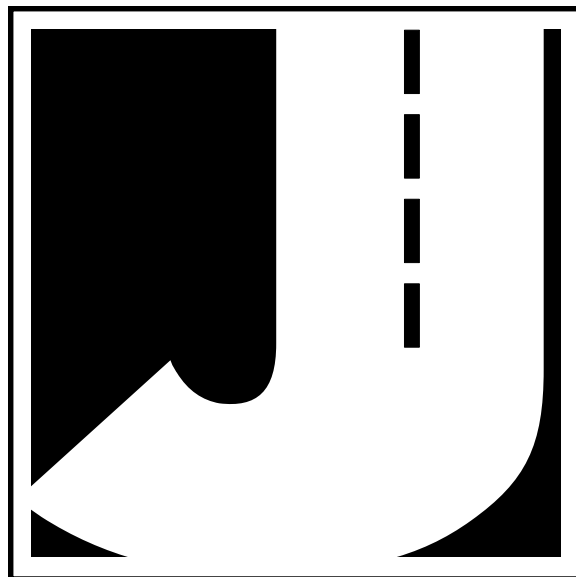


# PETRAPro

*Traffic Data Analysis & Reporting Software*



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**support@jamartech.com**

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For information on all known issues with PETRAPro, go to:

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Address any correspondence to:

**JAMAR Technologies, Inc.  
1500 Industry Road, Suite C  
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# Table of Contents

Technical Support .....	iii
Chapter 1 — Introduction and Installation.....	1.1
Chapter 2 — Navigating in PETRAPro and Using the Help System .....	2.1
Navigating in PETRAPro .....	2.2
The Help System .....	2.4
Chapter 3 — Type of Data Collection & Data Flow .....	3.1
Types of Data Collection .....	3.2
Data Flow .....	3.3
Chapter 4 — Learning the Basics of PETRAPro, Part 1 .....	4.1
Lesson 1 – Setting Your Preferences .....	4.2
Lesson 2 – Using the Main Screen .....	4.10
Lesson 3 – Downloading Data and Opening Existing Files .....	4.12
Chapter 5 — Learning the Basics of PETRAPro, Part 2 .....	5.1
Lesson 4 – Editing Your Data .....	5.2
Lesson 5 – The Tools Menu .....	5.8
Lesson 6 – Producing a Report.....	5.24
Chapter 6 — Turning Movement Files and Reports .....	6.1
Chapter 7 — Roundabout Movement Files and Reports .....	7.1
Chapter 8 — Stop Sign Delay Files and Reports .....	8.1
Chapter 9 — Signalized Intersection Delay Files & Reports .....	9.1
Chapter 10 — Multi-direction Gap Files and Reports .....	10.1
Chapter 11 — Classification Files and Reports .....	11.1
Chapter 12 — Spot Speed Files and Reports .....	12.1
Chapter 13 — Saturation Flow Files and Reports.....	13.1
Chapter 14 — Time-Stamped Files .....	14.1
Chapter 15 — Troubleshooting.....	15.1
Software Updates .....	13.2
Error Messages .....	13.2
Frequently Asked Questions.....	13.2
Appendix .....	A.1
Installing USB Drivers .....	A.2
Downloading Using a Serial Port.....	A.5
Federal Highway Administration Classification Scheme F.....	A.6
Export Options .....	A.7
Statistical Calculations .....	A.8
Registry Entry.....	A.8
Data Formats .....	A.9

# Chapter 1



## Introduction and Installation

## Introduction & Installation

### What is PETRAPro?

PETRAPro is the analysis software for data collected with JAMAR Technologies hand-held data collectors. This program can be used to process data from a variety of studies, including turning movement, roundabout movement, classification, multi-direction gap, stop sign delay, signalized intersection delay, spot speed, saturation flow and time-stamp.

PETRAPro, which was released in 2004, replaces the previous software used for this data analysis, PETRA for Windows, which was released in 1998.

PETRAPro was developed with today's practicing engineer in mind, with emphasis placed on ease of use while maintaining powerful capabilities. It allows you to download studies from JAMAR hand-held data collectors, manually enter data, view and edit the data, print reports and graphs, and store the studies for later retrieval. Data can also be exported in several formats for further analysis using other programs.

If you would like to get started right away, Chapters 4 & 5 of this manual provide an in-depth tutorial on all of the essential aspects of the program needed to start downloading your data and producing reports.



### Recommended Computer Requirements

- Windows XP, Windows Vista or Windows 7.
- 64 MB of RAM or higher.
- 20 MB or higher of free space on your hard disk.
- Available USB Port for downloading data

### Supported Studies

PETRAPro will download and process the following types of data collected with a JAMAR hand-held data collector: Standard Turning Movement, Enhanced Turning Movement, Roundabout Movements, Classification, Multi-direction Gap, Signalized Intersection Delay, Stop Sign Delay, Spot Speed, Saturation Flow and Time-Stamp.

### Supported Data Collectors

PETRAPro reads data from the current hand-held data collectors manufactured by JAMAR, the TDC Ultra. It also reads data from data collectors previously manufactured by JAMAR, including the IMC-IV, IMC-4, DB-400, DB-100, TDC-8 and TDC-12.

### Software Updates

Updated versions of JAMAR software are released periodically and are posted on the JAMAR web site. Licensed owners of PETRAPro may download updates to the program to make sure they always have the latest version of the software on their computer. To download the latest version of PETRAPro, go to [www.jamartech.com](http://www.jamartech.com) and then select Downloads from the list of options.

### Software Support

If you encounter any problems while using the program, or have any questions on specific operations, refer first to this manual and the program's built-in Help system. For up to the minute information on all known issues with the program, refer to the PETRAPro support web page at: [www.jamartech.com/petraprosupport](http://www.jamartech.com/petraprosupport).

## Definitions

Like any technical field, traffic data collection and analysis has its share of technical words and phrases. This program makes use of a few of these. Experienced users will be familiar with many (if not all) of these, while new users may not. In any event, before working with the program be sure you have a good understanding of the words and phrases used in the program that may mean something more specific than they imply.

**Turning Movements** — This is a generic term that applies to data that has been collected at an intersection where the direction of a vehicle (left, through, right) that passes through the intersection is recorded.

**Standard Turning Movement** — This is a term specific to PETRAPro that applies to turning movement data that has been classified by up to three groups using the Bank1 and Bank 2 keys of the TDC-12 hand-held data collector.

**Enhanced Turning Movement** — This is a term specific to PETRAPro that applies to turning movement data that has been classified by up to fourteen groups using the classification keys of the TDC-12 hand-held data collector.

**Classification** — Data that has been collected with the purpose of determining what types of vehicles (motorcycles, passenger cars, tractor trailers, etc.) are traveling over the study site for a given period of time. The most commonly used scheme for classifying vehicles is the Federal Highway Administration's Scheme F, which is described in the appendix.

**Signalized Intersection Delay** — Data that is collected to determine delay information at an intersection controlled by a traffic signal.

**Stop Sign Delay** — Data that is collected to determine delay information at an intersection controlled by a stop sign.

**Spot Speed** — Data that has been collected with the purpose of determining how fast vehicles are traveling over the study site for a short period of time. This data is then interpreted to provide statistics such as 85th and 95th percentiles. This data is usually collected to determine if longer speed studies (usually conducted with an automatic traffic recorder like a JAMAR TRAX) is necessary.

**Gap** — Data that has been collected with the purpose of determining when no traffic (or gaps) occur at the study site. Once a gap occurs, this format also records how long the gap lasts, in seconds.

**Saturation Flow Rate** — This is the number of vehicles that could pass through an intersection in one hour, if the signal light were always green. This value is used for several design purposes.

**Interval** — This is a pre-defined time period into which the data in many of the studies is divided. The most commonly used interval time is 15 minutes.

**Site Code** — This is a number, or combination of number and letters, used to help identify where a specific study was done. This is for optional use. You do not have to enter a site code if you do not use them.

**Approach** — This is a specific direction of traffic that comes to, or approaches, an intersection, such as the From North (also known as Southbound) approach, From West approach, etc. Each approach is comprised of several different movements of data.

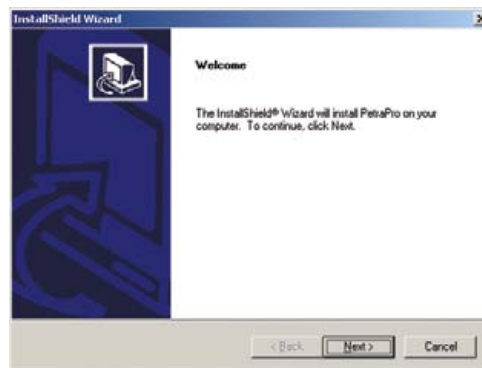


**Movement** — This is a specific portion of data from an approach defined by the direction a vehicle moved. A vehicle coming from the east and making a Left turn is part of the ‘Left’ movement for that approach. A vehicle making a right turn is part of the ‘Right’ movement, etc.

**Groups** — Also known as classes, this stands for any data that is collected where specific types of vehicles are kept separate. Commonly used groups are passenger cars, light trucks, and heavy trucks.

## Installing PETRAPro

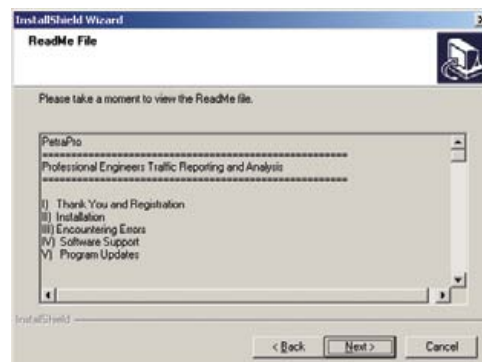
Begin the installation by placing the PETRAPro CD into your CD-ROM drive. If your CD drive is configured for Autoplay, the Installation Options program will start after a few seconds. Otherwise, click on the ‘Start’ button on your Windows desktop. Select Run from the list of options and type the command line ‘X:\launch’ where X is the letter of your CD-ROM drive. Press OK and you will see the Installation Options for the program.



**Figure 1-1:**  
Welcome  
Screen



**Figure 1-2:**  
License  
Screen



**Figure 1-3:**  
Information  
Screen

The Installation Options allow you to do a number of things in addition to installing the program. To begin installing the program, click on **Install PETRAPro**.

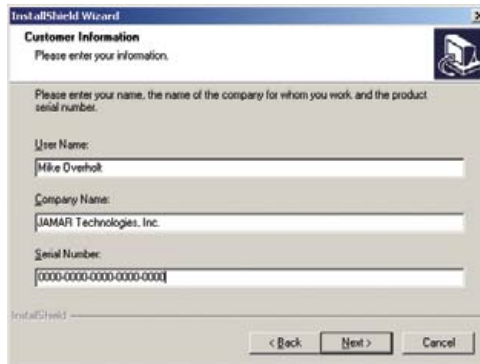
The Welcome screen lets you know that the installation for the program has begun. During the installation, files used by the program will be copied to your computer, including some Windows system files. If other programs are open and using some of the files that need to be installed, an error can occur. Make sure you close any programs that are running before you install this or any Windows-based software. Click *Next* and the License Agreement screen will appear.

The License Agreement screen allows you to review the software license for the program. You must accept the agreement in order to proceed with the installation. If you do not accept the agreement, the program must be returned to JAMAR. If you agree to the license, click *Yes*.

The Information screen of the installation provides an opportunity to review the Read Me file that is included with the program. This file contains additional information on the program and can also be read at the conclusion of the installation. Click *Next* once you have reviewed this information.

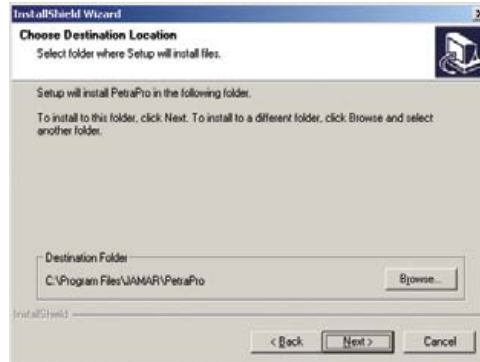


**Figure 1-4:**  
Customer  
Information  
Screen



The Customer Information screen requires you to enter your name, as well as your company's name. Your serial number, which is located on the back of the CD case, must also be entered. When entering the number be sure to include the dashes. If the serial number is entered incorrectly, you will not be allowed to proceed with the installation. Once the information has been entered, click the *Next* button to continue.

**Figure 1-5:**  
Destination  
Location  
Screen



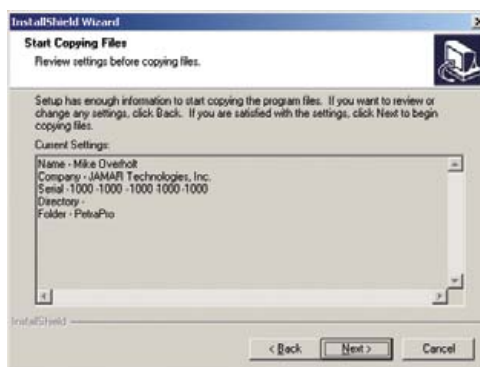
The Choose Destination Location screen is used to select where the program will be installed. The default location is C:\Program Files\JAMAR\PETRAPro. Once the directory has been set, click *Next*.

**Figure 1-6:**  
Program  
Folder Screen



The Select Program Folder screen is used to name the folder the program is stored in. Click *Next*.

**Figure 1-7:**  
Start Copying  
Files Screen



Once the Installation program has enough information to start copying files onto the computer, the Start Copying Files screen will appear. You can then review the previous choices you have made and if you would like to change anything before proceeding, use the Back button. Otherwise, click *Next* and the program will be installed.

**Figure 1-8:**  
Installation  
Complete  
Screen



The InstallShield Wizard Complete screen will appear after the program files have been copied onto the computer.

You may be prompted to Restart your computer at this point. If you are, be sure to restart before attempting to use PETRAPro.

You are also given the option to start PETRAPro immediately, view the Read Me file again, or do both.

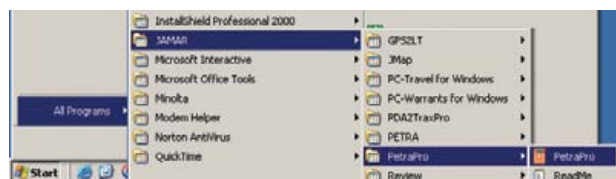
## Running PETRAPro

Like most Windows programs, there are several ways you can run the software. Here are two:

1– Open an Explorer window (right click on My Computer and select Explore) and find the PETRAPro.exe file, which is probably in the *C:\Program Files\JAMAR\PETRAPro* folder. Double click on the file **PETRAPro.exe** and the program will run.

2 – Select **Start, Programs**, and then **JAMAR** from the list of installed programs. Choose **PETRAPro** from the list, then choose **PETRAPro** again to run the program.

**Figure 1-9:**  
Start-up  
Selection



# Chapter 2



## Navigating in PETRAPro and Using the Help System

## Navigating in PETRAPro

PETRAPro has been designed to allow you to easily access the many features and options contained in the program. The tool bar located at the top of the program allows quick access to some of the program's most common features while the drop-down menus provide access to all functions of the program.

### Toolbar Icons

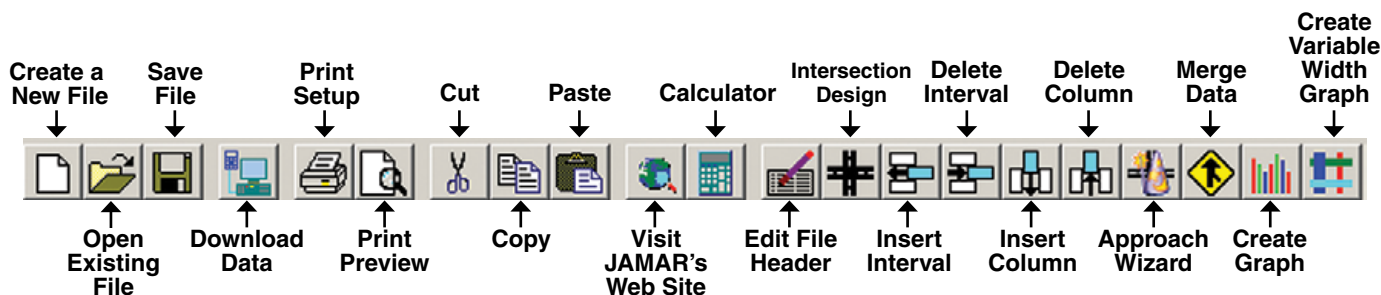


Figure 2-1: Toolbar

### Menu Options



Figure 2-2:  
File Menu

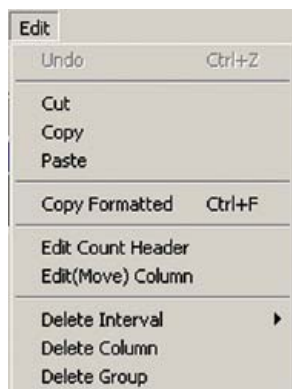


Figure 2-3:  
Edit Menu

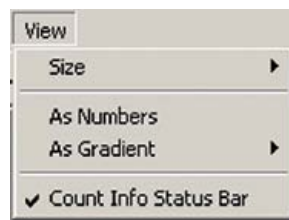


Figure 2-4:  
View Menu

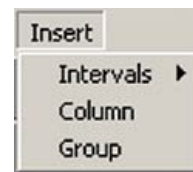


Figure 2-5:  
Insert Menu

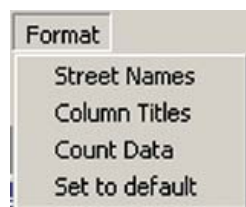


Figure 2-6:  
Format Menu



Figure 2-7:  
Tools Menu

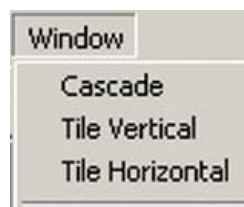


Figure 2-8:  
Window Menu

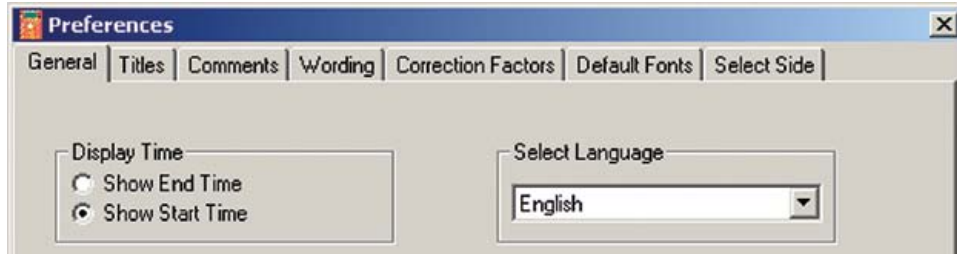


Figure 2-9:  
Help Menu

## Other Navigation and Selection Devices

### Tabs

A number of screens in the program contain Tabs to allow access to additional information. To access this additional information, click on the tab you wish to go to.



**Figure 2-10:**  
Preferences  
– General tab

In this example, the General tab is currently active. To select any other the other tabs, such as the Titles tab shown below, click on them with the mouse.



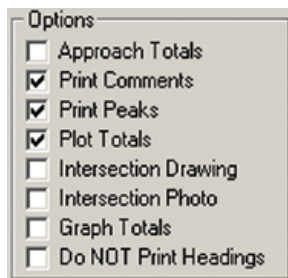
**Figure 2-11:**  
Preferences  
– Titles tab

### Radio Buttons

Many areas of the program contain radio buttons for selecting options and features. In general, you click on the circle next to the item to select it. Radio buttons are used when only one option can be selected at a time.

In the example shown in figure 2-10 above, taken from the General tab of the Preferences, the *Show Start Time* option has been selected.

### Check Boxes

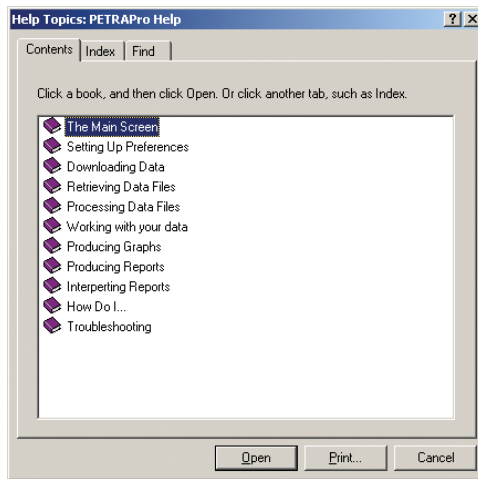


**Figure 2-12:**  
Check Boxes

Like radio buttons, many areas of the program contain check boxes for selecting options and features. In general, placing a check in the box tells the program to include the option or feature listed. No check means the option or feature is not to be included. Check boxes are used when more than one option can be selected at a time. In figure 2-12 (taken from the Print Setup), Print Comments, Print Peaks and Plot Totals are selected. The remaining options are not selected.



## The Help System



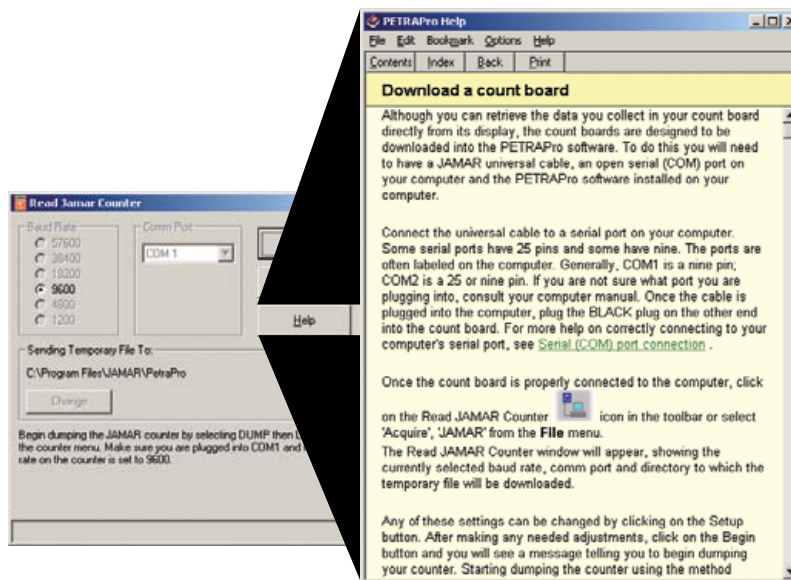
**Figure 2-13:**  
Help  
Contents

Like many other Windows programs, PETRAPro contains an extensive Help system to aid you in using the program. The Help system is essentially a built-in manual and most of the information that can be found in this printed manual can also be found electronically in the Help system.

There are several ways in which to access the information that is contained in the Help system. Select Help from the list of drop-down menus then choose PETRAPro Help Topics to be taken into the contents for the system, shown in Figure 2-13. The contents can be used to locate the item you want information on or use the Index or Find tabs to do a search using specific keywords.

Many screens in the program also contain Help buttons that will automatically pop-up Help information related to the screen you are working on. If you are not sure what to do in a certain screen, or what some of the available options mean, click on the Help button and detailed instructions will appear.

From downloading data, to editing a file, to printing the data, to interpreting the report, all the information needed to properly use the program can be found in the Help system.



**Figure 2-14:**  
Help  
Pop-up  
Window

# Chapter 3



## Types of Data Collection



## Types of Data Collection

One of the most useful features of the PETRAPro program is its ability to process several different types of data. The most common type is Turning Movements. Others types of data are Stop Sign Delay, Signalized Intersection Delay, Multi-direction Gap, Classification, Spot Speed, Saturation Flow Rate, and Time-stamped, all of which can be collected with the TDC-12.

### Turning Movements

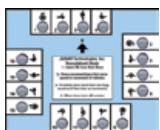


The JAMAR hand-held data collectors are designed to make turning movement data collection simple and accurate. Collected data can be edited in several ways and reports can be generated for overall volumes and peak information.

There are two forms of turning movement data that can be collected, Standard Turning Movements and Enhanced Turning Movements. With **Standard Turning Movements** you can classify up to three separate groups of vehicles by using the Bank 1 and Bank 2 keys located near the top of the TDC-12.

**Enhanced Turning Movement** studies allow you to expand the number of groups you can classify to up to 14. This is done by using the 14 class keys located near the bottom of the TDC-12.

### Roundabout Movements



Modern Roundabouts are one of the more popular new developments in traffic engineering and are being installed at an ever increasing number of locations. However, while the physical design of a modern roundabout is different from that of a standard intersection, the resulting vehicle movements are very similar - in most cases either straight, left or right. As such, the data collection for a Roundabout Movement study is very similar to a Standard Turning Movement Study.

### Classification



The normal use of the term Classification Study involves a manual survey of the types of vehicles. Each class is a particular type of vehicle, either a passenger car, a bus, a type of truck, etc. The study involves counting the number of vehicles of each class for a given amount of time. PETRAPro allows you to process data collected with the Federal Highway Administration's classification scheme, or your own custom scheme.

### Signalized Intersection Delay



Data that has been collected at a signalized intersection can be processed to provide a wide range of statistics. This includes the total volume recorded, number stopped, total delay, delay per stopped vehicle, delay per all vehicles, and percent of vehicles stopped.

### Multi-direction Gap

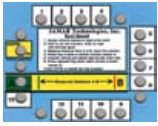


A gap is normally defined as the amount of time, in seconds, between the end of one vehicle and the beginning of the next. You can measure gaps on one lane or two lanes. PETRAPro can then produce gap reports for one lane, two lanes, or two lanes with combined gaps.

### Stop Sign Delay



Stop Sign Delay data can be processed by PETRAPro to provide a variety of statistics. The program will calculate how long it takes each vehicle to progress through the queue and enter the intersection, as well as keeping track of the number of cars in the queue at all times.



## Spot Speed

Spot Speed data can be analyzed to provide speed characteristics at a specified location, typically an approach to an intersection. Analysis includes speed percentiles, average speed, pace speed, number over speed limit and percent over speed limit.

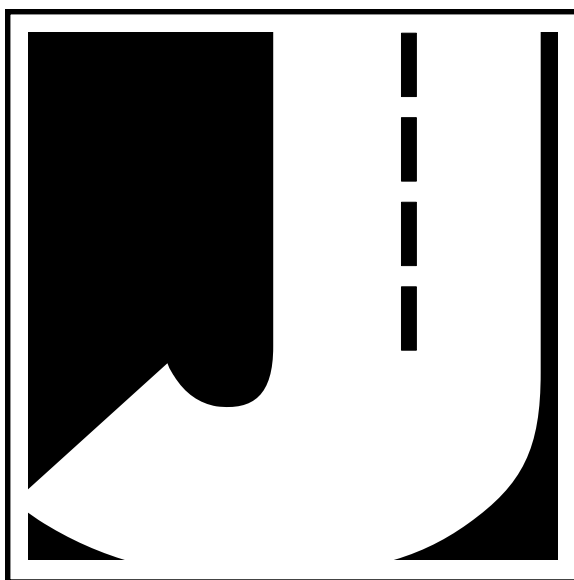


## Saturation Flow

A Saturation Flow rate is the number of vehicles that could pass through an intersection in one hour, if the signal light were always green. This value is used for several design purposes and, depending on how the data was collected, saturation flow studies can be analyzed not only for saturation flow information, but also signal timings and arrival types.

## Time-Stamped

Time-Stamped studies allow you to collect data in any format for your own analysis. The 1 through 16 keys can be used to record data. Each time stamp is recorded to the thousandth of a second (three decimal places). The data can then be exported in spreadsheet format for additional analysis.



# Chapter 4



## Learning the Basics of PETRAPro, Part 1

## Learning the Basics of PETRAPro

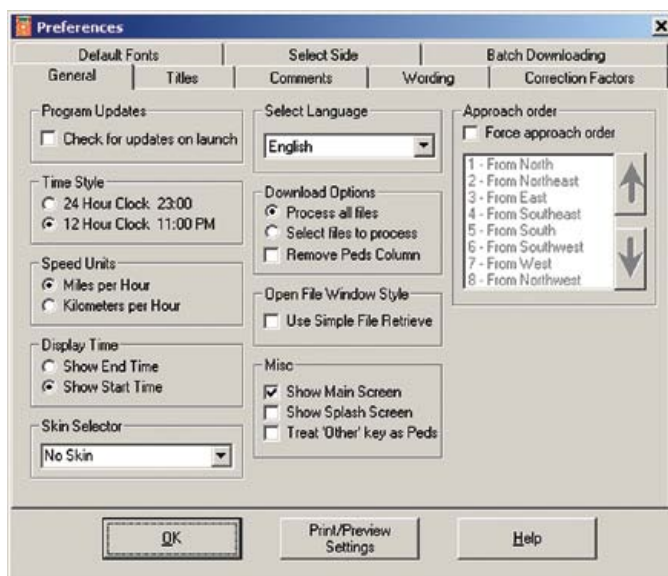
This chapter covers all of the essentials needed to begin downloading and producing reports from your data. This information is presented in a tutorial style so you can follow along on your computer as each aspect is covered. Once you have completed these lessons, you should have a good working knowledge of PETRAPro.

### Lesson 1 — Setting Your Preferences

Before you begin to use the program to process your data, you need to setup the program to suit your specific needs. This is done through the Preferences. The first time you run the program you will automatically be prompted to check your preferences. After this, these same settings can be accessed by clicking on the *File* menu, then selecting *Preferences*.

To start the program, click the Windows *Start* button, select *Programs*, then *JAMAR*, then *PETRAPro*. Once into the program, access the Preferences in the manner described in the previous paragraph.

There are eight tabs in the Preferences that can be used to customize the program. The tab that is visible when the screen first comes up is the **General** tab.



**Figure 4-1:**  
Preferences:  
General Tab

The first option listed is **Program Updates**. If this option is selected, when you start PETRAPro it will check the JAMAR web site for updates to the program. If an update is available, you will be given the option to download it.

An Internet connection is required for this feature to work properly. If you have an Internet connection, and would like to check for updates at start up, go ahead and select this option.

The second option is **Time Style**. This setting allows you to use either a 24-hour military clock or a 12-hour clock with AM and PM designations when

displaying interval times. Select the option that you prefer.

The next option is **Speed Units**. This setting allows you to choose either miles per hour or kilometers per hour when displaying a speed in Spot Speed data.

The next option is **Display Time**. This setting allows you to use either the start or the end time of an interval for display of the data. The most commonly used value is *Show Start Time*, but you may set this either way.

The **Skin Selector** option allows you to change the look of the program. There are a number of optional skins that can be applied to PETRAPro with different themes. You can select a few to see if there are any you like. If you prefer the standard Windows look and feel, leave the default *No Skin* setting selected.

The next option is **Select Language**. This setting allows you to set the language used for the commands in the program from those that are currently available.

The **Download Options** setting allows you to determine how the program should handle multiple files that are downloaded from a data collector at one time. The default option, *Process all files*, automatically opens a window for each file when the download is complete. The other option, *Select Files to Process*, brings up a list in the Open File screen of all the files that can be processed. You can then choose which specific files to process. Leave the default setting for now.

The Download Options also allows you to decide if you want to include the 'Peds' keys (also known as 'Other') as part of the download. JAMAR data collectors are designed with standard Right, Through and Left movement keys for each approach, but also have an extra key for each approach that can be used to count pedestrians or other things. Some users do not use these keys, and therefore don't want to include them with their data. We'll leave this box unchecked.

The next option is **Open File Window Style**. When opening existing files in PETRAPro, the default Open screen searches for all available drives and directories on the computer. The program then goes to the currently designated data directory, opens it and reads the headers of all the PETRAPro files. This information is then shown in the Open screen. For some users who are on restricted networks, or are working with hundreds of data files, this process can be time consuming. The *Use Simple File Retrieve Window* setting tells the program to only look for the designated data directory, and to only list the file names, rather than the full header information. This tutorial will cover some of the aspects of the standard Open screen so leave this preference unchecked.

The **Misc.** field gives you a couple options on how the program should act when it starts up and is running.

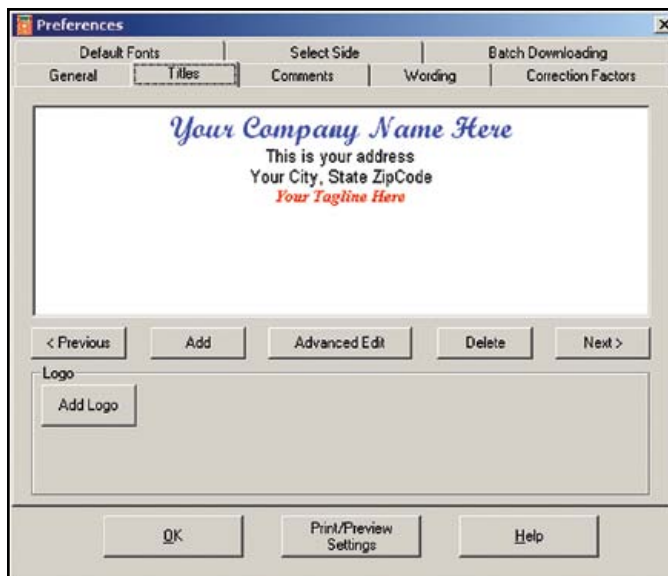
The Main screen is a graphical interface with shortcuts to some of the most common features of the program. Leave the *Show Main Screen* box checked. We'll be discussing this screen a little later on in this tutorial.

The Splash Screen is an opening graphic that appears when the program is first started. We'll leave this unchecked.

The *Treat 'Other' key as Peds* option affects how Turning Movement and Roundabout Movement data is displayed on the Intersection Plot. When this option is selected, data collected with the 'Other' keys (1,5,9,13) will be shown separately on the Intersection Plot. When it is not selected, this same data will be grouped with other vehicle data.

The final option, **Approach Order**, allows you to set a default order for how Turning Movement and Roundabout Movement data will be downloaded into the program. The default order is clockwise from the top (Southbound, Westbound, Northbound, Eastbound). If you wish to change this, put a check in the box *Force approach order*. You can then select any approach you want and move it using the Up and Down arrow keys.

