

**Technical Report No. 8**

**Air Emissions Inventory  
for the Greater Metropolitan Region in  
New South Wales**

**2008 Calendar Year**

**Emissions to Area Report Analysis:  
Excel Workbook Instructions**



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## 1 INTRODUCTION

The NSW Environment Protection Authority (EPA) has completed a two year air emissions inventory project (EPA 2012a, EPA 2012b, EPA 2012c, EPA 2012d, EPA 2012e, EPA 2012f, EPA 2012g & EPA 2012h). The base year of the inventory represents activities that took place during the 2008 calendar year and is accompanied by emission projections in yearly increments up to the 2036 calendar year. The area included in the study covers greater Sydney, Newcastle and Wollongong regions, known collectively as the Greater Metropolitan Region (GMR).

The study region defined as the GMR measures 210 km (east-west) by 273 km (north-south). The study region is defined in Table 1.1 and shown in Figure 1.1.

**Table 1-1: Definition of Greater Metropolitan, Sydney, Newcastle and Wollongong regions**

Region	South-west corner MGA <sup>1</sup> co-ordinates		North-east corner MGA <sup>1</sup> co-ordinates	
	Easting (km)	Northing (km)	Easting (km)	Northing (km)
Greater Metropolitan	210	6159	420	6432
Sydney	261	6201	360	6300
Newcastle	360	6348	408	6372
Wollongong	279	6174	318	6201

<sup>1</sup> MGA = Map Grid of Australia based on the Geocentric Datum of Australia 1994 (GDA94) (ICSM, 2006).

The air emissions inventory includes emissions from biogenic (i.e. natural living organisms), geogenic (i.e. natural non-living) and anthropogenic (i.e. human-made) sources. These are grouped into “modules” as follows:

- Natural (Biogenic and geogenic, e.g. bushfires, marine aerosol and vegetation);
- Commercial businesses (e.g. non-EPA licensed<sup>1</sup> printers, quarries and service stations);
- Domestic activities (e.g. residential lawn mowing, portable fuel containers and wood heaters);
- Industrial premises (e.g. EPA licensed<sup>2</sup> coal mines, oil refineries and power stations);
- Off-road vehicles and equipment (e.g. dump trucks, bulldozers, and marine vessels); and
- On-road transport (e.g. registered buses, cars and trucks).

<sup>1</sup> Not a scheduled activity or scheduled development work as defined in the *Protection of the Environment (Operations) Act 1997* (PCO, 2013a).

<sup>2</sup> An activity listed in Schedule 1 of the *Protection of the Environment (Operations) Act 1997* (PCO, 2013a).

More detailed information about source types and emissions of other air pollutants from natural, commercial businesses, domestic activities, industrial premises, off-road vehicles and equipment and on-road transport sources can be found in the individual air emissions inventory reports (EPA, 2012c; EPA, 2012d; EPA, 2012e; EPA, 2012f; EPA, 2012g and EPA, 2012h), respectively.

The pollutants inventoried include criteria pollutants specified in the *Ambient Air Quality NEPM* (NEPC, 2008), air toxics associated with the *National Pollutant Inventory (NPI) NEPM* (NEPC, 2008) and the *Air Toxics NEPM* (NEPC, 2004) and any other pollutants associated with state specific programs, including: *Load Based Licensing (Protection of the Environment Operations (General) Regulation 2009* (PCO, 2013b)); and *Protection of the Environment Operations (Clean Air) Regulation 2010* (PCO, 2013c).

This document contains instructions that explain the navigation and use of the accompanying Microsoft® Excel™ workbooks;

- 130766AEITR8EmissionstoArea.xls which contains an analysis of annual emission data by region, local government area (LGA), emission source module and emission generating activity for 17 substances:

- 1,3-butadiene
- Ammonia
- Carbon Monoxide
- Isomers of Xylene
- Oxides of Nitrogen
- Particulate Matter < 2.5µm
- Polycyclic Aromatic Hydrocarbons (PAH)
- Toluene
- Total Volatile Organic Compounds
- Acetaldehyde
- Benzene
- Formaldehyde
- Lead & Compounds
- Particulate Matter < 10µm
- Polychlorinated Dioxins & Furans
- Sulfur Dioxide
- Total Suspended Particles

- 130766AEITR8EmissionstoArea\_Monthly.xls which contains an analysis of monthly emission data by region, emissions source module and emission generating activity for 8 substances:

- Ammonia
- Oxides of Nitrogen
- Particulate Matter < 2.5µm
- Total Suspended Particles
- Carbon Monoxide
- Particulate Matter < 10µm
- Sulfur Dioxide
- Total Volatile Organic Compounds

The emission data contained in the workbooks has been extracted from the Emissions Data Management System (EDMS v2.0) via an “Emissions to Area Report”. The EDMS is an overarching air emissions inventory database that links to individual source-specific databases comprising all the data necessary to service policy and technical related queries, including the generation of data file for airshed chemistry modelling software.



Figure 1-1: Definition of Greater Metropolitan, Sydney, Newcastle and Wollongong regions

## 2 USING THE EXCEL™ WORKBOOKS

This document contains instructions that explain the navigation and use of the accompanying Microsoft® Excel™ workbooks. The instructions given in most cases specifically relate to the annual emissions Excel™ workbook 130766AEITR8EmissionstoArea.xls, however the principals also relate equally to 130766AEITR8EmissionstoArea\_Monthly.xls. Where specific instructions are required for the monthly workbook these will be detailed. Both of these workbooks are based on Emissions to Area Reports for criteria pollutants in the GMR during 2008 that have been extracted from the Emissions Data Management System (EDMS v2.0) (DECC, 2008)).

### 2.1 Download and Install Workbooks and Instructions

#### 2.1.1 Create Directory

Open Windows Explorer and create a new directory on your computer hard drive (e.g. C:\nsw\_gmr\_aei\_2008\) by selecting “File”, “New” and “Folder” from the command menu as shown in Figure 2.1.

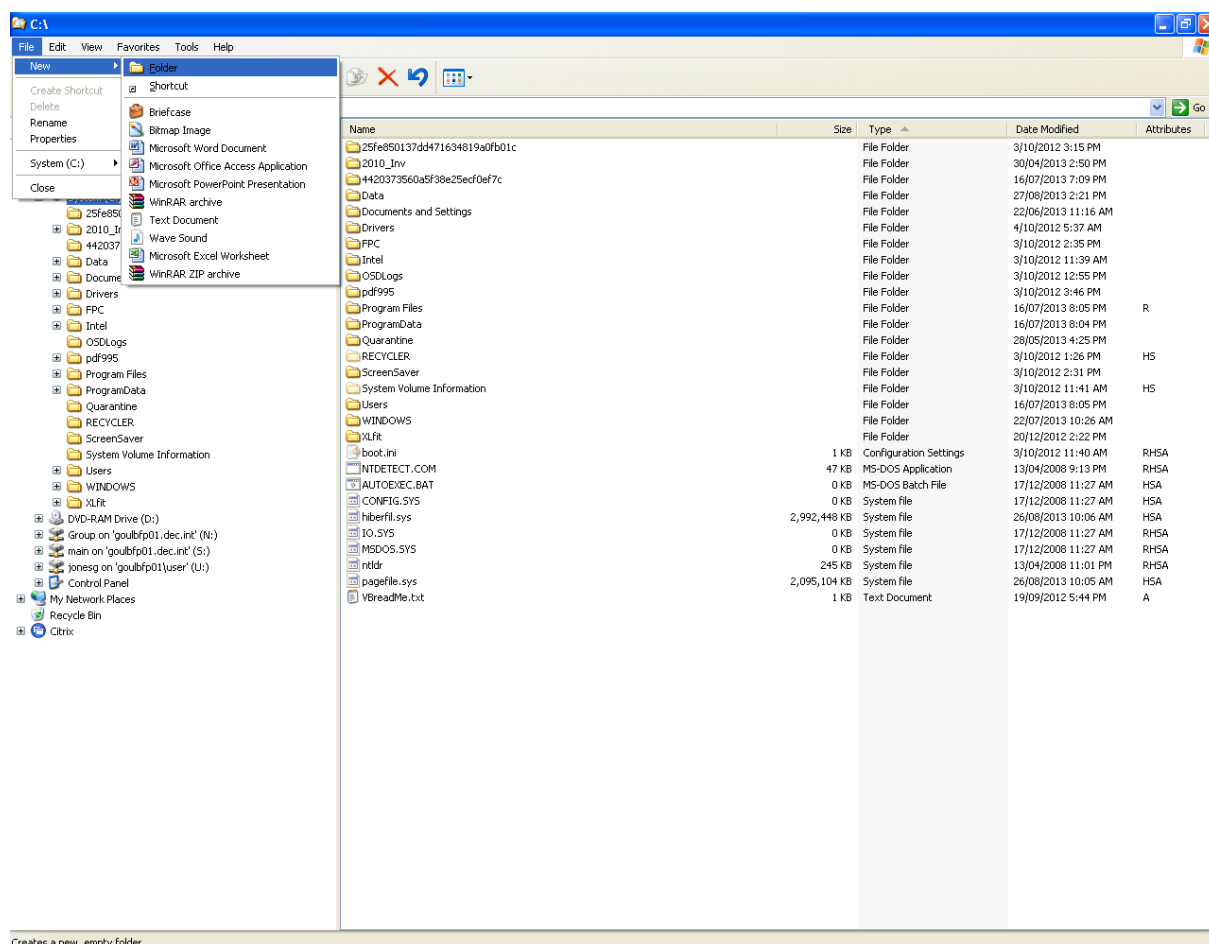


Figure 2-1: Create directory “C:\nsw\_gmr\_aei\_2008\”



### 2.1.2 Download Workbooks and Instructions

Download the .pdf file containing these instructions and the .zip files containing the Excel™ workbooks from the following web links and save to the directory created above:

- <http://www.epa.nsw.gov.au/resources/air/130766AEITR8EmissionstoArea.pdf>
- <http://www.epa.nsw.gov.au/resources/air/130766AEITR8EmissionstoArea.zip>
- [http://www.epa.nsw.gov.au/resources/air/130766AEITR8EmissionstoArea\\_Monthly.zip](http://www.epa.nsw.gov.au/resources/air/130766AEITR8EmissionstoArea_Monthly.zip)

### 2.1.3 Extract Workbooks

Extract the following files from the .zip files to the directory created:

- 130766AEITR8EmissionstoArea.xls - Excel™ workbook
- 130766AEITR8EmissionstoArea\_Monthly.xls- Excel™ workbook

To extract the files, double left mouse button click the .zip files in turn, select “Extract” from the command menu, select the directory to “Extract to” in the window and select the “Extract” button as shown in Figure 2.2.

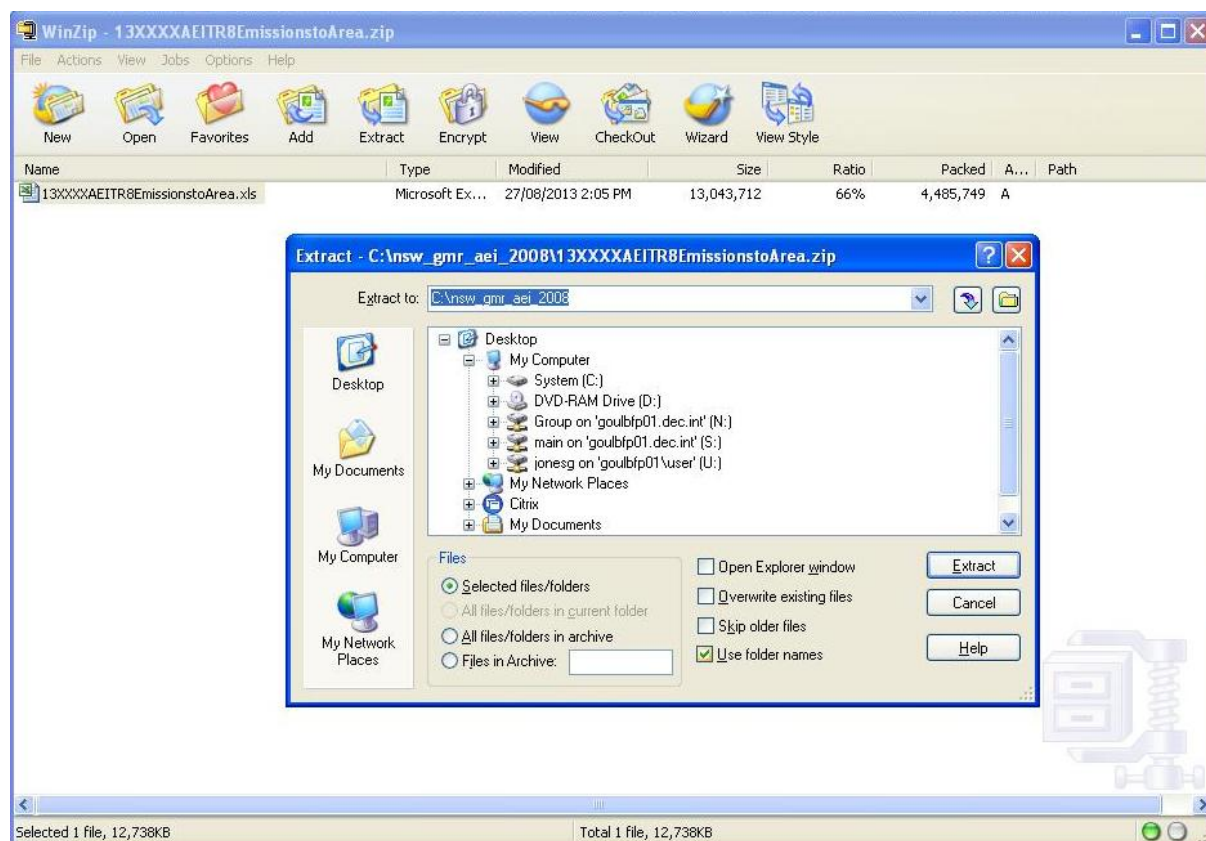


Figure 2-2: Extract “130766AEITR8EmissionstoArea.xls”

Ensure the Excel™ workbooks and these instructions are contained in the same directory so you can navigate to the instructions from the Excel™ workbook.

## 2.2 Using the Workbook

The instructions that follow relate specifically to the annual emissions workbook 130766AEITR8EmissionstoArea.xls, however the instructions apply equally to the monthly emissions workbook 130766AEITR8EmissionstoArea\_Monthly.xls.

### 2.2.1 Open Workbook

Open Windows Explorer and navigate to the Excel™ workbook at C:\nsw\_gmr\_aei\_2008\130766AEITR8EmissionstoArea.xls. Double left mouse button click the Excel™ workbook file as shown in Figure 2.3.

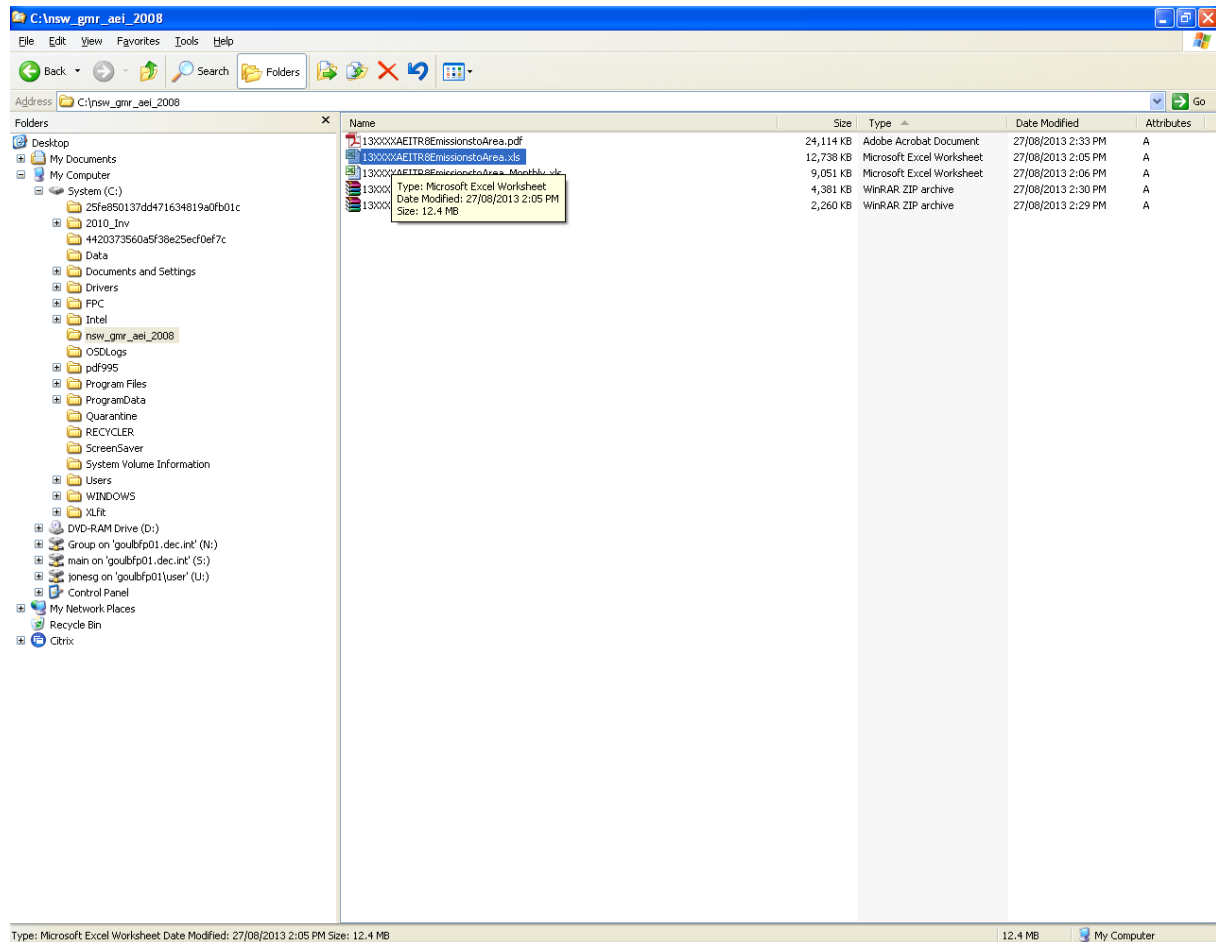


Figure 2-3: Open Workbook “130766AEITR8EmissionstoArea.xls”



### 2.2.2 Enable Macros

A “Security Warning” dialog box will now appear, which allows you to select from the following options:

- Disable Macros
- Enable Macros
- More Info

Select “Enable Macros” as shown in Figure 2.4.

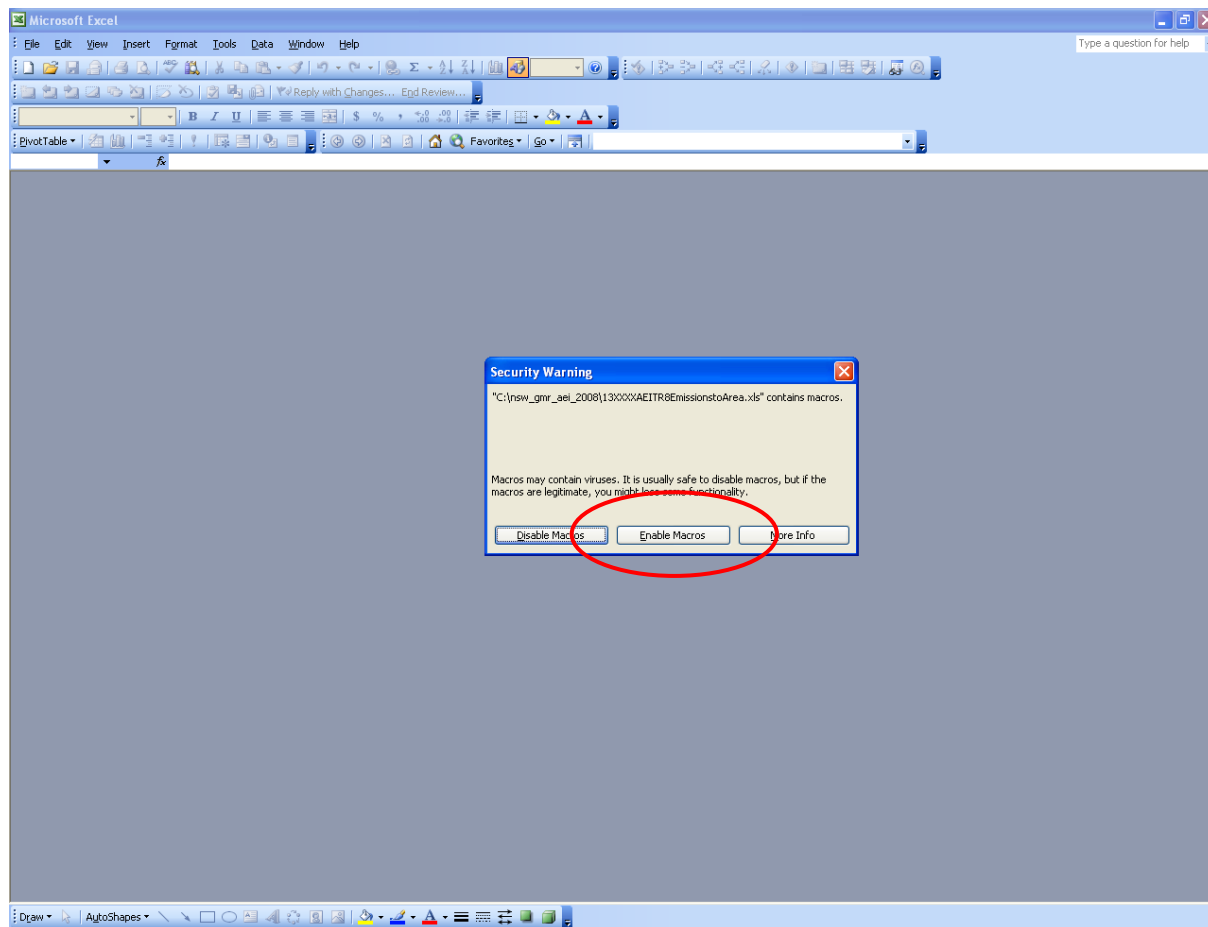


Figure 2-4: Select “Enable Macros”

### 2.2.3 Macro Security Settings

You may need to adjust your Excel™ macro security settings to run the macros built into the Excel™ Workbook. If necessary, follow the steps below:

**Step 1** - Select “Tools” and “Options” from the command menu as shown in Figure 2.5

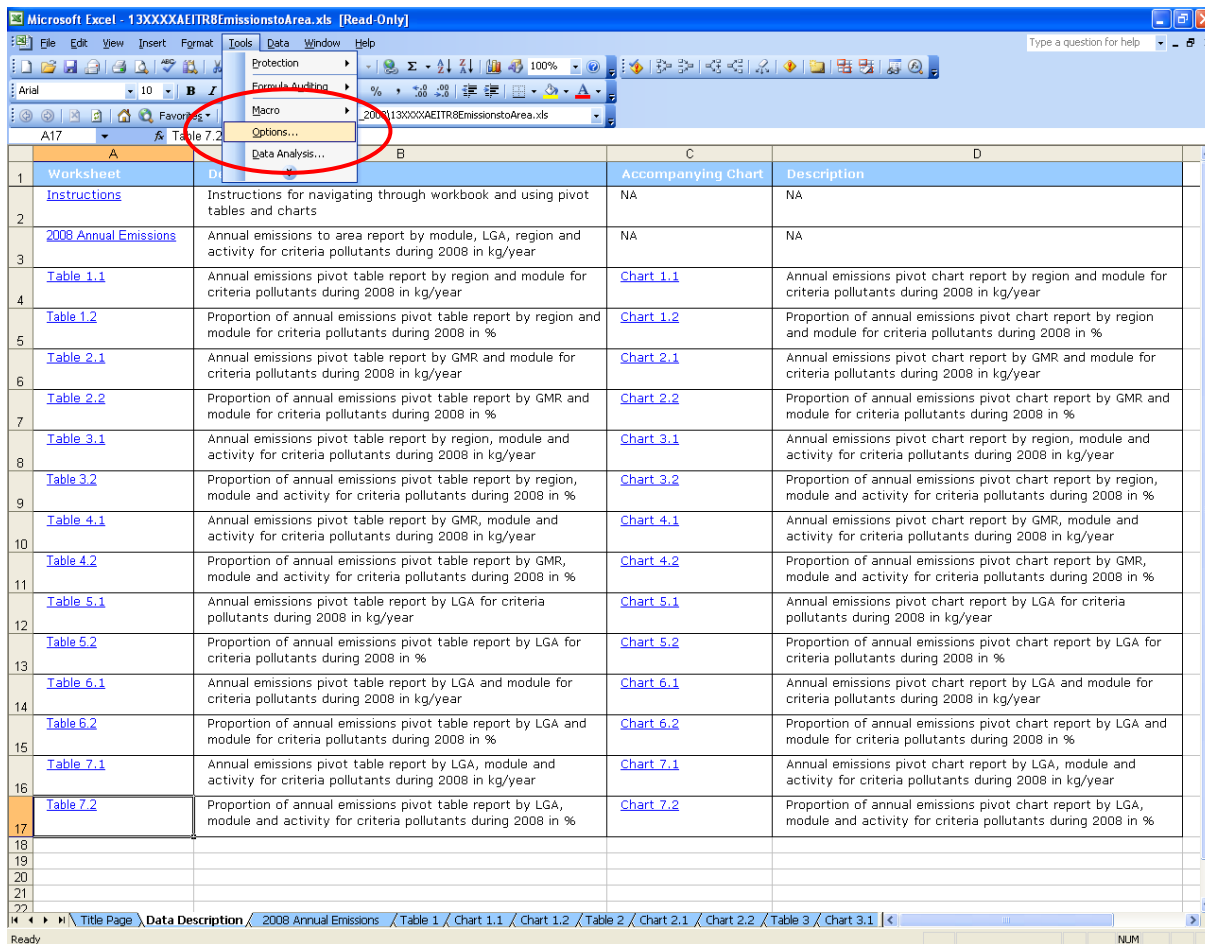
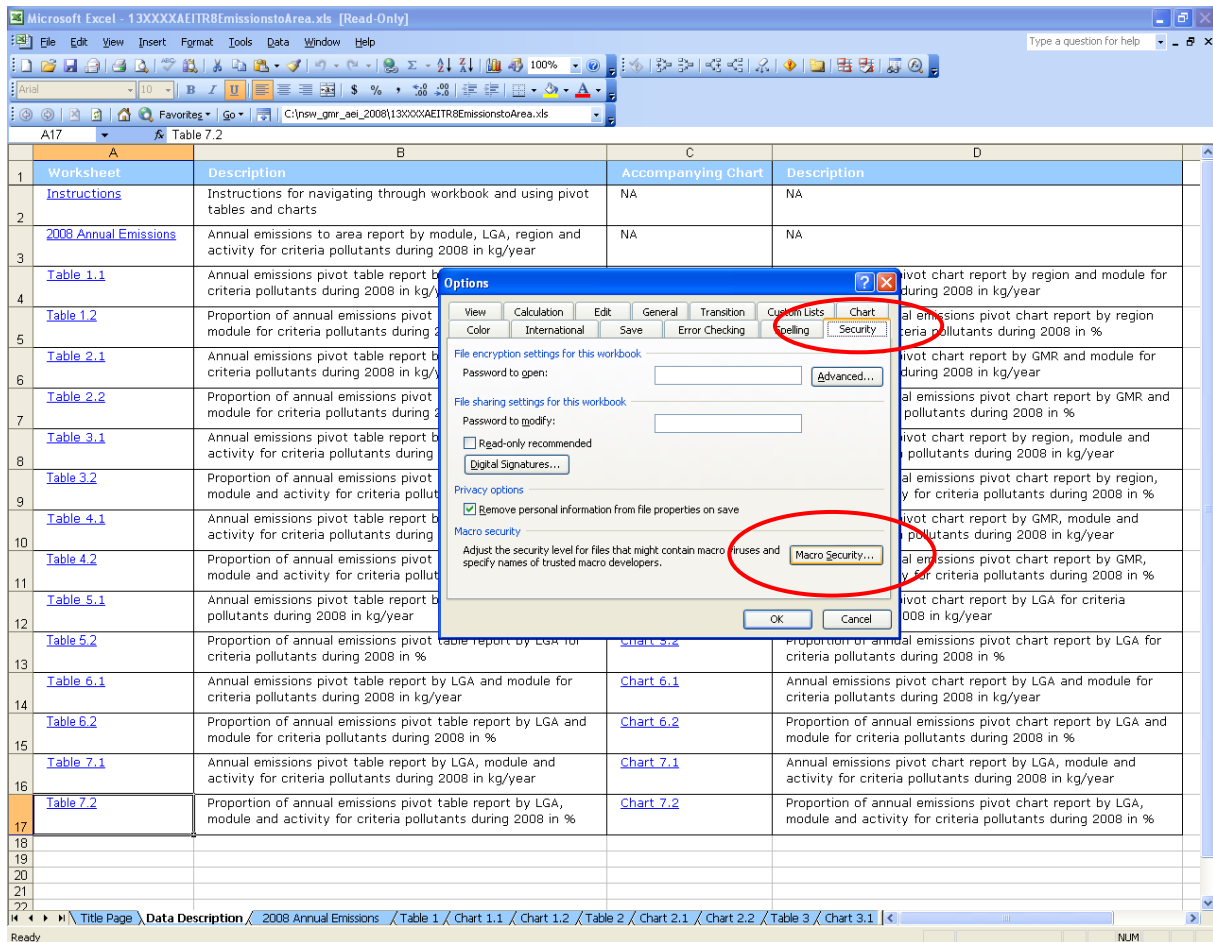


