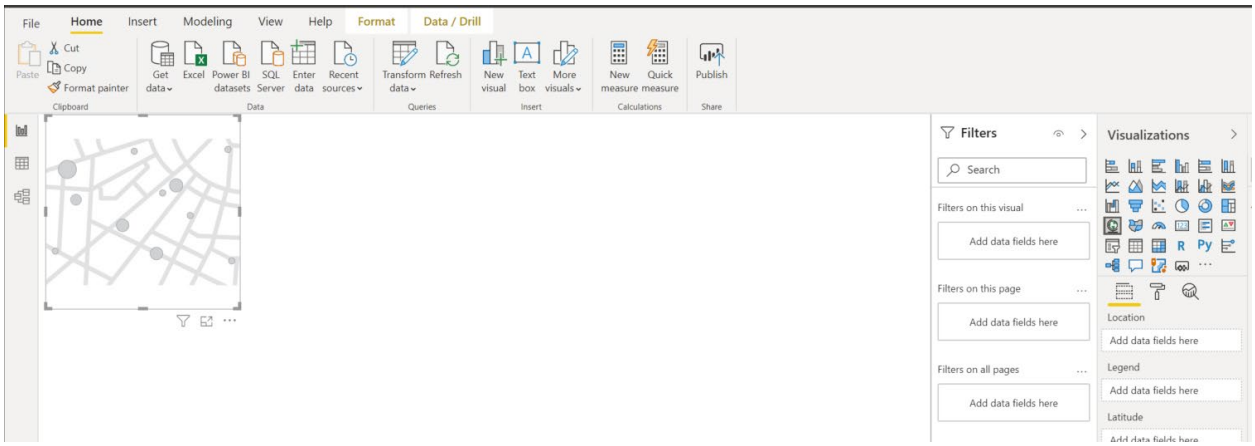
Step 3:

Follow the instructions below to prepare a map that shows where the potential customers are located. In addition, the size of the bubble for each city will indicate the number of potential customers in each city. The larger the bubble, the greater the number of potential customers located in that city.

Refer to the pictures below to see what your screen should look like as you prepare the mapping of the data.

Click the Globe icon under Visualizations. This is the mapping chart.

Your screen should look like this:

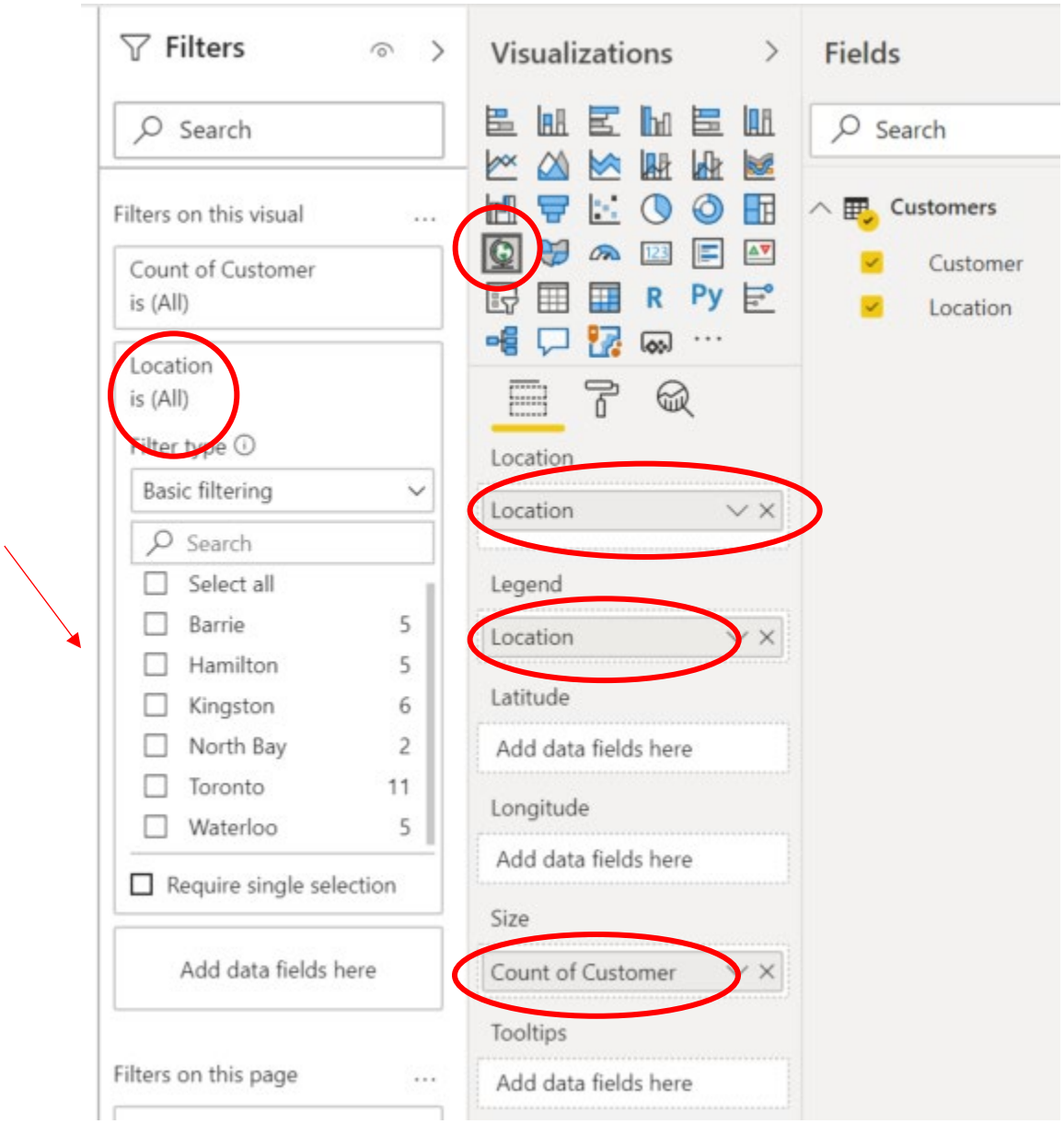


Then, under Fields, drag and drop “Location” to the Location box and the Legend box under Visualizations. Location and Legend under Visualizations should show “Location”.

Note: It is possible that your version of Power BI will place Kingston in Jamaica. If this problem occurs, please go back to the data file and add “, CA” after each city name then reload the data.

To make the bubble size dependent on the number of customers located in that city, drag and drop “Customer” under Fields into Size under Visualizations. Size should now show “Count of Customer”.

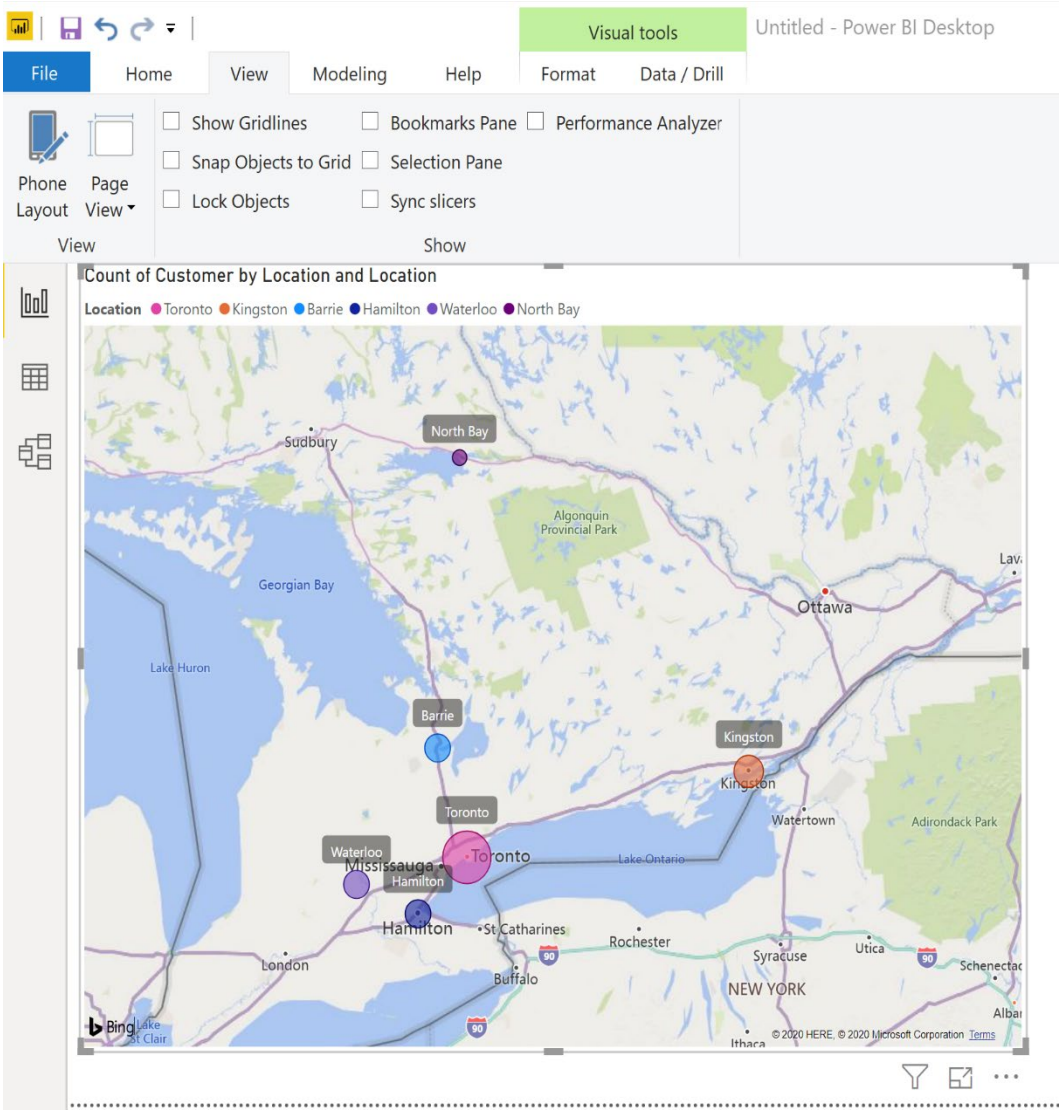
Under Filters, click the down arrow beside Location is (All), and you will see the number of potential customers by city.