Once you have finished setting your General preferences, click on the Titles tab at the top.



**Figure 4-2:**  
Preferences:  
Titles Tab

The **Titles** tab allows you to customize the four lines of text that are printed at the center top of each page of your reports. The titles can be edited to change the font, font style, font size, and font color. For the purposes of this tutorial, we'll replace the default titles that are stored with the program with your own. You may follow the steps below or substitute your own format as we go.

First, click on the *Advanced Edit* button. This opens a Text Editor window that you can use to format the titles. The first line of the titles is labeled *Your Company Name Here*. Delete this line and enter your organization's name.

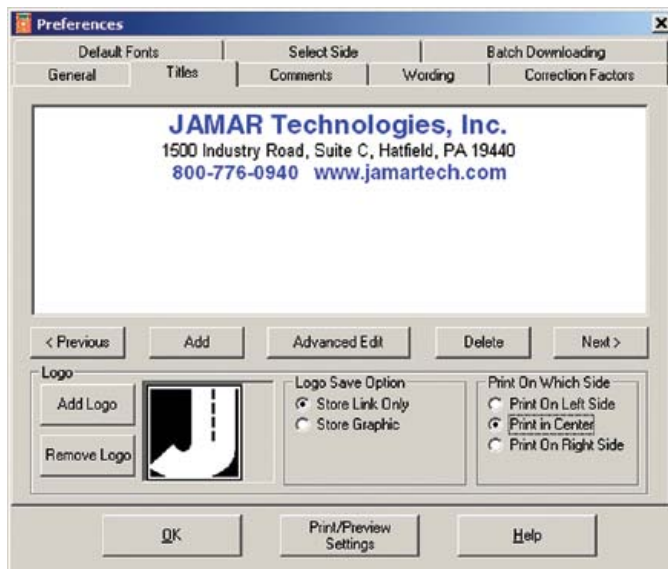
Next, we're going to change the Font. Highlight the first line, then click the down arrow in the font box that currently reads *Script MT Bold*. Set the new font as *Arial*, then click the *B* button to make it Bold. The current size of the font is a little large at 18, so we'll make it smaller. Leaving the first line highlighted, click the down arrow in the font size box that currently reads 18. Set the new size to 14. We're finished with the first line now, so click anywhere in the editor to remove the highlight. Notice that the preview screen has been updated to show your changes.

Next, delete the second, third and fourth lines and enter your address and phone number. When done, highlight all three lines and change the Font size to 12, color to black and type to Arial. Once all your changes are made, click the Save button and the you'll be taken back to the Titles tab, with the new titles in place.



**Note**

Note that you can store more than one set of titles in your preferences. To create a new set of titles, click on the *Add* button and a blank field will appear. Enter the new title information, and use the Text Editor to format. The *Delete* button can be used to remove any titles that you no longer need. You can choose from any of the stored titles when you prepare to print your reports.



**Figure 4-3:**  
Preferences:  
Titles  
with Logo

In addition to the standard text titles, the Titles tab also gives you the chance to use a graphic logo on your reports. Click the *Add Logo* button and the *Select Image to Attach* window will appear. You can use this screen to navigate to wherever you have a logo stored on your computer. The logo can be in a variety of formats, including JPEG, bitmap and GIF.

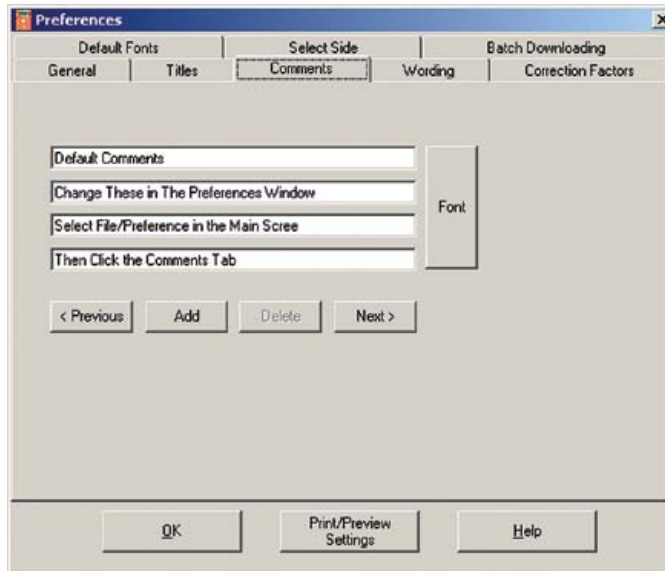
Once a logo has been added, a few additional options appear on the screen. The *Save Logo Option* allows you to decide if the entire logo will be stored with the file or if just a link to the logo's location will be stored.



You are also given the option of where to show the logo on the report. It can be placed on the left, right, or center of the report.

Note that you can still use the text titles even if you place the logo in the center of the report. The titles will print below the logo. If you don't want to use the text titles and only want to show the logo in the center, simply delete the text titles in this screen.

Once your titles are set the way you want, click on the Comments tab.



**Figure 4-4:**  
Preferences:  
Comments Tab

The **Comments** tab works in a manner very similar to the Titles tab. The comments listed will print in the upper left corner of the report and are designed to provide miscellaneous additional information with the data that is presented in the report.

The comments are expected to change from file to file, with information being added before each file is printed. As a result, the information that you enter here should be general labels. You will enter additional information that is specific to each file using the Edit Header function described later.

When you first click on the Comments tab you'll notice that 'Default Comments' is listed, along with a message telling you to change them. We'll replace these with ones that are more useful. First, delete the default text on the four comment lines. Next, type in *Weather:* on the first line, *Serial Number:* on the second line, *Collected By:* on the third line, and *Other Notes:* on the fourth line. When you are working with a specific file, you will fill out this information (or the information for the customized comments you've created) using the Edit Header function.

Like the Titles, the font used for the comments can be customized. However, this can only be done for the Comments as a whole. Click the *Font* button and set the font to Arial, Regular, 8.

As with the titles, you can store more than one set of comments in your preferences by using the Add button.

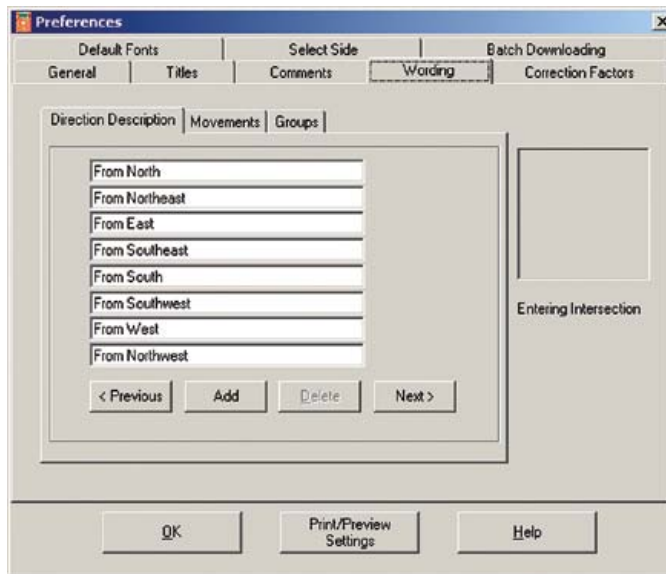
The settings that you apply to the comments will also affect the **File Comments** which are automatically printed in the upper right corner of reports. These comments include the file name, start date, site code and page number.



**Note**

Note that the Comments and Titles have to print on the same lines at the top of page (comments on right and left, titles in middle) so you do not want to make the font sizes too big, otherwise they will overlap in the printout.

Once you have set the Comments the way you want, click on the Wording tab.



**Figure 4-5:**  
Preferences:  
Wording Tab

The Wording tab allows you to customize the descriptions used with data that you download into the program. There are three areas that you can work with: the Direction Descriptions, Movements and Groups.

The **Direction Description** tab allows you to designate how each approach direction should be described, such as Northbound or From South. When a line is selected, an arrow showing the direction of the movement appears in the Entering Intersection box. You may store multiple sets of direction descriptions using the Add button.

The **Movements** tab applies to Turning Movement data and allows you to designate how each movement should be labeled when your data is downloaded. Most of the movements (right, thru, left) are pretty standard and will not need to be changed. However, the 'Other' keys (1, 5, 9, 13) of a JAMAR data collector can be used to collect a variety of things (pedestrians, bicycles, etc.). The default label is Peds but you can change this to whatever you think you'll be collecting with those keys.

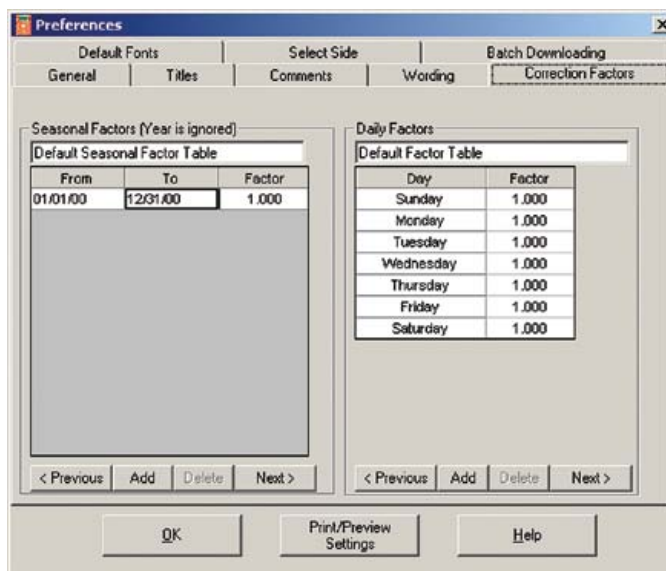
The **Groups** tab allows you to designate what names should be applied to the data collected using the unshifted, Bank 1 and Bank 2 keys of a Standard Turning Movement file. A common way of collecting data is to record Passenger Vehicles with the unshifted keys, Light Trucks with Bank1 and Heavy Trucks with Bank 2. You may set these any way you like.



**Note**

Note that changes made in the Wording tab will only affect subsequently downloaded files – they will not affect existing files. Any existing files must be edited within the files themselves. Also note that the Movement and Group settings you select in the Wording tab can be overwritten when working with a specific data file. How this is done will be discussed in a later lesson.

Once you have set the wording the way you want, click on the Correction Factors tab.



**Figure 4-6:**  
Preferences:  
Correction  
Factors

The **Factors** tab allows you to program correction factor tables for use with the data. There are two separate tables — one for seasonal factors and one for daily factors. These factors allow you to adjust your data based on historical information.

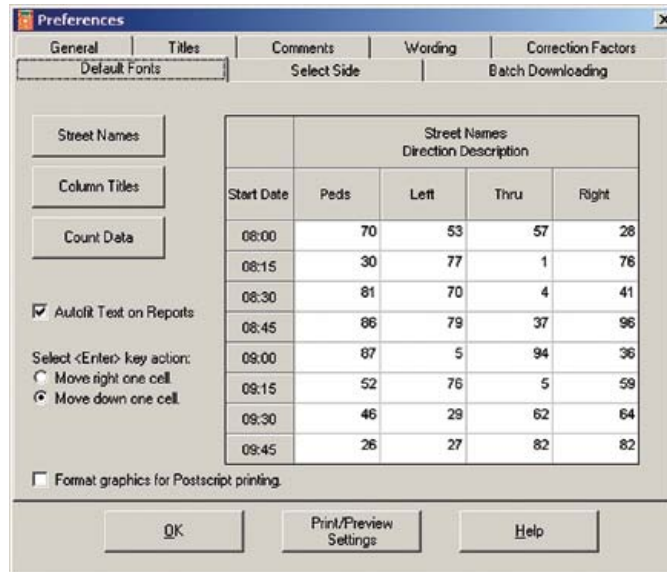
Multiple tables can be stored by using the Add button at the bottom of each field. These factors can be applied while editing your data or when producing your reports. Notice that the year in the seasonal factors table is ignored and therefore is defaulted to 00. For the purposes of this tutorial, we'll leave the factors with their default values.



**Note**

Note that you are not required to use factors with your data. You should only use factors if they have been supplied to you, or if you have created them based on historical information. If you are not familiar with how to use factors, leave them at the default setting of 1.000.

Once your Factors are set, click on the Default Fonts tab.



**Figure 4-7:**  
Preferences:  
Default Fonts

The **Default Fonts** tab allows you to customize the fonts that will be used in the program and on your reports. There are three areas you can set: Street Names, Column Titles and Count Data.

Click on the Street Names button. This will open the standard Windows font screen. You can then set the font in any format desired. We suggest using the font Arial with the style Bold and 10 point size, although you may use any settings you like. Click OK once the font is set. Notice that the preview screen updates to reflect the changes you have made.

Next, click on the Column Titles button. We suggest the font Arial with the style Regular and 8 point size for this font. Click OK, and repeat the same process with the Count Data button. Do not use large font sizes for the Column Titles and Count data or the reports may not have enough room to print them properly.



**Note**

Note that changes made in the Font tab will only affect newly created files, they will not affect existing data files. Changes can be applied to existing data files using the Format menu that will be discussed in a later lesson.

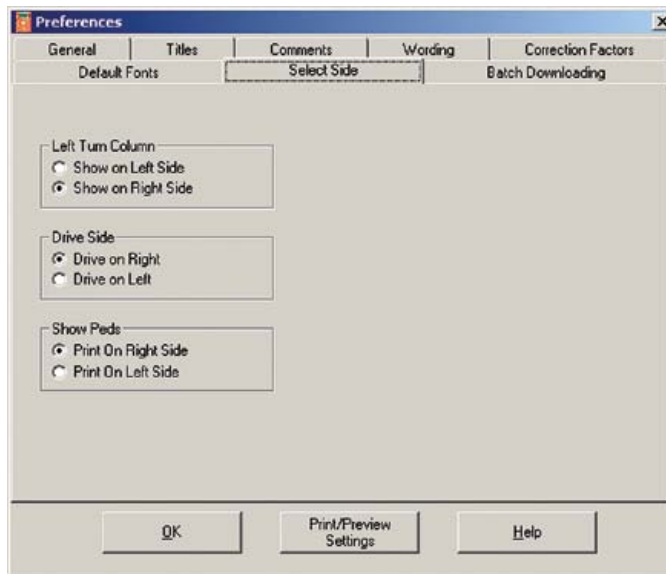
An important option on this screen is the *Autofit Text on Reports* checkbox. This option allows PETRAPro to automatically adjust the font size of any information on a report to fit in the space available for it. Leave this box checked.

There are also a couple additional options on this screen that can be used to customize the program.

The *Select <Enter> Key Action* field lets you set how the program will act when you press the Enter key while editing your data. The options are to either move the cursor down one cell or to the right one cell.

The *Format Graphics for Postscript Printing* checkbox lets you tell the program if the printer you are using is designed for the PostScript programming language. If you are not sure, leave the box unchecked.

Once you have set the Default Fonts tab the way you want, click the Select Side tab.



**Figure 4-8:**  
Preferences:  
Select Side

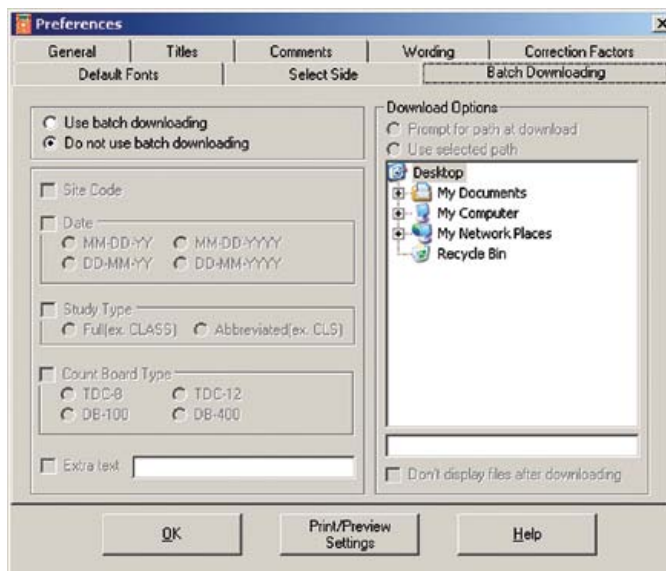
The **Select Side** tab allows you to set the order of some of the data in the program.

The first option is *Left Turn Column*. This setting allows you to choose whether the Left Turn movement (Turning Movement data) of each approach will be shown on the left of the display or on the right. This also affects how your reports will be printed.

The *Drive Side* option allows you to choose whether the vehicles in the study are drive on the right (as in the United States) or drive on the left (as in Europe). Set this according to your location.

The *Show Peds* option allows you to choose whether the Pedestrian column (also called Other column) is shown and printed on the right side of the approach data or the left.

Once you have set the Select Side tab the way you want, click the Batch Downloading tab.



**Figure 4-9:**  
Preferences:  
Batch  
Downloading

The **Batch Downloading** tab allows you to customize how files are treated when downloaded from a data collector.

If the *Use batch downloading* option is selected, the program will automatically assign file names and save the files that are downloaded.

The names used when assigning the file names depend on the options selected on this screen. You can choose to use any of the following when assigning the names: Site Code, Date, Study Type, Count Board Type and Extra text. If the program finds any files that would otherwise have the same named based

on the options selected, it adds a number to the end of the file name, starting at 1 and counting up.

The *Download Options* field allows you to select whether you want to be asked for a path to use when the files are downloaded, or if you want to use a pre-assigned path. The menu tree can be used to select the pre-assigned path.

You are also given the option of whether or not the files should appear on your screen in PETRAPro after they are saved. If the *Don't display files after download* box is selected, the files will be saved on the computer at the end of the download, but not automatically brought up in PETRAPro.

Note that you can quickly check all of the Preference settings using the Print/Preview Settings button located at the bottom middle of the screen. This feature allows you to produce a one-page report of all the options and formats you have selected.

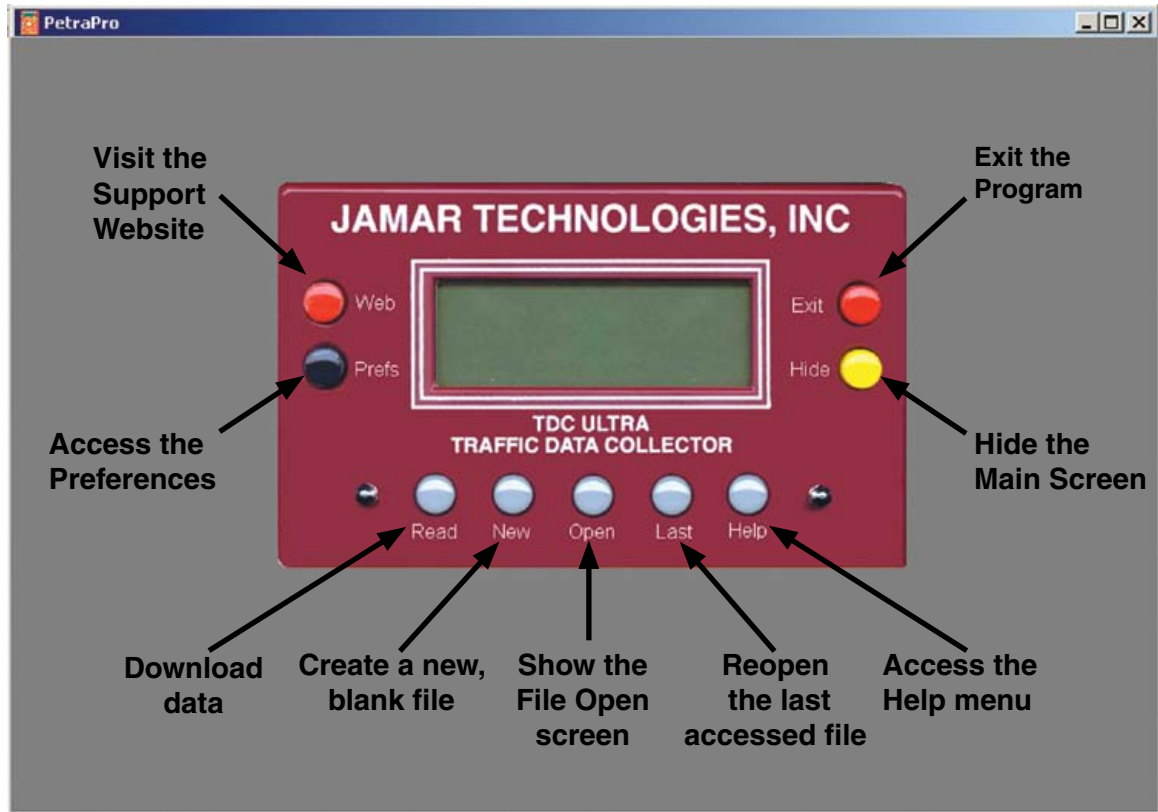
Now that we've seen how the Preferences work, we're ready to move on. Click the *OK* button.



Congratulations! You have completed the first lesson. In this lesson you learned how to set the preferences for the program. In the next lesson you'll learn the basics of downloading data and retrieving existing data files. You can take a break now, or jump right into the next lesson.

## Lesson 2 – Using the Main Screen

The Main Screen of PETRAPro is a graphical interface that gives you quick access to some of the most commonly used features of the program. Move your mouse cursor over the various buttons on the screen and notice that the display window changes to show a description of the option you are currently on.



**Figure 4-10:**  
Main  
Screen

Try clicking on the **Web** button. If you have an Internet connection, you should see the PETRAPro support web page appear. This page contains up-to-the-minute support information on the PETRAPro program. If you have a question about the program and you cannot find an answer to it in this manual, the support web page is the next best place to check.

The **Prefs** button will take you into the Preferences, which we covered in Lesson 1. You can access and change these settings at any time.

The **Read** button will bring up the Read JAMAR Counter screen, which can be used to download data from your data collector. We'll be discussing this in the next lesson.

Click on the **New** button. This button takes you into the New Count screen, which can be used to create a blank file for several types of data. These files are normally used if you need to do manual entry of data, or if you need to copy and paste data from other programs into PETRAPro for analysis. You can create blank files for Turning Movement, Classification (FHWA scheme or user-defined), Gap, Signalized Intersection Delay, Spot Speed or Saturation Flow Rate.

Click the Cancel button to exit back to the Main screen.

On the Main screen, click the **Open** button. This brings up the File Open screen, which is used to retrieve files you have previously saved on your computer. We'll be discussing this screen in the next lesson, so you can close it for now.



The **Last** button allows you to bypass the File Open screen and directly recall the last data file you were working with.

Click the **Help** button. This brings up the built in Help topics for the program. PETRAPro contains extensive Help documentation on all aspects of the program. This Help system is basically a built-in manual and most of the information found in this printed manual can be found in the Help system. If you get stuck when using the program, many of the screens have Help buttons that provide information on the feature you are using.

Next, click the **Hide** button. Notice that Main screen disappears, leaving only the program's menu options and toolbar icons available. You can use these options to access the program's features if you prefer not to use the Main Screen.

Go to the File menu, then select Exit. Once the program has closed, restart it. Notice that the Main Screen reappears. The Hide selection does not permanently hide the screen, it only hides it for your current session of PETRAPro. If you want to permanently hide the Main Screen and use the Menu options to navigate the program, go to the Preferences, General tab, and uncheck the *Show Main screen* box that we discussed in Lesson 1.



Congratulations! You have completed the second lesson. In this lesson you learned how to use the Main screen to access a variety of features in the program. In the next lesson you'll use the Main screen as a jumping off point to further explore the basics of downloading data and retrieving existing data files. You can take a break now, or jump right into the next lesson.



## Lesson 3 — Downloading Data and Opening Existing Files

*This tutorial requires a hand-held data collector with data in it. You can wait to do it until you have collected data or just follow along without actually performing the steps.*

Once you have performed a study with your data collector you will need to download it to your computer so PETRAPro can analyze the data.



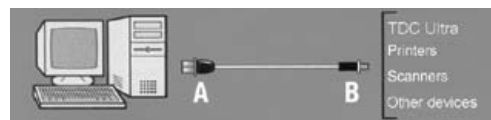
**Note**

Note that newer data collectors (TDC Ultra) use a USB connection for the download while older ones (TDC-12, TDC-8, DB-400, DB-100) use a serial port. The description below is for USB downloading with a TDC Ultra. Refer to the Appendix for more details on downloading using the serial port connection of older data collectors.

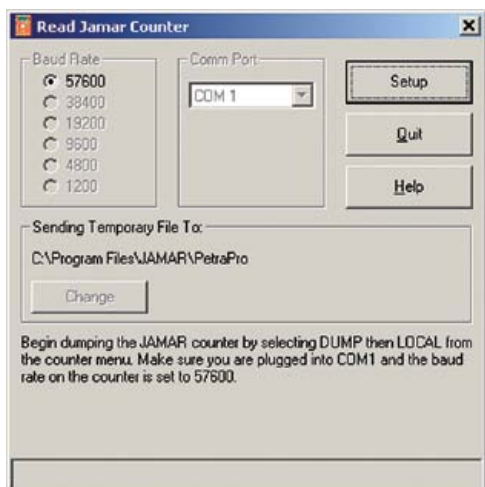


Also note that you should use the optional external power supply during the download process whenever possible. The download process draws a significant amount of power, so use of the external power supply will prolong the life of your AA batteries.

To download your data, first turn on the TDC Ultra and plug a USB cable into it. Then, plug the other end into your computer.



Note that the first time you are connecting the Ultra to a computer using the USB port, you will need to install the drivers for it. Refer to the Appendix for information on how to do this before proceeding. The USB drivers create a virtual comm port that you will select during the download process.



**Figure 4-11:**  
Read JAMAR  
Counter

Start the PETRAPro analysis software on your computer, and prepare it for download by selecting *Read* from the interface screen. The **Read JAMAR Counter** screen will appear. Note that you can also access this screen by going to the *File* menu, selecting *Acquire*, and choosing *JAMAR* or by clicking on the *Download a Count Board* icon in the toolbar.

The baud rate setting determines how fast the data will be transferred into the program. It must match the baud rate set on the data collector. The TDC Ultra's maximum speed is 57600, which is what we recommend you use. However, you can change the baud rate to any of the listed values by first clicking on the *Setup* button and then making your selection.

Clicking the *Setup* button also allows you to select the Comm Port to be used for the download. A comm port will have been created on the computer when the Ultra was connected to it. Select this port number. PETRAPro makes the selection easy by only listing the comm ports that are available on the computer.

After setting your baud rate and comm port, click on the *Begin* button and you will see a message prompting you to begin downloading the data collector.

**Figure 4-12:**  
Dump  
Menu

<b>CONTINUE</b>	<b>BAUD</b>	<b>EXIT</b>
<b>Begin local transfer at 57.6k baud</b>		

On the Main Menu of the TDC Ultra, use the TAB key to highlight DUMP, then press DO. The screen shown to the left is then displayed.

Note that the baud rate that the TDC Ultra is currently set for is shown on the bottom line. As we previously learned, the baud rate is the speed at which the data will be sent from the Ultra to the computer. The baud rate set in the Ultra **must** match the baud rate that has been selected in the software. You normally only have to set the Baud Rate once, to match the setting in the software. To set the Baud Rate, use the following steps.

**Figure 4-13:**  
Select  
Baud Rate

<b>1200</b>	<b>4800</b>	<b>9600</b>
<b>19.2K</b>	<b>38.4K</b>	<b>57.6K</b>
<b>Select Baud rate, then press DO.</b>		

Press TAB until Baud is flashing, then press DO. The screen shown to the left is then displayed.

Use the TAB key to move the highlight to the baud rate you want. Most computers will allow transfer at the fastest baud rate of 57,600. Once you have set the baud, press DO.

**Figure 4-14:**  
Begin  
Download

<b>BEGIN</b>	<b>EXIT</b>
<b>Press DO to start dump.</b>	
<b>Baud Rate = 57.6k</b>	

As mentioned, once the baud rate has been set, it will be used every time for the download, unless you change it.

Press TAB to highlight *Continue*, then press DO. The screen shown to the left is then displayed.

**Figure 4-15:**  
Transfer in  
Progress

<b>TRANSFER IN PROGRESS</b>
<b>count#:001</b>
<b>interval#:001</b>

At this point, the TDC Ultra is ready to download. Make sure your software is properly set up (refer to the software manual if you have any questions on this), then press the DO key. The screen shown here will then be displayed.

When the download is occurring you should see a status bar moving across the bottom of the *Read JAMAR Counter* screen. Once the download is complete separate windows should appear for every study contained in the data collector. Each file should then be saved with a permanent file name you provide.

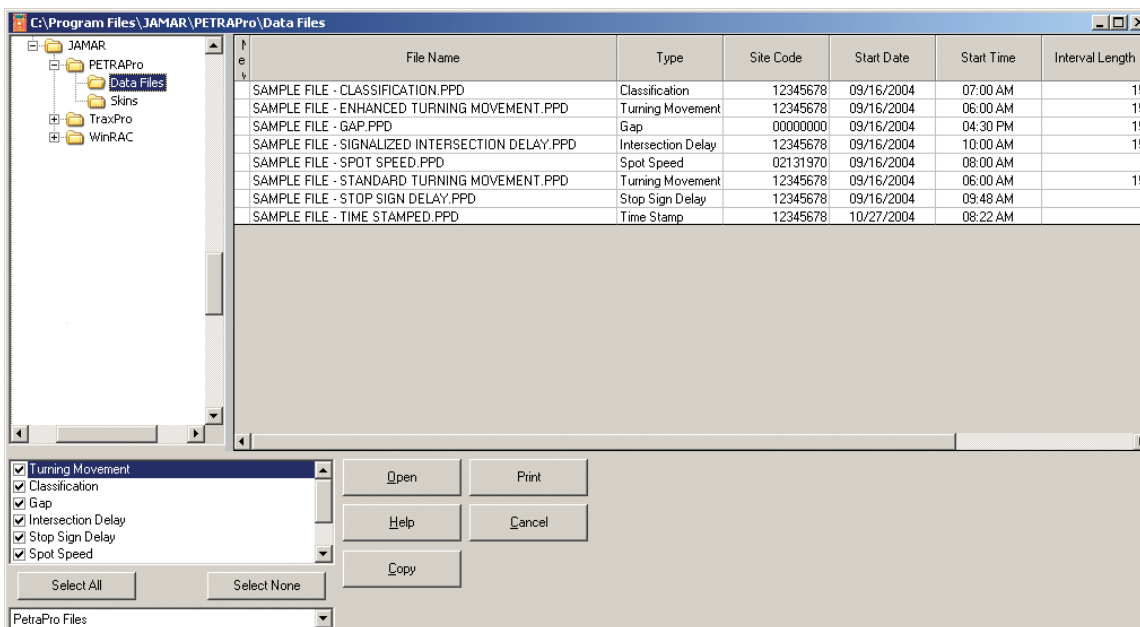
## Retrieving Saved Files

While you will usually download your data and produce reports all at one time, there may be times when you need to open a previously downloaded file for further analysis. In addition, you may have older files from other programs that you need to incorporate into PETRAPro. In either case, these files can easily be accessed through the program.

Close any files that you may have downloaded. (Don't worry about saving them. You can download them again at a later time. The data can be downloaded as many times as you like. It will remain in the data collector until you physically clear it from the unit.)

On the Main screen, click the *Open* button. This will bring up the Open File screen. You can also access this screen by going to the File menu and selecting Open.

The Open File screen works in a manner very similar to Windows Explorer. The directory tree on the left side of the screen is used to select the folder where your data files are stored. We want to retrieve one of the sample files that was installed with the program, so we'll need to use the directory tree to set the location of these files. The default installation location of this folder is C:\Program Files\JAMAR\PETRAPro\Data Files. Navigate to this path (or the path you used for the installation) using the tree. Once the data folder is selected you will see a list of files on the right side of the screen.



**Figure 4-16:**  
Open File  
Screen



Note that there are several types of files that can be opened by the program. Files created in PETRAPro, or saved in the PETRAPro format, use a .ppd file extension and will appear in black type. Files from earlier programs, such as PETRA for Windows or PETRA DOS, use different colors. These are the file types that the program is defaulted to look for. However, the program can also open files in the IMC (.dfi) and AAP (.vol) formats. To access either of these, select the appropriate entry from the drop down list at the lower left of the screen. IMC files appear in green, while AAP files appear in red.

The list of files on the right side of the screen contains a variety of information on each file, including the file name, type of data, site code, start date and start time, interval length, number of intervals and location information. Click on the column title 'Start Date' and note that the list of files is rearranged in chronological order. The file list can be sorted in a variety of ways simply by clicking on any of the column titles.

Note that you can print the list of files in your folder, along with the additional information shown in this screen, by clicking on the *Print* button. The *Copy* button can be used if you'd like to copy the list into another program, like Excel.

The file we want to retrieve is named *Sample File - Standard Turning Movement.ppd*. Locate this file in the list then click on it with your mouse. This will highlight the file. Once it has been highlighted, click on the *Open* button. The Open File screen will close and the file will be opened. You can also open files by double clicking on them.



Congratulations! You have completed the third lesson. In this lesson you learned how to download data from the hand-held data collectors into the program, and how to open existing files. In the next chapter you'll learn how to work with data files. You can take a break now, or jump right into the next lesson.