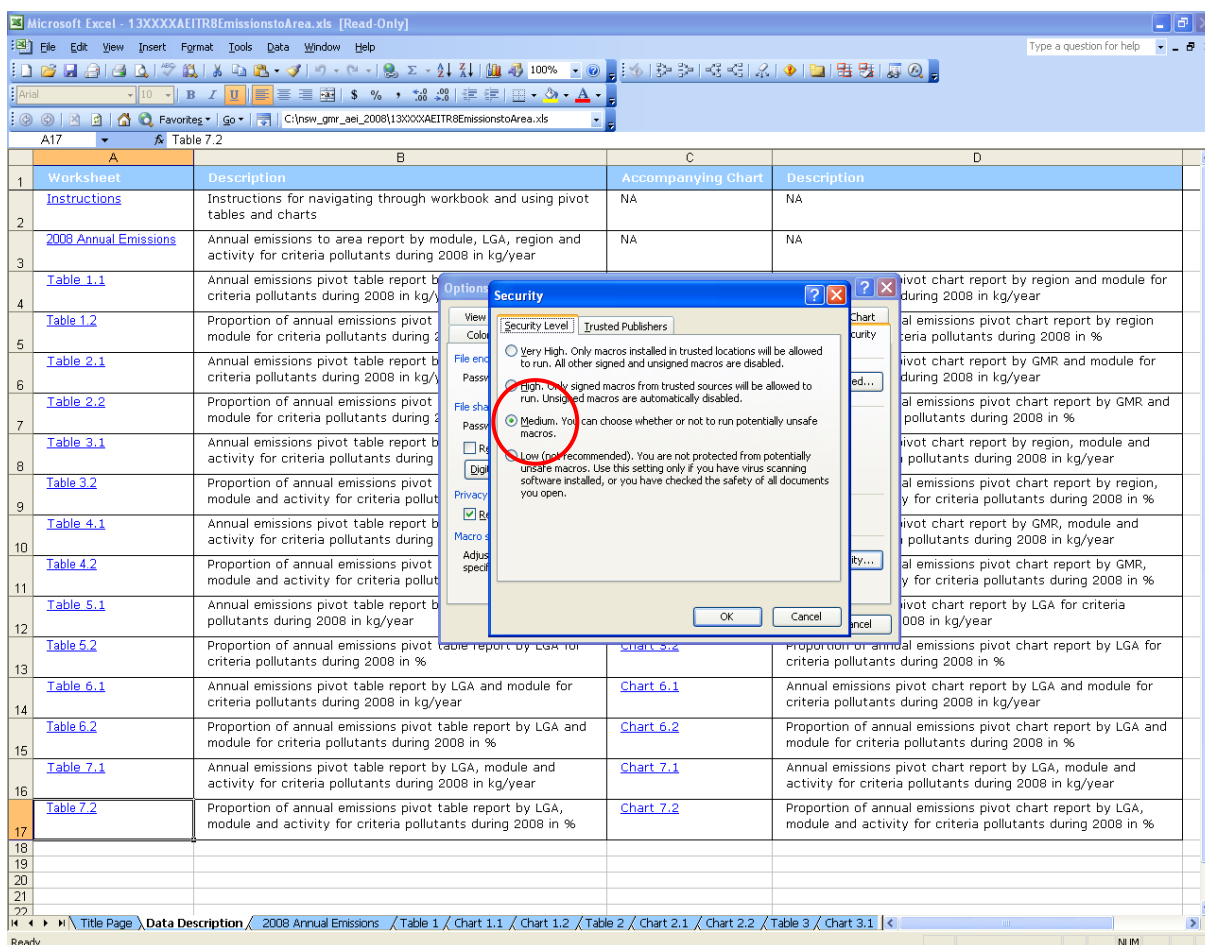
Figure 2-5: Select “Tools” and “Options”

**Step 2 - Select the “Security” tab and “Macro Security” button as shown in Figure 2.6**



**Figure 2-6: Select “Security” and “Macro Security”**

**Step 3 - Select the “Security Level” tab and “Medium” radio button as shown in Figure 2.7**



**Figure 2-7: Select “Security Level” and “Medium”**

**Step 4 - Select the “OK” button twice**

### 2.2.4 Password Protection

The Excel™ workbook is write-protected to ensure the data cannot be overwritten and requires a password to modify it. When the “Password” dialog box appears, select the “Read Only” button as shown in Figure 2.8.

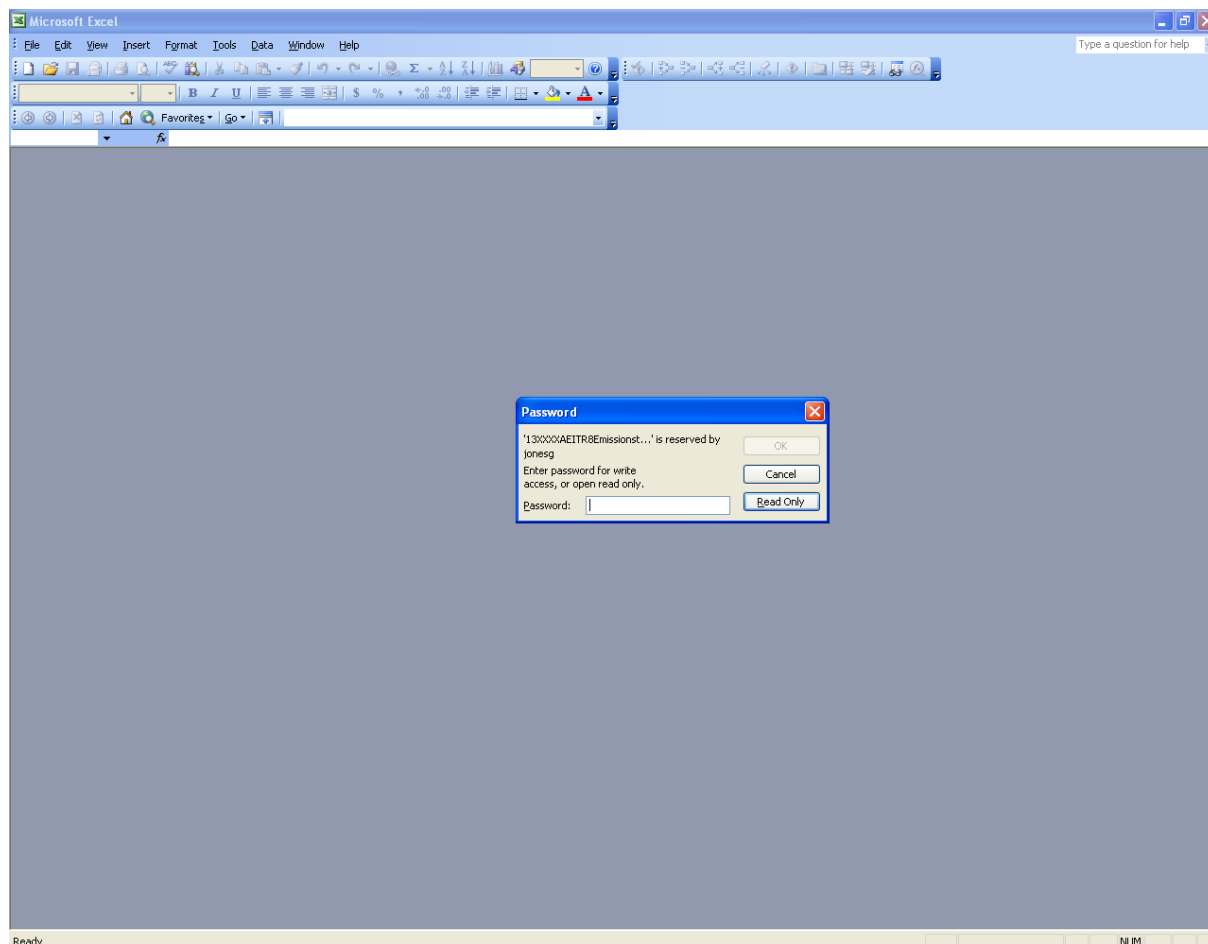


Figure 2-8: Select “Read Only”

### 2.2.5 Saving Changes

If you wish to save any changes to the Excel™ workbook, select “File” and “Save As” from the command menu as shown in Figure 2-9, use a different file name and select the “Save” button as shown in Figure 2-10.

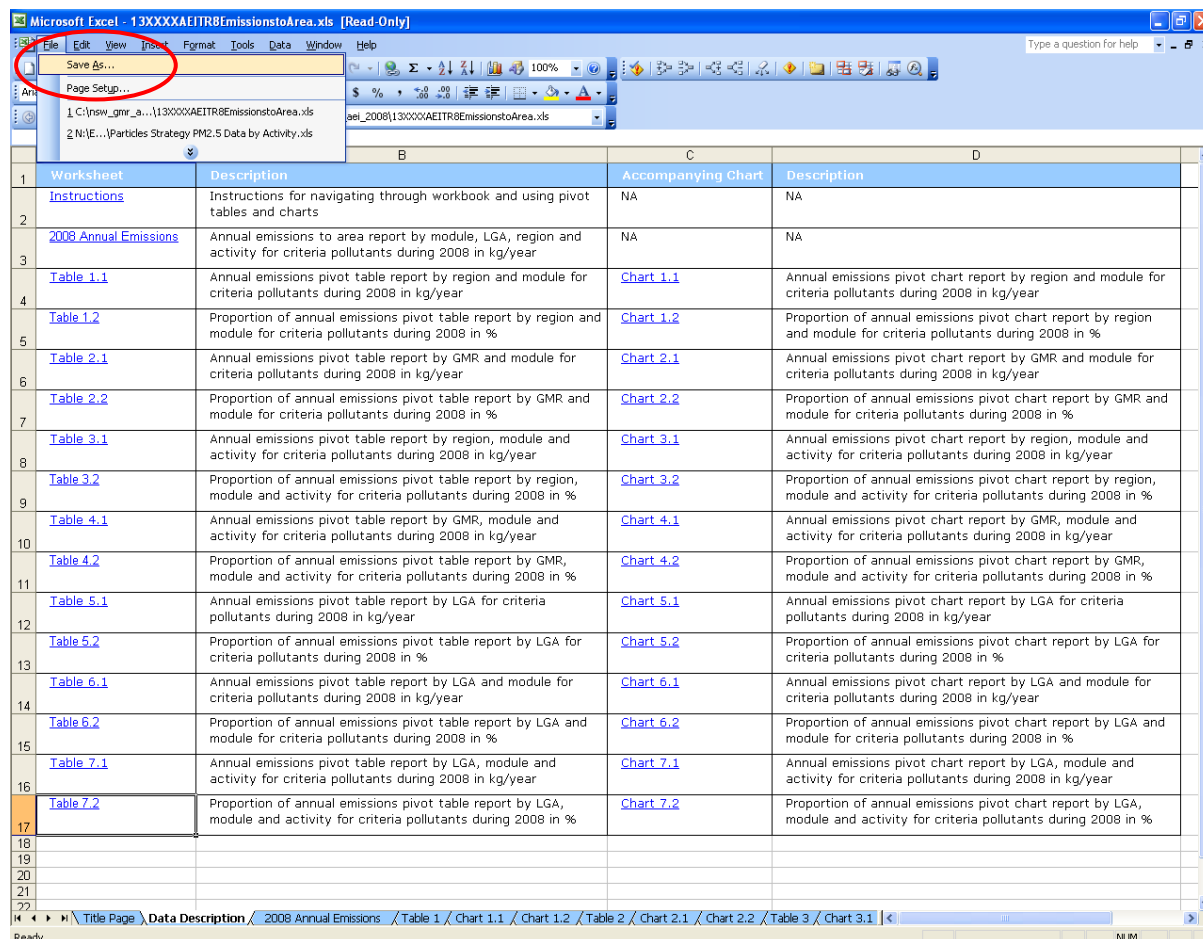


Figure 2-9: Select “File” and “Save As”

2. Using the Excel Workbook

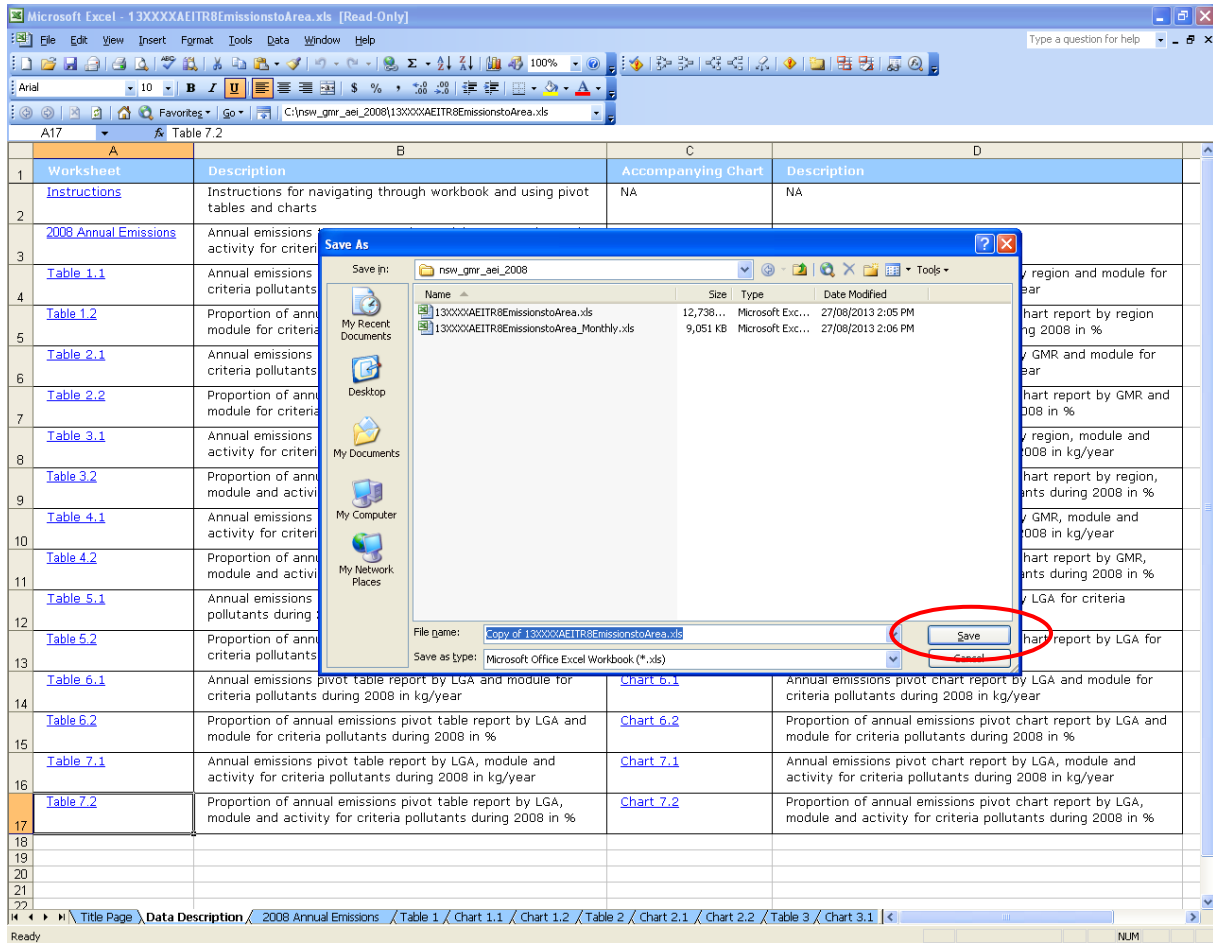


Figure 2-10: Select "Save"

## 2.3 Navigate the Workbook

### 2.3.1 Excel Workbook Structure

The Excel™ workbooks are based on an Emissions to Area Report for the GMR in 2008 that has been extracted from the Emissions Data Management System (EDMS v2.0) (DECC, 2008).

The Excel™ workbook contains a “Data Description” worksheet that includes in-built or macro hyperlinks to the following:

- [Instructions](#): These instructions
- [2008 Annual Emissions](#): Emissions to Area Report for the GMR in 2008 ([2008 Monthly Emissions](#) in the monthly workbook)
- [Table x.x](#): 14 Interactive pivot table reports (8 for the monthly workbook)
- [Chart x.x](#): 14 Interactive pivot chart reports (8 for the monthly workbook)

The contents of the Excel™ workbook can be viewed by left mouse button clicking on the “Data Description” worksheet tab at the bottom of the screen as shown in Figure 2.11.

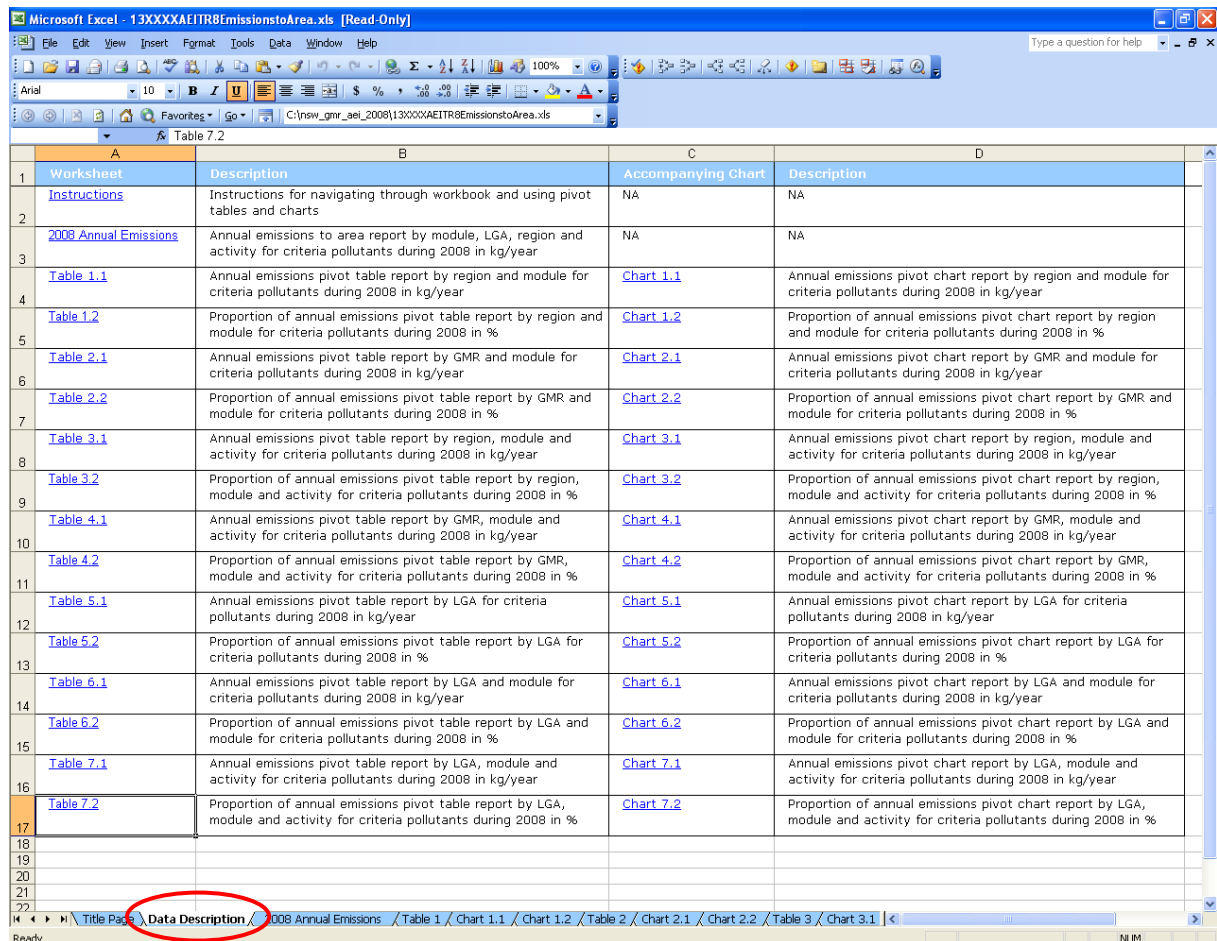


Figure 2-11: Select “Data Description” Worksheet



### 2.3.2 Using Built-In Hyperlinks and Macros

To assist in navigating the Excel™ workbook, it is useful to switch on the “Web” toolbar. To switch on the “Web” toolbar, select “View”, “Toolbars” and “Web” from the command menu as shown in Figure 2.12.

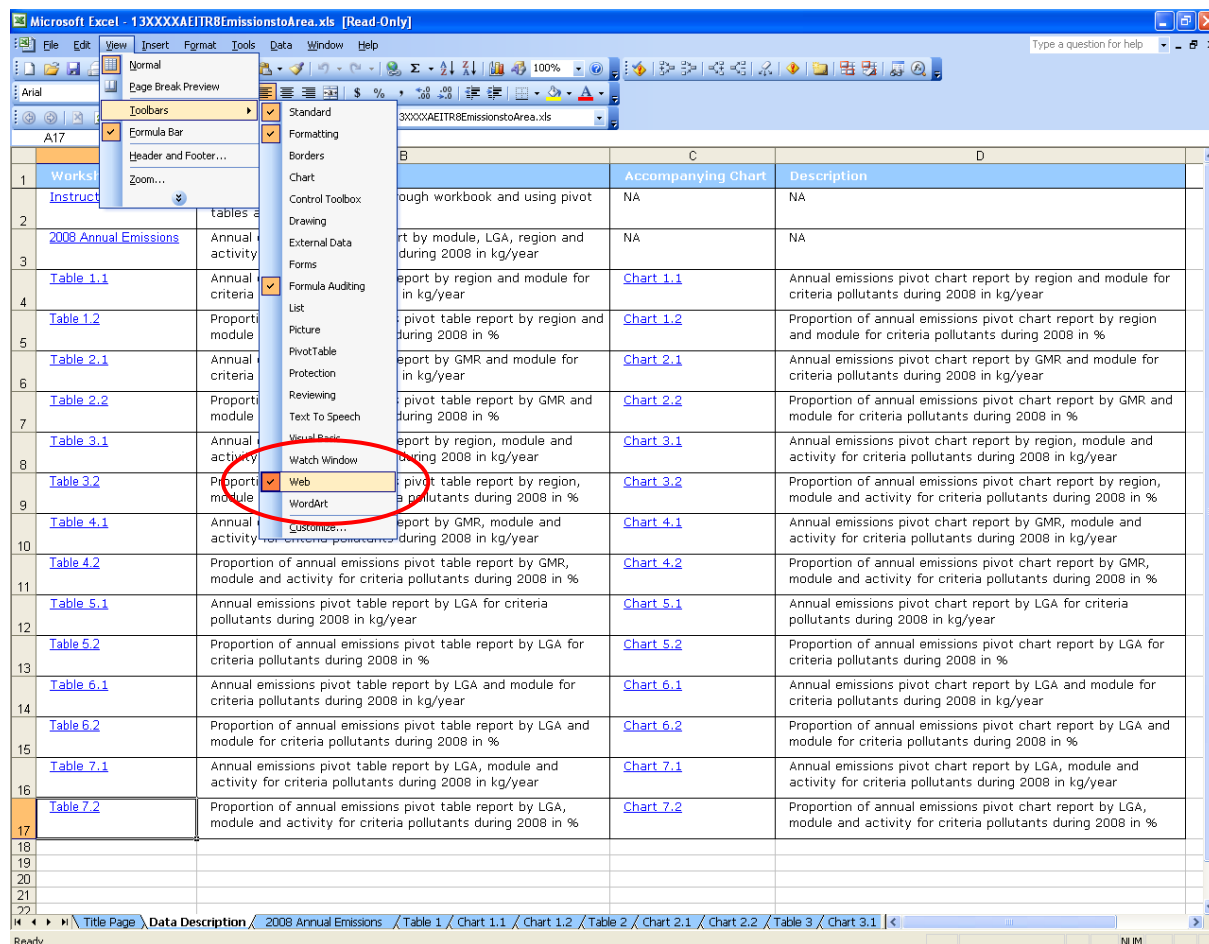


Figure 2-12: Select “Web” Toolbar

To select a table, left mouse button click the “Data Description” worksheet tab, move to the cell required and left mouse button click the built-in hyperlink. An example selection for Table 1.1 is shown in Figure 2.13.

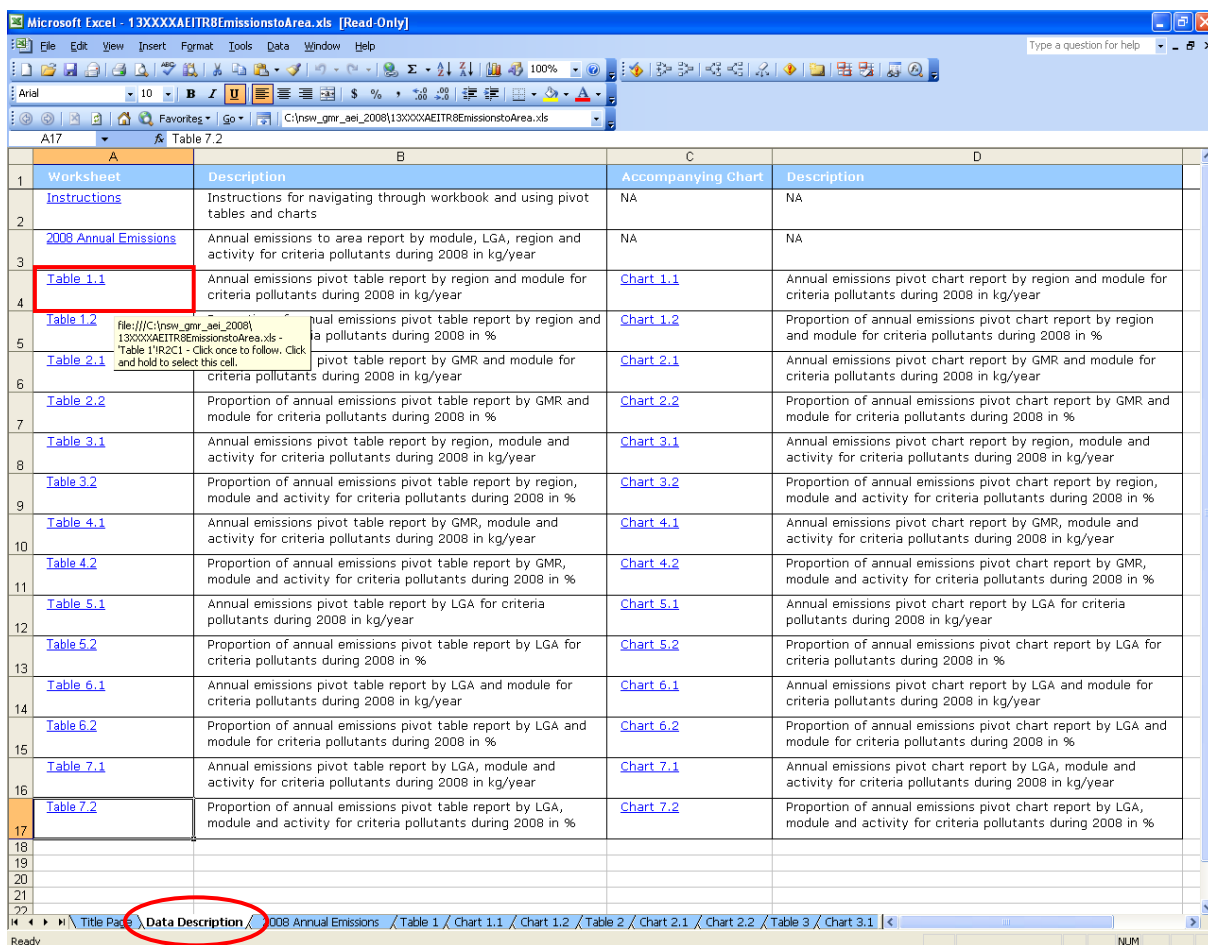


Figure 2-13: Select “Table 1.1”

To go back to the “Data Description” worksheet, left mouse button click the “back” web toolbar as shown in Figure 2.14.