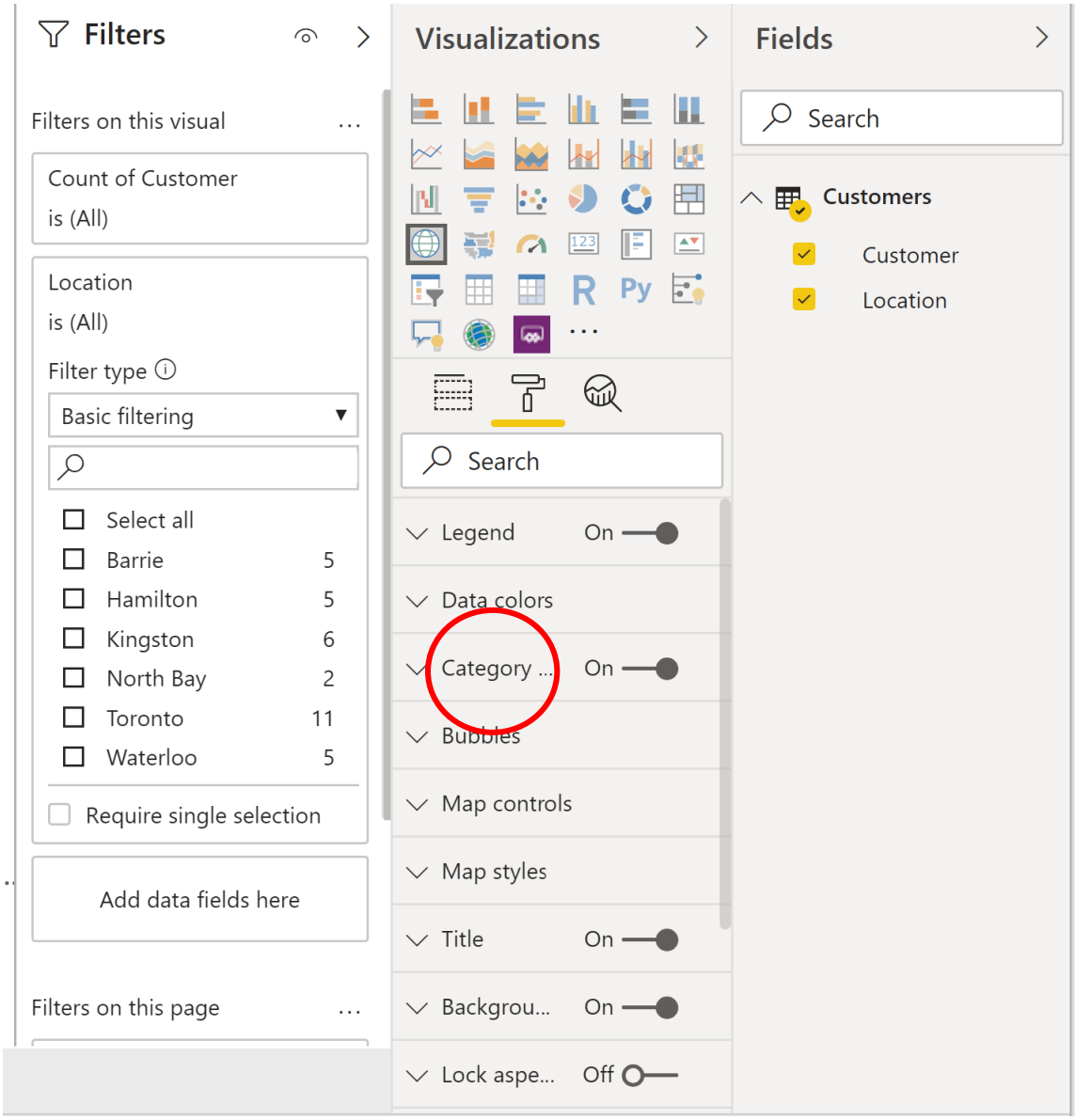


Once you have your map, you can enlarge it on the screen by dragging the corners to fit the screen.

This is what your map should look like; the bubble size for each city is dependent on the number of potential customers located in that city:

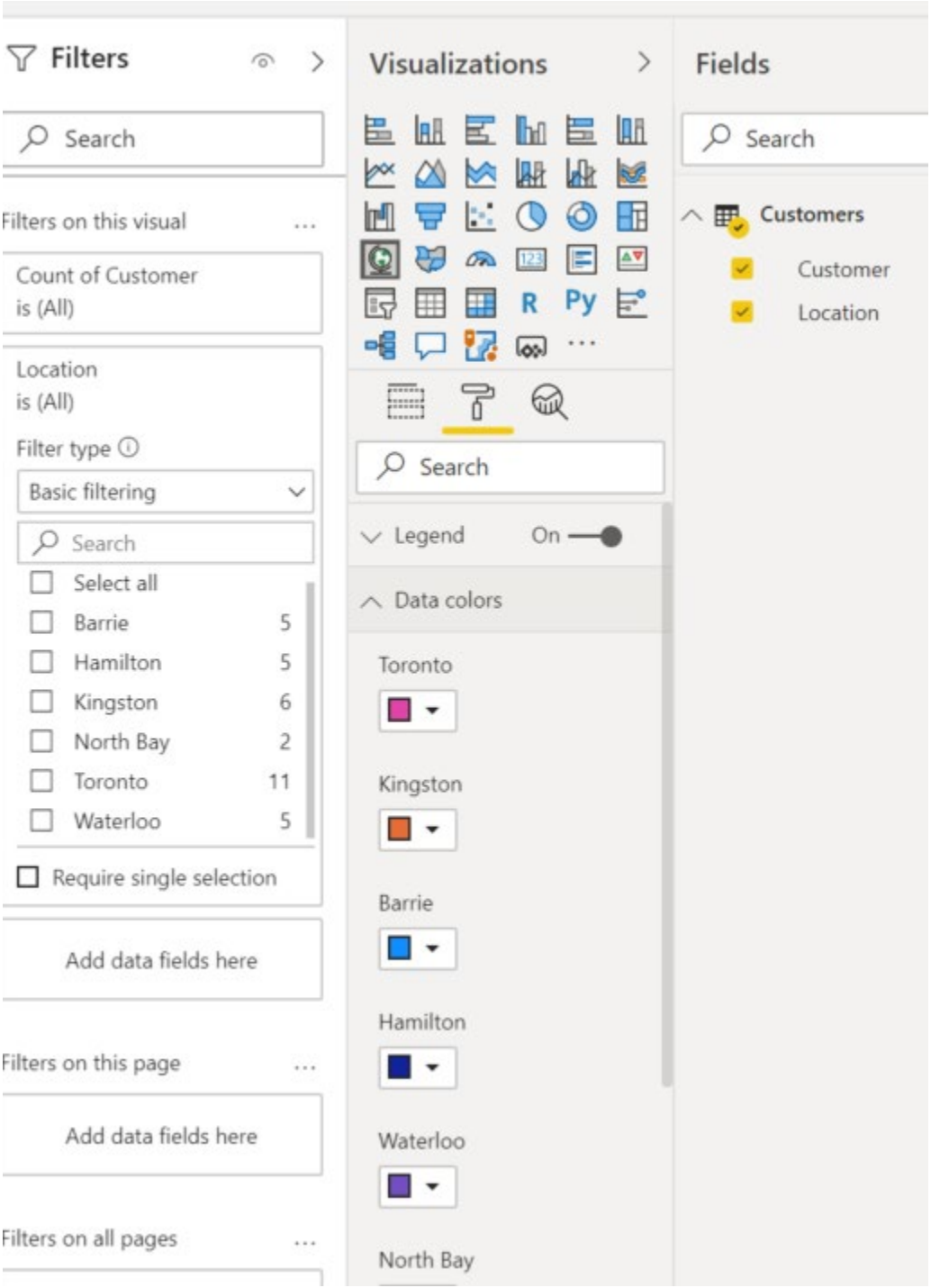
i. The map of the customer locations is seen below:





Note: To get the labels on the map, “Category” must be turned on as seen above.

You can change the colours of the bubbles by clicking the Format icon in the Visualizations pane under Data colors.



ii. The following information is based on the map:

1. Toronto has the highest number of customers, at 11. North Bay has the lowest number of customers, at 2.
2. North Bay is the city that is the farthest from Toronto.
3. The bubble size is the same for Barrie, Hamilton, and Waterloo, as each city has five customers.
4. Based on the map, Kingston and North Bay are at a greater distance from Toronto than Barrie is. Therefore, deliveries to Kingston and North Bay would likely require an overnight stay for the driver or overtime to be paid to the driver.
5. It makes sense to locate the distribution centre in Toronto, as there are 26 (5 + 5 + 5 + 11) customers within a day's drive of the city. This number includes all customers except those in Kingston (6) and North Bay (2).

Solution to Question 2

a)

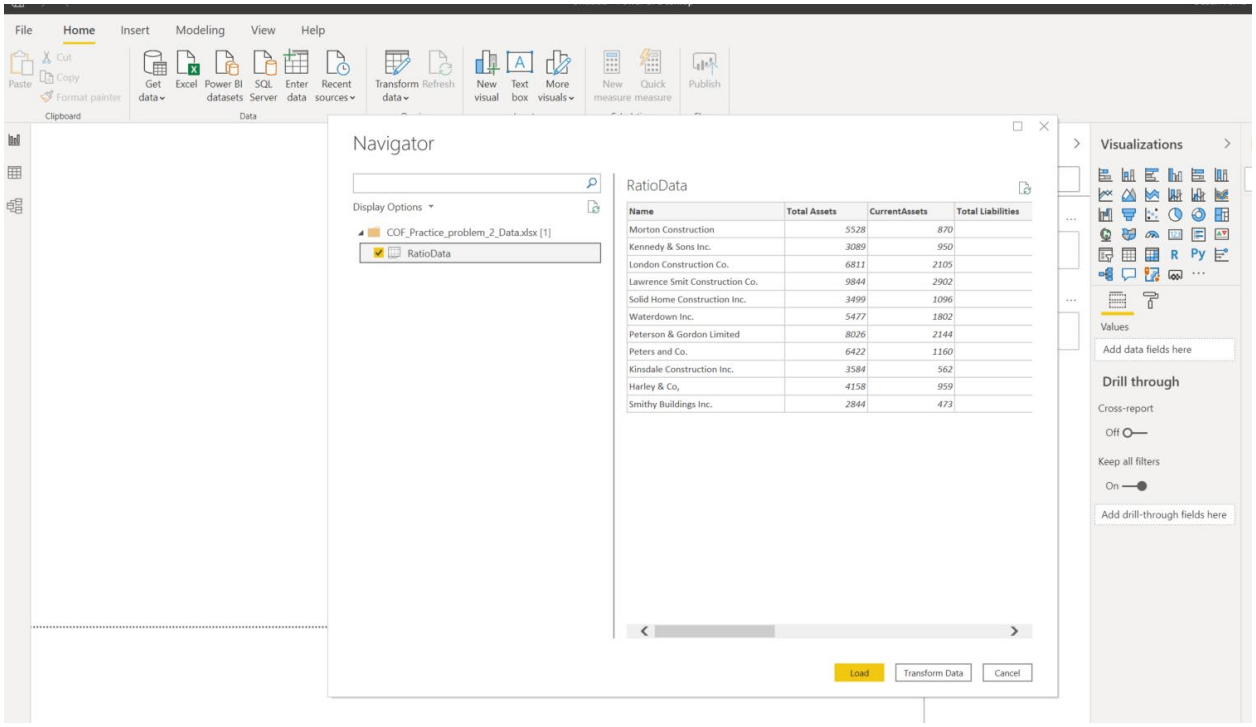
Step 1:

Open Power BI and import the file QUESTION2.DATA.xlsx using the Get Data function. This function is found on home ribbon at the top of the page.

Select "Get Data" which opens a panel of common file types. Select Excel and browse for the location of this file and select the file.

In the Navigator screen, check the "RatioData" worksheet because this is the worksheet that contains the data.

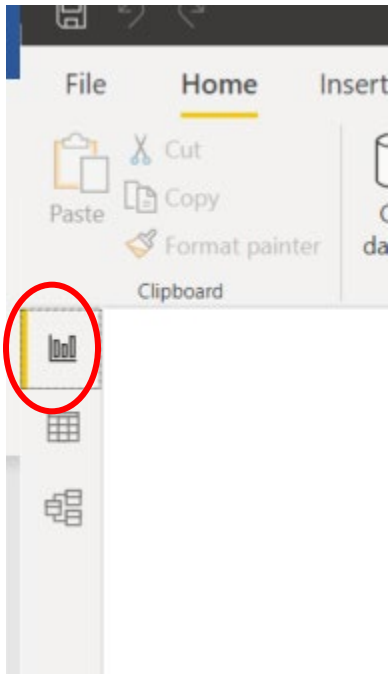
Your screen should look similar to the one below:



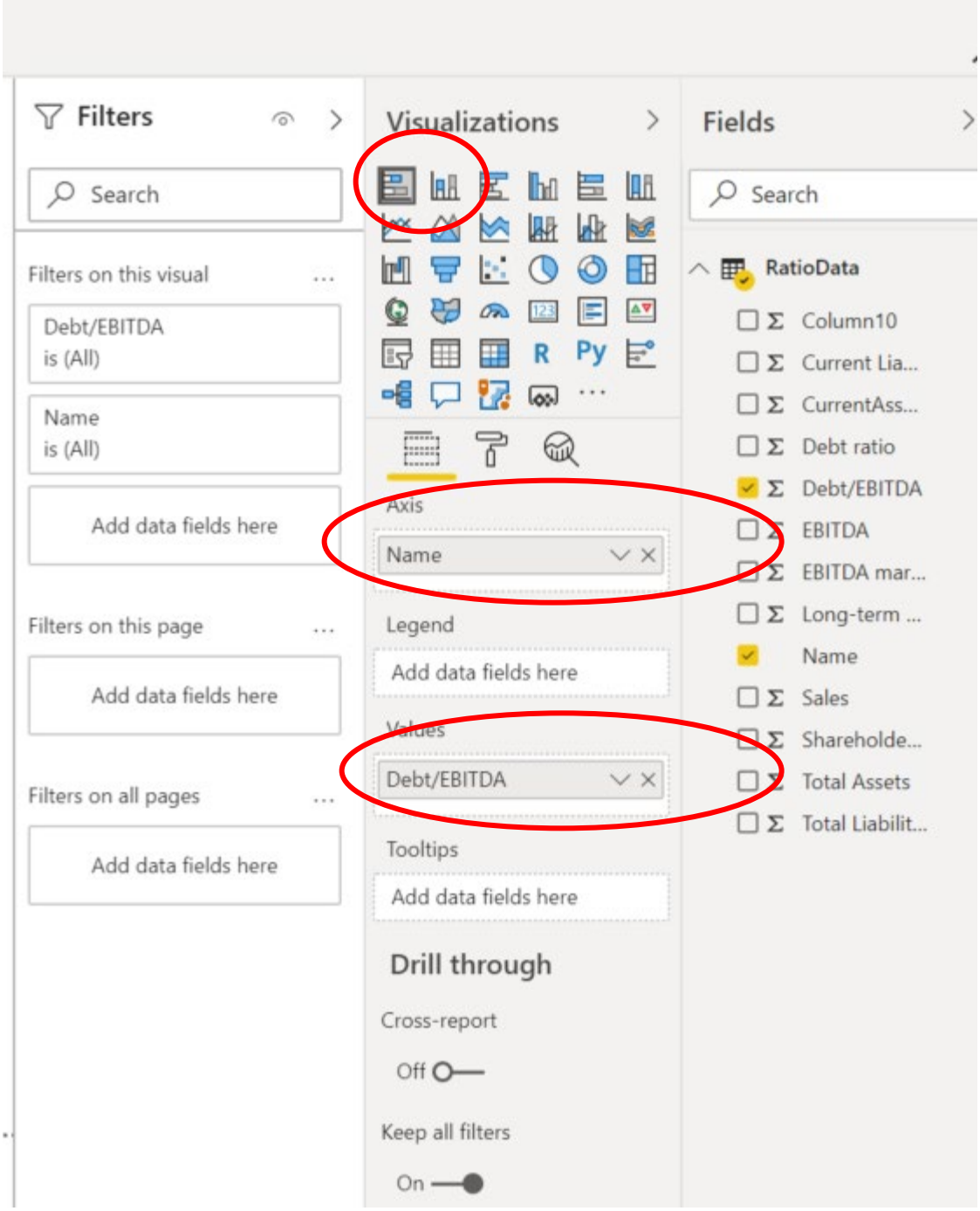
When you see the correct data, select “Load” at the bottom of the page.