# Chapter 5

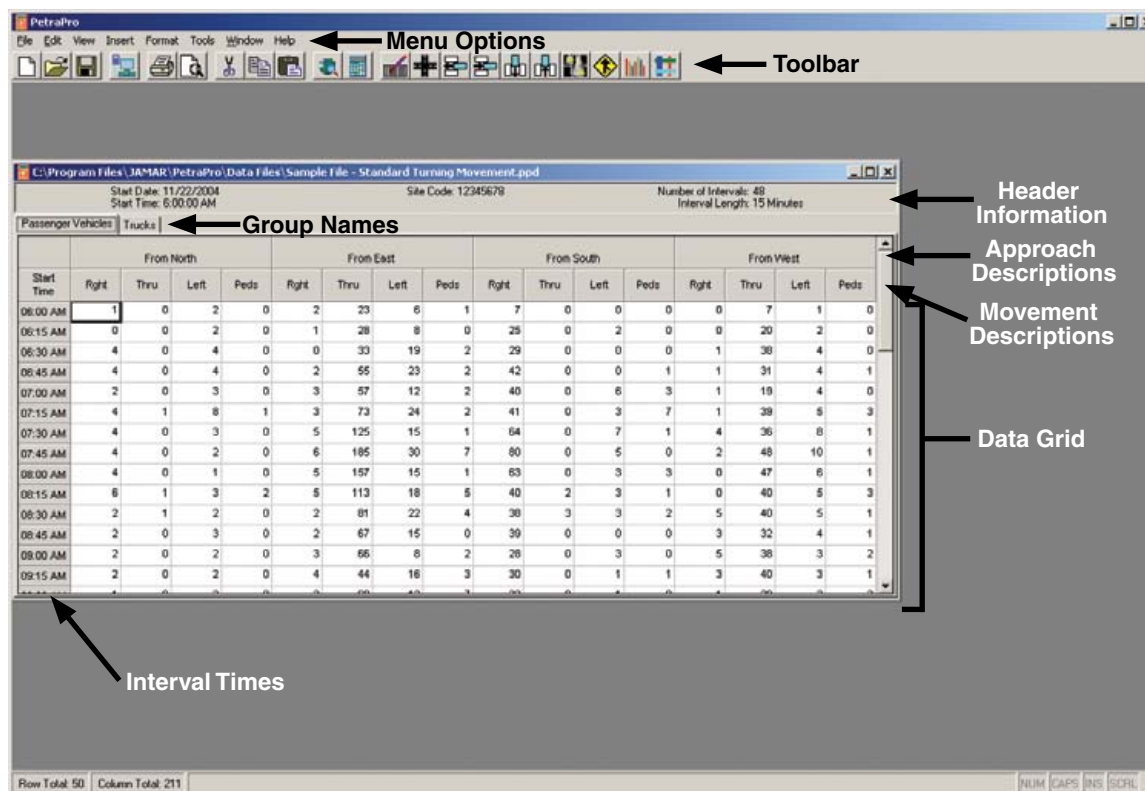


## Learning the Basics of PETRAPro, Part 2

## Lesson 4 — Editing Your Data

In this lesson you'll learn about some of the basic editing functions that can be done with data files. For this lesson we'll be working with the *Sample File - Standard Turning Movement* file that was installed with the program. Other PETRAPro data files (Classification, Gap, etc.) may look a little different but they all use similar editing functions.

If you already have the *Sample File - Standard Turning Movement* file open, great. Otherwise, follow the procedure described in Chapter 4, Lesson 3 to open it.



**Figure 5-1:**  
Turning  
Movement  
File

The first thing we want to do is identify the various parts of the file. The data file contains six main areas of information, as shown in Figure 5-1 above: Header Information, Approach Descriptions, Movement Descriptions, Group Names, Interval Times and Data Grid. The information in the file can be edited using the items in the Toolbar and Menu Options, also shown in Figure 5-1.

### Edit Header



We'll start by taking a look at the Header Information. Each PETRAPro file contains not only the data for the file, but other information that is pertinent to it, such as the start date, start time, GPS location, etc. Most of this information is stored in the file's header. To edit the header, go to the Edit menu and select *Edit Count Header*. Note that you can also access this feature by clicking on the Edit Header icon in the tool bar. This will open the Edit Header Information window.

Notice the Start Date and Time for the file, listed at the upper right. These are read in from the data collector when you download your data. If, for whatever reason, the data collector's date or time was set wrong, you can correct it here. Below the Date & Time is the Site Code for the file.

Below the Site Code field is the Group Descriptions field. These descriptions are also read in from the Preferences when you download your data. Don't worry if the descriptions shown for the sample file don't match what you entered in the Preferences. The sample file descriptions were created when the file was originally made - changes in the Preferences don't affect existing files like this one.



**Figure 5-2:**  
Edit Header  
Information

If you want to change the descriptions for an existing file you can do so here. In this case, it looks like the sample file was collected with passenger vehicles counted as group 1 and trucks counted as group 2. We have no reason to think this wasn't the case, so we'll leave them the way they are. We'll soon see how the different groups are displayed in the data.

The top left of the screen contains the comments for this file. Notice that the sample file has the general comment

information we entered in the Preferences in Chapter 4, Lesson 1. When a new file is created, the program reads in the comments you have set in the Preferences, then you use this Edit Header screen to fill in the specifics. That's what we'll do now.

Click your cursor to the right of the colon on line one and type in *Sunny*. Next, click to the right of Serial Number on line two and type in *TU-0001*, representing the serial number of the data collector. Now click to the right of Collected By: and enter your name. We don't have any Other Notes to add for line four, so enter *None*.

That's it for the Comments. We'll see how the comments we added apply to our report in a later lesson.

Below the Comments field is the *GIS Information* field. This can be used to enter GPS coordinates of where the data was collected. The coordinates can be entered in either the degrees & minutes format or just degrees format. The direction of the coordinates (North or South and East or West) must also be selected. We'll see how these can be used with your file a little later on in this tutorial.

Click *OK* and the Edit Header window will close.



You should now be back at the main data screen. We want to save these changes in the file, so click on the Save icon in the toolbar. You can also save the file by selecting Save from the File menu.

If you look at the top of the data Window you'll see some of the information we just saw in the Header listed on the screen, including the Start Date & Time, and Site Code. Also notice the two tabs located to the left labelled *Passenger Vehicles* and *Trucks*. Each tab contains that group's data. Click on the Trucks tab and notice that the data changes to show that group. Click back on the Passenger Vehicles tab and the data changes back.

Now that we're familiar with how to see all of our data, let's look at a few ways we can change it.

### Cut, Copy Paste

The data in the file is presented in a spreadsheet-style, and like other spreadsheets it is easy to make changes. Click on any of the cells in the file and it will become highlighted. You can then type a value directly into the cell. Give this a try. PETRAPro makes it easy for you to manually enter data.



Another easy way to edit your data is through the Cut, Copy and Paste commands. PETRAPro supports these standard Windows commands, which makes it easy to move data from one column to another, from one file to another, or from the program into a different program.

### Copy Formatted

If you need to move your data into another program to do some custom processing, PETRAPro also provides a more advanced version of the Copy command, called Copy Formatted. This command allows you to copy over not only your data, but also formatting information like interval times and column titles.

To see how this works, click on the Start Time (or End Time) box at the upper left of the data grid. This will highlight the entire data grid. Next, go up to the Edit menu and select Copy Formatted. This will copy the information to the Windows clipboard. If you have Excel, or some other spreadsheet program, open it up. Go to the Edit menu, select Paste and you'll see the data from PETRAPro dropped in, along with the interval times and column titles.

Microsoft Excel																		
File Edit View Insert Format Tools Data BoboPDF Window Help Adobe PDF																		
Type a question for help																		
D12 1 Arial 10 B I U																		
Book1																		
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		
1	Street Name	From North				From East				From South				From West				
2																		
3	Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
4	6:00 AM	1	0	0	2	0	7	0	0	0	2	23	6	1	0	7	1	0
5	6:15 AM	0	0	0	2	0	25	0	2	0	1	26	8	0	0	20	2	0
6	6:30 AM	4	0	4	0	29	0	0	0	0	33	19	2	1	38	4	0	
7	6:45 AM	4	0	4	0	42	0	0	1	2	55	23	2	1	31	4	1	
8	7:00 AM	2	0	3	0	40	0	6	3	3	57	12	2	1	19	4	0	
9	7:15 AM	4	1	8	1	41	0	3	7	3	73	24	2	1	39	5	3	

**Figure 5-3:**  
Data Pasted  
in Excel

### Export Options

In addition to the Copy Formatted command, PETRAPro also gives you the ability to directly export your data into the Excel format. In PETRAPro, go up to the *File* menu, then slide your mouse down to *Export*. A list of export options appear, including Excel. (The other export options are discussed in the Appendix.) Select Excel and you are prompted to supply a file name for the new Excel file. Once this is done, click OK and the file will be created.

### Insert & Delete Intervals

Another way you can edit a data file is by changing the number of intervals it contains. This is easily done using the Insert and Delete Interval commands. First we'll see how to add intervals to a file. This can be useful if you have files you want to combine using the Copy and Paste commands, or if you are manually entering data.

Click on *Insert* in the menu options, then go to *Intervals*. You are presented with three options: Add to Beginning, Add Before Current Interval and Add to End. For this lesson, we'll add some intervals to the start of the file, so select Add to Beginning. You are then asked how many intervals to add. Enter '4' and click OK. Notice that there are now four empty intervals at the start of the data. Also notice that the Start Time of the file has changed. Since we added four 15 minute intervals to the beginning, the program has automatically changed the Start Time from 6 AM to 5 AM.



Note that the Insert an Interval icon in the toolbar can be used to quickly add one interval to a file. When using this icon one interval is automatically added before the currently highlighted interval.

Now that we've seen how easy it is to add intervals, we'll try deleting them. Click on *Edit* in the menu options, then go to *Delete Interval*. Like with adding intervals, you are presented with three options: Delete From Beginning, Delete Current Interval and After and Delete From End. We're going to delete the intervals we just added, so select Delete From Beginning. You are then asked how many intervals to delete. Enter '4' and click OK. Notice that the four empty intervals have been removed, and the Start Time has been adjusted back to 6 AM.



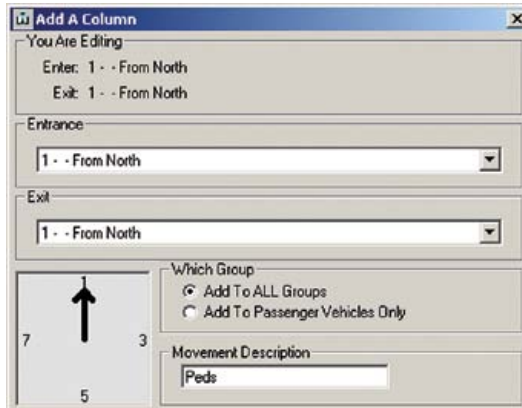


Note that the Delete Current Interval icon in the toolbar can be used to quickly remove one interval from the file. When using this icon the currently highlighted interval is automatically deleted.

## Insert & Delete Columns

PETRAPro also makes it easy for you to add, or subtract, columns of data. This can be useful if you have files that don't have the standard Right, Through and Left movements for all approaches.

Click on *Insert* in the menu options, then go to *Column*. The Add a Column window will then appear. Note that you can also use the Insert a Column icon to access this screen.



**Figure 5-4:**  
Add a Column

You use this screen to instruct the program where the column you are adding should go. The Entrance field should be set to the approach that the data is coming from, while the Exit field should be set to the approach it is exiting to.

We're going to add an additional Right column coming from the North and headed to the West (westbound). Leave the Entrance field set to *1 - From North*, since this is the North approach, and set the Exit field to *7 - From West*, since this is the West approach.

Notice that the diagram at the lower left of the screen updates to show you the direction of the column you are adding. Also notice that the Movement Description field updates as well. The Descriptions that appear are the same as the ones that have been set up in the Wording tab of the Preferences, covered in Lesson 1. You can use the default or manually add a title. We're going to pretend this column is for Right Turn on Red data, so change the Description to RTOR. We want this column to apply to the entire file, so leave the *Which Group* field set to *Add to All Groups*. Click OK and notice that a new column, titled RTOR has been added to the From North approach.



**Figure 5-5:**  
Delete a Column



Deleting a Column of data is even easier than adding one. To do this, you start by highlighting the column you want to remove. We'll remove the column we just added, so click on the RTOR column title and the entire column will be highlighted. Next, click on the Edit menu and select Delete Column. (Note that you can also use the Delete Current Column icon to access this feature.)

The Delete Current Column window will then appear, asking whether you want to delete the column from just the active group or all groups. We're going to remove it from all groups, so leave the default setting and click OK. Notice that the RTOR column is now gone.

## Edit (Move) A Column

In addition to adding columns of data, PETRAPro allows you to move existing columns to new locations, or edit their titles. This is especially useful if you used the Other keys (1, 5, 9, 13) to record movements other than the standard right, through and left at an intersection. To see how this works, double click on the *Right* column title in the From North (Southbound) approach, and the Edit (Move) A Column window will appear. Note that you can also access this screen by selecting *Edit (Move) Column* from the Edit menu.

Notice that this screen is essentially the same as the Add a Column screen described earlier. You can use the Entrance and Exit fields to change the direction of the column and use the Movement

Description field to change the title. We're not going to move any of the columns in the sample file, so click on Cancel.



#### Note

Note that the Movement Description field **should not** be changed to a different movement name without also changing the actual Entrance or Exit fields. If we were to change the description of the Right column we selected to read Left, the title would change but the data would still appear as right turn data in any diagrams of the intersection.

## Format Data

In addition to giving you a lot of flexibility for adding or removing data in a file, PETRAPro gives you a lot of flexibility in how your data should look. You can choose custom fonts for the Street Names, Column Titles and Count Data of your file by using the Format menu. Each of these selections allows you to choose a font type, font style, and font size.

The fonts that are used when a file is downloaded are taken from those that are set up in the Fonts tab of the Preferences screen. Since we took the time to set the fonts while we were in the Preferences (refer to Chapter4, Lesson 1 for more information on this), we'll apply them by using the Set to Default option. Click this selection and notice that the fonts of the file are changed to match what we designated in the Preferences screen.

## View Data

Another benefit that PETRAPro gives you is the ability to view your data in several different formats. To see a few of these, click on the *View* menu. Move to *Size* and notice that you are given several ways to change the size of your data file window.

Below *Size* are two selections, *As Numbers* and *As Gradient*, that let you see your data in two different ways. The program is defaulted to show you your data as numbers; that's what you are looking at on the screen right now. The *As Gradient* selection lets you see your data as shades of color, which can be very helpful in getting a quick understanding of your traffic volumes. There are four colors you can pick from: Red, Green, Blue and Gray.

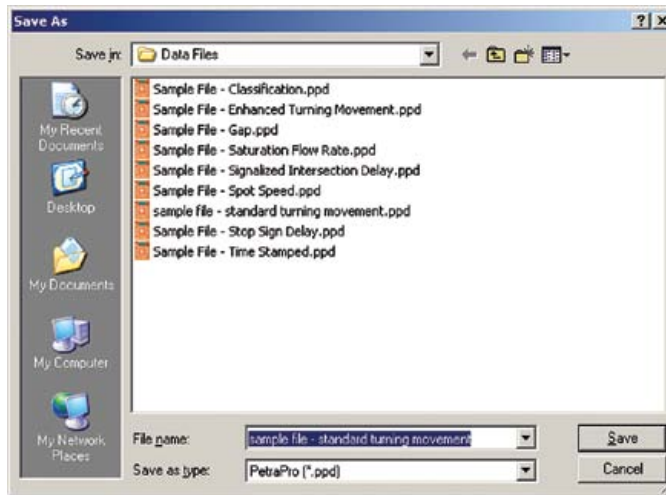
Click on the Red selection and notice that the data grid changes from showing numbers to showing colors. The black areas represent low volumes, while the red areas represent higher volumes – the lighter the red, the higher the volume. You can now easily see that the highest volume movements for the file are the through movements for the From East and From West approaches, with some additional elevated volumes for the Right movement on the From South approach. When done looking at this, go back to the View menu and reselect *As Numbers*. Your file should then be back to the default view.

The last item in the View menu is the Count Info Status bar. This is a useful feature, located at the bottom left of the data screen, that lets you quickly and easily see volume information by providing Column and Row totals for any highlighted cell.

Row Total: 44	Column Total: 3440
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## Save Changes

Before we conclude this lesson, we want to save all the changes that we made to the sample file. There are several ways you can do this. The quickest way is to click on the Save icon in the toolbar. This immediately saves the current file using the existing file name. You can also save the file by going to the File Menu, then selecting Save.



**Figure 5-6:**  
Save As  
Screen

If you want to change the name of the file before you save it, or if you want to change the location of where the file is saved, you can use the Save As option. Click on *Save As* in the File menu and the Save As window will appear.

The *Save In* field at the top of the window can be used to change the location of where the file is saved. The *File Name* field near the bottom of the screen can be used to change the name of the file.

Note that if you want to save the file in an older JAMAR format, such as

PETRA for Windows or PETRA DOS, you can do so by changing the Save As Type field at the bottom of the screen.

We're just going to save the file with its current name, in its current location, so click **Cancel** to close the Save As window. Then, click on the Save File icon in the toolbar to save the file.



Congratulations! You have completed lesson four. In this lesson we learned some of the standard editing techniques for data files. In the next lesson we'll learn how to use some of the Tools PETRAPro has. You can take a break now, or jump right into the next lesson.

## Lesson 5 — The Tools Menu

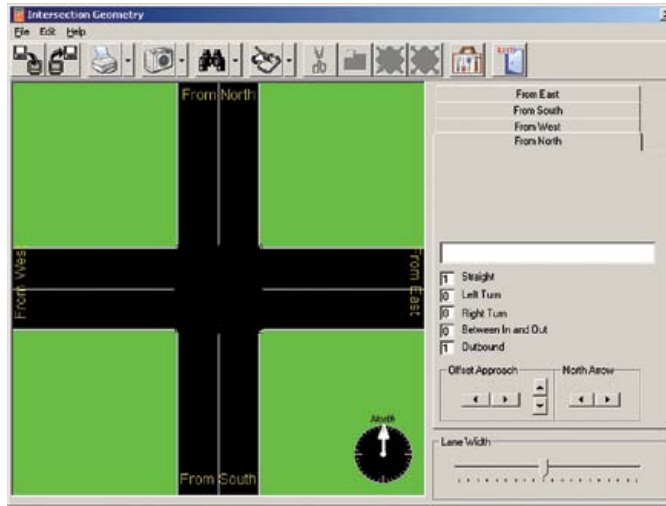
In this lesson you'll learn about some of the options that are available in the Tools menu, a selection of functions that let you further define and customize your data files. For this lesson we'll again be working with the *Sample File - Standard Turning Movement* file that was installed with the program. If you already have the sample file open, you're ready to go. Otherwise, follow the procedure described in Chapter 4, Lesson 3 to open it.

### Intersection Design Tool

The first selection in the Tools menu is **Intersection Design**. Select this from the menu and the Intersection Geometry window will appear. You can also access this screen by clicking on the Intersection Design icon in the toolbar.



**Figure 5-7:**  
Intersection  
Design



The Intersection Geometry tool allows you to enter street names of your intersection and provide a graphical representation of where your data was collected. This can be very beneficial in helping people who look at the data have a better understanding of it.

Up to eight different approaches can be defined, with options for selecting the number and type of inbound and outbound lanes as well as median dividers.

The tabs on the right side of the screen are used to select the approach you want to work with. To edit an existing approach, click on its tab (From East, From West, etc.) or click on the approach leg itself and the program will automatically call up the corresponding tab.

### Enter Street Names

The first thing we'll do is enter street names for our file. Click the From North approach and enter Main St. as the name of the approach. Notice that the picture of the intersection on the left updates to show the new name. Next, click the From South approach tab. Notice that the program automatically fills in the street name that you just enter for the From North approach. If an approach's street name is blank (like the From South was) the program will automatically update it with the name from the corresponding approach, saving you the trouble of retyping it.



### Note

Note that you can override this feature by simply typing in a new name for those rare cases when the street name may be different on opposite sides of the intersection.

Next, click on the From East approach tab. Enter *Broad St.* as the street name for this approach, then click the From West tab and the name will be copied over.

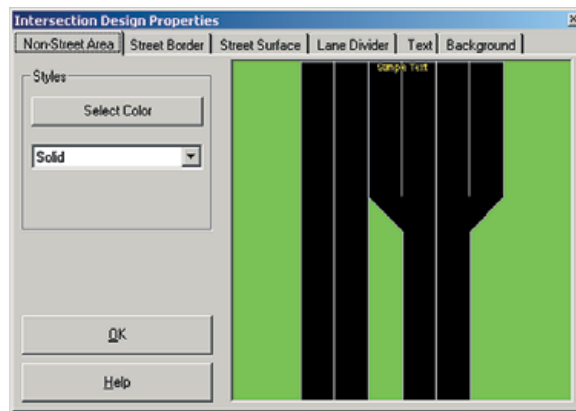
Now that we've entered our street names, we'll make a few changes to how the intersection itself actually looks.

The default view that you see for the sample file is pretty accurate for its intersection, but we're going to make a few changes anyway just so we get a better feel for how this tool works. Click on the From South (or Northbound) tab so this approach is active. We're going to add a Left Turn lane to this approach, so click in the Left Turn box and enter a 1. Lanes can be added for straight, left turn, right turn and outbound by changing the number listed in each of these boxes. Median dividers can

First, we want to make the lanes a little smaller so they are easier to see. To do this, use the *Lane Width* slider bar at the lower right of the screen. This is currently set to 100, so slide it to the left with your mouse until it says 90. Notice that the display look a little different now. Next, we're going to add a corresponding left turn lane to the From North approach. Click on this tab, and add a 1 to the Left Turn box. Now we want to line up the approaches a little better.

The North, South and East approaches look pretty good, but the West approach is a little off. Click on the From West tab so this approach is active, then begin clicking the left arrow in the *Offset Approach* field to move the approach to the left until it lines up with the other approaches.

While the arrows in the Offset Approach field can be used to move approaches left and right, or up and down, you can actually do this even easier by using your mouse to click and drag an approach. Click your mouse on the From West approach and, while you hold the mouse button down, move the mouse up and down, left and right. Notice that the approach moves with the mouse. You can do this with any of the approaches simply by clicking on them and holding the mouse button down. Once you are done, re-position your approaches so they are again lined up.



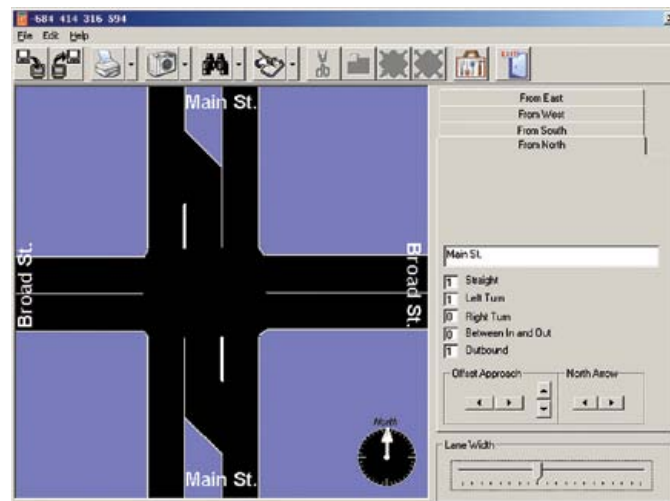
Now that we've seen how to set up the intersection geometry, let's see how to customize the look of it. The green background is a little hard on the eyes, and the yellow text for the street names is difficult to see, so we're going to change these.

Click on the Toolbox icon in the toolbar and the **Intersection Design Properties** window will appear. There are a number of different areas of the design you can change, including background colors, street colors, and line styles. The first thing we are going to do is change the green,

which is actually controlled by the *Non-Street Area* tab (this is the area in front of the background, not on the street itself).

Click on the Select Color button of this tab, change the color to a purple or dark blue, then click OK.

(If you use a black and white printer you may want to choose a dark gray.)



Next, we'll change the color of the text, so click on the Text tab. Click the *Select Font* button and the standard windows font screen will appear. Change the font color to white and to make the text stand out a little more change the size to 48 and the style to bold. Once this is done, click OK.

The divider lines between our left turn lanes and the other lanes seem a little large, so we'll adjust them as well. Click

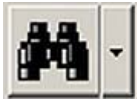


on the Lane Divider tab and notice the slider bar on the left. (Similar to the one we used earlier to adjust the lane width.)

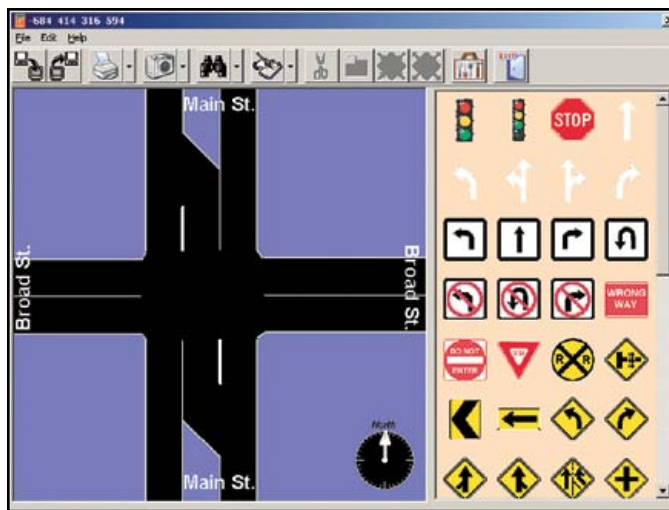
Click on the slider and notice that it is currently set to 5. Hold down your mouse button and slide the bar to the left until it is set on 1. You can then click OK to exit out of the Design Properties. Your intersection should now look similar to the one in Figure 5-9.

### Add Icons

Now that we have set the look of the intersection to the way we want it, we'll add some additional items to it that will provide more details.



Click on the binocular icon in the toolbar. Notice that the right side of the window changes to show a variety of images. The binocular icon lets you change the view of the intersection window. By clicking on it you can change from the design view, to the icon view, to the digital photo view. (We'll be covering the digital photo feature shortly.)



**Figure 5-10:**  
Intersection  
Geometry -  
Icon View

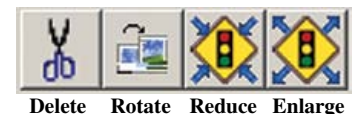
The icon view can be used to add graphics to your intersection. Any of the icons can be placed on the intersection by clicking and dragging them. For our intersection, we'll add pavement markings to indicate the two left turn lanes.

Click on the left turn arrow in the icon list (first icon on the second row) and, while holding the mouse button down, drag it into the left turn lane of the From South approach.

Now, repeat the same process and place the arrow in the left turn lane of the

From North approach. Notice that the arrow is not facing the way we want. We need to rotate the icon to face the correct way and to do this we'll use the Rotate icon in the toolbar.

Whenever you have an icon selected, four items in the toolbar become active: the Delete, Rotate, Reduce and Enlarge icons. These can be used to change how the icon looks.



Click the Rotate icon and notice that the turn arrow starts to rotate. Click it a few more times until it is facing the correct direction.

Scroll down through the list of icons and notice the different ones that can be used, including pavement markings and street signs. You can place these in any combination that you like. We used just two for this tutorial, but you can use as many as you like with your files.



In addition to the graphical icons, you can also add a text box icon to the intersection if you want to include a text message. To do this, click on the Notepad icon in the toolbar. You can move the text box around just like any of the other icons. To enter text, double click on the box and a cursor will appear. Type in 'Test Message', then press Enter on your keyboard. Note that you must press Enter on the keyboard whenever you are finished making text changes to the box.

Notice that you can't see the text. This is because our font color is white and the background is currently white. To resolve this, we'll make the background transparent. Click the down arrow next to



the Notepad icon and notice the list of options. These options can be used to change the text box border, background, alignment and font. Click on Transparent and the white background will disappear, allowing the text to be seen.

We don't need to keep the test message, so delete it by clicking on it to highlight it and then clicking on the Delete (scissors) icon.

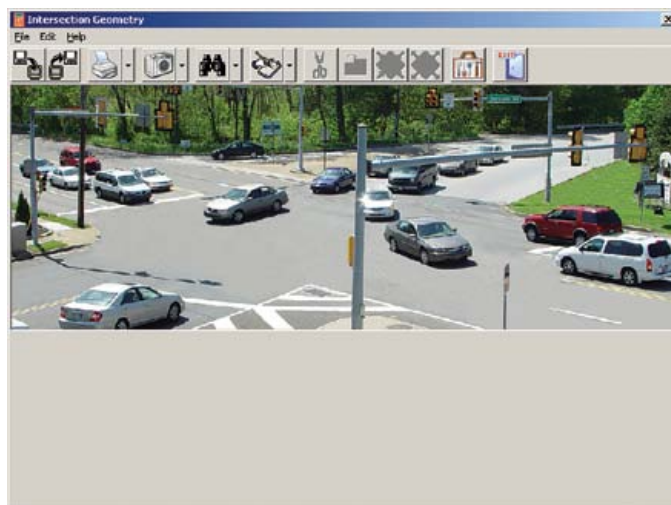
### Attached Digital Photo

Now that we've seen how the icons work with the intersection, we'll take a look at the next feature. Click the binocular icon again and the photo view will appear.

This feature allows you to include a digital photograph of your intersection with the data file. Notice that when we first access this screen it is blank since we haven't added a photo yet. That's what we'll do now.



To add a photo to your file, click the Camera icon in the toolbar. This will open the *Select Image to Attach* window which can be used to select the file you want to attached. Images can be in any of the following formats: Windows bitmap (.bmp), JPEG (.jpg), Windows Metafile (.wmf), Enhanced Metafile (.emf) or GIF (.gif).



**Figure 5-11:**  
Intersection  
Geometry -  
Photo View

A sample photo was installed when you installed PETRAPro. We'll attach this picture to our file. The file is named *intersection.jpg* and should be in your PETRAPro Data File folder. (The default path is C:\Program Files\JAMAR\PETRAPro\Data Files). Locate this file, select it and then click the Open button. The picture should then appear in the Photo view.

Note that there are two ways you can attach a photo, Embed or Link. These options can be accessed by clicking on the down arrow next to the camera icon.

The Embed option adds a copy of the photo to your data file (making the file larger). The Link option only adds a link to where the file is currently stored on your computer. In general, the embed option should be used if you will be sending the data files to other people while the link option should be used if the files will always be on your computer (and the location of the digital photos won't change).

Once you are satisfied with the design of the intersection, and the digital photo selected, you can print these by themselves using the Print button, or include them with the full report for your data file. We'll cover how to do this in a later lesson.

We want to save the changes we made so far, so go to the File menu and select *Exit and Save Changes*. Once you are back in the main data file screen, click the Save icon to save the file.



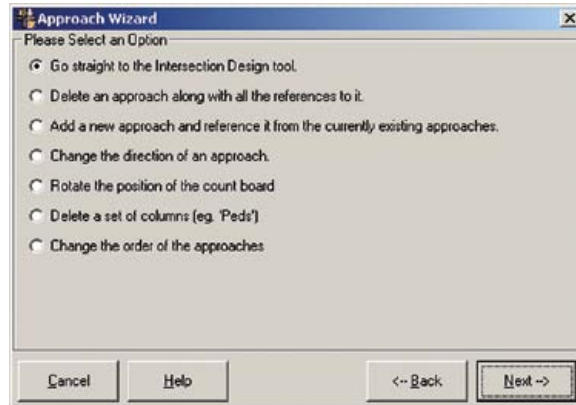
Note that there are a wide variety of ways you can change the look of the intersection design. We covered just a few to give you an idea of what you can do – use can use your own creativity when you start to work with your own data.

## Approach Wizard

The next selection in the Tools menu is the Approach Wizard. This wizard allows you to make a number of changes to the approach information in a file. We've covered some of the features of this wizard already, but there are a few new ones as well.



**Figure 5-12:**  
Approach  
Wizard



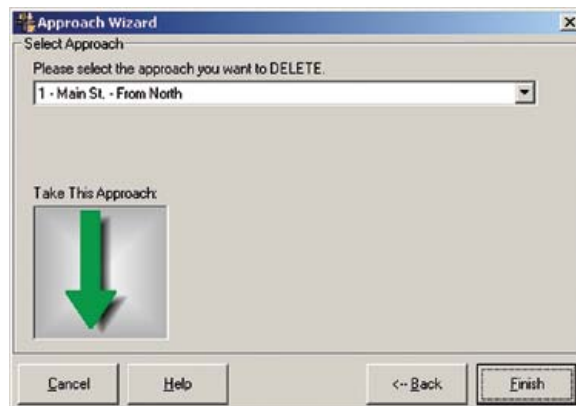
To access this wizard, go to the Tools menu and select Approach Wizard. The Approach Wizard window will then appear. Note that you can also access the wizard by clicking on the Approach Wizard icon in the toolbar.

The first selection on the list, *Go straight to the Intersection Design tool*, gives you the chance to go into the Intersection Design tool that we just covered. We don't need to revisit this, so we'll move on.

The second selection on the list, *Delete an approach along with all the references to it*, allows you to quickly and easily remove an entire approach from your data file. To give this a try, click the radio button next to this option, then click Next.

## Delete Approach

**Figure 5-13:**  
Approach  
Wizard –  
Delete  
Approach



The next screen lets you select the approach you want to remove. You can choose the approach from the box near the top of the screen. Click the down arrow of this box and select the From South approach. Notice that the large arrow graphic on the screen changes to show the direction of the approach you have selected. This graphic allows you to be sure you have selected the correct approach.

Click the Finish button and notice that the From South approach has been removed. Also notice that the movements from the other three approaches that would have been going to the From South approach have also been removed. When you delete an approach, all references to it from the other approaches are also deleted.

We don't actually want to permanently delete the From South approach, so we'll reverse the action we just took using the program's Undo function. This is a very useful feature that lets you undo the last change you made to a file.

We don't actually want to permanently delete the From South approach, so we'll reverse the action we just took using the program's Undo function. This is a very useful feature that lets you undo the last change you made to a file.

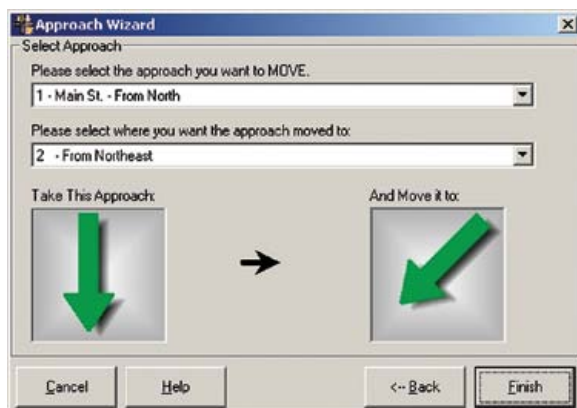
Click on the Edit menu and the option at the top should be Undo Delete Approach. Click this option and the file will be restored to its previous state. Note that the Undo option will only work for the last action you took. You cannot do multiple undos.