Emissions (kg/year)		Substance	1,3-BUTADIENE	ACETALDEHYDE	AMMONIA	BENZENE	CARBON MONOXIDE	FORMALDEHYDE	ISOMERS OF XYLENE
<b>Sydney</b>	Natural		4,387	200,615	407,327 NA		5,484,450 NA	NA	
	Commercial		1,519	2,578	1,285,310	38,270	335,365	47,897	87,854
	Domestic-Commercial		88,779	215,200	669,232	584,847	82,185,940	527,722	2,657,382
	Industrial		1,554	2,201	2,086,725	155,895	14,161,880	233,784	151,389
	Off-Road Mobile		17,906	46,697	10,838	164,413	20,801,007	112,535	601,961
	On-Road Mobile		142,149	100,701	1,586,944	633,760	123,712,355	266,387	978,504
<b>Sydney Total</b>			<b>256,294</b>	<b>567,992</b>	<b>6,046,376</b>	<b>1,567,184</b>	<b>246,680,996</b>	<b>1,188,326</b>	<b>4,477,090</b>
<b>Newcastle</b>	Natural		241	15,888	35,654 NA		301,417 NA	NA	
	Commercial		210	2.28	4,272	3,234	9,195	110	4,696
	Domestic-Commercial		7,187	17,613	50,959	46,779	6,553,795	43,397	187,143
	Industrial		830	2,490	1,155,536	44,964	41,949,759	7,382	33,788
	Off-Road Mobile		2,777	9,974	1,552	30,915	3,342,879	21,500	112,381
	On-Road Mobile		9,646	7,304	121,239	42,740	8,368,909	19,296	67,073
<b>Newcastle Total</b>			<b>20,892</b>	<b>53,262</b>	<b>1,369,213</b>	<b>168,632</b>	<b>60,525,955</b>	<b>91,685</b>	<b>405,080</b>
<b>Wollongong</b>	Natural		482	13,696	24,013 NA		603,172 NA	NA	
	Commercial		63.65	0.70	1,100	2,536	19,688	168	2,768
	Domestic-Commercial		4,808	11,735	35,115	31,447	4,411,529	28,047	132,985
	Industrial		1,499	132	484,306	252,585	529,474,067	14,906	8,967
	Off-Road Mobile		1,160	4,262	639	12,855	1,698,188	10,807	45,193
	On-Road Mobile		5,219	3,791	68,859	22,975	4,786,465	10,021	36,045
<b>Wollongong Total</b>			<b>13,231</b>	<b>33,616</b>	<b>614,032</b>	<b>322,398</b>	<b>540,993,110</b>	<b>64,748</b>	<b>225,958</b>
<b>Non Urban</b>	Natural		22,842	864,530	1,928,976 NA		28,544,971 NA	NA	
	Commercial		323	417	410,736	11,109	24,309	505	47,709
	Domestic-Commercial		17,874	43,959	124,773	115,917	16,226,022	108,536	452,957
	Industrial		2,972	25.08	832,254	7,324	27,778,848	4,253	518,667
	Off-Road Mobile		17,877	151,494	17,250	196,012	27,974,916	333,441	596,424
	On-Road Mobile		18,343	16,095	272,316	82,271	16,943,849	42,397	128,864
<b>Non Urban Total</b>			<b>80,232</b>	<b>1,076,107</b>	<b>3,586,305</b>	<b>412,632</b>	<b>117,492,915</b>	<b>489,132</b>	<b>1,744,621</b>

Proportion of Emissions (%)		Substance	1,3-BUTADIENE	ACETALDEHYDE	AMMONIA	BENZENE	CARBON MONOXIDE	FORMALDEHYDE	ISOMERS OF XYLENE
<b>Sydney</b>	Natural		1.18%	11.59%	3.51%	0.000000%	0.5679%	0.000000%	0.000000%
	Commercial		0.4098%	0.1489%	11.07%	1.55%	0.0347%	2.61%	1.28%
	Domestic-Commercial		23.95%	12.43%	5.76%	23.67%	8.51%	28.78%	38.78%
	Industrial		0.4192%	0.1271%	17.96%	6.31%	1.47%	12.75%	2.21%
	Off-Road Mobile		4.83%	2.70%	0.0933%	6.65%	2.15%	6.14%	8.78%
	On-Road Mobile		38.35%	5.82%	13.66%	25.24%	12.81%	14.53%	14.28%
<b>Sydney Total</b>			<b>69.15%</b>	<b>32.81%</b>	<b>52.05%</b>	<b>63.43%</b>	<b>25.54%</b>	<b>64.80%</b>	<b>65.33%</b>
<b>Newcastle</b>	Natural		0.0651%	0.9175%	0.3069%	0.000000%	0.0312%	0.000000%	0.000000%
	Commercial		0.0567%	0.000132%	0.0368%	0.1309%	0.000952%	0.0060%	0.0685%
	Domestic-Commercial		1.94%	1.02%	0.4387%	1.89%	0.6787%	2.37%	2.73%
	Industrial		0.2239%	0.1433%	9.95%	1.82%	4.34%	0.4026%	0.4931%
	Off-Road Mobile		0.7400%	0.4349%	0.0498%	1.06%	0.2428%	1.17%	1.44%
	On-Road Mobile		0.7400%	0.4349%	0.0498%	1.06%	0.2428%	1.17%	1.44%

Figure 2-14: Go Back using “Web” Toolbar

To select a chart, left mouse button click the “Data Description” worksheet tab, either move to the cell required or left mouse button click the macro hyperlink. An example selection for Chart 1.1 is shown in Figure 2.15. Note that when selecting a chart in the 130766AEITR8EmissionstoArea\_Monthly.xls workbook a formatting macro runs automatically which causes the screen to flicker for a few moments.

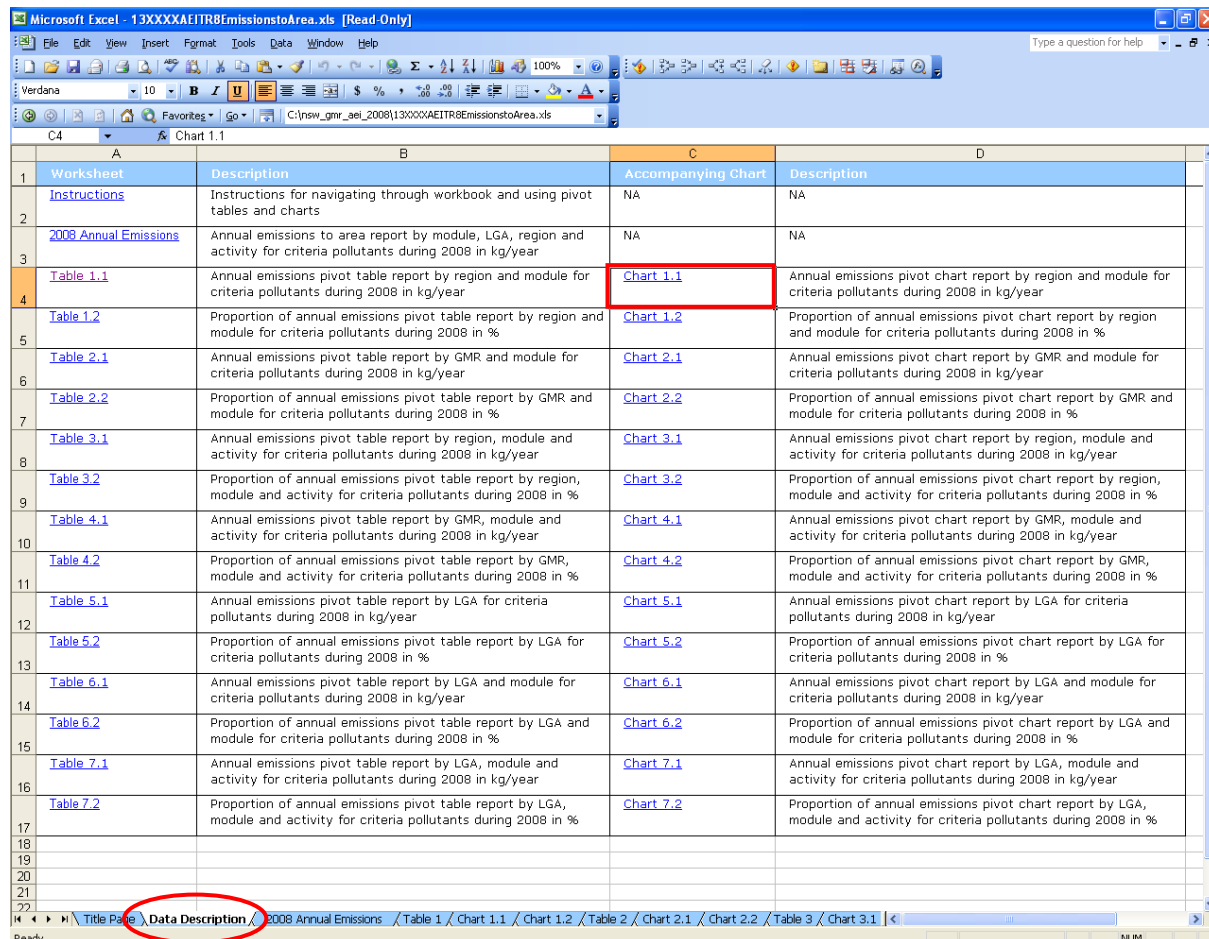


Figure 2-15: Select “Chart 1.1”

To go back to the “Data Description” worksheet, left mouse button click the “Data Description” worksheet tab or click on the “back” as shown in Figure 2.16.

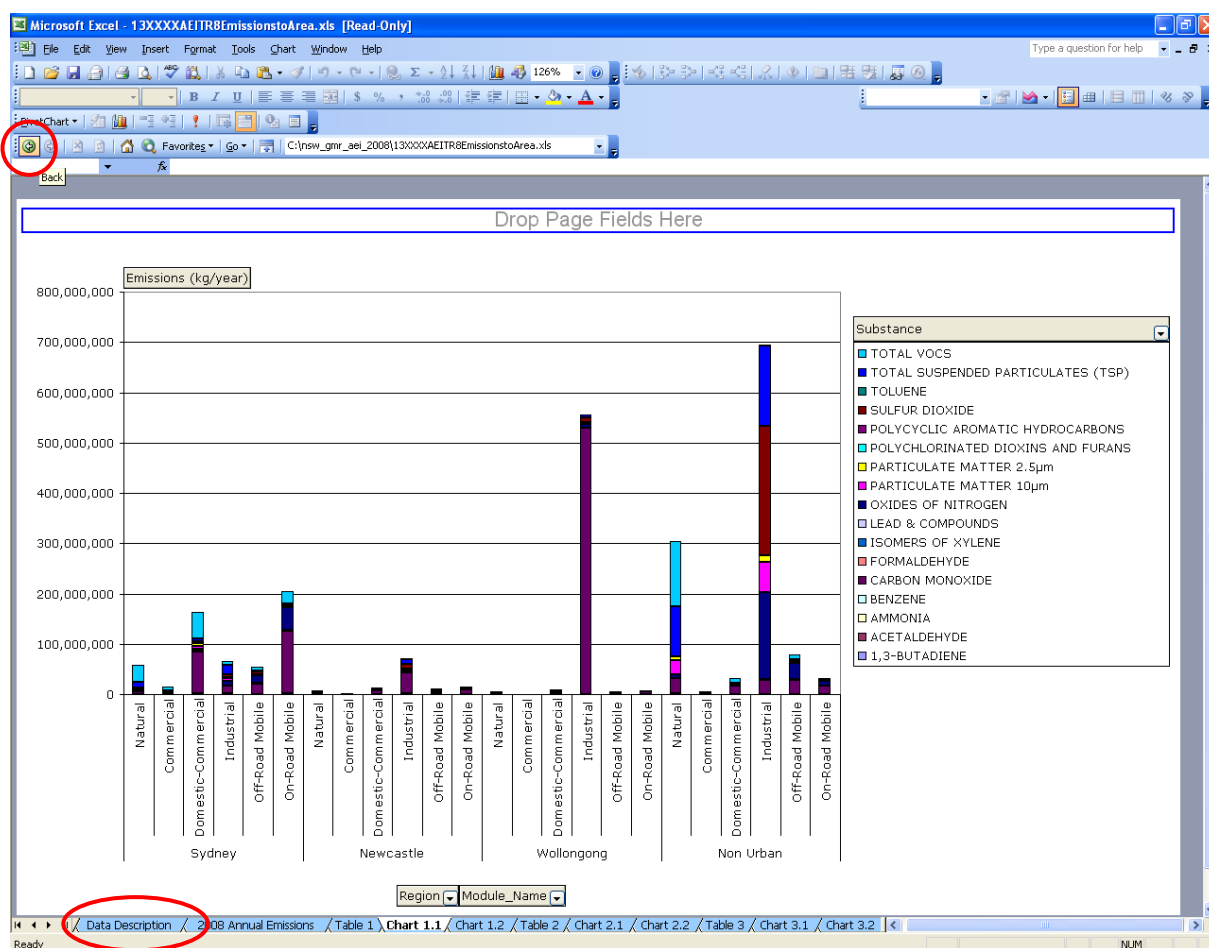


Figure 2-16: Go Back to “Data Description” Worksheet

### 2.3.3 Using Worksheet Tabs

Rather than using the in-built or macro hyperlinks to navigate the Excel™ workbook, you may choose to left mouse button click on any of the worksheet tabs instead to access the relevant information.

## 2.4 Using and Interpreting Existing Pivot Table Reports

### 2.4.1 Example 1 - Using Pivot Table Reports

Example 1 investigates the use of Table 7.1 in the annual emissions Excel™ workbook 130766AEITR8EmissionstoArea.xls. Table 7.1 contains an annual emissions pivot table report by LGA, module and activity during 2008 in kg/year. Start by navigating to the “Table 7.1” worksheet using any of the methods described previously as shown in Figure 2.17.

Table 7.1			Substance					
Emissions (kg/year)	LGA	Module_Name	Activity	1,3-BUTADIENE	ACETALDEHYDE	AMMONIA	BENZENE	CARBON MONOXIDE
	Ashfield	Natural	Fugitive/Windborne	NA	NA	NA	NA	NA
			Marine Aerosol	NA	NA	NA	NA	NA
			Soil	NA	NA	41.3	NA	NA
			Vegetation	NA	647	NA	NA	NA
			<b>Natural Total</b>	<b>NA</b>	<b>647</b>	<b>41.3</b>	<b>NA</b>	<b>NA</b>
		Commercial	Automotive Fuel Retailing	NA	NA	NA	NA	226
			Hospitals (Except Psychiatric Hospitals)	NA	NA	9.15	NA	9.31
			Laundries and Dry-Cleaners	NA	NA	NA	NA	NA
			Printing	NA	NA	NA	NA	NA
			Smash Repairing	NA	NA	NA	NA	NA
			<b>Commercial Total</b>	<b>NA</b>	<b>NA</b>	<b>9.15</b>	<b>NA</b>	<b>236</b>
		Domestic-Commercial	Barbeques	12.13	177	156	NA	39.75
			Cutback Bitumen	NA	NA	NA	NA	NA
			Domestic/Commercial Solvents/Aerosols	NA	NA	NA	NA	0.10
			Gaseous Fuel Burning	NA	2.70E-3	4,057	NA	0.43
			Graphic Arts	NA	NA	NA	NA	NA
			Lawn Mowing Evaporative (Domestic)	NA	NA	NA	NA	277
			Lawn Mowing Evaporative (Public Open Spaces)	NA	NA	NA	NA	33.62
			Lawn Mowing Exhaust (Domestic)	218	122	9.76	NA	1,712
			Lawn Mowing Exhaust (Public Open Spaces)	128	94.08	5.87	NA	1,171
			Liquid Fuel Burning (Domestic)	NA	0.07	14.92	NA	3.13E-3
			Natural/Town Gas Leakage	NA	NA	NA	NA	NA
			Solid Fuel Burning (Domestic)	530	1,755	3,191	NA	2,667
			Surface Coatings	NA	2.64	NA	NA	NA
			<b>Domestic-Commercial Total</b>	<b>888</b>	<b>2,151</b>	<b>7,435</b>	<b>NA</b>	<b>5,901</b>
		Industrial	General agricultural processing	NA	NA	NA	NA	NA
			<b>Industrial Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
		Off-Road Mobile	Aircraft (Flight Operations)	91.35	231	99.07	NA	91.08
			Commercial Boats Evaporative	NA	NA	NA	NA	3.31
			Commercial Boats Exhaust	31.78	72.77	18.11	NA	353
			Industrial Vehicles and Equipment	0.32	9.96	0.53	NA	0.55
			Locomotives	4.00	29.26	11.92	NA	3.37
			Recreational Boats Evaporative	NA	NA	NA	NA	6.16
			Recreational Boats Exhaust	9.53	7.28	0.81	NA	108
			<b>Off-Road Mobile Total</b>	<b>137</b>	<b>351</b>	<b>130</b>	<b>NA</b>	<b>566</b>
		On-Road Mobile	All - Evaporative	NA	NA	NA	NA	749
			All - Non-Exhaust PM	NA	NA	NA	NA	NA
			Heavy Duty Commercial Diesel - Exhaust	28.75	272	32.81	NA	76.15
			Light Duty Commercial Petrol - Exhaust	509	228	2,489	NA	1,988

Figure 2-17: Example 1 - Navigate to “Table 7.1” Worksheet

The pivot table contains drop-down menus in the blue shaded cells that allow you to make the following selections:

- Local Government Area (LGA) (e.g. Ashfield)
- Module\_Name (i.e. Natural, Commercial, Domestic-Commercial, Industrial, Off-Road Mobile and On-Road Mobile)
- Activity (e.g. Automotive Fuel Retailing)
- Substance (e.g. CARBON MONOXIDE)

To access the drop-down menus, click on the down pointing arrow at the bottom right of the cell.

In Example 1, the following selections are made using the drop-down menus:

- LGA - Ashfield
- Module\_Name - All
- Activity - All
- Substance - TOTAL VOCS

The steps required to do this are described below:

**Step 1** - Select the “LGA” drop-down menu, uncheck the “(Show All)” box and check the “Ashfield” box as shown in Figure 2.18

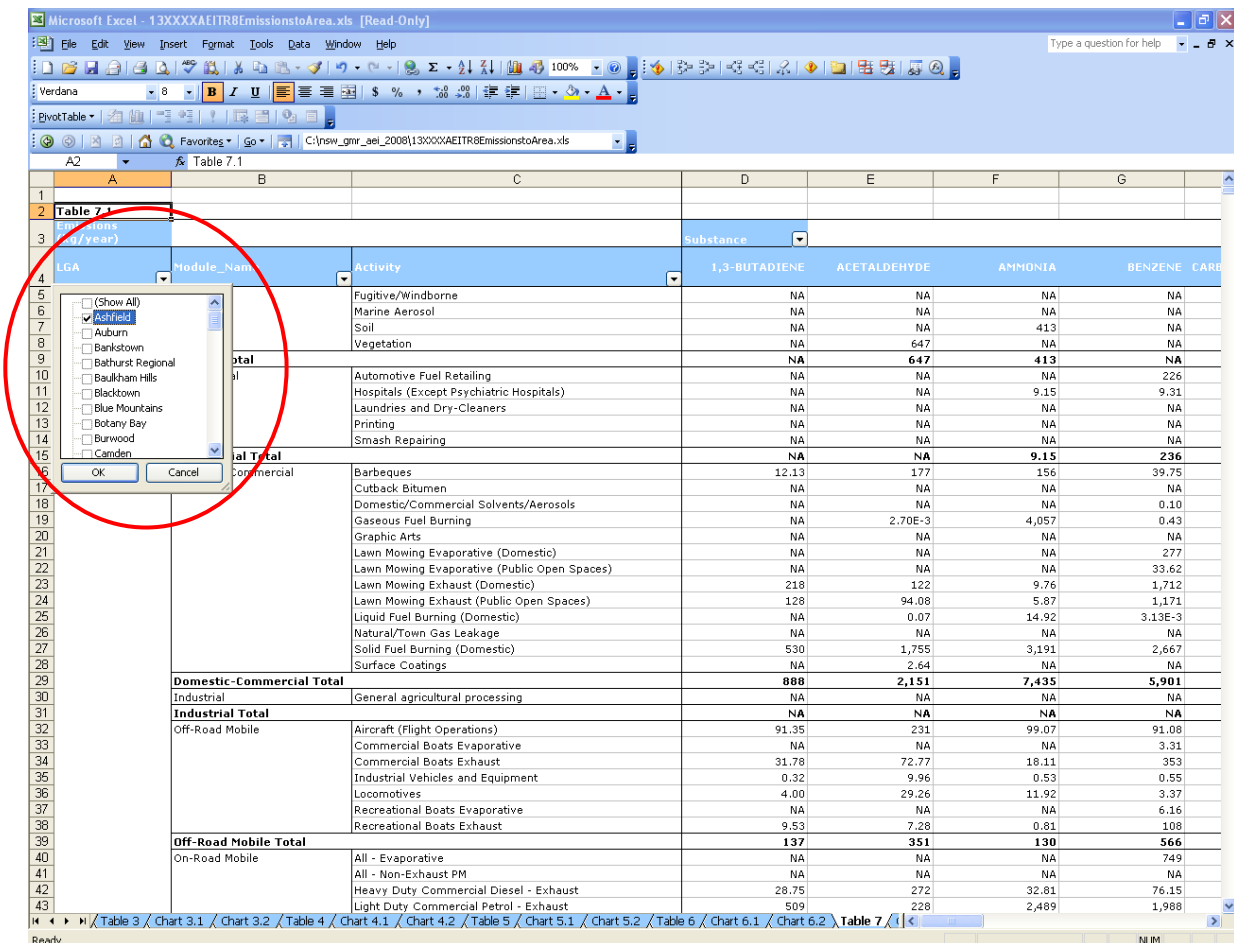


Figure 2-18: Example 1 - Select “LGA”

**Step 2** - Select the “Module\_Name” drop-down menu - No selections are required because all are checked by default

**Step 3** - Select the “Activity” drop-down menu - No selections are required because all are checked by default

**Step 4** - Select the "Substance" drop-down menu, uncheck the "(Show All)" box and check the "TOTAL VOCS" box as shown in Figure 2.19

Table 7.1				TALD	HYDE	AMMONIA	BENZENE	CARB
1								
2	<b>Table 7.1</b>							
3	Emissions (kg/year)							
4	LGA	Module Name	Activity	Substance				
5	Ashfield	Natural	Fugitive/Windborne	<input type="checkbox"/> OXIDES OF NITROGEN	NA	NA	NA	NA
6			Marine Aerosol	<input type="checkbox"/> PARTICULATE MATTER 1	NA	NA	NA	NA
7			Soil	<input type="checkbox"/> PARTICULATE MATTER 2	NA	41.3	NA	NA
8			Vegetation	<input type="checkbox"/> POLYCHLORINATED DIO	647	NA	NA	NA
9			<b>Natural Total</b>	<input type="checkbox"/> POLYCYCLIC AROMATIC	<b>647</b>	<b>41.3</b>	<b>NA</b>	<b>NA</b>
10				<input type="checkbox"/> SULFUR DIOXIDE	NA	NA	NA	NA
11		Commercial	Automotive Fuel Retailing	<input type="checkbox"/> TOLUENE	NA	NA	NA	226
12			Hospitals (Except Psychiatric Hospitals)	<input type="checkbox"/> TOTAL SUSPENDED PAR	NA	9.15	NA	9.31
13			Laundries and Dry-Cleaners	<input checked="" type="checkbox"/> TOTAL VOCS	NA	NA	NA	NA
14			Printing		NA	NA	NA	NA
15			Smash Repairing		NA	NA	NA	NA
16			<b>Commercial Total</b>		<b>NA</b>	<b>9.15</b>	<b>236</b>	<b>NA</b>
17		Domestic-Commercial	Barbeques		12.13	177	156	39.75
18			Cutback Bitumen		NA	NA	NA	NA
19			Domestic/Commercial Solvents/Aerosols		NA	NA	NA	0.10
20			Gaseous Fuel Burning		NA	2.70E-3	4,057	0.43
21			Graphic Arts		NA	NA	NA	NA
22			Lawn Mowing Evaporative (Domestic)		NA	NA	NA	277
23			Lawn Mowing Evaporative (Public Open Spaces)		NA	NA	NA	33.62
24			Lawn Mowing Exhaust (Domestic)		218	122	9.76	1,712
25			Lawn Mowing Exhaust (Public Open Spaces)		128	94.08	5.87	1,171
26			Liquid Fuel Burning (Domestic)		NA	0.07	14.92	3.13E-3
27			Natural/Town Gas Leakage		NA	NA	NA	NA
28			Solid Fuel Burning (Domestic)		530	1,755	3,191	2,667
29			Surface Coatings		NA	2.64	NA	NA
30			<b>Domestic-Commercial Total</b>		<b>888</b>	<b>2,151</b>	<b>7,435</b>	<b>5,901</b>
31		Industrial	General agricultural processing		NA	NA	NA	NA
32			<b>Industrial Total</b>		<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
33		Off-Road Mobile	Aircraft (Flight Operations)		91.35	231	99.07	91.08
34			Commercial Boats Evaporative		NA	NA	NA	3.31
35			Commercial Boats Exhaust		31.78	72.77	18.11	353
36			Industrial Vehicles and Equipment		0.32	9.96	0.53	0.55
37			Locomotives		4.00	29.26	11.92	3.37
38			Recreational Boats Evaporative		NA	NA	NA	6.16
39			Recreational Boats Exhaust		9.53	7.28	0.81	108
40			<b>Off-Road Mobile Total</b>		<b>137</b>	<b>351</b>	<b>130</b>	<b>566</b>
41		On-Road Mobile	All - Evaporative		NA	NA	NA	749
42			All - Non-Exhaust PM		NA	NA	NA	NA
43			Heavy Duty Commercial Diesel - Exhaust		28.75	272	32.81	76.15
			Light Duty Commercial Petrol - Exhaust		509	228	2,489	1,988

Figure 2-19: Example 1 - Select "Substance"



After making these selections, the Example 1 pivot table report will look like that shown in Figure 2.20.

Table 7.1	Substance	TOTAL VOC \$	
<b>Ashfield</b>	<b>Natural</b>	<b>15,372</b>	
	Natural	Vegetation	15,372
	<b>Natural Total</b>	<b>15,372</b>	
	<b>Commercial</b>	<b>40,275</b>	
	Commercial	Automotive Fuel Retailing	28,048
		Hospitals (Except Psychiatric Hospitals)	102
		Laundries and Dry-Cleaners	3,941
		Printing	6,187
		Smash Repairing	1,997
	<b>Commercial Total</b>	<b>40,275</b>	
	<b>Domestic-Commercial</b>	<b>596,371</b>	
	Domestic-Commercial	Barbeques	1,569
		Cutback Bitumen	1,182
		Domestic/Commercial Solvents/Aerosols	229,192
		Gaseous Fuel Burning	1,116
		Graphic Arts	31,513
		Lawn Mowing Evaporative (Domestic)	35,530
		Lawn Mowing Evaporative (Public Open Spaces)	4,310
		Lawn Mowing Exhaust (Domestic)	52,616
		Lawn Mowing Exhaust (Public Open Spaces)	40,524
		Liquid Fuel Burning (Domestic)	10,64
		Natural/Town Gas Leakage	28,804
		Solid Fuel Burning (Domestic)	57,995
		Surface Coatings	112,010
	<b>Domestic-Commercial Total</b>	<b>596,371</b>	
	<b>Off-Road Mobile</b>	<b>28,087</b>	
	Off-Road Mobile	Aircraft (Flight Operations)	6,662
		Commercial Boats Evaporative	425
		Commercial Boats Exhaust	13,891
		Industrial Vehicles and Equipment	588
		Locomotives	1,510
		Recreational Boats Evaporative	790
		Recreational Boats Exhaust	4,222
	<b>Off-Road Mobile Total</b>	<b>28,087</b>	
	<b>On-Road Mobile</b>	<b>257,057</b>	
	On-Road Mobile	All - Evaporative	116,189
		Heavy Duty Commercial Diesel - Exhaust	7,138
		Light Duty Commercial Petrol - Exhaust	40,494
		Light Duty Diesel - Exhaust	2,218
		Others - Exhaust	3,990
		Passenger Vehicle Petrol - Exhaust	87,028
	<b>On-Road Mobile Total</b>	<b>257,057</b>	
	<b>Ashfield Total</b>	<b>937,163</b>	
	<b>GMR Total</b>	<b>937,163</b>	

Figure 2-20: Example 1 - Pivot Table Report - Ashfield LGA Total VOC

You should note that Chart 7.1 is based on Table 7.1, so the information presented in the chart will also be modified according to these selections. Refer to Example 4 (Section 2.6.1), which shows the accompanying changes to the chart.