Step 2: Visualizations — debt-to-EBITDA ratio by company

To prepare a stacked bar chart showing the debt-to-EBITDA ratio by company, click the “Report” icon on the left panel.



To create a stacked bar chart, click the “Stacked bar chart” icon.
Select “Name” for the Axis.
Select “Debt/EBITDA” for Values.

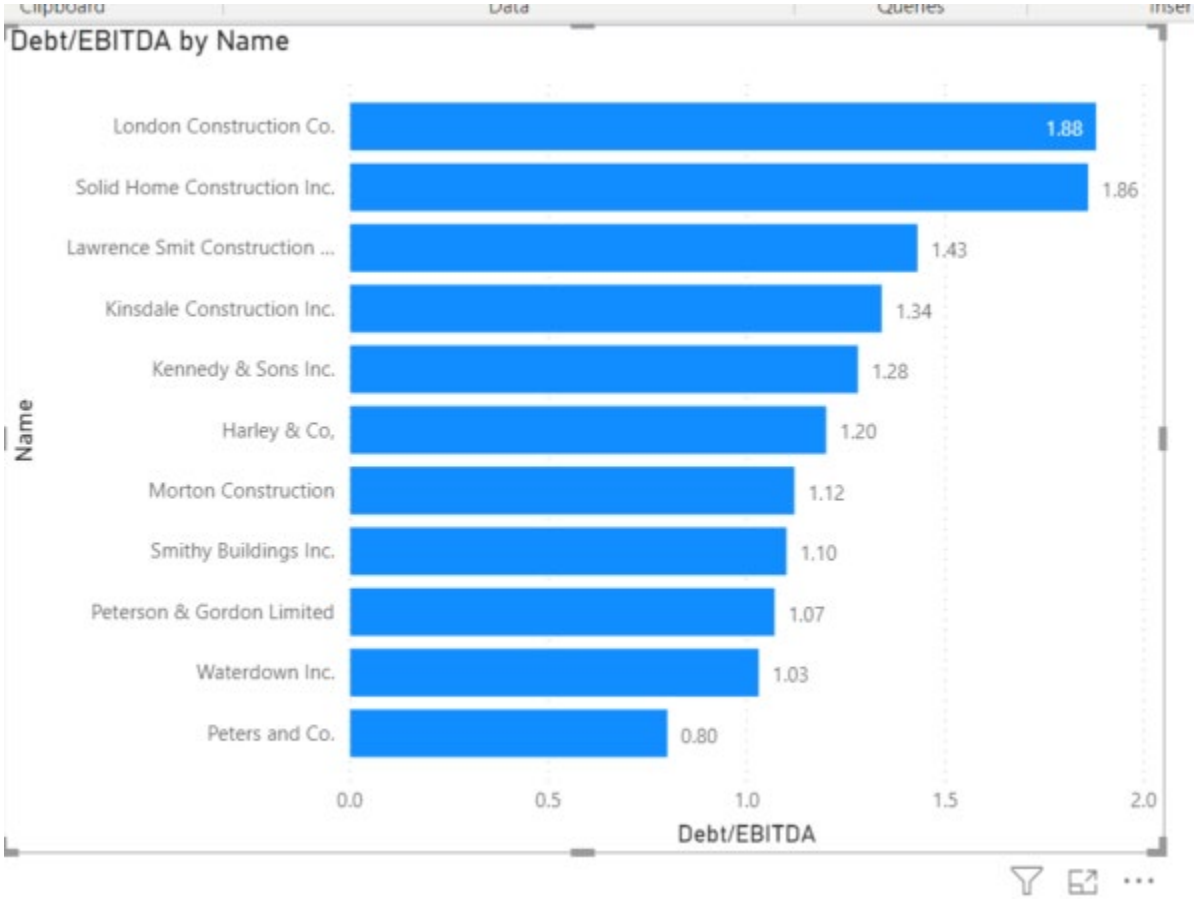


Step 3: Add data labels to the chart

To add data labels to the chart, make sure that the chart is selected so that modifications can be made. To select the chart, simply put your cursor over the chart and click. The chart will be outlined if it has been selected so that you can work on it.

Click the “Format” button under Visualizations (the paint roller).
Go down to “Data labels” and toggle to “On”.

Below is the stacked bar chart showing the debt-to-EBITDA ratio by company.