Go back to the Approach Wizard, select the third item on the list, *Add a new approach and reference it from the currently existing approaches*, then click Next. This selection is basically the same as the Delete approach selection, but in reverse. It allows you to add a new approach to the existing ones. Use the default selection (From Northeast) and click the Finish button. Notice that the new approach has been added, and that it is now referenced from the other existing approaches. We don't need this new approach, so use the Undo again to restore the file.

The next selection in the Approach Wizard is *Change the direction of an approach*. This option is usually used if you collected data at an intersection where there were four approaches but one (or more) of the approaches was not from one of the standard north, south, east or west directions.

### Change Approach Direction

**Figure 5-14:**  
Approach Wizard – Change Approach



Let's pretend that the From North data of our sample file was actually for a From Northeast approach. Select the change direction option, then click Next. The next screen allows you to select the approach you want to change and shows you how it will be changed. The screen is already set to how we want to change the approach, so just click Finish.

Notice that the From North approach has been changed to From Northeast. Also notice that the movement descriptions of the approach have been changed, as have those of the other

approaches that would be going into the new direction.

We don't want to permanently change the direction of the approach, so use the Undo option to reset the file, then go back to the Approach Wizard.

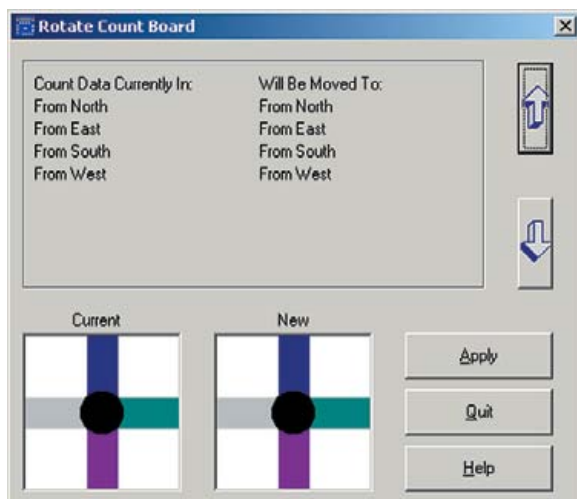
The next item on the list is *Rotate the position of the count board*.

### Rotate Count Board

When data is downloaded from a JAMAR hand-held data collector, PETRAPro assumes that the From North approach was counted with the 1 through 4 keys, From East with keys 5 through 8, From South with 9 through 12 and From West with 13 through 16. In fact, the turning movement diagram on the data collectors has a compass depiction that indicates the North direction.

Ideally, when in the field collecting data you would turn the data collector so that the compass faces North. However, some people do not like to do this, preferring to count with the data collector in its standard position regardless of the direction they are facing. This is where the rotate count board option comes in handy. It allows you to orient your data in PETRAPro regardless of how it was collected.

Select this option in the wizard, then click Next. The Rotate Count Board window will then appear.



**Figure 5-15:**  
Rotate Count Board

The *Count Data Currently In:* list shows how the data is presently laid out and below it is a color-coded display of the current layout. The *Will be Moved To:* list shows any of the changes you've set.

To rotate the data you use the up and down arrows on the right-hand side of the screen. The up arrow rotates the data clockwise, while the down arrow rotates the data counterclockwise.

Let's pretend that when the data for the sample file was collected the person doing the data collection was actually facing South. Click the

down arrow twice and notice that the *Will Be Moved To:* list changes along with the color-coded display below it. Now click the Apply button. The data that had been in the From North approach is now in the From South approach, and vice versa. The same is also true of the From East and From West data. Notice, however, that the order of the approaches hasn't changed – we've only moved the data itself.

We don't want to permanently change the data, so use the Undo option to reset the file, then go back to the Approach Wizard.

The next selection in the Approach Wizard is *Delete a set of columns*.

### Delete Column Set

**Figure 5-16:**  
Approach Wizard – Delete Column Set



JAMAR hand-held data collectors contain four groups of keys for each approach: left, thru, right and 'other'. The 'other' keys can be used to count a variety of things, like pedestrians or bicycles. However, you can also choose not to use them at all. If you don't use these keys, the *Delete a set of Columns* option allows you to remove them from the file easily.

Select this option from the list, then click Next. The next screen allows you to select the set of columns to remove. We'll remove the Peds column that is already selected, so click Finish.

Notice that the data file has been changed and all the Peds columns have been removed.

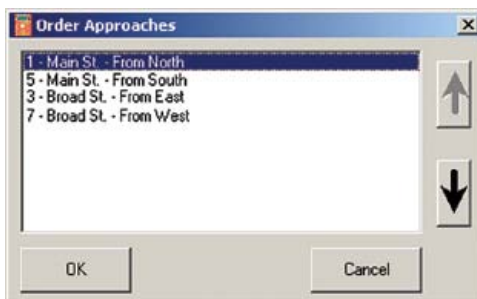
We don't want to permanently delete the Peds, so use the Undo option to reset the file, then go back to the Approach Wizard.

The final option in the Approach Wizard is *Change the order of the approaches*.

Turning Movement files in PETRAPro are defaulted to be listed in clockwise order starting from the top (From North, From East, From South, From West). If you don't like this order, the *Change the order of the approaches* option allows you to change it.

### Order Approaches

**Figure 5-17:**  
Order Approaches



Select this option, then click Next. The Order Approaches window will then appear. The current order of the approaches is listed from top to bottom - North, East, South, West. To move an approach, you click on it and then click on the large up and down arrows until it is placed in the order desired. Let's give this a try.

Click on the *From East* approach in the list of options, then click the up arrow once. This moves *From East* up, and drops *From North* down. Click OK and notice that

the data in the sample file moves to reflect the change we made. You can use this tool to rearrange the approaches of a file in any order you like.

We don't want to permanently change the order, so use the Undo option to reset the file.



## Merge Wizard

The next tool we are going to look at is the Merge Wizard. This is one of the more powerful features of PETRAPro. It allows you to quickly and easily combine multiple files into one.

The Merge Wizard will only work if you have two or more files open on the screen at one time, so we are going to make a copy of the sample file for this lesson. You should still have *Sample File - Standard Turning Movement* open – if not, open it now. Go to the File menu and select Save As. This will open the Save As window, which, as we saw before, lets you save a copy of an existing file with a new name. Change the file name to *Merge Sample* and click the Save button. We've now saved a copy of the sample file – while keeping the original file as well.

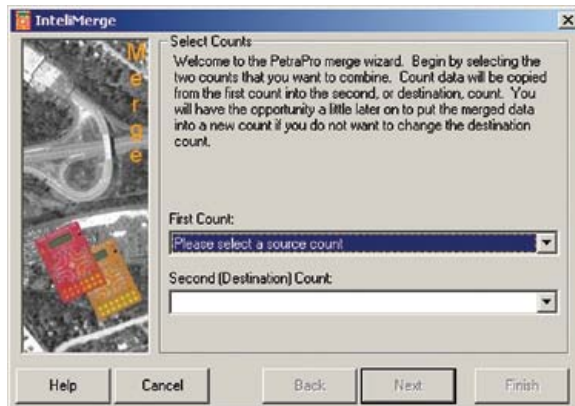
For this lesson we're going to chain the data from our Merge Sample file to the end of the original sample file. Since both files have the same start time, we're going to change the start time of the Merge Sample file and pretend that its data was collected at a different time of the day. The original start time is 6 AM and the data goes through the 5:45 PM interval. We're going to change the start time of Merge Sample to 6 PM, so we'll end up with two files that have 12 hours of data.

To change the Start Time of a file you use the Edit Header function, as we covered in Lesson 4. Click on the Edit Header icon, then go to the Start Time field. The times used in this screen are military, so enter 18:00. Click OK and notice that the time of the file has now changed to 6 PM.

Now that we have the file ready to go, let's reopen the original sample file. Go to the File menu, but don't select Open this time. Notice instead that at the bottom of the File menu is a list of recently used files. PETRAPro keeps a list of the last eight files used and displays them here for easy access. Locate *Sample File - Standard Turning Movement* in the list and click on it to open it.



**Figure 5-18:**  
Merge Wizard  
– Select Files



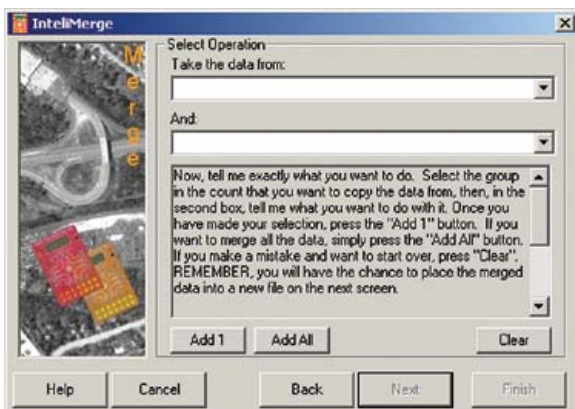
We're now ready to use the Merge Wizard, so go to the Tools menu and select Merge Wizard. The first of the Wizard screens will then appear on the screen. Note that you can also access this screen by clicking on the Merge Wizard icon in the toolbar.

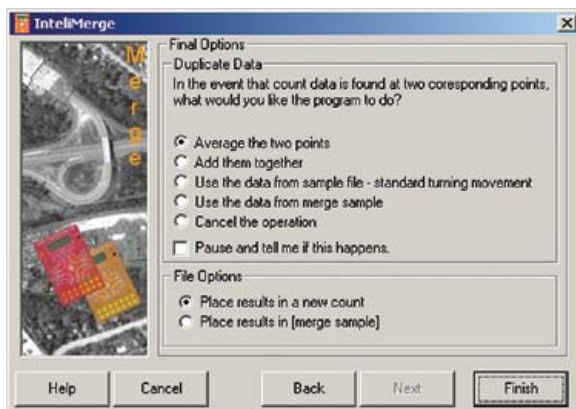
The first screen you see allows you to select the files you're going to merge. If you have more than two files open you can choose the two you want. Note that the Merge Wizard will only merge two files at a time. Select *Sample File - Standard Turning Movement* as the First Count, *Merge Sample* as the Second (Destination) Count, then click Next.

The next screen asks us to select the dates we want to use for the files. This is mainly for when you are merging files with different dates. That's not the case with our files, so just click Next.

The next screen prompts us to decide which groups of each file we want to combine. You can do just one group, or more than one, depending on your need.

**Figure 5-19:**  
Merge Wizard  
– Select Groups





**Figure 5-20:**  
Merge Wizard  
– Final Options

In most cases you'll be combining all the data in each file, so to do this click the Add All button then click Next.

The last screen of the Merge Wizard contains some error checking selections. In a typical file merge, data would not normally exist at the same point in the files being combined. However, if it does you must decide how the program should deal with it. The options you have are: Average the two point, Add them together, Use the value from [file 1], Use the value from [file 2], or Cancel the Operation.

Our files should not have any overlapping data, so we'll want to stop the operation if the program finds any. Click on the *Cancel the Operation* radio button.



**Note**

Note that the Final Options also contains a feature that can be very helpful in finding potential problems. The *Pause and tell me if this happens* checkbox, if selected, will stop and give you a warning if the program does find data at the same point in both files. The warning tells you at what interval, column and group the overlapping data was located.

Below the Final Options are the File Options. These two options let you decide if the merged data should be placed in a new file, or placed in one of the existing files. We're going to have a new file created, so leave the default option of *Place results in a new count* selected.

Now that we have all of our options selected, click on the Finish button. PETRAPro will then create a new file, combining the data from the two existing files in the manner we have specified. Notice that our new file has 96 intervals, 48 from each original file. At this point you would normally save the new file. We recommend that you save the file with a name different than the original two files so you can always get back to the originals if you encounter a problem. We don't need to save our merged file this time, so you can close it without saving it. Go ahead and also close the Merge Sample file.



**Note**

Note that while the Merge Wizard automates the process of combining files, you can also combine files through simple Copy and Paste commands. This can sometimes be quicker when you are dealing with short files.

## Correction Factor

The next item on the list of Tools is Correction Factors. This tool can be used to apply an adjustment factor to the data in the study. This is typically done to increase or decrease volumes, either for all the data or for just a specific movement. Factors can be applied from the Seasonal Factor Table or Daily Factor Table of the Preferences, or from a universal User Supplied Factor.

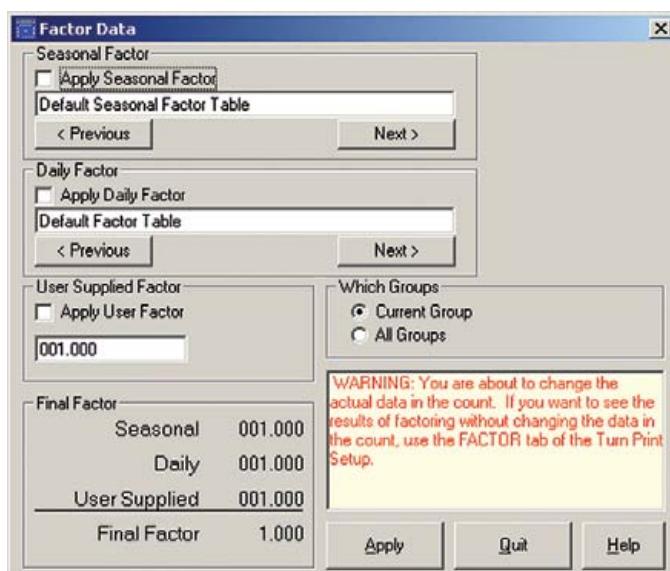


**Note**

Note that applying a factor with this tool will change the actual data of the file. If you wish to factor your data without actually changing it you can apply a factor to your finished report. The procedure for doing this is explained in a later lesson.

Let's take a look at how this tool works. Go to the Tool menu and select Correction Factor. The Factor Data window will then appear on the screen.





**Figure 5-21:**  
Factor Data

The top of the screen contains the selection boxes for Seasonal or Daily factors. The Factors tab of the Preferences can be used to store multiple sets of factor tables. Refer to Lesson 1 for more information on this.

To use a factor from one of the tables you click on the *Previous* or *Next* buttons to select the table you want. Once the table you want has been selected, be sure to place a check in the *Apply Factor* box. We aren't going to apply any seasonal or daily factors to our data, so you can leave the default settings in place.

Below the Daily Factor field is the *User Supplied Factor* field. This field allows you to enter one universal factor and apply it to your data, which is what we're going to do now. Change the value listed from 1.000 to 2.000, then place a check in the Apply User Factor box. Notice that the Final Factor table at the bottom of the screen updates to show this selection. This table is useful for keeping track of the factor you are going to use if you are using a combination of seasonal, daily or user supplied factors.

To the left of the User Supplied Factor field is the *Which Groups* field. This is used to instruct the program how to apply the factor. In our case, we're going to use the default setting and only apply it to the current group. Click the Apply button and notice that the data in our file has now been doubled. Applying a factor of 2 tells the program to multiply all the data points by 2, which results in double the amount of data.

Now that we've seen how applying a factor can affect the data, let's change the data back to its original volumes. Change the User Supplied Factor to 0.5 then click the Apply button again. Applying a factor of 0.5 tells the program to multiply all the data points by 0.5, which results in it being divided in half. The data is now back to where we started. Click Quit to exit the Factor Data screen.



**Note**

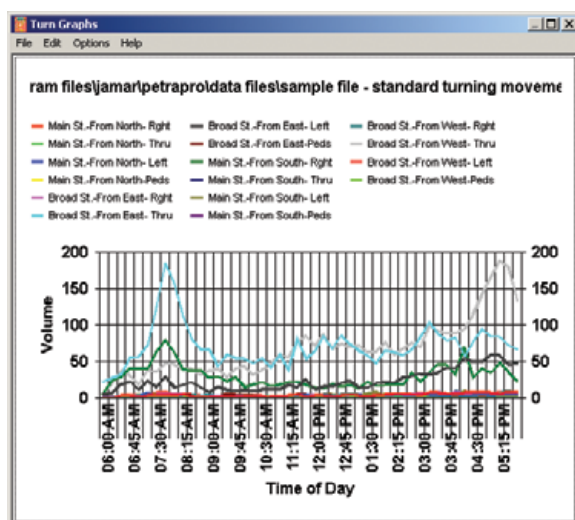
Note that factors do not have to be applied to all the data in the file, or all the data in a group. You can apply a factor to any specific portion of the data by highlighting the data you want to factor before going to the Correction Factor tool. Any factor that is applied will then only affect the highlighted data. This can be especially useful if you want to factor specific movements, like all Left movements or all Right movements.

## Graphs

The next tool on the menu is Graphs. PETRAPro contains a powerful graphing engine that allows you to create visually informative charts and graphs in a matter of minutes. With this tool you can present your data in an almost unlimited number of formats. For this lesson we'll create just one of the many formats, and along the way show some of the functions that can be used to create comprehensive graphs.



You should still have *Sample File - Standard Turning Movement* open – if not, open it now. To access the graphs, go to the Tools menu then select Graphs. This will open the Turn Graphs Window. Note that you can also access this screen by clicking on the Graphs icon.

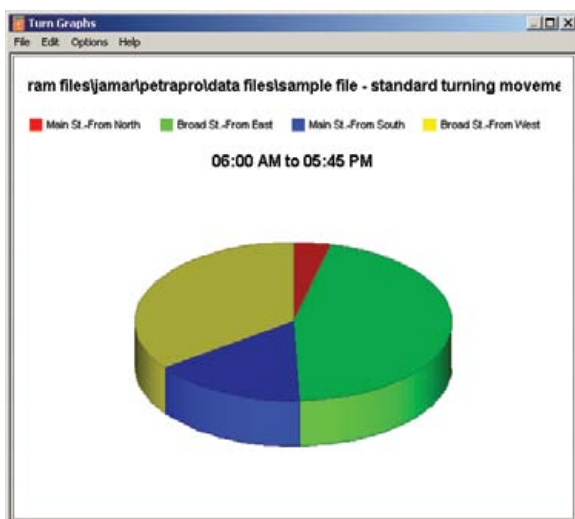


**Figure 5-22:**  
Default  
Graph

The initial graph screen that appears breaks down each movement of each approach over the entire length of the file. For this lesson we will change the graph to a three dimensional pie graph representing the data from the four approaches for the entire length of the file.

Note that graphs can be created from any portion of your data; you do not have to graph all of the data. To graph a portion of the data, highlight the specific area you want graphed then click on the graph icon. This can be used to graph a specific time period, or individual approaches.

The initial graph is a little confusing, so we'll make a few changes to make it clearer. To do this, we'll use the Options menu.



**Figure 5-23:**  
Initial  
3D Pie Graph

The *Sum Intervals* and *Sum Approaches* options allow you to combine data to present it more clearly. Select Sum Interval and the data will be consolidated. Next, select Sum Approaches and the various movements within an approach are combined.

The other selection in the Options menu is Type. PETRAPro allows you to create a wide range of graphs in both 2D and 3D format. Two-dimensional graphs include Bar/Pictograph, Line, Area, Step, Horizontal Bar and Pie. Three-dimensional graphs include Column, Tape, Area, Step, Horizontal Bar and Pie. Select Pie from the

3D selections and the graph is changed from a two dimensional bar graph to a three dimensional pie graph like the one seen in figure 5-23.

Now that we have the graph set up to show the data the way we want, we'll make a few more changes to make the graph even more descriptive. For these changes we'll be working with the **Chart Designer**.



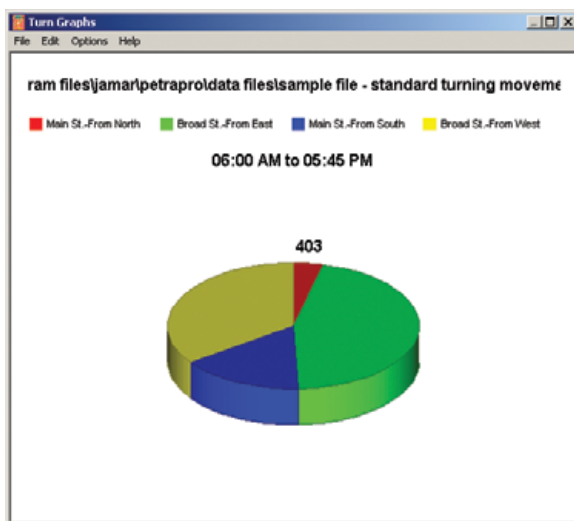
**Figure 5-24:**  
Chart  
Designer

The Chart Designer is a tool used to edit the more technical aspects of charts and graphs. You can start the designer by right-clicking on the graph and selecting Chart Designer from the pop-up window. However, it is usually better to start the designer by double-clicking on the area of the graph you want to edit, as this takes you directly to that location in the designer. We're going to add labels of the actual volume total for each

approach to the graph, so start by double clicking on the box next to Main St. From North.

The Chart Designer opens and takes us directly to the selection for Main St. From North. Click on the '+' sign next to this series and you'll see the options that are available. Click on Datapoint Labels.

**Figure 5-25:**  
Graph with  
First Label

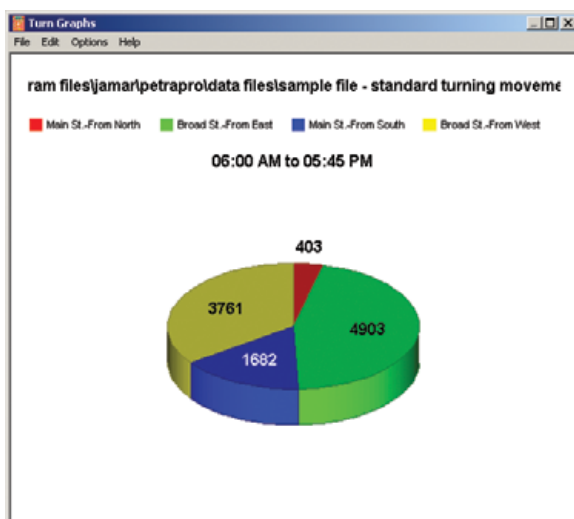


The Text Location field in the Appearance tab is what we need to change to have the datapoint labels appear in the graph. The default setting is for None. You can choose to have the labels shown either inside the section of the graph or outside it by selecting the appropriate entry. Since there isn't much data for the From North approach (and therefore its slice of the pie is pretty small), we'll select *Outside*. Click on the OK button and you will see the volume totals listed in the graph for this approach.

Next we'll do the From East approach. Double click on the box next to it and then go to the Datapoint Labels selection the same way did previously. The From East approach has the

most data of the file, so its pie slice is pretty big. Since this is the case we'll put the label right on the slice by selecting *Inside*. Once this is done, click OK and you'll see the new label, this time on the graph itself.

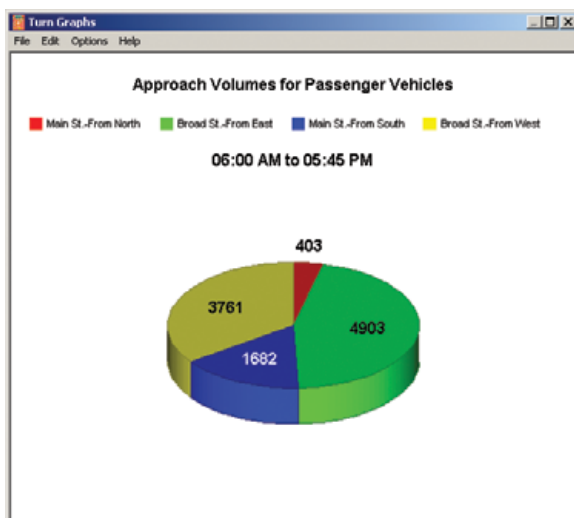
**Figure 5-26:**  
Graph with  
All Labels



Double click on the box next to From South and repeat the same procedure, selecting *Inside*. This time, however, we're going to change the format of the label. The pie slice for the From South approach is a little dark, so to make the label easier to read we'll have it be in white text rather than the default black text. To do this, select the Font tab of the Datapoint label screen (several tabs over from the Appearance tab we have been using). The font tab works just like the standard windows font tab, allowing you to change the type, style, size and color of the text. We're just going to change the color, so select white and click OK. The label is added on the graph, but this time in white type.

Now do the final approach, From West. You can choose whether to put the label inside or outside, and pick whatever style you want.

**Figure 5-27:**  
Final  
Graph



With the labels added to the graph it is more informative, but there's another change we can do to make it even better. The default title for the graph is the data file's name and location but this may not mean too much to the person looking at the graph. We'll change it to make it more descriptive. Double click on the current title and you'll be taken back into the Chart Designer, but this time to the Title selection.

Click on the Text tab and delete the current title. You can then enter any title you want that you

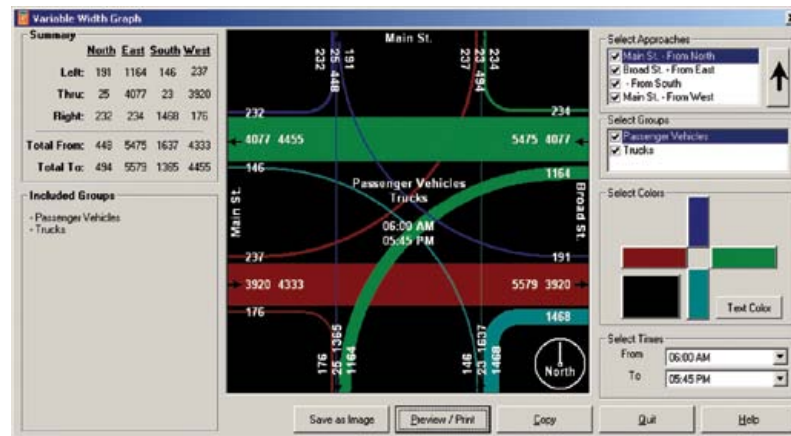
think will help properly describe the data. One example would be *Approach Volumes for Passenger Vehicles*. Once you have added the new title click OK.

The completed graph can be printed by selecting Print from the File menu. It can also be copied for pasting into other programs by selecting Copy from the Edit menu.

This tutorial covered just a few of the many ways you can customize your graphs. You can also change background colors, use graphics (such as organization logos) for backgrounds, rotate graphs, change lighting and otherwise edit your graphs to make them unique.

## Variable Width Graph

The next tool on the list is the *Variable Width Graph*. The Variable Width Graph is a representation of turning movement data using thick and thin lines to show volume differences – the thicker the line, the higher the volumes.



**Figure 5-28:**  
Variable  
Width Graph

To access this feature, go to the Tools menu, select Variable Width Graph and the graph window will appear. Note that you can also access this screen by clicking on the Variable Width Graph icon.

The left side of the screen displays the data, with arrows showing the direction the traffic is moving. The thick lines represent the heaviest

traffic volumes while the thin lines represent the lightest volumes.

At the top right, the *Select Approaches* field is used to determine what approach data will be used for the display. Click on the box next to *Main St. – From North* and notice that the volumes for this approach disappear. Reclick the box to put the data back.



**Note**

Note that in this field the data for the approach listed at the top appears in the forefront of the display, while the data for the approach listed at the bottom appears at the back of the display. The order in which the approaches are listed can be changed by clicking on an approach then clicking on the arrow to the right.

The *Select Groups* field works in the same manner. Click on the box next to *Trucks* and notice that the overall volumes go down. Also notice that the list of groups in the center of the screen gets updated to show that the Trucks are no longer being shown with the data. Reclick the box to put the data back.

The *Select Colors* field is used to pick what colors will be used to represent each approach's data, as well as the background and text colors. To change a color, click on the button representing the direction of traffic you want to affect and you can choose an existing color or define a custom color. This can also be done for the background of the plot by clicking on the large button in the lower left and for the text used in the plot by clicking on the Text Color button.



The current black background of the plot makes it a little difficult to see some of the information, so let's change it. Click on the background button and pick one of the dark gray colors. Once you've selected the color, click OK and the display will update to show the change.

The *Select Times* field is used to pick a specific time period within the data to be plotted. The default selection uses the start and end times of the study, but by clicking on the arrows in either the From or To boxes you can choose any time period. Change the *To* field to 6:45 AM and the volumes change accordingly.

Notice, however, that the line widths do not change dramatically. This is because the width of each line is always in relation to the widths of the other lines in the plot. The From East through movement volumes went from 5475 when we showed all the data to 225 when we showed just the first hour, but the width of the line did not change much, if at all. This is because the volumes for all the other movements were also reduced. Generally, if the line widths do not change appreciably when you show different portions of the data, it is an indication that the volumes of the movements are uniform, *in relation to each other*, throughout the day.

The Variable Width Graph can be printed directly from this screen, or included with a larger report. How you included it with a larger report will be covered in the next lesson. You can also copy the plot for pasting in other programs, like Word or Excel, by clicking the Copy button.



**Figure 5-29:**  
Print  
Settings

If you want to print the plot by itself you can do so by clicking on the *Preview/Print* button. Click this button and the print setup for the plot will appear. The Report Headings field is used to select a title for the printout from the list of titles created in the Titles tab of the Preferences. The Options field is used to select whether you want to print Headings

and Comments with the plot. The Plot Size slider bar is used to adjust the size of the plot for the printout. Once these are set, click the *Preview/Print* button again and a print preview of the plot will appear.

This screen shows a preview of how the plot will look when printed. You can send the plot to your printer, or save it in an electronic format as a PDF or Rich-Text file.

We won't bother to print the plot now, so click on the Close button to close the preview and the print setup, then click the Quit button to return to the main data screen. Click the Save icon to save the changes you've made.



**Note**

Note that the Variable Width Graph is not available for files with diagonal approaches, such as Southwestbound, Northeastbound, etc. It can only be used for files with standard North, South, East or West approaches.

## Change Interval Length

The next Tool in the list is *Change Interval Length*. This can be used to combine data intervals in your file to show the data in a larger time frame. To see how this works, we'll use it with our sample file, which uses 15 minute intervals. Go to the Tools menu and slide down to Change Interval Length. Select 60 Minutes from the list and notice that our file, which did have 48 15-minute intervals, has been converted to 12 60-minute intervals. We don't want to keep this change, so use the Undo option to reset the file.



**Note**

Note that the only options available when we went to the Change Interval Length selection were 30 and 60 Minutes. The 5 and 15 Minute options were disabled. This is because you can only change the interval length of your file to a larger value, not a smaller one. Since the data in our file is already stored in 15 minute blocks, the program does not know what portion of the volume in that 15 minute block was from the first 5 minutes, the second 5 minutes or the third 5 minutes. It only knows that the volume occurred at some point during the 15 minute block.

## Online Mapping

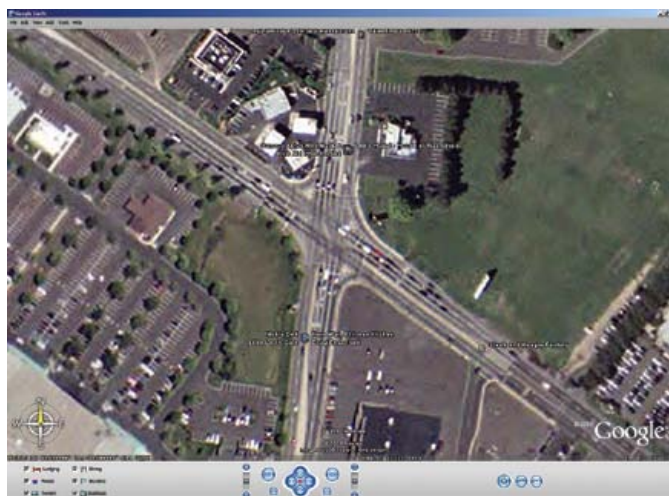
Earlier in this tutorial we saw how we could attach a digital photo of the data collection site to our data file. Now we'll see one of the options we have for getting these photos. The final tool in the list is *Online Map*. This tool lets you access the free web-based mapping applications Google Earth and Windows Live Local from your data file.

Google Earth and Windows Live Local are competing programs that in essence do the same thing - allow you to see aerial views of the Earth. To use these applications, you must have an Internet connection on your computer, and GPS coordinates stored in your PETRAPro file.

In Lesson 4 of this tutorial, we saw that GPS coordinates can be entered into a PETRAPro file on the Edit Header Information screen. The sample file we are working with has these coordinates already stored. We'll now use these coordinates to access a map of the data collection site.

The first application we'll look at is Google Earth. This application requires that you download and install a portion of it from the Google web site. If you plan to use Google Earth with PETRAPro, or want to follow along on your computer with this tutorial, download the free version of Google Earth now at: <http://earth.google.com/>.

Once Google Earth has been installed on your computer, you can start it by going to the Tools menu, sliding down to Online Map and selecting Google Earth. Note that you can also access this feature by clicking on the Google Earth icon in PETRAPro's toolbar.



Google Earth begins with an aerial view of the Earth and begins to zoom in to the coordinates of your PETRAPro file. It's a pretty cool process to watch. As the zoom brings you closer and closer to your location you'll begin to see more details. Finally the zoom will stop, around 1500 ft. above the coordinates of your PETRAPro data file.

Google Earth contains a number of different tools that you can use when viewing your map. The 'Layers' checklist lets you choose what information to include on the map you see. The 'Tilt'

**Figure 5-30:**  
Google Earth  
Aerial View

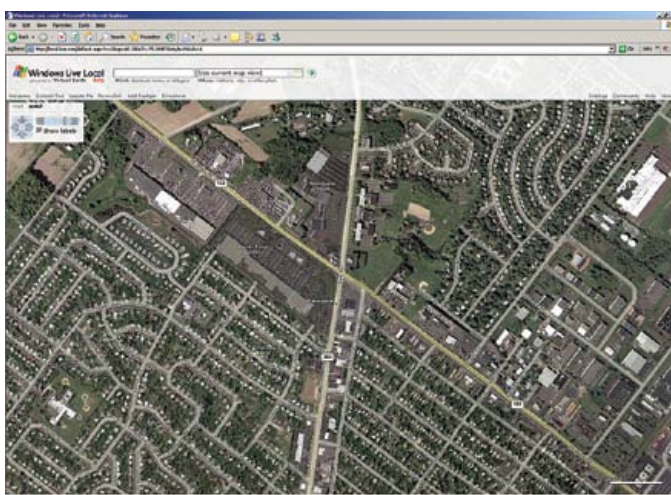


commands can be used to tilt your view for the map up or down while the ‘Rotate’ commands can be used to change your perspective. The ‘Zoom’ commands can be used to zoom farther out or closer in to your coordinates.