You should exercise care when interpreting the results of the pivot table report. In Example 1 (Figure 2-20), the value "GMR Total" is in fact the total for the selection being made. If all LGAs are selected, the TOTAL VOCS emissions would be 306,842,843 kg/year as shown in Figure 2.21, rather than 937,163 kg/year if Ashfield were selected as shown in Figure 2.20.

2. Using the Excel Workbook

1	A	B	C	D	E	F	G
2	<b>Table 7.1</b>						
3	Emissions (kg/year)			Substance			
4	LGA	Module_Name	Activity	TOTAL VOCs			
3162			Solid Fuel Burning (Domestic)	286,931			
3163			Surface Coatings	342,538			
3164			<b>Domestic-Commercial Total</b>	<b>2,089,271</b>			
3165		Industrial	Bitumen mixing	642			
3166			Ceramics production	260			
3167			Chemical production	31.87			
3168			Composting	23,837			
3169			Concrete works	1.76			
3170			General chemicals storage	1.14			
3171			Generation of electrical power from coal	147,351			
3172			Mining for coal	3,569			
3173			Non-thermal treatment of waste	14.14			
3174			Pesticides and related products production	0.20			
3175			Sewage treatment - large plants	213			
3176			Sewage treatment - small plants	614			
3177			Waste disposal (application to land)	28,747			
3178			<b>Industrial Total</b>	<b>205,282</b>			
3179		Off-Road Mobile	Aircraft (Flight Operations)	1,769			
3180			Aircraft (Ground Operations)	2,098			
3181			Commercial Boats Evaporative	310			
3182			Commercial Boats Exhaust	45,814			
3183			Commercial Vehicles and Equipment	359			
3184			Industrial Vehicles and Equipment	5,131			
3185			Locomotives	9,282			
3186			Recreational Boats Evaporative	28,048			
3187			Recreational Boats Exhaust	149,830			
3188			<b>Off-Road Mobile Total</b>	<b>242,641</b>			
3189		On-Road Mobile	All - Evaporative	459,458			
3190			Heavy Duty Commercial Diesel - Exhaust	25,366			
3191			Light Duty Commercial Petrol - Exhaust	68,208			
3192			Light Duty Diesel - Exhaust	4,499			
3193			Others - Exhaust	15,093			
3194			Passenger Vehicle Petrol - Exhaust	258,105			
3195			<b>On-Road Mobile Total</b>	<b>830,728</b>			
3196		<b>Wyong Total</b>		<b>6,696,883</b>			
3197		<b>GMR Total</b>		<b>306,842,843</b>			
3198							
3199							
3200							
3201							

Figure 2-21: Example 1 - Pivot Table Report with all LGA's Selected

### 2.4.2 Example 2 – Interpreting Pivot Table Reports

Extra care should be exercised when interpreting the results of the pivot table reports that present emissions as a proportion of the total.

Example 2 investigates the use of Table 7.2 in the Excel™ workbook 130766AEITR8EmissionstoArea.xls. Table 7.2 contains the proportion of annual emissions pivot table report by LGA, module and activity during 2008 in %. Start by navigating to the “Table 7.2” worksheet using any of the methods described previously and make the selections from the drop-down menus like Example 1 as shown in Figure 2.22.

Table 7.2			Substance
LGA	Module Name	Activity	TOTAL VOCs
<b>Natural</b>			<b>1.64%</b>
<b>Natural Total</b>			<b>1.64%</b>
<b>Commercial</b>			
	Automotive Fuel Retailing		2.99%
	Hospitals (Except Psychiatric Hospitals)		0.0103%
	Laundries and Dry-Cleaners		0.4208%
	Printing		0.8802%
	Smash Repairing		0.2103%
<b>Commercial Total</b>			<b>4.30%</b>
<b>Domestic-Commercial</b>			
	Barbeques		0.1674%
	Curback Bitumen		0.1262%
	Domestic/Commercial Solvents/Aerosols		24.46%
	Gaseous Fuel Burning		0.1890%
	Graphic Arts		3.38%
	Lawn Mowing Evaporative (Domestic)		3.79%
	Lawn Mowing Evaporative (Public Open Spaces)		0.4559%
	Lawn Mowing Exhaust (Domestic)		5.61%
	Lawn Mowing Exhaust (Public Open Spaces)		4.32%
	Liquid Fuel Burning (Domestic)		0.0011%
	Natural/Town Gas Leakage		3.07%
	Solid Fuel Burning (Domestic)		6.19%
	Surface Coatings		11.95%
<b>Domestic-Commercial Total</b>			<b>63.64%</b>
<b>Off-Road Mobile</b>			
	Aircraft (Flight Operations)		0.7103%
	Commercial Boats Evaporative		0.0453%
	Commercial Boats Exhaust		1.48%
	Industrial Vehicles and Equipment		0.0627%
	Locomotives		0.1611%
	Recreational Boats Evaporative		0.0043%
	Recreational Boats Exhaust		0.4595%
<b>Off-Road Mobile Total</b>			<b>3.00%</b>
<b>On-Road Mobile</b>			
	All - Evaporative		12.40%
	Heavy Duty Commercial Diesel - Exhaust		0.7617%
	Light Duty Commercial Petrol - Exhaust		4.32%
	Light Duty Diesel - Exhaust		0.2368%
	Others - Exhaust		0.4258%
	Passenger Vehicle Petrol - Exhaust		9.29%
<b>On-Road Mobile Total</b>			<b>27.43%</b>
<b>Ashfield Total</b>			<b>100.00%</b>
<b>GMR Total</b>			<b>100.00%</b>

Figure 2-22: Example 2 “Table 7.2” Worksheet - Pivot Table Report

2. Using the Excel Workbook

You will notice in Figure 2-22 the Ashfield Total and GMR Total are both 100%, since only the Ashfield LGA has been selected as shown in Figure 2.22. All other proportions shown in the pivot table report are proportions of annual emissions in Ashfield LGA only. However, if all LGAs are selected, you will notice the Ashfield Total is 0.3054 % as shown in Figure 2.23, while the GMR Total is 100%. All other proportions shown in the pivot table report are proportions of annual emissions in all LGAs (i.e. GMR).

Table 7.1	Emissions (kg/year)	Substance	TOTAL VOCs
Table 7.2	Proportion of Emissions (%)	Substance	TOTAL VOCs
LGA	Module_Name	Activity	TOTAL VOCs
Ashfield	Natural	Vegetation	0.0050%
	<b>Natural Total</b>		<b>0.0050%</b>
	Commercial	Automotive Fuel Retailing	0.0091%
		Hospitals (Except Psychiatric Hospitals)	0.000033%
		Laundries and Dry-Cleaners	0.0013%
		Printing	0.0020%
		Smash Repairing	0.000651%
	<b>Commercial Total</b>		<b>0.0131%</b>
	Domestic-Commercial	Barbeques	0.000511%
		Cutback Bitumen	0.000385%
		Domestic/Commercial Solvents/Aerosols	0.0747%
		Gaseous Fuel Burning	0.000364%
		Graphic Arts	0.0103%
		Lawn Mowing Evaporative (Domestic)	0.0116%
		Lawn Mowing Evaporative (Public Open Spaces)	0.0014%
		Lawn Mowing Exhaust (Domestic)	0.0171%
		Lawn Mowing Exhaust (Public Open Spaces)	0.0132%
		Liquid Fuel Burning (Domestic)	0.000003%
		Natural/Town Gas Leakage	0.0094%
		Solid Fuel Burning (Domestic)	0.0189%
		Surface Coatings	0.0365%
	<b>Domestic-Commercial Total</b>		<b>0.1944%</b>
	Off-Road Mobile	Aircraft (Flight Operations)	0.0022%
		Commercial Boats Evaporative	0.000138%
		Commercial Boats Exhaust	0.0045%
		Industrial Vehicles and Equipment	0.000192%
		Locomotives	0.000492%
		Recreational Boats Evaporative	0.000258%
		Recreational Boats Exhaust	0.0014%
	<b>Off-Road Mobile Total</b>		<b>0.0092%</b>
	On-Road Mobile	All - Evaporative	0.0379%
		Heavy Duty Commercial Diesel - Exhaust	0.0023%
		Light Duty Commercial Petrol - Exhaust	0.0132%
		Light Duty Diesel - Exhaust	0.000723%
		Others - Exhaust	0.0013%
		Passenger Vehicle Petrol - Exhaust	0.0284%
	<b>On-Road Mobile Total</b>		<b>0.0838%</b>
<b>Ashfield Total</b>			<b>0.3054%</b>

Figure 2-23: Example 2 - Pivot Table Report with all LGAs Selected

## 2.5 Creating New Pivot Table Reports

### 2.5.1 Example 3 - Creating Pivot Table Reports

Example 3 describes the steps required to create a pivot table report. Specifically, Table 1.1 in the Excel™ workbook will be created from scratch. Table 1.1 contains the annual emissions pivot table report by region and module during 2008 in kg/year.

The steps required to do this are described below:

**Step 1** - Navigate to the “2008 Annual Emissions” worksheet as shown in Figure 2.24

Module Name	Year	LGA	Region	Activity	Substance	kg/year
Industrial	2008	Ashfield	Sydney	General agricultural processing	LEAD & COMPOUNDS	0.000374921
Industrial	2008	Ashfield	Sydney	General agricultural processing	PARTICULATE MATTER 10µm	8480.844096
Industrial	2008	Ashfield	Sydney	General agricultural processing	PARTICULATE MATTER 2.5µm	2259.220805
Industrial	2008	Ashfield	Sydney	General agricultural processing	TOTAL SUSPENDED PARTICULATES (TSP)	17386.12909
Industrial	2008	Auburn	Sydney	Brewing and distilling	AMMONIA	17314.6742
Industrial	2008	Auburn	Sydney	Brewing and distilling	BENZENE	49.072
Industrial	2008	Auburn	Sydney	Brewing and distilling	CARBON MONOXIDE	8219.56
Industrial	2008	Auburn	Sydney	Brewing and distilling	FORMALDEHYDE	98.144
Industrial	2008	Auburn	Sydney	Brewing and distilling	LEAD & COMPOUNDS	0.13702356
Industrial	2008	Auburn	Sydney	Brewing and distilling	OXIDES OF NITROGEN	19647.36
Industrial	2008	Auburn	Sydney	Brewing and distilling	PARTICULATE MATTER 10µm	1244.507765
Industrial	2008	Auburn	Sydney	Brewing and distilling	PARTICULATE MATTER 2.5µm	1141.298854
Industrial	2008	Auburn	Sydney	Brewing and distilling	POLYCHLORINATED DIOXINS AND FURANS	1.16546E-07
Industrial	2008	Auburn	Sydney	Brewing and distilling	POLYCYCLIC AROMATIC HYDROCARBONS	0.067474
Industrial	2008	Auburn	Sydney	Brewing and distilling	SULFUR DIOXIDE	51.28024
Industrial	2008	Auburn	Sydney	Brewing and distilling	TOLUENE	24.536
Industrial	2008	Auburn	Sydney	Brewing and distilling	TOTAL SUSPENDED PARTICULATES (TSP)	1817.646612
Industrial	2008	Auburn	Sydney	Brewing and distilling	TOTAL VOCS	18826.1366
Industrial	2008	Auburn	Sydney	Cement or lime handling	AMMONIA	0.21222
Industrial	2008	Auburn	Sydney	Cement or lime handling	BENZENE	0.216
Industrial	2008	Auburn	Sydney	Cement or lime handling	CARBON MONOXIDE	36.288
Industrial	2008	Auburn	Sydney	Cement or lime handling	FORMALDEHYDE	0.432
Industrial	2008	Auburn	Sydney	Cement or lime handling	ISOMERS OF XYLENE	0.292298
Industrial	2008	Auburn	Sydney	Cement or lime handling	LEAD & COMPOUNDS	0.952940035
Industrial	2008	Auburn	Sydney	Cement or lime handling	OXIDES OF NITROGEN	43.2
Industrial	2008	Auburn	Sydney	Cement or lime handling	PARTICULATE MATTER 10µm	5453.674332
Industrial	2008	Auburn	Sydney	Cement or lime handling	PARTICULATE MATTER 2.5µm	953.7129035
Industrial	2008	Auburn	Sydney	Cement or lime handling	POLYCHLORINATED DIOXINS AND FURANS	5.13E-10
Industrial	2008	Auburn	Sydney	Cement or lime handling	POLYCYCLIC AROMATIC HYDROCARBONS	0.0000297
Industrial	2008	Auburn	Sydney	Cement or lime handling	SULFUR DIOXIDE	0.22572
Industrial	2008	Auburn	Sydney	Cement or lime handling	TOLUENE	0.197764
Industrial	2008	Auburn	Sydney	Cement or lime handling	TOTAL SUSPENDED PARTICULATES (TSP)	14640.26862
Industrial	2008	Auburn	Sydney	Cement or lime handling	TOTAL VOCS	5.614649736
Industrial	2008	Auburn	Sydney	Concrete works	LEAD & COMPOUNDS	0.013646257
Industrial	2008	Auburn	Sydney	Concrete works	PARTICULATE MATTER 10µm	4871.606363
Industrial	2008	Auburn	Sydney	Concrete works	PARTICULATE MATTER 2.5µm	747.8025271
Industrial	2008	Auburn	Sydney	Concrete works	TOTAL SUSPENDED PARTICULATES (TSP)	11930.43353
Industrial	2008	Auburn	Sydney	Dairy processing	AMMONIA	134.5956
Industrial	2008	Auburn	Sydney	Dairy processing	BENZENE	11.68
Industrial	2008	Auburn	Sydney	Dairy processing	CARBON MONOXIDE	1962.24
Industrial	2008	Auburn	Sydney	Dairy processing	FORMALDEHYDE	36.085581
Industrial	2008	Auburn	Sydney	Dairy processing	ISOMERS OF XYLENE	76.353488
Industrial	2008	Auburn	Sydney	Dairy processing	LEAD & COMPOUNDS	15.8344996
Industrial	2008	Auburn	Sydney	Dairy processing	OXIDES OF NITROGEN	2336
Industrial	2008	Auburn	Sydney	Dairy processing	PARTICULATE MATTER 10µm	24671.06479
Industrial	2008	Auburn	Sydney	Dairy processing	PARTICULATE MATTER 2.5µm	6103.389739

Figure 2-24: Example 3 - Navigate to “2008 Annual Emissions” Worksheet

**Step 2 -** Select “Data” and “PivotTable and PivotChart Report” from the command menu as shown in Figure 2.25. If cell A1 is not selected as shown, left mouse click on cell A1 to select.

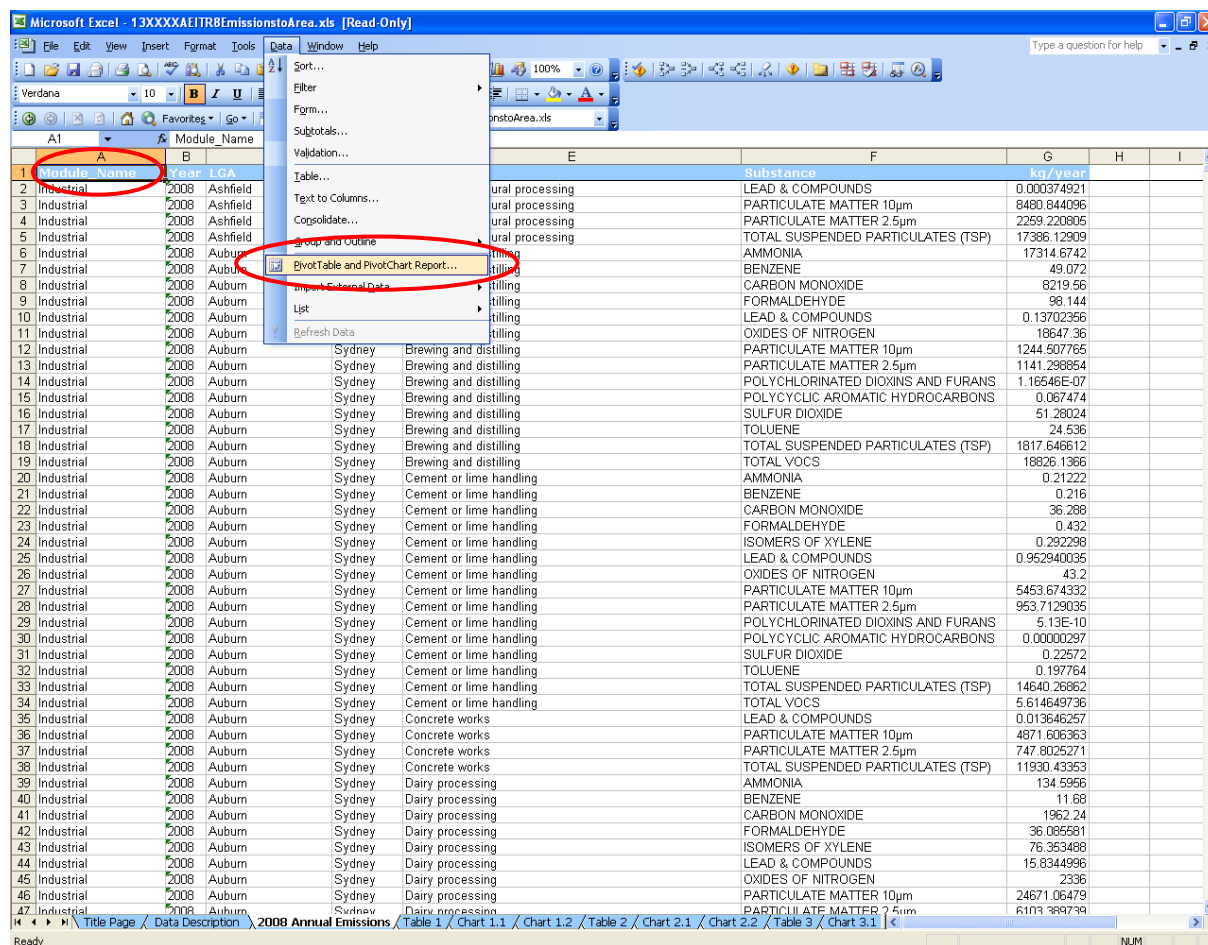


Figure 2-25: Example 3 – Select “Data” and “PivotTable and PivotChart Report”

**Step 3** – Select the “Microsoft Office Excel list or database” and “PivotTable” radio buttons as shown in Figure 2.26 and then select the “Next” button. You may also select the “PivotChart Report (with PivotTable report)” radio button at this point and complete both tasks at the same time. However, the steps required for creating a pivot chart report alone from a pivot table are separately discussed in Section 2.7

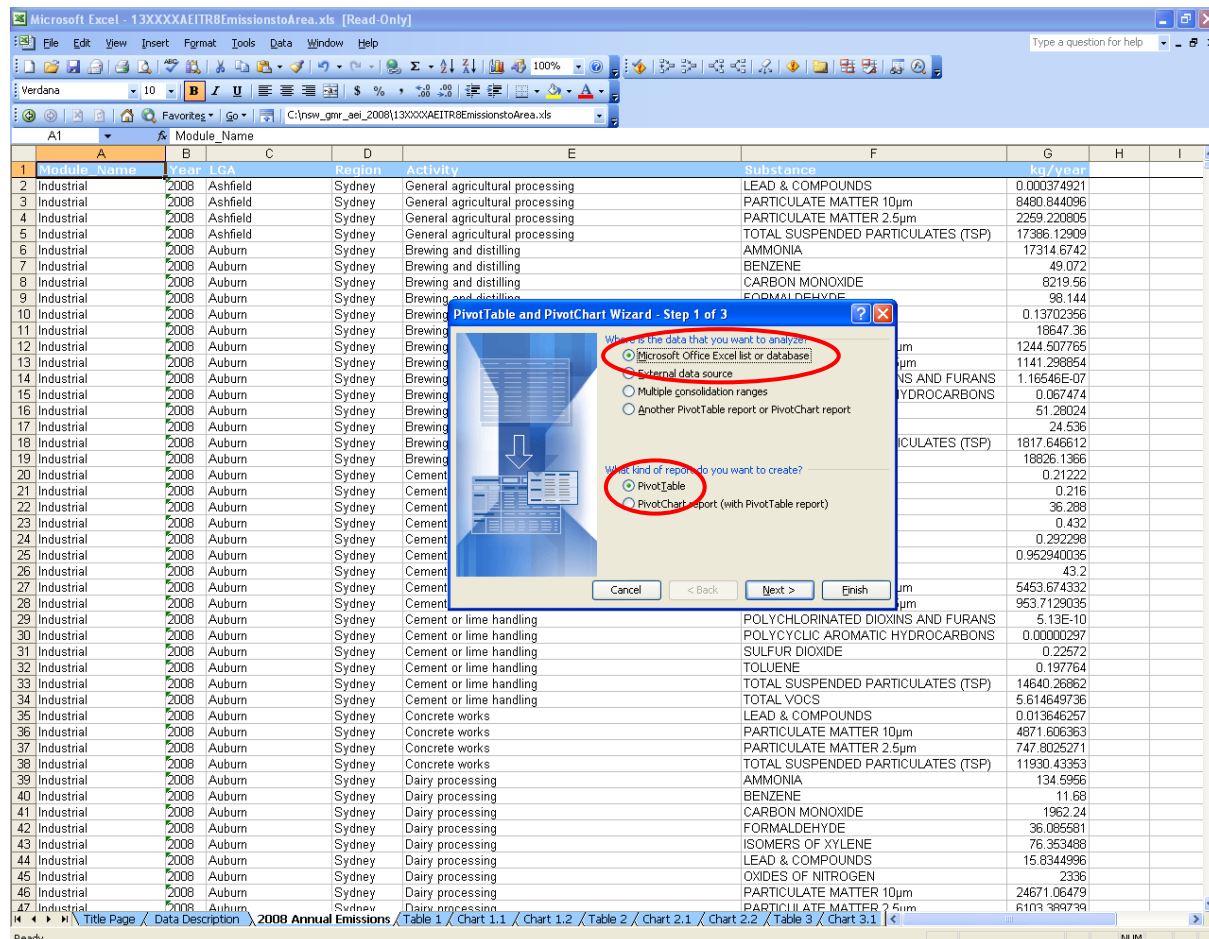


Figure 2-26: Example 3 – Select “Microsoft Office Excel list or database” and “PivotTable”

**Step 4** - The range \$A\$1:\$G\$36529 should be automatically selected in the “Range” box as shown in Figure 2.27. If not either select this range by clicking on the browse button and then highlighting this range on the worksheet (select cell A1, then press Cntrl+Shft+End), or type this range in to the “Range” box.”Click the “Next” button

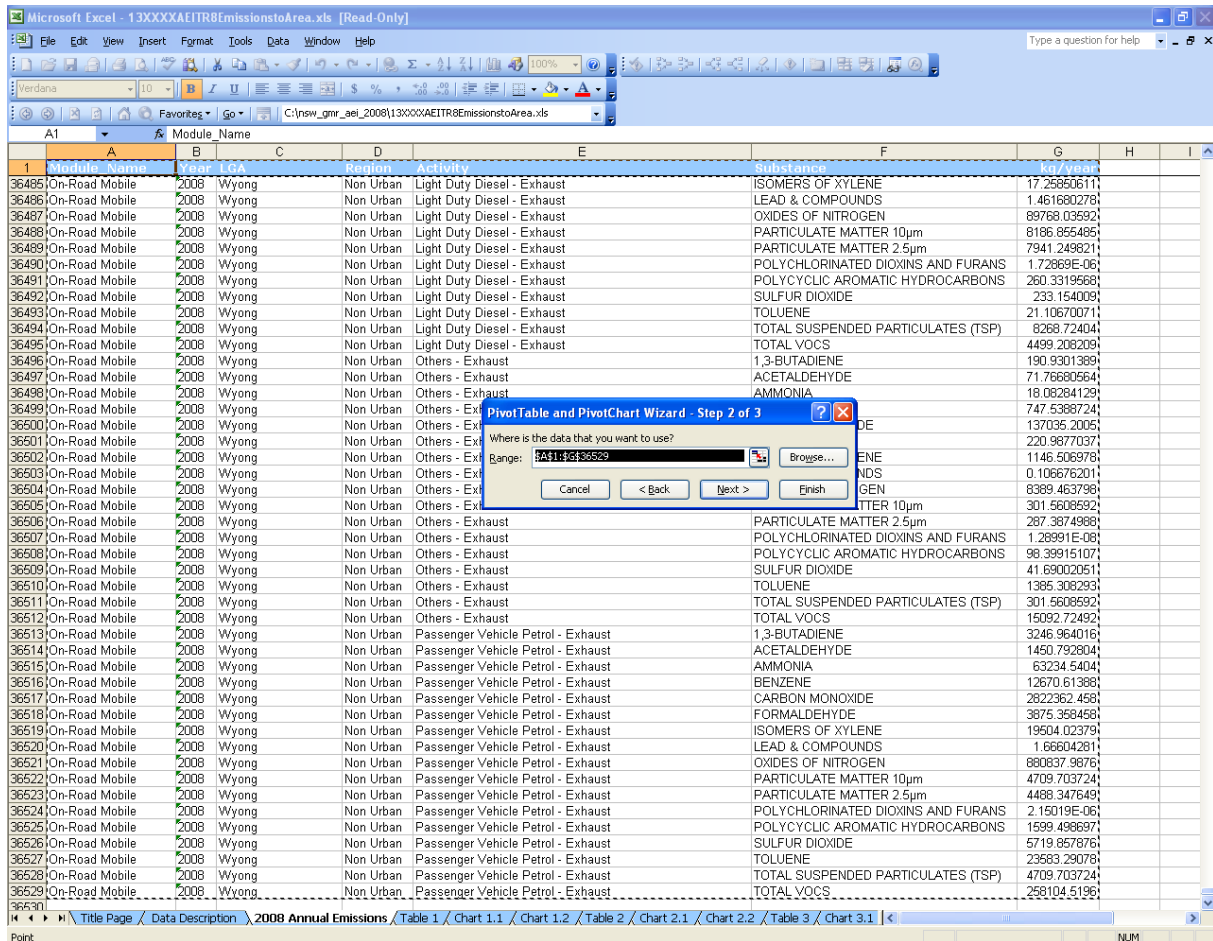


Figure 2-27: Example 3 - Select “Range”



**Step 5** – Select whether you would like to base the new pivot table report on an existing pivot table report or not. If the primary data source of both pivot tables is the same, it is preferable to select the “Yes” button so the Excel™ workbook will take up less disk space. In this example, the “No” button has been selected to simplify the number of steps as shown in Figure 2.28

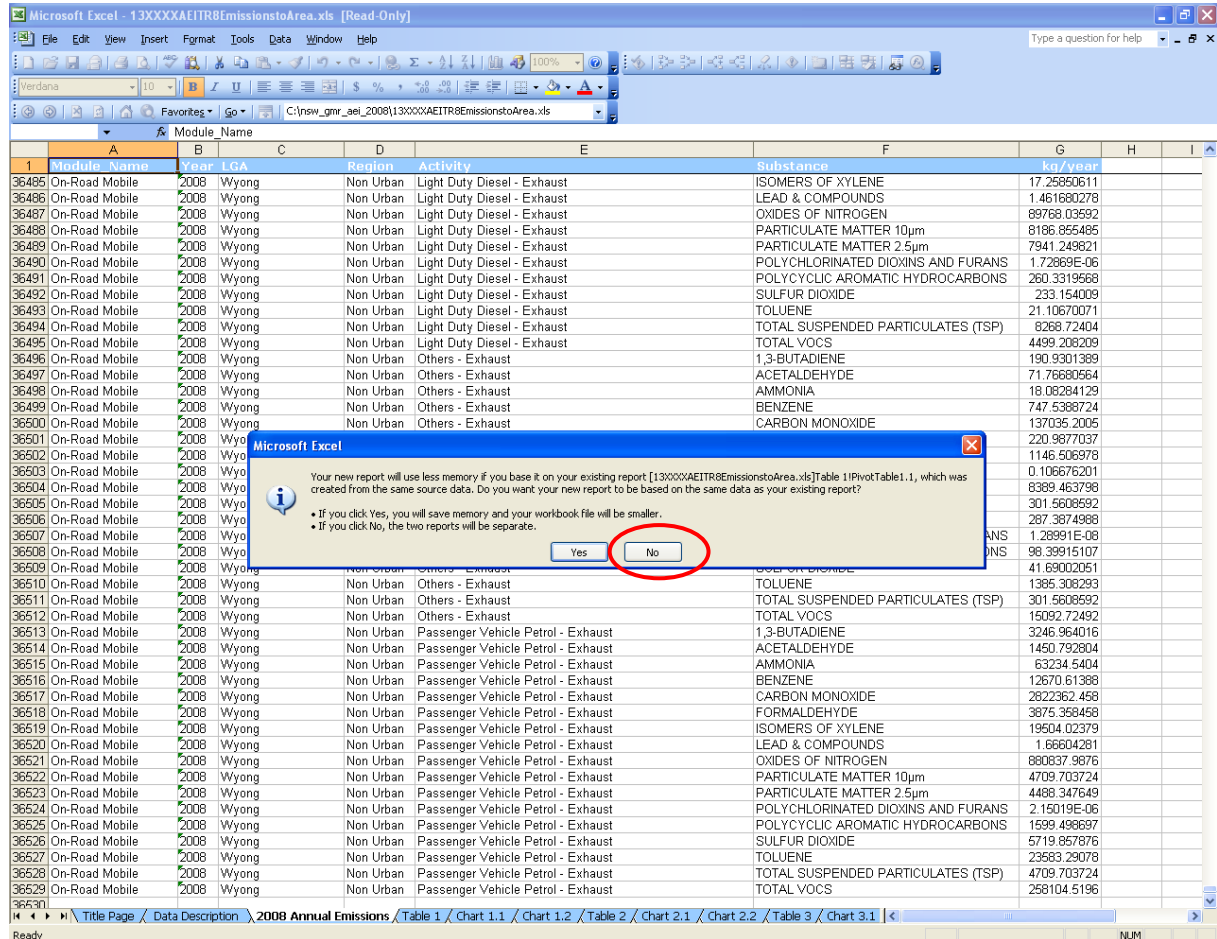


Figure 2-28: Example 3 – Select “No”