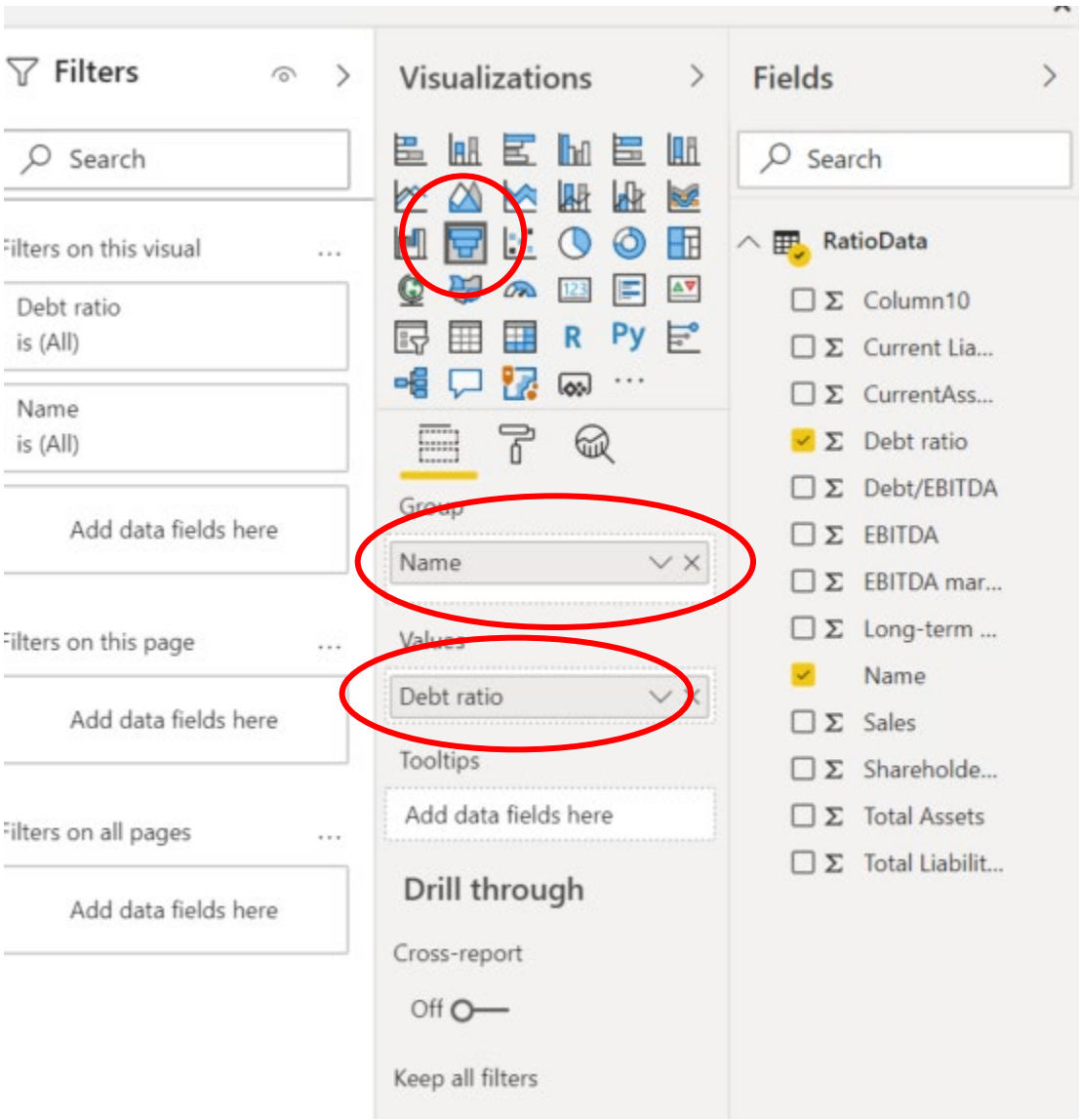


Based on the above chart, it appears that Morton has a debt-to-EBITDA ratio that is around the middle of the 11 companies included in the analysis. Within the narrow range of 1.0 to 1.2, there are five companies, including Morton, representing 45% for the sample. This is the range that has the most companies represented. Assuming that companies would tend toward an optimal amount of debt in comparison to earnings (before charges for interest, taxes, and depreciation), Morton’s total debt appears to be acceptable and similar to peers in the industry. Higher ratios indicate that companies have too much debt and therefore, based solely on this analysis, the amount of the line of credit should not be changed.

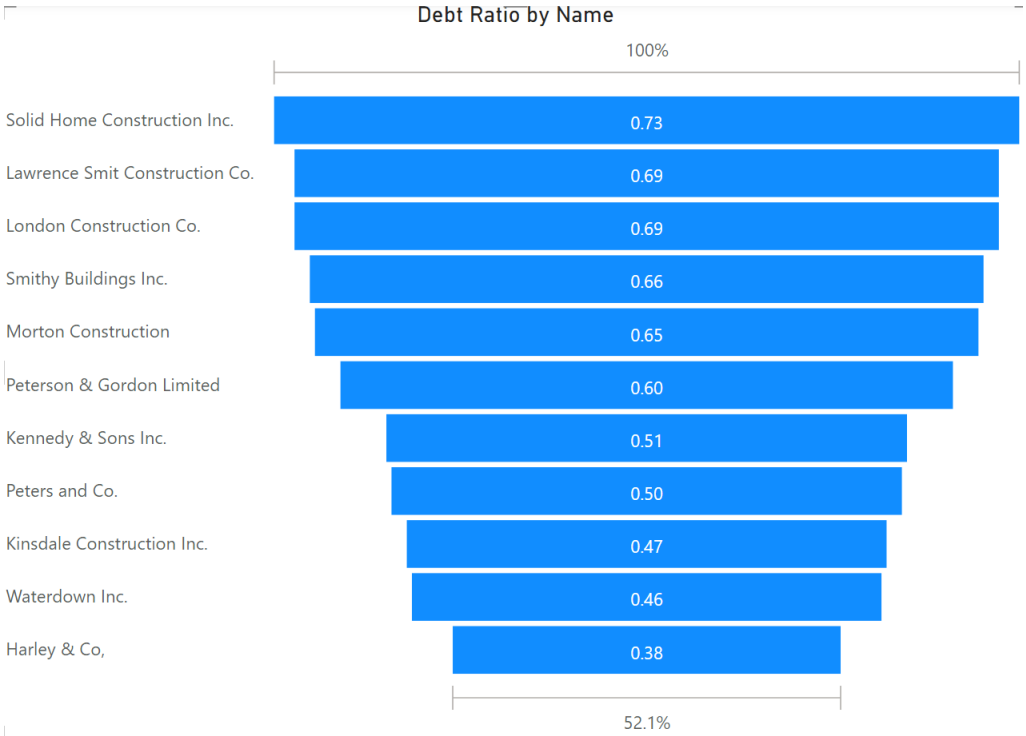
b)

To chart the debt ratio by name, select a new page by clicking the “+” at the bottom of the screen in Power BI. This will create a new blank page and a new chart can be created.

Under “Visualizations”, select the “Funnel” chart icon.
Under “Group”, drag and drop “Name” from the Fields.
Under “Values”, drag and drop “Debt ratio” from the Fields.


Filters
Search
Filters on this visual
Debt ratio
is (All)
Name
is (All)
Add data fields here
Filters on this page
Add data fields here
Filters on all pages
Add data fields here
Visualizations
Group
Name
Values
Debt ratio
Tooltips
Add data fields here
Drill through
Cross-report
Off
Keep all filters
Fields
Search
RatioData
Column10
Current Lia...
CurrentAss...
Debt ratio
Debt/EBITDA
EBITDA
EBITDA mar...
Long-term ...
Name
Sales
Shareholde...
Total Assets
Total Liabilit...

Below is the funnel chart of debt ratio by name.



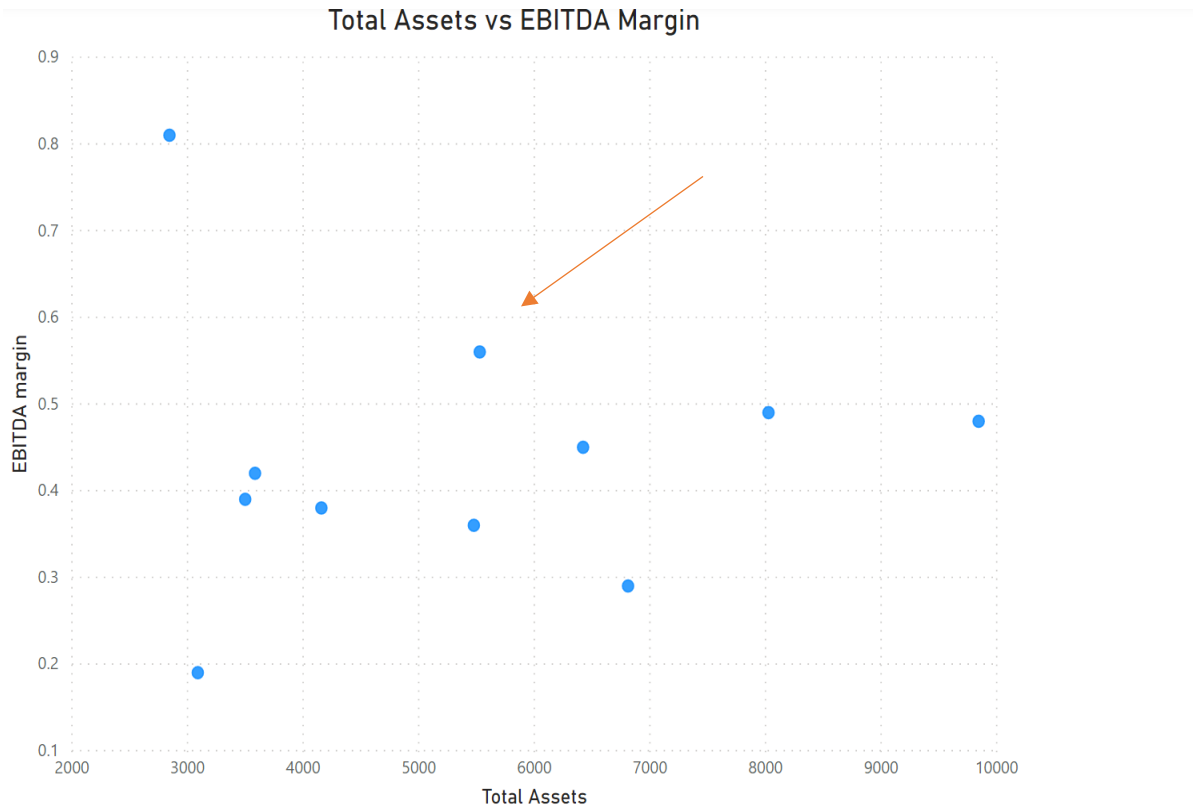
As indicated in this chart, Morton has a debt ratio of 65%, which is slightly higher than the median. There are six companies (55%) that have a debt ratio below that of Morton, ranging from 60% to 38%. There are four companies that have higher debt ratios. The higher ratios range from 66% to 73%. Therefore, it appears that Morton's debt ratio is slightly high and based on this analysis alone, the amount of the line of credit should be reduced, not increased, to achieve a ratio of no more than 60%.

c)

To chart the total assets to EBITDA, select a new page by clicking the "+" at the bottom of the screen. This will create a new blank page and a new chart can be created.