Once you have the map set to show what you want, you can save a copy of it for use in your PETRAPro file by selecting ‘Save Image’ from the File menu. The picture you saved can then be added to the Intersection Geometry in PETRAPro, as we did earlier in this lesson. Exit out of Google Earth once you are done playing with it.



The Windows Live Local application is very similar to Google Earth in that it provides aerial views of the Earth. Unlike Google Earth, this application does not require any program to be downloaded and installed on your computer, so to start it, go to the Tools menu, slide down to Online Map and select Windows Live Local. Note that you can also access this feature by clicking on the Windows Live Local icon in PETRAPro’s toolbar.



**Figure 5-31:**  
Windows  
Live Local  
Aerial View

Once you start Windows Live Local, it takes you directly to an aerial view of your coordinates. Like Google Earth, Windows Live Local has a few tools that can be used when looking at the map. A slider bar can be moved to zoom out from your location or zoom in.

For some locations, Google Earth has better images and for some Windows Live Local has the edge.

At the time this tutorial was written, Google Earth appears to have an advantage over Windows Live Local in that

the maps you create with Google Earth can be saved as a graphic and used in PETRAPro. However, these are both fairly new applications that are sure to evolve and improve as time goes by.



Congratulations! You have completed lesson five. In this lesson we learned how to use some of the Tools in PETRAPro. In the next lesson we’ll learn how to produce a report from the data. You can take a break now, or jump right into the next lesson.

## Lesson 6 — Producing a Report

Once you have edited a data file to your liking, you are most likely going to want to produce a report containing the data. For this lesson, we'll produce a report from the data contained in the *Sample File - Standard Turning Movement*. If you already have this file open on your screen, you're set to go. If not, retrieve it now. If you're not sure how to do this, refer to Chapter 4, Lesson 3 for instructions.



To begin the report creation process, click on the *File* menu and select *Print*. This will open the Turn Print Setup screen. Note that you can also access this screen by clicking on the Print icon.

**Figure 5-32:**  
Turn Print  
Setup -  
General tab

There are seven separate tabs on this screen that can be used to set up a report for printing. The first of these is the **General** tab. This tab allows you to pick the times for the report and set some other options that will determine how the data is printed.

At the top left is the *Select Interval Length* field. If you want to see the data presented in different interval lengths you can use this field. Two other options are No Data and Grand Total. Select No Data if you do not want to see the actual count data. This can be useful if you only want to produce a peak report

or an intersection plot. Select Grand Total to see the totals for the entire count without an interval break down. The most commonly used interval length is 15 minutes, so that's what we'll use. Set this field to 15 Minutes.

Below the Select Interval Length field is the *Empty Intervals* field. This is used to determine how the report should deal with intervals that contain all zeroes. This most often occurs when you collect data at specific times of a day (AM peak, PM peak, etc.) rather than continuously. If the Hide Empty Intervals box **is not** checked, the report will include intervals with all zeros in the report. If the box **is** checked, the report will replace the empty intervals with whatever is entered in the *Wording* box. 'Break' is the default setting but this may be changed to any wording desired. The data in our sample file is continuous, so we don't have to worry about this.

To the right of the Select Interval Length field is the *From - To* field. This field lets you select the time period for the report. It is defaulted to use the start and end times of the data, but you can change these if you don't want to print all of the data. We're going to use all the data in the sample file, so leave the default times alone.

Below the From - To field is the *Options* field. This is a very important field because it allows you to include a variety of features with the report. Any items that are checked will be included. Unchecked items are not included.

The first item on the list is *Approach Totals*. If this is checked an extra column of data is added to each approach in the report and shows the total for that approach. This can take up a lot of space, so unless you specifically need this information we recommend leaving this box unchecked. We'll leave it unchecked for this lesson.

The second item on the list is *Print Comments*. If this is checked, the Comments that were entered in the header for the file will be printed in the upper left corner of the report. Refer to the Edit Header portion of Lesson 4 for more information on this. Since we took the time to enter these comments, we might as well print them. Place a check in this box.

The third item on the list is *Print Peaks*. If this is checked, the program will look for peak information based on what has been entered in the Peak tab. Place a check in this box. We'll see how the peak tab works in a minute.

The fourth item on the list is *Plot Totals*. If this is checked, the report will contain a standard intersection plot of the overall data. We want to include this, so place a check in the box.

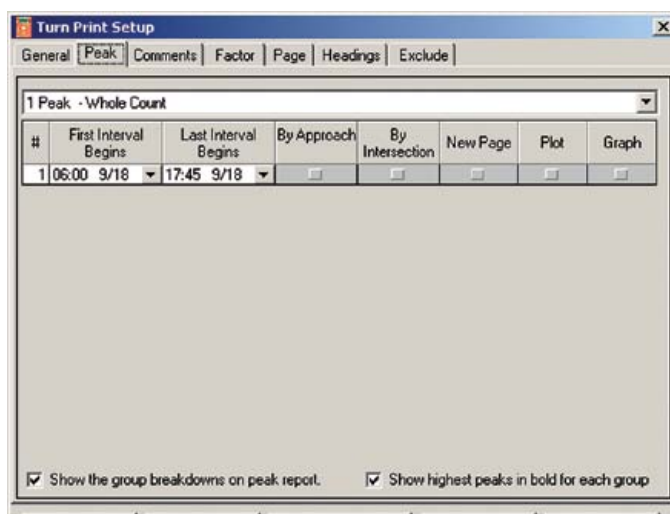
The fifth item on the list is *Intersection Drawing*. If this is checked, the report will include a copy of the Intersection Geometry that was setup using the Intersection Design tool, as discussed in Lesson 5. Since we set this up in Lesson 5, place a check in the box.

The sixth item on the list is *Intersection Photo*. If this is checked, the report will include a copy of any digital photo that has been included with the file. Since we set this up when using the Intersection Design tool in Lesson 5, we'll include it. Place a check in the box.

The seventh item on the list is *Graph Totals*. If this is checked, the report will include a copy of the Variable Width Graph, which we covered in Lesson 5. Place a check in this box as well.

The eighth item is *Do NOT Print Headings*. This allows you to produce a report without headings in the top middle of the report. We're going to see how these headings work a little later, so leave this box unchecked.

To the right of the Options field is the *Combine Groups* field. This field lets you select which groups you want to include in the report. We're going to print both group 1 (Passenger Vehicles) as well as group 2 (Trucks), so leave both groups checked.



**Figure 5-33:**  
Turn Print  
Setup -  
Peak tab

Now that we have the General tab finished, let's move to the next one – **Peaks**. Click on the Peak tab.

This tab is used to set up the peak information you wish to include in the report. There are several standard peak settings that can be accessed by clicking on the list box at the top of the screen, such as 1 Peak - Whole Count, 2 Peaks – 1 AM 1 PM, 3 Peaks – 1 AM 1 Noon 1 PM, etc. Or, you may set the peak information for any amount and times that you like. We're going to look for just one peak, so set the box as 1 Peak – Whole Count.

The # column at the far left of the screen allows you to look for multiple peaks within the time listed on that line. We only want one, so leave the default setting.

For each peak that is programmed, you are also given several options as to how the data should be presented when printed out. To select an option, click on the box shown below it and a check mark will appear. The options are:

<i>By Approach</i>	Select this option to have the program determine the peak hour on an approach by approach basis.
<i>By Intersection</i>	Select this option to have the program determine the peak hour based on the entire intersection total. The largest hour(s) will determine the peak, with no regard taken for individual approaches.
<i>New Page</i>	Select this option to force a page break to occur before printing the peak analysis.
<i>Plot</i>	Select this option to include an intersection plot of the peak data in the report.
<i>Graph</i>	Select this option to include a Variable Width Graph of the peak information.

The most common way of looking for peak information is By Intersection, so check the box for that. We want our peak information to start on a new page, so check the New Page box. We won't bother with a plot or graph, so leave these unchecked.

At the bottom left of the screen are two additional options, *Show the group breakdowns on peak report* and *Show highest peaks in bold for each group*. If the first option is selected, peak volumes will be reported for each group of data, as will the percentage of each group. If the second option is selected, the highest interval volumes for each movement and approach will be shown in bold. We want to see both of these, so put a check in each box.



**Note**

Note that the settings you select in the Peak tab will not be used unless you have checked off Print Peaks in the Options field of the General tab.

Now that the Peak information is set, let's take a look at the next tab. Click on the **Comments** tab. This tab allows you to include a variety of information printed with your data.

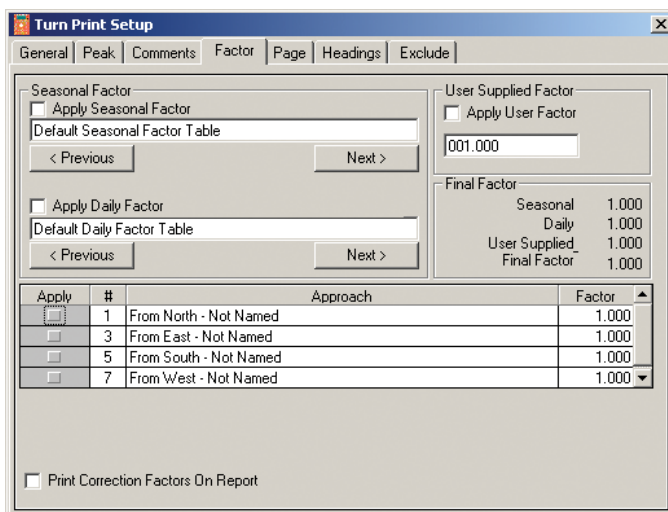
Does the information in the Count Comments field at the upper left look familiar? It should – we entered these comments using the Edit Header in lesson 4. You can use them the way they are, or you enter new ones directly on this screen. We'll leave them the way they are.

You are also given the option of where you want to have them printed: Top of first page only, Bottom of last page only or Top of each page. We'll use the default setting of Top of each page.

The other four tabs of this screen (Before Data, After Totals, At End of Report) are used to enter additional information for the report. These can be used to provide additional written information with your report. We aren't going to add any additional information, so we won't need to use these tabs.

**Figure 5-34:**  
Turn Print  
Setup -  
Comments tab





**Figure 5-35:**  
Turn Print  
Setup -  
Factor tab

The next tab is the **Factors** tab. Click on it to bring it up on the screen. This screen works in much the same way as the Factors tool that we covered in Lesson 5. The difference, however, is that using factors here does not change your original data; it only changes it on the report itself.

This tab also gives you the option of applying your factor to individual approaches. To do this you place a check in the Apply field for each of the approaches you wish to have the factor used on.

Another option found on this tab is the ability to print the factor with the report. You do this by checking the *Print Correction Factor on Report* box.

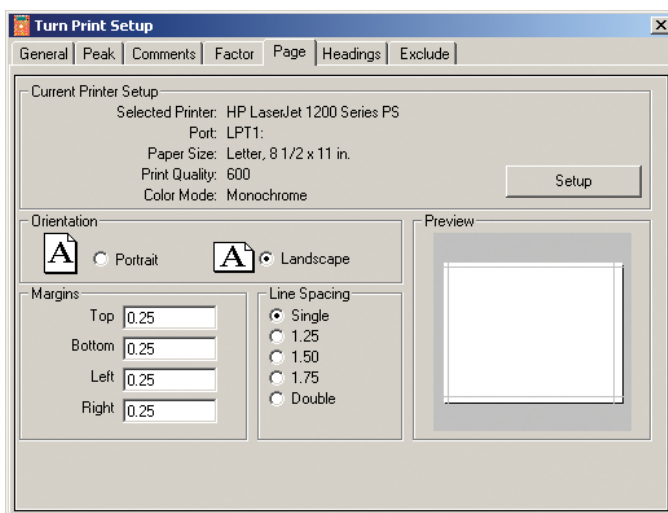
We aren't going to apply any factors to our report, so leave the factors with the 1.000 defaults.



**Note**

Note that when a factor other than 1.000 has been programmed, an asterisk (\*) will appear on the Factor tab to let you know that a factor is going to be used in the report.

The next tab, Page, is used to select the Printer you want to use and set some of the physical characteristics for the report. Click on this tab.



**Figure 5-36:**  
Turn Print  
Setup -  
Page tab

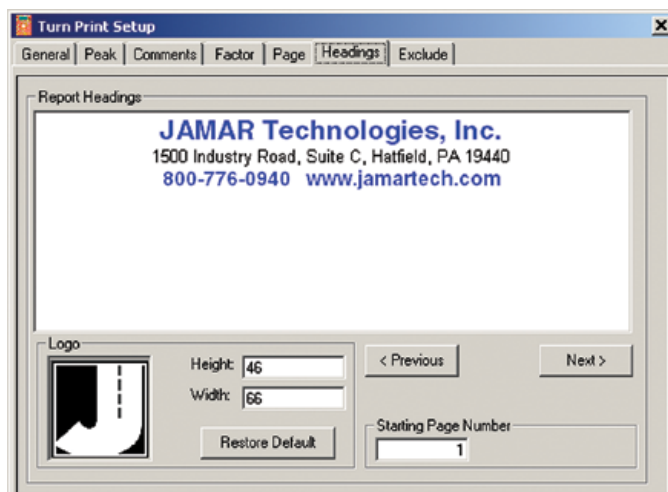
The *Current Printer Setup* field at the top of the screen provides information on the currently selected printer. To choose a different printer, click on the 'Setup' button.

The *Orientation* field allows setting your printout for either Portrait or Landscape, while the *Margins* field allows you to set the margins that will be used with the printout. Generally, you want the margins to be small enough so that there is enough room to print the actual data, but do not set them to zero otherwise information may get cut off. A setting of .25 is usually a good compromise.

To the right of the Margins field is the *Line Spacing* field. This allows you to set the spacing that will be used between each interval of data. The default setting is for single spacing, but can be changed to 1.25, 1.50, 1.75 or double spacing.

The final field on this tab is the Preview. This shows how the currently selected orientation and margins will appear in the printout. Change the Orientation from Portrait to Landscape, then back again. Notice that the Preview updates each time to show the change.

Now click on the Headings tab.



**Figure 5-37:**  
Turn Print  
Setup -  
Headings tab

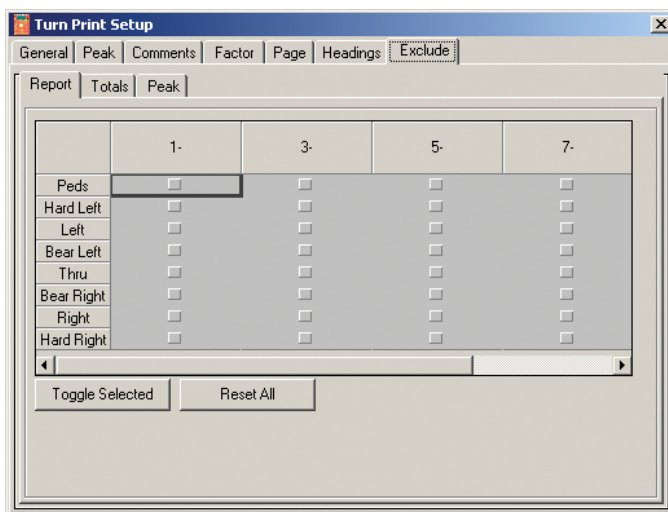
The *Report Headings* field is used to pick the title that will be printed at the top of each page in the report. Notice that the default titles are the ones we entered in the Preferences in Lesson 1. If you create multiple sets of titles in the Preferences, you can choose the ones you want using the Previous and Next buttons. For this report, we'll use the default titles.

At the bottom left of the Report Headings field is a preview of the logo to be used with the report. This is the logo that was set up through the Preferences

back in lesson 1. On this screen, you can change the size of the logo to make it larger or smaller by adjusting the Height and/or Width values.

At the bottom right of the Report Headings field is the *Starting Page Number* field. This field gives you the opportunity to start the page numbering at something other than the number 1. This feature would generally be used if you were planning to use the report as part of a larger document, or with other reports produced in PETRAPro. For this report, we'll leave it set for 1.

Now click on the final tab, Exclude.



**Figure 5-38:**  
Turn Print  
Setup -  
Exclude tab

This tab is used to exclude movements from different areas of the report. Movements can be excluded from the entire report, from the totals, or from peak analysis. To exclude a movement, find the appropriate row and check off the boxes for the approaches from which you wish to have the movement excluded. The Toggle Selected button will reverse the currently selected setting while the Reset Button will clear all settings.

When movements are excluded from the Totals, they will still be printed on the report. However, you can use the *Exclude From Totals Format* function to choose a

style in which these numbers are displayed so they can be distinguished from the movements that are being included in the totals. Also note that if a movement is excluded from the Totals it is automatically excluded from the Peak as well.

When movements have been excluded, an asterisk (\*) will appear on the Exclude tab. We aren't going to exclude any data from our report, so don't check any boxes.

Now that we're finished setting the report up, we want to see how it is going to look and decide how we are going to output it. Click on Preview.

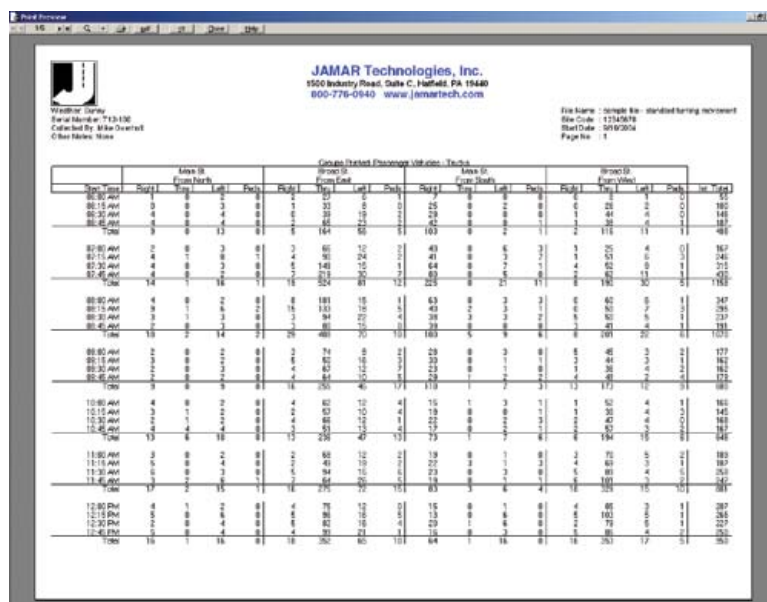


Once you click on Preview, the Print Preview screen will appear. This screen allows you to see how the finished report will look.

When the preview screen first appears, you may not be able to see the report clearly. To zoom in for a closer look, double click your mouse anywhere on the preview screen. You can zoom in closer by continuing to double click your mouse. If you get too close, you can zoom out by double clicking your right mouse button.

The options listed with the Magnifying glass button can also be used to get a different look at the report. The Whole Page selection shows a complete page in the preview. This

**Figure 5-39:**  
Report  
Preview



is the default selection when the preview first appears. The Page Width selection will zoom in on the report until it fits the entire width of the preview screen. Click on this selection to see how it looks. The Two Pages selection will do just what it says, show two pages at a time in the preview. Click on this selection to see how it looks. The Thumbnail selection provides small pictures of each page of the report. Click on this selection to see how it looks. The percentile listings, from 150% to 25%, provide different levels of magnification of the report. Click on some of these to see how they work. They produce the same affect as double clicking with the mouse's left and right buttons. Once you are done, click back on the Whole Page selection.

To view additional pages of a report when you are in Whole Page view, use the page selection options found at the upper left of the screen. Click the right arrow of this feature to scroll through the various pages of the report.

## Save Reports Electronically

One of the most useful features of the PETRAPro program is the ability to output your finished reports in an electronic format. The two options you have to do this are PDF and RTF.

The PDF option will create a copy of the report in Adobe Acrobat format, a widely used standard for the exchange of electronic files. Files created in PDF format can be viewed with the Acrobat Reader program, which is available for free from Adobe.

The RTF option will create a copy of the report in Rich Text Format, a text file that allows different font styles and colors. Files created in RTF format can be viewed with most word processing programs, such as Word or WordPad.

Using either the PDF or RTF report export options, you can create copies of a report that can be e-mailed or posted on the Internet. Other people can then view these reports without having to use PETRAPro. The main difference between the two formats is that people viewing a PDF file cannot change the data, while those viewing an RTF file can.



Now that we are finished previewing the report, it's time to print it out. To do this, click on the Print button. This will bring up the standard Windows print setup screen where you can choose the printer you want to print to. Keep in mind that reports from PETRAPro can be printed in color if you have a color printer. Once you have selected your printer, send the report to it.



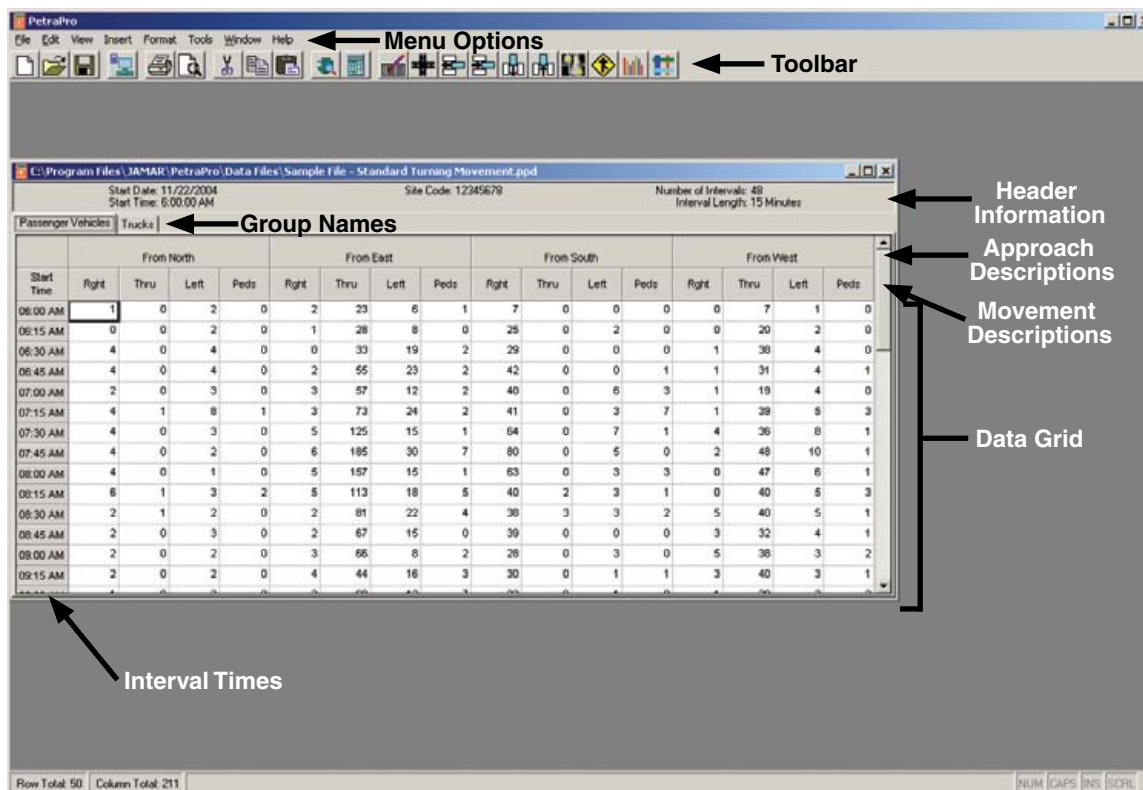
Congratulations! You have completed lesson six. In this lesson you learned how to produce a report from a data file. This lesson concludes the tutorial for learning the basics of PETRAPro. You should now have a good working knowledge of how to use the program.

# Chapter 6



## Turning Movement Files & Reports

## Turning Movement Files



**Figure 6-1:**  
Turning  
Movement  
File

Once a Turning Movement study is open in the program, there are a number of things that can be done to edit or adjust the file. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Turning Movement files contain six main areas of information: the Header Information, Approach Descriptions, Movement Descriptions, Group Names, Interval Times and Data Grid. These areas are shown in the figure above.

Standard Turning Movements are collected with 3 or less Group tabs. Enhanced Turning Movement files can have up to 16 separate groups of data.

The information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options, shown above. How these functions work are covered in detail in Chapters 4 & 5.

## Interpreting Turning Movement Reports

Turning Movement reports can be produced with a number of different options either included or excluded. The following sections cover the various options that can be used. Your reports may not include all of these options but they will contain some of them.

### Overall Data

Groups Printed- Passenger Vehicles - Trucks																	
Start Time	Main St. From North				Broad St. From East				Main St. From South				Broad St. From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
06:00 AM	1	0	2	0	2	27	6	1	7	0	0	0	0	8	1	0	55
06:15 AM	0	0	3	0	1	33	8	0	25	0	2	0	0	26	2	0	100
06:30 AM	4	0	4	0	0	39	19	2	29	0	0	0	1	44	4	0	146
06:45 AM	4	0	4	0	2	65	23	2	42	0	0	1	1	38	4	1	187
Total	9	0	13	0	5	164	56	5	103	0	2	1	2	116	11	1	488
07:00 AM	2	0	3	0	3	66	12	2	40	0	6	3	1	25	4	0	167
07:15 AM	4	1	8	1	4	90	24	2	41	0	3	7	1	51	6	3	246
07:30 AM	4	0	3	0	5	149	15	1	64	0	7	1	4	52	9	1	315
07:45 AM	4	0	2	0	7	219	30	7	80	0	5	0	2	62	11	1	430
Total	14	1	16	1	19	524	81	12	225	0	21	11	8	190	30	5	1158
Grand Total	23	1	29	1	24	688	137	17	328	0	23	12	10	306	41	6	1646
Approach %	42.6	1.9	53.7	1.9	2.8	79.4	15.8	2.0	90.4	0.0	6.3	3.3	2.8	84.3	11.3	1.7	
Total %	1.4	0.1	1.8	0.1	1.5	41.8	8.3	1.0	19.9	0.0	1.4	0.7	0.6	18.6	2.5	0.4	
Passenger Vehicles	23	1	28	1	22	579	137	17	328	0	23	12	10	298	38	6	1463
% Passenger Vehicles	100.0	100.0	96.6	100.0	91.7	84.2	100.0	100.0	100.0	0.0	100.0	100.0	100.0	77.8	92.7	100.0	88.9%
Trucks	0	0	1	0	2	109	0	0	0	0	0	0	0	8	3	0	183
% Trucks	0.0	0.0	3.4	0.0	8.3	15.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.2	7.3	0.0	11.1%

**Figure 6-2:**  
TM Report -  
Overall Data

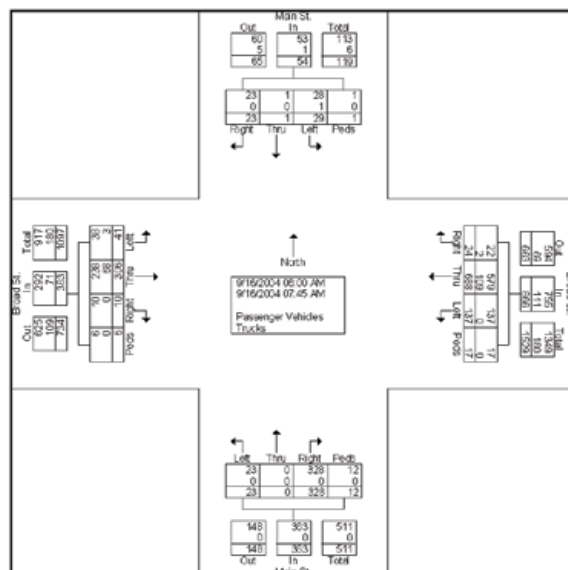
This area of the report contains all the data that was collected for the study. Generally the data is in 15-minute intervals, although it can also be done in 1, 5, 30, and 60-minute intervals.

The data is listed in chronological order with each interval's start time or end time displayed, depending on what option has been selected in the Preferences. Which groups of data are being shown is listed at the top of the report on the Groups Printed line.

At the end of the data, Grand Totals are provided for each movement, and each column is broken down into what percentage of the approach it is and what percentage of the overall data it is.

If more than one group is included in the report, a breakdown is provided for each group of data, including volume totals for each group, and what percentage each group is of the overall total.

### Intersection Plot



**Figure 6-3:**  
TM Report -  
Standard Plot

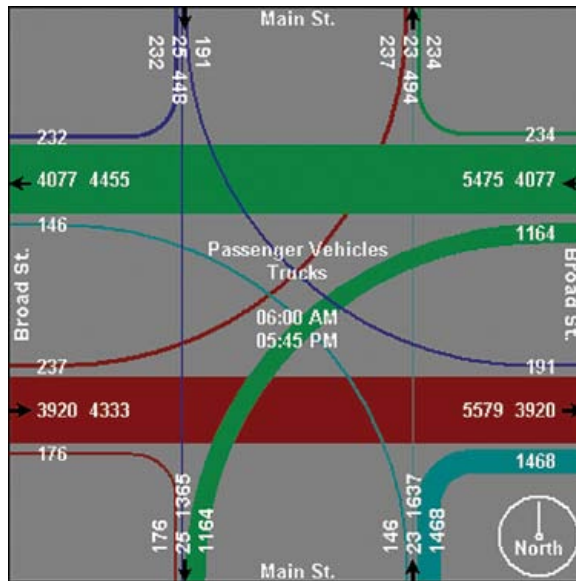
If the Plot Totals box is checked in the Options field of the General tab of the Turn Print Setup, an intersection plot of the overall data will be produced with the report. This is a graphical depiction of the data showing the Inbound and Outbound totals for each approach to the intersection.

The middle of the Intersection Plot contains a North arrow as well as a box listing the beginning and ending times of the data shown and what groups are being shown.

Note that In and Out listing are always in reference to the intersection itself. Refer to Chapter 13 for a more detailed explanation of this.



## Variable Width Graph



**Figure 6-4:**  
TM Report -  
Variable  
Width Graph

If the Graph Totals box is checked in the Options field of the General tab of the Turn Print Setup, a variable width graph of the overall data will be produced with the report. This is a graphical depiction of the data that uses lines of varying width to show volume differences — the thicker the line, the higher the volume.

The middle of the graph lists the beginning and ending times of the data shown and what groups are being shown.

## Peak Analysis

Peak analysis information will be printed with a report if the Print Peaks box is checked in the Options field of the General tab of the Turn Print Setup. The Peak tab of the Turn Print Setup is used to set the parameters for the peak analysis. Refer to chapter 5 for more information on setting up peak information for reports.

	Main St. From North					Broad St. From East					Main St. From South					Broad St. From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	8	0	6	0	14	8	115	50	5	178	41	0	6	1	48	8	166	7	1	182	422
05:00 PM	8	1	4	0	13	5	98	59	1	163	35	0	5	1	41	5	194	5	1	205	422
05:15 PM	7	0	6	0	13	7	102	59	0	168	49	0	1	0	50	7	222	9	2	240	471
05:30 PM	9	0	5	0	14	5	85	46	0	136	36	0	2	0	38	11	208	6	0	225	413
Total Volume	32	1	21	0	54	25	400	214	6	645	161	0	14	2	177	31	790	27	4	852	1728
% App. Total	59.3	1.9	38.9	0		3.9	62.0	33.2	0.9		91.0	0	7.9	1.1		3.6	92.7	3.2	0.5		
PHF	0.889	0.250	0.875	0.000	0.964	0.781	0.870	0.907	0.300	0.906	0.821	0.000	0.583	0.500	0.885	0.705	0.890	0.750	0.500	0.888	0.917
Passenger Vehicles	31	1	21	0	53	24	337	214	6	581	161	0	14	2	177	31	675	26	4	736	1547
% Passenger Vehicles	96.9	100	100	0	98.1	96.0	84.3	100	100	90.1	100	0	100	100	100	100	85.4	96.3	100	86.4	89.5
Trucks	1	0	0	0	1	1	63	0	0	64	0	0	0	0	0	0	115	1	0	116	181
% Trucks	3.1	0	0	0	1.9	4.0	15.8	0	0	9.9	0	0	0	0	0	0	14.6	3.7	0	13.6	10.5

**Figure 6-5:**  
TM Report -  
Peak Analysis

The first line of the analysis says 'Peak Hour From' and lists the start and end time that was picked for the analysis. It also lists whether one or more peaks are being looked for in this time period. The second line lists whether the analysis is for the Entire Intersection or By Approach and lists the actual starting time of the peak hour.

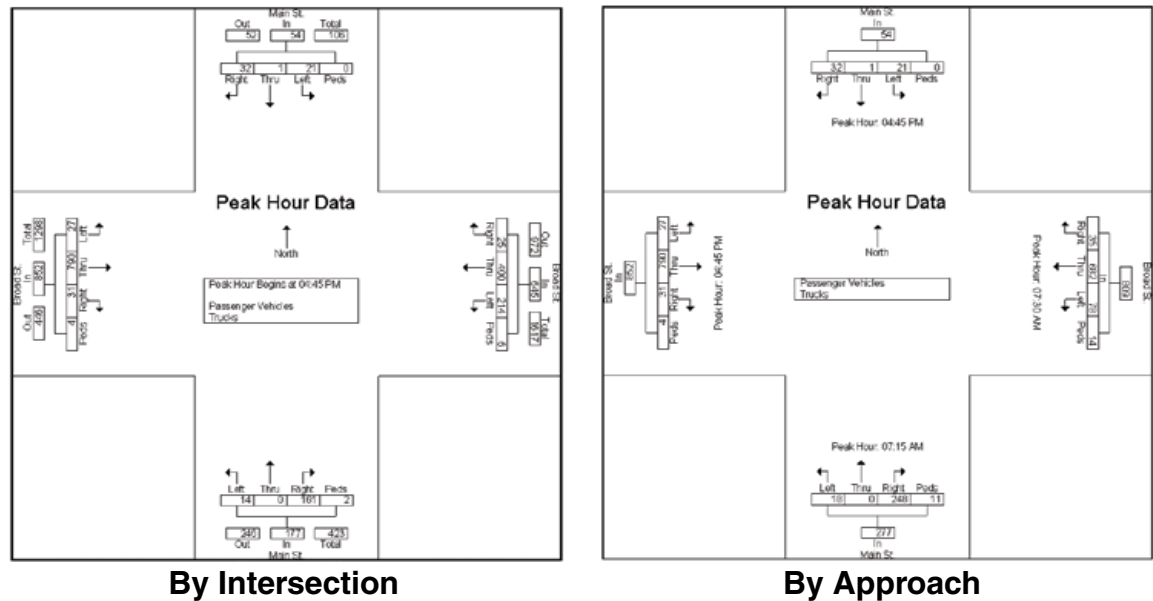
The next four lines list the actual volumes for the peak hour, with the high interval volume of each column in bold. This is followed by each movement's total volume for the peak hour, and what percentage it is of the approach.