**Step 6** – Select the pivot table report “Layout” button as shown in Figure 2.29

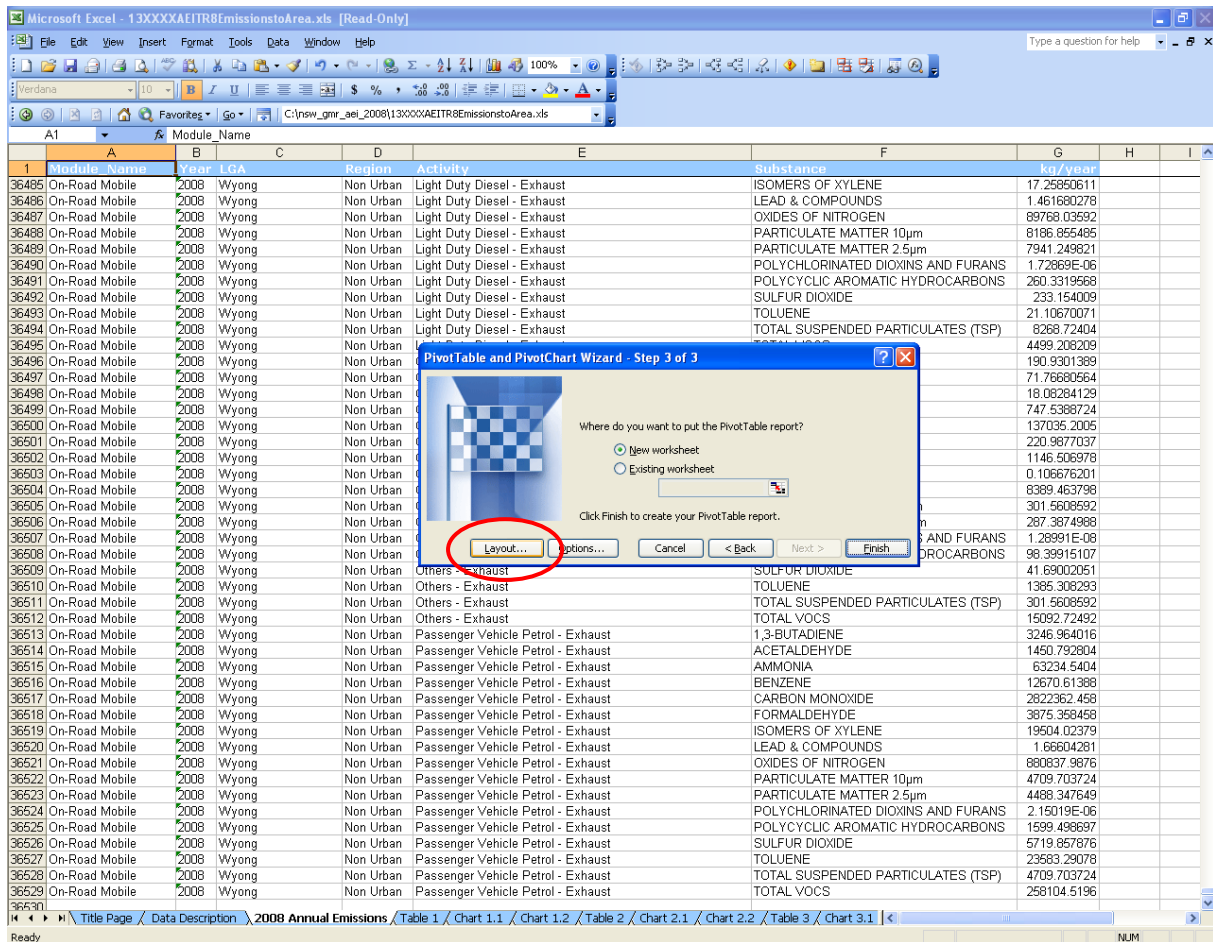


Figure 2-29: Example 3 – Select “Layout”

**Step 7** – Construct the pivot table report by dragging the field buttons on the right to the diagram on the left as shown in Figure 2.30 and Figure 2.31.

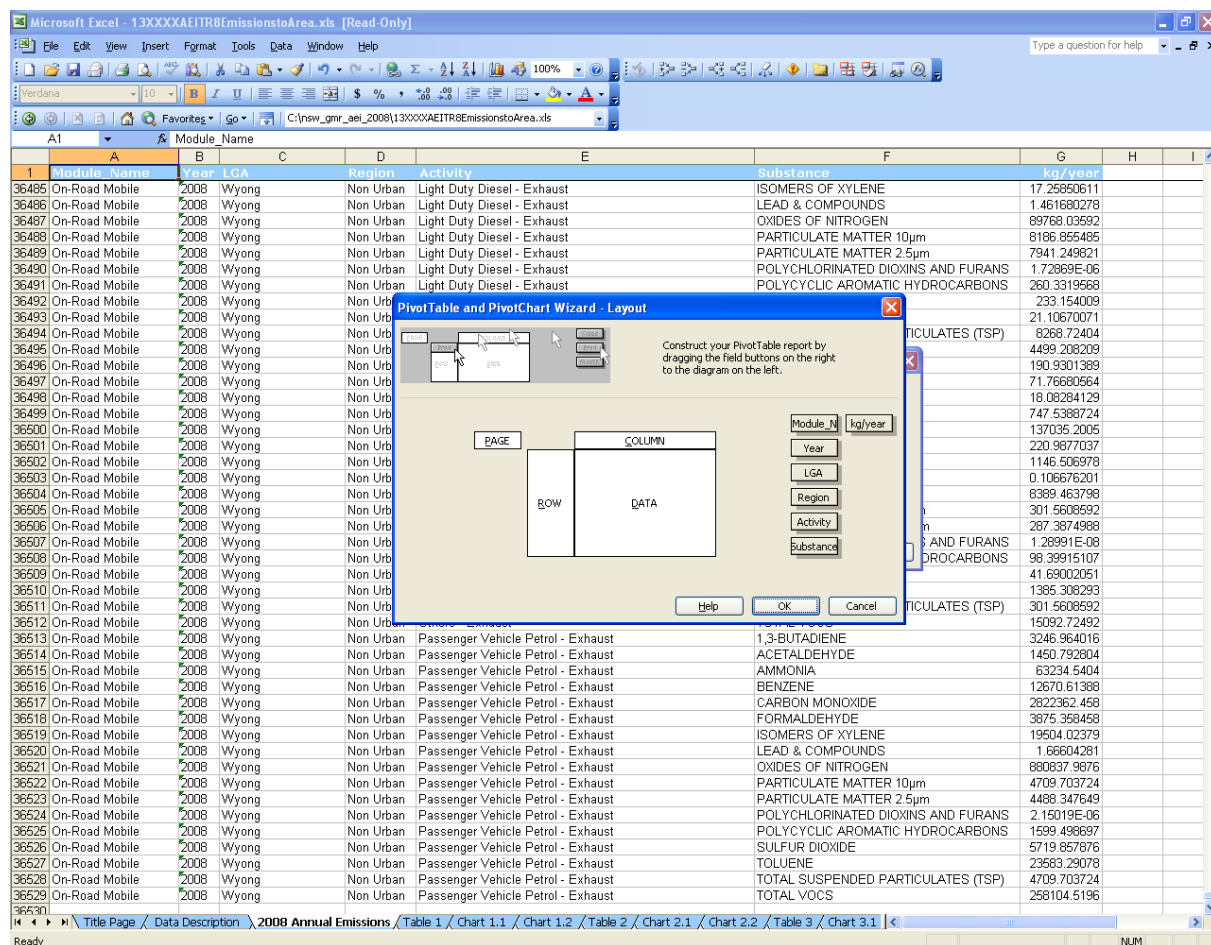


Figure 2-30: Example 3 – Pivot Table Layout Wizard

2. Using the Excel Workbook

The screenshot shows an Excel spreadsheet with the following columns: Name, Year, LGA, Region, Activity, Substance, and kg/year. The data includes various emission sources like 'Light Duty Diesel - Exhaust' and 'Passenger Vehicle Petrol - Exhaust' for different regions and LGAs. A 'PivotTable and PivotChart Wizard - Layout' dialog box is open, showing a diagram with 'Substance' in the COLUMN field, 'Region' and 'Module\_N' in the ROW field, and 'Sum of kg/year' in the DATA field. A 'Field Buttons' list on the right includes Module\_N, Year, LGA, Region, Activity, and Substance.

Name	Year	LGA	Region	Activity	Substance	kg/year
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	ISOMERS OF XYLENE	17.25850611
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	LEAD & COMPOUNDS	1.461680278
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	OXIDES OF NITROGEN	89768.03592
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	PARTICULATE MATTER 10µm	8186.855485
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	PARTICULATE MATTER 2.5µm	7941.249821
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCHLORINATED DIOXINS AND FURANS	1.72869E-06
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	260.3319568
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	233.154009
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	21.10670071
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	6268.72404
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	4499.208209
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	190.9301389
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	71.76680564
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	18.08284129
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	747.5388724
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	137035.2005
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	220.9877037
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	1146.506978
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	0.106676201
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	8389.463796
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	301.5608592
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	287.3874988
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	1.28991E-08
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	98.39915107
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	41.69002051
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	1385.308293
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	301.5608592
ibile	2008	Wyong	Non Urban	Light Duty Diesel - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	15092.72492
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	1,3-BUTADIENE	3246.964016
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	ACETALDEHYDE	1450.792804
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	AMMONIA	63234.5404
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	BENZENE	12670.61388
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	CARBON MONOXIDE	2822362.458
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	FORMALDEHYDE	3875.358458
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	ISOMERS OF XYLENE	19504.02379
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	LEAD & COMPOUNDS	1.66604281
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	OXIDES OF NITROGEN	880637.9876
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	PARTICULATE MATTER 10µm	4709.703724
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	PARTICULATE MATTER 2.5µm	4486.347649
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	POLYCHLORINATED DIOXINS AND FURANS	2.15019E-06
ibile	2008	Wyong	Non Urban	Passenger Vehicle Petrol - Exhaust	POLYCYCLIC AROMATIC HYDROCARBONS	1599.498697

Figure 2-31: Example 3 - Drag "Field Button"

**Step 8** – Double left mouse button click on the kg/year “Data” field button and then select the “Options” button. In the “Summarise by:” menu, select “Sum”. Click on the options button and in the “Show data as:” menu, select “Normal”, then select the “OK” button twice as shown in Figure 2.32

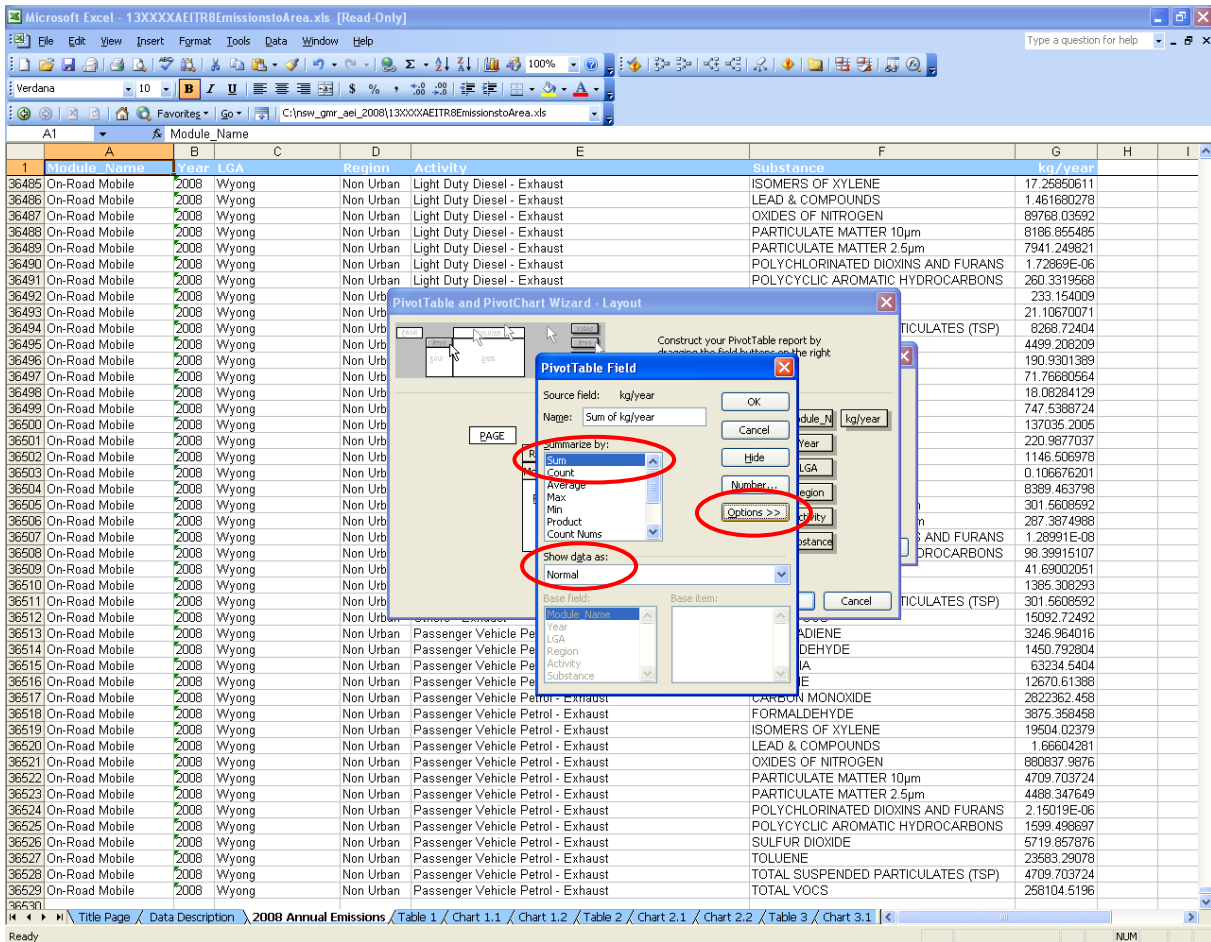


Figure 2-32: Example 3 – Select “PivotTable Field”

### Step 9 - Select the pivot table report “Options” button as shown in Figure 2.33

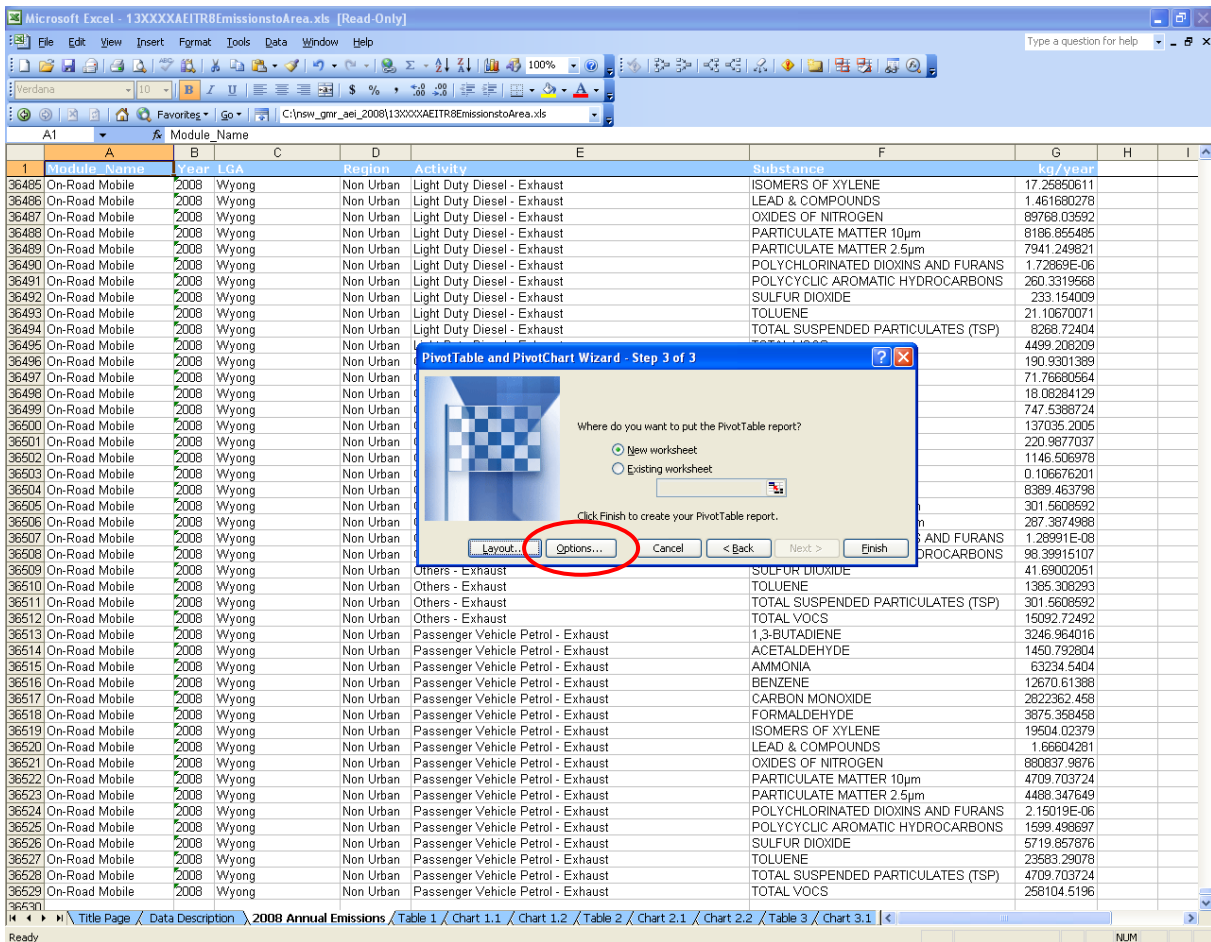


Figure 2-33: Example 3 - Select “Options”

**Step 10** - Uncheck the “Grand total for columns”, “Grand totals for rows” and Auto format table” boxes and select the “OK” button as shown in Figure 2.34

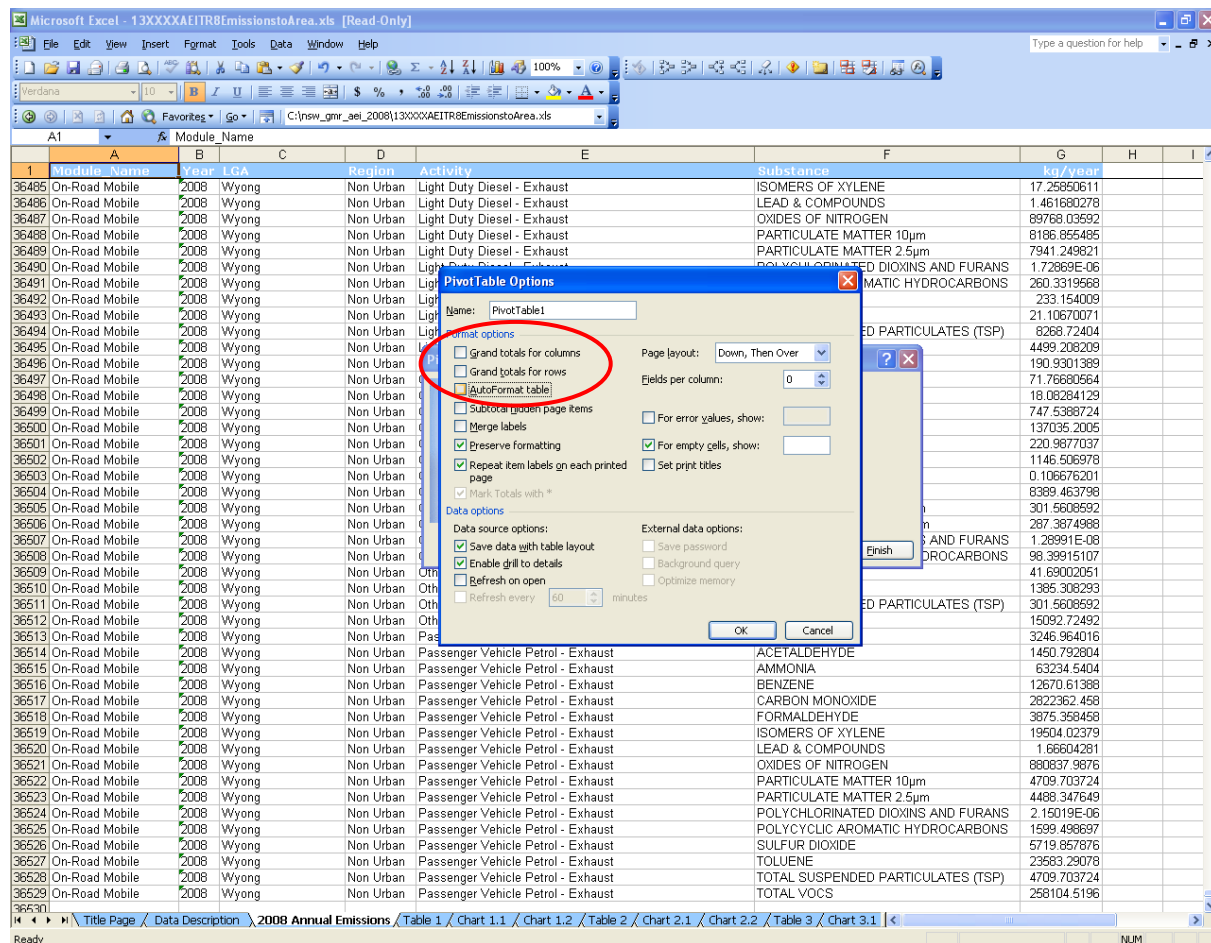


Figure 2-34: Example 3 - Uncheck “Format Options”



**Step 11 – Select the “Finish” button as shown in Figure 2.35**

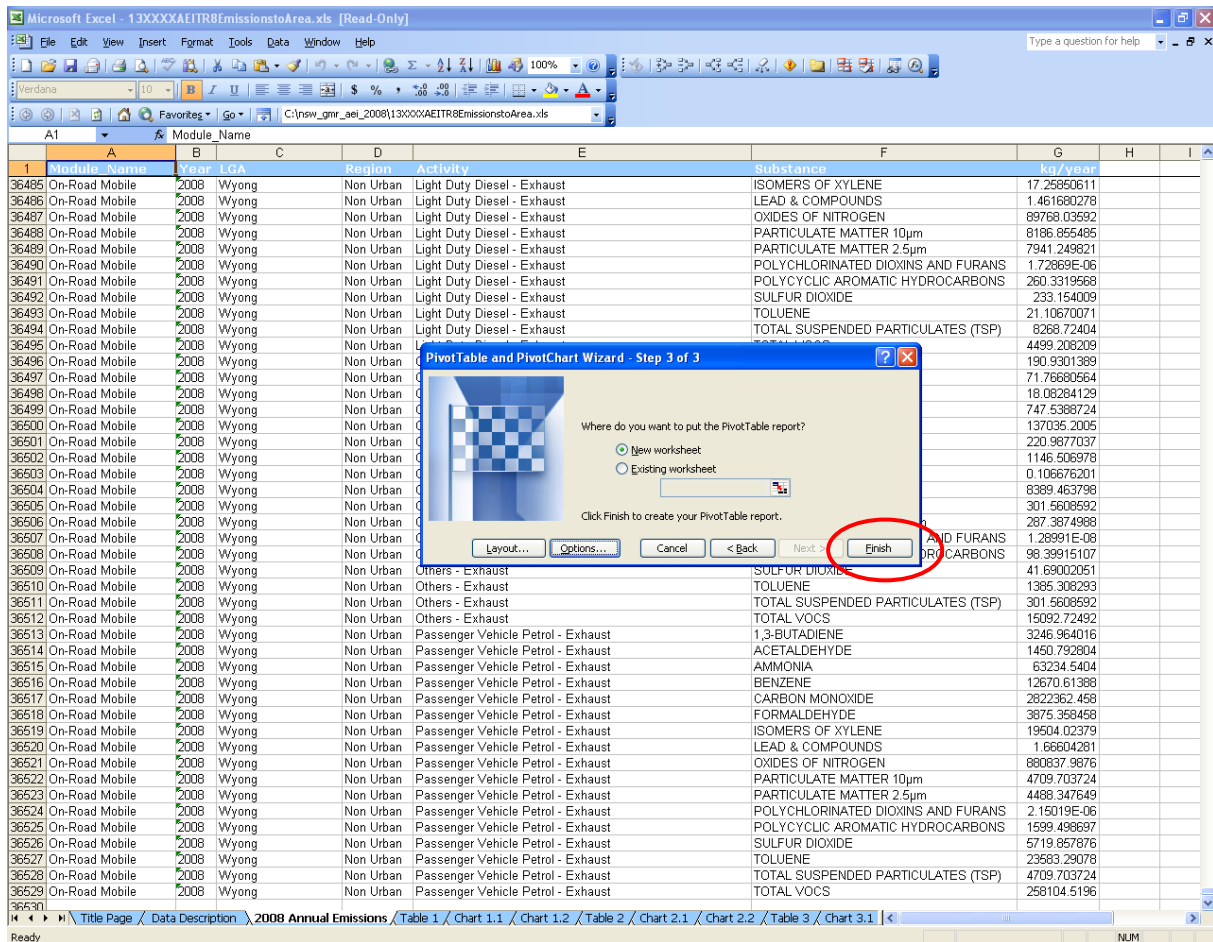


Figure 2-35: Example 3 – Select “Finish”





**Step 13** – Change the order of the regions with Sydney, Newcastle, Wollongong and Non Urban from first to last. Move to the cell containing “Sydney” and right mouse button click. Select “Order” and “Move to Beginning” from the drop-down menus. Select the order for all other regions using the same method as shown in Figure 2.37