Under "Visualizations", select the "Scatter" chart icon.
Under "Details", drag and drop "Name" from the Fields.
Under "X Axis", drag and drop "Total Assets" from the Fields.
Under "Y Axis", drag and drop "EBITDA margin" from the Fields.

Morton's EBITDA margin is indicated with an orange arrow. Morton appears to have an EBITDA margin that is higher than that of most competitors, except for one outlier which is at 81% (which appears unrealistic and might be incorrect). Given that Morton builds high-end custom homes, it likely can charge a premium price for the work done. This would result in a higher EBITDA margin in comparison to its competitors, which are involved in industrial and corporate construction and housing construction in new residential areas, and would have to charge competitive prices, resulting in lower margins.



d) Based on the above analysis, although Morton's debt ratio is slightly higher than the average, given its higher EBITDA margins due to the nature of its work, and given that its debt-to-EBITDA margin is in line with a high percentage of peers, I would recommend that the existing maximum amounts for the line of credit be maintained and that the request for additional funds be denied.

Solution to Question 3

a)

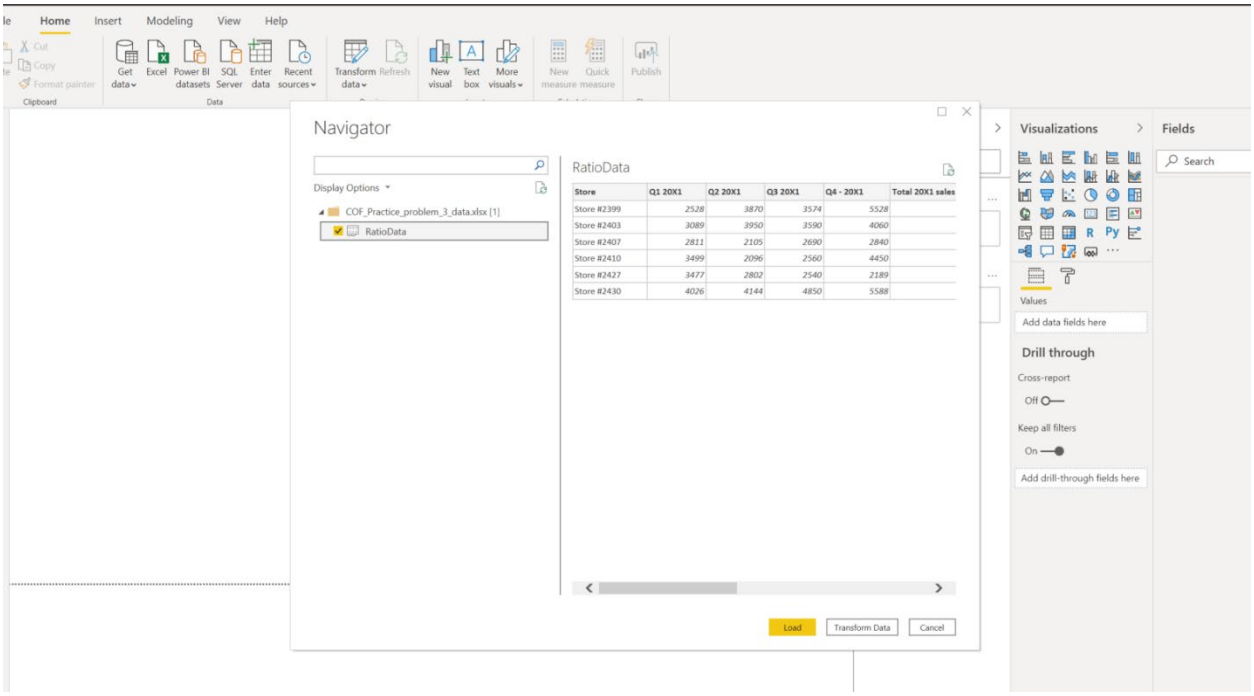
Step 1: Load data

Open Power BI and import the file QUESTION3.DATA.xlsx using the Get Data function. This function is found on home ribbon at the top of the page.

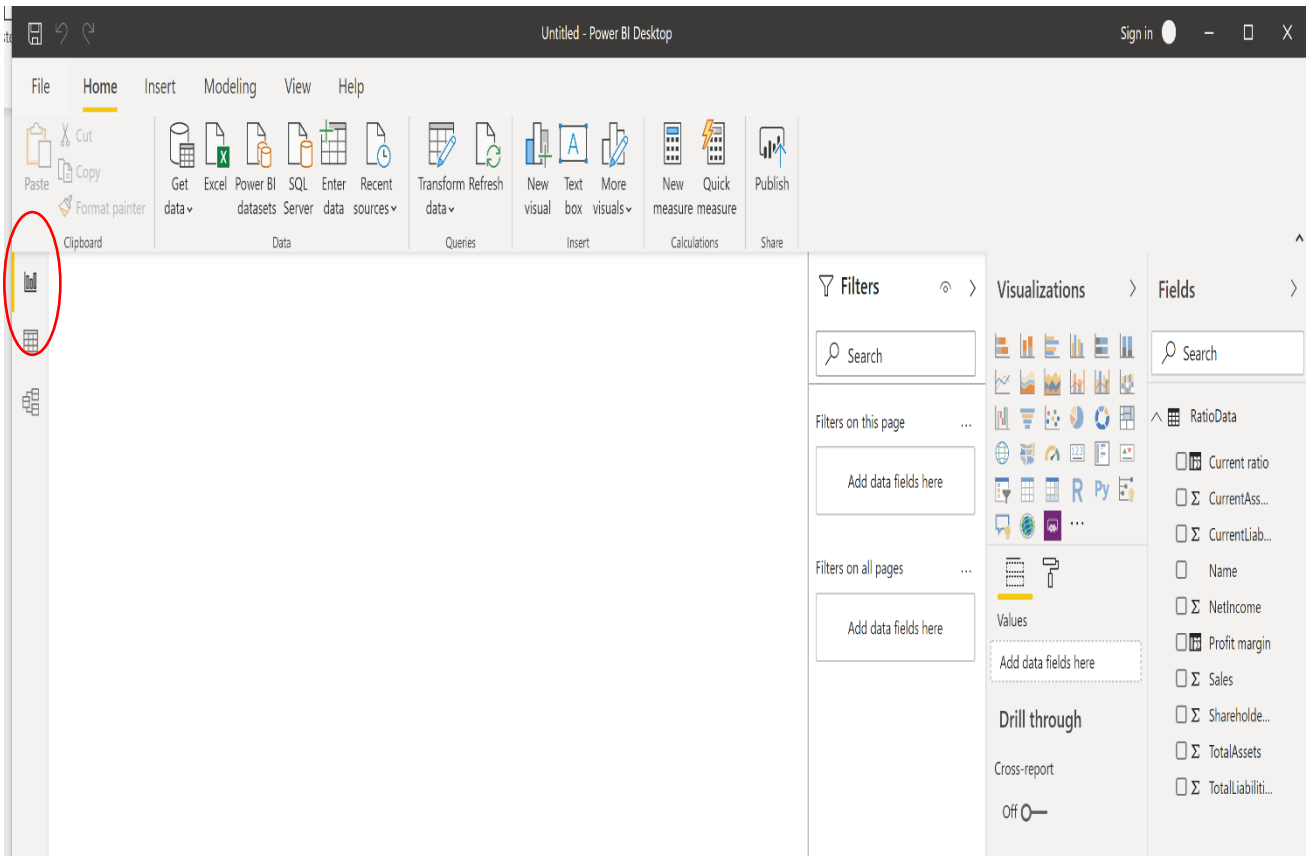
Select “Get Data” which opens a panel of common file types. Select Excel and browse for the location of this file and select the file.