The next line lists the PHF, or Peak Hour Factor, for each column of data. (Note that the overall PHF is not provided for peaks done By Approach.) Refer to the Appendix for more information on how the Peak Hour Factor is calculated.

Following the PHF information is optional group breakdown information. If the *Show the group breakdown on peak report* option has been selected in the Peak tab, this area will show the peak volumes on a group by group basis, as well as a percentage breakdown.

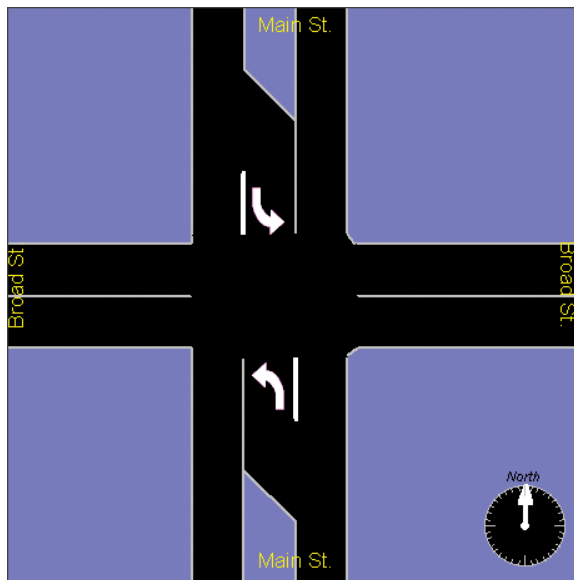
If a plot of the peak data has been requested in the Peak tab of the Turn Print Setup, an intersection plot of the peak data will follow the regular peak analysis. This plot is similar to the one described earlier for the overall data. Note that *By Approach* peak plots will only show Inbound volumes as the Outbound volumes would vary due to the different peak times of each approach.

**Figure 6-6:**  
TM Report -  
Peak Hour  
Intersection  
Plots



If a graph of the peak data has been requested in the Peak tab of the Turn Print Setup, a Variable Width graph of the peak data will also be produced with the report.

**Intersection  
Drawing**



**Figure 6-7:**  
TM Report -  
Intersection  
Drawing

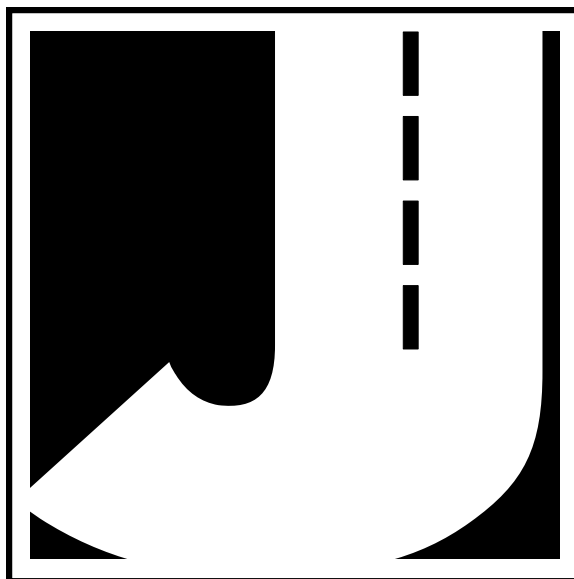
If the Intersection Drawing box is checked in the Options field of the General tab of the Turn Print Setup, a graphical depiction of the intersection where the data was collected will be included with the report.

The Intersection Drawing can be created or edited using the Intersection Design selection of the Tools menu. Refer to Chapter 5 for more information on how to design an intersection with this tool.

**Intersection  
Photo**

If the Intersection Photo box is checked in the Options field of the General tab of the Turn Print Setup, any digital photo you have attached to the file will be included with the report.

Digital photos can be attached to a file using the Intersection Design selection of the Tools menu. Refer to Chapter 5 for more information on how to include a digital photo with your data.



# Chapter 7



## Roundabout Movement Files & Reports

## Roundabout Movement Files

**Menu Options**

**Toolbar**

**Header Information**

**Approach Descriptions**

**Movement Descriptions**

**Group Names**

**Interval Times**

**Data Grid**

Start Time	11th Street From North				Central Ave From East				11th Street From South				Central Ave From West			
	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn	Right	Thru	Left	U Turn
07:00 AM	22	5	20	0	3	57	12	0	40	5	12	0	3	83	13	1
07:15 AM	22	11	20	0	3	73	24	0	41	11	12	0	3	80	26	1
07:30 AM	34	16	31	0	5	125	15	1	64	16	19	1	6	138	17	0
07:45 AM	43	22	38	1	6	185	30	0	80	22	23	0	7	204	30	2
08:00 AM	34	10	31	0	5	157	15	0	83	10	19	0	6	173	17	0
08:15 AM	22	12	20	1	5	113	18	2	40	12	12	0	6	124	20	2
08:30 AM	21	17	19	0	2	81	22	0	38	17	11	0	2	89	24	0
08:45 AM	21	14	19	0	2	67	15	2	29	14	11	0	2	74	17	3

Row Total: 256 Column Total: 219

**Figure 7-1:**  
Roundabout  
Movement  
File

Once a Roundabout Movement study is open in the program, there are a number of things that can be done to edit or adjust the file. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Roundabout Movement files contain six main areas of information: the Header Information, Approach Descriptions, Movement Descriptions, Group Names, Interval Times and Data Grid. These areas are shown in the figure above.

The information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options, shown above. Editing options for Roundabout files are identical to those for turning movement files. How these functions work are covered in detail in Chapters 4 & 5.



Roundabout Movement reports can be produced with a number of different options either included or excluded. The following sections cover the various options that can be used. Your reports may not include all of these options but they will contain some of them.

## Overall Data

**Figure 7-2:**  
Roundabout  
Report -  
Overall Data

Start Time	11th Street From North					Central Ave. From East					11th Street From South					Central Ave. From West					Int. Total
	Right	Thru	Left	U Turns	App. Total	Right	Thru	Left	U Turns	App. Total	Right	Thru	Left	U Turns	App. Total	Right	Thru	Left	U Turns	App. Total	
07:00 AM	25	5	22	0	52	3	64	14	0	81	45	5	14	0	64	3	71	15	1	90	287
07:15 AM	25	13	22	0	60	3	82	27	1	113	46	13	14	0	73	3	90	29	2	124	370
07:30 AM	38	18	35	0	91	5	141	17	1	164	72	18	21	1	112	7	155	19	0	181	548
07:45 AM	49	25	44	1	119	7	208	34	0	249	90	25	26	0	141	8	230	37	2	277	786
Total	137	61	123	1	322	18	495	92	2	607	253	61	75	1	390	21	546	100	5	672	1991
08:00 AM	38	11	35	0	84	5	177	17	0	199	71	11	21	2	105	7	195	19	1	222	610
08:15 AM	25	14	22	3	64	5	127	20	2	154	45	14	14	0	73	7	140	22	2	171	462
08:30 AM	23	19	21	0	63	2	91	25	0	118	43	19	13	0	75	2	100	27	0	129	385
08:45 AM	23	16	21	0	60	2	75	17	2	96	44	16	13	0	73	2	83	19	4	108	337
Total	109	60	99	3	271	14	470	79	4	567	203	60	61	2	326	18	518	87	7	630	1794
Grand Total	246	121	222	4	593	32	965	171	6	1174	456	121	136	3	716	39	1064	187	12	1302	3785
Approach %	41.5	20.4	37.4	0.7		2.7	82.2	14.6	0.5		63.7	16.9	19	0.4		3	81.7	14.4	0.9		
Total %	6.5	3.2	5.9	0.1	15.7	0.8	25.5	4.5	0.2	31	12	3.2	3.6	0.1	18.9	1	28.1	4.9	0.3	34.4	
Passenger Vehicles	219	107	199	2	527	31	858	151	5	1045	405	107	119	1	632	35	945	167	9	1156	3360
% Passenger Vehicles	89	88.4	89.6	50	88.9	96.9	88.9	88.3	83.3	89	88.8	88.4	87.5	33.3	88.3	89.7	88.8	89.3	75	88.8	88.8
Trucks	27	14	23	2	66	1	107	20	1	129	51	14	17	2	84	4	119	20	3	146	425
% Trucks	11	11.6	10.4	50	11.1	3.1	11.1	11.7	16.7	11	11.2	11.6	12.5	66.7	11.7	10.3	11.2	10.7	25	11.2	11.2

This area of the report contains all the data that was collected for the study. Generally the data is in 15-minute intervals, although it can also be done in 1, 5, 30, and 60-minute intervals.

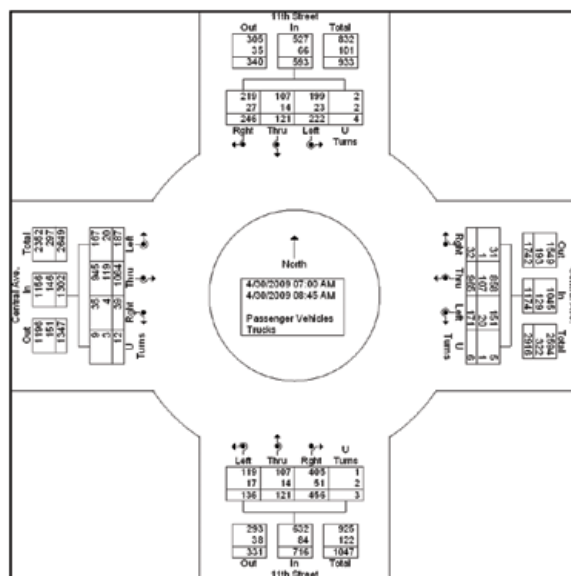
The data is listed in chronological order with each interval's start time or end time displayed, depending on what option has been selected in the Preferences. Which groups of data are being shown is listed at the top of the report on the Groups Printed line.

At the end of the data, Grand Totals are provided for each movement, and each column is broken down into what percentage of the approach it is and what percentage of the overall data it is.

If more than one group is included in the report, a breakdown is provided for each group of data, including volume totals for each group, and what percentage each group is of the overall total.

If the Plot Totals box is checked in the Options field of the General tab of the Turn Print Setup, an intersection plot of the overall data will be produced with the report. This is a graphical depiction of the data showing the Inbound and Outbound totals for each approach to the intersection.

## Intersection Plot

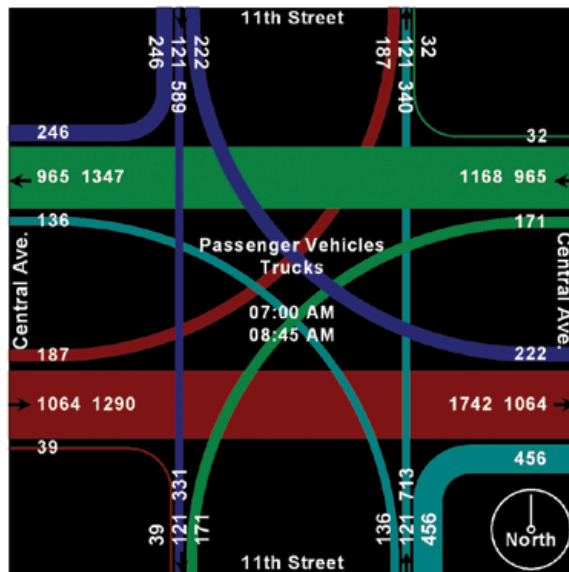


**Figure 7-3:**  
Roundabout  
Report -  
Standard Plot

The middle of the Intersection Plot contains a North arrow as well as a box listing the beginning and ending times of the data shown and what groups are being shown.

Note that In and Out listing are always in reference to the intersection itself. Refer to Chapter 15 for a more detailed explanation of this.

## Variable Width Graph



**Figure 7-4:**  
Roundabout  
Report -  
Variable  
Width Graph

If the Graph Totals box is checked in the Options field of the General tab of the Turn Print Setup, a variable width graph of the overall data will be produced with the report. This is a graphical depiction of the data that uses lines of varying width to show volume differences — the thicker the line, the higher the volume.

The middle of the graph lists the beginning and ending times of the data shown and what groups are being shown.

## Peak Analysis

Peak analysis information will be printed with a report if the Print Peaks box is checked in the Options field of the General tab of the Turn Print Setup. The Peak tab of the Turn Print Setup is used to set the parameters for the peak analysis. Refer to chapter 5 for more information on setting up peak information for reports.

	11th Street From North					Central Ave. From East					11th Street From South					Central Ave. From West					
Start Time	Right	Thru	Left	U Turns	App. Total	Right	Thru	Left	U Turns	App. Total	Right	Thru	Left	U Turns	App. Total	Right	Thru	Left	U Turns	App. Total	Inc. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	38	18	35	0	91	5	141	17	1	164	72	18	21	1	112	7	155	19	0	181	548
07:45 AM	49	25	44	1	119	7	208	34	0	249	90	25	26	0	141	8	230	37	2	277	786
08:00 AM	38	11	35	0	84	5	177	17	0	199	71	11	21	2	105	7	195	19	1	222	610
08:15 AM	25	14	22	3	64	5	127	20	2	154	45	14	14	0	73	7	140	22	2	171	462
Total Volume	150	68	136	4	358	22	653	88	3	766	278	68	82	3	431	29	720	97	5	851	2406
% App. Total	41.9	19	38	1.1		2.9	85.2	11.5	0.4		64.5	15.8	19	0.7		3.4	84.6	11.4	0.6		
PHF	.765	.680	.773	.333	.752	.786	.785	.647	.375	.769	.772	.680	.788	.375	.764	.906	.783	.655	.625	.768	.765
Passenger Vehicles	133	60	121	2	316	21	580	78	3	682	247	60	73	1	381	25	639	87	4	755	2134
% Passenger Vehicles	88.7	88.2	89.0	50.0	88.3	95.5	88.8	88.6	100	89.0	88.8	88.2	89.0	33.3	88.4	86.2	88.8	89.7	80.0	88.7	88.7
Trucks	17	8	15	2	42	1	73	10	0	84	31	8	9	2	50	4	81	10	1	96	272
% Trucks	11.3	11.8	11.0	50.0	11.7	4.5	11.2	11.4	0	11.0	11.2	11.8	11.0	66.7	11.6	13.8	11.3	10.3	20.0	11.3	11.3

**Figure 7-5:**  
Roundabout  
Report -  
Peak Analysis

The first line of the analysis says 'Peak Hour From' and lists the start and end time that was picked for the analysis. It also lists whether one or more peaks are being looked for in this time period. The second line lists whether the analysis is for the Entire Intersection or By Approach and lists the actual starting time of the peak hour.

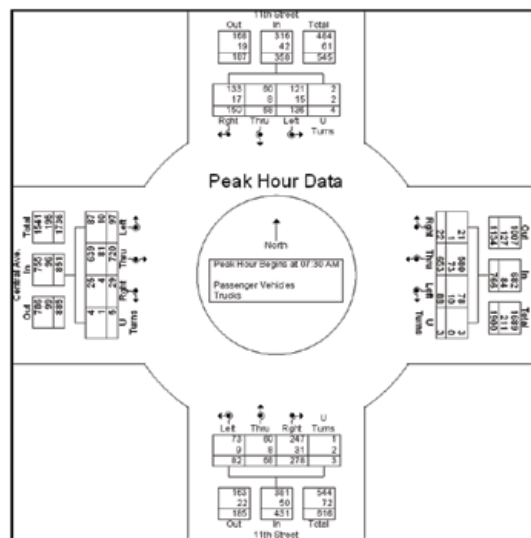
The next four lines list the actual volumes for the peak hour, with the high interval volume of each column in bold. This is followed by each movement's total volume for the peak hour, and what percentage it is of the approach.

The next line list the PHF, or Peak Hour Factor, for each column of data. (Note that the overall PHF is not provided for peaks done By Approach.) Refer to the Appendix for more information on how the Peak Hour Factor is calculated.

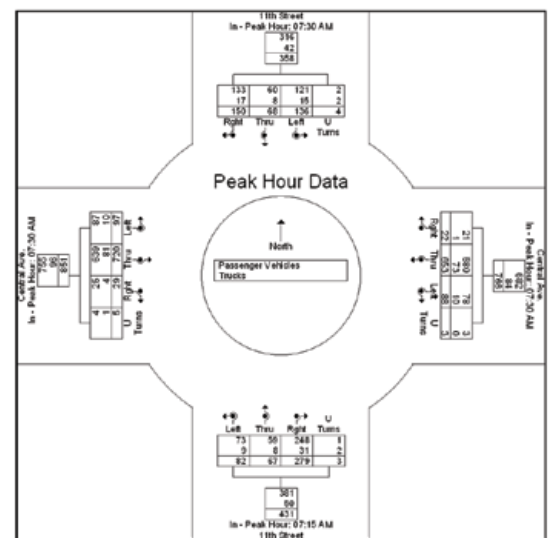
Following the PHF information is optional group breakdown information. If the *Show the group breakdown on peak report* option has been selected in the Peak tab, this area will show the peak volumes on a group by group basis, as well as a percentage breakdown.

If a plot of the peak data has been requested in the Peak tab of the Turn Print Setup, an intersection plot of the peak data will follow the regular peak analysis. This plot is similar to the one described earlier for the overall data. Note that *By Approach* peak plots will only show Inbound volumes as the Outbound volumes would vary due to the different peak times of each approach.

**Figure 7-6:**  
Roundabout  
Report -  
Peak Hour  
Intersection  
Plots



**By Intersection**

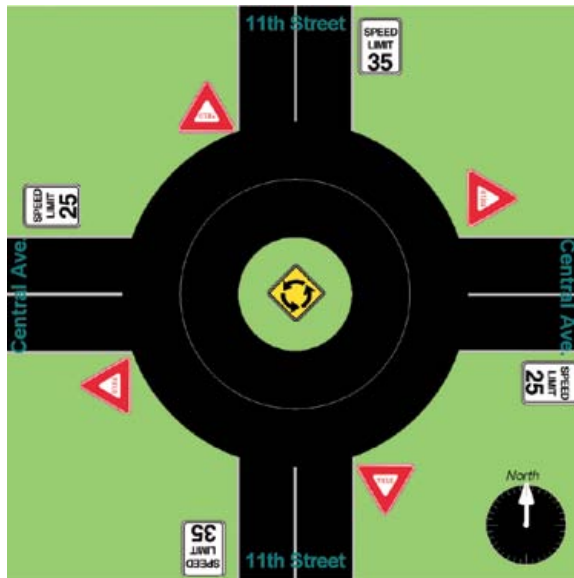


**By Approach**

If a graph of the peak data has been requested in the Peak tab of the Turn Print Setup, a Variable Width graph of the peak data will also be produced with the report.

## Intersection Drawing

**Figure 7-7:**  
Roundabout  
Report -  
Intersection  
Drawing



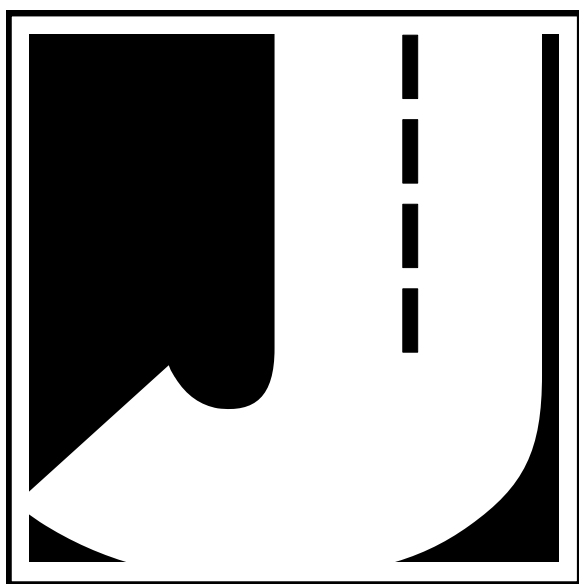
If the Intersection Drawing box is checked in the Options field of the General tab of the Turn Print Setup, a graphical depiction of the intersection where the data was collected will be included with the report.

The Intersection Drawing can be created or edited using the Intersection Design selection of the Tools menu. Refer to Chapter 5 for more information on how to design an intersection with this tool.

## Intersection Photo

If the Intersection Photo box is checked in the Options field of the General tab of the Turn Print Setup, any digital photo you have attached to the file will be included with the report.

Digital photos can be attached to a file using the Intersection Design selection of the Tools menu. Refer to Chapter 5 for more information on how to include a digital photo with your data.



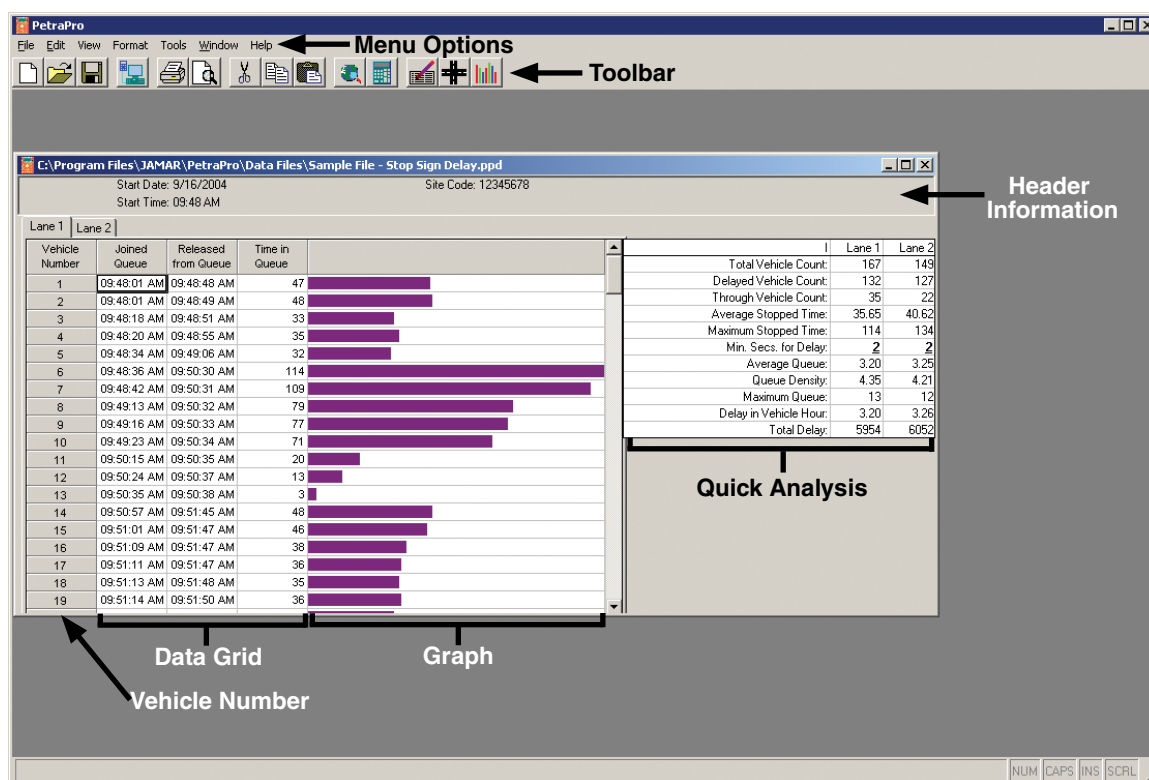
# Chapter 8



## Stop Sign Delay Files & Reports



## Stop Sign Delay Files



**Figure 8-1:**  
Stop Sign  
Delay File

Once you have opened a Stop Sign Delay file in the program there are several things that can be done to edit or adjust the file. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Stop Sign Delay files contain five main areas of information: the Header Information, Vehicle Number, Data Grid, Graph and Quick Analysis. These are shown in the figure above.

In a stop sign delay file each vehicle recorded is listed, along with the time it entered and left the queue, total time in the queue and a graphical representation of the time in queue. These numbers are used to calculate the values that are shown on the screen in the quick analysis. In the quick analysis, a numerical value can be typed in for the **Min. Secs for Delay**. The program will use this number in determining how long a vehicle had to stop in order to be considered delayed.

For example, if two seconds is entered the program will consider any vehicles that had to stop for zero or one seconds as not having been delayed. An example of this would be a vehicle doing a 'rolling' stop where it was recorded as leaving the queue immediately after entering it.

The information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options, shown above. These functions work in much the same way as they do for turning movements files. Refer to Chapters 4 & 5 for more information.

## Interpreting Stop Sign Delay Reports

Stop Sign Delay reports are set up in a manner very similar to Turning Movement reports. Refer to Chapter 5 for more details. Reports can be produced with a number of different options either included or excluded. The following sections cover the various options that can be used. Your reports may not include all of these options but they will contain some of them.

### Overall Data

**Figure 8-2:**  
Stop Sign  
Delay Report -  
Overall Data

L n.	No.	Joined Queue	Released From Queue	Delay	
1	1	9:48:01 AM	9:48:48 AM	47	
1	2	9:48:01 AM	9:48:49 AM	48	
1	3	9:48:18 AM	9:48:51 AM	33	
1	4	9:48:20 AM	9:48:55 AM	35	
1	5	9:48:34 AM	9:49:06 AM	32	
1	6	9:48:36 AM	9:50:30 AM	114	
1	7	9:48:42 AM	9:50:31 AM	109	
1	8	9:49:13 AM	9:50:32 AM	79	
1	9	9:49:16 AM	9:50:33 AM	77	
1	10	9:49:23 AM	9:50:34 AM	71	
1	11	9:50:15 AM	9:50:35 AM	20	
1	12	9:50:24 AM	9:50:37 AM	13	
1	13	9:50:35 AM	9:50:38 AM	3	
1	14	9:50:57 AM	9:51:45 AM	48	

This area of the report contains all the data that was collected for the study on a vehicle by vehicle basis. The data is listed in chronological order, with data from lane one listed first followed by data from lane two, if more than one lane was studied.

The times at which the vehicle joined and left the queue are listed, as well as the time delayed, in seconds. If Graph Totals has been selected in the Options field of the General tab of the Stop Sign Delay Print Setup, then a bar graph representing the delay time will also be printed. The color used for the bar graph can be changed using the Graph Color button in the Options field.

The wording for Lane 1 and Lane 2 can be changed using the Edit Count Header tool.

### Statistical Summary

**Figure 8-3:**  
Stop Sign  
Delay Report -  
Summary

9:48:00 AM - 10:19:00 AM	Lane 1
Total Vehicle Count:	167
Delayed Vehicle Count:	132
Through Vehicle Count:	35
Average Stopped Time:	35.65
Maximum Stopped Time:	114
Min. Secs. for Delay:	2
Average Queue:	3.20
Queue Density:	4.35
Maximum Queue:	13

The Statistical Summary can be produced for every 1, 5, 10, 15, 30 or 60 minutes of the data, or for all the data. This summary provides a breakdown of the overall data into a number of statistical categories for one or two lanes, depending on how many were included in the study.

**Start - End Times** – This line lists when the first and last vehicles of the study were recorded.

**Total Vehicle Count** – This line lists the total number of vehicles recorded in the summary period.

**Delayed Vehicle Count** – This line lists how many vehicles had to stop at the stop sign for a period longer than has been entered for the Minimum Seconds for Delay. Refer to the previous page for more information on how to enter this value.

**Through Vehicle Count** – This line lists how many vehicles had to stop for less than the time entered for the Minimum Seconds for Delay and are therefore not considered to be delayed.

**Average Stopped Time** – This line provides the average amount of time a vehicle had to wait at the stop sign.

**Maximum Stopped Time** – This line lists the longest time a vehicle had to wait at the stop sign.

**Minimum Seconds for Delay** – This is the value that has been entered in the file in the Min. Secs. for Delay field and is used in determining the Through and Delayed Vehicle Counts mentioned above. Refer to page 8.2 for more information on how to set this value.

**Average Queue** – To arrive at the average queue, the program scans through the data and, for each second, computes the number of vehicles waiting at the intersection (queue size) and adds it to the “total queue”. This total is then divided by the total number of seconds in the study (stop time - start time).

**Queue Density** – This value is calculated in a manner similar to Average Queue, with the exception that seconds where the queue is zero are not counted in total time. In other words, this is the average size of the queue when there was a queue. By looking at the Average Queue and Queue Density together you can determine the amount of platooning occurring at the intersection. The closer these two numbers are, the more evenly the traffic is arriving at the intersection. A large difference in these two numbers would indicate that vehicles are arriving in larger platoons.

**Maximum Queue** – This line gives the largest queue that existed during the summary period.

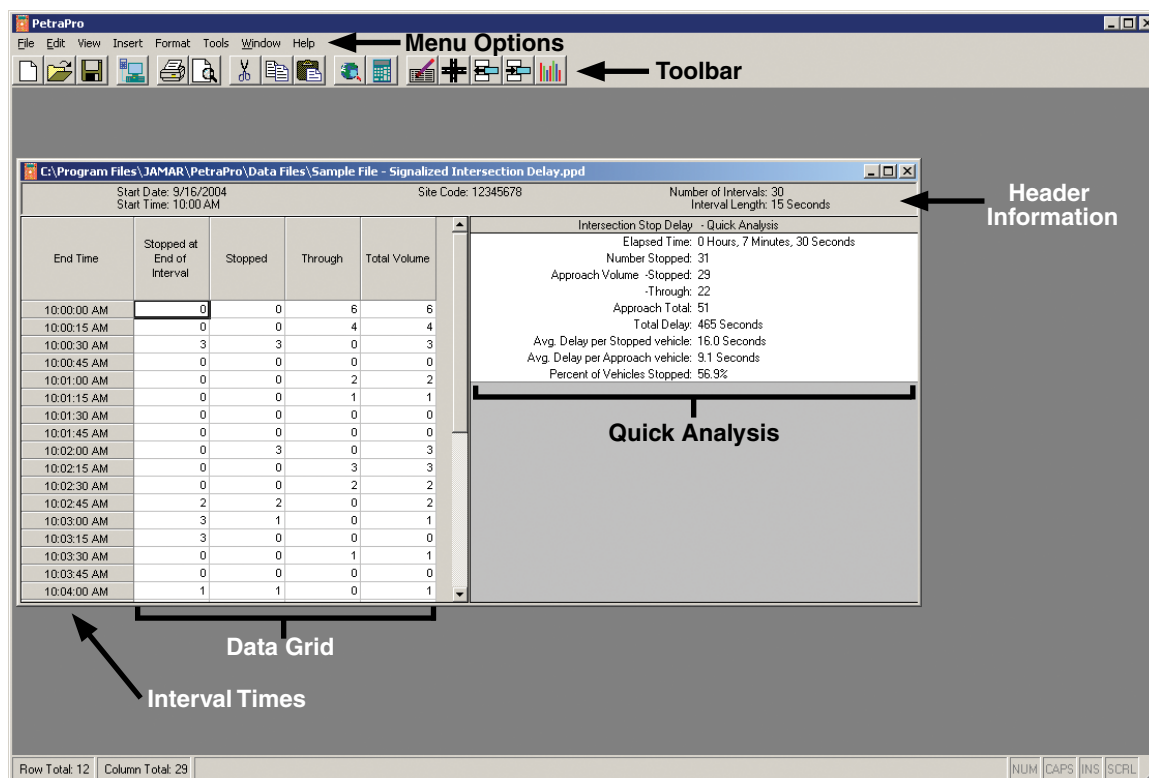
Stop Sign Delay reports can also contain a printout of the Intersection Drawing and/or Intersection Photo. Refer to chapter 6 for more information on this.

# Chapter 9



## Signalized Intersection Delay Files & Reports

## Signalized Intersection Delay Files



**Figure 9-1:**  
Signalized  
Intersection  
Delay File

Once you have opened a Signalized Intersection Delay file in the program there are several things that can be done to edit or adjust the file. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Intersection Delay files contain four main areas of information: the Header Information, Interval Times, Data Grid and Quick Analysis. These are shown in the figure above.

For each interval, the Stopped and Through totals are shown, which are then summed in the Total Volume column. The Stopped at End of Interval column lists the number of vehicles that were entered into the data collector as being in the queue. These numbers are used to calculate the values that are shown on the screen in the Quick Analysis.

The information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options, shown above. These functions work in much the same way as they do for turning movements files. Refer to Chapters 4 & 5 for more information.



## Interpreting Signalized Intersection Delay Reports

Signalized Intersection Delay reports are set up in a manner very similar to Turning Movement reports. Refer to Chapter 5 for more details. Reports can be produced with a number of different options either included or excluded. The following sections cover the various options that can be used. Your reports may not include all of these options but they will contain some of them.

### Overall Data

Eastbound at Broad				
Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
Factor	1.0	1.0	1.0	
10:05:00 AM	0	0	0	0
10:05:15 AM	0	0	0	0
10:05:30 AM	2	2	0	2
10:05:45 AM	0	2	0	2
10:06:00 AM	0	0	1	1
10:06:15 AM	0	1	0	1
10:06:30 AM	6	5	0	5
10:06:45 AM	5	4	0	4
10:07:00 AM	0	0	0	0
10:07:15 AM	2	2	0	2
Grand Total	15	16	1	17
Total %		94.1	5.9	

**Figure 9-2:**  
Intersection  
Delay Report -  
Overall Data

This area of the report contains all the data that was collected for the study. The data can be collected with an interval length of between 10 and 16 seconds. The data is listed in chronological order with each interval's start time or end time displayed, depending on what option has been selected in the General tab of Preferences. A Direction Description is listed at the top of the report if one has been entered using the Edit Count Header tool.