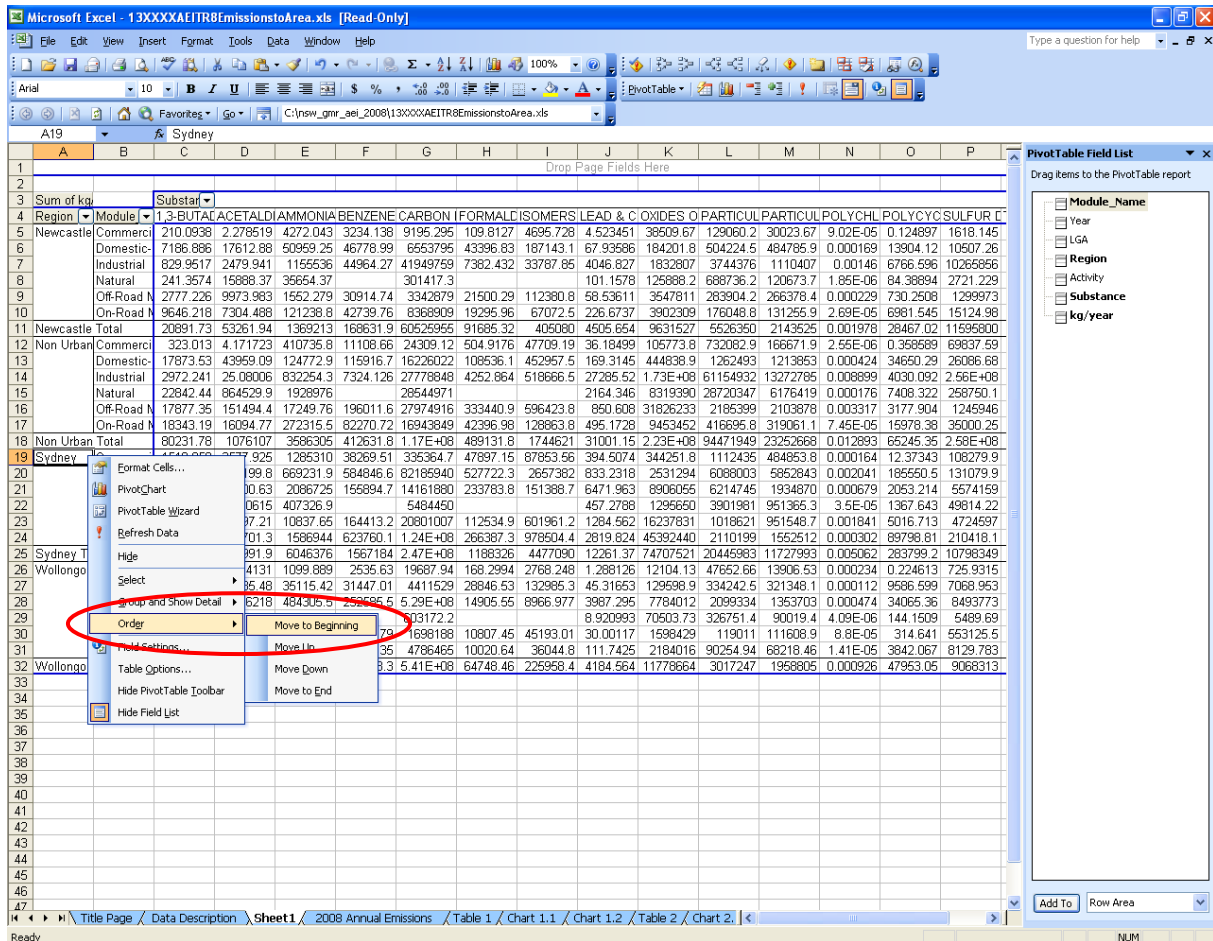


Figure 2-37: Example 3 – Select “Order”

**Step 14** – Select the entire pivot table report and then select the custom number format created for the Excel™ workbook. To do this, select “Format” and “Cells” from the command menu as shown in Figure 2.38

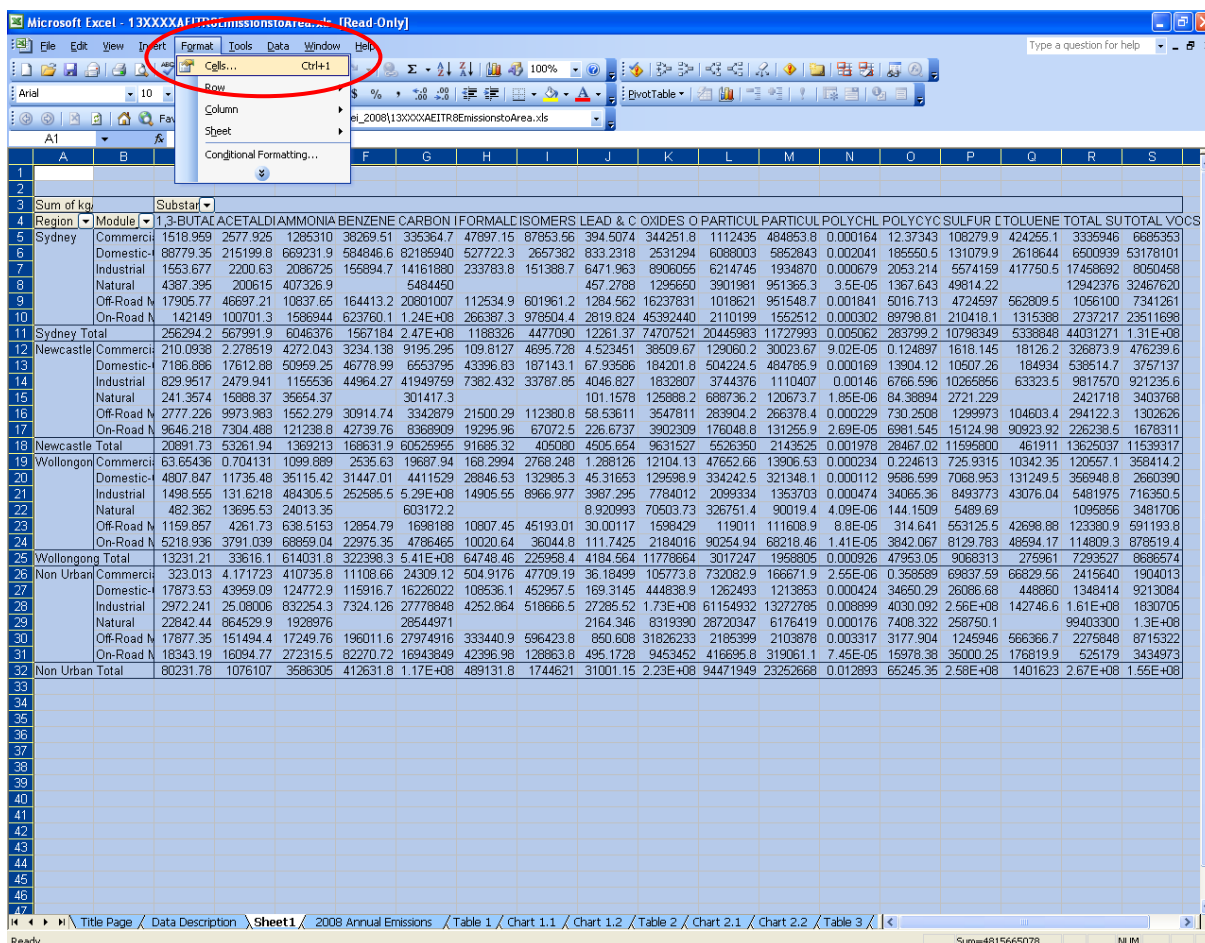


Figure 2-38: Example 3 - Select “Format” and “Cells”

2. Using the Excel Workbook

**Step 15** – Select the “Number” tab and the “Category:” “Custom” from the list. Scroll down to the end of the “Type:” list and select the format “[>100]#,##0;[<0.01]#,.#0E-#0;0.00” for emissions in kg/year (or the format “[>0.01]0.00%;[<0.00001]0.000000%;0.0000%” for proportion of emissions in %) as shown in Figure 2.39. You may create other custom number formats. Please refer to “Help” in the command menu for further assistance

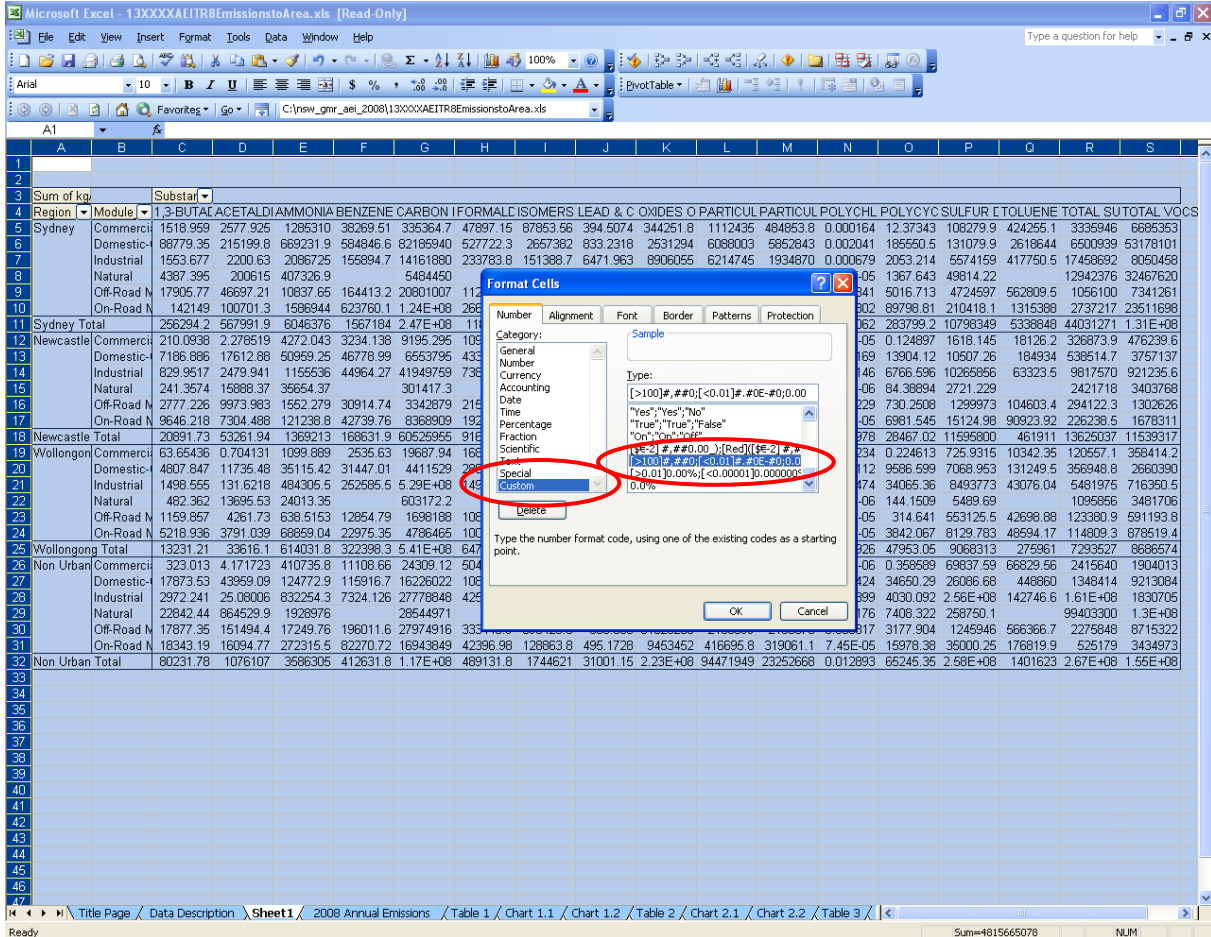


Figure 2-39: Example 3 – Select “Type”

**Step 16** – Select the desired cell “Alignment”, “Font”, “Borders” and “Patterns” according to Step 14. The final pivot table report will look like that shown in Figure 2.40. Please refer to “Help” in the command menu for further assistance

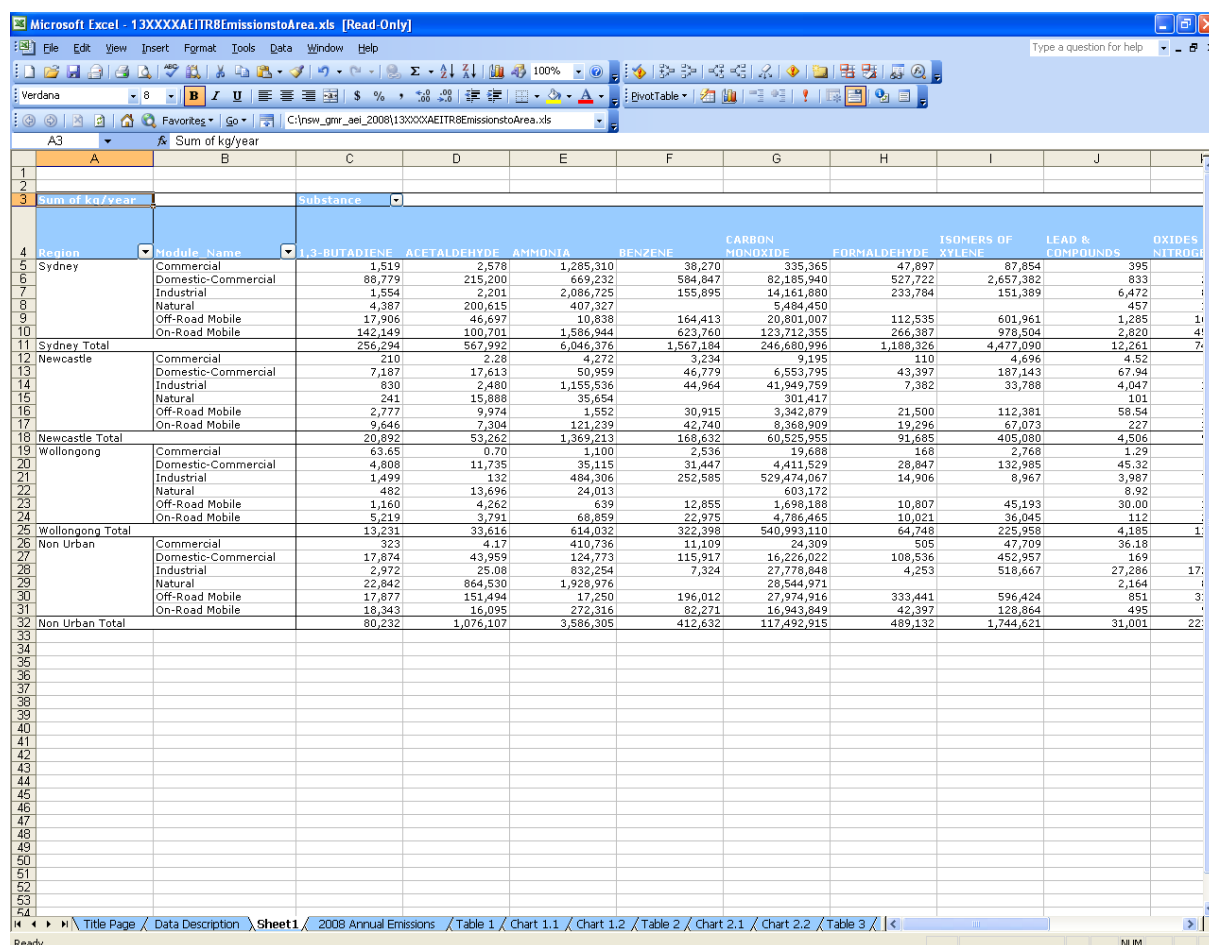


Figure 2-40: Example 3 – Formatted Pivot Table Report

**Step 17** – Make the desired selections from the “Region” (e.g. Sydney), “Module\_Name” (e.g. (Show All)) and “Substance” (e.g. TOTAL VOCs) drop-down menus as described in Example 1 (Section 2.4.1)

**Step 18** – Copy the table from the Excel™ workbook, past into a Word™ document if required and format as shown in Table 2.1

Table 2-1: Example 3 – Formatted Word™ Table

Emissions (kg/year)	Substance
Region	TOTAL VOCs
Sydney	6,685,353
	53,178,101
	8,050,458
	32,467,620
	7,341,261
	23,511,698
Sydney Total	131,234,491

## 2.6 Using and Interpreting Existing Pivot Chart Reports

### 2.6.1 Example 4 - Using Pivot Chart Reports

Example 4 investigates the use of Chart 7.1 in the Excel™ workbook 130766AEITR8EmissionstoArea.xls. Chart 7.1 contains an annual emissions pivot chart report by LGA, module and activity during 2008 in kg/year. Start by navigating to the “Chart 7.1” worksheet using any of the methods described previously as shown in Figure 2.41.

*Note that in the 130766AEITR8EmissionstoArea\_Monthly.xls workbook the charts will flicker for a few seconds when the chart is selected or filtered as automatic formatting macros run. This is normal.*

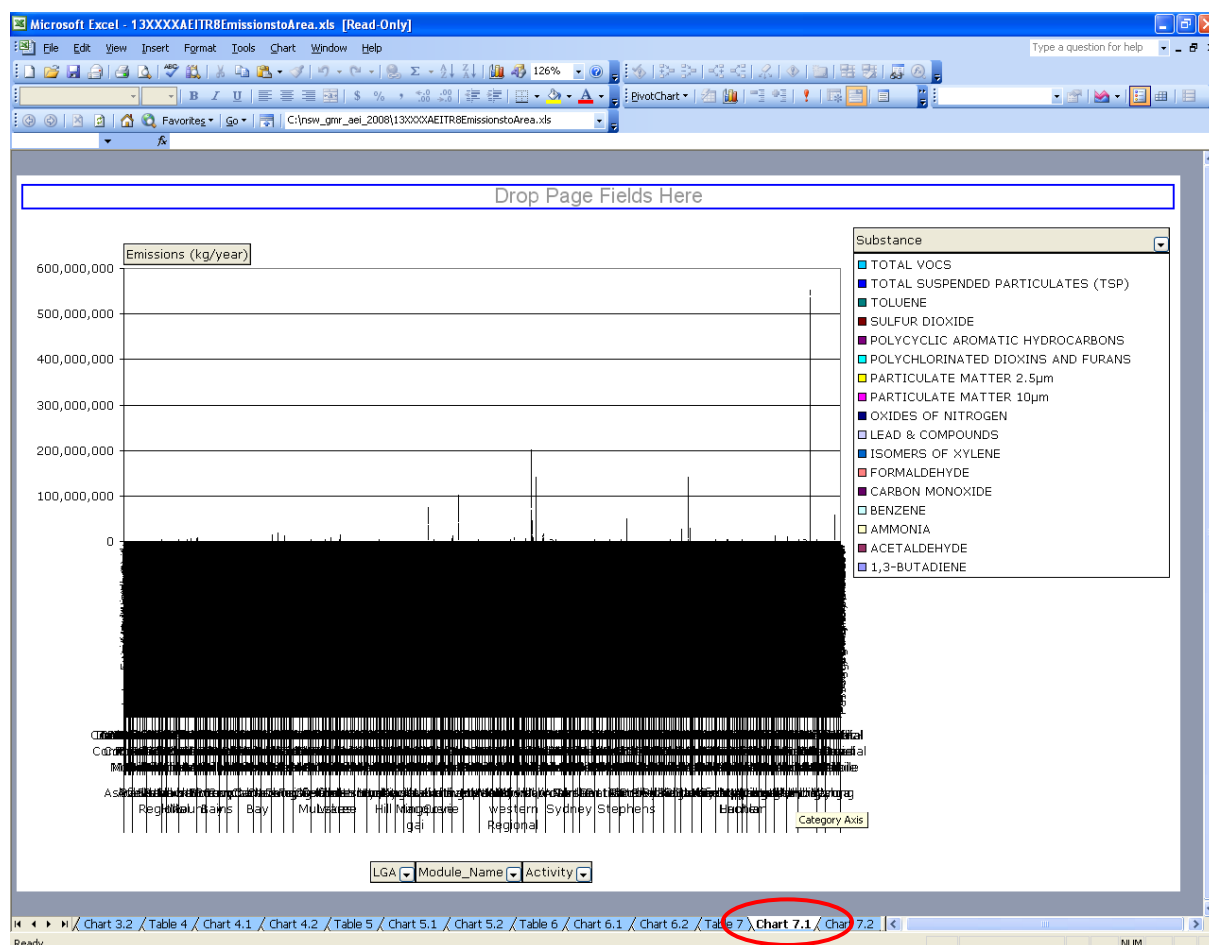


Figure 2-41: Example 4 - Navigate to “Chart 7.1” Worksheet

The pivot chart contains drop-down menus that allow you to make the following selections:

- Local Government Area (LGA) (e.g. Ashfield)
- Module\_Name (i.e. Biogenic, Commercial, Domestic-Commercial, Industrial, Off-Road Mobile and On-Road Mobile)
- Activity (e.g. Automotive Fuel Retailing)
- Substance (e.g. CARBON MONOXIDE)

Note that pivot chart 7.1 is based on the data in Table 7.1. Changes to the drop-down selections in Table 7.1 are also applied to Chart 7.1 and vice versa.

In Example 4, the following selections have been made using the drop-down menus:

- LGA - Ashfield
- Module\_Name - All
- Activity - All
- Substance - TOTAL VOCS

The steps required to do this are described below:

**Step 1** - Select the “LGA” drop-down menu, uncheck the “(Show All)” box and check the “Ashfield” box as shown in Figure 2.42

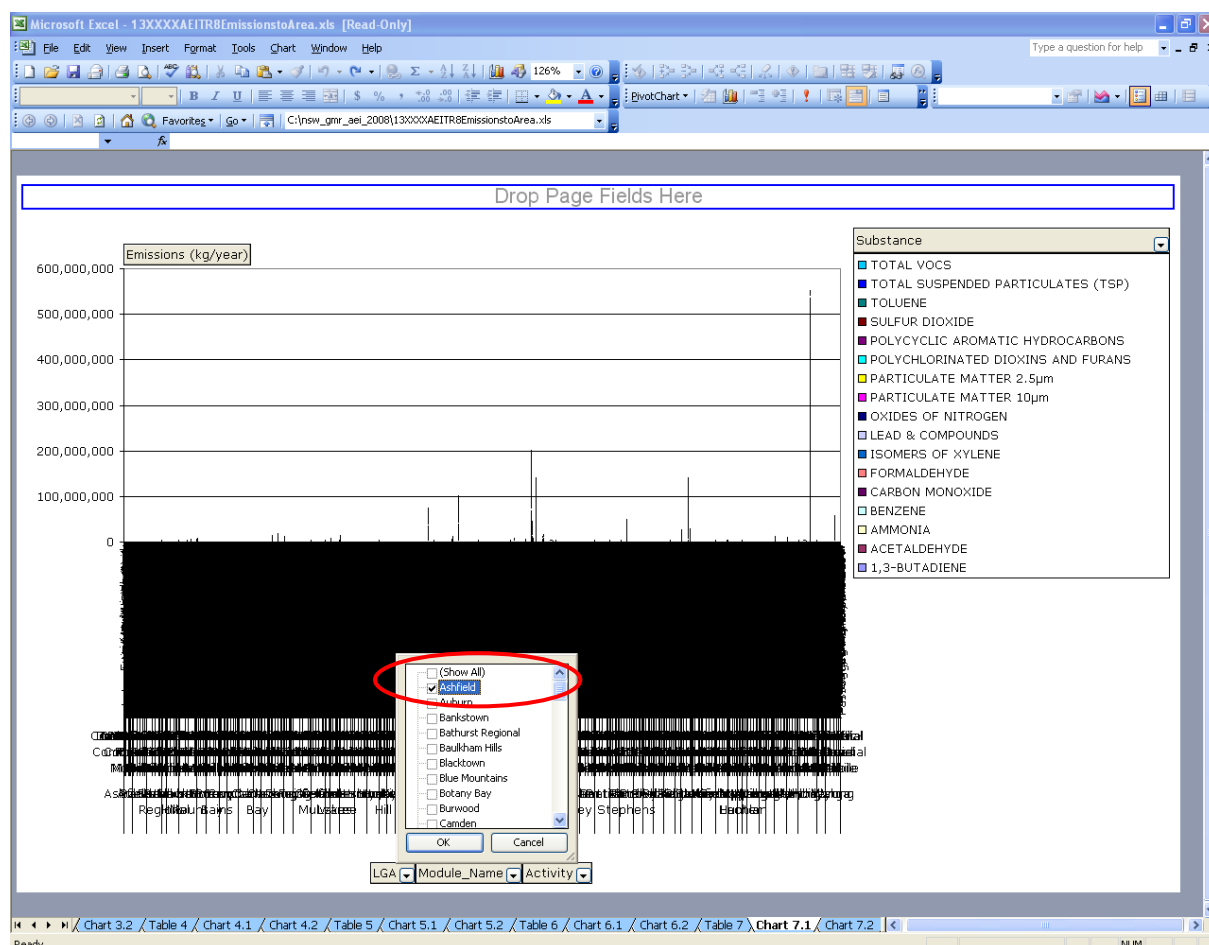


Figure 2-42: Example 4 - Select “LGA”

**Step 2** - Select the “Module\_Name” drop-down menu - No selections are required because all are checked by default

**Step 3** - Select the “Activity” drop-down menu - No selections are required because all are checked by default

**Step 4** - Select the "Substance" drop-down menu, uncheck the "(Show All)" box and check the "TOTAL VOCS" box as shown in Figure 2.43

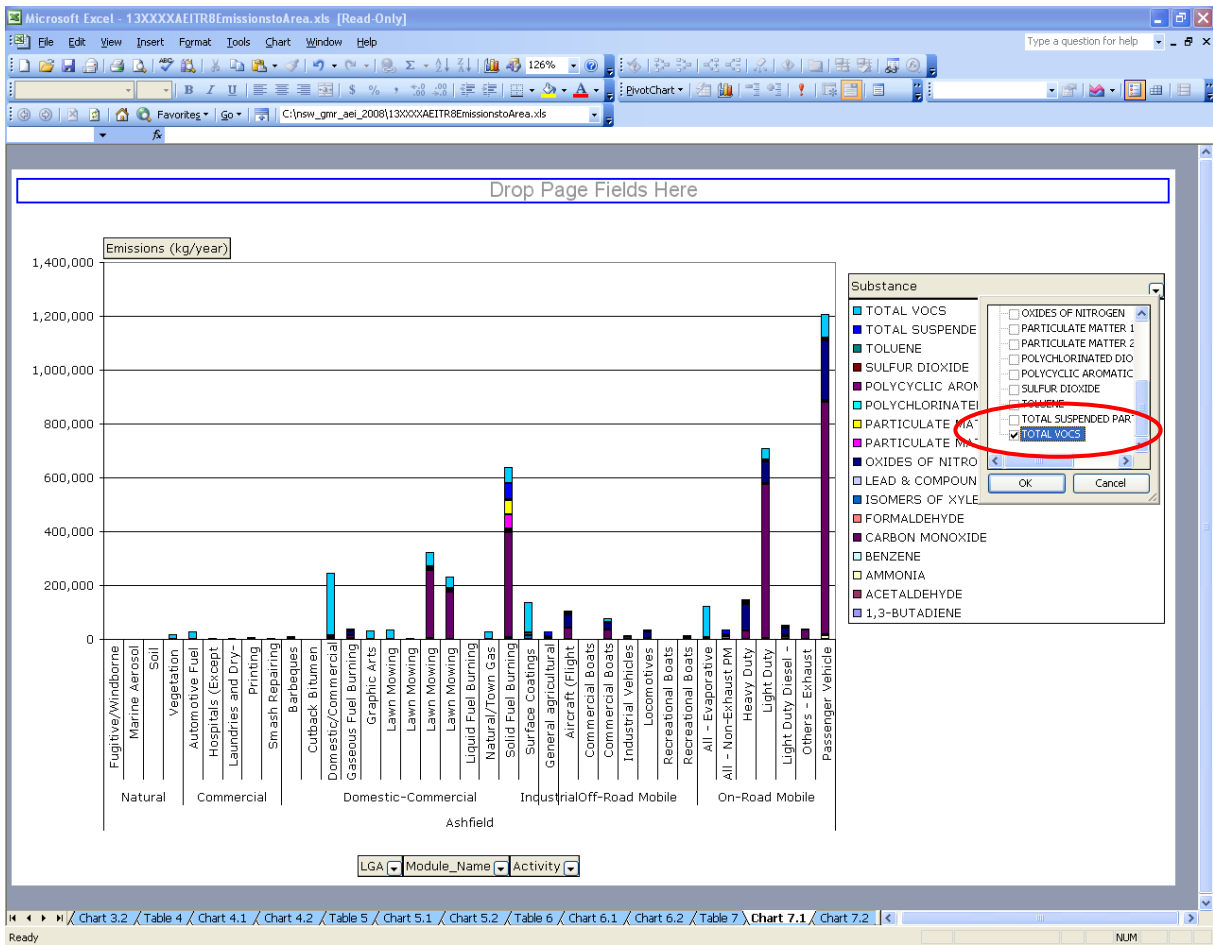


Figure 2-43: Example 4 - Select "Substance"



After making these selections, the Example 4 pivot chart report will look like that shown in Figure 2.44.