In the Navigator screen, check the “RatioData” worksheet because this is the worksheet that contains the data.

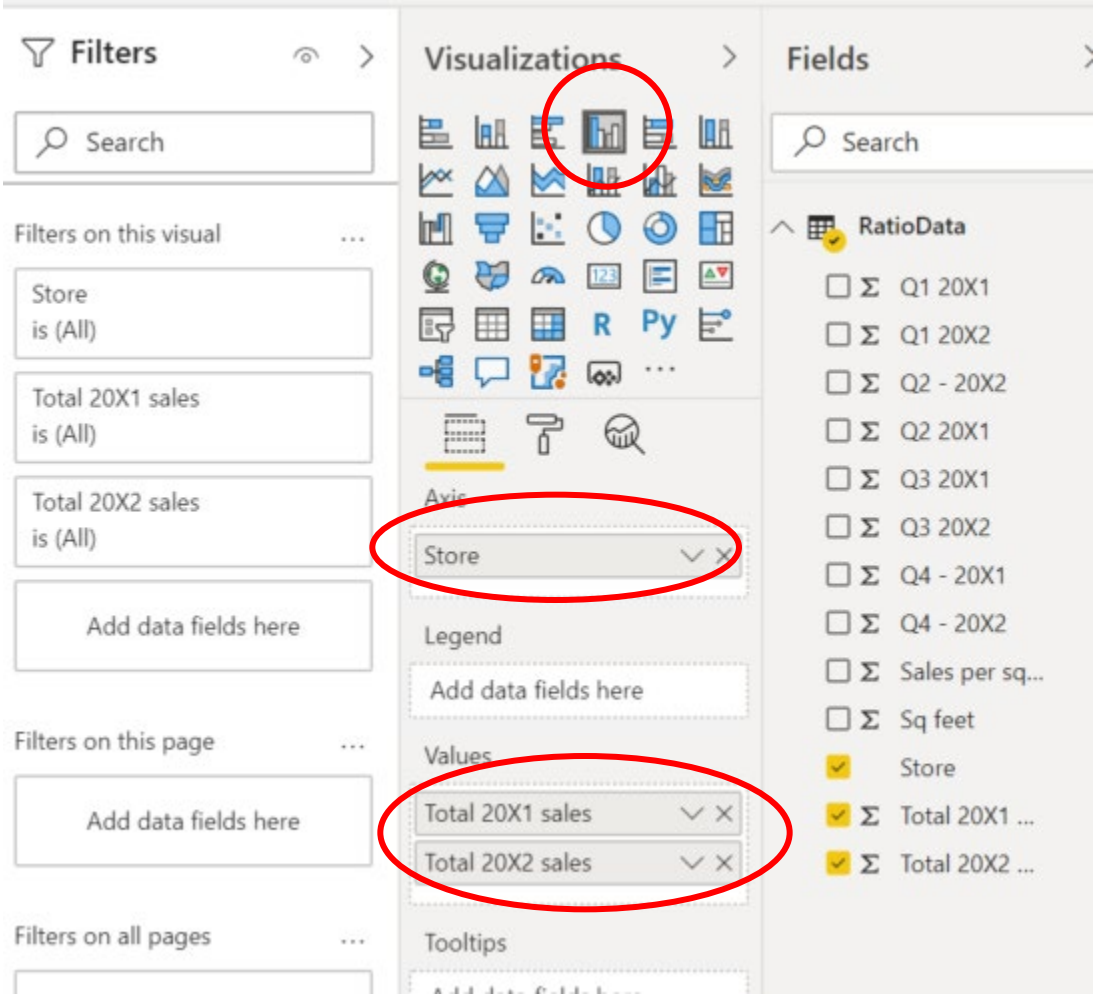
Your screen should look similar to the one below:



Step 2: Visualizations — total sales 20X1 and total sales 20X2 for each store
To prepare a clustered column chart showing the total sales for 20X1 and total sales for 20X2 for each store, click the “Report” icon on the left panel.

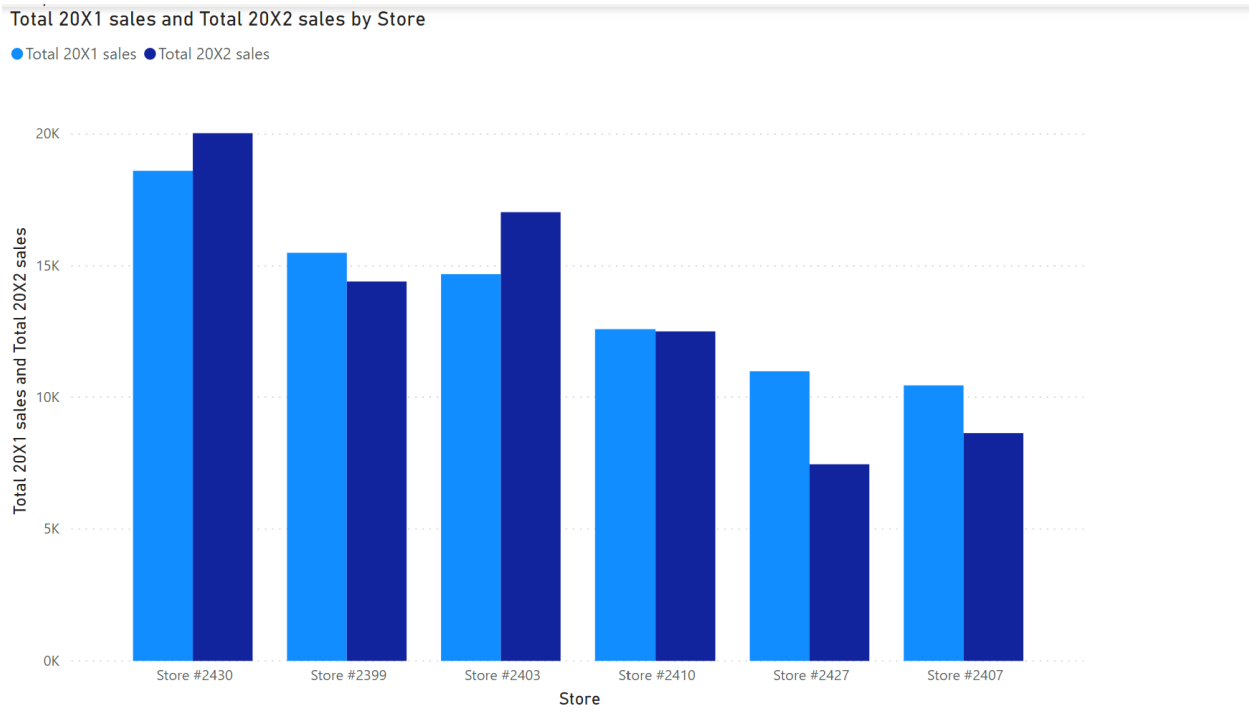


To create a clustered column chart, click the “Clustered column chart” icon.
Select “Store” for the Axis.
Select “Total 20X1 sales” and “Total 20X2 sales” for Values.


Filters
Search
Filters on this visual
Store
is (All)
Total 20X1 sales
is (All)
Total 20X2 sales
is (All)
Add data fields here
Filters on this page
Add data fields here
Filters on all pages
Visualizations
Axis
Store
Legend
Add data fields here
Values
Total 20X1 sales
Total 20X2 sales
Tooltips
Fields
Search
RatioData
Q1 20X1
Q1 20X2
Q2 - 20X2
Q2 20X1
Q3 20X1
Q3 20X2
Q4 - 20X1
Q4 - 20X2
Sales per sq...
Sq feet
Store
Total 20X1 ...
Total 20X2 ...

Expand the chart until the labels display as shown below.

Below is the clustered column chart showing the total sales for each of 20X1 and 20X2 for each store.