The first column of data is the *Stopped at End of Interval* data, which is the number of vehicles in the queue at the end of the interval, as entered by the person collecting the data. The second column is the *Stopped* data, which represents the total number of vehicles that had to stop at the intersection during the interval. The third column is the *Through* data, which represents the total number of vehicles that were able to proceed through the intersection without stopping during the interval. The final column of data is the *Total Volume*, which is a total of both the *Stopped* and *Through* vehicles in the interval. At the bottom of the data, the *Grand Totals* of each column are listed as well as the total percentage of *Stopped* and *Through* vehicles.

### Statistical Summary

First Sample: 10:00:00 AM
Last Sample: 10:07:15 AM
Sample Rate: 15 Seconds
Number of Samples: 30
Elapsed Time: 0 Hours, 7 Minutes, 30 Seconds
Number Stopped: 31
Approach Volume -Stopped: 29
-Through: 22
Approach Total: 51
Total Delay: 465
Avg. Delay per Stopped vehicle: 16.034
Avg. Delay per Approach vehicle: 9.118
Percent of Vehicles Stopped: 56.863

**Figure 9-3:**  
Intersection  
Delay Report -  
Summary

The Statistical Summary of the data provides a breakdown of the overall data into a number of statistical categories. The first two lines of the summary give the times of the first and last intervals done in the study. This is followed by the sample rate (interval length) chosen for the study, the number of samples collected and the total elapsed time of the study.

The *Number Stopped* entry shows the total number of vehicles recorded as being in a queue at the end of an interval. Below this is the *Approach Volume*, which is broken down into the total number of vehicles that had to stop and the total number that were able to pass through the intersection. These are then summed as the *Approach Total*. The next line lists the *Total Delay* in seconds, which is calculated by multiplying the Number Stopped by the Sample Rate value.

The *Avg. Delay per Stopped* vehicle gives the average delay for a vehicle that had to stop at the intersection (Total Delay divided by Approach Volume Stopped). The *Avg. Delay per Approach* vehicle gives the average delay of all approaching vehicles (Total Delay divided by Approach Total). The last line gives the percentage of all approaching vehicles that had to stop at the intersection (Approach Volume Stopped divided by Approach Total, multiplied by 100).

Peak Analysis information can be included with the report, but only if there is more than one hour of data. Otherwise this option is not available.

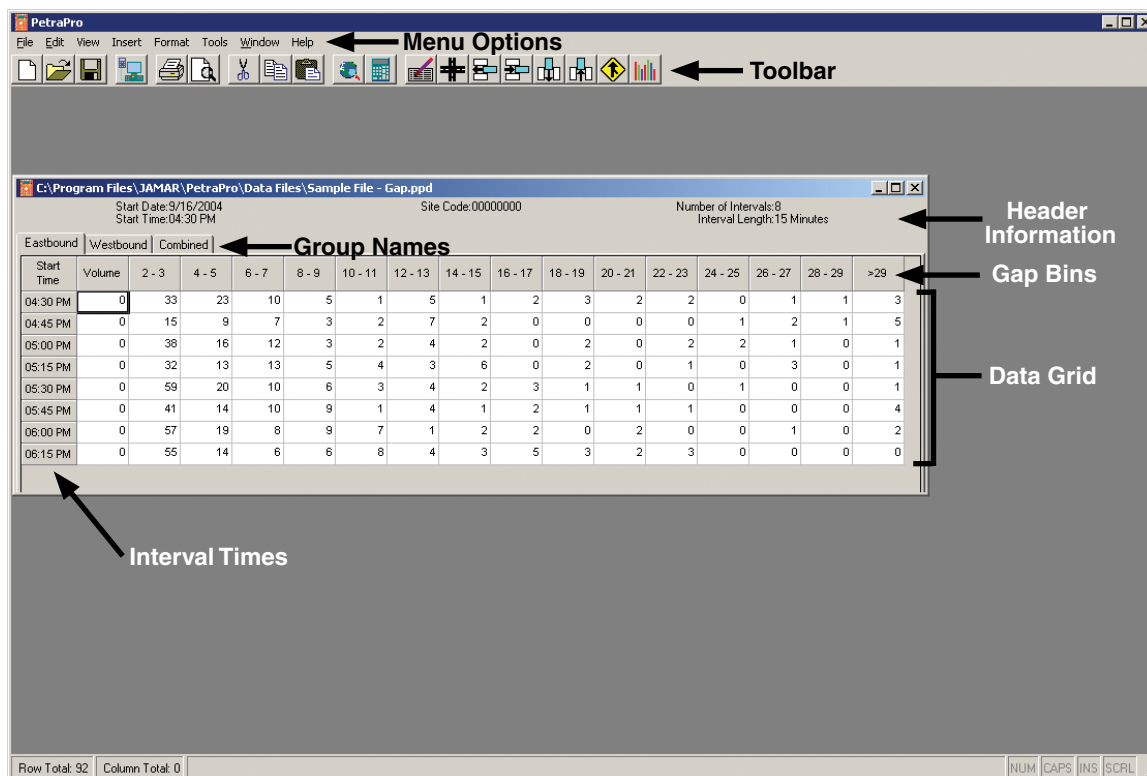
Signalized Intersection Delay reports can also contain a printout of the Intersection Drawing and/or Intersection photo. Refer to chapter 6 for more information on this.

# Chapter 10



## Multi-direction Gap Files & Reports

# Gap Files



**Figure 10-1:**  
Gap File

Gap files contain data on the number of gaps that occur in traffic, broken down into 15 two-second bins. These are: 2-3 seconds, 4-5, 6-7, 8-9, 10-11, 12-13, 14-15, 16-17, 18-19, 20-21, 22-23, 24-25, 26-27, 28-29 and greater than 29 seconds. These bins cannot be changed. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Gap files contain five main areas of information: the Header Information, Group Names, Gap Bins, Interval Times and Data Grid. These are shown in the figure above. The data grid lists the number of specific gaps that occurred per interval. For example, in the Gap file shown in the figure above there were 33 different gaps of between two and three seconds from 4:30 to 4:45 for the Eastbound group. There were 23 different gaps of four to five second, etc.

If more than one direction of gap information was recorded, the Group Name tabs can be used see the second direction as well as the combined gap information.



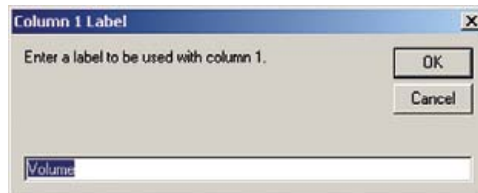
**Note**

Note that the Combined group is not merely a sum of the two direction. Rather, it is a listing of when there was a gap in both directions at the same time. This information is stored in real time while the data is being collected in the field.

The information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options, shown above. These functions work in much the same way as they do for turning movements files. Refer to Chapters 4 & 5 for more information.

**Column 1 Label** One feature that is unique to Gap files is the *Column 1 Label* Tool. This Tool, which can be accessed from the Tools menu, is used to change the label of the first column in gap studies. When doing a gap study you have the option to also count vehicles. This is not required to get gap information, but it can be useful in putting the gap information into perspective.

For example, imagine that at two different locations there were 100 gaps measured, and the average gap was 10 seconds. Now imagine that at the first location there were 125 cars counted, and at the second location there were 2000 counted. Location one is a quiet little street, with fairly steady traffic. Location two is much heavier with platoons of cars. Knowing the volumes helps a lot.



**Figure 10-2:**  
Edit Column 1  
Label

However, some people use the count button to count other things, such as pedestrians trying to cross during gaps. With the Column 1 Label function you can change the name of this count column to reflect what it was that you actually counted.

## Interpreting Gap Reports

Gap reports are set up in a manner very similar to Turning Movement reports. Refer to chapter 5 for more details. Reports can be produced with a number of different options either included or excluded. The following sections cover the various options that can be used. Your reports may not include all of these options but they will contain some of them.

### Overall Data

**Figure 10-3:**  
Gap Report -  
Overall Data

Directions Printed: Eastbound																	
Start Time	Vol.	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total
02:30 PM	0	33	23	10	5	1	5	1	2	3	2	2	0	1	1	3	92
02:45 PM	0	15	9	7	3	2	7	2	0	0	0	0	1	2	1	5	54
Total	0	48	32	17	8	3	12	3	2	3	2	2	1	3	2	8	146
03:00 PM	0	38	16	12	3	2	4	2	0	2	0	2	2	1	0	1	85
03:15 PM	0	32	13	13	5	4	3	6	0	2	0	1	0	3	0	1	83
03:30 PM	0	59	20	10	6	3	4	2	3	1	1	0	1	0	0	1	111
03:45 PM	0	41	14	10	9	1	4	1	2	1	1	1	0	0	0	4	89
Total	0	170	63	45	23	10	15	11	5	6	2	4	3	4	0	7	368
04:00 PM	0	57	19	8	9	7	1	2	2	0	2	0	0	1	0	2	110
04:15 PM	0	55	14	6	6	8	4	3	5	3	2	3	0	0	0	0	109
Grand Total	0	330	128	76	46	28	32	19	14	12	8	9	4	8	2	17	733
Total %		45.0	17.5	10.4	6.3	3.8	4.4	2.6	1.9	1.6	1.1	1.2	0.5	1.1	0.3	2.3	

This area of the report contains all the data that was collected for the study. Generally the data is collected in 15-minute intervals, although it can also be done in 1, 5, 30, and 60-minute intervals.

The data is listed in chronological order with each interval's start time or end time displayed, depending on what option has been selected in the General tab of Preferences. Which directions of data are being shown is listed at the top of the report on the Directions Printed line. The names of the directions can be changed for each specific file in the Edit Count Header function.

The first column is the count column, and will only contain data if a count was done while the gap information was being recorded. The label for this column can be changed using the Column 1 Label function, as described previously.

The report lists the number of specific gaps that occurred per interval. For example, in figure 10-3 above there were 33 different gaps of between two and three seconds from 2:30 to 2:45. There were 23 different gaps of four to five second, etc. The Int. Total column gives the total number of gaps recorded (note that this number does not include the count data from column one) while the Average column lists what bin the average gap for the interval fell into.



At the end of the data the total of each gap bin is listed, along with the overall average gap and what percentage each bin was of the overall data.

### Peak Analysis

Peak analysis information will be printed with a report if the Print Peaks box is checked in the Options field of the General tab of the Gap Print Setup. The Peak tab of the Gap Print Setup is used to set the parameters for the peak analysis. **Note that you can only get peak information for a gap study if count information was collected while gaps were being recorded.**

**Figure 10-4:**  
Gap Report -  
Peak Analysis

```

Peak Hour From 02:30 PM to 04:15 PM - Peak 1 of 1
Peak Occurred: 03:30 PM
Volume        276
High Int.     04:15 PM
Volume        89
PHF           0.775
  
```

The first line of the analysis read *Peak Hour From* and lists the start and end time that was picked for the analysis. It also lists whether one or more peaks are being looked for in this time period. The second line lists the starting time of when the peak hour occurred. The third line lists the volume for the peak hour. The next two lines list the time of the highest interval within the peak hour, and the volume for that high interval. The last line gives the PHF, also know as Peak Hour Factor.

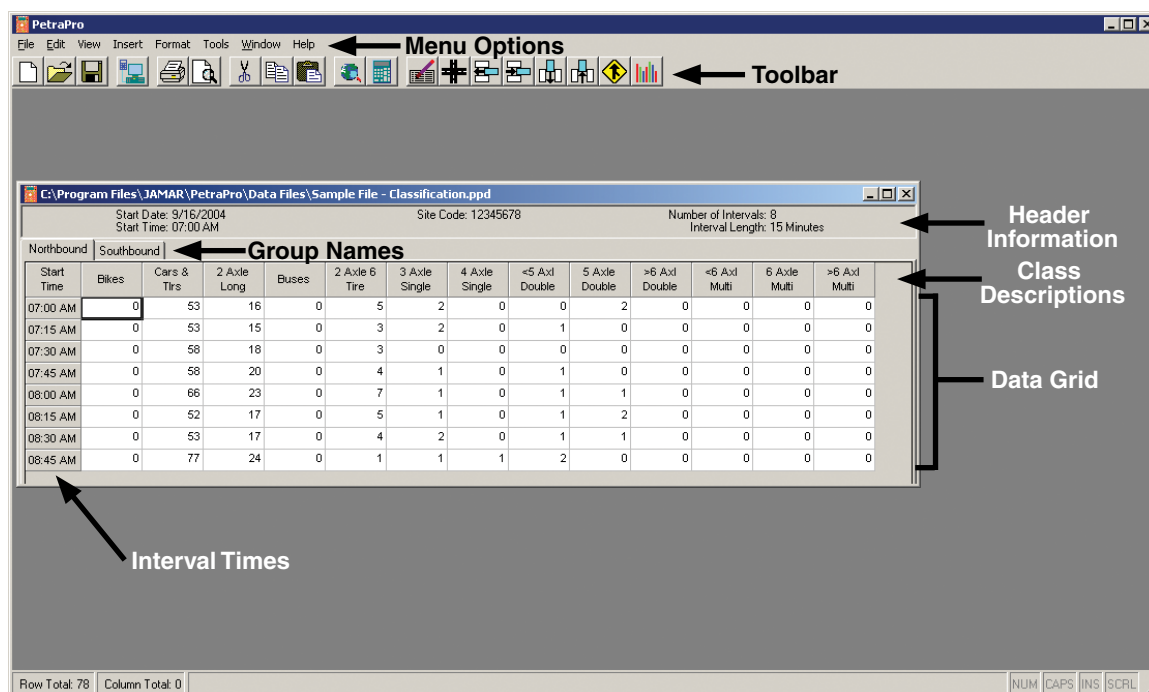
Gap reports can also contain a printout of the Intersection Drawing and/or Intersection photo. Refer to chapter 6 for more information on this.

# Chapter 11



## Classification Files & Reports

## Classification Files



**Figure 11-1:**  
Classification  
File

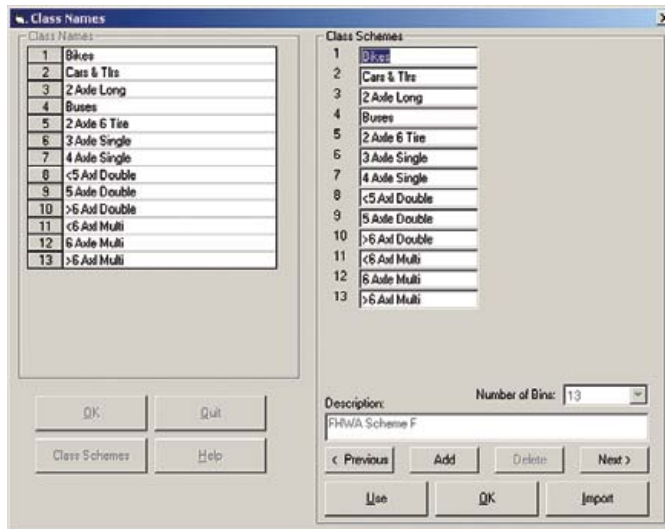
Classification studies can be done in two formats: using the standard Federal Highway Administration's (FHWA) Scheme F of thirteen classes, or using a user defined classification scheme. Refer to the Appendix for a detailed description of the FHWA's scheme F.

Whether the file is user defined or FHWA Scheme F, they are edited in the same manner, the only difference being the number of classes used. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Classification files contain four main areas of information: the Header Information, Class Descriptions, Interval Times and Data Grid. These area are shown in the figure above.

The information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options, shown above. These functions work in much the same way as they do for Turning Movements files. Refer to Chapters 4 & 5 for more information.

## Edit Class Descriptions



**Figure 11-2:**  
Edit Class Descriptions

One feature that is unique to Classification files is the **Edit Class Descriptions** option. This feature can be accessed from the Edit menu, or by double-clicking on one of the existing class definition column titles. It is used to enter the descriptions of the classes being used. When first opened, the current class names are shown and can be edited as desired. The *Class Schemes* button expands the window for selecting a previously saved scheme or importing a scheme.

You can create a new scheme by clicking on the Add button and entering the

number of bins (up to 32) to use in the scheme, followed by the definitions of each and the description you want to give the scheme. Click the *Use* button to use the currently selected scheme in the active file.

## Interpreting Classification Reports

Classification reports are set up in a manner very similar to Turning Movement reports. Refer to Chapter 5 for more details. Reports can be produced with a number of different options either included or excluded. The following sections cover the various options that can be used. Your reports may not include all of these options but they will contain some of them.

### Overall Data

Directions Printed: Northbound															
Start Time	Bikes	Cars & Trs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Int. Total	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
09:15 AM	0	53	16	0	5	2	0	0	2	0	0	0	0	78	
09:30 AM	0	53	15	0	3	2	0	1	0	0	0	0	0	74	
09:45 AM	0	58	18	0	3	0	0	0	0	0	0	0	0	79	
Total	0	164	49	0	11	4	0	1	2	0	0	0	0	231	
10:00 AM	0	58	20	0	4	1	0	1	0	0	0	0	0	84	
10:15 AM	0	66	23	0	7	1	0	1	1	0	0	0	0	99	
10:30 AM	0	52	17	0	5	1	0	1	2	0	0	0	0	78	
10:45 AM	0	53	17	0	4	2	0	1	1	0	0	0	0	78	
Total	0	229	77	0	20	5	0	4	4	0	0	0	0	339	
11:00 AM	0	77	24	0	1	1	1	2	0	0	0	0	0	106	
Grand Total	0	470	150	0	32	10	1	7	6	0	0	0	0	676	
Total %	0.0	69.5	22.2	0.0	4.7	1.5	0.1	1.0	0.9	0.0	0.0	0.0	0.0		

**Figure 11-3:**  
Class Report - Overall Data

This area of the report contains all the data that was collected for the study. Generally the data is collected in 15-minute intervals, although it can also be done in 1, 5, 30, and 60-minute intervals.

The data is listed in chronological order with each interval's start time or end time displayed, depending on what option has been selected in the General tab of Preferences. Which directions of data are being shown is listed at the top of the report on the Directions Printed line. At the end of the data the total for each class is listed, as well as the percentage it is of the overall data.

## Peak Analysis

Peak analysis information will be printed with a report if the Print Peaks box is checked in the Options field of the General tab of the Classification Print Setup. The Peak tab of the Classification Print Setup is used to set the parameters for the peak analysis.

**Figure 11-4:**  
Class Report -  
Peak Analysis

Start Time	Bikes	Cars & Trs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Int. Total
Peak Hour From 09:15 AM to 11:00 AM - Peak 1 of 1														
Peak Occurred: 10:15 AM														
Volume	0	248	81	0	17	5	1	5	4	0	0	0	0	361
Percent	0.0	68.7	22.4	0.0	4.7	1.4	0.3	1.4	1.1	0.0	0.0	0.0	0.0	
High Int. 11:00 AM														
Volume	0	77	24	0	1	1	1	2	0	0	0	0	0	106
PHF	0.651													

The first line of the analysis reads *Peak Hour From* and lists the start and end time that was picked for the analysis. It also lists whether one or more peaks are being looked for in this time period. The second line lists the starting time of when the peak hour occurred. The third and fourth lines list the volumes for the hour by each class and what percentage they are of the overall peak data. The next two lines list the time of the highest interval within the peak hour, and the volumes for that high interval. The last line gives the PHF, also know as Peak Hour Factor.

Classification reports can also contain a printout of the Intersection Drawing and/or Intersection Photo. Refer to chapter 6 for more information on this.

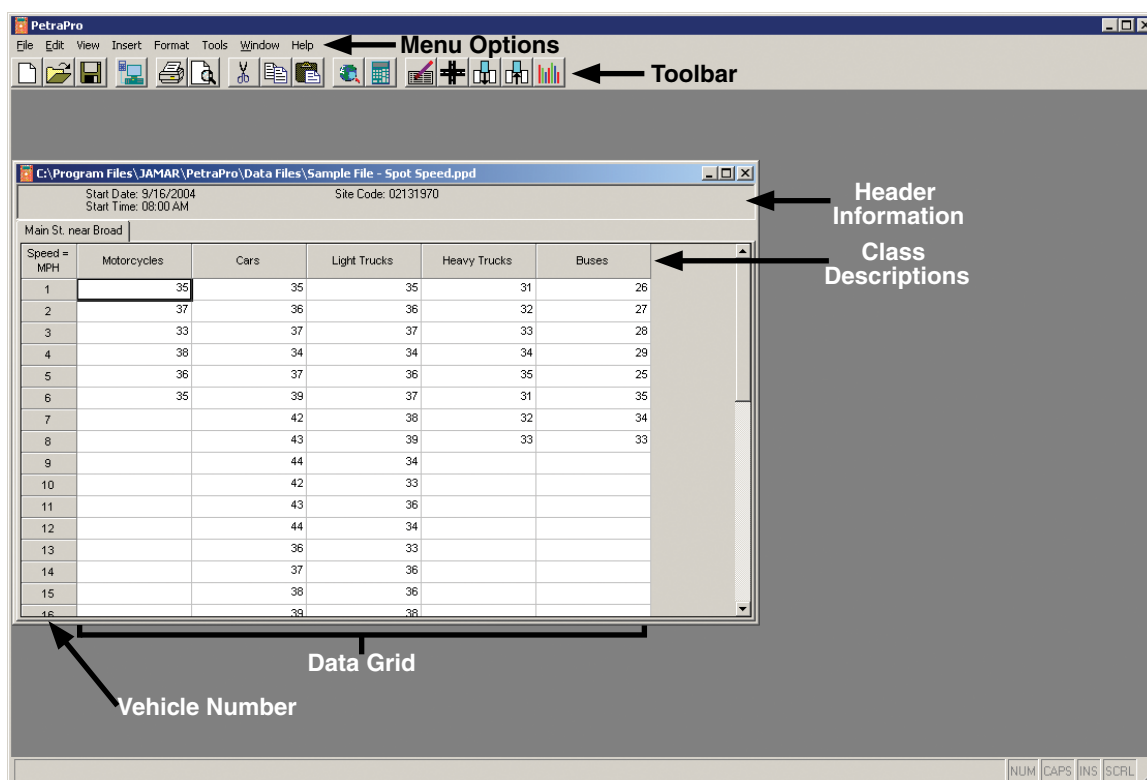


# Chapter 12



## Spot Speed Files & Reports

## Spot Speed Files



Once you have opened a Spot Speed file in the program there are several things that can be done to edit or adjust the file. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Spot Speed files contain four main areas of information: the Header Information, Class Descriptions, Vehicle Number and Data Grid. These are shown in the figure above.

In a spot speed file the speed of each vehicle recorded is listed, broken down into the classes that were used during the data collection. For example, in the figure above the first motorcycle recorded was travelling at a speed of 35 mph, the second 37, the third 33, etc. By looking at the Vehicle Number, you can determine the total number of vehicles of each class. In the figure above, there is a total of six motorcycles, eight heavy trucks, etc.

The information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options, shown above. These functions work in much the same way as they do for turning movements files. Refer to Chapters 4 & 5 for more information.

### Convert Units

One feature that is unique to Spot Speed files is the **Convert to MPH/KPH** option. This option, which can be accessed from the Tools menu, is used to convert the speed values from miles per hour to kilometers per hour, or vice versa.

## Interpreting Spot Speed Reports

### Overall Data

#	Motorcycles	Cars	Light Trucks	Heavy Trucks	Busses
1	35	35	35	31	26
2	37	36	36	32	27
3	33	37	37	33	28
4	38	34	34	34	29
5	36	37	36	35	25
6	35	39	37	31	35
7		42	38	32	34
8		43	39	33	33
9		44	34		
10		42	33		
11		43	36		
12		44	34		
13		36	33		
14		37	36		
15		38	36		
16		39	38		
17		40	39		
18		48	43		
19		48			
20		47			

**Figure 12-2:**  
Spot Speed  
Report -  
Overall Data

This area of the report contains all the data that was collected for the study on a vehicle by vehicle basis. The vehicles are listed in the order in which they were collected. If the speed data was recorded for specific classes, each class is listed separately. The data can be shown in either MPH or KPH.

### Statistical Summary

The Statistical Summary can be produced with a number of different categories, depending on what has been selected in the Spot Speed Reports. The first column lists which class of vehicle is being analyzed while the second column gives the total vehicle count for that class.

**Figure 12-3:**  
Spot Speed  
Report -  
Summary

Class	Vehicle Count	10 MPH Pace Speed	Number in Pace	Percent in Pace	Average Speed	Number of Vehicles Over 35 MPH	Percent of Vehicles Over 35 MPH	15 Percentile	True Median (50th Percentile)	85 Percentile	95 Percentile
Motorcycles	6	29 - 38	6	100	36	3	50	33	36	37	38
Cars	36	35 - 44	29	81	41	33	92	36	42	45	47
Light Trucks	18	30 - 39	17	94	36	12	67	34	36	38	39
Heavy Trucks	8	26 - 35	8	100	35	0	0	31	32	34	35
Busses	9	28 - 34	7	89	30	0	0	29	29	34	39
Summary	76	33 - 42	52	69	37	48	63	39	37	42	47

**Average Speed** – This is derived by adding all the individual speeds within each class, and then dividing that result by the number of speed samples.

**Percentile Speed** – Reports can include percentile speeds from 5 to 100 percent in 5 mph increments. A percentile speed is determined by sorting all the speed samples from slow to fast, and then moving up the list to the point where the percentile requested occurs. For example, if you were looking for the 85th percentile and had a file with 100 speed samples, the program would sort the samples and then take the 85th vehicle from the list, which would be the 85th percentile speed. This is the same as saying ‘85 percent of the traffic was traveling at this speed or slower’.

**Pace Speed** – This column represents the largest number of vehicles traveling in a 10 mph speed range. For example, if the pace speed is 26 to 35, then you could say ‘More vehicles were traveling 26 to 35 mph than any other 10 mph speed range’.

**Number/Percent in Pace** – These columns give the total number of vehicles that were in the pace speed range and what percentage this was of the overall data. The lower the percentage of vehicles in the pace speed range, the more widely dispersed the speeds in the study are.

**Number/Percent of Vehicles Over Speed Limit** – These columns give the total number of vehicles that were traveling over the designated speed limit and what percentage this was of the overall data. The Speed Limit value can be entered in the Print Setup screen.

Spot Speed reports can also contain a printout of the Intersection Drawing and/or Intersection Photo. Refer to chapter 6 for more information on this.

# Chapter 13



## Saturation Flow Files & Reports



## Saturation Flow Files

When you first process a Saturation Flow file, a window titled New Count Options will appear with several options related to the data.

**Figure 13-1:**  
Saturation  
Flow New  
Count Options

The **Count Identification** field at the top provides Start Date, Start Time and Site Code information on the file being processed.

The **Type of Study** field allows you to select how the data was collected in the field. There are three different ways to collect data:

**Type 1** provides only saturation flow rates. For this type of data, you only need to record the start of the green signal interval and when each vehicle crosses the stop bar. If this type of data has been collected, the Signal Timings area of the file will only show when each green interval began and when each vehicle crossed the stop bar.

**Type 2** provides saturation flow rates as well as the timings of each signal interval. For this type of data, you need to record all signal interval changes as well as when the vehicles cross the stop bar. If this type of data has been collected, you will see the timings for all three intervals of a cycle, and when each vehicle crossed the stop bar.

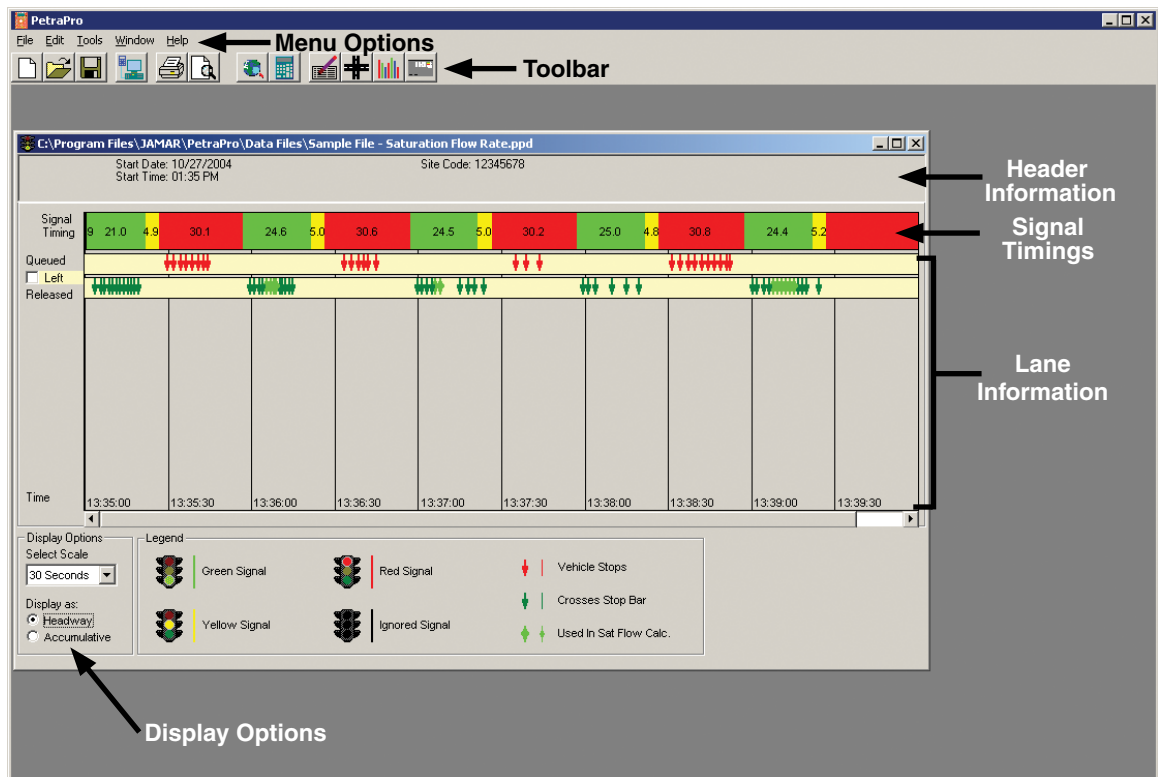
**Type 3** provides saturation flow rates, signal timings and vehicle arrival types. For this type of data, you need to record all signal interval changes, when vehicles cross the stop bar and when vehicles stop in the queue. If this type of data has been collected, you will see the timings for all three intervals of a cycle, when each vehicle crossed the stop bar and when each vehicle stopped in the queue. Figure 13-2 shows an example of a Type 3 data file.

PETRAPro will default the selection in this field to either Type 1, Type 2 or Type 3 based on its analysis of the data.

The **Select Lane Usage** field allows you to select how each of the available four lanes was recorded during the study. The options are Not Used, Normal Lane or Left Turn Lane. PETRAPro will default the selection for each lane to one of these options, based on its analysis of the data.

The **Ignore Vehicles** field allows you to select with which vehicle to start the saturation flow rate analysis. The analysis should be based only on vehicles that have a saturation headway, which generally begins with the fourth or fifth vehicle in the queue.

How the data in a saturation flow is presented in PETRAPro is largely determined by the type of saturation flow study you did, and the other options selected in the New Count Options window.



**Figure 13-2:**  
Saturation  
Flow File

Once you have opened a Saturation Flow file in the program there are several things that can be done to edit or adjust the file. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Saturation Flow files contain four main areas of information: the Header Information, Signal Timings and Lane Information and Display Options. These are shown in the figure above.

### Signal Timings

The signal timings of each cycle are graphically represented at the top of the file. The timings can be adjusted by clicking on one of the traffic signals and dragging the mouse while you hold down the mouse button. This is usually done if an error was made during the data collection and the timings were not recorded correctly.

You can also add a signal by right-clicking in the Signal Timing bar and selecting Add Signal. This is usually done if an error was made during the data collection and a signal interval was not recorded at all during the data collection. Note that the right-click menu can also be used to ignore or delete a signal interval.

### Lane Information

Up to four lanes of traffic are displayed below the signal timings. For each lane, a green time marker represents when a vehicle crossed the stop bar during the green interval. Vehicles that are being used to calculate the saturation flow rate (usually starting with the fourth vehicle) are a lighter green. A red time marker represents when a vehicle stopped in the queue during the red interval.

Vehicle markers can be added or deleted from a lane by right-clicking on the lane. You can also use the right-click menu to select (or deselect) vehicles to be used in the saturation flow calculation, and to completely delete a lane.

**Display Options**

The Display Options field at the lower left of the screen can be used to change the time scale used in the display of data. This field can also be used to toggle the time listed for each vehicle from headway (the time, in seconds, from the previous vehicle) to accumulative (the time, in seconds, from the start of the signal interval).

Additional information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options. These functions work in much the same way as they do for turning movements files. Refer to Chapters 4 & 5 for more information.

## Interpreting Saturation Flow Reports

Saturation Flow reports are set up in a manner very similar to Turning Movement reports. Refer to Chapter 5 for more details. Reports can be produced with a number of different options either included or excluded. The following sections cover the various options that can be used. Your reports may not include all of these options but they will contain some of them.