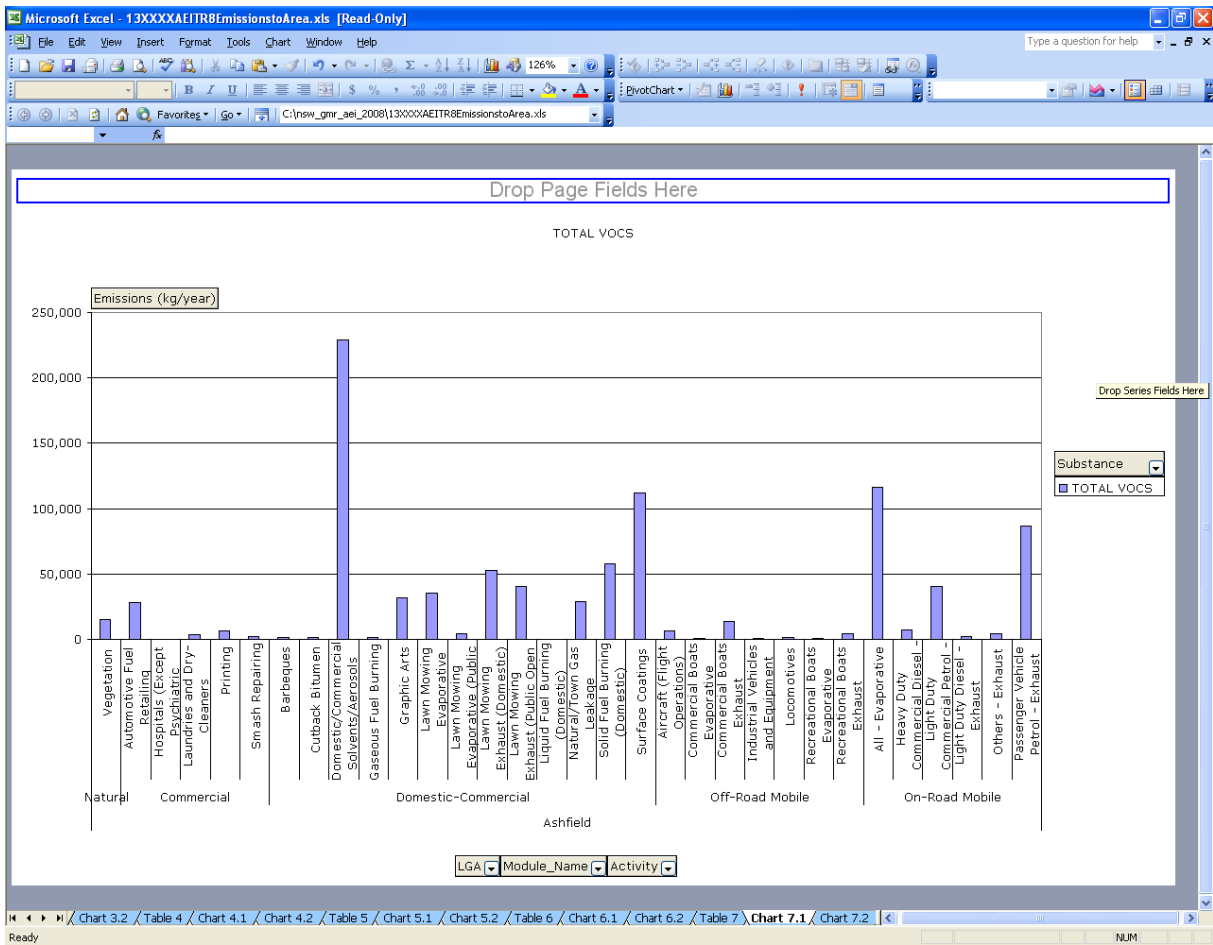


Figure 2-44: Example 4 - Pivot Chart Report

You should note that Chart 7.1 is based on Table 7.1, so the information presented in the table will also be modified according to these selections. Refer to Example 1 (Section 2.4.1), which shows the accompanying changes to the table.

### 2.6.2 Example 5 - Interpreting Pivot Chart Reports

Extra care should be exercised when interpreting the results of the pivot chart reports that present emissions as a proportion of the total.

Example 5 investigates the use of Chart 7.2 in the Excel™ workbook. Chart 7.2 contains the proportion of annual emissions pivot chart report by LGA, module and activity during 2008 in %. Start by navigating to the “Chart 7.2” worksheet using any of the methods described previously and make the selections from the drop-down menus like Example 4 as shown in Figure 2.45.

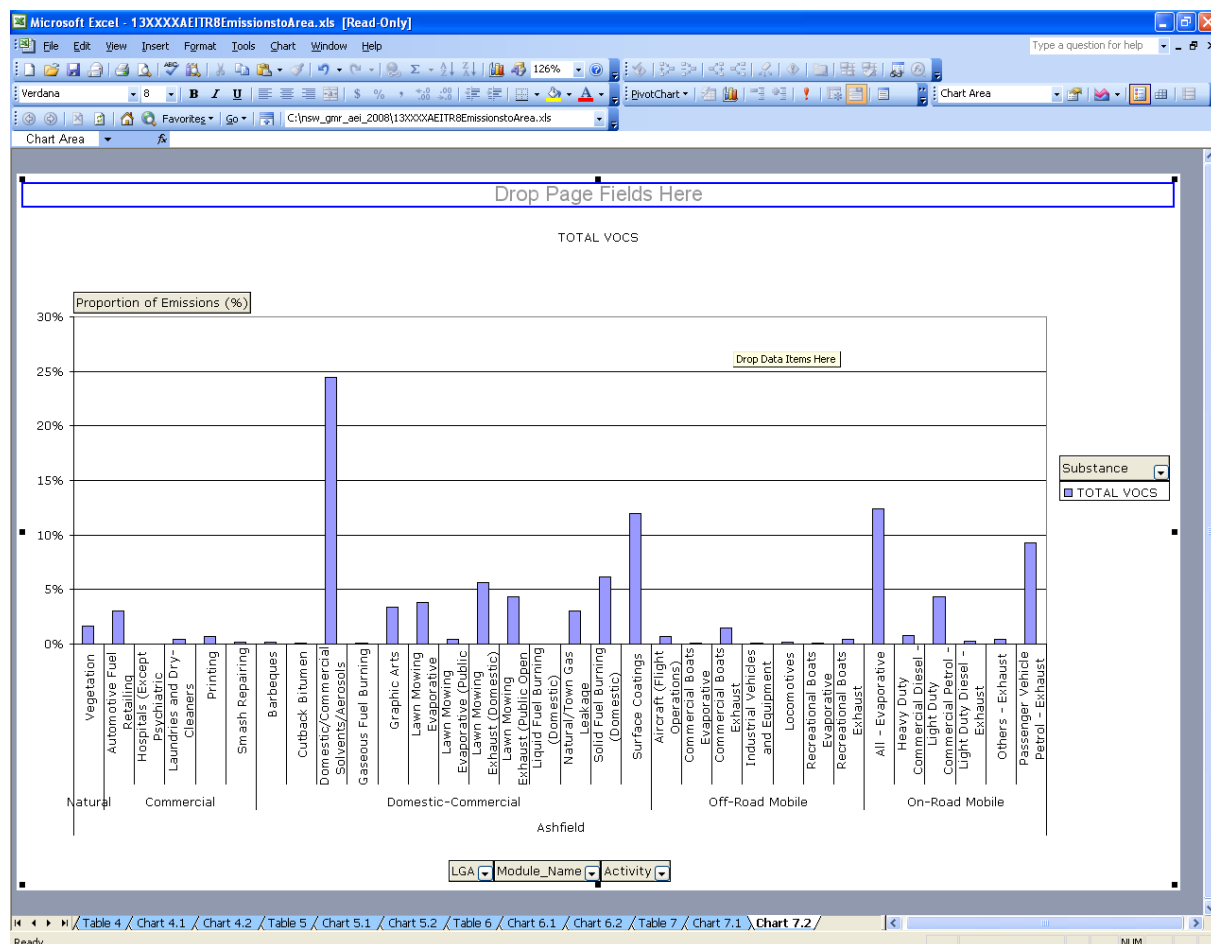


Figure 2-45: Example 5 - Navigate to “Chart 7.2” Worksheet

You will notice the Ashfield Total is 100%, since only the Ashfield LGA has been selected as shown in Figure 2.45. All other proportions shown in the pivot chart report are proportions of annual emissions in Ashfield LGA only. However, if all LGAs are selected, you will notice the Ashfield Total is 0.3054 % as was seen in the pivot table report in Figure 2-23. All other proportions shown in the pivot chart report are proportions of annual emissions in all LGAs (i.e. GMR).

## 2.7 Creating New Pivot Chart Reports

### 2.7.1 Example 6 - Creating Pivot Chart Reports

Example 6 describes the steps required to create a pivot chart report. Specifically, Chart 1.1 in the Excel™ workbook will be created from first principals. Chart 1.1 contains the annual emissions pivot chart report by region and module during 2008 in kg/year.

The steps required to do this are described below:

**Step 1** - Navigate to the “Table 1.1” worksheet and select any cell within the pivot table report as shown in Figure 2-46.

Table 1.1		Substance						
Region	Module Name	1,3-BUTADIENE	ACETALDEHYDE	AMMONIA	BENZENE	CARBON MONOXIDE	FORMALDEHYDE	ISOMERS OF XYLENE
Sydney	Natural	4,387	200,615	407,327	NA	5,484,450	NA	NA
	Commercial	1,519	2,578	1,285,310	36,270	335,365	47,897	87,854
	Domestic-Commercial	88,779	215,200	669,232	584,847	82,185,940	527,722	2,657,382
	Industrial	1,554	2,201	2,086,725	155,895	14,161,880	233,784	151,389
	Off-Road Mobile	17,906	46,697	10,838	164,413	20,801,007	112,535	601,961
	On-Road Mobile	142,149	100,701	1,586,944	623,760	123,712,355	266,387	978,504
<b>Sydney Total</b>		<b>256,294</b>	<b>567,992</b>	<b>6,046,376</b>	<b>1,567,184</b>	<b>246,680,996</b>	<b>1,188,326</b>	<b>4,477,090</b>
Newcastle	Natural	241	15,888	35,654	NA	301,417	NA	NA
	Commercial	210	2,28	4,272	3,234	9,155	110	4,696
	Domestic-Commercial	7,187	17,613	50,959	46,779	6,553,795	43,397	187,143
	Industrial	830	2,480	1,155,536	44,964	41,949,759	7,382	33,788
	Off-Road Mobile	2,777	9,974	1,552	30,915	3,342,879	21,500	112,381
	On-Road Mobile	5,646	7,394	121,239	42,740	8,368,909	19,296	67,073
<b>Newcastle Total</b>		<b>20,892</b>	<b>53,262</b>	<b>1,369,213</b>	<b>168,632</b>	<b>60,525,955</b>	<b>91,685</b>	<b>405,080</b>
Wollongong	Natural	482	13,696	24,013	NA	603,172	NA	NA
	Commercial	63.65	0.70	1,100	2,536	19,688	168	2,768
	Domestic-Commercial	4,808	11,735	35,115	31,447	4,411,529	28,847	132,985
	Industrial	1,499	132	484,306	252,585	529,474,067	14,906	8,967
	Off-Road Mobile	1,160	4,262	639	12,855	1,698,188	10,807	45,193
	On-Road Mobile	5,219	3,791	68,859	22,975	4,786,465	10,021	36,945
<b>Wollongong Total</b>		<b>13,231</b>	<b>33,616</b>	<b>614,032</b>	<b>322,398</b>	<b>540,993,110</b>	<b>64,748</b>	<b>225,958</b>
Non Urban	Natural	22,842	864,530	1,928,976	NA	28,544,971	NA	NA
	Commercial	323	4,17	410,736	11,109	24,309	505	47,709
	Domestic-Commercial	17,874	43,959	124,773	115,917	16,226,022	108,536	452,957
	Industrial	2,972	25,08	832,254	7,324	27,778,848	4,253	519,667
	Off-Road Mobile	17,877	151,494	17,250	196,012	27,574,916	333,441	596,424
	On-Road Mobile	18,343	16,095	272,316	82,271	16,943,849	42,397	128,864
<b>Non Urban Total</b>		<b>80,232</b>	<b>1,076,187</b>	<b>3,586,305</b>	<b>412,632</b>	<b>117,492,915</b>	<b>489,132</b>	<b>1,744,621</b>

Figure 2-46: Example 6 - Navigate to “Table 1.1” Worksheet

**Step 2 -** Select “View”, “Toolbars” and “PivotTable” from the command menu as shown in Figure 2-47. The “PivotTable” toolbar will now appear.

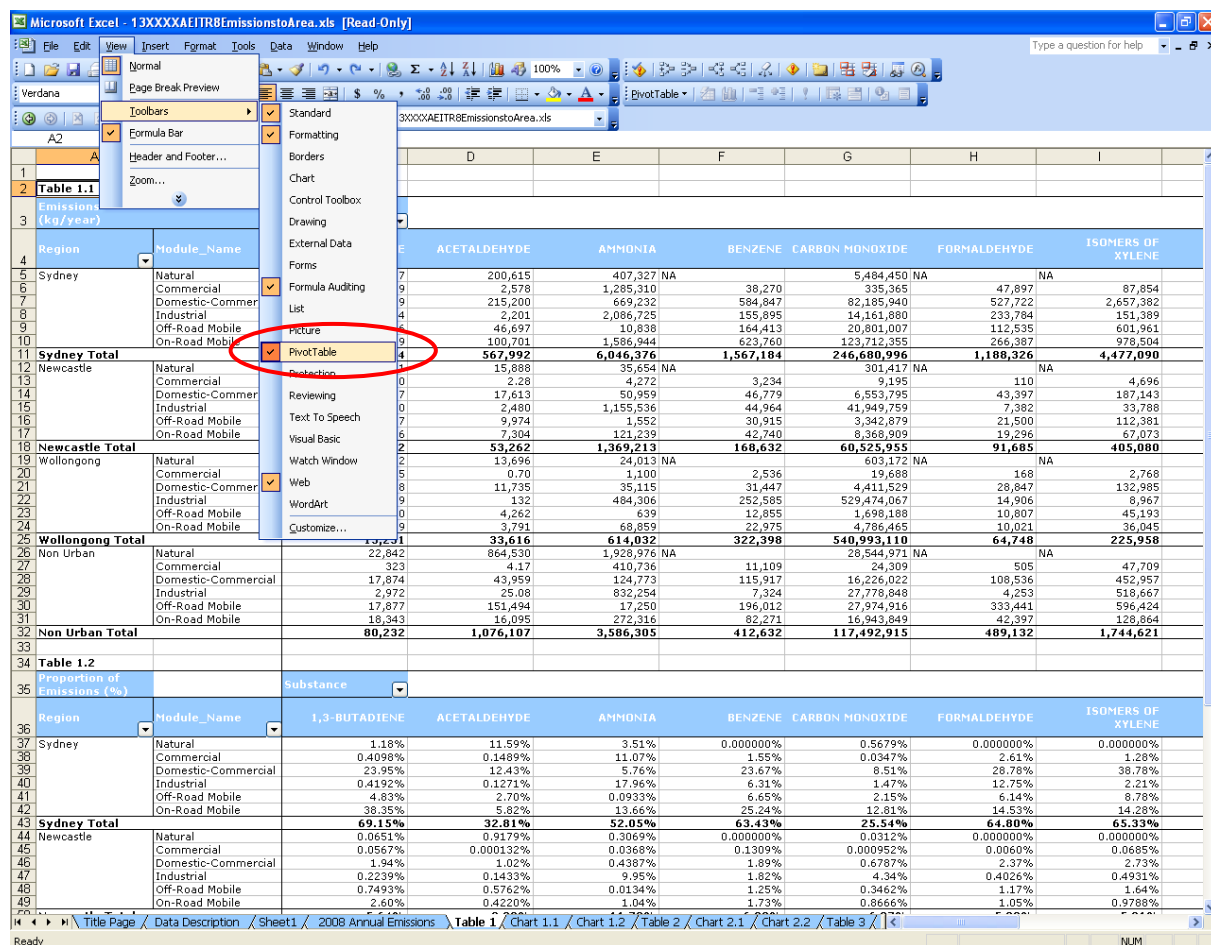
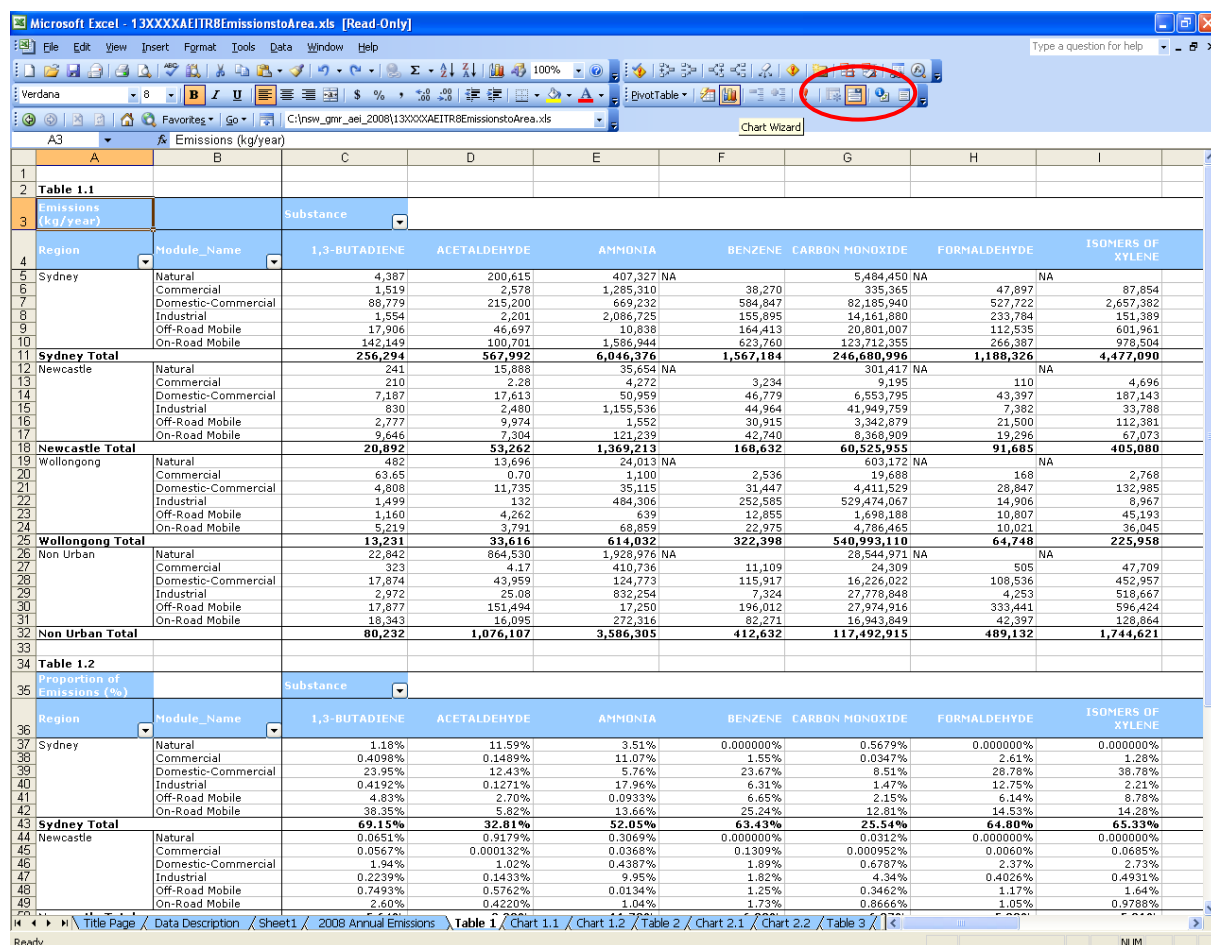


Figure 2-47: Example 6 - Select “View”, “Toolbars” and “PivotTable”

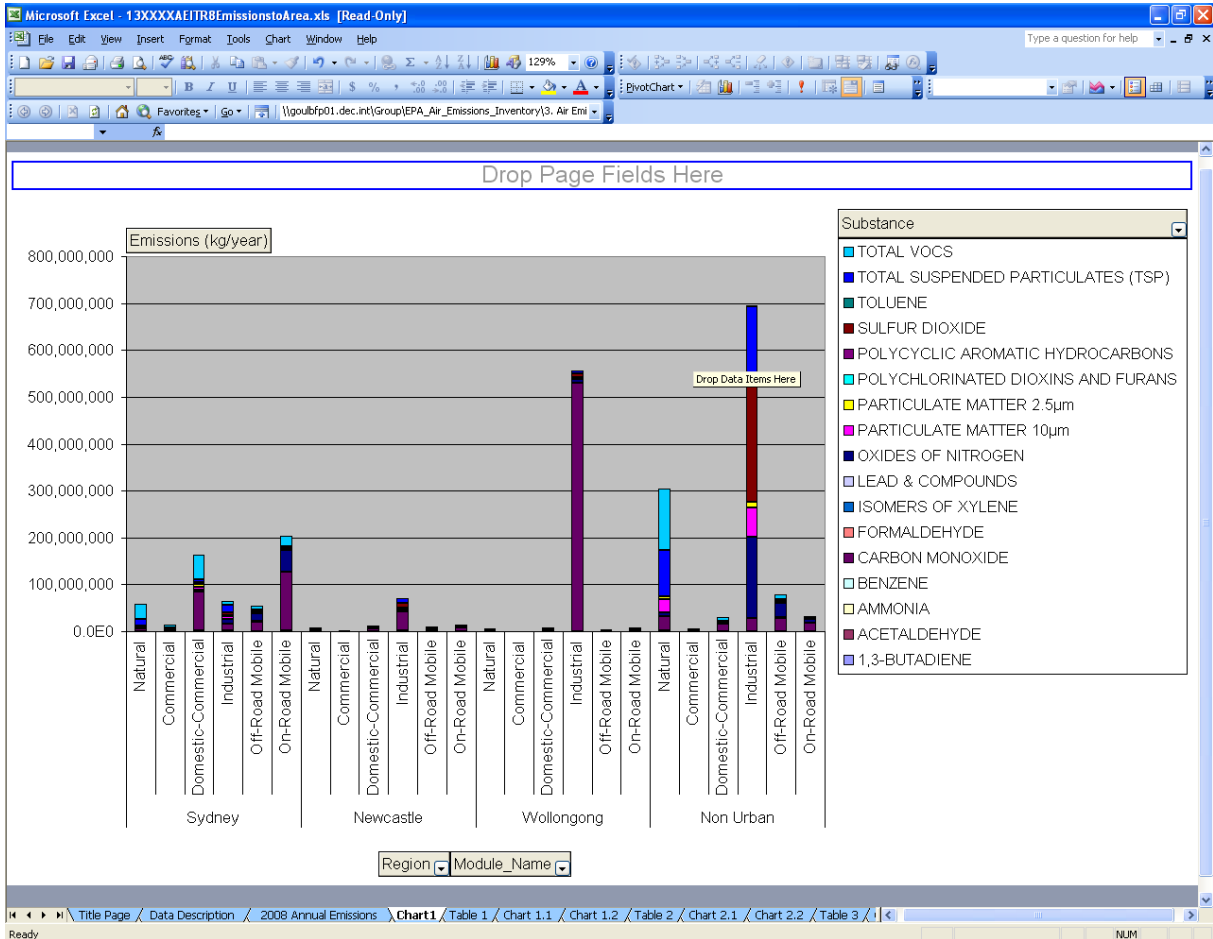
**Step 3 – Select the “Chart Wizard” from the “PivotTable” toolbar as shown in Figure 2-48.**



**Figure 2-48: Example 6 – Select “Chart Wizard”**

**Step 4** – A pivot chart report will automatically be generated corresponding with Chart 1.1 in the Excel™ workbook as shown in Figure 2-49. Note that as this is created from the same pivot table report as Chart 1.1, data selections made in this new chart will also be applied to Table 1.1 and Chart 1.1.

You will notice that the formatting of the original charts has been lost when the new chart in Figure 2-49 is created. Step 5 below shows how to save user defined chart formats to apply to new charts.



**Figure 2-49: Example 6 – Pivot Chart Report with no Selections**

**Step 5** – To create a user defined chart format based on Chart 1.1, first navigate to Chart 1.1, then right mouse click on the chart and select Chart Type as shown in Figure 2-50.

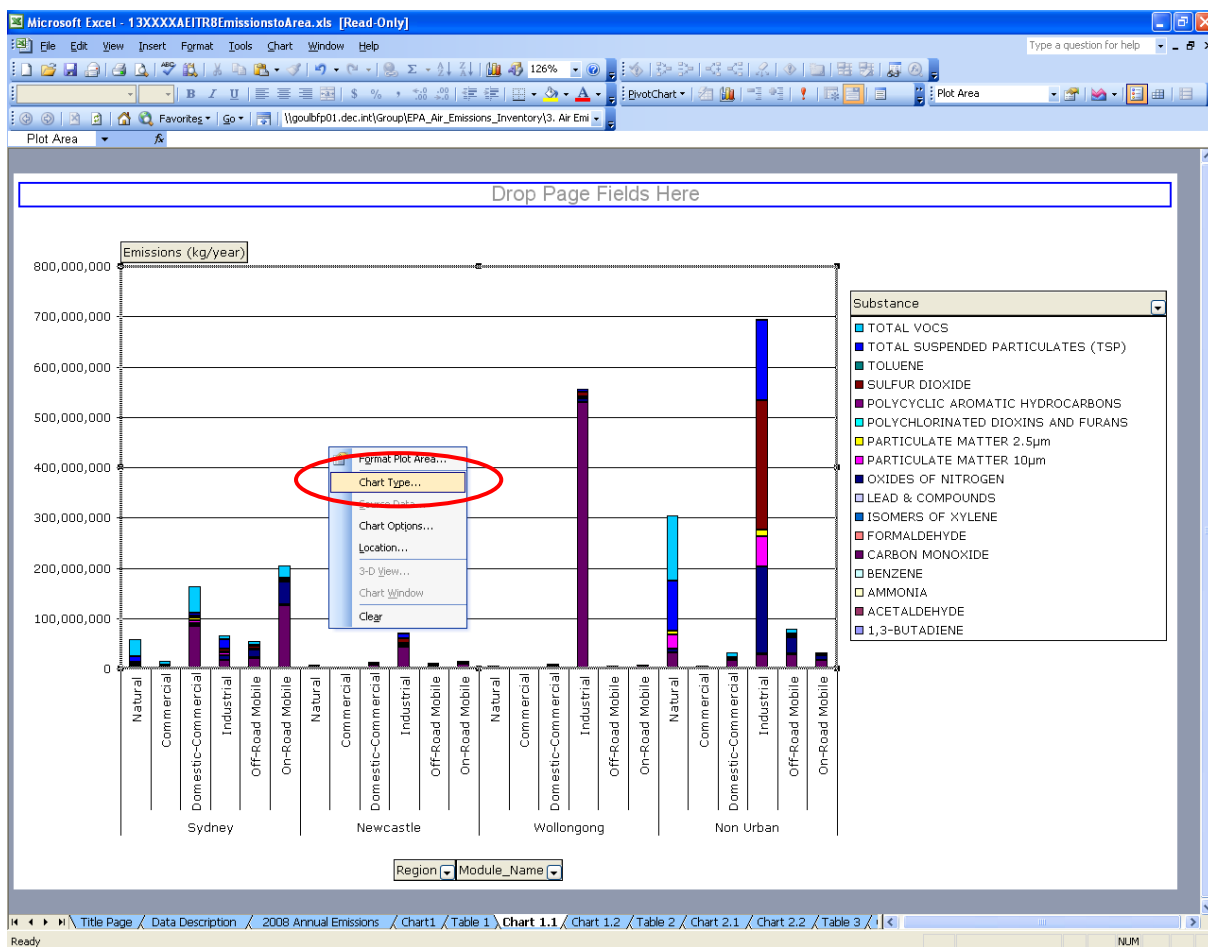


Figure 2-50: Right click and select Chart Type

**Step 6** – In the Chart Type dialogue, select the “Custom Types” tab and the “User-defined” radio button and press the “Add” button as shown Figure 2-51