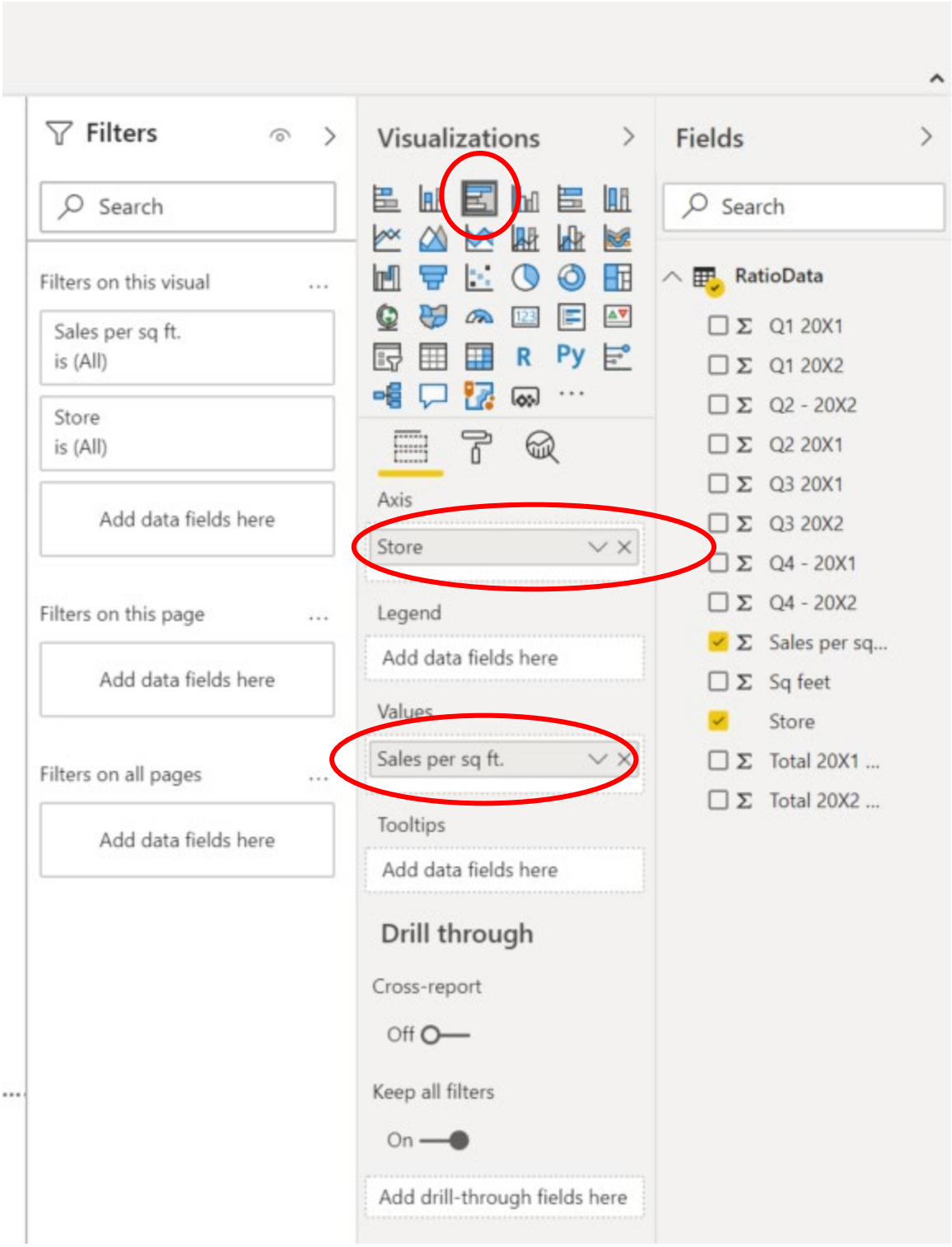
Based on this chart, stores #2399, #2427, and #2407 all had total annual sales decline in 20X2. In addition, Store #2427 saw the greatest decline year over year, with Store #2407 coming next. Finally, store #2427 also had the lowest number of sales for 20X2 with Store #2407 having the second lowest.

Based on this analysis, stores #2427 and #2407 should be further investigated to determine why the sales declined in 20X2.

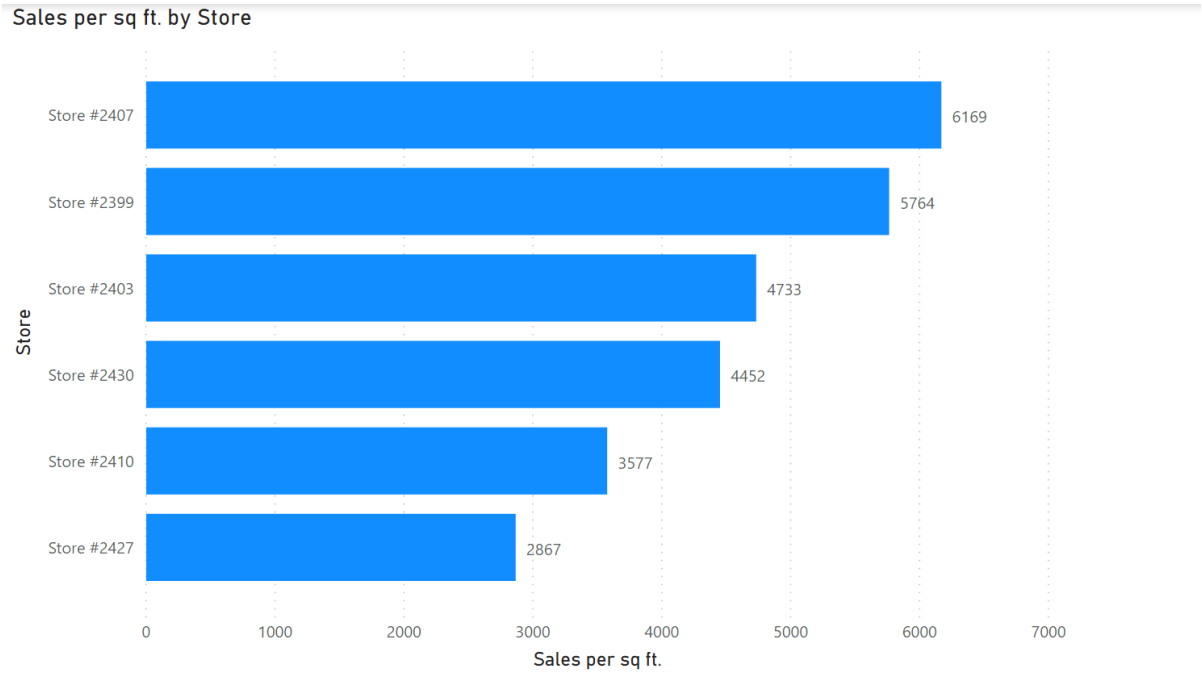
b)

To chart the sales per square foot by store, select a new page by clicking the “+” at the bottom of the screen. This will create a new blank page and a new chart can be created.

Under “Visualizations”, select the “Clustered bar chart” chart icon.
Under “Axis”, drag and drop “Store” from the Fields.
Under “Values”, drag and drop “Sales per s ft” from the Fields.


Filters
Search
Filters on this visual
Sales per sq ft.
is (All)
Store
is (All)
Add data fields here
Filters on this page
Add data fields here
Filters on all pages
Add data fields here
Visualizations
Axis
Store
Legend
Add data fields here
Values
Sales per sq ft.
Tooltips
Add data fields here
Drill through
Cross-report
Off
Keep all filters
On
Add drill-through fields here
Fields
Search
RatioData
Q1 20X1
Q1 20X2
Q2 - 20X2
Q2 20X1
Q3 20X1
Q3 20X2
Q4 - 20X1
Q4 - 20X2
Sales per sq...
Sq feet
Store
Total 20X1 ...
Total 20X2 ...

The clustered bar chart is below.



Analysis of this chart indicates that Store #2407 has the highest sales per square foot and is therefore the best performer of the group. In contrast, Store #2427 has the lowest sales per square foot, indicating that it is the worst performing store in the group, with Store #2410 having the second lowest sales per square foot.

c) Although Store #2407 had declining sales for 20X2, its sales per square foot is still the highest of all the stores and is therefore performing very well in comparison to the others. Why the sales declined in 20X2 should still be investigated, but it is not a poorly performing location at this time and so should not be closed.

The store location that seems to have the most problems and is the worst performer is Store #2427. This store had declining sales for 20X2 and low sales for both 20X1 and 20X2, along with the lowest sales per square foot. Therefore, this is the worst-performing store and should be investigated to understand why. Until an investigation is complete, the store should not be closed.

Information that should be gathered about Store #2427 to make a full assessment might include the following:

- Was there anything that happened at the store or surrounding area during the year that was out of the ordinary and would cause fewer customers to come and shop at this location?
- Was there a change in management during the year?
- Has a competitor opened close to this location?
- What is the population size that this store services?
- Does the store sell the right mix of products for the customer base that is served?