### Individual Cycle Data

Cycle Number: 3  
Time: 9:22:43.1  
Lane Type: Normal

Lane	1	Average	Total	Phase	Timing
Arrived On Red	11	11.0	11.0	Green	34.2
Arrived on Green	6	6.0	6.0	Yellow	2.7
Volume	17	17.0	17.0	Red	108.1
Arrival Type	4	4.0	4.0	Total	145.0
Lost Time	0.9	0.9	0.9		
# For Sat Flow	7	7.0	7.0		
Sat Flow	2042	2042.0	2042.0		

Lane	Enter Intersection: Accumulative																
1	2.4	4.6	6.2	7.9	10.0	11.5	13.0	14.6	16.7	18.7	20.3	22.0	23.7	25.0	26.5	29.0	30.5

Lane	Join Queue: Accumulative								
1	41.7	47.8	50.5	59.3	66.6	70.1	93.1	96.4	100.3

Lane	Enter Intersection: Headway																
1	2.4	2.2	1.6	1.7	2.1	1.5	1.5	1.6	2.1	2.0	1.5	1.8	1.6	1.3	1.5	2.4	1.5

Lane	Join Queue: Headway								
1	41.7	6.1	2.7	8.7	7.3	3.5	23.0	3.4	3.9

**Figure 13-3:**  
Saturation  
Flow Report -  
Individual  
Cycle

If *Include Individual Cycles* has been selected in the Print Setup, the report will contain a statistical breakdown of each cycle in the study. Depending on the type of saturation flow study done, this breakdown includes:

**Arrived on Red** - the number of vehicles that arrived during the red interval.

**Arrived on Green** - the number of vehicles that arrived during the green interval.

**Volume** - the total number of vehicle that crossed the stop bar during the cycle (arrived on red and arrived on green).

**Arrival Type** - a numerical designation representing the quality of progression. There are six types:

*Type 1* - Very poor progression, with dense platoons and over 80 percent of volume arriving at the start of the red interval.

*Type 2* - Unfavorable progression, with moderately dense platoons and between 40 and 80 percent of volume arriving throughout the red interval.

*Type 3* - Random Arrivals, with highly dispersed platoons where the main platoon contains less than 40 percent of the volume.

*Type 4* - Favorable progression, with moderately dense platoons and between 40 and 80 percent of volume arriving throughout the green interval.

*Type 5* - Highly favorable progression, with dense platoons and over 80 percent of volume arriving at the start of the green interval.

*Type 6* - Exceptional Progression, with very dense platoons progressing over a number of closely spaced intersections.

**Lost Time** - The time (in seconds) that is lost while the first few vehicles in a queue start up to proceed through the intersection when the green interval begins. This value is calculated by determining the saturation headway of the cycle (the average headway of all vehicles used to calculate the saturation flow rate) then subtracting this value from the headway of the vehicles at the start of the queue that were not used to calculate the saturation flow rate.

**# for Sat Flow** - the number of vehicles used in calculating the saturation flow rate for the cycle

**Sat Flow** - the saturation flow rate calculated for the cycle. This number represents the number of vehicle that could travel through the intersection in one hour if the signal were green for the entire hour.

The breakdown is provided for each lane, along with an average for all the lanes and the total for all the lanes. The signal timing for the cycle is also provided.

If *Print Data as Headway* and/or *Print Data as Accumulative* have been selected in the Print Setup, individual vehicle data is provided for these, both when entering the intersection and when joining the queue.

**Summary Cycle Data** If *Include Overall Average Summary* has been selected in the Print Setup, the report will contain a statistical average summary of all the cycles in the study. This summary contains the same type of information provided for the Individual Cycle Data listed above.

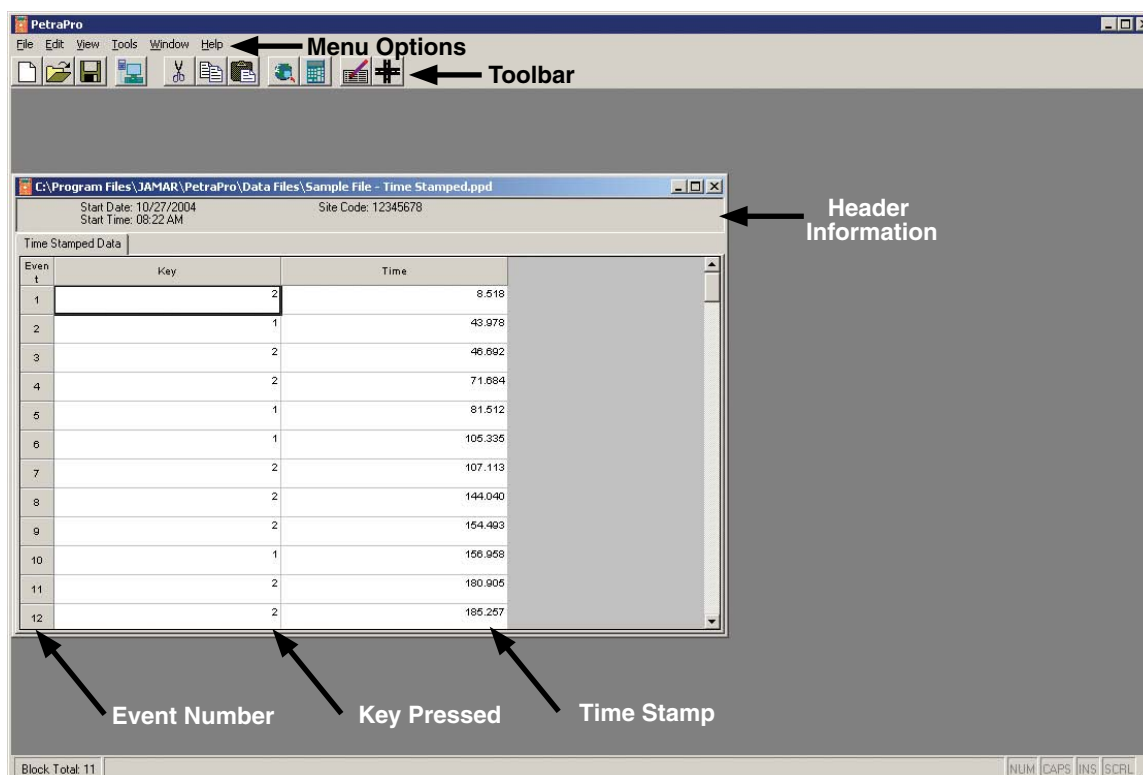


# Chapter 14



## Time-Stamped Files

## Time-Stamped Files



**Figure 14-1:**  
Time-stamped  
File

Once you have opened a Time-stamped file in the program there are several things that can be done to edit or adjust the file. Each file appears in its own window in the program; you may have more than one file open in the program at a time.

Time-Stamped files contain four main areas of information: the Header Information, Event Number, Key Pressed and Time Stamp. These are shown in the figure above.

In a time-stamped file, every key pressed during the study is listed, along with its time-stamp (to one-thousandth of a second). The times are offset from the Start Time of the data file. For example, in the figure above, the start time of the file is 8:22 AM. The time stamp of the first key pressed (2) is 8.518, meaning that the first event occurred at 8:22:08.518.

The information contained in the file can be adjusted and modified in several ways using the Toolbar and Menu Options, shown above. These functions work in much the same way as they do for turning movements files. Refer to Chapters 4 & 5 for more information.



Note that direct reports **cannot** be produced from time-stamped data. This data is designed to be exported into Excel format for independent analysis. To export the data, go to the File menu, then select Export.

# Chapter 15



# Troubleshooting

## Software Updates

For you are having any trouble using your copy of PETRAPro, the first thing we recommend you check is your version number. Updates to the program, which contain new features and bug fixes, are issued periodically and posted on our web site at [www.jamartech.com](http://www.jamartech.com). To check the version of your program, select About from the Help menu.

## Error Messages

PETRAPro is written in Visual Basic and makes use of the Windows Run Time library. Any unexpected problems that occur in the program will usually generate a Run Time Error. These errors are listed by a number, followed by a text message. Should you encounter one of these, make a note of the full error message then check the PETRAPro support web page at [www.jamartech.com/PETRAProsupport.html](http://www.jamartech.com/PETRAProsupport.html) to see if the error is a known issue.

## Submitting a Support Request

PETRAPro has a built-in form for submitting a support request. Should you encounter an error or experience a problem with the program, you can submit a support request using this form if your computer has an Internet connection.

To access this form, go to the Help menu and select Support Request. The Support Request screen will then appear. Please fill out the contact information and provide a detailed description of the problem you are having. The support form will automatically attach the most recent temporary file from your last download. It will also automatically attach the active data file you have open, so if your problem is related to a specific file, be sure to have the file open.

Once you have completed the support form, click the *Send Support Request* button and your support request will be sent to our support department.

## Frequently Asked Questions

### **Are there any known problems with running the program on certain Windows operating systems?**

No. The program should run properly on any 98 or higher Windows operating systems, including 98, NT, ME, 2000, XP and Vista.

### **My equipment won't download to the computer. What's wrong?**

With most computers, downloading your data should be fairly easy. However, if you encounter a problem, check the following items.

1. Some devices that are plugged into a serial port will not allow you to download your data properly. These are devices that require a program (called a DEVICE DRIVER) to be running in the computer at all times. These device drivers are very self-centered, and think that all the data coming into the serial port is for them. Digital cameras, Palm Pilots, scanners, power backups, mice, digitizer boards, and light pens are all devices that require these device drivers to be running. If you have to unplug a device from the serial port to plug your download cable in, or if you are using a switch box, be sure that the device does not have a driver running in memory.

2. Many computers have more than one serial port. You will need to know which serial port you are plugging the download cable into. Serial ports are designated as COMx where x is a number from 1 to 16. You will need to know this number to download the count board. Consult your computer instruction manual if you have any questions on identifying the proper port number.

3. You must correctly identify the type of port you are plugging the download cable into. The 25 and nine pin connectors used for serial (Com) ports are also used for serial or parallel printers, mice, plotters, video cards and other devices. Just because your cable fits into a connector on your computer does not mean it is a serial port. Consult your computer instruction manual if you have any questions on what ports are serial ports on your computer.

#### **My computer doesn't have a serial (com) port. What can I do?**

Older JAMAR equipment downloads to a computer's serial (COM) port. If your computer does not have a serial port, or if you have a conflict on a serial port, an alternative is to use a USB to Serial Adapter. These devices allow you to download data using a USB port as if it were a COM port. A wide variety of these devices are available, usually for less than \$30. A link to one of these devices can be found on our web site at [www.jamartech.com/hardwaresupport.htm](http://www.jamartech.com/hardwaresupport.htm).

#### **The message 'This file is already marked in use.' appears when I try to open a file. What does that mean?**

This message appears if the file being opened is already open in another window or is being accessed from a network drive and has been opened by another user. This is to warn the user that someone else may be working on the file at that moment.



*This message will also appear if the file was open when the program crashed.*

Selecting 'Yes' to continue will open the file and it can then be edited. When the file is properly closed, the message will not appear the next time that the file is opened.

You should only answer 'Yes' to continue if you know you are the only one working with the file and it was open when the program crashed. Answering 'Yes' while the file is open in another window or on another computer will result in data loss.

#### **Some of the data in my report does not fit properly and wraps to a lower line. Why?**

PETRAPro will always try to fit the information to be printed in the space available. If the program cannot fit a piece of information in the space allocated, it will subscript the portion that does not fit onto another line. To avoid this, try adjusting the size of the left and right margins to give the report more space. If printing in the portrait mode, try using the landscape mode. These changes can be made in the Page tab of the Print Setup.

70	344 0	116 4	114	4788
1.5	71.8	24.3	2.4	
0.7	33.9	11.5	1.1	47.2

**Data Subscripting**

70	3440	1164	114	4788
1.5	71.8	24.3	2.4	
0.7	33.9	11.5	1.1	47.2

**Normal Format**

You may also reduce the font size of the count data or column titles through the Format selection of the main menu.

#### **The sides of my report are being cut off. Why?**

This can occur on some printers if the margins for the report have been set to zero. To correct this, set the left and right margins to a minimum of 0.1. This can be done in the Page tab of the Print Setup.

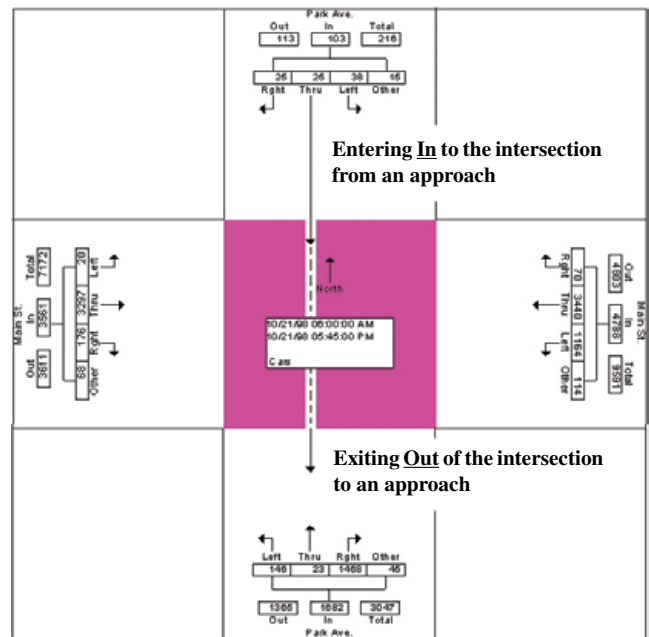


### The In and Out totals on the intersection plot appear reversed. Are they?

No. The In and Out listing of the Intersection plot are always in reference to the intersection itself.

A vehicle is considered to be going **In** to the intersection **from an approach** or travelling **Out** of the intersection **to an approach**. As a result, each vehicle is counted twice in the plot. Once as it enters **IN** to the intersection, and once as it exits **OUT** of the intersection.

In the figure to the right, the Thru total of 25 of Park Ave. southbound is counted as part of the southbound IN total, since the vehicles are entering IN to the intersection. However, the 25 is also counted as part of the OUT total (along with the eastbound Right and westbound Left) of the northbound approach since it is travelling out of the intersection to this approach.



### How do I get data into other programs?

There are several ways to transfer data from PETRAPro into other programs. The easiest way is to use the Windows Copy and Paste commands. PETRAPro supports these commands so data can be easily moved out of (or into) the program.

PETRAPro also contains an Export function that allows data to be saved in several formats, including Excel, AAP (for import into other traffic programs like Synchro) and delimited ASCII. Refer to the appendix for more information on how the export function works.



# Appendix

## Installing USB Drivers

### Installing USB Drivers

The first time you are downloading the TDC Ultra to a computer using the USB port, you will need to install the drivers for it. There are two drivers that will be installed, one right after the other. These drivers are available on the Downloads section of the JAMAR web site ([www.jamartech.com](http://www.jamartech.com)), on the installation CD for the PETRAPro software, and as part of the Windows Update feature available from Microsoft using an Internet connection.

To install the drivers, first turn the Ultra on, then connect a USB cable to your computer and then to the USB port of the Ultra.



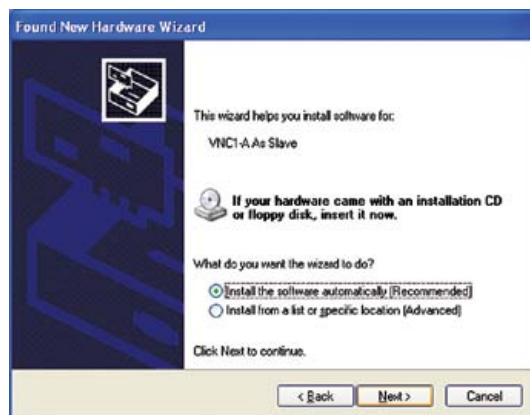
The Windows 'Found New Hardware' message will pop up, referencing USB Serial Converter, then the *Found New Hardware Wizard* will appear.



**Figure A-1:**  
Found New  
Hardware

One of the features of Windows XP and Vista is to use your Internet connection to search the Windows Update web site for any available drivers for USB devices you connect to your computer, like the TDC Ultra. If you have not used this feature before, you'll first see a screen like the one shown to the left when you first connect the Ultra.

The drivers for the Ultra are available through this feature, so if you'd like to allow the wizard to connect to the Internet, select one for the first two options and click Next.



**Figure A-2:**  
Installation  
Options

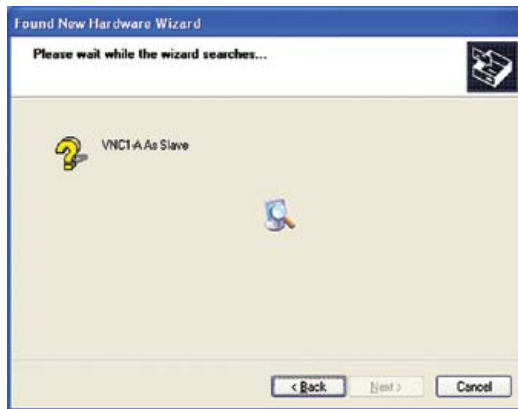
After you click Next (or if you have previously instructed Windows to always check the Windows Update web site for drivers), you'll see the screen shown to the left.

This screen is used to tell Windows where to look for the drivers it needs. We recommend using the first selection, *Install the Software Automatically*.

Note that whenever possible we recommend you use the drivers available through the Windows Update web site as this is the easiest method for loading the drivers. However, if you are not able to use the

Windows Update web site, the drivers are also available on the Downloads section of the JAMAR web site and PETRAPro installation CDs for versions later than 1.5.0. If you are downloading the drivers from the JAMAR web site, be sure to follow the directions listed there. If you would like to use the drivers on the PETRAPro CD, insert the CD into your drive.

**Figure A-3:**  
Searching for  
Driver



Once you are ready to proceed, click Next. The Wizard will then start searching for the best available drivers and you'll see a screen like the one shown to the left.

**Figure A-4:**  
Installing  
Driver



Once the wizard is finished searching, it will begin to load the driver it has found and you'll see a screen like the one shown to the left.

Note that if the Wizard finds more than one driver (like if you are using Windows Update and also have a PETRAPro CD in your drive), the Wizard will list all the available drivers. You can then select the one you'd like and then proceed.

**Figure A-5:**  
Finished  
Install



When the driver is finished installing you'll see a screen like the one shown to the left.

Click Finish and you'll complete installing this driver, but there's still one more to go.

**Figure A-6:**  
Found New  
Hardware



Once you click Finish, the Windows 'Found New Hardware' message will pop up again, referencing a USB Serial Port, and the *Found New Hardware Wizard* will reappear. Don't be alarmed, this is what's supposed to happen. There is a second driver that needs to be installed to create a virtual comm port.

To install this second driver, follow the same steps as the first.



**Figure A-7:**  
Installation  
Process

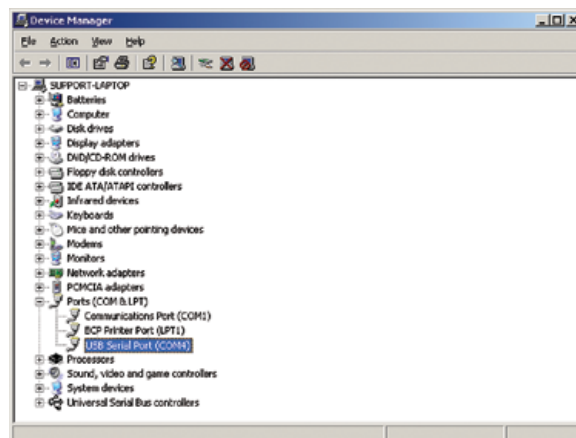
Once the second driver is installed, you may see a message like the one below, prompting you to restart your computer.



**Figure A-8:**  
Reboot  
Computer

Restart your computer to complete the process of installing the drivers.

The process of installing the USB drivers has created a virtual comm port on your computer and assigned this port a number from 1 to 16. You will need to select this comm port number in PETRAPro when you go to download your Ultra. PETRAPro makes this easier to do by only listing the comm ports that are available in the download screen. However, if you want to check to see what port number the virtual comm port has been assigned, you can do so through the computer's Device Manager list.



**Figure A-9:**  
Port  
Listings

To access this information, right-click on the My Computer icon then select Properties. In the System Properties window, click on the Hardware Tab, then click the Device Manager button. Click the plus sign (+) next to Ports and you should see a list similar to the one shown below, showing the port number that your computer has assigned.



## Downloading Using a Serial Port

Older JAMAR data collectors (TDC-12, TDC-8, DB-400, DB-100) download using a serial port. To download these units, you will need to have a JAMAR universal cable and an open serial port on your computer.

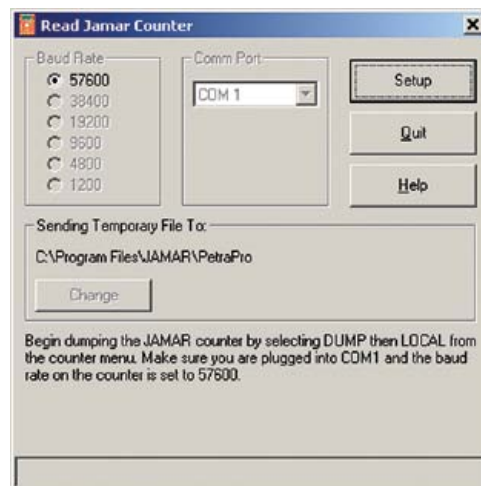
If your computer does not have a serial port, or if you have a conflict on a serial port, an alternative is to use a USB to Serial Adapter. These devices allow you to download data using a USB port as if it were a serial port. A wide variety of these devices are available, usually for less than \$40. More information on these devices can be found on our web site at [www.jamartech.com/H06000.html](http://www.jamartech.com/H06000.html).

Note that only a JAMAR Universal Cable (or cable with matching pin configuration) should be used for downloading data. The data collectors and universal cable use just three pins (2, 3 & 5) for the data transfer. However, some of the other pins on the data collector's serial port are left open for other functions. The universal cable blocks these other pins so no extraneous voltage can be sent from the computer to the data collector. If you use a generic serial cable (which has all nine pins connected) it is possible that the computer could send out incompatible voltage to the data collector that could damage it or cause your data to be lost or corrupted.

To begin the download process, turn the data collector on. (If you are still in data collection mode, turn the unit off, then back on. Turning the unit off ends the study and stores it in memory. You cannot download data while you are in data collection mode.) Connect the universal cable to a serial port on your computer. The ports are often labeled on the computer. If you are not sure what port you are plugging into, consult your computer manual.



**Figure A-10:**  
Read JAMAR  
Counter



Once the cable is plugged into the computer, plug the other end into the port on the data collector then click on the *Read* button of the Main screen and the **Read JAMAR Counter** screen will appear. You can also access this screen by going to the File menu, selecting Acquire, and choosing JAMAR.

The baud rate setting determines how fast the data will be transferred into the program and it must match the baud rate set on the data collector. Click the *Setup* button and set the baud rate in PETRAPro to match what you have selected in your data collector. Once this is set, select the com port into which you have connected the universal cable.

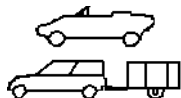
After making these adjustments, click on the *Begin* button and you will see a message prompting you to begin downloading the data collector. To do this, press the TAB key on the data collector until *Dump* is flashing, then press the DO key. *Local* should then be flashing. Check the bottom two lines of the display to see what the baud rate is set to. If it matches what you set in the software, hit DO. If it does not match, tab to Baud and set it accordingly, then go back to Local and hit DO. You should then see *Begin* flashing. Press DO and the download will begin.

When the download is occurring you should see a status bar moving across the bottom of the Read JAMAR Counter screen. Once the download is complete separate windows should appear for every study contained in the data collector. Each file should then be saved with a permanent file name you provide.

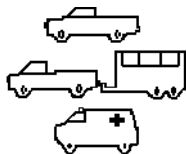
# Federal Highway Administration Scheme F



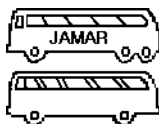
**Class 1 - Motorcycles.** This class includes all two- or three-wheeled motorized vehicles. These vehicles typically have a saddle-type of seat and are steered by handlebars rather than a steering wheel. This includes motorcycles, motor scooters, mopeds, motor-powered bicycles and three-wheel motorcycles.



**Class 2 - Passenger cars.** This class includes all sedans, coupes and station wagons manufactured primarily for the purpose of carrying passengers, including those pulling recreational or other light trailers.



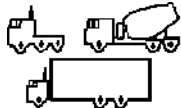
**Class 3 - Pickups, Vans and other 2-axle, 4-tire Single Unit Vehicles.** This class includes all two-axle, four tire vehicles other than passenger cars, which includes pickups, vans, campers, small motor homes, ambulances, minibuses and carryalls. These types of vehicles which are pulling recreational or other light trailers are included.



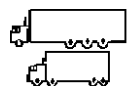
**Class 4 - Buses.** This class includes all vehicles manufactured as traditional passenger-carrying buses with two axles and six tires or three or more axles. This includes only traditional buses, including school and transit buses, functioning as passenger-carrying vehicles. All two-axle, four tire minibuses should be classified as Class 3. Modified buses should be considered to be trucks and classified appropriately.



**Class 5 - Two-Axle, Six-Tire Single Unit Trucks.** This class includes all vehicles on a *single frame* which have *two axles and dual rear tires*. This includes trucks, camping and recreation vehicles, motor homes, etc.



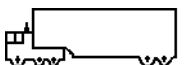
**Class 6 - Three-Axle Single Unit Trucks.** This class includes all vehicles on a *single frame* which have *three axles*. This includes trucks, camping and recreation vehicles, motor homes, etc.



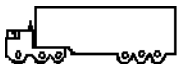
**Class 7 - Four or More Axle Single Unit Trucks.** This class includes all vehicles on a *single frame* with *four or more axles*.



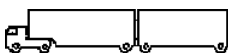
**Class 8 - Four or Less Axle Single Trailer Trucks.** This class includes all vehicles with *four or less axles* consisting of *two units*, in which the pulling unit is a tractor or single unit truck.



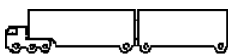
**Class 9 - Five-Axle Single Trailer Trucks.** This class includes all *five-axle* vehicles consisting of *two units* in which the pulling unit is a tractor or single unit truck.



**Class 10 - Six or More Axle Single Trailer Trucks.** This class includes all vehicles with *six or more axles* consisting of *two units* in which the pulling unit is a tractor or single unit truck.



**Class 11 - Five or Less Axle Multi-Trailer Trucks.** This class includes all vehicles with *five or less axles* consisting of *three or more units* in which the pulling unit is a tractor or single unit truck.



**Class 12 - Six-Axle Multi-Trailer Trucks.** This class includes all *six-axle* vehicles consisting of *three or more units* in which the pulling unit is a tractor or single unit truck.

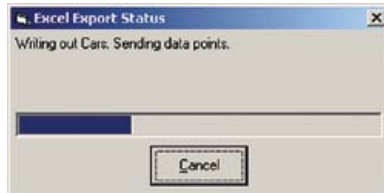


**Class 13 - Seven or More Axle Multi-Trailer Trucks.** This class includes all vehicles with *seven or more axles* consisting of *three or more units* in which the pulling unit is a tractor or single unit truck.

## Export Options

PETRAPro includes an Export function that allows data to be saved in a variety of formats. To export your data, open a data file then go to the **File** menu and select **Export**. Select the format you want to use from the list of options and you will then be prompted to supply a file name for the exported data. Once a file name is supplied, additional information may be required depending on the format option you have selected. The options are:

**Figure A-11:**  
Excel  
Export



**Excel (.xls)** – This option allows you to save the data in an Excel spreadsheet. After you provide a file name, PETRAPro will begin to write the file out to Excel. Note that you must have Excel already installed on your computer for this export to work.

**Figure A-12:**  
AAP Export  
Options



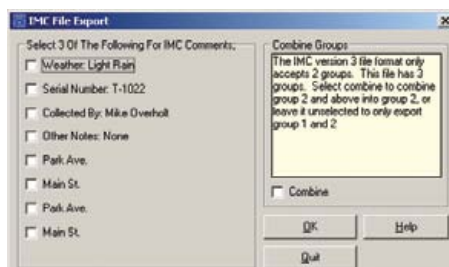
**AAP (\*.vol)** – This will save the data in an AAP format, which was an early standard for traffic analysis software programs. This format can be used to transfer data into programs like Synchro. When exporting to this format you are given the option of selecting the groups to export. A four digit reference number is used when naming the file and you may also assign an optional line of text.

**Figure A-13:**  
ASCII Export  
Options



**ASCII (\*.txt)** – This will save the data in a delimited text format. When exporting to this format you are given the option of exporting just the first group, or all groups. You are also given the option of selecting the delimiter (the character used to separate data points) for the file. The options are tab, comma, semicolon, space or user defined.

**Figure A-14:**  
IMC Export  
Options



**IMC v3 (\*.dfl)** – This will save the data in the format of the IMC program, which was the original software for use with JAMAR hand-held data collectors in the 1980s. The IMC file format only allows three lines of comments, so you are given the option of selecting the comments you want to use. This file format also only uses two groups of data, so you are given the option of combining groups.

## Statistical Calculations

### Peak Hour Factor (PHF)

The Peak Hour Factor (PHF) is used to indicate how evenly the rate of flow of traffic is during the peak hour. For 15 minute intervals the equation for determining the PHF is:

$$PHF = \frac{V}{4 \times V_{15}}$$

Where V equals hourly volume (vehicles per hour) and  $V_{15}$  equals the maximum 15 minute volume within the hour.

The maximum value a PHF could be is 1.000, which would occur if the volumes in each 15 minute interval of the peak hour were equal. This is shown in the example to the left. The minimum value a PHF could be is 0.250, which would occur if the total volume for the peak hour occurred in only one interval. This is shown in the example to the right.

Time	Volume
8:00	25
8:15	25
8:30	25
8:45	25

$$\frac{100}{4 \times 25} = 1.000$$

**Maximum Possible PHF**

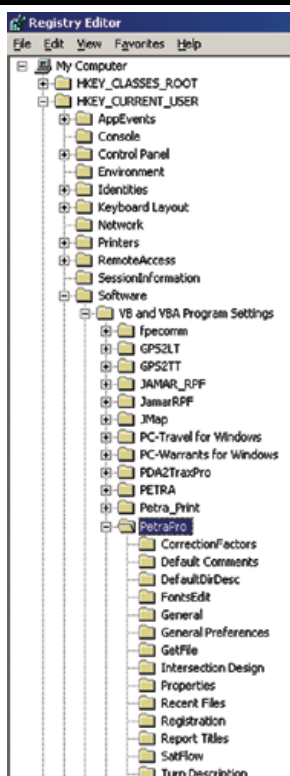
Time	Volume
8:00	0
8:15	0
8:30	100
8:45	0

$$\frac{100}{4 \times 100} = 0.250$$

**Minimum Possible PHF**

Typically the PHF will fall into a range of 0.700 to 0.980. The lower the value, the higher the degree of variation in volumes during the peak hour.

## Registry Entry



**Figure A-15:**  
Registry  
Entry

PETRAPro creates an entry in the Windows Registry when it is installed. This entry contains the default settings that are configured for the program, and can be reviewed or edited if an error is encountered in using the program.

**WARNING: Incorrect changes to the Windows Registry may cause your computer to stop operating correctly. Only use this function if you are sure of what you are doing.**

The registry entry for PETRAPro can be located at:

**HKEY\_CURRENT\_USER**  
**Software**  
**VB and VBA Program Settings**  
**PETRAPro**

## Data Formats

The data that is read by PETRAPro from a JAMAR hand-held data collector is in standard ASCII (text) format. In PETRAPro, the temporary file **JAMAR.jcd** is created every time a data collector is downloaded. This file contains all the data that was output from the data collector. The program then uses this file to create the various data files you work with in the program, which are in a binary format. If an error occurs during this process, the JAMAR.jcd file can be reviewed using any program that will read text files, such as Windows WordPad. The general format of the data of each of the supported studies is as follows:

**Standard Turning Movement, Roundabout Movement, Gap, Signalized Intersection Delay:**

varies*	leader characters (20)
001	count number
001	interval number
01	interval length (min)
nnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAAA	(20 characters)
hhmm	start time
mmddyy	start date
nnnn,nnnn,...nnnn	data, 10 per line
...	
ccc	checksum

[illegible]

## Enhanced Turning Movement

AAAAAAAAAAAAAAAAAAAA	leader characters (20)
001	count number
001	interval number (always = 001)
nnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAA	(20 characters)
hhmm	start time
mmddyy	start date
ss cc (or ss ttt)	data, 2 per line
...	

```

ss = switch number (01-16)
cc = class number (01-014)
or
ss = 00 for time marker (1 every 60 seconds)
ttt = checksum for all data since last time marker

```

### Stop Sign Delay, Saturation Flow and Time-Stamp

varies*	leader characters (20)
001	count number
001	interval number
nnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAA	(20 characters)
hhmm	start time
mmddyy	start date
ss tttt	data, 2 per line
...	

ss = switch number (01-16, but not all switches are used)  
 ttt = # of timer ticks since last time marker (0001-2048)  
 1 tick = 15.6 msec

or  
ss = 00 for time marker (1 every 30 seconds)  
tttt = checksum for all data since last time marker

\* The twenty leader characters vary depending on the study

<<<<<<<<<<<<<<<<<<<<	Stop Sign Delay
+++++	Saturation Flow
RRRRRRRRRRRRRRRRRR	Time-Stamp

**Classification:**

#####	leader characters (20)
001	count number
001	interval number
01	interval length (min)
nnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAAA	(20 characters)
s	scheme code
kk	number of classes
hhmm	start time
mmddyy	start date
nnnn,nnnn,...nnnn	data, 10 per line
...	
ccc	checksum

**Spot Speed:**

!!!!!!!!!!!!!!!!!!!!	leader characters (20)
001	count number
001	interval number
01	interval length (min)
nnnnnnnnn	8 digit site code
AAAAAAAAAAAAAAAAAAAA	Alpha site code
AAAAAAAAAAAAAAAAAAAA	(20 characters)
hhmm	start time
mmddyy	start date
nn	MPH speed data, 1 per line
...	
ccc	checksum

<b>Notes:</b> <ul style="list-style-type: none"><li>• Checksum is mod 256 of all characters in interval</li><li>• All lines are followed by CR, LF characters</li><li>• Last line of data followed by 20 colons “:” (end of data character)</li></ul>
---

- |   |
|---|
| <b>Notes:</b> <ul style="list-style-type: none"><li>• Checksum is mod 256 of all characters in interval</li><li>• All lines are followed by CR, LF characters</li><li>• Last line of data followed by 20 colons “:”<br/>(end of data character)</li></ul> |
|---|