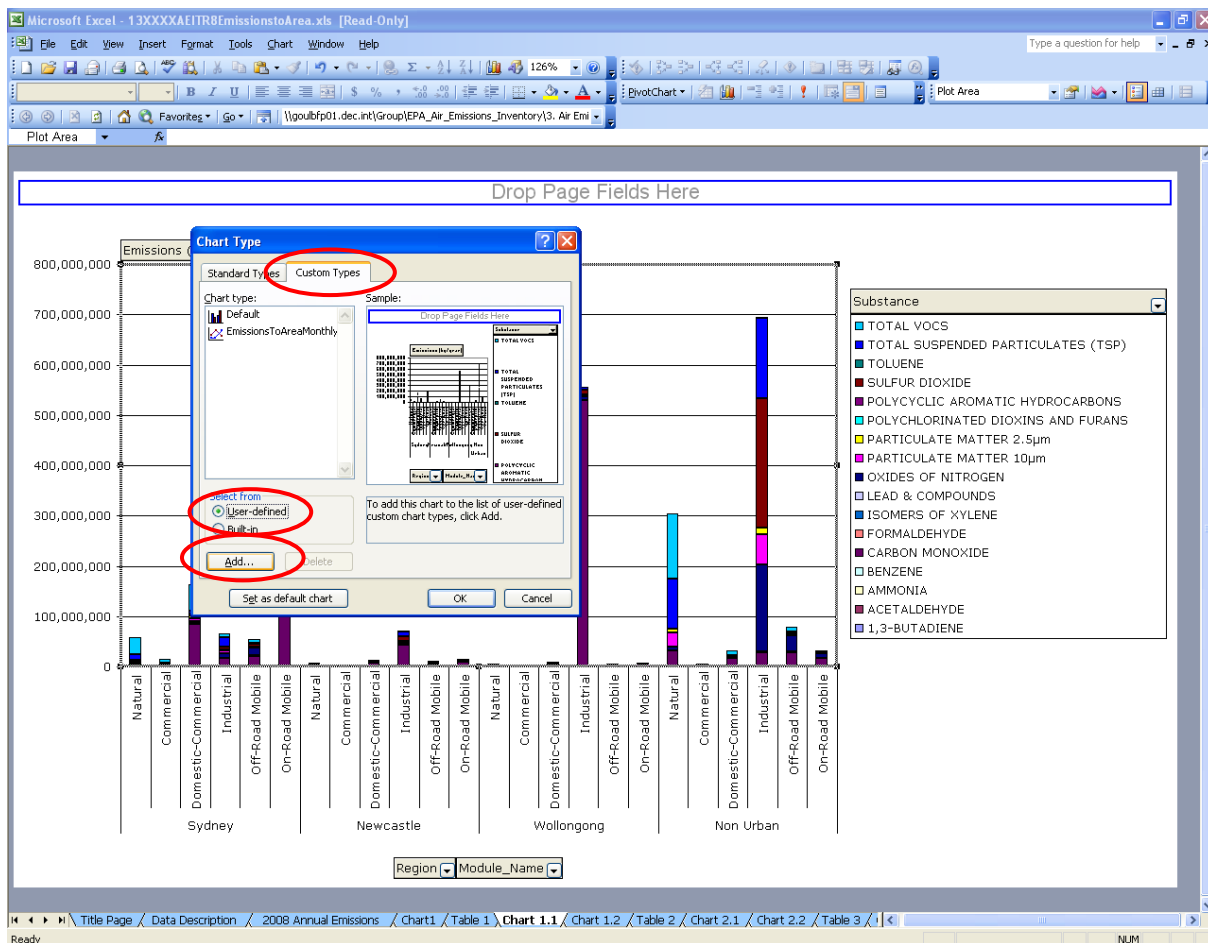


Figure 2-51: Add user defined chart format



**Step 7** - Enter the “Name” as “Pivot Chart v1” and “Description” as “Apply to: Charts 1.1 & 2.1” and press the “OK” button twice as shown in Figure 2-52. At Charts 1.2, 3.1 and 3.2, follow the same procedure and create “Pivot Chart v2” and “Apply to: Charts 1.2 and 2.2”, “Pivot Chart v3” and “Apply to: Charts 3.1, 4.1, 5.1, 6.1 and 7.1” and “Pivot Chart v4” and “Apply to: Charts 3.2, 4.2, 5.2, 6.2 and 7.2”. Pivot Chart v1 to Pivot Chart v4 will now be available for you to apply time after time. You may create other custom chart formats. Please refer to “Help” in the command menu for further assistance

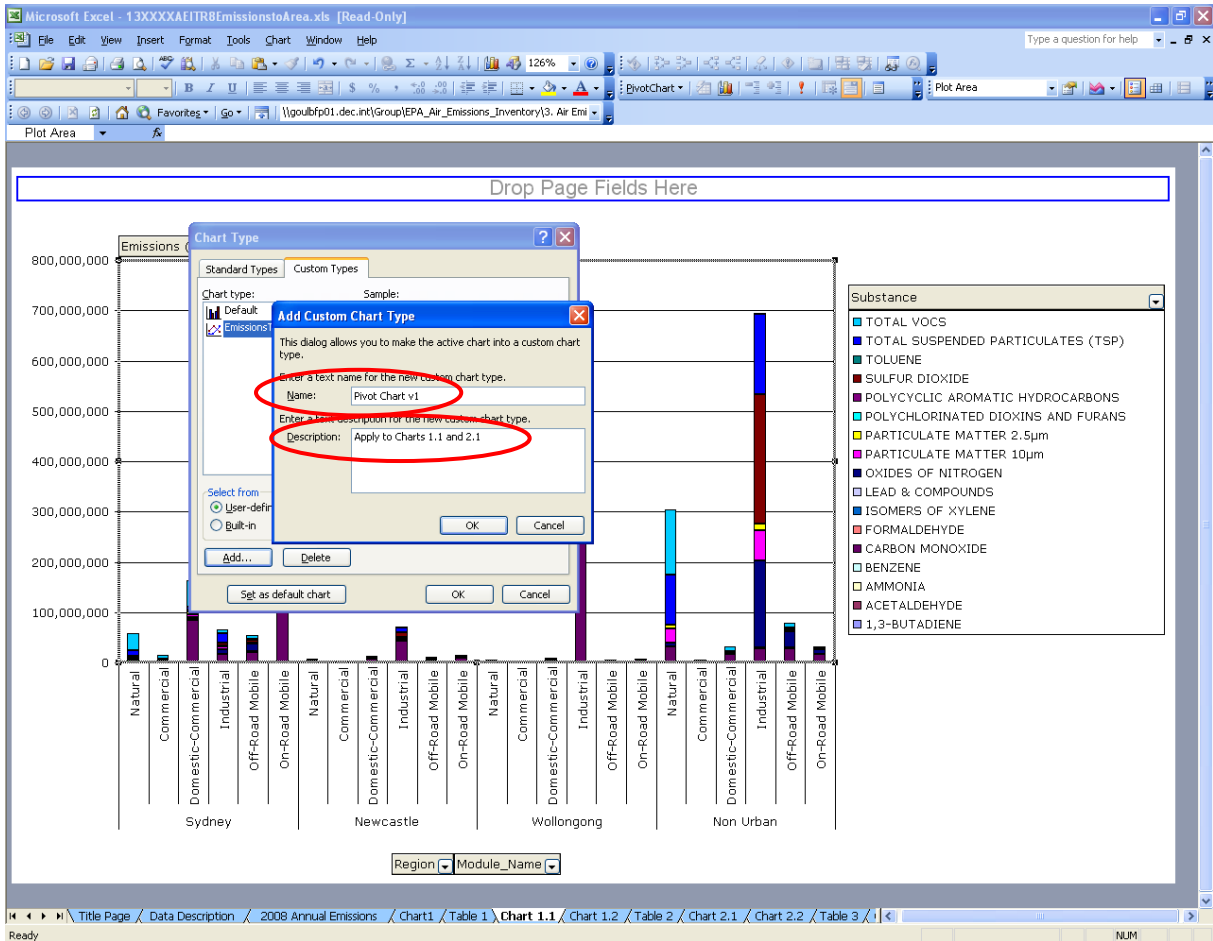


Figure 2-52: Enter name and description for custom chart format

**Step 8** - Navigate back to the new chart created in Step 4 above. Right Click on the chart, select Chart Type, click on the Custom Types tab and on the User-defined radio button. Select Pivot Chart v1 and click OK. This will apply the formatting of the original chart 1.1 to the new chart just created. To filter the chart to display total VOCS for Sydney, from the drop-down menus in the pivot chart report, make the following selections:

- “Substance” - “TOTAL VOCS”
- “Region” - “Sydney”
- “Module\_Name” - “(Show All)”

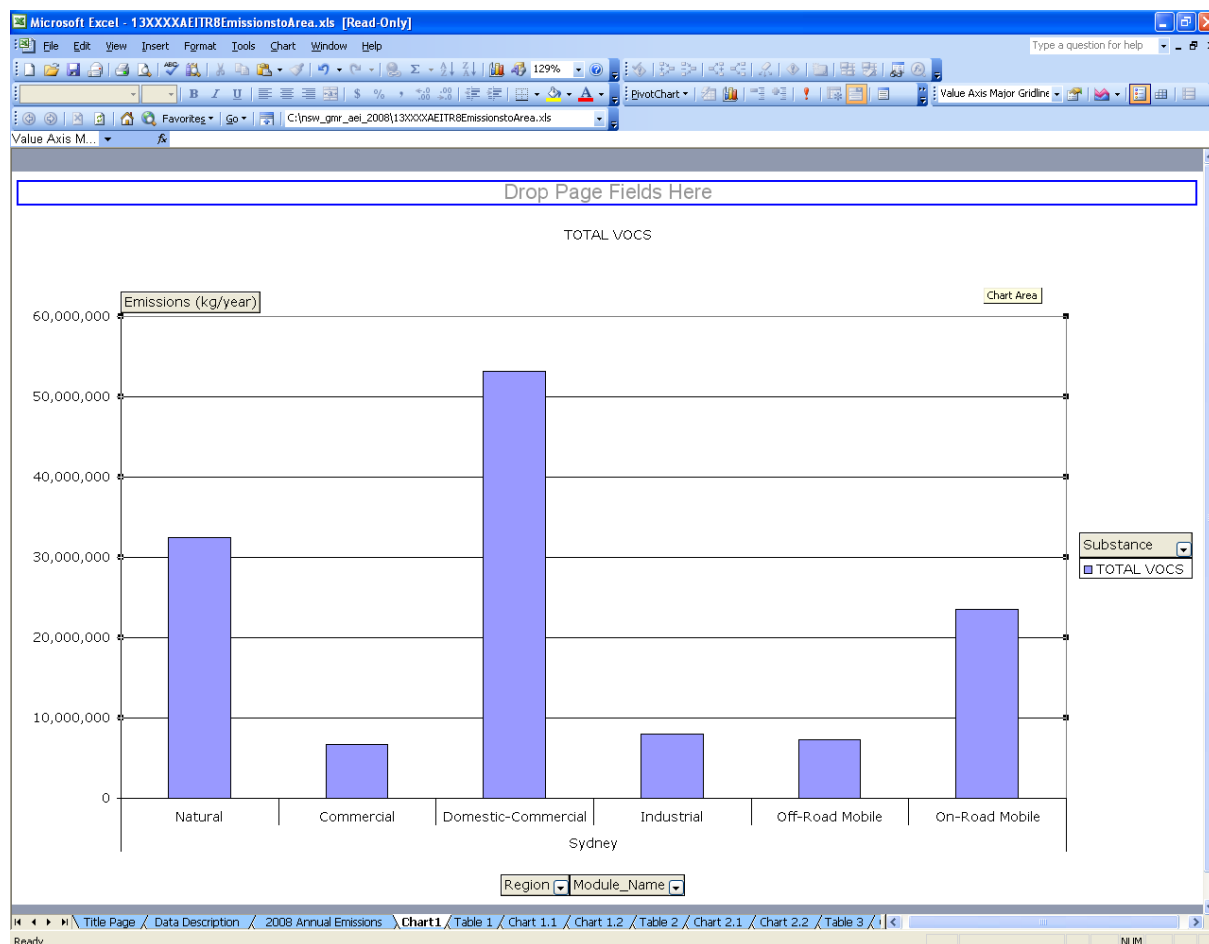


Figure 2-53: Example 6 – Pivot Chart Report with Selections

**Step 9** – You may wish to change the scale on the value axis. To do this, select the left vertical axis of the plot area, right mouse button click and select “Format Axis” as shown in Figure 2-54. Select the “Scale” tab and under “Value (y) axis scale” and “Auto”, uncheck the “Major unit:” box and insert “55000000” and select the OK button as shown in Figure 2-55.

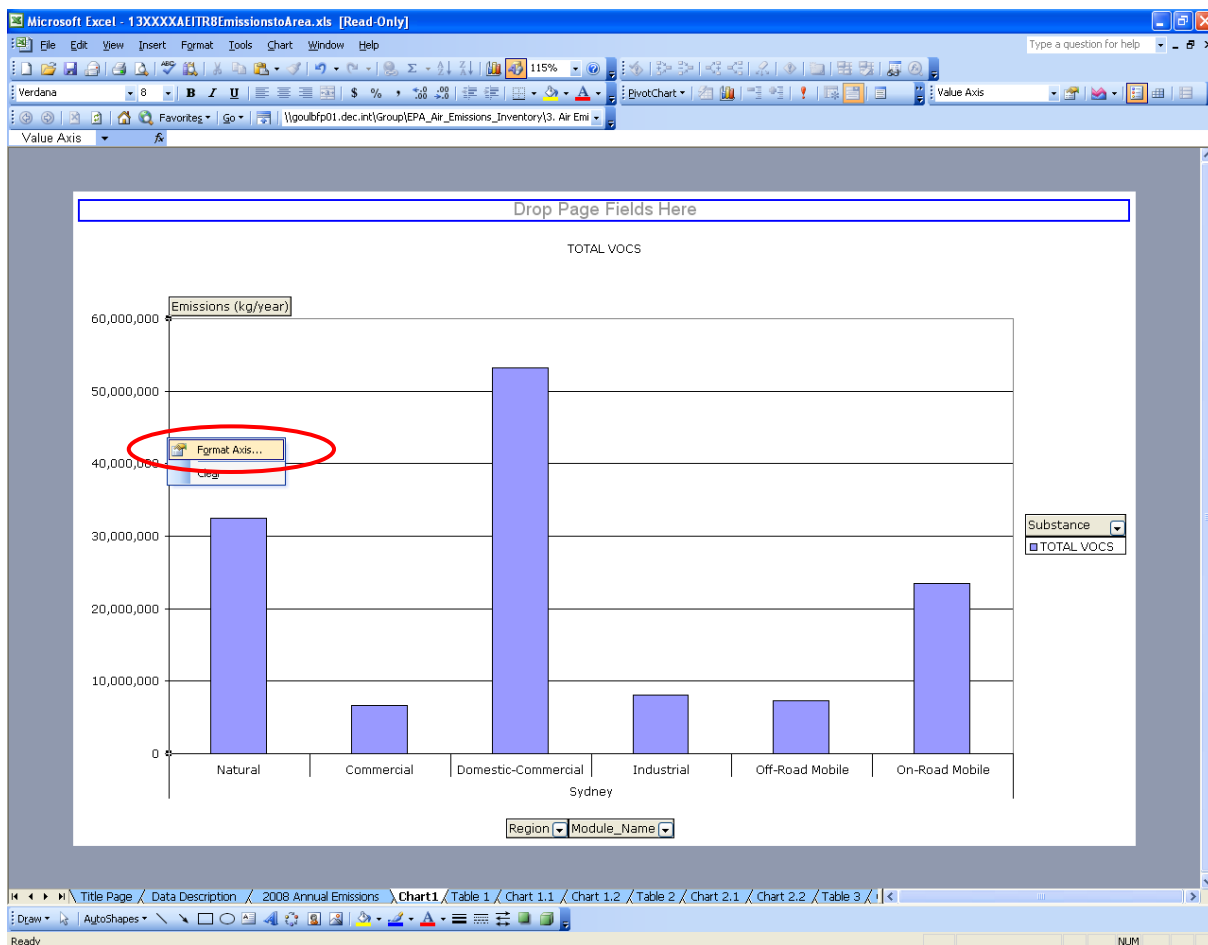


Figure 2-54: Example 6 – Select “Format Axis”

2. Using the Excel Workbook

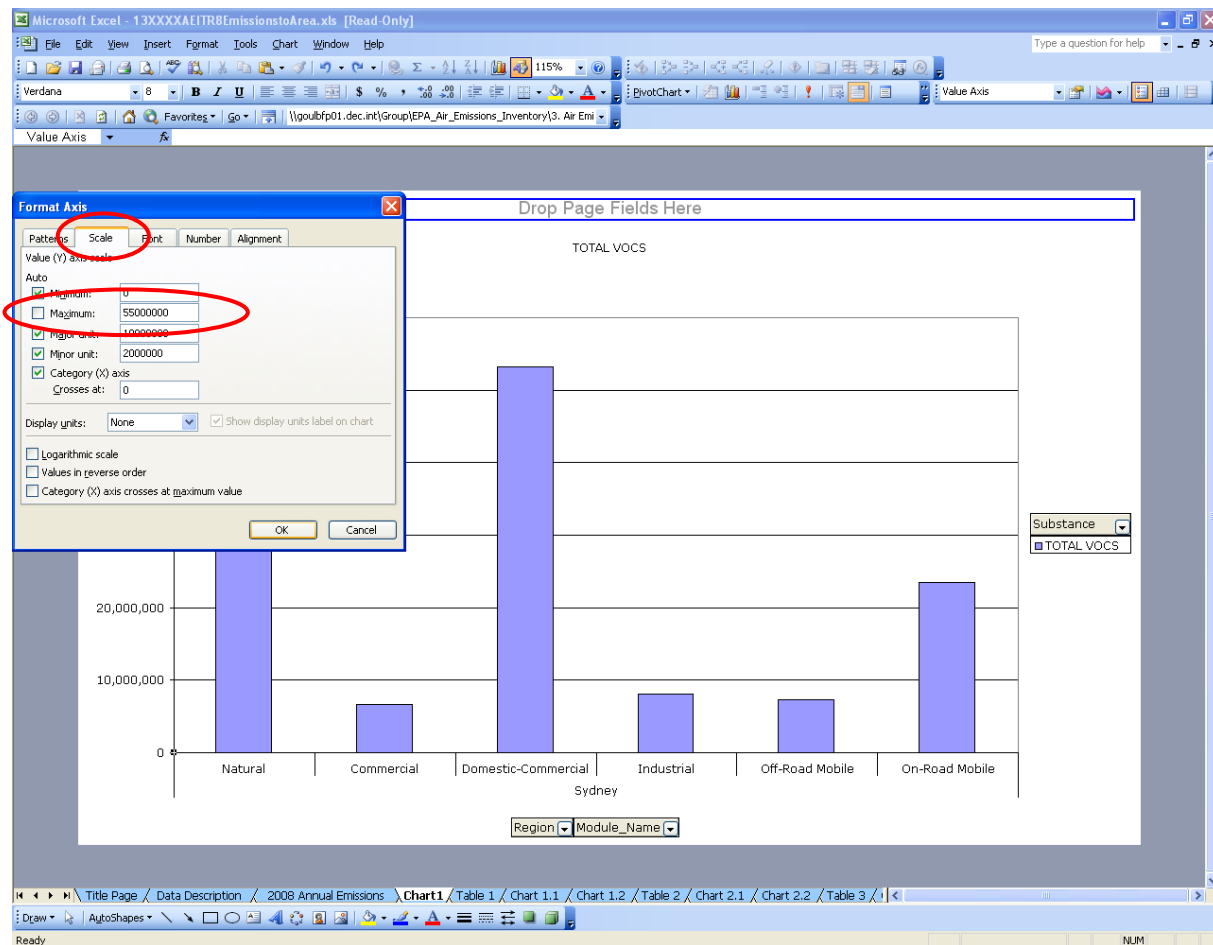
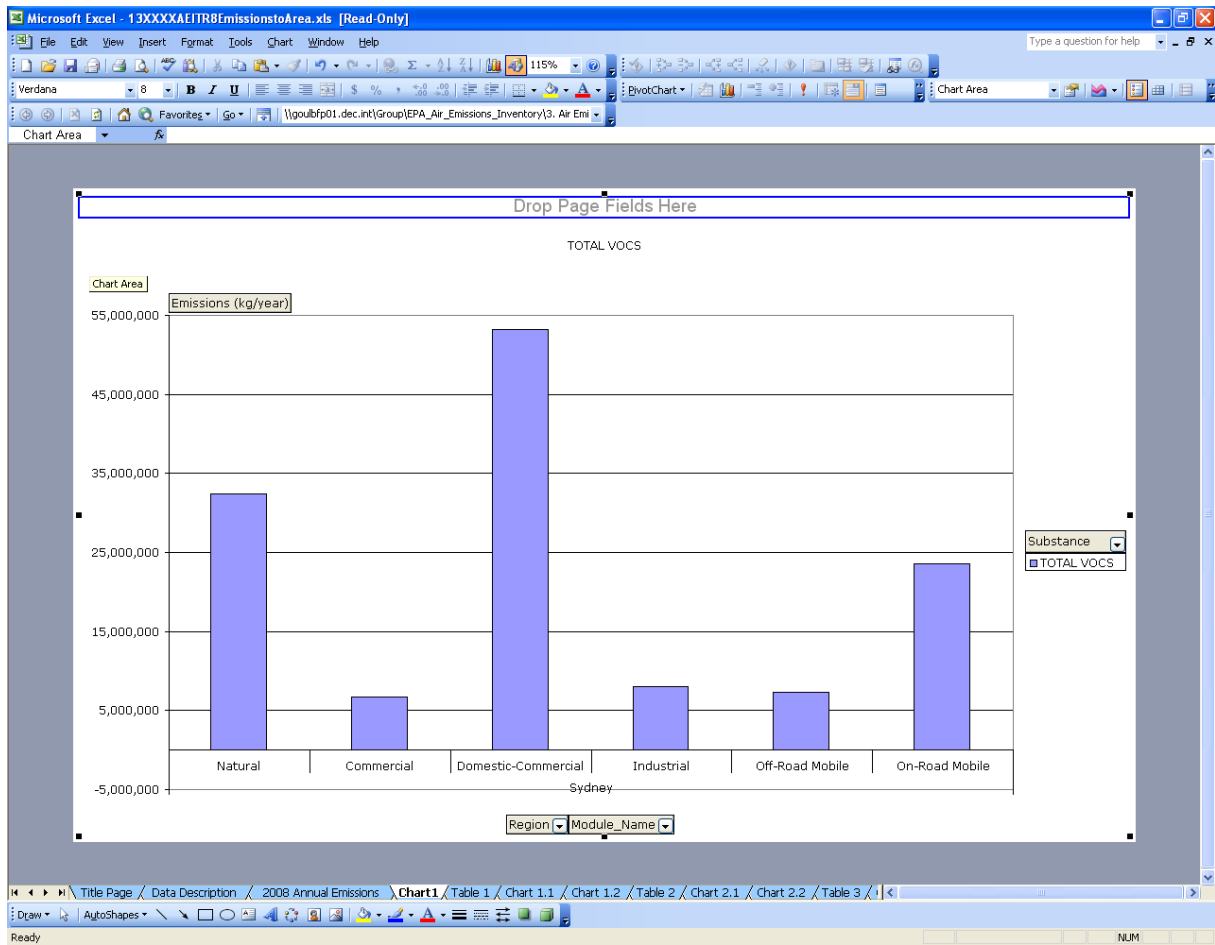


Figure 2-55: Example 6 - Select "Scale"

**Step 10** - The final pivot chart report will now look like that shown in Figure 2-56. Please refer to “Help” in the command menu for further assistance.



**Figure 2-56: Example 6 – Formatted Pivot Chart Report**

**Step 11** –You may wish to hide the pivot chart field buttons. To do this, select any of the pivot chart field buttons, right mouse button click and then select “Hide PivotChart Field Buttons” as shown in Figure 2-57.

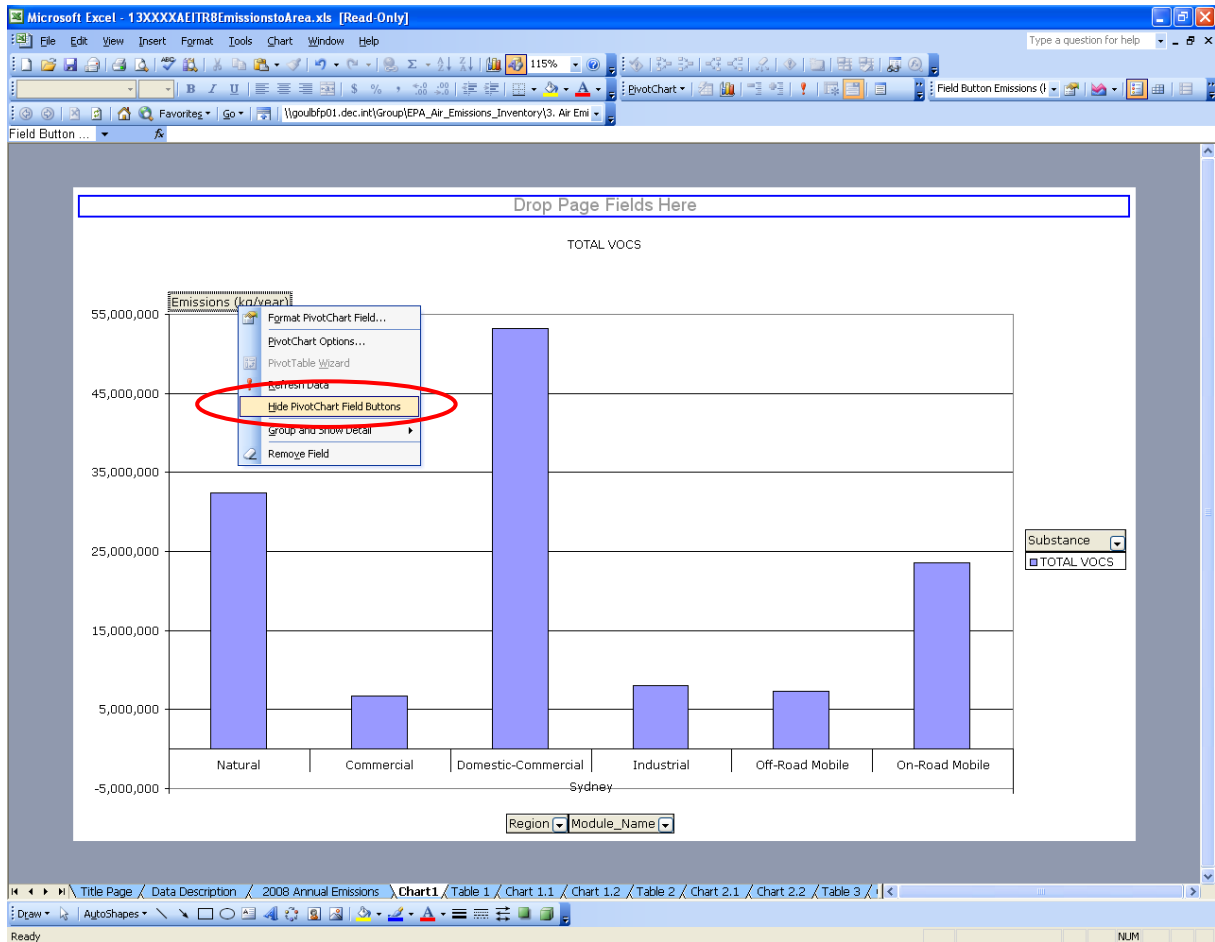
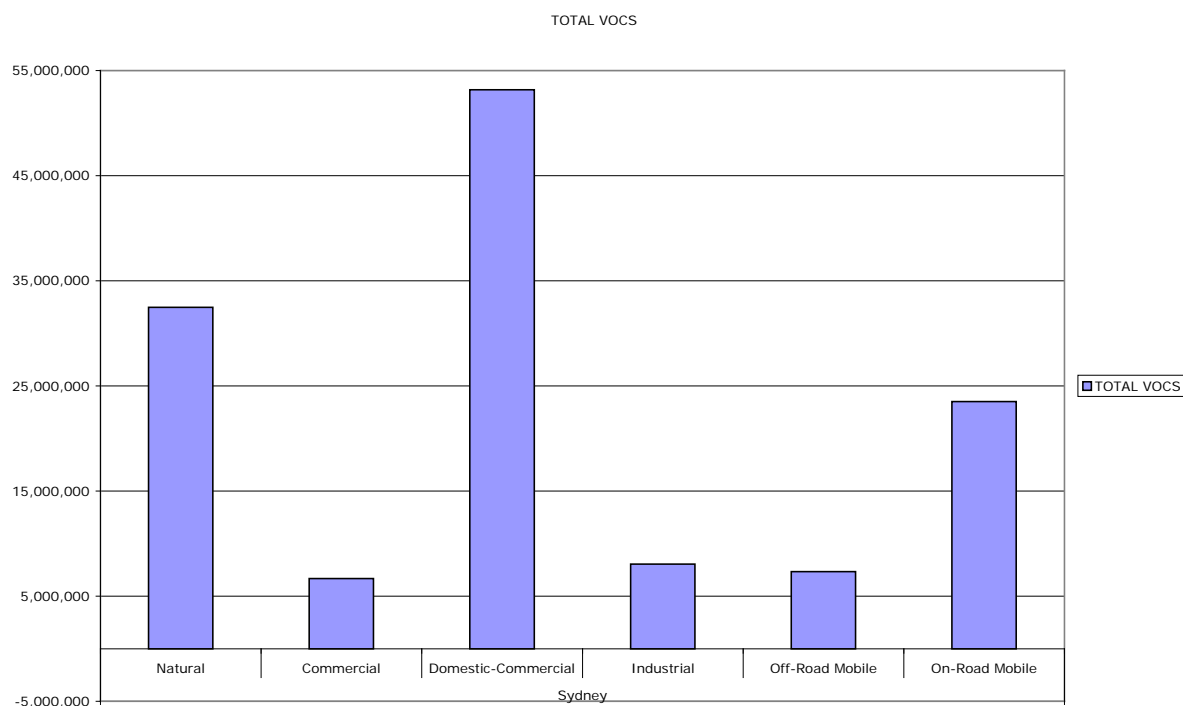


Figure 2-57: Example 6 – “Hide PivotChart Field Buttons”

**Step 12** – Copy the chart from the Excel™ workbook, paste into a Word™ document if required and format as shown in Figure 2-58.



**Figure 2-58: Example 6 – Formatted Word™ Chart**





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